Texas Commission on Environmental Quality

Waste Permits Division Correspondence Cover Sheet

Date: 11/21/2022
Facility Name: Sandow Steam Electric Station
Permit or Registration No.: CCR111

Nature of Correspondence:
☐ Initial/New
☒ Response/Revision to TCEQ Tracking No.: 27247239 (from subject line of TCEQ letter regarding initial submission)

Affix this cover sheet to the front of your submission to the Waste Permits Division. Check appropriate box for type of correspondence. Contact WPD at (512) 239-2335 if you have questions regarding this form.

Table 1 - Municipal Solid Waste Correspondence

Applications	Reports and Notifications
☐ New Notice of Intent	☐ Alternative Daily Cover Report
☐ Notice of Intent Revision	☐ Closure Report
☐ New Permit (including Subchapter T)	☐ Compost Report
☐ New Registration (including Subchapter T)	☐ Groundwater Alternate Source Demonstration
☐ Major Amendment	☐ Groundwater Corrective Action
☐ Minor Amendment	☐ Groundwater Monitoring Report
☐ Limited Scope Major Amendment	☐ Groundwater Background Evaluation
☐ Notice Modification	☐ Landfill Gas Corrective Action
☐ Non-Notice Modification	☐ Landfill Gas Monitoring
☐ Transfer/Name Change Modification	☐ Liner Evaluation Report
☐ Temporary Authorization	☐ Soil Boring Plan
☐ Voluntary Revocation	☐ Special Waste Request
☐ Subchapter T Disturbance Non-Enclosed Structure	☐ Other:
☐ Other:	

Table 2 - Industrial & Hazardous Waste Correspondence

Applications	Reports and Responses
☐ New	☐ Annual/Biennial Site Activity Report
☐ Renewal	☐ CPT Plan/Result
☐ Post-Closure Order	☐ Closure Certification/Report
☐ Major Amendment	☐ Construction Certification/Report
☐ Minor Amendment	☐ CPT Plan/Result
☒ CCR Registration	☐ Extension Request
☐ CCR Registration Major Amendment	☐ Groundwater Monitoring Report
☐ CCR Registration Minor Amendment	☐ Interim Status Change
☐ Class 3 Modification	☐ Interim Status Closure Plan
☐ Class 2 Modification	☐ Soil Core Monitoring Report
☐ Class 1 ED Modification	☐ Treatability Study
☐ Class 1 Modification	☐ Trial Burn Plan/Result
☐ Endorsement	☐ Unsaturated Zone Monitoring Report
☐ Temporary Authorization	☐ Waste Minimization Report
☐ Voluntary Revocation	☐ Other:
☐ 335.6 Notification	
☐ Other:	

Luminant

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Delivered Electronically via IHWPER@tceq.texas.gov

November 21, 2022

Texas Commission on Environmental Quality
Industrial and Hazardous Waste Permits Section - MC-130
12100 Park 35 Circle
Austin, TX 78753

RE: Response to Email NOD New Registration No. CCR111
Luminant Generation Company LLC – Rockdale, Milam County
Industrial Solid Waste Registration No. 88209
EPA Identification No. TXR000078075
Tracking No. 27247239; RN102147881/CN603256413

Luminant Generation Company LLC has prepared written responses for the deficiencies identified in the "Email NOD - New Registration – Luminant Generation Company LLC – Registration No. CCR111" received via email from TCEQ on September 22, 2022. The written responses are in Table 1. Updated application and appendix revisions are attached for review.

If you have any questions or require any additional information, please contact Eric Chavers at 903-389-6062 or by e-mail at eric.chavers@luminant.com.

Sincerely,

Renee Collins

Attachments: CCR111 Application-Revision 2
CCR111 Application Revision 2 REDLINE
APPENDIX E-Revision 1
APPENDIX F-Revision 1
APPENDIX G-Revision 1

cc with attachments:

Pradeep Patel (pradeep.patel@tceq.texas.gov)
Daniella Ortiz de Montellano (daniela.ortiz-demontellano@tceq.texas.gov)

Table 1 - NOD Summary and Response
Registration No. CCR111 - Luminant Generation Company LLC
Application Deficiencies - Technical NOD 2

ID[1]	App. Section	App. Sub Section	Location[2]	Citation	Deficiency Description/Resolution	Response
1	IV	Table IV.D	Table IV.D	40 CFR 257.84	Revise to indicate that weekly inspection items will be conducted at intervals not exceeding 7 days.	Table IV.D. has been revised to contain the following language: "Weekly inspections are performed at intervals not exceeding seven days per 40 CFR 257.84(a)."
2	VI	VI.27.B	[GW Monitoring]	30 TAC 352.911(a); 40 CFR 257.91(b)	Provide groundwater flow direction on the potentiometric surface contour maps in the Groundwater Monitoring Report 2021.	The "2021 Annual Groundwater Monitoring and Corrective Action Report-Revision 1" includes potentiometric surface contour maps that indicate flow direction. The revised report is in APPENDIX E. In the report see Attachment 2, Figures A-1 and A-2.
3	VI	VI.27.D	[GW Monitoring System Certification]	30 TAC 352.911; 40 CFR 257.91(b)(1)(2)	Provide the local geological hydrological position of uppermost aquifer in the CCR Landfill site and up dip and down dip areas.	Additional information on the local geology/hydrogeology as requested by TCEQ in our meeting October 28, 2022, can be found in the "Groundwater Monitoring System Certification Addendum No. 1" located in APPENDIX E.
4	VI	VI.27.D	[GW Monitoring]	30 TAC 352.231(d), 352.4; 40 CFR 257.91(b)	Provide a geologic cross-section for the landfill and adjacent area that shows the screen zone as part of the uppermost aquifer.	Geologic cross-sections for the landfill and adjacent area as requested can be found in the "Groundwater Monitoring System Certification Addendum No. 1" located in APPENDIX E. See Figures, 2, 3, and 4.
5	VI	VI.29.C	[GW Monitoring]	30 TAC 352.941(c); 40 CFR 257.94(e)	Explain how SSI sources are not originated from the AX Landfill in the Alternate Source Demonstration Summaries of March 2021 and 2022.	Further discussion of SSI sources can be found in Section 3.0 of the "2021 Annual Groundwater Monitoring and Corrective Action Report-Revision 1". The revised report is in APPENDIX E.
6	VI	VI.29	[2021 Annual Groundwater Monitoring and Corrective	30 TAC §352.931; 40 CFR 257.90(e), 257.93	Provide analytical data for the 2021 Groundwater Monitoring and Corrective Action Report.	The "2021 Annual Groundwater Monitoring and Corrective Action Report-Revision 1" includes groundwater monitoring analytical data. The revised report is in APPENDIX E. In the report see Attachment 3.
7	VI	VI.29	Table VI.C-1	Application Instructions 40 CFR 257.94 Appendix III	Add and complete attached "Table VI.C-1 – Groundwater Detection Monitoring Parameters.", if applicable. This table was inadvertently omitted in the application form.	Table VI.C-1. has been updated and inserted in application.
8	VI	VI.30.H	Table VI.D-2	Application Instructions	Replace title of "Table VI.D.2 – Groundwater Detection Monitoring Parameters" with "Table VI.D-2 – Groundwater Assessment Monitoring Parameters" and complete if applicable.	Not applicable since unit is currently in detection monitoring.
9	VII	VII.31 – Appendix F	(Appendix C (Page 3040)	30 TAC Subchapter K; 40 CFR 257.102, 40 CFR 257.102(b), 257.102(d)(1)(iii)(d)(1)(iii)	a. Include a Texas Licensed Professional Engineer (P.E.) signature and seal for the 2016 slope stability analysis (Appendix C). b. Provide the slope stability analysis using the available site-specific geotechnical data instead of generally accepted assumptions.	"Closure Plan-Addendum No. 1" for AX Landfill includes the original 2016 signed and sealed slope stability analysis. Also included in the addendum is confirmation that the Slope Stablitiy Model will be updated using site-specific geotechnical data during final closure. The revised plan is located in APPENDIX F.

10	VII	VII.32	Appendix G	30 TAC 352.131(a) and (b), 352.1101	a. Revise Post Closure Cost Estimate to be based in current dollars (2021 dollars) and include the year in terms of dollars that the estimate was made. b. Remove any post-closure plan and cost estimate information that is not applicable to this facility.	A) The "Post Closure Care Cost Estimate" located in APPENDIX G is based on 2021 dollars as noted in Table 1. B) The "Post Closure Care Cost Estimate" located in APPENDIX G has been updated to only include the Sandow facility.
11	VIII	VIII.34	VIII.34	30 TAC 352.1101	Provide a statement that a Financial Assurance mechanism will be provided within 90 days if a registration is issued. For assistance, contact Mr. Mark Stoebner, Financial Analyst at mark.stoebner@tceq.texas.gov.	Acceptable financial assurance mechanism per 30 TAC 352.1101 will be provided no more than 90 days after the executive director's approval of the registration. This statement has also been added under Section VIII.34 in the application document.

[1] Deficiency ID – Key: Use this numbered ID to identify the NOD response.
[2] Location of deficiency in submittal/application. Items in square brackets [ ] refer to applicant's supplemental information submitted as attachments/appendices to the application form.

Texas Commission on Environmental Quality

Registration Application for Coal Combustion Residuals (CCR) Waste Management

I. General Information

1. Reason for Submittal

Type of Registration Application

☐ New ☐ Major Amendment ☐ Minor Amendment

☒ Notice of Deficiency (NOD) Response ☐ Transfer ☐ Name Change

☐ Other

2. Application Fees

☒ $150 Application Fee

Payment Method

☐ Check ☒ Online through ePay portal <www3.tceq.texas.gov/epay/>

If paid online, enter ePay Trace Number: 582EA000467498

3. Facility Information

Facility information must match regulated entity information on the Core Data Form.

Applicant: ☐ Owner ☐ Operator ☒ Owner/Operator

Facility TCEQ Solid Waste Registration No: 88209

Facility EPA ID: TXR000078075

Regulated Entity Reference No. (if issued): RN102147881

Facility Name: SANDOW STEAM ELECTRIC STATION

Facility (Area Code) Telephone Number: 214-875-8338

Facility physical street address (city, state, zip code, county): 3708A CHARLES MARTIN HALL ROAD, ROCKDALE, TX, 76577, MILAM

Facility mailing address (city, state, zip code, county): 6555 SIERRA DR, IRVING, TX 75039, DALLAS

Latitude (Degrees, Minutes Seconds): 30° 33′ 51″

Longitude (Degrees, Minutes Seconds): 97° 03′ 50″

4. Publicly Accessible Website

Provide the URL address of a publicly accessible website where the owner or operator of a CCR unit will post information.
https://www.luminant.com/ccr/

5. Facility Landowner(s) Information

Facility landowner(s) name: LUMINANT GENERATION COMPANY LLC

Facility landowner mailing address: 6555 SIERRA DR

City: IRVING State: TX Zip Code: 75039

(Area Code) Telephone Number: 214-875-8338

Email Address (optional):

6. CCR Waste Management Unit(s)

☒ Landfill Unit(s) ☐ Surface Impoundment(s)

For each existing landfill, new landfill and lateral expansion, existing surface impoundment, and new surface impoundment and lateral expansion(s) provide information on type of waste, the registered unit(s) in which they are managed, and sampling and analytical methods.

Submit the following tables:

Table I.6. – CCR Waste Management Units;

Table I.6.A. – Waste Management Information;

Table I.6.B. – Waste Managed in Registered Units; and

Table I.6.C. – Sampling and Analytical Methods.

7. Description of Proposed Activities or Changes to Existing Facility

Provide a brief description of the proposed activities if application is for a new facility, or the proposed changes to an existing facility or registration conditions, if the application is for an amendment.

Luminant Generation Company LLC formerly operated the Sandow Steam Electric Station (SASES) located approximately 7 miles southwest of Rockdale in Milam County, Texas. SASES was a lignite-fired electric generation facility retired in 2018. Coal Combustion Residuals (CCR) including fly ash and bed ash were generated as part of the unit's operation.

AX Landfill is the primary disposal facility for CCR generated at SASES and is located approximately 7,500 feet south of SASES. AX Landfill is listed on the Notice of Registration (SWR 88209) for SASES as Waste Management Unit 008 and is regulated as a Class 2 non-hazardous industrial solid waste landfill under 30 TAC §335.

8. Primary Contact Information

Contact Name: Renee Collins Title: Sr. Director, Environmental Services

Contact mailing address: 6555 Sierra Drive
City: Irving County: Dallas State: Texas Zip Code: 75039
(Area Code) Telephone Number: 214-875-8338

Email Address (optional): renee.collins@luminant.com

9. Notice Publishing

Party responsible for publishing notice:
☒ Applicant ☐ Consultant ☐ Agent in Service

Contact Name: Renee Collins Title: Sr. Director, Environmental Services

Contact mailing address: 6555 Sierra Drive
City: Irving County: Dallas State: Texas Zip Code: 75039
(Area Code) Telephone Number: 214-875-8338

10. Alternative Language Notice

Is an alternative language notice required for this application? For determination, refer to Alternative Language Checklist on the Public Notice Verification Form (TCEQ-20244-Waste-NORI).

☐ Yes ☒ No

11. Public Place Location of Application

Name of the Public Place: Lucy Hill Patterson Memorial Library
Physical Address: 201 Ackerman St
City: Rockdale County: MILAM State: TX Zip Code: 76567
(Area code) Telephone Number: 512-446-3410

12. Ownership Status of the Facility

☐ Corporation ☐ Limited Partnership
☐ Sole Proprietorship ☐ General Partnership ☒ Other (specify): Limited Liability Company

Does the Site Owner (Permittee/Registrant) own all the CCR units and all the facility property?

☒ Yes ☐ No

13. Property / Legal Description Information

Provide a legal description and supporting documents of the property where the management of CCR waste will occur; including a survey plat and a boundary metes and bounds description (30 TAC §352.231(g)).

Submit the following documents:

a. Property Legal Description
b. Property Metes and Bounds Description
c. Metes and Bounds Drawings
d. On-Site Easements Drawings

See APPENDIX A for Property/Legal Description Information and Property Owner Affidavit.

14. Operator Information

Identify the entity who will conduct facility operations, if the owner and operator are not the same.

Operator Name: LUMINANT GENERATION COMPANY LLC

Operator mailing address: 6555 Sierra Drive

City: Irving State: TX Zip Code: 75039

(Area Code) Telephone Number: 214-875-8338

Email Address (optional):

15. Confidential Documents

Does the application contain confidential documents?

☐ Yes ☒ No

If "Yes", cross-reference the confidential documents throughout the application and submit as a separate attachment in a binder clearly marked "CONFIDENTIAL."

16. Permits and Construction Approvals

Permit or Approval	Received	Pending	Not Applicable
Hazardous Waste Management Program under the Texas Solid Waste Disposal Act	☒	☐	☐
Underground Injection Control Program under the Texas Injection Well Act	☐	☐	☒
National Pollutant Discharge Elimination System Program under the Clean Water Act and Waste Discharge Program under Texas Water Code, Chapter 26	☐	☐	☒
Prevention of Significant Deterioration Program under the Federal Clean Air Act (FCAA).	☐	☐	☒
National Emission Standards for Hazardous Air Pollutants Preconstruction Approval under the FCAA	☐	☐	☒
Other (describe):	☐	☐	☐

17. Legal Authority

The owner and operator of the facility shall submit verification of their legal status with the application. This shall be a one-page certificate of incorporation issued by the secretary of state. The owner or operator shall list all persons having over a 20% ownership in the facility.

See APPENDIX A for Certificate of Authority.

18. TCEQ Core Data Form

The TCEQ requires that a Core Data Form (TCEQ-10400) be submitted on all incoming applications, unless a Regulated Entity and Customer Reference Number has been issued by the TCEQ and no core data information has changed. For more information regarding the Core Data Form, call (512) 239-5175 or visit the TCEQ Website.

See APPENDIX A for TCEQ Core Data Form.

19. Other Governmental Entities Information

Coastal Management Program

Is the facility within the Coastal Management Program boundary?

☐ Yes ☒ No

Local Government Jurisdiction (If Applicable)
Within City Limits of: N/A
Within Extraterritorial Jurisdiction of: N/A

Is the facility located in an area in which the governing body of the municipality or county has prohibited the storage, processing or disposal of municipal or industrial solid waste?

☐ Yes ☒ No If "Yes", provide a copy of the ordinance or order as an attachment.

20. Attachments

Does the application include the following?

General Maps	☒ Yes	☐ No
General Topographic Map	☒ Yes	☐ No
Facility Layout Map	☒ Yes	☐ No
Surrounding Features Map	☒ Yes	☐ No
Process Flow Diagram	☒ Yes	☐ No
Land Ownership Map	☒ Yes	☐ No
Land Ownership List	☒ Yes	☐ No
Pre-printed Mailing Labels	☒ Yes	☐ No

Maps and drawings shall be legible and easily readable by eye without magnification. Scales and paper size shall be chosen based on the type of map submitted, the land area covered, and the amount of detail to be shown. See instructions for details regarding maps and drawings to be submitted in application.

See APPENDIX A for Attachments detailed in Item 20.

21. Verification of Compliance

Does the owner and operator verify that the design, construction, and operation of CCR landfill(s) and surface impoundment(s) meets the requirements of 30 TAC §352.231(f) (30 TAC §352.2; 40 CFR §257.52, and 40 CFR §§257.3-1 – 257.3-3).

☒ Yes ☐ No

As requested by TCEQ, please see the "Response to TCEQ CCR Unit Registration Comments" memorandum for AX Landfill provided by Golder in APPENDIX A.

II. Location Restrictions and Geology

See Instructions and Technical Guidance

22. Location Restrictions

Submit certifications and technical reports demonstrating compliance of CCR unit(s) with applicable location restrictions (30 TAC 352, Subchapter E) and comply with 30 TAC §352.231(d) and 30 TAC §352.4 for submission of engineering and geoscientific information.

A. **Placement above the uppermost aquifer** (30 TAC §352.601) (40 CFR §257.60). For those CCR units whose base is less than five feet above the upper limit of the uppermost aquifer, please submit a copy of the demonstration showing evidence of compliance with 40 CFR §257.60(a) – (c).

B. **Wetlands** (30 TAC §352.611) (40 CFR §257.61). For CCR units located in wetlands, please submit a copy of the demonstration showing evidence of compliance with 40 CFR §257.61(a) – (c).

C. **Fault areas** (30 TAC §352.621) (40 CFR §257.62). For CCR units located within 200 feet of the outermost damage zone of a fault, please submit a copy of the demonstration showing evidence of compliance with 40 CFR §257.62(a) – (c).

D. **Seismic impact zones** (30 TAC §352.631) (40 CFR §257.63). For CCR units located in a seismic impact zone, please submit a copy of the demonstration showing evidence of compliance with 40 CFR §257.63(a) – (c).

E. **Unstable areas** (30 TAC §352.641) (40 CFR §257.64). For CCR units located in unstable areas, please submit a copy of the demonstration showing evidence of compliance with 40 CFR §257.64(a) – (d).

Location Restriction Demonstration and Location Restriction Evaluation for AX Landfill located in APPENDIX B.

23. Geology Summary Report

Submit a summary of the geologic conditions at the facility, including the relation of the geologic condition to each CCR unit. The summary must include enough information and data and include sources and references for the information. Include all groundwater monitoring data required by 40 CFR Part 257, Subpart D, (30 TAC §352.241, §352.601, §352.621, §352.631, and §352.641) and submitted in accordance of 30 TAC §352.4.

Note: Previously prepared documents may be submitted but must be supplemented or updated as necessary to provide the requested information (30 TAC §352.241(b)).

For Geology Summary, please refer to "Groundwater Monitoring System Certification" report for AX Landfill located in APPENDIX E. The Local Geology and Hydrogeology summary is located in Section 2.2 of the report.

All groundwater monitoring data is summarized in the "2020 Annual Groundwater Monitoring and Corrective Action Report" for AX Landfill located in APPENDIX E.

III. Fugitive Dust Control Plan

24. Fugitive Dust Control Plan

A. **Submit a copy of the CCR Fugitive Dust Control Plan** (30 TAC §352.801) (40 CFR §257.80(b)), or the most recently amended plan. The initial plan or subsequent amended plan must be certified by a qualified Texas licensed professional engineer (Texas P.E.) that the plan meets the requirements of 30 TAC Chapter 352.

B. **Submit the most recent Annual CCR Fugitive Dust Control Report** (30 TAC §352.801) (40 CFR §257.80(c)) and include the report information.

CCR Fugitive Dust Control Plan and the 2021 Annual CCR Fugitive Dust Control Report located in APPENDIX C.

IV. Landfill Criteria

See Instructions and Technical Guidance – No. 30 Coal Combustion Residuals Landfill

25. Landfill(s) for CCR Waste

Provide the following information below if there is a landfill; if there is more than one landfill, separate information is required for each landfill.

A. **Landfill Characteristics**

Describe the design, installation, construction, and operation of the landfill and submit a completed Table IV.A. – Landfill Characteristics.

AX Landfill Cells 1, 2 and 2A are lined landfill cells. Construction of Cell 1 was completed in July 2013 and construction of Cells 2 and 2A was initiated in May 2015. Cell 2 was completed in October 2015 and Cell 2A was completed in July 2016. Placement of CCR began in Cell 1 in May 2015 and Cell 2 in September 2016. CCRs have not been placed to date in Cell 2A.

The AX Landfill is constructed partially above and partially below grade and are surrounded by engineered earthen embankments that extend approximately 10 to 15 feet above surrounding grade. Smaller interior earthen embankments separate Cells 1, 2 and 2A from each other. A geosynthetic liner system, consisting of a 30-mil thick Geomembrane Supported Geosynthetic Clay Liner (GSGCL) installed on top of 2 feet of soil exhibiting a minimum hydraulic conductivity of 5×10^{-5} cm/sec, has been installed in the landfill cells. The liner system is installed across the bottom of each cell, extends across the interior embankments, and extends up the inside sides of the perimeter embankments. The liner system is covered with an approximately 18-inch thick layer of protective soil to prevent damage to the liner during landfill operations. The base of each landfill cell is sloped toward a collection area for runoff from active landfill areas at the downgradient edge of the cell.

B. Liner Design

1. For existing landfills, provide attachments describing how the facility will comply with 30 TAC 352, Subchapter F (Design Criteria).

   AX Landfill is an Existing CCR Landfill under the CCR rule. There are no design criteria for Existing CCR Landfills in either the state or federal CCR rule. 30 TAC 352, Subchapter F or 40 CFR 257.70

2. For new landfills or lateral expansions of existing landfills, submit pages describing how the facility will comply with 30 TAC §352.261 and 30 TAC §352.701. N/A

3. Complete Table IV.B. - Landfill Liner System and specify the type of liner used for the landfill.

4. Provide attachments describing the design, installation, and operation of the liner and leak detection system. The description must demonstrate that the liner and leak detection system will prevent discharge to the land, groundwater, and surface water. Submit a quality assurance project plan (QAPP) to ensure that each analysis is performed appropriately.

   Construction Completion Reports are located in APPENDIX D for the construction of cells 1, 2, and 2A for A-X Landfill.

C. Leachate Collection and Removal

Submit design information and description of leachate collection and removal system in accordance with 30 TAC §352.701. N/A

Complete Table IV.C. - Landfill Leachate Collection System. N/A

D. Design of Liner and Leachate Collection and Removal System.

For a new landfill or lateral expansion of a CCR landfill, provide a qualified Texas P.E. certification and technical report that the design of the liner and the leachate collection and removal system meets the requirements of 30 TAC §352.711. N/A

E. Run-on and Run-off Controls

At time of application, attach pages describing how the facility will comply with the run-on and run-off system plan for an existing, new, or lateral expansion of a CCR landfill information. Provide a qualified Texas P.E. certification and technical report that the run-on and run-off control system plans meet the requirements of 30 TAC §352.811.

"Run-on and Run-off Control System Plan" for AX Landfill is located in APPENDIX D.

F. Inspection for Landfills

At time of application, attach pages describing how the facility will comply 30 TAC §352.841 and complete Table IV.D. – Inspection Schedule for Landfills. For existing CCR landfills, provide the most recent inspection report. All CCR landfills and any lateral expansions of a CCR landfill must be inspected for any structural weakness, malfunction, deterioration conditions which are disrupting or have the potential to disrupt the operation or safety of the CCR unit, or any other conditions which may cause harm to human health and environment at a frequency specified in 40 CFR §257.84(a) and (b).

The 2021 Annual CCR Landfill inspection report is located in APPENDIX D.

V. Surface Impoundment Criteria

See Instructions and Technical Guidance – No. 31 Coal Combustion Residuals Surface Impoundment

N/A

26. Surface Impoundment(s) for CCR Waste

Provide the following information below if there is a surface impoundment; if there is more than one surface impoundment, separate information is required for each surface impoundment.

A. General Surface Impoundment(s) Characteristics

Provide information about the characteristics of the surface impoundment(s): incised, surface area (acres), storage volume (acres-feet), and depth (feet).

For all surface impoundment(s), include the following information:

1. Complete Table V.A. - Surface Impoundments Characteristics. List the surface impoundment(s) to be registered as a CCR unit(s), the wastes managed in each unit, and the rated capacity or size of each unit.
2. Describe the surface impoundment(s) and provide a plan view drawing with cross-sections, if available.

   Specify the minimum freeboard to be maintained and the basis of the design to prevent overtopping resulting from normal or abnormal operation; overfilling; wind and wave action; rainfall; run-on; malfunctions of level controllers, alarms, and other equipment; and human error. Show that adequate freeboard will be available to prevent overtopping from a 100-year, 24-hour storm.
3. Waste Flow
   Describe the means that will be used to immediately shut off the flow of waste to the impoundment in the event of liner failure or to prevent overtopping.
4. Dike Construction ☐ Yes ☐ No

   If Yes, submit the dike certification (located at the end of the application).

   The structural integrity of the dike system must be certified by a qualified Texas P.E. before the registration is issued. If the impoundment is not being used, the dike system must be certified before it can be put into use. The certification must be sealed by a qualified Texas P.E., along with the engineering firm's name and registration number (30 TAC §352.4).

A report shall accompany the dike certification which summarizes the activities, calculations, and laboratory and field analyses performed in support of the dike certification. Describe the design basis used in construction of the dikes. A QAPP should be included in the report to ensure that each analysis is performed appropriately and include:

(1) Slope Stability Analysis

(2) Hydrostatic and Hydrodynamic Analysis

(3) Storm Loading

(4) Rapid Drawdown

Earthen dikes should have a protective cover to minimize wind and water erosion and to preserve the structural integrity of the dike. Describe the protective cover used and describe its installation and maintenance procedures.

B. Liner Design

For surface impoundment(s), provide information about how the facility will comply with 30 TAC §352.711 for existing CCR surface impoundments. For new and lateral expansion of CCR surface impoundments provide information on how the facility will comply with 30 TAC §352.261, and 30 TAC §352.721, see Instructions and Technical Guidance No. 31 Coal Combustion Residuals Surface Impoundment. The qualified Texas P.E. must certify that the design of the liner complies with the requirements of 30 TAC Chapter 352 and 40 CFR Part 257, Subpart D, where required.

Is the CCR surface impoundment unlined? ☐ Yes ☐ No

If "Yes", the CCR unit is subject to the closure requirements under 30 TAC Chapter 352 and 40 CFR §257.101(a) to retrofit or close. A notification must be prepared stating that an assessment of corrective measures has been initiated.

1. Complete Table V.B. - Surface Impoundment Liner System for each surface impoundment to be registered.
2. Describe the design, installation and operation of liner and leak detection components. The description must demonstrate that the liner and leak detection system will prevent discharge to the land and surface water. Submit a QAPP report to ensure that each analysis is performed appropriately.
3. For new or laterally expansions of existing surface impoundments, provide a subsurface soil investigation report that must include:
   a. A description of all borings drilled, at the unit location, to test soils and characterize groundwater;
   b. A unit map drawn to scale showing the surveyed locations and elevations of the borings, including location of permanent identification markers ((30 TAC §352.731) and (40 CFR §257.73(a)(1));
   c. Cross-sections prepared from the borings depicting the generalized strata at the unit;
   d. Boring logs, including a description of materials encountered, and any discontinuities such as fractures, fissures, slickensides, lenses or seams;
   e. A description of the geotechnical data and the geotechnical properties of the subsurface soil materials, including the suitability of the soils and strata for the intended uses; and
   f. A demonstration that all geotechnical tests were performed in accordance with industry practices and recognized procedures.

C. Hazard Potential Classification

Provide the current hazard potential classification assessment and associated documentation, as required by 30 TAC §352.731 or §352.741 and 40 CFR §257.73(a)(2) or §257.74(a)(2). The qualified Texas P.E. must certify that the initial hazard potential classification and any subsequent periodic classification was conducted in accordance with the requirements of 30 TAC Chapter 352, where required.

Hazard Potential Classification: **LOW**

D. Emergency Action Plan for High or Significantly High Hazard Potential

Provide the current Emergency Action Plan that has been certified by a qualified Texas P.E. and includes the following requirements from 30 TAC 352, Subchapter F and 40 CFR §257.73(a)(3)(i)(A) - (E) or 40 CFR §257.74 (a)(3)(i)(A) - (E). The qualified Texas P.E. must certify that the written Emergency Action Plan and any subsequent amendment of the plan complies with the requirements of 30 TAC 352, Subchapter F, where required.

Complete Table V.J. - Inspection of Surface Impoundments

E. Inflow Design Flood Control System Plan

Describe how the surface impoundment(s) system will manage stormwater run-on away from the surface impoundment(s) (30 TAC §352.821 and 40 CFR §257.82(a) and (c)). Stormwater run-on must be diverted away from a surface impoundment, based on the hazard potential. Where dikes are used to divert run-on, they must be protected from erosion. Include all analyses used to calculate run-on volumes. Provide the inflow design flood control system plan. Provide qualified Texas P.E. certification that the initial and periodic inflow design flood control system plans meet the requirements of 30 TAC §352.821, where required.

F. History of Construction for Existing CCR Surface Impoundment(s), or the Design and Construction Plans for New and Lateral Expansions

Provide information on the history of construction for each existing CCR surface impoundment (30 TAC §352.731 and 40 CFR §257.73(c)) or the design and construction plans for new and lateral expansions of each CCR surface impoundment (30 TAC §352.741) and (40 CFR §257.74(c)).

G. Structural Stability Assessment

Provide the most recent structural stability assessment of the surface impoundments. Include the combined capacity of all surface impoundment spillways with calculations; the peak discharge the unit must meet for all combined spillways; probable maximum flood-high hazard, 1,000-yr-significant high hazard, 100-yr-low hazard; identify if there were any structural stability deficiencies in last assessment; identify how these deficiencies were managed and corrected; and qualified Texas P.E. certification. The structural stability assessment must include all information required in 30 TAC §352.731 for existing surface impoundments or 30 TAC §352.741 for new or laterally expanding surface impoundments.

H. Safety Factor Assessment

The current safety factor assessment must be submitted with the application. It must include documentation that demonstrates whether the calculated factors of safety for each CCR surface impoundment achieve the minimum safety factors specified in 30 TAC 352, Subchapter F and 40 CFR §257.73(e)(1)(i) - (iv) and 40 CFR §257.74(e)(1)(i) - (iv) for the critical cross-section of the embankment. The critical cross-section is the cross-section anticipated to be the most susceptible to structural failure based on appropriate engineering considerations, including loading conditions. The safety factor assessments must be supported by appropriate engineering calculations and certified by a qualified Texas P.E.

VI. Groundwater Monitoring and Corrective Action (30 TAC 352, Subchapter H)

See Instructions and Technical Guidance – No. 32 Coal Combustion Residuals Groundwater Monitoring and Corrective Action

27. Groundwater Monitoring System

A. Complete Table VI.A. - Unit Groundwater Detection Monitoring System.

B. Provide a map showing location of wells, groundwater elevations, and groundwater flow direction.

See Groundwater Potentiometric Surface Maps in Appendix C of the "Groundwater Monitoring System Certification" report for AX Landfill located in APPENDIX E.

C. Provide attachments describing how the facility will comply with the requirements in 30 TAC §352.911 and provide a certification by a qualified Texas P.E or qualified Texas P.G. that the groundwater monitoring system design and construction meet the requirements of 30 TAC Chapter 352.

See "Groundwater Monitoring System Certification" report for AX Landfill located in APPENDIX E. The certification statement can be found on the second page of the document.

D. Provide a figure showing the geologic units and fill materials overlying the uppermost aquifer, materials comprising the uppermost aquifer, and materials comprising the confining unit defining the lower boundary of the uppermost aquifer, including, but not limited to, thicknesses, stratigraphy, lithology, hydraulic conductivities, porosities and effective porosities.

See Figures 3, 4, 5, 6 in the "Groundwater Monitoring System Certification" report for AX Landfill located in APPENDIX E. Additional information on the local geology/hydrogeology can be found in the "Groundwater Monitoring System Certification Addendum No. 1" located in APPENDIX E.

E. For a multiunit groundwater monitoring system, demonstrate that the groundwater monitoring system will be equally as capable of detecting monitored constituents at the waste boundary of the CCR unit as the individual groundwater monitoring system for each CCR unit by providing at minimum the following information:

1. Number, spacing, and orientation of each CCR unit;
2. Hydrogeologic setting; and
3. Site history.

F. Has there been any sampling concentrations of one or more constituents listed in Appendix IV detected at statistically significant levels above the groundwater protection standard (GWPS)? ☐ Yes ☒ No

G. Provide information on how monitoring wells have been constructed and cased in a manner that maintains the integrity of the monitoring well borehole and to prevent contamination of samples and the groundwater.

See Appendix A in the "Groundwater Monitoring System Certification" report for AX Landfill located in APPENDIX E

28. Groundwater Monitoring Sampling and Analysis Program

Provide a sampling and analysis plan that includes procedures and techniques; sampling and analytical methods that are appropriate for groundwater sampling; and that address the requirements of 30 TAC §352.931 and 40 CFR §257.93. Provide a P.E or P.G. certification that describes the statistical method selected to evaluate the groundwater monitoring data and certifies that the selected statistical method is appropriate for evaluating the groundwater monitoring data for the CCR management area. Refer to TG-32 for information and guidance.

See "Groundwater Monitoring Plan-Revision 2" and "Statistical Analysis Plan-Revision 1" for AX Landfill located in APPENDIX E

29. CCR Unit(s) in a Detection Monitoring Program

Does the facility have CCR unit(s) in a Detection Monitoring Program?

☒ Yes ☐ No

AX Landfill

If "Yes", Submit the following information:

A. Submit Table VI.C. – Facility CCR Units Under Detection Monitoring.

B. Provide a Background Evaluation Report.

Background data was derived from the eight independent sampling events required under 40 CFR 257.94(b). A summary of the background monitoring program can be found in Section 3.0 of the "2017 Annual Groundwater Monitoring Report". Background water quality data is summarized in Tables 3 and 4 and laboratory analytical reports are located in Appendix A of the 2017 report.

The "2017 Annual Groundwater Monitoring Report" is in APPENDIX E.

C. Provide a report with the results of semiannual monitoring events.

The "2020 Annual Groundwater Monitoring and Corrective Action Report" and the "2021 Annual Groundwater Monitoring and Corrective Action Report-Revision 1" for AX Landfill are in APPENDIX E.

1. Has a statistically significant increase (SSI) been detected for one or more of the constituents listed in Appendix III at any monitoring well?

   ☒ Yes ☐ No

2. Has a notification to the executive director been sent within 14 days?

   ☒ Yes ☐ No

3. Date assessment monitoring program will start: N/A Due to successful ASDs

4. Do you plan to provide an alternative source demonstration (ASD)?

   ☒ Yes ☐ No

30. CCR Unit(s) in an Assessment Monitoring Program

Does the facility have CCR unit(s) in an Assessment Monitoring Program?

☐ Yes ☒ No

If "Yes", Submit information related for units.

A. Complete Table VI.D. – CCR Units Under Assessment Monitoring.

B. Provide, for each well in assessment monitoring status, the recorded concentrations lab sheets and results in a tabulated form.

C. Have the concentrations of all constituents listed in Appendices III and IV been at or below background values, using the statistical procedures in 30 TAC §352.931 and 40 CFR §257.93(g), for two consecutive sampling events for the CCR unit(s)? ☐ Yes ☐ No

If answer to above is yes, detection monitoring may resume. The owner or operator must prepare a notification stating that detection monitoring is resuming for the CCR unit and obtain written approval from the executive director.

D. Are there any concentrations of any constituent in Appendices III and IV above background values? ☐ Yes ☐ No

1. Has a notification to the executive director been sent within 14 days?

   ☐ Yes ☐ No

E. Date assessment of corrective measures will be initiated (must be within **90 days** of finding a statistically significant level above the GWPS) for the CCR unit(s):

F. Will you provide an ASD (see TG-32 for an acceptable submittal)? ☐ Yes ☐ No

G. Date assessment of corrective measures will be initiated if ASD is not accepted?

H. Complete Table VI.D-2. - Groundwater Detection Monitoring Parameters

Note: Refer to TG-32 regarding establishing a GWPS for each constituent in Appendix IV detected in the groundwater and attach as table.

I. Have you completed the assessment of corrective measures? ☐ Yes ☐ No
If "Yes", date assessment of corrective measures was completed: September 5, 2019
If "No", date assessment of corrective measures will be completed:
Expected date of submittal of amendment (see note below):
Provide completed assessment of corrected measures materials.

Note: Within **30 days** of completing the assessment of corrective measures, and before remedy implementation, the owner or operator shall submit an application for amendment to the registration. In some circumstances, the assessment of corrective measures and selected remedy may be approved as part of the initial application for the CCR unit registration.

J. Have you selected a remedy? ☐ Yes ☐ No

Provide public meeting documentation under 30 TAC §352.961 and a report under 30 TAC §352.971 and 40 CFR §257.97.

VII. Closure and Post-Closure Care

See Instructions and Technical Guidance

Submit a full closure plan and post-closure plan and all information describing how the owner or operator will comply with 30 TAC 352, Subchapter J and 40 CFR §§257.100 - 257.104. The owner of property on which an existing disposal facility is located, following the closure of a unit, must also submit documentation that a notation has been placed in the deed to the facility that will in perpetuity notify any potential purchasers of the property that the land has been used to manage CCR wastes and its use is restricted (30 TAC §352.1221 and 40 CFR §257.102(i)). For CCR units, closed after

October 19, 2015, that were closed before submission of the application, the applicant should submit documentation to show that notices required under 30 TAC 352, Subchapter K and 40 CFR §257.105 or §257.106 have been filed.

31. Closure Plan

This section applies to the owners and operators of all CCR units required to be registered. The applicant must close the facility in a manner that minimizes need for further maintenance and controls, or eliminates, to the extent necessary to protect human health and the environment, the post-closure release of CCR waste, chemical constituents of concern, leachate, contaminated rainfall, or waste decomposition products to the groundwater, surface waters, or to the atmosphere.

The type of unit to be closed can determine the level of detail sufficient for a closure plan. CCR units which have been certified closed after October 19, 2015, must provide documentation to demonstrate compliance with state and federal regulations.

For each unit to be registered, complete Table VII.A.1. - Unit Closure and list the CCR Unit components to be decontaminated, possible methods of decontamination, and possible methods of disposal of wastes and waste residues generated during unit closure. All ancillary components must be decontaminated, and the generated waste disposed of appropriately.

See “Closure Plan” and “Closure Plan-Addendum No. 1” for AX Landfill in APPENDIX F.

Information about CCR units closed or to be closed under alternative closure requirements must be provided in Table VII.A.2. - CCR Units Under Alternative Closure Notification.

Guidance on design of a closure cap and final cover for non-hazardous industrial solid wastes landfills is provided in EPA publication 530-SW-85-014, TCEQ Technical Guidance No. 3 and TCEQ publication, RG-534, “Guidance for Liner Construction and Testing for a Municipal Solid Waste Landfill”.

32. Post-Closure Care Plan

Provide a post-closure care plan that complies with the requirements of 30 TAC §352.1241.

See “Post-Closure Plan” for AX Landfill in APPENDIX F.

Post-closure care of each CCR unit must continue for at least 30 years after the date of completing closure of the unit and must consist of monitoring and reporting of the groundwater monitoring systems, in addition to the maintenance and monitoring of CCR unit. Continuation of certain security requirements may be necessary after the date of closure. Post-closure use of property on or in which waste remains after closure must never be allowed to disrupt the integrity of the containment system. In addition, submit the following information:

- The name, address, and phone number of the person or office to contact about the CCR unit during the post-closure period; and

  Luminant-Environmental Services
  Renee Collins-Senior Environmental Director
  6555 Sierra Drive
  Irving, TX 75039
  214-875-8338
  CCRPostClosurePlan@Luminant.com

- A discussion of the future use of the land associated with each unit.

  See section 5.0 of the “Post-Closure Plan” for the AX Landfill in APPENDIX F.

Landfills and surface impoundments which have been certified closed after October 19, 2015, must be included in post-closure care plans, unless they have been determined to have been closed by waste removal equivalent to the closure standards in 30 TAC §352.1221 and 40 CFR §257.102 or 30 TAC §352.1231 and 40 CFR §257.103. If such a demonstration has been made pursuant to 40 CFR §257.102 or §257.103, but an equivalency determination has not been made, please submit a copy of the demonstration documentation. If an equivalency determination has been made, applicant should submit a copy of this determination.

VIII. Financial Assurance

33. Post-Closure Care Cost Estimate

Financial assurance for post-closure care (30 TAC §352.1101) applies to owners or operators of all CCR units, except CCR units from which the owner or operator intends to remove wastes and perform clean closure. Provide a written cost estimate in current dollars of the total cost of the 30-year (or longer, if applicable under 30 TAC §352.1101(d)) post-closure care period to perform post-closure care requirements as prescribed in 30 TAC §352.1241. The cost estimate must be based on the costs of hiring a third party to conduct post-closure care maintenance.

Complete Table VIII.A.1 – Post-Closure Cost Summary for Existing Registered Units

See Post-Closure Care Cost Estimate for AX Landfill in APPENDIX G. Sandow AX Landfill cost estimates are summarized in Table 1.

Complete Table VIII.A.2. - Post-Closure Cost Summary for Proposed Registered Units

34. Financial Assurance Mechanism

The financial assurance for post-closure care is required in accordance with 30 TAC §352.1101. The applicant shall demonstrate the financial assurance within 90 days after approval of the registration with a financial mechanism acceptable to TCEQ in compliance with 30 TAC §352.1101(c) and 30 TAC §37, Subchapters A through D, except as indicated in 30 TAC §352.1111, in an amount no less than the amount specified in the approved Post-Closure Care Cost Summary. Provide a description of the proposed financial assurance mechanism.

Acceptable financial assurance mechanism per 30 TAC 352.1101 will be provided no more than 90 days after the executive director's approval of the registration.

Complete Table VIII.B. - Post-Closure Period, for the authorized post-closure period, to meet the requirements of 30 TAC §352.1241(a) through (c).

Signature Page

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Applicant Signature: _____ Date: _____

Name and Official Title (type or print): _____

Owner or Operator Signature: _____ Date: _____

Name and Official Title (type or print): _____

To be completed by the owner or operator if the application is signed by an authorized representative for the operator

I, _____ hereby designate _____
(operator) (authorized representative)

as my representative and hereby authorize said representative to sign any application, submit additional information as may be requested by the Commission; and/or appear for me at any hearing or before the Texas Commission on Environmental Quality in conjunction with this request for a CCR waste management registration. I further understand that I am responsible for the contents of this application, for oral statements given by my authorized representative in support of the application, and for compliance with the terms and conditions of any registration which might be issued based upon this application.

_____
Printed or Typed Name of Applicant or Principal Executive Officer

_____
Signature

(Note: Application Must Bear Signature & Seal of Notary Public)

Subscribed and sworn to before me by the said _____ on this

_____ day of _____, _____.

My commission expires on the _____ day of _____, _____

(Seal) Notary Public in and for _____ County, Texas

Registration Application for Coal Combustion Residuals Waste Management

(See instructions for P.E/P.G. seal requirements.)

Attachments and Tables	**Attachment No.**
General Information	Appendix A
Property/Legal Description	
Property Owner Affidavit	
Legal Authority	
Delegation of Signature Authority	
TCEQ Core Data Form	
Attachments	
Response to TCEQ CCR Unit Registration Comments (Item 21)	
Location Restrictions & Geology	Appendix B
Location Restriction Demonstration	
Location Restriction Evaluation	
Fugitive Dust Control Plan	Appendix C
CCR Fugitive Dust Control Plan	
2021 Annual CCR Fugitive Dust Control Report	
Landfill Criteria	Appendix D
Construction Completion Reports	
Run-on and Run-off Control System Plan	
2021 Annual CCR Unit Inspection Report	
Groundwater Monitoring and Corrective Action	Appendix E
Groundwater Monitoring System Certification	
Groundwater Monitoring System Certification-Addendum No. 1	
Groundwater Monitoring Plan-Revision 2	
Statistical Analysis Plan-Revision 1	
2017 Annual Groundwater Monitoring Report	
2020 Groundwater Monitoring and Corrective Action Report	
2021 Groundwater Monitoring Plan and Corrective Action Report-Revision 1	
Closure and Post-Closure Care	Appendix F
Closure Plan	
Closure Plan-Addendum No. 1	
Post-Closure Plan	
Financial Assurance	Appendix G
Post-Closure Care Cost Estimate	

Tables

Tables	Submitted	Not Applicable
Table I.6. - CCR Waste Management Units	☒	☐
Table I.6.A. - Waste Management Information	☒	☐
Table I.6.B. - Wastes Managed in Registered Units	☒	☐
Table I.6.C. - Sampling and Analytical Methods	☒	☐
Table IV.A. - Landfill Characteristics	☒	☐
Table IV.B. - Landfill Liner System	☒	☐
Table IV.C. - Landfill Leachate Collection System	☐	☒
Table IV.D. - Inspection Schedule of Landfills	☒	☐
Table V.A. - Surface Impoundments Characteristics	☐	☒
Table V.B. - Surface Impoundment Liner System	☐	☒
Table V.J. - Inspection of Surface Impoundments	☐	☒
Table VI.A. - Unit Groundwater Detection Monitoring System	☒	☐
Table VI.C. - CCR Units Under Detection Monitoring	☒	☐
Table VI.C-1. – Groundwater Detection Monitoring Parameters	☒	☐
Table VI.D. - CCR Units Under Assessment Monitoring	☐	☒
Table VI.D-2. - Groundwater Assessment Monitoring Parameters	☐	☒
Table VII.A.1. - Unit Closure	☒	☐
Table VII.A.2. - CCR Units Under Alternative Closure Notification	☐	☒
Table VIII.A.1. - Post-Closure Cost Summary for Existing Registered Units	☒	☐
Table VIII.A.2. - Post-Closure Cost Summary for Proposed Registered Units	☐	☒
Table VIII.B. - Post-Closure Period	☐	☒

Additional Attachments as Applicable - Select all those apply and add as necessary

☒ TCEQ Core Data Form(s) Appendix A
☒ Signatory Authority Delegation Appendix A
☐ Fee Payment Receipt
☐ Confidential Documents
☒ Certificate of Fact (Certificate of Incorporation) Appendix A
☐ Assumed Name Certificate

Table I.6. – CCR Waste Management Units

CCR Unit No.[1]	Unit Name	N.O.R. No.[1]	Unit Description[3]	Capacity	Unit Status[2]
008	AX Landfill	008	Landfill	15.29 million cubic yards	Active

1 Registered Unit No. and N.O.R. No. cannot be reassigned to new units or used more than once.
2 Unit Status options: Active, Closed, Inactive (built but not managing waste), Proposed (not yet built), Never Built, Transferred, Post-Closure.
3 If a unit has been transferred, the applicant should indicate which facility/permit it has been transferred to in the Unit Description column.

Table I.6.A. – Waste Management Information

Waste No.[1]	Waste Type(s)	Source	Volume (tons/year)[2]
1	Fly Ash	Coal Combustion Byproduct	0
2	Waste Lignite	Misc. Maintenance Activities	56 tons
3	Bed Ash	Coal Combustion Byproduct	0
4	Construction Debris	Misc. Maintenance Activities	0

1 Assign waste number sequentially. Do not remove waste number wastes which are no longer generated

2 Reflects 2021 records

Table I.6.B. – Wastes Managed in Registered Units

Waste No.[1]	Waste	TCEQ Waste Form Codes and Classification Codes
1	Fly Ash	TWC-30023042, TX Form Code-304, Class 2
2	Waste Lignite	TWC-30044092, TX Form Code-409, Class 2
3	Bed Ash	TWC-30053042, TX Form Code-304, Class 2
4	Construction Debris	TWC-37043902, TX Form Code-390, Class 2

1 from Table I.6.A., first column

Table I.6.C – Sampling and Analytical Methods

Waste No.[1]	Sampling Location	Sampling Method	Frequency	Parameter	Test Method	Desired Accuracy Level
1-Flyash	Landfill/flyash silos/electrostatic precipitator	Grab	<5 years or change in waste generation process	TCLP Metals pH	SW1311/7470A SW1311/6020B SW9045C	See below [2]
2-Waste lignite	Drainage ditches around coal piles	Grab	<5 years or change in waste generation process	TCLP Metals	SW1311/7470A SW1311/6020B	See below [2]
3-Bottom ash	Landfill	Grab	<5 years or change in waste generation process	TCLP Metals	SW1311/7470A SW1311/6020B	See below [2]
4-Construction Debris	Varies by project	Composite	As needed	TCLP metals, TPH	SW1311/7470A SW1311/6020B TX1005	See below [2]

1 from Table I.6.A., first column

2 Analytical protocol will meet EPA quality control and accuracy specifications as published in the SW-846 Methods. The laboratory will be TCEQ accredited.

Table IV.A. – Landfills Characteristics

Registered Unit No.	Landfill	N.O.R. No.	Waste Nos.[1]	Rated Capacity	Dimensions[2]	Distance from lowest liner to groundwater	Action Leakage Rate (if required)	Unit will manage CCR Waste and non-CCR Waste (state all that apply)
008	AX Landfill	008	1 thru 9	15.29 million cubic yards	4100 ft L x 2000 ft W x 90 ft H (height @ max design) 179 acres	N/A	N/A	Waste numbers 1-9 as described in Table I.6.A.

1 From Table I.6.A., first column
2 Dimensions should be provided as average length, width and depth, also include the surface acreage for the unit.

Table IV.B. – Landfill Liner System

Registered Unit No.*	Landfill	Geomembrane Liner Material	Geomembrane Liner Permeability (cm/sec)	Geomembrane Liner Thickness	Soil Liner Material	Soil Liner Permeability (cm/sec)	Soil Liner Thickness
008	AX Landfill	GCL with 30-mil HDPE geomembrane	$<1.00 \times 10^{-7}$	30 mil	Compacted clay	$<5 \times 10^{-5}$ cm/sec	Minimum 2 ft

* This number should match the Registration Unit No. given on Table IV.A.

Table IV.C. – Landfill Leachate Collection System

Registered Unit No.	Landfill Name	Drainage Media	Collection Pipes (including risers)	Filter Fabric	Geofabric	Sump Material
N/A						

Table IV.D. – Inspection Schedule of Landfills

Facility Unit(s) and Basic Elements	Possible Error, Malfunction, or Deterioration	Frequency of Inspection
008-AX Landfill	Inspect for any appearances of actual or potential structural weakness and other conditions which are disrupting of have the potential to disrupt the operation and safety of the CCR unit	Weekly inspections are performed at intervals not exceeding seven days per 40 CFR 257.84(a).
Embankments	Surface cracking, animal burrows, misalignments, slides, vegetative cover, rutting, erosion, seepage, slope protection/chutes	Weekly inspections are performed at intervals not exceeding seven days per 40 CFR 257.84(a).
Capped Areas	Animal burrows, vegetative cover, rutting, surface cracking	Weekly inspections are performed at intervals not exceeding seven days per 40 CFR 257.84(a).
Active Work Area	Contact water, dusting	Weekly inspections are performed at intervals not exceeding seven days per 40 CFR 257.84(a).
Groundwater Monitoring Wells	Deterioration of pads, bollards, missing locks, compromise of casing integrity	Semi-Annual Inspection
008-AX Landfill		Annually per 40 CFR 257.84(b)
	Inspect for any changed in geometry of the structure since the previous annual inspection.	Annual Inspection
	Estimate the approximate volume of CCR contained in the unit at the time of the inspection.	Annual Inspection
	Inspect for any appearance of actual or potential structural weakness of the CCR unit, and any conditions that are disrupting or have the potential to disrupt the operation and safety of the unit.	Annual Inspection
	Inspect for any other change(s) which have affected the stability or operation of the CCR unit since the previous inspection	Annual Inspection

Table V.A. – Surface Impoundment Characteristics

Registered Unit No.	Surface Impoundment Name	N.O.R. No.	Waste Nos.[1]	Rated Capacity	Dimensions[2]	Distance from lowest liner to groundwater	Action Leakage Rate (if required)	Unit will manage CCR Waste and non-CCR Waste (state all that apply)
N/A								

1 From Table I.6.A., first column
2 Dimensions should be provided as average length, width and depth, also include the surface acreage for the unit.

Table V.B. – Surface Impoundment Liner System

Registered Unit No.*	Surface Impoundment Name	Geomembrane Liner Material	Geomembrane Liner Permeability (cm/sec)	Geomembrane Liner Thickness	Soil Liner Material	Soil Liner Permeability (cm/sec)	Soil Liner Thickness
N/A							

* This number should match the Registration Unit No. given on Table V.A.

Table V.J. – Inspection Schedule of Surface Impoundments

Facility Unit(s) and Basic Elements	Possible Error, Malfunction, or Deterioration	Frequency of Inspection
N/A		

Table VI.A. - Unit Groundwater Detection Monitoring Systems

Waste Management Unit/Area Name[1]	**WMU 008 - AX Landfill**									
Well Number(s):	AXMW-1	AXMW-2	AX-23	AX-24	AX-25*	AX-25R	AX-26	AX-27	AX-28	AX-29
Hydrogeologic Unit Monitored	Wilcox Group	Wilcox Group	Wilcox Group	Wilcox Group	Wilcox Group	Wilcox Group	Wilcox Group	Wilcox Group	Wilcox Group	Wilcox Group
Type (e.g., point of compliance, background, observation, etc.)	POC	POC	POC	POC	POC	POC	POC	POC	POC	POC
Up or Down Gradient	Up	Up	Up	Down	Down	Down	Down	Down	Down	Up
Casing Diameter and Material	2 " PVC	2 " PVC	4" PVC	2 " PVC	2 " PVC	2 " PVC	2 " PVC	4" pvc	2 " PVC	2 " PVC
Screen Diameter and Material	2 " PVC	2 " PVC	4" PVC	2 " PVC	2 " PVC	2 " PVC	2 " PVC	4" PVC	2 " PVC	2 " PVC
Screen Slot Size (in.)	0.010"	0.010"	0.010"	0.010"	0.010"	0.010"	0.010"	0.010"	0.010"	0.010"
Top of Casing Elevation (Ft, Mean Sea Level *[MSL]*)	473.65	482.25	482.26	468.74	443.62	442.9	458.6	479.47	463.26	487.73
Grade or Surface Elevation (Ft, MSL)	471.88	480.54	479.78	466.48	441.11	440.4	456.34	476.82	460.75	484.96
Well Depth (Ft, Below Grade Surface *[BGS]*)	53	63	85	81	75	73	75	98	45	65
Well Depth (Ft, Below Top of Casing *[BTOC]*)	54.77	64.71	87.48	83.26	77.51	75.5	77.26	100.65	47.51	67.77
Screen Interval										
From (Ft, BGS)	33	43	65	61	65	63	55	78	25	45
To (Ft, BGS)	53	63	85	81	75	73	75	98	45	65
Screen Interval										
From (Ft, BTOC)	34.77	44.71	67.48	63.26	67.51	65.5	57.26	80.65	27.51	47.77
To (Ft, BTOC)	54.77	64.71	87.48	83.26	77.51	75.5	77.26	100.65	47.51	67.77

1 From Tables in Section I.; *MSL* : Mean Sea Level; *BGS* : Below Grade Surface; *BTOC* : Below Top of Casing

*Well AX-25 was damaged and subsequently pluggedon May 6, 2020. Well AX-25R was installed and completed on May 7, 2020, as a replacement for AX-25.

Table VI.C. – CCR Units Under Detection Monitoring

N.O.R. Unit No.	Unit Description[1,2]	Well(s)	Constituent(s)	Date of SSI Determination	Date of Assessment Monitoring Notification[3]
008	AX Landfill	AX-25, AX-27, AX-28	Ca (25, 27, 28) SO4 (27)	1/16/18	N/A-ASD successful (4/15/18)
008	AX Landfill	AX-23, AX-24, AX-25, AX-26, AX-27, AX-28, AX-29	Ca (25, 27) SO4 (26, 27) F (23, 24, 25, 28, 29)	1/15/19	N/A-ASD successful (4/10/19)
008	AX Landfill	AX-24, AX-25, AX-27	Ca (24, 25, 27) SO4 (27) F (25)	1/8/20	N/A-ASD successful (4/7/20)
008	AX Landfill	AX-24, AX-25R, AX-26, AX-27	B (27) Ca (24, 25R, 26, 27) SO4 (26, 27)	12/7/20	N/A-ASD successful (3/5/21)

1 Indicates a unit for which a 30 TAC Chapter 352/40 CFR Part 257, Subpart D alternative closure determination has been requested pursuant to 40 CFR §257.103.
2 Indicates a unit for which a 30 TAC Chapter 352/40 CFR Part 257, Subpart D alternative closure determination has been made pursuant to 40 CFR §257.103.
3 Enter month, day, and year.

Table VI.C-1. – Groundwater Detection Monitoring Parameters

Parameter	Sampling Frequency	Analytical Method	Practical Quantification Limit (units)	Concentration Limit[1]
AX Landfill				
AXMW-1 Boron	Semi-Annual	SW6020A	0.6 mg/L	0.681
AXMW-1 Calcium	Semi-Annual	SW6020A	6.0 mg/L	569
AXMW-1 Chloride	Semi-Annual	E300	100 mg/L	491
AXMW-1 Fluoride	Semi-Annual	E300	0.4 mg/L	0.4
AXMW-1 Field pH	Semi-Annual	Field Measured	s.u.	5.49 7.09
AXMW-1 Sulfate	Semi-Annual	E300	300 mg/L	2,660
AXMW-1 TDS	Semi-Annual	M2540C	50.0 mg/L	5,820
AXMW-2 Boron	Semi-Annual	SW6020A	0.03 mg/L	3.62
AXMW-2 Calcium	Semi-Annual	SW6020A	15.0 mg/L	943
AXMW-2 Chloride	Semi-Annual	E300	100 mg/L	391
AXMW-2 Fluoride	Semi-Annual	E300	0.4 mg/L	1.88
AXMW-2 Field pH	Semi-Annual	Field Measured	s.u.	4.6 7.63
AXMW-2 Sulfate	Semi-Annual	E300	300 mg/L	3,040
AXMW-2 TDS	Semi-Annual	M2540C	50.0 mg/L	4,940
AX-23 Boron	Semi-Annual	SW6020A	0.03 mg/L	1.1
AX-23 Calcium	Semi-Annual	SW6020A	15.0 mg/L	475
AX-23 Chloride	Semi-Annual	E300	10.0 mg/L	313
AX-23 Fluoride	Semi-Annual	E300	0.4 mg/L	0.4
AX-23 Field pH	Semi-Annual	Field Measured	s.u.	3.24 7.95
AX-23 Sulfate	Semi-Annual	E300	30.0 mg/L	1,030
AX-23 TDS	Semi-Annual	M2540C	50.0 mg/L	3,090
AX-24 Boron	Semi-Annual	SW6020A	0.03 mg/L	0.311
AX-24 Calcium	Semi-Annual	SW6020A	15.0 mg/L	273
AX-24 Chloride	Semi-Annual	E300	100 mg/L	580
AX-24 Fluoride	Semi-Annual	E300	0.4 mg/L	0.4
AX-24 Field pH	Semi-Annual	Field Measured	s.u.	3.89 9.38
AX-24 Sulfate	Semi-Annual	E300	300 mg/L	1,010
AX-24 TDS	Semi-Annual	M2540C	50.0 mg/L	2,520

AX-25(R) Boron	Semi-Annual	SW6020A	0.03 mg/L	0.298
AX-25(R) Calcium	Semi-Annual	SW6020A	6.0 mg/L	262
AX-25(R) Chloride	Semi-Annual	E300	100 mg/L	1,140
AX-25(R) Fluoride	Semi-Annual	E300	0.4 mg/L	0.507
AX-25(R) Field pH	Semi-Annual	Field Measured	s.u.	4.69 9.2
AX-25(R) Sulfate	Semi-Annual	E300	300 mg/L	795
AX-25(R) TDS	Semi-Annual	M2540C	50.0 mg/L	3,980
AX-26 Boron	Semi-Annual	SW6020A	0.03 mg/L	0.446
AX-26 Calcium	Semi-Annual	SW6020A	15.0 mg/L	915
AX-26 Chloride	Semi-Annual	E300	100 mg/L	3,040
AX-26 Fluoride	Semi-Annual	E300	0.4 mg/L	0.4
AX-26 Field pH	Semi-Annual	Field Measured	s.u.	5.07 8.14
AX-26 Sulfate	Semi-Annual	E300	300 mg/L	1,200
AX-26 TDS	Semi-Annual	M2540C	50.0 mg/L	8,300
AX-27 Boron	Semi-Annual	SW6020A	0.03 mg/L	0.28
AX-27 Calcium	Semi-Annual	SW6020A	15.0 mg/L	366
AX-27 Chloride	Semi-Annual	E300	100 mg/L	1,020
AX-27 Fluoride	Semi-Annual	E300	0.4 mg/L	0.4
AX-27 Field pH	Semi-Annual	Field Measured	s.u.	6.08 7.3
AX-27 Sulfate	Semi-Annual	E300	300 mg/L	478
AX-27 TDS	Semi-Annual	M2540C	50.0 mg/L	3,620
AX-28 Boron	Semi-Annual	SW6020A	0.03 mg/L	0.393
AX-28 Calcium	Semi-Annual	SW6020A	15.0 mg/L	633
AX-28 Chloride	Semi-Annual	E300	100 mg/L	756
AX-28 Fluoride	Semi-Annual	E300	0.4 mg/L	.04
AX-28 Field pH	Semi-Annual	Field Measured	s.u.	4.67 8.55
AX-28 Sulfate	Semi-Annual	E300	300 mg/L	2,280
AX-28 TDS	Semi-Annual	M2540C	50.0 mg/L	3,790
AX-29 Boron	Semi-Annual	SW6020A	0.03 mg/L	0.432
AX-29 Calcium	Semi-Annual	SW6020A	15.0 mg/L	791
AX-29 Chloride	Semi-Annual	E300	100 mg/L	306
AX-29 Fluoride	Semi-Annual	E300	0.4 mg/L	0.4

AX-29 Field pH	Semi-Annual	Field Measured	s.u.	2.73 7.01
AX-29 Sulfate	Semi-Annual	E300	300 mg/L	1,440
AX-29 TDS	Semi-Annual	M2540C	50.0 mg/L	3,370

1 The concentration limit is the basis for determining whether a release has occurred from the CCR unit/area.

Table VI.D. – CCR Units Under Assessment Monitoring

N.O.R. Unit No.	Unit Description[1,2]	Well(s)	Constituent(s)	Date of SSI Determination	Date of Assessment Monitoring Notification[3]
N/A					

1 Indicates a unit for which a 30 TAC Chapter 352/40 CFR Part 257, Subpart D alternative closure determination has been requested pursuant to 40 CFR §257.103.
2 Indicates a unit for which a 30 TAC Chapter 352/40 CFR Part 257, Subpart D alternative closure determination has been made pursuant to 40 CFR §257.103.
3 Enter month, day, and year

Table VI.D-2. – Groundwater Assessment Monitoring Parameters

Parameter	Sampling Frequency	Analytical Method	Practical Quantification Limit (units)	Concentration Limit[1]

[1] The concentration limit is the basis for determining whether a release has occurred from the CCR unit/area.

Table VII.A.1. – Unit Closure

For each unit to be registered, list the unit components to be decontaminated, the possible methods of decontamination, and the possible methods of disposal of wastes and waste residues generated during unit closure.

Equipment or CCR Unit	Possible Methods of Decontamination[1]	Possible Methods of Disposal[1]
008-AX Landfill	Close in Place	No disposal

1 Applicants may list more than one appropriate method.

Table VII.A.2. – CCR Units Under Alternative Closure Notification

Registered Unit No.	N.O.R. Unit No.	Unit Description[1,2]	Date of Receipt of Last Waste[3]	Date of Closure Notification[3]
N/A				

1 Indicates a unit for which a 30 TAC Chapter 352/40 CFR Part 257, Subpart D alternative closure determination has been requested pursuant to 40 CFR §257.103.
2 Indicates a unit for which a 30 TAC Chapter 352/40 CFR Part 257, Subpart D alternative closure determination has been made pursuant to 40 CFR §257.103.
3 Enter month, day, and year.

Table VIII.A.1. – Post-Closure Cost Summary for Existing Registered Units

Unit	Cost
008-AX Landfill	$2,591,600
Total Existing Unit Post-Closure Cost Estimate	$2,591,600 (in 2021 Dollars)[1]

Table VIII.A.2. - Post-Closure Cost Summary for Proposed Registered Units

Unit	Cost
N/A	

1 As units are added or deleted from these tables through future registration amendments, the remaining itemized unit costs should be updated for inflation when re-calculating the revised total cost in current dollars.

Table VIII.B. – Post-Closure Period

Unit Name	Date Certified Closed	Authorized Post-Closure Period (Yrs.)	Earliest Date Post-Closure Ends (See Note 1)
[Unit Example 1]	**[1/1/1995]**	30 years	**[1/1/2025]**
[Unit Example 2]	**[1/1/1990]**	30 years	**[1/1/2020]**
[Unit Example 3]	**[1/1/1984]**	30 years	**[1/1/2014]**

Note 1 – Post-Closure Care shall continue beyond the specified date until the Executive Director has approved the applicant's request to reduce or terminate the post-closure period, consistent with 30 TAC §352.1241 – Post-Closure Care Requirements.

N/A

Texas Commission on Environmental Quality

Registration Application for Coal Combustion Residuals (CCR) Waste Management

I. General Information

1. Reason for Submittal

Type of Registration Application

☐ New ☐ Major Amendment ☐ Minor Amendment

☒ Notice of Deficiency (NOD) Response ☐ Transfer ☐ Name Change

☐ Other

2. Application Fees

☒ $150 Application Fee

Payment Method

☐ Check ☒ Online through ePay portal <www3.tceq.texas.gov/epay/>

If paid online, enter ePay Trace Number: 582EA000467498

3. Facility Information

Facility information must match regulated entity information on the Core Data Form.

Applicant: ☐ Owner ☐ Operator ☒ Owner/Operator

Facility TCEQ Solid Waste Registration No: 88209

Facility EPA ID: TXR000078075

Regulated Entity Reference No. (if issued): RN102147881

Facility Name: SANDOW STEAM ELECTRIC STATION

Facility (Area Code) Telephone Number: 214-875-8338

Facility physical street address (city, state, zip code, county): 3708A CHARLES MARTIN HALL ROAD, ROCKDALE, TX, 76577, MILAM

Facility mailing address (city, state, zip code, county): 6555 SIERRA DR, IRVING, TX 75039, DALLAS

Latitude (Degrees, Minutes Seconds): 30° 33′ 51″

Longitude (Degrees, Minutes Seconds): 97° 03′ 50″

4. Publicly Accessible Website

Provide the URL address of a publicly accessible website where the owner or operator of a CCR unit will post information.
https://www.luminant.com/ccr/

5. Facility Landowner(s) Information

Facility landowner(s) name: LUMINANT GENERATION COMPANY LLC

Facility landowner mailing address: 6555 SIERRA DR

City: IRVING State: TX Zip Code: 75039

(Area Code) Telephone Number: 214-875-8338

Email Address (optional):

6. CCR Waste Management Unit(s)

☒ Landfill Unit(s) ☐ Surface Impoundment(s)

For each existing landfill, new landfill and lateral expansion, existing surface impoundment, and new surface impoundment and lateral expansion(s) provide information on type of waste, the registered unit(s) in which they are managed, and sampling and analytical methods.

Submit the following tables:

Table I.6. – CCR Waste Management Units;

Table I.6.A. – Waste Management Information;

Table I.6.B. – Waste Managed in Registered Units; and

Table I.6.C. – Sampling and Analytical Methods.

7. Description of Proposed Activities or Changes to Existing Facility

Provide a brief description of the proposed activities if application is for a new facility, or the proposed changes to an existing facility or registration conditions, if the application is for an amendment.

Luminant Generation Company LLC formerly operated the Sandow Steam Electric Station (SASES) located approximately 7 miles southwest of Rockdale in Milam County, Texas. SASES was a lignite-fired electric generation facility retired in 2018. Coal Combustion Residuals (CCR) including fly ash and bed ash were generated as part of the unit's operation.

AX Landfill is the primary disposal facility for CCR generated at SASES and is located approximately 7,500 feet south of SASES. AX Landfill is listed on the Notice of Registration (SWR 88209) for SASES as Waste Management Unit 008 and is regulated as a Class 2 non-hazardous industrial solid waste landfill under 30 TAC §335.

8. Primary Contact Information

Contact Name: Renee Collins Title: Sr. Director, Environmental Services

Contact mailing address: 6555 Sierra Drive
City: Irving County: Dallas State: Texas Zip Code: 75039
(Area Code) Telephone Number: 214-875-8338

Email Address (optional): renee.collins@luminant.com

9. Notice Publishing

Party responsible for publishing notice:
☒ Applicant ☐ Consultant ☐ Agent in Service

Contact Name: Renee Collins Title: Sr. Director, Environmental Services

Contact mailing address: 6555 Sierra Drive
City: Irving County: Dallas State: Texas Zip Code: 75039
(Area Code) Telephone Number: 214-875-8338

10. Alternative Language Notice

Is an alternative language notice required for this application? For determination, refer to Alternative Language Checklist on the Public Notice Verification Form (TCEQ-20244-Waste-NORI).

☐ Yes ☒ No

11. Public Place Location of Application

Name of the Public Place: Lucy Hill Patterson Memorial Library
Physical Address: 201 Ackerman St
City: Rockdale County: MILAM State: TX Zip Code: 76567
(Area code) Telephone Number: 512-446-3410

12. Ownership Status of the Facility

☐ Corporation ☐ Limited Partnership
☐ Sole Proprietorship ☐ General Partnership ☒ Other (specify): Limited Liability Company

Does the Site Owner (Permittee/Registrant) own all the CCR units and all the facility property?

☒ Yes ☐ No

13. Property / Legal Description Information

Provide a legal description and supporting documents of the property where the management of CCR waste will occur; including a survey plat and a boundary metes and bounds description (30 TAC §352.231(g)).

Submit the following documents:

a. Property Legal Description
b. Property Metes and Bounds Description
c. Metes and Bounds Drawings
d. On-Site Easements Drawings

See APPENDIX A for Property/Legal Description Information and Property Owner Affidavit.

14. Operator Information

Identify the entity who will conduct facility operations, if the owner and operator are not the same.

Operator Name: LUMINANT GENERATION COMPANY LLC

Operator mailing address: 6555 Sierra Drive

City: Irving State: TX Zip Code: 75039

(Area Code) Telephone Number: 214-875-8338

Email Address (optional):

15. Confidential Documents

Does the application contain confidential documents?

☐ Yes ☒ No

If "Yes", cross-reference the confidential documents throughout the application and submit as a separate attachment in a binder clearly marked "CONFIDENTIAL."

16. Permits and Construction Approvals

Permit or Approval	Received	Pending	Not Applicable
Hazardous Waste Management Program under the Texas Solid Waste Disposal Act	☒	☐	☐
Underground Injection Control Program under the Texas Injection Well Act	☐	☐	☒
National Pollutant Discharge Elimination System Program under the Clean Water Act and Waste Discharge Program under Texas Water Code, Chapter 26	☐	☐	☒
Prevention of Significant Deterioration Program under the Federal Clean Air Act (FCAA).	☐	☐	☒
National Emission Standards for Hazardous Air Pollutants Preconstruction Approval under the FCAA	☐	☐	☒
Other (describe):	☐	☐	☐

17. Legal Authority

The owner and operator of the facility shall submit verification of their legal status with the application. This shall be a one-page certificate of incorporation issued by the secretary of state. The owner or operator shall list all persons having over a 20% ownership in the facility.

See APPENDIX A for Certificate of Authority.

18. TCEQ Core Data Form

The TCEQ requires that a Core Data Form (TCEQ-10400) be submitted on all incoming applications, unless a Regulated Entity and Customer Reference Number has been issued by the TCEQ and no core data information has changed. For more information regarding the Core Data Form, call (512) 239-5175 or visit the TCEQ Website.

See APPENDIX A for TCEQ Core Data Form.

19. Other Governmental Entities Information

Coastal Management Program

Is the facility within the Coastal Management Program boundary?

☐ Yes ☒ No

Local Government Jurisdiction (If Applicable)
Within City Limits of: N/A
Within Extraterritorial Jurisdiction of: N/A

Is the facility located in an area in which the governing body of the municipality or county has prohibited the storage, processing or disposal of municipal or industrial solid waste?

☐ Yes ☒ No If "Yes", provide a copy of the ordinance or order as an attachment.

20. Attachments

Does the application include the following?

General Maps	☒ Yes	☐ No
General Topographic Map	☒ Yes	☐ No
Facility Layout Map	☒ Yes	☐ No
Surrounding Features Map	☒ Yes	☐ No
Process Flow Diagram	☒ Yes	☐ No
Land Ownership Map	☒ Yes	☐ No
Land Ownership List	☒ Yes	☐ No
Pre-printed Mailing Labels	☒ Yes	☐ No

Maps and drawings shall be legible and easily readable by eye without magnification. Scales and paper size shall be chosen based on the type of map submitted, the land area covered, and the amount of detail to be shown. See instructions for details regarding maps and drawings to be submitted in application.

See APPENDIX A for Attachments detailed in Item 20.

21. Verification of Compliance

Does the owner and operator verify that the design, construction, and operation of CCR landfill(s) and surface impoundment(s) meets the requirements of 30 TAC §352.231(f) (30 TAC §352.2; 40 CFR §257.52, and 40 CFR §§257.3-1 – 257.3-3).

☒ Yes ☐ No

As requested by TCEQ, please see the "Response to TCEQ CCR Unit Registration Comments" memorandum for AX Landfill provided by Golder in APPENDIX A.

II. Location Restrictions and Geology

See Instructions and Technical Guidance

22. Location Restrictions

Submit certifications and technical reports demonstrating compliance of CCR unit(s) with applicable location restrictions (30 TAC 352, Subchapter E) and comply with 30 TAC §352.231(d) and 30 TAC §352.4 for submission of engineering and geoscientific information.

A. **Placement above the uppermost aquifer** (30 TAC §352.601) (40 CFR §257.60). For those CCR units whose base is less than five feet above the upper limit of the uppermost aquifer, please submit a copy of the demonstration showing evidence of compliance with 40 CFR §257.60(a) – (c).

B. **Wetlands** (30 TAC §352.611) (40 CFR §257.61). For CCR units located in wetlands, please submit a copy of the demonstration showing evidence of compliance with 40 CFR §257.61(a) – (c).

C. **Fault areas** (30 TAC §352.621) (40 CFR §257.62). For CCR units located within 200 feet of the outermost damage zone of a fault, please submit a copy of the demonstration showing evidence of compliance with 40 CFR §257.62(a) – (c).

D. **Seismic impact zones** (30 TAC §352.631) (40 CFR §257.63). For CCR units located in a seismic impact zone, please submit a copy of the demonstration showing evidence of compliance with 40 CFR §257.63(a) – (c).

E. **Unstable areas** (30 TAC §352.641) (40 CFR §257.64). For CCR units located in unstable areas, please submit a copy of the demonstration showing evidence of compliance with 40 CFR §257.64(a) – (d).

Location Restriction Demonstration and Location Restriction Evaluation for AX Landfill located in APPENDIX B.

23. Geology Summary Report

Submit a summary of the geologic conditions at the facility, including the relation of the geologic condition to each CCR unit. The summary must include enough information and data and include sources and references for the information. Include all groundwater monitoring data required by 40 CFR Part 257, Subpart D, (30 TAC §352.241, §352.601, §352.621, §352.631, and §352.641) and submitted in accordance of 30 TAC §352.4.

Note: Previously prepared documents may be submitted but must be supplemented or updated as necessary to provide the requested information (30 TAC §352.241(b)).

For Geology Summary, please refer to "Groundwater Monitoring System Certification" report for AX Landfill located in APPENDIX E. The Local Geology and Hydrogeology summary is located in Section 2.2 of the report.

All groundwater monitoring data is summarized in the "2020 Annual Groundwater Monitoring and Corrective Action Report" for AX Landfill located in APPENDIX E.

III. Fugitive Dust Control Plan

24. Fugitive Dust Control Plan

A. **Submit a copy of the CCR Fugitive Dust Control Plan** (30 TAC §352.801) (40 CFR §257.80(b)), or the most recently amended plan. The initial plan or subsequent amended plan must be certified by a qualified Texas licensed professional engineer (Texas P.E.) that the plan meets the requirements of 30 TAC Chapter 352.

B. **Submit the most recent Annual CCR Fugitive Dust Control Report** (30 TAC §352.801) (40 CFR §257.80(c)) and include the report information.

CCR Fugitive Dust Control Plan and the 2021 Annual CCR Fugitive Dust Control Report located in APPENDIX C.

IV. Landfill Criteria

See Instructions and Technical Guidance – No. 30 Coal Combustion Residuals Landfill

25. Landfill(s) for CCR Waste

Provide the following information below if there is a landfill; if there is more than one landfill, separate information is required for each landfill.

A. **Landfill Characteristics**

Describe the design, installation, construction, and operation of the landfill and submit a completed Table IV.A. – Landfill Characteristics.

AX Landfill Cells 1, 2 and 2A are lined landfill cells. Construction of Cell 1 was completed in July 2013 and construction of Cells 2 and 2A was initiated in May 2015. Cell 2 was completed in October 2015 and Cell 2A was completed in July 2016. Placement of CCR began in Cell 1 in May 2015 and Cell 2 in September 2016. CCRs have not been placed to date in Cell 2A.

The AX Landfill is constructed partially above and partially below grade and are surrounded by engineered earthen embankments that extend approximately 10 to 15 feet above surrounding grade. Smaller interior earthen embankments separate Cells 1, 2 and 2A from each other. A geosynthetic liner system, consisting of a 30-mil thick Geomembrane Supported Geosynthetic Clay Liner (GSGCL) installed on top of 2 feet of soil exhibiting a minimum hydraulic conductivity of 5×10^{-5} cm/sec, has been installed in the landfill cells. The liner system is installed across the bottom of each cell, extends across the interior embankments, and extends up the inside sides of the perimeter embankments. The liner system is covered with an approximately 18-inch thick layer of protective soil to prevent damage to the liner during landfill operations. The base of each landfill cell is sloped toward a collection area for runoff from active landfill areas at the downgradient edge of the cell.

B. Liner Design

1. For existing landfills, provide attachments describing how the facility will comply with 30 TAC 352, Subchapter F (Design Criteria).

   AX Landfill is an Existing CCR Landfill under the CCR rule. There are no design criteria for Existing CCR Landfills in either the state or federal CCR rule. 30 TAC 352, Subchapter F or 40 CFR 257.70

2. For new landfills or lateral expansions of existing landfills, submit pages describing how the facility will comply with 30 TAC §352.261 and 30 TAC §352.701. N/A

3. Complete Table IV.B. - Landfill Liner System and specify the type of liner used for the landfill.

4. Provide attachments describing the design, installation, and operation of the liner and leak detection system. The description must demonstrate that the liner and leak detection system will prevent discharge to the land, groundwater, and surface water. Submit a quality assurance project plan (QAPP) to ensure that each analysis is performed appropriately.

   Construction Completion Reports are located in APPENDIX D for the construction of cells 1, 2, and 2A for A-X Landfill.

C. Leachate Collection and Removal

Submit design information and description of leachate collection and removal system in accordance with 30 TAC §352.701. N/A

Complete Table IV.C. - Landfill Leachate Collection System. N/A

D. Design of Liner and Leachate Collection and Removal System.

For a new landfill or lateral expansion of a CCR landfill, provide a qualified Texas P.E. certification and technical report that the design of the liner and the leachate collection and removal system meets the requirements of 30 TAC §352.711. N/A

E. Run-on and Run-off Controls

At time of application, attach pages describing how the facility will comply with the run-on and run-off system plan for an existing, new, or lateral expansion of a CCR landfill information. Provide a qualified Texas P.E. certification and technical report that the run-on and run-off control system plans meet the requirements of 30 TAC §352.811.

"Run-on and Run-off Control System Plan" for AX Landfill is located in APPENDIX D.

F. Inspection for Landfills

At time of application, attach pages describing how the facility will comply 30 TAC §352.841 and complete Table IV.D. – Inspection Schedule for Landfills. For existing CCR landfills, provide the most recent inspection report. All CCR landfills and any lateral expansions of a CCR landfill must be inspected for any structural weakness, malfunction, deterioration conditions which are disrupting or have the potential to disrupt the operation or safety of the CCR unit, or any other conditions which may cause harm to human health and environment at a frequency specified in 40 CFR §257.84(a) and (b).

The 2021 Annual CCR Landfill inspection report is located in APPENDIX D.

V. Surface Impoundment Criteria

See Instructions and Technical Guidance – No. 31 Coal Combustion Residuals Surface Impoundment

N/A

26. Surface Impoundment(s) for CCR Waste

Provide the following information below if there is a surface impoundment; if there is more than one surface impoundment, separate information is required for each surface impoundment.

A. General Surface Impoundment(s) Characteristics

Provide information about the characteristics of the surface impoundment(s): incised, surface area (acres), storage volume (acres-feet), and depth (feet).

For all surface impoundment(s), include the following information:

1. Complete Table V.A. - Surface Impoundments Characteristics. List the surface impoundment(s) to be registered as a CCR unit(s), the wastes managed in each unit, and the rated capacity or size of each unit.
2. Describe the surface impoundment(s) and provide a plan view drawing with cross-sections, if available.

   Specify the minimum freeboard to be maintained and the basis of the design to prevent overtopping resulting from normal or abnormal operation; overfilling; wind and wave action; rainfall; run-on; malfunctions of level controllers, alarms, and other equipment; and human error. Show that adequate freeboard will be available to prevent overtopping from a 100-year, 24-hour storm.
3. Waste Flow
   Describe the means that will be used to immediately shut off the flow of waste to the impoundment in the event of liner failure or to prevent overtopping.
4. Dike Construction ☐ Yes ☐ No

   If Yes, submit the dike certification (located at the end of the application).

   The structural integrity of the dike system must be certified by a qualified Texas P.E. before the registration is issued. If the impoundment is not being used, the dike system must be certified before it can be put into use. The certification must be sealed by a qualified Texas P.E., along with the engineering firm's name and registration number (30 TAC §352.4).

A report shall accompany the dike certification which summarizes the activities, calculations, and laboratory and field analyses performed in support of the dike certification. Describe the design basis used in construction of the dikes. A QAPP should be included in the report to ensure that each analysis is performed appropriately and include:

(1) Slope Stability Analysis

(2) Hydrostatic and Hydrodynamic Analysis

(3) Storm Loading

(4) Rapid Drawdown

Earthen dikes should have a protective cover to minimize wind and water erosion and to preserve the structural integrity of the dike. Describe the protective cover used and describe its installation and maintenance procedures.

B. Liner Design

For surface impoundment(s), provide information about how the facility will comply with 30 TAC §352.711 for existing CCR surface impoundments. For new and lateral expansion of CCR surface impoundments provide information on how the facility will comply with 30 TAC §352.261, and 30 TAC §352.721, see Instructions and Technical Guidance No. 31 Coal Combustion Residuals Surface Impoundment. The qualified Texas P.E. must certify that the design of the liner complies with the requirements of 30 TAC Chapter 352 and 40 CFR Part 257, Subpart D, where required.

Is the CCR surface impoundment unlined? ☐ Yes ☐ No

If "Yes", the CCR unit is subject to the closure requirements under 30 TAC Chapter 352 and 40 CFR §257.101(a) to retrofit or close. A notification must be prepared stating that an assessment of corrective measures has been initiated.

1. Complete Table V.B. - Surface Impoundment Liner System for each surface impoundment to be registered.
2. Describe the design, installation and operation of liner and leak detection components. The description must demonstrate that the liner and leak detection system will prevent discharge to the land and surface water. Submit a QAPP report to ensure that each analysis is performed appropriately.
3. For new or laterally expansions of existing surface impoundments, provide a subsurface soil investigation report that must include:
   a. A description of all borings drilled, at the unit location, to test soils and characterize groundwater;
   b. A unit map drawn to scale showing the surveyed locations and elevations of the borings, including location of permanent identification markers ((30 TAC §352.731) and (40 CFR §257.73(a)(1));
   c. Cross-sections prepared from the borings depicting the generalized strata at the unit;
   d. Boring logs, including a description of materials encountered, and any discontinuities such as fractures, fissures, slickensides, lenses or seams;
   e. A description of the geotechnical data and the geotechnical properties of the subsurface soil materials, including the suitability of the soils and strata for the intended uses; and
   f. A demonstration that all geotechnical tests were performed in accordance with industry practices and recognized procedures.

C. Hazard Potential Classification

Provide the current hazard potential classification assessment and associated documentation, as required by 30 TAC §352.731 or §352.741 and 40 CFR §257.73(a)(2) or §257.74(a)(2). The qualified Texas P.E. must certify that the initial hazard potential classification and any subsequent periodic classification was conducted in accordance with the requirements of 30 TAC Chapter 352, where required.

Hazard Potential Classification: **LOW**

D. Emergency Action Plan for High or Significantly High Hazard Potential

Provide the current Emergency Action Plan that has been certified by a qualified Texas P.E. and includes the following requirements from 30 TAC 352, Subchapter F and 40 CFR §257.73(a)(3)(i)(A) - (E) or 40 CFR §257.74 (a)(3)(i)(A) - (E). The qualified Texas P.E. must certify that the written Emergency Action Plan and any subsequent amendment of the plan complies with the requirements of 30 TAC 352, Subchapter F, where required.

Complete Table V.J. - Inspection of Surface Impoundments

E. Inflow Design Flood Control System Plan

Describe how the surface impoundment(s) system will manage stormwater run-on away from the surface impoundment(s) (30 TAC §352.821 and 40 CFR §257.82(a) and (c)). Stormwater run-on must be diverted away from a surface impoundment, based on the hazard potential. Where dikes are used to divert run-on, they must be protected from erosion. Include all analyses used to calculate run-on volumes. Provide the inflow design flood control system plan. Provide qualified Texas P.E. certification that the initial and periodic inflow design flood control system plans meet the requirements of 30 TAC §352.821, where required.

F. History of Construction for Existing CCR Surface Impoundment(s), or the Design and Construction Plans for New and Lateral Expansions

Provide information on the history of construction for each existing CCR surface impoundment (30 TAC §352.731 and 40 CFR §257.73(c)) or the design and construction plans for new and lateral expansions of each CCR surface impoundment (30 TAC §352.741) and (40 CFR §257.74(c)).

G. Structural Stability Assessment

Provide the most recent structural stability assessment of the surface impoundments. Include the combined capacity of all surface impoundment spillways with calculations; the peak discharge the unit must meet for all combined spillways; probable maximum flood-high hazard, 1,000-yr-significant high hazard, 100-yr-low hazard; identify if there were any structural stability deficiencies in last assessment; identify how these deficiencies were managed and corrected; and qualified Texas P.E. certification. The structural stability assessment must include all information required in 30 TAC §352.731 for existing surface impoundments or 30 TAC §352.741 for new or laterally expanding surface impoundments.

H. Safety Factor Assessment

The current safety factor assessment must be submitted with the application. It must include documentation that demonstrates whether the calculated factors of safety for each CCR surface impoundment achieve the minimum safety factors specified in 30 TAC 352, Subchapter F and 40 CFR §257.73(e)(1)(i) - (iv) and 40 CFR §257.74(e)(1)(i) - (iv) for the critical cross-section of the embankment. The critical cross-section is the cross-section anticipated to be the most susceptible to structural failure based on appropriate engineering considerations, including loading conditions. The safety factor assessments must be supported by appropriate engineering calculations and certified by a qualified Texas P.E.

VI. Groundwater Monitoring and Corrective Action (30 TAC 352, Subchapter H)

See Instructions and Technical Guidance – No. 32 Coal Combustion Residuals Groundwater Monitoring and Corrective Action

27. Groundwater Monitoring System

A. Complete Table VI.A. - Unit Groundwater Detection Monitoring System.

B. Provide a map showing location of wells, groundwater elevations, and groundwater flow direction.

See Groundwater Potentiometric Surface Maps in Appendix C of the "Groundwater Monitoring System Certification" report for AX Landfill located in APPENDIX E.

C. Provide attachments describing how the facility will comply with the requirements in 30 TAC §352.911 and provide a certification by a qualified Texas P.E or qualified Texas P.G. that the groundwater monitoring system design and construction meet the requirements of 30 TAC Chapter 352.

See "Groundwater Monitoring System Certification" report for AX Landfill located in APPENDIX E. The certification statement can be found on the second page of the document.

D. Provide a figure showing the geologic units and fill materials overlying the uppermost aquifer, materials comprising the uppermost aquifer, and materials comprising the confining unit defining the lower boundary of the uppermost aquifer, including, but not limited to, thicknesses, stratigraphy, lithology, hydraulic conductivities, porosities and effective porosities.

See Figures 3, 4, 5, 6 in the "Groundwater Monitoring System Certification" report for AX Landfill located in APPENDIX E. Additional information on the local geology/hydrogeology can be found in the "Groundwater Monitoring System Certification Addendum No. 1" located in APPENDIX E.

E. For a multiunit groundwater monitoring system, demonstrate that the groundwater monitoring system will be equally as capable of detecting monitored constituents at the waste boundary of the CCR unit as the individual groundwater monitoring system for each CCR unit by providing at minimum the following information:

1. Number, spacing, and orientation of each CCR unit;
2. Hydrogeologic setting; and
3. Site history.

F. Has there been any sampling concentrations of one or more constituents listed in Appendix IV detected at statistically significant levels above the groundwater protection standard (GWPS)? ☐ Yes ☒ No

G. Provide information on how monitoring wells have been constructed and cased in a manner that maintains the integrity of the monitoring well borehole and to prevent contamination of samples and the groundwater.

See Appendix A in the "Groundwater Monitoring System Certification" report for AX Landfill located in APPENDIX E

28. Groundwater Monitoring Sampling and Analysis Program

Provide a sampling and analysis plan that includes procedures and techniques; sampling and analytical methods that are appropriate for groundwater sampling; and that address the requirements of 30 TAC §352.931 and 40 CFR §257.93. Provide a P.E or P.G. certification that describes the statistical method selected to evaluate the groundwater monitoring data and certifies that the selected statistical method is appropriate for evaluating the groundwater monitoring data for the CCR management area. Refer to TG-32 for information and guidance.

See "Groundwater Monitoring Plan-Revision 2" and "Statistical Analysis Plan-Revision 1" for AX Landfill located in APPENDIX E

29. CCR Unit(s) in a Detection Monitoring Program

Does the facility have CCR unit(s) in a Detection Monitoring Program?

☒ Yes ☐ No

AX Landfill

If "Yes", Submit the following information:

A. Submit Table VI.C. – Facility CCR Units Under Detection Monitoring.

B. Provide a Background Evaluation Report.

Background data was derived from the eight independent sampling events required under 40 CFR 257.94(b). A summary of the background monitoring program can be found in Section 3.0 of the "2017 Annual Groundwater Monitoring Report". Background water quality data is summarized in Tables 3 and 4 and laboratory analytical reports are located in Appendix A of the 2017 report.

The "2017 Annual Groundwater Monitoring Report" is in APPENDIX E.

C. Provide a report with the results of semiannual monitoring events.

~~See the~~The "2020 Annual Groundwater Monitoring and Corrective Action ~~Report" for AX Landfill in APPENDIX E.~~Report" and the "2021 Annual Groundwater Monitoring and Corrective Action Report-Revision 1" for AX Landfill are in APPENDIX E.

1. Has a statistically significant increase (SSI) been detected for one or more of the constituents listed in Appendix III at any monitoring well?

   ☒ Yes ☐ No

2. Has a notification to the executive director been sent within 14 days?

   ☒ Yes ☐ No

3. Date assessment monitoring program will start: N/A Due to successful ASDs

4. Do you plan to provide an alternative source demonstration (ASD)?

   ☒ Yes ☐ No

30. CCR Unit(s) in an Assessment Monitoring Program

Does the facility have CCR unit(s) in an Assessment Monitoring Program?

☐ Yes ☒ No

If "Yes", Submit information related for units.

A. Complete Table VI.D. – CCR Units Under Assessment Monitoring.

B. Provide, for each well in assessment monitoring status, the recorded concentrations lab sheets and results in a tabulated form.

C. Have the concentrations of all constituents listed in Appendices III and IV been at or below background values, using the statistical procedures in 30 TAC §352.931 and 40 CFR §257.93(g), for two consecutive sampling events for the CCR unit(s)? ☐ Yes ☐ No

If answer to above is yes, detection monitoring may resume. The owner or operator must prepare a notification stating that detection monitoring is resuming for the CCR unit and obtain written approval from the executive director.

D. Are there any concentrations of any constituent in Appendices III and IV above background values? ☐ Yes ☐ No

1. Has a notification to the executive director been sent within 14 days?

   ☐ Yes ☐ No

E. Date assessment of corrective measures will be initiated (must be within **90 days** of finding a statistically significant level above the GWPS) for the CCR unit(s):

F. Will you provide an ASD (see TG-32 for an acceptable submittal)? ☐ Yes ☐ No

G. Date assessment of corrective measures will be initiated if ASD is not accepted?

H. Complete Table VI.D-2. - Groundwater Detection Monitoring Parameters

Note: Refer to TG-32 regarding establishing a GWPS for each constituent in Appendix IV detected in the groundwater and attach as table.

I. Have you completed the assessment of corrective measures? ☐ Yes ☐ No
If "Yes", date assessment of corrective measures was completed: September 5, 2019
If "No", date assessment of corrective measures will be completed:
Expected date of submittal of amendment (see note below):
Provide completed assessment of corrected measures materials.

Note: Within **30 days** of completing the assessment of corrective measures, and before remedy implementation, the owner or operator shall submit an application for amendment to the registration. In some circumstances, the assessment of corrective measures and selected remedy may be approved as part of the initial application for the CCR unit registration.

J. Have you selected a remedy? ☐ Yes ☐ No

Provide public meeting documentation under 30 TAC §352.961 and a report under 30 TAC §352.971 and 40 CFR §257.97.

VII. Closure and Post-Closure Care

See Instructions and Technical Guidance

Submit a full closure plan and post-closure plan and all information describing how the owner or operator will comply with 30 TAC 352, Subchapter J and 40 CFR §§257.100 - 257.104. The owner of property on which an existing disposal facility is located, following the closure of a unit, must also submit documentation that a notation has been placed in the deed to the facility that will in perpetuity notify any potential purchasers of the property that the land has been used to manage CCR wastes and its use is restricted (30 TAC §352.1221 and 40 CFR §257.102(i)). For CCR units, closed after

October 19, 2015, that were closed before submission of the application, the applicant should submit documentation to show that notices required under 30 TAC 352, Subchapter K and 40 CFR §257.105 or §257.106 have been filed.

31. Closure Plan

This section applies to the owners and operators of all CCR units required to be registered. The applicant must close the facility in a manner that minimizes need for further maintenance and controls, or eliminates, to the extent necessary to protect human health and the environment, the post-closure release of CCR waste, chemical constituents of concern, leachate, contaminated rainfall, or waste decomposition products to the groundwater, surface waters, or to the atmosphere.

The type of unit to be closed can determine the level of detail sufficient for a closure plan. CCR units which have been certified closed after October 19, 2015, must provide documentation to demonstrate compliance with state and federal regulations.

For each unit to be registered, complete Table VII.A.1. - Unit Closure and list the CCR Unit components to be decontaminated, possible methods of decontamination, and possible methods of disposal of wastes and waste residues generated during unit closure. All ancillary components must be decontaminated, and the generated waste disposed of appropriately.

See "Closure Plan" and "Closure Plan-Addendum No. 1" for AX Landfill in APPENDIX F.

Information about CCR units closed or to be closed under alternative closure requirements must be provided in Table VII.A.2. - CCR Units Under Alternative Closure Notification.

Guidance on design of a closure cap and final cover for non-hazardous industrial solid wastes landfills is provided in EPA publication 530-SW-85-014, TCEQ Technical Guidance No. 3 and TCEQ publication, RG-534, "Guidance for Liner Construction and Testing for a Municipal Solid Waste Landfill".

32. Post-Closure Care Plan

Provide a post-closure care plan that complies with the requirements of 30 TAC §352.1241.

See "Post-Closure Plan" for AX Landfill in APPENDIX F.

Post-closure care of each CCR unit must continue for at least 30 years after the date of completing closure of the unit and must consist of monitoring and reporting of the groundwater monitoring systems, in addition to the maintenance and monitoring of CCR unit. Continuation of certain security requirements may be necessary after the date of closure. Post-closure use of property on or in which waste remains after closure must never be allowed to disrupt the integrity of the containment system. In addition, submit the following information:

- The name, address, and phone number of the person or office to contact about the CCR unit during the post-closure period; and

  Luminant-Environmental Services
  Renee Collins-Senior Environmental Director
  6555 Sierra Drive
  Irving, TX 75039
  214-875-8338
  CCRPostClosurePlan@Luminant.com

- A discussion of the future use of the land associated with each unit.

  See section 5.0 of the "Post-Closure Plan" for the AX Landfill in APPENDIX F.

Landfills and surface impoundments which have been certified closed after October 19, 2015, must be included in post-closure care plans, unless they have been determined to have been closed by waste removal equivalent to the closure standards in 30 TAC §352.1221 and 40 CFR §257.102 or 30 TAC §352.1231 and 40 CFR §257.103. If such a demonstration has been made pursuant to 40 CFR §257.102 or §257.103, but an equivalency determination has not been made, please submit a copy of the demonstration documentation. If an equivalency determination has been made, applicant should submit a copy of this determination.

VIII. Financial Assurance

33. Post-Closure Care Cost Estimate

Financial assurance for post-closure care (30 TAC §352.1101) applies to owners or operators of all CCR units, except CCR units from which the owner or operator intends to remove wastes and perform clean closure. Provide a written cost estimate in current dollars of the total cost of the 30-year (or longer, if applicable under 30 TAC §352.1101(d)) post-closure care period to perform post-closure care requirements as prescribed in 30 TAC §352.1241. The cost estimate must be based on the costs of hiring a third party to conduct post-closure care maintenance.

Complete Table VIII.A.1 – Post-Closure Cost Summary for Existing Registered Units

See Post-Closure Care Cost Estimate ~~Memo~~ for AX Landfill ~~from Golder~~ in APPENDIX G. Sandow AX Landfill cost estimates are summarized in Table ~~6~~1.

Complete Table VIII.A.2. - Post-Closure Cost Summary for Proposed Registered Units

34. Financial Assurance Mechanism

The financial assurance for post-closure care is required in accordance with 30 TAC §352.1101. The applicant shall demonstrate the financial assurance within 90 days after approval of the registration with a financial mechanism acceptable to TCEQ in compliance with 30 TAC §352.1101(c) and 30 TAC §37, Subchapters A through D, except as indicated in 30 TAC §352.1111, in an amount no less than the amount specified in the approved Post-Closure Care Cost Summary. Provide a description of the proposed financial assurance mechanism.

~~Vistra Corporation currently uses AEGIS Insurance Services Endorsement No. 60 (TCEQ Endorsement for Closure, Post-Closure or Corrective Action) as an approved financial assurance mechanism at other Vistra owned facilities. Applicant intends to add post-closure coverage amounts detailed in Table VIII.A.1. to current policy.~~Acceptable financial assurance mechanism per 30 TAC 352.1101 will be provided no more than 90 days after the executive director's approval of the registration.

Complete Table VIII.B. - Post-Closure Period, for the authorized post-closure period, to meet the requirements of 30 TAC §352.1241(a) through (c).

Signature Page

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Applicant Signature: _____ Date: _____

Name and Official Title (type or print): _____

Owner or Operator Signature: _____ Date: _____

Name and Official Title (type or print): _____

To be completed by the owner or operator if the application is signed by an authorized representative for the operator

I, _____ hereby designate _____
(operator) (authorized representative)

as my representative and hereby authorize said representative to sign any application, submit additional information as may be requested by the Commission; and/or appear for me at any hearing or before the Texas Commission on Environmental Quality in conjunction with this request for a CCR waste management registration. I further understand that I am responsible for the contents of this application, for oral statements given by my authorized representative in support of the application, and for compliance with the terms and conditions of any registration which might be issued based upon this application.

_____
Printed or Typed Name of Applicant or Principal Executive Officer

_____
Signature

(Note: Application Must Bear Signature & Seal of Notary Public)

Subscribed and sworn to before me by the said _____ on this

_____ day of _____, _____.

My commission expires on the _____ day of _____, _____

(Seal) Notary Public in and for _____ County, Texas

Registration Application for Coal Combustion Residuals Waste Management

(See instructions for P.E/P.G. seal requirements.)

Attachments and Tables	**Attachment No.**
General Information	Appendix A
Property/Legal Description	
Property Owner Affidavit	
Legal Authority	
Delegation of Signature Authority	
TCEQ Core Data Form	
Attachments	
Response to TCEQ CCR Unit Registration Comments (Item 21)	
Location Restrictions & Geology	Appendix B
Location Restriction Demonstration	
Location Restriction Evaluation	
Fugitive Dust Control Plan	Appendix C
CCR Fugitive Dust Control Plan	
2021 Annual CCR Fugitive Dust Control Report	
Landfill Criteria	Appendix D
Construction Completion Reports	
Run-on and Run-off Control System Plan	
2021 Annual CCR Unit Inspection Report	
Groundwater Monitoring and Corrective Action	Appendix E
Groundwater Monitoring System Certification	
Groundwater Monitoring System Certification-Addendum No. 1	
Groundwater Monitoring Plan-Revision 2	
Statistical Analysis Plan-Revision 1	
2017 Annual Groundwater Monitoring Report	
2020 Groundwater Monitoring and Corrective Action Report	
2021 Groundwater Monitoring Plan and Corrective Action Report-Revision 1	
Closure and Post-Closure Care	Appendix F
Closure Plan	
Closure Plan-Addendum No. 1	
Post-Closure Plan	
Financial Assurance	Appendix G
Post-Closure Care Cost Estimate ~~Memo~~	

Tables

Tables	Submitted	Not Applicable
Table I.6. - CCR Waste Management Units	☒	☐
Table I.6.A. - Waste Management Information	☒	☐
Table I.6.B. - Wastes Managed in Registered Units	☒	☐
Table I.6.C. - Sampling and Analytical Methods	☒	☐
Table IV.A. - Landfill Characteristics	☒	☐
Table IV.B. - Landfill Liner System	☒	☐
Table IV.C. - Landfill Leachate Collection System	☐	☒
Table IV.D. - Inspection Schedule of Landfills	☒	☐
Table V.A. - Surface Impoundments Characteristics	☐	☒
Table V.B. - Surface Impoundment Liner System	☐	☒
Table V.J. - Inspection of Surface Impoundments	☐	☒
Table VI.A. - Unit Groundwater Detection Monitoring System	☒	☐
Table VI.C. - CCR Units Under Detection Monitoring	☒	☐
Table VI.C-1. – Groundwater Detection Monitoring Parameter	☒	☐
Table VI.D. - CCR Units Under Assessment Monitoring	☐	☒
Table VI.D-2. - Groundwater ~~Detection~~ Assessment Monitoring Parameters	☐☒	☒
Table VII.A.1. - Unit Closure	☒	☐
Table VII.A.2. - CCR Units Under Alternative Closure Notification	☐	☒
Table VIII.A.1. - Post-Closure Cost Summary for Existing Registered Units	☒	☐
Table VIII.A.2. - Post-Closure Cost Summary for Proposed Registered Units	☐	☒
Table VIII.B. - Post-Closure Period	☐	☒

Additional Attachments as Applicable - Select all those apply and add as necessary

☒ TCEQ Core Data Form(s) Appendix A
☒ Signatory Authority Delegation Appendix A
☐ Fee Payment Receipt
☐ Confidential Documents
☒ Certificate of Fact (Certificate of Incorporation) Appendix A
☐ Assumed Name Certificate

Table I.6. – CCR Waste Management Units

CCR Unit No.[1]	Unit Name	N.O.R. No.[1]	Unit Description[3]	Capacity	Unit Status[2]
008	AX Landfill	008	Landfill	15.29 million cubic yards	Active

1 Registered Unit No. and N.O.R. No. cannot be reassigned to new units or used more than once.
2 Unit Status options: Active, Closed, Inactive (built but not managing waste), Proposed (not yet built), Never Built, Transferred, Post-Closure.
3 If a unit has been transferred, the applicant should indicate which facility/permit it has been transferred to in the Unit Description column.

Table I.6.A. – Waste Management Information

Waste No.[1]	Waste Type(s)	Source	Volume (tons/year)[2]
1	Fly Ash	Coal Combustion Byproduct	0
2	Waste Lignite	Misc. Maintenance Activities	56 tons
3	Bed Ash	Coal Combustion Byproduct	0
4	Construction Debris	Misc. Maintenance Activities	0

1 Assign waste number sequentially. Do not remove waste number wastes which are no longer generated

2 Reflects 2021 records

Table I.6.B. – Wastes Managed in Registered Units

Waste No.[1]	Waste	TCEQ Waste Form Codes and Classification Codes
1	Fly Ash	TWC-30023042, TX Form Code-304, Class 2
2	Waste Lignite	TWC-30044092, TX Form Code-409, Class 2
3	Bed Ash	TWC-30053042, TX Form Code-304, Class 2
4	Construction Debris	TWC-37043902, TX Form Code-390, Class 2

1 from Table I.6.A., first column

Table I.6.C – Sampling and Analytical Methods

Waste No.[1]	Sampling Location	Sampling Method	Frequency	Parameter	Test Method	Desired Accuracy Level
1-Flyash	Landfill/flyash silos/electrostatic precipitator	Grab	<5 years or change in waste generation process	TCLP Metals pH	SW1311/7470A SW1311/6020B SW9045C	See below [2]
2-Waste lignite	Drainage ditches around coal piles	Grab	<5 years or change in waste generation process	TCLP Metals	SW1311/7470A SW1311/6020B	See below [2]
3-Bottom ash	Landfill	Grab	<5 years or change in waste generation process	TCLP Metals	SW1311/7470A SW1311/6020B	See below [2]
4-Construction Debris	Varies by project	Composite	As needed	TCLP metals, TPH	SW1311/7470A SW1311/6020B TX1005	See below [2]

1 from Table I.6.A., first column

2 Analytical protocol will meet EPA quality control and accuracy specifications as published in the SW-846 Methods. The laboratory will be TCEQ accredited.

Table IV.A. – Landfills Characteristics

Registered Unit No.	Landfill	N.O.R. No.	Waste Nos.[1]	Rated Capacity	Dimensions[2]	Distance from lowest liner to groundwater	Action Leakage Rate (if required)	Unit will manage CCR Waste and non-CCR Waste (state all that apply)
008	AX Landfill	008	1 thru 9	15.29 million cubic yards	4100 ft L x 2000 ft W x 90 ft H (height @ max design) 179 acres	N/A	N/A	Waste numbers 1-9 as described in Table I.6.A.

1 From Table I.6.A., first column
2 Dimensions should be provided as average length, width and depth, also include the surface acreage for the unit.

Table IV.B. – Landfill Liner System

Registered Unit No.*	Landfill	Geomembrane Liner Material	Geomembrane Liner Permeability (cm/sec)	Geomembrane Liner Thickness	Soil Liner Material	Soil Liner Permeability (cm/sec)	Soil Liner Thickness
008	AX Landfill	GCL with 30-mil HDPE geomembrane	$<1.00 \times 10^{-7}$	30 mil	Compacted clay	$<5 \times 10^{-5}$ cm/sec	Minimum 2 ft

* This number should match the Registration Unit No. given on Table IV.A.

Table IV.C. – Landfill Leachate Collection System

Registered Unit No.	Landfill Name	Drainage Media	Collection Pipes (including risers)	Filter Fabric	Geofabric	Sump Material
N/A						

Table IV.D. – Inspection Schedule of Landfills

Facility Unit(s) and Basic Elements	Possible Error, Malfunction, or Deterioration	Frequency of Inspection
008-AX Landfill	Inspect for any appearances of actual or potential structural weakness and other conditions which are disrupting of have the potential to disrupt the operation and safety of the CCR unit	Weekly inspections are performed at intervals not exceeding seven days per 40 CFR 257.84(a).~~Weekly Inspection per 40 CFR 257.84(a)~~
Embankments	Surface cracking, animal burrows, misalignments, slides, vegetative cover, rutting, erosion, seepage, slope protection/chutes	Weekly inspections are performed at intervals not exceeding seven days per 40 CFR 257.84(a).~~Weekly Inspection~~
Capped Areas	Animal burrows, vegetative cover, rutting, surface cracking	Weekly inspections are performed at intervals not exceeding seven days per 40 CFR 257.84(a).~~Weekly Inspection~~
Active Work Area	Contact water, dusting	Weekly inspections are performed at intervals not exceeding seven days per 40 CFR 257.84(a).~~Weekly Inspection~~
Groundwater Monitoring Wells	Deterioration of pads, bollards, missing locks, compromise of casing integrity	Semi-Annual Inspection
008-AX Landfill		Annually per 40 CFR 257.84(b)
	Inspect for any changed in geometry of the structure since the previous annual inspection.	Annual Inspection
	Estimate the approximate volume of CCR contained in the unit at the time of the inspection.	Annual Inspection
	Inspect for any appearance of actual or potential structural weakness of the CCR unit, and any conditions that are disrupting or have the potential to disrupt the operation and safety of the unit.	Annual Inspection
	Inspect for any other change(s) which have affected the stability or operation of the CCR unit since the previous inspection	Annual Inspection

Table V.A. – Surface Impoundment Characteristics

Registered Unit No.	Surface Impoundment Name	N.O.R. No.	Waste Nos.[1]	Rated Capacity	Dimensions[2]	Distance from lowest liner to groundwater	Action Leakage Rate (if required)	Unit will manage CCR Waste and non-CCR Waste (state all that apply)
N/A								

1 From Table I.6.A., first column
2 Dimensions should be provided as average length, width and depth, also include the surface acreage for the unit.

Table V.B. – Surface Impoundment Liner System

Registered Unit No.*	Surface Impoundment Name	Geomembrane Liner Material	Geomembrane Liner Permeability (cm/sec)	Geomembrane Liner Thickness	Soil Liner Material	Soil Liner Permeability (cm/sec)	Soil Liner Thickness
N/A							

* This number should match the Registration Unit No. given on Table V.A.

Table V.J. – Inspection Schedule of Surface Impoundments

Facility Unit(s) and Basic Elements	Possible Error, Malfunction, or Deterioration	Frequency of Inspection
N/A		

Table VI.A. - Unit Groundwater Detection Monitoring Systems

Waste Management Unit/Area Name[1]	**WMU 008 - AX Landfill**									
Well Number(s):	AXMW-1	AXMW-2	AX-23	AX-24	AX-25*	AX-25R	AX-26	AX-27	AX-28	AX-29
Hydrogeologic Unit Monitored	Wilcox Group	Wilcox Group	Wilcox Group	Wilcox Group	Wilcox Group	Wilcox Group	Wilcox Group	Wilcox Group	Wilcox Group	Wilcox Group
Type (e.g., point of compliance, background, observation, etc.)	POC	POC	POC	POC	POC	POC	POC	POC	POC	POC
Up or Down Gradient	Up	Up	Up	Down	Down	Down	Down	Down	Down	Up
Casing Diameter and Material	2 " PVC	2 " PVC	4" PVC	2 " PVC	2 " PVC	2 " PVC	2 " PVC	4" pvc	2 " PVC	2 " PVC
Screen Diameter and Material	2 " PVC	2 " PVC	4" PVC	2 " PVC	2 " PVC	2 " PVC	2 " PVC	4" PVC	2 " PVC	2 " PVC
Screen Slot Size (in.)	0.010"	0.010"	0.010"	0.010"	0.010"	0.010"	0.010"	0.010"	0.010"	0.010"
Top of Casing Elevation (Ft, Mean Sea Level *[MSL]*)	473.65	482.25	482.26	468.74	443.62	442.9	458.6	479.47	463.26	487.73
Grade or Surface Elevation (Ft, MSL)	471.88	480.54	479.78	466.48	441.11	440.4	456.34	476.82	460.75	484.96
Well Depth (Ft, Below Grade Surface *[BGS]*)	53	63	85	81	75	73	75	98	45	65
Well Depth (Ft, Below Top of Casing *[BTOC]*)	54.77	64.71	87.48	83.26	77.51	75.5	77.26	100.65	47.51	67.77
Screen Interval										
From (Ft, BGS)	33	43	65	61	65	63	55	78	25	45
To (Ft, BGS)	53	63	85	81	75	73	75	98	45	65
Screen Interval										
From (Ft, BTOC)	34.77	44.71	67.48	63.26	67.51	65.5	57.26	80.65	27.51	47.77
To (Ft, BTOC)	54.77	64.71	87.48	83.26	77.51	75.5	77.26	100.65	47.51	67.77

1 From Tables in Section I.; *MSL* : Mean Sea Level; *BGS* : Below Grade Surface; *BTOC* : Below Top of Casing

*Well AX-25 was damaged and subsequently pluggedon May 6, 2020. Well AX-25R was installed and completed on May 7, 2020, as a replacement for AX-25.

Table VI.C. – CCR Units Under Detection Monitoring

N.O.R. Unit No.	Unit Description[1,2]	Well(s)	Constituent(s)	Date of SSI Determination	Date of Assessment Monitoring Notification[3]
008	AX Landfill	AX-25, AX-27, AX-28	Ca (25, 27, 28) SO4 (27)	1/16/18	N/A-ASD successful (4/15/18)
008	AX Landfill	AX-23, AX-24, AX-25, AX-26, AX-27, AX-28, AX-29	Ca (25, 27) SO4 (26, 27) F (23, 24, 25, 28, 29)	1/15/19	N/A-ASD successful (4/10/19)
008	AX Landfill	AX-24, AX-25, AX-27	Ca (24, 25, 27) SO4 (27) F (25)	1/8/20	N/A-ASD successful (4/7/20)
008	AX Landfill	AX-24, AX-25R, AX-26, AX-27	B (27) Ca (24, 25R, 26, 27) SO4 (26, 27)	12/7/20	N/A-ASD successful (3/5/21)

1 Indicates a unit for which a 30 TAC Chapter 352/40 CFR Part 257, Subpart D alternative closure determination has been requested pursuant to 40 CFR §257.103.
2 Indicates a unit for which a 30 TAC Chapter 352/40 CFR Part 257, Subpart D alternative closure determination has been made pursuant to 40 CFR §257.103.
3 Enter month, day, and year.

Table VI.~~D-2~~C-1. – Groundwater Detection Monitoring Parameters

Parameter	Sampling Frequency	Analytical Method	Practical Quantification Limit (units)	Concentration Limit[1]
AX Landfill				
AXMW-1 Boron	Semi-Annual	SW6020A	0.6 mg/L	0.681
AXMW-1 Calcium	Semi-Annual	SW6020A	6.0 mg/L	569
AXMW-1 Chloride	Semi-Annual	E300	100 mg/L	491
AXMW-1 Fluoride	Semi-Annual	E300	0.4 mg/L	0.4
AXMW-1 Field pH	Semi-Annual	Field Measured	s.u.	5.49 7.09
AXMW-1 Sulfate	Semi-Annual	E300	300 mg/L	2,660
AXMW-1 TDS	Semi-Annual	M2540C	50.0 mg/L	5,820
AXMW-2 Boron	Semi-Annual	SW6020A	0.03 mg/L	3.62
AXMW-2 Calcium	Semi-Annual	SW6020A	15.0 mg/L	943
AXMW-2 Chloride	Semi-Annual	E300	100 mg/L	391
AXMW-2 Fluoride	Semi-Annual	E300	0.4 mg/L	1.88
AXMW-2 Field pH	Semi-Annual	Field Measured	s.u.	4.6 7.63
AXMW-2 Sulfate	Semi-Annual	E300	300 mg/L	3,040
AXMW-2 TDS	Semi-Annual	M2540C	50.0 mg/L	4,940
AX-23 Boron	Semi-Annual	SW6020A	0.03 mg/L	1.1
AX-23 Calcium	Semi-Annual	SW6020A	15.0 mg/L	475
AX-23 Chloride	Semi-Annual	E300	10.0 mg/L	313
AX-23 Fluoride	Semi-Annual	E300	0.4 mg/L	0.4
AX-23 Field pH	Semi-Annual	Field Measured	s.u.	3.24 7.95
AX-23 Sulfate	Semi-Annual	E300	30.0 mg/L	1,030
AX-23 TDS	Semi-Annual	M2540C	50.0 mg/L	3,090
AX-24 Boron	Semi-Annual	SW6020A	0.03 mg/L	0.311
AX-24 Calcium	Semi-Annual	SW6020A	15.0 mg/L	273
AX-24 Chloride	Semi-Annual	E300	100 mg/L	580
AX-24 Fluoride	Semi-Annual	E300	0.4 mg/L	0.4
AX-24 Field pH	Semi-Annual	Field Measured	s.u.	3.89 9.38
AX-24 Sulfate	Semi-Annual	E300	300 mg/L	1,010
AX-24 TDS	Semi-Annual	M2540C	50.0 mg/L	2,520

AX-25(R) Boron	Semi-Annual	SW6020A	0.03 mg/L	0.298
AX-25(R) Calcium	Semi-Annual	SW6020A	6.0 mg/L	262
AX-25(R) Chloride	Semi-Annual	E300	100 mg/L	1,140
AX-25(R) Fluoride	Semi-Annual	E300	0.4 mg/L	0.507
AX-25(R) Field pH	Semi-Annual	Field Measured	s.u.	4.69 9.2
AX-25(R) Sulfate	Semi-Annual	E300	300 mg/L	795
AX-25(R) TDS	Semi-Annual	M2540C	50.0 mg/L	3,980
AX-26 Boron	Semi-Annual	SW6020A	0.03 mg/L	0.446
AX-26 Calcium	Semi-Annual	SW6020A	15.0 mg/L	915
AX-26 Chloride	Semi-Annual	E300	100 mg/L	3,040
AX-26 Fluoride	Semi-Annual	E300	0.4 mg/L	0.4
AX-26 Field pH	Semi-Annual	Field Measured	s.u.	5.07 8.14
AX-26 Sulfate	Semi-Annual	E300	300 mg/L	1,200
AX-26 TDS	Semi-Annual	M2540C	50.0 mg/L	8,300
AX-27 Boron	Semi-Annual	SW6020A	0.03 mg/L	0.28
AX-27 Calcium	Semi-Annual	SW6020A	15.0 mg/L	366
AX-27 Chloride	Semi-Annual	E300	100 mg/L	1,020
AX-27 Fluoride	Semi-Annual	E300	0.4 mg/L	0.4
AX-27 Field pH	Semi-Annual	Field Measured	s.u.	6.08 7.3
AX-27 Sulfate	Semi-Annual	E300	300 mg/L	478
AX-27 TDS	Semi-Annual	M2540C	50.0 mg/L	3,620
AX-28 Boron	Semi-Annual	SW6020A	0.03 mg/L	0.393
AX-28 Calcium	Semi-Annual	SW6020A	15.0 mg/L	633
AX-28 Chloride	Semi-Annual	E300	100 mg/L	756
AX-28 Fluoride	Semi-Annual	E300	0.4 mg/L	.04
AX-28 Field pH	Semi-Annual	Field Measured	s.u.	4.67 8.55
AX-28 Sulfate	Semi-Annual	E300	300 mg/L	2,280
AX-28 TDS	Semi-Annual	M2540C	50.0 mg/L	3,790
AX-29 Boron	Semi-Annual	SW6020A	0.03 mg/L	0.432
AX-29 Calcium	Semi-Annual	SW6020A	15.0 mg/L	791
AX-29 Chloride	Semi-Annual	E300	100 mg/L	306
AX-29 Fluoride	Semi-Annual	E300	0.4 mg/L	0.4

AX-29 Field pH	Semi-Annual	Field Measured	s.u.	2.73 7.01
AX-29 Sulfate	Semi-Annual	E300	300 mg/L	1,440
AX-29 TDS	Semi-Annual	M2540C	50.0 mg/L	3,370

1 The concentration limit is the basis for determining whether a release has occurred from the CCR unit/area.

Table VI.D. – CCR Units Under Assessment Monitoring

N.O.R. Unit No.	Unit Description[1,2]	Well(s)	Constituent(s)	Date of SSI Determination	Date of Assessment Monitoring Notification[3]
N/A					

1 Indicates a unit for which a 30 TAC Chapter 352/40 CFR Part 257, Subpart D alternative closure determination has been requested pursuant to 40 CFR §257.103.
2 Indicates a unit for which a 30 TAC Chapter 352/40 CFR Part 257, Subpart D alternative closure determination has been made pursuant to 40 CFR §257.103.
3 Enter month, day, and year

Table VI.D-2. – Groundwater Assessment Monitoring Parameters

Parameter	Sampling Frequency	Analytical Method	Practical Quantification Limit (units)	Concentration Limit[1]

[1] The concentration limit is the basis for determining whether a release has occurred from the CCR unit/area.

Table VII.A.1. – Unit Closure

For each unit to be registered, list the unit components to be decontaminated, the possible methods of decontamination, and the possible methods of disposal of wastes and waste residues generated during unit closure.

Equipment or CCR Unit	Possible Methods of Decontamination[1]	Possible Methods of Disposal[1]
008-AX Landfill	Close in Place	No disposal

1 Applicants may list more than one appropriate method.

Table VII.A.2. – CCR Units Under Alternative Closure Notification

Registered Unit No.	N.O.R. Unit No.	Unit Description[1,2]	Date of Receipt of Last Waste[3]	Date of Closure Notification[3]
N/A				

1 Indicates a unit for which a 30 TAC Chapter 352/40 CFR Part 257, Subpart D alternative closure determination has been requested pursuant to 40 CFR §257.103.
2 Indicates a unit for which a 30 TAC Chapter 352/40 CFR Part 257, Subpart D alternative closure determination has been made pursuant to 40 CFR §257.103.
3 Enter month, day, and year.

Table VIII.A.1. – Post-Closure Cost Summary for Existing Registered Units

Unit	Cost
008-AX Landfill	$2,591,600
Total Existing Unit Post-Closure Cost Estimate	$2,591,600 (in 2021 Dollars)[1]

Table VIII.A.2. - Post-Closure Cost Summary for Proposed Registered Units

Unit	Cost
N/A	

1 As units are added or deleted from these tables through future registration amendments, the remaining itemized unit costs should be updated for inflation when re-calculating the revised total cost in current dollars.

Table VIII.B. – Post-Closure Period

Unit Name	Date Certified Closed	Authorized Post-Closure Period (Yrs.)	Earliest Date Post-Closure Ends (See Note 1)
[Unit Example 1]	**[1/1/1995]**	30 years	**[1/1/2025]**
[Unit Example 2]	**[1/1/1990]**	30 years	**[1/1/2020]**
[Unit Example 3]	**[1/1/1984]**	30 years	**[1/1/2014]**

Note 1 – Post-Closure Care shall continue beyond the specified date until the Executive Director has approved the applicant's request to reduce or terminate the post-closure period, consistent with 30 TAC §352.1241 – Post-Closure Care Requirements.

N/A

APPENDIX E – GROUNDWATER MONITORING AND CORRECTIVE ACTION

Groundwater Monitoring System Certification
Groundwater Monitoring System Certification-Addendum No.1
Groundwater Monitoring Plan-Revision 2
Statistical Analysis Plan-Revision 1
2017 Annual Groundwater Monitoring Report
2020 Groundwater Monitoring and Corrective Action Report
2021 Groundwater Monitoring and Corrective Action Report-Revision 1

COAL COMBUSTION RESIDUAL RULE
GROUNDWATER MONITORING SYSTEM CERTIFICATION

SANDOW 5 GENERATING PLANT
AX LANDFILL
ROCKDALE, TEXAS

OCTOBER 16, 2017

Prepared For:

Luminant Generation Company, LLC
6555 Sierra Drive
Irving, TX 75039

Prepared By:

Pastor, Behling & Wheeler, LLC
2201 Double Creek Drive, Suite 4004
Round Rock, Texas 78664
Texas Engineering Firm No. 4760

October 16, 2017

PROFESSIONAL CERTIFICATION

This document and all attachments were prepared by Pastor, Behling & Wheeler, LLC under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I hereby certify that the groundwater monitoring system installed at the referenced facility has been designed and constructed to meet the requirements of Section 257.91 of the CCR Rule.

Patrick J. Behling, P.E.
Principal Engineer
PASTOR, BEHLING & WHEELER, LLC

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1.0 INTRODUCTION

Luminant Generation Company, LLC (Luminant) operates the Sandow 5 Generating Plant (Sandow) located approximately 7 miles southwest of Rockdale in Milam County, Texas. Unit No. 5 is an approximately 581-megawatt, lignite-fired electric generation unit that was placed into service in 2009. Coal Combustion Residuals (CCRs) including fly ash and bed ash are generated as part of Unit No. 5 operation. CCR material is currently managed in the AX Landfill (the Site) located approximately 7,500 feet south of Unit No. 5 on former mined land that is part of the Sandow Lignite Mine (Figure 1). Disposal of CCRs in the AX Landfill began in May 2015.

The CCR Rule (40 CFR 257 Subpart D - *Standards for the Receipt of Coal Combustion Residuals in Landfills and Surface Impoundments*) has been promulgated by the EPA to regulate the management and disposal of CCRs as solid waste under Resource Conservation and Recovery Act (RCRA) Subtitle D. The final CCR Rule was published in the Federal Register on April 17, 2015. The effective date of the CCR Rule was October 19, 2015.

The CCR Rule establishes national minimum criteria for existing and new CCR landfills, existing and new CCR surface impoundments, and lateral expansions to landfills/impoundments. Pastor, Behling & Wheeler, LLC (PBW) was retained by Luminant to evaluate and certify that the groundwater monitoring system at the Site has been designed and constructed to meet the requirements in Section 257.91 of the CCR Rule.

1.1 Sandow 5 Units Subject to Groundwater Monitoring System Requirements

The AX Landfill is the only waste management unit associated with Sandow 5 that meets the definition of a CCR landfill. AX Landfill Cells 1, 2, and 2A are collectively considered an "existing landfill" under 40 CFR 257.53.

This groundwater monitoring system evaluation and certification was prepared for the AX Landfill, which includes Cells 1, 2, and 2A.

1.2 Description of AX Landfill Cells 1, 2, and 2A

The AX Landfill consists of Cells 1, 2, and 2A and covers an area of approximately 169 acres. The AX Landfill is located approximately 7,500 feet south of Sandow 5 on reclaimed mine land that is leased by Luminant from Alcoa (Figure 2). The landfill is used to manage fly ash and bed ash generated from Unit No. 5. Fly ash and bed ash are transported to the landfill in trucks and placed in the landfill as dry material.

AX Landfill Cells 1, 2, and 2A are lined landfill cells. Construction of Cell 1 was completed in July 2013 and construction of Cells 2 and 2A was initiated in May 2015. Cell 2 was completed in October 2015 and Cell 2A was completed in July 2016. Placement of Unit No. 5 CCR began in Cell 1 in May 2015 and Cell 2 in September 2016. As of the date of this report, CCR has not been placed in Cell 2A.

1.3 CCR Unit Groundwater Monitoring System Requirements

Section 257.91 of the CCR Rule indicates that existing CCR landfills and surface impoundments be provided with a groundwater monitoring system that consists of sufficient wells, installed at appropriate location and depths, to yield groundwater samples from the uppermost aquifer that meet the following criteria:

- Accurately represent the quality of background groundwater that has not been affected by leakage from a CCR unit; and
- Accurately represent the quality of groundwater passing the waste boundary of the CCR unit. The downgradient monitoring system must be installed at the waste boundary to ensure detection of groundwater contamination in the uppermost aquifer. All potential contaminant pathways must be monitored.

The specific configuration of the groundwater monitoring system must be determined based on site-specific technical information that must include aquifer thickness, groundwater flow rate, groundwater flow direction (including seasonal and temporal fluctuation in groundwater flow), saturated and unsaturated geologic units and fill materials that overly the uppermost aquifer, materials comprising the uppermost aquifer, and materials comprising the confining unit defining the lower boundary of the upmost aquifer, including, but not limited to, thickness, stratigraphy, lithology, hydraulic conductivities, porosities, and effective porosities.

At a minimum, the monitoring system must consist of at least one upgradient and three downgradient monitoring wells, and any additional monitoring wells necessary to accurately represent the quality of the background groundwater that has not been affected by leakage from the CCR unit and the quality of groundwater passing the waste boundary of the CCR unit.

Monitoring wells must be cased in a manner that maintains the integrity of the monitoring well borehole. This casing must be screened or perforated and packed with gravel or sand, where necessary, to enable collection of groundwater samples. The annular space above the sampling depth must be sealed to prevent contamination of samples and the groundwater. There must be documentation in the operating record of the design, installation, development, and decommissioning of any monitoring wells, piezometers and other measurement, sampling, and analytical devices. The qualified engineer must have access to and must review this documentation as part of the groundwater monitoring system certification.

2.0 GROUNDWATER MONITORING SYSTEM EVALUATION

2.1 AX Landfill Groundwater Monitoring System

The CCR groundwater monitoring well system at the AX Landfill consists of nine monitoring wells (AXMW-1, AXMW-2, AX-23, AX-24, AX-25, AX-26, AX-27, AX-28, and AX-29) that are each screened in the uppermost aquifer at the Site. The locations of the CCR monitoring wells are shown on Figure 2. Well construction information and survey data for the CCR wells are summarized in Table 1, CCR monitoring well logs are presented in Appendix A, and photographs of the CCR wells are presented in Appendix B.

2.2 Local Geology and Hydrogeology

The AX Landfill is located in the former Sandow Lignite Mine, which is located in the outcrop area of the Eocene-aged Wilcox Group (Barnes, 1974). The Wilcox Group in the vicinity of the Site is divided into the Hooper Formation, the Simsboro Formation, and the Calvert Bluff Formation (listed from oldest to youngest). The overburden interval and lignite seams mined at the Sandow Lignite Mine are part of the Calvert Bluff Formation.

The AX Landfill is constructed within overburden spoil material that was previously excavated and backfilled during lignite mining operations at the Sandow Lignite Mine. Geologic cross sections were constructed through the landfill area using lithologic data from new and existing CCR wells and other historical soil borings completed in the AX Landfill area. Cross section locations are presented on Figure 3 and the cross sections are presented on Figures 4, 5, and 6.

Lithologic descriptions from soil borings completed in the spoil material indicate that the spoil consists of a highly heterogeneous mixture of sand, silty and clayey sand, and clay. The mine spoil extends from ground surface to depths ranging from approximately 100 feet below ground surface (bgs) on the northwest side of the AX Landfill to more than 160 feet bgs on the southeast side of the AX Landfill. Native material encountered below the spoil zone generally consisted of lignite or native clay.

The uppermost aquifer at the Site occurs under unconfined conditions within the overburden spoil and extends to the base of the spoil where lignite and/or clay confining units are encountered.

2.3 Groundwater Potentiometric Surface Elevations

Eight background groundwater monitoring events were performed using the AX Landfill CCR monitoring well system from October 2015 to December 2016. Static water levels measured during the background monitoring period indicated water elevations ranging from 383.59 feet above mean sea level (amsl) to 458.55 feet amsl, and depths to water ranging from 23.70 feet bgs to 84.11 feet bgs (Table 2). Groundwater potentiometric surface maps based on data collected during the background monitoring period are presented in Appendix C.

Groundwater elevations were generally highest on the west side of the landfill and lowest on the east side of the landfill, with an inferred groundwater flow direction to the east. An average hydraulic gradient of approximately 0.02 ft/ft in the uppermost aquifer was calculated using the groundwater potentiometric surface maps. Based on the potentiometric surface maps, the location of each CCR monitoring well relative to the AX Landfill is as follows:

Upgradient Wells	Downgradient Wells
AXMW-1	AX-24
AXMW-2	AX-25
AX-23	AX-26
AX-29	AX-27
	AX-28

2.4 Uppermost Aquifer Hydraulic Conductivity Testing

PBW performed slug tests at monitoring wells AXMW-1 and AXMW-2 on October 5, 2015 to evaluate groundwater linear flow velocities of the uppermost aquifer at the Site. Slug test data and time-head change plots used to calculate hydraulic conductivities and transmissivities of the uppermost aquifer are provided in Appendix D. A summary of these hydraulic properties is presented in Table 3.

The average hydraulic conductivities for the test wells ranged from 1.85×10^{-4} cm/sec (well AXMW-1) to 2.96×10^{-4} cm/sec (well AXMW-2), with a geometric mean for the test wells of 2.34×10^{-4} cm/sec.

2.5 Conclusions

The CCR groundwater monitoring well system at the AX Landfill complies with Section 257.91 of the CCR Rule. This conclusion is supported by the following as described in detail in previous sections of this report:

- Nine monitoring wells are included in the CCR groundwater monitoring system – four upgradient monitoring wells and five downgradient monitoring wells.
- Each monitoring well is screened in the uppermost aquifer at the Site. Samples collected from upgradient monitoring wells will be representative of the quality of background groundwater that has not been affected by leakage from the landfill and samples collected from downgradient wells will ensure detection of groundwater contamination in the uppermost aquifer from the landfill.
- The monitoring wells are constructed with appropriate well casing to maintain the integrity of the monitoring well borehole and with slotted well screens to enable collection of groundwater samples. In addition, the annular space above the well screen is appropriately sealed to prevent water from entering the well screen from surface sources.
- Appropriate documentation exists in the owner/operator's operating record concerning the design, installation, and development of the monitoring wells.

3.0 REFERENCES

Barnes, Virgil E., 1974. Geologic Atlas of Texas, Austin Sheet. Texas Bureau of Economic Geology.

Tables

TABLE 1
CCR WELL CONSTRUCTION SUMMARY
SANDOW AX LANDFILL

Well ID	Date Installed	Northing	Easting	Ground Elevation (ft amsl)	TOC Elevation (ft amsl)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Screen Length (ft)	Total Design Depth (ft bgs)	Casing Diameter (in)
AX-23	10/15/15	335065	3028456	479.78	482.26	65	85	20	85	4
AX-24	10/15/15	336503	3031537	466.48	468.74	61	81	20	81	2
AX-25	10/16/15	335806	3032212	441.11	443.62	65	75	10	75	2
AX-26	10/14/15	334521	3031007	456.34	458.60	55	75	20	75	2
AX-27	10/14/15	333747	3030177	476.82	479.47	78	98	20	98	4
AX-28	10/13/15	332787	3029656	460.75	463.26	25	45	20	45	2
AX-29	10/13/15	333162	3028622	484.96	487.73	45	65	20	65	2
AXMW-1	11/28/12	336064	3029088	471.88	473.65	33	53	20	53	2
AXMW-2	11/28/12	334057	3028201	480.54	482.25	43	63	20	63	2

Notes:
1. Abbreviations: ft - feet; amsl - above mean sea level; bgs - below ground surface; TOC - top of casing; in - inches.

TABLE 2
GROUNDWATER ELEVATION SUMMARY
SANDOW AX LANDFILL

Well ID	TOC Elevation (ft amsl)	Date	Depth to Water (ft btoc)	Water Elevation (ft amsl)
AXMW-1	473.65	11/03/15	25.75	447.90
		12/17/15	25.67	447.98
		02/08/16	25.82	447.83
		04/25/16	25.55	448.10
		06/15/16	25.60	448.05
		08/09/16	26.52	447.13
		10/05/16	25.77	447.88
		12/22/16	26.31	447.34
AXMW-2	482.25	10/29/15	25.86	456.39
		12/17/15	24.75	457.50
		02/08/16	24.51	457.74
		04/26/16	23.72	458.53
		06/15/16	23.70	458.55
		08/10/16	24.35	457.90
		10/06/16	23.98	458.27
		12/22/16	24.26	457.99
AX-23	482.26	10/29/15	32.23	450.03
		12/17/15	31.60	450.66
		02/08/16	31.15	451.11
		04/26/16	30.26	452.00
		06/15/16	30.13	452.13
		08/09/16	30.49	451.77
		10/05/16	30.21	452.05
		12/21/16	30.08	452.18
AX-24	468.74	10/29/15	67.01	401.73
		12/18/15	66.67	402.07
		02/09/16	64.99	403.75
		04/25/16	60.80	407.94
		06/14/16	57.39	411.35
		08/09/16	53.90	414.84
		10/05/16	51.35	417.39
		12/21/16	48.98	419.76
AX-25	443.62	10/29/15	60.03	383.59
		12/18/15	52.99	390.63
		02/09/16	45.84	397.78
		04/25/16	37.94	405.68
		06/14/16	33.62	410.00
		08/10/16	34.78	408.84
		10/05/16	29.18	414.44
		12/21/16	27.44	416.18
AX-26	458.60	11/03/15	63.71	394.89
		12/17/15	58.04	400.56
		02/08/16	54.21	404.39
		04/25/16	51.15	407.45
		06/14/16	46.30	412.30
		08/10/16	51.84	406.76
		10/06/16	47.41	411.19
		12/22/16	45.50	413.10

TABLE 2
GROUNDWATER ELEVATION SUMMARY
SANDOW AX LANDFILL

Well ID	TOC Elevation (ft amsl)	Date	Depth to Water (ft btoc)	Water Elevation (ft amsl)
AX-27	479.47	11/03/15	77.32	402.15
		12/17/15	76.38	403.09
		02/08/16	75.04	404.43
		04/26/16	72.75	406.72
		06/14/16	71.62	407.85
		08/09/16	70.36	409.11
		10/06/16	69.11	410.36
		12/22/16	67.08	412.39
AX-28	463.26	11/03/15	40.38	422.88
		12/18/15	38.87	424.39
		02/08/16	38.71	424.55
		04/25/16	39.25	424.01
		06/15/16	39.18	424.08
		08/09/16	38.99	424.27
		10/05/16	38.69	424.57
		12/21/16	38.39	424.87
AX-29	487.73	10/29/15	59.10	428.63
		12/17/15	58.96	428.77
		02/08/16	58.56	429.17
		04/26/16	57.46	430.27
		06/14/16	57.02	430.71
		08/10/16	56.66	431.07
		10/06/16	56.13	431.60
		12/21/16	55.39	432.34

Notes:
1. Abbreviations: TOC - top of casing; ft - feet; amsl - above mean sea level.

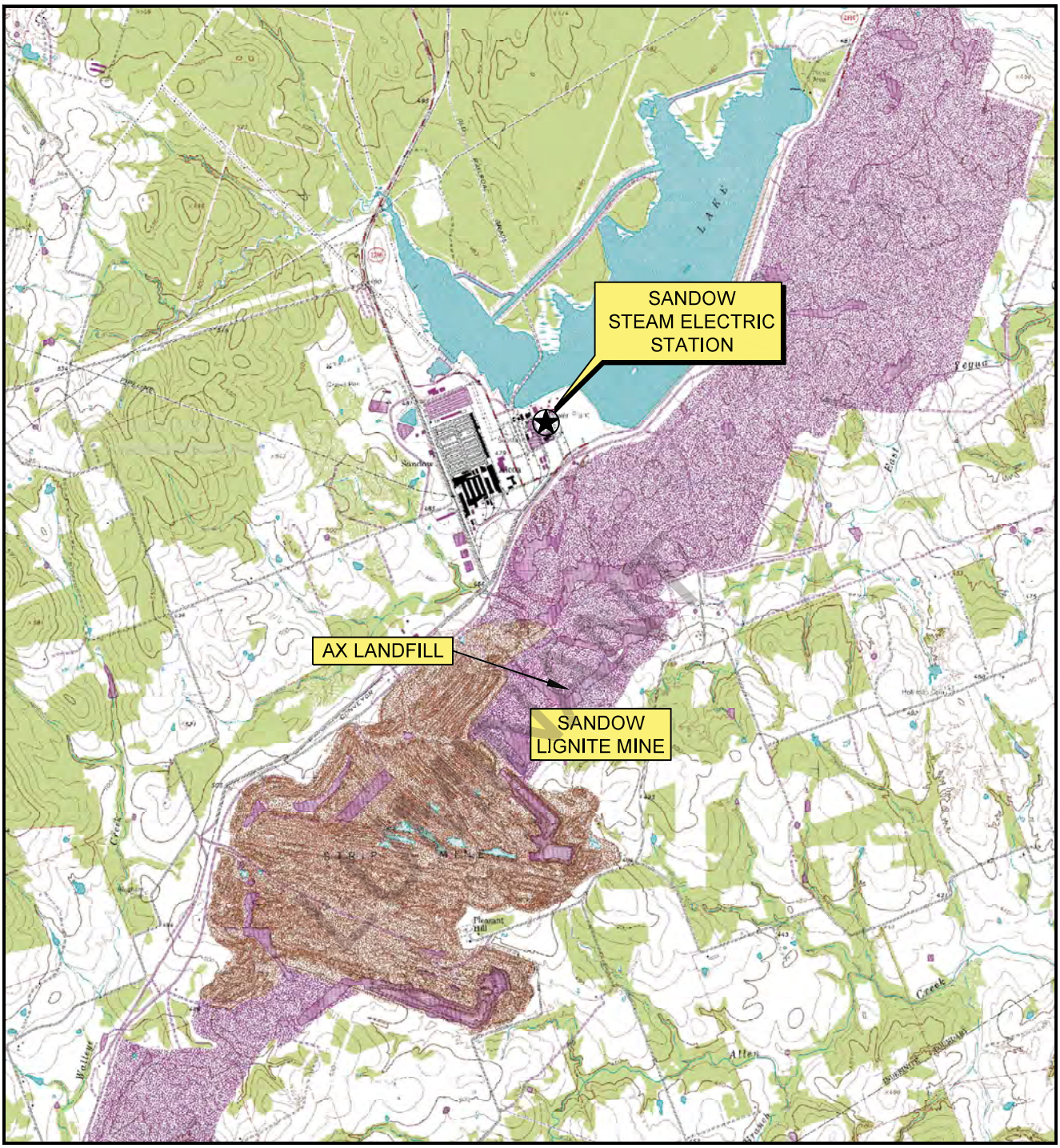
TABLE 3
SUMMARY OF AQUIFER TEST RESULTS
SANDOW AX LANDFILL

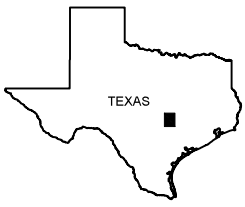
Well ID	Test Type	Aquifer Type	Analysis Method	Approximate Saturated Thickness (feet)	Results	
					T (cm^2/sec)	K (cm/sec)
AXMW-1	Slug-In	Unconfined	Bouwer-Rice	80	3.32E-01	1.36E-04
AXMW-1	Slug-Out	Unconfined	Bouwer-Rice	80	5.70E-01	2.34E-04
				Arithmetic Mean	**4.51E-01**	**1.85E-04**
AXMW-2	Slug-In	Unconfined	Bouwer-Rice	80	7.77E-01	3.19E-04
AXMW-2	Slug-Out	Unconfined	Bouwer-Rice	80	6.64E-01	2.72E-04
				Arithmetic Mean	**7.21E-01**	**2.96E-04**
				GEOMETRIC MEAN FOR ALL WELLS	**5.70E-01**	**2.34E-04**

Notes:

1. Abbreviations: T - transmissivity; K - hydraulic conductivity.

Figures





QUADRANGLE LOCATION

N

Scale in Feet

0 2000 4000

SOURCE:
Base map from www.tnris.gov, Alcoa Lake, TX 7.5 min. USGS quadrangle dated 1963, revised 1988.

SANDOW STEAM ELECTRIC STATION

ROCKDALE, TEXAS

Figure 1

SITE LOCATION MAP

PROJECT: 5164E	BY: AJD	REVISIONS
DATE: MAR., 2017	CHECKED: PJB	

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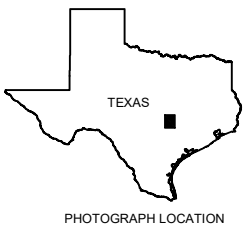
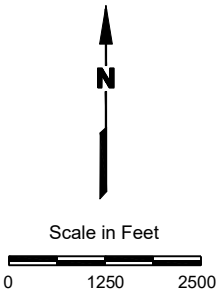
CONSULTING ENGINEERS AND SCIENTISTS

EXPLANATION

CCR Monitoring Well Location



PHOTOGRAPH LOCATION



SOURCE:
Imagery from www.tnris.gov, Alcoa Lake, aerial photographs, 2012.

SANDOW 5 GENERATING PLANT

AX LANDFILL

Figure 2

SITE PLAN

PROJECT: 5164E	BY: AJD	REVISIONS
DATE: SEPT., 2017	CHECKED: PJB	

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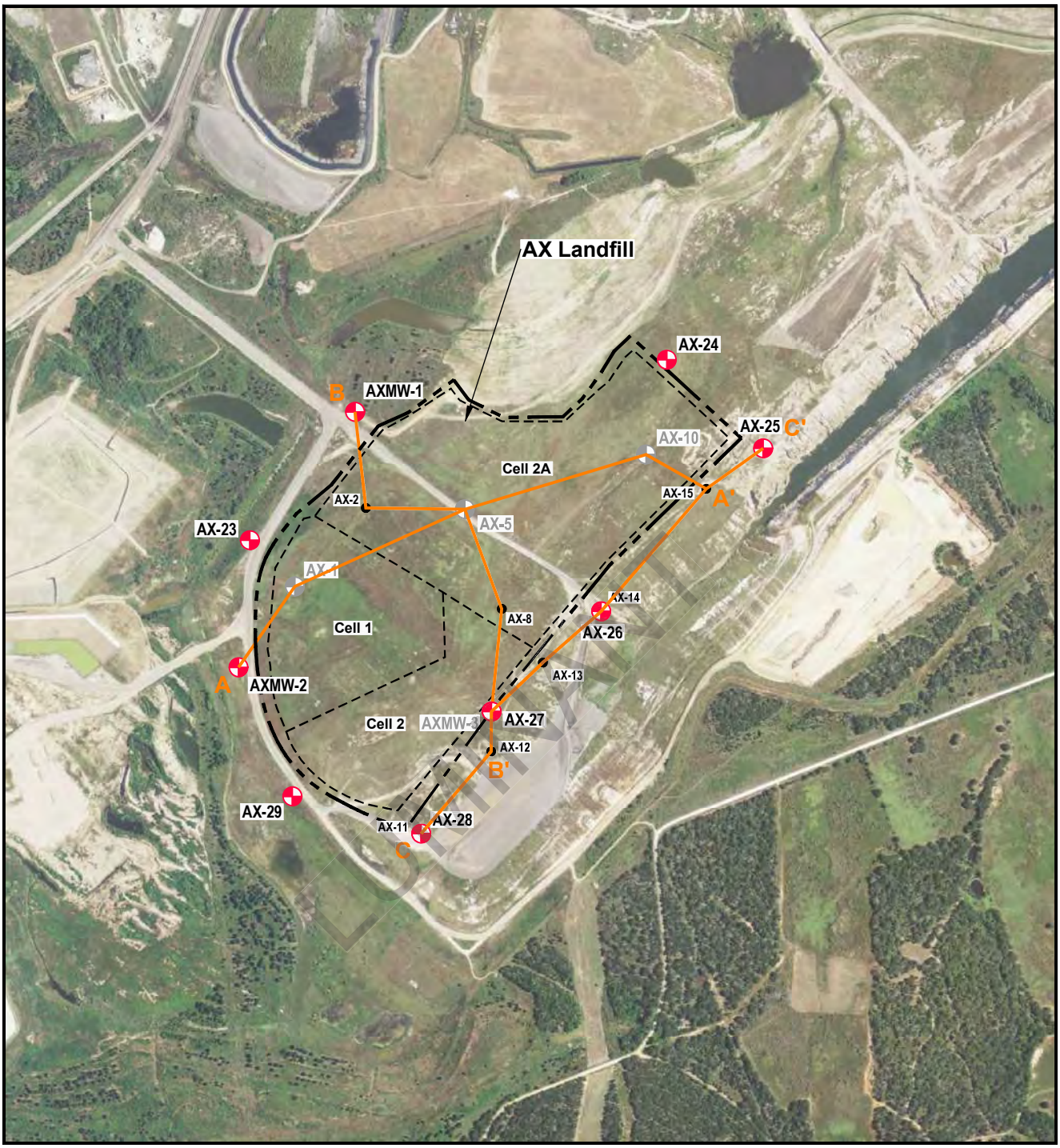

EXPLANATION

- CCR Monitoring Well Location
- Monitoring Well - Plugged
- Soil Boring Location
- A____A' Geologic Cross Section Location Lines

N

Scale in Feet

0 600 1200

SOURCE:
Imagery from www.tnris.gov, Alcoa Lake, aerial photographs, 2012.

SANDOW 5 GENERATING PLANT
AX LANDFILL

Figure 3

AX LANDFILL CROSS SECTION LOCATION MAP

PROJECT: 5164E	BY: AJD	REVISIONS
DATE: SEPT., 2017	CHECKED: PJB	

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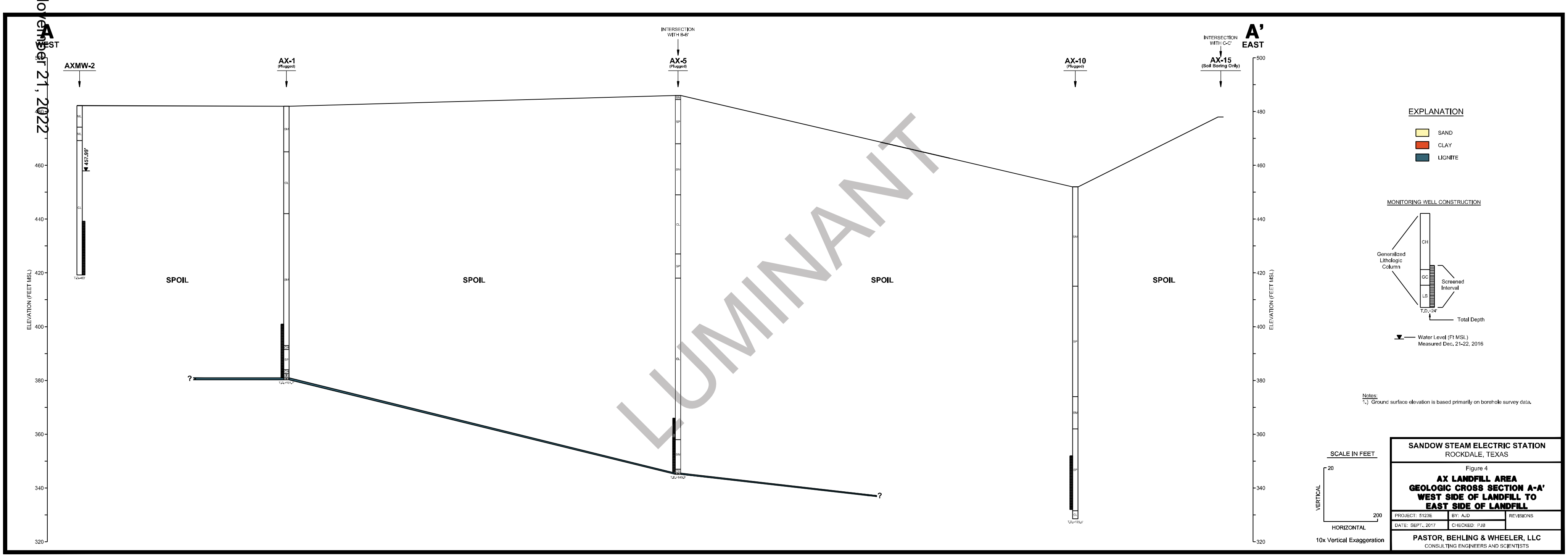
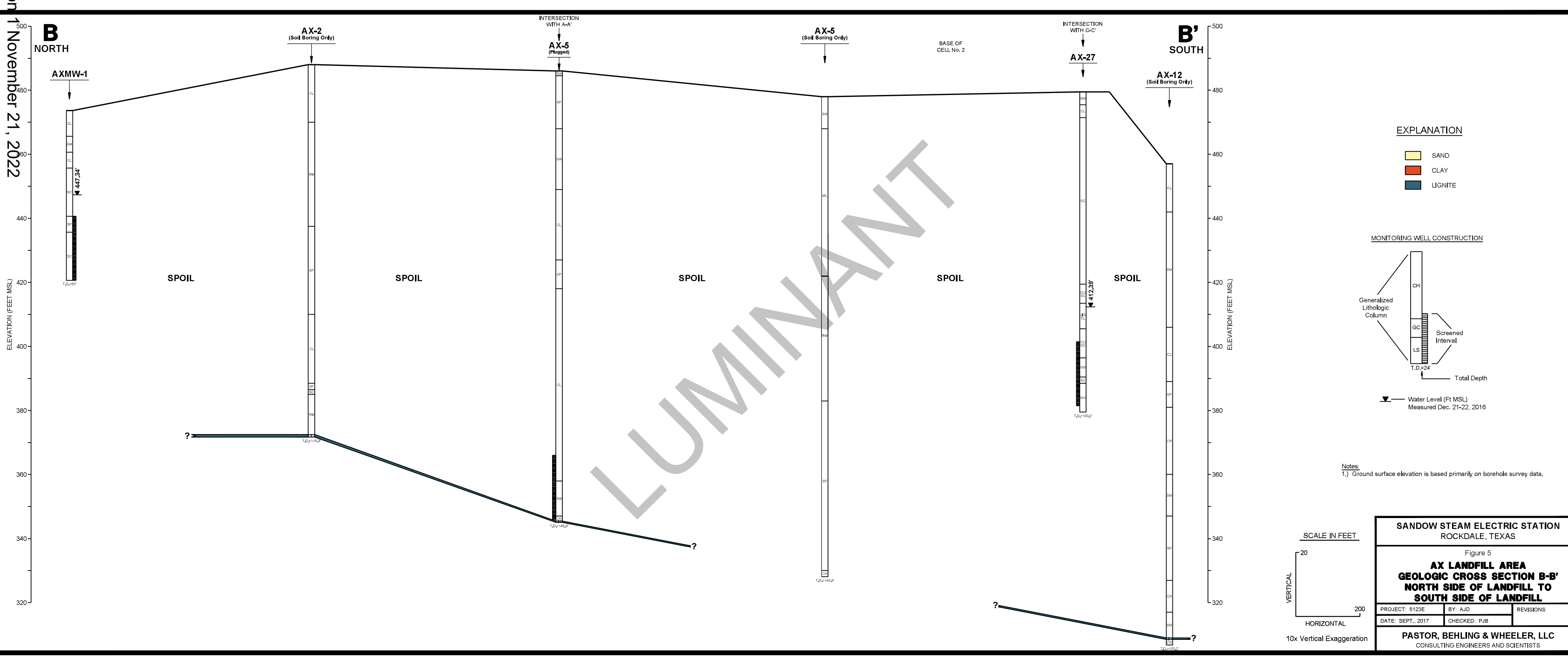

A
WEST
A'
EAST
AXMW-2
AX-1
(Plugged)
INTERSECTION WITH B-B'
AX-5
(Plugged)
AX-10
(Plugged)
INTERSECTION WITH C-C'
AX-15
(Soil Boring Only)
457.99'
SPOIL
SPOIL
SPOIL
SPOIL
?
?
ELEVATION (FEET MSL)
500
480
460
440
420
400
380
360
340
320
EXPLANATION
SAND
CLAY
LIGNITE
MONITORING WELL CONSTRUCTION
Generalized Lithologic Column
CH
GC
LS
Screened Interval
T.D.=24'
Total Depth
Water Level (Ft MSL) Measured Dec. 21-22, 2016
Notes:
1.) Ground surface elevation is based primarily on borehole survey data.
SCALE IN FEET
VERTICAL
20
HORIZONTAL
200
10x Vertical Exaggeration
SANDOW STEAM ELECTRIC STATION
ROCKDALE, TEXAS
Figure 4
AX LANDFILL AREA
GEOLOGIC CROSS SECTION A-A'
WEST SIDE OF LANDFILL TO
EAST SIDE OF LANDFILL
PROJECT: 51238
BY: AJD
REVISIONS
DATE: SEPT., 2017
CHECKED: PJB
PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS



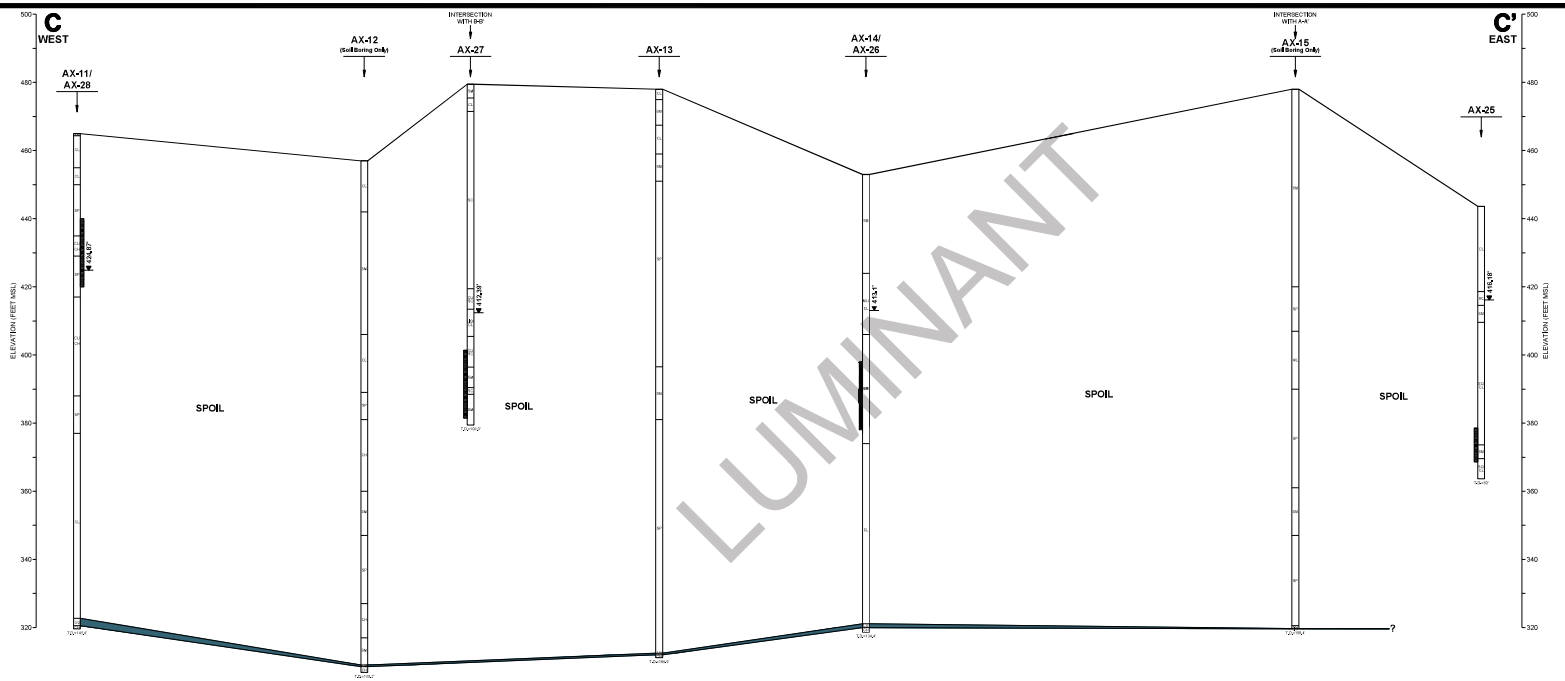
SANDOW STEAM ELECTRIC STATION
ROCKDALE, TEXAS

Figure 5

**AX LANDFILL AREA
GEOLOGIC CROSS SECTION B-B'
NORTH SIDE OF LANDFILL TO
SOUTH SIDE OF LANDFILL**

PROJECT: 5123E	BY: AJD	REVISIONS
DATE: SEPT., 2017	CHECKED: PJB	

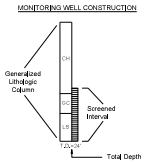
PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS



EXPLANATION

SAND
CLAY
LIGNITE

MONITORING WELL CONSTRUCTION



Water Level (Ft MSL)
Measured Dec. 21-22, 2016

Notes:
1.) Ground surface elevation is based primarily on borehole survey data.

SCALE IN FEET

10x Vertical Exaggeration

SANDOW STEAM ELECTRIC STATION
ROCKDALE, TEXAS

Figure 6

AX LANDFILL AREA
GEOLOGIC CROSS SECTION C-C'
WEST SIDE OF LANDFILL TO
EAST SIDE OF LANDFILL

PROJECT: 5123E	BY: AJD	REVISIONS
DATE: SEPT. 2017	CHECKED: PJB	

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CONSULTING ENGINEERS AND SCIENTISTS

Appendix A

CCR Monitoring Well Logs

Luminant

Log of Boring: AX-23

Sandow 5 Generating Plant
Rockdale, TX

PBW Project No. 5164E

Completion Date:	10/15/2015	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	8.5
Driller:	Timmy Beach	Total Depth (ft):	90
Driller's License:	5814M	TOC Elevation (ft. AMSL):	482.26
Logged By:	Michelle Hulewicz	Northing:	335064.705
Sampling Method:	4"x10' Core barrel	Easting:	3028456.298

Depth (ft)	Well Materials	Recovery (ft/ft)	USCS	Lithologic Description
0				
5		4.0/10.0		
10				
15		9.2/10.0		
20				
25		10.0/10.0		(0 - 59) Silty, sandy CLAY spoil, dark gray and brown, dry to moist, moisture content increases with depth, none to weak cementation, soft to hard, none to medium plasticity, abundant roots (0'-2'), more cohesive with depth, higher sand content (11'-15'), color change to brown with orange and rust colored mottling (11'-15'), lower sand content and light gray and dark gray clay laminations (15'-17', 23'-27', 36'-39'), orange sand lenses in dark gray clay (17'-23' and 30'-36'), higher sand content (27'-36'), dark gray with light gray and orange mottling (39'-47' and 53'-56'), lower clay content with depth (56'-59')
30			CL	
35		9.0/10.0		
40				
45		10.0/10.0		
50				
55		8.0/10.0		
60			SM	(59 - 60) Silty SAND spoil, light gray, very moist, moderate cementation, unconsolidated, gradual contact
65		9.7/10.0		
70				
75		9.0/10.0	SC/CL	(60 - 90) Sandy CLAY/ clayey SAND spoil, dark gray, orange and light gray mottling throughout, very moist, weak to moderate cementation, soft to very firm, low to medium plasticity, light gray sand lenses, 1' thick orange and dark gray clay layer at 66', sand layers with higher moisture content (6" thick at 72', 1' thick at 89', 1' thick at 85', and 2" thick light gray sand lense at 89'), lignite layer at 90'
80				
85		8.7/10.0		
90				

PBW

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Notes:
1. This log should not be used separately from the report to which it is attached.

Well Materials
(2.48-65) Casing, 4" Sch 40 FJT PVC
(65-85) Screen, 4" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-61') Grout
(61'-63') Bentonite pellets
(63'-85') 20/40 sand

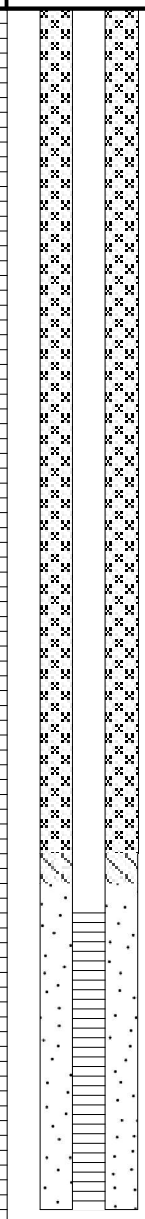
Luminant

Log of Boring: AX-24

Sandow 5 Generating Plant
Rockdale, TX

PBW Project No. 5164E

Completion Date:	10/15/2015	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6.25
Driller:	Timmy Beach	Total Depth (ft):	90
Driller's License:	5814M	TOC Elevation (ft. AMSL):	468.74
Logged By:	Michelle Hulewicz	Northing:	336503.03
Sampling Method:	4"x10' Core barrel	Easting:	3031536.564

Depth (ft)	Well Materials	Recovery (ft/ft)	USCS	Lithologic Description
0		3.0/10.0	SM	(0 - 17) Silty SAND spoil, light gray, dry, soft, unconsolidated, tan/brown with some orange 5'-10'), gradual increase in clay content with depth
5				
10		2.8/10.0		
15				
20		8.0/10.0		
25				
30		6.0/10.0		
35				
40		6.0/10.0	SC/CL	(17 - 80) Sandy CLAY/ clayey SAND spoil, dark gray, dry to moist (moisture increases with depth), weak cementation, soft with firm clay layers, clay layer at 19' (dark brown, dark gray, and light gray laminations), higher clay content (20'-27'), 2" tan sand lens at 25', higher sand content (27'-30'), interbedded light gray/tan sand and dark gray clay layers (sand at 32'-33', 33.5'-34.5', 35'-40', 41'-42', 44'-45', and 48'-50), dark gray silty clay layer (53'-58'), dark gray with brown/tan (60'-62'), silty clay layer with tan sand lenses (62'-68'), rusty colored and orange mottling (64'-65'), 1' thick tan and very moist sand layer at 74', higher clay content (74'-76'), light gray sand layer at 77', 1' thick dark gray/ brown clay layer at 78'
45				
50				
55		10.0/10.0		
60				
65		10.0/10.0		
70				
75		9.0/10.0		
80				
85		10.0/10.0	SM	(80 - 90) Silty SAND spoil, dark gray/ brown, wet (80'-84') and very moist (84'-90'), color change to light gray at 84', small lignite pieces (less than 0.5" diameter) at 84'.
90				

PBW

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Notes:
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Well Materials
(2.26-61) Casing, 2" Sch 40 FJT PVC
(61-81) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-57') Grout
(57'-59') Bentonite pellets
(59'-81') 20/40 sand

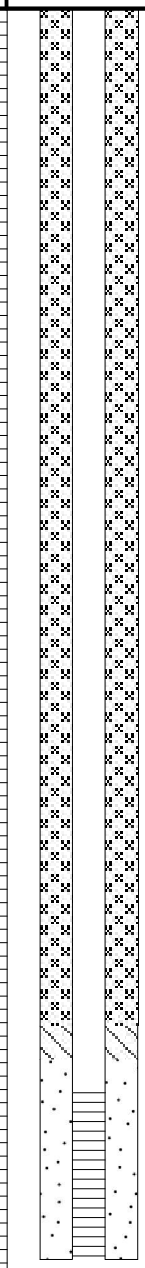
Luminant

Log of Boring: AX-25

Sandow 5 Generating Plant
Rockdale, TX

PBW Project No. 5164E

Completion Date:	10/16/2015	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6.25
Driller:	Timmy Beach	Total Depth (ft):	80
Driller's License:	5814M	TOC Elevation (ft. AMSL):	443.62
Logged By:	Michelle Hulewicz	Northing:	335806.391
Sampling Method:	4"x10' Core barrel	Easting:	3032212.339

Depth (ft)	Well Materials	Recovery (ft/ft)	USCS	Lithologic Description
0		4.0/10.0	CL	(0 - 25) Silty CLAY spoil, brown and dark gray with some orange and light gray, dry, weak cementation, soft to firm, unconsolidated (13'-17'), some lignite pieces at 9' and 12', becomes more sandy (very fine grained) with depth, clay and lignite mixed 21'-22', piece of wood (4" thick) at 24'
4				
8				
12		4.0/10.0		
16				
20		9.7/10.0		
24				
28			SC	(25 - 29) Clayey SAND spoil, light gray and tan, dry, soft, none to weak cementation
32			SM	(29 - 34) Silty SAND spoil with clay lenses, slightly moist, soft, unconsolidated
36		3.0/10.0	SC/CL	(34 - 70) Clayey SAND/ sandy CLAY spoil, light gray with orange mottling (34'-40'), slightly moist, moisture content increases with depth, none to weak cementation, unconsolidated, none to low plasticity, piece of wood at 39', interbedded sandy clay and clayey sand, gray and tan with orange, dark gray and brown mixed in (40'-50'), hard 2" thick gray clay layer at 47', ~1" thick clay lenses (medium plasticity, dark gray, light gray, and dark brown) throughout 50'-60', color transition to dark gray/brown at 60', higher sand content and higher moisture content (63'-64'), trace amounts of lignite at 63', higher clay content (very firm, dark gray, medium plasticity) (64'-68'), dark brown and orange (67'-68')
40				
44		7.2/10.0		
48				
52		4.0/10.0		
56				
60				
64		10.0/10.0		
68				
72			SM	(70 - 74) Silty SAND spoil with clay lenses, light and dark gray, wet, weak cementation, unconsolidated, none to low plasticity
76		9.5/10.0	SC/CL	(74 - 80) Clayey SAND/ sandy CLAY spoil, dark gray and brown, moist, weak to moderate cementation, soft to firm, none to low plasticity, higher clay content with depth, 2" thick orange layer with lignite pieces at 79'
80				

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Tel (512) 671-3434 Fax (512) 671-3446

Notes:
1. This log should not be used separately from the report to which it is attached.

Well Materials
(2.51-65) Casing, 2" Sch 40 FJT PVC
(65-75) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-61') Grout
(61'-63') Bentonite pellets
(63'-75') 20/40 sand

Luminant

Log of Boring: AX-26

Sandow 5 Generating Plant
Rockdale, TX

PBW Project No. 5164E

Completion Date:	10/14/2015	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6.25
Driller:	Timmy Beach	Total Depth (ft):	80
Driller's License:	5814M	TOC Elevation (ft. AMSL):	458.6
Logged By:	Michelle Hulewicz	Northing:	334521.489
Sampling Method:	4"x10' Core barrel	Easting:	3031007.111

Depth (ft)	Well Materials	Recovery (ft/ft)	USCS	Lithologic Description
0				
4		5.0/10.0	CL	(0 - 10) Silty CLAY spoil, dark brown, dry, weak cementation, soft, none to low plasticity, orange, dark gray, and light gray clay lenses, more compact with depth, higher plasticity with depth
8				
12			SC	(10 - 12) Clayey SAND spoil, gray and tan, slightly moist, none to weak cementation, unconsolidated
16		6.0/10.0	CL	(12 - 20) Silty CLAY spoil, dark brown, slightly moist, weak cementation, firm, lower sand content (17'-20'), color change to dark gray with light gray lamination, friable
20				
24		6.0/10.0		
28				
32		9.0/10.0		
36				(20 - 65) Sandy CLAY/clayey SAND spoil, light gray and brown with dark gray clay lenses, moist, weak cementation, soft with firm clay lenses, none to medium plasticity, ~1' thick dark gray, firm, and friable clay layer, purple and orange clay lenses (25'-30'), higher sand content (30'-32'), higher clay content (32'-35'), light gray and dark gray laminations (35'-38'), orange and gray clay lenses (38'-40'), dark gray (40'-43') transitions to light gray (43'-45'), dark purple, light gray, and brown clay lenses (45'-47'), higher sand content (45'-50'), higher dark gray clay content (50'-51'), higher sand content (light gray/tan) (51'-53'), higher clay content with dark and light laminations (53'-54'), higher sand content (light gray) (54'-55'), dark gray with orange mottling (55'-65'), 2" thick sand layer at 65'
40			SC/CL	
44		9.2/10.0		
48				
52		7.0/10.0		
56				
60				
64		6.0/10.0		
68				
72			CL	(65 - 80) Silty CLAY spoil with some sand, dark gray, moist, weak to moderate cementation, firm, low to medium plasticity, very wet (70'-74'), slightly moist (74'-80')
76		7.0/10.0		
80				

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Notes:
1. This log should not be used separately from the report to which it is attached.

Well Materials
(2.26-55) Casing, 2" Sch 40 FJT PVC
(55-75) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-51') Grout
(51'-53') Bentonite pellets
(53'-75') 20/40 sand

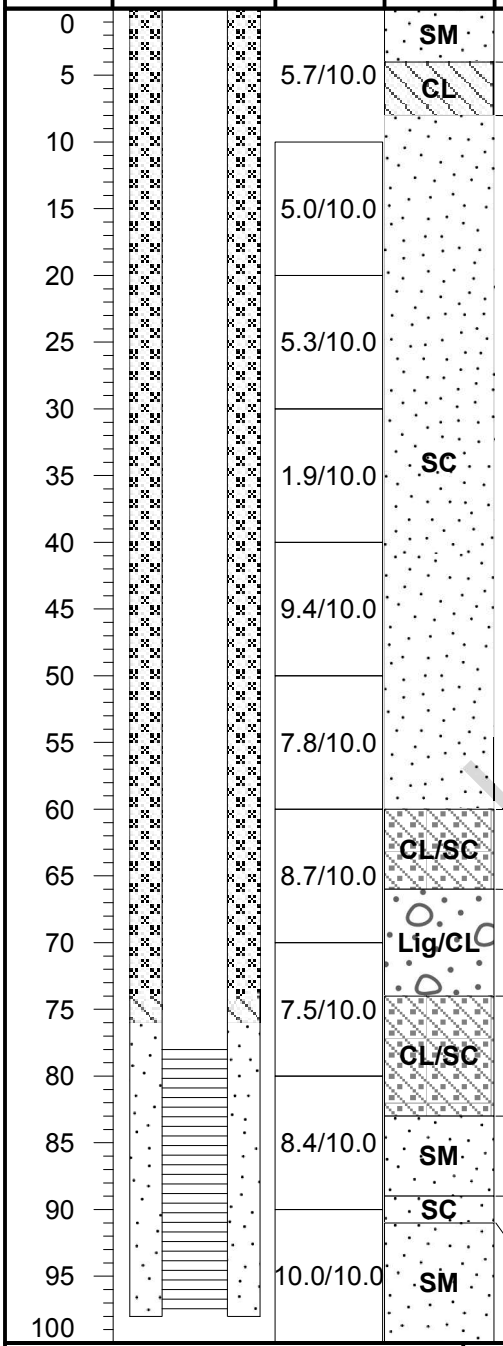
Luminant

Log of Boring: AX-27

Sandow 5 Generating Plant
Rockdale, TX

PBW Project No. 5164E

Completion Date:	10/14/2015	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	8.5
Driller:	Timmy Beach	Total Depth (ft):	100
Driller's License:	5814M	TOC Elevation (ft. AMSL):	479.47
Logged By:	Michelle Hulewicz	Northing:	333747.276
Sampling Method:	4"x10' Core barrel	Easting:	3030177.105



Depth (ft)	Recovery (ft/ft)	USCS	Lithologic Description
0		SM	(0 - 4) Silty SAND spoil with clay, dark brown, dry, none to weak cementation, unconsolidated to consolidated, organic smell, more cohesive with depth
5	5.7/10.0	CL	(4 - 8) Sandy, silty CLAY spoil, dark brown, dry, weak to moderate cementation, firm, low plasticity, 2" thick organic layer at 5', metallic nodule at 7'
10			
15	5.0/10.0		
20			
25	5.3/10.0		
30		SC	(8 - 60) Clayey SAND spoil, gray, slightly moist, weak cementation, unconsolidated, none to low plasticity, lower clay content (13'-16' and 23'-27'), tan clayey sand (12'-13'), dark gray clay lenses present (16'-19' and 23'-27'), 3" diameter rock at 31', orange/brown, light gray, and dark gray clay lenses throughout 30'-50', 4" thick lignite layer at 49', 6" thick lignite layer at 56', pieces of lignite present in clayey sand (56'-60'), 2" thick dark gray clay layer at 59'
35	1.9/10.0		
40			
45	9.4/10.0		
50			
55	7.8/10.0		
60		CL/SC	(60 - 66) Sandy CLAY/ clayey SAND spoil, dark gray, higher clay content (60'-63' and 64'-66'), some orange and light gray mottling (60'-66'), moist, weak cementation, soft with firm clay pockets
65	8.7/10.0		
70		Lig/CL	(66 - 74) Interbedded light gray CLAY and LIGNITE spoil, dry, weak cementation, firm to very hard, none to low plasticity
75	7.5/10.0		
80		CL/SC	(74 - 83) Sandy CLAY/ clayey SAND spoil, dark gray and tan, moist, weak cementation, firm, softer and higher sand content with depth, higher clay content (80'-83')
85	8.4/10.0	SM	(83 - 89) Silty SAND spoil, light gray and tan, wet, weak cementation, unconsolidated, 1" thick dark gray clay lense at 87'
90		SC	(89 - 91) Clayey SAND spoil, orange and dark gray, moist, weak to moderate, unconsolidated to consolidated, none to low plasticity
95	10.0/10.0	SM	(91 - 100) Silty SAND spoil, light gray, wet, weak cementation, unconsolidated to consolidated, dark gray and tan clay lenses present (95'-98'), rock fragment present at 96', higher clay content with depth, rusty colored clay lense at 99'
100			

PBW

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Notes:
1. This log should not be used separately from the report to which it is attached.

Well Materials
(2.65-78) Casing, 4" Sch 40 FJT PVC
(78-98) Screen, 4" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-74') Grout
(74'-76') Bentonite pellets
(76'-98') 20/40 sand

Luminant

Log of Boring: AX-28

Sandow 5 Generating Plant
Rockdale, TX

PBW Project No. 5164E

Completion Date:	10/13/2015	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6.25
Driller:	Timmy Beach	Total Depth (ft):	50
Driller's License:	5814M	TOC Elevation (ft. AMSL):	463.26
Logged By:	Michelle Hulewicz	Northing:	332787.311
Sampling Method:	4"x10' Core barrel	Easting:	3029655.555

Depth (ft)	Well Materials	Recovery (ft/ft)	USCS	Lithologic Description
0				
4		7.0/10.0	CL	(0 - 10) Sandy CLAY spoil, dark brown, dry to moist, weak cementation, soft to firm, none to low plasicity, organics present (roots, twigs), lower sand content with depth
8				
12		4.8/10.0		
16				
20		6.5/10.0	SM/SC	(10 - 43) Silty SAND spoil with some clay, light gray to tan, moist, weak cementation, unconsolidated, none to low plasticity, rust colored staining (~6" thick) at 15', interbedded dark gray, hard clay layers with some purple and rust coloring, 6" clay layer at 20' and 8" clay layer at 35', higher clay content with depth, color change to dark brown/ dark gray at 30', becomes wet (39'-43')
24				
28				
32		5.0/10.0		
36				
40				
44		10.0/10.0	CL	(43 - 50) Sandy CLAY spoil, dark gray, slightly moist, moderate cementation, firm to hard, none to low plasticity, rust colored and black nodules present
48				
52				

PBW

Pastor, Behling & Wheeler, LLC
2201 Double Creek Dr., Suite 4004
Round Rock, TX 78664
Tel (512) 671-3434 Fax (512) 671-3446

Notes:
1. This log should not be used separately from the report to which it is attached.

Well Materials
(2.51-25) Casing, 2" Sch 40 FJT PVC
(25-45) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-21') Grout
(21'-23') Bentonite pellets
(23'-45') 20/40 sand

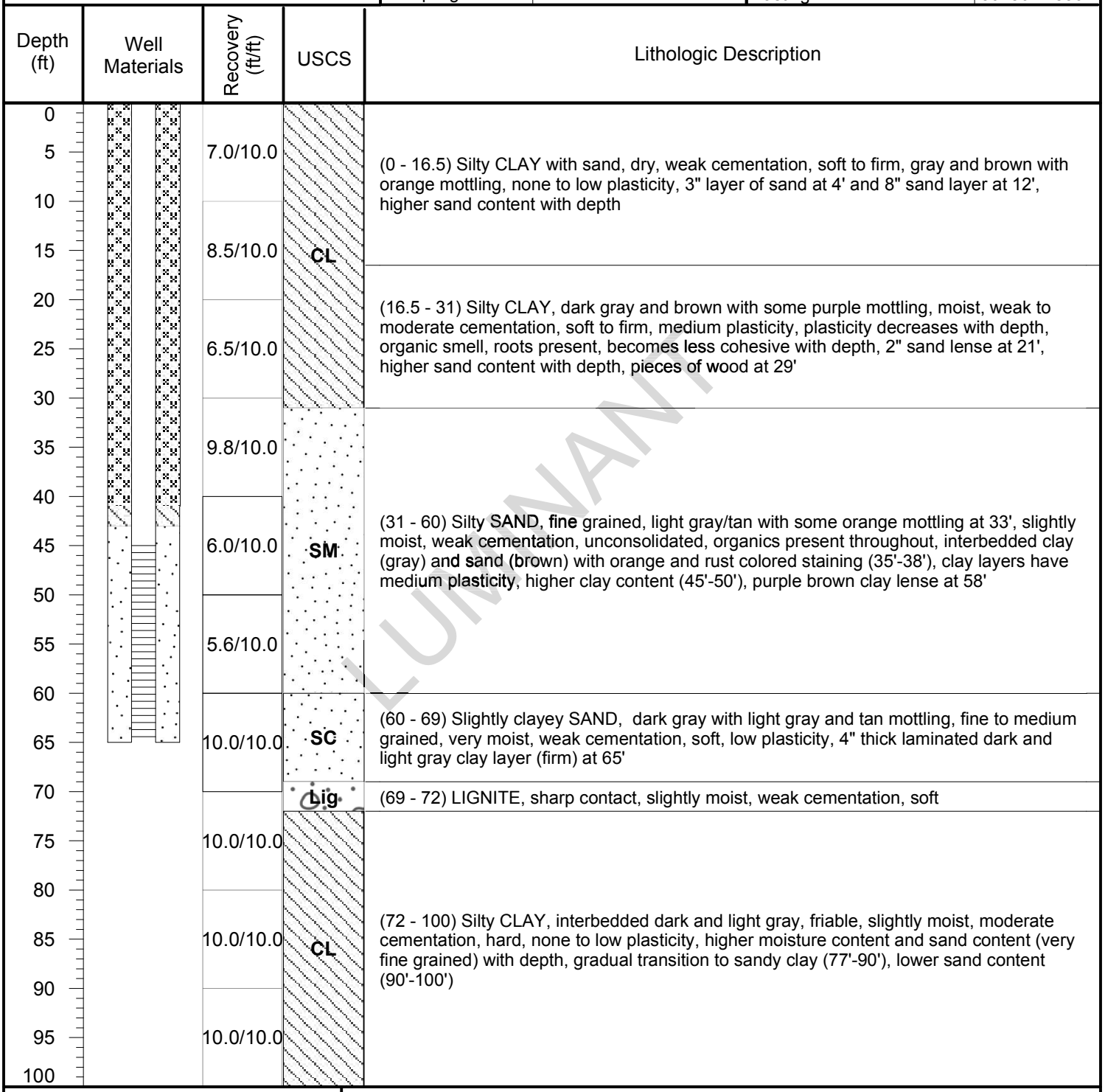
Luminant

Log of Boring: AX-29

Sandow 5 Generating Plant
Rockdale, TX

PBW Project No. 5164E

Completion Date:	10/13/2015	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6.25
Driller:	Timmy Beach	Total Depth (ft):	100
Driller's License:	5814M	TOC Elevation (ft. AMSL):	487.73
Logged By:	Michelle Hulewicz	Northing:	333161.803
Sampling Method:	4"x10' Core barrel	Easting:	3028621.836



Lithologic Description

(0 - 16.5) Silty CLAY with sand, dry, weak cementation, soft to firm, gray and brown with orange mottling, none to low plasticity, 3" layer of sand at 4' and 8" sand layer at 12', higher sand content with depth

(16.5 - 31) Silty CLAY, dark gray and brown with some purple mottling, moist, weak to moderate cementation, soft to firm, medium plasticity, plasticity decreases with depth, organic smell, roots present, becomes less cohesive with depth, 2" sand lense at 21', higher sand content with depth, pieces of wood at 29'

(31 - 60) Silty SAND, fine grained, light gray/tan with some orange mottling at 33', slightly moist, weak cementation, unconsolidated, organics present throughout, interbedded clay (gray) and sand (brown) with orange and rust colored staining (35'-38'), clay layers have medium plasticity, higher clay content (45'-50'), purple brown clay lense at 58'

(60 - 69) Slightly clayey SAND, dark gray with light gray and tan mottling, fine to medium grained, very moist, weak cementation, soft, low plasticity, 4" thick laminated dark and light gray clay layer (firm) at 65'

(69 - 72) LIGNITE, sharp contact, slightly moist, weak cementation, soft

(72 - 100) Silty CLAY, interbedded dark and light gray, friable, slightly moist, moderate cementation, hard, none to low plasticity, higher moisture content and sand content (very fine grained) with depth, gradual transition to sandy clay (77'-90'), lower sand content (90'-100')

PBW

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Notes:
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Well Materials
(2.77-45) Casing, 2" Sch 40 FJT PVC
(45-65) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-41') Grout
(41'-43') Bentonite pellets
(43'-65') 20/40 sand

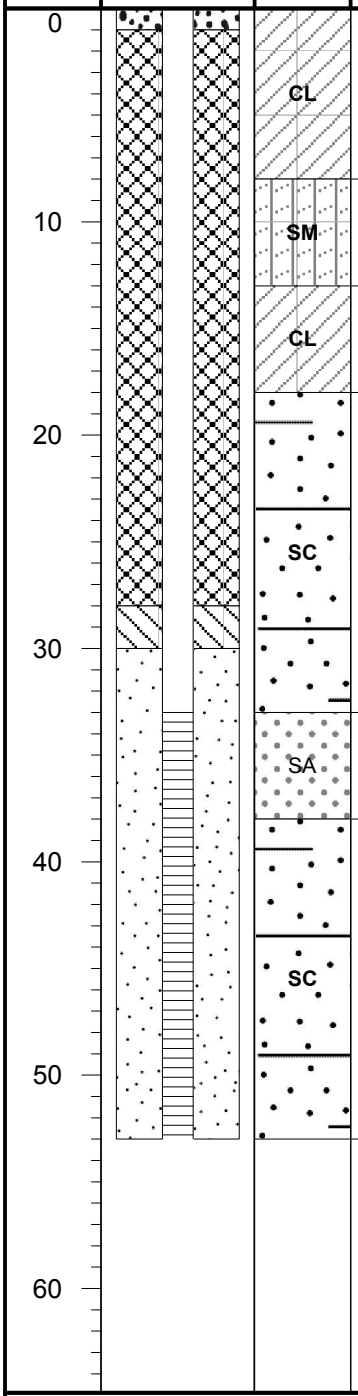
Luminant

Log of Boring: AXMW-1

Sandow 5 Generating Plant
Rockdale, TX

PBW Project No. 1815

Completion Date:	11/28/2012	Drilling Method:	Hollow Stem Auge
Drilling Company:	EnviroCore, Inc.	Borehole Diameter (in.):	8
Driller:	Craig Schena	Total Depth (ft):	53
Driller's License:	4694	Northing:	336064.36
Field Supervisor:	Carolyn E Sexton	Easting:	3029087.23
Sampling Method:	Cuttings	TOC Elev. (ft AMSL):	473.65



(0.0 - 8) SILTY CLAY, CL, very dark gray, with sand.

(8 - 13) SILTY SAND, SM, yellowish brown, with pebbles, and hematite.

(13 - 18) SANDY CLAY, CL, very dark grayish brown, poorly sorted.

(18 - 33) CLAYEY SAND, SC, dark yellowish brown, some lignite fragments.

(33 - 38) SAND, light olive brown, medium grained, sub-rounded, moderately sorted.

(38 - 53) CLAYEY SAND, SC, yellowish brown, medium grained, sub-angular, poorly sorted.

Notes: All material is mine spoil

PBW
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Annular Materials
(0.0 - 1.0) Concrete
(1.0 - 28.0) BenSeal
(28.0 - 30.0) Bentonite Chips
(30.0 - 53.0) Filter Pack (16/30)

Well Materials
(+3.0 - 33.0) Casing, 2" Sch 40 FJT PVC
(33.0 - 53.0) Screen, 2" Sch 40 FJT PVC, 0.01 slot

Luminant

Log of Boring: AXMW-2

Sandow 5 Generating Plant
Rockdale, TX

PBW Project No. 1815

Completion Date:	11/28/2012	Drilling Method:	Hollow Stem Auge
Drilling Company:	EnviroCore, Inc.	Borehole Diameter (in.):	8
Driller:	Craig Schena	Total Depth (ft):	63
Driller's License:	4694	Northing:	334057.17
Field Supervisor:	Carolyn E Sexton	Easting:	3028199.98
Sampling Method:	Cuttings	TOC Elev. (ft AMSL):	482.25

Depth (ft)	Well Materials	USCS	Lithologic Description
0		ML	(0.0 - 8) SANDY SILT, ML, dark grayish brown.
10			(8 - 13) CLAYEY SILT with sand, ML, dark grayish brown.
		CL	(13 - 63) SILTY CLAY, CL, dark gray, moist, some sand and lignite fragments.
20			
30			
40			
50			
60			

Notes: All material is mine spoil.

Annular Materials
(0.0 - 1.0) Concrete
(1.0 - 38.0) BenSeal
(38.0 - 40.0) Bentonite Chips
(40.0 - 63.0) Filter Pack (16/30)

Well Materials
(+3.0 - 43.0) Casing, 2" Sch 40 FJT PVC
(43.0 - 63.0) Screen, 2" Sch 40 FJT PVC, 0.01 slot

PBW
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Appendix B

Photographs of CCR Monitoring Wells

Appendix B – Photographs of CCR Groundwater Monitoring Wells
Sandow AX Landfill

Photograph 1: AX-23

Photograph 2: AX-24

Appendix B – Photographs of CCR Groundwater Monitoring Wells
Sandow AX Landfill

Photograph 3: AX-25

Photograph 4: AX-26

Appendix B – Photographs of CCR Groundwater Monitoring Wells
Sandow AX Landfill

Photograph 5: AX-27

Photograph 6: AX-28

Appendix B – Photographs of CCR Groundwater Monitoring Wells
Sandow AX Landfill

Photograph 7: AX-29

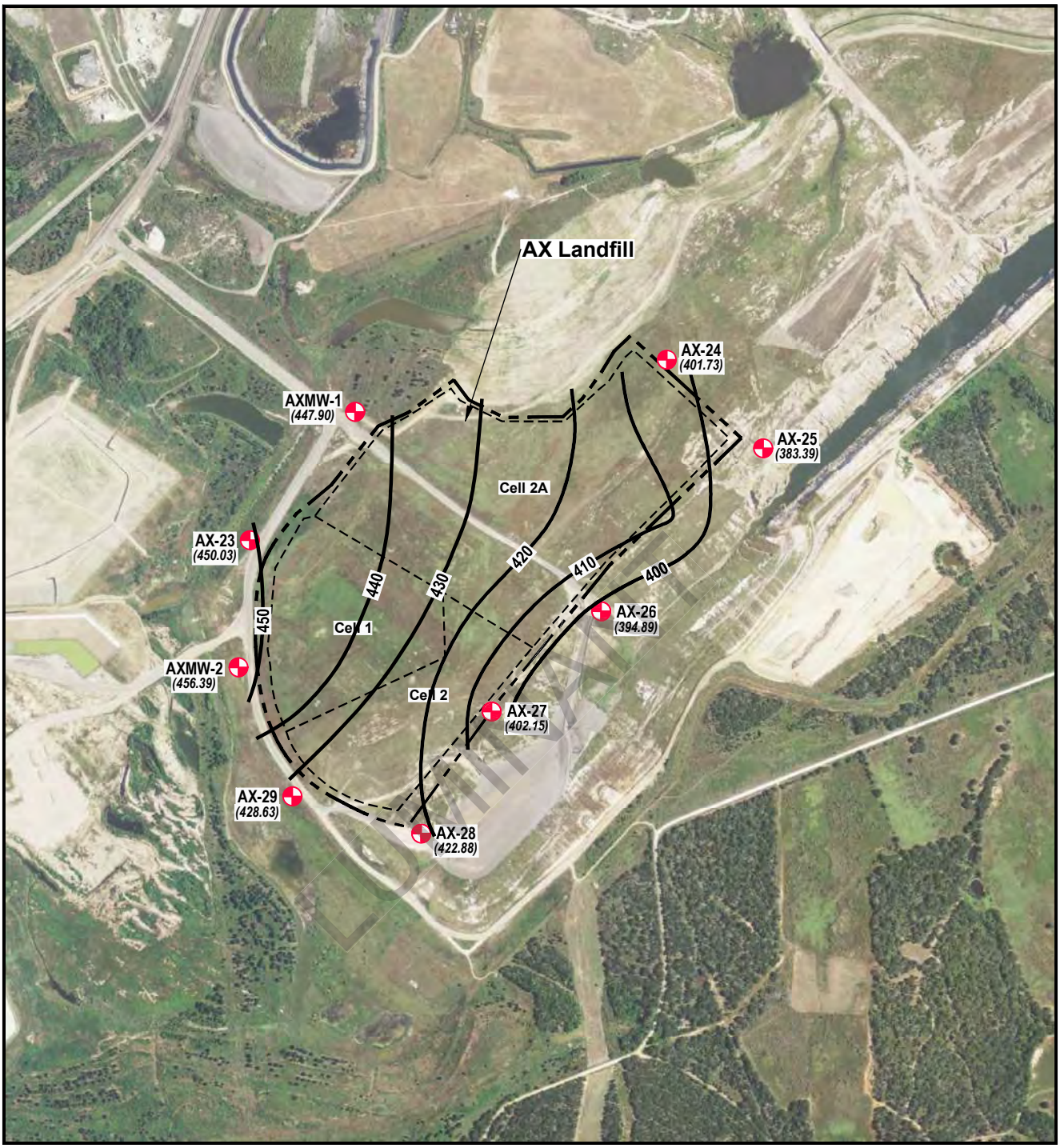
Photograph 8: AXMW-1

Appendix B – Photographs of CCR Groundwater Monitoring Wells
Sandow AX Landfill

Photograph 9: AXMW-2

Appendix C

Groundwater Potentiometric Surface Maps



EXPLANATION

- CCR Monitoring Well
- *(414.49)* Groundwater Potentiometric Surface (ft. MSL)
- 400 Groundwater Potentiometric Surface Contour (C.I. = 10 ft.)

N

Scale in Feet

0 600 1200

SOURCE:
Imagery from www.tnris.gov, Alcoa Lake, aerial photographs, 2012.

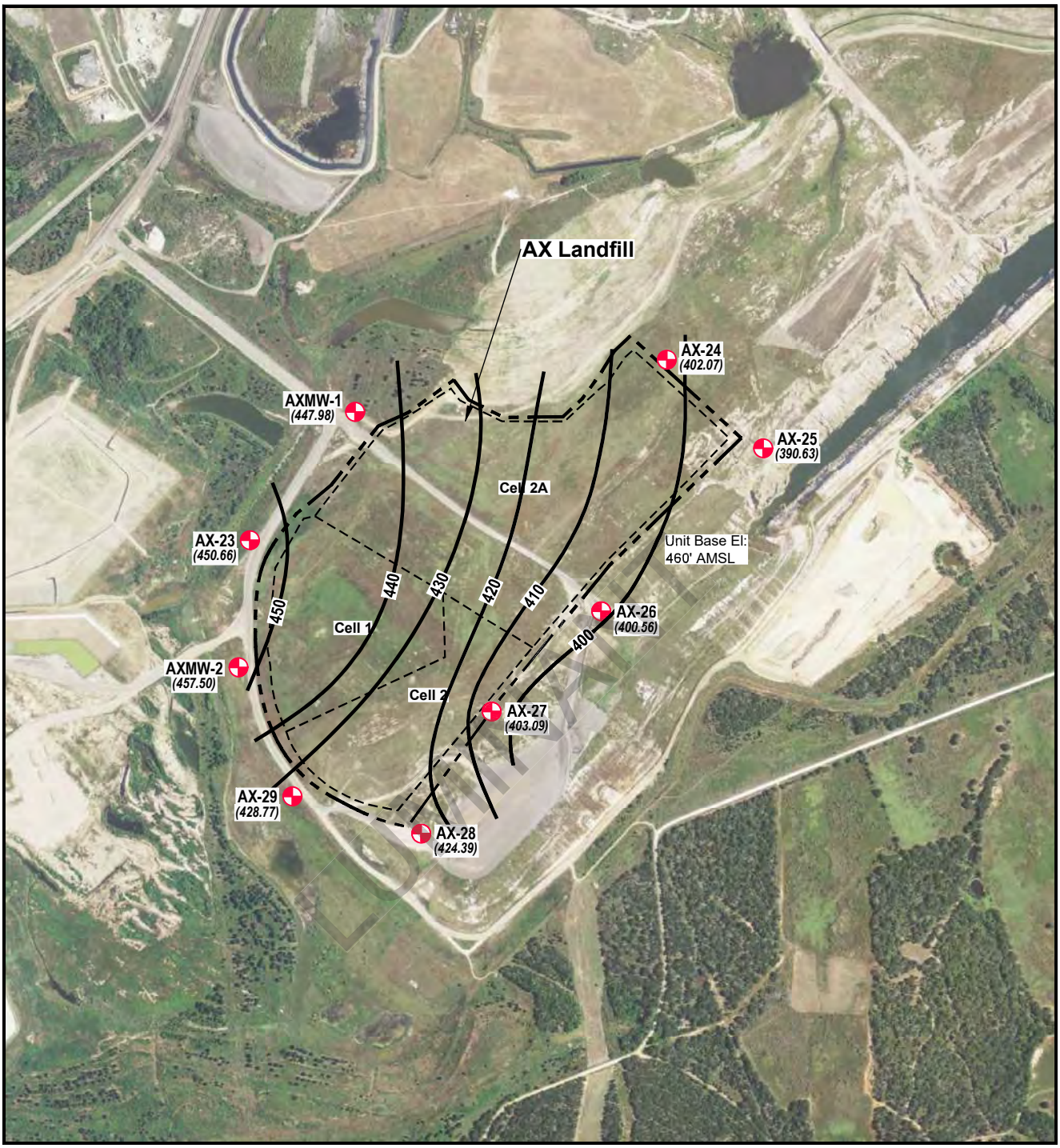
SANDOW 5 GENERATING PLANT
AX LANDFILL

Figure C-1

AX LANDFILL GROUNDWATER POTENTIOMETRIC SURFACE MAP OCTOBER 29 - NOVEMBER 3, 2015

PROJECT: 5164E	BY: AJD	REVISIONS
DATE: SEPT., 2017	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS



EXPLANATION

- CCR Monitoring Well
- *(414.49)* Groundwater Potentiometric Surface (ft. MSL)
- 400 Groundwater Potentiometric Surface Contour (C.I. = 10 ft.)

N

Scale in Feet

0 600 1200

SOURCE:
Imagery from www.tnris.gov, Alcoa Lake, aerial photographs, 2012.

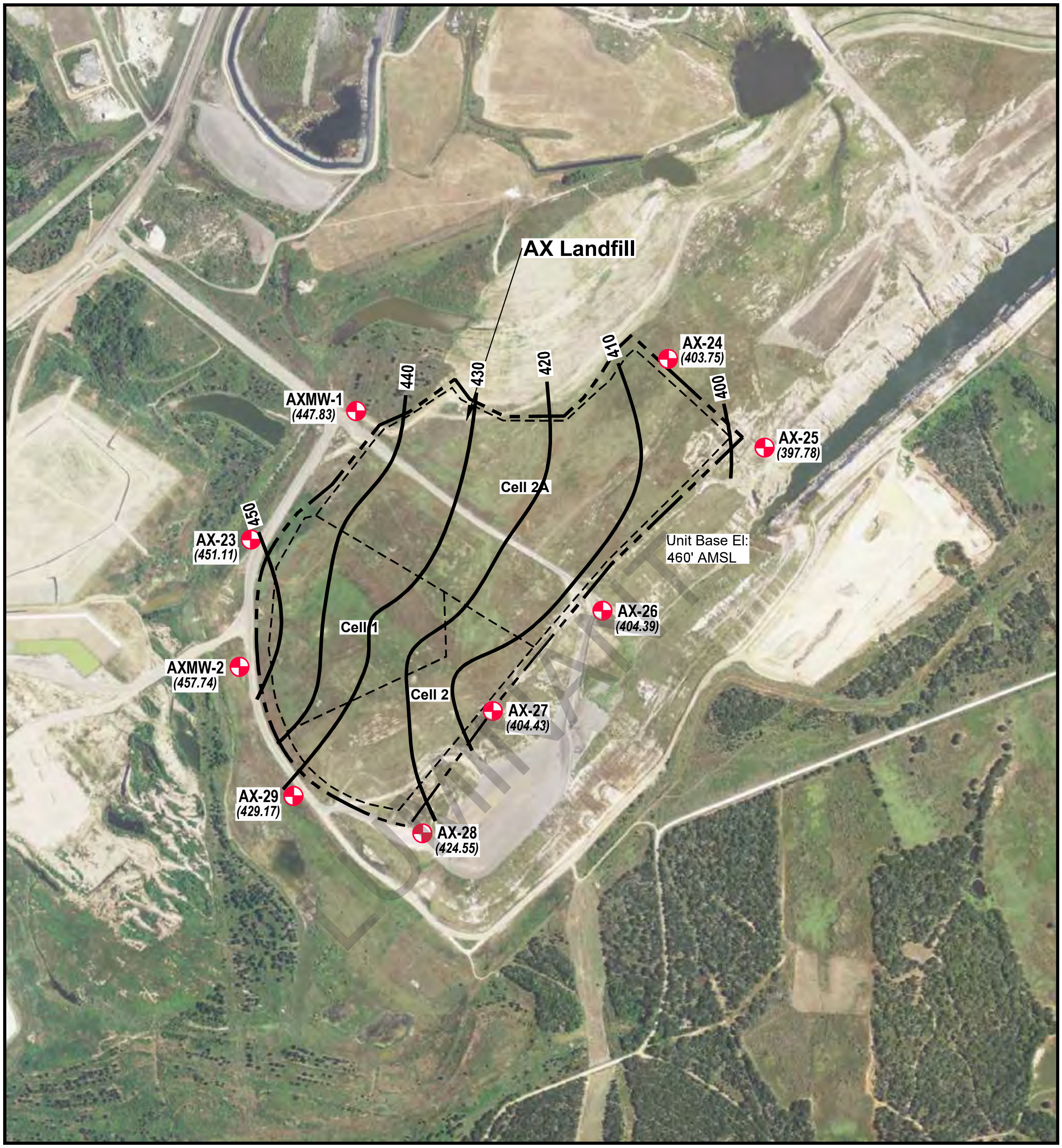
SANDOW 5 GENERATING PLANT
AX LANDFILL

Figure C-2

AX LANDFILL GROUNDWATER POTENTIOMETRIC SURFACE MAP DECEMBER 17-18, 2015

PROJECT: 5164E	BY: AJD	REVISIONS
DATE: SEPT., 2017	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS



EXPLANATION

(symbol)	CCR Monitoring Well
(414.49)	Groundwater Potentiometric Surface (ft. MSL)
— 400 —	Groundwater Potentiometric Surface Contour (C.I. = 10 ft.)

N

Scale in Feet

0 600 1200

SOURCE:
Imagery from www.tnris.gov, Alcoa Lake, aerial photographs, 2012.

SANDOW 5 GENERATING PLANT

AX LANDFILL

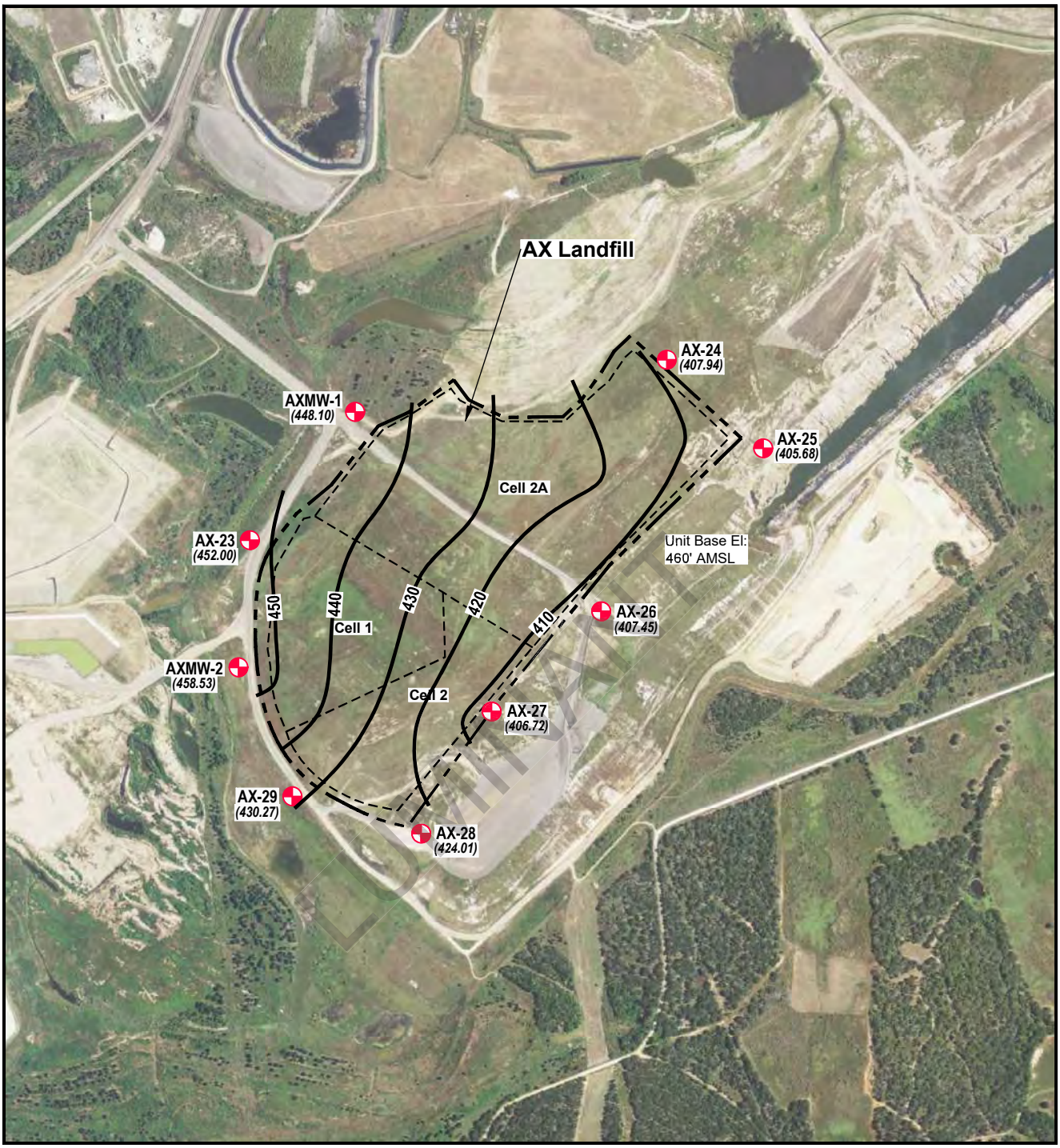
Figure C-3

AX LANDFILL GROUNDWATER POTENTIOMETRIC SURFACE MAP FEBRUARY 8-9, 2016

PROJECT: 5164E	BY: AJD	REVISIONS
DATE: SEPT., 2017	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC

CONSULTING ENGINEERS AND SCIENTISTS



EXPLANATION

- CCR Monitoring Well
- *(414.49)* Groundwater Potentiometric Surface (ft. MSL)
- 400 Groundwater Potentiometric Surface Contour (C.I. = 10 ft.)

N

Scale in Feet

0 600 1200

SOURCE:
Imagery from www.tnris.gov, Alcoa Lake, aerial photographs, 2012.

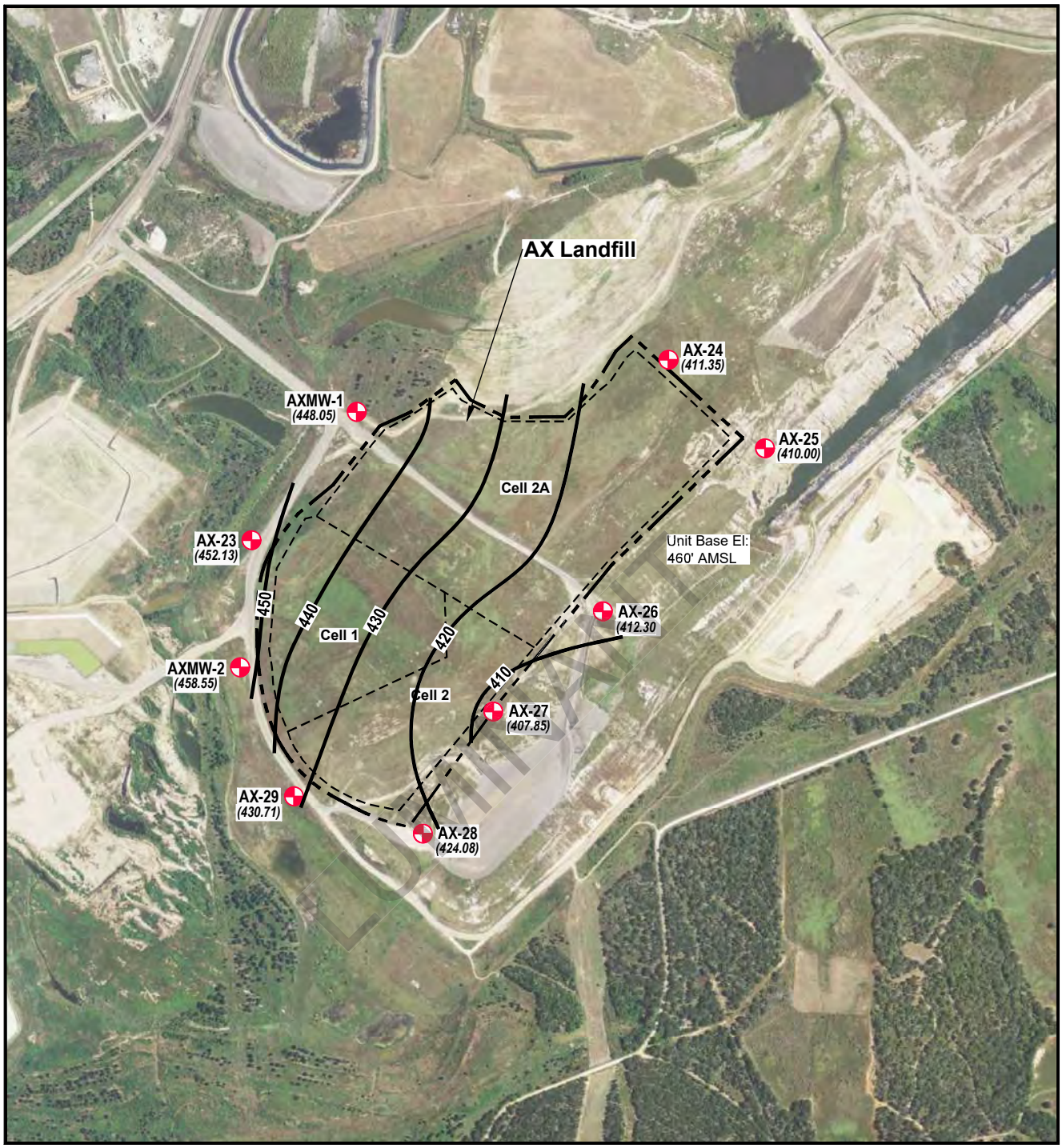
SANDOW 5 GENERATING PLANT
AX LANDFILL

Figure C-4

AX LANDFILL GROUNDWATER POTENTIOMETRIC SURFACE MAP APRIL 25-26, 2016

PROJECT: 5164E	BY: AJD	REVISIONS
DATE: SEPT., 2017	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS



EXPLANATION

- CCR Monitoring Well
- *(414.49)* Groundwater Potentiometric Surface (ft. MSL)
- 400 Groundwater Potentiometric Surface Contour (C.I. = 10 ft.)

N

Scale in Feet

0 600 1200

SOURCE:
Imagery from www.tnris.gov, Alcoa Lake, aerial photographs, 2012.

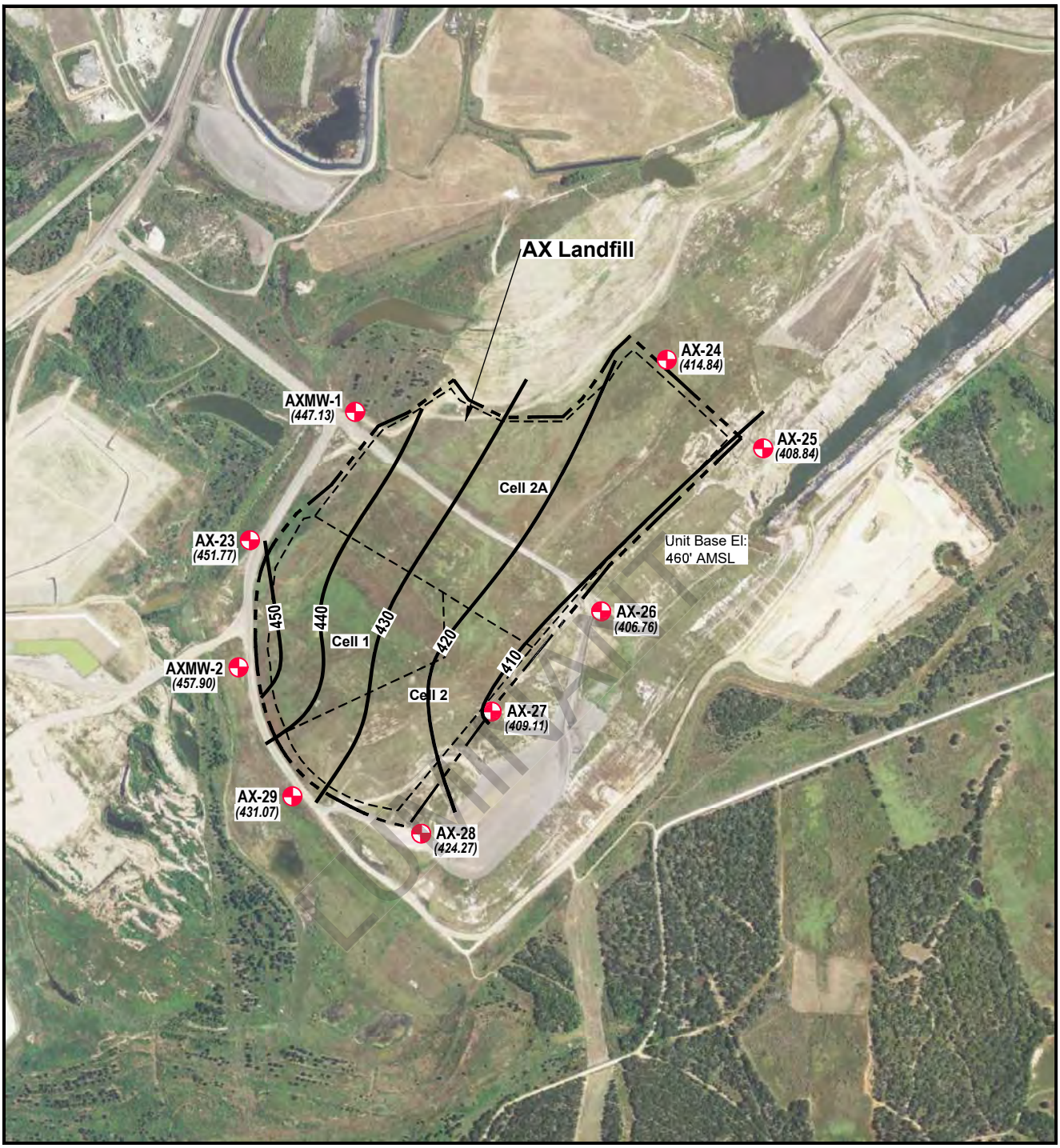
SANDOW 5 GENERATING PLANT
AX LANDFILL

Figure C-5

AX LANDFILL GROUNDWATER POTENTIOMETRIC SURFACE MAP JUNE 14-15, 2016

PROJECT: 5164E	BY: AJD	REVISIONS
DATE: SEPT., 2017	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS



EXPLANATION

- CCR Monitoring Well
- *(414.49)* Groundwater Potentiometric Surface (ft. MSL)
- —400— Groundwater Potentiometric Surface Contour (C.I. = 10 ft.)

N

Scale in Feet

0 600 1200

SOURCE:
Imagery from www.tnris.gov, Alcoa Lake, aerial photographs, 2012.

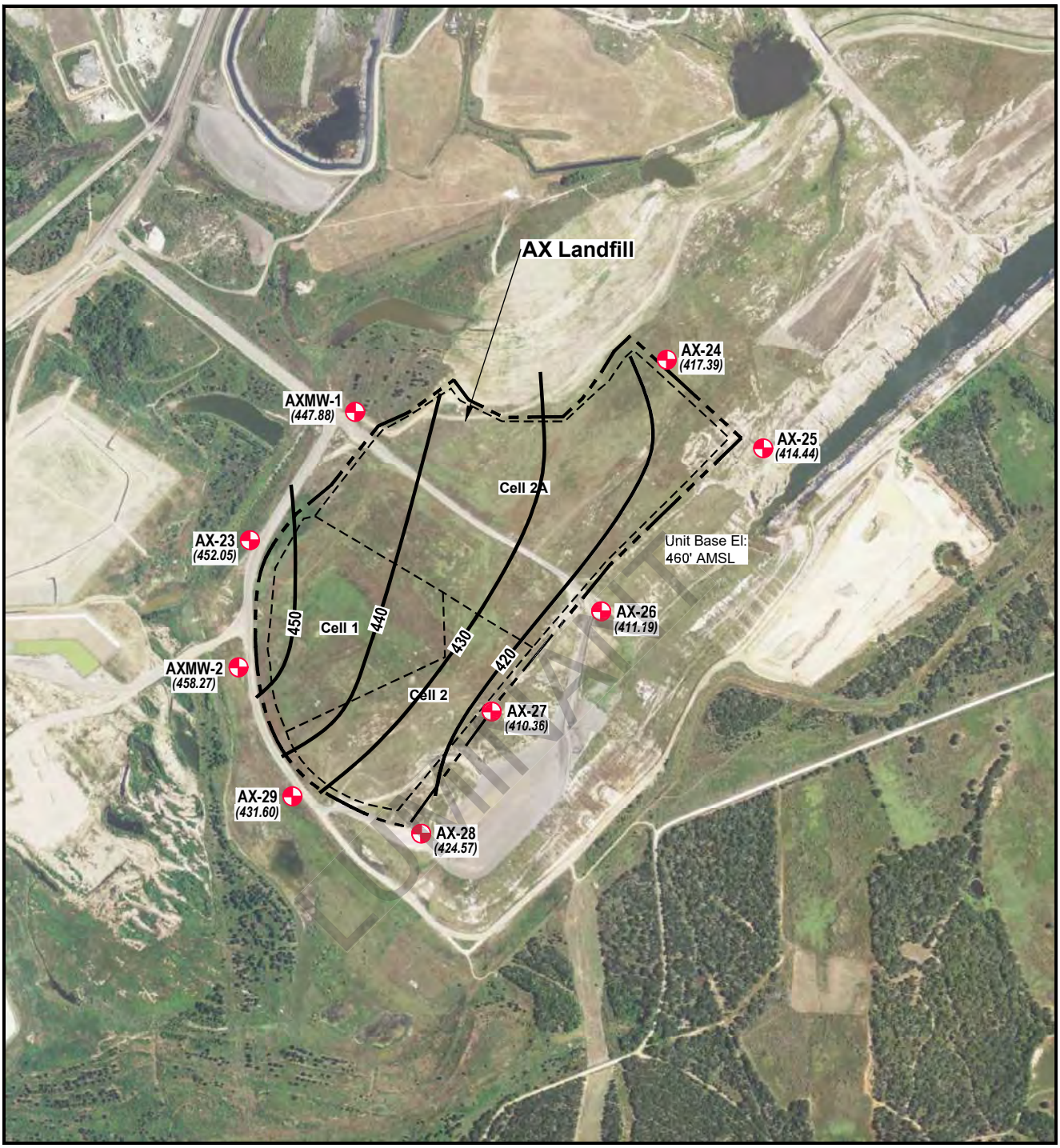
SANDOW 5 GENERATING PLANT
AX LANDFILL

Figure C-6

AX LANDFILL GROUNDWATER POTENTIOMETRIC SURFACE MAP AUGUST 9-10, 2016

PROJECT: 5164E	BY: AJD	REVISIONS
DATE: SEPT., 2017	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS



EXPLANATION

- CCR Monitoring Well
- *(414.49)* Groundwater Potentiometric Surface (ft. MSL)
- 400 Groundwater Potentiometric Surface Contour (C.I. = 10 ft.)

N

Scale in Feet

0 600 1200

SOURCE:
Imagery from www.tnris.gov, Alcoa Lake, aerial photographs, 2012.

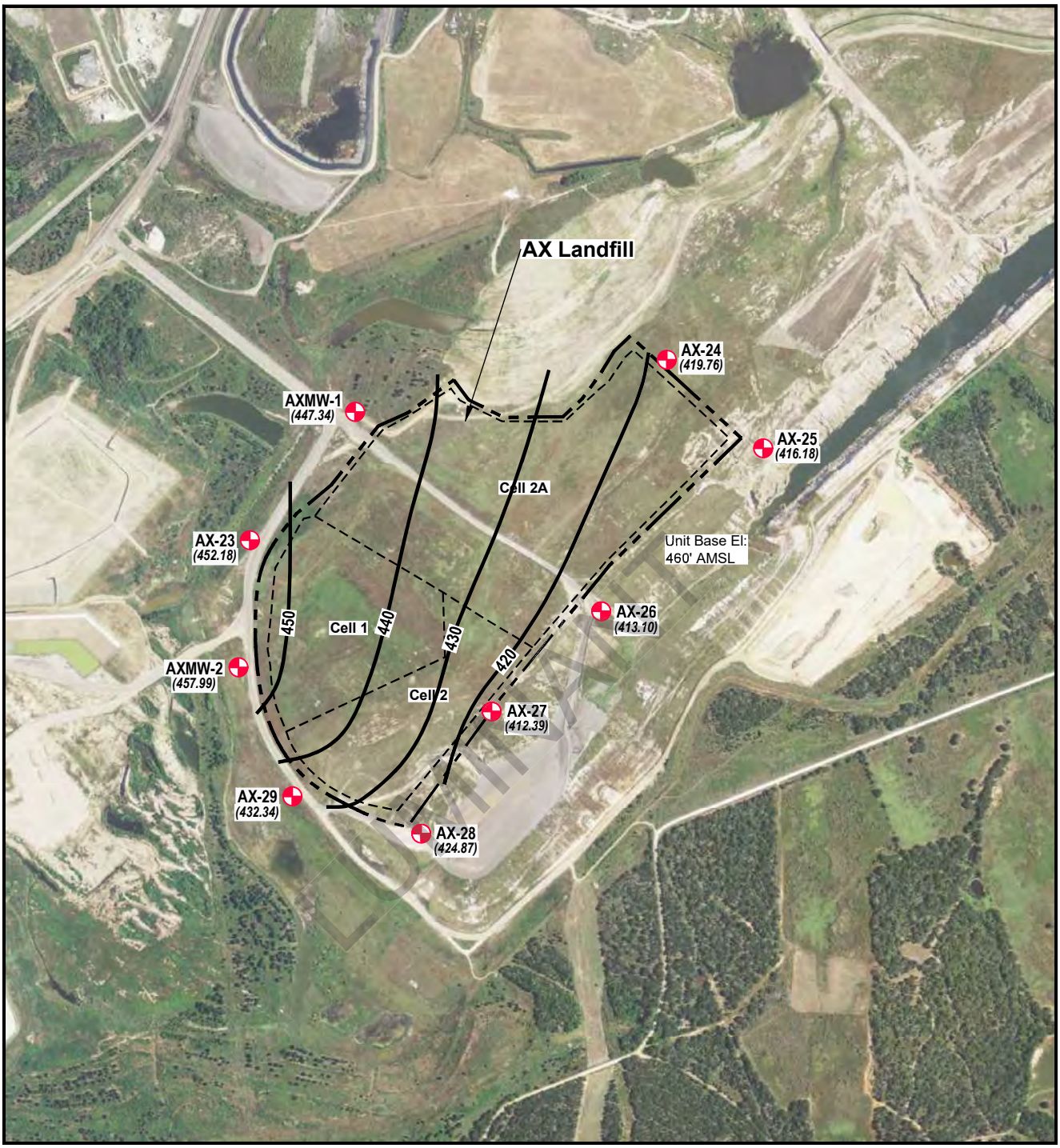
SANDOW 5 GENERATING PLANT
AX LANDFILL

Figure C-7

AX LANDFILL GROUNDWATER POTENTIOMETRIC SURFACE MAP OCTOBER 5-6, 2016

PROJECT: 5164E	BY: AJD	REVISIONS
DATE: SEPT., 2017	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS



EXPLANATION

- CCR Monitoring Well
- *(414.49)* Groundwater Potentiometric Surface (ft. MSL)
- 400 Groundwater Potentiometric Surface Contour (C.I. = 10 ft.)

N

Scale in Feet

0 600 1200

SOURCE:
Imagery from www.tnris.gov, Alcoa Lake, aerial photographs, 2012.

SANDOW 5 GENERATING PLANT
AX LANDFILL

Figure C-8

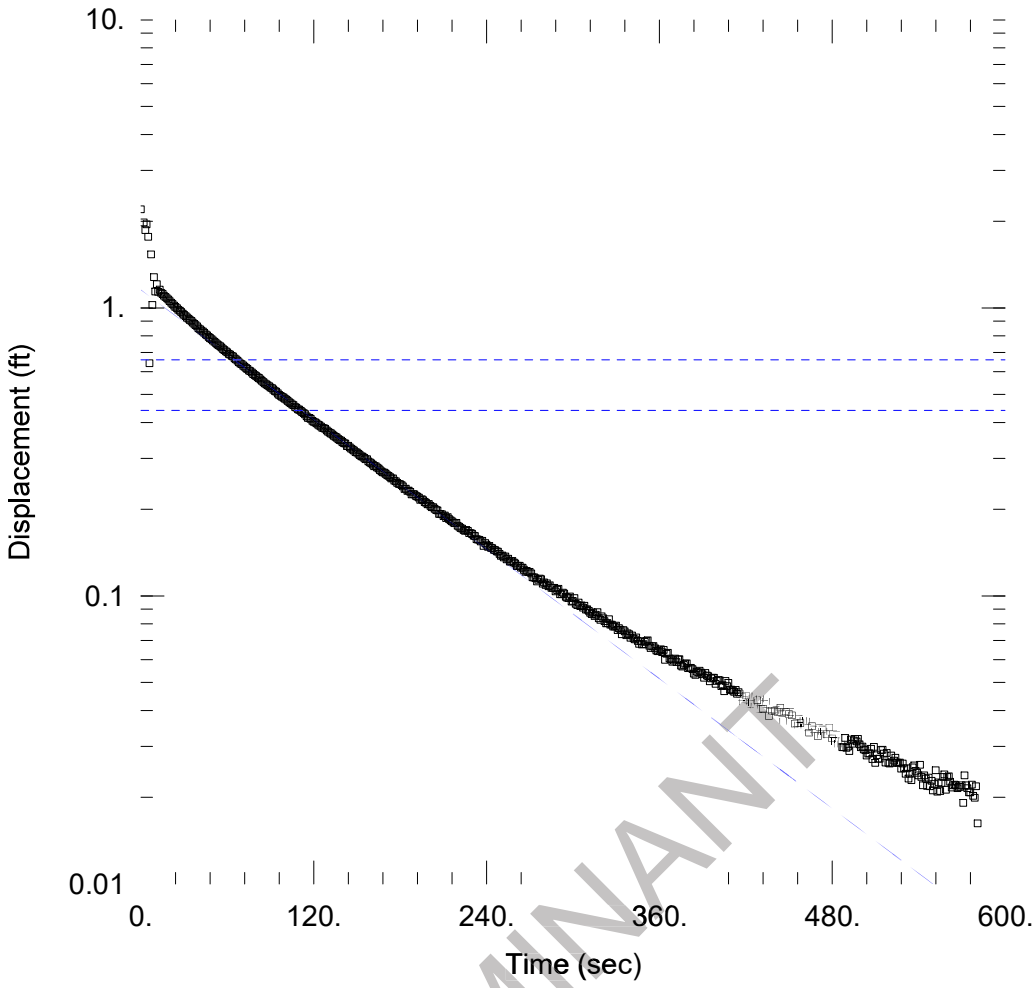
AX LANDFILL GROUNDWATER POTENTIOMETRIC SURFACE MAP DECEMBER 21-22, 2016

PROJECT: 5164E	BY: AJD	REVISIONS
DATE: SEPT., 2017	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS

Appendix D

Aquifer Test Data



WELL TEST ANALYSIS

Data Set: J:\...\AXMW-1 Slug IN.aqt
Date: 11/18/15 Time: 09:52:45

PROJECT INFORMATION

Company: PBW
Client: Luminant
Project: 5164-E
Location: Sandow AX
Test Well: AXMW-1
Test Date: 10-5-15

AQUIFER DATA

Saturated Thickness: 28.12 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (AXMW-1)

Initial Displacement: 2.2 ft
Total Well Penetration Depth: 28.12 ft
Casing Radius: 0.083 ft
Static Water Column Height: 28.12 ft
Screen Length: 20. ft
Well Radius: 0.33 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.002861 cm/sec
y0 = 1.155 ft

Data Set: J:\5164 - Luminant CCR Well Installation and GW Sampling\5164-E_Sandow 5\Slug Tests\Sandow Slug Tests
Date: 11/18/15
Time: 09:54:08

PROJECT INFORMATION

Company: PBW
Client: Luminant
Project: 5164-E
Location: Sandow AX
Test Date: 10-5-15
Test Well: AXMW-1

AQUIFER DATA

Saturated Thickness: 28.12 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: AXMW-1

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 2.2 ft
Static Water Column Height: 28.12 ft
Casing Radius: 0.083 ft
Well Radius: 0.33 ft
Well Skin Radius: 0.33 ft
Screen Length: 20. ft
Total Well Penetration Depth: 28.12 ft

No. of Observations: 581

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
0.	0.	292.	0.1014
2.	1.982	293.	0.1027
3.	1.863	294.	0.1017
4.	1.948	295.	0.0993
5.	1.764	296.	0.0987
6.	0.6431	297.	0.0982
7.	1.533	298.	0.0996
8.	1.023	299.	0.0957
9.	1.279	300.	0.0959
10.	1.14	301.	0.0983
11.	1.21	302.	0.0938
12.	1.136	303.	0.0929
13.	1.156	304.	0.0948
14.	1.127	305.	0.0921
15.	1.118	306.	0.0927
16.	1.103	307.	0.0909
17.	1.091	308.	0.0923
18.	1.079	309.	0.0896
19.	1.068	310.	0.0897
20.	1.054	311.	0.0887
21.	1.042	312.	0.0873
22.	1.03	313.	0.0866
23.	1.019	314.	0.0875
24.	1.008	315.	0.0852
25.	0.9967	316.	0.0859
26.	0.986	317.	0.0878
27.	0.9766	318.	0.0835
28.	0.967	319.	0.0826
29.	0.9552	320.	0.0849
30.	0.9458	321.	0.0835

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
31.	0.9365	322.	0.0816
32.	0.9254	323.	0.0802
33.	0.9172	324.	0.0805
34.	0.9065	325.	0.0829
35.	0.8997	326.	0.0795
36.	0.8888	327.	0.0794
37.	0.881	328.	0.0783
38.	0.8712	329.	0.0783
39.	0.862	330.	0.0788
40.	0.8491	331.	0.0761
41.	0.8427	332.	0.0772
42.	0.8348	333.	0.0763
43.	0.8269	334.	0.0736
44.	0.8193	335.	0.076
45.	0.8087	336.	0.0752
46.	0.8022	337.	0.073
47.	0.7927	338.	0.0741
48.	0.7861	339.	0.0735
49.	0.778	340.	0.0716
50.	0.7705	341.	0.0728
51.	0.7625	342.	0.0712
52.	0.7556	343.	0.0707
53.	0.7474	344.	0.0717
54.	0.7415	345.	0.0697
55.	0.7362	346.	0.0682
56.	0.7277	347.	0.0695
57.	0.7192	348.	0.0678
58.	0.7137	349.	0.0679
59.	0.7056	350.	0.0691
60.	0.6999	351.	0.0697
61.	0.6924	352.	0.0701
62.	0.6885	353.	0.0671
63.	0.6815	354.	0.0659
64.	0.677	355.	0.0668
65.	0.6682	356.	0.0669
66.	0.6623	357.	0.0657
67.	0.6552	358.	0.0645
68.	0.648	359.	0.0642
69.	0.641	360.	0.0645
70.	0.6368	361.	0.0652
71.	0.6305	362.	0.0637
72.	0.6238	363.	0.0649
73.	0.618	364.	0.06
74.	0.6139	365.	0.0629
75.	0.6058	366.	0.0635
76.	0.6021	367.	0.0605
77.	0.5965	368.	0.0603
78.	0.5901	369.	0.0591
79.	0.5845	370.	0.0596
80.	0.5806	371.	0.0606
81.	0.5745	372.	0.0589
82.	0.5708	373.	0.0601
83.	0.5635	374.	0.0603
84.	0.5584	375.	0.0572
85.	0.5528	376.	0.0568
86.	0.5472	377.	0.0575
87.	0.5431	378.	0.0582
88.	0.5386	379.	0.0583
89.	0.5342	380.	0.0561
90.	0.5283	381.	0.0563
91.	0.5256	382.	0.0563
92.	0.5203	383.	0.0557
93.	0.5139	384.	0.0537
94.	0.5121	385.	0.0532
95.	0.5049	386.	0.0545
96.	0.4992	387.	0.0543

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
97.	0.4949	388.	0.0549
98.	0.4915	389.	0.0541
99.	0.4884	390.	0.0534
100.	0.4841	391.	0.052
101.	0.4803	392.	0.054
102.	0.4748	393.	0.0529
103.	0.4699	394.	0.0526
104.	0.4666	395.	0.0505
105.	0.4615	396.	0.0517
106.	0.4595	397.	0.0519
107.	0.4522	398.	0.0519
108.	0.4496	399.	0.0495
109.	0.4447	400.	0.0506
110.	0.4431	401.	0.051
111.	0.4383	402.	0.0509
112.	0.4338	403.	0.0486
113.	0.4307	404.	0.049
114.	0.4274	405.	0.0466
115.	0.4204	406.	0.0506
116.	0.4155	407.	0.0486
117.	0.4145	408.	0.0499
118.	0.4115	409.	0.0471
119.	0.4049	410.	0.0473
120.	0.4027	411.	0.0469
121.	0.3999	412.	0.0464
122.	0.3969	413.	0.0471
123.	0.3926	414.	0.0457
124.	0.3907	415.	0.0463
125.	0.3872	416.	0.0457
126.	0.3829	417.	0.0445
127.	0.3824	418.	0.0428
128.	0.38	419.	0.0436
129.	0.3753	420.	0.0451
130.	0.372	421.	0.0455
131.	0.3683	422.	0.0449
132.	0.3667	423.	0.0422
133.	0.3632	424.	0.0427
134.	0.3598	425.	0.0431
135.	0.3568	426.	0.0414
136.	0.3544	427.	0.0437
137.	0.3502	428.	0.0434
138.	0.3475	429.	0.0405
139.	0.3456	430.	0.0439
140.	0.3422	431.	0.0404
141.	0.3388	432.	0.0406
142.	0.3383	433.	0.0421
143.	0.3315	434.	0.043
144.	0.3316	435.	0.043
145.	0.3278	436.	0.0383
146.	0.3241	437.	0.0397
147.	0.3221	438.	0.04
148.	0.3198	439.	0.0416
149.	0.3154	440.	0.0399
150.	0.3145	441.	0.0403
151.	0.3115	442.	0.0396
152.	0.3086	443.	0.0396
153.	0.3052	444.	0.0409
154.	0.3045	445.	0.0391
155.	0.3014	446.	0.0367
156.	0.2978	447.	0.0397
157.	0.298	448.	0.0395
158.	0.2931	449.	0.0369
159.	0.2905	450.	0.0389
160.	0.2887	451.	0.0396
161.	0.2853	452.	0.0385
162.	0.2822	453.	0.0368

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
163.	0.2818	454.	0.036
164.	0.2789	455.	0.0362
165.	0.2769	456.	0.0356
166.	0.2731	457.	0.0373
167.	0.2708	458.	0.0362
168.	0.2686	459.	0.0367
169.	0.268	460.	0.0369
170.	0.2657	461.	0.0368
171.	0.2625	462.	0.0367
172.	0.2612	463.	0.0349
173.	0.2584	464.	0.0335
174.	0.2558	465.	0.0367
175.	0.2557	466.	0.0353
176.	0.2509	467.	0.0344
177.	0.25	468.	0.0338
178.	0.2467	469.	0.0355
179.	0.2451	470.	0.0326
180.	0.2442	471.	0.0349
181.	0.2421	472.	0.0329
182.	0.2397	473.	0.0344
183.	0.2353	474.	0.0338
184.	0.2357	475.	0.034
185.	0.2316	476.	0.0331
186.	0.2318	477.	0.0314
187.	0.2296	478.	0.0349
188.	0.2252	479.	0.031
189.	0.2258	480.	0.032
190.	0.2249	481.	0.0331
191.	0.2222	482.	0.0314
192.	0.2212	483.	0.033
193.	0.2194	484.	0.0306
194.	0.2155	485.	0.0306
195.	0.2164	486.	0.0306
196.	0.2149	487.	0.0298
197.	0.2121	488.	0.0298
198.	0.2103	489.	0.0321
199.	0.2078	490.	0.0297
200.	0.2082	491.	0.03
201.	0.2054	492.	0.0289
202.	0.2031	493.	0.0317
203.	0.2033	494.	0.0307
204.	0.2005	495.	0.0315
205.	0.1987	496.	0.0319
206.	0.198	497.	0.0312
207.	0.1926	498.	0.0319
208.	0.1927	499.	0.0305
209.	0.192	500.	0.0298
210.	0.1891	501.	0.03
211.	0.19	502.	0.0293
212.	0.1866	503.	0.0291
213.	0.1876	504.	0.0279
214.	0.1846	505.	0.0283
215.	0.1829	506.	0.0284
216.	0.1817	507.	0.0294
217.	0.1797	508.	0.0271
218.	0.1789	509.	0.0299
219.	0.179	510.	0.0263
220.	0.1753	511.	0.028
221.	0.1738	512.	0.0272
222.	0.1722	513.	0.0272
223.	0.1711	514.	0.0291
224.	0.1695	515.	0.0292
225.	0.168	516.	0.0283
226.	0.1694	517.	0.0264
227.	0.168	518.	0.0285
228.	0.165	519.	0.0263

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
229.	0.1651	520.	0.0262
230.	0.1641	521.	0.0279
231.	0.1616	522.	0.0263
232.	0.1612	523.	0.0268
233.	0.1574	524.	0.0274
234.	0.1569	525.	0.0264
235.	0.1564	526.	0.0263
236.	0.1546	527.	0.0264
237.	0.1551	528.	0.0251
238.	0.1491	529.	0.0262
239.	0.1526	530.	0.0252
240.	0.1505	531.	0.0241
241.	0.1479	532.	0.0252
242.	0.1492	533.	0.0232
243.	0.1468	534.	0.0241
244.	0.1463	535.	0.0229
245.	0.1446	536.	0.0254
246.	0.144	537.	0.0258
247.	0.1428	538.	0.0247
248.	0.1424	539.	0.0243
249.	0.1399	540.	0.0238
250.	0.1377	541.	0.0259
251.	0.1381	542.	0.0235
252.	0.136	543.	0.022
253.	0.1371	544.	0.0238
254.	0.134	545.	0.0232
255.	0.1344	546.	0.0219
256.	0.1318	547.	0.0234
257.	0.1317	548.	0.0218
258.	0.1321	549.	0.0228
259.	0.1304	550.	0.0211
260.	0.1296	551.	0.0222
261.	0.1271	552.	0.0248
262.	0.1272	553.	0.0209
263.	0.1273	554.	0.0225
264.	0.1252	555.	0.021
265.	0.1253	556.	0.0224
266.	0.1232	557.	0.0235
267.	0.1213	558.	0.024
268.	0.122	559.	0.0212
269.	0.1208	560.	0.0235
270.	0.1213	561.	0.0236
271.	0.1197	562.	0.0226
272.	0.1161	563.	0.0216
273.	0.1159	564.	0.022
274.	0.115	565.	0.0221
275.	0.1123	566.	0.022
276.	0.1137	567.	0.0215
277.	0.1147	568.	0.0217
278.	0.1143	569.	0.0217
279.	0.1103	570.	0.022
280.	0.1114	571.	0.0191
281.	0.1091	572.	0.0238
282.	0.1106	573.	0.022
283.	0.1081	574.	0.0215
284.	0.1087	575.	0.0208
285.	0.1067	576.	0.0208
286.	0.1067	577.	0.0221
287.	0.1067	578.	0.0202
288.	0.1037	579.	0.0199
289.	0.1049	580.	0.0218
290.	0.1059	581.	0.0162
291.	0.1013		

SOLUTION

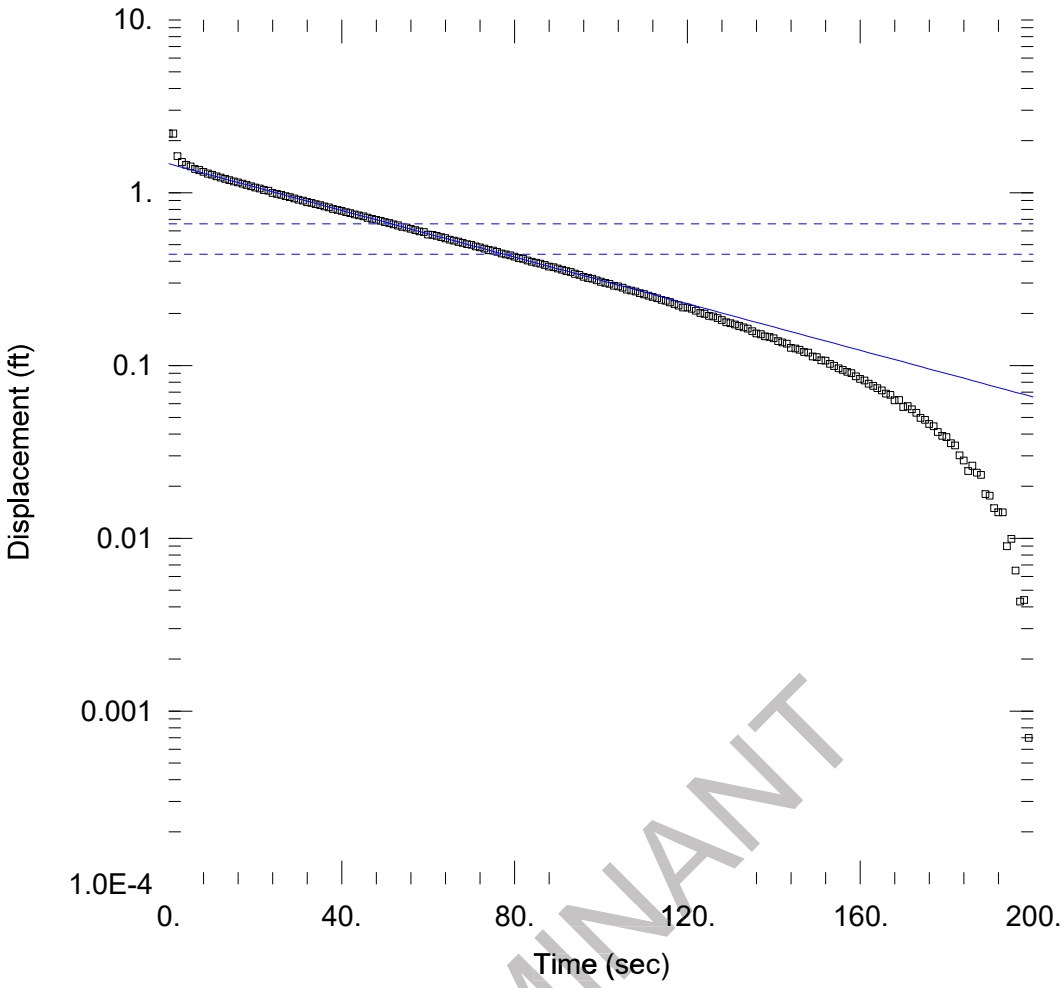
Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
ln(Re/rw): 63.11

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.002861	cm/sec
y0	1.155	ft

T = K*b = 2.452 cm²/sec



WELL TEST ANALYSIS

Data Set: J:\...\AXMW-1 Slug OUT.aqt
Date: 11/18/15 Time: 09:54:33

PROJECT INFORMATION

Company: PBW
Client: Luminant
Project: 5164-E
Location: Sandow AX
Test Well: AXMW-1
Test Date: 10-5-15

AQUIFER DATA

Saturated Thickness: 28.12 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (AXMW-1)

Initial Displacement: 2.2 ft
Total Well Penetration Depth: 28.12 ft
Casing Radius: 0.083 ft
Static Water Column Height: 28.12 ft
Screen Length: 20. ft
Well Radius: 0.33 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.005144 cm/sec y0 = 1.469 ft

Data Set: J:\5164 - Luminant CCR Well Installation and GW Sampling\5164-E_Sandow 5\Slug Tests\Sandow Slug Tests
Date: 11/18/15
Time: 09:55:06

PROJECT INFORMATION

Company: PBW
Client: Luminant
Project: 5164-E
Location: Sandow AX
Test Date: 10-5-15
Test Well: AXMW-1

AQUIFER DATA

Saturated Thickness: 28.12 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: AXMW-1

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 2.2 ft
Static Water Column Height: 28.12 ft
Casing Radius: 0.083 ft
Well Radius: 0.33 ft
Well Skin Radius: 0.33 ft
Screen Length: 20. ft
Total Well Penetration Depth: 28.12 ft

No. of Observations: 201

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
0.	0.	101.	0.3006
1.	2.2	102.	0.2966
2.	1.624	103.	0.2894
3.	1.503	104.	0.2862
4.	1.45	105.	0.282
5.	1.418	106.	0.2748
6.	1.369	107.	0.2717
7.	1.353	108.	0.2673
8.	1.321	109.	0.2624
9.	1.289	110.	0.2585
10.	1.269	111.	0.2538
11.	1.245	112.	0.249
12.	1.224	113.	0.2446
13.	1.204	114.	0.2399
14.	1.183	115.	0.2362
15.	1.163	116.	0.2324
16.	1.145	117.	0.2264
17.	1.127	118.	0.2227
18.	1.109	119.	0.2167
19.	1.091	120.	0.2162
20.	1.073	121.	0.2124
21.	1.055	122.	0.2071
22.	1.039	123.	0.201
23.	1.024	124.	0.1994
24.	0.9947	125.	0.1937
25.	0.9847	126.	0.1922
26.	0.9697	127.	0.1882
27.	0.9548	128.	0.1835
28.	0.941	129.	0.1778
29.	0.9261	130.	0.1752

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
30.	0.9109	131.	0.1727
31.	0.8974	132.	0.1695
32.	0.8825	133.	0.1664
33.	0.8714	134.	0.163
34.	0.8585	135.	0.1578
35.	0.8453	136.	0.1535
36.	0.8336	137.	0.1517
37.	0.8205	138.	0.1477
38.	0.8057	139.	0.1463
39.	0.7959	140.	0.1436
40.	0.7838	141.	0.1385
41.	0.7712	142.	0.136
42.	0.7607	143.	0.1338
43.	0.7495	144.	0.1267
44.	0.7377	145.	0.1251
45.	0.7287	146.	0.1234
46.	0.7168	147.	0.1198
47.	0.7063	148.	0.1184
48.	0.6969	149.	0.1129
49.	0.6865	150.	0.1118
50.	0.6767	151.	0.1072
51.	0.6668	152.	0.1064
52.	0.6563	153.	0.1021
53.	0.6462	154.	0.0995
54.	0.6342	155.	0.0962
55.	0.628	156.	0.0944
56.	0.6178	157.	0.0918
57.	0.6079	158.	0.0902
58.	0.5972	159.	0.0865
59.	0.5924	160.	0.0835
60.	0.5732	161.	0.082
61.	0.5702	162.	0.0785
62.	0.5623	163.	0.076
63.	0.5521	164.	0.0739
64.	0.5447	165.	0.0716
65.	0.5347	166.	0.0688
66.	0.5278	167.	0.0675
67.	0.5199	168.	0.0628
68.	0.511	169.	0.063
69.	0.5031	170.	0.0574
70.	0.4984	171.	0.0581
71.	0.489	172.	0.0558
72.	0.4819	173.	0.0532
73.	0.4749	174.	0.0497
74.	0.4661	175.	0.0484
75.	0.4625	176.	0.0459
76.	0.4534	177.	0.0445
77.	0.4454	178.	0.0412
78.	0.4385	179.	0.0392
79.	0.433	180.	0.0385
80.	0.4256	181.	0.0355
81.	0.4188	182.	0.0345
82.	0.4135	183.	0.0302
83.	0.4051	184.	0.0282
84.	0.3984	185.	0.0245
85.	0.3933	186.	0.0263
86.	0.3886	187.	0.024
87.	0.3818	188.	0.0233
88.	0.3737	189.	0.018
89.	0.3705	190.	0.0176
90.	0.3636	191.	0.0149
91.	0.3583	192.	0.0141
92.	0.3512	193.	0.0141
93.	0.3475	194.	0.009
94.	0.3399	195.	0.0099
95.	0.3349	196.	0.0065

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
96.	0.3258	197.	0.0043
97.	0.321	198.	0.0044
98.	0.3178	199.	0.0007
99.	0.3113	200.	0.
100.	0.3055		

SOLUTION

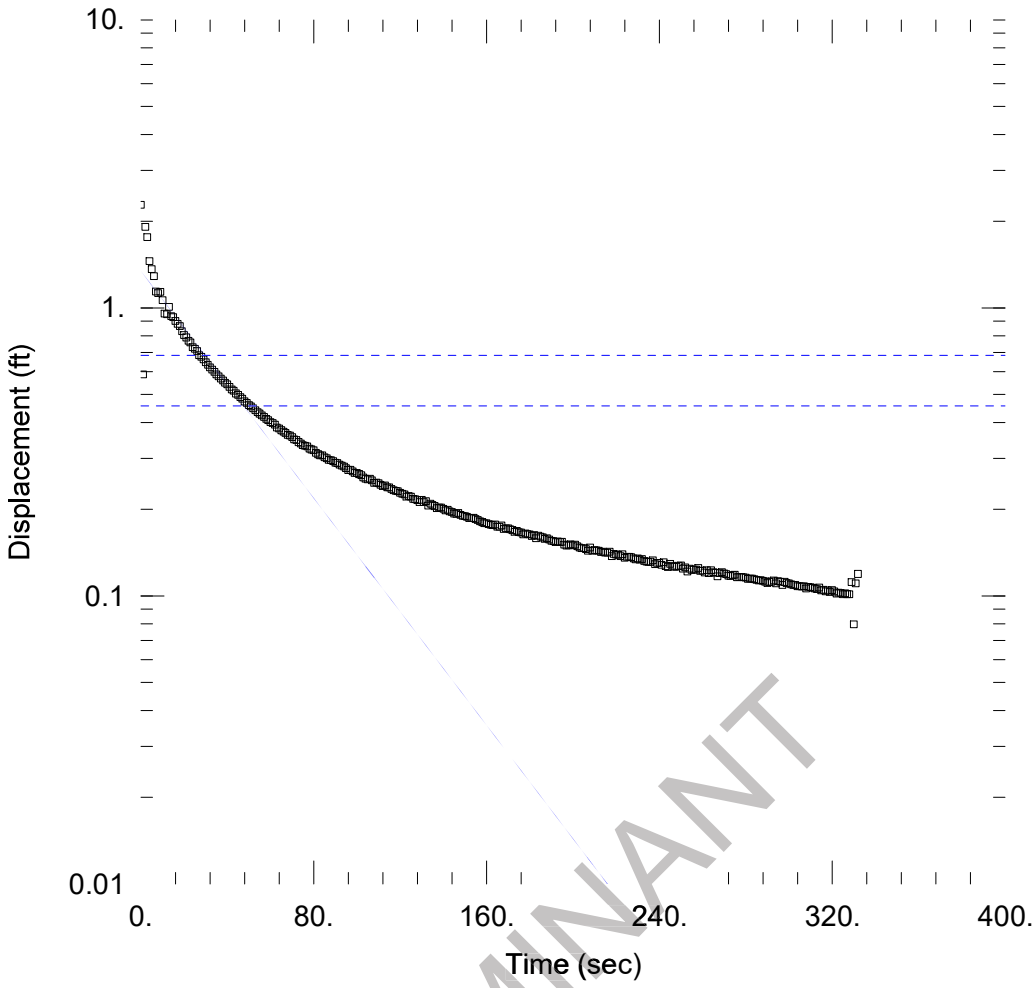
Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
ln(Re/rw): 63.11

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.005144	cm/sec
y0	1.469	ft

T = K*b = 4.409 cm²/sec



WELL TEST ANALYSIS

Data Set: J:\...\AXMW-2 Slug IN.aqt
Date: 11/18/15 Time: 10:02:45

PROJECT INFORMATION

Company: PBW
Client: Luminant
Project: 5164-E
Location: Sandow AX
Test Well: AXMW-2
Test Date: 10-5-15

AQUIFER DATA

Saturated Thickness: 39.22 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (AXMW-2)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 39.22 ft
Casing Radius: 0.083 ft
Static Water Column Height: 39.22 ft
Screen Length: 20. ft
Well Radius: 0.33 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0004255 cm/sec
y0 = 1.341 ft

Data Set: J:\5164 - Luminant CCR Well Installation and GW Sampling\5164-E_Sandow 5\Slug Tests\Sandow Slug Tests
Date: 11/18/15
Time: 10:03:01

PROJECT INFORMATION

Company: PBW
Client: Luminant
Project: 5164-E
Location: Sandow AX
Test Date: 10-5-15
Test Well: AXMW-2

AQUIFER DATA

Saturated Thickness: 39.22 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: AXMW-2

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 2.28 ft
Static Water Column Height: 39.22 ft
Casing Radius: 0.083 ft
Well Radius: 0.33 ft
Well Skin Radius: 0.33 ft
Screen Length: 20. ft
Total Well Penetration Depth: 39.22 ft

No. of Observations: 333

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
0.	0.	167.	0.1756
1.	0.5873	168.	0.1709
2.	1.91	169.	0.1715
3.	1.76	170.	0.1717
4.	1.453	171.	0.1703
5.	1.363	172.	0.1692
6.	1.287	173.	0.1666
7.	1.139	174.	0.168
8.	1.126	175.	0.1662
9.	1.136	176.	0.166
10.	1.064	177.	0.1635
11.	0.9551	178.	0.1649
12.	0.9512	179.	0.1637
13.	1.009	180.	0.1635
14.	0.9347	181.	0.1612
15.	0.9296	182.	0.1625
16.	0.8993	183.	0.1586
17.	0.8808	184.	0.1618
18.	0.8647	185.	0.1605
19.	0.8291	186.	0.1597
20.	0.8047	187.	0.1578
21.	0.7895	188.	0.1583
22.	0.7677	189.	0.1567
23.	0.7579	190.	0.1554
24.	0.73	191.	0.1548
25.	0.7201	192.	0.1537
26.	0.7084	193.	0.1545
27.	0.6841	194.	0.1537
28.	0.6756	195.	0.1541
29.	0.6616	196.	0.1505

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
30.	0.6468	197.	0.1497
31.	0.6343	198.	0.15
32.	0.6221	199.	0.1509
33.	0.6105	200.	0.15
34.	0.5989	201.	0.1506
35.	0.5879	202.	0.1486
36.	0.5784	203.	0.147
37.	0.5683	204.	0.1463
38.	0.5594	205.	0.1463
39.	0.5491	206.	0.1453
40.	0.542	207.	0.1434
41.	0.532	208.	0.1473
42.	0.5212	209.	0.1435
43.	0.5153	210.	0.1441
44.	0.5046	211.	0.1439
45.	0.4984	212.	0.1434
46.	0.4895	213.	0.1418
47.	0.4831	214.	0.1425
48.	0.4736	215.	0.1411
49.	0.4677	216.	0.1412
50.	0.4598	217.	0.1423
51.	0.4545	218.	0.1375
52.	0.4482	219.	0.1399
53.	0.4412	220.	0.1391
54.	0.4346	221.	0.1388
55.	0.4294	222.	0.1373
56.	0.4237	223.	0.1396
57.	0.4176	224.	0.1357
58.	0.4116	225.	0.1368
59.	0.4074	226.	0.1365
60.	0.4015	227.	0.1364
61.	0.3981	228.	0.1349
62.	0.3926	229.	0.1339
63.	0.3839	230.	0.135
64.	0.3813	231.	0.1334
65.	0.3759	232.	0.1343
66.	0.3711	233.	0.1323
67.	0.3678	234.	0.1315
68.	0.362	235.	0.1312
69.	0.3607	236.	0.1314
70.	0.3555	237.	0.1327
71.	0.3493	238.	0.1288
72.	0.3476	239.	0.13
73.	0.3421	240.	0.1302
74.	0.3382	241.	0.1283
75.	0.3335	242.	0.1307
76.	0.3324	243.	0.1271
77.	0.3302	244.	0.1258
78.	0.3245	245.	0.129
79.	0.3224	246.	0.1272
80.	0.32	247.	0.1262
81.	0.3142	248.	0.1261
82.	0.3106	249.	0.1271
83.	0.3077	250.	0.1274
84.	0.3074	251.	0.1243
85.	0.3031	252.	0.1255
86.	0.3004	253.	0.1214
87.	0.2963	254.	0.1244
88.	0.296	255.	0.1232
89.	0.2933	256.	0.1234
90.	0.29	257.	0.1234
91.	0.2893	258.	0.1249
92.	0.2856	259.	0.1221
93.	0.2833	260.	0.1225
94.	0.2808	261.	0.1205
95.	0.2772	262.	0.1226

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
96.	0.274	263.	0.12
97.	0.274	264.	0.1227
98.	0.2707	265.	0.1207
99.	0.2668	266.	0.1202
100.	0.267	267.	0.1168
101.	0.2648	268.	0.1199
102.	0.2625	269.	0.1207
103.	0.2579	270.	0.1197
104.	0.2552	271.	0.1189
105.	0.2537	272.	0.1176
106.	0.255	273.	0.1171
107.	0.2516	274.	0.1182
108.	0.2468	275.	0.1185
109.	0.2474	276.	0.116
110.	0.246	277.	0.1164
111.	0.2428	278.	0.1164
112.	0.2408	279.	0.116
113.	0.2419	280.	0.1157
114.	0.2382	281.	0.1146
115.	0.2379	282.	0.1148
116.	0.2351	283.	0.1147
117.	0.2327	284.	0.1143
118.	0.2317	285.	0.1136
119.	0.2309	286.	0.1132
120.	0.2279	287.	0.1134
121.	0.2263	288.	0.1129
122.	0.2252	289.	0.1121
123.	0.221	290.	0.1107
124.	0.2221	291.	0.1118
125.	0.2212	292.	0.1122
126.	0.217	293.	0.113
127.	0.2164	294.	0.1105
128.	0.2148	295.	0.1125
129.	0.2117	296.	0.112
130.	0.2152	297.	0.1091
131.	0.2114	298.	0.1119
132.	0.2133	299.	0.1109
133.	0.2059	300.	0.1104
134.	0.2088	301.	0.1096
135.	0.2069	302.	0.1092
136.	0.2052	303.	0.1091
137.	0.2017	304.	0.1079
138.	0.2025	305.	0.1079
139.	0.2024	306.	0.1076
140.	0.2004	307.	0.108
141.	0.1981	308.	0.1061
142.	0.1992	309.	0.1074
143.	0.1966	310.	0.1072
144.	0.1955	311.	0.1067
145.	0.1934	312.	0.1061
146.	0.1929	313.	0.1055
147.	0.1938	314.	0.1068
148.	0.191	315.	0.1044
149.	0.1897	316.	0.105
150.	0.1889	317.	0.1037
151.	0.1879	318.	0.1045
152.	0.1864	319.	0.103
153.	0.186	320.	0.1047
154.	0.1866	321.	0.1036
155.	0.1847	322.	0.102
156.	0.1835	323.	0.1025
157.	0.1816	324.	0.1023
158.	0.1804	325.	0.1012
159.	0.1788	326.	0.1021
160.	0.1787	327.	0.1015
161.	0.1775	328.	0.1013

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
162.	0.1763	329.	0.1116
163.	0.1761	330.	0.0797
164.	0.1767	331.	0.1106
165.	0.1737	332.	0.1192
166.	0.174		

SOLUTION

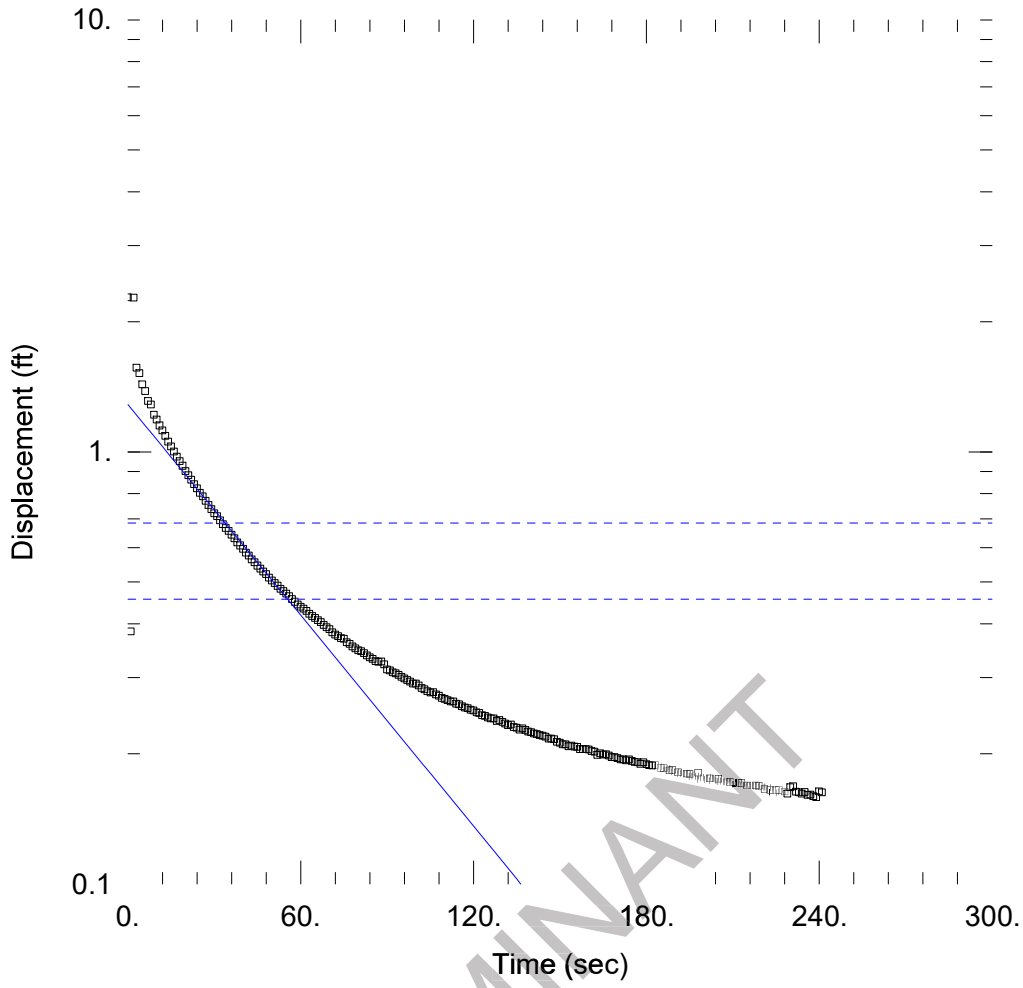
Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
ln(Re/rw): 3.573

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.0004255	cm/sec
y0	1.341	ft

T = K*b = 0.5086 cm²/sec



WELL TEST ANALYSIS

Data Set: J:\...\AXMW-2 Slug OUT.aqt
Date: 11/18/15 Time: 10:03:36

PROJECT INFORMATION

Company: PBW
Client: Luminant
Project: 5164-E
Location: Sandow AX
Test Well: AXMW-2
Test Date: 10-5-15

AQUIFER DATA

Saturated Thickness: 39.22 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (New Well)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 39.22 ft
Casing Radius: 0.083 ft
Static Water Column Height: 39.22 ft
Screen Length: 20. ft
Well Radius: 0.33 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0003512 cm/sec
y0 = 1.287 ft

Data Set: J:\5164 - Luminant CCR Well Installation and GW Sampling\5164-E_Sandow 5\Slug Tests\Sandow Slug Tests
Date: 11/18/15
Time: 10:03:55

PROJECT INFORMATION

Company: PBW
Client: Luminant
Project: 5164-E
Location: Sandow AX
Test Date: 10-5-15
Test Well: AXMW-2

AQUIFER DATA

Saturated Thickness: 39.22 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: New Well

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 2.28 ft
Static Water Column Height: 39.22 ft
Casing Radius: 0.083 ft
Well Radius: 0.33 ft
Well Skin Radius: 0.33 ft
Screen Length: 20. ft
Total Well Penetration Depth: 39.22 ft

No. of Observations: 242

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
0.	0.	121.	0.2493
1.	0.3839	122.	0.2487
2.	2.276	123.	0.2458
3.	1.566	124.	0.2449
4.	1.52	125.	0.2427
5.	1.434	126.	0.2416
6.	1.382	127.	0.2416
7.	1.311	128.	0.2381
8.	1.287	129.	0.2394
9.	1.218	130.	0.2371
10.	1.187	131.	0.2352
11.	1.151	132.	0.2332
12.	1.121	133.	0.2338
13.	1.089	134.	0.2308
14.	1.057	135.	0.2297
15.	1.029	136.	0.2274
16.	1.002	137.	0.2289
17.	0.9751	138.	0.2273
18.	0.9519	139.	0.2253
19.	0.9287	140.	0.2243
20.	0.9024	141.	0.2231
21.	0.8825	142.	0.2222
22.	0.8617	143.	0.2212
23.	0.8413	144.	0.2201
24.	0.8234	145.	0.2191
25.	0.804	146.	0.217
26.	0.7887	147.	0.2171
27.	0.7703	148.	0.216
28.	0.7537	149.	0.2132
29.	0.7375	150.	0.2123

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
30.	0.721	151.	0.2102
31.	0.7095	152.	0.2103
32.	0.6941	153.	0.2082
33.	0.6805	154.	0.2089
34.	0.6665	155.	0.2079
35.	0.6559	156.	0.2075
36.	0.6424	157.	0.2052
37.	0.6306	158.	0.2052
38.	0.6174	159.	0.2052
39.	0.6075	160.	0.2046
40.	0.5961	161.	0.2031
41.	0.5839	162.	0.2022
42.	0.575	163.	0.1989
43.	0.5636	164.	0.2004
44.	0.5556	165.	0.1991
45.	0.5458	166.	0.1996
46.	0.537	167.	0.1982
47.	0.5287	168.	0.1966
48.	0.5213	169.	0.1964
49.	0.5119	170.	0.1956
50.	0.504	171.	0.194
51.	0.4972	172.	0.1942
52.	0.49	173.	0.1931
53.	0.4821	174.	0.1943
54.	0.4758	175.	0.1925
55.	0.4701	176.	0.1914
56.	0.4635	177.	0.1913
57.	0.4563	178.	0.1895
58.	0.4501	179.	0.1912
59.	0.443	180.	0.1891
60.	0.4382	181.	0.1884
61.	0.4332	182.	0.1879
62.	0.4283	183.	0.1885
63.	0.4219	184.	0.1868
64.	0.4169	185.	0.1857
65.	0.4127	186.	0.1854
66.	0.4078	187.	0.1849
67.	0.4035	188.	0.1831
68.	0.3974	189.	0.1838
69.	0.3928	190.	0.1817
70.	0.3888	191.	0.1813
71.	0.382	192.	0.1799
72.	0.3777	193.	0.1799
73.	0.3746	194.	0.18
74.	0.3709	195.	0.1797
75.	0.3694	196.	0.1771
76.	0.3624	197.	0.1774
77.	0.3594	198.	0.181
78.	0.3546	199.	0.1745
79.	0.3509	200.	0.176
80.	0.3472	201.	0.1762
81.	0.3455	202.	0.1755
82.	0.3419	203.	0.1733
83.	0.338	204.	0.1757
84.	0.3343	205.	0.1752
85.	0.3316	206.	0.1724
86.	0.3275	207.	0.173
87.	0.3268	208.	0.1724
88.	0.327	209.	0.1722
89.	0.3224	210.	0.1721
90.	0.3137	211.	0.1701
91.	0.3121	212.	0.171
92.	0.3088	213.	0.1714
93.	0.3072	214.	0.1692
94.	0.3046	215.	0.169
95.	0.3017	216.	0.1683

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
96.	0.299	217.	0.1686
97.	0.2962	218.	0.1691
98.	0.2938	219.	0.1688
99.	0.2907	220.	0.1678
100.	0.2909	221.	0.1659
101.	0.2881	222.	0.1669
102.	0.2838	223.	0.1651
103.	0.2823	224.	0.1624
104.	0.2792	225.	0.1648
105.	0.2773	226.	0.165
106.	0.2776	227.	0.1635
107.	0.2744	228.	0.1636
108.	0.2727	229.	0.1617
109.	0.2694	230.	0.1675
110.	0.2679	231.	0.1683
111.	0.266	232.	0.1633
112.	0.2643	233.	0.1628
113.	0.2645	234.	0.1617
114.	0.2611	235.	0.1632
115.	0.2603	236.	0.1606
116.	0.2577	237.	0.161
117.	0.2559	238.	0.1595
118.	0.255	239.	0.1588
119.	0.2529	240.	0.1638
120.	0.2522	241.	0.1628

SOLUTION

Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
ln(Re/rw): 3.573

VISUAL ESTIMATION RESULTS

Estimated Parameters

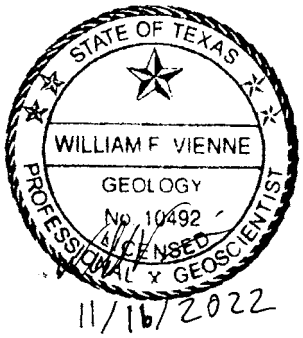
Parameter	Estimate	
K	0.0003512	cm/sec
y0	1.287	ft

$T = K*b = 0.4199$ cm²/sec

REPORT

Groundwater Monitoring System Certification Addendum No. 1

Sandow Steam Electric Station - AX Landfill
Rockdale, Texas



Submitted to:

Luminant Generation Company LLC

Submitted by:

WSP GOLDER

1601 S MoPac Expressway
Suite 325D
Austin, Texas, USA 78746
+1 512 671-3434

31404097.007

November 2022

PROFESSIONAL CERTIFICATION

This document and all attachments were prepared by WSP Golder under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I hereby certify that Addendum No.1 to the Groundwater Monitoring System Certification for the AX Landfill at the Sandow Steam Electric Station has been prepared in accordance with the requirements of 40 C.F.R. §257.91.

Patrick J. Behling, P.E.
Principal Engineer
WSP Golder
Texas Firm Registration No. 22771

Table of Contents

FIGURES

APPENDICES

DOCUMENT REVISION RECORD

Issue No.	Date	Details of Revisions
Revision 0	October 2017	Original Document
Addendum 1	November 2022	Added information on the local geology/hydrogeology and groundwater monitoring system to address TCEQ comments on the original report.

1.0 INTRODUCTION

On behalf of Luminant Generation Company LLC (Luminant), WSP Golder (Golder) has prepared this Addendum No. 1 to the Groundwater Monitoring System Certification for the AX Landfill (AX LF) located at the Sandow Steam Electric Station (SASES) in Milam County, Texas (hereafter, the "Site") (Figure 1). Luminant formerly operated the SASES and Coal Combustion Residuals (CCR) including fly ash and bed ash generated as part of SASES operation were placed in the AX LF. The AX LF is regulated as an Existing CCR Landfill under 40 C.F.R. § 257, Subpart D (the "CCR Rule").

The original Groundwater Monitoring System Certification for the AX LF was prepared in October 2017 in accordance with 40 C.F.R. §257.91 and placed in the SASES operating record in accordance with 40 C.F.R. §257.105 (PBW, 2017). This Addendum No. 1 updates the Groundwater Monitoring System Certification to include additional information on the following:

1. Discussion about the local geological and hydrological position of uppermost aquifer at the AX Landfill and the surrounding area.
2. Discussion of the depth of the uppermost aquifer in the up dip and down dip areas of the AX Landfill.
3. Geologic cross-sections across the landfill and adjacent area that show:
    a. Screened zone within the uppermost aquifer.
    b. The highest observed groundwater levels.
    c. A projection of the AX Landfill boundaries along the cross sections to show its position with respect to the groundwater table.
4. Confirmation that CCR well AX-27 is located outside the AX LF waste boundary

2.0 GROUNDWATER MONITORING SYSTEM

The CCR groundwater monitoring well system at the AX Landfill consists of nine monitoring wells (AXMW-1, AXMW-2, AX-23, AX-24, AX-25, AX-26, AX-27, AX-28, and AX-29) that are each screened in the uppermost aquifer at the Site. The locations of the CCR monitoring wells are shown on Figure 2. Based on the groundwater potentiometric surface maps presented in the original Groundwater Monitoring System Certification and in subsequent CCR reports, the location of each CCR monitoring well relative to the AX Landfill is as follows:

Upgradient Wells	Downgradient Wells
AXMW-1	AX-24
AXMW-2	AX-25
AX-23	AX-26
AX-29	AX-27
	AX-28

2.1 Local Geology and Hydrogeology

The AX Landfill is located within the boundaries of the former Sandow Lignite Mine, which is in the outcrop area of the Wilcox Group (Barnes, 1974). The Wilcox Group in the vicinity of the Site is divided into the Hooper Member, the Simsboro Member, and the Calvert Bluff Member (listed from oldest to youngest). The geologic units present at the Site regionally dip from northwest to southeast toward the Texas Gulf Coastal Plain (Barnes, 1974). The overburden interval and lignite seams mined at the Sandow Lignite Mine are part of the Calvert Bluff Formation. The following is a generalized stratigraphic column of the geologic units at the Site:

SERIES	GROUP	MEMBER	GENERAL DEPOSITIONAL ENVIRONMENT	LITHOLOGIC DESCRIPTION
PALEOCENE TO EOCENE (66 to 23 Million Years Ago)	WILCOX	**Calvert Bluff**	Deltaic, marsh, and swamp	Primarily silt and clay with varying amounts of sand and lignite
		Simsboro	Fluvial sands	Sand with minor silt and clay
		Hooper	Marsh and swamp	Primarily silt and clay with minor amounts of sand and lignite

Source: Barnes (1974)

The mine areas consist of an overburden interval (the interval above the lowest minable lignite seam, which was

disturbed during mining operations) and an underburden interval (the interval below the lowest minable lignite seam, which was not disturbed during mining operations). The overburden and underburden intervals are depicted on geologic cross sections constructed through the landfill area. The locations of the cross sections are shown on Figure 2 and the cross sections are presented on Figures 3 and 4.

The AX Landfill is constructed near the top of the overburden interval, which was previously excavated and backfilled during lignite mining operations. The location of the AX Landfill boundaries relative to the overburden interval are shown on the cross sections on Figure 3 and 4. The approximate extent of the mined areas near the AX Landfill is shown as the brown and purple-hatched areas on the USGS topographic map presented on Figure 1. The AX Landfill is surrounded by previously mined areas, with mined areas occurring both up dip (northwest) and down dip (southeast) of the AX Landfill.

Lithologic descriptions from soil borings completed in the mined overburden material (“mine spoil”) indicate that it consists of a highly heterogeneous mixture of sand, silty and clayey sand, and clay. The mine spoil extends from ground surface to depths ranging from approximately 100 feet below ground surface (bgs) on the northwest side of the AX Landfill to more than 160 feet bgs on the southeast side of the AX Landfill. The portions of the lowest minable lignite seam that still remain and the underlying clay shown on the cross sections mark the base of the mined overburden interval. As shown on the cross section figures, an inactive fault is present approximately 1,200 feet southeast of the AX Landfill. Mining occurred up to the fault but did not occur on the southeastern (upthrown) side of the fault, where the primary minable lignite seam is discontinuous. The mine underburden interval (the interval below the minable lignite seam) is stratigraphically higher on the upthrown side of the fault than it is on the downthrown side of the fault. Soil boring information from the upthrown side of the fault indicates that the Simsboro sand member of the Wilcox Group occurs approximately 10 feet below the base of the mined overburden interval.

As shown on the cross sections on Figures 4 and 5, groundwater is first encountered in the mine spoil material below the base of the AX Landfill. The uppermost aquifer at the Site is the saturated portion of the mined overburden interval. It extends from the water table (generally 20 to 80 feet bgs) to the base of the mined overburden interval, which is marked by the remaining native lignite and clay confining unit that sit above the Simsboro sand. The uppermost aquifer occurs under unconfined/water table conditions. Aquifer testing and total dissolved solids (TDS) data from wells completed within the mine spoil indicate that it is a Class 2 groundwater resource (i.e., it produces greater than 150 gallons per day and has TDS concentrations less than 10,000 mg/L).

3.0 POSITION OF CCR WELL AX-27 RELATIVE TO THE AX LF WASTE BOUNDARY

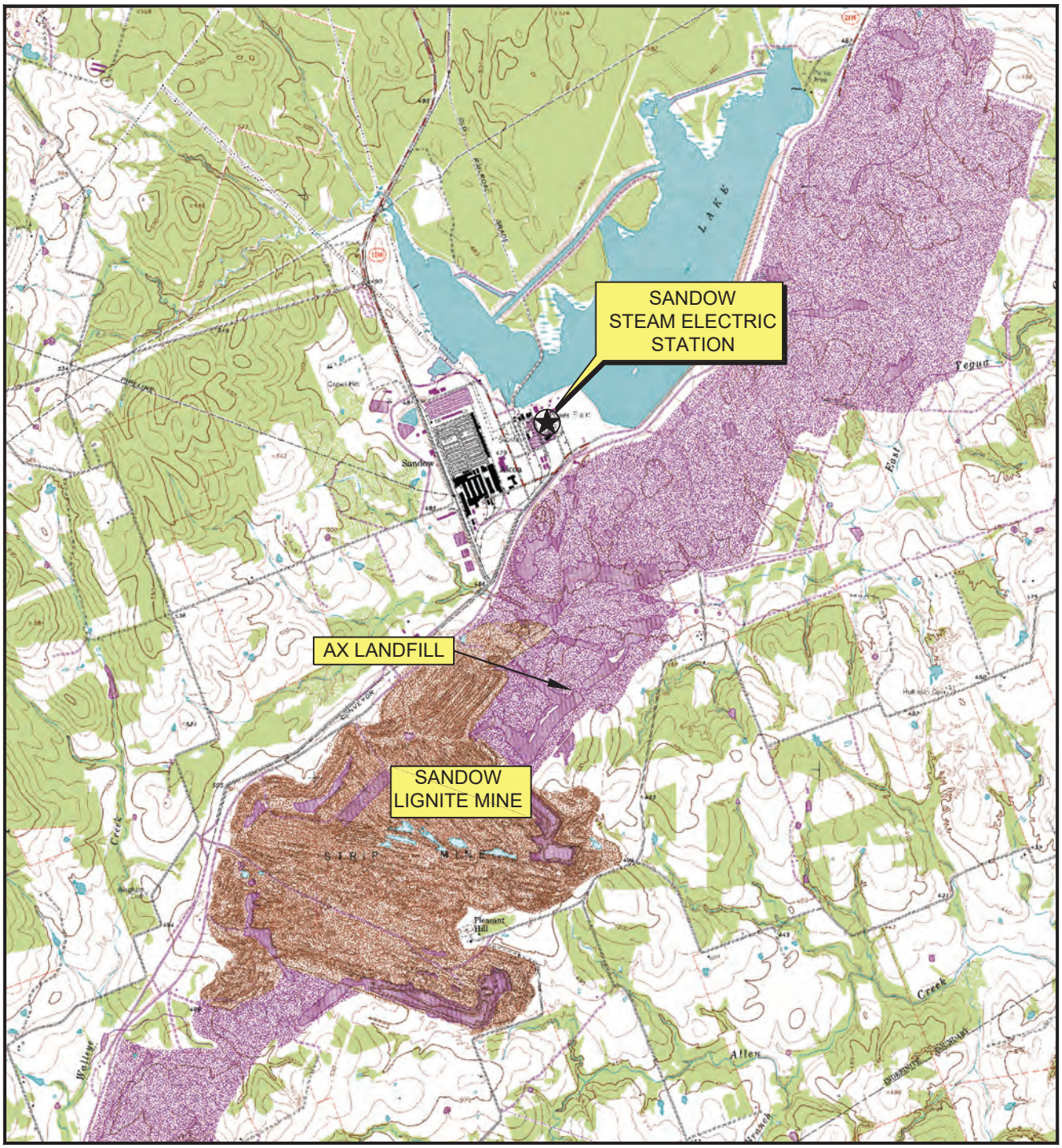
CCR well location maps included herein and provided in previous CCR reports could be mistakenly interpreted to indicate that CCR well AX-27 is located within the waste cell boundary of the AX LF. A photograph of well AX-27 is provided in Appendix A that shows AX-27(right side of photo) located outside the above-grade berm that marks the boundary of the AX LF waste cells. Although AX-27 may be located within the deed recorded boundary for the AX LF, it is outside the AX LF waste cell boundary; therefore, its position complies with the monitoring well location requirements of 40 C.F.R. § 257.91(a)(2).

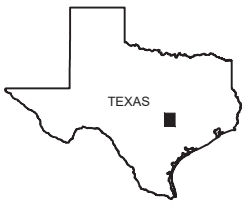
4.0 REFERENCES

Barnes, Virgil E., 1974. Geologic Atlas of Texas, Austin Sheet. Texas Bureau of Economic Geology.

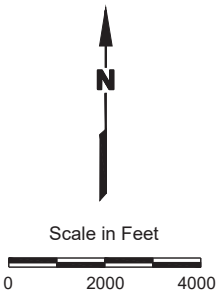
Pastor, Behling & Wheeler, LLC (PBW), 2016. CCR Groundwater Monitoring System Certification – Sandow 5 Generating Plant, AX Landfill, Rockdale, Texas. October 16.

FIGURES





QUADRANGLE LOCATION



SOURCE:
Base map from www.tnris.gov, Alcoa Lake, TX 7.5 min. USGS quadrangle dated 1963, revised 1988.

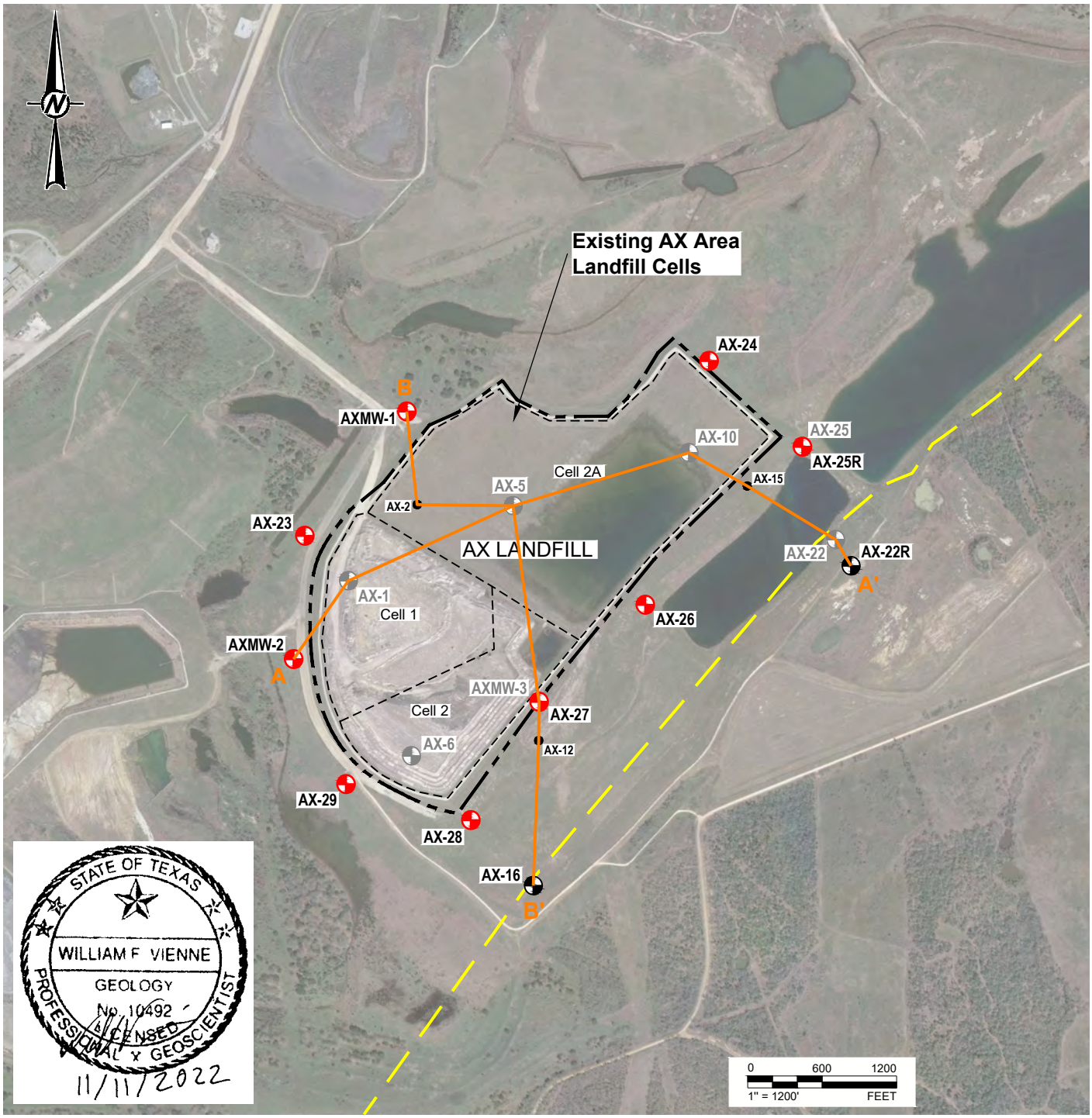
SANDOW STEAM ELECTRIC STATION
ROCKDALE, TEXAS

Figure 1

SITE LOCATION MAP

PROJECT: 31404097.004	BY: AJD	REVISIONS
DATE: MAR., 2017	CHECKED: PJB	

WSP GOLDER



STATE OF TEXAS
WILLIAM F VIENNE
GEOLOGY
No. 10492
LICENSED
PROFESSIONAL GEOSCIENTIST
11/11/2022

LEGEND

- CCR MONITORING WELL
- NON-CCR MONITORING WELL
- MONITORING WELL - PLUGGED
- SOIL BORING LOCATION
- APPROXIMATE LOCATION OF INACTIVE FAULT
- A —— A' GEOLOGIC CROSS SECTION LOCATION LINES

REFERENCE(S)
BASE MAP TAKEN FROM GOOGLE EARTH, IMAGERY DATED MARCH 2022.

CLIENT
LUMINANT

PROJECT
SANDOW 5 GENERATING PLANT
ROCKDALE, TEXAS

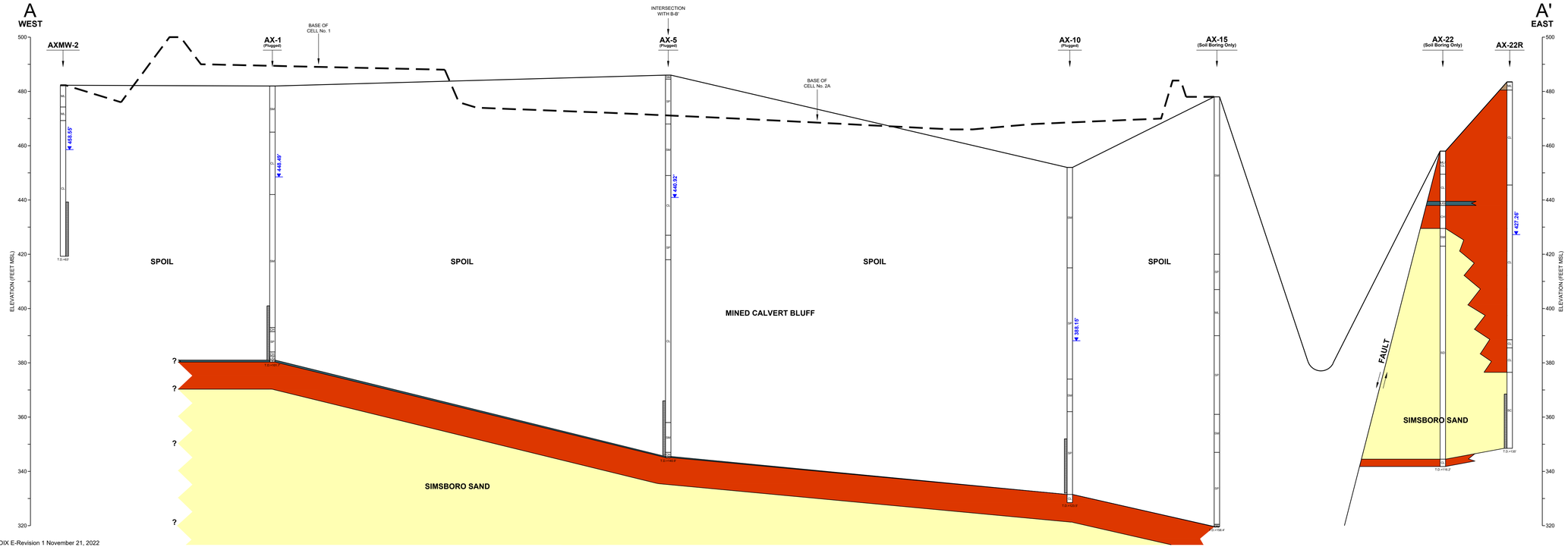
TITLE
AX LANDFILL AREA

CONSULTANT
WSP GOLDER

YYYY-MM-DD	2022-11-09
DESIGNED	AJD
PREPARED	AJD
REVIEWED	WFV
APPROVED	WFV

PROJECT NO. 31404097.004 | REV. 0 | FIGURE 2

APPENDIX E Revision 1 November 21, 2022

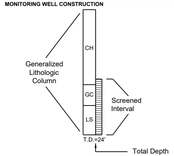


APPENDIX E-Revision 1 November 21, 2022

LEGEND

- SAND
- CLAY
- LIGNITE
- PROJECTED BOTTOM OF CCR LANDFILL

MONITORING WELL CONSTRUCTION



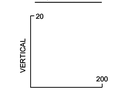
Max. Observed Historical Water Level (Ft MSL)

NOTE(S)

1. GROUND SURFACE ELEVATION IS BASED PRIMARILY ON BOREHOLE SURVEY DATA.

STATE OF TEXAS
WILLIAM F. VIENNE
GEOLOGY
No. 10492
PROFESSIONAL GEOSCIENTIST
11/11/2022

SCALE IN FEET



10x Vertical Exaggeration

CLIENT
LUMINANT

PROJECT
SANDOW 5 GENERATING PLANT
ROCKDALE, TEXAS

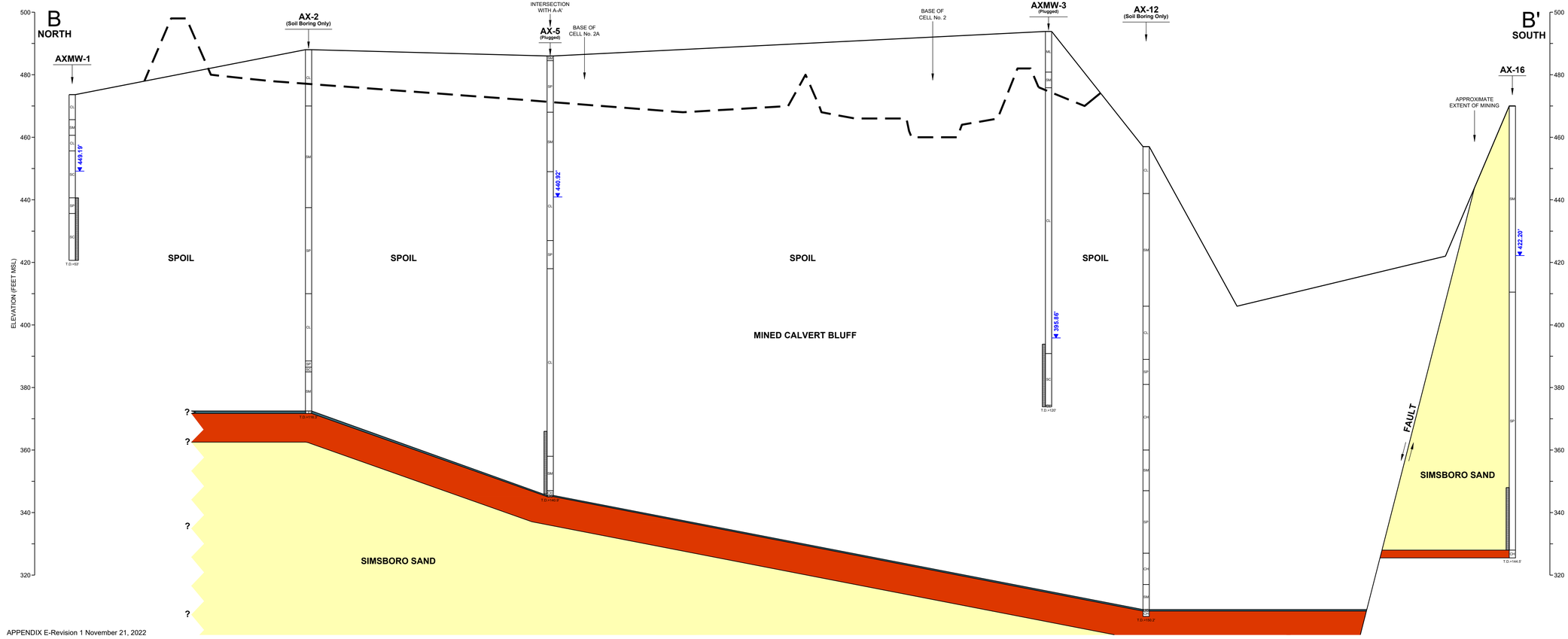
TITLE
AX LANDFILL AREA
GEOLOGIC CROSS SECTION A-A'
WEST SIDE OF LANDFILL TO EAST SIDE OF LANDFILL

CONSULTANT

wsp GOLDER

YYYY-MM-DD	2022-11-09
DESIGNED	AJD
PREPARED	AJD
REVIEWED	WFV
APPROVED	WFV

PROJECT NO. 31404097.004 | REV 0 | FIGURE 3

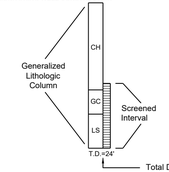


APPENDIX E-Revision 1 November 21, 2022

LEGEND

- SAND
- CLAY
- LIGNITE
- PROJECTED BOTTOM OF CCR LANDFILL

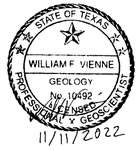
MONITORING WELL CONSTRUCTION



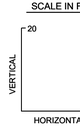
Max. Observed Historical Water Level (Ft MSL)

NOTE(S)

1. GROUND SURFACE ELEVATION IS BASED PRIMARILY ON BOREHOLE SURVEY DATA.
2. CALVERT BLUFF CLAY AND SIMSBORO SHOWN BELOW LIGNITE ON DOWNTHROWN SIDE OF FAULT ARE INFERRED BASED ON RELATIVE POSITIONS OF THESE UNITS OBSERVED ON UPTHROWN SIDE OF FAULT.



SCALE IN FEET



10x Vertical Exaggeration

CLIENT
LUMINANT

PROJECT
SANDOW 5 GENERATING PLANT
ROCKDALE, TEXAS

TITLE
AX LANDFILL AREA
GEOLOGIC CROSS SECTION B-B'
NORTH SIDE OF LANDFILL TO SOUTH SIDE OF LANDFILL

CONSULTANT

wsp GOLDER

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PROJECT NO. 31404097.004 | REV. 0 | FIGURE 4

APPENDIX A

Photograph of CCR Well AX-27

DESCRIPTION	**Photograph 1** – CCR Well AX-27 (right side of photo) shown outside the bermed AX LF waste boundary.	
SITE NAME	Sandow AX Landfill	DATE 2020

REPORT

Groundwater Monitoring Plan - Revision 2

Sandow Steam Electric Station - AX Landfill
Rockdale, Texas

Submitted to:

Luminant Generation Company LLC

Submitted by:

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DOCUMENT REVISION RECORD

Issue No.	Date	Details of Revisions
Revision 0	October 2017	Original Document
Revision 1	January 2022	Updated information on data evaluation procedures, updated well information
Revision 2	November 2022	Signed/sealed report and added professional geoscientist seal to figures that contain geological interpretations (e.g., boring logs), addressed sample shipment and quality assurance/quality control procedures, specified that the rate and direction of groundwater flow will be determined each sampling event, provided additional information on the statistical methods used to develop background values and evaluate sample data, specified that Alternate Source Demonstrations must be certified by a professional engineer, and updated groundwater protection standard information for cobalt, lithium, molybdenum

1.0 INTRODUCTION

The former Steam Electric Station (Sandow) is located approximately 7 miles southwest of Rockdale in Milam County, Texas. Coal Combustion Residuals (CCRs) including fly ash and bed ash that were generated as part of the Sandow plant operation were previously placed in the AX Landfill located approximately 7,500 feet south of the plant on reclaimed land that is part of the former Sandow Lignite Mine (Figure 1).

The CCR Rule (40 C.F.R. §257 Subpart D - *Standards for the Receipt of Coal Combustion Residuals in Landfills and Surface Impoundments*) has been promulgated by the EPA to regulate the management and disposal of CCRs as solid waste under Resource Conservation and Recovery Act (RCRA) Subtitle D. The CCR Rule established national minimum criteria for existing and new CCR landfills, existing and new CCR surface impoundments, and lateral expansions to landfills/impoundments. The AX Landfill is the only waste management unit associated with Sandow that meets the definition of a CCR landfill. The AX Landfill is considered an "existing landfill" under 40 CFR 257.53.

A groundwater monitoring plan was developed for the Site in accordance with Sections 257.90 through 257.95 of the CCR Rule in 2017 (PBW, 2017a). The CCR groundwater monitoring system at the Site was certified by a professional engineer in accordance with Section 257.91 of the CCR Rule as part of a separate report (PBW, 2017b). This revised groundwater monitoring plan updates and replaces the previous groundwater monitoring plan.

1.1 CCR Unit Groundwater Monitoring Applicability

Section 257.90 of the CCR Rule requires that existing CCR landfills and surface impoundments be in compliance with the following groundwater monitoring requirements:

- Install a groundwater monitoring system as required under Section 257.91;
- Develop a groundwater sampling and analysis program to include selection of the statistical procedures to be used for evaluating groundwater monitoring data as required under Section 257.93;
- Initiate a detection monitoring program to include obtaining a minimum of eight independent samples for each background and downgradient monitoring well as required under Section 257.94; and
- Begin evaluating the groundwater monitoring data for statistically significant increases over background levels for the constituents listed in Appendix III of this part as required under

Section 257.94.

Once a groundwater monitoring system and groundwater monitoring program has been established at the CCR unit, the owner or operator must conduct groundwater monitoring and, if necessary, corrective action throughout the active life and post-closure care period of the CCR unit. In the event of a release from a CCR unit, the owner or operator must take all necessary measures to control the source(s) of releases so as to reduce or eliminate, to the maximum extent feasible, further releases of contaminants into the environment.

For existing CCR landfills and surface impoundments, the owner or operator must prepare an annual groundwater monitoring and corrective action report to document the status of the groundwater monitoring and corrective action program for the CCR unit for the previous calendar year.

1.2 Groundwater Sampling and Analysis Requirements

The CCR Rule establishes groundwater sampling and analysis criteria that are designed to create consistency and ensure that monitoring results provide accurate representations of groundwater quality at the CCR groundwater monitoring wells. A sampling and analysis program must be developed for each unit that includes procedures and techniques for sample collection, sample preservation and shipment, analytical procedures, chain of custody control, and quality assurance and quality control. Depending on the constituents and concentrations detected, groundwater monitoring at each CCR unit may consist of detection monitoring (Section 257.94) only or a combination of detection monitoring and assessment monitoring (Section 257.95). Selected technical groundwater sampling and analysis criteria are described in detail below; however, the complete CCR Rule should be referenced for notification requirements and other criteria.

1.2.1 Groundwater Elevations

Groundwater elevations must be measured in each well immediately prior to purging, each time groundwater is sampled.

1.2.2 General Groundwater Analytical Requirements

The CCR groundwater monitoring program must include sampling and analytical methods that are appropriate for groundwater sampling and that accurately measure hazardous constituents and other monitoring parameters in groundwater samples. The EPA publication *Test Methods for Evaluating*

Solid Waste, Physical/Chemical Methods (SW-846), is EPA'S official compendium of analytical and sampling methods that have been evaluated and approved for use in complying with the RCRA regulations (EPA, 2015).

Groundwater monitoring under the CCR Rule includes analyses for inorganic parameters and metals. All metals analyses must be reported as "total recoverable metals" to capture both the particulate fraction and dissolved fraction of metals in the groundwater. The CCR Rule stipulates that groundwater samples cannot be field filtered prior to analysis.

1.2.3 Background Groundwater Quality Determination

Background groundwater quality must be established in a hydraulically upgradient or background well(s) for each of the groundwater constituents required in the detection monitoring or assessment monitoring program that applies to the CCR unit. Background groundwater quality may be established at wells that are not located hydraulically upgradient from the CCR unit if the samples accurately represent the quality of background groundwater that has not been affected by leakage from the CCR unit.

1.2.4 Detection Monitoring Requirements

Groundwater detection monitoring must be performed at each CCR unit (CCR Rule Section 257.94). The following constituents must be included in the detection monitoring program (from Appendix III to the CCR Rule):

- Boron
- Calcium
- Chloride
- Fluoride
- pH
- Sulfate
- Total Dissolved Solids (TDS)

The monitoring frequency for these constituents must be at least semi-annual during the active life of the CCR unit and post-closure period. The reported concentrations of the detection monitoring constituents must be compared to the respective CCR unit background concentration developed for each constituent. If a statistically significant increase over background levels is determined for one or more of the constituents listed above at any monitoring well at the CCR unit waste boundary, within 90 days the owner or operator must:

- Establish an assessment monitoring program as described in Section 257.95 of the Rule, or

- Demonstrate that a source other than the CCR unit caused the statistically significant increase over background levels for a constituent or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. If a successful demonstration is completed within the 90-day period, the owner or operator of the CCR unit may continue with the detection monitoring program.

1.2.5 Assessment Monitoring Requirements

Assessment monitoring is required under the CCR Rule whenever a statistically significant increase over background levels has been detected for one or more of the detection monitoring constituents listed above (CCR Rule Section 257.95). The following constituents must be included in the assessment monitoring program (from Appendix IV to the CCR Rule):

- Antimony
- Arsenic
- Barium
- Beryllium
- Cadmium
- Chromium
- Cobalt
- Fluoride
- Lead
- Lithium
- Mercury
- Molybdenum
- Selenium
- Thallium
- Radium 226 and 228 combined

Within 90 days of triggering an assessment monitoring program, and annually thereafter, the owner or operator of the CCR unit must sample and analyze the groundwater for all assessment monitoring constituents (Appendix IV) listed above. At least one sample must be collected from each well associated with the CCR unit.

Within 90 days of obtaining the results from the initial assessment monitoring sampling event, the owner or operator of the CCR unit must resample all wells associated with the CCR unit, conduct analyses for all detection monitoring parameters (Appendix III) and for those assessment monitoring constituents (Appendix IV) that have been detected as part of assessment monitoring. At least one

sample must be collected from each well associated with the CCR unit. This monitoring must be performed on at least a semi-annual basis thereafter. The owner or operator of a CCR unit may demonstrate the need for an alternative monitoring frequency for repeated sampling and analysis for these constituents during the active life and the post-closure care period based on the availability of groundwater. If there is not adequate groundwater flow to sample wells semi-annually, the alternative frequency shall be no less than annual.

Within 90 days of obtaining the results from the initial assessment monitoring sampling event, groundwater protection standards (GWPSs) must be established for all assessment monitoring constituents (Appendix IV) detected in the CCR unit monitoring wells. The GWPS shall be:

- For constituents for which a federal maximum contaminant level (MCL) has been established under 40 CFR 141.62 and 141.66, the MCL for that constituent; or
- For constituents for which an MCL has not been established, the background concentration or approved regional screening level for the constituent established in accordance with CCR Rule Section 257.91; or
- For constituents for which the background level is higher than the MCL, the background concentration.

Following are the federal MCLs or alternate accepted screening criteria that have been established for the assessment monitoring constituents (Appendix IV) identified in the Rule:

Constituent	**MCL (mg/L)**
Antimony	0.006
Arsenic	0.01
Barium	2.0
Beryllium	0.004
Cadmium	0.005
Chromium	0.1
Cobalt	0.006*
Fluoride	4.0
Lead	0.015*
Lithium	0.04*
Mercury	0.002

Constituent	MCL (mg/L)
Molybdenum	0.10*
Selenium	0.05
Thallium	0.002
Radium 226/228 Combined	5 pCi/L**

* Health-protective benchmarks adopted by the USEPA for Appendix IV constituents without established MCLs.
** pCi/L = picocuries per liter

If the concentrations of all detection monitoring constituents (Appendix III) and assessment monitoring constituents (Appendix IV) are shown to be statistically at or below background values for two consecutive sampling events, the owner or operator may return to performing only detection monitoring of the CCR unit. If the concentrations of any detection monitoring constituents (Appendix III) and assessment monitoring constituents (Appendix IV) are shown to be statistically above background values, but all concentrations are below their respective GWPS, the owner or operator must continue assessment monitoring of the CCR Unit.

Within 90 days of finding that any of the assessment monitoring constituents (Appendix IV) have been detected at a statistically significant level exceeding their respective GWPS, the owner or operator of the CCR unit must either:

- Initiate an assessment of corrective measures for the CCR unit (CCR Rule Section 257.96); or
- Demonstrate that a source other than the CCR unit caused the contamination, or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. If a successful demonstration is made, the owner or operator must continue assessment monitoring. If a successful demonstration has not been made at the end of the 90 day period, the owner or operator of the CCR unit must initiate an assessment of corrective measures for the CCR unit.

If one or more assessment monitoring constituents (Appendix IV) are detected at statistically significant levels above their respective GWPS, the owner or operator of the CCR unit must characterize the nature and extent of the release. Characterization of the release includes the following minimum measures:

- Install additional monitoring wells necessary to define the contaminant plume(s);

- Collect data on the nature and estimated quantity of material released including specific information on the assessment monitoring constituents (Appendix IV) and the levels at which they are present in the material released;

- Install at least one additional monitoring well at the facility boundary in the direction of contaminant migration and sample this well for all detection monitoring parameters (Appendix III) and for those assessment monitoring constituents (Appendix IV) that have been detected as part of assessment monitoring. This monitoring must be performed on at least a semi-annual basis thereafter.

- Sample all CCR unit wells for all detection monitoring parameters (Appendix III) and for those assessment monitoring constituents (Appendix IV) that have been detected as part of assessment monitoring. This monitoring must be performed on at least a semi-annual basis thereafter.

1.3 Groundwater Statistical Evaluation Procedures

Statistical analysis of the groundwater monitoring data is required as part of detection monitoring and assessment monitoring under the CCR Rule. One of the following statistical methods must be used to evaluate groundwater monitoring data for each monitored constituent:

- A parametric analysis of variance followed by multiple comparison procedures to identify statistically significant evidence of contamination. The method must include estimation and testing of the contrasts between each compliance well's mean and the background mean levels for each constituent; or

- An analysis of variance based on ranks followed by multiple comparison procedures to identify statistically significant evidence of contamination. The method must include estimation and testing of the contrasts between each compliance well's median and the background median levels for each constituent; or

- A tolerance or prediction interval procedure in which an interval for each constituent is established from the distribution of the background data. The level of each constituent in each compliance well is compared to the upper tolerance or prediction limit established from the background data; or

- A control chart approach that gives control limits for each constituent; or

- Another statistical test method that meets the performance standards.

Any statistical method chosen must comply with the following performance standards:

- The statistical method used to evaluate groundwater monitoring data shall be appropriate for the distribution of constituents. Probability distributions of data values shall use parametric methods, and non-probability distributions of data values shall use non-parametric methods. If the distribution of the constituents is shown to be inappropriate for a probability theory test, the

data must be transformed or a distribution-free (non-parametric) theory test must be used. If the distributions for the constituents differ, more than one statistical method may be needed;

- If an individual well comparison procedure is used to compare an individual compliance well constituent concentration with background constituent concentrations or a GWPS, the test shall be done at a Type I error level no less than 0.01 for each testing period. If a multiple comparison procedure is used, the Type I experiment wise error rate for each testing period shall be no less than 0.05; however, the Type I error of no less than 0.01 for individual well comparison must be maintained. This performance standard does not apply to tolerance intervals, prediction intervals, or control charts;

- If a control chart approach is used to evaluate groundwater monitoring data, the specific type of chart and its associated parameter values shall be such that this approach is at least as effective as any other approach in this section for evaluating groundwater data. The parameter values shall be determined after considering the number of samples in the background database, the data distribution, and the range of the concentration values for each constituent of concern;

- If a tolerance interval or a prediction interval is used to evaluate groundwater monitoring data, the levels of confidence and, for tolerance intervals, the percentage of the population that the interval must contain, shall be such that this approach is at least as effective as any other approach in this section for evaluating groundwater data. These parameters shall be determined after considering the number of samples in the background database, the data distribution, and the range of the concentration values for each constituent of concern;

- The statistical method must account for data below the limit of detection with one or more statistical procedures that shall be at least as effective as any other approach in this section for evaluating groundwater data. Any practical quantitation limit that is used in the statistical method shall be the lowest concentration level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions that are available to the facility; and

- If necessary, the statistical method must include procedures to control or correct for seasonal and spatial variability as well as temporal correlation in the data.

The owner/operator of the CCR unit must determine if there has been a statistically significant increase over background (detection monitoring) or MCLs/background (assessment monitoring) for each constituent required in the particular groundwater monitoring program that applies to the CCR unit. The determination of statistical increase over background/MCLs for each constituent at each monitoring well must be made within 90 days after completing sampling and analysis.

2.0 GROUNDWATER MONITORING PROCEDURES

This section describes groundwater sampling and analysis procedures for monitoring the CCR unit wells to comply with the requirements of 40 CFR 257.90 - 257.95 of the CCR Rule.

2.1 AX Landfill Groundwater Monitoring System

The CCR groundwater monitoring system consists of the following ten monitoring wells:

Upgradient Wells	Downgradient Wells
AXMW-1	AX-24
AXMW-2	AX-25R
AX-23	AX-26
AX-29	AX-27
	AX-28

A detailed Site Plan showing the CCR monitoring well locations is presented on Figure 2. Boring logs for the wells are provided in Appendix A. The CCR groundwater monitoring system was certified by a professional engineer in accordance with Section 257.91 of the CCR Rule as part of a separate report (PBW, 2017b).

2.2 Groundwater Sampling Procedures

2.2.1 Equipment Assembly and Preparation

Activities that occur during groundwater sampling are summarized as follows:

- pre-arrangement of sample analytical requests with analytical testing laboratory;
- assembly and preparation of sampling equipment and supplies;
- groundwater sampling;
- water-level measurements;
- well purging;
- field parameter measurements;
- sample collection;
- sample preservation;
- sample labeling;
- completion of sample records;
- completion of chain-of-custody records; and
- sample shipment.

Prior to each sampling event, equipment to be used is assembled, properly cleaned and its operating condition verified. In addition, all record-keeping materials are prepared. Sampling procedures are conducted in general accordance with EPA SW-846 methods.

Decontamination of all non-disposable or non-dedicated field measurement, purging, and sampling equipment are performed for each sampling event before any purging/sampling activities begin, after each well is sampled, and at the end of the sampling event. Decontamination procedures are summarized below:

(1) Wash equipment with low-residue soap and/or detergent solution.
(2) Rinse with distilled water; and
(3) Repeat steps (1) and (2) above, as necessary.

2.2.2 General Groundwater Sampling Procedures

Prior to collecting samples, each well is inspected for signs of damage to the well protective casing and well pad. Each field instrument is calibrated according to the manufacturer's instructions prior to use.

Special care should be exercised to prevent contamination of the groundwater and extracted samples during the sampling activities. The primary way in which such contamination can occur is contact with improperly cleaned equipment. To prevent such contamination, all non-dedicated sampling equipment is thoroughly cleaned before and between uses at different sampling locations. In addition to the use of properly cleaned equipment, a new pair of disposable latex (or similar) gloves is worn for each well.

2.2.3 Groundwater Level Measurements

Groundwater levels are measured prior to purging the wells. Using a pre-cleaned water level meter, the groundwater surface is measured from the casing datum to the nearest 0.01-foot. Total depth measurements are also collected on, at least, an annual basis. The rate and direction of groundwater flow should be determined for each groundwater monitoring event using the groundwater level measurements and aquifer hydraulic properties presented in the CCR Groundwater Monitoring System Certification (PBW, 2017b).

2.2.4 Well Purging and Sampling

Well purging and sampling is conducted using either a submersible pump or peristaltic pump in accordance with standard low flow sampling procedures. The sampler withdraws water in a manner that minimized stress (drawdown) to the system to the extent practicable. When the pump intake is located within the screened interval, the water pumped is drawn in directly from the formation with little mixing of casing water or disturbance to the sampling zone. Thus, sample results are more representative of the constituents present in the groundwater.

Purging rates during sample collection are generally performed at 0.5 liters per minute (L/min) or less. Field parameters (pH, temperature, conductivity and turbidity) are measured to evaluate when the well

is adequately purged. Turbidity in the samples should be minimized as much as possible. By using minimal pumping rates, dedicated equipment whenever possible, and positioning the intake for the sample tubing or submersible pump off of the bottom of the well.

For groundwater samples, at least three field measurements should be taken during the course of purging the well. If the parameters have not stabilized at that time, field measurements and purging will continue until two consecutive readings have stabilized to within the following limits:

- Temperature: +/-1° C
- pH: +/-0.1 pH units
- Specific conductance: +/-10%
- Turbidity: +/- 10%

Sample extraction is accomplished by using the pump that was previously used to purge the well. The sample bottle is filled directly from the pump line. The pumping rate and parameter measurements are recorded on groundwater sampling forms in the field. If a well goes dry during purging, sampling is performed after the well has sufficiently recharged to allow sample collection.

Groundwater samples will not be filtered in the field prior to collection in accordance with Section 257.93(i) of the CCR Rule.

2.2.5 Containers, Labels, and Sample Shipment

Samples are collected in laboratory-supplied containers. The following information is legibly and indelibly written on the label:

- project identification;
- sample identification;
- name or initials of collector;
- date and time of collection;
- analysis requested; and
- sample preservative, if applicable.

After the samples are collected, the sample containers are placed in a cooler or similar container, preserved with ice, and shipped to the laboratory for analysis.

2.2.6 Chain-of-Custody Control

After samples are collected, chain-of-custody procedures are followed to establish a written record concerning sample movement between the sampling site and the testing laboratory. Each shipping

container has a chain-of-custody form completed by the sampling personnel packing the samples. The chain-of-custody form for each container is completed and sealed in the shipping container.

2.3 Analytical Procedures

The laboratory analytical methods utilized for the analysis of detection monitoring and assessment monitoring programs are appropriate and commonly utilized EPA methodologies, or other similar standard methodologies. Typical methodologies used to analyze the detection and assessment program constituents are presented below:

Detection Monitoring Program (Appendix III Constituents)

- Boron and calcium by EPA Method SW6020;
- Chloride, fluoride, and sulfate by EPA Method E300;
- pH by Standard Method M4500-H + B (field measurement); and
- TDS by Standard Method M2540.

Assessment Monitoring Program (Appendix IV Constituents)

- Antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, lead, lithium, molybdenum, selenium, and thallium by EPA Method SW6020;
- Fluoride EPA Method E300;
- Mercury by EPA Method SW7470; and
- Radium 226 and 228 by EPA Methods 904.0/SW9320 Modified and 903.1 Modified.

All metals analyses shall be reported as “total recoverable metals” in accordance with Section 257.93(1) of the CCR Rule. Filtering of samples prior to analysis is not permitted.

2.3.1 Data Quality Assurance/Quality Control

A quality assurance/quality control (QA/QC) program will be implemented to confirm the validity of the analytical results. Laboratory QC samples will include method blanks, laboratory control samples, and matrix spike/matrix spike duplicates. Field QC samples will include one field duplicate per sampling event. The selected laboratory must have in place documented quality assurance protocols and quality control checks to demonstrate the laboratory’s procedures and practices are consistent with the National Environmental Laboratory Accreditation Conference (NELAC) standards. Potential issues regarding the quality of the data should be evaluated through the examination of:

- The project objectives;
- Laboratory review checklist and associated exceptions report;
- The reportable data; and
- The field notes and data associated with the sampling event(s).

In the case where quality control criteria are outside applicable limits, a summary must be presented that indicates the affected samples, the quality control parameter reviewed, the qualifiers and bias code(s) applied to the data point, and the determination made concerning the usability of data.

3.0 STATISTICAL EVALUATION PROCEDURES

The following statistical evaluation approaches were selected to demonstrate groundwater compliance for the AX Landfill under the CCR Rule:

- Use of intrawell data evaluations, which compare new sample data to historical data at each groundwater monitoring well independently. Use of interwell data evaluations, which compare new sample data to data from upgradient or background wells, is also considered a valid evaluation method and may be used in the future.

- Use of upper prediction limits (UPLs) to develop site-specific background concentrations for all Appendix III and Appendix IV constituents. This approach is a common statistical method used to evaluate groundwater compliance for Subtitle D landfill facilities and is one of the approved options for groundwater quality data statistical evaluation under the CCR Rule.

- After every detection monitoring event, Appendix III constituent concentrations from each well are compared to background UPLs to ascertain if a statistically significant increase above background exists. Background UPLs are based on a 1-of-2 resampling approach, meaning that if zero or one concentration measurement from a series of two independent samples collected from a well do not exceed the appropriate UPL, then a statistically significant increase over background has not occurred at a CCR unit.

- If in assessment monitoring, the 95% lower confidence limit of the mean (LCL) is calculated after each assessment monitoring event for each Appendix IV constituent. The set of data used to calculate LCLs is based on current and historical constituent concentrations. A statistically significant increase over the GWPS has occurred at a CCR unit when the LCL for at least one assessment monitoring constituent at a well is greater than the appropriate GWPS.

The statistical evaluation procedures proposed for the AX Landfill groundwater data conform with the Rule requirements discussed in Section 1.3, as well as the Statistical Analysis Plan for the Site, EPA's *Unified Guidance: Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities* (EPA, 2009), and the American Society for Testing and Materials (ASTM) standard D6312-17, *Developing Appropriate Statistical Approaches for Groundwater Detection Monitoring Programs at waste Disposal Facilities* (ASTM, 2017).

Eight independent groundwater samples were evaluated for each Appendix III parameter at each well to statistically establish detection monitoring prediction limits. Eight independent groundwater samples were also evaluated for each Appendix IV parameter at each well to establish assessment monitoring GWPSs. The GWPSs were developed using the following methodology:

- For constituents for which a federal maximum contaminant level (MCL) has been established, the MCL for that constituent; or

- For constituents for which an MCL has not been established, the background concentration (prediction limit) or approved regional screening level for the constituent; or

- For constituents for which the background level (prediction limit) is higher than the MCL, the background concentration (prediction limit) for the constituent.

4.0 DETECTION MONITORING DATA EVALUATION

CCR groundwater detection monitoring will be performed on a semi-annual basis during the active life of the landfill and during the post-closure period. Each CCR monitoring well will be sampled for the following Appendix III constituents as part of the detection monitoring program:

- Boron
- Calcium
- Chloride
- Fluoride
- pH
- Sulfate
- Total Dissolved Solids (TDS)

Sampling and analytical procedures will be as described in previous sections of this plan.

After each detection monitoring event, the reported concentrations of the detection monitoring constituents at each well will be compared to the background concentration prediction limits developed for each constituent as described in Section 3 of this plan to ascertain if a statistically significant increase above background concentrations does or no does not exist. Possible outcomes from comparing the detection monitoring constituent concentrations in each well to their respective background concentration prediction limits are as follows:

- All detection monitoring constituent concentrations in each well are less than or equal to their respective background concentration prediction limits in the well; or
- One or more detection monitoring constituent concentrations in each well are above their respective background concentration prediction limits in the well.

4.1 No Statistically Significant Increase Over Background Concentrations

The background concentration prediction limits were developed based on a one-of-two resampling approach, meaning that if concentrations in at least one sample in a series of two independent samples collected from a well do not exceed their prediction limits, then a statistically significant increase over background concentrations has not occurred. This conclusion will be reached if the data indicate either of the following:

- All detection monitoring constituent concentrations in each well are less than or equal to their respective background concentration prediction limits; or

- One or more detection monitoring constituent concentration in any well is above the respective background concentration prediction limits. If this occurs, the well or wells with concentrations above the prediction limits will be resampled and analyzed for the detection monitoring constituent or constituents that exceed the prediction limits. If the resample indicates that the target detection monitoring constituent concentrations in the well or wells are less than or equal to their respective background concentration prediction limits, then it can be concluded that a statistically significant increase over background concentrations for all detection monitoring constituents does not exist, since concentrations in one sample of the two independent samples do not exceed their prediction limits.

If the groundwater monitoring data indicate that a statistically significant increase over background does not exist at the CCR wells, detection monitoring at all CCR wells will continue on a semi-annual basis.

4.2 Statistically Significant Increase Over Background Concentrations

If one or more detection monitoring constituent concentrations in any well is above the respective background concentration prediction limit in both the original detection monitoring sample and the resample, then a statistically significant increase over background concentrations for the target detection monitoring constituents can be concluded. If a statistically significant increase is indicated, within 90 days the owner/operator will:

- Establish an assessment monitoring program as described in this plan, or
- Demonstrate that a source other than the CCR unit caused the statistically significant increase over background levels for a constituent, or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The demonstration must be summarized in a report that is certified by a professional engineer. If a successful demonstration is completed within the 90-day period, the owner or operator of the CCR unit may continue with the detection monitoring program.

5.0 ASSESSMENT MONITORING DATA EVALUATION

CCR groundwater assessment monitoring will be performed at the AX Landfill groundwater monitoring system whenever a statistically significant increase over GWPSs has been confirmed for one or more of the detection monitoring constituents listed in this plan. Within 90 days of triggering the assessment monitoring program, and annually thereafter, each CCR monitoring well in the AX Landfill groundwater monitoring system will be sampled for the following Appendix IV parameters as part of the assessment monitoring program:

- Antimony
- Arsenic
- Barium
- Beryllium
- Cadmium
- Chromium
- Cobalt
- Fluoride
- Lead
- Lithium
- Mercury
- Molybdenum
- Selenium
- Thallium
- Radium 226 and 228 combined

Sampling and analytical procedures will be as described in previous sections of this plan.

Within 90 days of obtaining the results from the initial assessment monitoring sampling event, all wells in the groundwater monitoring system will be resampled and analyzed for:

- All Appendix III detection monitoring parameters; and
- The Appendix IV assessment monitoring parameters that were detected as part of the assessment monitoring event.

This monitoring will be performed on at least a semi-annual basis thereafter unless the owner/operator can demonstrate the need for an alternative monitoring frequency for repeated sampling and analysis for these constituents during the active life and the post-closure care period based on the availability of groundwater. If there is not adequate groundwater flow to sample wells semi-annually, the alternative frequency shall be no less than annual.

Within 90 days of obtaining the results from the initial assessment monitoring sampling event, GWPSs will be established for all Appendix IV assessment monitoring constituents that were detected in the AX Landfill groundwater monitoring system wells as follows:

- For constituents for which a federal maximum contaminant level (MCL) has been established, the MCL for that constituent; or
- For constituents for which an MCL has not been established, the background concentration or approved regional screening level for the constituent; or
- For constituents for which the background level is higher than the MCL, the background concentration for the constituent.

The 95% LCL of each Appendix IV constituent concentration at each well will be compared to the GWPSs established for each constituent to ascertain if a statistically significant increase above the GWPSs does or does not exist.

5.1 No Statistically Significant Increase Over Groundwater Protection Standards

If the groundwater monitoring data indicate that a statistically significant increase over GWPSs does not exist at the CCR wells, all wells in the groundwater monitoring system will be sampled on a semi-annual basis and analyzed for:

- All Appendix III detection monitoring parameters; and
- The Appendix IV assessment monitoring parameters that were detected as part of the initial assessment monitoring event.

This monitoring will be performed on at least a semi-annual basis unless the owner/operator can demonstrate the need for an alternative monitoring frequency for repeated sampling and analysis for these constituents during the active life and the post-closure care period based on the availability of groundwater.

If the concentrations of all Appendix III detection monitoring constituents and Appendix IV assessment monitoring constituents are shown to be statistically at or below background values for two consecutive assessment monitoring sampling events, assessment monitoring will be terminated and detection monitoring as described in this plan will resume. If the concentrations of any Appendix III detection

monitoring constituents and Appendix IV assessment monitoring constituents are shown to be statistically above background values, but all concentrations are below their respective GWPSs, assessment monitoring will continue.

5.2 Statistically Significant Increase Over Groundwater Protection Standards

If a statistically significant increase over GWPSs for any Appendix IV assessment monitoring constituent is confirmed, within 90 days of the initial assessment monitoring event, the owner/operator will either:

- Initiate an assessment of corrective measures for the CCR unit in accordance with CCR Rule Section 257.96; or
- Demonstrate that a source other than the CCR unit caused the contamination, or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The demonstration must be summarized in a report that is certified by a professional engineer. If a successful demonstration is made, the owner or operator must continue assessment monitoring. If a successful demonstration has not been made at the end of the 90 day period, the owner or operator of the CCR unit must initiate an assessment of corrective measures for the CCR unit.

If one or more Appendix IV assessment monitoring constituents are detected at statistically significant levels above their respective GWPS in any sampling event, and if a source other than the CCR unit cannot be demonstrated to have caused the contamination, a release from the CCR unit is likely and the nature and extent of the release will be further characterized as follows:

- Install additional monitoring wells necessary to define the contaminant plume(s);
- Collect data on the nature and estimated quantity of material released including specific information on the Appendix IV assessment monitoring constituents and the levels at which they are present in the material released;
- Install at least one additional monitoring well at the facility boundary in the direction of contaminant migration and sample this well for all Appendix III detection monitoring parameters and for those Appendix IV assessment monitoring constituents that have been detected as part of assessment monitoring. This monitoring must be performed on at least a semi-annual basis thereafter.
- Sample all CCR unit wells for all Appendix III detection monitoring parameters and for those Appendix IV assessment monitoring constituents hat have been detected as part of assessment monitoring. This monitoring must be performed on at least a semi-annual basis thereafter.

6.0 REPORTING REQUIREMENTS

The results of the CCR groundwater monitoring program will be reported each year in an Annual Groundwater Monitoring and Corrective Action Report. The annual report will document the status of the groundwater monitoring and corrective action program, summarize key actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year. At a minimum, the Annual Groundwater Monitoring and Corrective Action Report will contain the following information:

- A map, aerial image, or diagram showing the CCR unit and all background (or upgradient) and downgradient monitoring wells, to include the well identification numbers, that are part of the groundwater monitoring program for the CCR unit;
- Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken;
- In addition to all the monitoring data obtained under CCR Rule Sections 257.90 through 257.98, a summary including the number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and whether the sample was required by the detection monitoring or assessment monitoring programs;
- A narrative discussion of any transition between monitoring programs (e.g., the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant increase over background levels); and
- Other information required to be included in the annual report as specified in CCR Rule Sections 257.90 through 257.98.

The Groundwater Monitoring and Corrective Action Reports must be placed in the facility operating record no later than January 31 of the year following completion of the groundwater monitoring program from the preceding calendar year.

7.0 REFERENCES

ASTM, 2017. Standard Guide for Developing Appropriate Statistical Approaches for Groundwater Detection Monitoring Programs at Waste Disposal Facilities - D6312-17.

EPA, 2015. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846). On-Line.

EPA, 2009. Unified Guidance Document: Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, EPA 530/R-09-007, March.

Golder Associates USA, Inc. (Golder), 2022. Statistical Analysis Plan, Revision No. 1, AX Landfill, Sandow Steam Electric Station. August 16.

PBW, 2017a. Groundwater Monitoring Plan – Sandow 5 Generating Plant, AX Landfill, Rockdale, Texas.

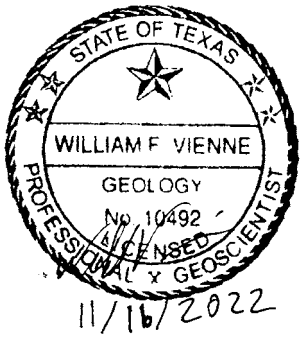
PBW, 2017b. CCR Groundwater Monitoring System Certification – Sandow 5 Generating Plant, AX Landfill, Rockdale, Texas.

SIGNATURE PAGE

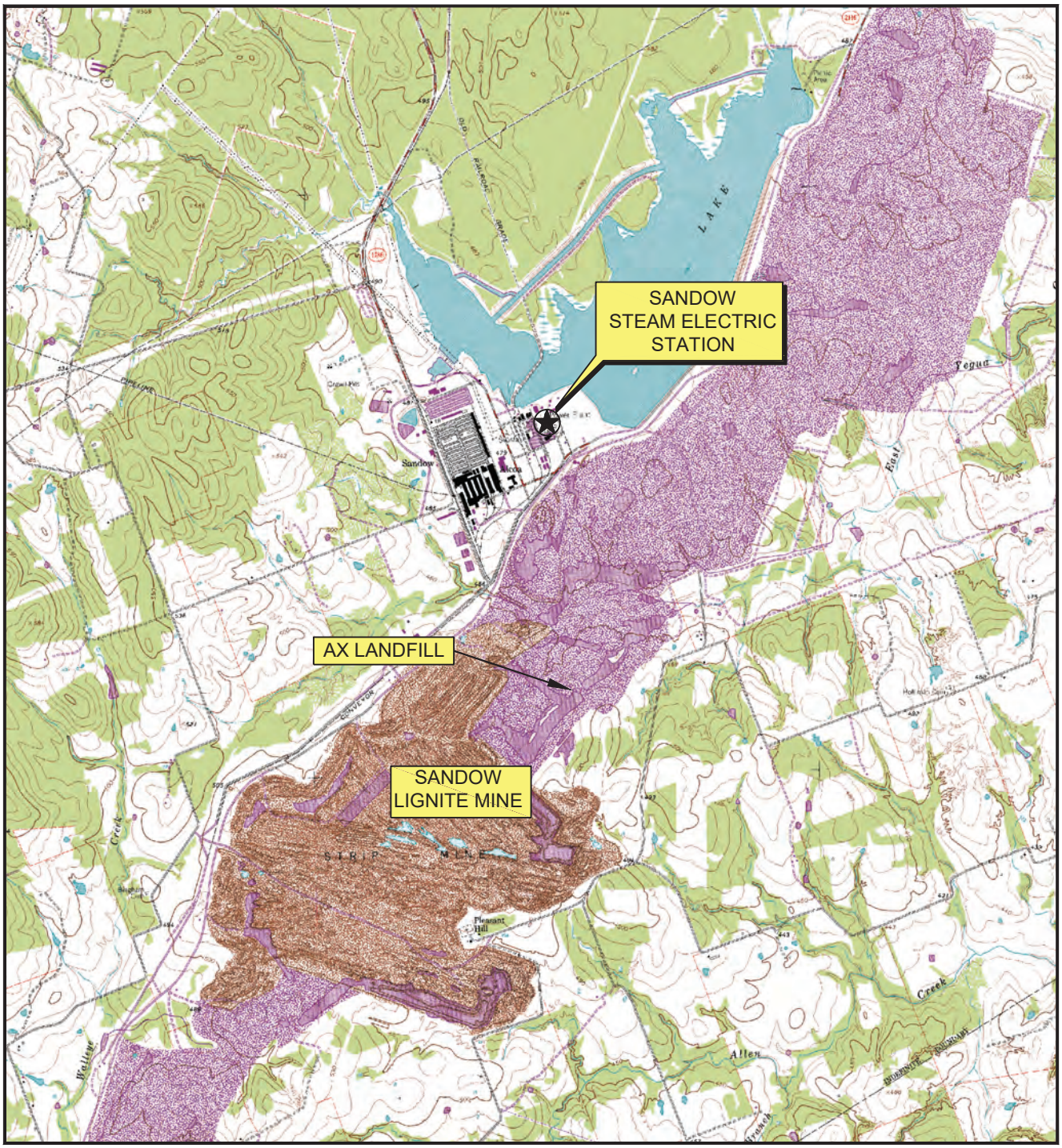
Golder Associates Inc., Member of WSP

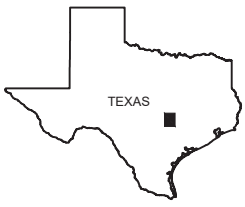
Patrick J. Behling
Principal Engineer

William F. Vienne
Senior Hydrogeologist

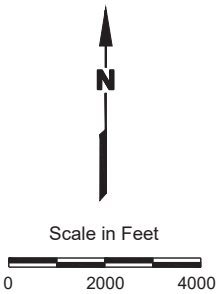


FIGURES





QUADRANGLE LOCATION



SOURCE:
Base map from www.tnris.gov, Alcoa Lake, TX 7.5 min. USGS quadrangle dated 1963, revised 1988.

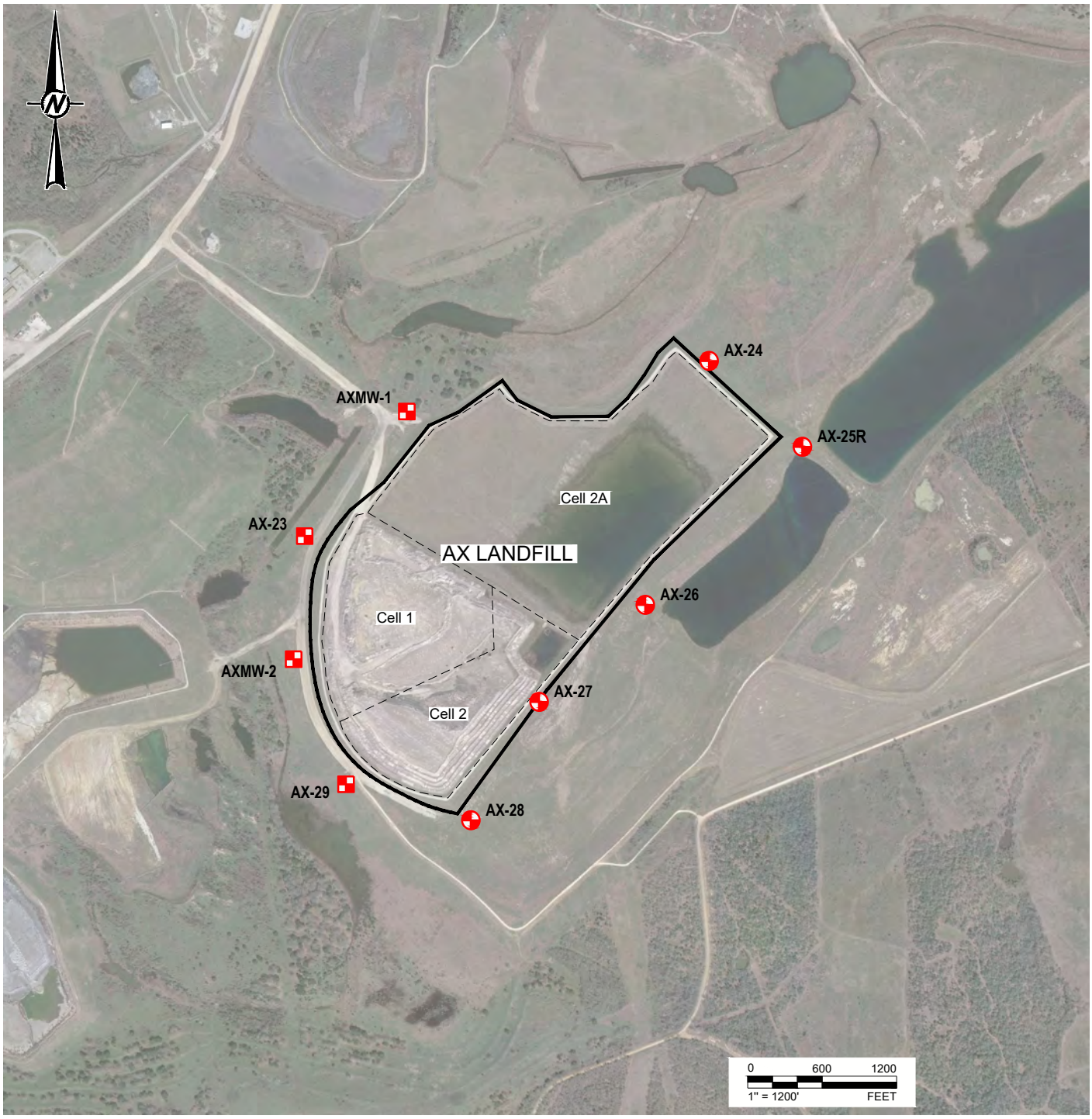
SANDOW STEAM ELECTRIC STATION
ROCKDALE, TEXAS

Figure 1

SITE LOCATION MAP

PROJECT: 31404097.004	BY: AJD	REVISIONS
DATE: MAR., 2017	CHECKED: PJB	

WSP GOLDER



LEGEND

- DOWNGRADIENT CCR MONITORING WELL
- UPGRADIENT CCR MONITORING WELL
- DEED RESTRICTION BOUNDARY
- WASTE BOUNDARY

REFERENCE(S)

BASE MAP TAKEN FROM GOOGLE EARTH, IMAGERY DATED MARCH 2022.

CLIENT
LUMINANT

PROJECT
SANDOW 5 GENERATING PLANT
ROCKDALE, TEXAS

TITLE
DETAILED SITE PLAN - AX LANDFILL

CONSULTANT
WSP GOLDER

YYYY-MM-DD	2022-11-10
DESIGNED	AJD
PREPARED	AJD
REVIEWED	WFV
APPROVED	WFV

PROJECT NO. 31404097.004 | REV. 0 | FIGURE 2

APPENDIX A

CCR Monitoring Well Logs

Luminant

Log of Boring: AX-23

Sandow Steam Electric Station
Rockdale, TX

PBW Project No. 5164E

Completion Date:	10/15/2015	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	8.5
Driller:	Timmy Beach	Total Depth (ft):	90
Driller's License:	5814M	TOC Elevation (ft. AMSL):	482.26
Logged By:	Michelle Hulewicz	Northing:	335064.705
Sampling Method:	4"x10' Core barrel	Easting:	3028456.298

STATE OF TEXAS
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11/11/2022

Depth (ft)	Recovery (ft/ft)	USCS	Lithologic Description
0–10	4.0/10.0	CL	(0 - 59) Silty, sandy CLAY spoil, dark gray and brown, dry to moist, moisture content increases with depth, none to weak cementation, soft to hard, none to medium plasticity, abundant roots (0'-2'), more cohesive with depth, higher sand content (11'-15'), color change to brown with orange and rust colored mottling (11'-15'), lower sand content and light gray and dark gray clay laminations (15'-17', 23'-27', 36'-39'), orange sand lenses in dark gray clay (17'-23' and 30'-36'), higher sand content (27'-36'), dark gray with light gray and orange mottling (39'-47' and 53'-56'), lower clay content with depth (56'-59')
10–20	9.2/10.0		
20–30	10.0/10.0		
30–40	9.0/10.0		
40–50	10.0/10.0		
50–60	8.0/10.0		
		SM	(59 - 60) Silty SAND spoil, light gray, very moist, moderate cementation, unconsolidated, gradual contact
60–70	9.7/10.0	SC/CL	(60 - 90) Sandy CLAY/ clayey SAND spoil, dark gray, orange and light gray mottling throughout, very moist, weak to moderate cementation, soft to very firm, low to medium plasticity, light gray sand lenses, 1' thick orange and dark gray clay layer at 66', sand layers with higher moisture content (6" thick at 72', 1' thick at 89', 1' thick at 85', and 2" thick light gray sand lense at 89'), lignite layer at 90'
70–80	9.0/10.0		
80–90	8.7/10.0		

PBW

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Notes:
1. This log should not be used separately from the report to which it is attached.

Well Materials
(2.48-65) Casing, 4" Sch 40 FJT PVC
(65-85) Screen, 4" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-61') Grout
(61'-63') Bentonite pellets
(63'-85') 20/40 sand

Luminant

Log of Boring: AX-24

Sandow Steam Electric Station
Rockdale, TX

PBW Project No. 5164E

Completion Date:	10/15/2015	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6.25
Driller:	Timmy Beach	Total Depth (ft):	90
Driller's License:	5814M	TOC Elevation (ft. AMSL):	468.74
Logged By:	Michelle Hulewicz	Northing:	336503.03
Sampling Method:	4"x10' Core barrel	Easting:	3031536.564

Depth (ft)	Well Materials	Recovery (ft/ft)	USCS	Lithologic Description
0				
5		3.0/10.0	SM	(0 - 17) Silty SAND spoil, light gray, dry, soft, unconsolidated, tan/brown with some orange 5'-10'), gradual increase in clay content with depth
10				
15		2.8/10.0		
20		8.0/10.0	SC/CL	(17 - 80) Sandy CLAY/ clayey SAND spoil, dark gray, dry to moist (moisture increases with depth), weak cementation, soft with firm clay layers, clay layer at 19' (dark brown, dark gray, and light gray laminations), higher clay content (20'-27'), 2" tan sand lens at 25', higher sand content (27'-30'), interbedded light gray/tan sand and dark gray clay layers (sand at 32'-33', 33.5'-34.5', 35'-40', 41'-42', 44'-45', and 48'-50), dark gray silty clay layer (53'-58'), dark gray with brown/tan (60'-62'), silty clay layer with tan sand lenses (62'-68'), rusty colored and orange mottling (64'-65'), 1' thick tan and very moist sand layer at 74', higher clay content (74'-76'), light gray sand layer at 77', 1' thick dark gray/ brown clay layer at 78'
25				
30				
35		6.0/10.0		
40				
45		6.0/10.0		
50				
55		10.0/10.0		
60				
65		10.0/10.0		
70				
75		9.0/10.0		
80				
85		10.0/10.0	SM	(80 - 90) Silty SAND spoil, dark gray/ brown, wet (80'-84') and very moist (84'-90'), color change to light gray at 84', small lignite pieces (less than 0.5" diameter) at 84'.
90				

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Notes:
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Well Materials
(2.26-61) Casing, 2" Sch 40 FJT PVC
(61-81) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-57') Grout
(57'-59') Bentonite pellets
(59'-81') 20/40 sand

Luminant

Log of Boring: AX-25R

Sandow Steam Electric Station
Rockdale, Texas

Golder Project No. 19122262G

Completion Date:	5/7/2020	Drilling Method:	HSA
Drilling Company:	Vortex Drilling	Borehole Diameter (in.):	6
Driller:	Jim Neal	Total Depth (ft):	72.96
Driller's License:	4648	TOC Elevation (ft. AMSL):	442.901
Logged By:	Jacob Jarvis	Northing:	10178388
Sampling Method:	2.5' Split Spoon	Easting:	3328702

Depth (ft)	Well Materials	Recovery (ft/ft)	USCS	Lithologic Description
0		0.0/5.0	NR	(0 - 5) No Returns, HydroVAC
5		2.5/2.5		
		2.5/2.5	SC	(5 - 15) Clayey SAND Spoil, brown to grayish brown, soft, no plasticity, sand is fine to very fine, dry, trace lenses of clean gray sand, woody debris at 8', moist at 12.5'
10		1.6/2.5		
		1.5/2.5		
15		1.5/2.5	CL	(15 - 19) Sandy CLAY Spoil, grayish brown, soft, medium to high plasticity, sand throughout is fine to very fine, trace lenses of gray well sorted sand
		1.5/2.5		
20		2.0/2.5	LIG	(19 - 22.8) LIGNITE Spoil, blk, soft
		1.5/2.5		
25		2.0/2.5	SC	(22.8 - 30) Clayey SAND Spoil, gray, soft, medium plasticity, moist, trace lenses of clean gray sand, saturated well sorted sand 27.5-29.0, damp below
		2.5/2.5		
30		2.5/2.5	SP	(30 - 34) SAND Spoil, tan to grayish brown, soft, no to low plasticity, moist to wet, some clay throughout, sand is fine to medium grained
		2.5/2.5		
35		2.5/2.5	SC	(34 - 39) Sandy CLAY Spoil, tan - brown to graysih brown, highly variable sand and clay content, variable color, soft to moderatly firm, wet, fine - medium grained sand
		2.5/2.5		
40		2.5/2.5		
		2.5/2.5		
45		2.5/2.5		
		2.5/2.5		
50		2.5/2.5		
		2.5/2.5		
55		2.5/2.5	SP	(39 - 70.5) SAND with variable Clay Spoil, tan to brown, soft, low plasticity, trace clay throughout, lenses of clean clay, clay lenses are dark gray, lense of gray well sorted fine sand at 51'-52', slight increase in clay content at 55', sands are saturated at 60'
		1.0/2.5		
		1.5/2.5		
60		0.0/2.5		
		1.5/2.5		
65		2.0/2.5		
		2.0/2.5		
70			SC	(70.5 - 72.5) Sandy CLAY Spoil, dark gray, firm, medium plasticity, moist to wet
75				

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O·512.671.3434 F·512.671.3446

Notes:
1. This log should not be used separately from the report to which it is attached.

Well Materials
(0 - 62.96) Casing, 2" Sch 40 FJT PVC
(62.96 - 72.96) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-2') Cement
(2'-58') Bentonite 3/8" Chips
(58'-73') 20/40 sand

Luminant

Log of Boring: AX-26

Sandow Steam Electric Station
Rockdale, TX

PBW Project No. 5164E

Completion Date:	10/14/2015	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6.25
Driller:	Timmy Beach	Total Depth (ft):	80
Driller's License:	5814M	TOC Elevation (ft. AMSL):	458.6
Logged By:	Michelle Hulewicz	Northing:	334521.489
Sampling Method:	4"x10' Core barrel	Easting:	3031007.111

Depth (ft)	Well Materials	Recovery (ft/ft)	USCS	Lithologic Description
0				
4		5.0/10.0	CL	(0 - 10) Silty CLAY spoil, dark brown, dry, weak cementation, soft, none to low plasticity, orange, dark gray, and light gray clay lenses, more compact with depth, higher plasticity with depth
8				
12			SC	(10 - 12) Clayey SAND spoil, gray and tan, slightly moist, none to weak cementation, unconsolidated
16		6.0/10.0	CL	(12 - 20) Silty CLAY spoil, dark brown, slightly moist, weak cementation, firm, lower sand content (17'-20'), color change to dark gray with light gray lamination, friable
20				
24		6.0/10.0		
28				
32		9.0/10.0		
36				(20 - 65) Sandy CLAY/clayey SAND spoil, light gray and brown with dark gray clay lenses, moist, weak cementation, soft with firm clay lenses, none to medium plasticity, ~1' thick dark gray, firm, and friable clay layer, purple and orange clay lenses (25'-30'), higher sand content (30'-32'), higher clay content (32'-35'), light gray and dark gray laminations (35'-38'), orange and gray clay lenses (38'-40'), dark gray (40'-43') transitions to light gray (43'-45'), dark purple, light gray, and brown clay lenses (45'-47'), higher sand content (45'-50'), higher dark gray clay content (50'-51'), higher sand content (light gray/tan) (51'-53'), higher clay content with dark and light laminations (53'-54'), higher sand content (light gray) (54'-55'), dark gray with orange mottling (55'-65'), 2" thick sand layer at 65'
40			SC/CL	
44		9.2/10.0		
48				
52		7.0/10.0		
56				
60				
64		6.0/10.0		
68				
72			CL	(65 - 80) Silty CLAY spoil with some sand, dark gray, moist, weak to moderate cementation, firm, low to medium plasticity, very wet (70'-74'), slightly moist (74'-80')
76		7.0/10.0		
80				

STATE OF TEXAS
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Notes:
1. This log should not be used separately from the report to which it is attached.

Well Materials
(2.26-55) Casing, 2" Sch 40 FJT PVC
(55-75) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-51') Grout
(51'-53') Bentonite pellets
(53'-75') 20/40 sand

Luminant

Log of Boring: AX-27

Sandow Steam Electric Station
Rockdale, TX

PBW Project No. 5164E

Completion Date:	10/14/2015	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	8.5
Driller:	Timmy Beach	Total Depth (ft):	100
Driller's License:	5814M	TOC Elevation (ft. AMSL):	479.47
Logged By:	Michelle Hulewicz	Northing:	333747.276
Sampling Method:	4"x10' Core barrel	Easting:	3030177.105

Depth (ft)	Well Materials	Recovery (ft/ft)	USCS	Lithologic Description
0			SM	(0 - 4) Silty SAND spoil with clay, dark brown, dry, none to weak cementation, unconsolidated to consolidated, organic smell, more cohesive with depth
5		5.7/10.0	CL	(4 - 8) Sandy, silty CLAY spoil, dark brown, dry, weak to moderate cementation, firm, low plasticity, 2" thick organic layer at 5', metallic nodule at 7'
10		5.0/10.0		
15				
20		5.3/10.0		
25				
30		1.9/10.0	SC	(8 - 60) Clayey SAND spoil, gray, slightly moist, weak cementation, unconsolidated, none to low plasticity, lower clay content (13'-16' and 23'-27'), tan clayey sand (12'-13'), dark gray clay lenses present (16'-19' and 23'-27'), 3" diameter rock at 31', orange/brown, light gray, and dark gray clay lenses throughout 30'-50', 4" thick lignite layer at 49', 6" thick lignite layer at 56', pieces of lignite present in clayey sand (56'-60'), 2" thick dark gray clay layer at 59'
35				
40		9.4/10.0		
45				
50		7.8/10.0		
55				
60		8.7/10.0	CL/SC	(60 - 66) Sandy CLAY/ clayey SAND spoil, dark gray, higher clay content (60'-63' and 64'-66'), some orange and light gray mottling (60'-66'), moist, weak cementation, soft with firm clay pockets
65				
70			Lig/CL	(66 - 74) Interbedded light gray CLAY and LIGNITE spoil, dry, weak cementation, firm to very hard, none to low plasticity
75		7.5/10.0		
80			CL/SC	(74 - 83) Sandy CLAY/ clayey SAND spoil, dark gray and tan, moist, weak cementation, firm, softer and higher sand content with depth, higher clay content (80'-83')
85		8.4/10.0	SM	(83 - 89) Silty SAND spoil, light gray and tan, wet, weak cementation, unconsolidated, 1" thick dark gray clay lense at 87'
90			SC	(89 - 91) Clayey SAND spoil, orange and dark gray, moist, weak to moderate, unconsolidated to consolidated, none to low plasticity
95		10.0/10.0	SM	(91 - 100) Silty SAND spoil, light gray, wet, weak cementation, unconsolidated to consolidated, dark gray and tan clay lenses present (95'-98'), rock fragment present at 96', higher clay content with depth, rusty colored clay lense at 99'
100				

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Notes:
1. This log should not be used separately from the report to which it is attached.

Well Materials
(2.65-78) Casing, 4" Sch 40 FJT PVC
(78-98) Screen, 4" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-74') Grout
(74'-76') Bentonite pellets
(76'-98') 20/40 sand

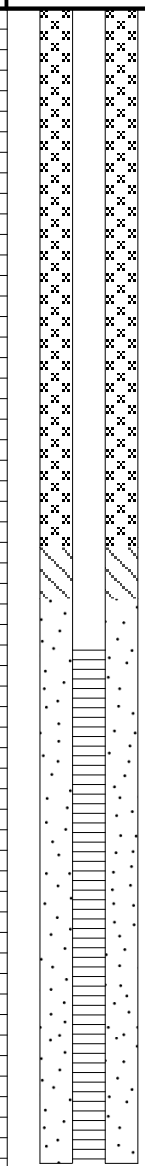
Luminant

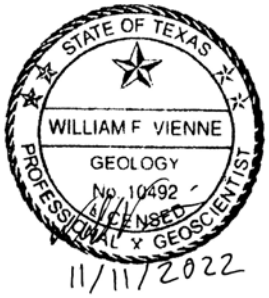
Log of Boring: AX-28

Sandow Steam Electric Station
Rockdale, TX

PBW Project No. 5164E

Completion Date:	10/13/2015	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6.25
Driller:	Timmy Beach	Total Depth (ft):	50
Driller's License:	5814M	TOC Elevation (ft. AMSL):	463.26
Logged By:	Michelle Hulewicz	Northing:	332787.311
Sampling Method:	4"x10' Core barrel	Easting:	3029655.555

Depth (ft)	Well Materials	Recovery (ft/ft)	USCS	Lithologic Description
0		7.0/10.0	CL	(0 - 10) Sandy CLAY spoil, dark brown, dry to moist, weak cementation, soft to firm, none to low plasicity, organics present (roots, twigs), lower sand content with depth
4				
8				
12		4.8/10.0		
16				
20		6.5/10.0	SM/SC	(10 - 43) Silty SAND spoil with some clay, light gray to tan, moist, weak cementation, unconsolidated, none to low plasticity, rust colored staining (~6" thick) at 15', interbedded dark gray, hard clay layers with some purple and rust coloring, 6" clay layer at 20' and 8" clay layer at 35', higher clay content with depth, color change to dark brown/ dark gray at 30', becomes wet (39'-43')
24				
28				
32		5.0/10.0		
36				
40				
44		10.0/10.0	CL	(43 - 50) Sandy CLAY spoil, dark gray, slightly moist, moderate cementation, firm to hard, none to low plasticity, rust colored and black nodules present
48				
52				



PBW

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Notes:
1. This log should not be used separately from the report to which it is attached.

Well Materials
(2.51-25) Casing, 2" Sch 40 FJT PVC
(25-45) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-21') Grout
(21'-23') Bentonite pellets
(23'-45') 20/40 sand

Luminant

Log of Boring: AX-29

Sandow Steam Electric Station
Rockdale, TX

PBW Project No. 5164E

Completion Date:	10/13/2015	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6.25
Driller:	Timmy Beach	Total Depth (ft):	100
Driller's License:	5814M	TOC Elevation (ft. AMSL):	487.73
Logged By:	Michelle Hulewicz	Northing:	333161.803
Sampling Method:	4"x10' Core barrel	Easting:	3028621.836

Depth (ft)	Well Materials	Recovery (ft/ft)	USCS	Lithologic Description
0				
5		7.0/10.0		(0 - 16.5) Silty CLAY with sand, dry, weak cementation, soft to firm, gray and brown with orange mottling, none to low plasticity, 3" layer of sand at 4' and 8" sand layer at 12', higher sand content with depth
10				
15		8.5/10.0	CL	
20				(16.5 - 31) Silty CLAY, dark gray and brown with some purple mottling, moist, weak to moderate cementation, soft to firm, medium plasticity, plasticity decreases with depth, organic smell, roots present, becomes less cohesive with depth, 2" sand lense at 21', higher sand content with depth, pieces of wood at 29'
25		6.5/10.0		
30				
35		9.8/10.0		(31 - 60) Silty SAND, fine grained, light gray/tan with some orange mottling at 33', slightly moist, weak cementation, unconsolidated, organics present throughout, interbedded clay (gray) and sand (brown) with orange and rust colored staining (35'-38'), clay layers have medium plasticity, higher clay content (45'-50'), purple brown clay lense at 58'
40				
45		6.0/10.0	SM	
50				
55		5.6/10.0		
60				
65		10.0/10.0	SC	(60 - 69) Slightly clayey SAND, dark gray with light gray and tan mottling, fine to medium grained, very moist, weak cementation, soft, low plasticity, 4" thick laminated dark and light gray clay layer (firm) at 65'
70			Lig	(69 - 72) LIGNITE, sharp contact, slightly moist, weak cementation, soft
		10.0/10.0		(72 - 100) Silty CLAY, interbedded dark and light gray, friable, slightly moist, moderate cementation, hard, none to low plasticity, higher moisture content and sand content (very fine grained) with depth, gradual transition to sandy clay (77'-90'), lower sand content (90'-100')
		10.0/10.0	CL	
		10.0/10.0		
100				

STATE OF TEXAS
WILLIAM F VIENNE
GEOLOGY
No. 10492
LICENSED
PROFESSIONAL GEOSCIENTIST
11/11/2022

PBW

Pastor, Behling & Wheeler, LLC
2201 Double Creek Dr., Suite 4004
Round Rock, TX 78664
Tel (512) 671-3434 Fax (512) 671-3446

Notes:
1. This log should not be used separately from the report to which it is attached.

Well Materials
(2.77-45) Casing, 2" Sch 40 FJT PVC
(45-65) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-41') Grout
(41'-43') Bentonite pellets
(43'-65') 20/40 sand

Luminant

Log of Boring: AXMW-1

AX Landfill
Rockdale, TX

PBW Project No. 1815

Completion Date:	11/28/2012	Drilling Method:	Hollow Stem Auge
Drilling Company:	EnviroCore, Inc.	Borehole Diameter (in.):	8
Driller:	Craig Schena	Total Depth (ft):	53
Driller's License:	4694	Northing:	336064.36
Field Supervisor:	Carolyn E Sexton	Easting:	3029087.23
Sampling Method:	Cuttings	TOC Elev. (ft AMSL):	473.65

Depth (ft)	Well Materials	USCS	Lithologic Description
0		CL	(0.0 - 8) SILTY CLAY, CL, very dark gray, with sand.
10		SM	(8 - 13) SILTY SAND, SM, yellowish brown, with pebbles, and hematite.
		CL	(13 - 18) SANDY CLAY, CL, very dark grayish brown, poorly sorted.
20		SC	(18 - 33) CLAYEY SAND, SC, dark yellowish brown, some lignite fragments.
30		SA	(33 - 38) SAND, light olive brown, medium grained, sub-rounded, moderately sorted.
40		SC	(38 - 53) CLAYEY SAND, SC, yellowish brown, medium grained, sub-angular, poorly sorted.
50			
60			

STATE OF TEXAS
WILLIAM F VIENNE
GEOLOGY
No. 10492
LICENSED
PROFESSIONAL GEOSCIENTIST
11/11/2022

Notes: All material is mine spoil

PBW

Pastor, Behling & Wheeler, LLC
2201 Double Creek Dr., Suite 4004
Round Rock, TX 78664
Tel (512) 671-3434 Fax (512) 671-3446

Annular Materials
(0.0 - 1.0) Concrete
(1.0 - 28.0) BenSeal
(28.0 - 30.0) Bentonite Chips
(30.0 - 53.0) Filter Pack (16/30)

Well Materials
(+3.0 - 33.0) Casing, 2" Sch 40 FJT PVC
(33.0 - 53.0) Screen, 2" Sch 40 FJT PVC, 0.01 slot

Luminant

Log of Boring: AXMW-2

AX Landfill
Rockdale, TX

PBW Project No. 1815

Completion Date:	11/28/2012	Drilling Method:	Hollow Stem Auge
Drilling Company:	EnviroCore, Inc.	Borehole Diameter (in.):	8
Driller:	Craig Schena	Total Depth (ft):	63
Driller's License:	4694	Northing:	334057.17
Field Supervisor:	Carolyn E Sexton	Easting:	3028199.98
Sampling Method:	Cuttings	TOC Elev. (ft AMSL):	482.25

Depth (ft)	Well Materials	USCS	Lithologic Description
0		ML	(0.0 - 8) SANDY SILT, ML, dark grayish brown.
10			(8 - 13) CLAYEY SILT with sand, ML, dark grayish brown.
20		CL	(13 - 63) SILTY CLAY, CL, dark gray, moist, some sand and lignite fragments.
30			
40			
50			
60			

STATE OF TEXAS
WILLIAM F VIENNE
GEOLOGY
No. 10492
LICENSED
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11/11/2022

Notes: All material is mine spoil.

PBW

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Annular Materials
(0.0 - 1.0) Concrete
(1.0 - 38.0) BenSeal
(38.0 - 40.0) Bentonite Chips
(40.0 - 63.0) Filter Pack (16/30)

Well Materials
(+3.0 - 43.0) Casing, 2" Sch 40 FJT PVC
(43.0 - 63.0) Screen, 2" Sch 40 FJT PVC, 0.01 slot

COAL COMBUSTION RESIDUAL RULE
STATISTICAL ANALYSIS PLAN
REVISION NO. 1

SANDOW STEAM ELECTRIC STATION
AX LANDFILL
ROCKDALE, TEXAS

NOVEMBER 16, 2022

Prepared For:

Luminant Generation Company LLC

Prepared By:

Golder Associates USA , Inc.
1601 S. Mopac Expy, Suite 325D
Austin, Texas 78746
Texas Engineering Firm Registration No. 22771

PROFESSIONAL CERTIFICATION

This document and all attachments were prepared by Golder Associates USA, Inc. under my direction or supervision. I hereby certify that the proposed statistical method is appropriate for evaluating groundwater data in accordance with the requirements of Sections 257.93 through 257.95 of the CCR Rule.

Patrick J. Behling, P.E.
Principal Engineer
GOLDER ASSOCIATES USA, INC.

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LIST OF ACRONYMS AND ABBREVIATIONS

ANOVA	analysis of variance
CCR	coal combustion residuals
EPA	United States Environmental Protection Agency
GWPS	groundwater protection standard
LCL	lower confidence limit of the mean
MCL	maximum contaminant level
PPCC	Filliben's probability plot correlation coefficient test
RROS	robust regression order statistics
SAP	statistical analysis plan
SWFPR	site-wide false positive rate
UPL	upper prediction limit

1.0 INTRODUCTION

The United States Environmental Protection Agency (EPA) issued regulations regarding the disposal of coal combustion residuals (CCR) in certain landfills and impoundments in April 2015. These regulations, found under 40 CFR 257, Subpart D and referred to as the "CCR Rule" require facilities to design a groundwater monitoring program to monitor if landfills or impoundments with CCR materials, called CCR units, are impacting downgradient groundwater quality.

Section 257.90 of the CCR Rule requires that all existing CCR landfills and surface impoundments comply with the following groundwater monitoring requirements no later than October 17, 2017:

- Install a groundwater monitoring system as required under Section 257.91;
- Develop a groundwater sampling and analysis program to include selection of the statistical procedures to be used for evaluating groundwater monitoring data as required under Section 257.93;
- Initiate a detection monitoring program to include obtaining a minimum of eight independent samples for each background upgradient and downgradient monitoring well as required under Section 257.94; and
- Begin evaluating the groundwater monitoring data for statistically significant increases over background levels for the constituents listed in Appendix III of this part as required under Section 257.94.

Statistical analysis of groundwater monitoring data is required as part of detection monitoring and assessment monitoring under Section 257.93 of the CCR Rule. Section 257.93 of the CCR Rule provides several options for statistically evaluating groundwater data. The owner or operator of the CCR unit must select one of the statistical methods specified in paragraphs (f)(1) through (5) of Section 257.93 when evaluating constituent concentrations from the groundwater monitoring. EPA's *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (EPA, 2009), also called the "Unified Guidance", presents acceptable statistical approaches for such evaluations and analyses. However, neither the CCR Rule nor the Unified Guidance outlines a step-by-step process to consistently evaluate groundwater monitoring data in order to satisfy the CCR Rule.

The purpose of this statistical analysis plan (SAP) is to develop a standard set of statistical approaches to follow when demonstrating groundwater compliance for each CCR unit in accordance with the CCR Rule and the Unified Guidance. Depending on the CCR unit and the evaluation of groundwater data for the CCR

unit, CCR groundwater compliance may be evaluated using either an interwell or an intrawell approach—the interwell approach being a comparison of water quality data upgradient of the CCR unit to water quality data downgradient of the CCR unit, and the intrawell approach being a comparison of water quality data of a well against background values established from that well's own historical water quality data.

This SAP describes and summarizes the statistical approach for establishing and evaluating baseline conditions to use for detection monitoring and assessment monitoring. The plan is designed to detect a release from a CCR facility. The plan conforms with EPA "Unified Guidance Document: Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities," March 2009, and the American Society for Testing and Materials (ASTM) Standard D6312-17, Developing Appropriate Statistical Approaches for Groundwater Detection Monitoring Programs at Waste Disposal Facilities.

2.0 DATA PREPARATION

Analytical data from wells in the groundwater monitoring network at a CCR unit during each sampling event are first reviewed for usability after final data packages are received from the laboratory. The analytical data are then prepared for statistical analysis. Methods for handling duplicate and non-detect data are implemented during this data preparation phase in order to comply with the performance standards outlined in 40 CFR 257.93. During the data preparation, anomalously low or high constituent concentrations are also considered for usability. The following subsections provide further details.

2.1 Handling Duplicate Data

Field duplicates and data rejected after data validation are removed from the data set. Only the primary samples are retained for the statistical evaluation.

2.2 Handling Non-Detect Data

A non-detected constituent concentration is defined as any analytical result that either has an instrument response but is below a sample detection limit or that has no instrument response. A non-detected concentration is handled by using one of two approaches, depending on the percentage of detections in the data set:

- If a data set has at least 85% of samples detected, half of the sample detection limit is substituted as a proxy concentration. In these cases, substituting a proxy concentration will not alter the results of statistical tests or summary statistics (EPA, 2009; EPA, 2000).

- If a data set has at least 50% but no more than 85% of the samples detected, the robust regression order statistics (RROS) method is used to estimate summary statistics such as the mean and standard deviation (EPA, 2009).

- If a data set has fewer than 50% of the samples detected, then nonparametric statistical approaches are used to evaluate the data and to prepare summary statistics (EPA, 2009; EPA, 2000).

It should be noted that J-flagged data (estimated concentrations between the sample detection limit and the reporting limit) are defined as detected concentrations.

2.3 Handling Anomalous Detections

There may be infrequent cases when an anomalously high or low detection cannot be confirmed after resampling a well. In such cases, the anomalous detection should be considered for removal from the data

set and should be replaced by the resampled concentration so that current conditions are not over- or under-estimated. This is particularly important when estimating a baseline or background value to use to compare to future constituent concentrations from the network of groundwater monitoring wells. An anomalous detection may be identified at any point after analytical laboratory results are available, based on professional judgment or based on the outlier evaluation (see Section 3.4 for more details about testing for outliers). If an analytical result is removed, documentation should be provided in the annual report stating which analytical result was removed and justifying its removal.

3.0 STATISTICAL ASSUMPTIONS

Before baseline or background values can be established, a number of statistical assumptions are evaluated to determine if concentrations are independent and identically distributed. A sample's constituent concentration is independent when no other sample concentrations influence its measurement, regardless of when or where the sample was collected. Statistical independence is indicated by a set of random data. But randomness is only demonstrated by the presence of mean and variance stationarity and the lack of evidence for effects such as spatial and temporal variation, autocorrelation, and trends (EPA, 2009).

The validity of statistical independence is checked by testing for:

- Spatial stationarity,
- Temporal stationarity,
- Lack of autocorrelation, and
- Lack of statistical data outliers.

For the purpose of this SAP, the statistical software R (The R Foundation, 2017) is assumed to be used to perform the statistical tests used for checking the validity of independent samples. Other applicable programs may be used as necessary.

3.1 Spatial Stationarity

Spatial stationarity is defined as the lack of variability across well locations. Spatial variation may be naturally occurring and unaffected by human activity, or may be caused by human activity. The presence of spatial variability does not necessarily mean that contamination is present. If spatial variability is present, regardless whether it's naturally-occurring or not, it may hinder attempts to identify the cause of a statistically significant increase in constituent concentrations between current and baseline or background conditions (EPA, 2009). In some cases, spatial variability may make upgradient-to-downgradient comparisons (also called interwell comparisons) difficult (EPA, 2009).

One way to identify spatial stationarity is to observe whether spatial variability does or does not exist across multiple wells. This is particularly true when a CCR unit has more than one upgradient well and when interwell comparisons are used for detection or assessment monitoring. Constituent concentrations from each upgradient well are taken as a single data set and then upgradient well data sets are compared. Before establishing baseline or background values for the detection monitoring or assessment monitoring

programs, two steps are taken to check for spatial stationarity for each constituent and groundwater monitoring well (recommended by the Unified Guidance):

1. Side-by-side box plots are created, and
2. The one-way analysis of variance (ANOVA) or Kruskal-Wallis test is used.

Box plots provide a quick screen for possible spatial variation. The ANOVA and Kruskal-Wallis test are more formal tests for identifying spatial variability. All of the statistical tests are performed and the box plots are generated using the statistical software R (The R Foundation, 2017) or similar software.

In some cases, spatial variability, where substantial differences in average constituent concentrations are present among upgradient wells, can make interwell comparisons difficult (EPA, 2009). Professional judgment should be used to determine whether the set of constituent concentrations from all upgradient wells appropriately represent baseline or background conditions and whether the spatial variability will prevent the detection or assessment monitoring from identifying a potential release at a CCR unit. If the spatial variability were to indicate that analytical data from a set of upgradient wells do not appropriately represent background conditions or if the spatial variability were to hinder the detection or assessment monitoring, then the data set should be adjusted accordingly.

3.1.1 Box Plots

A box plot is a graphical representation of the pattern and distribution of concentrations for a single constituent data set. Visually comparing box plots for upgradient well's constituent concentrations, side-by-side, is one way to identify similarities or differences across upgradient well concentrations. If box plots contain similar range of concentrations, then the concentrations for the upgradient wells are similar (spatial stationarity). Likewise, if box plots do not contain similar range of concentrations, then the concentrations for the upgradient wells are different: spatial variability. Section 3.4.1 provides more details about how to create box plots.

3.1.2 ANOVA and Kruskal-Wallis Tests

The ANOVA and Kruskal-Wallis tests are similar statistical tests; both tests indicate significant spatial variability by indicating whether a statistically significant difference exists among average, upgradient well concentrations. The ANOVA is a parametric approach for comparing average concentrations across two

or more wells. The Kruskal-Wallis test is a non-parametric approach to the ANOVA using the ranks of concentrations, rather than using the actual concentration measurements. Neither test can be performed if the variances across upgradient wells are unequal. A Type I error rate (α), or level of significance, is set to α=0.05 for identifying a statistical significant different among well averages.

Determining which test to perform, either the ANOVA or Kruskal-Wallis tests, depends upon the frequency of detected results, the validity of assuming normality or lognormality for residuals, and the validity of assuming upgradient wells have equal variances. More details about these dependencies are provided in the subsections below (Sections 3.1.2.1-3.1.2.3). Figure 1 outlines the steps taken to define which statistical test (ANOVA or Kruskal-Wallis) should be used. The method used to determine the appropriate statistical test is based on the Unified Guidance recommendations. Tests of normality and equal variances use a 0.01 level of significance, rather than a 0.05 level of significance, because the ANOVA is reasonably robust to small departures of normality and equal variances (EPA, 2009).

No statistical test is performed when there are no detected concentration measurements in any of the upgradient wells.

If there are at least 85% detected concentrations in every upgradient well, then the ANOVA may be considered. For any non-detected concentration, half of the sample detection limit is used as a proxy concentration (see Section 2.2 for more details). The assumptions of normality and equal variances are checked. To test the normality assumption, residuals are tested using two distributional tests, the Shapiro-Wilk test and Filliben's probability plot correlation coefficient (PPCC) test. The Levene's test is used to check for equal variances. Only when evidence exists that both assumptions are valid is the ANOVA using the raw concentration measurements used. If either assumption is not met, then the assumptions of normality and equal variances are checked using the log-transformed data. Only when evidence exists that both assumptions are valid is the ANOVA using the log-transformed concentration measurements used. If either assumption is not met, then an ANOVA cannot be considered.

If there are fewer than 85% detected concentrations or if the ANOVA cannot be considered, then the Kruskal-Wallis may be considered. Non-detected data are treated differently for the Kruskal-Wallis test since the ranks of the data are used rather than the concentration measurements: all data below the maximum sample detection limit are set to the same value, lower than the maximum sample detection limit (Helsel, 2012). Since the Kruskal-Wallis tests uses ranks of the data, the actual value used for data below the maximum sample detection limit is not relevant. The assumption of equal variances is checked using

the Fligner's test. If the Fligner's test indicates that the assumption of equal variances is valid, then the Kruskal-Wallis test is used. Otherwise, no test can be performed because variances are heterogeneous among upgradient well concentration measurements.

3.2 Temporal Stationarity

Temporal stationarity is the lack of temporal variability. Temporal variability refers to the concept that concentration measurements vary over time. Temporal variability may be present across a group of wells and/or constituents. Temporal variability can also be present at an individual well or for a single constituent. By definition, temporal variability also includes autocorrelation, which is discussed separately in Section 3.3.

Any temporal pattern can invalidate or weaken the results of statistical testing (EPA, 2009). Plotting concentrations over time for a given constituent and for a given well is one way to identify possible trends. The Mann-Kendall trend test is another way to identify possible temporal variation for a given constituent and well. The Mann-Kendall is a nonparametric method to test for an increasing or decreasing linear trend over time. The Mann-Kendall doesn't require any special treatment for non-detects, other than all non-detects should be set to a common value lower than any of the detected concentrations (EPA, 2009 p.8-32). The Mann-Kendall is performed for any set of data with at least one detected concentration.

Before establishing baseline or background values for the detection monitoring or assessment monitoring programs, two steps are taken to check for temporal stationarity for each constituent and groundwater monitoring well:

1. A time plot is created, and
2. The Mann-Kendall trend test is used.

The time plots are generated and the Mann-Kendall trend test is performed using the statistical software R (The R Foundation, 2017) and the EnvStats package (Package 'EnvStats', 2017) or similar software.

Statistically significant increasing or decreasing temporal trends are not expected for any upgradient well since, by definition, an upgradient well should not be impacted by a release at the CCR unit. If, however, there is evidence of a temporal trend, then professional judgment should be used to determine whether constituent concentrations from that upgradient well appropriately represent baseline or background conditions and whether the trend will prevent the detection or assessment monitoring from identifying a

potential release at a CCR unit. If the trend were to indicate that an upgradient well does not appropriately represent baseline or background conditions or if the trend were to hinder the detection or assessment monitoring, then the data set should be adjusted accordingly.

To identify a statistically significant temporal trend, a Type I experiment wise error rate (α) is set to $\alpha = 0.05$. That means, a single test error rate is defined for each well across the detected Appendix III or Appendix IV constituents. Each well's single test error rate is based on the number of detected constituents, d, for a given constituent list. For example, a well with five detected Appendix IV constituents ($d = 5$) has a single test error rate equal to $1 - (1 - \alpha)^{1/d^*} = 1 - (1 - 0.05)^{1/5} = 0.0102$. A statistically significant linear trend is identified when the p-value for the Mann-Kendall test is less than the single test error rate.

3.3 Lack of Autocorrelation

Autocorrelation is the statistical dependence between pairs of constituent concentrations across a sequence of time. That is, pairs of consecutive concentrations will exhibit stronger similarity in concentration measurements than expected from pairs collected at random times (p.6-25, EPA, 2009). To identify autocorrelation, the Unified Guidance recommends using the rank von Neumann ratio test for its ease of use and robustness when applied to either normal or non-normal distributions (p.14-17 EPA, 2009). Since this test has not been designed to handle tied values such as non-detect concentrations, this test is only performed for those wells and constituents with at least 50% detected concentrations.

The rank von Neumann ratio test statistic and associated p-value are computed using the statistical software R (The R Foundation, 2017) and the EnvStats package (Package 'EnvStats', 2017) or similar software.

Before baseline or background values are established for the detection monitoring or assessment monitoring programs, the rank von Neumann ratio test is used. Statistically significant autocorrelation is not expected for any well since, by definition, constituent concentration measurements from a well should be collected with far enough time between sampling events that a more recent sample does not include the same volume of groundwater as any previous sample. If, however, there is evidence of autocorrelation, then professional judgment should be used to determine whether constituent concentrations from a well appropriately represent baseline or background conditions and whether the trend will prevent the detection or assessment monitoring from identifying a potential release at a CCR unit. If the trend were to indicate that a well does not appropriately represent baseline or background conditions or if the trend were to hinder the detection

or assessment monitoring, then the data set should be adjusted accordingly.

To identify a statistically significant autocorrelation, a Type I experiment wise error rate, α, of 0.05 is used for each well across the detected Appendix III or Appendix IV constituents. Each well's single test error rate is based on the number of constituents detected at least 50% of the time, d^*, for a given constituent list. For example, a well with five detected Appendix IV constituents ($d^* = 5$), has a single test error rate equal to $1 - (1 - \alpha)^{1/d^*} = 1 - (1 - 0.05)^{1/5} = 0.0102$. A statistically significant autocorrelation is identified when the p-value for the rank von Neumann test is less than the single test error rate.

3.4 Lack of Statistical Outliers

Based on the Unified Guidance, outliers are "extreme, unusual-looking measurements". An outlier may be an invalid concentration measurement due to a typographical error, an equipment error, a sampling error, etc. Or an outlier may be a valid concentration measurement that reflects a "...temporary, local 'hot spot' of higher concentration" (EPA, 2009). Furthermore, outliers are "measurements (larger or smaller than other data values) that are not representative of the sample population from which they were drawn" (EPA, 2002).

The Unified Guidance recommends testing for outliers to attempt to determine whether a suspect outlier may have been drawn from the same sample population as the rest of the data. "The basic problem with including statistical outliers in analyzing groundwater data is that they do not come from the same distribution as the other measurements in the sample and so fail the identically distributed presumption of most tests" (EPA, 2009).

The consequences of keeping statistical outliers when developing a baseline or background value may lead to an unreasonably high value that will be unable to identify potential releases at a CCR unit. Professional judgment should be used to determine whether to retain or remove any outlier. The Unified Guidance states that outliers generally should not be removed unless some basis for a likely error or discrepancy can be identified. Possible errors or discrepancies include "...values significantly outside the historical ranges of background data" (EPA, 2009). "The decision to discard an outlier should be based on some scientific or quality assurance basis" (EPA, 2000). "A data point should not be eliminated from the background data set simply because it is the highest value that was observed" (EPA, 2002). EPA recommends "…that all data not known to be in error should be considered valid" (EPA, 1989). Furthermore, "[t]he general rule is that a measurement should never be deleted from a data set solely on the basis of an outlier test" (SWDIV,

1999).

Before baseline or background values are established for the detection monitoring or assessment monitoring programs, two steps are taken to check for suspect outliers for each constituent with at least 50% detected concentrations and at each well or set of upgradient wells:

1. A box plot is created to identify suspect outliers, and
2. The Dixon's test or Rosner's test is used.

Possible, or suspect, outliers are identified using a box plot. The statistical outlier tests, the Dixon's test and Rosner's test, are tests to check whether any suspect outlier is a statistical outlier. The box plots are generated and the Dixon's or Rosner's test is performed using the statistical software R (The R Foundation, 2017) or similar software.

3.4.1 Box Plots

Creating a box plot is a visual technique used to identify suspect outliers. Box plots can also demonstrate the pattern and distribution of constituent concentrations for a data set. The size of the vertical box in a box plot indicates where the middle half of the data fall (i.e., the interquartile range, IQR). Concentration measurements that plot further away from the others indicate suspect outliers; for a box plot, these measurements are called mild or extreme outliers (EPA, 2009).

Box plots are constructed to identify two types of suspect outliers: mild and extreme outliers. Suspect outliers are defined in terms of the IQR, represented by the range of the middle half of the data and indicated by the vertical 'box' in a box plot. The IQR is the difference between the upper quartile and the lower quartile of the data. Mild and extreme outliers are identified for small or large sample detected concentration measurements. A high, mild outlier is any detected concentration that exceeds 1.5 times the IQR, but no more than 3 times the IQR, from the upper quartile. A small, mild outlier is any detected concentration that is below 1.5 times the IQR, but no less than 3 times the IQR, from the lower quartile. A high, extreme outlier is any detected concentration greater than 3 times the IQR from the upper quartile. A low, extreme outlier is any detected concentration less than 3 times the IQR from the lower quartile. EPA, 2009 and EPA, 2017 state that mild and extreme outliers should be considered suspect outliers. Computational details for box plots are found in EPA guidance documents (EPA, 2000; EPA, 2009).

3.4.2 Statistical Outlier Tests

A statistical outlier test, either the Dixon's test or Rosner's test, is performed for each data set having at least one suspect outlier in order to determine if the suspect outlier is also a statistical outlier. For a data set with no more than 25 samples, the Dixon's test is used. For a data set with at least 20 samples, the Rosner's test is used. Dixon's test can only test if one detected concentration (i.e., the minimum or the maximum) is a statistical outlier. The Rosner's test can test if one or more detected concentrations are statistical outliers (EPA, 2000; EPA, 2002; EPA, 2009). Computational details for these outlier tests are outlined in EPA documents (EPA, 2000; EPA, 2009). Based on results from the statistical outlier tests, mild and extreme outliers are classified as statistical outliers.

Both statistical outlier tests assume that the data set with the suspect outlier(s) removed is normally distributed (or lognormally distributed if the data are transformed to the natural-log scale). Section 4.1.2 below discusses how to test distributional assumptions of normality or lognormality.

Any extreme, suspect outlier that is also identified as a statistical outlier is evaluated for possible errors or data discrepancies before a baseline or background value is established. Suspect outliers, including those also classified as statistical outliers, should be reviewed for having possible analytical or other quality errors. Professional judgment should be used to determine whether constituent concentrations defined as suspect or statistical outliers should be removed so that baseline or background conditions are properly represented so that detection or assessment monitoring can identify a potential release at a CCR unit. If an outlier does not represent baseline or background conditions or if the outlier hinders the detection or assessment monitoring, then the data set should be adjusted accordingly.

4.0 STATISTICAL APPROACH FOR DETECTION AND ASSESSMENT MONITORING

Section 257.93 of the CCR rule provides several options for statistically evaluating the groundwater data and the performance standards to follow at CCR facilities. At each CCR unit, upper prediction limits (UPLs) are calculated for each detected constituent to establish baseline or background values. To achieve UPLs with sufficient statistical power, the UPLs are designed to include retesting procedures based on the 1-of-2 approach (one assigned sample and one resample—see Section 4.1.3). Using UPLs is one of the preferred methods for comparing groundwater based on the Unified Guidance (EPA, 2009).

UPLs are computed using baseline or background data. The source of the baseline or background data may differ, depending whether interwell or intrawell comparisons are appropriate. "With interwell tests, background is derived from distinct, initially upgradient background wells" (EPA, 2009). "Future data from each of these compliance wells are then tested against this common background. On the other hand, intrawell background [also called baseline] is derived from and represents historical groundwater conditions in each individual compliance well." (EPA, 2009)

There are several considerations to make when determining whether interwell or intrawell comparisons should be performed. To consider interwell comparisons for a CCR unit, the groundwater monitoring data should meet the statistical assumptions of spatial stationarity, temporal stationarity, lack of autocorrelation, and lack of statistical outliers (see Section 3). Furthermore, the CCR unit should

- have at least one upgradient well,
- have a clearly defined groundwater flow direction without any radial flow, and
- not contain highly variable mine spoil.

If any of these conditions cannot be met or if the statistical assumptions cannot be met, then intrawell comparisons should be considered for a CCR unit. Both Gibbons and EPA's Unified guidance recommend using intrawell analyses when spatial variability exists. Both Gibbons and the Unified Guidance caution that intrawell analyses are appropriate in the absence of contamination. Since a CCR unit may be an existing landfill or impoundment that is now under the CCR rule, there is a possibility that contamination may be present. Professional judgment should be used for such CCR units to determine if contamination is likely present, and to determine which type of comparison is more appropriate.

4.1 Calculating UPLs

UPLs are estimated with constituent concentrations that are independent and identically distributed, as described in Section 3. The set of data used to calculate UPLs are based on constituent concentrations from the eight background sampling events and from either:

- upgradient wells for the CCR unit (for interwell comparisons), or
- individual compliance well (for intrawell comparisons).

UPLs must be calculated using a single-test error rate that accounts for the site-wide false positive rate (SWFPR) associated with all of the detection or assessment monitoring comparisons. The SWFPR is set based on the Unified Guidance recommendations and is discussed in more detail in Section 4.1.1.

After assumptions have been checked and outliers have been identified for the appropriate set of data, the data distribution is defined in accordance with EPA guidance (EPA, 2000; EPA, 2002; EPA, 2009; EPA, 2017; SWDIV, 1998). UPLs are then calculated based on the defined data distribution. Distributions are defined using the methodology outlined in Section 4.1.2, and the UPLs are calculated using the methodology described in Section 4.1.3.

The statistical software R (The R Foundation, 2017) or similar software is used to perform all statistical distribution tests and to calculate UPLs.

4.1.1 Defining Single-test error rate

Based on 40 CFR 257.93 (g)(2) and the Unified Guidance, the cumulative SWFPR or Type I experiment wise error rate for yearly monitoring shall be no more than 0.10. That means, a single test error rate must be considerably lower than 0.10. The single test error rate depends on the number of detected constituents and number of compliance wells evaluated in a CCR unit's monitoring program, defined as:
$1-(1-\alpha)^{1/cw}$, where:

- α=0.10, the SWFPR;
- c=the number detected constituents for the monitoring program (the Appendix III constituents for detection monitoring or Appendix IV constituents for assessment monitoring); and
- w=the number of compliance wells at the CCR unit.

Sampling frequency is not included in this single-test error rate because UPL calculations are designed to account for the number of sampling events per year.

4.1.2 Defining a Distribution for Background

The type of UPL calculated is based on a data set's defined distribution. Figure 2 outlines the steps to take to define whether a data set follows a normal, gamma, lognormal, or nonparametric distribution. If there are no detections for a data set, no distribution is defined. For a constituent with fewer than 50% detected concentrations, the distribution is defined as nonparametric (EPA, 2000; EPA, 2009).

For each data set with at least 50% detected concentrations and at least 4 samples, the data's distribution is tested using up to three distributional tests, which include the Shapiro-Wilk test, Kolmogorov-Smirnov test, and PPCC test. A test for the gamma distribution is included because EPA, 2017 generally recommends using summary statistics from a gamma distribution before using statistics from a lognormal distribution when both the gamma and lognormal distributional assumptions are valid. All of these distributional tests are recommended by EPA (EPA, 2000; EPA, 2002; EPA, 2009; EPA, 2017). Each distributional test is performed with only the detected data, which reflects how ProUCL performs distributional tests (EPA, 2017).

The method used to define a distribution, using the largest p-value from all of the appropriate tests and comparing it to a 0.05 level of significance, is designed to follow ProUCL's distributional recommendations. It should be noted that for a data set with fewer than five detected samples, the Kolmogorov-Smirnov test and the PPCC test cannot be performed. And, the Kolmogorov-Smirnov test is not used to test for gamma distributions.

If results from any of these three tests indicate the data are normally distributed (when the largest p-value is greater than 0.05), the distribution is defined as normal. If none of the test results indicate normality, the detected data set is tested for the gamma distribution by running the Shapiro-Wilk and PPCC tests. If either test indicates the data set follow a gamma distribution (when the larger p-value is greater than 0.05), the

distribution is defined as a gamma distribution. If none of the test results indicate a gamma distribution, the data set is tested for lognormality by running the Shapiro-Wilk, Kolmogorov-Smirnov, and PPCC tests with the log-transformed detected data. If results from any of these tests indicate the data set is lognormally distributed (when the largest p-value is greater than 0.05), the distribution is defined as lognormal. If none of the distributional test results indicate normality, a gamma distribution, or lognormality, the data's distribution is defined as nonparametric.

4.1.3 Calculating UPLs

UPLs are calculated using a 1-of-2 retesting strategy to ensure comparisons are statistically powerful and to minimize the SWFPR. A 1-of-2 retesting strategy means that if one or more constituent concentrations in a compliance well are above their respective background concentration, a resample is collected to validate or invalidate the background concentration exceedance. According to the Unified Guidance, "A *1-of-m* retesting plan implies that up to *m* groundwater measurements may have to be collected at each compliance well, including the initial observation and *(m-1)* possible resamples. For the test to be valid, all of these sample measurements need to be statistically independent" (EPA, 2009). An independent resample may be collected between sampling events if necessary.

The Unified Guidance defines when a well is in-compliance and out-of-compliance: "If the initial groundwater observation is in-bounds [in compliance with the designed standard], the test is complete and no resamples need to be collected. Only when the first concentration exceeds the UPL, does additional sampling come into play" (EPA, 2009). If all *m* samples (the initial sample plus *m-1* resamples) exceed, then the well is considered out-of-compliance. If none of the *(m-1)* resamples exceed after the initial sample exceeded, then the well can still be considered to be in-compliance (EPA, 2009).

The type of UPL computed (e.g., parametric or nonparametric) is based on the detection frequency and the defined data distribution for each data set, as described in Section 4.1.2. For a constituent with no detected concentration measurements in the baseline or background data, the UPL is set to the reporting limit (EPA, 2009). For a constituent with at least 50% detections, the UPL calculation adjusts for non-detected concentration(s) as described in Section 2.2, and the appropriate UPL calculation is used based on results from the distributional tests. If no parametric distribution (normal, lognormal, or gamma) can be defined for a data set, then a nonparametric UPL is estimated. Since J-flagged data are defined as detected, a calculated UPL may be less than the reporting limit; in such cases, the UPL is set to the reporting limit.

4.2 Establishing Background Values

Background values used for detection monitoring or assessment monitoring are based on UPLs. For detection monitoring (Appendix III constituents), background values are defined as the higher of the UPL and reporting limit. For assessment monitoring (Appendix IV constituents) background values are defined as the highest of the maximum concentration level (MCL), UPL, reporting limit, or other accepted screening level for constituents without MCLs. The reporting limit is included so that a constituent having an UPL below the reporting limit does not have an unfair limitation because most or all of the baseline or background constituent concentrations are below the reporting limit. For each CCR unit, tables of statistically-derived background values will be prepared for each Appendix III and Appendix IV constituent. For interwell comparisons, background values will be developed using upgradient well data. For intrawell comparisons, background values will be developed for each monitoring well using historical data from the well.

4.3 Updating Background Values

As detection or assessment monitoring continues, it is recommended to update baseline or background data sets periodically with valid monitoring concentrations that are representative of groundwater unimpacted by leakage from the CCR unit. The Unified Guidance recommends reviewing and possibly updating background values when enough new concentrations have been collected to perform statistical comparisons. That means, background values should be reviewed about every two or three years during. Failure to update background will exclude factors such as natural temporal variation, changes in field or laboratory methodologies, and changes in the water table due to meteorological conditions or other influences.

5.0 DETECTION MONITORING DATA EVALUATION

Detection monitoring will be performed at each CCR unit's groundwater monitoring system on a semi-annual basis during the active life of the CCR unit and during the post-closure period. Each CCR monitoring well will be sampled for the following Appendix III constituents as part of the detection monitoring program:

- Boron
- Calcium
- Chloride
- Fluoride
- field-measured pH
- Sulfate
- Total Dissolved Solids (TDS)

After every detection monitoring event, the constituent concentrations from each well will be compared to the background values, as described in Section 3 of this plan, to ascertain if a statistically significant increase above background exists. Possible outcomes from comparing the detection monitoring constituent concentrations in each well to their respective background values are as follows:

- All detection monitoring constituent concentrations in a compliance well are less than or equal to their respective background values; or

- One or more detection monitoring constituent concentrations in a compliance well are above their respective background values.

5.1 No Statistically Significant Increase over Background Values

Baseline and background UPLs are based on a 1-of-2 resampling approach, meaning that if zero or one concentration measurements from a series of two independent samples collected from a well do not exceed the appropriate UPL, then a statistically significant increase over baseline or background has not occurred at a CCR unit. This conclusion will be reached if the data indicate either of the following:

- All detection monitoring constituent concentrations in a compliance well are less than or equal to their respective background values; or

- At least one detection monitoring constituent concentration in a well is above the respective background value. If this occurs, the well or wells with constituent concentration(s) above the background value(s) will be resampled and analyzed for the detection monitoring constituent(s) with exceedances. If the resample indicates that the target detection monitoring constituent concentration(s) in the well or wells is less than or equal to their respective background value(s),

then it can be concluded that a statistically significant increase over background for all detection monitoring constituents has not occurred, since concentrations in one sample of the two independent samples do not exceed the appropriate baseline or background value(s).

If the groundwater monitoring data indicates that a statistically significant increase over background has not occurred at the CCR wells, then detection monitoring at all CCR wells will continue on a semi-annual basis.

5.2 Statistically Significant Increase over Background Values

If one or more detection monitoring constituent concentrations in any well is above the respective background value in both the original detection monitoring sample and the resample, then a statistically significant increase over background for the target detection monitoring constituents can be concluded. If a statistically significant increase is indicated, within 90 days Luminant will:

- Establish an assessment monitoring program as described in this plan, or
- Demonstrate that a source other than the CCR unit caused the statistically significant increase over the baseline or background value for a constituent, or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. If a successful demonstration is completed within the 90-day period, the owner or operator of the CCR unit may continue with the detection monitoring program.

6.0 ASSESSMENT MONITORING DATA EVALUATION

Assessment monitoring will be performed at a CCR unit's groundwater monitoring system after a statistically significant increase over background values has been confirmed in that well for one or more of the detection monitoring constituents. Within 90 days of triggering the assessment monitoring program, and annually thereafter, each CCR monitoring well requiring assessment monitoring will be sampled for the following Appendix IV parameters as part of the assessment monitoring program:

- Antimony
- Arsenic
- Barium
- Beryllium
- Cadmium
- Chromium
- Cobalt
- Fluoride
- Lead
- Lithium
- Mercury
- Molybdenum
- Selenium
- Thallium
- Radium 226 and 228 combined

Within 90 days of obtaining the results from the initial assessment monitoring sampling event, all wells in a CCR unit's groundwater monitoring system will be resampled and analyzed for:

- All Appendix III detection monitoring parameters; and
- The Appendix IV assessment monitoring parameters that were detected as part of the assessment monitoring event.

This monitoring will be performed on at least an annual basis thereafter, unless Luminant can demonstrate the need for an alternative monitoring frequency for repeated sampling and analysis for these constituents during the active life and the post-closure care period based on the availability of groundwater.

Within 90 days of obtaining the results from the initial assessment monitoring sampling event, a GWPS will be established for each of the Appendix IV assessment monitoring constituents that were detected in the groundwater monitoring system wells as follows:

- For constituents for which an MCL has been established, the highest of the MCL, UPL, and reporting limit for that constituent; or

- For constituents for which an MCL has not been established, the higher of the UPL, reporting limit, or levels that are equivalent to specified regional screening level (RSL) for that constituent (note: future revisions to the Rule may allow additional flexibility in establishing GWPS for states with EPA-approved CCR permit programs for Appendix IV constituents that do not have a MCL).

Each assessment monitoring constituent will be evaluated to ascertain if a statistically significant increase above the GWPS exists. Possible outcomes are as follows:

- All averages from assessment monitoring constituent concentrations at a well are not statistically greater than to their respective GWPS; or
- One or more averages from assessment monitoring constituent concentrations at a well are statistically greater than their respective GWPS.

6.1 Calculating LCLs

For each assessment monitoring constituent, the 95% lower confidence limit of the mean (LCL) is estimated. The set of data used to calculate LCLs are based on the constituent concentrations from the current year's sampling events and enough previous sampling events to reasonably estimate each LCL (the goal should be to have around eight to ten samples).

LCLs are calculated based on the defined data distribution. The data distribution is defined in accordance with EPA guidance (EPA, 2000; EPA, 2002; EPA, 2009; EPA, 2017; SWDIV, 1998). Distributions are defined using the methodology outlined in Section 6.1.1. The LCLs are calculated using the methodology described in Section 6.1.2.

The statistical software R (The R Foundation, 2017) or similar software is used to perform all statistical distribution tests and to calculate LCLs.

6.1.1 Defining a Distribution for LCLs

The type of LCL calculated is based on a data set's defined distribution. The same methodology for defining a distribution for background, described in Section 4.1.2 and outlined in Figure 2, is used to define the distribution for each assessment monitoring constituent data set as normal, gamma, lognormal, or nonparametric.

6.1.2 Calculating LCLs

The type of LCL computed (e.g., parametric or nonparametric) is based on the detection frequency and the defined data distribution for each data set, as described in Section 6.1.1. For a constituent with no detected concentration measurements, the LCL is set to the reporting limit (EPA, 2009). For a constituent with at least 50% detections, the LCL calculation adjusts for non-detected concentration(s) as described in Section 2.2, and the appropriate LCL calculation is used based on results from the distributional tests. If no parametric distribution (normal, lognormal, or gamma) can be defined for a data set or there are fewer than 50% detections, then a nonparametric, approximate 95% lower confidence limit of the median is estimated.

6.2 No Statistically Significant Increase Over GWPS

A statistically significant increase over the groundwater protection standard has not occurred at a CCR unit when the LCL for every assessment monitoring constituent at a well is less than or equal to the appropriate GWPS.

Assessment monitoring will continue on an annual basis. If for two consecutive assessment monitoring sampling events, the constituent concentrations for all Appendix III constituents are at or below background values and all Appendix IV constituents are shown to be statistically at or below their appropriate GWPS, then assessment monitoring will be terminated and detection monitoring as described in this plan will resume. If the constituent concentrations of any Appendix III constituents are shown to be statistically above background values, but all Appendix IV constituents have no statistically significant increase over their respective GWPS, then assessment monitoring will continue.

6.3 Statistically Significant Increase Over GWPS

A statistically significant increase over the groundwater protection standard has occurred at a CCR unit when the LCL for at least one assessment monitoring constituent at a well is greater than the appropriate GWPS. If a statistically significant increase over groundwater protection standards for any Appendix IV assessment monitoring constituent is confirmed, within 90 days of the initial assessment monitoring event, Luminant will either:

- Initiate an assessment of corrective measures for the CCR unit in accordance with CCR Rule Section 257.96; or
- Demonstrate that a source other than the CCR unit caused the contamination, or that the statistically

significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. If a successful demonstration is made, the owner or operator must continue assessment monitoring. If a successful demonstration has not been made at the end of the 90 day period, the owner or operator of the CCR unit must initiate an assessment of corrective measures for the CCR unit.

If one or more Appendix IV assessment monitoring constituent concentrations are statistically above the respective groundwater protection standards, and if a source other than the CCR unit cannot be demonstrated to have caused the contamination, a release from the CCR unit is likely and the nature and extent of the release will be further characterized as follows:

- Install additional monitoring wells necessary to define the contaminant plume(s);
- Collect data on the nature and estimated quantity of material released including specific information on the Appendix IV assessment monitoring constituents and the levels at which they are present in the material released;
- Install at least one additional monitoring well at the facility boundary in the direction of contaminant migration and sample this well for all Appendix III detection monitoring parameters and for those Appendix IV assessment monitoring constituents that have been detected as part of assessment monitoring. This monitoring must be performed on at least an annual basis thereafter.
- Sample all CCR unit wells for all Appendix III detection monitoring parameters and for those Appendix IV assessment monitoring constituents that have been detected as part of assessment monitoring. This monitoring must be performed on at least an annual basis thereafter.

7.0 REPORTING REQUIREMENTS

The results of the CCR groundwater monitoring program performed at each CCR unit will be reported yearly in an Annual Groundwater Monitoring and Corrective Action Report. A separate annual report for each CCR unit will document the status of the groundwater monitoring and corrective action program, summarize key actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year. At a minimum, the Annual Groundwater Monitoring and Corrective Action Report will contain the following information:

- A map, aerial image, or diagram showing the CCR unit and all background (or upgradient) and downgradient monitoring wells, to include the well identification numbers, that are part of the groundwater monitoring program for the CCR unit;

- Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken;

- In addition to all the monitoring data obtained under CCR Rule Sections 257.90 through 257.98, a summary including the number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and whether the sample was required by the detection monitoring or assessment monitoring programs, as well as the basis for the background values and the statistical methods employed to establish the background values;

- A narrative discussion of any transition between monitoring programs (e.g., the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant increase over background levels); and

- Other information required to be included in the annual report as specified in CCR Rule Sections 257.90 through 257.98.

The Groundwater Monitoring and Corrective Action Report for the 2017 monitoring program must be placed in each facility operating record no later than January 31, 2018. Subsequent reports must be placed in the facility operating records no later than January 31 of the year following completion of the groundwater monitoring program from the preceding calendar year. The reports must also be posted to the owner or operator's CCR Rule Compliance Data and Information internet site within 30 days of placing the reports in the operating record.

8.0 REFERENCES

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FIGURES

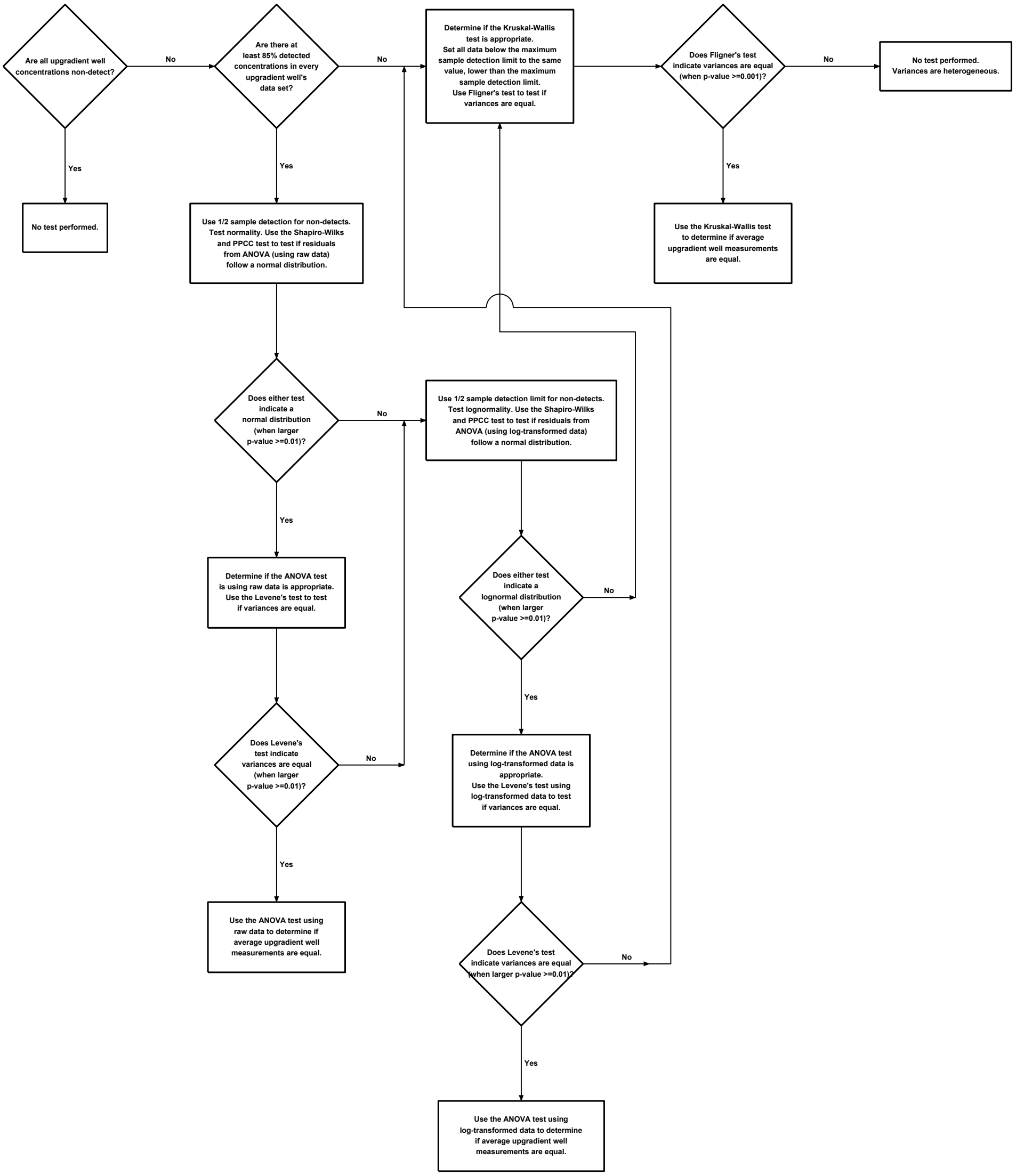
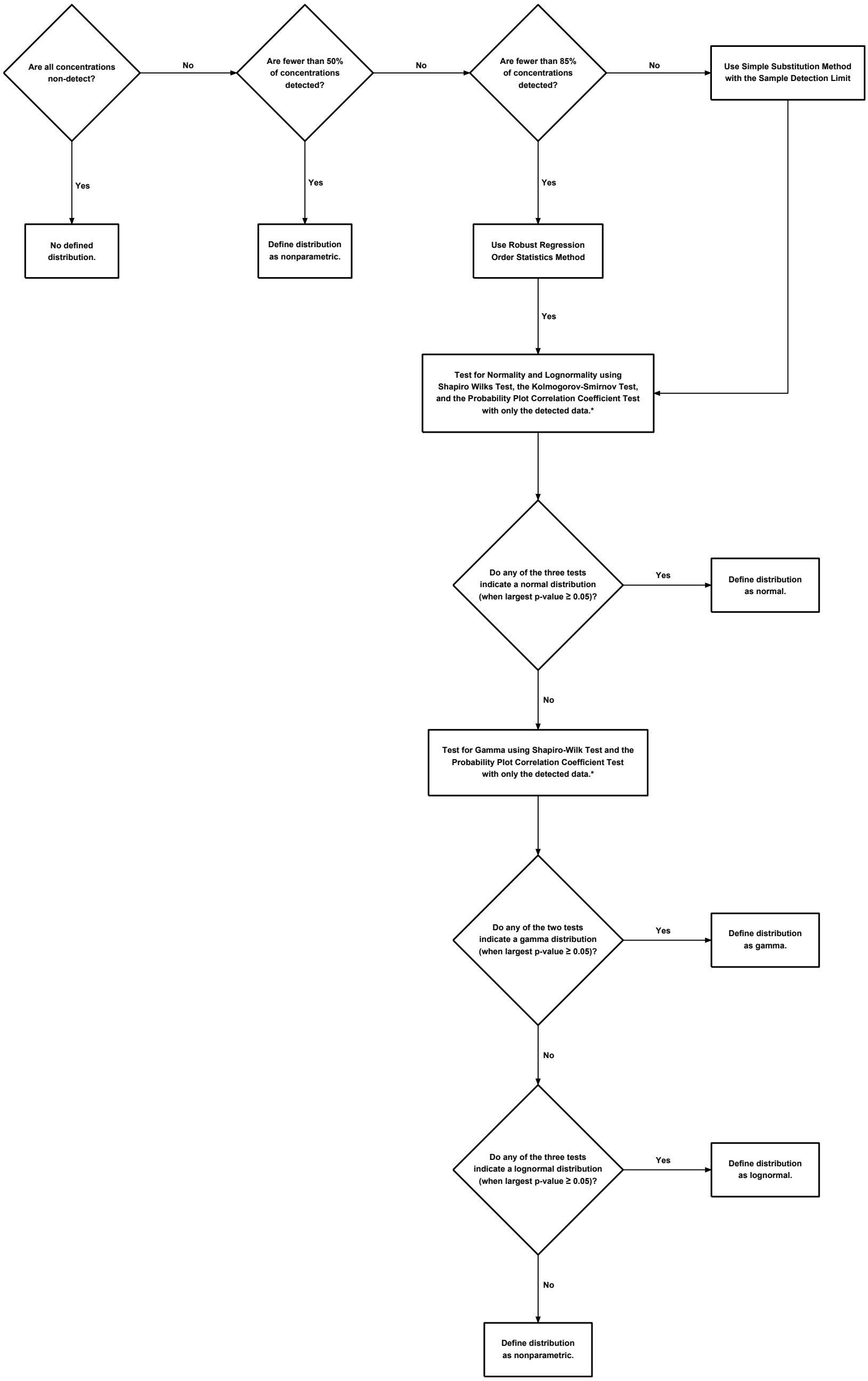


Figure 1

PROCESS FOR SELECTING ANOVA OR KRUSKAL-WALLIS TEST TO COMPARE UPGRADIENT WELL AVERAGES

PROJECT: 5164E	BY: AJD	REVISIONS
DATE: JAN 2019	CHECKED: PJB	

GOLDER ASSOCIATES USA, INC.



Note:

* - Distributional tests can not be performed for the following cases:

1. For a data group with fewer than five detected samples, the Kolmogorov-Smirnov Test and the Probability Plot Correlation Coefficient Test can not be performed using only the detected concentrations.
2. For a data group with fewer than four detected samples, the Shapiro-Wilks Test can not be performed using only the detected concentrations.

Figure 2

PROCESS FOR DEFINING A DISTRIBUTION FOR A DATA SET

PROJECT: 5164E	BY: AJD	REVISIONS
DATE: JAN 2019	CHECKED: PJB	

GOLDER ASSOCIATES USA, INC.

COAL COMBUSTION RESIDUAL RULE
2017 ANNUAL GROUNDWATER MONITORING REPORT

SANDOW STEAM ELECTRIC STATION
AX LANDFILL
ROCKDALE, TEXAS

JANUARY 31, 2018

Prepared For:

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1.0 INTRODUCTION

Luminant Generation Company LLC (Luminant) operated the Sandow Steam Electric Station (Sandow) located approximately 7 miles southwest of Rockdale in Milam County, Texas. The AX Landfill (the Site) was constructed primarily to receive Coal Combustion Residuals (CCRs), including fly ash and bed ash, from Unit 5. The AX Landfill is located approximately 7,500 feet south of Unit No. 5 on former mined land that is part of the Sandow Lignite Mine (Figure 1). Disposal of CCRs in the AX Landfill began in May 2015.

The CCR Rule (40 CFR 257 Subpart D - *Standards for the Receipt of Coal Combustion Residuals in Landfills and Surface Impoundments*) has been promulgated by the EPA to regulate the management and disposal of CCRs as solid waste under Resource Conservation and Recovery Act (RCRA) Subtitle D. The final CCR Rule was published in the Federal Register on April 17, 2015. The effective date of the CCR Rule was October 19, 2015. The AX Landfill, which includes Cells 1, 2, and 2A, meets the definition of a CCR landfill and is subject to groundwater monitoring system requirements of the CCR Rule.

1.1 CCR Unit Groundwater Monitoring Applicability

Section 257.90 of the CCR Rule requires that existing CCR landfills and surface impoundments be in compliance with the following groundwater monitoring requirements no later than October 17, 2017:

- Install a groundwater monitoring system as required under Section 257.91;
- Develop a groundwater sampling and analysis program to include selection of the statistical procedures to be used for evaluating groundwater monitoring data as required under Section 257.93;
- Initiate a detection monitoring program to include obtaining a minimum of eight independent samples for each background and downgradient monitoring well as required under Section 257.94; and
- Begin evaluating the groundwater monitoring data for statistically significant increases over background levels for the constituents listed in Appendix III of this part as required under Section 257.94.

Pastor, Behling & Wheeler, LLC (PBW) was retained by Luminant to evaluate the CCR groundwater monitoring system and develop and implement a CCR groundwater sampling and analysis program at the

Site. To document these activities, PBW prepared the following reports, which were placed in the facility's operating record to comply with Section 257.105(h) of the CCR Rule:

- CCR Groundwater Monitoring System Certification (PBW, 2017a);
- CCR Monitoring Well Design, Installation, Development, and Decommissioning Report (PBW, 2017b); and
- CCR Statistical Analysis Plan (PBW, 2017c).

For existing CCR landfills and surface impoundments, the owner or operator must prepare an annual groundwater monitoring and corrective action report to document the status of the groundwater monitoring and corrective action program for the CCR unit for the previous calendar year. The CCR Rule requires that the owner or operator of a CCR unit prepare the initial annual groundwater monitoring and corrective action report for the unit no later than January 31, 2018, and annually thereafter. Per Section 257.90(e) of the CCR Rule, the report should contain the following information, to the extent available:

(1) A map, aerial image, or diagram showing the CCR unit and all background (or upgradient) and downgradient monitoring wells, to include the well identification numbers, that are part of the groundwater monitoring program for the CCR unit;

(2) Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken;

(3) In addition to all the monitoring data obtained under §§ 257.90 through 257.98, a summary including the number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and whether the sample was required by the detection monitoring or assessment monitoring programs;

(4) A narrative discussion of any transition between monitoring programs (*e.g.,* the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant increase over background levels); and

(5) Other information required to be included in the annual report as specified in §§ 257.90 through 257.98.

1.2 Groundwater Sampling and Analysis Requirements

1.2.1 Background Monitoring Requirements

The CCR Rule requires that background groundwater quality be established in background well(s) for each of the groundwater constituents required in the detection monitoring or assessment monitoring program that applies to the CCR unit. Background groundwater quality may be established at wells that are not located hydraulically upgradient from the CCR unit if the samples accurately represent the quality of background groundwater that has not been affected by leakage from the CCR unit. Section 257.94(b) of the CCR Rule requires that a minimum of eight independent samples from each background and downgradient well associated with a CCR unit be collected and analyzed for the constituents listed in Appendix III and Appendix IV to Part 257 CCR Rule no later than October 17, 2017.

PBW was retained by Luminant to collected and analyze the required background well samples at the Site. Eight background groundwater monitoring events were performed using the AX Landfill CCR monitoring well system from October 2015 to December 2016. The background groundwater monitoring program is described in detail in Section 2 of this report.

1.2.2 Detection Monitoring Requirements

Groundwater detection monitoring must be performed at each CCR unit (CCR Rule Section 257.94). The following constituents must be included in the detection monitoring program (from Appendix III of the CCR Rule):

- Boron
- Calcium
- Chloride
- Fluoride
- pH
- Sulfate
- Total Dissolved Solids (TDS)

The monitoring frequency for these constituents must be at least semi-annual during the active life of the CCR unit and post-closure period. The reported concentrations of the detection monitoring constituents must be compared to the respective CCR unit background concentration developed for each constituent. If a statistically significant increase over background is determined for one or more of the constituents listed above at any monitoring well at the CCR unit waste boundary, within 90 days the owner or operator

must:

- Establish an assessment monitoring program as described in Section 257.95 of the Rule; or

- Demonstrate that a source other than the CCR unit caused the statistically significant increase over background levels for a constituent or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. If a successful demonstration is completed within the 90-day period, the owner or operator of the CCR unit may continue with the detection monitoring program. If at the end of the 90-day period in 257.94(e)(2), the owner or operator is unable to successfully make an alternate source demonstration, the assessment monitoring program is triggered and the owner or operator has 90 days to complete the sampling required under 257.95(d).

Detection monitoring performed at the Site is discussed in Section 4.0 of this report.

1.2.3 Assessment Monitoring Requirements

Assessment monitoring is required under the CCR Rule whenever a statistically significant increase over background levels has been detected for one or more of the detection monitoring constituents listed above (CCR Rule Section 257.95). The following constituents must be included in the assessment monitoring program (from Appendix IV of the CCR Rule):

- Antimony
- Arsenic
- Barium
- Beryllium
- Cadmium
- Chromium
- Cobalt
- Fluoride
- Lead
- Lithium
- Mercury
- Molybdenum
- Selenium
- Thallium
- Radium 226 and 228 combined

Assessment monitoring performed at the Site is discussed in Section 5.0 of this report.

2.0 GROUNDWATER MONITORING SYSTEM

2.1 Description of AX Landfill Cells 1, 2, and 2A

The AX Landfill consists of Cells 1, 2, and 2A and covers an area of approximately 169 acres. The AX Landfill is located approximately 7,500 feet south of Sandow Unit 5 on reclaimed mine land that is leased by Luminant from Alcoa (Figure 2). The landfill is used primarily to manage fly ash and bed ash generated from Unit No. 5. Fly ash and bed ash are transported to the landfill in trucks and placed in the landfill as dry material.

AX Landfill Cells 1, 2, and 2A are lined landfill cells. Construction of Cell 1 was completed in July 2013 and construction of Cells 2 and 2A was initiated in May 2015. Cell 2 was completed in October 2015 and Cell 2A was completed in July 2016. Placement of Unit No. 5 CCR began in Cell 1 in May 2015 and Cell 2 in September 2016. As of the date of this report, CCR has not been placed in Cell 2A.

2.2 Local Geology and Hydrogeology

The AX Landfill is located in the former Sandow Lignite Mine, which is located in the outcrop area of the Eocene-aged Wilcox Group (Barnes, 1974). The Wilcox Group in the vicinity of the Site is divided into the Hooper Formation, the Simsboro Formation, and the Calvert Bluff Formation (listed from oldest to youngest). The overburden interval and lignite seams mined at the Sandow Lignite Mine are part of the Calvert Bluff Formation.

The AX Landfill is constructed within overburden spoil material that was previously excavated and backfilled during lignite mining operations at the Sandow Lignite Mine. Based on soil borings completed in the spoil material, the spoil consists of a highly heterogeneous mixture of sand, silty and clayey sand, and clay. The mine spoil extends from ground surface to depths ranging from approximately 100 feet below ground surface (bgs) on the northwest side of the AX Landfill to more than 160 feet bgs on the southeast side of the AX Landfill. Native material encountered below the spoil zone generally consists of lignite or native clay (PBW, 2017a). The uppermost aquifer at the Site occurs under unconfined conditions within the overburden spoil and extends to the base of the spoil where lignite and/or clay confining units are encountered.

2.3 AX Landfill Groundwater Monitoring System

The CCR groundwater monitoring well system at the AX Landfill consists of nine monitoring wells (AXMW-1, AXMW-2, AX-23, AX-24, AX-25, AX-26, AX-27, AX-28, and AX-29) that are each screened in the uppermost aquifer at the Site. The locations of the CCR monitoring wells are shown on Figure 2. Well construction information and survey data for the CCR wells are summarized in Table 1. Wells were installed in 2012 and 2015. No wells were added to or removed from the CCR groundwater monitoring system in 2017.

2.4 Groundwater Potentiometric Surface

Static water levels measured during the background monitoring period 2017 detection monitoring event indicated water elevations ranging from 383.59 feet above mean sea level (amsl) to 458.55 feet amsl, and depths to water ranging from 19.65 feet bgs to 77.32 feet bgs (Table 2).

Groundwater elevations were generally highest on the west side of the landfill and lowest on the east side of the landfill, with an inferred groundwater flow direction to the east (Figure 3). Based on the inferred groundwater flow direction, the location of each CCR monitoring well relative to the AX Landfill is as follows:

Upgradient Wells	Downgradient Wells
AXMW-1	AX-24
AXMW-2	AX-25
AX-23	AX-26
AX-29	AX-27
	AX-28

3.0 BACKGROUND GROUNDWATER MONITORING PROGRAM

Eight background groundwater monitoring events were performed using the AX Landfill CCR monitoring well system from October 2015 to December 2016. The results of the background monitoring events are described in this section.

3.1 Background Groundwater Monitoring Results

The AX Landfill CCR groundwater monitoring wells were sampled approximately every two months from October 2015 to December 2016 (eight sampling events) to fulfill the background monitoring period sampling requirements of the CCR Rule. Background sample data are summarized in Table 3 (Appendix III) and Table 4 (Appendix IV). Laboratory analytical reports for the data are presented in Appendix A.

3.2 Background Statistical Evaluation Procedures

Statistical analysis of groundwater monitoring data is required as part of detection monitoring and assessment monitoring under Section 257.93 of the CCR Rule. Section 257.93 of the CCR Rule provides several options for statistically evaluating the groundwater data. The owner or operator of the CCR unit must select one of the following statistical methods specified in paragraphs (f)(1) through (5) of Section 257.93 to be use in evaluating groundwater monitoring data for each specified constituent:

(1) A parametric analysis of variance followed by multiple comparison procedures to identify statistically significant evidence of contamination. The method must include estimation and testing of the contrasts between each compliance well's mean and the background mean levels for each constituent.

(2) An analysis of variance based on ranks followed by multiple comparison procedures to identify statistically significant evidence of contamination. The method must include estimation and testing of the contrasts between each compliance well's median and the background median levels for each constituent.

(3) A tolerance or prediction interval procedure, in which an interval for each constituent is established from the distribution of the background data and the level of each constituent in each compliance well is compared to the upper tolerance or prediction limit.

(4) A control chart approach that gives control limits for each constituent.

(5) Another statistical test method that meets the performance standards of paragraph (g) of this section.

The following statistical evaluation approaches were selected to demonstrate groundwater compliance for the AX Landfill under the CCR Rule:

- Use of intrawell data evaluations, which compare new sample data to historical data at each groundwater monitoring well independently.
- Use of prediction limits for data comparisons. This approach is a common statistical method used to evaluate groundwater compliance for Subtitle D landfill facilities and is one of the approved options for groundwater quality data statistical evaluation under the CCR Rule.

The evaluation procedures used for the AX Landfill background groundwater data conforms with the Rule requirements shown above, as well as EPA's *Unified Guidance: Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities* (EPA, 2009) and the American Society for Testing and Materials (ASTM) standard D6312-17, *Developing Appropriate Statistical Approaches for Groundwater Detection Monitoring Programs at waste Disposal Facilities* (ASTM, 2017). The statistical approach used for establishing prediction limits based on the background data are described in detail in the Statistical Analysis Plan for the Site (PBW, 2017c).

4.0 DETECTION GROUNDWATER MONITORING PROGRAM

In accordance with CCR Rule Section 257.94, detection monitoring groundwater samples are collected on a semi-annual basis from the AX Landfill CCR groundwater monitoring network.

4.1 Detection Monitoring Results

PBW collected the initial detection monitoring groundwater samples from the AX Landfill CCR monitoring wells in October 2017 and evaluation of the data commenced by October 17, 2017. The detection monitoring results are summarized in Table 5. Laboratory analytical reports for the detection monitoring samples are included in Appendix B. The evaluation of these data will be completed in 2018, and the evaluation will be summarized in the 2018 Annual Groundwater Monitoring Report.

4.2 CCR Detection Monitoring Activities Planned for 2018

In accordance with CCR Rule Section 257.94, detection monitoring groundwater samples will be collected on a semi-annual basis in 2018 and the analytical data from both sampling events will be included in the 2018 Annual Groundwater Monitoring Report. A statistical evaluation of the 2017 detection monitoring data and the first semi-annual 2018 detection monitoring data will be summarized in the 2018 Annual Groundwater Monitoring Report. If a statistically significant increase over background is determined for one or more of the detection monitoring constituents at any monitoring well at the CCR unit waste boundary, Luminant will comply with the applicable CCR Rule requirements in 257.94(e)(2).

5.0 ASSESSMENT GROUNDWATER MONITORING PROGRAM

Assessment groundwater monitoring was not performed at the Site during 2017. Assessment monitoring will be performed during 2018 if required based on the 2017/2018 detection monitoring results.

6.0 REFERENCES

ASTM, 2017. Standard Guide for Developing Appropriate Statistical Approaches for Groundwater Detection Monitoring Programs at Waste Disposal Facilities - D6312-17.

Barnes, Virgil E., 1974. Geologic Atlas of Texas, Austin Sheet. Texas Bureau of Economic Geology.

Environmental Protection Agency (EPA), 2009. Unified Guidance Document: Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, EPA 530-R-09-007, March 2009.

Pastor, Behling & Wheeler, LLC, 2017a. Coal Combustion Residual Rule Groundwater Monitoring System Certification, Sandow 5 Generating Plant, AX Landfill, Rockdale, Texas. October 16, 2017.

Pastor, Behling & Wheeler, LLC, 2017b. Coal Combustion Residual Rule Monitoring Well Design, Installation, Development, and Decommissioning Report, Sandow 5 Generating Plant, AX Landfill, Rockdale, Texas. October 13, 2017.

Pastor, Behling & Wheeler, LLC, 2017c. Coal Combustion Residual Rule Statistical Analysis Plan, Sandow 5 Generating Plant, AX Landfill, Rockdale, Texas. October 11, 2017.

Tables

TABLE 1
CCR WELL CONSTRUCTION SUMMARY
SANDOW AX LANDFILL

Well ID	Date Installed	Northing	Easting	Ground Elevation (ft amsl)	TOC Elevation (ft amsl)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Screen Length (ft)	Total Design Depth (ft bgs)	Casing Diameter (in)
AX-23	10/15/15	335065	3028456	479.78	482.26	65	85	20	85	4
AX-24	10/15/15	336503	3031537	466.48	468.74	61	81	20	81	2
AX-25	10/16/15	335806	3032212	441.11	443.62	65	75	10	75	2
AX-26	10/14/15	334521	3031007	456.34	458.60	55	75	20	75	2
AX-27	10/14/15	333747	3030177	476.82	479.47	78	98	20	98	4
AX-28	10/13/15	332787	3029656	460.75	463.26	25	45	20	45	2
AX-29	10/13/15	333162	3028622	484.96	487.73	45	65	20	65	2
AXMW-1	11/28/12	336064	3029088	471.88	473.65	33	53	20	53	2
AXMW-2	11/28/12	334057	3028201	480.54	482.25	43	63	20	63	2

Notes:
1. Abbreviations: ft - feet; amsl - above mean sea level; bgs - below ground surface; TOC - top of casing; in - inches.

TABLE 2
GROUNDWATER ELEVATION SUMMARY
SANDOW AX LANDFILL

Well ID	TOC Elevation (ft amsl)	Date	Depth to Water (ft btoc)	Water Elevation (ft amsl)
AXMW-1	473.65	11/03/15	25.75	447.90
		12/17/15	25.67	447.98
		02/08/16	25.82	447.83
		04/25/16	25.55	448.10
		06/15/16	25.60	448.05
		08/09/16	26.52	447.13
		10/05/16	25.77	447.88
		12/22/16	26.31	447.34
AXMW-2	482.25	10/29/15	25.86	456.39
		12/17/15	24.75	457.50
		02/08/16	24.51	457.74
		04/26/16	23.72	458.53
		06/15/16	23.70	458.55
		08/10/16	24.35	457.90
		10/06/16	23.98	458.27
		12/22/16	24.26	457.99
AX-23	482.26	10/29/15	32.23	450.03
		12/17/15	31.60	450.66
		02/08/16	31.15	451.11
		04/26/16	30.26	452.00
		06/15/16	30.13	452.13
		08/09/16	30.49	451.77
		10/05/16	30.21	452.05
		12/21/16	30.08	452.18
AX-24	468.74	10/29/15	67.01	401.73
		12/18/15	66.67	402.07
		02/09/16	64.99	403.75
		04/25/16	60.80	407.94
		06/14/16	57.39	411.35
		08/09/16	53.90	414.84
		10/05/16	51.35	417.39
		12/21/16	48.98	419.76
AX-25	443.62	10/29/15	60.03	383.59
		12/18/15	52.99	390.63
		02/09/16	45.84	397.78
		04/25/16	37.94	405.68
		06/14/16	33.62	410.00
		08/10/16	34.78	408.84
		10/05/16	29.18	414.44
		12/21/16	27.44	416.18

TABLE 2
GROUNDWATER ELEVATION SUMMARY
SANDOW AX LANDFILL

Well ID	TOC Elevation (ft amsl)	Date	Depth to Water (ft btoc)	Water Elevation (ft amsl)
AX-26	458.60	11/03/15	63.71	394.89
		12/17/15	58.04	400.56
		02/08/16	54.21	404.39
		04/25/16	51.15	407.45
		06/14/16	46.30	412.30
		08/10/16	51.84	406.76
		10/06/16	47.41	411.19
		12/22/16	45.50	413.10
AX-27	479.47	11/03/15	77.32	402.15
		12/17/15	76.38	403.09
		02/08/16	75.04	404.43
		04/26/16	72.75	406.72
		06/14/16	71.62	407.85
		08/09/16	70.36	409.11
		10/06/16	69.11	410.36
		12/22/16	67.08	412.39
AX-28	463.26	11/03/15	40.38	422.88
		12/18/15	38.87	424.39
		02/08/16	38.71	424.55
		04/25/16	39.25	424.01
		06/15/16	39.18	424.08
		08/09/16	38.99	424.27
		10/05/16	38.69	424.57
		12/21/16	38.39	424.87
AX-29	487.73	10/29/15	59.10	428.63
		12/17/15	58.96	428.77
		02/08/16	58.56	429.17
		04/26/16	57.46	430.27
		06/14/16	57.02	430.71
		08/10/16	56.66	431.07
		10/06/16	56.13	431.60
		12/21/16	55.39	432.34

Notes:
1. Abbreviations: TOC - top of casing; ft - feet; amsl - above mean sea level.

TABLE 3
APPENDIX III BACKGROUND GROUNDWATER ANALYTICAL DATA
SANDOW AX LANDFILL

Sample Location	Date Sampled	B (mg/L)	Ca (mg/L)	Cl (mg/L)	Fl (mg/L)	pH (s.u.)	SO_4 (mg/L)	TDS (mg/L)
AX-23	10/29/15	0.112	268	<0.002	0.211 J	7.95	426	1,640
	12/17/15	0.0466	10.8	11.5	<0.1	6.70	30	135
	02/08/16	0.287	177	124	0.273 J	6.36	459	1,250
	04/26/16	0.3	188	131	0.186 J	6.36	471	1,200
	06/15/16	0.0509	218	141	<0.1	6.60	502	1,730
	08/09/16	0.0987	53.4	40.8	<0.1	6.82	149	515
	10/05/16	0.293	246	156	0.179 J	6.22	562	1,680
	12/21/16	0.311	243	170	<0.1	--[3]	582	1,550
AX-24	10/29/15	0.0617	150	0.00476 J	0.148 J	6.57	695	1,640
	12/18/15	0.165	231	195	0.149 J	7.63	766	1,840
	02/09/16	0.0929	232	249	0.207	6.40	783	1,900
	04/25/16	0.12	232	299	<0.1	6.08	756	1,820
	06/14/16	0.0945	238	275	<0.1	6.29	776	1,980
	08/09/16	<0.5	273	273	<0.1	6.10	837	2,010
	10/05/16	0.0921	239	250	0.106 J	6.00	768	2,290
	12/21/16	0.112	228	365	<0.1	--[3]	1,010	1,890
AX-25	10/29/15	0.114	163	<0.002	0.28 J	7.17	303	1,050
	12/18/15	0.141	113	160	0.212 J	7.45	278	996
	02/09/16	0.172	242	457	0.342	7.10	410	2,080
	04/25/16	0.206	225	526	0.25 J	6.36	470	1,920
	06/14/16	0.219	252	513	0.207 J	6.56	474	2,210
	08/10/16	0.196	262	606	0.199 J	6.51	534	2,450
	10/05/16	0.184	250	503	0.292 J	6.33	446	2,710
	12/21/16	0.214	244	637	<0.1	--[3]	613	2,360
AX-26	11/03/15	0.301	789	2170	<0.1	7.18	996	6,430
	12/17/15	0.326	915	2220	0.304 J	6.69	1,050	6,440
	02/08/16	0.366	670	1420	0.119 J	7.02	1,100	4,610
	04/25/16	0.394	571	1200	<0.1	6.12	1,020	4,080
	06/14/16	0.36	591	972	<0.1	6.55	1,020	3,930
	08/10/16	0.311	587	1180	<0.1	6.34	1,060	4,210
	10/06/16	0.311	558	875	<0.1	6.34	931	3,390
	12/22/16	0.358	567	1170	<0.1	--[3]	941	4,250
AX-27	11/03/15	0.117	131	248	<0.1	7.30	172	971
	12/17/15	0.172	299	544	<0.1	6.27	371	1,920
	02/08/16	0.189	324	548	0.185 J	6.34	400	2,140
	04/26/16	0.196	295	557	<0.1	6.18	383	1,990
	06/14/16	0.194	338	610	<0.1	6.38	418	2,370
	08/09/16	0.178	359	670	<0.1	6.40	468	2,320
	10/06/16	0.216	356	600	<0.1	6.08	394	1,740
	12/22/16	0.209	366	741	<0.1	--[3]	478	2,640

TABLE 3
APPENDIX III BACKGROUND GROUNDWATER ANALYTICAL DATA
SANDOW AX LANDFILL

Sample Location	Date Sampled	B (mg/L)	Ca (mg/L)	Cl (mg/L)	Fl (mg/L)	pH (s.u.)	SO_4 (mg/L)	TDS (mg/L)
AX-28	11/03/15	0.187	421	494	<0.1	6.27	1,030	2,830
	12/18/15	0.15	477	275	0.106 J	7.31	1,420	3,150
	02/08/16	0.213	518	206	0.272 J	6.25	1,950	3,270
	04/25/16	0.181	480	378	<0.1	6.07	1,450	2,940
	06/15/16	0.239	500	412	<0.1	6.67	1,460	2,790
	08/09/16	<0.5	574	412	<0.1	6.50	1,450	3,120
	10/06/16	0.135	478	426	<0.1	7.22	1,110	3,240
	12/21/16	0.313	507	563	<0.1	--[3]	1,290	3,400
AX-29	10/29/15	0.251	286	0.00878	0.145 J	7.01	1,200	2,490
	12/17/15	0.323	293	279	0.104 J	6.27	1,080	2,430
	02/08/16	0.299	334	269	0.227 J	6.42	1,170	2,620
	04/26/16	0.37	372	301	<0.1	6.03	1,270	2,590
	06/14/16	0.316	347	288	<0.1	6.23	1,240	3,000
	08/10/16	0.318	791	293	<0.1	6.25	1,300	2,860
	10/05/16	0.347	383	282	0.123 J	5.94	1,130	2,940
	12/21/16	0.337	339	306	<0.1	--[3]	1,110	2,610
AXMW-1	11/03/15	0.465	418	396	<0.1	7.09	2,110	3,920
	12/17/15	0.517	400	303	<0.1	5.57	2,000	3,420
	02/08/16	0.516	399	263	0.188 J	5.49	2,260	3,450
	04/25/16	0.499	447	372	<0.1	5.55	2,440	3,970
	06/15/16	0.549	472	353	<0.1	5.96	2,280	5,150
	08/09/16	0.624 J	514	353	<0.1	5.60	2,290	4,350
	10/05/16	0.497	465	325	<0.1	5.49	2,050	4,140
	12/22/16	0.553	443	394	<0.1	--[3]	2,120	4,220
AXMW-2	10/29/15	0.622	113	<0.002	0.261 J	6.75	977	2,290
	12/17/15	1.31	422	155	0.357 J	6.53	1,450	2,820
	02/08/16	2.17	549	192	1.09	6.01	2,200	3,800
	04/26/16	2.32	548	210	0.771	5.81	2,130	3,460
	06/15/16	2.33	570	199	<0.1	5.98	1,970	3,780
	08/09/16	1.49	479	177	0.299 J	6.00	1,840	3,310
	10/06/16	1.84	541	200	0.882	5.73	1,840	2,950
	12/22/16	1.96	503	210	<0.1	--[3]	1,840	3,630
Equipment Blank								
EB	04/25/16	0.0308	0.207 J	<0.3	<0.1	--	<1	<10
	06/14/16	0.027 J	0.159 J	<0.3	<0.1	--	<1	<10
	08/09/16	0.0359	46.1	2.87	<0.1	--	18.3	<10
	10/05/16	0.0432	3.53	22.2	<0.1	--	5.73	<10
	12/21/16	0.0257 J	0.226 J	<0.3	<0.1	--	<1	<10

Notes:

1. Abbreviations: mg/L - milligrams per liter; TDS - total dissolved solids; s.u. - standard units.
2. J - concentration is below method quantitation limit; result is an estimate.
3. --[3]: pH meter malfunctioned in field.

TABLE 4
APPENDIX IV BACKGROUND GROUNDWATER ANALYTICAL DATA
SANDOW AX LANDFILL

Sample Location	Date Sampled	Sb (mg/L)	As (mg/L)	Ba (mg/L)	Be (mg/L)	Cd (mg/L)	Cr (mg/L)	Co (mg/L)	Fl (mg/L)	Pb (mg/L)	Li (mg/L)	Hg (mg/L)	Mo (mg/L)	Se (mg/L)	Th (mg/L)	Ra 226 (pCi/L)	Ra 228 (pCi/L)	Ra 226/228 Combined^ (pCi/L)
AX-22R	10/29/15	<0.0008	<0.002	0.12	<0.0003	<0.0003	<0.002	<0.003	0.158 J	<0.0003	0.0502	<0.00008	<0.002	<0.002	<0.0005	1.12	<1.47	2.59
	12/17/15	<0.0008	<0.002	0.116	<0.0003	<0.0003	<0.002	<0.003	0.224 J	<0.0003	0.0521	<0.00008	<0.002	<0.002	<0.0005	1.15	2.13	3.28
	02/09/16	<0.0008	<0.002	0.102	<0.0003	<0.0003	0.0108	<0.003	0.139	<0.0003	0.0526	<0.00008	<0.002	<0.002	<0.0005	1.160	<1.67	2.83
	04/25/16	<0.0008	<0.002	0.107	<0.0003	<0.0003	0.00212 J	<0.003	<0.1	<0.0003	0.0536	<0.00008	<0.002	<0.002	<0.0005	0.724	<1.02	1.74
	06/14/16	<0.0008	<0.002	0.0983	<0.0003	<0.0003	0.00486 J	<0.003	<0.1	<0.0003	0.0525	<0.00008	<0.002	<0.002	<0.0005	0.263	<0.821	1.08
	08/09/16	<0.0008	<0.002	0.108	<0.0003	<0.0003	<0.002	<0.003	<0.1	<0.0003	0.0505	<0.00008	<0.002	<0.002	<0.0005	0.642	<0.59	1.23
	10/05/16	<0.0005	<0.002	0.101	<0.0003	<0.0003	<0.002	<0.003	0.237 J	<0.0003	0.0496	<0.00008	<0.002	<0.002	<0.0005	0.532	<0.63	1.16
	12/21/16	<0.0008	<0.002	0.11	<0.0003	<0.0003	<0.002	<0.003	<0.1	<0.0003	0.0553	<0.00008	<0.002	<0.002	<0.0005	0.308	1.01	1.32
AX-23	10/29/15	<0.0008	<0.002	0.273	<0.0003	<0.0003	<0.002	0.0106	0.211 J	<0.0003	<0.005	<0.00008	<0.002	<0.002	<0.0005	1.37	1.87	3.24
	12/17/15	<0.0008	<0.002	0.0407	<0.0003	<0.0003	<0.002	<0.003	<0.1	<0.0003	<0.005	<0.00008	<0.002	<0.002	<0.0005	0.912	<1.82	2.73
	02/08/16	<0.0008	0.00984	0.119	<0.0003	<0.0003	<0.002	0.00518	0.273 J	<0.0003	0.0059 J	<0.00008	<0.002	<0.002	<0.0005	1.49	<1.90	3.39
	04/26/16	<0.0008	0.00919	0.114	<0.0003	<0.0003	<0.002	<0.003	0.186 J	<0.0003	0.00618 J	<0.00008	<0.002	<0.002	<0.0005	<0.36	<1.29	1.65
	06/15/16	<0.0008	0.00887	0.0954	<0.0003	<0.0003	<0.002	<0.003	<0.1	<0.0003	0.0062 J	<0.00008	<0.002	<0.002	<0.0005	0.289	<0.957	1.25
	08/09/16	<0.0008	<0.002	0.179	<0.0003	<0.0003	<0.002	<0.003	<0.1	<0.0003	<0.005	<0.00008	<0.002	<0.002	<0.0005	0.682	<0.547	1.23
	10/05/16	<0.0005	0.00879	0.074	<0.0003	<0.0003	<0.002	0.0032 J	0.179 J	<0.0003	0.0071 J	<0.00008	<0.002	<0.002	<0.0005	1.00	1.07	2.07
	12/21/16	<0.0008	0.00889	0.0727	<0.0003	<0.0003	<0.002	<0.003	<0.1	<0.0003	0.0091 J	<0.00008	<0.002	<0.002	<0.0005	0.462	<0.749	1.21
AX-24	10/29/15	<0.00008	0.00206 J	0.231	<0.0003	<0.0003	0.00476 J	0.0269	0.148 J	0.000804 J	0.0577	<0.00008	<0.002	<0.002	<0.0005	1.29	2.73	4.02
	12/18/15	<0.0008	0.00538	0.068	<0.0003	<0.0003	0.0093	0.0266	0.149 J	0.00146	0.0681	<0.00008	<0.002	<0.002	<0.0005	1.67	2.65	4.32
	02/09/16	<0.0008	0.00333	0.065	<0.0003	<0.0003	0.00505	0.00925	0.207	0.0011	0.0795	<0.00008	<0.002	<0.002	<0.0005	0.648	<2.00	2.65
	04/25/16	<0.0008	0.00403 J	0.0473	<0.0003	<0.0003	0.00475 J	0.00544	<0.1	0.00062 J	0.0795	<0.00008	<0.002	<0.002	<0.0005	0.636	2.37	3.01
	06/14/16	<0.0008	0.00434 J	0.0354	<0.0003	<0.0003	0.00457 J	0.0049 J	<0.1	<0.0003	0.0841	<0.00008	<0.002	<0.002	<0.0005	0.383	1.58	1.96
	08/09/16	<0.0008	0.00456 J	0.034	<0.0003	<0.0003	0.00502	0.00528	<0.1	0.000522 J	0.0749	<0.00008	<0.002	<0.002	<0.0005	0.457	<0.494	0.95
	10/05/16	<0.0005	0.00423 J	0.0294	<0.0003	<0.0003	0.00591	0.00638	0.106 J	<0.0003	0.0709	<0.00008	<0.002	<0.002	<0.0005	0.643	2.19	2.83
	12/21/16	<0.0008	0.00531	0.0326	<0.0003	<0.0003	0.00471 J	0.00659	<0.1	<0.0003	0.0747	<0.00008	<0.002	<0.002	<0.0005	0.286	1.86	2.15
AX-25	10/29/15	<0.0008	<0.002	0.204	<0.0003	<0.0003	<0.002	0.00988	0.28 J	0.000902 J	0.0218	<0.00008	<0.002	<0.002	<0.0005	0.537	4.28	4.82
	12/18/15	0.000916 J	<0.002	0.184	<0.0003	<0.0003	<0.002	<0.003	0.212 J	<0.0003	0.0237	<0.00008	<0.002	<0.002	<0.0005	0.306	1.55	1.86
	02/09/16	<0.0008	0.0042	0.119	<0.0003	<0.0003	0.0376	0.0232	0.342	0.000662	0.0548	<0.00008	<0.002	<0.002	<0.0005	2.04	1.60	3.64
	04/25/16	<0.0008	0.00372 J	0.14	<0.0003	<0.0003	0.00395 J	0.0244	0.25 J	0.000421 J	0.0472	<0.00008	<0.002	<0.002	<0.0005	0.617	<0.89	1.51
	06/14/16	<0.0008	0.00452 J	0.0999	<0.0003	<0.0003	0.0736	0.0247	0.207 J	<0.0003	0.0406	<0.00008	0.00285 J	<0.002	<0.0005	0.283	0.999	1.28
	08/10/16	<0.0008	0.00445 J	0.0808	<0.0003	<0.0003	0.0021 J	0.0311	0.199 J	<0.0003	0.0274	<0.00008	<0.002	<0.002	<0.0005	0.371	<0.572	0.94
	10/05/16	<0.0005	0.00414 J	0.0777	<0.0003	<0.0003	0.00248 J	0.0304	0.292 J	<0.0003	0.0266	<0.00008	<0.002	<0.002	<0.0005	0.632	1.00	1.63
	12/21/16	<0.0008	0.0047 J	0.074	<0.0003	<0.0003	0.00498 J	0.0342	<0.1	<0.0003	0.0313	<0.00008	<0.002	<0.002	<0.0005	0.440	2.08	2.52
AX-26	11/03/15	<0.0008	0.00212 J	0.136	<0.0003	<0.0003	0.0056	0.0343	<0.1	0.00116	0.546	<0.00008	<0.002	<0.002	<0.0005	1.82	<1.77	3.59
	12/17/15	<0.0008	0.00348 J	0.0964	<0.0003	<0.0003	0.0065	0.0419	0.304 J	0.000823 J	0.625	<0.00008	<0.002	<0.002	<0.0005	1.96	2.93	4.89
	02/08/16	<0.0008	0.0038 J	0.0676	<0.0003	<0.0003	0.0055	0.0276	0.119 J	0.00106	0.474	<0.00008	<0.002	<0.002	<0.0005	1.48	2.99	4.47
	04/25/16	<0.0008	0.00316 J	0.0495	<0.0003	<0.0003	0.00604	0.0253	<0.1	<0.0003	0.473	<0.00008	<0.002	<0.002	<0.0005	0.533	<1.18	1.71
	06/14/16	<0.0008	0.00252 J	0.0442	<0.0003	<0.0003	0.0232	0.0205	<0.1	0.000957 J	0.551	<0.00008	<0.002	<0.002	<0.0005	0.545	1.49	2.04
	08/10/16	<0.0008	0.00323 J	0.0442	<0.0003	<0.0003	0.0099	0.0233	<0.1	<0.0003	0.443	<0.00008	<0.002	<0.002	<0.0005	0.707	<1.14	1.85
	10/06/16	<0.0005	0.0023 J	0.0367	<0.0003	<0.0003	0.00267 J	0.0202	<0.1	<0.0003	0.385	<0.00008	<0.002	<0.002	<0.0005	0.454	2.77	3.22
	12/22/16	<0.0008	0.00205 J	0.0394	<0.0003	<0.0003	0.0179	0.0226	<0.1	<0.0003	0.526	<0.00008	<0.002	<0.002	<0.0005	0.534	<1.05	1.58
AX-27	11/03/15	<0.0008	<0.002	0.488	<0.0003	<0.0003	0.00476 J	0.00906	<0.1	0.00393	0.0252	<0.00008	<0.002	<0.002	<0.0005	1.06	2.01	3.07
	12/17/15	<0.0008	0.00422 J	0.225	<0.0003	<0.0003	<0.002	0.0208	<0.1	<0.0003	0.0813	<0.00008	<0.002	<0.002	<0.0005	1.360	<1.89	3.25
	02/08/16	<0.0008	0.00413 J	0.173	<0.0003	<0.0003	0.00431 J	0.0245	0.185 J	0.00112	0.0841	<0.00008	<0.002	<0.002	<0.0005	1.69	3.09	4.78
	04/26/16	<0.0008	0.00441 J	0.165	<0.0003	<0.0003	0.0285	0.021	<0.1	0.000542 J	0.0719	<0.00008	<0.002	<0.002	<0.0005	0.625	3.18	3.81
	06/14/16	<0.0008	0.00299 J	0.116	<0.0003	<0.0003	0.0121	0.023	<0.1	<0.0003	0.103	<0.00008	<0.002	<0.002	<0.0005	0.703	2.09	2.79
	08/09/16	<0.0008	0.00309 J	0.112	<0.0003	<0.0003	<0.002	0.0208	<0.1	<0.0003	0.088	<0.00008	<0.002	<0.002	<0.0005	0.592	1.79	2.38
	10/06/16	<0.0005	0.0032 J	0.108	<0.0003	<0.0003	<0.002	0.0197	<0.1	<0.0003	0.0828	<0.00008	<0.002	<0.002	<0.0005	0.889	1.29	2.18
	12/22/16	<0.0008	0.0027 J	0.0969	<0.0003	<0.0003	0.00698	0.0235	<0.1	<0.0003	0.102	<0.00008	<0.002	<0.002	<0.0005	0.414	1.49	1.90

TABLE 4
APPENDIX IV BACKGROUND GROUNDWATER ANALYTICAL DATA
SANDOW AX LANDFILL

Sample Location	Date Sampled	Sb (mg/L)	As (mg/L)	Ba (mg/L)	Be (mg/L)	Cd (mg/L)	Cr (mg/L)	Co (mg/L)	Fl (mg/L)	Pb (mg/L)	Li (mg/L)	Hg (mg/L)	Mo (mg/L)	Se (mg/L)	Th (mg/L)	Ra 226 (pCi/L)	Ra 228 (pCi/L)	Ra 226/228 Combined^ (pCi/L)
AX-28	11/03/15	<0.0008	<0.002	0.16	<0.0003	0.000871 J	0.00326 J	0.0305	<0.1	0.00251	0.202	<0.00008	<0.002	<0.002	<0.0005	1.44	2.51	3.95
	12/18/15	<0.0008	<0.002	0.0476	<0.0003	<0.0003	0.00511	0.021	0.106 J	0.000401 J	0.254	<0.00008	<0.002	<0.002	<0.0005	1.02	<1.62	2.64
	02/08/16	<0.0008	<0.002	0.0555	<0.0003	<0.0003	0.00692	0.0211	0.272 J	0.0021	0.252	<0.00008	<0.002	<0.002	<0.0005	1.840	1.89	3.73
	04/25/16	<0.0008	<0.002	0.034	<0.0003	<0.0003	0.00568	0.0232	<0.1	<0.0003	0.245	<0.0004	<0.002	<0.002	<0.0005	0.747	<1.42	2.17
	06/15/16	<0.0008	<0.002	0.0305	<0.0003	<0.0003	0.057	0.0239	<0.1	<0.0003	0.268	<0.00008	0.00236 J	<0.002	<0.0005	<0.124	<0.761	0.885
	08/09/16	<0.0008	<0.002	0.0342	<0.0003	<0.0003	0.00266 J	0.0241	<0.1	0.000867 J	0.245	<0.00008	<0.002	<0.002	<0.0005	0.286	<0.43	0.72
	10/06/16	<0.0005	<0.002	0.0342	<0.0003	<0.0003	1.24	0.0322	<0.1	0.000682 J	0.241	<0.00008	0.0258	<0.002	<0.0005	0.247	1.38	1.63
	11/03/16	--	--	--	--	--	<0.002	--	--	--	--	--	--	--	--	--	--	--
	12/21/16	<0.0008	<0.002	0.0383	<0.0003	<0.0003	0.147	0.0266	<0.1	0.000581 J	0.271	<0.00008	0.00466 J	<0.002	<0.0005	0.338	0.928	1.27
AX-29	10/29/15	<0.0008	0.0041 J	0.179	<0.0003	0.000314 J	0.00878	0.0573	0.145 J	0.00442	0.0267	<0.00008	0.00491 J	0.00204 J	<0.0005	1.52	<1.29	2.81
	12/17/15	<0.0008	0.00556	0.0737	<0.0003	<0.0003	0.00216 J	0.0878	0.104 J	0.000593 J	0.0348	<0.00008	0.00333 J	<0.002	<0.0005	1.23	<2.58	3.81
	02/08/16	<0.0008	0.00413 J	0.118	0.000317 J	<0.0003	0.0187	0.124	0.227 J	0.00572	0.0469	<0.00008	<0.002	0.00382 J	<0.0005	1.74	<1.82	3.56
	04/26/16	<0.0008	<0.002	0.0388	<0.0003	0.00334	0.00488 J	0.116	<0.1	<0.0003	0.0427	<0.00008	<0.002	<0.002	<0.0005	1.30	<1.01	2.31
	06/14/16	<0.0008	<0.002	0.0366	<0.0003	0.00223	0.0301	0.115	<0.1	<0.0003	0.0449	<0.00008	<0.002	<0.002	<0.0005	0.719	1.84	2.56
	08/10/16	<0.0008	<0.002	0.0329	<0.0003	0.00308	0.0109	0.104	<0.1	<0.0003	0.0411	<0.00008	<0.002	<0.002	<0.0005	0.739	2.05	2.79
	10/05/16	<0.0005	<0.002	0.0328	<0.0003	0.00379	0.00378 J	0.0959	0.123 J	0.000308 J	0.0391	<0.00008	<0.002	<0.002	<0.0005	0.622	<0.163	0.79
	12/21/16	<0.0008	<0.002	0.0304	<0.0003	0.00475	0.00333 J	0.105	<0.1	<0.0003	0.0438	<0.00008	<0.002	<0.002	<0.0005	0.457	1.59	2.05
AXMW-1	11/03/15	<0.0008	0.0199	0.0193	0.000683 J	0.000777 J	0.00603	0.387	<0.1	0.00152	0.0307	<0.00008	<0.002	0.00291 J	<0.0005	1.63	2.84	4.47
	12/17/15	<0.0008	0.013	0.0155	0.000677 J	0.000764 J	<0.002	0.363	<0.1	0.000622 J	0.0467	<0.00008	<0.002	<0.002	<0.0005	<0.562	4.58	5.14
	02/08/16	0.00331	0.00301 J	0.036	0.000462 J	0.00101	0.0113	0.388	0.188 J	0.000724 J	0.107	<0.00008	<0.002	<0.002	<0.0005	2.520	<1.91	4.43
	04/25/16	<0.0008	0.0176	0.019	0.000394 J	<0.0003	0.00284 J	0.409	<0.1	0.000468 J	0.0249	<0.00008	<0.002	<0.002	<0.0005	1.22	2.28	3.50
	04/25/16 DUP	<0.0008	0.0181	0.0173	<0.0003	<0.0003	<0.002	0.414	<0.1	0.000589 J	0.0248	<0.00008	<0.002	<0.002	<0.0005	1.08	<1.19	2.27
	06/15/16	<0.0008	0.0159	0.0173	0.000404 J	<0.0003	<0.002	0.418	<0.1	<0.0003	0.0229	<0.00008	<0.002	<0.002	<0.0005	0.657	1.55	2.21 J
	06/15/16 DUP	<0.0008	0.0161	0.0168	0.000305 J	<0.0003	<0.002	0.421	<0.1	<0.0003	0.0247	<0.00008	<0.002	<0.002	<0.0005	3.53	1.30	4.83 J
	08/09/16	<0.0008	0.0173	0.0192	0.00039 J	<0.0003	0.0106	0.39	<0.1	0.000602 J	0.0246	<0.00008	<0.002	<0.002	<0.0005	1.06	1.78	2.84
	08/09/16 DUP	<0.0008	0.0175	0.0204	0.000377 J	<0.0003	0.0107	0.389	<0.1	0.000595 J	0.024	<0.00008	<0.002	<0.002	<0.0005	1.49	2.53	4.02
	10/05/16	<0.0005	0.0175	0.0166	0.000518 J	<0.0003	0.00781	0.372	<0.1	<0.0003	0.0256	<0.00008	<0.002	<0.002	<0.0005	0.713	1.86	2.57
	10/05/16 DUP	<0.0005	0.0172	0.0162	0.000419 J	<0.0003	0.00614	0.376	<0.1	<0.0003	0.0259	<0.00008	<0.002	<0.002	<0.0005	0.911	1.87	2.78
	12/22/16	<0.0008	0.0189	0.0184	0.000337 J	<0.0003	0.00968	0.412	<0.1	<0.0003	0.0253	<0.00008	<0.002	<0.002	<0.0005	1.02	1.29	2.31
	12/22/16 DUP	<0.0008	0.0192	0.0187	0.000406 J	<0.0003	0.00865	0.413	<0.1	<0.0003	0.0254	<0.00008	<0.002	<0.002	<0.0005	1.08	<0.846	1.93
AXMW-2	10/29/15	<0.0008	0.00823	0.0198	<0.0003	<0.0003	<0.002	0.0133	0.261 J	<0.0003	0.0973	<0.00008	<0.002	<0.002	<0.0005	<0.380	2.19	2.57
	12/17/15	<0.0008	<0.002	0.0217	<0.0003	<0.0003	<0.002	0.0243	0.357 J	<0.0003	0.1	<0.00008	<0.002	<0.002	<0.0005	1.27	2.21	3.48
	02/08/16	<0.0008	0.048	0.0417	0.000559 J	<0.0003	0.0436	0.0474	1.09	0.00282	0.0809	<0.00008	0.00276 J	<0.002	<0.0005	0.606	1.41	2.02
	04/26/16	<0.0008	0.0248	0.0252	<0.0003	<0.0003	0.00227 J	0.0493	0.771	0.000337 J	0.085	<0.00008	<0.002	<0.002	<0.0005	0.481	<1.67	2.15
	06/15/16	<0.0008	0.0249	0.0229	<0.0003	<0.0003	0.00257 J	0.0464	<0.1	<0.0003	0.0946	<0.00008	<0.002	<0.002	<0.0005	0.206	<0.771	0.98
	08/09/16	<0.0008	0.0197	0.0201	<0.0003	<0.0003	<0.002	0.0327	0.299 J	0.000356 J	0.0914	<0.00008	<0.002	<0.002	<0.0005	0.528	1.55	2.08
	10/06/16	<0.0005	0.023	0.022	<0.0003	<0.0003	<0.002	0.0403	0.882	<0.0003	0.0774	<0.00008	<0.002	<0.002	<0.0005	0.239	0.645	0.88
	12/22/16	<0.0008	0.0292	0.0263	<0.0003	<0.0003	<0.002	0.0441	<0.1	0.000489 J	0.0891	<0.00008	<0.002	<0.002	<0.0005	<0.225	0.852	1.08
Equipment Blank																		
EB	04/25/16	<0.0008	<0.002	<0.003	<0.0003	<0.0003	<0.002	<0.003	<0.1	<0.0003	<0.005	<0.00008	<0.002	<0.002	<0.0005	<0.19	<1.16	1.35
	06/14/16	<0.0008	<0.002	<0.003	<0.0003	<0.0003	<0.002	<0.003	<0.1	<0.0003	<0.005	<0.00008	<0.002	<0.002	<0.0005	<0.209	<0.818	1.03
	08/09/16	<0.0008	<0.002	0.0222	<0.0003	<0.0003	<0.002	<0.003	<0.1	<0.0003	<0.005	<0.00008	<0.002	<0.002	<0.0005	<0.367	0.648	1.02
	10/05/16	<0.0005	<0.002	0.0475	<0.0003	<0.0003	<0.002	<0.003	<0.1	<0.0003	<0.005	<0.00008	<0.002	<0.002	<0.0005	0.461	0.770	1.23
	12/21/16	<0.0008	<0.002	<0.003	<0.0003	<0.0003	<0.002	<0.003	<0.1	<0.0003	<0.005	<0.00008	<0.002	<0.002	<0.0005	<0.179	<0.556	0.74

Notes:
1. Abbreviations; mg/L - milligrams per liter; pCi/L - picocuries per liter.
2. ^ - Sum of Ra 226 and Ra 228 concentrations. Non-detect isotope results were assigned a value equal to the minimum detectable concentration.
3. J - concentration is below method quantitation limit; result is an estimate.

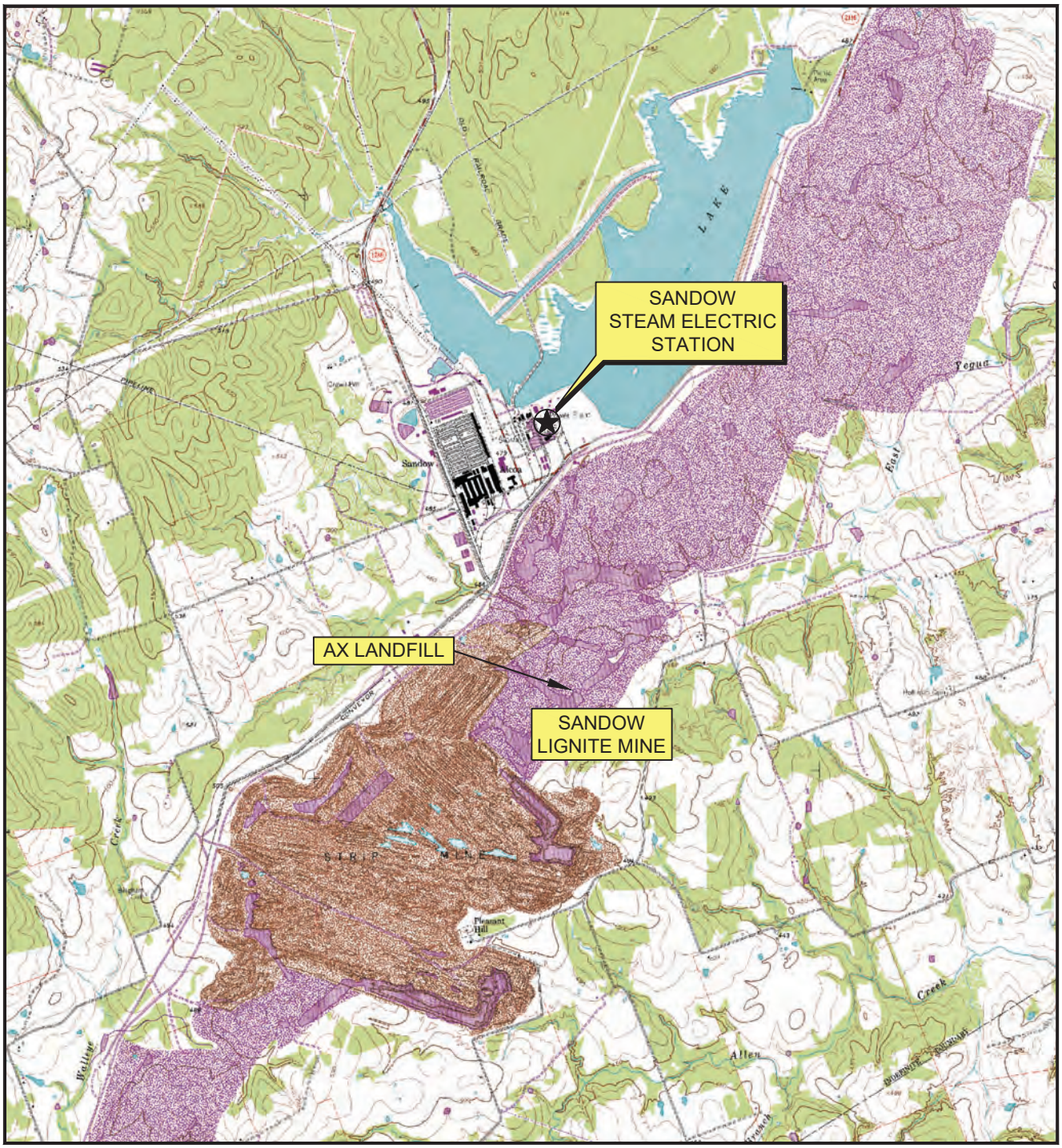
TABLE 5
APPENDIX III DETECTION MONITORING GROUNDWATER ANALYTICAL DATA
SANDOW AX LANDFILL

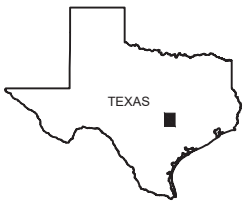
Sample Location	Date Sampled	B (mg/L)	Ca (mg/L)	Cl (mg/L)	Fl (mg/L)	pH (s.u.)	SO_4 (mg/L)	TDS (mg/L)
AX-23	10/02/17	0.314	316	184	<0.1	6.43	631	1,620
AX-24	10/02/17	0.129	252	307	<0.1	6.12	632	1,810
AX-25	10/03/17	0.205	325	586	<0.1	6.37	504	2,400
AX-26	10/02/17	0.352	666	11,000	<0.1	6.38	945	3,740
AX-27	10/02/17	0.206	462	652	<0.1	6.19	569	2,490
AX-28	10/02/17	0.207	664	384	<0.1	6.25	1,670	3,350
AX-29	10/03/17	0.316	392	276	<0.1	6.20	1,110	2,480
AXMW-1	10/03/17	0.463	477	348	<0.1	5.75	1,990	3,620
AXMW-2	10/03/17	2.14	644	207	<0.1	5.93	1,990	3,640

Notes:

1. Abbreviations: mg/L - milligrams per liter; TDS - total dissolved solids; s.u. - standard units.
2. J - concentration is below method quantitation limit; result is an estimate.

Figures





QUADRANGLE LOCATION

N

Scale in Feet

0 2000 4000

SOURCE:
Base map from www.tnris.gov, Alcoa Lake, TX 7.5 min. USGS quadrangle dated 1963, revised 1988.

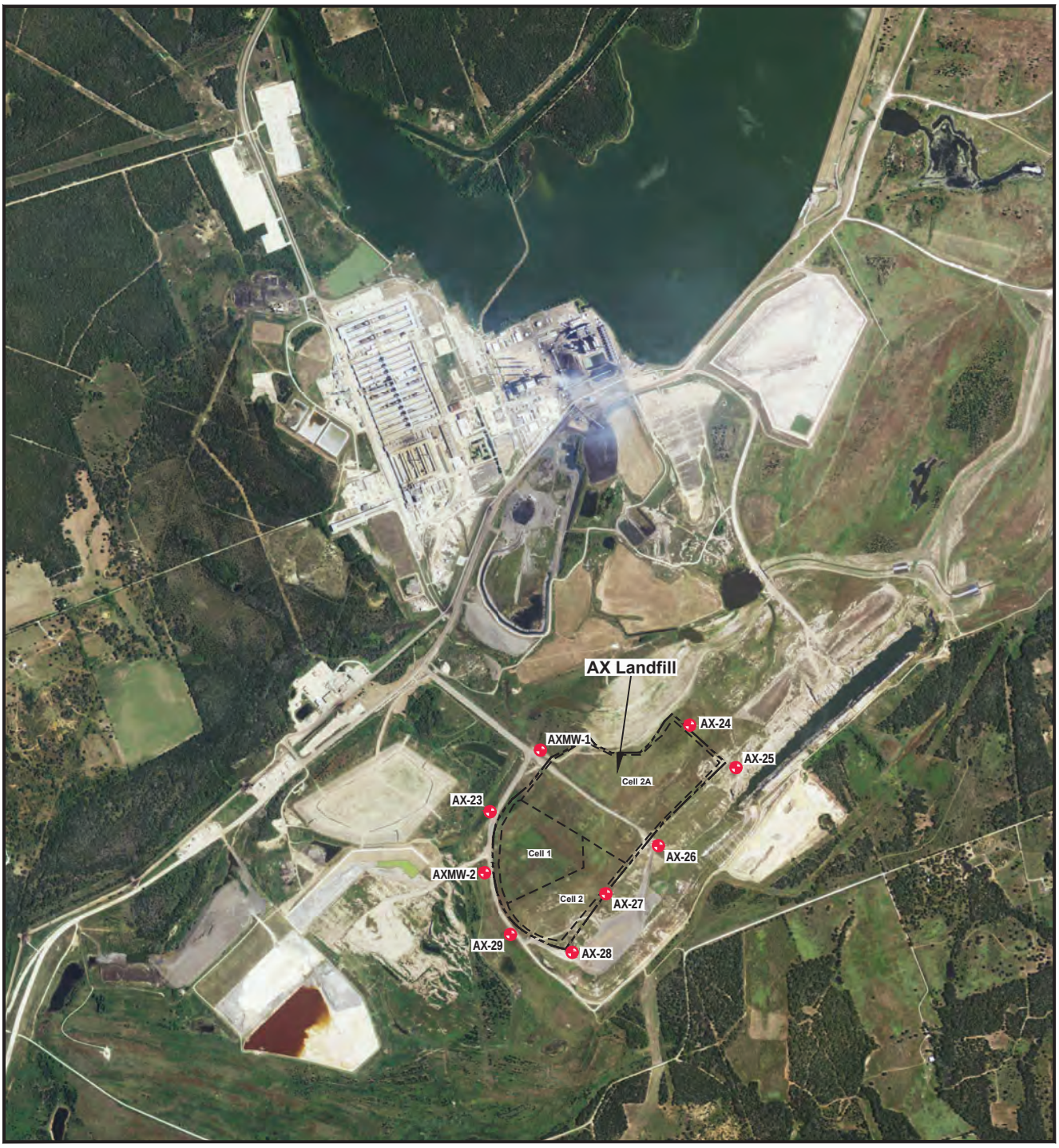
SANDOW STEAM ELECTRIC STATION
ROCKDALE, TEXAS

Figure 1

SITE LOCATION MAP

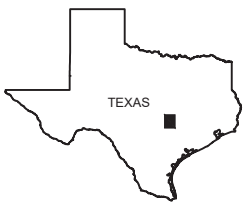
PROJECT: 5164E	BY: AJD	REVISIONS
DATE: MAR., 2017	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS

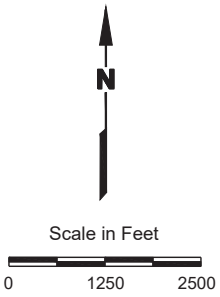


EXPLANATION

CCR Monitoring Well Location



PHOTOGRAPH LOCATION



SOURCE:
Imagery from www.tnris.gov, Alcoa Lake, aerial photographs, 2012.

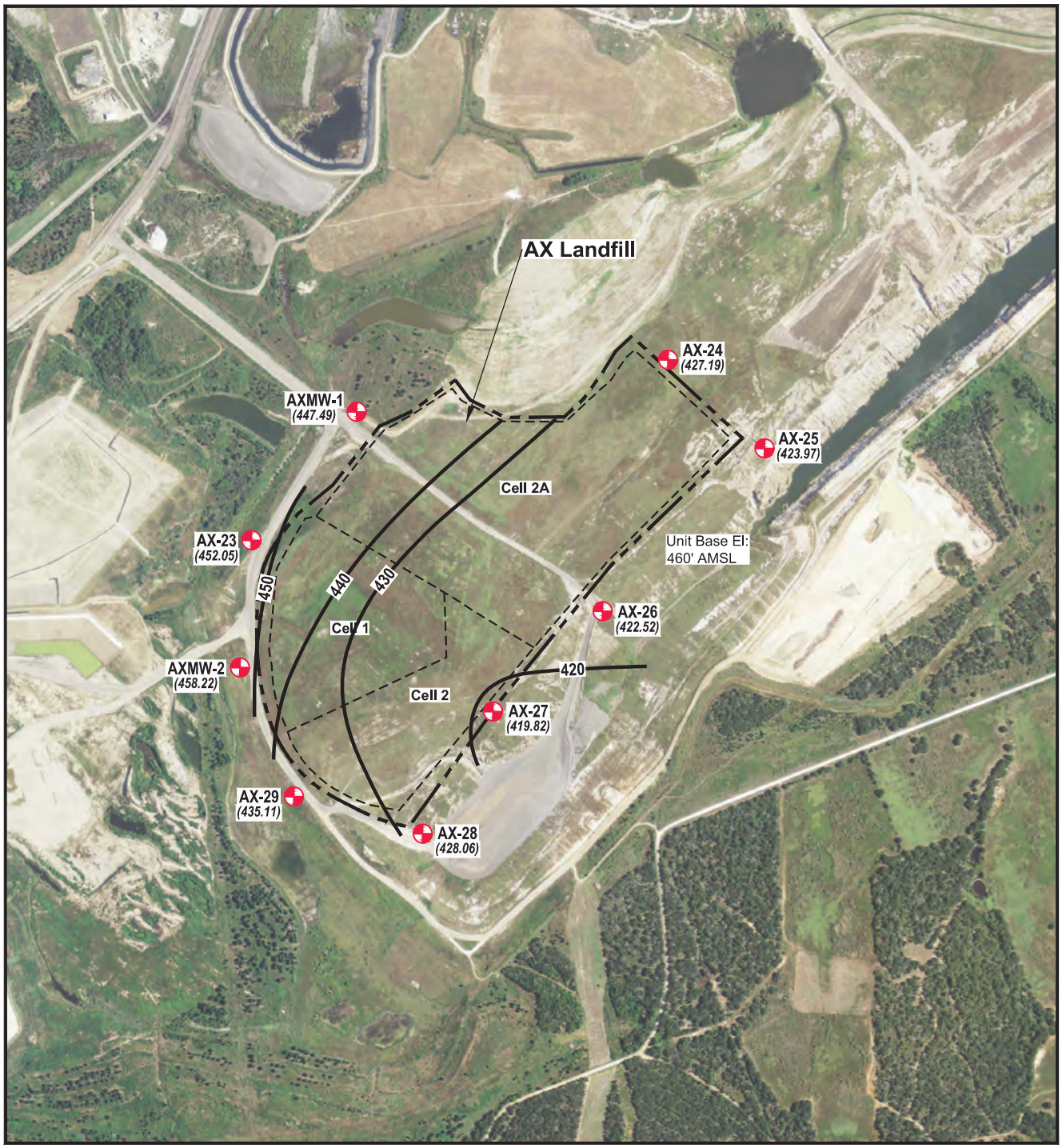
SANDOW STEAM ELECTRIC STATION
AX LANDFILL

Figure 2

SITE PLAN

PROJECT: 5164E	BY: AJD	REVISIONS
DATE: SEPT., 2017	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS



EXPLANATION

- CCR Monitoring Well
- *(414.49)* Groundwater Potentiometric Surface (ft. MSL)
- 400 Groundwater Potentiometric Surface Contour (C.I. = 10 ft.)

N

Scale in Feet

0 600 1200

SOURCE:
Imagery from www.tnris.gov, Alcoa Lake, aerial photographs, 2012.

SANDOW STEAM ELECTRIC STATION
ROCKDALE, TEXAS

Figure 3

AX LANDFILL GROUNDWATER POTENTIOMETRIC SURFACE MAP OCTOBER 2-3, 2017

PROJECT: 5347E	BY: AJD	REVISIONS
DATE: JAN., 2018	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS

Appendix A

Laboratory Analytical Reports – Background Data

December 07, 2015

Will Vienne
Pastor, Behling & Wheeler
2201 Double Creek Dr #4004
Round Rock, Texas 78664
TEL: (512) 671-3434
FAX (512) 671-3446

Order No.: 1510306

RE: Sandow AX

Dear Will Vienne:

DHL Analytical, Inc. received 6 sample(s) on 10/30/2015 for the analyses presented in the following report.

There were no problems with the analyses and all data met requirements of NELAC except where noted in the Case Narrative. All non-NELAC methods will be identified accordingly in the case narrative and all estimated uncertainties of test results are within method or EPA specifications.

If you have any questions regarding these tests results, please feel free to call. Thank you for using DHL Analytical.

Sincerely,

John DuPont
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-15-15

Table of Contents

DHL ANALYTICAL
2300 Double Creek Dr. ■ Round Rock, TX 78664
Phone (512) 388-8222 ■ FAX (512) 388-8229
Web: www.dhlanalytical.com
E-Mail: login@dhlanalytical.com

CH

CLIENT: PBW
ADDRESS: 2201 Double Creek Dr. Ste #4004
PHONE: (512) 671-3434 FAX/E-MAIL: will.vienne@pbwllc.com
DATA REPORTED TO: Will Vienne
ADDITIONAL REPORT COPIES TO:

DATE: 10/29/15
PO #: 5164-E DHL WORK OR
PROJECT LOCATION OR NAME: Sandow A
CLENT PROJECT #: 5164-E CO

Authorize 5% surcharge for TRRP Report? ☒ Yes ☐ No

S=SOIL W=WATER A=AIR L=LIQUID SE=SEDIMENT
P=PAINT SL=SLUDGE O=OTHER SO=SOLID

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	PRESERVATION: HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESERVED
AX-23	01	10/29/15	0945	W	P	4		X		X	
AXMW-2	02	10/29/15	1120	W	P	4		X		X	
AX-29	03	10/29/15	1205	W	P	4		X		X	
AX-22R	04	10/29/15	1440	W	P	4		X		X	
AX-25	05	10/29/15	1515	W	P	4		X		X	
AX-24	06	10/29/15	1550	W	P	4		X		X	

ANALYSES
BTEX ☐ MTBE ☐ [METHOD 8021]
TPH 1005 ☐ TPH 1006 ☐ HOLD 1006 ☐
GRO [METHOD 8015] ☐ DRO [METHOD 8105] ☐
VOC 8260 ☐ VOC 624 ☐ VOC 8260/5035 ☐
SVOC 8270 ☐ PAH 8270 ☐ HOLD PAH ☐ SVOC 625 ☐
8270 PEST ☐ 625 PEST/PCB ☐ 608 PCB ☐
8270 O-P PEST ☐ 8082 PCB ☐ 8270 PCB ☐
8321 HERB ☐ T PHOS, AMMONIA ☐
METALS 6020 ☐ METALS 200.8 ☐ DISS. METALS ☐
RCRA ☐ TX11 ☐
PH ☐ HEX CHROM ☐ ALKALINITY
CHLORIDE ☐ ANIONS
TCLP-SVOC ☐ VOC
TCLP-METALS ☐
RCI ☐

RELINQUISHED BY: (Signature) DATE/TIME 10-30-15/ 15:20 RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)

TURN AROUND TIME
RUSH ☐ CALL FIRST
1 DAY ☐ CALL FIRST
2 DAY ☐
NORMAL ☒
OTHER ☐ _____

LABORATORY USE
RECEIVING TEMP: _
CUSTODY SEALS:
CARRIER: ☐ LONE
☐ COURIER DELIVER
☐ HAND DELIVERED

☒ DHL DISPOSAL @ $5.00 each ☐ Return

ATTACHMENT 1
CCR ANALYTE SUMMARY

Appendix III Constituents	Appendix IV Constituents
Boron	Arsenic
Calcium	Barium
Chloride	Beryllium
Fluoride	Cadmium
pH	Chromium
Sulfate	Cobalt
Total Dissolved Solids	Fluoride
	Lead
	Lithium
	Mercury
	Molybdenum
	Selenium
	Thallium
	Radium 226 and 228 combined

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name Pastor, Behling & Wheeler

Date Received: 10/30/2015

Work Order Number 1510306

Received by MB

Checklist completed by: _____ 10/30/2015
Signature | Date

Reviewed by _____ 10/30/2015
Initials | Date

Carrier name Hand Delivered

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	3.1 °C
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH<2 acceptable upon receipt?	Yes ☑	No ☐	NA ☐ LOT # 8086
	Adjusted? NO		Checked by MB
Water - ph>9 (S) or ph>12 (CN) acceptable upon receipt?	Yes ☐	No ☐	NA ☑ LOT #
	Adjusted? _____		Checked by _____

Any No response must be detailed in the comments section below.

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding _____

Comments: _____

Corrective Action _____

DHL Analytical, Inc. **Date:** *07-Dec-15*

CLIENT: Pastor, Behling & Wheeler
Project: Sandow AX
Lab Order: 1510306

CASE NARRATIVE

Samples were analyzed using the methods outlined in the following references:

Method SW6020A - Metals Analysis
Method SW7470A - Mercury Analysis
Method E300 - Anions Analysis
Method M4500-H+ B - pH of a Water Analysis
Method M2540C - TDS Analysis

LOG IN

The samples were received and log-in performed on 10/30/15. A total of 6 samples were received. The samples arrived in good condition and were properly packaged.

METALS ANALYSIS

For Metals analysis performed on 11/9/15 Boron was detected below the reporting limit in the method blank (MB-72211). All samples may be biased high for this analyte. No further corrective actions were taken.

For Metals analysis performed on 11/9/15 the matrix spike and matrix spike duplicate recoveries were out of control limits for Calcium. These are flagged accordingly in the QC summary report. The sample selected for the matrix spike and matrix spike duplicate was from this work order. The LCS was within control limits for this analyte. No further corrective actions were taken.

For Metals analysis performed on 11/9/15 LCVL2-151109 and CCV3-151105 were slightly above control limits for Calcium or Antimony. These are flagged accordingly. The associated CCV2-151109 and LCVL3-151105 were within control limits for these analytes. No further corrective actions were taken.

MERCURY ANALYSIS

For Mercury analysis the matrix spike and matrix spike duplicate was re-prepped and re-analyzed on 11/10/15. This was due to a prep error. This exceeded the 24 hour prep window.

DHL Analytical, Inc.

Date: *07-Dec-15*

CLIENT: Pastor, Behling & Wheeler
Project: Sandow AX
Lab Order: 1510306

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
1510306-01	AX-23		10/29/15 09:45 AM	10/30/2015
1510306-02	AXMW-2		10/29/15 11:20 AM	10/30/2015
1510306-03	AX-29		10/29/15 12:05 PM	10/30/2015
1510306-04	AX-22R		10/29/15 02:40 PM	10/30/2015
1510306-05	AX-25		10/29/15 03:15 PM	10/30/2015
1510306-06	AX-24		10/29/15 03:50 PM	10/30/2015

& Wheeler

PREP DATES REPORT

Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
10/29/15 09:45 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/06/15 09:55 AM	72211
10/29/15 09:45 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/06/15 09:55 AM	72211
10/29/15 09:45 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	11/05/15 06:10 AM	72178
10/29/15 09:45 AM	Aqueous	E300	Anion Preparation	11/05/15 09:55 AM	72188
10/29/15 09:45 AM	Aqueous	E300	Anion Preparation	11/05/15 09:55 AM	72188
10/29/15 09:45 AM	Aqueous	M4500-H+ B	pH Preparation	10/30/15 03:59 PM	72109
10/29/15 09:45 AM	Aqueous	M2540C	TDS Preparation	11/03/15 02:01 PM	72150
10/29/15 11:20 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/06/15 09:55 AM	72211
10/29/15 11:20 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/06/15 09:55 AM	72211
10/29/15 11:20 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	11/05/15 06:10 AM	72178
10/29/15 11:20 AM	Aqueous	E300	Anion Preparation	11/05/15 09:55 AM	72188
10/29/15 11:20 AM	Aqueous	E300	Anion Preparation	11/05/15 09:55 AM	72188
10/29/15 11:20 AM	Aqueous	M4500-H+ B	pH Preparation	10/30/15 03:59 PM	72109
10/29/15 11:20 AM	Aqueous	M2540C	TDS Preparation	11/03/15 02:01 PM	72150
10/29/15 12:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/06/15 09:55 AM	72211
10/29/15 12:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/06/15 09:55 AM	72211
10/29/15 12:05 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	11/05/15 06:10 AM	72178
10/29/15 12:05 PM	Aqueous	E300	Anion Preparation	11/05/15 09:55 AM	72188
10/29/15 12:05 PM	Aqueous	E300	Anion Preparation	11/05/15 09:55 AM	72188
10/29/15 12:05 PM	Aqueous	M4500-H+ B	pH Preparation	10/30/15 03:59 PM	72109
10/29/15 12:05 PM	Aqueous	M2540C	TDS Preparation	11/03/15 02:01 PM	72150
10/29/15 02:40 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/06/15 09:55 AM	72211
10/29/15 02:40 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/06/15 09:55 AM	72211
10/29/15 02:40 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	11/05/15 06:10 AM	72178
10/29/15 02:40 PM	Aqueous	E300	Anion Preparation	11/05/15 09:55 AM	72188
10/29/15 02:40 PM	Aqueous	E300	Anion Preparation	11/05/15 09:55 AM	72188
10/29/15 02:40 PM	Aqueous	M4500-H+ B	pH Preparation	10/30/15 03:59 PM	72109
10/29/15 02:40 PM	Aqueous	M2540C	TDS Preparation	11/03/15 02:01 PM	72150

& Wheeler

PREP DATES REPORT

Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
10/29/15 03:15 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/06/15 09:55 AM	72211
10/29/15 03:15 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/06/15 09:55 AM	72211
10/29/15 03:15 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	11/05/15 06:10 AM	72178
10/29/15 03:15 PM	Aqueous	E300	Anion Preparation	11/05/15 09:55 AM	72188
10/29/15 03:15 PM	Aqueous	E300	Anion Preparation	11/05/15 09:55 AM	72188
10/29/15 03:15 PM	Aqueous	M4500-H+ B	pH Preparation	10/30/15 03:59 PM	72109
10/29/15 03:15 PM	Aqueous	M2540C	TDS Preparation	11/03/15 02:01 PM	72150
10/29/15 03:50 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/06/15 09:55 AM	72211
10/29/15 03:50 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/06/15 09:55 AM	72211
10/29/15 03:50 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/06/15 09:55 AM	72211
10/29/15 03:50 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	11/05/15 06:10 AM	72178
10/29/15 03:50 PM	Aqueous	E300	Anion Preparation	11/05/15 09:55 AM	72188
10/29/15 03:50 PM	Aqueous	E300	Anion Preparation	11/05/15 09:55 AM	72188
10/29/15 03:50 PM	Aqueous	M4500-H+ B	pH Preparation	10/30/15 03:59 PM	72109
10/29/15 03:50 PM	Aqueous	M2540C	TDS Preparation	11/03/15 02:01 PM	72150

& Wheeler

ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	SW7470A	Mercury Total: Aqueous	72178	1	11/09/15 12:28 PM	CETAC2_HG_151109B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72211	1	11/09/15 05:00 PM	ICP-MS3_151109A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72211	10	11/10/15 01:10 PM	ICP-MS4_151110B
Aqueous	E300	Anions by IC method - Water	72188	1	11/05/15 01:14 PM	IC3_151105A
Aqueous	E300	Anions by IC method - Water	72188	100	11/05/15 04:35 PM	IC3_151105A
Aqueous	M4500-H+ B	pH	72109	1	10/30/15 04:06 PM	TITRATOR_151030A
Aqueous	M2540C	Total Dissolved Solids	72150	1	11/04/15 07:20 AM	WC_151103B
Aqueous	SW7470A	Mercury Total: Aqueous	72178	1	11/09/15 12:40 PM	CETAC2_HG_151109B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72211	100	11/10/15 01:14 PM	ICP-MS4_151110B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72211	1	11/09/15 05:12 PM	ICP-MS3_151109A
Aqueous	E300	Anions by IC method - Water	72188	1	11/05/15 01:38 PM	IC3_151105A
Aqueous	E300	Anions by IC method - Water	72188	10	11/05/15 04:59 PM	IC3_151105A
Aqueous	M4500-H+ B	pH	72109	1	10/30/15 04:07 PM	TITRATOR_151030A
Aqueous	M2540C	Total Dissolved Solids	72150	1	11/04/15 07:20 AM	WC_151103B
Aqueous	SW7470A	Mercury Total: Aqueous	72178	1	11/09/15 12:42 PM	CETAC2_HG_151109B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72211	1	11/09/15 05:18 PM	ICP-MS3_151109A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72211	100	11/10/15 01:16 PM	ICP-MS4_151110B
Aqueous	E300	Anions by IC method - Water	72188	1	11/05/15 01:58 PM	IC3_151105A
Aqueous	E300	Anions by IC method - Water	72188	100	11/05/15 05:40 PM	IC3_151105A
Aqueous	M4500-H+ B	pH	72109	1	10/30/15 04:09 PM	TITRATOR_151030A
Aqueous	M2540C	Total Dissolved Solids	72150	1	11/04/15 07:20 AM	WC_151103B
Aqueous	SW7470A	Mercury Total: Aqueous	72178	1	11/09/15 12:44 PM	CETAC2_HG_151109B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72211	1	11/09/15 05:24 PM	ICP-MS3_151109A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72211	10	11/10/15 01:18 PM	ICP-MS4_151110B
Aqueous	E300	Anions by IC method - Water	72188	1	11/05/15 02:19 PM	IC3_151105A
Aqueous	E300	Anions by IC method - Water	72188	10	11/05/15 06:42 PM	IC3_151105A

& Wheeler

ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	M4500-H+ B	pH	72109	1	10/30/15 04:12 PM	TITRATOR_151030A
Aqueous	M2540C	Total Dissolved Solids	72150	1	11/04/15 07:20 AM	WC_151103B
Aqueous	SW7470A	Mercury Total: Aqueous	72178	1	11/09/15 12:46 PM	CETAC2_HG_151109 B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72211	1	11/09/15 05:30 PM	ICP-MS3_151109A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72211	50	11/10/15 01:20 PM	ICP-MS4_151110B
Aqueous	E300	Anions by IC method - Water	72188	1	11/05/15 02:39 PM	IC3_151105A
Aqueous	E300	Anions by IC method - Water	72188	10	11/05/15 07:02 PM	IC3_151105A
Aqueous	M4500-H+ B	pH	72109	1	10/30/15 04:14 PM	TITRATOR_151030A
Aqueous	M2540C	Total Dissolved Solids	72150	1	11/04/15 07:20 AM	WC_151103B
Aqueous	SW7470A	Mercury Total: Aqueous	72178	1	11/09/15 12:49 PM	CETAC2_HG_151109 B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72211	1	11/09/15 06:30 PM	ICP-MS3_151109A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72211	50	11/10/15 01:22 PM	ICP-MS4_151110B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72211	1	11/10/15 01:43 PM	ICP-MS4_151110B
Aqueous	E300	Anions by IC method - Water	72188	1	11/05/15 03:00 PM	IC3_151105A
Aqueous	E300	Anions by IC method - Water	72188	10	11/05/15 07:23 PM	IC3_151105A
Aqueous	M4500-H+ B	pH	72109	1	10/30/15 04:15 PM	TITRATOR_151030A
Aqueous	M2540C	Total Dissolved Solids	72150	1	11/04/15 07:20 AM	WC_151103B

DHL Analytical, Inc.

Date: *07-Dec-15*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-23
Project:	Sandow AX	**Lab ID:**	1510306-01
Project No:	5164-E	**Collection Date:**	10/29/15 09:45 AM
Lab Order:	1510306	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **ABO**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	11/09/15 12:28 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **KL**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	11/09/15 05:00 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	11/09/15 05:00 PM
Barium	0.273	0.00300	0.0100		mg/L	1	11/09/15 05:00 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	11/09/15 05:00 PM
Boron	0.112	0.0100	0.0300		mg/L	1	11/09/15 05:00 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	11/09/15 05:00 PM
Calcium	76.3	1.00	3.00		mg/L	10	11/10/15 01:10 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	11/09/15 05:00 PM
Cobalt	0.0106	0.00300	0.00500		mg/L	1	11/09/15 05:00 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	11/09/15 05:00 PM
Lithium	<0.00500	0.00500	0.0100		mg/L	1	11/09/15 05:00 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	11/09/15 05:00 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	11/09/15 05:00 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	11/09/15 05:00 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	268	30.0	100		mg/L	100	11/05/15 04:35 PM
Fluoride	0.211	0.100	0.400	J	mg/L	1	11/05/15 01:14 PM
Sulfate	426	100	300		mg/L	100	11/05/15 04:35 PM
PH		**M4500-H+ B**					Analyst: **LM**
pH	6.53	0	0		pH Units@14.4℃	1	10/30/15 04:06 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **BJT**
Total Dissolved Solids (Residue, Filterable)	1640	50.0	50.0		mg/L	1	11/04/15 07:20 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *07-Dec-15*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AXMW-2
Project:	Sandow AX	**Lab ID:**	1510306-02
Project No:	5164-E	**Collection Date:**	10/29/15 11:20 AM
Lab Order:	1510306	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **ABO**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	11/09/15 12:40 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **KL**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	11/09/15 05:12 PM
Arsenic	0.00823	0.00200	0.00500		mg/L	1	11/09/15 05:12 PM
Barium	0.0198	0.00300	0.0100		mg/L	1	11/09/15 05:12 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	11/09/15 05:12 PM
Boron	0.622	0.0100	0.0300		mg/L	1	11/09/15 05:12 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	11/09/15 05:12 PM
Calcium	304	10.0	30.0		mg/L	100	11/10/15 01:14 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	11/09/15 05:12 PM
Cobalt	0.0133	0.00300	0.00500		mg/L	1	11/09/15 05:12 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	11/09/15 05:12 PM
Lithium	0.0973	0.00500	0.0100		mg/L	1	11/09/15 05:12 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	11/09/15 05:12 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	11/09/15 05:12 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	11/09/15 05:12 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	113	3.00	10.0		mg/L	10	11/05/15 04:59 PM
Fluoride	0.261	0.100	0.400	J	mg/L	1	11/05/15 01:38 PM
Sulfate	977	10.0	30.0		mg/L	10	11/05/15 04:59 PM
PH		**M4500-H+ B**					Analyst: **LM**
pH	6.49	0	0		pH Units@14℃	1	10/30/15 04:07 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **BJT**
Total Dissolved Solids (Residue, Filterable)	2290	50.0	50.0		mg/L	1	11/04/15 07:20 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *07-Dec-15*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-29
Project:	Sandow AX	**Lab ID:**	1510306-03
Project No:	5164-E	**Collection Date:**	10/29/15 12:05 PM
Lab Order:	1510306	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **ABO**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	11/09/15 12:42 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **KL**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	11/09/15 05:18 PM
Arsenic	0.00410	0.00200	0.00500	J	mg/L	1	11/09/15 05:18 PM
Barium	0.179	0.00300	0.0100		mg/L	1	11/09/15 05:18 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	11/09/15 05:18 PM
Boron	0.251	0.0100	0.0300		mg/L	1	11/09/15 05:18 PM
Cadmium	0.000314	0.000300	0.00100	J	mg/L	1	11/09/15 05:18 PM
Calcium	283	10.0	30.0		mg/L	100	11/10/15 01:16 PM
Chromium	0.00878	0.00200	0.00500		mg/L	1	11/09/15 05:18 PM
Cobalt	0.0573	0.00300	0.00500		mg/L	1	11/09/15 05:18 PM
Lead	0.00442	0.000300	0.00100		mg/L	1	11/09/15 05:18 PM
Lithium	0.0267	0.00500	0.0100		mg/L	1	11/09/15 05:18 PM
Molybdenum	0.00491	0.00200	0.00500	J	mg/L	1	11/09/15 05:18 PM
Selenium	0.00204	0.00200	0.00500	J	mg/L	1	11/09/15 05:18 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	11/09/15 05:18 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	286	30.0	100		mg/L	100	11/05/15 05:40 PM
Fluoride	0.145	0.100	0.400	J	mg/L	1	11/05/15 01:58 PM
Sulfate	1200	100	300		mg/L	100	11/05/15 05:40 PM
PH		**M4500-H+ B**					Analyst: **LM**
pH	6.48	0	0		pH Units@13.8℃	1	10/30/15 04:09 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **BJT**
Total Dissolved Solids (Residue, Filterable)	2490	50.0	50.0		mg/L	1	11/04/15 07:20 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *07-Dec-15*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-22R
Project:	Sandow AX	**Lab ID:**	1510306-04
Project No:	5164-E	**Collection Date:**	10/29/15 02:40 PM
Lab Order:	1510306	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **ABO**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	11/09/15 12:44 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **KL**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	11/09/15 05:24 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	11/09/15 05:24 PM
Barium	0.120	0.00300	0.0100		mg/L	1	11/09/15 05:24 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	11/09/15 05:24 PM
Boron	0.0833	0.0100	0.0300		mg/L	1	11/09/15 05:24 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	11/09/15 05:24 PM
Calcium	84.1	1.00	3.00		mg/L	10	11/10/15 01:18 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	11/09/15 05:24 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	11/09/15 05:24 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	11/09/15 05:24 PM
Lithium	0.0502	0.00500	0.0100		mg/L	1	11/09/15 05:24 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	11/09/15 05:24 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	11/09/15 05:24 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	11/09/15 05:24 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	109	3.00	10.0		mg/L	10	11/05/15 06:42 PM
Fluoride	0.158	0.100	0.400	J	mg/L	1	11/05/15 02:19 PM
Sulfate	54.0	1.00	3.00		mg/L	1	11/05/15 02:19 PM
PH		**M4500-H+ B**					Analyst: **LM**
pH	7.39	0	0		pH Units@14.9℃	1	10/30/15 04:12 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **BJT**
Total Dissolved Solids (Residue, Filterable)	606	10.0	10.0		mg/L	1	11/04/15 07:20 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *07-Dec-15*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-25
Project:	Sandow AX	**Lab ID:**	1510306-05
Project No:	5164-E	**Collection Date:**	10/29/15 03:15 PM
Lab Order:	1510306	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **ABO**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	11/09/15 12:46 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **KL**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	11/09/15 05:30 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	11/09/15 05:30 PM
Barium	0.204	0.00300	0.0100		mg/L	1	11/09/15 05:30 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	11/09/15 05:30 PM
Boron	0.114	0.0100	0.0300		mg/L	1	11/09/15 05:30 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	11/09/15 05:30 PM
Calcium	108	5.00	15.0		mg/L	50	11/10/15 01:20 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	11/09/15 05:30 PM
Cobalt	0.00988	0.00300	0.00500		mg/L	1	11/09/15 05:30 PM
Lead	0.000902	0.000300	0.00100	J	mg/L	1	11/09/15 05:30 PM
Lithium	0.0218	0.00500	0.0100		mg/L	1	11/09/15 05:30 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	11/09/15 05:30 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	11/09/15 05:30 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	11/09/15 05:30 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	163	3.00	10.0		mg/L	10	11/05/15 07:02 PM
Fluoride	0.280	0.100	0.400	J	mg/L	1	11/05/15 02:39 PM
Sulfate	303	10.0	30.0		mg/L	10	11/05/15 07:02 PM
PH		**M4500-H+ B**					Analyst: **LM**
pH	6.94	0	0		pH Units@15.7℃	1	10/30/15 04:14 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **BJT**
Total Dissolved Solids (Residue, Filterable)	1050	10.0	10.0		mg/L	1	11/04/15 07:20 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *07-Dec-15*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-24
Project:	Sandow AX	**Lab ID:**	1510306-06
Project No:	5164-E	**Collection Date:**	10/29/15 03:50 PM
Lab Order:	1510306	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **ABO**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	11/09/15 12:49 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **KL**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	11/09/15 06:30 PM
Arsenic	0.00206	0.00200	0.00500	J	mg/L	1	11/09/15 06:30 PM
Barium	0.231	0.00300	0.0100		mg/L	1	11/09/15 06:30 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	11/10/15 01:43 PM
Boron	0.0617	0.0100	0.0300		mg/L	1	11/09/15 06:30 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	11/09/15 06:30 PM
Calcium	190	5.00	15.0		mg/L	50	11/10/15 01:22 PM
Chromium	0.00476	0.00200	0.00500	J	mg/L	1	11/09/15 06:30 PM
Cobalt	0.0269	0.00300	0.00500		mg/L	1	11/10/15 01:43 PM
Lead	0.000804	0.000300	0.00100	J	mg/L	1	11/09/15 06:30 PM
Lithium	0.0577	0.00500	0.0100		mg/L	1	11/09/15 06:30 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	11/09/15 06:30 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	11/09/15 06:30 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	11/10/15 01:43 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	150	3.00	10.0		mg/L	10	11/05/15 07:23 PM
Fluoride	0.148	0.100	0.400	J	mg/L	1	11/05/15 03:00 PM
Sulfate	695	10.0	30.0		mg/L	10	11/05/15 07:23 PM
PH		**M4500-H+ B**					Analyst: **LM**
pH	6.36	0	0		pH Units@16.9℃	1	10/30/15 04:15 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **BJT**
Total Dissolved Solids (Residue, Filterable)	1640	50.0	50.0		mg/L	1	11/04/15 07:20 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

CLIENT: Pastor, Behling & Wheeler
Work Order: 1510306
Project: Sandow AX

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_151109B

The QC data in batch 72178 applies to the following samples: 1510306-01A, 1510306-02A, 1510306-03A, 1510306-04A, 1510306-05A, 1510306-06A

Sample ID	**MB-72178**	Batch ID:	**72178**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**CETAC2_HG_151109B**	Analysis Date:	**11/9/2015 12:21:59 PM**	Prep Date:	**11/5/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	<0.0000800	0.000200								

Sample ID	**LCS-72178**	Batch ID:	**72178**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**CETAC2_HG_151109B**	Analysis Date:	**11/9/2015 12:24:15 PM**	Prep Date:	**11/5/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00196	0.000200	0.00200	0	98.0	85	115			

Sample ID	**LCSD-72178**	Batch ID:	**72178**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**CETAC2_HG_151109B**	Analysis Date:	**11/9/2015 12:26:31 PM**	Prep Date:	**11/5/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00211	0.000200	0.00200	0	106	85	115	7.37	15	

Sample ID	**1510306-01A SD**	Batch ID:	**72178**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**SD**	Run ID:	**CETAC2_HG_151109B**	Analysis Date:	**11/9/2015 12:31:04 PM**	Prep Date:	**11/5/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	<0.000400	0.00100	0	0				0	10	

Sample ID	**1510306-01A PDS**	Batch ID:	**72178**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**PDS**	Run ID:	**CETAC2_HG_151109B**	Analysis Date:	**11/9/2015 12:33:19 PM**	Prep Date:	**11/5/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00246	0.000200	0.00250	0	98.4	85	115			

Sample ID	**1510306-01A MS**	Batch ID:	**72178**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**CETAC2_HG_151109B**	Analysis Date:	**11/10/2015 4:29:45 PM**	Prep Date:	**11/5/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00207	0.000200	0.00200	0	104	80	120			

Sample ID	**1510306-01A MSD**	Batch ID:	**72178**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**CETAC2_HG_151109B**	Analysis Date:	**11/10/2015 4:32:01 PM**	Prep Date:	**11/5/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00207	0.000200	0.00200	0	104	80	120	0	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1510306
Project: Sandow AX

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_151109B

Sample ID	**ICV-151109**	Batch ID:	**R82564**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**CETAC2_HG_151109B**	Analysis Date:	**11/9/2015 10:48:31 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00393	0.000200	0.00400	0	98.2	90	110			

Sample ID	**CCV2-151109**	Batch ID:	**R82564**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_151109B**	Analysis Date:	**11/9/2015 12:17:26 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00204	0.000200	0.00200	0	102	90	110			

Sample ID	**CCV3-151109**	Batch ID:	**R82564**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_151109B**	Analysis Date:	**11/9/2015 12:58:16 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00204	0.000200	0.00200	0	102	90	110			

Sample ID	**CCV4-151109**	Batch ID:	**R82564**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_151109B**	Analysis Date:	**11/9/2015 1:14:13 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00202	0.000200	0.00200	0	101	90	110			

Sample ID	**ICV-151110**	Batch ID:	**R82564**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**CETAC2_HG_151109B**	Analysis Date:	**11/10/2015 3:36:25 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00396	0.000200	0.00400	0	99.0	90	110			

Sample ID	**CCV1-151110**	Batch ID:	**R82564**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_151109B**	Analysis Date:	**11/10/2015 4:20:38 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00206	0.000200	0.00200	0	103	90	110			

Sample ID	**CCV2-151110**	Batch ID:	**R82564**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_151109B**	Analysis Date:	**11/10/2015 4:36:35 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00204	0.000200	0.00200	0	102	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1510306
Project: Sandow AX

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS3_151109A

The QC data in batch 72211 applies to the following samples: 1510306-01A, 1510306-02A, 1510306-03A, 1510306-04A, 1510306-05A, 1510306-06A

Sample ID **MB-72211** Batch ID: **72211** TestNo: **SW6020A** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS3_151109A** Analysis Date: **11/9/2015 4:35:00 PM** Prep Date: **11/6/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.000800	0.00250								
Arsenic	<0.00200	0.00500								
Barium	<0.00300	0.0100								
Beryllium	<0.000300	0.00100								
Boron	0.0135	0.0300								
Cadmium	<0.000300	0.00100								
Calcium	<0.100	0.300								
Chromium	<0.00200	0.00500								
Cobalt	<0.00300	0.00500								
Lead	<0.000300	0.00100								
Lithium	<0.00500	0.0100								
Molybdenum	<0.00200	0.00500								
Selenium	<0.00200	0.00500								
Thallium	<0.000500	0.00150								

Sample ID **LCS-72211** Batch ID: **72211** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS3_151109A** Analysis Date: **11/9/2015 4:41:00 PM** Prep Date: **11/6/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.177	0.00250	0.200	0	88.3	80	120			
Arsenic	0.178	0.00500	0.200	0	89.0	80	120			
Barium	0.177	0.0100	0.200	0	88.3	80	120			
Beryllium	0.187	0.00100	0.200	0	93.6	80	120			
Boron	0.185	0.0300	0.200	0	92.6	80	120			
Cadmium	0.172	0.00100	0.200	0	86.2	80	120			
Calcium	4.48	0.300	5.00	0	89.7	80	120			
Chromium	0.178	0.00500	0.200	0	88.9	80	120			
Cobalt	0.188	0.00500	0.200	0	94.1	80	120			
Lead	0.178	0.00100	0.200	0	89.2	80	120			
Lithium	0.182	0.0100	0.200	0	91.2	80	120			
Molybdenum	0.169	0.00500	0.200	0	84.4	80	120			
Selenium	0.178	0.00500	0.200	0	89.2	80	120			
Thallium	0.187	0.00150	0.200	0	93.4	80	120			

Sample ID **LCSD-72211** Batch ID: **72211** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS3_151109A** Analysis Date: **11/9/2015 4:47:00 PM** Prep Date: **11/6/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.181	0.00250	0.200	0	90.4	80	120	2.35	15	
Arsenic	0.178	0.00500	0.200	0	88.8	80	120	0.281	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1510306
Project: Sandow AX

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS3_151109A

Sample ID **LCSD-72211**	Batch ID: **72211**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCSD**	Run ID: **ICP-MS3_151109A**	Analysis Date: **11/9/2015 4:47:00 PM**	Prep Date: **11/6/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.177	0.0100	0.200	0	88.6	80	120	0.396	15	
Beryllium	0.189	0.00100	0.200	0	94.4	80	120	0.851	15	
Boron	0.190	0.0300	0.200	0	95.0	80	120	2.56	15	
Cadmium	0.174	0.00100	0.200	0	86.8	80	120	0.694	15	
Calcium	4.60	0.300	5.00	0	92.0	80	120	2.53	15	
Chromium	0.178	0.00500	0.200	0	88.8	80	120	0.113	15	
Cobalt	0.186	0.00500	0.200	0	93.2	80	120	1.01	15	
Lead	0.181	0.00100	0.200	0	90.6	80	120	1.45	15	
Lithium	0.183	0.0100	0.200	0	91.6	80	120	0.492	15	
Molybdenum	0.170	0.00500	0.200	0	85.2	80	120	1.00	15	
Selenium	0.179	0.00500	0.200	0	89.4	80	120	0.168	15	
Thallium	0.187	0.00150	0.200	0	93.4	80	120	0	15	

Sample ID **1510306-01A SD**	Batch ID: **72211**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **SD**	Run ID: **ICP-MS3_151109A**	Analysis Date: **11/9/2015 5:06:00 PM**	Prep Date: **11/6/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.00400	0.0125	0	0				0	10	
Arsenic	<0.0100	0.0250	0	0				0	10	
Barium	0.274	0.0500	0	0.273				0.238	10	
Beryllium	<0.00150	0.00500	0	0				0	10	
Boron	0.114	0.150	0	0.112				1.28	10	
Cadmium	<0.00150	0.00500	0	0				0	10	
Chromium	<0.0100	0.0250	0	0				0	10	
Cobalt	<0.0150	0.0250	0	0.0106				0	10	
Lead	<0.00150	0.00500	0	0				0	10	
Lithium	<0.0250	0.0500	0	0				0	10	
Molybdenum	<0.0100	0.0250	0	0				0	10	
Selenium	<0.0100	0.0250	0	0				0	10	
Thallium	<0.00250	0.00750	0	0				0	10	

Sample ID **1510306-01A PDS**	Batch ID: **72211**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS3_151109A**	Analysis Date: **11/9/2015 5:36:00 PM**	Prep Date: **11/6/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.191	0.00250	0.200	0	95.5	80	120			
Arsenic	0.193	0.00500	0.200	0	96.4	80	120			
Barium	0.462	0.0100	0.200	0.273	94.4	80	120			
Beryllium	0.202	0.00100	0.200	0	101	80	120			
Boron	0.299	0.0300	0.200	0.112	93.5	80	120			
Cadmium	0.182	0.00100	0.200	0	91.2	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1510306
Project: Sandow AX

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS3_151109A

Sample ID **1510306-01A PDS** Batch ID: **72211** TestNo: **SW6020A** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS3_151109A** Analysis Date: **11/9/2015 5:36:00 PM** Prep Date: **11/6/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chromium	0.194	0.00500	0.200	0	97.0	80	120			
Cobalt	0.209	0.00500	0.200	0.0106	99.1	80	120			
Lead	0.196	0.00100	0.200	0	98.2	80	120			
Lithium	0.192	0.0100	0.200	0	96.0	80	120			
Molybdenum	0.185	0.00500	0.200	0	92.6	80	120			
Selenium	0.185	0.00500	0.200	0	92.6	80	120			
Thallium	0.205	0.00150	0.200	0	102	80	120			

Sample ID **1510306-01A MS** Batch ID: **72211** TestNo: **SW6020A** Units: **mg/L**
SampType: **MS** Run ID: **ICP-MS3_151109A** Analysis Date: **11/9/2015 5:42:00 PM** Prep Date: **11/6/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.196	0.00250	0.200	0	98.2	80	120			
Arsenic	0.193	0.00500	0.200	0	96.4	80	120			
Barium	0.475	0.0100	0.200	0.273	101	80	120			
Beryllium	0.200	0.00100	0.200	0	99.8	80	120			
Boron	0.301	0.0300	0.200	0.112	94.2	80	120			
Cadmium	0.183	0.00100	0.200	0	91.4	80	120			
Calcium	84.0	0.300	5.00	77.0	140	80	120			S
Chromium	0.187	0.00500	0.200	0	93.4	80	120			
Cobalt	0.201	0.00500	0.200	0.0106	95.1	80	120			
Lead	0.189	0.00100	0.200	0	94.3	80	120			
Lithium	0.190	0.0100	0.200	0	94.8	80	120			
Molybdenum	0.186	0.00500	0.200	0	93.0	80	120			
Selenium	0.185	0.00500	0.200	0	92.4	80	120			
Thallium	0.199	0.00150	0.200	0	99.4	80	120			

Sample ID **1510306-01A MSD** Batch ID: **72211** TestNo: **SW6020A** Units: **mg/L**
SampType: **MSD** Run ID: **ICP-MS3_151109A** Analysis Date: **11/9/2015 5:48:00 PM** Prep Date: **11/6/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.185	0.00250	0.200	0	92.5	80	120	6.03	15	
Arsenic	0.188	0.00500	0.200	0	93.8	80	120	2.79	15	
Barium	0.448	0.0100	0.200	0.273	87.5	80	120	5.79	15	
Beryllium	0.190	0.00100	0.200	0	95.0	80	120	4.93	15	
Boron	0.287	0.0300	0.200	0.112	87.3	80	120	4.73	15	
Cadmium	0.176	0.00100	0.200	0	87.8	80	120	4.13	15	
Calcium	79.5	0.300	5.00	77.0	51.6	80	120	5.41	15	S
Chromium	0.181	0.00500	0.200	0	90.4	80	120	3.26	15	
Cobalt	0.196	0.00500	0.200	0.0106	92.5	80	120	2.67	15	
Lead	0.178	0.00100	0.200	0	89.2	80	120	5.50	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1510306
Project: Sandow AX

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS3_151109A

Sample ID **1510306-01A MSD** Batch ID: **72211** TestNo: **SW6020A** Units: **mg/L**
SampType: **MSD** Run ID: **ICP-MS3_151109A** Analysis Date: **11/9/2015 5:48:00 PM** Prep Date: **11/6/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lithium	0.182	0.0100	0.200	0	91.2	80	120	3.82	15	
Molybdenum	0.176	0.00500	0.200	0	88.2	80	120	5.24	15	
Selenium	0.182	0.00500	0.200	0	91.0	80	120	1.53	15	
Thallium	0.189	0.00150	0.200	0	94.4	80	120	5.26	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1510306
Project: Sandow AX

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS3_151109A

Sample ID **ICV1-151109**	Batch ID: **R82588**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS3_151109A**	Analysis Date: **11/9/2015 12:27:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.100	0.00250	0.100	0	100	90	110			
Arsenic	0.0973	0.00500	0.100	0	97.3	90	110			
Barium	0.0998	0.0100	0.100	0	99.8	90	110			
Beryllium	0.105	0.00100	0.100	0	105	90	110			
Boron	0.0945	0.0300	0.100	0	94.5	90	110			
Cadmium	0.0970	0.00100	0.100	0	97.0	90	110			
Calcium	2.34	0.300	2.50	0	93.5	90	110			
Chromium	0.106	0.00500	0.100	0	106	90	110			
Cobalt	0.108	0.00500	0.100	0	108	90	110			
Lead	0.103	0.00100	0.100	0	103	90	110			
Lithium	0.0997	0.0100	0.100	0	99.7	90	110			
Molybdenum	0.0926	0.00500	0.100	0	92.6	90	110			
Selenium	0.0940	0.00500	0.100	0	94.0	90	110			
Thallium	0.101	0.00150	0.100	0	101	90	110			

Sample ID **ILCVL-151109**	Batch ID: **R82588**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS3_151109A**	Analysis Date: **11/9/2015 12:39:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00189	0.00250	0.00200	0	94.4	70	130			
Arsenic	0.00477	0.00500	0.00500	0	95.3	70	130			
Barium	0.00497	0.0100	0.00500	0	99.5	70	130			
Beryllium	0.00110	0.00100	0.00100	0	110	70	130			
Boron	0.0197	0.0300	0.0200	0	98.4	70	130			
Cadmium	0.00101	0.00100	0.00100	0	101	70	130			
Calcium	0.102	0.300	0.100	0	102	70	130			
Chromium	0.00505	0.00500	0.00500	0	101	70	130			
Cobalt	0.00525	0.00500	0.00500	0	105	70	130			
Lead	0.00108	0.00100	0.00100	0	108	70	130			
Lithium	0.0101	0.0100	0.0100	0	101	70	130			
Molybdenum	0.00482	0.00500	0.00500	0	96.3	70	130			
Selenium	0.00513	0.00500	0.00500	0	103	70	130			
Thallium	0.00106	0.00150	0.00100	0	106	70	130			

Sample ID **CCV1-151109**	Batch ID: **R82588**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS3_151109A**	Analysis Date: **11/9/2015 3:35:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.201	0.00250	0.200	0	100	90	110			
Arsenic	0.192	0.00500	0.200	0	95.8	90	110			
Barium	0.194	0.0100	0.200	0	97.2	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1510306
Project: Sandow AX

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS3_151109A

Sample ID **CCV1-151109** Batch ID: **R82588** TestNo: **SW6020A** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS3_151109A** Analysis Date: **11/9/2015 3:35:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.205	0.00100	0.200	0	102	90	110			
Boron	0.194	0.0300	0.200	0	97.0	90	110			
Cadmium	0.191	0.00100	0.200	0	95.4	90	110			
Calcium	5.15	0.300	5.00	0	103	90	110			
Chromium	0.194	0.00500	0.200	0	97.0	90	110			
Cobalt	0.202	0.00500	0.200	0	101	90	110			
Lead	0.201	0.00100	0.200	0	101	90	110			
Lithium	0.194	0.0100	0.200	0	96.9	90	110			
Molybdenum	0.187	0.00500	0.200	0	93.6	90	110			
Selenium	0.192	0.00500	0.200	0	96.2	90	110			
Thallium	0.207	0.00150	0.200	0	103	90	110			

Sample ID **LCVL1-151109** Batch ID: **R82588** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS3_151109A** Analysis Date: **11/9/2015 3:53:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00186	0.00250	0.00200	0	93.1	70	130			
Arsenic	0.00461	0.00500	0.00500	0	92.3	70	130			
Barium	0.00485	0.0100	0.00500	0	97.1	70	130			
Beryllium	0.00102	0.00100	0.00100	0	102	70	130			
Boron	0.0190	0.0300	0.0200	0	95.1	70	130			
Cadmium	0.000956	0.00100	0.00100	0	95.6	70	130			
Calcium	0.113	0.300	0.100	0	113	70	130			
Chromium	0.00470	0.00500	0.00500	0	94.0	70	130			
Cobalt	0.00495	0.00500	0.00500	0	99.0	70	130			
Lead	0.00102	0.00100	0.00100	0	102	70	130			
Lithium	0.00951	0.0100	0.0100	0	95.1	70	130			
Molybdenum	0.00445	0.00500	0.00500	0	89.0	70	130			
Selenium	0.00483	0.00500	0.00500	0	96.6	70	130			
Thallium	0.00100	0.00150	0.00100	0	100	70	130			

Sample ID **CCV2-151109** Batch ID: **R82588** TestNo: **SW6020A** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS3_151109A** Analysis Date: **11/9/2015 5:54:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.202	0.00250	0.200	0	101	90	110			
Arsenic	0.200	0.00500	0.200	0	99.8	90	110			
Barium	0.201	0.0100	0.200	0	100	90	110			
Beryllium	0.215	0.00100	0.200	0	108	90	110			
Boron	0.198	0.0300	0.200	0	99.2	90	110			
Cadmium	0.192	0.00100	0.200	0	96.1	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1510306
Project: Sandow AX

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS3_151109A

Sample ID **CCV2-151109** Batch ID: **R82588** TestNo: **SW6020A** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS3_151109A** Analysis Date: **11/9/2015 5:54:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	5.44	0.300	5.00	0	109	90	110			
Chromium	0.200	0.00500	0.200	0	99.8	90	110			
Cobalt	0.210	0.00500	0.200	0	105	90	110			
Lead	0.204	0.00100	0.200	0	102	90	110			
Lithium	0.208	0.0100	0.200	0	104	90	110			
Molybdenum	0.192	0.00500	0.200	0	96.2	90	110			
Selenium	0.200	0.00500	0.200	0	100	90	110			
Thallium	0.212	0.00150	0.200	0	106	90	110			

Sample ID **LCVL2-151109** Batch ID: **R82588** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS3_151109A** Analysis Date: **11/9/2015 6:12:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00192	0.00250	0.00200	0	96.0	70	130			
Arsenic	0.00484	0.00500	0.00500	0	96.7	70	130			
Barium	0.00493	0.0100	0.00500	0	98.7	70	130			
Beryllium	0.00103	0.00100	0.00100	0	103	70	130			
Boron	0.0200	0.0300	0.0200	0	100	70	130			
Cadmium	0.00101	0.00100	0.00100	0	101	70	130			
Calcium	0.131	0.300	0.100	0	131	70	130			S
Chromium	0.00482	0.00500	0.00500	0	96.4	70	130			
Cobalt	0.00508	0.00500	0.00500	0	102	70	130			
Lead	0.00103	0.00100	0.00100	0	103	70	130			
Lithium	0.00992	0.0100	0.0100	0	99.2	70	130			
Molybdenum	0.00456	0.00500	0.00500	0	91.2	70	130			
Selenium	0.00499	0.00500	0.00500	0	99.7	70	130			
Thallium	0.00101	0.00150	0.00100	0	101	70	130			

Sample ID **CCV3-151105** Batch ID: **R82588** TestNo: **SW6020A** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS3_151109A** Analysis Date: **11/9/2015 7:42:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.222	0.00250	0.200	0	111	90	110			S
Arsenic	0.216	0.00500	0.200	0	108	90	110			
Barium	0.217	0.0100	0.200	0	109	90	110			
Boron	0.204	0.0300	0.200	0	102	90	110			
Cadmium	0.210	0.00100	0.200	0	105	90	110			
Chromium	0.219	0.00500	0.200	0	109	90	110			
Lead	0.219	0.00100	0.200	0	109	90	110			
Lithium	0.216	0.0100	0.200	0	108	90	110			
Molybdenum	0.212	0.00500	0.200	0	106	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1510306
Project: Sandow AX

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS3_151109A

Sample ID **CCV3-151105**	Batch ID: **R82588**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS3_151109A**	Analysis Date: **11/9/2015 7:42:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Selenium	0.208	0.00500	0.200	0	104	90	110			

Sample ID **LCVL3-151105**	Batch ID: **R82588**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS3_151109A**	Analysis Date: **11/9/2015 8:13:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00206	0.00250	0.00200	0	103	70	130			
Arsenic	0.00506	0.00500	0.00500	0	101	70	130			
Barium	0.00534	0.0100	0.00500	0	107	70	130			
Boron	0.0193	0.0300	0.0200	0	96.4	70	130			
Cadmium	0.00105	0.00100	0.00100	0	105	70	130			
Chromium	0.00534	0.00500	0.00500	0	107	70	130			
Lead	0.00105	0.00100	0.00100	0	105	70	130			
Lithium	0.0106	0.0100	0.0100	0	106	70	130			
Molybdenum	0.00512	0.00500	0.00500	0	103	70	130			
Selenium	0.00526	0.00500	0.00500	0	105	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1510306
Project: Sandow AX

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_151110B

The QC data in batch 72211 applies to the following samples: 1510306-01A, 1510306-02A, 1510306-03A, 1510306-04A, 1510306-05A, 1510306-06A

Sample ID **1510306-01A SD**	Batch ID: **72211**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **SD**	Run ID: **ICP-MS4_151110B**	Analysis Date: **11/10/2015 1:12:00 PM**	Prep Date: **11/6/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	75.5	15.0	0	76.3				1.05	10	

Sample ID **1510306-01A PDS**	Batch ID: **72211**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS4_151110B**	Analysis Date: **11/10/2015 1:32:00 PM**	Prep Date: **11/6/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	117	3.00	50.0	76.3	81.6	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

Sample ID **ICV-151110**	Batch ID: **R82595**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS4_151110B**	Analysis Date: **11/10/2015 10:51:00 A**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.102	0.00100	0.100	0	102	90	110			
Calcium	2.25	0.300	2.50	0	90.0	90	110			
Cobalt	0.110	0.00500	0.100	0	110	90	110			
Thallium	0.102	0.00150	0.100	0	102	90	110			

Sample ID **LCVL-151110**	Batch ID: **R82595**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_151110B**	Analysis Date: **11/10/2015 10:59:00 A**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.00126	0.00100	0.00100	0	126	70	130			
Calcium	0.0951	0.300	0.100	0	95.1	70	130			
Cobalt	0.00546	0.00500	0.00500	0	109	70	130			
Thallium	0.00104	0.00150	0.00100	0	104	70	130			

Sample ID **CCV4-151110**	Batch ID: **R82595**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_151110B**	Analysis Date: **11/10/2015 12:58:00 P**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.84	0.300	5.00	0	96.8	90	110			

Sample ID **LCVL4-151110**	Batch ID: **R82595**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_151110B**	Analysis Date: **11/10/2015 1:05:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.101	0.300	0.100	0	101	70	130			

Sample ID **CCV5-151110**	Batch ID: **R82595**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_151110B**	Analysis Date: **11/10/2015 1:34:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.200	0.00100	0.200	0	99.9	90	110			
Calcium	4.80	0.300	5.00	0	96.0	90	110			
Cobalt	0.203	0.00500	0.200	0	102	90	110			
Thallium	0.197	0.00150	0.200	0	98.3	90	110			

Sample ID **LCVL5-151110**	Batch ID: **R82595**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_151110B**	Analysis Date: **11/10/2015 1:38:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.000933	0.00100	0.00100	0	93.3	70	130			
Calcium	0.0950	0.300	0.100	0	95.0	70	130			

CLIENT: Pastor, Behling & Wheeler
Work Order: 1510306
Project: Sandow AX

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_151110B

Sample ID **LCVL5-151110**	Batch ID: **R82595**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_151110B**	Analysis Date: **11/10/2015 1:38:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.00538	0.00500	0.00500	0	108	70	130			
Thallium	0.00101	0.00150	0.00100	0	101	70	130			

Sample ID **CCV6-151110**	Batch ID: **R82595**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_151110B**	Analysis Date: **11/10/2015 2:01:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.204	0.00100	0.200	0	102	90	110			
Cobalt	0.203	0.00500	0.200	0	101	90	110			
Thallium	0.196	0.00150	0.200	0	97.8	90	110			

Sample ID **LCVL6-151110**	Batch ID: **R82595**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_151110B**	Analysis Date: **11/10/2015 2:05:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.000981	0.00100	0.00100	0	98.1	70	130			
Cobalt	0.00531	0.00500	0.00500	0	106	70	130			
Thallium	0.00101	0.00150	0.00100	0	101	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1510306
Project: Sandow AX

ANALYTICAL QC SUMMARY REPORT

RunID: IC3_151105A

The QC data in batch 72188 applies to the following samples: 1510306-01D, 1510306-02D, 1510306-03D, 1510306-04D, 1510306-05D, 1510306-06D

Sample ID **MB-72188** Batch ID: **72188** TestNo: **E300** Units: **mg/L**
SampType: **MBLK** Run ID: **IC3_151105A** Analysis Date: **11/5/2015 10:00:11 AM** Prep Date: **11/5/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	<0.300	1.00								
Fluoride	<0.100	0.400								
Sulfate	<1.00	3.00								

Sample ID **LCS-72188** Batch ID: **72188** TestNo: **E300** Units: **mg/L**
SampType: **LCS** Run ID: **IC3_151105A** Analysis Date: **11/5/2015 10:23:40 AM** Prep Date: **11/5/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.68	1.00	10.00	0	96.8	90	110			
Fluoride	3.97	0.400	4.000	0	99.3	90	110			
Sulfate	30.2	3.00	30.00	0	101	90	110			

Sample ID **LCSD-72188** Batch ID: **72188** TestNo: **E300** Units: **mg/L**
SampType: **LCSD** Run ID: **IC3_151105A** Analysis Date: **11/5/2015 10:44:19 AM** Prep Date: **11/5/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.70	1.00	10.00	0	97.0	90	110	0.248	20	
Fluoride	3.97	0.400	4.000	0	99.3	90	110	0.025	20	
Sulfate	30.2	3.00	30.00	0	101	90	110	0.162	20	

Sample ID **1510306-03DMS** Batch ID: **72188** TestNo: **E300** Units: **mg/L**
SampType: **MS** Run ID: **IC3_151105A** Analysis Date: **11/5/2015 6:00:56 PM** Prep Date: **11/5/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2230	100	2000	285.8	97.1	90	110			
Fluoride	1960	40.0	2000	0	98.0	90	110			
Sulfate	3050	300	2000	1201	92.6	90	110			

Sample ID **1510306-03DMSD** Batch ID: **72188** TestNo: **E300** Units: **mg/L**
SampType: **MSD** Run ID: **IC3_151105A** Analysis Date: **11/5/2015 6:21:35 PM** Prep Date: **11/5/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2210	100	2000	285.8	96.1	90	110	0.920	20	
Fluoride	1950	40.0	2000	0	97.4	90	110	0.660	20	
Sulfate	3060	300	2000	1201	92.9	90	110	0.200	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1510306
Project: Sandow AX

ANALYTICAL QC SUMMARY REPORT

RunID: IC3_151105A

Sample ID **ICV-151105**	Batch ID: **R82547**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC3_151105A**	Analysis Date: **11/5/2015 9:09:56 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	24.4	1.00	25.00	0	97.7	90	110			
Fluoride	9.75	0.400	10.00	0	97.5	90	110			
Sulfate	74.8	3.00	75.00	0	99.7	90	110			

Sample ID **CCV1-151105**	Batch ID: **R82547**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC3_151105A**	Analysis Date: **11/5/2015 3:46:10 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.72	1.00	10.00	0	97.2	90	110			
Fluoride	4.01	0.400	4.000	0	100	90	110			
Sulfate	30.2	3.00	30.00	0	101	90	110			

Sample ID **CCV2-151105**	Batch ID: **R82547**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC3_151105A**	Analysis Date: **11/5/2015 8:04:42 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.70	1.00	10.00	0	97.0	90	110			
Fluoride	3.98	0.400	4.000	0	99.4	90	110			
Sulfate	30.5	3.00	30.00	0	102	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1510306
Project: Sandow AX

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_151030A

The QC data in batch 72109 applies to the following samples: 1510306-01D, 1510306-02D, 1510306-03D, 1510306-04D, 1510306-05D, 1510306-06D

Sample ID **1510306-06D DUP** Batch ID: **72109** TestNo: **M4500-H+ B** Units: **pH Units@17℃**
SampType: **DUP** Run ID: **TITRATOR_151030A** Analysis Date: **10/30/2015 4:17:00 PM** Prep Date: **10/30/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.33	0	0	6.360				0.473	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1510306
Project: Sandow AX

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_151030A

Sample ID	**ICV-151030**	Batch ID:	**R82444**	TestNo:	**M4500-H+ B**	Units:	**pH Units@21.7℃**
SampType:	**ICV**	Run ID:	**TITRATOR_151030A**	Analysis Date:	**10/30/2015 2:33:00 PM**	Prep Date:	**10/30/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	9.96	0	10.00	0	99.6	99	101			

Sample ID	**CCV1-151030**	Batch ID:	**R82444**	TestNo:	**M4500-H+ B**	Units:	**pH Units@21.2℃**
SampType:	**CCV**	Run ID:	**TITRATOR_151030A**	Analysis Date:	**10/30/2015 2:57:00 PM**	Prep Date:	**10/30/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.97	0	7.000	0	99.6	97.1	102.9			

Sample ID	**CCV2-151030**	Batch ID:	**R82444**	TestNo:	**M4500-H+ B**	Units:	**pH Units@21.5℃**
SampType:	**CCV**	Run ID:	**TITRATOR_151030A**	Analysis Date:	**10/30/2015 3:15:00 PM**	Prep Date:	**10/30/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.97	0	7.000	0	99.6	97.1	102.9			

Sample ID	**CCV3-151030**	Batch ID:	**R82444**	TestNo:	**M4500-H+ B**	Units:	**pH Units@21.9℃**
SampType:	**CCV**	Run ID:	**TITRATOR_151030A**	Analysis Date:	**10/30/2015 4:18:00 PM**	Prep Date:	**10/30/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.97	0	7.000	0	99.6	97.1	102.9			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1510306
Project: Sandow AX

ANALYTICAL QC SUMMARY REPORT

RunID: WC_151103B

The QC data in batch 72150 applies to the following samples: 1510306-01D, 1510306-02D, 1510306-03D, 1510306-04D, 1510306-05D, 1510306-06D

Sample ID **MB-72150**	Batch ID: **72150**	TestNo: **M2540C**	Units: **mg/L**
SampType: **MBLK**	Run ID: **WC_151103B**	Analysis Date: **11/4/2015 7:20:00 AM**	Prep Date: **11/3/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	<10.0	10.0								

Sample ID **LCS-72150**	Batch ID: **72150**	TestNo: **M2540C**	Units: **mg/L**
SampType: **LCS**	Run ID: **WC_151103B**	Analysis Date: **11/4/2015 7:20:00 AM**	Prep Date: **11/3/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	759	10.0	745.6	0	102	90	113			

Sample ID **1510306-01D-DUP**	Batch ID: **72150**	TestNo: **M2540C**	Units: **mg/L**
SampType: **DUP**	Run ID: **WC_151103B**	Analysis Date: **11/4/2015 7:20:00 AM**	Prep Date: **11/3/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	1650	50.0	0	1640				0.608	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

GEL Laboratories LLC
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gel.com

December 03, 2015

Mr. John DuPont
DHL Analytical
2300 Double Creek Drive
Round Rock, Texas 78664

Re: Routine Analysis
Work Order: 384907
SDG: 1510306

Dear Mr. DuPont:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on November 05, 2015. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4707.

Sincerely,

Anna C Day

Anna Day
Project Manager

Purchase Order: 13987
Enclosures

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 − (843) 556−8171 − www.gel.com

Certificate of Analysis Report
for

DHLA002 DHL Analytical

Client SDG: 1510306 GEL Work Order: 384907

The Qualifiers in this report are defined as follows:

* A quality control analyte recovery is outside of specified acceptance criteria

** Analyte is a Tracer compound

** Analyte is a surrogate compound

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Anna Day.

Reviewed by Anna C Day

There are no "Data Exception Reports" associated with this analytical report.

c.

ACD 11/5/15
~~384792~~

CHAIN-OF-CUSTODY RECORD

FAX: (512) 388-8229 384907

TEL: (843) 556-8171
FAX:
Acct #:

RA 228/RA226

30-Oct-15

	Matrix	DHL#	Date Collected	Bottle Type	Requested Tests					
					E903.1	E904.0				
	Aqueous	-01B	10/29/15 09:45 AM	500HDPEHNO3		1				
	Aqueous	-01C	10/29/15 09:45 AM	500HDPEHNO3	1					
	Aqueous	-02B	10/29/15 11:20 AM	500HDPEHNO3		1				
	Aqueous	-02C	10/29/15 11:20 AM	500HDPEHNO3	1					
	Aqueous	-03B	10/29/15 12:05 PM	500HDPEHNO3		1				
	Aqueous	-03C	10/29/15 12:05 PM	500HDPEHNO3	1					
	Aqueous	-04B	10/29/15 02:40 PM	500HDPEHNO3		1				
	Aqueous	-04C	10/29/15 02:40 PM	500HDPEHNO3	1					
	Aqueous	-05B	10/29/15 03:15 PM	500HDPEHNO3		1				
	Aqueous	-05C	10/29/15 03:15 PM	500HDPEHNO3	1					
	Aqueous	-06B	10/29/15 03:50 PM	500HDPEHNO3		1				
	Aqueous	-06C	10/29/15 03:50 PM	500HDPEHNO3	1					

e analyze these samples with a Standard Turnaround Time.
ohn DuPont if you have questions.
y Control Package Needed: Standard / _____
_ report to both cac@dhlanalytical.com & dupont@dhlanalytical.com

	Date/Time		Date/Time
	11/2/15 1730	Received by: Jed ec	11/2/15 1730
		Received by: B Luthman	11/5/150920

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: DHLA	SDG/AR/COC/Work Order: 384907
Received By: Brielle Luthman	Date Received: 11/5/15 0920

Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?		/	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0
Classified Radioactive II or III by RSO?		/	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?		/	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		/	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?		/	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		/	

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	/			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*		/		Preservation Method: Ice bags Blue ice Dry ice (None) Other (describe) *all temperatures are recorded in Celsius 20°
2a	Daily check performed and passed on IR temperature gun?	/			Temperature Device Serial #: Secondary Temperature Device Serial # (If Applicable): 150340071
3	Chain of custody documents included with shipment?	/			
4	Sample containers intact and sealed?	/			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?	/			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	Do Low Level Perchlorate samples have headspace as required?		/		Sample ID's and containers affected:
7	VOA vials contain acid preservation?		/		(If unknown, select No)
8	VOA vials free of headspace (defined as < 6mm bubble)?		/		Sample ID's and containers affected:
9	Are Encore containers present?			/	(If yes, immediately deliver to Volatiles laboratory)
10	Samples received within holding time?	/			ID's and tests affected:
11	Sample ID's on COC match ID's on bottles?	/			Sample ID's and containers affected: Client emailed 3rd chain.
12	Date & time on COC match date & time on bottles?	/			Sample ID's affected:
13	Number of containers received match number indicated on COC?	/			Sample ID's affected:
14	Are sample containers identifiable as GEL provided?			/	
15	COC form is properly signed in relinquished/received sections?	/			
16	Carrier and tracking number.				Circle Applicable: FedEx Air (FedEx Ground) UPS Field Services Courier Other 7748 7750 1368 7748 7751 0226

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials AWD Date 11/6/15 Page 1 of 1 GL-CHL-SR-001 Rev 2

List of current GEL Certifications as of 03 December 2015

State	Certification
Alaska	UST−110
Arkansas	88−0651
CLIA	42D0904046
California	2940 Interim
Colorado	SC00012
Connecticut	PH−0169
Delaware	SC000122013−10
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330−15−00283, P330−15−00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC000122013−10
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C−SC−01
Kansas NELAP	E−10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA150001
Maryland	270
Massachusetts	M−SC012
Michigan	9976
Mississippi	SC000122013−10
Nebraska	NE−OS−26−13
Nevada	SC000122016−1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R−158
Oklahoma	9904
Pennsylvania NELAP	68−00485
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235−15−10
Utah NELAP	SC000122015−19
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: December 3, 2015

Company :	DHL Analytical
Address :	2300 Double Creek Drive
	Round Rock, Texas 78664
Contact:	Mr. John DuPont
Project:	Routine Analysis

Client Sample ID:	AX-23	Project:	DHLA00112
Sample ID:	384907001	Client ID:	DHLA002
Matrix:	Water		
Collect Date:	29-OCT-15 09:45		
Receive Date:	05-NOV-15		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting												
GFPC, Ra228, Liquid "As Received"												
Radium-228		1.87	+/-1.06	1.58	3.00	pCi/L		AXM6	12/03/15	1028	1525788	1
Rad Radium-226												
Lucas Cell, Ra226, liquid "As Received"												
Radium-226		1.37	+/-0.379	0.352	1.00	pCi/L		CXP3	12/01/15	0610	1523135	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			88.3	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: December 3, 2015

Company : DHL Analytical
Address : 2300 Double Creek Drive

Round Rock, Texas 78664
Contact: Mr. John DuPont
Project: Routine Analysis

Client Sample ID: AXMW-2
Sample ID: 384907002
Matrix: Water
Collect Date: 29-OCT-15 11:20
Receive Date: 05-NOV-15
Collector: Client

Project: DHLA00112
Client ID: DHLA002

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting												
GFPC, Ra228, Liquid "As Received"												
Radium-228		2.19	+/-1.18	1.78	3.00	pCi/L		AXM6	12/03/15	1028	1525788	1
Rad Radium-226												
Lucas Cell, Ra226, liquid "As Received"												
Radium-226	U	0.094	+/-0.206	0.380	1.00	pCi/L		CXP3	12/01/15	0610	1523135	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			94.5	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: December 3, 2015

Company : DHL Analytical
Address : 2300 Double Creek Drive

Round Rock, Texas 78664
Contact: Mr. John DuPont
Project: Routine Analysis

Client Sample ID:	AX-29	Project:	DHLA00112
Sample ID:	384907003	Client ID:	DHLA002
Matrix:	Water		
Collect Date:	29-OCT-15 12:05		
Receive Date:	05-NOV-15		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting												
GFPC, Ra228, Liquid "As Received"												
Radium-228	U	0.184	+/-0.691	1.29	3.00	pCi/L		AXM6	12/03/15	1028	1525788	1
Rad Radium-226												
Lucas Cell, Ra226, liquid "As Received"												
Radium-226		1.52	+/-0.451	0.438	1.00	pCi/L		CXP3	12/01/15	0610	1523135	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			89.7	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: December 3, 2015

Company :	DHL Analytical
Address :	2300 Double Creek Drive
	Round Rock, Texas 78664
Contact:	Mr. John DuPont
Project:	Routine Analysis

Client Sample ID:	AX-22R	Project:	DHLA00112
Sample ID:	384907004	Client ID:	DHLA002
Matrix:	Water		
Collect Date:	29-OCT-15 14:20		
Receive Date:	05-NOV-15		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting												
GFPC, Ra228, Liquid "As Received"												
Radium-228	U	0.159	+/-0.784	1.47	3.00	pCi/L		AXM6	12/03/15	1028	1525788	1
Rad Radium-226												
Lucas Cell, Ra226, liquid "As Received"												
Radium-226		1.12	+/-0.381	0.403	1.00	pCi/L		CXP3	12/01/15	0610	1523135	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			93.5	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: December 3, 2015

Company : DHL Analytical
Address : 2300 Double Creek Drive

Round Rock, Texas 78664
Contact: Mr. John DuPont
Project: Routine Analysis

Client Sample ID:	AX-25	Project:	DHLA00112
Sample ID:	384907005	Client ID:	DHLA002
Matrix:	Water		
Collect Date:	29-OCT-15 15:15		
Receive Date:	05-NOV-15		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting												
GFPC, Ra228, Liquid "As Received"												
Radium-228		4.28	+/-1.51	2.09	3.00	pCi/L		AXM6	12/03/15	1029	1525788	1
Rad Radium-226												
Lucas Cell, Ra226, liquid "As Received"												
Radium-226		0.537	+/-0.271	0.336	1.00	pCi/L		CXP3	12/01/15	0610	1523135	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			92.8	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: December 3, 2015

Company : DHL Analytical
Address : 2300 Double Creek Drive

Round Rock, Texas 78664
Contact: Mr. John DuPont
Project: Routine Analysis

Client Sample ID:	AX-24	Project:	DHLA00112
Sample ID:	384907006	Client ID:	DHLA002
Matrix:	Water		
Collect Date:	29-OCT-15 15:50		
Receive Date:	05-NOV-15		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting												
GFPC, Ra228, Liquid "As Received"												
Radium-228		2.73	+/-1.12	1.44	3.00	pCi/L		AXM6	12/03/15	1029	1525788	1
Rad Radium-226												
Lucas Cell, Ra226, liquid "As Received"												
Radium-226		1.29	+/-0.393	0.387	1.00	pCi/L		CXP3	12/01/15	0705	1523135	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			99.4	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

QC Summary

Report Date: December 3, 2015

DHL Analytical
2300 Double Creek Drive
Round Rock, Texas

Contact: **Mr. John DuPont**

Workorder: **384907**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gas Flow										
Batch 1525788										
QC1203439721 384907006 DUP										
Radium-228		2.73		2.63	pCi/L	3.72		(0% - 100%)	AXM6	12/03/15 10:29
	Uncertainty	+/-1.12		+/-1.23						
QC1203439722 LCS										
Radium-228	29.1			23.8	pCi/L		81.7	(75%-125%)		12/03/15 10:29
	Uncertainty			+/-2.54						
QC1203439720 MB										
Radium-228				2.78	pCi/L					12/03/15 10:29
	Uncertainty			+/-1.39						
Rad Ra-226										
Batch 1523135										
QC1203432991 385424001 DUP										
Radium-226		2.59		2.14	pCi/L	19.2		(0% - 100%)	CXP3	12/01/15 07:35
	Uncertainty	+/-0.642		+/-0.580						
QC1203432993 LCS										
Radium-226	24.4			25.0	pCi/L		102	(75%-125%)		12/01/15 08:10
	Uncertainty			+/-1.63						
QC1203432990 MB										
Radium-226				0.185	pCi/L					12/01/15 07:35
	Uncertainty			+/-0.144						
QC1203432992 385424001 MS										
Radium-226	122	2.59		95.6	pCi/L		76.2	(75%-125%)		12/01/15 07:35
	Uncertainty	+/-0.642		+/-6.31						

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

**	Analyte is a Tracer compound
<	Result is less than value reported
>	Result is greater than value reported
BD	Results are either below the MDC or tracer recovery is low
FA	Failed analysis.
H	Analytical holding time was exceeded
J	Value is estimated
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
M	M if above MDC and less than LLD
M	REMP Result > MDC/CL and < RDL
N/A	RPD or %Recovery limits do not apply.

QC Summary

Workorder: **384907**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time

N1	See case narrative
ND	Analyte concentration is not detected above the detection limit
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
R	Sample results are rejected
U	Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
UI	Gamma Spectroscopy--Uncertain identification
UJ	Gamma Spectroscopy--Uncertain identification
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
h	Preparation or preservation holding time was exceeded

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

December 09, 2015

Will Vienne
Pastor, Behling & Wheeler
2201 Double Creek Dr #4004
Round Rock, Texas 78664
TEL: (512) 671-3434
FAX (512) 671-3446

Order No.: 1511031

RE: Sandow

Dear Will Vienne:

DHL Analytical, Inc. received 4 sample(s) on 11/3/2015 for the analyses presented in the following report.

There were no problems with the analyses and all data met requirements of NELAC except where noted in the Case Narrative. All non-NELAC methods will be identified accordingly in the case narrative and all estimated uncertainties of test results are within method or EPA specifications.

If you have any questions regarding these tests results, please feel free to call. Thank you for using DHL Analytical.

Sincerely,

John DuPont
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-15-15

Table of Contents

2300 Double Creek Dr. ■ Round Rock, TX 78664
Phone (512) 388-8222 ■ FAX (512) 388-8229
Web: www.dhlanalytical.com
E-Mail: login@dhlanalytical.com

№ 68800
CHAIN-OF-CUSTODY

Creek Dr Suite 4004
FAX/E-MAIL: Will.Vienne@pbwllc.com
enne

DATE: 11-03-15 PAGE 1 OF 1
PO #: 5164-E DHL WORK ORDER #: 151031
PROJECT LOCATION OR NAME: Sandow
CLENT PROJECT #: 5164-E COLLECTOR: WV, MH

P=PAINT
SL=SLUDGE
O=OTHER
SO=SOLID
NT

e	Time	Matrix	Container Type	# of Containers	PRESERVATION: HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESERVED	ANALYSES	FIELD NOTES
-15	940	W	P	4		X		X		See attached	
15	1050	W	P	4		X		X			
-15	1145	W	P	4		X		X			
-15	1245	W	P	4		X		X			

ANALYSES: BTEX ☐ MTBE ☐ [METHOD 8021] TPH 1005 ☐ TPH 1006 ☐ HOLD 1006 ☐ GRO [METHOD 8015] ☐ DRO [METHOD 8105] ☐ VOC 8260 ☐ VOC 624 ☐ VOC 8260/5035 ☐ SVOC 8270 ☐ PAH 8270 ☐ HOLD PAH ☐ SVOC 625 ☐ 8270 PEST ☐ 625 PEST/PCB ☐ 608 PCB ☐ 8270 O-P PEST ☐ 8082 PCB ☐ 8270 PCB ☐ 8321 HERB ☐ TPHOS, AMMONIA ☐ METALS 6020 ☐ METALS 200.8 ☐ DISS. METALS ☐ ____ ☐ RCRA ☐ TX11 ☐ PH ☐ HEX CHROM ☐ ALKALINITY ☐ COD ☐ CHLORIDE ☐ ANIONS ____ ☐ TCLP-SVOC ☐ VOC ☐ PEST ☐ HERB ☐ TCLP-METALS ☐ RCRA 8 ☐ TX-11 ☐ Pb ☐ RCI ☐ FLASHPOINT ☐ DGAS ☐ TDS ☐ TSS ☐ % MOISTURE ☐ CYANIDE ☐

DATE/TIME	RECEIVED BY: (Signature)
11-3-15 1643	
DATE/TIME	RECEIVED BY: (Signature)
DATE/TIME	RECEIVED BY: (Signature)

SPOSAL @ $5.00 each ☐ Return

3

TURN AROUND TIME
RUSH ☐ CALL FIRST
1 DAY ☐ CALL FIRST
2 DAY ☐
NORMAL ☑
OTHER ☐ _____

LABORATORY USE ONLY:
RECEIVING TEMP: 3.0 THERM #: 78
CUSTODY SEALS: ☐ BROKEN ☐ INTACT ☑ NOT USED
CARRIER: ☐ LONE STAR ☐ FEDEX ☐ UPS ☐ OTHER
☐ COURIER DELIVERY
☐ HAND DELIVERED

ATTACHMENT 1
CCR ANALYTE SUMMARY

Appendix III Constituents	Appendix IV Constituents
Boron	Arsenic
Calcium	Barium
Chloride	Beryllium
Fluoride	Cadmium
pH	Chromium
Sulfate	Cobalt
Total Dissolved Solids	Fluoride
	Lead
	Lithium
	Mercury
	Molybdenum
	Selenium
	Thallium
	Radium 226 and 228 combined

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name Pastor, Behling & Wheeler

Date Received: 11/3/2015

Work Order Number 1511031

Received by JB

Checklist completed by: _____ 11/3/2015
Signature Date

Reviewed by _____ 11/3/2015
Initials Date

Carrier name Hand Delivered

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	3.0 °C
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH<2 acceptable upon receipt?	Yes ☑	No ☐	NA ☐ LOT # 8086
	Adjusted? NO		Checked by _____
Water - ph>9 (S) or ph>12 (CN) acceptable upon receipt?	Yes ☐	No ☐	NA ☑ LOT #
	Adjusted? _____		Checked by _____

Any No response must be detailed in the comments section below.

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding _____

Comments: _____

Corrective Action _____

DHL Analytical, Inc. **Date:** *09-Dec-15*

CLIENT: Pastor, Behling & Wheeler
Project: Sandow
Lab Order: 1511031

CASE NARRATIVE

Samples were analyzed using the methods outlined in the following references:

Method SW6020A - Metals Analysis
Method SW7470A - Mercury Analysis
Method E300 - Anions Analysis
Method M4500-H+ B - pH of a Water Analysis
Method M2540C - TDS Analysis

LOG IN

The samples were received and log-in performed on 11/3/15. A total of 4 samples were received. The samples arrived in good condition and were properly packaged.

METALS ANALYSIS

For Metals analysis performed on 11/9/15 Boron was detected below the reporting limit in the method blank (MB-72211). All samples were detected greater than 10 times the amount in the blank for this analyte except for sample AX-27 which may be biased high. No further corrective actions were taken.

For Metals analysis samples AX-28 and AX-26 had low responses for the internal standard Bismuth. The associated analyte (Lead) was not reported from this analytical run.

For Metals analysis performed on 11/9/15 the matrix spike and matrix spike duplicate recoveries were out of control limits for Calcium. These are flagged accordingly in the QC summary report. The sample selected for the matrix spike and matrix spike duplicate was not from this work order. The LCS was within control limits for this analyte. No further corrective actions were taken.

For Metals analysis performed on 11/9/15 LCVL2-151109 and CCV3-151105 were slightly above control limits for Calcium or Antimony. These are flagged accordingly. The associated CCV2-151109 and LCVL3-151105 were within control limits for these analytes. No further corrective actions were taken.

MERCURY ANALYSIS

For Mercury analysis the matrix spike and matrix spike duplicate was re-prepped and re-analyzed on 11/10/15. This was due to a prep error. This exceeded the 24 hour prep window.

DHL Analytical, Inc.

Date: *09-Dec-15*

CLIENT: Pastor, Behling & Wheeler
Project: Sandow
Lab Order: 1511031

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
1511031-01	AX-28		11/03/15 09:40 AM	11/3/2015
1511031-02	AX-27		11/03/15 10:50 AM	11/3/2015
1511031-03	AX-26		11/03/15 11:45 AM	11/3/2015
1511031-04	AXMW-1		11/03/15 12:45 PM	11/3/2015

& Wheeler

PREP DATES REPORT

Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
11/03/15 09:40 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/06/15 09:55 AM	72211
11/03/15 09:40 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/06/15 09:55 AM	72211
11/03/15 09:40 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/06/15 09:55 AM	72211
11/03/15 09:40 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	11/05/15 06:10 AM	72178
11/03/15 09:40 AM	Aqueous	E300	Anion Preparation	11/09/15 09:25 AM	72221
11/03/15 09:40 AM	Aqueous	E300	Anion Preparation	11/09/15 09:25 AM	72221
11/03/15 09:40 AM	Aqueous	M4500-H+ B	pH Preparation	11/04/15 08:44 AM	72158
11/03/15 09:40 AM	Aqueous	M2540C	TDS Preparation	11/05/15 04:18 PM	72200
11/03/15 10:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/06/15 09:55 AM	72211
11/03/15 10:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/06/15 09:55 AM	72211
11/03/15 10:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/06/15 09:55 AM	72211
11/03/15 10:50 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	11/05/15 06:10 AM	72178
11/03/15 10:50 AM	Aqueous	E300	Anion Preparation	11/09/15 09:25 AM	72221
11/03/15 10:50 AM	Aqueous	E300	Anion Preparation	11/09/15 09:25 AM	72221
11/03/15 10:50 AM	Aqueous	M4500-H+ B	pH Preparation	11/04/15 08:44 AM	72158
11/03/15 10:50 AM	Aqueous	M2540C	TDS Preparation	11/05/15 04:18 PM	72200
11/03/15 11:45 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/06/15 09:55 AM	72211
11/03/15 11:45 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/06/15 09:55 AM	72211
11/03/15 11:45 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/06/15 09:55 AM	72211
11/03/15 11:45 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	11/05/15 06:10 AM	72178
11/03/15 11:45 AM	Aqueous	E300	Anion Preparation	11/09/15 09:25 AM	72221
11/03/15 11:45 AM	Aqueous	E300	Anion Preparation	11/09/15 09:25 AM	72221
11/03/15 11:45 AM	Aqueous	M4500-H+ B	pH Preparation	11/04/15 08:44 AM	72158
11/03/15 11:45 AM	Aqueous	M2540C	TDS Preparation	11/05/15 04:18 PM	72200
11/03/15 12:45 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/06/15 09:55 AM	72211
11/03/15 12:45 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/06/15 09:55 AM	72211
11/03/15 12:45 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/06/15 09:55 AM	72211
11/03/15 12:45 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	11/05/15 06:10 AM	72178

& Wheeler

PREP DATES REPORT

Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
11/03/15 12:45 PM	Aqueous	E300	Anion Preparation	11/09/15 09:25 AM	72221
11/03/15 12:45 PM	Aqueous	E300	Anion Preparation	11/09/15 09:25 AM	72221
11/03/15 12:45 PM	Aqueous	M4500-H+ B	pH Preparation	11/04/15 08:44 AM	72158
11/03/15 12:45 PM	Aqueous	M2540C	TDS Preparation	11/05/15 04:18 PM	72200

& Wheeler

ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	SW7470A	Mercury Total: Aqueous	72178	1	11/09/15 01:05 PM	CETAC2_HG_151109B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72211	1	11/09/15 07:06 PM	ICP-MS3_151109A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72211	100	11/10/15 01:28 PM	ICP-MS4_151110B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72211	1	11/10/15 01:53 PM	ICP-MS4_151110B
Aqueous	E300	Anions by IC method - Water	72221	1	11/09/15 12:30 PM	IC2_151109A
Aqueous	E300	Anions by IC method - Water	72221	100	11/09/15 03:21 PM	IC2_151109A
Aqueous	M4500-H+ B	pH	72158	1	11/04/15 09:50 AM	TITRATOR_151104A
Aqueous	M2540C	Total Dissolved Solids	72200	1	11/06/15 07:55 AM	WC_151105D
Aqueous	SW7470A	Mercury Total: Aqueous	72178	1	11/09/15 01:07 PM	CETAC2_HG_151109B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72211	10	11/10/15 01:30 PM	ICP-MS4_151110B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72211	1	11/10/15 01:55 PM	ICP-MS4_151110B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72211	1	11/09/15 07:18 PM	ICP-MS3_151109A
Aqueous	E300	Anions by IC method - Water	72221	1	11/09/15 12:44 PM	IC2_151109A
Aqueous	E300	Anions by IC method - Water	72221	10	11/09/15 02:46 PM	IC2_151109A
Aqueous	M4500-H+ B	pH	72158	1	11/04/15 09:52 AM	TITRATOR_151104A
Aqueous	M2540C	Total Dissolved Solids	72200	1	11/06/15 07:55 AM	WC_151105D
Aqueous	SW7470A	Mercury Total: Aqueous	72178	1	11/09/15 01:09 PM	CETAC2_HG_151109B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72211	1	11/09/15 07:24 PM	ICP-MS3_151109A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72211	100	11/10/15 12:54 PM	ICP-MS4_151110B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72211	1	11/10/15 01:57 PM	ICP-MS4_151110B
Aqueous	E300	Anions by IC method - Water	72221	1	11/09/15 12:59 PM	IC2_151109A
Aqueous	E300	Anions by IC method - Water	72221	100	11/09/15 03:37 PM	IC2_151109A
Aqueous	M4500-H+ B	pH	72158	1	11/04/15 09:55 AM	TITRATOR_151104A
Aqueous	M2540C	Total Dissolved Solids	72200	1	11/06/15 07:55 AM	WC_151105D
Aqueous	SW7470A	Mercury Total: Aqueous	72178	1	11/09/15 01:11 PM	CETAC2_HG_151109B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72211	100	11/10/15 12:56 PM	ICP-MS4_151110B

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ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72211	1	11/10/15 01:59 PM	ICP-MS4_151110B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72211	1	11/09/15 07:30 PM	ICP-MS3_151109A
Aqueous	E300	Anions by IC method - Water	72221	1	11/09/15 01:14 PM	IC2_151109A
Aqueous	E300	Anions by IC method - Water	72221	100	11/09/15 03:52 PM	IC2_151109A
Aqueous	M4500-H+ B	pH	72158	1	11/04/15 09:57 AM	TITRATOR_151104A
Aqueous	M2540C	Total Dissolved Solids	72200	1	11/06/15 07:55 AM	WC_151105D

DHL Analytical, Inc.

Date: *09-Dec-15*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-28
Project:	Sandow	**Lab ID:**	1511031-01
Project No:	5164-E	**Collection Date:**	11/03/15 09:40 AM
Lab Order:	1511031	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **ABO**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	11/09/15 01:05 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **KL**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	11/09/15 07:06 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	11/09/15 07:06 PM
Barium	0.160	0.00300	0.0100		mg/L	1	11/09/15 07:06 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	11/10/15 01:53 PM
Boron	0.187	0.0100	0.0300		mg/L	1	11/09/15 07:06 PM
Cadmium	0.000871	0.000300	0.00100	J	mg/L	1	11/09/15 07:06 PM
Calcium	421	10.0	30.0		mg/L	100	11/10/15 01:28 PM
Chromium	0.00326	0.00200	0.00500	J	mg/L	1	11/09/15 07:06 PM
Cobalt	0.0305	0.00300	0.00500		mg/L	1	11/10/15 01:53 PM
Lead	0.00251	0.000300	0.00100		mg/L	1	11/10/15 01:53 PM
Lithium	0.202	0.00500	0.0100		mg/L	1	11/09/15 07:06 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	11/09/15 07:06 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	11/09/15 07:06 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	11/10/15 01:53 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	494	30.0	100		mg/L	100	11/09/15 03:21 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	11/09/15 12:30 PM
Sulfate	1030	100	300		mg/L	100	11/09/15 03:21 PM
PH		**M4500-H+ B**					Analyst: **LM**
pH	6.55	0	0		pH Units@16.6℃	1	11/04/15 09:50 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **BJT**
Total Dissolved Solids (Residue, Filterable)	2830	50.0	50.0		mg/L	1	11/06/15 07:55 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *09-Dec-15*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-27
Project:	Sandow	**Lab ID:**	1511031-02
Project No:	5164-E	**Collection Date:**	11/03/15 10:50 AM
Lab Order:	1511031	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **ABO**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	11/09/15 01:07 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **KL**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	11/09/15 07:18 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	11/09/15 07:18 PM
Barium	0.488	0.00300	0.0100		mg/L	1	11/09/15 07:18 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	11/10/15 01:55 PM
Boron	0.117	0.0100	0.0300		mg/L	1	11/09/15 07:18 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	11/09/15 07:18 PM
Calcium	131	1.00	3.00		mg/L	10	11/10/15 01:30 PM
Chromium	0.00476	0.00200	0.00500	J	mg/L	1	11/09/15 07:18 PM
Cobalt	0.00906	0.00300	0.00500		mg/L	1	11/10/15 01:55 PM
Lead	0.00393	0.000300	0.00100		mg/L	1	11/09/15 07:18 PM
Lithium	0.0252	0.00500	0.0100		mg/L	1	11/09/15 07:18 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	11/09/15 07:18 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	11/09/15 07:18 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	11/10/15 01:55 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	248	3.00	10.0		mg/L	10	11/09/15 02:46 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	11/09/15 12:44 PM
Sulfate	172	10.0	30.0		mg/L	10	11/09/15 02:46 PM
PH		**M4500-H+ B**					Analyst: **LM**
pH	6.65	0	0		pH Units@16.8℃	1	11/04/15 09:52 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **BJT**
Total Dissolved Solids (Residue, Filterable)	971	10.0	10.0		mg/L	1	11/06/15 07:55 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *09-Dec-15*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-26
Project:	Sandow	**Lab ID:**	1511031-03
Project No:	5164-E	**Collection Date:**	11/03/15 11:45 AM
Lab Order:	1511031	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **ABO**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	11/09/15 01:09 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **KL**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	11/09/15 07:24 PM
Arsenic	0.00212	0.00200	0.00500	J	mg/L	1	11/09/15 07:24 PM
Barium	0.136	0.00300	0.0100		mg/L	1	11/09/15 07:24 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	11/10/15 01:57 PM
Boron	0.301	0.0100	0.0300		mg/L	1	11/09/15 07:24 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	11/09/15 07:24 PM
Calcium	789	10.0	30.0		mg/L	100	11/10/15 12:54 PM
Chromium	0.00560	0.00200	0.00500		mg/L	1	11/09/15 07:24 PM
Cobalt	0.0343	0.00300	0.00500		mg/L	1	11/10/15 01:57 PM
Lead	0.00116	0.000300	0.00100		mg/L	1	11/10/15 01:57 PM
Lithium	0.546	0.00500	0.0100		mg/L	1	11/09/15 07:24 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	11/09/15 07:24 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	11/09/15 07:24 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	11/10/15 01:57 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	2170	30.0	100		mg/L	100	11/09/15 03:37 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	11/09/15 12:59 PM
Sulfate	996	100	300		mg/L	100	11/09/15 03:37 PM
PH		**M4500-H+ B**					Analyst: **LM**
pH	6.55	0	0		pH Units@17.4℃	1	11/04/15 09:55 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **BJT**
Total Dissolved Solids (Residue, Filterable)	6430	50.0	50.0		mg/L	1	11/06/15 07:55 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *09-Dec-15*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AXMW-1
Project:	Sandow	**Lab ID:**	1511031-04
Project No:	5164-E	**Collection Date:**	11/03/15 12:45 PM
Lab Order:	1511031	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **ABO**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	11/09/15 01:11 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **KL**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	11/09/15 07:30 PM
Arsenic	0.0199	0.00200	0.00500		mg/L	1	11/09/15 07:30 PM
Barium	0.0193	0.00300	0.0100		mg/L	1	11/09/15 07:30 PM
Beryllium	0.000683	0.000300	0.00100	J	mg/L	1	11/10/15 01:59 PM
Boron	0.465	0.0100	0.0300		mg/L	1	11/09/15 07:30 PM
Cadmium	0.000777	0.000300	0.00100	J	mg/L	1	11/09/15 07:30 PM
Calcium	418	10.0	30.0		mg/L	100	11/10/15 12:56 PM
Chromium	0.00603	0.00200	0.00500		mg/L	1	11/09/15 07:30 PM
Cobalt	0.387	0.00300	0.00500		mg/L	1	11/10/15 01:59 PM
Lead	0.00152	0.000300	0.00100		mg/L	1	11/09/15 07:30 PM
Lithium	0.0307	0.00500	0.0100		mg/L	1	11/09/15 07:30 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	11/09/15 07:30 PM
Selenium	0.00291	0.00200	0.00500	J	mg/L	1	11/09/15 07:30 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	11/10/15 01:59 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	396	30.0	100		mg/L	100	11/09/15 03:52 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	11/09/15 01:14 PM
Sulfate	2110	100	300		mg/L	100	11/09/15 03:52 PM
PH		**M4500-H+ B**					Analyst: **LM**
pH	6.01	0	0		pH Units@17.5℃	1	11/04/15 09:57 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **BJT**
Total Dissolved Solids (Residue, Filterable)	3920	50.0	50.0		mg/L	1	11/06/15 07:55 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

CLIENT: Pastor, Behling & Wheeler
Work Order: 1511031
Project: Sandow

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_151109B

The QC data in batch 72178 applies to the following samples: 1511031-01A, 1511031-02A, 1511031-03A, 1511031-04A

Sample ID	**MB-72178**	Batch ID:	**72178**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**CETAC2_HG_151109B**	Analysis Date:	**11/9/2015 12:21:59 PM**	Prep Date:	**11/5/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	<0.0000800	0.000200								

Sample ID	**LCS-72178**	Batch ID:	**72178**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**CETAC2_HG_151109B**	Analysis Date:	**11/9/2015 12:24:15 PM**	Prep Date:	**11/5/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00196	0.000200	0.00200	0	98.0	85	115			

Sample ID	**LCSD-72178**	Batch ID:	**72178**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**CETAC2_HG_151109B**	Analysis Date:	**11/9/2015 12:26:31 PM**	Prep Date:	**11/5/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00211	0.000200	0.00200	0	106	85	115	7.37	15	

Sample ID	**1510306-01A SD**	Batch ID:	**72178**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**SD**	Run ID:	**CETAC2_HG_151109B**	Analysis Date:	**11/9/2015 12:31:04 PM**	Prep Date:	**11/5/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	<0.000400	0.00100	0	0				0	10	

Sample ID	**1510306-01A PDS**	Batch ID:	**72178**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**PDS**	Run ID:	**CETAC2_HG_151109B**	Analysis Date:	**11/9/2015 12:33:19 PM**	Prep Date:	**11/5/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00246	0.000200	0.00250	0	98.4	85	115			

Sample ID	**1510306-01A MS**	Batch ID:	**72178**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**CETAC2_HG_151109B**	Analysis Date:	**11/10/2015 4:29:45 PM**	Prep Date:	**11/5/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00207	0.000200	0.00200	0	104	80	120			

Sample ID	**1510306-01A MSD**	Batch ID:	**72178**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**CETAC2_HG_151109B**	Analysis Date:	**11/10/2015 4:32:01 PM**	Prep Date:	**11/5/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00207	0.000200	0.00200	0	104	80	120	0	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1511031
Project: Sandow

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_151109B

Sample ID	**ICV-151109**	Batch ID:	**R82564**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**CETAC2_HG_151109B**	Analysis Date:	**11/9/2015 10:48:31 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00393	0.000200	0.00400	0	98.2	90	110			

Sample ID	**CCV2-151109**	Batch ID:	**R82564**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_151109B**	Analysis Date:	**11/9/2015 12:17:26 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00204	0.000200	0.00200	0	102	90	110			

Sample ID	**CCV3-151109**	Batch ID:	**R82564**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_151109B**	Analysis Date:	**11/9/2015 12:58:16 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00204	0.000200	0.00200	0	102	90	110			

Sample ID	**CCV4-151109**	Batch ID:	**R82564**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_151109B**	Analysis Date:	**11/9/2015 1:14:13 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00202	0.000200	0.00200	0	101	90	110			

Sample ID	**ICV-151110**	Batch ID:	**R82564**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**CETAC2_HG_151109B**	Analysis Date:	**11/10/2015 3:36:25 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00396	0.000200	0.00400	0	99.0	90	110			

Sample ID	**CCV1-151110**	Batch ID:	**R82564**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_151109B**	Analysis Date:	**11/10/2015 4:20:38 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00206	0.000200	0.00200	0	103	90	110			

Sample ID	**CCV2-151110**	Batch ID:	**R82564**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_151109B**	Analysis Date:	**11/10/2015 4:36:35 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00204	0.000200	0.00200	0	102	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1511031
Project: Sandow

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS3_151109A

The QC data in batch 72211 applies to the following samples: 1511031-01A, 1511031-02A, 1511031-03A, 1511031-04A

Sample ID **MB-72211** Batch ID: **72211** TestNo: **SW6020A** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS3_151109A** Analysis Date: **11/9/2015 4:35:00 PM** Prep Date: **11/6/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.000800	0.00250								
Arsenic	<0.00200	0.00500								
Barium	<0.00300	0.0100								
Beryllium	<0.000300	0.00100								
Boron	0.0135	0.0300								
Cadmium	<0.000300	0.00100								
Calcium	<0.100	0.300								
Chromium	<0.00200	0.00500								
Cobalt	<0.00300	0.00500								
Lead	<0.000300	0.00100								
Lithium	<0.00500	0.0100								
Molybdenum	<0.00200	0.00500								
Selenium	<0.00200	0.00500								
Thallium	<0.000500	0.00150								

Sample ID **LCS-72211** Batch ID: **72211** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS3_151109A** Analysis Date: **11/9/2015 4:41:00 PM** Prep Date: **11/6/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.177	0.00250	0.200	0	88.3	80	120			
Arsenic	0.178	0.00500	0.200	0	89.0	80	120			
Barium	0.177	0.0100	0.200	0	88.3	80	120			
Beryllium	0.187	0.00100	0.200	0	93.6	80	120			
Boron	0.185	0.0300	0.200	0	92.6	80	120			
Cadmium	0.172	0.00100	0.200	0	86.2	80	120			
Calcium	4.48	0.300	5.00	0	89.7	80	120			
Chromium	0.178	0.00500	0.200	0	88.9	80	120			
Cobalt	0.188	0.00500	0.200	0	94.1	80	120			
Lead	0.178	0.00100	0.200	0	89.2	80	120			
Lithium	0.182	0.0100	0.200	0	91.2	80	120			
Molybdenum	0.169	0.00500	0.200	0	84.4	80	120			
Selenium	0.178	0.00500	0.200	0	89.2	80	120			
Thallium	0.187	0.00150	0.200	0	93.4	80	120			

Sample ID **LCSD-72211** Batch ID: **72211** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS3_151109A** Analysis Date: **11/9/2015 4:47:00 PM** Prep Date: **11/6/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.181	0.00250	0.200	0	90.4	80	120	2.35	15	
Arsenic	0.178	0.00500	0.200	0	88.8	80	120	0.281	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS3_151109A

Sample ID **LCSD-72211**	Batch ID: **72211**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCSD**	Run ID: **ICP-MS3_151109A**	Analysis Date: **11/9/2015 4:47:00 PM**	Prep Date: **11/6/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.177	0.0100	0.200	0	88.6	80	120	0.396	15	
Beryllium	0.189	0.00100	0.200	0	94.4	80	120	0.851	15	
Boron	0.190	0.0300	0.200	0	95.0	80	120	2.56	15	
Cadmium	0.174	0.00100	0.200	0	86.8	80	120	0.694	15	
Calcium	4.60	0.300	5.00	0	92.0	80	120	2.53	15	
Chromium	0.178	0.00500	0.200	0	88.8	80	120	0.113	15	
Cobalt	0.186	0.00500	0.200	0	93.2	80	120	1.01	15	
Lead	0.181	0.00100	0.200	0	90.6	80	120	1.45	15	
Lithium	0.183	0.0100	0.200	0	91.6	80	120	0.492	15	
Molybdenum	0.170	0.00500	0.200	0	85.2	80	120	1.00	15	
Selenium	0.179	0.00500	0.200	0	89.4	80	120	0.168	15	
Thallium	0.187	0.00150	0.200	0	93.4	80	120	0	15	

Sample ID **1510306-01A SD**	Batch ID: **72211**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **SD**	Run ID: **ICP-MS3_151109A**	Analysis Date: **11/9/2015 5:06:00 PM**	Prep Date: **11/6/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.00400	0.0125	0	0				0	10	
Arsenic	<0.0100	0.0250	0	0				0	10	
Barium	0.274	0.0500	0	0.273				0.238	10	
Beryllium	<0.00150	0.00500	0	0				0	10	
Boron	0.114	0.150	0	0.112				1.28	10	
Cadmium	<0.00150	0.00500	0	0				0	10	
Chromium	<0.0100	0.0250	0	0				0	10	
Cobalt	<0.0150	0.0250	0	0.0106				0	10	
Lead	<0.00150	0.00500	0	0				0	10	
Lithium	<0.0250	0.0500	0	0				0	10	
Molybdenum	<0.0100	0.0250	0	0				0	10	
Selenium	<0.0100	0.0250	0	0				0	10	
Thallium	<0.00250	0.00750	0	0				0	10	

Sample ID **1510306-01A PDS**	Batch ID: **72211**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS3_151109A**	Analysis Date: **11/9/2015 5:36:00 PM**	Prep Date: **11/6/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.191	0.00250	0.200	0	95.5	80	120			
Arsenic	0.193	0.00500	0.200	0	96.4	80	120			
Barium	0.462	0.0100	0.200	0.273	94.4	80	120			
Beryllium	0.202	0.00100	0.200	0	101	80	120			
Boron	0.299	0.0300	0.200	0.112	93.5	80	120			
Cadmium	0.182	0.00100	0.200	0	91.2	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1511031
Project: Sandow

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS3_151109A

Sample ID **1510306-01A PDS**	Batch ID: **72211**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS3_151109A**	Analysis Date: **11/9/2015 5:36:00 PM**	Prep Date: **11/6/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chromium	0.194	0.00500	0.200	0	97.0	80	120			
Cobalt	0.209	0.00500	0.200	0.0106	99.1	80	120			
Lead	0.196	0.00100	0.200	0	98.2	80	120			
Lithium	0.192	0.0100	0.200	0	96.0	80	120			
Molybdenum	0.185	0.00500	0.200	0	92.6	80	120			
Selenium	0.185	0.00500	0.200	0	92.6	80	120			
Thallium	0.205	0.00150	0.200	0	102	80	120			

Sample ID **1510306-01A MS**	Batch ID: **72211**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS3_151109A**	Analysis Date: **11/9/2015 5:42:00 PM**	Prep Date: **11/6/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.196	0.00250	0.200	0	98.2	80	120			
Arsenic	0.193	0.00500	0.200	0	96.4	80	120			
Barium	0.475	0.0100	0.200	0.273	101	80	120			
Beryllium	0.200	0.00100	0.200	0	99.8	80	120			
Boron	0.301	0.0300	0.200	0.112	94.2	80	120			
Cadmium	0.183	0.00100	0.200	0	91.4	80	120			
Calcium	84.0	0.300	5.00	77.0	140	80	120			S
Chromium	0.187	0.00500	0.200	0	93.4	80	120			
Cobalt	0.201	0.00500	0.200	0.0106	95.1	80	120			
Lead	0.189	0.00100	0.200	0	94.3	80	120			
Lithium	0.190	0.0100	0.200	0	94.8	80	120			
Molybdenum	0.186	0.00500	0.200	0	93.0	80	120			
Selenium	0.185	0.00500	0.200	0	92.4	80	120			
Thallium	0.199	0.00150	0.200	0	99.4	80	120			

Sample ID **1510306-01A MSD**	Batch ID: **72211**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS3_151109A**	Analysis Date: **11/9/2015 5:48:00 PM**	Prep Date: **11/6/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.185	0.00250	0.200	0	92.5	80	120	6.03	15	
Arsenic	0.188	0.00500	0.200	0	93.8	80	120	2.79	15	
Barium	0.448	0.0100	0.200	0.273	87.5	80	120	5.79	15	
Beryllium	0.190	0.00100	0.200	0	95.0	80	120	4.93	15	
Boron	0.287	0.0300	0.200	0.112	87.3	80	120	4.73	15	
Cadmium	0.176	0.00100	0.200	0	87.8	80	120	4.13	15	
Calcium	79.5	0.300	5.00	77.0	51.6	80	120	5.41	15	S
Chromium	0.181	0.00500	0.200	0	90.4	80	120	3.26	15	
Cobalt	0.196	0.00500	0.200	0.0106	92.5	80	120	2.67	15	
Lead	0.178	0.00100	0.200	0	89.2	80	120	5.50	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1511031
Project: Sandow

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS3_151109A

Sample ID **1510306-01A MSD**	Batch ID: **72211**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS3_151109A**	Analysis Date: **11/9/2015 5:48:00 PM**	Prep Date: **11/6/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lithium	0.182	0.0100	0.200	0	91.2	80	120	3.82	15	
Molybdenum	0.176	0.00500	0.200	0	88.2	80	120	5.24	15	
Selenium	0.182	0.00500	0.200	0	91.0	80	120	1.53	15	
Thallium	0.189	0.00150	0.200	0	94.4	80	120	5.26	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1511031
Project: Sandow

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS3_151109A

Sample ID **ICV1-151109**	Batch ID: **R82588**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS3_151109A**	Analysis Date: **11/9/2015 12:27:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.100	0.00250	0.100	0	100	90	110			
Arsenic	0.0973	0.00500	0.100	0	97.3	90	110			
Barium	0.0998	0.0100	0.100	0	99.8	90	110			
Beryllium	0.105	0.00100	0.100	0	105	90	110			
Boron	0.0945	0.0300	0.100	0	94.5	90	110			
Cadmium	0.0970	0.00100	0.100	0	97.0	90	110			
Calcium	2.34	0.300	2.50	0	93.5	90	110			
Chromium	0.106	0.00500	0.100	0	106	90	110			
Cobalt	0.108	0.00500	0.100	0	108	90	110			
Lead	0.103	0.00100	0.100	0	103	90	110			
Lithium	0.0997	0.0100	0.100	0	99.7	90	110			
Molybdenum	0.0926	0.00500	0.100	0	92.6	90	110			
Selenium	0.0940	0.00500	0.100	0	94.0	90	110			
Thallium	0.101	0.00150	0.100	0	101	90	110			

Sample ID **ILCVL-151109**	Batch ID: **R82588**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS3_151109A**	Analysis Date: **11/9/2015 12:39:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00189	0.00250	0.00200	0	94.4	70	130			
Arsenic	0.00477	0.00500	0.00500	0	95.3	70	130			
Barium	0.00497	0.0100	0.00500	0	99.5	70	130			
Beryllium	0.00110	0.00100	0.00100	0	110	70	130			
Boron	0.0197	0.0300	0.0200	0	98.4	70	130			
Cadmium	0.00101	0.00100	0.00100	0	101	70	130			
Calcium	0.102	0.300	0.100	0	102	70	130			
Chromium	0.00505	0.00500	0.00500	0	101	70	130			
Cobalt	0.00525	0.00500	0.00500	0	105	70	130			
Lead	0.00108	0.00100	0.00100	0	108	70	130			
Lithium	0.0101	0.0100	0.0100	0	101	70	130			
Molybdenum	0.00482	0.00500	0.00500	0	96.3	70	130			
Selenium	0.00513	0.00500	0.00500	0	103	70	130			
Thallium	0.00106	0.00150	0.00100	0	106	70	130			

Sample ID **CCV1-151109**	Batch ID: **R82588**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS3_151109A**	Analysis Date: **11/9/2015 3:35:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.201	0.00250	0.200	0	100	90	110			
Arsenic	0.192	0.00500	0.200	0	95.8	90	110			
Barium	0.194	0.0100	0.200	0	97.2	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1511031
Project: Sandow

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS3_151109A

Sample ID **CCV1-151109** Batch ID: **R82588** TestNo: **SW6020A** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS3_151109A** Analysis Date: **11/9/2015 3:35:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.205	0.00100	0.200	0	102	90	110			
Boron	0.194	0.0300	0.200	0	97.0	90	110			
Cadmium	0.191	0.00100	0.200	0	95.4	90	110			
Calcium	5.15	0.300	5.00	0	103	90	110			
Chromium	0.194	0.00500	0.200	0	97.0	90	110			
Cobalt	0.202	0.00500	0.200	0	101	90	110			
Lead	0.201	0.00100	0.200	0	101	90	110			
Lithium	0.194	0.0100	0.200	0	96.9	90	110			
Molybdenum	0.187	0.00500	0.200	0	93.6	90	110			
Selenium	0.192	0.00500	0.200	0	96.2	90	110			
Thallium	0.207	0.00150	0.200	0	103	90	110			

Sample ID **LCVL1-151109** Batch ID: **R82588** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS3_151109A** Analysis Date: **11/9/2015 3:53:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00186	0.00250	0.00200	0	93.1	70	130			
Arsenic	0.00461	0.00500	0.00500	0	92.3	70	130			
Barium	0.00485	0.0100	0.00500	0	97.1	70	130			
Beryllium	0.00102	0.00100	0.00100	0	102	70	130			
Boron	0.0190	0.0300	0.0200	0	95.1	70	130			
Cadmium	0.000956	0.00100	0.00100	0	95.6	70	130			
Calcium	0.113	0.300	0.100	0	113	70	130			
Chromium	0.00470	0.00500	0.00500	0	94.0	70	130			
Cobalt	0.00495	0.00500	0.00500	0	99.0	70	130			
Lead	0.00102	0.00100	0.00100	0	102	70	130			
Lithium	0.00951	0.0100	0.0100	0	95.1	70	130			
Molybdenum	0.00445	0.00500	0.00500	0	89.0	70	130			
Selenium	0.00483	0.00500	0.00500	0	96.6	70	130			
Thallium	0.00100	0.00150	0.00100	0	100	70	130			

Sample ID **CCV2-151109** Batch ID: **R82588** TestNo: **SW6020A** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS3_151109A** Analysis Date: **11/9/2015 5:54:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.202	0.00250	0.200	0	101	90	110			
Arsenic	0.200	0.00500	0.200	0	99.8	90	110			
Barium	0.201	0.0100	0.200	0	100	90	110			
Beryllium	0.215	0.00100	0.200	0	108	90	110			
Boron	0.198	0.0300	0.200	0	99.2	90	110			
Cadmium	0.192	0.00100	0.200	0	96.1	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1511031
Project: Sandow

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS3_151109A

Sample ID **CCV2-151109** Batch ID: **R82588** TestNo: **SW6020A** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS3_151109A** Analysis Date: **11/9/2015 5:54:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	5.44	0.300	5.00	0	109	90	110			
Chromium	0.200	0.00500	0.200	0	99.8	90	110			
Cobalt	0.210	0.00500	0.200	0	105	90	110			
Lead	0.204	0.00100	0.200	0	102	90	110			
Lithium	0.208	0.0100	0.200	0	104	90	110			
Molybdenum	0.192	0.00500	0.200	0	96.2	90	110			
Selenium	0.200	0.00500	0.200	0	100	90	110			
Thallium	0.212	0.00150	0.200	0	106	90	110			

Sample ID **LCVL2-151109** Batch ID: **R82588** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS3_151109A** Analysis Date: **11/9/2015 6:12:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00192	0.00250	0.00200	0	96.0	70	130			
Arsenic	0.00484	0.00500	0.00500	0	96.7	70	130			
Barium	0.00493	0.0100	0.00500	0	98.7	70	130			
Beryllium	0.00103	0.00100	0.00100	0	103	70	130			
Boron	0.0200	0.0300	0.0200	0	100	70	130			
Cadmium	0.00101	0.00100	0.00100	0	101	70	130			
Calcium	0.131	0.300	0.100	0	131	70	130			S
Chromium	0.00482	0.00500	0.00500	0	96.4	70	130			
Cobalt	0.00508	0.00500	0.00500	0	102	70	130			
Lead	0.00103	0.00100	0.00100	0	103	70	130			
Lithium	0.00992	0.0100	0.0100	0	99.2	70	130			
Molybdenum	0.00456	0.00500	0.00500	0	91.2	70	130			
Selenium	0.00499	0.00500	0.00500	0	99.7	70	130			
Thallium	0.00101	0.00150	0.00100	0	101	70	130			

Sample ID **CCV3-151105** Batch ID: **R82588** TestNo: **SW6020A** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS3_151109A** Analysis Date: **11/9/2015 7:42:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.222	0.00250	0.200	0	111	90	110			S
Arsenic	0.216	0.00500	0.200	0	108	90	110			
Barium	0.217	0.0100	0.200	0	109	90	110			
Boron	0.204	0.0300	0.200	0	102	90	110			
Cadmium	0.210	0.00100	0.200	0	105	90	110			
Chromium	0.219	0.00500	0.200	0	109	90	110			
Lead	0.219	0.00100	0.200	0	109	90	110			
Lithium	0.216	0.0100	0.200	0	108	90	110			
Molybdenum	0.212	0.00500	0.200	0	106	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1511031
Project: Sandow

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS3_151109A

Sample ID **CCV3-151105**	Batch ID: **R82588**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS3_151109A**	Analysis Date: **11/9/2015 7:42:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Selenium	0.208	0.00500	0.200	0	104	90	110			

Sample ID **LCVL3-151105**	Batch ID: **R82588**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS3_151109A**	Analysis Date: **11/9/2015 8:13:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00206	0.00250	0.00200	0	103	70	130			
Arsenic	0.00506	0.00500	0.00500	0	101	70	130			
Barium	0.00534	0.0100	0.00500	0	107	70	130			
Boron	0.0193	0.0300	0.0200	0	96.4	70	130			
Cadmium	0.00105	0.00100	0.00100	0	105	70	130			
Chromium	0.00534	0.00500	0.00500	0	107	70	130			
Lead	0.00105	0.00100	0.00100	0	105	70	130			
Lithium	0.0106	0.0100	0.0100	0	106	70	130			
Molybdenum	0.00512	0.00500	0.00500	0	103	70	130			
Selenium	0.00526	0.00500	0.00500	0	105	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1511031
Project: Sandow

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_151110B

The QC data in batch 72211 applies to the following samples: 1511031-01A, 1511031-02A, 1511031-03A, 1511031-04A

Sample ID **1510306-01A SD** Batch ID: **72211** TestNo: **SW6020A** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS4_151110B** Analysis Date: **11/10/2015 1:12:00 PM** Prep Date: **11/6/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	75.5	15.0	0	76.3				1.05	10	

Sample ID **1510306-01A PDS** Batch ID: **72211** TestNo: **SW6020A** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS4_151110B** Analysis Date: **11/10/2015 1:32:00 PM** Prep Date: **11/6/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	117	3.00	50.0	76.3	81.6	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1511031
Project: Sandow

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_151110B

Sample ID	**ICV-151110**	Batch ID:	**R82595**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**ICP-MS4_151110B**	Analysis Date:	**11/10/2015 10:51:00 A**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.102	0.00100	0.100	0	102	90	110			
Calcium	2.25	0.300	2.50	0	90.0	90	110			
Cobalt	0.110	0.00500	0.100	0	110	90	110			
Lead	0.103	0.00100	0.100	0	103	90	110			
Thallium	0.102	0.00150	0.100	0	102	90	110			

Sample ID	**LCVL-151110**	Batch ID:	**R82595**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_151110B**	Analysis Date:	**11/10/2015 10:59:00 A**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.00126	0.00100	0.00100	0	126	70	130			
Calcium	0.0951	0.300	0.100	0	95.1	70	130			
Cobalt	0.00546	0.00500	0.00500	0	109	70	130			
Lead	0.00103	0.00100	0.00100	0	103	70	130			
Thallium	0.00104	0.00150	0.00100	0	104	70	130			

Sample ID	**CCV3-151110**	Batch ID:	**R82595**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_151110B**	Analysis Date:	**11/10/2015 12:38:00 P**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.78	0.300	5.00	0	95.6	90	110			

Sample ID	**LCVL3-151110**	Batch ID:	**R82595**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_151110B**	Analysis Date:	**11/10/2015 12:42:00 P**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.102	0.300	0.100	0	102	70	130			

Sample ID	**CCV4-151110**	Batch ID:	**R82595**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_151110B**	Analysis Date:	**11/10/2015 12:58:00 P**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.84	0.300	5.00	0	96.8	90	110			

Sample ID	**LCVL4-151110**	Batch ID:	**R82595**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_151110B**	Analysis Date:	**11/10/2015 1:05:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.101	0.300	0.100	0	101	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1511031
Project: Sandow

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_151110B

Sample ID **CCV5-151110** Batch ID: **R82595** TestNo: **SW6020A** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS4_151110B** Analysis Date: **11/10/2015 1:34:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.200	0.00100	0.200	0	99.9	90	110			
Calcium	4.80	0.300	5.00	0	96.0	90	110			
Cobalt	0.203	0.00500	0.200	0	102	90	110			
Lead	0.191	0.00100	0.200	0	95.7	90	110			
Thallium	0.197	0.00150	0.200	0	98.3	90	110			

Sample ID **LCVL5-151110** Batch ID: **R82595** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS4_151110B** Analysis Date: **11/10/2015 1:38:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.000933	0.00100	0.00100	0	93.3	70	130			
Calcium	0.0950	0.300	0.100	0	95.0	70	130			
Cobalt	0.00538	0.00500	0.00500	0	108	70	130			
Lead	0.00100	0.00100	0.00100	0	100	70	130			
Thallium	0.00101	0.00150	0.00100	0	101	70	130			

Sample ID **CCV6-151110** Batch ID: **R82595** TestNo: **SW6020A** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS4_151110B** Analysis Date: **11/10/2015 2:01:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.204	0.00100	0.200	0	102	90	110			
Cobalt	0.203	0.00500	0.200	0	101	90	110			
Lead	0.191	0.00100	0.200	0	95.7	90	110			
Thallium	0.196	0.00150	0.200	0	97.8	90	110			

Sample ID **LCVL6-151110** Batch ID: **R82595** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS4_151110B** Analysis Date: **11/10/2015 2:05:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.000981	0.00100	0.00100	0	98.1	70	130			
Cobalt	0.00531	0.00500	0.00500	0	106	70	130			
Lead	0.00101	0.00100	0.00100	0	101	70	130			
Thallium	0.00101	0.00150	0.00100	0	101	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1511031
Project: Sandow

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_151109A

The QC data in batch 72221 applies to the following samples: 1511031-01D, 1511031-02D, 1511031-03D, 1511031-04D

Sample ID	MB-72221	Batch ID:	72221	TestNo:	E300	Units:	mg/L
SampType:	MBLK	Run ID:	IC2_151109A	Analysis Date:	11/9/2015 9:45:32 AM	Prep Date:	11/9/2015

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	<0.300	1.00								
Fluoride	<0.100	0.400								
Sulfate	<1.00	3.00								

Sample ID	LCSD-72221	Batch ID:	72221	TestNo:	E300	Units:	mg/L
SampType:	LCSD	Run ID:	IC2_151109A	Analysis Date:	11/9/2015 10:14:41 AM	Prep Date:	11/9/2015

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.0	1.00	10.00	0	100	90	110	1.05	20	
Fluoride	3.62	0.400	4.000	0	90.6	90	110	1.96	20	
Sulfate	29.6	3.00	30.00	0	98.8	90	110	1.44	20	

Sample ID	LCS-72221	Batch ID:	72221	TestNo:	E300	Units:	mg/L
SampType:	LCS	Run ID:	IC2_151109A	Analysis Date:	11/9/2015 10:30:26 AM	Prep Date:	11/9/2015

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.1	1.00	10.00	0	101	90	110			
Fluoride	3.69	0.400	4.000	0	92.3	90	110			
Sulfate	30.1	3.00	30.00	0	100	90	110			

Sample ID	1511077-02AMS	Batch ID:	72221	TestNo:	E300	Units:	mg/L
SampType:	MS	Run ID:	IC2_151109A	Analysis Date:	11/9/2015 11:09:31 AM	Prep Date:	11/9/2015

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2280	100	2000	151.0	106	90	110			
Fluoride	1950	40.0	2000	0	97.5	90	110			
Sulfate	4000	300	2000	1839	108	90	110			

Sample ID	1511077-02AMSD	Batch ID:	72221	TestNo:	E300	Units:	mg/L
SampType:	MSD	Run ID:	IC2_151109A	Analysis Date:	11/9/2015 11:24:06 AM	Prep Date:	11/9/2015

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2280	100	2000	151.0	106	90	110	0.029	20	
Fluoride	2000	40.0	2000	0	100	90	110	2.62	20	
Sulfate	3940	300	2000	1839	105	90	110	1.50	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1511031
Project: Sandow

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_151109A

Sample ID **ICV-151109**	Batch ID: **R82596**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC2_151109A**	Analysis Date: **11/9/2015 9:08:45 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	24.7	1.00	25.00	0	98.9	90	110			
Fluoride	9.76	0.400	10.00	0	97.6	90	110			
Sulfate	75.5	3.00	75.00	0	101	90	110			

Sample ID **CCV1-151109**	Batch ID: **R82596**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_151109A**	Analysis Date: **11/9/2015 1:57:13 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.0	1.00	10.00	0	100	90	110			
Fluoride	3.88	0.400	4.000	0	96.9	90	110			
Sulfate	30.1	3.00	30.00	0	100	90	110			

Sample ID **CCV2-151109**	Batch ID: **R82596**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_151109A**	Analysis Date: **11/9/2015 4:08:45 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.94	1.00	10.00	0	99.4	90	110			
Fluoride	3.89	0.400	4.000	0	97.3	90	110			
Sulfate	29.8	3.00	30.00	0	99.2	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1511031
Project: Sandow

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_151104A

The QC data in batch 72158 applies to the following samples: 1511031-01D, 1511031-02D, 1511031-03D, 1511031-04D

Sample ID	**1511031-04D DUP**	Batch ID:	**72158**	TestNo:	**M4500-H+ B**	Units:	**pH Units@17.9℃**
SampType:	**DUP**	Run ID:	**TITRATOR_151104A**	Analysis Date:	**11/4/2015 9:58:00 AM**	Prep Date:	**11/4/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	5.98	0	0	6.010				0.500	5	

Sample ID	**1511047-02C DUP**	Batch ID:	**72158**	TestNo:	**M4500-H+ B**	Units:	**pH Units@14.1℃**
SampType:	**DUP**	Run ID:	**TITRATOR_151104A**	Analysis Date:	**11/4/2015 12:24:00 PM**	Prep Date:	**11/4/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	7.28	0	0	7.320				0.548	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1511031
Project: Sandow

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_151104A

Sample ID	**ICV-151104**	Batch ID:	**R82520**	TestNo:	**M4500-H+ B**	Units:	**pH Units@22℃**
SampType:	**ICV**	Run ID:	**TITRATOR_151104A**	Analysis Date:	**11/4/2015 9:45:00 AM**	Prep Date:	**11/4/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	9.97	0	10.00	0	99.7	99	101			

Sample ID	**CCV2-151104**	Batch ID:	**R82520**	TestNo:	**M4500-H+ B**	Units:	**pH Units@22.4℃**
SampType:	**CCV**	Run ID:	**TITRATOR_151104A**	Analysis Date:	**11/4/2015 2:23:00 PM**	Prep Date:	**11/4/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.98	0	7.000	0	99.7	97.1	102.9			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1511031
Project: Sandow

ANALYTICAL QC SUMMARY REPORT

RunID: WC_151105D

The QC data in batch 72200 applies to the following samples: 1511031-01D, 1511031-02D, 1511031-03D, 1511031-04D

Sample ID	**MB-72200**	Batch ID:	**72200**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**WC_151105D**	Analysis Date:	**11/6/2015 7:55:00 AM**	Prep Date:	**11/5/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	<10.0	10.0								

Sample ID	**LCS-72200**	Batch ID:	**72200**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**WC_151105D**	Analysis Date:	**11/6/2015 7:55:00 AM**	Prep Date:	**11/5/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	729	10.0	745.6	0	97.8	90	113			

Sample ID	**1511043-01B-DUP**	Batch ID:	**72200**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_151105D**	Analysis Date:	**11/6/2015 7:55:00 AM**	Prep Date:	**11/5/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	536	10.0	0	533.0				0.561	5	

Sample ID	**1511058-01B-DUP**	Batch ID:	**72200**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_151105D**	Analysis Date:	**11/6/2015 7:55:00 AM**	Prep Date:	**11/5/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	916	10.0	0	917.0				0.109	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

GEL Laboratories LLC
a member of The GEL Group INC

PO Box 30712 Charleston, SC 29417
2040 Savage Road Charleston, SC 29407
P 843.556.8171
F 843.766.1178

gel.com

December 03, 2015

Mr. John DuPont
DHL Analytical
2300 Double Creek Drive
Round Rock, Texas 78664

Re: Routine Analysis
Work Order: 385086
SDG: 1511031

Dear Mr. DuPont:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on November 09, 2015. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4707.

Sincerely,

Anna C Day

Anna Day
Project Manager

Purchase Order: 13992
Enclosures

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 − (843) 556−8171 − www.gel.com

Certificate of Analysis Report
for

DHLA002 DHL Analytical

Client SDG: 1511031 GEL Work Order: 385086

The Qualifiers in this report are defined as follows:

* A quality control analyte recovery is outside of specified acceptance criteria

** Analyte is a Tracer compound

** Analyte is a surrogate compound

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Anna Day.

Reviewed by Anna C Day

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: December 3, 2015

Company : DHL Analytical
Address : 2300 Double Creek Drive

Round Rock, Texas 78664
Contact: Mr. John DuPont
Project: Routine Analysis

Client Sample ID: AX-28
Sample ID: 385086001
Matrix: Water
Collect Date: 03-NOV-15 09:40
Receive Date: 09-NOV-15
Collector: Client

Project: DHLA00112
Client ID: DHLA002

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting												
GFPC, Ra228, Liquid "As Received"												
Radium-228		2.51	+/-1.04	1.37	3.00	pCi/L		AXM6	12/03/15	1029	1525788	1
Rad Radium-226												
Lucas Cell, Ra226, liquid "As Received"												
Radium-226		1.44	+/-0.459	0.466	1.00	pCi/L		CXP3	12/01/15	0705	1523135	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			92.8	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: December 3, 2015

Company :	DHL Analytical
Address :	2300 Double Creek Drive
	Round Rock, Texas 78664
Contact:	Mr. John DuPont
Project:	Routine Analysis

Client Sample ID:	AX-27	Project:	DHLA00112
Sample ID:	385086002	Client ID:	DHLA002
Matrix:	Water		
Collect Date:	03-NOV-15 10:50		
Receive Date:	09-NOV-15		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting												
GFPC, Ra228, Liquid "As Received"												
Radium-228		2.01	+/-1.21	1.87	3.00	pCi/L		AXM6	12/03/15	1029	1525788	1
Rad Radium-226												
Lucas Cell, Ra226, liquid "As Received"												
Radium-226		1.06	+/-0.325	0.323	1.00	pCi/L		CXP3	12/01/15	0705	1523135	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			94	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: December 3, 2015

Company :	DHL Analytical
Address :	2300 Double Creek Drive
	Round Rock, Texas 78664
Contact:	Mr. John DuPont
Project:	Routine Analysis

Client Sample ID:	AX-26	Project:	DHLA00112
Sample ID:	385086003	Client ID:	DHLA002
Matrix:	Water		
Collect Date:	03-NOV-15 11:45		
Receive Date:	09-NOV-15		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting												
GFPC, Ra228, Liquid "As Received"												
Radium-228	U	0.893	+/-1.05	1.77	3.00	pCi/L		AXM6	12/03/15	1029	1525788	1
Rad Radium-226												
Lucas Cell, Ra226, liquid "As Received"												
Radium-226		1.82	+/-0.484	0.438	1.00	pCi/L		CXP3	12/01/15	0705	1523135	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			93.6	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: December 3, 2015

Company :	DHL Analytical
Address :	2300 Double Creek Drive
	Round Rock, Texas 78664
Contact:	Mr. John DuPont
Project:	Routine Analysis

Client Sample ID:	AXMW-1	Project:	DHLA00112
Sample ID:	385086004	Client ID:	DHLA002
Matrix:	Water		
Collect Date:	03-NOV-15 12:45		
Receive Date:	09-NOV-15		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting												
GFPC, Ra228, Liquid "As Received"												
Radium-228		2.84	+/-1.10	1.44	3.00	pCi/L		AXM6	12/03/15	1029	1525788	1
Rad Radium-226												
Lucas Cell, Ra226, liquid "As Received"												
Radium-226		1.63	+/-0.407	0.352	1.00	pCi/L		CXP3	12/01/15	0705	1523135	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			88	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

QC Summary

Report Date: December 3, 2015

DHL Analytical
2300 Double Creek Drive
Round Rock, Texas

Contact: **Mr. John DuPont**

Workorder: **385086**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gas Flow										
Batch 1525788										
QC1203439721 384907006 DUP										
Radium-228		2.73		2.63	pCi/L	3.72		(0% - 100%)	AXM6	12/03/15 10:29
	Uncertainty	+/-1.12		+/-1.23						
QC1203439722 LCS										
Radium-228	29.1			23.8	pCi/L		81.7	(75%-125%)		12/03/15 10:29
	Uncertainty			+/-2.54						
QC1203439720 MB										
Radium-228				2.78	pCi/L					12/03/15 10:29
	Uncertainty			+/-1.39						
Rad Ra-226										
Batch 1523135										
QC1203432991 385424001 DUP										
Radium-226		2.59		2.14	pCi/L	19.2		(0% - 100%)	CXP3	12/01/15 07:35
	Uncertainty	+/-0.642		+/-0.580						
QC1203432993 LCS										
Radium-226	24.4			25.0	pCi/L		102	(75%-125%)		12/01/15 08:10
	Uncertainty			+/-1.63						
QC1203432990 MB										
Radium-226				0.185	pCi/L					12/01/15 07:35
	Uncertainty			+/-0.144						
QC1203432992 385424001 MS										
Radium-226	122	2.59		95.6	pCi/L		76.2	(75%-125%)		12/01/15 07:35
	Uncertainty	+/-0.642		+/-6.31						

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

- ** Analyte is a Tracer compound
- < Result is less than value reported
- > Result is greater than value reported
- BD Results are either below the MDC or tracer recovery is low
- FA Failed analysis.
- H Analytical holding time was exceeded
- J Value is estimated
- K Analyte present. Reported value may be biased high. Actual value is expected to be lower.
- L Analyte present. Reported value may be biased low. Actual value is expected to be higher.
- M M if above MDC and less than LLD
- M REMP Result > MDC/CL and < RDL
- N/A RPD or %Recovery limits do not apply.

QC Summary

Workorder: 385086

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time

N1 See case narrative

ND Analyte concentration is not detected above the detection limit

NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

Q One or more quality control criteria have not been met. Refer to the applicable narrative or DER.

R Sample results are rejected

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

UI Gamma Spectroscopy--Uncertain identification

UJ Gamma Spectroscopy--Uncertain identification

UL Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.

X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

Y Other specific qualifiers were required to properly define the results. Consult case narrative.

^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.

h Preparation or preservation holding time was exceeded

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

There are no "Data Exception Reports" associated with this analytical report.

3950806

CHAIN-OF-CUSTODY RECORD

FAX: *(512) 388-8229*

TEL: (843) 556-8171
FAX:
Acct #:

03-Nov-15

	Matrix	DHL#	Date Collected	Bottle Type	226 E903.1	228 E904.0	Requested Tests			
	Aqueous	-01B	11/03/15 09:40 AM	500HDPEHNO3		1				
	Aqueous	-01C	11/03/15 09:40 AM	500HDPEHNO3	1					
	Aqueous	-02B	11/03/15 10:50 AM	500HDPEHNO3		1				
	Aqueous	-02C	11/03/15 10:50 AM	500HDPEHNO3	1					
	Aqueous	-03B	11/03/15 11:45 AM	500HDPEHNO3		1				
	Aqueous	-03C	11/03/15 11:45 AM	500HDPEHNO3	1					
	Aqueous	-04B	11/03/15 12:45 PM	500HDPEHNO3		1				
	Aqueous	-04C	11/03/15 12:45 PM	500HDPEHNO3	1					

e analyze these samples with a Standard Turnaround Time.
ohn DuPont if you have questions.
y Control Package Needed: Standard / _____
. report to both cac@dhlanalytical.com & dupont@dhlanalytical.com

	Date/Time		Date/Time
	11/4/15 1730	Received by:	11/4/15 1730
		Received by: B Luthman	11/9/15 0915

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: DHLA	**SDG/AR/COC/Work Order:** 385086
Received By: Brielle Luthman	**Date Received:** 11/9/15 0915

Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?		/	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0
Classified Radioactive II or III by RSO?		/	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?		/	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		/	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?		/	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		/	

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	/			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*		/		Preservation Method: Ice bags Blue ice Dry ice (None) Other (describe) *all temperatures are recorded in Celsius 1.6°
2a	Daily check performed and passed on IR temperature gun?	/			Temperature Device Serial #: Secondary Temperature Device Serial # (If Applicable): 150340071
3	Chain of custody documents included with shipment?	/			
4	Sample containers intact and sealed?	/			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?	/			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	Do Low Level Perchlorate samples have headspace as required?		/		Sample ID's and containers affected:
7	VOA vials contain acid preservation?		/		(If unknown, select No)
8	VOA vials free of headspace (defined as < 6mm bubble)?		/		Sample ID's and containers affected:
9	Are Encore containers present?			/	(If yes, immediately deliver to Volatiles laboratory)
10	Samples received within holding time?	/			ID's and tests affected:
11	Sample ID's on COC match ID's on bottles?	/			Sample ID's and containers affected:
12	Date & time on COC match date & time on bottles?	/			Sample ID's affected:
13	Number of containers received match number indicated on COC?	/			Sample ID's affected:
14	Are sample containers identifiable as GEL provided?			/	
15	COC form is properly signed in relinquished/received sections?	/			
16	Carrier and tracking number.				Circle Applicable: FedEx Air (FedEx Ground) UPS Field Services Courier Other 7748 9381 3609

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials AWD Date 11/9/15 Page 1 of 1 GL-CHL-SR-001 Rev 2

List of current GEL Certifications as of 03 December 2015

State	Certification
Alaska	UST−110
Arkansas	88−0651
CLIA	42D0904046
California	2940 Interim
Colorado	SC00012
Connecticut	PH−0169
Delaware	SC000122013−10
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330−15−00283, P330−15−00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC000122013−10
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C−SC−01
Kansas NELAP	E−10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA150001
Maryland	270
Massachusetts	M−SC012
Michigan	9976
Mississippi	SC000122013−10
Nebraska	NE−OS−26−13
Nevada	SC000122016−1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R−158
Oklahoma	9904
Pennsylvania NELAP	68−00485
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235−15−10
Utah NELAP	SC000122015−19
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

January 22, 2016

Will Vienne
Pastor, Behling & Wheeler
2201 Double Creek Dr #4004
Round Rock, Texas 78664
TEL: (512) 671-3434
FAX (512) 671-3446

Order No.: 1512238

RE: Sandow - AX Landfill

Dear Will Vienne:

DHL Analytical, Inc. received 10 sample(s) on 12/17/2015 for the analyses presented in the following report.

There were no problems with the analyses and all data met requirements of NELAC except where noted in the Case Narrative. All non-NELAC methods will be identified accordingly in the case narrative and all estimated uncertainties of test results are within method or EPA specifications.

If you have any questions regarding these tests results, please feel free to call. Thank you for using DHL Analytical.

Sincerely,

John DuPont
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-15-15

Table of Contents

DHL ANALYTICAL
2300 Double Creek Dr. ■ Round Rock, TX 78664
Phone (512) 388-8222 ■ FAX (512) 388-8229
Web: www.dhlanalytical.com
E-Mail: login@dhlanalytical.com

CHA

CLIENT: Pastor, Behling & Wheeler
ADDRESS: 2201 Double Creek Dr. Ste 4004
PHONE: (512) 671-3434 FAX/E-MAIL:
DATA REPORTED TO: Will Vienne will.vienne@pbwllc.com
ADDITIONAL REPORT COPIES TO: Sara Taube sara.taube@pbwllc.com

DATE: 12/17/15
PO #: DHL WORK ORD
PROJECT LOCATION OR NAME: Sandow AX
CLENT PROJECT #: 5164E COLL

Authorize 5% surcharge for TRRP Report? ☐ Yes ☑ No

S=SOIL W=WATER A=AIR L=LIQUID SE=SEDIMENT
P=PAINT SL=SLUDGE O=OTHER SO=SOLID

PRESERVATION: HCl | HNO_3 | H_2SO_4 ☐ NaOH ☐ | ICE | UNPRESERVED

ANALYSES: BTEX ☐ MTBE ☐ 8021] TPH 1005 ☐ TPH 1006 ☐ HOLD 1006 ☐ GRO (METHOD 8015) ☐ DRO (METHOD 8105) ☐ VOC 8260 ☐ VOC 624 ☐ VOC 8260/5035 ☐ SVOC 8270 ☐ PAH 8270 ☐ HOLD PAH ☐ SVOC 625 ☐ 8270 PEST ☐ 625 PEST/PCB ☐ 8082 PCB ☐ 608 PCB ☐ 8270 PCB ☐ 8270 O-P PEST ☐ 8321 HERB ☐ T PHOS, AMMONIA ☐ METALS 6020 ☐ METALS 200.8 ☐ DISS. METALS ☐ RCRA ☐ TX11 ☐ PH ☐ HEX CHROM ☐ ALKALINITY ☐ CHLORIDE ☐ ANIONS TCLP-SVOC ☐ VOC ☐ TCLP-METALS ☐ RCI ☐ TDS

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESERVED
AX-22R	01	12/17/15	8:20	L		4		X		X	
AX MW-2	02		10:10								
AX-29	03		10:35								
AX-23	04		11:30								
AX MW-1	05		12:50								
AX-27	06		13:35								
AX-26	07	↓	14:55	↓		↓		↓		↓	

RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature) Jane Taube DATE/TIME 12/17/15 16:51 RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)

TURN AROUND TIME
RUSH ☐ CALL FIRST
1 DAY ☐ CALL FIRST
2 DAY ☐
NORMAL ☐
OTHER ☐

LABORATORY USE O
RECEIVING TEMP: 3.
CUSTODY SEALS: ☐
CARRIER: ☐ LONE S
☐ COURIER DELIVERY
☐ HAND DELIVERED

DHL ANALYTICAL
2300 Double Creek Dr. ■ Round Rock, TX 78664
Phone (512) 388-8222 ■ FAX (512) 388-8229
Web: www.dhlanalytical.com
E-Mail: login@dhlanalytical.com

CHA

CLIENT: Pastor, Behling & Wheeler
ADDRESS: 2201 Double Creek Dr. Ste 4004
PHONE: (512) 671-3434 FAX/E-MAIL:
DATA REPORTED TO: Will Vienne will.vienne@pbwllc.com
ADDITIONAL REPORT COPIES TO: Sara Taube sara.taube@pbwllc.com

DATE: 12/18/2015
PO #: DHL WORK ORD
PROJECT LOCATION OR NAME: Sandow AX L
CLENT PROJECT #: 5164E COLL

Authorize 5% surcharge for TRRP Report? ☐ Yes ☐ No

S=SOIL P=PAINT
W=WATER SL=SLUDGE
A=AIR O=OTHER
L=LIQUID SO=SOLID
SE=SEDIMENT

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	PRESERVATION: HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESERVED
AX-24	08	12/18/15	8:50	W	plastic	4		X			
AX-25	089	↓	9:30	↓	↓	↓		↓			
AX-28	10	↓	10:40	↓	↓	↓		↓			

ANALYSES: BTEX ☐ MTBE ☐ [METHOD 8021] TPH 1005 ☐ TPH 1006 ☐ HOLD 1006 ☐ GRO [METHOD 8015] ☐ DRO [METHOD 8105] ☐ VOC 8260 ☐ VOC 624 ☐ VOC 8260/5035 ☐ SVOC 8270 ☐ PAH 8270 ☐ HOLD PAH ☐ SVOC 625 ☐ 8270 PEST ☐ 625 PEST/PCB ☐ 608 PCB ☐ 8270 PCB ☐ 8270 O-P PEST ☐ 8082 PCB ☐ 8270 PCB ☐ 8321 HERB ☐ T PHOS, AMMONIA ☐ METALS 6020 ☐ METALS 200.8 ☐ DISS. METALS ☐ RCRA ☐ TX11 ☐ PH ☐ HEX CHROM ☐ ALKALINITY ☐ CHLORIDE ☐ ANIONS TCLP-SVOC ☐ VOC ☐ TCLP-METALS ☐ RCI ☐ TDS

RELINQUISHED BY: (Signature) Sara Taube DATE/TIME 12/18/15 RECEIVED BY: (Signature) 1710
RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)

TURN AROUND TIME
RUSH ☐ CALL FIRST
1 DAY ☐ CALL FIRST
2 DAY ☐
NORMAL ☐
OTHER ☐

LABORATORY USE O
RECEIVING TEMP:
CUSTODY SEALS: ☐
CARRIER: ☐ LONE S
☐ COURIER DELIVERY
☑ HAND DELIVERED

John Dupont

From: Sara Taube [Sara.Taube@pbwllc.com]
Sent: Wednesday, July 22, 2015 12:05 PM
To: John Dupont
Subject: CCR Appendix III and IV
Follow Up Flag: Follow up
Flag Status: Completed

Hi John,

Here are the Appendix III and Appendix IV constituents that we will need to have analyzed under the CCR Rule.

Appendix III
Boron
Calcium
Chloride
Fluoride
pH
sulfate
TDS

Appendix IV
Antimony
Arsenic
Barium
Beryllium
Cadmium
Chromium
Cobalt
Fluoride
Lead
Lithium
Mercury
Molybdenum
Selenium
Thallium
Radium 226 and 228

We are looking to have approximately 74 wells sampled 8 times over the course of the next two years. Please let me know if there is any more information you might need.

Cheers,

Sara

10/26/2015

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name **Pastor, Behling & Wheeler**

Date Received: **12/17/2015**

Work Order Number **1512238**

Received by **JB**

Checklist completed by: Signature 12/17/2015 Date

Reviewed by: Initials 12/17/2015 Date

Carrier name Hand Delivered

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	3.1 °C, 29
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH<2 acceptable upon receipt?	Yes ☑	No ☐	NA ☐ LOT # 8086
	Adjusted? no		Checked by
Water - ph>9 (S) or ph>12 (CN) acceptable upon receipt?	Yes ☐	No ☐	NA ☑ LOT #
	Adjusted?		Checked by

Any No response must be detailed in the comments section below.

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding _____

Comments: _____

Corrective Action _____

Page 1 of 1

DHL Analytical, Inc. **Date:** *22-Jan-16*

CLIENT: Pastor, Behling & Wheeler
Project: Sandow - AX Landfill
Lab Order: 1512238

CASE NARRATIVE

Samples were analyzed using the methods outlined in the following references:

Method SW6020A - Metals Analysis
Method SW7470A - Mercury Analysis
Method E300 - Anions Analysis
Method M4500-H+ B - pH of a Water Analysis
Method M2540C - TDS Analysis
Sub-contract - Radium-228 and Radium-226 analyses by methods E904.0/SW8469320 Modified and E903.1 Modified. Analyzed at GEL Laboratory.

LOG IN

The samples were received and log-in performed on 12/17/15. A total of 10 samples were received. The samples arrived in good condition and were properly packaged.

METALS ANALYSIS

For Metals analysis performed on 1/5/16 Boron was detected below the reporting limit in the method blank (MB-72945). All samples may be biased high for this analyte. No further corrective actions were taken.

For Metals analysis performed on 1/5/16 the matrix spike and matrix spike duplicate recoveries were out of control limits for Boron and/or Calcium. These are flagged accordingly in the QC summary report. The sample selected for the matrix spike and matrix spike duplicate was not from this work order. The LCS was within control limits for these analytes. No further corrective actions were taken.

DHL Analytical, Inc.

Date: *22-Jan-16*

CLIENT: Pastor, Behling & Wheeler
Project: Sandow - AX Landfill
Lab Order: 1512238

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
1512238-01	AX-22R		12/17/15 08:20 AM	12/17/2015
1512238-02	AXMW-2		12/17/15 10:10 AM	12/17/2015
1512238-03	AX-29		12/17/15 10:35 AM	12/17/2015
1512238-04	AX-23		12/17/15 11:30 AM	12/17/2015
1512238-05	AXMW-1		12/17/15 12:50 PM	12/17/2015
1512238-06	AX-27		12/17/15 01:35 PM	12/17/2015
1512238-07	AX-26		12/17/15 02:55 PM	12/17/2015
1512238-08	AX-24		12/18/15 08:50 AM	12/18/2015
1512238-09	AX-25		12/18/15 09:30 AM	12/18/2015
1512238-10	AX-28		12/18/15 10:40 AM	12/18/2015

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PREP DATES REPORT

Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
12/17/15 08:20 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/15 09:04 AM	72945
12/17/15 08:20 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/15 09:04 AM	72945
12/17/15 08:20 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/15 09:04 AM	72945
12/17/15 08:20 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	12/19/15 10:27 AM	72834
12/17/15 08:20 AM	Aqueous	E300	Anion Preparation	12/28/15 09:54 AM	72953
12/17/15 08:20 AM	Aqueous	E300	Anion Preparation	12/28/15 09:54 AM	72953
12/17/15 08:20 AM	Aqueous	M4500-H+ B	pH Preparation	12/18/15 08:50 AM	72803
12/17/15 08:20 AM	Aqueous	M2540C	TDS Preparation	12/21/15 01:00 PM	72884
12/17/15 10:10 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/15 09:04 AM	72945
12/17/15 10:10 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/15 09:04 AM	72945
12/17/15 10:10 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/15 09:04 AM	72945
12/17/15 10:10 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	12/19/15 10:27 AM	72834
12/17/15 10:10 AM	Aqueous	E300	Anion Preparation	12/28/15 09:54 AM	72953
12/17/15 10:10 AM	Aqueous	E300	Anion Preparation	12/28/15 09:54 AM	72953
12/17/15 10:10 AM	Aqueous	M4500-H+ B	pH Preparation	12/18/15 08:50 AM	72803
12/17/15 10:10 AM	Aqueous	M2540C	TDS Preparation	12/21/15 01:00 PM	72884
12/17/15 10:35 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/15 09:04 AM	72945
12/17/15 10:35 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/15 09:04 AM	72945
12/17/15 10:35 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/15 09:04 AM	72945
12/17/15 10:35 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	12/19/15 10:27 AM	72834
12/17/15 10:35 AM	Aqueous	E300	Anion Preparation	12/28/15 09:54 AM	72953
12/17/15 10:35 AM	Aqueous	E300	Anion Preparation	12/28/15 09:54 AM	72953
12/17/15 10:35 AM	Aqueous	M4500-H+ B	pH Preparation	12/18/15 08:50 AM	72803
12/17/15 10:35 AM	Aqueous	M2540C	TDS Preparation	12/22/15 02:43 PM	72907
12/17/15 11:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/15 09:04 AM	72945
12/17/15 11:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/15 09:04 AM	72945
12/17/15 11:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/15 09:04 AM	72945
12/17/15 11:30 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	12/19/15 10:27 AM	72834

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PREP DATES REPORT

Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
12/17/15 11:30 AM	Aqueous	E300	Anion Preparation	12/28/15 09:54 AM	72953
12/17/15 11:30 AM	Aqueous	M4500-H+ B	pH Preparation	12/18/15 08:50 AM	72803
12/17/15 11:30 AM	Aqueous	M2540C	TDS Preparation	12/22/15 02:43 PM	72907
12/17/15 12:50 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/15 09:04 AM	72945
12/17/15 12:50 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/15 09:04 AM	72945
12/17/15 12:50 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/15 09:04 AM	72945
12/17/15 12:50 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	12/19/15 10:27 AM	72834
12/17/15 12:50 PM	Aqueous	E300	Anion Preparation	12/28/15 09:54 AM	72953
12/17/15 12:50 PM	Aqueous	E300	Anion Preparation	12/28/15 09:54 AM	72953
12/17/15 12:50 PM	Aqueous	M4500-H+ B	pH Preparation	12/18/15 08:50 AM	72803
12/17/15 12:50 PM	Aqueous	M2540C	TDS Preparation	12/22/15 02:43 PM	72907
12/17/15 01:35 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/15 09:04 AM	72945
12/17/15 01:35 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/15 09:04 AM	72945
12/17/15 01:35 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/15 09:04 AM	72945
12/17/15 01:35 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	12/19/15 10:27 AM	72834
12/17/15 01:35 PM	Aqueous	E300	Anion Preparation	12/28/15 09:54 AM	72953
12/17/15 01:35 PM	Aqueous	E300	Anion Preparation	12/28/15 09:54 AM	72953
12/17/15 01:35 PM	Aqueous	M4500-H+ B	pH Preparation	12/18/15 08:50 AM	72803
12/17/15 01:35 PM	Aqueous	M2540C	TDS Preparation	12/22/15 02:43 PM	72907
12/17/15 02:55 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/15 09:04 AM	72945
12/17/15 02:55 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/15 09:04 AM	72945
12/17/15 02:55 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/15 09:04 AM	72945
12/17/15 02:55 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	12/19/15 10:27 AM	72834
12/17/15 02:55 PM	Aqueous	E300	Anion Preparation	12/28/15 09:54 AM	72953
12/17/15 02:55 PM	Aqueous	E300	Anion Preparation	12/28/15 09:54 AM	72953
12/17/15 02:55 PM	Aqueous	M4500-H+ B	pH Preparation	12/18/15 08:50 AM	72803
12/17/15 02:55 PM	Aqueous	M2540C	TDS Preparation	12/22/15 02:43 PM	72907
12/18/15 08:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/15 09:04 AM	72945

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PREP DATES REPORT

Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
12/18/15 08:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/15 09:04 AM	72945
12/18/15 08:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/15 09:04 AM	72945
12/18/15 08:50 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	12/19/15 10:27 AM	72834
12/18/15 08:50 AM	Aqueous	E300	Anion Preparation	12/28/15 09:54 AM	72953
12/18/15 08:50 AM	Aqueous	E300	Anion Preparation	12/28/15 09:54 AM	72953
12/18/15 08:50 AM	Aqueous	M4500-H+ B	pH Preparation	12/18/15 08:50 AM	72803
12/18/15 08:50 AM	Aqueous	M2540C	TDS Preparation	12/22/15 02:43 PM	72907
12/18/15 09:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/15 09:04 AM	72945
12/18/15 09:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/15 09:04 AM	72945
12/18/15 09:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/15 09:04 AM	72945
12/18/15 09:30 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	12/19/15 10:27 AM	72834
12/18/15 09:30 AM	Aqueous	E300	Anion Preparation	12/28/15 09:54 AM	72953
12/18/15 09:30 AM	Aqueous	E300	Anion Preparation	12/28/15 09:54 AM	72953
12/18/15 09:30 AM	Aqueous	M4500-H+ B	pH Preparation	12/18/15 08:50 AM	72803
12/18/15 09:30 AM	Aqueous	M2540C	TDS Preparation	12/22/15 02:43 PM	72907
12/18/15 10:40 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/15 09:04 AM	72945
12/18/15 10:40 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/15 09:04 AM	72945
12/18/15 10:40 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/15 09:04 AM	72945
12/18/15 10:40 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	12/19/15 10:27 AM	72834
12/18/15 10:40 AM	Aqueous	E300	Anion Preparation	12/28/15 09:54 AM	72953
12/18/15 10:40 AM	Aqueous	E300	Anion Preparation	12/28/15 09:54 AM	72953
12/18/15 10:40 AM	Aqueous	M4500-H+ B	pH Preparation	12/18/15 08:50 AM	72803
12/18/15 10:40 AM	Aqueous	M2540C	TDS Preparation	12/22/15 02:43 PM	72907

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ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	SW7470A	Mercury Total: Aqueous	72834	1	12/22/15 12:27 PM	CETAC2_HG_151222A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72945	10	01/04/16 02:59 PM	ICP-MS4_160104E
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72945	1	01/05/16 04:20 PM	ICP-MS4_160105A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72945	1	01/06/16 08:51 PM	ICP-MS4_160106B
Aqueous	E300	Anions by IC method - Water	72953	1	12/28/15 11:17 AM	IC2_151228A
Aqueous	E300	Anions by IC method - Water	72953	10	12/28/15 02:19 PM	IC2_151228A
Aqueous	M4500-H+ B	pH	72803	1	12/18/15 03:23 PM	TITRATOR_151218A
Aqueous	M2540C	Total Dissolved Solids	72884	1	12/22/15 08:00 AM	WC_151221A
Aqueous	SW7470A	Mercury Total: Aqueous	72834	1	12/22/15 12:30 PM	CETAC2_HG_151222A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72945	1	01/06/16 08:53 PM	ICP-MS4_160106B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72945	100	01/04/16 03:01 PM	ICP-MS4_160104E
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72945	1	01/05/16 04:22 PM	ICP-MS4_160105A
Aqueous	E300	Anions by IC method - Water	72953	1	12/28/15 11:31 AM	IC2_151228A
Aqueous	E300	Anions by IC method - Water	72953	100	12/28/15 02:33 PM	IC2_151228A
Aqueous	M4500-H+ B	pH	72803	1	12/18/15 03:25 PM	TITRATOR_151218A
Aqueous	M2540C	Total Dissolved Solids	72884	1	12/22/15 08:00 AM	WC_151221A
Aqueous	SW7470A	Mercury Total: Aqueous	72834	1	12/22/15 12:32 PM	CETAC2_HG_151222A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72945	1	01/06/16 08:54 PM	ICP-MS4_160106B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72945	1	01/05/16 04:24 PM	ICP-MS4_160105A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72945	100	01/04/16 03:21 PM	ICP-MS4_160104E
Aqueous	E300	Anions by IC method - Water	72953	100	12/28/15 02:48 PM	IC2_151228A
Aqueous	E300	Anions by IC method - Water	72953	1	12/28/15 11:46 AM	IC2_151228A
Aqueous	M4500-H+ B	pH	72803	1	12/18/15 03:26 PM	TITRATOR_151218A
Aqueous	M2540C	Total Dissolved Solids	72907	1	12/23/15 08:05 AM	WC_151222B
Aqueous	SW7470A	Mercury Total: Aqueous	72834	1	12/22/15 12:34 PM	CETAC2_HG_151222A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72945	1	01/04/16 03:40 PM	ICP-MS4_160104E

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ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72945	1	01/05/16 04:26 PM	ICP-MS4_160105A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72945	1	01/06/16 08:56 PM	ICP-MS4_160106B
Aqueous	E300	Anions by IC method - Water	72953	1	12/28/15 12:00 PM	IC2_151228A
Aqueous	M4500-H+ B	pH	72803	1	12/18/15 03:29 PM	TITRATOR_151218A
Aqueous	M2540C	Total Dissolved Solids	72907	1	12/23/15 08:05 AM	WC_151222B
Aqueous	SW7470A	Mercury Total: Aqueous	72834	1	12/22/15 12:36 PM	CETAC2_HG_151222A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72945	100	01/04/16 03:23 PM	ICP-MS4_160104E
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72945	1	01/05/16 04:28 PM	ICP-MS4_160105A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72945	1	01/06/16 08:58 PM	ICP-MS4_160106B
Aqueous	E300	Anions by IC method - Water	72953	1	12/28/15 12:15 PM	IC2_151228A
Aqueous	E300	Anions by IC method - Water	72953	100	12/28/15 03:02 PM	IC2_151228A
Aqueous	M4500-H+ B	pH	72803	1	12/18/15 03:31 PM	TITRATOR_151218A
Aqueous	M2540C	Total Dissolved Solids	72907	1	12/23/15 08:05 AM	WC_151222B
Aqueous	SW7470A	Mercury Total: Aqueous	72834	1	12/22/15 12:46 PM	CETAC2_HG_151222A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72945	100	01/04/16 03:25 PM	ICP-MS4_160104E
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72945	1	01/05/16 04:30 PM	ICP-MS4_160105A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72945	1	01/06/16 09:00 PM	ICP-MS4_160106B
Aqueous	E300	Anions by IC method - Water	72953	1	12/28/15 12:30 PM	IC2_151228A
Aqueous	E300	Anions by IC method - Water	72953	100	12/28/15 03:17 PM	IC2_151228A
Aqueous	M4500-H+ B	pH	72803	1	12/18/15 03:34 PM	TITRATOR_151218A
Aqueous	M2540C	Total Dissolved Solids	72907	1	12/23/15 08:05 AM	WC_151222B
Aqueous	SW7470A	Mercury Total: Aqueous	72834	1	12/22/15 12:48 PM	CETAC2_HG_151222A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72945	100	01/04/16 03:27 PM	ICP-MS4_160104E
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72945	1	01/05/16 04:32 PM	ICP-MS4_160105A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72945	1	01/06/16 09:02 PM	ICP-MS4_160106B
Aqueous	E300	Anions by IC method - Water	72953	1	12/28/15 12:44 PM	IC2_151228A

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ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	E300	Anions by IC method - Water	72953	100	12/28/15 03:32 PM	IC2_151228A
Aqueous	M4500-H+ B	pH	72803	1	12/18/15 03:36 PM	TITRATOR_151218A
Aqueous	M2540C	Total Dissolved Solids	72907	1	12/23/15 08:05 AM	WC_151222B
Aqueous	SW7470A	Mercury Total: Aqueous	72834	1	12/22/15 12:50 PM	CETAC2_HG_151222A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72945	1	01/06/16 09:04 PM	ICP-MS4_160106B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72945	100	01/04/16 03:29 PM	ICP-MS4_160104E
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72945	1	01/05/16 04:34 PM	ICP-MS4_160105A
Aqueous	E300	Anions by IC method - Water	72953	100	12/28/15 03:46 PM	IC2_151228A
Aqueous	E300	Anions by IC method - Water	72953	1	12/28/15 12:59 PM	IC2_151228A
Aqueous	M4500-H+ B	pH	72803	1	12/18/15 03:38 PM	TITRATOR_151218A
Aqueous	M2540C	Total Dissolved Solids	72907	1	12/23/15 08:05 AM	WC_151222B
Aqueous	SW7470A	Mercury Total: Aqueous	72834	1	12/22/15 12:52 PM	CETAC2_HG_151222A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72945	10	01/04/16 03:32 PM	ICP-MS4_160104E
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72945	1	01/05/16 04:36 PM	ICP-MS4_160105A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72945	1	01/06/16 09:06 PM	ICP-MS4_160106B
Aqueous	E300	Anions by IC method - Water	72953	10	12/28/15 04:01 PM	IC2_151228A
Aqueous	E300	Anions by IC method - Water	72953	1	12/28/15 01:14 PM	IC2_151228A
Aqueous	M4500-H+ B	pH	72803	1	12/18/15 03:41 PM	TITRATOR_151218A
Aqueous	M2540C	Total Dissolved Solids	72907	1	12/23/15 08:05 AM	WC_151222B
Aqueous	SW7470A	Mercury Total: Aqueous	72834	1	12/22/15 12:55 PM	CETAC2_HG_151222A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72945	100	01/04/16 03:34 PM	ICP-MS4_160104E
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72945	1	01/05/16 04:38 PM	ICP-MS4_160105A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	72945	1	01/06/16 09:08 PM	ICP-MS4_160106B
Aqueous	E300	Anions by IC method - Water	72953	1	12/28/15 01:28 PM	IC2_151228A
Aqueous	E300	Anions by IC method - Water	72953	100	12/28/15 04:15 PM	IC2_151228A
Aqueous	M4500-H+ B	pH	72803	1	12/18/15 03:46 PM	TITRATOR_151218A

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ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	M2540C	Total Dissolved Solids	72907	1	12/23/15 08:05 AM	WC_151222B

DHL Analytical, Inc.

Date: *22-Jan-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-22R
Project:	Sandow - AX Landfill	**Lab ID:**	1512238-01
Project No:	5164-E	**Collection Date:**	12/17/15 08:20 AM
Lab Order:	1512238	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **ABO**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	12/22/15 12:27 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	01/05/16 04:20 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	01/05/16 04:20 PM
Barium	0.116	0.00300	0.0100		mg/L	1	01/05/16 04:20 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	01/05/16 04:20 PM
Boron	0.106	0.0100	0.0300		mg/L	1	01/05/16 04:20 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	01/05/16 04:20 PM
Calcium	87.0	1.00	3.00		mg/L	10	01/04/16 02:59 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	01/05/16 04:20 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	01/05/16 04:20 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	01/05/16 04:20 PM
Lithium	0.0521	0.00500	0.0100		mg/L	1	01/05/16 04:20 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	01/05/16 04:20 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	01/05/16 04:20 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	01/06/16 08:51 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	102	3.00	10.0		mg/L	10	12/28/15 02:19 PM
Fluoride	0.224	0.100	0.400	J	mg/L	1	12/28/15 11:17 AM
Sulfate	49.2	1.00	3.00		mg/L	1	12/28/15 11:17 AM
PH		**M4500-H+ B**					Analyst: **LM**
pH	7.22	0	0		pH Units@16.1℃	1	12/18/15 03:23 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **BJT**
Total Dissolved Solids (Residue, Filterable)	543	10.0	10.0		mg/L	1	12/22/15 08:00 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *22-Jan-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AXMW-2
Project:	Sandow - AX Landfill	**Lab ID:**	1512238-02
Project No:	5164-E	**Collection Date:**	12/17/15 10:10 AM
Lab Order:	1512238	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **ABO**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	12/22/15 12:30 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	01/05/16 04:22 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	01/05/16 04:22 PM
Barium	0.0217	0.00300	0.0100		mg/L	1	01/05/16 04:22 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	01/05/16 04:22 PM
Boron	1.31	0.0100	0.0300		mg/L	1	01/05/16 04:22 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	01/05/16 04:22 PM
Calcium	422	10.0	30.0		mg/L	100	01/04/16 03:01 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	01/05/16 04:22 PM
Cobalt	0.0243	0.00300	0.00500		mg/L	1	01/05/16 04:22 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	01/05/16 04:22 PM
Lithium	0.100	0.00500	0.0100		mg/L	1	01/05/16 04:22 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	01/05/16 04:22 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	01/05/16 04:22 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	01/06/16 08:53 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	155	30.0	100		mg/L	100	12/28/15 02:33 PM
Fluoride	0.357	0.100	0.400	J	mg/L	1	12/28/15 11:31 AM
Sulfate	1450	100	300		mg/L	100	12/28/15 02:33 PM
PH		**M4500-H+ B**					Analyst: **LM**
pH	6.28	0	0		pH Units@15.8℃	1	12/18/15 03:25 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **BJT**
Total Dissolved Solids (Residue, Filterable)	2820	50.0	50.0		mg/L	1	12/22/15 08:00 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *22-Jan-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-29
Project:	Sandow - AX Landfill	**Lab ID:**	1512238-03
Project No:	5164-E	**Collection Date:**	12/17/15 10:35 AM
Lab Order:	1512238	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **ABO**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	12/22/15 12:32 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	01/05/16 04:24 PM
Arsenic	0.00556	0.00200	0.00500		mg/L	1	01/05/16 04:24 PM
Barium	0.0737	0.00300	0.0100		mg/L	1	01/05/16 04:24 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	01/05/16 04:24 PM
Boron	0.323	0.0100	0.0300		mg/L	1	01/05/16 04:24 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	01/05/16 04:24 PM
Calcium	293	10.0	30.0		mg/L	100	01/04/16 03:21 PM
Chromium	0.00216	0.00200	0.00500	J	mg/L	1	01/05/16 04:24 PM
Cobalt	0.0878	0.00300	0.00500		mg/L	1	01/05/16 04:24 PM
Lead	0.000593	0.000300	0.00100	J	mg/L	1	01/05/16 04:24 PM
Lithium	0.0348	0.00500	0.0100		mg/L	1	01/05/16 04:24 PM
Molybdenum	0.00333	0.00200	0.00500	J	mg/L	1	01/05/16 04:24 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	01/05/16 04:24 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	01/06/16 08:54 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	279	30.0	100		mg/L	100	12/28/15 02:48 PM
Fluoride	0.104	0.100	0.400	J	mg/L	1	12/28/15 11:46 AM
Sulfate	1080	100	300		mg/L	100	12/28/15 02:48 PM
PH		**M4500-H+ B**					Analyst: **LM**
pH	6.29	0	0		pH Units@15.8℃	1	12/18/15 03:26 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **BJT**
Total Dissolved Solids (Residue, Filterable)	2430	50.0	50.0		mg/L	1	12/23/15 08:05 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *22-Jan-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-23
Project:	Sandow - AX Landfill	**Lab ID:**	1512238-04
Project No:	5164-E	**Collection Date:**	12/17/15 11:30 AM
Lab Order:	1512238	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **ABO**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	12/22/15 12:34 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	01/05/16 04:26 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	01/05/16 04:26 PM
Barium	0.0407	0.00300	0.0100		mg/L	1	01/05/16 04:26 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	01/05/16 04:26 PM
Boron	0.0466	0.0100	0.0300		mg/L	1	01/04/16 03:40 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	01/05/16 04:26 PM
Calcium	10.8	0.100	0.300		mg/L	1	01/05/16 04:26 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	01/05/16 04:26 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	01/05/16 04:26 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	01/05/16 04:26 PM
Lithium	<0.00500	0.00500	0.0100		mg/L	1	01/05/16 04:26 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	01/05/16 04:26 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	01/05/16 04:26 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	01/06/16 08:56 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	11.5	0.300	1.00		mg/L	1	12/28/15 12:00 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	12/28/15 12:00 PM
Sulfate	30.2	1.00	3.00		mg/L	1	12/28/15 12:00 PM
PH		**M4500-H+ B**					Analyst: **LM**
pH	6.91	0	0		pH Units@16.1℃	1	12/18/15 03:29 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **BJT**
Total Dissolved Solids (Residue, Filterable)	135	10.0	10.0		mg/L	1	12/23/15 08:05 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *22-Jan-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AXMW-1
Project:	Sandow - AX Landfill	**Lab ID:**	1512238-05
Project No:	5164-E	**Collection Date:**	12/17/15 12:50 PM
Lab Order:	1512238	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **ABO**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	12/22/15 12:36 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	01/05/16 04:28 PM
Arsenic	0.0130	0.00200	0.00500		mg/L	1	01/05/16 04:28 PM
Barium	0.0155	0.00300	0.0100		mg/L	1	01/05/16 04:28 PM
Beryllium	0.000677	0.000300	0.00100	J	mg/L	1	01/05/16 04:28 PM
Boron	0.517	0.0100	0.0300		mg/L	1	01/05/16 04:28 PM
Cadmium	0.000764	0.000300	0.00100	J	mg/L	1	01/05/16 04:28 PM
Calcium	400	10.0	30.0		mg/L	100	01/04/16 03:23 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	01/05/16 04:28 PM
Cobalt	0.363	0.00300	0.00500		mg/L	1	01/05/16 04:28 PM
Lead	0.000622	0.000300	0.00100	J	mg/L	1	01/05/16 04:28 PM
Lithium	0.0467	0.00500	0.0100		mg/L	1	01/05/16 04:28 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	01/05/16 04:28 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	01/05/16 04:28 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	01/06/16 08:58 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	303	30.0	100		mg/L	100	12/28/15 03:02 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	12/28/15 12:15 PM
Sulfate	2000	100	300		mg/L	100	12/28/15 03:02 PM
PH		**M4500-H+ B**					Analyst: **LM**
pH	5.82	0	0		pH Units@16.3℃	1	12/18/15 03:31 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **BJT**
Total Dissolved Solids (Residue, Filterable)	3420	50.0	50.0		mg/L	1	12/23/15 08:05 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *22-Jan-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-27
Project:	Sandow - AX Landfill	**Lab ID:**	1512238-06
Project No:	5164-E	**Collection Date:**	12/17/15 01:35 PM
Lab Order:	1512238	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **ABO**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	12/22/15 12:46 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	01/05/16 04:30 PM
Arsenic	0.00422	0.00200	0.00500	J	mg/L	1	01/05/16 04:30 PM
Barium	0.225	0.00300	0.0100		mg/L	1	01/05/16 04:30 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	01/05/16 04:30 PM
Boron	0.172	0.0100	0.0300		mg/L	1	01/05/16 04:30 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	01/05/16 04:30 PM
Calcium	299	10.0	30.0		mg/L	100	01/04/16 03:25 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	01/05/16 04:30 PM
Cobalt	0.0208	0.00300	0.00500		mg/L	1	01/05/16 04:30 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	01/05/16 04:30 PM
Lithium	0.0813	0.00500	0.0100		mg/L	1	01/05/16 04:30 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	01/05/16 04:30 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	01/05/16 04:30 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	01/06/16 09:00 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	544	30.0	100		mg/L	100	12/28/15 03:17 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	12/28/15 12:30 PM
Sulfate	371	100	300		mg/L	100	12/28/15 03:17 PM
PH		**M4500-H+ B**					Analyst: **LM**
pH	6.54	0	0		pH Units@17℃	1	12/18/15 03:34 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **BJT**
Total Dissolved Solids (Residue, Filterable)	1920	50.0	50.0		mg/L	1	12/23/15 08:05 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *22-Jan-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-26
Project:	Sandow - AX Landfill	**Lab ID:**	1512238-07
Project No:	5164-E	**Collection Date:**	12/17/15 02:55 PM
Lab Order:	1512238	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **ABO**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	12/22/15 12:48 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	01/05/16 04:32 PM
Arsenic	0.00348	0.00200	0.00500	J	mg/L	1	01/05/16 04:32 PM
Barium	0.0964	0.00300	0.0100		mg/L	1	01/05/16 04:32 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	01/05/16 04:32 PM
Boron	0.326	0.0100	0.0300		mg/L	1	01/05/16 04:32 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	01/05/16 04:32 PM
Calcium	915	10.0	30.0		mg/L	100	01/04/16 03:27 PM
Chromium	0.00650	0.00200	0.00500		mg/L	1	01/05/16 04:32 PM
Cobalt	0.0419	0.00300	0.00500		mg/L	1	01/05/16 04:32 PM
Lead	0.000823	0.000300	0.00100	J	mg/L	1	01/05/16 04:32 PM
Lithium	0.625	0.00500	0.0100		mg/L	1	01/05/16 04:32 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	01/05/16 04:32 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	01/05/16 04:32 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	01/06/16 09:02 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	2220	30.0	100		mg/L	100	12/28/15 03:32 PM
Fluoride	0.304	0.100	0.400	J	mg/L	1	12/28/15 12:44 PM
Sulfate	1050	100	300		mg/L	100	12/28/15 03:32 PM
PH		**M4500-H+ B**					Analyst: **LM**
pH	6.48	0	0		pH Units@17.6℃	1	12/18/15 03:36 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **BJT**
Total Dissolved Solids (Residue, Filterable)	6440	50.0	50.0		mg/L	1	12/23/15 08:05 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *22-Jan-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-24
Project:	Sandow - AX Landfill	**Lab ID:**	1512238-08
Project No:	5164-E	**Collection Date:**	12/18/15 08:50 AM
Lab Order:	1512238	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **ABO**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	12/22/15 12:50 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	01/05/16 04:34 PM
Arsenic	0.00538	0.00200	0.00500		mg/L	1	01/05/16 04:34 PM
Barium	0.0680	0.00300	0.0100		mg/L	1	01/05/16 04:34 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	01/05/16 04:34 PM
Boron	0.165	0.0100	0.0300		mg/L	1	01/05/16 04:34 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	01/05/16 04:34 PM
Calcium	231	10.0	30.0		mg/L	100	01/04/16 03:29 PM
Chromium	0.00930	0.00200	0.00500		mg/L	1	01/05/16 04:34 PM
Cobalt	0.0266	0.00300	0.00500		mg/L	1	01/05/16 04:34 PM
Lead	0.00146	0.000300	0.00100		mg/L	1	01/05/16 04:34 PM
Lithium	0.0681	0.00500	0.0100		mg/L	1	01/05/16 04:34 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	01/05/16 04:34 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	01/05/16 04:34 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	01/06/16 09:04 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	195	30.0	100		mg/L	100	12/28/15 03:46 PM
Fluoride	0.149	0.100	0.400	J	mg/L	1	12/28/15 12:59 PM
Sulfate	766	100	300		mg/L	100	12/28/15 03:46 PM
PH		**M4500-H+ B**					Analyst: **LM**
pH	6.41	0	0		pH Units@18℃	1	12/18/15 03:38 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **BJT**
Total Dissolved Solids (Residue, Filterable)	1840	50.0	50.0		mg/L	1	12/23/15 08:05 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *22-Jan-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-25
Project:	Sandow - AX Landfill	**Lab ID:**	1512238-09
Project No:	5164-E	**Collection Date:**	12/18/15 09:30 AM
Lab Order:	1512238	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **ABO**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	12/22/15 12:52 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	0.000916	0.000800	0.00250	J	mg/L	1	01/05/16 04:36 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	01/05/16 04:36 PM
Barium	0.184	0.00300	0.0100		mg/L	1	01/05/16 04:36 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	01/05/16 04:36 PM
Boron	0.141	0.0100	0.0300		mg/L	1	01/05/16 04:36 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	01/05/16 04:36 PM
Calcium	113	1.00	3.00		mg/L	10	01/04/16 03:32 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	01/05/16 04:36 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	01/05/16 04:36 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	01/05/16 04:36 PM
Lithium	0.0237	0.00500	0.0100		mg/L	1	01/05/16 04:36 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	01/05/16 04:36 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	01/05/16 04:36 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	01/06/16 09:06 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	160	3.00	10.0		mg/L	10	12/28/15 04:01 PM
Fluoride	0.212	0.100	0.400	J	mg/L	1	12/28/15 01:14 PM
Sulfate	278	10.0	30.0		mg/L	10	12/28/15 04:01 PM
PH		**M4500-H+ B**					Analyst: **LM**
pH	7.05	0	0		pH Units@18.9℃	1	12/18/15 03:41 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **BJT**
Total Dissolved Solids (Residue, Filterable)	996	10.0	10.0		mg/L	1	12/23/15 08:05 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *22-Jan-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-28
Project:	Sandow - AX Landfill	**Lab ID:**	1512238-10
Project No:	5164-E	**Collection Date:**	12/18/15 10:40 AM
Lab Order:	1512238	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **ABO**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	12/22/15 12:55 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	01/05/16 04:38 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	01/05/16 04:38 PM
Barium	0.0476	0.00300	0.0100		mg/L	1	01/05/16 04:38 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	01/05/16 04:38 PM
Boron	0.150	0.0100	0.0300		mg/L	1	01/05/16 04:38 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	01/05/16 04:38 PM
Calcium	477	10.0	30.0		mg/L	100	01/04/16 03:34 PM
Chromium	0.00511	0.00200	0.00500		mg/L	1	01/05/16 04:38 PM
Cobalt	0.0210	0.00300	0.00500		mg/L	1	01/05/16 04:38 PM
Lead	0.000401	0.000300	0.00100	J	mg/L	1	01/05/16 04:38 PM
Lithium	0.254	0.00500	0.0100		mg/L	1	01/05/16 04:38 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	01/05/16 04:38 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	01/05/16 04:38 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	01/06/16 09:08 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	275	30.0	100		mg/L	100	12/28/15 04:15 PM
Fluoride	0.106	0.100	0.400	J	mg/L	1	12/28/15 01:28 PM
Sulfate	1420	100	300		mg/L	100	12/28/15 04:15 PM
PH		**M4500-H+ B**					Analyst: **LM**
pH	6.52	0	0		pH Units@18.4℃	1	12/18/15 03:46 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **BJT**
Total Dissolved Solids (Residue, Filterable)	3150	50.0	50.0		mg/L	1	12/23/15 08:05 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

CLIENT: Pastor, Behling & Wheeler
Work Order: 1512238
Project: Sandow - AX Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_151222A

The QC data in batch 72834 applies to the following samples: 1512238-01A, 1512238-02A, 1512238-03A, 1512238-04A, 1512238-05A, 1512238-06A, 1512238-07A, 1512238-08A, 1512238-09A, 1512238-10A

Sample ID	**MB-72834**	Batch ID:	**72834**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**CETAC2_HG_151222A**	Analysis Date:	**12/22/2015 11:44:20 A**	Prep Date:	**12/19/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	<0.0000800	0.000200								

Sample ID	**LCS-72834**	Batch ID:	**72834**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**CETAC2_HG_151222A**	Analysis Date:	**12/22/2015 11:46:37 A**	Prep Date:	**12/19/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00196	0.000200	0.00200	0	98.0	85	115			

Sample ID	**LCSD-72834**	Batch ID:	**72834**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**CETAC2_HG_151222A**	Analysis Date:	**12/22/2015 11:48:53 A**	Prep Date:	**12/19/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00189	0.000200	0.00200	0	94.5	85	115	3.64	15	

Sample ID	**1512237-01A SD**	Batch ID:	**72834**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**SD**	Run ID:	**CETAC2_HG_151222A**	Analysis Date:	**12/22/2015 11:53:27 A**	Prep Date:	**12/19/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	<0.000400	0.00100	0	0				0	10	

Sample ID	**1512237-01A PDS**	Batch ID:	**72834**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**PDS**	Run ID:	**CETAC2_HG_151222A**	Analysis Date:	**12/22/2015 11:55:43 A**	Prep Date:	**12/19/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00248	0.000200	0.00250	0	99.2	85	115			

Sample ID	**1512237-01A MS**	Batch ID:	**72834**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**CETAC2_HG_151222A**	Analysis Date:	**12/22/2015 11:58:00 A**	Prep Date:	**12/19/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00197	0.000200	0.00200	0	98.5	80	120			

Sample ID	**1512237-01A MSD**	Batch ID:	**72834**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**CETAC2_HG_151222A**	Analysis Date:	**12/22/2015 12:00:17 P**	Prep Date:	**12/19/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00195	0.000200	0.00200	0	97.5	80	120	1.02	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1512238
Project: Sandow - AX Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_151222A

Sample ID **ICV-151222**	Batch ID: **R83299**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **ICV**	Run ID: **CETAC2_HG_151222A**	Analysis Date: **12/22/2015 10:31:35 A**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00397	0.000200	0.00400	0	99.2	90	110			

Sample ID **CCV2-151222**	Batch ID: **R83299**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **CCV**	Run ID: **CETAC2_HG_151222A**	Analysis Date: **12/22/2015 11:39:45 A**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00183	0.000200	0.00200	0	91.5	90	110			

Sample ID **CCV3-151222**	Batch ID: **R83299**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **CCV**	Run ID: **CETAC2_HG_151222A**	Analysis Date: **12/22/2015 12:23:10 P**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00192	0.000200	0.00200	0	96.0	90	110			

Sample ID **CCV4-151222**	Batch ID: **R83299**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **CCV**	Run ID: **CETAC2_HG_151222A**	Analysis Date: **12/22/2015 12:57:25 P**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00190	0.000200	0.00200	0	95.0	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1512238
Project: Sandow - AX Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160104E

The QC data in batch 72945 applies to the following samples: 1512238-01A, 1512238-02A, 1512238-03A, 1512238-04A, 1512238-05A, 1512238-06A, 1512238-07A, 1512238-08A, 1512238-09A, 1512238-10A

Sample ID **1512237-01A SD** Batch ID: **72945** TestNo: **SW6020A** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS4_160104E** Analysis Date: **1/4/2016 2:43:00 PM** Prep Date: **12/28/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	3.83	1.50	0	3.69				3.87	10	
Calcium	153	15.0	0	155				1.20	10	

Sample ID **1512237-01A PDS** Batch ID: **72945** TestNo: **SW6020A** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS4_160104E** Analysis Date: **1/4/2016 3:04:00 PM** Prep Date: **12/28/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	5.44	0.300	2.00	3.69	87.8	80	120			
Calcium	199	3.00	50.0	155	88.1	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank
J	Analyte detected between MDL and RL
ND	Not Detected at the Method Detection Limit
RL	Reporting Limit
J	Analyte detected between SDL and RL
DF	Dilution Factor
MDL	Method Detection Limit
R	RPD outside accepted control limits
S	Spike Recovery outside control limits
N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1512238
Project: Sandow - AX Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160104E

Sample ID	**ICV-160104**	Batch ID:	**R83480**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**ICP-MS4_160104E**	Analysis Date:	**1/4/2016 10:01:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.102	0.0300	0.100	0	102	90	110			
Calcium	2.37	0.300	2.50	0	94.7	90	110			

Sample ID	**LCVL-160104**	Batch ID:	**R83480**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160104E**	Analysis Date:	**1/4/2016 10:05:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0248	0.0300	0.0200	0	124	70	130			
Calcium	0.0945	0.300	0.100	0	94.5	70	130			

Sample ID	**CCV7-160104**	Batch ID:	**R83480**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_160104E**	Analysis Date:	**1/4/2016 2:27:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.221	0.0300	0.200	0	110	90	110			
Calcium	4.91	0.300	5.00	0	98.3	90	110			

Sample ID	**LCVL7-160104**	Batch ID:	**R83480**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160104E**	Analysis Date:	**1/4/2016 2:37:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0238	0.0300	0.0200	0	119	70	130			
Calcium	0.0949	0.300	0.100	0	94.9	70	130			

Sample ID	**CCV8-160104**	Batch ID:	**R83480**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_160104E**	Analysis Date:	**1/4/2016 3:06:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.221	0.0300	0.200	0	110	90	110			
Calcium	4.94	0.300	5.00	0	98.8	90	110			

Sample ID	**LCVL8-160104**	Batch ID:	**R83480**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160104E**	Analysis Date:	**1/4/2016 3:17:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0246	0.0300	0.0200	0	123	70	130			
Calcium	0.0945	0.300	0.100	0	94.5	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1512238
Project: Sandow - AX Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160104E

Sample ID	**CCV9-160104**	Batch ID:	**R83480**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_160104E**	Analysis Date:	**1/4/2016 3:44:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.209	0.0300	0.200	0	105	90	110			
Calcium	4.90	0.300	5.00	0	97.9	90	110			

Sample ID	**LCVL9-160104**	Batch ID:	**R83480**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160104E**	Analysis Date:	**1/4/2016 3:55:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0191	0.0300	0.0200	0	95.4	70	130			
Calcium	0.0900	0.300	0.100	0	90.0	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1512238
Project: Sandow - AX Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160105A

The QC data in batch 72945 applies to the following samples: 1512238-01A, 1512238-02A, 1512238-03A, 1512238-04A, 1512238-05A, 1512238-06A, 1512238-07A, 1512238-08A, 1512238-09A, 1512238-10A

Sample ID **MB-72945** Batch ID: **72945** TestNo: **SW6020A** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS4_160105A** Analysis Date: **1/5/2016 2:28:00 PM** Prep Date: **12/28/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.000800	0.00250								
Arsenic	<0.00200	0.00500								
Barium	<0.00300	0.0100								
Beryllium	<0.000300	0.00100								
Boron	0.0119	0.0300								
Cadmium	<0.000300	0.00100								
Calcium	<0.100	0.300								
Chromium	<0.00200	0.00500								
Cobalt	<0.00300	0.00500								
Lead	<0.000300	0.00100								
Lithium	<0.00500	0.0100								
Molybdenum	<0.00200	0.00500								
Selenium	<0.00200	0.00500								

Sample ID **LCS-72945** Batch ID: **72945** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS4_160105A** Analysis Date: **1/5/2016 2:30:00 PM** Prep Date: **12/28/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.186	0.00250	0.200	0	93.1	80	120			
Arsenic	0.196	0.00500	0.200	0	98.1	80	120			
Barium	0.193	0.0100	0.200	0	96.5	80	120			
Beryllium	0.193	0.00100	0.200	0	96.5	80	120			
Boron	0.198	0.0300	0.200	0	99.0	80	120			
Cadmium	0.191	0.00100	0.200	0	95.5	80	120			
Calcium	4.64	0.300	5.00	0	92.8	80	120			
Chromium	0.195	0.00500	0.200	0	97.6	80	120			
Cobalt	0.200	0.00500	0.200	0	100	80	120			
Lead	0.189	0.00100	0.200	0	94.7	80	120			
Lithium	0.194	0.0100	0.200	0	97.0	80	120			
Molybdenum	0.186	0.00500	0.200	0	93.0	80	120			
Selenium	0.197	0.00500	0.200	0	98.6	80	120			

Sample ID **LCSD-72945** Batch ID: **72945** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS4_160105A** Analysis Date: **1/5/2016 2:32:00 PM** Prep Date: **12/28/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.190	0.00250	0.200	0	95.1	80	120	2.14	15	
Arsenic	0.198	0.00500	0.200	0	99.0	80	120	0.868	15	
Barium	0.198	0.0100	0.200	0	98.9	80	120	2.47	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

Sample ID **LCSD-72945**	Batch ID: **72945**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCSD**	Run ID: **ICP-MS4_160105A**	Analysis Date: **1/5/2016 2:32:00 PM**	Prep Date: **12/28/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.199	0.00100	0.200	0	99.3	80	120	2.85	15	
Boron	0.212	0.0300	0.200	0	106	80	120	6.77	15	
Cadmium	0.197	0.00100	0.200	0	98.3	80	120	2.87	15	
Calcium	4.64	0.300	5.00	0	92.7	80	120	0.117	15	
Chromium	0.198	0.00500	0.200	0	98.9	80	120	1.32	15	
Cobalt	0.204	0.00500	0.200	0	102	80	120	1.77	15	
Lead	0.195	0.00100	0.200	0	97.7	80	120	3.10	15	
Lithium	0.199	0.0100	0.200	0	99.5	80	120	2.47	15	
Molybdenum	0.191	0.00500	0.200	0	95.6	80	120	2.78	15	
Selenium	0.200	0.00500	0.200	0	100	80	120	1.35	15	

Sample ID **1512237-01A SD**	Batch ID: **72945**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **SD**	Run ID: **ICP-MS4_160105A**	Analysis Date: **1/5/2016 2:38:00 PM**	Prep Date: **12/28/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.00400	0.0125	0	0				0	10	
Arsenic	<0.0100	0.0250	0	0				0	10	
Barium	0.201	0.0500	0	0.210				3.99	10	
Beryllium	<0.00150	0.00500	0	0				0	10	
Cadmium	<0.00150	0.00500	0	0				0	10	
Chromium	<0.0100	0.0250	0	0				0	10	
Cobalt	<0.0150	0.0250	0	0.00356				0	10	
Lead	<0.00150	0.00500	0	0				0	10	
Lithium	0.0416	0.0500	0	0.0417				0.296	10	
Molybdenum	<0.0100	0.0250	0	0.00805				0	10	
Selenium	0.0344	0.0250	0	0.0345				0.462	10	

Sample ID **1512237-01A PDS**	Batch ID: **72945**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS4_160105A**	Analysis Date: **1/5/2016 2:58:00 PM**	Prep Date: **12/28/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.172	0.00250	0.200	0	86.0	80	120			
Arsenic	0.204	0.00500	0.200	0	102	80	120			
Barium	0.390	0.0100	0.200	0.210	90.3	80	120			
Beryllium	0.194	0.00100	0.200	0	97.0	80	120			
Cadmium	0.190	0.00100	0.200	0	94.9	80	120			
Chromium	0.197	0.00500	0.200	0	98.4	80	120			
Cobalt	0.203	0.00500	0.200	0.00356	99.8	80	120			
Lead	0.197	0.00100	0.200	0	98.6	80	120			
Lithium	0.227	0.0100	0.200	0.0417	92.5	80	120			
Molybdenum	0.195	0.00500	0.200	0.00805	93.5	80	120			

CLIENT: Pastor, Behling & Wheeler
Work Order: 1512238
Project: Sandow - AX Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160105A

Sample ID **1512237-01A PDS**	Batch ID: **72945**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS4_160105A**	Analysis Date: **1/5/2016 2:58:00 PM**	Prep Date: **12/28/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Selenium	0.233	0.00500	0.200	0.0345	99.4	80	120			

Sample ID **1512237-01A MS**	Batch ID: **72945**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS4_160105A**	Analysis Date: **1/5/2016 3:00:00 PM**	Prep Date: **12/28/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.191	0.00250	0.200	0	95.7	80	120			
Arsenic	0.202	0.00500	0.200	0	101	80	120			
Barium	0.394	0.0100	0.200	0.210	92.3	80	120			
Beryllium	0.191	0.00100	0.200	0	95.3	80	120			
Boron	3.71	0.0300	0.200	3.61	52.6	80	120			S
Cadmium	0.188	0.00100	0.200	0	94.2	80	120			
Calcium	150	0.300	5.00	151	-28.0	80	120			S
Chromium	0.191	0.00500	0.200	0	95.7	80	120			
Cobalt	0.195	0.00500	0.200	0.00356	96.0	80	120			
Lead	0.190	0.00100	0.200	0	95.2	80	120			
Lithium	0.226	0.0100	0.200	0.0417	92.0	80	120			
Molybdenum	0.196	0.00500	0.200	0.00805	94.2	80	120			
Selenium	0.234	0.00500	0.200	0.0345	99.6	80	120			

Sample ID **1512237-01A MSD**	Batch ID: **72945**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS4_160105A**	Analysis Date: **1/5/2016 3:02:00 PM**	Prep Date: **12/28/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.190	0.00250	0.200	0	94.9	80	120	0.828	15	
Arsenic	0.201	0.00500	0.200	0	101	80	120	0.273	15	
Barium	0.395	0.0100	0.200	0.210	92.6	80	120	0.189	15	
Beryllium	0.193	0.00100	0.200	0	96.5	80	120	1.28	15	
Boron	3.83	0.0300	0.200	3.61	112	80	120	3.15	15	
Cadmium	0.187	0.00100	0.200	0	93.5	80	120	0.715	15	
Calcium	149	0.300	5.00	151	-52.2	80	120	0.806	15	S
Chromium	0.190	0.00500	0.200	0	94.9	80	120	0.844	15	
Cobalt	0.194	0.00500	0.200	0.00356	95.5	80	120	0.512	15	
Lead	0.190	0.00100	0.200	0	94.9	80	120	0.327	15	
Lithium	0.220	0.0100	0.200	0.0417	89.2	80	120	2.43	15	
Molybdenum	0.194	0.00500	0.200	0.00805	93.0	80	120	1.19	15	
Selenium	0.234	0.00500	0.200	0.0345	99.6	80	120	0.021	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1512238
Project: Sandow - AX Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160105A

Sample ID **ICV-160105**	Batch ID: **R83481**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS4_160105A**	Analysis Date: **1/5/2016 11:22:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.0949	0.00250	0.100	0	94.9	90	110			
Arsenic	0.103	0.00500	0.100	0	103	90	110			
Barium	0.100	0.0100	0.100	0	100	90	110			
Beryllium	0.101	0.00100	0.100	0	101	90	110			
Boron	0.104	0.0300	0.100	0	104	90	110			
Cadmium	0.101	0.00100	0.100	0	101	90	110			
Calcium	2.30	0.300	2.50	0	92.1	90	110			
Chromium	0.105	0.00500	0.100	0	105	90	110			
Cobalt	0.108	0.00500	0.100	0	108	90	110			
Lead	0.102	0.00100	0.100	0	102	90	110			
Lithium	0.0984	0.0100	0.100	0	98.4	90	110			
Molybdenum	0.0966	0.00500	0.100	0	96.6	90	110			
Selenium	0.102	0.00500	0.100	0	102	90	110			

Sample ID **LCVL-160105**	Batch ID: **R83481**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_160105A**	Analysis Date: **1/5/2016 11:26:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00199	0.00250	0.00200	0	99.4	70	130			
Arsenic	0.00495	0.00500	0.00500	0	99.0	70	130			
Barium	0.00489	0.0100	0.00500	0	97.7	70	130			
Beryllium	0.000790	0.00100	0.00100	0	79.0	70	130			
Boron	0.0197	0.0300	0.0200	0	98.3	70	130			
Cadmium	0.000992	0.00100	0.00100	0	99.2	70	130			
Calcium	0.0944	0.300	0.100	0	94.4	70	130			
Chromium	0.00499	0.00500	0.00500	0	99.8	70	130			
Cobalt	0.00520	0.00500	0.00500	0	104	70	130			
Lead	0.000899	0.00100	0.00100	0	89.9	70	130			
Lithium	0.00999	0.0100	0.0100	0	99.9	70	130			
Molybdenum	0.00492	0.00500	0.00500	0	98.5	70	130			
Selenium	0.00551	0.00500	0.00500	0	110	70	130			

Sample ID **CCV3-160105**	Batch ID: **R83481**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160105A**	Analysis Date: **1/5/2016 2:02:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.195	0.00250	0.200	0	97.4	90	110			
Arsenic	0.206	0.00500	0.200	0	103	90	110			
Barium	0.201	0.0100	0.200	0	101	90	110			
Beryllium	0.200	0.00100	0.200	0	100	90	110			
Boron	0.214	0.0300	0.200	0	107	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

Sample ID **CCV3-160105** Batch ID: **R83481** TestNo: **SW6020A** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS4_160105A** Analysis Date: **1/5/2016 2:02:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	0.200	0.00100	0.200	0	100	90	110			
Calcium	4.81	0.300	5.00	0	96.2	90	110			
Chromium	0.202	0.00500	0.200	0	101	90	110			
Cobalt	0.209	0.00500	0.200	0	105	90	110			
Lead	0.201	0.00100	0.200	0	101	90	110			
Lithium	0.197	0.0100	0.200	0	98.4	90	110			
Molybdenum	0.195	0.00500	0.200	0	97.7	90	110			
Selenium	0.211	0.00500	0.200	0	105	90	110			

Sample ID **LCVL3-160105** Batch ID: **R83481** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS4_160105A** Analysis Date: **1/5/2016 2:21:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00185	0.00250	0.00200	0	92.4	70	130			
Arsenic	0.00496	0.00500	0.00500	0	99.2	70	130			
Barium	0.00479	0.0100	0.00500	0	95.8	70	130			
Beryllium	0.00102	0.00100	0.00100	0	102	70	130			
Boron	0.0249	0.0300	0.0200	0	124	70	130			
Cadmium	0.000938	0.00100	0.00100	0	93.8	70	130			
Calcium	0.101	0.300	0.100	0	101	70	130			
Chromium	0.00491	0.00500	0.00500	0	98.2	70	130			
Cobalt	0.00510	0.00500	0.00500	0	102	70	130			
Lead	0.000801	0.00100	0.00100	0	80.1	70	130			
Lithium	0.00960	0.0100	0.0100	0	96.0	70	130			
Molybdenum	0.00455	0.00500	0.00500	0	90.9	70	130			
Selenium	0.00512	0.00500	0.00500	0	102	70	130			

Sample ID **CCV4-160105** Batch ID: **R83481** TestNo: **SW6020A** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS4_160105A** Analysis Date: **1/5/2016 3:44:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.196	0.00250	0.200	0	98.2	90	110			
Arsenic	0.209	0.00500	0.200	0	105	90	110			
Barium	0.203	0.0100	0.200	0	102	90	110			
Beryllium	0.206	0.00100	0.200	0	103	90	110			
Boron	0.219	0.0300	0.200	0	110	90	110			
Cadmium	0.202	0.00100	0.200	0	101	90	110			
Calcium	4.76	0.300	5.00	0	95.2	90	110			
Chromium	0.204	0.00500	0.200	0	102	90	110			
Cobalt	0.211	0.00500	0.200	0	106	90	110			
Lead	0.197	0.00100	0.200	0	98.6	90	110			

CLIENT: Pastor, Behling & Wheeler
Work Order: 1512238
Project: Sandow - AX Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160105A

Sample ID **CCV4-160105** Batch ID: **R83481** TestNo: **SW6020A** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS4_160105A** Analysis Date: **1/5/2016 3:44:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lithium	0.204	0.0100	0.200	0	102	90	110			
Molybdenum	0.197	0.00500	0.200	0	98.3	90	110			
Selenium	0.212	0.00500	0.200	0	106	90	110			

Sample ID **LCVL4-160105** Batch ID: **R83481** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS4_160105A** Analysis Date: **1/5/2016 4:15:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00185	0.00250	0.00200	0	92.4	70	130			
Arsenic	0.00509	0.00500	0.00500	0	102	70	130			
Barium	0.00484	0.0100	0.00500	0	96.8	70	130			
Beryllium	0.00116	0.00100	0.00100	0	116	70	130			
Boron	0.0212	0.0300	0.0200	0	106	70	130			
Cadmium	0.000977	0.00100	0.00100	0	97.7	70	130			
Calcium	0.102	0.300	0.100	0	102	70	130			
Chromium	0.00502	0.00500	0.00500	0	100	70	130			
Cobalt	0.00522	0.00500	0.00500	0	104	70	130			
Lead	0.000793	0.00100	0.00100	0	79.3	70	130			
Lithium	0.0104	0.0100	0.0100	0	104	70	130			
Molybdenum	0.00456	0.00500	0.00500	0	91.3	70	130			
Selenium	0.00515	0.00500	0.00500	0	103	70	130			

Sample ID **CCV5-160105** Batch ID: **R83481** TestNo: **SW6020A** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS4_160105A** Analysis Date: **1/5/2016 4:46:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.193	0.00250	0.200	0	96.4	90	110			
Arsenic	0.207	0.00500	0.200	0	104	90	110			
Barium	0.201	0.0100	0.200	0	101	90	110			
Beryllium	0.206	0.00100	0.200	0	103	90	110			
Boron	0.217	0.0300	0.200	0	109	90	110			
Cadmium	0.199	0.00100	0.200	0	99.3	90	110			
Calcium	4.79	0.300	5.00	0	95.8	90	110			
Chromium	0.204	0.00500	0.200	0	102	90	110			
Cobalt	0.210	0.00500	0.200	0	105	90	110			
Lead	0.199	0.00100	0.200	0	99.5	90	110			
Lithium	0.212	0.0100	0.200	0	106	90	110			
Molybdenum	0.193	0.00500	0.200	0	96.6	90	110			
Selenium	0.210	0.00500	0.200	0	105	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1512238
Project: Sandow - AX Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160105A

Sample ID	**LCVL5-160105**	Batch ID:	**R83481**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160105A**	Analysis Date:	**1/5/2016 4:56:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00189	0.00250	0.00200	0	94.3	70	130			
Arsenic	0.00501	0.00500	0.00500	0	100	70	130			
Barium	0.00490	0.0100	0.00500	0	97.9	70	130			
Beryllium	0.000974	0.00100	0.00100	0	97.4	70	130			
Boron	0.0227	0.0300	0.0200	0	114	70	130			
Cadmium	0.000940	0.00100	0.00100	0	94.0	70	130			
Calcium	0.0993	0.300	0.100	0	99.3	70	130			
Chromium	0.00500	0.00500	0.00500	0	100	70	130			
Cobalt	0.00516	0.00500	0.00500	0	103	70	130			
Lead	0.000807	0.00100	0.00100	0	80.7	70	130			
Lithium	0.0117	0.0100	0.0100	0	117	70	130			
Molybdenum	0.00471	0.00500	0.00500	0	94.2	70	130			
Selenium	0.00519	0.00500	0.00500	0	104	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1512238
Project: Sandow - AX Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160106B

The QC data in batch 72945 applies to the following samples: 1512238-01A, 1512238-02A, 1512238-03A, 1512238-04A, 1512238-05A, 1512238-06A, 1512238-07A, 1512238-08A, 1512238-09A, 1512238-10A

Sample ID	**MB-72945**	Batch ID:	**72945**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**ICP-MS4_160106B**	Analysis Date:	**1/6/2016 8:06:00 PM**	Prep Date:	**12/28/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Thallium	<0.000500	0.00150								

Sample ID	**LCS-72945**	Batch ID:	**72945**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**ICP-MS4_160106B**	Analysis Date:	**1/6/2016 8:08:00 PM**	Prep Date:	**12/28/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Thallium	0.188	0.00150	0.200	0	94.2	80	120			

Sample ID	**LCSD-72945**	Batch ID:	**72945**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**ICP-MS4_160106B**	Analysis Date:	**1/6/2016 8:10:00 PM**	Prep Date:	**12/28/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Thallium	0.193	0.00150	0.200	0	96.3	80	120	2.16	15	

Sample ID	**1512237-01A SD**	Batch ID:	**72945**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**SD**	Run ID:	**ICP-MS4_160106B**	Analysis Date:	**1/6/2016 8:16:00 PM**	Prep Date:	**12/28/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Thallium	<0.00250	0.00750	0	0				0	10	

Sample ID	**1512237-01A PDS**	Batch ID:	**72945**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**PDS**	Run ID:	**ICP-MS4_160106B**	Analysis Date:	**1/6/2016 8:36:00 PM**	Prep Date:	**12/28/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Thallium	0.204	0.00150	0.200	0	102	80	120			

Sample ID	**1512237-01A MS**	Batch ID:	**72945**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**ICP-MS4_160106B**	Analysis Date:	**1/6/2016 8:38:00 PM**	Prep Date:	**12/28/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Thallium	0.194	0.00150	0.200	0	96.8	80	120			

Sample ID	**1512237-01A MSD**	Batch ID:	**72945**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**ICP-MS4_160106B**	Analysis Date:	**1/6/2016 8:40:00 PM**	Prep Date:	**12/28/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Thallium	0.192	0.00150	0.200	0	95.9	80	120	0.887	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1512238
Project: Sandow - AX Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160106B

Sample ID	**ICV2-160106**	Batch ID:	**R83506**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**ICP-MS4_160106B**	Analysis Date:	**1/6/2016 7:56:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Thallium	0.0956	0.00150	0.100	0	95.6	90	110			

Sample ID	**ILCVL2-160106**	Batch ID:	**R83506**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160106B**	Analysis Date:	**1/6/2016 8:00:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Thallium	0.000858	0.00150	0.00100	0	85.8	70	130			

Sample ID	**CCV1-160106**	Batch ID:	**R83506**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_160106B**	Analysis Date:	**1/6/2016 8:42:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Thallium	0.199	0.00150	0.200	0	99.6	90	110			

Sample ID	**LCVL1-160106**	Batch ID:	**R83506**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160106B**	Analysis Date:	**1/6/2016 8:46:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Thallium	0.000931	0.00150	0.00100	0	93.1	70	130			

Sample ID	**CCV2-160106**	Batch ID:	**R83506**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_160106B**	Analysis Date:	**1/6/2016 9:10:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Thallium	0.199	0.00150	0.200	0	99.7	90	110			

Sample ID	**LCVL2-160106**	Batch ID:	**R83506**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160106B**	Analysis Date:	**1/6/2016 9:14:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Thallium	0.000892	0.00150	0.00100	0	89.2	70	130			

Sample ID	**CCV4-160106**	Batch ID:	**R83506**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_160106B**	Analysis Date:	**1/6/2016 10:17:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Thallium	0.194	0.00150	0.200	0	97.0	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1512238
Project: Sandow - AX Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160106B

Sample ID	**LCVL4-160106**	Batch ID:	**R83506**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160106B**	Analysis Date:	**1/6/2016 10:21:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Thallium	0.000872	0.00150	0.00100	0	87.2	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank
J	Analyte detected between MDL and RL
ND	Not Detected at the Method Detection Limit
RL	Reporting Limit
J	Analyte detected between SDL and RL
DF	Dilution Factor
MDL	Method Detection Limit
R	RPD outside accepted control limits
S	Spike Recovery outside control limits
N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1512238
Project: Sandow - AX Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_151228A

The QC data in batch 72953 applies to the following samples: 1512238-01D, 1512238-02D, 1512238-03D, 1512238-04D, 1512238-05D, 1512238-06D, 1512238-07D, 1512238-08D, 1512238-09D, 1512238-10D

Sample ID **MB-72953** Batch ID: **72953** TestNo: **E300** Units: **mg/L**
SampType: **MBLK** Run ID: **IC2_151228A** Analysis Date: **12/28/2015 10:15:55 A** Prep Date: **12/28/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	<0.300	1.00								
Fluoride	<0.100	0.400								
Sulfate	<1.00	3.00								

Sample ID **LCS-72953** Batch ID: **72953** TestNo: **E300** Units: **mg/L**
SampType: **LCS** Run ID: **IC2_151228A** Analysis Date: **12/28/2015 10:30:31 A** Prep Date: **12/28/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.99	1.00	10.00	0	99.9	90	110			
Fluoride	3.68	0.400	4.000	0	92.0	90	110			
Sulfate	29.0	3.00	30.00	0	96.7	90	110			

Sample ID **LCSD-72953** Batch ID: **72953** TestNo: **E300** Units: **mg/L**
SampType: **LCSD** Run ID: **IC2_151228A** Analysis Date: **12/28/2015 10:45:08 A** Prep Date: **12/28/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.99	1.00	10.00	0	99.9	90	110	0.009	20	
Fluoride	3.84	0.400	4.000	0	95.9	90	110	4.13	20	
Sulfate	29.2	3.00	30.00	0	97.3	90	110	0.586	20	

Sample ID **1512238-03DMS** Batch ID: **72953** TestNo: **E300** Units: **mg/L**
SampType: **MS** Run ID: **IC2_151228A** Analysis Date: **12/28/2015 4:32:26 PM** Prep Date: **12/28/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2230	100	2000	279.2	97.6	90	110			
Fluoride	1990	40.0	2000	0	99.6	90	110			
Sulfate	2920	300	2000	1079	91.8	90	110			

Sample ID **1512238-03DMSD** Batch ID: **72953** TestNo: **E300** Units: **mg/L**
SampType: **MSD** Run ID: **IC2_151228A** Analysis Date: **12/28/2015 4:47:02 PM** Prep Date: **12/28/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2240	100	2000	279.2	98.1	90	110	0.432	20	
Fluoride	2010	40.0	2000	0	100	90	110	0.764	20	
Sulfate	2950	300	2000	1079	93.3	90	110	1.01	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1512238
Project: Sandow - AX Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_151228A

Sample ID **ICV-151228**	Batch ID: **R83389**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC2_151228A**	Analysis Date: **12/28/2015 9:44:28 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	23.7	1.00	25.00	0	94.8	90	110			
Fluoride	9.13	0.400	10.00	0	91.3	90	110			
Sulfate	71.4	3.00	75.00	0	95.2	90	110			

Sample ID **CCV1-151228**	Batch ID: **R83389**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_151228A**	Analysis Date: **12/28/2015 1:45:40 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.94	1.00	10.00	0	99.4	90	110			
Fluoride	4.02	0.400	4.000	0	100	90	110			
Sulfate	30.7	3.00	30.00	0	102	90	110			

Sample ID **CCV2-151228**	Batch ID: **R83389**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_151228A**	Analysis Date: **12/28/2015 5:01:39 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.67	1.00	10.00	0	96.7	90	110			
Fluoride	4.08	0.400	4.000	0	102	90	110			
Sulfate	29.3	3.00	30.00	0	97.7	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1512238
Project: Sandow - AX Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_151218A

The QC data in batch 72803 applies to the following samples: 1512238-01D, 1512238-02D, 1512238-03D, 1512238-04D, 1512238-05D, 1512238-06D, 1512238-07D, 1512238-08D, 1512238-09D, 1512238-10D

Sample ID	**1512237-01D DUP**	Batch ID:	**72803**	TestNo:	**M4500-H+ B**	Units:	**pH Units@15.5℃**
SampType:	**DUP**	Run ID:	**TITRATOR_151218A**	Analysis Date:	**12/18/2015 3:00:00 PM**	Prep Date:	**12/18/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	7.25	0	0	7.230				0.276	5	

Sample ID	**1512238-10D DUP**	Batch ID:	**72803**	TestNo:	**M4500-H+ B**	Units:	**pH Units@18.8℃**
SampType:	**DUP**	Run ID:	**TITRATOR_151218A**	Analysis Date:	**12/18/2015 3:47:00 PM**	Prep Date:	**12/18/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.54	0	0	6.520				0.306	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1512238
Project: Sandow - AX Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_151218A

Sample ID	ICV-151218	Batch ID:	R83249	TestNo:	M4500-H+ B	Units:	pH Units@21.2℃
SampType:	ICV	Run ID:	TITRATOR_151218A	Analysis Date:	12/18/2015 2:48:00 PM	Prep Date:	12/18/2015

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	9.96	0	10.00	0	99.6	99	101			

Sample ID	CCV1-151218	Batch ID:	R83249	TestNo:	M4500-H+ B	Units:	pH Units@20.2℃
SampType:	CCV	Run ID:	TITRATOR_151218A	Analysis Date:	12/18/2015 3:17:00 PM	Prep Date:	12/18/2015

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	7.01	0	7.000	0	100	97.1	102.9			

Sample ID	CCV2-151218	Batch ID:	R83249	TestNo:	M4500-H+ B	Units:	pH Units@19.2℃
SampType:	CCV	Run ID:	TITRATOR_151218A	Analysis Date:	12/18/2015 3:42:00 PM	Prep Date:	12/18/2015

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.97	0	7.000	0	99.6	97.1	102.9			

Sample ID	CCV3-151218	Batch ID:	R83249	TestNo:	M4500-H+ B	Units:	pH Units@19.9℃
SampType:	CCV	Run ID:	TITRATOR_151218A	Analysis Date:	12/18/2015 3:48:00 PM	Prep Date:	12/18/2015

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.97	0	7.000	0	99.6	97.1	102.9			

Sample ID	CCV-151218-PH12	Batch ID:	R83249	TestNo:	M4500-H+ B	Units:	pH Units@21.4℃
SampType:	CCV	Run ID:	TITRATOR_151218A	Analysis Date:	12/18/2015 4:48:00 PM	Prep Date:	12/18/2015

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	12.0	0	12.00	0	100	97.1	102.9			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1512238
Project: Sandow - AX Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: **WC_151221A**

The QC data in batch 72884 applies to the following samples: 1512238-01D, 1512238-02D

Sample ID	**MB-72884**	Batch ID:	**72884**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**WC_151221A**	Analysis Date:	**12/22/2015 8:00:00 AM**	Prep Date:	**12/21/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	<10.0	10.0								

Sample ID	**LCS-72884**	Batch ID:	**72884**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**WC_151221A**	Analysis Date:	**12/22/2015 8:00:00 AM**	Prep Date:	**12/21/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	749	10.0	745.6	0	100	90	113			

Sample ID	**1512251-01B-DUP**	Batch ID:	**72884**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_151221A**	Analysis Date:	**12/22/2015 8:00:00 AM**	Prep Date:	**12/21/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	340	10.0	0	338.0				0.590	5	

Sample ID	**1512237-07D-DUP**	Batch ID:	**72884**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_151221A**	Analysis Date:	**12/22/2015 8:00:00 AM**	Prep Date:	**12/21/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	1900	50.0	0	1875				1.32	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1512238
Project: Sandow - AX Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: WC_151222B

The QC data in batch 72907 applies to the following samples: 1512238-03D, 1512238-04D, 1512238-05D, 1512238-06D, 1512238-07D, 1512238-08D, 1512238-09D, 1512238-10D

Sample ID **MB-72907** Batch ID: **72907** TestNo: **M2540C** Units: **mg/L**
SampType: **MBLK** Run ID: **WC_151222B** Analysis Date: **12/23/2015 8:05:00 AM** Prep Date: **12/22/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	<10.0	10.0								

Sample ID **LCS-72907** Batch ID: **72907** TestNo: **M2540C** Units: **mg/L**
SampType: **LCS** Run ID: **WC_151222B** Analysis Date: **12/23/2015 8:05:00 AM** Prep Date: **12/22/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	736	10.0	745.6	0	98.7	90	113			

Sample ID **1512238-03D-DUP** Batch ID: **72907** TestNo: **M2540C** Units: **mg/L**
SampType: **DUP** Run ID: **WC_151222B** Analysis Date: **12/23/2015 8:05:00 AM** Prep Date: **12/22/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	2400	50.0	0	2425				1.04	5	

Sample ID **1512286-06D-DUP** Batch ID: **72907** TestNo: **M2540C** Units: **mg/L**
SampType: **DUP** Run ID: **WC_151222B** Analysis Date: **12/23/2015 8:05:00 AM** Prep Date: **12/22/2015**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	960	50.0	0	940.0				2.11	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

GEL Laboratories LLC
a member of The GEL Group INC

PO Box 30712 Charleston, SC 29417
2040 Savage Road Charleston, SC 29407
P 843.556.8171
F 843.766.1178

gel.com

January 15, 2016

Mr. John DuPont
DHL Analytical
2300 Double Creek Drive
Round Rock, Texas 78664

Re: Routine Analysis
Work Order: 387927
SDG: 1512238

Dear Mr. DuPont:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on December 22, 2015. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4707.

Sincerely,

Anna C Day

Anna Day
Project Manager

Purchase Order: 14095
Enclosures

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 − (843) 556−8171 − www.gel.com

Certificate of Analysis Report
for

DHLA002 DHL Analytical

Client SDG: 1512238 GEL Work Order: 387927

The Qualifiers in this report are defined as follows:

* A quality control analyte recovery is outside of specified acceptance criteria

** Analyte is a Tracer compound

** Analyte is a surrogate compound

U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Anna Day.

Reviewed by Anna C Day

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: January 15, 2016

Company :	DHL Analytical
Address :	2300 Double Creek Drive
	Round Rock, Texas 78664
Contact:	Mr. John DuPont
Project:	Routine Analysis

Client Sample ID:	AX-22R	Project:	DHLA00112
Sample ID:	387927001	Client ID:	DHLA002
Matrix:	Water		
Collect Date:	17-DEC-15 08:20		
Receive Date:	22-DEC-15		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting												
GFPC, Ra228, Liquid "As Received"												
Radium-228		2.13	+/-1.15	1.68	3.00	pCi/L		AXM6	01/11/16	1122	1534782	1
Rad Radium-226												
Lucas Cell, Ra226, liquid "As Received"												
Radium-226		1.15	+/-0.479	0.564	1.00	pCi/L		CXP3	01/13/16	0715	1533729	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			84.2	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: January 15, 2016

Company : DHL Analytical
Address : 2300 Double Creek Drive

Round Rock, Texas 78664
Contact: Mr. John DuPont
Project: Routine Analysis

Client Sample ID:	AXMW-2	Project:	DHLA00112
Sample ID:	387927002	Client ID:	DHLA002
Matrix:	Water		
Collect Date:	17-DEC-15 10:10		
Receive Date:	22-DEC-15		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting												
GFPC, Ra228, Liquid "As Received"												
Radium-228		2.21	+/-1.08	1.48	3.00	pCi/L		AXM6	01/11/16	1122	1534782	1
Rad Radium-226												
Lucas Cell, Ra226, liquid "As Received"												
Radium-226		1.27	+/-0.450	0.488	1.00	pCi/L		CXP3	01/13/16	0715	1533729	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			80.4	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

GEL LABORATORIES LLC
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Certificate of Analysis

Report Date: January 15, 2016

Company :	DHL Analytical
Address :	2300 Double Creek Drive
	Round Rock, Texas 78664
Contact:	Mr. John DuPont
Project:	Routine Analysis

Client Sample ID:	AX-29	Project:	DHLA00112
Sample ID:	387927003	Client ID:	DHLA002
Matrix:	Water		
Collect Date:	17-DEC-15 10:35		
Receive Date:	22-DEC-15		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting												
GFPC, Ra228, Liquid "As Received"												
Radium-228	U	2.43	+/-1.64	2.58	3.00	pCi/L		AXM6	01/14/16	1116	1534782	1
Rad Radium-226												
Lucas Cell, Ra226, liquid "As Received"												
Radium-226		1.23	+/-0.484	0.553	1.00	pCi/L		CXP3	01/13/16	0715	1533729	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			70.3	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

GEL LABORATORIES LLC
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Certificate of Analysis

Report Date: January 15, 2016

Company : DHL Analytical
Address : 2300 Double Creek Drive

Round Rock, Texas 78664
Contact: Mr. John DuPont
Project: Routine Analysis

Client Sample ID:	AX-23	Project:	DHLA00112
Sample ID:	387927004	Client ID:	DHLA002
Matrix:	Water		
Collect Date:	17-DEC-15 11:30		
Receive Date:	22-DEC-15		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting												
GFPC, Ra228, Liquid "As Received"												
Radium-228	U	0.677	+/-1.05	1.82	3.00	pCi/L		AXM6	01/11/16	1120	1534782	1
Rad Radium-226												
Lucas Cell, Ra226, liquid "As Received"												
Radium-226		0.912	+/-0.458	0.589	1.00	pCi/L		CXP3	01/13/16	0715	1533729	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			88.1	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

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Certificate of Analysis

Report Date: January 15, 2016

Company : DHL Analytical
Address : 2300 Double Creek Drive

Round Rock, Texas 78664
Contact: Mr. John DuPont
Project: Routine Analysis

Client Sample ID: AXMW-1
Sample ID: 387927005
Matrix: Water
Collect Date: 17-DEC-15 12:50
Receive Date: 22-DEC-15
Collector: Client

Project: DHLA00112
Client ID: DHLA002

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting												
GFPC, Ra228, Liquid "As Received"												
Radium-228		4.58	+/-1.73	2.37	3.00	pCi/L		AXM6	01/14/16	1116	1534782	1
Rad Radium-226												
Lucas Cell, Ra226, liquid "As Received"												
Radium-226	U	0.557	+/-0.386	0.562	1.00	pCi/L		CXP3	01/13/16	0715	1533729	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			69.7	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

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Certificate of Analysis

Report Date: January 15, 2016

Company : DHL Analytical
Address : 2300 Double Creek Drive

Round Rock, Texas 78664
Contact: Mr. John DuPont
Project: Routine Analysis

Client Sample ID:	AX-27	Project:	DHLA00112
Sample ID:	387927006	Client ID:	DHLA002
Matrix:	Water		
Collect Date:	17-DEC-15 13:35		
Receive Date:	22-DEC-15		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting												
GFPC, Ra228, Liquid "As Received"												
Radium-228	U	0.748	+/-1.10	1.89	3.00	pCi/L		AXM6	01/11/16	1122	1534782	1
Rad Radium-226												
Lucas Cell, Ra226, liquid "As Received"												
Radium-226		1.36	+/-0.482	0.522	1.00	pCi/L		CXP3	01/13/16	0745	1533729	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			89.9	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Certificate of Analysis

Report Date: January 15, 2016

Company :	DHL Analytical
Address :	2300 Double Creek Drive
	Round Rock, Texas 78664
Contact:	Mr. John DuPont
Project:	Routine Analysis

Client Sample ID:	AX-26	Project:	DHLA00112
Sample ID:	387927007	Client ID:	DHLA002
Matrix:	Water		
Collect Date:	17-DEC-15 14:55		
Receive Date:	22-DEC-15		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting												
GFPC, Ra228, Liquid "As Received"												
Radium-228		2.93	+/-1.80	2.77	3.00	pCi/L		AXM6	01/14/16	1116	1534782	1
Rad Radium-226												
Lucas Cell, Ra226, liquid "As Received"												
Radium-226		1.96	+/-0.549	0.431	1.00	pCi/L		CXP3	01/13/16	0745	1533729	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			58.6	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

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Certificate of Analysis

Report Date: January 15, 2016

Company : DHL Analytical
Address : 2300 Double Creek Drive

Round Rock, Texas 78664
Contact: Mr. John DuPont
Project: Routine Analysis

Client Sample ID:	AX-24	Project:	DHLA00112
Sample ID:	387927008	Client ID:	DHLA002
Matrix:	Water		
Collect Date:	18-DEC-15 08:50		
Receive Date:	22-DEC-15		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting												
GFPC, Ra228, Liquid "As Received"												
Radium-228		2.65	+/-1.21	1.70	3.00	pCi/L		AXM6	01/11/16	1122	1534782	1
Rad Radium-226												
Lucas Cell, Ra226, liquid "As Received"												
Radium-226		1.67	+/-0.594	0.643	1.00	pCi/L		CXP3	01/13/16	0745	1533729	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			87	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

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Certificate of Analysis

Report Date: January 15, 2016

Company : DHL Analytical
Address : 2300 Double Creek Drive

Round Rock, Texas 78664
Contact: Mr. John DuPont
Project: Routine Analysis

Client Sample ID:	AX-25	Project:	DHLA00112
Sample ID:	387927009	Client ID:	DHLA002
Matrix:	Water		
Collect Date:	18-DEC-15 09:30		
Receive Date:	22-DEC-15		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting												
GFPC, Ra228, Liquid "As Received"												
Radium-228		1.55	+/-1.01	1.50	3.00	pCi/L		AXM6	01/11/16	1122	1534782	1
Rad Radium-226												
Lucas Cell, Ra226, liquid "As Received"												
Radium-226		0.306	+/-0.224	0.293	1.00	pCi/L		CXP3	01/13/16	0745	1533729	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			79.6	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

GEL LABORATORIES LLC
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Certificate of Analysis

Report Date: January 15, 2016

Company :	DHL Analytical
Address :	2300 Double Creek Drive
	Round Rock, Texas 78664
Contact:	Mr. John DuPont
Project:	Routine Analysis

Client Sample ID:	AX-28	Project:	DHLA00112
Sample ID:	387927010	Client ID:	DHLA002
Matrix:	Water		
Collect Date:	18-DEC-15 10:40		
Receive Date:	22-DEC-15		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting												
GFPC, Ra228, Liquid "As Received"												
Radium-228	U	1.49	+/-1.06	1.62	3.00	pCi/L		AXM6	01/11/16	1121	1534782	1
Rad Radium-226												
Lucas Cell, Ra226, liquid "As Received"												
Radium-226		1.02	+/-0.433	0.515	1.00	pCi/L		CXP3	01/13/16	0745	1533729	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			80.6	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

QC Summary

Report Date: January 15, 2016

DHL Analytical
2300 Double Creek Drive
Round Rock, Texas

Contact: **Mr. John DuPont**

Workorder: **387927**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gas Flow										
Batch 1534782										
QC1203462630 387923008 DUP										
Radium-228	U	-1.01	U	1.44	pCi/L	N/A		N/A	AXM6	01/11/16 11:23
	Uncertainty	+/-1.22		+/-1.67						
QC1203462631 LCS										
Radium-228	28.8			32.1	pCi/L		111	(75%-125%)		01/11/16 11:23
	Uncertainty			+/-3.04						
QC1203462629 MB										
Radium-228			U	0.140	pCi/L					01/11/16 11:22
	Uncertainty			+/-0.932						
Rad Ra-226										
Batch 1533729										
QC1203459858 387939001 DUP										
Radium-226	U	0.553		1.43	pCi/L	88.7		(0% - 100%)	CXP3	01/13/16 09:30
	Uncertainty	+/-0.383		+/-0.574						
QC1203459860 LCS										
Radium-226	30.5			23.2	pCi/L		76.1	(75%-125%)		01/13/16 09:30
	Uncertainty			+/-1.83						
QC1203459857 MB										
Radium-226			U	0.124	pCi/L					01/13/16 09:30
	Uncertainty			+/-0.353						
QC1203459859 387939001 MS										
Radium-226	61.0 U	0.553		51.9	pCi/L		85.1	(75%-125%)		01/13/16 09:30
	Uncertainty	+/-0.383		+/-4.09						

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

- ** Analyte is a Tracer compound
- < Result is less than value reported
- > Result is greater than value reported
- BD Results are either below the MDC or tracer recovery is low
- FA Failed analysis.
- H Analytical holding time was exceeded
- J Value is estimated
- K Analyte present. Reported value may be biased high. Actual value is expected to be lower.
- L Analyte present. Reported value may be biased low. Actual value is expected to be higher.
- M M if above MDC and less than LLD
- M REMP Result > MDC/CL and < RDL
- N/A RPD or %Recovery limits do not apply.

QC Summary

Workorder: **387927**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time

N1	See case narrative
ND	Analyte concentration is not detected above the detection limit
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
R	Sample results are rejected
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
UI	Gamma Spectroscopy--Uncertain identification
UJ	Gamma Spectroscopy--Uncertain identification
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
h	Preparation or preservation holding time was exceeded

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

There are no "Data Exception Reports" associated with this analytical report.

CHAIN-OF-CUSTODY RECORD

FAX: *(512) 388-8229*

TEL: (843) 556-8171
FAX:
Acct #: 357927

18-Dec-15

	Matrix	DHL#	Date Collected	Bottle Type	Requested Tests E903.1	E904.0				
	Aqueous	-01B	12/17/15 08:20 AM	500HDPEHNO3		1				
	Aqueous	-01C	12/17/15 08:20 AM	500HDPEHNO3	1					
	Aqueous	-02B	12/17/15 10:10 AM	500HDPEHNO3		1				
	Aqueous	-02C	12/17/15 10:10 AM	500HDPEHNO3	1					
	Aqueous	-03B	12/17/15 10:35 AM	500HDPEHNO3		1				
	Aqueous	-03C	12/17/15 10:35 AM	500HDPEHNO3	1					
	Aqueous	-04B	12/17/15 11:30 AM	500HDPEHNO3		1				
	Aqueous	-04C	12/17/15 11:30 AM	500HDPEHNO3	1					
	Aqueous	-05B	12/17/15 12:50 PM	500HDPEHNO3		1				
	Aqueous	-05C	12/17/15 12:50 PM	500HDPEHNO3	1					
	Aqueous	-06B	12/17/15 01:35 PM	500HDPEHNO3		1				
	Aqueous	-06C	12/17/15 01:35 PM	500HDPEHNO3	1					
	Aqueous	-07B	12/17/15 02:55 PM	500HDPEHNO3		1				
	Aqueous	-07C	12/17/15 02:55 PM	500HDPEHNO3	1					
	Aqueous	-08B	12/18/15 08:50 AM	500HDPEHNO3		1				
	Aqueous	-08C	12/18/15 08:50 AM	500HDPEHNO3	1					
	Aqueous	-09B	12/18/15 09:30 AM	500HDPEHNO3		1				
	Aqueous	-09C	12/18/15 09:30 AM	500HDPEHNO3	1					

e analyze these samples with a Standard Turnaround Time.
ohn DuPont if you have questions.
y Control Package Needed: Standard / _____
L report to both cac@dhlanalytical.com & dupont@dhlanalytical.com

	Date/Time		Date/Time
	12/18/15 1733	Received by: Fedex	12/18/15 1730
		Received by: B Luthman	12/22/15 0850

CHAIN-OF-CUSTODY RECORD

FAX: *(512) 388-8229*

TEL: (843) 556-8171
FAX:
Acct #:

18-Dec-15

	Matrix	DHL#	Date Collected	Bottle Type	Requested Tests					
					E903.1	E904.0				
	Aqueous	-10B	12/18/15 10:40 AM	500HDPEHNO3		1				
	Aqueous	-10C	12/18/15 10:40 AM	500HDPEHNO3	1					

e analyze these samples with a Standard Turnaround Time.
ohn DuPont if you have questions.
y Control Package Needed: Standard / _____
L report to both cac@dhlanalytical.com & dupont@dhlanalytical.com

	Date/Time		Date/Time
	12/18/15 1733	Received by:	12/18/15 1733
		Received by: B. Luethman	12/22/15 0850

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: DHLA	**SDG/AR/COC/Work Order:** 387927
Received By: Brielle Luthman	**Date Received:** 12/22/15 0850

Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?		/	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): Ø
Classified Radioactive II or III by RSO?		/	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?		/	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		/	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?		/	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		/	

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	/			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*		/		Preservation Method: Ice bags Blue ice Dry ice (None) Other (describe) *all temperatures are recorded in Celsius 18°
2a	Daily check performed and passed on IR temperature gun?	/			Temperature Device Serial #: Secondary Temperature Device Serial # (If Applicable): E5032015830
3	Chain of custody documents included with shipment?	/			
4	Sample containers intact and sealed?	/			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?	/			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	Do Low Level Perchlorate samples have headspace as required?		/		Sample ID's and containers affected:
7	VOA vials contain acid preservation?		/		(If unknown, select No)
8	VOA vials free of headspace (defined as < 6mm bubble)?		/		Sample ID's and containers affected:
9	Are Encore containers present?			/	(If yes, immediately deliver to Volatiles laboratory)
10	Samples received within holding time?	/			ID's and tests affected:
11	Sample ID's on COC match ID's on bottles?	/			Sample ID's and containers affected:
12	Date & time on COC match date & time on bottles?			/	Sample ID's affected: AX MW-2 1035 AX-29 1010
13	Number of containers received match number indicated on COC?	/			Sample ID's affected:
14	Are sample containers identifiable as GEL provided?			/	
15	COC form is properly signed in relinquished/received sections?	/			
16	Carrier and tracking number.				Circle Applicable: FedEx Air (FedEx Ground) UPS Field Services Courier Other 7752 4994 4957

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials HH Date 122215 Page 1 of 1 GL-CHL-SR-001 Rev 2

List of current GEL Certifications as of 15 January 2016

State	Certification
Alaska	UST−110
Arkansas	88−0651
CLIA	42D0904046
California	2940 Interim
Colorado	SC00012
Connecticut	PH−0169
Delaware	SC000122013−10
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330−15−00283, P330−15−00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC000122013−10
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C−SC−01
Kansas NELAP	E−10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA150001
Maryland	270
Massachusetts	M−SC012
Michigan	9976
Mississippi	SC000122013−10
Nebraska	NE−OS−26−13
Nevada	SC000122016−1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R−158
Oklahoma	9904
Pennsylvania NELAP	68−00485
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235−15−10
Utah NELAP	SC000122015−19
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

March 14, 2016

Will Vienne
Pastor, Behling & Wheeler
2201 Double Creek Dr #4004
Round Rock, Texas 78664
TEL: (512) 671-3434
FAX (512) 671-3446

Order No.: 1602090

RE: Sandow CCR

Dear Will Vienne:

DHL Analytical, Inc. received 7 sample(s) on 2/9/2016 for the analyses presented in the following report.

There were no problems with the analyses and all data met requirements of NELAC except where noted in the Case Narrative. All non-NELAC methods will be identified accordingly in the case narrative and all estimated uncertainties of test results are within method or EPA specifications.

If you have any questions regarding these tests results, please feel free to call. Thank you for using DHL Analytical.

Sincerely,

John DuPont
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-15-15

Table of Contents

DHL ANALYTICAL
2300 Double Creek Dr. ■ Round Rock, TX 78664
Phone (512) 388-8222 ■ FAX (512) 388-8229
Web: www.dhlanalytical.com
E-Mail: login@dhlanalytical.com

CHA

CLIENT: Pastor, Behling & Wheeler
ADDRESS: 2201 Double Creek Dr Ste 1004
PHONE: 512-671-3434 FAX/E-MAIL:
DATA REPORTED TO: Will Vienne
ADDITIONAL REPORT COPIES TO: Karla Henson

DATE: 2/8/2016
PO #: DHL WORK ORD
PROJECT LOCATION OR NAME: Sandow C
CLENT PROJECT #: 5164E COLL

Authorize 5% surcharge for TRRP Report? ☐ Yes ☑ No

S=SOIL P=PAINT
W=WATER SL=SLUDGE
A=AIR O=OTHER
L=LIQUID SO=SOLID
SE=SEDIMENT

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	PRESERVATION HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESERVED
AX-28	1	2/8/16	9:35	W	500/200	4		X			
AX-29	2		10:20								
AXMW-2	3		12:10								
AX-23	4		13:00								
AXMW-1	5		14:20								
AX-27	6		15:05								
AX-26	7		15:55								

ANALYSES: BTEX ☐ MTBE ☐ (METHOD 8021) TPH 1005 ☐ TPH 1006 ☐ HOLD 1006 ☐ GRO (METHOD 8015) ☐ DRO (METHOD 8105) ☐ VOC 8260 ☐ VOC 624 ☐ VOC 8260/5035 ☐ SVOC 8270 ☐ PAH 8270 ☐ HOLD PAH ☐ SVOC 625 ☐ 8270 PEST ☐ O-P PEST ☐ 625 PEST/PCB ☐ 608 PCB ☐ 8270 PCB ☐ 8321 HERB ☐ T PHOS, AMMONIA ☐ 8082 PCB ☐ 8270 PCB ☐ METALS 6020 ☐ METALS 200.8 ☐ DISS. METALS ☐ RCRA ☐ TX11 ☐ PH ☐ HEX CHROM ☐ ALKALINITY ☐ CHLORIDE ☐ ANIONS TCLP-SVOC ☐ VOC ☐ TCLP-METALS ☐ RCI ☐ FLA TDS

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
[signature]	2/8/16 17:55	
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
[signature]	2/9/16 8:29	[signature]
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)

TURN AROUND TIME
RUSH ☐ CALL FIRST
1 DAY ☐ CALL FIRST
2 DAY ☐
NORMAL ☑
OTHER ☐ _____

LABORATORY USE O
RECEIVING TEMP: 4
CUSTODY SEALS: ☐
CARRIER: ☐ LONE S
☐ COURIER DELIVERY
☑ HAND DELIVERED

John Dupont

From: Sara Taube [Sara.Taube@pbwllc.com]
Sent: Wednesday, July 22, 2015 12:05 PM
To: John Dupont
Subject: CCR Appendix III and IV
Follow Up Flag: Follow up
Flag Status: Completed

Hi John,

Here are the Appendix III and Appendix IV constituents that we will need to have analyzed under the CCR Rule.

Appendix III
Boron
Calcium
Chloride
Fluoride
pH
sulfate
TDS

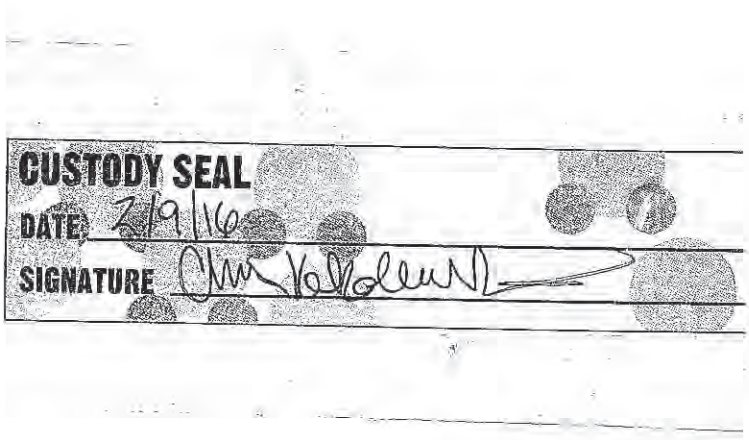
Appendix IV
Antimony
Arsenic
Barium
Beryllium
Cadmium
Chromium
Cobalt
Fluoride
Lead
Lithium
Mercury
Molybdenum
Selenium
Thallium
Radium 226 and 228

We are looking to have approximately 74 wells sampled 8 times over the course of the next two years. Please let me know if there is any more information you might need.

Cheers,

Sara

10/26/2015


CUSTODY SEAL
DATE 3/9/16
SIGNATURE


QEC
Quality Environmental Cor
800-255-3950 • 304-255-

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name **Pastor, Behling & Wheeler** Date Received: **2/9/2016**

Work Order Number **1602090** Received by **MB**

Checklist completed by: _____ 2/9/2016 Reviewed by JD 2/9/2016
Signature Date Initials Date

Carrier name Hand Delivered

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	4.2 °C
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH<2 acceptable upon receipt?	Yes ☑	No ☐	NA ☐ LOT # 8086
	Adjusted? No		Checked by MB
Water - ph>9 (S) or ph>12 (CN) acceptable upon receipt?	Yes ☐	No ☐	NA ☑ LOT #
	Adjusted? _____		Checked by _____

Any No response must be detailed in the comments section below.

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

CLIENT: Pastor, Behling & Wheeler
Project: Sandow CCR
Lab Order: 1602090

CASE NARRATIVE

Samples were analyzed using the methods outlined in the following references:

Method SW6020A - Metals Analysis
Method SW7470A - Mercury Analysis
Method E300 - Anions Analysis
Method M4500-H+ B - pH of a Water Analysis
Method M2540C - TDS Analysis
Sub-contract - Radium-228 and Radium-226 analyses by methods E904.0/SW8469320 Modified and E903.1 Modified. Analyzed at GEL Laboratory.

LOG IN

The samples were received and log-in performed on 2/9/16. A total of 7 samples were received. The samples arrived in good condition and were properly packaged.

METALS ANALYSIS

For Metals analysis performed on 2/12/16 the matrix spike and matrix spike duplicate recoveries were above control limits for Calcium. These are flagged accordingly in the QC summary report. The sample selected for the matrix spike and matrix spike duplicate was not from this work order. The LCS was within control limits for this analyte. No further corrective actions were taken.

For Metals analysis performed on 2/12/16 the RPD for the serial dilution was slightly above control limits for Boron. This is flagged accordingly. The PDS was within control limits for this analyte. No further corrective actions were taken.

For Metals analysis performed on 2/15/16 ILCVL2-160215 was slightly above control limits for Boron. This is flagged accordingly. The associated ICV2-160215 was within control limits for this analyte. No further corrective actions were taken.

ANIONS ANALYSIS

For Anions analysis performed on 2/9/16 the matrix spike recovery was slightly above control limits for Sulfate. This is flagged accordingly in the QC summary report. The sample selected for the matrix spike and matrix spike duplicate was not from this work order. The LCS was within control limits for this analyte. No further corrective actions were taken.

TDS ANALYSIS

CLIENT:	Pastor, Behling & Wheeler
Project:	Sandow CCR
Lab Order:	1602090

CASE NARRATIVE

For TDS analysis performed on 2/10/16 the sample and sample duplicate (1602090-01 & 1602090-01 DUP) had the RPD slightly above control limits. This is flagged accordingly in the QC summary report. This may be due to the sample being turbid. No futher corrective actions were taken.

DHL Analytical, Inc.

Date: *14-Mar-16*

CLIENT: Pastor, Behling & Wheeler
Project: Sandow CCR
Lab Order: 1602090

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
1602090-01	AX-28		02/08/16 09:35 AM	2/9/2016
1602090-02	AX-29		02/08/16 10:20 AM	2/9/2016
1602090-03	AXMW-2		02/08/16 12:10 PM	2/9/2016
1602090-04	AX-23		02/08/16 01:00 PM	2/9/2016
1602090-05	AXMW-1		02/08/16 02:20 PM	2/9/2016
1602090-06	AX-27		02/08/16 03:05 PM	2/9/2016
1602090-07	AX-26		02/08/16 03:55 PM	2/9/2016

& Wheeler

PREP DATES REPORT

Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
02/08/16 09:35 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	02/11/16 08:56 AM	73623
02/08/16 09:35 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	02/11/16 08:56 AM	73623
02/08/16 09:35 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	02/09/16 11:11 AM	73599
02/08/16 09:35 AM	Aqueous	E300	Anion Preparation	02/09/16 10:20 AM	73596
02/08/16 09:35 AM	Aqueous	E300	Anion Preparation	02/09/16 10:20 AM	73596
02/08/16 09:35 AM	Aqueous	M4500-H+ B	pH Preparation	02/10/16 09:36 AM	73612
02/08/16 09:35 AM	Aqueous	M2540C	TDS Preparation	02/10/16 11:52 AM	73615
02/08/16 10:20 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	02/11/16 08:56 AM	73623
02/08/16 10:20 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	02/11/16 08:56 AM	73623
02/08/16 10:20 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	02/09/16 11:11 AM	73599
02/08/16 10:20 AM	Aqueous	E300	Anion Preparation	02/09/16 10:20 AM	73596
02/08/16 10:20 AM	Aqueous	E300	Anion Preparation	02/09/16 10:20 AM	73596
02/08/16 10:20 AM	Aqueous	M4500-H+ B	pH Preparation	02/10/16 09:36 AM	73612
02/08/16 10:20 AM	Aqueous	M2540C	TDS Preparation	02/10/16 11:52 AM	73615
02/08/16 12:10 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	02/11/16 08:56 AM	73623
02/08/16 12:10 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	02/11/16 08:56 AM	73623
02/08/16 12:10 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	02/11/16 08:56 AM	73623
02/08/16 12:10 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	02/09/16 11:11 AM	73599
02/08/16 12:10 PM	Aqueous	E300	Anion Preparation	02/09/16 10:20 AM	73596
02/08/16 12:10 PM	Aqueous	E300	Anion Preparation	02/09/16 10:20 AM	73596
02/08/16 12:10 PM	Aqueous	M4500-H+ B	pH Preparation	02/10/16 09:36 AM	73612
02/08/16 12:10 PM	Aqueous	M2540C	TDS Preparation	02/10/16 11:52 AM	73615
02/08/16 01:00 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	02/11/16 08:56 AM	73623
02/08/16 01:00 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	02/11/16 08:56 AM	73623
02/08/16 01:00 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	02/09/16 11:11 AM	73599
02/08/16 01:00 PM	Aqueous	E300	Anion Preparation	02/09/16 10:20 AM	73596
02/08/16 01:00 PM	Aqueous	E300	Anion Preparation	02/09/16 10:20 AM	73596
02/08/16 01:00 PM	Aqueous	M4500-H+ B	pH Preparation	02/10/16 09:36 AM	73612

& Wheeler

PREP DATES REPORT

Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
02/08/16 01:00 PM	Aqueous	M2540C	TDS Preparation	02/10/16 11:52 AM	73615
02/08/16 02:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	02/11/16 08:56 AM	73623
02/08/16 02:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	02/11/16 08:56 AM	73623
02/08/16 02:20 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	02/09/16 11:11 AM	73599
02/08/16 02:20 PM	Aqueous	E300	Anion Preparation	02/09/16 10:20 AM	73596
02/08/16 02:20 PM	Aqueous	E300	Anion Preparation	02/09/16 10:20 AM	73596
02/08/16 02:20 PM	Aqueous	M4500-H+ B	pH Preparation	02/10/16 09:36 AM	73612
02/08/16 02:20 PM	Aqueous	M2540C	TDS Preparation	02/10/16 11:52 AM	73615
02/08/16 03:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	02/11/16 08:56 AM	73623
02/08/16 03:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	02/11/16 08:56 AM	73623
02/08/16 03:05 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	02/09/16 11:11 AM	73599
02/08/16 03:05 PM	Aqueous	E300	Anion Preparation	02/09/16 10:20 AM	73596
02/08/16 03:05 PM	Aqueous	E300	Anion Preparation	02/09/16 10:20 AM	73596
02/08/16 03:05 PM	Aqueous	M4500-H+ B	pH Preparation	02/10/16 09:36 AM	73612
02/08/16 03:05 PM	Aqueous	M2540C	TDS Preparation	02/10/16 11:52 AM	73615
02/08/16 03:55 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	02/11/16 08:56 AM	73623
02/08/16 03:55 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	02/11/16 08:56 AM	73623
02/08/16 03:55 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	02/09/16 11:11 AM	73599
02/08/16 03:55 PM	Aqueous	E300	Anion Preparation	02/09/16 10:20 AM	73596
02/08/16 03:55 PM	Aqueous	E300	Anion Preparation	02/09/16 10:20 AM	73596
02/08/16 03:55 PM	Aqueous	M4500-H+ B	pH Preparation	02/10/16 09:36 AM	73612
02/08/16 03:55 PM	Aqueous	M2540C	TDS Preparation	02/10/16 11:52 AM	73615

& Wheeler

ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	SW7470A	Mercury Total: Aqueous	73599	1	02/09/16 03:01 PM	CETAC2_HG_160209C
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	73623	1	02/12/16 12:15 PM	ICP-MS4_160212C
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	73623	50	02/15/16 04:40 PM	ICP-MS4_160215F
Aqueous	E300	Anions by IC method - Water	73596	1	02/09/16 11:38 AM	IC3_160209A
Aqueous	E300	Anions by IC method - Water	73596	100	02/09/16 03:23 PM	IC3_160209A
Aqueous	M4500-H+ B	pH	73612	1	02/10/16 10:03 AM	TITRATOR_160210A
Aqueous	M2540C	Total Dissolved Solids	73615	1	02/11/16 08:30 AM	WC_160210B
Aqueous	SW7470A	Mercury Total: Aqueous	73599	1	02/09/16 03:12 PM	CETAC2_HG_160209C
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	73623	1	02/12/16 12:17 PM	ICP-MS4_160212C
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	73623	50	02/15/16 04:42 PM	ICP-MS4_160215F
Aqueous	E300	Anions by IC method - Water	73596	100	02/09/16 03:46 PM	IC3_160209A
Aqueous	E300	Anions by IC method - Water	73596	1	02/09/16 12:02 PM	IC3_160209A
Aqueous	M4500-H+ B	pH	73612	1	02/10/16 10:05 AM	TITRATOR_160210A
Aqueous	M2540C	Total Dissolved Solids	73615	1	02/11/16 08:30 AM	WC_160210B
Aqueous	SW7470A	Mercury Total: Aqueous	73599	1	02/09/16 03:14 PM	CETAC2_HG_160209C
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	73623	1	02/12/16 12:19 PM	ICP-MS4_160212C
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	73623	50	02/15/16 04:44 PM	ICP-MS4_160215F
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	73623	5	02/15/16 04:46 PM	ICP-MS4_160215F
Aqueous	E300	Anions by IC method - Water	73596	1	02/09/16 12:23 PM	IC3_160209A
Aqueous	E300	Anions by IC method - Water	73596	100	02/09/16 04:07 PM	IC3_160209A
Aqueous	M4500-H+ B	pH	73612	1	02/10/16 10:07 AM	TITRATOR_160210A
Aqueous	M2540C	Total Dissolved Solids	73615	1	02/11/16 08:30 AM	WC_160210B
Aqueous	SW7470A	Mercury Total: Aqueous	73599	1	02/09/16 03:16 PM	CETAC2_HG_160209C
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	73623	1	02/12/16 12:21 PM	ICP-MS4_160212C
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	73623	10	02/15/16 04:48 PM	ICP-MS4_160215F
Aqueous	E300	Anions by IC method - Water	73596	10	02/09/16 04:28 PM	IC3_160209A

& Wheeler

ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	E300	Anions by IC method - Water	73596	1	02/09/16 12:43 PM	IC3_160209A
Aqueous	M4500-H+ B	pH	73612	1	02/10/16 10:09 AM	TITRATOR_160210A
Aqueous	M2540C	Total Dissolved Solids	73615	1	02/11/16 08:30 AM	WC_160210B
Aqueous	SW7470A	Mercury Total: Aqueous	73599	1	02/09/16 03:19 PM	CETAC2_HG_160209C
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	73623	1	02/12/16 12:23 PM	ICP-MS4_160212C
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	73623	50	02/15/16 04:50 PM	ICP-MS4_160215F
Aqueous	E300	Anions by IC method - Water	73596	1	02/09/16 01:04 PM	IC3_160209A
Aqueous	E300	Anions by IC method - Water	73596	100	02/09/16 04:48 PM	IC3_160209A
Aqueous	M4500-H+ B	pH	73612	1	02/10/16 10:11 AM	TITRATOR_160210A
Aqueous	M2540C	Total Dissolved Solids	73615	1	02/11/16 08:30 AM	WC_160210B
Aqueous	SW7470A	Mercury Total: Aqueous	73599	1	02/09/16 03:26 PM	CETAC2_HG_160209C
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	73623	1	02/12/16 12:25 PM	ICP-MS4_160212C
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	73623	50	02/15/16 04:52 PM	ICP-MS4_160215F
Aqueous	E300	Anions by IC method - Water	73596	1	02/09/16 01:24 PM	IC3_160209A
Aqueous	E300	Anions by IC method - Water	73596	100	02/09/16 05:09 PM	IC3_160209A
Aqueous	M4500-H+ B	pH	73612	1	02/10/16 10:15 AM	TITRATOR_160210A
Aqueous	M2540C	Total Dissolved Solids	73615	1	02/11/16 08:30 AM	WC_160210B
Aqueous	SW7470A	Mercury Total: Aqueous	73599	1	02/09/16 03:28 PM	CETAC2_HG_160209C
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	73623	1	02/12/16 12:27 PM	ICP-MS4_160212C
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	73623	50	02/15/16 04:54 PM	ICP-MS4_160215F
Aqueous	E300	Anions by IC method - Water	73596	1	02/09/16 01:45 PM	IC3_160209A
Aqueous	E300	Anions by IC method - Water	73596	100	02/09/16 05:30 PM	IC3_160209A
Aqueous	M4500-H+ B	pH	73612	1	02/10/16 10:18 AM	TITRATOR_160210A
Aqueous	M2540C	Total Dissolved Solids	73615	1	02/11/16 08:30 AM	WC_160210B

DHL Analytical, Inc.

Date: *14-Mar-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-28
Project:	Sandow CCR	**Lab ID:**	1602090-01
Project No:	5164E	**Collection Date:**	02/08/16 09:35 AM
Lab Order:	1602090	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **KL**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	02/09/16 03:01 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	02/12/16 12:15 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	02/12/16 12:15 PM
Barium	0.0555	0.00300	0.0100		mg/L	1	02/12/16 12:15 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	02/12/16 12:15 PM
Boron	0.213	0.0100	0.0300		mg/L	1	02/12/16 12:15 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	02/12/16 12:15 PM
Calcium	518	5.00	15.0		mg/L	50	02/15/16 04:40 PM
Chromium	0.00692	0.00200	0.00500		mg/L	1	02/12/16 12:15 PM
Cobalt	0.0211	0.00300	0.00500		mg/L	1	02/12/16 12:15 PM
Lead	0.00210	0.000300	0.00100		mg/L	1	02/12/16 12:15 PM
Lithium	0.252	0.00500	0.0100		mg/L	1	02/12/16 12:15 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	02/12/16 12:15 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	02/12/16 12:15 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	02/12/16 12:15 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	206	30.0	100		mg/L	100	02/09/16 03:23 PM
Fluoride	0.272	0.100	0.400	J	mg/L	1	02/09/16 11:38 AM
Sulfate	1950	100	300		mg/L	100	02/09/16 03:23 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.68	0	0		pH Units@12.6℃	1	02/10/16 10:03 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	3270	50.0	50.0		mg/L	1	02/11/16 08:30 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *14-Mar-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-29
Project:	Sandow CCR	**Lab ID:**	1602090-02
Project No:	5164E	**Collection Date:**	02/08/16 10:20 AM
Lab Order:	1602090	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **KL**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	02/09/16 03:12 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	02/12/16 12:17 PM
Arsenic	0.00413	0.00200	0.00500	J	mg/L	1	02/12/16 12:17 PM
Barium	0.118	0.00300	0.0100		mg/L	1	02/12/16 12:17 PM
Beryllium	0.000317	0.000300	0.00100	J	mg/L	1	02/12/16 12:17 PM
Boron	0.299	0.0100	0.0300		mg/L	1	02/12/16 12:17 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	02/12/16 12:17 PM
Calcium	334	5.00	15.0		mg/L	50	02/15/16 04:42 PM
Chromium	0.0187	0.00200	0.00500		mg/L	1	02/12/16 12:17 PM
Cobalt	0.124	0.00300	0.00500		mg/L	1	02/12/16 12:17 PM
Lead	0.00572	0.000300	0.00100		mg/L	1	02/12/16 12:17 PM
Lithium	0.0469	0.00500	0.0100		mg/L	1	02/12/16 12:17 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	02/12/16 12:17 PM
Selenium	0.00382	0.00200	0.00500	J	mg/L	1	02/12/16 12:17 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	02/12/16 12:17 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	269	30.0	100		mg/L	100	02/09/16 03:46 PM
Fluoride	0.227	0.100	0.400	J	mg/L	1	02/09/16 12:02 PM
Sulfate	1170	100	300		mg/L	100	02/09/16 03:46 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.45	0	0		pH Units@12.4℃	1	02/10/16 10:05 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	2620	50.0	50.0		mg/L	1	02/11/16 08:30 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *14-Mar-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AXMW-2
Project:	Sandow CCR	**Lab ID:**	1602090-03
Project No:	5164E	**Collection Date:**	02/08/16 12:10 PM
Lab Order:	1602090	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **KL**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	02/09/16 03:14 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	02/12/16 12:19 PM
Arsenic	0.0480	0.00200	0.00500		mg/L	1	02/12/16 12:19 PM
Barium	0.0417	0.00300	0.0100		mg/L	1	02/12/16 12:19 PM
Beryllium	0.000559	0.000300	0.00100	J	mg/L	1	02/12/16 12:19 PM
Boron	2.17	0.0500	0.150		mg/L	5	02/15/16 04:46 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	02/12/16 12:19 PM
Calcium	549	5.00	15.0		mg/L	50	02/15/16 04:44 PM
Chromium	0.0436	0.00200	0.00500		mg/L	1	02/12/16 12:19 PM
Cobalt	0.0474	0.00300	0.00500		mg/L	1	02/12/16 12:19 PM
Lead	0.00282	0.000300	0.00100		mg/L	1	02/12/16 12:19 PM
Lithium	0.0809	0.00500	0.0100		mg/L	1	02/12/16 12:19 PM
Molybdenum	0.00276	0.00200	0.00500	J	mg/L	1	02/12/16 12:19 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	02/12/16 12:19 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	02/12/16 12:19 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	192	30.0	100		mg/L	100	02/09/16 04:07 PM
Fluoride	1.09	0.100	0.400		mg/L	1	02/09/16 12:23 PM
Sulfate	2200	100	300		mg/L	100	02/09/16 04:07 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.31	0	0		pH Units@13.1℃	1	02/10/16 10:07 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	3800	50.0	50.0		mg/L	1	02/11/16 08:30 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *14-Mar-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-23
Project:	Sandow CCR	**Lab ID:**	1602090-04
Project No:	5164E	**Collection Date:**	02/08/16 01:00 PM
Lab Order:	1602090	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **KL**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	02/09/16 03:16 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	02/12/16 12:21 PM
Arsenic	0.00984	0.00200	0.00500		mg/L	1	02/12/16 12:21 PM
Barium	0.119	0.00300	0.0100		mg/L	1	02/12/16 12:21 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	02/12/16 12:21 PM
Boron	0.287	0.0100	0.0300		mg/L	1	02/12/16 12:21 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	02/12/16 12:21 PM
Calcium	177	1.00	3.00		mg/L	10	02/15/16 04:48 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	02/12/16 12:21 PM
Cobalt	0.00518	0.00300	0.00500		mg/L	1	02/12/16 12:21 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	02/12/16 12:21 PM
Lithium	0.00590	0.00500	0.0100	J	mg/L	1	02/12/16 12:21 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	02/12/16 12:21 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	02/12/16 12:21 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	02/12/16 12:21 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	124	3.00	10.0		mg/L	10	02/09/16 04:28 PM
Fluoride	0.273	0.100	0.400	J	mg/L	1	02/09/16 12:43 PM
Sulfate	459	10.0	30.0		mg/L	10	02/09/16 04:28 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.72	0	0		pH Units@13.3℃	1	02/10/16 10:09 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	1250	50.0	50.0		mg/L	1	02/11/16 08:30 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *14-Mar-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AXMW-1
Project:	Sandow CCR	**Lab ID:**	1602090-05
Project No:	5164E	**Collection Date:**	02/08/16 02:20 PM
Lab Order:	1602090	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **KL**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	02/09/16 03:19 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	0.00331	0.000800	0.00250		mg/L	1	02/12/16 12:23 PM
Arsenic	0.00301	0.00200	0.00500	J	mg/L	1	02/12/16 12:23 PM
Barium	0.0360	0.00300	0.0100		mg/L	1	02/12/16 12:23 PM
Beryllium	0.000462	0.000300	0.00100	J	mg/L	1	02/12/16 12:23 PM
Boron	0.516	0.0100	0.0300		mg/L	1	02/12/16 12:23 PM
Cadmium	0.00101	0.000300	0.00100		mg/L	1	02/12/16 12:23 PM
Calcium	399	5.00	15.0		mg/L	50	02/15/16 04:50 PM
Chromium	0.0113	0.00200	0.00500		mg/L	1	02/12/16 12:23 PM
Cobalt	0.388	0.00300	0.00500		mg/L	1	02/12/16 12:23 PM
Lead	0.000724	0.000300	0.00100	J	mg/L	1	02/12/16 12:23 PM
Lithium	0.107	0.00500	0.0100		mg/L	1	02/12/16 12:23 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	02/12/16 12:23 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	02/12/16 12:23 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	02/12/16 12:23 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	263	30.0	100		mg/L	100	02/09/16 04:48 PM
Fluoride	0.188	0.100	0.400	J	mg/L	1	02/09/16 01:04 PM
Sulfate	2260	100	300		mg/L	100	02/09/16 04:48 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	5.57	0	0		pH Units@13.8℃	1	02/10/16 10:11 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	3450	50.0	50.0		mg/L	1	02/11/16 08:30 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *14-Mar-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-27
Project:	Sandow CCR	**Lab ID:**	1602090-06
Project No:	5164E	**Collection Date:**	02/08/16 03:05 PM
Lab Order:	1602090	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **KL**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	02/09/16 03:26 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	02/12/16 12:25 PM
Arsenic	0.00413	0.00200	0.00500	J	mg/L	1	02/12/16 12:25 PM
Barium	0.173	0.00300	0.0100		mg/L	1	02/12/16 12:25 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	02/12/16 12:25 PM
Boron	0.189	0.0100	0.0300		mg/L	1	02/12/16 12:25 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	02/12/16 12:25 PM
Calcium	324	5.00	15.0		mg/L	50	02/15/16 04:52 PM
Chromium	0.00431	0.00200	0.00500	J	mg/L	1	02/12/16 12:25 PM
Cobalt	0.0245	0.00300	0.00500		mg/L	1	02/12/16 12:25 PM
Lead	0.00112	0.000300	0.00100		mg/L	1	02/12/16 12:25 PM
Lithium	0.0841	0.00500	0.0100		mg/L	1	02/12/16 12:25 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	02/12/16 12:25 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	02/12/16 12:25 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	02/12/16 12:25 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	548	30.0	100		mg/L	100	02/09/16 05:09 PM
Fluoride	0.185	0.100	0.400	J	mg/L	1	02/09/16 01:24 PM
Sulfate	400	100	300		mg/L	100	02/09/16 05:09 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.55	0	0		pH Units@14.9℃	1	02/10/16 10:15 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	2140	50.0	50.0		mg/L	1	02/11/16 08:30 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *14-Mar-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-26
Project:	Sandow CCR	**Lab ID:**	1602090-07
Project No:	5164E	**Collection Date:**	02/08/16 03:55 PM
Lab Order:	1602090	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **KL**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	02/09/16 03:28 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	02/12/16 12:27 PM
Arsenic	0.00380	0.00200	0.00500	J	mg/L	1	02/12/16 12:27 PM
Barium	0.0676	0.00300	0.0100		mg/L	1	02/12/16 12:27 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	02/12/16 12:27 PM
Boron	0.366	0.0100	0.0300		mg/L	1	02/12/16 12:27 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	02/12/16 12:27 PM
Calcium	670	5.00	15.0		mg/L	50	02/15/16 04:54 PM
Chromium	0.00550	0.00200	0.00500		mg/L	1	02/12/16 12:27 PM
Cobalt	0.0276	0.00300	0.00500		mg/L	1	02/12/16 12:27 PM
Lead	0.00106	0.000300	0.00100		mg/L	1	02/12/16 12:27 PM
Lithium	0.474	0.00500	0.0100		mg/L	1	02/12/16 12:27 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	02/12/16 12:27 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	02/12/16 12:27 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	02/12/16 12:27 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	1420	30.0	100		mg/L	100	02/09/16 05:30 PM
Fluoride	0.119	0.100	0.400	J	mg/L	1	02/09/16 01:45 PM
Sulfate	1100	100	300		mg/L	100	02/09/16 05:30 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.65	0	0		pH Units@15.2℃	1	02/10/16 10:18 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	4610	50.0	50.0		mg/L	1	02/11/16 08:30 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602090
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_160209C

The QC data in batch 73599 applies to the following samples: 1602090-01A, 1602090-02A, 1602090-03A, 1602090-04A, 1602090-05A, 1602090-06A, 1602090-07A

Sample ID **MB-73599** Batch ID: **73599** TestNo: **SW7470A** Units: **mg/L**
SampType: **MBLK** Run ID: **CETAC2_HG_160209C** Analysis Date: **2/9/2016 2:43:00 PM** Prep Date: **2/9/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	<0.0000800	0.000200								

Sample ID **LCS-73599** Batch ID: **73599** TestNo: **SW7470A** Units: **mg/L**
SampType: **LCS** Run ID: **CETAC2_HG_160209C** Analysis Date: **2/9/2016 2:45:16 PM** Prep Date: **2/9/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00221	0.000200	0.00200	0	110	85	115			

Sample ID **LCSD-73599** Batch ID: **73599** TestNo: **SW7470A** Units: **mg/L**
SampType: **LCSD** Run ID: **CETAC2_HG_160209C** Analysis Date: **2/9/2016 2:47:32 PM** Prep Date: **2/9/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00215	0.000200	0.00200	0	108	85	115	2.75	15	

Sample ID **1602090-01A SD** Batch ID: **73599** TestNo: **SW7470A** Units: **mg/L**
SampType: **SD** Run ID: **CETAC2_HG_160209C** Analysis Date: **2/9/2016 3:03:23 PM** Prep Date: **2/9/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	<0.000400	0.00100	0	0				0	10	

Sample ID **1602090-01A PDS** Batch ID: **73599** TestNo: **SW7470A** Units: **mg/L**
SampType: **PDS** Run ID: **CETAC2_HG_160209C** Analysis Date: **2/9/2016 3:05:39 PM** Prep Date: **2/9/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00213	0.000200	0.00250	0	85.2	85	115			

Sample ID **1602090-01A MS** Batch ID: **73599** TestNo: **SW7470A** Units: **mg/L**
SampType: **MS** Run ID: **CETAC2_HG_160209C** Analysis Date: **2/9/2016 3:07:55 PM** Prep Date: **2/9/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00213	0.000200	0.00200	0	106	80	120			

Sample ID **1602090-01A MSD** Batch ID: **73599** TestNo: **SW7470A** Units: **mg/L**
SampType: **MSD** Run ID: **CETAC2_HG_160209C** Analysis Date: **2/9/2016 3:10:11 PM** Prep Date: **2/9/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00207	0.000200	0.00200	0	104	80	120	2.86	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602090
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_160209C

Sample ID	**ICV-160209**	Batch ID:	**R84071**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**CETAC2_HG_160209C**	Analysis Date:	**2/9/2016 1:34:04 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00380	0.000200	0.00400	0	95.0	90	110			

Sample ID	**CCV2-160209**	Batch ID:	**R84071**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_160209C**	Analysis Date:	**2/9/2016 2:35:23 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00195	0.000200	0.00200	0	97.5	90	110			

Sample ID	**CCV3-160209**	Batch ID:	**R84071**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_160209C**	Analysis Date:	**2/9/2016 3:21:33 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00199	0.000200	0.00200	0	99.5	90	110			

Sample ID	**CCV4-160209**	Batch ID:	**R84071**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_160209C**	Analysis Date:	**2/9/2016 3:30:41 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00196	0.000200	0.00200	0	98.0	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602090
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160212C

The QC data in batch 73623 applies to the following samples: 1602090-01A, 1602090-02A, 1602090-03A, 1602090-04A, 1602090-05A, 1602090-06A, 1602090-07A

Sample ID **MB-73623** Batch ID: **73623** TestNo: **SW6020A** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS4_160212C** Analysis Date: **2/12/2016 12:01:00 PM** Prep Date: **2/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.000800	0.00250								
Arsenic	<0.00200	0.00500								
Barium	<0.00300	0.0100								
Beryllium	<0.000300	0.00100								
Boron	<0.0100	0.0300								
Cadmium	<0.000300	0.00100								
Calcium	<0.100	0.300								
Chromium	<0.00200	0.00500								
Cobalt	<0.00300	0.00500								
Lead	<0.000300	0.00100								
Lithium	<0.00500	0.0100								
Molybdenum	<0.00200	0.00500								
Selenium	<0.00200	0.00500								
Thallium	<0.000500	0.00150								

Sample ID **LCS-73623** Batch ID: **73623** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS4_160212C** Analysis Date: **2/12/2016 12:03:00 PM** Prep Date: **2/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.188	0.00250	0.200	0	94.1	80	120			
Arsenic	0.187	0.00500	0.200	0	93.3	80	120			
Barium	0.186	0.0100	0.200	0	92.9	80	120			
Beryllium	0.195	0.00100	0.200	0	97.3	80	120			
Boron	0.190	0.0300	0.200	0	94.8	80	120			
Cadmium	0.189	0.00100	0.200	0	94.3	80	120			
Calcium	4.58	0.300	5.00	0	91.6	80	120			
Chromium	0.188	0.00500	0.200	0	93.9	80	120			
Cobalt	0.190	0.00500	0.200	0	94.8	80	120			
Lead	0.179	0.00100	0.200	0	89.3	80	120			
Lithium	0.199	0.0100	0.200	0	99.5	80	120			
Molybdenum	0.179	0.00500	0.200	0	89.7	80	120			
Selenium	0.187	0.00500	0.200	0	93.3	80	120			
Thallium	0.179	0.00150	0.200	0	89.4	80	120			

Sample ID **LCSD-73623** Batch ID: **73623** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS4_160212C** Analysis Date: **2/12/2016 12:05:00 PM** Prep Date: **2/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.189	0.00250	0.200	0	94.3	80	120	0.249	15	

Qualifiers:

B	Analyte detected in the associated Method Blank
J	Analyte detected between MDL and RL
ND	Not Detected at the Method Detection Limit
RL	Reporting Limit
J	Analyte detected between SDL and RL
DF	Dilution Factor
MDL	Method Detection Limit
R	RPD outside accepted control limits
S	Spike Recovery outside control limits
N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602090
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160212C

Sample ID **LCSD-73623**	Batch ID: **73623**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCSD**	Run ID: **ICP-MS4_160212C**	Analysis Date: **2/12/2016 12:05:00 PM**	Prep Date: **2/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.188	0.00500	0.200	0	94.2	80	120	0.894	15	
Barium	0.185	0.0100	0.200	0	92.3	80	120	0.643	15	
Beryllium	0.193	0.00100	0.200	0	96.5	80	120	0.734	15	
Boron	0.201	0.0300	0.200	0	100	80	120	5.67	15	
Cadmium	0.188	0.00100	0.200	0	93.9	80	120	0.415	15	
Calcium	4.58	0.300	5.00	0	91.6	80	120	0.014	15	
Chromium	0.185	0.00500	0.200	0	92.5	80	120	1.57	15	
Cobalt	0.191	0.00500	0.200	0	95.7	80	120	0.883	15	
Lead	0.182	0.00100	0.200	0	91.0	80	120	1.83	15	
Lithium	0.198	0.0100	0.200	0	99.2	80	120	0.244	15	
Molybdenum	0.180	0.00500	0.200	0	89.8	80	120	0.103	15	
Selenium	0.188	0.00500	0.200	0	94.0	80	120	0.775	15	
Thallium	0.183	0.00150	0.200	0	91.3	80	120	2.15	15	

Sample ID **1602096-01A SD**	Batch ID: **73623**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **SD**	Run ID: **ICP-MS4_160212C**	Analysis Date: **2/12/2016 12:11:00 PM**	Prep Date: **2/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.00400	0.0125	0	0				0	10	
Arsenic	<0.0100	0.0250	0	0.00358				0	10	
Barium	0.0356	0.0500	0	0.0347				2.78	10	
Beryllium	<0.00150	0.00500	0	0				0	10	
Boron	0.375	0.150	0	0.329				13.1	10	R
Cadmium	<0.00150	0.00500	0	0				0	10	
Chromium	<0.0100	0.0250	0	0				0	10	
Cobalt	<0.0150	0.0250	0	0.00519				0	10	
Lead	<0.00150	0.00500	0	0				0	10	
Lithium	0.128	0.0500	0	0.127				1.00	10	
Molybdenum	<0.0100	0.0250	0	0				0	10	
Selenium	<0.0100	0.0250	0	0				0	10	
Thallium	<0.00250	0.00750	0	0				0	10	

Sample ID **1602096-01A PDS**	Batch ID: **73623**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS4_160212C**	Analysis Date: **2/12/2016 12:31:00 PM**	Prep Date: **2/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.194	0.00250	0.200	0	97.2	80	120			
Arsenic	0.193	0.00500	0.200	0.00358	94.5	80	120			
Barium	0.219	0.0100	0.200	0.0347	92.4	80	120			
Beryllium	0.182	0.00100	0.200	0	91.0	80	120			
Boron	0.507	0.0300	0.200	0.329	88.9	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602090
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160212C

Sample ID **1602096-01A PDS**	Batch ID: **73623**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS4_160212C**	Analysis Date: **2/12/2016 12:31:00 PM**	Prep Date: **2/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	0.177	0.00100	0.200	0	88.4	80	120			
Chromium	0.184	0.00500	0.200	0	92.0	80	120			
Cobalt	0.184	0.00500	0.200	0.00519	89.6	80	120			
Lead	0.185	0.00100	0.200	0	92.4	80	120			
Lithium	0.297	0.0100	0.200	0.127	85.1	80	120			
Molybdenum	0.178	0.00500	0.200	0	88.8	80	120			
Selenium	0.191	0.00500	0.200	0	95.6	80	120			
Thallium	0.184	0.00150	0.200	0	92.0	80	120			

Sample ID **1602096-01A MS**	Batch ID: **73623**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS4_160212C**	Analysis Date: **2/12/2016 12:33:00 PM**	Prep Date: **2/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.200	0.00250	0.200	0	100	80	120			
Arsenic	0.198	0.00500	0.200	0.00358	97.2	80	120			
Barium	0.233	0.0100	0.200	0.0347	99.4	80	120			
Beryllium	0.187	0.00100	0.200	0	93.3	80	120			
Boron	0.527	0.0300	0.200	0.329	98.9	80	120			
Cadmium	0.188	0.00100	0.200	0	93.8	80	120			
Calcium	431	0.300	5.00	420	221	80	120			S
Chromium	0.185	0.00500	0.200	0	92.3	80	120			
Cobalt	0.186	0.00500	0.200	0.00519	90.3	80	120			
Lead	0.191	0.00100	0.200	0	95.5	80	120			
Lithium	0.312	0.0100	0.200	0.127	92.5	80	120			
Molybdenum	0.190	0.00500	0.200	0	94.8	80	120			
Selenium	0.197	0.00500	0.200	0	98.4	80	120			
Thallium	0.193	0.00150	0.200	0	96.3	80	120			

Sample ID **1602096-01A MSD**	Batch ID: **73623**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS4_160212C**	Analysis Date: **2/12/2016 12:35:00 PM**	Prep Date: **2/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.201	0.00250	0.200	0	101	80	120	0.475	15	
Arsenic	0.199	0.00500	0.200	0.00358	97.9	80	120	0.686	15	
Barium	0.229	0.0100	0.200	0.0347	97.3	80	120	1.78	15	
Beryllium	0.187	0.00100	0.200	0	93.6	80	120	0.278	15	
Boron	0.545	0.0300	0.200	0.329	108	80	120	3.46	15	
Cadmium	0.186	0.00100	0.200	0	93.0	80	120	0.764	15	
Calcium	433	0.300	5.00	420	276	80	120	0.636	15	S
Chromium	0.187	0.00500	0.200	0	93.3	80	120	1.04	15	
Cobalt	0.188	0.00500	0.200	0.00519	91.4	80	120	1.15	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602090
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160212C

Sample ID **1602096-01A MSD**	Batch ID: **73623**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS4_160212C**	Analysis Date: **2/12/2016 12:35:00 PM**	Prep Date: **2/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	0.191	0.00100	0.200	0	95.4	80	120	0.106	15	
Lithium	0.315	0.0100	0.200	0.127	94.3	80	120	1.14	15	
Molybdenum	0.189	0.00500	0.200	0	94.7	80	120	0.103	15	
Selenium	0.197	0.00500	0.200	0	98.5	80	120	0.056	15	
Thallium	0.192	0.00150	0.200	0	96.1	80	120	0.174	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602090
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160212C

Sample ID	ICV-160212	Batch ID:	R84167	TestNo:	SW6020A	Units:	mg/L
SampType:	ICV	Run ID:	ICP-MS4_160212C	Analysis Date:	2/12/2016 10:33:00 AM	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.0978	0.00250	0.100	0	97.8	90	110			
Arsenic	0.0980	0.00500	0.100	0	98.0	90	110			
Barium	0.0968	0.0100	0.100	0	96.8	90	110			
Beryllium	0.0981	0.00100	0.100	0	98.1	90	110			
Boron	0.0974	0.0300	0.100	0	97.4	90	110			
Cadmium	0.0972	0.00100	0.100	0	97.2	90	110			
Calcium	2.35	0.300	2.50	0	94.0	90	110			
Chromium	0.101	0.00500	0.100	0	101	90	110			
Cobalt	0.101	0.00500	0.100	0	101	90	110			
Lead	0.0983	0.00100	0.100	0	98.3	90	110			
Lithium	0.0990	0.0100	0.100	0	99.0	90	110			
Molybdenum	0.0932	0.00500	0.100	0	93.2	90	110			
Selenium	0.0999	0.00500	0.100	0	99.9	90	110			
Thallium	0.0970	0.00150	0.100	0	97.0	90	110			

Sample ID	LCVL-160212	Batch ID:	R84167	TestNo:	SW6020A	Units:	mg/L
SampType:	LCVL	Run ID:	ICP-MS4_160212C	Analysis Date:	2/12/2016 10:42:00 AM	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00190	0.00250	0.00200	0	95.1	70	130			
Arsenic	0.00497	0.00500	0.00500	0	99.4	70	130			
Barium	0.00474	0.0100	0.00500	0	94.8	70	130			
Beryllium	0.000922	0.00100	0.00100	0	92.2	70	130			
Boron	0.0258	0.0300	0.0200	0	129	70	130			
Cadmium	0.000982	0.00100	0.00100	0	98.2	70	130			
Calcium	0.104	0.300	0.100	0	104	70	130			
Chromium	0.00503	0.00500	0.00500	0	101	70	130			
Cobalt	0.00509	0.00500	0.00500	0	102	70	130			
Lead	0.000993	0.00100	0.00100	0	99.3	70	130			
Lithium	0.0105	0.0100	0.0100	0	105	70	130			
Molybdenum	0.00463	0.00500	0.00500	0	92.6	70	130			
Selenium	0.00521	0.00500	0.00500	0	104	70	130			
Thallium	0.000972	0.00150	0.00100	0	97.2	70	130			

Sample ID	CCV2-160212	Batch ID:	R84167	TestNo:	SW6020A	Units:	mg/L
SampType:	CCV	Run ID:	ICP-MS4_160212C	Analysis Date:	2/12/2016 11:40:00 AM	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.189	0.00250	0.200	0	94.5	90	110			
Arsenic	0.191	0.00500	0.200	0	95.7	90	110			
Barium	0.190	0.0100	0.200	0	94.9	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602090
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160212C

Sample ID **CCV2-160212**	Batch ID: **R84167**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160212C**	Analysis Date: **2/12/2016 11:40:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.195	0.00100	0.200	0	97.7	90	110			
Boron	0.195	0.0300	0.200	0	97.7	90	110			
Cadmium	0.191	0.00100	0.200	0	95.7	90	110			
Calcium	4.55	0.300	5.00	0	91.1	90	110			
Chromium	0.190	0.00500	0.200	0	95.0	90	110			
Cobalt	0.194	0.00500	0.200	0	96.9	90	110			
Lead	0.186	0.00100	0.200	0	93.1	90	110			
Lithium	0.197	0.0100	0.200	0	98.4	90	110			
Molybdenum	0.182	0.00500	0.200	0	90.8	90	110			
Selenium	0.191	0.00500	0.200	0	95.5	90	110			
Thallium	0.186	0.00150	0.200	0	93.1	90	110			

Sample ID **LCVL2-160212**	Batch ID: **R84167**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_160212C**	Analysis Date: **2/12/2016 11:57:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00196	0.00250	0.00200	0	98.2	70	130			
Arsenic	0.00498	0.00500	0.00500	0	99.5	70	130			
Barium	0.00495	0.0100	0.00500	0	98.9	70	130			
Beryllium	0.000937	0.00100	0.00100	0	93.7	70	130			
Boron	0.0206	0.0300	0.0200	0	103	70	130			
Cadmium	0.000953	0.00100	0.00100	0	95.3	70	130			
Calcium	0.104	0.300	0.100	0	104	70	130			
Chromium	0.00499	0.00500	0.00500	0	99.8	70	130			
Cobalt	0.00495	0.00500	0.00500	0	99.0	70	130			
Lead	0.000935	0.00100	0.00100	0	93.5	70	130			
Lithium	0.0112	0.0100	0.0100	0	112	70	130			
Molybdenum	0.00467	0.00500	0.00500	0	93.4	70	130			
Selenium	0.00510	0.00500	0.00500	0	102	70	130			
Thallium	0.000978	0.00150	0.00100	0	97.8	70	130			

Sample ID **CCV3-160212**	Batch ID: **R84167**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160212C**	Analysis Date: **2/12/2016 12:37:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.191	0.00250	0.200	0	95.4	90	110			
Arsenic	0.198	0.00500	0.200	0	99.1	90	110			
Barium	0.194	0.0100	0.200	0	96.8	90	110			
Beryllium	0.196	0.00100	0.200	0	98.1	90	110			
Cadmium	0.192	0.00100	0.200	0	96.1	90	110			
Calcium	4.86	0.300	5.00	0	97.2	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602090
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160212C

Sample ID **CCV3-160212**	Batch ID: **R84167**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160212C**	Analysis Date: **2/12/2016 12:37:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chromium	0.191	0.00500	0.200	0	95.4	90	110			
Cobalt	0.196	0.00500	0.200	0	98.2	90	110			
Lead	0.192	0.00100	0.200	0	96.0	90	110			
Lithium	0.199	0.0100	0.200	0	99.4	90	110			
Molybdenum	0.181	0.00500	0.200	0	90.6	90	110			
Selenium	0.197	0.00500	0.200	0	98.6	90	110			
Thallium	0.190	0.00150	0.200	0	95.1	90	110			

Sample ID **CCV3-160212**	Batch ID: **R84167**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160212C**	Analysis Date: **2/12/2016 12:48:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.197	0.0300	0.200	0	98.5	90	110			

Sample ID **LCVL3-160212**	Batch ID: **R84167**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_160212C**	Analysis Date: **2/12/2016 1:19:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00197	0.00250	0.00200	0	98.4	70	130			
Arsenic	0.00508	0.00500	0.00500	0	102	70	130			
Barium	0.00486	0.0100	0.00500	0	97.2	70	130			
Beryllium	0.000872	0.00100	0.00100	0	87.2	70	130			
Boron	0.0257	0.0300	0.0200	0	128	70	130			
Cadmium	0.000988	0.00100	0.00100	0	98.8	70	130			
Calcium	0.106	0.300	0.100	0	106	70	130			
Chromium	0.00487	0.00500	0.00500	0	97.4	70	130			
Cobalt	0.00498	0.00500	0.00500	0	99.6	70	130			
Lead	0.000913	0.00100	0.00100	0	91.3	70	130			
Lithium	0.0101	0.0100	0.0100	0	101	70	130			
Molybdenum	0.00457	0.00500	0.00500	0	91.4	70	130			
Selenium	0.00646	0.00500	0.00500	0	129	70	130			
Thallium	0.000957	0.00150	0.00100	0	95.7	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602090
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160215F

The QC data in batch 73623 applies to the following samples: 1602090-01A, 1602090-02A, 1602090-03A, 1602090-04A, 1602090-05A, 1602090-06A, 1602090-07A

Sample ID	**1602096-01A SD**	Batch ID:	**73623**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**SD**	Run ID:	**ICP-MS4_160215F**	Analysis Date:	**2/15/2016 4:38:00 PM**	Prep Date:	**2/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	432	75.0	0	422				2.33	10	

Sample ID	**1602096-01A PDS**	Batch ID:	**73623**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**PDS**	Run ID:	**ICP-MS4_160215F**	Analysis Date:	**2/15/2016 4:58:00 PM**	Prep Date:	**2/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	646	15.0	250	422	89.7	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602090
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160215F

Sample ID	**ICV2-160215**	Batch ID:	**R84190**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**ICP-MS4_160215F**	Analysis Date:	**2/15/2016 4:21:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.109	0.0300	0.100	0	109	90	110			
Calcium	2.28	0.300	2.50	0	91.1	90	110			

Sample ID	**ILCVL2-160215**	Batch ID:	**R84190**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160215F**	Analysis Date:	**2/15/2016 4:25:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0272	0.0300	0.0200	0	136	70	130			S
Calcium	0.103	0.300	0.100	0	103	70	130			

Sample ID	**CCV1-160215**	Batch ID:	**R84190**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_160215F**	Analysis Date:	**2/15/2016 5:00:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.204	0.0300	0.200	0	102	90	110			
Calcium	4.82	0.300	5.00	0	96.3	90	110			

Sample ID	**LCVL1-160215**	Batch ID:	**R84190**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160215F**	Analysis Date:	**2/15/2016 5:05:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0250	0.0300	0.0200	0	125	70	130			
Calcium	0.101	0.300	0.100	0	101	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602090
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC3_160209A

The QC data in batch 73596 applies to the following samples: 1602090-01D, 1602090-02D, 1602090-03D, 1602090-04D, 1602090-05D, 1602090-06D, 1602090-07D

Sample ID	**MB-73596**	Batch ID:	**73596**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**IC3_160209A**	Analysis Date:	**2/9/2016 10:29:11 AM**	Prep Date:	**2/9/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	<0.300	1.00								
Fluoride	<0.100	0.400								
Sulfate	<1.00	3.00								

Sample ID	**LCS-73596**	Batch ID:	**73596**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**IC3_160209A**	Analysis Date:	**2/9/2016 10:52:40 AM**	Prep Date:	**2/9/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.66	1.00	10.00	0	96.6	90	110			
Fluoride	4.27	0.400	4.000	0	107	90	110			
Sulfate	31.5	3.00	30.00	0	105	90	110			

Sample ID	**LCSD-73596**	Batch ID:	**73596**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**IC3_160209A**	Analysis Date:	**2/9/2016 11:13:20 AM**	Prep Date:	**2/9/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.99	1.00	10.00	0	99.9	90	110	3.35	20	
Fluoride	4.18	0.400	4.000	0	105	90	110	2.04	20	
Sulfate	31.0	3.00	30.00	0	103	90	110	1.58	20	

Sample ID	**1602082-02AMS**	Batch ID:	**73596**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**IC3_160209A**	Analysis Date:	**2/9/2016 6:52:35 PM**	Prep Date:	**2/9/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2020	100	2000	101.3	95.9	90	110			
Fluoride	1940	40.0	2000	12.24	96.3	90	110			
Sulfate	4180	300	2000	1827	118	90	110			S

Sample ID	**1602082-02AMSD**	Batch ID:	**73596**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**IC3_160209A**	Analysis Date:	**2/9/2016 7:13:15 PM**	Prep Date:	**2/9/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2020	100	2000	101.3	96.1	90	110	0.199	20	
Fluoride	1950	40.0	2000	12.24	96.8	90	110	0.548	20	
Sulfate	3940	300	2000	1827	106	90	110	5.93	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602090
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC3_160209A

Sample ID **ICV-160209**	Batch ID: **R84078**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC3_160209A**	Analysis Date: **2/9/2016 9:43:31 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	24.3	1.00	25.00	0	97.4	90	110			
Fluoride	10.1	0.400	10.00	0	101	90	110			
Sulfate	76.5	3.00	75.00	0	102	90	110			

Sample ID **CCV1-160209**	Batch ID: **R84078**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC3_160209A**	Analysis Date: **2/9/2016 2:26:52 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.84	1.00	10.00	0	98.4	90	110			
Fluoride	4.17	0.400	4.000	0	104	90	110			
Sulfate	31.9	3.00	30.00	0	106	90	110			

Sample ID **CCV2-160209**	Batch ID: **R84078**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC3_160209A**	Analysis Date: **2/9/2016 8:15:11 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.70	1.00	10.00	0	97.0	90	110			
Fluoride	4.24	0.400	4.000	0	106	90	110			
Sulfate	31.4	3.00	30.00	0	105	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602090
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_160210A

The QC data in batch 73612 applies to the following samples: 1602090-01D, 1602090-02D, 1602090-03D, 1602090-04D, 1602090-05D, 1602090-06D, 1602090-07D

Sample ID	**1602072-01D-DUP**	Batch ID:	**73612**	TestNo:	**M4500-H+ B**	Units:	**pH Units@13.8℃**
SampType:	**DUP**	Run ID:	**TITRATOR_160210A**	Analysis Date:	**2/10/2016 9:55:00 AM**	Prep Date:	**2/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	9.48	0	0	9.480				0	5	

Sample ID	**1602090-07D-DUP**	Batch ID:	**73612**	TestNo:	**M4500-H+ B**	Units:	**pH Units@16.2℃**
SampType:	**DUP**	Run ID:	**TITRATOR_160210A**	Analysis Date:	**2/10/2016 10:21:00 AM**	Prep Date:	**2/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.59	0	0	6.650				0.906	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602090
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_160210A

Sample ID	**ICV-160210**	Batch ID:	**R84089**	TestNo:	**M4500-H+ B**	Units:	**pH Units@21.3℃**
SampType:	**ICV**	Run ID:	**TITRATOR_160210A**	Analysis Date:	**2/10/2016 9:50:00 AM**	Prep Date:	**2/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	10.1	0	10.00	0	101	99	101			

Sample ID	**CCV1-160210**	Batch ID:	**R84089**	TestNo:	**M4500-H+ B**	Units:	**pH Units@20.4℃**
SampType:	**CCV**	Run ID:	**TITRATOR_160210A**	Analysis Date:	**2/10/2016 10:12:00 AM**	Prep Date:	**2/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	7.01	0	7.000	0	100	97.1	102.9			

Sample ID	**CCV2-160210**	Batch ID:	**R84089**	TestNo:	**M4500-H+ B**	Units:	**pH Units@20.8℃**
SampType:	**CCV**	Run ID:	**TITRATOR_160210A**	Analysis Date:	**2/10/2016 10:27:00 AM**	Prep Date:	**2/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	7.01	0	7.000	0	100	97.1	102.9			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602090
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: WC_160210B

The QC data in batch 73615 applies to the following samples: 1602090-01D, 1602090-02D, 1602090-03D, 1602090-04D, 1602090-05D, 1602090-06D, 1602090-07D

Sample ID	**MB-73615**	Batch ID:	**73615**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**WC_160210B**	Analysis Date:	**2/11/2016 8:30:00 AM**	Prep Date:	**2/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	<10.0	10.0								

Sample ID	**LCS-73615**	Batch ID:	**73615**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**WC_160210B**	Analysis Date:	**2/11/2016 8:30:00 AM**	Prep Date:	**2/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	759	10.0	745.6	0	102	90	113			

Sample ID	**1602090-01D-DUP**	Batch ID:	**73615**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_160210B**	Analysis Date:	**2/11/2016 8:30:00 AM**	Prep Date:	**2/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	3610	50.0	0	3270				9.88	5	R

Sample ID	**1602096-01C-DUP**	Batch ID:	**73615**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_160210B**	Analysis Date:	**2/11/2016 8:30:00 AM**	Prep Date:	**2/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	2600	50.0	0	2525				3.12	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

GEL Laboratories LLC
a member of The GEL Group INC

PO Box 30712 Charleston, SC 29417
2040 Savage Road Charleston, SC 29407
P 843.556.8171
F 843.766.1178

gel.com

March 11, 2016

Mr. John DuPont
DHL Analytical
2300 Double Creek Drive
Round Rock, Texas 78664

Re: Routine Analysis
Work Order: 391269

Dear Mr. DuPont:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on February 12, 2016. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4707.

Sincerely,

Anna C Day

Anna Day
Project Manager

Purchase Order: 14230
Enclosures

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 − (843) 556−8171 − www.gel.com

Certificate of Analysis Report
for

DHLA002 DHL Analytical

Client SDG: 391269 GEL Work Order: 391269

The Qualifiers in this report are defined as follows:

* A quality control analyte recovery is outside of specified acceptance criteria

** Analyte is a Tracer compound

** Analyte is a surrogate compound

U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Anna Day.

Reviewed by Anna C Day

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: March 11, 2016

Company :	DHL Analytical
Address :	2300 Double Creek Drive
	Round Rock, Texas 78664
Contact:	Mr. John DuPont
Project:	Routine Analysis

Client Sample ID:	AX-28	Project:	DHLA00112
Sample ID:	391269001	Client ID:	DHLA002
Matrix:	Water		
Collect Date:	08-FEB-16 09:35		
Receive Date:	12-FEB-16		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting												
GFPC, Ra228, Liquid "As Received"												
Radium-228		1.89	+/-1.11	1.66	3.00	pCi/L		AXM6	03/10/16	1529	1547100	1
Rad Radium-226												
Lucas Cell, Ra226, liquid "As Received"												
Radium-226		1.84	+/-0.486	0.365	1.00	pCi/L		CXP3	02/29/16	0730	1544971	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			81.1	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: March 11, 2016

Company : DHL Analytical
Address : 2300 Double Creek Drive

Round Rock, Texas 78664
Contact: Mr. John DuPont
Project: Routine Analysis

Client Sample ID:	AX-29	Project:	DHLA00112
Sample ID:	391269002	Client ID:	DHLA002
Matrix:	Water		
Collect Date:	08-FEB-16 10:20		
Receive Date:	12-FEB-16		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting												
GFPC, Ra228, Liquid "As Received"												
Radium-228	U	1.30	+/-1.12	1.82	3.00	pCi/L		AXM6	03/10/16	1529	1547100	1
Rad Radium-226												
Lucas Cell, Ra226, liquid "As Received"												
Radium-226		1.74	+/-0.405	0.183	1.00	pCi/L		CXP3	02/29/16	0730	1544971	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			86.4	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: March 11, 2016

Company : DHL Analytical
Address : 2300 Double Creek Drive

Round Rock, Texas 78664
Contact: Mr. John DuPont
Project: Routine Analysis

Client Sample ID:	AXMW-2	Project:	DHLA00112
Sample ID:	391269003	Client ID:	DHLA002
Matrix:	Water		
Collect Date:	08-FEB-16 12:10		
Receive Date:	12-FEB-16		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting												
GFPC, Ra228, Liquid "As Received"												
Radium-228		1.41	+/-0.889	1.34	3.00	pCi/L		AXM6	03/10/16	1529	1547100	1
Rad Radium-226												
Lucas Cell, Ra226, liquid "As Received"												
Radium-226		0.606	+/-0.252	0.193	1.00	pCi/L		CXP3	02/29/16	0730	1544971	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			93	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: March 11, 2016

Company : DHL Analytical
Address : 2300 Double Creek Drive

Round Rock, Texas 78664
Contact: Mr. John DuPont
Project: Routine Analysis

Client Sample ID:	AX-23	Project:	DHLA00112
Sample ID:	391269004	Client ID:	DHLA002
Matrix:	Water		
Collect Date:	08-FEB-16 13:00		
Receive Date:	12-FEB-16		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting												
GFPC, Ra228, Liquid "As Received"												
Radium-228	U	0.911	+/-1.12	1.90	3.00	pCi/L		AXM6	03/10/16	1529	1547100	1
Rad Radium-226												
Lucas Cell, Ra226, liquid "As Received"												
Radium-226		1.49	+/-0.492	0.497	1.00	pCi/L		CXP3	02/29/16	0800	1544971	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			96.7	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

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Certificate of Analysis

Report Date: March 11, 2016

Company : DHL Analytical
Address : 2300 Double Creek Drive

Round Rock, Texas 78664
Contact: Mr. John DuPont
Project: Routine Analysis

Client Sample ID:	AXMW-1	Project:	DHLA00112
Sample ID:	391269005	Client ID:	DHLA002
Matrix:	Water		
Collect Date:	08-FEB-16 14:20		
Receive Date:	12-FEB-16		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting												
GFPC, Ra228, Liquid "As Received"												
Radium-228	U	1.72	+/-1.20	1.91	3.00	pCi/L		AXM6	03/10/16	1529	1547100	1
Rad Radium-226												
Lucas Cell, Ra226, liquid "As Received"												
Radium-226		2.52	+/-0.634	0.551	1.00	pCi/L		CXP3	02/29/16	0800	1544971	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			94.3	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: March 11, 2016

Company : DHL Analytical
Address : 2300 Double Creek Drive

Round Rock, Texas 78664
Contact: Mr. John DuPont
Project: Routine Analysis

Client Sample ID: AX-27
Sample ID: 391269006
Matrix: Water
Collect Date: 08-FEB-16 15:05
Receive Date: 12-FEB-16
Collector: Client

Project: DHLA00112
Client ID: DHLA002

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting												
GFPC, Ra228, Liquid "As Received"												
Radium-228		3.09	+/-1.11	1.39	3.00	pCi/L		AXM6	03/10/16	1529	1547100	1
Rad Radium-226												
Lucas Cell, Ra226, liquid "As Received"												
Radium-226		1.69	+/-0.498	0.450	1.00	pCi/L		CXP3	02/29/16	0800	1544971	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			88.2	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: March 11, 2016

Company : DHL Analytical
Address : 2300 Double Creek Drive

Round Rock, Texas 78664
Contact: Mr. John DuPont
Project: Routine Analysis

Client Sample ID: AX-26
Sample ID: 391269007
Matrix: Water
Collect Date: 08-FEB-16 15:55
Receive Date: 12-FEB-16
Collector: Client

Project: DHLA00112
Client ID: DHLA002

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting												
GFPC, Ra228, Liquid "As Received"												
Radium-228		2.99	+/-1.12	1.46	3.00	pCi/L		AXM6	03/10/16	1529	1547100	1
Rad Radium-226												
Lucas Cell, Ra226, liquid "As Received"												
Radium-226		1.48	+/-0.462	0.395	1.00	pCi/L		CXP3	02/29/16	0800	1544971	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			87.1	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

QC Summary

Report Date: March 11, 2016

DHL Analytical
2300 Double Creek Drive
Round Rock, Texas

Contact: **Mr. John DuPont**

Workorder: **391269**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gas Flow										
Batch 1547100										
QC1203495195 391269004 DUP										
Radium-228	U	0.911	U	-0.266	pCi/L	N/A		N/A	AXM6	03/10/16 15:32
	Uncertainty	+/-1.12		+/-1.07						
QC1203495196 LCS										
Radium-228	47.1			44.4	pCi/L		94.3	(75%-125%)		03/10/16 15:32
	Uncertainty			+/-2.95						
QC1203495194 MB										
Radium-228			U	-1.06	pCi/L					03/10/16 15:32
	Uncertainty			+/-0.650						
Rad Ra-226										
Batch 1544971										
QC1203489430 391300001 DUP										
Radium-226		1.00		1.20	pCi/L	18.3		(0% - 100%)	CXP3	02/29/16 08:30
	Uncertainty	+/-0.405		+/-0.434						
QC1203489432 LCS										
Radium-226	24.4			24.0	pCi/L		98.3	(75%-125%)		02/29/16 09:05
	Uncertainty			+/-1.73						
QC1203489429 MB										
Radium-226			U	0.216	pCi/L					02/29/16 08:30
	Uncertainty			+/-0.205						
QC1203489431 391300001 MS										
Radium-226	122	1.00		124	pCi/L		101	(75%-125%)		02/29/16 09:05
	Uncertainty	+/-0.405		+/-8.28						

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

**	Analyte is a Tracer compound
<	Result is less than value reported
>	Result is greater than value reported
BD	Results are either below the MDC or tracer recovery is low
FA	Failed analysis.
H	Analytical holding time was exceeded
J	Value is estimated
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
M	M if above MDC and less than LLD
M	REMP Result > MDC/CL and < RDL
N/A	RPD or %Recovery limits do not apply.

QC Summary

Workorder: **391269**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time

N1	See case narrative
ND	Analyte concentration is not detected above the detection limit
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
R	Sample results are rejected
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
UI	Gamma Spectroscopy--Uncertain identification
UJ	Gamma Spectroscopy--Uncertain identification
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
h	Preparation or preservation holding time was exceeded

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

There are no "Data Exception Reports" associated with this analytical report.

CHAIN-OF-CUSTODY RECORD

FAX: *(512) 388-8229*

391269

TEL: (843) 556-8171
FAX:
Acct #:

09-Feb-16

	Matrix	DHL#	Date Collected	Bottle Type	224 E903.1	225 E904.0	Requested Tests			
	Aqueous	-01B	02/08/16 09:35 AM	500HDPEHNO3		1				
	Aqueous	-01C	02/08/16 09:35 AM	500HDPEHNO3	1					
	Aqueous	-02B	02/08/16 10:20 AM	500HDPEHNO3		1				
	Aqueous	-02C	02/08/16 10:20 AM	500HDPEHNO3	1					
	Aqueous	-03B	02/08/16 12:10 PM	500HDPEHNO3		1				
	Aqueous	-03C	02/08/16 12:10 PM	500HDPEHNO3	1					
	Aqueous	-04B	02/08/16 01:00 PM	500HDPEHNO3		1				
	Aqueous	-04C	02/08/16 01:00 PM	500HDPEHNO3	1					
	Aqueous	-05B	02/08/16 02:20 PM	500HDPEHNO3		1				
	Aqueous	-05C	02/08/16 02:20 PM	500HDPEHNO3	1					
	Aqueous	-06B	02/08/16 03:05 PM	500HDPEHNO3		1				
	Aqueous	-06C	02/08/16 03:05 PM	500HDPEHNO3	1					
	Aqueous	-07B	02/08/16 03:55 PM	500HDPEHNO3		1				
	Aqueous	-07C	02/08/16 03:55 PM	500HDPEHNO3	1					

nalyze these samples with a Standard Turnaround Time.
n DuPont if you have questions.
Control Package Needed: Standard / _____
eport to both cac@dhlanalytical.com & dupont@dhlanalytical.com

	Date/Time		Date/Time
[signature]	2/9/16 1730	Received by: [signature]	2/9/16 1730
		Received by: [signature]	2/12/16 8:40

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: DHLA		**SDG/AR/COC/Work Order:** 391269	
Received By: ZKW		**Date Received:** 2/12/16	
Suspected Hazard Information	**Yes**	**No**	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?		✓	Maximum Net Counts Observed* (Observed Counts - Area Background Counts):
Classified Radioactive II or III by RSO?		✓	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?		✓	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		✓	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		✓	

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*		✓		Preservation Method: Ice bags Blue ice Dry ice (None) Other (describe) *all temperatures are recorded in Celsius 10°C
2a	Daily check performed and passed on IR temperature gun?	✓			Temperature Device Serial #: Secondary Temperature Device Serial # (If Applicable): 130462946
3	Chain of custody documents included with shipment?	✓			
4	Sample containers intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?	✓			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	Do Low Level Perchlorate samples have headspace as required?		✓		Sample ID's and containers affected:
7	VOA vials contain acid preservation?		✓		(If unknown, select No)
8	VOA vials free of headspace (defined as < 6mm bubble)?		✓		Sample ID's and containers affected:
9	Are Encore containers present?			✓	(If yes, immediately deliver to Volatiles laboratory)
10	Samples received within holding time?	✓			ID's and tests affected:
11	Sample ID's on COC match ID's on bottles?	✓			Sample ID's and containers affected:
12	Date & time on COC match date & time on bottles?	✓			Sample ID's affected:
13	Number of containers received match number indicated on COC?	✓			Sample ID's affected:
14	Are sample containers identifiable as GEL provided?			✓	
15	COC form is properly signed in relinquished/received sections?	✓			
16	Carrier and tracking number.	✓			Circle Applicable: FedEx Air (FedEx Ground) UPS Field Services Courier Other 7756 0622 0617

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials AVD Date 2/15/16 Page 1 of 1 GL-CHL-SR-001 Rev 2

List of current GEL Certifications as of 11 March 2016

State	Certification
Alaska	UST−0110
Arkansas	88−0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH−0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330−15−00283, P330−15−00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C−SC−01
Kansas NELAP	E−10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA160006
Maryland	270
Massachusetts	M−SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE−OS−26−13
Nevada	SC000122016−1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R−158
Oklahoma	9904
Pennsylvania NELAP	68−00485
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235−16−11
Utah NELAP	SC000122016−20
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

March 14, 2016

Will Vienne
Pastor, Behling & Wheeler
2201 Double Creek Dr #4004
Round Rock, Texas 78664
TEL: (512) 671-3434
FAX (512) 671-3446

Order No.: 1602095

RE: Sandow CCR

Dear Will Vienne:

DHL Analytical, Inc. received 3 sample(s) on 2/9/2016 for the analyses presented in the following report.

There were no problems with the analyses and all data met requirements of NELAC except where noted in the Case Narrative. All non-NELAC methods will be identified accordingly in the case narrative and all estimated uncertainties of test results are within method or EPA specifications.

If you have any questions regarding these tests results, please feel free to call. Thank you for using DHL Analytical.

Sincerely,

John DuPont
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-15-15

Table of Contents

DHL ANALYTICAL
2300 Double Creek Dr. ■ Round Rock, TX 78664
Phone (512) 388-8222 ■ FAX (512) 388-8229
Web: www.dhlanalytical.com
E-Mail: login@dhlanalytical.com

CH

CLIENT: Pastor Behling & Wheeler
ADDRESS: 2201 Double Creek Dr Ste 4004
PHONE: 512-671-3434 FAX/E-MAIL: will.vienne@pbwllc.com
DATA REPORTED TO: Will Vienne
ADDITIONAL REPORT COPIES TO: Karla Henson

DATE: 2/9/16
PO #: DHL WORK OR
PROJECT LOCATION OR NAME: Sandow
CLENT PROJECT #: 5164E CO

Authorize 5% surcharge for TRRP Report? ☐ Yes ☒ No

S=SOIL W=WATER A=AIR L=LIQUID SE=SEDIMENT
P=PAINT SL=SLUDGE O=OTHER SO=SOLID

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	PRESERVATION: HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESERVED
AX-22R	1	2/9/16	935	W		4		X		X	
AX-25	2	2/9/16	1035	W		4		X		X	
AX-24	3	2/9/16	1220	W		4		X		X	

ANALYSES: BTEX ☐ MTBE ☐ [METHOD 8021] TPH 1005 ☐ TPH 1006 ☐ HOLD 1006 ☐ GRO (METHOD 8015) ☐ DRO (METHOD 8105) ☐ VOC 8260 ☐ VOC 624 ☐ VOC 8260/5035 ☐ SVOC 8270 ☐ PAH 8270 ☐ HOLD PAH ☐ SVOC 625 ☐ 8270 PEST ☐ 625 PEST/PCB ☐ 608 PCB ☐ 8270 PCB ☐ 8270 O-P PEST ☐ 8082 PCB ☐ 608 PCB ☐ 8270 PCB ☐ 8321 HERB ☐ T PHOS, AMMONIA ☐ METALS 6020 ☐ METALS 200.8 ☐ DISS. METALS ☐ RCRA ☐ TX11 ☐ ___ PH ☐ HEX CHROM ☐ ALKALINITY ☐ CHLORIDE ☐ ANIONS ☐ TCLP-SVOC ☐ VOC ☐ TCLP-METALS ☐ RCI ☐

RELINQUISHED BY: (Signature) DATE/TIME 2/9/16 12:50 RECEIVED BY: (Signature) 12:50
RELINQUISHED BY: (Signature) DATE/TIME 2/9/16 14:04 RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)

☐ DHL DISPOSAL @ $5.00 each ☐ Return

TURN AROUND TIME
RUSH ☐ CALL FIRST
1 DAY ☐ CALL FIRST
2 DAY ☐
NORMAL ☑
OTHER ☐ ____

LABORATORY USE
RECEIVING TEMP: ___
CUSTODY SEALS:
CARRIER: ☐ LONE
☐ COURIER DELIVER
☑ HAND DELIVERED

John Dupont

From: Sara Taube [Sara.Taube@pbwllc.com]
Sent: Wednesday, July 22, 2015 12:05 PM
To: John Dupont
Subject: CCR Appendix III and IV
Follow Up Flag: Follow up
Flag Status: Completed

Hi John,

Here are the Appendix III and Appendix IV constituents that we will need to have analyzed under the CCR Rule.

Appendix III
Boron
Calcium
Chloride
Fluoride
pH
sulfate
TDS

Appendix IV
Antimony
Arsenic
Barium
Beryllium
Cadmium
Chromium
Cobalt
Fluoride
Lead
Lithium
Mercury
Molybdenum
Selenium
Thallium
Radium 226 and 228

We are looking to have approximately 74 wells sampled 8 times over the course of the next two years. Please let me know if there is any more information you might need.

Cheers,

Sara

10/26/2015

CUSTODY SEAL

DATE 7/19/16

SIGNATURE

QEC

Quality Environmental Containers

800-255-3950 • 304-255-3900

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name **Pastor, Behling & Wheeler** Date Received: **2/9/2016**

Work Order Number **1602095** Received by **MB**

Checklist completed by: _____ 2/9/2016 Reviewed by JD 2/9/2016
Signature Date Initials Date

Carrier name Hand Delivered

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	4.2 °C
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH<2 acceptable upon receipt?	Yes ☑	No ☐	NA ☐ LOT # 8086
	Adjusted? No		Checked by MB
Water - ph>9 (S) or ph>12 (CN) acceptable upon receipt?	Yes ☐	No ☐	NA ☑ LOT #
	Adjusted? _____		Checked by _____

Any No response must be detailed in the comments section below.

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

DHL Analytical, Inc. **Date:** *14-Mar-16*

CLIENT: Pastor, Behling & Wheeler
Project: Sandow CCR
Lab Order: 1602095

CASE NARRATIVE

Samples were analyzed using the methods outlined in the following references:

Method SW6020A - Metals Analysis
Method SW7470A - Mercury Analysis
Method E300 - Anions Analysis
Method M4500-H+ B - pH of a Water Analysis
Method M2540C - TDS Analysis
Sub-contract - Radium-228 and Radium-226 analyses by methods E904.0/SW8469320 Modified and E903.1 Modified. Analyzed at GEL Laboratory.

LOG IN

The samples were received and log-in performed on 2/9/16. A total of 3 samples were received. The samples arrived in good condition and were properly packaged.

METALS ANALYSIS

For Metals analysis performed on 2/12/16 the matrix spike and matrix spike duplicate recoveries were above control limits for Calcium. These are flagged accordingly in the QC summary report. The sample selected for the matrix spike and matrix spike duplicate was not from this work order. The LCS was within control limits for this analyte. No further corrective actions were taken.

For Metals analysis performed on 2/12/16 the RPD for the serial dilution was slightly above control limits for Boron. This is flagged accordingly. The PDS was within control limits for this analyte. No further corrective actions were taken.

TDS ANALYSIS

For TDS analysis performed on 2/10/16 the sample and sample duplicate (1602090-01 & 1602090-01 DUP) had the RPD slightly above control limits. This is flagged accordingly in the QC summary report. This may be due to the sample being turbid. No futher corrective actions were taken.

DHL Analytical, Inc.

Date: *14-Mar-16*

CLIENT: Pastor, Behling & Wheeler
Project: Sandow CCR
Lab Order: 1602095

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
1602095-01	AX-22R		02/09/16 09:35 AM	2/9/2016
1602095-02	AX-25		02/09/16 10:35 AM	2/9/2016
1602095-03	AX-24		02/09/16 12:20 PM	2/9/2016

& Wheeler

PREP DATES REPORT

Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
02/09/16 09:35 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	02/11/16 08:56 AM	73623
02/09/16 09:35 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	02/11/16 08:56 AM	73623
02/09/16 09:35 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	02/19/16 08:28 AM	73748
02/09/16 09:35 AM	Aqueous	E300	Anion Preparation	02/10/16 09:33 AM	73611
02/09/16 09:35 AM	Aqueous	E300	Anion Preparation	02/10/16 09:33 AM	73611
02/09/16 09:35 AM	Aqueous	M4500-H+ B	pH Preparation	02/10/16 09:36 AM	73612
02/09/16 09:35 AM	Aqueous	M2540C	TDS Preparation	02/10/16 11:52 AM	73615
02/09/16 10:35 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	02/11/16 08:56 AM	73623
02/09/16 10:35 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	02/11/16 08:56 AM	73623
02/09/16 10:35 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	02/19/16 08:28 AM	73748
02/09/16 10:35 AM	Aqueous	E300	Anion Preparation	02/10/16 09:33 AM	73611
02/09/16 10:35 AM	Aqueous	E300	Anion Preparation	02/10/16 09:33 AM	73611
02/09/16 10:35 AM	Aqueous	M4500-H+ B	pH Preparation	02/10/16 09:36 AM	73612
02/09/16 10:35 AM	Aqueous	M2540C	TDS Preparation	02/10/16 11:52 AM	73615
02/09/16 12:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	02/11/16 08:56 AM	73623
02/09/16 12:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	02/11/16 08:56 AM	73623
02/09/16 12:20 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	02/19/16 08:28 AM	73748
02/09/16 12:20 PM	Aqueous	E300	Anion Preparation	02/10/16 09:33 AM	73611
02/09/16 12:20 PM	Aqueous	E300	Anion Preparation	02/10/16 09:33 AM	73611
02/09/16 12:20 PM	Aqueous	M4500-H+ B	pH Preparation	02/10/16 09:36 AM	73612
02/09/16 12:20 PM	Aqueous	M2540C	TDS Preparation	02/10/16 11:52 AM	73615

& Wheeler

ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	SW7470A	Mercury Total: Aqueous	73748	1	02/19/16 03:42 PM	CETAC2_HG_160219A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	73623	1	02/12/16 12:29 PM	ICP-MS4_160212C
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	73623	10	02/15/16 04:56 PM	ICP-MS4_160215F
Aqueous	E300	Anions by IC method - Water	73611	1	02/10/16 10:47 AM	IC3_160210A
Aqueous	E300	Anions by IC method - Water	73611	10	02/10/16 11:56 AM	IC3_160210A
Aqueous	M4500-H+ B	pH	73612	1	02/10/16 10:22 AM	TITRATOR_160210A
Aqueous	M2540C	Total Dissolved Solids	73615	1	02/11/16 08:30 AM	WC_160210B
Aqueous	SW7470A	Mercury Total: Aqueous	73748	1	02/19/16 03:53 PM	CETAC2_HG_160219A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	73623	50	02/15/16 05:09 PM	ICP-MS4_160215F
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	73623	1	02/12/16 01:23 PM	ICP-MS4_160212C
Aqueous	E300	Anions by IC method - Water	73611	100	02/10/16 12:20 PM	IC3_160210A
Aqueous	E300	Anions by IC method - Water	73611	1	02/10/16 11:08 AM	IC3_160210A
Aqueous	M4500-H+ B	pH	73612	1	02/10/16 10:23 AM	TITRATOR_160210A
Aqueous	M2540C	Total Dissolved Solids	73615	1	02/11/16 08:30 AM	WC_160210B
Aqueous	SW7470A	Mercury Total: Aqueous	73748	1	02/19/16 03:55 PM	CETAC2_HG_160219A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	73623	1	02/12/16 01:25 PM	ICP-MS4_160212C
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	73623	50	02/15/16 05:11 PM	ICP-MS4_160215F
Aqueous	E300	Anions by IC method - Water	73611	1	02/10/16 11:29 AM	IC3_160210A
Aqueous	E300	Anions by IC method - Water	73611	100	02/10/16 12:41 PM	IC3_160210A
Aqueous	M4500-H+ B	pH	73612	1	02/10/16 10:25 AM	TITRATOR_160210A
Aqueous	M2540C	Total Dissolved Solids	73615	1	02/11/16 08:30 AM	WC_160210B

DHL Analytical, Inc.

Date: *14-Mar-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-22R
Project:	Sandow CCR	**Lab ID:**	1602095-01
Project No:	5164E	**Collection Date:**	02/09/16 09:35 AM
Lab Order:	1602095	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	02/19/16 03:42 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	02/12/16 12:29 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	02/12/16 12:29 PM
Barium	0.102	0.00300	0.0100		mg/L	1	02/12/16 12:29 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	02/12/16 12:29 PM
Boron	0.117	0.0100	0.0300		mg/L	1	02/12/16 12:29 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	02/12/16 12:29 PM
Calcium	76.4	1.00	3.00		mg/L	10	02/15/16 04:56 PM
Chromium	0.0108	0.00200	0.00500		mg/L	1	02/12/16 12:29 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	02/12/16 12:29 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	02/12/16 12:29 PM
Lithium	0.0526	0.00500	0.0100		mg/L	1	02/12/16 12:29 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	02/12/16 12:29 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	02/12/16 12:29 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	02/12/16 12:29 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	88.4	3.00	10.0		mg/L	10	02/10/16 11:56 AM
Fluoride	0.139	0.100	0.400	J	mg/L	1	02/10/16 10:47 AM
Sulfate	49.3	1.00	3.00		mg/L	1	02/10/16 10:47 AM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	7.12	0	0		pH Units@17℃	1	02/10/16 10:22 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	505	10.0	10.0		mg/L	1	02/11/16 08:30 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *14-Mar-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-25
Project:	Sandow CCR	**Lab ID:**	1602095-02
Project No:	5164E	**Collection Date:**	02/09/16 10:35 AM
Lab Order:	1602095	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	02/19/16 03:53 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	02/12/16 01:23 PM
Arsenic	0.00420	0.00200	0.00500	J	mg/L	1	02/12/16 01:23 PM
Barium	0.119	0.00300	0.0100		mg/L	1	02/12/16 01:23 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	02/12/16 01:23 PM
Boron	0.172	0.0100	0.0300		mg/L	1	02/12/16 01:23 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	02/12/16 01:23 PM
Calcium	242	5.00	15.0		mg/L	50	02/15/16 05:09 PM
Chromium	0.0376	0.00200	0.00500		mg/L	1	02/12/16 01:23 PM
Cobalt	0.0232	0.00300	0.00500		mg/L	1	02/12/16 01:23 PM
Lead	0.000662	0.000300	0.00100	J	mg/L	1	02/12/16 01:23 PM
Lithium	0.0548	0.00500	0.0100		mg/L	1	02/12/16 01:23 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	02/12/16 01:23 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	02/12/16 01:23 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	02/12/16 01:23 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	457	30.0	100		mg/L	100	02/10/16 12:20 PM
Fluoride	0.342	0.100	0.400	J	mg/L	1	02/10/16 11:08 AM
Sulfate	410	100	300		mg/L	100	02/10/16 12:20 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.61	0	0		pH Units@17.1℃	1	02/10/16 10:23 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	2080	50.0	50.0		mg/L	1	02/11/16 08:30 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *14-Mar-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-24
Project:	Sandow CCR	**Lab ID:**	1602095-03
Project No:	5164E	**Collection Date:**	02/09/16 12:20 PM
Lab Order:	1602095	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	02/19/16 03:55 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	02/12/16 01:25 PM
Arsenic	0.00333	0.00200	0.00500	J	mg/L	1	02/12/16 01:25 PM
Barium	0.0650	0.00300	0.0100		mg/L	1	02/12/16 01:25 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	02/12/16 01:25 PM
Boron	0.0929	0.0100	0.0300		mg/L	1	02/12/16 01:25 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	02/12/16 01:25 PM
Calcium	232	5.00	15.0		mg/L	50	02/15/16 05:11 PM
Chromium	0.00505	0.00200	0.00500		mg/L	1	02/12/16 01:25 PM
Cobalt	0.00925	0.00300	0.00500		mg/L	1	02/12/16 01:25 PM
Lead	0.00110	0.000300	0.00100		mg/L	1	02/12/16 01:25 PM
Lithium	0.0795	0.00500	0.0100		mg/L	1	02/12/16 01:25 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	02/12/16 01:25 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	02/12/16 01:25 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	02/12/16 01:25 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	249	30.0	100		mg/L	100	02/10/16 12:41 PM
Fluoride	0.207	0.100	0.400	J	mg/L	1	02/10/16 11:29 AM
Sulfate	783	100	300		mg/L	100	02/10/16 12:41 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.41	0	0		pH Units@17.5℃	1	02/10/16 10:25 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	1900	50.0	50.0		mg/L	1	02/11/16 08:30 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_160219A

The QC data in batch 73748 applies to the following samples: 1602095-01A, 1602095-02A, 1602095-03A

Sample ID	**MB-73748**	Batch ID:	**73748**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**CETAC2_HG_160219A**	Analysis Date:	**2/19/2016 3:30:39 PM**	Prep Date:	**2/19/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	<0.0000800	0.000200								

Sample ID	**LCS-73748**	Batch ID:	**73748**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**CETAC2_HG_160219A**	Analysis Date:	**2/19/2016 3:37:28 PM**	Prep Date:	**2/19/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00196	0.000200	0.00200	0	98.0	85	115			

Sample ID	**LCSD-73748**	Batch ID:	**73748**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**CETAC2_HG_160219A**	Analysis Date:	**2/19/2016 3:39:44 PM**	Prep Date:	**2/19/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00187	0.000200	0.00200	0	93.5	85	115	4.70	15	

Sample ID	**1602095-01A SD**	Batch ID:	**73748**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**SD**	Run ID:	**CETAC2_HG_160219A**	Analysis Date:	**2/19/2016 3:44:15 PM**	Prep Date:	**2/19/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	<0.000400	0.00100	0	0				0	10	

Sample ID	**1602095-01A PDS**	Batch ID:	**73748**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**PDS**	Run ID:	**CETAC2_HG_160219A**	Analysis Date:	**2/19/2016 3:46:31 PM**	Prep Date:	**2/19/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00237	0.000200	0.00250	0	94.8	85	115			

Sample ID	**1602095-01A MS**	Batch ID:	**73748**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**CETAC2_HG_160219A**	Analysis Date:	**2/19/2016 3:48:47 PM**	Prep Date:	**2/19/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00196	0.000200	0.00200	0	98.0	80	120			

Sample ID	**1602095-01A MSD**	Batch ID:	**73748**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**CETAC2_HG_160219A**	Analysis Date:	**2/19/2016 3:51:03 PM**	Prep Date:	**2/19/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00192	0.000200	0.00200	0	96.0	80	120	2.06	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_160219A

Sample ID	**ICV-160219**	Batch ID:	**R84257**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**CETAC2_HG_160219A**	Analysis Date:	**2/19/2016 2:20:12 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00388	0.000200	0.00400	0	97.0	90	110			

Sample ID	**CCV2-160219**	Batch ID:	**R84257**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_160219A**	Analysis Date:	**2/19/2016 3:26:05 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00195	0.000200	0.00200	0	97.5	90	110			

Sample ID	**CCV3-160219**	Batch ID:	**R84257**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_160219A**	Analysis Date:	**2/19/2016 4:13:44 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00196	0.000200	0.00200	0	98.0	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160212C

The QC data in batch 73623 applies to the following samples: 1602095-01A, 1602095-02A, 1602095-03A

Sample ID	MB-73623	Batch ID:	73623	TestNo:	SW6020A	Units:	mg/L
SampType:	MBLK	Run ID:	ICP-MS4_160212C	Analysis Date:	2/12/2016 12:01:00 PM	Prep Date:	2/11/2016

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.000800	0.00250								
Arsenic	<0.00200	0.00500								
Barium	<0.00300	0.0100								
Beryllium	<0.000300	0.00100								
Boron	<0.0100	0.0300								
Cadmium	<0.000300	0.00100								
Calcium	<0.100	0.300								
Chromium	<0.00200	0.00500								
Cobalt	<0.00300	0.00500								
Lead	<0.000300	0.00100								
Lithium	<0.00500	0.0100								
Molybdenum	<0.00200	0.00500								
Selenium	<0.00200	0.00500								
Thallium	<0.000500	0.00150								

Sample ID	LCS-73623	Batch ID:	73623	TestNo:	SW6020A	Units:	mg/L
SampType:	LCS	Run ID:	ICP-MS4_160212C	Analysis Date:	2/12/2016 12:03:00 PM	Prep Date:	2/11/2016

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.188	0.00250	0.200	0	94.1	80	120			
Arsenic	0.187	0.00500	0.200	0	93.3	80	120			
Barium	0.186	0.0100	0.200	0	92.9	80	120			
Beryllium	0.195	0.00100	0.200	0	97.3	80	120			
Boron	0.190	0.0300	0.200	0	94.8	80	120			
Cadmium	0.189	0.00100	0.200	0	94.3	80	120			
Calcium	4.58	0.300	5.00	0	91.6	80	120			
Chromium	0.188	0.00500	0.200	0	93.9	80	120			
Cobalt	0.190	0.00500	0.200	0	94.8	80	120			
Lead	0.179	0.00100	0.200	0	89.3	80	120			
Lithium	0.199	0.0100	0.200	0	99.5	80	120			
Molybdenum	0.179	0.00500	0.200	0	89.7	80	120			
Selenium	0.187	0.00500	0.200	0	93.3	80	120			
Thallium	0.179	0.00150	0.200	0	89.4	80	120			

Sample ID	LCSD-73623	Batch ID:	73623	TestNo:	SW6020A	Units:	mg/L
SampType:	LCSD	Run ID:	ICP-MS4_160212C	Analysis Date:	2/12/2016 12:05:00 PM	Prep Date:	2/11/2016

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.189	0.00250	0.200	0	94.3	80	120	0.249	15	
Arsenic	0.188	0.00500	0.200	0	94.2	80	120	0.894	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160212C

Sample ID **LCSD-73623**	Batch ID: **73623**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCSD**	Run ID: **ICP-MS4_160212C**	Analysis Date: **2/12/2016 12:05:00 PM**	Prep Date: **2/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.185	0.0100	0.200	0	92.3	80	120	0.643	15	
Beryllium	0.193	0.00100	0.200	0	96.5	80	120	0.734	15	
Boron	0.201	0.0300	0.200	0	100	80	120	5.67	15	
Cadmium	0.188	0.00100	0.200	0	93.9	80	120	0.415	15	
Calcium	4.58	0.300	5.00	0	91.6	80	120	0.014	15	
Chromium	0.185	0.00500	0.200	0	92.5	80	120	1.57	15	
Cobalt	0.191	0.00500	0.200	0	95.7	80	120	0.883	15	
Lead	0.182	0.00100	0.200	0	91.0	80	120	1.83	15	
Lithium	0.198	0.0100	0.200	0	99.2	80	120	0.244	15	
Molybdenum	0.180	0.00500	0.200	0	89.8	80	120	0.103	15	
Selenium	0.188	0.00500	0.200	0	94.0	80	120	0.775	15	
Thallium	0.183	0.00150	0.200	0	91.3	80	120	2.15	15	

Sample ID **1602096-01A SD**	Batch ID: **73623**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **SD**	Run ID: **ICP-MS4_160212C**	Analysis Date: **2/12/2016 12:11:00 PM**	Prep Date: **2/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.00400	0.0125	0	0				0	10	
Arsenic	<0.0100	0.0250	0	0.00358				0	10	
Barium	0.0356	0.0500	0	0.0347				2.78	10	
Beryllium	<0.00150	0.00500	0	0				0	10	
Boron	0.375	0.150	0	0.329				13.1	10	R
Cadmium	<0.00150	0.00500	0	0				0	10	
Chromium	<0.0100	0.0250	0	0				0	10	
Cobalt	<0.0150	0.0250	0	0.00519				0	10	
Lead	<0.00150	0.00500	0	0				0	10	
Lithium	0.128	0.0500	0	0.127				1.00	10	
Molybdenum	<0.0100	0.0250	0	0				0	10	
Selenium	<0.0100	0.0250	0	0				0	10	
Thallium	<0.00250	0.00750	0	0				0	10	

Sample ID **1602096-01A PDS**	Batch ID: **73623**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS4_160212C**	Analysis Date: **2/12/2016 12:31:00 PM**	Prep Date: **2/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.194	0.00250	0.200	0	97.2	80	120			
Arsenic	0.193	0.00500	0.200	0.00358	94.5	80	120			
Barium	0.219	0.0100	0.200	0.0347	92.4	80	120			
Beryllium	0.182	0.00100	0.200	0	91.0	80	120			
Boron	0.507	0.0300	0.200	0.329	88.9	80	120			
Cadmium	0.177	0.00100	0.200	0	88.4	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160212C

Sample ID **1602096-01A PDS**	Batch ID: **73623**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS4_160212C**	Analysis Date: **2/12/2016 12:31:00 PM**	Prep Date: **2/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chromium	0.184	0.00500	0.200	0	92.0	80	120			
Cobalt	0.184	0.00500	0.200	0.00519	89.6	80	120			
Lead	0.185	0.00100	0.200	0	92.4	80	120			
Lithium	0.297	0.0100	0.200	0.127	85.1	80	120			
Molybdenum	0.178	0.00500	0.200	0	88.8	80	120			
Selenium	0.191	0.00500	0.200	0	95.6	80	120			
Thallium	0.184	0.00150	0.200	0	92.0	80	120			

Sample ID **1602096-01A MS**	Batch ID: **73623**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS4_160212C**	Analysis Date: **2/12/2016 12:33:00 PM**	Prep Date: **2/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.200	0.00250	0.200	0	100	80	120			
Arsenic	0.198	0.00500	0.200	0.00358	97.2	80	120			
Barium	0.233	0.0100	0.200	0.0347	99.4	80	120			
Beryllium	0.187	0.00100	0.200	0	93.3	80	120			
Boron	0.527	0.0300	0.200	0.329	98.9	80	120			
Cadmium	0.188	0.00100	0.200	0	93.8	80	120			
Calcium	431	0.300	5.00	420	221	80	120			S
Chromium	0.185	0.00500	0.200	0	92.3	80	120			
Cobalt	0.186	0.00500	0.200	0.00519	90.3	80	120			
Lead	0.191	0.00100	0.200	0	95.5	80	120			
Lithium	0.312	0.0100	0.200	0.127	92.5	80	120			
Molybdenum	0.190	0.00500	0.200	0	94.8	80	120			
Selenium	0.197	0.00500	0.200	0	98.4	80	120			
Thallium	0.193	0.00150	0.200	0	96.3	80	120			

Sample ID **1602096-01A MSD**	Batch ID: **73623**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS4_160212C**	Analysis Date: **2/12/2016 12:35:00 PM**	Prep Date: **2/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.201	0.00250	0.200	0	101	80	120	0.475	15	
Arsenic	0.199	0.00500	0.200	0.00358	97.9	80	120	0.686	15	
Barium	0.229	0.0100	0.200	0.0347	97.3	80	120	1.78	15	
Beryllium	0.187	0.00100	0.200	0	93.6	80	120	0.278	15	
Boron	0.545	0.0300	0.200	0.329	108	80	120	3.46	15	
Cadmium	0.186	0.00100	0.200	0	93.0	80	120	0.764	15	
Calcium	433	0.300	5.00	420	276	80	120	0.636	15	S
Chromium	0.187	0.00500	0.200	0	93.3	80	120	1.04	15	
Cobalt	0.188	0.00500	0.200	0.00519	91.4	80	120	1.15	15	
Lead	0.191	0.00100	0.200	0	95.4	80	120	0.106	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160212C

Sample ID	**1602096-01A MSD**	Batch ID:	**73623**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**ICP-MS4_160212C**	Analysis Date:	**2/12/2016 12:35:00 PM**	Prep Date:	**2/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lithium	0.315	0.0100	0.200	0.127	94.3	80	120	1.14	15	
Molybdenum	0.189	0.00500	0.200	0	94.7	80	120	0.103	15	
Selenium	0.197	0.00500	0.200	0	98.5	80	120	0.056	15	
Thallium	0.192	0.00150	0.200	0	96.1	80	120	0.174	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160212C

Sample ID **ICV-160212**	Batch ID: **R84167**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS4_160212C**	Analysis Date: **2/12/2016 10:33:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.0978	0.00250	0.100	0	97.8	90	110			
Arsenic	0.0980	0.00500	0.100	0	98.0	90	110			
Barium	0.0968	0.0100	0.100	0	96.8	90	110			
Beryllium	0.0981	0.00100	0.100	0	98.1	90	110			
Boron	0.0974	0.0300	0.100	0	97.4	90	110			
Cadmium	0.0972	0.00100	0.100	0	97.2	90	110			
Calcium	2.35	0.300	2.50	0	94.0	90	110			
Chromium	0.101	0.00500	0.100	0	101	90	110			
Cobalt	0.101	0.00500	0.100	0	101	90	110			
Lead	0.0983	0.00100	0.100	0	98.3	90	110			
Lithium	0.0990	0.0100	0.100	0	99.0	90	110			
Molybdenum	0.0932	0.00500	0.100	0	93.2	90	110			
Selenium	0.0999	0.00500	0.100	0	99.9	90	110			
Thallium	0.0970	0.00150	0.100	0	97.0	90	110			

Sample ID **LCVL-160212**	Batch ID: **R84167**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_160212C**	Analysis Date: **2/12/2016 10:42:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00190	0.00250	0.00200	0	95.1	70	130			
Arsenic	0.00497	0.00500	0.00500	0	99.4	70	130			
Barium	0.00474	0.0100	0.00500	0	94.8	70	130			
Beryllium	0.000922	0.00100	0.00100	0	92.2	70	130			
Boron	0.0258	0.0300	0.0200	0	129	70	130			
Cadmium	0.000982	0.00100	0.00100	0	98.2	70	130			
Calcium	0.104	0.300	0.100	0	104	70	130			
Chromium	0.00503	0.00500	0.00500	0	101	70	130			
Cobalt	0.00509	0.00500	0.00500	0	102	70	130			
Lead	0.000993	0.00100	0.00100	0	99.3	70	130			
Lithium	0.0105	0.0100	0.0100	0	105	70	130			
Molybdenum	0.00463	0.00500	0.00500	0	92.6	70	130			
Selenium	0.00521	0.00500	0.00500	0	104	70	130			
Thallium	0.000972	0.00150	0.00100	0	97.2	70	130			

Sample ID **CCV2-160212**	Batch ID: **R84167**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160212C**	Analysis Date: **2/12/2016 11:40:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.189	0.00250	0.200	0	94.5	90	110			
Arsenic	0.191	0.00500	0.200	0	95.7	90	110			
Barium	0.190	0.0100	0.200	0	94.9	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160212C

Sample ID **CCV2-160212**	Batch ID: **R84167**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160212C**	Analysis Date: **2/12/2016 11:40:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.195	0.00100	0.200	0	97.7	90	110			
Boron	0.195	0.0300	0.200	0	97.7	90	110			
Cadmium	0.191	0.00100	0.200	0	95.7	90	110			
Calcium	4.55	0.300	5.00	0	91.1	90	110			
Chromium	0.190	0.00500	0.200	0	95.0	90	110			
Cobalt	0.194	0.00500	0.200	0	96.9	90	110			
Lead	0.186	0.00100	0.200	0	93.1	90	110			
Lithium	0.197	0.0100	0.200	0	98.4	90	110			
Molybdenum	0.182	0.00500	0.200	0	90.8	90	110			
Selenium	0.191	0.00500	0.200	0	95.5	90	110			
Thallium	0.186	0.00150	0.200	0	93.1	90	110			

Sample ID **LCVL2-160212**	Batch ID: **R84167**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_160212C**	Analysis Date: **2/12/2016 11:57:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00196	0.00250	0.00200	0	98.2	70	130			
Arsenic	0.00498	0.00500	0.00500	0	99.5	70	130			
Barium	0.00495	0.0100	0.00500	0	98.9	70	130			
Beryllium	0.000937	0.00100	0.00100	0	93.7	70	130			
Boron	0.0206	0.0300	0.0200	0	103	70	130			
Cadmium	0.000953	0.00100	0.00100	0	95.3	70	130			
Calcium	0.104	0.300	0.100	0	104	70	130			
Chromium	0.00499	0.00500	0.00500	0	99.8	70	130			
Cobalt	0.00495	0.00500	0.00500	0	99.0	70	130			
Lead	0.000935	0.00100	0.00100	0	93.5	70	130			
Lithium	0.0112	0.0100	0.0100	0	112	70	130			
Molybdenum	0.00467	0.00500	0.00500	0	93.4	70	130			
Selenium	0.00510	0.00500	0.00500	0	102	70	130			
Thallium	0.000978	0.00150	0.00100	0	97.8	70	130			

Sample ID **CCV3-160212**	Batch ID: **R84167**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160212C**	Analysis Date: **2/12/2016 12:37:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.191	0.00250	0.200	0	95.4	90	110			
Arsenic	0.198	0.00500	0.200	0	99.1	90	110			
Barium	0.194	0.0100	0.200	0	96.8	90	110			
Beryllium	0.196	0.00100	0.200	0	98.1	90	110			
Cadmium	0.192	0.00100	0.200	0	96.1	90	110			
Calcium	4.86	0.300	5.00	0	97.2	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160212C

Sample ID	**CCV3-160212**	Batch ID:	**R84167**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_160212C**	Analysis Date:	**2/12/2016 12:37:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chromium	0.191	0.00500	0.200	0	95.4	90	110			
Cobalt	0.196	0.00500	0.200	0	98.2	90	110			
Lead	0.192	0.00100	0.200	0	96.0	90	110			
Lithium	0.199	0.0100	0.200	0	99.4	90	110			
Molybdenum	0.181	0.00500	0.200	0	90.6	90	110			
Selenium	0.197	0.00500	0.200	0	98.6	90	110			
Thallium	0.190	0.00150	0.200	0	95.1	90	110			

Sample ID	**CCV3-160212**	Batch ID:	**R84167**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_160212C**	Analysis Date:	**2/12/2016 12:48:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.197	0.0300	0.200	0	98.5	90	110			

Sample ID	**LCVL3-160212**	Batch ID:	**R84167**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160212C**	Analysis Date:	**2/12/2016 1:19:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00197	0.00250	0.00200	0	98.4	70	130			
Arsenic	0.00508	0.00500	0.00500	0	102	70	130			
Barium	0.00486	0.0100	0.00500	0	97.2	70	130			
Beryllium	0.000872	0.00100	0.00100	0	87.2	70	130			
Boron	0.0257	0.0300	0.0200	0	128	70	130			
Cadmium	0.000988	0.00100	0.00100	0	98.8	70	130			
Calcium	0.106	0.300	0.100	0	106	70	130			
Chromium	0.00487	0.00500	0.00500	0	97.4	70	130			
Cobalt	0.00498	0.00500	0.00500	0	99.6	70	130			
Lead	0.000913	0.00100	0.00100	0	91.3	70	130			
Lithium	0.0101	0.0100	0.0100	0	101	70	130			
Molybdenum	0.00457	0.00500	0.00500	0	91.4	70	130			
Selenium	0.00646	0.00500	0.00500	0	129	70	130			
Thallium	0.000957	0.00150	0.00100	0	95.7	70	130			

Sample ID	**CCV4-160212**	Batch ID:	**R84167**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_160212C**	Analysis Date:	**2/12/2016 1:52:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.190	0.00250	0.200	0	95.0	90	110			
Arsenic	0.200	0.00500	0.200	0	99.8	90	110			
Barium	0.189	0.0100	0.200	0	94.6	90	110			
Beryllium	0.197	0.00100	0.200	0	98.6	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160212C

Sample ID **CCV4-160212** Batch ID: **R84167** TestNo: **SW6020A** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS4_160212C** Analysis Date: **2/12/2016 1:52:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.200	0.0300	0.200	0	100	90	110			
Cadmium	0.191	0.00100	0.200	0	95.4	90	110			
Chromium	0.193	0.00500	0.200	0	96.6	90	110			
Cobalt	0.198	0.00500	0.200	0	99.1	90	110			
Lead	0.191	0.00100	0.200	0	95.5	90	110			
Lithium	0.201	0.0100	0.200	0	100	90	110			
Molybdenum	0.181	0.00500	0.200	0	90.3	90	110			
Selenium	0.202	0.00500	0.200	0	101	90	110			
Thallium	0.190	0.00150	0.200	0	94.8	90	110			

Sample ID **LCVL4-160212** Batch ID: **R84167** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS4_160212C** Analysis Date: **2/12/2016 2:20:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00200	0.00250	0.00200	0	99.8	70	130			
Arsenic	0.00500	0.00500	0.00500	0	100	70	130			
Barium	0.00486	0.0100	0.00500	0	97.3	70	130			
Beryllium	0.000878	0.00100	0.00100	0	87.8	70	130			
Boron	0.0197	0.0300	0.0200	0	98.6	70	130			
Cadmium	0.000928	0.00100	0.00100	0	92.8	70	130			
Chromium	0.00485	0.00500	0.00500	0	96.9	70	130			
Cobalt	0.00494	0.00500	0.00500	0	98.8	70	130			
Lead	0.000889	0.00100	0.00100	0	88.9	70	130			
Lithium	0.0104	0.0100	0.0100	0	104	70	130			
Molybdenum	0.00471	0.00500	0.00500	0	94.2	70	130			
Selenium	0.00632	0.00500	0.00500	0	126	70	130			
Thallium	0.000938	0.00150	0.00100	0	93.8	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160215F

The QC data in batch 73623 applies to the following samples: 1602095-01A, 1602095-02A, 1602095-03A

Sample ID	**1602096-01A SD**	Batch ID:	**73623**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**SD**	Run ID:	**ICP-MS4_160215F**	Analysis Date:	**2/15/2016 4:38:00 PM**	Prep Date:	**2/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	432	75.0	0	422				2.33	10	

Sample ID	**1602096-01A PDS**	Batch ID:	**73623**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**PDS**	Run ID:	**ICP-MS4_160215F**	Analysis Date:	**2/15/2016 4:58:00 PM**	Prep Date:	**2/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	646	15.0	250	422	89.7	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160215F

Sample ID	**ICV2-160215**	Batch ID:	**R84190**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**ICP-MS4_160215F**	Analysis Date:	**2/15/2016 4:21:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	2.28	0.300	2.50	0	91.1	90	110			

Sample ID	**ILCVL2-160215**	Batch ID:	**R84190**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160215F**	Analysis Date:	**2/15/2016 4:25:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.103	0.300	0.100	0	103	70	130			

Sample ID	**CCV1-160215**	Batch ID:	**R84190**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_160215F**	Analysis Date:	**2/15/2016 5:00:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.82	0.300	5.00	0	96.3	90	110			

Sample ID	**LCVL1-160215**	Batch ID:	**R84190**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160215F**	Analysis Date:	**2/15/2016 5:05:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.101	0.300	0.100	0	101	70	130			

Sample ID	**CCV2-160215**	Batch ID:	**R84190**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_160215F**	Analysis Date:	**2/15/2016 5:24:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.82	0.300	5.00	0	96.4	90	110			

Sample ID	**LCVL2-160215**	Batch ID:	**R84190**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160215F**	Analysis Date:	**2/15/2016 5:28:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.101	0.300	0.100	0	101	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC3_160210A

The QC data in batch 73611 applies to the following samples: 1602095-01D, 1602095-02D, 1602095-03D

Sample ID	MB-73611	Batch ID:	73611	TestNo:	E300	Units:	mg/L
SampType:	MBLK	Run ID:	IC3_160210A	Analysis Date:	2/10/2016 9:43:05 AM	Prep Date:	2/10/2016

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	<0.300	1.00								
Fluoride	<0.100	0.400								
Sulfate	<1.00	3.00								

Sample ID	LCS-73611	Batch ID:	73611	TestNo:	E300	Units:	mg/L
SampType:	LCS	Run ID:	IC3_160210A	Analysis Date:	2/10/2016 10:06:35 AM	Prep Date:	2/10/2016

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.67	1.00	10.00	0	96.7	90	110			
Fluoride	4.36	0.400	4.000	0	109	90	110			
Sulfate	32.1	3.00	30.00	0	107	90	110			

Sample ID	LCSD-73611	Batch ID:	73611	TestNo:	E300	Units:	mg/L
SampType:	LCSD	Run ID:	IC3_160210A	Analysis Date:	2/10/2016 10:27:14 AM	Prep Date:	2/10/2016

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.1	1.00	10.00	0	101	90	110	4.50	20	
Fluoride	4.27	0.400	4.000	0	107	90	110	2.14	20	
Sulfate	31.8	3.00	30.00	0	106	90	110	0.859	20	

Sample ID	1602095-03DMS	Batch ID:	73611	TestNo:	E300	Units:	mg/L
SampType:	MS	Run ID:	IC3_160210A	Analysis Date:	2/10/2016 1:08:04 PM	Prep Date:	2/10/2016

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2220	100	2000	249.4	98.5	90	110			
Fluoride	1970	40.0	2000	0	98.3	90	110			
Sulfate	2840	300	2000	782.6	103	90	110			

Sample ID	1602095-03DMSD	Batch ID:	73611	TestNo:	E300	Units:	mg/L
SampType:	MSD	Run ID:	IC3_160210A	Analysis Date:	2/10/2016 1:31:38 PM	Prep Date:	2/10/2016

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2220	100	2000	249.4	98.7	90	110	0.202	20	
Fluoride	1980	40.0	2000	0	99.0	90	110	0.744	20	
Sulfate	2880	300	2000	782.6	105	90	110	1.44	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC3_160210A

Sample ID **ICV-160210**	Batch ID: **R84106**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC3_160210A**	Analysis Date: **2/10/2016 8:55:07 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	24.5	1.00	25.00	0	97.8	90	110			
Fluoride	10.3	0.400	10.00	0	103	90	110			
Sulfate	77.9	3.00	75.00	0	104	90	110			

Sample ID **CCV1-160210**	Batch ID: **R84106**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC3_160210A**	Analysis Date: **2/10/2016 2:12:56 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.66	1.00	10.00	0	96.6	90	110			
Fluoride	4.16	0.400	4.000	0	104	90	110			
Sulfate	30.8	3.00	30.00	0	103	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_160210A

The QC data in batch 73612 applies to the following samples: 1602095-01D, 1602095-02D, 1602095-03D

Sample ID	**1602072-01D-DUP**	Batch ID:	**73612**	TestNo:	**M4500-H+ B**	Units:	**pH Units@13.8℃**
SampType:	**DUP**	Run ID:	**TITRATOR_160210A**	Analysis Date:	**2/10/2016 9:55:00 AM**	Prep Date:	**2/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	9.48	0	0	9.480				0	5	

Sample ID	**1602090-07D-DUP**	Batch ID:	**73612**	TestNo:	**M4500-H+ B**	Units:	**pH Units@16.2℃**
SampType:	**DUP**	Run ID:	**TITRATOR_160210A**	Analysis Date:	**2/10/2016 10:21:00 AM**	Prep Date:	**2/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.59	0	0	6.650				0.906	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_160210A

Sample ID	**ICV-160210**	Batch ID:	**R84089**	TestNo:	**M4500-H+ B**	Units:	**pH Units@21.3℃**
SampType:	**ICV**	Run ID:	**TITRATOR_160210A**	Analysis Date:	**2/10/2016 9:50:00 AM**	Prep Date:	**2/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	10.1	0	10.00	0	101	99	101			

Sample ID	**CCV1-160210**	Batch ID:	**R84089**	TestNo:	**M4500-H+ B**	Units:	**pH Units@20.4℃**
SampType:	**CCV**	Run ID:	**TITRATOR_160210A**	Analysis Date:	**2/10/2016 10:12:00 AM**	Prep Date:	**2/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	7.01	0	7.000	0	100	97.1	102.9			

Sample ID	**CCV2-160210**	Batch ID:	**R84089**	TestNo:	**M4500-H+ B**	Units:	**pH Units@20.8℃**
SampType:	**CCV**	Run ID:	**TITRATOR_160210A**	Analysis Date:	**2/10/2016 10:27:00 AM**	Prep Date:	**2/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	7.01	0	7.000	0	100	97.1	102.9			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1602095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: WC_160210B

The QC data in batch 73615 applies to the following samples: 1602095-01D, 1602095-02D, 1602095-03D

Sample ID	**MB-73615**	Batch ID:	**73615**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**WC_160210B**	Analysis Date:	**2/11/2016 8:30:00 AM**	Prep Date:	**2/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	<10.0	10.0								

Sample ID	**LCS-73615**	Batch ID:	**73615**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**WC_160210B**	Analysis Date:	**2/11/2016 8:30:00 AM**	Prep Date:	**2/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	759	10.0	745.6	0	102	90	113			

Sample ID	**1602090-01D-DUP**	Batch ID:	**73615**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_160210B**	Analysis Date:	**2/11/2016 8:30:00 AM**	Prep Date:	**2/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	3610	50.0	0	3270				9.88	5	R

Sample ID	**1602096-01C-DUP**	Batch ID:	**73615**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_160210B**	Analysis Date:	**2/11/2016 8:30:00 AM**	Prep Date:	**2/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	2600	50.0	0	2525				3.12	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

GEL Laboratories LLC
a member of The GEL Group INC

PO Box 30712 Charleston, SC 29417
2040 Savage Road Charleston, SC 29407
P 843.556.8171
F 843.766.1178

gel.com

March 11, 2016

Mr. John DuPont
DHL Analytical
2300 Double Creek Drive
Round Rock, Texas 78664

Re: Routine Analysis
Work Order: 391388

Dear Mr. DuPont:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on February 15, 2016. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4707.

Sincerely,

Anna C Day

Anna Day
Project Manager

Purchase Order: 14234
Enclosures

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 − (843) 556−8171 − www.gel.com

Certificate of Analysis Report
for

DHLA002 DHL Analytical

Client SDG: 391388 GEL Work Order: 391388

The Qualifiers in this report are defined as follows:

* A quality control analyte recovery is outside of specified acceptance criteria

** Analyte is a Tracer compound

** Analyte is a surrogate compound

U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Anna Day.

Reviewed by Anna C Day

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: March 11, 2016

Company :	DHL Analytical
Address :	2300 Double Creek Drive
	Round Rock, Texas 78664
Contact:	Mr. John DuPont
Project:	Routine Analysis

Client Sample ID:	AX-22R	Project:	DHLA00112
Sample ID:	391388001	Client ID:	DHLA002
Matrix:	Water		
Collect Date:	09-FEB-16 09:35		
Receive Date:	15-FEB-16		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting												
GFPC, Ra228, Liquid "As Received"												
Radium-228	U	1.56	+/-1.06	1.67	3.00	pCi/L		AXM6	03/10/16	1529	1547100	1
Rad Radium-226												
Lucas Cell, Ra226, liquid "As Received"												
Radium-226		1.16	+/-0.537	0.667	1.00	pCi/L		CXP3	03/11/16	0510	1545936	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			96.3	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: March 11, 2016

Company : DHL Analytical
Address : 2300 Double Creek Drive

Round Rock, Texas 78664
Contact: Mr. John DuPont
Project: Routine Analysis

Client Sample ID: AX-25
Sample ID: 391388002
Matrix: Water
Collect Date: 09-FEB-16 10:35
Receive Date: 15-FEB-16
Collector: Client

Project: DHLA00112
Client ID: DHLA002

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting												
GFPC, Ra228, Liquid "As Received"												
Radium-228		1.60	+/-0.810	1.12	3.00	pCi/L		AXM6	03/10/16	1529	1547100	1
Rad Radium-226												
Lucas Cell, Ra226, liquid "As Received"												
Radium-226		2.04	+/-0.715	0.767	1.00	pCi/L		CXP3	03/11/16	0510	1545936	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			93.6	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: March 11, 2016

Company : DHL Analytical
Address : 2300 Double Creek Drive

Round Rock, Texas 78664
Contact: Mr. John DuPont
Project: Routine Analysis

Client Sample ID:	AX-24	Project:	DHLA00112
Sample ID:	391388003	Client ID:	DHLA002
Matrix:	Water		
Collect Date:	09-FEB-16 12:20		
Receive Date:	15-FEB-16		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting												
GFPC, Ra228, Liquid "As Received"												
Radium-228	U	0.126	+/-1.11	2.00	3.00	pCi/L		AXM6	03/10/16	1532	1547100	1
Rad Radium-226												
Lucas Cell, Ra226, liquid "As Received"												
Radium-226		0.648	+/-0.369	0.414	1.00	pCi/L		CXP3	03/11/16	0510	1545936	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			96.8	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

QC Summary

Report Date: March 11, 2016

DHL Analytical
2300 Double Creek Drive
Round Rock, Texas

Contact: **Mr. John DuPont**

Workorder: **391388**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gas Flow										
Batch 1547100										
QC1203495195 391269004 DUP										
Radium-228	U	0.911	U	-0.266	pCi/L	N/A		N/A	AXM6	03/10/16 15:32
	Uncertainty	+/-1.12		+/-1.07						
QC1203495196 LCS										
Radium-228	47.1			44.4	pCi/L		94.3	(75%-125%)		03/10/16 15:32
	Uncertainty			+/-2.95						
QC1203495194 MB										
Radium-228			U	-1.06	pCi/L					03/10/16 15:32
	Uncertainty			+/-0.650						
Rad Ra-226										
Batch 1545936										
QC1203492181 391479001 DUP										
Radium-226		1.82		1.25	pCi/L	37.2		(0% - 100%)	CXP3	03/11/16 07:00
	Uncertainty	+/-0.690		+/-0.516						
QC1203492183 LCS										
Radium-226	24.4			23.4	pCi/L		95.9	(75%-125%)		03/11/16 07:00
	Uncertainty			+/-2.13						
QC1203492180 MB										
Radium-226			U	0.466	pCi/L					03/11/16 05:45
	Uncertainty			+/-0.340						
QC1203492182 391479001 MS										
Radium-226	122	1.82		146	pCi/L		118	(75%-125%)		03/11/16 07:00
	Uncertainty	+/-0.690		+/-11.5						

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

**	Analyte is a Tracer compound
<	Result is less than value reported
>	Result is greater than value reported
BD	Results are either below the MDC or tracer recovery is low
FA	Failed analysis.
H	Analytical holding time was exceeded
J	Value is estimated
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
M	M if above MDC and less than LLD
M	REMP Result > MDC/CL and < RDL
N/A	RPD or %Recovery limits do not apply.

QC Summary

Workorder: **391388**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time

N1 See case narrative

ND Analyte concentration is not detected above the detection limit

NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

Q One or more quality control criteria have not been met. Refer to the applicable narrative or DER.

R Sample results are rejected

U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

UI Gamma Spectroscopy--Uncertain identification

UJ Gamma Spectroscopy--Uncertain identification

UL Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.

X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

Y Other specific qualifiers were required to properly define the results. Consult case narrative.

^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.

h Preparation or preservation holding time was exceeded

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

There are no "Data Exception Reports" associated with this analytical report.

391388

CHAIN-OF-CUSTODY RECORD

FAX: *(512) 388-8229*

TEL: (843) 556-8171
FAX:
Acct #:

09-Feb-16

	Matrix	DHL#	Date Collected	Bottle Type	Requested Tests					
					E903.1	E904.0				
	Aqueous	-01B	02/09/16 09:35 AM	500HDPEHNO3		1				
	Aqueous	-01C	02/09/16 09:35 AM	500HDPEHNO3	1					
	Aqueous	-02B	02/09/16 10:35 AM	500HDPEHNO3		1				
	Aqueous	-02C	02/09/16 10:35 AM	500HDPEHNO3	1					
	Aqueous	-03B	02/09/16 12:20 PM	500HDPEHNO3		1				
	Aqueous	-03C	02/09/16 12:20 PM	500HDPEHNO3	1					

analyze these samples with a Standard Turnaround Time.
n DuPont if you have questions.
Control Package Needed: Standard / _____
eport to both cac@dhlanalytical.com & dupont@dhlanalytical.com

	Date/Time		Date/Time
	2/10/16 (73)	Received by: Fed ex	2/10/16 1730
		Received by: Dawn Grimball	2/15/16 0845

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: DHLA			**SDG/AR/COC/Work Order:** 391388
Received By: Shana Mack			**Date Received:** 2/15/16 8:45
Suspected Hazard Information	**Yes**	**No**	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?		–	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 30 cpm
Classified Radioactive II or III by RSO?		–	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?		–	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		–	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?		–	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		–	

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*		✓		Preservation Method: Ice bags Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius 10C
2a	Daily check performed and passed on IR temperature gun?	✓			Temperature Device Serial #: Secondary Temperature Device Serial # (If Applicable): CS032015835
3	Chain of custody documents included with shipment?	✓			
4	Sample containers intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?	✓			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	Do Low Level Perchlorate samples have headspace as required?		✓		Sample ID's and containers affected:
7	VOA vials contain acid preservation?		✓		(If unknown, select No)
8	VOA vials free of headspace (defined as < 6mm bubble)?		✓		Sample ID's and containers affected:
9	Are Encore containers present?			✓	(If yes, immediately deliver to Volatiles laboratory)
10	Samples received within holding time?	✓			ID's and tests affected:
11	Sample ID's on COC match ID's on bottles?	✓			Sample ID's and containers affected:
12	Date & time on COC match date & time on bottles?	✓			Sample ID's affected:
13	Number of containers received match number indicated on COC?	✓			Sample ID's affected:
14	Are sample containers identifiable as GEL provided?			✓	
15	COC form is properly signed in relinquished/received sections?	✓			
16	Carrier and tracking number.				Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other 7756 1577 8264

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials AD Date 2/15/16 Page 1 of 1 GL-CHL-SR-001 Rev 2

List of current GEL Certifications as of 11 March 2016

State	Certification
Alaska	UST−0110
Arkansas	88−0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH−0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330−15−00283, P330−15−00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C−SC−01
Kansas NELAP	E−10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA160006
Maryland	270
Massachusetts	M−SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE−OS−26−13
Nevada	SC000122016−1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R−158
Oklahoma	9904
Pennsylvania NELAP	68−00485
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235−16−11
Utah NELAP	SC000122016−20
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

June 06, 2016

Will Vienne
Pastor, Behling & Wheeler
2201 Double Creek Dr #4004
Round Rock, Texas 78664
TEL: (512) 671-3434
FAX (512) 671-3446

Order No.: 1604288

RE: Sandow CCR

Dear Will Vienne:

DHL Analytical, Inc. received 12 sample(s) on 4/26/2016 for the analyses presented in the following report.

There were no problems with the analyses and all data met requirements of NELAC except where noted in the Case Narrative. All non-NELAC methods will be identified accordingly in the case narrative and all estimated uncertainties of test results are within method or EPA specifications.

If you have any questions regarding these tests results, please feel free to call. Thank you for using DHL Analytical.

Sincerely,

John DuPont
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-16-16

Table of Contents

DHL ANALYTICAL
2300 Double Creek Dr. ■ Round Rock, TX 78664
Phone (512) 388-8222 ■ FAX (512) 388-8229
Web: www.dhlanalytical.com
E-Mail: login@dhlanalytical.com

CLIENT: Pastor, Behling & Wheeler
ADDRESS: 2201 Double Creek Dr. Ste 4004 Round Rock, TX 78664
PHONE: (512) 671-3434 FAX/E-MAIL:
DATA REPORTED TO: Will Vienne
ADDITIONAL REPORT COPIES TO: Karla Hensen

DATE: 4/26/2016
PO #: DHL WORK
PROJECT LOCATION OR NAME: Sandow
CLENT PROJECT #: 5164E

Authorize 5% surcharge for TRRP Report? ☐ Yes ☑ No

S=SOIL W=WATER A=AIR L=LIQUID SE=SEDIMENT
P=PAINT SL=SLUDGE O=OTHER SO=SOLID

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	PRESERVATION: HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESERVED
AXMW-1	1	4/25/16	10:30	W	P	4		X		X	
AX-24	2		11:30								
AX-28	3		12:35								
AX-22R	4		13:10								
AX-25	5		14:25								
AX-26	6		16:05								
MW-1	7		-								
EB-1	8		9:05								
AX-27	9	4/26/2016	14:35								
AXMW-2	10		11:45								
AX-29	11		13:20								
AX-23	12		14:15								

ANALYSES: BTEX ☐ MTBE ☐ [METHOD 8021] | TPH 1005 ☐ TPH 1006 ☐ HOLD 1006 ☐ | GRO [METHOD 8015] ☐ DRO [METHOD 8105] ☐ | VOC 8260 ☐ VOC 624 ☐ VOC 8260/5035 ☐ | SVOC 8270 ☐ PAH 8270 ☐ HOLD PAH ☐ SVOC625 ☐ | 8270 PEST ☐ 625 PEST/PCB ☐ 608 PCB ☐ | 8270 O-P PEST ☐ 8082 PCB ☐ 8270 PCB ☐ | 8321 HERB ☐ T PHOS, AMMONIA ☐ | METALS 6020 ☐ METALS 200.8 ☐ DISS. METALS | RCRA ☐ TX11 ☐ | PH ☐ HEX CHROM ☐ ALKALINITY | CHLORIDE ☐ ANIONS | TCLP-SVOC ☐ | TCLP-METALS

RELINQUISHED BY: (Signature) John Turpe	DATE/TIME 4/26/2016	RECEIVED BY: (Signature)	11:35
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	

TURN AROUND TIME
RUSH ☐ CALL FIRST
1 DAY ☐ CALL FIRST
2 DAY ☐
NORMAL ☑
OTHER ☐

LABORATORY US
RECEIVING TEMPS
CUSTODY SEALS:
CARRIER: ☐ LO
☐ COURIER DELIV
☐ HAND DELIVER

John Dupont

From: Sara Taube [Sara.Taube@pbwllc.com]
Sent: Wednesday, July 22, 2015 12:05 PM
To: John Dupont
Subject: CCR Appendix III and IV
Follow Up Flag: Follow up
Flag Status: Completed

Hi John,

Here are the Appendix III and Appendix IV constituents that we will need to have analyzed under the CCR Rule.

Appendix III
Boron
Calcium
Chloride
Fluoride
pH
sulfate
TDS

Appendix IV
Antimony
Arsenic
Barium
Beryllium
Cadmium
Chromium
Cobalt
Fluoride
Lead
Lithium
Mercury
Molybdenum
Selenium
Thallium
Radium 226 and 228

We are looking to have approximately 74 wells sampled 8 times over the course of the next two years. Please let me know if there is any more information you might need.

Cheers,

Sara

10/26/2015

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name **Pastor, Behling & Wheeler** Date Received: **4/26/2016**

Work Order Number **1604288** Received by **JB**

Checklist completed by: _____ 4/26/2016 Reviewed by _____ 4/26/2016
Signature Date Initials Date

Carrier name Hand Delivered

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	3.7 °C 4.6
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH<2 acceptable upon receipt?	Yes ☑	No ☐	NA ☐ LOT # 8086
	Adjusted? no		Checked by [illegible]
Water - ph>9 (S) or ph>12 (CN) acceptable upon receipt?	Yes ☐	No ☐	NA ☑ LOT #
	Adjusted? _____		Checked by _____

Any No response must be detailed in the comments section below.

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

DHL Analytical, Inc. **Date:** *06-Jun-16*

CLIENT: Pastor, Behling & Wheeler
Project: Sandow CCR
Lab Order: 1604288

CASE NARRATIVE

Samples were analyzed using the methods outlined in the following references:

Method SW6020A - Metals Analysis
Method SW7470A - Mercury Analysis
Method E300 - Anions Analysis
Method M4500-H+ B - pH of a Water Analysis
Method M2540C - TDS Analysis

LOG IN

The samples were received and log-in performed on 4/26/16. A total of 12 samples were received. The samples arrived in good condition and were properly packaged.

METALS ANALYSIS

For Metals analysis performed on 4/28/16 and 5/9/16 the matrix spike and matrix spike duplicate recoveries were above control limits for Calcium or Boron. These are flagged accordingly in the QC summary report. The sample selected for the matrix spike and matrix spike duplicate was from this work order. The LCS was within control limits for these analytes. No further corrective actions were taken.

For Metals analysis performed on 5/9/16 the RPD for the serial dilution was above control limits for Boron. This is flagged accordingly. The PDS was within control limits for this analyte. No further corrective actions were taken.

MERCURY ANALYSIS

For Mercury analysis performed on 4/28/16 the PDS recovery was slightly below control limits. This is flagged accordingly in the QC summary report. The serial dilution was within control limits. No further corrective actions were taken.

DHL Analytical, Inc.

Date: *06-Jun-16*

CLIENT: Pastor, Behling & Wheeler
Project: Sandow CCR
Lab Order: 1604288

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
1604288-01	AXMW-1		04/25/16 10:30 AM	4/26/2016
1604288-02	AX-24		04/25/16 11:30 AM	4/26/2016
1604288-03	AX-28		04/25/16 12:35 PM	4/26/2016
1604288-04	AX-22R		04/25/16 01:10 PM	4/26/2016
1604288-05	AX-25		04/25/16 02:25 PM	4/26/2016
1604288-06	AX-26		04/25/16 04:05 PM	4/26/2016
1604288-07	MW-1		04/25/16	4/26/2016
1604288-08	EB-1		04/25/16 09:05 AM	4/26/2016
1604288-09	AX-27		04/26/16 02:35 PM	4/26/2016
1604288-10	AXMW-2		04/26/16 11:45 AM	4/26/2016
1604288-11	AX-29		04/26/16 01:20 PM	4/26/2016
1604288-12	AX-23		04/26/16 02:15 PM	4/26/2016

& Wheeler

PREP DATES REPORT

Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
04/25/16 10:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/25/16 10:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/25/16 10:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/25/16 10:30 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	04/27/16 12:00 PM	74829
04/25/16 10:30 AM	Aqueous	E300	Anion Preparation	04/28/16 09:22 AM	74841
04/25/16 10:30 AM	Aqueous	E300	Anion Preparation	04/28/16 09:22 AM	74841
04/25/16 10:30 AM	Aqueous	M4500-H+ B	pH Preparation	04/27/16 08:22 AM	74811
04/25/16 10:30 AM	Aqueous	M2540C	TDS Preparation	05/02/16 01:35 PM	74905
04/25/16 11:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/25/16 11:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/25/16 11:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/25/16 11:30 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	04/27/16 12:00 PM	74829
04/25/16 11:30 AM	Aqueous	E300	Anion Preparation	04/28/16 09:22 AM	74841
04/25/16 11:30 AM	Aqueous	E300	Anion Preparation	04/28/16 09:22 AM	74841
04/25/16 11:30 AM	Aqueous	M4500-H+ B	pH Preparation	04/27/16 08:22 AM	74811
04/25/16 11:30 AM	Aqueous	M2540C	TDS Preparation	05/02/16 01:35 PM	74905
04/25/16 12:35 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/25/16 12:35 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/25/16 12:35 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/25/16 12:35 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	04/27/16 12:00 PM	74829
04/25/16 12:35 PM	Aqueous	E300	Anion Preparation	04/28/16 09:22 AM	74841
04/25/16 12:35 PM	Aqueous	E300	Anion Preparation	04/28/16 09:22 AM	74841
04/25/16 12:35 PM	Aqueous	M4500-H+ B	pH Preparation	04/27/16 08:22 AM	74811
04/25/16 12:35 PM	Aqueous	M2540C	TDS Preparation	05/02/16 01:35 PM	74905
04/25/16 01:10 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/25/16 01:10 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/25/16 01:10 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/25/16 01:10 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	04/27/16 12:00 PM	74829

& Wheeler

PREP DATES REPORT

Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
04/25/16 01:10 PM	Aqueous	E300	Anion Preparation	04/28/16 09:22 AM	74841
04/25/16 01:10 PM	Aqueous	E300	Anion Preparation	04/28/16 09:22 AM	74841
04/25/16 01:10 PM	Aqueous	M4500-H+ B	pH Preparation	04/27/16 08:22 AM	74811
04/25/16 01:10 PM	Aqueous	M2540C	TDS Preparation	05/02/16 01:35 PM	74905
04/25/16 02:25 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/25/16 02:25 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/25/16 02:25 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/25/16 02:25 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	04/27/16 12:00 PM	74829
04/25/16 02:25 PM	Aqueous	E300	Anion Preparation	04/28/16 09:22 AM	74841
04/25/16 02:25 PM	Aqueous	E300	Anion Preparation	04/28/16 09:22 AM	74841
04/25/16 02:25 PM	Aqueous	M4500-H+ B	pH Preparation	04/27/16 08:22 AM	74811
04/25/16 02:25 PM	Aqueous	M2540C	TDS Preparation	05/02/16 01:35 PM	74905
04/25/16 04:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/25/16 04:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/25/16 04:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/25/16 04:05 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	04/27/16 12:00 PM	74829
04/25/16 04:05 PM	Aqueous	E300	Anion Preparation	04/28/16 09:22 AM	74841
04/25/16 04:05 PM	Aqueous	E300	Anion Preparation	04/28/16 09:22 AM	74841
04/25/16 04:05 PM	Aqueous	M4500-H+ B	pH Preparation	04/27/16 08:22 AM	74811
04/25/16 04:05 PM	Aqueous	M2540C	TDS Preparation	05/02/16 01:35 PM	74905
04/25/16	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/25/16	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/25/16	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/25/16	Aqueous	SW7470A	Mercury Aq Prep, Total	04/27/16 12:00 PM	74829
04/25/16	Aqueous	E300	Anion Preparation	04/28/16 09:22 AM	74841
04/25/16	Aqueous	E300	Anion Preparation	04/28/16 09:22 AM	74841
04/25/16	Aqueous	M4500-H+ B	pH Preparation	04/27/16 08:22 AM	74811
04/25/16	Aqueous	M2540C	TDS Preparation	05/02/16 01:35 PM	74905

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PREP DATES REPORT

Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
04/25/16 09:05 AM	Equip Blank	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/25/16 09:05 AM	Equip Blank	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/25/16 09:05 AM	Equip Blank	SW7470A	Mercury Aq Prep, Total	04/27/16 12:00 PM	74829
04/25/16 09:05 AM	Equip Blank	E300	Anion Preparation	04/28/16 09:22 AM	74841
04/25/16 09:05 AM	Equip Blank	E300	Anion Preparation	04/28/16 09:22 AM	74841
04/25/16 09:05 AM	Equip Blank	M4500-H+ B	pH Preparation	04/27/16 08:22 AM	74811
04/25/16 09:05 AM	Equip Blank	M2540C	TDS Preparation	05/02/16 01:35 PM	74905
04/26/16 02:35 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/26/16 02:35 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/26/16 02:35 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/26/16 02:35 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	04/27/16 12:00 PM	74829
04/26/16 02:35 PM	Aqueous	E300	Anion Preparation	04/28/16 09:22 AM	74841
04/26/16 02:35 PM	Aqueous	E300	Anion Preparation	04/28/16 09:22 AM	74841
04/26/16 02:35 PM	Aqueous	E300	Anion Preparation	04/28/16 09:22 AM	74841
04/26/16 02:35 PM	Aqueous	M4500-H+ B	pH Preparation	04/27/16 08:22 AM	74811
04/26/16 02:35 PM	Aqueous	M2540C	TDS Preparation	05/02/16 01:35 PM	74905
04/26/16 11:45 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/26/16 11:45 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/26/16 11:45 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/26/16 11:45 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	04/27/16 12:00 PM	74829
04/26/16 11:45 AM	Aqueous	E300	Anion Preparation	04/28/16 09:22 AM	74841
04/26/16 11:45 AM	Aqueous	E300	Anion Preparation	04/28/16 09:22 AM	74841
04/26/16 11:45 AM	Aqueous	M4500-H+ B	pH Preparation	04/27/16 08:22 AM	74811
04/26/16 11:45 AM	Aqueous	M2540C	TDS Preparation	05/02/16 01:35 PM	74905
04/26/16 01:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/26/16 01:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/26/16 01:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/26/16 01:20 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	04/27/16 12:00 PM	74829

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PREP DATES REPORT

Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
04/26/16 01:20 PM	Aqueous	E300	Anion Preparation	04/28/16 09:22 AM	74841
04/26/16 01:20 PM	Aqueous	E300	Anion Preparation	04/28/16 09:22 AM	74841
04/26/16 01:20 PM	Aqueous	M4500-H+ B	pH Preparation	04/27/16 08:22 AM	74811
04/26/16 01:20 PM	Aqueous	M2540C	TDS Preparation	05/02/16 01:35 PM	74905
04/26/16 02:15 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/26/16 02:15 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/26/16 02:15 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	04/27/16 08:30 AM	74809
04/26/16 02:15 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	04/27/16 12:00 PM	74829
04/26/16 02:15 PM	Aqueous	E300	Anion Preparation	04/28/16 09:22 AM	74841
04/26/16 02:15 PM	Aqueous	E300	Anion Preparation	04/28/16 09:22 AM	74841
04/26/16 02:15 PM	Aqueous	M4500-H+ B	pH Preparation	04/27/16 08:22 AM	74811
04/26/16 02:15 PM	Aqueous	M2540C	TDS Preparation	05/02/16 01:35 PM	74905

& Wheeler

ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	SW7470A	Mercury Total: Aqueous	74829	1	04/28/16 10:40 AM	CETAC2_HG_160428A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	1	04/28/16 07:09 PM	ICP-MS4_160428B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	50	05/09/16 10:55 AM	ICP-MS4_160509A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	1	05/09/16 11:54 AM	ICP-MS4_160509A
Aqueous	E300	Anions by IC method - Water	74841	1	04/28/16 11:04 AM	IC4_160428A
Aqueous	E300	Anions by IC method - Water	74841	100	04/28/16 03:35 PM	IC4_160428A
Aqueous	M4500-H+ B	pH	74811	1	04/27/16 09:10 AM	TITRATOR_160427A
Aqueous	M2540C	Total Dissolved Solids	74905	1	05/03/16 08:45 AM	WC_160502B
Aqueous	SW7470A	Mercury Total: Aqueous	74829	1	04/28/16 10:43 AM	CETAC2_HG_160428A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	1	05/09/16 12:00 PM	ICP-MS4_160509A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	1	04/28/16 07:17 PM	ICP-MS4_160428B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	50	05/09/16 10:59 AM	ICP-MS4_160509A
Aqueous	E300	Anions by IC method - Water	74841	1	04/28/16 11:19 AM	IC4_160428A
Aqueous	E300	Anions by IC method - Water	74841	100	04/28/16 03:50 PM	IC4_160428A
Aqueous	M4500-H+ B	pH	74811	1	04/27/16 09:13 AM	TITRATOR_160427A
Aqueous	M2540C	Total Dissolved Solids	74905	1	05/03/16 08:45 AM	WC_160502B
Aqueous	SW7470A	Mercury Total: Aqueous	74829	5	04/28/16 10:45 AM	CETAC2_HG_160428A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	1	04/28/16 07:19 PM	ICP-MS4_160428B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	50	05/09/16 11:01 AM	ICP-MS4_160509A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	1	05/09/16 12:02 PM	ICP-MS4_160509A
Aqueous	E300	Anions by IC method - Water	74841	1	04/28/16 11:34 AM	IC4_160428A
Aqueous	E300	Anions by IC method - Water	74841	100	04/28/16 04:05 PM	IC4_160428A
Aqueous	M4500-H+ B	pH	74811	1	04/27/16 09:15 AM	TITRATOR_160427A
Aqueous	M2540C	Total Dissolved Solids	74905	1	05/03/16 08:45 AM	WC_160502B
Aqueous	SW7470A	Mercury Total: Aqueous	74829	1	04/28/16 10:47 AM	CETAC2_HG_160428A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	1	04/28/16 07:21 PM	ICP-MS4_160428B

& Wheeler

ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	10	05/09/16 11:03 AM	ICP-MS4_160509A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	1	05/09/16 12:04 PM	ICP-MS4_160509A
Aqueous	E300	Anions by IC method - Water	74841	1	04/28/16 11:49 AM	IC4_160428A
Aqueous	E300	Anions by IC method - Water	74841	10	04/28/16 04:50 PM	IC4_160428A
Aqueous	M4500-H+ B	pH	74811	1	04/27/16 09:17 AM	TITRATOR_160427A
Aqueous	M2540C	Total Dissolved Solids	74905	1	05/03/16 08:45 AM	WC_160502B
Aqueous	SW7470A	Mercury Total: Aqueous	74829	1	04/28/16 10:49 AM	CETAC2_HG_160428A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	1	05/09/16 12:06 PM	ICP-MS4_160509A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	1	04/28/16 07:23 PM	ICP-MS4_160428B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	50	05/09/16 11:05 AM	ICP-MS4_160509A
Aqueous	E300	Anions by IC method - Water	74841	1	04/28/16 12:04 PM	IC4_160428A
Aqueous	E300	Anions by IC method - Water	74841	100	04/28/16 05:35 PM	IC4_160428A
Aqueous	M4500-H+ B	pH	74811	1	04/27/16 09:19 AM	TITRATOR_160427A
Aqueous	M2540C	Total Dissolved Solids	74905	1	05/03/16 08:45 AM	WC_160502B
Aqueous	SW7470A	Mercury Total: Aqueous	74829	1	04/28/16 10:52 AM	CETAC2_HG_160428A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	1	04/28/16 07:25 PM	ICP-MS4_160428B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	50	05/09/16 11:07 AM	ICP-MS4_160509A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	1	05/09/16 12:08 PM	ICP-MS4_160509A
Aqueous	E300	Anions by IC method - Water	74841	1	04/28/16 12:19 PM	IC4_160428A
Aqueous	E300	Anions by IC method - Water	74841	100	04/28/16 05:50 PM	IC4_160428A
Aqueous	M4500-H+ B	pH	74811	1	04/27/16 09:20 AM	TITRATOR_160427A
Aqueous	M2540C	Total Dissolved Solids	74905	1	05/03/16 08:45 AM	WC_160502B
Aqueous	SW7470A	Mercury Total: Aqueous	74829	1	04/28/16 10:54 AM	CETAC2_HG_160428A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	1	04/28/16 07:27 PM	ICP-MS4_160428B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	50	05/09/16 11:09 AM	ICP-MS4_160509A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	1	05/09/16 12:10 PM	ICP-MS4_160509A

& Wheeler

ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	E300	Anions by IC method - Water	74841	1	04/28/16 12:34 PM	IC4_160428A
Aqueous	E300	Anions by IC method - Water	74841	100	04/28/16 06:05 PM	IC4_160428A
Aqueous	M4500-H+ B	pH	74811	1	04/27/16 09:22 AM	TITRATOR_160427A
Aqueous	M2540C	Total Dissolved Solids	74905	1	05/03/16 08:45 AM	WC_160502B
Equip Blank	SW7470A	Mercury Total: Aqueous	74829	1	04/28/16 10:56 AM	CETAC2_HG_160428A
Equip Blank	SW6020A	Trace Metals: ICP-MS - Water	74809	1	04/28/16 07:29 PM	ICP-MS4_160428B
Equip Blank	SW6020A	Trace Metals: ICP-MS - Water	74809	1	05/09/16 12:41 PM	ICP-MS4_160509A
Equip Blank	E300	Anions by IC method - Water	74841	1	04/28/16 12:49 PM	IC4_160428A
Equip Blank	E300	Anions by IC method - Water	74841	1	04/28/16 02:26 PM	IC4_160428A
Equip Blank	M4500-H+ B	pH	74811	1	04/27/16 09:26 AM	TITRATOR_160427A
Equip Blank	M2540C	Total Dissolved Solids	74905	1	05/03/16 08:45 AM	WC_160502B
Aqueous	SW7470A	Mercury Total: Aqueous	74829	1	04/28/16 11:03 AM	CETAC2_HG_160428A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	1	04/28/16 07:45 PM	ICP-MS4_160428B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	50	05/09/16 11:11 AM	ICP-MS4_160509A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	1	05/09/16 12:43 PM	ICP-MS4_160509A
Aqueous	E300	Anions by IC method - Water	74841	1	04/28/16 01:04 PM	IC4_160428A
Aqueous	E300	Anions by IC method - Water	74841	10	04/28/16 07:20 PM	IC4_160428A
Aqueous	E300	Anions by IC method - Water	74841	100	04/28/16 07:35 PM	IC4_160428A
Aqueous	M4500-H+ B	pH	74811	1	04/27/16 09:29 AM	TITRATOR_160427A
Aqueous	M2540C	Total Dissolved Solids	74905	1	05/03/16 08:45 AM	WC_160502B
Aqueous	SW7470A	Mercury Total: Aqueous	74829	1	04/28/16 11:05 AM	CETAC2_HG_160428A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	1	04/28/16 07:47 PM	ICP-MS4_160428B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	50	05/09/16 11:13 AM	ICP-MS4_160509A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	10	05/09/16 12:45 PM	ICP-MS4_160509A
Aqueous	E300	Anions by IC method - Water	74841	1	04/28/16 01:19 PM	IC4_160428A
Aqueous	E300	Anions by IC method - Water	74841	100	04/28/16 07:50 PM	IC4_160428A

& Wheeler

ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	M4500-H+ B	pH	74811	1	04/27/16 09:31 AM	TITRATOR_160427A
Aqueous	M2540C	Total Dissolved Solids	74905	1	05/03/16 08:45 AM	WC_160502B
Aqueous	SW7470A	Mercury Total: Aqueous	74829	1	04/28/16 11:08 AM	CETAC2_HG_160428A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	1	05/09/16 12:47 PM	ICP-MS4_160509A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	1	04/28/16 07:49 PM	ICP-MS4_160428B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	50	05/09/16 11:15 AM	ICP-MS4_160509A
Aqueous	E300	Anions by IC method - Water	74841	1	04/28/16 02:41 PM	IC4_160428A
Aqueous	E300	Anions by IC method - Water	74841	100	04/28/16 08:20 PM	IC4_160428A
Aqueous	M4500-H+ B	pH	74811	1	04/27/16 09:32 AM	TITRATOR_160427A
Aqueous	M2540C	Total Dissolved Solids	74905	1	05/03/16 08:45 AM	WC_160502B
Aqueous	SW7470A	Mercury Total: Aqueous	74829	1	04/28/16 11:10 AM	CETAC2_HG_160428A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	1	04/28/16 07:51 PM	ICP-MS4_160428B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	50	05/09/16 11:44 AM	ICP-MS4_160509A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	74809	1	05/09/16 12:49 PM	ICP-MS4_160509A
Aqueous	E300	Anions by IC method - Water	74841	1	04/28/16 02:56 PM	IC4_160428A
Aqueous	E300	Anions by IC method - Water	74841	10	04/28/16 08:35 PM	IC4_160428A
Aqueous	M4500-H+ B	pH	74811	1	04/27/16 09:35 AM	TITRATOR_160427A
Aqueous	M2540C	Total Dissolved Solids	74905	1	05/03/16 08:45 AM	WC_160502B

DHL Analytical, Inc.

Date: *06-Jun-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AXMW-1
Project:	Sandow CCR	**Lab ID:**	1604288-01
Project No:	5164E	**Collection Date:**	04/25/16 10:30 AM
Lab Order:	1604288	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **KL**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	04/28/16 10:40 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	04/28/16 07:09 PM
Arsenic	0.0176	0.00200	0.00500		mg/L	1	04/28/16 07:09 PM
Barium	0.0190	0.00300	0.0100		mg/L	1	04/28/16 07:09 PM
Beryllium	0.000394	0.000300	0.00100	J	mg/L	1	04/28/16 07:09 PM
Boron	0.499	0.0100	0.0300		mg/L	1	05/09/16 11:54 AM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	04/28/16 07:09 PM
Calcium	447	5.00	15.0		mg/L	50	05/09/16 10:55 AM
Chromium	0.00284	0.00200	0.00500	J	mg/L	1	04/28/16 07:09 PM
Cobalt	0.409	0.00300	0.00500		mg/L	1	04/28/16 07:09 PM
Lead	0.000468	0.000300	0.00100	J	mg/L	1	04/28/16 07:09 PM
Lithium	0.0249	0.00500	0.0100		mg/L	1	04/28/16 07:09 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	04/28/16 07:09 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	04/28/16 07:09 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	04/28/16 07:09 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	372	30.0	100		mg/L	100	04/28/16 03:35 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	04/28/16 11:04 AM
Sulfate	2440	100	300		mg/L	100	04/28/16 03:35 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.08	0	0		pH Units@17.7℃	1	04/27/16 09:10 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	3970	50.0	50.0		mg/L	1	05/03/16 08:45 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *06-Jun-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-24
Project:	Sandow CCR	**Lab ID:**	1604288-02
Project No:	5164E	**Collection Date:**	04/25/16 11:30 AM
Lab Order:	1604288	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **KL**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	04/28/16 10:43 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	04/28/16 07:17 PM
Arsenic	0.00403	0.00200	0.00500	J	mg/L	1	04/28/16 07:17 PM
Barium	0.0473	0.00300	0.0100		mg/L	1	04/28/16 07:17 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	04/28/16 07:17 PM
Boron	0.120	0.0100	0.0300		mg/L	1	05/09/16 12:00 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	04/28/16 07:17 PM
Calcium	232	5.00	15.0		mg/L	50	05/09/16 10:59 AM
Chromium	0.00475	0.00200	0.00500	J	mg/L	1	04/28/16 07:17 PM
Cobalt	0.00544	0.00300	0.00500		mg/L	1	04/28/16 07:17 PM
Lead	0.000620	0.000300	0.00100	J	mg/L	1	04/28/16 07:17 PM
Lithium	0.0795	0.00500	0.0100		mg/L	1	04/28/16 07:17 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	04/28/16 07:17 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	04/28/16 07:17 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	04/28/16 07:17 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	299	30.0	100		mg/L	100	04/28/16 03:50 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	04/28/16 11:19 AM
Sulfate	756	100	300		mg/L	100	04/28/16 03:50 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.49	0	0		pH Units@17.1℃	1	04/27/16 09:13 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	1820	50.0	50.0		mg/L	1	05/03/16 08:45 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *06-Jun-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-28
Project:	Sandow CCR	**Lab ID:**	1604288-03
Project No:	5164E	**Collection Date:**	04/25/16 12:35 PM
Lab Order:	1604288	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **KL**
Mercury	<0.000400	0.000400	0.00100		mg/L	5	04/28/16 10:45 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	04/28/16 07:19 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	04/28/16 07:19 PM
Barium	0.0340	0.00300	0.0100		mg/L	1	04/28/16 07:19 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	04/28/16 07:19 PM
Boron	0.181	0.0100	0.0300		mg/L	1	05/09/16 12:02 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	04/28/16 07:19 PM
Calcium	480	5.00	15.0		mg/L	50	05/09/16 11:01 AM
Chromium	0.00568	0.00200	0.00500		mg/L	1	04/28/16 07:19 PM
Cobalt	0.0232	0.00300	0.00500		mg/L	1	04/28/16 07:19 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	04/28/16 07:19 PM
Lithium	0.245	0.00500	0.0100		mg/L	1	04/28/16 07:19 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	04/28/16 07:19 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	04/28/16 07:19 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	04/28/16 07:19 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	378	30.0	100		mg/L	100	04/28/16 04:05 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	04/28/16 11:34 AM
Sulfate	1450	100	300		mg/L	100	04/28/16 04:05 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.50	0	0		pH Units@17.1℃	1	04/27/16 09:15 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	2940	50.0	50.0		mg/L	1	05/03/16 08:45 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *06-Jun-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-22R
Project:	Sandow CCR	**Lab ID:**	1604288-04
Project No:	5164E	**Collection Date:**	04/25/16 01:10 PM
Lab Order:	1604288	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **KL**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	04/28/16 10:47 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	04/28/16 07:21 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	04/28/16 07:21 PM
Barium	0.107	0.00300	0.0100		mg/L	1	04/28/16 07:21 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	04/28/16 07:21 PM
Boron	0.127	0.0100	0.0300		mg/L	1	05/09/16 12:04 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	04/28/16 07:21 PM
Calcium	76.6	1.00	3.00		mg/L	10	05/09/16 11:03 AM
Chromium	0.00212	0.00200	0.00500	J	mg/L	1	04/28/16 07:21 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	04/28/16 07:21 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	04/28/16 07:21 PM
Lithium	0.0536	0.00500	0.0100		mg/L	1	04/28/16 07:21 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	04/28/16 07:21 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	04/28/16 07:21 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	04/28/16 07:21 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	95.2	3.00	10.0		mg/L	10	04/28/16 04:50 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	04/28/16 11:49 AM
Sulfate	54.1	1.00	3.00		mg/L	1	04/28/16 11:49 AM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	7.22	0	0		pH Units@17.4℃	1	04/27/16 09:17 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	488	10.0	10.0		mg/L	1	05/03/16 08:45 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *06-Jun-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-25
Project:	Sandow CCR	**Lab ID:**	1604288-05
Project No:	5164E	**Collection Date:**	04/25/16 02:25 PM
Lab Order:	1604288	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **KL**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	04/28/16 10:49 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	04/28/16 07:23 PM
Arsenic	0.00372	0.00200	0.00500	J	mg/L	1	04/28/16 07:23 PM
Barium	0.140	0.00300	0.0100		mg/L	1	04/28/16 07:23 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	04/28/16 07:23 PM
Boron	0.206	0.0100	0.0300		mg/L	1	05/09/16 12:06 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	04/28/16 07:23 PM
Calcium	225	5.00	15.0		mg/L	50	05/09/16 11:05 AM
Chromium	0.00395	0.00200	0.00500	J	mg/L	1	04/28/16 07:23 PM
Cobalt	0.0244	0.00300	0.00500		mg/L	1	04/28/16 07:23 PM
Lead	0.000421	0.000300	0.00100	J	mg/L	1	04/28/16 07:23 PM
Lithium	0.0472	0.00500	0.0100		mg/L	1	04/28/16 07:23 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	04/28/16 07:23 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	04/28/16 07:23 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	04/28/16 07:23 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	526	30.0	100		mg/L	100	04/28/16 05:35 PM
Fluoride	0.250	0.100	0.400	J	mg/L	1	04/28/16 12:04 PM
Sulfate	470	100	300		mg/L	100	04/28/16 05:35 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.66	0	0		pH Units@17.5℃	1	04/27/16 09:19 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	1920	50.0	50.0		mg/L	1	05/03/16 08:45 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *06-Jun-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-26
Project:	Sandow CCR	**Lab ID:**	1604288-06
Project No:	5164E	**Collection Date:**	04/25/16 04:05 PM
Lab Order:	1604288	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **KL**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	04/28/16 10:52 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	04/28/16 07:25 PM
Arsenic	0.00316	0.00200	0.00500	J	mg/L	1	04/28/16 07:25 PM
Barium	0.0495	0.00300	0.0100		mg/L	1	04/28/16 07:25 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	04/28/16 07:25 PM
Boron	0.394	0.0100	0.0300		mg/L	1	05/09/16 12:08 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	04/28/16 07:25 PM
Calcium	571	5.00	15.0		mg/L	50	05/09/16 11:07 AM
Chromium	0.00604	0.00200	0.00500		mg/L	1	04/28/16 07:25 PM
Cobalt	0.0253	0.00300	0.00500		mg/L	1	04/28/16 07:25 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	04/28/16 07:25 PM
Lithium	0.473	0.00500	0.0100		mg/L	1	04/28/16 07:25 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	04/28/16 07:25 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	04/28/16 07:25 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	04/28/16 07:25 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	1200	30.0	100		mg/L	100	04/28/16 05:50 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	04/28/16 12:19 PM
Sulfate	1020	100	300		mg/L	100	04/28/16 05:50 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.59	0	0		pH Units@17.6℃	1	04/27/16 09:20 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	4080	50.0	50.0		mg/L	1	05/03/16 08:45 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *06-Jun-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	MW-1
Project:	Sandow CCR	**Lab ID:**	1604288-07
Project No:	5164E	**Collection Date:**	04/25/16
Lab Order:	1604288	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **KL**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	04/28/16 10:54 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	04/28/16 07:27 PM
Arsenic	0.0181	0.00200	0.00500		mg/L	1	04/28/16 07:27 PM
Barium	0.0173	0.00300	0.0100		mg/L	1	04/28/16 07:27 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	04/28/16 07:27 PM
Boron	0.552	0.0100	0.0300		mg/L	1	05/09/16 12:10 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	04/28/16 07:27 PM
Calcium	459	5.00	15.0		mg/L	50	05/09/16 11:09 AM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	04/28/16 07:27 PM
Cobalt	0.414	0.00300	0.00500		mg/L	1	04/28/16 07:27 PM
Lead	0.000589	0.000300	0.00100	J	mg/L	1	04/28/16 07:27 PM
Lithium	0.0248	0.00500	0.0100		mg/L	1	04/28/16 07:27 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	04/28/16 07:27 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	04/28/16 07:27 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	04/28/16 07:27 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	377	30.0	100		mg/L	100	04/28/16 06:05 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	04/28/16 12:34 PM
Sulfate	2320	100	300		mg/L	100	04/28/16 06:05 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.05	0	0		pH Units@18℃	1	04/27/16 09:22 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	4030	50.0	50.0		mg/L	1	05/03/16 08:45 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *06-Jun-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	EB-1
Project:	Sandow CCR	**Lab ID:**	1604288-08
Project No:	5164E	**Collection Date:**	04/25/16 09:05 AM
Lab Order:	1604288	**Matrix:**	EQUIP BLANK

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **KL**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	04/28/16 10:56 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	04/28/16 07:29 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	04/28/16 07:29 PM
Barium	<0.00300	0.00300	0.0100		mg/L	1	04/28/16 07:29 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	04/28/16 07:29 PM
Boron	0.0308	0.0100	0.0300		mg/L	1	05/09/16 12:41 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	04/28/16 07:29 PM
Calcium	0.207	0.100	0.300	J	mg/L	1	04/28/16 07:29 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	04/28/16 07:29 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	04/28/16 07:29 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	04/28/16 07:29 PM
Lithium	<0.00500	0.00500	0.0100		mg/L	1	04/28/16 07:29 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	04/28/16 07:29 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	04/28/16 07:29 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	04/28/16 07:29 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	<0.300	0.300	1.00		mg/L	1	04/28/16 02:26 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	04/28/16 02:26 PM
Sulfate	<1.00	1.00	3.00		mg/L	1	04/28/16 02:26 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.91	0	0		pH Units@18.5℃	1	04/27/16 09:26 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	<10.0	10.0	10.0		mg/L	1	05/03/16 08:45 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *06-Jun-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-27
Project:	Sandow CCR	**Lab ID:**	1604288-09
Project No:	5164E	**Collection Date:**	04/26/16 02:35 PM
Lab Order:	1604288	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **KL**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	04/28/16 11:03 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	04/28/16 07:45 PM
Arsenic	0.00441	0.00200	0.00500	J	mg/L	1	04/28/16 07:45 PM
Barium	0.165	0.00300	0.0100		mg/L	1	04/28/16 07:45 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	04/28/16 07:45 PM
Boron	0.196	0.0100	0.0300		mg/L	1	05/09/16 12:43 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	04/28/16 07:45 PM
Calcium	295	5.00	15.0		mg/L	50	05/09/16 11:11 AM
Chromium	0.0285	0.00200	0.00500		mg/L	1	04/28/16 07:45 PM
Cobalt	0.0210	0.00300	0.00500		mg/L	1	04/28/16 07:45 PM
Lead	0.000542	0.000300	0.00100	J	mg/L	1	04/28/16 07:45 PM
Lithium	0.0719	0.00500	0.0100		mg/L	1	04/28/16 07:45 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	04/28/16 07:45 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	04/28/16 07:45 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	04/28/16 07:45 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	557	30.0	100		mg/L	100	04/28/16 07:35 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	04/28/16 01:04 PM
Sulfate	383	10.0	30.0		mg/L	10	04/28/16 07:20 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.58	0	0		pH Units@18.3℃	1	04/27/16 09:29 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	1990	50.0	50.0		mg/L	1	05/03/16 08:45 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *06-Jun-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AXMW-2
Project:	Sandow CCR	**Lab ID:**	1604288-10
Project No:	5164E	**Collection Date:**	04/26/16 11:45 AM
Lab Order:	1604288	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **KL**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	04/28/16 11:05 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	04/28/16 07:47 PM
Arsenic	0.0248	0.00200	0.00500		mg/L	1	04/28/16 07:47 PM
Barium	0.0252	0.00300	0.0100		mg/L	1	04/28/16 07:47 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	04/28/16 07:47 PM
Boron	2.32	0.100	0.300		mg/L	10	05/09/16 12:45 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	04/28/16 07:47 PM
Calcium	548	5.00	15.0		mg/L	50	05/09/16 11:13 AM
Chromium	0.00227	0.00200	0.00500	J	mg/L	1	04/28/16 07:47 PM
Cobalt	0.0493	0.00300	0.00500		mg/L	1	04/28/16 07:47 PM
Lead	0.000337	0.000300	0.00100	J	mg/L	1	04/28/16 07:47 PM
Lithium	0.0850	0.00500	0.0100		mg/L	1	04/28/16 07:47 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	04/28/16 07:47 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	04/28/16 07:47 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	04/28/16 07:47 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	210	30.0	100		mg/L	100	04/28/16 07:50 PM
Fluoride	0.771	0.100	0.400		mg/L	1	04/28/16 01:19 PM
Sulfate	2130	100	300		mg/L	100	04/28/16 07:50 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.22	0	0		pH Units@18.3℃	1	04/27/16 09:31 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	3460	50.0	50.0		mg/L	1	05/03/16 08:45 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *06-Jun-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-29
Project:	Sandow CCR	**Lab ID:**	1604288-11
Project No:	5164E	**Collection Date:**	04/26/16 01:20 PM
Lab Order:	1604288	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **KL**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	04/28/16 11:08 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	04/28/16 07:49 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	04/28/16 07:49 PM
Barium	0.0388	0.00300	0.0100		mg/L	1	04/28/16 07:49 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	04/28/16 07:49 PM
Boron	0.370	0.0100	0.0300		mg/L	1	05/09/16 12:47 PM
Cadmium	0.00334	0.000300	0.00100		mg/L	1	04/28/16 07:49 PM
Calcium	372	5.00	15.0		mg/L	50	05/09/16 11:15 AM
Chromium	0.00488	0.00200	0.00500	J	mg/L	1	04/28/16 07:49 PM
Cobalt	0.116	0.00300	0.00500		mg/L	1	04/28/16 07:49 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	04/28/16 07:49 PM
Lithium	0.0427	0.00500	0.0100		mg/L	1	04/28/16 07:49 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	04/28/16 07:49 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	04/28/16 07:49 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	04/28/16 07:49 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	301	30.0	100		mg/L	100	04/28/16 08:20 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	04/28/16 02:41 PM
Sulfate	1270	100	300		mg/L	100	04/28/16 08:20 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.39	0	0		pH Units@18.3℃	1	04/27/16 09:32 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	2590	50.0	50.0		mg/L	1	05/03/16 08:45 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *06-Jun-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-23
Project:	Sandow CCR	**Lab ID:**	1604288-12
Project No:	5164E	**Collection Date:**	04/26/16 02:15 PM
Lab Order:	1604288	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **KL**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	04/28/16 11:10 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	04/28/16 07:51 PM
Arsenic	0.00919	0.00200	0.00500		mg/L	1	04/28/16 07:51 PM
Barium	0.114	0.00300	0.0100		mg/L	1	04/28/16 07:51 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	04/28/16 07:51 PM
Boron	0.300	0.0100	0.0300		mg/L	1	05/09/16 12:49 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	04/28/16 07:51 PM
Calcium	188	5.00	15.0		mg/L	50	05/09/16 11:44 AM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	04/28/16 07:51 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	04/28/16 07:51 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	04/28/16 07:51 PM
Lithium	0.00618	0.00500	0.0100	J	mg/L	1	04/28/16 07:51 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	04/28/16 07:51 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	04/28/16 07:51 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	04/28/16 07:51 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	131	3.00	10.0		mg/L	10	04/28/16 08:35 PM
Fluoride	0.186	0.100	0.400	J	mg/L	1	04/28/16 02:56 PM
Sulfate	471	10.0	30.0		mg/L	10	04/28/16 08:35 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.69	0	0		pH Units@18.6℃	1	04/27/16 09:35 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	1200	50.0	50.0		mg/L	1	05/03/16 08:45 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

CLIENT: Pastor, Behling & Wheeler
Work Order: 1604288
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_160428A

The QC data in batch 74829 applies to the following samples: 1604288-01A, 1604288-02A, 1604288-03A, 1604288-04A, 1604288-05A, 1604288-06A, 1604288-07A, 1604288-08A, 1604288-09A, 1604288-10A, 1604288-11A, 1604288-12A

Sample ID	**MB-74829**	Batch ID:	**74829**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**CETAC2_HG_160428A**	Analysis Date:	**4/28/2016 10:29:34 AM**	Prep Date:	**4/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	<0.0000800	0.000200								

Sample ID	**LCS-74829**	Batch ID:	**74829**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**CETAC2_HG_160428A**	Analysis Date:	**4/28/2016 10:31:50 AM**	Prep Date:	**4/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00198	0.000200	0.00200	0	99.0	85	115			

Sample ID	**LCSD-74829**	Batch ID:	**74829**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**CETAC2_HG_160428A**	Analysis Date:	**4/28/2016 10:34:06 AM**	Prep Date:	**4/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00208	0.000200	0.00200	0	104	85	115	4.93	15	

Sample ID	**1604304-05B SD**	Batch ID:	**74829**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**SD**	Run ID:	**CETAC2_HG_160428A**	Analysis Date:	**4/28/2016 11:24:03 AM**	Prep Date:	**4/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	<0.000400	0.00100	0	0				0	10	

Sample ID	**1604304-05B PDS**	Batch ID:	**74829**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**PDS**	Run ID:	**CETAC2_HG_160428A**	Analysis Date:	**4/28/2016 11:26:19 AM**	Prep Date:	**4/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00210	0.000200	0.00250	0	84.0	85	115			S

Sample ID	**1604304-05B MS**	Batch ID:	**74829**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**CETAC2_HG_160428A**	Analysis Date:	**4/28/2016 11:28:36 AM**	Prep Date:	**4/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00161	0.000200	0.00200	0	80.5	80	120			

Sample ID	**1604304-05B MSD**	Batch ID:	**74829**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**CETAC2_HG_160428A**	Analysis Date:	**4/28/2016 11:30:52 AM**	Prep Date:	**4/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00162	0.000200	0.00200	0	81.0	80	120	0.619	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1604288
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_160428A

Sample ID	**ICV-160428**	Batch ID:	**R85496**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**CETAC2_HG_160428A**	Analysis Date:	**4/28/2016 10:25:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00393	0.000200	0.00400	0	98.2	90	110			

Sample ID	**CCV1-160428**	Batch ID:	**R85496**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_160428A**	Analysis Date:	**4/28/2016 10:59:03 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00199	0.000200	0.00200	0	99.5	90	110			

Sample ID	**CCV2-160428**	Batch ID:	**R85496**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_160428A**	Analysis Date:	**4/28/2016 11:33:10 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00198	0.000200	0.00200	0	99.0	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1604288
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160428B

The QC data in batch 74809 applies to the following samples: 1604288-01A, 1604288-02A, 1604288-03A, 1604288-04A, 1604288-05A, 1604288-06A, 1604288-07A, 1604288-08A, 1604288-09A, 1604288-10A, 1604288-11A, 1604288-12A

Sample ID **MB-74809** Batch ID: **74809** TestNo: **SW6020A** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS4_160428B** Analysis Date: **4/28/2016 7:01:00 PM** Prep Date: **4/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.000800	0.00250								
Arsenic	<0.00200	0.00500								
Barium	<0.00300	0.0100								
Beryllium	<0.000300	0.00100								
Cadmium	<0.000300	0.00100								
Calcium	<0.100	0.300								
Chromium	<0.00200	0.00500								
Cobalt	<0.00300	0.00500								
Lead	<0.000300	0.00100								
Lithium	<0.00500	0.0100								
Molybdenum	<0.00200	0.00500								
Selenium	<0.00200	0.00500								
Thallium	<0.000500	0.00150								

Sample ID **LCS-74809** Batch ID: **74809** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS4_160428B** Analysis Date: **4/28/2016 7:03:00 PM** Prep Date: **4/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.197	0.00250	0.200	0	98.4	80	120			
Arsenic	0.208	0.00500	0.200	0	104	80	120			
Barium	0.204	0.0100	0.200	0	102	80	120			
Beryllium	0.198	0.00100	0.200	0	99.2	80	120			
Cadmium	0.200	0.00100	0.200	0	99.9	80	120			
Calcium	5.02	0.300	5.00	0	100	80	120			
Chromium	0.206	0.00500	0.200	0	103	80	120			
Cobalt	0.207	0.00500	0.200	0	103	80	120			
Lead	0.202	0.00100	0.200	0	101	80	120			
Lithium	0.196	0.0100	0.200	0	97.8	80	120			
Molybdenum	0.196	0.00500	0.200	0	98.2	80	120			
Selenium	0.211	0.00500	0.200	0	106	80	120			
Thallium	0.198	0.00150	0.200	0	99.0	80	120			

Sample ID **LCSD-74809** Batch ID: **74809** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS4_160428B** Analysis Date: **4/28/2016 7:05:00 PM** Prep Date: **4/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.198	0.00250	0.200	0	98.8	80	120	0.383	15	
Arsenic	0.208	0.00500	0.200	0	104	80	120	0.063	15	
Barium	0.207	0.0100	0.200	0	103	80	120	1.47	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1604288
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160428B

Sample ID **LCSD-74809**	Batch ID: **74809**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCSD**	Run ID: **ICP-MS4_160428B**	Analysis Date: **4/28/2016 7:05:00 PM**	Prep Date: **4/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.198	0.00100	0.200	0	98.9	80	120	0.285	15	
Cadmium	0.202	0.00100	0.200	0	101	80	120	0.897	15	
Calcium	5.02	0.300	5.00	0	100	80	120	0.042	15	
Chromium	0.208	0.00500	0.200	0	104	80	120	1.09	15	
Cobalt	0.208	0.00500	0.200	0	104	80	120	0.780	15	
Lead	0.202	0.00100	0.200	0	101	80	120	0.365	15	
Lithium	0.201	0.0100	0.200	0	100	80	120	2.46	15	
Molybdenum	0.198	0.00500	0.200	0	98.8	80	120	0.576	15	
Selenium	0.211	0.00500	0.200	0	106	80	120	0.046	15	
Thallium	0.200	0.00150	0.200	0	100	80	120	0.994	15	

Sample ID **1604288-01A SD**	Batch ID: **74809**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **SD**	Run ID: **ICP-MS4_160428B**	Analysis Date: **4/28/2016 7:11:00 PM**	Prep Date: **4/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.00400	0.0125	0	0				0	10	
Arsenic	0.0173	0.0250	0	0.0176				1.88	10	
Barium	0.0190	0.0500	0	0.0190				0.226	10	
Beryllium	<0.00150	0.00500	0	0.000394				0	10	
Cadmium	<0.00150	0.00500	0	0				0	10	
Chromium	<0.0100	0.0250	0	0.00284				0	10	
Cobalt	0.418	0.0250	0	0.409				2.32	10	
Lead	<0.00150	0.00500	0	0.000468				0	10	
Lithium	0.0255	0.0500	0	0.0249				2.23	10	
Molybdenum	<0.0100	0.0250	0	0				0	10	
Selenium	<0.0100	0.0250	0	0				0	10	
Thallium	<0.00250	0.00750	0	0				0	10	

Sample ID **1604288-01A PDS**	Batch ID: **74809**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS4_160428B**	Analysis Date: **4/28/2016 7:31:00 PM**	Prep Date: **4/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.200	0.00250	0.200	0	99.9	80	120			
Arsenic	0.224	0.00500	0.200	0.0176	103	80	120			
Barium	0.219	0.0100	0.200	0.0190	99.9	80	120			
Beryllium	0.184	0.00100	0.200	0.000394	92.0	80	120			
Cadmium	0.188	0.00100	0.200	0	93.9	80	120			
Chromium	0.206	0.00500	0.200	0.00284	102	80	120			
Cobalt	0.582	0.00500	0.200	0.409	86.8	80	120			
Lead	0.197	0.00100	0.200	0.000468	98.2	80	120			
Lithium	0.201	0.0100	0.200	0.0249	87.9	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1604288
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160428B

Sample ID **1604288-01A PDS**	Batch ID: **74809**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS4_160428B**	Analysis Date: **4/28/2016 7:31:00 PM**	Prep Date: **4/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Molybdenum	0.193	0.00500	0.200	0	96.3	80	120			
Selenium	0.218	0.00500	0.200	0	109	80	120			
Thallium	0.192	0.00150	0.200	0	95.9	80	120			

Sample ID **1604288-01A MS**	Batch ID: **74809**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS4_160428B**	Analysis Date: **4/28/2016 7:33:00 PM**	Prep Date: **4/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.193	0.00250	0.200	0	96.5	80	120			
Arsenic	0.229	0.00500	0.200	0.0176	106	80	120			
Barium	0.222	0.0100	0.200	0.0190	102	80	120			
Beryllium	0.187	0.00100	0.200	0.000394	93.4	80	120			
Cadmium	0.191	0.00100	0.200	0	95.6	80	120			
Calcium	506	0.300	5.00	495	223	80	120			S
Chromium	0.203	0.00500	0.200	0.00284	100	80	120			
Cobalt	0.613	0.00500	0.200	0.409	102	80	120			
Lead	0.200	0.00100	0.200	0.000468	99.9	80	120			
Lithium	0.207	0.0100	0.200	0.0249	90.9	80	120			
Molybdenum	0.199	0.00500	0.200	0	99.3	80	120			
Selenium	0.222	0.00500	0.200	0	111	80	120			
Thallium	0.199	0.00150	0.200	0	99.3	80	120			

Sample ID **1604288-01A MSD**	Batch ID: **74809**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS4_160428B**	Analysis Date: **4/28/2016 7:35:00 PM**	Prep Date: **4/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.192	0.00250	0.200	0	95.9	80	120	0.544	15	
Arsenic	0.229	0.00500	0.200	0.0176	105	80	120	0.409	15	
Barium	0.224	0.0100	0.200	0.0190	102	80	120	0.682	15	
Beryllium	0.186	0.00100	0.200	0.000394	92.9	80	120	0.470	15	
Cadmium	0.189	0.00100	0.200	0	94.5	80	120	1.14	15	
Calcium	503	0.300	5.00	495	163	80	120	0.600	15	S
Chromium	0.204	0.00500	0.200	0.00284	101	80	120	0.425	15	
Cobalt	0.609	0.00500	0.200	0.409	100	80	120	0.658	15	
Lead	0.199	0.00100	0.200	0.000468	99.1	80	120	0.808	15	
Lithium	0.208	0.0100	0.200	0.0249	91.5	80	120	0.543	15	
Molybdenum	0.197	0.00500	0.200	0	98.5	80	120	0.762	15	
Selenium	0.216	0.00500	0.200	0	108	80	120	2.46	15	
Thallium	0.197	0.00150	0.200	0	98.3	80	120	1.06	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1604288
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160428B

Sample ID **ICV-160428**	Batch ID: **R85511**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS4_160428B**	Analysis Date: **4/28/2016 12:21:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.0974	0.00250	0.100	0	97.4	90	110			
Arsenic	0.100	0.00500	0.100	0	100	90	110			
Barium	0.0986	0.0100	0.100	0	98.6	90	110			
Beryllium	0.101	0.00100	0.100	0	101	90	110			
Cadmium	0.0983	0.00100	0.100	0	98.3	90	110			
Calcium	2.37	0.300	2.50	0	94.8	90	110			
Chromium	0.103	0.00500	0.100	0	103	90	110			
Cobalt	0.105	0.00500	0.100	0	105	90	110			
Lead	0.0993	0.00100	0.100	0	99.3	90	110			
Lithium	0.101	0.0100	0.100	0	101	90	110			
Molybdenum	0.0956	0.00500	0.100	0	95.6	90	110			
Selenium	0.102	0.00500	0.100	0	102	90	110			
Thallium	0.0968	0.00150	0.100	0	96.8	90	110			

Sample ID **LCVL-160428**	Batch ID: **R85511**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_160428B**	Analysis Date: **4/28/2016 12:27:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00186	0.00250	0.00200	0	93.1	70	130			
Arsenic	0.00501	0.00500	0.00500	0	100	70	130			
Barium	0.00493	0.0100	0.00500	0	98.6	70	130			
Beryllium	0.00109	0.00100	0.00100	0	109	70	130			
Cadmium	0.000998	0.00100	0.00100	0	99.8	70	130			
Calcium	0.0949	0.300	0.100	0	94.9	70	130			
Chromium	0.00515	0.00500	0.00500	0	103	70	130			
Cobalt	0.00517	0.00500	0.00500	0	103	70	130			
Lead	0.000996	0.00100	0.00100	0	99.6	70	130			
Lithium	0.0114	0.0100	0.0100	0	114	70	130			
Molybdenum	0.00476	0.00500	0.00500	0	95.3	70	130			
Selenium	0.00508	0.00500	0.00500	0	102	70	130			
Thallium	0.000949	0.00150	0.00100	0	94.9	70	130			

Sample ID **CCV8-160428**	Batch ID: **R85511**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160428B**	Analysis Date: **4/28/2016 6:53:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.197	0.00250	0.200	0	98.3	90	110			
Arsenic	0.203	0.00500	0.200	0	101	90	110			
Barium	0.201	0.0100	0.200	0	100	90	110			
Beryllium	0.198	0.00100	0.200	0	99.1	90	110			
Cadmium	0.198	0.00100	0.200	0	98.9	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank
J	Analyte detected between MDL and RL
ND	Not Detected at the Method Detection Limit
RL	Reporting Limit
J	Analyte detected between SDL and RL
DF	Dilution Factor
MDL	Method Detection Limit
R	RPD outside accepted control limits
S	Spike Recovery outside control limits
N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1604288
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160428B

Sample ID **CCV8-160428**	Batch ID: **R85511**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160428B**	Analysis Date: **4/28/2016 6:53:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.96	0.300	5.00	0	99.2	90	110			
Chromium	0.205	0.00500	0.200	0	102	90	110			
Cobalt	0.202	0.00500	0.200	0	101	90	110			
Lead	0.200	0.00100	0.200	0	99.9	90	110			
Lithium	0.194	0.0100	0.200	0	97.1	90	110			
Molybdenum	0.195	0.00500	0.200	0	97.3	90	110			
Selenium	0.208	0.00500	0.200	0	104	90	110			
Thallium	0.196	0.00150	0.200	0	98.0	90	110			

Sample ID **LCVL8-160428**	Batch ID: **R85511**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_160428B**	Analysis Date: **4/28/2016 6:57:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00192	0.00250	0.00200	0	96.0	70	130			
Arsenic	0.00486	0.00500	0.00500	0	97.1	70	130			
Barium	0.00499	0.0100	0.00500	0	99.8	70	130			
Beryllium	0.000964	0.00100	0.00100	0	96.4	70	130			
Cadmium	0.00103	0.00100	0.00100	0	103	70	130			
Calcium	0.104	0.300	0.100	0	104	70	130			
Chromium	0.00512	0.00500	0.00500	0	102	70	130			
Cobalt	0.00501	0.00500	0.00500	0	100	70	130			
Lead	0.000987	0.00100	0.00100	0	98.7	70	130			
Lithium	0.0108	0.0100	0.0100	0	108	70	130			
Molybdenum	0.00463	0.00500	0.00500	0	92.6	70	130			
Selenium	0.00545	0.00500	0.00500	0	109	70	130			
Thallium	0.000942	0.00150	0.00100	0	94.2	70	130			

Sample ID **CCV9-160428**	Batch ID: **R85511**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160428B**	Analysis Date: **4/28/2016 7:37:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.197	0.00250	0.200	0	98.6	90	110			
Arsenic	0.206	0.00500	0.200	0	103	90	110			
Barium	0.202	0.0100	0.200	0	101	90	110			
Beryllium	0.189	0.00100	0.200	0	94.7	90	110			
Cadmium	0.197	0.00100	0.200	0	98.4	90	110			
Calcium	4.95	0.300	5.00	0	99.1	90	110			
Chromium	0.203	0.00500	0.200	0	102	90	110			
Cobalt	0.202	0.00500	0.200	0	101	90	110			
Lead	0.200	0.00100	0.200	0	99.8	90	110			
Lithium	0.190	0.0100	0.200	0	94.8	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1604288
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160428B

Sample ID **CCV9-160428**	Batch ID: **R85511**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160428B**	Analysis Date: **4/28/2016 7:37:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Molybdenum	0.192	0.00500	0.200	0	96.2	90	110			
Selenium	0.209	0.00500	0.200	0	105	90	110			
Thallium	0.196	0.00150	0.200	0	97.9	90	110			

Sample ID **LCVL9-160428**	Batch ID: **R85511**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_160428B**	Analysis Date: **4/28/2016 7:41:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00194	0.00250	0.00200	0	96.9	70	130			
Arsenic	0.00500	0.00500	0.00500	0	100	70	130			
Barium	0.00497	0.0100	0.00500	0	99.4	70	130			
Beryllium	0.00103	0.00100	0.00100	0	103	70	130			
Cadmium	0.000929	0.00100	0.00100	0	92.9	70	130			
Calcium	0.105	0.300	0.100	0	105	70	130			
Chromium	0.00503	0.00500	0.00500	0	101	70	130			
Cobalt	0.00498	0.00500	0.00500	0	99.6	70	130			
Lead	0.000946	0.00100	0.00100	0	94.6	70	130			
Lithium	0.0106	0.0100	0.0100	0	106	70	130			
Molybdenum	0.00461	0.00500	0.00500	0	92.2	70	130			
Selenium	0.00574	0.00500	0.00500	0	115	70	130			
Thallium	0.000944	0.00150	0.00100	0	94.4	70	130			

Sample ID **CCV10-160428**	Batch ID: **R85511**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160428B**	Analysis Date: **4/28/2016 8:05:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.199	0.00250	0.200	0	99.3	90	110			
Arsenic	0.208	0.00500	0.200	0	104	90	110			
Barium	0.204	0.0100	0.200	0	102	90	110			
Beryllium	0.191	0.00100	0.200	0	95.5	90	110			
Cadmium	0.199	0.00100	0.200	0	99.3	90	110			
Chromium	0.207	0.00500	0.200	0	103	90	110			
Cobalt	0.204	0.00500	0.200	0	102	90	110			
Lead	0.199	0.00100	0.200	0	99.6	90	110			
Lithium	0.192	0.0100	0.200	0	96.2	90	110			
Molybdenum	0.195	0.00500	0.200	0	97.5	90	110			
Selenium	0.211	0.00500	0.200	0	106	90	110			
Thallium	0.196	0.00150	0.200	0	98.1	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1604288
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160428B

Sample ID **LCVL10-160428** Batch ID: **R85511** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS4_160428B** Analysis Date: **4/28/2016 8:10:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00185	0.00250	0.00200	0	92.4	70	130			
Arsenic	0.00509	0.00500	0.00500	0	102	70	130			
Barium	0.00513	0.0100	0.00500	0	103	70	130			
Beryllium	0.000973	0.00100	0.00100	0	97.3	70	130			
Cadmium	0.000969	0.00100	0.00100	0	96.9	70	130			
Chromium	0.00522	0.00500	0.00500	0	104	70	130			
Cobalt	0.00506	0.00500	0.00500	0	101	70	130			
Lead	0.000941	0.00100	0.00100	0	94.1	70	130			
Lithium	0.0105	0.0100	0.0100	0	105	70	130			
Molybdenum	0.00463	0.00500	0.00500	0	92.5	70	130			
Selenium	0.00556	0.00500	0.00500	0	111	70	130			
Thallium	0.000955	0.00150	0.00100	0	95.5	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1604288
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160509A

The QC data in batch 74809 applies to the following samples: 1604288-01A, 1604288-02A, 1604288-03A, 1604288-04A, 1604288-05A, 1604288-06A, 1604288-07A, 1604288-08A, 1604288-09A, 1604288-10A, 1604288-11A, 1604288-12A

Sample ID	**MB-74809**	Batch ID:	**74809**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**ICP-MS4_160509A**	Analysis Date:	**5/9/2016 10:46:00 AM**	Prep Date:	**4/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	<0.0100	0.0300								

Sample ID	**LCS-74809**	Batch ID:	**74809**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**ICP-MS4_160509A**	Analysis Date:	**5/9/2016 10:48:00 AM**	Prep Date:	**4/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.200	0.0300	0.200	0	99.8	80	120			

Sample ID	**LCSD-74809**	Batch ID:	**74809**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**ICP-MS4_160509A**	Analysis Date:	**5/9/2016 10:51:00 AM**	Prep Date:	**4/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.212	0.0300	0.200	0	106	80	120	5.98	15	

Sample ID	**1604288-01A SD**	Batch ID:	**74809**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**SD**	Run ID:	**ICP-MS4_160509A**	Analysis Date:	**5/9/2016 10:57:00 AM**	Prep Date:	**4/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	445	75.0	0	447				0.432	10	

Sample ID	**1604288-01A PDS**	Batch ID:	**74809**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**PDS**	Run ID:	**ICP-MS4_160509A**	Analysis Date:	**5/9/2016 11:17:00 AM**	Prep Date:	**4/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	665	15.0	250	447	87.2	80	120			

Sample ID	**1604288-01A MS**	Batch ID:	**74809**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**ICP-MS4_160509A**	Analysis Date:	**5/9/2016 11:19:00 AM**	Prep Date:	**4/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	1.08	1.50	0.200	0.839	122	80	120			S

Sample ID	**1604288-01A MSD**	Batch ID:	**74809**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**ICP-MS4_160509A**	Analysis Date:	**5/9/2016 11:21:00 AM**	Prep Date:	**4/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	1.03	1.50	0.200	0.839	96.8	80	120	4.84	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1604288
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160509A

Sample ID **1604288-01A SD**	Batch ID: **74809**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **SD**	Run ID: **ICP-MS4_160509A**	Analysis Date: **5/9/2016 11:56:00 AM**	Prep Date: **4/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.647	0.150	0	0.499				25.9	10	R

Sample ID **1604288-01A PDS**	Batch ID: **74809**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS4_160509A**	Analysis Date: **5/9/2016 11:58:00 AM**	Prep Date: **4/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.672	0.0300	0.200	0.499	86.4	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1604288
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160509A

Sample ID	**ICV-160509**	Batch ID:	**R85680**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**ICP-MS4_160509A**	Analysis Date:	**5/9/2016 10:31:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.102	0.0300	0.100	0	102	90	110			
Calcium	2.27	0.300	2.50	0	90.9	90	110			

Sample ID	**LCVL-160509**	Batch ID:	**R85680**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160509A**	Analysis Date:	**5/9/2016 10:40:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0234	0.0300	0.0200	0	117	70	130			
Calcium	0.0935	0.300	0.100	0	93.5	70	130			

Sample ID	**CCV1-160509**	Batch ID:	**R85680**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_160509A**	Analysis Date:	**5/9/2016 11:23:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.191	0.0300	0.200	0	95.6	90	110			
Calcium	4.56	0.300	5.00	0	91.2	90	110			

Sample ID	**LCVL1-160509**	Batch ID:	**R85680**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160509A**	Analysis Date:	**5/9/2016 11:39:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0230	0.0300	0.0200	0	115	70	130			
Calcium	0.0972	0.300	0.100	0	97.2	70	130			

Sample ID	**CCV2-160509**	Batch ID:	**R85680**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_160509A**	Analysis Date:	**5/9/2016 12:20:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.214	0.0300	0.200	0	107	90	110			
Calcium	4.65	0.300	5.00	0	93.1	90	110			

Sample ID	**LCVL2-160509**	Batch ID:	**R85680**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160509A**	Analysis Date:	**5/9/2016 12:37:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0249	0.0300	0.0200	0	124	70	130			
Calcium	0.0890	0.300	0.100	0	89.0	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank
J	Analyte detected between MDL and RL
ND	Not Detected at the Method Detection Limit
RL	Reporting Limit
J	Analyte detected between SDL and RL
DF	Dilution Factor
MDL	Method Detection Limit
R	RPD outside accepted control limits
S	Spike Recovery outside control limits
N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1604288
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160509A

Sample ID	**CCV3-160509**	Batch ID:	**R85680**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_160509A**	Analysis Date:	**5/9/2016 12:59:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.212	0.0300	0.200	0	106	90	110			

Sample ID	**LCVL3-160509**	Batch ID:	**R85680**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160509A**	Analysis Date:	**5/9/2016 1:13:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0254	0.0300	0.0200	0	127	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1604288
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC4_160428A

The QC data in batch 74841 applies to the following samples: 1604288-01D, 1604288-02D, 1604288-03D, 1604288-04D, 1604288-05D, 1604288-06D, 1604288-07D, 1604288-08D, 1604288-09D, 1604288-10D, 1604288-11D, 1604288-12D

Sample ID **MB-74841** Batch ID: **74841** TestNo: **E300** Units: **mg/L**
SampType: **MBLK** Run ID: **IC4_160428A** Analysis Date: **4/28/2016 10:11:49 AM** Prep Date: **4/28/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	<0.300	1.00								
Fluoride	<0.100	0.400								
Sulfate	<1.00	3.00								

Sample ID **LCS-74841** Batch ID: **74841** TestNo: **E300** Units: **mg/L**
SampType: **LCS** Run ID: **IC4_160428A** Analysis Date: **4/28/2016 10:26:49 AM** Prep Date: **4/28/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.0	1.00	10.00	0	100	90	110			
Fluoride	4.15	0.400	4.000	0	104	90	110			
Sulfate	30.1	3.00	30.00	0	100	90	110			

Sample ID **LCSD-74841** Batch ID: **74841** TestNo: **E300** Units: **mg/L**
SampType: **LCSD** Run ID: **IC4_160428A** Analysis Date: **4/28/2016 10:41:49 AM** Prep Date: **4/28/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.0	1.00	10.00	0	100	90	110	0.132	20	
Fluoride	4.17	0.400	4.000	0	104	90	110	0.403	20	
Sulfate	30.1	3.00	30.00	0	100	90	110	0.099	20	

Sample ID **1604288-03DMS** Batch ID: **74841** TestNo: **E300** Units: **mg/L**
SampType: **MS** Run ID: **IC4_160428A** Analysis Date: **4/28/2016 4:20:18 PM** Prep Date: **4/28/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2450	100	2000	378.3	103	90	110			
Fluoride	2040	40.0	2000	0	102	90	110			
Sulfate	3550	300	2000	1445	105	90	110			

Sample ID **1604288-03DMSD** Batch ID: **74841** TestNo: **E300** Units: **mg/L**
SampType: **MSD** Run ID: **IC4_160428A** Analysis Date: **4/28/2016 4:35:18 PM** Prep Date: **4/28/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2470	100	2000	378.3	104	90	110	0.727	20	
Fluoride	2060	40.0	2000	0	103	90	110	0.882	20	
Sulfate	3590	300	2000	1445	107	90	110	0.974	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1604288
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC4_160428A

Sample ID **1604288-04DMS**	Batch ID: **74841**	TestNo: **E300**	Units: **mg/L**
SampType: **MS**	Run ID: **IC4_160428A**	Analysis Date: **4/28/2016 5:05:18 PM**	Prep Date: **4/28/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	303	10.0	200.0	95.20	104	90	110			
Fluoride	206	4.00	200.0	0	103	90	110			
Sulfate	263	30.0	200.0	50.68	106	90	110			

Sample ID **1604288-04DMSD**	Batch ID: **74841**	TestNo: **E300**	Units: **mg/L**
SampType: **MSD**	Run ID: **IC4_160428A**	Analysis Date: **4/28/2016 5:20:18 PM**	Prep Date: **4/28/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	303	10.0	200.0	95.20	104	90	110	0.047	20	
Fluoride	207	4.00	200.0	0	104	90	110	0.366	20	
Sulfate	262	30.0	200.0	50.68	105	90	110	0.369	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1604288
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC4_160428A

Sample ID **ICV-160428**	Batch ID: **R85525**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC4_160428A**	Analysis Date: **4/28/2016 9:24:01 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	25.2	1.00	25.00	0	101	90	110			
Fluoride	10.2	0.400	10.00	0	102	90	110			
Sulfate	75.9	3.00	75.00	0	101	90	110			

Sample ID **CCV1-160428**	Batch ID: **R85525**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC4_160428A**	Analysis Date: **4/28/2016 1:49:07 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.3	1.00	10.00	0	103	90	110			
Fluoride	4.15	0.400	4.000	0	104	90	110			
Sulfate	32.9	3.00	30.00	0	110	90	110			

Sample ID **CCV2-160428**	Batch ID: **R85525**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC4_160428A**	Analysis Date: **4/28/2016 6:35:18 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.2	1.00	10.00	0	102	90	110			
Fluoride	4.08	0.400	4.000	0	102	90	110			
Sulfate	30.7	3.00	30.00	0	102	90	110			

Sample ID **CCV3-160428**	Batch ID: **R85525**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC4_160428A**	Analysis Date: **4/28/2016 9:05:18 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.3	1.00	10.00	0	103	90	110			
Fluoride	4.20	0.400	4.000	0	105	90	110			
Sulfate	30.9	3.00	30.00	0	103	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1604288
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_160427A

The QC data in batch 74811 applies to the following samples: 1604288-01D, 1604288-02D, 1604288-03D, 1604288-04D, 1604288-05D, 1604288-06D, 1604288-07D, 1604288-08D, 1604288-09D, 1604288-10D, 1604288-11D, 1604288-12D

Sample ID **1604253-01A-DUP** Batch ID: **74811** TestNo: **M4500-H+ B** Units: **pH Units@17.2℃**
SampType: **DUP** Run ID: **TITRATOR_160427A** Analysis Date: **4/27/2016 9:07:00 AM** Prep Date: **4/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	9.89	0	0	9.870				0.202	5	

Sample ID **1604288-12D-DUP** Batch ID: **74811** TestNo: **M4500-H+ B** Units: **pH Units@18.9℃**
SampType: **DUP** Run ID: **TITRATOR_160427A** Analysis Date: **4/27/2016 9:36:00 AM** Prep Date: **4/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.68	0	0	6.690				0.150	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1604288
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_160427A

Sample ID	**ICV-160427**	Batch ID:	**R85466**	TestNo:	**M4500-H+ B**	Units:	**pH Units@21.9℃**
SampType:	**ICV**	Run ID:	**TITRATOR_160427A**	Analysis Date:	**4/27/2016 8:35:00 AM**	Prep Date:	**4/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	9.99	0	10.00	0	99.9	99	101			

Sample ID	**CCV1-160427**	Batch ID:	**R85466**	TestNo:	**M4500-H+ B**	Units:	**pH Units@21.2℃**
SampType:	**CCV**	Run ID:	**TITRATOR_160427A**	Analysis Date:	**4/27/2016 9:23:00 AM**	Prep Date:	**4/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	7.02	0	7.000	0	100	97.1	102.9			

Sample ID	**CCV2-160427**	Batch ID:	**R85466**	TestNo:	**M4500-H+ B**	Units:	**pH Units@21.2℃**
SampType:	**CCV**	Run ID:	**TITRATOR_160427A**	Analysis Date:	**4/27/2016 9:38:00 AM**	Prep Date:	**4/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	7.02	0	7.000	0	100	97.1	102.9			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1604288
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: WC_160502B

The QC data in batch 74905 applies to the following samples: 1604288-01D, 1604288-02D, 1604288-03D, 1604288-04D, 1604288-05D, 1604288-06D, 1604288-07D, 1604288-08D, 1604288-09D, 1604288-10D, 1604288-11D, 1604288-12D

Sample ID	**MB-74905**	Batch ID:	**74905**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**WC_160502B**	Analysis Date:	**5/3/2016 8:45:00 AM**	Prep Date:	**5/2/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	<10.0	10.0								

Sample ID	**LCS-74905**	Batch ID:	**74905**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**WC_160502B**	Analysis Date:	**5/3/2016 8:45:00 AM**	Prep Date:	**5/2/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	754	10.0	745.6	0	101	90	113			

Sample ID	**1604288-01D-DUP**	Batch ID:	**74905**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_160502B**	Analysis Date:	**5/3/2016 8:45:00 AM**	Prep Date:	**5/2/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	4060	50.0	0	3970				2.12	5	

Sample ID	**1604315-01F-DUP**	Batch ID:	**74905**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_160502B**	Analysis Date:	**5/3/2016 8:45:00 AM**	Prep Date:	**5/2/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	368	10.0	0	370.0				0.542	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

NJ OK001

Case Narrative

Lab No: 20160401

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r d r r d r r r d dr r r d
r d r d

r d r r d r r r d d r d r r

Observations / Nonconformances

r r r d d r
M

OUTREACH LABORATORY, A Divsion of ESC Lab Sciences
Address: 311 North Aspen Avenue, Broken Arrow, OK, 74012 EMail: outreach@esclabsciences.com - Tel: (918) 251-2515

r

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r d / /

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Analytical Report

	Method	Result	DL	Units	Qual	Prep Date	Analysis Date	Analyst
Lab ID	**20160401-01**							
Client ID	**AXMW-1**							
Date Sampled	**4/25/2016 10:30:00 AM**							
Matrix	**NPW**							
	Radiochemical Analyses							
d d		/		/				
d	M M	/		/		/ /	/ /	
d	/	/		/		/ /	/ /	
Lab ID	**20160401-02**							
Client ID	**AX-24**							
Date Sampled	**4/25/2016 11:30:00 AM**							
Matrix	**NPW**							
	Radiochemical Analyses							
d d		/		/				
d	M M	/		/		/ /	/ /	
d	/	/		/		/ /	/ /	
Lab ID	**20160401-03**							
Client ID	**AX-28**							
Date Sampled	**4/25/2016 12:35:00 PM**							
Matrix	**NPW**							
	Radiochemical Analyses							
d d		/		/				
d	M M	/		/		/ /	/ /	
d	/	/		/		/ /	/ /	
Lab ID	**20160401-04**							
Client ID	**AX-22R**							
Date Sampled	**4/25/2016 1:10:00 AM**							
Matrix	**NPW**							
	Radiochemical Analyses							
d d		/		/				
d	M M	/		/		/ /	/ /	
d	/	/		/		/ /	/ /	

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Analytical Report

	Method	Result	DL	Units	Qual	Prep Date	Analysis Date	Analyst
Lab ID	**20160401-05**							
Client ID	**AX-25**							
Date Sampled	**4/25/2016 2:25:00 AM**							
Matrix	**NPW**							
	Radiochemical Analyses							
d d		/		/				
d	M M	/		/		/ /	/ /	
d	/	/		/		/ /	/ /	
Lab ID	**20160401-06**							
Client ID	**AX-26**							
Date Sampled	**4/25/2016 4:05:00 AM**							
Matrix	**NPW**							
	Radiochemical Analyses							
d d		/		/				
d	M M	/		/		/ /	/ /	
d	/	/		/		/ /	/ /	
Lab ID	**20160401-07**							
Client ID	**MW-1**							
Date Sampled	**4/25/2016**							
Matrix	**NPW**							
	Radiochemical Analyses							
d d		/		/				
d	M M	/		/		/ /	/ /	
d	/	/		/		/ /	/ /	
Lab ID	**20160401-08**							
Client ID	**EB-1**							
Date Sampled	**4/25/2016 9:05:00 AM**							
Matrix	**NPW**							
	Radiochemical Analyses							
d d		/		/				
d	M M	/		/		/ /	/ /	
d	/	/		/		/ /	/ /	

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Analytical Report

	Method	Result	DL	Units	Qual	Prep Date	Analysis Date	Analyst
Lab ID	**20160401-09**							
Client ID	**AX-27**							
Date Sampled	**4/26/2016 2:35:00 AM**							
Matrix	**NPW**							
	Radiochemical Analyses							
d d		/		/				
d	M M	/		/		/ /	/ /	
d	/	/		/		/ /	/ /	
Lab ID	**20160401-10**							
Client ID	**AXMW-2**							
Date Sampled	**4/26/2016 11:45:00 AM**							
Matrix	**NPW**							
	Radiochemical Analyses							
d d		/		/				
d	M M	/		/		/ /	/ /	
d	/	/		/		/ /	/ /	
Lab ID	**20160401-11**							
Client ID	**AX-29**							
Date Sampled	**4/26/2016 1:20:00 AM**							
Matrix	**NPW**							
	Radiochemical Analyses							
d d		/		/				
d	M M	/		/		/ /	/ /	
d	/	/		/		/ /	/ /	
Lab ID	**20160401-12**							
Client ID	**AX-23**							
Date Sampled	**4/26/2016 2:15:00 AM**							
Matrix	**NPW**							
	Radiochemical Analyses							
d d		/		/				
d	M M	/		/		/ /	/ /	
d	/	/		/		/ /	/ /	

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QC Report

Parameter	Blank	LCS %REC	LCSD %REC	LCSD RPD	DUP RPD	RER, NAD or DER	MS %REC	MSD %REC	MSD RPD	Date
d										/ /
d										/ /

Lab Approval: 

DHL Analytical, Inc.
2300 Double Creek Drive
Round Rock, TX 78664
TEL: *(512) 388-8222* FAX: *(512) 388-8229*

CHAIN-OF-CUSTODY REC

Work Order: 1604288

Subcontractor:

ESC Laboratory
311 North Aspen
Broken Arrow, Oklahoma 74012

TEL: (918) 251-2515
FAX:
Acct #: DHLRRTX

Sample Id	Matrix	DHL#	Date Collected	Bottle Type	Requested Tests			
					E904.0	SM7500Ra-B M		
AXMW-1	Aqueous	-01B	04/25/16 10:30 AM	500HDPEHNO3	1			
AXMW-1	Aqueous	-01C	04/25/16 10:30 AM	500HDPEHNO3		1		
AX-24	Aqueous	-02B	04/25/16 11:30 AM	500HDPEHNO3	1			
AX-24	Aqueous	-02C	04/25/16 11:30 AM	500HDPEHNO3		1		
AX-28	Aqueous	-03B	04/25/16 12:35 PM	500HDPEHNO3	1			
AX-28	Aqueous	-03C	04/25/16 12:35 PM	500HDPEHNO3		1		
AX-22R	Aqueous	-04B	04/25/16 01:10 PM	500HDPEHNO3	1			
AX-22R	Aqueous	-04C	04/25/16 01:10 PM	500HDPEHNO3		1		
AX-25	Aqueous	-05B	04/25/16 02:25 PM	500HDPEHNO3	1			
AX-25	Aqueous	-05C	04/25/16 02:25 PM	500HDPEHNO3		1		
AX-26	Aqueous	-06B	04/25/16 04:05 PM	500HDPEHNO3	1			
AX-26	Aqueous	-06C	04/25/16 04:05 PM	500HDPEHNO3		1		
MW-1	Aqueous	-07B	04/25/16	500HDPEHNO3	1			
MW-1	Aqueous	-07C	04/25/16	500HDPEHNO3		1		
EB-1	Aqueous	-08B	04/25/16 09:05 AM	500HDPEHNO3	1			
EB-1	Aqueous	-08C	04/25/16 09:05 AM	500HDPEHNO3		1		
AX-27	Aqueous	-09B	04/26/16 02:35 PM	500HDPEHNO3	1			
AX-27	Aqueous	-09C	04/26/16 02:35 PM	500HDPEHNO3		1		

General Comments:

Please analyze these samples with Normal Turnaround Time.
Report RA-226, Ra-228 & Combined per Specs DHLRRTX033116S.
Quality Control Package Needed: Standard - NELAC Rad Test compliant
Email to cac@dhlanalytical.com & dupont@dhlanalytical.com

		Date/Time		
Relinquished by:	J Barker	4/26/16 1730	**Received by:**	Forestar
Relinquished by:			**Received by:**	

DHL Analytical, Inc.
2300 Double Creek Drive
Round Rock, TX 78664
TEL: *(512) 388-8222* FAX: *(512) 388-8229*

CHAIN-OF-CUSTODY REC

Work Order: 1604288

Subcontractor:

ESC Laboratory
311 North Aspen
Broken Arrow, Oklahoma 74012

TEL: (918) 251-2515
FAX:
Acct #: DHLRRTX

Sample Id	Matrix	DHL#	Date Collected	Bottle Type	Requested Tests			
					E904.0	SM7500Ra-B M		
AXMW-2	Aqueous	-10B	04/26/16 11:45 AM	500HDPEHNO3	1			
AXMW-2	Aqueous	-10C	04/26/16 11:45 AM	500HDPEHNO3		1		
AX-29	Aqueous	-11B	04/26/16 01:20 PM	500HDPEHNO3	1			
AX-29	Aqueous	-11C	04/26/16 01:20 PM	500HDPEHNO3		1		
AX-23	Aqueous	-12B	04/26/16 02:15 PM	500HDPEHNO3	1			
AX-23	Aqueous	-12C	04/26/16 02:15 PM	500HDPEHNO3		1		

General Comments:

Please analyze these samples with Normal Turnaround Time.
Report RA-226, Ra-228 & Combined per Specs DHLRRTX033116S.
Quality Control Package Needed: Standard - NELAC Rad Test compliant
Email to cac@dhlanalytical.com & dupont@dhlanalytical.com

		Date/Time		
Relinquished by:		4/26/16 1730	**Received by:**	
Relinquished by:			**Received by:**	

SAMPLE LOGIN

Date Received: *04/28/16 08:57:54*

Lab Number: **20160401**

Sample Number	Client Sample ID	Matrix	Date Sampled	Container Type	Container Size	Preservation	Pre Upo
20160401-01 B	AXMW-1	NPW	04/25/16	Plastic	500 ml	HNO3, pH < 2	☑
20160401-01 A	AXMW-1	NPW	04/25/16	Plastic	500 ml	HNO3, pH < 2	☑
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160401-02 A	AX-24	NPW	04/25/16	Plastic	500 ml	HNO3, pH < 2	☑
20160401-02 B	AX-24	NPW	04/25/16	Plastic	500 ml	HNO3, pH < 2	☑
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160401-03 A	AX-28	NPW	04/25/16	Plastic	500 ml	HNO3, pH < 2	☑
20160401-03 B	AX-28	NPW	04/25/16	Plastic	500 ml	HNO3, pH < 2	☑
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160401-04 A	AX-22R	NPW	04/25/16	Plastic	500 ml	HNO3, pH < 2	☑
20160401-04 B	AX-22R	NPW	04/25/16	Plastic	500 ml	HNO3, pH < 2	☑
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160401-05 A	AX-25	NPW	04/25/16	Plastic	500 ml	HNO3, pH < 2	☑
20160401-05 B	AX-25	NPW	04/25/16	Plastic	500 ml	HNO3, pH < 2	☑
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160401-06 B	AX-26	NPW	04/25/16	Plastic	500 ml	HNO3, pH < 2	☑
20160401-06 A	AX-26	NPW	04/25/16	Plastic	500 ml	HNO3, pH < 2	☑
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160401-07 B	MW-1	NPW	04/25/16	Plastic	500 ml	HNO3, pH < 2	☑
20160401-07 A	MW-1	NPW	04/25/16	Plastic	500 ml	HNO3, pH < 2	☑
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				

20160401-08 A	EB-1	NPW	04/25/16	Plastic	500 ml	HNO3, pH < 2	☑
20160401-08 B	EB-1	NPW	04/25/16	Plastic	500 ml	HNO3, pH < 2	☑
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160401-09 A	AX-27	NPW	04/26/16	Plastic	500 ml	HNO3, pH < 2	☑
20160401-09 B	AX-27	NPW	04/26/16	Plastic	500 ml	HNO3, pH < 2	☑
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160401-10 A	AXMW-2	NPW	04/26/16	Plastic	500 ml	HNO3, pH < 2	☑
20160401-10 B	AXMW-2	NPW	04/26/16	Plastic	500 ml	HNO3, pH < 2	☑
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160401-11 A	AX-29	NPW	04/26/16	Plastic	500 ml	HNO3, pH < 2	☑
20160401-11 B	AX-29	NPW	04/26/16	Plastic	500 ml	HNO3, pH < 2	☑
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160401-12 B	AX-23	NPW	04/26/16	Plastic	500 ml	HNO3, pH < 2	☑
20160401-12 A	AX-23	NPW	04/26/16	Plastic	500 ml	HNO3, pH < 2	☑
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				

CONTAINER INSPECTION

Coolers 1 Custody Seals Broken ND Temperature: C NA Ice Radiation Survey: <300 cpm

NA

SAMPLE INSPECTION

Sample Seal Broken No Chain of Custody Record ✓ Labels in Tact ✓ Radiation Survey Complete ☐

Anomalies -sample # 04, AY-22R, COC has sample time as 13:10 and container label has 13:20. 04/28/1
sample # 09, AY-27, COC has sample time as 14:35 and container label has 14:50. 1

Inspected By: _____ DATE 4/28/16

QA or Designee Review: _____ DATE 04/28/16

Sample Custodian Review: _____ DATE _____

Project Notes:

August 03, 2016

Will Vienne
Pastor, Behling & Wheeler
2201 Double Creek Dr #4004
Round Rock, Texas 78664
TEL: (512) 671-3434
FAX (512) 671-3446

Order No.: 1606145

RE: Sandow CCR

Dear Will Vienne:

DHL Analytical, Inc. received 7 sample(s) on 6/14/2016 for the analyses presented in the following report.

There were no problems with the analyses and all data met requirements of NELAC except where noted in the Case Narrative. All non-NELAC methods will be identified accordingly in the case narrative and all estimated uncertainties of test results are within method or EPA specifications.

If you have any questions regarding these tests results, please feel free to call. Thank you for using DHL Analytical.

Sincerely,

John DuPont
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-16-16

Table of Contents

DHL ANALYTICAL
2300 Double Creek Dr. ■ Round Rock, TX 78664
Phone (512) 388-8222 ■ FAX (512) 388-8229
Web: www.dhlanalytical.com
E-Mail: login@dhlanalytical.com

CLIENT: PBW
ADDRESS: 2201 Double Creek Dr Ste 4004 Round Rock TX
PHONE: (512) 671-3434 FAX/E-MAIL:
DATA REPORTED TO: Will Vienne, Karla Henson
ADDITIONAL REPORT COPIES TO: Sara Taube

DATE: 6/14/2016
PO #: [redacted] DHL WORK
PROJECT LOCATION OR NAME: Sandow
CLENT PROJECT #: S1646

Authorize 5% surcharge for TRRP Report? ❑ Yes ❑ No

S=SOIL P=PAINT
W=WATER SL=SLUDGE
A=AIR O=OTHER
L=LIQUID SO=SOLID
SE=SEDIMENT

PRESERVATION

ANALYSES: BTEX ❑ MTBE ❑ [METHOD 8021] | TPH 1005 ❑ TPH 1006 ❑ HOLD 1006 ❑ | GRO [METHOD 8015] ❑ DRO [METHOD 8105] ❑ | VOC 8260 ❑ VOC 624 ❑ VOC 8260/5035 ❑ | SVOC 8270 ❑ PAH 8270 ❑ HOLD PAH ❑ SVOC 625 ❑ | 8270 PEST ❑ 625 PEST/PCB ❑ 608 PCB ❑ | 8270 O-P PEST ❑ 8082 PCB ❑ 8270 PCB ❑ | 8321 HERB ❑ T PHOS, AMMONIA ❑ | METALS 6020 ❑ METALS 200.8 ❑ DISS. METALS | RCRA ❑ TX11 ❑ | PH ❑ HEX CHROM ❑ ALKALIN | CHLORIDE ❑ ANIONS | TCLP-SVOC ❑ | TCLP-MET | RC

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	HCl	HNO_3	H_2SO_4 ❑ NaOH ❑	ICE	UNPRESERVED
AX-24	1	6/14/16	10:00	W		4		X		X	
AX-26	2		11:30								
AX-27	3		12:25								
AX-25	4		13:35								
AX-22R	5		14:40								
AX-29	6		15:50								
EB-01	7	↓	8:55	↓		↓		↓		↓	

RELINQUISHED BY: (Signature) Sara Taube DATE/TIME 6/14/16 17:20 RECEIVED BY: (Signature) [signature]
RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)

TURN AROUND TIME
RUSH ❑ CALL FIRST
1 DAY ❑ CALL FIRST
2 DAY ❑
NORMAL ☑
OTHER ❑

LABORATORY US
RECEIVING TEMP:
CUSTODY SEALS:
CARRIER: ❑ LON
❑ COURIER DELIV
☒ HAND DELIVER

APPENDIX E Revision 1 November 21, 2022
❑ DHL DISPOSAL @ $5.00 each ❑ Return

John Dupont

From: Sara Taube [Sara.Taube@pbwllc.com]
Sent: Wednesday, July 22, 2015 12:05 PM
To: John Dupont
Subject: CCR Appendix III and IV
Follow Up Flag: Follow up
Flag Status: Completed

Hi John,

Here are the Appendix III and Appendix IV constituents that we will need to have analyzed under the CCR Rule.

Appendix III
Boron
Calcium
Chloride
Fluoride
pH
sulfate
TDS

Appendix IV
Antimony
Arsenic
Barium
Beryllium
Cadmium
Chromium
Cobalt
Fluoride
Lead
Lithium
Mercury
Molybdenum
Selenium
Thallium
Radium 226 and 228

We are looking to have approximately 74 wells sampled 8 times over the course of the next two years. Please let me know if there is any more information you might need.

Cheers,

Sara

10/26/2015

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name Pastor, Behling & Wheeler | Date Received: 6/14/2016

Work Order Number 1606145 | Received by JT

Checklist completed by: _____ 6/15/2016 (Signature / Date) | Reviewed by PL 6/15/2016 (Initials / Date)

Carrier name Hand Delivered

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	3.5 °C
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH<2 acceptable upon receipt?	Yes ☑	No ☐	NA ☐ LOT # 8086
	Adjusted? _____		Checked by _____
Water - ph>9 (S) or ph>12 (CN) acceptable upon receipt?	Yes ☐	No ☐	NA ☑ LOT #
	Adjusted? _____		Checked by _____

Any No response must be detailed in the comments section below.

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

DHL Analytical, Inc. **Date:** *03-Aug-16*

CLIENT: Pastor, Behling & Wheeler
Project: Sandow CCR
Lab Order: 1606145

CASE NARRATIVE

Samples were analyzed using the methods outlined in the following references:

Method SW6020A - Metals Analysis
Method SW7470A - Mercury Analysis
Method E300 - Anions Analysis
Method M4500-H+ B - pH of a Water Analysis
Method M2540C - TDS Analysis
Sub-contract - Radium-228 and Radium-226 analyses by methods E904/9320 and SM 7500 Ra B M. Analyzed at ESC Lab Sciences.

LOG IN

The samples were received and log-in performed on 6/14/16. A total of 7 samples were received. The samples arrived in good condition and were properly packaged.

METALS ANALYSIS

For Metals analysis performed on 6/17/16, 6/20/16, 6/23/16 and 6/24/16 (batches 75691 & 75715) the matrix spikes and matrix spike duplicate recoveries were out of control limits for a total of four analytes. These are flagged accordingly in the QC summary report. The samples selected for the matrix spikes and matrix spike duplicates (batches 75691 & 75715) were not from this work order. The LCSs were within control limits for these analytes. No further corrective actions were taken.

For Metals analysis performed on 6/24/16 (batch 75715) the RPD for the serial dilution was above control limits for Boron. This is flagged accordingly in the QC summary report. The PDS was within control limits for this analyte. No further corrective actions were taken.

For Metals analysis performed on 6/17/16 (batch 75691) the PDS recovery was below control limits for Molybdenum. This is flagged accordingly. The serial dilution was within control limits for this analyte. No further corrective actions were taken.

DHL Analytical, Inc.

Date: *03-Aug-16*

CLIENT: Pastor, Behling & Wheeler
Project: Sandow CCR
Lab Order: 1606145

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
1606145-01	AX-24		06/14/16 10:00 AM	6/14/2016
1606145-02	AX-26		06/14/16 11:30 AM	6/14/2016
1606145-03	AX-27		06/14/16 12:25 PM	6/14/2016
1606145-04	AX-25		06/14/16 01:35 PM	6/14/2016
1606145-05	AX-22R		06/14/16 02:40 PM	6/14/2016
1606145-06	AX-29		06/14/16 03:50 PM	6/14/2016
1606145-07	EB-01		06/14/16 08:55 AM	6/14/2016

& Wheeler

PREP DATES REPORT

Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
06/14/16 10:00 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/16/16 11:00 AM	75691
06/14/16 10:00 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/16/16 11:00 AM	75691
06/14/16 10:00 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/16/16 11:00 AM	75691
06/14/16 10:00 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	06/15/16 08:44 AM	75654
06/14/16 10:00 AM	Aqueous	E300	Anion Preparation	06/21/16 09:15 AM	75766
06/14/16 10:00 AM	Aqueous	E300	Anion Preparation	06/21/16 09:15 AM	75766
06/14/16 10:00 AM	Aqueous	M4500-H+ B	pH Preparation	06/15/16 08:20 AM	75648
06/14/16 10:00 AM	Aqueous	M2540C	TDS Preparation	06/17/16 11:15 AM	75699
06/14/16 11:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/16/16 11:00 AM	75691
06/14/16 11:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/16/16 11:00 AM	75691
06/14/16 11:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/16/16 11:00 AM	75691
06/14/16 11:30 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	06/15/16 08:44 AM	75654
06/14/16 11:30 AM	Aqueous	E300	Anion Preparation	06/21/16 09:15 AM	75766
06/14/16 11:30 AM	Aqueous	E300	Anion Preparation	06/21/16 09:15 AM	75766
06/14/16 11:30 AM	Aqueous	M4500-H+ B	pH Preparation	06/15/16 08:20 AM	75648
06/14/16 11:30 AM	Aqueous	M2540C	TDS Preparation	06/17/16 11:15 AM	75699
06/14/16 12:25 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/16/16 11:00 AM	75691
06/14/16 12:25 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/16/16 11:00 AM	75691
06/14/16 12:25 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/16/16 11:00 AM	75691
06/14/16 12:25 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	06/15/16 08:44 AM	75654
06/14/16 12:25 PM	Aqueous	E300	Anion Preparation	06/21/16 09:15 AM	75766
06/14/16 12:25 PM	Aqueous	E300	Anion Preparation	06/21/16 09:15 AM	75766
06/14/16 12:25 PM	Aqueous	M4500-H+ B	pH Preparation	06/15/16 08:20 AM	75648
06/14/16 12:25 PM	Aqueous	M2540C	TDS Preparation	06/17/16 11:15 AM	75699
06/14/16 01:35 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/16/16 11:00 AM	75691
06/14/16 01:35 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/16/16 11:00 AM	75691
06/14/16 01:35 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/16/16 11:00 AM	75691
06/14/16 01:35 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	06/15/16 08:44 AM	75654

& Wheeler

PREP DATES REPORT

Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
06/14/16 01:35 PM	Aqueous	E300	Anion Preparation	06/21/16 09:15 AM	75766
06/14/16 01:35 PM	Aqueous	E300	Anion Preparation	06/21/16 09:15 AM	75766
06/14/16 01:35 PM	Aqueous	M4500-H+ B	pH Preparation	06/15/16 08:20 AM	75648
06/14/16 01:35 PM	Aqueous	M2540C	TDS Preparation	06/17/16 11:15 AM	75699
06/14/16 02:40 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/17/16 10:42 AM	75715
06/14/16 02:40 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/17/16 10:42 AM	75715
06/14/16 02:40 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/17/16 10:42 AM	75715
06/14/16 02:40 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	06/15/16 08:44 AM	75654
06/14/16 02:40 PM	Aqueous	E300	Anion Preparation	06/21/16 09:15 AM	75766
06/14/16 02:40 PM	Aqueous	E300	Anion Preparation	06/21/16 09:15 AM	75766
06/14/16 02:40 PM	Aqueous	M4500-H+ B	pH Preparation	06/15/16 08:20 AM	75648
06/14/16 02:40 PM	Aqueous	M2540C	TDS Preparation	06/17/16 11:15 AM	75699
06/14/16 03:50 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/17/16 10:42 AM	75715
06/14/16 03:50 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/17/16 10:42 AM	75715
06/14/16 03:50 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/17/16 10:42 AM	75715
06/14/16 03:50 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	06/15/16 08:44 AM	75654
06/14/16 03:50 PM	Aqueous	E300	Anion Preparation	06/21/16 09:15 AM	75766
06/14/16 03:50 PM	Aqueous	E300	Anion Preparation	06/21/16 09:15 AM	75766
06/14/16 03:50 PM	Aqueous	M4500-H+ B	pH Preparation	06/15/16 08:20 AM	75648
06/14/16 03:50 PM	Aqueous	M2540C	TDS Preparation	06/17/16 11:15 AM	75699
06/14/16 08:55 AM	Equip Blank	SW3005A	Aq Prep Metals : ICP-MS	06/17/16 10:42 AM	75715
06/14/16 08:55 AM	Equip Blank	SW3005A	Aq Prep Metals : ICP-MS	06/17/16 10:42 AM	75715
06/14/16 08:55 AM	Equip Blank	SW7470A	Mercury Aq Prep, Total	06/15/16 08:44 AM	75654
06/14/16 08:55 AM	Equip Blank	E300	Anion Preparation	06/21/16 09:15 AM	75766
06/14/16 08:55 AM	Equip Blank	E300	Anion Preparation	06/21/16 09:15 AM	75766
06/14/16 08:55 AM	Equip Blank	M4500-H+ B	pH Preparation	06/15/16 08:20 AM	75648
06/14/16 08:55 AM	Equip Blank	M2540C	TDS Preparation	06/17/16 11:15 AM	75699

& Wheeler

ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	SW7470A	Mercury Total: Aqueous	75654	1	06/23/16 11:52 AM	CETAC2_HG_160623A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75691	1	06/17/16 01:57 PM	ICP-MS4_160617B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75691	50	06/23/16 01:47 PM	ICP-MS4_160623A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75691	1	06/23/16 01:49 PM	ICP-MS4_160623A
Aqueous	E300	Anions by IC method - Water	75766	1	06/21/16 10:50 AM	IC4_160621A
Aqueous	E300	Anions by IC method - Water	75766	100	06/21/16 02:29 PM	IC4_160621A
Aqueous	M4500-H+ B	pH	75648	1	06/15/16 11:16 AM	TITRATOR_160615A
Aqueous	M2540C	Total Dissolved Solids	75699	1	06/20/16 08:45 AM	WC_160617A
Aqueous	SW7470A	Mercury Total: Aqueous	75654	1	06/23/16 11:54 AM	CETAC2_HG_160623A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75691	1	06/17/16 01:59 PM	ICP-MS4_160617B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75691	50	06/23/16 01:51 PM	ICP-MS4_160623A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75691	1	06/23/16 01:53 PM	ICP-MS4_160623A
Aqueous	E300	Anions by IC method - Water	75766	1	06/21/16 11:05 AM	IC4_160621A
Aqueous	E300	Anions by IC method - Water	75766	100	06/21/16 02:44 PM	IC4_160621A
Aqueous	M4500-H+ B	pH	75648	1	06/15/16 11:20 AM	TITRATOR_160615A
Aqueous	M2540C	Total Dissolved Solids	75699	1	06/20/16 08:45 AM	WC_160617A
Aqueous	SW7470A	Mercury Total: Aqueous	75654	1	06/23/16 12:01 PM	CETAC2_HG_160623A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75691	1	06/17/16 02:01 PM	ICP-MS4_160617B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75691	50	06/23/16 01:55 PM	ICP-MS4_160623A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75691	1	06/23/16 01:57 PM	ICP-MS4_160623A
Aqueous	E300	Anions by IC method - Water	75766	1	06/21/16 11:20 AM	IC4_160621A
Aqueous	E300	Anions by IC method - Water	75766	100	06/21/16 02:59 PM	IC4_160621A
Aqueous	M4500-H+ B	pH	75648	1	06/15/16 11:21 AM	TITRATOR_160615A
Aqueous	M2540C	Total Dissolved Solids	75699	1	06/20/16 08:45 AM	WC_160617A
Aqueous	SW7470A	Mercury Total: Aqueous	75654	1	06/23/16 12:03 PM	CETAC2_HG_160623A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75691	1	06/23/16 02:01 PM	ICP-MS4_160623A

& Wheeler

ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75691	1	06/17/16 02:03 PM	ICP-MS4_160617B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75691	50	06/23/16 01:59 PM	ICP-MS4_160623A
Aqueous	E300	Anions by IC method - Water	75766	100	06/21/16 03:14 PM	IC4_160621A
Aqueous	E300	Anions by IC method - Water	75766	1	06/21/16 11:35 AM	IC4_160621A
Aqueous	M4500-H+ B	pH	75648	1	06/15/16 11:22 AM	TITRATOR_160615A
Aqueous	M2540C	Total Dissolved Solids	75699	1	06/20/16 08:45 AM	WC_160617A
Aqueous	SW7470A	Mercury Total: Aqueous	75654	1	06/23/16 12:05 PM	CETAC2_HG_160623A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75715	1	06/20/16 03:03 PM	ICP-MS4_160620B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75715	10	06/24/16 11:43 AM	ICP-MS4_160624A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75715	1	06/24/16 11:45 AM	ICP-MS4_160624A
Aqueous	E300	Anions by IC method - Water	75766	1	06/21/16 11:50 AM	IC4_160621A
Aqueous	E300	Anions by IC method - Water	75766	10	06/21/16 03:29 PM	IC4_160621A
Aqueous	M4500-H+ B	pH	75648	1	06/15/16 11:25 AM	TITRATOR_160615A
Aqueous	M2540C	Total Dissolved Solids	75699	1	06/20/16 08:45 AM	WC_160617A
Aqueous	SW7470A	Mercury Total: Aqueous	75654	1	06/23/16 12:08 PM	CETAC2_HG_160623A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75715	1	06/24/16 11:49 AM	ICP-MS4_160624A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75715	1	06/20/16 03:05 PM	ICP-MS4_160620B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75715	50	06/24/16 11:47 AM	ICP-MS4_160624A
Aqueous	E300	Anions by IC method - Water	75766	1	06/21/16 12:05 PM	IC4_160621A
Aqueous	E300	Anions by IC method - Water	75766	100	06/21/16 04:14 PM	IC4_160621A
Aqueous	M4500-H+ B	pH	75648	1	06/15/16 11:26 AM	TITRATOR_160615A
Aqueous	M2540C	Total Dissolved Solids	75699	1	06/20/16 08:45 AM	WC_160617A
Equip Blank	SW7470A	Mercury Total: Aqueous	75654	1	06/23/16 12:10 PM	CETAC2_HG_160623A
Equip Blank	SW6020A	Trace Metals: ICP-MS - Water	75715	1	06/20/16 03:07 PM	ICP-MS4_160620B
Equip Blank	SW6020A	Trace Metals: ICP-MS - Water	75715	1	06/24/16 11:51 AM	ICP-MS4_160624A
Equip Blank	E300	Anions by IC method - Water	75766	1	06/21/16 12:20 PM	IC4_160621A

& Wheeler

ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Equip Blank	E300	Anions by IC method - Water	75766	1	06/21/16 01:49 PM	IC4_160621A
Equip Blank	M4500-H+ B	pH	75648	1	06/15/16 11:29 AM	TITRATOR_160615A
Equip Blank	M2540C	Total Dissolved Solids	75699	1	06/20/16 08:45 AM	WC_160617A

DHL Analytical, Inc.

Date: *03-Aug-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-24
Project:	Sandow CCR	**Lab ID:**	1606145-01
Project No:	5164-E	**Collection Date:**	06/14/16 10:00 AM
Lab Order:	1606145	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **KL**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	06/23/16 11:52 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	06/17/16 01:57 PM
Arsenic	0.00434	0.00200	0.00500	J	mg/L	1	06/17/16 01:57 PM
Barium	0.0354	0.00300	0.0100		mg/L	1	06/17/16 01:57 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	06/17/16 01:57 PM
Boron	0.0945	0.0100	0.0300		mg/L	1	06/23/16 01:49 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	06/17/16 01:57 PM
Calcium	238	5.00	15.0		mg/L	50	06/23/16 01:47 PM
Chromium	0.00457	0.00200	0.00500	J	mg/L	1	06/17/16 01:57 PM
Cobalt	0.00494	0.00300	0.00500	J	mg/L	1	06/17/16 01:57 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	06/17/16 01:57 PM
Lithium	0.0841	0.00500	0.0100		mg/L	1	06/23/16 01:49 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	06/17/16 01:57 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	06/17/16 01:57 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	06/17/16 01:57 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	275	30.0	100		mg/L	100	06/21/16 02:29 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	06/21/16 10:50 AM
Sulfate	776	100	300		mg/L	100	06/21/16 02:29 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.36	0	0		pH Units@18.4℃	1	06/15/16 11:16 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	1980	50.0	50.0		mg/L	1	06/20/16 08:45 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *03-Aug-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-26
Project:	Sandow CCR	**Lab ID:**	1606145-02
Project No:	5164-E	**Collection Date:**	06/14/16 11:30 AM
Lab Order:	1606145	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **KL**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	06/23/16 11:54 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	06/17/16 01:59 PM
Arsenic	0.00252	0.00200	0.00500	J	mg/L	1	06/17/16 01:59 PM
Barium	0.0442	0.00300	0.0100		mg/L	1	06/17/16 01:59 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	06/17/16 01:59 PM
Boron	0.360	0.0100	0.0300		mg/L	1	06/23/16 01:53 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	06/17/16 01:59 PM
Calcium	591	5.00	15.0		mg/L	50	06/23/16 01:51 PM
Chromium	0.0232	0.00200	0.00500		mg/L	1	06/17/16 01:59 PM
Cobalt	0.0205	0.00300	0.00500		mg/L	1	06/17/16 01:59 PM
Lead	0.000957	0.000300	0.00100	J	mg/L	1	06/17/16 01:59 PM
Lithium	0.551	0.00500	0.0100		mg/L	1	06/23/16 01:53 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	06/17/16 01:59 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	06/17/16 01:59 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	06/17/16 01:59 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	972	30.0	100		mg/L	100	06/21/16 02:44 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	06/21/16 11:05 AM
Sulfate	1020	100	300		mg/L	100	06/21/16 02:44 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.60	0	0		pH Units@18.3℃	1	06/15/16 11:20 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	3930	50.0	50.0		mg/L	1	06/20/16 08:45 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *03-Aug-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-27
Project:	Sandow CCR	**Lab ID:**	1606145-03
Project No:	5164-E	**Collection Date:**	06/14/16 12:25 PM
Lab Order:	1606145	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **KL**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	06/23/16 12:01 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	06/17/16 02:01 PM
Arsenic	0.00299	0.00200	0.00500	J	mg/L	1	06/17/16 02:01 PM
Barium	0.116	0.00300	0.0100		mg/L	1	06/17/16 02:01 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	06/17/16 02:01 PM
Boron	0.194	0.0100	0.0300		mg/L	1	06/23/16 01:57 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	06/17/16 02:01 PM
Calcium	338	5.00	15.0		mg/L	50	06/23/16 01:55 PM
Chromium	0.0121	0.00200	0.00500		mg/L	1	06/17/16 02:01 PM
Cobalt	0.0230	0.00300	0.00500		mg/L	1	06/17/16 02:01 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	06/17/16 02:01 PM
Lithium	0.103	0.00500	0.0100		mg/L	1	06/23/16 01:57 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	06/17/16 02:01 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	06/17/16 02:01 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	06/17/16 02:01 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	610	30.0	100		mg/L	100	06/21/16 02:59 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	06/21/16 11:20 AM
Sulfate	418	100	300		mg/L	100	06/21/16 02:59 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.50	0	0		pH Units@18.3℃	1	06/15/16 11:21 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	2370	50.0	50.0		mg/L	1	06/20/16 08:45 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *03-Aug-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-25
Project:	Sandow CCR	**Lab ID:**	1606145-04
Project No:	5164-E	**Collection Date:**	06/14/16 01:35 PM
Lab Order:	1606145	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **KL**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	06/23/16 12:03 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	06/17/16 02:03 PM
Arsenic	0.00452	0.00200	0.00500	J	mg/L	1	06/17/16 02:03 PM
Barium	0.0999	0.00300	0.0100		mg/L	1	06/17/16 02:03 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	06/17/16 02:03 PM
Boron	0.219	0.0100	0.0300		mg/L	1	06/23/16 02:01 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	06/17/16 02:03 PM
Calcium	252	5.00	15.0		mg/L	50	06/23/16 01:59 PM
Chromium	0.0736	0.00200	0.00500		mg/L	1	06/17/16 02:03 PM
Cobalt	0.0247	0.00300	0.00500		mg/L	1	06/17/16 02:03 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	06/17/16 02:03 PM
Lithium	0.0406	0.00500	0.0100		mg/L	1	06/23/16 02:01 PM
Molybdenum	0.00285	0.00200	0.00500	J	mg/L	1	06/17/16 02:03 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	06/17/16 02:03 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	06/17/16 02:03 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	513	30.0	100		mg/L	100	06/21/16 03:14 PM
Fluoride	0.207	0.100	0.400	J	mg/L	1	06/21/16 11:35 AM
Sulfate	474	100	300		mg/L	100	06/21/16 03:14 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.61	0	0		pH Units@18.3℃	1	06/15/16 11:22 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	2210	50.0	50.0		mg/L	1	06/20/16 08:45 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *03-Aug-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-22R
Project:	Sandow CCR	**Lab ID:**	1606145-05
Project No:	5164-E	**Collection Date:**	06/14/16 02:40 PM
Lab Order:	1606145	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **KL**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	06/23/16 12:05 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	06/20/16 03:03 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	06/20/16 03:03 PM
Barium	0.0983	0.00300	0.0100		mg/L	1	06/20/16 03:03 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	06/20/16 03:03 PM
Boron	0.0870	0.0100	0.0300		mg/L	1	06/24/16 11:45 AM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	06/20/16 03:03 PM
Calcium	71.5	1.00	3.00		mg/L	10	06/24/16 11:43 AM
Chromium	0.00486	0.00200	0.00500	J	mg/L	1	06/20/16 03:03 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	06/20/16 03:03 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	06/20/16 03:03 PM
Lithium	0.0525	0.00500	0.0100		mg/L	1	06/20/16 03:03 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	06/20/16 03:03 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	06/20/16 03:03 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	06/20/16 03:03 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	90.4	3.00	10.0		mg/L	10	06/21/16 03:29 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	06/21/16 11:50 AM
Sulfate	52.4	1.00	3.00		mg/L	1	06/21/16 11:50 AM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	7.21	0	0		pH Units@18.5℃	1	06/15/16 11:25 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	495	10.0	10.0		mg/L	1	06/20/16 08:45 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *03-Aug-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-29
Project:	Sandow CCR	**Lab ID:**	1606145-06
Project No:	5164-E	**Collection Date:**	06/14/16 03:50 PM
Lab Order:	1606145	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **KL**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	06/23/16 12:08 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	06/20/16 03:05 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	06/20/16 03:05 PM
Barium	0.0366	0.00300	0.0100		mg/L	1	06/20/16 03:05 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	06/20/16 03:05 PM
Boron	0.316	0.0100	0.0300		mg/L	1	06/24/16 11:49 AM
Cadmium	0.00223	0.000300	0.00100		mg/L	1	06/20/16 03:05 PM
Calcium	347	5.00	15.0		mg/L	50	06/24/16 11:47 AM
Chromium	0.0301	0.00200	0.00500		mg/L	1	06/20/16 03:05 PM
Cobalt	0.115	0.00300	0.00500		mg/L	1	06/20/16 03:05 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	06/20/16 03:05 PM
Lithium	0.0449	0.00500	0.0100		mg/L	1	06/20/16 03:05 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	06/20/16 03:05 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	06/20/16 03:05 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	06/20/16 03:05 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	288	30.0	100		mg/L	100	06/21/16 04:14 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	06/21/16 12:05 PM
Sulfate	1240	100	300		mg/L	100	06/21/16 04:14 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.37	0	0		pH Units@18.7℃	1	06/15/16 11:26 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	3000	50.0	50.0		mg/L	1	06/20/16 08:45 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *03-Aug-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	EB-01
Project:	Sandow CCR	**Lab ID:**	1606145-07
Project No:	5164-E	**Collection Date:**	06/14/16 08:55 AM
Lab Order:	1606145	**Matrix:**	EQUIP BLANK

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **KL**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	06/23/16 12:10 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	06/20/16 03:07 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	06/20/16 03:07 PM
Barium	<0.00300	0.00300	0.0100		mg/L	1	06/20/16 03:07 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	06/20/16 03:07 PM
Boron	0.0270	0.0100	0.0300	J	mg/L	1	06/24/16 11:51 AM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	06/20/16 03:07 PM
Calcium	0.159	0.100	0.300	J	mg/L	1	06/20/16 03:07 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	06/20/16 03:07 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	06/20/16 03:07 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	06/20/16 03:07 PM
Lithium	<0.00500	0.00500	0.0100		mg/L	1	06/20/16 03:07 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	06/20/16 03:07 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	06/20/16 03:07 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	06/20/16 03:07 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	<0.300	0.300	1.00		mg/L	1	06/21/16 01:49 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	06/21/16 01:49 PM
Sulfate	<1.00	1.00	3.00		mg/L	1	06/21/16 01:49 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	7.16	0	0		pH Units@20.2℃	1	06/15/16 11:29 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	<10.0	10.0	10.0		mg/L	1	06/20/16 08:45 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606145
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_160623A

The QC data in batch 75654 applies to the following samples: 1606145-01A, 1606145-02A, 1606145-03A, 1606145-04A, 1606145-05A, 1606145-06A, 1606145-07A

Sample ID	**MB-75654**	Batch ID:	**75654**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**CETAC2_HG_160623A**	Analysis Date:	**6/23/2016 11:18:18 AM**	Prep Date:	**6/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	<0.0000800	0.000200								

Sample ID	**LCS-75654**	Batch ID:	**75654**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**CETAC2_HG_160623A**	Analysis Date:	**6/23/2016 11:20:34 AM**	Prep Date:	**6/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00202	0.000200	0.00200	0	101	85	115			

Sample ID	**LCSD-75654**	Batch ID:	**75654**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**CETAC2_HG_160623A**	Analysis Date:	**6/23/2016 11:22:50 AM**	Prep Date:	**6/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00199	0.000200	0.00200	0	99.5	85	115	1.50	15	

Sample ID	**1606121-06A SD**	Batch ID:	**75654**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**SD**	Run ID:	**CETAC2_HG_160623A**	Analysis Date:	**6/23/2016 11:38:42 AM**	Prep Date:	**6/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	<0.000400	0.00100	0	0				0	10	

Sample ID	**1606121-06A PDS**	Batch ID:	**75654**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**PDS**	Run ID:	**CETAC2_HG_160623A**	Analysis Date:	**6/23/2016 11:40:57 AM**	Prep Date:	**6/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00244	0.000200	0.00250	0	97.6	85	115			

Sample ID	**1606121-06A MS**	Batch ID:	**75654**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**CETAC2_HG_160623A**	Analysis Date:	**6/23/2016 11:43:13 AM**	Prep Date:	**6/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00201	0.000200	0.00200	0	101	80	120			

Sample ID	**1606121-06A MSD**	Batch ID:	**75654**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**CETAC2_HG_160623A**	Analysis Date:	**6/23/2016 11:45:29 AM**	Prep Date:	**6/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00200	0.000200	0.00200	0	100	80	120	0.499	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606145
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_160623A

Sample ID	**ICV-160623**	Batch ID:	**R86503**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**CETAC2_HG_160623A**	Analysis Date:	**6/23/2016 10:03:19 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00399	0.000200	0.00400	0	99.8	90	110			

Sample ID	**CCV2-160623**	Batch ID:	**R86503**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_160623A**	Analysis Date:	**6/23/2016 11:13:45 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00197	0.000200	0.00200	0	98.5	90	110			

Sample ID	**CCV3-160623**	Batch ID:	**R86503**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_160623A**	Analysis Date:	**6/23/2016 11:56:51 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00196	0.000200	0.00200	0	98.0	90	110			

Sample ID	**CCV4-160623**	Batch ID:	**R86503**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_160623A**	Analysis Date:	**6/23/2016 12:24:10 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00197	0.000200	0.00200	0	98.5	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606145
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160617B

The QC data in batch 75691 applies to the following samples: 1606145-01A, 1606145-02A, 1606145-03A, 1606145-04A

Sample ID **MB-75691** Batch ID: **75691** TestNo: **SW6020A** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS4_160617B** Analysis Date: **6/17/2016 1:01:00 PM** Prep Date: **6/16/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.000800	0.00250								
Arsenic	<0.00200	0.00500								
Barium	<0.00300	0.0100								
Beryllium	<0.000300	0.00100								
Cadmium	<0.000300	0.00100								
Calcium	<0.100	0.300								
Chromium	<0.00200	0.00500								
Cobalt	<0.00300	0.00500								
Lead	<0.000300	0.00100								
Lithium	<0.00500	0.0100								
Molybdenum	<0.00200	0.00500								
Selenium	<0.00200	0.00500								
Thallium	<0.000500	0.00150								

Sample ID **LCS-75691** Batch ID: **75691** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS4_160617B** Analysis Date: **6/17/2016 1:03:00 PM** Prep Date: **6/16/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.201	0.00250	0.200	0	100	80	120			
Arsenic	0.203	0.00500	0.200	0	101	80	120			
Barium	0.202	0.0100	0.200	0	101	80	120			
Beryllium	0.211	0.00100	0.200	0	105	80	120			
Cadmium	0.202	0.00100	0.200	0	101	80	120			
Calcium	4.79	0.300	5.00	0	95.7	80	120			
Chromium	0.207	0.00500	0.200	0	104	80	120			
Cobalt	0.210	0.00500	0.200	0	105	80	120			
Lead	0.200	0.00100	0.200	0	100	80	120			
Lithium	0.226	0.0100	0.200	0	113	80	120			
Molybdenum	0.200	0.00500	0.200	0	100	80	120			
Selenium	0.206	0.00500	0.200	0	103	80	120			
Thallium	0.205	0.00150	0.200	0	102	80	120			

Sample ID **LCSD-75691** Batch ID: **75691** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS4_160617B** Analysis Date: **6/17/2016 1:05:00 PM** Prep Date: **6/16/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.200	0.00250	0.200	0	100	80	120	0.276	15	
Arsenic	0.202	0.00500	0.200	0	101	80	120	0.489	15	
Barium	0.202	0.0100	0.200	0	101	80	120	0.031	15	
Beryllium	0.214	0.00100	0.200	0	107	80	120	1.50	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606145
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160617B

Sample ID **LCSD-75691**	Batch ID: **75691**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCSD**	Run ID: **ICP-MS4_160617B**	Analysis Date: **6/17/2016 1:05:00 PM**	Prep Date: **6/16/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	0.202	0.00100	0.200	0	101	80	120	0.137	15	
Calcium	4.82	0.300	5.00	0	96.5	80	120	0.815	15	
Chromium	0.205	0.00500	0.200	0	103	80	120	0.800	15	
Cobalt	0.208	0.00500	0.200	0	104	80	120	0.679	15	
Lead	0.200	0.00100	0.200	0	100	80	120	0.177	15	
Lithium	0.215	0.0100	0.200	0	107	80	120	5.18	15	
Molybdenum	0.198	0.00500	0.200	0	99.0	80	120	1.14	15	
Selenium	0.203	0.00500	0.200	0	101	80	120	1.44	15	
Thallium	0.206	0.00150	0.200	0	103	80	120	0.579	15	

Sample ID **1606142-07A SD**	Batch ID: **75691**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **SD**	Run ID: **ICP-MS4_160617B**	Analysis Date: **6/17/2016 1:11:00 PM**	Prep Date: **6/16/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.00400	0.0125	0	0				0	10	
Arsenic	0.0147	0.0250	0	0.0148				1.02	10	
Barium	0.0245	0.0500	0	0.0247				0.963	10	
Beryllium	<0.00150	0.00500	0	0				0	10	
Cadmium	<0.00150	0.00500	0	0.000432				0	10	
Chromium	<0.0100	0.0250	0	0				0	10	
Cobalt	0.0449	0.0250	0	0.0423				5.90	10	
Lead	<0.00150	0.00500	0	0				0	10	
Molybdenum	0.809	0.0250	0	0.813				0.480	10	
Selenium	<0.0100	0.0250	0	0.00263				0	10	
Thallium	<0.00250	0.00750	0	0				0	10	

Sample ID **1606142-07A PDS**	Batch ID: **75691**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS4_160617B**	Analysis Date: **6/17/2016 1:31:00 PM**	Prep Date: **6/16/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.194	0.00250	0.200	0	97.1	80	120			
Arsenic	0.218	0.00500	0.200	0.0148	102	80	120			
Barium	0.214	0.0100	0.200	0.0247	94.8	80	120			
Beryllium	0.163	0.00100	0.200	0	81.6	80	120			
Cadmium	0.176	0.00100	0.200	0.000432	87.8	80	120			
Chromium	0.183	0.00500	0.200	0	91.3	80	120			
Cobalt	0.232	0.00500	0.200	0.0423	94.8	80	120			
Lead	0.202	0.00100	0.200	0	101	80	120			
Molybdenum	0.942	0.00500	0.200	0.813	64.6	80	120			S
Selenium	0.235	0.00500	0.200	0.00263	116	80	120			
Thallium	0.202	0.00150	0.200	0	101	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606145
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160617B

Sample ID **1606142-07A MS**	Batch ID: **75691**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS4_160617B**	Analysis Date: **6/17/2016 1:33:00 PM**	Prep Date: **6/16/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.191	0.00250	0.200	0	95.6	80	120			
Arsenic	0.219	0.00500	0.200	0.0148	102	80	120			
Barium	0.217	0.0100	0.200	0.0247	96.0	80	120			
Beryllium	0.155	0.00100	0.200	0	77.6	80	120			S
Cadmium	0.177	0.00100	0.200	0.000432	88.4	80	120			
Calcium	378	0.300	5.00	368	211	80	120			S
Chromium	0.176	0.00500	0.200	0	87.9	80	120			
Cobalt	0.230	0.00500	0.200	0.0423	94.0	80	120			
Lead	0.198	0.00100	0.200	0	99.0	80	120			
Lithium	0.212	0.0100	0.200	0.0731	69.4	80	120			S
Molybdenum	0.997	0.00500	0.200	0.813	92.0	80	120			
Selenium	0.238	0.00500	0.200	0.00263	118	80	120			
Thallium	0.202	0.00150	0.200	0	101	80	120			

Sample ID **1606142-07A MSD**	Batch ID: **75691**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS4_160617B**	Analysis Date: **6/17/2016 1:35:00 PM**	Prep Date: **6/16/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.196	0.00250	0.200	0	97.9	80	120	2.33	15	
Arsenic	0.219	0.00500	0.200	0.0148	102	80	120	0.093	15	
Barium	0.220	0.0100	0.200	0.0247	97.7	80	120	1.56	15	
Beryllium	0.156	0.00100	0.200	0	77.9	80	120	0.395	15	S
Cadmium	0.179	0.00100	0.200	0.000432	89.3	80	120	0.962	15	
Calcium	376	0.300	5.00	368	158	80	120	0.702	15	S
Chromium	0.177	0.00500	0.200	0	88.6	80	120	0.876	15	
Cobalt	0.230	0.00500	0.200	0.0423	93.7	80	120	0.257	15	
Lead	0.202	0.00100	0.200	0	101	80	120	2.10	15	
Lithium	0.205	0.0100	0.200	0.0731	66.0	80	120	3.27	15	S
Molybdenum	1.01	0.00500	0.200	0.813	96.4	80	120	0.878	15	
Selenium	0.242	0.00500	0.200	0.00263	120	80	120	1.68	15	
Thallium	0.204	0.00150	0.200	0	102	80	120	0.915	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606145
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160617B

Sample ID	**ICV-160617**	Batch ID:	**R86404**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**ICP-MS4_160617B**	Analysis Date:	**6/17/2016 10:43:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.101	0.00250	0.100	0	101	90	110			
Arsenic	0.0990	0.00500	0.100	0	99.0	90	110			
Barium	0.0982	0.0100	0.100	0	98.2	90	110			
Beryllium	0.0990	0.00100	0.100	0	99.0	90	110			
Cadmium	0.0981	0.00100	0.100	0	98.1	90	110			
Calcium	2.33	0.300	2.50	0	93.3	90	110			
Chromium	0.103	0.00500	0.100	0	103	90	110			
Cobalt	0.102	0.00500	0.100	0	102	90	110			
Lead	0.0976	0.00100	0.100	0	97.6	90	110			
Lithium	0.0940	0.0100	0.100	0	94.0	90	110			
Molybdenum	0.0945	0.00500	0.100	0	94.5	90	110			
Selenium	0.102	0.00500	0.100	0	102	90	110			
Thallium	0.0979	0.00150	0.100	0	97.9	90	110			

Sample ID	**LCVL-160617**	Batch ID:	**R86404**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160617B**	Analysis Date:	**6/17/2016 10:47:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00199	0.00250	0.00200	0	99.6	70	130			
Arsenic	0.00512	0.00500	0.00500	0	102	70	130			
Barium	0.00522	0.0100	0.00500	0	104	70	130			
Beryllium	0.000870	0.00100	0.00100	0	87.0	70	130			
Cadmium	0.00100	0.00100	0.00100	0	100	70	130			
Calcium	0.110	0.300	0.100	0	110	70	130			
Chromium	0.00533	0.00500	0.00500	0	107	70	130			
Cobalt	0.00519	0.00500	0.00500	0	104	70	130			
Lead	0.000918	0.00100	0.00100	0	91.8	70	130			
Lithium	0.0100	0.0100	0.0100	0	100	70	130			
Molybdenum	0.00500	0.00500	0.00500	0	100	70	130			
Selenium	0.00530	0.00500	0.00500	0	106	70	130			
Thallium	0.00103	0.00150	0.00100	0	103	70	130			

Sample ID	**CCV2-160617**	Batch ID:	**R86404**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_160617B**	Analysis Date:	**6/17/2016 12:42:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.198	0.00250	0.200	0	99.2	90	110			
Arsenic	0.201	0.00500	0.200	0	101	90	110			
Barium	0.196	0.0100	0.200	0	98.0	90	110			
Beryllium	0.214	0.00100	0.200	0	107	90	110			
Cadmium	0.195	0.00100	0.200	0	97.5	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606145
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160617B

Sample ID **CCV2-160617**	Batch ID: **R86404**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160617B**	Analysis Date: **6/17/2016 12:42:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.72	0.300	5.00	0	94.5	90	110			
Chromium	0.203	0.00500	0.200	0	101	90	110			
Cobalt	0.208	0.00500	0.200	0	104	90	110			
Lead	0.200	0.00100	0.200	0	100	90	110			
Lithium	0.216	0.0100	0.200	0	108	90	110			
Molybdenum	0.193	0.00500	0.200	0	96.5	90	110			
Selenium	0.204	0.00500	0.200	0	102	90	110			
Thallium	0.204	0.00150	0.200	0	102	90	110			

Sample ID **LCVL2-160617**	Batch ID: **R86404**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_160617B**	Analysis Date: **6/17/2016 12:47:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00200	0.00250	0.00200	0	99.8	70	130			
Arsenic	0.00529	0.00500	0.00500	0	106	70	130			
Barium	0.00505	0.0100	0.00500	0	101	70	130			
Beryllium	0.000756	0.00100	0.00100	0	75.6	70	130			
Cadmium	0.00102	0.00100	0.00100	0	102	70	130			
Calcium	0.107	0.300	0.100	0	107	70	130			
Chromium	0.00525	0.00500	0.00500	0	105	70	130			
Cobalt	0.00528	0.00500	0.00500	0	106	70	130			
Lead	0.000861	0.00100	0.00100	0	86.1	70	130			
Lithium	0.0129	0.0100	0.0100	0	129	70	130			
Molybdenum	0.00499	0.00500	0.00500	0	99.7	70	130			
Selenium	0.00573	0.00500	0.00500	0	115	70	130			
Thallium	0.00102	0.00150	0.00100	0	102	70	130			

Sample ID **CCV3-160617**	Batch ID: **R86404**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160617B**	Analysis Date: **6/17/2016 1:37:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.204	0.00250	0.200	0	102	90	110			
Arsenic	0.201	0.00500	0.200	0	101	90	110			
Barium	0.199	0.0100	0.200	0	99.7	90	110			
Beryllium	0.197	0.00100	0.200	0	98.5	90	110			
Cadmium	0.199	0.00100	0.200	0	99.7	90	110			
Calcium	5.10	0.300	5.00	0	102	90	110			
Chromium	0.196	0.00500	0.200	0	98.1	90	110			
Cobalt	0.202	0.00500	0.200	0	101	90	110			
Lead	0.200	0.00100	0.200	0	100	90	110			
Lithium	0.198	0.0100	0.200	0	98.8	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606145
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160617B

Sample ID **CCV3-160617**	Batch ID: **R86404**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160617B**	Analysis Date: **6/17/2016 1:37:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Molybdenum	0.197	0.00500	0.200	0	98.6	90	110			
Selenium	0.210	0.00500	0.200	0	105	90	110			
Thallium	0.206	0.00150	0.200	0	103	90	110			

Sample ID **LCVL3-160617**	Batch ID: **R86404**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_160617B**	Analysis Date: **6/17/2016 1:41:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00207	0.00250	0.00200	0	104	70	130			
Arsenic	0.00526	0.00500	0.00500	0	105	70	130			
Barium	0.00527	0.0100	0.00500	0	105	70	130			
Beryllium	0.00116	0.00100	0.00100	0	116	70	130			
Cadmium	0.00100	0.00100	0.00100	0	100	70	130			
Calcium	0.112	0.300	0.100	0	112	70	130			
Chromium	0.00526	0.00500	0.00500	0	105	70	130			
Cobalt	0.00534	0.00500	0.00500	0	107	70	130			
Lead	0.000882	0.00100	0.00100	0	88.2	70	130			
Lithium	0.0113	0.0100	0.0100	0	113	70	130			
Molybdenum	0.00514	0.00500	0.00500	0	103	70	130			
Selenium	0.00562	0.00500	0.00500	0	112	70	130			
Thallium	0.00104	0.00150	0.00100	0	104	70	130			

Sample ID **CCV4-160617**	Batch ID: **R86404**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160617B**	Analysis Date: **6/17/2016 2:05:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.200	0.00250	0.200	0	99.9	90	110			
Arsenic	0.200	0.00500	0.200	0	100	90	110			
Barium	0.197	0.0100	0.200	0	98.7	90	110			
Beryllium	0.211	0.00100	0.200	0	106	90	110			
Cadmium	0.197	0.00100	0.200	0	98.6	90	110			
Chromium	0.201	0.00500	0.200	0	100	90	110			
Cobalt	0.205	0.00500	0.200	0	102	90	110			
Lead	0.198	0.00100	0.200	0	99.2	90	110			
Molybdenum	0.193	0.00500	0.200	0	96.3	90	110			
Selenium	0.206	0.00500	0.200	0	103	90	110			
Thallium	0.204	0.00150	0.200	0	102	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606145
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160617B

Sample ID **LCVL4-160617** Batch ID: **R86404** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS4_160617B** Analysis Date: **6/17/2016 2:09:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00201	0.00250	0.00200	0	101	70	130			
Arsenic	0.00529	0.00500	0.00500	0	106	70	130			
Barium	0.00510	0.0100	0.00500	0	102	70	130			
Beryllium	0.00101	0.00100	0.00100	0	101	70	130			
Cadmium	0.000909	0.00100	0.00100	0	90.9	70	130			
Chromium	0.00530	0.00500	0.00500	0	106	70	130			
Cobalt	0.00536	0.00500	0.00500	0	107	70	130			
Lead	0.000862	0.00100	0.00100	0	86.2	70	130			
Molybdenum	0.00493	0.00500	0.00500	0	98.5	70	130			
Selenium	0.00535	0.00500	0.00500	0	107	70	130			
Thallium	0.00102	0.00150	0.00100	0	102	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank
J	Analyte detected between MDL and RL
ND	Not Detected at the Method Detection Limit
RL	Reporting Limit
J	Analyte detected between SDL and RL
DF	Dilution Factor
MDL	Method Detection Limit
R	RPD outside accepted control limits
S	Spike Recovery outside control limits
N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606145
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160620B

The QC data in batch 75715 applies to the following samples: 1606145-05A, 1606145-06A, 1606145-07A

Sample ID **MB-75715** Batch ID: **75715** TestNo: **SW6020A** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS4_160620B** Analysis Date: **6/20/2016 2:51:00 PM** Prep Date: **6/17/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.000800	0.00250								
Arsenic	<0.00200	0.00500								
Barium	<0.00300	0.0100								
Beryllium	<0.000300	0.00100								
Cadmium	<0.000300	0.00100								
Calcium	<0.100	0.300								
Chromium	<0.00200	0.00500								
Cobalt	<0.00300	0.00500								
Lead	<0.000300	0.00100								
Lithium	<0.00500	0.0100								
Molybdenum	<0.00200	0.00500								
Selenium	<0.00200	0.00500								
Thallium	<0.000500	0.00150								

Sample ID **LCS-75715** Batch ID: **75715** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS4_160620B** Analysis Date: **6/20/2016 2:53:00 PM** Prep Date: **6/17/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.192	0.00250	0.200	0	96.0	80	120			
Arsenic	0.201	0.00500	0.200	0	100	80	120			
Barium	0.196	0.0100	0.200	0	98.0	80	120			
Beryllium	0.196	0.00100	0.200	0	98.1	80	120			
Cadmium	0.195	0.00100	0.200	0	97.4	80	120			
Calcium	4.73	0.300	5.00	0	94.5	80	120			
Chromium	0.199	0.00500	0.200	0	99.5	80	120			
Cobalt	0.209	0.00500	0.200	0	105	80	120			
Lead	0.195	0.00100	0.200	0	97.6	80	120			
Lithium	0.205	0.0100	0.200	0	102	80	120			
Molybdenum	0.188	0.00500	0.200	0	94.2	80	120			
Selenium	0.206	0.00500	0.200	0	103	80	120			
Thallium	0.196	0.00150	0.200	0	98.2	80	120			

Sample ID **LCSD-75715** Batch ID: **75715** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS4_160620B** Analysis Date: **6/20/2016 2:55:00 PM** Prep Date: **6/17/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.192	0.00250	0.200	0	95.8	80	120	0.217	15	
Arsenic	0.199	0.00500	0.200	0	99.4	80	120	0.835	15	
Barium	0.193	0.0100	0.200	0	96.7	80	120	1.32	15	
Beryllium	0.199	0.00100	0.200	0	99.3	80	120	1.18	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606145
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160620B

Sample ID **LCSD-75715**	Batch ID: **75715**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCSD**	Run ID: **ICP-MS4_160620B**	Analysis Date: **6/20/2016 2:55:00 PM**	Prep Date: **6/17/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	0.195	0.00100	0.200	0	97.6	80	120	0.161	15	
Calcium	4.72	0.300	5.00	0	94.5	80	120	0.015	15	
Chromium	0.200	0.00500	0.200	0	99.8	80	120	0.305	15	
Cobalt	0.207	0.00500	0.200	0	103	80	120	1.17	15	
Lead	0.195	0.00100	0.200	0	97.5	80	120	0.124	15	
Lithium	0.199	0.0100	0.200	0	99.3	80	120	3.03	15	
Molybdenum	0.189	0.00500	0.200	0	94.6	80	120	0.372	15	
Selenium	0.203	0.00500	0.200	0	102	80	120	1.45	15	
Thallium	0.195	0.00150	0.200	0	97.5	80	120	0.713	15	

Sample ID **1606160-02A SD**	Batch ID: **75715**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **SD**	Run ID: **ICP-MS4_160620B**	Analysis Date: **6/20/2016 3:01:00 PM**	Prep Date: **6/17/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.00400	0.0125	0	0				0	10	
Arsenic	<0.0100	0.0250	0	0				0	10	
Barium	0.0639	0.0500	0	0.0652				2.09	10	
Beryllium	<0.00150	0.00500	0	0				0	10	
Cadmium	<0.00150	0.00500	0	0.000386				0	10	
Chromium	<0.0100	0.0250	0	0				0	10	
Cobalt	<0.0150	0.0250	0	0				0	10	
Lead	<0.00150	0.00500	0	0				0	10	
Lithium	0.0421	0.0500	0	0.0451				6.82	10	
Molybdenum	<0.0100	0.0250	0	0.00481				0	10	
Selenium	0.0475	0.0250	0	0.0462				2.77	10	
Thallium	<0.00250	0.00750	0	0				0	10	

Sample ID **1606160-02A PDS**	Batch ID: **75715**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS4_160620B**	Analysis Date: **6/20/2016 3:21:00 PM**	Prep Date: **6/17/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.187	0.00250	0.200	0	93.6	80	120			
Arsenic	0.199	0.00500	0.200	0	99.6	80	120			
Barium	0.259	0.0100	0.200	0.0652	97.0	80	120			
Beryllium	0.190	0.00100	0.200	0	94.9	80	120			
Cadmium	0.192	0.00100	0.200	0.000386	95.7	80	120			
Chromium	0.201	0.00500	0.200	0	100	80	120			
Cobalt	0.205	0.00500	0.200	0	102	80	120			
Lead	0.197	0.00100	0.200	0	98.7	80	120			
Lithium	0.238	0.0100	0.200	0.0451	96.7	80	120			
Molybdenum	0.195	0.00500	0.200	0.00481	95.2	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606145
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160620B

Sample ID **1606160-02A PDS**	Batch ID: **75715**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS4_160620B**	Analysis Date: **6/20/2016 3:21:00 PM**	Prep Date: **6/17/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Selenium	0.243	0.00500	0.200	0.0462	98.5	80	120			
Thallium	0.198	0.00150	0.200	0	98.8	80	120			

Sample ID **1606160-02A MS**	Batch ID: **75715**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS4_160620B**	Analysis Date: **6/20/2016 3:23:00 PM**	Prep Date: **6/17/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.198	0.00250	0.200	0	99.2	80	120			
Arsenic	0.198	0.00500	0.200	0	99.2	80	120			
Barium	0.262	0.0100	0.200	0.0652	98.4	80	120			
Beryllium	0.189	0.00100	0.200	0	94.5	80	120			
Cadmium	0.193	0.00100	0.200	0.000386	96.4	80	120			
Calcium	95.0	0.300	5.00	91.5	69.3	80	120			S
Chromium	0.195	0.00500	0.200	0	97.3	80	120			
Cobalt	0.202	0.00500	0.200	0	101	80	120			
Lead	0.192	0.00100	0.200	0	96.1	80	120			
Lithium	0.236	0.0100	0.200	0.0451	95.6	80	120			
Molybdenum	0.198	0.00500	0.200	0.00481	96.8	80	120			
Selenium	0.240	0.00500	0.200	0.0462	96.9	80	120			
Thallium	0.194	0.00150	0.200	0	97.0	80	120			

Sample ID **1606160-02A MSD**	Batch ID: **75715**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS4_160620B**	Analysis Date: **6/20/2016 3:25:00 PM**	Prep Date: **6/17/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.197	0.00250	0.200	0	98.6	80	120	0.627	15	
Arsenic	0.202	0.00500	0.200	0	101	80	120	1.88	15	
Barium	0.265	0.0100	0.200	0.0652	100	80	120	1.25	15	
Beryllium	0.194	0.00100	0.200	0	96.9	80	120	2.57	15	
Cadmium	0.194	0.00100	0.200	0.000386	96.6	80	120	0.193	15	
Calcium	98.3	0.300	5.00	91.5	136	80	120	3.45	15	S
Chromium	0.198	0.00500	0.200	0	99.0	80	120	1.74	15	
Cobalt	0.203	0.00500	0.200	0	102	80	120	0.702	15	
Lead	0.198	0.00100	0.200	0	98.9	80	120	2.90	15	
Lithium	0.244	0.0100	0.200	0.0451	99.4	80	120	3.21	15	
Molybdenum	0.199	0.00500	0.200	0.00481	97.3	80	120	0.497	15	
Selenium	0.246	0.00500	0.200	0.0462	99.8	80	120	2.38	15	
Thallium	0.201	0.00150	0.200	0	100	80	120	3.46	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606145
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160620B

Sample ID **ICV-160620**	Batch ID: **R86427**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS4_160620B**	Analysis Date: **6/20/2016 11:40:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.100	0.00250	0.100	0	100	90	110			
Arsenic	0.0988	0.00500	0.100	0	98.8	90	110			
Barium	0.0988	0.0100	0.100	0	98.8	90	110			
Beryllium	0.100	0.00100	0.100	0	100	90	110			
Cadmium	0.0978	0.00100	0.100	0	97.8	90	110			
Calcium	2.30	0.300	2.50	0	92.2	90	110			
Chromium	0.101	0.00500	0.100	0	101	90	110			
Cobalt	0.105	0.00500	0.100	0	105	90	110			
Lead	0.0982	0.00100	0.100	0	98.2	90	110			
Lithium	0.0971	0.0100	0.100	0	97.1	90	110			
Molybdenum	0.0936	0.00500	0.100	0	93.6	90	110			
Selenium	0.102	0.00500	0.100	0	102	90	110			
Thallium	0.0973	0.00150	0.100	0	97.3	90	110			

Sample ID **LCVL-160620**	Batch ID: **R86427**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_160620B**	Analysis Date: **6/20/2016 11:48:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00198	0.00250	0.00200	0	99.2	70	130			
Arsenic	0.00512	0.00500	0.00500	0	102	70	130			
Barium	0.00512	0.0100	0.00500	0	102	70	130			
Beryllium	0.000973	0.00100	0.00100	0	97.3	70	130			
Cadmium	0.000984	0.00100	0.00100	0	98.4	70	130			
Calcium	0.101	0.300	0.100	0	101	70	130			
Chromium	0.00518	0.00500	0.00500	0	104	70	130			
Cobalt	0.00529	0.00500	0.00500	0	106	70	130			
Lead	0.000914	0.00100	0.00100	0	91.4	70	130			
Lithium	0.0101	0.0100	0.0100	0	101	70	130			
Molybdenum	0.00477	0.00500	0.00500	0	95.4	70	130			
Selenium	0.00562	0.00500	0.00500	0	112	70	130			
Thallium	0.000990	0.00150	0.00100	0	99.0	70	130			

Sample ID **CCV4-160620**	Batch ID: **R86427**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160620B**	Analysis Date: **6/20/2016 2:35:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.197	0.00250	0.200	0	98.6	90	110			
Arsenic	0.201	0.00500	0.200	0	100	90	110			
Barium	0.196	0.0100	0.200	0	98.1	90	110			
Beryllium	0.193	0.00100	0.200	0	96.7	90	110			
Cadmium	0.198	0.00100	0.200	0	98.8	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank
J	Analyte detected between MDL and RL
ND	Not Detected at the Method Detection Limit
RL	Reporting Limit
J	Analyte detected between SDL and RL
DF	Dilution Factor
MDL	Method Detection Limit
R	RPD outside accepted control limits
S	Spike Recovery outside control limits
N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606145
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160620B

Sample ID **CCV4-160620**	Batch ID: **R86427**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160620B**	Analysis Date: **6/20/2016 2:35:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.72	0.300	5.00	0	94.5	90	110			
Chromium	0.199	0.00500	0.200	0	99.3	90	110			
Cobalt	0.209	0.00500	0.200	0	104	90	110			
Lead	0.197	0.00100	0.200	0	98.6	90	110			
Lithium	0.197	0.0100	0.200	0	98.3	90	110			
Molybdenum	0.188	0.00500	0.200	0	94.2	90	110			
Selenium	0.203	0.00500	0.200	0	101	90	110			
Thallium	0.199	0.00150	0.200	0	99.4	90	110			

Sample ID **LCVL4-160620**	Batch ID: **R86427**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_160620B**	Analysis Date: **6/20/2016 2:47:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00191	0.00250	0.00200	0	95.7	70	130			
Arsenic	0.00508	0.00500	0.00500	0	102	70	130			
Barium	0.00495	0.0100	0.00500	0	99.0	70	130			
Beryllium	0.000827	0.00100	0.00100	0	82.7	70	130			
Cadmium	0.000970	0.00100	0.00100	0	97.0	70	130			
Calcium	0.101	0.300	0.100	0	101	70	130			
Chromium	0.00513	0.00500	0.00500	0	103	70	130			
Cobalt	0.00533	0.00500	0.00500	0	107	70	130			
Lead	0.000880	0.00100	0.00100	0	88.0	70	130			
Lithium	0.00907	0.0100	0.0100	0	90.7	70	130			
Molybdenum	0.00472	0.00500	0.00500	0	94.4	70	130			
Selenium	0.00573	0.00500	0.00500	0	115	70	130			
Thallium	0.000975	0.00150	0.00100	0	97.5	70	130			

Sample ID **CCV5-160620**	Batch ID: **R86427**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160620B**	Analysis Date: **6/20/2016 3:27:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.194	0.00250	0.200	0	96.8	90	110			
Arsenic	0.200	0.00500	0.200	0	99.8	90	110			
Barium	0.194	0.0100	0.200	0	97.0	90	110			
Beryllium	0.194	0.00100	0.200	0	96.9	90	110			
Cadmium	0.193	0.00100	0.200	0	96.6	90	110			
Calcium	4.74	0.300	5.00	0	94.9	90	110			
Chromium	0.199	0.00500	0.200	0	99.3	90	110			
Cobalt	0.207	0.00500	0.200	0	103	90	110			
Lead	0.194	0.00100	0.200	0	97.2	90	110			
Lithium	0.199	0.0100	0.200	0	99.7	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606145
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160620B

Sample ID **CCV5-160620**	Batch ID: **R86427**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160620B**	Analysis Date: **6/20/2016 3:27:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Molybdenum	0.188	0.00500	0.200	0	94.2	90	110			
Selenium	0.202	0.00500	0.200	0	101	90	110			
Thallium	0.197	0.00150	0.200	0	98.6	90	110			

Sample ID **LCVL5-160620**	Batch ID: **R86427**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_160620B**	Analysis Date: **6/20/2016 3:37:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00205	0.00250	0.00200	0	102	70	130			
Arsenic	0.00507	0.00500	0.00500	0	101	70	130			
Barium	0.00495	0.0100	0.00500	0	99.0	70	130			
Beryllium	0.00103	0.00100	0.00100	0	103	70	130			
Cadmium	0.000972	0.00100	0.00100	0	97.2	70	130			
Calcium	0.0956	0.300	0.100	0	95.6	70	130			
Chromium	0.00514	0.00500	0.00500	0	103	70	130			
Cobalt	0.00531	0.00500	0.00500	0	106	70	130			
Lead	0.000882	0.00100	0.00100	0	88.2	70	130			
Lithium	0.0105	0.0100	0.0100	0	105	70	130			
Molybdenum	0.00475	0.00500	0.00500	0	95.1	70	130			
Selenium	0.00515	0.00500	0.00500	0	103	70	130			
Thallium	0.000981	0.00150	0.00100	0	98.1	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606145
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160623A

The QC data in batch 75691 applies to the following samples: 1606145-01A, 1606145-02A, 1606145-03A, 1606145-04A

Sample ID	**MB-75691**	Batch ID:	**75691**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**ICP-MS4_160623A**	Analysis Date:	**6/23/2016 12:23:00 PM**	Prep Date:	**6/16/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	<0.0100	0.0300								

Sample ID	**LCS-75691**	Batch ID:	**75691**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**ICP-MS4_160623A**	Analysis Date:	**6/23/2016 12:25:00 PM**	Prep Date:	**6/16/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.211	0.0300	0.200	0	105	80	120			

Sample ID	**LCSD-75691**	Batch ID:	**75691**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**ICP-MS4_160623A**	Analysis Date:	**6/23/2016 12:27:00 PM**	Prep Date:	**6/16/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.211	0.0300	0.200	0	106	80	120	0.445	15	

Sample ID	**1606142-07A SD**	Batch ID:	**75691**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**SD**	Run ID:	**ICP-MS4_160623A**	Analysis Date:	**6/23/2016 12:33:00 PM**	Prep Date:	**6/16/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	1.91	1.50	0	1.79				6.67	10	

Sample ID	**1606142-07A PDS**	Batch ID:	**75691**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**PDS**	Run ID:	**ICP-MS4_160623A**	Analysis Date:	**6/23/2016 12:53:00 PM**	Prep Date:	**6/16/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	3.87	0.300	2.00	1.79	104	80	120			

Sample ID	**1606142-07A MS**	Batch ID:	**75691**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**ICP-MS4_160623A**	Analysis Date:	**6/23/2016 12:55:00 PM**	Prep Date:	**6/16/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	2.16	0.300	0.200	1.79	183	80	120			S

Sample ID	**1606142-07A MSD**	Batch ID:	**75691**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**ICP-MS4_160623A**	Analysis Date:	**6/23/2016 12:57:00 PM**	Prep Date:	**6/16/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	2.09	0.300	0.200	1.79	149	80	120	3.18	15	S

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606145
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160623A

Sample ID **1606142-07A SD**	Batch ID: **75691**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **SD**	Run ID: **ICP-MS4_160623A**	Analysis Date: **6/23/2016 1:43:00 PM**	Prep Date: **6/16/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	376	75.0	0	369				1.91	10	

Sample ID **1606142-07A PDS**	Batch ID: **75691**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS4_160623A**	Analysis Date: **6/23/2016 1:45:00 PM**	Prep Date: **6/16/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	608	15.0	250	369	95.6	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606145
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160623A

Sample ID	**ICV-160623**	Batch ID:	**R86514**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**ICP-MS4_160623A**	Analysis Date:	**6/23/2016 11:37:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.107	0.0300	0.100	0	107	90	110			
Calcium	2.37	0.300	2.50	0	94.6	90	110			
Lithium	0.104	0.0100	0.100	0	104	90	110			

Sample ID	**LCVL-160623**	Batch ID:	**R86514**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160623A**	Analysis Date:	**6/23/2016 11:48:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0213	0.0300	0.0200	0	107	70	130			
Calcium	0.0946	0.300	0.100	0	94.6	70	130			
Lithium	0.0114	0.0100	0.0100	0	114	70	130			

Sample ID	**CCV1-160623**	Batch ID:	**R86514**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_160623A**	Analysis Date:	**6/23/2016 12:12:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.196	0.0300	0.200	0	97.8	90	110			

Sample ID	**LCVL1-160623**	Batch ID:	**R86514**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160623A**	Analysis Date:	**6/23/2016 12:19:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0234	0.0300	0.0200	0	117	70	130			

Sample ID	**CCV2-160623**	Batch ID:	**R86514**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_160623A**	Analysis Date:	**6/23/2016 12:59:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.211	0.0300	0.200	0	105	90	110			
Calcium	4.81	0.300	5.00	0	96.1	90	110			
Lithium	0.202	0.0100	0.200	0	101	90	110			

Sample ID	**LCVL2-160623**	Batch ID:	**R86514**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160623A**	Analysis Date:	**6/23/2016 1:37:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0184	0.0300	0.0200	0	92.2	70	130			
Calcium	0.0925	0.300	0.100	0	92.5	70	130			
Lithium	0.00975	0.0100	0.0100	0	97.5	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606145
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160623A

Sample ID	**CCV3-160623**	Batch ID:	**R86514**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_160623A**	Analysis Date:	**6/23/2016 2:03:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.216	0.0300	0.200	0	108	90	110			
Calcium	4.90	0.300	5.00	0	97.9	90	110			
Lithium	0.214	0.0100	0.200	0	107	90	110			

Sample ID	**LCVL3-160623**	Batch ID:	**R86514**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160623A**	Analysis Date:	**6/23/2016 2:22:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0198	0.0300	0.0200	0	98.8	70	130			
Calcium	0.0933	0.300	0.100	0	93.3	70	130			
Lithium	0.0110	0.0100	0.0100	0	110	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606145
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160624A

The QC data in batch 75715 applies to the following samples: 1606145-05A, 1606145-06A, 1606145-07A

Sample ID	MB-75715	Batch ID:	75715	TestNo:	SW6020A	Units:	mg/L
SampType:	MBLK	Run ID:	ICP-MS4_160624A	Analysis Date:	6/24/2016 11:31:00 AM	Prep Date:	6/17/2016

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	<0.0100	0.0300								

Sample ID	LCS-75715	Batch ID:	75715	TestNo:	SW6020A	Units:	mg/L
SampType:	LCS	Run ID:	ICP-MS4_160624A	Analysis Date:	6/24/2016 11:33:00 AM	Prep Date:	6/17/2016

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.192	0.0300	0.200	0	96.0	80	120			

Sample ID	LCSD-75715	Batch ID:	75715	TestNo:	SW6020A	Units:	mg/L
SampType:	LCSD	Run ID:	ICP-MS4_160624A	Analysis Date:	6/24/2016 11:35:00 AM	Prep Date:	6/17/2016

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.194	0.0300	0.200	0	96.8	80	120	0.797	15	

Sample ID	1606160-02A SD	Batch ID:	75715	TestNo:	SW6020A	Units:	mg/L
SampType:	SD	Run ID:	ICP-MS4_160624A	Analysis Date:	6/24/2016 11:41:00 AM	Prep Date:	6/17/2016

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	1.83	1.50	0	1.45				23.3	10	R
Calcium	87.1	15.0	0	87.0				0.137	10	

Sample ID	1606160-02A PDS	Batch ID:	75715	TestNo:	SW6020A	Units:	mg/L
SampType:	PDS	Run ID:	ICP-MS4_160624A	Analysis Date:	6/24/2016 12:01:00 PM	Prep Date:	6/17/2016

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	3.52	0.300	2.00	1.45	103	80	120			
Calcium	129	3.00	50.0	87.0	83.4	80	120			

Sample ID	1606160-02A MS	Batch ID:	75715	TestNo:	SW6020A	Units:	mg/L
SampType:	MS	Run ID:	ICP-MS4_160624A	Analysis Date:	6/24/2016 12:03:00 PM	Prep Date:	6/17/2016

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	1.85	0.300	0.200	1.45	199	80	120			S

Sample ID	1606160-02A MSD	Batch ID:	75715	TestNo:	SW6020A	Units:	mg/L
SampType:	MSD	Run ID:	ICP-MS4_160624A	Analysis Date:	6/24/2016 12:05:00 PM	Prep Date:	6/17/2016

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	1.77	0.300	0.200	1.45	161	80	120	4.14	15	S

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606145
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160624A

Sample ID **ICV-160624**	Batch ID: **R86541**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS4_160624A**	Analysis Date: **6/24/2016 10:57:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.101	0.0300	0.100	0	101	90	110			
Calcium	2.26	0.300	2.50	0	90.3	90	110			

Sample ID **LCVL-160624**	Batch ID: **R86541**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_160624A**	Analysis Date: **6/24/2016 11:16:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0208	0.0300	0.0200	0	104	70	130			
Calcium	0.0919	0.300	0.100	0	91.9	70	130			

Sample ID **CCV1-160624**	Batch ID: **R86541**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160624A**	Analysis Date: **6/24/2016 12:27:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.200	0.0300	0.200	0	100	90	110			
Calcium	4.56	0.300	5.00	0	91.2	90	110			

Sample ID **LCVL1-160624**	Batch ID: **R86541**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_160624A**	Analysis Date: **6/24/2016 12:33:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0193	0.0300	0.0200	0	96.6	70	130			
Calcium	0.0946	0.300	0.100	0	94.6	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606145
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC4_160621A

The QC data in batch 75766 applies to the following samples: 1606145-01D, 1606145-02D, 1606145-03D, 1606145-04D, 1606145-05D, 1606145-06D, 1606145-07D

Sample ID	**MB-75766**	Batch ID:	**75766**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**IC4_160621A**	Analysis Date:	**6/21/2016 9:53:23 AM**	Prep Date:	**6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	<0.300	1.00								
Fluoride	<0.100	0.400								
Sulfate	<1.00	3.00								

Sample ID	**LCS-75766**	Batch ID:	**75766**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**IC4_160621A**	Analysis Date:	**6/21/2016 10:08:22 AM**	Prep Date:	**6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.1	1.00	10.00	0	101	90	110			
Fluoride	3.91	0.400	4.000	0	97.8	90	110			
Sulfate	31.1	3.00	30.00	0	104	90	110			

Sample ID	**LCSD-75766**	Batch ID:	**75766**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**IC4_160621A**	Analysis Date:	**6/21/2016 10:23:22 AM**	Prep Date:	**6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.1	1.00	10.00	0	101	90	110	0.146	20	
Fluoride	3.91	0.400	4.000	0	97.7	90	110	0.178	20	
Sulfate	31.1	3.00	30.00	0	104	90	110	0.137	20	

Sample ID	**1606145-05DMS**	Batch ID:	**75766**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**IC4_160621A**	Analysis Date:	**6/21/2016 3:44:23 PM**	Prep Date:	**6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	299	10.0	200.0	90.45	105	90	110			
Fluoride	203	4.00	200.0	0	102	90	110			
Sulfate	265	30.0	200.0	51.23	107	90	110			

Sample ID	**1606145-05DMSD**	Batch ID:	**75766**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**IC4_160621A**	Analysis Date:	**6/21/2016 3:59:23 PM**	Prep Date:	**6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	299	10.0	200.0	90.45	104	90	110	0.297	20	
Fluoride	203	4.00	200.0	0	101	90	110	0.184	20	
Sulfate	264	30.0	200.0	51.23	107	90	110	0.164	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606145
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC4_160621A

Sample ID **ICV-160621**	Batch ID: **R86467**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC4_160621A**	Analysis Date: **6/21/2016 9:02:55 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	25.5	1.00	25.00	0	102	90	110			
Fluoride	9.91	0.400	10.00	0	99.1	90	110			
Sulfate	78.6	3.00	75.00	0	105	90	110			

Sample ID **CCV1-160621**	Batch ID: **R86467**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC4_160621A**	Analysis Date: **6/21/2016 1:05:30 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.2	1.00	10.00	0	102	90	110			
Fluoride	3.92	0.400	4.000	0	97.9	90	110			
Sulfate	31.3	3.00	30.00	0	104	90	110			

Sample ID **CCV2-160621**	Batch ID: **R86467**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC4_160621A**	Analysis Date: **6/21/2016 4:44:23 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.4	1.00	10.00	0	104	90	110			
Fluoride	4.04	0.400	4.000	0	101	90	110			
Sulfate	31.6	3.00	30.00	0	105	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606145
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_160615A

The QC data in batch 75648 applies to the following samples: 1606145-01D, 1606145-02D, 1606145-03D, 1606145-04D, 1606145-05D, 1606145-06D, 1606145-07D

Sample ID	**1606145-01D-DUP**	Batch ID:	**75648**	TestNo:	**M4500-H+ B**	Units:	**pH Units@17.9℃**
SampType:	**DUP**	Run ID:	**TITRATOR_160615A**	Analysis Date:	**6/15/2016 11:17:00 AM**	Prep Date:	**6/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.35	0	0	6.360				0.157	5	

Sample ID	**1606160-01D-DUP**	Batch ID:	**75648**	TestNo:	**M4500-H+ B**	Units:	**pH Units@18℃**
SampType:	**DUP**	Run ID:	**TITRATOR_160615A**	Analysis Date:	**6/15/2016 2:10:00 PM**	Prep Date:	**6/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.74	0	0	6.710				0.446	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606145
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_160615A

Sample ID	**ICV-160615**	Batch ID:	**R86335**	TestNo:	**M4500-H+ B**	Units:	**pH Units@22.2℃**
SampType:	**ICV**	Run ID:	**TITRATOR_160615A**	Analysis Date:	**6/15/2016 8:24:00 AM**	Prep Date:	**6/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	9.93	0	10.00	0	99.3	99	101			

Sample ID	**CCV1-160615**	Batch ID:	**R86335**	TestNo:	**M4500-H+ B**	Units:	**pH Units@22.2℃**
SampType:	**CCV**	Run ID:	**TITRATOR_160615A**	Analysis Date:	**6/15/2016 11:30:00 AM**	Prep Date:	**6/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.98	0	7.000	0	99.7	97.1	102.9			

Sample ID	**CCV2-160615**	Batch ID:	**R86335**	TestNo:	**M4500-H+ B**	Units:	**pH Units@21.9℃**
SampType:	**CCV**	Run ID:	**TITRATOR_160615A**	Analysis Date:	**6/15/2016 2:32:00 PM**	Prep Date:	**6/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.98	0	7.000	0	99.7	97.1	102.9			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606145
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: WC_160617A

The QC data in batch 75699 applies to the following samples: 1606145-01D, 1606145-02D, 1606145-03D, 1606145-04D, 1606145-05D, 1606145-06D, 1606145-07D

Sample ID	**MB-75699**	Batch ID:	**75699**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**WC_160617A**	Analysis Date:	**6/20/2016 8:45:00 AM**	Prep Date:	**6/17/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	<10.0	10.0								

Sample ID	**LCS-75699**	Batch ID:	**75699**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**WC_160617A**	Analysis Date:	**6/20/2016 8:45:00 AM**	Prep Date:	**6/17/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	760	10.0	745.6	0	102	90	113			

Sample ID	**1606145-04D-DUP**	Batch ID:	**75699**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_160617A**	Analysis Date:	**6/20/2016 8:45:00 AM**	Prep Date:	**6/17/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	2300	50.0	0	2205				4.00	5	

Sample ID	**1606168-01D-DUP**	Batch ID:	**75699**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_160617A**	Analysis Date:	**6/20/2016 8:45:00 AM**	Prep Date:	**6/17/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	3850	50.0	0	3780				1.83	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

Case Narrative

Lab No: 20160582

This report contains the analytical results for the 7 sample(s) received under chain of custody by ESC Lab Sciences on 6/17/2016 11:29:38 AM. These samples are associated with your 1606145 project.

The analytical results included in this report meet all applicable quality control procedure requirements except as noted below:

The test results in this report meet all NELAC requirements unless noted below:

This report shall not be reproduced, except in full, without the written approval of ESC Lab Sciences.

All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client.

Results have been reviewed by the Director of Radiochemistry or their designees and is approved for release.

Observations / Nonconformances

OUTREACH LABORATORY, A Divsion of ESC Lab Sciences
Address: 311 North Aspen Avenue, Broken Arrow, OK, 74012 EMail: outreach@esclabsciences.com - Tel: (918) 251-2515

Analytical Report

	Method	Result	DL	Units	Qual	Prep Date	Analysis Date	Analyst
Lab ID : **20160582-01**								
Client ID : **AX-24**								
Date Sampled : **6/14/2016 10:00:00 AM**								
Matrix : **NPW**								
		Radiochemical Analyses						
Combined Radium		1.96 +/- 0.775	0.899	pCi/l				
Radium-226	SM 7500 Ra B M*	0.383 +/- 0.144	0.093	pCi/l		07/06/16	07/08/16	AK
Radium-228	EPA 904*/9320*	1.58 +/- 0.631	0.806	pCi/l		07/19/16	07/22/16	JR
Lab ID : **20160582-02**								
Client ID : **AX-26**								
Date Sampled : **6/14/2016 11:30:00 AM**								
Matrix : **NPW**								
		Radiochemical Analyses						
Combined Radium		2.04 +/- 1.02	1.21	pCi/l				
Radium-226	SM 7500 Ra B M*	0.545 +/- 0.180	0.148	pCi/l		07/06/16	07/08/16	AK
Radium-228	EPA 904*/9320*	1.49 +/- 0.836	1.06	pCi/l		07/19/16	07/22/16	JR
Lab ID : **20160582-03**								
Client ID : **AX-27**								
Date Sampled : **6/14/2016 12:25:00 PM**								
Matrix : **NPW**								
		Radiochemical Analyses						
Combined Radium		2.79 +/- 1.13	1.19	pCi/l				
Radium-226	SM 7500 Ra B M*	0.703 +/- 0.214	0.156	pCi/l		07/06/16	07/08/16	AK
Radium-228	EPA 904*/9320*	2.09 +/- 0.915	1.07	pCi/l		07/19/16	07/25/16	JR
Lab ID : **20160582-04**								
Client ID : **AX-25**								
Date Sampled : **6/14/2016 1:35:00 PM**								
Matrix : **NPW**								
		Radiochemical Analyses						
Combined Radium		1.28 +/- 0.855	0.967	pCi/l				
Radium-226	SM 7500 Ra B M*	0.283 +/- 0.136	0.123	pCi/l		07/06/16	07/11/16	AK
Radium-228	EPA 904*/9320*	0.999 +/- 0.719	0.844	pCi/l		07/19/16	07/25/16	JR

OUTREACH LABORATORY, A Divsion of ESC Lab Sciences
Address: 311 North Aspen Avenue, Broken Arrow, OK, 74012 EMail: outreach@esclabsciences.com - Tel: (918) 251-2515

Analytical Report

	Method	Result	DL	Units	Qual	Prep Date	Analysis Date	Analyst
Lab ID : 20160582-05								
Client ID : AX-22R								
Date Sampled : 6/14/2016 2:40:00 PM								
Matrix : NPW								
Radiochemical Analyses								
Combined Radium		0.970 +/- 0.778	0.954	pCi/l				
Radium-226	SM 7500 Ra B M*	0.263 +/- 0.135	0.133	pCi/l		07/06/16	07/11/16	AK
Radium-228	EPA 904*/9320*	0.707 +/- 0.642	0.821	pCi/l		07/19/16	07/25/16	JR
Lab ID : 20160582-06								
Client ID : AX-29								
Date Sampled : 6/14/2016 3:50:00 PM								
Matrix : NPW								
Radiochemical Analyses								
Combined Radium		2.56 +/- 1.08	1.14	pCi/l				
Radium-226	SM 7500 Ra B M*	0.719 +/- 0.196	0.119	pCi/l		07/06/16	07/11/16	AK
Radium-228	EPA 904*/9320*	1.84 +/- 0.888	1.06	pCi/l		07/19/16	07/25/16	JR
Lab ID : 20160582-07								
Client ID : EB-01								
Date Sampled : 6/14/2016 8:55:00 AM								
Matrix : NPW								
Radiochemical Analyses								
Combined Radium		0.663 +/- 0.787	1.03	pCi/l				
Radium-226	SM 7500 Ra B M*	0.089 +/- 0.132	0.209	pCi/l		07/06/16	07/11/16	AK
Radium-228	EPA 904*/9320*	0.574 +/- 0.655	0.818	pCi/l		07/19/16	07/25/16	JR

*NELAC Certified Parameter BDL = Below Detection Limit

OUTREACH LABORATORY, A Divsion of ESC Lab Sciences
Address: 311 North Aspen Avenue, Broken Arrow, OK, 74012 EMail: outreach@esclabsciences.com - Tel: (918) 251-2515

QC Report

Parameter	Blank	LCS %REC	LCSD %REC	LCSD RPD	DUP RPD	RER, NAD or DER	MS %REC	MSD %REC	MSD RPD	Batch ID
Radium-226	-0.001	102.0			NC	0.605	87.3	103.0	16.1	R1107
Radium-228	0.163	88.3			NC	0.469	96.2	99.8	3.6	R3832

Lab Approval: 

*NELAC Certified Parameter BDL = Below Detection Limit

OUTREACH LABORATORY, A Divsion of ESC Lab Sciences
Address: 311 North Aspen Avenue, Broken Arrow, OK, 74012 EMail: outreach@esclabsciences.com - Tel: (918) 251-2515

DHL Analytical, Inc.
2300 Double Creek Drive
Round Rock, TX 78664
TEL: *(512) 388-8222* FAX: *(512) 388-8229*

CHAIN-OF-CUSTODY REC

Work Order: 1606145

Subcontractor:

ESC Laboratory
311 North Aspen
Broken Arrow, Oklahoma 74012

TEL: (918) 251-2515
FAX:
Acct #: DHLRRTX

Sample Id	Matrix	DHL#	Date Collected	Bottle Type	Requested Tests			
					E904.0	SM7500Ra-B M		
AX-24	Aqueous	-01B	06/14/16 10:00 AM	500HDPEHNO3	1			
AX-24	Aqueous	-01C	06/14/16 10:00 AM	500HDPEHNO3		1		
AX-26	Aqueous	-02B	06/14/16 11:30 AM	500HDPEHNO3	1			
AX-26	Aqueous	-02C	06/14/16 11:30 AM	500HDPEHNO3		1		
AX-27	Aqueous	-03B	06/14/16 12:25 PM	500HDPEHNO3	1			
AX-27	Aqueous	-03C	06/14/16 12:25 PM	500HDPEHNO3		1		
AX-25	Aqueous	-04B	06/14/16 01:35 PM	500HDPEHNO3	1			
AX-25	Aqueous	-04C	06/14/16 01:35 PM	500HDPEHNO3		1		
AX-22R	Aqueous	-05B	06/14/16 02:40 PM	500HDPEHNO3	1			
AX-22R	Aqueous	-05C	06/14/16 02:40 PM	500HDPEHNO3		1		
AX-29	Aqueous	-06B	06/14/16 03:50 PM	500HDPEHNO3	1			
AX-29	Aqueous	-06C	06/14/16 03:50 PM	500HDPEHNO3		1		
EB-01	Equip Blank	-07B	06/14/16 08:55 AM	500HDPEHNO3	1			
EB-01	Equip Blank	-07C	06/14/16 08:55 AM	500HDPEHNO3		1		

General Comments:

Please analyze these samples with Normal Turnaround Time.
Report RA-226, Ra-228 & Combined per Specs DHLRRTX033116S.
Quality Control Package Needed: Standard - NELAC Rad Test compliant
Email to cac@dhlanalytical.com & dupont@dhlanalytical.com

L84
2016

		Date/Time		
Relinquished by:		6/15/16 1730	**Received by:**	
Relinquished by:			**Received by:**	

SAMPLE LOGIN

Date Received: *6/17/2016 11:29:3* **Lab Number:** **20160582**

Sample Number	Client Sample ID	Matrix	Date Sampled	Container Type	Container Size	Preservation	Pre Up
20160582-01 B	AX-24	NPW	06/14/16	Plastic	500 ml	HNO3, pH < 2	☐
20160582-01 A	AX-24	NPW	06/14/16	Plastic	500 ml	HNO3, pH < 2	☐
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160582-02 B	AX-26	NPW	06/14/16	Plastic	500 ml	HNO3, pH < 2	☐
20160582-02 A	AX-26	NPW	06/14/16	Plastic	500 ml	HNO3, pH < 2	☐
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160582-03 B	AX-27	NPW	06/14/16	Plastic	500 ml	HNO3, pH < 2	☐
20160582-03 A	AX-27	NPW	06/14/16	Plastic	500 ml	HNO3, pH < 2	☐
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160582-04 B	AX-25	NPW	06/14/16	Plastic	500 ml	HNO3, pH < 2	☐
20160582-04 A	AX-25	NPW	06/14/16	Plastic	500 ml	HNO3, pH < 2	☐
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160582-05 B	AX-22R	NPW	06/14/16	Plastic	500 ml	HNO3, pH < 2	☐
20160582-05 A	AX-22R	NPW	06/14/16	Plastic	500 ml	HNO3, pH < 2	☐
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160582-06 B	AX-29	NPW	06/14/16	Plastic	500 ml	HNO3, pH < 2	☐
20160582-06 A	AX-29	NPW	06/14/16	Plastic	500 ml	HNO3, pH < 2	☐
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160582-07 B	EB-01	NPW	06/14/16	Plastic	500 ml	HNO3, pH < 2	☐
20160582-07 A	EB-01	NPW	06/14/16	Plastic	500 ml	HNO3, pH < 2	☐
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				

CONTAINER INSPECTION

 # Coolers 1 **Custody Seals Broken** Ø ☐ **Temperature:** NA **C** **Ice** **Radiation Survey:** <300 cpm

SAMPLE INSPECTION

Sample Seal Broken Ø **Chain of Custody Record** ☑ **Labels in Tact** ☑ **Radiation Survey Complete** ☐ NA

Anomalies

Inspected By: _____ **DATE** 6-17-16

QA or Designee Review: Raymond Thomas **DATE** 06/17/16

Sample Custodian Review: _____ **DATE** _____

Project Notes:

July 22, 2016

Will Vienne
Pastor, Behling & Wheeler
2201 Double Creek Dr #4004
Round Rock, Texas 78664
TEL: (512) 671-3434
FAX (512) 671-3446

Order No.: 1606168

RE: Sandow CCR

Dear Will Vienne:

DHL Analytical, Inc. received 5 sample(s) on 6/15/2016 for the analyses presented in the following report.

There were no problems with the analyses and all data met requirements of NELAC except where noted in the Case Narrative. All non-NELAC methods will be identified accordingly in the case narrative and all estimated uncertainties of test results are within method or EPA specifications.

If you have any questions regarding these tests results, please feel free to call. Thank you for using DHL Analytical.

Sincerely,

John DuPont
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-16-16

Table of Contents

DHL ANALYTICAL
2300 Double Creek Dr. ■ Round Rock, TX 78664
Phone (512) 388-8222 ■ FAX (512) 388-8229
Web: www.dhlanalytical.com
E-Mail: login@dhlanalytical.com

CLIENT: Pastor, Behling & Wheeler
ADDRESS: 2201 Double Creek Dr. Ste 4004 Round Rock 78664
PHONE: (512) 396 71-3434 FAX/E-MAIL:
DATA REPORTED TO: Will Vienne
ADDITIONAL REPORT COPIES TO: Karla Henson, Sara Taube

DATE: 6/15/2016
PO #: DHL WORK
PROJECT LOCATION OR NAME: Sandow
CLENT PROJECT #: 51045

Authorize 5% surcharge for TRRP Report? ☐ Yes ☑ No

S=SOIL P=PAINT
W=WATER SL=SLUDGE
A=AIR O=OTHER
L=LIQUID SO=SOLID
SE=SEDIMENT

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	PRESERVATION HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESERVED
AXMW-2	1	6/15/16	9:10	W		4		X		X	
AX-23	2	"	9:55	"		"		"		"	
AX-28	3	"	11:00	"		"		"		"	
AXMW-1	4	"	13:05	"		"		"		"	
MW-1	5	↓	–	↓		↓		↓		↓	

ANALYSES: BTEX ☐ MTBE ☐ [METHOD 8021] | TPH 1005 ☐ TPH 1006 ☐ HOLD 1006 ☐ | GRO [METHOD 8015] ☐ DRO [METHOD 8105] ☐ | VOC 8260 ☐ VOC 624 ☐ VOC 8260/5035 ☐ | SVOC 8270 ☐ PAH 8270 ☐ HOLD PAH ☐ SVOC 625 ☐ | 8270 PEST ☐ 625 PEST/PCB ☐ 608 PCB ☐ | 8270 O-P PEST ☐ 8082 PCB ☐ 8270 PCB ☐ | 8321 HERB ☐ T PHOS, AMMONIA ☐ | METALS 6020 ☐ METALS 200.8 ☐ DISS. METALS | RCRA ☐ TX11 ☐ | PH ☐ HEX-CHROM ☐ ALKALIN | CHLORIDE ☐ ANIONS | TCLP-SVOC ☐ | TCLP-ME | RC

RELINQUISHED BY: (Signature) Sara Taube	DATE/TIME 6/15/2016	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)

TURN AROUND TIME
RUSH ☐ CALL FIRST
1 DAY ☐ CALL FIRST
2 DAY ☐
NORMAL ☑
OTHER ☐ _____

LABORATORY US
RECEIVING TEMP:
CUSTODY SEALS:
CARRIER: ☐ LO
☐ COURIER DELIV
☐ HAND DELIVER

John Dupont

From: Sara Taube [Sara.Taube@pbwllc.com]
Sent: Wednesday, July 22, 2015 12:05 PM
To: John Dupont
Subject: CCR Appendix III and IV
Follow Up Flag: Follow up
Flag Status: Completed

Hi John,

Here are the Appendix III and Appendix IV constituents that we will need to have analyzed under the CCR Rule.

Appendix III
Boron
Calcium
Chloride
Fluoride
pH
sulfate
TDS

Appendix IV
Antimony
Arsenic
Barium
Beryllium
Cadmium
Chromium
Cobalt
Fluoride
Lead
Lithium
Mercury
Molybdenum
Selenium
Thallium
Radium 226 and 228

We are looking to have approximately 74 wells sampled 8 times over the course of the next two years. Please let me know if there is any more information you might need.

Cheers,

Sara

10/26/2015

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name **Pastor, Behling & Wheeler** Date Received: **6/15/2016**

Work Order Number **1606168** Received by **JB**

Checklist completed by: _____ 6/15/2016 Reviewed by _____ 6/15/2016
Signature Date Initials Date

Carrier name Hand Delivered

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	1.1 °C
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH<2 acceptable upon receipt?	Yes ☑	No ☐	NA ☐ LOT # 8086
	Adjusted? NO		Checked by _____
Water - ph>9 (S) or ph>12 (CN) acceptable upon receipt?	Yes ☐	No ☐	NA ☑ LOT #
	Adjusted? _____		Checked by _____

Any No response must be detailed in the comments section below.

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

DHL Analytical, Inc. **Date:** *22-Jul-16*

CLIENT: Pastor, Behling & Wheeler
Project: Sandow CCR
Lab Order: 1606168

CASE NARRATIVE

Samples were analyzed using the methods outlined in the following references:

Method SW6020A - Metals Analysis
Method SW7470A - Mercury Analysis
Method E300 - Anions Analysis
Method M4500-H+ B - pH of a Water Analysis
Method M2540C - TDS Analysis
Sub-contract - Radium-228 and Radium-226 analyses by methods E904/9320 and SM 7500 Ra B M. Analyzed at ESC Lab Sciences.

LOG IN

The samples were received and log-in performed on 6/15/16. A total of 5 samples were received. The samples arrived in good condition and were properly packaged.

METALS ANALYSIS

For Metals analysis performed on 6/21/16 and 6/27/16 the matrix spike and matrix spike duplicate recoveries were out of control limits for Calcium or Boron. These are flagged accordingly in the QC summary report. The sample selected for the matrix spike and matrix spike duplicate was not from this work order. The LCS was within control limits for these analytes. No further corrective actions were taken.

For Metals analysis performed on 6/28/16 the RPD for the serial dilution was slightly above control limits for Boron. This is flagged accordingly. The PDS was within control limits for this analyte. No further corrective actions were taken.

For Metals analysis performed on 6/28/16 the PDS recovery was slightly below control limits for Calcium. This is flagged accordingly. The serial dilution was within control limits for this analyte. No further corrective actions were taken.

ANIONS ANALYSIS

For Anions analysis performed on 6/22/16 the matrix spike recovery was slightly above control limits for Sulfate. This is flagged accordingly in the QC summary report. The sample selected for the matrix spike and matrix spike duplicate was from this work order. The LCS was within control limits for this analyte. No further corrective actions were taken.

TDS ANALYSIS

CLIENT:	Pastor, Behling & Wheeler
Project:	Sandow CCR
Lab Order:	1606168

CASE NARRATIVE

For TDS analysis performed on 6/21/16 (batch 75770) the sample and sample duplicate (1606193-05 & 1606193-05 DUP) had the RPD above control limits. This was due to the sample selected for duplicate being silty. No further corrective actions were taken.

DHL Analytical, Inc.

Date: *22-Jul-16*

CLIENT: Pastor, Behling & Wheeler
Project: Sandow CCR
Lab Order: 1606168

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
1606168-01	AXMW-2		06/15/16 09:10 AM	6/15/2016
1606168-02	AX-23		06/15/16 09:55 AM	6/15/2016
1606168-03	AX-28		06/15/16 11:00 AM	6/15/2016
1606168-04	AXMW-1		06/15/16 01:05 PM	6/15/2016
1606168-05	MW-1		06/15/16	6/15/2016

& Wheeler

PREP DATES REPORT

Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
06/15/16 09:10 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/21/16 04:30 AM	75756
06/15/16 09:10 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/21/16 04:30 AM	75756
06/15/16 09:10 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/21/16 04:30 AM	75756
06/15/16 09:10 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/21/16 04:30 AM	75756
06/15/16 09:10 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	06/21/16 09:19 AM	75769
06/15/16 09:10 AM	Aqueous	E300	Anion Preparation	06/22/16 09:31 AM	75795
06/15/16 09:10 AM	Aqueous	E300	Anion Preparation	06/22/16 09:31 AM	75795
06/15/16 09:10 AM	Aqueous	M4500-H+ B	pH Preparation	06/17/16 12:32 PM	75719
06/15/16 09:10 AM	Aqueous	M2540C	TDS Preparation	06/17/16 11:15 AM	75699
06/15/16 09:55 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/21/16 04:30 AM	75756
06/15/16 09:55 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/21/16 04:30 AM	75756
06/15/16 09:55 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/21/16 04:30 AM	75756
06/15/16 09:55 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	06/21/16 09:19 AM	75769
06/15/16 09:55 AM	Aqueous	E300	Anion Preparation	06/22/16 09:31 AM	75795
06/15/16 09:55 AM	Aqueous	E300	Anion Preparation	06/22/16 09:31 AM	75795
06/15/16 09:55 AM	Aqueous	M4500-H+ B	pH Preparation	06/17/16 12:32 PM	75719
06/15/16 09:55 AM	Aqueous	M2540C	TDS Preparation	06/21/16 09:45 AM	75770
06/15/16 11:00 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/21/16 04:30 AM	75756
06/15/16 11:00 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/21/16 04:30 AM	75756
06/15/16 11:00 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/21/16 04:30 AM	75756
06/15/16 11:00 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	06/21/16 09:19 AM	75769
06/15/16 11:00 AM	Aqueous	E300	Anion Preparation	06/22/16 09:31 AM	75795
06/15/16 11:00 AM	Aqueous	E300	Anion Preparation	06/22/16 09:31 AM	75795
06/15/16 11:00 AM	Aqueous	M4500-H+ B	pH Preparation	06/17/16 12:32 PM	75719
06/15/16 11:00 AM	Aqueous	M2540C	TDS Preparation	06/21/16 09:45 AM	75770
06/15/16 01:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/21/16 04:30 AM	75756
06/15/16 01:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/21/16 04:30 AM	75756
06/15/16 01:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/21/16 04:30 AM	75756

& Wheeler

PREP DATES REPORT

Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
06/15/16 01:05 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	06/21/16 09:19 AM	75769
06/15/16 01:05 PM	Aqueous	E300	Anion Preparation	06/22/16 09:31 AM	75795
06/15/16 01:05 PM	Aqueous	E300	Anion Preparation	06/22/16 09:31 AM	75795
06/15/16 01:05 PM	Aqueous	M4500-H+ B	pH Preparation	06/17/16 12:32 PM	75719
06/15/16 01:05 PM	Aqueous	M2540C	TDS Preparation	06/21/16 09:45 AM	75770
06/15/16	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/21/16 04:30 AM	75756
06/15/16	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/21/16 04:30 AM	75756
06/15/16	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/21/16 04:30 AM	75756
06/15/16	Aqueous	SW7470A	Mercury Aq Prep, Total	06/21/16 09:19 AM	75769
06/15/16	Aqueous	E300	Anion Preparation	06/22/16 09:31 AM	75795
06/15/16	Aqueous	E300	Anion Preparation	06/22/16 09:31 AM	75795
06/15/16	Aqueous	M4500-H+ B	pH Preparation	06/17/16 12:32 PM	75719
06/15/16	Aqueous	M2540C	TDS Preparation	06/21/16 09:45 AM	75770

& Wheeler

ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	SW7470A	Mercury Total: Aqueous	75769	1	06/23/16 01:05 PM	CETAC2_HG_160623A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75756	1	06/21/16 03:45 PM	ICP-MS4_160621D
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75756	50	06/23/16 03:59 PM	ICP-MS4_160623A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75756	10	06/23/16 04:01 PM	ICP-MS4_160623A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75756	10	06/27/16 02:03 PM	ICP-MS4_160627A
Aqueous	E300	Anions by IC method - Water	75795	1	06/22/16 11:59 AM	IC2_160622A
Aqueous	E300	Anions by IC method - Water	75795	100	06/22/16 01:59 PM	IC2_160622A
Aqueous	M4500-H+ B	pH	75719	1	06/17/16 12:59 PM	TITRATOR_160617A
Aqueous	M2540C	Total Dissolved Solids	75699	1	06/20/16 08:45 AM	WC_160617A
Aqueous	SW7470A	Mercury Total: Aqueous	75769	1	06/23/16 01:07 PM	CETAC2_HG_160623A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75756	1	06/27/16 02:05 PM	ICP-MS4_160627A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75756	1	06/21/16 03:47 PM	ICP-MS4_160621D
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75756	50	06/23/16 04:03 PM	ICP-MS4_160623A
Aqueous	E300	Anions by IC method - Water	75795	1	06/22/16 12:14 PM	IC2_160622A
Aqueous	E300	Anions by IC method - Water	75795	10	06/22/16 02:14 PM	IC2_160622A
Aqueous	M4500-H+ B	pH	75719	1	06/17/16 01:02 PM	TITRATOR_160617A
Aqueous	M2540C	Total Dissolved Solids	75770	1	06/22/16 08:36 AM	WC_160621C
Aqueous	SW7470A	Mercury Total: Aqueous	75769	1	06/23/16 01:09 PM	CETAC2_HG_160623A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75756	1	06/27/16 02:07 PM	ICP-MS4_160627A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75756	1	06/21/16 03:49 PM	ICP-MS4_160621D
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75756	50	06/23/16 04:05 PM	ICP-MS4_160623A
Aqueous	E300	Anions by IC method - Water	75795	1	06/22/16 12:28 PM	IC2_160622A
Aqueous	E300	Anions by IC method - Water	75795	100	06/22/16 02:58 PM	IC2_160622A
Aqueous	M4500-H+ B	pH	75719	1	06/17/16 01:03 PM	TITRATOR_160617A
Aqueous	M2540C	Total Dissolved Solids	75770	1	06/22/16 08:36 AM	WC_160621C
Aqueous	SW7470A	Mercury Total: Aqueous	75769	1	06/23/16 01:16 PM	CETAC2_HG_160623A

& Wheeler

ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75756	1	06/21/16 03:51 PM	ICP-MS4_160621D
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75756	50	06/23/16 04:07 PM	ICP-MS4_160623A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75756	1	06/27/16 02:09 PM	ICP-MS4_160627A
Aqueous	E300	Anions by IC method - Water	75795	1	06/22/16 12:43 PM	IC2_160622A
Aqueous	E300	Anions by IC method - Water	75795	100	06/22/16 03:12 PM	IC2_160622A
Aqueous	M4500-H+ B	pH	75719	1	06/17/16 01:05 PM	TITRATOR_160617A
Aqueous	M2540C	Total Dissolved Solids	75770	1	06/22/16 08:36 AM	WC_160621C
Aqueous	SW7470A	Mercury Total: Aqueous	75769	1	06/23/16 01:19 PM	CETAC2_HG_160623A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75756	1	06/21/16 03:53 PM	ICP-MS4_160621D
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75756	50	06/23/16 04:09 PM	ICP-MS4_160623A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	75756	1	06/27/16 02:11 PM	ICP-MS4_160627A
Aqueous	E300	Anions by IC method - Water	75795	1	06/22/16 12:58 PM	IC2_160622A
Aqueous	E300	Anions by IC method - Water	75795	100	06/22/16 03:27 PM	IC2_160622A
Aqueous	M4500-H+ B	pH	75719	1	06/17/16 01:07 PM	TITRATOR_160617A
Aqueous	M2540C	Total Dissolved Solids	75770	1	06/22/16 08:36 AM	WC_160621C

DHL Analytical, Inc.

Date: *22-Jul-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AXMW-2
Project:	Sandow CCR	**Lab ID:**	1606168-01
Project No:	5164E	**Collection Date:**	06/15/16 09:10 AM
Lab Order:	1606168	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **KL**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	06/23/16 01:05 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	06/21/16 03:45 PM
Arsenic	0.0249	0.00200	0.00500		mg/L	1	06/21/16 03:45 PM
Barium	0.0229	0.00300	0.0100		mg/L	1	06/21/16 03:45 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	06/21/16 03:45 PM
Boron	2.33	0.100	0.300		mg/L	10	06/27/16 02:03 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	06/21/16 03:45 PM
Calcium	570	5.00	15.0		mg/L	50	06/23/16 03:59 PM
Chromium	0.00257	0.00200	0.00500	J	mg/L	1	06/21/16 03:45 PM
Cobalt	0.0464	0.00300	0.00500		mg/L	1	06/21/16 03:45 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	06/21/16 03:45 PM
Lithium	0.0946	0.00500	0.0100		mg/L	1	06/21/16 03:45 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	06/21/16 03:45 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	06/21/16 03:45 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	06/21/16 03:45 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	199	30.0	100		mg/L	100	06/22/16 01:59 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	06/22/16 11:59 AM
Sulfate	1970	100	300		mg/L	100	06/22/16 01:59 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.29	0	0		pH Units@18.8℃	1	06/17/16 12:59 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	3780	50.0	50.0		mg/L	1	06/20/16 08:45 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *22-Jul-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-23
Project:	Sandow CCR	**Lab ID:**	1606168-02
Project No:	5164E	**Collection Date:**	06/15/16 09:55 AM
Lab Order:	1606168	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **KL**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	06/23/16 01:07 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	06/21/16 03:47 PM
Arsenic	0.00887	0.00200	0.00500		mg/L	1	06/21/16 03:47 PM
Barium	0.0954	0.00300	0.0100		mg/L	1	06/21/16 03:47 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	06/21/16 03:47 PM
Boron	0.0509	0.0100	0.0300		mg/L	1	06/27/16 02:05 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	06/21/16 03:47 PM
Calcium	218	5.00	15.0		mg/L	50	06/23/16 04:03 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	06/21/16 03:47 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	06/21/16 03:47 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	06/21/16 03:47 PM
Lithium	0.00617	0.00500	0.0100	J	mg/L	1	06/21/16 03:47 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	06/21/16 03:47 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	06/21/16 03:47 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	06/21/16 03:47 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	141	3.00	10.0		mg/L	10	06/22/16 02:14 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	06/22/16 12:14 PM
Sulfate	502	10.0	30.0		mg/L	10	06/22/16 02:14 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.75	0	0		pH Units@15.6℃	1	06/17/16 01:02 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	1730	50.0	50.0		mg/L	1	06/22/16 08:36 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *22-Jul-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-28
Project:	Sandow CCR	**Lab ID:**	1606168-03
Project No:	5164E	**Collection Date:**	06/15/16 11:00 AM
Lab Order:	1606168	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **KL**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	06/23/16 01:09 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	06/21/16 03:49 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	06/21/16 03:49 PM
Barium	0.0305	0.00300	0.0100		mg/L	1	06/21/16 03:49 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	06/21/16 03:49 PM
Boron	0.239	0.0100	0.0300		mg/L	1	06/27/16 02:07 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	06/21/16 03:49 PM
Calcium	500	5.00	15.0		mg/L	50	06/23/16 04:05 PM
Chromium	0.0570	0.00200	0.00500		mg/L	1	06/21/16 03:49 PM
Cobalt	0.0239	0.00300	0.00500		mg/L	1	06/21/16 03:49 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	06/21/16 03:49 PM
Lithium	0.268	0.00500	0.0100		mg/L	1	06/21/16 03:49 PM
Molybdenum	0.00236	0.00200	0.00500	J	mg/L	1	06/21/16 03:49 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	06/21/16 03:49 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	06/21/16 03:49 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	412	30.0	100		mg/L	100	06/22/16 02:58 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	06/22/16 12:28 PM
Sulfate	1460	100	300		mg/L	100	06/22/16 02:58 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.64	0	0		pH Units@15.3℃	1	06/17/16 01:03 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	2790	50.0	50.0		mg/L	1	06/22/16 08:36 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *22-Jul-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AXMW-1
Project:	Sandow CCR	**Lab ID:**	1606168-04
Project No:	5164E	**Collection Date:**	06/15/16 01:05 PM
Lab Order:	1606168	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **KL**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	06/23/16 01:16 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	06/21/16 03:51 PM
Arsenic	0.0159	0.00200	0.00500		mg/L	1	06/21/16 03:51 PM
Barium	0.0173	0.00300	0.0100		mg/L	1	06/21/16 03:51 PM
Beryllium	0.000404	0.000300	0.00100	J	mg/L	1	06/21/16 03:51 PM
Boron	0.549	0.0100	0.0300		mg/L	1	06/27/16 02:09 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	06/21/16 03:51 PM
Calcium	472	5.00	15.0		mg/L	50	06/23/16 04:07 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	06/21/16 03:51 PM
Cobalt	0.418	0.00300	0.00500		mg/L	1	06/21/16 03:51 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	06/21/16 03:51 PM
Lithium	0.0229	0.00500	0.0100		mg/L	1	06/21/16 03:51 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	06/21/16 03:51 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	06/21/16 03:51 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	06/21/16 03:51 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	353	30.0	100		mg/L	100	06/22/16 03:12 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	06/22/16 12:43 PM
Sulfate	2280	100	300		mg/L	100	06/22/16 03:12 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	5.96	0	0		pH Units@15.7℃	1	06/17/16 01:05 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	5150	50.0	50.0		mg/L	1	06/22/16 08:36 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *22-Jul-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	MW-1
Project:	Sandow CCR	**Lab ID:**	1606168-05
Project No:	5164E	**Collection Date:**	06/15/16
Lab Order:	1606168	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **KL**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	06/23/16 01:19 PM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	06/21/16 03:53 PM
Arsenic	0.0161	0.00200	0.00500		mg/L	1	06/21/16 03:53 PM
Barium	0.0168	0.00300	0.0100		mg/L	1	06/21/16 03:53 PM
Beryllium	0.000305	0.000300	0.00100	J	mg/L	1	06/21/16 03:53 PM
Boron	0.560	0.0100	0.0300		mg/L	1	06/27/16 02:11 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	06/21/16 03:53 PM
Calcium	474	5.00	15.0		mg/L	50	06/23/16 04:09 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	06/21/16 03:53 PM
Cobalt	0.421	0.00300	0.00500		mg/L	1	06/21/16 03:53 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	06/21/16 03:53 PM
Lithium	0.0247	0.00500	0.0100		mg/L	1	06/21/16 03:53 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	06/21/16 03:53 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	06/21/16 03:53 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	06/21/16 03:53 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	351	30.0	100		mg/L	100	06/22/16 03:27 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	06/22/16 12:58 PM
Sulfate	2220	100	300		mg/L	100	06/22/16 03:27 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	5.98	0	0		pH Units@15.2℃	1	06/17/16 01:07 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	4160	50.0	50.0		mg/L	1	06/22/16 08:36 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606168
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_160623A

The QC data in batch 75769 applies to the following samples: 1606168-01A, 1606168-02A, 1606168-03A, 1606168-04A, 1606168-05A

Sample ID	**MB-75769**	Batch ID:	**75769**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**CETAC2_HG_160623A**	Analysis Date:	**6/23/2016 12:33:39 PM**	Prep Date:	**6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	<0.0000800	0.000200								

Sample ID	**LCS-75769**	Batch ID:	**75769**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**CETAC2_HG_160623A**	Analysis Date:	**6/23/2016 12:35:55 PM**	Prep Date:	**6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00196	0.000200	0.00200	0	98.0	85	115			

Sample ID	**LCSD-75769**	Batch ID:	**75769**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**CETAC2_HG_160623A**	Analysis Date:	**6/23/2016 12:38:11 PM**	Prep Date:	**6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00201	0.000200	0.00200	0	101	85	115	2.52	15	

Sample ID	**1606160-06A SD**	Batch ID:	**75769**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**SD**	Run ID:	**CETAC2_HG_160623A**	Analysis Date:	**6/23/2016 12:42:44 PM**	Prep Date:	**6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	<0.000400	0.00100	0	0				0	10	

Sample ID	**1606160-06A PDS**	Batch ID:	**75769**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**PDS**	Run ID:	**CETAC2_HG_160623A**	Analysis Date:	**6/23/2016 12:44:59 PM**	Prep Date:	**6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00243	0.000200	0.00250	0	97.2	85	115			

Sample ID	**1606160-06A MS**	Batch ID:	**75769**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**CETAC2_HG_160623A**	Analysis Date:	**6/23/2016 12:47:15 PM**	Prep Date:	**6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00206	0.000200	0.00200	0	103	80	120			

Sample ID	**1606160-06A MSD**	Batch ID:	**75769**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**CETAC2_HG_160623A**	Analysis Date:	**6/23/2016 12:49:30 PM**	Prep Date:	**6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00205	0.000200	0.00200	0	103	80	120	0.487	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606168
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_160623A

Sample ID	**ICV-160623**	Batch ID:	**R86503**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**CETAC2_HG_160623A**	Analysis Date:	**6/23/2016 10:03:19 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00399	0.000200	0.00400	0	99.8	90	110			

Sample ID	**CCV4-160623**	Batch ID:	**R86503**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_160623A**	Analysis Date:	**6/23/2016 12:24:10 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00197	0.000200	0.00200	0	98.5	90	110			

Sample ID	**CCV5-160623**	Batch ID:	**R86503**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_160623A**	Analysis Date:	**6/23/2016 1:12:12 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00198	0.000200	0.00200	0	99.0	90	110			

Sample ID	**CCV6-160623**	Batch ID:	**R86503**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_160623A**	Analysis Date:	**6/23/2016 1:39:31 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00198	0.000200	0.00200	0	99.0	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606168
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160621D

The QC data in batch 75756 applies to the following samples: 1606168-01A, 1606168-02A, 1606168-03A, 1606168-04A, 1606168-05A

Sample ID **MB-75756** Batch ID: **75756** TestNo: **SW6020A** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS4_160621D** Analysis Date: **6/21/2016 2:40:00 PM** Prep Date: **6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.000800	0.00250								
Arsenic	<0.00200	0.00500								
Barium	<0.00300	0.0100								
Beryllium	<0.000300	0.00100								
Cadmium	<0.000300	0.00100								
Calcium	<0.100	0.300								
Chromium	<0.00200	0.00500								
Cobalt	<0.00300	0.00500								
Lead	<0.000300	0.00100								
Lithium	<0.00500	0.0100								
Molybdenum	<0.00200	0.00500								
Selenium	<0.00200	0.00500								
Thallium	<0.000500	0.00150								

Sample ID **LCS-75756** Batch ID: **75756** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS4_160621D** Analysis Date: **6/21/2016 2:42:00 PM** Prep Date: **6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.195	0.00250	0.200	0	97.5	80	120			
Arsenic	0.200	0.00500	0.200	0	100	80	120			
Barium	0.199	0.0100	0.200	0	99.3	80	120			
Beryllium	0.202	0.00100	0.200	0	101	80	120			
Cadmium	0.198	0.00100	0.200	0	99.0	80	120			
Calcium	4.65	0.300	5.00	0	93.0	80	120			
Chromium	0.201	0.00500	0.200	0	100	80	120			
Cobalt	0.207	0.00500	0.200	0	103	80	120			
Lead	0.198	0.00100	0.200	0	99.1	80	120			
Lithium	0.203	0.0100	0.200	0	101	80	120			
Molybdenum	0.190	0.00500	0.200	0	95.0	80	120			
Selenium	0.203	0.00500	0.200	0	101	80	120			
Thallium	0.197	0.00150	0.200	0	98.4	80	120			

Sample ID **LCSD-75756** Batch ID: **75756** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS4_160621D** Analysis Date: **6/21/2016 2:44:00 PM** Prep Date: **6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.195	0.00250	0.200	0	97.4	80	120	0.032	15	
Arsenic	0.197	0.00500	0.200	0	98.7	80	120	1.33	15	
Barium	0.196	0.0100	0.200	0	98.2	80	120	1.14	15	
Beryllium	0.201	0.00100	0.200	0	100	80	120	0.639	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606168
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160621D

Sample ID **LCSD-75756**	Batch ID: **75756**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCSD**	Run ID: **ICP-MS4_160621D**	Analysis Date: **6/21/2016 2:44:00 PM**	Prep Date: **6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	0.197	0.00100	0.200	0	98.3	80	120	0.737	15	
Calcium	4.82	0.300	5.00	0	96.3	80	120	3.58	15	
Chromium	0.201	0.00500	0.200	0	100	80	120	0.020	15	
Cobalt	0.204	0.00500	0.200	0	102	80	120	1.12	15	
Lead	0.197	0.00100	0.200	0	98.3	80	120	0.796	15	
Lithium	0.203	0.0100	0.200	0	102	80	120	0.364	15	
Molybdenum	0.191	0.00500	0.200	0	95.7	80	120	0.717	15	
Selenium	0.202	0.00500	0.200	0	101	80	120	0.492	15	
Thallium	0.196	0.00150	0.200	0	97.8	80	120	0.622	15	

Sample ID **1606207-16A SD**	Batch ID: **75756**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **SD**	Run ID: **ICP-MS4_160621D**	Analysis Date: **6/21/2016 2:50:00 PM**	Prep Date: **6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.00400	0.0125	0	0				0	10	
Arsenic	<0.0100	0.0250	0	0				0	10	
Barium	0.0296	0.0500	0	0.0303				2.34	10	
Beryllium	<0.00150	0.00500	0	0				0	10	
Cadmium	<0.00150	0.00500	0	0				0	10	
Chromium	<0.0100	0.0250	0	0				0	10	
Cobalt	<0.0150	0.0250	0	0				0	10	
Lead	<0.00150	0.00500	0	0				0	10	
Lithium	0.161	0.0500	0	0.153				5.06	10	
Molybdenum	<0.0100	0.0250	0	0.00392				0	10	
Selenium	<0.0100	0.0250	0	0				0	10	
Thallium	<0.00250	0.00750	0	0				0	10	

Sample ID **1606207-16A PDS**	Batch ID: **75756**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS4_160621D**	Analysis Date: **6/21/2016 3:10:00 PM**	Prep Date: **6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.199	0.00250	0.200	0	99.3	80	120			
Arsenic	0.198	0.00500	0.200	0	99.2	80	120			
Barium	0.227	0.0100	0.200	0.0303	98.3	80	120			
Beryllium	0.187	0.00100	0.200	0	93.5	80	120			
Cadmium	0.185	0.00100	0.200	0	92.5	80	120			
Chromium	0.197	0.00500	0.200	0	98.3	80	120			
Cobalt	0.195	0.00500	0.200	0	97.5	80	120			
Lead	0.200	0.00100	0.200	0	100	80	120			
Lithium	0.331	0.0100	0.200	0.153	89.1	80	120			
Molybdenum	0.197	0.00500	0.200	0.00392	96.7	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606168
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160621D

Sample ID **1606207-16A PDS**	Batch ID: **75756**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS4_160621D**	Analysis Date: **6/21/2016 3:10:00 PM**	Prep Date: **6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Selenium	0.202	0.00500	0.200	0	101	80	120			
Thallium	0.200	0.00150	0.200	0	100	80	120			

Sample ID **1606207-16A MS**	Batch ID: **75756**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS4_160621D**	Analysis Date: **6/21/2016 3:12:00 PM**	Prep Date: **6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.199	0.00250	0.200	0	99.7	80	120			
Arsenic	0.202	0.00500	0.200	0	101	80	120			
Barium	0.233	0.0100	0.200	0.0303	101	80	120			
Beryllium	0.182	0.00100	0.200	0	91.0	80	120			
Cadmium	0.189	0.00100	0.200	0	94.3	80	120			
Calcium	348	0.300	5.00	345	63.5	80	120			S
Chromium	0.191	0.00500	0.200	0	95.5	80	120			
Cobalt	0.195	0.00500	0.200	0	97.6	80	120			
Lead	0.201	0.00100	0.200	0	101	80	120			
Lithium	0.333	0.0100	0.200	0.153	90.0	80	120			
Molybdenum	0.203	0.00500	0.200	0.00392	99.8	80	120			
Selenium	0.204	0.00500	0.200	0	102	80	120			
Thallium	0.202	0.00150	0.200	0	101	80	120			

Sample ID **1606207-16A MSD**	Batch ID: **75756**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS4_160621D**	Analysis Date: **6/21/2016 3:14:00 PM**	Prep Date: **6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.195	0.00250	0.200	0	97.6	80	120	2.12	15	
Arsenic	0.200	0.00500	0.200	0	100	80	120	0.933	15	
Barium	0.229	0.0100	0.200	0.0303	99.4	80	120	1.77	15	
Beryllium	0.181	0.00100	0.200	0	90.3	80	120	0.798	15	
Cadmium	0.186	0.00100	0.200	0	92.9	80	120	1.48	15	
Calcium	354	0.300	5.00	345	181	80	120	1.67	15	S
Chromium	0.188	0.00500	0.200	0	93.9	80	120	1.63	15	
Cobalt	0.192	0.00500	0.200	0	95.9	80	120	1.82	15	
Lead	0.200	0.00100	0.200	0	100	80	120	0.416	15	
Lithium	0.327	0.0100	0.200	0.153	87.2	80	120	1.71	15	
Molybdenum	0.201	0.00500	0.200	0.00392	98.5	80	120	1.22	15	
Selenium	0.203	0.00500	0.200	0	101	80	120	0.872	15	
Thallium	0.201	0.00150	0.200	0	101	80	120	0.414	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606168
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160621D

Sample ID **ICV-160621**	Batch ID: **R86455**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS4_160621D**	Analysis Date: **6/21/2016 10:36:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.101	0.00250	0.100	0	101	90	110			
Arsenic	0.101	0.00500	0.100	0	101	90	110			
Barium	0.100	0.0100	0.100	0	100	90	110			
Beryllium	0.0975	0.00100	0.100	0	97.5	90	110			
Cadmium	0.0998	0.00100	0.100	0	99.8	90	110			
Calcium	2.38	0.300	2.50	0	95.1	90	110			
Chromium	0.104	0.00500	0.100	0	104	90	110			
Cobalt	0.104	0.00500	0.100	0	104	90	110			
Lead	0.0998	0.00100	0.100	0	99.8	90	110			
Lithium	0.100	0.0100	0.100	0	100	90	110			
Molybdenum	0.0962	0.00500	0.100	0	96.2	90	110			
Selenium	0.101	0.00500	0.100	0	101	90	110			
Thallium	0.0978	0.00150	0.100	0	97.8	90	110			

Sample ID **LCVL-160621**	Batch ID: **R86455**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_160621D**	Analysis Date: **6/21/2016 10:42:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00199	0.00250	0.00200	0	99.3	70	130			
Arsenic	0.00508	0.00500	0.00500	0	102	70	130			
Barium	0.00486	0.0100	0.00500	0	97.2	70	130			
Beryllium	0.000997	0.00100	0.00100	0	99.7	70	130			
Cadmium	0.000965	0.00100	0.00100	0	96.5	70	130			
Calcium	0.0939	0.300	0.100	0	93.9	70	130			
Chromium	0.00524	0.00500	0.00500	0	105	70	130			
Cobalt	0.00503	0.00500	0.00500	0	101	70	130			
Lead	0.000989	0.00100	0.00100	0	98.9	70	130			
Lithium	0.00984	0.0100	0.0100	0	98.4	70	130			
Molybdenum	0.00488	0.00500	0.00500	0	97.6	70	130			
Selenium	0.00541	0.00500	0.00500	0	108	70	130			
Thallium	0.000991	0.00150	0.00100	0	99.1	70	130			

Sample ID **CCV5-160621**	Batch ID: **R86455**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160621D**	Analysis Date: **6/21/2016 2:24:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.194	0.00250	0.200	0	97.0	90	110			
Arsenic	0.199	0.00500	0.200	0	99.4	90	110			
Barium	0.197	0.0100	0.200	0	98.5	90	110			
Beryllium	0.200	0.00100	0.200	0	99.8	90	110			
Cadmium	0.197	0.00100	0.200	0	98.7	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

Sample ID **CCV5-160621**	Batch ID: **R86455**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160621D**	Analysis Date: **6/21/2016 2:24:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.88	0.300	5.00	0	97.6	90	110			
Chromium	0.203	0.00500	0.200	0	101	90	110			
Cobalt	0.203	0.00500	0.200	0	101	90	110			
Lead	0.200	0.00100	0.200	0	100	90	110			
Lithium	0.208	0.0100	0.200	0	104	90	110			
Molybdenum	0.189	0.00500	0.200	0	94.5	90	110			
Selenium	0.201	0.00500	0.200	0	100	90	110			
Thallium	0.200	0.00150	0.200	0	99.8	90	110			

Sample ID **LCVL5-160621**	Batch ID: **R86455**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_160621D**	Analysis Date: **6/21/2016 2:32:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00200	0.00250	0.00200	0	100	70	130			
Arsenic	0.00500	0.00500	0.00500	0	100	70	130			
Barium	0.00499	0.0100	0.00500	0	99.7	70	130			
Beryllium	0.000961	0.00100	0.00100	0	96.1	70	130			
Cadmium	0.00102	0.00100	0.00100	0	102	70	130			
Calcium	0.100	0.300	0.100	0	100	70	130			
Chromium	0.00516	0.00500	0.00500	0	103	70	130			
Cobalt	0.00508	0.00500	0.00500	0	102	70	130			
Lead	0.000899	0.00100	0.00100	0	89.9	70	130			
Lithium	0.00957	0.0100	0.0100	0	95.7	70	130			
Molybdenum	0.00475	0.00500	0.00500	0	95.1	70	130			
Selenium	0.00537	0.00500	0.00500	0	107	70	130			
Thallium	0.000973	0.00150	0.00100	0	97.3	70	130			

Sample ID **CCV6-160621**	Batch ID: **R86455**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160621D**	Analysis Date: **6/21/2016 3:18:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.196	0.00250	0.200	0	98.0	90	110			
Arsenic	0.198	0.00500	0.200	0	99.1	90	110			
Barium	0.199	0.0100	0.200	0	99.5	90	110			
Beryllium	0.207	0.00100	0.200	0	103	90	110			
Cadmium	0.196	0.00100	0.200	0	97.9	90	110			
Calcium	4.93	0.300	5.00	0	98.6	90	110			
Chromium	0.201	0.00500	0.200	0	101	90	110			
Cobalt	0.206	0.00500	0.200	0	103	90	110			
Lead	0.200	0.00100	0.200	0	100	90	110			
Lithium	0.210	0.0100	0.200	0	105	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606168
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160621D

Sample ID **CCV6-160621**	Batch ID: **R86455**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160621D**	Analysis Date: **6/21/2016 3:18:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Molybdenum	0.192	0.00500	0.200	0	96.0	90	110			
Selenium	0.204	0.00500	0.200	0	102	90	110			
Thallium	0.198	0.00150	0.200	0	98.8	90	110			

Sample ID **LCVL6-160621**	Batch ID: **R86455**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_160621D**	Analysis Date: **6/21/2016 3:32:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00196	0.00250	0.00200	0	98.0	70	130			
Arsenic	0.00499	0.00500	0.00500	0	99.8	70	130			
Barium	0.00492	0.0100	0.00500	0	98.3	70	130			
Beryllium	0.000919	0.00100	0.00100	0	91.9	70	130			
Cadmium	0.00103	0.00100	0.00100	0	103	70	130			
Calcium	0.0979	0.300	0.100	0	97.9	70	130			
Chromium	0.00511	0.00500	0.00500	0	102	70	130			
Cobalt	0.00510	0.00500	0.00500	0	102	70	130			
Lead	0.000916	0.00100	0.00100	0	91.6	70	130			
Lithium	0.0117	0.0100	0.0100	0	117	70	130			
Molybdenum	0.00462	0.00500	0.00500	0	92.5	70	130			
Selenium	0.00506	0.00500	0.00500	0	101	70	130			
Thallium	0.000988	0.00150	0.00100	0	98.8	70	130			

Sample ID **CCV7-160621**	Batch ID: **R86455**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160621D**	Analysis Date: **6/21/2016 3:59:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.195	0.00250	0.200	0	97.3	90	110			
Arsenic	0.200	0.00500	0.200	0	100	90	110			
Barium	0.199	0.0100	0.200	0	99.3	90	110			
Beryllium	0.197	0.00100	0.200	0	98.6	90	110			
Cadmium	0.198	0.00100	0.200	0	99.1	90	110			
Chromium	0.202	0.00500	0.200	0	101	90	110			
Cobalt	0.208	0.00500	0.200	0	104	90	110			
Lead	0.203	0.00100	0.200	0	102	90	110			
Lithium	0.203	0.0100	0.200	0	102	90	110			
Molybdenum	0.191	0.00500	0.200	0	95.4	90	110			
Selenium	0.203	0.00500	0.200	0	102	90	110			
Thallium	0.202	0.00150	0.200	0	101	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606168
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160621D

Sample ID **LCVL7-160621** Batch ID: **R86455** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS4_160621D** Analysis Date: **6/21/2016 4:10:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00197	0.00250	0.00200	0	98.4	70	130			
Arsenic	0.00496	0.00500	0.00500	0	99.3	70	130			
Barium	0.00505	0.0100	0.00500	0	101	70	130			
Beryllium	0.00102	0.00100	0.00100	0	102	70	130			
Cadmium	0.000977	0.00100	0.00100	0	97.7	70	130			
Chromium	0.00505	0.00500	0.00500	0	101	70	130			
Cobalt	0.00518	0.00500	0.00500	0	104	70	130			
Lead	0.000890	0.00100	0.00100	0	89.0	70	130			
Lithium	0.0105	0.0100	0.0100	0	105	70	130			
Molybdenum	0.00477	0.00500	0.00500	0	95.5	70	130			
Selenium	0.00518	0.00500	0.00500	0	104	70	130			
Thallium	0.000962	0.00150	0.00100	0	96.2	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606168
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160623A

The QC data in batch 75756 applies to the following samples: 1606168-01A, 1606168-02A, 1606168-03A, 1606168-04A, 1606168-05A

Sample ID	**1606207-16A SD**	Batch ID:	**75756**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**SD**	Run ID:	**ICP-MS4_160623A**	Analysis Date:	**6/23/2016 3:10:00 PM**	Prep Date:	**6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	338	7.50	0	336				0.533	10	

Sample ID	**1606207-16A PDS**	Batch ID:	**75756**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**PDS**	Run ID:	**ICP-MS4_160623A**	Analysis Date:	**6/23/2016 3:30:00 PM**	Prep Date:	**6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	354	1.50	25.0	337	70.1	80	120			S

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606168
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160623A

Sample ID	ICV-160623	Batch ID:	R86514	TestNo:	SW6020A	Units:	mg/L
SampType:	ICV	Run ID:	ICP-MS4_160623A	Analysis Date:	6/23/2016 11:37:00 AM	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	2.37	0.300	2.50	0	94.6	90	110			

Sample ID	LCVL-160623	Batch ID:	R86514	TestNo:	SW6020A	Units:	mg/L
SampType:	LCVL	Run ID:	ICP-MS4_160623A	Analysis Date:	6/23/2016 11:48:00 AM	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.0946	0.300	0.100	0	94.6	70	130			

Sample ID	CCV4-160623	Batch ID:	R86514	TestNo:	SW6020A	Units:	mg/L
SampType:	CCV	Run ID:	ICP-MS4_160623A	Analysis Date:	6/23/2016 2:48:00 PM	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.79	0.300	5.00	0	95.8	90	110			

Sample ID	LCVL4-160623	Batch ID:	R86514	TestNo:	SW6020A	Units:	mg/L
SampType:	LCVL	Run ID:	ICP-MS4_160623A	Analysis Date:	6/23/2016 2:55:00 PM	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.107	0.300	0.100	0	107	70	130			

Sample ID	CCV5-160623	Batch ID:	R86514	TestNo:	SW6020A	Units:	mg/L
SampType:	CCV	Run ID:	ICP-MS4_160623A	Analysis Date:	6/23/2016 3:36:00 PM	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.86	0.300	5.00	0	97.2	90	110			

Sample ID	LCVL5-160623	Batch ID:	R86514	TestNo:	SW6020A	Units:	mg/L
SampType:	LCVL	Run ID:	ICP-MS4_160623A	Analysis Date:	6/23/2016 3:43:00 PM	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.0995	0.300	0.100	0	99.5	70	130			

Sample ID	CCV6-160623	Batch ID:	R86514	TestNo:	SW6020A	Units:	mg/L
SampType:	CCV	Run ID:	ICP-MS4_160623A	Analysis Date:	6/23/2016 4:11:00 PM	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.78	0.300	5.00	0	95.6	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606168
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160623A

Sample ID	**LCVL6-160623**	Batch ID:	**R86514**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160623A**	Analysis Date:	**6/23/2016 4:31:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.0980	0.300	0.100	0	98.0	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606168
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160627A

The QC data in batch 75756 applies to the following samples: 1606168-01A, 1606168-02A, 1606168-03A, 1606168-04A, 1606168-05A

Sample ID	**MB-75756**	Batch ID:	**75756**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**ICP-MS4_160627A**	Analysis Date:	**6/27/2016 12:39:00 PM**	Prep Date:	**6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	<0.0100	0.0300								

Sample ID	**LCS-75756**	Batch ID:	**75756**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**ICP-MS4_160627A**	Analysis Date:	**6/27/2016 12:41:00 PM**	Prep Date:	**6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.208	0.0300	0.200	0	104	80	120			

Sample ID	**LCSD-75756**	Batch ID:	**75756**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**ICP-MS4_160627A**	Analysis Date:	**6/27/2016 12:43:00 PM**	Prep Date:	**6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.205	0.0300	0.200	0	102	80	120	1.45	15	

Sample ID	**1606207-16A MS**	Batch ID:	**75756**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**ICP-MS4_160627A**	Analysis Date:	**6/27/2016 1:11:00 PM**	Prep Date:	**6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	2.01	0.150	0.200	1.70	157	80	120			S

Sample ID	**1606207-16A MSD**	Batch ID:	**75756**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**ICP-MS4_160627A**	Analysis Date:	**6/27/2016 1:13:00 PM**	Prep Date:	**6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	1.97	0.150	0.200	1.70	137	80	120	2.03	15	S

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606168
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160627A

Sample ID	**ICV-160627**	Batch ID:	**R86563**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**ICP-MS4_160627A**	Analysis Date:	**6/27/2016 12:26:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0994	0.0300	0.100	0	99.4	90	110			

Sample ID	**LCVL-160627**	Batch ID:	**R86563**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160627A**	Analysis Date:	**6/27/2016 12:32:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0231	0.0300	0.0200	0	115	70	130			

Sample ID	**CCV1-160627**	Batch ID:	**R86563**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_160627A**	Analysis Date:	**6/27/2016 1:27:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.213	0.0300	0.200	0	107	90	110			

Sample ID	**LCVL1-160627**	Batch ID:	**R86563**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160627A**	Analysis Date:	**6/27/2016 1:45:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0244	0.0300	0.0200	0	122	70	130			

Sample ID	**CCV2-160627**	Batch ID:	**R86563**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_160627A**	Analysis Date:	**6/27/2016 2:23:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.212	0.0300	0.200	0	106	90	110			

Sample ID	**LCVL2-160627**	Batch ID:	**R86563**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160627A**	Analysis Date:	**6/27/2016 2:41:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0208	0.0300	0.0200	0	104	70	130			

Sample ID	**CCV3-160627**	Batch ID:	**R86563**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_160627A**	Analysis Date:	**6/27/2016 3:20:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.212	0.0300	0.200	0	106	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606168
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160627A

Sample ID **LCVL3-160627**	Batch ID: **R86563**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_160627A**	Analysis Date: **6/27/2016 3:36:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0219	0.0300	0.0200	0	109	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606168
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160628A

The QC data in batch 75756 applies to the following samples: 1606168-01A, 1606168-02A, 1606168-03A, 1606168-04A, 1606168-05A

Sample ID	**1606207-16A SD**	Batch ID:	**75756**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**SD**	Run ID:	**ICP-MS4_160628A**	Analysis Date:	**6/28/2016 11:43:00 AM**	Prep Date:	**6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	1.75	0.750	0	1.54				13.1	10	R

Sample ID	**1606207-16A PDS**	Batch ID:	**75756**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**PDS**	Run ID:	**ICP-MS4_160628A**	Analysis Date:	**6/28/2016 11:47:00 AM**	Prep Date:	**6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	2.53	0.150	1.00	1.54	99.5	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606168
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160628A

Sample ID	**ICV-160628**	Batch ID:	**R86587**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**ICP-MS4_160628A**	Analysis Date:	**6/28/2016 11:22:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0991	0.0300	0.100	0	99.1	90	110			

Sample ID	**LCVL-160628**	Batch ID:	**R86587**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160628A**	Analysis Date:	**6/28/2016 11:33:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0251	0.0300	0.0200	0	125	70	130			

Sample ID	**CCV1-160628**	Batch ID:	**R86587**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_160628A**	Analysis Date:	**6/28/2016 12:03:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.204	0.0300	0.200	0	102	90	110			

Sample ID	**LCVL1-160628**	Batch ID:	**R86587**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160628A**	Analysis Date:	**6/28/2016 12:18:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0204	0.0300	0.0200	0	102	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606168
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_160622A

The QC data in batch 75795 applies to the following samples: 1606168-01D, 1606168-02D, 1606168-03D, 1606168-04D, 1606168-05D

Sample ID	**MB-75795**	Batch ID:	**75795**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**IC2_160622A**	Analysis Date:	**6/22/2016 10:06:32 AM**	Prep Date:	**6/22/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	<0.300	1.00								
Fluoride	<0.100	0.400								
Sulfate	<1.00	3.00								

Sample ID	**LCS-75795**	Batch ID:	**75795**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**IC2_160622A**	Analysis Date:	**6/22/2016 10:21:09 AM**	Prep Date:	**6/22/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.56	1.00	10.00	0	95.6	90	110			
Fluoride	3.70	0.400	4.000	0	92.6	90	110			
Sulfate	29.4	3.00	30.00	0	97.9	90	110			

Sample ID	**LCSD-75795**	Batch ID:	**75795**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**IC2_160622A**	Analysis Date:	**6/22/2016 10:35:45 AM**	Prep Date:	**6/22/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.57	1.00	10.00	0	95.7	90	110	0.095	20	
Fluoride	3.76	0.400	4.000	0	94.1	90	110	1.67	20	
Sulfate	29.3	3.00	30.00	0	97.7	90	110	0.290	20	

Sample ID	**1606168-02DMS**	Batch ID:	**75795**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**IC2_160622A**	Analysis Date:	**6/22/2016 2:28:47 PM**	Prep Date:	**6/22/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	328	10.0	200.0	141.0	93.4	90	110			
Fluoride	198	4.00	200.0	0	99.0	90	110			
Sulfate	730	30.0	200.0	502.2	114	90	110			S

Sample ID	**1606168-02DMSD**	Batch ID:	**75795**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**IC2_160622A**	Analysis Date:	**6/22/2016 2:43:24 PM**	Prep Date:	**6/22/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	328	10.0	200.0	141.0	93.5	90	110	0.077	20	
Fluoride	199	4.00	200.0	0	99.4	90	110	0.408	20	
Sulfate	723	30.0	200.0	502.2	110	90	110	1.01	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606168
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_160622A

Sample ID **ICV-160622**	Batch ID: **R86509**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC2_160622A**	Analysis Date: **6/22/2016 9:30:50 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	23.8	1.00	25.00	0	95.4	90	110			
Fluoride	9.55	0.400	10.00	0	95.5	90	110			
Sulfate	74.8	3.00	75.00	0	99.7	90	110			

Sample ID **CCV1-160622**	Batch ID: **R86509**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_160622A**	Analysis Date: **6/22/2016 1:27:24 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.61	1.00	10.00	0	96.1	90	110			
Fluoride	3.93	0.400	4.000	0	98.1	90	110			
Sulfate	29.9	3.00	30.00	0	99.6	90	110			

Sample ID **CCV2-160622**	Batch ID: **R86509**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_160622A**	Analysis Date: **6/22/2016 3:55:42 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.68	1.00	10.00	0	96.8	90	110			
Fluoride	3.97	0.400	4.000	0	99.3	90	110			
Sulfate	30.1	3.00	30.00	0	100	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606168
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_160617A

The QC data in batch 75719 applies to the following samples: 1606168-01D, 1606168-02D, 1606168-03D, 1606168-04D, 1606168-05D

Sample ID	**1606168-01D-DUP**	Batch ID:	**75719**	TestNo:	**M4500-H+ B**	Units:	**pH Units@18.1℃**
SampType:	**DUP**	Run ID:	**TITRATOR_160617A**	Analysis Date:	**6/17/2016 1:00:00 PM**	Prep Date:	**6/17/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.26	0	0	6.290				0.478	5	

Sample ID	**1606193-04D-DUP**	Batch ID:	**75719**	TestNo:	**M4500-H+ B**	Units:	**pH Units@17.3℃**
SampType:	**DUP**	Run ID:	**TITRATOR_160617A**	Analysis Date:	**6/17/2016 1:20:00 PM**	Prep Date:	**6/17/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.95	0	0	6.890				0.867	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606168
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_160617A

Sample ID	**ICV-160617**	Batch ID:	**R86391**	TestNo:	**M4500-H+ B**	Units:	**pH Units@21.9℃**
SampType:	**ICV**	Run ID:	**TITRATOR_160617A**	Analysis Date:	**6/17/2016 12:36:00 PM**	Prep Date:	**6/17/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	9.97	0	10.00	0	99.7	99	101			

Sample ID	**CCV1-160617**	Batch ID:	**R86391**	TestNo:	**M4500-H+ B**	Units:	**pH Units@21.2℃**
SampType:	**CCV**	Run ID:	**TITRATOR_160617A**	Analysis Date:	**6/17/2016 1:15:00 PM**	Prep Date:	**6/17/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	7.01	0	7.000	0	100	97.1	102.9			

Sample ID	**CCV2-160617**	Batch ID:	**R86391**	TestNo:	**M4500-H+ B**	Units:	**pH Units@21.2℃**
SampType:	**CCV**	Run ID:	**TITRATOR_160617A**	Analysis Date:	**6/17/2016 1:44:00 PM**	Prep Date:	**6/17/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	7.00	0	7.000	0	100	97.1	102.9			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606168
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: WC_160617A

The QC data in batch 75699 applies to the following samples: 1606168-01D

Sample ID **MB-75699**	Batch ID: **75699**	TestNo: **M2540C**	Units: **mg/L**
SampType: **MBLK**	Run ID: **WC_160617A**	Analysis Date: **6/20/2016 8:45:00 AM**	Prep Date: **6/17/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	<10.0	10.0								

Sample ID **LCS-75699**	Batch ID: **75699**	TestNo: **M2540C**	Units: **mg/L**
SampType: **LCS**	Run ID: **WC_160617A**	Analysis Date: **6/20/2016 8:45:00 AM**	Prep Date: **6/17/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	760	10.0	745.6	0	102	90	113			

Sample ID **1606145-04D-DUP**	Batch ID: **75699**	TestNo: **M2540C**	Units: **mg/L**
SampType: **DUP**	Run ID: **WC_160617A**	Analysis Date: **6/20/2016 8:45:00 AM**	Prep Date: **6/17/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	2300	50.0	0	2205				4.00	5	

Sample ID **1606168-01D-DUP**	Batch ID: **75699**	TestNo: **M2540C**	Units: **mg/L**
SampType: **DUP**	Run ID: **WC_160617A**	Analysis Date: **6/20/2016 8:45:00 AM**	Prep Date: **6/17/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	3850	50.0	0	3780				1.83	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1606168
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: WC_160621C

The QC data in batch 75770 applies to the following samples: 1606168-02D, 1606168-03D, 1606168-04D, 1606168-05D

Sample ID	**MB-75770**	Batch ID:	**75770**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**WC_160621C**	Analysis Date:	**6/22/2016 8:36:00 AM**	Prep Date:	**6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	<10.0	10.0								

Sample ID	**LCS-75770**	Batch ID:	**75770**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**WC_160621C**	Analysis Date:	**6/22/2016 8:36:00 AM**	Prep Date:	**6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	770	10.0	745.6	0	103	90	113			

Sample ID	**1606168-02D-DUP**	Batch ID:	**75770**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_160621C**	Analysis Date:	**6/22/2016 8:36:00 AM**	Prep Date:	**6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	1800	50.0	0	1725				4.26	5	

Sample ID	**1606193-05D-DUP**	Batch ID:	**75770**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_160621C**	Analysis Date:	**6/22/2016 8:36:00 AM**	Prep Date:	**6/21/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	3920	50.0	0	6135				44.1	5	R

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

NJ OK001

Case Narrative

Lab No: 20160580

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r d r d

r d r r d r r rd d r d rr

OUTREACH LABORATORY, A Divsion of ESC Lab Sciences
Address: 311 North Aspen Avenue, Broken Arrow, OK, 74012 EMail: outreach@esclabsciences.com - Tel: (918) 251-2515

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Analytical Report

	Method	Result	DL	Units	Qual	Prep Date	Analysis Date	Analyst
Lab ID	**20160580-01**							
Client ID	**AXMW-2**							
Date Sampled	**6/15/2016 9:10:00 AM**							
Matrix	**NPW**							
	Radiochemical Analyses							
d d	/			/				
d	M M	/		/		/ /	/ /	
d	/	/		/		/ /	/ /	
Lab ID	**20160580-02**							
Client ID	**AX-23**							
Date Sampled	**6/15/2016 9:55:00 AM**							
Matrix	**NPW**							
	Radiochemical Analyses							
d d	/			/				
d	M M	/		/		/ /	/ /	
d	/	/		/		/ /	/ /	
Lab ID	**20160580-03**							
Client ID	**AX-28**							
Date Sampled	**6/15/2016 11:00:00 AM**							
Matrix	**NPW**							
	Radiochemical Analyses							
d d	/			/				
d	M M	/		/		/ /	/ /	
d	/	/		/		/ /	/ /	
Lab ID	**20160580-04**							
Client ID	**AXMW-1**							
Date Sampled	**6/15/2016 1:05:00 PM**							
Matrix	**NPW**							
	Radiochemical Analyses							
d d	/			/				
d	M M	/		/		/ /	/ /	
d	/	/		/		/ /	/ /	

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Analytical Report

	Method	Result	DL	Units	Qual	Prep Date	Analysis Date	Analyst
Lab ID	**20160580-05**							
Client ID	**MW-1**							
Date Sampled	**6/15/2016**							
Matrix	**NPW**							
	Radiochemical Analyses							
d d		/		/				
d	M M	/		/		/ /	/ /	
d	/	/		/		/ /	/ /	

QC Report

Parameter	Blank	LCS %REC	LCSD %REC	LCSD RPD	DUP RPD	RER, NAD or DER	MS %REC	MSD %REC	MSD RPD	Batch ID
d										
d										

Lab Approval:

OUTREACH LABORATORY, A Divsion of ESC Lab Sciences
Address: 311 North Aspen Avenue, Broken Arrow, OK, 74012 EMail: outreach@esclabsciences.com - Tel: (918) 251-2515

DHL Analytical, Inc.
2300 Double Creek Drive
Round Rock, TX 78664

TEL: *(512) 388-8222* FAX: *(512) 388-8229*

Work Order: 1606168

CHAIN-OF-CUSTODY REC

Subcontractor:

ESC Laboratory
311 North Aspen
Broken Arrow, Oklahoma 74012

TEL: (918) 251-2515
FAX:
Acct #: DHLRRTX

1606050

	Sample Id	Matrix	DHL#	Date Collected	Bottle Type	Requested Tests			
						E904.0	SM7500Ra-B M		
01	AXMW-2	Aqueous	-01B	06/15/16 09:10 AM	500HDPEHNO3	1			
	AXMW-2	Aqueous	-01C	06/15/16 09:10 AM	500HDPEHNO3		1		
02	AX-23	Aqueous	-02B	06/15/16 09:55 AM	500HDPEHNO3	1			
	AX-23	Aqueous	-02C	06/15/16 09:55 AM	500HDPEHNO3		1		
03	AX-28	Aqueous	-03B	06/15/16 11:00 AM	500HDPEHNO3	1			
	AX-28	Aqueous	-03C	06/15/16 11:00 AM	500HDPEHNO3		1		
04	AXMW-1	Aqueous	-04B	06/15/16 01:05 PM	500HDPEHNO3	1			
	AXMW-1	Aqueous	-04C	06/15/16 01:05 PM	500HDPEHNO3		1		
	MW-1	Aqueous	-05B	06/15/16	500HDPEHNO3	1			
05	MW-1	Aqueous	-05C	06/15/16	500HDPEHNO3		1		

General Comments:

Please analyze these samples with a Standard Turnaround Time.
Call John DuPont if you have questions.
Quality Control Package Needed: Standard
EMAIL report to both cac@dhlanalytical.com & dupont@dhlanalytical.com

		Date/Time		
Relinquished by:		6/15/16 17:30	**Received by:**	
Relinquished by:			**Received by:**	

SAMPLE LOGIN

Date Received: *6/17/2016 11:12:5*

Lab Number: 20160580

Sample Number	Client Sample ID	Matrix	Date Sampled	Container Type	Container Size	Preservation	Pr Up
20160580-01 B	AXMW-2	NPW	06/15/16	Plastic	500 ml	HNO3, pH < 2	☐
20160580-01 A	AXMW-2	NPW	06/15/16	Plastic	500 ml	HNO3, pH < 2	☐
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160580-02 B	AX-23	NPW	06/15/16	Plastic	500 ml	HNO3, pH < 2	☐
20160580-02 A	AX-23	NPW	06/15/16	Plastic	500 ml	HNO3, pH < 2	☐
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160580-03 B	AX-28	NPW	06/15/16	Plastic	500 ml	HNO3, pH < 2	☐
20160580-03 A	AX-28	NPW	06/15/16	Plastic	500 ml	HNO3, pH < 2	☐
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160580-04 B	AXMW-1	NPW	06/15/16	Plastic	500 ml	HNO3, pH < 2	☐
20160580-04 A	AXMW-1	NPW	06/15/16	Plastic	500 ml	HNO3, pH < 2	☐
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160580-05 B	MW-1	NPW	06/15/16	Plastic	500 ml	HNO3, pH < 2	☐
20160580-05 A	MW-1	NPW	06/15/16	Plastic	500 ml	HNO3, pH < 2	☐
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				

CONTAINER INSPECTION

Coolers 1 Custody Seals Broken 0 ☐ Temperature: NA C Ice Radiation Survey: <300 cpm

SAMPLE INSPECTION

Sample Seal Broken 0 Chain of Custody Record ☑ Labels in Tact ☑ Radiation Survey Complete ☐ NA

Anomalies

Inspected By: [signature] DATE 6/17/16

QA or Designee Review: Raymond Thomas DATE 06/17/16

Sample Custodian Review: _____ DATE _____

Project Notes:

September 08, 2016

Will Vienne
Pastor, Behling & Wheeler
2201 Double Creek Dr #4004
Round Rock, Texas 78664
TEL: (512) 671-3434
FAX (512) 671-3446

Order No.: 1608095

RE: Sandow CCR

Dear Will Vienne:

DHL Analytical, Inc. received 12 sample(s) on 8/9/2016 for the analyses presented in the following report.

There were no problems with the analyses and all data met requirements of NELAC except where noted in the Case Narrative. All non-NELAC methods will be identified accordingly in the case narrative and all estimated uncertainties of test results are within method or EPA specifications.

If you have any questions regarding these tests results, please feel free to call. Thank you for using DHL Analytical.

Sincerely,

John DuPont
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-16-16

Table of Contents

DHL ANALYTICAL
2300 Double Creek Dr. ■ Round Rock, TX 78664
Phone (512) 388-8222 ■ FAX (512) 388-8229
Web: www.dhlanalytical.com
E-Mail: login@dhlanalytical.com

CLIENT: Pastor, Behling & Wheeler
ADDRESS: 2201 Double Creek Dr Ste 4004
PHONE: 512-671-3434 FAX/E-MAIL: will.vienne@pbwllc.com
DATA REPORTED TO: Will Vienne
ADDITIONAL REPORT COPIES TO: Karla Henson

DATE: 8/9/2016
PO #:
PROJECT LOCATION OR NAME: San
CLENT PROJECT #: 5164E

Authorize 5% surcharge for TRRP Report? ☐ Yes ☐ No

S=SOIL P=PAINT
W=WATER SL=SLUDGE
A=AIR O=OTHER
L=LIQUID SO=SOLID
SE=SEDIMENT

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	PRESERVATION: HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESERVED
AX-24	01	8/9/16	9:35	W		4		X		X	
AX-22R	02	8/9/16	10:30								
AX-28	03		11:35								
~~AX~~MW-1	04		12:20								
AX-27	05		14:15								
AX-23	06		15:15								
~~AX~~MW-01	07										
EB-01	08	8/9/16	830	W		4		X		X	

ANALYSES: BTEX ☐ MTBE ☐ [METHOD 8021] | TPH 1005 ☐ TPH 1006 ☐ HOLD 1006 ☐ | GRO [METHOD 8015] ☐ DRO [METHOD 8105] ☐ | VOC 8260 ☐ VOC 624 ☐ VOC 8260/5035 ☐ | SVOC 8270 ☐ PAH 8270 ☐ HOLD PAH ☐ SVOC 625 ☐ | 8270 PEST ☐ 625 PEST/PCB ☐ 608 PCB ☐ | 8270 O-P PEST ☐ 8082 PCB ☐ 8270 PCB ☐ | 8321 HERB ☐ T PHOS, AMMONIA ☐ | METALS 6020 ☐ METALS 200.8 ☐ | RCRA ☐ TX1T ☐ | PH ☐ HEX CHROM ☐ | CHLORIDE ☐ | TCLP

RELINQUISHED BY: (Signature)	DATE/TIME 8/9/16/16:35	RECEIVED BY: (Signature)	
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	

TURN AROUND TIME
RUSH ☐ CALL FIRST
1 DAY ☐ CALL FIRST
2 DAY ☐
NORMAL ☒
OTHER ☐

LABORATOR
RECEIVING TE
CUSTODY SEA
CARRIER: ☐
☐ COURIER DI
☐ HAND DELI

☐ DHL DISPOSAL @ $5.00 each ☐ Return

DHL ANALYTICAL
2300 Double Creek Dr. ■ Round Rock, TX 78664
Phone (512) 388-8222 ■ FAX (512) 388-8229
Web: www.dhlanalytical.com
E-Mail: login@dhlanalytical.com

CLIENT: Pastor, Behling & Wheeler
ADDRESS: 2201 Double Creek Dr Ste 400A
PHONE: (512) 671-3434 FAX/E-MAIL: will-vienne@pbwllc.com
DATA REPORTED TO: Will Vienne
ADDITIONAL REPORT COPIES TO: Karla Henson

DATE: 8/10/2016
PO #:
PROJECT LOCATION OR NAME: San
CLENT PROJECT #: 5164E

Authorize 5% surcharge for TRRP Report? ☐ Yes ☑ No

S=SOIL P=PAINT
W=WATER SL=SLUDGE
A=AIR O=OTHER
L=LIQUID SO=SOLID
SE=SEDIMENT

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	PRESERVATION HCl	HNO3	H2SO4 ☐ NaOH ☐	ICE	UNPRESERVED
AX-25	09	8/10/2016	8:35	W		4		X		X	
AX-26	210		9:30								
AXMW2	311		11:00								
AX-29	412		11:50								
	413	8/10/16									

ANALYSES: BTEX ☐ MTBE ☐ [METHOD 8021] | TPH 1005 ☐ TPH 1006 ☐ HOLD 1006 ☐ | GRO [METHOD 8015] ☐ DRO [METHOD 8105] ☐ | VOC 8260 ☐ VOC 624 ☐ VOC 8260/5035 ☐ | SVOC 8270 ☐ PAH 8270 ☐ HOLD PAH ☐ SVOC 625 ☐ | 8270 PEST ☐ 625 PEST/PCB ☐ 608 PCB ☐ | 8270 O-P PEST ☐ 8082 PCB ☐ 8270 PCB ☐ | 8321 HERB ☐ T PHOS, AMMONIA ☐ | METALS 6020 ☐ METALS 200.8 ☐ | RCRA ☐ TX11 ☐ | PH ☐ HEX CHROM ☐ | CHLORIDE ☐ | TCLP

RELINQUISHED BY: (Signature) John Tambe	DATE/TIME 8/10/16 15:05	RECEIVED BY: (Signature) Karla
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)

☐ DHL DISPOSAL @ $5.00 each ☐ Return

TURN AROUND TIME
RUSH ☐ CALL FIRST
1 DAY ☐ CALL FIRST
2 DAY ☐
NORMAL ☑
OTHER ☐

LABORATOR
RECEIVING TE
CUSTODY SEA
CARRIER: ☐
☐ COURIER D
☐ HAND DELI

John Dupont

From: Sara Taube [Sara.Taube@pbwllc.com]
Sent: Wednesday, July 22, 2015 12:05 PM
To: John Dupont
Subject: CCR Appendix III and IV
Follow Up Flag: Follow up
Flag Status: Completed

Hi John,

Here are the Appendix III and Appendix IV constituents that we will need to have analyzed under the CCR Rule.

Appendix III
Boron
Calcium
Chloride
Fluoride
pH
sulfate
TDS

Appendix IV
Antimony
Arsenic
Barium
Beryllium
Cadmium
Chromium
Cobalt
Fluoride
Lead
Lithium
Mercury
Molybdenum
Selenium
Thallium
Radium 226 and 228

We are looking to have approximately 74 wells sampled 8 times over the course of the next two years. Please let me know if there is any more information you might need.

Cheers,

Sara

10/26/2015

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name Pastor, Behling & Wheeler

Date Received: 8/9/2016

Work Order Number 1608095

Received by JB

Checklist completed by: Signature 8/9/2016 Date

Reviewed by PL Initials 8/9/2016 Date

Carrier name Hand Delivered

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	5.1 °C 3.1
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH<2 acceptable upon receipt?	Yes ☑	No ☐	NA ☐ LOT # 8086
	Adjusted? 100		Checked by
Water - ph>9 (S) or ph>12 (CN) acceptable upon receipt?	Yes ☐	No ☐	NA ☑ LOT #
	Adjusted?		Checked by

Any No response must be detailed in the comments section below.

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

CLIENT: Pastor, Behling & Wheeler
Project: Sandow CCR
Lab Order: 1608095

CASE NARRATIVE

Samples were analyzed using the methods outlined in the following references:

Method SW6020A - Metals Analysis
Method SW7470A - Mercury Analysis
Method E300 - Anions Analysis
Method M4500-H+ B - pH of a Water Analysis
Method M2540C - TDS Analysis
Sub-contract - Radium-228 and Radium-226 analyses by methods E904/9320 and SM 7500 Ra B M. Analyzed at ESC Lab Sciences.

LOG IN

The samples were received and log-in performed on 8/9/16 and 8/10/16. A total of 12 samples were received. The samples arrived in good condition and were properly packaged.

METALS ANALYSIS

For Metals analysis performed on 8/17/16 and 8/18/16 (batches 76764 & 76796) the matrix spikes and matrix spike duplicate recoveries were out of control limits for seven analytes. These are flagged accordingly in the QC summary report. The samples selected for the matrix spikes and matrix spike duplicates were not from this work order. The LCSs were within control limits for these analytes. No further corrective actions were taken.

For Metals analysis performed on 8/18/16 (batch 76796) the RPD for the serial dilution was slightly above control limits for Boron. This is flagged accordingly. The PDS was within control limits for this analyte. No further corrective actions were taken.

For Metals analysis performed on 8/18/16 and 8/19/16 three LCVLs were below control limits for Boron. These are flagged accordingly. The associated CCVs were within control limits for this analyte. No further corrective actions were taken.

DHL Analytical, Inc.

Date: *08-Sep-16*

CLIENT: Pastor, Behling & Wheeler
Project: Sandow CCR
Lab Order: 1608095

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
1608095-01	AX-24		08/09/16 09:35 AM	8/9/2016
1608095-02	AX-22R		08/09/16 10:30 AM	8/9/2016
1608095-03	AX-28		08/09/16 11:35 AM	8/9/2016
1608095-04	AXMW-1		08/09/16 12:20 PM	8/9/2016
1608095-05	AX-27		08/09/16 02:15 PM	8/9/2016
1608095-06	AX-23		08/09/16 03:15 PM	8/9/2016
1608095-07	MW-01		08/09/16	8/9/2016
1608095-08	EB-01		08/09/16 08:30 AM	8/9/2016
1608095-09	AX-25		08/10/16 08:35 AM	8/10/2016
1608095-10	AX-26		08/10/16 09:30 AM	8/10/2016
1608095-11	AXMW-2		08/10/16 11:00 AM	8/10/2016
1608095-12	AX-29		08/10/16 11:50 AM	8/10/2016

& Wheeler

PREP DATES REPORT

Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
08/09/16 09:35 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/09/16 09:35 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/09/16 09:35 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/09/16 09:35 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	08/16/16 11:56 AM	76826
08/09/16 09:35 AM	Aqueous	E300	Anion Preparation	08/10/16 09:00 AM	76753
08/09/16 09:35 AM	Aqueous	E300	Anion Preparation	08/10/16 09:00 AM	76753
08/09/16 09:35 AM	Aqueous	M4500-H+ B	pH Preparation	08/15/16 08:23 AM	76798
08/09/16 09:35 AM	Aqueous	M2540C	TDS Preparation	08/12/16 01:05 PM	76794
08/09/16 10:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/09/16 10:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/09/16 10:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/09/16 10:30 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	08/16/16 11:56 AM	76826
08/09/16 10:30 AM	Aqueous	E300	Anion Preparation	08/10/16 09:00 AM	76753
08/09/16 10:30 AM	Aqueous	E300	Anion Preparation	08/10/16 09:00 AM	76753
08/09/16 10:30 AM	Aqueous	M4500-H+ B	pH Preparation	08/15/16 08:23 AM	76798
08/09/16 10:30 AM	Aqueous	M2540C	TDS Preparation	08/12/16 01:05 PM	76794
08/09/16 11:35 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/09/16 11:35 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/09/16 11:35 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/09/16 11:35 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	08/16/16 11:56 AM	76826
08/09/16 11:35 AM	Aqueous	E300	Anion Preparation	08/10/16 09:00 AM	76753
08/09/16 11:35 AM	Aqueous	E300	Anion Preparation	08/10/16 09:00 AM	76753
08/09/16 11:35 AM	Aqueous	M4500-H+ B	pH Preparation	08/15/16 08:23 AM	76798
08/09/16 11:35 AM	Aqueous	M2540C	TDS Preparation	08/12/16 01:05 PM	76794
08/09/16 12:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/09/16 12:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/09/16 12:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/09/16 12:20 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	08/16/16 11:56 AM	76826

& Wheeler

PREP DATES REPORT

Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
08/09/16 12:20 PM	Aqueous	E300	Anion Preparation	08/10/16 09:00 AM	76753
08/09/16 12:20 PM	Aqueous	E300	Anion Preparation	08/10/16 09:00 AM	76753
08/09/16 12:20 PM	Aqueous	M4500-H+ B	pH Preparation	08/15/16 08:23 AM	76798
08/09/16 12:20 PM	Aqueous	M2540C	TDS Preparation	08/12/16 01:05 PM	76794
08/09/16 02:15 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/09/16 02:15 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/09/16 02:15 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/09/16 02:15 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	08/16/16 11:56 AM	76826
08/09/16 02:15 PM	Aqueous	E300	Anion Preparation	08/10/16 09:00 AM	76753
08/09/16 02:15 PM	Aqueous	E300	Anion Preparation	08/10/16 09:00 AM	76753
08/09/16 02:15 PM	Aqueous	M4500-H+ B	pH Preparation	08/15/16 08:23 AM	76798
08/09/16 02:15 PM	Aqueous	M2540C	TDS Preparation	08/12/16 01:05 PM	76794
08/09/16 03:15 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/09/16 03:15 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/09/16 03:15 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/09/16 03:15 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/09/16 03:15 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	08/16/16 11:56 AM	76826
08/09/16 03:15 PM	Aqueous	E300	Anion Preparation	08/10/16 09:00 AM	76753
08/09/16 03:15 PM	Aqueous	M4500-H+ B	pH Preparation	08/15/16 08:23 AM	76798
08/09/16 03:15 PM	Aqueous	M2540C	TDS Preparation	08/12/16 01:05 PM	76794
08/09/16	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/09/16	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/09/16	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/09/16	Aqueous	SW7470A	Mercury Aq Prep, Total	08/16/16 11:56 AM	76826
08/09/16	Aqueous	E300	Anion Preparation	08/10/16 09:00 AM	76753
08/09/16	Aqueous	E300	Anion Preparation	08/10/16 09:00 AM	76753
08/09/16	Aqueous	M4500-H+ B	pH Preparation	08/15/16 08:23 AM	76798
08/09/16	Aqueous	M2540C	TDS Preparation	08/12/16 01:05 PM	76794

& Wheeler

PREP DATES REPORT

Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
08/09/16 08:30 AM	Equip Blank	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/09/16 08:30 AM	Equip Blank	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/09/16 08:30 AM	Equip Blank	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/09/16 08:30 AM	Equip Blank	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/09/16 08:30 AM	Equip Blank	SW7470A	Mercury Aq Prep, Total	08/16/16 11:56 AM	76826
08/09/16 08:30 AM	Equip Blank	E300	Anion Preparation	08/10/16 09:00 AM	76753
08/09/16 08:30 AM	Equip Blank	E300	Anion Preparation	08/10/16 09:00 AM	76753
08/09/16 08:30 AM	Equip Blank	M4500-H+ B	pH Preparation	08/15/16 08:23 AM	76798
08/09/16 08:30 AM	Equip Blank	M2540C	TDS Preparation	08/12/16 01:05 PM	76794
08/10/16 08:35 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/10/16 08:35 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/10/16 08:35 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/10/16 08:35 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	08/16/16 11:56 AM	76826
08/10/16 08:35 AM	Aqueous	E300	Anion Preparation	08/11/16 10:56 AM	76776
08/10/16 08:35 AM	Aqueous	E300	Anion Preparation	08/11/16 10:56 AM	76776
08/10/16 08:35 AM	Aqueous	M4500-H+ B	pH Preparation	08/15/16 08:23 AM	76798
08/10/16 08:35 AM	Aqueous	M2540C	TDS Preparation	08/12/16 01:05 PM	76794
08/10/16 09:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/10/16 09:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/10/16 09:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/10/16 09:30 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	08/16/16 11:56 AM	76826
08/10/16 09:30 AM	Aqueous	E300	Anion Preparation	08/11/16 10:56 AM	76776
08/10/16 09:30 AM	Aqueous	E300	Anion Preparation	08/11/16 10:56 AM	76776
08/10/16 09:30 AM	Aqueous	M4500-H+ B	pH Preparation	08/15/16 08:23 AM	76798
08/10/16 09:30 AM	Aqueous	M2540C	TDS Preparation	08/12/16 01:05 PM	76794
08/10/16 11:00 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/10/16 11:00 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/10/16 11:00 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764

& Wheeler

PREP DATES REPORT

Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
08/10/16 11:00 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/10/16 11:00 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/10/16 11:00 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/10/16 04:43 PM	76764
08/10/16 11:00 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	08/16/16 11:56 AM	76826
08/10/16 11:00 AM	Aqueous	E300	Anion Preparation	08/11/16 10:56 AM	76776
08/10/16 11:00 AM	Aqueous	E300	Anion Preparation	08/11/16 10:56 AM	76776
08/10/16 11:00 AM	Aqueous	E300	Anion Preparation	08/11/16 10:56 AM	76776
08/10/16 11:00 AM	Aqueous	M4500-H+ B	pH Preparation	08/15/16 08:23 AM	76798
08/10/16 11:00 AM	Aqueous	M2540C	TDS Preparation	08/12/16 01:05 PM	76794
08/10/16 11:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/15/16 08:01 AM	76796
08/10/16 11:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/15/16 08:01 AM	76796
08/10/16 11:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/15/16 08:01 AM	76796
08/10/16 11:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/15/16 08:01 AM	76796
08/10/16 11:50 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	08/16/16 11:56 AM	76826
08/10/16 11:50 AM	Aqueous	E300	Anion Preparation	08/11/16 10:56 AM	76776
08/10/16 11:50 AM	Aqueous	E300	Anion Preparation	08/11/16 10:56 AM	76776
08/10/16 11:50 AM	Aqueous	M4500-H+ B	pH Preparation	08/15/16 08:23 AM	76798
08/10/16 11:50 AM	Aqueous	M2540C	TDS Preparation	08/12/16 01:05 PM	76794

& Wheeler

ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	SW7470A	Mercury Total: Aqueous	76826	1	08/17/16 11:17 AM	CETAC2_HG_160817A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	50	08/17/16 03:22 PM	ICP-MS3_160817A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	1	08/16/16 02:41 PM	ICP-MS4_160816B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	1	08/19/16 02:33 PM	ICP-MS4_160819A
Aqueous	E300	Anions by IC method - Water	76753	1	08/10/16 11:23 AM	IC4_160810A
Aqueous	E300	Anions by IC method - Water	76753	100	08/10/16 03:38 PM	IC4_160810A
Aqueous	M4500-H+ B	pH	76798	1	08/15/16 10:36 AM	TITRATOR_160815A
Aqueous	M2540C	Total Dissolved Solids	76794	1	08/15/16 08:46 AM	WC_160812A
Aqueous	SW7470A	Mercury Total: Aqueous	76826	1	08/17/16 11:20 AM	CETAC2_HG_160817A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	10	08/17/16 03:28 PM	ICP-MS3_160817A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	1	08/16/16 02:43 PM	ICP-MS4_160816B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	1	08/19/16 03:28 PM	ICP-MS4_160819A
Aqueous	E300	Anions by IC method - Water	76753	1	08/10/16 11:38 AM	IC4_160810A
Aqueous	E300	Anions by IC method - Water	76753	10	08/10/16 03:53 PM	IC4_160810A
Aqueous	M4500-H+ B	pH	76798	1	08/15/16 10:41 AM	TITRATOR_160815A
Aqueous	M2540C	Total Dissolved Solids	76794	1	08/15/16 08:46 AM	WC_160812A
Aqueous	SW7470A	Mercury Total: Aqueous	76826	1	08/17/16 11:22 AM	CETAC2_HG_160817A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	50	08/17/16 03:34 PM	ICP-MS3_160817A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	1	08/16/16 02:45 PM	ICP-MS4_160816B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	1	08/19/16 03:30 PM	ICP-MS4_160819A
Aqueous	E300	Anions by IC method - Water	76753	1	08/10/16 11:53 AM	IC4_160810A
Aqueous	E300	Anions by IC method - Water	76753	100	08/10/16 04:38 PM	IC4_160810A
Aqueous	M4500-H+ B	pH	76798	1	08/15/16 10:42 AM	TITRATOR_160815A
Aqueous	M2540C	Total Dissolved Solids	76794	1	08/15/16 08:46 AM	WC_160812A
Aqueous	SW7470A	Mercury Total: Aqueous	76826	1	08/17/16 11:24 AM	CETAC2_HG_160817A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	1	08/19/16 03:32 PM	ICP-MS4_160819A

& Wheeler

ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	50	08/17/16 03:40 PM	ICP-MS3_160817A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	1	08/16/16 02:47 PM	ICP-MS4_160816B
Aqueous	E300	Anions by IC method - Water	76753	1	08/10/16 12:08 PM	IC4_160810A
Aqueous	E300	Anions by IC method - Water	76753	100	08/10/16 04:53 PM	IC4_160810A
Aqueous	M4500-H+ B	pH	76798	1	08/15/16 10:44 AM	TITRATOR_160815A
Aqueous	M2540C	Total Dissolved Solids	76794	1	08/15/16 08:46 AM	WC_160812A
Aqueous	SW7470A	Mercury Total: Aqueous	76826	1	08/17/16 11:35 AM	CETAC2_HG_160817A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	1	08/16/16 02:49 PM	ICP-MS4_160816B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	50	08/19/16 02:17 PM	ICP-MS4_160819A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	1	08/19/16 03:34 PM	ICP-MS4_160819A
Aqueous	E300	Anions by IC method - Water	76753	100	08/10/16 05:08 PM	IC4_160810A
Aqueous	E300	Anions by IC method - Water	76753	1	08/10/16 12:23 PM	IC4_160810A
Aqueous	M4500-H+ B	pH	76798	1	08/15/16 10:47 AM	TITRATOR_160815A
Aqueous	M2540C	Total Dissolved Solids	76794	1	08/15/16 08:46 AM	WC_160812A
Aqueous	SW7470A	Mercury Total: Aqueous	76826	1	08/17/16 11:38 AM	CETAC2_HG_160817A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	1	08/19/16 04:41 PM	ICP-MS3_160819B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	1	08/16/16 02:51 PM	ICP-MS4_160816B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	10	08/19/16 02:19 PM	ICP-MS4_160819A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	1	08/19/16 03:36 PM	ICP-MS4_160819A
Aqueous	E300	Anions by IC method - Water	76753	1	08/10/16 12:38 PM	IC4_160810A
Aqueous	M4500-H+ B	pH	76798	1	08/15/16 10:48 AM	TITRATOR_160815A
Aqueous	M2540C	Total Dissolved Solids	76794	1	08/15/16 08:46 AM	WC_160812A
Aqueous	SW7470A	Mercury Total: Aqueous	76826	1	08/17/16 11:40 AM	CETAC2_HG_160817A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	50	08/19/16 02:21 PM	ICP-MS4_160819A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	1	08/19/16 03:38 PM	ICP-MS4_160819A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	1	08/16/16 02:53 PM	ICP-MS4_160816B

& Wheeler

ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	E300	Anions by IC method - Water	76753	1	08/10/16 12:53 PM	IC4_160810A
Aqueous	E300	Anions by IC method - Water	76753	100	08/10/16 05:23 PM	IC4_160810A
Aqueous	M4500-H+ B	pH	76798	1	08/15/16 10:50 AM	TITRATOR_160815A
Aqueous	M2540C	Total Dissolved Solids	76794	1	08/15/16 08:46 AM	WC_160812A
Equip Blank	SW7470A	Mercury Total: Aqueous	76826	1	08/17/16 11:42 AM	CETAC2_HG_160817A
Equip Blank	SW6020A	Trace Metals: ICP-MS - Water	76764	1	08/19/16 04:47 PM	ICP-MS3_160819B
Equip Blank	SW6020A	Trace Metals: ICP-MS - Water	76764	1	08/16/16 02:55 PM	ICP-MS4_160816B
Equip Blank	SW6020A	Trace Metals: ICP-MS - Water	76764	10	08/19/16 02:23 PM	ICP-MS4_160819A
Equip Blank	SW6020A	Trace Metals: ICP-MS - Water	76764	1	08/19/16 03:40 PM	ICP-MS4_160819A
Equip Blank	E300	Anions by IC method - Water	76753	1	08/10/16 02:30 PM	IC4_160810A
Equip Blank	E300	Anions by IC method - Water	76753	1	08/10/16 01:08 PM	IC4_160810A
Equip Blank	M4500-H+ B	pH	76798	1	08/15/16 10:53 AM	TITRATOR_160815A
Equip Blank	M2540C	Total Dissolved Solids	76794	1	08/15/16 08:46 AM	WC_160812A
Aqueous	SW7470A	Mercury Total: Aqueous	76826	1	08/17/16 11:45 AM	CETAC2_HG_160817A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	1	08/16/16 02:57 PM	ICP-MS4_160816B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	50	08/19/16 02:25 PM	ICP-MS4_160819A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	1	08/19/16 03:42 PM	ICP-MS4_160819A
Aqueous	E300	Anions by IC method - Water	76776	1	08/11/16 12:23 PM	IC4_160811A
Aqueous	E300	Anions by IC method - Water	76776	100	08/11/16 04:08 PM	IC4_160811A
Aqueous	M4500-H+ B	pH	76798	1	08/15/16 10:54 AM	TITRATOR_160815A
Aqueous	M2540C	Total Dissolved Solids	76794	1	08/15/16 08:46 AM	WC_160812A
Aqueous	SW7470A	Mercury Total: Aqueous	76826	1	08/17/16 11:47 AM	CETAC2_HG_160817A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	1	08/19/16 03:44 PM	ICP-MS4_160819A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	50	08/19/16 02:27 PM	ICP-MS4_160819A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	1	08/16/16 03:16 PM	ICP-MS4_160816B
Aqueous	E300	Anions by IC method - Water	76776	100	08/11/16 04:23 PM	IC4_160811A

& Wheeler

ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	E300	Anions by IC method - Water	76776	1	08/11/16 12:38 PM	IC4_160811A
Aqueous	M4500-H+ B	pH	76798	1	08/15/16 10:58 AM	TITRATOR_160815A
Aqueous	M2540C	Total Dissolved Solids	76794	1	08/15/16 08:46 AM	WC_160812A
Aqueous	SW7470A	Mercury Total: Aqueous	76826	1	08/17/16 11:54 AM	CETAC2_HG_160817A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	10	08/19/16 04:53 PM	ICP-MS3_160819B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	1	08/16/16 03:18 PM	ICP-MS4_160816B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	50	08/19/16 02:29 PM	ICP-MS4_160819A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	10	08/19/16 02:31 PM	ICP-MS4_160819A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	10	08/22/16 12:13 PM	ICP-MS4_160822A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76764	1	08/22/16 12:15 PM	ICP-MS4_160822A
Aqueous	E300	Anions by IC method - Water	76776	1	08/11/16 12:53 PM	IC4_160811A
Aqueous	E300	Anions by IC method - Water	76776	10	08/11/16 04:38 PM	IC4_160811A
Aqueous	E300	Anions by IC method - Water	76776	100	08/11/16 04:53 PM	IC4_160811A
Aqueous	M4500-H+ B	pH	76798	1	08/15/16 11:00 AM	TITRATOR_160815A
Aqueous	M2540C	Total Dissolved Solids	76794	1	08/15/16 08:46 AM	WC_160812A
Aqueous	SW7470A	Mercury Total: Aqueous	76826	1	08/17/16 11:56 AM	CETAC2_HG_160817A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76796	1	08/19/16 02:20 PM	ICP-MS3_160819A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76796	1	08/17/16 03:13 PM	ICP-MS4_160817A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76796	100	08/18/16 04:18 PM	ICP-MS4_160818B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	76796	1	08/23/16 11:38 AM	ICP-MS4_160823A
Aqueous	E300	Anions by IC method - Water	76776	1	08/11/16 01:08 PM	IC4_160811A
Aqueous	E300	Anions by IC method - Water	76776	100	08/11/16 05:08 PM	IC4_160811A
Aqueous	M4500-H+ B	pH	76798	1	08/15/16 11:05 AM	TITRATOR_160815A
Aqueous	M2540C	Total Dissolved Solids	76794	1	08/15/16 08:46 AM	WC_160812A

DHL Analytical, Inc.

Date: *09-Sep-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-24
Project:	Sandow CCR	**Lab ID:**	1608095-01
Project No:	5164E	**Collection Date:**	08/09/16 09:35 AM
Lab Order:	1608095	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	08/17/16 11:17 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	08/16/16 02:41 PM
Arsenic	0.00456	0.00200	0.00500	J	mg/L	1	08/16/16 02:41 PM
Barium	0.0340	0.00300	0.0100		mg/L	1	08/16/16 02:41 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	08/19/16 02:33 PM
Boron	0.0779	0.0100	0.0300		mg/L	1	08/19/16 02:33 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	08/16/16 02:41 PM
Calcium	273	5.00	15.0		mg/L	50	08/17/16 03:22 PM
Chromium	0.00502	0.00200	0.00500		mg/L	1	08/16/16 02:41 PM
Cobalt	0.00528	0.00300	0.00500		mg/L	1	08/16/16 02:41 PM
Lead	0.000522	0.000300	0.00100	J	mg/L	1	08/16/16 02:41 PM
Lithium	0.0749	0.00500	0.0100		mg/L	1	08/19/16 02:33 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	08/16/16 02:41 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	08/16/16 02:41 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	08/16/16 02:41 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	273	30.0	100		mg/L	100	08/10/16 03:38 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	08/10/16 11:23 AM
Sulfate	837	100	300		mg/L	100	08/10/16 03:38 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.57	0	0		pH Units@20.7℃	1	08/15/16 10:36 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	2010	50.0	50.0		mg/L	1	08/15/16 08:46 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *09-Sep-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-22R
Project:	Sandow CCR	**Lab ID:**	1608095-02
Project No:	5164E	**Collection Date:**	08/09/16 10:30 AM
Lab Order:	1608095	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	08/17/16 11:20 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	08/16/16 02:43 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	08/16/16 02:43 PM
Barium	0.108	0.00300	0.0100		mg/L	1	08/16/16 02:43 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	08/19/16 03:28 PM
Boron	0.110	0.100	0.300	J	mg/L	10	08/17/16 03:28 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	08/16/16 02:43 PM
Calcium	89.0	1.00	3.00		mg/L	10	08/17/16 03:28 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	08/16/16 02:43 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	08/16/16 02:43 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	08/16/16 02:43 PM
Lithium	0.0505	0.00500	0.0100		mg/L	1	08/19/16 03:28 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	08/16/16 02:43 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	08/16/16 02:43 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	08/16/16 02:43 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	91.1	3.00	10.0		mg/L	10	08/10/16 03:53 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	08/10/16 11:38 AM
Sulfate	52.1	1.00	3.00		mg/L	1	08/10/16 11:38 AM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	7.51	0	0		pH Units@20.8℃	1	08/15/16 10:41 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	562	10.0	10.0		mg/L	1	08/15/16 08:46 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *09-Sep-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-28
Project:	Sandow CCR	**Lab ID:**	1608095-03
Project No:	5164E	**Collection Date:**	08/09/16 11:35 AM
Lab Order:	1608095	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	08/17/16 11:22 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	08/16/16 02:45 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	08/16/16 02:45 PM
Barium	0.0342	0.00300	0.0100		mg/L	1	08/16/16 02:45 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	08/19/16 03:30 PM
Boron	0.244	0.0100	0.0300		mg/L	1	08/19/16 03:30 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	08/16/16 02:45 PM
Calcium	574	5.00	15.0		mg/L	50	08/17/16 03:34 PM
Chromium	0.00266	0.00200	0.00500	J	mg/L	1	08/16/16 02:45 PM
Cobalt	0.0241	0.00300	0.00500		mg/L	1	08/16/16 02:45 PM
Lead	0.000867	0.000300	0.00100	J	mg/L	1	08/16/16 02:45 PM
Lithium	0.245	0.00500	0.0100		mg/L	1	08/19/16 03:30 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	08/16/16 02:45 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	08/16/16 02:45 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	08/16/16 02:45 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	412	30.0	100		mg/L	100	08/10/16 04:38 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	08/10/16 11:53 AM
Sulfate	1450	100	300		mg/L	100	08/10/16 04:38 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.76	0	0		pH Units@20.7℃	1	08/15/16 10:42 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	3120	50.0	50.0		mg/L	1	08/15/16 08:46 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *09-Sep-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AXMW-1
Project:	Sandow CCR	**Lab ID:**	1608095-04
Project No:	5164E	**Collection Date:**	08/09/16 12:20 PM
Lab Order:	1608095	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	08/17/16 11:24 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	08/16/16 02:47 PM
Arsenic	0.0173	0.00200	0.00500		mg/L	1	08/16/16 02:47 PM
Barium	0.0192	0.00300	0.0100		mg/L	1	08/16/16 02:47 PM
Beryllium	0.000390	0.000300	0.00100	J	mg/L	1	08/19/16 03:32 PM
Boron	0.624	0.500	1.50	J	mg/L	50	08/17/16 03:40 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	08/16/16 02:47 PM
Calcium	514	5.00	15.0		mg/L	50	08/17/16 03:40 PM
Chromium	0.0106	0.00200	0.00500		mg/L	1	08/16/16 02:47 PM
Cobalt	0.390	0.00300	0.00500		mg/L	1	08/16/16 02:47 PM
Lead	0.000602	0.000300	0.00100	J	mg/L	1	08/16/16 02:47 PM
Lithium	0.0246	0.00500	0.0100		mg/L	1	08/19/16 03:32 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	08/16/16 02:47 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	08/16/16 02:47 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	08/16/16 02:47 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	353	30.0	100		mg/L	100	08/10/16 04:53 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	08/10/16 12:08 PM
Sulfate	2290	100	300		mg/L	100	08/10/16 04:53 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.04	0	0		pH Units@20.6℃	1	08/15/16 10:44 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	4350	50.0	50.0		mg/L	1	08/15/16 08:46 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *09-Sep-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-27
Project:	Sandow CCR	**Lab ID:**	1608095-05
Project No:	5164E	**Collection Date:**	08/09/16 02:15 PM
Lab Order:	1608095	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	08/17/16 11:35 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	08/16/16 02:49 PM
Arsenic	0.00309	0.00200	0.00500	J	mg/L	1	08/16/16 02:49 PM
Barium	0.112	0.00300	0.0100		mg/L	1	08/16/16 02:49 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	08/19/16 03:34 PM
Boron	0.178	0.0100	0.0300		mg/L	1	08/19/16 03:34 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	08/16/16 02:49 PM
Calcium	359	5.00	15.0		mg/L	50	08/19/16 02:17 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	08/16/16 02:49 PM
Cobalt	0.0208	0.00300	0.00500		mg/L	1	08/16/16 02:49 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	08/16/16 02:49 PM
Lithium	0.0880	0.00500	0.0100		mg/L	1	08/19/16 03:34 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	08/16/16 02:49 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	08/16/16 02:49 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	08/16/16 02:49 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	670	30.0	100		mg/L	100	08/10/16 05:08 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	08/10/16 12:23 PM
Sulfate	468	100	300		mg/L	100	08/10/16 05:08 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.68	0	0		pH Units@20.7℃	1	08/15/16 10:47 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	2320	50.0	50.0		mg/L	1	08/15/16 08:46 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *09-Sep-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-23
Project:	Sandow CCR	**Lab ID:**	1608095-06
Project No:	5164E	**Collection Date:**	08/09/16 03:15 PM
Lab Order:	1608095	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	08/17/16 11:38 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	08/16/16 02:51 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	08/16/16 02:51 PM
Barium	0.179	0.00300	0.0100		mg/L	1	08/16/16 02:51 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	08/19/16 03:36 PM
Boron	0.0987	0.0100	0.0300		mg/L	1	08/19/16 04:41 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	08/16/16 02:51 PM
Calcium	53.4	1.00	3.00		mg/L	10	08/19/16 02:19 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	08/16/16 02:51 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	08/16/16 02:51 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	08/16/16 02:51 PM
Lithium	<0.00500	0.00500	0.0100		mg/L	1	08/19/16 03:36 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	08/16/16 02:51 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	08/16/16 02:51 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	08/16/16 02:51 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	40.8	0.300	1.00		mg/L	1	08/10/16 12:38 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	08/10/16 12:38 PM
Sulfate	149	1.00	3.00		mg/L	1	08/10/16 12:38 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	7.06	0	0		pH Units@20.8℃	1	08/15/16 10:48 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	515	10.0	10.0		mg/L	1	08/15/16 08:46 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *09-Sep-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	MW-01
Project:	Sandow CCR	**Lab ID:**	1608095-07
Project No:	5164E	**Collection Date:**	08/09/16
Lab Order:	1608095	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	08/17/16 11:40 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	08/16/16 02:53 PM
Arsenic	0.0175	0.00200	0.00500		mg/L	1	08/16/16 02:53 PM
Barium	0.0204	0.00300	0.0100		mg/L	1	08/16/16 02:53 PM
Beryllium	0.000377	0.000300	0.00100	J	mg/L	1	08/19/16 03:38 PM
Boron	0.488	0.0100	0.0300		mg/L	1	08/19/16 03:38 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	08/16/16 02:53 PM
Calcium	471	5.00	15.0		mg/L	50	08/19/16 02:21 PM
Chromium	0.0107	0.00200	0.00500		mg/L	1	08/16/16 02:53 PM
Cobalt	0.389	0.00300	0.00500		mg/L	1	08/16/16 02:53 PM
Lead	0.000595	0.000300	0.00100	J	mg/L	1	08/16/16 02:53 PM
Lithium	0.0240	0.00500	0.0100		mg/L	1	08/19/16 03:38 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	08/16/16 02:53 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	08/16/16 02:53 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	08/16/16 02:53 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	372	30.0	100		mg/L	100	08/10/16 05:23 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	08/10/16 12:53 PM
Sulfate	2390	100	300		mg/L	100	08/10/16 05:23 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.01	0	0		pH Units@20.4℃	1	08/15/16 10:50 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	4060	50.0	50.0		mg/L	1	08/15/16 08:46 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *09-Sep-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	EB-01
Project:	Sandow CCR	**Lab ID:**	1608095-08
Project No:	5164E	**Collection Date:**	08/09/16 08:30 AM
Lab Order:	1608095	**Matrix:**	EQUIP BLANK

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	08/17/16 11:42 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	08/16/16 02:55 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	08/16/16 02:55 PM
Barium	0.0222	0.00300	0.0100		mg/L	1	08/16/16 02:55 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	08/19/16 03:40 PM
Boron	0.0359	0.0100	0.0300		mg/L	1	08/19/16 04:47 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	08/16/16 02:55 PM
Calcium	46.1	1.00	3.00		mg/L	10	08/19/16 02:23 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	08/16/16 02:55 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	08/16/16 02:55 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	08/16/16 02:55 PM
Lithium	<0.00500	0.00500	0.0100		mg/L	1	08/19/16 03:40 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	08/16/16 02:55 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	08/16/16 02:55 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	08/16/16 02:55 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	2.87	0.300	1.00		mg/L	1	08/10/16 02:30 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	08/10/16 02:30 PM
Sulfate	18.3	1.00	3.00		mg/L	1	08/10/16 02:30 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	8.09	0	0		pH Units@20.4℃	1	08/15/16 10:53 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	<10.0	10.0	10.0		mg/L	1	08/15/16 08:46 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *09-Sep-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-25
Project:	Sandow CCR	**Lab ID:**	1608095-09
Project No:	5164E	**Collection Date:**	08/10/16 08:35 AM
Lab Order:	1608095	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	08/17/16 11:45 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	08/16/16 02:57 PM
Arsenic	0.00445	0.00200	0.00500	J	mg/L	1	08/16/16 02:57 PM
Barium	0.0808	0.00300	0.0100		mg/L	1	08/16/16 02:57 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	08/19/16 03:42 PM
Boron	0.196	0.0100	0.0300		mg/L	1	08/19/16 03:42 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	08/16/16 02:57 PM
Calcium	262	5.00	15.0		mg/L	50	08/19/16 02:25 PM
Chromium	0.00210	0.00200	0.00500	J	mg/L	1	08/16/16 02:57 PM
Cobalt	0.0311	0.00300	0.00500		mg/L	1	08/16/16 02:57 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	08/16/16 02:57 PM
Lithium	0.0274	0.00500	0.0100		mg/L	1	08/19/16 03:42 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	08/16/16 02:57 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	08/16/16 02:57 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	08/16/16 02:57 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	606	30.0	100		mg/L	100	08/11/16 04:08 PM
Fluoride	0.199	0.100	0.400	J	mg/L	1	08/11/16 12:23 PM
Sulfate	534	100	300		mg/L	100	08/11/16 04:08 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.84	0	0		pH Units@20.5℃	1	08/15/16 10:54 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	2450	50.0	50.0		mg/L	1	08/15/16 08:46 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *09-Sep-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-26
Project:	Sandow CCR	**Lab ID:**	1608095-10
Project No:	5164E	**Collection Date:**	08/10/16 09:30 AM
Lab Order:	1608095	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	08/17/16 11:47 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	08/16/16 03:16 PM
Arsenic	0.00323	0.00200	0.00500	J	mg/L	1	08/16/16 03:16 PM
Barium	0.0442	0.00300	0.0100		mg/L	1	08/16/16 03:16 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	08/19/16 03:44 PM
Boron	0.311	0.0100	0.0300		mg/L	1	08/19/16 03:44 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	08/16/16 03:16 PM
Calcium	587	5.00	15.0		mg/L	50	08/19/16 02:27 PM
Chromium	0.00990	0.00200	0.00500		mg/L	1	08/16/16 03:16 PM
Cobalt	0.0233	0.00300	0.00500		mg/L	1	08/16/16 03:16 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	08/16/16 03:16 PM
Lithium	0.443	0.00500	0.0100		mg/L	1	08/19/16 03:44 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	08/16/16 03:16 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	08/16/16 03:16 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	08/16/16 03:16 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	1180	30.0	100		mg/L	100	08/11/16 04:23 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	08/11/16 12:38 PM
Sulfate	1060	100	300		mg/L	100	08/11/16 04:23 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.71	0	0		pH Units@20.8℃	1	08/15/16 10:58 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	4210	50.0	50.0		mg/L	1	08/15/16 08:46 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *09-Sep-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AXMW-2
Project:	Sandow CCR	**Lab ID:**	1608095-11
Project No:	5164E	**Collection Date:**	08/10/16 11:00 AM
Lab Order:	1608095	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	08/17/16 11:54 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	08/16/16 03:18 PM
Arsenic	0.0197	0.00200	0.00500		mg/L	1	08/16/16 03:18 PM
Barium	0.0201	0.00300	0.0100		mg/L	1	08/16/16 03:18 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	08/22/16 12:15 PM
Boron	1.49	0.100	0.300		mg/L	10	08/19/16 04:53 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	08/16/16 03:18 PM
Calcium	479	5.00	15.0		mg/L	50	08/19/16 02:29 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	08/16/16 03:18 PM
Cobalt	0.0327	0.00300	0.00500		mg/L	1	08/16/16 03:18 PM
Lead	0.000356	0.000300	0.00100	J	mg/L	1	08/16/16 03:18 PM
Lithium	0.0914	0.00500	0.0100		mg/L	1	08/22/16 12:15 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	08/16/16 03:18 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	08/16/16 03:18 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	08/16/16 03:18 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	177	3.00	10.0		mg/L	10	08/11/16 04:38 PM
Fluoride	0.299	0.100	0.400	J	mg/L	1	08/11/16 12:53 PM
Sulfate	1840	100	300		mg/L	100	08/11/16 04:53 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.43	0	0		pH Units@20.6℃	1	08/15/16 11:00 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	3310	50.0	50.0		mg/L	1	08/15/16 08:46 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *09-Sep-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-29
Project:	Sandow CCR	**Lab ID:**	1608095-12
Project No:	5164E	**Collection Date:**	08/10/16 11:50 AM
Lab Order:	1608095	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	08/17/16 11:56 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	08/17/16 03:13 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	08/17/16 03:13 PM
Barium	0.0329	0.00300	0.0100		mg/L	1	08/17/16 03:13 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	08/17/16 03:13 PM
Boron	0.318	0.0100	0.0300		mg/L	1	08/19/16 02:20 PM
Cadmium	0.00308	0.000300	0.00100		mg/L	1	08/17/16 03:13 PM
Calcium	791	10.0	30.0		mg/L	100	08/18/16 04:18 PM
Chromium	0.0109	0.00200	0.00500		mg/L	1	08/17/16 03:13 PM
Cobalt	0.104	0.00300	0.00500		mg/L	1	08/17/16 03:13 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	08/17/16 03:13 PM
Lithium	0.0411	0.00500	0.0100		mg/L	1	08/23/16 11:38 AM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	08/17/16 03:13 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	08/17/16 03:13 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	08/17/16 03:13 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	293	30.0	100		mg/L	100	08/11/16 05:08 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	08/11/16 01:08 PM
Sulfate	1300	100	300		mg/L	100	08/11/16 05:08 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.68	0	0		pH Units@20.8℃	1	08/15/16 11:05 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	2860	50.0	50.0		mg/L	1	08/15/16 08:46 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_160817A

The QC data in batch 76826 applies to the following samples: 1608095-01A, 1608095-02A, 1608095-03A, 1608095-04A, 1608095-05A, 1608095-06A, 1608095-07A, 1608095-08A, 1608095-09A, 1608095-10A, 1608095-11A, 1608095-12A

Sample ID **MB-76826** Batch ID: **76826** TestNo: **SW7470A** Units: **mg/L**
SampType: **MBLK** Run ID: **CETAC2_HG_160817A** Analysis Date: **8/17/2016 11:08:48 AM** Prep Date: **8/16/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	<0.0000800	0.000200								

Sample ID **LCS-76826** Batch ID: **76826** TestNo: **SW7470A** Units: **mg/L**
SampType: **LCS** Run ID: **CETAC2_HG_160817A** Analysis Date: **8/17/2016 11:13:20 AM** Prep Date: **8/16/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00208	0.000200	0.00200	0	104	85	115			

Sample ID **LCSD-76826** Batch ID: **76826** TestNo: **SW7470A** Units: **mg/L**
SampType: **LCSD** Run ID: **CETAC2_HG_160817A** Analysis Date: **8/17/2016 11:15:36 AM** Prep Date: **8/16/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00206	0.000200	0.00200	0	103	85	115	0.966	15	

Sample ID **1608095-04A SD** Batch ID: **76826** TestNo: **SW7470A** Units: **mg/L**
SampType: **SD** Run ID: **CETAC2_HG_160817A** Analysis Date: **8/17/2016 11:26:55 AM** Prep Date: **8/16/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	<0.000400	0.00100	0	0				0	10	

Sample ID **1608095-04A PDS** Batch ID: **76826** TestNo: **SW7470A** Units: **mg/L**
SampType: **PDS** Run ID: **CETAC2_HG_160817A** Analysis Date: **8/17/2016 11:29:11 AM** Prep Date: **8/16/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00227	0.000200	0.00250	0	90.8	85	115			

Sample ID **1608095-04A MS** Batch ID: **76826** TestNo: **SW7470A** Units: **mg/L**
SampType: **MS** Run ID: **CETAC2_HG_160817A** Analysis Date: **8/17/2016 11:31:27 AM** Prep Date: **8/16/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00185	0.000200	0.00200	0	92.5	80	120			

Sample ID **1608095-04A MSD** Batch ID: **76826** TestNo: **SW7470A** Units: **mg/L**
SampType: **MSD** Run ID: **CETAC2_HG_160817A** Analysis Date: **8/17/2016 11:33:42 AM** Prep Date: **8/16/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00185	0.000200	0.00200	0	92.5	80	120	0	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_160817A

Sample ID	**ICV-160817**	Batch ID:	**R87650**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**CETAC2_HG_160817A**	Analysis Date:	**8/17/2016 11:04:13 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00389	0.000200	0.00400	0	97.2	90	110			

Sample ID	**CCV1-160817**	Batch ID:	**R87650**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_160817A**	Analysis Date:	**8/17/2016 11:49:36 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00198	0.000200	0.00200	0	99.0	90	110			

Sample ID	**CCV2-160817**	Batch ID:	**R87650**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_160817A**	Analysis Date:	**8/17/2016 12:16:56 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00194	0.000200	0.00200	0	97.0	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS3_160817A

The QC data in batch 76764 applies to the following samples: 1608095-01A, 1608095-02A, 1608095-03A, 1608095-04A, 1608095-05A, 1608095-06A, 1608095-07A, 1608095-08A, 1608095-09A, 1608095-10A, 1608095-11A

Sample ID **MB-76764** Batch ID: **76764** TestNo: **SW6020A** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS3_160817A** Analysis Date: **8/17/2016 2:05:00 PM** Prep Date: **8/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	<0.0100	0.0300								
Calcium	<0.100	0.300								

Sample ID **LCS-76764** Batch ID: **76764** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS3_160817A** Analysis Date: **8/17/2016 2:11:00 PM** Prep Date: **8/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.216	0.0300	0.200	0	108	80	120			
Calcium	5.26	0.300	5.00	0	105	80	120			

Sample ID **LCSD-76764** Batch ID: **76764** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS3_160817A** Analysis Date: **8/17/2016 2:17:00 PM** Prep Date: **8/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.214	0.0300	0.200	0	107	80	120	0.697	15	
Calcium	5.25	0.300	5.00	0	105	80	120	0.209	15	

Sample ID **1608096-07C SD** Batch ID: **76764** TestNo: **SW6020A** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS3_160817A** Analysis Date: **8/17/2016 2:34:00 PM** Prep Date: **8/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	<2.50	7.50	0	0.567				0	10	
Calcium	170	75.0	0	177				4.18	10	

Sample ID **1608096-07C PDS** Batch ID: **76764** TestNo: **SW6020A** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS3_160817A** Analysis Date: **8/17/2016 2:40:00 PM** Prep Date: **8/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	10.9	1.50	10.0	0.567	103	80	120			
Calcium	420	15.0	250	177	97.1	80	120			

Sample ID **1608096-07C MS** Batch ID: **76764** TestNo: **SW6020A** Units: **mg/L**
SampType: **MS** Run ID: **ICP-MS3_160817A** Analysis Date: **8/17/2016 3:46:00 PM** Prep Date: **8/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.664	1.50	0.200	0.567	48.2	80	120			S
Calcium	180	15.0	5.00	177	69.0	80	120			S

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS3_160817A

Sample ID	**1608096-07C MSD**	Batch ID:	**76764**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**ICP-MS3_160817A**	Analysis Date:	**8/17/2016 3:52:00 PM**	Prep Date:	**8/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.652	1.50	0.200	0.567	42.8	80	120	1.67	15	S
Calcium	178	15.0	5.00	177	17.0	80	120	1.45	15	S

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS3_160817A

Sample ID **ICV1-160817**	Batch ID: **R87665**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS3_160817A**	Analysis Date: **8/17/2016 1:41:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.107	0.0300	0.100	0	107	90	110			
Calcium	2.48	0.300	2.50	0	99.2	90	110			

Sample ID **ILCVL-160817**	Batch ID: **R87665**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS3_160817A**	Analysis Date: **8/17/2016 1:53:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0246	0.0300	0.0200	0	123	70	130			
Calcium	0.110	0.300	0.100	0	110	70	130			

Sample ID **CCV1-160817**	Batch ID: **R87665**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS3_160817A**	Analysis Date: **8/17/2016 4:31:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.215	0.0300	0.200	0	108	90	110			
Calcium	5.23	0.300	5.00	0	105	90	110			

Sample ID **LCVL1-160817**	Batch ID: **R87665**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS3_160817A**	Analysis Date: **8/17/2016 4:43:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0243	0.0300	0.0200	0	122	70	130			
Calcium	0.112	0.300	0.100	0	112	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS3_160819A

Sample ID	**ICV1-160819**	Batch ID:	**R87700**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**ICP-MS3_160819A**	Analysis Date:	**8/19/2016 11:28:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.107	0.0300	0.100	0	107	90	110			

Sample ID	**ILCVL-160819**	Batch ID:	**R87700**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS3_160819A**	Analysis Date:	**8/19/2016 11:34:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0248	0.0300	0.0200	0	124	70	130			

Sample ID	**CCV1-160810**	Batch ID:	**R87700**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS3_160819A**	Analysis Date:	**8/19/2016 2:26:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.214	0.0300	0.200	0	107	90	110			

Sample ID	**LCVL1-160810**	Batch ID:	**R87700**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS3_160819A**	Analysis Date:	**8/19/2016 2:37:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0236	0.0300	0.0200	0	118	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS3_160819B

Sample ID	**ICV1-160819**	Batch ID:	**R87709**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**ICP-MS3_160819B**	Analysis Date:	**8/19/2016 11:28:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.107	0.0300	0.100	0	107	90	110			

Sample ID	**ILCVL-160819**	Batch ID:	**R87709**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS3_160819B**	Analysis Date:	**8/19/2016 11:34:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0248	0.0300	0.0200	0	124	70	130			

Sample ID	**CCV2-160819**	Batch ID:	**R87709**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS3_160819B**	Analysis Date:	**8/19/2016 4:59:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.209	0.0300	0.200	0	105	90	110			

Sample ID	**LCVL2-160819**	Batch ID:	**R87709**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS3_160819B**	Analysis Date:	**8/19/2016 5:11:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0224	0.0300	0.0200	0	112	70	130			

Sample ID	**CCV1-160810**	Batch ID:	**R87709**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS3_160819B**	Analysis Date:	**8/19/2016 2:26:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.214	0.0300	0.200	0	107	90	110			

Sample ID	**LCVL1-160810**	Batch ID:	**R87709**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS3_160819B**	Analysis Date:	**8/19/2016 2:37:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0236	0.0300	0.0200	0	118	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160816B

The QC data in batch 76764 applies to the following samples: 1608095-01A, 1608095-02A, 1608095-03A, 1608095-04A, 1608095-05A, 1608095-06A, 1608095-07A, 1608095-08A, 1608095-09A, 1608095-10A, 1608095-11A

Sample ID **MB-76764** Batch ID: **76764** TestNo: **SW6020A** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS4_160816B** Analysis Date: **8/16/2016 2:25:00 PM** Prep Date: **8/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.000800	0.00250								
Arsenic	<0.00200	0.00500								
Barium	<0.00300	0.0100								
Beryllium	<0.000300	0.00100								
Cadmium	<0.000300	0.00100								
Chromium	<0.00200	0.00500								
Cobalt	<0.00300	0.00500								
Lead	<0.000300	0.00100								
Molybdenum	<0.00200	0.00500								
Selenium	<0.00200	0.00500								
Thallium	<0.000500	0.00150								

Sample ID **LCS-76764** Batch ID: **76764** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS4_160816B** Analysis Date: **8/16/2016 2:27:00 PM** Prep Date: **8/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.202	0.00250	0.200	0	101	80	120			
Arsenic	0.207	0.00500	0.200	0	103	80	120			
Barium	0.199	0.0100	0.200	0	99.7	80	120			
Beryllium	0.178	0.00100	0.200	0	89.1	80	120			
Cadmium	0.202	0.00100	0.200	0	101	80	120			
Chromium	0.204	0.00500	0.200	0	102	80	120			
Cobalt	0.208	0.00500	0.200	0	104	80	120			
Lead	0.198	0.00100	0.200	0	98.9	80	120			
Molybdenum	0.201	0.00500	0.200	0	101	80	120			
Selenium	0.203	0.00500	0.200	0	101	80	120			
Thallium	0.202	0.00150	0.200	0	101	80	120			

Sample ID **LCSD-76764** Batch ID: **76764** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS4_160816B** Analysis Date: **8/16/2016 2:29:00 PM** Prep Date: **8/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.204	0.00250	0.200	0	102	80	120	1.09	15	
Arsenic	0.206	0.00500	0.200	0	103	80	120	0.339	15	
Barium	0.200	0.0100	0.200	0	100	80	120	0.550	15	
Beryllium	0.178	0.00100	0.200	0	89.0	80	120	0.108	15	
Cadmium	0.201	0.00100	0.200	0	100	80	120	0.761	15	
Chromium	0.204	0.00500	0.200	0	102	80	120	0.027	15	
Cobalt	0.208	0.00500	0.200	0	104	80	120	0.071	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160816B

Sample ID **LCSD-76764**	Batch ID: **76764**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCSD**	Run ID: **ICP-MS4_160816B**	Analysis Date: **8/16/2016 2:29:00 PM**	Prep Date: **8/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	0.201	0.00100	0.200	0	101	80	120	1.63	15	
Molybdenum	0.202	0.00500	0.200	0	101	80	120	0.472	15	
Selenium	0.202	0.00500	0.200	0	101	80	120	0.485	15	
Thallium	0.205	0.00150	0.200	0	102	80	120	1.22	15	

Sample ID **1608096-07C SD**	Batch ID: **76764**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **SD**	Run ID: **ICP-MS4_160816B**	Analysis Date: **8/16/2016 2:39:00 PM**	Prep Date: **8/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.00400	0.0125	0	0				0	10	
Arsenic	<0.0100	0.0250	0	0				0	10	
Barium	0.0678	0.0500	0	0.0692				2.10	10	
Cadmium	<0.00150	0.00500	0	0				0	10	
Chromium	<0.0100	0.0250	0	0				0	10	
Cobalt	<0.0150	0.0250	0	0				0	10	
Lead	<0.00150	0.00500	0	0				0	10	
Molybdenum	<0.0100	0.0250	0	0.00630				0	10	
Selenium	<0.0100	0.0250	0	0.00817				0	10	
Thallium	<0.00250	0.00750	0	0				0	10	

Sample ID **1608096-07C PDS**	Batch ID: **76764**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS4_160816B**	Analysis Date: **8/16/2016 2:59:00 PM**	Prep Date: **8/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.221	0.00250	0.200	0	110	80	120			
Arsenic	0.228	0.00500	0.200	0	114	80	120			
Barium	0.289	0.0100	0.200	0.0692	110	80	120			
Cadmium	0.221	0.00100	0.200	0	111	80	120			
Chromium	0.232	0.00500	0.200	0	116	80	120			
Cobalt	0.217	0.00500	0.200	0	109	80	120			
Lead	0.225	0.00100	0.200	0	112	80	120			
Molybdenum	0.233	0.00500	0.200	0.00630	113	80	120			
Selenium	0.217	0.00500	0.200	0.00817	104	80	120			
Thallium	0.224	0.00150	0.200	0	112	80	120			

Sample ID **1608096-07C MS**	Batch ID: **76764**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS4_160816B**	Analysis Date: **8/16/2016 3:01:00 PM**	Prep Date: **8/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.217	0.00250	0.200	0	108	80	120			
Arsenic	0.206	0.00500	0.200	0	103	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160816B

Sample ID **1608096-07C MS**	Batch ID: **76764**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS4_160816B**	Analysis Date: **8/16/2016 3:01:00 PM**	Prep Date: **8/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.269	0.0100	0.200	0.0692	99.8	80	120			
Cadmium	0.201	0.00100	0.200	0	100	80	120			
Chromium	0.203	0.00500	0.200	0	101	80	120			
Cobalt	0.194	0.00500	0.200	0	96.9	80	120			
Lead	0.202	0.00100	0.200	0	101	80	120			
Molybdenum	0.215	0.00500	0.200	0.00630	104	80	120			
Selenium	0.198	0.00500	0.200	0.00817	95.1	80	120			
Thallium	0.202	0.00150	0.200	0	101	80	120			

Sample ID **1608096-07C MSD**	Batch ID: **76764**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS4_160816B**	Analysis Date: **8/16/2016 3:03:00 PM**	Prep Date: **8/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.215	0.00250	0.200	0	107	80	120	1.06	15	
Arsenic	0.210	0.00500	0.200	0	105	80	120	1.50	15	
Barium	0.269	0.0100	0.200	0.0692	99.9	80	120	0.066	15	
Cadmium	0.200	0.00100	0.200	0	100	80	120	0.175	15	
Chromium	0.203	0.00500	0.200	0	101	80	120	0.033	15	
Cobalt	0.196	0.00500	0.200	0	98.1	80	120	1.16	15	
Lead	0.205	0.00100	0.200	0	103	80	120	1.63	15	
Molybdenum	0.218	0.00500	0.200	0.00630	106	80	120	1.41	15	
Selenium	0.197	0.00500	0.200	0.00817	94.4	80	120	0.747	15	
Thallium	0.206	0.00150	0.200	0	103	80	120	1.67	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160816B

Sample ID **ICV-160816**	Batch ID: **R87638**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS4_160816B**	Analysis Date: **8/16/2016 12:31:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.104	0.00250	0.100	0	104	90	110			
Arsenic	0.101	0.00500	0.100	0	101	90	110			
Barium	0.101	0.0100	0.100	0	101	90	110			
Beryllium	0.102	0.00100	0.100	0	102	90	110			
Cadmium	0.101	0.00100	0.100	0	101	90	110			
Chromium	0.105	0.00500	0.100	0	105	90	110			
Cobalt	0.106	0.00500	0.100	0	106	90	110			
Lead	0.0992	0.00100	0.100	0	99.2	90	110			
Molybdenum	0.0977	0.00500	0.100	0	97.7	90	110			
Selenium	0.101	0.00500	0.100	0	101	90	110			
Thallium	0.0975	0.00150	0.100	0	97.5	90	110			

Sample ID **LCVL-160816**	Batch ID: **R87638**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_160816B**	Analysis Date: **8/16/2016 12:39:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00216	0.00250	0.00200	0	108	70	130			
Arsenic	0.00535	0.00500	0.00500	0	107	70	130			
Barium	0.00532	0.0100	0.00500	0	106	70	130			
Beryllium	0.00100	0.00100	0.00100	0	100	70	130			
Cadmium	0.00109	0.00100	0.00100	0	109	70	130			
Chromium	0.00546	0.00500	0.00500	0	109	70	130			
Cobalt	0.00549	0.00500	0.00500	0	110	70	130			
Lead	0.00109	0.00100	0.00100	0	109	70	130			
Molybdenum	0.00540	0.00500	0.00500	0	108	70	130			
Selenium	0.00562	0.00500	0.00500	0	112	70	130			
Thallium	0.00105	0.00150	0.00100	0	104	70	130			

Sample ID **CCV2-160816**	Batch ID: **R87638**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160816B**	Analysis Date: **8/16/2016 2:08:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.213	0.00250	0.200	0	106	90	110			
Arsenic	0.208	0.00500	0.200	0	104	90	110			
Barium	0.204	0.0100	0.200	0	102	90	110			
Beryllium	0.184	0.00100	0.200	0	92.2	90	110			
Cadmium	0.208	0.00100	0.200	0	104	90	110			
Chromium	0.209	0.00500	0.200	0	105	90	110			
Cobalt	0.211	0.00500	0.200	0	105	90	110			
Lead	0.207	0.00100	0.200	0	104	90	110			
Molybdenum	0.211	0.00500	0.200	0	105	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

Sample ID **CCV2-160816**	Batch ID: **R87638**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160816B**	Analysis Date: **8/16/2016 2:08:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Selenium	0.204	0.00500	0.200	0	102	90	110			
Thallium	0.210	0.00150	0.200	0	105	90	110			

Sample ID **LCVL2-160816**	Batch ID: **R87638**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_160816B**	Analysis Date: **8/16/2016 2:21:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00215	0.00250	0.00200	0	107	70	130			
Arsenic	0.00535	0.00500	0.00500	0	107	70	130			
Barium	0.00535	0.0100	0.00500	0	107	70	130			
Beryllium	0.000864	0.00100	0.00100	0	86.4	70	130			
Cadmium	0.00108	0.00100	0.00100	0	108	70	130			
Chromium	0.00545	0.00500	0.00500	0	109	70	130			
Cobalt	0.00545	0.00500	0.00500	0	109	70	130			
Lead	0.00112	0.00100	0.00100	0	112	70	130			
Molybdenum	0.00523	0.00500	0.00500	0	105	70	130			
Selenium	0.00559	0.00500	0.00500	0	112	70	130			
Thallium	0.00104	0.00150	0.00100	0	104	70	130			

Sample ID **CCV3-160816**	Batch ID: **R87638**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160816B**	Analysis Date: **8/16/2016 3:05:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.215	0.00250	0.200	0	108	90	110			
Arsenic	0.208	0.00500	0.200	0	104	90	110			
Barium	0.203	0.0100	0.200	0	101	90	110			
Cadmium	0.209	0.00100	0.200	0	104	90	110			
Chromium	0.209	0.00500	0.200	0	104	90	110			
Cobalt	0.207	0.00500	0.200	0	103	90	110			
Lead	0.204	0.00100	0.200	0	102	90	110			
Molybdenum	0.211	0.00500	0.200	0	105	90	110			
Selenium	0.192	0.00500	0.200	0	95.8	90	110			
Thallium	0.205	0.00150	0.200	0	102	90	110			

Sample ID **LCVL3-160816**	Batch ID: **R87638**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_160816B**	Analysis Date: **8/16/2016 3:11:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00235	0.00250	0.00200	0	117	70	130			
Arsenic	0.00530	0.00500	0.00500	0	106	70	130			
Barium	0.00518	0.0100	0.00500	0	104	70	130			

Sample ID **LCVL3-160816** Batch ID: **R87638** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS4_160816B** Analysis Date: **8/16/2016 3:11:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	0.00104	0.00100	0.00100	0	104	70	130			
Chromium	0.00546	0.00500	0.00500	0	109	70	130			
Cobalt	0.00522	0.00500	0.00500	0	104	70	130			
Lead	0.00113	0.00100	0.00100	0	113	70	130			
Molybdenum	0.00540	0.00500	0.00500	0	108	70	130			
Selenium	0.00573	0.00500	0.00500	0	115	70	130			
Thallium	0.00106	0.00150	0.00100	0	106	70	130			

Sample ID **CCV4-160816** Batch ID: **R87638** TestNo: **SW6020A** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS4_160816B** Analysis Date: **8/16/2016 3:35:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.215	0.00250	0.200	0	107	90	110			
Arsenic	0.207	0.00500	0.200	0	104	90	110			
Barium	0.201	0.0100	0.200	0	101	90	110			
Cadmium	0.207	0.00100	0.200	0	104	90	110			
Chromium	0.210	0.00500	0.200	0	105	90	110			
Cobalt	0.206	0.00500	0.200	0	103	90	110			
Lead	0.201	0.00100	0.200	0	100	90	110			
Molybdenum	0.209	0.00500	0.200	0	105	90	110			
Selenium	0.195	0.00500	0.200	0	97.7	90	110			
Thallium	0.207	0.00150	0.200	0	103	90	110			

Sample ID **LCVL4-160816** Batch ID: **R87638** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS4_160816B** Analysis Date: **8/16/2016 3:40:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00215	0.00250	0.00200	0	107	70	130			
Arsenic	0.00534	0.00500	0.00500	0	107	70	130			
Barium	0.00515	0.0100	0.00500	0	103	70	130			
Cadmium	0.00104	0.00100	0.00100	0	104	70	130			
Chromium	0.00547	0.00500	0.00500	0	109	70	130			
Cobalt	0.00534	0.00500	0.00500	0	107	70	130			
Lead	0.00105	0.00100	0.00100	0	105	70	130			
Molybdenum	0.00535	0.00500	0.00500	0	107	70	130			
Selenium	0.00539	0.00500	0.00500	0	108	70	130			
Thallium	0.00101	0.00150	0.00100	0	101	70	130			

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160817A

The QC data in batch 76796 applies to the following samples: 1608095-12A

Sample ID **MB-76796** Batch ID: **76796** TestNo: **SW6020A** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS4_160817A** Analysis Date: **8/17/2016 2:19:00 PM** Prep Date: **8/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.000800	0.00250								
Arsenic	<0.00200	0.00500								
Barium	<0.00300	0.0100								
Beryllium	<0.000300	0.00100								
Cadmium	<0.000300	0.00100								
Calcium	<0.100	0.300								
Chromium	<0.00200	0.00500								
Cobalt	<0.00300	0.00500								
Lead	<0.000300	0.00100								
Molybdenum	<0.00200	0.00500								
Selenium	<0.00200	0.00500								
Thallium	<0.000500	0.00150								

Sample ID **LCS-76796** Batch ID: **76796** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS4_160817A** Analysis Date: **8/17/2016 2:22:00 PM** Prep Date: **8/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.205	0.00250	0.200	0	102	80	120			
Arsenic	0.197	0.00500	0.200	0	98.5	80	120			
Barium	0.193	0.0100	0.200	0	96.3	80	120			
Beryllium	0.200	0.00100	0.200	0	100	80	120			
Cadmium	0.194	0.00100	0.200	0	97.2	80	120			
Calcium	4.62	0.300	5.00	0	92.5	80	120			
Chromium	0.193	0.00500	0.200	0	96.5	80	120			
Cobalt	0.193	0.00500	0.200	0	96.5	80	120			
Lead	0.189	0.00100	0.200	0	94.6	80	120			
Molybdenum	0.193	0.00500	0.200	0	96.5	80	120			
Selenium	0.190	0.00500	0.200	0	95.2	80	120			
Thallium	0.198	0.00150	0.200	0	98.9	80	120			

Sample ID **LCSD-76796** Batch ID: **76796** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS4_160817A** Analysis Date: **8/17/2016 2:24:00 PM** Prep Date: **8/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.206	0.00250	0.200	0	103	80	120	0.470	15	
Arsenic	0.199	0.00500	0.200	0	99.5	80	120	0.972	15	
Barium	0.193	0.0100	0.200	0	96.3	80	120	0.020	15	
Beryllium	0.198	0.00100	0.200	0	99.1	80	120	0.915	15	
Cadmium	0.191	0.00100	0.200	0	95.5	80	120	1.75	15	
Calcium	4.65	0.300	5.00	0	93.0	80	120	0.535	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160817A

Sample ID **LCSD-76796**	Batch ID: **76796**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCSD**	Run ID: **ICP-MS4_160817A**	Analysis Date: **8/17/2016 2:24:00 PM**	Prep Date: **8/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chromium	0.196	0.00500	0.200	0	97.9	80	120	1.42	15	
Cobalt	0.196	0.00500	0.200	0	97.9	80	120	1.47	15	
Lead	0.190	0.00100	0.200	0	94.9	80	120	0.221	15	
Molybdenum	0.191	0.00500	0.200	0	95.3	80	120	1.22	15	
Selenium	0.196	0.00500	0.200	0	97.8	80	120	2.71	15	
Thallium	0.195	0.00150	0.200	0	97.7	80	120	1.22	15	

Sample ID **1608137-04A SD**	Batch ID: **76796**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **SD**	Run ID: **ICP-MS4_160817A**	Analysis Date: **8/17/2016 2:30:00 PM**	Prep Date: **8/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.0400	0.125	0	0				0	10	
Arsenic	0.777	0.250	0	0.784				0.834	10	
Barium	<0.150	0.500	0	0.116				0	10	
Beryllium	<0.0150	0.0500	0	0				0	10	
Cadmium	<0.0150	0.0500	0	0				0	10	
Calcium	6.62	15.0	0	6.38				3.72	10	
Chromium	<0.100	0.250	0	0				0	10	
Cobalt	<0.150	0.250	0	0.142				0	10	
Lead	<0.0150	0.0500	0	0				0	10	
Molybdenum	0.524	0.250	0	0.525				0.238	10	
Selenium	<0.100	0.250	0	0				0	10	
Thallium	<0.0250	0.0750	0	0				0	10	

Sample ID **1608137-04A PDS**	Batch ID: **76796**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS4_160817A**	Analysis Date: **8/17/2016 2:50:00 PM**	Prep Date: **8/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	2.10	0.0250	2.00	0	105	80	120			
Arsenic	2.76	0.0500	2.00	0.783	99.0	80	120			
Barium	2.06	0.100	2.00	0.116	97.3	80	120			
Beryllium	1.91	0.0100	2.00	0	95.7	80	120			
Cadmium	1.84	0.0100	2.00	0	92.2	80	120			
Calcium	50.5	3.00	50.0	6.38	88.3	80	120			
Chromium	1.93	0.0500	2.00	0	96.3	80	120			
Cobalt	2.06	0.0500	2.00	0.142	95.8	80	120			
Lead	1.96	0.0100	2.00	0	97.8	80	120			
Molybdenum	2.33	0.0500	2.00	0.525	90.3	80	120			
Selenium	1.95	0.0500	2.00	0	97.5	80	120			
Thallium	1.94	0.0150	2.00	0	96.8	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160817A

Sample ID **1608137-04A MS**	Batch ID: **76796**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS4_160817A**	Analysis Date: **8/17/2016 2:52:00 PM**	Prep Date: **8/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.198	0.0250	0.200	0	99.1	80	120			
Arsenic	2.30	0.0500	0.200	0.783	757	80	120			S
Barium	0.225	0.100	0.200	0.116	54.6	80	120			S
Beryllium	0.183	0.0100	0.200	0	91.3	80	120			
Cadmium	0.182	0.0100	0.200	0	91.0	80	120			
Calcium	5.79	3.00	5.00	6.38	-11.8	80	120			S
Chromium	0.182	0.0500	0.200	0	91.1	80	120			
Cobalt	0.186	0.0500	0.200	0.142	21.6	80	120			S
Lead	0.200	0.0100	0.200	0	100	80	120			
Molybdenum	2.23	0.0500	0.200	0.525	853	80	120			S
Selenium	0.154	0.0500	0.200	0	76.9	80	120			S
Thallium	0.189	0.0150	0.200	0	94.5	80	120			

Sample ID **1608137-04A MSD**	Batch ID: **76796**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS4_160817A**	Analysis Date: **8/17/2016 2:54:00 PM**	Prep Date: **8/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.175	0.0250	0.200	0	87.7	80	120	12.2	15	
Arsenic	2.33	0.0500	0.200	0.783	775	80	120	1.56	15	S
Barium	0.213	0.100	0.200	0.116	48.7	80	120	5.39	15	S
Beryllium	0.175	0.0100	0.200	0	87.3	80	120	4.51	15	
Cadmium	0.178	0.0100	0.200	0	89.1	80	120	2.09	15	
Calcium	5.50	3.00	5.00	6.38	-17.5	80	120	5.06	15	S
Chromium	0.172	0.0500	0.200	0	85.8	80	120	6.04	15	
Cobalt	0.179	0.0500	0.200	0.142	18.3	80	120	3.66	15	S
Lead	0.198	0.0100	0.200	0	98.8	80	120	1.39	15	
Molybdenum	2.25	0.0500	0.200	0.525	861	80	120	0.745	15	S
Selenium	0.151	0.0500	0.200	0	75.4	80	120	2.07	15	S
Thallium	0.189	0.0150	0.200	0	94.3	80	120	0.265	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160817A

Sample ID **ICV-160817**	Batch ID: **R87663**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS4_160817A**	Analysis Date: **8/17/2016 10:42:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.104	0.00250	0.100	0	104	90	110			
Arsenic	0.101	0.00500	0.100	0	101	90	110			
Barium	0.0993	0.0100	0.100	0	99.3	90	110			
Beryllium	0.100	0.00100	0.100	0	100	90	110			
Cadmium	0.0985	0.00100	0.100	0	98.5	90	110			
Calcium	2.34	0.300	2.50	0	93.8	90	110			
Chromium	0.104	0.00500	0.100	0	104	90	110			
Cobalt	0.103	0.00500	0.100	0	103	90	110			
Lead	0.101	0.00100	0.100	0	101	90	110			
Molybdenum	0.0952	0.00500	0.100	0	95.2	90	110			
Selenium	0.101	0.00500	0.100	0	101	90	110			
Thallium	0.101	0.00150	0.100	0	101	90	110			

Sample ID **LCVL-160817**	Batch ID: **R87663**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_160817A**	Analysis Date: **8/17/2016 10:46:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00221	0.00250	0.00200	0	110	70	130			
Arsenic	0.00526	0.00500	0.00500	0	105	70	130			
Barium	0.00513	0.0100	0.00500	0	103	70	130			
Beryllium	0.000783	0.00100	0.00100	0	78.3	70	130			
Cadmium	0.00104	0.00100	0.00100	0	104	70	130			
Calcium	0.105	0.300	0.100	0	105	70	130			
Chromium	0.00526	0.00500	0.00500	0	105	70	130			
Cobalt	0.00522	0.00500	0.00500	0	104	70	130			
Lead	0.00111	0.00100	0.00100	0	110	70	130			
Molybdenum	0.00524	0.00500	0.00500	0	105	70	130			
Selenium	0.00555	0.00500	0.00500	0	111	70	130			
Thallium	0.00105	0.00150	0.00100	0	105	70	130			

Sample ID **CCV4-160817**	Batch ID: **R87663**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160817A**	Analysis Date: **8/17/2016 2:11:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.207	0.00250	0.200	0	103	90	110			
Arsenic	0.209	0.00500	0.200	0	105	90	110			
Barium	0.208	0.0100	0.200	0	104	90	110			
Beryllium	0.207	0.00100	0.200	0	103	90	110			
Cadmium	0.208	0.00100	0.200	0	104	90	110			
Calcium	4.67	0.300	5.00	0	93.5	90	110			
Chromium	0.207	0.00500	0.200	0	103	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

Sample ID **CCV4-160817**	Batch ID: **R87663**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160817A**	Analysis Date: **8/17/2016 2:11:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.208	0.00500	0.200	0	104	90	110			
Lead	0.204	0.00100	0.200	0	102	90	110			
Molybdenum	0.205	0.00500	0.200	0	103	90	110			
Selenium	0.203	0.00500	0.200	0	101	90	110			
Thallium	0.210	0.00150	0.200	0	105	90	110			

Sample ID **LCVL4-160817**	Batch ID: **R87663**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_160817A**	Analysis Date: **8/17/2016 2:15:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00226	0.00250	0.00200	0	113	70	130			
Arsenic	0.00509	0.00500	0.00500	0	102	70	130			
Barium	0.00516	0.0100	0.00500	0	103	70	130			
Beryllium	0.00123	0.00100	0.00100	0	123	70	130			
Cadmium	0.00108	0.00100	0.00100	0	108	70	130			
Calcium	0.106	0.300	0.100	0	106	70	130			
Chromium	0.00521	0.00500	0.00500	0	104	70	130			
Cobalt	0.00503	0.00500	0.00500	0	101	70	130			
Lead	0.00103	0.00100	0.00100	0	103	70	130			
Molybdenum	0.00495	0.00500	0.00500	0	99.0	70	130			
Selenium	0.00460	0.00500	0.00500	0	91.9	70	130			
Thallium	0.00104	0.00150	0.00100	0	104	70	130			

Sample ID **CCV5-160817**	Batch ID: **R87663**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160817A**	Analysis Date: **8/17/2016 2:56:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.204	0.00250	0.200	0	102	90	110			
Arsenic	0.211	0.00500	0.200	0	105	90	110			
Barium	0.206	0.0100	0.200	0	103	90	110			
Beryllium	0.210	0.00100	0.200	0	105	90	110			
Cadmium	0.202	0.00100	0.200	0	101	90	110			
Calcium	4.60	0.300	5.00	0	92.0	90	110			
Chromium	0.205	0.00500	0.200	0	103	90	110			
Cobalt	0.206	0.00500	0.200	0	103	90	110			
Lead	0.204	0.00100	0.200	0	102	90	110			
Molybdenum	0.205	0.00500	0.200	0	102	90	110			
Selenium	0.209	0.00500	0.200	0	105	90	110			
Thallium	0.211	0.00150	0.200	0	106	90	110			

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160817A

Sample ID **LCVL5-160817**	Batch ID: **R87663**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_160817A**	Analysis Date: **8/17/2016 3:08:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00233	0.00250	0.00200	0	117	70	130			
Arsenic	0.00544	0.00500	0.00500	0	109	70	130			
Barium	0.00517	0.0100	0.00500	0	103	70	130			
Beryllium	0.00126	0.00100	0.00100	0	126	70	130			
Cadmium	0.00102	0.00100	0.00100	0	102	70	130			
Calcium	0.0993	0.300	0.100	0	99.3	70	130			
Chromium	0.00526	0.00500	0.00500	0	105	70	130			
Cobalt	0.00523	0.00500	0.00500	0	105	70	130			
Lead	0.00103	0.00100	0.00100	0	103	70	130			
Molybdenum	0.00498	0.00500	0.00500	0	99.7	70	130			
Selenium	0.00544	0.00500	0.00500	0	109	70	130			
Thallium	0.00103	0.00150	0.00100	0	103	70	130			

Sample ID **CCV6-160817**	Batch ID: **R87663**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160817A**	Analysis Date: **8/17/2016 3:33:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.203	0.00250	0.200	0	102	90	110			
Arsenic	0.204	0.00500	0.200	0	102	90	110			
Barium	0.208	0.0100	0.200	0	104	90	110			
Beryllium	0.202	0.00100	0.200	0	101	90	110			
Cadmium	0.202	0.00100	0.200	0	101	90	110			
Chromium	0.201	0.00500	0.200	0	101	90	110			
Cobalt	0.195	0.00500	0.200	0	97.7	90	110			
Lead	0.206	0.00100	0.200	0	103	90	110			
Molybdenum	0.200	0.00500	0.200	0	99.8	90	110			
Selenium	0.198	0.00500	0.200	0	99.2	90	110			
Thallium	0.210	0.00150	0.200	0	105	90	110			

Sample ID **LCVL6-160817**	Batch ID: **R87663**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_160817A**	Analysis Date: **8/17/2016 3:38:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00230	0.00250	0.00200	0	115	70	130			
Arsenic	0.00526	0.00500	0.00500	0	105	70	130			
Barium	0.00533	0.0100	0.00500	0	107	70	130			
Beryllium	0.00128	0.00100	0.00100	0	128	70	130			
Cadmium	0.000952	0.00100	0.00100	0	95.2	70	130			
Chromium	0.00519	0.00500	0.00500	0	104	70	130			
Cobalt	0.00517	0.00500	0.00500	0	103	70	130			
Lead	0.00101	0.00100	0.00100	0	101	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160817A

Sample ID **LCVL6-160817** Batch ID: **R87663** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS4_160817A** Analysis Date: **8/17/2016 3:38:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Molybdenum	0.00482	0.00500	0.00500	0	96.4	70	130			
Selenium	0.00483	0.00500	0.00500	0	96.7	70	130			
Thallium	0.00102	0.00150	0.00100	0	102	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160818B

The QC data in batch 76796 applies to the following samples: 1608095-12A

Sample ID	**MB-76796**	Batch ID:	**76796**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**ICP-MS4_160818B**	Analysis Date:	**8/18/2016 4:03:00 PM**	Prep Date:	**8/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	<0.0100	0.0300								
Lithium	<0.00500	0.0100								

Sample ID	**LCS-76796**	Batch ID:	**76796**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**ICP-MS4_160818B**	Analysis Date:	**8/18/2016 4:05:00 PM**	Prep Date:	**8/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.193	0.0300	0.200	0	96.3	80	120			
Lithium	0.206	0.0100	0.200	0	103	80	120			

Sample ID	**LCSD-76796**	Batch ID:	**76796**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**ICP-MS4_160818B**	Analysis Date:	**8/18/2016 4:07:00 PM**	Prep Date:	**8/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.195	0.0300	0.200	0	97.6	80	120	1.41	15	
Lithium	0.203	0.0100	0.200	0	102	80	120	1.14	15	

Sample ID	**1608137-04A SD**	Batch ID:	**76796**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**SD**	Run ID:	**ICP-MS4_160818B**	Analysis Date:	**8/18/2016 4:14:00 PM**	Prep Date:	**8/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	1.81	1.50	0	2.03				11.5	10	R
Lithium	<0.250	0.500	0	0				0	10	

Sample ID	**1608137-04A PDS**	Batch ID:	**76796**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**PDS**	Run ID:	**ICP-MS4_160818B**	Analysis Date:	**8/18/2016 4:16:00 PM**	Prep Date:	**8/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	3.97	0.300	2.00	2.03	96.7	80	120			
Lithium	1.92	0.100	2.00	0	96.1	80	120			

Sample ID	**1608137-04A MS**	Batch ID:	**76796**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**ICP-MS4_160818B**	Analysis Date:	**8/18/2016 4:26:00 PM**	Prep Date:	**8/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	4.27	0.300	0.200	2.03	1120	80	120			S
Lithium	0.194	0.100	0.200	0	96.8	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160818B

Sample ID **1608137-04A MSD** Batch ID: **76796** TestNo: **SW6020A** Units: **mg/L**
SampType: **MSD** Run ID: **ICP-MS4_160818B** Analysis Date: **8/18/2016 4:28:00 PM** Prep Date: **8/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	4.25	0.300	0.200	2.03	1110	80	120	0.340	15	S
Lithium	0.172	0.100	0.200	0	86.1	80	120	11.6	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160818B

Sample ID	**ICV2-160818**	Batch ID:	**R87690**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**ICP-MS4_160818B**	Analysis Date:	**8/18/2016 2:06:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0920	0.0300	0.100	0	92.0	90	110			
Lithium	0.0995	0.0100	0.100	0	99.5	90	110			

Sample ID	**ILCVL2-160818**	Batch ID:	**R87690**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160818B**	Analysis Date:	**8/18/2016 2:11:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0190	0.0300	0.0200	0	95.0	70	130			
Lithium	0.00953	0.0100	0.0100	0	95.3	70	130			

Sample ID	**CCV3-160818**	Batch ID:	**R87690**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_160818B**	Analysis Date:	**8/18/2016 3:42:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.193	0.0300	0.200	0	96.6	90	110			
Lithium	0.208	0.0100	0.200	0	104	90	110			

Sample ID	**LCVL3-160818**	Batch ID:	**R87690**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160818B**	Analysis Date:	**8/18/2016 3:54:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.00902	0.0300	0.0200	0	45.1	70	130			S
Lithium	0.0107	0.0100	0.0100	0	107	70	130			

Sample ID	**CCV4-160818**	Batch ID:	**R87690**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_160818B**	Analysis Date:	**8/18/2016 4:30:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.210	0.0300	0.200	0	105	90	110			
Lithium	0.207	0.0100	0.200	0	104	90	110			

Sample ID	**LCVL4-160818**	Batch ID:	**R87690**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160818B**	Analysis Date:	**8/18/2016 4:39:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0150	0.0300	0.0200	0	75.0	70	130			
Lithium	0.0113	0.0100	0.0100	0	113	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank
J	Analyte detected between MDL and RL
ND	Not Detected at the Method Detection Limit
RL	Reporting Limit
J	Analyte detected between SDL and RL
DF	Dilution Factor
MDL	Method Detection Limit
R	RPD outside accepted control limits
S	Spike Recovery outside control limits
N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160819A

The QC data in batch 76764 applies to the following samples: 1608095-01A, 1608095-02A, 1608095-03A, 1608095-04A, 1608095-05A, 1608095-06A, 1608095-07A, 1608095-08A, 1608095-09A, 1608095-10A, 1608095-11A

Sample ID	**MB-76764**	Batch ID:	**76764**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**ICP-MS4_160819A**	Analysis Date:	**8/19/2016 2:04:00 PM**	Prep Date:	**8/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	<0.000300	0.00100								
Lithium	<0.00500	0.0100								

Sample ID	**LCS-76764**	Batch ID:	**76764**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**ICP-MS4_160819A**	Analysis Date:	**8/19/2016 2:06:00 PM**	Prep Date:	**8/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.202	0.00100	0.200	0	101	80	120			
Lithium	0.199	0.0100	0.200	0	99.4	80	120			

Sample ID	**LCSD-76764**	Batch ID:	**76764**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**ICP-MS4_160819A**	Analysis Date:	**8/19/2016 2:08:00 PM**	Prep Date:	**8/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.203	0.00100	0.200	0	102	80	120	0.390	15	
Lithium	0.199	0.0100	0.200	0	99.3	80	120	0.131	15	

Sample ID	**1608096-07C SD**	Batch ID:	**76764**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**SD**	Run ID:	**ICP-MS4_160819A**	Analysis Date:	**8/19/2016 2:15:00 PM**	Prep Date:	**8/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	<0.00150	0.00500	0	0				0	10	
Lithium	0.0516	0.0500	0	0.0520				0.593	10	

Sample ID	**1608096-07C PDS**	Batch ID:	**76764**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**PDS**	Run ID:	**ICP-MS4_160819A**	Analysis Date:	**8/19/2016 2:35:00 PM**	Prep Date:	**8/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.188	0.00100	0.200	0	93.8	80	120			
Lithium	0.230	0.0100	0.200	0.0520	89.1	80	120			

Sample ID	**1608096-07C MS**	Batch ID:	**76764**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**ICP-MS4_160819A**	Analysis Date:	**8/19/2016 2:37:00 PM**	Prep Date:	**8/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.189	0.00100	0.200	0	94.7	80	120			
Lithium	0.237	0.0100	0.200	0.0520	92.5	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160819A

Sample ID	**1608096-07C MSD**	Batch ID:	**76764**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**ICP-MS4_160819A**	Analysis Date:	**8/19/2016 2:39:00 PM**	Prep Date:	**8/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.193	0.00100	0.200	0	96.6	80	120	1.90	15	
Lithium	0.242	0.0100	0.200	0.0520	95.2	80	120	2.29	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160819A

Sample ID	**ICV-160819**	Batch ID:	**R87706**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**ICP-MS4_160819A**	Analysis Date:	**8/19/2016 12:09:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.100	0.00100	0.100	0	100	90	110			
Calcium	2.40	0.300	2.50	0	96.1	90	110			
Lithium	0.0967	0.0100	0.100	0	96.7	90	110			

Sample ID	**LCVL-160819**	Batch ID:	**R87706**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160819A**	Analysis Date:	**8/19/2016 12:13:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.00112	0.00100	0.00100	0	112	70	130			
Calcium	0.103	0.300	0.100	0	103	70	130			
Lithium	0.0108	0.0100	0.0100	0	108	70	130			

Sample ID	**CCV2-160819**	Batch ID:	**R87706**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_160819A**	Analysis Date:	**8/19/2016 1:28:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.193	0.00100	0.200	0	96.7	90	110			
Calcium	4.91	0.300	5.00	0	98.3	90	110			
Lithium	0.200	0.0100	0.200	0	100	90	110			

Sample ID	**LCVL2-160819**	Batch ID:	**R87706**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160819A**	Analysis Date:	**8/19/2016 1:45:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.00101	0.00100	0.00100	0	101	70	130			
Calcium	0.104	0.300	0.100	0	104	70	130			
Lithium	0.0103	0.0100	0.0100	0	103	70	130			

Sample ID	**CCV3-160819**	Batch ID:	**R87706**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_160819A**	Analysis Date:	**8/19/2016 2:41:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.194	0.00100	0.200	0	97.2	90	110			
Boron	0.206	0.0300	0.200	0	103	90	110			
Calcium	5.03	0.300	5.00	0	101	90	110			
Lithium	0.200	0.0100	0.200	0	100	90	110			

Sample ID	**LCVL3-160819**	Batch ID:	**R87706**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160819A**	Analysis Date:	**8/19/2016 3:13:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

B	Analyte detected in the associated Method Blank
J	Analyte detected between MDL and RL
ND	Not Detected at the Method Detection Limit
RL	Reporting Limit
J	Analyte detected between SDL and RL
DF	Dilution Factor
MDL	Method Detection Limit
R	RPD outside accepted control limits
S	Spike Recovery outside control limits
N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160819A

Sample ID **LCVL3-160819**	Batch ID: **R87706**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_160819A**	Analysis Date: **8/19/2016 3:13:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.00120	0.00100	0.00100	0	120	70	130			
Boron	0.00457	0.0300	0.0200	0	22.9	70	130			S
Calcium	0.104	0.300	0.100	0	104	70	130			
Lithium	0.0104	0.0100	0.0100	0	104	70	130			

Sample ID **CCV4-160819**	Batch ID: **R87706**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_160819A**	Analysis Date: **8/19/2016 3:46:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.195	0.00100	0.200	0	97.4	90	110			
Boron	0.204	0.0300	0.200	0	102	90	110			
Lithium	0.200	0.0100	0.200	0	99.9	90	110			

Sample ID **LCVL4-160819**	Batch ID: **R87706**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_160819A**	Analysis Date: **8/19/2016 3:53:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.00111	0.00100	0.00100	0	110	70	130			
Boron	0.00923	0.0300	0.0200	0	46.2	70	130			S
Lithium	0.0113	0.0100	0.0100	0	113	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160822A

Sample ID	**ICV-160822**	Batch ID:	**R87716**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**ICP-MS4_160822A**	Analysis Date:	**8/22/2016 11:39:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.102	0.00100	0.100	0	102	90	110			
Lithium	0.100	0.0100	0.100	0	100	90	110			

Sample ID	**LCVL-160822**	Batch ID:	**R87716**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160822A**	Analysis Date:	**8/22/2016 11:48:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.00103	0.00100	0.00100	0	103	70	130			
Lithium	0.0111	0.0100	0.0100	0	111	70	130			

Sample ID	**CCV1-160822**	Batch ID:	**R87716**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_160822A**	Analysis Date:	**8/22/2016 12:33:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.210	0.00100	0.200	0	105	90	110			
Lithium	0.208	0.0100	0.200	0	104	90	110			

Sample ID	**LCVL1-160822**	Batch ID:	**R87716**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160822A**	Analysis Date:	**8/22/2016 12:39:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.00500	0.0100	0.00500	0	99.9	70	130			
Beryllium	0.00107	0.00100	0.00100	0	107	70	130			
Boron	0.0226	0.0300	0.0200	0	113	70	130			
Lithium	0.0112	0.0100	0.0100	0	112	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_160823A

Sample ID	**ICV-160823**	Batch ID:	**R87746**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**ICP-MS4_160823A**	Analysis Date:	**8/23/2016 11:07:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lithium	0.0931	0.0100	0.100	0	93.1	90	110			

Sample ID	**LCVL-160823**	Batch ID:	**R87746**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160823A**	Analysis Date:	**8/23/2016 11:11:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lithium	0.0102	0.0100	0.0100	0	102	70	130			

Sample ID	**CCV1-160823**	Batch ID:	**R87746**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_160823A**	Analysis Date:	**8/23/2016 11:55:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lithium	0.205	0.0100	0.200	0	102	90	110			

Sample ID	**LCVL1-160823**	Batch ID:	**R87746**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_160823A**	Analysis Date:	**8/23/2016 12:00:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lithium	0.00961	0.0100	0.0100	0	96.1	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC4_160810A

The QC data in batch 76753 applies to the following samples: 1608095-01D, 1608095-02D, 1608095-03D, 1608095-04D, 1608095-05D, 1608095-06D, 1608095-07D, 1608095-08D

Sample ID **MB-76753** Batch ID: **76753** TestNo: **E300** Units: **mg/L**
SampType: **MBLK** Run ID: **IC4_160810A** Analysis Date: **8/10/2016 9:37:41 AM** Prep Date: **8/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	<0.300	1.00								
Fluoride	<0.100	0.400								
Sulfate	<1.00	3.00								

Sample ID **LCS-76753** Batch ID: **76753** TestNo: **E300** Units: **mg/L**
SampType: **LCS** Run ID: **IC4_160810A** Analysis Date: **8/10/2016 9:52:41 AM** Prep Date: **8/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.90	1.00	10.00	0	99.0	90	110			
Fluoride	3.68	0.400	4.000	0	91.9	90	110			
Sulfate	30.7	3.00	30.00	0	102	90	110			

Sample ID **LCSD-76753** Batch ID: **76753** TestNo: **E300** Units: **mg/L**
SampType: **LCSD** Run ID: **IC4_160810A** Analysis Date: **8/10/2016 10:07:41 AM** Prep Date: **8/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.89	1.00	10.00	0	98.9	90	110	0.160	20	
Fluoride	3.65	0.400	4.000	0	91.3	90	110	0.722	20	
Sulfate	30.8	3.00	30.00	0	103	90	110	0.260	20	

Sample ID **1608095-02DMS** Batch ID: **76753** TestNo: **E300** Units: **mg/L**
SampType: **MS** Run ID: **IC4_160810A** Analysis Date: **8/10/2016 4:08:32 PM** Prep Date: **8/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	302	10.0	200.0	91.13	105	90	110			
Fluoride	200	4.00	200.0	0	100	90	110			
Sulfate	263	30.0	200.0	49.44	107	90	110			

Sample ID **1608095-02DMSD** Batch ID: **76753** TestNo: **E300** Units: **mg/L**
SampType: **MSD** Run ID: **IC4_160810A** Analysis Date: **8/10/2016 4:23:32 PM** Prep Date: **8/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	302	10.0	200.0	91.13	105	90	110	0.016	20	
Fluoride	201	4.00	200.0	0	100	90	110	0.244	20	
Sulfate	264	30.0	200.0	49.44	107	90	110	0.505	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC4_160810A

Sample ID **ICV-160810**	Batch ID: **R87556**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC4_160810A**	Analysis Date: **8/10/2016 9:03:03 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	25.3	1.00	25.00	0	101	90	110			
Fluoride	9.41	0.400	10.00	0	94.1	90	110			
Sulfate	79.1	3.00	75.00	0	105	90	110			

Sample ID **CCV1-160810**	Batch ID: **R87556**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC4_160810A**	Analysis Date: **8/10/2016 1:38:29 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.3	1.00	10.00	0	103	90	110			
Fluoride	3.88	0.400	4.000	0	97.1	90	110			
Sulfate	31.6	3.00	30.00	0	105	90	110			

Sample ID **CCV1-160810**	Batch ID: **R87556**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC4_160810A**	Analysis Date: **8/10/2016 5:53:32 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.3	1.00	10.00	0	103	90	110			
Fluoride	3.93	0.400	4.000	0	98.3	90	110			
Sulfate	31.4	3.00	30.00	0	105	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC4_160811A

The QC data in batch 76776 applies to the following samples: 1608095-09D, 1608095-10D, 1608095-11D, 1608095-12D

Sample ID	**MB-76776**	Batch ID:	**76776**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**IC4_160811A**	Analysis Date:	**8/11/2016 11:33:58 AM**	Prep Date:	**8/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	<0.300	1.00								
Fluoride	<0.100	0.400								
Sulfate	<1.00	3.00								

Sample ID	**LCS-76776**	Batch ID:	**76776**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**IC4_160811A**	Analysis Date:	**8/11/2016 11:48:58 AM**	Prep Date:	**8/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.2	1.00	10.00	0	102	90	110			
Fluoride	3.90	0.400	4.000	0	97.5	90	110			
Sulfate	31.3	3.00	30.00	0	104	90	110			

Sample ID	**LCSD-76776**	Batch ID:	**76776**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**IC4_160811A**	Analysis Date:	**8/11/2016 12:03:58 PM**	Prep Date:	**8/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.3	1.00	10.00	0	103	90	110	0.397	20	
Fluoride	3.87	0.400	4.000	0	96.8	90	110	0.764	20	
Sulfate	31.3	3.00	30.00	0	104	90	110	0.215	20	

Sample ID	**1608117-06CMS**	Batch ID:	**76776**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**IC4_160811A**	Analysis Date:	**8/11/2016 5:23:35 PM**	Prep Date:	**8/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2490	100	2000	315.3	109	90	110			
Fluoride	2050	40.0	2000	0	102	90	110			
Sulfate	2790	300	2000	617.6	109	90	110			

Sample ID	**1608117-06CMSD**	Batch ID:	**76776**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**IC4_160811A**	Analysis Date:	**8/11/2016 5:38:35 PM**	Prep Date:	**8/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2500	100	2000	315.3	109	90	110	0.247	20	
Fluoride	2060	40.0	2000	0	103	90	110	0.541	20	
Sulfate	2800	300	2000	617.6	109	90	110	0.446	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC4_160811A

Sample ID **ICV-160811**	Batch ID: **R87577**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC4_160811A**	Analysis Date: **8/11/2016 10:51:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	26.0	1.00	25.00	0	104	90	110			
Fluoride	9.87	0.400	10.00	0	98.7	90	110			
Sulfate	80.0	3.00	75.00	0	107	90	110			

Sample ID **CCV1-160811**	Batch ID: **R87577**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC4_160811A**	Analysis Date: **8/11/2016 3:06:27 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.4	1.00	10.00	0	104	90	110			
Fluoride	3.93	0.400	4.000	0	98.2	90	110			
Sulfate	31.4	3.00	30.00	0	105	90	110			

Sample ID **CCV2-160811**	Batch ID: **R87577**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC4_160811A**	Analysis Date: **8/11/2016 6:08:35 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.4	1.00	10.00	0	104	90	110			
Fluoride	3.91	0.400	4.000	0	97.8	90	110			
Sulfate	31.6	3.00	30.00	0	105	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_160815A

The QC data in batch 76798 applies to the following samples: 1608095-01D, 1608095-02D, 1608095-03D, 1608095-04D, 1608095-05D, 1608095-06D, 1608095-07D, 1608095-08D, 1608095-09D, 1608095-10D, 1608095-11D, 1608095-12D

Sample ID	**1608095-01D-DUP**	Batch ID:	**76798**	TestNo:	**M4500-H+ B**	Units:	**pH Units@21℃**
SampType:	**DUP**	Run ID:	**TITRATOR_160815A**	Analysis Date:	**8/15/2016 10:39:00 AM**	Prep Date:	**8/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.62	0	0	6.570				0.758	5	

Sample ID	**1608095-11D-DUP**	Batch ID:	**76798**	TestNo:	**M4500-H+ B**	Units:	**pH Units@20.7℃**
SampType:	**DUP**	Run ID:	**TITRATOR_160815A**	Analysis Date:	**8/15/2016 11:02:00 AM**	Prep Date:	**8/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.39	0	0	6.430				0.624	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_160815A

Sample ID	**ICV-160815**	Batch ID:	**R87598**	TestNo:	**M4500-H+ B**	Units:	**pH Units@21.3℃**
SampType:	**ICV**	Run ID:	**TITRATOR_160815A**	Analysis Date:	**8/15/2016 9:21:00 AM**	Prep Date:	**8/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	9.90	0	10.00	0	99.0	99	101			

Sample ID	**CCV1-160815**	Batch ID:	**R87598**	TestNo:	**M4500-H+ B**	Units:	**pH Units@20.9℃**
SampType:	**CCV**	Run ID:	**TITRATOR_160815A**	Analysis Date:	**8/15/2016 10:56:00 AM**	Prep Date:	**8/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.95	0	7.000	0	99.3	97.1	102.9			

Sample ID	**CCV2-160815**	Batch ID:	**R87598**	TestNo:	**M4500-H+ B**	Units:	**pH Units@21.2℃**
SampType:	**CCV**	Run ID:	**TITRATOR_160815A**	Analysis Date:	**8/15/2016 11:35:00 AM**	Prep Date:	**8/15/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.95	0	7.000	0	99.3	97.1	102.9			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1608095
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: WC_160812A

The QC data in batch 76794 applies to the following samples: 1608095-01D, 1608095-02D, 1608095-03D, 1608095-04D, 1608095-05D, 1608095-06D, 1608095-07D, 1608095-08D, 1608095-09D, 1608095-10D, 1608095-11D, 1608095-12D

Sample ID	**MB-76794**	Batch ID:	**76794**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**WC_160812A**	Analysis Date:	**8/15/2016 8:46:00 AM**	Prep Date:	**8/12/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	<10.0	10.0								

Sample ID	**LCS-76794**	Batch ID:	**76794**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**WC_160812A**	Analysis Date:	**8/15/2016 8:46:00 AM**	Prep Date:	**8/12/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	779	10.0	745.6	0	104	90	113			

Sample ID	**1608116-01D-DUP**	Batch ID:	**76794**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_160812A**	Analysis Date:	**8/15/2016 8:46:00 AM**	Prep Date:	**8/12/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	1510	50.0	0	1430				5.11	5	

Sample ID	**1608117-01C-DUP**	Batch ID:	**76794**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_160812A**	Analysis Date:	**8/15/2016 8:46:00 AM**	Prep Date:	**8/12/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	2190	50.0	0	2230				2.04	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

NJ OK001

Case Narrative

Lab No: 20160773

This report contains the analytical results for the 12 sample(s) received under chain of custody by ESC Lab Sciences on 8/12/2016 9:50:00 AM. These samples are associated with your 1608095 project.

The analytical results included in this report meet all applicable quality control procedure requirements except as noted below:

The test results in this report meet all NELAC requirements unless noted below:

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All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client.

Results have been reviewed by the Director of Radiochemistry or their designees and is approved for release.

Observations / Nonconformances

OUTREACH LABORATORY, A Divsion of ESC Lab Sciences
Address: 311 North Aspen Avenue, Broken Arrow, OK, 74012 EMail: outreach@esclabsciences.com - Tel: (918) 251-2515

Analytical Report

	Method	Result	DL	Units	Qual	Prep Date	Analysis Date	Analyst
Lab ID : **20160773-01**								
Client ID : **AX-24**								
Date Sampled : **8/9/2016 9:35:00 AM**								
Matrix : **NPW**								
		Radiochemical Analyses						
Combined Radium		0.870 +/- 0.989	0.652	pCi/l				
Radium-226	SM 7500 Ra B M*	0.457 +/- 0.160	0.158	pCi/l		08/22/16	08/25/16	AK
Radium-228	EPA 904*/9320*	0.413 +/- 0.829	0.494	pCi/l		08/25/16	08/30/16	JR
Lab ID : **20160773-02**								
Client ID : **AX-22R**								
Date Sampled : **8/9/2016 10:30:00 AM**								
Matrix : **NPW**								
		Radiochemical Analyses						
Combined Radium		0.959 +/- 1.32	0.795	pCi/l				
Radium-226	SM 7500 Ra B M*	0.642 +/- 0.280	0.205	pCi/l		08/22/16	08/25/16	AK
Radium-228	EPA 904*/9320*	0.317 +/- 1.04	0.590	pCi/l		08/25/16	08/30/16	JR
Lab ID : **20160773-03**								
Client ID : **AX-28**								
Date Sampled : **8/9/2016 11:35:00 AM**								
Matrix : **NPW**								
		Radiochemical Analyses						
Combined Radium		0.663 +/- 0.927	0.626	pCi/l				
Radium-226	SM 7500 Ra B M*	0.286 +/- 0.163	0.196	pCi/l		08/22/16	08/25/16	AK
Radium-228	EPA 904*/9320*	0.377 +/- 0.764	0.430	pCi/l		08/25/16	08/30/16	JR
Lab ID : **20160773-04**								
Client ID : **AXMW-1**								
Date Sampled : **8/9/2016 12:20:00 PM**								
Matrix : **NPW**								
		Radiochemical Analyses						
Combined Radium		2.84 +/- 1.16	0.769	pCi/l				
Radium-226	SM 7500 Ra B M*	1.06 +/- 0.251	0.135	pCi/l		08/22/16	08/25/16	AK
Radium-228	EPA 904*/9320*	1.78 +/- 0.906	0.634	pCi/l		08/25/16	08/30/16	JR

Analytical Report

	Method	Result	DL	Units	Qual	Prep Date	Analysis Date	Analyst
Lab ID : **20160773-05**								
Client ID : **AX-27**								
Date Sampled : **8/9/2016 2:15:00 PM**								
Matrix : **NPW**								
Radiochemical Analyses								
Combined Radium		2.38 +/- 1.11	0.639	pCi/l				
Radium-226	SM 7500 Ra B M*	0.592 +/- 0.211	0.161	pCi/l		08/22/16	08/26/16	AK
Radium-228	EPA 904*/9320*	1.79 +/- 0.897	0.478	pCi/l		08/25/16	08/30/16	JR
Lab ID : **20160773-06**								
Client ID : **AX-23**								
Date Sampled : **8/9/2016 3:15:00 PM**								
Matrix : **NPW**								
Radiochemical Analyses								
Combined Radium		0.682 +/- 1.12	0.651	pCi/l				
Radium-226	SM 7500 Ra B M*	0.682 +/- 0.218	0.104	pCi/l		08/22/16	08/26/16	AK
Radium-228	EPA 904*/9320*	-0.258 +/- 0.900	0.547	pCi/l		08/25/16	08/30/16	JR
Lab ID : **20160773-07**								
Client ID : **MW-01**								
Date Sampled : **8/9/2016**								
Matrix : **NPW**								
Radiochemical Analyses								
Combined Radium		4.02 +/- 1.37	0.760	pCi/l				
Radium-226	SM 7500 Ra B M*	1.49 +/- 0.274	0.124	pCi/l		08/22/16	08/26/16	AK
Radium-228	EPA 904*/9320*	2.53 +/- 1.10	0.636	pCi/l		08/25/16	08/30/16	JR
Lab ID : **20160773-08**								
Client ID : **EB-01**								
Date Sampled : **8/9/2016 8:30:00 AM**								
Matrix : **NPW**								
Radiochemical Analyses								
Combined Radium		0.648 +/- 1.07	0.906	pCi/l				
Radium-226	SM 7500 Ra B M*	-0.092 +/- 0.159	0.367	pCi/l		08/22/16	08/26/16	AK
Radium-228	EPA 904*/9320*	0.648 +/- 0.911	0.539	pCi/l		08/25/16	08/30/16	JR

*NELAC Certified Parameter BDL = Below Detection Limit

Analytical Report

	Method	Result	DL	Units	Qual	Prep Date	Analysis Date	Analyst
Lab ID : **20160773-09**								
Client ID : **AX-25**								
Date Sampled : **8/10/2016 8:35:00 AM**								
Matrix : **NPW**								
		Radiochemical Analyses						
Combined Radium		0.658 +/- 1.23	0.857	pCi/l				
Radium-226	SM 7500 Ra B M*	0.371 +/- 0.244	0.285	pCi/l		08/22/16	08/26/16	AK
Radium-228	EPA 904*/9320*	0.286 +/- 0.981	0.572	pCi/l		08/25/16	08/30/16	JR
Lab ID : **20160773-10**								
Client ID : **AX-26**								
Date Sampled : **8/10/2016 9:30:00 AM**								
Matrix : **NPW**								
		Radiochemical Analyses						
Combined Radium		0.937 +/- 2.06	1.27	pCi/l				
Radium-226	SM 7500 Ra B M*	0.707 +/- 0.207	0.134	pCi/l		08/22/16	08/26/16	AK
Radium-228	EPA 904*/9320*	0.230 +/- 1.85	1.14	pCi/l		08/25/16	08/30/16	JR
Lab ID : **20160773-11**								
Client ID : **AXMW-2**								
Date Sampled : **8/10/2016 11:00:00 AM**								
Matrix : **NPW**								
		Radiochemical Analyses						
Combined Radium		2.07 +/- 1.25	0.752	pCi/l				
Radium-226	SM 7500 Ra B M*	0.528 +/- 0.156	0.118	pCi/l		08/22/16	08/26/16	AK
Radium-228	EPA 904*/9320*	1.55 +/- 1.09	0.634	pCi/l		08/25/16	08/30/16	JR
Lab ID : **20160773-12**								
Client ID : **AX-29**								
Date Sampled : **8/10/2016 11:50:00 AM**								
Matrix : **NPW**								
		Radiochemical Analyses						
Combined Radium		2.79 +/- 1.09	0.667	pCi/l				
Radium-226	SM 7500 Ra B M*	0.739 +/- 0.211	0.183	pCi/l		08/22/16	08/26/16	AK
Radium-228	EPA 904*/9320*	2.05 +/- 0.876	0.485	pCi/l		08/25/16	08/30/16	JR

QC Report

Parameter	Blank	LCS %REC	LCSD %REC	LCSD RPD	DUP RPD	RER, NAD or DER	MS %REC	MSD %REC	MSD RPD	Batch ID
Radium-226	0.018	105.0			NC	0.051	116.0	119.0	2.7	R1123
Radium-228	-0.353	83.9			NC	0.174	84.7	81.6	17.8	R3847

Lab Approval:

Ron Eidson
Director of Radiochemistry

DHL Analytical, Inc.
2300 Double Creek Drive
Round Rock, TX 78664
TEL: *(512) 388-8222* FAX: *(512) 388-8229*
Work Order: 1608095

CHAIN-OF-CUSTODY RECO

Subcontractor:
ESC Laboratory
311 North Aspen
Broken Arrow, Oklahoma 74012
TEL: (918) 251-2515
FAX:
Acct #: DHLRRTX

Sample Id	Matrix	DHL#	Date Collected	Bottle Type	Requested Tests			
					E904.0	SM7500Ra-B M		
AX-24	Aqueous	-01B	08/09/16 09:35 AM	500HDPEHNO3	1			
AX-24	Aqueous	-01C	08/09/16 09:35 AM	500HDPEHNO3		1		
AX-22R	Aqueous	-02B	08/09/16 10:30 AM	500HDPEHNO3	1			
AX-22R	Aqueous	-02C	08/09/16 10:30 AM	500HDPEHNO3		1		
AX-28	Aqueous	-03B	08/09/16 11:35 AM	500HDPEHNO3	1			
AX-28	Aqueous	-03C	08/09/16 11:35 AM	500HDPEHNO3		1		
AXMW-1	Aqueous	-04B	08/09/16 12:20 PM	500HDPEHNO3	1			
AXMW-1	Aqueous	-04C	08/09/16 12:20 PM	500HDPEHNO3		1		
AX-27	Aqueous	-05B	08/09/16 02:15 PM	500HDPEHNO3	1			
AX-27	Aqueous	-05C	08/09/16 02:15 PM	500HDPEHNO3		1		
AX-23	Aqueous	-06B	08/09/16 03:15 PM	500HDPEHNO3	1			
AX-23	Aqueous	-06C	08/09/16 03:15 PM	500HDPEHNO3		1		
MW-01	Aqueous	-07B	08/09/16	500HDPEHNO3	1			
MW-01	Aqueous	-07C	08/09/16	500HDPEHNO3		1		
EB-01	Equip Blank	-08B	08/09/16 08:30 AM	500HDPEHNO3	1			
EB-01	Equip Blank	-08C	08/09/16 08:30 AM	500HDPEHNO3		1		
AX-25	Aqueous	-09B	08/10/16 08:35 AM	500HDPEHNO3	1			
AX-25	Aqueous	-09C	08/10/16 08:35 AM	500HDPEHNO3		1		

General Comments:
Please analyze these samples with Normal Turnaround Time.
Report RA-226, Ra-228 & Combined per Specs DHLRRTX033116S.
Quality Control Package Needed: Standard - NELAC Rad Test compliant
Email to cac@dhlanalytical.com & dupont@dhlanalytical.com

L853586
20160773

		Date/Time		
Relinquished by:		8/10/16 1730	Received by:	
Relinquished by:			Received by:	

DHL Analytical, Inc.
2300 Double Creek Drive
Round Rock, TX 78664
TEL: *(512) 388-8222* FAX: *(512) 388-8229*

CHAIN-OF-CUSTODY RECO

Work Order: 1608095

Subcontractor:

ESC Laboratory
311 North Aspen
Broken Arrow, Oklahoma 74012

TEL: (918) 251-2515
FAX:
Acct #: DHLRRTX

Sample Id	Matrix	DHL#	Date Collected	Bottle Type	Requested Tests			
					E904.0	SM7500Ra-B M		
AX-26	Aqueous	-10B	08/10/16 09:30 AM	500HDPEHNO3	1			
AX-26	Aqueous	-10C	08/10/16 09:30 AM	500HDPEHNO3		1		
AXMW-2	Aqueous	-11B	08/10/16 11:00 AM	500HDPEHNO3	1			
AXMW-2	Aqueous	-11C	08/10/16 11:00 AM	500HDPEHNO3		1		
AX-29	Aqueous	-12B	08/10/16 11:50 AM	500HDPEHNO3	1			
AX-29	Aqueous	-12C	08/10/16 11:50 AM	500HDPEHNO3		1		

General Comments:

Please analyze these samples with Normal Turnaround Time.
Report RA-226, Ra-228 & Combined per Specs DHLRRTX033116S.
Quality Control Package Needed: Standard - NELAC Rad Test compliant
Email to cac@dhlanalytical.com & dupont@dhlanalytical.com

		Date/Time		
Relinquished by:	[signature]	8/10/16 1730	Received by:	[signature]
Relinquished by:			Received by:	

SAMPLE LOGIN

Date Received: *8/12/2016 9:50:00*

Lab Number: 20160773

Sample Number	Client Sample ID	Matrix	Date Sampled	Container Type	Container Size	Preservation	Pres Upo
20160773-01 B	AX-24	NPW	08/09/16	Plastic	500 ml	HNO3, pH < 2	☐
20160773-01 A	AX-24	NPW	08/09/16	Plastic	500 ml	HNO3, pH < 2	☐
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160773-02 A	AX-22R	NPW	08/09/16	Plastic	500 ml	HNO3, pH < 2	☐
20160773-02 B	AX-22R	NPW	08/09/16	Plastic	500 ml	HNO3, pH < 2	☐
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160773-03 A	AX-28	NPW	08/09/16	Plastic	500 ml	HNO3, pH < 2	☐
20160773-03 B	AX-28	NPW	08/09/16	Plastic	500 ml	HNO3, pH < 2	☐
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160773-04 A	AXMW-1	NPW	08/09/16	Plastic	500 ml	HNO3, pH < 2	☐
20160773-04 B	AXMW-1	NPW	08/09/16	Plastic	500 ml	HNO3, pH < 2	☐
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160773-05 A	AX-27	NPW	08/09/16	Plastic	500 ml	HNO3, pH < 2	☐
20160773-05 B	AX-27	NPW	08/09/16	Plastic	500 ml	HNO3, pH < 2	☐
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160773-06 B	AX-23	NPW	08/09/16	Plastic	500 ml	HNO3, pH < 2	☐
20160773-06 A	AX-23	NPW	08/09/16	Plastic	500 ml	HNO3, pH < 2	☐
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160773-07 B	MW-01	NPW	08/09/16	Plastic	500 ml	HNO3, pH < 2	☐
20160773-07 A	MW-01	NPW	08/09/16	Plastic	500 ml	HNO3, pH < 2	☐
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				

20160773-08 A	EB-01	NPW	08/09/16	Plastic	500 ml	HNO3, pH < 2	☐
20160773-08 B	EB-01	NPW	08/09/16	Plastic	500 ml	HNO3, pH < 2	☐
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160773-09 A	AX-25	NPW	08/10/16	Plastic	500 ml	HNO3, pH < 2	☐
20160773-09 B	AX-25	NPW	08/10/16	Plastic	500 ml	HNO3, pH < 2	☐
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160773-10 A	AX-26	NPW	08/10/16	Plastic	500 ml	HNO3, pH < 2	☐
20160773-10 B	AX-26	NPW	08/10/16	Plastic	500 ml	HNO3, pH < 2	☐
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160773-11 A	AXMW-2	NPW	08/10/16	Plastic	500 ml	HNO3, pH < 2	☐
20160773-11 B	AXMW-2	NPW	08/10/16	Plastic	500 ml	HNO3, pH < 2	☐
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160773-12 B	AX-29	NPW	08/10/16	Plastic	500 ml	HNO3, pH < 2	☐
20160773-12 A	AX-29	NPW	08/10/16	Plastic	500 ml	HNO3, pH < 2	☐
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				

CONTAINER INSPECTION

Coolers 1 Custody Seals Broken Q Temperature: Amb °C Ice Radiation Survey: <300 cpm

SAMPLE INSPECTION

Sample Seal Broken Q Chain of Custody Record ✓ Labels in Tact ✓ Radiation Survey Complete N/A

Anomalies there is ~~a~~ 2 AX-28 & no AXMW-28.

Inspected By: Amber Taylor DATE 8/12/16

QA or Designee Review: Raymond Thomas DATE 08/12/16

Sample Custodian Review: Sia DATE 8/12/16

Project Notes:

November 09, 2016

Will Vienne
Pastor, Behling & Wheeler
2201 Double Creek Dr #4004
Round Rock, Texas 78664
TEL: (512) 671-3434
FAX (512) 671-3446

Order No.: 1610028

RE: Sandow CCR

Dear Will Vienne:

DHL Analytical, Inc. received 12 sample(s) on 10/5/2016 for the analyses presented in the following report.

There were no problems with the analyses and all data met requirements of NELAC except where noted in the Case Narrative. All non-NELAC methods will be identified accordingly in the case narrative and all estimated uncertainties of test results are within method or EPA specifications.

If you have any questions regarding these tests results, please feel free to call. Thank you for using DHL Analytical.

Sincerely,

John DuPont
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-16-17

Table of Contents

DHL ANALYTICAL
2300 Double Creek Dr. ■ Round Rock, TX 78664
Phone (512) 388-8222 ■ FAX (512) 388-8229
Web: www.dhlanalytical.com
E-Mail: login@dhlanalytical.com

CLIENT: Pastor, Behling & Wheeler
ADDRESS: 2201 Double Creek Dr Ste 4004
PHONE: (512) 671-3434 FAX/E-MAIL:
DATA REPORTED TO: Will Vienne
ADDITIONAL REPORT COPIES TO: Karla Henson

DATE: 10/5/2016
PO #: DHL WOR
PROJECT LOCATION OR NAME: Sando
CLENT PROJECT #: 5164E

Authorize 5% surcharge for TRRP Report? ☐ Yes ☑ No

S=SOIL W=WATER A=AIR L=LIQUID SE=SEDIMENT
P=PAINT SL=SLUDGE O=OTHER SO=SOLID

PRESERVATION: HCl | HNO_3 | H_2SO_4 ☐ NaOH ☐ | ICE | UNPRESERVED

ANALYSES: BTEX ☐ MTBE ☐ (METHOD 8021) | TPH 1005 ☐ TPH 1006 ☐ HOLD 1006 ☐ | GRO (METHOD 8015) ☐ DRO (METHOD 8105) ☐ | VOC 8260 ☐ VOC 624 ☐ VOC 8260/5035 ☐ | SVOC 8270 ☐ PAH 8270 ☐ HOLD PAH ☐ SVOC 625 ☐ | 8270 PEST ☐ 625 PEST/PCB ☐ 608 PCB ☐ | 8270 O-P PEST ☐ 8082 PCB ☐ 8270 PCB ☐ | 8321 HERB ☐ T PHOS, AMMONIA ☐ | METALS 6020 ☐ METALS 200.8 ☐ DISS. ME | RCRA ☐ TX1 ☐ | PH ☐ HEX CHROM ☐ AL | CHLORIDE ☐ ANI | TCLP-SVOC | TCLP

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESERVED
AX-24	1	10/5/16	9:50	W	P	4		X		X	X
AX-25	2		~~9:50~~ 11:30								
AX-22R	3		~~11:45~~								
AX-28	4		14:15								
AXMW-1	5		15:05								
AX-23	6		15:50								
EB-01	7		9:05								
AX-1	8		-								

RELINQUISHED BY: (Signature) — DATE/TIME: 10/5/16 17:15 — RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature) — DATE/TIME — RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature) — DATE/TIME — RECEIVED BY: (Signature)

☐ DW EXPORT $5.00 each ☐ Return

TURN AROUND TIME
RUSH ☐ CALL FIRST
1 DAY ☐ CALL FIRST
2 DAY ☐
NORMAL ☑
OTHER ☐

LABORATORY
RECEIVING TEM
CUSTODY SEAL
CARRIER: ☐ L
☐ COURIER DEL
☒ HAND DELIVE

DHL ANALYTICAL

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CLIENT: Pastor, Behling & Wheeler
ADDRESS: 2201 Double Creek Dr Ste 4004
PHONE: (512) 671-3434 FAX/E-MAIL:
DATA REPORTED TO: Will Vienne
ADDITIONAL REPORT COPIES TO: Karla Henson

DATE: 10/6/2016
PO #:
PROJECT LOCATION OR NAME: Sandon
CLENT PROJECT #: 5164E

Authorize 5% surcharge for TRRP Report? ☐ Yes ☑ No

S=SOIL P=PAINT
W=WATER SL=SLUDGE
A=AIR O=OTHER
L=LIQUID SO=SOLID
SE=SEDIMENT

ANALYSES: BTEX ☐ MTBE ☐ [METHOD 8021] | TPH 1005 ☐ TPH 1006 ☐ HOLD 1006 ☐ | GRO [METHOD 8015] ☐ DRO [METHOD 8105] ☐ | VOC 8260 ☐ VOC 624 ☐ VOC 8260/5035 ☐ | SVOC 8270 ☐ PAH 8270 ☐ HOLD PAH ☐ SVOC 625 ☐ | 8270 PEST ☐ 625 PEST/PCB ☐ 608 PCB ☐ | 8270 O-P PEST ☐ 8082 PCB ☐ 8270 PCB ☐ | 8321 HERB ☐ T PHOS, AMMONIA ☐ | METALS 6020 ☐ METALS 200.8 ☐ DISS. ME | RCRA ☐ TX11 ☐ | PH ☐ HEX CHROM ☐ ALK | CHLORIDE ☐ ANIO | TCLP-SVOC | TCLP

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESERVED
AX-29 9	1	10/6/16	10:30	W	Plastic	4		X		X	X
AXMW-2 10	2	↓	9:05	↓	↓	↓		↓		↓	↓
AX-27 11	3	↓	11:10	↓	↓	↓		↓		↓	↓
AX-26 12	4	↓	11:50	↓	↓	↓		↓		↓	↓

RELINQUISHED BY: (Signature) [signature] DATE/TIME 10/6/16 13:20 RECEIVED BY: (Signature) [signature]
RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)

☐ DHL DISPOSAL @ $5.00 each ☐ Return

TURN AROUND TIME
RUSH ☐ CALL FIRST
1 DAY ☐ CALL FIRST
2 DAY ☐
NORMAL ☑
OTHER ☐

LABORATORY
RECEIVING TEM
CUSTODY SEAL
CARRIER: ☐ L
☐ COURIER DEL
☑ HAND DELIV

John Dupont

From:	Sara Taube [Sara.Taube@pbwllc.com]
Sent:	Wednesday, July 22, 2015 12:05 PM
To:	John Dupont
Subject:	CCR Appendix III and IV
Follow Up Flag:	Follow up
Flag Status:	Completed

Hi John,

Here are the Appendix III and Appendix IV constituents that we will need to have analyzed under the CCR Rule.

Appendix III
Boron
Calcium
Chloride
Fluoride
pH
sulfate
TDS

Appendix IV
Antimony
Arsenic
Barium
Beryllium
Cadmium
Chromium
Cobalt
Fluoride
Lead
Lithium
Mercury
Molybdenum
Selenium
Thallium
Radium 226 and 228

We are looking to have approximately 74 wells sampled 8 times over the course of the next two years. Please let me know if there is any more information you might need.

Cheers,

Sara

10/26/2015

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name Pastor, Behling & Wheeler

Date Received: 10/5/2016

Work Order Number 1610028

Received by JT

Checklist completed by: _____ 10/6/2016
Signature Date

Reviewed by _____ 10/6/2016
Initials Date

Carrier name Hand Delivered

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	5.6 °C 10.3
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH<2 acceptable upon receipt?	Yes ☑	No ☐	NA ☐ LOT # 8086
	Adjusted? NO		Checked by _____
Water - ph>9 (S) or ph>12 (CN) acceptable upon receipt?	Yes ☐	No ☐	NA ☑ LOT #
	Adjusted? _____		Checked by _____

Any No response must be detailed in the comments section below.

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

DHL Analytical, Inc. **Date:** *09-Nov-16*

CLIENT: Pastor, Behling & Wheeler
Project: Sandow CCR
Lab Order: 1610028

CASE NARRATIVE

Samples were analyzed using the methods outlined in the following references:

Method SW6020A - Metals Analysis
Method SW7470A - Mercury Analysis
Method E300 - Anions Analysis
Method M4500-H+ B - pH of a Water Analysis
Method M2540C - TDS Analysis
Sub-contract - Radium-228 and Radium-226 analyses by methods E904/9320 and SM 7500 Ra B M. Analyzed at ESC Lab Sciences.

LOG IN

The samples were received and log-in performed on 10/5/16. A total of 12 samples were received. The samples arrived in good condition and were properly packaged.

METALS ANALYSIS

For Metals analysis sample AX-28 had the Chromium result which was above the historical trend line. The Chromium result was verified by re-analysis directly from the sample container and was confirmed. The sample contained fine black particles.

For Metals analysis performed on 10/17/16 CCV4-161017 had low responses for all internal standards. All associated analytes were within control limits. No further corrective actions were taken.

For Metals analysis performed on 10/17/16 CCB4-161017 had low responses for the internal standards Bismuth and Indium. All associated analytes were below the reporting limits. No further corrective actions were taken.

For Metals analysis performed on 10/17/16 CCV5-161017 had low responses for the internal standards Scandium(1) and Scandium(2). All associated analytes were within control limits. No further corrective actions were taken.

For Metals analysis performed on 10/17/16 LCVL4-161017 had low responses for the internal standards Bismuth, Indium, Scandium(1) and Scandium(2). All associated analytes were within control limits. No further corrective actions were taken.

For Metals analysis performed on 10/17/16 LCVL5-161017 had low responses for the internal standard Scandium(2). All associated analytes were within control limits. No further corrective actions were taken.

For Metals analysis performed on 10/13/16, 10/18/16 and 10/19/16 (batches 77488 & 77470) the matrix spikes and matrix spike duplicate recoveries were below control limits for Boron and/or Calcium. These are flagged accordingly in the QC summary report. The samples selected for the matrix spikes and matrix spike duplicates were not from this work order. The LCSs were within control limits for these analytes. No further corrective actions were taken.

For Metals analysis performed on 10/18/16 (batch 77470) the PDS recovery was out of control limits for Calcium. This is flagged accordingly. The serial dilution was within control limits for this analyte. No further corrective actions were taken.

MERCURY ANALYSIS

For Mercury analysis performed on 10/11/16 (batch 77501) the PDS recovery was slightly below control limits. This is flagged accordingly in the QC summary report. The serial dilution was within control limits. No further corrective actions were taken.

DHL Analytical, Inc.

Date: *09-Nov-16*

CLIENT: Pastor, Behling & Wheeler
Project: Sandow CCR
Lab Order: 1610028

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
1610028-01	AX-24		10/05/16 09:50 AM	10/5/2016
1610028-02	AX-25		10/05/16 11:00 AM	10/5/2016
1610028-03	AX-22R		10/05/16 11:45 AM	10/5/2016
1610028-04	AX-28		10/05/16 02:15 PM	10/5/2016
1610028-05	AXMW-1		10/05/16 03:05 PM	10/5/2016
1610028-06	AX-23		10/05/16 03:50 PM	10/5/2016
1610028-07	EB-01		10/05/16 09:05 AM	10/5/2016
1610028-08	AX-1		10/05/16	10/5/2016
1610028-09	AX-29		10/06/16 10:30 AM	10/6/2016
1610028-10	AXMW-2		10/06/16 09:05 AM	10/6/2016
1610028-11	AX-27		10/06/16 11:10 AM	10/6/2016
1610028-12	AX-26		10/06/16 11:50 AM	10/6/2016

& Wheeler

PREP DATES REPORT

Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
10/05/16 09:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/07/16 08:36 AM	77470
10/05/16 09:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/07/16 08:36 AM	77470
10/05/16 09:50 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	10/10/16 01:05 PM	77501
10/05/16 09:50 AM	Aqueous	E300	Anion Preparation	10/11/16 09:08 AM	77511
10/05/16 09:50 AM	Aqueous	E300	Anion Preparation	10/11/16 09:08 AM	77511
10/05/16 09:50 AM	Aqueous	M4500-H+ B	pH Preparation	10/06/16 10:45 AM	77460
10/05/16 09:50 AM	Aqueous	M2540C	TDS Preparation	10/10/16 11:16 AM	77500
10/05/16 11:00 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/07/16 08:36 AM	77470
10/05/16 11:00 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/07/16 08:36 AM	77470
10/05/16 11:00 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	10/10/16 01:05 PM	77501
10/05/16 11:00 AM	Aqueous	E300	Anion Preparation	10/11/16 09:08 AM	77511
10/05/16 11:00 AM	Aqueous	E300	Anion Preparation	10/11/16 09:08 AM	77511
10/05/16 11:00 AM	Aqueous	M4500-H+ B	pH Preparation	10/06/16 10:45 AM	77460
10/05/16 11:00 AM	Aqueous	M2540C	TDS Preparation	10/10/16 11:16 AM	77500
10/05/16 11:45 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/07/16 08:36 AM	77470
10/05/16 11:45 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/07/16 08:36 AM	77470
10/05/16 11:45 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	10/10/16 01:05 PM	77501
10/05/16 11:45 AM	Aqueous	E300	Anion Preparation	10/11/16 09:08 AM	77511
10/05/16 11:45 AM	Aqueous	E300	Anion Preparation	10/11/16 09:08 AM	77511
10/05/16 11:45 AM	Aqueous	M4500-H+ B	pH Preparation	10/06/16 10:45 AM	77460
10/05/16 11:45 AM	Aqueous	M2540C	TDS Preparation	10/11/16 09:09 AM	77528
10/05/16 02:15 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/07/16 08:36 AM	77470
10/05/16 02:15 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/07/16 08:36 AM	77470
10/05/16 02:15 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	10/10/16 01:05 PM	77501
10/05/16 02:15 PM	Aqueous	E300	Anion Preparation	10/11/16 09:08 AM	77511
10/05/16 02:15 PM	Aqueous	E300	Anion Preparation	10/11/16 09:08 AM	77511
10/05/16 02:15 PM	Aqueous	M4500-H+ B	pH Preparation	10/06/16 10:45 AM	77460
10/05/16 02:15 PM	Aqueous	M2540C	TDS Preparation	10/11/16 09:09 AM	77528

& Wheeler

PREP DATES REPORT

Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
10/05/16 03:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/07/16 08:36 AM	77470
10/05/16 03:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/07/16 08:36 AM	77470
10/05/16 03:05 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	10/10/16 01:05 PM	77501
10/05/16 03:05 PM	Aqueous	E300	Anion Preparation	10/11/16 09:08 AM	77511
10/05/16 03:05 PM	Aqueous	E300	Anion Preparation	10/11/16 09:08 AM	77511
10/05/16 03:05 PM	Aqueous	M4500-H+ B	pH Preparation	10/06/16 10:45 AM	77460
10/05/16 03:05 PM	Aqueous	M2540C	TDS Preparation	10/11/16 09:09 AM	77528
10/05/16 03:50 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/07/16 08:36 AM	77470
10/05/16 03:50 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/07/16 08:36 AM	77470
10/05/16 03:50 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	10/10/16 01:05 PM	77501
10/05/16 03:50 PM	Aqueous	E300	Anion Preparation	10/11/16 09:08 AM	77511
10/05/16 03:50 PM	Aqueous	E300	Anion Preparation	10/11/16 09:08 AM	77511
10/05/16 03:50 PM	Aqueous	M4500-H+ B	pH Preparation	10/06/16 10:45 AM	77460
10/05/16 03:50 PM	Aqueous	M2540C	TDS Preparation	10/11/16 09:09 AM	77528
10/05/16 09:05 AM	Equip Blank	SW3005A	Aq Prep Metals : ICP-MS	10/07/16 08:36 AM	77470
10/05/16 09:05 AM	Equip Blank	SW3005A	Aq Prep Metals : ICP-MS	10/07/16 08:36 AM	77470
10/05/16 09:05 AM	Equip Blank	SW7470A	Mercury Aq Prep, Total	10/10/16 01:05 PM	77501
10/05/16 09:05 AM	Equip Blank	E300	Anion Preparation	10/11/16 09:08 AM	77511
10/05/16 09:05 AM	Equip Blank	M4500-H+ B	pH Preparation	10/06/16 10:45 AM	77460
10/05/16 09:05 AM	Equip Blank	M2540C	TDS Preparation	10/11/16 09:09 AM	77528
10/05/16	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/07/16 08:36 AM	77470
10/05/16	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/07/16 08:36 AM	77470
10/05/16	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/07/16 08:36 AM	77470
10/05/16	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/07/16 08:36 AM	77470
10/05/16	Aqueous	SW7470A	Mercury Aq Prep, Total	10/10/16 01:05 PM	77501
10/05/16	Aqueous	E300	Anion Preparation	10/11/16 09:08 AM	77511
10/05/16	Aqueous	E300	Anion Preparation	10/11/16 09:08 AM	77511
10/05/16	Aqueous	M4500-H+ B	pH Preparation	10/06/16 10:45 AM	77460

& Wheeler

PREP DATES REPORT

Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
10/05/16	Aqueous	M2540C	TDS Preparation	10/11/16 09:09 AM	77528
10/06/16 10:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/07/16 08:36 AM	77470
10/06/16 10:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/07/16 08:36 AM	77470
10/06/16 10:30 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	10/10/16 01:05 PM	77501
10/06/16 10:30 AM	Aqueous	E300	Anion Preparation	10/11/16 09:08 AM	77511
10/06/16 10:30 AM	Aqueous	E300	Anion Preparation	10/11/16 09:08 AM	77511
10/06/16 10:30 AM	Aqueous	M4500-H+ B	pH Preparation	10/07/16 08:00 AM	77467
10/06/16 10:30 AM	Aqueous	M2540C	TDS Preparation	10/11/16 09:09 AM	77528
10/06/16 09:05 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/07/16 08:36 AM	77470
10/06/16 09:05 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/07/16 08:36 AM	77470
10/06/16 09:05 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/07/16 08:36 AM	77470
10/06/16 09:05 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	10/10/16 01:05 PM	77501
10/06/16 09:05 AM	Aqueous	E300	Anion Preparation	10/11/16 09:08 AM	77511
10/06/16 09:05 AM	Aqueous	E300	Anion Preparation	10/11/16 09:08 AM	77511
10/06/16 09:05 AM	Aqueous	M4500-H+ B	pH Preparation	10/07/16 08:00 AM	77467
10/06/16 09:05 AM	Aqueous	M2540C	TDS Preparation	10/11/16 09:09 AM	77528
10/06/16 11:10 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/07/16 08:36 AM	77470
10/06/16 11:10 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/07/16 08:36 AM	77470
10/06/16 11:10 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	10/10/16 01:05 PM	77501
10/06/16 11:10 AM	Aqueous	E300	Anion Preparation	10/11/16 09:08 AM	77511
10/06/16 11:10 AM	Aqueous	E300	Anion Preparation	10/11/16 09:08 AM	77511
10/06/16 11:10 AM	Aqueous	M4500-H+ B	pH Preparation	10/07/16 08:00 AM	77467
10/06/16 11:10 AM	Aqueous	M2540C	TDS Preparation	10/11/16 09:09 AM	77528
10/06/16 11:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/10/16 08:36 AM	77488
10/06/16 11:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/10/16 08:36 AM	77488
10/06/16 11:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/10/16 08:36 AM	77488
10/06/16 11:50 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	10/10/16 01:05 PM	77501
10/06/16 11:50 AM	Aqueous	E300	Anion Preparation	10/11/16 09:08 AM	77511

& Wheeler

PREP DATES REPORT

Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
10/06/16 11:50 AM	Aqueous	E300	Anion Preparation	10/11/16 09:08 AM	77511
10/06/16 11:50 AM	Aqueous	M4500-H+ B	pH Preparation	10/07/16 08:00 AM	77467
10/06/16 11:50 AM	Aqueous	M2540C	TDS Preparation	10/11/16 09:09 AM	77528

& Wheeler

ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	SW7470A	Mercury Total: Aqueous	77501	1	10/11/16 10:50 AM	CETAC2_HG_161011A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	77470	50	10/18/16 02:24 PM	ICP-MS4_161018B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	77470	1	10/18/16 03:36 PM	ICP-MS4_161018B
Aqueous	E300	Anions by IC method - Water	77511	1	10/11/16 10:47 AM	IC2_161011A
Aqueous	E300	Anions by IC method - Water	77511	100	10/11/16 04:50 PM	IC2_161011A
Aqueous	M4500-H+ B	pH	77460	1	10/06/16 11:25 AM	TITRATOR_161006A
Aqueous	M2540C	Total Dissolved Solids	77500	1	10/11/16 08:47 AM	WC_161010A
Aqueous	SW7470A	Mercury Total: Aqueous	77501	1	10/11/16 10:52 AM	CETAC2_HG_161011A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	77470	1	10/18/16 03:38 PM	ICP-MS4_161018B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	77470	50	10/18/16 02:26 PM	ICP-MS4_161018B
Aqueous	E300	Anions by IC method - Water	77511	1	10/11/16 11:01 AM	IC2_161011A
Aqueous	E300	Anions by IC method - Water	77511	100	10/11/16 05:04 PM	IC2_161011A
Aqueous	M4500-H+ B	pH	77460	1	10/06/16 11:29 AM	TITRATOR_161006A
Aqueous	M2540C	Total Dissolved Solids	77500	1	10/11/16 08:47 AM	WC_161010A
Aqueous	SW7470A	Mercury Total: Aqueous	77501	1	10/11/16 11:07 AM	CETAC2_HG_161011A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	77470	10	10/18/16 02:28 PM	ICP-MS4_161018B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	77470	1	10/18/16 03:42 PM	ICP-MS4_161018B
Aqueous	E300	Anions by IC method - Water	77511	1	10/11/16 11:16 AM	IC2_161011A
Aqueous	E300	Anions by IC method - Water	77511	10	10/11/16 05:19 PM	IC2_161011A
Aqueous	M4500-H+ B	pH	77460	1	10/06/16 11:30 AM	TITRATOR_161006A
Aqueous	M2540C	Total Dissolved Solids	77528	1	10/12/16 08:41 AM	WC_161011B
Aqueous	SW7470A	Mercury Total: Aqueous	77501	1	10/11/16 11:09 AM	CETAC2_HG_161011A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	77470	50	10/18/16 02:30 PM	ICP-MS4_161018B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	77470	1	10/18/16 03:44 PM	ICP-MS4_161018B
Aqueous	E300	Anions by IC method - Water	77511	1	10/11/16 11:30 AM	IC2_161011A
Aqueous	E300	Anions by IC method - Water	77511	100	10/11/16 05:33 PM	IC2_161011A

& Wheeler

ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	M4500-H+ B	pH	77460	1	10/06/16 11:32 AM	TITRATOR_161006A
Aqueous	M2540C	Total Dissolved Solids	77528	1	10/12/16 08:41 AM	WC_161011B
Aqueous	SW7470A	Mercury Total: Aqueous	77501	1	10/11/16 11:11 AM	CETAC2_HG_161011A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	77470	50	10/18/16 02:32 PM	ICP-MS4_161018B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	77470	1	10/18/16 03:46 PM	ICP-MS4_161018B
Aqueous	E300	Anions by IC method - Water	77511	1	10/11/16 11:45 AM	IC2_161011A
Aqueous	E300	Anions by IC method - Water	77511	100	10/11/16 05:48 PM	IC2_161011A
Aqueous	M4500-H+ B	pH	77460	1	10/06/16 11:33 AM	TITRATOR_161006A
Aqueous	M2540C	Total Dissolved Solids	77528	1	10/12/16 08:41 AM	WC_161011B
Aqueous	SW7470A	Mercury Total: Aqueous	77501	1	10/11/16 11:13 AM	CETAC2_HG_161011A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	77470	10	10/18/16 02:34 PM	ICP-MS4_161018B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	77470	1	10/18/16 03:48 PM	ICP-MS4_161018B
Aqueous	E300	Anions by IC method - Water	77511	1	10/11/16 12:00 PM	IC2_161011A
Aqueous	E300	Anions by IC method - Water	77511	10	10/12/16 09:37 AM	IC2_161011A
Aqueous	M4500-H+ B	pH	77460	1	10/06/16 11:36 AM	TITRATOR_161006A
Aqueous	M2540C	Total Dissolved Solids	77528	1	10/12/16 08:41 AM	WC_161011B
Equip Blank	SW7470A	Mercury Total: Aqueous	77501	1	10/11/16 11:16 AM	CETAC2_HG_161011A
Equip Blank	SW6020A	Trace Metals: ICP-MS - Water	77470	1	10/18/16 03:50 PM	ICP-MS4_161018B
Equip Blank	SW6020A	Trace Metals: ICP-MS - Water	77470	10	10/18/16 02:36 PM	ICP-MS4_161018B
Equip Blank	E300	Anions by IC method - Water	77511	1	10/11/16 02:06 PM	IC2_161011A
Equip Blank	M4500-H+ B	pH	77460	1	10/06/16 11:39 AM	TITRATOR_161006A
Equip Blank	M2540C	Total Dissolved Solids	77528	1	10/12/16 08:41 AM	WC_161011B
Aqueous	SW7470A	Mercury Total: Aqueous	77501	1	10/11/16 11:18 AM	CETAC2_HG_161011A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	77470	50	10/19/16 01:37 PM	ICP-MS3_161019A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	77470	50	10/21/16 03:20 PM	ICP-MS3_161021A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	77470	10	10/18/16 02:38 PM	ICP-MS4_161018B

& Wheeler

ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	77470	1	10/18/16 04:06 PM	ICP-MS4_161018B
Aqueous	E300	Anions by IC method - Water	77511	1	10/11/16 12:14 PM	IC2_161011A
Aqueous	E300	Anions by IC method - Water	77511	100	10/12/16 09:52 AM	IC2_161011A
Aqueous	M4500-H+ B	pH	77460	1	10/06/16 11:41 AM	TITRATOR_161006A
Aqueous	M2540C	Total Dissolved Solids	77528	1	10/12/16 08:41 AM	WC_161011B
Aqueous	SW7470A	Mercury Total: Aqueous	77501	1	10/11/16 11:20 AM	CETAC2_HG_161011A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	77470	100	10/18/16 03:30 PM	ICP-MS4_161018B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	77470	1	10/18/16 04:08 PM	ICP-MS4_161018B
Aqueous	E300	Anions by IC method - Water	77511	1	10/11/16 02:21 PM	IC2_161011A
Aqueous	E300	Anions by IC method - Water	77511	100	10/12/16 10:06 AM	IC2_161011A
Aqueous	M4500-H+ B	pH	77467	1	10/07/16 09:37 AM	TITRATOR_161007A
Aqueous	M2540C	Total Dissolved Solids	77528	1	10/12/16 08:41 AM	WC_161011B
Aqueous	SW7470A	Mercury Total: Aqueous	77501	1	10/11/16 11:23 AM	CETAC2_HG_161011A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	77470	1	10/18/16 04:10 PM	ICP-MS4_161018B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	77470	50	10/18/16 03:32 PM	ICP-MS4_161018B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	77470	10	10/18/16 02:40 PM	ICP-MS4_161018B
Aqueous	E300	Anions by IC method - Water	77511	1	10/11/16 02:35 PM	IC2_161011A
Aqueous	E300	Anions by IC method - Water	77511	100	10/12/16 10:22 AM	IC2_161011A
Aqueous	M4500-H+ B	pH	77467	1	10/07/16 09:40 AM	TITRATOR_161007A
Aqueous	M2540C	Total Dissolved Solids	77528	1	10/12/16 08:41 AM	WC_161011B
Aqueous	SW7470A	Mercury Total: Aqueous	77501	1	10/11/16 11:29 AM	CETAC2_HG_161011A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	77470	50	10/18/16 03:34 PM	ICP-MS4_161018B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	77470	1	10/18/16 04:12 PM	ICP-MS4_161018B
Aqueous	E300	Anions by IC method - Water	77511	1	10/11/16 02:50 PM	IC2_161011A
Aqueous	E300	Anions by IC method - Water	77511	100	10/12/16 10:43 AM	IC2_161011A
Aqueous	M4500-H+ B	pH	77467	1	10/07/16 09:43 AM	TITRATOR_161007A

& Wheeler

ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	M2540C	Total Dissolved Solids	77528	1	10/12/16 08:41 AM	WC_161011B
Aqueous	SW7470A	Mercury Total: Aqueous	77501	1	10/11/16 11:32 AM	CETAC2_HG_161011A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	77488	1	10/17/16 07:32 PM	ICP-MS3_161017A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	77488	50	10/18/16 04:16 PM	ICP-MS4_161018B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	77488	1	10/18/16 04:18 PM	ICP-MS4_161018B
Aqueous	E300	Anions by IC method - Water	77511	1	10/11/16 03:05 PM	IC2_161011A
Aqueous	E300	Anions by IC method - Water	77511	100	10/12/16 10:58 AM	IC2_161011A
Aqueous	M4500-H+ B	pH	77467	1	10/07/16 09:44 AM	TITRATOR_161007A
Aqueous	M2540C	Total Dissolved Solids	77528	1	10/12/16 08:41 AM	WC_161011B

DHL Analytical, Inc.

Date: *09-Nov-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-24
Project:	Sandow CCR	**Lab ID:**	1610028-01
Project No:	5164E	**Collection Date:**	10/05/16 09:50 AM
Lab Order:	1610028	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	10/11/16 10:50 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **CVD**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	10/18/16 03:36 PM
Arsenic	0.00423	0.00200	0.00500	J	mg/L	1	10/18/16 03:36 PM
Barium	0.0294	0.00300	0.0100		mg/L	1	10/18/16 03:36 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	10/18/16 03:36 PM
Boron	0.0921	0.0100	0.0300		mg/L	1	10/18/16 03:36 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	10/18/16 03:36 PM
Calcium	239	5.00	15.0		mg/L	50	10/18/16 02:24 PM
Chromium	0.00591	0.00200	0.00500		mg/L	1	10/18/16 03:36 PM
Cobalt	0.00638	0.00300	0.00500		mg/L	1	10/18/16 03:36 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	10/18/16 03:36 PM
Lithium	0.0709	0.00500	0.0100		mg/L	1	10/18/16 03:36 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	10/18/16 03:36 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	10/18/16 03:36 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	10/18/16 03:36 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	250	30.0	100		mg/L	100	10/11/16 04:50 PM
Fluoride	0.106	0.100	0.400	J	mg/L	1	10/11/16 10:47 AM
Sulfate	768	100	300		mg/L	100	10/11/16 04:50 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.64	0	0		pH Units@20.1℃	1	10/06/16 11:25 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	2290	50.0	50.0		mg/L	1	10/11/16 08:47 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *09-Nov-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-25
Project:	Sandow CCR	**Lab ID:**	1610028-02
Project No:	5164E	**Collection Date:**	10/05/16 11:00 AM
Lab Order:	1610028	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	10/11/16 10:52 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **CVD**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	10/18/16 03:38 PM
Arsenic	0.00414	0.00200	0.00500	J	mg/L	1	10/18/16 03:38 PM
Barium	0.0777	0.00300	0.0100		mg/L	1	10/18/16 03:38 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	10/18/16 03:38 PM
Boron	0.184	0.0100	0.0300		mg/L	1	10/18/16 03:38 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	10/18/16 03:38 PM
Calcium	250	5.00	15.0		mg/L	50	10/18/16 02:26 PM
Chromium	0.00248	0.00200	0.00500	J	mg/L	1	10/18/16 03:38 PM
Cobalt	0.0304	0.00300	0.00500		mg/L	1	10/18/16 03:38 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	10/18/16 03:38 PM
Lithium	0.0266	0.00500	0.0100		mg/L	1	10/18/16 03:38 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	10/18/16 03:38 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	10/18/16 03:38 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	10/18/16 03:38 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	503	30.0	100		mg/L	100	10/11/16 05:04 PM
Fluoride	0.292	0.100	0.400	J	mg/L	1	10/11/16 11:01 AM
Sulfate	446	100	300		mg/L	100	10/11/16 05:04 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.89	0	0		pH Units@19.7℃	1	10/06/16 11:29 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	2710	50.0	50.0		mg/L	1	10/11/16 08:47 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *09-Nov-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-22R
Project:	Sandow CCR	**Lab ID:**	1610028-03
Project No:	5164E	**Collection Date:**	10/05/16 11:45 AM
Lab Order:	1610028	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	10/11/16 11:07 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **CVD**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	10/18/16 03:42 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	10/18/16 03:42 PM
Barium	0.101	0.00300	0.0100		mg/L	1	10/18/16 03:42 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	10/18/16 03:42 PM
Boron	0.0891	0.0100	0.0300		mg/L	1	10/18/16 03:42 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	10/18/16 03:42 PM
Calcium	78.2	1.00	3.00		mg/L	10	10/18/16 02:28 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	10/18/16 03:42 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	10/18/16 03:42 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	10/18/16 03:42 PM
Lithium	0.0496	0.00500	0.0100		mg/L	1	10/18/16 03:42 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	10/18/16 03:42 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	10/18/16 03:42 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	10/18/16 03:42 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	83.5	3.00	10.0		mg/L	10	10/11/16 05:19 PM
Fluoride	0.237	0.100	0.400	J	mg/L	1	10/11/16 11:16 AM
Sulfate	48.5	1.00	3.00		mg/L	1	10/11/16 11:16 AM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	7.14	0	0		pH Units@19.5℃	1	10/06/16 11:30 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	436	10.0	10.0		mg/L	1	10/12/16 08:41 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *09-Nov-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-28
Project:	Sandow CCR	**Lab ID:**	1610028-04
Project No:	5164E	**Collection Date:**	10/05/16 02:15 PM
Lab Order:	1610028	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	10/11/16 11:09 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **CVD**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	10/18/16 03:44 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	10/18/16 03:44 PM
Barium	0.0342	0.00300	0.0100		mg/L	1	10/18/16 03:44 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	10/18/16 03:44 PM
Boron	0.135	0.0100	0.0300		mg/L	1	10/18/16 03:44 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	10/18/16 03:44 PM
Calcium	478	5.00	15.0		mg/L	50	10/18/16 02:30 PM
Chromium	1.24	0.00200	0.00500		mg/L	1	10/18/16 03:44 PM
Cobalt	0.0322	0.00300	0.00500		mg/L	1	10/18/16 03:44 PM
Lead	0.000682	0.000300	0.00100	J	mg/L	1	10/18/16 03:44 PM
Lithium	0.241	0.00500	0.0100		mg/L	1	10/18/16 03:44 PM
Molybdenum	0.0258	0.00200	0.00500		mg/L	1	10/18/16 03:44 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	10/18/16 03:44 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	10/18/16 03:44 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	426	30.0	100		mg/L	100	10/11/16 05:33 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	10/11/16 11:30 AM
Sulfate	1110	100	300		mg/L	100	10/11/16 05:33 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.47	0	0		pH Units@18.5℃	1	10/06/16 11:32 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	3240	50.0	50.0		mg/L	1	10/12/16 08:41 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *09-Nov-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AXMW-1
Project:	Sandow CCR	**Lab ID:**	1610028-05
Project No:	5164E	**Collection Date:**	10/05/16 03:05 PM
Lab Order:	1610028	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	10/11/16 11:11 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **CVD**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	10/18/16 03:46 PM
Arsenic	0.0175	0.00200	0.00500		mg/L	1	10/18/16 03:46 PM
Barium	0.0166	0.00300	0.0100		mg/L	1	10/18/16 03:46 PM
Beryllium	0.000518	0.000300	0.00100	J	mg/L	1	10/18/16 03:46 PM
Boron	0.497	0.0100	0.0300		mg/L	1	10/18/16 03:46 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	10/18/16 03:46 PM
Calcium	465	5.00	15.0		mg/L	50	10/18/16 02:32 PM
Chromium	0.00781	0.00200	0.00500		mg/L	1	10/18/16 03:46 PM
Cobalt	0.372	0.00300	0.00500		mg/L	1	10/18/16 03:46 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	10/18/16 03:46 PM
Lithium	0.0256	0.00500	0.0100		mg/L	1	10/18/16 03:46 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	10/18/16 03:46 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	10/18/16 03:46 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	10/18/16 03:46 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	325	30.0	100		mg/L	100	10/11/16 05:48 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	10/11/16 11:45 AM
Sulfate	2050	100	300		mg/L	100	10/11/16 05:48 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	5.91	0	0		pH Units@18.5℃	1	10/06/16 11:33 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	4140	50.0	50.0		mg/L	1	10/12/16 08:41 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *09-Nov-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-23
Project:	Sandow CCR	**Lab ID:**	1610028-06
Project No:	5164E	**Collection Date:**	10/05/16 03:50 PM
Lab Order:	1610028	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	10/11/16 11:13 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **CVD**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	10/18/16 03:48 PM
Arsenic	0.00879	0.00200	0.00500		mg/L	1	10/18/16 03:48 PM
Barium	0.0740	0.00300	0.0100		mg/L	1	10/18/16 03:48 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	10/18/16 03:48 PM
Boron	0.293	0.0100	0.0300		mg/L	1	10/18/16 03:48 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	10/18/16 03:48 PM
Calcium	246	1.00	3.00		mg/L	10	10/18/16 02:34 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	10/18/16 03:48 PM
Cobalt	0.00320	0.00300	0.00500	J	mg/L	1	10/18/16 03:48 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	10/18/16 03:48 PM
Lithium	0.00709	0.00500	0.0100	J	mg/L	1	10/18/16 03:48 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	10/18/16 03:48 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	10/18/16 03:48 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	10/18/16 03:48 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	156	3.00	10.0		mg/L	10	10/12/16 09:37 AM
Fluoride	0.179	0.100	0.400	J	mg/L	1	10/11/16 12:00 PM
Sulfate	562	10.0	30.0		mg/L	10	10/12/16 09:37 AM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.62	0	0		pH Units@18.8℃	1	10/06/16 11:36 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	1680	50.0	50.0		mg/L	1	10/12/16 08:41 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *09-Nov-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	EB-01
Project:	Sandow CCR	**Lab ID:**	1610028-07
Project No:	5164E	**Collection Date:**	10/05/16 09:05 AM
Lab Order:	1610028	**Matrix:**	EQUIP BLANK

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	10/11/16 11:16 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **CVD**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	10/18/16 03:50 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	10/18/16 03:50 PM
Barium	0.0475	0.00300	0.0100		mg/L	1	10/18/16 03:50 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	10/18/16 03:50 PM
Boron	0.0432	0.0100	0.0300		mg/L	1	10/18/16 03:50 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	10/18/16 03:50 PM
Calcium	3.53	1.00	3.00		mg/L	10	10/18/16 02:36 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	10/18/16 03:50 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	10/18/16 03:50 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	10/18/16 03:50 PM
Lithium	<0.00500	0.00500	0.0100		mg/L	1	10/18/16 03:50 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	10/18/16 03:50 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	10/18/16 03:50 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	10/18/16 03:50 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	22.2	0.300	1.00		mg/L	1	10/11/16 02:06 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	10/11/16 02:06 PM
Sulfate	5.73	1.00	3.00		mg/L	1	10/11/16 02:06 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	7.12	0	0		pH Units@18.7℃	1	10/06/16 11:39 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	<10.0	10.0	10.0		mg/L	1	10/12/16 08:41 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *09-Nov-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-1
Project:	Sandow CCR	**Lab ID:**	1610028-08
Project No:	5164E	**Collection Date:**	10/05/16
Lab Order:	1610028	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	10/11/16 11:18 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **CVD**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	10/18/16 04:06 PM
Arsenic	0.0172	0.00200	0.00500		mg/L	1	10/18/16 04:06 PM
Barium	0.0162	0.00300	0.0100		mg/L	1	10/18/16 04:06 PM
Beryllium	0.000419	0.000300	0.00100	J	mg/L	1	10/18/16 04:06 PM
Boron	0.534	0.100	0.300		mg/L	10	10/18/16 02:38 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	10/18/16 04:06 PM
Calcium	488	5.00	15.0		mg/L	50	10/21/16 03:20 PM
Chromium	0.00614	0.00200	0.00500		mg/L	1	10/18/16 04:06 PM
Cobalt	0.376	0.00300	0.00500		mg/L	1	10/18/16 04:06 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	10/18/16 04:06 PM
Lithium	0.0259	0.00500	0.0100		mg/L	1	10/18/16 04:06 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	10/18/16 04:06 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	10/18/16 04:06 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	10/18/16 04:06 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	341	30.0	100		mg/L	100	10/12/16 09:52 AM
Fluoride	<0.100	0.100	0.400		mg/L	1	10/11/16 12:14 PM
Sulfate	2080	100	300		mg/L	100	10/12/16 09:52 AM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	5.89	0	0		pH Units@19.1℃	1	10/06/16 11:41 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	4300	50.0	50.0		mg/L	1	10/12/16 08:41 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *09-Nov-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-29
Project:	Sandow CCR	**Lab ID:**	1610028-09
Project No:	5164E	**Collection Date:**	10/06/16 10:30 AM
Lab Order:	1610028	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	10/11/16 11:20 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **CVD**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	10/18/16 04:08 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	10/18/16 04:08 PM
Barium	0.0328	0.00300	0.0100		mg/L	1	10/18/16 04:08 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	10/18/16 04:08 PM
Boron	0.347	0.0100	0.0300		mg/L	1	10/18/16 04:08 PM
Cadmium	0.00379	0.000300	0.00100		mg/L	1	10/18/16 04:08 PM
Calcium	383	10.0	30.0		mg/L	100	10/18/16 03:30 PM
Chromium	0.00378	0.00200	0.00500	J	mg/L	1	10/18/16 04:08 PM
Cobalt	0.0959	0.00300	0.00500		mg/L	1	10/18/16 04:08 PM
Lead	0.000308	0.000300	0.00100	J	mg/L	1	10/18/16 04:08 PM
Lithium	0.0391	0.00500	0.0100		mg/L	1	10/18/16 04:08 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	10/18/16 04:08 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	10/18/16 04:08 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	10/18/16 04:08 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	282	30.0	100		mg/L	100	10/12/16 10:06 AM
Fluoride	0.123	0.100	0.400	J	mg/L	1	10/11/16 02:21 PM
Sulfate	1130	100	300		mg/L	100	10/12/16 10:06 AM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.37	0	0		pH Units@18.6℃	1	10/07/16 09:37 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	2940	50.0	50.0		mg/L	1	10/12/16 08:41 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *09-Nov-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AXMW-2
Project:	Sandow CCR	**Lab ID:**	1610028-10
Project No:	5164E	**Collection Date:**	10/06/16 09:05 AM
Lab Order:	1610028	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	10/11/16 11:23 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **CVD**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	10/18/16 04:10 PM
Arsenic	0.0230	0.00200	0.00500		mg/L	1	10/18/16 04:10 PM
Barium	0.0220	0.00300	0.0100		mg/L	1	10/18/16 04:10 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	10/18/16 04:10 PM
Boron	1.84	0.0100	0.0300		mg/L	1	10/18/16 04:10 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	10/18/16 04:10 PM
Calcium	541	5.00	15.0		mg/L	50	10/18/16 03:32 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	10/18/16 04:10 PM
Cobalt	0.0403	0.00300	0.00500		mg/L	1	10/18/16 04:10 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	10/18/16 04:10 PM
Lithium	0.0774	0.00500	0.0100		mg/L	1	10/18/16 04:10 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	10/18/16 04:10 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	10/18/16 04:10 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	10/18/16 04:10 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	200	30.0	100		mg/L	100	10/12/16 10:22 AM
Fluoride	0.882	0.100	0.400		mg/L	1	10/11/16 02:35 PM
Sulfate	1840	100	300		mg/L	100	10/12/16 10:22 AM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.25	0	0		pH Units@18.7℃	1	10/07/16 09:40 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	2950	50.0	50.0		mg/L	1	10/12/16 08:41 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *09-Nov-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-27
Project:	Sandow CCR	**Lab ID:**	1610028-11
Project No:	5164E	**Collection Date:**	10/06/16 11:10 AM
Lab Order:	1610028	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	10/11/16 11:29 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **CVD**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	10/18/16 04:12 PM
Arsenic	0.00320	0.00200	0.00500	J	mg/L	1	10/18/16 04:12 PM
Barium	0.108	0.00300	0.0100		mg/L	1	10/18/16 04:12 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	10/18/16 04:12 PM
Boron	0.216	0.0100	0.0300		mg/L	1	10/18/16 04:12 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	10/18/16 04:12 PM
Calcium	356	5.00	15.0		mg/L	50	10/18/16 03:34 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	10/18/16 04:12 PM
Cobalt	0.0197	0.00300	0.00500		mg/L	1	10/18/16 04:12 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	10/18/16 04:12 PM
Lithium	0.0828	0.00500	0.0100		mg/L	1	10/18/16 04:12 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	10/18/16 04:12 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	10/18/16 04:12 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	10/18/16 04:12 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	600	30.0	100		mg/L	100	10/12/16 10:43 AM
Fluoride	<0.100	0.100	0.400		mg/L	1	10/11/16 02:50 PM
Sulfate	394	100	300		mg/L	100	10/12/16 10:43 AM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.60	0	0		pH Units@19℃	1	10/07/16 09:43 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	1740	50.0	50.0		mg/L	1	10/12/16 08:41 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *09-Nov-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-26
Project:	Sandow CCR	**Lab ID:**	1610028-12
Project No:	5164E	**Collection Date:**	10/06/16 11:50 AM
Lab Order:	1610028	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	10/11/16 11:32 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **CVD**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	10/18/16 04:18 PM
Arsenic	0.00230	0.00200	0.00500	J	mg/L	1	10/18/16 04:18 PM
Barium	0.0367	0.00300	0.0100		mg/L	1	10/18/16 04:18 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	10/17/16 07:32 PM
Boron	0.311	0.0100	0.0300		mg/L	1	10/17/16 07:32 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	10/18/16 04:18 PM
Calcium	558	5.00	15.0		mg/L	50	10/18/16 04:16 PM
Chromium	0.00267	0.00200	0.00500	J	mg/L	1	10/17/16 07:32 PM
Cobalt	0.0202	0.00300	0.00500		mg/L	1	10/17/16 07:32 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	10/18/16 04:18 PM
Lithium	0.385	0.00500	0.0100		mg/L	1	10/17/16 07:32 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	10/18/16 04:18 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	10/17/16 07:32 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	10/18/16 04:18 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	875	30.0	100		mg/L	100	10/12/16 10:58 AM
Fluoride	<0.100	0.100	0.400		mg/L	1	10/11/16 03:05 PM
Sulfate	931	100	300		mg/L	100	10/12/16 10:58 AM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.58	0	0		pH Units@18.2℃	1	10/07/16 09:44 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	3390	50.0	50.0		mg/L	1	10/12/16 08:41 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_161011A

The QC data in batch 77501 applies to the following samples: 1610028-01A, 1610028-02A, 1610028-03A, 1610028-04A, 1610028-05A, 1610028-06A, 1610028-07A, 1610028-08A, 1610028-09A, 1610028-10A, 1610028-11A, 1610028-12A

Sample ID **MB-77501** Batch ID: **77501** TestNo: **SW7470A** Units: **mg/L**
SampType: **MBLK** Run ID: **CETAC2_HG_161011A** Analysis Date: **10/11/2016 10:43:15 A** Prep Date: **10/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	<0.0000800	0.000200								

Sample ID **LCS-77501** Batch ID: **77501** TestNo: **SW7470A** Units: **mg/L**
SampType: **LCS** Run ID: **CETAC2_HG_161011A** Analysis Date: **10/11/2016 10:45:30 A** Prep Date: **10/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00204	0.000200	0.00200	0	102	85	115			

Sample ID **LCSD-77501** Batch ID: **77501** TestNo: **SW7470A** Units: **mg/L**
SampType: **LCSD** Run ID: **CETAC2_HG_161011A** Analysis Date: **10/11/2016 10:47:46 A** Prep Date: **10/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00203	0.000200	0.00200	0	102	85	115	0.491	15	

Sample ID **1610028-02A SD** Batch ID: **77501** TestNo: **SW7470A** Units: **mg/L**
SampType: **SD** Run ID: **CETAC2_HG_161011A** Analysis Date: **10/11/2016 10:54:34 A** Prep Date: **10/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	<0.000400	0.00100	0	0				0	10	

Sample ID **1610028-02A MS** Batch ID: **77501** TestNo: **SW7470A** Units: **mg/L**
SampType: **MS** Run ID: **CETAC2_HG_161011A** Analysis Date: **10/11/2016 10:59:05 A** Prep Date: **10/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00171	0.000200	0.00200	0	85.5	80	120			

Sample ID **1610028-02A MSD** Batch ID: **77501** TestNo: **SW7470A** Units: **mg/L**
SampType: **MSD** Run ID: **CETAC2_HG_161011A** Analysis Date: **10/11/2016 11:01:21 A** Prep Date: **10/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00169	0.000200	0.00200	0	84.5	80	120	1.18	15	

Sample ID **1610028-02A PDS** Batch ID: **77501** TestNo: **SW7470A** Units: **mg/L**
SampType: **PDS** Run ID: **CETAC2_HG_161011A** Analysis Date: **10/11/2016 11:04:54 A** Prep Date: **10/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00201	0.000200	0.00250	0	80.4	85	115			S

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_161011A

Sample ID	**ICV-161011**	Batch ID:	**R88493**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**CETAC2_HG_161011A**	Analysis Date:	**10/11/2016 10:38:41 A**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00399	0.000200	0.00400	0	99.8	90	110			

Sample ID	**CCV1-161011**	Batch ID:	**R88493**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_161011A**	Analysis Date:	**10/11/2016 11:25:19 A**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00193	0.000200	0.00200	0	96.5	90	110			

Sample ID	**CCV2-161011**	Batch ID:	**R88493**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_161011A**	Analysis Date:	**10/11/2016 11:52:39 A**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00195	0.000200	0.00200	0	97.5	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS3_161017A

The QC data in batch 77488 applies to the following samples: 1610028-12A

Sample ID	MB-77488	Batch ID:	77488	TestNo:	SW6020A	Units:	mg/L
SampType:	MBLK	Run ID:	ICP-MS3_161017A	Analysis Date:	10/17/2016 5:21:00 PM	Prep Date:	10/10/2016

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	<0.0100	0.0300								

Sample ID	LCS-77488	Batch ID:	77488	TestNo:	SW6020A	Units:	mg/L
SampType:	LCS	Run ID:	ICP-MS3_161017A	Analysis Date:	10/17/2016 5:27:00 PM	Prep Date:	10/10/2016

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.182	0.0300	0.200	0	90.8	80	120			

Sample ID	LCSD-77488	Batch ID:	77488	TestNo:	SW6020A	Units:	mg/L
SampType:	LCSD	Run ID:	ICP-MS3_161017A	Analysis Date:	10/17/2016 5:33:00 PM	Prep Date:	10/10/2016

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.183	0.0300	0.200	0	91.6	80	120	0.932	15	

Sample ID	1610064-03A SD	Batch ID:	77488	TestNo:	SW6020A	Units:	mg/L
SampType:	SD	Run ID:	ICP-MS3_161017A	Analysis Date:	10/17/2016 7:21:00 PM	Prep Date:	10/10/2016

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.00400	0.0125	0	0				0	10	
Barium	0.169	0.0500	0	0.177				4.76	10	
Beryllium	<0.00150	0.00500	0	0				0	10	
Cobalt	<0.0150	0.0250	0	0.0110				0	10	
Lithium	<0.0250	0.0500	0	0.0109				0	10	
Molybdenum	<0.0100	0.0250	0	0				0	10	
Selenium	<0.0100	0.0250	0	0				0	10	
Thallium	<0.00250	0.00750	0	0				0	10	

Sample ID	1610064-03A PDS	Batch ID:	77488	TestNo:	SW6020A	Units:	mg/L
SampType:	PDS	Run ID:	ICP-MS3_161017A	Analysis Date:	10/17/2016 7:27:00 PM	Prep Date:	10/10/2016

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.198	0.00250	0.200	0	99.0	80	120			
Barium	0.364	0.0100	0.200	0.177	93.0	80	120			
Beryllium	0.188	0.00100	0.200	0	94.2	80	120			
Cobalt	0.194	0.00500	0.200	0.0110	91.8	80	120			
Lithium	0.191	0.0100	0.200	0.0109	90.0	80	120			
Molybdenum	0.198	0.00500	0.200	0	98.9	80	120			
Selenium	0.182	0.00500	0.200	0	91.2	80	120			
Thallium	0.201	0.00150	0.200	0	100	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS3_161017A

Sample ID **ICV1-161017**	Batch ID: **R88590**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS3_161017A**	Analysis Date: **10/17/2016 12:36:00 P**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.0997	0.00250	0.100	0	99.7	90	110			
Barium	0.0981	0.0100	0.100	0	98.1	90	110			
Beryllium	0.102	0.00100	0.100	0	102	90	110			
Boron	0.0956	0.0300	0.100	0	95.6	90	110			
Chromium	0.105	0.00500	0.100	0	105	90	110			
Cobalt	0.105	0.00500	0.100	0	105	90	110			
Lithium	0.103	0.0100	0.100	0	103	90	110			
Molybdenum	0.0973	0.00500	0.100	0	97.3	90	110			
Selenium	0.0997	0.00500	0.100	0	99.7	90	110			
Thallium	0.0967	0.00150	0.100	0	96.7	90	110			

Sample ID **ILCVL-161017**	Batch ID: **R88590**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS3_161017A**	Analysis Date: **10/17/2016 12:48:00 P**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00195	0.00250	0.00200	0	97.6	70	130			
Barium	0.00495	0.0100	0.00500	0	99.0	70	130			
Beryllium	0.00114	0.00100	0.00100	0	114	70	130			
Boron	0.0209	0.0300	0.0200	0	104	70	130			
Chromium	0.00525	0.00500	0.00500	0	105	70	130			
Cobalt	0.00533	0.00500	0.00500	0	107	70	130			
Lithium	0.0107	0.0100	0.0100	0	107	70	130			
Molybdenum	0.00518	0.00500	0.00500	0	104	70	130			
Selenium	0.00540	0.00500	0.00500	0	108	70	130			
Thallium	0.00107	0.00150	0.00100	0	107	70	130			

Sample ID **CCV2-161017**	Batch ID: **R88590**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS3_161017A**	Analysis Date: **10/17/2016 4:26:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.203	0.0300	0.200	0	102	90	110			

Sample ID **LCVL2-161017**	Batch ID: **R88590**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS3_161017A**	Analysis Date: **10/17/2016 5:14:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0232	0.0300	0.0200	0	116	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS3_161017A

Sample ID **CCV3-161017**	Batch ID: **R88590**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS3_161017A**	Analysis Date: **10/17/2016 6:51:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.213	0.00250	0.200	0	106	90	110			
Barium	0.209	0.0100	0.200	0	104	90	110			
Beryllium	0.216	0.00100	0.200	0	108	90	110			
Boron	0.198	0.0300	0.200	0	99.0	90	110			
Chromium	0.210	0.00500	0.200	0	105	90	110			
Cobalt	0.210	0.00500	0.200	0	105	90	110			
Lithium	0.216	0.0100	0.200	0	108	90	110			
Molybdenum	0.212	0.00500	0.200	0	106	90	110			
Selenium	0.202	0.00500	0.200	0	101	90	110			
Thallium	0.211	0.00150	0.200	0	105	90	110			

Sample ID **LCVL3-161017**	Batch ID: **R88590**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS3_161017A**	Analysis Date: **10/17/2016 7:03:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00217	0.00250	0.00200	0	109	70	130			
Barium	0.00527	0.0100	0.00500	0	105	70	130			
Beryllium	0.00111	0.00100	0.00100	0	111	70	130			
Boron	0.0233	0.0300	0.0200	0	117	70	130			
Chromium	0.00523	0.00500	0.00500	0	105	70	130			
Cobalt	0.00526	0.00500	0.00500	0	105	70	130			
Lithium	0.0104	0.0100	0.0100	0	104	70	130			
Molybdenum	0.00524	0.00500	0.00500	0	105	70	130			
Selenium	0.00533	0.00500	0.00500	0	107	70	130			
Thallium	0.00112	0.00150	0.00100	0	112	70	130			

Sample ID **CCV4-161017**	Batch ID: **R88590**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS3_161017A**	Analysis Date: **10/17/2016 8:26:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.211	0.00250	0.200	0	106	90	110			
Barium	0.208	0.0100	0.200	0	104	90	110			
Beryllium	0.208	0.00100	0.200	0	104	90	110			
Boron	0.185	0.0300	0.200	0	92.6	90	110			
Chromium	0.203	0.00500	0.200	0	102	90	110			
Cobalt	0.202	0.00500	0.200	0	101	90	110			
Lithium	0.210	0.0100	0.200	0	105	90	110			
Molybdenum	0.208	0.00500	0.200	0	104	90	110			
Selenium	0.203	0.00500	0.200	0	102	90	110			
Thallium	0.211	0.00150	0.200	0	105	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS3_161017A

Sample ID **LCVL4-161017** Batch ID: **R88590** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS3_161017A** Analysis Date: **10/17/2016 8:38:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00220	0.00250	0.00200	0	110	70	130			
Barium	0.00527	0.0100	0.00500	0	105	70	130			
Beryllium	0.00111	0.00100	0.00100	0	111	70	130			
Boron	0.0239	0.0300	0.0200	0	120	70	130			
Chromium	0.00537	0.00500	0.00500	0	107	70	130			
Cobalt	0.00518	0.00500	0.00500	0	104	70	130			
Lithium	0.0103	0.0100	0.0100	0	103	70	130			
Molybdenum	0.00522	0.00500	0.00500	0	104	70	130			
Selenium	0.00539	0.00500	0.00500	0	108	70	130			
Thallium	0.00113	0.00150	0.00100	0	113	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS3_161019A

The QC data in batch 77470 applies to the following samples: 1610028-01A, 1610028-02A, 1610028-03A, 1610028-04A, 1610028-05A, 1610028-06A, 1610028-07A, 1610028-08A, 1610028-09A, 1610028-10A, 1610028-11A

Sample ID	**1610029-03A SD**	Batch ID:	**77470**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**SD**	Run ID:	**ICP-MS3_161019A**	Analysis Date:	**10/19/2016 1:01:00 PM**	Prep Date:	**10/7/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.834	0.750	0	0.795				4.73	10	

Sample ID	**1610029-03A PDS**	Batch ID:	**77470**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**PDS**	Run ID:	**ICP-MS3_161019A**	Analysis Date:	**10/19/2016 1:07:00 PM**	Prep Date:	**10/7/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	1.77	0.150	1.00	0.795	97.2	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS3_161019A

The QC data in batch 77488 applies to the following samples: 1610028-12A

Sample ID	1610064-03A MS	Batch ID:	77488	TestNo:	SW6020A	Units:	mg/L
SampType:	MS	Run ID:	ICP-MS3_161019A	Analysis Date:	10/19/2016 1:25:00 PM	Prep Date:	10/10/2016

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.197	0.00250	0.200	0	98.3	80	120			
Arsenic	0.199	0.00500	0.200	0	99.4	80	120			
Barium	0.362	0.0100	0.200	0.169	96.2	80	120			
Beryllium	0.193	0.00100	0.200	0	96.5	80	120			
Boron	2.55	0.0300	0.200	2.42	64.5	80	120			S
Cobalt	0.201	0.00500	0.200	0.0110	95.0	80	120			
Lithium	0.212	0.0100	0.200	0.0114	100	80	120			
Molybdenum	0.193	0.00500	0.200	0	96.6	80	120			
Selenium	0.195	0.00500	0.200	0	97.4	80	120			
Thallium	0.195	0.00150	0.200	0	97.4	80	120			

Sample ID	1610064-03A MSD	Batch ID:	77488	TestNo:	SW6020A	Units:	mg/L
SampType:	MSD	Run ID:	ICP-MS3_161019A	Analysis Date:	10/19/2016 1:31:00 PM	Prep Date:	10/10/2016

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.196	0.00250	0.200	0	98.1	80	120	0.204	15	
Arsenic	0.199	0.00500	0.200	0	99.3	80	120	0.151	15	
Barium	0.358	0.0100	0.200	0.169	94.5	80	120	0.917	15	
Beryllium	0.192	0.00100	0.200	0	96.2	80	120	0.311	15	
Boron	2.53	0.0300	0.200	2.42	56.5	80	120	0.630	15	S
Cobalt	0.200	0.00500	0.200	0.0110	94.6	80	120	0.349	15	
Lithium	0.214	0.0100	0.200	0.0114	101	80	120	0.847	15	
Molybdenum	0.194	0.00500	0.200	0	97.0	80	120	0.362	15	
Selenium	0.196	0.00500	0.200	0	97.8	80	120	0.410	15	
Thallium	0.196	0.00150	0.200	0	97.8	80	120	0.307	15	

Sample ID	1610064-03A SD	Batch ID:	77488	TestNo:	SW6020A	Units:	mg/L
SampType:	SD	Run ID:	ICP-MS3_161019A	Analysis Date:	10/19/2016 1:49:00 PM	Prep Date:	10/10/2016

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	2.60	0.750	0	2.36				9.70	10	

Sample ID	1610064-03A PDS	Batch ID:	77488	TestNo:	SW6020A	Units:	mg/L
SampType:	PDS	Run ID:	ICP-MS3_161019A	Analysis Date:	10/19/2016 1:55:00 PM	Prep Date:	10/10/2016

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	3.48	0.150	1.00	2.36	112	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS3_161019A

Sample ID **ICV1-161019**	Batch ID: **R88617**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS3_161019A**	Analysis Date: **10/19/2016 12:37:00 P**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.0968	0.00250	0.100	0	96.8	90	110			
Arsenic	0.0999	0.00500	0.100	0	99.9	90	110			
Barium	0.0966	0.0100	0.100	0	96.6	90	110			
Beryllium	0.0996	0.00100	0.100	0	99.6	90	110			
Boron	0.0980	0.0300	0.100	0	98.0	90	110			
Cobalt	0.104	0.00500	0.100	0	104	90	110			
Lithium	0.104	0.0100	0.100	0	104	90	110			
Molybdenum	0.0916	0.00500	0.100	0	91.6	90	110			
Selenium	0.100	0.00500	0.100	0	100	90	110			
Thallium	0.0967	0.00150	0.100	0	96.7	90	110			

Sample ID **ILCVL-161019**	Batch ID: **R88617**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS3_161019A**	Analysis Date: **10/19/2016 12:49:00 P**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00193	0.00250	0.00200	0	96.6	70	130			
Arsenic	0.00485	0.00500	0.00500	0	97.1	70	130			
Barium	0.00487	0.0100	0.00500	0	97.4	70	130			
Beryllium	0.00106	0.00100	0.00100	0	106	70	130			
Boron	0.0190	0.0300	0.0200	0	95.1	70	130			
Cobalt	0.00510	0.00500	0.00500	0	102	70	130			
Lithium	0.0105	0.0100	0.0100	0	105	70	130			
Molybdenum	0.00437	0.00500	0.00500	0	87.3	70	130			
Selenium	0.00507	0.00500	0.00500	0	101	70	130			
Thallium	0.00103	0.00150	0.00100	0	103	70	130			

Sample ID **CCV1-161019**	Batch ID: **R88617**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS3_161019A**	Analysis Date: **10/19/2016 2:37:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.193	0.00250	0.200	0	96.4	90	110			
Arsenic	0.200	0.00500	0.200	0	100	90	110			
Barium	0.194	0.0100	0.200	0	96.8	90	110			
Beryllium	0.201	0.00100	0.200	0	100	90	110			
Boron	0.191	0.0300	0.200	0	95.6	90	110			
Cobalt	0.198	0.00500	0.200	0	98.8	90	110			
Lithium	0.213	0.0100	0.200	0	106	90	110			
Molybdenum	0.188	0.00500	0.200	0	94.0	90	110			
Selenium	0.197	0.00500	0.200	0	98.6	90	110			
Thallium	0.193	0.00150	0.200	0	96.3	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS3_161019A

Sample ID	**LCVL1-161019**	Batch ID:	**R88617**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS3_161019A**	Analysis Date:	**10/19/2016 2:49:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00205	0.00250	0.00200	0	103	70	130			
Arsenic	0.00520	0.00500	0.00500	0	104	70	130			
Barium	0.00497	0.0100	0.00500	0	99.4	70	130			
Beryllium	0.00107	0.00100	0.00100	0	107	70	130			
Boron	0.0239	0.0300	0.0200	0	119	70	130			
Cobalt	0.00498	0.00500	0.00500	0	99.5	70	130			
Lithium	0.0105	0.0100	0.0100	0	105	70	130			
Molybdenum	0.00424	0.00500	0.00500	0	84.8	70	130			
Selenium	0.00526	0.00500	0.00500	0	105	70	130			
Thallium	0.00109	0.00150	0.00100	0	109	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS3_161021A

Sample ID	**ICV1-161021**	Batch ID:	**R88662**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**ICP-MS3_161021A**	Analysis Date:	**10/21/2016 12:35:00 P**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	2.43	0.300	2.50	0	97.0	90	110			

Sample ID	**ILCVL-161021**	Batch ID:	**R88662**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS3_161021A**	Analysis Date:	**10/21/2016 12:47:00 P**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.0885	0.300	0.100	0	88.5	70	130			

Sample ID	**CCV1-161021**	Batch ID:	**R88662**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS3_161021A**	Analysis Date:	**10/21/2016 2:37:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.90	0.300	5.00	0	98.1	90	110			

Sample ID	**LCVL1-161021**	Batch ID:	**R88662**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS3_161021A**	Analysis Date:	**10/21/2016 2:49:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.0845	0.300	0.100	0	84.5	70	130			

Sample ID	**CCV1-161021**	Batch ID:	**R88662**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS3_161021A**	Analysis Date:	**10/21/2016 3:32:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.90	0.300	5.00	0	97.9	90	110			

Sample ID	**LCVL1-161021**	Batch ID:	**R88662**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS3_161021A**	Analysis Date:	**10/21/2016 3:44:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.101	0.300	0.100	0	101	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_161013C

The QC data in batch 77488 applies to the following samples: 1610028-12A

Sample ID	MB-77488	Batch ID:	77488	TestNo:	SW6020A	Units:	mg/L
SampType:	MBLK	Run ID:	ICP-MS4_161013C	Analysis Date:	10/13/2016 9:35:00 PM	Prep Date:	10/10/2016

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.000800	0.00250								
Arsenic	<0.00200	0.00500								
Barium	<0.00300	0.0100								
Beryllium	<0.000300	0.00100								
Cadmium	<0.000300	0.00100								
Calcium	<0.100	0.300								
Chromium	<0.00200	0.00500								
Cobalt	<0.00300	0.00500								
Lead	<0.000300	0.00100								
Lithium	<0.00500	0.0100								
Molybdenum	<0.00200	0.00500								
Selenium	<0.00200	0.00500								
Thallium	<0.000500	0.00150								

Sample ID	LCS-77488	Batch ID:	77488	TestNo:	SW6020A	Units:	mg/L
SampType:	LCS	Run ID:	ICP-MS4_161013C	Analysis Date:	10/13/2016 9:37:00 PM	Prep Date:	10/10/2016

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.194	0.00250	0.200	0	97.1	80	120			
Arsenic	0.209	0.00500	0.200	0	105	80	120			
Barium	0.194	0.0100	0.200	0	96.9	80	120			
Beryllium	0.191	0.00100	0.200	0	95.6	80	120			
Cadmium	0.189	0.00100	0.200	0	94.7	80	120			
Calcium	4.68	0.300	5.00	0	93.5	80	120			
Chromium	0.193	0.00500	0.200	0	96.3	80	120			
Cobalt	0.197	0.00500	0.200	0	98.4	80	120			
Lead	0.191	0.00100	0.200	0	95.4	80	120			
Lithium	0.190	0.0100	0.200	0	95.2	80	120			
Molybdenum	0.182	0.00500	0.200	0	91.1	80	120			
Selenium	0.205	0.00500	0.200	0	103	80	120			
Thallium	0.188	0.00150	0.200	0	93.8	80	120			

Sample ID	LCSD-77488	Batch ID:	77488	TestNo:	SW6020A	Units:	mg/L
SampType:	LCSD	Run ID:	ICP-MS4_161013C	Analysis Date:	10/13/2016 9:39:00 PM	Prep Date:	10/10/2016

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.196	0.00250	0.200	0	97.8	80	120	0.718	15	
Arsenic	0.208	0.00500	0.200	0	104	80	120	0.635	15	
Barium	0.193	0.0100	0.200	0	96.5	80	120	0.445	15	
Beryllium	0.192	0.00100	0.200	0	95.8	80	120	0.217	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_161013C

Sample ID **LCSD-77488**	Batch ID: **77488**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCSD**	Run ID: **ICP-MS4_161013C**	Analysis Date: **10/13/2016 9:39:00 PM**	Prep Date: **10/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	0.190	0.00100	0.200	0	95.1	80	120	0.387	15	
Calcium	4.66	0.300	5.00	0	93.2	80	120	0.323	15	
Chromium	0.193	0.00500	0.200	0	96.4	80	120	0.131	15	
Cobalt	0.195	0.00500	0.200	0	97.7	80	120	0.715	15	
Lead	0.191	0.00100	0.200	0	95.3	80	120	0.089	15	
Lithium	0.189	0.0100	0.200	0	94.5	80	120	0.782	15	
Molybdenum	0.184	0.00500	0.200	0	91.9	80	120	0.860	15	
Selenium	0.206	0.00500	0.200	0	103	80	120	0.399	15	
Thallium	0.188	0.00150	0.200	0	94.0	80	120	0.228	15	

Sample ID **1610064-03A SD**	Batch ID: **77488**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **SD**	Run ID: **ICP-MS4_161013C**	Analysis Date: **10/13/2016 9:45:00 PM**	Prep Date: **10/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	<0.100	0.250	0	0				0	10	
Cadmium	<0.0150	0.0500	0	0				0	10	
Calcium	145	15.0	0	146				0.582	10	
Chromium	<0.100	0.250	0	0				0	10	
Lead	<0.0150	0.0500	0	0				0	10	

Sample ID **1610064-03A PDS**	Batch ID: **77488**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS4_161013C**	Analysis Date: **10/13/2016 9:55:00 PM**	Prep Date: **10/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	1.99	0.0500	2.00	0	99.4	80	120			
Cadmium	1.84	0.0100	2.00	0	91.8	80	120			
Calcium	189	3.00	50.0	146	85.1	80	120			
Chromium	1.93	0.0500	2.00	0	96.3	80	120			
Lead	1.86	0.0100	2.00	0	92.9	80	120			

Sample ID **1610064-03A MS**	Batch ID: **77488**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS4_161013C**	Analysis Date: **10/13/2016 9:57:00 PM**	Prep Date: **10/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	0.196	0.0100	0.200	0	97.8	80	120			
Calcium	149	3.00	5.00	146	60.7	80	120			S
Chromium	0.195	0.0500	0.200	0	97.7	80	120			
Lead	0.191	0.0100	0.200	0	95.3	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_161013C

Sample ID **1610064-03A MSD** Batch ID: **77488** TestNo: **SW6020A** Units: **mg/L**
SampType: **MSD** Run ID: **ICP-MS4_161013C** Analysis Date: **10/13/2016 9:59:00 PM** Prep Date: **10/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	0.196	0.0100	0.200	0	97.8	80	120	0.040	15	
Calcium	150	3.00	5.00	146	85.6	80	120	0.830	15	
Chromium	0.199	0.0500	0.200	0	99.6	80	120	1.87	15	
Lead	0.195	0.0100	0.200	0	97.7	80	120	2.41	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_161013C

Sample ID **ICV-161013**	Batch ID: **R88546**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS4_161013C**	Analysis Date: **10/13/2016 10:34:00 A**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.100	0.00250	0.100	0	100	90	110			
Arsenic	0.101	0.00500	0.100	0	101	90	110			
Barium	0.0990	0.0100	0.100	0	99.0	90	110			
Beryllium	0.0984	0.00100	0.100	0	98.4	90	110			
Cadmium	0.0984	0.00100	0.100	0	98.4	90	110			
Calcium	2.40	0.300	2.50	0	96.0	90	110			
Chromium	0.105	0.00500	0.100	0	105	90	110			
Cobalt	0.105	0.00500	0.100	0	105	90	110			
Lead	0.0992	0.00100	0.100	0	99.2	90	110			
Lithium	0.0948	0.0100	0.100	0	94.8	90	110			
Molybdenum	0.0957	0.00500	0.100	0	95.7	90	110			
Selenium	0.102	0.00500	0.100	0	102	90	110			
Thallium	0.0969	0.00150	0.100	0	96.9	90	110			

Sample ID **LCVL-161013**	Batch ID: **R88546**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_161013C**	Analysis Date: **10/13/2016 10:39:00 A**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00191	0.00250	0.00200	0	95.5	70	130			
Arsenic	0.00507	0.00500	0.00500	0	101	70	130			
Barium	0.00485	0.0100	0.00500	0	97.1	70	130			
Beryllium	0.000841	0.00100	0.00100	0	84.1	70	130			
Cadmium	0.000934	0.00100	0.00100	0	93.4	70	130			
Calcium	0.0926	0.300	0.100	0	92.6	70	130			
Chromium	0.00515	0.00500	0.00500	0	103	70	130			
Cobalt	0.00522	0.00500	0.00500	0	104	70	130			
Lead	0.00106	0.00100	0.00100	0	106	70	130			
Lithium	0.00991	0.0100	0.0100	0	99.1	70	130			
Molybdenum	0.00499	0.00500	0.00500	0	99.7	70	130			
Selenium	0.00504	0.00500	0.00500	0	101	70	130			
Thallium	0.000974	0.00150	0.00100	0	97.4	70	130			

Sample ID **CCV12-161013**	Batch ID: **R88546**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_161013C**	Analysis Date: **10/13/2016 8:59:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.198	0.00250	0.200	0	99.0	90	110			
Arsenic	0.206	0.00500	0.200	0	103	90	110			
Barium	0.200	0.0100	0.200	0	99.8	90	110			
Beryllium	0.203	0.00100	0.200	0	102	90	110			
Cadmium	0.200	0.00100	0.200	0	99.8	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

Sample ID	CCV12-161013	Batch ID:	R88546	TestNo:	SW6020A	Units:	mg/L
SampType:	CCV	Run ID:	ICP-MS4_161013C	Analysis Date:	10/13/2016 8:59:00 PM	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.69	0.300	5.00	0	93.7	90	110			
Chromium	0.202	0.00500	0.200	0	101	90	110			
Cobalt	0.205	0.00500	0.200	0	102	90	110			
Lead	0.194	0.00100	0.200	0	96.9	90	110			
Lithium	0.202	0.0100	0.200	0	101	90	110			
Molybdenum	0.195	0.00500	0.200	0	97.3	90	110			
Selenium	0.204	0.00500	0.200	0	102	90	110			
Thallium	0.191	0.00150	0.200	0	95.5	90	110			

Sample ID	LCVL12-161013	Batch ID:	R88546	TestNo:	SW6020A	Units:	mg/L
SampType:	LCVL	Run ID:	ICP-MS4_161013C	Analysis Date:	10/13/2016 9:03:00 PM	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00199	0.00250	0.00200	0	99.3	70	130			
Arsenic	0.00511	0.00500	0.00500	0	102	70	130			
Barium	0.00485	0.0100	0.00500	0	96.9	70	130			
Beryllium	0.00103	0.00100	0.00100	0	103	70	130			
Cadmium	0.000951	0.00100	0.00100	0	95.1	70	130			
Calcium	0.0804	0.300	0.100	0	80.4	70	130			
Chromium	0.00511	0.00500	0.00500	0	102	70	130			
Cobalt	0.00507	0.00500	0.00500	0	101	70	130			
Lead	0.000907	0.00100	0.00100	0	90.7	70	130			
Lithium	0.0107	0.0100	0.0100	0	107	70	130			
Molybdenum	0.00483	0.00500	0.00500	0	96.5	70	130			
Selenium	0.00582	0.00500	0.00500	0	116	70	130			
Thallium	0.000973	0.00150	0.00100	0	97.3	70	130			

Sample ID	CCV13-161013	Batch ID:	R88546	TestNo:	SW6020A	Units:	mg/L
SampType:	CCV	Run ID:	ICP-MS4_161013C	Analysis Date:	10/13/2016 10:01:00 P	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.204	0.00250	0.200	0	102	90	110			
Arsenic	0.210	0.00500	0.200	0	105	90	110			
Barium	0.201	0.0100	0.200	0	101	90	110			
Beryllium	0.204	0.00100	0.200	0	102	90	110			
Cadmium	0.202	0.00100	0.200	0	101	90	110			
Calcium	4.86	0.300	5.00	0	97.1	90	110			
Chromium	0.203	0.00500	0.200	0	102	90	110			
Cobalt	0.200	0.00500	0.200	0	99.9	90	110			
Lead	0.197	0.00100	0.200	0	98.5	90	110			
Lithium	0.203	0.0100	0.200	0	102	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_161013C

Sample ID **CCV13-161013**	Batch ID: **R88546**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_161013C**	Analysis Date: **10/13/2016 10:01:00 P**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Molybdenum	0.192	0.00500	0.200	0	96.2	90	110			
Selenium	0.207	0.00500	0.200	0	103	90	110			
Thallium	0.194	0.00150	0.200	0	97.1	90	110			

Sample ID **LCVL13-161013**	Batch ID: **R88546**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_161013C**	Analysis Date: **10/13/2016 10:05:00 P**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00228	0.00250	0.00200	0	114	70	130			
Arsenic	0.00557	0.00500	0.00500	0	111	70	130			
Barium	0.00486	0.0100	0.00500	0	97.2	70	130			
Beryllium	0.000879	0.00100	0.00100	0	87.9	70	130			
Cadmium	0.000970	0.00100	0.00100	0	97.0	70	130			
Calcium	0.0833	0.300	0.100	0	83.3	70	130			
Chromium	0.00512	0.00500	0.00500	0	102	70	130			
Cobalt	0.00518	0.00500	0.00500	0	104	70	130			
Lead	0.000911	0.00100	0.00100	0	91.1	70	130			
Lithium	0.0106	0.0100	0.0100	0	106	70	130			
Molybdenum	0.00481	0.00500	0.00500	0	96.1	70	130			
Selenium	0.00621	0.00500	0.00500	0	124	70	130			
Thallium	0.000988	0.00150	0.00100	0	98.8	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_161018B

The QC data in batch 77470 applies to the following samples: 1610028-01A, 1610028-02A, 1610028-03A, 1610028-04A, 1610028-05A, 1610028-06A, 1610028-07A, 1610028-08A, 1610028-09A, 1610028-10A, 1610028-11A

Sample ID **MB-77470** Batch ID: **77470** TestNo: **SW6020A** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS4_161018B** Analysis Date: **10/18/2016 2:12:00 PM** Prep Date: **10/7/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.000800	0.00250								
Arsenic	<0.00200	0.00500								
Barium	<0.00300	0.0100								
Beryllium	<0.000300	0.00100								
Boron	<0.0100	0.0300								
Cadmium	<0.000300	0.00100								
Calcium	<0.100	0.300								
Chromium	<0.00200	0.00500								
Cobalt	<0.00300	0.00500								
Lead	<0.000300	0.00100								
Lithium	<0.00500	0.0100								
Molybdenum	<0.00200	0.00500								
Selenium	<0.00200	0.00500								
Thallium	<0.000500	0.00150								

Sample ID **LCS-77470** Batch ID: **77470** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS4_161018B** Analysis Date: **10/18/2016 2:14:00 PM** Prep Date: **10/7/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.200	0.00250	0.200	0	99.8	80	120			
Arsenic	0.204	0.00500	0.200	0	102	80	120			
Barium	0.200	0.0100	0.200	0	100	80	120			
Beryllium	0.202	0.00100	0.200	0	101	80	120			
Boron	0.187	0.0300	0.200	0	93.6	80	120			
Cadmium	0.199	0.00100	0.200	0	99.3	80	120			
Calcium	4.88	0.300	5.00	0	97.7	80	120			
Chromium	0.209	0.00500	0.200	0	105	80	120			
Cobalt	0.206	0.00500	0.200	0	103	80	120			
Lead	0.200	0.00100	0.200	0	100	80	120			
Lithium	0.199	0.0100	0.200	0	99.4	80	120			
Molybdenum	0.199	0.00500	0.200	0	99.6	80	120			
Selenium	0.202	0.00500	0.200	0	101	80	120			
Thallium	0.203	0.00150	0.200	0	102	80	120			

Sample ID **LCSD-77470** Batch ID: **77470** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS4_161018B** Analysis Date: **10/18/2016 2:16:00 PM** Prep Date: **10/7/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.199	0.00250	0.200	0	99.5	80	120	0.269	15	

Qualifiers:

B	Analyte detected in the associated Method Blank
J	Analyte detected between MDL and RL
ND	Not Detected at the Method Detection Limit
RL	Reporting Limit
J	Analyte detected between SDL and RL
DF	Dilution Factor
MDL	Method Detection Limit
R	RPD outside accepted control limits
S	Spike Recovery outside control limits
N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_161018B

Sample ID **LCSD-77470**	Batch ID: **77470**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCSD**	Run ID: **ICP-MS4_161018B**	Analysis Date: **10/18/2016 2:16:00 PM**	Prep Date: **10/7/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.200	0.00500	0.200	0	100	80	120	1.80	15	
Barium	0.195	0.0100	0.200	0	97.5	80	120	2.46	15	
Beryllium	0.199	0.00100	0.200	0	99.6	80	120	1.11	15	
Boron	0.193	0.0300	0.200	0	96.6	80	120	3.22	15	
Cadmium	0.197	0.00100	0.200	0	98.3	80	120	1.02	15	
Calcium	4.95	0.300	5.00	0	98.9	80	120	1.25	15	
Chromium	0.207	0.00500	0.200	0	104	80	120	0.838	15	
Cobalt	0.200	0.00500	0.200	0	100	80	120	2.66	15	
Lead	0.201	0.00100	0.200	0	100	80	120	0.143	15	
Lithium	0.194	0.0100	0.200	0	96.9	80	120	2.60	15	
Molybdenum	0.196	0.00500	0.200	0	98.0	80	120	1.54	15	
Selenium	0.204	0.00500	0.200	0	102	80	120	1.21	15	
Thallium	0.204	0.00150	0.200	0	102	80	120	0.431	15	

Sample ID **1610029-03A SD**	Batch ID: **77470**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **SD**	Run ID: **ICP-MS4_161018B**	Analysis Date: **10/18/2016 2:22:00 PM**	Prep Date: **10/7/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.00400	0.0125	0	0				0	10	
Arsenic	<0.0100	0.0250	0	0				0	10	
Barium	0.0847	0.0500	0	0.0824				2.79	10	
Beryllium	<0.00150	0.00500	0	0				0	10	
Cadmium	<0.00150	0.00500	0	0				0	10	
Calcium	203	1.50	0	196				3.72	10	
Chromium	<0.0100	0.0250	0	0				0	10	
Cobalt	<0.0150	0.0250	0	0				0	10	
Lead	<0.00150	0.00500	0	0				0	10	
Lithium	0.0546	0.0500	0	0.0502				8.39	10	
Molybdenum	<0.0100	0.0250	0	0.00530				0	10	
Selenium	<0.0100	0.0250	0	0				0	10	
Thallium	<0.00250	0.00750	0	0				0	10	

Sample ID **1610029-03A PDS**	Batch ID: **77470**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS4_161018B**	Analysis Date: **10/18/2016 2:42:00 PM**	Prep Date: **10/7/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.199	0.00250	0.200	0	99.4	80	120			
Arsenic	0.194	0.00500	0.200	0	97.1	80	120			
Barium	0.272	0.0100	0.200	0.0824	95.0	80	120			
Beryllium	0.186	0.00100	0.200	0	92.8	80	120			
Cadmium	0.183	0.00100	0.200	0	91.6	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_161018B

Sample ID **1610029-03A PDS**	Batch ID: **77470**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS4_161018B**	Analysis Date: **10/18/2016 2:42:00 PM**	Prep Date: **10/7/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	190	0.300	5.00	196	-118	80	120			S
Chromium	0.197	0.00500	0.200	0	98.7	80	120			
Cobalt	0.185	0.00500	0.200	0	92.6	80	120			
Lead	0.191	0.00100	0.200	0	95.5	80	120			
Lithium	0.217	0.0100	0.200	0.0502	83.6	80	120			
Molybdenum	0.196	0.00500	0.200	0.00530	95.2	80	120			
Selenium	0.188	0.00500	0.200	0	93.9	80	120			
Thallium	0.194	0.00150	0.200	0	97.1	80	120			

Sample ID **1610029-03A MS**	Batch ID: **77470**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS4_161018B**	Analysis Date: **10/18/2016 2:44:00 PM**	Prep Date: **10/7/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.199	0.00250	0.200	0	99.7	80	120			
Arsenic	0.205	0.00500	0.200	0	103	80	120			
Barium	0.277	0.0100	0.200	0.0824	97.5	80	120			
Beryllium	0.192	0.00100	0.200	0	96.0	80	120			
Boron	1.01	0.0300	0.200	0.806	101	80	120			
Cadmium	0.190	0.00100	0.200	0	95.0	80	120			
Calcium	199	0.300	5.00	196	73.5	80	120			S
Chromium	0.201	0.00500	0.200	0	101	80	120			
Cobalt	0.192	0.00500	0.200	0	96.0	80	120			
Lead	0.204	0.00100	0.200	0	102	80	120			
Lithium	0.232	0.0100	0.200	0.0502	91.1	80	120			
Molybdenum	0.205	0.00500	0.200	0.00530	99.7	80	120			
Selenium	0.198	0.00500	0.200	0	98.9	80	120			
Thallium	0.210	0.00150	0.200	0	105	80	120			

Sample ID **1610029-03A MSD**	Batch ID: **77470**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS4_161018B**	Analysis Date: **10/18/2016 2:46:00 PM**	Prep Date: **10/7/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.202	0.00250	0.200	0	101	80	120	1.30	15	
Arsenic	0.205	0.00500	0.200	0	103	80	120	0.045	15	
Barium	0.282	0.0100	0.200	0.0824	99.7	80	120	1.57	15	
Beryllium	0.193	0.00100	0.200	0	96.6	80	120	0.671	15	
Boron	1.03	0.0300	0.200	0.806	112	80	120	2.22	15	
Cadmium	0.192	0.00100	0.200	0	95.8	80	120	0.762	15	
Calcium	200	0.300	5.00	196	74.6	80	120	0.026	15	S
Chromium	0.201	0.00500	0.200	0	101	80	120	0.002	15	
Cobalt	0.192	0.00500	0.200	0	96.1	80	120	0.068	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_161018B

Sample ID **1610029-03A MSD**	Batch ID: **77470**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS4_161018B**	Analysis Date: **10/18/2016 2:46:00 PM**	Prep Date: **10/7/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	0.204	0.00100	0.200	0	102	80	120	0.049	15	
Lithium	0.230	0.0100	0.200	0.0502	90.1	80	120	0.861	15	
Molybdenum	0.208	0.00500	0.200	0.00530	101	80	120	1.61	15	
Selenium	0.200	0.00500	0.200	0	99.8	80	120	0.939	15	
Thallium	0.209	0.00150	0.200	0	104	80	120	0.438	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_161018B

Sample ID **ICV-161018**	Batch ID: **R88599**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS4_161018B**	Analysis Date: **10/18/2016 1:01:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.103	0.00250	0.100	0	103	90	110			
Arsenic	0.100	0.00500	0.100	0	100	90	110			
Barium	0.100	0.0100	0.100	0	100	90	110			
Beryllium	0.103	0.00100	0.100	0	103	90	110			
Boron	0.101	0.0300	0.100	0	101	90	110			
Cadmium	0.0989	0.00100	0.100	0	98.9	90	110			
Calcium	2.46	0.300	2.50	0	98.4	90	110			
Chromium	0.108	0.00500	0.100	0	108	90	110			
Cobalt	0.104	0.00500	0.100	0	104	90	110			
Lead	0.105	0.00100	0.100	0	105	90	110			
Lithium	0.0955	0.0100	0.100	0	95.5	90	110			
Molybdenum	0.0982	0.00500	0.100	0	98.2	90	110			
Selenium	0.101	0.00500	0.100	0	101	90	110			
Thallium	0.105	0.00150	0.100	0	105	90	110			

Sample ID **LCVL-161018**	Batch ID: **R88599**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_161018B**	Analysis Date: **10/18/2016 1:03:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00236	0.00250	0.00200	0	118	70	130			
Arsenic	0.00523	0.00500	0.00500	0	105	70	130			
Barium	0.00499	0.0100	0.00500	0	99.7	70	130			
Beryllium	0.00111	0.00100	0.00100	0	111	70	130			
Boron	0.0246	0.0300	0.0200	0	123	70	130			
Cadmium	0.00109	0.00100	0.00100	0	109	70	130			
Calcium	0.104	0.300	0.100	0	104	70	130			
Chromium	0.00551	0.00500	0.00500	0	110	70	130			
Cobalt	0.00531	0.00500	0.00500	0	106	70	130			
Lead	0.00110	0.00100	0.00100	0	110	70	130			
Lithium	0.0111	0.0100	0.0100	0	111	70	130			
Molybdenum	0.00541	0.00500	0.00500	0	108	70	130			
Selenium	0.00607	0.00500	0.00500	0	121	70	130			
Thallium	0.00111	0.00150	0.00100	0	111	70	130			

Sample ID **CCV1-161018**	Batch ID: **R88599**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_161018B**	Analysis Date: **10/18/2016 1:41:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.205	0.00250	0.200	0	103	90	110			
Arsenic	0.207	0.00500	0.200	0	104	90	110			
Barium	0.203	0.0100	0.200	0	102	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_161018B

Sample ID **CCV1-161018**	Batch ID: **R88599**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_161018B**	Analysis Date: **10/18/2016 1:41:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.206	0.00100	0.200	0	103	90	110			
Boron	0.201	0.0300	0.200	0	100	90	110			
Cadmium	0.205	0.00100	0.200	0	103	90	110			
Calcium	4.81	0.300	5.00	0	96.2	90	110			
Chromium	0.211	0.00500	0.200	0	105	90	110			
Cobalt	0.207	0.00500	0.200	0	104	90	110			
Lead	0.203	0.00100	0.200	0	102	90	110			
Lithium	0.196	0.0100	0.200	0	98.2	90	110			
Molybdenum	0.204	0.00500	0.200	0	102	90	110			
Selenium	0.211	0.00500	0.200	0	106	90	110			
Thallium	0.206	0.00150	0.200	0	103	90	110			

Sample ID **LCVL1-161018**	Batch ID: **R88599**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_161018B**	Analysis Date: **10/18/2016 1:56:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00196	0.00250	0.00200	0	98.2	70	130			
Arsenic	0.00530	0.00500	0.00500	0	106	70	130			
Barium	0.00502	0.0100	0.00500	0	100	70	130			
Beryllium	0.000980	0.00100	0.00100	0	98.0	70	130			
Boron	0.0212	0.0300	0.0200	0	106	70	130			
Cadmium	0.000980	0.00100	0.00100	0	98.0	70	130			
Calcium	0.103	0.300	0.100	0	103	70	130			
Chromium	0.00552	0.00500	0.00500	0	110	70	130			
Cobalt	0.00523	0.00500	0.00500	0	105	70	130			
Lead	0.00106	0.00100	0.00100	0	106	70	130			
Lithium	0.0103	0.0100	0.0100	0	103	70	130			
Molybdenum	0.00490	0.00500	0.00500	0	98.0	70	130			
Selenium	0.00558	0.00500	0.00500	0	112	70	130			
Thallium	0.00103	0.00150	0.00100	0	103	70	130			

Sample ID **CCV2-161018**	Batch ID: **R88599**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_161018B**	Analysis Date: **10/18/2016 3:11:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.208	0.00250	0.200	0	104	90	110			
Arsenic	0.211	0.00500	0.200	0	105	90	110			
Barium	0.206	0.0100	0.200	0	103	90	110			
Beryllium	0.210	0.00100	0.200	0	105	90	110			
Boron	0.214	0.0300	0.200	0	107	90	110			
Cadmium	0.207	0.00100	0.200	0	104	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_161018B

Sample ID **CCV2-161018**	Batch ID: **R88599**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_161018B**	Analysis Date: **10/18/2016 3:11:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.93	0.300	5.00	0	98.7	90	110			
Chromium	0.218	0.00500	0.200	0	109	90	110			
Cobalt	0.210	0.00500	0.200	0	105	90	110			
Lead	0.211	0.00100	0.200	0	105	90	110			
Lithium	0.204	0.0100	0.200	0	102	90	110			
Molybdenum	0.208	0.00500	0.200	0	104	90	110			
Selenium	0.213	0.00500	0.200	0	107	90	110			
Thallium	0.213	0.00150	0.200	0	106	90	110			

Sample ID **LCVL2-161018**	Batch ID: **R88599**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_161018B**	Analysis Date: **10/18/2016 3:26:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00205	0.00250	0.00200	0	103	70	130			
Arsenic	0.00536	0.00500	0.00500	0	107	70	130			
Barium	0.00523	0.0100	0.00500	0	105	70	130			
Beryllium	0.00102	0.00100	0.00100	0	102	70	130			
Boron	0.0224	0.0300	0.0200	0	112	70	130			
Cadmium	0.00108	0.00100	0.00100	0	108	70	130			
Calcium	0.103	0.300	0.100	0	103	70	130			
Chromium	0.00550	0.00500	0.00500	0	110	70	130			
Cobalt	0.00519	0.00500	0.00500	0	104	70	130			
Lead	0.000995	0.00100	0.00100	0	99.5	70	130			
Lithium	0.00991	0.0100	0.0100	0	99.1	70	130			
Molybdenum	0.00508	0.00500	0.00500	0	102	70	130			
Selenium	0.00538	0.00500	0.00500	0	108	70	130			
Thallium	0.00104	0.00150	0.00100	0	104	70	130			

Sample ID **CCV3-161008**	Batch ID: **R88599**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_161018B**	Analysis Date: **10/18/2016 3:52:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.210	0.00250	0.200	0	105	90	110			
Arsenic	0.216	0.00500	0.200	0	108	90	110			
Barium	0.209	0.0100	0.200	0	105	90	110			
Beryllium	0.206	0.00100	0.200	0	103	90	110			
Boron	0.207	0.0300	0.200	0	103	90	110			
Cadmium	0.209	0.00100	0.200	0	104	90	110			
Calcium	4.98	0.300	5.00	0	99.5	90	110			
Chromium	0.216	0.00500	0.200	0	108	90	110			
Cobalt	0.209	0.00500	0.200	0	105	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_161018B

Sample ID **CCV3-161008**	Batch ID: **R88599**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_161018B**	Analysis Date: **10/18/2016 3:52:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	0.210	0.00100	0.200	0	105	90	110			
Lithium	0.198	0.0100	0.200	0	98.8	90	110			
Molybdenum	0.208	0.00500	0.200	0	104	90	110			
Selenium	0.215	0.00500	0.200	0	107	90	110			
Thallium	0.213	0.00150	0.200	0	106	90	110			

Sample ID **LCVL3-161018**	Batch ID: **R88599**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_161018B**	Analysis Date: **10/18/2016 4:00:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00208	0.00250	0.00200	0	104	70	130			
Arsenic	0.00526	0.00500	0.00500	0	105	70	130			
Barium	0.00536	0.0100	0.00500	0	107	70	130			
Beryllium	0.00110	0.00100	0.00100	0	110	70	130			
Boron	0.0239	0.0300	0.0200	0	120	70	130			
Cadmium	0.00101	0.00100	0.00100	0	101	70	130			
Calcium	0.105	0.300	0.100	0	105	70	130			
Chromium	0.00531	0.00500	0.00500	0	106	70	130			
Cobalt	0.00523	0.00500	0.00500	0	105	70	130			
Lead	0.00102	0.00100	0.00100	0	102	70	130			
Lithium	0.00972	0.0100	0.0100	0	97.2	70	130			
Molybdenum	0.00530	0.00500	0.00500	0	106	70	130			
Selenium	0.00564	0.00500	0.00500	0	113	70	130			
Thallium	0.00105	0.00150	0.00100	0	105	70	130			

Sample ID **CCV4-161018**	Batch ID: **R88599**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_161018B**	Analysis Date: **10/18/2016 4:25:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.212	0.00250	0.200	0	106	90	110			
Arsenic	0.217	0.00500	0.200	0	109	90	110			
Barium	0.210	0.0100	0.200	0	105	90	110			
Beryllium	0.211	0.00100	0.200	0	105	90	110			
Boron	0.216	0.0300	0.200	0	108	90	110			
Cadmium	0.211	0.00100	0.200	0	106	90	110			
Calcium	4.97	0.300	5.00	0	99.4	90	110			
Chromium	0.217	0.00500	0.200	0	109	90	110			
Cobalt	0.214	0.00500	0.200	0	107	90	110			
Lead	0.209	0.00100	0.200	0	105	90	110			
Lithium	0.203	0.0100	0.200	0	101	90	110			
Molybdenum	0.211	0.00500	0.200	0	105	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_161018B

Sample ID **CCV4-161018**	Batch ID: **R88599**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_161018B**	Analysis Date: **10/18/2016 4:25:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Selenium	0.217	0.00500	0.200	0	109	90	110			
Thallium	0.213	0.00150	0.200	0	107	90	110			

Sample ID **LCVL4-161018**	Batch ID: **R88599**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_161018B**	Analysis Date: **10/18/2016 4:47:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00204	0.00250	0.00200	0	102	70	130			
Arsenic	0.00547	0.00500	0.00500	0	109	70	130			
Barium	0.00528	0.0100	0.00500	0	106	70	130			
Beryllium	0.00106	0.00100	0.00100	0	106	70	130			
Boron	0.0185	0.0300	0.0200	0	92.6	70	130			
Cadmium	0.00105	0.00100	0.00100	0	105	70	130			
Calcium	0.107	0.300	0.100	0	107	70	130			
Chromium	0.00545	0.00500	0.00500	0	109	70	130			
Cobalt	0.00525	0.00500	0.00500	0	105	70	130			
Lead	0.000992	0.00100	0.00100	0	99.2	70	130			
Lithium	0.00998	0.0100	0.0100	0	99.8	70	130			
Molybdenum	0.00504	0.00500	0.00500	0	101	70	130			
Selenium	0.00621	0.00500	0.00500	0	124	70	130			
Thallium	0.00104	0.00150	0.00100	0	104	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_161011A

The QC data in batch 77511 applies to the following samples: 1610028-01D, 1610028-02D, 1610028-03D, 1610028-04D, 1610028-05D, 1610028-06D, 1610028-07D, 1610028-08D, 1610028-09D, 1610028-10D, 1610028-11D, 1610028-12D

Sample ID **MB-77511** Batch ID: **77511** TestNo: **E300** Units: **mg/L**
SampType: **MBLK** Run ID: **IC2_161011A** Analysis Date: **10/11/2016 9:44:27 AM** Prep Date: **10/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	<0.300	1.00								
Fluoride	<0.100	0.400								
Sulfate	<1.00	3.00								

Sample ID **LCS-77511** Batch ID: **77511** TestNo: **E300** Units: **mg/L**
SampType: **LCS** Run ID: **IC2_161011A** Analysis Date: **10/11/2016 9:59:04 AM** Prep Date: **10/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.83	1.00	10.00	0	98.3	90	110			
Fluoride	3.80	0.400	4.000	0	95.0	90	110			
Sulfate	29.6	3.00	30.00	0	98.6	90	110			

Sample ID **LCSD-77511** Batch ID: **77511** TestNo: **E300** Units: **mg/L**
SampType: **LCSD** Run ID: **IC2_161011A** Analysis Date: **10/11/2016 10:13:40 A** Prep Date: **10/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.89	1.00	10.00	0	98.9	90	110	0.640	20	
Fluoride	3.91	0.400	4.000	0	97.8	90	110	2.90	20	
Sulfate	29.7	3.00	30.00	0	99.0	90	110	0.372	20	

Sample ID **1610068-01AMS** Batch ID: **77511** TestNo: **E300** Units: **mg/L**
SampType: **MS** Run ID: **IC2_161011A** Analysis Date: **10/11/2016 3:51:41 PM** Prep Date: **10/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	327	10.0	200.0	122.6	102	90	110			
Fluoride	200	4.00	200.0	0	100	90	110			
Sulfate	251	30.0	200.0	59.04	95.9	90	110			

Sample ID **1610068-01AMSD** Batch ID: **77511** TestNo: **E300** Units: **mg/L**
SampType: **MSD** Run ID: **IC2_161011A** Analysis Date: **10/11/2016 4:06:18 PM** Prep Date: **10/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	326	10.0	200.0	122.6	102	90	110	0.241	20	
Fluoride	201	4.00	200.0	0	100	90	110	0.448	20	
Sulfate	245	30.0	200.0	59.04	92.9	90	110	2.45	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_161011A

Sample ID **1610068-02AMS**	Batch ID: **77511**	TestNo: **E300**	Units: **mg/L**
SampType: **MS**	Run ID: **IC2_161011A**	Analysis Date: **10/11/2016 4:20:54 PM**	Prep Date: **10/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	336	10.0	200.0	128.1	104	90	110			
Fluoride	203	4.00	200.0	0	101	90	110			
Sulfate	241	30.0	200.0	48.89	96.0	90	110			

Sample ID **1610068-02AMSD**	Batch ID: **77511**	TestNo: **E300**	Units: **mg/L**
SampType: **MSD**	Run ID: **IC2_161011A**	Analysis Date: **10/11/2016 4:35:31 PM**	Prep Date: **10/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	329	10.0	200.0	128.1	100	90	110	2.13	20	
Fluoride	203	4.00	200.0	0	102	90	110	0.308	20	
Sulfate	241	30.0	200.0	48.89	95.9	90	110	0.047	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

Sample ID **ICV-161011**	Batch ID: **R88515**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC2_161011A**	Analysis Date: **10/11/2016 9:06:57 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	25.0	1.00	25.00	0	99.9	90	110			
Fluoride	9.70	0.400	10.00	0	97.0	90	110			
Sulfate	75.2	3.00	75.00	0	100	90	110			

Sample ID **CCV1-161011**	Batch ID: **R88515**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_161011A**	Analysis Date: **10/11/2016 1:24:31 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.82	1.00	10.00	0	98.2	90	110			
Fluoride	3.94	0.400	4.000	0	98.4	90	110			
Sulfate	29.6	3.00	30.00	0	98.8	90	110			

Sample ID **CCV2-161011**	Batch ID: **R88515**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_161011A**	Analysis Date: **10/11/2016 6:03:10 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.83	1.00	10.00	0	98.3	90	110			
Fluoride	4.04	0.400	4.000	0	101	90	110			
Sulfate	29.7	3.00	30.00	0	99.1	90	110			

Sample ID **CCV3-161011**	Batch ID: **R88515**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_161011A**	Analysis Date: **10/12/2016 9:06:14 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.68	1.00	10.00	0	96.8	90	110			
Fluoride	3.70	0.400	4.000	0	92.4	90	110			
Sulfate	29.1	3.00	30.00	0	97.2	90	110			

Sample ID **CCV4-161011**	Batch ID: **R88515**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_161011A**	Analysis Date: **10/12/2016 11:16:08 A**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.92	1.00	10.00	0	99.2	90	110			
Fluoride	3.85	0.400	4.000	0	96.3	90	110			
Sulfate	29.7	3.00	30.00	0	98.9	90	110			

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_161006A

The QC data in batch 77460 applies to the following samples: 1610028-01D, 1610028-02D, 1610028-03D, 1610028-04D, 1610028-05D, 1610028-06D, 1610028-07D, 1610028-08D

Sample ID	**1610028-01D-DUP**	Batch ID:	**77460**	TestNo:	**M4500-H+ B**	Units:	**pH Units@19.3℃**
SampType:	**DUP**	Run ID:	**TITRATOR_161006A**	Analysis Date:	**10/6/2016 11:26:00 AM**	Prep Date:	**10/6/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.54	0	0	6.640				1.52	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_161006A

Sample ID	**ICV-161006**	Batch ID:	**R88423**	TestNo:	**M4500-H+ B**	Units:	**pH Units@21.5℃**
SampType:	**ICV**	Run ID:	**TITRATOR_161006A**	Analysis Date:	**10/6/2016 10:47:00 AM**	Prep Date:	**10/6/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	9.90	0	10.00	0	99.0	99	101			

Sample ID	**CCV1-161006**	Batch ID:	**R88423**	TestNo:	**M4500-H+ B**	Units:	**pH Units@21.2℃**
SampType:	**CCV**	Run ID:	**TITRATOR_161006A**	Analysis Date:	**10/6/2016 11:42:00 AM**	Prep Date:	**10/6/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.96	0	7.000	0	99.4	97.1	102.9			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_161007A

The QC data in batch 77467 applies to the following samples: 1610028-09D, 1610028-10D, 1610028-11D, 1610028-12D

Sample ID **1610028-09D-DUP**	Batch ID: **77467**	TestNo: **M4500-H+ B**	Units: **pH Units@18.2℃**
SampType: **DUP**	Run ID: **TITRATOR_161007A**	Analysis Date: **10/7/2016 9:39:00 AM**	Prep Date: **10/7/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.40	0	0	6.370				0.470	5	

Sample ID **1610036-07D-DUP**	Batch ID: **77467**	TestNo: **M4500-H+ B**	Units: **pH Units@17.9℃**
SampType: **DUP**	Run ID: **TITRATOR_161007A**	Analysis Date: **10/7/2016 10:05:00 AM**	Prep Date: **10/7/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.79	0	0	6.770				0.295	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_161007A

Sample ID	**ICV-161007**	Batch ID:	**R88450**	TestNo:	**M4500-H+ B**	Units:	**pH Units@21.6℃**
SampType:	**ICV**	Run ID:	**TITRATOR_161007A**	Analysis Date:	**10/7/2016 8:13:00 AM**	Prep Date:	**10/7/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	9.91	0	10.00	0	99.1	99	101			

Sample ID	**CCV1-161007**	Batch ID:	**R88450**	TestNo:	**M4500-H+ B**	Units:	**pH Units@21.3℃**
SampType:	**CCV**	Run ID:	**TITRATOR_161007A**	Analysis Date:	**10/7/2016 9:58:00 AM**	Prep Date:	**10/7/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.97	0	7.000	0	99.6	97.1	102.9			

Sample ID	**CCV2-161007**	Batch ID:	**R88450**	TestNo:	**M4500-H+ B**	Units:	**pH Units@21.1℃**
SampType:	**CCV**	Run ID:	**TITRATOR_161007A**	Analysis Date:	**10/7/2016 10:24:00 AM**	Prep Date:	**10/7/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.97	0	7.000	0	99.6	97.1	102.9			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: WC_161010A

The QC data in batch 77500 applies to the following samples: 1610028-01D, 1610028-02D

Sample ID	**MB-77500**	Batch ID:	**77500**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**WC_161010A**	Analysis Date:	**10/11/2016 8:47:00 AM**	Prep Date:	**10/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	<10.0	10.0								

Sample ID	**LCS-77500**	Batch ID:	**77500**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**WC_161010A**	Analysis Date:	**10/11/2016 8:47:00 AM**	Prep Date:	**10/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	764	10.0	745.6	0	102	90	113			

Sample ID	**1610028-01D-DUP**	Batch ID:	**77500**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_161010A**	Analysis Date:	**10/11/2016 8:47:00 AM**	Prep Date:	**10/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	2350	50.0	0	2290				2.59	5	

Sample ID	**1610047-05A-DUP**	Batch ID:	**77500**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_161010A**	Analysis Date:	**10/11/2016 8:47:00 AM**	Prep Date:	**10/10/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	12300	200	0	11780				3.99	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1610028
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: WC_161011B

The QC data in batch 77528 applies to the following samples: 1610028-03D, 1610028-04D, 1610028-05D, 1610028-06D, 1610028-07D, 1610028-08D, 1610028-09D, 1610028-10D, 1610028-11D, 1610028-12D

Sample ID	**MB-77528**	Batch ID:	**77528**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**WC_161011B**	Analysis Date:	**10/12/2016 8:41:00 AM**	Prep Date:	**10/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	<10.0	10.0								

Sample ID	**LCS-77528**	Batch ID:	**77528**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**WC_161011B**	Analysis Date:	**10/12/2016 8:41:00 AM**	Prep Date:	**10/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	751	10.0	745.6	0	101	90	113			

Sample ID	**1610028-03D-DUP**	Batch ID:	**77528**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_161011B**	Analysis Date:	**10/12/2016 8:41:00 AM**	Prep Date:	**10/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	447	10.0	0	436.0				2.49	5	

Sample ID	**1610058-14B-DUP**	Batch ID:	**77528**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_161011B**	Analysis Date:	**10/12/2016 8:41:00 AM**	Prep Date:	**10/11/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	3140	50.0	0	3065				2.42	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

Case Narrative

Lab No: 20160978

This report contains the analytical results for the 12 sample(s) received under chain of custody by ESC Lab Sciences on 10/10/2016 10:31:31 AM. These samples are associated with your 1609028 project.

The analytical results included in this report meet all applicable quality control procedure requirements except as noted below:

The test results in this report meet all NELAC requirements unless noted below:

All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client.

Results have been reviewed by the Director of Radiochemistry or their designees and is approved for release.

Observations / Nonconformances

Analytical Report

	Method	Result	DL	Units	Qual	Prep Date	Analysis Date	Analyst
Lab ID : 20160978-01								
Client ID : AX-24								
Date Sampled : 10/5/2016 9:50:00 AM								
Matrix : NPW								
		Radiochemical Analyses						
Combined Radium		2.83 +/- 1.14	0.768	pCi/l				
Radium-226	SM 7500 Ra B M*	0.643 +/- 0.294	0.268	pCi/l		10/26/16	10/28/16	RE
Radium-228	EPA 904*/9320*	2.19 +/- 0.848	0.500	pCi/l		10/21/16	10/26/16	JR
Lab ID : 20160978-02								
Client ID : AX-25								
Date Sampled : 10/5/2016 11:00:00 AM								
Matrix : NPW								
		Radiochemical Analyses						
Combined Radium		1.63 +/- 1.33	1.04	pCi/l				
Radium-226	SM 7500 Ra B M*	0.632 +/- 0.308	0.310	pCi/l		10/26/16	10/28/16	RE
Radium-228	EPA 904*/9320*	1.00 +/- 1.02	0.734	pCi/l		10/21/16	10/31/16	JR
Lab ID : 20160978-03								
Client ID : AX-22R								
Date Sampled : 10/5/2016 11:45:00 AM								
Matrix : NPW								
		Radiochemical Analyses						
Combined Radium		0.532 +/- 1.26	0.879	pCi/l				
Radium-226	SM 7500 Ra B M*	0.532 +/- 0.252	0.249	pCi/l		10/26/16	10/28/16	RE
Radium-228	EPA 904*/9320*	-0.620 +/- 1.01	0.630	pCi/l		10/21/16	10/26/16	JR
Lab ID : 20160978-04								
Client ID : AX-28								
Date Sampled : 10/5/2016 2:15:00 PM								
Matrix : NPW								
		Radiochemical Analyses						
Combined Radium		1.63 +/- 0.982	0.676	pCi/l				
Radium-226	SM 7500 Ra B M*	0.247 +/- 0.180	0.206	pCi/l		10/26/16	10/28/16	RE
Radium-228	EPA 904*/9320*	1.38 +/- 0.802	0.470	pCi/l		10/21/16	10/26/16	JR

Analytical Report

	Method	Result	DL	Units	Qual	Prep Date	Analysis Date	Analyst
Lab ID : 20160978-05								
Client ID : AXMW-1								
Date Sampled : 10/5/2016 3:05:00 PM								
Matrix : NPW								
		Radiochemical Analyses						
Combined Radium		2.57 +/- 1.11	0.631	pCi/l				
Radium-226	SM 7500 Ra B M*	0.713 +/- 0.197	0.081	pCi/l		11/02/16	11/07/16	AK
Radium-228	EPA 904*/9320*	1.86 +/- 0.911	0.550	pCi/l		10/21/16	10/26/16	JR
Lab ID : 20160978-06								
Client ID : AX-23								
Date Sampled : 10/5/2016 3:50:00 PM								
Matrix : NPW								
		Radiochemical Analyses						
Combined Radium		2.07 +/- 1.18	0.831	pCi/l				
Radium-226	SM 7500 Ra B M*	1.00 +/- 0.373	0.361	pCi/l		10/26/16	10/28/16	RE
Radium-228	EPA 904*/9320*	1.07 +/- 0.806	0.470	pCi/l		10/21/16	10/26/16	JR
Lab ID : 20160978-07								
Client ID : EB-01								
Date Sampled : 10/5/2016 9:05:00 AM								
Matrix : NPW								
		Radiochemical Analyses						
Combined Radium		1.23 +/- 1.06	0.800	pCi/l				
Radium-226	SM 7500 Ra B M*	0.461 +/- 0.303	0.364	pCi/l		10/26/16	10/28/16	RE
Radium-228	EPA 904*/9320*	0.770 +/- 0.752	0.436	pCi/l		10/21/16	10/26/16	JR
Lab ID : 20160978-08								
Client ID : AX-1								
Date Sampled : 10/5/2016								
Matrix : NPW								
		Radiochemical Analyses						
Combined Radium		2.78 +/- 0.976	0.551	pCi/l				
Radium-226	SM 7500 Ra B M*	0.911 +/- 0.249	0.144	pCi/l		11/02/16	11/07/16	AK
Radium-228	EPA 904*/9320*	1.87 +/- 0.727	0.407	pCi/l		10/21/16	10/26/16	JR

*NELAC Certified Parameter BDL = Below Detection Limit

Analytical Report

	Method	Result	DL	Units	Qual	Prep Date	Analysis Date	Analyst
Lab ID : 20160978-09								
Client ID : AX-29								
Date Sampled : 10/6/2016 10:30:00 AM								
Matrix : NPW								
		Radiochemical Analyses						
Combined Radium		0.785 +/- 1.20	0.724	pCi/l				
Radium-226	SM 7500 Ra B M*	0.622 +/- 0.190	0.120	pCi/l		11/02/16	11/07/16	AK
Radium-228	EPA 904*/9320*	0.163 +/- 1.01	0.604	pCi/l		10/21/16	10/26/16	JR
Lab ID : 20160978-10								
Client ID : AXMW-2								
Date Sampled : 10/6/2016 9:05:00 AM								
Matrix : NPW								
		Radiochemical Analyses						
Combined Radium		0.884 +/- 0.888	0.568	pCi/l				
Radium-226	SM 7500 Ra B M*	0.239 +/- 0.132	0.103	pCi/l		11/02/16	11/07/16	AK
Radium-228	EPA 904*/9320*	0.645 +/- 0.756	0.465	pCi/l		10/21/16	10/26/16	JR
Lab ID : 20160978-11								
Client ID : AX-27								
Date Sampled : 10/6/2016 11:10:00 AM								
Matrix : NPW								
		Radiochemical Analyses						
Combined Radium		2.18 +/- 1.42	1.06	pCi/l				
Radium-226	SM 7500 Ra B M*	0.889 +/- 0.402	0.417	pCi/l		10/26/16	10/28/16	RE
Radium-228	EPA 904*/9320*	1.29 +/- 1.02	0.638	pCi/l		10/21/16	10/26/16	JR
Lab ID : 20160978-12								
Client ID : AX-26								
Date Sampled : 10/6/2016 11:50:00 AM								
Matrix : NPW								
		Radiochemical Analyses						
Combined Radium		3.22 +/- 1.16	0.665	pCi/l				
Radium-226	SM 7500 Ra B M*	0.454 +/- 0.170	0.093	pCi/l		11/02/16	11/07/16	AK
Radium-228	EPA 904*/9320*	2.77 +/- 0.988	0.572	pCi/l		10/21/16	10/26/16	JR

QC Report

Parameter	Blank	LCS %REC	LCSD %REC	LCSD RPD	DUP RPD	RER, NAD or DER	MS %REC	MSD %REC	MSD RPD	Batch ID
Radium-226	-0.019	107.0			NC	0.357	123.0	115.0	6.4	R1153
Radium-226	0.053	103.0			NC	0.410	101.0	102.0	0.8	R1149
Radium-228	-0.091	89.4			NC	1.290	91.7	98.4	9.9	R3868

Lab Approval:

Ron Eidson
Director of Radiochemistry

*NELAC Certified Parameter BDL = Below Detection Limit

DHL Analytical, Inc.
2300 Double Creek Drive
Round Rock, TX 78664
TEL: *(512) 388-8222* FAX: *(512) 388-8229*

CHAIN-OF-CUSTODY REC

Work Order: 1610028

Subcontractor:

ESC Laboratory
311 North Aspen
Broken Arrow, Oklahoma 74012

TEL: (918) 251-2515
FAX:
Acct #: DHLRRTX

	Sample Id	Matrix	DHL#	Date Collected	Bottle Type	Requested Tests			
						E904.0	SM7500Ra-B M		
1	AX-24	Aqueous	-01B	10/05/16 09:50 AM	500HDPEHNO3	1			
	AX-24	Aqueous	-01C	10/05/16 09:50 AM	500HDPEHNO3		1		
2	AX-25	Aqueous	-02B	10/05/16 11:00 AM	500HDPEHNO3	1			
	AX-25	Aqueous	-02C	10/05/16 11:00 AM	500HDPEHNO3		1		
3	AX-22R	Aqueous	-03B	10/05/16 11:45 AM	500HDPEHNO3	1			
	AX-22R	Aqueous	-03C	10/05/16 11:45 AM	500HDPEHNO3		1		
4	AX-28	Aqueous	-04B	10/05/16 02:15 PM	500HDPEHNO3	1			
	AX-28	Aqueous	-04C	10/05/16 02:15 PM	500HDPEHNO3		1		
5	AXMW-1	Aqueous	-05B	10/05/16 03:05 PM	500HDPEHNO3	1			
	AXMW-1	Aqueous	-05C	10/05/16 03:05 PM	500HDPEHNO3		1		
6	AX-23	Aqueous	-06B	10/05/16 03:50 PM	500HDPEHNO3	1			
	AX-23	Aqueous	-06C	10/05/16 03:50 PM	500HDPEHNO3		1		
7	EB-01	Equip Blank	-07B	10/05/16 09:05 AM	500HDPEHNO3	1			
	EB-01	Equip Blank	-07C	10/05/16 09:05 AM	500HDPEHNO3		1		
8	AX-1	Aqueous	-08B	10/05/16	500HDPEHNO3	1			
	AX-1	Aqueous	-08C	10/05/16	500HDPEHNO3		1		
9	AX-29	Aqueous	-09B	10/06/16 10:30 AM	500HDPEHNO3	1			
	AX-29	Aqueous	-09C	10/06/16 10:30 AM	500HDPEHNO3		1		

General Comments:

Please analyze these samples with Normal Turnaround Time.
Report RA-226, Ra-228 & Combined per Specs DHLRRTX033116S.
Quality Control Package Needed: Standard - NELAC Rad Test compliant
Email to cac@dhlanalytical.com & dupont@dhlanalytical.com

25168
C86

		Date/Time		
Relinquished by:		10/06/16 1230	Received by:	Lorestan
Relinquished by:			Received by:	

DHL Analytical, Inc.
2300 Double Creek Drive
Round Rock, TX 78664
TEL: *(512) 388-8222* FAX: *(512) 388-8229*

CHAIN-OF-CUSTODY REC

Work Order: 1610028

Subcontractor:

ESC Laboratory
311 North Aspen
Broken Arrow, Oklahoma 74012

TEL: (918) 251-2515
FAX:
Acct #: DHLRRTX

	Sample Id	Matrix	DHL#	Date Collected	Bottle Type	Requested Tests			
						E904.0	SM7500Ra-B M		
10	AXMW-2	Aqueous	-10B	10/06/16 09:05 AM	500HDPEHNO3	1			
	AXMW-2	Aqueous	-10C	10/06/16 09:05 AM	500HDPEHNO3		1		
11	AX-27	Aqueous	-11B	10/06/16 11:10 AM	500HDPEHNO3	1			
	AX-27	Aqueous	-11C	10/06/16 11:10 AM	500HDPEHNO3		1		
12	AX-26	Aqueous	-12B	10/06/16 11:50 AM	500HDPEHNO3	1			
	AX-26	Aqueous	-12C	10/06/16 11:50 AM	500HDPEHNO3		1		

General Comments:

Please analyze these samples with Normal Turnaround Time.
Report RA-226, Ra-228 & Combined per Specs DHLRRTX033116S.
Quality Control Package Needed: Standard - NELAC Rad Test compliant
Email to cac@dhlanalytical.com & dupont@dhlanalytical.com

		Date/Time		
Relinquished by:		10/6/16 1730	**Received by:**	Logstar
Relinquished by:			**Received by:**	

SAMPLE LOGIN

Date Received: *10/10/2016 10:31:* Lab Number: 20160978

Sample Number	Client Sample ID	Matrix	Date Sampled	Container Type	Container Size	Preservation	Prese Upon
20160978-01 B	AX-24	NPW	10/05/16	Plastic	500 ml	HNO3, pH < 2	
20160978-01 A	AX-24	NPW	10/05/16	Plastic	500 ml	HNO3, pH < 2	
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160978-02 A	AX-25	NPW	10/05/16	Plastic	500 ml	HNO3, pH < 2	
20160978-02 B	AX-25	NPW	10/05/16	Plastic	500 ml	HNO3, pH < 2	
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160978-03 A	AX-22R	NPW	10/05/16	Plastic	500 ml	HNO3, pH < 2	
20160978-03 B	AX-22R	NPW	10/05/16	Plastic	500 ml	HNO3, pH < 2	
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160978-04 A	AX-28	NPW	10/05/16	Plastic	500 ml	HNO3, pH < 2	
20160978-04 B	AX-28	NPW	10/05/16	Plastic	500 ml	HNO3, pH < 2	
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160978-05 A	AXMW-1	NPW	10/05/16	Plastic	500 ml	HNO3, pH < 2	
20160978-05 B	AXMW-1	NPW	10/05/16	Plastic	500 ml	HNO3, pH < 2	
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160978-06 B	AX-23	NPW	10/05/16	Plastic	500 ml	HNO3, pH < 2	
20160978-06 A	AX-23	NPW	10/05/16	Plastic	500 ml	HNO3, pH < 2	
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20160978-07 B	EB-01	NPW	10/05/16	Plastic	500 ml	HNO3, pH < 2	
20160978-07 A	EB-01	NPW	10/05/16	Plastic	500 ml	HNO3, pH < 2	
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				

20160978-08 A	AX-1	NPW	10/05/16	Plastic	500 ml	HNO3, pH < 2
20160978-08 B	AX-1	NPW	10/05/16	Plastic	500 ml	HNO3, pH < 2
Radium-226			SM 7500 Ra B M*			
Radium-228			EPA 904*/9320*			
20160978-09 A	AX-29	NPW	10/06/16	Plastic	500 ml	HNO3, pH < 2
20160978-09 B	AX-29	NPW	10/06/16	Plastic	500 ml	HNO3, pH < 2
Radium-226			SM 7500 Ra B M*			
Radium-228			EPA 904*/9320*			
20160978-10 A	AXMW-2	NPW	10/06/16	Plastic	500 ml	HNO3, pH < 2
20160978-10 B	AXMW-2	NPW	10/06/16	Plastic	500 ml	HNO3, pH < 2
Radium-226			SM 7500 Ra B M*			
Radium-228			EPA 904*/9320*			
20160978-11 A	AX-27	NPW	10/06/16	Plastic	500 ml	HNO3, pH < 2
20160978-11 B	AX-27	NPW	10/06/16	Plastic	500 ml	HNO3, pH < 2
Radium-226			SM 7500 Ra B M*			
Radium-228			EPA 904*/9320*			
20160978-12 B	AX-26	NPW	10/06/16	Plastic	500 ml	HNO3, pH < 2
20160978-12 A	AX-26	NPW	10/06/16	Plastic	500 ml	HNO3, pH < 2
Radium-226			SM 7500 Ra B M*			
Radium-228			EPA 904*/9320*			

CONTAINER INSPECTION

Coolers 1 Custody Seals Broken 0 Temperature: Amb Ice Radiation Survey: <300 cpm

SAMPLE INSPECTION

Sample Seal Broken ✓ Chain of Custody Record ✓ Labels in Tact ✓ Radiation Survey Complete N/A

Anomalies Several labels had water damage and had to be paired together to identify
AxMW-2, AX-1, ED-01

Inspected By: _____ DATE 10/10/16

QA or Designee Review: _____ DATE _____

Sample Custodian Review: _____ DATE 10/10/16

Project Notes:

November 14, 2016

Will Vienne
Pastor, Behling & Wheeler
2201 Double Creek Dr #4004
Round Rock, Texas 78664
TEL: (512) 671-3434
FAX (512) 671-3446

Order No.: 1611030

RE: Sandow CCR

Dear Will Vienne:

DHL Analytical, Inc. received 2 sample(s) on 11/3/2016 for the analyses presented in the following report.

There were no problems with the analyses and all data met requirements of NELAC except where noted in the Case Narrative. All non-NELAC methods will be identified accordingly in the case narrative and all estimated uncertainties of test results are within method or EPA specifications.

If you have any questions regarding these tests results, please feel free to call. Thank you for using DHL Analytical.

Sincerely,

John DuPont
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-16-17

Table of Contents

DHL ANALYTICAL
2300 Double Creek Dr. ■ Round Rock, TX 78664
Phone (512) 388-8222 ■ FAX (512) 388-8229
Web: www.dhlanalytical.com
E-Mail: login@dhlanalytical.com

CLIENT: Pastor Behling & Wheeler
ADDRESS: 2201 Double Creek Dr Ste 4004 Round Rock, TX 78664
PHONE: 512-671-3434 FAX/E-MAIL: will.vienne@pbwllc.com
DATA REPORTED TO: Will Vienne
ADDITIONAL REPORT COPIES TO: Michelle.Hermiston@pbwllc.com

DATE: 11/2/16
PO #: [illegible] DHL WOR
PROJECT LOCATION OR NAME: Sando
CLENT PROJECT #: 5164E

Authorize 5% surcharge for TRRP Report? ❑ Yes ❑ No

S=SOIL W=WATER A=AIR L=LIQUID SE=SEDIMENT
P=PAINT SL=SLUDGE O=OTHER SO=SOLID

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	PRESERVATION: HCl	HNO_3	H_2SO_4 ❑ NaOH ❑	ICE	UNPRESERVED
AX-28	01	~~11/2/16~~ 11/3/16	11:00	W	P	1		X		X	
AX-B	02	~~11/2/16~~ 11/3/16	11:00	W	P	1		X		X	

ANALYSES: BTEX ❑ MTBE ❑ [METHOD 8021] TPH 1005 ❑ TPH 1006 ❑ HOLD 1006 ❑ GRO [METHOD 8015] ❑ DRO [METHOD 8105] ❑ VOC 8260 ❑ VOC 624 ❑ VOC 8260/5035 ❑ SVOC 8270 ❑ PAH 8270 ❑ HOLD PAH ❑ SVOC 625 ❑ 8270 PEST ❑ 625 PEST/PCB ❑ 608 PCB ❑ 8270 PCB ❑ 8270 O-P PEST ❑ 8082 PCB ❑ 8321 HERB ❑ T PHOS, AMMONIA ❑ METALS 6020 ❑ METALS 200.8 ❑ DISS. M RCRA ❑ TX11 ❑ PH ❑ HEX CHROM ❑ CHLORIDE ❑ TCLP-SVOC TC

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
[signature]	11/2/16 12:15	[signature]
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)

❑ DHL DISPOSAL @ $5.00 each ❑ Return

TURN AROUND TIME
RUSH ❑ CALL FIRST
1 DAY ❑ CALL FIRST
2 DAY ❑
NORMAL ☒
OTHER ❑ _____

LABORATORY
RECEIVING TE
CUSTODY SEA
CARRIER: ❑
❑ COURIER DE
☒ HAND DELIV

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name Pastor, Behling & Wheeler | Date Received: 11/3/2016

Work Order Number 1611030 | Received by JT

Checklist completed by: [signature] Signature | 11/3/2016 Date | Reviewed by (DL) Initials | 11/3/2016 Date

Carrier name Hand Delivered

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	8.7 °C
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH<2 acceptable upon receipt?	Yes ☑	No ☐	NA ☐ LOT # 8086
	Adjusted? NO		Checked by [signature]
Water - ph>9 (S) or ph>12 (CN) acceptable upon receipt?	Yes ☐	No ☐	NA ☑ LOT #
	Adjusted?		Checked by

Any No response must be detailed in the comments section below.

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

CLIENT: Pastor, Behling & Wheeler
Project: Sandow CCR
Lab Order: 1611030

CASE NARRATIVE

Samples were analyzed using the methods outlined in the following references:

Method SW6020A - Metals Analysis

LOG IN

The samples were received and log-in performed on 11/3/2016. A total of 1 sample was received and analyzed. The sample arrived in good condition and was properly packaged. Additional analysis was declined per the client on 11/14/2016. All method blanks, laboratory spikes, and/or matrix spikes met quality assurance objectives.

DHL Analytical, Inc.

Date: *14-Nov-16*

CLIENT: Pastor, Behling & Wheeler
Project: Sandow CCR
Lab Order: 1611030

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
1611030-01	AX-28		11/03/16 11:00 AM	11/3/2016
1611030-02	AX-B		11/03/16 11:00 AM	11/3/2016

& Wheeler

PREP DATES REPORT

Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
11/03/16 11:00 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/08/16 08:28 AM	77818

& Wheeler

ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	77818	1	11/08/16 03:23 PM	ICP-MS4_161108B

DHL Analytical, Inc.

Date: *14-Nov-16*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-28
Project:	Sandow CCR	**Lab ID:**	1611030-01
Project No:	5164E	**Collection Date:**	11/03/16 11:00 AM
Lab Order:	1611030	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **CVD**
Chromium	<0.00200	0.00200	0.00500		mg/L	1	11/08/16 03:23 PM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

CLIENT: Pastor, Behling & Wheeler
Work Order: 1611030
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_161108B

The QC data in batch 77818 applies to the following samples: 1611030-01A

Sample ID	**MB-77818**	Batch ID:	**77818**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**ICP-MS4_161108B**	Analysis Date:	**11/8/2016 2:59:00 PM**	Prep Date:	**11/8/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chromium	<0.00200	0.00500								

Sample ID	**LCS-77818**	Batch ID:	**77818**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**ICP-MS4_161108B**	Analysis Date:	**11/8/2016 3:01:00 PM**	Prep Date:	**11/8/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chromium	0.200	0.00500	0.200	0	100	80	120			

Sample ID	**LCSD-77818**	Batch ID:	**77818**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**ICP-MS4_161108B**	Analysis Date:	**11/8/2016 3:03:00 PM**	Prep Date:	**11/8/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chromium	0.200	0.00500	0.200	0	99.8	80	120	0.146	15	

Sample ID	**1610240-01A SD**	Batch ID:	**77818**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**SD**	Run ID:	**ICP-MS4_161108B**	Analysis Date:	**11/8/2016 3:07:00 PM**	Prep Date:	**11/8/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chromium	<0.0100	0.0250	0	0				0	10	

Sample ID	**1610240-01A PDS**	Batch ID:	**77818**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**PDS**	Run ID:	**ICP-MS4_161108B**	Analysis Date:	**11/8/2016 3:27:00 PM**	Prep Date:	**11/8/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chromium	0.202	0.00500	0.200	0	101	80	120			

Sample ID	**1610240-01A MS**	Batch ID:	**77818**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**ICP-MS4_161108B**	Analysis Date:	**11/8/2016 3:29:00 PM**	Prep Date:	**11/8/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chromium	0.193	0.00500	0.200	0	96.5	80	120			

Sample ID	**1610240-01A MSD**	Batch ID:	**77818**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**ICP-MS4_161108B**	Analysis Date:	**11/8/2016 3:31:00 PM**	Prep Date:	**11/8/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chromium	0.198	0.00500	0.200	0	98.9	80	120	2.51	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1611030
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_161108B

Sample ID	**ICV-161108**	Batch ID:	**R88896**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**ICP-MS4_161108B**	Analysis Date:	**11/8/2016 12:31:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chromium	0.108	0.00500	0.100	0	108	90	110			

Sample ID	**LCVL-161108**	Batch ID:	**R88896**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_161108B**	Analysis Date:	**11/8/2016 12:33:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chromium	0.00532	0.00500	0.00500	0	106	70	130			

Sample ID	**CCV2-161108**	Batch ID:	**R88896**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_161108B**	Analysis Date:	**11/8/2016 2:06:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chromium	0.208	0.00500	0.200	0	104	90	110			

Sample ID	**LCVL2-161108**	Batch ID:	**R88896**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_161108B**	Analysis Date:	**11/8/2016 2:28:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chromium	0.00535	0.00500	0.00500	0	107	70	130			

Sample ID	**CCV3-161108**	Batch ID:	**R88896**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_161108B**	Analysis Date:	**11/8/2016 4:00:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chromium	0.206	0.00500	0.200	0	103	90	110			

Sample ID	**LCVL3-161108**	Batch ID:	**R88896**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_161108B**	Analysis Date:	**11/8/2016 4:32:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chromium	0.00540	0.00500	0.00500	0	108	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

January 31, 2017

Will Vienne
Pastor, Behling & Wheeler
2201 Double Creek Dr #4004
Round Rock, Texas 78664
TEL: (512) 671-3434
FAX (512) 671-3446

Order No.: 1612246

RE: Sandow CCR

Dear Will Vienne:

DHL Analytical, Inc. received 12 sample(s) on 12/21/2016 for the analyses presented in the following report.

There were no problems with the analyses and all data met requirements of NELAC except where noted in the Case Narrative. All non-NELAC methods will be identified accordingly in the case narrative and all estimated uncertainties of test results are within method or EPA specifications.

If you have any questions regarding these tests results, please feel free to call. Thank you for using DHL Analytical.

Sincerely,

John DuPont
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-16-17

Table of Contents

DHL ANALYTICAL
2300 Double Creek Dr. ■ Round Rock, TX 78664
Phone (512) 388-8222 ■ FAX (512) 388-8229
Web: www.dhlanalytical.com
E-Mail: login@dhlanalytical.com

CHA

CLIENT: Pastor, Behling & Wheeler
ADDRESS: 2201 Double Creek Dr Ste 4004
PHONE: (512) 671-3434 FAX/E-MAIL:
DATA REPORTED TO: Will Vienne
ADDITIONAL REPORT COPIES TO: Karla Henson

DATE: 12/21/2016
PO #: DHL WORK ORD
PROJECT LOCATION OR NAME: Sandow C
CLENT PROJECT #: 5164E COL

Authorize 5% surcharge for TRRP Report? ☐ Yes ☑ No

S=SOIL W=WATER A=AIR L=LIQUID SE=SEDIMENT P=PAINT SL=SLUDGE O=OTHER SO=SOLID

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	PRESERVATION: HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESERVED
AX-24	01	12/21/16	10:50	W	P	4		X		X	
AX-25	02		11:50								
AX-22R	03		12:55								
AX-29	04		14:05								
AX-28	05		14:45								
AX-23	06		15:40								
EB 01	07		10:00								

ANALYSES: BTEX ☐ MTBE ☐ [METHOD 8021] | TPH 1005 ☐ TPH 1006 ☐ HOLD 1006 ☐ | GRO [METHOD 8015] ☐ DRO [METHOD 8105] ☐ | VOC 8260 ☐ VOC 624 ☐ VOC 8260/5035 ☐ | SVOC 8270 ☐ PAH 8270 ☐ HOLD PAH ☐ SVOC 625 ☐ | 8270 PEST ☐ 625 PEST/PCB ☐ 608 PCB ☐ 8270 PCB ☐ | 8270 O-P PEST ☐ 8082 PCB ☐ 8270 PCB ☐ | 8321 HERB ☐ T PHOS, AMMONIA ☐ | METALS 6020 ☐ METALS 200.8 ☐ DISS. METALS ☐ | RCRA ☐ TX11 ☐ | PH ☐ HEX CHROM ☐ ALKALINITY ☐ | CHLORIDE ☐ ANIONS | TCLP-SVOC ☐ VOC ☐ | TCLP-METALS ☐ | RCI ☐ FI

RELINQUISHED BY: (Signature) Jane Tauke DATE/TIME 12/21/2016 17:00 RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)

☐ DHL DISPOSAL @ $5.00 each ☐ Return

TURN AROUND TIME
RUSH ☐ CALL FIRST
1 DAY ☐ CALL FIRST
2 DAY ☐
NORMAL ☑
OTHER ☐ _____

LABORATORY USE O
RECEIVING TEMP: 1.
CUSTODY SEALS: ☐
CARRIER: ☐ LONE S
☐ COURIER DELIVERY
☒ HAND DELIVERED

DHL ANALYTICAL
2300 Double Creek Dr. ■ Round Rock, TX 78664
Phone (512) 388-8222 ■ FAX (512) 388-8229
Web: www.dhlanalytical.com
E-Mail: login@dhlanalytical.com

CHA

CLIENT: Pastor, Behling & Wheeler
ADDRESS: 2201 Double Creek Dr ste 1004
PHONE: (512)671-3434 FAX/E-MAIL:
DATA REPORTED TO: Will Vienne
ADDITIONAL REPORT COPIES TO: Karla Henson

DATE: 12/22/2016
PO #: DHL WORK ORD
PROJECT LOCATION OR NAME: Landow C
CLENT PROJECT #: SIU4E COL

Authorize 5% surcharge for TRRP Report? ☐ Yes ☑ No

S=SOIL W=WATER A=AIR L=LIQUID SE=SEDIMENT P=PAINT SL=SLUDGE O=OTHER SO=SOLID

PRESERVATION: HCl | HNO_3 | H_2SO_4 ☐ NaOH ☐ | ICE | UNPRESERVED

ANALYSES: BTEX ☐ MTBE ☐ (METHOD 8021) | TPH 1005 ☐ TPH 1006 ☐ HOLD 1006 ☐ | GRO (METHOD 8015) ☐ DRO (METHOD 8105) ☐ | VOC 8260 ☐ VOC 624 ☐ VOC 8260/5035 ☐ | SVOC 8270 ☐ PAH 8270 ☐ HOLD PAH ☐ SVOC 625 ☐ | 8270 PEST ☐ 625 PEST/PCB ☐ 608 PCB ☐ | 8270 O-P PEST ☐ 8082 PCB ☐ 8270 PCB ☐ | 8321 HERB ☐ T PHOS, AMMONIA ☐ | METALS 6020 ☐ METALS 200.8 ☐ DISS. METALS ☐ | RCRA ☐ TX11 ☐ | PH ☐ HEX CHROM ☐ ALKALINITY ☐ | CHLORIDE ☐ ANIONS | TCLP-SVOC ☐ VOC ☐ | TCLP-METALS ☐ | RCI ☐ FLA | TDS

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESERVED
AXMW-1	508	12/22/16	10:35	W	P	4		X		X	
AXMW-2	509	↓	12:35	↓	↓	↓		↓		↓	
AX-27	510		13:20								
AX-26	511		14:25								
MW-1	512	↓	-	↓	↓	↓		↓		↓	

RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)
12/22/16 16:00

RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)

RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)

TURN AROUND TIME
RUSH ☐ CALL FIRST
1 DAY ☐ CALL FIRST
2 DAY ☐
NORMAL ☒
OTHER ☐ _____

LABORATORY USE O
RECEIVING TEMP: 1.
CUSTODY SEALS: ☐
CARRIER: ☐ LONE S
☐ COURIER DELIVERY
☒ HAND DELIVERED

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name **Pastor, Behling & Wheeler**

Date Received: **12/21/2016**

Work Order Number **1612246**

Received by **JT**

Checklist completed by: Signature 12/21/2016 Date

Reviewed by Initials 12/21/2016 Date

Carrier name Hand Delivered

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	1.8 °C, 1.9
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH<2 acceptable upon receipt?	Yes ☑	No ☐	NA ☐ LOT # 8086
	Adjusted? no		Checked by
Water - ph>9 (S) or ph>12 (CN) acceptable upon receipt?	Yes ☐	No ☐	NA ☑ LOT #
	Adjusted?		Checked by

Any No response must be detailed in the comments section below.

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

DHL Analytical, Inc. **Date:** *31-Jan-17*

CLIENT: Pastor, Behling & Wheeler
Project: Sandow CCR
Lab Order: 1612246

CASE NARRATIVE

Samples were analyzed using the methods outlined in the following references:

Method SW6020A - Metals Analysis
Method SW7470A - Mercury Analysis
Method E300 - Anions Analysis
Method M4500-H+ B - pH of a Water Analysis
Method M2540C - TDS Analysis
Sub-contract - Radium-228 and Radium-226 analyses by methods E904/9320 and SM 7500 Ra B M. Analyzed at ESC Lab Sciences.

LOG IN

The samples were received and log-in performed on 12/21/16 and 12/27/17. A total of 12 samples were received. The samples arrived in good condition and were properly packaged.

METALS ANALYSIS

For Metals analysis performed on 1/7/17 the matrix spike and matrix spike duplicate recoveries were out of control limits for Calcium. These are flagged accordingly in the QC summary report. The sample selected for the matrix spike and matrix spike duplicate was from this work order. The LCS was within control limits for this analyte. No further corrective actions were taken.

For Metals analysis performed on 1/8/17 the PDS recovery was above control limits for Calcium. This is flagged accordingly. The serial dilution was within control limits for this analyte. No further corrective actions were taken.

For Metals analysis performed on 1/7/17 the RPD for the serial dilution was slightly above control limits for Boron. This is flagged accordingly. The PDS was within control limits for this analyte. No further corrective actions were taken.

ANIONS ANALYSIS

For Anions analysis performed on 12/29/16 Chloride was detected below the reporting in ICB-161229. All associated samples were either below detection limits for greater than 10 times the amount in the ICB. No further corrective actions were taken.

DHL Analytical, Inc.

Date: *31-Jan-17*

CLIENT: Pastor, Behling & Wheeler
Project: Sandow CCR
Lab Order: 1612246

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
1612246-01	AX-24		12/21/16 10:50 AM	12/21/2016
1612246-02	AX-25		12/21/16 11:50 AM	12/21/2016
1612246-03	AX-22R		12/21/16 12:55 PM	12/21/2016
1612246-04	AX-29		12/21/16 02:05 PM	12/21/2016
1612246-05	AX-28		12/21/16 02:45 PM	12/21/2016
1612246-06	AX-23		12/21/16 03:40 PM	12/21/2016
1612246-07	EB-01		12/21/16 10:00 AM	12/21/2016
1612246-08	AXMW-1		12/22/16 10:35 AM	12/22/2016
1612246-09	AXMW-2		12/22/16 12:35 PM	12/22/2016
1612246-10	AX-27		12/22/16 01:20 PM	12/22/2016
1612246-11	AX-26		12/22/16 02:25 PM	12/22/2016
1612246-12	MW-1		12/22/16	12/22/2016

& Wheeler

PREP DATES REPORT

Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
12/21/16 10:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/16 08:24 AM	78492
12/21/16 10:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/16 08:24 AM	78492
12/21/16 10:50 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	12/27/16 10:29 AM	78483
12/21/16 10:50 AM	Aqueous	E300	Anion Preparation	12/29/16 09:26 AM	78518
12/21/16 10:50 AM	Aqueous	E300	Anion Preparation	12/29/16 09:26 AM	78518
12/21/16 10:50 AM	Aqueous	M4500-H+ B	pH Preparation	12/23/16 09:27 AM	78459
12/21/16 10:50 AM	Aqueous	M2540C	TDS Preparation	12/22/16 03:42 PM	78447
12/21/16 11:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/16 08:24 AM	78492
12/21/16 11:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/16 08:24 AM	78492
12/21/16 11:50 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	12/27/16 10:29 AM	78483
12/21/16 11:50 AM	Aqueous	E300	Anion Preparation	12/29/16 09:26 AM	78518
12/21/16 11:50 AM	Aqueous	E300	Anion Preparation	12/29/16 09:26 AM	78518
12/21/16 11:50 AM	Aqueous	M4500-H+ B	pH Preparation	12/23/16 09:27 AM	78459
12/21/16 11:50 AM	Aqueous	M2540C	TDS Preparation	12/22/16 03:42 PM	78447
12/21/16 12:55 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/16 08:24 AM	78492
12/21/16 12:55 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/16 08:24 AM	78492
12/21/16 12:55 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	12/29/16 09:04 AM	78517
12/21/16 12:55 PM	Aqueous	E300	Anion Preparation	12/29/16 09:26 AM	78518
12/21/16 12:55 PM	Aqueous	E300	Anion Preparation	12/29/16 09:26 AM	78518
12/21/16 12:55 PM	Aqueous	M4500-H+ B	pH Preparation	12/23/16 09:27 AM	78459
12/21/16 12:55 PM	Aqueous	M2540C	TDS Preparation	12/22/16 03:42 PM	78447
12/21/16 02:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/16 08:24 AM	78492
12/21/16 02:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/16 08:24 AM	78492
12/21/16 02:05 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	12/29/16 09:04 AM	78517
12/21/16 02:05 PM	Aqueous	E300	Anion Preparation	12/29/16 09:26 AM	78518
12/21/16 02:05 PM	Aqueous	E300	Anion Preparation	12/29/16 09:26 AM	78518
12/21/16 02:05 PM	Aqueous	M4500-H+ B	pH Preparation	12/23/16 09:27 AM	78459
12/21/16 02:05 PM	Aqueous	M2540C	TDS Preparation	12/22/16 03:42 PM	78447

& Wheeler

PREP DATES REPORT

Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
12/21/16 02:45 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/16 08:24 AM	78492
12/21/16 02:45 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/16 08:24 AM	78492
12/21/16 02:45 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	12/29/16 09:04 AM	78517
12/21/16 02:45 PM	Aqueous	E300	Anion Preparation	12/29/16 09:26 AM	78518
12/21/16 02:45 PM	Aqueous	E300	Anion Preparation	12/29/16 09:26 AM	78518
12/21/16 02:45 PM	Aqueous	M4500-H+ B	pH Preparation	12/23/16 09:27 AM	78459
12/21/16 02:45 PM	Aqueous	M2540C	TDS Preparation	12/22/16 03:42 PM	78447
12/21/16 03:40 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/16 08:24 AM	78492
12/21/16 03:40 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/16 08:24 AM	78492
12/21/16 03:40 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	12/29/16 09:04 AM	78517
12/21/16 03:40 PM	Aqueous	E300	Anion Preparation	12/29/16 09:26 AM	78518
12/21/16 03:40 PM	Aqueous	E300	Anion Preparation	12/29/16 09:26 AM	78518
12/21/16 03:40 PM	Aqueous	M4500-H+ B	pH Preparation	12/23/16 09:27 AM	78459
12/21/16 03:40 PM	Aqueous	M2540C	TDS Preparation	12/22/16 03:42 PM	78447
12/21/16 10:00 AM	Equip Blank	SW3005A	Aq Prep Metals : ICP-MS	12/28/16 08:24 AM	78492
12/21/16 10:00 AM	Equip Blank	SW7470A	Mercury Aq Prep, Total	12/29/16 09:04 AM	78517
12/21/16 10:00 AM	Equip Blank	E300	Anion Preparation	12/29/16 09:26 AM	78518
12/21/16 10:00 AM	Equip Blank	E300	Anion Preparation	12/29/16 09:26 AM	78518
12/21/16 10:00 AM	Equip Blank	M4500-H+ B	pH Preparation	12/23/16 09:27 AM	78459
12/21/16 10:00 AM	Equip Blank	M2540C	TDS Preparation	12/22/16 03:42 PM	78447
12/22/16 10:35 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/16 08:24 AM	78492
12/22/16 10:35 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/16 08:24 AM	78492
12/22/16 10:35 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/16 08:24 AM	78492
12/22/16 10:35 AM	Aqueous	SW7470A	Mercury Aq Prep, Total	12/29/16 09:04 AM	78517
12/22/16 10:35 AM	Aqueous	E300	Anion Preparation	12/29/16 09:26 AM	78518
12/22/16 10:35 AM	Aqueous	E300	Anion Preparation	12/29/16 09:26 AM	78518
12/22/16 10:35 AM	Aqueous	M4500-H+ B	pH Preparation	12/23/16 09:27 AM	78459
12/22/16 10:35 AM	Aqueous	M2540C	TDS Preparation	12/27/16 03:09 PM	78478

& Wheeler

PREP DATES REPORT

Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
12/22/16 12:35 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/16 08:24 AM	78492
12/22/16 12:35 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/16 08:24 AM	78492
12/22/16 12:35 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/16 08:24 AM	78492
12/22/16 12:35 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/16 08:24 AM	78492
12/22/16 12:35 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/16 08:24 AM	78492
12/22/16 12:35 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	12/29/16 09:04 AM	78517
12/22/16 12:35 PM	Aqueous	E300	Anion Preparation	12/29/16 09:26 AM	78518
12/22/16 12:35 PM	Aqueous	E300	Anion Preparation	12/29/16 09:26 AM	78518
12/22/16 12:35 PM	Aqueous	M4500-H+ B	pH Preparation	12/23/16 09:27 AM	78459
12/22/16 12:35 PM	Aqueous	M2540C	TDS Preparation	12/27/16 03:09 PM	78478
12/22/16 01:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/16 08:24 AM	78492
12/22/16 01:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/16 08:24 AM	78492
12/22/16 01:20 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	12/29/16 09:04 AM	78517
12/22/16 01:20 PM	Aqueous	E300	Anion Preparation	12/29/16 09:26 AM	78518
12/22/16 01:20 PM	Aqueous	E300	Anion Preparation	12/29/16 09:26 AM	78518
12/22/16 01:20 PM	Aqueous	M4500-H+ B	pH Preparation	12/23/16 09:27 AM	78459
12/22/16 01:20 PM	Aqueous	M2540C	TDS Preparation	12/27/16 03:09 PM	78478
12/22/16 02:25 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/16 08:24 AM	78492
12/22/16 02:25 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/16 08:24 AM	78492
12/22/16 02:25 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/16 08:24 AM	78492
12/22/16 02:25 PM	Aqueous	SW7470A	Mercury Aq Prep, Total	12/29/16 09:04 AM	78517
12/22/16 02:25 PM	Aqueous	E300	Anion Preparation	12/29/16 09:26 AM	78518
12/22/16 02:25 PM	Aqueous	E300	Anion Preparation	12/29/16 09:26 AM	78518
12/22/16 02:25 PM	Aqueous	M4500-H+ B	pH Preparation	12/23/16 09:27 AM	78459
12/22/16 02:25 PM	Aqueous	M2540C	TDS Preparation	12/27/16 03:09 PM	78478
12/22/16	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/16 08:24 AM	78492
12/22/16	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/16 08:24 AM	78492
12/22/16	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	12/28/16 08:24 AM	78492

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PREP DATES REPORT

Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
12/22/16	Aqueous	SW7470A	Mercury Aq Prep, Total	12/29/16 09:04 AM	78517
12/22/16	Aqueous	E300	Anion Preparation	12/29/16 09:26 AM	78518
12/22/16	Aqueous	E300	Anion Preparation	12/29/16 09:26 AM	78518
12/22/16	Aqueous	M4500-H+ B	pH Preparation	12/23/16 09:27 AM	78459
12/22/16	Aqueous	M2540C	TDS Preparation	12/27/16 03:09 PM	78478

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ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	SW7470A	Mercury Total: Aqueous	78483	1	12/29/16 10:44 AM	CETAC2_HG_161229A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	78492	1	01/07/17 06:42 PM	ICP-MS4_170107D
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	78492	100	01/08/17 01:30 PM	ICP-MS4_170108C
Aqueous	E300	Anions by IC method - Water	78518	1	12/29/16 11:12 AM	IC4_161229A
Aqueous	E300	Anions by IC method - Water	78518	100	12/29/16 04:44 PM	IC4_161229A
Aqueous	M4500-H+ B	pH	78459	1	12/23/16 10:59 AM	TITRATOR_161223A
Aqueous	M2540C	Total Dissolved Solids	78447	1	12/23/16 08:39 AM	WC_161222A
Aqueous	SW7470A	Mercury Total: Aqueous	78483	1	12/29/16 10:46 AM	CETAC2_HG_161229A
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	78492	1	01/07/17 06:44 PM	ICP-MS4_170107D
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	78492	100	01/08/17 01:53 PM	ICP-MS4_170108C
Aqueous	E300	Anions by IC method - Water	78518	1	12/29/16 11:27 AM	IC4_161229A
Aqueous	E300	Anions by IC method - Water	78518	100	12/29/16 04:59 PM	IC4_161229A
Aqueous	M4500-H+ B	pH	78459	1	12/23/16 11:00 AM	TITRATOR_161223A
Aqueous	M2540C	Total Dissolved Solids	78447	1	12/23/16 08:39 AM	WC_161222A
Aqueous	SW7470A	Mercury Total: Aqueous	78517	1	12/30/16 10:34 AM	CETAC2_HG_161230B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	78492	1	01/07/17 06:46 PM	ICP-MS4_170107D
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	78492	10	01/08/17 01:55 PM	ICP-MS4_170108C
Aqueous	E300	Anions by IC method - Water	78518	1	12/29/16 11:42 AM	IC4_161229A
Aqueous	E300	Anions by IC method - Water	78518	10	12/29/16 05:44 PM	IC4_161229A
Aqueous	M4500-H+ B	pH	78459	1	12/23/16 11:02 AM	TITRATOR_161223A
Aqueous	M2540C	Total Dissolved Solids	78447	1	12/23/16 08:39 AM	WC_161222A
Aqueous	SW7470A	Mercury Total: Aqueous	78517	1	12/30/16 10:46 AM	CETAC2_HG_161230B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	78492	100	01/08/17 01:49 PM	ICP-MS4_170108C
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	78492	1	01/07/17 06:38 PM	ICP-MS4_170107D
Aqueous	E300	Anions by IC method - Water	78518	1	12/29/16 11:57 AM	IC4_161229A
Aqueous	E300	Anions by IC method - Water	78518	100	12/29/16 06:29 PM	IC4_161229A

& Wheeler

ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	M4500-H+ B	pH	78459	1	12/23/16 11:04 AM	TITRATOR_161223A
Aqueous	M2540C	Total Dissolved Solids	78447	1	12/23/16 08:39 AM	WC_161222A
Aqueous	SW7470A	Mercury Total: Aqueous	78517	1	12/30/16 10:48 AM	CETAC2_HG_161230 B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	78492	1	01/07/17 06:48 PM	ICP-MS4_170107D
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	78492	100	01/08/17 01:57 PM	ICP-MS4_170108C
Aqueous	E300	Anions by IC method - Water	78518	100	12/29/16 06:44 PM	IC4_161229A
Aqueous	E300	Anions by IC method - Water	78518	1	12/29/16 12:12 PM	IC4_161229A
Aqueous	M4500-H+ B	pH	78459	1	12/23/16 11:06 AM	TITRATOR_161223A
Aqueous	M2540C	Total Dissolved Solids	78447	1	12/23/16 08:39 AM	WC_161222A
Aqueous	SW7470A	Mercury Total: Aqueous	78517	1	12/30/16 10:50 AM	CETAC2_HG_161230 B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	78492	1	01/07/17 06:50 PM	ICP-MS4_170107D
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	78492	100	01/08/17 01:59 PM	ICP-MS4_170108C
Aqueous	E300	Anions by IC method - Water	78518	1	12/29/16 12:27 PM	IC4_161229A
Aqueous	E300	Anions by IC method - Water	78518	10	12/29/16 06:59 PM	IC4_161229A
Aqueous	M4500-H+ B	pH	78459	1	12/23/16 11:07 AM	TITRATOR_161223A
Aqueous	M2540C	Total Dissolved Solids	78447	1	12/23/16 08:39 AM	WC_161222A
Equip Blank	SW7470A	Mercury Total: Aqueous	78517	1	12/30/16 10:53 AM	CETAC2_HG_161230 B
Equip Blank	SW6020A	Trace Metals: ICP-MS - Water	78492	1	01/07/17 06:52 PM	ICP-MS4_170107D
Equip Blank	E300	Anions by IC method - Water	78518	1	12/29/16 12:42 PM	IC4_161229A
Equip Blank	E300	Anions by IC method - Water	78518	1	12/29/16 02:32 PM	IC4_161229A
Equip Blank	M4500-H+ B	pH	78459	1	12/23/16 11:10 AM	TITRATOR_161223A
Equip Blank	M2540C	Total Dissolved Solids	78447	1	12/23/16 08:39 AM	WC_161222A
Aqueous	SW7470A	Mercury Total: Aqueous	78517	1	12/30/16 10:55 AM	CETAC2_HG_161230 B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	78492	1	01/07/17 06:55 PM	ICP-MS4_170107D
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	78492	2	01/08/17 01:14 PM	ICP-MS4_170108C
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	78492	100	01/08/17 02:02 PM	ICP-MS4_170108C

& Wheeler

ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	E300	Anions by IC method - Water	78518	1	12/29/16 12:57 PM	IC4_161229A
Aqueous	E300	Anions by IC method - Water	78518	100	12/29/16 07:59 PM	IC4_161229A
Aqueous	M4500-H+ B	pH	78459	1	12/23/16 11:11 AM	TITRATOR_161223A
Aqueous	M2540C	Total Dissolved Solids	78478	1	12/28/16 08:41 AM	WC_161227C
Aqueous	SW7470A	Mercury Total: Aqueous	78517	1	12/30/16 10:57 AM	CETAC2_HG_161230B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	78492	5	01/07/17 06:57 PM	ICP-MS4_170107D
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	78492	1	01/07/17 11:57 PM	ICP-MS4_170107D
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	78492	500	01/08/17 02:04 PM	ICP-MS4_170108C
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	78492	1	01/08/17 07:25 PM	ICP-MS4_170108C
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	78492	1	01/11/17 08:41 PM	ICP-MS4_170111E
Aqueous	E300	Anions by IC method - Water	78518	1	12/29/16 01:12 PM	IC4_161229A
Aqueous	E300	Anions by IC method - Water	78518	100	12/29/16 08:14 PM	IC4_161229A
Aqueous	M4500-H+ B	pH	78459	1	12/23/16 11:15 AM	TITRATOR_161223A
Aqueous	M2540C	Total Dissolved Solids	78478	1	12/28/16 08:41 AM	WC_161227C
Aqueous	SW7470A	Mercury Total: Aqueous	78517	1	12/30/16 10:59 AM	CETAC2_HG_161230B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	78492	1	01/07/17 06:59 PM	ICP-MS4_170107D
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	78492	100	01/08/17 02:06 PM	ICP-MS4_170108C
Aqueous	E300	Anions by IC method - Water	78518	1	12/29/16 02:47 PM	IC4_161229A
Aqueous	E300	Anions by IC method - Water	78518	100	12/29/16 08:29 PM	IC4_161229A
Aqueous	M4500-H+ B	pH	78459	1	12/23/16 11:19 AM	TITRATOR_161223A
Aqueous	M2540C	Total Dissolved Solids	78478	1	12/28/16 08:41 AM	WC_161227C
Aqueous	SW7470A	Mercury Total: Aqueous	78517	1	12/30/16 11:02 AM	CETAC2_HG_161230B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	78492	100	01/08/17 02:08 PM	ICP-MS4_170108C
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	78492	1	01/07/17 08:04 PM	ICP-MS4_170107D
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	78492	1	01/08/17 01:16 PM	ICP-MS4_170108C
Aqueous	E300	Anions by IC method - Water	78518	1	12/29/16 03:02 PM	IC4_161229A

& Wheeler

ANALYTICAL DATES REPORT

Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
Aqueous	E300	Anions by IC method - Water	78518	100	12/29/16 08:44 PM	IC4_161229A
Aqueous	M4500-H+ B	pH	78459	1	12/23/16 11:20 AM	TITRATOR_161223A
Aqueous	M2540C	Total Dissolved Solids	78478	1	12/28/16 08:41 AM	WC_161227C
Aqueous	SW7470A	Mercury Total: Aqueous	78517	1	12/30/16 11:04 AM	CETAC2_HG_161230B
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	78492	1	01/07/17 08:06 PM	ICP-MS4_170107D
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	78492	2	01/08/17 01:18 PM	ICP-MS4_170108C
Aqueous	SW6020A	Trace Metals: ICP-MS - Water	78492	100	01/08/17 02:10 PM	ICP-MS4_170108C
Aqueous	E300	Anions by IC method - Water	78518	1	12/29/16 03:17 PM	IC4_161229A
Aqueous	E300	Anions by IC method - Water	78518	100	12/29/16 08:59 PM	IC4_161229A
Aqueous	M4500-H+ B	pH	78459	1	12/23/16 11:22 AM	TITRATOR_161223A
Aqueous	M2540C	Total Dissolved Solids	78478	1	12/28/16 08:41 AM	WC_161227C

DHL Analytical, Inc.

Date: *31-Jan-17*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-24
Project:	Sandow CCR	**Lab ID:**	1612246-01
Project No:	5164-E	**Collection Date:**	12/21/16 10:50 AM
Lab Order:	1612246	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	12/29/16 10:44 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **CVD**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	01/07/17 06:42 PM
Arsenic	0.00531	0.00200	0.00500		mg/L	1	01/07/17 06:42 PM
Barium	0.0326	0.00300	0.0100		mg/L	1	01/07/17 06:42 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	01/07/17 06:42 PM
Boron	0.112	0.0100	0.0300		mg/L	1	01/07/17 06:42 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	01/07/17 06:42 PM
Calcium	228	10.0	30.0		mg/L	100	01/08/17 01:30 PM
Chromium	0.00471	0.00200	0.00500	J	mg/L	1	01/07/17 06:42 PM
Cobalt	0.00659	0.00300	0.00500		mg/L	1	01/07/17 06:42 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	01/07/17 06:42 PM
Lithium	0.0747	0.00500	0.0100		mg/L	1	01/07/17 06:42 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	01/07/17 06:42 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	01/07/17 06:42 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	01/07/17 06:42 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	365	30.0	100		mg/L	100	12/29/16 04:44 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	12/29/16 11:12 AM
Sulfate	1010	100	300		mg/L	100	12/29/16 04:44 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.37	0	0		pH Units@17.6℃	1	12/23/16 10:59 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	1890	50.0	50.0		mg/L	1	12/23/16 08:39 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *31-Jan-17*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-25
Project:	Sandow CCR	**Lab ID:**	1612246-02
Project No:	5164-E	**Collection Date:**	12/21/16 11:50 AM
Lab Order:	1612246	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	12/29/16 10:46 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **CVD**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	01/07/17 06:44 PM
Arsenic	0.00470	0.00200	0.00500	J	mg/L	1	01/07/17 06:44 PM
Barium	0.0740	0.00300	0.0100		mg/L	1	01/07/17 06:44 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	01/07/17 06:44 PM
Boron	0.214	0.0100	0.0300		mg/L	1	01/07/17 06:44 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	01/07/17 06:44 PM
Calcium	244	10.0	30.0		mg/L	100	01/08/17 01:53 PM
Chromium	0.00498	0.00200	0.00500	J	mg/L	1	01/07/17 06:44 PM
Cobalt	0.0342	0.00300	0.00500		mg/L	1	01/07/17 06:44 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	01/07/17 06:44 PM
Lithium	0.0313	0.00500	0.0100		mg/L	1	01/07/17 06:44 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	01/07/17 06:44 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	01/07/17 06:44 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	01/07/17 06:44 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	637	30.0	100		mg/L	100	12/29/16 04:59 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	12/29/16 11:27 AM
Sulfate	613	100	300		mg/L	100	12/29/16 04:59 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.58	0	0		pH Units@16.8℃	1	12/23/16 11:00 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	2360	50.0	50.0		mg/L	1	12/23/16 08:39 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *31-Jan-17*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-22R
Project:	Sandow CCR	**Lab ID:**	1612246-03
Project No:	5164-E	**Collection Date:**	12/21/16 12:55 PM
Lab Order:	1612246	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	12/30/16 10:34 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **CVD**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	01/07/17 06:46 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	01/07/17 06:46 PM
Barium	0.110	0.00300	0.0100		mg/L	1	01/07/17 06:46 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	01/07/17 06:46 PM
Boron	0.102	0.0100	0.0300		mg/L	1	01/07/17 06:46 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	01/07/17 06:46 PM
Calcium	77.2	1.00	3.00		mg/L	10	01/08/17 01:55 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	01/07/17 06:46 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	01/07/17 06:46 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	01/07/17 06:46 PM
Lithium	0.0553	0.00500	0.0100		mg/L	1	01/07/17 06:46 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	01/07/17 06:46 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	01/07/17 06:46 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	01/07/17 06:46 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	95.4	3.00	10.0		mg/L	10	12/29/16 05:44 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	12/29/16 11:42 AM
Sulfate	51.3	1.00	3.00		mg/L	1	12/29/16 11:42 AM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	7.10	0	0		pH Units@17.5℃	1	12/23/16 11:02 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	498	10.0	10.0		mg/L	1	12/23/16 08:39 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *31-Jan-17*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-29
Project:	Sandow CCR	**Lab ID:**	1612246-04
Project No:	5164-E	**Collection Date:**	12/21/16 02:05 PM
Lab Order:	1612246	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	12/30/16 10:46 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **CVD**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	01/07/17 06:38 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	01/07/17 06:38 PM
Barium	0.0304	0.00300	0.0100		mg/L	1	01/07/17 06:38 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	01/07/17 06:38 PM
Boron	0.337	0.0100	0.0300		mg/L	1	01/07/17 06:38 PM
Cadmium	0.00475	0.000300	0.00100		mg/L	1	01/07/17 06:38 PM
Calcium	339	10.0	30.0		mg/L	100	01/08/17 01:49 PM
Chromium	0.00333	0.00200	0.00500	J	mg/L	1	01/07/17 06:38 PM
Cobalt	0.105	0.00300	0.00500		mg/L	1	01/07/17 06:38 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	01/07/17 06:38 PM
Lithium	0.0438	0.00500	0.0100		mg/L	1	01/07/17 06:38 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	01/07/17 06:38 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	01/07/17 06:38 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	01/07/17 06:38 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	306	30.0	100		mg/L	100	12/29/16 06:29 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	12/29/16 11:57 AM
Sulfate	1110	100	300		mg/L	100	12/29/16 06:29 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.28	0	0		pH Units@16.6℃	1	12/23/16 11:04 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	2610	50.0	50.0		mg/L	1	12/23/16 08:39 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *31-Jan-17*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-28
Project:	Sandow CCR	**Lab ID:**	1612246-05
Project No:	5164-E	**Collection Date:**	12/21/16 02:45 PM
Lab Order:	1612246	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	12/30/16 10:48 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **CVD**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	01/07/17 06:48 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	01/07/17 06:48 PM
Barium	0.0383	0.00300	0.0100		mg/L	1	01/07/17 06:48 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	01/07/17 06:48 PM
Boron	0.313	0.0100	0.0300		mg/L	1	01/07/17 06:48 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	01/07/17 06:48 PM
Calcium	507	10.0	30.0		mg/L	100	01/08/17 01:57 PM
Chromium	0.147	0.00200	0.00500		mg/L	1	01/07/17 06:48 PM
Cobalt	0.0266	0.00300	0.00500		mg/L	1	01/07/17 06:48 PM
Lead	0.000581	0.000300	0.00100	J	mg/L	1	01/07/17 06:48 PM
Lithium	0.271	0.00500	0.0100		mg/L	1	01/07/17 06:48 PM
Molybdenum	0.00466	0.00200	0.00500	J	mg/L	1	01/07/17 06:48 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	01/07/17 06:48 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	01/07/17 06:48 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	563	30.0	100		mg/L	100	12/29/16 06:44 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	12/29/16 12:12 PM
Sulfate	1290	100	300		mg/L	100	12/29/16 06:44 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.41	0	0		pH Units@17℃	1	12/23/16 11:06 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	3400	50.0	50.0		mg/L	1	12/23/16 08:39 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *31-Jan-17*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-23
Project:	Sandow CCR	**Lab ID:**	1612246-06
Project No:	5164-E	**Collection Date:**	12/21/16 03:40 PM
Lab Order:	1612246	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	12/30/16 10:50 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **CVD**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	01/07/17 06:50 PM
Arsenic	0.00889	0.00200	0.00500		mg/L	1	01/07/17 06:50 PM
Barium	0.0727	0.00300	0.0100		mg/L	1	01/07/17 06:50 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	01/07/17 06:50 PM
Boron	0.311	0.0100	0.0300		mg/L	1	01/07/17 06:50 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	01/07/17 06:50 PM
Calcium	243	10.0	30.0		mg/L	100	01/08/17 01:59 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	01/07/17 06:50 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	01/07/17 06:50 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	01/07/17 06:50 PM
Lithium	0.00906	0.00500	0.0100	J	mg/L	1	01/07/17 06:50 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	01/07/17 06:50 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	01/07/17 06:50 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	01/07/17 06:50 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	170	3.00	10.0		mg/L	10	12/29/16 06:59 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	12/29/16 12:27 PM
Sulfate	582	10.0	30.0		mg/L	10	12/29/16 06:59 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.53	0	0		pH Units@16.6℃	1	12/23/16 11:07 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	1550	50.0	50.0		mg/L	1	12/23/16 08:39 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *31-Jan-17*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	EB-01
Project:	Sandow CCR	**Lab ID:**	1612246-07
Project No:	5164-E	**Collection Date:**	12/21/16 10:00 AM
Lab Order:	1612246	**Matrix:**	EQUIP BLANK

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	12/30/16 10:53 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **CVD**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	01/07/17 06:52 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	01/07/17 06:52 PM
Barium	<0.00300	0.00300	0.0100		mg/L	1	01/07/17 06:52 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	01/07/17 06:52 PM
Boron	0.0257	0.0100	0.0300	J	mg/L	1	01/07/17 06:52 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	01/07/17 06:52 PM
Calcium	0.226	0.100	0.300	J	mg/L	1	01/07/17 06:52 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	01/07/17 06:52 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	01/07/17 06:52 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	01/07/17 06:52 PM
Lithium	<0.00500	0.00500	0.0100		mg/L	1	01/07/17 06:52 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	01/07/17 06:52 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	01/07/17 06:52 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	01/07/17 06:52 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	<0.300	0.300	1.00		mg/L	1	12/29/16 02:32 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	12/29/16 02:32 PM
Sulfate	<1.00	1.00	3.00		mg/L	1	12/29/16 02:32 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	7.11	0	0		pH Units@16.8℃	1	12/23/16 11:10 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	<10.0	10.0	10.0		mg/L	1	12/23/16 08:39 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *31-Jan-17*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AXMW-1
Project:	Sandow CCR	**Lab ID:**	1612246-08
Project No:	5164-E	**Collection Date:**	12/22/16 10:35 AM
Lab Order:	1612246	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	12/30/16 10:55 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **CVD**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	01/07/17 06:55 PM
Arsenic	0.0189	0.00200	0.00500		mg/L	1	01/07/17 06:55 PM
Barium	0.0184	0.00300	0.0100		mg/L	1	01/07/17 06:55 PM
Beryllium	0.000337	0.000300	0.00100	J	mg/L	1	01/07/17 06:55 PM
Boron	0.553	0.0200	0.0600		mg/L	2	01/08/17 01:14 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	01/07/17 06:55 PM
Calcium	443	10.0	30.0		mg/L	100	01/08/17 02:02 PM
Chromium	0.00968	0.00200	0.00500		mg/L	1	01/07/17 06:55 PM
Cobalt	0.412	0.00300	0.00500		mg/L	1	01/07/17 06:55 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	01/07/17 06:55 PM
Lithium	0.0253	0.00500	0.0100		mg/L	1	01/07/17 06:55 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	01/07/17 06:55 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	01/07/17 06:55 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	01/07/17 06:55 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	394	30.0	100		mg/L	100	12/29/16 07:59 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	12/29/16 12:57 PM
Sulfate	2120	100	300		mg/L	100	12/29/16 07:59 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	5.84	0	0		pH Units@17.4℃	1	12/23/16 11:11 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	4220	50.0	50.0		mg/L	1	12/28/16 08:41 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *31-Jan-17*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AXMW-2
Project:	Sandow CCR	**Lab ID:**	1612246-09
Project No:	5164-E	**Collection Date:**	12/22/16 12:35 PM
Lab Order:	1612246	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	12/30/16 10:57 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **CVD**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	01/11/17 08:41 PM
Arsenic	0.0292	0.00200	0.00500		mg/L	1	01/11/17 08:41 PM
Barium	0.0263	0.00300	0.0100		mg/L	1	01/07/17 11:57 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	01/07/17 11:57 PM
Boron	1.96	0.0500	0.150		mg/L	5	01/07/17 06:57 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	01/07/17 11:57 PM
Calcium	503	50.0	150		mg/L	500	01/08/17 02:04 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	01/07/17 11:57 PM
Cobalt	0.0441	0.00300	0.00500		mg/L	1	01/07/17 11:57 PM
Lead	0.000489	0.000300	0.00100	J	mg/L	1	01/11/17 08:41 PM
Lithium	0.0891	0.00500	0.0100		mg/L	1	01/07/17 11:57 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	01/11/17 08:41 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	01/07/17 11:57 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	01/07/17 11:57 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	210	30.0	100		mg/L	100	12/29/16 08:14 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	12/29/16 01:12 PM
Sulfate	1840	100	300		mg/L	100	12/29/16 08:14 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.14	0	0		pH Units@18.5℃	1	12/23/16 11:15 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	3630	50.0	50.0		mg/L	1	12/28/16 08:41 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *31-Jan-17*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-27
Project:	Sandow CCR	**Lab ID:**	1612246-10
Project No:	5164-E	**Collection Date:**	12/22/16 01:20 PM
Lab Order:	1612246	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	12/30/16 10:59 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **CVD**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	01/07/17 06:59 PM
Arsenic	0.00270	0.00200	0.00500	J	mg/L	1	01/07/17 06:59 PM
Barium	0.0969	0.00300	0.0100		mg/L	1	01/07/17 06:59 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	01/07/17 06:59 PM
Boron	0.209	0.0100	0.0300		mg/L	1	01/07/17 06:59 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	01/07/17 06:59 PM
Calcium	366	10.0	30.0		mg/L	100	01/08/17 02:06 PM
Chromium	0.00698	0.00200	0.00500		mg/L	1	01/07/17 06:59 PM
Cobalt	0.0235	0.00300	0.00500		mg/L	1	01/07/17 06:59 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	01/07/17 06:59 PM
Lithium	0.102	0.00500	0.0100		mg/L	1	01/07/17 06:59 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	01/07/17 06:59 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	01/07/17 06:59 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	01/07/17 06:59 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	741	30.0	100		mg/L	100	12/29/16 08:29 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	12/29/16 02:47 PM
Sulfate	478	100	300		mg/L	100	12/29/16 08:29 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.38	0	0		pH Units@18.4℃	1	12/23/16 11:19 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	2640	50.0	50.0		mg/L	1	12/28/16 08:41 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *31-Jan-17*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-26
Project:	Sandow CCR	**Lab ID:**	1612246-11
Project No:	5164-E	**Collection Date:**	12/22/16 02:25 PM
Lab Order:	1612246	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	12/30/16 11:02 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **CVD**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	01/07/17 08:04 PM
Arsenic	0.00205	0.00200	0.00500	J	mg/L	1	01/07/17 08:04 PM
Barium	0.0394	0.00300	0.0100		mg/L	1	01/07/17 08:04 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	01/07/17 08:04 PM
Boron	0.358	0.0100	0.0300		mg/L	1	01/08/17 01:16 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	01/07/17 08:04 PM
Calcium	567	10.0	30.0		mg/L	100	01/08/17 02:08 PM
Chromium	0.0179	0.00200	0.00500		mg/L	1	01/07/17 08:04 PM
Cobalt	0.0226	0.00300	0.00500		mg/L	1	01/07/17 08:04 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	01/07/17 08:04 PM
Lithium	0.526	0.00500	0.0100		mg/L	1	01/07/17 08:04 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	01/07/17 08:04 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	01/07/17 08:04 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	01/07/17 08:04 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	1170	30.0	100		mg/L	100	12/29/16 08:44 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	12/29/16 03:02 PM
Sulfate	941	100	300		mg/L	100	12/29/16 08:44 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	6.44	0	0		pH Units@18.6℃	1	12/23/16 11:20 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	4250	50.0	50.0		mg/L	1	12/28/16 08:41 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *31-Jan-17*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	MW-1
Project:	Sandow CCR	**Lab ID:**	1612246-12
Project No:	5164-E	**Collection Date:**	12/22/16
Lab Order:	1612246	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **AH**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	12/30/16 11:04 AM
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **CVD**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	01/07/17 08:06 PM
Arsenic	0.0192	0.00200	0.00500		mg/L	1	01/07/17 08:06 PM
Barium	0.0187	0.00300	0.0100		mg/L	1	01/07/17 08:06 PM
Beryllium	0.000406	0.000300	0.00100	J	mg/L	1	01/07/17 08:06 PM
Boron	0.557	0.0200	0.0600		mg/L	2	01/08/17 01:18 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	01/07/17 08:06 PM
Calcium	455	10.0	30.0		mg/L	100	01/08/17 02:10 PM
Chromium	0.00865	0.00200	0.00500		mg/L	1	01/07/17 08:06 PM
Cobalt	0.413	0.00300	0.00500		mg/L	1	01/07/17 08:06 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	01/07/17 08:06 PM
Lithium	0.0254	0.00500	0.0100		mg/L	1	01/07/17 08:06 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	01/07/17 08:06 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	01/07/17 08:06 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	01/07/17 08:06 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **AV**
Chloride	399	30.0	100		mg/L	100	12/29/16 08:59 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	12/29/16 03:17 PM
Sulfate	2110	100	300		mg/L	100	12/29/16 08:59 PM
PH		**M4500-H+ B**					Analyst: **BJT**
pH	5.87	0	0		pH Units@19.2℃	1	12/23/16 11:22 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **AJH**
Total Dissolved Solids (Residue, Filterable)	4130	50.0	50.0		mg/L	1	12/28/16 08:41 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

CLIENT: Pastor, Behling & Wheeler
Work Order: 1612246
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_161229A

The QC data in batch 78483 applies to the following samples: 1612246-01A, 1612246-02A

Sample ID	**MB-78483**	Batch ID:	**78483**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**CETAC2_HG_161229A**	Analysis Date:	**12/29/2016 9:54:23 AM**	Prep Date:	**12/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	<0.0000800	0.000200								

Sample ID	**LCS-78483**	Batch ID:	**78483**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**CETAC2_HG_161229A**	Analysis Date:	**12/29/2016 9:56:39 AM**	Prep Date:	**12/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00195	0.000200	0.00200	0	97.5	85	115			

Sample ID	**LCSD-78483**	Batch ID:	**78483**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**CETAC2_HG_161229A**	Analysis Date:	**12/29/2016 9:58:55 AM**	Prep Date:	**12/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00200	0.000200	0.00200	0	100	85	115	2.53	15	

Sample ID	**1612206-04A SD**	Batch ID:	**78483**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**SD**	Run ID:	**CETAC2_HG_161229A**	Analysis Date:	**12/29/2016 10:10:14 A**	Prep Date:	**12/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	<0.000400	0.00100	0	0				0	10	

Sample ID	**1612206-04A PDS**	Batch ID:	**78483**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**PDS**	Run ID:	**CETAC2_HG_161229A**	Analysis Date:	**12/29/2016 10:12:30 A**	Prep Date:	**12/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00232	0.000200	0.00250	0	92.8	85	115			

Sample ID	**1612206-04A MS**	Batch ID:	**78483**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**CETAC2_HG_161229A**	Analysis Date:	**12/29/2016 10:14:46 A**	Prep Date:	**12/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00192	0.000200	0.00200	0	96.0	80	120			

Sample ID	**1612206-04A MSD**	Batch ID:	**78483**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**CETAC2_HG_161229A**	Analysis Date:	**12/29/2016 10:17:02 A**	Prep Date:	**12/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00194	0.000200	0.00200	0	97.0	80	120	1.04	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1612246
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_161229A

Sample ID	**ICV-161229**	Batch ID:	**R89699**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**CETAC2_HG_161229A**	Analysis Date:	**12/29/2016 9:49:49 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00397	0.000200	0.00400	0	99.2	90	110			

Sample ID	**CCV1-161229**	Batch ID:	**R89699**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_161229A**	Analysis Date:	**12/29/2016 10:32:56 A**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00201	0.000200	0.00200	0	101	90	110			

Sample ID	**CCV2-161229**	Batch ID:	**R89699**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_161229A**	Analysis Date:	**12/29/2016 11:02:31 A**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00200	0.000200	0.00200	0	100	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1612246
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_161230B

The QC data in batch 78517 applies to the following samples: 1612246-03A, 1612246-04A, 1612246-05A, 1612246-06A, 1612246-07A, 1612246-08A, 1612246-09A, 1612246-10A, 1612246-11A, 1612246-12A

Sample ID	**MB-78517**	Batch ID:	**78517**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**CETAC2_HG_161230B**	Analysis Date:	**12/30/2016 10:28:07 A**	Prep Date:	**12/29/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	<0.0000800	0.000200								

Sample ID	**LCS-78517**	Batch ID:	**78517**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**CETAC2_HG_161230B**	Analysis Date:	**12/30/2016 10:30:23 A**	Prep Date:	**12/29/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00189	0.000200	0.00200	0	94.5	85	115			

Sample ID	**LCSD-78517**	Batch ID:	**78517**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**CETAC2_HG_161230B**	Analysis Date:	**12/30/2016 10:32:39 A**	Prep Date:	**12/29/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00191	0.000200	0.00200	0	95.5	85	115	1.05	15	

Sample ID	**1612246-03A SD**	Batch ID:	**78517**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**SD**	Run ID:	**CETAC2_HG_161230B**	Analysis Date:	**12/30/2016 10:37:11 A**	Prep Date:	**12/29/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	<0.000400	0.00100	0	0				0	10	

Sample ID	**1612246-03A PDS**	Batch ID:	**78517**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**PDS**	Run ID:	**CETAC2_HG_161230B**	Analysis Date:	**12/30/2016 10:39:27 A**	Prep Date:	**12/29/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00229	0.000200	0.00250	0	91.6	85	115			

Sample ID	**1612246-03A MS**	Batch ID:	**78517**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**CETAC2_HG_161230B**	Analysis Date:	**12/30/2016 10:41:43 A**	Prep Date:	**12/29/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00196	0.000200	0.00200	0	98.0	80	120			

Sample ID	**1612246-03A MSD**	Batch ID:	**78517**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**CETAC2_HG_161230B**	Analysis Date:	**12/30/2016 10:44:00 A**	Prep Date:	**12/29/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00196	0.000200	0.00200	0	98.0	80	120	0	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1612246
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_161230B

Sample ID	**ICV-161230**	Batch ID:	**R89725**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**CETAC2_HG_161230B**	Analysis Date:	**12/30/2016 9:49:30 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00394	0.000200	0.00400	0	98.5	90	110			

Sample ID	**CCV1-161230**	Batch ID:	**R89725**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_161230B**	Analysis Date:	**12/30/2016 10:23:33 A**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00200	0.000200	0.00200	0	100	90	110			

Sample ID	**CCV2-161230**	Batch ID:	**R89725**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_161230B**	Analysis Date:	**12/30/2016 11:06:45 A**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00199	0.000200	0.00200	0	99.5	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1612246
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_170107D

The QC data in batch 78492 applies to the following samples: 1612246-01A, 1612246-02A, 1612246-03A, 1612246-04A, 1612246-05A, 1612246-06A, 1612246-07A, 1612246-08A, 1612246-09A, 1612246-10A, 1612246-11A, 1612246-12A

Sample ID **MB-78492** Batch ID: **78492** TestNo: **SW6020A** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS4_170107D** Analysis Date: **1/7/2017 6:30:00 PM** Prep Date: **12/28/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.000800	0.00250								
Arsenic	<0.00200	0.00500								
Barium	<0.00300	0.0100								
Beryllium	<0.000300	0.00100								
Boron	<0.0100	0.0300								
Cadmium	<0.000300	0.00100								
Calcium	<0.100	0.300								
Chromium	<0.00200	0.00500								
Cobalt	<0.00300	0.00500								
Lead	<0.000300	0.00100								
Lithium	<0.00500	0.0100								
Molybdenum	<0.00200	0.00500								
Selenium	<0.00200	0.00500								
Thallium	<0.000500	0.00150								

Sample ID **LCS-78492** Batch ID: **78492** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS4_170107D** Analysis Date: **1/7/2017 6:32:00 PM** Prep Date: **12/28/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.203	0.00250	0.200	0	102	80	120			
Arsenic	0.213	0.00500	0.200	0	106	80	120			
Barium	0.203	0.0100	0.200	0	102	80	120			
Beryllium	0.211	0.00100	0.200	0	105	80	120			
Boron	0.208	0.0300	0.200	0	104	80	120			
Cadmium	0.207	0.00100	0.200	0	104	80	120			
Calcium	5.00	0.300	5.00	0	100	80	120			
Chromium	0.208	0.00500	0.200	0	104	80	120			
Cobalt	0.210	0.00500	0.200	0	105	80	120			
Lead	0.202	0.00100	0.200	0	101	80	120			
Lithium	0.205	0.0100	0.200	0	103	80	120			
Molybdenum	0.203	0.00500	0.200	0	102	80	120			
Selenium	0.210	0.00500	0.200	0	105	80	120			
Thallium	0.202	0.00150	0.200	0	101	80	120			

Sample ID **LCSD-78492** Batch ID: **78492** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS4_170107D** Analysis Date: **1/7/2017 6:34:00 PM** Prep Date: **12/28/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.205	0.00250	0.200	0	102	80	120	0.682	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1612246
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_170107D

Sample ID **LCSD-78492**	Batch ID: **78492**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCSD**	Run ID: **ICP-MS4_170107D**	Analysis Date: **1/7/2017 6:34:00 PM**	Prep Date: **12/28/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.214	0.00500	0.200	0	107	80	120	0.821	15	
Barium	0.205	0.0100	0.200	0	103	80	120	0.935	15	
Beryllium	0.217	0.00100	0.200	0	108	80	120	2.77	15	
Boron	0.212	0.0300	0.200	0	106	80	120	1.92	15	
Cadmium	0.208	0.00100	0.200	0	104	80	120	0.260	15	
Calcium	4.97	0.300	5.00	0	99.4	80	120	0.616	15	
Chromium	0.210	0.00500	0.200	0	105	80	120	1.14	15	
Cobalt	0.213	0.00500	0.200	0	106	80	120	1.33	15	
Lead	0.205	0.00100	0.200	0	103	80	120	1.53	15	
Lithium	0.208	0.0100	0.200	0	104	80	120	1.21	15	
Molybdenum	0.202	0.00500	0.200	0	101	80	120	0.444	15	
Selenium	0.211	0.00500	0.200	0	106	80	120	0.882	15	
Thallium	0.204	0.00150	0.200	0	102	80	120	0.908	15	

Sample ID **1612246-04A SD**	Batch ID: **78492**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **SD**	Run ID: **ICP-MS4_170107D**	Analysis Date: **1/7/2017 6:40:00 PM**	Prep Date: **12/28/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.00400	0.0125	0	0				0	10	
Arsenic	<0.0100	0.0250	0	0				0	10	
Barium	0.0303	0.0500	0	0.0304				0.372	10	
Beryllium	<0.00150	0.00500	0	0				0	10	
Boron	0.388	0.150	0	0.337				14.0	10	R
Cadmium	0.00485	0.00500	0	0.00475				2.00	10	
Chromium	<0.0100	0.0250	0	0.00333				0	10	
Cobalt	0.108	0.0250	0	0.105				3.07	10	
Lead	<0.00150	0.00500	0	0				0	10	
Lithium	0.0471	0.0500	0	0.0438				7.26	10	
Molybdenum	<0.0100	0.0250	0	0				0	10	
Selenium	<0.0100	0.0250	0	0				0	10	
Thallium	<0.00250	0.00750	0	0				0	10	

Sample ID **1612246-04A PDS**	Batch ID: **78492**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS4_170107D**	Analysis Date: **1/7/2017 7:01:00 PM**	Prep Date: **12/28/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.211	0.00250	0.200	0	106	80	120			
Arsenic	0.224	0.00500	0.200	0	112	80	120			
Barium	0.235	0.0100	0.200	0.0304	102	80	120			
Beryllium	0.210	0.00100	0.200	0	105	80	120			
Boron	0.515	0.0300	0.200	0.337	89.0	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1612246
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_170107D

Sample ID **1612246-04A PDS**	Batch ID: **78492**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS4_170107D**	Analysis Date: **1/7/2017 7:01:00 PM**	Prep Date: **12/28/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	0.203	0.00100	0.200	0.00475	99.3	80	120			
Chromium	0.213	0.00500	0.200	0.00333	105	80	120			
Cobalt	0.307	0.00500	0.200	0.105	101	80	120			
Lead	0.208	0.00100	0.200	0	104	80	120			
Lithium	0.232	0.0100	0.200	0.0438	94.0	80	120			
Molybdenum	0.203	0.00500	0.200	0	101	80	120			
Selenium	0.217	0.00500	0.200	0	108	80	120			
Thallium	0.207	0.00150	0.200	0	104	80	120			

Sample ID **1612246-04A MS**	Batch ID: **78492**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS4_170107D**	Analysis Date: **1/7/2017 7:03:00 PM**	Prep Date: **12/28/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.209	0.00250	0.200	0	104	80	120			
Arsenic	0.219	0.00500	0.200	0	110	80	120			
Barium	0.238	0.0100	0.200	0.0304	104	80	120			
Beryllium	0.201	0.00100	0.200	0	100	80	120			
Boron	0.548	0.0300	0.200	0.337	105	80	120			
Cadmium	0.207	0.00100	0.200	0.00475	101	80	120			
Calcium	357	0.300	5.00	355	52.0	80	120			S
Chromium	0.203	0.00500	0.200	0.00333	99.7	80	120			
Cobalt	0.304	0.00500	0.200	0.105	99.6	80	120			
Lead	0.205	0.00100	0.200	0	102	80	120			
Lithium	0.230	0.0100	0.200	0.0438	93.3	80	120			
Molybdenum	0.209	0.00500	0.200	0	104	80	120			
Selenium	0.212	0.00500	0.200	0	106	80	120			
Thallium	0.206	0.00150	0.200	0	103	80	120			

Sample ID **1612246-04A MSD**	Batch ID: **78492**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS4_170107D**	Analysis Date: **1/7/2017 7:05:00 PM**	Prep Date: **12/28/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.209	0.00250	0.200	0	104	80	120	0.127	15	
Arsenic	0.225	0.00500	0.200	0	112	80	120	2.39	15	
Barium	0.239	0.0100	0.200	0.0304	104	80	120	0.435	15	
Beryllium	0.207	0.00100	0.200	0	104	80	120	3.39	15	
Boron	0.540	0.0300	0.200	0.337	101	80	120	1.40	15	
Cadmium	0.205	0.00100	0.200	0.00475	100	80	120	1.06	15	
Calcium	365	0.300	5.00	355	211	80	120	2.21	15	S
Chromium	0.206	0.00500	0.200	0.00333	102	80	120	1.87	15	
Cobalt	0.309	0.00500	0.200	0.105	102	80	120	1.62	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1612246
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_170107D

Sample ID **1612246-04A MSD** Batch ID: **78492** TestNo: **SW6020A** Units: **mg/L**
SampType: **MSD** Run ID: **ICP-MS4_170107D** Analysis Date: **1/7/2017 7:05:00 PM** Prep Date: **12/28/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	0.207	0.00100	0.200	0	104	80	120	1.21	15	
Lithium	0.240	0.0100	0.200	0.0438	98.0	80	120	3.95	15	
Molybdenum	0.208	0.00500	0.200	0	104	80	120	0.478	15	
Selenium	0.218	0.00500	0.200	0	109	80	120	2.83	15	
Thallium	0.210	0.00150	0.200	0	105	80	120	2.06	15	

Qualifiers:

B	Analyte detected in the associated Method Blank
J	Analyte detected between MDL and RL
ND	Not Detected at the Method Detection Limit
RL	Reporting Limit
J	Analyte detected between SDL and RL
DF	Dilution Factor
MDL	Method Detection Limit
R	RPD outside accepted control limits
S	Spike Recovery outside control limits
N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1612246
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_170107D

Sample ID **ICV-170107**	Batch ID: **R89825**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS4_170107D**	Analysis Date: **1/7/2017 12:28:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.0993	0.00250	0.100	0	99.3	90	110			
Arsenic	0.102	0.00500	0.100	0	102	90	110			
Barium	0.103	0.0100	0.100	0	103	90	110			
Beryllium	0.101	0.00100	0.100	0	101	90	110			
Boron	0.100	0.0300	0.100	0	100	90	110			
Cadmium	0.102	0.00100	0.100	0	102	90	110			
Calcium	2.32	0.300	2.50	0	92.7	90	110			
Chromium	0.107	0.00500	0.100	0	107	90	110			
Cobalt	0.106	0.00500	0.100	0	106	90	110			
Lead	0.102	0.00100	0.100	0	102	90	110			
Lithium	0.100	0.0100	0.100	0	100	90	110			
Molybdenum	0.0993	0.00500	0.100	0	99.3	90	110			
Selenium	0.103	0.00500	0.100	0	103	90	110			
Thallium	0.101	0.00150	0.100	0	101	90	110			

Sample ID **LCVL-170107**	Batch ID: **R89825**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_170107D**	Analysis Date: **1/7/2017 12:32:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00190	0.00250	0.00200	0	95.0	70	130			
Arsenic	0.00504	0.00500	0.00500	0	101	70	130			
Barium	0.00514	0.0100	0.00500	0	103	70	130			
Beryllium	0.000982	0.00100	0.00100	0	98.2	70	130			
Boron	0.0210	0.0300	0.0200	0	105	70	130			
Cadmium	0.00104	0.00100	0.00100	0	104	70	130			
Calcium	0.105	0.300	0.100	0	105	70	130			
Chromium	0.00526	0.00500	0.00500	0	105	70	130			
Cobalt	0.00522	0.00500	0.00500	0	104	70	130			
Lead	0.00107	0.00100	0.00100	0	107	70	130			
Lithium	0.00973	0.0100	0.0100	0	97.3	70	130			
Molybdenum	0.00532	0.00500	0.00500	0	106	70	130			
Selenium	0.00521	0.00500	0.00500	0	104	70	130			
Thallium	0.00102	0.00150	0.00100	0	102	70	130			

Sample ID **CCV5-170107**	Batch ID: **R89825**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_170107D**	Analysis Date: **1/7/2017 6:06:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.205	0.00250	0.200	0	103	90	110			
Arsenic	0.217	0.00500	0.200	0	108	90	110			
Barium	0.205	0.0100	0.200	0	102	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1612246
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_170107D

Sample ID **CCV5-170107**	Batch ID: **R89825**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_170107D**	Analysis Date: **1/7/2017 6:06:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.206	0.00100	0.200	0	103	90	110			
Boron	0.202	0.0300	0.200	0	101	90	110			
Cadmium	0.207	0.00100	0.200	0	103	90	110			
Calcium	4.93	0.300	5.00	0	98.7	90	110			
Chromium	0.204	0.00500	0.200	0	102	90	110			
Cobalt	0.212	0.00500	0.200	0	106	90	110			
Lead	0.207	0.00100	0.200	0	103	90	110			
Lithium	0.198	0.0100	0.200	0	99.2	90	110			
Molybdenum	0.202	0.00500	0.200	0	101	90	110			
Selenium	0.216	0.00500	0.200	0	108	90	110			
Thallium	0.206	0.00150	0.200	0	103	90	110			

Sample ID **LCVL5-170107**	Batch ID: **R89825**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_170107D**	Analysis Date: **1/7/2017 6:24:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00181	0.00250	0.00200	0	90.5	70	130			
Arsenic	0.00542	0.00500	0.00500	0	108	70	130			
Barium	0.00498	0.0100	0.00500	0	99.5	70	130			
Beryllium	0.00101	0.00100	0.00100	0	101	70	130			
Boron	0.0236	0.0300	0.0200	0	118	70	130			
Cadmium	0.00102	0.00100	0.00100	0	102	70	130			
Calcium	0.0994	0.300	0.100	0	99.4	70	130			
Chromium	0.00517	0.00500	0.00500	0	103	70	130			
Cobalt	0.00526	0.00500	0.00500	0	105	70	130			
Lead	0.000946	0.00100	0.00100	0	94.6	70	130			
Lithium	0.00994	0.0100	0.0100	0	99.4	70	130			
Molybdenum	0.00483	0.00500	0.00500	0	96.6	70	130			
Selenium	0.00597	0.00500	0.00500	0	119	70	130			
Thallium	0.00100	0.00150	0.00100	0	100	70	130			

Sample ID **CCV6-170107**	Batch ID: **R89825**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_170107D**	Analysis Date: **1/7/2017 7:16:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.201	0.00250	0.200	0	100	90	110			
Arsenic	0.218	0.00500	0.200	0	109	90	110			
Barium	0.203	0.0100	0.200	0	101	90	110			
Beryllium	0.214	0.00100	0.200	0	107	90	110			
Boron	0.215	0.0300	0.200	0	108	90	110			
Cadmium	0.205	0.00100	0.200	0	103	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1612246
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_170107D

Sample ID **CCV6-170107**	Batch ID: **R89825**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_170107D**	Analysis Date: **1/7/2017 7:16:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.93	0.300	5.00	0	98.7	90	110			
Chromium	0.206	0.00500	0.200	0	103	90	110			
Cobalt	0.215	0.00500	0.200	0	108	90	110			
Lead	0.205	0.00100	0.200	0	103	90	110			
Lithium	0.205	0.0100	0.200	0	103	90	110			
Molybdenum	0.199	0.00500	0.200	0	99.4	90	110			
Selenium	0.220	0.00500	0.200	0	110	90	110			
Thallium	0.206	0.00150	0.200	0	103	90	110			

Sample ID **LCVL6-170107**	Batch ID: **R89825**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_170107D**	Analysis Date: **1/7/2017 8:02:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00178	0.00250	0.00200	0	89.0	70	130			
Arsenic	0.00517	0.00500	0.00500	0	103	70	130			
Barium	0.00493	0.0100	0.00500	0	98.7	70	130			
Beryllium	0.00113	0.00100	0.00100	0	113	70	130			
Boron	0.0234	0.0300	0.0200	0	117	70	130			
Cadmium	0.00102	0.00100	0.00100	0	102	70	130			
Calcium	0.0962	0.300	0.100	0	96.2	70	130			
Chromium	0.00491	0.00500	0.00500	0	98.2	70	130			
Cobalt	0.00526	0.00500	0.00500	0	105	70	130			
Lead	0.000928	0.00100	0.00100	0	92.8	70	130			
Lithium	0.00949	0.0100	0.0100	0	94.9	70	130			
Molybdenum	0.00486	0.00500	0.00500	0	97.1	70	130			
Selenium	0.00519	0.00500	0.00500	0	104	70	130			
Thallium	0.000958	0.00150	0.00100	0	95.8	70	130			

Sample ID **CCV7-170107**	Batch ID: **R89825**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_170107D**	Analysis Date: **1/7/2017 8:24:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.200	0.00250	0.200	0	100	90	110			
Arsenic	0.219	0.00500	0.200	0	110	90	110			
Barium	0.200	0.0100	0.200	0	100	90	110			
Beryllium	0.209	0.00100	0.200	0	104	90	110			
Cadmium	0.204	0.00100	0.200	0	102	90	110			
Chromium	0.203	0.00500	0.200	0	102	90	110			
Cobalt	0.211	0.00500	0.200	0	106	90	110			
Lead	0.204	0.00100	0.200	0	102	90	110			
Lithium	0.202	0.0100	0.200	0	101	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1612246
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_170107D

Sample ID **CCV7-170107**	Batch ID: **R89825**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_170107D**	Analysis Date: **1/7/2017 8:24:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Molybdenum	0.196	0.00500	0.200	0	97.9	90	110			
Selenium	0.218	0.00500	0.200	0	109	90	110			
Thallium	0.201	0.00150	0.200	0	101	90	110			

Sample ID **LCVL7-170107**	Batch ID: **R89825**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_170107D**	Analysis Date: **1/7/2017 8:33:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00182	0.00250	0.00200	0	91.2	70	130			
Arsenic	0.00542	0.00500	0.00500	0	108	70	130			
Barium	0.00483	0.0100	0.00500	0	96.5	70	130			
Beryllium	0.00115	0.00100	0.00100	0	115	70	130			
Cadmium	0.00102	0.00100	0.00100	0	102	70	130			
Chromium	0.00494	0.00500	0.00500	0	98.7	70	130			
Cobalt	0.00514	0.00500	0.00500	0	103	70	130			
Lead	0.000931	0.00100	0.00100	0	93.1	70	130			
Lithium	0.0101	0.0100	0.0100	0	101	70	130			
Molybdenum	0.00461	0.00500	0.00500	0	92.2	70	130			
Selenium	0.00587	0.00500	0.00500	0	117	70	130			
Thallium	0.000962	0.00150	0.00100	0	96.2	70	130			

Sample ID **CCV12-170107**	Batch ID: **R89825**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_170107D**	Analysis Date: **1/7/2017 11:26:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.202	0.0100	0.200	0	101	90	110			
Beryllium	0.209	0.00100	0.200	0	105	90	110			
Cadmium	0.205	0.00100	0.200	0	103	90	110			
Chromium	0.203	0.00500	0.200	0	102	90	110			
Cobalt	0.214	0.00500	0.200	0	107	90	110			
Lithium	0.201	0.0100	0.200	0	101	90	110			
Selenium	0.219	0.00500	0.200	0	109	90	110			
Thallium	0.204	0.00150	0.200	0	102	90	110			

Sample ID **LCVL12-170107**	Batch ID: **R89825**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_170107D**	Analysis Date: **1/7/2017 11:30:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.00499	0.0100	0.00500	0	99.8	70	130			
Beryllium	0.00113	0.00100	0.00100	0	113	70	130			
Cadmium	0.00110	0.00100	0.00100	0	110	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank
J	Analyte detected between MDL and RL
ND	Not Detected at the Method Detection Limit
RL	Reporting Limit
J	Analyte detected between SDL and RL
DF	Dilution Factor
MDL	Method Detection Limit
R	RPD outside accepted control limits
S	Spike Recovery outside control limits
N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1612246
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_170107D

Sample ID	**LCVL12-170107**	Batch ID:	**R89825**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_170107D**	Analysis Date:	**1/7/2017 11:30:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chromium	0.00503	0.00500	0.00500	0	101	70	130			
Cobalt	0.00540	0.00500	0.00500	0	108	70	130			
Lithium	0.00995	0.0100	0.0100	0	99.5	70	130			
Selenium	0.00604	0.00500	0.00500	0	121	70	130			
Thallium	0.00109	0.00150	0.00100	0	109	70	130			

Sample ID	**CCV13-170107**	Batch ID:	**R89825**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_170107D**	Analysis Date:	**1/8/2017 12:01:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.200	0.0100	0.200	0	100	90	110			
Beryllium	0.209	0.00100	0.200	0	104	90	110			
Cadmium	0.204	0.00100	0.200	0	102	90	110			
Chromium	0.203	0.00500	0.200	0	102	90	110			
Cobalt	0.210	0.00500	0.200	0	105	90	110			
Lithium	0.193	0.0100	0.200	0	96.6	90	110			
Selenium	0.220	0.00500	0.200	0	110	90	110			
Thallium	0.203	0.00150	0.200	0	102	90	110			

Sample ID	**LCVL13-170107**	Batch ID:	**R89825**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_170107D**	Analysis Date:	**1/8/2017 12:05:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.00515	0.0100	0.00500	0	103	70	130			
Beryllium	0.00124	0.00100	0.00100	0	124	70	130			
Cadmium	0.00108	0.00100	0.00100	0	108	70	130			
Chromium	0.00509	0.00500	0.00500	0	102	70	130			
Cobalt	0.00540	0.00500	0.00500	0	108	70	130			
Lithium	0.00977	0.0100	0.0100	0	97.7	70	130			
Selenium	0.00649	0.00500	0.00500	0	130	70	130			
Thallium	0.00106	0.00150	0.00100	0	106	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1612246
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_170108C

The QC data in batch 78492 applies to the following samples: 1612246-01A, 1612246-02A, 1612246-03A, 1612246-04A, 1612246-05A, 1612246-06A, 1612246-07A, 1612246-08A, 1612246-09A, 1612246-10A, 1612246-11A, 1612246-12A

Sample ID **1612246-04A SD** Batch ID: **78492** TestNo: **SW6020A** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS4_170108C** Analysis Date: **1/8/2017 1:51:00 PM** Prep Date: **12/28/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	339	150	0	339				0.120	10	

Sample ID **1612246-04A PDS** Batch ID: **78492** TestNo: **SW6020A** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS4_170108C** Analysis Date: **1/8/2017 2:12:00 PM** Prep Date: **12/28/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	817	30.0	5.00	339	9550	80	120			S

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1612246
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_170108C

Sample ID	**ICV-170108**	Batch ID:	**R89833**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**ICP-MS4_170108C**	Analysis Date:	**1/8/2017 11:44:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.104	0.0300	0.100	0	104	90	110			
Calcium	2.27	0.300	2.50	0	90.9	90	110			

Sample ID	**LCVL-170108**	Batch ID:	**R89833**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_170108C**	Analysis Date:	**1/8/2017 11:49:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0195	0.0300	0.0200	0	97.3	70	130			
Calcium	0.0957	0.300	0.100	0	95.7	70	130			

Sample ID	**CCV2-170108**	Batch ID:	**R89833**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_170108C**	Analysis Date:	**1/8/2017 1:02:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.212	0.0300	0.200	0	106	90	110			
Calcium	4.72	0.300	5.00	0	94.5	90	110			

Sample ID	**LCVL2-170108**	Batch ID:	**R89833**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_170108C**	Analysis Date:	**1/8/2017 1:06:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0189	0.0300	0.0200	0	94.3	70	130			
Calcium	0.0988	0.300	0.100	0	98.8	70	130			

Sample ID	**CCV3-170108**	Batch ID:	**R89833**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_170108C**	Analysis Date:	**1/8/2017 1:41:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.207	0.0300	0.200	0	103	90	110			
Calcium	4.80	0.300	5.00	0	95.9	90	110			

Sample ID	**LCVL3-170108**	Batch ID:	**R89833**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_170108C**	Analysis Date:	**1/8/2017 1:45:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0151	0.0300	0.0200	0	75.3	70	130			
Calcium	0.0987	0.300	0.100	0	98.7	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1612246
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_170108C

Sample ID	**CCV4-170108**	Batch ID:	**R89833**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_170108C**	Analysis Date:	**1/8/2017 2:17:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.79	0.300	5.00	0	95.7	90	110			

Sample ID	**LCVL4-170108**	Batch ID:	**R89833**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_170108C**	Analysis Date:	**1/8/2017 2:21:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.0957	0.300	0.100	0	95.7	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1612246
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_170111E

Sample ID **ICV-170111**	Batch ID: **R89913**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS4_170111E**	Analysis Date: **1/11/2017 1:37:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.101	0.00250	0.100	0	101	90	110			
Arsenic	0.0975	0.00500	0.100	0	97.5	90	110			
Lead	0.0975	0.00100	0.100	0	97.5	90	110			
Molybdenum	0.0993	0.00500	0.100	0	99.3	90	110			

Sample ID **LCVL-170111**	Batch ID: **R89913**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_170111E**	Analysis Date: **1/11/2017 1:41:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00197	0.00250	0.00200	0	98.4	70	130			
Arsenic	0.00484	0.00500	0.00500	0	96.7	70	130			
Lead	0.00108	0.00100	0.00100	0	108	70	130			
Molybdenum	0.00522	0.00500	0.00500	0	104	70	130			

Sample ID **CCV7-170111**	Batch ID: **R89913**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_170111E**	Analysis Date: **1/11/2017 8:23:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.205	0.00250	0.200	0	103	90	110			
Arsenic	0.198	0.00500	0.200	0	99.2	90	110			
Lead	0.191	0.00100	0.200	0	95.3	90	110			
Molybdenum	0.199	0.00500	0.200	0	99.6	90	110			

Sample ID **LCVL7-170111**	Batch ID: **R89913**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_170111E**	Analysis Date: **1/11/2017 8:27:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00205	0.00250	0.00200	0	102	70	130			
Arsenic	0.00477	0.00500	0.00500	0	95.3	70	130			
Lead	0.000996	0.00100	0.00100	0	99.6	70	130			
Molybdenum	0.00504	0.00500	0.00500	0	101	70	130			

Sample ID **CCV8-170111**	Batch ID: **R89913**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_170111E**	Analysis Date: **1/11/2017 8:51:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.204	0.00250	0.200	0	102	90	110			
Arsenic	0.197	0.00500	0.200	0	98.7	90	110			
Lead	0.190	0.00100	0.200	0	95.1	90	110			
Molybdenum	0.196	0.00500	0.200	0	98.1	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1612246
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_170111E

Sample ID **LCVL8-170111** Batch ID: **R89913** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS4_170111E** Analysis Date: **1/11/2017 8:55:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00202	0.00250	0.00200	0	101	70	130			
Arsenic	0.00477	0.00500	0.00500	0	95.5	70	130			
Lead	0.000942	0.00100	0.00100	0	94.2	70	130			
Molybdenum	0.00488	0.00500	0.00500	0	97.7	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank
J	Analyte detected between MDL and RL
ND	Not Detected at the Method Detection Limit
RL	Reporting Limit
J	Analyte detected between SDL and RL
DF	Dilution Factor
MDL	Method Detection Limit
R	RPD outside accepted control limits
S	Spike Recovery outside control limits
N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1612246
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC4_161229A

The QC data in batch 78518 applies to the following samples: 1612246-01D, 1612246-02D, 1612246-03D, 1612246-04D, 1612246-05D, 1612246-06D, 1612246-07D, 1612246-08D, 1612246-09D, 1612246-10D, 1612246-11D, 1612246-12D

Sample ID **LCS-78518** Batch ID: **78518** TestNo: **E300** Units: **mg/L**
SampType: **LCS** Run ID: **IC4_161229A** Analysis Date: **12/29/2016 10:21:13 A** Prep Date: **12/29/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.85	1.00	10.00	0	98.5	90	110			
Fluoride	3.79	0.400	4.000	0	94.8	90	110			
Sulfate	29.8	3.00	30.00	0	99.4	90	110			

Sample ID **LCSD-78518** Batch ID: **78518** TestNo: **E300** Units: **mg/L**
SampType: **LCSD** Run ID: **IC4_161229A** Analysis Date: **12/29/2016 10:36:13 A** Prep Date: **12/29/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.69	1.00	10.00	0	96.9	90	110	1.63	20	
Fluoride	3.73	0.400	4.000	0	93.1	90	110	1.77	20	
Sulfate	29.9	3.00	30.00	0	99.6	90	110	0.179	20	

Sample ID **MB-78518** Batch ID: **78518** TestNo: **E300** Units: **mg/L**
SampType: **MBLK** Run ID: **IC4_161229A** Analysis Date: **12/29/2016 2:17:16 PM** Prep Date: **12/29/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	<0.300	1.00								
Fluoride	<0.100	0.400								
Sulfate	<1.00	3.00								

Sample ID **1612246-02DMS** Batch ID: **78518** TestNo: **E300** Units: **mg/L**
SampType: **MS** Run ID: **IC4_161229A** Analysis Date: **12/29/2016 5:14:14 PM** Prep Date: **12/29/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2490	100	2000	636.5	92.6	90	110			
Fluoride	1960	40.0	2000	0	97.8	90	110			
Sulfate	2490	300	2000	612.9	93.8	90	110			

Sample ID **1612246-02DMSD** Batch ID: **78518** TestNo: **E300** Units: **mg/L**
SampType: **MSD** Run ID: **IC4_161229A** Analysis Date: **12/29/2016 5:29:14 PM** Prep Date: **12/29/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2460	100	2000	636.5	91.3	90	110	1.09	20	
Fluoride	1950	40.0	2000	0	97.3	90	110	0.521	20	
Sulfate	2450	300	2000	612.9	92.1	90	110	1.41	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1612246
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC4_161229A

Sample ID **1612246-03DMS**	Batch ID: **78518**	TestNo: **E300**	Units: **mg/L**
SampType: **MS**	Run ID: **IC4_161229A**	Analysis Date: **12/29/2016 5:59:14 PM**	Prep Date: **12/29/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	277	10.0	200.0	95.44	90.6	90	110			
Fluoride	195	4.00	200.0	0	97.5	90	110			
Sulfate	248	30.0	200.0	49.27	99.2	90	110			

Sample ID **1612246-03DMSD**	Batch ID: **78518**	TestNo: **E300**	Units: **mg/L**
SampType: **MSD**	Run ID: **IC4_161229A**	Analysis Date: **12/29/2016 6:14:14 PM**	Prep Date: **12/29/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	278	10.0	200.0	95.44	91.2	90	110	0.490	20	
Fluoride	196	4.00	200.0	0	98.1	90	110	0.607	20	
Sulfate	249	30.0	200.0	49.27	99.9	90	110	0.581	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1612246
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC4_161229A

Sample ID **ICV-161229**	Batch ID: **R89718**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC4_161229A**	Analysis Date: **12/29/2016 9:25:55 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	24.0	1.00	25.00	0	96.0	90	110			
Fluoride	9.23	0.400	10.00	0	92.3	90	110			
Sulfate	74.9	3.00	75.00	0	99.8	90	110			

Sample ID **CCV1-161229**	Batch ID: **R89718**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC4_161229A**	Analysis Date: **12/29/2016 1:42:05 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.97	1.00	10.00	0	99.7	90	110			
Fluoride	3.79	0.400	4.000	0	94.7	90	110			
Sulfate	32.3	3.00	30.00	0	108	90	110			

Sample ID **CCV2-161229**	Batch ID: **R89718**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC4_161229A**	Analysis Date: **12/29/2016 7:29:14 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.2	1.00	10.00	0	102	90	110			
Fluoride	3.93	0.400	4.000	0	98.3	90	110			
Sulfate	30.1	3.00	30.00	0	100	90	110			

Sample ID **CCV3-161229**	Batch ID: **R89718**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC4_161229A**	Analysis Date: **12/29/2016 9:29:14 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.0	1.00	10.00	0	100	90	110			
Fluoride	3.87	0.400	4.000	0	96.7	90	110			
Sulfate	30.1	3.00	30.00	0	100	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1612246
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_161223A

The QC data in batch 78459 applies to the following samples: 1612246-01D, 1612246-02D, 1612246-03D, 1612246-04D, 1612246-05D, 1612246-06D, 1612246-07D, 1612246-08D, 1612246-09D, 1612246-10D, 1612246-11D, 1612246-12D

Sample ID	**1612244-01A-DUP**	Batch ID:	**78459**	TestNo:	**M4500-H+ B**	Units:	**pH Units@18℃**
SampType:	**DUP**	Run ID:	**TITRATOR_161223A**	Analysis Date:	**12/23/2016 10:57:00 A**	Prep Date:	**12/23/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	7.49	0	0	7.410				1.07	5	

Sample ID	**1612246-09D-DUP**	Batch ID:	**78459**	TestNo:	**M4500-H+ B**	Units:	**pH Units@18.3℃**
SampType:	**DUP**	Run ID:	**TITRATOR_161223A**	Analysis Date:	**12/23/2016 11:17:00 A**	Prep Date:	**12/23/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.12	0	0	6.140				0.326	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1612246
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_161223A

Sample ID	**ICV-161223**	Batch ID:	**R89624**	TestNo:	**M4500-H+ B**	Units:	**pH Units@21.5℃**
SampType:	**ICV**	Run ID:	**TITRATOR_161223A**	Analysis Date:	**12/23/2016 9:49:00 AM**	Prep Date:	**12/23/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	9.94	0	10.00	0	99.4	99	101			

Sample ID	**CCV1-161223**	Batch ID:	**R89624**	TestNo:	**M4500-H+ B**	Units:	**pH Units@20.8℃**
SampType:	**CCV**	Run ID:	**TITRATOR_161223A**	Analysis Date:	**12/23/2016 11:12:00 A**	Prep Date:	**12/23/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.98	0	7.000	0	99.7	97.1	102.9			

Sample ID	**CCV2-161223**	Batch ID:	**R89624**	TestNo:	**M4500-H+ B**	Units:	**pH Units@21.5℃**
SampType:	**CCV**	Run ID:	**TITRATOR_161223A**	Analysis Date:	**12/23/2016 12:10:00 P**	Prep Date:	**12/23/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.99	0	7.000	0	99.9	97.1	102.9			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1612246
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: WC_161222A

The QC data in batch 78447 applies to the following samples: 1612246-01D, 1612246-02D, 1612246-03D, 1612246-04D, 1612246-05D, 1612246-06D, 1612246-07D

Sample ID	**MB-78447**	Batch ID:	**78447**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**WC_161222A**	Analysis Date:	**12/23/2016 8:39:00 AM**	Prep Date:	**12/22/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	<10.0	10.0								

Sample ID	**LCS-78447**	Batch ID:	**78447**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**WC_161222A**	Analysis Date:	**12/23/2016 8:39:00 AM**	Prep Date:	**12/22/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	747	10.0	745.6	0	100	90	113			

Sample ID	**1612206-01D-DUP**	Batch ID:	**78447**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_161222A**	Analysis Date:	**12/23/2016 8:39:00 AM**	Prep Date:	**12/22/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	555	10.0	0	539.0				2.93	5	

Sample ID	**1612246-05D-DUP**	Batch ID:	**78447**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_161222A**	Analysis Date:	**12/23/2016 8:39:00 AM**	Prep Date:	**12/22/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	3300	50.0	0	3400				3.14	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1612246
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: WC_161227C

The QC data in batch 78478 applies to the following samples: 1612246-08D, 1612246-09D, 1612246-10D, 1612246-11D, 1612246-12D

Sample ID	**MB-78478**	Batch ID:	**78478**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**WC_161227C**	Analysis Date:	**12/28/2016 8:41:00 AM**	Prep Date:	**12/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	<10.0	10.0								

Sample ID	**LCS-78478**	Batch ID:	**78478**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**WC_161227C**	Analysis Date:	**12/28/2016 8:41:00 AM**	Prep Date:	**12/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	750	10.0	745.6	0	101	90	113			

Sample ID	**1612246-12D-DUP**	Batch ID:	**78478**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_161227C**	Analysis Date:	**12/28/2016 8:41:00 AM**	Prep Date:	**12/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	3990	50.0	0	4125				3.45	5	

Sample ID	**1612277-01D-DUP**	Batch ID:	**78478**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_161227C**	Analysis Date:	**12/28/2016 8:41:00 AM**	Prep Date:	**12/27/2016**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	915	50.0	0	905.0				1.10	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

NJ OK001

Case Narrative

Lab No: 20161275

This report contains the analytical results for the 12 sample(s) received under chain of custody by ESC Lab Sciences on 12/27/2016 10:37:37 AM. These samples are associated with your 1612246 project.

The analytical results included in this report meet all applicable quality control procedure requirements except as noted below:

The test results in this report meet all NELAC requirements unless noted below:

This report shall not be reproduced, except in full, without the written approval of ESC Lab Sciences.

All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client.

Results have been reviewed by the Director of Radiochemistry or their designees and is approved for release.

Observations / Nonconformances

L880948

OUTREACH LABORATORY, A Divsion of ESC Lab Sciences
Address: 311 North Aspen Avenue, Broken Arrow, OK, 74012 EMail: outreach@esclabsciences.com - Tel: (918) 251-2515

Analytical Report

	Method	Result	DL	Units	Qual	Prep Date	Analysis Date	Analyst
Lab ID : 20161275-01								
Client ID : AX-24								
Date Sampled : 12/21/2016 10:50:00 AM								
Matrix : NPW								
Radiochemical Analyses								
Combined Radium		2.15 +/- 1.25	0.881	pCi/l				
Radium-226	SM 7500 Ra B M*	0.286 +/- 0.171	0.202	pCi/l		01/18/17	01/20/17	AK
Radium-228	EPA 904*/9320*	1.86 +/- 1.08	0.679	pCi/l		01/19/17	01/26/17	JR
Lab ID : 20161275-02								
Client ID : AX-25								
Date Sampled : 12/21/2016 11:50:00 AM								
Matrix : NPW								
Radiochemical Analyses								
Combined Radium		2.52 +/- 1.25	0.846	pCi/l				
Radium-226	SM 7500 Ra B M*	0.440 +/- 0.192	0.176	pCi/l		01/18/17	01/20/17	AK
Radium-228	EPA 904*/9320*	2.08 +/- 1.06	0.670	pCi/l		01/19/17	01/26/17	JR
Lab ID : 20161275-03								
Client ID : AX-22R								
Date Sampled : 12/21/2016 12:55:00 PM								
Matrix : NPW								
Radiochemical Analyses								
Combined Radium		1.32 +/- 0.724	0.949	pCi/l				
Radium-226	SM 7500 Ra B M*	0.308 +/- 0.169	0.175	pCi/l		01/18/17	01/20/17	AK
Radium-228	EPA 904*/9320*	1.01 +/- 0.555	0.774	pCi/l		01/19/17	01/26/17	JR
Lab ID : 20161275-04								
Client ID : AX-29								
Date Sampled : 12/21/2016 2:05:00 PM								
Matrix : NPW								
Radiochemical Analyses								
Combined Radium		2.05 +/- 0.715	0.914	pCi/l				
Radium-226	SM 7500 Ra B M*	0.457 +/- 0.180	0.158	pCi/l		01/18/17	01/20/17	AK
Radium-228	EPA 904*/9320*	1.59 +/- 0.535	0.756	pCi/l		01/19/17	01/26/17	JR

Analytical Report

	Method	Result	DL	Units	Qual	Prep Date	Analysis Date	Analyst
Lab ID : **20161275-05**								
Client ID : **AX-28**								
Date Sampled : **12/21/2016 2:45:00 PM**								
Matrix : **NPW**								
Radiochemical Analyses								
Combined Radium		1.27 +/- 0.677	0.919	pCi/l				
Radium-226	SM 7500 Ra B M*	0.338 +/- 0.161	0.177	pCi/l		01/18/17	01/20/17	AK
Radium-228	EPA 904*/9320*	0.928 +/- 0.516	0.742	pCi/l		01/19/17	01/26/17	JR
Lab ID : **20161275-06**								
Client ID : **AX-23**								
Date Sampled : **12/21/2016 3:40:00 PM**								
Matrix : **NPW**								
Radiochemical Analyses								
Combined Radium		0.967 +/- 0.724	1.014	pCi/l				
Radium-226	SM 7500 Ra B M*	0.462 +/- 0.232	0.265	pCi/l		01/18/17	01/20/17	AK
Radium-228	EPA 904*/9320*	0.505 +/- 0.492	0.749	pCi/l		01/19/17	01/26/17	JR
Lab ID : **20161275-07**								
Client ID : **EB-01**								
Date Sampled : **12/21/2016 10:00:00 AM**								
Matrix : **NPW**								
Radiochemical Analyses								
Combined Radium		0.000 +/- 0.498	0.735	pCi/l				
Radium-226	SM 7500 Ra B M*	-0.032 +/- 0.089	0.179	pCi/l		01/19/17	01/23/17	AK
Radium-228	EPA 904*/9320*	-0.291 +/- 0.409	0.556	pCi/l		01/19/17	01/26/17	JR
Lab ID : **20161275-08**								
Client ID : **AXMW-1**								
Date Sampled : **12/22/2016 10:35:00 AM**								
Matrix : **NPW**								
Radiochemical Analyses								
Combined Radium		2.31 +/- 0.707	0.782	pCi/l				
Radium-226	SM 7500 Ra B M*	1.02 +/- 0.261	0.166	pCi/l		01/19/17	01/23/17	AK
Radium-228	EPA 904*/9320*	1.29 +/- 0.446	0.616	pCi/l		01/19/17	01/26/17	JR

Analytical Report

	Method	Result	DL	Units	Qual	Prep Date	Analysis Date	Analyst
Lab ID : 20161275-09								
Client ID : AXMW-2								
Date Sampled : 12/22/2016 12:35:00 PM								
Matrix : NPW								
		Radiochemical Analyses						
Combined Radium		0.984 +/- 0.625	0.863	pCi/l				
Radium-226	SM 7500 Ra B M*	0.132 +/- 0.152	0.225	pCi/l		01/19/17	01/23/17	AK
Radium-228	EPA 904*/9320*	0.852 +/- 0.473	0.638	pCi/l		01/19/17	01/26/17	JR
Lab ID : 20161275-10								
Client ID : AX-27								
Date Sampled : 12/22/2016 1:20:00 PM								
Matrix : NPW								
		Radiochemical Analyses						
Combined Radium		1.90 +/- 0.664	0.944	pCi/l				
Radium-226	SM 7500 Ra B M*	0.414 +/- 0.225	0.288	pCi/l		01/19/17	01/23/17	AK
Radium-228	EPA 904*/9320*	1.49 +/- 0.439	0.656	pCi/l		01/19/17	01/26/17	JR
Lab ID : 20161275-11								
Client ID : AX-26								
Date Sampled : 12/22/2016 2:25:00 PM								
Matrix : NPW								
		Radiochemical Analyses						
Combined Radium		0.900 +/- 0.816	1.19	pCi/l				
Radium-226	SM 7500 Ra B M*	0.534 +/- 0.185	0.144	pCi/l		01/19/17	01/23/17	AK
Radium-228	EPA 904*/9320*	0.366 +/- 0.631	1.05	pCi/l		01/19/17	01/26/17	JR
Lab ID : 20161275-12								
Client ID : MW-1								
Date Sampled : 12/22/2016								
Matrix : NPW								
		Radiochemical Analyses						
Combined Radium		1.89 +/- 0.732	1.03	pCi/l				
Radium-226	SM 7500 Ra B M*	1.08 +/- 0.264	0.181	pCi/l		01/19/17	01/23/17	AK
Radium-228	EPA 904*/9320*	0.806 +/- 0.468	0.846	pCi/l		01/19/17	01/26/17	JR

QC Report

Parameter	Blank	LCS %REC	LCSD %REC	LCSD RPD	DUP RPD	RER, NAD or DER	MS %REC	MSD %REC	MSD RPD	Batch ID
Radium-226	0.002	103.0			NC	0.547	94.2	108.0	13.6	R1181
Radium-226	-0.007	107.0			NC	0.682	106.0	109.0	1.9	R1180
Radium-228	0.409	92.0			7.2	0.082	96.4	113.0	15.8	R3911

Lab Approval: _____

DHL Analytical, Inc.
2300 Double Creek Drive
Round Rock, TX 78664
TEL: *(512) 388-8222* FAX: *(512) 388-8229*

CHAIN-OF-CUSTODY REC

Work Order: 1612246

Subcontractor:

ESC Laboratory
311 North Aspen
Broken Arrow, Oklahoma 74012

TEL: (918) 251-2515
FAX:
Acct #: DHLRRTX

	Sample Id	Matrix	DHL#	Date Collected	Bottle Type	Requested Tests E904.0	SM7500Ra-B M		
1	AX-24	Aqueous	-01B	12/21/16 10:50 AM	1LHDPEHNO3	1			
	AX-24	Aqueous	-01C	12/21/16 10:50 AM	500HDPEHNO3		1		
2	AX-25	Aqueous	-02B	12/21/16 11:50 AM	1LHDPEHNO3	1			
	AX-25	Aqueous	-02C	12/21/16 11:50 AM	500HDPEHNO3		1		
3	AX-22R	Aqueous	-03B	12/21/16 12:55 PM	1LHDPEHNO3	1			
	AX-22R	Aqueous	-03C	12/21/16 12:55 PM	500HDPEHNO3		1		
4	AX-29	Aqueous	-04B	12/21/16 02:05 PM	1LHDPEHNO3	1			
	AX-29	Aqueous	-04C	12/21/16 02:05 PM	500HDPEHNO3		1		
5	AX-28	Aqueous	-05B	12/21/16 02:45 PM	1LHDPEHNO3	1			
	AX-28	Aqueous	-05C	12/21/16 02:45 PM	500HDPEHNO3		1		
6	AX-23	Aqueous	-06B	12/21/16 03:40 PM	1LHDPEHNO3	1			
	AX-23	Aqueous	-06C	12/21/16 03:40 PM	500HDPEHNO3		1		
7	EB-01	Equip Blank	-07B	12/21/16 10:00 AM	1LHDPEHNO3	1			
	EB-01	Equip Blank	-07C	12/21/16 10:00 AM	500HDPEHNO3		1		
8	AXMW-1	Aqueous	-08B	12/22/16 10:35 AM	1LHDPEHNO3	1			
	AXMW-1	Aqueous	-08C	12/22/16 10:35 AM	500HDPEHNO3		1		
9	AXMW-2	Aqueous	-09B	12/22/16 12:35 PM	1LHDPEHNO3	1			
	AXMW-2	Aqueous	-09C	12/22/16 12:35 PM	500HDPEHNO3		1		

General Comments:

Please analyze these samples with Normal Turnaround Time.
Report RA-226, Ra-228 & Combined per Specs.
Quality Control Package Needed: Standard - NELAC Rad Test compliant
Email to cac@dhlanalytical.com & dupont@dhlanalytical.com

C

	Date/Time		
Relinquished by:	12/22/16 1730	Received by:	Lonestar
Relinquished by:		Received by:	

DHL Analytical, Inc.
2300 Double Creek Drive
Round Rock, TX 78664
TEL: *(512) 388-8222* FAX: *(512) 388-8229*

CHAIN-OF-CUSTODY REC

Work Order: 1612246

Subcontractor:

ESC Laboratory
311 North Aspen
Broken Arrow, Oklahoma 74012

TEL: (918) 251-2515
FAX:
Acct #: DHLRRTX

	Sample Id	Matrix	DHL#	Date Collected	Bottle Type	Requested Tests E904.0	SM7500Ra-B M		
10	AX-27	Aqueous	-10B	12/22/16 01:20 PM	1LHDPEHNO3	1			
	AX-27	Aqueous	-10C	12/22/16 01:20 PM	500HDPEHNO3		1		
11	AX-26	Aqueous	-11B	12/22/16 02:25 PM	1LHDPEHNO3	1			
	AX-26	Aqueous	-11C	12/22/16 02:25 PM	500HDPEHNO3		1		
12	MW-1	Aqueous	-12B	12/22/16	1LHDPEHNO3	1			
	MW-1	Aqueous	-12C	12/22/16	500HDPEHNO3		1		

General Comments:

Please analyze these samples with Normal Turnaround Time.
Report RA-226, Ra-228 & Combined per Specs.
Quality Control Package Needed: Standard - NELAC Rad Test compliant
Email to cac@dhlanalytical.com & dupont@dhlanalytical.com

		Date/Time		
Relinquished by:		12/22/16 1730	**Received by:**	
Relinquished by:			**Received by:**	

12/16/12

SAMPLE LOGIN

Date Received: *12/27/2016 10:37:* **Lab Number:** **20161275**

Sample Number	Client Sample ID	Matrix	Date Sampled	Container Type	Container Size	Preservation	Pres Upo
20161275-01 B	AX-24	NPW	12/21/16	Plastic	1 L	HNO3, pH < 2	
20161275-01 A	AX-24	NPW	12/21/16	Plastic	500 ml	HNO3, pH < 2	
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20161275-02 A	AX-25	NPW	12/21/16	Plastic	500 ml	HNO3, pH < 2	
20161275-02 B	AX-25	NPW	12/21/16	Plastic	1 L	HNO3, pH < 2	
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20161275-03 A	AX-22R	NPW	12/21/16	Plastic	500 ml	HNO3, pH < 2	
20161275-03 B	AX-22R	NPW	12/21/16	Plastic	1 L	HNO3, pH < 2	
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20161275-04 A	AX-29	NPW	12/21/16	Plastic	500 ml	HNO3, pH < 2	
20161275-04 B	AX-29	NPW	12/21/16	Plastic	1 L	HNO3, pH < 2	
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20161275-05 A	AX-28	NPW	12/21/16	Plastic	500 ml	HNO3, pH < 2	
20161275-05 B	AX-28	NPW	12/21/16	Plastic	1 L	HNO3, pH < 2	
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20161275-06 B	AX-23	NPW	12/21/16	Plastic	1 L	HNO3, pH < 2	
20161275-06 A	AX-23	NPW	12/21/16	Plastic	500 ml	HNO3, pH < 2	
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				
20161275-07 B	EB-01	NPW	12/21/16	Plastic	1 L	HNO3, pH < 2	
20161275-07 A	EB-01	NPW	12/21/16	Plastic	500 ml	HNO3, pH < 2	
Radium-226			SM 7500 Ra B M*				
Radium-228			EPA 904*/9320*				

20161275-08 A	AXMW-1	NPW	12/22/16	Plastic	500 ml	HNO3, pH < 2
20161275-08 B	AXMW-1	NPW	12/22/16	Plastic	1 L	HNO3, pH < 2
Radium-226			SM 7500 Ra B M*			
Radium-228			EPA 904*/9320*			
20161275-09 A	AXMW-2	NPW	12/22/16	Plastic	500 ml	HNO3, pH < 2
20161275-09 B	AXMW-2	NPW	12/22/16	Plastic	1 L	HNO3, pH < 2
Radium-226			SM 7500 Ra B M*			
Radium-228			EPA 904*/9320*			
20161275-10 A	AX-27	NPW	12/22/16	Plastic	500 ml	HNO3, pH < 2
20161275-10 B	AX-27	NPW	12/22/16	Plastic	1 L	HNO3, pH < 2
Radium-226			SM 7500 Ra B M*			
Radium-228			EPA 904*/9320*			
20161275-11 A	AX-26	NPW	12/22/16	Plastic	500 ml	HNO3, pH < 2
20161275-11 B	AX-26	NPW	12/22/16	Plastic	1 L	HNO3, pH < 2
Radium-226			SM 7500 Ra B M*			
Radium-228			EPA 904*/9320*			
20161275-12 B	MW-1	NPW	12/22/16	Plastic	1 L	HNO3, pH < 2
20161275-12 A	MW-1	NPW	12/22/16	Plastic	500 ml	HNO3, pH < 2
Radium-226			SM 7500 Ra B M*			
Radium-228			EPA 904*/9320*			

CONTAINER INSPECTION

Coolers 1 Custody Seals Broken Ø Temperature: Amb C Ice Radiation Survey: <300 cpm

SAMPLE INSPECTION

Sample Seal Broken Ø Chain of Custody Record ☑ Labels in Tact ☑ Radiation Survey Complete N/A

Anomalies

Inspected By: _____ DATE 12/27/16

QA or Designee Review: Raymond Thomas DATE _____

Sample Custodian Review: _____ DATE 12/27/16

Project Notes:

Appendix B

Laboratory Analytical Reports – Detection Monitoring Data

October 11, 2017

Will Vienne
Pastor, Behling & Wheeler
2201 Double Creek Dr #4004
Round Rock, Texas 78664
TEL: (512) 671-3434
FAX (512) 671-3446

Order No.: 1710015

RE: Sandow CCR

Dear Will Vienne:

DHL Analytical, Inc. received 9 sample(s) on 10/3/2017 for the analyses presented in the following report.

There were no problems with the analyses and all data met requirements of NELAC except where noted in the Case Narrative. All non-NELAC methods will be identified accordingly in the case narrative and all estimated uncertainties of test results are within method or EPA specifications.

If you have any questions regarding these tests results, please feel free to call. Thank you for using DHL Analytical.

Sincerely,

John DuPont
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-17-19

Table of Contents

DHL ANALYTICAL
2300 Double Creek Dr. ■ Round Rock, TX 78664
Phone (512) 388-8222 ■ FAX (512) 388-8229
Web: www.dhlanalytical.com
E-Mail: login@dhlanalytical.com

№ 77895

CHAIN-OF-CUSTODY

CLIENT: Pastor, Behling & Wheeler LLC
ADDRESS: 2201 Double Creek Drive Ste 4004 Round Rock, TX
PHONE: 512-671-3434 FAX/E-MAIL: will.vienne@pbwllc.com
DATA REPORTED TO: Will Vienne
ADDITIONAL REPORT COPIES TO:

DATE: 10/3/17 PAGE 1 OF 1
PO #: DHL WORK ORDER #: 1710015
PROJECT LOCATION OR NAME: Sandow CCR
CLENT PROJECT #: 5164E COLLECTOR: MH/CH

Authorize 5% surcharge for TRRP Report? ☐ Yes ☐ No

S=SOIL W=WATER A=AIR L=LIQUID SE=SEDIMENT P=PAINT SL=SLUDGE O=OTHER SO=SOLID

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	PRESERVATION HCl	HNO3	H2SO4 ☐ NaOH ☐	ICE	UNPRESERVED	ANALYSES: BTEX ☐ MTBE ☐ [METHOD 8021] / TPH 1005 ☐ TPH 1006 ☐ HOLD 1006 ☐ / GRO [METHOD 8015] ☐ DRO [METHOD 8105] ☐ / VOC 8260 ☐ VOC 624 ☐ VOC 8260/5035 ☐ / SVOC 8270 ☐ PAH 8270 ☐ HOLD PAH ☐ SVOC 625 ☐ / 8270 PEST ☐ 625 PEST/PCB ☐ 608 PCB ☐ 8270 PCB ☐ / 8270 O-P PEST ☐ 8082 PCB ☐ 608 PCB ☐ / 8321 HERB ☐ T PHOS, AMMONIA ☐ / METALS 6020 ☐ METALS 200.8 ☐ DISS. METALS ☐ _____ ☐ / RCRA ☐ TX11 ☐ _____ / PH ☐ HEX CHROM ☐ ALKALINITY ☐ COD ☐ / CHLORIDE ☐ ANIONS _____ ☐ / TCLP-SVOC ☐ VOC ☐ PEST ☐ HERB ☐ / TCLP-METALS ☐ RCRA 8 ☐ TX-11 ☐ Pb ☐ / RCI ☐ FLASHPOINT ☐ DGAS ☐ / TDS ☐ TSS ☐ % MOISTURE ☐ CYANIDE ☐ / See Appendix III - no pH	FIELD NOTES
AX-24	01	10/2/17	1140	W		2		1*		X	1		X
AX-27	02	↓	1450			2		1		X	1		X
AX-28	03		1605			2		1		X	1		X
AX-26	04	↓	1735			2		1		X	1		X
AX-25	05	10/3/17	930			2		1		X	1		X
AXMW-1	06		1120			2		1		X	1		X
AXMW-2	07		1225			2		1		X	1		X
AX-29	08		1405			2		1		X	1		X
AX-23	09	↓	1620			2		1		X	1		X

RELINQUISHED BY: (Signature) DATE/TIME 10/3/17 5:54pm RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)

☐ DHL DISPOSAL @ $5.00 each ☐ Return

3

TURN AROUND TIME
RUSH ☐ CALL FIRST
1 DAY ☐ CALL FIRST
2 DAY ☐
NORMAL ☐
OTHER ☑ by 10/13

LABORATORY USE ONLY:
RECEIVING TEMP: 2.3°C THERM #: 78
CUSTODY SEALS: ☐ BROKEN ☐ INTACT ☒ NOT USED
CARRIER: ☐ LONE STAR ☐ FEDEX ☐ UPS ☐ OTHER
☐ COURIER DELIVERY
☒ HAND DELIVERED

John DuPont

From: Will Vienne <will.vienne@pbwllc.com>
Sent:
To: John DuPont
Cc: John Brayton; Keith Starek; Pat Behling
Subject: CCR Sampling

Follow Up Flag: Follow up
Flag Status: Completed

Hi John,

We are starting the second phase of sampling for the CCR project, which includes sampling the CCR wells on a semi-annual basis. Only Appendix III constituents will be analyzed:

Boron
Calcium
Chloride
Fluoride
Field pH
Sulfate
Total Dissolved Solids

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name **Pastor, Behling & Wheeler** Date Received: **10/3/2017**

Work Order Number **1710015** Received by **JGD**

Checklist completed by: _____ 10/4/2017 (Signature / Date) Reviewed by: 65 10/4/2017 (Initials / Date)

Carrier name Hand Delivered

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	2.3 °C
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH<2 acceptable upon receipt?	Yes ☐	No ☑	NA ☐ LOT # 8086
	Adjusted? Yes		Checked by EL
Water - ph>9 (S) or ph>12 (CN) acceptable upon receipt?	Yes ☐	No ☐	NA ☑ LOT #
	Adjusted? _____		Checked by _____

Any No response must be detailed in the comments section below.

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: Sample AX-24 received with pH>2.

Corrective Action Sample pH adjusted at login w/ HNO3 (Lot #P1750) to pH<2

DHL Analytical, Inc. **Date:** *11-Oct-17*

CLIENT: Pastor, Behling & Wheeler
Project: Sandow CCR
Lab Order: 1710015

CASE NARRATIVE

Samples were analyzed using the methods outlined in the following references:

Method SW6020A - Metals Analysis
Method E300 - Anions Analysis
Method M2540C - TDS Analysis

LOG IN

The samples were received and log-in performed on 10/3/17. A total of 9 samples were received. Nitric acid was added to sample AX-24 upon arrival at DHL Analytical. The samples arrived in good condition and were properly packaged.

METALS ANALYSIS

For Metals analysis performed on 10/9/17 the matrix spike and matrix spike duplicate recoveries were out of control limits for Calcium. These are flagged accordingly in the QC summary report. The sample selected for the matrix spike and matrix spike duplicate was from this work order. The LCS was within control limits for this analyte. No further corrective actions were taken.

For Metals analysis performed on 10/9/17 the PDS recovery was slightly above control limits for Calcium. This is flagged accordingly. The serial dilution was within control limits for this analyte. No further corrective actions were taken.

DHL Analytical, Inc.

Date: *11-Oct-17*

CLIENT: Pastor, Behling & Wheeler
Project: Sandow CCR
Lab Order: 1710015

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
1710015-01	AX-24		10/02/17 11:40 AM	10/3/2017
1710015-02	AX-27		10/02/17 02:50 PM	10/3/2017
1710015-03	AX-28		10/02/17 04:05 PM	10/3/2017
1710015-04	AX-26		10/02/17 05:35 PM	10/3/2017
1710015-05	AX-25		10/03/17 09:30 AM	10/3/2017
1710015-06	AXMW-1		10/03/17 11:20 AM	10/3/2017
1710015-07	AXMW-2		10/03/17 12:25 PM	10/3/2017
1710015-08	AX-29		10/03/17 02:05 PM	10/3/2017
1710015-09	AX-23		10/03/17 04:20 PM	10/3/2017

DHL Analytical, Inc. *11-Oct-17*

Lab Order: 1710015
Client: Pastor, Behling & Wheeler
Project: Sandow CCR

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
1710015-01A	AX-24	10/02/17 11:40 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/06/17 08:19 AM	82680
	AX-24	10/02/17 11:40 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/06/17 08:19 AM	82680
1710015-01B	AX-24	10/02/17 11:40 AM	Aqueous	E300	Anion Preparation	10/05/17 09:38 AM	82668
	AX-24	10/02/17 11:40 AM	Aqueous	E300	Anion Preparation	10/05/17 09:38 AM	82668
	AX-24	10/02/17 11:40 AM	Aqueous	M2540C	TDS Preparation	10/05/17 09:59 AM	82671
1710015-02A	AX-27	10/02/17 02:50 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/06/17 08:19 AM	82680
	AX-27	10/02/17 02:50 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/06/17 08:19 AM	82680
1710015-02B	AX-27	10/02/17 02:50 PM	Aqueous	E300	Anion Preparation	10/05/17 09:38 AM	82668
	AX-27	10/02/17 02:50 PM	Aqueous	E300	Anion Preparation	10/05/17 09:38 AM	82668
	AX-27	10/02/17 02:50 PM	Aqueous	M2540C	TDS Preparation	10/05/17 09:59 AM	82671
1710015-03A	AX-28	10/02/17 04:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/06/17 08:19 AM	82680
	AX-28	10/02/17 04:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/06/17 08:19 AM	82680
1710015-03B	AX-28	10/02/17 04:05 PM	Aqueous	E300	Anion Preparation	10/05/17 09:38 AM	82668
	AX-28	10/02/17 04:05 PM	Aqueous	E300	Anion Preparation	10/05/17 09:38 AM	82668
	AX-28	10/02/17 04:05 PM	Aqueous	M2540C	TDS Preparation	10/05/17 09:59 AM	82671
1710015-04A	AX-26	10/02/17 05:35 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/06/17 08:19 AM	82680
	AX-26	10/02/17 05:35 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/06/17 08:19 AM	82680
1710015-04B	AX-26	10/02/17 05:35 PM	Aqueous	E300	Anion Preparation	10/05/17 09:38 AM	82668
	AX-26	10/02/17 05:35 PM	Aqueous	E300	Anion Preparation	10/05/17 09:38 AM	82668
	AX-26	10/02/17 05:35 PM	Aqueous	M2540C	TDS Preparation	10/05/17 09:59 AM	82671
1710015-05A	AX-25	10/03/17 09:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/06/17 08:19 AM	82680
	AX-25	10/03/17 09:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/06/17 08:19 AM	82680
1710015-05B	AX-25	10/03/17 09:30 AM	Aqueous	E300	Anion Preparation	10/05/17 09:38 AM	82668
	AX-25	10/03/17 09:30 AM	Aqueous	E300	Anion Preparation	10/05/17 09:38 AM	82668
	AX-25	10/03/17 09:30 AM	Aqueous	M2540C	TDS Preparation	10/05/17 09:59 AM	82671
1710015-06A	AXMW-1	10/03/17 11:20 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/06/17 08:19 AM	82680
	AXMW-1	10/03/17 11:20 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/06/17 08:19 AM	82680
1710015-06B	AXMW-1	10/03/17 11:20 AM	Aqueous	E300	Anion Preparation	10/05/17 09:38 AM	82668

DHL Analytical, Inc.

11-Oct-17

Lab Order: 1710015
Client: Pastor, Behling & Wheeler
Project: Sandow CCR

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
1710015-06B	AXMW-1	10/03/17 11:20 AM	Aqueous	E300	Anion Preparation	10/05/17 09:38 AM	82668
	AXMW-1	10/03/17 11:20 AM	Aqueous	M2540C	TDS Preparation	10/05/17 09:59 AM	82671
1710015-07A	AXMW-2	10/03/17 12:25 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/06/17 08:19 AM	82680
	AXMW-2	10/03/17 12:25 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/06/17 08:19 AM	82680
1710015-07B	AXMW-2	10/03/17 12:25 PM	Aqueous	E300	Anion Preparation	10/05/17 09:38 AM	82668
	AXMW-2	10/03/17 12:25 PM	Aqueous	E300	Anion Preparation	10/05/17 09:38 AM	82668
	AXMW-2	10/03/17 12:25 PM	Aqueous	M2540C	TDS Preparation	10/05/17 09:59 AM	82671
1710015-08A	AX-29	10/03/17 02:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/06/17 08:19 AM	82680
	AX-29	10/03/17 02:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/06/17 08:19 AM	82680
1710015-08B	AX-29	10/03/17 02:05 PM	Aqueous	E300	Anion Preparation	10/05/17 09:38 AM	82668
	AX-29	10/03/17 02:05 PM	Aqueous	E300	Anion Preparation	10/05/17 09:38 AM	82668
	AX-29	10/03/17 02:05 PM	Aqueous	M2540C	TDS Preparation	10/05/17 09:59 AM	82671
1710015-09A	AX-23	10/03/17 04:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/06/17 08:19 AM	82680
	AX-23	10/03/17 04:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/06/17 08:19 AM	82680
1710015-09B	AX-23	10/03/17 04:20 PM	Aqueous	E300	Anion Preparation	10/05/17 09:38 AM	82668
	AX-23	10/03/17 04:20 PM	Aqueous	E300	Anion Preparation	10/05/17 09:38 AM	82668
	AX-23	10/03/17 04:20 PM	Aqueous	M2540C	TDS Preparation	10/05/17 09:59 AM	82671

DHL Analytical, Inc. *11-Oct-17*

Lab Order: 1710015
Client: Pastor, Behling & Wheeler
Project: Sandow CCR

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
1710015-01A	AX-24	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	82680	50	10/09/17 01:51 PM	ICP-MS4_171009C
	AX-24	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	82680	1	10/09/17 12:29 PM	ICP-MS4_171009C
1710015-01B	AX-24	Aqueous	E300	Anions by IC method - Water	82668	100	10/05/17 01:38 PM	IC4_171005A
	AX-24	Aqueous	E300	Anions by IC method - Water	82668	1	10/05/17 04:26 PM	IC4_171005A
	AX-24	Aqueous	M2540C	Total Dissolved Solids	82671	1	10/06/17 08:30 AM	WC_171005B
1710015-02A	AX-27	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	82680	1	10/09/17 12:31 PM	ICP-MS4_171009C
	AX-27	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	82680	50	10/09/17 01:53 PM	ICP-MS4_171009C
1710015-02B	AX-27	Aqueous	E300	Anions by IC method - Water	82668	100	10/05/17 02:14 PM	IC4_171005A
	AX-27	Aqueous	E300	Anions by IC method - Water	82668	1	10/05/17 04:38 PM	IC4_171005A
	AX-27	Aqueous	M2540C	Total Dissolved Solids	82671	1	10/06/17 08:30 AM	WC_171005B
1710015-03A	AX-28	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	82680	1	10/09/17 12:33 PM	ICP-MS4_171009C
	AX-28	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	82680	50	10/09/17 01:55 PM	ICP-MS4_171009C
1710015-03B	AX-28	Aqueous	E300	Anions by IC method - Water	82668	1	10/05/17 04:50 PM	IC4_171005A
	AX-28	Aqueous	E300	Anions by IC method - Water	82668	100	10/05/17 02:26 PM	IC4_171005A
	AX-28	Aqueous	M2540C	Total Dissolved Solids	82671	1	10/06/17 08:30 AM	WC_171005B
1710015-04A	AX-26	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	82680	1	10/09/17 12:35 PM	ICP-MS4_171009C
	AX-26	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	82680	50	10/09/17 01:57 PM	ICP-MS4_171009C
1710015-04B	AX-26	Aqueous	E300	Anions by IC method - Water	82668	100	10/05/17 02:38 PM	IC4_171005A
	AX-26	Aqueous	E300	Anions by IC method - Water	82668	1	10/05/17 05:02 PM	IC4_171005A
	AX-26	Aqueous	M2540C	Total Dissolved Solids	82671	1	10/06/17 08:30 AM	WC_171005B
1710015-05A	AX-25	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	82680	50	10/09/17 01:59 PM	ICP-MS4_171009C
	AX-25	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	82680	1	10/09/17 12:37 PM	ICP-MS4_171009C
1710015-05B	AX-25	Aqueous	E300	Anions by IC method - Water	82668	100	10/05/17 02:50 PM	IC4_171005A
	AX-25	Aqueous	E300	Anions by IC method - Water	82668	1	10/05/17 05:14 PM	IC4_171005A
	AX-25	Aqueous	M2540C	Total Dissolved Solids	82671	1	10/06/17 08:30 AM	WC_171005B
1710015-06A	AXMW-1	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	82680	2	10/09/17 12:39 PM	ICP-MS4_171009C
	AXMW-1	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	82680	50	10/09/17 02:01 PM	ICP-MS4_171009C
1710015-06B	AXMW-1	Aqueous	E300	Anions by IC method - Water	82668	100	10/05/17 03:02 PM	IC4_171005A

DHL Analytical, Inc. *11-Oct-17*

Lab Order: 1710015
Client: Pastor, Behling & Wheeler
Project: Sandow CCR

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
1710015-06B	AXMW-1	Aqueous	E300	Anions by IC method - Water	82668	1	10/05/17 05:26 PM	IC4_171005A
	AXMW-1	Aqueous	M2540C	Total Dissolved Solids	82671	1	10/06/17 08:30 AM	WC_171005B
1710015-07A	AXMW-2	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	82680	10	10/09/17 12:41 PM	ICP-MS4_171009C
	AXMW-2	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	82680	50	10/09/17 02:03 PM	ICP-MS4_171009C
1710015-07B	AXMW-2	Aqueous	E300	Anions by IC method - Water	82668	100	10/05/17 03:14 PM	IC4_171005A
	AXMW-2	Aqueous	E300	Anions by IC method - Water	82668	1	10/05/17 05:38 PM	IC4_171005A
	AXMW-2	Aqueous	M2540C	Total Dissolved Solids	82671	1	10/06/17 08:30 AM	WC_171005B
1710015-08A	AX-29	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	82680	1	10/09/17 12:43 PM	ICP-MS4_171009C
	AX-29	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	82680	50	10/09/17 02:05 PM	ICP-MS4_171009C
1710015-08B	AX-29	Aqueous	E300	Anions by IC method - Water	82668	100	10/05/17 03:26 PM	IC4_171005A
	AX-29	Aqueous	E300	Anions by IC method - Water	82668	1	10/05/17 05:50 PM	IC4_171005A
	AX-29	Aqueous	M2540C	Total Dissolved Solids	82671	1	10/06/17 08:30 AM	WC_171005B
1710015-09A	AX-23	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	82680	1	10/09/17 12:26 PM	ICP-MS4_171009C
	AX-23	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	82680	50	10/09/17 01:47 PM	ICP-MS4_171009C
1710015-09B	AX-23	Aqueous	E300	Anions by IC method - Water	82668	10	10/05/17 03:38 PM	IC4_171005A
	AX-23	Aqueous	E300	Anions by IC method - Water	82668	1	10/05/17 06:02 PM	IC4_171005A
	AX-23	Aqueous	M2540C	Total Dissolved Solids	82671	1	10/06/17 08:30 AM	WC_171005B

DHL Analytical, Inc.

Date: *11-Oct-17*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-24
Project:	Sandow CCR	**Lab ID:**	1710015-01
Project No:	5164E	**Collection Date:**	10/02/17 11:40 AM
Lab Order:	1710015	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **SP**
Boron	0.129	0.0100	0.0300		mg/L	1	10/09/17 12:29 PM
Calcium	252	5.00	15.0		mg/L	50	10/09/17 01:51 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	307	30.0	100		mg/L	100	10/05/17 01:38 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	10/05/17 04:26 PM
Sulfate	632	100	300		mg/L	100	10/05/17 01:38 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **BTJ**
Total Dissolved Solids (Residue, Filterable)	1810	50.0	50.0		mg/L	1	10/06/17 08:30 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *11-Oct-17*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-27
Project:	Sandow CCR	**Lab ID:**	1710015-02
Project No:	5164E	**Collection Date:**	10/02/17 02:50 PM
Lab Order:	1710015	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **SP**
Boron	0.206	0.0100	0.0300		mg/L	1	10/09/17 12:31 PM
Calcium	462	5.00	15.0		mg/L	50	10/09/17 01:53 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	652	30.0	100		mg/L	100	10/05/17 02:14 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	10/05/17 04:38 PM
Sulfate	569	100	300		mg/L	100	10/05/17 02:14 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **BTJ**
Total Dissolved Solids (Residue, Filterable)	2490	50.0	50.0		mg/L	1	10/06/17 08:30 AM

Qualifiers:					
	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *11-Oct-17*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-28
Project:	Sandow CCR	**Lab ID:**	1710015-03
Project No:	5164E	**Collection Date:**	10/02/17 04:05 PM
Lab Order:	1710015	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **SP**
Boron	0.207	0.0100	0.0300		mg/L	1	10/09/17 12:33 PM
Calcium	664	5.00	15.0		mg/L	50	10/09/17 01:55 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	384	30.0	100		mg/L	100	10/05/17 02:26 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	10/05/17 04:50 PM
Sulfate	1670	100	300		mg/L	100	10/05/17 02:26 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **BTJ**
Total Dissolved Solids (Residue, Filterable)	3350	50.0	50.0		mg/L	1	10/06/17 08:30 AM

Qualifiers:					
	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *11-Oct-17*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-26
Project:	Sandow CCR	**Lab ID:**	1710015-04
Project No:	5164E	**Collection Date:**	10/02/17 05:35 PM
Lab Order:	1710015	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **SP**
Boron	0.352	0.0100	0.0300		mg/L	1	10/09/17 12:35 PM
Calcium	666	5.00	15.0		mg/L	50	10/09/17 01:57 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	1100	30.0	100		mg/L	100	10/05/17 02:38 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	10/05/17 05:02 PM
Sulfate	945	100	300		mg/L	100	10/05/17 02:38 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **BTJ**
Total Dissolved Solids (Residue, Filterable)	3740	50.0	50.0		mg/L	1	10/06/17 08:30 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *11-Oct-17*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-25
Project:	Sandow CCR	**Lab ID:**	1710015-05
Project No:	5164E	**Collection Date:**	10/03/17 09:30 AM
Lab Order:	1710015	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **SP**
Boron	0.205	0.0100	0.0300		mg/L	1	10/09/17 12:37 PM
Calcium	325	5.00	15.0		mg/L	50	10/09/17 01:59 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	586	30.0	100		mg/L	100	10/05/17 02:50 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	10/05/17 05:14 PM
Sulfate	504	100	300		mg/L	100	10/05/17 02:50 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **BTJ**
Total Dissolved Solids (Residue, Filterable)	2400	50.0	50.0		mg/L	1	10/06/17 08:30 AM

Qualifiers:					
	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *11-Oct-17*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AXMW-1
Project:	Sandow CCR	**Lab ID:**	1710015-06
Project No:	5164E	**Collection Date:**	10/03/17 11:20 AM
Lab Order:	1710015	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **SP**
Boron	0.463	0.0200	0.0600		mg/L	2	10/09/17 12:39 PM
Calcium	477	5.00	15.0		mg/L	50	10/09/17 02:01 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	348	30.0	100		mg/L	100	10/05/17 03:02 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	10/05/17 05:26 PM
Sulfate	1990	100	300		mg/L	100	10/05/17 03:02 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **BTJ**
Total Dissolved Solids (Residue, Filterable)	3620	50.0	50.0		mg/L	1	10/06/17 08:30 AM

Qualifiers:					
	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *11-Oct-17*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AXMW-2
Project:	Sandow CCR	**Lab ID:**	1710015-07
Project No:	5164E	**Collection Date:**	10/03/17 12:25 PM
Lab Order:	1710015	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **SP**
Boron	2.14	0.100	0.300		mg/L	10	10/09/17 12:41 PM
Calcium	644	5.00	15.0		mg/L	50	10/09/17 02:03 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	207	30.0	100		mg/L	100	10/05/17 03:14 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	10/05/17 05:38 PM
Sulfate	1990	100	300		mg/L	100	10/05/17 03:14 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **BTJ**
Total Dissolved Solids (Residue, Filterable)	3640	50.0	50.0		mg/L	1	10/06/17 08:30 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *11-Oct-17*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-29
Project:	Sandow CCR	**Lab ID:**	1710015-08
Project No:	5164E	**Collection Date:**	10/03/17 02:05 PM
Lab Order:	1710015	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **SP**
Boron	0.316	0.0100	0.0300		mg/L	1	10/09/17 12:43 PM
Calcium	392	5.00	15.0		mg/L	50	10/09/17 02:05 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	276	30.0	100		mg/L	100	10/05/17 03:26 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	10/05/17 05:50 PM
Sulfate	1110	100	300		mg/L	100	10/05/17 03:26 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **BTJ**
Total Dissolved Solids (Residue, Filterable)	2480	50.0	50.0		mg/L	1	10/06/17 08:30 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits
N	Parameter not NELAC certified		

DHL Analytical, Inc.

Date: *11-Oct-17*

CLIENT:	Pastor, Behling & Wheeler	**Client Sample ID:**	AX-23
Project:	Sandow CCR	**Lab ID:**	1710015-09
Project No:	5164E	**Collection Date:**	10/03/17 04:20 PM
Lab Order:	1710015	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **SP**
Boron	0.314	0.0100	0.0300		mg/L	1	10/09/17 12:26 PM
Calcium	316	5.00	15.0		mg/L	50	10/09/17 01:47 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	184	3.00	10.0		mg/L	10	10/05/17 03:38 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	10/05/17 06:02 PM
Sulfate	631	10.0	30.0		mg/L	10	10/05/17 03:38 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **BTJ**
Total Dissolved Solids (Residue, Filterable)	1620	50.0	50.0		mg/L	1	10/06/17 08:30 AM

Qualifiers:					
	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

CLIENT: Pastor, Behling & Wheeler
Work Order: 1710015
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_171009C

The QC data in batch 82680 applies to the following samples: 1710015-01A, 1710015-02A, 1710015-03A, 1710015-04A, 1710015-05A, 1710015-06A, 1710015-07A, 1710015-08A, 1710015-09A

Sample ID **MB-82680** Batch ID: **82680** TestNo: **SW6020A** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS4_171009C** Analysis Date: **10/9/2017 12:18:00 PM** Prep Date: **10/6/2017**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	<0.0100	0.0300								
Calcium	<0.100	0.300								

Sample ID **LCS-82680** Batch ID: **82680** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS4_171009C** Analysis Date: **10/9/2017 12:20:00 PM** Prep Date: **10/6/2017**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.203	0.0300	0.200	0	101	80	120			
Calcium	5.18	0.300	5.00	0	104	80	120			

Sample ID **LCSD-82680** Batch ID: **82680** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS4_171009C** Analysis Date: **10/9/2017 12:22:00 PM** Prep Date: **10/6/2017**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.209	0.0300	0.200	0	104	80	120	2.84	15	
Calcium	5.18	0.300	5.00	0	104	80	120	0.014	15	

Sample ID **1710015-09A SD** Batch ID: **82680** TestNo: **SW6020A** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS4_171009C** Analysis Date: **10/9/2017 12:28:00 PM** Prep Date: **10/6/2017**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.342	0.150	0	0.314				8.46	10	

Sample ID **1710015-09A PDS** Batch ID: **82680** TestNo: **SW6020A** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS4_171009C** Analysis Date: **10/9/2017 12:47:00 PM** Prep Date: **10/6/2017**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.501	0.0300	0.200	0.314	93.2	80	120			

Sample ID **1710015-09A MS** Batch ID: **82680** TestNo: **SW6020A** Units: **mg/L**
SampType: **MS** Run ID: **ICP-MS4_171009C** Analysis Date: **10/9/2017 12:48:00 PM** Prep Date: **10/6/2017**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.511	0.0300	0.200	0.314	98.5	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1710015
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_171009C

Sample ID **1710015-09A MSD**	Batch ID: **82680**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS4_171009C**	Analysis Date: **10/9/2017 12:50:00 PM**	Prep Date: **10/6/2017**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.515	0.0300	0.200	0.314	100	80	120	0.713	15	

Sample ID **1710015-09A SD**	Batch ID: **82680**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **SD**	Run ID: **ICP-MS4_171009C**	Analysis Date: **10/9/2017 1:49:00 PM**	Prep Date: **10/6/2017**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	320	75.0	0	316				1.28	10	

Sample ID **1710015-09A PDS**	Batch ID: **82680**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS4_171009C**	Analysis Date: **10/9/2017 2:09:00 PM**	Prep Date: **10/6/2017**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	626	15.0	250	316	124	80	120			S

Sample ID **1710015-09A MS**	Batch ID: **82680**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS4_171009C**	Analysis Date: **10/9/2017 2:11:00 PM**	Prep Date: **10/6/2017**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	314	15.0	5.00	316	-30.9	80	120			S

Sample ID **1710015-09A MSD**	Batch ID: **82680**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS4_171009C**	Analysis Date: **10/9/2017 2:13:00 PM**	Prep Date: **10/6/2017**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	318	15.0	5.00	316	40.1	80	120	1.12	15	S

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1710015
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_171009C

Sample ID	**ICV-171009**	Batch ID:	**R94582**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**ICP-MS4_171009C**	Analysis Date:	**10/9/2017 10:07:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0991	0.0300	0.100	0	99.1	90	110			
Calcium	2.55	0.300	2.50	0	102	90	110			

Sample ID	**LCVL-171009**	Batch ID:	**R94582**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_171009C**	Analysis Date:	**10/9/2017 10:14:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0208	0.0300	0.0200	0	104	70	130			
Calcium	0.105	0.300	0.100	0	105	70	130			

Sample ID	**CCV2-171009**	Batch ID:	**R94582**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_171009C**	Analysis Date:	**10/9/2017 11:22:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.212	0.0300	0.200	0	106	90	110			
Calcium	5.18	0.300	5.00	0	104	90	110			

Sample ID	**LCVL2-171009**	Batch ID:	**R94582**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_171009C**	Analysis Date:	**10/9/2017 11:26:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0244	0.0300	0.0200	0	122	70	130			
Calcium	0.107	0.300	0.100	0	107	70	130			

Sample ID	**CCV3-171009**	Batch ID:	**R94582**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_171009C**	Analysis Date:	**10/9/2017 12:57:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.218	0.0300	0.200	0	109	90	110			
Calcium	5.14	0.300	5.00	0	103	90	110			

Sample ID	**LCVL3-171009**	Batch ID:	**R94582**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_171009C**	Analysis Date:	**10/9/2017 1:09:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0246	0.0300	0.0200	0	123	70	130			
Calcium	0.102	0.300	0.100	0	102	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1710015
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_171009C

Sample ID	**CCV4-171009**	Batch ID:	**R94582**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_171009C**	Analysis Date:	**10/9/2017 1:22:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	5.14	0.300	5.00	0	103	90	110			

Sample ID	**LCVL4-171009**	Batch ID:	**R94582**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_171009C**	Analysis Date:	**10/9/2017 1:28:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.0999	0.300	0.100	0	99.9	70	130			

Sample ID	**CCV5-171009**	Batch ID:	**R94582**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_171009C**	Analysis Date:	**10/9/2017 2:15:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	5.07	0.300	5.00	0	101	90	110			

Sample ID	**LCVL5-171009**	Batch ID:	**R94582**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_171009C**	Analysis Date:	**10/9/2017 2:19:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.0965	0.300	0.100	0	96.5	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1710015
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC4_171005A

The QC data in batch 82668 applies to the following samples: 1710015-01B, 1710015-02B, 1710015-03B, 1710015-04B, 1710015-05B, 1710015-06B, 1710015-07B, 1710015-08B, 1710015-09B

Sample ID **MB-82668** Batch ID: **82668** TestNo: **E300** Units: **mg/L**
SampType: **MBLK** Run ID: **IC4_171005A** Analysis Date: **10/5/2017 12:13:44 PM** Prep Date: **10/5/2017**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	<0.300	1.00								
Fluoride	<0.100	0.400								
Sulfate	<1.00	3.00								

Sample ID **LCS-82668** Batch ID: **82668** TestNo: **E300** Units: **mg/L**
SampType: **LCS** Run ID: **IC4_171005A** Analysis Date: **10/5/2017 12:25:44 PM** Prep Date: **10/5/2017**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.89	1.00	10.00	0	98.9	90	110			
Fluoride	3.98	0.400	4.000	0	99.5	90	110			
Sulfate	29.5	3.00	30.00	0	98.3	90	110			

Sample ID **LCSD-82668** Batch ID: **82668** TestNo: **E300** Units: **mg/L**
SampType: **LCSD** Run ID: **IC4_171005A** Analysis Date: **10/5/2017 12:37:44 PM** Prep Date: **10/5/2017**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.85	1.00	10.00	0	98.5	90	110	0.453	20	
Fluoride	3.97	0.400	4.000	0	99.4	90	110	0.129	20	
Sulfate	29.3	3.00	30.00	0	97.7	90	110	0.601	20	

Sample ID **1710015-01BMS** Batch ID: **82668** TestNo: **E300** Units: **mg/L**
SampType: **MS** Run ID: **IC4_171005A** Analysis Date: **10/5/2017 1:50:18 PM** Prep Date: **10/5/2017**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2400	100	2000	307.0	104	90	110			
Fluoride	2040	40.0	2000	0	102	90	110			
Sulfate	2700	300	2000	632.2	103	90	110			

Sample ID **1710015-01BMSD** Batch ID: **82668** TestNo: **E300** Units: **mg/L**
SampType: **MSD** Run ID: **IC4_171005A** Analysis Date: **10/5/2017 2:02:18 PM** Prep Date: **10/5/2017**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2400	100	2000	307.0	105	90	110	0.098	20	
Fluoride	2030	40.0	2000	0	102	90	110	0.345	20	
Sulfate	2650	300	2000	632.2	101	90	110	1.79	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1710015
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC4_171005A

Sample ID **ICV-171005**	Batch ID: **R94547**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC4_171005A**	Analysis Date: **10/5/2017 11:49:44 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	24.9	1.00	25.00	0	99.6	90	110			
Fluoride	9.87	0.400	10.00	0	98.7	90	110			
Sulfate	75.4	3.00	75.00	0	101	90	110			

Sample ID **CCV1-171005**	Batch ID: **R94547**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC4_171005A**	Analysis Date: **10/5/2017 4:02:18 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.91	1.00	10.00	0	99.1	90	110			
Fluoride	4.02	0.400	4.000	0	101	90	110			
Sulfate	29.5	3.00	30.00	0	98.3	90	110			

Sample ID **CCV2-171005**	Batch ID: **R94547**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC4_171005A**	Analysis Date: **10/5/2017 6:26:18 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.1	1.00	10.00	0	101	90	110			
Fluoride	4.05	0.400	4.000	0	101	90	110			
Sulfate	31.0	3.00	30.00	0	103	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

CLIENT: Pastor, Behling & Wheeler
Work Order: 1710015
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: WC_171005B

The QC data in batch 82671 applies to the following samples: 1710015-01B, 1710015-02B, 1710015-03B, 1710015-04B, 1710015-05B, 1710015-06B, 1710015-07B, 1710015-08B, 1710015-09B

Sample ID	**MB-82671**	Batch ID:	**82671**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**WC_171005B**	Analysis Date:	**10/6/2017 8:30:00 AM**	Prep Date:	**10/5/2017**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	<10.0	10.0								

Sample ID	**LCS-82671**	Batch ID:	**82671**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**WC_171005B**	Analysis Date:	**10/6/2017 8:30:00 AM**	Prep Date:	**10/5/2017**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	741	10.0	745.6	0	99.4	90	113			

Sample ID	**1710036-03B-DUP**	Batch ID:	**82671**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_171005B**	Analysis Date:	**10/6/2017 8:30:00 AM**	Prep Date:	**10/5/2017**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	2510	50.0	0	2545				1.38	5	

Sample ID	**1710028-01A-DUP**	Batch ID:	**82671**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_171005B**	Analysis Date:	**10/6/2017 8:30:00 AM**	Prep Date:	**10/5/2017**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	584	10.0	0	588.0				0.683	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAC certified

2020 Annual Groundwater Monitoring and Corrective Action Report

Sandow Steam Electric Station AX Landfill - Milam County, Texas

Prepared for:

Luminant Generation Company LLC

Prepared by:

Golder Associates Inc.

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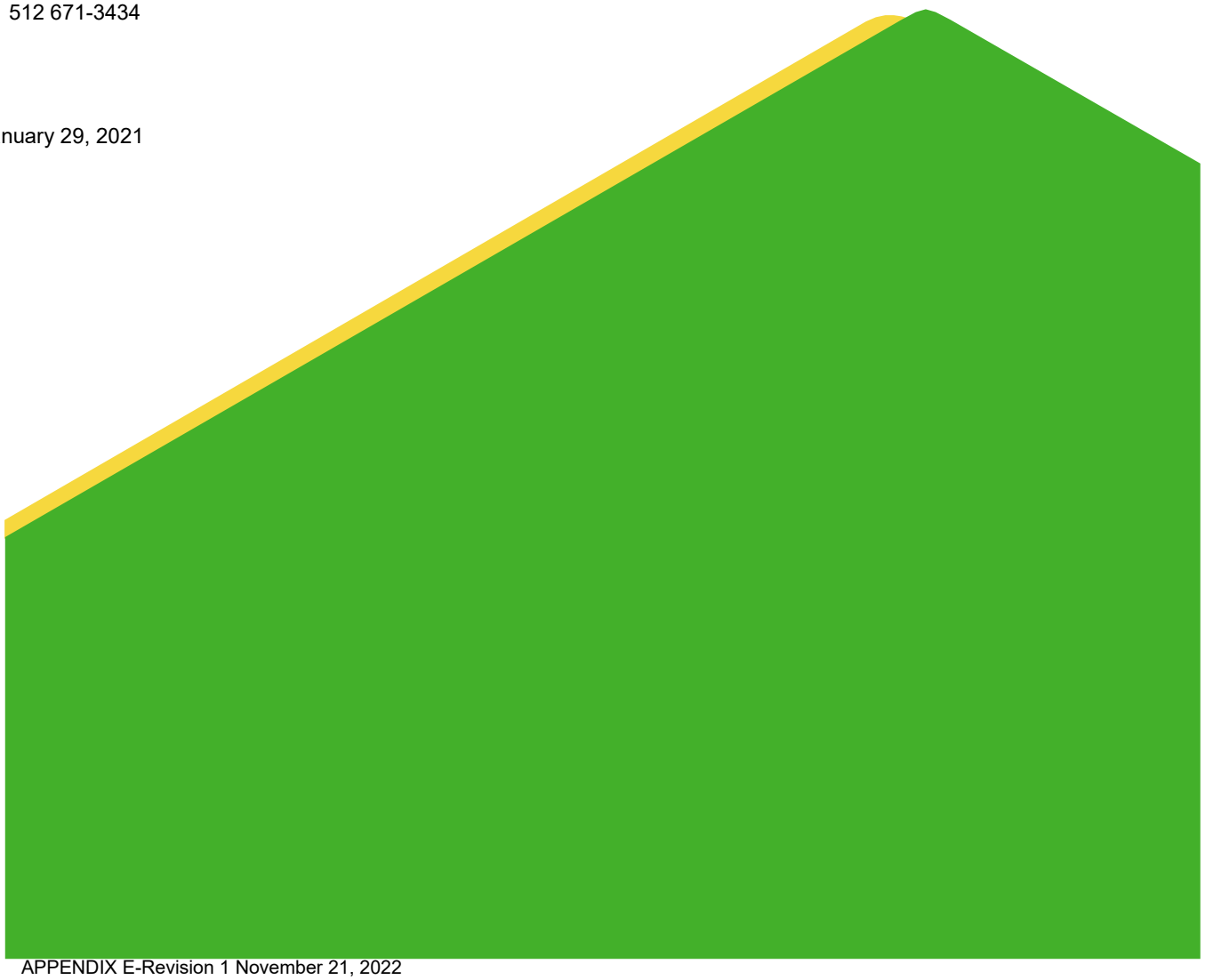
January 29, 2021



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ACRONYMS AND ABBREVIATIONS

CCR	Coal Combustion Residuals
CFR	Code of Federal Regulations
GWPS	Groundwater Protection Standard
MCL	Maximum Concentration Level
mg/L	Milligrams per Liter
NA	Not Applicable
SSI	Statistically Significant Increase
SSL	Statistically Significant Level
USEPA	United States Environmental Protection Agency

EXECUTIVE SUMMARY

Golder Associates, Inc. (Golder) has prepared this report on behalf of Luminant Generation Company LLC (Luminant) to satisfy the 2020 annual groundwater monitoring and corrective action reporting requirements of the Coal Combustion Residuals (CCR) Rule (40 CFR 257, Subpart D) for the AX Landfill (the "CCR unit") at the former Sandow Steam Electric Station in Milam County, Texas. The CCR units and CCR monitoring well network are shown on Figure 1.

At the beginning and end of the 2020 reporting period, the CCR unit was operating under a Detection Monitoring Program as described in 40 CFR § 257.94. The Detection Monitoring Program for the AX Landfill was established in September 2017. Statistically significant increases (SSIs) above background prediction limits were identified for several Appendix III parameters as part of the 2017 through 2019 Detection Monitoring events; however, Alternate Source Demonstrations were completed in 2018, 2019, and 2020 which indicated that a source other than the CCR unit caused the SSIs observed in 2017, 2018, and 2019. During 2020, SSIs were also identified for several Appendix III constituents, including boron in well AX-27; calcium in wells AX-24, AX-25R, AX-26, and AX-27; and sulfate in wells AX-26 and AX-27. Alternate sources for the SSIs identified in the 2020 sample data are being evaluated in accordance with 40 CFR § 257.94. If an alternate source is not identified to be the cause of the 2020 SSIs, an Assessment Monitoring Program will be established in accordance with 40 CFR § 257.94(e)(2).

1.0 INTRODUCTION

Golder Associates, Inc. (Golder) has prepared this report on behalf of Luminant Generation Company LLC (Luminant) to satisfy the 2020 annual groundwater monitoring and corrective action reporting requirements of the Coal Combustion Residuals (CCR) Rule for the AX Landfill at the former Sandow Steam Electric Station in Milam County, Texas. The CCR units and CCR monitoring well network are shown on Figure 1.

The CCR Rule (40 CFR 257 Subpart D - *Standards for the Receipt of Coal Combustion Residuals in Landfills and Surface Impoundments*) has been promulgated by the United States Environmental Protection Agency (USEPA) to regulate the management and disposal of CCRs as solid waste under Resource Conservation and Recovery Act (RCRA) Subtitle D. For existing CCR landfills and surface impoundments, the CCR Rule requires that the owner or operator prepare an annual groundwater monitoring and corrective action report to document the status of the groundwater monitoring and corrective action program for the CCR unit for the previous calendar year. Per 40 CFR 257.90(e) of the CCR Rule, the report should contain the following information, to the extent available:

(1) A map, aerial image, or diagram showing the CCR unit and all background (or upgradient) and downgradient monitoring wells, to include the well identification numbers, that are part of the groundwater monitoring program for the CCR unit;

(2) Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken;

(3) In addition to all the monitoring data obtained under §§ 257.90 through 257.98, a summary including the number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and whether the sample was required by the detection monitoring or assessment monitoring programs;

(4) A narrative discussion of any transition between monitoring programs (*e.g.,* the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant increase over background levels); and

(5) Other information required to be included in the annual report as specified in §§ 257.90 through 257.98.

(6) A section at the beginning of the annual report that provides an overview of the current status of groundwater monitoring and corrective action programs for the CCR unit. At a minimum, the summary must specify all of the following:

(i) At the start of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in § 257.94 or the assessment monitoring program in § 257.95;

(ii) At the end of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in § 257.94 or the assessment monitoring program in § 257.95;

(iii) If it was determined that there was a statistically significant increase over background for one or more constituents listed in Appendix III to this part pursuant to § 257.94(e):

(A) Identify those constituents listed in Appendix III to this part and the names of the monitoring wells associated with such an increase; and

(B) Provide the date when the assessment monitoring program was initiated for the CCR unit.

(iv) If it was determined that there was a SSL above the groundwater protection standard for one or more constituents listed in Appendix IV to this part pursuant to § 257.95(g) include all of the following:

(A) Identify those constituents listed in Appendix IV to this part and the names of the monitoring wells associated with such an increase;

(B) Provide the date when the assessment of corrective measures was initiated for the CCR unit;

(C) Provide the date when the public meeting was held for the assessment of corrective measures for the CCR unit; and

(D) Provide the date when the assessment of corrective measures was completed for the CCR unit.

(v) Whether a remedy was selected pursuant to § 257.97 during the current annual reporting period, and if so, the date of remedy selection; and

(vi) Whether remedial activities were initiated or are ongoing pursuant to § 257.98 during the current annual reporting period.

2.0 MONITORING AND CORRECTIVE ACTION PROGRAM STATUS

The AX Landfill CCR unit is currently in a Detection Monitoring Program. The initial Detection Monitoring Program groundwater samples were collected from the AX Landfill CCR monitoring well network in October 2017. Subsequent Detection Monitoring Program groundwater samples were collected on a semi-annual basis since that time. Data evaluation is completed using procedures described in the Statistical Analysis Plan (PBW, 2017) to identify statistically significant increases (SSIs) of Appendix III parameters over background concentrations. The Detection Monitoring Program sampling dates and parameters are summarized in the following table:

Detection Monitoring Program Summary

Sampling Dates	Parameters	SSIs	Assessment Monitoring Program Established
October 2017 March 2018 (re-samples)	Appendix III	Yes	No (Alternate Source Demonstration Completed)
March 2018 October 2018	Appendix III	Yes	No (Alternate Source Demonstration Completed)
June 2019 November 2019	Appendix III	Yes	No (Alternate Source Demonstration Completed)
May 2020 November 2020	Appendix III	Yes	To Be Determined (Alternate Source Currently Being Assessed)

The statistical background values and Appendix III analytical data are presented in Tables 1 and 2, respectively. SSIs of Appendix III parameters were identified during each Detection Monitoring Program sampling event thus far. An initial Alternate Source Demonstration was completed in 2018, which indicated that a source other than the CCR unit caused the SSIs observed in the 2017 sample data and 2018 re-sample data. Similarly, subsequent Alternate Source Demonstrations were completed in 2019 and 2020 based on sample data collected during the previous year. The AX Landfill has remained in the Detection Monitoring Program. A summary of the Alternate Source Demonstration based on data collected in 2019 is presented in Attachment 1 as required by 40 CFR 257.94(e)(2).

Detection Monitoring Program groundwater samples were collected from the CCR groundwater monitoring network on a semi-annual basis in 2020, as required by the CCR Rule. The analytical data from the 2020 semi-

annual Detection Monitoring Program sampling events were evaluated using procedures described in the Statistical Analysis Plan to identify SSIs of Appendix III parameters over background concentrations. SSIs of Appendix III parameters over background concentrations were identified for several constituents for which SSIs had previously been attributed to alternate sources. Alternate sources for the SSIs identified in the 2020 sample data are being evaluated in accordance with 40 CFR § 257.94. If an alternate source is not identified to be the cause of the SSI, an Assessment Monitoring Program will be established in accordance with 40 CFR § 257.94(e)(2).

3.0 KEY ACTIONS COMPLETED IN 2020

Semi-annual Detection Monitoring Program groundwater monitoring events were conducted in May and November 2020. The number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and the analytical results for the groundwater samples are summarized in Table 2. A map showing the CCR units and monitoring wells is provided as Figure 1.

As discussed in the 2019 Annual Groundwater Monitoring and Corrective Action Report, CCR well AX-25 could not be sampled during the second semi-annual Detection Monitoring event in 2019 because the well was found to be damaged at the time of the sampling event. The dedicated sample tubing in the well was constricted by a blockage in the casing and a water level probe could not be lowered below the blockage point (approximately 17 feet below ground surface). It is assumed that the well casing collapsed at the blockage point. CCR well AX-25 was plugged and abandoned on May 6, 2020. AX-25 was replaced by well AX-25R, which is located immediately adjacent to former damaged well. The well construction log for AX-25R is provided in Attachment 2. Detection Monitoring Program groundwater samples were collected from well AX-25R during 2020.

An Alternate Source Demonstration was completed in February 2020 in accordance with 40 CFR 257.94(e)(2), which documented that a source other than the AX Landfill caused the SSIs detected over background levels during the 2019 Detection Monitoring Program sampling events. A copy of the 2020 Alternate Source Demonstration is provided in Attachment 1

4.0 PROBLEMS ENCOUNTERED AND ACTIONS TO RESOLVE THE PROBLEMS

No problems were encountered with the CCR groundwater monitoring program in 2020.

5.0 KEY ACTIVITIES PLANNED FOR 2021

The following key activities are planned for 2021:

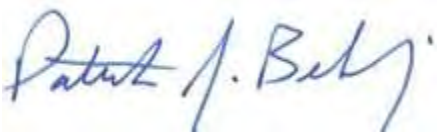
- Continue the Detection Monitoring Program in accordance with 40 CFR § 257.94.
- Complete evaluation of Appendix III analytical data and compare results to statistical background values to determine whether an SSI has occurred.
- If an SSI is identified, potential alternate sources (i.e., a source other than the CCR unit caused the SSI or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality) will be evaluated. If an alternate source is identified to be the cause of the SSI, a written demonstration will be completed within 90 days of SSI determination and included in the Annual Groundwater Monitoring and Corrective Action Report.
- If an alternate source is not identified to be the cause of the SSI, an Assessment Monitoring Program will be established in accordance with 40 CFR § 257.94(e)(2).

6.0 REFERENCES

Pastor, Behling & Wheeler, LLC, 2017. Coal Combustion Residual Rule Statistical Analysis Plan, Sandow Steam Electric Station, AX Landfill, Rockdale, Texas.

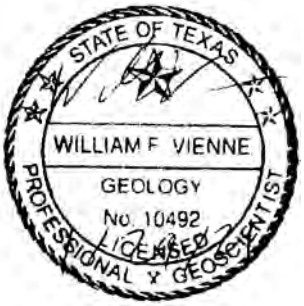
Signature Page

Golder Associates Inc.

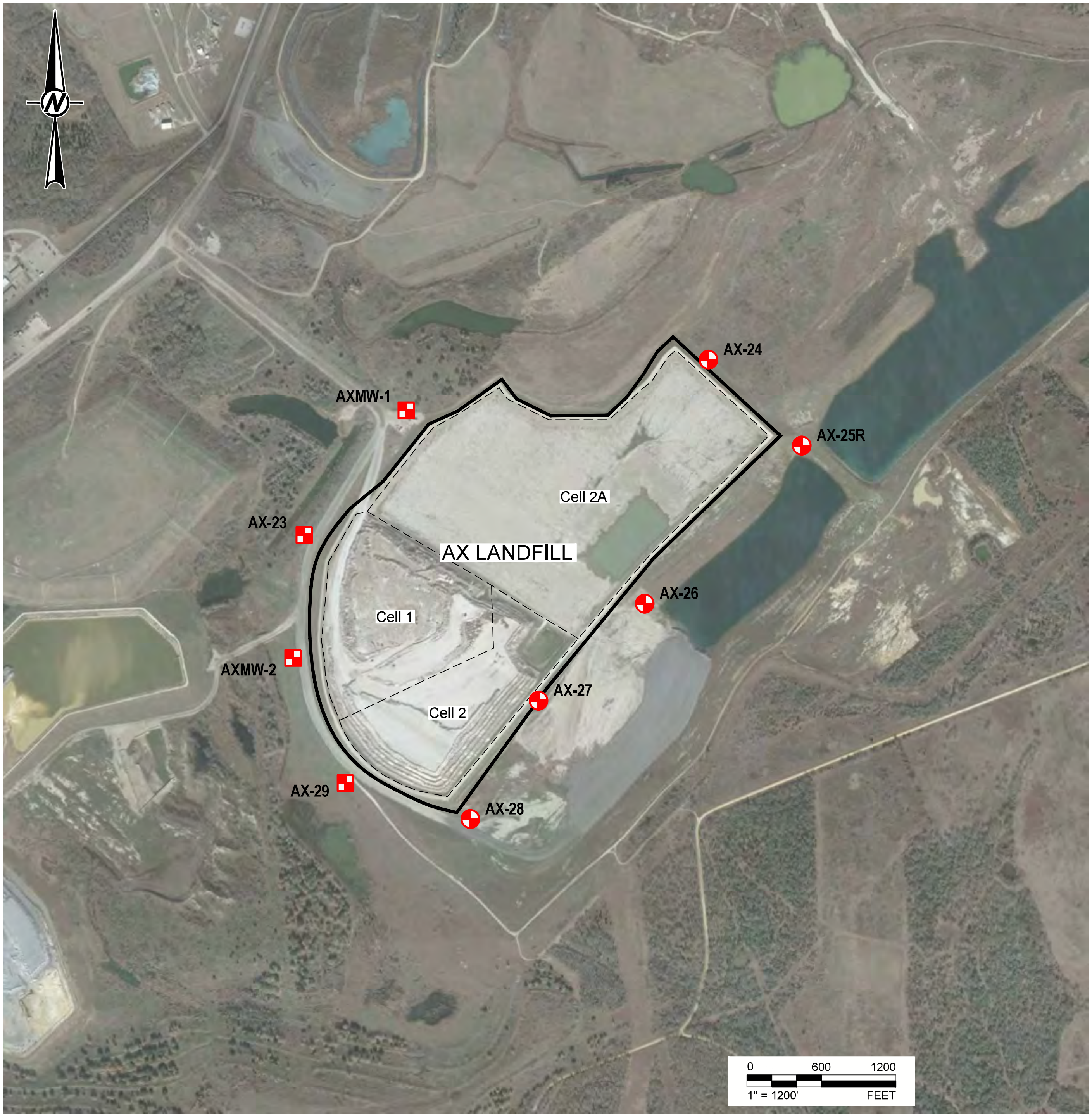


Patrick J. Behling
Principal Engineer

William F. Vienne
Senior Hydrogeologist



FIGURES



LEGEND

- DOWNGRADIENT CCR MONITORING WELL
- UPGRADIENT CCR MONITORING WELL

NOTE(S)

REFERENCE(S)

BASE MAP TAKEN FROM GOOGLE EARTH, IMAGERY DATED 1/7/18.

CLIENT
LUMINANT

PROJECT
SANDOW 5 GENERATING PLANT
ROCKDALE, TEXAS

TITLE
DETAILED SITE PLAN - AX LANDFILL

CONSULTANT

GOLDER

YYYY-MM-DD	2020-01-23
DESIGNED	AJD
PREPARED	AJD
REVIEWED	WFV
APPROVED	WFV

PROJECT NO.	REV.	FIGURE
19122262	0	1

TABLES

Table 1
Statistical Background Values
Sandow Steam Electric Station AX Landfill

Sample Location	Boron (mg/L)	Calcium (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Field pH (s.u.)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)
Upgradient Wells							
AXMW-1	0.681	569	491	0.4	5.49 7.09	2,660	5,820
AXMW-2	3.62	943	391	1.88	4.6 7.63	3,040	4,940
AX-23	1.1	475	313	0.4	3.24 7.95	1,030	3,090
AX-29	0.432	791	306	0.4	2.73 7.01	1,440	3,370
Downgradient Wells							
AX-24	0.311	273	580	0.4	3.89 9.38	1,010	2,520
AX-25(R)	0.298	262	1,140	0.507	4.69 9.2	795	3,980
AX-26	0.446	915	3,040	0.4	5.07 8.14	1,200	8,300
AX-27	0.281	366	1,020	0.4	6.08 7.3	478	3,620
AX-28	0.393	633	756	0.4	4.67 8.55	2,280	3,790

Table 2
Appendix III Analytical Results
Sandow Steam Electric Station AX Landfill

Sample Location	Date Sampled	B (mg/L)	Ca (mg/L)	Cl (mg/L)	F (mg/L)	Field pH (s.u.)	SO_4 (mg/L)	TDS (mg/L)
Upgradient Wells								
AXMW-1	10/03/17	0.46	477	348	<0.1	5.75	1990	3620
	03/21/18	0.50	425	267	0.122 J	5.89	2050	3680
	10/09/18	0.51	473	229	0.37	6.31	2260	3730
	06/27/19	0.80	371	242	0.37	5.10	1720	2810
	11/12/19	1.14	362	138	0.115 J	5.33	1540	2800
	05/19/20	2.27	296	137	<0.100	4.87	1570	2680
	11/11/20	4.08	369	202	0.112 J	5.55	1560	2680
AXMW-2	10/03/17	2.14	644	207	<0.1	5.93	1990	3640
	03/21/18	2.64	628	218	1.18	5.80	2280	4050
	10/09/18	1.47	562	179	0.84	6.66	1960	3280
	06/27/19	1.75	578	203	1.39	5.87	1720	3280
	11/12/19	0.88	483	147	0.228 J	6.14	1160	2480
	05/19/20	0.74	396	143	<0.100	6.19	1150	2490
	11/11/20	0.67	539	180	<0.100	6.35	1240	2610
AX-23	10/03/17	0.31	316	184	<0.1	6.43	631	1620
	03/23/18	0.31	309	193	0.77	6.09	655	1730
	10/09/18	0.38	305	210	0.45	7.00	636	1700
	06/27/19	0.31	335	224	0.49	6.19	652	1760
	11/12/19	0.34	304	183	0.186 J	6.28	590	1640
	05/19/20	0.35	277	232	<0.100	6.14	641	1750
	11/11/20	0.35	357	256	0.105 J	6.40	677	1800
AX-29	10/03/17	0.32	392	276	<0.1	6.20	1110	2480
	03/23/18	0.30	356	285	0.81	5.89	1160	2450
	10/09/18	0.36	339	274	0.45	6.99	1060	2390
	06/27/19	0.31	352	275	<1.00	5.85	1110	2460
	11/13/19	0.47	449	281	<0.100	5.80	1210	2850
	05/19/20	0.37	308	261	<0.100	5.85	1050	2560
	11/11/20	0.39	429	320	<0.100	5.96	1190	2700

Table 2
Appendix III Analytical Results
Sandow Steam Electric Station AX Landfill

Sample Location	Date Sampled	B (mg/L)	Ca (mg/L)	Cl (mg/L)	F (mg/L)	Field pH (s.u.)	SO_4 (mg/L)	TDS (mg/L)
Downgradient Wells								
AX-24	10/02/17	0.13	252	307	<0.1	6.12	632	1810
	03/26/18	0.13	254	309	0.279 J	5.82	762	1880
	10/08/18	0.18	260	283	0.59	6.82	759	1840
	07/02/19	0.14	325	244	0.49	5.80	887	2060
	11/13/19	0.20	319	226	<0.100	5.91	752	2040
	05/19/20	0.19	271	256	<0.100	5.87	800	2080
	11/12/20	0.17	368	300	<0.100	5.98	947	2180
AX-25	10/03/17	0.21	325	586	<0.1	6.37	504	2400
	03/16/18	--	302	--	--	--	--	--
	03/26/18	0.20	281	583	0.75	6.38	526	2420
	10/08/18	0.23	324	586	1.01	7.09	492	2360
	07/02/19	0.20	384	616	0.87	6.26	608	2590
	11/12/19	Well damaged; Plugged 5/6/2020						
AX-25R	05/19/20	0.28	218	573	0.269 J	6.25	592	2470
	11/11/20	0.23	264	515	0.270 J	6.38	524	2210
AX-26	10/02/17	0.35	666	1100	<0.1	6.38	945	3740
	03/26/18	0.34	912	1820	<0.1	6.41	1300	4980
	10/08/18	0.40	905	1720	<0.1	7.09	1220	4680
	07/02/19	0.36	409	465	0.45	6.14	643	2380
	11/13/19	0.39	651	1010	<0.100	5.91	853	3350
	05/19/20	0.38	617	1240	<0.100	6.20	838	3830
	11/12/20	0.40	980	2060	<0.100	6.29	1240	5110
AX-27	10/02/17	0.21	462	652	<0.1	6.19	569	2490
	03/16/18	--	453	--	--	--	659	--
	3/16/2018 dup	--	456	--	--	--	648	--
	03/26/18	0.21	438	584	<0.1	6.29	661	2350
	10/08/18	0.25	422	540	0.14	7.17	554	2220
	07/02/19	0.21	379	459	0.59	6.05	520	2090
	11/13/19	0.26	395	465	<0.100	6.05	480	2050
	05/19/20	0.30	329	479	<0.100	6.20	450	1930
	11/12/20	0.29	432	569	<0.100	6.47	522	2080

Table 2
Appendix III Analytical Results
Sandow Steam Electric Station AX Landfill

Sample Location	Date Sampled	B (mg/L)	Ca (mg/L)	Cl (mg/L)	F (mg/L)	Field pH (s.u.)	SO_4 (mg/L)	TDS (mg/L)
AX-28	10/02/17	0.21	664	384	<0.1	6.25	1670	3350
	03/16/18	--	634	--	--	--	--	--
	03/23/18	0.20	621	354	<0.1	6.17	1720	3430
	10/08/18	0.31	578	230	0.47	6.87	1710	3300
	10/8/18 dup	0.32	577	233	0.51		1780	3370
	06/27/19	0.30	585	146	0.15	5.87	1870	3320
	11/13/19	0.23	616	235	<0.100	5.57	1820	3560
	05/19/20	0.23	492	153	<0.100	5.97	1870	3250
	11/11/20	0.21	577	126	<0.100	6.09	1810	3200

Notes:
1. Abbreviations: mg/L - milligram per liter; s.u. - standard units.
2. J - concentration is below method quantitation limit; result is an estimate.

ATTACHMENT 1

ALTERNATE SOURCE DEMONSTRATION REPORT

ALTERNATE SOURCE DEMONSTRATION SUMMARY

SANDOW STEAM ELECTRIC STATION – AX LANDFILL

Introduction

This Alternative Source Demonstration Summary was prepared to document that a source other than the AX Landfill (the Site) caused the statistically significant increases (SSIs) over background levels observed during the 2019 Detection Monitoring Program sampling events as required by 40 CFR 257.94(e)(2). A detailed Site plan of the Coal Combustion Residual (CCR) groundwater monitoring network is shown on Figure 1. The Detection Monitoring Program groundwater data are summarized in Table 1.

Description of the AX Landfill

The AX Landfill is constructed within highly heterogeneous overburden spoil material that was previously excavated and backfilled during lignite mining operations at the Sandow Lignite Mine. The uppermost aquifer at the Site occurs under unconfined conditions within the overburden spoil and extends to the base of the spoil, where lignite and/or clay confining units are encountered. An average linear flow velocity of 0.15 feet/day was calculated for the AX Landfill based on aquifer characteristics presented in the Groundwater Monitoring System Certification for the Site (PBW, 2017a).

The AX Landfill consists of Cells 1 and 2 and covers an area of approximately 70 acres (Figure 1). Cell 2A of the AX Landfill was constructed adjacent to Cells 1 and 2, but was never used. Construction of Cell 1 was completed in July 2013 and construction of Cell 2 was completed in October 2015. Placement of Unit No. 5 CCR began in Cell 1 in May 2015 and Cell 2 in September 2016. CCR has never been placed in Cell 2A.

Previous Detection Monitoring Results

The initial Detection Monitoring Program groundwater samples were collected from the AX Landfill in October 2017. SSIs were observed during the initial sampling event for calcium in wells AX-25, AX-27, and AX-28 and sulfate in well AX-27. SSIs were subsequently observed during the 2018 semi-annual groundwater sampling events for calcium in wells AX-25 and AX-27, sulfate in wells AX-26 and AX-27, and fluoride in wells AX-23, AX-24, AX-25, AX-28, and AX-29. Alternate Source Demonstration Reports (PBW 2018; Golder 2019) were completed based on the 2017 and 2018 sample data. The Alternate Source Demonstration Reports attributed the SSIs to natural variation in groundwater quality due to the heterogeneity of the spoil groundwater system based on: (1) Concentrations of the constituents with SSIs were higher in groundwater samples from other Site wells, including from wells hydraulically upgradient of the AX Landfill, and (2) Groundwater flow velocity calculations indicate that groundwater could not have traveled from the active landfill cells to the wells where prediction limit exceedances were observed during the time since ash was first placed in the cells.

Based on the Alternate Source Demonstrations, the AX Landfill has remained in the Detection Monitoring Program.

2019 Semi-Annual Detection Monitoring Results

Detection Monitoring Program groundwater samples were collected on a semi-annual basis from the AX Landfill CCR monitoring well network in 2019 in accordance with 40 CFR 257.94. SSIs were observed during the 2019 semi-annual groundwater sampling events in downgradient wells AX-24 (calcium), AX-25 (calcium and fluoride), and AX-27 (calcium and sulfate). Prediction limit exceedances were also observed during the first 2019 sampling event for fluoride in downgradient wells AX-26 and AX-27; however, these temporary exceedances of the

prediction limit are not considered SSIs because they were not confirmed by the second 2019 sampling event results.

Data variability across the CCR monitoring network is very high. Calcium, fluoride, and sulfate concentrations in downgradient wells where SSIs were indicated have consistently been lower than other wells where SSIs were not indicated. For example, calcium concentrations in downgradient wells AX-24, AX-25 and AX-27 (where SSIs were indicated for calcium) are similar to or lower than calcium concentrations in downgradient wells where SSIs were not indicated (AX-26 and AX-28) and in upgradient wells (AXMW-2). Similarly, concentrations of fluoride and sulfate in the downgradient wells where SSIs were indicated (AX-25 and AX-27) have consistently been lower than concentrations in downgradient wells where SSIs were not indicated and in upgradient wells. Based on the high site-wide variability in calcium, fluoride, and sulfate, the SSIs observed during the 2019 semi-annual monitoring events are attributed to natural variation in groundwater quality related to heterogeneity of the mine spoil rather than a suspected release from the AX Landfill.

This conclusion is further supported by the location of the wells where SSIs were identified relative to Cells 1 and 2. Based on the timing of ash placement in the AX Landfill and the average linear groundwater velocity (0.15 feet/day), wells AX-24 and AX-25 are all located sufficiently far from Cells 1 and 2 that affected water in contact with the cells would not have reached these wells by the time that the 2019 Detection Monitoring Program groundwater samples were collected. Ash was first placed in Cell 2 in September 2016. Using the conservative assumptions that the wells are located directly downgradient of the active cells (Cells 1 and 2) and that chemical adsorption is negligible, the theoretical amount of time for groundwater in contact with the active cells to reach AX-24 and AX-25 (both approximately 2,500 feet from the active cells) is 40 to 50 years.

The other downgradient well where an SSI was identified was AX-27 (for calcium and sulfate only). The theoretical amount of time it would take groundwater in contact with Cell 2 to reach AX-27 (approximately 70 feet from Cell 2) is 1.3 years. Theoretically, groundwater in contact with Cell 2 could have reached AX-27 before the 2019 semi-annual groundwater samples were collected; however, the calcium and sulfate concentrations observed in the 2019 samples from well AX-27 are similar to those observed prior to 2019 and before groundwater from Cell 2 would have theoretically reached AX-27 (Table 1). As such, the SSIs identified at AX-27 are not indications of a release from the AX Landfill.

Conclusion

SSIs were identified for calcium, fluoride, and sulfate in one or more downgradient wells during the 2019 Detection Monitoring Program semi-annual groundwater sampling events at the AX Landfill. However, all observed SSIs are attributed to natural variation in groundwater quality due to the heterogeneity of the spoil groundwater system and are not considered evidence of a release from the CCR unit. In accordance with Section 257.94(e)(2), Luminant should continue the Detection Monitoring Program at the unit. Initiation of an Assessment Monitoring Program is not required at this time.

References

Pastor, Behling & Wheeler, LLC (PBW), 2017a. Coal Combustion Residual Rule, Groundwater Monitoring System Certification, Sandow 5 Generating Plant, AX Landfill, Rockdale, Texas. October 16, 2017.

Pastor, Behling & Wheeler, LLC (PBW), 2017b. Coal Combustion Residual Rule, Statistical Analysis Plan, Sandow 5 Generating Plant, AX Landfill, Rockdale, Texas. October 11, 2017.

Pastor, Behling & Wheeler, LLC (PBW), 2018. Coal Combustion Residual Rule, Alternate Source Demonstration Report, Sandow 5 Generating Plant, AX Landfill, Rockdale, Texas.

Pastor, Behling & Wheeler, LLC (PBW), 2019. Coal Combustion Residual Rule, Alternate Source Demonstration Report, Sandow 5 Generating Plant, AX Landfill, Rockdale, Texas.

PROFESSIONAL CERTIFICATION

This document and all attachments were prepared by Golder Associates Inc. under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I hereby certify that the alternative source demonstration at the referenced facility meets the requirements of Section 257.94(e)(2) of the CCR Rule.

Patrick J. Behling, P.E.

Principal Engineer

GOLDER ASSOCIATES INC.

Table 1
CCR Groundwater Detection Monitoring Data Summary
Sandow Steam Electric Station - AX Landfill

Sample Location	Date Sampled	B		Ca		Cl		F		Field pH		SO_4		TDS	
		Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data
Upgradient Wells															
AXMW-1	10/03/17	0.68	0.46	569	477	491	348	0.40	<0.1	5.49 7.09	5.75	2660	1990	5820	3620
	03/21/18		0.50		425		267		0.122 J		5.89		2050		3680
	10/09/18		0.51		473		229		0.37		6.31		2260		3730
	06/27/19		0.80		371		242		0.37		5.10		1720		2810
	11/12/19		1.14		362		138		0.115 J		5.33		1540		2800
AXMW-2	10/03/17	3.62	2.14	943	644	391	207	1.88	<0.1	4.6 7.63	5.93	3040	1990	4940	3640
	03/21/18		2.64		628		218		1.18		5.80		2280		4050
	10/09/18		1.47		562		179		0.84		6.66		1960		3280
	06/27/19		1.75		578		203		1.39		5.87		1720		3280
	11/12/19		0.88		483		147		0.228 J		6.14		1160		2480
AX-23	10/03/17	1.10	0.31	475	316	313	184	0.40	<0.1	3.24 7.95	6.43	1030	631	3090	1620
	03/23/18		0.31		309		193		0.77		6.09		655		1730
	10/09/18		0.38		305		210		0.45		7.00		636		1700
	06/27/19		0.31		335		224		0.49		6.19		652		1760
	11/12/19		0.34		304		183		0.186 J		6.28		590		1640
AX-29	10/03/17	0.43	0.32	791	392	306	276	0.40	<0.1	2.73 7.01	6.20	1440	1110	3370	2480
	03/23/18		0.30		356		285		0.81		5.89		1160		2450
	10/09/18		0.36		339		274		0.45		6.99		1060		2390
	06/27/19		0.31		352		275		<1.00		5.85		1110		2460
	11/13/19		0.47		449		281		<0.100		5.80		1210		2850

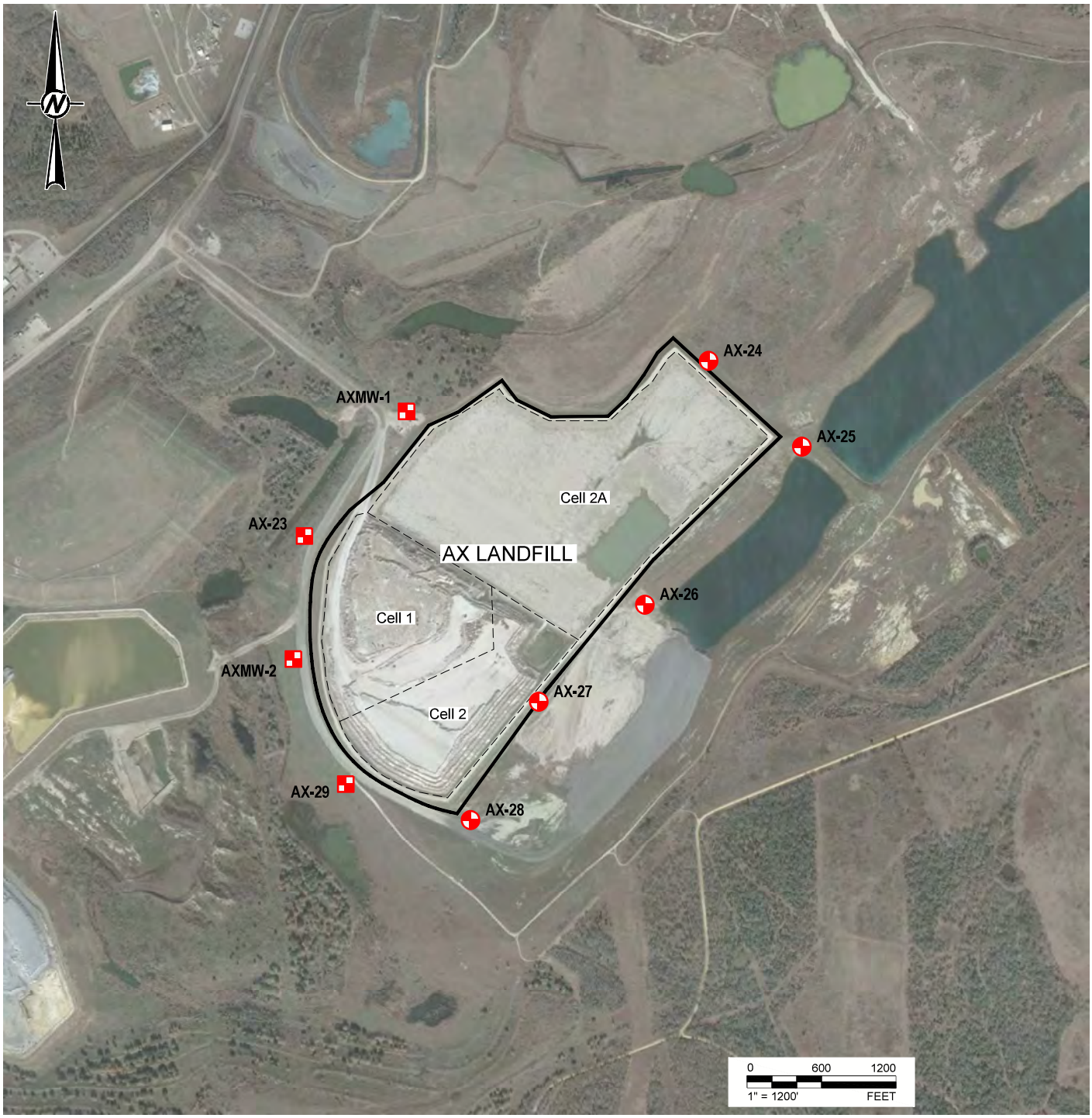
Table 1
CCR Groundwater Detection Monitoring Data Summary
Sandow Steam Electric Station - AX Landfill

Sample Location	Date Sampled	B		Ca		Cl		F		Field pH		SO_4		TDS	
		Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data
Downgradient Wells															
AX-24	10/02/17	0.31	0.13	273	252	580	307	0.40	<0.1	3.89 9.38	6.12	1010	632	2520	1810
	03/26/18		0.13		254		309		0.279 J		5.82		762		1880
	10/08/18		0.18		260		283		0.59		6.82		759		1840
	07/02/19		0.14		325		244		0.49		5.80		887		2060
	11/13/19		0.20		319		226		<0.100		5.91		752		2040
AX-25	10/03/17	0.30	0.21	262	325	1140	586	0.51	<0.1	4.69 9.2	6.37	795	504	3980	2400
	03/16/18		--		302		--		--		--		--		--
	03/26/18		0.20		281		583		0.75		6.38		526		2420
	10/08/18		0.23		324		586		1.01		7.09		492		2360
	07/02/19		0.20		384		616		0.87		6.26		608		2590
	11/12/19	Well Damaged													
AX-26	10/02/17	0.45	0.35	915	666	3040	1100	0.40	<0.1	5.07 8.14	6.38	1200	945	8300	3740
	03/26/18		0.34		912		1820		<0.1		6.41		1300		4980
	10/08/18		0.40		905		1720		<0.1		7.09		1220		4680
	07/02/19		0.36		409		465		0.45		6.14		643		2380
	11/13/19		0.39		651		1010		<0.100		5.91		853		3350
AX-27	10/02/17	0.28	0.21	366	462	1020	652	0.40	<0.1	6.08 7.3	6.19	478	569	3620	2490
	03/16/18		--		453		--		--		--		659		--
	3/16/2018 dup		--		456		--		--		--		648		--
	03/26/18		0.21		438		584		<0.1		6.29		661		2350
	10/08/18		0.25		422		540		0.14		7.17		554		2220
	07/02/19		0.21		379		459		0.59		6.05		520		2090
	11/13/19		0.26		395		465		<0.100		6.05		480		2050

Table 1
CCR Groundwater Detection Monitoring Data Summary
Sandow Steam Electric Station - AX Landfill

Sample Location	Date Sampled	B		Ca		Cl		F		Field pH		SO_4		TDS	
		Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data
AX-28	10/02/17	0.39	0.21	633	664	756	384	0.40	<0.1	4.67 8.55	6.25	2280	1670	3790	3350
	03/16/18		--		634		--		--		--		--		--
	03/23/18		0.20		621		354		<0.1		6.17		1720		3430
	10/08/18		0.31		578		230		0.47		6.87		1710		3300
	10/8/18 dup		0.32		577		233		0.51				1780		3370
	06/27/19		0.30		585		146		0.15		5.87		1870		3320
	11/13/19		0.23		616		235		<0.100		5.57		1820		3560

Notes:
1. All concentrations in mg/L. pH in standard units.
2. J - concentration is below sample quantitation limit; result is an estimate.



LEGEND

- DOWNGRADIENT CCR MONITORING WELL
- UPGRADIENT CCR MONITORING WELL

NOTE(S)

1. WELL AX-25 IS DAMAGED AND COULD NOT BE SAMPLED DURING THE SECOND SEMI-ANNUAL SAMPLING EVENT IN 2019.

REFERENCE(S)

BASE MAP TAKEN FROM GOOGLE EARTH, IMAGERY DATED 12/7/2018

CLIENT
LUMINANT

PROJECT
SANDOW 5 GENERATING PLANT
ROCKDALE, TEXAS

TITLE
DETAILED SITE PLAN - AX LANDFILL

CONSULTANT
GOLDER

YYYY-MM-DD	2020-01-23
DESIGNED	AJD
PREPARED	AJD
REVIEWED	WFV
APPROVED	WFV

PROJECT NO. 19122262 | REV. 0 | FIGURE 1

ATTACHMENT 2

WELL AX-25R WELL CONSTRUCTION LOG

Luminant

Log of Boring: AX-25R

Sandow Steam Electric Station
Rockdale, Texas

Golder Project No. 19122262G

Completion Date:	5/7/2020	Drilling Method:	HSA
Drilling Company:	Vortex Drilling	Borehole Diameter (in.):	6
Driller:	Jim Neal	Total Depth (ft):	72.96
Driller's License:	4648	TOC Elevation (ft. AMSL):	442.901
Logged By:	Jacob Jarvis	Northing:	10178388
Sampling Method:	2.5' Split Spoon	Easting:	3328702

Depth (ft)	Well Materials	Recovery (ft/ft)	USCS	Lithologic Description
0		0.0/5.0	NR	(0 - 5) No Returns, HydroVAC
5		2.5/2.5	SC	(5 - 15) Clayey SAND Spoil, brown to grayish brown, soft, no plasticity, sand is fine to very fine, dry, trace lenses of clean gray sand, woody debris at 8', moist at 12.5'
		2.5/2.5		
10		1.6/2.5		
		1.5/2.5		
15		1.5/2.5	CL	(15 - 19) Sandy CLAY Spoil, grayish brown, soft, medium to high plasticity, sand throughout is fine to very fine, trace lenses of gray well sorted sand
		1.5/2.5		
20		2.0/2.5	LIG	(19 - 22.8) LIGNITE Spoil, blk, soft
		1.5/2.5	SC	(22.8 - 30) Clayey SAND Spoil, gray, soft, medium plasticity, moist, trace lenses of clean gray sand, saturated well sorted sand 27.5-29.0, damp below
25		2.0/2.5		
		2.5/2.5		
30		2.5/2.5	SP	(30 - 34) SAND Spoil, tan to grayish brown, soft, no to low plasticity, moist to wet, some clay throughout, sand is fine to medium grained
		2.5/2.5		
35		2.5/2.5	SC	(34 - 39) Sandy CLAY Spoil, tan - brown to graysih brown, highly variable sand and clay content, variable color, soft to moderatly firm, wet, fine - medium grained sand
		2.5/2.5		
40		2.5/2.5	SP	(39 - 70.5) SAND with variable Clay Spoil, tan to brown, soft, low plasticity, trace clay throughout, lenses of clean clay, clay lenses are dark gray, lense of gray well sorted fine sand at 51'-52', slight increase in clay content at 55', sands are saturated at 60'
		2.5/2.5		
45		2.5/2.5		
		2.5/2.5		
50		2.5/2.5		
		2.5/2.5		
55		2.5/2.5		
		1.0/2.5		
		1.5/2.5		
60		0.0/2.5		
		1.5/2.5		
65		2.0/2.5		
		2.0/2.5		
70			SC	(70.5 - 72.5) Sandy CLAY Spoil, dark gray, firm, medium plasticity, moist to wet
75				

GOLDER
2201 Double Creek Dr., Suite 4004
Round Rock, Texas 78664
O·512.671.3434 F·512.671.3446

Notes:
1. This log should not be used separately from the report to which it is attached.

Well Materials
(0 - 62.96) Casing, 2" Sch 40 FJT PVC
(62.96 - 72.96) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-2') Cement
(2'-58') Bentonite 3/8" Chips
(58'-73') 20/40 sand

golder.com

2021 Annual Groundwater Monitoring and Corrective Action Report - Revision 1

Sandow Steam Electric Station AX Landfill - Milam County, Texas

Prepared for:

Luminant Generation Company LLC

Prepared by:

Golder Associates Inc., Member of WSP

1601 S. Mopac Expy, Suite 325D, Austin, Texas, USA 78746

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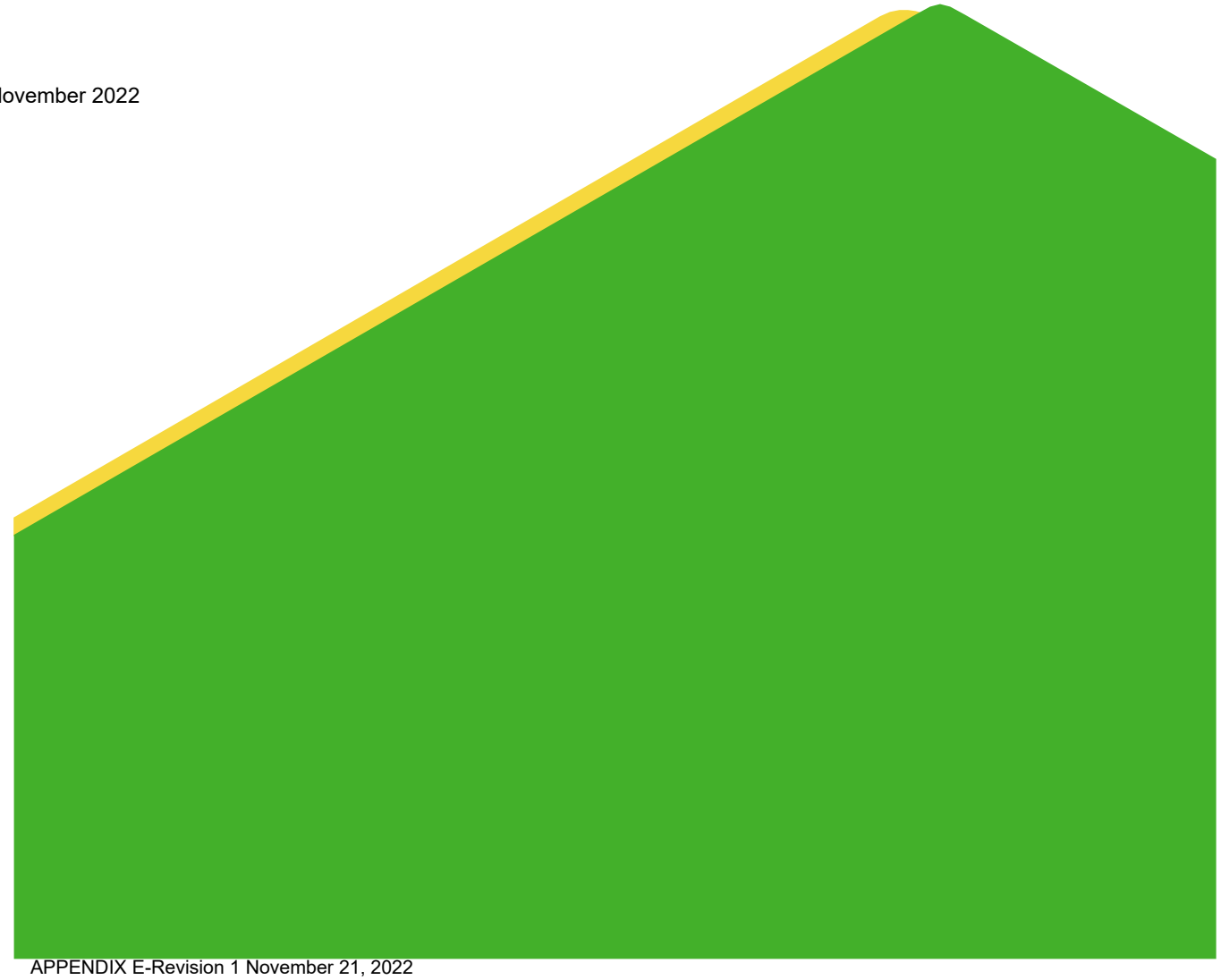
November 2022



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ACRONYMS AND ABBREVIATIONS

CCR	Coal Combustion Residuals
C.F.R.	Code of Federal Regulations
GWPS	Groundwater Protection Standard
MCL	Maximum Concentration Level
mg/L	Milligrams per Liter
NA	Not Applicable
SSI	Statistically Significant Increase
SSL	Statistically Significant Level
T.A.C	Texas Administrative Code
USEPA	United States Environmental Protection Agency

DOCUMENT REVISION RECORD

Issue No.	Date	Details of Revisions
Revision 0	January 31, 2022	Original Document
Revision 1	November 2022	Added groundwater potentiometric surface maps, laboratory analytical reports, additional information on alternate source demonstration, and professional seals to figures where applicable

EXECUTIVE SUMMARY

Golder Associates USA Inc. (Golder), Member of WSP, has prepared this report on behalf of Luminant Generation Company LLC (Luminant) to satisfy the 2021 annual groundwater monitoring and corrective action reporting requirements of 40 C.F.R. Part 257 and 30 T.A.C. Chapter 352 for the AX Landfill (the “CCR unit”) at the former Sandow Steam Electric Station in Milam County, Texas. The CCR units and CCR monitoring well network are shown on Figure 1.

At the beginning and end of the 2021 reporting period, the CCR unit was operating under a Detection Monitoring Program as described in §257.94. The Detection Monitoring Program for the AX Landfill was established in September 2017. Statistically significant increases (SSIs) above background prediction limits were identified for several Appendix III parameters as part of the 2017 through 2020 Detection Monitoring events; however, Alternate Source Demonstrations were completed which indicated that a source other than the CCR unit caused the SSIs. During 2021, SSIs were also identified for several Appendix III constituents, including for calcium in wells AX-24, AX-26, and AX-27; and sulfate in wells AX-24 and AX-26. Alternate sources for the SSIs identified in the 2021 sample data are being evaluated in accordance with §257.94. If an alternate source is not identified to be the cause of the 2021 SSIs, an Assessment Monitoring Program will be established in accordance with §257.94(e)(2).

1.0 INTRODUCTION

Golder Associates, Inc. (Golder) has prepared this report on behalf of Luminant Generation Company LLC (Luminant) to satisfy the 2021 annual groundwater monitoring and corrective action reporting requirements of the Coal Combustion Residuals (CCR) Rule for the AX Landfill at the former Sandow Steam Electric Station in Milam County, Texas. The CCR units and CCR monitoring well network are shown on Figure 1.

The CCR Rule (40 C.F.R. 257 Subpart D - *Standards for the Receipt of Coal Combustion Residuals in Landfills and Surface Impoundments*) has been promulgated by the United States Environmental Protection Agency (USEPA) to regulate the management and disposal of CCRs as solid waste under Resource Conservation and Recovery Act (RCRA) Subtitle D. TCEQ has adopted portions of the federal CCR rule at 30 T.A.C. Chapter 352 (Texas CCR Rule), and USEPA published its final approval of the Texas CCR rule on June 28, 2021. *See* 86 Fed. Reg. 33,892 (June 28, 2021). The Texas CCR Rule became effective on July 28, 2021, and it adopts and incorporates by reference the requirements for the annual groundwater monitoring report located at 40 C.F.R. § 257.90. *See* 30 T.A.C. § 352.901. It further adopts and incorporates by reference the Federal CCR Program requirements for detection and assessment monitoring in 30 T.A.C. §352.941 and 30 T.A.C. §352.951, respectively. Pursuant to 30 T.A.C. § 352.902, this report will be submitted to TCEQ for review no later than 30 days after the report has been placed in the facility's operating record. For existing CCR landfills and surface impoundments, the CCR Rule requires that the owner or operator prepare an annual groundwater monitoring and corrective action report to document the status of the groundwater monitoring and corrective action program for the CCR unit for the previous calendar year. Per §257.90(e) of the CCR Rule, the report should contain the following information, to the extent available:

(1) A map, aerial image, or diagram showing the CCR unit and all background (or upgradient) and downgradient monitoring wells, to include the well identification numbers, that are part of the groundwater monitoring program for the CCR unit;

(2) Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken;

(3) In addition to all the monitoring data obtained under §§ 257.90 through 257.98, a summary including the number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and whether the sample was required by the detection monitoring or assessment monitoring programs;

(4) A narrative discussion of any transition between monitoring programs (*e.g.,* the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant increase over background levels); and

(5) Other information required to be included in the annual report as specified in §§ 257.90 through 257.98.

(6) A section at the beginning of the annual report that provides an overview of the current status of groundwater monitoring and corrective action programs for the CCR unit. At a minimum, the summary must specify all of the following:

(i) At the start of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in § 257.94 or the assessment monitoring program in § 257.95;

(ii) At the end of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in § 257.94 or the assessment monitoring program in § 257.95;

(iii) If it was determined that there was a statistically significant increase over background for one or more constituents listed in Appendix III to this part pursuant to § 257.94(e):

(A) Identify those constituents listed in Appendix III to this part and the names of the monitoring wells associated with such an increase; and

(B) Provide the date when the assessment monitoring program was initiated for the CCR unit.

(iv) If it was determined that there was a SSL above the groundwater protection standard for one or more constituents listed in Appendix IV to this part pursuant to § 257.95(g) include all of the following:

(A) Identify those constituents listed in Appendix IV to this part and the names of the monitoring wells associated with such an increase;

(B) Provide the date when the assessment of corrective measures was initiated for the CCR unit;

(C) Provide the date when the public meeting was held for the assessment of corrective measures for the CCR unit; and

(D) Provide the date when the assessment of corrective measures was completed for the CCR unit.

(v) Whether a remedy was selected pursuant to § 257.97 during the current annual reporting period, and if so, the date of remedy selection; and

(vi) Whether remedial activities were initiated or are ongoing pursuant to § 257.98 during the current annual reporting period.

2.0 MONITORING AND CORRECTIVE ACTION PROGRAM STATUS

The AX Landfill CCR unit is currently in a Detection Monitoring Program. The initial Detection Monitoring Program groundwater samples were collected from the AX Landfill CCR monitoring well network in October 2017. Subsequent Detection Monitoring Program groundwater samples were collected on a semi-annual basis since that time. Data evaluation is completed using procedures described in the Statistical Analysis Plan (PBW, 2017) to identify statistically significant increases (SSIs) of Appendix III parameters over background concentrations. The Detection Monitoring Program sampling dates and parameters are summarized in the following table:

Detection Monitoring Program Summary

Sampling Dates	Parameters	SSIs	Assessment Monitoring Program Established
October 2017 March 2018 (re-samples)	Appendix III	Yes	No (Alternate Source Demonstration Completed)
March 2018 October 2018	Appendix III	Yes	No (Alternate Source Demonstration Completed)
June 2019 November 2019	Appendix III	Yes	No (Alternate Source Demonstration Completed)
May 2020 November 2020	Appendix III	Yes	To Be Determined (Alternate Source Demonstration Completed)
June 2021 November 2021	Appendix III	Yes	To Be Determined (Alternate Source Currently Being Assessed)

The statistical background values and Appendix III analytical data are presented in Tables 1 and 2, respectively. SSIs of Appendix III parameters were identified during each Detection Monitoring Program sampling event thus far. An initial Alternate Source Demonstration was completed in 2018, which indicated that a source other than the CCR unit caused the SSIs observed in the 2017 sample data and 2018 re-sample data. Similarly, subsequent Alternate Source Demonstrations were completed in 2019 through 2021 based on sample data collected during the previous year. As a result, the AX Landfill has remained in the Detection Monitoring Program. A summary of the Alternate Source Demonstration based on data collected in 2020 is presented in Attachment 1 as required by §257.94(e)(2).

Detection Monitoring Program groundwater samples were collected from the CCR groundwater monitoring network on a semi-annual basis in 2021, as required by the CCR Rule. The analytical data from the 2021 semi-annual Detection Monitoring Program sampling events were evaluated using procedures described in the Statistical Analysis Plan to identify SSIs of Appendix III parameters over background concentrations. SSIs of Appendix III parameters over background concentrations were identified for calcium and sulfate, which are constituents for which SSIs had previously been attributed to alternate sources. Alternate sources for the SSIs identified in the 2021 sample data are being evaluated in accordance with §257.94. If an alternate source is not identified to be the cause of the SSI, an Assessment Monitoring Program will be established in accordance with §257.94(e)(2).

3.0 KEY ACTIONS COMPLETED IN 2021

Semi-annual Detection Monitoring Program groundwater monitoring events were conducted in June and November 2021. The number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and the analytical results for the groundwater samples are summarized in Table 2. A map showing the CCR units and monitoring wells is provided as Figure 1. No wells were installed or decommissioned during 2021.

As noted in Section 2.0, SSIs were observed during the initial and subsequent CCR groundwater monitoring events at the Site. SSIs have been observed for boron, calcium, fluoride, and/or sulfate, which are all naturally occurring constituents in groundwater. The SSIs were not attributed to a release from the AX Landfill because: (1) Concentrations of the constituents with SSIs were higher in groundwater samples from other Site wells where SSIs were not observed, including from wells hydraulically upgradient of the AX Landfill, and (2) Groundwater flow characteristics indicate that groundwater could not have traveled from the active landfill cells to the wells where SSIs were observed during the time since CCR was first placed in the cells. The AX Landfill is constructed within highly heterogeneous mine spoil material that was previously excavated and backfilled during lignite mining operations at the Sandow Lignite Mine. The disruption of stratified sediments during mining and exposure of sediment surfaces and pore spaces in fine-grained materials that were previously isolated from the groundwater flow system results in increased dissolved solids and increased heterogeneity in groundwater composition during the post-mining period. Alternate Source Demonstration Reports have been completed in accordance with the CCR rule requirements, which attributed the SSIs to natural variation in groundwater quality due to the post-mine increase in dissolved solids and heterogeneity of the mine spoil groundwater system. Additional details on the SSI evaluations are provided in the 2021 and 2022 Alternate Source Demonstration reports in Attachment 1.

Water elevations measured in the CCR wells during the semi-annual groundwater sampling events were used to develop groundwater potentiometric surface maps, which are presented in Attachment 2. The inferred direction of groundwater flow was to the east during both semi-annual ground sampling events in 2021.

Laboratory analytical reports for the 2021 groundwater samples are presented in Attachment 3.

4.0 PROBLEMS ENCOUNTERED AND ACTIONS TO RESOLVE THE PROBLEMS

No problems were encountered with the CCR groundwater monitoring program in 2021.

5.0 KEY ACTIVITIES PLANNED FOR 2022

The following key activities are planned for 2022:

- Luminant submitted a registration application to TCEQ under the Texas CCR Rule for the Sandow AX Landfill on January 24, 2022.
- Continue the Detection Monitoring Program in accordance with applicable provisions of 40 C.F.R. §257.95 and 30 T.A.C. §352.941.
- If an alternate source is identified to be the cause of the SSIs observed in 2021, which are described in this report, a written demonstration will be completed within 90 days of SSI determination and included in the following Annual Groundwater Monitoring and Corrective Action Report.

6.0 REFERENCES

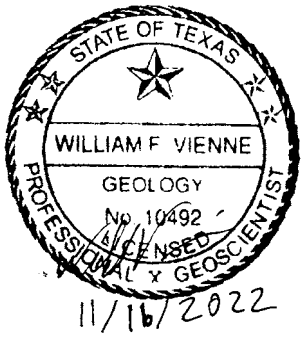
Pastor, Behling & Wheeler, LLC, 2017. Coal Combustion Residual Rule Statistical Analysis Plan, Sandow Steam Electric Station, AX Landfill, Rockdale, Texas.

Signature Page

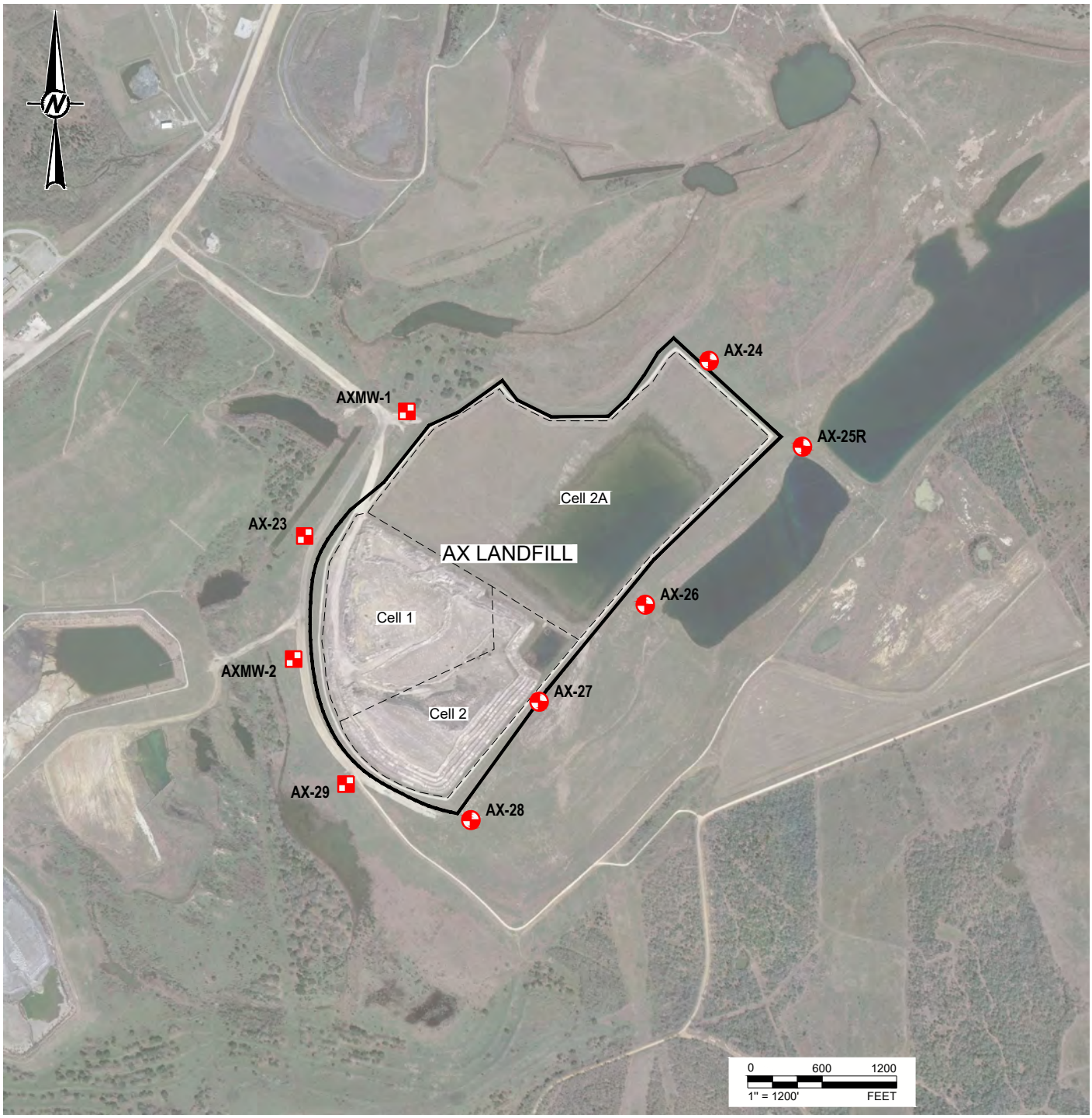
Golder Associates Inc.

Patrick J. Behling
Principal Engineer

William F. Vienne
Senior Hydrogeologist



FIGURES



LEGEND

- DOWNGRADIENT CCR MONITORING WELL
- UPGRADIENT CCR MONITORING WELL
- DEED RESTRICTION BOUNDARY
- WASTE BOUNDARY

REFERENCE(S)

BASE MAP TAKEN FROM GOOGLE EARTH, IMAGERY DATED MARCH 2022.

CLIENT
LUMINANT

PROJECT
SANDOW 5 GENERATING PLANT
ROCKDALE, TEXAS

TITLE
DETAILED SITE PLAN - AX LANDFILL

CONSULTANT
WSP GOLDER

YYYY-MM-DD	2022-11-10
DESIGNED	AJD
PREPARED	AJD
REVIEWED	WFV
APPROVED	WFV

PROJECT NO.	REV.	FIGURE
31404097.004	0	1

TABLES

Table 1
Statistical Background Values
Sandow Steam Electric Station AX Landfill

Sample Location	Boron (mg/L)	Calcium (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Field pH (s.u.)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)
Upgradient Wells							
AXMW-1	0.681	569	491	0.4	5.49 7.09	2,660	5,820
AXMW-2	3.62	943	391	1.88	4.6 7.63	3,040	4,940
AX-23	1.1	475	313	0.4	3.24 7.95	1,030	3,090
AX-29	0.432	791	306	0.4	2.73 7.01	1,440	3,370
Downgradient Wells							
AX-24	0.311	273	580	0.4	3.89 9.38	1,010	2,520
AX-25(R)	0.298	262	1,140	0.507	4.69 9.2	795	3,980
AX-26	0.446	915	3,040	0.4	5.07 8.14	1,200	8,300
AX-27	0.281	366	1,020	0.4	6.08 7.3	478	3,620
AX-28	0.393	633	756	0.4	4.67 8.55	2,280	3,790

Table 2
Appendix III Analytical Results
Sandow Steam Electric Station AX Landfill

Sample Location	Date Sampled	B	Ca	Cl	F	Field pH	SO_4	TDS
Upgradient Wells								
AXMW-1	10/03/17	0.46	477	348	<0.1	5.75	1990	3620
	03/21/18	0.50	425	267	0.122 J	5.89	2050	3680
	10/09/18	0.51	473	229	0.37	6.31	2260	3730
	06/27/19	0.80	371	242	0.37	5.10	1720	2810
	11/12/19	1.14	362	138	0.115 J	5.33	1540	2800
	05/19/20	2.27	296	137	<0.100	4.87	1570	2680
	11/11/20	4.08	369	202	0.112 J	5.55	1560	2680
	06/07/21	5.43	293	146	<0.100	4.50	1360	2290
	11/17/21	8.21	292	160	0.181 J	5.85	1470	2600
AXMW-2	10/03/17	2.14	644	207	<0.1	5.93	1990	3640
	03/21/18	2.64	628	218	1.18	5.80	2280	4050
	10/09/18	1.47	562	179	0.84	6.66	1960	3280
	06/27/19	1.75	578	203	1.39	5.87	1720	3280
	11/12/19	0.88	483	147	0.228 J	6.14	1160	2480
	05/19/20	0.74	396	143	<0.100	6.19	1150	2490
	11/11/20	0.67	539	180	<0.100	6.35	1240	2610
	06/07/21	0.58	449	131	<0.100	6.28	1180	2550
	11/17/21	0.622	423	118	0.224 J	6.44	1160	2620
AX-23	10/03/17	0.31	316	184	<0.1	6.43	631	1620
	03/23/18	0.31	309	193	0.77	6.09	655	1730
	10/09/18	0.38	305	210	0.45	7.00	636	1700
	06/27/19	0.31	335	224	0.49	6.19	652	1760
	11/12/19	0.34	304	183	0.186 J	6.28	590	1640
	05/19/20	0.35	277	232	<0.100	6.14	641	1750
	11/11/20	0.35	357	256	0.105 J	6.40	677	1800
	06/09/21	0.335	318	238	0.368 J	6.17	655	1720
	11/17/21	0.278	300	248	0.259 J	6.35	651	1860

Table 2
Appendix III Analytical Results
Sandow Steam Electric Station AX Landfill

Sample Location	Date Sampled	B	Ca	Cl	F	Field pH	SO_4	TDS
AX-29	10/03/17	0.32	392	276	<0.1	6.20	1110	2480
	03/23/18	0.30	356	285	0.81	5.89	1160	2450
	10/09/18	0.36	339	274	0.45	6.99	1060	2390
	06/27/19	0.31	352	275	<1.00	5.85	1110	2460
	11/13/19	0.47	449	281	<0.100	5.80	1210	2850
	05/19/20	0.37	308	261	<0.100	5.85	1050	2560
	11/11/20	0.39	429	320	<0.100	5.96	1190	2700
	06/10/21	0.37	365	245	<0.100	6.17	1090	2580
	11/16/21	0.341	339	297	0.201 J	5.90	1120	2630
Downgradient Wells								
AX-24	10/02/17	0.13	252	307	<0.1	6.12	632	1810
	03/26/18	0.13	254	309	0.279 J	5.82	762	1880
	10/08/18	0.18	260	283	0.59	6.82	759	1840
	07/02/19	0.14	325	244	0.49	5.80	887	2060
	11/13/19	0.20	319	226	<0.100	5.91	752	2040
	05/19/20	0.19	271	256	<0.100	5.87	800	2080
	11/12/20	0.17	368	300	<0.100	5.98	947	2180
	06/09/21	0.166	339	201	<0.100	5.86	1040	2240
	11/18/21	0.153	333	179	0.138 J	6.00	1070	2390
AX-25	10/03/17	0.21	325	586	<0.1	6.37	504	2400
	3/16/2018 resample	--	302	--	--	--	--	--
	03/26/18	0.20	281	583	0.75	6.38	526	2420
	10/08/18	0.23	324	586	1.01	7.09	492	2360
	07/02/19	0.20	384	616	0.87	6.26	608	2590
	11/12/19							
	05/07/20							
AX-25R	05/19/20	0.28	218	573	0.269 J	6.25	592	2470
	11/11/20	0.23	264	515	0.270 J	6.38	524	2210
	06/07/21	0.213	228	355	0.42	6.36	475	2020
	11/16/21	0.197	210	400	0.493	6.50	492	2120

Table 2
Appendix III Analytical Results
Sandow Steam Electric Station AX Landfill

Sample Location	Date Sampled	B	Ca	Cl	F	Field pH	SO_4	TDS
AX-26	10/02/17	0.35	666	1100	<0.1	6.38	945	3740
	03/26/18	0.34	912	1820	<0.1	6.41	1300	4980
	10/08/18	0.40	905	1720	<0.1	7.09	1220	4680
	07/02/19	0.36	409	465	0.45	6.14	643	2380
	11/13/19	0.39	651	1010	<0.100	5.91	853	3350
	05/19/20	0.38	617	1240	<0.100	6.20	838	3830
	11/12/20	0.40	980	2060	<0.100	6.29	1240	5110
	06/09/21	0.383	896	1790	<0.100	5.95	1120	4800
	11/18/21	0.360	939	2230	<0.100	6.13	1280	5930
AX-27	10/02/17	0.21	462	652	<0.1	6.19	569	2490
	3/16/2018 resample	--	453	--	--	--	659	--
	3/16/2018 dup	--	456	--	--	--	648	--
	03/26/18	0.21	438	584	<0.1	6.29	661	2350
	10/08/18	0.25	422	540	0.14	7.17	554	2220
	07/02/19	0.21	379	459	0.59	6.05	520	2090
	11/13/19	0.26	395	465	<0.100	6.05	480	2050
	05/19/20	0.30	329	479	<0.100	6.20	450	1930
	11/12/20	0.29	432	569	<0.100	6.47	522	2080
	06/09/21	0.307	384	464	<0.100	6.03	535	1980
	11/18/21	0.249	390	461	0.204 J	6.47	419	1980
AX-28	10/02/17	0.21	664	384	<0.1	6.25	1670	3350
	3/16/2018 resample	--	634	--	--	--	--	--
	03/23/18	0.20	621	354	<0.1	6.17	1720	3430
	10/08/18	0.31	578	230	0.47	6.87	1710	3300
	10/8/18 dup	0.32	577	233	0.51		1780	3370
	06/27/19	0.30	585	146	0.15	5.87	1870	3320
	11/13/19	0.23	616	235	<0.100	5.57	1820	3560
	05/19/20	0.23	492	153	<0.100	5.97	1870	3250
	11/11/20	0.21	577	126	<0.100	6.09	1810	3200
	06/09/21	0.188	461	80.2	<0.100	5.91	1610	2810
	11/16/21	0.256	466	61.9	0.198 J	5.99	1760	3040

Notes:
1. Abbreviations: mg/L - milligram per liter; s.u. - standard units.
2. J - concentration is below method quantitation limit; result is an estimate.

ATTACHMENT 1

ALTERNATE SOURCE DEMONSTRATION REPORTS

ALTERNATE SOURCE DEMONSTRATION SUMMARY

SANDOW STEAM ELECTRIC STATION – AX LANDFILL

Introduction

This Alternate Source Demonstration Summary was prepared to document that a source other than the AX Landfill (the Site) caused the statistically significant increases (SSIs) over background levels observed during the 2020 Coal Combustion Residual (CCR) Detection Monitoring Program sampling events as required by 40 CFR 257.94(e)(2) (the "CCR Rule").

AX Landfill History and CCR Monitoring Well Network

A Site Plan showing the AX Landfill and vicinity is shown on Figure 1. The AX Landfill consists of Cells 1 and 2 and covers an area of approximately 70 acres (Figure 1). Cell 2A of the AX Landfill was constructed adjacent to Cells 1 and 2, but was never used. Construction of Cell 1 was completed in July 2013 and construction of Cell 2 was completed in October 2015. Placement of Unit No. 5 CCR began in Cell 1 in May 2015 and Cell 2 in September 2016. CCR has never been placed in Cell 2A. The Sandow Steam Electric Station, which was formerly the source of CCR to the AX Landfill, ceased power generation operations in 2018. CCR has not been placed in the AX Landfill since the plant shut down in 2018.

The AX Landfill is constructed within highly heterogeneous overburden spoil material that was previously excavated and backfilled during lignite mining operations at the Sandow Lignite Mine. The uppermost aquifer at the Site occurs under unconfined conditions within the overburden spoil and extends to the base of the spoil, where lignite and/or clay confining units are encountered. An average linear flow velocity of 0.15 feet/day was calculated for the AX Landfill based on aquifer characteristics presented in the Groundwater Monitoring System Certification for the Site (PBW, 2017a).

The CCR groundwater monitoring well system at AX Landfill consists of six monitoring wells (MW-02, MW-05, MW-07, MW-08R, MW-09, and AL-10) that are each screened in the uppermost aquifer at the Site. Groundwater elevations have consistently been highest west of the AX Landfill and lowest east of the AX Landfill, with a groundwater flow direction generally from west to east. Based on the observed groundwater potentiometric surface at the Site, the location of each CCR monitoring well relative to the AX Landfill 1 is as follows:

Upgradient/Background Wells	Downgradient Wells
AXMW-1	AX-24
AXMW-2	AX-25/25R
AX-23	AX-26
AX-29	AX-27
	AX-28

Previous Detection Monitoring Results

Detection Monitoring Program groundwater data collected from the AX Landfill CCR monitoring well network from 2017 through 2020 are summarized in Table 1. The initial Detection Monitoring Program groundwater samples were collected from the AX Landfill in October 2017. SSIs were observed during the initial sampling event for calcium in wells AX-25, AX-27, and AX-28 and sulfate in well AX-27. SSIs were subsequently observed during the 2018 semi-annual groundwater sampling events for calcium in wells AX-25 and AX-27, sulfate in wells AX-26

and AX-27, and fluoride in wells AX-23, AX-24, AX-25, AX-28, and AX-29. Alternate Source Demonstration Reports (PBW 2018; Golder 2019; Golder 2020) attributed the SSIs to natural variation in groundwater quality due to the heterogeneity of the spoil groundwater system based on: (1) Concentrations of the constituents with SSIs were higher in groundwater samples from other Site wells, including from wells hydraulically upgradient of the AX Landfill, and (2) Groundwater flow velocity calculations indicate that groundwater could not have traveled from the active landfill cells to the wells where SSIs were observed during the time since CCR was first placed in the cells. Based on the results of the Alternate Source Demonstrations, the AX Landfill has remained in the Detection Monitoring Program.

2020 Semi-Annual Detection Monitoring Results

Detection Monitoring Program groundwater samples were collected on a semi-annual basis from the AX Landfill CCR monitoring well network in 2020 in accordance with 40 CFR 257.94. SSIs were observed during the 2020 semi-annual groundwater sampling events in downgradient wells AX-24 (calcium), AX-25R (calcium), AX-26 (calcium and sulfate), and AX-27 (boron, calcium, and sulfate).

Data variability across the CCR monitoring network is very high. Boron, calcium, and sulfate concentrations in downgradient wells where SSIs were indicated have generally been lower than other wells where SSIs were not indicated and/or in background wells. For example, calcium concentrations in downgradient wells AX-24, AX-25R and AX-27 (where SSIs are indicated for calcium) are similar to or lower than calcium concentrations in downgradient well AX-28 where SSIs were not indicated and in upgradient well AXMW-2. The calcium SSI observed in well AX-26 in November 2020 (980 mg/L) is higher than calcium concentrations in other downgradient and upgradient wells; however, this calcium concentration is similar to historical calcium concentrations observed in samples from AX-26 that did not indicate SSIs and, as discussed in the paragraph below, AX-26 is located sufficiently far from the landfill cells containing CCR that groundwater from these areas would not have reached AX-26 by 2020. Concentrations of sulfate in the downgradient wells where SSIs were indicated (AX-26 and AX-27) have consistently been lower than concentrations in downgradient wells where SSIs were not indicated and in upgradient wells. Boron concentrations in downgradient well AX-27 are lower than all boron concentrations in 2020 groundwater samples from all upgradient wells. Based on the high site-wide variability in boron, calcium, and sulfate sample concentrations, the SSIs observed during the 2020 semi-annual monitoring events are attributed to natural variability in groundwater quality related to heterogeneity of the mine spoil rather than a release from the AX Landfill.

This conclusion is further supported by the location of the wells where SSIs were identified relative to Cells 1 and 2. Based on the timing of CCR placement in the AX Landfill and the calculated average linear groundwater velocity (0.15 feet/day) by PBW (2017a), wells AX-24, AX-25R, and AX-26 are all located sufficiently far from Cells 1 and 2 that affected water in contact with the cells would not have reached these wells by the time that the 2020 Detection Monitoring Program groundwater samples were collected. CCR was first placed in Cell 1 in May 2015 and in Cell 2 in September 2016. Using the conservative assumptions that the wells are located directly downgradient of the active cells (Cells 1 and 2) and that chemical adsorption is negligible, the theoretical amount of time for groundwater in contact with the active cells to reach AX-26 (approximately 800 feet from the former active cells) and AX-24 and AX-25 (both approximately 2,500 feet from the former active cells) is 15 and 40-50 years, respectively.

The other downgradient well where an SSI was identified was AX-27 (boron, calcium, and sulfate). AX-27 is located approximately 70 feet from Cell 2. The estimated amount of time it would take groundwater in contact with Cell 2 to reach AX-27 is approximately 1.3 years. Theoretically, groundwater in contact with Cell 2 could have reached AX-27 before the 2020 semi-annual groundwater samples were collected; however, the boron, calcium, and sulfate concentrations observed in the 2020 samples from well AX-27 are similar to those observed

in historical samples collected from the well before groundwater from Cell 2 would have theoretically reached AX-27. Additionally, the boron, calcium, and sulfate concentrations observed in the 2020 samples from well AX-27 are lower than concentrations observed in upgradient wells.

Conclusion

SSIs were identified for boron, calcium, and sulfate in one or more downgradient wells during the 2020 Detection Monitoring Program semi-annual groundwater sampling events at the AX Landfill. However, all observed SSIs are attributed to natural variability in groundwater quality due to the heterogeneity of the mine spoil groundwater system and are not considered evidence of a release from the CCR unit. In accordance with Section 257.94(e)(2), Luminant should continue the Detection Monitoring Program at the unit. Initiation of an Assessment Monitoring Program is not required at this time.

References

Pastor, Behling & Wheeler, LLC (PBW), 2017a. Coal Combustion Residual Rule, Groundwater Monitoring System Certification, Sandow 5 Generating Plant, AX Landfill, Rockdale, Texas. October 16, 2017.

Pastor, Behling & Wheeler, LLC (PBW), 2018. Coal Combustion Residual Rule, Alternate Source Demonstration Report, Sandow 5 Generating Plant, AX Landfill, Rockdale, Texas.

Golder Associates (Golder), 2019. Coal Combustion Residual Rule, Alternate Source Demonstration Report, Sandow 5 Generating Plant, AX Landfill, Rockdale, Texas.

Golder Associates (Golder), 2020. Coal Combustion Residual Rule, Alternate Source Demonstration Report, Sandow 5 Generating Plant, AX Landfill, Rockdale, Texas.

PROFESSIONAL CERTIFICATION

This document and all attachments were prepared by Golder Associates Inc. under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I hereby certify that the alternative source demonstration at the referenced facility meets the requirements of Section 257.94(e)(2) of the CCR Rule.

Patrick J. Behling, P.E.
Principal Engineer
GOLDER ASSOCIATES INC.

Table 1
CCR Groundwater Detection Monitoring Data Summary
Sandow Steam Electric Station - AX Landfill

Sample Location	Date Sampled	B		Ca		Cl		F		Field pH		SO_4		TDS	
		Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data
Upgradient Wells															
AXMW-1	10/03/17	0.68	0.46	569	477	491	348	0.40	<0.1	5.49 7.09	5.75	2660	1990	5820	3620
	03/21/18		0.50		425		267		0.122 J		5.89		2050		3680
	10/09/18		0.51		473		229		0.37		6.31		2260		3730
	06/27/19		0.80		371		242		0.37		5.10		1720		2810
	11/12/19		1.14		362		138		0.115 J		5.33		1540		2800
	05/19/20		2.27		296		137		<0.100		4.87		1570		2680
	11/11/20		4.08		369		202		0.112 J		5.55		1560		2680
AXMW-2	10/03/17	3.62	2.14	943	644	391	207	1.88	<0.1	4.6 7.63	5.93	3040	1990	4940	3640
	03/21/18		2.64		628		218		1.18		5.80		2280		4050
	10/09/18		1.47		562		179		0.84		6.66		1960		3280
	06/27/19		1.75		578		203		1.39		5.87		1720		3280
	11/12/19		0.88		483		147		0.228 J		6.14		1160		2480
	05/19/20		0.74		396		143		<0.100		6.19		1150		2490
	11/11/20		0.67		539		180		<0.100		6.35		1240		2610
AX-23	10/03/17	1.10	0.31	475	316	313	184	0.40	<0.1	3.24 7.95	6.43	1030	631	3090	1620
	03/23/18		0.31		309		193		0.77		6.09		655		1730
	10/09/18		0.38		305		210		0.45		7.00		636		1700
	06/27/19		0.31		335		224		0.49		6.19		652		1760
	11/12/19		0.34		304		183		0.186 J		6.28		590		1640
	05/19/20		0.35		277		232		<0.100		6.14		641		1750
	11/11/20		0.35		357		256		0.105 J		6.40		677		1800

Table 1
CCR Groundwater Detection Monitoring Data Summary
Sandow Steam Electric Station - AX Landfill

Sample Location	Date Sampled	B		Ca		Cl		F		Field pH		SO_4		TDS	
		Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data
AX-29	10/03/17	0.43	0.32	791	392	306	276	0.40	<0.1	2.73 7.01	6.20	1440	1110	3370	2480
	03/23/18		0.30		356		285		0.81		5.89		1160		2450
	10/09/18		0.36		339		274		0.45		6.99		1060		2390
	06/27/19		0.31		352		275		<1.00		5.85		1110		2460
	11/13/19		0.47		449		281		<0.100		5.80		1210		2850
	05/19/20		0.37		308		261		<0.100		5.85		1050		2560
	11/11/20		0.39		429		320		<0.100		5.96		1190		2700
Downgradient Wells															
AX-24	10/02/17	0.31	0.13	273	252	580	307	0.40	<0.1	3.89 9.38	6.12	1010	632	2520	1810
	03/26/18		0.13		254		309		0.279 J		5.82		762		1880
	10/08/18		0.18		260		283		0.59		6.82		759		1840
	07/02/19		0.14		325		244		0.49		5.80		887		2060
	11/13/19		0.20		319		226		<0.100		5.91		752		2040
	05/19/20		0.19		271		256		<0.100		5.87		800		2080
	11/12/20		0.17		368		300		<0.100		5.98		947		2180
AX-25	10/03/17	0.30	0.21	262	325	1140	586	0.51	<0.1	4.69 9.20	6.37	795	504	3980	2400
	03/16/18		--		302		--		--		--		--		--
	03/26/18		0.20		281		583		0.75		6.38		526		2420
	10/08/18		0.23		324		586		1.01		7.09		492		2360
	07/02/19		0.20		384		616		0.87		6.26		608		2590
	11/12/19	Well Damaged													
	05/07/20	Well Plugged and Abandoned													

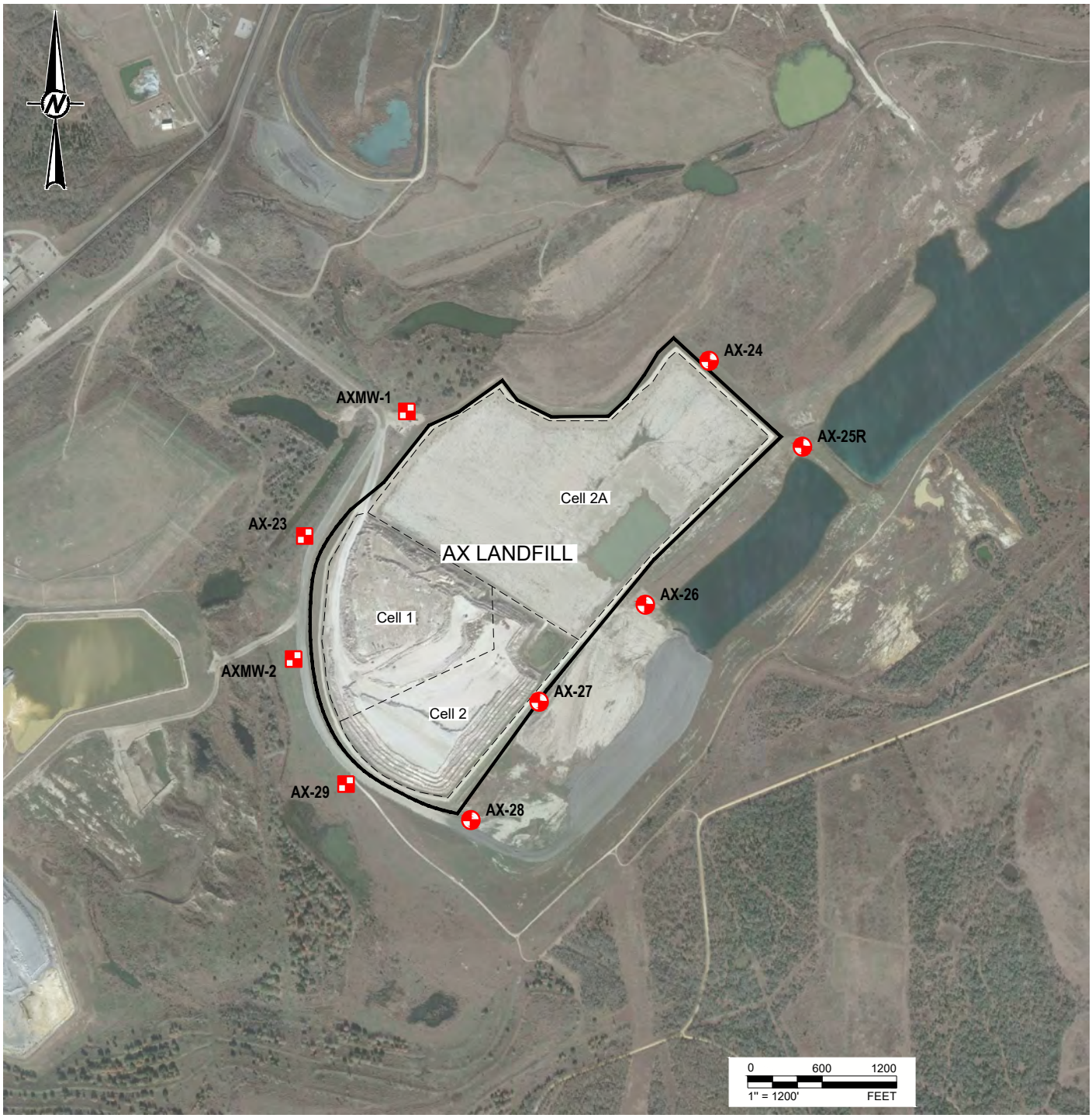
Table 1
CCR Groundwater Detection Monitoring Data Summary
Sandow Steam Electric Station - AX Landfill

Sample Location	Date Sampled	B		Ca		Cl		F		Field pH		SO_4		TDS	
		Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data
AX-25R	05/19/20	0.30	0.28	262	218	1140	573	0.51	0.269 J	4.69 9.20	6.25	795.00	592	3980	2470
	11/11/20		0.23		264		515		0.270 J		6.38		524		2210
AX-26	10/02/17	0.45	0.35	915	666	3040	1100	0.40	<0.1	5.07 8.14	6.38	1200	945	8300	3740
	03/26/18		0.34		912		1820		<0.1		6.41		1300		4980
	10/08/18		0.40		905		1720		<0.1		7.09		1220		4680
	07/02/19		0.36		409		465		0.45		6.14		643		2380
	11/13/19		0.39		651		1010		<0.100		5.91		853		3350
	05/19/20		0.38		617		1240		<0.100		6.20		838		3830
	11/12/20		0.40		980		2060		<0.100		6.29		1240		5110
AX-27	10/02/17	0.28	0.21	366	462	1020	652	0.40	<0.1	6.08 7.3	6.19	478	569	3620	2490
	03/16/18		--		453		--		--		--		659		--
	/16/2018 du		--		456		--		--		--		648		--
	03/26/18		0.21		438		584		<0.1		6.29		661		2350
	10/08/18		0.25		422		540		0.14		7.17		554		2220
	07/02/19		0.21		379		459		0.59		6.05		520		2090
	11/13/19		0.26		395		465		<0.100		6.05		480		2050
	05/19/20		0.30		329		479		<0.100		6.20		450		1930
	11/12/20		0.29		432		569		<0.100		6.47		522		2080

Table 1
CCR Groundwater Detection Monitoring Data Summary
Sandow Steam Electric Station - AX Landfill

Sample Location	Date Sampled	B		Ca		Cl		F		Field pH		SO_4		TDS	
		Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data
AX-28	10/02/17	0.39	0.21	633	664	756	384	0.40	<0.1	4.67 8.55	6.25	2280	1670	3790	3350
	03/16/18		--		634		--		--		--		--		--
	03/23/18		0.20		621		354		<0.1		6.17		1720		3430
	10/08/18		0.31		578		230		0.47		6.87		1710		3300
	10/8/18 dup		0.32		577		233		0.51				1780		3370
	06/27/19		0.30		585		146		0.15		5.87		1870		3320
	11/13/19		0.23		616		235		<0.100		5.57		1820		3560
	05/19/20		0.23		492		153		<0.100		5.97		1870		3250
	11/11/20		0.21		577		126		<0.100		6.09		1810		3200

Notes:
Notes:
1. Abbreviations: mg/L - milligram per liter; s.u. - standard units.
2. J - concentration is below method quantitation limit; result is an estimate.



LEGEND

- DOWNGRADIENT CCR MONITORING WELL
- UPGRADIENT CCR MONITORING WELL

NOTE(S)

REFERENCE(S)

BASE MAP TAKEN FROM GOOGLE EARTH, IMAGERY DATED 12/2022

APPENDIX E Revision 1 November 21, 2022

CLIENT
LUMINANT

PROJECT
SANDOW 5 GENERATING PLANT
ROCKDALE, TEXAS

TITLE
DETAILED SITE PLAN - AX LANDFILL

CONSULTANT
GOLDER

YYYY-MM-DD	2020-01-23
DESIGNED	AJD
PREPARED	AJD
REVIEWED	WFV
APPROVED	WFV

PROJECT NO.	REV.	FIGURE
19122262	0	1

ALTERNATE SOURCE DEMONSTRATION SUMMARY

SANDOW STEAM ELECTRIC STATION – AX LANDFILL

Introduction

This Alternate Source Demonstration Summary was prepared to document that a source other than the AX Landfill (the Site) caused the statistically significant increases (SSIs) over background levels observed during the 2020 Coal Combustion Residual (CCR) Detection Monitoring Program sampling events as required by 40 CFR 257.94(e)(2) of the federal CCR Rule. The Texas Commission on Environmental Quality (TCEQ) has adopted portions of the federal CCR rule at 30 T.A.C. Chapter 352 (Texas CCR Rule). The Texas CCR Rule became effective on July 28, 2021, and it adopts and incorporates by reference the requirements for the annual groundwater monitoring report located at 40 C.F.R. §257.90 (*See* 30 T.A.C. §352.901) and the Federal CCR Program requirements for detection and assessment monitoring at 40 C.F.R. §257.94 and §257.95 (*See* 30 T.A.C. §352.941 and 30 T.A.C. §352.951). Pursuant to 30 T.A.C. §352.941(c)(1), a notification was submitted to the Executive Director on January 14, 2022 indicating an intent to pursue an Alternate Source Demonstration. This Alternate Source Demonstration will be submitted to the Executive Director pursuant to 30 T.A.C. §352.941(c)(2).

AX Landfill History and CCR Monitoring Well Network

A Site Plan showing the AX Landfill and vicinity is shown on Figure 1. The AX Landfill consists of Cells 1 and 2 and covers an area of approximately 70 acres (Figure 1). Cell 2A of the AX Landfill was constructed adjacent to Cells 1 and 2 but was never used. Construction of Cell 1 was completed in July 2013 and construction of Cell 2 was completed in October 2015. Placement of Unit No. 5 CCR began in Cell 1 in May 2015 and Cell 2 in September 2016. CCR has never been placed in Cell 2A. The Sandow Steam Electric Station, which was formerly the source of CCR to the AX Landfill, ceased power generation operations in 2018. CCR has not been placed in the AX Landfill since the plant shut down in 2018.

The AX Landfill is constructed within highly heterogeneous overburden spoil material that was previously excavated and backfilled during lignite mining operations at the Sandow Lignite Mine. The uppermost aquifer at the Site occurs under unconfined conditions within the overburden spoil and extends to the base of the spoil, where lignite and/or clay confining units are encountered. An average linear flow velocity of 0.15 feet/day was calculated for the AX Landfill based on aquifer characteristics presented in the Groundwater Monitoring System Certification for the Site (PBW 2017).

The CCR groundwater monitoring well system at AX Landfill consists of nine monitoring wells that are each screened in the uppermost aquifer at the Site. Groundwater elevations have consistently been highest west of the AX Landfill and lowest east of the AX Landfill, with a groundwater flow direction generally from west to east. Based on the observed groundwater potentiometric surface at the Site, the location of each CCR monitoring well relative to the AX Landfill 1 is as follows:

Upgradient/Background Wells	Downgradient Wells
AXMW-1	AX-24
AXMW-2	AX-25/25R
AX-23	AX-26
AX-29	AX-27
	AX-28

Previous Detection Monitoring Results

Detection Monitoring Program groundwater data collected from the AX Landfill CCR monitoring well network from 2017 through 2021 are summarized in Table 1. The initial Detection Monitoring Program groundwater samples were collected from the AX Landfill in October 2017. SSIs were observed during the initial and subsequent sampling events for boron, calcium, fluoride, and/or sulfate. Alternate Source Demonstration Reports attributed the SSIs to natural variation in groundwater quality due to the heterogeneity of the spoil groundwater system based on: (1) Concentrations of the constituents with SSIs were higher in groundwater samples from other Site wells, including from wells hydraulically upgradient of the AX Landfill, and (2) Groundwater flow velocity calculations indicate that groundwater could not have traveled from the active landfill cells to the wells where SSIs were observed during the time since CCR was first placed in the cells. Based on the results of the Alternate Source Demonstrations, the AX Landfill has remained in the Detection Monitoring Program.

2021 Semi-Annual Detection Monitoring Results

Detection Monitoring Program groundwater samples were collected on a semi-annual basis from the AX Landfill CCR monitoring well network in 2021 in accordance with 40 CFR 257.94. SSIs were observed during the 2021 semi-annual groundwater sampling events in downgradient wells AX-24 (calcium and sulfate), AX-26 (calcium and sulfate), and AX-27 (calcium).

Data variability across the CCR monitoring network is very high. Calcium and sulfate concentrations in downgradient wells where SSIs were indicated in 2021 were generally lower than in other wells where SSIs were not indicated and/or in background wells. For example, calcium concentrations in downgradient wells AX-24 and AX-27 (where SSIs are indicated for calcium) are similar to or lower than calcium concentrations in downgradient wells where SSIs were not indicated and in upgradient wells. The calcium SSI observed in 2021 in well AX-26 (max concentration of 939 mg/L) is higher than calcium concentrations in other downgradient and upgradient wells; however, this calcium concentration is similar to historical calcium concentrations observed in samples from AX-26 that did not indicate SSIs and, as discussed in the paragraph below, AX-26 is located sufficiently far from the landfill cells containing CCR that groundwater from these areas would not have reached AX-26 by 2021. Concentrations of sulfate in the downgradient wells where SSIs were indicated (AX-24 and AX-26) have consistently been lower than concentrations in downgradient wells where SSIs were not indicated and in upgradient wells. Based on the high site-wide variability in calcium and sulfate sample concentrations, the SSIs observed during the 2021 semi-annual monitoring events are attributed to natural variability in groundwater quality related to heterogeneity of the mine spoil rather than a release from the AX Landfill.

This conclusion is further supported by the location of the wells where SSIs were identified relative to Cells 1 and 2. Based on the timing of CCR placement in the AX Landfill and the calculated average linear groundwater velocity (0.15 feet/day) by PBW (2017), wells AX-24 and AX-26 are located sufficiently far from Cells 1 and 2 that affected water in contact with the cells would not have reached these wells by the time that the 2021 Detection Monitoring Program groundwater samples were collected. CCR was first placed in Cell 1 in May 2015 and in Cell 2 in September 2016. Using the conservative assumptions that the wells are located directly downgradient of the active cells (Cells 1 and 2) and that chemical adsorption is negligible, the theoretical amount of time for groundwater in contact with the active cells to reach AX-26 (approximately 800 feet from the former active cells) and AX-24 (approximately 2,500 feet from the former active cells) is 15 and 40-50 years, respectively.

The other downgradient well where an SSI was identified was AX-27 (calcium). AX-27 is located approximately 70 feet from Cell 2. The estimated amount of time it would take groundwater in contact with Cell 2 to reach AX-27 is approximately 1.3 years. Theoretically, groundwater in contact with Cell 2 could have reached AX-27 before the 2021 semi-annual groundwater samples were collected; however, the calcium concentrations observed in the 2021 samples from well AX-27 are similar to those observed in historical samples collected from the well before

groundwater from Cell 2 would have theoretically reached AX-27. Additionally, the calcium concentrations observed in the 2021 samples from well AX-27 are lower than concentrations observed in upgradient wells.

Conclusion

SSIs were identified for calcium and sulfate in one or more downgradient wells during the 2021 Detection Monitoring Program semi-annual groundwater sampling events at the AX Landfill. However, all observed SSIs are attributed to natural variability in groundwater quality due to the heterogeneity of the mine spoil groundwater system and are not considered evidence of a release from the CCR unit. In accordance with Section 257.94(e)(2), Luminant should continue the Detection Monitoring Program at the unit. Initiation of an Assessment Monitoring Program is not required at this time.

References

Pastor, Behling & Wheeler, LLC (PBW), 2017. Coal Combustion Residual Rule, Groundwater Monitoring System Certification, Sandow 5 Generating Plant, AX Landfill, Rockdale, Texas. October 16, 2017.

PROFESSIONAL CERTIFICATION

This document and all attachments were prepared by Golder Associates USA Inc., Member of WSP, under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I hereby certify that the alternative source demonstration at the referenced facility meets the requirements of Section 257.94(e)(2) of the CCR Rule.

Patrick J. Behling, P.E.
Principal Engineer
GOLDER ASSOCIATES USA INC., Member of WSP

Table 1
Appendix III Analytical Results
Sandow Steam Electric Station AX Landfill

Sample Location	Date Sampled	B		Ca		Cl		F		Field pH		SO_4		TDS	
		Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data
Upgradient Wells															
AXMW-1	10/03/17	0.68	0.46	569	477	491	348	0.40	<0.1	5.49 7.09	5.75	2660	1990	5820	3620
	03/21/18		0.50		425		267		0.122 J		5.89		2050		3680
	10/09/18		0.51		473		229		0.37		6.31		2260		3730
	06/27/19		**0.80**		371		242		0.37		**5.10**		1720		2810
	11/12/19		**1.14**		362		138		0.115 J		**5.33**		1540		2800
	05/19/20		**2.27**		296		137		<0.100		**4.87**		1570		2680
	11/11/20		**4.08**		369		202		0.112 J		5.55		1560		2680
	06/07/21		**5.43**		293		146		<0.100		**4.50**		1360		2290
	11/17/21		**8.21**		292		160		0.181 J		5.85		1470		2600
AXMW-2	10/03/17	3.62	2.14	943	644	391	207	1.88	<0.1	4.6 7.63	5.93	3040	1990	4940	3640
	03/21/18		2.64		628		218		1.18		5.80		2280		4050
	10/09/18		1.47		562		179		0.84		6.66		1960		3280
	06/27/19		1.75		578		203		1.39		5.87		1720		3280
	11/12/19		0.88		483		147		0.228 J		6.14		1160		2480
	05/19/20		0.74		396		143		<0.100		6.19		1150		2490
	11/11/20		0.67		539		180		<0.100		6.35		1240		2610
	06/07/21		0.58		449		131		<0.100		6.28		1180		2550
	11/17/21		0.622		423		118		0.224 J		6.44		1160		2620
AX-23	10/03/17	1.10	0.31	475	316	313	184	0.40	<0.1	3.24 7.95	6.43	1030	631	3090	1620
	03/23/18		0.31		309		193		**0.77**		6.09		655		1730
	10/09/18		0.38		305		210		**0.45**		7.00		636		1700
	06/27/19		0.31		335		224		**0.49**		6.19		652		1760
	11/12/19		0.34		304		183		0.186 J		6.28		590		1640
	05/19/20		0.35		277		232		<0.100		6.14		641		1750
	11/11/20		0.35		357		256		0.105 J		6.40		677		1800
	06/09/21		0.335		318		238		0.368 J		6.17		655		1720
	11/17/21		0.278		300		248		0.259 J		6.35		651		1860

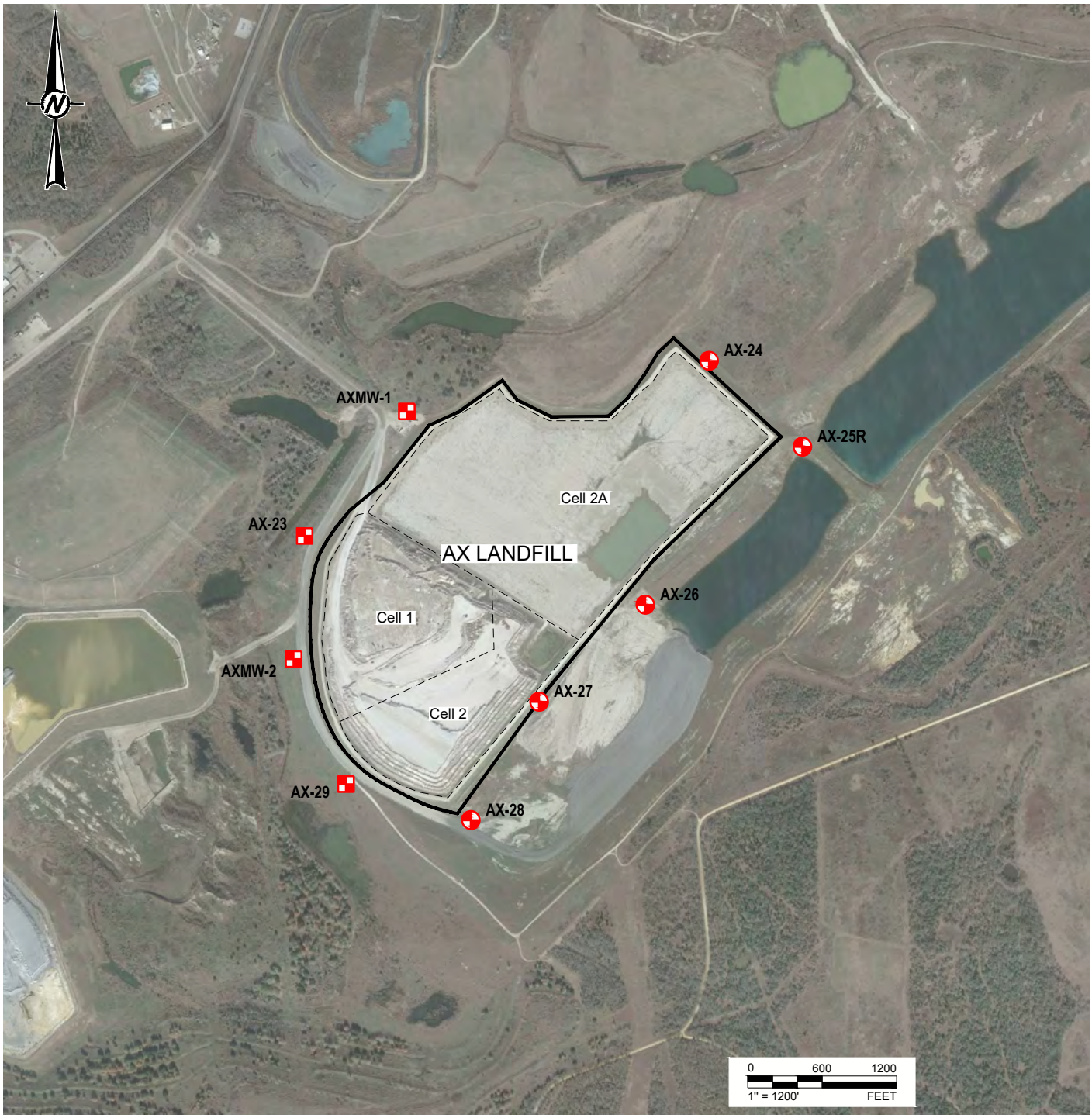
Table 1
Appendix III Analytical Results
Sandow Steam Electric Station AX Landfill

Sample Location	Date Sampled	B		Ca		Cl		F		Field pH		SO_4		TDS	
		Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data
AX-29	10/03/17	0.43	0.32	791	392	306	276	0.40	<0.1	2.73 7.01	6.20	1440	1110	3370	2480
	03/23/18		0.30		356		285		**0.81**		5.89		1160		2450
	10/09/18		0.36		339		274		**0.45**		6.99		1060		2390
	06/27/19		0.31		352		275		<1.00		5.85		1110		2460
	11/13/19		**0.47**		449		281		<0.100		5.80		1210		2850
	05/19/20		0.37		308		261		<0.100		5.85		1050		2560
	11/11/20		0.39		429		**320**		<0.100		5.96		1190		2700
	06/10/21		0.37		365		245		<0.100		6.17		1090		2580
	11/16/21		0.341		339		297		0.201 J		5.90		1120		2630
Downgradient Wells															
AX-24	10/02/17	0.31	0.13	273	252	580	307	0.40	<0.1	3.89 9.38	6.12	1010	632	2520	1810
	03/26/18		0.13		254		309		0.279 J		5.82		762		1880
	10/08/18		0.18		260		283		**0.59**		6.82		759		1840
	07/02/19		0.14		**325**		244		**0.49**		5.80		887		2060
	11/13/19		0.20		**319**		226		<0.100		5.91		752		2040
	05/19/20		0.19		271		256		<0.100		5.87		800		2080
	11/12/20		0.17		**368**		300		<0.100		5.98		947		2180
	06/09/21		0.166		**339**		201		<0.100		5.86		**1040**		2240
	11/18/21		0.153		**333**		179		0.138 J		6.00		**1070**		2390
AX-25	10/03/17	0.30	0.21	262	**325**	1140	586	0.51	<0.1	4.69 9.20	6.37	795	504	3980	2400
	3/16/2018 resample		--		**302**		--		--		--		--		--
	03/26/18		0.20		**281**		583		**0.75**		6.38		526		2420
	10/08/18		0.23		**324**		586		**1.01**		7.09		492		2360
	07/02/19		0.20		**384**		616		**0.87**		6.26		608		2590
	11/12/19	Well Damaged													
	05/07/20	Well Plugged and Abandoned (replaced by AX-25R)													
AX-25R	05/19/20	0.30	0.28	262	218	1140	573	0.51	0.269 J	4.69 9.20	6.25	795	592	3980	2470
	11/11/20		0.23		**264**		515		0.270 J		6.38		524		2210
	06/07/21		0.213		228		355		0.42		6.36		475		2020
	11/16/21		0.197		210		400		0.493		6.50		492		2120

Table 1
Appendix III Analytical Results
Sandow Steam Electric Station AX Landfill

Sample Location	Date Sampled	B		Ca		Cl		F		Field pH		SO_4		TDS	
		Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data
AX-26	10/02/17	0.45	0.35	915	666	3040	1100	0.40	<0.1	5.07 8.14	6.38	1200	945	8300	3740
	03/26/18		0.34		912		1820		<0.1		6.41		**1300**		4980
	10/08/18		0.40		905		1720		<0.1		7.09		**1220**		4680
	07/02/19		0.36		409		465		**0.45**		6.14		643		2380
	11/13/19		0.39		651		1010		<0.100		5.91		853		3350
	05/19/20		0.38		617		1240		<0.100		6.20		838		3830
	11/12/20		0.40		**980**		2060		<0.100		6.29		**1240**		5110
	06/09/21		0.383		**896**		1790		<0.100		5.95		1120		4800
	11/18/21		0.360		**939**		2230		<0.100		6.13		**1280**		5930
AX-27	10/02/17	0.28	0.21	366	**462**	1020	652	0.40	<0.1	6.08 7.3	6.19	478	**569**	3620	2490
	3/16/2018 resample		--		**453**		--		--		--		**659**		--
	3/16/2018 dup		--		**456**		--		--		--		**648**		--
	03/26/18		0.21		**438**		584		<0.1		6.29		**661**		2350
	10/08/18		0.25		**422**		540		0.14		7.17		**554**		2220
	07/02/19		0.21		**379**		459		**0.59**		6.05		**520**		2090
	11/13/19		0.26		**395**		465		<0.100		6.05		**480**		2050
	05/19/20		**0.30**		329		479		<0.100		6.20		450		1930
	11/12/20		**0.29**		**432**		569		<0.100		6.47		**522**		2080
	06/09/21		**0.307**		**384**		464		<0.100		**6.03**		**535**		1980
	11/18/21		0.249		**390**		461		0.204 J		6.47		419		1980
AX-28	10/02/17	0.39	0.21	633	**664**	756	384	0.40	<0.1	4.67 8.55	6.25	2280	1670	3790	3350
	3/16/2018 resample		--		**634**		--		--		--		--		--
	03/23/18		0.20		621		354		<0.1		6.17		1720		3430
	10/08/18		0.31		578		230		**0.47**		6.87		1710		3300
	10/8/18 dup		0.32		577		233		**0.51**				1780		3370
	06/27/19		0.30		585		146		0.15		5.87		1870		3320
	11/13/19		0.23		616		235		<0.100		5.57		1820		3560
	05/19/20		0.23		492		153		<0.100		5.97		1870		3250
	11/11/20		0.21		577		126		<0.100		6.09		1810		3200
	06/09/21		0.188		461		80.2		<0.100		5.91		1610		2810
	11/16/21		0.256		466		61.9		0.198 J		5.99		1760		3040

Notes:
Notes:
1. Abbreviations: mg/L - milligram per liter; s.u. - standard units.
2. J - concentration is below method quantitation limit; result is an estimate.
3. Highlighted sample results exceed the prediction limit.



LEGEND

- DOWNGRADIENT CCR MONITORING WELL
- UPGRADIENT CCR MONITORING WELL

NOTE(S)

REFERENCE(S)

BASE MAP TAKEN FROM GOOGLE EARTH, IMAGERY DATED 12/2022

APPENDIX E Revision 1 November 21, 2022

CLIENT
LUMINANT

PROJECT
SANDOW 5 GENERATING PLANT
ROCKDALE, TEXAS

TITLE
DETAILED SITE PLAN - AX LANDFILL

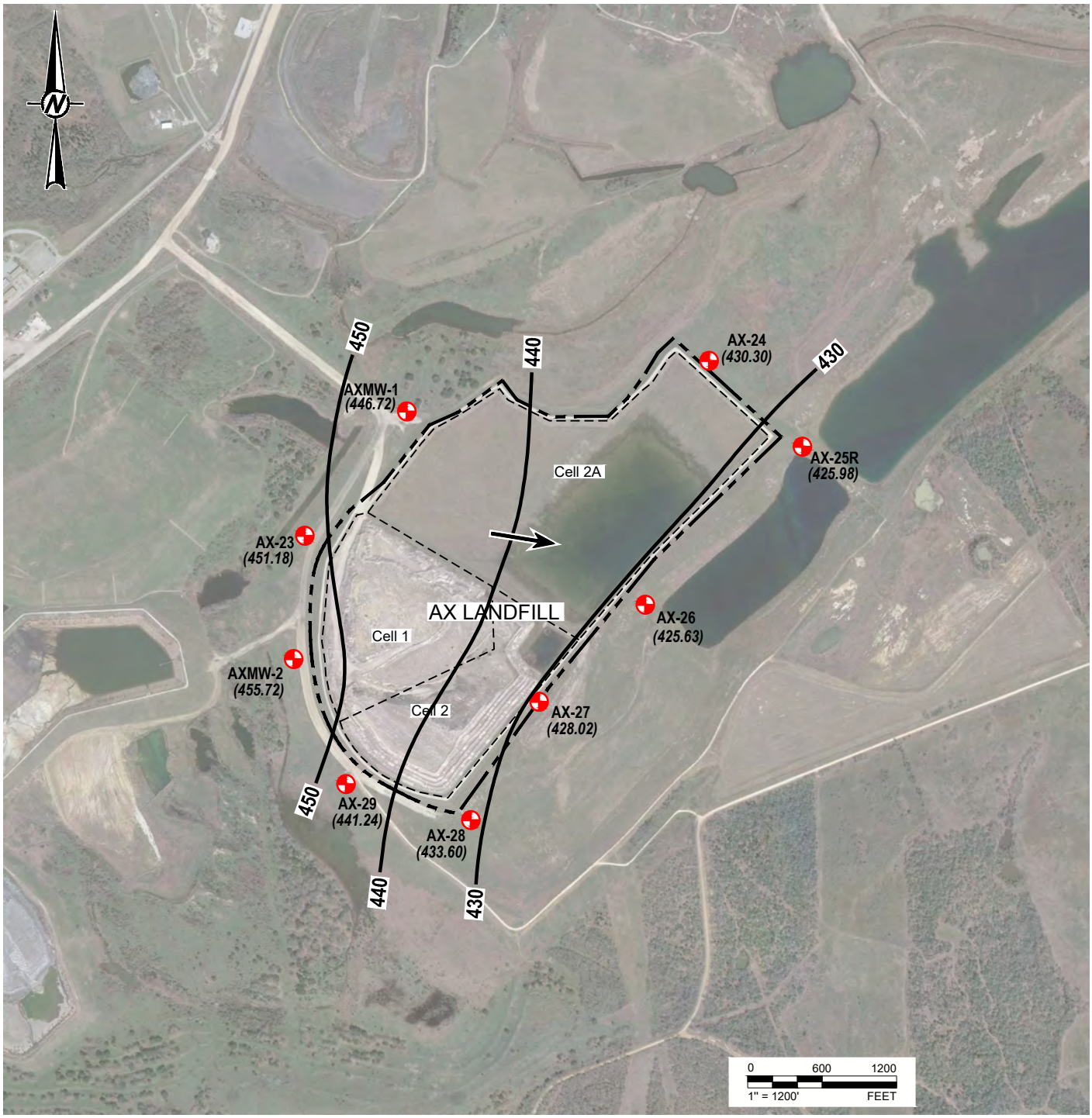
CONSULTANT
WSP GOLDER

YYYY-MM-DD	2020-01-23
DESIGNED	AJD
PREPARED	AJD
REVIEWED	WFV
APPROVED	WFV

PROJECT NO.	REV.	FIGURE
19122262	0	1

ATTACHMENT 2

GROUNDWATER POTENTIOMETRIC SURFACE MAPS



LEGEND

- CCR MONITORING WELL
- (414.49) GROUNDWATER POTENTIOMETRIC SURFACE (FT MSL)
- 400 GROUNDWATER POTENTIOMETRIC SURFACE CONTOUR (C.I. = 10 FT)
- INFERRED GROUNDWATER FLOW DIRECTION

STATE OF TEXAS
WILLIAM F VIENNE
GEOLOGY
No. 10492
LICENSED
PROFESSIONAL GEOSCIENTIST
11/11/2022

REFERENCE(S)
BASE MAP TAKEN FROM GOOGLE EARTH, IMAGERY MARCH 2022

CLIENT
LUMINANT

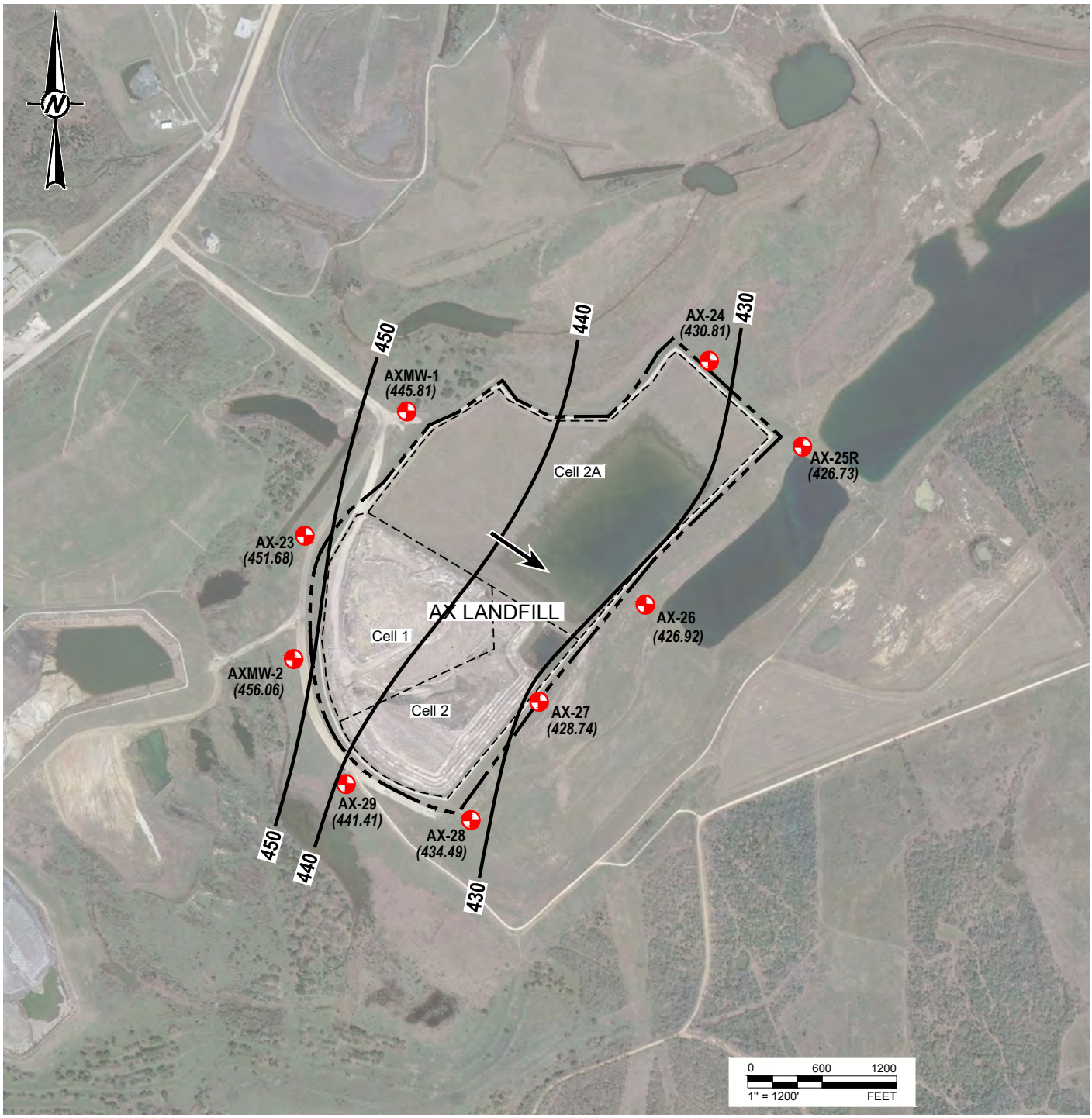
PROJECT
SANDOW 5 GENERATING PLANT
ROCKDALE, TEXAS

TITLE
AX LANDFILL
POTENTIOMETRIC SURFACE MAP
JUNE 7, 2021

CONSULTANT
WSP GOLDER

YYYY-MM-DD	2022-11-08
DESIGNED	AJD
PREPARED	AJD
REVIEWED	WFV
APPROVED	WFV

PROJECT NO. 31404097.004 | REV. 0 | FIGURE A-1



LEGEND

- CCR MONITORING WELL
- (414.49) GROUNDWATER POTENTIOMETRIC SURFACE (FT MSL)
- 400 GROUNDWATER POTENTIOMETRIC SURFACE CONTOUR (C.I. = 10 FT)
- INFERRED GROUNDWATER FLOW DIRECTION

STATE OF TEXAS
WILLIAM F VIENNE
GEOLOGY
No 10492
LICENSED
PROFESSIONAL GEOSCIENTIST
11/11/2022

REFERENCE(S)
BASE MAP TAKEN FROM GOOGLE EARTH, IMAGERY DATED MARCH 2022.

CLIENT
LUMINANT

PROJECT
SANDOW 5 GENERATING PLANT
ROCKDALE, TEXAS

TITLE
AX LANDFILL
POTENTIOMETRIC SURFACE MAP
NOVEMBER 17, 2021

CONSULTANT
WSP GOLDER

YYYY-MM-DD	2022-11-08
DESIGNED	AJD
PREPARED	AJD
REVIEWED	WFV
APPROVED	WFV

PROJECT NO. 31404097.004
REV. 0
FIGURE A-2

APPENDIX E Revision 1 November 21, 2022

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

Last Edited By: usad701305 Date: 2022-11-08 Time:4:42:07 PM | Printed By: USAD701305 Date: 2022-11-10 Time:1:50:11 PM
Path: \\golder.gds\complexdata\office\Texarkana\Projects - Round Rock_2022\31404097 - Luminant CCR\Sandow\PRODUCTION\2022-11\ | File Name: A2 - POT Surface Map-AX Landfill (November 2021).dwg

ATTACHMENT 3

LABORATORY ANALYTICAL

REPORTS

June 18, 2021

Will Vienne
Golder
2201 Double Creek Dr #4004
Round Rock, Texas 78664
TEL: (512) 671-3434
FAX (512) 671-3446

Order No.: 2106088

RE: Sandow CCR

Dear Will Vienne:

DHL Analytical, Inc. received 8 sample(s) on 6/10/2021 for the analyses presented in the following report.

There were no problems with the analyses and all data met requirements of NELAP except where noted in the Case Narrative. All non-NELAP methods will be identified accordingly in the case narrative and all estimated uncertainties of test results are within method or EPA specifications.

If you have any questions regarding these tests results, please feel free to call. Thank you for using DHL Analytical.

Sincerely,

John DuPont
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-21-27

Table of Contents

DHL ANALYTICAL
2300 Double Creek Dr. Round Rock, TX 78664
Phone 512.388.8222
Web: **www.dhlanalytical.com**
Email: **login@dhlanalytical.com**

CHAIN-OF-CUSTODY

CLIENT: Golder Associates
ADDRESS: 2201 Double Creek Dr.
PHONE: 512-671-3434 EMAIL:
DATA REPORTED TO: Will Vienne, J. Jarvis
ADDITIONAL REPORT COPIES TO:

PO#:
PROJECT LOCATION OR NAME: Sandow CCR
CLIENT PROJECT # 19122762

LABORATORY USE ONLY
DHL WORKORDER #: 2106088

COLLECTOR: J. Jarvis

Authorize 5% surcharge for TRRP report? ☐ Yes ☐ No

Lab Use Only: W=WATER L=LIQUID S=SOIL SO=SOLID SE=SEDIMENT P=PAINT SL=SLUDGE

Field Sample I.D.	DHL Lab #	Collection Date	Collection Time	Matrix	Container Type	# of Containers	PRESERVATION: HCL	HNO_3	H_2SO_4	NaOH ☐ Zn Acetate ☐	ICE ☒ UNPRESERVED ☒	ANALYSES
AX-25R	01	6/7/21	1415	W	P	2		1			X	1
AXMW-2	02		1502									
AXMW-1	03		1535									
AX-23	04	6/9/21	0945									
AX-24	05		1033									
AX-26	06		1107									
AX-27	07		1150									
AX-28	08		1310									

ANALYSES: BTEX ☐ MTBE ☐ [METHOD 8260] | TPH 1005 ☐ TPH 1006 ☐ HOLD 1006 ☐ | GRO 8015 ☐ DRO 8015 ☐ | VOC 8260 ☐ VOC 624.1 ☐ | SVOC 8270 ☐ SVOC 625.1 ☐ | PAH 8270 ☐ HOLD PAH ☐ | PEST 8270 ☐ 625.1 ☐ O-P PEST 8270 ☐ | PCB 8082 ☐ 608.3 ☐ PCB 8270 ☐ 625.1 ☐ | HERB 8321 ☐ T PHOS ☐ AMMONIA ☐ | METALS 6020 ☐ 200.8 ☐ DISS. METALS ☐ | RCRA 8 ☐ TX11 ☐ _____ | pH ☐ HEX CHROM ☐ ALKALINITY ☐ COD ☐ | ANIONS 300 ☐ 9056 ☐ _____ | TCLP-SVOC ☐ VOC ☐ PEST ☐ HERB ☐ | TCLP-METALS ☐ RCRA 8 ☐ TX-11 ☐ Pb ☐ | RCI ☐ IGN ☐ DGAS ☐ OIL&GREASE ☐ | TDS ☐ TSS ☐ % MOIST ☐ CYANIDE ☐ | Appendix III | FIELD NOTES

Relinquished By: (Sign)	DATE/TIME	Received by:
Amm Arnd	6/10/21 1652	
Relinquished By: (Sign)	DATE/TIME	Received by:
Relinquished By: (Sign)	DATE/TIME	Received by:

TURN AROUND TIME (CALL FIRST FOR RUSH)
RUSH-1 DAY☐ RUSH-2 DAY☐ RUSH-3 DAY☐
NORMAL☒ OTHER ☐
DUE DATE _____ ☐

LABORATORY USE ONLY
RECEIVING TEMP (°C): 3.4°C THERM #: 78
CUSTODY SEALS: ☐ BROKEN ☐ INTACT ☒ NOT USED
CARRIER: ☐ LSO ☐ FEDEX ☐ UPS ☐ COURIER ☐ OTHER ☒ HAND DELIVERED

☐ **DHL DISPOSAL @ 5.00 each** ☐ **Return**

A1 Landfill – PO# 19122450 – boron, selenium, sulfate – use filter for boron and selenium

Well ID	Top of Screen	Bottom of Screen	Total Depth	Depth to water	pump	dedicated tubing?	Analysis
LMW-1	20	30	30	18.48	peri	yes	B, Se, SO4
LMW-2	23	33	33	21.91	peri	yes	B, Se, SO4
LMW-3	17	32	32	12.68	peri	yes	B, Se, SO4
LMW-4	41	61	61	16.33	peri	yes	B, Se, SO4
LMW-5	15	30	30	7.66	peri	yes	B, Se, SO4
LMW-6R	20	35	35	3.77	peri	yes	B, Se, SO4
LMW-7R	25	40	40	20.45	peri	yes	B, Se, SO4
LMW-8R	20	30	30	19.65	peri	yes	B, Se, SO4
LMW-9	20	30	30	12.31	peri	yes	B, Se, SO4
PC-MW-8	16.7	26.7	27	12.67	peri	yes	B, Se, SO4

AX Landfill – Multiple POs, multiple analyses – don't use filter for Appendix III, use filter for boron and selenium

Well ID	Top of Screen	Bottom of Screen	Total Depth	pump	dedicated tubing?	Analysis	PO
AX-23	65	85	85	bladder	yes	App III	19122262
AX-24	60	80	80	bladder	yes	App III	19122262
AX-25R	60	70	70	peri	yes	App III	19122262
AX-26	55	75	75	bladder	yes	App III	19122262
AX-27	78	98	98	bladder	yes	App III	19122262
AX-28	25	45	45	bladder	yes	App III	19122262
AX-29	45	65	65	bladder	yes	App III	19122262
AXMW-1	33	53	53	bladder	yes	App III	19122262
						B, Se, SO4	19122450
AXMW-2	43	63	63	bladder	yes	App III	19122262
						B, Se, SO4	19122450
AX-16	122	142	142	?	?	B, Se, SO4	19122450
AX-22	115	135	135	?	?	B, Se, SO4	19122450

*Appendix III – boron, calcium, chloride, fluoride, sulfate, TDS

SO2 Ponds – PO# 19122450 – boron, selenium, sulfate – use filter for boron and selenium

Well ID	Top of Screen	Bottom of Screen	Total Depth	Depth to Water	pump	Tubing Intake	dedicated tubing?	Analysis
CSL-MW-13R	44.7	54.7	55	31.93	sub	50	no	B, Se, SO4
CSL-MW-18	34	44	50.5	32.18	sub	40	no	B, Se, SO4
CSL-MW-19	46	56	58	55.97	sub	50	no	B, Se, SO4
CSL-MW-20	49	59	60	54.88	sub	45	no	B, Se, SO4
CSL-MW-21	48	58	59.5	47.82	sub	63	no	B, Se, SO4
CSL-MW-23	35.8	55.8	56	32.57	sub	45	no	B, Se, SO4
CSL-MW-26R	85	90	95	30.69	sub	92	no	B, Se, SO4
CSL-MW-31	44.5	54.5	55	46.38	sub	50	no	B, Se, SO4
CSL-MW-34	141.5	151.5	152	122.98	sub	146	no	B, Se, SO4
CSL-MW-35	139.5	149.5	150	121.54	sub	145	no	B, Se, SO4
C-1	34.8	44.8	45	17.95	peri	40	?	B, Se, SO4
C-2	49.8	59.8	60	12.95	peri	55	?	B, Se, SO4
C-3	52.8	62.8	63	34.14	sub	58	no	B, Se, SO4
CL2-MW-4	14.5	24.5	25	8.86	peri	20	?	B, Se, SO4
CL2-MW-5	9.5	19.5	20	4.93	peri	15	?	B, Se, SO4
CL2-MW-6	39.5	49.5	50	28.54	sub	45	no	B, Se, SO4
PC-MW-2	25	35	35	22.84	peri	30	?	B, Se, SO4
PC-MW-4	148.1	158.1	160	136.89	sub	153	no	B, Se, SO4

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name **Golder** Date Received: **6/11/2021**

Work Order Number **2106088** Received by: **RA**

Checklist completed by: _____ 6/11/2021 Reviewed by VL 6/11/2021
Signature | Date | Initials | Date

Carrier name: Hand Delivered

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	**3.4** °C
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH<2 acceptable upon receipt?	Yes ☑	No ☐	NA ☐ LOT # 13171
	Adjusted? no		Checked by EL
Water - ph>9 (S) or ph>10 (CN) acceptable upon receipt?	Yes ☐	No ☐	NA ☑ LOT #
	Adjusted?		Checked by

Any No response must be detailed in the comments section below.

Client contacted: _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action: _____

Laboratory Name: DHL Analytical, Inc.

Laboratory Review Checklist: Reportable Data

Project Name: Sandow CCR	**LRC Date:** 6/18/21
Reviewer Name: Carlos Castro	**Laboratory Work Order:** 2106088
Prep Batch Number(s): See Prep Dates Report	**Run Batch:** See Analytical Dates Report

#[1]	A[2]	Description	Yes	No	NA[3]	NR[4]	ER#[5]
		Chain-of-Custody (C-O-C)					
R1	OI	**1)** Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	**X**				**R1-01**
		2) Were all departures from standard conditions described in an exception report?			**X**		
R2	OI	**Sample and Quality Control (QC) Identification**					
		1) Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	**X**				
		2) Are all laboratory ID numbers cross-referenced to the corresponding QC data?	**X**				
R3	OI	**Test Reports**					
		1) Were all samples prepared and analyzed within holding times?	**X**				
		2) Other than those results < MQL, were all other raw values bracketed by calibration standards?	**X**				
		3) Were calculations checked by a peer or supervisor?	**X**				
		4) Were all analyte identifications checked by a peer or supervisor?	**X**				
		5) Were sample detection limits reported for all analytes not detected?	**X**				
		6) Were all results for soil and sediment samples reported on a dry weight basis?			**X**		
		7) Were % moisture (or solids) reported for all soil and sediment samples?			**X**		
		8) Were bulk soils/solids samples for volatile analysis extracted with methanol per EPA Method 5035?			**X**		
		9) If required for the project, TICs reported?			**X**		
R4	O	**Surrogate Recovery Data**					
		1) Were surrogates added prior to extraction?	**X**				
		2) Were surrogate percent recoveries in all samples within the laboratory QC limits?	**X**				
R5	OI	**Test Reports/Summary Forms for Blank Samples**					
		1) Were appropriate type(s) of blanks analyzed?	**X**				
		2) Were blanks analyzed at the appropriate frequency?	**X**				
		3) Where method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	**X**				
		4) Were blank concentrations < MDL?	**X**				
		5) For analyte(s) detected in a blank sample, was the concentration, unadjusted for sample specific factors, in all associated field samples, **greater** than 10 times the concentration in the blank sample?			**X**		
R6	OI	**Laboratory Control Samples (LCS):**					
		1) Were all COCs included in the LCS?	**X**				
		2) Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	**X**				
		3) Were LCSs analyzed at the required frequency?	**X**				
		4) Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	**X**				
		5) Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	**X**				
		6) Was the LCSD RPD within QC limits (if applicable)?	**X**				
R7	OI	**Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Data**					
		1) Were the project/method specified analytes included in the MS and MSD?	**X**				
		2) Were MS/MSD analyzed at the appropriate frequency?	**X**				
		3) Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?		**X**			**R7-03**
		4) Were MS/MSD RPDs within laboratory QC limits?	**X**				
R8	OI	**Analytical Duplicate Data**					
		1) Were appropriate analytical duplicates analyzed for each matrix?	**X**				
		2) Were analytical duplicates analyzed at the appropriate frequency?	**X**				
		3) Were RPDs or relative standard deviations within the laboratory QC limits?	**X**				
R9	OI	**Method Quantitation Limits (MQLs):**					
		1) Are the MQLs for each method analyte included in the laboratory data package?	**X**				
		2) Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	**X**				
		3) Are unadjusted MQLs and DCSs included in the laboratory data package?	**X**				
R10	OI	**Other Problems/Anomalies**					
		1) Are all known problems/anomalies/special conditions noted in this LRC and ER?	**X**				
		2) Was applicable and available technology used to lower the SDL to minimize the matrix interference affects on the sample results?	**X**				
		3) Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	**X**				

Laboratory Name: DHL Analytical, Inc.

Laboratory Review Checklist (continued): Supporting Data

Project Name: Sandow CCR	**LRC Date:** 6/18/21
Reviewer Name: Carlos Castro	**Laboratory Work Order:** 2106088
Prep Batch Number(s): See Prep Dates Report	**Run Batch:** See Analytical Dates Report

#[1]	A[2]	Description	Yes	No	NA[3]	NR[4]	ER#[5]
S1	OI	**Initial Calibration (ICAL)**					
		1) Were response factors and/or relative response factors for each analyte within QC limits?	X				
		2) Were percent RSDs or correlation coefficient criteria met?	X				
		3) Was the number of standards recommended in the method used for all analytes?	X				
		4) Were all points generated between the lowest and highest standard used to calculate the curve?	X				
		5) Are ICAL data available for all instruments used?	X				
		6) Has the initial calibration curve been verified using an appropriate second source standard?	X				
S2	OI	**Initial and Continuing calibration Verification (ICCV and CCV) and Continuing Calibration blank (CCB):**					
		1) Was the CCV analyzed at the method-required frequency?	X				
		2) Were percent differences for each analyte within the method-required QC limits?	X				
		3) Was the ICAL curve verified for each analyte?	X				
		4) Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	X				
S3	O	**Mass Spectral Tuning:**					
		1) Was the appropriate compound for the method used for tuning?	X				
		2) Were ion abundance data within the method-required QC limits?	X				
S4	O	**Internal Standards (IS):**					
		1) Were IS area counts and retention times within the method-required QC limits?	X				
S5	OI	**Raw Data (NELAC Section 5.5.10)**					
		1) Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
		2) Were data associated with manual integrations flagged on the raw data?	X				
S6	O	**Dual Column Confirmation**					
		1) Did dual column confirmation results meet the method-required QC?			X		
S7	O	**Tentatively Identified Compounds (TICs):**					
		1) If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
S8	I	**Interference Check Sample (ICS) Results:**					
		1) Were percent recoveries within method QC limits?	X				
S9	I	**Serial Dilutions, Post Digestion Spikes, and Method of Standard Additions**					
		1) Were percent differences, recoveries, and the linearity within the QC limits specified in the method?		X			**S9-01**
S10	OI	**Method Detection Limit (MDL) Studies**					
		1) Was a MDL study performed for each reported analyte?	X				
		2) Is the MDL either adjusted or supported by the analysis of DCSs?	X				
S11	OI	**Proficiency Test Reports:**					
		1) Was the lab's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
S12	OI	**Standards Documentation**					
		1) Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
S13	OI	**Compound/Analyte Identification Procedures**					
		1) Are the procedures for compound/analyte identification documented?	X				
S14	OI	**Demonstration of Analyst Competency (DOC)**					
		1) Was DOC conducted consistent with NELAC Chapter 5 – Appendix C?	X				
		2) Is documentation of the analyst's competency up-to-date and on file?	X				
S15	OI	**Verification/Validation Documentation for Methods** (NELAC Chapter 5)					
		1) Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
S16	OI	**Laboratory Standard Operating Procedures (SOPs):**					
		1) Are laboratory SOPs current and on file for each method performed?	X				

1 Items identified by the letter "R" should be included in the laboratory data package submitted to the TCEQ in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.

2 O = organic analyses; I = inorganic analyses (and general chemistry, when applicable).

3 NA = Not applicable.

4 NR = Not Reviewed.

5 ER# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

Laboratory Data Package Signature Page – RG-366/TRRP-13

This data package consists of:

This signature page, the laboratory review checklist, and the following reportable data:

R1 Field chain-of-custody documentation;
R2 Sample identification cross-reference;
R3 Test reports (analytical data sheets) for each environmental sample that includes:
  a) Items consistent with NELAC Chapter 5,
  b) dilution factors,
  c) preparation methods,
  d) cleanup methods, and
  e) if required for the project, tentatively identified compounds (TICs).
R4 Surrogate recovery data including:
  a) Calculated recovery (%R), and
  b) The laboratory's surrogate QC limits.
R5 Test reports/summary forms for blank samples;
R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  a) LCS spiking amounts,
  b) Calculated %R for each analyte, and
  c) The laboratory's LCS QC limits.
R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  a) Samples associated with the MS/MSD clearly identified,
  b) MS/MSD spiking amounts,
  c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,
  d) Calculated %Rs and relative percent differences (RPDs), and
  e) The laboratory's MS/MSD QC limits
R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  a) The amount of analyte measured in the duplicate,
  b) The calculated RPD, and
  c) The laboratory's QC limits for analytical duplicates.
R9 List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix;
R10 Other problems or anomalies.

The Exception Report for each "No" or "Not Reviewed (NR)" item in the Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory is not accredited under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature below, I affirm to the best of my knowledge that all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information or data affecting the quality of the data has been knowingly withheld.

This laboratory was last inspected by TCEQ on February 23-26, 2021. Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Name: John DuPont
Official Title: General Manager

Name: Dr. Derhsing Luu
Official Title: Technical Director

Signature

6/18/2021
Date

DHL Analytical, Inc. **Date:** *18-Jun-21*

CLIENT: Golder
Project: Sandow CCR
Lab Order: 2106088

CASE NARRATIVE

Samples were analyzed using the methods outlined in the following references:

Method SW6020B - Metals Analysis
Method E300 - Anions Analysis
Method M2540C - TDS Analysis

Exception Report R1-01

The samples were received and log-in performed on 6/10/21. A total of 8 samples were received. The samples arrived in good condition and were properly packaged.

Exception Report R7-03

For Anions analysis performed on 6/14/21 (batch 100908) the matrix spikes and/or matrix spike duplicate recoveries (2106039-11 MSD & 2106088-01 MS/MSD) were out of control limits for Fluoride or Sulfate. These are flagged accordingly in the QC summary report. The sample selected for the matrix spike and matrix spike duplicate (2106039-11 MS/MSD) was not from this work order. The sample selected for the matrix spike and matrix spike duplicate (2106088-01 MS/MSD) was from this work order. The LCS was within control limits for these analytes. No further corrective actions were taken.

For Metals analysis performed on 6/15/21 the matrix spike and matrix spike duplicate recoveries were out of control limits for Calcium. This is flagged accordingly. The sample selected for the matrix spike and matrix spike duplicate was from this work order. The LCS was within control limits for this analyte. No further corrective actions were taken.

Exception Report S9-01

For Metals analysis performed on 6/15/21 the RPD for the serial dilution was slightly above control limits for Boron. This is flagged accordingly in the QC summary report. The PDS was within control limits for this analyte. No further corrective actions were taken.

DHL Analytical, Inc.

Date: *18-Jun-21*

CLIENT: Golder
Project: Sandow CCR
Lab Order: 2106088

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
2106088-01	AX-25R		06/07/21 02:15 PM	6/10/2021
2106088-02	AXMW-2		06/07/21 03:02 PM	6/10/2021
2106088-03	AXMW-1		06/07/21 03:35 PM	6/10/2021
2106088-04	AX-23		06/09/21 09:45 AM	6/10/2021
2106088-05	AX-24		06/09/21 10:33 AM	6/10/2021
2106088-06	AX-26		06/09/21 11:07 AM	6/10/2021
2106088-07	AX-27		06/09/21 11:50 AM	6/10/2021
2106088-08	AX-28		06/09/21 01:10 PM	6/10/2021

Lab Order: 2106088
Client: Golder
Project: Sandow CCR

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
2106088-01A	AX-25R	06/07/21 02:15 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/14/21 09:08 AM	100906
	AX-25R	06/07/21 02:15 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/14/21 09:08 AM	100906
	AX-25R	06/07/21 02:15 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/14/21 09:08 AM	100906
2106088-01B	AX-25R	06/07/21 02:15 PM	Aqueous	E300	Anion Preparation	06/14/21 09:37 AM	100908
	AX-25R	06/07/21 02:15 PM	Aqueous	E300	Anion Preparation	06/14/21 09:37 AM	100908
	AX-25R	06/07/21 02:15 PM	Aqueous	M2540C	TDS Preparation	06/14/21 08:35 AM	100893
2106088-02A	AXMW-2	06/07/21 03:02 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/14/21 09:08 AM	100906
	AXMW-2	06/07/21 03:02 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/14/21 09:08 AM	100906
	AXMW-2	06/07/21 03:02 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/14/21 09:08 AM	100906
2106088-02B	AXMW-2	06/07/21 03:02 PM	Aqueous	E300	Anion Preparation	06/14/21 09:37 AM	100908
	AXMW-2	06/07/21 03:02 PM	Aqueous	E300	Anion Preparation	06/14/21 09:37 AM	100908
	AXMW-2	06/07/21 03:02 PM	Aqueous	M2540C	TDS Preparation	06/14/21 08:35 AM	100893
2106088-03A	AXMW-1	06/07/21 03:35 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/14/21 09:08 AM	100906
	AXMW-1	06/07/21 03:35 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/14/21 09:08 AM	100906
	AXMW-1	06/07/21 03:35 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/14/21 09:08 AM	100906
2106088-03B	AXMW-1	06/07/21 03:35 PM	Aqueous	E300	Anion Preparation	06/14/21 09:37 AM	100908
	AXMW-1	06/07/21 03:35 PM	Aqueous	E300	Anion Preparation	06/14/21 09:37 AM	100908
	AXMW-1	06/07/21 03:35 PM	Aqueous	M2540C	TDS Preparation	06/14/21 08:35 AM	100893
2106088-04A	AX-23	06/09/21 09:45 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/14/21 09:08 AM	100906
	AX-23	06/09/21 09:45 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/14/21 09:08 AM	100906
	AX-23	06/09/21 09:45 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/14/21 09:08 AM	100906
2106088-04B	AX-23	06/09/21 09:45 AM	Aqueous	E300	Anion Preparation	06/14/21 09:37 AM	100908
	AX-23	06/09/21 09:45 AM	Aqueous	E300	Anion Preparation	06/14/21 09:37 AM	100908
	AX-23	06/09/21 09:45 AM	Aqueous	M2540C	TDS Preparation	06/14/21 08:35 AM	100893
2106088-05A	AX-24	06/09/21 10:33 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/14/21 09:08 AM	100906
	AX-24	06/09/21 10:33 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/14/21 09:08 AM	100906
	AX-24	06/09/21 10:33 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/14/21 09:08 AM	100906
2106088-05B	AX-24	06/09/21 10:33 AM	Aqueous	E300	Anion Preparation	06/14/21 09:37 AM	100908

Lab Order: 2106088
Client: Golder
Project: Sandow CCR

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
2106088-05B	AX-24	06/09/21 10:33 AM	Aqueous	E300	Anion Preparation	06/14/21 09:37 AM	100908
	AX-24	06/09/21 10:33 AM	Aqueous	M2540C	TDS Preparation	06/14/21 08:35 AM	100893
2106088-06A	AX-26	06/09/21 11:07 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/14/21 09:08 AM	100906
	AX-26	06/09/21 11:07 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/14/21 09:08 AM	100906
	AX-26	06/09/21 11:07 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/14/21 09:08 AM	100906
2106088-06B	AX-26	06/09/21 11:07 AM	Aqueous	E300	Anion Preparation	06/14/21 09:37 AM	100908
	AX-26	06/09/21 11:07 AM	Aqueous	E300	Anion Preparation	06/14/21 09:37 AM	100908
	AX-26	06/09/21 11:07 AM	Aqueous	M2540C	TDS Preparation	06/14/21 08:35 AM	100893
2106088-07A	AX-27	06/09/21 11:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/14/21 09:08 AM	100906
	AX-27	06/09/21 11:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/14/21 09:08 AM	100906
	AX-27	06/09/21 11:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/14/21 09:08 AM	100906
2106088-07B	AX-27	06/09/21 11:50 AM	Aqueous	E300	Anion Preparation	06/14/21 09:37 AM	100908
	AX-27	06/09/21 11:50 AM	Aqueous	E300	Anion Preparation	06/14/21 09:37 AM	100908
	AX-27	06/09/21 11:50 AM	Aqueous	M2540C	TDS Preparation	06/14/21 08:35 AM	100893
2106088-08A	AX-28	06/09/21 01:10 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/14/21 09:08 AM	100906
	AX-28	06/09/21 01:10 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/14/21 09:08 AM	100906
	AX-28	06/09/21 01:10 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/14/21 09:08 AM	100906
2106088-08B	AX-28	06/09/21 01:10 PM	Aqueous	E300	Anion Preparation	06/14/21 09:37 AM	100908
	AX-28	06/09/21 01:10 PM	Aqueous	E300	Anion Preparation	06/14/21 09:37 AM	100908
	AX-28	06/09/21 01:10 PM	Aqueous	E300	Anion Preparation	06/15/21 11:00 AM	100919
	AX-28	06/09/21 01:10 PM	Aqueous	M2540C	TDS Preparation	06/14/21 08:35 AM	100893

Lab Order: 2106088
Client: Golder
Project: Sandow CCR

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
2106088-01A	AX-25R	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	100906	1	06/15/21 02:08 PM	ICP-MS5_210615A
	AX-25R	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	100906	50	06/15/21 04:00 PM	ICP-MS5_210615A
	AX-25R	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	100906	1	06/15/21 02:54 PM	ICP-MS4_210615A
2106088-01B	AX-25R	Aqueous	E300	Anions by IC method - Water	100908	100	06/14/21 04:26 PM	IC2_210614A
	AX-25R	Aqueous	E300	Anions by IC method - Water	100908	1	06/15/21 02:02 AM	IC2_210614A
	AX-25R	Aqueous	M2540C	Total Dissolved Solids	100893	1	06/14/21 12:10 PM	WC_210614B
2106088-02A	AXMW-2	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	100906	2	06/15/21 02:56 PM	ICP-MS4_210615A
	AXMW-2	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	100906	1	06/15/21 02:11 PM	ICP-MS5_210615A
	AXMW-2	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	100906	50	06/15/21 04:02 PM	ICP-MS5_210615A
2106088-02B	AXMW-2	Aqueous	E300	Anions by IC method - Water	100908	100	06/14/21 05:14 PM	IC2_210614A
	AXMW-2	Aqueous	E300	Anions by IC method - Water	100908	1	06/15/21 02:18 AM	IC2_210614A
	AXMW-2	Aqueous	M2540C	Total Dissolved Solids	100893	1	06/14/21 12:10 PM	WC_210614B
2106088-03A	AXMW-1	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	100906	50	06/15/21 04:05 PM	ICP-MS5_210615A
	AXMW-1	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	100906	50	06/15/21 02:58 PM	ICP-MS4_210615A
	AXMW-1	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	100906	1	06/15/21 02:13 PM	ICP-MS5_210615A
2106088-03B	AXMW-1	Aqueous	E300	Anions by IC method - Water	100908	100	06/14/21 05:30 PM	IC2_210614A
	AXMW-1	Aqueous	E300	Anions by IC method - Water	100908	1	06/15/21 02:34 AM	IC2_210614A
	AXMW-1	Aqueous	M2540C	Total Dissolved Solids	100893	1	06/14/21 12:10 PM	WC_210614B
2106088-04A	AX-23	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	100906	2	06/15/21 03:00 PM	ICP-MS4_210615A
	AX-23	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	100906	1	06/15/21 02:16 PM	ICP-MS5_210615A
	AX-23	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	100906	50	06/15/21 04:08 PM	ICP-MS5_210615A
2106088-04B	AX-23	Aqueous	E300	Anions by IC method - Water	100908	10	06/14/21 10:18 PM	IC2_210614A
	AX-23	Aqueous	E300	Anions by IC method - Water	100908	1	06/15/21 02:50 AM	IC2_210614A
	AX-23	Aqueous	M2540C	Total Dissolved Solids	100893	1	06/14/21 12:10 PM	WC_210614B
2106088-05A	AX-24	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	100906	50	06/15/21 04:10 PM	ICP-MS5_210615A
	AX-24	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	100906	1	06/15/21 02:19 PM	ICP-MS5_210615A
	AX-24	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	100906	1	06/15/21 03:02 PM	ICP-MS4_210615A
2106088-05B	AX-24	Aqueous	E300	Anions by IC method - Water	100908	100	06/14/21 05:46 PM	IC2_210614A

Lab Order: 2106088
Client: Golder
Project: Sandow CCR

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
2106088-05B	AX-24	Aqueous	E300	Anions by IC method - Water	100908	1	06/15/21 03:06 AM	IC2_210614A
	AX-24	Aqueous	M2540C	Total Dissolved Solids	100893	1	06/14/21 12:10 PM	WC_210614B
2106088-06A	AX-26	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	100906	2	06/15/21 03:04 PM	ICP-MS4_210615A
	AX-26	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	100906	1	06/15/21 02:21 PM	ICP-MS5_210615A
	AX-26	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	100906	50	06/15/21 04:13 PM	ICP-MS5_210615A
2106088-06B	AX-26	Aqueous	E300	Anions by IC method - Water	100908	100	06/14/21 06:02 PM	IC2_210614A
	AX-26	Aqueous	E300	Anions by IC method - Water	100908	1	06/15/21 04:42 AM	IC2_210614A
	AX-26	Aqueous	M2540C	Total Dissolved Solids	100893	1	06/14/21 12:10 PM	WC_210614B
2106088-07A	AX-27	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	100906	50	06/15/21 04:15 PM	ICP-MS5_210615A
	AX-27	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	100906	2	06/15/21 03:06 PM	ICP-MS4_210615A
	AX-27	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	100906	1	06/15/21 02:24 PM	ICP-MS5_210615A
2106088-07B	AX-27	Aqueous	E300	Anions by IC method - Water	100908	100	06/14/21 06:18 PM	IC2_210614A
	AX-27	Aqueous	E300	Anions by IC method - Water	100908	1	06/15/21 04:58 AM	IC2_210614A
	AX-27	Aqueous	M2540C	Total Dissolved Solids	100893	1	06/14/21 12:10 PM	WC_210614B
2106088-08A	AX-28	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	100906	1	06/15/21 02:50 PM	ICP-MS4_210615A
	AX-28	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	100906	1	06/15/21 02:03 PM	ICP-MS5_210615A
	AX-28	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	100906	50	06/15/21 03:55 PM	ICP-MS5_210615A
2106088-08B	AX-28	Aqueous	E300	Anions by IC method - Water	100908	100	06/14/21 06:34 PM	IC2_210614A
	AX-28	Aqueous	E300	Anions by IC method - Water	100908	1	06/15/21 05:14 AM	IC2_210614A
	AX-28	Aqueous	E300	Anions by IC method - Water	100919	10	06/16/21 02:06 AM	IC2_210615A
	AX-28	Aqueous	M2540C	Total Dissolved Solids	100893	1	06/14/21 12:10 PM	WC_210614B

DHL Analytical, Inc.

Date: *18-Jun-21*

CLIENT:	Golder	**Client Sample ID:**	AX-25R
Project:	Sandow CCR	**Lab ID:**	2106088-01
Project No:	19122262	**Collection Date:**	06/07/21 02:15 PM
Lab Order:	2106088	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Boron	0.213	0.0100	0.0300		mg/L	1	06/15/21 02:54 PM
Calcium	228	5.00	15.0		mg/L	50	06/15/21 04:00 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	355	30.0	100		mg/L	100	06/14/21 04:26 PM
Fluoride	0.420	0.100	0.400		mg/L	1	06/15/21 02:02 AM
Sulfate	475	100	300		mg/L	100	06/14/21 04:26 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	2020	50.0	50.0		mg/L	1	06/14/21 12:10 PM

Qualifiers:

ND - Not Detected at the SDL
J - Analyte detected between SDL and RL
B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAP certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *18-Jun-21*

CLIENT:	Golder	**Client Sample ID:**	AXMW-2
Project:	Sandow CCR	**Lab ID:**	2106088-02
Project No:	19122262	**Collection Date:**	06/07/21 03:02 PM
Lab Order:	2106088	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Boron	0.580	0.0200	0.0600		mg/L	2	06/15/21 02:56 PM
Calcium	449	5.00	15.0		mg/L	50	06/15/21 04:02 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	131	30.0	100		mg/L	100	06/14/21 05:14 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	06/15/21 02:18 AM
Sulfate	1180	100	300		mg/L	100	06/14/21 05:14 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	2550	50.0	50.0		mg/L	1	06/14/21 12:10 PM

Qualifiers:

ND - Not Detected at the SDL
J - Analyte detected between SDL and RL
B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAP certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *18-Jun-21*

CLIENT:	Golder	**Client Sample ID:**	AXMW-1
Project:	Sandow CCR	**Lab ID:**	2106088-03
Project No:	19122262	**Collection Date:**	06/07/21 03:35 PM
Lab Order:	2106088	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Boron	5.43	0.500	1.50		mg/L	50	06/15/21 02:58 PM
Calcium	293	5.00	15.0		mg/L	50	06/15/21 04:05 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	146	30.0	100		mg/L	100	06/14/21 05:30 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	06/15/21 02:34 AM
Sulfate	1360	100	300		mg/L	100	06/14/21 05:30 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	2290	50.0	50.0		mg/L	1	06/14/21 12:10 PM

Qualifiers:

ND - Not Detected at the SDL
J - Analyte detected between SDL and RL
B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAP certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *18-Jun-21*

CLIENT:	Golder	**Client Sample ID:**	AX-23
Project:	Sandow CCR	**Lab ID:**	2106088-04
Project No:	19122262	**Collection Date:**	06/09/21 09:45 AM
Lab Order:	2106088	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Boron	0.335	0.0200	0.0600		mg/L	2	06/15/21 03:00 PM
Calcium	318	5.00	15.0		mg/L	50	06/15/21 04:08 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	238	3.00	10.0		mg/L	10	06/14/21 10:18 PM
Fluoride	0.368	0.100	0.400	J	mg/L	1	06/15/21 02:50 AM
Sulfate	655	10.0	30.0		mg/L	10	06/14/21 10:18 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1720	50.0	50.0		mg/L	1	06/14/21 12:10 PM

Qualifiers:

- ND - Not Detected at the SDL
- J - Analyte detected between SDL and RL
- B - Analyte detected in the associated Method Blank
- DF- Dilution Factor
- N - Parameter not NELAP certified
- See Final Page of Report for MQLs and MDLs
- S - Spike Recovery outside control limits
- C - Sample Result or QC discussed in Case Narrative
- RL - Reporting Limit (MQL adjusted for moisture and sample size)
- SDL - Sample Detection Limit
- E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *18-Jun-21*

CLIENT:	Golder	**Client Sample ID:**	AX-24
Project:	Sandow CCR	**Lab ID:**	2106088-05
Project No:	19122262	**Collection Date:**	06/09/21 10:33 AM
Lab Order:	2106088	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Boron	0.166	0.0100	0.0300		mg/L	1	06/15/21 03:02 PM
Calcium	339	5.00	15.0		mg/L	50	06/15/21 04:10 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	201	30.0	100		mg/L	100	06/14/21 05:46 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	06/15/21 03:06 AM
Sulfate	1040	100	300		mg/L	100	06/14/21 05:46 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	2240	50.0	50.0		mg/L	1	06/14/21 12:10 PM

Qualifiers:

ND - Not Detected at the SDL
J - Analyte detected between SDL and RL
B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAP certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *18-Jun-21*

CLIENT:	Golder	**Client Sample ID:**	AX-26
Project:	Sandow CCR	**Lab ID:**	2106088-06
Project No:	19122262	**Collection Date:**	06/09/21 11:07 AM
Lab Order:	2106088	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Boron	0.383	0.0200	0.0600		mg/L	2	06/15/21 03:04 PM
Calcium	896	5.00	15.0		mg/L	50	06/15/21 04:13 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	1790	30.0	100		mg/L	100	06/14/21 06:02 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	06/15/21 04:42 AM
Sulfate	1120	100	300		mg/L	100	06/14/21 06:02 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	4800	50.0	50.0		mg/L	1	06/14/21 12:10 PM

Qualifiers:

ND - Not Detected at the SDL
J - Analyte detected between SDL and RL
B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAP certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *18-Jun-21*

CLIENT:	Golder	**Client Sample ID:**	AX-27
Project:	Sandow CCR	**Lab ID:**	2106088-07
Project No:	19122262	**Collection Date:**	06/09/21 11:50 AM
Lab Order:	2106088	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Boron	0.307	0.0200	0.0600		mg/L	2	06/15/21 03:06 PM
Calcium	384	5.00	15.0		mg/L	50	06/15/21 04:15 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	464	30.0	100		mg/L	100	06/14/21 06:18 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	06/15/21 04:58 AM
Sulfate	535	100	300		mg/L	100	06/14/21 06:18 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1980	50.0	50.0		mg/L	1	06/14/21 12:10 PM

Qualifiers:

ND - Not Detected at the SDL
J - Analyte detected between SDL and RL
B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAP certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *18-Jun-21*

CLIENT:	Golder	**Client Sample ID:**	AX-28
Project:	Sandow CCR	**Lab ID:**	2106088-08
Project No:	19122262	**Collection Date:**	06/09/21 01:10 PM
Lab Order:	2106088	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Boron	0.188	0.0100	0.0300		mg/L	1	06/15/21 02:50 PM
Calcium	461	5.00	15.0		mg/L	50	06/15/21 03:55 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	80.2	3.00	10.0		mg/L	10	06/16/21 02:06 AM
Fluoride	<0.100	0.100	0.400		mg/L	1	06/15/21 05:14 AM
Sulfate	1610	100	300		mg/L	100	06/14/21 06:34 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	2810	50.0	50.0		mg/L	1	06/14/21 12:10 PM

Qualifiers:

ND - Not Detected at the SDL
J - Analyte detected between SDL and RL
B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAP certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

CLIENT: Golder
Work Order: 2106088
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_210428A

Sample ID: **DCS4-100323** Batch ID: **100323** TestNo: **SW6020B** Units: **mg/L**
SampType: **DCS4** Run ID: **ICP-MS4_210428A** Analysis Date: **4/28/2021 10:39:00 AM** Prep Date: **4/27/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0310	0.0300	0.0300	0	103	70	130	0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2106088
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_210615A

The QC data in batch 100906 applies to the following samples: 2106088-01A, 2106088-02A, 2106088-03A, 2106088-04A, 2106088-05A, 2106088-06A, 2106088-07A, 2106088-08A

Sample ID: **MB-100906** Batch ID: **100906** TestNo: **SW6020B** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS4_210615A** Analysis Date: **6/15/2021 2:42:00 PM** Prep Date: **6/14/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	<0.0100	0.0300								

Sample ID: **LCS-100906** Batch ID: **100906** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS4_210615A** Analysis Date: **6/15/2021 2:44:00 PM** Prep Date: **6/14/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.201	0.0300	0.200	0	101	80	120			

Sample ID: **LCSD-100906** Batch ID: **100906** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS4_210615A** Analysis Date: **6/15/2021 2:46:00 PM** Prep Date: **6/14/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.206	0.0300	0.200	0	103	80	120	2.50	15	

Sample ID: **2106088-08A SD** Batch ID: **100906** TestNo: **SW6020B** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS4_210615A** Analysis Date: **6/15/2021 2:52:00 PM** Prep Date: **6/14/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.235	0.150	0	0.188				21.9	20	R

Sample ID: **2106088-08A PDS** Batch ID: **100906** TestNo: **SW6020B** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS4_210615A** Analysis Date: **6/15/2021 3:12:00 PM** Prep Date: **6/14/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.351	0.0300	0.200	0.188	81.0	75	125			

Sample ID: **2106088-08A MS** Batch ID: **100906** TestNo: **SW6020B** Units: **mg/L**
SampType: **MS** Run ID: **ICP-MS4_210615A** Analysis Date: **6/15/2021 3:15:00 PM** Prep Date: **6/14/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.382	0.0300	0.200	0.188	97.0	75	125			

Sample ID: **2106088-08A MSD** Batch ID: **100906** TestNo: **SW6020B** Units: **mg/L**
SampType: **MSD** Run ID: **ICP-MS4_210615A** Analysis Date: **6/15/2021 3:17:00 PM** Prep Date: **6/14/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.370	0.0300	0.200	0.188	90.9	75	125	3.25	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2106088
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_210615A

Sample ID: **ICV-210615**	Batch ID: **R115818**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS4_210615A**	Analysis Date: **6/15/2021 11:39:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.104	0.0300	0.100	0	104	90	110			

Sample ID: **LCVL-210615**	Batch ID: **R115818**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_210615A**	Analysis Date: **6/15/2021 11:49:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0224	0.0300	0.0200	0	112	80	120			

Sample ID: **CCV3-210615**	Batch ID: **R115818**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_210615A**	Analysis Date: **6/15/2021 2:09:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.200	0.0300	0.200	0	100	90	110			

Sample ID: **CCV4-210615**	Batch ID: **R115818**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_210615A**	Analysis Date: **6/15/2021 3:23:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.203	0.0300	0.200	0	102	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2106088
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_210428A

Sample ID: **DCS2-100323**	Batch ID: **100323**	TestNo: **SW6020B**		Units: **mg/L**	
SampType: **DCS2**	Run ID: **ICP-MS5_210428A**	Analysis Date: **4/28/2021 10:53:00 AM**		Prep Date: **4/27/2021**	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.302	0.300	0.300	0	101	70	130	0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2106088
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_210615A

The QC data in batch 100906 applies to the following samples: 2106088-01A, 2106088-02A, 2106088-03A, 2106088-04A, 2106088-05A, 2106088-06A, 2106088-07A, 2106088-08A

Sample ID: **MB-100906** Batch ID: **100906** TestNo: **SW6020B** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS5_210615A** Analysis Date: **6/15/2021 3:44:00 PM** Prep Date: **6/14/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	<0.100	0.300								

Sample ID: **LCS-100906** Batch ID: **100906** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS5_210615A** Analysis Date: **6/15/2021 3:47:00 PM** Prep Date: **6/14/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.47	0.300	5.00	0	89.4	80	120			

Sample ID: **LCSD-100906** Batch ID: **100906** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS5_210615A** Analysis Date: **6/15/2021 3:49:00 PM** Prep Date: **6/14/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.67	0.300	5.00	0	93.5	80	120	4.47	15	

Sample ID: **2106088-08A SD** Batch ID: **100906** TestNo: **SW6020B** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS5_210615A** Analysis Date: **6/15/2021 3:57:00 PM** Prep Date: **6/14/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	481	75.0	0	461				4.20	20	

Sample ID: **2106088-08A PDS** Batch ID: **100906** TestNo: **SW6020B** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS5_210615A** Analysis Date: **6/15/2021 4:18:00 PM** Prep Date: **6/14/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	752	15.0	250	461	116	75	125			

Sample ID: **2106088-08A MS** Batch ID: **100906** TestNo: **SW6020B** Units: **mg/L**
SampType: **MS** Run ID: **ICP-MS5_210615A** Analysis Date: **6/15/2021 4:21:00 PM** Prep Date: **6/14/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	463	15.0	5.00	461	39.7	75	125			S

Sample ID: **2106088-08A MSD** Batch ID: **100906** TestNo: **SW6020B** Units: **mg/L**
SampType: **MSD** Run ID: **ICP-MS5_210615A** Analysis Date: **6/15/2021 4:23:00 PM** Prep Date: **6/14/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	460	15.0	5.00	461	-36.5	75	125	0.825	15	S

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2106088
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_210615A

Sample ID: **ICV-210615**	Batch ID: **R115817**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS5_210615A**	Analysis Date: **6/15/2021 10:48:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	2.45	0.300	2.50	0	97.9	90	110			

Sample ID: **LCVL-210615**	Batch ID: **R115817**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS5_210615A**	Analysis Date: **6/15/2021 10:54:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.109	0.300	0.100	0	109	80	120			

Sample ID: **CCV4-210615**	Batch ID: **R115817**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_210615A**	Analysis Date: **6/15/2021 3:28:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	5.05	0.300	5.00	0	101	90	110			

Sample ID: **CCV5-210615**	Batch ID: **R115817**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_210615A**	Analysis Date: **6/15/2021 4:26:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	5.14	0.300	5.00	0	103	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2106088
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_210527A

Sample ID: **DCS3-100738** Batch ID: **100738** TestNo: **E300** Units: **mg/L**
SampType: **DCS3** Run ID: **IC2_210527A** Analysis Date: **5/27/2021 4:13:05 PM** Prep Date: **5/27/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	1.25	1.00	1.000	0	125	70	130	0	0	
Fluoride	0.408	0.400	0.4000	0	102	70	130	0	0	
Sulfate	3.03	3.00	3.000	0	101	70	130	0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2106088
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_210614A

The QC data in batch 100908 applies to the following samples: 2106088-01B, 2106088-02B, 2106088-03B, 2106088-04B, 2106088-05B, 2106088-06B, 2106088-07B, 2106088-08B

Sample ID: **MB-100908** Batch ID: **100908** TestNo: **E300** Units: **mg/L**
SampType: **MBLK** Run ID: **IC2_210614A** Analysis Date: **6/14/2021 11:51:44 AM** Prep Date: **6/14/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	<0.300	1.00								
Fluoride	<0.100	0.400								
Sulfate	<1.00	3.00								

Sample ID: **LCS-100908** Batch ID: **100908** TestNo: **E300** Units: **mg/L**
SampType: **LCS** Run ID: **IC2_210614A** Analysis Date: **6/14/2021 12:07:44 PM** Prep Date: **6/14/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.25	1.00	10.00	0	92.5	90	110			
Fluoride	3.91	0.400	4.000	0	97.6	90	110			
Sulfate	29.7	3.00	30.00	0	99.0	90	110			

Sample ID: **LCSD-100908** Batch ID: **100908** TestNo: **E300** Units: **mg/L**
SampType: **LCSD** Run ID: **IC2_210614A** Analysis Date: **6/14/2021 12:23:44 PM** Prep Date: **6/14/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.26	1.00	10.00	0	92.6	90	110	0.117	20	
Fluoride	3.89	0.400	4.000	0	97.2	90	110	0.418	20	
Sulfate	29.6	3.00	30.00	0	98.5	90	110	0.489	20	

Sample ID: **2106039-11AMS** Batch ID: **100908** TestNo: **E300** Units: **mg/L**
SampType: **MS** Run ID: **IC2_210614A** Analysis Date: **6/14/2021 3:54:01 PM** Prep Date: **6/14/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2410	100	2000	226.9	109	90	110			
Fluoride	2200	40.0	2000	0	110	90	110			
Sulfate	4550	300	2000	2758	89.7	90	110			

Sample ID: **2106039-11AMSD** Batch ID: **100908** TestNo: **E300** Units: **mg/L**
SampType: **MSD** Run ID: **IC2_210614A** Analysis Date: **6/14/2021 4:10:01 PM** Prep Date: **6/14/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2420	100	2000	226.9	109	90	110	0.456	20	
Fluoride	2210	40.0	2000	0	111	90	110	0.356	20	S
Sulfate	4560	300	2000	2758	90.0	90	110	0.115	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2106088
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_210614A

Sample ID: **2106088-01BMS**	Batch ID: **100908**	TestNo: **E300**	Units: **mg/L**
SampType: **MS**	Run ID: **IC2_210614A**	Analysis Date: **6/14/2021 4:42:02 PM**	Prep Date: **6/14/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2320	100	2000	354.9	98.4	90	110			
Fluoride	1990	40.0	2000	0	99.3	90	110			
Sulfate	2210	300	2000	475.1	86.9	90	110			S

Sample ID: **2106088-01BMSD**	Batch ID: **100908**	TestNo: **E300**	Units: **mg/L**
SampType: **MSD**	Run ID: **IC2_210614A**	Analysis Date: **6/14/2021 4:58:02 PM**	Prep Date: **6/14/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2330	100	2000	354.9	98.7	90	110	0.286	20	
Fluoride	1990	40.0	2000	0	99.4	90	110	0.120	20	
Sulfate	2210	300	2000	475.1	86.5	90	110	0.329	20	S

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2106088
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_210614A

Sample ID: **ICV-210614**	Batch ID: **R115795**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC2_210614A**	Analysis Date: **6/14/2021 11:19:44 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	24.7	1.00	25.00	0	98.7	90	110			
Fluoride	10.1	0.400	10.00	0	101	90	110			
Sulfate	77.8	3.00	75.00	0	104	90	110			

Sample ID: **CCV1-210614**	Batch ID: **R115795**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_210614A**	Analysis Date: **6/14/2021 8:10:01 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.33	1.00	10.00	0	93.3	90	110			
Fluoride	4.03	0.400	4.000	0	101	90	110			
Sulfate	30.1	3.00	30.00	0	100	90	110			

Sample ID: **CCV2-210614**	Batch ID: **R115795**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_210614A**	Analysis Date: **6/15/2021 12:10:01 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.29	1.00	10.00	0	92.9	90	110			
Fluoride	3.97	0.400	4.000	0	99.3	90	110			
Sulfate	29.8	3.00	30.00	0	99.2	90	110			

Sample ID: **CCV3-210614**	Batch ID: **R115795**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_210614A**	Analysis Date: **6/15/2021 4:10:01 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	4.00	0.400	4.000	0	100	90	110			

Sample ID: **CCV4-210614**	Batch ID: **R115795**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_210614A**	Analysis Date: **6/15/2021 6:18:01 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	4.04	0.400	4.000	0	101	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2106088
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_210615A

The QC data in batch 100919 applies to the following samples: 2106088-08B

Sample ID: **MB-100919**	Batch ID: **100919**	TestNo: **E300**	Units: **mg/L**
SampType: **MBLK**	Run ID: **IC2_210615A**	Analysis Date: **6/15/2021 7:42:19 PM**	Prep Date: **6/15/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	<0.300	1.00								

Sample ID: **LCS-100919**	Batch ID: **100919**	TestNo: **E300**	Units: **mg/L**
SampType: **LCS**	Run ID: **IC2_210615A**	Analysis Date: **6/15/2021 7:58:19 PM**	Prep Date: **6/15/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.06	1.00	10.00	0	90.6	90	110			

Sample ID: **LCSD-100919**	Batch ID: **100919**	TestNo: **E300**	Units: **mg/L**
SampType: **LCSD**	Run ID: **IC2_210615A**	Analysis Date: **6/15/2021 8:14:20 PM**	Prep Date: **6/15/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.03	1.00	10.00	0	90.3	90	110	0.309	20	

Sample ID: **2106090-01BMS**	Batch ID: **100919**	TestNo: **E300**	Units: **mg/L**
SampType: **MS**	Run ID: **IC2_210615A**	Analysis Date: **6/15/2021 8:46:20 PM**	Prep Date: **6/15/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2060	100	2000	152.3	95.4	90	110			

Sample ID: **2106090-01BMSD**	Batch ID: **100919**	TestNo: **E300**	Units: **mg/L**
SampType: **MSD**	Run ID: **IC2_210615A**	Analysis Date: **6/15/2021 9:02:19 PM**	Prep Date: **6/15/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2010	100	2000	152.3	92.9	90	110	2.42	20	

Sample ID: **2106091-01BMS**	Batch ID: **100919**	TestNo: **E300**	Units: **mg/L**
SampType: **MS**	Run ID: **IC2_210615A**	Analysis Date: **6/16/2021 1:34:19 AM**	Prep Date: **6/15/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2130	100	2000	244.6	94.4	90	110			

Sample ID: **2106091-01BMSD**	Batch ID: **100919**	TestNo: **E300**	Units: **mg/L**
SampType: **MSD**	Run ID: **IC2_210615A**	Analysis Date: **6/16/2021 1:50:19 AM**	Prep Date: **6/15/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2130	100	2000	244.6	94.1	90	110	0.354	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2106088
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_210615A

Sample ID: **ICV-210615**	Batch ID: **R115816**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC2_210615A**	Analysis Date: **6/15/2021 7:10:19 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	24.3	1.00	25.00	0	97.4	90	110			

Sample ID: **CCV1-210615**	Batch ID: **R115816**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_210615A**	Analysis Date: **6/16/2021 12:30:19 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.16	1.00	10.00	0	91.6	90	110			

Sample ID: **CCV2-210615**	Batch ID: **R115816**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_210615A**	Analysis Date: **6/16/2021 5:02:19 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.25	1.00	10.00	0	92.5	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank
J	Analyte detected between MDL and RL
ND	Not Detected at the Method Detection Limit
RL	Reporting Limit
J	Analyte detected between SDL and RL
DF	Dilution Factor
MDL	Method Detection Limit
R	RPD outside accepted control limits
S	Spike Recovery outside control limits
N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2106088
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: WC_210614B

The QC data in batch 100893 applies to the following samples: 2106088-01B, 2106088-02B, 2106088-03B, 2106088-04B, 2106088-05B, 2106088-06B, 2106088-07B, 2106088-08B

Sample ID: **MB-100893**	Batch ID: **100893**	TestNo: **M2540C**	Units: **mg/L**
SampType: **MBLK**	Run ID: **WC_210614B**	Analysis Date: **6/14/2021 12:10:00 PM**	Prep Date: **6/14/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	<10.0	10.0								

Sample ID: **LCS-100893**	Batch ID: **100893**	TestNo: **M2540C**	Units: **mg/L**
SampType: **LCS**	Run ID: **WC_210614B**	Analysis Date: **6/14/2021 12:10:00 PM**	Prep Date: **6/14/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	759	10.0	745.6	0	102	90	113			

Sample ID: **2106088-01B-DUP**	Batch ID: **100893**	TestNo: **M2540C**	Units: **mg/L**
SampType: **DUP**	Run ID: **WC_210614B**	Analysis Date: **6/14/2021 12:10:00 PM**	Prep Date: **6/14/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	2010	50.0	0	2015				0.248	5	

Sample ID: **2106088-02B-DUP**	Batch ID: **100893**	TestNo: **M2540C**	Units: **mg/L**
SampType: **DUP**	Run ID: **WC_210614B**	Analysis Date: **6/14/2021 12:10:00 PM**	Prep Date: **6/14/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	2460	50.0	0	2550				3.59	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *18-Jun-21*

CLIENT: Golder
Work Order: 2106088
Project: Sandow CCR

MQL SUMMARY REPORT

TestNo: E300	**MDL**	**MQL**
Analyte	**mg/L**	**mg/L**
Chloride	0.300	1.00
Fluoride	0.100	0.400
Sulfate	1.00	3.00

TestNo: SW6020B	**MDL**	**MQL**
Analyte	**mg/L**	**mg/L**
Boron	0.0100	0.0300
Calcium	0.100	0.300

TestNo: M2540C	**MDL**	**MQL**
Analyte	**mg/L**	**mg/L**
Total Dissolved Solids (Residue, Filt	10.0	10.0

Qualifiers: MQL -Method Quantitation Limit as defined by TRRP
MDL -Method Detection Limit as defined by TRRP

June 21, 2021

Will Vienne
Golder
2201 Double Creek Dr #4004
Round Rock, Texas 78664
TEL: (512) 671-3434
FAX (512) 671-3446

Order No.: 2106091

RE: Sandow CCR

Dear Will Vienne:

DHL Analytical, Inc. received 1 sample(s) on 6/11/2021 for the analyses presented in the following report.

There were no problems with the analyses and all data met requirements of NELAP except where noted in the Case Narrative. All non-NELAP methods will be identified accordingly in the case narrative and all estimated uncertainties of test results are within method or EPA specifications.

If you have any questions regarding these tests results, please feel free to call. Thank you for using DHL Analytical.

Sincerely,

John DuPont
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-21-27

Table of Contents

DHL ANALYTICAL
2300 Double Creek Dr. ■ Round Rock, TX 78664
Phone (512) 388-8222 ■ FAX (512) 388-8229
Web: www.dhlanalytical.com
E-Mail: login@dhlanalytical.com

№ 69776

CHAIN-OF-CUSTODY

CLIENT: Golder Associates
ADDRESS: 2201 Double Creek Dr.
PHONE: 512 671 3434 FAX/E-MAIL:
DATA REPORTED TO: W. Vienne, J. Jarvis
ADDITIONAL REPORT COPIES TO:

DATE: 6/11/21 PAGE 1 OF 1
PO #: DHL WORK ORDER #: 2106091
PROJECT LOCATION OR NAME: Sandow CCR
CLENT PROJECT #: 19122262 COLLECTOR: J. Jarvis

Authorize 5% surcharge for TRRP Report? ❑ Yes ❑ No

S=SOIL P=PAINT
W=WATER SL=SLUDGE
A=AIR O=OTHER
L=LIQUID SO=SOLID
SE=SEDIMENT

PRESERVATION: HCl | HNO_3 | H_2SO_4 ❑ NaOH ❑ | ICE | UNPRESERVED

ANALYSES: BTEX ❑ MTBE ❑ [METHOD 8021] | TPH 1005 ❑ TPH 1006 ❑ HOLD 1006 ❑ | GRO [METHOD 8015] ❑ DRO [METHOD 8105] ❑ | VOC 8260 ❑ VOC 624 ❑ VOC 8260/5035 ❑ | SVOC 8270 ❑ PAH 8270 ❑ HOLD PAH ❑ SVOC 625 ❑ | 8270 PEST ❑ 625 PEST/PCB ❑ 608 PCB ❑ | 8270 O-P PEST ❑ 8082 PCB ❑ 8270 PCB ❑ | 8321 HERB ❑ T PHOS, AMMONIA ❑ | METALS 6020 ❑ METALS 200.8 ❑ DISS. METALS ❑ | RCRA ❑ TX11 ❑ | PH ❑ HEX CHROM ❑ ALKALINITY ❑ COD ❑ | CHLORIDE ❑ ANIONS ❑ | TCLP-SVOC ❑ VOC ❑ PEST ❑ HERB ❑ | TCLP-METALS ❑ RCRA 8 ❑ TX-11 ❑ Pb ❑ | RCI ❑ FLASHPOINT ❑ DGAS ❑ | TDS ❑ TSS ❑ % MOISTURE ❑ CYANIDE ❑ | App IIE | FIELD NOTES

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	HCl	HNO_3	H_2SO_4 ❑ NaOH ❑	ICE	UNPRESERVED																						FIELD NOTES
AX-29	01	6/10/21	1130	W	P	2		1		X	1																		X				

RELINQUISHED BY: (Signature) DATE/TIME 6/11/21 0947 RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)

❑ DHL DISPOSAL @ $5.00 each ❑ Return

TURN AROUND TIME
RUSH ❑ CALL FIRST
1 DAY ❑ CALL FIRST
2 DAY ❑
NORMAL ☒
OTHER ❑

LABORATORY USE ONLY:
RECEIVING TEMP: 5.2°c THERM #: 78
CUSTODY SEALS: ❑ BROKEN ❑ INTACT ☒ NOT USED
CARRIER: ❑ LONE STAR ❑ FEDEX ❑ UPS ❑ OTHER
❑ COURIER DELIVERY
☒ HAND DELIVERED

A1 Landfill – PO# 19122450 – boron, selenium, sulfate – use filter for boron and selenium

Well ID	Top of Screen	Bottom of Screen	Total Depth	Depth to water	pump	dedicated tubing?	Analysis
LMW-1	20	30	30	18.48	peri	yes	B, Se, SO4
LMW-2	23	33	33	21.91	peri	yes	B, Se, SO4
LMW-3	17	32	32	12.68	peri	yes	B, Se, SO4
LMW-4	41	61	61	16.33	peri	yes	B, Se, SO4
LMW-5	15	30	30	7.66	peri	yes	B, Se, SO4
LMW-6R	20	35	35	3.77	peri	yes	B, Se, SO4
LMW-7R	25	40	40	20.45	peri	yes	B, Se, SO4
LMW-8R	20	30	30	19.65	peri	yes	B, Se, SO4
LMW-9	20	30	30	12.31	peri	yes	B, Se, SO4
PC-MW-8	16.7	26.7	27	12.67	peri	yes	B, Se, SO4

AX Landfill – Multiple POs, multiple analyses – don't use filter for Appendix III, use filter for boron and selenium

Well ID	Top of Screen	Bottom of Screen	Total Depth	pump	dedicated tubing?	Analysis	PO
AX-23	65	85	85	bladder	yes	App III	19122262
AX-24	60	80	80	bladder	yes	App III	19122262
AX-25R	60	70	70	peri	yes	App III	19122262
AX-26	55	75	75	bladder	yes	App III	19122262
AX-27	78	98	98	bladder	yes	App III	19122262
AX-28	25	45	45	bladder	yes	App III	19122262
AX-29	45	65	65	bladder	yes	App III	19122262
AXMW-1	33	53	53	bladder	yes	App III	19122262
						B, Se, SO4	19122450
AXMW-2	43	63	63	bladder	yes	App III	19122262
						B, Se, SO4	19122450
AX-16	122	142	142	?	?	B, Se, SO4	19122450
AX-22	115	135	135	?	?	B, Se, SO4	19122450

*Appendix III – boron, calcium, chloride, fluoride, sulfate, TDS

SO2 Ponds – PO# 19122450 – boron, selenium, sulfate – use filter for boron and selenium

Well ID	Top of Screen	Bottom of Screen	Total Depth	Depth to Water	pump	Tubing Intake	dedicated tubing?	Analysis
CSL-MW-13R	44.7	54.7	55	31.93	sub	50	no	B, Se, SO4
CSL-MW-18	34	44	50.5	32.18	sub	40	no	B, Se, SO4
CSL-MW-19	46	56	58	55.97	sub	50	no	B, Se, SO4
CSL-MW-20	49	59	60	54.88	sub	45	no	B, Se, SO4
CSL-MW-21	48	58	59.5	47.82	sub	63	no	B, Se, SO4
CSL-MW-23	35.8	55.8	56	32.57	sub	45	no	B, Se, SO4
CSL-MW-26R	85	90	95	30.69	sub	92	no	B, Se, SO4
CSL-MW-31	44.5	54.5	55	46.38	sub	50	no	B, Se, SO4
CSL-MW-34	141.5	151.5	152	122.98	sub	146	no	B, Se, SO4
CSL-MW-35	139.5	149.5	150	121.54	sub	145	no	B, Se, SO4
C-1	34.8	44.8	45	17.95	peri	40	?	B, Se, SO4
C-2	49.8	59.8	60	12.95	peri	55	?	B, Se, SO4
C-3	52.8	62.8	63	34.14	sub	58	no	B, Se, SO4
CL2-MW-4	14.5	24.5	25	8.86	peri	20	?	B, Se, SO4
CL2-MW-5	9.5	19.5	20	4.93	peri	15	?	B, Se, SO4
CL2-MW-6	39.5	49.5	50	28.54	sub	45	no	B, Se, SO4
PC-MW-2	25	35	35	22.84	peri	30	?	B, Se, SO4
PC-MW-4	148.1	158.1	160	136.89	sub	153	no	B, Se, SO4

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name **Golder** Date Received: **6/11/2021**

Work Order Number **2106091** Received by: **RA**

Checklist completed by: _____ 6/11/2021 Reviewed by _____ 6/11/2021
Signature | Date | Initials | Date

Carrier name: Hand Delivered

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	**5.2** °C
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH<2 acceptable upon receipt?	Yes ☑	No ☐	NA ☐ LOT # 13171
	Adjusted? no		Checked by EL
Water - ph>9 (S) or ph>10 (CN) acceptable upon receipt?	Yes ☐	No ☐	NA ☑ LOT #
	Adjusted? _____		Checked by _____

Any No response must be detailed in the comments section below.

Client contacted: _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action: _____

Laboratory Name: DHL Analytical, Inc.

Laboratory Review Checklist: Reportable Data

Project Name: Sandow CCR	**LRC Date:** 6/21/21
Reviewer Name: Carlos Castro	**Laboratory Work Order:** 2106091
Prep Batch Number(s): See Prep Dates Report	**Run Batch:** See Analytical Dates Report

#[1]	A[2]	Description	Yes	No	NA[3]	NR[4]	ER#[5]
		Chain-of-Custody (C-O-C)					
R1	OI	**1)** Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	**X**				**R1-01**
		2) Were all departures from standard conditions described in an exception report?			**X**		
R2	OI	**Sample and Quality Control (QC) Identification**					
		1) Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	**X**				
		2) Are all laboratory ID numbers cross-referenced to the corresponding QC data?	**X**				
R3	OI	**Test Reports**					
		1) Were all samples prepared and analyzed within holding times?	**X**				
		2) Other than those results < MQL, were all other raw values bracketed by calibration standards?	**X**				
		3) Were calculations checked by a peer or supervisor?	**X**				
		4) Were all analyte identifications checked by a peer or supervisor?	**X**				
		5) Were sample detection limits reported for all analytes not detected?	**X**				
		6) Were all results for soil and sediment samples reported on a dry weight basis?			**X**		
		7) Were % moisture (or solids) reported for all soil and sediment samples?			**X**		
		8) Were bulk soils/solids samples for volatile analysis extracted with methanol per EPA Method 5035?			**X**		
		9) If required for the project, TICs reported?			**X**		
R4	O	**Surrogate Recovery Data**					
		1) Were surrogates added prior to extraction?			**X**		
		2) Were surrogate percent recoveries in all samples within the laboratory QC limits?			**X**		
R5	OI	**Test Reports/Summary Forms for Blank Samples**					
		1) Were appropriate type(s) of blanks analyzed?	**X**				
		2) Were blanks analyzed at the appropriate frequency?	**X**				
		3) Where method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	**X**				
		4) Were blank concentrations < MDL?	**X**				
		5) For analyte(s) detected in a blank sample, was the concentration, unadjusted for sample specific factors, in all associated field samples, **greater** than 10 times the concentration in the blank sample?			**X**		
R6	OI	**Laboratory Control Samples (LCS):**					
		1) Were all COCs included in the LCS?	**X**				
		2) Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	**X**				
		3) Were LCSs analyzed at the required frequency?	**X**				
		4) Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	**X**				
		5) Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	**X**				
		6) Was the LCSD RPD within QC limits (if applicable)?	**X**				
R7	OI	**Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Data**					
		1) Were the project/method specified analytes included in the MS and MSD?	**X**				
		2) Were MS/MSD analyzed at the appropriate frequency?	**X**				
		3) Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?		**X**			**R7-03**
		4) Were MS/MSD RPDs within laboratory QC limits?	**X**				
R8	OI	**Analytical Duplicate Data**					
		1) Were appropriate analytical duplicates analyzed for each matrix?	**X**				
		2) Were analytical duplicates analyzed at the appropriate frequency?	**X**				
		3) Were RPDs or relative standard deviations within the laboratory QC limits?	**X**				
R9	OI	**Method Quantitation Limits (MQLs):**					
		1) Are the MQLs for each method analyte included in the laboratory data package?	**X**				
		2) Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	**X**				
		3) Are unadjusted MQLs and DCSs included in the laboratory data package?	**X**				
R10	OI	**Other Problems/Anomalies**					
		1) Are all known problems/anomalies/special conditions noted in this LRC and ER?	**X**				
		2) Was applicable and available technology used to lower the SDL to minimize the matrix interference affects on the sample results?	**X**				
		3) Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	**X**				

Laboratory Name: DHL Analytical, Inc.

Laboratory Review Checklist (continued): Supporting Data

Project Name: Sandow CCR	**LRC Date:** 6/21/21
Reviewer Name: Carlos Castro	**Laboratory Work Order:** 2106091
Prep Batch Number(s): See Prep Dates Report	**Run Batch:** See Analytical Dates Report

#[1]	A[2]	Description	Yes	No	NA[3]	NR[4]	ER#[5]
S1	OI	**Initial Calibration (ICAL)**					
		1) Were response factors and/or relative response factors for each analyte within QC limits?	X				
		2) Were percent RSDs or correlation coefficient criteria met?	X				
		3) Was the number of standards recommended in the method used for all analytes?	X				
		4) Were all points generated between the lowest and highest standard used to calculate the curve?	X				
		5) Are ICAL data available for all instruments used?	X				
		6) Has the initial calibration curve been verified using an appropriate second source standard?	X				
S2	OI	**Initial and Continuing calibration Verification (ICCV and CCV) and Continuing Calibration blank (CCB):**					
		1) Was the CCV analyzed at the method-required frequency?	X				
		2) Were percent differences for each analyte within the method-required QC limits?	X				
		3) Was the ICAL curve verified for each analyte?	X				
		4) Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	X				
S3	O	**Mass Spectral Tuning:**					
		1) Was the appropriate compound for the method used for tuning?	X				
		2) Were ion abundance data within the method-required QC limits?	X				
S4	O	**Internal Standards (IS):**					
		1) Were IS area counts and retention times within the method-required QC limits?	X				
S5	OI	**Raw Data (NELAC Section 5.5.10)**					
		1) Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
		2) Were data associated with manual integrations flagged on the raw data?	X				
S6	O	**Dual Column Confirmation**					
		1) Did dual column confirmation results meet the method-required QC?			X		
S7	O	**Tentatively Identified Compounds (TICs):**					
		1) If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
S8	I	**Interference Check Sample (ICS) Results:**					
		1) Were percent recoveries within method QC limits?	X				
S9	I	**Serial Dilutions, Post Digestion Spikes, and Method of Standard Additions**					
		1) Were percent differences, recoveries, and the linearity within the QC limits specified in the method?		X			**S9-01**
S10	OI	**Method Detection Limit (MDL) Studies**					
		1) Was a MDL study performed for each reported analyte?	X				
		2) Is the MDL either adjusted or supported by the analysis of DCSs?	X				
S11	OI	**Proficiency Test Reports:**					
		1) Was the lab's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
S12	OI	**Standards Documentation**					
		1) Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
S13	OI	**Compound/Analyte Identification Procedures**					
		1) Are the procedures for compound/analyte identification documented?	X				
S14	OI	**Demonstration of Analyst Competency (DOC)**					
		1) Was DOC conducted consistent with NELAC Chapter 5 – Appendix C?	X				
		2) Is documentation of the analyst's competency up-to-date and on file?	X				
S15	OI	**Verification/Validation Documentation for Methods** (NELAC Chapter 5)					
		1) Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
S16	OI	**Laboratory Standard Operating Procedures (SOPs):**					
		1) Are laboratory SOPs current and on file for each method performed?	X				

1 Items identified by the letter "R" should be included in the laboratory data package submitted to the TCEQ in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.

2 O = organic analyses; I = inorganic analyses (and general chemistry, when applicable).

3 NA = Not applicable.

4 NR = Not Reviewed.

5 ER# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

Laboratory Data Package Signature Page – RG-366/TRRP-13

This data package consists of:

This signature page, the laboratory review checklist, and the following reportable data:

R1 Field chain-of-custody documentation;
R2 Sample identification cross-reference;
R3 Test reports (analytical data sheets) for each environmental sample that includes:
  a) Items consistent with NELAC Chapter 5,
  b) dilution factors,
  c) preparation methods,
  d) cleanup methods, and
  e) if required for the project, tentatively identified compounds (TICs).
R4 Surrogate recovery data including:
  a) Calculated recovery (%R), and
  b) The laboratory's surrogate QC limits.
R5 Test reports/summary forms for blank samples;
R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  a) LCS spiking amounts,
  b) Calculated %R for each analyte, and
  c) The laboratory's LCS QC limits.
R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  a) Samples associated with the MS/MSD clearly identified,
  b) MS/MSD spiking amounts,
  c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,
  d) Calculated %Rs and relative percent differences (RPDs), and
  e) The laboratory's MS/MSD QC limits
R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  a) The amount of analyte measured in the duplicate,
  b) The calculated RPD, and
  c) The laboratory's QC limits for analytical duplicates.
R9 List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix;
R10 Other problems or anomalies.

The Exception Report for each "No" or "Not Reviewed (NR)" item in the Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory is not accredited under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature below, I affirm to the best of my knowledge that all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information or data affecting the quality of the data has been knowingly withheld.

This laboratory was last inspected by TCEQ on February 23-26, 2021. Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Name: John DuPont
Official Title: General Manager

Signature

06/21/21

Date

Name: Dr. Derhsing Luu
Official Title: Technical Director

DHL Analytical, Inc. **Date:** *21-Jun-21*

CLIENT: Golder
Project: Sandow CCR
Lab Order: 2106091

CASE NARRATIVE

Samples were analyzed using the methods outlined in the following references:

Method SW6020B - Metals Analysis
Method E300 - Anions Analysis
Method M2540C - TDS Analysis

Exception Report R1-01

The sample was received and log-in performed on 6/11/21. A total of 1 sample was received. The sample arrived in good condition and was properly packaged.

Exception Report R7-03

For Anions analysis performed on 6/15/21 the matrix spikes and matrix spike duplicate recoveries (2106090-01 MSD & 2106091-01 MS/MSD) were slightly below control limits for Sulfate. These are flagged accordingly in the QC summary report. The sample selected for the matrix spike and matrix spike duplicate (2106090-01 MS/MSD) was not from this work order. The sample selected for the matrix spike and matrix spike duplicate (2106091-01 MS/MSD) was from this work order. The LCS was within control limits for this analyte. No further corrective actions were taken.

For Metals analysis performed on 6/17/21 the matrix spike and matrix spike duplicate recoveries were below control limits for Calcium. These are flagged accordingly. The sample selected for the matrix spike and matrix spike duplicate was not from this work order. The LCS was within control limits for this analyte. No further corrective actions were taken.

Exception Report S9-01

For Metals analysis performed on 6/17/21 the PDS recovery was below control limits for Calcium. This is flagged accordingly in the QC summary report. The serial dilution was within control limits for this analyte. No further corrective actions were taken.

DHL Analytical, Inc.

Date: *21-Jun-21*

CLIENT: Golder
Project: Sandow CCR
Lab Order: 2106091

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
2106091-01	AX-29		06/10/21 11:30 AM	6/11/2021

Lab Order: 2106091
Client: Golder
Project: Sandow CCR

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
2106091-01A	AX-29	06/10/21 11:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/16/21 08:43 AM	100923
	AX-29	06/10/21 11:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/16/21 08:43 AM	100923
	AX-29	06/10/21 11:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/16/21 08:43 AM	100923
2106091-01B	AX-29	06/10/21 11:30 AM	Aqueous	E300	Anion Preparation	06/15/21 11:00 AM	100919
	AX-29	06/10/21 11:30 AM	Aqueous	E300	Anion Preparation	06/15/21 11:00 AM	100919
	AX-29	06/10/21 11:30 AM	Aqueous	M2540C	TDS Preparation	06/14/21 08:35 AM	100893

Lab Order: 2106091
Client: Golder
Project: Sandow CCR

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
2106091-01A	AX-29	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	100923	50	06/17/21 01:59 PM	ICP-MS5_210617B
	AX-29	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	100923	1	06/17/21 11:16 AM	ICP-MS5_210617B
	AX-29	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	100923	1	06/17/21 02:25 PM	ICP-MS4_210617D
2106091-01B	AX-29	Aqueous	E300	Anions by IC method - Water	100919	1	06/16/21 05:34 AM	IC2_210615A
	AX-29	Aqueous	E300	Anions by IC method - Water	100919	100	06/16/21 01:18 AM	IC2_210615A
	AX-29	Aqueous	M2540C	Total Dissolved Solids	100893	1	06/14/21 12:10 PM	WC_210614B

DHL Analytical, Inc.

Date: *21-Jun-21*

CLIENT:	Golder	**Client Sample ID:**	AX-29
Project:	Sandow CCR	**Lab ID:**	2106091-01
Project No:	19122262	**Collection Date:**	06/10/21 11:30 AM
Lab Order:	2106091	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Boron	0.370	0.0100	0.0300		mg/L	1	06/17/21 02:25 PM
Calcium	365	5.00	15.0		mg/L	50	06/17/21 01:59 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	245	30.0	100		mg/L	100	06/16/21 01:18 AM
Fluoride	<0.100	0.100	0.400		mg/L	1	06/16/21 05:34 AM
Sulfate	1090	100	300		mg/L	100	06/16/21 01:18 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	2580	50.0	50.0		mg/L	1	06/14/21 12:10 PM

Qualifiers:

ND - Not Detected at the SDL
J - Analyte detected between SDL and RL
B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAP certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

CLIENT: Golder
Work Order: 2106091
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_210428A

Sample ID: **DCS4-100323** Batch ID: **100323** TestNo: **SW6020B** Units: **mg/L**
SampType: **DCS4** Run ID: **ICP-MS4_210428A** Analysis Date: **4/28/2021 10:39:00 AM** Prep Date: **4/27/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0310	0.0300	0.0300	0	103	70	130	0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2106091
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_210617D

The QC data in batch 100923 applies to the following samples: 2106091-01A

Sample ID: **MB-100923**	Batch ID: **100923**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MBLK**	Run ID: **ICP-MS4_210617D**	Analysis Date: **6/17/2021 2:13:00 PM**	Prep Date: **6/16/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	<0.0100	0.0300								

Sample ID: **LCS-100923**	Batch ID: **100923**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCS**	Run ID: **ICP-MS4_210617D**	Analysis Date: **6/17/2021 2:15:00 PM**	Prep Date: **6/16/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.200	0.0300	0.200	0	100	80	120			

Sample ID: **LCSD-100923**	Batch ID: **100923**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCSD**	Run ID: **ICP-MS4_210617D**	Analysis Date: **6/17/2021 2:17:00 PM**	Prep Date: **6/16/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.191	0.0300	0.200	0	95.7	80	120	4.33	15	

Sample ID: **2106093-04E SD**	Batch ID: **100923**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **SD**	Run ID: **ICP-MS4_210617D**	Analysis Date: **6/17/2021 2:23:00 PM**	Prep Date: **6/16/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.139	0.150	0	0.117				17.2	20	

Sample ID: **2106093-04E PDS**	Batch ID: **100923**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS4_210617D**	Analysis Date: **6/17/2021 2:27:00 PM**	Prep Date: **6/16/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.302	0.0300	0.200	0.117	92.3	75	125			

Sample ID: **2106093-04E MS**	Batch ID: **100923**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS4_210617D**	Analysis Date: **6/17/2021 2:31:00 PM**	Prep Date: **6/16/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.308	0.0300	0.200	0.117	95.6	75	125			

Sample ID: **2106093-04E MSD**	Batch ID: **100923**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS4_210617D**	Analysis Date: **6/17/2021 2:32:00 PM**	Prep Date: **6/16/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.306	0.0300	0.200	0.117	94.2	75	125	0.939	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2106091
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_210617D

Sample ID: **ICV-210617**	Batch ID: **R115846**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS4_210617D**	Analysis Date: **6/17/2021 10:50:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0960	0.0300	0.100	0	96.0	90	110			

Sample ID: **LCVL-210617**	Batch ID: **R115846**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_210617D**	Analysis Date: **6/17/2021 11:01:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0203	0.0300	0.0200	0	102	80	120			

Sample ID: **CCV3-210617**	Batch ID: **R115846**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_210617D**	Analysis Date: **6/17/2021 2:08:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.203	0.0300	0.200	0	102	90	110			

Sample ID: **CCV4-210617**	Batch ID: **R115846**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_210617D**	Analysis Date: **6/17/2021 2:37:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.213	0.0300	0.200	0	107	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2106091
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_210428A

Sample ID: **DCS2-100323**	Batch ID: **100323**	TestNo: **SW6020B**		Units: **mg/L**	
SampType: **DCS2**	Run ID: **ICP-MS5_210428A**	Analysis Date: **4/28/2021 10:53:00 AM**		Prep Date: **4/27/2021**	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.302	0.300	0.300	0	101	70	130	0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2106091
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_210617B

The QC data in batch 100923 applies to the following samples: 2106091-01A

Sample ID: **MB-100923**	Batch ID: **100923**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MBLK**	Run ID: **ICP-MS5_210617B**	Analysis Date: **6/17/2021 10:57:00 AM**	Prep Date: **6/16/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	<0.100	0.300								

Sample ID: **LCS-100923**	Batch ID: **100923**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCS**	Run ID: **ICP-MS5_210617B**	Analysis Date: **6/17/2021 11:00:00 AM**	Prep Date: **6/16/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.93	0.300	5.00	0	98.5	80	120			

Sample ID: **LCSD-100923**	Batch ID: **100923**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCSD**	Run ID: **ICP-MS5_210617B**	Analysis Date: **6/17/2021 11:03:00 AM**	Prep Date: **6/16/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.78	0.300	5.00	0	95.6	80	120	3.06	15	

Sample ID: **2106093-04E SD**	Batch ID: **100923**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **SD**	Run ID: **ICP-MS5_210617B**	Analysis Date: **6/17/2021 11:10:00 AM**	Prep Date: **6/16/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	94.7	1.50	0	93.8				0.914	20	

Sample ID: **2106093-04E PDS**	Batch ID: **100923**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS5_210617B**	Analysis Date: **6/17/2021 11:36:00 AM**	Prep Date: **6/16/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	94.6	0.300	5.00	93.8	14.4	75	125			S

Sample ID: **2106093-04E MS**	Batch ID: **100923**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS5_210617B**	Analysis Date: **6/17/2021 11:41:00 AM**	Prep Date: **6/16/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	97.1	0.300	5.00	93.8	64.8	75	125			S

Sample ID: **2106093-04E MSD**	Batch ID: **100923**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS5_210617B**	Analysis Date: **6/17/2021 11:48:00 AM**	Prep Date: **6/16/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	95.7	0.300	5.00	93.8	37.7	75	125	1.41	15	S

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2106091
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_210617B

Sample ID: **ICV-210617**	Batch ID: **R115845**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS5_210617B**	Analysis Date: **6/17/2021 10:41:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	2.43	0.300	2.50	0	97.0	90	110			

Sample ID: **LCVL-210617**	Batch ID: **R115845**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS5_210617B**	Analysis Date: **6/17/2021 10:49:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.0853	0.300	0.100	0	85.3	80	120			

Sample ID: **CCV1-210617**	Batch ID: **R115845**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_210617B**	Analysis Date: **6/17/2021 11:52:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.99	0.300	5.00	0	99.7	90	110			

Sample ID: **CCV2-210617**	Batch ID: **R115845**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_210617B**	Analysis Date: **6/17/2021 12:44:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	5.10	0.300	5.00	0	102	90	110			

Sample ID: **CCV3-210617**	Batch ID: **R115845**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_210617B**	Analysis Date: **6/17/2021 2:31:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.85	0.300	5.00	0	97.0	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2106091
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_210527A

Sample ID: **DCS3-100738** Batch ID: **100738** TestNo: **E300** Units: **mg/L**
SampType: **DCS3** Run ID: **IC2_210527A** Analysis Date: **5/27/2021 4:13:05 PM** Prep Date: **5/27/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	1.25	1.00	1.000	0	125	70	130	0	0	
Fluoride	0.408	0.400	0.4000	0	102	70	130	0	0	
Sulfate	3.03	3.00	3.000	0	101	70	130	0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2106091
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_210615A

The QC data in batch 100919 applies to the following samples: 2106091-01B

Sample ID: **MB-100919** Batch ID: **100919** TestNo: **E300** Units: **mg/L**
SampType: **MBLK** Run ID: **IC2_210615A** Analysis Date: **6/15/2021 7:42:19 PM** Prep Date: **6/15/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	<0.300	1.00								
Fluoride	<0.100	0.400								
Sulfate	<1.00	3.00								

Sample ID: **LCS-100919** Batch ID: **100919** TestNo: **E300** Units: **mg/L**
SampType: **LCS** Run ID: **IC2_210615A** Analysis Date: **6/15/2021 7:58:19 PM** Prep Date: **6/15/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.06	1.00	10.00	0	90.6	90	110			
Fluoride	3.74	0.400	4.000	0	93.6	90	110			
Sulfate	29.0	3.00	30.00	0	96.8	90	110			

Sample ID: **LCSD-100919** Batch ID: **100919** TestNo: **E300** Units: **mg/L**
SampType: **LCSD** Run ID: **IC2_210615A** Analysis Date: **6/15/2021 8:14:20 PM** Prep Date: **6/15/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.03	1.00	10.00	0	90.3	90	110	0.309	20	
Fluoride	3.76	0.400	4.000	0	93.9	90	110	0.347	20	
Sulfate	29.0	3.00	30.00	0	96.6	90	110	0.145	20	

Sample ID: **2106090-01BMS** Batch ID: **100919** TestNo: **E300** Units: **mg/L**
SampType: **MS** Run ID: **IC2_210615A** Analysis Date: **6/15/2021 8:46:20 PM** Prep Date: **6/15/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2060	100	2000	152.3	95.4	90	110			
Fluoride	1960	40.0	2000	0	98.1	90	110			
Sulfate	3140	300	2000	1355	89.1	90	110			S

Sample ID: **2106090-01BMSD** Batch ID: **100919** TestNo: **E300** Units: **mg/L**
SampType: **MSD** Run ID: **IC2_210615A** Analysis Date: **6/15/2021 9:02:19 PM** Prep Date: **6/15/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2010	100	2000	152.3	92.9	90	110	2.42	20	
Fluoride	1940	40.0	2000	0	96.8	90	110	1.33	20	
Sulfate	3090	300	2000	1355	86.7	90	110	1.52	20	S

Sample ID: **2106091-01BMS** Batch ID: **100919** TestNo: **E300** Units: **mg/L**
SampType: **MS** Run ID: **IC2_210615A** Analysis Date: **6/16/2021 1:34:19 AM** Prep Date: **6/15/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2106091
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_210615A

Sample ID: **2106091-01BMS**	Batch ID: **100919**	TestNo: **E300**	Units: **mg/L**
SampType: **MS**	Run ID: **IC2_210615A**	Analysis Date: **6/16/2021 1:34:19 AM**	Prep Date: **6/15/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2130	100	2000	244.6	94.4	90	110			
Fluoride	1960	40.0	2000	0	98.1	90	110			
Sulfate	2810	300	2000	1093	85.7	90	110			S

Sample ID: **2106091-01BMSD**	Batch ID: **100919**	TestNo: **E300**	Units: **mg/L**
SampType: **MSD**	Run ID: **IC2_210615A**	Analysis Date: **6/16/2021 1:50:19 AM**	Prep Date: **6/15/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2130	100	2000	244.6	94.1	90	110	0.354	20	
Fluoride	1970	40.0	2000	0	98.5	90	110	0.386	20	
Sulfate	2810	300	2000	1093	85.9	90	110	0.148	20	S

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2106091
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_210615A

Sample ID: **ICV-210615**	Batch ID: **R115816**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC2_210615A**	Analysis Date: **6/15/2021 7:10:19 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	24.3	1.00	25.00	0	97.4	90	110			
Fluoride	9.96	0.400	10.00	0	99.6	90	110			
Sulfate	77.2	3.00	75.00	0	103	90	110			

Sample ID: **CCV1-210615**	Batch ID: **R115816**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_210615A**	Analysis Date: **6/16/2021 12:30:19 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.16	1.00	10.00	0	91.6	90	110			
Fluoride	3.95	0.400	4.000	0	98.7	90	110			
Sulfate	29.3	3.00	30.00	0	97.8	90	110			

Sample ID: **CCV2-210615**	Batch ID: **R115816**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_210615A**	Analysis Date: **6/16/2021 5:02:19 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.25	1.00	10.00	0	92.5	90	110			
Fluoride	3.99	0.400	4.000	0	99.8	90	110			
Sulfate	29.4	3.00	30.00	0	98.0	90	110			

Sample ID: **CCV3-210615**	Batch ID: **R115816**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_210615A**	Analysis Date: **6/16/2021 6:38:19 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	3.98	0.400	4.000	0	99.6	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2106091
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: WC_210614B

The QC data in batch 100893 applies to the following samples: 2106091-01B

Sample ID: **MB-100893**	Batch ID: **100893**	TestNo: **M2540C**	Units: **mg/L**
SampType: **MBLK**	Run ID: **WC_210614B**	Analysis Date: **6/14/2021 12:10:00 PM**	Prep Date: **6/14/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	<10.0	10.0								

Sample ID: **LCS-100893**	Batch ID: **100893**	TestNo: **M2540C**	Units: **mg/L**
SampType: **LCS**	Run ID: **WC_210614B**	Analysis Date: **6/14/2021 12:10:00 PM**	Prep Date: **6/14/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	759	10.0	745.6	0	102	90	113			

Sample ID: **2106088-01B-DUP**	Batch ID: **100893**	TestNo: **M2540C**	Units: **mg/L**
SampType: **DUP**	Run ID: **WC_210614B**	Analysis Date: **6/14/2021 12:10:00 PM**	Prep Date: **6/14/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	2010	50.0	0	2015				0.248	5	

Sample ID: **2106088-02B-DUP**	Batch ID: **100893**	TestNo: **M2540C**	Units: **mg/L**
SampType: **DUP**	Run ID: **WC_210614B**	Analysis Date: **6/14/2021 12:10:00 PM**	Prep Date: **6/14/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	2460	50.0	0	2550				3.59	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *21-Jun-21*

CLIENT: Golder
Work Order: 2106091
Project: Sandow CCR

MQL SUMMARY REPORT

TestNo: E300	**MDL**	**MQL**
Analyte	**mg/L**	**mg/L**
Chloride	0.300	1.00
Fluoride	0.100	0.400
Sulfate	1.00	3.00

TestNo: SW6020B	**MDL**	**MQL**
Analyte	**mg/L**	**mg/L**
Boron	0.0100	0.0300
Calcium	0.100	0.300

TestNo: M2540C	**MDL**	**MQL**
Analyte	**mg/L**	**mg/L**
Total Dissolved Solids (Residue, Filt	10.0	10.0

Qualifiers: MQL -Method Quantitation Limit as defined by TRRP
MDL -Method Detection Limit as defined by TRRP

December 01, 2021

Will Vienne
Golder
2201 Double Creek Dr #4004
Round Rock, Texas 78664
TEL: (512) 671-3434
FAX: (512) 671-3446

Order No.: 2111158

RE: Sandow CCR

Dear Will Vienne:

DHL Analytical, Inc. received 9 sample(s) on 11/19/2021 for the analyses presented in the following report.

There were no problems with the analyses and all data met requirements of NELAP except where noted in the Case Narrative. All non-NELAP methods will be identified accordingly in the case narrative and all estimated uncertainties of test results are within method or EPA specifications.

If you have any questions regarding these tests results, please feel free to call. Thank you for using DHL Analytical.

Sincerely,

John DuPont
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-21-27

Table of Contents

DHL ANALYTICAL
2300 Double Creek Dr. Round Rock, TX 78664
Phone 512.388.8222
Web: **www.dhlanalytical.com**
Email: **login@dhlanalytical.com**

CHAIN-OF-CUSTODY

CLIENT: 2201 Double Creek Dr. — Golder Associates
ADDRESS:
PHONE: 512-671-3434 EMAIL: Will Vrenna
DATA REPORTED TO: Will Vrenna J. Sams
ADDITIONAL REPORT COPIES TO:

DATE: 11/19/21
PO#:
PROJECT LOCATION OR NAME: Sandow CCR
CLIENT PROJECT # 191222662 COLLECTOR: J. Sams

LABORATORY USE ONLY
DHL WORKORDER #: 211158

Authorize 5% surcharge for TRRP report? ☐ Yes ☐ No

W=WATER L=LIQUID S=SOLID SO=SOLID SE=SEDIMENT P=PAINT SL=SLUDGE

Field Sample I.D.	DHL Lab #	Collection Date	Collection Time	Matrix	Container Type	# of Containers	PRESERVATION: HCL	HNO_3	H_2SO_4	NaOH ☐ Zn Acetate ☐	ICE ☒ UNPRESERVED ☐	ANALYSES: Ash III	FIELD NOTES
AX-25R	01	11/16/21	905	W	P	2		1			X	X	
~~AX-22R~~ AX-28	02	11/16/21	1130										
~~AX-28~~ AX-29	03	11/16/21	1215										
AX-23	04	11/17/21	955										
AXMW-1	05	10:30	~~930~~ 11/18/21										
AXMW-2	06		1158 per Joseph S.										
AX-24	07	11/18/21	1610										
AX-26	08		1645										
AX-27	09		1725										

Relinquished By: (Sign) DATE/TIME 11/19/21 1700 Received by:
Relinquished By: (Sign) DATE/TIME Received by:
Relinquished By: (Sign) DATE/TIME Received by:

TURN AROUND TIME (CALL FIRST FOR RUSH)
RUSH-1 DAY☐ RUSH-2 DAY☐ RUSH-3 DAY☐
NORMAL ☐ OTHER ☐
DUE DATE _____ ☐

LABORATORY USE ONLY
RECEIVING TEMP (°C): 1.2°C/1.1°C THERM #: 95
CUSTODY SEALS: ☐ BROKEN ☐ INTACT ☒ NOT USED
CARRIER: ☐ LSO ☐ FEDEX ☐ UPS ☐ COURIER ☐ OTHER ☒ HAND DELIVERED

☐ **DHL DISPOSAL @ 5.00 each** ☐ **Return**

DHL COC REV 3 | MAR 2021

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name **Golder**

Date Received: **11/19/2021**

Work Order Number **2111158**

Received by: **RA**

Checklist completed by: Signature 11/22/2021 Date

Reviewed by SH Initials 11/22/2021 Date

Carrier name: Hand Delivered

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	1.2 °C / 1.1°C
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH<2 acceptable upon receipt?	Yes ☑	No ☐	NA ☐ LOT # 13171
	Adjusted? NO		Checked by R.A.
Water - ph>9 (S) or ph>10 (CN) acceptable upon receipt?	Yes ☐	No ☐	NA ☑ LOT #
	Adjusted?		Checked by

Any No response must be detailed in the comments section below.

Client contacted: Golder Date contacted: 11/22/21 Person contacted Jacob J.

Contacted by: Ryan A. Regarding: Collection Time

Comments: Sample AXMW-1 had a collection time of 09:30 recorded on the CoC, but the sample label has a collection time of 10:30

Corrective Action: Per Jacob J. DHL will use the collection time written on the label. (10:30)

v

Laboratory Name: DHL Analytical, Inc.

Laboratory Review Checklist: Reportable Data

Project Name: Sandow CCR	**LRC Date:** 12/1/2021
Reviewer Name: Angie O'Donnell	**Laboratory Work Order: 2111158**
Prep Batch Number(s): See Prep Dates Report	**Run Batch:** See Analytical Dates Report

#[1]	A[2]	Description	Yes	No	NA[3]	NR[4]	ER#[5]
		Chain-of-Custody (C-O-C)					
R1	OI	**1)** Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	**X**				**R1-01**
		2) Were all departures from standard conditions described in an exception report?	**X**				
R2	OI	**Sample and Quality Control (QC) Identification**					
		1) Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	**X**				
		2) Are all laboratory ID numbers cross-referenced to the corresponding QC data?	**X**				
R3	OI	**Test Reports**					
		1) Were all samples prepared and analyzed within holding times?	**X**				
		2) Other than those results < MQL, were all other raw values bracketed by calibration standards?	**X**				
		3) Were calculations checked by a peer or supervisor?	**X**				
		4) Were all analyte identifications checked by a peer or supervisor?	**X**				
		5) Were sample detection limits reported for all analytes not detected?	**X**				
		6) Were all results for soil and sediment samples reported on a dry weight basis?			**X**		
		7) Were % moisture (or solids) reported for all soil and sediment samples?			**X**		
		8) Were bulk soils/solids samples for volatile analysis extracted with methanol per EPA Method 5035?			**X**		
		9) If required for the project, TICs reported?			**X**		
R4	O	**Surrogate Recovery Data**					
		1) Were surrogates added prior to extraction?			**X**		
		2) Were surrogate percent recoveries in all samples within the laboratory QC limits?			**X**		
R5	OI	**Test Reports/Summary Forms for Blank Samples**					
		1) Were appropriate type(s) of blanks analyzed?	**X**				
		2) Were blanks analyzed at the appropriate frequency?	**X**				
		3) Where method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	**X**				
		4) Were blank concentrations < MDL?	**X**				
		5) For analyte(s) detected in a blank sample, was the concentration, unadjusted for sample specific factors, in all associated field samples, **greater** than 10 times the concentration in the blank sample?			**X**		
R6	OI	**Laboratory Control Samples (LCS):**					
		1) Were all COCs included in the LCS?	**X**				
		2) Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	**X**				
		3) Were LCSs analyzed at the required frequency?	**X**				
		4) Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	**X**				
		5) Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	**X**				
		6) Was the LCSD RPD within QC limits (if applicable)?	**X**				
R7	OI	**Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Data**					
		1) Were the project/method specified analytes included in the MS and MSD?	**X**				
		2) Were MS/MSD analyzed at the appropriate frequency?	**X**				
		3) Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?		**X**			**R7-03**
		4) Were MS/MSD RPDs within laboratory QC limits?	**X**				
R8	OI	**Analytical Duplicate Data**					
		1) Were appropriate analytical duplicates analyzed for each matrix?	**X**				
		2) Were analytical duplicates analyzed at the appropriate frequency?	**X**				
		3) Were RPDs or relative standard deviations within the laboratory QC limits?	**X**				
R9	OI	**Method Quantitation Limits (MQLs):**					
		1) Are the MQLs for each method analyte included in the laboratory data package?	**X**				
		2) Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	**X**				
		3) Are unadjusted MQLs and DCSs included in the laboratory data package?	**X**				
R10	OI	**Other Problems/Anomalies**					
		1) Are all known problems/anomalies/special conditions noted in this LRC and ER?	**X**				
		2) Was applicable and available technology used to lower the SDL to minimize the matrix interference affects on the sample results?	**X**				
		3) Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	**X**				

Laboratory Name: DHL Analytical, Inc.

Laboratory Review Checklist (continued): Supporting Data

Project Name: Sandow CCR	**LRC Date:** 12/1/2021
Reviewer Name: Angie O'Donnell	**Laboratory Work Order: 2111158**
Prep Batch Number(s): See Prep Dates Report	**Run Batch:** See Analytical Dates Report

#[1]	A[2]	Description	Yes	No	NA[3]	NR[4]	ER#[5]
S1	OI	**Initial Calibration (ICAL)**					
		1) Were response factors and/or relative response factors for each analyte within QC limits?	X				
		2) Were percent RSDs or correlation coefficient criteria met?	X				
		3) Was the number of standards recommended in the method used for all analytes?	X				
		4) Were all points generated between the lowest and highest standard used to calculate the curve?	X				
		5) Are ICAL data available for all instruments used?	X				
		6) Has the initial calibration curve been verified using an appropriate second source standard?	X				
S2	OI	**Initial and Continuing calibration Verification (ICCV and CCV) and Continuing Calibration blank (CCB):**					
		1) Was the CCV analyzed at the method-required frequency?	X				
		2) Were percent differences for each analyte within the method-required QC limits?	X				
		3) Was the ICAL curve verified for each analyte?	X				
		4) Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	X				
S3	O	**Mass Spectral Tuning:**					
		1) Was the appropriate compound for the method used for tuning?	X				
		2) Were ion abundance data within the method-required QC limits?	X				
S4	O	**Internal Standards (IS):**					
		1) Were IS area counts and retention times within the method-required QC limits?	X				
S5	OI	**Raw Data (NELAC Section 5.5.10)**					
		1) Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
		2) Were data associated with manual integrations flagged on the raw data?	X				
S6	O	**Dual Column Confirmation**					
		1) Did dual column confirmation results meet the method-required QC?			X		
S7	O	**Tentatively Identified Compounds (TICs):**					
		1) If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
S8	I	**Interference Check Sample (ICS) Results:**					
		1) Were percent recoveries within method QC limits?	X				
S9	I	**Serial Dilutions, Post Digestion Spikes, and Method of Standard Additions**					
		1) Were percent differences, recoveries, and the linearity within the QC limits specified in the method?		X			**S9-01**
S10	OI	**Method Detection Limit (MDL) Studies**					
		1) Was a MDL study performed for each reported analyte?	X				
		2) Is the MDL either adjusted or supported by the analysis of DCSs?	X				
S11	OI	**Proficiency Test Reports:**					
		1) Was the lab's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
S12	OI	**Standards Documentation**					
		1) Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
S13	OI	**Compound/Analyte Identification Procedures**					
		1) Are the procedures for compound/analyte identification documented?	X				
S14	OI	**Demonstration of Analyst Competency (DOC)**					
		1) Was DOC conducted consistent with NELAC Chapter 5 – Appendix C?	X				
		2) Is documentation of the analyst's competency up-to-date and on file?	X				
S15	OI	**Verification/Validation Documentation for Methods** (NELAC Chapter 5)					
		1) Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
S16	OI	**Laboratory Standard Operating Procedures (SOPs):**					
		1) Are laboratory SOPs current and on file for each method performed?	X				

1 Items identified by the letter "R" should be included in the laboratory data package submitted to the TCEQ in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.

2 O = organic analyses; I = inorganic analyses (and general chemistry, when applicable).

3 NA = Not applicable.

4 NR = Not Reviewed.

5 ER# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

Laboratory Data Package Signature Page – RG-366/TRRP-13

This data package consists of:

This signature page, the laboratory review checklist, and the following reportable data:

R1 Field chain-of-custody documentation;
R2 Sample identification cross-reference;
R3 Test reports (analytical data sheets) for each environmental sample that includes:
  a) Items consistent with NELAC Chapter 5,
  b) dilution factors,
  c) preparation methods,
  d) cleanup methods, and
  e) if required for the project, tentatively identified compounds (TICs).
R4 Surrogate recovery data including:
  a) Calculated recovery (%R), and
  b) The laboratory's surrogate QC limits.
R5 Test reports/summary forms for blank samples;
R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  a) LCS spiking amounts,
  b) Calculated %R for each analyte, and
  c) The laboratory's LCS QC limits.
R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  a) Samples associated with the MS/MSD clearly identified,
  b) MS/MSD spiking amounts,
  c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,
  d) Calculated %Rs and relative percent differences (RPDs), and
  e) The laboratory's MS/MSD QC limits
R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  a) The amount of analyte measured in the duplicate,
  b) The calculated RPD, and
  c) The laboratory's QC limits for analytical duplicates.
R9 List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix;
R10 Other problems or anomalies.

The Exception Report for each "No" or "Not Reviewed (NR)" item in the Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory is not accredited under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature below, I affirm to the best of my knowledge that all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information or data affecting the quality of the data has been knowingly withheld.

This laboratory was last inspected by TCEQ on February 23-26, 2021. Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Name: John DuPont
Official Title: General Manager

Signature

12/01/21
Date

Name: Dr. Derhsing Luu
Official Title: Technical Director

DHL Analytical, Inc. **Date:** *01-Dec-21*

CLIENT: Golder
Project: Sandow CCR
Lab Order: 2111158

CASE NARRATIVE

Samples were analyzed using the methods outlined in the following references:

Method SW6020B - Metals Analysis
Method E300 - Anions Analysis
Method M2540C - TDS Analysis

Exception Report R1-01

The samples were received and log-in performed on 11/19/2021. A total of 9 samples were received and analyzed. The samples arrived in good condition and were properly packaged. See details regarding the time of collection for one sample in the Sample Receipt Checklist.

Exception Report R7-03

For Metals Analysis, for Batch 102952, the recovery of Calcium for the Matrix Spike and Matrix Spike Duplicate (2111159-21 MS/MSD) was above the method control limits. This is flagged accordingly in the QC Summary Report. This analyte was within method control limits in the associated LCS. No further corrective action was taken.

Exception Report S9-01

For Metals Analysis, for Batch 102952, the recovery of Calcium for the Post Digestion Spike (2111159-21 PDS) was outside of the method control limits. This is flagged accordingly in the QC Summary Report. This analyte was within method control limits in the associated Serial Dilution. No further corrective action was taken.

DHL Analytical, Inc.

Date: *01-Dec-21*

CLIENT: Golder
Project: Sandow CCR
Lab Order: 2111158

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
2111158-01	AX-25R		11/16/21 09:05 AM	11/19/2021
2111158-02	AX-28		11/16/21 11:30 AM	11/19/2021
2111158-03	AX-29		11/16/21 12:15 PM	11/19/2021
2111158-04	AX-23		11/17/21 09:55 AM	11/19/2021
2111158-05	AXMW-1		11/17/21 10:30 AM	11/19/2021
2111158-06	AXMW-2		11/17/21 11:58 AM	11/19/2021
2111158-07	AX-24		11/18/21 04:10 PM	11/19/2021
2111158-08	AX-26		11/18/21 04:45 PM	11/19/2021
2111158-09	AX-27		11/18/21 05:25 PM	11/19/2021

Lab Order: 2111158
Client: Golder
Project: Sandow CCR

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
2111158-01A	AX-25R	11/16/21 09:05 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/23/21 08:18 AM	102952
	AX-25R	11/16/21 09:05 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/23/21 08:18 AM	102952
2111158-01B	AX-25R	11/16/21 09:05 AM	Aqueous	E300	Anion Preparation	11/23/21 02:34 PM	102961
	AX-25R	11/16/21 09:05 AM	Aqueous	E300	Anion Preparation	11/23/21 02:34 PM	102961
	AX-25R	11/16/21 09:05 AM	Aqueous	M2540C	TDS Preparation	11/22/21 10:59 AM	102939
2111158-02A	AX-28	11/16/21 11:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/23/21 08:18 AM	102952
	AX-28	11/16/21 11:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/23/21 08:18 AM	102952
2111158-02B	AX-28	11/16/21 11:30 AM	Aqueous	E300	Anion Preparation	11/23/21 02:34 PM	102961
	AX-28	11/16/21 11:30 AM	Aqueous	E300	Anion Preparation	11/23/21 02:34 PM	102961
	AX-28	11/16/21 11:30 AM	Aqueous	E300	Anion Preparation	11/23/21 02:34 PM	102961
	AX-28	11/16/21 11:30 AM	Aqueous	M2540C	TDS Preparation	11/22/21 10:59 AM	102939
2111158-03A	AX-29	11/16/21 12:15 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/23/21 08:18 AM	102952
	AX-29	11/16/21 12:15 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/23/21 08:18 AM	102952
2111158-03B	AX-29	11/16/21 12:15 PM	Aqueous	E300	Anion Preparation	11/23/21 02:34 PM	102961
	AX-29	11/16/21 12:15 PM	Aqueous	E300	Anion Preparation	11/23/21 02:34 PM	102961
	AX-29	11/16/21 12:15 PM	Aqueous	M2540C	TDS Preparation	11/22/21 10:59 AM	102939
2111158-04A	AX-23	11/17/21 09:55 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/23/21 08:18 AM	102952
	AX-23	11/17/21 09:55 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/23/21 08:18 AM	102952
2111158-04B	AX-23	11/17/21 09:55 AM	Aqueous	E300	Anion Preparation	11/23/21 02:34 PM	102961
	AX-23	11/17/21 09:55 AM	Aqueous	E300	Anion Preparation	11/23/21 02:34 PM	102961
	AX-23	11/17/21 09:55 AM	Aqueous	M2540C	TDS Preparation	11/22/21 10:59 AM	102939
2111158-05A	AXMW-1	11/17/21 10:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/23/21 08:18 AM	102952
	AXMW-1	11/17/21 10:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/23/21 08:18 AM	102952
2111158-05B	AXMW-1	11/17/21 10:30 AM	Aqueous	E300	Anion Preparation	11/23/21 02:34 PM	102961
	AXMW-1	11/17/21 10:30 AM	Aqueous	E300	Anion Preparation	11/23/21 02:34 PM	102961
	AXMW-1	11/17/21 10:30 AM	Aqueous	M2540C	TDS Preparation	11/22/21 10:59 AM	102939
2111158-06A	AXMW-2	11/17/21 11:58 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/23/21 08:18 AM	102952
	AXMW-2	11/17/21 11:58 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/23/21 08:18 AM	102952

Lab Order: 2111158
Client: Golder
Project: Sandow CCR

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
2111158-06B	AXMW-2	11/17/21 11:58 AM	Aqueous	E300	Anion Preparation	11/23/21 02:34 PM	102961
	AXMW-2	11/17/21 11:58 AM	Aqueous	E300	Anion Preparation	11/23/21 02:34 PM	102961
	AXMW-2	11/17/21 11:58 AM	Aqueous	M2540C	TDS Preparation	11/22/21 10:59 AM	102939
2111158-07A	AX-24	11/18/21 04:10 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/23/21 08:18 AM	102952
	AX-24	11/18/21 04:10 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/23/21 08:18 AM	102952
2111158-07B	AX-24	11/18/21 04:10 PM	Aqueous	E300	Anion Preparation	11/23/21 02:34 PM	102961
	AX-24	11/18/21 04:10 PM	Aqueous	E300	Anion Preparation	11/23/21 02:34 PM	102961
	AX-24	11/18/21 04:10 PM	Aqueous	M2540C	TDS Preparation	11/22/21 10:59 AM	102939
2111158-08A	AX-26	11/18/21 04:45 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/23/21 08:18 AM	102952
	AX-26	11/18/21 04:45 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/23/21 08:18 AM	102952
2111158-08B	AX-26	11/18/21 04:45 PM	Aqueous	E300	Anion Preparation	11/23/21 02:34 PM	102961
	AX-26	11/18/21 04:45 PM	Aqueous	E300	Anion Preparation	11/23/21 02:34 PM	102961
	AX-26	11/18/21 04:45 PM	Aqueous	M2540C	TDS Preparation	11/22/21 10:59 AM	102939
2111158-09A	AX-27	11/18/21 05:25 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/24/21 08:48 AM	102970
	AX-27	11/18/21 05:25 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	11/24/21 08:48 AM	102970
2111158-09B	AX-27	11/18/21 05:25 PM	Aqueous	E300	Anion Preparation	11/23/21 02:34 PM	102961
	AX-27	11/18/21 05:25 PM	Aqueous	E300	Anion Preparation	11/23/21 02:34 PM	102961
	AX-27	11/18/21 05:25 PM	Aqueous	M2540C	TDS Preparation	11/22/21 10:59 AM	102939

Lab Order: 2111158
Client: Golder
Project: Sandow CCR

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
2111158-01A	AX-25R	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	102952	50	11/24/21 02:30 PM	ICP-MS5_211124B
	AX-25R	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	102952	1	11/24/21 03:14 PM	ICP-MS4_211124D
2111158-01B	AX-25R	Aqueous	E300	Anions by IC method - Water	102961	100	11/23/21 05:26 PM	IC2_211123A
	AX-25R	Aqueous	E300	Anions by IC method - Water	102961	1	11/24/21 02:30 AM	IC2_211123A
	AX-25R	Aqueous	M2540C	Total Dissolved Solids	102939	1	11/22/21 04:45 PM	WC_211122B
2111158-02A	AX-28	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	102952	1	11/24/21 03:16 PM	ICP-MS4_211124D
	AX-28	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	102952	50	11/24/21 02:32 PM	ICP-MS5_211124B
2111158-02B	AX-28	Aqueous	E300	Anions by IC method - Water	102961	100	11/23/21 05:43 PM	IC2_211123A
	AX-28	Aqueous	E300	Anions by IC method - Water	102961	10	11/23/21 11:57 PM	IC2_211123A
	AX-28	Aqueous	E300	Anions by IC method - Water	102961	1	11/24/21 02:47 AM	IC2_211123A
	AX-28	Aqueous	M2540C	Total Dissolved Solids	102939	1	11/22/21 04:45 PM	WC_211122B
2111158-03A	AX-29	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	102952	1	11/24/21 03:18 PM	ICP-MS4_211124D
	AX-29	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	102952	50	11/24/21 02:35 PM	ICP-MS5_211124B
2111158-03B	AX-29	Aqueous	E300	Anions by IC method - Water	102961	100	11/23/21 06:34 PM	IC2_211123A
	AX-29	Aqueous	E300	Anions by IC method - Water	102961	1	11/24/21 03:04 AM	IC2_211123A
	AX-29	Aqueous	M2540C	Total Dissolved Solids	102939	1	11/22/21 04:45 PM	WC_211122B
2111158-04A	AX-23	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	102952	1	11/24/21 03:20 PM	ICP-MS4_211124D
	AX-23	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	102952	50	11/24/21 02:38 PM	ICP-MS5_211124B
2111158-04B	AX-23	Aqueous	E300	Anions by IC method - Water	102961	10	11/24/21 12:14 AM	IC2_211123A
	AX-23	Aqueous	E300	Anions by IC method - Water	102961	1	11/24/21 03:21 AM	IC2_211123A
	AX-23	Aqueous	M2540C	Total Dissolved Solids	102939	1	11/22/21 04:45 PM	WC_211122B
2111158-05A	AXMW-1	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	102952	20	11/24/21 03:22 PM	ICP-MS4_211124D
	AXMW-1	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	102952	50	11/24/21 02:40 PM	ICP-MS5_211124B
2111158-05B	AXMW-1	Aqueous	E300	Anions by IC method - Water	102961	1	11/24/21 03:38 AM	IC2_211123A
	AXMW-1	Aqueous	E300	Anions by IC method - Water	102961	100	11/23/21 07:25 PM	IC2_211123A
	AXMW-1	Aqueous	M2540C	Total Dissolved Solids	102939	1	11/22/21 04:45 PM	WC_211122B
2111158-06A	AXMW-2	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	102952	2	11/24/21 03:24 PM	ICP-MS4_211124D
	AXMW-2	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	102952	50	11/24/21 02:43 PM	ICP-MS5_211124B

Lab Order: 2111158
Client: Golder
Project: Sandow CCR

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
2111158-06B	AXMW-2	Aqueous	E300	Anions by IC method - Water	102961	100	11/23/21 07:42 PM	IC2_211123A
	AXMW-2	Aqueous	E300	Anions by IC method - Water	102961	1	11/24/21 03:55 AM	IC2_211123A
	AXMW-2	Aqueous	M2540C	Total Dissolved Solids	102939	1	11/22/21 04:45 PM	WC_211122B
2111158-07A	AX-24	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	102952	1	11/24/21 03:26 PM	ICP-MS4_211124D
	AX-24	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	102952	50	11/24/21 02:45 PM	ICP-MS5_211124B
2111158-07B	AX-24	Aqueous	E300	Anions by IC method - Water	102961	100	11/23/21 07:59 PM	IC2_211123A
	AX-24	Aqueous	E300	Anions by IC method - Water	102961	1	11/24/21 04:12 AM	IC2_211123A
	AX-24	Aqueous	M2540C	Total Dissolved Solids	102939	1	11/22/21 04:45 PM	WC_211122B
2111158-08A	AX-26	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	102952	1	11/24/21 03:28 PM	ICP-MS4_211124D
	AX-26	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	102952	50	11/24/21 02:48 PM	ICP-MS5_211124B
2111158-08B	AX-26	Aqueous	E300	Anions by IC method - Water	102961	100	11/23/21 08:16 PM	IC2_211123A
	AX-26	Aqueous	E300	Anions by IC method - Water	102961	1	11/24/21 04:29 AM	IC2_211123A
	AX-26	Aqueous	M2540C	Total Dissolved Solids	102939	1	11/22/21 04:45 PM	WC_211122B
2111158-09A	AX-27	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	102970	50	11/29/21 01:51 PM	ICP-MS4_211129B
	AX-27	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	102970	1	11/29/21 12:28 PM	ICP-MS5_211129A
2111158-09B	AX-27	Aqueous	E300	Anions by IC method - Water	102961	100	11/23/21 08:33 PM	IC2_211123A
	AX-27	Aqueous	E300	Anions by IC method - Water	102961	1	11/24/21 04:46 AM	IC2_211123A
	AX-27	Aqueous	M2540C	Total Dissolved Solids	102939	1	11/22/21 04:45 PM	WC_211122B

DHL Analytical, Inc.

Date: *01-Dec-21*

CLIENT:	Golder	**Client Sample ID:**	AX-25R
Project:	Sandow CCR	**Lab ID:**	2111158-01
Project No:	19122262	**Collection Date:**	11/16/21 09:05 AM
Lab Order:	2111158	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Boron	0.197	0.0100	0.0300		mg/L	1	11/24/21 03:14 PM
Calcium	210	5.00	15.0		mg/L	50	11/24/21 02:30 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	400	30.0	100		mg/L	100	11/23/21 05:26 PM
Fluoride	0.493	0.100	0.400		mg/L	1	11/24/21 02:30 AM
Sulfate	492	100	300		mg/L	100	11/23/21 05:26 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	2120	50.0	50.0		mg/L	1	11/22/21 04:45 PM

Qualifiers:

ND - Not Detected at the SDL
J - Analyte detected between SDL and RL
B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAP certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *01-Dec-21*

CLIENT:	Golder	**Client Sample ID:**	AX-28
Project:	Sandow CCR	**Lab ID:**	2111158-02
Project No:	19122262	**Collection Date:**	11/16/21 11:30 AM
Lab Order:	2111158	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Boron	0.256	0.0100	0.0300		mg/L	1	11/24/21 03:16 PM
Calcium	466	5.00	15.0		mg/L	50	11/24/21 02:32 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	61.9	3.00	10.0		mg/L	10	11/23/21 11:57 PM
Fluoride	0.198	0.100	0.400	J	mg/L	1	11/24/21 02:47 AM
Sulfate	1760	100	300		mg/L	100	11/23/21 05:43 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	3040	50.0	50.0		mg/L	1	11/22/21 04:45 PM

Qualifiers:

ND - Not Detected at the SDL
J - Analyte detected between SDL and RL
B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAP certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *01-Dec-21*

CLIENT:	Golder	**Client Sample ID:**	AX-29
Project:	Sandow CCR	**Lab ID:**	2111158-03
Project No:	19122262	**Collection Date:**	11/16/21 12:15 PM
Lab Order:	2111158	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Boron	0.341	0.0100	0.0300		mg/L	1	11/24/21 03:18 PM
Calcium	339	5.00	15.0		mg/L	50	11/24/21 02:35 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	297	30.0	100		mg/L	100	11/23/21 06:34 PM
Fluoride	0.201	0.100	0.400	J	mg/L	1	11/24/21 03:04 AM
Sulfate	1120	100	300		mg/L	100	11/23/21 06:34 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	2630	50.0	50.0		mg/L	1	11/22/21 04:45 PM

Qualifiers:

ND - Not Detected at the SDL
J - Analyte detected between SDL and RL
B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAP certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *01-Dec-21*

CLIENT:	Golder	**Client Sample ID:**	AX-23
Project:	Sandow CCR	**Lab ID:**	2111158-04
Project No:	19122262	**Collection Date:**	11/17/21 09:55 AM
Lab Order:	2111158	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Boron	0.278	0.0100	0.0300		mg/L	1	11/24/21 03:20 PM
Calcium	300	5.00	15.0		mg/L	50	11/24/21 02:38 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	248	3.00	10.0		mg/L	10	11/24/21 12:14 AM
Fluoride	0.259	0.100	0.400	J	mg/L	1	11/24/21 03:21 AM
Sulfate	651	10.0	30.0		mg/L	10	11/24/21 12:14 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1860	50.0	50.0		mg/L	1	11/22/21 04:45 PM

Qualifiers:

ND - Not Detected at the SDL
J - Analyte detected between SDL and RL
B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAP certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *01-Dec-21*

CLIENT:	Golder	**Client Sample ID:**	AXMW-1
Project:	Sandow CCR	**Lab ID:**	2111158-05
Project No:	19122262	**Collection Date:**	11/17/21 10:30 AM
Lab Order:	2111158	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Boron	8.21	0.200	0.600		mg/L	20	11/24/21 03:22 PM
Calcium	292	5.00	15.0		mg/L	50	11/24/21 02:40 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	160	30.0	100		mg/L	100	11/23/21 07:25 PM
Fluoride	0.181	0.100	0.400	J	mg/L	1	11/24/21 03:38 AM
Sulfate	1470	100	300		mg/L	100	11/23/21 07:25 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	2600	50.0	50.0		mg/L	1	11/22/21 04:45 PM

Qualifiers:

ND - Not Detected at the SDL
J - Analyte detected between SDL and RL
B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAP certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *01-Dec-21*

CLIENT:	Golder	**Client Sample ID:**	AXMW-2
Project:	Sandow CCR	**Lab ID:**	2111158-06
Project No:	19122262	**Collection Date:**	11/17/21 11:58 AM
Lab Order:	2111158	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Boron	0.622	0.0200	0.0600		mg/L	2	11/24/21 03:24 PM
Calcium	423	5.00	15.0		mg/L	50	11/24/21 02:43 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	118	30.0	100		mg/L	100	11/23/21 07:42 PM
Fluoride	0.224	0.100	0.400	J	mg/L	1	11/24/21 03:55 AM
Sulfate	1160	100	300		mg/L	100	11/23/21 07:42 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	2620	50.0	50.0		mg/L	1	11/22/21 04:45 PM

Qualifiers:

ND - Not Detected at the SDL
J - Analyte detected between SDL and RL
B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAP certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *01-Dec-21*

CLIENT:	Golder	**Client Sample ID:**	AX-24
Project:	Sandow CCR	**Lab ID:**	2111158-07
Project No:	19122262	**Collection Date:**	11/18/21 04:10 PM
Lab Order:	2111158	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Boron	0.153	0.0100	0.0300		mg/L	1	11/24/21 03:26 PM
Calcium	333	5.00	15.0		mg/L	50	11/24/21 02:45 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	179	30.0	100		mg/L	100	11/23/21 07:59 PM
Fluoride	0.138	0.100	0.400	J	mg/L	1	11/24/21 04:12 AM
Sulfate	1070	100	300		mg/L	100	11/23/21 07:59 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	2390	50.0	50.0		mg/L	1	11/22/21 04:45 PM

Qualifiers:

- ND - Not Detected at the SDL
- J - Analyte detected between SDL and RL
- B - Analyte detected in the associated Method Blank
- DF- Dilution Factor
- N - Parameter not NELAP certified
- See Final Page of Report for MQLs and MDLs
- S - Spike Recovery outside control limits
- C - Sample Result or QC discussed in Case Narrative
- RL - Reporting Limit (MQL adjusted for moisture and sample size)
- SDL - Sample Detection Limit
- E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *01-Dec-21*

CLIENT:	Golder	**Client Sample ID:**	AX-26
Project:	Sandow CCR	**Lab ID:**	2111158-08
Project No:	19122262	**Collection Date:**	11/18/21 04:45 PM
Lab Order:	2111158	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Boron	0.360	0.0100	0.0300		mg/L	1	11/24/21 03:28 PM
Calcium	939	5.00	15.0		mg/L	50	11/24/21 02:48 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	2230	30.0	100		mg/L	100	11/23/21 08:16 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	11/24/21 04:29 AM
Sulfate	1280	100	300		mg/L	100	11/23/21 08:16 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	5930	50.0	50.0		mg/L	1	11/22/21 04:45 PM

Qualifiers:

ND - Not Detected at the SDL
J - Analyte detected between SDL and RL
B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAP certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *01-Dec-21*

CLIENT:	Golder	**Client Sample ID:**	AX-27
Project:	Sandow CCR	**Lab ID:**	2111158-09
Project No:	19122262	**Collection Date:**	11/18/21 05:25 PM
Lab Order:	2111158	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Boron	0.249	0.0100	0.0300		mg/L	1	11/29/21 12:28 PM
Calcium	390	5.00	15.0		mg/L	50	11/29/21 01:51 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	461	30.0	100		mg/L	100	11/23/21 08:33 PM
Fluoride	0.204	0.100	0.400	J	mg/L	1	11/24/21 04:46 AM
Sulfate	419	100	300		mg/L	100	11/23/21 08:33 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1980	50.0	50.0		mg/L	1	11/22/21 04:45 PM

Qualifiers:

- ND - Not Detected at the SDL
- J - Analyte detected between SDL and RL
- B - Analyte detected in the associated Method Blank
- DF- Dilution Factor
- N - Parameter not NELAP certified
- See Final Page of Report for MQLs and MDLs
- S - Spike Recovery outside control limits
- C - Sample Result or QC discussed in Case Narrative
- RL - Reporting Limit (MQL adjusted for moisture and sample size)
- SDL - Sample Detection Limit
- E - TPH pattern not Gas or Diesel Range Pattern

CLIENT: Golder
Work Order: 2111158
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_211104B

Sample ID: **DCS2-102615**	Batch ID: **102615**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **DCS2**	Run ID: **ICP-MS4_211104B**	Analysis Date: **11/4/2021 10:47:00 AM**	Prep Date: **10/29/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.300	0.300	0.300	0	100	70	130	0	0	

Sample ID: **DCS4-102615**	Batch ID: **102615**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **DCS4**	Run ID: **ICP-MS4_211104B**	Analysis Date: **11/4/2021 10:52:00 AM**	Prep Date: **10/29/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0317	0.0300	0.0300	0	106	70	130	0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2111158
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_211124D

The QC data in batch 102952 applies to the following samples: 2111158-01A, 2111158-02A, 2111158-03A, 2111158-04A, 2111158-05A, 2111158-06A, 2111158-07A, 2111158-08A

Sample ID: **MB-102952**	Batch ID: **102952**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MBLK**	Run ID: **ICP-MS4_211124D**	Analysis Date: **11/24/2021 3:02:00 PM**	Prep Date: **11/23/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	<0.0100	0.0300								

Sample ID: **LCS-102952**	Batch ID: **102952**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCS**	Run ID: **ICP-MS4_211124D**	Analysis Date: **11/24/2021 3:04:00 PM**	Prep Date: **11/23/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.186	0.0300	0.200	0	93.2	80	120			

Sample ID: **LCSD-102952**	Batch ID: **102952**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCSD**	Run ID: **ICP-MS4_211124D**	Analysis Date: **11/24/2021 3:06:00 PM**	Prep Date: **11/23/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.193	0.0300	0.200	0	96.3	80	120	3.25	15	

Sample ID: **2111159-21A SD**	Batch ID: **102952**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **SD**	Run ID: **ICP-MS4_211124D**	Analysis Date: **11/24/2021 3:12:00 PM**	Prep Date: **11/23/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.318	0.150	0	0.290				9.33	20	

Sample ID: **2111159-21A PDS**	Batch ID: **102952**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS4_211124D**	Analysis Date: **11/24/2021 3:32:00 PM**	Prep Date: **11/23/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.463	0.0300	0.200	0.290	86.7	75	125			

Sample ID: **2111159-21A MS**	Batch ID: **102952**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS4_211124D**	Analysis Date: **11/24/2021 3:34:00 PM**	Prep Date: **11/23/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.475	0.0300	0.200	0.290	92.8	75	125			

Sample ID: **2111159-21A MSD**	Batch ID: **102952**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS4_211124D**	Analysis Date: **11/24/2021 3:36:00 PM**	Prep Date: **11/23/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.501	0.0300	0.200	0.290	106	75	125	5.25	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2111158
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_211124D

Sample ID: **ICV-211124**	Batch ID: **R118212**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS4_211124D**	Analysis Date: **11/24/2021 10:08:00 A**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.100	0.0300	0.100	0	100	90	110			

Sample ID: **LCVL-211124**	Batch ID: **R118212**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_211124D**	Analysis Date: **11/24/2021 10:22:00 A**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0168	0.0300	0.0200	0	83.9	80	120			

Sample ID: **CCV7-211124**	Batch ID: **R118212**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_211124D**	Analysis Date: **11/24/2021 2:52:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.198	0.0300	0.200	0	98.8	90	110			

Sample ID: **CCV8-211124**	Batch ID: **R118212**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_211124D**	Analysis Date: **11/24/2021 3:38:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.197	0.0300	0.200	0	98.7	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2111158
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_211129B

Sample ID: **ICV-211129**	Batch ID: **R118221**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS4_211129B**	Analysis Date: **11/29/2021 10:42:00 A**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	2.56	0.300	2.50	0	103	90	110			

Sample ID: **LCVL-211129**	Batch ID: **R118221**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_211129B**	Analysis Date: **11/29/2021 10:49:00 A**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.105	0.300	0.100	0	105	80	120			

Sample ID: **CCV4-211129**	Batch ID: **R118221**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_211129B**	Analysis Date: **11/29/2021 1:08:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	5.29	0.300	5.00	0	106	90	110			

Sample ID: **CCV5-211129**	Batch ID: **R118221**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_211129B**	Analysis Date: **11/29/2021 2:11:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	5.31	0.300	5.00	0	106	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2111158
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_211101A

Sample ID: **DCS2-102615**	Batch ID: **102615**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **DCS2**	Run ID: **ICP-MS5_211101A**	Analysis Date: **11/1/2021 10:43:00 AM**	Prep Date: **10/29/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.314	0.300	0.300	0	105	70	130	0	0	

Sample ID: **DCS4-102615**	Batch ID: **102615**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **DCS4**	Run ID: **ICP-MS5_211101A**	Analysis Date: **11/1/2021 10:49:00 AM**	Prep Date: **10/29/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0373	0.0300	0.0300	0	124	70	130	0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2111158
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_211124B

The QC data in batch 102952 applies to the following samples: 2111158-01A, 2111158-02A, 2111158-03A, 2111158-04A, 2111158-05A, 2111158-06A, 2111158-07A, 2111158-08A

Sample ID: **MB-102952** Batch ID: **102952** TestNo: **SW6020B** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS5_211124B** Analysis Date: **11/24/2021 2:14:00 PM** Prep Date: **11/23/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	<0.100	0.300								

Sample ID: **LCS-102952** Batch ID: **102952** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS5_211124B** Analysis Date: **11/24/2021 2:17:00 PM** Prep Date: **11/23/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.61	0.300	5.00	0	92.2	80	120			

Sample ID: **LCSD-102952** Batch ID: **102952** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS5_211124B** Analysis Date: **11/24/2021 2:20:00 PM** Prep Date: **11/23/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.50	0.300	5.00	0	90.0	80	120	2.52	15	

Sample ID: **2111159-21A SD** Batch ID: **102952** TestNo: **SW6020B** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS5_211124B** Analysis Date: **11/24/2021 2:27:00 PM** Prep Date: **11/23/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	588	1.50	0	586				0.499	20	

Sample ID: **2111159-21A PDS** Batch ID: **102952** TestNo: **SW6020B** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS5_211124B** Analysis Date: **11/24/2021 2:53:00 PM** Prep Date: **11/23/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	561	0.300	5.00	586	-496	75	125			S

Sample ID: **2111159-21A MS** Batch ID: **102952** TestNo: **SW6020B** Units: **mg/L**
SampType: **MS** Run ID: **ICP-MS5_211124B** Analysis Date: **11/24/2021 2:56:00 PM** Prep Date: **11/23/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	604	0.300	5.00	586	362	75	125			S

Sample ID: **2111159-21A MSD** Batch ID: **102952** TestNo: **SW6020B** Units: **mg/L**
SampType: **MSD** Run ID: **ICP-MS5_211124B** Analysis Date: **11/24/2021 2:58:00 PM** Prep Date: **11/23/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	606	0.300	5.00	586	409	75	125	0.393	15	S

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2111158
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_211124B

Sample ID: **ICV-211124**	Batch ID: **R118201**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS5_211124B**	Analysis Date: **11/24/2021 10:12:00 A**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	2.39	0.300	2.50	0	95.5	90	110			

Sample ID: **LCVL-211124**	Batch ID: **R118201**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS5_211124B**	Analysis Date: **11/24/2021 10:21:00 A**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.105	0.300	0.100	0	105	80	120			

Sample ID: **CCV5-211124**	Batch ID: **R118201**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_211124B**	Analysis Date: **11/24/2021 2:09:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.87	0.300	5.00	0	97.4	90	110			

Sample ID: **CCV6-211124**	Batch ID: **R118201**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_211124B**	Analysis Date: **11/24/2021 3:01:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.93	0.300	5.00	0	98.6	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2111158
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS5_211129A**

The QC data in batch 102970 applies to the following samples: 2111158-09A

Sample ID: **MB-102970**	Batch ID: **102970**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MBLK**	Run ID: **ICP-MS5_211129A**	Analysis Date: **11/29/2021 12:07:00 P**	Prep Date: **11/24/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	<0.0100	0.0300								
Calcium	<0.100	0.300								

Sample ID: **LCS-102970**	Batch ID: **102970**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCS**	Run ID: **ICP-MS5_211129A**	Analysis Date: **11/29/2021 12:10:00 P**	Prep Date: **11/24/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.178	0.0300	0.200	0	88.8	80	120			
Calcium	4.85	0.300	5.00	0	97.0	80	120			

Sample ID: **LCSD-102970**	Batch ID: **102970**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCSD**	Run ID: **ICP-MS5_211129A**	Analysis Date: **11/29/2021 12:13:00 P**	Prep Date: **11/24/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.184	0.0300	0.200	0	92.0	80	120	3.51	15	
Calcium	4.79	0.300	5.00	0	95.8	80	120	1.26	15	

Sample ID: **2111168-22C SD**	Batch ID: **102970**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **SD**	Run ID: **ICP-MS5_211129A**	Analysis Date: **11/29/2021 12:20:00 P**	Prep Date: **11/24/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	<0.0500	0.150	0	0				0	20	
Calcium	<0.500	1.50	0	0				0	20	

Sample ID: **2111168-22C PDS**	Batch ID: **102970**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS5_211129A**	Analysis Date: **11/29/2021 12:46:00 P**	Prep Date: **11/24/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.199	0.0300	0.200	0	99.7	75	125			
Calcium	4.72	0.300	5.00	0	94.4	75	125			

Sample ID: **2111168-22C MS**	Batch ID: **102970**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS5_211129A**	Analysis Date: **11/29/2021 12:49:00 P**	Prep Date: **11/24/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.191	0.0300	0.200	0	95.6	75	125			
Calcium	4.82	0.300	5.00	0	96.5	75	125			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2111158
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_211129A

Sample ID: **2111168-22C MSD**	Batch ID: **102970**	TestNo: **SW6020B**	Units: **mg/L**		
SampType: **MSD**	Run ID: **ICP-MS5_211129A**	Analysis Date: **11/29/2021 12:52:00 P**	Prep Date: **11/24/2021**		

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.192	0.0300	0.200	0	95.8	75	125	0.188	15	
Calcium	4.82	0.300	5.00	0	96.4	75	125	0.026	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2111158
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_211129A

Sample ID: **ICV-211129**	Batch ID: **R118218**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS5_211129A**	Analysis Date: **11/29/2021 11:54:00 A**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0979	0.0300	0.100	0	97.9	90	110			
Calcium	2.39	0.300	2.50	0	95.7	90	110			

Sample ID: **LCVL-211129**	Batch ID: **R118218**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS5_211129A**	Analysis Date: **11/29/2021 11:59:00 A**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0227	0.0300	0.0200	0	113	80	120			
Calcium	0.0947	0.300	0.100	0	94.7	80	120			

Sample ID: **CCV1-211129**	Batch ID: **R118218**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_211129A**	Analysis Date: **11/29/2021 12:54:00 P**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.200	0.0300	0.200	0	100	90	110			
Calcium	5.01	0.300	5.00	0	100	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2111158
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_210928A

Sample ID: **DCS2-102216**	Batch ID: **102216**	TestNo: **E300**		Units: **mg/L**	
SampType: **DCS2**	Run ID: **IC2_210928A**	Analysis Date: **9/28/2021 1:38:01 PM**		Prep Date: **9/28/2021**	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	0.533	1.00	0.5000	0	107	70	130	0	0	
Fluoride	0.179	0.400	0.2000	0	89.5	70	130	0	0	
Sulfate	1.55	3.00	1.500	0	104	70	130	0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2111158
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_211123A

The QC data in batch 102961 applies to the following samples: 2111158-01B, 2111158-02B, 2111158-03B, 2111158-04B, 2111158-05B, 2111158-06B, 2111158-07B, 2111158-08B, 2111158-09B

Sample ID: **MB-102961** Batch ID: **102961** TestNo: **E300** Units: **mg/L**
SampType: **MBLK** Run ID: **IC2_211123A** Analysis Date: **11/23/2021 3:35:17 PM** Prep Date: **11/23/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	<0.300	1.00								
Fluoride	<0.100	0.400								
Sulfate	<1.00	3.00								

Sample ID: **LCS-102961** Batch ID: **102961** TestNo: **E300** Units: **mg/L**
SampType: **LCS** Run ID: **IC2_211123A** Analysis Date: **11/23/2021 3:52:17 PM** Prep Date: **11/23/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.2	1.00	10.00	0	102	90	110			
Fluoride	4.03	0.400	4.000	0	101	90	110			
Sulfate	30.2	3.00	30.00	0	101	90	110			

Sample ID: **LCSD-102961** Batch ID: **102961** TestNo: **E300** Units: **mg/L**
SampType: **LCSD** Run ID: **IC2_211123A** Analysis Date: **11/23/2021 4:09:17 PM** Prep Date: **11/23/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.2	1.00	10.00	0	102	90	110	0.348	20	
Fluoride	4.01	0.400	4.000	0	100	90	110	0.435	20	
Sulfate	30.0	3.00	30.00	0	100	90	110	0.474	20	

Sample ID: **2111158-02BMS** Batch ID: **102961** TestNo: **E300** Units: **mg/L**
SampType: **MS** Run ID: **IC2_211123A** Analysis Date: **11/23/2021 6:00:31 PM** Prep Date: **11/23/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2020	100	2000	104.3	96.0	90	110			
Fluoride	1960	40.0	2000	0	97.8	90	110			
Sulfate	3580	300	2000	1758	91.2	90	110			

Sample ID: **2111158-02BMSD** Batch ID: **102961** TestNo: **E300** Units: **mg/L**
SampType: **MSD** Run ID: **IC2_211123A** Analysis Date: **11/23/2021 6:17:31 PM** Prep Date: **11/23/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2050	100	2000	104.3	97.1	90	110	1.05	20	
Fluoride	1980	40.0	2000	0	99.1	90	110	1.27	20	
Sulfate	3620	300	2000	1758	92.8	90	110	0.891	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2111158
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_211123A

Sample ID: **2111158-03BMS**	Batch ID: **102961**	TestNo: **E300**	Units: **mg/L**
SampType: **MS**	Run ID: **IC2_211123A**	Analysis Date: **11/23/2021 6:51:31 PM**	Prep Date: **11/23/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2270	100	2000	296.9	98.8	90	110			
Fluoride	1960	40.0	2000	0	97.9	90	110			
Sulfate	3000	300	2000	1121	93.7	90	110			

Sample ID: **2111158-03BMSD**	Batch ID: **102961**	TestNo: **E300**	Units: **mg/L**
SampType: **MSD**	Run ID: **IC2_211123A**	Analysis Date: **11/23/2021 7:08:31 PM**	Prep Date: **11/23/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2280	100	2000	296.9	99.0	90	110	0.161	20	
Fluoride	1970	40.0	2000	0	98.4	90	110	0.517	20	
Sulfate	3000	300	2000	1121	93.8	90	110	0.074	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2111158
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_211123A

Sample ID: **ICV-211123**	Batch ID: **R118166**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC2_211123A**	Analysis Date: **11/23/2021 3:01:17 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	26.1	1.00	25.00	0	104	90	110			
Fluoride	10.2	0.400	10.00	0	102	90	110			
Sulfate	76.3	3.00	75.00	0	102	90	110			

Sample ID: **CCV1-211123**	Batch ID: **R118166**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_211123A**	Analysis Date: **11/23/2021 9:58:31 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.3	1.00	10.00	0	103	90	110			
Fluoride	4.08	0.400	4.000	0	102	90	110			
Sulfate	30.3	3.00	30.00	0	101	90	110			

Sample ID: **CCV2-211123**	Batch ID: **R118166**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_211123A**	Analysis Date: **11/24/2021 1:56:31 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.2	1.00	10.00	0	102	90	110			
Fluoride	4.12	0.400	4.000	0	103	90	110			
Sulfate	30.2	3.00	30.00	0	101	90	110			

Sample ID: **CCV3-211123**	Batch ID: **R118166**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_211123A**	Analysis Date: **11/24/2021 5:54:31 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.2	1.00	10.00	0	102	90	110			
Fluoride	4.13	0.400	4.000	0	103	90	110			
Sulfate	30.2	3.00	30.00	0	101	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 2111158
Project: Sandow CCR

ANALYTICAL QC SUMMARY REPORT

RunID: WC_211122B

The QC data in batch 102939 applies to the following samples: 2111158-01B, 2111158-02B, 2111158-03B, 2111158-04B, 2111158-05B, 2111158-06B, 2111158-07B, 2111158-08B, 2111158-09B

Sample ID: **MB-102939**	Batch ID: **102939**	TestNo: **M2540C**	Units: **mg/L**
SampType: **MBLK**	Run ID: **WC_211122B**	Analysis Date: **11/22/2021 4:45:00 PM**	Prep Date: **11/22/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	<10.0	10.0								

Sample ID: **LCS-102939**	Batch ID: **102939**	TestNo: **M2540C**	Units: **mg/L**
SampType: **LCS**	Run ID: **WC_211122B**	Analysis Date: **11/22/2021 4:45:00 PM**	Prep Date: **11/22/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	756	10.0	745.6	0	101	90	113			

Sample ID: **2111158-01B-DUP**	Batch ID: **102939**	TestNo: **M2540C**	Units: **mg/L**
SampType: **DUP**	Run ID: **WC_211122B**	Analysis Date: **11/22/2021 4:45:00 PM**	Prep Date: **11/22/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	2110	50.0	0	2115				0.237	5	

Sample ID: **2111158-02B-DUP**	Batch ID: **102939**	TestNo: **M2540C**	Units: **mg/L**
SampType: **DUP**	Run ID: **WC_211122B**	Analysis Date: **11/22/2021 4:45:00 PM**	Prep Date: **11/22/2021**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	3060	50.0	0	3040				0.656	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *01-Dec-21*

CLIENT: Golder
Work Order: 2111158
Project: Sandow CCR

MQL SUMMARY REPORT

TestNo: E300	MDL	MQL
Analyte	**mg/L**	**mg/L**
Chloride	0.300	1.00
Fluoride	0.100	0.400
Sulfate	1.00	3.00

TestNo: SW6020B	MDL	MQL
Analyte	**mg/L**	**mg/L**
Boron	0.0100	0.0300
Calcium	0.100	0.300

TestNo: M2540C	MDL	MQL
Analyte	**mg/L**	**mg/L**
Total Dissolved Solids (Residue, Filt	10.0	10.0

Qualifiers: MQL -Method Quantitation Limit as defined by TRRP
MDL -Method Detection Limit as defined by TRRP

APPENDIX F – CLOSURE AND POST-CLOSURE CARE

Closure Plan
Closure Plan - Addendum No. 1
Post-Closure Plan

CCR CLOSURE PLAN
SANDOW 5 GENERATING PLANT
AX LANDFILL CELLS 1, 2 AND 2A
ROCKDALE, TEXAS

OCTOBER 2016

Prepared for:

LUMINANT GENERATION COMPANY, LLC
1601 Bryan Street (EP-27)
Dallas, Texas 75201

Prepared by:

PASTOR, BEHLING & WHEELER, LLC
2201 Double Creek Drive, Suite 4004
Round Rock, Texas 78664
Texas Engineering Firm No. 4760

PBW Project No. 5196D

PROFESSIONAL CERTIFICATION

This document and all attachments were prepared by Pastor, Behling & Wheeler, LLC under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I hereby certify that the conceptual closure plan was developed in accordance with the requirements of Section 257.102(b) of the CCR Rule.

10/05/16

Patrick J. Behling, P.E.
Principal Engineer
PASTOR, BEHLING & WHEELER, LLC

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1.0 INTRODUCTION

Luminant Generation Company, LLC (Luminant) operates the Sandow 5 Generating Plant located approximately 7 miles southwest of Rockdale in Milam County, Texas (Figure 1). Unit No. 5 is an approximately 581-megawatt, lignite-fired electric generation unit that was placed into service in 2009. Coal Combustion Residuals (CCR) including fly ash and bed ash are generated as part of Unit No. 5 operation. CCR is currently managed in the AX Landfill located approximately 7,500 feet south of Unit No. 5.

The CCR Rule (40 CFR 257 Subpart D - *Standards for the Receipt of Coal Combustion Residuals in Landfills and Surface Impoundments*) has been promulgated by EPA to regulate the management and disposal of CCRs as solid waste under Resource Conservation and Recovery Act (RCRA) Subtitle D. The final CCR Rule was published in the Federal Register on April 17, 2015. The effective date of the CCR Rule was October 19, 2015.

The CCR Rule establishes national operating criteria for existing CCR surface landfills and impoundments, including development of closure plans for all CCR landfills and impoundments. Pastor, Behling & Wheeler, LLC (PBW) was retained by Luminant to develop this closure plan for the AX Landfill.

1.1 CCR Landfill Closure Plan Requirements

Section 257.102(b) of the CCR Rule specifies that a written closure plan must be prepared for each existing CCR landfill that describes the steps necessary to close the landfill at any point during the active life of the unit consistent with recognized and generally accepted good engineering practices. The closure plan must include, at a minimum, the following information:

- A narrative description of how the CCR landfill will be closed in accordance with Section 257.102;
- If closure of the landfill will be accomplished by leaving CCR in place, the closure plan will provide a description of the final cover system designed in accordance with Section 257.102(d) of the CCR Rule, including details concerning the methods and procedures used to install the final cover. The closure plan must also discuss how the final cover system will achieve the following performance standards specified in Section 257.102(d):
    - Control, minimize or eliminate, to the maximum extent feasible, post-closure infiltration of liquids into the waste and releases of CCR, leachate, or contaminated run-off to the ground or surface waters or to the atmosphere;

- Preclude the probability of future impoundment of water, sediment, or slurry;
- Include measures that provide for major slope stability to prevent the sloughing or movement of the final cover system during the closure and post-closure care period;
- Minimize the need for further maintenance of the unit; and
- Be completed in the shortest amount of time consistent with recognized and generally accepted good engineering practices.

The final cover system must be designed and constructed to meet the following criteria:

- The permeability of the final cover system must be less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than 1 X 10^{-5} cm/sec, whichever is less.
- The infiltration of liquids through the closed CCR unit must be minimized by the use of an infiltration layer that contains a minimum of 18 inches of earthen material.
- The erosion of the final cover system must be minimized by the use of an erosion layer that contains a minimum of six inches of earthen material that is capable of sustaining native plant growth.
- The disruption of the integrity of the final cover system must be minimized through a design that accommodates settling and subsidence.

An alternative final cover system design may also be used, provided the alternative final cover system is designed and constructed to meet the following criteria:

- The alternative final cover system must include an infiltration layer that achieves an equivalent reduction in infiltration as the infiltration layer specified above.
- The alternative final cover system must include an erosion layer that provides equivalent protection from wind or water erosion as the erosion layer specified above
- The disruption of the integrity of the alternative final cover system must be minimized through a design that accommodates settling and subsidence.

- An estimate of the maximum inventory of CCR ever on-site over the active life of the landfill and an estimate of the largest area of the landfill ever requiring a final cover at any time during the active life of the unit.
- A schedule for completing all activities necessary to satisfy the closure criteria, including an estimate of the year in which all closure activities for the landfill will be completed. The schedule should provide sufficient information to describe the sequential steps that will be taken to close the unit, including identification of major milestones such as coordinating with and obtaining necessary approvals and permits from other agencies, the dewatering and stabilization phases of landfill closure, or installation of the final cover system, and the estimated timeframes to complete each step or phase of unit closure.
- In accordance with Section 257.102(e)(1) of the CCR Rule, closure of a landfill must be initiated no later than 30 days after the date on which the landfill either receives the known final receipt of

CCR or non-CCR waste or the known final volume of CCR is removed from the landfill for the purpose of beneficial use. Alternatively, under Section 257.102(e)(2), closure of the landfill must be initiated if the landfill has been idle and has not received CCR or non-CCR waste for two years. Additional two year extensions to initiate closure may be obtained with appropriate documentation.

- In accordance with Section 257.102(f) of the CCR Rule, closure of a landfill must be completed within six months of commencing closure activities. Additional extensions to complete closure may be obtained with appropriate documentation.

The landfill closure plan must be certified by a qualified professional engineer and must document how the closure plan has been designed and constructed to comply with the requirements of section 257.102(b)(4) of the CCR Rule.

In accordance with 257.102(b)(2) of the CCR Rule, the initial written closure plan for an existing CCR landfill must be completed and placed in the facility operating record no later than October 17, 2016.

1.2 Sandow 5 Units Subject to Closure Plan Requirements

The AX Landfill is the only waste management unit associated with Sandow 5 that meets the definition of a CCR Landfill. AX Landfill Cells 1, 2 and 2A are collectively considered an "existing landfill" under 40 CFR 257.53.

This closure plan was prepared for AX Landfill Cells 1, 2 and 2A. In accordance with 257.104 of the CCR Rule, the closure plan must be amended when future landfill cells are constructed at the AX Landfill.

1.3 Description of AX Landfill

The AX Landfill consists of Cells 1, 2 and 2A and covers an area of approximately 148.9 acres. The AX Landfill is located approximately 7,500 feet south of Sandow 5 on reclaimed mine land that is leased by Luminant from Alcoa (Figure 2). A site plan for the AX Landfill is shown on Figure 3. The AX Landfill was registered with the TCEQ as a Class 2 Non-hazardous Waste Landfill in 2008, and the registration was updated in 2015 (PBW, 2008; PBW 2015). The landfill is used to manage fly ash and bed ash generated from Unit No. 5. Fly ash and bed ash are transported to the landfill in trucks and placed in the landfill as dry material.

AX Landfill Cells 1, 2 and 2A are lined landfill cells. Construction of Cell 1 was completed in July 2013

and construction of Cells 2 and 2A was initiated in May 2015. Cell 2 was completed in October 2015 and Cell 2A was completed in July 2016. Placement of Unit No. 5 CCR began in Cell 1 in May 2015 and Cell 2 in September 2016. As of the completion date of this plan, CCR has not been placed in Cell 2A.

The AX Landfill is constructed partially above and partially below grade and are surrounded by engineered earthen dikes that extend approximately 10 to 15 feet above surrounding grade. Smaller interior earthen dikes separate Cells 1, 2 and 2A from each other. A geosynthetic liner system, consisting of a 30 mil thick Geomembrane Supported Geosynthetic Clay Liner (GSGCL) installed on top of 2 feet of soil exhibiting a minimum hydraulic conductivity of 5×10^{-5} cm/sec, has been installed in the landfill cells. The liner system is installed across the bottom of each cell, extends across the interior dikes, and extends up the inside sides of the perimeter dikes. The liner system is covered with an approximately 18-inch thick layer of protective soil to prevent damage to the liner during landfill operations. The base of each landfill cell is sloped toward a collection area for runoff from active landfill areas at the downgradient edge of the cell.

CCR will be placed within the engineered earthen dikes that surround Cells 1, 2 and 2A. CCR levels at the embankment start approximately 2 feet below the top of the embankment and the material is sloped upward at approximately 4 (Horizontal) to 1 (Vertical) to an approximate height of 40 feet above the top of the embankment. The material then slopes upward from the top of the 4:1 sloped tier at 3 to 5 percent and reaches a peak elevation of approximately El. 586 near the center of the landfill.

2.0 CLOSURE PLAN FOR AX LANDFILL

Although the closure plan presented herein for the AX Landfill was developed in accordance with the requirements of Section 257.102 of the CCR Rule, this plan should be considered conceptual in nature given the fundamental assumptions used as the basis of the closure plan. As part of the initiation of final CCR unit closure activities, the conceptual closure plan should be reviewed and revised to ensure appropriate modifications are incorporated into the final design plans and specifications prior to release for bidding and construction.

2.1 Description of AX Landfill Closure

As described in Section 1, Luminant plans to close the AX Landfill in accordance with Section 257.102(d) of the CCR Rule by leaving CCR in-place and constructing a final cover system over the CCR located within the landfill. As described in Section 2.2, the final cover system will be designed to achieve the performance standards previously stated in Section 1.1.

2.2 Final Cover System

A final cover system will be constructed over the CCR placed in the AX Landfill. The cover will be installed on the exterior lower tier sloped face (4H:1V) of the CCR placement area and on the flat top areas (3 to 5 percent slope) of the landfill. The final cover system will consist of a linear low density polyethylene cap. A final cover system consisting of compacted clay was not identified as an option for the AX Landfill due to the absence of suitable clay in the vicinity.

In accordance with Section 257.102(d) of the CCR Rule, the permeability of the final cover system will be less than or equal to the permeability of the existing bottom liner in the AX Landfill (i.e. a 30 mil thick GSGCL installed on top of 2 feet of soil exhibiting a permeability of $<5 \times 10^{-5}$ cm/sec). The proposed final grading plan for the final cover system is illustrated in Figure 4. Typical details for the final cover system are shown on Figure 6. Example technical specifications for the components of the final cover system are shown in Appendix A.

The materials and construction procedures for the proposed final cover system have been selected to minimize potential for differential settlement and subsidence. Post-closure monitoring activities will be performed to ensure the cover system complies with the requirements of the CCR Rule. Furthermore, an evaluation of infiltration through the proposed cover system was developed using the U.S. Army Corps of

Engineers – Hydrologic Evaluation of Landfill Performance (HELP) model (Appendix B). As demonstrated by the HELP model results, the permeability of the linear low density polyethylene cap will achieve an improved reduction in infiltration compared to the clay cap (infiltration layer) cover described in Section 257.102(d) of the CCR Rule. The final cover system will also be designed to minimize impounding of water on the cap and associated long-term care activities.

In the future, Luminant may expand the AX Landfill to the south of Cells 1, 2 and 2A. If this occurs, the future landfill cells will be considered "Lateral Expansions to Existing CCR Landfills" under the CCR Rule. Luminant may design the future AX Landfill cells to overlap portions of existing Cells 2 and 2A to utilize the combined airspace between the existing cells and the future cells. As a result, the current plan will be to cover the southern part of Cells 2 and 2A with a temporary soil cover (1 foot of vegetated soil) in anticipation of future construction of the liner system for future AX Landfill cells south of Cells 1, 2 and 2A (see Figure 4).

2.2.1 Linear Low Density Polyethylene Cap

Select fill and/or CCR deemed suitable for beneficial use will be placed within the proposed limits of the landfill cover system to the lines and grades specified for the cap subgrade (Figure 4). Upon placement of select fill or CCR to within approximately two feet of proposed finished grade, 6 inches of approved select fill material (i.e. embankment spoil material or contactor-supplied select fill) will be placed in accordance with the specifications for cap subgrade. A 40-mil linear low density polyethylene (LLDPE) liner will be installed over the cap subgrade. LLDPE liner deployment, field seaming, and field quality assurance testing will conform to Section 2420 of the Technical Specifications. A geonet drainage layer will be installed above the LLDPE liner to provide lateral drainage relief of infiltration from the overlying vegetative soil layer. A 12-inch minimum thickness fill soil layer and a 6-inch minimum thickness vegetative soil layer will be placed over the prepared clay cap and permanent vegetative cover will be established in accordance with Sections 02340 and 02350 of the Technical Specifications.

2.3 Final Cover System Slope Stability

Selection of suitable construction materials, proper material placement, and quality assurance testing of both the subgrade preparation and cover system installation in accordance with the Technical Specifications (Appendix A) will ensure stability of the final cover system. The SLIDE 7.0 equilibrium slope stability model was used to demonstrate that the proposed cover system is stable at the slopes specified in the conceptual closure plan (see Appendix C).

2.4 Stormwater Run-off Control

Surface drainage of the cap covering CCR will generally consist of sheet flow or shallow concentrated flow along stormwater diversion berms that will convey run-off to reinforced stormwater let-down structures. The cover system will allow for lateral drainage of infiltration off the capped area to prevent saturation of the vegetative layer and/or ponding on the cover system.

The slope of the exterior face of the existing perimeter earthen embankment is approximately 3H:1V and the slope of the exterior lower tier sloped face of the cap is approximately 4H:1V. Stormwater let-down structures will be constructed at intervals on these steeply sloped faces to convey run-off from the limits of the capped area away from the landfill. Slope stabilization material (Geocells, fabric-formed channel armor or approved equivalent) will be placed across the cross-section of the stormwater let-down structures to control erosion in these areas.

A surface water control plan for the AX Landfill is shown on Figure 5. A conceptual run-off control plan that includes estimated peak discharges based on the 25-year/24-hour storm event (8.16 inches) for the capped area is presented in Appendix D. Typical construction details for the stormwater let-down structures and related appurtenances are provided on Figures 6 and 7. Technical Specifications for the stormwater let-down structures and related appurtenances are included in Appendix A.

2.5 CCR Inventory and Area to Be Capped

The estimated CCR capacity for AX Landfill Cells 1, 2 and 2A (modelled using Civil 3D) is approximately 15,290,000 CY. Outputs from the Civil 3D model used to calculate the capacity are reproduced in Appendix E. The capped surface area of AX Landfill Cells 1, 2 and 2A is approximately 148 acres (See Appendix E).

2.6 Closure Schedule

The final closure of the landfill will be completed within six months of start of closure; however, Sections 257.102(f)(2) and 257.103 of the CCR Rule allow for extension of the closure schedule or demonstration that alternative closure requirements should apply to the CCR units. A Gantt chart illustrating the sequential steps of the CCR closure process, including pre-construction activities (i.e. necessary notifications and permitting) as well as closure milestones, is included as Appendix F.

3.0 REFERENCES

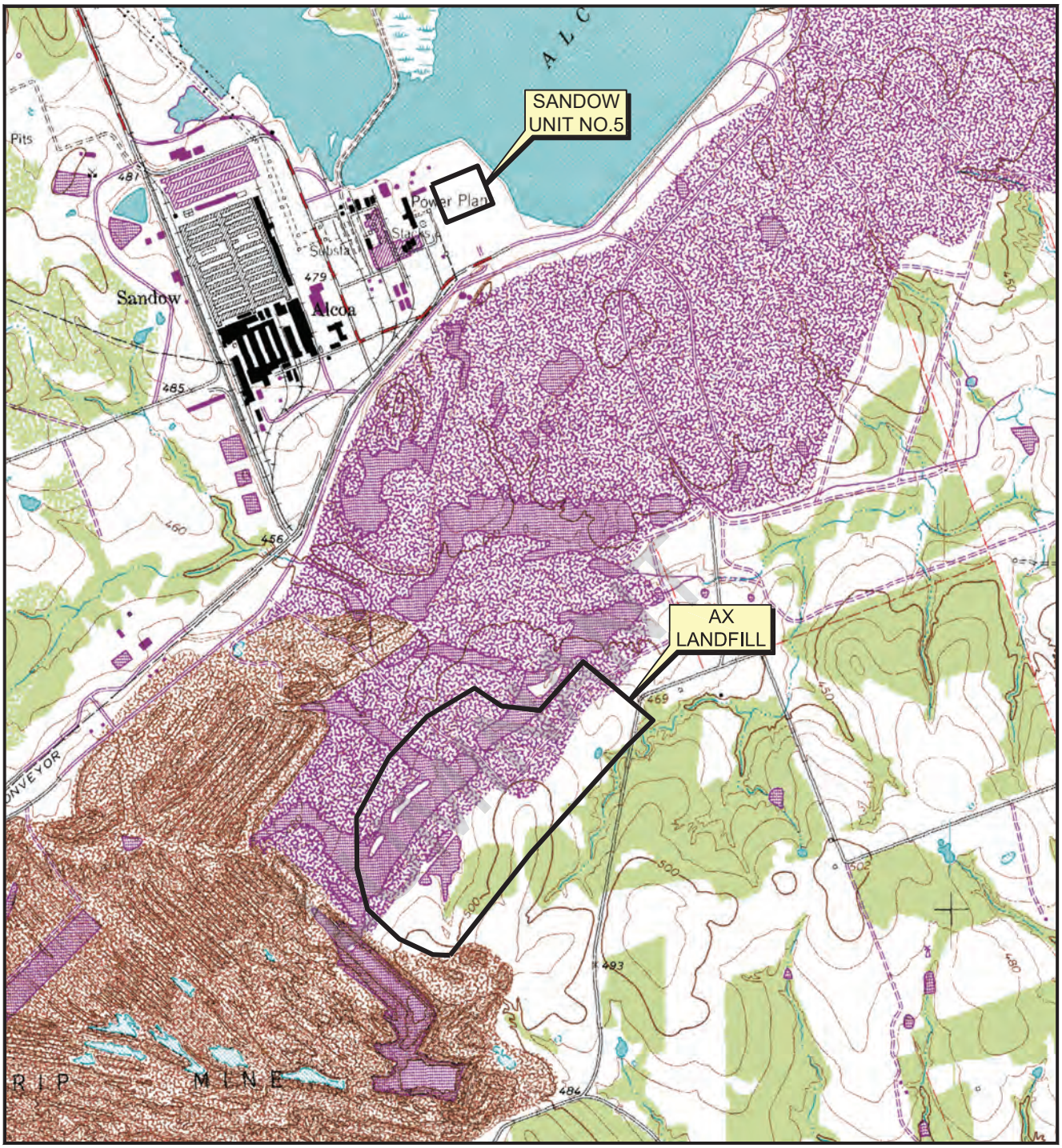
Pastor, Behling & Wheeler, LLC (PBW), 2008. *TCEQ Registration Package – AX Area Landfill, Rockdale, Texas*, June 4.

PBW, 2015. Update to TCEQ Notification – AX Area Landfill, Sandow Steam Electric Station Unit 5, February 3.

Schroeder, P.R., Dozier, T.S., Zappi, P.A., McEnroe, B.M., Sjostrom, J.W. and Peton, R.L., 1994. *The Hydrologic Evaluation of Landfill Performance (HELP) Model*: *Engineering Documentation for Version 3*, EPA/600/R-94/168b, US. Environmental Protection Agency, Risk Reduction Engineering Laboratory, Cincinnati, OH.

United States Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS), 1986. *Urban Hydrology for Small Watersheds - TR-55*, June.

FIGURES



QUADRANGLE LOCATION

N

Scale in Feet

0 1000 2000

SOURCE:
Base map from www.tnris.gov, Alcoa Lake, TX 7.5 min. USGS quadrangle dated 1963, revised 1988.

LUMINANT GENERATION COMPANY, LLC

SANDOW UNIT NO.5

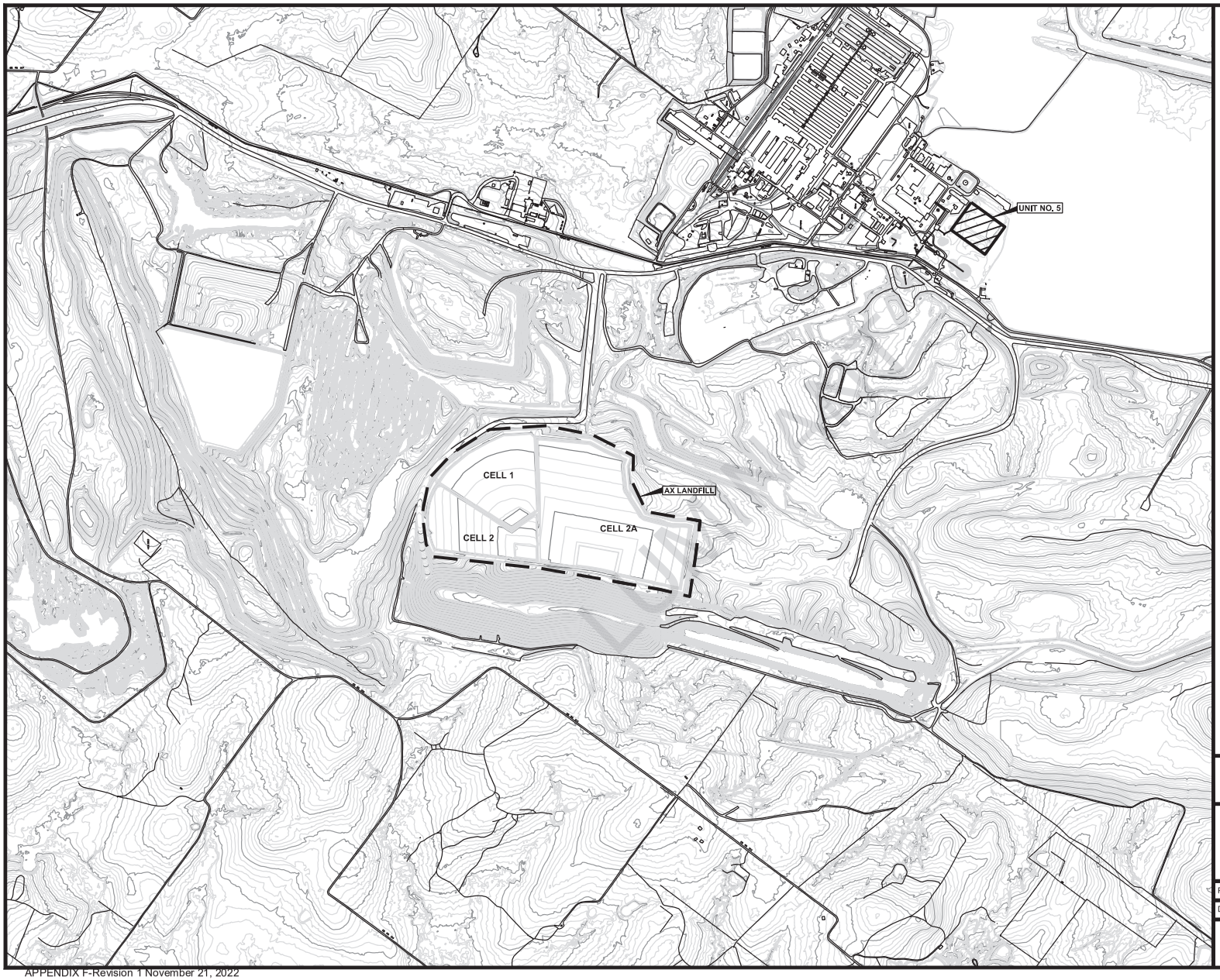
Figure 1

AX LANDFILL LOCATION MAP

PROJECT: 5196D	BY: ADJ	REVISIONS
DATE: SEP., 2016	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC

CONSULTING ENGINEERS AND SCIENTISTS



NOTE:
EXISTING GRADE CONTOURS OUTSIDE OF CELLS 1, 2 AND 2A ARE CIRCA 2006 AND ARE SHOWN FOR REFERENCE ONLY. CONTOURS DO NOT NECESSARILY REFLECT EXISTING CONDITIONS.

Scale in Feet

0 750 1500

LUMINANT GENERATION COMPANY, LLC

SANDOW UNIT NO.5

Figure 2

AX LANDFILL
SITE VICINITY MAP

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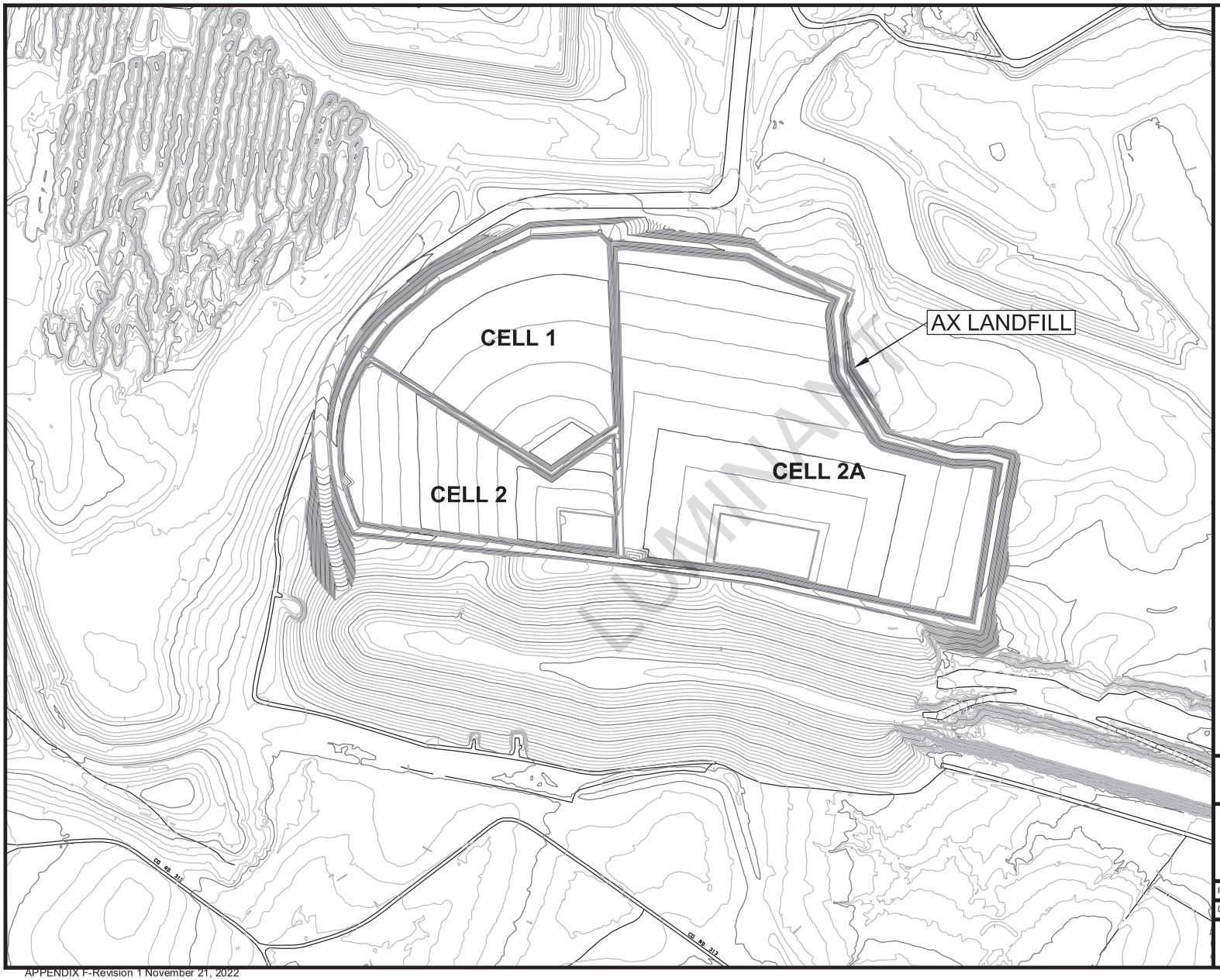

NOTE:
EXISTING GRADE CONTOURS OUTSIDE OF CELLS 1, 2 AND 2A ARE CIRCA 2006 AND ARE SHOWN FOR REFERENCE ONLY. CONTOURS DO NOT NECESSARILY REFLECT EXISTING CONDITIONS.

Scale in Feet

0 750 1500

LUMINANT GENERATION COMPANY, LLC
SANDOW UNIT NO.5

Figure 3

AX LANDFILL
EXISTING SITE PLAN

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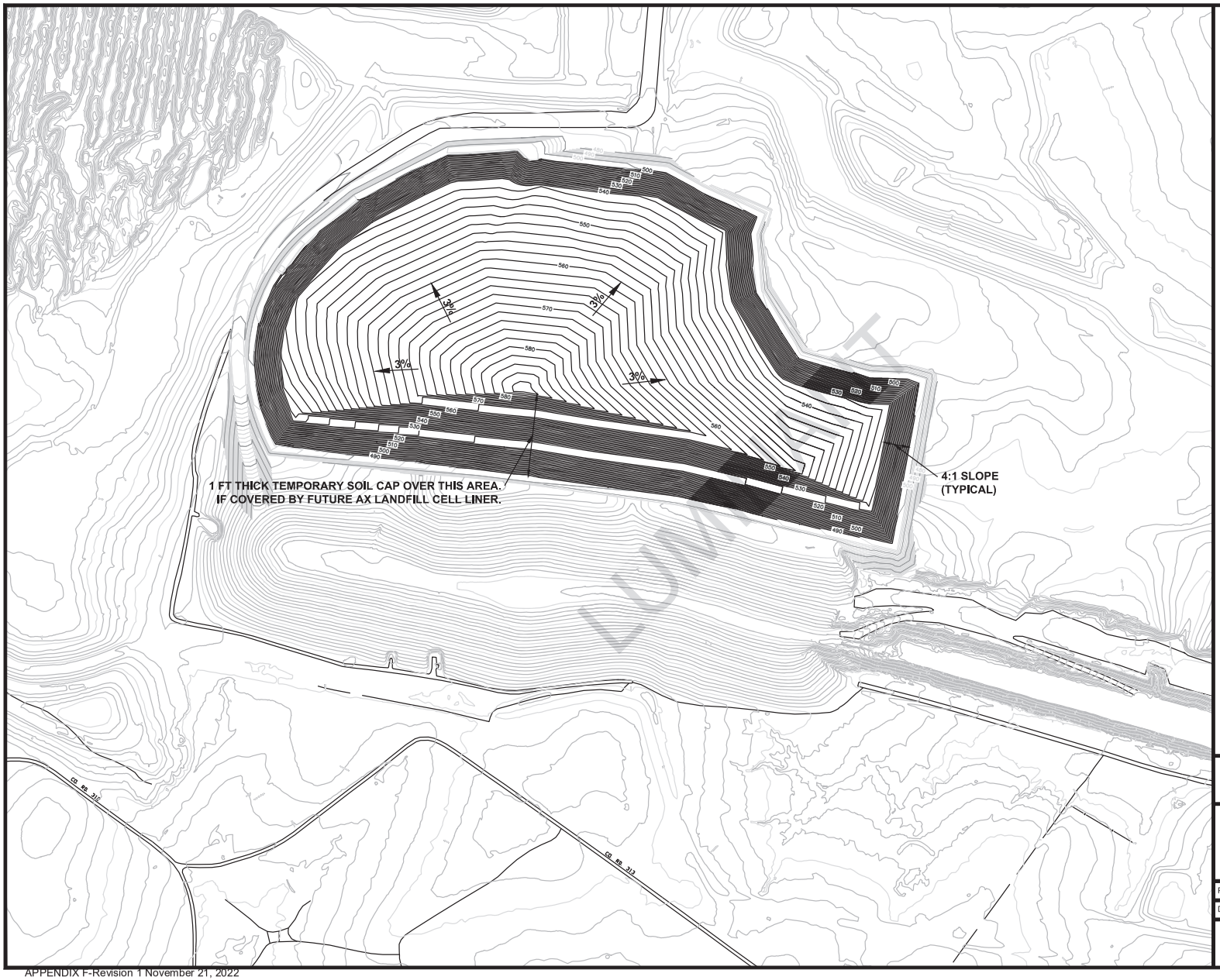

NOTES:

1) EXISTING GRADE CONTOURS OUTSIDE OF CELLS 1, 2 AND 2A ARE CIRCA 2006 AND ARE SHOWN FOR REFERENCE ONLY. CONTOURS DO NOT NECESSARILY REFLECT EXISTING CONDITIONS.
2) STORM WATER LET-DOWN STRUCTURE AND DIVERSION BERM LOCATIONS NOT SHOWN.

Scale in Feet

0 300 600

LUMINANT GENERATION COMPANY, LLC

SANDOW UNIT NO.5

Figure 4

AX LANDILL
PROPOSED CAP GRADING PLAN

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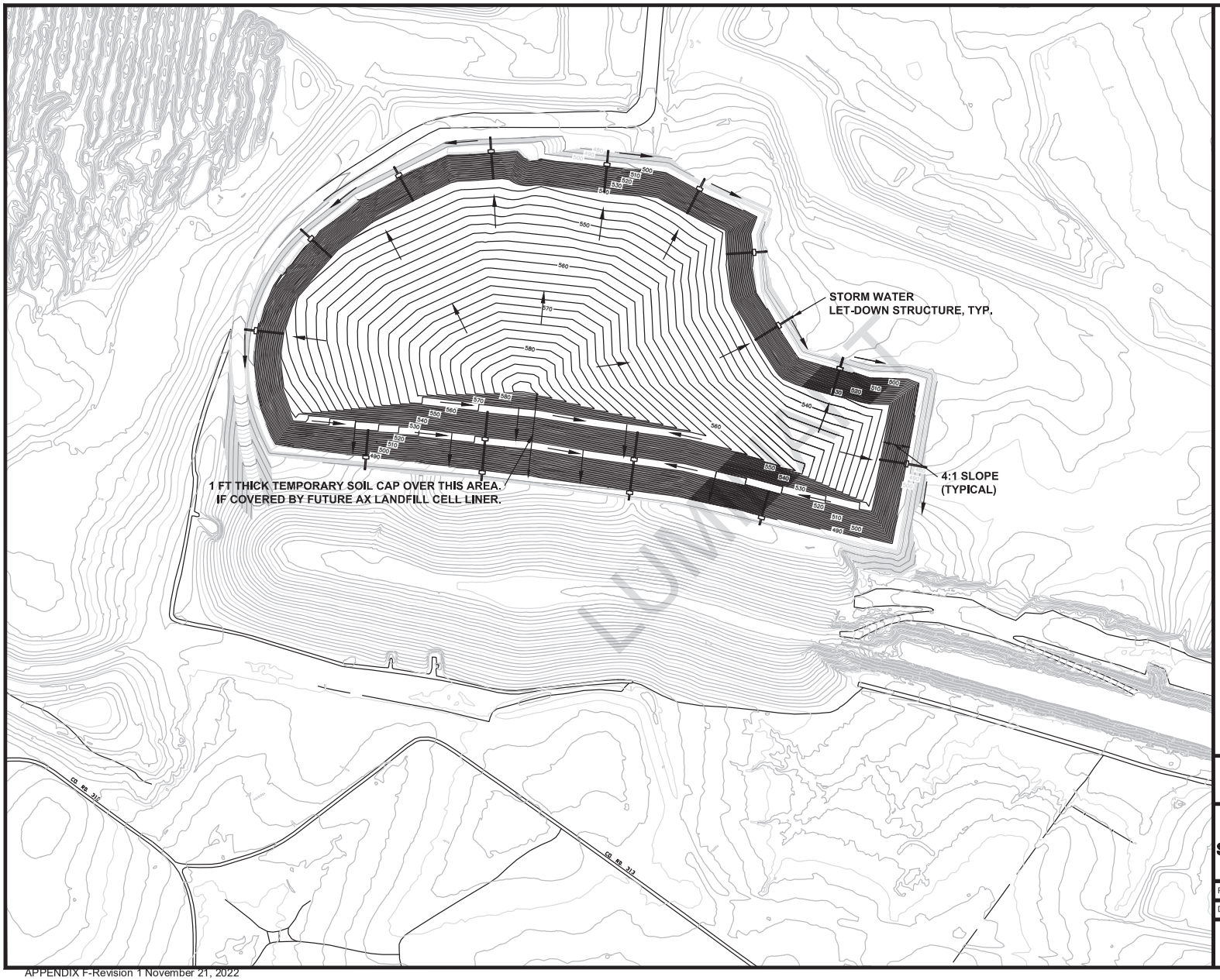

EXPLANATION

Flow Path

NOTES:

1) EXISTING GRADE CONTOURS OUTSIDE OF CELLS 1, 2 AND 2A ARE CIRCA 2006 AND ARE SHOWN FOR REFERENCE ONLY. CONTOURS DO NOT NECESSARILY REFLECT EXISTING CONDITIONS.

Scale in Feet

0 300 600

LUMINANT GENERATION COMPANY, LLC

SANDOW UNIT NO.5

Figure 5

AX LANDFILL
SURFACE WATER CONTROL PLAN

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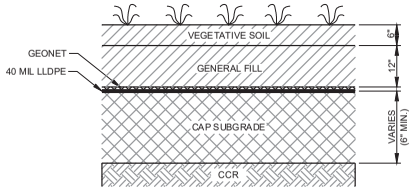
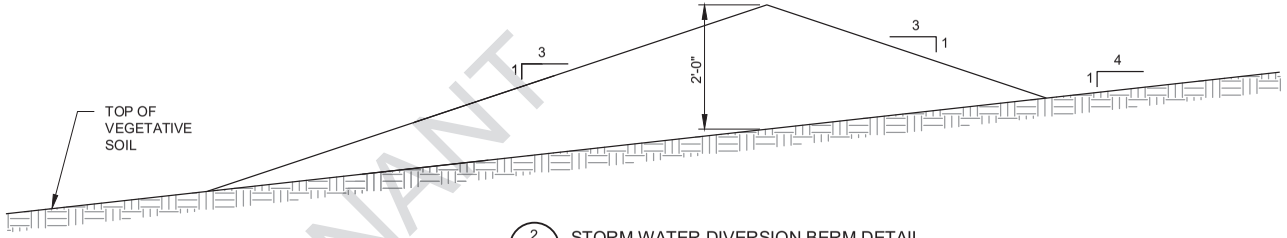
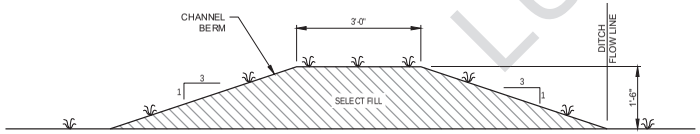


1/6 LLDPE CAP DETAIL
NOT TO SCALE



2/6 STORM WATER DIVERSION BERM DETAIL
SCALE: 1"= 2'



3/6 CHANNEL BERM
NOT TO SCALE

LUMINANT GENERATION COMPANY, LLC
SANDOW UNIT NO.5

Figure 6

AX LANDFILL
TYPICAL CONSTRUCTION
DETAILS - CCR COVER SYSTEM

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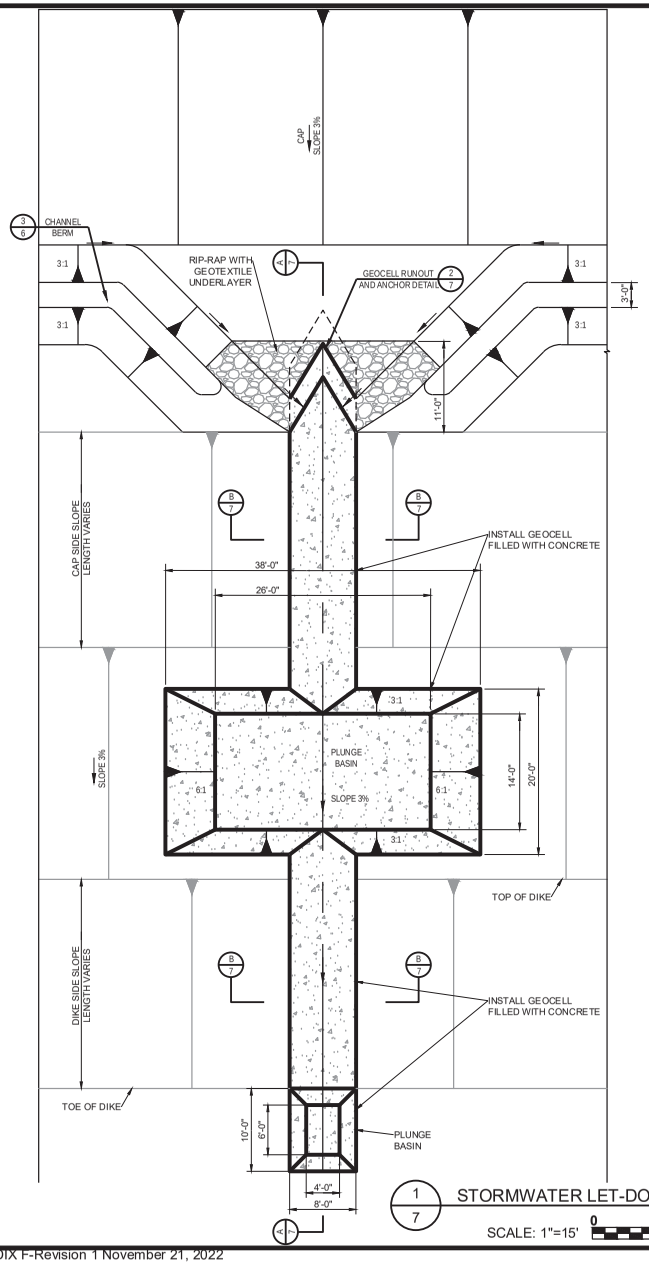
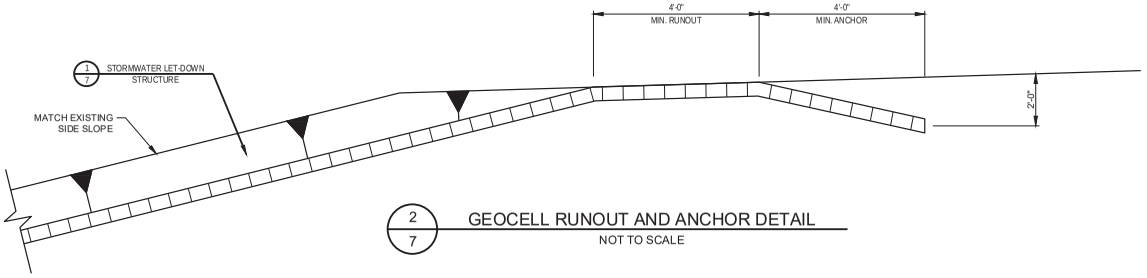


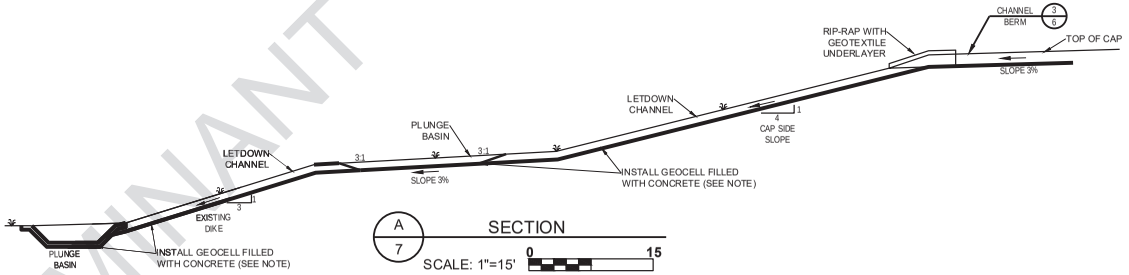
1 7 STORMWATER LET-DOWN STRUCTURE

SCALE: 1"=15' 0 15



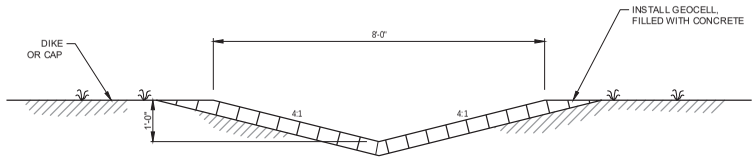
2 7 GEOCELL RUNOUT AND ANCHOR DETAIL

NOT TO SCALE



A 7 SECTION

SCALE: 1"=15' 0 15



B 7 SECTION

NOT TO SCALE

LUMINANT GENERATION COMPANY, LLC
SANDOW UNIT NO.5

Figure 7

AX LANDFILL TYPICAL CONSTRUCTION DETAILS - CCR COVER SYSTEM

PROJECT: 5196D	BY: ADJ	REVISIONS
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PASTOR, BEHLING & WHEELER, LLC
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APPENDIX A

TECHNICAL SPECIFICATIONS

SANDOW UNIT 5
AX LANDFILL CLOSURE
TECHNICAL SPECIFICATIONS

SANDOW UNIT 5 AX LANDFILL CLOSURE
TECHNICAL SPECIFICATIONS
TABLE OF CONTENTS

SECTION 01100

EROSION AND SEDIMENTATION CONTROL

PART 1 - GENERAL

1.1 DESCRIPTION

A. This Section consists of furnishing, placing, and maintaining erosion and sedimentation control measures as shown on the Drawings, as directed by the COMPANY, and where necessary to reduce sediment content of runoff prior to establishment of permanent vegetation.

1.2 PERFORMANCE REQUIREMENTS

A. CONTRACTOR shall provide erosion and sedimentation control measures to control erosion and sediment runoff in any location where erosion and sediment runoff is likely to occur and as required by the COMPANY. Erosion and sedimentation control measures shall remain in place until removal is approved by the COMPANY.

B. Clearing and stripping of vegetation, regrading and other construction activities shall be conducted in a manner to minimize erosion. Existing drainage patterns and vegetation shall be protected and retained to the greatest extent practicable.

C. The size and duration of exposure of disturbed areas shall be kept to a minimum and all disturbed soil shall be stabilized as quickly as practicable. Diversion channels/berms shall be located upstream from disturbed areas to minimize the amount of run-on to the disturbed areas.

D. In the event that erosion and sedimentation control measures used by CONTRACTOR prove to be inadequate as determined by COMPANY, CONTRACTOR shall be required to adjust his operations to the extent necessary to control sedimentation and shall repair areas impacted by sedimentation as directed by COMPANY at no additional cost to COMPANY.

1.3 SUBMITTALS

A. CONTRACTOR shall submit the following to COMPANY a minimum of 14 days prior to initiating field activities:

1. A copy of the construction Storm Water Pollution Prevention Plan (SWPPP) developed for the Work.

2. An installation schedule for erosion and sedimentation control measures. This schedule shall cover all ground disturbance activities including material staging areas and planned excavation and grading areas.

3. Certification that all proposed erosion and sedimentation control products comply with the requirements of these specifications.

PART 2 - PRODUCTS

2.1 SILT FENCE

A. Silt fence fabric material shall be a woven geotextile conforming to the following requirements:

Physical Property	Test Method	Requirement
Tensile Strength, lb.	ASTM D4632	100 Minimum
Elongation @ Yield, %	ASTM D4632	10-40
Trapezoidal Tear, N (lb.)	ASTM D4533	50 Minimum
Apparent Opening Size	ASTM D4751	20-50
Permittivity, 1/sec	ASTM D4491	0.1 Minimum
UV Stability, 500 hr.	ASTM D4355	80 Minimum

B. Posts shall be essentially straight wood or steel posts with a minimum length of 48 inches. Soft wood posts must be at least 3 in. in diameter or nominal 2 x 4 in. Hardwood posts must have a minimum cross-section of 1-1/2 x 1-1/2 inches. T- or L-shaped steel posts must have a minimum weight of 1.3 pounds per foot.

2.2 EROSION CONTROL FABRIC

A. Erosion Control Fabric shall be North American Green S150 or COMPANY-approved equal.

B. Erosion control fabric blanket shall have a minimum width of 6 feet. The fabric mat shall be machine-produced of 100 percent coconut fiber with colored line or thread along outer edges to indicate material overlap limits and shall have a minimum weight of 0.50lb./sq.yd.

C. The top and bottom cover of the fabric shall be heavy-weight polypropylene netting with ultraviolet additives to delay breakdown. The mesh size shall be a minimum of 0.5 inch by 0.5 inch.

D. The blanket and top/bottom covers shall be sown together on 1.5 inch center at 50 stitches per roll width with UV stable polypropylene thread.

E. Erosion Control Fabric shall be installed using 6-in. wooden stakes or metal staples of sufficient material quality, cross-section, and strength to anchor the erosion control blanket against loads imposed by surface runoff and sediment.

2.3 HAY BALES

A. Hay bales may be obtained from local sources and shall weigh 40 to 120 pounds per bale. Only grain hay bales, free of noxious weeds, shall be used. Bales shall be tightly and securely bound with wire to provide a stable bale and to extend the functional life of the bale to the extent practicable. Bales shall be free from rot and mold.

B. Stakes for hay bales shall be wooden stakes or metal rebar of sufficient material quality, cross-section, and strength to secure the hay bales.

2.4 TEMPORARY VEGETATION

A. Temporary Vegetation shall be applied on areas left exposed for greater than 30 days. CONTRACTOR shall use temporary vegetation seed mixture and application rate as specified in Section 02350, "Vegetation," or CONTRACTOR may alternatively submit proposed temporary vegetation seed mix and application rate to COMPANY for approval no later than 7 days prior to use.

B. Mulch shall be applied after temporary vegetation seeding at a rate of 1.5 tons/acre for straw mulch, or at the rate recommended by the manufacturer if wood fiber mulch is used.

CONTRACTOR shall ensure that mulch does not redistribute after application. CONTRACTOR shall reapply mulch as necessary to maintain uniform coverage. Straw mulch shall include dry oat or wheat straw, native hay, or chopped corn stalks. The mulch shall be free from weeds and foreign matter detrimental to plant life. Wood fiber mulch shall include approved wood cellulose fiber in chip form and be free of ingredients that could inhibit germination and growth.

PART 3 - EXECUTION

3.1 GENERAL

A. Delivery, Storage, and Handling. Product delivery, storage and handling shall comply with manufacturer's recommendations. All erosion and sedimentation control products shall be delivered in manufacturer's wrapping and shall be stored in a manner to prevent damage. Damaged or unsuitable products shall be promptly removed from the job site and replaced with products meeting these specifications.

B. All erosion and sedimentation control measures shall be installed in accordance with manufacturer's recommendations and approved by the COMPANY prior to initiating any clearing, demolition or construction activities.

C. Cut Areas. Establish an erosion control line (hay bales or filter fabric) at toe of slope in all cut areas prior to beginning cut operations.

D. Fill Areas. Establish an erosion control line (hay bales or filter fabric) approximately 10 feet from toe of slope of proposed fill areas prior to beginning fill operations.

E. Stockpiles. Sides of soil stockpiles shall have a maximum slope of 2:1. All stockpiles shall be surrounded by a sediment barrier (hay bales or filter fabric) unless otherwise approved by the COMPANY. All stockpiles left bare for more than 30 days shall be stabilized with temporary vegetation and/or mulch.

3.2 SILT FENCE

A. Silt fence shall be installed along the downstream perimeter of all disturbed areas to intercept sediment from sheet flow.

B. Posts shall be embedded into the ground at least 18 inches deep and shall be spaced a maximum of 8 feet apart.

C. Filter fabric shall be installed by digging a 6 inch wide by 6 inch deep trench along the upstream side of the fence. Place approximately 6 to 8 inches of the fabric in the trench and backfill the trench.

D. Unless otherwise shown on the Drawings, attach the wire mesh to wooden posts with staples, or to steel posts with T-clips, in at least 4 places equally spaced. Sewn vertical pockets may be used to attach wire mesh or fabric to end posts.

E. Fasten the fabric to the top strand of the reinforcement by rings or cord every 15 inches or less. Locate fabric splices at a fence post with a minimum overlap of 6 inches attached in at least 4 places equally spaced. Do not locate fabric splices in concentrated flow areas.

3.3 EROSION CONTROL FABRIC

A. Erosion control fabric shall be installed following completion of final grading activities in the following disturbed earth areas unless otherwise approved by the COMPANY:

1. All exterior slopes 4(H) to I(V) and steeper; and
2. All drainage ditches, channels and swales.

B. Erosion control fabric shall be anchored at the top of the slope using an anchor trench and shall be rolled down the slope so as to maintain tension to preclude folds and wrinkles. Any folds or wrinkles shall be removed by hand.

C. The erosion control fabric anchor trench shall be 6 inches wide by 6 inches deep. The trench fabric shall be connected to the vertical face of the trench using stakes or staples spaced at 12 inches on center. The trench shall be backfilled and compacted upon completion of stapling.

D. Successive erosion control fabric panels shall be overlapped in such a manner that the upstream and upslope panel is placed over the downstream and downslope panel. Panels shall overlap a minimum of 6 inches at end joints and on sideslopes.

E. Stake or staple through both panels with stakes/staples driven flush with the soil surface. Stake/staple spacing shall be in accordance with manufacturer's recommendations.

3.4 HAY BALES

A. Hay bales shall be installed to form water stops, filtration dams, diversions, etc. as required for erosion and sedimentation control. On sloping terrain, hay bales may be used to trap sediment until vegetation has become established.

B. Place bales lengthwise with ends tight, abutting one another. Install bales with bindings located on the sides.

C. Entrench hay bales a minimum of 4 inches and backfill. Place backfill on the upstream side of the bales.

D. Secure the bale in place with two stakes per bale and insert straw in voids between bales.

3.5 MAINTENANCE

A. All erosion and sedimentation controls shall be maintained in a structurally sound and functional manner. All erosion and sedimentation controls shall be inspected at least on a weekly basis, immediately after each rainfall and daily during prolonged rainfall.

B. Any damaged or deteriorating systems shall be replaced immediately upon discovery or as directed by COMPANY.

C. Sediment deposits shall be removed when the deposit reaches 1/3 the height of the fence or sooner to provide a functional and stable system. Sediment retained by sedimentation and erosion control systems shall be removed by CONTRACTOR and may be used on the project as fill as approved by COMPANY.

D. Areas where temporary vegetation or mulch has been applied shall be inspected to ensure proper growth and coverage. Temporary vegetation or mulch shall be reapplied as necessary to minimize erosion.

3.6 REMOVAL

A. Erosion and sedimentation controls shall remain in-place until the COMPANY directs their removal. Upon removal CONTRACTOR shall dispose of any sediment accumulations, dress the area to the satisfaction of COMPANY, and shall vegetate all bare areas in accordance with the Contract Documents. Temporary erosion control blanket materials specified are biodegradable and will remain in place after establishment of permanent vegetation.

++END OF SECTION++

SECTION 01200

DUST CONTROL

PART 1 - GENERAL

1.1 DESCRIPTION

A. This Section consists of performance of dust control measures as necessary to prevent fugitive dust during construction activities or as directed by the ENGINEER.

1.2 PERFORMANCE REQUIREMENTS

A. CONTRACTOR shall implement all necessary dust control measures to prevent fugitive dust during all construction activities.

B. The need for dust control measures will be based on visual observation of airborne dust. CONTRACTOR shall implement dust control measures on a regular basis throughout the duration of the work unless otherwise authorized by the ENGINEER. CONTRACTOR shall adjust operations and/or dust controls as necessary, at no additional cost to COMPANY, if directed by ENGINEER to mitigate dust.

1.3 SUBMITTALS

A. CONTRACTOR shall submit the following to ENGINEER a minimum of 5 days prior to initiating dust control measures:

1. Source of dust control water;
2. List of dust control equipment; and
3. Manufacturer specification sheets and material safety data sheets (MSDS) for chemical additives used for dust control.

PART 2 - PRODUCTS

2.1 WATER

A. Water used for dust control need not be potable, but must not be contaminated. Proposed source of dust control water must be approved by ENGINEER prior to initiating dust control measures.

2.2 CHEMICAL ADDITIVES

A. Chemical additives shall be incorporated into dust control measures only if approved by the ENGINEER.

B. Calcium Chloride for dust control shall conform to the requirements of ASTM D98, Type 1 or Type 2.

C. Alternative chemical additives for dust control may be used if approved by the ENGINEER.

2.3 EQUIPMENT

A. Dust control water shall be applied using tank trucks equipped with water cannon capable of delivering water through either front- or rear-mounted nozzles. Tank trucks shall be of sufficient size and mobility and carry a sufficient quantity of water to control dust generated by CONTRACTOR's activities.

B. More than one water tank truck may be required during construction activities to sufficiently suppress dust.

PART 3 - EXECUTION

3.1 IMPLEMENTATION OF DUST CONTROL MEASURES

A. Vehicular traffic in disturbed areas shall be limited to the extent practicable. Construction vehicles shall maintain low speeds to minimize the amount of dust created. Adequate freeboard in loaded trucks shall be maintained to prevent spillage during operations. Roadway surfaces shall be kept free of spilled/tracked soil.

B. Soil stockpiles shall be graded and shaped to minimize surface area. Water or covers shall be applied to stockpiles as needed to control dust.

C. Apply dust control water uniformly over roads and disturbed areas from trucks capable of uniform distribution. Provide suitable devices for positive shut-off and for regulating flow of water.

D. Apply calcium chloride or other chemical additives at locations only when directed by ENGINEER. Spread calcium chloride or other chemical additives by approved devices and methods for uniform distribution.

E. Dust control water and/or chemical additives shall be applied so as to limit and/or prevent formation of standing water and mud; over spray of chemical dust suppressants in areas adjacent to surface water bodies or sensitive habitats; and/or flushing of materials off of the work area.

++END OF SECTION++

SECTION 02200

SITE PREPARATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. This Section consists of all work associated with clearing and preparing the work area, borrow areas, and other work areas for earthwork and other construction activities, including removal of existing vegetation and verification of existing site conditions.

1.2 EXISTING SITE CONDITIONS

A. CONTRACTOR shall verify that existing topographic conditions in the Work Area as shown on the Drawings are an accurate representation of existing site conditions prior to initiating construction activities.

B. If CONTRACTOR contends that existing topographic conditions are different from that shown on the Drawings, Contractor shall submit survey data from a Texas-registered land surveyor to document actual topographic conditions, and shall identify with such submission additional work required which was not accounted for in CONTRACTOR's bid. There shall be no opportunity for a Claim for extra work due to differing topographic conditions once stripping or excavation work has started.

C. Existing site improvements (utilities, monitoring wells, and similar items) shall be located and protected by CONTRACTOR before CONTRACTOR begins clearing operations.

1.3 SUBMITTALS

A. Clearing and grubbing and solid waste generated during cap subgrade preparation shall be placed within the active portion of the landfill unless otherwise approved by the ENGINEER. CONTRACTOR shall submit name and address of the alternate disposal facility proposed for management of trash and rubbish generated in connection with site preparation at least 5 days prior to beginning clearing operations.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 CLEARING

A. Clearing shall consist of the cutting, shredding, and stockpiling of all trees and shrubs and the stripping of all grass and similar surface vegetation within the limits of the landfill and borrow areas. Clearing shall be limited to the areas required to perform the work.

B. CONTRACTOR shall segregate material removed as part of clearing from soils to be incorporated into subsequent earthwork activities.

3.2 VEGETATIVE SOIL STRIPPING AND STOCKPILING

A. After completion of clearing activities, CONTRACTOR shall strip the uppermost approximately 12 inches of existing vegetative soil from the cleared areas. Material identified as vegetative soil shall be subject to ENGINEER’s approval.

B. CONTRACTOR shall stockpile stripped vegetative soil in the work area in a location acceptable to the ENGINEER.

3.3 DISPOSAL OF BRUSH AND OTHER VEGETATIVE MATERIAL

A. CONTRACTOR shall dispose of all brush and other vegetative materials generated during site clearing in accordance with all applicable regulations and as approved by the ENGINEER.

B. If approved by the ENGINEER, CONTRACTOR may burn brush and other vegetative material in accordance with the requirements of TCEQ Publication RG-049 “Outdoor Burning in Texas”, as modified to comply with COMPANY requirements. Specific requirements for burning of brush and other vegetative material include, but are not limited to, the following:

1. Commence or continue burning only when the wind direction and other weather conditions are such that the smoke and other pollutants will not present a hazard to any public road, landing strip, or water body or have an adverse effect on any off-site structure.

2. Don’t start burning unless weather conditions are such that the smoke will dissipate (winds of at least 6 miles per hour; no temperature inversions) while still allowing the fire to be contained and controlled (winds no faster than 23 miles per hour).

3. Post someone to flag traffic if at any time the burning causes or may tend to cause smoke to blow onto or across a road or highway.

4. Begin burning no earlier than one hour after sunrise, end it the same day and no later than one hour before sunset, and make sure that a responsible party is present while the burn is active and the fire is progressing.

5. At the end of the burn, extinguish isolated residual fires or smoldering objects if the smoke they produce can be a nuisance or a traffic hazard.

C. CONTRACTOR will be responsible for controlling fires in compliance with all Federal, State, and Local laws and regulations. The securing of necessary burning permits shall be the responsibility of the CONTRACTOR. All burning shall be under the constant care of competent watchmen. All materials resulting from clearing and grubbing operations and disposed of by burning on the site shall be thoroughly and completely reduced to ashes.

D. CONTRACTOR shall be responsible for providing a suitable location (subject to ENGINEER and COMPANY approval) for off-site disposal of cleared material not burned on-site. Once ENGINEER and COMPANY have approved the disposal location, CONTRACTOR shall transport and dispose the material in accordance with all applicable regulations.

++END OF SECTION++

SECTION 02300

EARTHWORK

PART 1 - GENERAL

1.1 DESCRIPTION

A. This Section consists of all activities associated with earthwork construction, including, but not necessarily limited to:

1. Excavation, loading, transportation, unloading and stockpiling of soil from COMPANY-designated locations;

2. Placement, compaction, and grading of various earthen materials;

3. Ditch grading; and

4. All other activities required to complete earthwork construction as shown on the Drawings, specified herein and or required by the COMPANY.

1.2 REFERENCES

A. American Society of Testing Materials (ASTM) Standards/Publications (Latest version):

C33	Standard Specification for Concrete Aggregates
D422	Method of Particle Size Analysis of Soils
D698	Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3)
D1557	Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3)
D1587	Standard Practice for Thin-walled Tube Sampling of Soils
D2487	Classification of Soils for Engineering Purposes
D2922	Density of Soil In Place by Nuclear Density Gage
D3080	Standard Test Method for Direct Shear Test of Soils Under Consolidated Drained Conditions
D4318	Liquid Limit, Plastic Limit and Plasticity Index of Soils
D5084	Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter
D6938	Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

1.3 DEFINITIONS

A. Select Fill: Soil material suitable for use as cap fill, for dike construction or other areas identified by the COMPANY.

B. General Fill: Any non-classified soil deemed suitable by the COMPANY.

C. Liner Subgrade: Soil complying with the specified requirements located immediately beneath the flexible membrane liner.

D. Vegetative Soil: Growth medium used along with any necessary admixtures to support vegetation.

E. Gravel: Granular crushed stone material used as erosion protection in ditches.

F. Road Base: Granular material placed on the surface of haul roads, access roads and other areas designated on the Drawings, identified in the Specifications or required by the COMPANY.

G. Rip Rap: Stone armor material used in drainage features for erosion control and energy dissipation.

1.4 SUBMITTALS

A. CONTRACTOR shall identify all earthwork material suppliers and shall submit written verification from his material suppliers that all earthwork materials to be used for the work comply with the requirements of this Section.

B. CONTRACTOR shall submit copies of all geotechnical laboratory reports within 10 working days after sample collection.

1.5 QUALITY CONTROL

A. CONTRACTOR shall perform construction surveys, as needed, to ensure that the lines and grades of all excavations, embankments, ditches, pipe trenches, pipe inverts, and graded surfaces are in accordance with the drawings and specifications.

B. COMPANY may perform pre-construction and post-construction topographic surveys of the work area and related areas and may perform additional quality assurance surveys. CONTRACTOR shall coordinate his activities with COMPANY's surveyor and provide safe access to all excavation areas for survey and/or verification sampling activities.

1.6 TESTING

A. The number and type of testing required for each type of earthwork shall be as specified in the specific section related to the type of earthwork.

B. COMPANY will select the locations for all tests. Tests performed at locations not approved by the COMPANY will not be accepted.

C. All undisturbed earthwork samples shall be collected using a thin-walled sampler complying with ASTM D1587. The length of the sampler shall be suitable for collection of an undisturbed sample over the specified sampling interval.

D. Unless otherwise specified, testing shall be performed in accordance with the following methods:

1. Soil classification shall be performed using ASTM D2487. Liquid Limits, Plastic Limits and Plasticity Indices shall be determined using ASTM D4318.

2. Moisture-Density Relationships shall be determined using ASTM D698. Unless otherwise directed by COMPANY. ASTM D1557 may be used only where specified.

3. In-place density and moisture content shall be determined using ASTM D6938 (Nuclear Density Gage). Other methods for determining in-place density and moisture may not be used unless approved by the COMPANY.

4. Hydraulic conductivity shall be determined using ASTM D5084.

5. Direct shear testing shall be performed in accordance with ASTM D3040.

1.7 TOLERANCES

A. Grades and slopes of all earthwork shall be straight and true. Unless otherwise specified, CONTRACTOR shall complete all earthwork within the dimensional tolerances presented below.

B. Elevation Tolerances:

1. Liner Subgrade Surface: plus 0.1 foot, minus 0.0 foot.
2. Gravel Surface: plus 0.1 foot, minus 0.0 foot.
3. All Other Surfaces: plus 0.2 foot, minus 0.0 foot.

C. Thickness Tolerances:

1. Liner Subgrade: plus 0.2 foot, minus 0.0 foot.
2. All Other Surfaces: plus 0.1 foot, minus 0.0 foot.

D. Grade Tolerances: All grades/slopes shall be completed within

1. Liner Subgrade Surface: plus or minus 0.1 percent of design slope.
2. Gravel and Drainage Features: plus or minus 0.1 percent of design slope.
3. All Other Surfaces: plus or minus 0.2 percent of design slope.

E. Horizontal Coordinates and/or Earthwork Dimensions: plus or minus 0.5 feet

1.8 UTILITIES

A. COMPANY will attempt to deactivate electrical and other utilities in areas to be excavated; however, CONTRACTOR shall be ultimately responsible for ensuring that no energized equipment or utilities are present prior to initiating excavation activities. If CONTRACTOR identifies energized or active equipment or utilities, CONTRACTOR shall cease work and notify COMPANY so that the equipment/utilities may be deactivated. CONTRACTOR shall again check the equipment and utilities to ensure they are deactivated prior to proceeding with excavation activities.

B. CONTRACTOR shall note that underground and aboveground utilities may be located in the area of the Work. CONTRACTOR shall be ultimately responsible for protecting the utilities during earthwork and related activities.

1.9 EARTHWORK SAFETY

A. As discussed in other areas of these specifications, CONTRACTOR shall be fully responsible for the health and safety of all personnel in the work area, at all times, and shall take all necessary precautions to protect personnel.

B. In addition to general health and safety responsibilities, CONTRACTOR shall be fully responsible for complying with all applicable OSHA and related regulations regarding earthwork, including, but not limited to, the requirements of 40 CFR Part 126.

PART 2 - PRODUCTS

2.1 SELECT FILL

A. Select fill shall consist of soil excavated during foundation soil grading. CONTRACTOR shall be responsible for loading, transporting, placement and compaction of select fill.

B. Select fill shall classify as CH, CL or SC using ASTM D2487, shall have a plasticity index between 15 and 40, and shall be free of roots, brush, sod, or other perishable materials and debris.

2.2 GENERAL FILL

A. General fill shall be any non-classified soil deemed suitable by the COMPANY. General fill shall be free of trash, rubbish or other deleterious substances. The maximum particle size of general fill shall be 6 inches.

2.3 LINER SUBGRADE

A. Liner Subgrade shall consist of soil excavated from the site during foundation grading. CONTRACTOR shall be responsible for loading, transporting, placement and compaction of Liner Subgrade.

B. Liner Subgrade shall classify as CH or CL using ASTM D2487 and shall contain no organic material, sticks, or other deleterious material.

C. The maximum particle size of liner subgrade shall be 3 inches. Particles larger than 1 inch shall be subrounded to rounded.

2.4 VEGETATIVE SOIL

A. Vegetative soil shall consist of soil stripped from the work area and stockpiled by the CONTRACTOR. Vegetative soil shall be free of deleterious material, materials toxic to plant growth, noxious weed seeds, rhizomes, roots, subsoil, rocks, or other debris.

2.5 GRAVEL

A. Gravel shall be washed, angular crushed gravel or crushed limestone, free of mud, clay, vegetation or other debris, conforming to ASTM C33 for stone quality.

B. Gravel shall have the following size gradation:

U.S. Sieve Size	Percent Passing
1.5 Inch	100
1 Inch	90 to 100
0.5 Inch	15 to 60
No. 4	0 to 10
No. 8	0 to 5

C. Gravel shall conform to the following:

1. Liquid Limit (LL) less than or equal to 35.

2. Plasticity Index (PI) less than or equal to 10.

2.6 ROAD BASE

A. Road base shall consist of crushed stone, free of mud, clay, vegetation or other debris, conforming to the requirements of TXDOT Item 248, Type A (Grade I). Size Gradation shall comply with the following:

U.S. Sieve Size	Percent Passing
2.5 inch	100
1.75 inch	100
0.875 inch	65 to 90
0.375 inch	50 to 70
No. 4	35 to 55
No. 40	15 to 30
No. 200	0

B. Road Base shall conform to the following:

1. Liquid Limit (LL) less than or equal to 35.

2. Plasticity Index (PI) less than or equal to 10.

2.7 RIPRAP

A. Riprap shall be clean, well-graded durable natural stone with a minimum specific gravity of 2.4. Unless otherwise approved by the COMPANY, riprap shall comply with the following:

1. No deleterious material, noxious weed seeds, roots, subsoil, or other debris shall be present.

3 Riprap shall consist of stone conforming to the following gradation:

Stone Weight (pounds)	Percent Lighter Than
700	100
300	50 to 100
150	15 to 50
45	0 to 15

4 Stones shall be at least 3 inches in their least dimension. The breadth or thickness of each stone shall not be less than one-third the length of the stone.

PART 3 - EXECUTION

3.1 GENERAL

A. All earthwork shall be completed to the lines and grades shown on the Drawings and as required by the COMPANY.

B. CONTRACTOR shall not place material in the presence of water unless approved by the COMPANY. Saturated areas shall be dewatered by CONTRACTOR as specified herein prior to

initiating earthwork activities. CONTRACTOR shall remove all saturated soils, muck, organic matter and other materials not suitable for compaction or proof-rolling from dewatered areas prior to placing fill materials.

C. All proof rolling shall be performed as follows unless another method is approved by the COMPANY:

1. Proof rolling equipment shall be approved by the COMPANY. Proof rolling equipment may be self-propelled or towed by a suitable tractor.

2. Proof rolling equipment shall have a rolling width of 8 to 10 feet and shall be capable of operating under various contact pressures.

3. Contact pressure of proof rolling equipment shall be a minimum of 2000 pounds per square foot.

4. A minimum of two passes with the proof rolling equipment shall be completed across the entire native soil surface prior to placement of any material.

5. Any area shown to be unstable or non-uniform after proof rolling shall be recompacted and/or reworked until proof rolled to the satisfaction of the COMPANY.

D. Compaction of all materials shall be performed with an appropriately heavy, properly ballasted penetrating-foot compactor. A minimum of four passes of the compactor shall be performed on each material lift regardless of whether the lift complies with specified density requirements within less than four passes.

E. When target compaction/density is specified using ASTM D698 (Standard Proctor), the minimum weight of the compacting equipment shall be 1500 pounds per linear foot of drum length.

F. The daily work area shall extend a distance no greater than necessary to maintain moist conditions and continuous operations. Desiccation and crusting of the lift surface shall be avoided as much as possible.

G. Water added to soils shall be clean and shall not have come into contact with waste or any objectionable material. Source of water shall be approved by COMPANY prior to application.

H. Unless otherwise specified or approved by the COMPANY, the maximum clod size in each lift prior to compaction shall be 2 inches in diameter. Clod size shall be reduced through discing, pulverizing or similar methods. Unless otherwise approved by the COMPANY, a minimum of 4 passes with discing or pulverizing equipment shall be made across each lift prior to beginning compaction. A pass is defined as one trip across the lift surface. Passes shall be made at alternating right angles across the lift surface.

I. Finished, compacted lifts of all material shall be sprayed with clean water as necessary to prevent drying and desiccation.

J. At the end of each construction day's activities, completed lifts shall be sealed by rolling with a rubber-tired or smooth drum roller. Prior to resuming placement of overlying material, the surface of the previous lift shall be scarified to a minimum depth of 2 inches.

3.2 DEWATERING

A. CONTRACTOR shall note that some of the work may be performed in areas exhibiting saturated conditions at and below the groundwater table. CONTRACTOR shall not place material in the presence of water unless approved by the COMPANY.

B. CONTRACTOR shall dewater the work area using pumps or other method approved by the COMPANY. Dewatering measures shall be implemented by the time the excavation reaches the water level in order to maintain the integrity of the in-situ material. Dewatering water shall be discharged in accordance with COMPANY requirements in a manner that minimizes erosion and other disturbances to existing drainage features and adjacent areas.

C. All dewatering system components, including cofferdams, pumps, piping and related equipment shall be removed by the CONTRACTOR at the completion of the work.

3.3 SELECT FILL

A. Select fill shall be placed and compacted in lifts. Maximum loose lift thickness shall be 8 inches. Maximum compacted lift thickness shall be 6 inches.

B. Prior to compaction, the moisture content of the select fill shall be no greater than plus 3 percent of the optimum moisture content as determined by ASTM D698 (Standard Proctor). If the moisture content is above the specified maximum, select fill shall be pulverized, disced or similarly reworked to air dry the material and decrease the moisture content.

C. Each select fill lift shall be compacted to a minimum of 90 percent maximum dry density as determined by ASTM D698 (Standard Proctor). Material with densities less than the specified density shall be recompacted and/or reworked as necessary to achieve the specified density.

D. Each lift shall be thoroughly compacted and shall satisfy all moisture and density requirements before a subsequent lift is placed.

E. COMPANY will test select fill per the following guidelines:

1. One moisture density relationship test in accordance with ASTM D698 (Standard Proctor) shall be performed for every 50,000 cubic yards placed.

2. One in-place density test in accordance with ASTM D6938 shall be performed for every 20,000 square feet of surface area for each lift. Surface area shall be measured in the horizontal plane.

3. One soil classification in accordance with ASTM D2487 shall be performed for every 50,000 cubic yards placed.

4. Plasticity Index (PI) shall be included in the soil classification. One moisture-density relationship test in accordance with ASTM D698 (Standard Proctor) shall be performed any time a PI change greater than 10 is observed in the soil classification tests.

F. After completion of the select fill, but before beginning installation of the overlying materials, CONTRACTOR shall survey the finished elevations of the select fill to ensure that the top of the select fill is at the grades and elevations specified on the Drawings. There shall be a minimum of one survey point for every 5,000 square feet of select fill surface area.

3.4 SELECT FILL ON STEEP SLOPES

A. Steep slopes are defined as surfaces with slopes steeper than 5 horizontal to 1 vertical.

B. Construction of select fill on steep slopes shall comply with all other requirements for select fill, in addition to those specified herein.

C. Select fill shall be placed and compacted in benched, horizontal lifts. Maximum loose lift thickness shall be 8 inches. Maximum compacted lift thickness shall be 6 inches.

D. Lifts shall be placed and compacted horizontally (benched parallel to the toe of the slope) rather than vertically (up and down the slope). Each lift shall be wide enough to permit passage of compacting equipment.

E. Lifts shall extend horizontally beyond the required final elevations of select fill to permit grading back to the required slopes after compaction and testing.

F. After each lift has been compacted, tested and accepted by the COMPANY, Contractor shall grade the slope to the required elevations

3.5 LINER SUBGRADE

A. Liner Subgrade shall be placed and compacted in lifts. Maximum loose lift thickness shall be 8 inches. Maximum compacted lift thickness shall be 6 inches. A total of 2 lifts will be placed to construct the 12 inch Liner Subgrade thickness.

B. Prior to compaction of each of the lifts, CONTRACTOR shall manually remove all visible rock 3 inches or greater in size from the lift. After the visible rocks have been removed, CONTRACTOR shall compact each lift as discussed below.

C. Prior to compaction of each lift, the moisture content of the Liner Subgrade shall be no greater than plus 4 percent of the optimum moisture content as determined by ASTM D698 (Standard Proctor). If the moisture content is above the specified maximum, Liner Subgrade shall be pulverized, disced or similarly reworked to air dry the material and decrease the moisture content.

D. Each lift shall be compacted to a minimum of 90 percent maximum dry density as determined by ASTM D698 (Standard Proctor). Material with densities less than the specified density shall be recompacted and/or reworked as necessary to achieve the specified density.

E. Each lift shall be thoroughly compacted and shall satisfy all specified requirements before a subsequent lift is placed.

F. After the second lift has been compacted and tested, the surface of the Liner Subgrade shall be rolled and sealed with a smooth drum roller. A minimum of four passes of the roller shall be performed on the Liner Subgrade. A pass is defined as one trip across the entire Liner Subgrade surface.

H. CONTRACTOR shall test Liner Subgrade as specified herein:

1. One moisture density relationship test in accordance with ASTM D698 (Standard Proctor) shall be performed for every 10,000 cubic yards placed.

2. One in-place density test in accordance with ASTM D6938 shall be performed for every 20,000 square feet of surface area for each lift. Surface area shall be measured in the horizontal plane.

3. One soil classification in accordance with ASTM D2487 shall be performed for every 10,000 cubic yards placed.

4. Plasticity Index (PI) shall be included in the soil classification. One moisture-density relationship test in accordance with ASTM D698 (Standard Proctor) shall be performed any time a PI change greater than 10 is observed in the soil classification tests.

5. One hydraulic conductivity test by ASTM D5084 for every 10,000 cubic yards of Liner Subgrade. Each test shall be performed on a composite Liner Subgrade sample collected from the Liner Subgrade stockpile as approved by COMPANY. The composite sample shall be compacted to 90 percent maximum dry density as determined by ASTM D698 (Standard

Proctor) prior to performing the hydraulic conductivity test.

I. After completion of the Liner Subgrade, but before beginning installation of the overlying materials, CONTRACTOR shall survey the finished elevations of the Liner Subgrade to ensure that the top of the Liner Subgrade is at the grades and elevations specified on the Drawings. There shall be a minimum of one survey point for every 10,000 square feet of Liner Subgrade surface area.

3.6 VEGETATIVE SOIL

A. Vegetative Soil shall not be placed until the underlying soil has been approved by the COMPANY.

B. Vegetative Soil shall be placed in one 12 inch lift without damaging the underlying soil. Vegetative Soil shall be tracked in and smoothed out using tracked equipment. No direct compactive effort shall be used on vegetative soil.

C. After completion of the Vegetative Soil layer, CONTRACTOR shall survey the finished elevations of the Vegetative Soil to ensure that the top of the vegetative soil is at the grades and elevations specified on the Drawings. There shall be a minimum of one survey point for every 5,000 square feet of Vegetative Soil surface area.

3.7 ROAD BASE

A. Road Base shall be placed on access ramps, on the top of the dike and as required by the COMPANY.

B. Geotextile shall be placed beneath all Road Base in accordance with Section 2430 of these specifications.

C. Road Base shall be placed and compacted in lifts, with a maximum loose lift thickness of 8 inches. Each fill lift shall be compacted using a minimum of four passes of the compactor. A pass is defined as one trip across the lift surface. There is no target maximum density requirement for road base.

D. After completion of the road base, but before beginning installation of the overlying materials, CONTRACTOR shall survey the finished elevations of the road base to ensure that the top of the road base is at the grades and elevations specified on the Drawings. There shall be a minimum of one survey point for every 5,000 square feet of road base surface area.

3.8 RIPRAP

A. Riprap shall be placed on geotextile conforming to the requirements of Section 02300 of these specifications. Place geotextile with the length running up and down the slope. Ensure geotextile has a minimum overlap of 2 feet at all seams.

B. Riprap shall be placed in such manner as to produce a well graded mass of rock with the minimum practicable percentage of voids, and shall be constructed within a tolerance of plus 4 inches or minus 2 inches from the lines and grades shown on the Drawings. Placement shall begin at the bottom of the area to be covered and continue up slope. Subsequent loads of material shall be placed against previously placed material in such a manner as to ensure a relatively homogenous mass. Open joints shall be filled with spalls or small rocks. Rocks shall be arranged to present a uniform finished top surface such that the variation between tops of adjacent rocks shall not exceed 3 inches.

C. No stone shall be dropped through air from a height greater than 3 feet on top of the geotextile. The larger stones shall be well distributed and the entire mass of stones in their final position shall be roughly graded to conform to the gradation specified in this specification. The finished

riprap shall be free from objectionable pockets of small stones and clusters of larger stones. Placing riprap by dumping into chutes or by similar methods likely to cause segregation of the various sizes will not be permitted. Placing riprap by dumping it at the top of the slope and pushing it down the slope will not be permitted. Rearranging of individual stones will be required to the extent necessary to obtain a well-graded distribution of stone sizes as specified above.

++END OF SECTION++

SECTION 02320

CAP SUBGRADE

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section shall govern work associated with grading, excavation, supply, hauling, placement and compaction of cap subgrade material.

B. Work associated with the cap subgrade shall also conform to Section 02300 – Earthwork of the Specifications.

1.2 MATERIALS INCLUDED IN THIS SECTION

A. Existing Coal Combustion By-Products used as cap subgrade

B. Contractor-supplied material used as cap subgrade

1.3 RELATED SECTIONS

A. Section 02300 Earthwork

1.4 REFERENCES

A. Reference Standards for cap subgrade shall be as referenced in Section 02300 – Earthwork

1.5 SUBMITTALS

A. Submittals for cap subgrade shall be as specified in Section 02300 – Earthwork

PART 2 - PRODUCTS

2.1 COAL COMBUSTION BY-PRODUCTS AS CAP SUBGRADE

A. COMPANY will supply CCBs or existing CCBs within the landfill may be re-graded for use as cap subgrade.

B. COMPANY will identify the location of CCBs outside of the landfill that may be used to supplement existing landfilled materials. Contractor shall be responsible for loading, transporting, placement, and compaction of CCBs used as cap subgrade.

C. Cap subgrade shall be free of roots, brush, sod, or other perishable materials and debris.

2.2 CONTRACTOR-SUPPLIED MATERIAL AS CAP SUBGRADE

A. Contractor-supplied cap subgrade material shall be as specified herein.

B. Cap subgrade material shall be approved by the Engineer prior to delivery to the Site.

C. Contractor shall provide written Certification to Engineer that material to be supplied conforms to the requirements of this specification.

D. Cap subgrade shall be clean fill material free of waste material, organic material, sticks, or other deleterious material.

E. Cap subgrade may include crushed rock, broken rock, broken concrete and similar materials

provided these materials do not exceed 30 percent (by weight) of the total material in the cap subgrade lift of which they are part.

F. Contractor-supplied cap subgrade shall be soil class “CL” or “CH” according to ASTM D2487 and shall conform to the following:

1. No material larger than 3-inch diameter.
2. Plasticity Index (PI) greater than or equal to 7.
3. Particle size distribution shall conform to the following:

U.S. Sieve Size	Percent Passing
No. 4	80-95
No. 40	55-75
No. 200	Greater than 50

PART 3 – EXECUTION

3.1 GENERAL

A. Compaction of all materials shall be performed with an appropriately heavy, properly ballasted penetrating foot compactor. A minimum of four passes of the compactor shall be performed on each material lift. A pass is defined as one trip of the compactor over the lift and back to the starting point by a single drum roller or one trip across the lift surface from one side to the other if the compacting equipment has front and back compacting rollers.

B. The minimum weight of the compacting equipment shall be 1,500 pounds per linear foot of drum length.

C. The daily work area shall extend a distance no greater than necessary to maintain moist conditions and continuous operations. Desiccation and crusting of the lift surface shall be avoided as much as possible.

D. Water added to soils shall be clean and shall not have come into contact with waste or any objectionable material.

3.2 CONSTRUCTION OF CAP SUBGRADE

A. All existing vegetation on areas to be capped or regraded shall be stripped or otherwise removed prior to placing cap subgrade or regarding. Contractor shall be responsible for disposal of all debris resulting from vegetation removal in accordance with applicable laws and regulations.

B. After existing vegetation has been removed, material underlying the cap subgrade shall be scarified to a minimum depth of 2-inches prior to placement of cap subgrade. Areas that only require regarding may not require scarifiying and compaction provided that such areas meet that are regarded to meet the requirements of Subsection 3.2.C of this Specification.

C. Cap subgrade shall conform to the following:

1. Cap subgrade shall be placed in compacted lifts. Maximum loose lift thickness shall be 12 inches and a minimum of four passes of the compacting equipment shall be required for each lift.

2. After the final lift has been placed and compacted to the required elevations, the cap subgrade shall be proof rolled using the methods specified herein or other method approved by the Engineer:

a. Proof rolling equipment shall consist of not less than four pneumatic tired wheels, arranged so that the wheels carry approximately equal loads when operating on uneven surfaces. Proof rolling equipment may be self-propelled or towed by a suitable tractor.

b. Proof rolling equipment shall have a rolling width of 8 to 10 feet and shall be capable of operating under various contact pressures.

c. Contact pressure of proof rolling equipment shall be a minimum of 2,000 pounds per square foot.

d. A minimum of two passes with proof rolling equipment shall be completed across the entire prepared cap subgrade surface.

3. Any area of the cap subgrade shown to be unstable or non-uniform after proof rolling shall be recompacted and/or reworked until proof rolled to the satisfaction of the ENGINEER.

D. Finished lifts of cap subgrade shall be sprayed with clean water as necessary to prevent drying and desiccation.

E. At the end of each construction day's activities, completed lifts shall be sealed by rolling with a rubber-tired or smooth drum roller. Prior to resuming placement of material the surface of the cap subgrade shall be scarified to a minimum depth of 2 inches.

F. After completion of the cap subgrade, but before beginning installation of overlying materials, Contractor shall survey the finished elevations of the cap subgrade to ensure that the top of the cap subgrade is at the specified grades and elevations presented in the Conceptual Closure Plan. There shall be a minimum of one survey point for every 10,000 square feet of cap surface area.

++END OF SECTION++

SECTION 02340

VEGETATIVE SOIL LAYER

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section shall govern work associated with grading, excavation, supply, hauling, placement and compaction of the vegetative soil material.

B. Work associated with the vegetative soil layer shall also conform to Section 02300 – Earthwork of the Specifications.

1.2 MATERIALS INCLUDED IN THIS SECTION

A. COMPANY-supplied material used as vegetative soil

B. Contractor-supplied material used as vegetative soil

1.3 RELATED SECTIONS

A. Section 02300 Earthwork

B. Vegetation

1.4 REFERENCES

A. Reference Standards for vegetative soil layer shall be as referenced in Section 02300 – Earthwork

1.5 SUBMITTALS

A. Submittals for cap subgrade shall be as specified in Section 02300 – Earthwork

PART 2 - PRODUCTS

2.1 COMPANY-SUPPLIED MATERIAL AS VEGETATIVE SOIL LAYER

A. COMPANY will supply Contractor with material for use as vegetative soil layer.

B. COMPANY will identify the location of material for Contractor. Contractor shall be responsible for loading, transporting, placement, and compaction of material used as the vegetative soil layer.

2.2 CONTRACTOR-SUPPLIED MATERIAL AS VEGETATIVE SOIL LAYER

A. Vegetative soil layer shall be a clay loam or silty clay loam as classified by the United States Department of Agriculture and shall comply with all of the following:

1. Free of deleterious material, materials toxic to plant growth, noxious weed seeds, rhizomes, roots, subsoil, rocks, or other debris.
2. Maximum sodium adsorption ration (SAR): 8
3. Maximum electrical conductivity (EC): 2 mmhos/cm
4. Maximum particle dimension: 2 inches.

5. The pH shall be between 6.0 and 8.5 standard units. If approved by the Engineer, Contractor may amend soil as necessary to achieve the specified pH.

PART 3 - EXECUTION

3.1 VEGETATIVE SOIL LAYER PLACEMENT

A. Vegetative Soil shall not be placed until the underlying soil has been approved by the ENGINEER.

B. Vegetative Soil shall be placed in one 18 inch lift without damaging the underlying soil. Vegetative Soil shall be tracked in and smoothed out using tracked equipment. No direct compactive effort shall be used on vegetative soil.

C. After completion of the Vegetative Soil layer, CONTRACTOR shall survey the finished elevations of the Vegetative Soil to ensure that the top of the protective soil is at the grades and elevations specified on the Drawings. There shall be a minimum of one survey point for every 10,000 square feet of Vegetative Soil surface area.

++END OF SECTION++

SECTION 02350

VEGETATION

PART 1 – GENERAL

1.1 SUMMARY

A. This Section describes the requirements for vegetation establishment in areas disturbed during construction activities.

1.2 SUBMITTALS

A. CONTRACTOR shall submit information regarding proposed seed, fertilizer, mulch, tackifier and any other materials to be used to establish vegetation at least 10 days prior to delivery.

PART 2 – PRODUCTS

2.1 SEED SUPPLIERS

A. Seed suppliers must provide labeling of variety, purity, and germination. The supplier must satisfy State of Texas seed quality laws. The COMPANY must approve seed supplier.

2.2 SEED DELIVERY, STORAGE, AND HANDLING

A. Grass seed mixture shall be delivered in sealed containers. Seed in damaged packaging will not be accepted. CONTRACTOR shall provide seed mixture in containers showing the percentage of each species in the seed mix, year of production, net weight, date of packaging, name and address of supplier, percent of weed seed content, and guaranteed percentage of purity and germination.

B. Fertilizer shall be delivered in appropriate waterproof containers showing weight, chemical analysis, and name of manufacturer.

2.3 SEED MIXTURE

A. Seed mixture shall be appropriate for the season in which it is planted and shall be approved by the COMPANY prior to placement.

B. Seed shall be hulled, extra-fine grade, treated with fungicide, and shall have a germination and purity that will produce, after allowance for Federal Seed Act tolerances, a pure live seed (PLS) content of not less than 85 percent. Seed shall be labeled in accordance with U.S. Department of Agriculture rules and regulations.

C. Unless otherwise approved by the COMPANY, vegetation seed mixture shall consist of the following grasses at the application rates specified:

Grass Species	Application Rate (pounds PLS per acre)
Gulf Rye	30
Common Bermuda Grass	20
Total:	50

D. Alternative seed mixtures may be submitted in writing to the COMPANY and must be approved by the COMPANY prior to seed application.

2.4 ACCESSORIES

A. Mulching materials shall consist of dry oat, wheat, or Bermuda straw, free from weeds and foreign matter detrimental to plant life. Native hay or chopped cornstalks are acceptable. Also acceptable is approved chip-form wood cellulose fiber that is free of ingredients that could inhibit growth or germination.

B. Compost, if used as an organic admixture, shall be applied per TXDOT Special Specification; Item 1027 "Furnishing and Placing Compost." Compost application is optional and subject to the approval of the COMPANY, which must be obtained at least 10 days prior to use.

C. Fertilizer shall be applied to vegetative soil layer material and shall be inorganic chemical fertilizer consisting of 20-5-5 fertilizer applied at 200 pounds per acre.

D. Stakes shall be softwood lumber, chisel pointed.

E. Water shall be from fresh water sources and shall be free from soil, acids, alkalis, salt, or any other substance injurious to growth of grass.

PART 3 – EXECUTION

3.1 INSPECTION OF VEGETATIVE SOIL

A. CONTRACTOR shall verify that vegetative soil and areas disturbed during construction activities are ready to receive the work covered by this section.

3.2 FERTILIZER

A. All fertilizer shall be applied in accordance with manufacturer's instructions.

B. Manure, if used, may be applied at a rate of up to 10 tons/acre. Manure application is optional subject to the approval of the COMPANY, which must be obtained at least 10 days prior to use.

C. Pre-planting fertilizer shall be mixed thoroughly into the upper 3 in. of vegetative-soil layer prior to applying seed.

3.3 SEEDING

A. Drill seed application is acceptable for slopes equal to or flatter than 4(H):1(V).

B. Seed shall be applied evenly by broadcast or hydroseed application at the rate specified in this Section. Adjustment to rate shall be made for variations in seed purity and germination to achieve the PLS equivalent rate. Hydroseeding is acceptable as a broadcast method of seeding and fertilizing. If dry broadcasting is done, seeds must be raked into the upper soil surface and seed must be applied at half of the specified broadcast rate. Designated areas for erosion control may not be seeded in excess of that which can be covered with erosion control material on the same day.

C. CONTRACTOR shall not sow immediately following rain, when ground is too dry, or during windy periods.

3.4 SEED PROTECTION/EROSION CONTROL

A. Straw/hay mulch shall be applied to all seeded areas, with slopes less than 4(H) to 1(V), within 24 hours after seeding operations. Straw or hay mulch shall be applied at a rate of approximately 150 pounds per 1000 square feet (6,500 pounds per acre) and crimped in place. Cellulose fiber

mulch shall be applied at a rate of approximately 75 pounds per 1,000 square feet (3,200 pounds per acre).

B. Seeded sloped areas shall be covered with erosion control fabric on all exterior slopes of 4(H) to I(V) and steeper; and in all drainage channels and swales in accordance with Section 1100, "Erosion and Sedimentation Control."

3.5 IRRIGATION

A. CONTRACTOR shall irrigate seeded areas if and as necessary to comply with the Uniform Grass Coverage (UGC) requirements of this Section.

B. Irrigation may be performed by water truck or by temporary irrigation system. If a temporary irrigation system is used, CONTRACTOR shall remove temporary irrigation system once COMPANY has accepted vegetated areas.

C. Irrigation shall be performed for a minimum of thirty days after initial planting and for as long as necessary to establish UGC across the entire seeded area.

3.6 ESTABLISHMENT AND ACCEPTANCE OF PERMANENT VEGETATION

A. It shall be solely the CONTRACTOR's responsibility to establish UGC across all application areas, regardless of unseasonable climatic conditions or other adverse conditions affecting planting operations and growth of vegetation.

B. Uniform Grass Coverage (UGC) shall be defined as a uniform stand of the specified grass with not less than 12 growing plants per square foot of seeded areas.

C. COMPANY will consider application areas acceptable only when:

1. A statistically significant number of randomly sampled plots have an average of 12 growing plants per square foot.

2. A minimum of one mowing has been performed in the seeded areas.

3. UGC has been deemed to have been achieved by the COMPANY.

D. Any application areas, which are not determined to be acceptable by the COMPANY, shall be replanted, refertilized, and reirrigated at no additional cost to the COMPANY.

E. The life and satisfactory condition of all plants (including grass) shall be guaranteed by CONTRACTOR for a period of up to one calendar year after written notice of first acceptance of vegetation by COMPANY. The guarantee period shall include one complete growing season and dormant period.

++END OF SECTION++

SECTION 02420

FLEXIBLE MEMBRANE LINER

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section shall govern work associated with furnishing and installing Flexible Membrane Liner, including, but not limited to, layout, placement, seaming, patching and testing.

1.2 REFERENCES

A. American Society of Testing Materials (ASTM) Standards/Publications (Latest version):

D 638	Standard Test Method for Tensile Properties of Plastics
D 1004	Test Method for Initial Tear Resistance of Plastic or Film Sheeting
D 1238	Standard Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer
D 1505	Test Method for Density of Plastics by the Density-Gradient Technique
D 1603	Test Method for Carbon Black in Olefin Plastics
D 2216	Test Method for Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-aggregate Mixtures
D 3895	Standard Test Method for Oxidative-Induction Time of Polyolefins by Differential Scanning Calorimetry
D 4354	Standard Practice for Sampling of Geosynthetics for Testing
D 4632	Standard Test Method for Grab Breaking Load and Elongation of Geotextiles
D 4643	Standard Test Method for Determination of Water (Moisture) Content of Soil by the Microwave Oven Method
D 4759	Standard of Practice for Determining the Specification Conformance of Geosynthetics
D 4833	Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Other Related Products.
D 5084	Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter
D 5199	Measuring Nominal Thickness of Geotextiles and Geomembranes
D 5261	Standard Test Method for Measuring Mass Per Unit Area of Geotextiles
D 5321	Standard Test Method for Determining the Coefficient of Soil and Geosynthetic or Geosynthetic and Geosynthetic Friction by the Direct Shear Method
D 5397	Standard Test Method for Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test

D 5596	Standard Test Method for Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics
D 5641	Standard Practice for Geomembrane Seam Evaluation by Vacuum Chamber
D 5820	Standard Practice for Pressurized Air Channel Evaluation of Dual Seamed Geomembranes
D 5994	Standard Test Method for Measuring Core Thickness of Textured Geomembranes
E 96	Standard Test Methods for Water Vapor Transmission of Materials

B. Geosynthetic Research Institute (GRI)

GM 17	Test Properties, Testing Frequency and Recommended Warranty for Linear Low Density Polyethylene (LLDPE) Smooth and Textured Geomembranes

1.3 DEFINITIONS

A. Flexible Membrane Liner (FML) - An essentially impermeable flexible geomembrane liner of linear low density polyethylene (LLDPE).

B. INSTALLER -Party responsible for liner installation, including handling, transporting, storing, deploying, protecting, sampling, patching damaged liner and temporary restraining against wind and thermal/solar expansion.

C. Lot - Group of consecutively numbered rolls from the same manufacturing line.

D. MANUFACTURER - Party responsible for the production and quality of the liner.

E. Overlap - The width of material of a liner panel in contact with an adjacent liner panel. The overlap distance is measured perpendicular from the overlying edge of one panel to the underlying edge of the other.

1.4 SUBMITTALS

A. CONTRACTOR shall submit the following product information at least 10 days prior to delivery:

1. FML: Certification stating that the FML meets the product requirements of this specification and copies of quality control tests performed by MANUFACTURER.

B. CONTRACTOR shall submit the name of the INSTALLER at least 3 weeks prior to installation, including resume of installation supervisor to be assigned to the project and a list of FML projects completed by INSTALLER.

C. CONTRACTOR shall submit a Quality Control Plan and Installation Procedures at least 3 weeks prior to installation. The information shall include a list of quality control tests performed and typical testing frequencies, recommended installation procedures, and panel layout drawing identifying panels and overlaps.

D. CONTRACTOR shall submit the following upon completion of the FML installation:

1. Certification from the INSTALLER stating that the FML has been installed in accordance with the Drawings and Specifications.

2. As-built record drawings showing instrument surveyed locations of all panels, seams, repairs, patches and test samples.

3. Test reports verifying that the FML has been installed in accordance with the specified requirements.

4. Test reports verifying completion of all field seams and repairs are in accord with specified requirements.

1.5 QUALIFICATIONS

A. INSTALLER must have experience installing FML liners on at least 5 projects of each liner type and have installed a minimum of 2,000,000 square feet of each liner type.

B. INSTALLER shall provide a minimum of one Master Seamer (minimum 1,000,000 square feet using the type of seaming apparatus proposed for this project) for work on the project.

C. MANUFACTURER may serve as the INSTALLER or may use an outside INSTALLER that has been approved and certified by MANUFACTURER.

1.6 QUALITY CONTROL

A. CONTRACTOR is responsible for the overall quality of the installed FML. CONTRACTOR shall maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. CONTRACTOR shall perform construction surveys, as needed, to ensure that the location and grades of all liner installations are in accordance with the design requirements.

C. ENGINEER may perform periodic quality assurance monitoring above and beyond that specified herein. CONTRACTOR shall cooperate, as required, in quality assurance monitoring.

1.8 WARRANTY

A. FML material shall be warranted by the MANUFACTURER on a pro-rata basis against defects for a period of 5 years from the date of acceptance by the COMPANY.

B. FML installation shall be warranted by the INSTALLER against defects in workmanship for a period of 1 year from the date of acceptance by the COMPANY.

PART 2 - PRODUCTS

2.1 FML PRODUCT STANDARD

A. FML shall be Type “UltraFlex” as manufactured by GSE Environmental, Inc. (GSE) of Houston, Texas; or ENGINEER-approved equivalent. The FML shall be a black, coextruded geomembrane.

B. Smooth FML shall be installed on flat surfaces and slopes less than 4(H) to I(V). Textured FML shall be installed on slopes 4(H) to I(V) and steeper.

C. FML Material Properties

1. FML shall be 40 mil thick linear low density polyethylene (LLDPE) and shall comply with the following:

Property	ASTM Method	Frequency	Unit	Minimum Average Values
Thickness	D5994	Every Roll	mil	40
Density	D1505	200,000 lbs	g/cm^3	0.94
Tensile Break Strength (smooth/textured)	D6693	20,000 lbs	lb/in	152/60
Elongation at Break (smooth/textured)	D6693	20,000 lbs	%	800/250
Tear Resistance	D1004	45,000 lbs	lb	22
Puncture Resistance (smooth/textured)	D4833	45,000 lbs	lb	56/44
Carbon Black Content	D1603	20,000 lbs	%	2.0 – 3.0
Notch Constant Tensile Load	D5397	200,000 lbs	hr	300
Oxidative Induction Time	D3895	200,000 lbs	min	>100

D. FML Extrudate Rod or Bead shall conform to the following:

1. Extrudate material shall be made from same type resin as the FML.
2. Additives shall be thoroughly dispersed.
3. Materials shall be free of contamination by moisture or foreign matter.

E. FML Welding/Seaming Equipment shall meet the following requirements:

1. Gauges showing temperatures in apparatus (extrusion welder) or wedge (wedge welder) shall be present.
2. An adequate number of welding apparati shall be available to avoid delaying work.
3. Power source must be capable of providing constant voltage under combined line load.

2.2 FML PACKING AND LABELING

A. FML shall be wrapped around a structurally sound core than can support the weight of the liner. Liners shall be supplied in rolls wrapped in relatively impermeable and opaque protective covers and marked or tagged with the following information:

1. MANUFACTURER's name
2. product identification
3. lot or batch number
4. roll number
5. roll dimensions

2.3 FML MANUFACTURING QUALITY CONTROL

A. FML shall be subjected to quality control and conformance testing to assure that the materials provided meet the specified requirements. Where possible, sampling shall be performed on sacrificial portions of the material to minimize repair of sampled locations.

B. All materials shall be tested in accordance with MANUFACTURER's quality control program and as specified herein. The MANUFACTURER shall perform the testing. Samples not satisfying the requirements of these specifications shall result in the rejection of the applicable rolls. At

CONTRACTOR's expense, additional testing of individual rolls may be performed to more closely identify the non-complying rolls and/or to qualify individual rolls.

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE and HANDLING

A. Deliver material to the job site only after ENGINEER/COMPANY accepts required submittals.

B. Comply with MANUFACTURER'S recommendations regarding product protection. Maintain product clean and free of damage.

C. Liner shall be covered with a waterproof, tight-fitting plastic protective covering resistant to ultraviolet degradation. Damage to protective covering shall be repaired immediately. Repairs shall be such that the liner is protected from moisture or other deleterious conditions.

D. Deliver product to the job site in MANUFACTURER's original packaging, with labels intact and legible. Maintain packaged materials with seals unbroken and labels intact until time of use. Promptly remove damaged or unsuitable products from the job site and promptly replace with products meeting the required specifications.

E. Comply with MANUFACTURER's recommendations when hauling, unloading, deploying, and installing liner. Do not fold liner. Inspect for defects before installing.

3.2 FML DEPLOYMENT

A. MANUFACTURER shall verify to the ENGINEER that the materials upon which the FML will be installed are acceptable prior to initiating FML deployment.

B. Assign each panel a simple and logical identifying code. The coding system shall be subject to approval by the ENGINEER and shall be determined at the job site.

C. Visually inspect the FML during deployment for imperfections and mark faulty or suspect areas.

D. Deployment of FML panels shall be performed in a manner that will comply with the following guidelines:

1. Unroll FML using methods that will not damage FML and will protect underlying surface from damage (spreader bar, protected equipment bucket).

2. Place ballast (commonly sandbags) on FML which will not damage FML to prevent wind uplift.

3. Personnel walking on FML shall not engage in activities or wear shoes that could damage it. Smoking will not be permitted on the FML.

4. Do not allow heavy vehicular traffic directly on FML. Rubber-tired ATV's and trucks are acceptable if wheel contact is less than 6 psi.

5. Protect FML in areas of heavy traffic by placing protective cover over the FML.

E. Sufficient material (slack) shall be provided to allow for thermal expansion and contraction of the material.

F. During installation avoid bridging, stresses in the FML, wrinkles and folds.

G. Schedule FML deployment so deployment, welding and covering occur within as narrow a temperature range as possible. Do not deploy in the presence of excessive moisture,

precipitation, ponded water or high winds.

H. Deploy panels to minimize field seams in corners, odd-shaped geometric locations and outside corners.

I. Shingle panels on slopes and grades so upgradient panel is on top.

J. Unroll only those factory-packaged sections which are to be anchored or seamed together in one day.

K. After panels are initially in place, remove as many wrinkles as possible. Unroll several panels and allow the liner to "relax" before beginning field seaming. The purpose of this is to make the edges which are to be bonded as smooth and free of wrinkles as possible.

L. Once panels are in-place and smooth, commence field seaming operations.

M. Personnel working on the FML shall not smoke, wear damaging shoes or engage in any activity which damages the FML.

N. Anchor trenches shall be constructed as shown on the Drawings. Round edges of anchor trenches or cushion with geotextile. The anchor trench shall be excavated, backfilled and compacted in accordance with MANUFACTURER's recommendations. Care should be taken when backfilling the trench to prevent any damage to the FML.

O. Damaged and sample coupon areas of FML shall be repaired by the CONTRACTOR before leaving the site at the end of each day. Any damage to subgrade while coupons are open is the responsibility of the CONTRACTOR. Repaired areas will be tested for seam integrity by the CONTRACTOR. Damaged materials are the property of the CONTRACTOR and will be removed from the site at the CONTRACTOR's expense. The CONTRACTOR will retain all ownership and responsibility for the FML until acceptance by the COMPANY.

3.3 FML SEAMING

A. Provide at least one Master Seamer who shall provide direct supervision over other welders as necessary.

B. Use a sequential seam numbering system compatible with panel numbering system that is acceptable to the ENGINEER and INSTALLER.

C. Seaming may be extrusion or wedge welding or a combination of these methods. Solvent welding is not acceptable. ENGINEER reserves the right to reject any proposed seaming method.

1. Extrusion Welding. Extrusion welding applies a molten bead of material to preheated sheets of FML which are then joined by pressure. Prior to extrusion welding:

   a. Hot-air tack adjacent pieces together using procedures that do not damage the FML.
   b. Clean FML surfaces by disc grinder or equivalent.
   c. Purge welding apparatus of heat-degraded extrudate before welding.

2. Wedge Welding. The wedge welding process heats the FML area to be joined to the melting point and then applies pressure to join the melted surfaces. Wedge welding apparatus shall be a self-propelled device equipped with an electronic controller which displays applicable temperatures.

D. Seaming shall be performed in accordance with the following:

1. All foreign matter (dirt, water, oil, etc) shall be removed from the area to be bonded. No

solvents shall be used to clean the FML.

2. It is imperative to keep surface water runoff from beneath the FML at all times during installation. The CONTRACTOR's panel placement, seam welding technique and welding schedule shall minimize or eliminate the accumulation of water beneath the FML. Any water found ponded beneath the FML after the FML has been installed shall be removed by the CONTRACTOR at no cost to the COMPANY. Subgrade beneath FML that has become excessively moist, soft or unsuitable to perform its intended function shall be replaced at no cost to the COMPANY.

3. As much as practical, field seaming shall start in the middle and work toward an open end in order to minimize cutting and patching of large wrinkles that become trapped. When seaming the side slopes, seaming should start at the toe of the slope and work up the slope. Tack welds, if used, shall use heat only; no double-sided tape, glue or other method will be permitted. The FML should be seamed completely to the ends of all panels to minimize the potential of tear propagation along the seam. Seaming of the bottom membrane to the sidewall membrane shall be conducted when conditions minimize thermal expansion effects. The completed liner shall not exhibit "trampolining" and shall be in full contact with the underlying materials.

4. FML sheets to be joined shall be overlapped at least 6-inches after the necessary aligning and cutting, unless otherwise shown on the Contract Drawings.

5. In corners and odd shaped geometric locations, the number of field seams should be minimized.

6. No seaming should be attempted above 40 degrees C (104 degrees F) ambient air temperature. Below 5 degrees C (41 degrees F) ambient air temperature, preheating of the FML may be required. It shall be the responsibility of the CONTRACTOR to demonstrate that conditions are favorable for seaming by acceptable test (start-up) seams which duplicate, as closely as possible, actual field conditions. Preheating may be achieved by natural and/or artificial means (shelters and heating devices).

7. A moveable protective layer of plastic may be required, as recommended by the ENGINEER, to be placed directly below each overlap of FML that is to be seamed. This is to prevent any moisture build-up between the sheets to be welded.

8. Seaming will extend to the outside edge of panels to be placed in anchor trenches.

9. If required, a firm substratum should be provided by using a flat board, a conveyor belt, or similar hard surface directly under the seam overlap to achieve proper support.

10. No folds, wrinkles or "fish-mouths" shall be allowed within the seam area. Where wrinkles or folds occur, the material shall be cut, overlapped and an extrusion-weld shall be applied. All welds on completion of the work shall be tightly bonded and sealed. Do not cover FML at locations that have been repaired until test results with passing values are available.

11. After seaming is complete in a given area, FML edges in the anchor trench should be buried. Do not bury the FML edge in the anchor trench within 30 feet of an incomplete or unbounded field seam.

12. At the end of each day or installation segment, all unseamed edges shall be anchored by sand bags or other approved device. Sand bags shall weigh approximately 20 pounds and shall be placed no further apart than 20 foot spacing along the open end of the FML. Sand bags securing the FML on the side slopes should be connected by a rope fastened at the top of the slope by a temporary anchor. If high winds are expected, boards along the edge of unseamed panels, with weighted sand bags on top, should be used to anchor

the FML on the bottom of the cell. Sand bags fastened by rope should be used to secure unseamed edges on the side slopes. Staples, U-shaped rods or other penetrating anchors shall not be used to secure the FML. The temporary anchoring of the FML is the responsibility of the CONTRACTOR. Any material damaged as the result of weather effects, shall be repaired or replaced at no cost to the COMPANY.

3.4 FML TESTING

A. General

1. CONTRACTOR shall employ a Geosynthetic Quality Assurance Laboratory to conduct all laboratory testing required by these Specifications.

2. Samples of the field seams shall be taken and tested in accordance with ASTM D638 to ensure that tensile strength at yield and break, elongation at yield and break meet the minimum specifications. A quality control certificate shall be issued with the material.

3. The CONTRACTOR shall employ on-site physical non-destructive testing on all welds.

4. A quality control technician shall inspect each sheet and seam. Any area showing a defect shall be marked and repaired in accordance with the FML repair procedures presented in these Specifications.

B. Trial Weld Testing. Trial weld testing shall be performed to verify welding equipment is operating properly. Trial weld testing shall be made each day prior to commencing field seaming and no welding equipment or welder shall be allowed to perform production welds until equipment and welders have successfully completed a trial weld test. Trial weld testing shall be completed in accordance with the following:

1. Make trial welds under the same surface and environmental conditions as the production welds, i.e., in contact with subgrade and similar ambient temperature.

2. Minimum of two trial weld tests per day, per welding apparatus, one made prior to the start of work and one completed at mid shift. Each seamer will make at least one trial weld test each day.

3. Cut four, one-inch wide by six-inch long test specimens from the trial weld and quantitatively test the specimens for peel adhesion and shear strength. Trial weld test specimens shall pass when the results are in compliance with the following minimum seam values:

Property	ASTM Procedure	Unit	Minimum Values
Peel Strength (fusion)	D6392	lb/in	75
Peel Strength (extrusion)	D6392	lb/in	72
Shear Strength	D6392	lb/in	90

4. The criteria for passing a peel test shall be conformance with all of the following:

   a. Failure shall be by Film Tear Bond (FTB);

   b. No greater than 10 percent of the seam width peels (separates) at any point;

   c. Compliance with the specified minimum seam values for peel; and

   d. The break shall be ductile and shall occur in the FML material itself, not through peel separation.

5. The criteria for passing a shear test shall be conformance with all of the following:

   a. Failure shall be by FTB; and

   b. Compliance with the specified minimum seam values for shear.

6. If a trial weld fails, the entire operation will be repeated. If the additional trial weld fails, the seaming apparatus or seamer will not be accepted and will not be used for seaming until the deficiencies are corrected and two consecutive successful full test seams are achieved. Trial weld failure is defined as failure of any one of the specimens tested in shear or peel.

7. Successful trial weld samples shall be assigned a number and marked accordingly by the CONTRACTOR, who will also log the date, hour, ambient temperature, number of seaming unit, name of seamer and pass or fail description. The CONTRACTOR shall submit this data to the COMPANY following acceptance of the FML.

C. Non-Destructive Testing. All field seams shall be tested by the CONTRACTOR continuously using non-destructive techniques. Requirements for non-destructive testing are as follows:

1. Single Weld Seams: CONTRACTOR shall maintain and use equipment and personnel at the site to perform continuous vacuum box testing on all single weld production seams or when the geometry of the weld makes pressure testing impractical. Vacuum testing shall be performed in accordance with ASTM D 5641.

2. Double Weld Seams: CONTRACTOR shall maintain and use equipment and personnel to perform air pressure testing of all double weld seams. Air pressure testing shall be performed in accordance with ASTM D 5820.

D. Destructive Testing. Field seams shall be tested by the CONTRACTOR at specified intervals using destructive tests. Requirements for destructive testing are as follows:

1. Destructive testing will be performed on an average of every 1,500 linear feet of field seam. Test locations shall be approved by the ENGINEER.

2. Destructive test samples shall be 12 inches wide and of sufficient length to provide one sample to archive, one sample to the ENGINEER, and two samples to the CONTRACTOR for both field and laboratory testing.

3. Destructive testing shall be performed in accordance with ASTM D 6392, Standard Test Method for Determining the Integrity of Non-Reinforced Geomembrane Seams Produced Using Thermo-Fusion Methods. Testing requirements are as follows:

   a. Each sample shall be large enough to test five specimens in peel and five specimens in shear.

   b. The average values of each set of five specimens must comply with the material and seam requirements of this Specification and four of the five specimen tests must meet the material and seam requirements of this Specification for the seam to be considered a passing seam. If the average of the five specimens is adequate, but one of the specimens is failing, values for the failing specimen must be at least 80 percent of the specified values for the seam sample to pass.

   c. A maximum of one non-FTB failure out of five tests is acceptable provided the non-FTB specimen meets strength requirements.

   d. If unresolved discrepancies exist between Engineer's and CONTRACTOR's test results, the archived sample may be tested by the Engineer.

4. Test specimens shall pass when the results are in compliance with the following minimum seam values:

Property	ASTM Procedure	Unit	Minimum Values
Peel Strength (fusion)	D6392	lb/in	75
Peel Strength (extrusion)	D6392	lb/in	72
Shear Strength	D6392	lb/in	90

5. Failed Seam Procedures:

   a. If the seam fails, INSTALLER shall follow one of two options:

      i. Reconstruct the seam between any two passed test locations.

      ii. Trace the weld to intermediate location at least 10 feet minimum or where the seam ends in both directions from the location of the failed test.

   b. The next seam welded using the same welding device is required to obtain an additional sample, i.e., if one side of the seam is less than 10 feet long.

   c. If sample passes, then the seam shall be reconstructed or capped between the test sample locations.

6. CONTRACTOR shall repair all holes in the FML resulting from destructive sampling and shall test the continuity of the repair in accordance with these Specifications.

3.5 FML REPAIR

A. Remove damaged FML and replace with acceptable FML materials if damage cannot be satisfactorily repaired.

B. Repair any portion of unsatisfactory FML or seam area failing a destructive or non-destructive test.

C. INSTALLER shall be responsible for repair of defective areas.

D. Agreement upon the appropriate repair method shall be decided between ENGINEER and CONTRACTOR by using one of the following repair methods:

1. Patching- Used to repair large holes, tears, undispersed raw materials and contamination by foreign matter.

2. Abrading and Re-welding- Used to repair short section of a seam.

3. Spot Welding- Used to repair pinholes or other minor, localized flaws or where FML thickness has been reduced.

4. Capping- Used to repair long lengths of failed seams.

5. Flap Welding- Used to extrusion weld the flap (excess outer portion) of a fusion weld in lieu of a full cap.

6. Remove the unacceptable seam and replace with new material.

E. The following procedures shall be followed when a repair method is used:

1. All FML surfaces shall be clean and dry at the time of repair.

2. Surfaces of the FML which are to be repaired by extrusion welds shall be lightly abraded to assure cleanliness.

3. Extend patches or caps at least 6 inches for extrusion welds and 4 inches for wedge welds beyond the edge of the defect, and around all corners of patch material.

F. Repair Verification. CONTRACTOR shall number and log each patch repair and shall non-destructively test each repair using methods specified in this Specification

3.6 PROTECTIVE SOIL PLACEMENT

A. Protective Soil shall be placed over the FML as specified in Section 02300 of these Specifications and as specified herein.

3.7 FML ACCEPTANCE

A. COMPANY will accept the FML installation when:

1. The installation is complete as determined by the ENGINEER.

2. All required submittals and documentation have been received and approved by ENGINEER.

3. Test reports verifying completion of all field seams and repairs are in accord with specified requirements.

4. CONTRACTOR provides ENGINEER with as-built record drawings of the instrument surveyed panel layout and seam locations with reference numbers for test locations.

5. Written certification documents have been received and approved by ENGINEER.

++END OF SECTION++

SECTION 02430

GEOTEXTILE

PART 1 – GENERAL

1.1 DESCRIPTION

A. This section shall govern work associated with furnishing and installing geotextile including, but not limited to, layout, installation, and testing.

1.2 REFERENCES

A. American Society of Testing Materials (ASTM) Standards/Publications (Latest version):

D3776	Test Method for Mass per Unit Area (weight) of Woven Fabric
D3786	Test Method for Hydraulic Bursting Strength of Knitted Goods and Non-woven Fabrics
D3787	Test Method for Hydraulic Bursting Strength of Knitted Goods and Non-woven Fabrics, Diaphragm Bursting Strength Test
D4354	Standard Practice for Sampling Geosynthetics for Testing
D4355	Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus
D4491	Test Method for Water Permeability of Geotextiles by Permittivity
D4533	Test Method for Trapezoid Tearing Strength of Geotextiles
D4595	Test Method for Tensile Properties by the Wide-width Strip Method
D4632	Test Method for Breaking Load and Elongation of Geotextiles (Grab Method)
D4751	Test Method for Determining Apparent Opening Size of Geotextile
D4833	Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
D5199	Test Method for Measuring Nominal Thickness of Geotextiles and Geomembranes

1.3 SUBMITTALS

A. At least 14 days prior to installation of the geotextile, CONTRACTOR shall submit for approval the following information:

1. Manufacturer‘s Literature. Submit manufacturer’s literature for proposed geotextile, including catalog cut sheets, material samples and, written instructions for delivery, storage, handling, installation, seaming, and repair.

2. Manufacturer Certification. Written certification from the manufacturer that the geotextile complies with the requirements of these specifications and is appropriate for the intended application.

PART 2 - PRODUCTS

2.1 GEOTEXTILE

A. Geotextile shall be non-woven, continuous or staple filament, needle-punched polypropylene or polyester suitable for AASHTO M-288 Class 2 applications. Yarn shall be oriented into a stable network that maintains its structure during handling, installation, and long-term service.

B. Geotextile shall be uniform in color, density, and other physical properties and free of foreign inclusions or other defects.

C. Geotextile shall be nominal 8 oz per square yard and shall conform to the following minimum average roll values for the properties listed:

Property	ASTM	Unit	Minimum Values
Mass per Unit Area	D5261	oz/yd2	8
Grab Tensile Strength	D4632	lb	220
Grab Elongation	D4632	%	50
CBR Puncture Strength	D6241	lb	575
Trapezoid Tear Strength	D4533	lb	90
Apparent Opening Size	D4751	US Sieve	80
Permittivity	D4491	sec^{-1}	1.3
Water Flow Rate	D4491	gpm/ft2	95
UV Resistance	D4355	% Retained	70

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE and HANDLING

A. Comply with the manufacturer's recommendations regarding product handling and protection.

B. Deliver products to the job site in their manufacturer's original packaging, with labels intact and legible.

C. Maintain packaged materials with seals unbroken and labels intact until time of use. Maintain in a manner that keeps product clean, dry and free of damage. Promptly remove damaged or unsuitable products from the job site and promptly replace with products meeting the required specifications.

D. Comply with manufacturer's recommendations when hauling, unloading, deploying, and installing geotextile. Inspect for defects before installing.

3.2 GEOTEXTILE INSTALLATION

A. Extend geotextile into anchor trenches as shown in the Drawings. Roll geotextile down the slope in such a manner as to maintain tension to preclude folds and wrinkles. Remove any folds or wrinkles by hand.

B. Ballast geotextile during deployment. Remove ballast immediately prior to covering geotextile with succeeding construction layer.

C. During installation, do no entrap rocks, dust, or moisture that could damage geotextile or cause clogging.

D. Schedule deployment activities so geotextile is exposed to direct sunlight for no more than 5 days, unless geotextile is ultraviolet-light stabilized.

E. Overlap geotextile 2 feet minimum at all seams.

F. Inspect geotextile and repair holes or tears. Patch using the same geotextile, with minimum overlap of 2 feet in all directions.

++END OF SECTION++

SECTION 02440

GEOCOMPOSITE DRAINAGE LAYER

PART 1 – GENERAL

1.1 DESCRIPTION

A. This section shall govern work associated with furnishing and installing geocompsite drainage layer including, but not limited to, layout, installation, and testing.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM)

D1238	Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer
D1505	Standard Test Method for Density of Plastics by the Density-Gradient Technique
D4218	Standard Test Method for Determination of Carbon Black Content in Polyethylene Compounds by the Muffle Furnace Technique D 1603-94 Standard Test Method for Carbon Black in Olefin Plastics
D4355	Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus
D4491	Standard Test Method for Water Permeability of Geotextiles by Permittivity
D4533	Standard Test Method for Trapezoid Tearing Strength of Geotextiles
D4716	Standard Test Method for Determining the (In-Plane) Flow Rate Per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head
D4751	Standard Test Method for Determining Apparent Opening Size of a Geotextile
D6241	Standard Test Method for the Static Puncture Strength of Geotextiles and Geotextile- Related Products Using a 50-mm Probe D 4833-88 (1996) Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Related Products
D5261	Standard Test Method for Measuring the Mass Per Unit Area of Geotextiles
D7005	Determining the Bond Strength (Ply-Adhesion) of Geocomposites
D7179	Standard Test Method for Determining Geonet Breaking Force

B. Environmental Protection Agency (EPA)

Daniel, D.E. and R.M. Koerner, (1993), Technical Guidance Document: Quality Assurance and Quality Control for Waste Containment Facilities, EPA/600/R-93/182.

1.3 DEFINITIONS

A. COMPANY - The individual or firm responsible for the design and preparation of the project's Contract Drawings and Specifications.

B. Geocomposite Manufacturer (MANUFACTURER) - The party responsible for manufacturing the geocomposite rolls.

C. Geosynthetic Quality Assurance Laboratory (TESTING LABORATORY) – Provided by CONTRACTOR, party that's independent from the MANUFACTURER and INSTALLER, responsible for conducting laboratory tests on samples of geosynthetics obtained at the site or during manufacturing.

D. INSTALLER- Party responsible for field handling, transporting, storing and deploying the geocomposite.

E. Lot- A quantity of resin (usually the capacity of one rail car) used to manufacture polyethylene geocomposite rolls. The finished rolls will be identified by a roll number traceable to the resin lot.

1.4 QUALIFICATIONS

A. MANUFACTURER

1. MANUFACTURER shall have manufactured a minimum of 10,000,000 square feet of polyethylene geocomposite material.

B. INSTALLER

1. INSTALLER shall have installed a minimum of 1 million square feet of geocomposite in the last year.

2. INSTALLER shall have worked in a similar capacity on at least 5 projects similar in complexity to the project described in the contract documents.

3. The Installation Supervisor shall have worked in a similar capacity on projects similar in size and complexity to the project described in the Contract Documents.

1.5 SUBMITTALS

A. At least 14 days prior to installation of the geocomposite, CONTRACTOR shall submit for approval the following information:

1. Manufacturer's Literature. Submit manufacturer's literature for proposed geocomposite, including catalog cut sheets, material samples and, written instructions for delivery, storage, handling, installation, seaming, and repair.

2. Manufacturer Certification. Written certification from the manufacturer that the geocomposite complies with the requirements of these specifications and is appropriate for the intended application.

1.6 MATERIAL LABELING, DELIVERY, STORAGE AND HANDLING

A. Labeling - Each roll delivered to the site shall be wrapped and labeled by the MANUFACTURER. The label will identify:

1. manufacturer's name
2. product identification
3. length
4. width
5. roll number

B. Delivery - Rolls will be prepared to ship by appropriate means to prevent damage to the material and to facilitate off-loading.

C. Storage - The on-site storage location provided by the CONTRACTOR to protect the geonet from abrasions, excessive dirt and moisture shall have the following characteristics:

1. level (no wooden pallets)
2. smooth
3. dry
4. protected from theft and vandalism
5. adjacent to the area being lined

D. Handling

1. The CONTRACTOR and INSTALLER shall handle all rolls in such a manner to ensure they are not damaged in any way.

2. The INSTALLER shall take any necessary precautions to prevent damage to underlying layers during placement of the drainage material.

1. 7 WARRANTY

A. Material shall include one-year warranty against defects.

B. Installation shall be warranted against defects in workmanship for a period of 1-year from the date of geocomposite completion.

PART 2 - PRODUCTS

2.1 GEOCOMPOSITE PRODUCT STANDARD

A. Geocomposite shall be 275-mil FabriNet Geocomposite Double-sided with 8 oz geotextile as manufactured by GSE, or approved equal.

B. Geocomposite shall be manufactured by extruding two crossing strands to form a bi-planar drainage net structure with a non-woven geotextile bonded to one or both sides.

C. Geocomposite shall have properties that meet or exceed the values listed as follows:

1. Geocomposite

Property	ASTM	Frequency	Unit	Minimum Values
Transmissivity	D4716	1/540,000 ft2	gal/min/ft	3.4
Ply Adhesion	D7005	1/50,000 ft2	lb/in	1.0

2. Geonet

Property	ASTM	Frequency	Unit	Minimum Values
Core Thickness	D5199	1/50,000 ft2	mil	275
Transmissivity	D4716	1/50,000 ft2	gal/min/ft	29
Density	D1505	1/50,000 ft2	g/cm3	0.94
Tensile Strength	D7179	1/50,000 ft2	lb/in	65
Carbon Black Content	D4218	1/50,000 ft2	%	2.0

3. Geotextile

Property	ASTM	Frequency	Unit	Minimum Values
Mass per Unit Area	D5261	1/90,000 ft2	oz/yd2	8
Grab Tensile Strength	D4632	1/90,000 ft2	lb	220

Grab Elongation	D4632	1/90,000 ft2	%	50
CBR Puncture Strength	D6241	1/90,000 ft2	lb	575
Trapezoid Tear Strength	D4533	1/90,000 ft2	lb	90
Apparent Opening Size	D4751	1/540,000 ft2	US Sieve	80
Permittivity	D4491	1/540,000 ft2	sec^{-1}	1.3
Water Flow Rate	D4491	1/540,000 ft2	gpm/ft2	95
UV Resistance	D4355	Per Formulation	% Retained	70

D. Resin

1. Resin shall be new first quality, compounded polyethylene resin.

2. Natural resin (without carbon black) shall meet the following additional minimum requirements:

Property	ASTM Test Method	Value
Density (g/cm3)	D1505	>0.932
Melt Flow Index (g/10 min)	D1238	< 1.0

2.2 MANUFACTURING QUALITY CONTROL

1. Geocomposite shall be manufactured in accordance with the Manufacturer's Quality Control Plan.

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE and HANDLING

A. Comply with the manufacturer's recommendations regarding product handling and protection.

B. Deliver products to the job site in their manufacturer's original packaging, with labels intact and legible.

C. Maintain packaged materials with seals unbroken and labels intact until time of use. Maintain in a manner that keeps product clean, dry and free of damage. Promptly remove damaged or unsuitable products from the job site and promptly replace with products meeting the required specifications.

D. Comply with manufacturer's recommendations when hauling, unloading, deploying, and installing geotextile. Inspect for defects before installing.

3.2 FAMILIARIZATION

A. Inspection

1. Prior to implementing any of the work in the Section to be lined, the INSTALLER shall carefully inspect and approve the areas to receive the geocomposite.

2. If INSTALLER has any concerns regarding the areas to receive geocomposite, he shall immediately notify COMPANY.

3.3 INSTALLATION

A. The geocomposite roll should be installed in the direction of the slope and in the intended

direction of flow unless otherwise specified by the COMPANY.

B. If the project contains long, steep slopes, special care should be taken so that only full length rolls are used at the top of the slope.

C. In the presence of wind, all geocomposites shall be weighted down with sandbags or the equivalent. Such sandbags shall be used during placement and remain until replaced with cover material.

D. The geocomposite shall be properly anchored to resist sliding. Anchor trench compacting equipment shall not come into direct contact with the geocomposite.

E. In applying fill material, no equipment can drive directly across the geocomposite. The specified fill material shall be placed and spread utilizing vehicles with a low ground pressure.

F. The cover soil shall be placed in the geocomposite in a manner that prevents damage to the geocomposite. Placement of the cover soil shall proceed immediately following the placement and inspection of the geocomposite.

3.4 SEAMS AND OVERLAPS

A. Each component of the geocomposite will be secured or seamed to the like component at overlaps.

B. Geonet Components

1. Adjacent edges of the geonet along the length of the geocomposite roll shall be placed with the edges of each geonet butted against each other.

2. The overlaps shall be joined by tying the geonet structure with cable ties. These ties shall be spaced every 5 feet along the roll length.

3. Adjoining geocomposite rolls (end to end) across the roll width should be shingled down in the direction of the slope, with the geonet portion of the top overlapping the geonet portion of the bottom geocomposite a minimum of 12 inches across the roll width.

4. The geonet portion should be tied every 6 inches in the anchor trench or as specified by the COMPANY.

3.5 REPAIR

A. Prior to covering the deployed geocomposite, each roll shall be inspected for damage resulting from construction.

B. Any rips, tears or damaged areas on the deployed geocomposite shall be removed and patched. The patch shall be secured to the original geonet by tying every 6 inches with the approved tying devices. If the area to be repaired is more than 50 percent of the width of the panel, the damaged area shall be cut out and the two portions of the geonet shall be cut out and the two portions of the geonet shall be joined in accordance with 3.4 above.

++END OF SECTION++

SECTION 02450

GEOCELLS

PART 1 – GENERAL

1.1 DESCRIPTION

A. This section shall govern work associated with furnishing and installing geocells (cellular confinement system) including, but not limited to, layout, installation, and testing.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM)

D1505	Standard Test Method for Density of Plastics by the Density-Gradient Technique
D1603	Standard Test Method for Carbon Black in Olefin Plastics
D1693	Standard Test Method for Environmental Stress-Cracking of Ethylene Plastics
D5199	Standard Test Method for Measuring the Nominal Thickness of Geosynthetics
D5397	Standard Test Method for Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test

B. US Army Corps of Engineers (USACE)

Technical Report GL-86-19, Appendix A.

1.4 QUALIFICATIONS

A. Geocell Manufacturer's Field Representative shall have worked in a similar capacity on at least 5 geocell projects similar in complexity to the project described in the contract documents.

B. Geocell Installer shall have worked in a similar capacity on at least 5 geocell projects similar in complexity to the project described in the contract documents.

1.5 SUBMITTALS

A. At least 14 days prior to installation of the geocells, CONTRACTOR shall submit for approval the following information:

1. Manufacturer’s Literature. Submit manufacturer’s literature for proposed geocells, including catalog cut sheets, material samples and, written instructions for delivery, storage, handling, installation, seaming, and repair.

2. Manufacturer Certification. Written certification from the manufacturer that the geocells comply with the requirements of these specifications and is appropriate for the intended application.

1. 6 WARRANTY

A. Material shall include one-year warranty against defects.

B. Installation shall be warranted against defects in workmanship for a period of 1-year from the date of geocell completion.

PART 2 - PRODUCTS

2.1 GEOCELL PRODUCT STANDARD

A. Geocells shall be black Terracell 140 perforated, textured high-density polyethylene (HDPE) geocell as manufactured by Hanes Geo Components, or approved equal.

B. Geocells shall be manufactured to meet the values listed as follows:

Property	Values
Cell Depth	4 in
Nominal Expanded Cell Size	10.2 in X 8.8 in
Nominal Expanded Cell Area	44.8 in
Nominal Expanded Section (L X W)	21.4 ft X 8.4 ft
Cells per Section (L X W)	29 cells X 10 cells
Nominal Expanded Section Area	180 sf
Weld Spacing	14 in

C. Geocells shall be constructed using virgin, non-thermally degraded HDPE with material properties that meet or exceed the following values:

Property	ASTM	Unit	Minimum Values
Polymer Density	D1505	g/cm3	0.935-0.965
Environmental Stress Crack Resistance	D5397	hours	>400
Environmental Stress Crack Resistance	D1693	hours	>6000
Minimum Carbon Black Content	D1603	%	1.5
Nominal Sheet Thickness	D5199	mil	60 (+10%, -5%)
Seam Peel Strength	USACE	lb	320

D. Geocell weld joints shall have a Seam Hang Strength able to support a load of 160 pounds for 30 days minimum or for 7 days minimum while undergoing temperature change from 74 degrees F to 130 degrees F on 1-hour cycle.

E. The HDPE strips used to construct the Geocell shall be textured with diamond shaped indentations. The rhomboidal indentations shall have a surface density of 140 to 200 per in^2.

F. Geocells shall be perforated with10 mm diameter holes spaced at 16.6 mm on center. The holes shall be placed in horizontal rows staggered 8.3 mm on relative to hole centers.

G. Geocell section length shall be in accordance with manufacturer recommendations for intended application.

2.2 ACCESSORIES

A. J-Hooks:

1. J-Hooks shall be uncoated steel reinforcing bars as follows:

   a. Diameter: 0.5 inch
   b. Length: 12 inches minimum.
   c. Hook: 180-degree bend

2.3 INFILL MATERIAL

A. Infill Material shall be concrete. Concrete shall at a minimum be Class A, 3,000-psi concrete with three-quarter inch diameter aggregate.

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE and HANDLING

A. Comply with the Manufacturer's recommendations regarding product handling and protection.

B. Deliver products to the job site in their manufacturer's original packaging, with labels intact and legible.

C. Maintain packaged materials with seals unbroken and labels intact until time of use. Maintain in a manner that keeps product clean, dry and free of damage. Promptly remove damaged or unsuitable products from the job site and promptly replace with products meeting the required specifications.

D. Comply with Manufacturer's recommendations when hauling, unloading, deploying, and installing geotextile. Inspect for defects before installing.

3.2 FAMILIARIZATION

A. Inspection

3. Prior to beginning geocell installation, Geocell Installer and Geocell Manufacturer's Field Representative shall carefully inspect and approve the area to receive geocells.

4. If Geocell Installer or Geocell Manufacturer's Field Representative have any concerns regarding the proposed geocell area, they shall immediately notify COMPANY.

3.3 PREPARATION

A. Prepare site by removing vegetative cover, debris, and unacceptable soils from area where geocells will be installed.

B. Replace removed soils with acceptable materials.

3.4 INSTALLATION

A. Install geocells in accordance with manufacturer's instructions at locations indicated on the drawings.

B. Anchor geocell sections as necessary to resist sliding due to gravitational forces and sheet flow.

The upper edge of the geocell shall be buried in an anchor trench as recommended by the Manufacturer and shown on the Drawings. Geocells shall also be anchored using J-Hooks in accordance with manufacturer recommendations.

C. Ensure top edges of adjoining cell walls are flush with each other and in proper alignment.

D. Geocells shall be infilled with concrete. Deliver infill material to geocells from top of slope or channel to bottom in accordance with manufacturer's instructions.

E. Limit drop height of infill material to a maximum of 3 feet to prevent damage to geocells.

F. Manually rake and machine finish concrete infill material.

++END OF SECTION++

APPENDIX B

HELP MODEL OUTPUT

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**   **
**HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE   **
**   HELP MODEL VERSION 3.07 (1 November 1997)   **
**   DEVELOPED BY ENVIRONMENTAL LABORATORY   **
**   USAE WATERWAYS EXPERIMENT STATION   **
FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
**   **
**   **
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PRECIPITATION DATA FILE: C:\WHI\VHELP22\data\P4750.VHP_weather1.dat
TEMPERATURE DATA FILE: C:\WHI\VHELP22\data\P4750.VHP_weather2.dat
SOLAR RADIATION DATA FILE: C:\WHI\VHELP22\data\P4750.VHP_weather3.dat
EVAPOTRANSPIRATION DATA: C:\WHI\VHELP22\data\P4750.VHP_weather4.dat
SOIL AND DESIGN DATA FILE: C:\WHI\VHELP22\data\P4750.VHP\I_393035.inp
OUTPUT DATA FILE: C:\WHI\VHELP22\data\P4750.VHP\O_393035.prt

TIME: 15:33   DATE: 9/ 8/2016

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   TITLE: LLDPE Cap

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     NOTE: INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
            COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.

                                LAYER 1

                    TYPE 1 - VERTICAL PERCOLATION LAYER
                        MATERIAL TEXTURE NUMBER   6
          THICKNESS   =   45.72   CM
          POROSITY   =   0.4530 VOL/VOL
          FIELD CAPACITY   =   0.1900 VOL/VOL
          WILTING POINT   =   0.0850 VOL/VOL
          INITIAL SOIL WATER CONTENT   =   0.1742 VOL/VOL
          EFFECTIVE SAT. HYD. COND.   =   0.720001612800E-03 CM/SEC
        NOTE: SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY   5.00
               FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.

                                LAYER 2

                    TYPE 2 - LATERAL DRAINAGE LAYER
                        MATERIAL TEXTURE NUMBER 20
          THICKNESS   =   0.50   CM
          POROSITY   =   0.8500 VOL/VOL
          FIELD CAPACITY   =   0.0100 VOL/VOL
          WILTING POINT   =   0.0050 VOL/VOL
          INITIAL SOIL WATER CONTENT   =   0.0604 VOL/VOL
          EFFECTIVE SAT. HYD. COND.   =   10.0000000000   CM/SEC
          SLOPE   =   3.00   PERCENT
          DRAINAGE LENGTH   =   457.2   METERS

LAYER 3

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 36

THICKNESS	=	0.10 CM
POROSITY	=	0.0000 VOL/VOL
FIELD CAPACITY	=	0.0000 VOL/VOL
WILTING POINT	=	0.0000 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000 VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.400000000000E-12 CM/SEC
FML PINHOLE DENSITY	=	9.88 HOLES/HECTARE
FML INSTALLATION DEFECTS	=	9.88 HOLES/HECTARE
FML PLACEMENT QUALITY	=	3 - GOOD

LAYER 4

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 30

THICKNESS	=	609.60 CM
POROSITY	=	0.5410 VOL/VOL
FIELD CAPACITY	=	0.1870 VOL/VOL
WILTING POINT	=	0.0470 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1870 VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.500000000000E-04 CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE # 6 WITH A FAIR STAND OF GRASS, A SURFACE SLOPE OF 3.% AND A SLOPE LENGTH OF 457. METERS.

SCS RUNOFF CURVE NUMBER	=	66.08
FRACTION OF AREA ALLOWING RUNOFF	=	100.0 PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	64.7497 HECTARES
EVAPORATIVE ZONE DEPTH	=	25.4 CM
INITIAL WATER IN EVAPORATIVE ZONE	=	3.629 CM
UPPER LIMIT OF EVAPORATIVE STORAGE	=	11.506 CM
LOWER LIMIT OF EVAPORATIVE STORAGE	=	2.159 CM
INITIAL SNOW WATER	=	0.000 CM
INITIAL WATER IN LAYER MATERIALS	=	121.988 CM
TOTAL INITIAL WATER	=	121.988 CM
TOTAL SUBSURFACE INFLOW	=	0.00 MM/YR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
Austin TX

STATION LATITUDE	=	30.31 DEGREES
MAXIMUM LEAF AREA INDEX	=	4.50
START OF GROWING SEASON (JULIAN DATE)	=	44
END OF GROWING SEASON (JULIAN DATE)	=	346
EVAPORATIVE ZONE DEPTH	=	10.0 INCHES
AVERAGE ANNUAL WIND SPEED	=	9.30 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	66.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	70.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	66.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	67.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR Austin TX

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OC	MAY/NOV	JUN/DEC
1.60	2.49	1.68	3.11	4.19	3.06
1.89	2.24	3.60	3.38	2.20	2.06

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR Austin TX

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
49.10	53.20	60.50	68.70	74.90	81.60
84.70	84.50	79.20	69.80	58.70	52.10

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR Austin TX
AND STATION LATITUDE = 30.56 DEGREES

HEAD #1: AVERAGE HEAD ON TOP OF LAYER 3
DRAIN #1: LATERAL DRAINAGE FROM LAYER 2 (RECIRCULATION AND COLLECTION)
LEAK #1: PERCOLATION OR LEAKAGE THROUGH LAYER 3
LEAK #2: PERCOLATION OR LEAKAGE THROUGH LAYER 4

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 30

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	1.15	2.50	1.69	3.07	4.12	2.87
	2.10	2.84	3.09	2.84	2.07	2.03
STD. DEVIATIONS	0.76	1.44	0.99	1.85	2.16	2.46
	1.60	2.21	2.00	2.10	1.33	1.35
RUNOFF						
TOTALS	0.000	0.000	0.000	0.001	0.013	0.011
	0.003	0.000	0.002	0.007	0.001	0.000
STD. DEVIATIONS	0.000	0.000	0.000	0.007	0.061	0.044
	0.018	0.000	0.013	0.030	0.003	0.001
EVAPOTRANSPIRATION						
TOTALS	1.419	1.437	1.892	2.405	3.062	2.187
	1.930	2.327	2.302	1.787	1.111	1.248
STD. DEVIATIONS	0.517	0.620	0.843	1.015	1.281	1.415
	1.250	1.453	1.162	0.948	0.400	0.329
LATERAL DRAINAGE COLLECTED FROM LAYER 2						
TOTALS	0.3473	0.5005	0.3782	0.5084	0.9809	0.6407
	0.6022	0.3377	0.6368	0.9121	0.6852	0.6618
STD. DEVIATIONS	0.4188	0.6877	0.4828	0.7816	1.1086	0.7157
	0.9055	0.4963	0.8662	1.1777	0.8537	0.6166
PERCOLATION/LEAKAGE THROUGH LAYER 3						
TOTALS	0.0005	0.0011	0.0006	0.0021	0.0039	0.0022
	0.0027	0.0013	0.0022	0.0035	0.0020	0.0010
STD. DEVIATIONS	0.0016	0.0025	0.0017	0.0055	0.0072	0.0041
	0.0090	0.0038	0.0053	0.0076	0.0044	0.0022

PERCOLATION/LEAKAGE THROUGH LAYER 4

TOTALS	0.0010	0.0010	0.0009	0.0006	0.0019	0.0033
	0.0030	0.0010	0.0013	0.0037	0.0023	0.0031
STD. DEVIATIONS	0.0029	0.0024	0.0027	0.0017	0.0039	0.0059
	0.0062	0.0032	0.0027	0.0088	0.0033	0.0064

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 3

AVERAGES	0.0418	0.1185	0.0548	0.2121	0.3858	0.2205
	0.2699	0.1270	0.2231	0.3396	0.1951	0.0915
STD. DEVIATIONS	0.1593	0.2684	0.1650	0.5739	0.7261	0.4196
	0.9185	0.3848	0.5455	0.7632	0.4484	0.2119

****
****

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 30

	INCHES	CU. FEET	PERCENT
PRECIPITATION	30.38 (6.302)	17642770.7	100.00
RUNOFF	0.039 (0.0767)	22796.28	0.129
EVAPOTRANSPIRATION	23.107 (3.3700)	13420175.45	76.066
LATERAL DRAINAGE COLLECTED FROM LAYER 2	7.19190 (3.32660)	4176961.856	23.67520
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.02325 (0.02049)	13502.055	0.07653
AVERAGE HEAD ON TOP OF LAYER 3	0.190 (0.174)		
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.02325 (0.01888)	13501.069	0.07652
CHANGE IN WATER STORAGE	0.016 (1.0223)	9336.27	0.053

****
****

PEAK DAILY VALUES FOR YEARS 1 THROUGH 30 and their dates (DDDYYYY)

	(INCHES)	(CU. FT.)	
PRECIPITATION	5.09	2956207.56546	1290008
RUNOFF	0.332	192667.06862	1290008
DRAINAGE COLLECTED FROM LAYER 2	0.22587	131180.80290	1840012
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.005545	3220.25452	1840012
AVERAGE HEAD ON TOP OF LAYER 3	17.775		
MAXIMUM HEAD ON TOP OF LAYER 3	30.938		
LOCATION OF MAXIMUM HEAD IN LAYER 2 (DISTANCE FROM DRAIN)	193.4 FEET		
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.001560	906.02026	2730012
SNOW WATER	1.95	1131571.6871	3430003
MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.4479		
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.0850		

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

****
****

FINAL WATER STORAGE AT END OF YEAR 30

LAYER	(INCHES)	(VOL/VOL)
1	3.6138	0.2008
2	0.0156	0.0792
3	0.0000	0.0000
4	44.8797	0.1870

SNOW WATER 0.000

****
****

APPENDIX C
CAP/COVER SYSTEM SLOPE STABILITY MODEL OUTPUT

September 30, 2016

Mr. Pat Behling
Pastor, Behling & Wheeler, LLC
2201 Double Creek Dr., Suite 4004
Round Rock, TX 78664

Re: Evaluation of Landfill Cap Slope Stability – Sandow Unit No. 5 AX Landfill, near Rockdale, Texas

Dear Mr. Behling:

As requested by Pastor, Behling & Wheeler, LLC (PBW), Bullock, Bennett & Associates, LLC (BBA) has completed evaluation of slope-stability of the proposed cap for the AX Landfill at the Sandow Mine located near Rockdale, Texas. This analysis is based on the most recent preliminary design drawings dated August 2016, provided to BBA by PBW. No site specific geotechnical data was provided to BBA for this analysis, therefore, assumptions regarding typical soil properties and interface friction angles are made in this evaluation. It is recommended that site-specific soils and proposed synthetic materials be tested for engineering strength properties, and slope stability analysis using the on-site data and final design criteria be completed prior to construction activities.

Stability Analysis of Synthetic Cap Components

This stability analysis is limited to evaluation of veneer cover soils and synthetics on 4(H):1(V) slopes, assuming the following cap configuration (from bottom to top):

Synthetic Cap System

- Compacted clay subgrade;
- Textured (both sides) flexible membrane liner (FML);
- Double-sided (geotextile on both sides) geonet drainage layer; and,
- 1.5 foot-thick cover soils.

Soil slopes of 4(H):1(V) typically are stable and do not require slope stability analysis; however, when placed as a thin veneer over a barrier such as a synthetic liner/lateral drainage layer, stability can be compromised if resisting forces along the material interfaces are not sufficient to prevent sliding. To evaluate these conditions for the proposed cap systems described above, slope stability analysis was completed using limit equilibrium and a finite slope model. As discussed in the attached analysis, veneer cover soil slope stability is very sensitive to the interface friction angle of materials, while typical variance of soil properties such as unit weight and internal friction angle have considerably less effect on the analysis. Given the sensitivity to interface friction angle, this parameter was varied for analysis, while a generally representative soil unit weight and internal friction angle were used.

A range of interface friction angles from 19 to 27 were used to capture the range associated with proposed cap components, as shown in the attached Appendix Table 1 of the *Geosynthetics Research Institute, Direct Shear Database of Geosynthetic-to Geosynthetic and Geosynthetic-to-Soil Interfaces (Koerner, Narejo, June 14, 2005)*. For conservative analysis, cohesion and adhesion values were assumed to be zero. A unit weight and internal friction angle of 115 pounds per cubic foot (pcf) and 15 degrees, respectively, were used for the soil and are generally representative of commonly

available soils in Texas, including a wide range of silty, sandy, and lean to fat clays commonly used as cover soil.

Estimated factors of safety for this analysis range from approximately 1.4 to 2.0 for interface friction angles ranging from 19 to 27, respectively, with assumed cohesion and adhesion values of zero. See *Veneer Cover Soil Analysis of Synthetic Cap System* in Attachment 1 for calculations and further stated assumptions.

Please find attached the landfill cap slope stability analysis and supporting notes, assumptions, and documentation, and please feel free to contact me at (512) 355-9198 if you have any questions about this submittal, or if I can be of any further assistance.

Sincerely,

BBA, LLC

Dan Bullock, P.E.
Principal Engineer

Attachments

ATTACHMENT 1

Veneer Cover Soil Analysis of Synthetic Cap System

LANDFILL COVER SLOPE STABILITY ANALYSIS
Sandow Unit No. 5 AX Landfill, near Rockdale, Texas

DEFINITION OF TERMS

Wa	Total weight of active wedge
Wp	Total weight of passive wedge
Na	Effective force normal to the failure plane of the active wedge
Np	Effective force normal to the failure plane of the passive wedge
Y	Unit weight of the cover soil
h	Thickness of the cover soil
L	Length of slope measured along the geomembrane
B	Soil slope angle beneath the geomembrane
Phi	Friction angle of the cover soil
Delta	Interface friction angle between cover soil and geomembrane
Ca	Adhesive force between cover soil of the active wedge and the geomembrane
ca	Adhesion between cover soil of the active wedge and the geomembrane
C	Cohesive force along the failure plane of the passive wedge
c	Cohesion of the cover soil
Ea	Interwedge force acting on the active wedge from the passive wedge
Ep	Interwedge force acting on the passive wedge from the active wedge, and
FS	Factor of safety against cover soil sliding on the geocomposite

EQUATIONS: (Designing with Geosynthetics (4th Edition), Robert M. Koerner)

Wa = Yh^2(L/h - 1/sinB - tanB/2) (3.14)

Na= WaCosB (3.15)

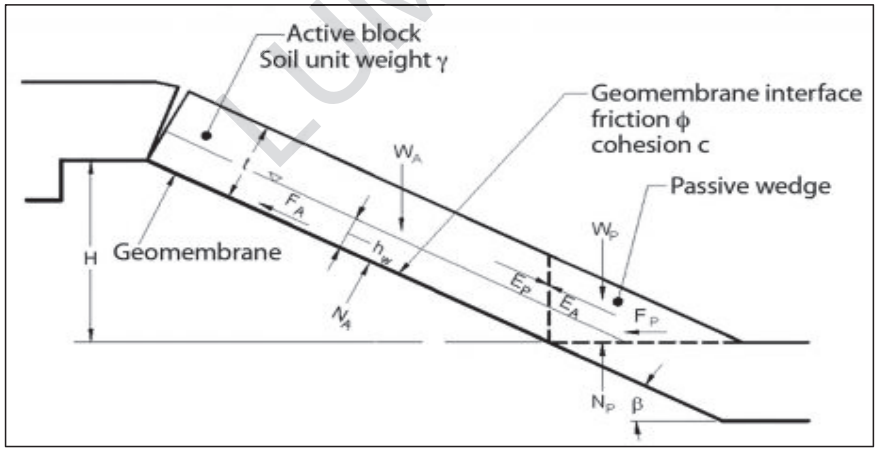
Wp= Yh^2/Sin2B (3.17)

a=(Wa-NaCosB)CosB

b=-[(Wa-NaCosB)sinB*tanPhi+(NaTanDelta+Ca)SinBCosB+sinB(C+WpTanPhi)]

c=(NaTanDelta+Ca)Sin^2BTanPhi

$$FS = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad (3.22)$$



FREE BODY DIAGRAM

LANDFILL COVER SLOPE STABILITY ANALYSIS
Sandow Unit No. 5 AX Landfill, near Rockdale, Texas

INPUT PARAMETERS:

Delta	19	21	23	25	27	degrees
Y	115	115	115	115	115	pcf
Phi	15	15	15	15	15	degrees
h	1.5	1.5	1.5	1.5	1.5	feet
L	3000	3000	3000	3000	3000	feet
B	14.04	14.04	14.04	14.04	14.04	degrees
Ca	0	0	0	0	0	
ca	0	0	0	0	0	
C	0	0	0	0	0	
c	0	0	0	0	0	

CALCULATIONS:

Wa	516,401.07	516,401.07	516,401.07	516,401.07	516,401.07	lb/ft
Wp	549.71	549.71	549.71	549.71	549.71	lb/ft
Na	500,974.42	500,974.42	500,974.42	500,974.42	500,974.42	lb/ft
a	29,515.82	29,515.82	29,515.82	29,515.82	29,515.82	
b	-42,609.43	-47,270.98	-52,059.21	-56,991.52	-62,087.13	
c	2,773.75	3,092.24	3,419.38	3,756.37	4,104.51	
FS	**1.38**	**1.53**	**1.70**	**1.86**	**2.04**	

NOTES/ASSUMPTIONS:

- Assumes cap system includes, from bottom to top: 1 foot compacted clay subgrade, 40 mil textured FML, double-sided geocomposite drainage layer (geotextile on both sides), and 1.5 feet of vegetative cover soil.
- Assumes slopes of 4(h):1(v) (14.04 deg).
- Assumes solid waste is stable (stability of waste not evaluated).
- Dynamic loading associated with construction or operations equipment were not evaluated. Use of construction methods protective of the liner system are assumed.
- Assumes effective lateral drainage layer and drained cover soil conditions prevents excess pore water pressure.
- Assumes no landfill gas migration into cap components.
- Interface friction angles between geotextile and soil, and between FML and geotextile are considered. For conservative evaluation purposes, no contribution of material tensile strengths, adhesion, or cohesion are considered for increased stability.
- Sensitivity analysis indicates very little effect on FS with moderate (plus or minus 10 pcf) change in soil unit weight and soil friction angle (plus or minus 10 degrees) parameters, but is very sensitive to variation in interface friction angles therefore, 5 different interface friction angles (19, 21, 23, 25, and 27) were evaluated. Typical values for interface friction angle are provided in attachments. GRI30 - Appendix Table 1 (Geosynthetics Research Institute, Direct Shear Database of Geosynthetic-to-Geosynthetic and Geosynthetic-to-Soil Interfaces - Koerner, Narejo, June 14, 2005) is attached.
- Assumes cover soil of uniform thickness and constant unit weight. Unit weight of 115 pcf, and friction angle of 15 degrees assumed.
- Due to lack of available on-site soil data, generalized soil engineering properties were assumed. A general range of synthetic material interface friction angles (with soil and other synthetic materials) were also assumed. Use of actual on-site soil materials and proposed synthetic materials for follow up laboratory testing and slope stability analysis is recommended prior to construction. Testing should include interface friction angle (and internal friction angle, as appropriate) measurements for all materials.
- Maximum slope length of less than 3,000 feet measured from preliminary design drawings, 3,000 feet was conservatively used in calculations.

ATTACHMENT 2

GRI30 – Appendix Table 1

Geosynthetic Research Institute
475 Kedron Avenue
Folsom, PA 19033-1208 USA
TEL (610) 522-8440
FAX (610) 522-8441

Direct Shear Database of Geosynthetic-to-Geosynthetic and Geosynthetic-to-Soil Interfaces

by

George R. Koerner, Ph.D., P.E.
Geosynthetic Research Institute
Folsom, PA 19033-1208
gkoerner@dca.net

and

Dhani Narejo, Ph.D.
GSE Lining Technology, Inc.
Houston, TX 77073
dnarejo@gseworld.com

GRI Report #30

June 14, 2005

Appendix Table 1. Summary of interface shear strengths.

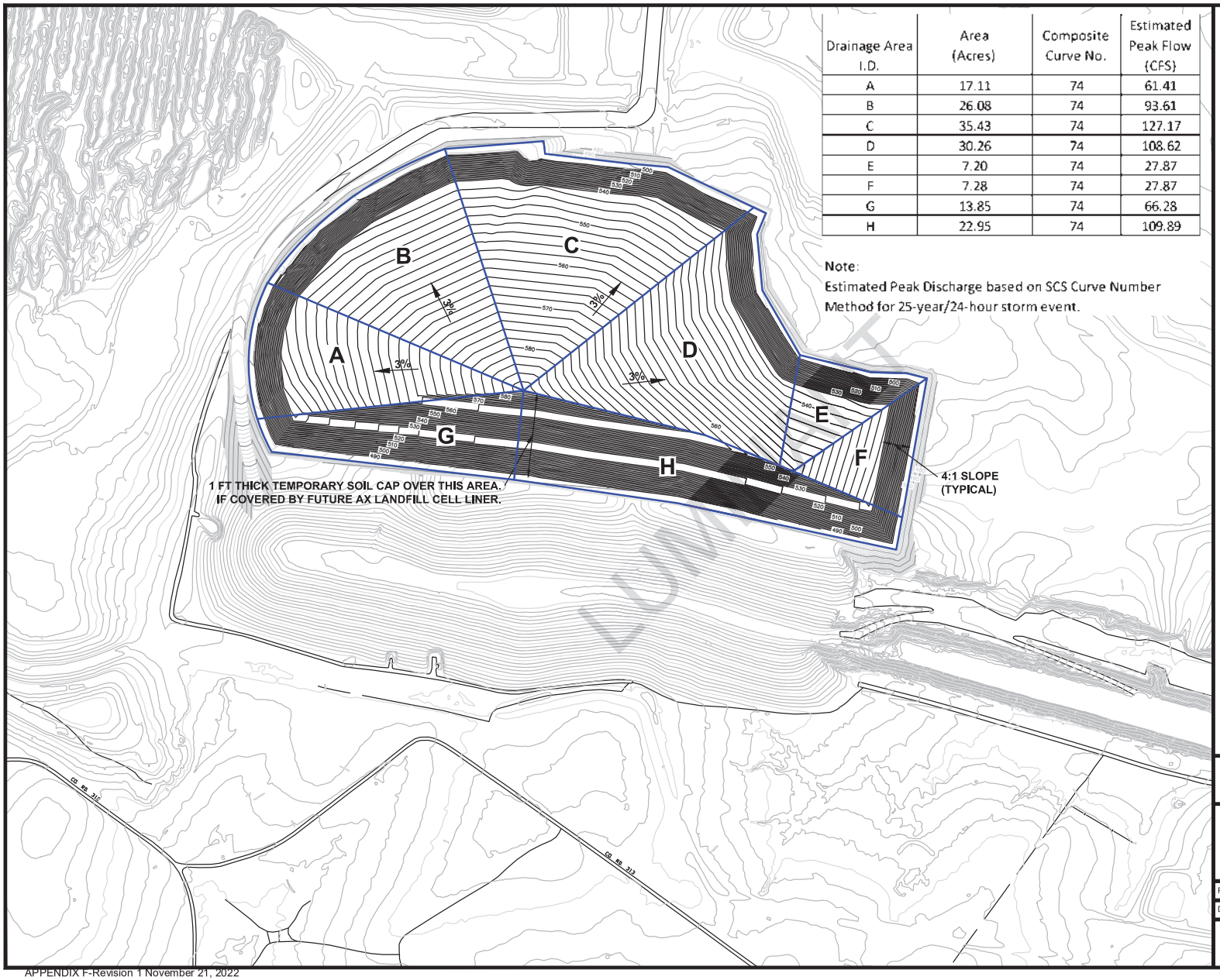
Interface 1*	Interface 2*	Peak Strength					Residual Strength				
		Fig. No.	δ (deg)	Ca (kPa)	Points	R^2	Fig. No.	δ (deg)	Ca (kPa)	Points	R^2
HDPE-S	Granular Soil	1a	21	0	162	0.93	1b	17	0	128	0.92
HDPE-S	Cohesive Soil										
	Saturated	1c	11	7	79	0.94	1d	11	0	59	0.95
	Unsaturated	1c	22	0	44	0.93	1d	18	0	32	0.93
HDPE-S	NW-NP GT	1e	11	0	149	0.93	1f	9	0	82	0.96
HDPE-S	Geonet	1g	11	0	196	0.90	1h	9	0	118	0.93
HDPE-S	Geocomposite	1i	15	0	36	0.97	1j	12	0	30	0.93
HDPE-T	Granular Soil	2a	34	0	251	0.98	2b	31	0	239	0.96
HDPE-T	Cohesive Soil										
	Saturated	2c	18	10	167	0.93	2d	16	0	150	0.90
	Unsaturated	2c	19	23	62	0.91	2d	22	0	35	0.93
HDPE-T	NW-NP GT	2e	25	8	254	0.96	2f	17	0	217	0.95
HDPE-T	Geonet	2g	13	0	31	0.99	2h	10	0	27	0.99
HDPE-T	Geocomposite	2i	26	0	168	0.95	2j	15	0	164	0.94
LLDPE-S	Granular Soil	3a	27	0	6	1.00	3b	24	0	9	1.00
LLDPE-S	Cohesive Soil	3c	11	12.4	12	0.94	3d	12	3.7	9	0.93
LLDPE-S	NW-NP GT	3e	10	0	23	0.63	3f	9	0	23	0.49
LLDPE-S	Geonet	3g	11	0	9	0.99	3h	10	0	9	1.00
LLDPE-T	Granular Soil	4a	26	7.7	12	0.95	4b	25	5.2	12	0.95
LLDPE-T	Cohesive Soil	4c	21	5.8	12	1.00	4d	13	7.0	9	0.98
LLDPE-T	NW-NP GT	4e	26	8.1	9	1.00	4f	17	9.5	9	0.96
LLDPE-T	Geonet	4g	15	3.6	6	0.97	4h	11	0	6	0.98
PVC-S	Granular Soil	5a	26	0.4	6	0.99	5b	19	0	6	0.99
PVC-S	Cohesive Soil	5c	22	0.9	11	0.88	5d	15	0	9	0.95
PVC-S	NW-NP GT	5e	20	0	89	0.91	5f	16	0	83	0.74
PVC-S	NW-HB GT	5g	18	0	3	1.00	5h	12	0.1	3	1.00
PVC-S	Woven GT	5i	17	0	6	0.54	5j	7	0	6	0.93
PVC-S	Geonet	5k	18	0.1	3	1.00	5l	16	0.6	3	1.00

Appendix Table 1. (continued)

Interface 1*	Interface 2*	Peak Strength					Residual Strength				
		Fig. No.	δ (deg)	Ca (kPa)	Points	R^2	Fig. No.	δ (deg)	Ca (kPa)	Points	R^2
PVC-F	NW-NP GT	6a	27	0.2	26	0.95	6b	23	0	26	0.95
PVC-F	NW-HB GT	6c	30	0	8	0.97	6d	27	0	8	0.90
PVC-F	Woven GT	6e	15	0	6	0.78	6f	10	0	6	0.76
PVC-F	Geonet	6g	25	0	11	1.00	6h	19	0	11	0.99
PVC-F	Geocomposite	6i	27	1.1	5	1.00	6j	22	4.7	6	1.00
CSPE-R	Granular Soil	7a	36	0	3	1.00	7b	16	0	3	1.00
CSPE-R	Cohesive Soil	7c	31	5.7	6	0.71	7d	18	0	6	0.99
CSPE-R	NW-NP GT	7e	14	0	6	0.97	7f	10	0	6	0.98
CSPE-R	NW-HB GT	7g	21	0	3	1.00	7h	10	0	3	1.00
CSPE-R	Woven GT	7i	11	0	6	0.92	7j	11	0	3	1.00
CSPE-R	Geonet	7k	28	0	9	0.87	7l	16	0	9	0.80
NW-NP GT	Granular Soil	8a	33	0	290	0.97	8b	33	0	117	0.96
NW-HB GT	Granular Soil	8c	28	0	6	0.99	8d	16	0	6	0.91
Woven GT	Granular Soil	8e	32	0	81	0.99	8f	29	0	28	0.98
NW-NP GT	Cohesive Soil	9a	30	5	79	0.96	9b	21	0	28	0.79
NW-HB GT	Cohesive Soil	9c	29	0.9	15	0.71	9d	10	0	15	0.83
Woven GT	Cohesive Soil	9e	29	0	34	0.94	9f	19	0	16	0.86
GCL Reinforced (internal)	N/A	10a	16	38	406	0.85	10b	6	12	182	0.91
GCL (NW-NP GT)	HDPE-T	11a	23	8	180	0.95	11b	13	0	157	0.90
GCL (W-SF GT)	HDPE-T	11c	18	11	196	0.96	11d	12	0	153	0.92
Geonet	NW-NP GT	12a	23	0	52	0.97	12b	16	0	32	0.97
Geocomposite (NW-NP GT)	Granular Soil	13a	27	14	14	0.86	13b	21	8	10	0.92

APPENDIX D

STORMWATER HYDROLOGY CALCULATIONS



Drainage Area I.D.	Area (Acres)	Composite Curve No.	Estimated Peak Flow (CFS)
A	17.11	74	61.41
B	26.08	74	93.61
C	35.43	74	127.17
D	30.26	74	108.62
E	7.20	74	27.87
F	7.28	74	27.87
G	13.85	74	66.28
H	22.95	74	109.89

Note:
Estimated Peak Discharge based on SCS Curve Number Method for 25-year/24-hour storm event.

EXPLANATION

- Proposed Finished Grade Contour 1 ft Interval
- Proposed Finished Grade Contour 5 ft Interval
- Flow Path
- Concentration Flow Path
- Approximate Alignment Stormwater Diversion Berm
- Storm Water Drainage Divide

Scale in Feet
0 300 600

LUMINANT GENERATION COMPANY, LLC
SANDOW UNIT NO.5

Appendix D

AX LANDFILL DRAINAGE AREAS AND ESTIMATED PEAK DISCHARGE

PROJECT: 5196D	BY: ADJ	REVISIONS
DATE: SEP., 2016	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS

Sandow AX Landfill
Summary of Peak Flow Estimate - SCC TR-55 Method

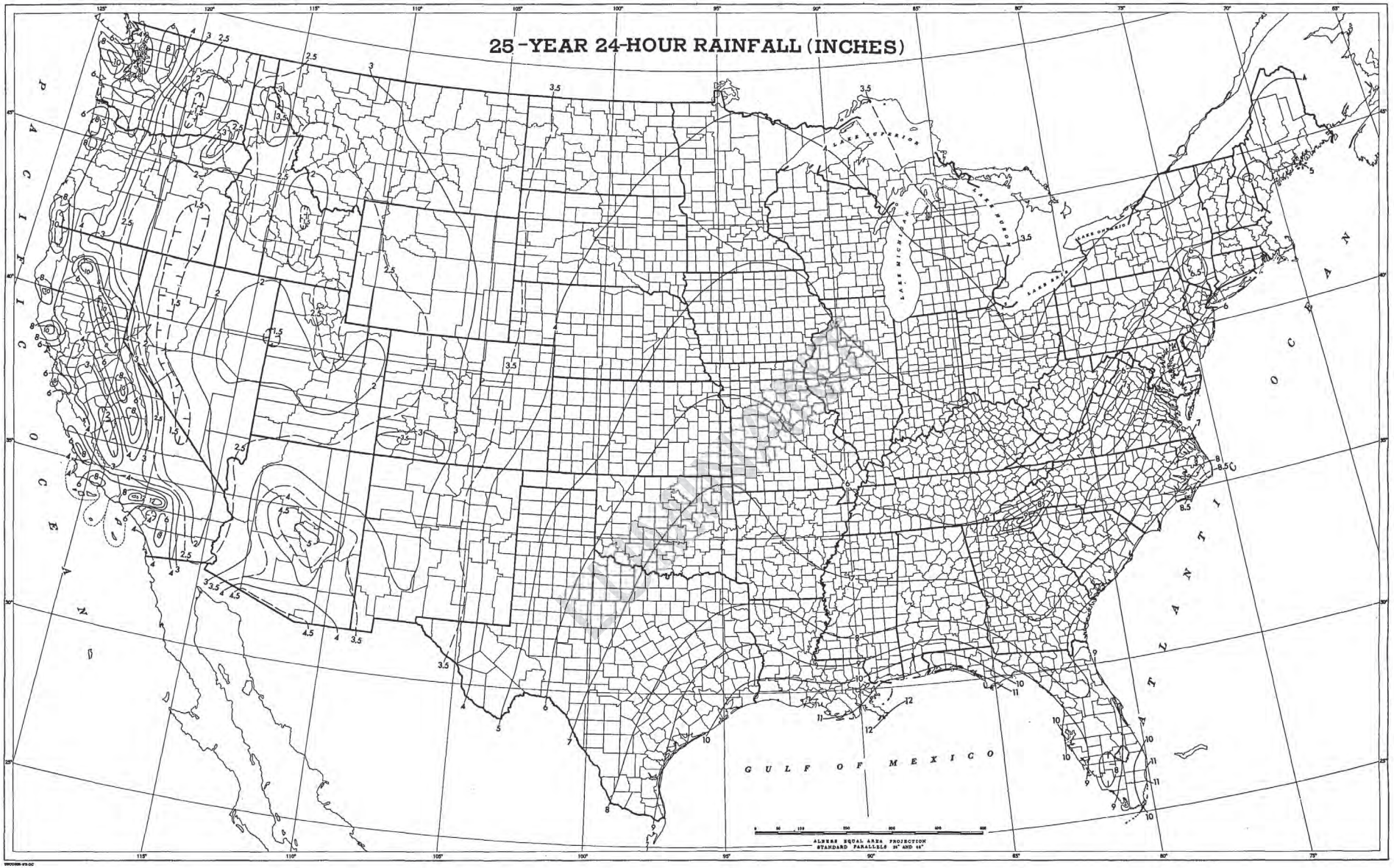
USDA - Natural Resources Conservation Service - Conservation Engineering Division - TR-55 June, 1986

SCS TR-55 Equation & Variables	
Qp= Qu*Area (miles2)* Q*Fp	
Q_p= Estimated Peak Discharge (cfs)	$Q= (P-I_a)^2/(P-I_a) + S)$
Q_u=Unit Peak Discharge (cfs/mile2-inch)	P= Design Storm Rainfall (inches)
A= Area (square miles)	Ia=0.2S (Initial abstractions; inches)
Q= Rainfall Excess (Depth of Runoff Over Watershed)	S= (1000/CN)-10
F_p= Ponding Factor (% of ponds/swamps)	CN= SCS Curve Number

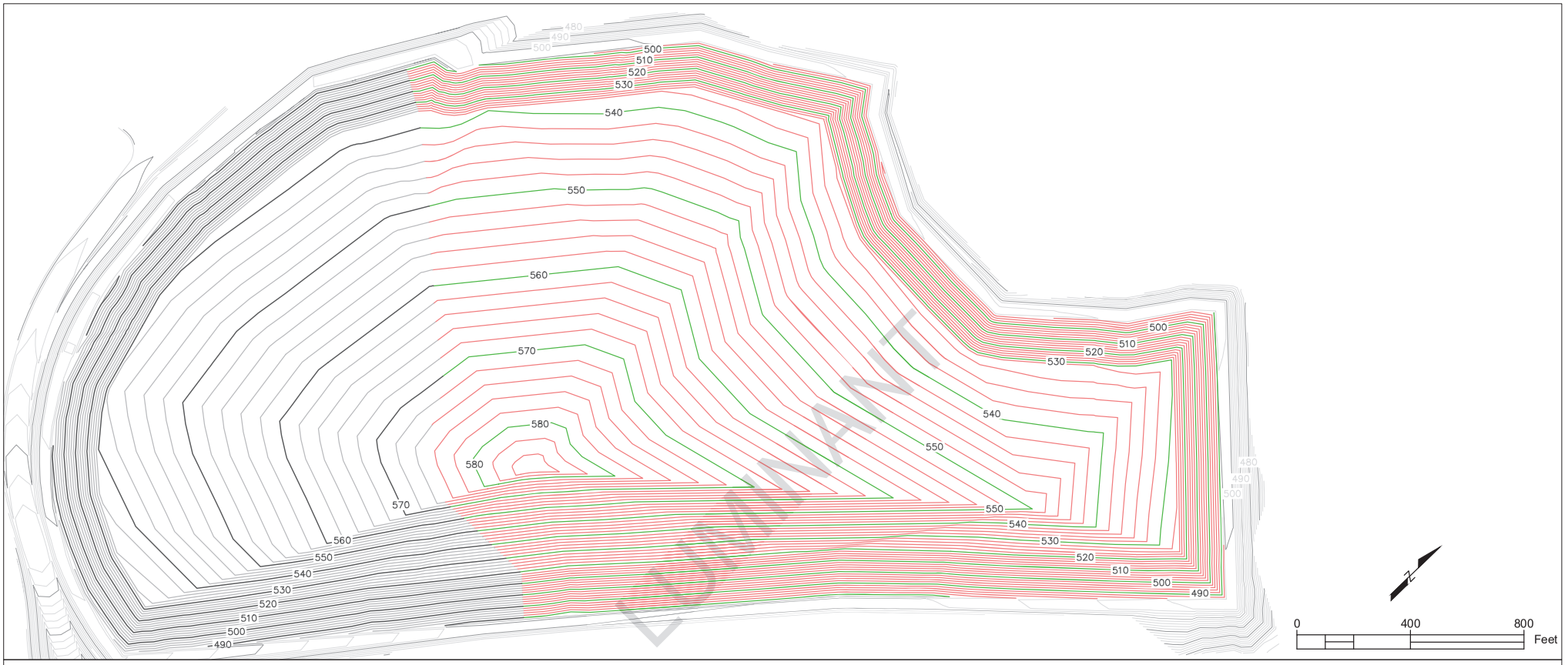
Assumptions:
Hydrologic soil group C for the vegetative cover soil layer
Open Space (Good Condition (grass cover>75%) or Pasture, Grassland, or range - continuous forage for grazing - good hydrologic condition)
Rainfall Distribution Area III for Gulf of Mexico and Atlantic Coast
Manning's Kinematic Solution (Overlap and Meadows, 1976) for Sheet Flow

Drainage Area	Area (acres)	Area (mi^2)	Composite Curve Number (Table 2-2a or c)	Estimated Peak Flow (CFS) Q_p	P(25yr,24hr rainfall - Appendix B)	S=(1000/CN)-10	I_a	Q	$I_{a/P}$	F_p
A	17.11	0.027	74	61.41	8.2	3.514	0.703	5.105	0.086	1
B	26.08	0.041	74	93.61	8.2	3.514	0.703	5.105	0.086	1
C	35.43	0.055	74	127.17	8.2	3.514	0.703	5.105	0.086	1
D	30.26	0.047	74	108.62	8.2	3.514	0.703	5.105	0.086	1
E	7.20	0.011	74	27.57	8.2	3.514	0.703	5.105	0.086	1
F	7.28	0.011	74	27.87	8.2	3.514	0.703	5.105	0.086	1
G	13.85	0.022	74	66.28	8.2	3.514	0.703	5.105	0.086	1
H	22.95	0.036	74	109.84	8.2	3.514	0.703	5.105	0.086	1

	(Sheet Flow <= 300')					(Shallow Concentrated Flow)				
Drainage Area	Tt (hr) Eq 3-3	P2 (2-yr, 24-hr rainfall - Apdx B), in	L, ft	s (ft/ft)	n (Table 3-1 for Short Grass Prarie)	v (ft/sec) (Fig - 3-1)	L, ft	Tt (hr) L/(v*3600)	Tt (hr) (Tt Sheet Flow+ Tt Shallow Flow)	qu (Exhibit 4-III)
A	0.288	4.3	300	0.0300	0.15	2.8	1200	0.1190	0.41	450
B	0.288	4.3	300	0.0300	0.15	2.8	1050	0.1042	0.39	450
C	0.288	4.3	300	0.0300	0.15	2.8	950	0.0942	0.38	450
D	0.288	4.3	300	0.0300	0.15	2.8	1100	0.1091	0.40	450
E	0.288	4.3	300	0.0300	0.15	2.8	300	0.0298	0.32	480
F	0.288	4.3	300	0.0300	0.15	2.8	300	0.0298	0.32	480
G	0.124	4.3	300	0.2500	0.15	8	400	0.0139	0.14	600
H	0.124	4.3	300	0.2500	0.15	8	400	0.0139	0.14	600


25-YEAR 24-HOUR RAINFALL (INCHES)
PACIFIC OCEAN
ATLANTIC OCEAN
GULF OF MEXICO
LAKE SUPERIOR
LAKE MICHIGAN
LAKE HURON
LAKE ERIE
LAKE ONTARIO
ALBERS EQUAL AREA PROJECTION
STANDARD PARALLELS 29° AND 45°

APPENDIX E
CCR VOLUME AND AREA CALCULATIONS



Explanation

Phase 3 Ash Volume: 9,730,523

	Existing AX Area Contour – 2 ft. interval
500	Existing AX Area Contour – 10 ft. interval
	Phase 1 & 2 Ash Contour – 2 ft. interval
500	Phase 1 & 2 Ash Contour – 10 ft. interval
	Phase 3 Ash Contour – 2 ft. interval
500	Phase 3 Ash Contour – 10 ft. interval

Cut/Fill Summary

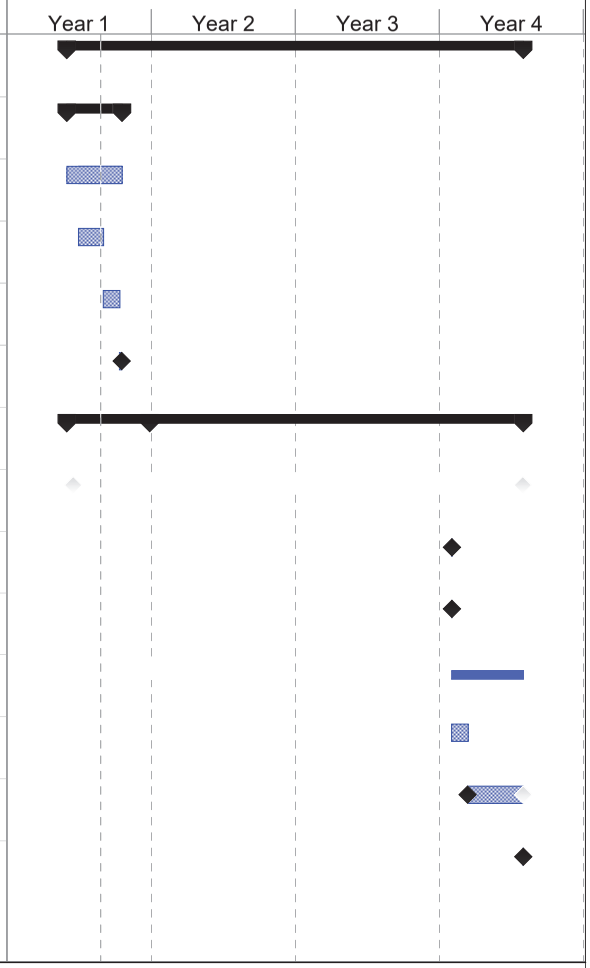
Name	Cut Factor	Fill Factor	2d Area	Cut	Fill	Net
Phase 1 2 & 3 Ash Volume	**1.000**	**1.000**	6483918.27 Sq. Ft.	0.45 Cu. Yd.	15292975.05 Cu. Yd.	15292974.60 Cu. Yd.<Fill>
Phase 1 & 2 Ash Volume	**1.000**	**1.000**	2770574.84 Sq. Ft.	1.74 Cu. Yd.	5562451.93 Cu. Yd.	5562450.18 Cu. Yd.<Fill>
Phase 1 Ash Volume	**1.000**	**1.000**	1472596.92 Sq. Ft.	0.87 Cu. Yd.	2437982.60 Cu. Yd.	2437981.73 Cu. Yd.<Fill>

APPENDIX F

PROJECT SCHEDULE – CCR CLOSURE PROCESS

APPENDIX F
PROJECT SCHEDULE - CCR UNIT CLOSURE PROCESS

ID	Task Name
1	**SANDOW 5 AX LANDFILL - CLOSURE PLAN**
2	**TASK-1 257.102 Closure Planning for CCR Units**
3	**Preparation of Closure Plan**
4	Review Draft Closure Plan
5	Revise Draft Closure Plan
6	Finalize Closure Plan
7	**Task 2 - 257.102 (d) Closure In-Place of CCR Unit**
8	**Closure Triggers**
9	Closure Initiated within 2-years of Last Receipt of Waste
10	Closure Initiated within 2-years of Last Beneficial Use of CCR
11	**Closure Sequence**
12	TPDES Storm Water Construction General Permit NOI
13	Construct Final Cover System
14	Closure Completion Deadline or Two 1-year Extensions
	Note - Extension requires demonstration of infeasibility 257.102(f)(2))



Page 1

Task		Inactive Task		Manual Summary	
Split		Inactive Task		Start-only	
Milestone		Inactive Milestone		Finish-only	
Summary		Inactive Summary		Progress	
Project Summary		Manual Task		Deadline	
External Tasks		Duration-only			
External Milestone		Manual Summary Rollup			

Notes: Schedule does not include administrative/legal/receiver activities. Closure initiation will be determined in accordance with the CCR Rule and this timeline only illustrates the anticipated construction sequencing following closure initiation.

REPORT

CLOSURE PLAN ADDENDUM NO. 1

Sandow Steam Electric Station - AX Landfill
Milam County, Texas

Submitted to:

Luminant Generation Company LLC

Submitted by:

WSP GOLDER

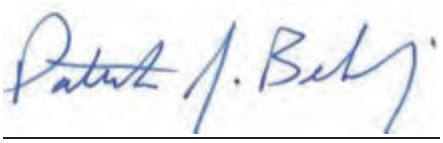
1601 S MoPac Expressway
Suite 325D
Austin, Texas, USA 78746
+1 737 703 3900

31404097.007

November 2022

PROFESSIONAL CERTIFICATION

This document and all attachments were prepared by WSP Golder under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I hereby certify that Addendum No.1 to the Closure Plan for the AX Landfill at the Sandow Steam Electric Station has been prepared in accordance with the requirements of 40 C.F.R. §257.102(b).



Patrick J. Behling, P.E.
Principal Engineer
WSP Golder
Texas Firm Registration No. 22771

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APPENDICES

DOCUMENT REVISION RECORD

Issue No.	Date	Details of Revisions
Revision 0	October 2016	Original Document
Addendum 1	November 2022	Added Slope Stability Model sealed by a Professional Engineer licensed in the State of Texas and confirmation that the Slope Stability Model will be updated using site-specific geotechnical data during final closure

1.0 INTRODUCTION

On behalf of Luminant Generation Company LLC (Luminant), WSP Golder (Golder) has prepared this Addendum No. 1 to the Closure Plan for the AX Landfill (AX LF) located at the Sandow Steam Electric Station (SASES) in Milam County, Texas (hereafter, the "Site"). Luminant formerly operated the SASES and Coal Combustion Residuals (CCR) including fly ash and bed ash generated as part of SASES operation were placed in the AX LF. The AX LF is regulated as an Existing CCR Landfill under 40 C.F.R. § 257, Subpart D (the "CCR Rule").

The original Closure Plan for the AX LF was prepared in October 2016 in accordance with 40 C.F.R. §257.102(b) and placed in the SASES operating record in accordance with 40 C.F.R. §257.105(h)(10) (PBW, 2016). This Addendum No. 1 updates the Closure Plan to reflect the following:

- Inclusion of a Cap/Cover System Slope Stability Model sealed by a Professional Engineer licensed in the State of Texas; and
- Confirmation that the Cap/Cover System Slope Stability Model will be updated using site-specific geotechnical data during final closure of the AX LF.

2.0 CAP/COVER SYSTEM SLOPE STABILITY MODELING

A final cap/cover system will be constructed over the CCR placed in the AX LF as part of unit closure as described in the 2016 Closure Plan (PBW, 2016). The final cap/cover system for the AX LF described in the 2016 Closure Plan consisted of the following (from bottom to top):

- Minimum 6 inches of select fill on top of CCR to serve as cap subgrade;
- A 40-mil linear low density polyethylene (LLDPE) geomembrane liner;
- A geonet drainage layer to provide lateral drainage of infiltration from the overlying soil layers;
- A 12-inch minimum thickness fill soil layer and a 6-inch minimum thickness vegetative soil layer placed over the geonet drainage layer; and
- Permanent vegetative cover established on the vegetative soil.

The cap/cover system will be constructed using suitable materials, proper material placement, and quality assurance testing to ensure stability of the final cover system.

Slope stability modeling documentation was included as Appendix C to the 2016 Closure Plan to demonstrate that the proposed cap/cover system is stable at the design cap slopes and Cap/Cover System Slope Stability Model documentation sealed by a Professional Engineer licensed in the State of Texas is attached as Appendix A to this Addendum No. 1.

It should be noted that the Cap/Cover System Slope Stability Model in Appendix A to this Addendum No. 1 was completed using generic geotechnical data for the cap/cover system components since closure of the AX LF will occur at a future date and the specific materials selected for the cap will be determined at that time. The AX LF Closure Plan will be updated to include a revised Cap/Cover System Slope Stability Model using site-specific geotechnical data during design of the final cap/closure system for the AX LF.

3.0 REFERENCES

Pastor, Behling & Wheeler, LLC (PBW), 2016. CCR Closure Plan – AX Landfill, Sandow 5 Generating Plant, Rockdale, Texas. October.

APPENDIX A

Cap/Cover System Slope Stability Model Documentation

September 30, 2016

Mr. Pat Behling
Pastor, Behling & Wheeler, LLC
2201 Double Creek Dr., Suite 4004
Round Rock, TX 78664

Re: Evaluation of Landfill Cap Slope Stability – Sandow Unit No. 5 AX Landfill, near Rockdale, Texas

Dear Mr. Behling:

As requested by Pastor, Behling & Wheeler, LLC (PBW), Bullock, Bennett & Associates, LLC (BBA) has completed evaluation of slope-stability of the proposed cap for the AX Landfill at the Sandow Mine located near Rockdale, Texas. This analysis is based on the most recent preliminary design drawings dated August 2016, provided to BBA by PBW. No site specific geotechnical data was provided to BBA for this analysis, therefore, assumptions regarding typical soil properties and interface friction angles are made in this evaluation. It is recommended that site-specific soils and proposed synthetic materials be tested for engineering strength properties, and slope stability analysis using the on-site data and final design criteria be completed prior to construction activities.

Stability Analysis of Synthetic Cap Components

This stability analysis is limited to evaluation of veneer cover soils and synthetics on 4(H):1(V) slopes, assuming the following cap configuration (from bottom to top):

Synthetic Cap System

- Compacted clay subgrade;
- Textured (both sides) flexible membrane liner (FML);
- Double-sided (geotextile on both sides) geonet drainage layer; and,
- 1.5 foot-thick cover soils.

Soil slopes of 4(H):1(V) typically are stable and do not require slope stability analysis; however, when placed as a thin veneer over a barrier such as a synthetic liner/lateral drainage layer, stability can be compromised if resisting forces along the material interfaces are not sufficient to prevent sliding. To evaluate these conditions for the proposed cap systems described above, slope stability analysis was completed using limit equilibrium and a finite slope model. As discussed in the attached analysis, veneer cover soil slope stability is very sensitive to the interface friction angle of materials, while typical variance of soil properties such as unit weight and internal friction angle have considerably less effect on the analysis. Given the sensitivity to interface friction angle, this parameter was varied for analysis, while a generally representative soil unit weight and internal friction angle were used.

A range of interface friction angles from 19 to 27 were used to capture the range associated with proposed cap components, as shown in the attached Appendix Table 1 of the *Geosynthetics Research Institute, Direct Shear Database of Geosynthetic-to Geosynthetic and Geosynthetic-to-Soil Interfaces (Koerner, Narejo, June 14, 2005)*. For conservative analysis, cohesion and adhesion values were assumed to be zero. A unit weight and internal friction angle of 115 pounds per cubic foot (pcf) and 15 degrees, respectively, were used for the soil and are generally representative of commonly

available soils in Texas, including a wide range of silty, sandy, and lean to fat clays commonly used as cover soil.

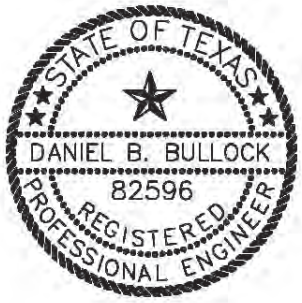
Estimated factors of safety for this analysis range from approximately 1.4 to 2.0 for interface friction angles ranging from 19 to 27, respectively, with assumed cohesion and adhesion values of zero. See *Veneer Cover Soil Analysis of Synthetic Cap System* in Attachment 1 for calculations and further stated assumptions.

Please find attached the landfill cap slope stability analysis and supporting notes, assumptions, and documentation, and please feel free to contact me at (512) 355-9198 if you have any questions about this submittal, or if I can be of any further assistance.

Sincerely,

BBA, LLC

Dan Bullock, P.E.
Principal Engineer



9/30/2016

Attachments

ATTACHMENT 1

Veneer Cover Soil Analysis of Synthetic Cap System

LANDFILL COVER SLOPE STABILITY ANALYSIS
Sandow Unit No. 5 AX Landfill, near Rockdale, Texas

DEFINITION OF TERMS

Wa	Total weight of active wedge
Wp	Total weight of passive wedge
Na	Effective force normal to the failure plane of the active wedge
Np	Effective force normal to the failure plane of the passive wedge
Y	Unit weight of the cover soil
h	Thickness of the cover soil
L	Length of slope measured along the geomembrane
B	Soil slope angle beneath the geomembrane
Phi	Friction angle of the cover soil
Delta	Interface friction angle between cover soil and geomembrane
Ca	Adhesive force between cover soil of the active wedge and the geomembrane
ca	Adhesion between cover soil of the active wedge and the geomembrane
C	Cohesive force along the failure plane of the passive wedge
c	Cohesion of the cover soil
Ea	Interwedge force acting on the active wedge from the passive wedge
Ep	Interwedge force acting on the passive wedge from the active wedge, and
FS	Factor of safety against cover soil sliding on the geocomposite

EQUATIONS: (Designing with Geosynthetics (4th Edition), Robert M. Koerner)

Wa = Yh^2(L/h - 1/sinB - tanB/2) (3.14)

Na= WaCosB (3.15)

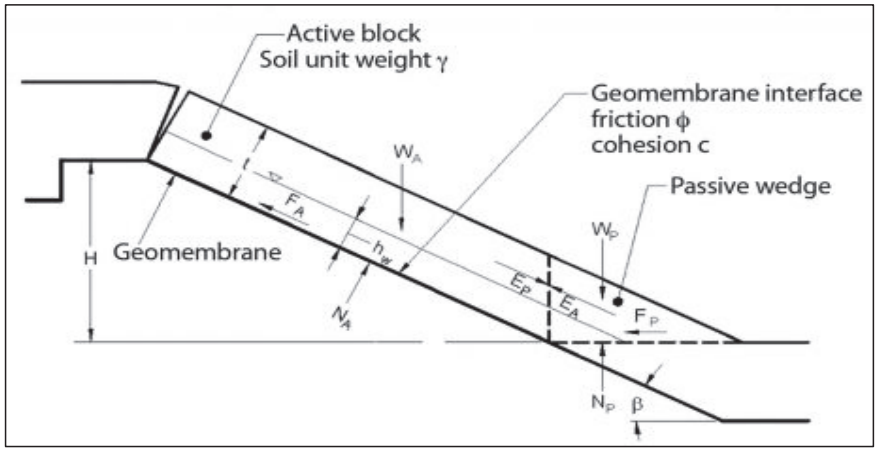
Wp= Yh^2/Sin2B (3.17)

a=(Wa-NaCosB)CosB

b=-[(Wa-NaCosB)sinB*tanPhi+(NaTanDelta+Ca)SinBCosB+sinB(C+WpTanPhi)]

c=(NaTanDelta+Ca)Sin^2BTanPhi

$$FS = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad (3.22)$$



FREE BODY DIAGRAM

LANDFILL COVER SLOPE STABILITY ANALYSIS
Sandow Unit No. 5 AX Landfill, near Rockdale, Texas

INPUT PARAMETERS:

Delta	19	21	23	25	27	degrees
Y	115	115	115	115	115	pcf
Phi	15	15	15	15	15	degrees
h	1.5	1.5	1.5	1.5	1.5	feet
L	3000	3000	3000	3000	3000	feet
B	14.04	14.04	14.04	14.04	14.04	degrees
Ca	0	0	0	0	0	
ca	0	0	0	0	0	
C	0	0	0	0	0	
c	0	0	0	0	0	

CALCULATIONS:

Wa	516,401.07	516,401.07	516,401.07	516,401.07	516,401.07	lb/ft
Wp	549.71	549.71	549.71	549.71	549.71	lb/ft
Na	500,974.42	500,974.42	500,974.42	500,974.42	500,974.42	lb/ft
a	29,515.82	29,515.82	29,515.82	29,515.82	29,515.82	
b	-42,609.43	-47,270.98	-52,059.21	-56,991.52	-62,087.13	
c	2,773.75	3,092.24	3,419.38	3,756.37	4,104.51	
FS	**1.38**	**1.53**	**1.70**	**1.86**	**2.04**	

NOTES/ASSUMPTIONS:

- Assumes cap system includes, from bottom to top: 1 foot compacted clay subgrade, 40 mil textured FML, double-sided geocomposite drainage layer (geotextile on both sides), and 1.5 feet of vegetative cover soil.
- Assumes slopes of 4(h):1(v) (14.04 deg).
- Assumes solid waste is stable (stability of waste not evaluated).
- Dynamic loading associated with construction or operations equipment were not evaluated. Use of construction methods protective of the liner system are assumed.
- Assumes effective lateral drainage layer and drained cover soil conditions prevents excess pore water pressure.
- Assumes no landfill gas migration into cap components.
- Interface friction angles between geotextile and soil, and between FML and geotextile are considered. For conservative evaluation purposes, no contribution of material tensile strengths, adhesion, or cohesion are considered for increased stability.
- Sensitivity analysis indicates very little effect on FS with moderate (plus or minus 10 pcf) change in soil unit weight and soil friction angle (plus or minus 10 degrees) parameters, but is very sensitive to variation in interface friction angles therefore, 5 different interface friction angles (19, 21, 23, 25, and 27) were evaluated. Typical values for interface friction angle are provided in attachments. GRI30 - Appendix Table 1 (Geosynthetics Research Institute, Direct Shear Database of Geosynthetic-to-Geosynthetic and Geosynthetic-to-Soil Interfaces - Koerner, Narejo, June 14, 2005) is attached.
- Assumes cover soil of uniform thickness and constant unit weight. Unit weight of 115 pcf, and friction angle of 15 degrees assumed.
- Due to lack of available on-site soil data, generalized soil engineering properties were assumed. A general range of synthetic material interface friction angles (with soil and other synthetic materials) were also assumed. Use of actual on-site soil materials and proposed synthetic materials for follow up laboratory testing and slope stability analysis is recommended prior to construction. Testing should include interface friction angle (and internal friction angle, as appropriate) measurements for all materials.
- Maximum slope length of less than 3,000 feet measured from preliminary design drawings, 3,000 feet was conservatively used in calculations.

ATTACHMENT 2

GRI30 – Appendix Table 1

Geosynthetic Research Institute
475 Kedron Avenue
Folsom, PA 19033-1208 USA
TEL (610) 522-8440
FAX (610) 522-8441

Direct Shear Database of Geosynthetic-to-Geosynthetic and Geosynthetic-to-Soil Interfaces

by

George R. Koerner, Ph.D., P.E.
Geosynthetic Research Institute
Folsom, PA 19033-1208
gkoerner@dca.net

and

Dhani Narejo, Ph.D.
GSE Lining Technology, Inc.
Houston, TX 77073
dnarejo@gseworld.com

GRI Report #30

June 14, 2005

Appendix Table 1. Summary of interface shear strengths.

Interface 1*	Interface 2*	Peak Strength					Residual Strength				
		Fig. No.	δ (deg)	Ca (kPa)	Points	R^2	Fig. No.	δ (deg)	Ca (kPa)	Points	R^2
HDPE-S	Granular Soil	1a	21	0	162	0.93	1b	17	0	128	0.92
HDPE-S	Cohesive Soil										
	Saturated	1c	11	7	79	0.94	1d	11	0	59	0.95
	Unsaturated	1c	22	0	44	0.93	1d	18	0	32	0.93
HDPE-S	NW-NP GT	1e	11	0	149	0.93	1f	9	0	82	0.96
HDPE-S	Geonet	1g	11	0	196	0.90	1h	9	0	118	0.93
HDPE-S	Geocomposite	1i	15	0	36	0.97	1j	12	0	30	0.93
HDPE-T	Granular Soil	2a	34	0	251	0.98	2b	31	0	239	0.96
HDPE-T	Cohesive Soil										
	Saturated	2c	18	10	167	0.93	2d	16	0	150	0.90
	Unsaturated	2c	19	23	62	0.91	2d	22	0	35	0.93
HDPE-T	NW-NP GT	2e	25	8	254	0.96	2f	17	0	217	0.95
HDPE-T	Geonet	2g	13	0	31	0.99	2h	10	0	27	0.99
HDPE-T	Geocomposite	2i	26	0	168	0.95	2j	15	0	164	0.94
LLDPE-S	Granular Soil	3a	27	0	6	1.00	3b	24	0	9	1.00
LLDPE-S	Cohesive Soil	3c	11	12.4	12	0.94	3d	12	3.7	9	0.93
LLDPE-S	NW-NP GT	3e	10	0	23	0.63	3f	9	0	23	0.49
LLDPE-S	Geonet	3g	11	0	9	0.99	3h	10	0	9	1.00
LLDPE-T	Granular Soil	4a	26	7.7	12	0.95	4b	25	5.2	12	0.95
LLDPE-T	Cohesive Soil	4c	21	5.8	12	1.00	4d	13	7.0	9	0.98
LLDPE-T	NW-NP GT	4e	26	8.1	9	1.00	4f	17	9.5	9	0.96
LLDPE-T	Geonet	4g	15	3.6	6	0.97	4h	11	0	6	0.98
PVC-S	Granular Soil	5a	26	0.4	6	0.99	5b	19	0	6	0.99
PVC-S	Cohesive Soil	5c	22	0.9	11	0.88	5d	15	0	9	0.95
PVC-S	NW-NP GT	5e	20	0	89	0.91	5f	16	0	83	0.74
PVC-S	NW-HB GT	5g	18	0	3	1.00	5h	12	0.1	3	1.00
PVC-S	Woven GT	5i	17	0	6	0.54	5j	7	0	6	0.93
PVC-S	Geonet	5k	18	0.1	3	1.00	5l	16	0.6	3	1.00

Appendix Table 1. (continued)

Interface 1*	Interface 2*	Peak Strength					Residual Strength				
		Fig. No.	δ (deg)	Ca (kPa)	Points	R^2	Fig. No.	δ (deg)	Ca (kPa)	Points	R^2
PVC-F	NW-NP GT	6a	27	0.2	26	0.95	6b	23	0	26	0.95
PVC-F	NW-HB GT	6c	30	0	8	0.97	6d	27	0	8	0.90
PVC-F	Woven GT	6e	15	0	6	0.78	6f	10	0	6	0.76
PVC-F	Geonet	6g	25	0	11	1.00	6h	19	0	11	0.99
PVC-F	Geocomposite	6i	27	1.1	5	1.00	6j	22	4.7	6	1.00
CSPE-R	Granular Soil	7a	36	0	3	1.00	7b	16	0	3	1.00
CSPE-R	Cohesive Soil	7c	31	5.7	6	0.71	7d	18	0	6	0.99
CSPE-R	NW-NP GT	7e	14	0	6	0.97	7f	10	0	6	0.98
CSPE-R	NW-HB GT	7g	21	0	3	1.00	7h	10	0	3	1.00
CSPE-R	Woven GT	7i	11	0	6	0.92	7j	11	0	3	1.00
CSPE-R	Geonet	7k	28	0	9	0.87	7l	16	0	9	0.80
NW-NP GT	Granular Soil	8a	33	0	290	0.97	8b	33	0	117	0.96
NW-HB GT	Granular Soil	8c	28	0	6	0.99	8d	16	0	6	0.91
Woven GT	Granular Soil	8e	32	0	81	0.99	8f	29	0	28	0.98
NW-NP GT	Cohesive Soil	9a	30	5	79	0.96	9b	21	0	28	0.79
NW-HB GT	Cohesive Soil	9c	29	0.9	15	0.71	9d	10	0	15	0.83
Woven GT	Cohesive Soil	9e	29	0	34	0.94	9f	19	0	16	0.86
GCL Reinforced (internal)	N/A	10a	16	38	406	0.85	10b	6	12	182	0.91
GCL (NW-NP GT)	HDPE-T	11a	23	8	180	0.95	11b	13	0	157	0.90
GCL (W-SF GT)	HDPE-T	11c	18	11	196	0.96	11d	12	0	153	0.92
Geonet	NW-NP GT	12a	23	0	52	0.97	12b	16	0	32	0.97
Geocomposite (NW-NP GT)	Granular Soil	13a	27	14	14	0.86	13b	21	8	10	0.92

CCR POST-CLOSURE PLAN
SANDOW 5 GENERATING PLANT
AX LANDFILL CELLS 1, 2 AND 2A
ROCKDALE, TEXAS

October 2016

Prepared for:

LUMINANT GENERATION COMPANY, LLC
1601 Bryan Street (EP-27)
Dallas, Texas 75201

Prepared by:

PASTOR, BEHLING & WHEELER, LLC
2201 Double Creek Drive, Suite 4004
Round Rock, Texas 78664
Texas Engineering Firm No. 4760

PBW Project No. 5196D

PROFESSIONAL CERTIFICATION

This document and all attachments were prepared by Pastor, Behling & Wheeler, LLC under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I hereby certify that this Post-Closure Plan has been prepared in accordance with the requirements of Section 257.104 of the CCR Rule.

10/05/16

Patrick J. Behling, P.E.
Principal Engineer
PASTOR, BEHLING & WHEELER, LLC

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LIST OF FIGURES

1.0 INTRODUCTION

Luminant Generation Company, LLC (Luminant) operates the Sandow 5 Generating Plant located approximately 7 miles southwest of Rockdale in Milam County, Texas (Figure 1). Unit No. 5 is an approximately 581-megawatt, lignite-fired electric generation unit that was placed into service in 2009. Coal Combustion Residuals (CCR) including fly ash and bed ash are generated as part of Unit No. 5 operation. CCR is currently managed in the AX Landfill located approximately 7,500 feet south of Unit No. 5.

The CCR Rule (40 CFR 257 Subpart D - *Standards for the Receipt of Coal Combustion Residuals in Landfills and Surface Impoundments*) has been promulgated by EPA to regulate the management and disposal of CCRs as solid waste under Resource Conservation and Recovery Act (RCRA) Subtitle D. The final CCR Rule was published in the Federal Register on April 17, 2015. The effective date of the CCR Rule was October 19, 2015.

The CCR Rule establishes national operating criteria for existing CCR surface impoundments and landfills, including development of post-closure plans (PCP) for all CCR impoundments and landfills. Pastor, Behling & Wheeler, LLC (PBW) was retained by Luminant to develop this post-closure plan for the AX Landfill.

1.1 CCR Landfill Post-Closure Care Requirements

Section 257.104 of the CCR Rule specifies the post-closure care requirements for existing CCR landfills that have been closed in accordance with Section 257.102 of the Rule. Following closure of the landfill, the owner/operator must conduct post-closure care for the unit, consisting of at least the following:

- Maintaining the integrity and effectiveness of the final cover system, including making repairs to the final cover as necessary to correct the effects of settlement, subsidence, erosion, or other events, and preventing run-on and run-off from eroding or otherwise damaging the final cover; and

- Maintaining the groundwater monitoring system for the unit and monitoring the groundwater in accordance with the requirements of Sections 257.90 through 257.98 of the CCR Rule.

Post-closure care must be conducted for 30 years after the CCR landfill has been closed. If at the end of the 30-year post-closure care period, groundwater assessment monitoring is being performed at the unit in

accordance with Section 257.95 of the CCR Rule, post-closure care of the unit must continue until the unit has returned to groundwater detection monitoring under Section 257.95.

Once the post-closure care period has been completed, the owner/operator of the CCR landfill must prepare a notification verifying that post-closure care has been completed. The notification must include certification by a qualified professional engineer verifying that post-closure care has been completed in accordance with the written closure plan for the unit. The notification must be placed in the facility operating record within 60 days of the completion of post-closure care.

Section 257.104(d) of the CCR Rule specifies that a written post-closure plan must be prepared for each existing CCR landfill that describes the post-closure care activities for the unit. The post-closure plan must include, at a minimum, the following information:

- A description of the required post-closure monitoring and maintenance activities and the frequency at which these activities will be performed;
- The name, address, telephone number, and email address of the person or office to contact about the facility during the post-closure care period; and
- A description of the planned uses of the closed unit property during the post-closure period. Post-closure use of the property must not disturb the integrity of the final cover, liner, or any other component of the unit containment system, or the function of the monitoring systems.

  If the owner/operator of the unit desires to disturb any of the components of the closure during the post-closure care period, a qualified professional engineer must certify that the disturbance of the final cover, liner, or other component of the containment system, including any removal of CCR, will not increase the potential threat to human health or the environment. The certification must be placed in the facility operating record and the Texas Commission on Environmental Quality (TCEQ) must be notified.

The landfill PCP must be certified by a qualified professional engineer and must document how the PCP has been designed and constructed to comply with the requirements of Section 257.104.

In accordance with 257.104(d)(2) of the CCR Rule, the initial PCP for an existing CCR landfill must be completed and placed in the facility operating record no later than October 17, 2016. The PCP must be amended whenever:

- There is a change in the operation of the landfill that would substantially affect the written post-closure plan in effect; or

- After post-closure activities have commenced, unanticipated events necessitate a revision of the written post-closure plan.

The PCP must be amended at least 60 days prior to a planned change in the operation of the facility or CCR landfill, or no later than 60 days after an unanticipated event requires the need to revise an existing PCP. If the PCP is revised after post-closure activities have commenced for a CCR landfill, the PCP must be amended no later than 30 days following the triggering event. The owner or operator of the CCR landfill must obtain a written certification from a qualified professional engineer that the initial and any amendment of the PCP plan meets the requirements of Section 257.104 of the CCR Rule.

1.2 Sandow 5 Units Subject to Post-Closure Plan Requirements

The AX Landfill is the only waste management unit associated with Sandow 5 that meets the definition of a CCR Landfill. AX Landfill Cells 1, 2 and 2A are collectively considered an "existing landfill" under 40 CFR 257.53.

This PCP was prepared for the AX Landfill. In accordance with 40 CFR 257.104 of the CCR Rule, the PCP must be amended when future landfill units or lateral expansions of the AX Landfill are constructed at Sandow 5.

1.3 Description of AX Landfill Cells 1, 2 and 2A

The AX Landfill consists of Cells 1, 2 and 2A and covers an area of approximately 148.9 acres. The AX Landfill is located approximately 7,500 feet south of Sandow 5 on reclaimed mine land that is leased by Luminant from Alcoa (Figure 2). A site plan for the AX Landfill is shown on Figure 3. The AX Landfill was registered with the TCEQ as a Class 2 Non-hazardous Waste Landfill in 2008, and the registration was updated in 2015 (PBW, 2008; PBW 2015). The landfill is used to manage fly ash and bed ash generated from Unit No. 5. Fly ash and bed ash are transported to the landfill in trucks and placed in the landfill as dry material.

AX Landfill Cells 1, 2 and 2A are lined landfill cells. Construction of Cell 1 was completed in July 2013 and construction of Cells 2 and 2A was initiated in May 2015. Cell 2 was completed in October 2015 and Cell 2A was completed in July 2016. Placement of Unit No. 5 CCR began in Cell 1 in May 2015 and Cell 2 in September 2016. As of the completion date of this plan, CCR has not been placed in Cell 2A.

The AX Landfill is constructed partially above and partially below grade and are surrounded by engineered earthen dikes that extend approximately 10 to 15 feet above surrounding grade. Smaller interior earthen dikes separate Cells 1, 2 and 2A from each other. A geosynthetic liner system, consisting of a 30 mil thick Geomembrane Supported Geosynthetic Clay Liner (GSGCL) installed on top of 2 feet of soil exhibiting a minimum hydraulic conductivity of 5 X 10-5 cm/sec, has been installed in the landfill cells. The liner system is installed across the bottom of each cell, extends across the interior dikes, and extends up the inside sides of the perimeter dikes. The liner system is covered with an approximately 18-inch thick layer of protective soil to prevent damage to the liner during landfill operations. The base of each landfill cell is sloped toward a collection area for runoff from active landfill areas at the downgradient edge of the cell.

CCR will be placed within the engineered earthen dikes that surround Cells 1, 2 and 2A. CCR levels at the embankment start approximately 2 feet below the top of the embankment and the material is sloped upward at approximately 4 (Horizontal) to 1 (Vertical) to an approximate height of 40 feet above the top of the embankment. The material then slopes upward from the top of the 4:1 sloped tier at 3 to 5 percent and reaches a peak elevation of approximately El. 586 near the center of the landfill.

As described in the CCR Closure Plan prepared for the AX Landfill, Luminant plans to close the AX Landfill in accordance with Section 257.102(d) of the CCR Rule by leaving CCR in-place and constructing a final cover system over the CCR located within the landfill (PBW, 2016). The proposed final grading plan for the final cover system is illustrated in Figure 3. Additional details regarding the final cover system are described in the CCR Closure Plan (PBW, 2016).

2.0 POST-CLOSURE INSPECTION AND MAINTENANCE PLAN

Monitoring and maintenance activities will be performed to maintain the integrity and effectiveness of the final cover system as specified in 40 CFR 257.104(b)(1). During the post-closure monitoring and maintenance period at the site, the final cover of the closed CCR unit will be inspected at the frequency indicated in Table 1 below:

Table 1 – Post-Closure Care Maintenance

Post-Closure Care Maintenance Item	Frequency of Inspections	Types of Deficiency Conditions to be looked for during inspections
Final Cover Condition	Annually	Inspection for vegetation, erosion, settlement, ponding water, and functionality and the surface water drainage system
Vegetation	Annually	Erosion rills and depressions, vegetative stress
Drainage structures	Annually	Sediment and debris build up, component damage, blockages, erosion, ponding of water in non-designated areas, excessive vegetative growth

Each monitoring and maintenance activity will be documented and include the date, components and items monitored, name of the individual performing the monitoring/maintenance, a description of the deficiencies observed (if any), maintenance/repairs performed (if any), and related information.

At a minimum, maintenance will be performed as needed prior to the next scheduled inspection.

3.0 GROUNDWATER MONITORING

As specified in 40 CFR 257.104(b)(3), groundwater monitoring activities will continue throughout the post-closure care period in accordance with 40 CFR 257.90 through 40 CFR 257.98. All groundwater monitoring wells that are part of the groundwater monitoring network will be monitored and maintained during the post-closure care period in accordance with the Groundwater Sampling and Analysis Plan, which will be finalized and placed in the Operating Record by October 17, 2017.

If at the end of the 30-year post-closure care period, groundwater assessment monitoring is being performed at the unit in accordance with 40 CFR 257.95, post-closure care of the unit must continue until the unit has returned to groundwater detection monitoring under 40 CFR 257.95.

4.0 FACILITY CONTACT INFORMATION

Table 2: Contact Information

Name	Luminant - Environmental Services
Address	1601 Bryan St., Dallas, Texas 75201
Telephone Number	214-875-8654
Email	CCRPostClosurePlan@Luminant.com

5.0 POST-CLOSURE LAND USE

Post-closure use of the property will not disturb the integrity of the final cover, liner system, or any other component of the containment system, or function of the monitoring system in accordance with §257.104(d)(1)(iii) unless necessary to comply with the maintenance requirements of this subpart or as otherwise provided as allowed under this subpart.

Post-closure land use is anticipated to be undeveloped/unchanged and the area will be deed recorded and deed restricted to prevent disturbance of the closed waste management unit.

6.0 NOTIFICATION OF COMPLETION OF POST-CLOSURE CARE PERIOD

No later than 60 days following completion of the post-closure care period, a certification will be prepared by a qualified professional engineer verifying that the post-closure care has been completed in accordance with this Post-Closure Plan.

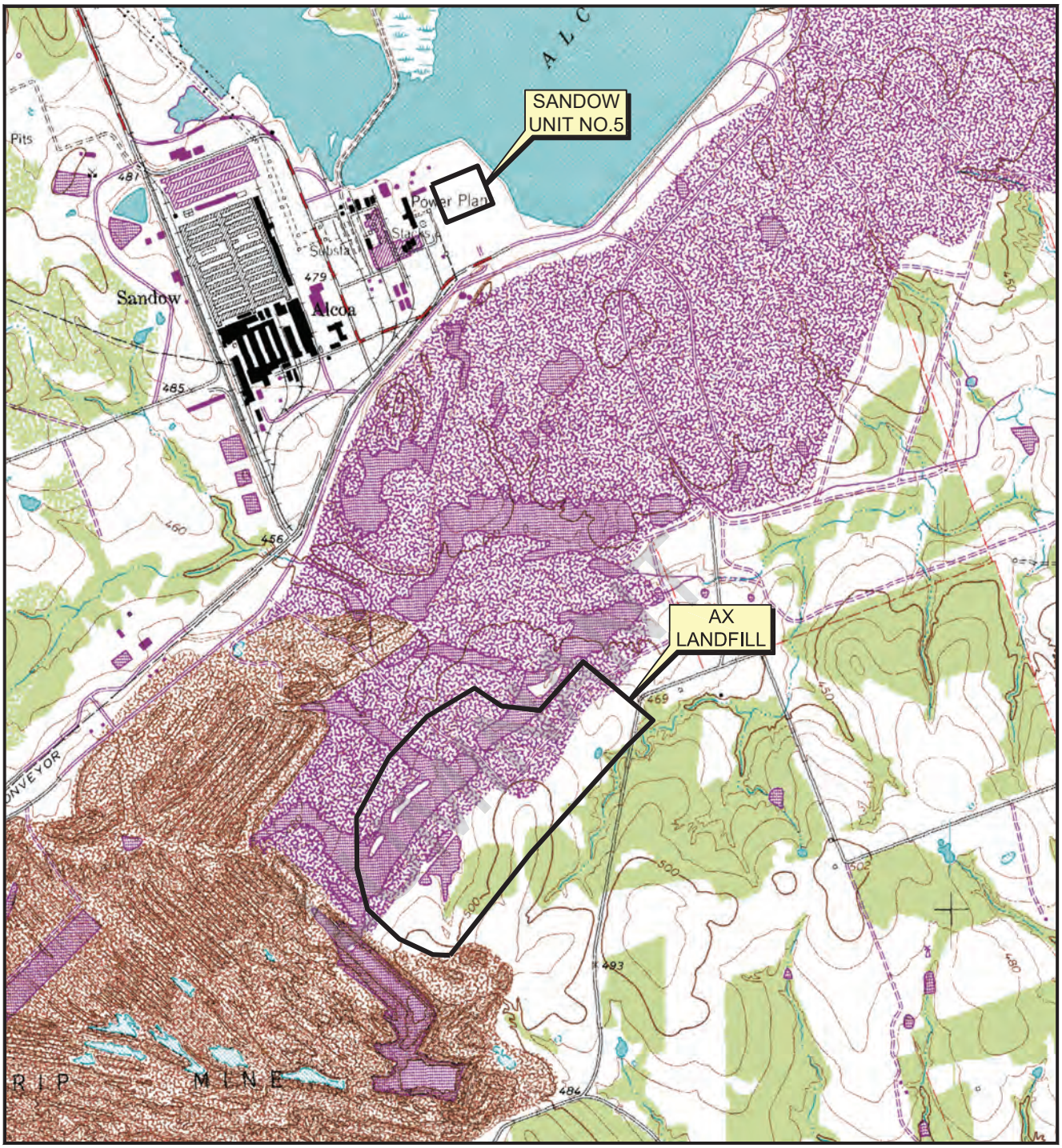
7.0 REFERENCES

Pastor, Behling & Wheeler, LLC (PBW), 2016. CCR Closure Plan – Sandow 5 Generating Plant, AX Landfill Cells 1, 2 and 2A, Rockdale, Texas, October.

PBW, 2015. Update to TCEQ Notification – AX Area Landfill, Sandow Steam Electric Station Unit 5, February 3.

PBW, 2008. *TCEQ Registration Package – AX Area Landfill, Rockdale, Texas,* June 4.

Figures



QUADRANGLE LOCATION

N

Scale in Feet

0 1000 2000

SOURCE:
Base map from www.tnris.gov, Alcoa Lake, TX 7.5 min. USGS quadrangle dated 1963, revised 1988.

LUMINANT GENERATION COMPANY, LLC

SANDOW UNIT NO.5

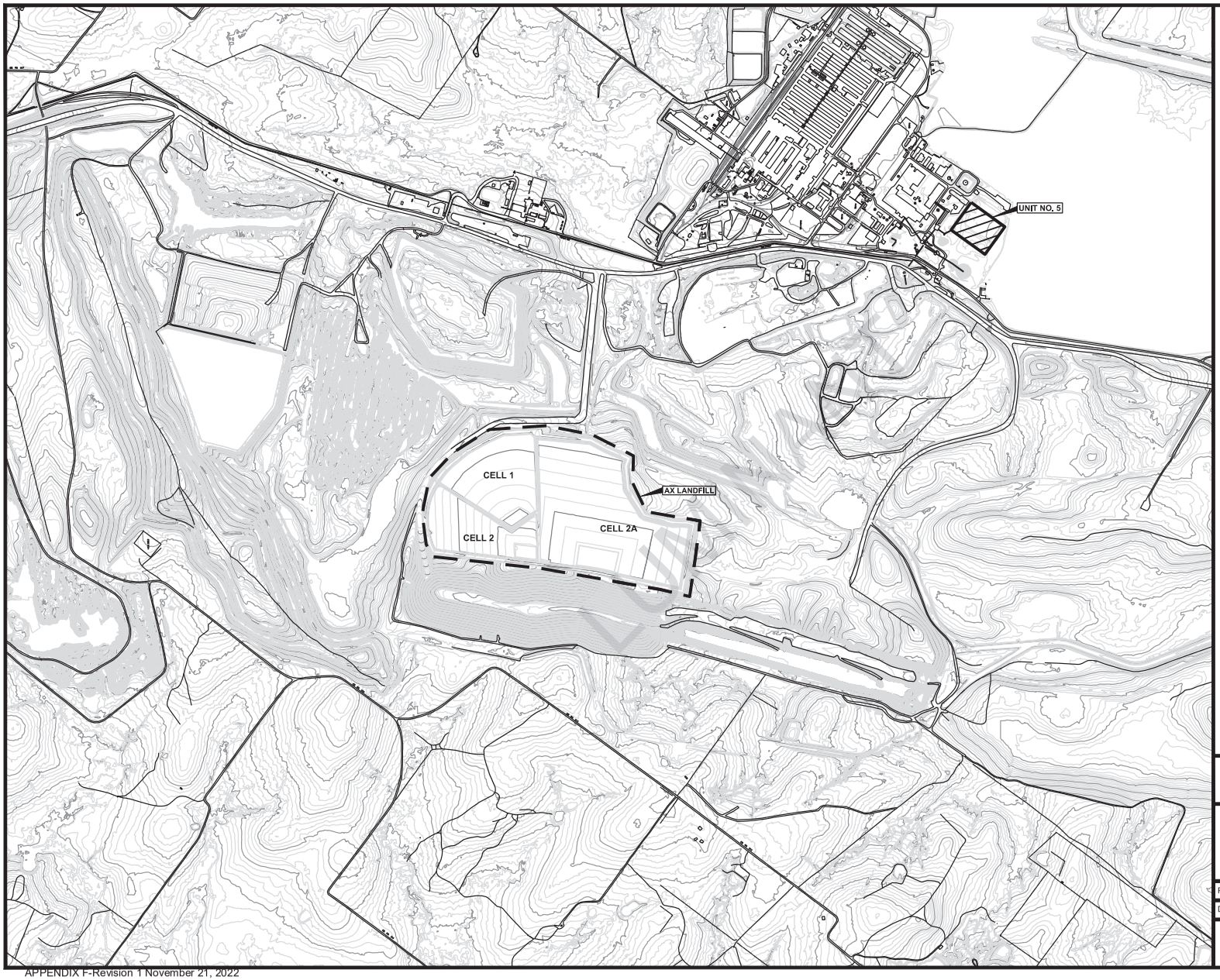
Figure 1

AX LANDFILL LOCATION MAP

PROJECT: 5196D	BY: ADJ	REVISIONS
DATE: SEP., 2016	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC

CONSULTING ENGINEERS AND SCIENTISTS



NOTE:
EXISTING GRADE CONTOURS OUTSIDE OF CELLS 1, 2 AND 2A ARE CIRCA 2006 AND ARE SHOWN FOR REFERENCE ONLY. CONTOURS DO NOT NECESSARILY REFLECT EXISTING CONDITIONS.

Scale in Feet

0 750 1500

LUMINANT GENERATION COMPANY, LLC

SANDOW UNIT NO.5

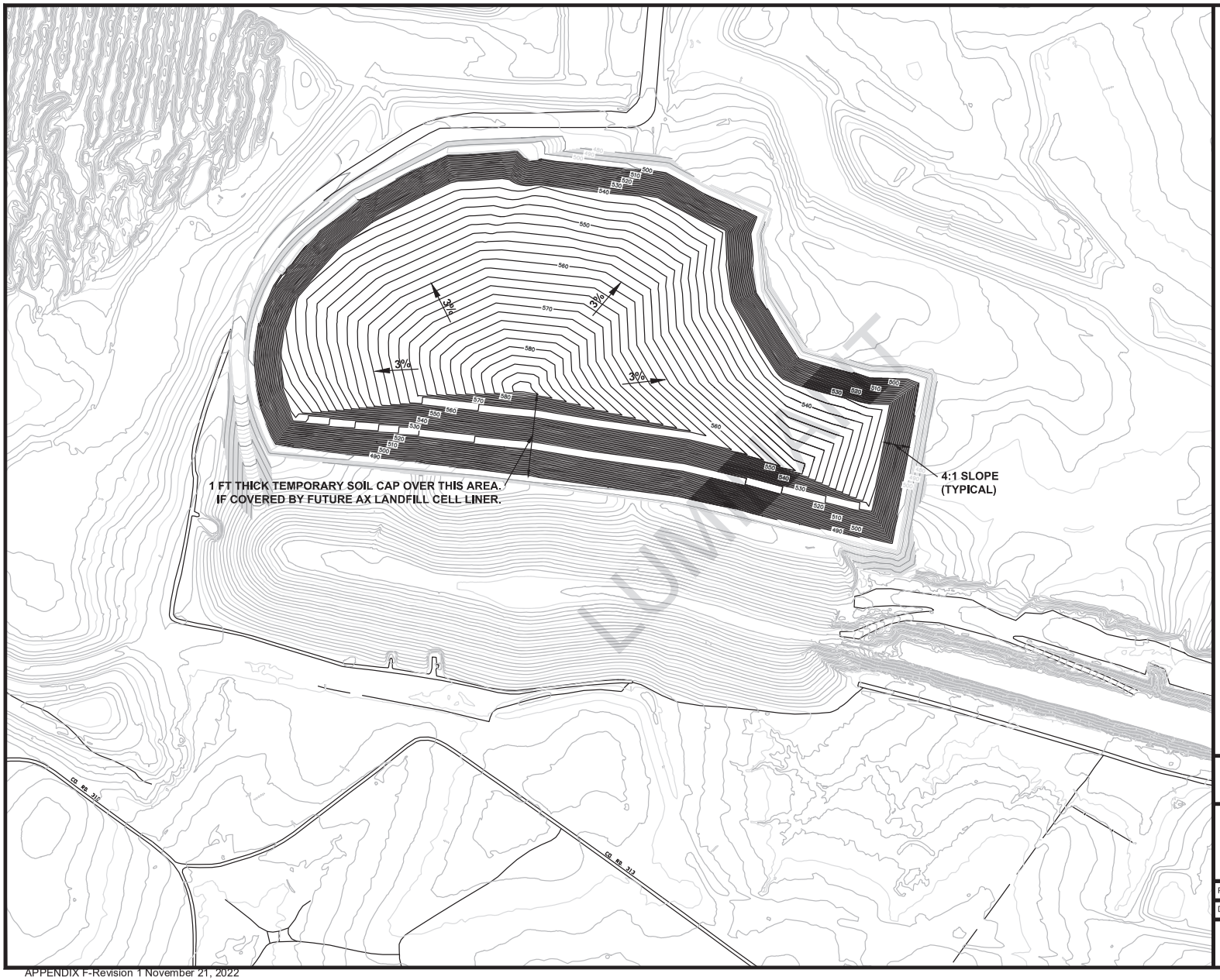
Figure 2

AX LANDFILL
SITE VICINITY MAP

PROJECT: 5196D	BY: ADJ/GJM	REVISIONS
DATE: SEP., 2016	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC

CONSULTING ENGINEERS AND SCIENTISTS



NOTES:

1) EXISTING GRADE CONTOURS OUTSIDE OF CELLS 1, 2 AND 2A ARE CIRCA 2006 AND ARE SHOWN FOR REFERENCE ONLY. CONTOURS DO NOT NECESSARILY REFLECT EXISTING CONDITIONS.
2) STORM WATER LET-DOWN STRUCTURE AND DIVERSION BERM LOCATIONS NOT SHOWN.

Scale in Feet

0 300 600

LUMINANT GENERATION COMPANY, LLC

SANDOW UNIT NO.5

Figure 3

AX LANDILL
PROPOSED CAP GRADING PLAN

PROJECT: 5196D	BY: ADJ	REVISIONS
DATE: SEP., 2016	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC

CONSULTING ENGINEERS AND SCIENTISTS

APPENDIX G – FINANCIAL ASSURANCE

Post-Closure Care Cost Estimate

TECHNICAL MEMORANDUM

DATE October 28, 2022 **Project No.** 31404097.007

TO Mr. Eric Chavers
Luminant

FROM Patrick J. Behling, PE/Will Vienne, PG **EMAIL Patrick.Behling@wsp.com**

SANDOW POWER PLANT
AX LANDFILL
POST CLOSURE CARE COST ESTIMATE

Luminant Generation Company LLC (Luminant) formerly operated the Sandow Steam Electric Station (SASES) located approximately 7 miles southwest of Rockdale in Milam County, Texas. Coal Combustion Residuals (CCR) including fly ash and bed ash were generated as part of SASES operation and placed in the AX Landfill (AX LF).

The AX LF is regulated as a CCR Unit under 40 CFR 257, Subpart D (the "Federal CCR Rule") and 30 Texas Administrative Code (TAC) Chapter 352 (The "TCEQ CCR Rule"). In accordance with 30 TAC §352.201, Luminant is required to submit an application to TCEQ to obtain a registration for the AX LF. WSP Golder (Golder) has been retained by Luminant to assist with preparation of a Post Closure Care Cost Estimate (PCCE) for the AX LF in accordance with §352.1101. This technical memorandum presents the PCCE estimated by Golder for the AX LF. The PCCE was prepared using TCEQ Technical Guidance Documents TG-30 and TG-31 and related documents.

1.0 CCR Unit Closure Assumptions

The PCCE was prepared based on the following closure assumptions for the AX LF:

- CCR Unit Closure:
  - Closure in Place with vegetated, low permeability cap
  - Cap Area: 150 acres
- Groundwater Closure:
  - No evidence of a release to groundwater to date
  - Continuation of Detection Monitoring for Groundwater
  - Nine (9) monitoring wells sampled semi-annually

2.0 Post Closure Care Cost Assumptions

The following general assumptions were incorporated into the PCCE:

- Post Closure Care Period. A post-closure care period of 30 years is assumed in accordance with 30 TAC §352.1241 and 40 CFR § 257.104(c).
- CCR Unit Inspections. Weekly and annual inspections of the CCR Unit are required under §352.831 and §352.841. It is assumed that these inspections will continue throughout the Post Closure Care Period.
- Final Cover Maintenance. It is likely that some level of maintenance/repair will be required for the final cover systems used to close the CCR Unit. The PCCE includes the following assumptions for final cover maintenance/repair:

- Years 1-5 After Closure - it is assumed that erosion damage on 5% of the cap soil will be repaired each year. The thickness of each repair is assumed to average 6 inches of soil. In addition, the repaired areas will be revegetated.
- Years 6-30 After Closure - it is assumed that erosion damage on 5% of the cap soil will be repaired three times during this period. The thickness of each repair is assumed to average 6 inches of soil. In addition, the repaired areas will be revegetated.
- Estimated engineering/mobilization costs associated with the repairs/revegetation are included in the PCCE.
- Annual mowing costs for the final cover are included in the PCCE.

- General Site Maintenance. Maintenance of run-off/drainage structures, access roads, fencing, signs, etc. are included in the PCCE.
- Groundwater Monitoring. Semi-annual groundwater monitoring in accordance with the Federal/TCEQ CCR Rules (detection monitoring or assessment monitoring) is on-going for the AX LF. It is assumed that the current groundwater monitoring program will continue throughout the Post Closure Care Period. It is also likely that maintenance of the monitoring well system at the AX LF will be required during the post closure care period. The PCCE assumes that one monitoring well will be replaced every 10 years at the CCR Unit.
- One Time Post Closure Care Costs. The following on time activities associated with post closure care are included in the PCCE:
  - Deed Notices/Surveys
  - Monitoring Well Plugging and Abandonment
- Contingency. A 10% contingency factor is included in the PCCE.
- All costs are in 2021 dollars.

3.0 Post Closure Care Cost Estimate

Based on the assumptions listed above, the 30-Year post closure care cost estimate for the AX LF is $2,591,600 (see Table 1 for details). It should be noted that the PCCE presented herein is considered an Opinion of Probable Cost and represents Golder's best judgement based on the assumptions stated, information available at the time the estimates were prepared, and Golder's experience with similar sites. The PCCE is susceptible to variations in future cost of materials, labor, and equipment and should not be considered guaranteed maximum prices for post closure care activities.

Please do not hesitate to contact us if you have any questions or comments.

Patrick J. Behling, P.E.
Director, Environmental Engineer

Will Vienne, P.G.
Senior Consultant, Austin Team Lead

TABLES

Table 1

Sandow Steam Electric Station - AX Landfill
Post Closure Care Cost Estimate - 30 TAC 352.1101

Item	Unit	Rate	Quantity	Cost/Event	No. of Events	30-Year Cost
CCR Unit Inspections (Annually)	LS	$15,000	1	$15,000	30	$450,000
Final Cover Maintenance						
- Erosion Repair, 6-inch avg. thickness, 5% of cap per year, Years 1-5	CY	$5	6,050	$30,250	5	$151,250
- Erosion Repair, 6-inch avg. thickness, 5% of cap, 3 times, Years 6-30	CY	$5	6,050	$30,250	3	$90,750
- Revegetation, 5% of cap area per year, Years 1-5	AC	$1,500	7.5	$11,250	5	$56,250
- Revegetation, 5% of cap area, 3 times, Years 6-30	AC	$1,500	7.5	$11,250	3	$33,750
- Engineering/Mobilization for Final Cover Repairs/Revegetation Events	LS	$10,000	1	$10,000	8	$80,000
- Mowing, per year	AC	$150	150	$22,500	30	$675,000
General Site Maintenance (Annually)						
- Run-off/Drainage Structures	LS	$4,000	1	$4,000	30	$120,000
- Access Roads, fencing, signs, etc.	LS	$2,000	1	$2,000	30	$60,000
GW Monitoring (Annually)						
- Detection Monitoring - Semi-annual Collection/Analysis, (9 MWs, 1 Dup)	EA	$500	10	$5,000	60	$300,000
- Annual Report	LS	$10,000	1	$10,000	30	$300,000
- Monitoring Well Maintenance (1 MW replaced every 10 years)	EA	$5,000	1	$5,000	3	$15,000
One Time Post Closure Care Costs						
- Deed Notices/Surveys	LS	$15,000	1	$15,000	1	$15,000
- Monitoring Well Plugging and Abandonment	EA	$1,000	9	$9,000	1	$9,000
					Subtotal 30-Year Post Closure Care Costs:	$2,356,000
					Contingency (10%):	$235,600
					30-Year Post Closure Cost Estimate:	**$2,591,600**

Notes:

1. All Costs in 2021 Dollars
2. SY - square yard
3. CY - cubic yard
4. EA - each
5. AC - acre
6. M - month
7. Gal - gallons
8. See Technical Memorandum for cost assumptions