2017 ANNUAL CCR UNIT INSPECTION REPORT

LUMINANT – MARTIN LAKE STEAM ELECTRIC STATION
ASH POND AREA, PERMANENT DISPOSAL POND NO. 5 & A-1 AREA LANDFILL
RUSK & PANOLA COUNTY, TEXAS

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1.0 INTRODUCTION

Luminant Generation Company, LLC (Luminant) operates the Martin Lake Steam Electric Station (MLSES) located approximately five miles southwest of Tatum in Rusk County, Texas. The power plant and related support areas occupy approximately 700 acres on a peninsula on the southwest side of Martin Lake (see Figure 1). The MLSES consists of three coal/lignite-fired units with a combined operating capacity of approximately 2,250 megawatts. Coal Combustion Residuals (CCR) including fly ash, bottom ash, gypsum are generated as part of MLSES unit operation. The CCRs are transported off-site for beneficial use by third-parties, are managed by Luminant on-site at Permanent Disposal Pond No. 5 (PDP-5), or are disposed at Luminant's A-1 Area Landfill. The A-1 Area Landfill is located approximately 2.5 miles southeast of the MLSES in Panola County.

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 operating criteria for existing CCR surface impoundments and landfills, including annual inspection requirements for all CCR units to ensure that the design, construction, operation, and maintenance of the CCR impoundment are consistent with recognized and generally accepted good engineering standards. Pastor, Behling & Wheeler, LLC (PBW) was retained by Luminant to perform the 2017 annual inspections of the CCR units at the MLSES. This report presents the findings of the 2017 annual inspections.

1.1 MLSES Units Subject to Annual CCR Inspection Requirements

The CCR Rule defines coal combustion residuals such as fly ash, bottom ash, boiler slag, flue gas desulfurization (FGD) materials (gypsum), and related solids generated from burning coal for the purpose of generating electricity by electric utilities and independent power producers. The annual inspection requirements of the CCR Rule apply to surface impoundments and landfills that dispose or otherwise engage in solid waste management of CCRs.

The following surface impoundments and landfills at the MLSES have been identified as CCR Units subject to the annual CCR inspection requirements. Each of the listed surface impoundments is surrounded by earthen embankments (dikes) with heights of five feet or more and has a storage volume greater than 20 acre-feet.

- West Ash Pond (WAP),
- East Ash Pond (EAP),
- New Scrubber Pond (SP),
- PDP-5, and
- A-1 Area Landfill.

A summary of CCR surface impoundment construction history and operational details is provide as Appendix A, and each of the CCR Units are described in greater detail below:

- Bottom Ash Ponds. The WAP and EAP (collectively "Bottom Ash Ponds" or "BAPs") are located approximately 2,000 feet east of the MLSES power plant (Figure 2). The WAP and EAP receive recovered sluice water from bottom ash dewatering bins and other MLSES process wastewater sources that typically include bottom ash fines. The ponds also act as surge basins for various water streams in the ash-water system. Process wastewater can be transferred from the BAPs to the SP and PDP-5 or used as makeup water to the bottom ash system. When sufficient ash has accumulated in either the WAP or EAP, the recovered sluice water is diverted to the other pond. Ash in the inactive pond is then removed and transported via rail car to the A-1 Area Landfill. The BAPs were originally constructed in the 1977 and upgraded in 1988 (WAP) and 2010 (EAP).

  The WAP and EAP are constructed partially above and partially below grade and are surrounded by engineered earthen embankments that extend above grade. The WAP and EAP share an interior embankment and cover areas of approximately 14.6 acres and 9.6 acres, respectively. The crest elevation of the BAP embankments is 330 feet above mean sea level (MSL) and the EAP borders Martin Lake (normal pool elevation 306 feet MSL).

  The BAPs were originally constructed in 1977 with an in-situ compacted clay liner. The WAP was removed from service in March 1988 and re-lined with a double 60-mil high density polyethylene (HDPE) liner system overlain with a concrete revetment mat. The EAP was dredged and removed from service in 1989, and a new south embankment was constructed to allow for an increase in the size of the SP. The EAP remained inactive until the installation of a new double 60-mil HDPE liner system with concrete revetment mat was completed in February 2010.

  With the exception of 24-inch subsurface dewatering lines used for decanting process wastewater from the WAP, no subsurface penetrations of the CCR units are present at MLSES. These subsurface lines are connected to a collection sump at the low pressure ash water pump station located south of the SP.

  Scrubber Pond. The SP is located immediately south of the EAP and east of the WAP (Figure 2). The SP is an approximately 12.5 acre surface impoundment that is used to manage FGD wastes as well as discharge from the sludge thickener sumps, the plant yard sumps, and storm water management areas. Solids present in the FGD wastewater settle within the pond and are periodically removed and managed similar to the ash solids from the WAP and EAP. Process wastewater can be transferred from the SP to the BAPs and PDP-5, or used as makeup water to the scrubber systems. The SP was originally constructed in 1977 with an in-situ compacted clay liner and was expanded to its current size in 1989. The SP was relined in 1989 with a double 60-mil HDPE liner system, overlain with a concrete revetment mat.

The SP is constructed partially above and partially below grade and is surrounded by engineered earthen embankments that extend above grade. The west embankment of the SP is an internal/shared embankment with the WAP and a portion of the northern embankment is an internal/shared embankment with the EAP. The crest elevation of the SP embankments is 330 feet MSL. Martin Lake (normal pool elevation 306 feet MSL) adjoins portions of the north and south embankments of the SP.

With the exception of 24-inch subsurface dewatering lines used for decanting process wastewater from the SP, no subsurface penetrations are present at the SP. These subsurface lines are connected to a collection sump at the low pressure ash water pump station located south of the SP.

- PDP-5. PDP-5 is located approximately 3,000 feet west-northwest of the MLSES power plant (Figure 2). PDP-5 is an approximately 53-acre surface impoundment that was constructed in 2010 over three closed PDPs (PDPs 1-3). PDP-5 is primarily used to manage excess liquids, including storm water from large precipitation events and excess process wastewater from both the FGD and bottom ash loops. Recovered CCR wastewaters are received in PDP-5 during cleaning cycles for the BAPs and SP. Process wastewater can be transferred between the BAPs, SP, or used as makeup water for specific CCR related systems. Process wastewater can be transferred from PDP-5 to the BAPs and the SP.

  PDP-5 is constructed above grade and is surrounded by engineered earthen embankments. The crest elevation of the PDP-5 embankments is 405.5 feet MSL, and the embankments are approximately 10 to 15 feet above surrounding grade. The liner system for the PDP-5 consists of the following:

  - a six-inch thick soil layer over the closed PDPs (in-place permeability of $1x10^{-5}$ cm/sec);
  - two-foot thick compacted clay liner (in-place permeability of $1x10^{-7}$ cm/sec); and
  - three-foot thick compacted clay interior/exterior embankment liner (minimum in-place permeability of $1x10^{-7}$ cm/sec).

- A-1 Area Landfill. The A-1 Area Landfill is located approximately 2.5 miles southeast of the MLSES power plant (Figure 2). The A-1 Area Landfill is the primary disposal facility for CCRs generated at the MLSES. The registered boundary for the landfill covers of approximately 986 acres and is located within a reclaimed section of the Luminant Beckville Mine. The A-1 Area Landfill is surrounded by and underlain by clay-rich spoil material that was previously excavated during lignite mining operations. The A-1 Area Landfill is registered under the Texas Commission on Environmental Quality and began receiving CCR in 1980.

  The A-1 Area Landfill is surrounded by earthen embankments constructed of mine spoil. Prior to placement of CCRs, the specified in-situ clay liner (a 1-foot thick compacted clay bottom liner) was constructed over prepared subgrade (mine spoil 70-100 feet in thickness). Hence, the bottom liner consists of clay scarified and re-compacted to achieve the design specification of 95 percent of maximum density and an in-place permeability of $1x10^{-7}$ cm/sec or less. The existing lined areas were constructed prior to the effective date of the CCR rule. Specifications for the construction of the perimeter embankments include placement of a 3-foot thick compacted clay liner on the interior slope of the embankment, which was specified not to exceed a 3:1

(horizontal:vertical) sideslope. Approximately 450-acres of the A-1 Area landfill has been closed by placement of a 3-foot thick compacted clay cap with a minimum 2-foot thick vegetative cover layer. Progressive capping/closure of the A-1 Area Landfill is performed as placement of CCR reaches the target cap subgrade elevations.

A number of former drainage control valves and active pond discharge control pipes that penetrate the perimeter embankment of the A-1 Area Landfill remain in-place.

1.2 Annual CCR Surface Impoundment Inspection Requirements

Section 257.83(b) of the CCR Rule specifies that annual inspections by a qualified professional engineer be performed for each CCR surface impoundment that: (1) has a dike height of five feet or more and a storage volume of 20 acre-feet or more; or (2) has a dike height of 20 feet or more. The annual CCR surface impoundment inspection must include the following:

- A review of available information regarding the status and condition of the CCR unit, including files available in the operating record, such as CCR unit design and construction information required by Sections 257.73(c)(1) and 257.74(c)(1), previous periodic structural stability assessments required under Sections 257.73(d) and 257.74(d), the results of inspections by the qualified person as required under Section 257.83(a), and the results of previous annual CCR inspections (where applicable).

- A visual inspection of the CCR unit to identify signs of distress or malfunction of the impoundment and appurtenant structures, and

- A visual inspection of any hydraulic structures underlying the base of the impoundment or passing through the dike of the impoundment for structural integrity and continued safe and reliable operation.

- A-1 Area Landfill is classified as an Existing CCR Landfill under the CCR Rule and is therefore subject to the annual inspection requirements of Section 257.84(b). The first annual CCR inspection for A-1Area Landfill was performed in 2015 (PBW, 2016a).

The qualified professional engineer must prepare a report following each inspection that addresses the following:

- Any changes in geometry of the impounding structure since previous annual inspection;

- The location and type of existing instrumentation and the maximum recorded readings of each instrument since the previous annual inspection;

- The approximate minimum, maximum, and present depth and elevation of the impounded water and CCR since the previous annual inspection;

- The storage capacity of the impounding structure at the time of the inspection;

- The approximate volume of the impounded water and CCR at the time of the inspection;
- Any appearances of actual or potential structural weakness of the impoundment, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the impoundment and appurtenant structures; and
- Any other change(s) which may have affected the stability or operation of the impounding structure since the previous inspection.

The first annual CCR inspection for the WAP, EAP, and SP was performed in 2015 (PBW, 2016a). A 2016 annual CCR inspection would have been required for the WAP, EAP, and SP in accordance with Section 257.83(b); however, CCR Rule Section 257.83(b)(4)(ii) states the following regarding annual inspection requirements for surface impoundments:

> *(ii) In any calendar year in which both the periodic inspection by a qualified professional engineer and the quinquennial (occurring every five years) structural stability assessment by a qualified professional engineer required by Sections 257.73(d) and 257.74(d) are required to be completed, the annual inspection is not required, provided the structural stability assessment is completed during the calendar year...*

A five-year structural stability assessment was performed for the WAP, EAP, and SP during 2016 by Golder Associates as required under CCR Rule Section 257.73(d) (Golder, 2016). Since the five-year structural stability assessment was performed for the WAP, EAP, and SP during 2016, a 2016 annual inspection was not performed for the WAP, EAP, and SP in accordance with CCR Rule Section 257.83(b)(4)(ii).

1.3 Annual CCR Landfill Inspection Requirements

Section 257.84(b) of the CCR Rule specifies that annual inspections be performed for CCR landfills by a qualified professional engineer. The annual CCR landfill inspection must include a review of available information regarding the status and condition of the CCR landfill including files available in the operating record, such as the results of inspections by the qualified person as required under Section 257.84(a), and the results of previous annual CCR inspections (where applicable) and visual inspection of the CCR landfill to identify signs of distress or malfunction of the landfill. The qualified professional engineer must prepare a report following each inspection that addresses the following:

- Any changes in geometry of the structure since the previous annual inspection;
- The approximate volume of CCR in the landfill at the time of the inspection;
- Any appearances of an actual or potential structural weakness of the CCR unit, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of

the CCR unit; and

- Any other change(s) which may have affected the stability or operation of the CCR unit since the previous annual inspection.

2.0 RECORDS REVIEW

In accordance with the requirements of 40 CFR Parts 257.83(b)(i) and 257.84(b)(i), Luminant provided PBW with the following information from the facility operating records for the CCR units at the MLSES:

- Fugitive Dust Control Plan (FDCP) for the CCR units,
- weekly qualified person inspection records for the CCR units,
- historical CCR unit design and construction documentation, and
- assessments of the structural stability of the CCR surface impoundments.
- 2015 Annual CCR Inspection Report
- 2016 Annual CCR Inspection Report (A-1 Area Landfill only)

The 2015 annual inspection report prepared by PBW (PBW, 2016a) is the only CCR annual inspection available for review for the EAP, WAP, SP, and PDP-5.

2.1 CCR Fugitive Dust Control Plan

The CCR FDCP for the MLSES dated October 2015 was reviewed by PBW as part of the annual CCR inspection process. The FDCP was certified by a Registered Professional Engineer on October 5, 2015, and placed into the operating record on October 16, 2015. CCR within the BAPs, SP and PDP-5 is managed using wet handling systems, which virtually eliminates the generation of fugitive dust. However, the MLSES CCR FDCP does include the following dust control measures:

- Water spray or fogging systems;
- Compaction;
- Vegetative cover; and
- Reduced vehicle speeds.

These dust controls shall be implemented during periodic removal of CCR solids from the BAPs and SP. In addition, during loading of fly ash at MLSES the material is conditioned during the loading process to mitigate fugitive dust. Controls are also in-place at the Beckville Mine to comply with the FDCP during placement of CCR within the A-1 Area Landfill. The FDCP includes provisions to amend the plan as necessary, and the plan includes a log for citizen complaints. No citizen complaints were recorded with the FDCP at the time of the annual inspection.

2.2 Weekly Qualified Person Inspection Records

Weekly inspections of CCR unit by a qualified person are required under Section 257.84(a) of the CCR Rule. PBW reviewed weekly qualified person inspection forms for the WAP, EAP, SP, PDP-5 and A-1 Area Landfill. Luminant initiated weekly CCR qualified person inspections at the MLSES in October, 2015, PBW reviewed copies of weekly inspections performed by Luminant during the 12 months prior to the annual inspection of the WAP, EAP, SP, PDP-5, and A-1 Area Landfill.

Items identified for monitoring or action at each CCR Unit weekly qualified person inspections can be summarized as follows:

- WAP and EAP:

- Repair rutting, ponded water following heavy rain and dump truck traffic on the crest of the WAP near the SP;
- Monitor wet areas following periods of heavy rain;
- Monitor/repair animal burrows and ant beds;
- Monitor conditions following water removal and cleanout of EAP (December 2016); and
- Monitor light vegetative cover on east side of EAP.

- SP:

- Repair rutting, ponded water following heavy rain and dump truck traffic on the east embankment crest;
- Monitor/repair animal burrows and ant beds on the embankments; and
- Monitor minor erosion and areas of limited vegetative cover.

- PDP-5:

- Monitor placement/grading of CCR on island and associated access road traffic (crest).
- Repair and monitor rutting on the south embankment crest access road; and
- Monitor/repair animal burrows and ant beds on the embankments.

- A-1 Area Landfill: Weekly CCR qualified person inspections of A-1 Area Landfill were performed throughout 2017. Given the size of the A-1 Area Landfill, weekly inspections consist of the following three elements:
    - an inspection of the entire landfill perimeter and capped areas in a vehicle;
    - direct visual inspection of any areas noted for on-going monitoring or repair; and
    - a walking inspection of an at least a 3,500 linear foot portion of the perimeter embankment.

This process allows for the identification of any changes or conditions that may disrupt or have the potential to disrupt the operation and safety of the CCR unit, while ensuring a minimum of seven walking inspections of the perimeter embankment are completed each year. To facilitate the inspection and monitoring activities, Luminant has established perimeter stationing (staked at 500 foot intervals) along the surveyed limits of the A-1 Area Landfill, and observations noted during the field inspection are reference to the field stationing.

Items identified for monitoring or action at the A-1 Area Landfill during the 2017 weekly qualified person inspections can be summarized as follows:

- Monitor/repair feral hog damage at numerous locations on the landfill cap and embankment;
- Monitor wet areas near boundary stations 214+00 and 223+00;
- Monitor rutting and ponded water near boundary station 27+00 following mowing;
- Monitor/repair of embankment erosion near boundary station 134+00; and
- Monitor embankment condition to ensure general maintenance of vegetation coincides with periods of dry weather.

No conditions with the potential to result in structural weakness of the impoundment embankments or that could potentially disrupt the operation and safety of the impoundments were reported during the weekly qualified person inspections of the WAP, EAP, SP and PDP-5. Recommended action items were limited to routine maintenance of access roads, erosion and animal burrows that do not currently have potential to result in structural weakness or disrupt the operation and safety of the impoundments.

Wet areas/seepage was frequently noted along the toe of the A-1 Area Landfill embankments in several areas during the weekly qualified person inspections. The wet/seepage areas were identified for on-going monitoring to assess the potential to result in a structural weakness in the embankments surrounding the landfill. Similar conditions were observed in 2015 and an assessment of the north embankment was performed between November 2015 and February 2016. Additional details related to the findings of the assessment are included in Section 2.4 Other observations/recommended action items were limited to routine maintenance of access roads, erosion and animal burrows that do not currently have potential to result in a structural weakness or disrupt the operation and safety of the landfill.

2.3 CCR Unit Design and Construction Documentation

Luminant provided PBW with the following historical documents that included information concerning the design and construction of the WAP, EAP, SP, and PDP-5 surface impoundments at the MLSES:

- CCR Study for MLSES (Burns & McDonnell, July 31, 2015); and
- Hydrogeologic/Geotechnical Evaluation A-1 Expansion Area (MFG, November 1991);
- A-1 Disposal Area Expansion, Class II Landfill Expansion Registration Notification and Technical Report (TU Electric Company, June 1993);
- CCR Closure Plans
    - Martin Lake Steam Electric Station Bottom Ash Ponds and New Scrubber Pond (PBW, 2016b).
    - Martin Lake Steam Electric Station Bottom Permanent Disposal Pond-5 (PBW, 2016c).

The CCR Study prepared by Burns and McDonnell included a review of historical slope stability evaluations performed for the WAP, EAP, SP and PDP-5 surface impoundments. A table summarizing the construction history and CCR management activities for the surface impoundments based on the historical documents is provided in Appendix A. A description of the design and construction characteristics for the WAP, EAP, SP and PDP-5 is presented in Section 1.3 of this annual report.

Luminant provided PBW with the following historical documents that included information concerning the siting study, construction specifications (i.e. clay liner and cap placement), and typical design section of the perimeter embankments and soil cap for the A-1 Area Landfill:

- Hydrogeologic/Geotechnical Evaluation A-1 Expansion Area (MFG, November 1991); and
- A-1 Disposal Area Expansion, Class II Landfill Expansion Registration Notification and Technical Report (TU Electric Company, June 1993)
- CCR Closure Plan- Martin Lake Steam Electric Station A-1 Area Landfill (PBW, 2016d)
- Run-on and Run-off Control System Plan Martin Lake Steam Electric Station A-1 Area Landfill (PBW, 2016e)

These documents include information concerning the siting study, construction specifications (i.e. clay liner and cap placement), and typical design section of the perimeter embankments and soil cap for the A-1 Area Landfill. A summary of available design and construction characteristics for the A-1Area Landfill is also presented in Section 1.2 of this annual report. As indicated in 2015 Annual CCR Unit

Inspection Report (PBW, 2016a), a geotechnical evaluation of the northern embankment of the A-1 Landfill was initiated in response to the discovery of a seep on November 12, 2015 at the toe of the embankment approximately 1,300 feet southeast of the North Run-off Collection Area (Station 27+00). The primary findings and recommendations of the geotechnical evaluation performed in 2016 include but were not limited to:

- The results of an electromagnetic (EM) survey identified elevated terrain conductivity values that generally correlated with saturated surface soil conditions between Station 21+00 to Station 35+00. Visual observations of seepage and the results of the EM survey were used to develop the scope of the geotechnical investigation.

- An 18-foot-thick saturated sand interval was encountered at 10.5 feet bgs during completion of a soil boring at the crest of the embankment near the observed seep. The sand strata was also encountered in soil borings completed along the crest of the embankment for a distance of over 400 linear feet, and the saturated sand interval is generally centered near the observed seep at the toe of the embankment. The top of the sand strata was also encountered at the toe of the embankment at a depth of four to six feet bgs near the apparent water seep location. The saturated sand interval was also encountered approximately 7 to 12 feet beneath the landfill liner in soil borings B-10 and B-11, respectively, which indicates the sand present within four feet bgs near the apparent water seep extends beneath the perimeter embankment and beneath the capped/lined portion of the landfill for a distance of over 90 feet. The mine spoil surrounding the sand strata consists primarily of silty clay that was saturated throughout the Area of Concern (AOC).

- Static water level was measured near or above ground surface in nested pairs of piezometers installed within the AOC as well as in the two nearest existing monitoring wells completed in the mine spoil (i.e. BMW-7R and BMW-9R). Increasing water table conditions have been observed over time in existing monitoring wells completed within the underlying mine spoil in this area, indicating gradual re-saturation of the spoil near the AOC.

- In accordance with TCEQ Technical Guideline No. 3, the minimum factor of safety for potential catastrophic failure of a permanent embankment slope (long-term slope failure) used to contain non-hazardous industrial solid waste above ground (i.e. Class II landfills) is 1.3. The results of a geotechnical evaluation of the A-1 Area Landfill northern perimeter embankment indicate that the embankment in the immediate vicinity of a seep (Station 27+00) meets the applicable TCEQ minimum factor of safety for slope stability under current conditions (BBA, 2016).

- Although the slope stability analysis of the A-1 Area Landfill northern perimeter embankment complies with the applicable TCEQ minimum factor of safety under current conditions, interim actions were recommended to mitigate observed seepage within the AOC. The most readily implementable alternative was to lower the groundwater elevation within the saturated sand interval encountered in the immediate vicinity of the seep. Since the observed sand thickens beneath the embankment, installation of extraction wells along the embankment crest were recommended prior to implementing any corrective actions in the immediate vicinity of the observed seep (i.e. near the toe of the embankment).

- The saturated CCR encountered within the landfill exhibits a significantly lower hydraulic conductivity than the saturated sand interval, dewatering of this interval may be necessary to reduce hydraulic head in the vicinity of the seep particularly if a hydraulic connection is observed during operation of the interim dewatering well network.

- During on-going operation of the active disposal area, accumulation of storm water in the NROCA and other areas within the limits of the A-1 Area Landfill should be minimized to the extent practicable.

To reduce the hydraulic head within the sand strata identified as the source of the former seep near Station 27+00, interim measures were initiated on September 1, 2016 by installing and operating a constant drawdown dewatering pump in an existing 4-inch piezometer (GT-5). Two additional dewatering wells were installed and began operating in November 2017. To date, over 2,500,000 gallons of water has been pumped from the three dewatering wells, which are each completed at the crest of the embankment within the saturated sand strata underlying the embankment. Static water levels within the sand strata in the vicinity of the former seep have been lowered approximately 10 feet at the crest of the embankment and approximately 5.4 feet at the toe of the embankment as a result of the interim measures.

2.4 CCR Surface Impoundment Structural Stability Assessment

Golder prepared a Structural Stability Assessment Report (Golder, 2016) for the MLSES surface impoundments dated October 2016. This report documents the condition of the EAP, WAP, SP and PDP-5 and in accordance with the CCR rule an annual inspection was not required in 2016. The October 2016 report prepared by Golder did not identify any structural stability deficiencies and previous geotechnical investigations indicate that critical embankment slopes of the EAP, WAP, SP and PDP-5 are stable. This includes the evaluation of rapid drawdown of Martin Lake and the potential impacts to slope stability of the EAP (East embankment) and SP (North and south embankments) that indicates a factor of safety (FOS) of 1.6. TCEQ Technical Guidance Document No. 4 (TG4) for non-hazardous industrial solid waste surface impoundments recommends a FOS of at least 1.5.

2.5 2015 and 2016 Annual CCR Inspection Reports and Current Status

PBW reviewed both the 2015 and 2016 Annual CCR Inspection Reports for the CCR Units at the MLSES (PBW, 2016a), as the most recent inspection report for the WAP, EAP, SP and PDP-5 were included in the 2015 report. The recommendations from the most recent Annual CCR Inspection Report for each CCR unit and the status of activities to address the recommendations at the time of the 2017 Annual CCR Inspection can be summarized as follows:

Recommendation from Most Recent Annual CCR Inspection	Status at Time of 2017 Annual CCR Inspection
A-1 AREA LANDFILL	
Monitor the several areas where saturated soil was observed at the toe of the perimeter embankment of the landfill near Stations 15+00 to 38+00, Station 71+00 to 75+00, and the Toe of the SROCA embankment (Station 214+00 and 223+00). Wet areas at the crest of the embankment along the lower portion of the north embankment access road, which are directly adjacent to the surface water diversion berm for the NROCA should also be monitored.	The 2017 CCR inspection occurred during an extended period of dry conditions that allowed for identification of the perennially saturated areas illustrated on Figure 7. Despite the presence of saturated surface soil along the toe of the northern embankment (Sta. 18+00 to 39+00), active seepage (i.e. base flow in drainage controls) was not observed at the toe of the north embankment at the time of the CCR inspection. Effectiveness of the interim pumping remedy near the former seep (Station 27+00) is being monitored by routine gauging of static fluid levels in piezometers installed as part of the geotechnical investigation. Measurable drawdown is currently observed within 300 feet of the three active pumping wells (GT-5, EW-2 and EW-3)) in piezometers completed within the same saturated sand interval. However, artesian conditions persist in the lower permeability mine spoil (i.e. clayey material) located near the toe within the AOC.
Monitor recently capped areas following significant rainfall events to identify areas of erosion and ensure adequate vegetative cover is established. Upon establishment of vegetative cover, storm water run-off should be diverted off the capped area to reduce storm water accumulation in the NROCA.	Permanent vegetative cover has been established on the recently capped areas and a significant portion of surface water run-off from this area discharges via a let-down structure located near Sta. 39+00. A surface water diversion berm remains at the crest of the embankment between Sta. 17+00 and Sta. 34+00. This berm diverts run off from portions of the recently capped areas to the NROCA. Seepage onto the soil cement stabilized pilot channel for the diversion ditch was observed during the 2017 annual inspection.
Monitor the re-vegetation of an area affected by a recent grass fire on the southernmost closed portion of the landfill.	Uniform grass coverage has been reestablished and no further action is warranted for this area.

Recommendation from Most Recent Annual CCR Inspection	Status at Time of 2017 Annual CCR Inspection
Monitor isolated areas of minor erosion occurring in areas with limited vegetative cover noted on Figure 3. Continue to monitor/repair feral hog damage present on the embankment to ensure erosion is not occurring due to the irregular slope and loss of vegetation (Figure 3). These areas should be repaired when conditions allow and the existing deterrent program should be reviewed and improved to prevent further damage to the extent practicable.	Areas of minor erosion persist on the downstream embankment of the SROCA, but these areas remain stable with respect to previously observed conditions. Improvement of topsoil conditions and establishment of uniform grass coverage should be performed in the spring as slope conditions allow. Only isolated areas of feral hog damage were noted during the 2017 CCR inspection. Repair of these areas should continue as slope/cap conditions allow.
Bottom Ash Ponds and New Scrubber Pond	
Repair erosion associated with a low pressure ash water transfer line leak on the west side of the WAP.	Leak repaired, erosion persists but vegetative cover has stabilized erosion in this area.
Remove trees at the toe of the slope along the northern embankment of the SP and at the southeast corner of the SP to allow for improved inspection and maintenance.	Trees have been removed, uniform grass coverage is present and the area was inspected during the 2017 annual inspection
Monitor localized erosional features near the northwest corner of the WAP, under the influent pipe rack on the north end of the EAP, and at the southeast corner of the EAP where the embankment joins the SP embankment.	These areas are noted for continued monitoring; however, uniform grass coverage stabilizes these areas and prevents excessive erosion of the irregular slopes and erosional features.
Monitor the following areas of slope irregularities where vegetative maintenance is difficult and localized steepened slopes may result in development of erosion: - South Embankment of the WAP; - Central and northern portion of the west embankment of the WAP; - North embankment of the WAP and EAP; - Steepening slope near the crest of the north and east embankments of the SP as well as immediately above the contact with the roller compacted cement portion of the embankment near the southeast corner of the SP; and - South central embankment of the SP.	These areas are noted for continued monitoring; however, uniform grass coverage stabilizes these areas and prevents excessive erosion of the irregular slopes and erosional features.

Recommendation from Most Recent Annual CCR Inspection	Status at Time of 2017 Annual CCR Inspection
Monitor the following areas where area of excessive wetness was observed at the toe of the slope: - South slope of the WAP and western portion of south slope of the SP where a piping corridor limits drainage relief at the toe. Reestablishing cribbing beneath the piping may provide for improved drainage; - East slope of the SP near the southeast corner; - East slope of the EAP along the face of the roller compacted cement portion of the slope. - North slope near the common embankment for the EAP and WAP - Near influent pipe rack of the EAP	The 2017 CCR inspection occurred during an extended period of dry conditions that allowed for identification of persistent areas of saturated soil, as illustrated on Figure 3.
Repair animal burrows with compacted clay fill.	Minor animal burrowing and seasonal presence of fire ant mounds persist, and identification/ maintenance of these area should continue.
Monitor slope irregularities, including a localized bulge (apparent former shallow surface slide) on the south embankment of the WAP and a slight depression near the south central portion of the SP embankment.	No change or deterioration of the embankment slopes in these areas was observed with respect to conditions observed during the 2015 inspection.
Permanent Disposal Pond-5	
Monitor two recent surficial repair areas on the south embankment	The areas have been repaired and uniform grass coverage has been restored.
Monitor localized shallow rill erosion occurring in areas with limited annual rye grass coverage, which is primarily located along the east embankment with other more localized areas noted on Figure 5.	The areas have been repaired and uniform grass coverage has been restored.

3.0 CCR SURFACE IMPOUNDMENT FIELD INSPECTIONS

The 2017 annual inspection of the MLSES CCR surface impoundments was performed on October 19, 2017. Brian Thomas, a registered professional engineer in the State of Texas, was accompanied by Luminant qualified person (Marvin Bradford) during the inspection. The inspection consisted of a walking visual survey of the downstream embankments, the embankment crest, and upstream embankments of the surface impoundments to identify potential areas of concern (if present) that could affect structural integrity or disrupt operation of the impoundment. Conditions at the surface impoundments observed were compared to the MLSES weekly inspections as well as the previous CCR inspections performed by PBW in 2015.

Current observations were recorded in the field using a hand-held global positioning system survey instrument in order to locate areas that require further monitoring and/or action to address potential areas of concern noted during the inspection. Figures 3 and 5 summarize the field observations from the inspections of the BAPs/SP and PDP-5, respectively. Photographs of the surface impoundments taken during the annual inspection are included as Appendices B and C. Figures 4 and 6 illustrate the location where photographs were taken during the inspection of the BAPs/SP and PDP-5, respectively. The following sections summarize the results of the annual inspection, including specific observations related to the structural elements of the MLSES CCR surface impoundments.

3.1 Field Inspection - Bottom Ash Ponds & Scrubber Ponds

The earthen embankments of the WAP, EAP and SP were inspected collectively since each surface impoundment shares interior embankments with the others.

3.1.1 Surface Impoundments – Downstream Embankment

The downstream embankments of the BAPs and SP were generally in good condition and no visual evidence or slope movement or misalignment was noted during the inspection. With the exception of an isolated area near the southeast corner of the EAP, the embankments were well vegetated with grasses that have been mowed to a height sufficient to allow for an adequate inspection. Isolated areas with irregular slope conditions are present along the Northwest portion of the WAP embankment and on the northern embankment of both the WAP and EAP. However, the relatively short slope lengths have limited erosion in these areas, as well maintained grasses also stabilize these slope irregularities.

Localized areas of erosion were noted on the downstream embankment, but in all cases the erosional features were generally surficial and should be monitored to ensure further erosion does not occur that warrants repair. Surface conditions at the Site were considerably drier with respect to conditions observed at the time of the 2015 annual inspections. Although no active seeps were observed, areas of wetness near the toe of the southwest corner of the SP and on the south end of the WAP. These isolated areas of saturated soil appear to be associated with low volume leakage of valves and other appurtenances of the bottom ash or FGD sluice lines. No direct discharge beyond the saturated areas was noted during the inspection and surface drainage near these areas is controlled. As indicated on Figure 3, the following areas were noted for future monitoring or repair:

- Monitor the following areas where Minor/Localized Erosion of the Embankment is present:
  - Southern embankment of SP (steepened upper portion of embankment)
  - Localized erosion along portions of the west embankment of the WAP

- Monitor the following areas of slope irregularities where vegetative maintenance is difficult and localized steepened slopes may result in development of erosion:
  - Southern portion of the west embankment of the WAP;
  - North embankment of the WAP and EAP;
  - South Embankment of SP

- Rehabilitate liner vents by removing solids/debris or adding rodent screens:
  - Eastern Embankment of EAP (solids removal)
  - Eastern Embankment of SP (screening)
  - Southern Embankment of SP (screening)

- Monitor the following areas where area of excessive wetness was observed at the toe of the slope:
  - Southern slope of WAP
  - Southwest corner of the WAP
  - Valve on the southern portion of the west embankment of the WAP.
  - South slope of SP (down slope of the inlet sluice piping)

- Monitor poor vegetative cover at the southwest corner of the EAP near the slope transition with the SP embankment.

- Monitor minor toe damage at the southwest corner of the Scrubber Pond. (apparently from mower traffic)

- Monitor the pipe corrosion and possible leaking in the central portion of the west embankment of the WAP.

3.1.2 Surface Impoundments – Embankment Crest

The majority of the embankment crest is improved with a crushed aggregate access road or elevated concrete pipe crossings. Access roads are generally in good conditions with limited areas of shallow ponding along the roadways. Recent re-grading of the dike crest following solids removal from the WAP was visible; however, additional grading is necessary to ensure runoff from the dike crest into the WAP along the northern portion of the west embankment crest. No visual evidence of slope failures or misalignments were noted on the crest of the embankments.

3.1.3 Surface Impoundments – Upstream Embankment

The upstream embankments of the BAPs and SP are armored with concrete revetment matting, which is generally in good condition and prevents erosion of the interior slopes via either wave action or erosion from run-off. Damaged sections of the concrete revetment matting where the HDPE liner was visible during the 2015 inspection have been repaired by filling the damaged areas with grout. With the exception of minor displacement of the revetment mat in localized areas, no visual evidence of slope failures or misalignments were noted on the upstream embankment of the BAPs and SP.

3.2 Field Inspection – PDP-5

3.2.1 Surface Impoundment – Downstream Embankment

PDP-5 was constructed in 2010 and generally remains in very good condition. The downstream embankments of PDP-5 were observed to be in good condition and no visual evidence or slope movement or misalignment noted during the inspection. One area of concern in the previous inspection was the limited vegetative coverage on the embankments. Uniform grass coverage of the entire downstream embankment has been established, which has reduced the potential for erosion. Very limited areas of rill erosion persist on the embankment and these areas are stabilized with permanent vegetative cover. There is no visual evidence of slope failures or misalignments.

3.2.2 Surface Impoundment – Embankment Crest

A small portion of the north and south embankment crest is improved for vehicular traffic with crushed aggregate, while the remaining areas are graded to drain and vegetated. The embankment crest is generally in good condition with limited areas of shallow ponding along the roadways. No visual evidence of slope failures or misalignment was noted on the crest of the embankment.

3.2.3 Surface Impoundment – Upstream Embankment

More uniform perennial grass coverage is generally present on the upstream embankment of PDP-5. However, erosion is occurring near the waterline on the upstream embankment as a result of wave action. Though present in most areas, this erosion is intensified near the southwest corner of the impoundment. The interior embankment near the point of discharge for various sluice pipes at the southeasts corner of PDP-5 should be repaired and armored to prevent scour of the upstream embankment at this point of discharge. No visual evidence of slope failures or misalignment was noted on the upstream embankment of PDP-5.

4.0 CCR LANDFILL FIELD INSPECTION

The 2017 annual inspection of the MLSES A-1 Area Landfill was performed on October 18, 2017. Brian Thomas, a registered professional engineer in the State of Texas performed the 2017 annual inspection. The inspection consisted of a walking visual survey of the embankments, cap, and storm water control structures of the A-1 Area Landfill. Current observations were recorded in the field using a hand-held global positioning system survey instrument in order to locate areas that require further monitoring and/or action to address potential areas of concern noted during the inspection. Figure 7 summarizes the field observations from the inspections of the A-1 Area Landfill. Photographs of the landfill taken during the annual inspection are included as Appendix D. Figure 8 illustrates the location where photographs were taken during the inspection of the A-1 Area Landfill. The following sections present the results of the annual inspection, including specific observations related to the structural elements of the A-1 Area Landfill.

The inspection requirements for CCR landfills include a review of the design, construction, operation and maintenance of the landfill in order to determine if the CCR unit meets generally accepted good engineering practice. The primary objective of the visual inspection of the A-1 Area Landfill was to identify any evidence of actual or potential structural weakness of the CCR unit, including conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit.

Approximately 480 acres of the A-1 Area Landfill has been completed with the final cap and cover system described in Section 1.2, and with exception of an approximately 100-acre portion of the registered limits of the A-1 Area Landfill Area, subgrade preparation and placement of the bottom compacted clay liner was completed prior to the effective date of the CCR rule. CCR placement is primarily focused near the central portion of the landfill until the design cap subgrade elevations are reached. As the design subgrade elevations are achieved, the landfill is progressively closed with the final cap and vegetative cover system. The field inspection of the landfill included a walking survey of the perimeter embankment or limits of incised areas within the registered landfill limits and a vehicular inspection of capped/closed portions of the landfill cap, including portions of the clay cap completed within the past two years. Observations were recorded in the field using a hand-held global positioning system and referenced to existing stationing marked at 500-foot intervals along the permitted limits of the A-1 Area Landfill. Inspection of the cap and vegetative cover system, active disposal areas, and the surface water control structures was performed in conjunction with the embankment inspection as well as during the driving survey of the landfill. Additional details concerning the landfill inspection are included in the following sections.

4.1 Perimeter Embankment

Topography along the 5-mile perimeter of the A-1 Area Landfill (permitted limits) varies greatly. Given the size and siting of the landfill within the reclaimed portion of the Luminant Beckvillle Mine, the perimeter earthen embankment varies from absent (within incised portions of the landfill) to heights greater than 20 feet within the closed/capped portions of the landfill. With exception of isolated areas of limited vegetative cover noted on Figure 7, the embankments were well vegetated with grasses that have been mowed to allow for visual inspection.

Based on conditions observed during the 2017 weekly inspections as well as the 2017 annual CCR inspection, areas of wet soil conditions persist between Stations 14+00 and 38+00. These areas can be characterized predominantly as saturated soil with areas of localized pooling (i.e. Category 1 seepage condition under Luminant's current weekly inspection program), as base flow in adjacent drainage ditches was not observed at the time of the 2017 annual inspection. Although saturated soil conditions were not observed near the toe of the embankment for the SROCA (Stations 214+00 and 223+00) during the 2017 annual inspection, weekly inspections continue to indicate that areas of saturated soil are present seasonally in response to periods of heavy rain. In general, the widespread areas of saturated soil on the embankments and pooling at the toe observed during the 2015 CCR inspection were predominantly absent at the time of the 2017 annual inspection (Figure 3). Furthermore, the area where discrete seepage was observed by Luminant prior to the 2015 inspection (i.e. near Station 27+00) has been eliminated as a result of the interim pumping remedy described in Section 2.3.

As indicated on Figure 3, the following areas of the landfill embankment were noted for future monitoring:

- Monitor the following areas between Station 15+00 to 38+00 where saturated soil was observed at the toe of the slope. Monitoring should document observed changes in the localized seepage (i.e. increases in flow, discoloration and/or presence of silt laden discharge) near Station 37+00.

- Monitor limited vegetative cover and minor erosion present on the downstream embankment of the SROCA (Station 213+00 to 225+00).

- Monitor revegetation of a disturbed area at the embankment crest near Station 145+00 following recent removal of underbrush.

- Although very limited with respect to conditions observed during the 2015 annual CCR inspection, feral hog damage present on the embankment as illustrated should be monitored to ensure erosion is not occurring due to the irregular slope and loss of vegetation (Figure 7). These areas should be repaired when conditions allow and the existing deterrent program should be reviewed and improved to prevent further damage to the extent practicable.

4.2 Landfill Cap

The capped portion of A-1 Area Landfill is generally in a stable condition with a well maintained 3-foot thick compacted clay cap with additional vegetative soil cover. Although slope lengths are long in some areas, the vegetative cover is generally in very good condition and the slopes typically do not exceed 3 percent, which results in relatively low potential for erosion. Storm water diversion berms are present on the south and east sides of the landfill cap to prevent surface water from reaching contact water collection sumps present along the crest of the embankment in these areas. A new storm water let-down structure was constructed in 2016 with a discharge point located near Station 38+00. The outlet of the storm water conveyance structure, which is armored with revetment stone, should be monitored to ensure potential erosion within this area is not affecting the toe of the embankment. A surface water drainage diversion remains in-place between Station 17+00 and 34+00, which diverts runoff from a portion of the recently capped area to the NROCA. An active seep (i.e. Category 2 seepage) was observed at the crest of the north embankment near Station 33+00; however, this seepage is located along the drainage diversion (i.e. within the landfill surface water drainage control zone) and the existing storm water diversion berm routes contact storm water in this area to the NROCA. Additional details concerning the sumps, contact, and non-contact storm water is provided in Section 3.4. Inspection of the capped portion of A-1 Area Landfill indicates that conditions that could disrupt or have the potential to disrupt the operation and safety of the CCR unit are not currently present.

As indicated on Figure 3, the following areas were noted for future monitoring within the recently capped areas of the landfill:

- Monitor areas of saturated soil at the crest of the northern embankment, including the active seep noted near Station 33+00. Monitoring should document observed changes in the seepage (i.e. increases in flow, discoloration and/or presence of silt laden discharge) and ensure that the existing drainage diversion captures and routes seepage to the NROCA (Appendix D; Photograph 1).

- Monitor seepage near the northwest corner of the NROCA. Monitoring should document observed changes in the seepage (i.e. increases in flow, discoloration and/or presence of silt laden discharge) and ensure that the existing drainage diversion captures and routes seepage to the NROCA (Appendix D; Photograph 8).

4.3 Active CCR Placement Areas

The majority of CCR placement is occurring near the central portion of the landfill in an effort to fill this area to target subgrade elevations. However, CCR is also placed within other areas of the landfill to allow for final subgrade preparation and progressive capping of the landfill. As indicated in Section 3.2, an approximately 90-acre portion of the landfill immediately west of the NROCA and southward has been capped within the past two years. Luminant personnel maintain and update a conceptual material placement and progressive capping plan with current operating projections through the year 2025. To date Luminant estimates that over 46,000,000 cubic yards of CCR has been placed in the A-1 Area Landfill.

In addition to the FDCP, Luminant has also implemented a surface water control plan to divert storm water from uncapped and/or active CCR disposal areas to run-off collection areas where the water can be transferred to treatment ponds within the A-1 Area, if needed, prior to discharge through permitted outfalls monitored by Luminant (PBW 2016e). Additional details concerning surface water drainage controls are provided in Section 3.4.

4.4 Surface Water Controls

Storm water is diverted off the capped portion of the A-1 Area Landfill to adjacent surface water ditches that provide drainage to areas within the Luminant Beckville Mine and ultimately to final discharge ponds that are permitted under the Texas Pollutant Discharge Elimination System (TPDES) and monitored by Luminant for compliance with effluent limitations. Storm water run-off from active areas of the landfill is collected in three areas within the A-1 Area Landfill (Figure 3). The NROCA and SROCA are the primary collection areas for storm water from uncapped and/or active CCR disposal areas, while limited collection of storm water from uncapped areas continues to occur within the former South Run-off Collection Area. Accumulated storm water in these areas is pumped to either of two treatment ponds prior to discharge into surrounding drainage ditches that ultimately report to a final TPDES monitoring location within the Beckville Mine.

Berms are located on the landfill cap immediately upslope and downslope of contact water collection sumps, which are located along the south and southeast portions of the landfill. Contact water collected within these sumps is pumped to either of two treatment ponds prior to discharge. Non-contact storm water upstream of the sumps is diverted to storm water let-down structures; however, the very limited slope along these berms and long flow length likely results in additional infiltration in the vicinity of the contact water collection sumps. Collection and management of storm water will be a continuing requirement while the A-1 Area Landfill remains active; however, long-term impoundment of water within the landfill should be minimized to the extent possible.

5.0 SUMMARY OF FINDINGS

The findings of the 2017 annual inspection of the MLSES CCR units are summarized herein. Luminant qualified persons responsible for the weekly inspections were briefed on the initial findings of the annual inspection to ensure that observed conditions did not represent a change in geometry since previous inspection or have the potential to disrupt operation and safety of the CCR unit.

5.1 Visual Observation of Embankment Alignments

- Bottom Ash Ponds, Scrubber Pond and PDP-5. Consistent with previous structural integrity evaluations, critical impoundment inspections performed on behalf of Luminant, and recently completed weekly inspections, no evidence of slope movements or misalignments that have potential to affect the structural integrity of the surface impoundment embankments were noted.

- A-1 Area Landfill. With the exception of an area the embankment that was repaired in response to the presence of a seep near Station 27+00, no evidence of slope movements or misalignments that have potential to affect the structural integrity of the landfill embankments were noted. The findings of the 2016 geotechnical evaluation of slope stability of this area indicate that the embankment in the immediate vicinity of a seep (Station 27+00) meets the applicable TCEQ minimum factor of safety for slope stability under conditions observed prior to initiating interim dewatering activities that are on-going (BBA, 2016).

5.2 Visual Observation of Surface Impoundment Capacity

MLSES staff monitor fluid levels in each of the CCR surface impoundments on a daily basis from surveyed control points for each impoundment (Figures 3 and 5). The following water level elevations were observed within the MLSES surface impoundments during the annual inspection:

- WAP: 326.58 feet above mean sea level (MSL)
- EAP: 312 feet-MSL;
- SP: 325.5 feet-MSL; and
- PDP-5: 397.25 feet-MSL.

The maximum impounded elevation of water in each of the surface impoundments within the past year and the associated minimum freeboard are listed below:

- WAP: 327.5 feet-MSL (2.5 feet freeboard);
- EAP: 314 feet-MSL (16 feet freeboard);
- SP: 328.17 feet-MSL (1.83 foot freeboard); and
- PDP-5: 401.08 (4.42 feet freeboard).

The minimum impounded elevation of water in each of the surface impoundments within the past year are listed below:

- WAP: 323.92 feet-MSL (6.08 feet freeboard);
- EAP: 312 feet-MSL (18 feet freeboard);
- SP: 323.92 feet-MSL (6.08 feet freeboard); and
- PDP-5: 396 feet-MSL (9.5 feet freeboard).

Based on available construction data, each of the surface impoundments were constructed to provide the following estimated storage capacities:

- WAP: 232.6 acre-feet;
- EAP: 125.8 acre-feet;
- SP: 198.9 acre-feet; and
- PDP-5: 190.3 acre-feet.

A visual estimate of the quantity of impounded solids present in the surface impoundments at the time of the annual inspection suggests the impoundments contain the following estimated percentages of available capacity:

- WAP: 70 percent;
- EAP: <20 percent;
- SP: 85 percent; and
- PDP-5: 50 percent.

It should be noted that no soundings or other quantitative measurements were used to estimate the current volume of CCR stored within the BAPs or the volume of water currently impounded.

5.3 CCR Unit Volume at Time of Inspection –Area-1 Area Landfill

During 2016, CCR placement occurred in the non-capped portions of the A-1 Area Landfill. Approximately 2,600,000 tons of CCRs were placed in the landfill from January through December, 2017. To date Luminant estimated that approximately 46,000,000 cubic yards of CCR has been placed in the A-1 Area Landfill.

5.4 Surface Impoundments – Visual Observations of Structural Integrity

No conditions were observed during the annual inspection that indicates an actual or potential structural weakness of any of the four CCR units at MLSES (EAP, WAP, SP and PDP-5) is present. No changes in geometry of the structure were noted with respect to conditions documented in the 2015

Annual CCR Unit Inspection Report (PBW, 2016a). In addition, no conditions were observed during the annual inspection that would indicate a disruption or the potential for disruption of the operation and safety of the CCR unit. A review of weekly inspections completed to date by Luminant and the completion of the annual inspection indicate that no changes that may affect the stability or operation of impounding structure have been observed.

5.5 Landfill – Visual Observations of Structural Integrity

With exception of the on-going dewatering and associated monitoring of effectiveness of the interim actions to address a former seep observed near Station 27+00 of the A-1 Area Landfill, no conditions were observed during the 2017 annual inspection that indicates an actual or potential structural weakness of the perimeter embankments surrounding A-1 Area Landfill. In addition, conditions observed during the annual inspection indicate that a disruption or the potential for disruption of the operation and safety of the CCR unit is not currently anticipated. A review of weekly inspections completed to date by Luminant and the completion of this annual inspection did not identify any changes that may affect the stability or operation of the landfill. Continued visual inspection of areas exhibiting persistent saturated soil conditions and localized areas of seepage along the northern embankment (Figure 3) will allow for identification of changes that may warrant response actions in addition to interim measures currently being implemented by Luminant (i.e. pumping from the three active dewatering wells).

6.0 RECOMMENDATIONS

The following recommendations are based on the results of the 2017 annual CCR inspection of the MLSES surface impoundments conducted October 19, 2017, and the A-1 Area Landfill annual inspection performed October 18, 2017:

- Luminant should continue to monitor the areas of concern documented during the annual inspection of each of the surface impoundments (EAP, WAP, SP and PDP-5) and the A-1 Area Landfill listed in Sections 3.0 and 4.0 of this report. However, based on a review of recent slope stability assessments for these CCR units and the findings of the annual inspection activities presented herein, the recommended maintenance/repairs activities do not currently pose a significant risk to the structural stability of the embankments. The following maintenance or repair activities should be completed when surface conditions allow for equipment access without causing further damage to the areas of concern:
  - **<u>A-1 Area Landfill:</u>**
    - Areas of minor erosion persist on the downstream embankment of the SROCA, and improvement of topsoil conditions and/or establishment of uniform grass coverage should be performed in the spring as slope conditions allow.
    - On-going maintenance to repair isolated areas of feral hog damage noted during the 2017 CCR inspection should continue as slope/cap conditions allow.
  - **<u>Bottom Ash Ponds and New Scrubber Pond:</u>**
    - Rehabilitate liner vents by removing solids/debris or adding rodent screens:
      - Eastern Embankment of EAP (solids removal)
      - Eastern Embankment of SP (screening)
      - Southern Embankment of SP (screening)
    - Identification and on-going maintenance to repair minor animal burrowing and seasonal presence of fire ant mounds should continue.
  - **<u>PDP-5:</u>**
    - The interior embankment near the point of discharge for various sluice pipes at the southeast corner of PDP-5 should be repaired and armored to prevent scour of the upstream embankment at this point of discharge.
- This annual inspection report should be completed by filing the report in the operating record of the respective CCR units no later than January 18, 2016.
- The 2016 annual inspection of the MLSES surface impoundments and A-1 Area Landfill should be performed in November/December 2016, unless otherwise required by the CCR rule.

7.0 REFERENCES

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Golder Associates Inc., 2016, *Structural Stability Assessment Report*, October 2016.

Pastor, Behling & Wheeler, LLC (PBW), 2016a. *Annual CCR Unit Inspection Report*. January 2016.

PBW, 2016b. *CCR Closure Plan Bottom Ash Ponds and New Scrubber Pond.* October 2016.

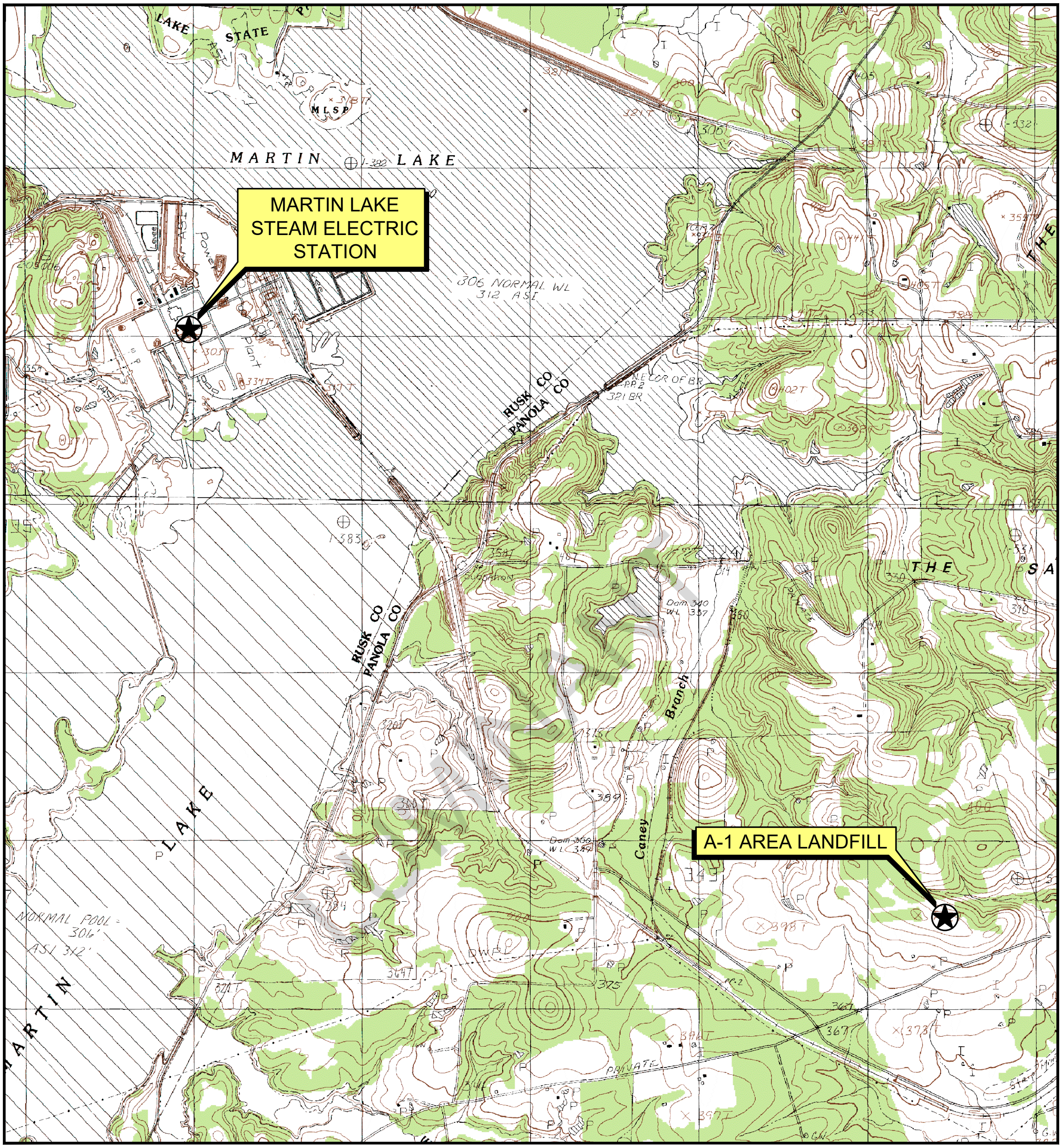
PBW, 2016c. *CCR Closure Plan Permanent Disposal Pond- 5.* October 2016.

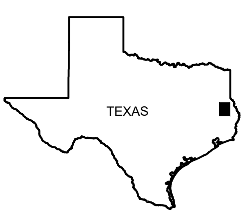
PBW, 2016d. *CCR Closure Plan A-1 Area Landfill.* October 2016.

PBW, 2016e. *Run-on and Run-off Control System Plan Martin Lake Steam Electric Station A-1 Area Landfill.* October 2016.

PBW, 2017. *2016 Annual CCR Unit Inspection Report Luminant Martin Lake Steam Electric Station A-1 Area Landfill.* January 2017.

FIGURES





N

Scale in Feet

0 1500 3000

SOURCE:
Base map from www.tnris.gov, Tatum, TX 7.5 min. USGS quadrangle dated 1983.

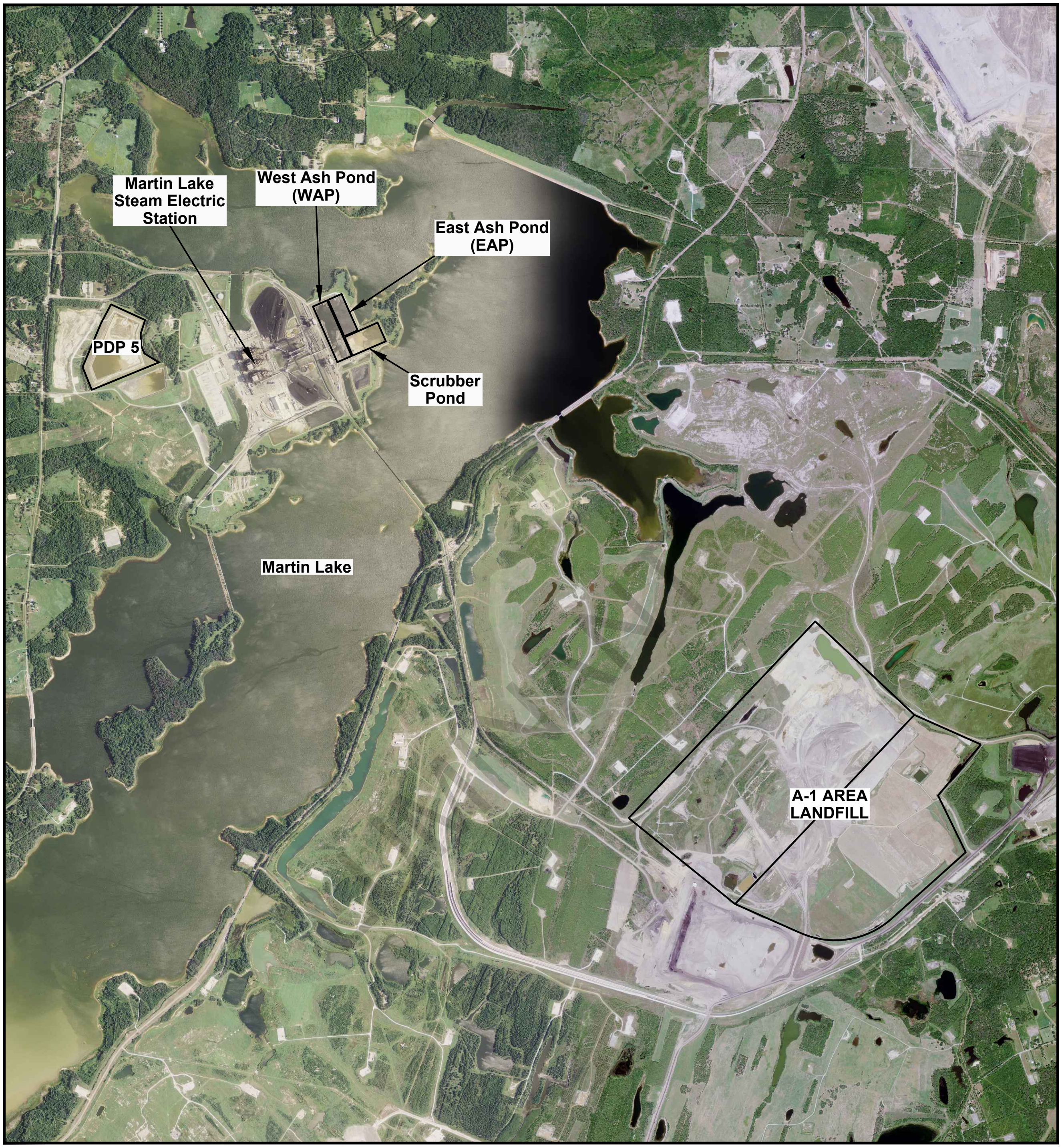
MARTIN LAKE STEAM ELECTRIC STATION
TATUM, TEXAS

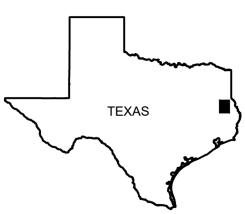
Figure 1

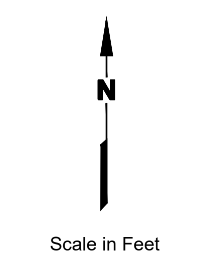
SITE LOCATION MAP

PROJECT: 5313-C	BY: AJD	REVISIONS
DATE: DEC., 2017	CHECKED: BDT	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS







SOURCE:
Imagery from www.tnris.gov, Rusk County, aerial photographs, 2012.

MARTIN LAKE STEAM ELECTRIC STATION TATUM, TEXAS		
Figure 2 **SITE VICINITY MAP**		
PROJECT: 5313-C	BY: AJD	REVISIONS
DATE: DEC., 2017	CHECKED: BDT	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS

EXPLANATION

- V — Rehabilitate Liner Vents (Remove Solids/Debris or Add Rodent Screens)
- Re-grade Dike Crest Following Solids Removal
- E — Monitor Minor/Localized Erosion of Embankment
- Monitor Irregular Embankment Slope
- W — Monitor Wetness at Embankment Toe
- Impoundment Staff Gauge

N

Scale in Feet

0 100 200

SOURCE:
Imagery from Google Earth, photography dated 4/6/17.

MARTIN LAKE STEAM ELECTRIC STATION
TATUM, TEXAS

Figure 3

ANNUAL INSPECTION FINDINGS SUMMARY MAP
BOTTOM ASH PONDS & SCRUBBER POND

PROJECT: 5313-C	BY: AJD	REVISIONS
DATE: DEC., 2017	CHECKED: BDT	

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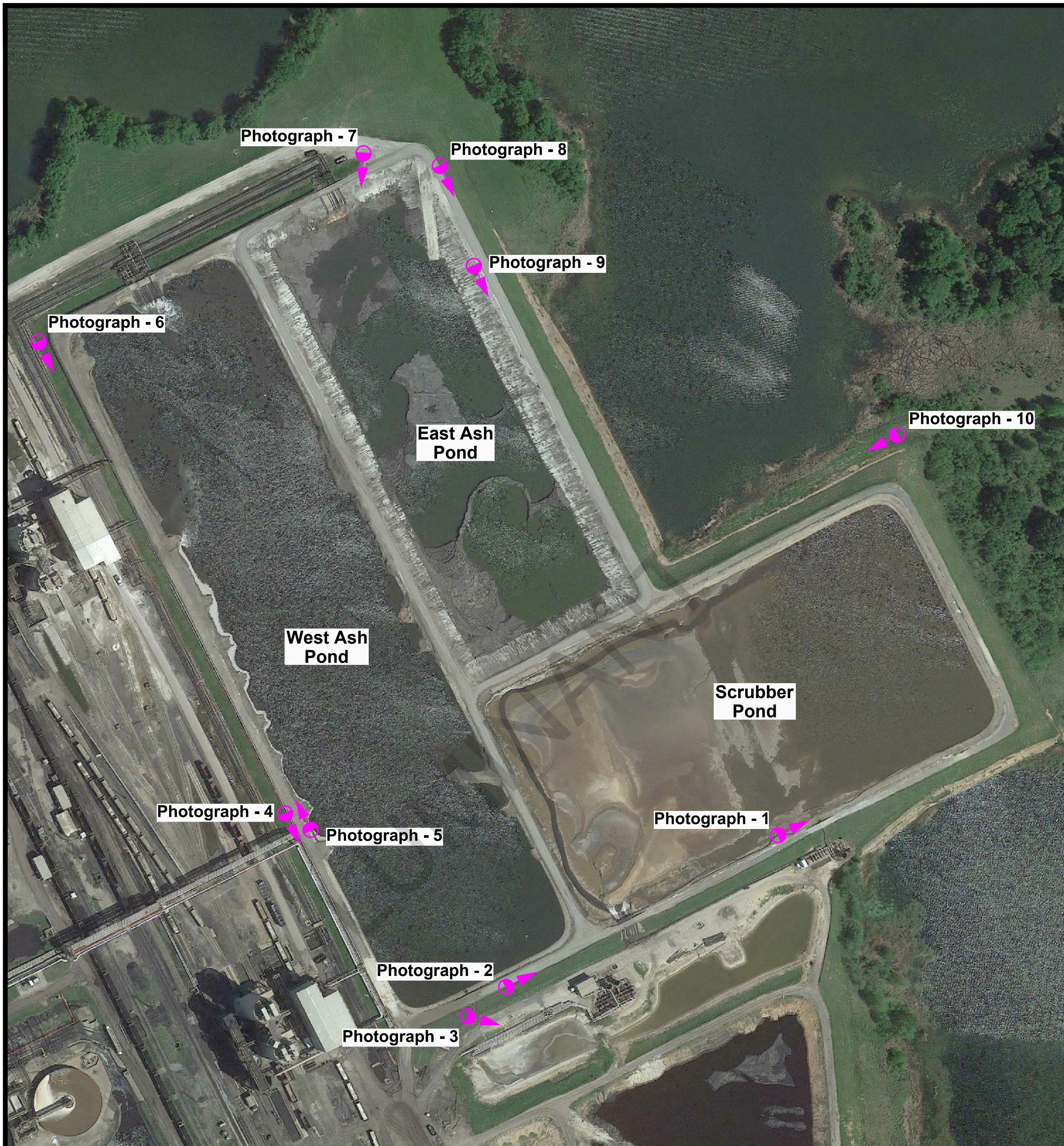
CONSULTING ENGINEERS AND SCIENTISTS



EXPLANATION

Photograph Location and Direction

N

Note:
See Appendix B for Inspection Photographs.

Scale in Feet
0 150 300

SOURCE:
Imagery from Google Earth, photography dated 4/6/17.

MARTIN LAKE STEAM ELECTRIC STATION
TATUM, TEXAS

Figure 4

ANNUAL INSPECTION PHOTOGRAPH LOG
BOTTOM ASH PONDS & SCRUBBER POND

PROJECT: 5313-C	BY: AJD	REVISIONS
DATE: DEC., 2017	CHECKED: BDT	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS

EXPLANATION

- Monitor Interior (Upstream) Embankment Erosion
- Repair Erosion/Armor Interior Embankment at Point of Discharge to PDP 5 (Influent Piping)
- Impoundment Staff Gauge

N

Scale in Feet

0 125 250

SOURCE:
Imagery from Google Earth, photography dated 4/6/17.

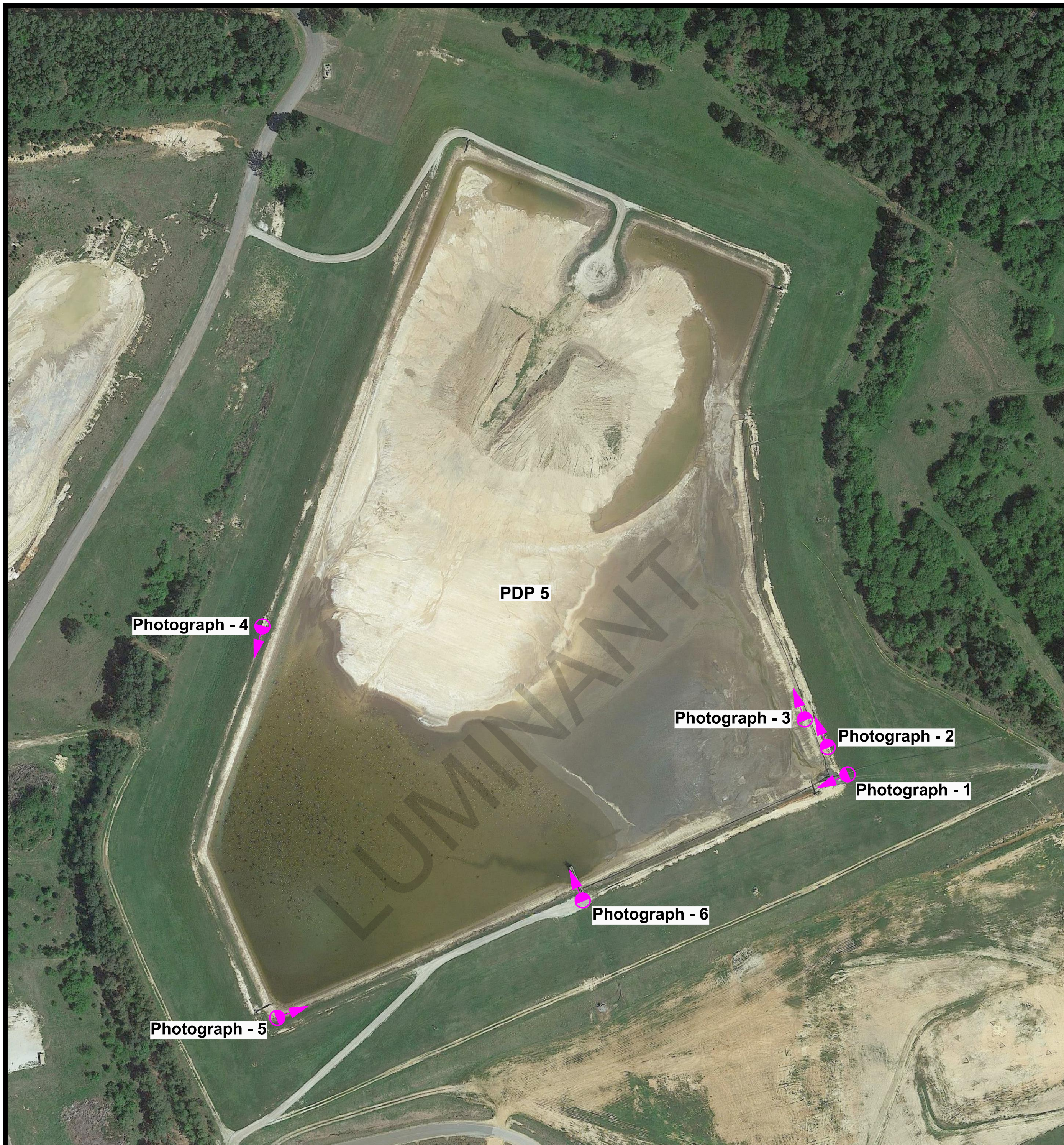
MARTIN LAKE STEAM ELECTRIC STATION
TATUM, TEXAS

Figure 5

ANNUAL INSPECTION FINDINGS SUMMARY MAP PDP 5

PROJECT: 5313-C	BY: AJD	REVISIONS
DATE: DEC., 2017	CHECKED: BDT	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS



EXPLANATION

Photograph Location and Direction

N

Scale in Feet

0 150 300

Note:
See Appendix C for Inspection Photographs.

SOURCE:
Imagery from Google Earth, photography dated 4/6/17.

MARTIN LAKE STEAM ELECTRIC STATION
TATUM, TEXAS

Figure 6

ANNUAL INSPECTION PHOTOGRAPH LOG PDP 5

PROJECT: 5313-C	BY: AJD	REVISIONS
DATE: DEC., 2017	CHECKED: BDT	

PASTOR, BEHLING & WHEELER, LLC
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EXPLANATION

- Monitor Hog Damage
- S-1 Category-1 Seep (No Discharge; Control Locally)
- S-2 Category-2 Seep (Controlled by Landfill SW Control System)
- Saturated Soil Near Crest with Drainage Control Diversion (Recently capped area)
- V Monitor Limited Vegetative Cover on Embankment
- E Monitor Minor Erosion on Embankment
- Monitor Wet Area at toe

N

Scale in Feet

0 500 1000

SOURCE:
Imagery from Google Earth, photography dated 4/6/17.

MARTIN LAKE STEAM ELECTRIC STATION
TATUM, TEXAS

Figure 7

ANNUAL INSPECTION FINDINGS SUMMARY MAP A-1 AREA LANDFILL

PROJECT: 5313-C	BY: AJD	REVISIONS
DATE: DEC., 2017	CHECKED: BDT	

PASTOR, BEHLING & WHEELER, LLC
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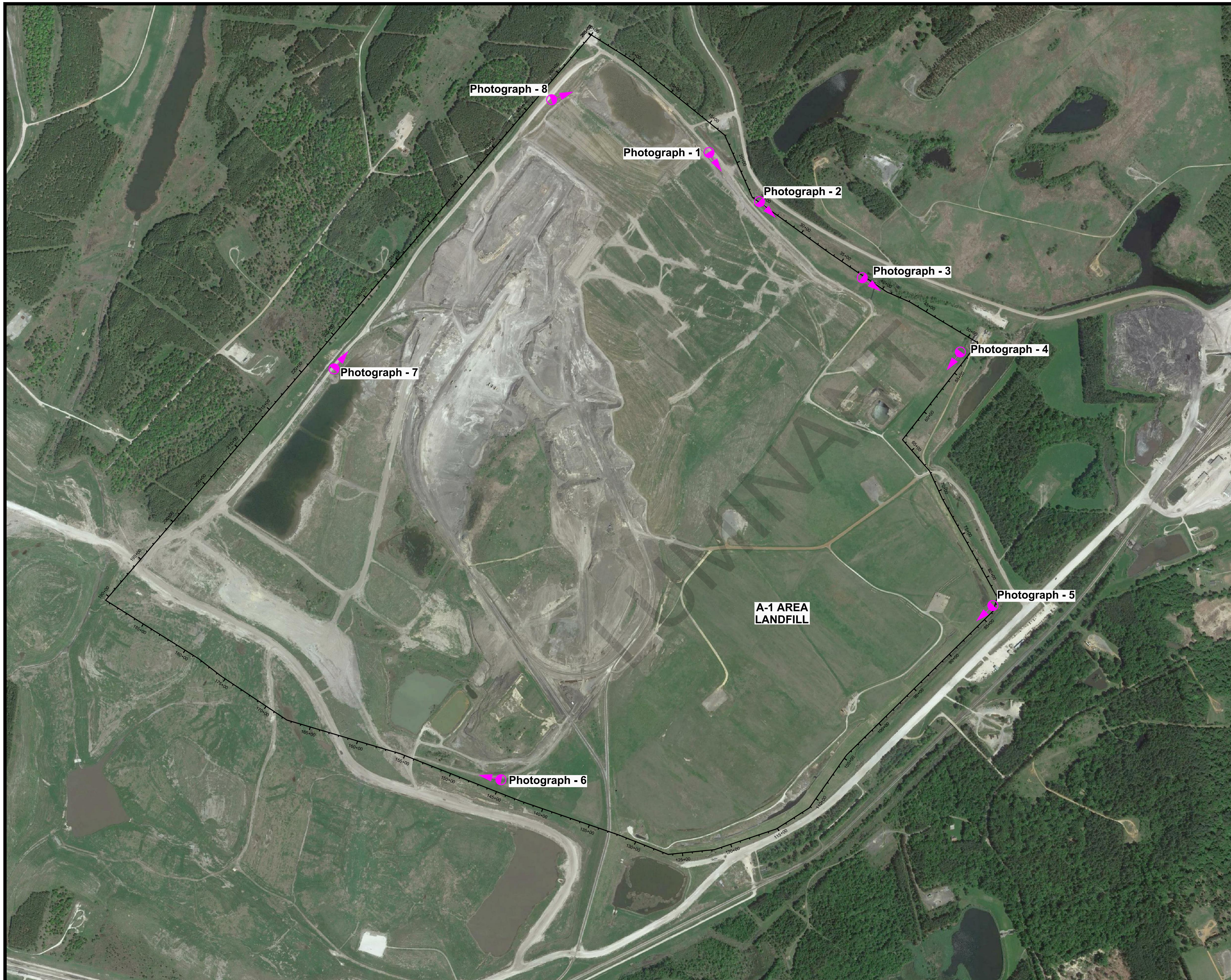

EXPLANATION

Photograph Location and Direction

Note:
See Appendix D for Inspection Photographs.

N

Scale in Feet
0 500 1000

SOURCE:
Imagery from Google Earth, photography dated 4/6/17.

MARTIN LAKE STEAM ELECTRIC STATION
TATUM, TEXAS

Figure 8

ANNUAL INSPECTION PHOTOGRAPH LOG A-1 AREA LANDFILL

PROJECT: 5313-C	BY: AJD	REVISIONS
DATE: DEC., 2017	CHECKED: BDT	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS

APPENDIX A

CCR SURFACE IMPOUNDMENT SUMMARY

APPENDIX A

CCR SURFACE IMPOUNDMENT SUMMARY
MARTIN LAKE STEAM ELECTRIC STATION

Surface Impoundment Identification	Date of Construction	Liner Specifications	Impoundment/Liner Modifications	Approximate Surface Area (Acres)	Influent Process Source(s)	Effluent Management
West Ash Pond (WAP)	1977	Double polyethylene liner system with leachate collection system overlain by fabric-formed grout armor (In service March 1988)	Original in-situ compacted clay liner replaced with current liner system	15	Process wastewater (Bottom ash fines and scubber sludge at typical 95%-5% ratio, respectively)	Solids dredged, dewatered and loaded in railcars for off-site disposal. Process wastewater transferred between EAP, WAP and ESP, used as process make-up water in EAP and WAP or transferred to Permanent Disposal Pond-4 via double-walled pipe.
East Ash Pond (EAP)	1977	Double polyethylene liner system with leachate collection system overlain by fabric-formed grout armor (In service February 2010)	Pond dredged and inactive between 1989 and 2010. New south dike was constructed in 1989 to increase the size of the ESP to current configuration. Original in-situ compacted clay liner replaced with current liner system in 2010.	10	Process wastewater (Bottom ash fines and scubber sludge at typical 95%-5% ratio, respectively)	Solids dredged, dewatered and loaded in railcars for off-site disposal. Process wastewater transferred between EAP, WAP and ESP, used as process make-up water in EAP and WAP or transferred to Permanent Disposal Pond-4 via double-walled pipe.
Scrubber Pond (SP)	1977	Double polyethylene liner system with leachate collection system overlain by fabric-formed grout armor (In service 1989)	Original in-situ compacted clay liner replaced with current liner system and pond expanded to current size in 1989.	12	Flue gas desulfurization waste (scrubber sludge), sludge thickener sumps north and south yards, and stormwater (high volume via yard sumps)	Solids dredged, dewatered and loaded in railcars for off-site disposal. Process wastewater transferred between EAP and WAP for use as process make-up water or transferred to Permanent Disposal Pond-4 via double-walled pipe.
PDP5	2010	6-inch thick clay buffer ($1x10^{-5}$ cm/sec) on top of closed PDPs 1, 2, &3 overlain by a 2 ft thick compacted clay ($1x10^{-7}$ cm/sec) with leachate collection system	None	53	Fly ash, bottom ash, crubber sludge, treated sewage sludge and process plant water	Water re-circulated back through plant processes

APPENDIX B

PHOTOGRAPHS – BOTTOM ASH PONDS AND SCRUBBER POND

Pastor, Behling & Wheeler	DESCRIPTION	**Photograph 1** – (View NE) Crest and armored upstream embankment of Scrubber Pond. Repair areas visible (former areas of exposed liner).	
PROJECT NO. 5313-C	SITE NAME	APA– Annual Surface Impoundment Inspection	DATE 10/19/2017

Pastor, Behling & Wheeler	DESCRIPTION	**Photograph 2** – (View NE) Downstream embankment of West Ash Pond and Scrubber Pone. Steepened slope at crest and piping at toe.	
PROJECT NO. 5313-C	SITE NAME	APA– Annual Surface Impoundment Inspection	DATE 10/19/2017

Pastor, Behling & Wheeler	DESCRIPTION	**Photograph 3** – (View SE) Downstream embankment of West Ash Pond with wetness at toe (Pipe leak, drainage controlled by catch basin).	
PROJECT NO. 5313-C	SITE NAE	APA– Annual Surface Impoundment Inspection	DATE 10/19/2017

Pastor, Behling & Wheeler	DESCRIPTION	**Photograph 4** – (View SE) Downstream Embankment of West Ash Pond with irregular slope visible.	
PROJECT NO. 5313-C	SITE NAE	APA– Annual Surface Impoundment Inspection	DATE 10/19/2017

Pastor, Behling & Wheeler	DESCRIPTION	**Photograph 5** – (View NW) West Ash Pond crest with solids on downstream embankment. Regrade to ensure drainage to pond.	
PROJECT NO. 5313-C	SITE NAME	APA– Annual Surface Impoundment Inspection	DATE 10/19/2017

Pastor, Behling & Wheeler	DESCRIPTION	**Photograph 6** – (View SE) View of west embankment of West Ash Pond. Monitor areas of erosion at toe (currently stable/vegetated).	
PROJECT NO. 5313-C	SITE NAME	APA– Annual Surface Impoundment Inspection	DATE 10/19/2017

Pastor, Behling & Wheeler	DESCRIPTION	**Photograph 7**– (View S) Northeast corner of East Ash Pond.	
PROJECT NO. 5313-C	SITE NAME	APA– Annual Surface Impoundment Inspection	DATE 10/19/2017

Pastor, Behling & Wheeler	DESCRIPTION	**Photograph 8** – (View SE) Crest and downstream Embankment of East Ash Pond.	
PROJECT NO. 5313-C	SITE NAME	APA– Annual Surface Impoundment Inspection	DATE 10/19/2017

Pastor, Behling & Wheeler	DESCRIPTION	**Photograph 9** – (View SE) Armored upstream embankment of East Ash Pond. Remove solids accumulation around liner vents.	
PROJECT NO. 5313-C	SITE NAME	APA– Annual Surface Impoundment Inspection	DATE 10/19/2017

Pastor, Behling & Wheeler	DESCRIPTION	**Photograph 10** – (View SW) Toe of Scrubber Pond embankment. Area cleared to allow for inspection of embankment toe.	
PROJECT NO. 5313-C	SITE NAME	APA– Annual Surface Impoundment Inspection	DATE 10/19/2017

APPENDIX C

PHOTOGRAPHS – PDP-5

Pastor, Behling & Wheeler	DESCRIPTION	**Photograph 1** – (View SW) Southeast corner of PDP-5; Erosion repair/armor needed for influent discharge point	
PROJECT NO. 5313-C	SITE NAME	PDP-5– Annual Surface Impoundment Inspection	DATE 10/18/2017

Pastor, Behling & Wheeler	DESCRIPTION	**Photograph 2** – (View NW) Eastern downstream embankment of PDP-5. Former area of poor vegetative cover and rill erosion (repaired).	
PROJECT NO. 5313-C	SITE NAME	PDP-5– Annual Surface Impoundment Inspection	DATE 10/18/2017

Pastor, Behling & Wheeler	DESCRIPTION	**Photograph 3** – (View NW) Crest and upstream embankment of PDP-5 on eastern side. Monitor rill erosion and poor vegetative cover.	
PROJECT NO. 5313-C	SITE NAE	PDP-5– Annual Surface Impoundment Inspection	DATE 10/18/2017

Pastor, Behling & Wheeler	DESCRIPTION	**Photograph 4** – (View SW) Crest and upstream embankment on west side of PDP-5. Monitor erosion from wave action.	
PROJECT NO. 5313-C	SITE NAE	PDP-5– Annual Surface Impoundment Inspection	DATE 10/18/2017

Pastor, Behling & Wheeler	DESCRIPTION	**Photograph 5** – (View NE) Southern embankment of PDP-5. Monitor erosion from wave action.	
PROJECT NO. 5313-C	SITE NAME	PDP-5– Annual Surface Impoundment Inspection	DATE 10/18/2017

Pastor, Behling & Wheeler	DESCRIPTION	**Photograph 6** – (View N) Staff gauge and pump station at south end of PDP-5. Majority of accumulated water has been removed from PDP5.	
PROJECT NO. 5313-C	SITE NAME	PDP-5– Annual Surface Impoundment Inspection	DATE 10/18/2017

APPENDIX D

PHOTOGRAPHS – A-1 AREA LANDFILL

Pastor, Behling & Wheeler PROJECT NO. 5313-C	DESCRIPTION	**Photograph 1** – (View SE; Near Sta. 18+00) Embankment crest (left), vegetated cap (right), and run off diversion berm (to NRCA) with soil cement armored channel visible. Category 2 (active seep) is located at crest within run off control zone approximately 1,400 feet to SE.	
	SITE NAME	A-1 Landfill– Annual Surface Impoundment Inspection	DATE 10/18/2017

Pastor, Behling & Wheeler PROJECT NO. 5313-C	DESCRIPTION	**Photograph 2** – (View SE; Sta 26+00) Former slope repair area following revegetation with saturated soil present at toe of embankment.	
	SITE NAME	A-1 Landfill– Annual Surface Impoundment Inspection	DATE 10/18/2017

Pastor, Behling & Wheeler	DESCRIPTION	**Photograph 3** – (View SE; Sta 38+00) Saturated soil at toe of embankment. Category 1 seep (no discharge from the saturated area).	
PROJECT NO. 5313-C	SITE NAE	A-1 Landfill– Annual Surface Impoundment Inspection	DATE 10/18/2017

Pastor, Behling & Wheeler	DESCRIPTION	**Photograph 4** – (View SW; Sta. 53+00) Downstream embankment.	
PROJECT NO. 5313-C	SITE NAE	A-1 Landfill– Annual Surface Impoundment Inspection	DATE 10/18/2017

Pastor, Behling & Wheeler	DESCRIPTION	**Photograph 5** – (View SW; Sta. 84+00) Crest of southeast embankment.	
PROJECT NO. 5313-C	SITE NAME	A-1 Landfill– Annual Surface Impoundment Inspection	DATE 10/18/2017

Pastor, Behling & Wheeler	DESCRIPTION	**Photograph 6** – (View SW; Near Sta. 145+00) Monitor embankment crest following recent vegetation/shrub removal.	
PROJECT NO. 5313-C	SITE NAME	A-1 Landfill– Annual Surface Impoundment Inspection	DATE 10/18/2017

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Pastor, Behling & Wheeler	DESCRIPTION	**Photograph 7**– (View NE; Sta. 222+00) Monitor poor vegetative cover and rill erosion near embankment crest (along lower access road).	
PROJECT NO. 5313-C	SITE NAME	A-1 Landfill– Annual Surface Impoundment Inspection	DATE 10/18/2017

Pastor, Behling & Wheeler	DESCRIPTION	**Photograph 8** – (View NE; Sta. 257+00) Feral hog disturbance of vegetated cap (right). Soil cement armored run off collection ditch (to NRCA) with Category 2 seep (active seepage)visible. Seepage is located within run off control zone.	
PROJECT NO. 5313-C	SITE NAME	A-1 Landfill– Annual Surface Impoundment Inspection	DATE 10/18/2017