Summary of Liner Construction
Martin Lake Impoundments

Luminant Generating Company, LLC

Martin Lake Steam Electric Station CCR Documentation
Project No. 90588

09/16/2016
Summary of Liner Construction
Martin Lake Impoundments

prepared for

Luminant Generating Company, LLC
Martin Lake Steam Electric Station CCR Documentation
Rusk County, Texas

Project No. 90588

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prepared by

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Certification

I hereby certify, as a Professional Engineer in the state of Texas, that the information in this document was assembled under my direct personal charge. This report is not intended or represented to be suitable for reuse by Luminant Generating Company, LLC or others without specific verification or adaptation by the Engineer.

Randell Lee Sedlacek, P.E. (Texas License No. 99056)

Date: 9/16/14
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## 1.0 Introduction

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1.0 INTRODUCTION

On April 17, 2015, the Environmental Protection Agency (EPA) issued the final version of the federal Coal Combustion Residual Rule (CCR Rule) to regulate the disposal of coal combustion residual (CCR) materials generated at coal-fired units. The rule will be administered as part of the Resource Conservation and Recovery Act [RCRA, 42 United States Code (U.S.C.) §6901 et seq.], using the Subtitle D approach.

Luminant Power (Luminant) is subject to the CCR Rule and as such must document the liner construction for existing surface impoundments per 40 Code of Federal Regulations (CFR) §257.71. This document provides the liner construction documentation for the following existing CCR surface impoundments at Martin Lake Steam Electric Station (MLSES):

- West Ash Pond (WAP)
- East Ash Pond (EAP)
- New Scrubber Pond (SP)
- Permanent Disposal Pond 5 (PDP-5)

![Figure 1 MLSES Site Plan](image-url)
An existing surface impoundment is classified as lined if the liner was constructed with any of the following:

- A liner consisting of a minimum of two feet of compacted soil with a hydraulic conductivity of no more than $1 \times 10^{-7}$ centimeters per second.
- A composite liner that meets the requirements of §257.70(b).
- An alternative composite liner that meets the requirements of §257.70(c).
2.0 LINER CONSTRUCTION

The following sections describe the liners at the CCR Impoundments at MLSES.

2.1 Bottom Ash Ponds

Based on drawings provided by Luminant, these ponds have high density polyethylene (HDPE) geomembrane (GM) liners. Drawing No.139-1411-302 Sheet 2, Rev 2 (See Appendix A) indicates side slopes of the West Ash Pond have a 60 mil HDPE GM over three feet of clay soil. The GM is covered by four inches of revetment. On the same drawing, the bottom of the West Ash Pond is shown to be two layers of 60 mil HDPE GM, separated by geonet. There are 18 inches of clay shown to be under the bottom GM, and four inches of revetment covering the top GM.

Drawing “Liner Section and Details” No. C-6, IFC 5/10 (See Appendix B), shows the sides and bottom of the East Ash Pond to consist of two layers of HDPE GM, separated by geonet. There are 18 inches of clay shown to be under the bottom HDPE GM, and four inches of revetment covering the top HDPE GM. A layer of geotextile fabric separates the bottom HDPE GM and the 18 inches of clay. The project specification provided for the East Ash Pond Reline Project indicates that the HDPE GM was 60 mil in thickness.

Within the preamble of the Rule, EPA documented the following concerns associated with a double synthetic liner system such as the system currently used in the state of Florida:

- Leaks through geomembrane imperfections and punctures
- Potential for slippage along the interface between the geomembrane layers
- Geomembrane embrittlement over time

The presence of the concrete revetment mat in the Luminant design increases the survivability of the membrane over the Florida liner system referenced in the preamble of the Rule by minimizing the potential for punctures. The Luminant liner system also includes a geonet between the two membranes, which when coupled with the anchor system decreases the slip potential between the membranes compared to having two membranes in contact with one another as described in the preamble.

Luminant has also provided a copy of a leak locations and repair procedures performed by Southwest Research Institute. This document indicates location and size of holes/tears, and the date which the hole/tear was repaired and vacuum tested. This was performed on the first HDPE liner installed in the West Ash Pond.

Based on the drawings provided, and the GM/soil system described on those drawings, BMcD’ s opinion is the West and East Ash Ponds would be considered unlined per the Rule. BMcD’s opinion is based on the following:

1. The drawings show a dual GM system underlain by 18” of clay soil. This does not meet the Rule because there is less than two feet of compacted soil with a hydraulic conductivity of no more than 1x10^{-7} cm/sec,
2. The drawings show a dual GM system underlain by 18” of clay soil. This does not meet the Rule because there is not a GM underlain by at least two feet of compacted soil with a hydraulic conductivity of no more than $1 \times 10^{-7}$ cm/sec.

3. The drawings show a dual GM system underlain by 18” of clay soil. This does not meet the Rule because it is not an alternative liner, which is defined as a GM underlain by a liner component that has a liquid flow rate no greater than the liquid flow rate of two feet of compacted soil with a hydraulic conductivity of no more than $1 \times 10^{-7}$ cm/sec.

In addition, for the East Ash Pond, the drawings show that a geotextile fabric separates the GM and the soil layer below. The Rule states “If the lower component of the alternative liner is compacted soil, the GM must be installed in direct and uniform contact with the compacted soil.” Therefore the presence of the geotextile fabric does not meet the definition of the alternative liner.

### 2.2 New Scrubber Pond

Based on drawings provided, the SP has a two GM liner system. Drawing No.139-1411-305 Sheet 1, Rev 4 (See Appendix C), shows the sides and bottom of the SP to consist of two layers of 60 mil HDPE GM, separated by geonet. The drawing shows random fill compacted to 95% under the bottom HDPE GM, and four inches of revetment covering the top HDPE GM. Note 5(B) on the same drawing states a layer of geotextile fabric separates the bottom HDPE GM and the subgrade.

Within the preamble of the Rule, EPA documented the following concerns associated with a double synthetic liner system such as the system currently used in the state of Florida:

- Leaks through geomembrane imperfections and punctures
- Potential for slippage along the interface between the geomembrane layers
- Geomembrane embrittlement over time

The presence of the concrete revetment mat in the Luminant design increases the survivability of the membrane over the Florida liner system referenced in the preamble of the Rule by minimizing the potential for punctures. The Luminant liner system also includes a geonet between the two membranes, which when coupled with the anchor system decreases the slip potential between the membranes compared to having two membranes in contact with one another as described in the preamble.

Luminant provided BMcD a copy of a report provided by Southwest Research Institute which documents the leak location survey for the primary liner of the New Scrubber Pond. In addition, Luminant has provided BMcD a memo dated August 9, 1989 describing the construction of the liner system described above.

Based on the drawings provided, and the GM/soil system described on those drawings, BMcD’s opinion is the SP would be considered unlined per the Rule. BMcD’s opinion is based on the following:
1. The drawings show a dual GM system underlain by random fill. This does not meet the Rule because there is not two feet of compacted soil with a hydraulic conductivity of no more than 1x10^{-7} cm/sec,

2. The drawings show a dual GM system underlain by random fill. This does not meet the Rule because there is not a GM underlain by at least two feet of compacted soil with a hydraulic conductivity of no more than 1x10^{-7} cm/sec,

3. The drawings show a dual GM system underlain by random fill. This does not meet the Rule because there is not an alternative liner, which is defined as a GM underlain by a liner component that has a liquid flow rate no greater than the liquid flow rate of two feet of compacted soil with a hydraulic conductivity of no more than 1x10^{-7} cm/sec.

In addition, the drawing makes note of a geotextile fabric which separates the GM and the soil layer below. The Rule states “the GM must be installed in direct and uniform contact with the compacted soil.” Therefore the presence of the geotextile fabric does not meet the definition of the alternative liner.

### 2.3 PDP 5

Based on drawings and other documentation provided by Luminant, the sides and bottom of consist of compacted soil. Drawing No.139-E001-305, Sheet C-29, “As Recorded” (See Appendix E) shows the side slopes of PDP 5 to consist of 3 foot of compacted clay. The bottom of PDP 5 consists of two feet of compacted clay. The Soil and Liner Quality Control Plan, which was provided in the project specification, calls for clay that has a coefficient of permeability of no more than 1.0x10^{-7} cm/sec.

Based on the drawings and specifications provided, and the soil system described on those documents, BMcD’s opinion is PDP 5 would be considered lined per the Rule. BMcD’s opinion is based on the drawing and Soil Liner Quality Control Plan indicating that there is two feet of compacted soil with a hydraulic conductivity of no more than 1x10^{-7} cm/sec. Therefore, PDP 5 at MLSES is being classified as an existing, lined CCR surface impoundment pursuant to §257.71(a)(1)(i).
APPENDIX A - WEST BOTTOM ASH POND

DRAWING NO. 139-1411-302 SHEET 01 REV. 5
DRAWING NO. 139-1411-302 SHEET 02 REV. 2
APPENDIX D - NOT USED
APPENDIX E - PERMANENT DISPOSAL POND 5

DRAWING NO. 139-E001-305 SHEET C-4 REV. 0
DRAWING NO. 139-E001-305 SHEET C-27 REV. 0
DRAWING NO. 139-E001-305 SHEET C-28 REV. 0