



NRG Texas Power LLC
Limestone Generating Station, Units 1 & 2

CCR Surface Impoundment Closure Plan

Prepared by



55 East Monroe Street
Chicago, IL 60603-5780 USA
312-269-2000
www.sargentlundy.com

S&L Project No. 12661-053

Rev. 0
Issue Date: October 7, 2016
Issue Purpose: Use

1 INTRODUCTION & PURPOSE

Federal CCR Rule Reference: 40 CFR 257.102(b)

Pursuant to 40 CFR 257.102(b), this document provides the written closure plan for the following existing coal combustion residual (CCR) surface impoundments at NRG Texas Power LLC's (NRG) Limestone Generating Station:

- Unit Bottom Ash Cooling Pond (BACP),
- Unit 019 E Pond,
- Unit 003 Secondary E Pond,
- Unit ST-18, and
- Unit 002 Storm Water Pond.

NRG intends to close these existing CCR surface impoundments through removal of the existing CCR and decontamination of affected areas pursuant to the requirements of 40 CFR 257.102(c). This closure plan does not differentiate between the individual impoundments.

NRG has evaluated the CCR landfill stormwater run-off pond (002) and determined that the subject surface impoundment does not meet the definition of a CCR surface impoundment based on EPA guidance. This determination is based on:

1. the fact that the CCR landfill stormwater run-off pond (002) is not designed primarily to hold an accumulation of CCR and liquid
2. the primary function of the landfill stormwater run-off pond (002) is not storage or disposal of CCR.

For the aforementioned reasons, NRG will no longer manage the CCR landfill stormwater run-off pond (002) as a CCR surface impoundment after October 17, 2016.

2 CLOSURE PLAN NARRATIVE DESCRIPTION

Federal CCR Rule Reference: 40 CFR 257.102(b)(1)(i)

The anticipated clean closure of the CCR surface impoundments at Limestone Generating Station will be performed in accordance with the following sequential steps:

1. Diversion of CCR, low volume waste, and/or storm water streams to the appropriate Station facilities,
2. Removal of process piping where applicable,
3. Dewatering of each CCR surface impoundment and *in situ* CCR sufficiently to allow for removal of the CCR,
4. Removal of CCR from each CCR surface impoundment for transportation to and disposal in a permitted landfill or for beneficial use,
5. Removal of any protective cover layers (e.g., riprap) along the impoundment's bottom and/or side slopes,
6. Stripping, as required, of portions of the clay liner that became intermixed with CCR,
7. Sampling of the groundwater near the former CCR surface impoundments (upgradient and downgradient) to verify the groundwater monitoring concentrations do not exceed the

groundwater protection standards established for constituents listed in Appendix IV to 40 CFR Part 257,

8. Certification by a qualified professional engineer that the closure has been completed in accordance with the closure plan in effect at that time, and
9. Restoration of areas formerly occupied by the CCR surface impoundments.

Restoration of the areas formerly occupied by the impoundments will be contingent upon NRG's intended use for the area after the successful clean closure. NRG will select the method of final restoration at the time of closure for each of the impoundments, and this plan will be subsequently amended as appropriate.

3 REMOVAL & DECONTAMINATION PROCEDURES

Federal CCR Rule Reference: 40 CFR 257.102(b)(1)(ii)

The clean closure of the existing CCR surface impoundments at the Limestone Generating Station will follow the sequential steps as outlined in Section 2 of this closure plan.

After ceasing flow into the impoundments, NRG will dewater each CCR surface impoundment and the CCR stored therein. The free liquid may be reused in plant operations or possibly discharged as allowed by the Texas Pollutant Discharge Elimination System (TPDES) permit in effect at the time of closure. Best management practices (BMPs) will be deployed. Perimeter drainage ditches may be cut through the *in situ* CCR within the impoundments to further passively dewater the material using gravity prior to removal. Also, CCR may be piled within the CCR surface impoundments to promote dewatering.

Once the CCR within the impoundments has been sufficiently dewatered for transportation and disposal purposes, mechanical excavators will be used to remove the CCR, protective layers (e.g., riprap), and portions of the liner material, if it became intermixed with CCR, from within the impoundments. The excavated material will then be placed into haul trucks for disposal at a permitted landfill or a beneficial use project. At the time of clean closure, the Station may elect to dispose of the excavated material at their on-site permitted industrial non-hazardous waste landfill. Excavation will advance until federal and state regulations for clean closure in effect at the time of closure are met.

The ongoing groundwater monitoring program will continue throughout the active life of each impoundment. Following the removal of CCR and any intermixed materials, an appropriate number of groundwater samples will be taken to ensure compliance with the groundwater protection standards established in 40 CFR 257.95(h). Quantities of constituents listed in Appendix IV to 40 CFR Part 257 within the samples obtained near the impoundment will need to remain below the established limits presented in the specified groundwater protection standard in order for the clean closure process to be declared complete. Since the first eight independent samples from background and downgradient wells, as required by 40 CFR 257.94(b), have not yet been collected and analyzed for constituents listed in Appendices III and IV to 40 CFR Part 257, the level of effort required to achieve this clean closure objective is currently unknown and will be revisited when that information is available. This plan will be subsequently amended as appropriate.

4 ESTIMATED MAXIMUM INVENTORY OF CCR

Federal CCR Rule Reference: 40 CFR 257.102(b)(1)(iv)

In addition to the referenced section of 40 CFR Part 257, the preamble states "...the closure plan should indicate the maximum inventory of CCR that will be open (and requiring a final cover) at one time" (Page 21411 of the Federal Register, Vol. 80, No. 74, Friday, April 17, 2015). A reasonably conservative estimate of the maximum inventory of CCR within the CCR surface impoundments can be calculated by considering 50 percent of the impoundment's capacity is filled with CCR prior to being dredged. This is conservative because the impoundments are dredged before the accumulation of CCR reaches this volume. Table 1 provides the estimated maximum inventory of CCR for each CCR surface impoundment.

**Table 1: Estimated Maximum Inventory of CCR
Within Each CCR Surface Impoundment**

CCR Surface Impoundment	Estimated Maximum Inventory of CCR (cy)
Unit BACP	60,000
Unit 019 E Pond	35,000
Unit 003 Secondary E Pond	35,000
Unit ST-18	13,000
Unit 002 Storm Water Pond	80,000

5 CLOSURE SCHEDULE

Federal CCR Rule Reference: 40 CFR 257.102(b)(1)(vi)

Clean closure of the existing CCR surface impoundments is estimated to require approximately two years from the date that CCR and low volume waste streams are ceased. Table 2 provides a listing of major milestones necessary to close the CCR units, with an estimated duration and an estimated year of completion for each milestone. NRG anticipates that all closure activities for the CCR surface impoundments will be complete by the year 2050.



Table 2: Planning Level Schedule for Closure of Existing CCR Surface Impoundments

Task Description	Estimated Duration	Estimated Completion Year
Place Closure Plan into Station's Operating Record	1 Day	2016
Send Notification of the Availability of Closure Plan to the Texas Commission of Environmental Quality (TCEQ) and Post Closure Plan to NRG's CCR Website	1 Month	2016
Final Engineering / State Closure Permit Application	6 Months	2048
Termination of CCR, Low Volume Waste and Storm Water Streams	1 Month	2048
Place Notification of Intent to Close into Station's Operating Record	1 Month	2048
Dewatering of CCR Surface Impoundments and <i>In Situ</i> CCR	3 Months	2049
Removal of CCR, Protective Cover Layer, and Intermixed Soils (If Applicable)	9 Months	2050
Monitoring and Sampling of Groundwater	1 Month	2050
Restoration of Former CCR Surface Impoundment Areas	5 Months	2050
Certification of Completion of Closure by a Qualified Professional Engineer	1 Month	2050
Place Notification of Completion of Closure into Station's Operating Record	1 Month	2050
Send Notification of Completion of Closure to TCEQ and Post Notification of Completion of Closure to NRG's CCR Website	1 Month	2050

6 AMENDMENTS TO CLOSURE PLAN

Federal CCR Rule Reference: 40 CFR 257.102(b)(3)

NRG will amend this plan prior to a change in the operation of any of the existing CCR surface impoundments that would substantially affect the written closure plan in effect or after an unanticipated event necessitates a revision to the written closure plan. If this written closure plan is revised, NRG will retain a qualified professional engineer licensed in the State of Texas to provide written certification that amendments to this plan meet the requirements of 40 CFR 257.102(b).

7 COMPLETION OF CLOSURE ACTIVITIES

Federal CCR Rule Reference: 40 CFR 257.102(f)(3)

Upon completion of closure for each CCR surface impoundment, NRG will obtain a certification from a qualified professional engineer licensed in the State of Texas verifying that each CCR surface impoundment has been closed in accordance with the closure plan in effect at the time of closure.

8 CERTIFICATION

Federal CCR Rule Reference: 40 CFR 257.102(b)(4)

This document meets the requirements for a written closure plan pursuant to 40 CFR 257.102(b).

I certify that this document was prepared by me or under my supervision and that I am a registered professional engineer under the laws of the State of Texas.

This document is released for use under the authority of James H. Staehlin, Texas PE # 87527 on October 7, 2016. Sargent & Lundy LLC Texas Registered Engineering Firm # F-2202.

Certified by: JAMES H. STAEHLIN Date: 10-7-2016

Seal:

