

**Coal Combustion Residual
Surface Impoundment
Annual Inspection**

**Basin Electric Power Cooperative
Leland Olds Station**

January 2019

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Background and Purpose

In accordance with 40 CFR § 257.83(b), the purpose of this document is to fulfill the requirements for an Annual Inspection Report prepared by a Qualified Professional Engineer (QPE) to ensure the design, construction, operation, and maintenance of the Basin Electric Power Cooperative (Basin Electric) Leland Olds Station (LOS) surface impoundments (Ash Pond 2 and Pond 3) are consistent with recognized and generally accepted good engineering standards.

LOS operates two lignite-fired boilers, resulting in the production of coal combustion residuals (CCRs). The facility is located approximately four miles southeast of Stanton in Mercer County, North Dakota.

LOS plant site CCR facilities were constructed in the 1960s and 1970s and first came under regulation by the North Dakota Department of Health (NDDoH) solid waste management rules in 1982. Ash Pond 2 (approximately 42 acres) was used for bottom ash disposal at LOS until it was placed in inactive status in 2015. Pond 3 (approximately 4.1 acres) did not directly receive sluiced ash from the plant, but instead served as a secondary settling basin to remove suspended solids. Pond 3 was also placed in inactive status in 2015. The EPA "Extension Rule" became effective on October 4, 2016 providing a timeline for inactive units to comply with CCR Rule requirements.

Pond 2 was partially closed in 2017. Approximately 23 acres in the south and southwest areas of the pond were closed in accordance with the design standards specified in 40 CFR § 257.102 and NDDoH permit requirements. The remaining areas of Ash Pond 2 and Pond 3 are scheduled to be closed in 2019.

During 2018, Ash Pond 2 received water from the temporary bottom ash handling system and other wastewater flows from the plant. Ash Pond 2 discharges into Pond 3 and the wastewater is conveyed to North Dakota Pollution Discharge Elimination System (NDPDES) Outfall 003 for eventual discharge.

Records Review

Existing information regarding the status and condition of the LOS surface impoundments was reviewed as part of the QPE annual inspection effort. The evaluation included reviews of the facility CCR Rule operating record, files associated with the NDDoH-issued solid waste management permit, and past inspection reports. No indications of structural instability have been observed to date for any of the CCR units at LOS. The results from structural stability and factors of safety assessments for each of the CCR surface impoundments at LOS are presented in documents prepared by Basin Electric's third-party engineer (AECOM) and are included in the operating record. The documents demonstrate the LOS surface impoundments meet the requirements set forth in 40 CFR § 257.73(d).

Ash Pond 2 and Pond 3 were constructed in the 1960s and 1970s concurrent with the construction of LOS Units 1 and 2. The impoundment dikes were constructed by excavating locally derived materials from the impoundment basins and placing the excavated materials (silts and clays) along the perimeter of the basins to form the impoundment dikes.

Ash Pond 2 and Pond 3 currently have open surface areas of approximately 19 and 4.1 acres, respectively, and are separated by an east-west oriented divider dike. The crest of the impoundment dike is at elevation +1694 feet and the toe is at elevation +1676 feet, resulting in an approximate 18 feet structural height. Pond 3 is located directly north of Ash Pond 2. The crest of the impoundment dike for Pond 3 is at elevation +1693 feet and the toe is at elevation +1682 feet resulting in an approximate 11-foot structural height. Ash Pond 2 and Pond 3 are both considered unlined ponds.

Both the divider dike between Ash Pond 2 and Pond 3 and the north dike of Pond 3 were reconstructed in 2012. The top 6 to 8 feet of the dikes were excavated, replaced, and recompacted. The materials used in the reconstruction of the dikes included cohesive clays hauled in from the LOS landfill site and dry LOS bottom ash. Construction was completed using standard earthwork compaction equipment and current compaction standards. The crests of the dikes were widened to 20' and the dikes were regraded to slopes of approximately 3H:1V. Cabled concrete erosion protection was added to the interior slopes between the low and high water operating elevations of the pond. The remaining open area of Ash Pond 2 is incised, has riprap erosion protection, and interior slopes of approximately 1.5H:1V.

Periodic Inspections

During 2018, qualified individuals (generally the LOS Environmental Coordinator or the LOS Coal and Yard Supervisor) conducted weekly inspections for any appearance of actual or potential structural weakness and other conditions which were disrupting or had the potential to disrupt the operation or safety of the surface impoundments. The weekly inspection checklists are filed in the operating record. Appearances of structural weakness may include, but are not limited to: (1) signs of piping and other internal erosion; (2) transverse, longitudinal, and desiccation cracking; (3) slides, bulges, boils, sloughs, scarps, sinkholes, or depressions; (4) animal burrows; (5) excessive or lacking vegetative cover; and (6) slope erosion. A review of the periodic inspection reports for the LOS CCR landfill indicated no signs of actual or potential structural weakness or other adverse conditions as described above.

Annual Inspection Criteria

Ash Pond 2 and Pond 3 are visually inspected by Basin Electric QPEs on a periodic and annual basis. The inspections seek to identify signs of distress or malfunction of the impoundment and appurtenant structures. The hydraulic structures passing through the dikes are also visually inspected for structural integrity and continued safe & reliable operation.

Based on the visual inspection of Ash Pond 2 and Pond 3 on October 23, 2018, the following annual inspection criteria are addressed:

- i. There have been no changes in the geometry of the northern Ash Pond 2 and Pond 3 dikes since the previous annual inspection.
- ii. Instrumentation for Pond 3 consists of a digital meter in the pumphouse and a staff gauge in the east end of the pond.
- iii. The maximum recorded reading of impounded water and CCR in Ash Pond 2 since the previous annual inspection is approximately 10' at an elevation of 1685.0 msl.
- iv. The maximum recorded reading in Pond 3 is 4.2' or 1682.2 msl.
- v. The approximate minimum depth of impounded water and CCR in Ash Pond 2 since the previous annual inspection is 6' or 1681.0 msl.
- vi. The approximate minimum depth in Pond 3 is 1.6' or 1679.6 msl.
- vii. The present depth and elevation of the impounded water and CCR in Ash Pond 2 is approximately 7' at an elevation of 1682 msl.

- viii. The present depth and elevation of the impounded water and CCR in Pond 3 is approximately 3' at an elevation of 1681 msl.
- ix. The storage capacity of Ash Pond 2 at the time of inspection is 496.80 ac-ft.
- x. The storage capacity of Pond 3 at the time of inspection is 49.49 ac-ft.
- xi. The approximate volume of impounded water and CCR in Ash Pond 2 at the time of inspection is 28.8 ac-ft.
- xii. The approximate volume of impounded water and CCR in Pond 3 at the time of inspection is 12.3 ac-ft.
- xiii. There are no appearances of actual or potential structural weakness of the impoundment, nor are there any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the ponds and appurtenant structures.
- xiv. There are no other changes that may affect the stability or operation of the impounding structures since the previous annual inspection.

Certification Statement

I certify this document has been prepared in accordance with 40 CFR § 257.83(b) which requires a written Annual Inspection Report by a Qualified Professional Engineer as set forth in the *Standards of the Disposal of Coal Combustion Residuals in Landfills and Impoundments*.



Kevin L. Solie, North Dakota PE-9488
January 13, 2019

