Presented To:

WESTERN FARMERS ELECTRIC COOPERATIVE

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Combined Coal Combustion Residual Surface Impoundments & Landfill 2016 Annual Inspection Report Hugo Plant

Project No.

OK00032135

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REALIZE THE DIFFERENCE

ENGINEERING CERTIFICATION

Pursuant to 40 CFR 257.83 and 40 CFR 257.84, and by means of this certification I attest that:

(i) I am familiar with the requirements of 40 CFR Part 257 (CCR Rule);

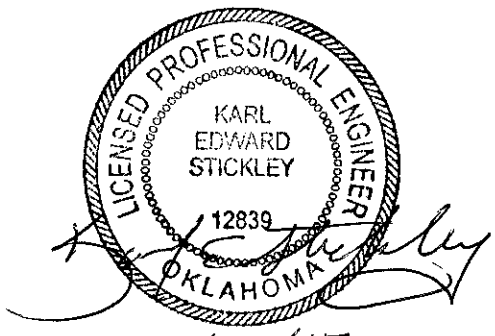
(ii) I, or my agent, have visited and inspected the CCR units at the Facility that are the subject of this Annual Inspection Report;

(iii) The aforementioned inspection(s) and this Annual Inspection Report have been conducted and prepared in accordance with good engineering practices, including consideration of applicable industry standards, and with the requirements of the CCR Rule; and

(iv) This Annual Report meets the requirements of 40 CFR 257.83 and 40 CFR 257.84

(v) I am a "Qualified Professional Engineer" as defined in 40 CFR 257.53 by the fact that I am a currently registered Civil Engineer in the State of Oklahoma and I have the technical knowledge and experience to make the specific technical certifications set forth herein.

C. H. Guernsey & Company
Karl E. Stickley, PE #12839



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1 BACKGROUND

Western Farmers Electric Coop (WFEC) procured **Guernsey** to perform the 2016 Annual Inspection of the Coal Combustion Residual (CCR) impoundments and landfill at its Hugo Power Plant (Hugo Plant). The Annual Inspection is a requirement of the Environmental Protection Agency (EPA) final rule titled *Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments* in 40 CFR Part 257 Subpart D, published in the Federal Register on April 17, 2015 and the counterpart rules of the Oklahoma Department of Environmental Quality (ODEQ) (collectively, CCR Rule).

The Hugo Plant is located on U.S. Hwy 70, east of Fort Towson, Oklahoma in Choctaw County. Operation of the plant began in April 1982. The Hugo Plant has one unit that burns Wyoming coal with a net output of 450 net mega-watts (MW).

The Hugo Plant generates three types of ash from burning coal – flyash, economizer ash, and bottom ash. At the Hugo Plant, the flyash is stored in silos or managed in the CCR Landfill (labeled CCR UNIT 1), economizer ash is managed in CCR UNIT 1, and bottom ash is sluiced to one of two cells in the CCR Impoundment (labeled CCR UNIT 2 and CCR UNIT 3). Fly ash, economizer ash, and bottom ash are beneficially reused.

Guernsey performed the inspection of the impoundment and landfill in accordance with the requirements outlined in 40 CFR 257.83(b) and 40 CFR 257.84(b) and OAC 252:517-13-4 and 252:517-13-5. The inspection included a review of available information regarding the status and condition of each CCR Unit and one (1) on-site visit in which **Guernsey** inspected the perimeter of CCR UNIT 1, CCR UNIT 2, and CCR UNIT 3 to look for signs of distress or malfunction of each unit and appurtenant structures, to verify the information provided by the Plant Inspections (defined below), and to assess volumes of water and ash.

1.1 Hugo Plant Bottom Ash Impoundments

There are two cells in the impoundment where bottom ash is stored. The north cell is labeled CCR UNIT 2 and the south cell is labeled CCR UNIT 3. The combined storage capacity of CCR UNIT 2 and CCR UNIT 3 is 1,064,000 cyds. Bottom ash from the boiler is sluiced to either CCR UNIT 2 or CCR UNIT 3.

WFEC personnel observe both cells of the CCR Impoundment each day, and conduct a formal inspection of both cells on a weekly basis and documents the findings. The cells are designed with a three-foot normal pool level freeboard, which equates to an elevation of 443 ft., or 16 ft. on the staff gauges located in each cell. Each cell has a 24” diameter constant elevation vertical pipe spillway that discharges into the Process Waste Pond located on the east side of the cells. These constant elevation vertical pipes maintain the water level three feet below the top of the embankment, an elevation of 443 ft., within each cell. Hugo Plant personnel can lower the water level below the normal pool level by operating a set of manual valves.

1.2 Hugo Plant Flyash Landfill

The flyash landfill is a two-cell unit, labeled CCR UNIT 1 that has a storage capacity of 1,044,000 cubic yards (cyds). The flyash is pneumatically conveyed to the flyash silo then loaded onto a truck and/or stored in the CCR landfill. Most of the flyash generated at the Hugo Plant is sold for beneficial use. Economizer ash is managed in the CCR landfill.

2 SCOPE OF REPORT

The purpose of the annual inspection is to meet the requirements outlined in 40 CFR 257.83(b) and 40 CFR 257.84(b) and the ODEQ's counterpart regulations. These regulations require an annual inspection performed by a "Qualified Professional Engineer" as defined in 40 CFR 257.53 and OAC 252:517-1-3.

The CCR Rule specifies the Annual Inspection Report must address the following items for a CCR impoundment:

- Changes in geometry since the previous annual inspection
- Location and type of existing instrumentation and maximum recorded readings of each instrument since the previous annual inspection
- Approximate minimum, maximum, present depth, and elevation of the impounded water and CCR since the previous annual inspection
- Storage capacity of the surface impoundment at time of inspection
- Approximate volume of the impounded water and CCR at the time of inspection
- Appearance of an actual or potential structural weakness
- Existing conditions that are disrupting or have the potential to disrupt the operation and safety of the impoundment
- Any other changes which may have affected the stability or operation of the impounding structure since the previous annual inspection
- Deficiencies or releases

The CCR Rule specifies the Annual Inspection Report must address the following items for a CCR landfill:

- Changes in geometry since the previous annual inspection
- Approximate volume of CCR at the time of inspection
- Appearance of an actual or potential structural weakness
- Existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR landfill
- To Any other changes which may have affected the stability or operation of the landfill since the previous annual inspection

- Deficiencies or releases

3 SITE INSPECTION

The **Guernsey** team, including the *Qualified Professional Engineer,* made one (1) trip to the Hugo Plant on December 20, 2016, to gather all the necessary field data and measurements for completion of the requirements of this Annual Inspection Report. The site visit included visual inspections of CCR UNIT 1, CCR UNIT 2, and CCR UNIT 3, noting any embankment integrity issues, vegetation growth, or other potential detrimental activity.

The field measurements for the cells (CCR UNIT 2 and CCR UNIT 3) included the following:

- Verify the geometry of the impoundment cells and note any changes
- Verify the storage capacity and water volume
- Verify the information documented on the Hugo Plant's weekly and monthly inspections
- Verify that CCR UNIT 2 and CCR UNIT 3 are operating near or below the 3 ft freeboard level

The field measurements for the CCR landfill (CCR UNIT 1) included the following:

- Verify the geometry of the CCR landfill and note any changes
- Verify the storage capacity and water volume
- Verify the Plant's weekly and monthly inspections

4 FINDINGS

The following findings are reported according to 40 CFR 257.83(b) and 40 CFR 257.84(b) and OAC 252:517-13-4(b) and 252:517-13-5(b)based on field measurements, observations, the 2015 Annual Inspection Report, the September 2016 Combined Initial Hazard Potential Classification, Structural Stability, and Safety Factor Assessment Report (September 2016 Initial Assessment), data provided by WFEC, and the Plant weekly and monthly inspection reports (Plant Inspections).

The Plant Inspections contain weekly observations of CCR UNIT 1, CCR UNIT 2, and CCR UNIT 3. The observations include, but are not limited to, the status of vegetation, sloughs, slides, cracks, bulges, animal burrows, silt or blocking of outfall structure, and water elevation (for CCR UNIT 2 and CCR UNIT 3). **Guernsey** reviewed the Plant Inspections and compiled the findings in a spreadsheet.

The Hugo Plant provided the 2016 inventory for flyash and bottom ash. **Guernsey** used this information to calculate the amount of ash and remaining capacity of each impoundment cell/landfill.

4.1 Bottom Ash Impoundments CCR UNIT 2 (north cell) and CCR UNIT 3 (south cell)

The status and condition of CCR UNIT 2 has not materially changed since the 2015 Annual Inspection Report or the September 2016 Initial Assessment. The Plant Inspections indicate that CCR UNIT 2 was drained during April of 2016 to facilitate minor riprap repairs on the northeast interior embankment.

CCR UNIT 3 was essentially drained at the time of the December 20, 2016 site inspection awaiting engineering design and specifications to improve the safety factor of the east embankment and repair the sloughed area located on the outer slope of the southern end of the east embankment. During the site inspection, the **Guernsey** team noted a crack had developed on the east embankment one to two feet from the edge of the inner embankment slope. The crack runs parallel to the centerline of the embankment and it is in the same area in which the east outer embankment slough is located. The effective width of the top of the embankment was measured at 14 ft.

There was no evidence to indicate that there were changes in geometry in CCR UNIT 2 or CCR UNIT 3 since the 2015 Annual Inspection. There were no visual signs of distress or malfunction noted during the December 20, 2016 site inspection, specifically signs of overtopping or breach of the embankments. The **Guernsey** team noted vegetation issues consistent with the Plant Inspections.

Based upon visual inspection, the concrete structure at each end of the pipe passing under the CCR embankment is in good condition. The pipe itself was not visible, but as noted in the 2015 Annual Inspection Report, the corrugated pipe was replaced with HDPE pipe in 2007. Repairs to the valve vault were made on February 11, 2016, according to the Plant Inspections.

The location and type of instrumentation used to measure and manage CCR UNIT 2 and CCR UNIT 3 has not changed since the 2015 Annual Inspection Report. At the time of the December 20, 2016 inspection, CCR UNIT 2 level was at an elevation of 443.37, which is 2.63 feet below the top of the embankment, and CCR UNIT 3 was essentially drained. The maximum water level reading for CCR UNIT 2 in 2016 was 443.7 recorded on August 25, 2016, which is 2.3 feet below the top of the embankment. The maximum water level reading for CCR UNIT 3 in 2016 was 443.2 recorded on August 25 and September 1, 2016, which is 2.8 feet below the top of the embankment. The minimum depth recorded for CCR UNIT 2 was 427.0 on April 4 through April 17, 2016, which is 19 feet below the top of the embankment. The minimum depth recorded for CCR UNIT 3 was 428.3 noted during the site inspection on December 20, 2016, which is 17.7 feet below the top of the embankment.

The September 2016 Initial Assessment noted that a water level of 443.0 or below should be maintained in CCR UNIT 2 and CCR UNIT 3 to allow adequate freeboard to contain a 100 year rain event without over topping the embankment. Based on the Plant's Inspections, the Plant

maintained CCR UNIT 2 and CCR UNIT 3 at, or below, 443.0 38 weeks of the year. The highest water level recorded was 443.7 on August 25, 2016 on CCR Unit 2.

Guernsey calculated the remaining storage capacity at the normal pool level of 443.0 for CCR UNIT 2 and CCR UNIT 3 based on inventory data provided by the Hugo Plant and the remaining storage capacity measured in the 2015 Annual Inspection Report. The remaining storage capacity of CCR UNIT 2 and CCR UNIT 3 is 399,000 cyds and 428,000 cyds respectively. The remaining storage capacity was calculated using the storage capacity from 2015 and performing a mass balance based on inventory numbers recorded by the plant assuming a density of 85 lbs/ft^3 [1] and an equal distribution of ash between CCR UNIT 2 and CCR UNIT 3.

The volume of impounded water at the time of inspection was 415,000 cyds in CCR UNIT 2 and 7,000 cyds in CCR UNIT 3 (CCR UNIT 3 was essentially drained at the time of the site inspection).

There was no structural weakness identified during the site inspection except for the slough area on the outer east embankment of CCR UNIT 3 as noted above and in the Plant Inspections. Neither the site inspection nor the Hugo Plant's documents noted any releases from the impoundment cells.

The site inspection and the information from the Plant Inspections indicate no additional conditions or changes, other than noted in the 2015 Annual Inspection Report, that are disrupting or have the potential to disrupt the operation, safety, and stability of CCR UNIT 2 and CCR UNIT 3.

4.2 Flyash Landfill CCR UNIT 1

The status and condition of CCR UNIT 1 has not materially changed since the 2015 Annual Inspection Report. There was no evidence to indicate that there were changes in geometry of the cells since the 2015 Annual Inspection. There were no visual signs of distress or malfunction noted during the December 20, 2016 site inspection. The **Guernsey** team noted vegetation and minor slough areas consistent with the Plant Inspections. There was some standing water in the south cell, due to the collection of storm water. The Plant was removing this water with a portable pump in order to minimize the amount of water in the landfill.

The approximate volume of CCR contained in the unit at the time of inspection was calculated based on the volume cited in the 2015 Annual Inspection Report and taking into account the amount of flyash added, removed, and sold, based on the Hugo Plant's inventory and assuming a flyash density of 75 lbs/ft^3. The approximate volume at the time of inspection was 540,000 cyds.

[1] The bottom ash density used in this report is based on data from various reports, and considers factors of moisture and relative compaction based on observation.

There was no appearance of an actual or potential structural weakness noted either during the site visit or in the Plant Inspections. Neither the site inspection nor the Hugo Plant's documents noted any releases of flyash from the CCR landfill.

The site inspection did not reveal any conditions that were or have the potential to disrupt the operation and safety of the CCR landfill, and there was no changes noted since the 2015 Annual Inspection Report that may affect the stability or operation of the CCR landfill.

5 CONCLUSION

Overall, the site inspection and the Plant Inspections did not reveal any deficiencies or releases in either CCR UNIT 1, CCR UNIT 2, or CCR UNIT 3. Under the Hugo Plant's standard practice, slope sloughs and other maintenance issues are noted on the weekly and/or monthly inspection reports and logged into the Hugo Plant's mechanical maintenance system. Specifically, slope sloughs are assigned maintenance work orders by priority based on location and severity of the slough. Severity of a slope slough is objective and based on the amount of displaced material.

There were no changes in the operation of CCR Unit 1, CCCR Unit 2, and CCR Unit 3 between the 2015 Annual Inspection and the 2016 Annual Inspection.

There is an estimated 236,000 cyds of bottom ash in CCR UNIT 2 and CCR UNIT 3, and a remaining capacity of 827,000 cyds.

There is an estimated 540,000 cyds of flyash in CCR UNIT 1 and a remaining capacity of 504,000 cyds.

Guernsey finds that at the time of the second annual inspection, the Hugo Plant CCR UNIT 1, CCR UNIT 2, and CCR UNIT 3 are designed, constructed, other than as discussed in the 2015 Annual Inspection Report and September 2016 Initial Assessment, operated, and maintained consistent with recognized and generally accepted engineering standards.