Presented To:

WESTERN FARMERS ELECTRIC COOPERATIVE

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

Project No.

OK00032129

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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:

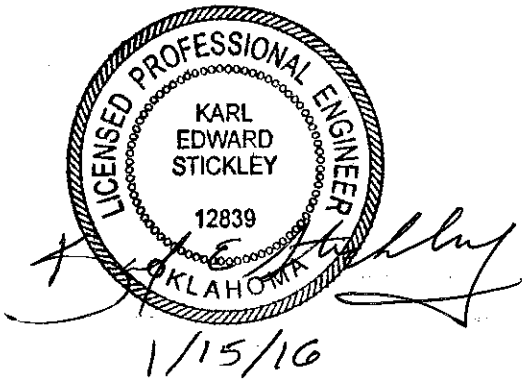
(i) I am familiar with the requirements of 40 CFR Part 257 (CCR Rule);

(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.



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C.H. GUERNSEY & COMPANY

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1 BACKGROUND

Western Farmers Electric Coop (WFEC) procured **Guernsey** to perform the 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.

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 two types of ash generated from burning the coal are classified as either flyash or bottom ash. At the Hugo Plant, the flyash is stored in silos or in the CCR landfill (labeled CCR1) and the bottom ash is sluiced to one of two CCR impoundments (labeled CCR2 and CCR3).

Guernsey performed the inspection of the impoundments and landfill in accordance with the requirements outlined in 40 CFR 257.83(b) and 40 CFR 257.84(b). The inspection included three (3) site visits during which the Hugo Plant's Operating Record, and available data and drawings were collected and reviewed. During each visit, **Guernsey** walked the perimeter of CCR1, CCR2, and CCR3 to inspect for signs of distress or malfunction of each unit and appurtenant structures, and to obtain field measurements required to determine the remaining capacity of the landfill and impoundments. The volumes are not based on topographic level accuracy, but were calculated based on field measurements and original drawings of the landfill and impoundments.

1.1 Flyash

The flyash landfill is a two-cell unit, labeled CCR1 that has a storage capacity of 1,044,000 cubic yards (cyds). The flyash is pneumatically conveyed to the flyash silo then loaded on to a truck and stored in the CCR landfill. Most of the flyash is removed from the landfill and sold for beneficial use. There is an estimated 551,000 cyds of flyash in the landfill and a remaining capacity of 493,000 cyds.

1.2 Bottom Ash

There are two bottom ash impoundments. The north impoundment is labeled CCR2 and the south impoundment is labeled CCR3. The combined storage capacity of CCR2 and CCR3 is 1,064,000 cyds. Bottom ash from the boiler is sluiced to either CCR2 or CCR3. There is an estimated 231,000 cyds of bottom ash in the impoundments and a remaining capacity of 833,000 cyds.

WFEC inspects both impoundments each day. The impoundments are designed with a three-foot normal pool level freeboard. This normal pool level freeboard is currently maintained by a 24"

diameter constant elevation vertical pipe spillway that discharges into the Process Waste Pond located on the east side of the impoundments. Water level below the three-foot normal pool level freeboard is lowered by operating a set of manual valves.

2 SCOPE OF INSPECTION

The purpose of the annual inspection is to meet the requirements outlined in 40 CFR 257.83(b) and 40 CFR 257.84(b). The regulations require an annual inspection performed by a "Qualified Professional Engineer" as defined in 40 CFR 257.53.

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 (since the inspection covered by this Annual Inspection Report is the first annual inspection of the CCR surface impoundment, the current characteristics of the surface impoundment will be compared to the "as built" characteristics)
- 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 (since the inspection covered by this Annual Inspection Report is the first annual inspection, this element will not be addressed)
- 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 (since this inspection will be the first annual inspection of the CCR surface impoundment, the current characteristics of the surface impoundment will be compared to the "as built" characteristics)
- 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 impoundment

- Any other changes which may have affected the stability or operation of the landfill since the previous annual inspection (since the inspection covered by this Annual Inspection Report is the first annual inspection, this element will not be addressed)
- Deficiencies or releases

3 SITE INSPECTION

Guernsey made three (3) trips to the Hugo Plant in order to review documentation and gather all of the necessary field data and measurements for completion of the requirements of this Annual Inspection Report. The first trip on November 5, 2015 consisted of data gathering and initial site reconnaissance. The second trip on December 3, 4, and 5, 2015 was for the purpose of obtaining field measurements of both the impoundment and landfill. The *Qualified Professional Engineer* made a visit to the site on December 22, 2015.

All three site visits included visual inspections of CCR1, CCR2, and CCR3. Any dike integrity issues, vegetation growth, or other potential detrimental activity was noted during the visual inspections.

The field measurements for the impoundments (CCR2 and CCR3) included the following:

- Verify the elevation of the vertical pipe spillway
- Verify the relation between the level gauges, 3 ft freeboard, and the overflow (vertical pipe spillway)
- Verify the dimensions the impoundment and slopes of the dikes
- Determine the bottom topography of the cells using bathometric survey techniques

The field measurements for the landfill (CCR1) included the following:

- Verify the dimensions of the impoundment and slope of the dikes.
- Verify the amount of ash in the landfill

During the initial site visit on November 5, 2015, **Guernsey** gathered records of operation, operation manuals, and construction drawings, as well as made a cursory inspection of CCR1, CCR2, and CCR3.

All three units, CCR1, CCR2, and CCR3, were visually inspected on December 3, 4, and 5, 2015 by **Guernsey** staff members. The inspection included walking around all three structures, taking photographs, taking notes, taking GPS positions, taking level measurements to determine water surface elevation, and taking water depth measurements of CCR2 and CCR3. The visual inspection revealed slope sloughing issues for all three CCR units. CCR3 had a slope slough on the outside slope of the east portion of the embankment between CCR3 and the Process Waste Pond. This slough area was estimated to be 50 ft long by 10 ft wide by 3 feet deep. All the other slope sloughing issues were minor. The design slopes of all the dikes are 2:1. The steep slopes

hinder the maintenance of the CCR's by limiting access to equipment for mowing and repairs. The slope sloughing has not been analyzed to determine if there is evidence of slope failures.

Feral pigs have caused some damage to the dikes, which could lead to erosion problems. Some erosion was noticed during the visual inspection on all three CCR units. The erosion is currently not a major problem. A few fire ant hills were located on some of the dikes that will need to be controlled, but do not appear to be a threat to the stability of the structures.

The depth of water contained in CCR2 and CCR3 was measured by using a boat to navigate to positions on the impoundments and using an eight-pound mushroom shaped anchor connected with a light chain and fiberglass tape measure. Twenty-four (24) measurements were taken on CCR2 and thirty-one (31) on CCR3. GPS coordinates were also taken at each location the depth was measured. The outside perimeter of the CCR units was also plotted using a GPS instrument.

On December 22, 2015, **Guernsey's** Qualified Professional Engineer conducted a third site inspection and obtained additional field measurements. **Guernsey** inspected the integrity of the hydraulic structures that passed through the impoundments and landfill to the extent possible. During the third inspection, **Guernsey** noted that repair work was in process on the sloughing identified above on the outside slope of the east portion of the embankment between CCR3 and the Process Waste Pond.

4 FINDINGS

The following inspection findings are reported according to 40 CFR 257.83 and 40 CFR 257.84 based on field measurements and data provided by WFEC.

4.1 Bottom Ash Impoundments CCR2 (north cell) and CCR3 (south cell)

4.1.1 Regulation Citation §257.83 (b)(i)

Review of available information regarding the status and condition of the CCR unit, including, but not limited to, files available in the operating record (e.g. CCR unit design and construction information required by §§257.73(c)(1) and 257.74(c)(1), previous periodic structural stability assessments required under §§257.73(d) and 257.74(d), the results of inspection by a qualified person and results of previous annual inspections).

Findings: Reviewed available information, previous stability reports, and 2015 weekly inspection reports. Since this is the first Annual Inspection Report for the Hugo Plant, the design plans were reviewed and compared to the visual inspection. Based on the observed soils and the site, current engineering standards would probably dictate a flatter dike than the constructed two (2) horizontal to one (1) vertical slopes.

4.1.2 Regulation Citation §257.83(b)(ii)

A visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit

Findings: CCR2 and CCR3, were visually inspected on December 3, 2015, with a follow-up inspection on December 22, 2015. The inspection included: walking around both impoundments, taking photographs, taking notes, taking GPS positions and measuring the approximate water depth at various locations in both CCR2 and CCR3. Although several areas of sloughing were noted during the inspection, there was no indication that these areas would cause a malfunction in the safe operation of the impoundments.

4.1.3 Regulation Citation §257.83(b)(iii)

A visual inspection of any hydraulic structures underlying the base of the CCR unit or passing through the dike of the CCR unit for structural integrity and continued safe and reliable operations

Findings: Concrete structures at each end of the pipe passing under the CCR dike are in good condition. The pipe itself was not visible due to complete submergence on both ends. However, this pipe is a recent HDPE replacement of the original corrugated metal pipe.

4.1.4 Regulation Citation §257.83(b)(2)(i)

Any changes in geometry of the structure since the previous annual inspection

Findings: Since this is the first annual inspection for the Hugo Plant, the design plans were reviewed and compared to the visual inspection findings. No noticeable changes appear to have occurred to CCR2 and CCR3 since construction. A few minor variations between the plans and the as-built impoundments were noted.

4.1.5 Regulation Citation §257.83(b)(2)(ii)

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

Findings: The water level of CCR2 and CCR3 are both measured toward the east end of the impoundments using a vertical staff marked with 0.1 foot increments. At the time of the inspection, CCR2 level was 2.63 feet below the top of the dike and CCR3 level was 4.30 feet below the top of the dike. Since this is the first Annual Inspection Report, maximum recorded readings since a previous annual inspection do not exist.

4.1.6 Regulation Citation §257.83(b)(2)(iii)

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

Findings: Observed water elevation is measured at the outlet structure. The elevation at the time of the inspection CCR level was 2.63 feet below the top of the dike and CCR level was 4.30 feet below the top of the dike. This is the first annual inspection so there is no data on the minimum and maximum elevation of the impounded water in CCR2 and CCR3.

4.1.7 Regulation Citation §257.83(b)(2)(iv)

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

Findings: At the time of the inspection (on December 3, 2015), the remaining storage capacity at normal pool level, three feet below the top of dike, for CCR2 was 402,000 cyds and for CCR3 was 431,000 cyds.

4.1.8 Regulation Citation §257.83(b)(2)(v)

The approximate volume of the impounded water and CCR at the time of inspection

Findings: At the time of the inspection (on December 3, 2015), the volume of impounded water in CCR2 was 418,000 cyds (at an elevation of 443.37 ft) and the volume of impounded water in CCR3 was 375,000 cyds (at an elevation of 441.7 ft). Elevation readings are based on the elevation of 446 ft assigned to the top of the discharge structure in construction drawings.

4.1.9 Regulation Citation §257.83(b)(2)(vi) (part 1)

Any appearances of an actual structural weakness of the CCR unit

Findings: The visual inspection revealed slope sloughing problems on CCR2 and CCR3. As identified previously, CCR3 had a slope slough on the outside slope of the east portion of the embankment between CCR3 and the Process Waste Pond. All the other slope sloughs were minor. No other structural weaknesses were identified.

4.1.10 Regulation Citation §257.83(b)(2)(vi) (part 2)

Any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit

Findings: The dikes of both CCR2 and CCR3 were designed and constructed at two (2) horizontal to one (1) vertical slopes. These slopes require monitoring and repair of sloughing. No other conditions are disrupting or have the potential to disrupt the operation and safety of the CCR units.

4.1.11 Regulation Citation §257.83(b)(2)(vii)

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

Findings: This is the first Annual Inspection Report.

4.2 Flyash Landfill CCR1

4.2.1 Regulation Citation §257.84(b)(i)

Review of available information regarding the status and condition of the CCR unit, including, but not limited to, files available in the operating record (e.g. results of inspections by a qualified person, and results of previous annual inspection)

Findings: Reviewed available information and 2015 weekly inspection reports. Since this is the first Annual Inspection Report for the Hugo Plant, the design plans were reviewed and compared to the visual inspection.

4.2.2 Regulation Citation §257.84(b)(ii)

A visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit

Findings: CCR1 was visually inspected on December 4, 2015, with a follow-up inspection on December 22, 2015. The inspection included walking around the structure, taking photographs, taking notes, taking GPS positions and measuring the approximate distance below the top of the dike of the landfilled fly ash. No signs of distress or malfunction were identified.

4.2.3 Regulation Citation §257.84(b)(2)(i)

Any changes in geometry of the structure since the previous annual inspection

Findings: Since this is the first Annual Inspection Report for the Hugo Plant, the design plans were reviewed and compared to the visual inspection findings. No noticeable changes appear to have occurred to CCR1 compared to the design plans**.**

4.2.4 Regulation Citation §257.84(b)(2)(ii)

The approximate volume of CCR contained in the unit at the time of inspection

Findings: The approximate volume of flyash contained in CCR1 at the time of inspection on December 3, 2015 was 551,000 cyds.

4.2.5 Regulation Citation §257.84(b)(2)(iii) (part 1)

Any appearances of an actual structural weakness of the CCR unit

Findings: The visual inspection revealed minor slope sloughing problems on CCR1. No actual structural weaknesses were identified.

4.2.6 Regulation Citation §257.84(b)(2)(iii)(part 2)

Any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit

Findings: The dikes of CCR1 were designed and constructed at two (2) horizontal to one (1) vertical slopes. These slopes require monitoring and repair of sloughing. No conditions were identified that are disrupting or have the potential to disrupt the operation and safety of the CCR unit.

4.2.7 Regulation Citation §257.84(b)(2)(iv)

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

Findings: This is the first Annual Inspection Report.

5 CONCLUSION

Overall, this first annual inspection under the CCR Rule did not reveal any deficiencies or releases in either CCR1, CCR2, or CCR3. 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.

Various operational changes have occurred since the commissioning of CCR1, CCR2, and CCR3 that differ from the original design of the systems. The original operation of the CCR2 and CCR3 specified the use of stop logs to manage the water level within the impoundments, which allowed the decanting of water. The current operational practice does not use the stop logs; instead, the non-emergency gates remain open. This practice does not allow for decanting, but it does provide a balance between personal safety and the original intent of the stop logs.

Guernsey finds that at the time of the first annual inspection of the Hugo Plant, CCR1, CCR2, and CCR3 are designed, constructed, (other than the 2:1 slopes, as discussed herein) operated, and maintained consistent with recognized and generally accepted good engineering standards.

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