SCS ENGINEERS

Annual CCR Landfill Inspection
Modules 1 - 3

Columbia Dry Ash Disposal Facility

Prepared for:

Wisconsin Power and Light Company

Columbia Energy Center
W8375 Murray Road
Pardeeville, Wisconsin 53954

Prepared by:

SCS ENGINEERS
2830 Dairy Drive
Madison, Wisconsin 53718-6751
(608) 224-2830

December 2017
File No. 25216067.17

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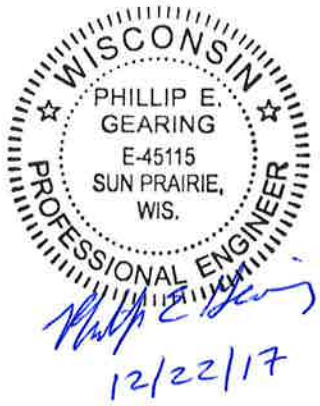
PE CERTIFICATION



I, Phillip E. Gearing, hereby certify that this Annual CCR Landfill Inspection Report meets the requirements of 40 CFR 257.84(b)(2), was prepared by me or under my direct supervision, and that I am a duly licensed Professional Engineer under the laws of the State of Wisconsin.

Phillip E Gearing 12/22/17

(signature) (date)

PHILIP E GEARING

(printed or typed name)

License number E-45115

My license renewal date is August 30, 2018.

Pages or sheets covered by this seal:

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1.0 INTRODUCTION

1.1 PURPOSE

SCS Engineers (SCS) completed an annual inspection of the Wisconsin Power and Light Company (WPL) Columbia Dry Ash Disposal Facility (COL) in Pardeeville, Wisconsin. The annual inspection was completed in accordance with the U.S. Environmental Protection Agency (USEPA) Coal Combustion Residuals (CCR) rule, 40 CFR 257 Subpart D, in particular 257.84(b)(1). According to 40 CFR 257.84(b)(1), an annual inspection by a qualified professional engineer is required for all existing and new CCR landfills, and any lateral expansion of a CCR landfill. The purpose of the annual inspection is to ensure that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering standards. The inspection must, at a minimum, include:

- A 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., the results of inspections by a qualified person, and results of previous annual inspections); and

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

This report has been prepared in accordance with 40 CFR 257.84(b)(2) to document the annual inspection.

1.2 BACKGROUND

The COL facility includes an active CCR landfill, which currently consists of three CCR units, all located in Phase 1 of the facility. The CCR landfill includes a second phase (Phase 2) which is currently undeveloped.

The active CCR landfill at COL is comprised of three existing CCR units:

- Module 1
- Module 2
- Module 3

The inspection requirements in 40 CFR 257.84(b)(1) apply to the three existing (active) CCR units listed above.

At the time of the inspection, the active CCR landfill modules were in various stages of development and use, as described in the table below.

Disposal Phase	Module	CCR Rule Status	Basis for Status
Phase 1	Module 1	Existing. Not currently accepting CCR. Will accept CCR again following construction of Phase 2, Modules 7 and 8.	Final or interim grades have been reached. Final cover completed on portions of the CCR unit. Final closure per 257.102 will not be completed until final grades are reached throughout the CCR unit.
	Module 2	Existing. Not currently accepting CCR. Will accept CCR again as overlay fill is placed as filling progresses in Phase 1, Module 3.	Final or interim grades have been reached. Final cover present on portions of the CCR unit. Final closure per 257.102 will not be completed until final grades are reached throughout the CCR unit.
	Module 3	Existing. Accepting CCR.	Consistent construction presence was initiated in September 2015, prior to effective date of CCR Rule. Module construction was completed in July 2016 and began receiving CCR after state approval of the construction.

2.0 SUMMARY OF RESULTS AND RECOMMENDATIONS

SCS identified no deficiencies or releases during the annual inspection of the CCR units at COL. Deficiencies and releases must be remedied by the owner or operator as soon as feasible and the remedy documented.

SCS did identify conditions during the annual inspection that are not considered deficiencies but have the potential to become a deficiency if left unaddressed. Each condition and the recommendations provided by SCS to address them are summarized in the table below. These conditions and recommendations are described in further detail in **Section 4.0**.

Condition	CCR Unit	Recommendation(s)	Report Section
Tall vegetation was observed in intermediate and final cover areas	Module 1 and 2	Vegetated areas shall be maintained and mowed	4.3.2
Erosion of drainage material around three outlet culverts	Module 2 (contact water area)	Continued observation for eroded areas and repair if observed	4.3.4
Minor erosion around the perimeter of Module 3	Module 3	Continued observation for eroded areas and repair if observed	4.3.4
Accumulated CCR in the contact water management area	Module 2	Accumulated CCR should be removed periodically to prevent impedance of contact water or prevent the release of CCR into the leachate/surface water pond	4.4.2.1

Note: Site staff was actively preparing to repair eroded areas and remove accumulated CCR the same day the annual inspection was completed. The site staff reported, post inspection, that the repair work was addressed the day of the inspection.

3.0 ANNUAL INSPECTION

Mr. Phillip Gearing of SCS completed an annual inspection of active CCR landfill areas at COL, including Module 1, Module 2, and Module 3 on September 28, 2017. Mr. Gearing is a licensed professional engineer in Wisconsin and holds a Bachelor's of Science degree in Geological Engineering. He has over 10 years of experience in the design, construction, and operation of solid waste disposal facilities. This was the third annual inspection of Module 1, Module 2, and Module 3 at COL. The scope of the annual inspection is described in **Sections 2.1** and **2.2**. The results of the annual inspection are discussed in **Section 3.0**.

3.1 OPERATING RECORD REVIEW

SCS reviewed the available information in the operating record for COL. Information reviewed by SCS included operating record materials provided by WPL and the information posted on Alliant Energy's CCR Rule Compliance Data and Information website for the COL facility.

3.2 VISUAL INSPECTION

SCS completed a visual inspection of Module 1, Module 2, and Module 3 to identify signs of distress or malfunction of the CCR units.

The visual inspection included observations of the following:

- CCR placement areas including active filling areas, intermediate cover areas, final cover areas, and exterior non-CCR berms or slopes.
- Leachate collection and removal system components including visible leachate drainage layer materials.
- Leachate and contact water run-off management features including internal contact water drainage features, leachate collection system discharge pipe, and the leachate/surface water pond.
- Non-contact storm water run-on and run-off control features including swales located adjacent to active fill areas, on intermediate/final cover slopes, and outside the landfill limits and the south sedimentation basin.

4.0 INSPECTION RESULTS

The results of the annual inspection, along with a description of any deficiencies or releases identified during the visual inspection, are summarized in the following sections.

4.1 CHANGES IN GEOMETRY

This is the third annual inspection of Module 1, Module 2, and Module 3 at the COL facility completed under 40 CFR 257.84(b)(1). No apparent changes in geometry were noted that would indicate distress or malfunction of the CCR units at the facility. All changes in geometry observed during the annual inspection were the result of planned CCR filling in Module 3.

At the time of the visual inspection, no active CCR placement was ongoing in Module 1. Final grades where no future CCR placement is anticipated in Module 1 have been reached. Interim grades where future CCR placement is planned where adjacent CCR unit construction will allow for the overlay of additional CCR in Module 1 have also been reached. The final cover has been extended along the south and west slopes. No change in the final cover on the east slope has occurred. Intermediate cover soils were placed on a portion of the south and east slopes in the fall of 2016. Vegetation has been established in the intermediate cover areas.

At the time of the visual inspection, no active CCR placement was ongoing in Module 2. Final grades where no future CCR placement is anticipated in Module 2 have been reached in a small area on a portion of the west slope. Interim grades where future CCR placement is planned where adjacent CCR unit construction will allow for the overlay of additional CCR in Module 2 have also been reached. Final cover has been constructed over a small portion of the west slope of Module 2. Intermediate cover soils were placed on a portion of the west, north, and east slopes in the fall of 2016. Vegetation has been established in the intermediate cover areas.

As noted in **Section 1.2**, Module 3 is currently accepting CCR. A temporary rain cover installed over the leachate drainage layer has been removed from a majority of the module. Temporary cover remains on small portions of the eastern and northern interior perimeter slopes of Module 3.

4.2 CCR VOLUMES

The approximate volume of CCR contained in each of the active modules at the time of inspection is summarized below. A description of how the estimate was developed and the sources used are also summarized below.

Disposal Phase	Module	Estimated Volume of CCR in Place	Basis for Estimate and Source
Phase 1	Module 1	554,029 cubic yards	Estimated volume based on existing waste volumes as of 11/31/2015 plus tons disposed between 12/1/2015 and 9/23/2016. Tonnage converted to cubic yards assuming an average unit weight for CCR of 0.9 tons per cubic yard. Volume includes material placed during the 2016 cover construction project. Estimated disposal volume is split evenly between Module 1 and Module 2. Disposal records for 12/1/2015 to 9/23/2016 provided by WPL. Waste placement in Modules 1 and 2 ceased on 9/23/2016.
	Module 2	219,429 cubic yards	Same as above.
	Module 3	89, 882 cubic yards	Waste placement in Module 3 began on 9/23/2016. Estimated volume based on tons disposed between 9/23/2016 and 4/25/2017. A survey was performed on 4/25/2017. Volume placed between 4/25/2017 and 9/28/2017 was estimated based on incoming tonnages. Tonnage was converted to cubic yards assuming an average unit weight for CCR of 0.9 tons per cubic yard. Disposal records for 9/23/2016 to 9/28/2017 provided by WPL.

4.3 APPEARANCE OF STRUCTURAL WEAKNESS

The inspection included a review of the appearance of an actual or potential structural weakness of the CCR unit. The visual inspection included a review of CCR fill areas including the top slopes, internal side slopes, external side slopes, and internal ramps/haul roads for the presence of the following conditions:

- Signs of surface movement or instability:
  - Sloughing, slumping, or sliding
  - Surface cracking
  - Slopes in excess of 3 horizontal to 1 vertical (3H:1V)
  - Toe of slope bench movement
  - Evidence of inadequate compaction of exposed CCR
- Inappropriate vegetation growth
- Animal burrows
- Erosion damage
- Unusual surface damage caused by vehicle traffic

4.3.1 Signs of Surface Movement or Instability

No other signs of surface movement or instability were noted during the inspection of Module 1, Module 2, and Module 3.

4.3.2 Inappropriate Vegetation Growth

Except as noted below, no inappropriate vegetation growth impacting the CCR unit was noted during the inspection of Module 1, Module 2, and Module 3.

It was observed in the weekly inspection reports and during the site inspection that vegetation was getting tall in the newly constructed Module 1 and Module 2 final cover and intermediate cover areas. It was discussed and reiterated with plant staff that vegetated cover areas be maintained and mowed to prevent inappropriate vegetation growth. The tall vegetation is not currently impacting the stability of the CCR landfill.

4.3.3 Animal Burrows

No animal burrows were noted during the inspection of Module 1, Module 2, and Module 3.

Deer tracks were noted in the weekly inspections performed by the site. Deer tracks have not caused instability on any slopes inspected.

4.3.4 Erosion Damage

Erosion of drainage layer material was observed around the three outlet culverts in the Module 2 contact water management area. Erosion appears to have been caused by concentrated flow of storm water.

Minor erosion was noted around the perimeter of Module 3 caused by run on from the existing perimeter access roads. Erosion appears to have been caused by concentrated flow of storm water.

The erosion conditions noted are not currently considered an operating deficiency since it is unlikely to have a significant impact on the function of the CCR unit. However, additional observation of these areas is recommended to ensure that the conditions observed during the

visual inspection, or similar future conditions, are addressed. The erosion was discussed with plant staff after the inspection was performed.

No additional erosion damage was noted during the inspection of Module 1, Module 2, and Module 3.

4.3.5 Unusual Surface Damage Caused by Vehicle Traffic

No unusual surface damage caused by vehicle traffic was noted during the inspection of Module 1, Module 2, and Module 3.

4.4 DISRUPTIVE CONDITIONS

4.4.1 Existing Disruptive Conditions

4.4.1.1 Current Inspection

No existing conditions that were disrupting the operation and safety of the CCR units were noted during the annual inspection.

4.4.1.2 Previous Inspection

No existing conditions that were disrupting the operation and safety of the CCR units were noted during the previous inspection.

4.4.2 Potentially Disruptive Conditions

4.4.2.1 Current Inspection

A potentially disruptive condition was noted during the inspection at the contact water management area located at the east end and within the limits of Module 2. The contact water management area is functioning as designed and has continued to accumulate CCR. The accumulated CCR in this area should be removed. When CCR is allowed to accumulate in this area, the accumulated CCR could impede the flow of contact water into the leachate/surface water pond or allow the release of CCR into the leachate/surface water pond.

The accumulated CCR and recommended maintenance in this area was discussed with plant staff at the time of the inspection. According to plant staff, the COL facility was going to address the situation immediately.

No other potentially disruptive conditions were noted during the inspection of Module 1, Module 2, and Module 3.

4.4.2.2 Previous Inspection

The same potentially disruptive condition was noted during the inspection at the contact water management area during the previous inspection. This area needs continual attention during

weekly inspections. As material accumulates, it should be removed in order to not impede leachate/storm water flow.

No other potentially disruptive conditions were noted during the previous inspection of Module 1, Module 2, and Module 3.

4.5 OTHER CHANGES SINCE PREVIOUS ANNUAL INSPECTION

The most significant change to the facility since the previous annual inspection is the completion of final cover and intermediate cover construction areas in Module 1 and Module 2. The areas have been restored and vegetation has been established in the cover areas.

No other changes to site conditions that appear to have the potential to affect the stability or operation of the facility were noted during the inspection of Module 1, Module 2, and Module 3.

5.0 FUTURE INSPECTIONS

5.1 EXISTING CCR LANDFILL

As stated in 40 CFR 257.84(b)(4), the owner or operator of the CCR unit must conduct the inspection required by paragraphs (b)(1) and (2) of this section on an annual basis. The date of completing the inspection report is the basis for establishing the deadline to complete the next subsequent inspection. Any required inspection may be conducted prior to the required deadline provided the owner or operator places the completed inspection report into the facility's operating record within a reasonable amount of time. In all cases, the deadline for completing subsequent inspection reports is based on the date of completing the previous inspection report. The owner or operator has completed an inspection when the inspection report has been placed in the facility's operating record.

The next annual inspection of Module 1, Module 2, and Module 3 must be completed within 1 year of the placement of this inspection report in the operating record for the COL facility.

5.2 NEW CCR LANDFILLS AND LATERAL EXPANSIONS

As discussed above, all of the CCR units at the COL facility are considered existing CCR units. The initial annual inspection for modules constructed in the future must be completed within 14 months of the initial receipt of CCR in the module per 40 CFR 257.84(b)(4).