SCS ENGINEERS

# Annual CCR Landfill Inspection
# OML Existing Landfill
# OML Expansion Phase 1

## Ottumwa-Midland Landfill

Prepared for:

Interstate Power and Light Company

Ottumwa-Midland Landfill
15300 130th Street
Ottumwa, Iowa 52501

Prepared by:

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

December 2017
File No. 25216073.17

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# Table of Contents

**Section** **Page**



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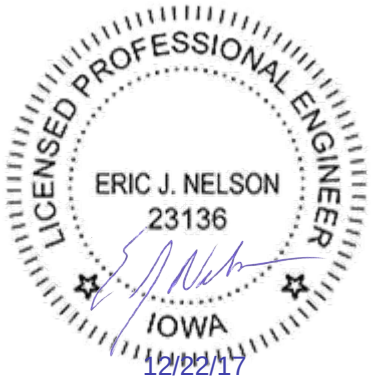
# PE CERTIFICATION




I, Eric J. Nelson, hereby certify that this Initial 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 Iowa.

12/22/2017

(signature) (date)

Eric J. Nelson

(printed or typed name)

License number 23136

My license renewal date is December 31, 2018.

Pages or sheets covered by this seal:

All - IPL OML Annual CCR Landfill Inspection, December 2017

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# 1.0 INTRODUCTION

## 1.1 PURPOSE

SCS Engineers (SCS) completed an annual inspection of the Interstate Power and Light Company (IPL) Ottumwa-Midland Landfill (OML) in Ottumwa, Iowa. 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 OML includes an active CCR landfill, which currently consists of two CCR units:

- OML Existing Landfill
- OML Expansion Phase 1

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

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

| CCR Unit | CCR Rule Status | Basis for Status |
|---|---|---|
| OML Existing Landfill | Existing, Accepting CCR | Module received CCR before and after the effective date of the CCR Rule. |
| OML Expansion Phase 1 | Existing, Accepting CCR | Module construction was completed in September 2015 and began receiving CCR in October 2016 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 OML. 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 |
|---|---|---|---|
| Steep CCR fill slopes with signs of movement indicated by surface cracking in the active filling area | Expansion Phase 1 | No additional CCR filling on top of slopes until buttressing fill is placed | 4.3.1 |
| Cracks in intermediate soil cover | Existing Landfill | Backfill the cracks and monitor | 4.3.1 |
| Weed growth in leachate drainage layer | Expansion Phase 1 | Monitor and remove as possible during regular maintenance | 4.3.2 |
| Mild gully erosion of intermediate soil cover | Existing Landfill | Monitor intermediate cover and repair/restore if CCR is visible | 4.3.4 |
| Erosion of bottom ash ramp | Expansion Phase 1 | Monitor and repair if ponding of water occurs | 4.3.4 |
| Water bubble under the temporary contact water basin liner | Expansion Phase 1 | Monitor until repair is completed (Note: repair was completed on December 5, 2017) | 4.4.2.1 |
| Surface cracking in temporary contact water and northern-most sedimentation basin berms | Expansion Phase 1 | Backfill the cracks and monitor | 4.4.2.1 |

# 3.0 ANNUAL INSPECTION

Mr. Eric Nelson of SCS completed an annual inspection of the active CCR units at OML, including the Existing Landfill and Expansion Phase 1 on October 4, 2017. Mr. Nelson is a licensed professional engineer in Iowa and holds a Bachelor's of Science degree in Geological Engineering. He has over 19 years of experience in the design, construction, and operation of solid waste disposal facilities. This was the third annual inspection of the Existing Landfill and Expansion Phase 1 at OML. The scope of the annual inspection is described in **Sections 3.1** and **3.2**. The results of the annual inspection are discussed in **Section 4.0**.

## 3.1 OPERATING RECORD REVIEW

SCS reviewed the available information in the operating record for OML prior to the visual inspection discussed in **Section 3.2**. Information reviewed by SCS included operating record materials provided by IPL and the information posted on Alliant Energy's CCR Rule Compliance Data and Information web site for the OML facility.

## 3.2 VISUAL INSPECTION

SCS completed a visual inspection of the Existing Landfill and Expansion Phase 1 at OML to identify signs of distress or malfunction of the CCR units. SCS also provided oversight of the recent construction activities for Phase 1.

The visual inspection included observations of the following:

- CCR placement areas including active filling areas, intermediate cover areas, and exterior non-CCR berms or slopes.
- Leachate collection and removal system components including visible leachate drainage layer materials, leachate vaults, cleanouts, and the leachate storage lagoon.
- Contact water run-off management features including internal contact water drainage features and Temporary Contact Water Basin 1/2.
- Non-contact storm water run-on and run-off control features including swales and sedimentation basins located adjacent to active fill areas but outside the landfill limits.
- Groundwater underdrain system components including the visible underdrain discharge pipes.

# 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 the Existing Landfill and Expansion Phase 1 at the OML 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 or intermediate soil cover placement activities.

At the time of the visual inspection, active CCR placement was evident in the Existing Landfill. CCR placement is limited to an area of approximately 500 feet (east to west) by 185 feet (north to south) in the southeast corner of the current top slope of the CCR unit. Intermediate cover is in place along a portion of the north, west, and east slopes; the majority of the south slope; and all but the active CCR placement area and access road on the top slope.

At the time of the visual inspection, active CCR placement was evident in Expansion Phase 1. CCR placement is limited to the north half of the bottom area of the CCR unit. The southern half of the bottom area of the CCR unit and the interior slopes (east, west, and south slopes) of the lined area are covered with a temporary rain cover, and no CCR has been placed in these areas.

## 4.2 CCR VOLUMES

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

| CCR Unit | Estimated Volume of CCR in Place | Basis for Estimate and Source |
|---|---|---|
| OML Existing Landfill | 870,778 cubic yards | Estimated volume based on existing in-place waste volume as of 5/23/2017 plus estimated waste disposed between 5/24/2017 and 10/4/2017. In place volume as of 5/23/2017 is based on topographic survey and includes all daily and intermediate cover soil. Waste disposed from 5/24 to 10/4/2017 (19,950 tons) was estimated using an average daily disposal rate of 150 tons per day, which is the average over the period of 1/1 to 10/12/2017. This tonnage was converted to cubic yards (22,167 cubic yards) assuming an average unit weight for CCR of 0.9 tons per cubic yard. It was assumed all waste from this period, with the exception of fly ash from Prairie Creek generating facility, was disposed of in the Existing Landfill. Disposal records for 2017 through 10/12/2017 were provided by IPL. |
| OML Expansion Phase 1 | 14,408 cubic yards | Estimated volume based on existing in-place waste volume as of 5/23/2017 plus estimated waste disposed between 5/24/2017 and 10/4/2017. In place volume as of 5/23/2017 is based on topographic survey. Waste disposed from 5/24 to 10/4/2017 (2,926 tons) was estimated using an average daily disposal rate of 22 tons per day, which is the average over the period of 1/1 to 10/12/2017. This tonnage was converted to cubic yards (3,251 cubic yards) assuming an average unit weight for CCR of 0.9 tons per cubic yard. However, only fly ash generated by Prairie Creek generating station was assumed to be disposed of in Expansion Phase 1 for this time period. Disposal records for 2017 through 10/12/2017 were provided by IPL. |

## 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

During our inspection, we noted slopes steeper than 3H:1V at the far east end and the south slope of the CCR fill within the active filling area of Expansion Phase 1. These slopes, estimated to be approximately 1H:1V and 8 to 10 feet high, showed signs of movement at the far east end of the CCR fill, which was indicated by surface cracking.

The CCR fill in this area is cemented, so the slopes cannot be flattened. We recommend that no additional fill be placed on top of the steep slopes until additional material is placed to the east and south to buttress the steep slopes. This will require that IPL remove a portion of the existing temporary rain cover. The steep slopes and the plan for filling in this area were discussed with the site operator during the inspections. IPL is currently placing CCR fill to the west with no plans to expand the fill vertically in areas where the surface cracking was noted until the active fill area is expanded to the east and south. The current slope conditions are not considered an operating deficiency based on the current filling operation and plan discussed with the site operator.

We also noted cracks in the intermediate soil cover during the inspection. One significant crack was observed in the intermediate cover on the west-facing slope immediately to the north of the access road leading into the active fill area for the Existing Landfill. The cracks in the intermediate cover are most likely the result of cover soil desiccation caused by the very dry conditions at the site over the last couple years. However, they might also be an indication of movement of the cover soils. The cracks are not considered an operating deficiency, but they should be backfilled by IPL and monitored during future 7-day inspections.

No other signs of surface movement or instability were noted in the inspection of the two CCR units. Areas where signs of potential surface movement or instability were noted outside the CCR units at supporting facilities are discussed in **Section 4.4**.

### 4.3.2 Inappropriate Vegetation Growth

No inappropriate vegetation growth that was causing apparent distress or malfunction of the CCR units was noted during the inspection.

Weed growth in the leachate drainage layer sand along the north edge of the Expansion Phase 1 active fill area was noted during the inspection. This vegetation does not currently appear to be limiting the function of the leachate drainage layer since no ponding or erosion of the leachate drainage layer was observed. No specific action is required at this time based on our observations. However, we recommend IPL continue to observe these areas for signs that the vegetation is impeding flow through the leachate drainage layer and remove the vegetation as possible during regular maintenance activities (e.g., when removing accumulated sediment from contact water ditches).

### 4.3.3 Animal Burrows

No animal burrows that were causing apparent distress or malfunction of the CCR units were noted during the inspection.

### 4.3.4 Erosion Damage

Mild gully erosion of the Existing Landfill intermediate cover materials was noted during the inspection. The erosion was observed in the intermediate cover on the west slope of the Existing Landfill to the west of the active fill area in the area between the top fill area access road and the road to the leachate vault installed for Expansion Phase 1. This erosion was also noted in the previous inspection. The erosion appears to have been repaired between the annual inspections based on the presence of sparse vegetation and straw mulch. The erosion appears to be caused by runoff from the top fill area access road. The runoff causing the erosion is controlled and directed to the storm water basin located to the south of the landfill. The erosion in this area is not currently considered an operating deficiency since it is unlikely to have a significant impact on the function of the CCR unit.

The erosion of the bottom ash ramp that was noted during the initial inspection remains; however, no significant changes to the conditions in this area were noted during the current inspection. Bottom ash from the ramp has eroded into the area along the north side of the ramp and into the culvert that allows the free flow of contact water under the ramp in Expansion Phase 1. The condition is not prohibiting the proper management of contact water because a temporary rain cover is installed over the south end of the culvert, so the culvert serves no current function. Non-contact water generated in the temporary rain cover area is properly managed by facility staff by pumping it to the adjacent sedimentation basin to the north.

Based on the current inspection, the conditions noted are not considered an operating deficiency since they are unlikely to have a significant impact on the function of the CCR unit. However, erosion and the resulting deposit of sediment in surface water and contact water management features have the potential to cause ponding of water that may impact the overall stability of the CCR unit. Additional observation of these areas and repair is recommended to ensure that the

conditions observed during the visual inspection, or similar future conditions, are addressed and do not have an impact on the overall stability of the CCR unit.

No other erosion damage was noted during the inspection.

#### 4.3.5 Unusual Surface Damage Caused by Vehicle Traffic

No unusual surface damage caused by vehicle traffic was noted during the inspection.

## 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

IPL staff has noted a water bubble under the geomembrane liner in the temporary contact water basin during their 7-day inspections of the CCR units at OML. The bubble is located immediately below a culvert that enters the basin on the south side and where the protective stone has eroded from above the geomembrane line and protective geotextile cushion. At the time of our inspection, IPL had discussed the necessary repairs with the Iowa Department of Natural Resource (IDNR), obtained IDNR approval to complete the repairs, procured a contractor to repair the bubble and replace the eroded stone material, and was waiting for the contractor to schedule the repairs.

The bubble in the temporary contact water basin liner has the potential to disrupt the operation of Expansion Phase 1 if the bubble conditions were to change and make the basin unsuitable to receive contact water. Based on discussions with the landfill staff, the size/condition of the bubble has not changed over time. It was recommended that IPL continue to monitor the bubble during their 7-day inspections until the planned repairs were completed. On December 5, 2017, the repairs to the temporary contact water basin liner were completed and the stone cover materials were replaced and enhanced. The repairs will be documented in a report and submitted to the IDNR.

During the site inspection, SCS observed surface cracking in the berms that border the temporary contact water basin and northern-most storm water sedimentation basin to the east. The cracks

are visible in sparsely vegetated areas along the top of the berm, which is constructed of clay. The cracks may be desiccation cracks caused by the very dry conditions at the site over the last couple years. They might also be an indication of movement of these berms. It is recommended that IPL staff fill the cracks with a sand/bentonite mixture and monitor the cracks for changes during their 7-day inspections.

#### 4.4.2.2 Previous Inspection

No potentially disruptive conditions were noted during the previous inspection.

## 4.5 OTHER CHANGES SINCE PREVIOUS ANNUAL INSPECTION

No 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 the Existing Landfill or Expansion Phase 1.

# 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 the Existing Landfill and Expansion Phase 1 must be completed within 1 year of the placement of this inspection report in the operating record for the OML facility.

## 5.2 NEW CCR LANDFILLS AND LATERAL EXPANSIONS

As discussed above, all of the CCR units at the OML facility are considered existing CCR units. The initial annual inspection for CCR units 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).

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