
CLOSURE AND POST-CLOSURE CARE PLAN

**JAMES RIVER POWER STATION
UTILITY WASTE LANDFILL**

CITY UTILITIES OF SPRINGFIELD, MISSOURI

INITIAL PREPARATION DATE: October 11, 2016

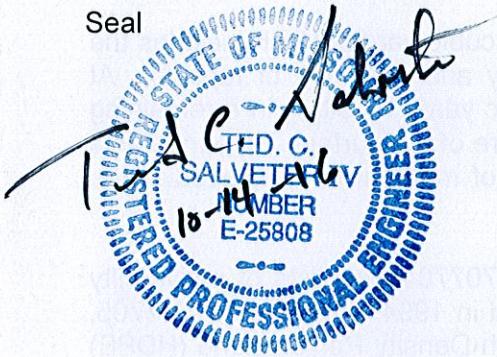
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1. CERTIFICATION PAGE

In accordance with 40 CFR 257.102(b)(4) and 257.104(d)(4), the undersigned certifies that the Closure and Post-Closure Care Plans contained in this document meet the applicable requirements of 40 CFR Part 257. This certification is based on information, drawings, data, reports, calculations, visual observations, and other documents reviewed by me personally, or individuals under my direct supervision, and includes documents prepared personally by me, or individuals under my direct supervision.

Seal



Name:

Ted C. Salveter

Signature:

Ted C. Salveter

Registration Number:

E-25808

Date:

10/14/16

2. INTRODUCTION

2.1 Plan Objective

This Closure and Post-Closure Care plan has been prepared in accordance with the closure and post-closure requirements found at 40 CFR 257.102(b) and 257.104(d), respectively. It is not the intent of this document to address those closure and post-closure requirements under Missouri Department of Natural Resource (MDNR) regulations that are also applicable to the UWL.

2.2 Facility Description

City Utilities of Springfield (CU) owns and operates a Utility Waste Landfill (UWL) located at the James River Power Station (JRPS) located at the southern boundary of the City of Springfield in Greene County, Missouri. The JRPS no longer burns coal, and is currently in the process of clean-closing the inactive surface impoundments and coal yard. CCR generated from closure activities will be placed in the UWL.

The UWL is permitted through the Missouri Department of Natural Resources to receive coal combustion residuals (CCR) from the combustion of coal at the JRPS and the John Twitty Energy Center (JTEC), another CU coal-fired power station located in southwest Springfield. The UWL was originally permitted in 1985 by the Missouri Department of Natural Resources (MDNR) under permit number 707704. In 1992 MDNR issued a new permit (Permit Number 707705) to allow the expansion of the landfill from a 17-acre fill footprint, to approximately 33 acres of fill. To date, approximately 16 acres of the total footprint have received final cover.

The UWL has a permitted capacity of approximately 1,867,000 cubic yards, which includes the 28-inch thick final cover system (24 inches of compacted clay and 4 inches of topsoil). At present the total airspace filled is approximately 1,080,000 cubic yards resulting in a remaining disposal airspace of approximately 787,000 cubic yards. Closure of the surface impoundments and coal yard will result in an additional 500,000 cubic yards of material being placed in the UWL.

The liner in the eastern portion of the landfill footprint (Permit 707704) consists of native silty clay soils. The western landfill expansion area liner, constructed in 1994 under Permit 707705, liner system consists of two feet of in-situ clay and a 60 mil High Density Polyethylene (HDPE) liner. A leachate collection layer, comprised of a geotextile fabric atop a HDPE geonet, overlies the HDPE liner. The HDPE liner and leachate collection layer was placed over the newly constructed western expansion area and extended to the east over the top of the ash fill already placed under permit # 707704. The entire HDPE liner and leachate collection layer was sloped such that any leachate drains to the storm water and leachate collection area in the southeast area of the landfill. This was formerly the storm water detention pond at the south end of the initial landfill. The MDNR, as a condition of the permit, required that an opening be left in the geomembrane liner to allow any leachate from the first (eastern) section of the landfill to drain into the leachate collection area. As a result, a 160-foot by 100-foot opening in the liner was constructed.

3. CLOSURE PLAN

In accordance with 40 CFR 257.102(b)(1)(i) through (vi), this UWL closure plan provides the following:

- Description of closure;
- Description of final cover system;
- Maximum CCR inventory;
- Maximum area of final cover;
- Closure schedule, notifications, certifications, and deed notations;
- Closure plan amendment.

3.1 Description of Closure

In accordance with 40 CFR 257.102(b)(1)(i), this section provides a narrative description of how the UWL will be permanently closed. As stated above, CU is currently in the process of clean-closing the inactive CCR surface impoundments and the coal yard. Following these activities, the UWL will have a remaining capacity of approximately 287,000 cubic yards. As such, the UWL will be temporarily closed with no defined timeframe for permanent closure. In accordance with MDNR regulations, a 12-inch thick temporary cover consisting of 8-inches of compacted clay and 4-inches of topsoil will be placed on the landfill.

At an undetermined future date, the UWL will be permanently closed following the placement of a sufficient volume of CCR to attain its permitted capacity. Placement of additional CCR will require:

- Removal of the temporary cover. The existing 3:1 vegetated side slopes will not be disturbed.
- Extension of existing haul road into opened area
- Construction of outer embankments (ash core with 24-inch clay cover) to contain ash fill and stormwater run-off
- Grading of ash fill to construct stormwater detention area capable of containing 25-year, 24-hour rainfall event
- Grading of the internal ash surface to promote drainage (1% slope minimum) to stormwater detention/leachate collection sump

The constructed “bowl” formed by the outer embankments will be systematically filled to final permit design contours. At all times CCR-tainted stormwater will be contained within the landfill and directed to the collection sump area. The ash fill crown surface will be protected from erosion as it is brought to final grade (1% minimum slope).

In the event that CU decides that the UWL will not be re-opened to accept additional CCR, the temporary cover will be modified to meet final cover requirements (24-inches of compacted clay and 6-inches of topsoil). Topsoil will be stripped off, the clay will be scarified/recompacted, and additional compacted clay will be added to achieve final cover requirements.

3.2 Description of Final Cover System

In accordance with 40 CFR 257.102(b)(1)(iii) a description of the final cover system must be included, along with the methods and procedures to be used to install the final cover. This section also discusses how the final cover system will achieve the performance standards specified in 257.102(d).

The final cover system required under Permit 707705 issued by MDNR equals or exceeds the final cover system requirements specified in 40 CFR 257.102(d)(3). The final cover system consists of 24 inches of compacted clay and four inches of topsoil therefore exceeding the minimum 18-inch thick infiltration layer required under 257.102(d)(3)(i)(B). The compacted clay has a permeability of 1×10^{-6} cm/sec or less therefore exceeding the minimum 1×10^{-5} cm/sec criteria in 257.102(d)(3)(i)(A). The UWL side slopes (up to the landfill crown) may not exceed a slope of 3:1. The UWL top crown must have a minimum slope of one (1) percent, sufficient to promote drainage and prevent ponding. Although the four (4) inches of topsoil is less than the six (6) inches of earthen material specified in 40 CFR 257.102(d)(3)(i)(c), it has functioned well to minimize erosion. In addition, the landfill will be monitored for erosion pursuant to state and federal regulations, therefore the risk detrimental erosion is further reduced. As stated previously, approximately 16 acres of the total 33 acre footprint have received final cover. Going forward, the topsoil layer of the final cover system will be increased to six inches to align with CCR requirements.

In accordance with 257.102(d)(3)(i)(A), the permeability of the final cover system is less than or equal to the permeability of the bottom liner system and natural subsoils present. This is based on the facts that the first UWL (Permit No. 707704) bottom liner consists of native silty clay subsoils, and that there is an opening in the HDPE liner system on the north side of the storm water/leachate collection area. In addition, it has been CU's experience that when compacted, fly ash/bottom ash exhibits a permeability in the range of 10⁻⁵ cm/sec or less, therefore infiltration is minimized if the ash surface is adequately sloped to shed precipitation.

After all wastes have been placed, and at the completion of each layer of the final cover system (including the interim cover system layers) a full topographic as-built survey will be completed clearly defining final cover system layer thicknesses and final slopes. Topographic surveys defining the waste footprint have already been performed and are part of the facility operating record.

3.3 Maximum CCR Inventory

As required by 257.102(b)(1)(iv), an estimate of the maximum inventory of CCR ever on-site over the active life of the UWL is provided herein. As stated previously, the JRPS no longer burns coal therefore CCR is no longer generated on-site. Those materials generated from the ongoing surface impoundment and coal yard closure activities are the maximum inventory that will exist on-site. It is currently estimated that approximately 500,000 cubic yards of CCR material will be placed in the UWL. This work will be completed no later than April 2018, after which CCR inventory will no longer exist on-site.

3.4 Maximum Area of Final Cover

As required by 257.102(b)(1)(v), an estimate of the largest area of the UWL ever requiring final cover during the UWL's active life is provided herein. The footprint of the open UWL, currently approximating 17 acres, represents the largest area requiring final cover. Approximately 16 acres of the entire landfill footprint has already received final cover.

3.5 Closure Schedule, Notifications, Certifications, and Deed Notations

As previously stated, there is no defined schedule for permanent closure of the UWL. The UWL will still have available, valuable permitted capacity to receive additional CCR. The UWL will be rendered inactive and receive a temporary cover following receipt of materials from surface impoundment and coal yard closure activities. It is anticipated that the landfill will be permanently closed concurrent with the John Twitty Energy Center (JTEC) UWL closure to retain the remaining capacity of the JRPS UWL for additional CCRs, or for mining of ash for beneficial use, if such a need arises.

In accordance with 257.102(e), closure activities will commence within 30 days following the known final receipt of CCR, or the known final removal of CCR for beneficial uses. In accordance with 257.102(f), closure will be completed within six months of commencing closure activities.

In accordance with 257.102(g), no later than the date closure is initiated, CU will prepare a notification of the intent to close the UWL. The notification will include a certification by a qualified professional engineer for the design of final cover system as required by 257.102(d)(3)(iii). The notification will be placed in the facility's operating record in accordance with 257.105.

Upon completion of closure, a qualified professional engineer will certify that closure has been completed in accordance with the requirements of this closure plan. This will be made part of the facility's operating record.

257.102(i)(1) requires that the property deed contain a notation that the land has been used as a UWL and that post-closure use is restricted. In accordance with MDNR regulations, a deed notification for the JRPS UWL has already been executed and recorded with Greene County. This meets the requirements of 257.102(i)(1)-(2).

3.6 Closure Plan Amendment

In accordance with 257.102(b)(3), City Utilities will amend the Closure Plan whenever:

1. There is a change in the operation of the UWL that would substantially affect the written plan in effect; or
2. Before or after closure activities have commenced, unanticipated events necessitate a revision of the plan.

The plan will be amended at least 60 days prior to a planned change in the operation of the UWL, or no later than 60 days after an unanticipated event requires the need for a revision. City Utilities will obtain a written certification from a qualified professional engineer that the initial and any amendment of the plan meets the applicable requirements of 257.102.

4. POST-CLOSURE CARE PLAN

This Post-Closure Care Plan addresses the post-closure care requirements stipulated in 257.104(d)(1)(i) through (iii). The following are addressed in turn:

- Monitoring and maintenance activities
- Facility contact information
- Post-closure period property uses
- Plan amendment

4.1 Monitoring and Maintenance Activities

City Utilities will conduct post-closure care for the UWL for a minimum of 30 years. These activities will consist of maintaining integrity of final cover system and maintaining/monitoring the groundwater monitoring system. The JRPS UWL is equipped with a leachate collection and removal system that must also be maintained and operated in accordance with Permit 707705.

Final Cover System

The final cover system will be monitored and maintained through-out the post-closure care period. Repairs will be made as necessary to correct the effects of settlement, subsidence, erosion (from run-on or run-off), or other events. Regular monthly visual inspections of the final cover system, coupled with additional inspections following severe rainfall and/or flood events will be made. To facilitate visual inspections, the UWL will be mowed as needed. Deficiencies will be noted and promptly corrected. Inspection activities will be documented and maintained with the facility operating record in accordance with 257.105. At a minimum, inspections will focus on:

- Storm water conveyance structures (ditches,swales) for signs of erosion or obstructions
- Removal of deep-rooted trees and shrubs
- Damage from burrowing animals
- Erosion of, or slumps in the final cover system
- Bare areas in vegetation on slopes and crown
- Excessive settlement of landfill crown that precludes drainage (no ponding of water)
- Access control fencing, gates and locks

Groundwater Monitoring System

A groundwater monitoring system is being developed in accordance with the requirements of 257.90 through 257.98, and applicable MDNR regulations. Groundwater monitoring will be conducted in accordance with the JRPS UWL Groundwater Sampling and Analysis Plan, which will be certified by a qualified professional engineer. As part of the regularly scheduled UWL inspections, the monitoring wells (caps, locks, bollards, etc.) will be inspected for damage.

Leachate Collection and Removal System

Due to closure of the ash ponds, the leachate collection and removal system will be modified to direct leachate to the sanitary sewer instead of it being pumped to the ash ponds for treatment and discharge. The design of the system has not been finalized. This change necessitates MDNR approval and modification of Permit 707705.

During post-closure, the leachate collection and removal system will be operated and maintained in accordance with MDNR Permit 707705. Following closure of the UWL, leachate generation should quickly dissipate. The primary objective is to maintain the system such that it maintains less than 12-inches of leachate on the HDPE liner, and that all leachate is captured and pumped to the sanitary sewer. The system will continue to be operated and maintained until MDNR is satisfied that the landfill has ceased to generate leachate.

The operation of the pump system will be controlled/monitored remotely from the JTEC control room. The system consists of dual submersible pumps which will typically alternate in operation unless both pumps are needed to control the leachate level in the pumping basin. Remote real-time monitoring capabilities include liquid levels (pump start, pump stop, and high level alarm), electric power at the pumps, instantaneous pump discharge rate, and motor run indicators. These signals will be used to set up alarm conditions that will be closely monitored in the JTEC Control Room. The system will be equipped with a flow meter/flow totalizer. The flow totalizer must be read on-site. City Utilities will quickly diagnose and correct any indications of abnormal operation. Repairs to the system will be made as soon as practicable. Additionally, the system will be equipped with a means to remove/pump leachate from the pump basin should the pumps be inoperable for an extended period.

In addition to remote monitoring, regular and episodic (following extended rainfall events or flood conditions) inspections of the system will include:

- Visual external inspection of system for damage (vandalism, flood debris, etc.)
- Inspect and record flow meter totalizer reading
- Visual inspection of leachate discharge into sanitary sewer manhole.

4.2 Facility Contact Information

The position listed below is responsible for ensuring that the activities of the Post-Closure Care Plan are conducted:

Position:	Director – Power Generation
Address:	301 E. Central Springfield MO 65802
Telephone No.:	417-863-9000
Email:	info@cityutilities.net

4.3 Post-closure Period Property Uses

There are no planned post-closure uses of the UWL property. No activities will be allowed that may jeopardize the integrity of the cover system. Access to the area will be restricted to plant personnel only. Unauthorized personnel are restricted from entry to the area.

4.4 Post-Closure Care Plan Amendment

In accordance with 257.104(d)(3), City Utilities will amend the Post-Closure Care Plan whenever:

1. There is a change in the operation of the UWL that would substantially affect the written plan in effect;
2. After post-closure activities have commenced, unanticipated events necessitate a revision of the plan.

The plan will be amended at least 60 days prior to a planned change in the operation of the UWL, or no later than 60 days after an unanticipated event requires the need for a revision. City Utilities will obtain a written certification from a qualified professional engineer that the initial and any amendment of the plan meets the applicable requirements of 257.104.