Location Restrictions
Ash Disposal Area
Otter Tail Power Company– Big Stone Plant

Introduction

This report presents documentation and certification for the location standards for the Ash Disposal Area (landfill) at the Big Stone Plant, in Big Stone City, South Dakota. The landfill is an existing coal combustion residual (CCR) landfill. This document addresses the requirements of 40 CFR 257.64, for existing CCR landfills and demonstrates the landfill's compliance with the requirements.

Location Restrictions

The sections below provide substantiation of compliance for the location restrictions.

Compliance with §257.64, Unstable Areas

To comply with §257.64, the owner or operator must demonstrate that:

(a) An existing or new CCR landfill, existing or new CCR surface impoundments, and all lateral expansions of CCR units must not be located in an unstable area…

(b) The owner or operator must consider all of the following factors, at minimum, when determining whether an area is unstable:

(1) On-site or local soil conditions that may result in significant differential settling;

(2) On-site or local geologic or geomorphologic features;

(3) On-site or local human-made features or events (both surface and subsurface).

The *Groundwater Monitoring System Report (Barr, 2016)* describes the soils and geology at the Big Stone Plant. The site is located within the Coteau des Prairie plateau region, and surficial geology is composed of Late Wisconsin Des Moines Lobe glacial till. The till is a continuous lithostratigraphic unit and consists of lean clay with discontinuous seams and lenses of sand and clayey sand.

The glacial till underlying the site is separated into two hydrostratigraphic units. The upper unit is comprised of brown (oxidized) till and contains seams of silt and clayed sand. The lower unit is gray (unoxidized) and is mostly lean clay. A well completion log for a well installed in August 1977 near the Plant indicates the upper brown till is present from 0 to 51 feet below grades surface (bgs), and the lower unit occurs from 51 to 227 feet bgs.

Standard penetration test (SPT) blow counts (N-values) obtained during monitoring well installation on the south and east sides of the site ranged from 5 (medium) to 20 (very stiff) in the till, and generally increased with depth.

The landfill is positioned between the Cooling Pond and Evaporation/Holding Pond areas, and is south of the North Reclaim Pond. The base of the landfill was constructed on native clay till. Construction drawings include a 1974 topographic map with a conceptual design for earthen embankments on the south and east side of the landfill.

Natural surface drainage surrounding the landfill is relatively flat with minor changes in elevation.

A portion of the raw water supply line is located underneath the landfill. The supply line is a 48-inch diameter, reinforced concrete pipe, and periodically provides water from Big Stone Lake to the plant. Valves positioned on the lake intake building and Cooling Pond discharge structure are closed following each pumping event to prevent movement of water through the pipe when the pumps are not in operation. Prior to CCR placement in the landfill, the pipe was backfilled with a minimum of 6.5 feet of compacted native material (till). The vertical alignment of the pipe under the landfill is in a local depression.

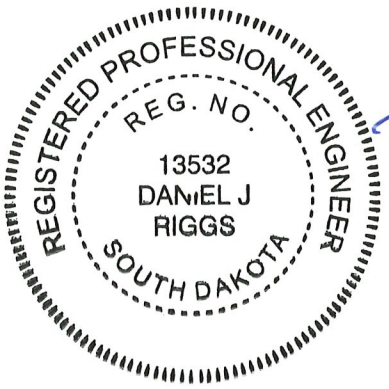
The landfill is an ash monofill that exhibits pozzolanic properties, and is not subject to flow. If a pipe failure did occur under the landfill, the closed valves and localized depression would limit the flow of water in the pipe, preventing scouring of pipe backfill. CCR in the landfill would remain within the underlying till, would not experience mass movement and/or release to the environment.

Conclusion

The Ash Disposal area is situated on glacial till up to 277 feet thick. Hydrogeologic investigations conducted at the landfill verify the base is constructed on consistently stable soils and meets all of the location restrictions listed under 40 CFR §257.64. The nature of the CCR in the landfill combined with mechanical controls and alignment of the underlying pipe would prevent any release of CCR to the environment during a pipe failure event. There are no apparent conditions that would cause underlying soils to experience mass movement or impact the structure of the unit and cause risk to human health or the environment through structural failures.

Certification

I hereby certify under penalty of law that this report was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based upon my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment.



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Date

References

Carlson McCain, 2017. CCR Groundwater Sampling and Analysis Plan, Ash Disposal Area – Big Stone Plant. Prepared by Carlson McCain, Inc., October, 2017.

Barr, 2016. Groundwater Monitoring System Report, Ash Disposal Area – Big Stone Plant. Prepared by Barr Engineering Co. December, 2016.