

Location Restrictions

Blue Pit

Otter Tail Power Company - Coyote Station

Introduction

This report presents documentation and certification for the location standards for the Blue Pit Facility (Blue Pit) at Coyote Station in Beulah, North Dakota. The Blue Pit is an existing lined coal combustion residual (CCR) landfill. This document addresses the requirements of 40 CFR 257.64, for existing CCR landfills and demonstrates the Blue Pit's compliance with the requirements.

Location Restrictions

The sections below provide substantiation of compliance for each of 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 Coyote Station. The Blue Pit is located within the Great Plains region of the Missouri Plateau. This region is characterized by sedimentary rock (Sentinel Butte Formation) overlain by glacial till (Coleharbor Formation) and has historically been mined for lignite coal reserves. Due to past mining history at the Blue Pit, the lignite was exposed, mined, and then the site was reclaimed with a combination of mine spoils and overburden materials.

Prior to construction of the Blue Pit, a site suitability study was conducted. The study, titled *Suitability Study Report for the Development of the Blue Pit FGD Waste Disposal Site (North Central, 1994)* concluded that the site was suitable for landfill construction and operation in accordance with the Solid Waste Management Rules of the State of North Dakota.

The study reported that the majority of the soils underlying the Blue Pit were stiff to very stiff high plasticity clay (CH) with some inclusions of lignite and scoria. Standard penetration test (SPT) blow counts (N-values) taken from borings conducted for the study ranged from 8 to 29 in the upper two to three feet, then increased with depth to over 100. Borings conducted as a part of the *Groundwater Monitoring System Report (Barr, 2016)* confirmed results of the original study.

The existing liner, i.e. liner constructed before October 14, 2015, features four feet of compacted clay placed directly on the reclaimed soil subgrade. The subgrade provided sufficient support during placement and compaction of the clay liner for it to achieve the specified 95 percent standard proctor density. Visual observations of undeveloped areas (future lateral expansions) within the Blue Pit footprint show no evidence of mass movements or subsidence.

The east side of the Blue Pit features a steep slope (approximately 1:1 horizontal to vertical), referred to as the east high wall, that is a result of mining activities. The east high wall rises from an elevation of 1,997 feet above mean sea level (MSL), i.e. the base of the landfill, to an elevation of 2,040 feet MSL, and is approximately 165 feet from North Dakota State Highway 49. Due to the steepness of the slope and the proximity to the highway, a slope stability study was conducted as a part of the *Suitability Study (North Central, 1994)*. The study concluded that the slope was stable during both short and long-term analysis, with a factor of safety greater than 2.0. Soil strength parameters for the stability analysis were generated from boring samples taken during the *Suitability Study (North Central, 1994)* investigation.


There are no utilities underlying the Blue Pit that would cause unstable conditions.

Conclusion

The conclusion of the *Site Suitability Study (North Central, 1994)*, subsequent hydrogeologic investigations, and visual observations of compaction during clay base liner construction verify the Blue Pit is constructed on stable soils and meets all of the location restrictions listed under 40 CFR §257.64. There are no apparent conditions that would cause underlying soils to move 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.



Daniel J. Riggs, PE
License No. PE10912

October 17, 2018
Date

References

North Central, 1994. Suitability Study Report for the Development of the Blue Pit FGD Waste Disposal Site, Coyote Station. Prepared by North Central Consultants, LTD., May, 1994.

Barr, 2016. Groundwater Monitoring System Report Slag Pond Area, Coyote Station. Prepared by Barr Engineering Co., November, 2016.