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November 9, 2015
Project No. 475.0221.000

TS Power Plant
914 Dunphy Ranch Road
Battle Mountain, Nevada 89820

Attention: **Mr. Dennis Laybourn**
Senior Environmental Manager

RE: **Location Restrictions Review**
CCR Landfill
TS Power Plant
Eureka County, Nevada

Dear Mr. Laybourn,

This letter presents our review of the existing information and certification that the TS Power Plant CCR Landfill complies with the intent of the location restrictions as defined in the requirements of the 2015 Coal Combustion Residue Rule (40CFR Part 257.64) administered by the Environmental Protection Agency (EPA).

We trust that this letter provides the certification that is required. Please do not hesitate to contact us if you have any questions or if you require additional information.

Sincerely,

NewFields Mining Design & Technical Services

Nancy Anne Card, P.E.
Associate

Reviewed by:

PROFESSIONAL ENGINEER STATE OF NEVADA
PAUL KAPLAN
Exp: 6.30.17
CIVIL
No 8034

9/10/2015

Paul Kaplan, C.E.M., P.E.
Principal

PK/NC/ng

Addressee: (2) + electronic
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1. INTRODUCTION

A geotechnical investigation and design program was conducted in 2005 as part of the Class III Landfill Permit Application for the TS Power Plant. This location restrictions review references appropriate sections of the original permit document (AMEC, 2005a) and is intended to satisfy the requirements of the 2015 Coal Combustion Residue Rule (40CFR Part 257.64). This review was prepared under the direction of the design engineer for the project, Paul Kaplan, P.E.

The Geotechnical and Design Report (AMEC, 2004b) submitted as part of Landfill Permit Application included the following:

- Subsurface investigation,
- Laboratory testing of site soils,
- Site characterization,
- Climate analyses,
- Surface water hydrologic and hydraulic analyses,
- Geoseismic evaluation,
- Slope stability analyses,
- Settlement analyses,
- Earthwork and construction recommendations, and
- Quality assurance during construction requirements.

1.1. Local Regulatory Basis

In addition to the provisions of the 2015 Coal Combustion Residue Rule, the CCR Landfill at the TS Power Plant is currently operated in accordance with the following local permits:

- Solid Waste Disposal Class III Permit No. SW270REV01 issued by Nevada Division of Environmental Protection - Bureau of Waste Management.
- Storm Water General Permit NVR050000 issued by the Nevada Division of Environmental Protection - Bureau of Water Pollution Control. In accordance with requirements of this general permit a Storm Water Pollution Prevention Plan (SWPPP) has been prepared for the TS Power Plant facilities.
- Class 1 Air Quality Operating Permit No. AP4911-2502 issued by Nevada Division of Environmental Protection - Bureau of Air Pollution Control.

Existing permit conditions associated with the location restrictions of the CCR are incorporated into this review.

1.2. Objectives

The location restriction established in the final rule for existing CCR Landfills—Unstable Areas is described in §257.64. The EPA defines an unstable area as a location that is susceptible to natural or human-induced events or forces capable of impairing the integrity of some or all of the structural components responsible for preventing releases from a CCR unit. The structural components of the TS Power Plant CCR Landfill include the following:

- A CCR Landfill lined with 80-mil HDPE geomembrane placed over a prepared soil surface
- An underdrain system to collect contact water (run-off) consisting of a free draining gravel overlying a underdrain piping network
- A collection channel to transport contact water (run-off) to the pond system
- Geomembrane-lined storm water ponds
- Perimeter berms to contain contact water (run-off) and to prevent non-contact water (run-on) from entering the landfill
- Storm water control systems including diversion of external non-contact water (run-on)

This report presents a review of the location of the existing facility with respect to any identified unstable areas. This review is based on the previous work completed as part of the original facility design. The review included site geology, soil conditions and human-made conditions. The owner is required to demonstrate that the CCR landfill meets the specific criteria established in the regulations.

1.3. Checklist

Table 1-1 provides a summary of the associated regulatory sections and lists the applicable requirements for reference.

Table 1-1: Unstable Areas Checklist

§257.64 Section	§257.64 Subsection	Requirements	Applicable Report Section
(a)		*An existing or new CCR landfill, existing or new CCR surface impoundment, or any lateral expansion of a CCR unit must not be located in an unstable area unless the owner or operator demonstrates by the dates specified in paragraph (d) of this section that recognized and generally accepted good engineering practices have been incorporated into the design of the CCR unit to ensure that the integrity of the structural components of the CCR unit will not be disrupted.*	Restricted Locations Review (NewFields, November 2015)
(b)		*The owner or operator must consider all of the following factors, at a minimum, when determining whether an area is unstable:*	Section 6
	(1)	*On-site or local soil conditions that may result in significant differential settling;*	Sections 3 & 4
	(2)	*On-site or local geologic or geomorphologic features; and*	Section 2
	(3)	*On-site or local human-made features or events (both surface and subsurface).*	Section 5
(c)		*The owner or operator of the CCR unit must obtain a certification from a qualified professional engineer stating that the demonstration meets the requirements of paragraph (a) of this section.*	Cover Letter
(d)		*The owner or operator of the CCR unit must complete the demonstration required by paragraph (a) of this section by the date specified in either paragraph (d)(1) or (2) of this section.*	
	(1)	*For an existing CCR landfill or existing CCR surface impoundment, the owner or operator must complete the demonstration no later than October 17, 2018.*	Section 7.1
	(2)	*For a new CCR landfill, new CCR surface impoundment, or any lateral expansion of a CCR unit, the owner or operator must complete the demonstration no later than the date of initial receipt of CCR in the CCR unit*	Not Applicable
	(3)	*The owner or operator has completed the demonstration required by paragraph (a) of this section when the demonstration is placed in the facility's operating record as required by §257.105(e)*	Section 7.2
	(4)	*An owner or operator of an existing CCR surface impoundment or existing CCR landfill who fails to demonstrate compliance with the requirements of paragraph (a) of this section by the date specified in paragraph (d)(1) of this section is subject to the requirements of § 257.101(b)(1) or (d)(1), respectively.*	Not Applicable
	(5)	*An owner or operator of a new CCR landfill, new CCR surface impoundment, or any lateral expansion of a CCR unit who fails to make the demonstration showing compliance with the requirements of paragraph (a) of this section is prohibited from placing CCR in the CCR unit.*	Not Applicable
(e)		*The owner or operator of the CCR unit must comply with the recordkeeping requirements specified in § 257.105(e), the notification requirements specified in § 257.106(e), and the Internet requirements specified in § 257.107(e).*	Sections 7.3 & 7.4

2. ON SITE GEOLOGIC CONDITIONS

The TS Power Plant site lies within the central portion of Boulder Valley in the Great Basin section of the Basin and Range Physiographic Province. This province is characterized by elongated and generally north-trending mountain ranges separated by broad intervening basins. This physiography resulted from extensive normal faulting which began in Late Tertiary time (Stewart, McKee and Stager, 1977). The mountains represent the uplifted structural blocks and consist of Paleozoic to Tertiary bedrock. The basins are generally filled with Tertiary to Quaternary volcanic, lacustrine and alluvial sediments, and are an expression of the intervening structural subsidence between the uplifted blocks.

Boulder Valley is bounded by the Tuscarora Mountains to the northeast, Sheep Creek Range to the northwest, and the Shoshone Range to the south. Surface elevations in the general area vary from about 8,000 to 9,000 feet above mean sea level in the bordering mountain ranges to about 4,600 feet on the valley floor near Dunphy. The general area is drained by numerous ephemeral drainages that originate in the mountain blocks and terminate within Boulder Valley. The valley drains to the south and southwest to the Humboldt River. The surficial geology of the site has been mapped as predominantly Quaternary alluvial deposits.

Available geologic mapping in the area indicates that the landfill is bordered to the east and west by young (Pleistocene to Holocene) faults. However, no active faults are located within the site and the young faults are over 200 feet from the TS Power Plant CCR Landfill.

3. SITE SOIL CONDITIONS

Site soil condition information was reviewed to characterize the site and to demonstrate that no natural unstable areas including areas that have poor soils for foundations, areas susceptible to mass movements, and karst terrains are present at the site.

3.1. Subsurface Investigation

In order to characterize and evaluate the existing soil and groundwater conditions at the site a field investigation program that consisted of test pit excavations and hollow stem auger borings was conducted in September 2004 as part of the geotechnical investigation and design process. Because of the relatively uniform subsurface conditions at the site, the exploration locations were evenly distributed throughout the study area.

Drilling and test pit excavation operations were performed under the continuous observation and supervision of experienced geotechnical staff. The soils were classified in the field based on visual and textural examination in general accordance with ASTM D2488, Standard

Recommended Practice for Description of Soils (Visual Manual Procedure). Representative samples were obtained for laboratory analysis. The classifications were later supplemented by subsequent laboratory observation. The final logs represent an interpretation of the contents of the field logs and the results of laboratory testing. Logs of the exploratory borings and test pits and a brief description of drilling and sampling equipment and procedures are presented in the referenced report (AMEC, 2005b).

3.2. Exploratory Test Borings

A total of four (4) exploratory borings were completed within the project area to obtain subsurface data and to install temporary groundwater monitoring points. The borings were advanced to depths of 51.5 to 71.5 feet below existing grade using a CME 55 truck mounted drill rig advancing 6-inch O.D. hollow stem auger.

Relatively undisturbed and disturbed drive samples of the soils were obtained in the borings using the standard one and three-eighths (1 3/8) inch internal diameter SPT sampler and a two and one-half (2½) inch internal diameter California sampler.

Upon completion, 2-inch l.D. PVC pipe was installed in each boring to a depth of at least 10 feet below the groundwater levels observed during drilling operations to allow for the temporary monitoring of groundwater levels.

3.3. Exploratory Test Pits

The test pits were excavated with a Caterpillar 330 BL excavator. A total of 13 pits were excavated to depths of 10 to 15 feet.

3.4. Laboratory Analysis

An extensive laboratory testing program was performed on samples obtained from the borings and test pits. The laboratory testing program included moisture and density tests, gradation tests, Atterberg limits tests, modified Proctor compaction tests, laboratory hydraulic conductivity tests, consolidation tests, direct shear strength tests, and corrosion tests.

Detailed laboratory test data are presented in the referenced report (AMEC, 2005b).

3.5. Subsurface Soil Conditions

Subsurface soil conditions encountered at the CCR Landfill location are relatively consistent and can be generally described as near surface silty fine sands and fine sandy silts underlain by fine

to medium sands. The upper one (1) to four (4) inches of soils typically contains moderate to significant roots where surface vegetation is present. Significant sagebrush roots at some locations extend as much as about 12 to 14 inches below the surface.

Excavation of the near-surface soils with a large excavator during the test pit program was generally very easy within the uncemented zones. At some locations, a one (1) to two (2) foot thick caliche layer was encountered at depths of approximately four (4) to seven (7) feet below existing grades. Test pit excavations within the uncemented, loose to very loose sands experienced moderate to significant sidewall caving.

The near surface silt and clayey soils encountered at the site were characterized to experience moderate strength and moderate to low compressibility characteristics under the anticipated light loads. The collapse test results indicate that the collapse potential upon wetting ranged from negligible to moderate. The underlying granular soils are not considered to be moisture sensitive, and will exhibit high strengths and low compressibility characteristics under the anticipated loads.

3.6. Groundwater

Temporary groundwater monitoring wells were installed at the CCR Landfill (B-AP-1 through B-AP-4) during the filed investigation.

Depths to groundwater at the CCR Landfill site at the time of the field investigation ranged from an average of about 25 feet at the upper (northeastern) portions of the site to 30 feet at the lower, southwest portion of the CCR Landfill site. Recent (2015) groundwater levels indicate a depth to groundwater of approximately 30 feet in the northeast portion of the site and 30 feet in the southwestern portion of the site. A groundwater gradient to the southwest is indicated.

4. SETTLEMENT AND DEFORMATION

4.1. Settlement Analysis

A settlement analysis of the CCR Landfill foundation soils was performed to determine if the anticipated settlements would hinder the flow of solution. The subgrade soils were conservatively assumed to consolidate under fully saturated conditions under the full CCR Landfill height of 60 feet and a waste unit weight of 100 pounds per cubic foot. The subgrade profile used in the analysis consisted of two (2) feet of properly prepared silts underlain by six (6) feet of natural silts. The upper silt layers are underlain by dense granular soils to a depth of 150 feet.

The stress increase imposed on the underlying soils is dependent on the geometry of the landfill materials (embankment). Variables include the height, crest width, groundwater depth and the side slopes of the fill material. Projected settlements under the landfill with groundwater depths of 16 and 30 feet ranged from five (5) to six (6) inches beneath the center of the landfill.

The resulting settlement profile is shaped like a trough, with the maximum settlement value near the center of the landfill. The landfill design is graded at one (1) percent to the perimeter drainage channels. The potential loss in grade considering the projected settlements is less than 0.01 percent. Therefore, the settlements at the top of the liner are not expected to hinder flow.

A significant portion of the projected settlements is expected to occur within a short period of time following loading.

4.2. Horizontal Deformation and Strain

The horizontal deformation profile was computed using a method presented by Lee and Shen (1969). The maximum horizontal extensional strain from settlement of the landfill foundation soils was estimated to be approximately 10 percent, which is below the typical yield strain of HDPE liners, which is about 13 percent. Strain at break for HDPE liners is in excess of 700 percent.

5. ON SITE HUMAN-MADE CONDITIONS

The site is located within previously undeveloped portions of the 250,000-acre TS Land & Livestock cattle ranch, and approximately three (3) miles north of the Interstate 80 Dunphy exit. Prior to construction of the CCR Landfill, the site was used for livestock grazing. Primary access to the site is a paved road extending north from Dunphy. The site can also be accessed through gated pastures extending from the feedlot located approximately one (1) mile to the northeast of the site.

Prior to construction of the CCR Landfill, the site was undeveloped except for ranch related fencing and unpaved access roads. Man-made features included an east-west running fence located approximately 500 feet to the north of the CCR Landfill. An unpaved access road formerly ran though the southwest portions of the CCR Landfill site.

The CCR Landfill site grades gently down to the southeast from elevations 4,650 to 4,632 feet. The site grades to the southwest to Rose Canal. A small drainage that formerly intersected the

northwest corner of the CCR Landfill site flows to the west, eventually draining to Boulder Creek.

The project site is fenced to prevent access by unauthorized personnel. No human-made conditions exist at the CCR Landfill site that would be classified as an unstable condition.

6. DISCUSSION OF FINDINGS

The results of this review indicate that the site is suitable for the CCR Landfill and that the landfill is not located in an unstable area.

The CCR Landfill has been constructed on existing site soils that have been properly characterized and prepared. Considering the foundation soil conditions and that the CCR Landfill is fully geomembrane lined, it is our opinion that the potential for significant collapse of the near surface site soils is very low. Site grading and proper preparation and compaction of the near-surface soils has also reduced the potential for collapse to negligible levels.

The near-surface silts and fine sand soils present at the site should be anticipated to exhibit moderate erosion potential when exposed to runoff. A routine maintenance program has been established to repair eroded areas as needed.

The near surface fine-grained soils are potentially frost susceptible. However, given the depths to groundwater, relatively short freeze season, and the method of construction, it is our opinion that significant frost heave will not be experienced within the CCR Landfill area.

Liquefaction is defined as the condition when saturated, loose, and cohesionless, sand-type soils lose their support capabilities because of excessive pore water pressure that develops during a seismic event. Considering the depth to groundwater and the density of the saturated soils encountered in the subsurface the potential for liquefaction at the site is considered very low.

7. TIMEFRAMES AND NOTIFICATION

7.1. Compliance with Timeframes

As an existing facility, the TS Power Plant is required under § 257.64(d)(1) to demonstrate that the CCR Landfill is not located within an unstable area no later than **October 17, 2018**.

7.2. Recordkeeping Requirements

It is understood that TS Power Plant must place the demonstrations documenting that the CCR unit is in compliance with the requirements under § 257.64(a) into the facility's operating records per § 257.105(e).

7.3. Notification

In accordance with § 257.106(e), the following entities must be notified when information has been placed in the operating record and on the owner's or operator's publicly accessible internet site:

Bureau Chief
Bureau of Waste Management
Nevada Division of Environmental Protection
901 South Stewart Street, Suite 4001
Carson City, Nevada 89701-5249

7.4. TSPP CCR Website

In accordance with § 257.107(e), the records described in Section 7.2 must be made available on a publicly accessible internet website.

The publicly accessible internet website is:

http://www.newmont.com/operations-and-projects/north-america/nevada-us/reports/default.aspx

8. REFERENCES

AMEC Earth & Environmental, 2005a, Revised Class III Landfill Permit Application, TS Power Plant, Triple S Ranch, Project Number 4-417-000652, March.

AMEC Earth & Environmental, 2005b, Revised Geotechnical and Design Report., Class III Ash Disposal Landfill and Evaporation Pond, TS Power Plant Project, Newmont Nevada Energy Investment LLC, Project Number 4-417-000652, March.

ASTM, 2003, Annual Book of ASTM Standards, Section Four, Construction, Volume 4.08, Soil and Rock (I) D 420 - D 5611, American Society of Testing and Materials, West Conshohocken, Pennsylvania, 1486 pp.

Class 1 Air Quality Operating Permit No. AP4911-2502 issued by Nevada Division of Environmental Protection - Bureau of Air Pollution Control.

Dohrenwend, J.C., and B.C. Moring, 1991, Reconnaissance Photogeologic Map of Young Faults in the Winnemucca 1 by 2 Quadrangle, Nevada. United States Geologic Miscellaneous Field Studies Map MF-2175.

Lee, K.L. and Shen, C.K., 1969, Horizontal movements related to subsidence, American Society of Civil Engineers Proceedings, Journal Soil Mechanics and Foundations Div., v. 95, SM 1.

Roberts, R.J. et al, 1967, Geology and Mineral Deposits of Eureka County, Nevada, Nevada (Bureau of Mines and Geology, Bulletin 64.

Solid Waste Disposal Class III Permit No. SW270REV01 issued by Nevada Division of Environmental Protection - Bureau of Waste Management.

Storm Water General Permit NVR050000 issued by the Nevada Division of Environmental Protection – Storm water Program.

Storm Water Pollution Prevention Plan (SWPPP), TS Power Plant, prepared by Newmont Nevada Energy Investment, March 2015.