SOUTH CAROLINA ELECTRIC & GAS

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POWER FOR LIVING

UNSTABLE AREAS CERTIFICATION

FOR THE

WILLIAMS STATION LANDFILL

BERKELEY COUNTY, SOUTH CAROLINA

OCTOBER 2018

SOUTH CAROLINA
GARRETT AND MOORE, INC.
No. C3371
CERTIFICATE OF AUTHORIZATION

GARRETT & MOORE
Engineering for the Power and Waste Industries

SOUTH CAROLINA
REGISTERED PROFESSIONAL ENGINEER
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9/5/18
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1 OVERVIEW

The EPA Administrator, Gina McCarthy, signed the Disposal of Coal Combustion Residuals from Electric Utilities final rule on December 19, 2014, and it was published in the Federal Register (FR) on April 17, 2015. The regulations provide a comprehensive set of requirements for the safe disposal of coal combustion residuals (CCRs), commonly known as coal ash, from coal-fired power plants. The rule will be administered as part of the Resource Conservation and Recovery Act [RCRA, 42 United States Code (U.S.C.) §6901 et seq.], using the Subtitle D approach.

South Carolina Electric & Gas (SCE&G) is subject to the CCR Rule. Based on SCE&G's review of the rule, the **Class Three Landfill** at **SCE&G Williams Station** has been determined to be an existing CCR landfill subject to the CCR rule requirements.

2 PURPOSE

The purpose of this report is to document that the Williams Station Class Three Landfill meets the requirements of CCR rule §257.64 – *Unstable Areas.*

3 APPLICABLE REGULATIONS

CCR rule §257.64 – *Unstable Areas* states the following:

> *(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.*
>
> *(b) The owner or operator must consider all of the following factors, at a 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; and*
>
> *(3) On-site or local human-made features or events (both surface and subsurface).*

4 CLASS THREE LANDFILL DESCRIPTION

Williams Station is coal-fired electric generation plant electric generation plant located in Bushy Park, Berkeley County, South Carolina. The Class Three Landfill associated with Williams Station is located on SC 9 approximately 5 miles east of the intersection of Highway 52 and SC 9.

Within the boundary of the Williams Station landfill property, SCE&G owns and operates Phase 1, consisting of Cell 1 through Cell 4, of the Class Three Landfill. The Phase 1 disposal unit was constructed in accordance with the construction permit (permit LF3-00001) issued from the South Carolina Department of Health and Environmental Control (DHEC) on September 30, 2008. The Phase 1 disposal unit was placed into operation in accordance with an operation approval issued by DHEC on June 23, 2010.

5 UNSTABLE AREAS DISCUSSION

For purposes of this review, EPA's CCR rules (to include reference to *EPA Solid Waste Disposal Facility Criteria, Technical Manual* – EPA530-R-93-017) has defined the following:

> *(1) Unstable area means a location that is susceptible to natural or human-induced events or forces capable of impairing the integrity of some or all of the landfill structural components responsible for preventing releases from a landfill. Unstable areas can include poor foundation conditions, areas susceptible to mass movements, and Karst terrains.*
>
> *(2) Structural components means liners, leachate collection systems, final covers, run-on/run-off systems, and any other component used in the construction and operation of the MSWLF that is necessary for protection of human health and the environment.*
>
> *(3) Poor foundation conditions means those areas where features exist which event may result in inadequate foundation support for the structural components of a MSWLF unit.*
>
> *(4) Areas susceptible to mass movement means those areas of influence (i.e., areas characterized as having an active or substantial possibility of mass movement) where the movement of earth material at, beneath, or adjacent to the MSWLF unit, because of natural or man induced events, results in the downslope transport of soil and rock material by means of gravitational influence. Areas of mass movement include, but are not limited to, landslides, avalanches, debris slides and flows, solifluction, block sliding, and rock fall.*
>
> *(5) Karst terrains means areas where karst topography, with its characteristic surface and subterranean features, is developed as the result of dissolution of limestone, dolomite, or other soluble rock. Characteristic physiographic features present in karst terrains include, but are not limited to, sinkholes, sinking streams, caves, large springs, and blind valleys.*

Natural Unstable Areas

EPA states that natural unstable areas include those areas that:

- *Have poor soils for foundations;*
- *Are susceptible to mass movement;*
- *Have karst features.*

As part of the investigation and design for the landfill, a hydrogeological site characterization and stability assessment were conducted to evaluate subsurface conditions, to analyze slope stability, to identify any potentially hazardous site conditions, and to provide an examination of any related design needs (reports: *SCE&G Williams Station Highway 52 Industrial Solid Waste Landfill, Permit to Construct Application*, May 2007, revised August 2008; *SCE&G Williams Station Highway 52 Industrial Solid Waste Landfill – Location Restriction Study*, December 2006; *Phase 1 Hydrogeologic Characterization Report for SCE&G Property near Moncks Corner, South Carolina*, April 1991; *Phase 2 Hydrogeologic Characterization Report for SCE&G Property near Moncks Corner, South Carolina*, October 1991). The assessments included investigating the geotechnical and geological characteristics of the site to establish soil strengths and other engineering properties using field and laboratory tests. The assessments also included a seismic hazard analysis, static and seismic slope stability and foundation settlement to identify any poor foundation conditions or areas susceptible to mass movement. Published USGS and other local pertinent geologic literature identify no known Karst terrain in the area of the site, which was confirmed through the hydrogeologic site investigation. Based on my review of the facility's hydrogeological site characterization and stability assessment reports, the landfill site is not located in an unstable area.

Moreover, as part of the construction for the landfill, a construction quality assurance and geotechnical program was utilized to provide construction observation and monitoring of the natural foundation conditions for the landfill. Based on my review of the construction quality assurance and geotechnical program report (report *SCE&G Williams Station Highway 52 Landfill, Construction Certification Report Cells 1-4*, May 2010) and my observations during landfill construction, the landfill's natural foundation conditions were firm and unyielded with no evidence of the landfill site being located in an unstable area observed.

Human-Induced Unstable Areas

EPA states that examples of human-induced unstable areas conditions include:

- *The presence of cut and/or fill slopes during construction of the waste unit may cause slippage of existing soil or soils, adjacent embankments, and slopes; rock;*
- *Excessive drawdown of ground water increases the effective overburden on the foundation soils underneath the waste unit, which may cause excessive settlement or bearing capacity failure on the foundation soils;*
- *Closed landfill as the foundation for a new landfill ("piggy-backing") may be unstable unless the closed landfill has undergone complete settlement of the underling wastes.*

As part of the construction for the landfill, a construction quality assurance program was utilized to provide observation and monitoring of the natural foundation conditions, foundation excavations and structural fill placement for the landfill. Based on my review of the construction quality assurance report (report *SCE&G Williams Station Highway 52 Landfill, Construction Certification Report Cells 1-4*, May 2010)

and my observations during landfill construction, all cut and fill slopes during construction were stable and did not cause slippage of existing soils or soils, adjacent embankments and slopes.

With regards to groundwater drawdown, the landfill is developed to maintain sufficient separation from groundwater with no drawdown of groundwater at or in the vicinity of the landfill necessary or occurred/planned for landfill related or other site purposes. Additionally, the Williams Hwy 52 landfill is founded on native undisturbed soils and is not founded over any landfilled waste ("piggy-backing").

Based on the above discussions, the landfill is not located in a human-induced unstable area.

6 CONCLUSION

Based on my review of the facility records and my observations during the development of the landfill as discussed above, the Williams Station Class Three Landfill is not located in an Unstable Area and meets the requirements of CCR rule §257.64 – *Unstable Areas.*