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October 15, 2018

Tennessee Valley Authority
1101 Market Street
Chattanooga, Tennessee 37402

Engineer's Certification of Unstable Area Demonstration
Gypsum Disposal Area, Gypsum Disposal Area Stilling Pond 1, and Gypsum Disposal Area Stilling Pond 2
EPA Final CCR Rule
TVA Paradise Fossil Plant
Drakesboro, Kentucky

1.0 PURPOSE

The purpose of this document is to certify that the Unstable Area Demonstration for the TVA Paradise Fossil Plant (PAF) Gypsum Disposal Area, Gypsum Disposal Area Stilling Pond 1, and Gypsum Disposal Area Stilling Pond 2 is in compliance with the unstable area location requirements in the EPA Final CCR Rule, 40 CFR § 257.64.

2.0 BACKGROUND

As required by 40 CFR § 257.64 of the EPA Final CCR Rule, by October 17, 2018, an owner or operator of an existing surface impoundment or landfill must complete the unstable areas demonstration. An existing CCR surface impoundment or landfill must not be located in an unstable area unless the owner or operator demonstrates that recognized and generally accepted good engineering practices have been incorporated into the design of the CCR unit so that the integrity of the structural components of the CCR unit will not be disrupted.

In support of the above assessment, AECOM completed the evaluation described in the referenced "Engineer's Certification of Unstable Area Demonstration (40 CFR § 257.64) for Coal Combustion Residuals (CCR), Existing Surface Impoundments - Gypsum Disposal Area, Gypsum Disposal Area Stilling Pond 1, and Gypsum Disposal Area Stilling Pond 2", dated October 10, 2018. A complete listing of documents reviewed and utilized as part of this assessment is included in the References at the end of the report.

3.0 SUMMARY OF FINDINGS

Based upon the findings of the referenced Engineer's Certification of Unstable Areas Demonstration, AECOM has determined that the Gypsum Disposal Area, Gypsum Disposal Area Stilling Pond 1, and Gypsum Disposal Area Stilling Pond 2 meet the requirement of the EPA Final CCR Rule 40 CFR § 257.64(a).

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4.0 Qualified Professional Engineer Certification

I, Nicholas Golden, being a Professional Engineer in good standing in the State of Kentucky, do hereby certify, to the best of my knowledge, information, and belief that the information contained in this certification has been prepared in accordance with generally accepted engineering practices; that the information contained herein is accurate as of the date of my signature below; and that Gypsum Disposal Area, Gypsum Disposal Area Stilling Pond 1, and Gypsum Disposal Area Stilling Pond 2 meet the unstable areas requirements of 40 CFR § 257.64(a).

SIGNATURE _____ DATE 10/15/18

ADDRESS: AECOM
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ATTACHMENTS: Engineer's Certification of Unstable Area Demonstration (40 CFR § 257.64) for Coal Combustion Residuals (CCR) Existing Surface Impoundments - Gypsum Disposal Area, Gypsum Disposal Area Stilling Pond 1, and Gypsum Disposal Area Stilling Pond 2

COAL COMBUSTION RESIDUAL DISPOSAL PROGRAM

TENNESSEE VALLEY AUTHORITY – PARADISE FOSSIL PLANT
GYPSUM DISPOSAL AREA, GYPSUM DISPOSAL AREA STILLING POND 1, AND GYPSUM DISPOSAL AREA STILLING POND 2
DRAKESBORO, KENTUCKY

ENGINEER'S CERTIFICATE OF UNSTABLE AREA DEMONSTRATION (40 CFR §257.64) FOR COAL COMBUSTION RESIDUALS (CCR)

EXISTING SURFACE IMPOUNDMENTS

Prepared for

TVA

Tennessee Valley Authority
1101 Market Street
Chattanooga, TN 37402-2801

October 15, 2018 – Rev 0

Prepared by

AECOM

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FIGURES

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1.0 PROJECT BACKGROUND

1.1 OBJECTIVE

The purpose of this Unstable Areas Demonstration report is to document compliance with 40 CFR § 257.64(a) of the Environmental Protection Agency Final Coal Combustion Residuals Rule (EPA Final CCR Rule). This report is based on existing documentation such as construction drawings, record drawings, and any other pertinent data and/or investigations to support historic conditions and operations at the Gypsum Disposal Area, Gypsum Disposal Area Stilling Pond 1, and Gypsum Disposal Area Stilling Pond 2 (collectively referred to as the Gypsum Disposal Area) at the Tennessee Valley Authority (TVA) Paradise Fossil Plant (PAF). Supporting documentation used in this evaluation are referenced in Section 6 of this document.

1.2 RULE REQUIREMENT

According to 40 CFR § 257.64(a) of the EPA Final CCR Rule, any existing CCR surface impoundment must not be located in an unstable area unless the owner or operator demonstrates 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.

In accordance with 40 CFR § 257.64(b) the owner or operator must consider all of the following factors, at a minimum, when determining whether an area is unstable:

- 40 CFR § 257.64(b)(1) – On-site or local soil conditions that may result in significant differential settling;
- 40 CFR § 257.64(b)(2) – On-site or local geologic or geomorphologic features, and
- 40 CFR § 257.64(b)(3) – On-site or local human made features or events (both surface and subsurface).

Section 257.64(c) requires the owner or operator to obtain a certification from a qualified professional engineer stating that the demonstration meets the requirements of paragraph (a) of this section. In accordance with 40 CFR § 257.64(d)(1), the owner or operator must complete the required demonstration no later than October 17, 2018.

Hereafter, *italicized text* is copied verbatim from the EPA Final CCR Rule 40 CFR § 257.64 for clarity of discussion.

1.3 SITE DESCRIPTION

PAF is located in Drakesboro, Kentucky along the west bank of the Green River and State Route 176. The plant features three units, constructed between 1963 and 1970, and three large natural-draft cooling towers. Units 1 and 2 were retired in 2017. The plant sits inside the eastern border of Muhlenberg County as depicted below in **Figure 1**.

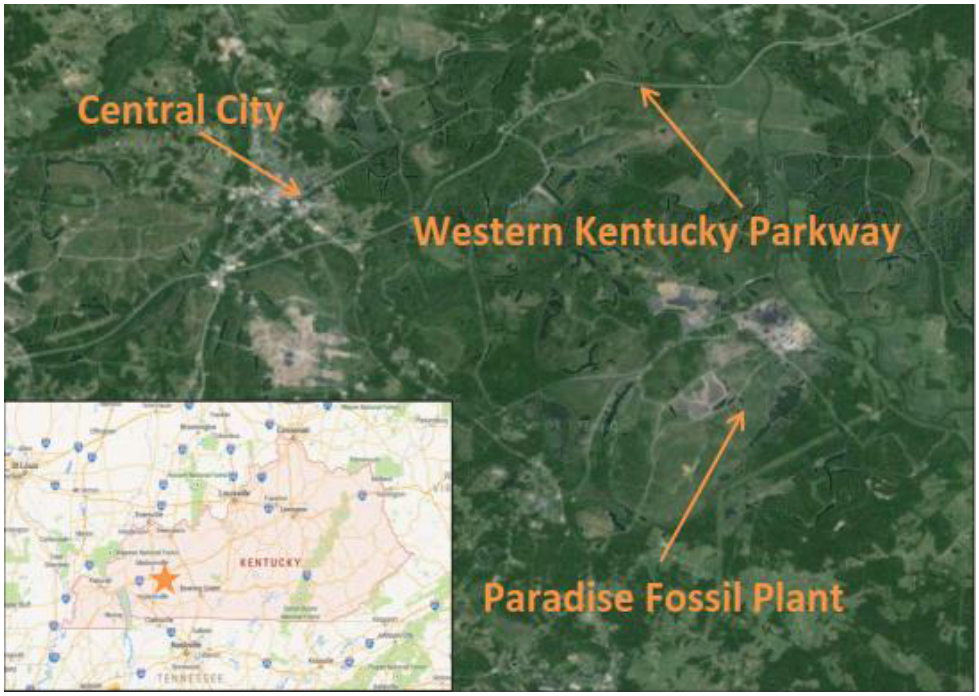


Figure 1: PAF Aerial View

The Gypsum Disposal Area is located in the southwest corner of the Paradise Facility and to the west of the plant. The Gypsum Disposal Area is approximately 225 acres in area and partially enclosed by a 1.4 mile long dike with a maximum height of approximately 62 feet. The Gypsum Disposal Area is bordered by hilly and grassy areas on all sides (**Figure 2)**. The Gypsum Disposal Area manages process water flows and CCR waste, gypsum and fly ash, during power generation. The Gypsum Disposal Area has two stilling ponds called Stilling Ponds 1 & 2 located at the southeast end of the Gypsum Disposal Area. These ponds receive process water and stormwater drainage from the Gypsum Disposal Area and the surrounding drainage area. Stilling Pond 1 drains to Stilling Pond 2, which discharges to a surface water channel that eventually leads to the Peabody Ash Pond, which is located on the southeast side of the site.

Figure 2: Site Overview

In 1985, TVA issued the initial drawings for the original embankment and Gypsum Stack Ash Pond. The pond was constructed and put into service in 1986. Stilling Ponds 1 & 2 and the original outlets were also constructed at this time. According to the construction drawings, foundation soils for the embankment were prepared by dewatering the area, clearing the vegetation, compacting the subgrade and scarification of the surficial soils in preparation for the earth fill placement. The embankment was constructed by placing earth fill materials in 6" lifts and compacting them to a minimum 95% of maximum dry density within a moisture range of -3% to +3% of optimum moisture as determined by ASTM D698 (Standard Proctor Method).

The Gypsum Stack Ash Pond was comprised of two adjoining ponds identified as the East Pond and the West Pond. The construction drawings for the original embankment included the installation of an internal drain system consisting of chimney drains, perforated collector pipes and finger drains.

Construction documents from 1993 show additional construction activities at the Gypsum Disposal Area. Construction included raising the southern dike, construction of eastern and western perimeter dikes, and an internal divider dike. By 1996, the expansion was completed, and TVA switched to gypsum-fly ash stacking. The facility is being operated utilizing the upstream method of construction and rim-ditch mode of operation, which allows for achieving proper compaction along rim areas of dikes.

In 2016, the spillway structure at Gypsum Disposal Area Stilling Pond 1 was replaced. The replacement spillway consists of three (3) 24-inch discharge pipes and a concrete impact basin for erosion control. The existing concrete riser spillway and outlet pipe were grouted full and closed in-place. The outlet pipes at Stilling Pond 2 were also replaced in 2016. Further information on the history and construction of the Gypsum Disposal Area can be found in

History of Construction (40 CFR § 257.73(c)) for Coal Combustion Residuals (CCR) Existing Surface Impoundments.

2.0 SITE ASSESSMENT

Per §257.64(b), the unstable areas demonstration must consider features or events when determining whether the area is unstable. An investigation of publicly available information and a desktop reconnaissance were examined in order to meet the requirements of §257.64(b).

Historical underground and strip mining operations were performed across the majority of the PAF property. A review of available information obtained from the Kentucky Division of Mine Safety (DMS) and online maps from the Kentucky Mine Mapping Information System was previously performed by AECOM. Figure 3, Gypsum Disposal Area Underground Map, displays the historic mines.

A review of available information obtained from the Kentucky Division of Mine Safety (DMS) and online maps from the Kentucky Mine Mapping Information System was previously performed by AECOM. Based on review of historical mine maps, two coal mines are located below the site, the Drake III Mine and Browder Mine (Attachment A). The Drake III Mine (KY Mine ID 06620-4) is located below the northern portion of the site, and was mined by the Pittsburg and Midway Coal Mining Company. This mine targeted the Coal Seam 9 via pillar and partial room extraction methods. Coal seam height generally varied from 5 to 6 feet thick, and mining pillars were on the order of 26 feet square, with an approximate 25 foot opening. The mining efforts took place from 1971 to 1979. After the abandonment of the Drake III mine in 1979, surface mining of the Coal Seam 9 was performed from 1982 to 1991 and is known as the Gibraltar Mine (KY Mine ID 04251). Historic documentation suggests the deep mines of Drake III were destroyed as part of these surface mining efforts to collect the remaining cola. The removal of the Drake III mine was not extensively delineated.

Based on review of the mine map, the Browder Mine is located below the southwestern portion of the site, and was mined by the W.A. Wickliffe Coal Company until 1951. The mine map indicates rectangular pillars with dimension of about 55 by 18 feet, with 24 foot opening, were used in the Browder Mine.

Existing mine map and geotechnical data was reviewed to collect information for use in deep mine stability analysis performed in support of the Unstable Areas Demonstration. AECOM reviewed the 2013 Stantec geotechnical exploration that occurred in July 2013 consisting of six (6) rock core borings advanced to the elevation of the No. 9 Coal Seam. The borings encountered bedrock consisting of shale, sandstone, and coal. The shale was described as moderately hard, with weathered zones, and light gray to gray in color. The sandstone was hard, very fine to medium grained, and light gray to gray in color. The coal was moderately hard, black, fractured, and blocky.

AECOM performed a supplemental investigation in December 2016 and January 2017 in order to further characterize the bedrock and mine conditions below the proposed landfill. The exploration consisted of drilling two borings, UG-1 and UG-2, within the area of the first proposed landfill cell. Both of the borings were advanced through Coal Seam 9 mine interval and into the underlying rock. Table 1 presents a summary of the depths and elevations where the No. 9 Coal Seam or mine workings were encountered during the AECOM explorations:

Table 1: AECOM Summary of No. 9 Coal Seam Information

Boring	Surface Elevation	No. 9 Coal Seam (Paradise Mine)		Remarks
		Coal Seam Depth Range (ft)	Coal Seam Elevation Range (ft)	
A-3	461.6	178.3 – 184.3	6.0	Void encountered at No. 9 Coal Seam elevation
B-1	447.1	161.0 – 171.5	10.5	Low recovery encountered at No. 9 Coal Seam elevation
C-5	443.2	NA	NA	Boring terminated above No. 9 Coal Seam elevation
D-5	425.6	162.5 – 170.4	7.9	Void encountered at No. 9 Coal Seam elevation
E-5	413.6	140.0 – 145.2	5.2	Void encountered at No. 9 Coal Seam elevation
F-6	461.9	168.0 – 174.0	6.0	Relatively intact coal at No. 9 Coal Seam elevation
H-2	448.3	155.0 – 161.6	6.6	Void encountered at No. 9 Coal Seam elevation
I-2	439.2	153.9 – 160.9	7.0	Void encountered at No. 9 Coal Seam elevation
UG-1	473	181.6 – 191.0	9.4	5 ft void with 4.4 ft muck pile encountered at No. 9 Coal Seam elevation
UG-2	455	149.8 – 166.0	16.2	8.1 ft total void with 9.2 ft of rubble encountered at No. 9 Coal Seam elevation

The results of the subsidence analysis presented in the Stantec report indicated acceptable factors of safety against pillar collapse and no subsidence for existing conditions with maximum elevation of about 534 ft at the time of the report.

3.0 FOUNDATION CONDITIONS

3.1 SITE GEOLOGY

PAF is located within the Shawnee Hills Section of the Interior Low Plateaus Physiographic Province in Northwestern Kentucky. Major geologic units in the area from the ground surface downward include Quaternary Age Alluvium and Residuum, the Upper Pennsylvanian Age Sturgis Formation and the Middle Pennsylvanian Age Carbondale Formation. The Sturgis Formation is made up of the former Lisman and Henshaw formations. Unmined areas, particularly in the flood plain of the Green River, consist of Quaternary Alluvial Sands, silts, and clays. Upland areas may consist of up to 25 feet of residual material derived from the weathering of shale and sandstone bedrock materials.

The site is located in the Western Kentucky Coal Field, an extension of the Illinois Basin, a depositional and structural feature centered in Illinois and extending into parts of Kentucky and Indiana. The Illinois Basin is Paleozoic in age and bounded to the north by the Wisconsin arch, to the East by the Cincinnati arch, to the Southeast by the Nashville dome, to the southwest by the Ozark dome, and to the northwest by the Mississippi River arch.

The Site is located within the Moorman Syncline, a surface expression of the Rough Creek Graben. Late Middle-Pennsylvanian Age rock exposures have been mapped in close proximity to the Site and comprise the Carbondale Formation. This formation extends from the Davis coal (W. Ky. No. 6) at the base of the formation to the Herrin coal (W. Ky. No. 11) at the top. The Cochester coal (W. Ky., No. 8) and overlying Springfield coal (W. Ky. No. 9) are also found within the Carbondale formation. The Springfield and Herrin coals are the most extensively mined coals of the Carbondale Formation. In Western Kentucky, from one coal to the next, a general stratigraphic series associated with a single sedimentary cycle, also called a cyclothem, may be found that consists of the following vertical sequence: coal-thin dark shale-silty gray shale, sandstone-seat earth-next coal. Limestone, part of a classic cyclothem, is uncommon in Western Kentucky and localized differences in depositional history lead to variations in the occurrence in thickness of sandstones across individual cyclothems.

The geology of the area encompassing the collective Gypsum Disposal Area includes alluvial deposits underlain by Pennsylvanian age bedrock formations. Geologic mapping indicates the site is primarily underlain by two geologic formations of Pennsylvanian age, the Carbondale and Shelburn Formations. Both formations generally consist of sandstone, which weathers to a dense sand. The Shelburn Formation underlies the Carbondale Formation. Underlying the Shelburn sandstone is a shale unit that is typically light-gray to black, and carbonaceous. Coal underlies the shale unit.

The site lies within an alluvial valley, which used to be the Jacob's Creek floodplain. The floodplain contained alluvial deposits consisting of gravel, sand, silt and clay. Previous mining operations existed in the vicinity of the impoundment resulting in thick deposits of mine spoils at the original surface of the Gypsum Disposal Area.

The foundation of the embankments and dikes consists of mine spoils. These materials are previously excavated overburden removed during the strip mining process and then replaced following removal of coal deposits. Accordingly, mine spoils tend to be heterogeneous. The majority of the mine spoils sampled consists of moist to wet, medium stiff to very stiff, lean clay (CL) with varying quantities of coal and rock fragments. The dike embankments were constructed using clayey mine spoils consisting of clayey sand (SC) or lean clay (CL) with varying quantities of gravel sized rock fragments.

3.2 SUBSURFACE CONDITIONS

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

3.2.1 SUBSURFACE SOIL CONDITIONS

(b)(1) the owner or operator must consider the on-site or local soil conditions that may result in significant differential settling in determining whether an area is unstable.

AECOM performed a geotechnical exploration in 2016 to evaluate the stability of the Upper Stilling Pond and Dikes of the Gypsum Disposal Area. A geotechnical exploration and evaluation was also performed in 2016 by GEI Consultants. The subsurface conditions within the embankment and foundation are mine spoils consisting of heterogenous mixtures of clay, sand, and coal and rock fragments. Safety Factor Assessments were completed in 2016 with all determining that there are no areas within the soil materials that were deemed to be unstable.

3.2.2 §257.64(B)(2) SITE GEOLOGIC/GEOMORPHIC FEATURES

(b)(2) *the owner or operator must consider on-site or local geologic or geomorphologic features*

PAF is located in the central portion of western Kentucky along the west shore of the Green River just north (downstream) of the confluence of the Green River and Jacob's Creek. The region is underlain by coal rich Pennsylvanian age bedrock formations. Strip mining operations have significantly altered the topography and geology within the vicinity of the plant and, as such, portions of the site are likely underlain by mine spoils. Geologic mapping indicates the plant and surrounding areas are underlain by the Sturgis and Carbondale Formations in general order of descending geology. The Sturgis Formation is described as consisting of interlayered medium- to coarse-grained micaceous sandstone, silty and clayey shale, coal, and underclay. The Carbondale Formation generally consists of cyclic sequences of fine-grained sandstone,

sandy shale, coal, and silty underclay. Although not depicted on the geologic mapping, alluvial deposits are likely present along the banks of the Green River. The geologic mapping indicates this alluvium generally consists of gravel, sand, silt, and clay and may be as much as 90 feet thick.

The Green River occupies a relatively flat-bottomed, alluvium-filled valley formed by the erosion of weak Pennsylvanian shales (Ryder, 1974). During Pleistocene time, the Green River was filled with coarse-grained deposits (fine sand to gravel) derived from the glaciers to the north and transported to the area by the Ohio River. Eventually, the Green River drainage basin became choked with sediment, causing impoundment of the north-flowing streams and deposition of finer-grained sediments (clay and silt) overlying the coarse deposits.

Beneath the residuum and the alluvial deposits, bedrock was encountered. Results from recovered cores consisted of two distinct bedrock units. One consists of moderately hard, fine to coarse grained, thinly bedded sandstone with occasional shale and clay seams, which appear to be part of the Carbondale Formation. The other consists of durable, dark gray, thinly bedded, laminated shale with occasional clay seams. The shale appears to be part of the Shelburn Formation.

3.3 §257.64(B)(3) NATURAL AND MAN MADE UNSTABLE AREAS

(b)(3) the owner or operator must consider on-site or local man-made features or events (both surface and subsurface)

AECOM analyzed publicly available information, historical drawing and recent geotechnical, structural and safety reports in order to determine the presence of unstable areas. The following sections examine potential natural and man-made unstable areas that may be present within the site.

3.3.1 NATURAL UNSTABLE AREAS

PAF is located within the Sturgis Formation (containing the former Lisman Formation) consists of interbedded sandstone, siltstone, shale, limestone, and coal. The contact between the Sturgis and Carbondale formation is the top of the Number 11 coal seam. The Carbondale Formation underlies the Sturgis and consists of alternating sandstone, siltstone, coal, silty shale, and limestone in some areas. It is the major coal producing formation in the Western Kentucky Coal Field and includes Coal Seam Numbers 6 through 11.
No karst or other natural unstable areas have been noted within the site.

3.3.2 MAN-MADE UNSTABLE AREAS

The desktop review completed by AECOM in 2017 reviewed available geotechnical and mining data previously discussed. Review of historical geotechnical explorations and mine maps indicate the site and surrounding area are underlain by mine spoil deposits from previous mining operations. Based on review of historical mine maps, two inactive coal mines are located below the site, the Drake III Mine and Browder Mine. Collapse of abandoned mine works

generally could result in surface subsidence and potentially compromise the structural integrity of a unit's embankments. In support of the desktop review completed by AECOM, a Deep Mine Stability Assessment was performed in 2018 to assess the Gypsum Disposal Area potential structural impacts the mines found within the site will have on the integrity of the impoundment.

Engineering analysis of the mine geometry, pillar stability and bearing capacity of the existing mines were conducted in the Deep Mine Stability Assessment to evaluate the potential for future mine instability.

3.3.2.1 Pillar Stability

A Pillar Stability Analysis was performed in order to evaluate the factor of safety against pillar collapse for existing conditions of the Drake III and Browder mines. The stability analysis was performed using the tributary method within the SDPS program which consists of dividing the pillar strength, calculated using five pillar strength formulas, by the overburden load carried by the pillar. The target factors of safety are based on general accepted standard of engineering practices. The target factor of safety and calculated factor of safety are presented below in Table 2 and Table 3.

TABLE2: DRAKE III MINE PILLAR STABILITY RESULTS

METHOD	PILLAR STRENGTH (PSI)	PILLAR STRESS (PSI)	TARGET FACTOR OF SAFETY	CALCULATED FACTOR OF SAFETY
Bieniawski	2012	677	1.75	3.0
Holland-Gaddy	1340	677	2.0	2.0

TABLE 3: BROWDER MINE PILLAR STABILITY RESULTS

METHOD	PILLAR STRENGTH (PSI)	PILLAR STRESS (PSI)	TARGET FACTOR OF SAFETY	CALCULATED FACTOR OF SAFETY
Bieniawski	1548	539	1.75	2.9
Holland-Gaddy	1102	539	2.0	2.1

3.3.2.2 Bearing Capacity

In addition to the Pillar Stability Analysis, the Bearing Capacity was assessed as the stresses within the pillars due to supporting the overburden is transferred from the pillars to the mine floor. These stresses can exceed the capacity of the mine floor rock which can lead to excessive pillar settlement or bearing capacity failure of the presented floor. The calculated pillar stresses, strengths, and factor of safety for each mine condition is presenting in Table 4 below. The calculated factors of safety for the mines are well above the target factors of safety for the conditions examined.

TABLE 4: BEARING CAPACITY FACTOR OF SAFETY					
MINE	MINE CONDITION	PILLAR STRESS (PSI)	ALLOWABLE BEARING CAPACITY (PSI	TARGET FACTOR OF SAFETY	CALCULATED FACTOR OF SAFETY
Drake III	Dry	677	7,000	3.0	9.0
	Wet	677	6,300	3.0	8.1
Browder	Dry	530	6,160	3.0	11.7
	Wet	530	5,540	3.0	10.5

3.3.2.3 Man-Made Unstable Areas Conclusion

A review of the available information and an analysis of the existing pillars determined that the existing mines are stable and have a low risk of impact to the Gypsum Disposal Area due to pillar crushing, bearing capacity failure, or roof beam failure. Therefore the integrity of the CCR unit has been demonstrated through analysis with adequate factors of safety to meet the requirements of § 257.64 with respect to the presence of underground mines.

4.0 HISTORICAL REMEDIAL ACTION

Per §257.64(b)(3), the unstable areas demonstration must consider on-site or local human-made features or events when determining whether the area is unstable. This includes the review of routine operations and inspections at the site to maintain precaution from human-induced events or forces that might impair the integrity of structural components responsible for preventing unpermitted release of CCR into the environment.

The site history of construction documentation describes repairs of minor sloughs associated with temporary seepage conditions that were repaired. No large scale (i.e. global) instability conditions have been identified at the site. Furthermore, no historic evidence of deep mine collapse such as sinkholes are known to have occurred on the PAF property. No other record or knowledge of structural instability has been identified for the Gypsum Disposal Area or Gypsum Disposal Area Stilling Ponds 1 & 2.

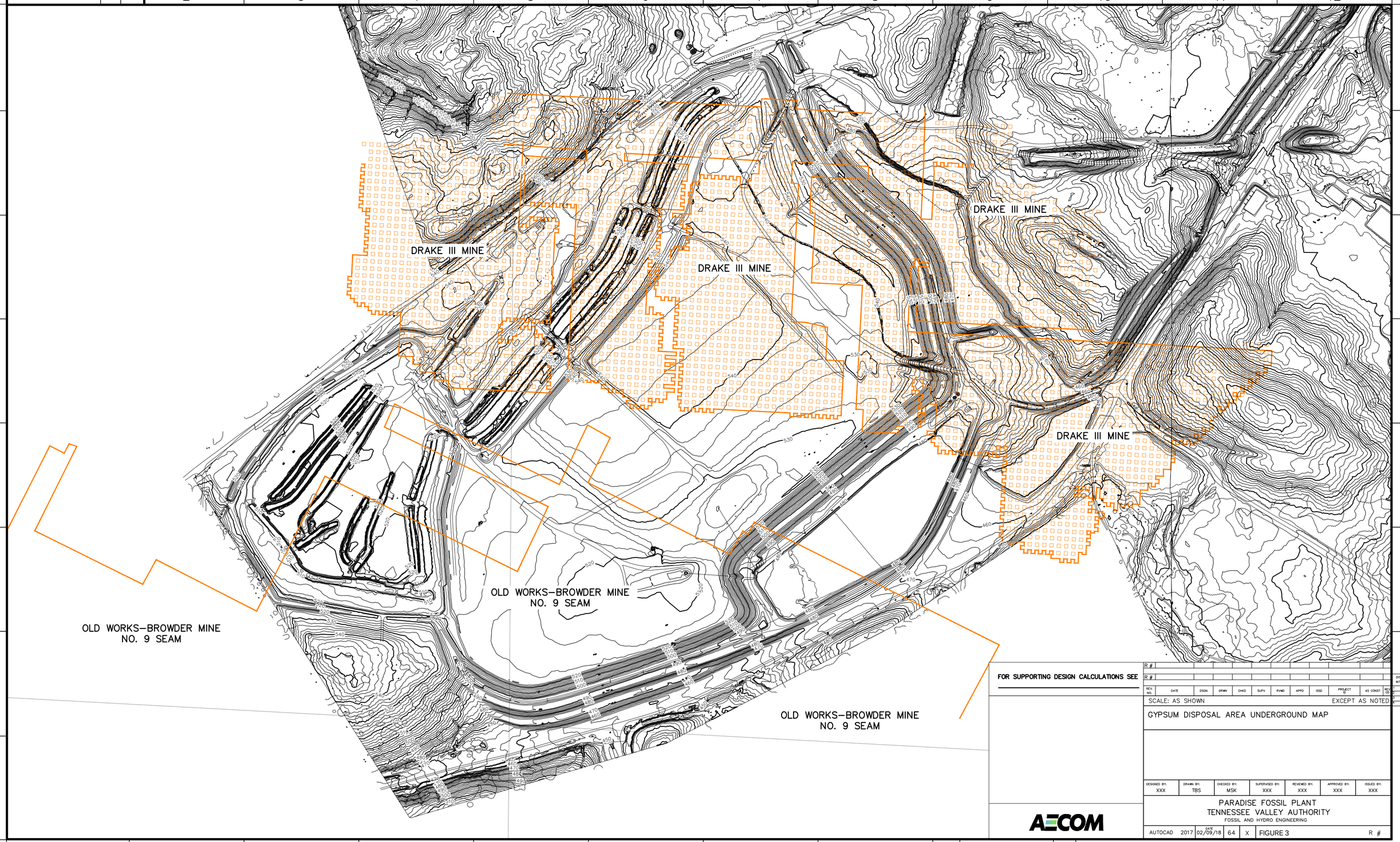
5.0 CONCLUSIONS

AECOM has concluded that TVA PAF Gypsum Disposal Area, Gypsum Disposal Area Stilling Pond 1, and Gypsum Disposal Area Stilling Pond 2 meet the unstable area requirements within § 257.64 of the EPA Final CCR Rule and poses no imminent threat.

6.0 REFERENCES

- AECOM, 2017. Deep Mine Evaluation Memorandum (Draft). Paradise Fossil Plant, Muhlenberg County, Kentucky, March 10, 2017.
- AECOM, 2018. Deep Mine Stability Assessment. Gypsum Disposal Area. TVA Paradise Fossil Plant. September 10, 2018.
- AECOM, Gypsum Disposal Area, History of Construction (40 CFR §257.73(c)) for CCR Certification, 2016.
- AECOM, Gypsum Disposal Area, Geotechnical Exploration and Analysis CCR Rule Compliance (Rev. 0), 2016.
- AECOM, Gypsum Disposal Area, Initial Structural Stability Assessment (40 CFR §257.73 (d)(1)) for Coal Combustion Residuals (CCR), 2016.
- University of Kentucky Geological Survey, 2015. Online Geologic Interactive Map Accessed at: http://kgs.uky.edu/kgsmap/kgsgeoserver/viewer.asp on January 21, 2015.
- Kentucky Mine Mapping Service, 2015. Online Interactive Mine Mapping Accessed at: http://eppcgis.ky.gov/flexviewers/minemapping/ on January 21, 2015.

FIGURES



FOR SUPPORTING DESIGN CALCULATIONS SEE

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV. TASK
R #											
R #											

DISCIPLINE INTERFACE

SCALE: AS SHOWN EXCEPT AS NOTED

GYPSUM DISPOSAL AREA UNDERGROUND MAP

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
XXX	TBS	MSK	XXX	XXX	XXX	XXX

PARADISE FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD 2017 | DATE 02/09/18 | 64 | X | FIGURE 3 | R #

AECOM

TASK COMPLETED BY: | REV NO.

PLOT FACTOR:XX
W_TVA

C.A.D. DRAWING
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