Cell 2 – Evaluation of Location Restrictions

SWEPCO – John W. Turk, Jr. Power Plant
Class 3N Landfill
Permit No. 0311-S3N-R1
AFIN: 29-00506
September 2018
Project No. 35177127

AEP SOUTHWESTERN ELECTRIC POWER COMPANY
A unit of American Electric Power

9-13-18

STATE OF ARKANSAS
★ ★ ★
REGISTERED PROFESSIONAL ENGINEER
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1.0 Objective

The purpose of this Location Restriction Evaluation Report (LRER) is to evaluate compliance with location restrictions (LRs) with the EPA Coal Combustion Residuals (CCR) regulations at the SWEPCO – John W. Turk, Jr Power Plant Class 3N Landfill (Permit No. 0311-S3N-R1) facility. Southwestern Electric Power Company (SWEPCO) is a unit of American Electric Power (AEP).

2.0 Background Information

2.1 Facility Location Description

Southwestern Electric Power Company owns and operates a coal-fired power plant (John W. Turk, Jr. Power Plant) with a Class 3 Non-Commercial (3N) solid waste facility (Class 3N Landfill) associated with the Power Plant. The site is located approximately 2.2 miles north of Fulton (Hempstead County), Arkansas. The Power Plant produces up to 600 Megawatts (MW) of electrical power utilizing western subbituminous coal. The Class 3N Landfill is used for disposal of fly ash, bottom ash, and other byproducts from the coal-fired Power Plant. The waste materials are non-hazardous and non-putrescible. (**FIGURE 1 & 2**)

2.2 Description of CCR Unit

2.2.1 Embankment Configuration

The landfill embankments are being constructed with 3:1 interior slopes. The outside embankment slopes are approximately 3:1. A composite liner system and a leachate collection and removal system for Cell 2 is being constructed. (**2011 Permit Application, Volume 3, Appendix B Design Drawings, Terracon Consultants Inc., February 2011**)[1]

2.2.2 Area/Volume

The Solid Waste Landfill permit 0311-S3N-R1, with an effective date of July 15, 2011, grants the Turk Facility Landfill 73 acres of disposal area. This disposal area correlates to 6,884,235 Cubic Yards of disposal Volume. Currently 14 acres (Cell 1) of the 73-acre Class 3N landfill have been constructed and are active. Cell 2 is currently under construction.

2.2.3 Construction and Operational History

During field activities, groundwater monitoring wells were installed around the Class 3N Landfill in accordance with the approved Groundwater Monitoring Well Installation Workplan, Revised August 1, 2011.

The monitoring wells are identified as MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, MW-7, MW-8, MW-9D, and MW-10 (**FIGURE 3**). The 10 monitoring wells were installed to depths ranging from 20 to 148 feet below ground surface (bgs). Each well installation was performed in accordance with ASTM D 5092-90 Design and Installation of Groundwater Monitoring Wells in Aquifers.

Each monitoring well was constructed using 2-inch diameter 0.010 slotted PVC screen. A 5- inch bottom cap was installed on the bottom of each screened interval. The screened interval was threaded to a solid 2-inch diameter PVC riser to bring the well to approximately 3 feet above ground. The annulus of each well was filled with 12/20 mesh silica sand from the bottom of the boring to a minimum of two feet above the screened interval. A minimum of two feet of coated bentonite pellets were then placed in the annulus on top of the sand filter pack and then hydrated. The remaining annulus was filled with bentonite chips to within approximately 1 foot of ground surface. A tremmie pipe was utilized to install sand, coated bentonite pellets, and bentonite chips in deep monitoring well MW-9D. A cement seal was then installed to ground surface.

The solid PVC riser in each well was brought to approximately 3 feet above ground surface. A 4-foot long metal protective locking collar was then installed over the PVC. A concrete pad with four (4) bollard posts was constructed around each well. (**Groundwater Monitoring Well Installation Report, Terracon Consultants Inc., December 2011**)[2]

An additional monitoring well, MW-11, was installed on March 24, 2016 in accordance with the approved Groundwater Monitoring Well Installation Workplan dated February 23, 2016. MW-11 is just north of the landfill boundary. The well was added to bring the groundwater monitoring network into compliance with CCR requirements.

2.2.4 Surface Water Control

The site has been designed with a series of berms, ditches, and drainage conveyances to direct stormwater away from and around the active disposal area. Stormwater diversion is necessary and desirable to minimize contact with waste while limiting the potential for leachate production. Each active waste cell will be constructed with a perimeter diversion berm to assist in separating leachate and stormwater.

The surface of the Landfill will be shaped and contoured to promote proper drainage away from Landfill. A series of internal ditches will be necessary to divert stormwater run-off from the Landfill to the perimeter ditches. The final cover system will also include a series of drainage conveyances designed to control drainage off the Landfill surface while minimizing erosion. Surface water run-

off will be directed to stormwater sediment ponds located adjacent to the proposed disposal area footprint. All ditches, swales, berms, conveyances, and stormwater sedimentation basins have been designed to control the run-off from a 25-year, 24-hour storm event.

2.3 Previous Investigations

Geotechnical

- Hydrogeologic and Geotechnical Report, Terracon, Revised October 2010

Groundwater and Other Environmental

- Hydrogeologic and Geotechnical Report, Terracon, Revised October 2010
- Groundwater analysis reports are done quarterly throughout each year
- Annual Engineering Inspections reports are done yearly.
- Groundwater Separation Distance Determination Report, Turk Permit Application, Volume 4, Appendix K.

2.4 Hydrogeologic Setting

2.4.1 Climate

The climate in this area of the state is humid with warm summers. Mean temperatures range from 81.6 °F in July to 45.7 °F in January. The average annual temperature is 64.1 °F. Recorded temperature extremes are 114 °F and -5 °F. The average annual rainfall is about 49 inches a year (**U.S.D.A Soil Conservation Commission, Arkansas State Water Plan, Feb. 1987, pg. 7**)[3].

2.4.2 Regional and Local Geologic Setting

The landfill is located within the Gulf Coastal Plain Physiographic Province and underlain by Cretaceous Age sediments. The landfill is underlain by the Arkadelphia Marl Formation. Quaternary terrace deposits are present to the south of the site and Quaternary alluvial deposits associated with Bridge Creek are present just to the north of the site; however, Quaternary deposits are not present within the landfill area.

The hydrogeologic investigation conducted in February through May, 2008 confirmed that the site is underlain by the Cretaceous Age Arkadelphia Marl, which is then underlain by the Nacatoch Sand Formation. The hydrogeologic units identified during the investigation were grouped together based upon similar geologic, geotechnical and hydrogeologic properties. Hydrogeologic “Unit A” is part of the Arkadelphia Marl Geologic Unit and contains clay with some intermittent Chert gravel. Some silty clay and sandy clay is present. Clayey gravel intervals are present primarily in the northern portion of the site. Gypsum veins are generally present near the lower contact of the unit. The Hydrologic Characteristics include: Groundwater can occur as secondary porosity in gypsum veins under confined conditions, groundwater is also present in gravel

intervals in the northern portion of the site, groundwater may move through the formation due to the blocky fissile nature of the material, average vertical permeability of $5.21X10^{-8}$ cm/sec based on lab geotechnical samples, average horizontal conductivity of $6.47X10^{-5}$cm/sec based on slug tests, and average horizontal conductivity of $8.33X10^{-4}$ cm/sec based on pump test data. Hydrogeologic "Unit B" is part of the Arkadelphia Marl Geologic Unit and contains Shaley Clay/Clayey Shale, is hard, and fissile in nature. Trace bivalve fossils are present and strong HCL reaction. The Hydrologic Characteristics include: Average vertical permeability of $1.13X10^{-7}$cm/sec based on lab geotechnical samples. Hydrogeologic "Unit C" is part of the Nacatoch Formation Geologic Unit and contains Sandstone with calcareous cement overlying fine grained, loosely cemented sand. The Hydrologic Characteristics include: Groundwater occurs under confined conditions within the loosely cemented sand. Average horizontal conductivity is $4.25X10^{-4}$ cm/sec based on slug test data.

The Arkadelphia Marl is mostly a dark gray to black marl or marly clay with some limy, gray sandstone, gray sandy clay, sandy limestone, concretionary limestone, with to light brown impure chalk. The sandy marls and limestone are found at or near the base of the unit, while the impure chalks are found closer to the top. The Arkadelphia Marl rests with slight unconformity upon the Nacatoch Sand. The marl is 120 to 160 feet thick. (R.T. Hill – 1888). The underlying Nacatoch Sand is composed of cross-bedded, yellowish and gray fine quartz sand; hard, fossiliferous sandy limestone; coarse, highly glauconitic sand; fine-grained, argillaceous blue-black sand; bedded light-gray clay and marl. The sands in the Nacatoch are generally unconsolidated. At the base of the unit hard, fossiliferous limestone and marl are found. The Nacatoch Sand appears to have an unconformity at its base. The unit is 150 to 400 feet thick.

2.4.3 Surface Water/Groundwater Interactions

The site is drained primarily to the south and east toward the perennial stream Bridge Creek. Bridge Creek flows into Boise d'Arc Creek approximately five miles southeast of the site. The southern portion of the site drains south toward unnamed intermittent drainages that flow into the Red River near Fulton, Arkansas. (**Terracon Consultant's Inc., Permit Modification Application, Volume 4, pg. 3**)[4]. Groundwater elevations are show on **FIGURES 4 & 5**.

Cell 2 is being constructed with a composite liner system that meets the CCR requirements. There should be no interaction between the landfill and groundwater or surface water with this composite liner system in place. In addition, a groundwater monitoring system is in place to detect any interaction (ie, release) should it occur. The groundwater potentiometric map shows groundwater flowing toward Bridge Creek. Bridge Creek is likely a gaining stream at this location. Surface water does impact groundwater. Periodically there has been evidence of temporary groundwater mounding as noted during the February 3, 2015 sampling event at MW-3.

2.4.4 Water Users

A water well inventory was conducted on wells within a one-half mile radius of the Class 3N landfill. The well inventory was conducted by utilizing Water Well Construction reports on file at the Arkansas Geological Commission.

Water well inquiry forms were submitted to property owners located within ½-mile radius of the site. Mr. Rosenbaum (property owner located approximately 2,000 feet west of the proposed landfill boundary), on July 10, 2010, verbally stated there are three (3) wells at his home and near the adjacent chicken houses. Water well construction reports were not identified for the wells. The estimated locations of the wells are shown on **FIGURE 6**. (**Terracon Consultant's Inc., Permit Modification Application, Volume 4, pg. 7**)[5]

New CCR Rules (§257.60 through §257.64)

New CCR landfills and all lateral expansions of CCR units must meet the §257.60 through §257.64 rules. These individual rules (§257.60 - Placement above the uppermost aquifer, §257.61 – Wetlands, §257.62 – Fault areas, §257.63 – Seismic impact zones, §257.64 – Unstable areas) are discussed below in more detail.

3.0 Required Isolation from Uppermost Aquifer

3.1 Aquifer Description and Piezometric Analysis

The site is underlain by the Cretaceous Age Arkadelphia Marl, which is then underlain by the Nacatoch Sand Formation. The hydrogeologic units identified during the investigation were grouped together based upon similar geologic, geotechnical and hydrogeologic properties. Hydrogeologic "Unit A" is part of the Arkadelphia Marl Geologic Unit and contains clay with some intermittent Chert gravel. Some silty clay and sandy clay is present. Clayey gravel intervals are present primarily in the northern portion of the site. Gypsum veins are generally present near the lower contact of the unit. The Hydrologic Characteristics include: Groundwater can occur as secondary porosity in gypsum veins under confined conditions, groundwater is also present in gravel intervals in the northern portion of the site, groundwater may move through the formation due to the blocky fissile nature of the material, average vertical permeability of $5.21X10^{-8}$ cm/sec based on lab geotechnical samples, average horizontal conductivity of $6.47X10^{-5}$ cm/sec based on slug tests, and average horizontal conductivity of $8.33X10^{-4}$ cm/sec based on pump test data. Hydrogeologic "Unit B" is part of the Arkadelphia Marl Geologic Unit and contains Shaley Clay/Clayey Shale, is hard, and fissile in nature. Trace bivalve fossils are present and strong HCL reaction. The Hydrologic Characteristics include: Average vertical permeability of $1.13X10^{-7}$cm/sec based on lab geotechnical samples. Hydrogeologic "Unit C" is part of the Nacatoch Formation Geologic Unit and contains Sandstone with calcareous cement overlying fine grained, loosely cemented sand. The Hydrologic Characteristics include: Groundwater occurs under

confined conditions within the loosely cemented sand. Average horizontal conductivity is $4.25X10^{-4}$ cm/sec based on slug test data.

A cross section map **(FIGURE 4)** and a potentiometric surface map were constructed **(FIGURE 5)** based on monitoring well seasonal high water levels and tests pits constructed during construction. The monitoring well water level data and the test pit data are illustrated in **TABLE 1**. According to the available data, a five-foot separation between Cell 2 and the bottom of the clay liner meets the five-foot separation after the north side of the landfill floor was raised.

3.2 Compliance

Based on information from the cross sections and potentiometric surface map of Cell 2, the seasonal High water levels and test pit elevations are more than five feet below the lowest point of the Cell 2 liner system after the cell floor was raised **(FIGURE 5)**. Cell 2 meets the five-foot separation requirements set forth by 40 CFR §257.60.

4.0 Wetlands Impact

4.1 Review of Local Wetlands

As per CCR rule §257.61, new landfills or lateral expansions to existing landfills must not be located in wetlands. The location of the landfill is shown in Appendix B of Volume 3 (See **FIGURE 7**).

4.2 Compliance

Cell 2 is not located in a wetland; therefore, it meets the requirements set forth by 40 CFR §257.61.

5.0 Fault Area

5.1 Description of Regional Geologic Structural Features and Tectonic History

New CCR landfills and all lateral expansions of CCR units must not be located within 60 meters (200 feet) of the outermost damage zone of a fault that has had displacement in Holocene time as per 40 CFR §257.62. The proposed facility will be located in the Gulf Coastal Plain region. Based on the Geologic Map of Arkansas, (Revised 1993), no mapped faults exist within the distance required in 40 CFR §257.62.

5.2 Compliance

Based on the available information, Cell 2 meets the requirements set forth by 40 CFR §257.62.

6.0 Seismic Impact Zone

6.1 Seismic Impact Zone – Definition and Regional Information

40 CFR §257.63 states that new CCR landfills and all lateral expansions of CCR units must not be located in seismic impact zones unless the owner or operator demonstrates that all structural components including liners, leachate collection and removal systems, and surface water control systems, are designed to resist the maximum horizontal acceleration in lithified earth material for the site.

A "seismic impact zone" is defined as an area with a two percent (2%) or greater probability that the maximum horizontal acceleration in lithified earth, expressed as a fraction of the earth's gravitation pull will exceed 0.10 (g) in fifty (50) years.

The proposed Cell 2 Landfill is not located with the area of influence of the New Madrid Seismic Zone, a major intra-plate seismic impact zone. According to seismic hazard mapping released by the United States Geologic Survey (USGS) National Seismic Hazard Mapping Project team in 2009, the maximum horizontal bedrock acceleration for the site is outside of the 2% probability of exceedance in fifty years is less than 0.10 (g) (0.08 (g)). The United States Geological Survey National Seismic Hazard Mapping is shown on **FIGURE 8**.

6.2 Compliance

Based on the available information, Cell 2 meets the seismic impact zone requirements set forth by 40 CFR §257.63.

7.0 Unstable Areas

7.1 Unstable Areas – Definition and Review of Local Conditions

Unstable area means a location that is susceptible to natural or human induced events or forces capable of impairing the integrity, including structural components of some or all of the CCR units that are responsible for preventing releases from such units. Unstable areas can include poor foundation conditions, areas susceptible to mass movements, and karst terrains as defined by 40 CFR §257.64.

Applicability – Owners or operators of existing or new CCR landfills or any lateral expansion of a CCR unit must not be located in an unstable area. The owner or operator must consider 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). The following sections analyze each of these factors as they relate to the landfill

7.1.1 – On-Site and Local Soil Conditions

The site soil conditions at the Turk facility do not meet the criteria for unstable conditions. Unstable conditions are usually associated with geological conditions such as Karst features. Characteristic physiographic features associated with Karst terrain such as sinkholes, sinking streams, caves, large springs, and blind valleys are not present on the site. **Section 2.4.2** of this document describes the local and regional soil properties. **FIGURE 9** is a soil map of the CCR unit.

7.1.2 – On-Site or Local Geologic or Geomorphologic Features

Based on the site specific boring logs, as well as published local and regional geologic and geomorphic information, there are no known on-site or adjacent geologic or geomorphic features which could adversely affect the stability of the surface impoundment as defined by 40 CFR §257.64. Information regarding the hydrogeologic, geologic and geotechnical conditions in the vicinity of the site are described in detail in **Section 2.4.2** of this document.

7.1.3 – On-Site or Local Human-Made Features or Events Affecting Stability

Looking at previous investigations, including slope stability analysis, hydrogeologic, and geotechnical reports, the site is not located in an unstable area. The site is in compliance with 40 CFR §257.64.

7.2 Compliance

Looking at previous investigations, including slope stability analysis and geotechnical reports, the site is not located in an unstable area. The site is in compliance with 40 CFR §257.64.

8.0 Summary and PE Certification

8.1 Summary

Southwestern Electric Power Company owns and operates a coal-fired power plant (John W. Turk, Jr. Power Plant) with a Class 3 Non-Commercial (3N) solid waste facility (Class 3N Landfill) associated with the Power Plant. The facility consists of a permitted approximately 73-acre disposal area. The location restrictions given in 40 CFR 257.60 through 257.63 concerning placement of above the uppermost aquifer, wetlands, fault areas, and seismic impact zones have been addressed in this report for the Cell 2 area. The hydrogeologic investigation conducted in February through May, 2008 confirmed that the site is underlain by the Cretaceous Age

Arkadelphia Marl, which is then underlain by the Nacatoch Sand Formation. The site soil conditions at the Turk facility do not meet the criteria for unstable conditions. Looking at previous investigations, including slope stability analysis, hydrogeologic, and geotechnical reports, the site is not located in an unstable area. The site is in compliance with 40 CFR 257 §257.64.

8.2 Limitations

The findings and conclusions resulting from this investigation are based upon information derived from the on-site activities and other services performed under the scope of work as described in this report; such information is subject to change over time if additional information is obtained. Please note that Terracon does not warrant the work of laboratories, regulatory agencies or other third parties supplying information used in the preparation of the report.

8.3 PE Certification

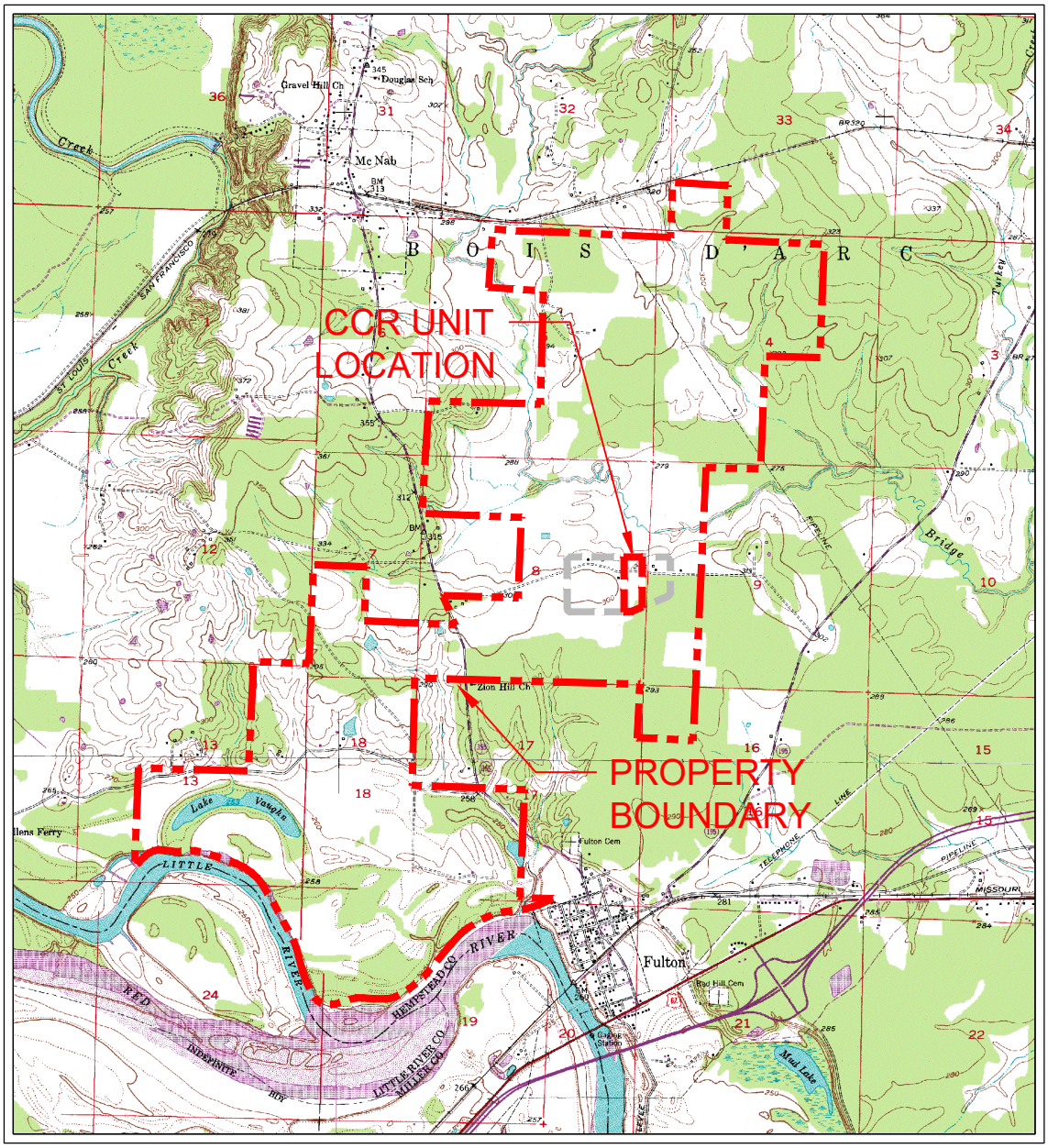
Name: David McCormick	Date: 9-13-18	STATE OF ARKANSAS ★★★ REGISTERED PROFESSIONAL ENGINEER ★★★ No. 9199 DAVID C. McCORMICK Stamp
Company: Terracon	Expiration Date: 12/31/19	

CERTIFICATE OF AUTHORIZATION TERRACON CONSULTANTS, INC. No. 223 ARKANSAS

Bibliography

1. 2011 Permit Application, Volume 3, Appendix B Design Drawings, Terracon Consultants Inc., February 2011.
2. Groundwater Monitoring Well Installation Report, Terracon Consultants Inc., December 2011
3. U.S.D.A Soil Conservation Commission, Arkansas State Water Plan, Feb. 1987, pg. 7
4. Terracon Consultant's Inc., Permit Modification Application, Volume 4, pg. 3
5. Terracon Consultant's Inc., Permit Modification Application, Volume 4, pg. 7
6. 2015 Minor Modification Application, Terracon Consultants Inc., December 2015.

UNITED STATES – DEPARTMENT OF THE INTERIOR – GEOLOGICAL SURVEY



SCALE 1:24 000

1 .5 0 KILOMETERS 1 2
1000 0 METERS 1000 2000
1 .5 0 1
MILES
1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000

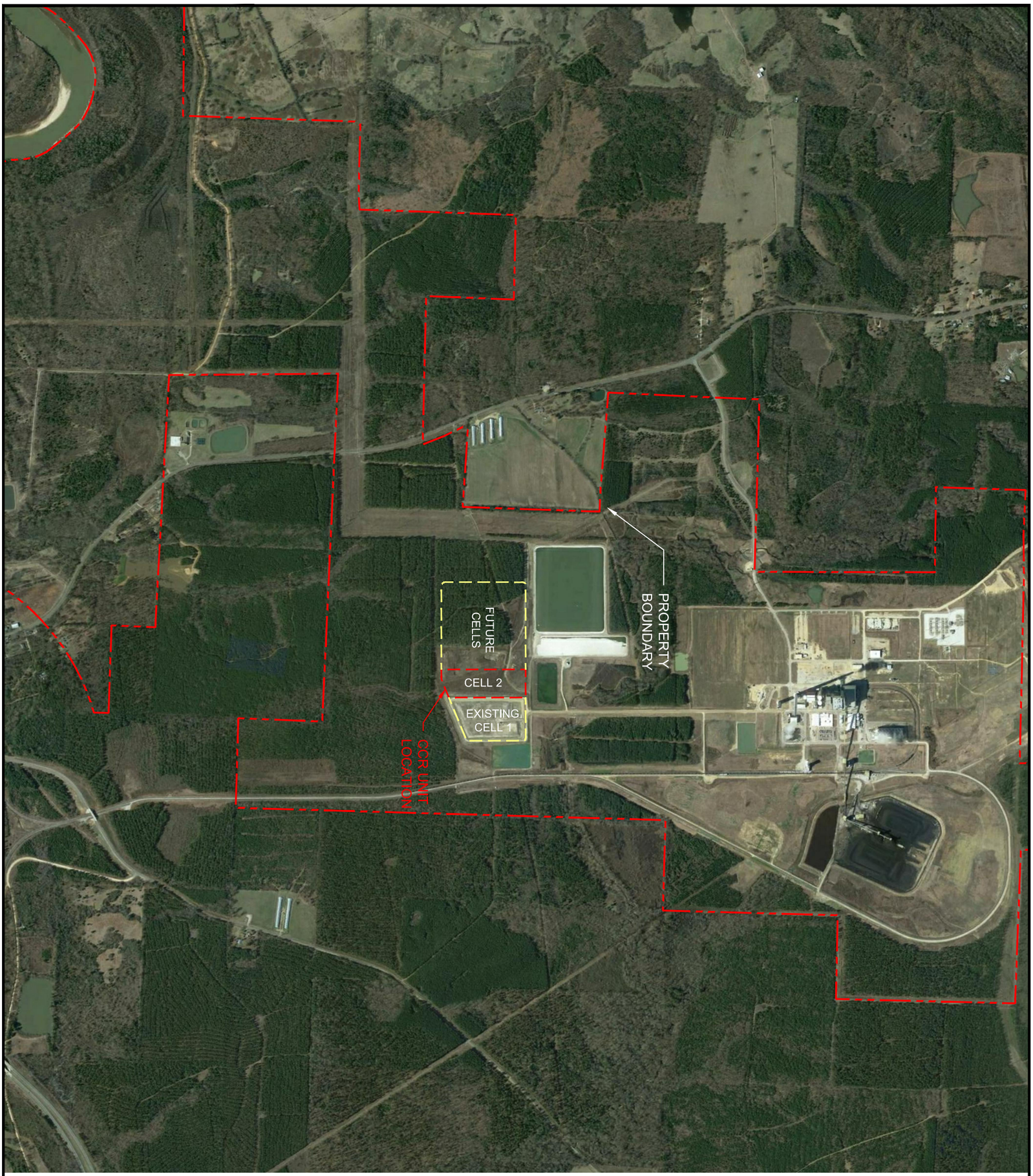
CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

N

FULTON / MCNAB QUADRANGLES
1951 - Revised 1970 & 1975
7.5 MINUTE SERIES (TOPOGRAPHIC)

Project Mngr: DCM	Project No. 216-002-35177127	Terracon Consulting Engineers and Scientists	SITE LOCATION MAP
Drawn By: TLB	Scale: AS SHOWN	25809 I-30 SOUTH BRYANT, AR 72022	EVALUATION OF CELL 2 LOCATION RESTRICTIONS
Checked By: TLB	File No. 401	PH. (501) 847-9292 FAX. (501) 847-9210	AMERICAN ELECTRIC POWER
Approved By: DCM	Date: 07/02/2018		JOHN W. TURK, JR. POWER PLANT
			FULTON ARKANSAS

FIG. No. 1



NOTE:
FUTURE CELLS ARE NOT PART OF THE CURRENT CCR UNIT.

SCALE IN FEET
0 375 750 1500
N

REV.	DATE	BY	DESCRIPTION

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PLANT & CCR UNIT LOCATION MAP

EVALUATION OF CELL 2 LOCATION RESTRICTIONS
AMERICAN ELECTRIC POWER
JOHN W. TURK, JR. POWER PLANT
FULTON ARKANSAS

FIGURE 2

DESIGNED BY:	DCM
DRAWN BY:	TLB
APPVD. BY:	DCM
SCALE:	SEE BARSCALE
DATE:	07/02/2018
JOB NO.	216-002-35177127
ACAD NO.	402
SHEET NO.:	2 OF 9

MAKE-UP WATER POND

WASTE WATER POND

LEACHATE COLLECTION POND

FUTURE CELLS

CELL 2

CELL 1

MW-1

MW-2

MW-3

MW-4

MW-5

MW-6

MW-7

MW-8

MW-9D

MW-10

MW-11

CCR UNIT LOCATION

N

0 100 200 400

SCALE IN FEET

NOTE:
FUTURE CELLS ARE NOT PART OF THE CURRENT CCR UNIT.

FIGURE 3

DESIGNED BY:	TLB
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APPVD. BY:	DCM
SCALE:	SEE BARSCALE
DATE:	07/02/2018
JOB NO.	216-002-35177127
ACAD NO.	403
SHEET NO.:	3 OF 9

CCR UNIT LAYOUT & WELL LOCATIONS

EVALUATION OF CELL 2 LOCATION RESTRICTIONS

AMERICAN ELECTRIC POWER

JOHN W. TURK, JR. POWER PLANT

FULTON ARKANSAS

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REV.	DATE	BY	DESCRIPTION

MAKE-UP WATER POND

WASTE WATER POND

LEACHATE COLLECTION POND

FUTURE CELLS

CELL 2
(UNDER CONSTRUCTION)

CELL 1
(ACTIVE)

MW - #1
298.75

MW - #2
295.85

MW - #3
288.05

MW - #4
278.08

MW - #5
281.63

MW - #6
278.64

MW - #7
275.55

MW - #8
281.08

MW - #9D
257.37

MW - #10
280.60

MW - #11
294.37

A

A'

B

B'

CCR UNIT LOCATION

N

0 100 200 400
SCALE IN FEET

LEGEND:

- PROPERTY BOUNDARY
- CCR UNIT BOUNDARY
- EXISTING CELL BOUNDARY
- FUTURE CELL BOUNDARY
- 281.44 HIGHEST OBSERVED GROUNDWATER ELEVATION
- MONITORING WELL

NOTE:
1. BASED OFF GROUNDWATER DATA FROM THE SEASONAL HIGH FROM 9-20-2011 TO 4-26-2018 SAMPLING EVENTS.
2. FUTURE CELLS ARE NOT PART OF THE CURRENT CCR UNIT.

FIGURE 4

DESIGNED BY:	TLB
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DATE:	07/02/2018
JOB NO.	216-002-35177127
ACAD NO.	404
SHEET NO.:	4 OF 9

CROSS SECTION LOCATION MAP

EVALUATION OF CELL 2 LOCATION RESTRICTIONS

AMERICAN ELECTRIC POWER

JOHN W. TURK, JR. POWER PLANT

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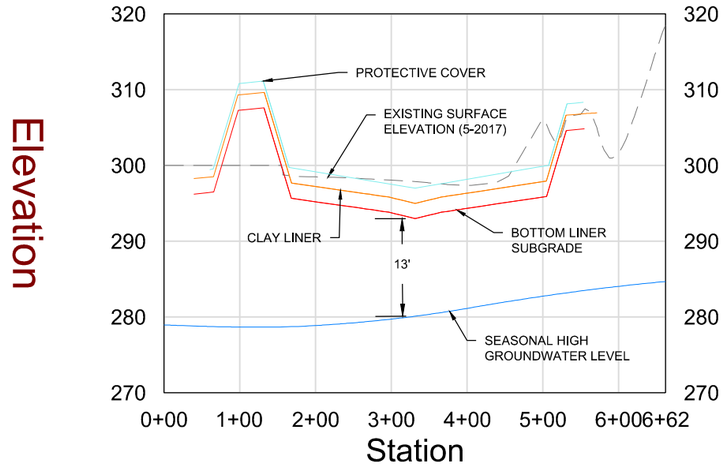
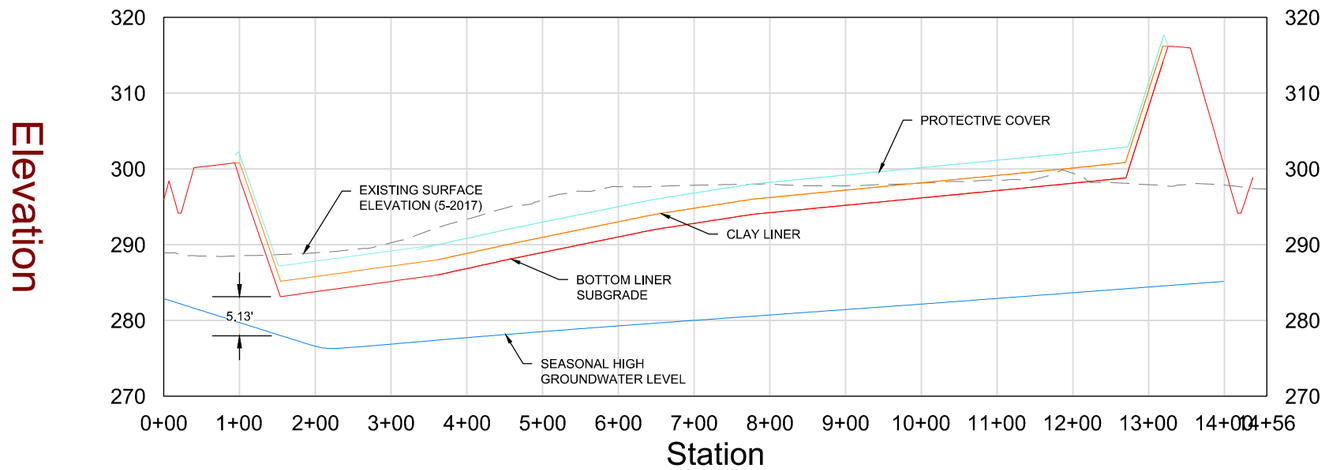
REV.	DATE	BY	DESCRIPTION

PROFILE - A-A'



PROFILE - B-B'



SCALES:

1" = 200' (HORIZONTAL)
1" = 20' (VERTICAL)
VERTICAL EXAGGERATION = x 10

NOTE:

POTENTIOMETRIC SURFACE DEPICTED ON THIS DRAWING WAS DERIVED FROM THE HIGHEST ELEVATION RECORDED DURING SAMPLING EVENTS CONDUCTED BETWEEN 9-20-2011 AND 4-26-2017. (SEE TABLE 1)

FIGURE 5

DESIGNED BY:	TLB
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APPVD. BY:	DCM
SCALE:	SEE BARSCALE
DATE:	07/02/2018
JOB NO.	216-002-35177127
ACAD NO.	405
SHEET NO.:	5 OF 9

CROSS SECTIONS

EVALUATION OF CELL 2 LOCATION RESTRICTIONS
AMERICAN ELECTRIC POWER
JOHN W. TURK, JR. POWER PLANT
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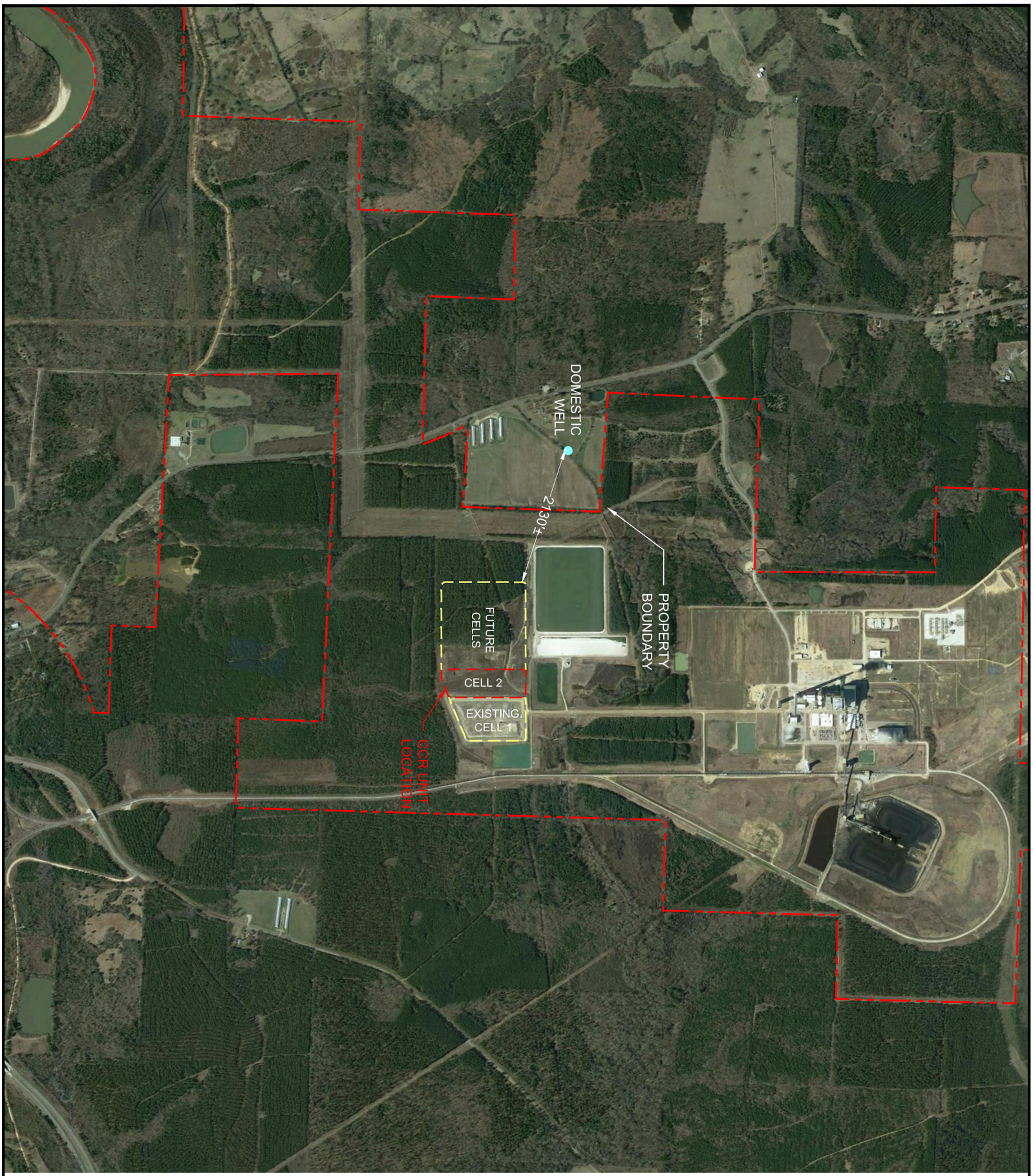
FAX: (501) 847-9210

REV.	DATE	BY	DESCRIPTION



LEGEND:

DOMESTIC WELLS

NOTE:

1. NEAREST DOMESTIC WELL IS SHOWN APPROXIMATELY 2130' AWAY.
2. FUTURE CELLS ARE NOT PART OF THE CURRENT CCR UNIT.

REV.	DATE	BY	DESCRIPTION

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NEAREST DOMESTIC WELL LOCATION MAP

EVALUATION OF CELL 2 LOCATION RESTRICTIONS

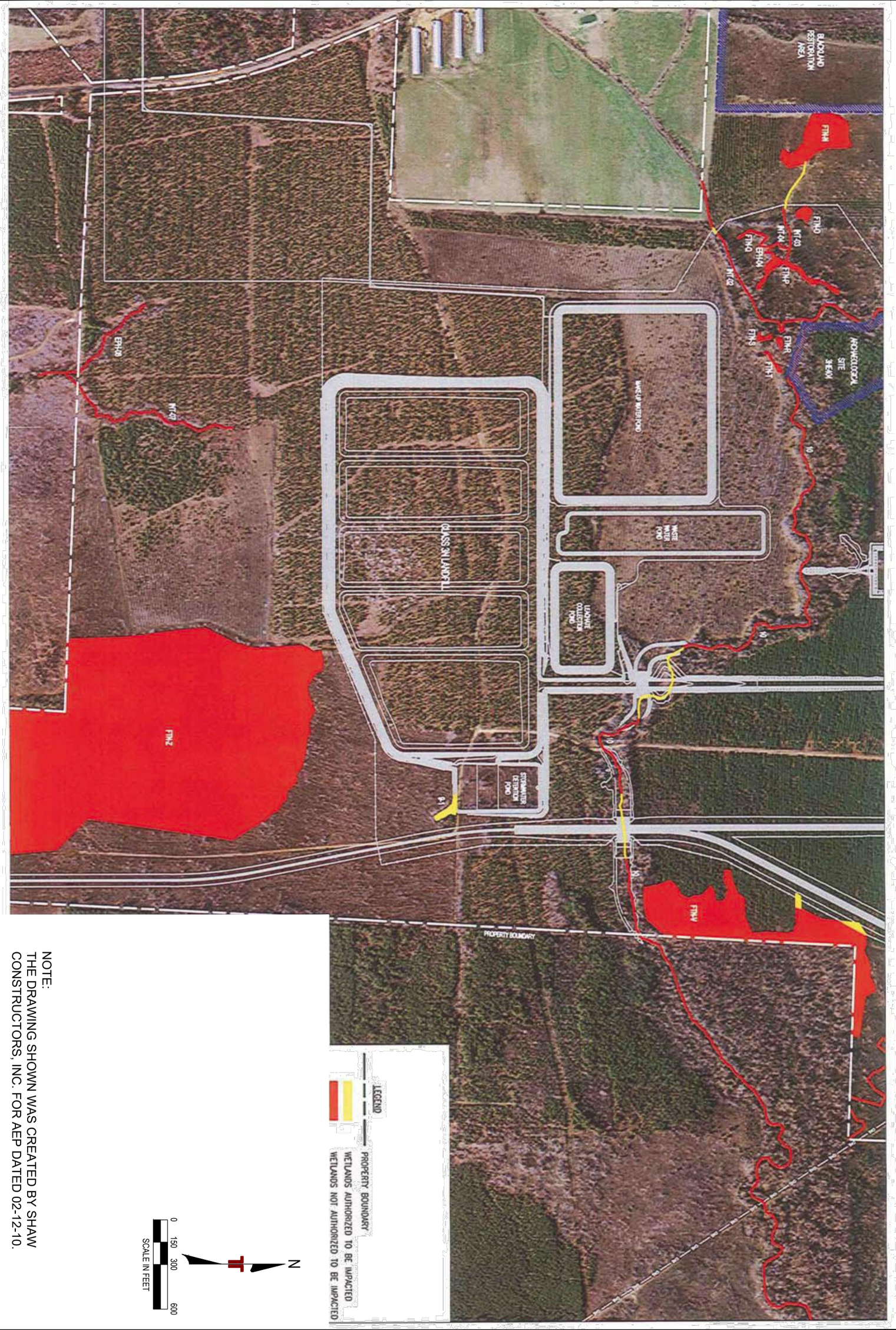
AMERICAN ELECTRIC POWER

JOHN W. TURK, JR. POWER PLANT

FULTON ARKANSAS

FIGURE 6

DESIGNED BY:	DCM
DRAWN BY:	TLB
APPVD. BY:	DCM
SCALE:	SEE BARSCALE
DATE:	07/02/2018
JOB NO.	216-002-35177127
ACAD NO.	406
SHEET NO.:	6 OF 9



NOTE:
THE DRAWING SHOWN WAS CREATED BY SHAW CONSTRUCTORS, INC. FOR AEP DATED 02-12-10.

REV.	DATE	BY	DESCRIPTION

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Consulting Engineers and Scientists
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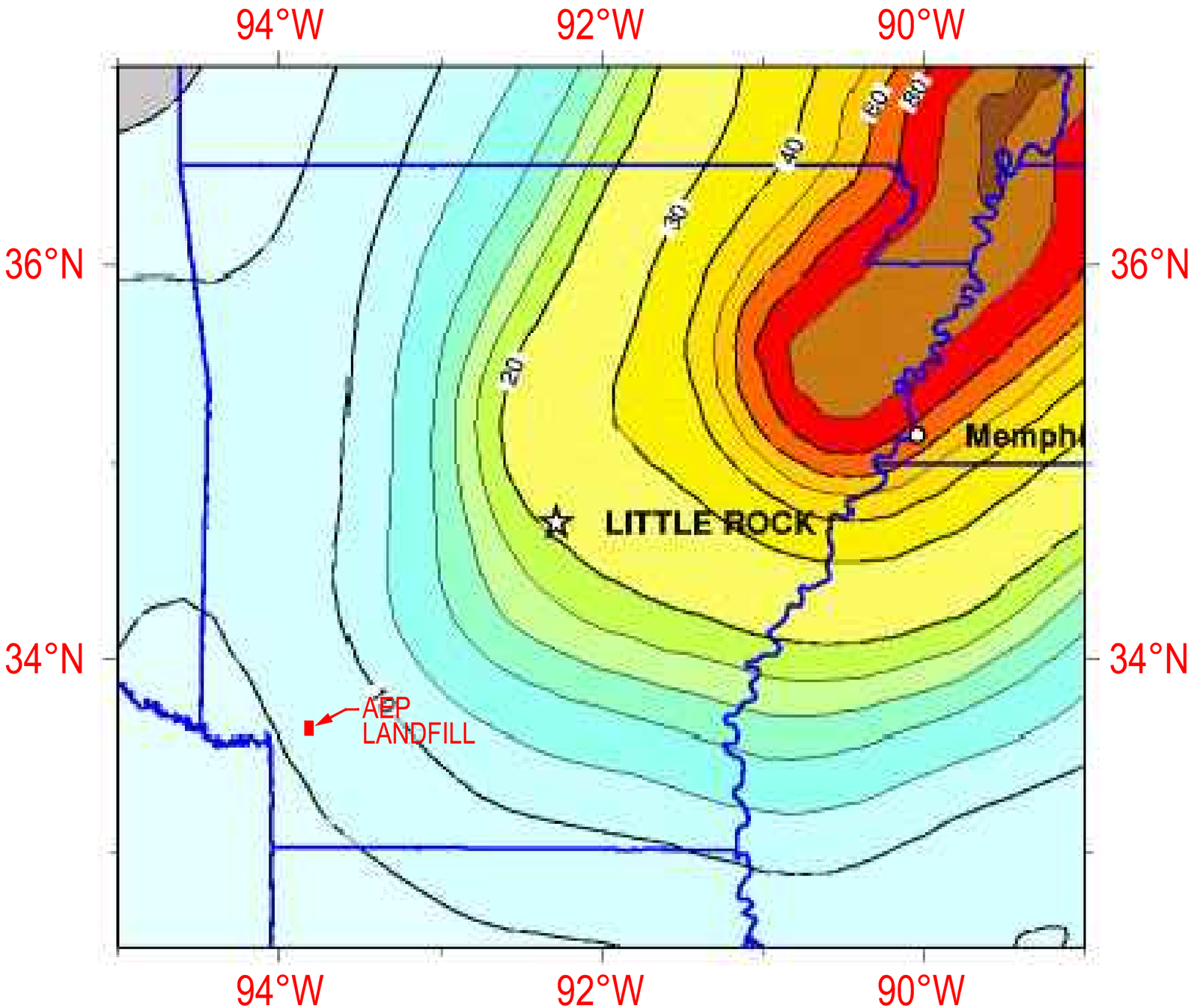
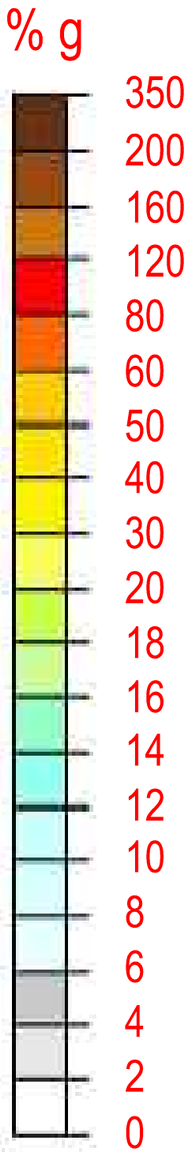
WETLAND LOCATION MAP

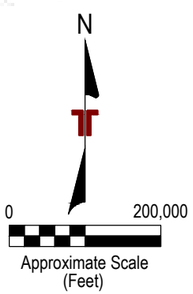
EVALUATION OF CELL 2 LOCATION RESTRICTIONS
AMERICAN ELECTRIC POWER
JOHN W. TURK, JR. POWER PLANT
FULTON ARKANSAS

FIGURE 7

DESIGNED BY:	DCM
DRAWN BY:	TLB
APPVD. BY:	DCM
SCALE:	SEE BARSCALE
DATE:	07/02/2018
JOB NO.	216-002-35177127
ACAD NO.	407
SHEET NO.:	7 OF 9







PEAK ACCELERATION (%G) WITH 2% PROBABILITY OF EXCEEDANCE IN 50 YEARS
SITE: NEHRP B-C BOUNDARY
NATIONAL SEISMIC HAZARD MAPPING PROJECT

FIGURE 8

DESIGNED BY:	DCM
DRAWN BY:	TLB
APPVD. BY:	DCM
SCALE:	SEE BARSCALE
DATE:	07/02/2018
JOB NO.	216-002-35177127
ACAD NO.	408
SHEET NO.:	8 OF 9

USGS NATIONAL SEISMIC HAZARD MAPPING

EVALUATION OF CELL 2 LOCATION RESTRICTIONS

AMERICAN ELECTRIC POWER

JOHN W. TURK, JR. POWER PLANT

FULTON ARKANSAS

Terracon
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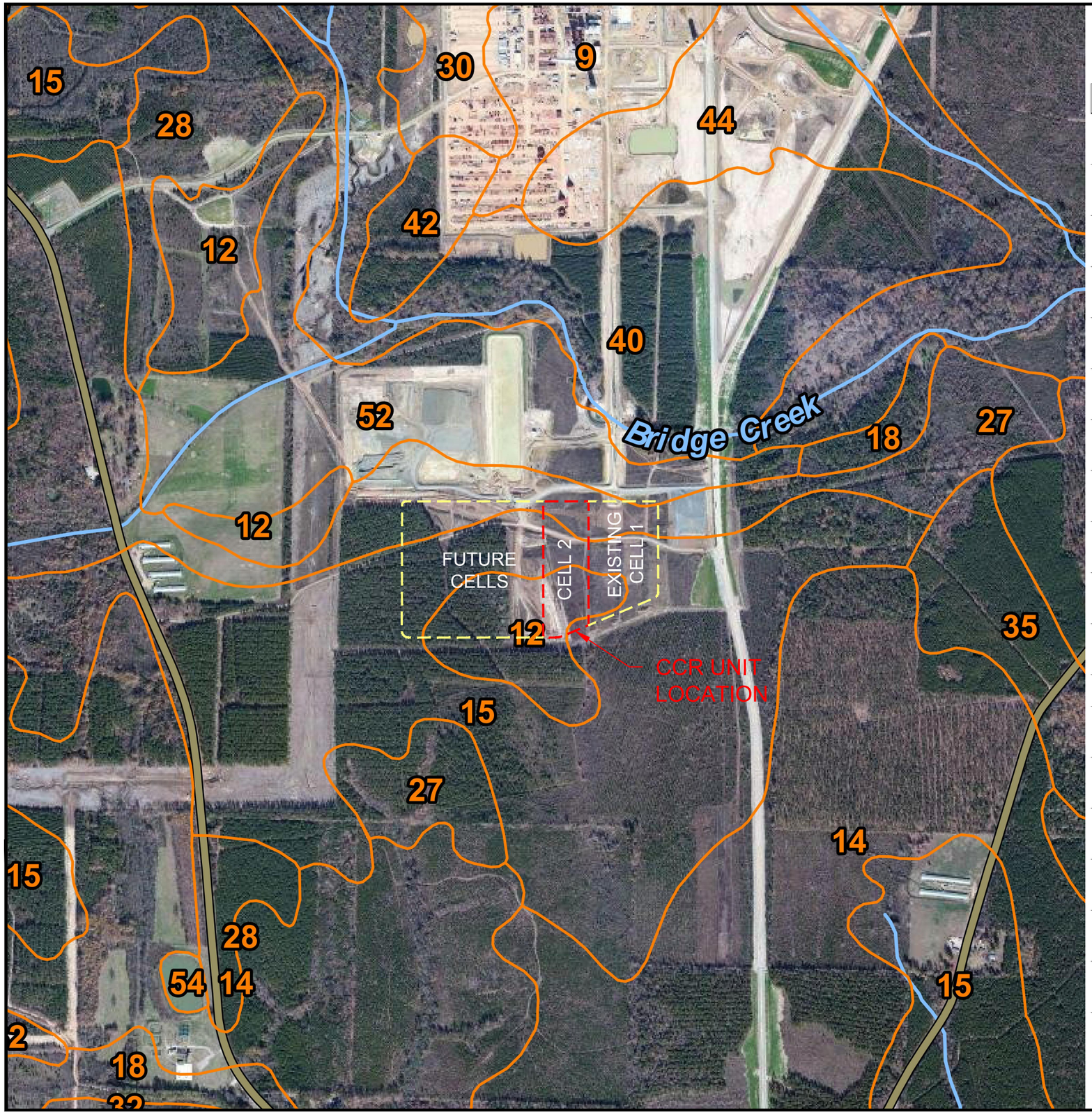
25809 I-30 SOUTH
BRYANT, AR 72022
PH. (501) 847-9292
FAX: (501) 847-9210

REV.	DATE	BY	DESCRIPTION



Map Unit Symbol	Map Unit Name
2	Bowie fine sandy loam, 1 to 3 percent slopes
9	Guyton silt loam, occasionally flooded
12	Houston clay, 1 to 3 percent slopes
14	Kipling loam, 1 to 3 percent slopes
15	Kipling silty clay loam, 3 to 8 percent slopes, eroded
18	Latanier silty clay, occasionally flooded
27	Oktibbeha silty clay loam, 3 to 8 percent slopes, eroded
28	Oktibbeha clay, 8 to 12 percent slopes, eroded
30	Ora fine sandy loam, 3 to 8 percent slopes
32	Perry clay, 0 to 1 percent slopes, occasionally flooded
35	Sacul fine sandy loam, 3 to 8 percent slopes
37	Sacul-Kirvin association, rolling
40	Sardis silt loam, occasionally flooded
42	Savannah fine sandy loam, 3 to 8 percent slopes
44	Sawyer loam, 3 to 8 percent slopes
47	Sterlington very fine sandy loam, 0 to 2 percent slopes
51	Tuscumbia clay, occasionally flooded
52	Una silty clay loam, occasionally flooded
54	Water

FIGURE 9

DESIGNED BY:	DCM
DRAWN BY:	TLB
APPVD. BY:	DCM
SCALE:	SEE BARSCALE
DATE:	07/02/2018
JOB NO.	216-002-35177127
ACAD NO.	409
SHEET NO.:	9 OF 9

NEARBY UNSTABLE AREAS

EVALUATION OF CELL 2 LOCATION RESTRICTIONS

AMERICAN ELECTRIC POWER

JOHN W. TURK, JR. POWER PLANT

FULTON ARKANSAS

Terracon
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25809 I-30 SOUTH BRYANT, AR 72022
PH: (501) 847-9292 FAX: (501) 847-9210

REV.	DATE	BY	DESCRIPTION

TABLE 1
SWEPCO - JOHN W. TURK, JR. POWER PLANT
CLASS 3N LANDFILL
MONITORING WELL DATA
POTENTIOMETRIC GROUNDWATER ELEVATIONS (FMSL)

Well	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9D	MW-10	MW-11	TEST PIT 1	TEST PIT 2
Date													
9/20/2011	284.28	264.25	266.16	273.23	273.26	261.26	270.28	<261.23	251.67	<262.99	-	-	-
12/30/2011	294.89	267.24	265.19	273.16	278.16	270.17	272.10	280.34	254.14	272.41	-	-	-
2/28/2012	295.83	267.40	269.42	272.69	278.33	271.15	272.41	279.96	254.54	274.22	-	-	-
5/17/2012	295.27	267.59	269.65	272.62	277.92	271.96	272.94	278.48	254.47	276.64	-	-	-
8/8/2012	293.35	267.64	269.64	272.51	275.16	271.78	271.46	275.80	252.43	276.89	-	-	-
11/7/2012	292.20	267.72	269.59	272.44	272.90	270.85	271.53	279.69	253.02	275.49	-	-	-
2/28/2013	294.29	267.94	270.03	272.32	278.71	272.53	272.77	280.87	253.93	278.06	-	-	-
5/20/2013	294.37	268.11	270.28	273.27	278.36	272.76	273.37	280.44	255.10	276.59	-	-	-
8/6/2013	293.69	267.99	270.68	273.31	278.35	273.03	272.89	279.61	253.71	277.66	-	-	-
11/4/2013	298.59	271.85	270.50	273.63	279.94	273.59	273.07	280.23	253.54	278.40	-	-	-
2/10/2014	296.87	268.35	270.65	275.18	279.81	274.90	273.79	281.08	254.15	278.94	-	-	-
5/5/2014	296.76	268.56	271.07	276.06	278.96	274.63	273.70	279.02	255.96	279.88	-	-	-
8/5/2014	297.03	272.81	276.01	276.03	279.77	277.85	274.02	280.09	254.21	278.59	-	-	-
11/5/2014	295.99	268.82	271.78	275.88	278.99	275.91	273.30	279.07	254.44	279.86	-	-	-
2/3/2015	298.75	272.90	286.87	276.30	279.89	278.41	274.00	280.64	253.31	280.42	-	-	-
5/5/2015	296.47	275.43	275.97	276.93	280.17	277.74	274.32	279.80	252.04	277.62	-	-	-
8/19/2015	295.02	270.66	274.04	277.45	277.96	273.69	272.99	277.97	252.65	280.05	-	-	-
11/18/2015	297.20	295.53	288.05	276.84	280.71	277.66	273.82	280.73	254.36	279.13	-	-	-
3/23/2016	297.35	281.27	282.69	277.92	280.25	277.87	274.09	279.08	256.98	280.60	-	-	-
4/26/2016	296.72	281.44	282.40	278.08	280.25	277.61	273.74	-	257.37	271.37	283.83	-	-
6/1/2016	297.05	295.85	277.73	277.82	280.65	278.54	275.55	280.53	256.66	275.00	273.38	-	-
7/25/2016	295.36	271.35	274.86	277.94	278.80	272.60	272.98	278.10	253.79	278.28	283.98	-	-
9/1/2016	296.65	274.41	275.22	277.94	279.84	276.52	273.50	278.94	253.87	278.23	284.00	-	-
11/2/2016	295.25	270.46	274.89	277.36	278.05	272.64	270.92	275.45	251.66	278.56	282.89	-	-
12/15/2016	295.66	274.02	275.51	276.93	279.89	277.85	272.83	277.86	251.29	277.41	283.09	-	-
2/1/2017	297.70	280.52	279.38	277.58	280.80	278.05	273.37	278.98	250.80	276.61	283.52	-	-
2/21/2017	297.37	290.69	278.94	277.45	279.83	278.37	275.10	280.43	251.21	272.19	284.37	-	-
5/2/2017	298.22	295.59	277.61	277.73	281.21	278.30	274.25	279.56	252.52	277.81	284.26	-	-
6/29/2017	296.55	271.91	275.67	277.88	279.53	274.22	273.43	277.22	253.18	278.98	283.71	-	-
7/19/2017	296.75	272.91	275.62	277.78	280.18	274.56	273.54	278.22	252.34	274.43	283.89	-	-
8/10/2017	296.68	294.59	276.42	277.83	281.63	275.16	273.93	279.36	252.54	273.95	284.19	-	-
12/6/2017	296.80	271.87	275.93	277.24	277.47	272.94	272.99	274.90	249.81	279.32	282.11	-	-
4/26/2018	297.49	279.79	277.67	278.26	279.91	278.37	273.82	278.75	252.94	280.39	281.89	-	-
6/13/2018	-	-	-	-	-	-	-	-	-	-	-	276.00	271.36
Seasonal High	298.75	295.85	288.05	278.26	281.63	278.54	275.55	281.08	257.37	280.60	284.37	276.00	271.36

Note:
1. MW-9D is in the lower aquifer.
2. Test Pit 1 Location: N-35,715.86 E-29,795.62 el.276.00
3. Test Pit 2 Location: N-34,269.16 E-29,066.44 el.271.36