Report 2 – Evaluation of Location Restrictions

SWEPCO - Flint Creek Class 3N Landfill
Permit No. 0273-S3N-R2
AFIN: 04-00107

August 2016
Project No. 35157124

Prepared for:
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Table of Contents

ATTACHMENTS

Figures

List of Tables

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 Southwestern Electric Power Company (SWEPCO) – Flint Creek Class 3N Landfill (Permit No. 0273-S3N-R2).

2.0 Background Information

2.1 Facility Location Description

The SWEPCO facility consists of an approximately 40-acre permitted Class 3N Landfill and various support facilities including entrance roads, leachate and contact water storage ponds, bottom ash ponds, vehicle/equipment facilities, groundwater monitoring facilities, and storm water control systems. The site is located in portions of Section 8, Township 18 North, and Range 33 West in Benton County, Arkansas (**FIGURE 1 & 2**).

2.2 Description of CCR Unit

2.2.1 Embankment Configuration

The landfill location is shown on **FIGURE 3**. The underlying limestone was described as light gray, hard with weathered/fractured zones. The facility is currently performing improvements to the landfill. The landfill embankments are being constructed with 3:1 interior slopes. The outside embankment slopes vary from approximately 4:1 to 2:1. A geosynthetic intermediate liner and collection system are currently being installed above existing wastes in the landfill. The remaining portions of the landfill are receiving final cover which includes a flexible membrane liner. After completion of the improvements the entire landfill will be covered with a flexible membrane liner (**SWEPCO, "Ash Landfill Major Modification – Construction Drawings", Flint Creek, Dated April 2011**)[1].

2.2.2 Area/Volume

SWEPCO currently own, operate, and maintain a Class 3N landfill facility located in Gentry, Arkansas. The Class 3N landfill is operated under the authority of the ADEQ Permit No. 0273-S3N-R2 issued on December 20, 2014. The landfill is permitted for approximately 2,854,000 Cubic Yards on 40 Acres of disposal area.

2.2.3 Construction and Operational History

The Flint Creek Power Plant was constructed from 1974 to 1978, and power production and fly ash disposal began in 1978. Ash was first disposed of in the east half on the landfill. The fly ash is removed from the fly ash storage silo and transported to the landfill in trucks. (**Burns & McDonnell Engineers-Architects-Consultants, Hydrogeologic Site Characterization, February 1992, Page 12**)[2]

As part of the permitting process, several soil borings were advanced to characterize the soil beneath the landfill. Five of the borings were converted to monitoring wells (B-01B to B-05). Monitoring wells B-01B, B-02, B-04, and B-05 are located at approximately the midpoint on each side of the landfill. Well B-05 is on the southern side and is an up gradient well. Monitoring well B-03, located in the center of the landfill was used during the initial hydrogeological site characterization and subsequently plugged and abandoned in February, 1993. The well's location in the middle of the active fill area necessitated its closure.

An additional monitoring well, B-06, was added in 2001. Well B-06 is located just north of the northwest corner of the landfill.

Three additional wells, B-07A, B-07C, and B-08, were added in May 2007. B-07A and B-07C were added north of the northern edge of the landfill. Monitoring well B-07A is set in competent bedrock at 100 feet below ground surface (bgs). Monitoring well B-07C is set on top of bedrock at 35.5 feet bgs and does not contain a sufficient amount of groundwater for the collection of a sample. Usually there is less than 0.5 feet of water in the well. Monitoring well B-07C was decommissioned and plugged in February 2016 and is not used for the preparation of the potentiometric surface map. Monitoring well B-08 was sited to the west of the southwest corner of the landfill. B-08 was set at 50 feet bgs which is above the bedrock. Monitoring well B-08 was inadvertently damaged on October 20, 2012, by a D-10 bulldozer and therefore plugged in December 2012.

An additional monitoring well, NE-8, was added in June 2011 as part of Nature and Extent Well installations. In November 2015 the well was renamed B-09 and added to the groundwater monitoring network wells.

Two additional wells, B-10 and B-11, were added on the west side of the landfill in November 2015. B-10 was installed adjacent to previously plugged well B-08 to serve as a replacement.

Two additional wells, B-12 and B-13, were added in February 2016. B-12 is located just north of the northeast corner of the landfill and B-13 is at the southeast corner. The 2 wells were added to bring the groundwater monitoring network into compliance with CCR requirements.

Leachate has been collected since April, 2010, using a leachate collection system located inside the landfill berm in the southeast corner of the landfill. The leachate is sampled for laboratory analysis at the same time as the groundwater monitoring wells and its sample identification is SW-1.

2.2.4 Surface Water Control

The drainage channels (perimeter ditches, letdowns, and terrace ditches) and culverts are designed to collect and convey stormwater run-off from the 10-year/24-hour storm event (design storm event), in accordance with the requirements of Reg.22.517(b), Reg.22.518, and Reg.22.527 from the Arkansas Department of Environmental Quality Solid Waste Management Rules.

Surface Water will be controlled by stormwater diversion berms, reinforced letdowns, perimeter ditches (with permanent erosion control matting where necessary), and culverts. The majority of the flow from the Landfill flows to two dedicated sediment ponds (the North Sediment Pond and the West Sediment Pond). The discharge points from the North and West Sediment ponds are shown on **FIGURE 2**. A small portion of run-off from the final cover from a southeast portion of the Landfill will flow to the Primary Ash Pond (**Major Modification, Appendix N-I, March 2014 – Rev. 2, Page PN-26, ADEQ Doc ID #65699**)[3].

Discharge

SWEPCO is authorized to discharge once-through condenser cooling water through Outfall 401 and combined wastewater through Outfall 101 from ash ponds (bottom ash discharge, low volume wastewater, and stormwater runoff, including coal pile runoff from a facility, treated municipal wastewater from the City of Gentry, and spring water/stormwater) from facility located as follows: approximately 3 miles southwest of Gentry in Benton County, Arkansas to receiving waters named:

Outfall 001: Little Flint Creek, thence to Flint Creek in Segment 3J of the Arkansas River Basin.
Outfalls 101 and 401: SWEPCO Reservoir, thence to Little Flint Creek, thence to Flint Creek in Segment 3J of the Arkansas River Basin.

The outfalls are located at the following coordinates (NAD 27):

Outfall 001: Latitude: 36° 14' 0.366"; **Longitude:** 94° 33' 05.944"
Outfall 101: Latitude: 36° 14' 59.38"; **Longitude:** 94°31' 34.90"
Outfall 401: Latitude: 36° 15' 29.17"; **Longitude:** 94°31' 33.80"

Discharge shall be in accordance with effluent limitations, monitoring requirements, and other conditions set forth in this permit.

2.3 Previous Investigations

Geotechnical

- Hull & Associates Inc., Permit Modification Application, March 2014, Section 3, Page PN-7
- Burns & McDonnel Engineers-Architects-Consultants, Hydrogeologic Site Characterization, February 1992, Section 2, pg. 2-1

Groundwater and Other Environmental

- Burns & McDonnel Engineers-Architects-Consultants, Hydrogeologic Site Characterization, February 1992, Section 4. Page 4-1

2.4 Hydrogeologic Setting

Groundwater occurs at various depths and the presence of water appears to be related to a number of factors, including site lithology, rock type and thickness, and number of fractures encountered.

Perched groundwater is occasionally present within the upper unconsolidated soils; however, this perched zone appears discontinuous across the site. Groundwater can occur in both the unconsolidated soils and within the limestone. (**Terracon Well Installation Report, August 2011, pg. 7**)[4]

In the area of the Flint Creek Power Plant, water wells supply rural domestic households. According to state water well records, water wells are typically drilled through the Boone Formation and Chattanooga Shale into the underlying Ordovician age dolomites, due to the low yield of the upper Boone Formation. In general, the total depth of the water wells is approximately 500 feet below ground surface. The water wells are usually cased to allow water production from both the Boone Formation and the Ordovician dolomites. Yields generally range from 2 to 30 gallons per minute (gpm). Some wells within the area have been completed only within the Boone Formation at a typical depth of approximately 200 feet below ground surface. Yields from these wells generally range from 2 to 10 gpm with some wells yielding up to 100 gpm. (**Burns & McDonnel Engineers-Architects-Consultants, Hydrogeologic Site Characterization, February 1992, Page 20**)[5]

2.4.1 Climate

The Arkansas River Basin lies in a semi-humid region characterized by long summers, relatively short winters, and a wide range of temperatures. Extremes in air temperatures may vary from winter lows around 0°F, usually caused by Canadian air masses to summer highs above 100°F.

Extreme temperatures may occur for short periods of time at any location within the study area. The growing season averages 244 days per year.

The average pan evaporation is about 54.9 inches for the Arkansas River Basin. Lake evaporation averages about 69 percent of the class A pan evaporation.

Precipitation is well distributed throughout the year with the driest periods occurring during the late summer and early fall. Mean annual precipitation in the study area ranges from less than 40 inches per year to greater than 52 inches per year (**Arkansas State Water Plan, Arkansas River Basin, pg. 3**)[6].

2.4.2 Regional and Local Geologic Setting

The Site is located in northwest Arkansas in the Springfield Plateau of the Ozark Plateau's Province. The Ozark Plateaus Province covers northern Arkansas and consists of sedimentary rock strata which have undergone massive uplift and which remain relatively horizontal with only minor deformation. Stream erosion has removed much of the original surface rock and typically dissected the area into hills and low mountains. Elevations typically range from 1200 to 1400 feet above mean sea level. Extensive relatively flat areas occur in Benton County (**USCS, Soil Survey of Benton County, Arkansas, January 1977**)[7]. The Site is underlain by the Boone Formation which consists primarily of limestone and chert of Lower Mississippian age. In-situ weathering has reduced the limestone, leaving chert and limestone gravel mixed with clay as a residual soil overburden. The Boone Formation, in this area, consists of a highly weathered cherty limestone with red to brown clay seams. (**Burns & McDonnell Engineers-Architects-Consultants, Hydrogeologic Site Characterization, February 1992, Page 20**)[5]

Groundwater occurs at various depths and the presence of water appears to be related to a number of factors, including site lithology, rock type and thickness, and number of fractures encountered. (**FIGURES 4 & 5**)

In the vicinity of the study area, the stratigraphy consists of a weathered residuum of the Boone Formation, overlying the cherty limestone of the Boone Formation (Mississippian). The Boone Formation lies conformably atop the St. Joe Member (Mississippian) and together comprise one hydrostatic unit known as the Boone-St. Joe Aquifer. Unconformably underlying the Boone-St. Joe is the Chattanooga Shale (Devonian), which acts as the upper confining layer of the Sylamore, Clifty, and Everton Aquifers.

In-situ weathering has reduced the limestone, leaving chert and limestone gravel mixed with clay as residual soil overburden. The Boone residuum is characterized by red (iron-rich) clay, weathered limestone and chert. The thickness of residuum varies from 30 to 50 feet, and the limestone and chert content also varies in lateral extent. The chert is typically the remnant of weathering after the limestone is removed by dissolution in surface and groundwater.

The Boone Formation is a gray, crinoidal limestone abundantly interbedded with gray, black and blue chert. It is massive, well cemented and has a thickness of approximately 280 feet in northwest Arkansas. It is nearly pure calcium carbonate which is soluble, and therefore underground drainage channels, sinkholes, caves and fissures can occur.

The underlying St. Joe Member is typically a light-gray, mud-supported Crinozoan-Bryozoan crystalline limestone, and is easily recognized by its lack of chert. In Northern Arkansas, the formation exhibits a thickness of between 6 to 84 feet, with an average of thickness of 45 feet.

The underlying Chattanooga Shale is a black, fissile and carbonaceous rock with abundant pyrite. It thickens (up to 70 feet) westward and acts as a barrier to vertical groundwater flow (**Nature and Extent Groundwater Monitoring Well Installation Report, Terracon. August 2011**)[8].

2.4.3 Surface Water/Groundwater Interactions

Based on water level elevations, groundwater flow across the Landfill is to the west. Currently there is not enough data to determine if there is surface water to groundwater communication near the Landfill.

2.4.4 Water Users

A spring and well survey was conducted on November 11, 1991. The area within one-quarter mile of the Site was searched for springs, flowing streams, lakes, ponds, and water wells. **FIGURE 6** includes the results of the survey. A more recent search of an Arkansas USGS water well database provided additional wells.

The closest water well was located approximately 1457 feet from the landfill boundary. No springs were located during the spring and well survey. When questioned, plant personnel knew of no springs within the survey area. All streams within the survey area are intermittent and were dry at the time of the survey.

Three large ponds are present within the survey area. The pond located in the SW 1/4 of the NW1/4 of Section 9 contains little water and is used for farming purposes. The plant's bottom ash storage pond is located in the SW1/4 of the NE1/4 of Section 9. The third pond is in the northern portion of the SE1/4 of the SE1/4 of Section 5. Two smaller ponds are also present in the SW1/4 of the SER of Section 5, and in the NW1/4 of the NE1/4 of Section 8. (**Burns & McDonnel Engineers-Architects-Consultants, Hydrogeologic Site Characterization, February 1992, Page 21**)[9]

3.0 Required Isolation from Uppermost Aquifer

Not all of the new CCR rules (§257.60 through §257.64) apply to existing landfills.

3.1 Aquifer Description and Piezometric Analysis

This section is not applicable since CCR rule §257.60 does not apply to existing landfills.

3.2 Compliance

This section is not applicable since CCR rule §257.60 does not apply to existing landfills.

4.0 Wetlands Impact

4.1 Review of Local Wetlands

This section is not applicable since CCR rule §257.61 does not apply to existing landfills.

4.2 Compliance

This section is not applicable since CCR rule §257.61 does not apply to existing landfills.

5.0 Fault Area

5.1 Description of Regional Geologic Structural Features and Tectonic History

This section is not applicable since CCR rule §257.62 does not apply to existing landfills.

5.2 Compliance

This section is not applicable since CCR rule §257.62 does not apply to existing landfills.

6.0 Seismic Impact Zone

6.1 Seismic Impact Zone – Definition and Regional Information

This section is not applicable since CCR rule §257.63 does not apply to existing landfills.

6.2 Compliance

This section is not applicable since CCR rule §257.63 does not apply to existing landfills.

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 unit that are responsible for preventing releases from such unit. Unstable areas can include poor foundation conditions, areas susceptible to mass movements, and karst terrains as defined by 40 CFR 257 §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 Flint Creek 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 7** 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 §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 §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 §257.64.

8.0 Summary and PE Certification

8.1 Summary

The Flint Creek Power Plant was constructed from 1974 to 1978 and began disposing of ash from power production in 1978. The facility consists of a permitted approximately 40-acre Class 3N landfill. The site is underlain by the Boone Formation consisting of primarily limestone and chert. In this area of the Boone Formation there is highly weathered cherty limestone with red to brown clay seams. The site soil conditions at the Flint Creek facility do not meet the criteria for unstable conditions. The facility meets the new CCR regulations pertaining location restrictions.

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.

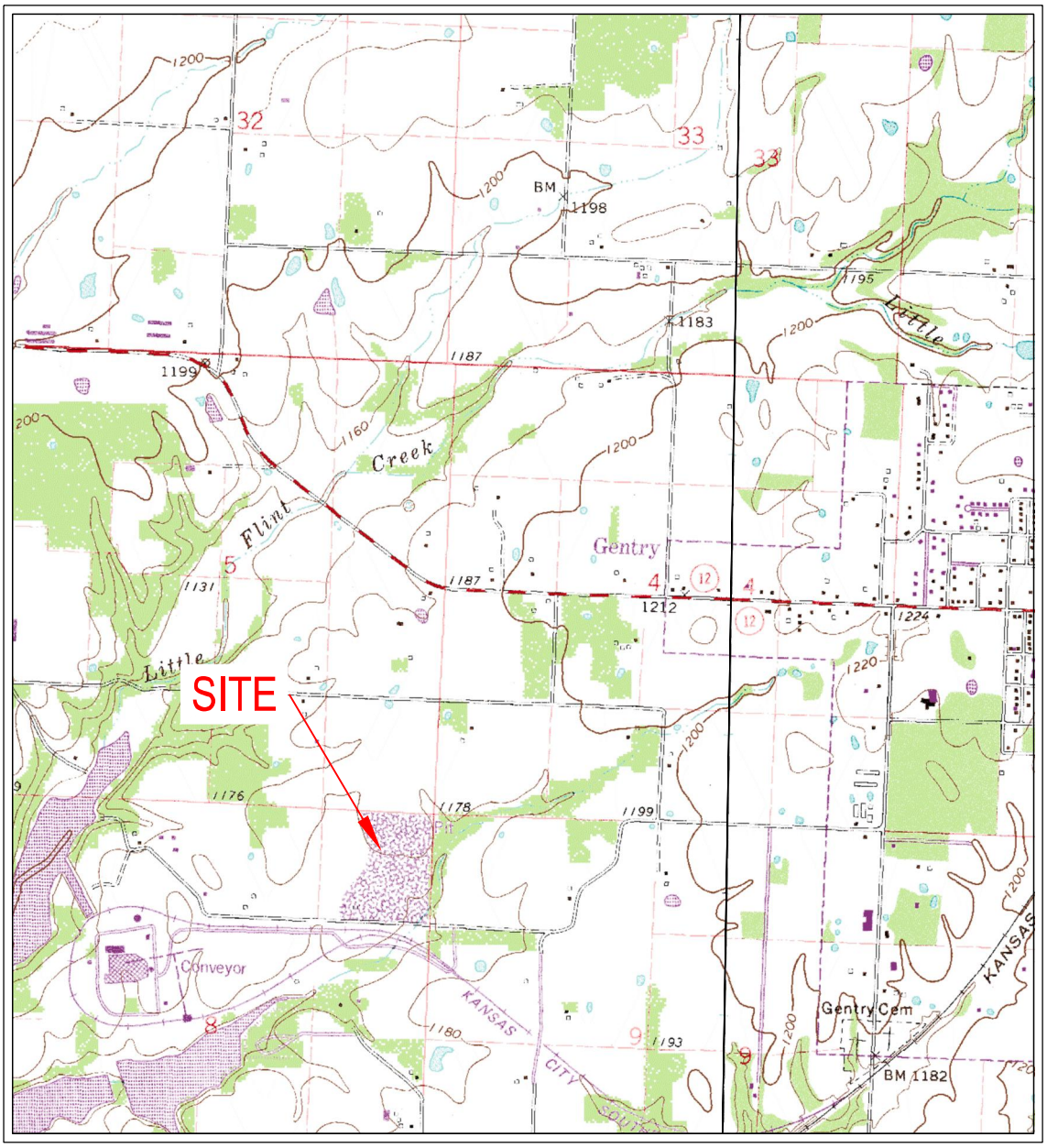
8.3 PE Certification

Name: [signature]	Date: 8/5/16	
Company: Terracon COA #223	Expiration Date: 12/31/17	Stamp

Bibliography

1 SWEPCO, “Ash Landfill Major Modification – Construction Drawings”, Flint Creek, Dated April 2011
2 Burns & McDonnel Engineers-Architects-Consultants, Hydrogeologic Site Characterization, February 1992, Page 12
3 Major Mod, Appendix N-I, March 2011, page N-I 1, Doc ID# 59803
4 Terracon Well Installation Report, August 2011, pg.7
5 Burns & McDonnel Engineers-Architects-Consultants, Hydrogeologic Site Characterization, February 1992, Page 20
6 Arkansas State Water Plan, Arkansas River Basin, pg. 3
7 USCS, Soil Survey of Benton County, Arkansas, January 1977
8 Nature and Extend Groundwater Monitoring Well Installation Report, Terracon, August 2011
9 Burns & McDonnel Engineers-Architects-Consultants, Hydrogeologic Site Characterization, February 1992, Page 21

UNITED STATES – DEPARTMENT OF THE INTERIOR – GEOLOGICAL SURVEY



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MILES

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CONTOUR INTERVAL 20 FEET

NATIONAL GEODETIC VERTICAL DATUM OF 1929

CHEROKEE CITY QUADRANGLE 1982 7.5 MINUTE SERIES (TOPOGRAPHIC)

Project Mngr: DCM	Project No. 216-001-35157124	Terracon Consulting Engineers and Scientists	SITE LOCATION MAP	FIG. No.
Drawn By: JDW	Scale: AS SHOWN	25809 I-30 SOUTH BRYANT, AR 72022	EVALUATION OF LOCATION RESTRICTIONS	1
Checked By: DCM	File No. 001	PH. (501) 847-9292 FAX. (501) 847-9210	AMERICAN ELECTRIC POWER	
Approved By: DCM	Date: 09-24-15		SWEPCO FLINT CREEK POWER PLANT LANDFILL	
			GENTRY ARKANSAS	

FIGURE 2

DESIGNED BY:	JDW
DRAWN BY:	JDW
APPVD. BY:	DCM
SCALE:	SEE BARSCALE
DATE:	4-14-2016
JOB NO.	216-001-35157124
ACAD NO.	LF/002
SHEET NO.:	2 OF 7

PLANT AND CCR UNIT LOCATION MAP

LOCATION RESTRICTION EVALUATION

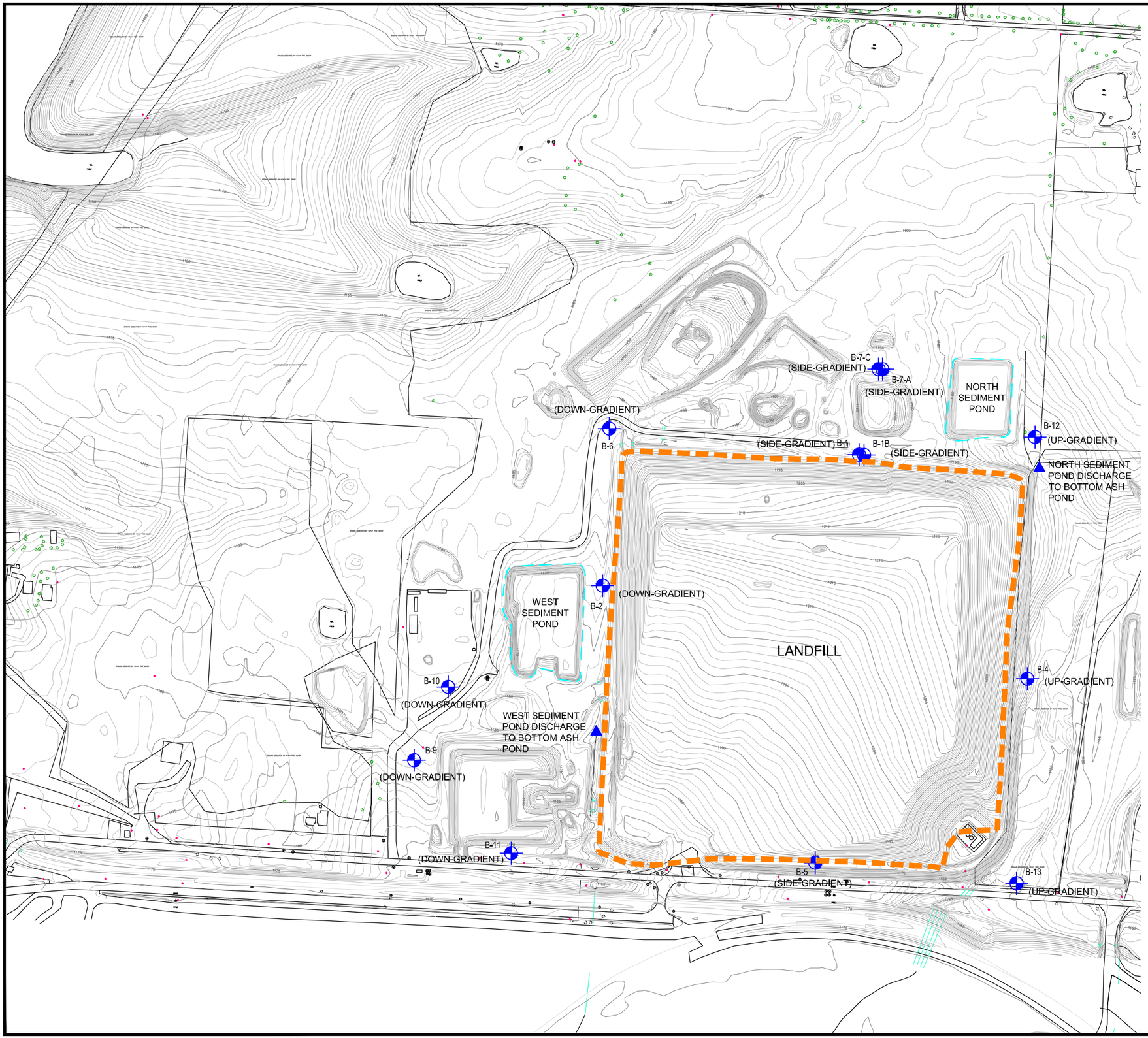
AMERICAN ELECTRIC POWER

SWEPCO FLINT CREEK POWER PLANT LANDFILL

GENTRY ARKANSAS

Terracon
Consulting Engineers and Scientists
25809 I-30 SOUTH BRYANT, AR 72022
PH. (501) 847-9292 FAX. (501) 847-9210

REV.	DATE	BY	DESCRIPTION



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0 75 150 300

SCALE IN FEET

LEGEND:

LANDFILL WASTE BOUNDARY

MONITORING WELL

NOTE:

WELL B-9 WAS PREVIOUSLY WELL NE-8.

FIGURE 3

DESIGNED BY:	JDW
DRAWN BY:	JDW
APPVD. BY:	DCM
SCALE:	SEE BARSCALE
DATE:	4-14-2016
JOB NO.	216-001-38157124
ACAD NO.	LF1003
SHEET NO.:	3 OF 7

CCR UNIT AND WELL LOCATIONS

LOCATION RESTRICTION EVALUATION

AMERICAN ELECTRIC POWER

SWEPCO FLINT CREEK POWER PLANT LANDFILL

GENTRY ARKANSAS

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Consulting Engineers and Scientists
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BRYANT, AR 72022
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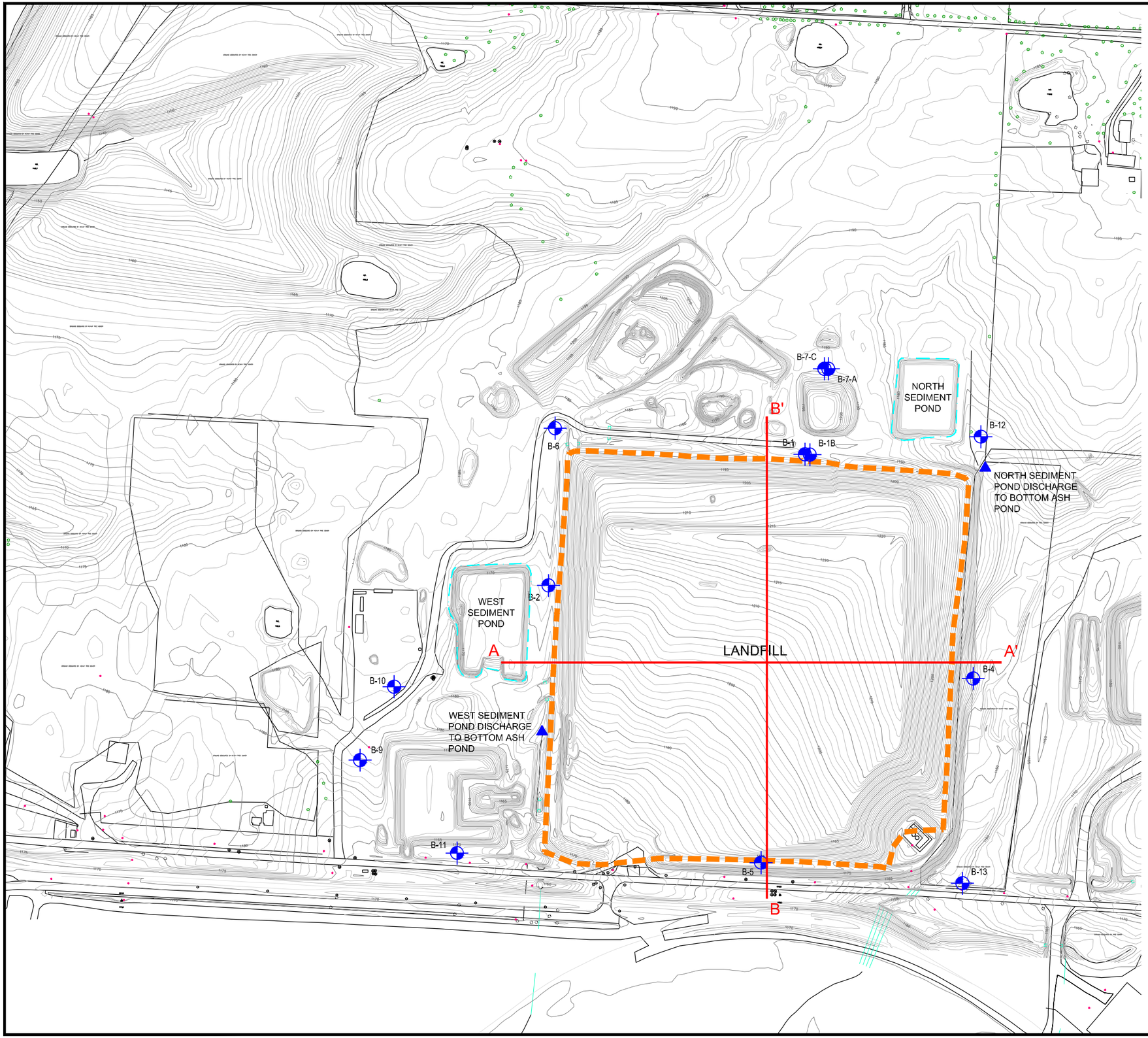
REV.	DATE	BY	DESCRIPTION



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SCALE IN FEET

NOTE:
CROSS SECTIONAL INFORMATION DEPICTED IN THESE CROSS SECTIONS WERE TAKEN FROM THE FOLLOWING SOURCES:

TOPOGRAPHIC INFORMATION:
SURVEY PROVIDED BY AEP, AND IS AN AERIAL SURVEY PERFORMED BY HENDERSON AERIAL SURVEYS, INC., DATED APRIL 30, 2015.

BOTTOM GRADING INFORMATION:
B-1B - B-5 WELL INSTALLATION LOGS PERFORMED BY BURNS & McDONNELL, DATING NOVEMBER 25, 1991 THROUGH MARCH 1, 1993.
B-6 WELL INSTALLATION LOG PERFORMED BY ANDERSON ENGINEERING, DATED OCTOBER 8, 2001.
B-7A & B-8 WELL INSTALLATION LOG PERFORMED BY TERRACON CONSULTANTS, INC., DATING MAY 16, 2007 & MAY 17, 2007.

UPPERMOST AQUIFER:
DATA FROM SAMPLING EVENTS PERFORMED BY AMERICAN ELECTRIC POWER, DATING FROM NOVEMBER 1, 1994 THROUGH MARCH 15, 2016.

LEGEND:

- LANDFILL WASTE BOUNDARY
- CROSS SECTION LOCATION
- MONITORING WELL

FIGURE 4

DESIGNED BY:	TLB
DRAWN BY:	SRE
APPVD. BY:	DCM
SCALE:	SEE BARSCALE
DATE:	4-14-2016
JOB NO.	216-001-38157124
ACAD NO.	LF1004
SHEET NO.:	4 OF 7

CROSS SECTION LOCATION MAP

LOCATION RESTRICTION EVALUATION

AMERICAN ELECTRIC POWER

SWEPCO FLINT CREEK POWER PLANT LANDFILL

GENTRY ARKANSAS

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REV.	DATE	BY	DESCRIPTION

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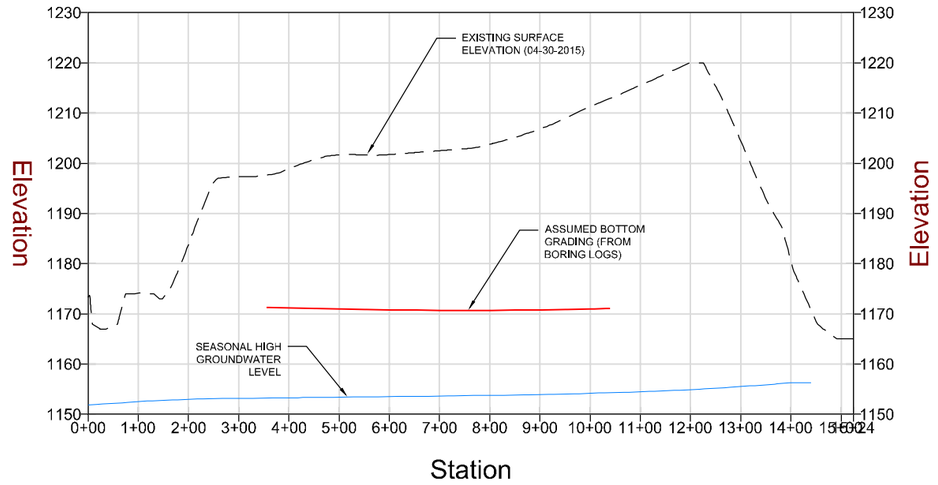

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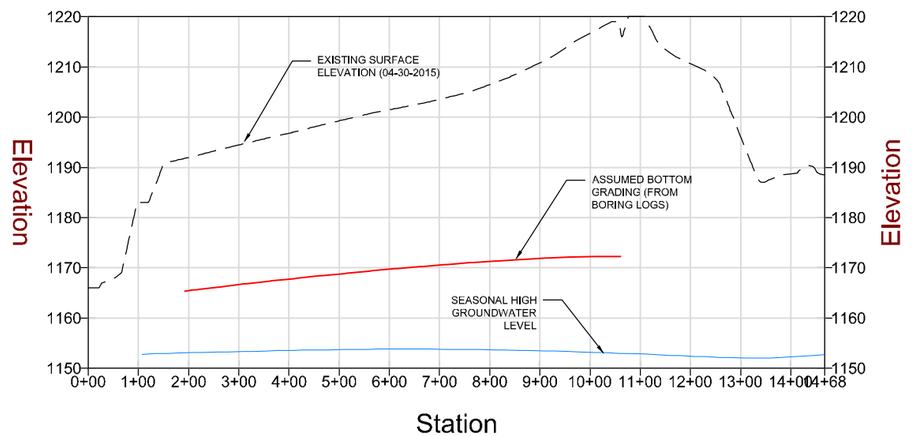

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B-7A & B-8 WELL INSTALLATION LOG PERFORMED BY TERRACON CONSULTANTS, INC., DATING MAY 16, 2007 & MAY 17, 2007.

UPPERMOST AQUIFER:
DATA FROM SAMPLING EVENTS PERFORMED BY AMERICAN ELECTRIC POWER, DATING FROM NOVEMBER 1, 1994 THROUGH MARCH 15, 2016.

FIGURE 5

DESIGNED BY:	TLB
DRAWN BY:	SRE
APPVD. BY:	DCM
SCALE:	SEE BARSCALE
DATE:	4-14-2016
JOB NO.	216-001-38157124
ACAD NO.	LF1005
SHEET NO.:	5 OF 7

CROSS SECTIONS

LOCATION RESTRICTION EVALUATION
AMERICAN ELECTRIC POWER
SWEPCO FLINT CREEK POWER PLANT LANDFILL
GENTRY ARKANSAS

Terracon
Consulting Engineers and Scientists
25809 I-30 SOUTH BRYANT, AR 72022
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REV.	DATE	BY	DESCRIPTION

DOMESTIC WELL
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DOMESTIC WELL
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DOMESTIC WELL
DOMESTIC WELL
DOMESTIC WELL
JERALD SHEA RD.
1457±
NORTH SEDIMENT POND
NORTH SEDIMENT POND DISCHARGE TO BOTTOM ASH POND
WEST SEDIMENT POND
WEST SEDIMENT POND DISCHARGE TO BOTTOM ASH POND
LANDFILL
SWEPCO PLANT RD.
POWER PLANT
SWEPCO RESERVOIR
COAL STORAGE AREA
BOTTOM ASH POND PRIMARY
SWEPCO RESERVOIR
COUNTY RD. 486
RD RD.
N
0 150 300 600
SCALE IN FEET

FIGURE 6

DESIGNED BY:	JDW
DRAWN BY:	JDW
APPVD. BY:	DCM
SCALE:	SEE BARSCALE
DATE:	4-14-2016
JOB NO.	215-001-39157124
ACAD NO.	LF1008
SHEET NO.:	6 OF 7

NEAREST DOMESTIC WELL LOCATION

GROUNDWATER MONITORING NETWORK EVALUATION

AMERICAN ELECTRIC POWER

SWEPCO FLINT CREEK POWER PLANT LANDFILL

GENTRY ARKANSAS

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BRYANT, AR 72022
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REV.	DATE	BY	DESCRIPTION

JERALD SHEA RD.

Jerald Shae

SWEPCO PLANT RD.

POWER PLANT

SWEPCO RESERVOIR

SWEPCO RESERVOIR

COAL STORAGE AREA

BOTTOM ASH POND PRIMARY

LANDFILL

NORTH SEDIMENT POND

WEST SEDIMENT POND

COUNTY RD. 486

TAYLOR ORCHARD RD

N

0 150 300 600

SCALE IN FEET

Benton County, A	
Map Unit Symbol	Map Unit Name
BtC	Britwater gravelly silt loam, 3 to 8 percent slopes
CnB	Captina silt loam, 1 to 3 percent slopes
Cs	Cherokee silt loam
CvF	Clarksville extremely gravelly silt loam, 12 to 50 percent slopes
Eg	Elsah soils, occasionally and frequently flooded
Hf	Healing silt loam, occasionally flooded
LrC	Linker fine sandy loam, 3 to 8 percent slopes
NfC	Nixa very gravelly silt loam, 3 to 8 percent slopes
NfD	Nixa very gravelly silt loam, 8 to 12 percent slopes
NoD	Noark very gravelly silt loam, 8 to 12 percent slopes
PeC	Peridge silt loam, 3 to 8 percent slopes
Se	Secesh gravelly silt loam, occasionally flooded
TsC	Tonti gravelly silt loam, 3 to 8 percent slopes

FIGURE 7

DESIGNED BY:	JDW
DRAWN BY:	JDW
APPVD. BY:	DCM
SCALE:	SEE BARSCALE
DATE:	05-25-2016
JOB NO.	216-001-35157124
ACAD NO.	009
SHEET NO.:	7 OF 7

NEARBY UNSTABLE AREAS

LOCATION RESTRICTION EVALUATION

AMERICAN ELECTRIC POWER

SWEPCO FLINT CREEK POWER PLANT LANDFILL

GENTRY ARKANSAS

Terracon

Consulting Engineers and Scientists

25809 I-30 SOUTH BRYANT, AR 72022

PH. (501) 847-9292 FAX. (501) 847-9210

REV.	DATE	BY	DESCRIPTION

TABLE 1 - Landfill Wells
AEP – Flint Creek
Class 3N Landfill
Groundwater Elevations (FMSL)

Well	B-1B	B-2	B-4	B-5	B-6	B-7A	B-8	B-9	B-10	B-11	B-12	B-13
Date												
11/1/1994	1136.36	1135.22	1136.70	1137.53								
4/27/1995	1144.40	1147.24	1148.62	1147.29								
11/3/1995	1138.12	1137.71	1137.11	1138.79								
5/7/1996	1137.94	1137.77	1138.21	1138.96								
11/7/1996	1135.72	1142.14	1147.28	1141.58								
5/1/1997	1145.86	1144.76	1145.45	1146.15								
12/9/1997	1140.96	1142.40	1144.41	1142.58								
5/28/1998												
11/18/1998	1141.95	1142.93	1143.55	1144.45								
5/12/1999	1147.91	1149.13	1150.53	1150.36								
11/10/1999	1138.18	1138.39	1138.70	1139.39								
5/10/2000	1138.54	1139.74	1142.03	1139.98								
11/21/2000	1141.76	1142.67	1143.30	1144.04								
5/16/2001	1142.22	1141.77	1142.18	1142.90								
11/14/2001	1138.94	1138.90	1139.18	1140.36	1137.73							
5/22/2002	1145.47	1146.60	1147.79	1147.34	1145.38							
11/19/2002	1139.02	1140.34	1140.60	1140.41	1139.34							
5/20/2003	1141.98	1144.86	1147.27	1143.72	1144.09							
11/19/2003	1137.35	1138.21	1139.16	1138.84	1137.47							
5/11/2004	1151.26	1152.99	1154.03	1152.90	1151.85							
11/16/2004	1142.87	1143.88	1144.25	1144.84	1142.72							
5/25/2005	1142.22	1142.28	1143.00	1143.02	1141.16							
8/17/2005	1140.84	1141.69	1142.28	1142.19	1140.71							
11/30/2005	1139.00	1139.52	1139.68	1140.17	1134.49							
2/15/2006	1137.43	1137.87	1138.02	1138.58	1136.87							
5/17/2006	1141.19	1142.77	1143.23	1143.27	1141.55							
8/24/2006	1139.80	1141.15	1141.71	1141.19	1140.24							
12/7/2006	1141.49	1143.74	1144.50	1143.70	1142.62							
2/20/2007	1147.28	1148.15	1149.01	1149.09	1146.98							
5/23/2007	1143.35	1144.34	1144.76	1145.15	1143.15	1143.24	1144.28					
8/22/2007	1141.04	1141.88	1142.08	1142.40	1140.82	1141.32	1141.93					
1/23/2008				1147.28								
5/14/2008	1150.64	1150.15	1150.61	1151.00	1148.90	1151.29	1149.62					
10/8/2008	1148.33	1148.48	1148.94	1149.35	1147.28	1148.51	1148.19					
1/7/2009		1144.64										
4/14/2009	1148.31	1150.36	1152.18	1150.22	1149.59	1148.18	1149.85					
7/29/2009	1145.69	1145.77	1146.07	1146.63	1144.66	1146.21						
8/21/2009												
10/28/2009	1149.07	1152.29	1154.20	1152.35	1151.21	1148.65	1151.74					
1/27/2010	1144.64	1145.90	1146.69	1145.75	1144.93	1145.10	1145.68					
5/18/2010	1146.76	1147.76	1149.38	1148.24	1146.93	1147.24	1147.45					
8/25/2010	1144.18	1144.80	1145.00	1144.91	1143.74	1144.60	1144.80					
11/30/2010	1141.62	1142.27	1142.57	1143.04	1141.33	1142.21	1142.30					
2/24/2011	1142.81	1144.86	1145.00	1145.12	1143.81	1153.48	1144.98					
5/25/2011	1149.84	1154.68	1156.89	1152.07	1154.14	1150.77	1151.07					
7/20/2011	1145.83	1145.85	1146.10	1146.59	1144.78	1146.46	1145.91	1152.77				
10/26/2011	1144.35	1145.40	1145.49	1146.03	1144.23	1144.54	1145.59	1153.02				
1/24/2012	1145.75	1146.02	1146.30	1146.72	1144.90	1146.07	1146.03	1158.63				
4/25/2012	1146.88	1146.67	1147.08	1147.66	1145.47	1147.56	1146.71	1153.85				
7/31/2012	1143.69	1144.37	1144.49	1144.79	1143.36	1144.11	1144.44	1151.94				
10/24/2012	1142.76	1143.57	1143.67	1144.12	1142.58	1143.19	plugged	1151.94				
1/29/2013	1141	1141.52	1141.58	1142.16	1140.53	1141.93		1151.5				
4/23/2013	1148.99	1151.21	1152.51	1150.86	1150.37	1148.4		1156.7				
8/8/2013	1145.09	1146.17	1146.3	1146.95	1144.18	1145.68		1154.32				
10/21/2013	1143.89	1144.73	1144.86	1145.51	1143.83	1144.38		1152.69				
1/29/2014	1145.83	1146.16	1146.69	1146.93	1145.04	1146.28		1154.99				
4/30/2014	1143.02	1143.97	1144.35	1144.71	1142.45	1143.53		1155.35				
7/23/2014	1145.35	1146.31	1147.16	1146.54	1144.89	1146.45		1154.91				
10/16/2014	1145.83	1148.97	1151.46	1149.61	1148.8	1145.6		1156.49				
1/20/2015	1145.75	1147.13	1147.51	1147.66	1145.92	1146.62		1155.21				
4/28/2015	1147.25	1147.75	1151.24	1148.49	1148.19	1146.07		1155.9				
7/22/2015	1151.29	1152.61	1153.59	1151.97	1151.4	1152.14		1156.14				
10/20/2015	1143.53	1144.05	1151.31	1143.66	1142.97	1144.16		1152.49				
3/15/2016	1148.29	1141.42	1148.02	1147.21	1145.5	1147.34		1155.39	1149.37	1145.67	1148.13	1147.66
Seasonal High	1151.29	1154.68	1156.89	1152.90	1154.14	1153.48	1151.74	1158.63	1149.37	1145.67	1148.13	1147.66

B-3 is not in use as a monitoring well.

B-9 was renamed from well NE-8, groundwater elevation data previous to 3/15/2016 was taken from NE-8.