COAL COMBUSTION RESIDUAL RULE
GROUNDWATER MONITORING SYSTEM CERTIFICATION

BIG BROWN STEAM ELECTRIC STATION
ASH DISPOSAL AREA II
FREESTONE COUNTY, TEXAS

OCTOBER 16, 2017

Prepared For:

Luminant Generation Company, LLC
6555 Sierra Drive
Irving, TX 75039

Prepared By:

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October 16, 2017

PROFESSIONAL CERTIFICATION

This document and all attachments were prepared by Pastor, Behling & Wheeler, LLC under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I hereby certify that the groundwater monitoring system installed at the referenced facility has been designed and constructed to meet the requirements of Section 257.91 of the CCR Rule.

Patrick J. Behling, P.E.
Principal Engineer
PASTOR, BEHLING & WHEELER, LLC

STATE OF TEXAS
PATRICK J. BEHLING
79872
LICENSED PROFESSIONAL ENGINEER
10/16/17

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1.0 INTRODUCTION

Luminant Generation Company, LLC (Luminant) operates the Big Brown Steam Electric Station (BBSES) located approximately 10 miles northeast of Fairfield, Freestone County, Texas (Figure 1). The BBSES consists of two coal/lignite-fired units with a combined operating capacity of approximately 1,150 megawatts that were put into operation in the early 1970s. Coal Combustion Residuals (CCRs) including fly ash and bed ash are generated as part of BBSES unit operation. The CCRs are transported off-site for beneficial use by third-parties or are managed/disposed of by Luminant at the BBSES. Two CCR units have been identified within the BBSES operations, the Bottom Ash Ponds and the Ash Disposal Area II. This report discusses the Ash Disposal Area II (the Site). Ash Disposal Area II meets the definition of a CCR landfill and is subject to groundwater monitoring system requirements of the CCR Rule.

The CCR Rule (40 CFR 257 Subpart D - *Standards for the Receipt of Coal Combustion Residuals in Landfills and Surface Impoundments*) has been promulgated by the EPA to regulate the management and disposal of CCRs as solid waste under Resource Conservation and Recovery Act (RCRA) Subtitle D. The final CCR Rule was published in the Federal Register on April 17, 2015. The effective date of the CCR Rule was October 19, 2015.

The CCR Rule establishes national minimum criteria for existing and new CCR landfills, existing and new CCR surface impoundments, and lateral expansions to landfills/impoundments. Pastor, Behling & Wheeler, LLC (PBW) was retained by Luminant to evaluate and certify that the groundwater monitoring system at the Site has been designed and constructed to meet the requirements in Section 257.91 of the CCR Rule.

1.1 Description of Ash Disposal Area II

Ash Disposal Area II is a CCR landfill located approximately 3,500 feet northeast of the power plant (Figure 2). The existing unit subject to the CCR Rule covers an area of approximately 320 acres and consists of ten active landfill cells (Cells 1 through 10) on the eastern side and one landfill cell that has been constructed but not yet used (Cell 11).

The landfill is constructed partially above and partially below grade and is surrounded by engineered earthen dikes that extend approximately 10 to 15 feet above surrounding grade. Cells 1 through 11 have been constructed and have a 3 foot thick compacted clay liner. Cells 1 through 5 were constructed in sequence beginning in approximately 1987. Cells 6 through 11 were constructed in sequence beginning in approximately 1992.

1.2 CCR Unit Groundwater Monitoring System Requirements

Section 257.91 of the CCR Rule indicates that existing CCR landfills and surface impoundments be provided with a groundwater monitoring system that consists of sufficient wells, installed at appropriate location and depths, to yield groundwater samples from the uppermost aquifer that meet the following criteria:

- Accurately represent the quality of background groundwater that has not been affected by leakage from a CCR unit; and
- Accurately represent the quality of groundwater passing the waste boundary of the CCR unit. The downgradient monitoring system must be installed at the waste boundary to ensure detection of groundwater contamination in the uppermost aquifer. All potential contaminant pathways must be monitored.

The specific configuration of the groundwater monitoring system must be determined based on site-specific technical information that must include aquifer thickness, groundwater flow rate, groundwater flow direction (including seasonal and temporal fluctuation in groundwater flow), saturated and unsaturated geologic units and fill materials that overly the uppermost aquifer, materials comprising the uppermost aquifer, and materials comprising the confining unit defining the lower boundary of the upmost aquifer, including, but not limited to, thickness, stratigraphy, lithology, hydraulic conductivities, porosities, and effective porosities.

At a minimum, the monitoring system must consist of at least one upgradient and three downgradient monitoring wells, and any additional monitoring wells necessary to accurately represent the quality of the background groundwater that has not been affected by leakage from the CCR unit and the quality of groundwater passing the waste boundary of the CCR unit.

Monitoring wells must be cased in a manner that maintains the integrity of the monitoring well borehole. This casing must be screened or perforated and packed with gravel or sand, where necessary, to enable collection of groundwater samples. The annular space above the sampling depth must be sealed to prevent contamination of samples and the groundwater. There must be documentation in the operating record of the design, installation, development, and decommissioning of any monitoring wells, piezometers and other measurement, sampling, and analytical devices. The qualified engineer must have access to and must review this documentation as part of the groundwater monitoring system certification.

2.0 GROUNDWATER MONITORING SYSTEM EVALUATION

2.1 Ash Disposal Area II Groundwater Monitoring System

The CCR groundwater monitoring well system at the Ash Disposal Area II consists of eight monitoring wells (AMW-10, AMW-13, AMW-14, AMW-20, AMW-21, AMW-22, AMW-23, and FMW-4R) that are each screened in the uppermost aquifer at the Site. The locations of the CCR monitoring wells are shown on Figure 2. Well construction information and survey data for the CCR wells are summarized in Table 1, CCR monitoring well logs are presented in Appendix A, and photographs of the CCR wells are presented in Appendix B.

2.2 Local Geology and Hydrogeology

The Ash Disposal Area II is located in the outcrop area of the Eocene-aged Wilcox Group (Barnes, 1970). PBW reviewed soil boring logs, monitoring well completion documentation, and historical reports to describe the geologic and hydrogeologic conditions in the Ash Disposal Area II. Geologic cross sections were constructed using these data. The locations of the cross sections are shown on Figure 3 and the cross sections are shown on Figures 4 and 5.

Based on soil borings completed in the upper approximate 80 feet bgs in the Ash Disposal Area II, the geology in this area generally consists of laterally continuous silty to clayey sand units interbedded with clay units. The uppermost aquifer occurs under unconfined conditions within the shallow sand units at the Site.

2.3 Groundwater Potentiometric Surface

Eight background groundwater monitoring events were performed using the Ash Disposal Area II CCR monitoring well system from October 2015 to December 2016. Static water levels measured during the background monitoring period indicated water elevations ranging from 269.83 feet above mean sea level (amsl) to 306.95 feet amsl, and depths to water ranging from 22.47 feet bgs to 51.42 feet bgs (Table 2). Groundwater potentiometric surface maps based on data collected during the background monitoring period are presented in Appendix C.

Groundwater elevations were generally highest near the southwest corner of the Ash Disposal Area II, with an inferred groundwater flow direction to the northeast. Based on the inferred groundwater flow direction, the location of each CCR monitoring well relative to the Ash Disposal Area II is as follows:

Upgradient Wells	Downgradient Wells
FMW-4R	AMW-10 AMW-13 AMW-14 AMW-20 AMW-21 AMW-22 AMW-23

2.4 Uppermost Aquifer Hydraulic Conductivity Testing

PBW performed slug tests at monitoring wells FMW4R, AMW-21, and AMW-22 on September 22, 2015 to evaluate groundwater linear flow velocities of the uppermost aquifer at the Site. Slug test data and time-head change plots used to calculate hydraulic conductivities and transmissivities of the uppermost aquifer are provided in Appendix D. A summary of these hydraulic properties is presented in Table 3. The average hydraulic conductivities for the wells ranged from 2.25 x 10^{-3} cm/sec (well AMW-21) to 2.97 x 10^{-4} cm/sec (well FMW-4R), with a geometric mean for the test wells of 8.50 x 10^{-4} cm/sec.

2.5 Conclusions

The CCR groundwater monitoring well system at the Ash Disposal Area II complies with Section 257.91 of the CCR Rule. This conclusion is supported by the following as described in detail in previous sections of this report:

- Eight monitoring wells are included in the CCR groundwater monitoring system – one upgradient monitoring well and seven downgradient monitoring wells.

- Each monitoring well is screened in the uppermost aquifer at the Site. Samples collected from upgradient monitoring wells will be representative of the quality of background groundwater that has not been affected by leakage from the landfill and samples collected from downgradient wells will ensure detection of groundwater contamination in the uppermost aquifer from the landfill.

- The monitoring wells are constructed with appropriate well casing to maintain the integrity of the monitoring well borehole and with slotted well screens to enable collection of groundwater samples. In addition, the annular space above the well screen is appropriately sealed to prevent contamination of groundwater samples from surface sources.

- Appropriate documentation exists concerning the design, installation, and development of the monitoring wells.

3.0 REFERENCES

Barnes, Virgil E., 1970. Geologic Atlas of Texas, Waco Sheet. Texas Bureau of Economic Geology.

Tables

TABLE 1
WELL CONSTRUCTION SUMMARY
ASH DISPOSAL AREA II
BIG BROWN STEAM ELECTRIC STATION

Well ID	Date Installed	Northing	Easting	Concrete Pad Elevation (ft amsl)	TOC Elevation (ft amsl)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Screen Length (ft)	Total Design Depth (ft bgs)	Casing Diameter (in)
AMW-10	3/20/1995	10657684	3627717	318.27	320.77	37.0	47.0	10.0	47.0	2
AMW-13	9/30/1997	10655659	3629368	319.44	322.64	36.0	46.0	10.0	46.0	2
AMW-14	1/20/2012	10656271	3630327	315.80	321.25	39.4	55.0	15.6	55.0	2
AMW-20	12/12/2011	10657911	3628452	318.27	320.99	45.0	60.0	15.0	60.0	2
AMW-21	9/13/2015	10656902	3626989	322.50	325.39	40.5	60.5	20.0	60.5	2
AMW-22	9/13/2015	10657510	3629150	315.81	318.69	35.5	55.5	20.0	55.5	2
AMW-23	9/13/2015	10656925	3629516	316.91	320.37	39.5	59.5	20.0	59.5	2
FMW-4R	12/3/2010	10653858	3627054	326.54	329.42	30.0	40.0	10.0	40.0	2

Notes:

1. Abbreviations: ft - feet; TOC - top of casing; amsl - above mean sea level; bgs - below ground surface; in - inches.

TABLE 2
GROUNDWATER ELEVATION SUMMARY
ASH DISPOSAL AREA II
BIG BROWN STEAM ELECTRIC STATION

Well ID	TOC Elevation (ft amsl)	Date	Depth to Water (ft btoc)	Water Elevation (ft amsl)
AMW-10	320.774	10/27/15	44.39	276.38
		12/15/15	43.96	276.81
		02/29/16	44.37	276.40
		04/12/16	43.97	276.80
		06/09/16	43.92	276.85
		09/01/16	43.63	277.14
		10/06/16	45.16	275.61
		12/15/16	47.92	272.85
AMW-13	322.643	10/27/15	38.46	284.18
		12/15/15	38.27	284.37
		02/29/16	37.69	284.95
		04/12/16	36.98	285.66
		06/09/16	37.31	285.33
		09/01/16	36.87	285.77
		10/06/16	36.22	286.42
		12/15/16	38.81	283.83
AMW-14	321.249	10/27/15	49.97	271.28
		12/15/15	49.56	271.69
		02/29/16	49.34	271.91
		04/12/16	49.49	271.76
		06/09/16	48.98	272.27
		09/01/16	48.86	272.39
		10/06/16	49.11	272.14
		12/15/16	51.42	269.83
AMW-20	320.985	10/27/15	48.22	272.77
		12/15/15	47.67	273.32
		02/29/16	47.82	273.17
		04/12/16	47.81	273.18
		06/09/16	47.71	273.28
		09/01/16	47.34	273.65
		10/06/16	48.51	272.48
		12/15/16	49.61	271.38
AMW-21	325.389	10/27/15	44.62	280.77
		12/15/15	44.47	280.92
		02/29/16	44.23	281.16
		04/12/16	44.19	281.20
		06/09/16	43.73	281.66
		09/01/16	43.72	281.67
		10/06/16	45.42	279.97
		12/15/16	49.15	276.24

TABLE 2
GROUNDWATER ELEVATION SUMMARY
ASH DISPOSAL AREA II
BIG BROWN STEAM ELECTRIC STATION

Well ID	TOC Elevation (ft amsl)	Date	Depth to Water (ft btoc)	Water Elevation (ft amsl)
AMW-22	318.685	10/27/15	44.56	274.13
		12/15/15	43.92	274.77
		02/29/16	43.87	274.82
		04/12/16	43.69	275.00
		06/09/16	38.81	279.88
		09/01/16	43.29	275.40
		10/06/16	43.29	275.40
		12/15/16	45.35	273.34
AMW-23	320.366	10/27/15	44.02	276.35
		12/15/15	43.57	276.80
		02/29/16	43.17	277.20
		04/12/16	42.96	277.41
		06/09/16	42.51	277.86
		09/01/16	42.35	278.02
		10/06/16	42.38	277.99
		12/15/16	43.69	276.68
FMW-4R	329.423	10/27/15	25.22	304.20
		12/15/15	23.61	305.81
		02/29/16	22.86	306.56
		04/12/16	22.47	306.95
		06/09/16	24.71	304.71
		09/01/16	22.88	306.54
		10/06/16	25.22	304.20
		12/15/16	27.21	302.21

Notes:
1. Abbreviations: TOC - top of casing; ft - feet, amsl - above mean sea level.

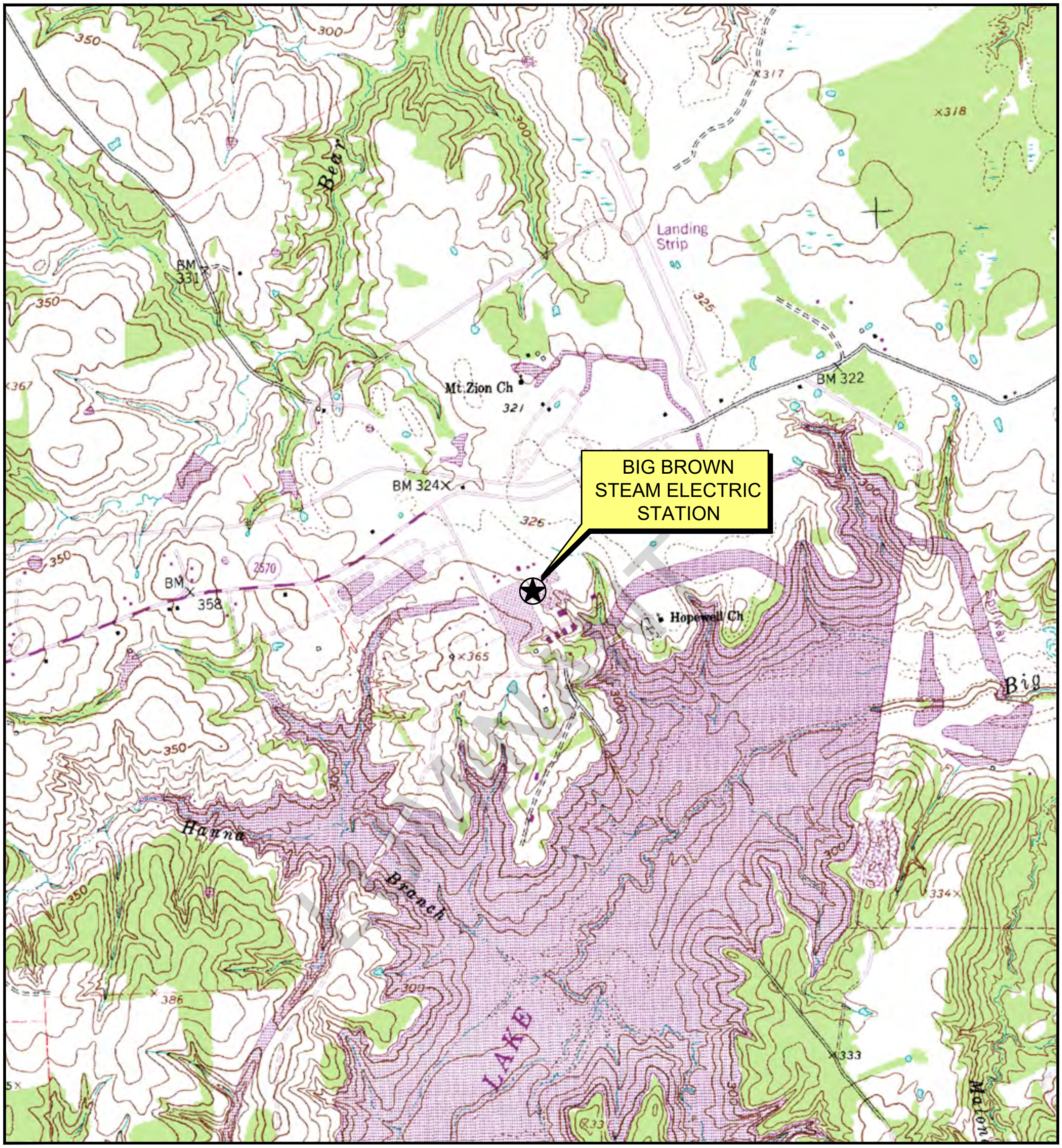
TABLE 3
SUMMARY OF AQUIFER TEST RESULTS
ASH DISPOSAL AREA II
BIG BROWN STEAM ELECTRIC STATION

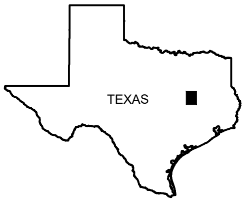
Well ID	Test Type	Aquifer Type	Analysis Method	Saturated Thickness (feet)	Results	
					T (cm^2/sec)	K (cm/sec)
AMW-21	Slug-Out[1]	Unconfined	Bouwer-Rice	13.50	9.25E-01	2.25E-03
AMW-22	Slug-Out[1]	Unconfined	Bouwer-Rice	11.50	6.14E-01	1.75E-03
FMW-4R	Slug-In	Unconfined	Bouwer-Rice	18.23	1.43E-01	2.57E-04
FMW-4R	Slug-Out	Unconfined	Bouwer-Rice	18.23	1.88E-01	3.38E-04
				MEAN	1.65E-01	2.97E-04
				Geometric Mean for All Tests	**4.54E-01**	**1.05E-03**

Notes:

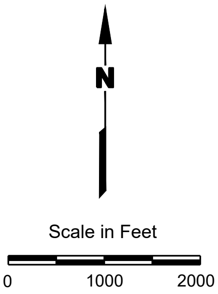
1. [1] - A slug-in test was not performed because the static water level was below top of screen.
2. Abbreviations: T - transmissivity; K - hydraulic conductivity.

Figures





QUADRANGLE LOCATION



SOURCE:
Base map from www.tnris.gov, Young, TX 7.5 min. USGS quadrangle dated 1961, revised 1982.

BIG BROWN STEAM ELECTRIC STATION

FAIRFIELD, TEXAS

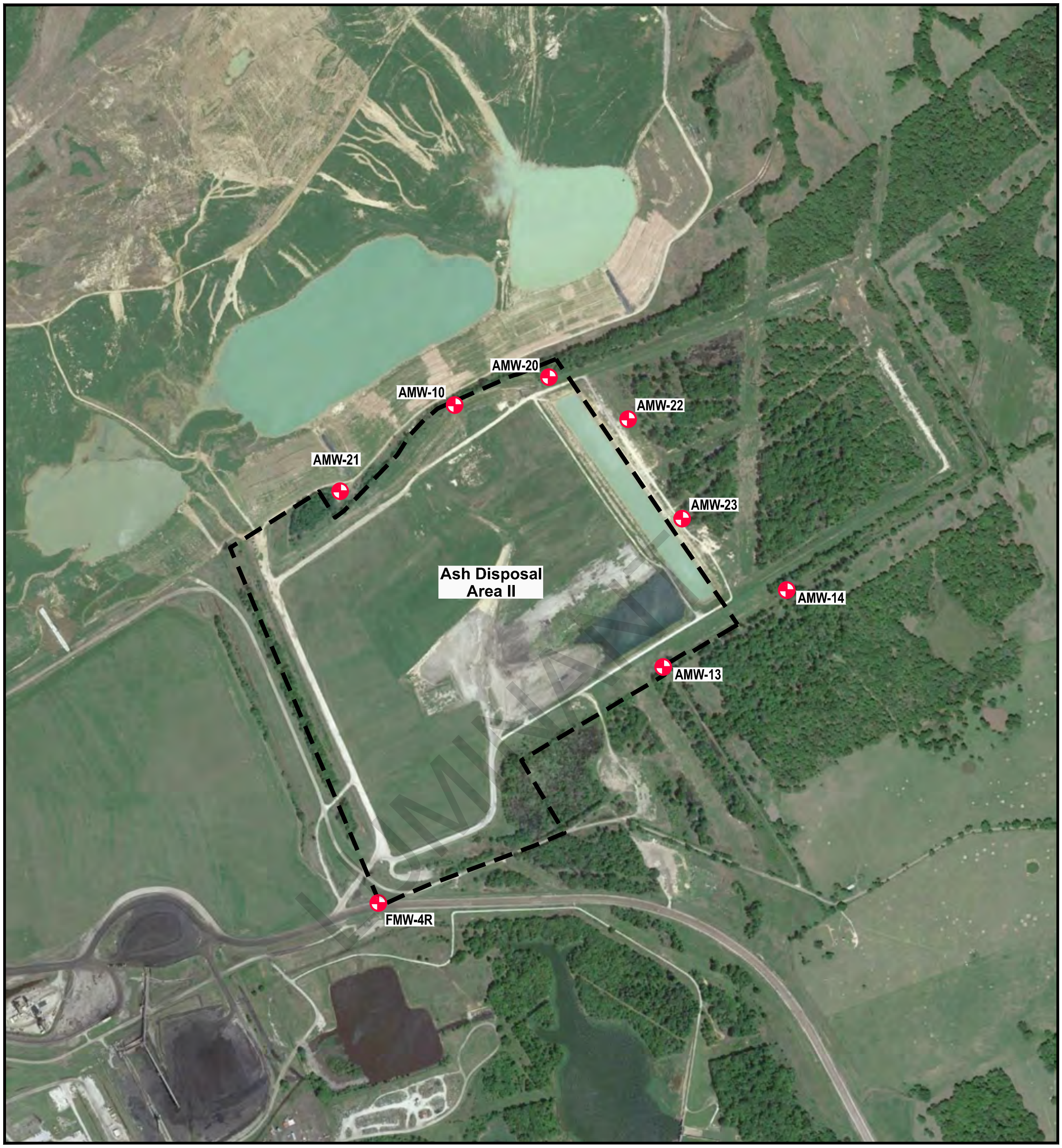
Figure 1

ASH DISPOSAL AREA II SITE LOCATION MAP

PROJECT: 5123A	BY: AJD	REVISIONS
DATE: JUNE, 2015	CHECKED: PJB	

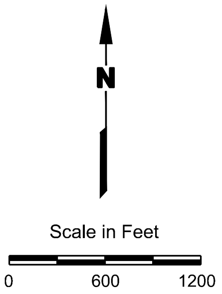
PASTOR, BEHLING & WHEELER, LLC

CONSULTING ENGINEERS AND SCIENTISTS



EXPLANATION

⊕ CCR Monitoring Well



SOURCE:
Imagery from Google Earth dated 3/30/2017.

BIG BROWN STEAM ELECTRIC STATION
FAIRFIELD, TEXAS

Figure 3

ASH DISPOSAL AREA II
DETAILED SITE PLAN

PROJECT: 5164A	BY: AJD	REVISIONS
DATE: SEPT., 2017	CHECKED: PJB	

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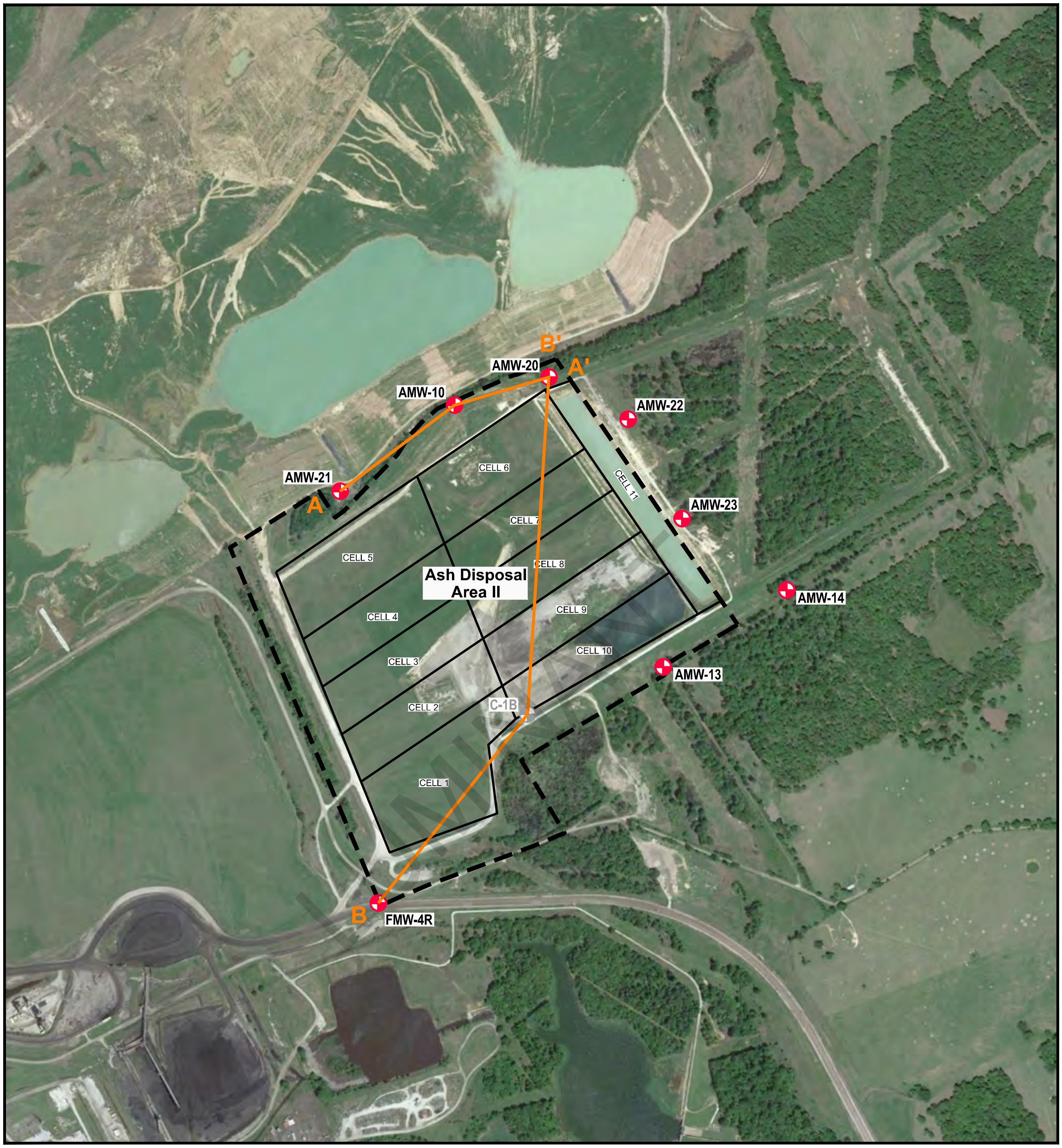
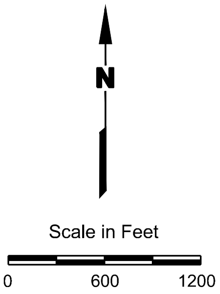


EXPLANATION

● CCR Monitoring Well Location

○ Plugged Monitoring Well

A____A' Geologic Cross Section Location Lines



SOURCE:
Imagery from Google Earth dated 3/30/2017.

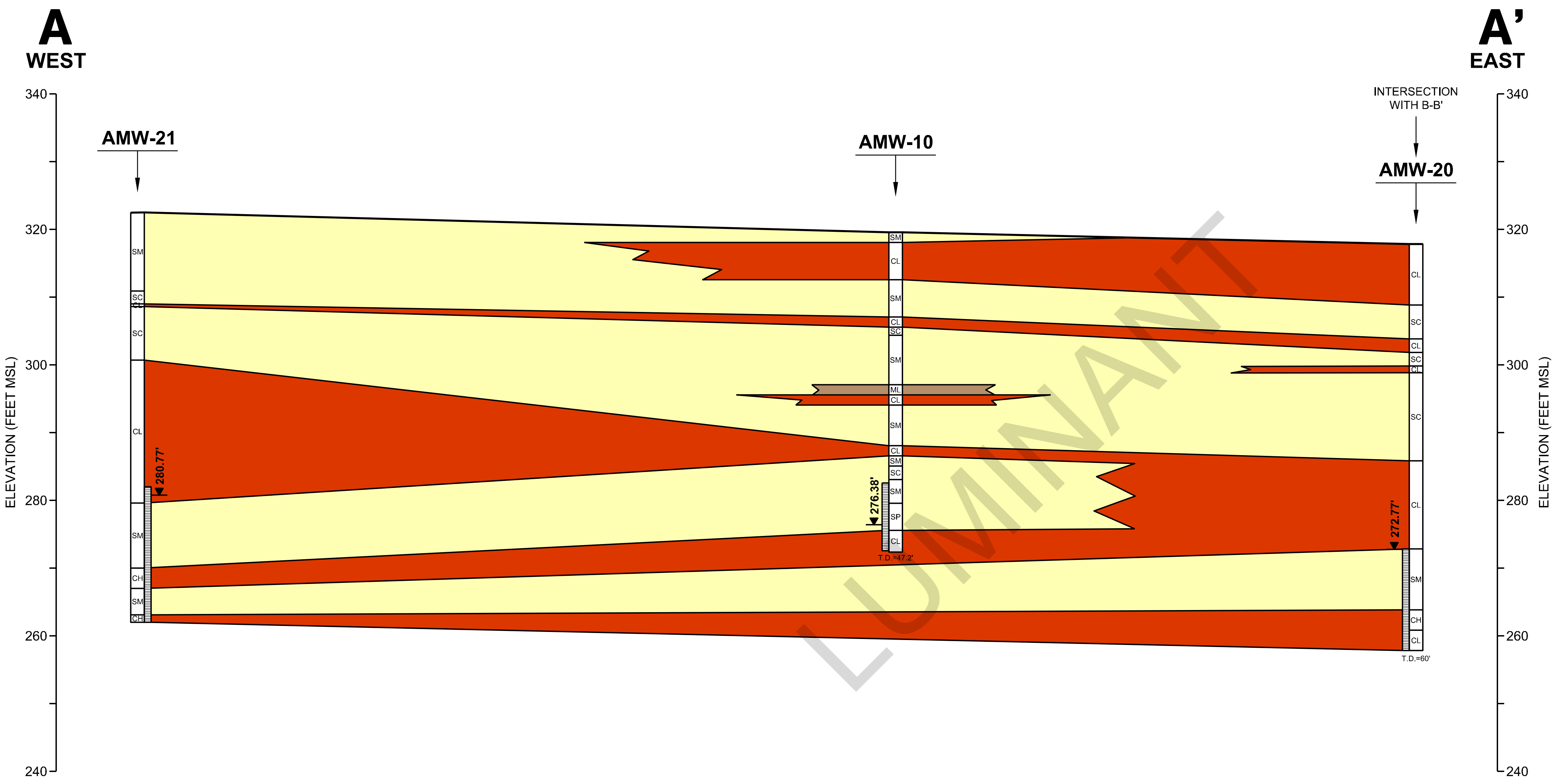
BIG BROWN STEAM ELECTRIC STATION
FAIRFIELD, TEXAS

Figure 3

ASH DISPOSAL AREA II CROSS SECTION LOCATION MAP

PROJECT: 5164A
BY: AJD
REVISIONS
DATE: SEPT., 2017
CHECKED: PJB

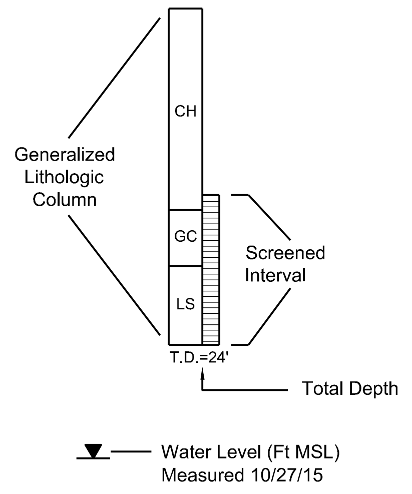
PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS



EXPLANATION

🟨 SAND
🟥 CLAY
🟫 SILT

MONITORING WELL CONSTRUCTION



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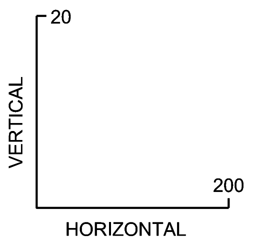

10x Vertical Exaggeration

BIG BROWN STEAM ELECTRIC STATION
FAIRFIELD, TEXAS

Figure 4

ASH DISPOSAL AREA II
GEOLOGIC CROSS SECTION A-A'

PROJECT: 5123A	BY: AJD	REVISIONS
DATE: OCT., 2017	CHECKED: PJB	

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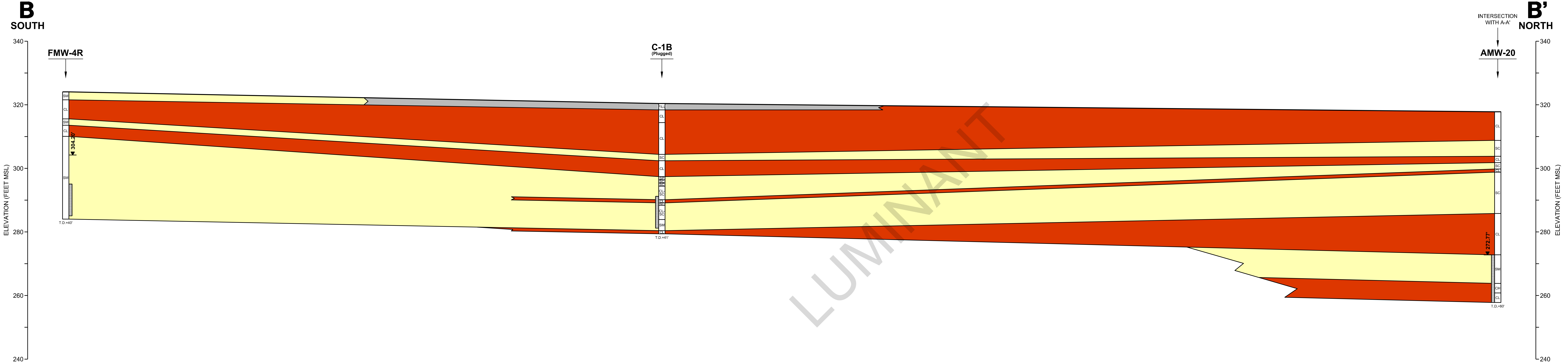
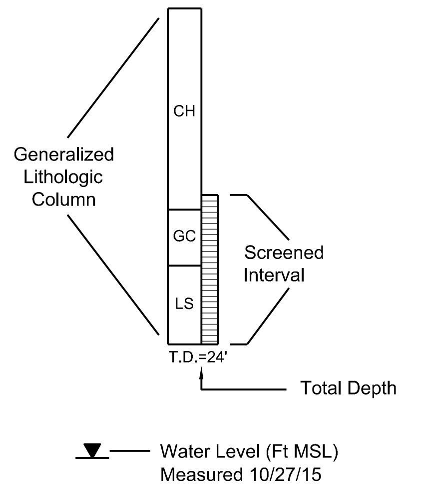


EXPLANATION

🟨	SAND
🟥	CLAY
🟫	SILT
⬜	FILL

MONITORING WELL CONSTRUCTION



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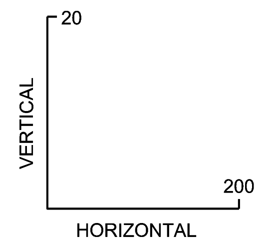


10x Vertical Exaggeration

BIG BROWN STEAM ELECTRIC STATION
FAIRFIELD, TEXAS

Figure 5

ASH DISPOSAL AREA II
GEOLOGIC CROSS SECTION B-B'

PROJECT: 5123A	BY: AJD	REVISIONS
DATE: OCT., 2017	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS

Appendix A

CCR Monitoring Well Logs

GROUNDWATER
TECHNOLOGY

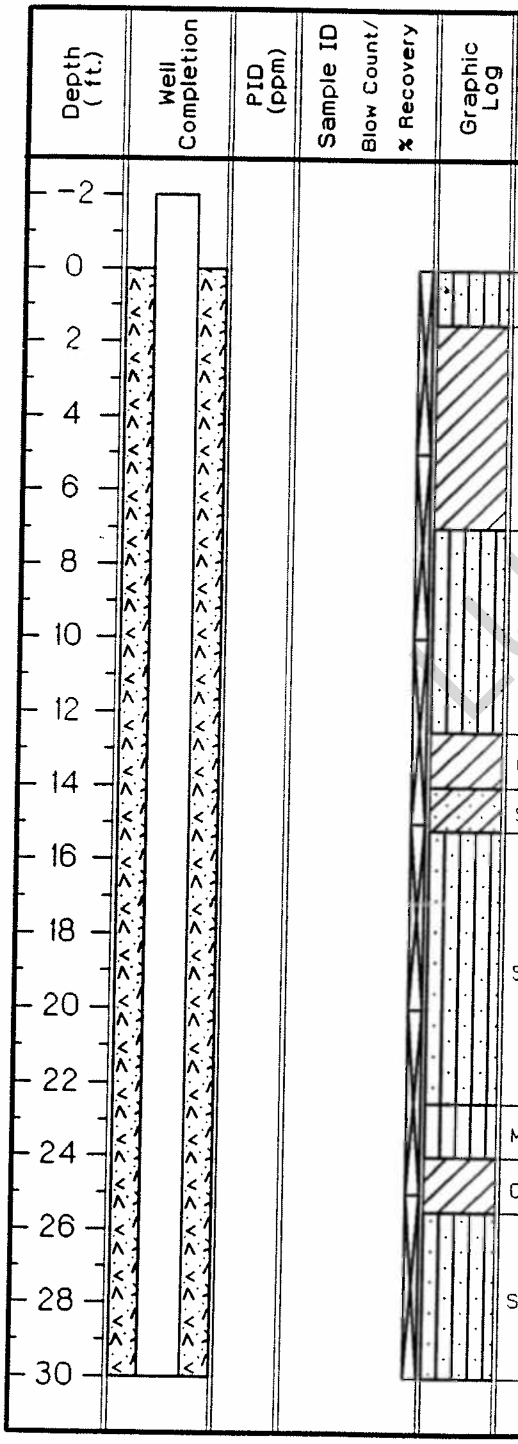
Drilling Log

Monitoring Well **AMW-10**

Project *Big Brown Ash Monitor Wells* Owner *Texas Utilities*
Location *Big Brown Steam Elec. Station, Ash Disposa Area* Proj. No. *042480243*
Surface Elev. ______ Total Hole Depth *47.2 ft.* Diameter *7.75 in.*
Top of Casing ______ Water Level Initial ______ Static ______
Screen: Dia *2 in.* Length *10 ft.* Type/Size *Sch PVC 0.01 in.*
Casing: Dia *2 in.* Length *40 ft.* Type *Sch 40 PVC*
Fill Material ______ Rig/Core *Failing F-6*
Drill Co. *Andrews & Foster* Method *Hollow-Stem Auger, CME 3" Sampler*
Driller *Don Foster* Log By *E. Matzner* Date *3/20/95* Permit # ______
Checked By *E.W. Muehlberger* License No. *2023*

See Site Map For Boring Location

COMMENTS:



USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
SM	0'-1.5' - SANDY SILT - Fill, brown, soft, friable, moist, very fine grained quartz, occasional roots
CL	1.5'-7.0' - SANDY SILTY CLAY - Yellowish-brown, red mottling, hard, low plasticity, moist, occasional roots, becomes sandier with depth
SM	7.0'-12.5' - CLAYEY SILTY SAND - Tan, gray and orange mottling, medium stiff, low plasticity, friable, slightly moist, very fine to fine-grained quartz, poorly sorted, subangular, trace carbonaceous material
CL	12.5'-14.0' - SILTY CLAY - gray, brownish orange mottling, hard, low plasticity, slightly moist, occasional plant fragments, trace carbonaceous material
SC	14.0'-15.2' - SILTY CLAYEY SAND - Light gray, reddish-brown mottling, stiff, friable
SM	15.2'-22.5' - SILTY SAND - Light gray and tan, soft, friable, dry, very fine-grained quartz, trace mica, trace dark minerals, moderately sorted, subangular, sugary texture
ML	22.5'-24.0' - SILT - Light gray, medium stiff, dry, powdery texture
CL	24.0'-25.5' - SILTY CLAY - gray, light brown mottling, very hard, dry
SM	25.5'-31.5' - SILTY SAND - brownish-yellow and tan, gray mottling, hard, friable, dry, trace carbonaceous material, occasional thin beds of clayey sand, trace white mica

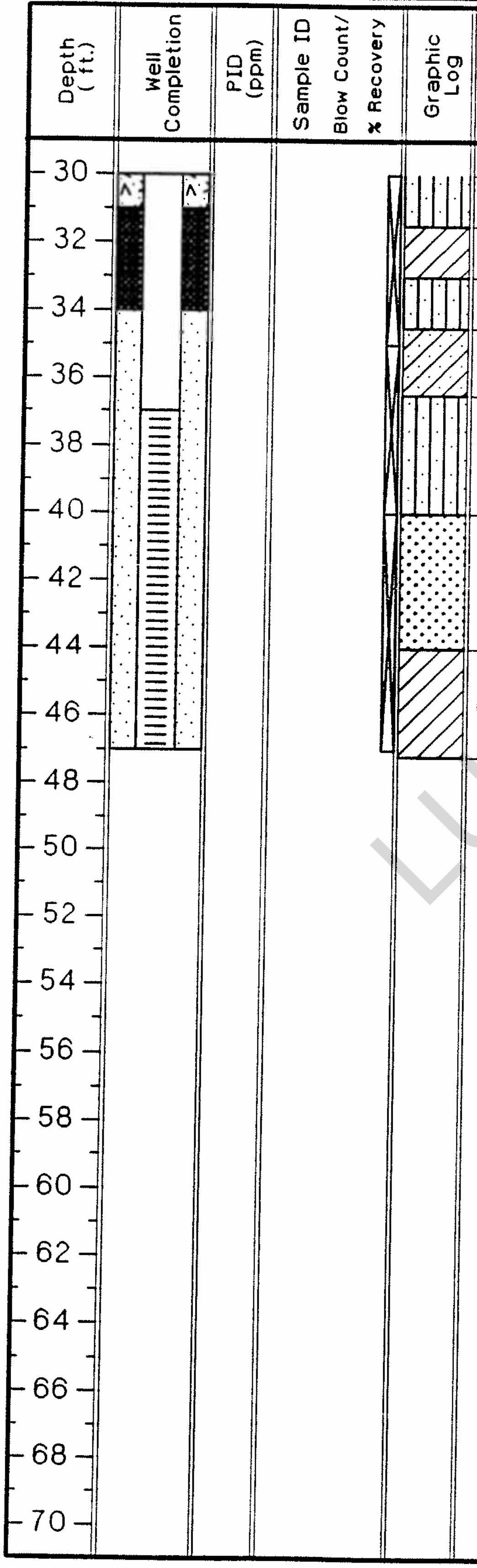
GROUNDWATER TECHNOLOGY

Drilling Log

Monitoring Well **AMW-10**

Project *Big Brown Ash Monitor Wells* Owner *Texas Utilities*

Location *Big Brown Steam Elec. Station, Ash Disposa Area* Proj. No. *042480243*



USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
SM	
CL	31.5'-33.0' - SILTY CLAY - brown, gray mottling, very stiff, low plasticity, slightly moist, trace carbonaceous material, trace dark minerals and white mica
SM	33.0'-34.5' - SILTY SAND - light brown, gray mottling, medium stiff, low plasticity to friable, moist, trace white mica and dark minerals
SC	34.5'-36.5' - CLAYEY SAND - light brown, gray mottling, medium stiff, low plasticity to friable, moist, trace white mica and dark minerals
SM	36.5'-40.0' - SILTY SAND - Brown, medium soft, friable, saturated, fine-grained quartz, moderately sorted, subangular, trace dark minerals and white mica, occasional thin beds of clean sand
SP	40.0'-44.0' - SAND - brown, soft, friable, saturated, fine to medium grained quartz, well-sorted, coarser with depth
CL	44.0'-47.2' - SANDY SILTY CLAY - brown and gray, yellowish-brown mottling, hard, low plasticity, wet to slightly moist near 47 feet, trace of white mica, dark minerals and carbonaceous material
	End of Boring at 47.2'

LEIGH ENGINEERING

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 97-1495
PROJECT NAME TU SERVICES-BBSES
LOCATION FM 2570, FAIRFIELD, TX
DRILLING METHOD HSA
SAMPLING METHOD ST/SS
GROUND ELEVATION NA
TOP OF CASING ELEVATION NA
LOGGED BY K. HENSON **/DRILLER** N. MOERICKE
REMARKS SUNNY AND WARM

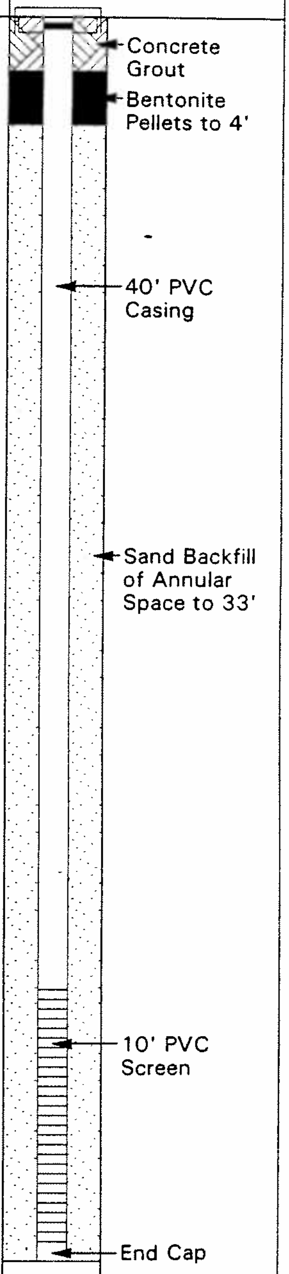
BORING/WELL NUMBER AMW-13
DATE DRILLED September 30, 1997
CASING TYPE/DIAMETER SCH 40 PVC/2-INCH
SCREEN TYPE/SLOT PRE-PACK SCH 40/0.010
GRAVEL PACK TYPE 20-40 SAND
GROUT TYPE BENTONITE
DEPTH TO WATER/DATE 35.37'/10-1-97
GROUND WATER ELEVATION/DATE NA
DRILLING CO. GW MONITORING, INC.

FID (ppm)	BLOW COUNTS	RECOVERY (%)	SAMPLING METHOD
		80	ST
		100	ST
		100	ST
		100	ST
		80	ST
		100	ST
		100	ST
		100	ST
		100	ST
		100	ST
		100	SS
		100	SS
		100	ST
		70	ST
		100	SS
		100	ST
		100	ST
		100	ST
		90	ST
		90	ST
		100	ST
		100	ST
		100	ST

DEPTH (ft. BGL): 5, 10, 15, 20, 25, 30, 35, 40, 45, 50

U.S.C.S.	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
SM	Unconsolidated, very fine-grained, light brown SILTY SAND, fill	2.0
CH	Hard, dry, stiff, brown CLAY, fill	3.0
SM	Unconsolidated, very fine-grained, tan SILTY SAND, fill	4.0
CL	Very stiff, brown SILTY CLAY, grading to a stiff, brown SANDY CLAY, with trace of roots and organic matter - hard, dry, light gray and reddish-brown mottled, stiff SANDY CLAY	10.0
SC	Hard, dry, stiff light gray and reddish brown CLAYEY SAND	12.5
CL	Hard, dry, stiff, gray and reddish-brown SANDY CLAY	13.0
SP	Dry, consolidated, very fine-grained, light gray and reddish brown SAND - 3-inch SANDY CLAY stringer, loose - more SANDY with some medium-stiff SANDY CLAY stringers (<3 inches)	20.0
SC	Medium soft, light gray with some reddish brown iron-staining CLAYEY SAND	22.5
CL	Medium-stiff, reddish brown and gray mottled SILTY CLAY - more sandy - alternating light gray and reddish-brown medium stiff SANDY and SILTY CLAYS	26.5
SC	Soft, light gray and reddish-brown mottled CLAYEY SAND	27.5
SP	Unconsolidated, fine-grained, light brown SAND	28.5
SC	Soft, moist, reddish-brown and light gray CLAYEY SAND - wet, light brown and gray - some root fragments	34.0
SP	Loose, fine-grained, brown SAND, wet	34.5
SC	Soft, light brown and gray mottled, CLAYEY SAND, with root fragments	37.0
SP	Loose, fine-grained, light brown SAND, wet	39.0
CL	Medium-stiff, reddish-brown SILTY CLAY - sandy	41.5
SC	Medium-soft, brown CLAYEY SAND, wet	42.5
SP	Loose, fine-grained, light brown SAND, wet	43.0
SC	Soft, brown CLAYEY SAND, wet	43.5
SP	Loose, medium-grained, brown SAND, wet	45.5
SC	Brown, soft, CLAYEY SAND	46.0
	BORING TERMINATED AT 46.0 FEET	

WELL DIAGRAM



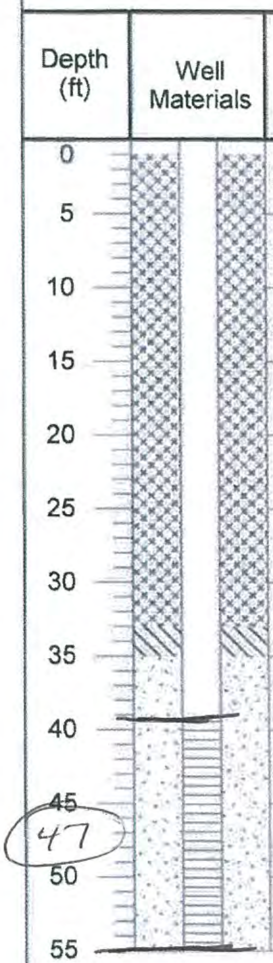
Luminant

Log of Boring: AMW-14

BBSES
Confidential Lanfill

PBW Project No. 1724

Completion Date:	1/20/2012	Drilling Method:	HSA
Drilling Company:	ETTL	Borehole Diameter (in.):	8.25
Driller:	Tommy Cook	Total Depth (ft):	55
Driller's License:	628748	Northing:	No Data
Field Supervisor:	Tim Jennings	Easting:	No Data
Sampling Method:	5' Sample Tube	Ground Elev. (ft AMSL):	No Data



Recovery (ft/ft)	USCS	Lithologic Description
5.0/5.0 5.0/5.0	SC	(0.0 - 8.0) Clayey SAND, grayish-brown, moist, soft, medium plasticity.
	CL	(8.0 - 10.3) Sandy CLAY, dark brownish-gray, moist, hard, medium plasticity.
5.0/5.0	SC	(10.3 - 12.3) Clayey SAND, brownish-orange, moist, soft, medium plasticity.
	CL	(12.3 - 14.2) Sandy CLAY, gray, orange mottling, moist, firm, medium plasticity.
5.0/5.0 4.0/5.0	SC	(14.2 - 25.0) Clayey SAND, less clay below 15.0', light gray to light brown, dry, very hard to soft, medium plasticity.
3.5/5.0	SP/SM	(25.0 - 31.7) SAND and silty SAND, sand with silty sand locally, brown with gray locally, moist, soft.
3.5/5.0	SC	(31.7 - 35.0) Clayey SAND, brown, moist, firm, medium plasticity.
3.0/5.0	SP/SM	(35.0 - 41.6) SAND with silty sand interbeds, moist, soft.
2.5/5.0	CL	(41.6 - 44.0) Sandy CLAY, brown, moist, soft, medium plasticity.
	SM	(44.0 - 47.0) Silty SAND, brown, wet, soft.
3.5/5.0	CL	(47.0 - 48.1) Sandy CLAY, brown, wet, soft, medium plasticity.
	SM	(48.1 - 52.2) Silty SAND, brown, wet, soft.
4.0/5.0	CL	(52.2 - 55.0) Sandy CLAY, brown, wet, firm, medium plasticity.

New pump was 56.5'

Cut off 10'

Pump will sit @ 46.5'

PBW
Pastor, Behling & Wheeler, LLC
2201 Double Creek Dr., Suite 4004
Round Rock, TX 78664
Tel (512) 671-3434 Fax (512) 671-3446

Notes:

Annular Materials
(0.0 - 33.0) Concrete
(33.0 -35.0) Bentonite Chips
(35.0 - 54.4) 20/40 Silica Sand

Well Materials
(+2.5 - 39.4) Casing, 2" Sch 40 FJT PVC
(39.4 - 55.0) Screen, 2" VPACK Sch 40 FJT PVC, 0.012 slot

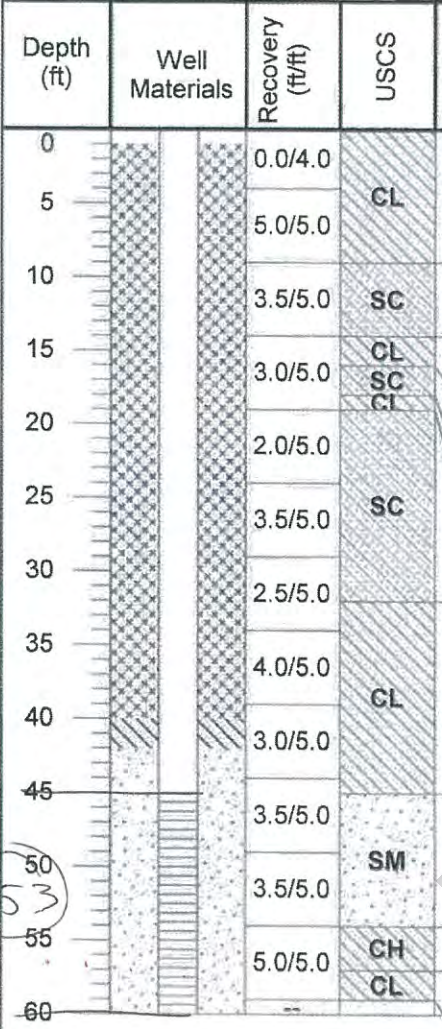
Luminant

Log of Boring: AMW-20

BBSES
Confidential Lanfill

PBW Project No. 1724

Completion Date:	12/12/2011	Drilling Method:	HSA
Drilling Company:	ETTL	Borehole Diameter (in.):	8.25
Driller:	Tommy Cook	Total Depth (ft):	60
Driller's License:	628748	Northing:	No Data
Field Supervisor:	Roberta McClure	Easting:	No Data
Sampling Method:	5' Sample Tube	Ground Elev. (ft AMSL):	No Data



Lithologic Description

(0.0 - 9.0) Sandy CLAY, light reddish-brown, yellowish-red mottling, dry, hard, low plasticity.

(9.0 - 14.0) Clayey SAND, light reddish-gray, less clay with depth, unconsolidated, moist.

(14.0 - 16.0) Silty CLAY, light gray, reddish-brown mottling, moist, firm, low plasticity.

(16.0 - 18.0) Clayey SAND, light gray, reddish-brown mottling, unconsolidated, sharp basal contact, moist.

(18.0 - 19.0) Silty CLAY, light gray, reddish-brown mottling, low plasticity.

(19.0 - 32.0) Clayey SAND, light gray, reddish-brown mottling, unconsolidated, some sandy clay interbeds, moist.

(32.0 - 45.0) Silty CLAY, light gray, reddish-brown staining, some sandy clay stringers, very moist, soft to slightly firm, medium plasticity.

(45.0 - 54.0) Silty SAND, some clay content from 43.0-49.0', reddish-brown, unconsolidated, moist, saturated at 47.0', soft.

(54.0 - 57.0) CLAY, dark gray, reddish-brown staining, wet, firm, hard.

(57.0 - 59.0) Sandy CLAY, dark gray, reddish-brown staining, very moist, soft, low plasticity.

Cut 10' off of New Pump

62.5' - 10' = 52.5'

PBW
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Round Rock, TX 78664
Tel (512) 671-3434 Fax (512) 671-3446

Notes:

Annular Materials
(0.0 - 1.0) Concrete
(1.0 - 40.0) Grout
(40.0 - 42.0) Bentonite Chips
(42.0-60.0) 20/40 Silica Sand

Well Materials
(+3.0 - 45.0) Casing, 2" Sch 40 FJT PVC
(45.0 - 60.0) Screen, 2" VPACK Sch 40 FJT PVC, 0.012 slot

Luminant

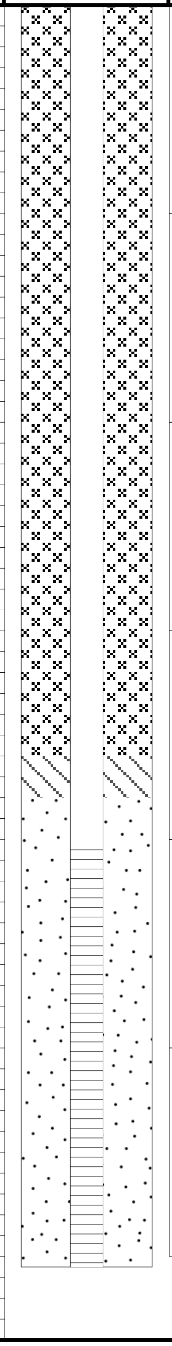
Log of Boring: AMW-21

Big Brown Steam Electric Station
Fairfield, TX

PBW Project No. 5164A

Completion Date:	9/13/2015	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6.5
Driller:	Dwayne Whitehead	Total Depth (ft):	60.5
Driller's License:	5814M	TOC Elevation (ft. AMSL):	325.389
Logged By:	Nolan Townsend	Northing:	10656902.126
Sampling Method:	4"x10' Core barrel	Easting:	3626989.216

Well Materials



Depth (ft)	Recovery (ft/ft)
0 - 10	2.0/10.0
10 - 20	3.9/10.0
20 - 30	2.3/10.0
30 - 40	3.5/10.0
40 - 50	3.8/10.0
50 - 60	9.5/10.0

USCS	Lithologic Description
SM	(0 - 11.6) Silty SAND with trace clay, light gray to tan, dry, unconsolidated, very fine grain sand, sharp basal contact
SC	(11.6 - 13.5) Clayey SAND with silt, light gray to tan, moist, slightly to moderately unconsolidated, very fine sand, trace to moderate orange mottling, mostly quartz sand, sharp basal contact
CL	(13.5 - 13.9) Sandy CLAY, light gray with moderate orange mottling, slightly moist, firm, low to moderate plasticity, thin sandy interbeds, very fine grain
SC	(13.9 - 21.8) Clayey, silty SAND, light gray to tan, moist, moderately consolidated, low plasticity, very fine grain, sharp basal contact
CL	(21.8 - 42.9) Sandy CLAY, light gray with moderate orange mottling, moist, firm, low to moderate plasticity, 33'-33.5' dark gray bands in clay (possibly lignitic), thin sandy interbeds, sand content increases with depth
SM	(42.9 - 52.5) Silty SAND, brownish yellow with tan, wet, moderately to slightly unconsolidated, trace clay, very fine sand, saturated
CH	(52.5 - 55.5) CLAY, light gray with abundant orange mottling, moist, hard, moderate to high plasticity, trace sand
SM	(55.5 - 59.4) Silty SAND, tan/brownish yellow, saturated, moderatly unconsolidated, very fine grain
CH	(59.4 - 60.5) CLAY with trace sandy lenses, dry to moist, hard, moderate to high plasticity

PBW

Pastor, Behling & Wheeler, LLC
2201 Double Creek Dr., Suite 4004
Round Rock, TX 78664
Tel (512) 671-3434 Fax (512) 671-3446

Notes:
1. This log should not be used separately from the report to which it is attached.

Well Materials
(+3.21 - 40.5) Casing, 2" Sch 40 FJT PVC
(40.5 - 60.5) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-36') Grout
(36'-38') Bentonite pellets
(38'-60.5') 20/40 sand

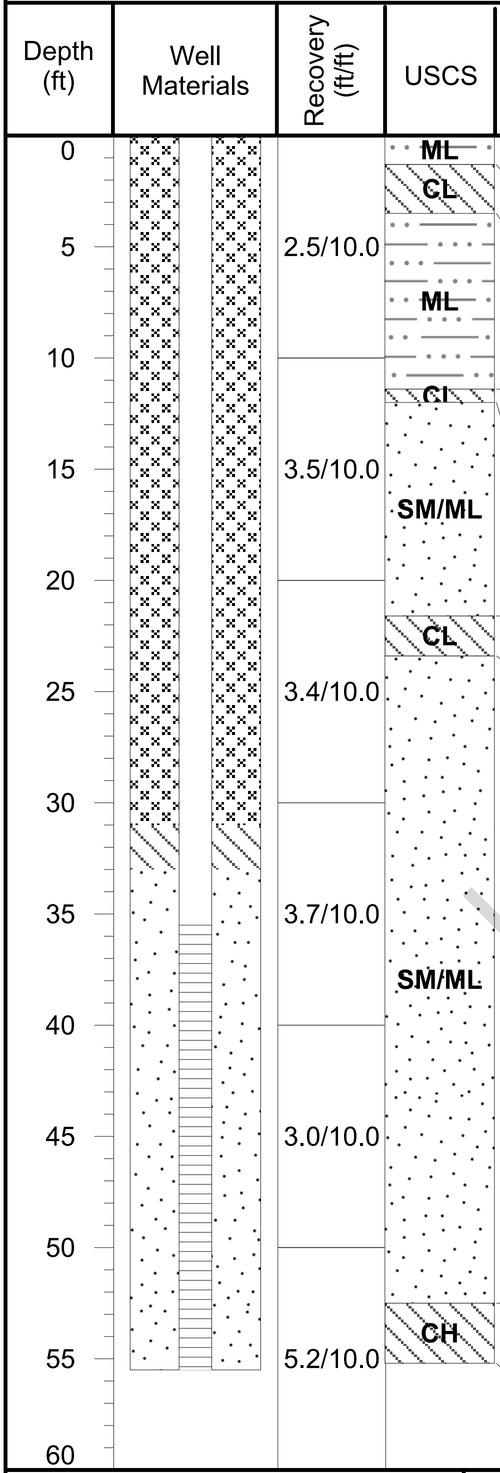
Luminant

Log of Boring: AMW-22

Big Brown Steam Electric Station
Fairfield, TX

PBW Project No. 5164A

Completion Date:	9/13/2015	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6.5
Driller:	Dwayne Whitehead	Total Depth (ft):	60
Driller's License:	5814M	TOC Elevation (ft. AMSL):	318.685
Logged By:	Nolan Townsend	Northing:	10657510.227
Sampling Method:	4"x10' Core barrel	Easting:	3629150.29



Lithologic Description

(0 - 1.3) Sandy SILT, light gray to tan, dry, unconsolidated, powdery, trace roots at top, very fine sand, sharp basal contact

(1.3 - 3.5) Sandy CLAY, gray to yellowish brown with moderate red-orange mottling, dry, very hard, low plasticity

(3.5 - 11.4) Sandy SILT, light gray to brownish yellow, dry, unconsolidated, powdery, very fine sand, sharp basal contact

(11.4 - 12) Sandy CLAY, light gray to gray with abundant orange mottling, dry to slightly moist, firm to hard, low plasticity, very fine sand, sand increase and clay decrease with depth, gradational basal contact

(12 - 21.6) Silty SAND with trace clay, tan to brownish yellow, dry to slightly moist, moderately unconsolidated, low plasticity, becomes powdery after 20', increased silt content

(21.6 - 23.4) Sandy CLAY, light gray to gray to yellow brown with moderate to trace orange/red mottling, dry to slightly moist, hard, low plasticity, very fine sand

(23.4 - 52.5) Silty SAND, brownish yellow, dry to slightly moist near 40', wet at 42.1', unconsolidated, mostly quartz with ~ 10% lithics, trace clay, sharp basal contact

(52.5 - 55.2) Sandy CLAY, gray/yellow brown, moist, hard to very hard, moderate to high plasticity, moderate to abundant orange mottling, very fine sandy interbeds/lenses (very thin)

PBW

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Round Rock, TX 78664
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Notes:
1. This log should not be used separately from the report to which it is attached.

Well Materials
(+2.91 - 35.5) Casing, 2" Sch 40 FJT PVC
(35.5 - 55.5) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-31') Grout
(31'-33') Bentonite pellets
(33'-55.5) 20/40 sand

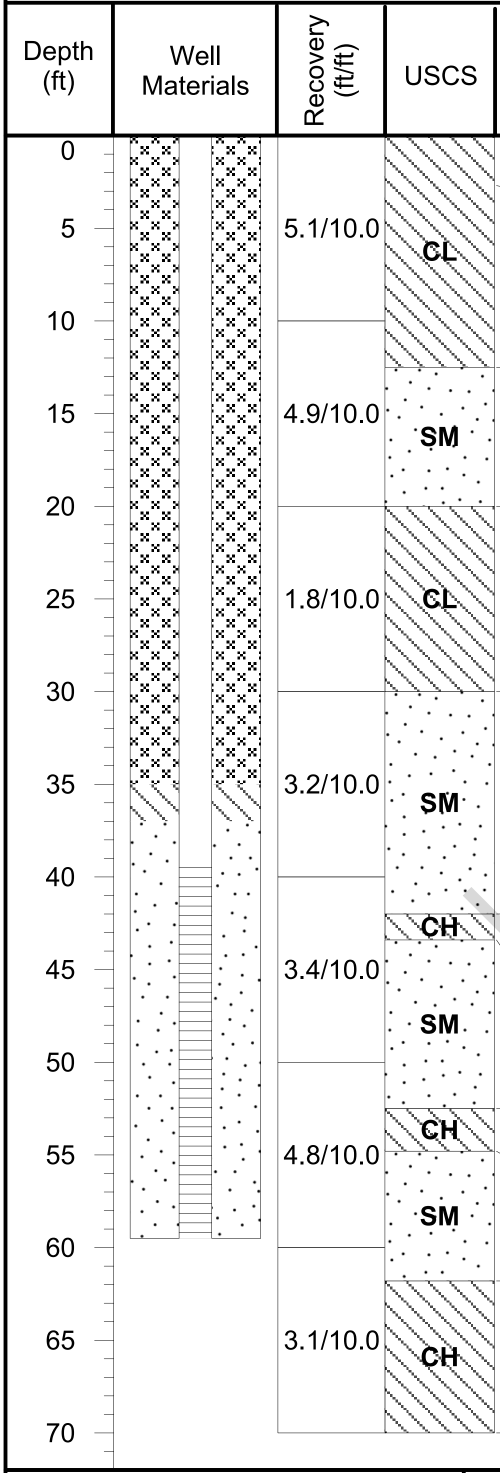
Luminant

Log of Boring: AMW-23

Big Brown Steam Electric Station
Fairfield, TX

PBW Project No. 5164A

Completion Date:	9/13/2015	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6.5
Driller:	Dwayne Whitehead	Total Depth (ft):	70
Driller's License:	5814M	TOC Elevation (ft. AMSL):	320.366
Logged By:	Nolan Townsend	Northing:	10656924.968
Sampling Method:	4"x10' Core barrel	Easting:	3629516.245



Lithologic Description

(0 - 2.7) Silty, sandy CLAY, light gray to tan, dry, very hard (indurated), low plasticity, trace sand (very fine grain), small pores visible, sharp basal contact

(2.7 - 12.5) Sandy CLAY, dark to light gray with trace to moderate orange mottling, dry, very hard, low plasticity, sharp basal contact

(12.5 - 20) Silty SAND, light gray with moderate orange mottling, dry to slightly moist, slightly unconsolidated, low plasticity, trace clay

(20 - 30) Silty, sandy CLAY, light gray, dry, very hard, low plasticity, trace to abundant orange mottling, trace roots, very fine sand, hard drilling

(30 - 42) Silty SAND, light gray to tan, dry to very slighlty moist, moist to very moist 41'-42', slightly to moderately unconsolidated, silt content decreasing with depth, very fine sand, mostly quartz sand with <10% lithic fragments

(42 - 43.4) Sandy CLAY, light gray with abundant orange mottling, moist to very moist, firm to hard, moderate to high plasticity, thin sandy lenses

(43.4 - 52.5) Silty SAND with trace clay, yellow brown, very moist to wet, slightly to moderately unconsolidated, very fine to fine sand, wet at 50'

(52.5 - 54.8) Sandy CLAY, light gray, very moist, firm, moderate to high plasticity, moderate to abundant orange mottling, very fine to fine sand lenses

(54.8 - 61.8) Silty SAND with trace clay, yellow brown, very moist, moderately unconsolidated, very fine to fine sand

(61.8 - 70) Sandy CLAY, light gray with abundant orange mottling/brownish yellow to yellow brown, moist, hard, moderate to high plasticity, thin sandy interbeds of very fine sand

PBW
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Round Rock, TX 78664
Tel (512) 671-3434 Fax (512) 671-3446

Notes:
1. This log should not be used separately from the report to which it is attached.

Well Materials
(3.64 - 39.5) Casing, 2" Sch 40 FJT PVC
(39.5 - 59.5) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-35') Grout
(35'-37') Bentonite pellets
(37'-59.5') 20/40 sand

Rone Engineering

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10-16140
PROJECT NAME Big Brown SES
LOCATION 850 FM 2570, Fairfield, TX
DRILLING METHOD HSA
SAMPLING METHOD CT
GROUND ELEVATION Not Determined
TOP OF CASING ELEVATION Not Determined
LOGGED BY S. Williams /DRILLER R. Garcia
REMARKS Overcast, 60-68 ° F

BORING/WELL NUMBER FMW-4R
DATE DRILLED 12/3/10
CASING TYPE/DIAMETER PVC / 2"
SCREEN TYPE/SLOT PVC / 0.10
GRAVEL PACK TYPE 16/30 Sand
GROUT TYPE Hydrated Bentonite
DEPTH TO WATER/DATE Not Recorded
GROUND WATER ELEVATION/DATE Not Recorded
DRILLING CO. West

PID (ppm)	LEL (%)	RECOVERY (%)	SAMPLING METHOD	SAMPLE	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
NA		100	CT					**FILL:** - dark brown sand and gravel	2.0
						CL	▨	**SILTY SANDY CLAY** - light brown, slight hydrocarbon odor 1.5-2'	5.0
NA		60	CT		5	CL	▨	**SANDY SILTY CLAY** - reddish brown, medium stiff	10.0
NA		100	CT		10	SC	▨	**FINE CLAYEY SAND** - light gray, with iron staining	11.5
						CL	▨	**SANDY CLAY** - light gray, with iron staining, very stiff	15.0
NA		30	CT		15	CL	▨	**SANDY CLAY** - light gray and brown, with iron staining, soft	20.0
NA		50	CT		20	SC	▨	**CLAYEY SAND** - light brown, fine	
NA		20	CT		25		▨		
NA		60	CT		30		▨		
					35				

WELL DIAGRAM

Rone Engineering

BORING/WELL CONSTRUCTION LOG

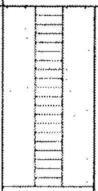
PROJECT NUMBER 10-16140

PROJECT NAME Big Brown SES

BORING/WELL NUMBER FMW-4R

DATE DRILLED 12/3/10

continued from previous page

PID (ppm)	LEL (%)	RECOVERY (%)	SAMPLING METHOD	SAMPLE	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
NA		60	CT	■			▨			
					40			Bottom of Borehole at 40 Feet 31 ° 49.619 N 096 ° 02.919 W	40.0	
					45					
					50					
					55					
					60					
					65					
					70					
					75					

Appendix B

Photographs of CCR Groundwater Monitoring Wells

Appendix B – Photographs of CCR Groundwater Monitoring Wells
Ash Disposal Area II - BBSES

Photograph 1: AMW-4R

Photograph 2: AMW-10

Appendix B – Photographs of CCR Groundwater Monitoring Wells
Ash Disposal Area II - BBSES

Photograph 3: AMW-13

Photograph 4: AMW-14

Appendix B – Photographs of CCR Groundwater Monitoring Wells
Ash Disposal Area II - BBSES

Photograph 5: AMW-20

Photograph 6: AMW-21

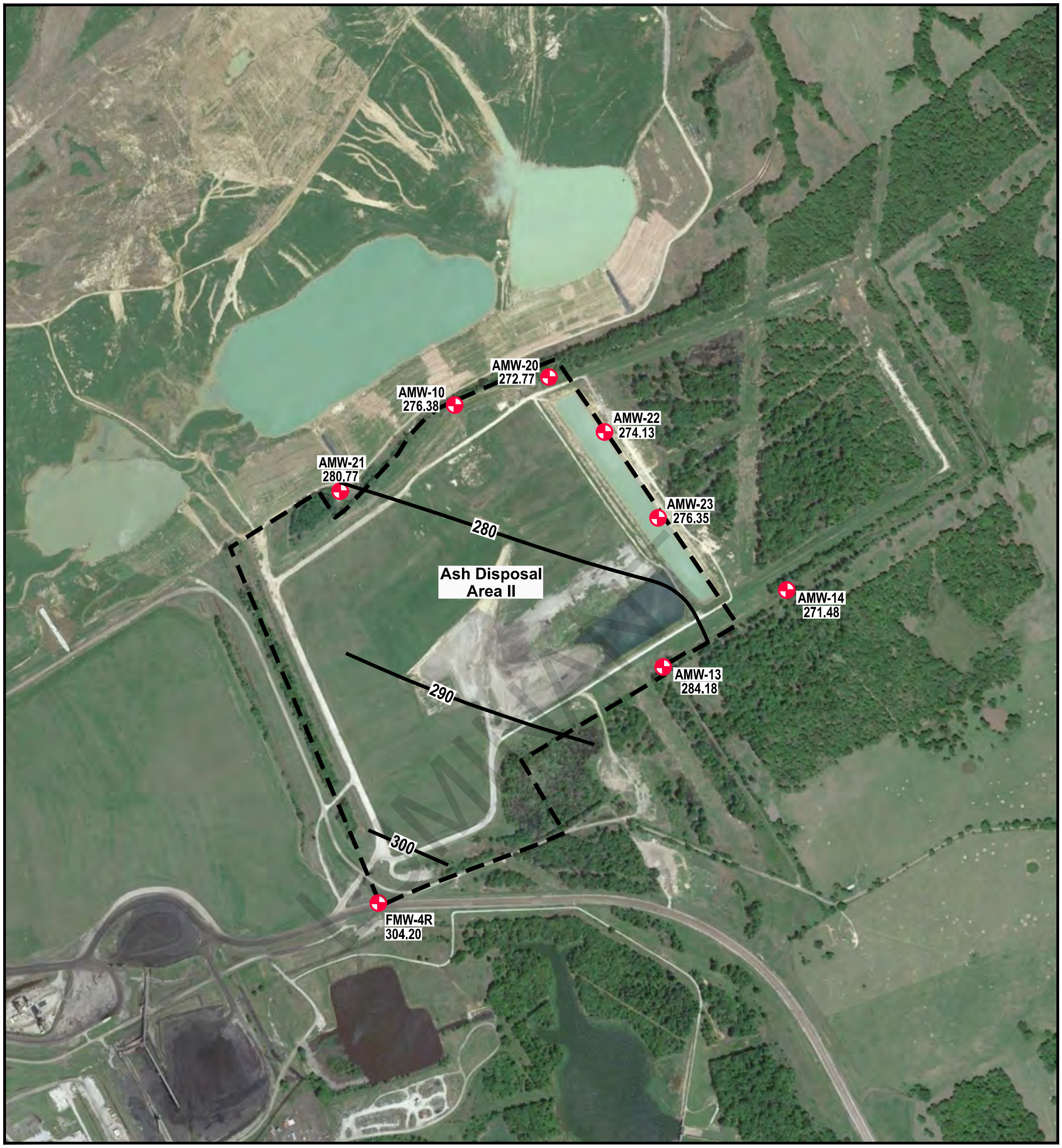
Appendix B – Photographs of CCR Groundwater Monitoring Wells
Ash Disposal Area II - BBSES

Photograph 7: AMW-22

Photograph 8: AMW-23

Appendix C

Groundwater Potentiometric Surface Maps



EXPLANATION

●	CCR Monitoring Well Location
(294.01)	Groundwater Potentiometric Surface (ft. MSL)
— 300 —	Groundwater Potentiometric Surface Contour (C.I. = 10 ft.)

N

Scale in Feet

0 600 1200

SOURCE:
Imagery from Google Earth dated 3/30/2017.

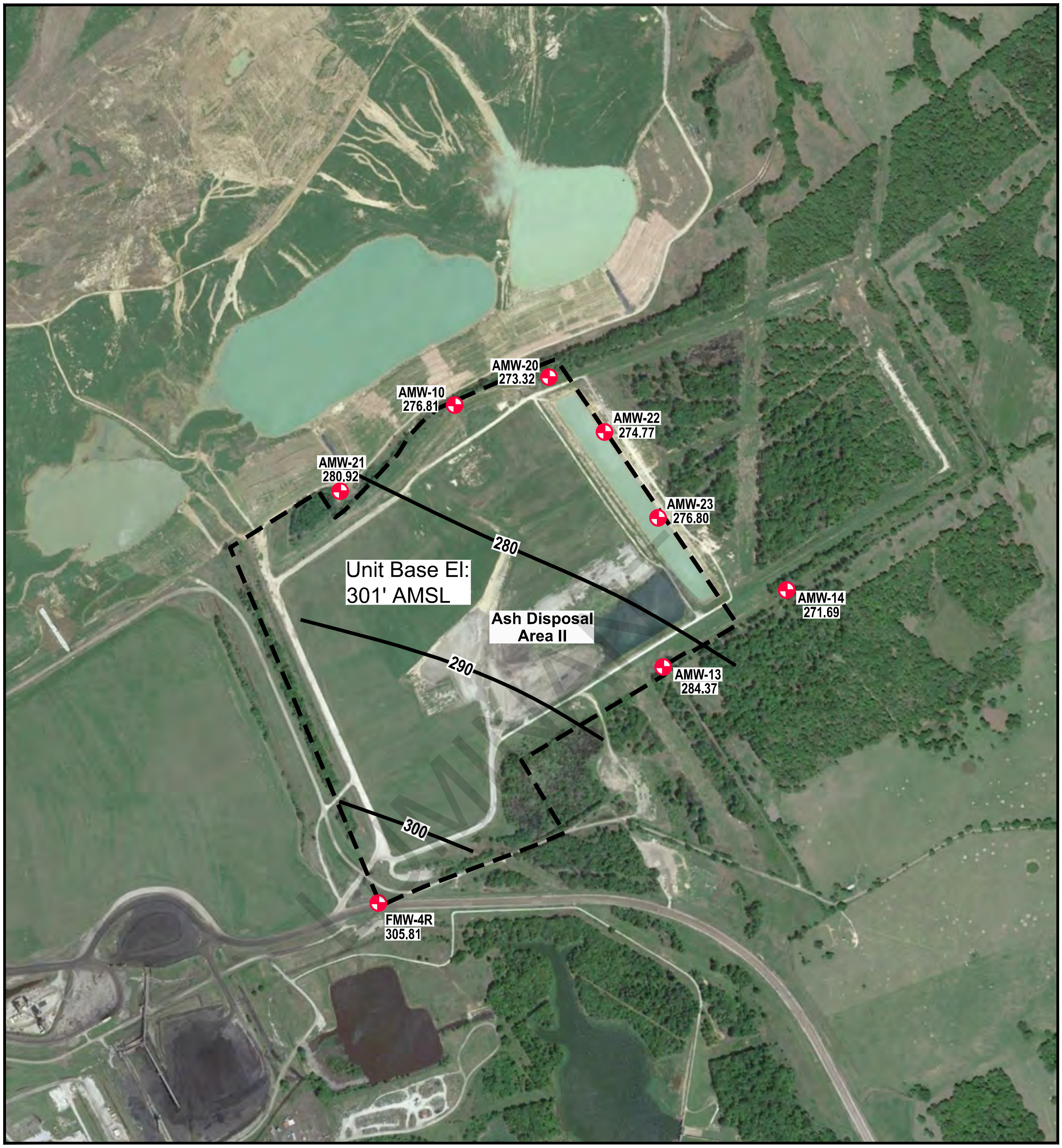
BIG BROWN STEAM ELECTRIC STATION
FAIRFIELD, TEXAS

Figure 1

ASH DISPOSAL AREA II POTENTIOMETRIC SURFACE MAP OCTOBER 27, 2015

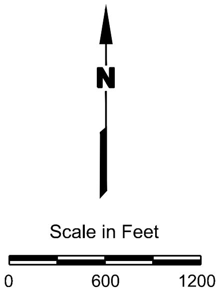
PROJECT: 5164A	BY: AJD	REVISIONS
DATE: SEPT., 2017	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS



EXPLANATION

⊕	CCR Monitoring Well Location
(294.01)	Groundwater Potentiometric Surface (ft. MSL)
— 300 —	Groundwater Potentiometric Surface Contour (C.I. = 10 ft.)



SOURCE:
Imagery from Google Earth dated 3/30/2017.

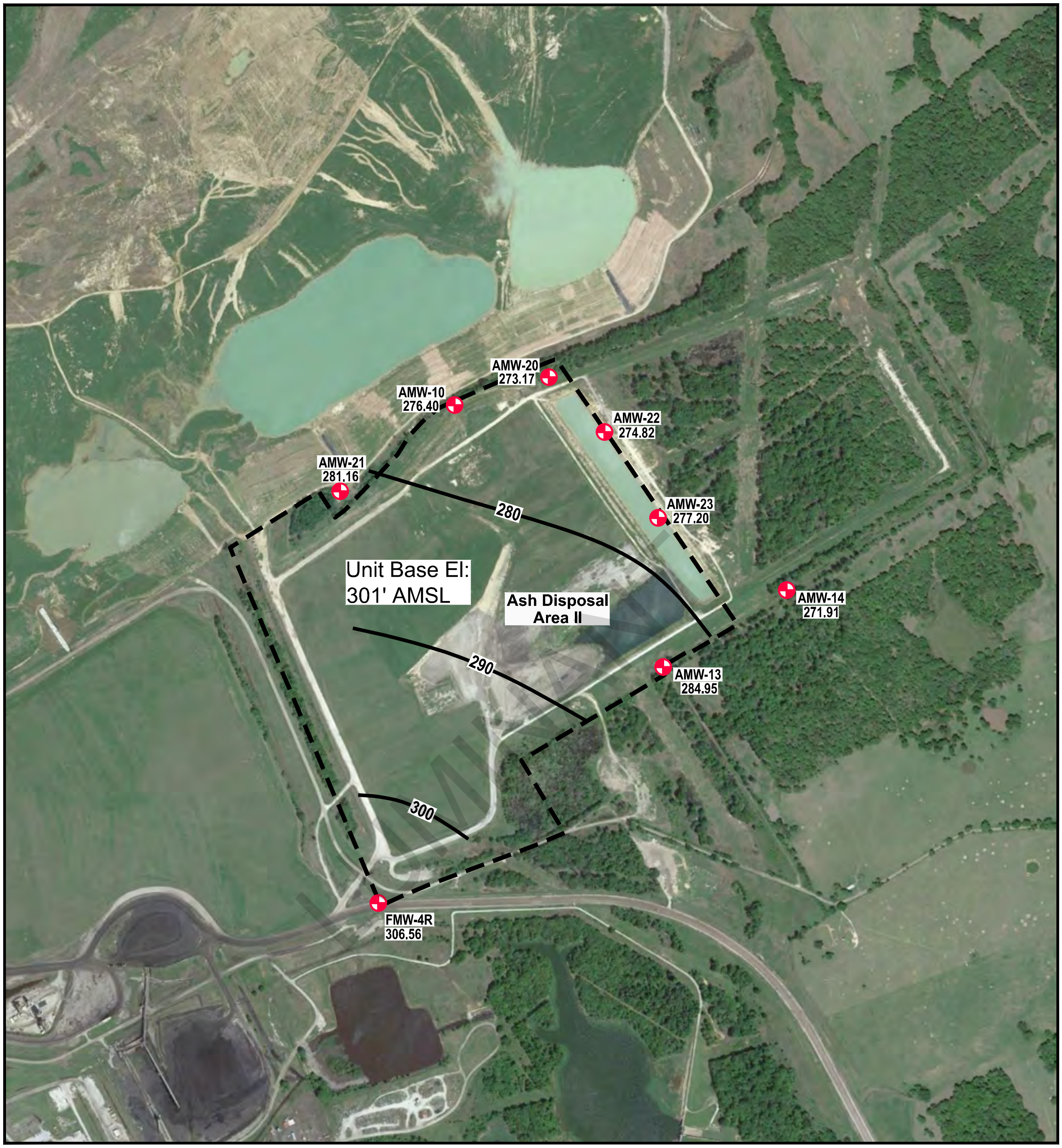
BIG BROWN STEAM ELECTRIC STATION
FAIRFIELD, TEXAS

Figure 2

ASH DISPOSAL AREA II POTENTIOMETRIC SURFACE MAP DECEMBER 15, 2015

PROJECT: 5164A	BY: AJD	REVISIONS
DATE: SEPT., 2017	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS



EXPLANATION

🔴	CCR Monitoring Well Location
(294.01)	Groundwater Potentiometric Surface (ft. MSL)
— 300 —	Groundwater Potentiometric Surface Contour (C.I. = 10 ft.)

N

Scale in Feet

0 600 1200

SOURCE:
Imagery from Google Earth dated 3/30/2017.

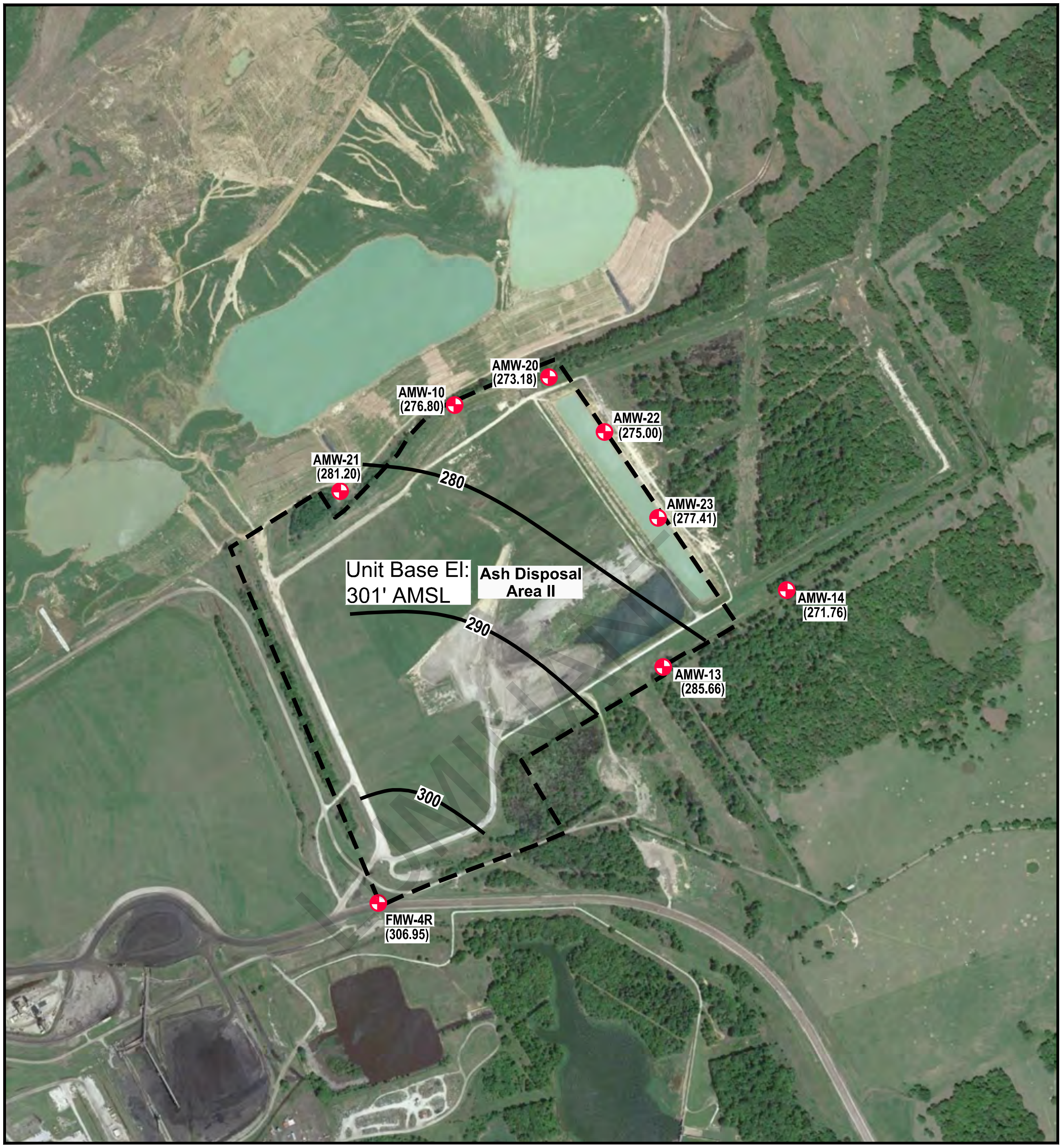
BIG BROWN STEAM ELECTRIC STATION
FAIRFIELD, TEXAS

Figure 3

ASH DISPOSAL AREA II POTENTIOMETRIC SURFACE MAP FEBRUARY 29, 2016

PROJECT: 5164A	BY: AJD	REVISIONS
DATE: SEPT., 2017	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS



EXPLANATION

●	CCR Monitoring Well Location
(294.01)	Groundwater Potentiometric Surface (ft. MSL)
— 300 —	Groundwater Potentiometric Surface Contour (C.I. = 10 ft.)

N

Scale in Feet

0 600 1200

SOURCE:
Imagery from Google Earth dated 3/30/2017.

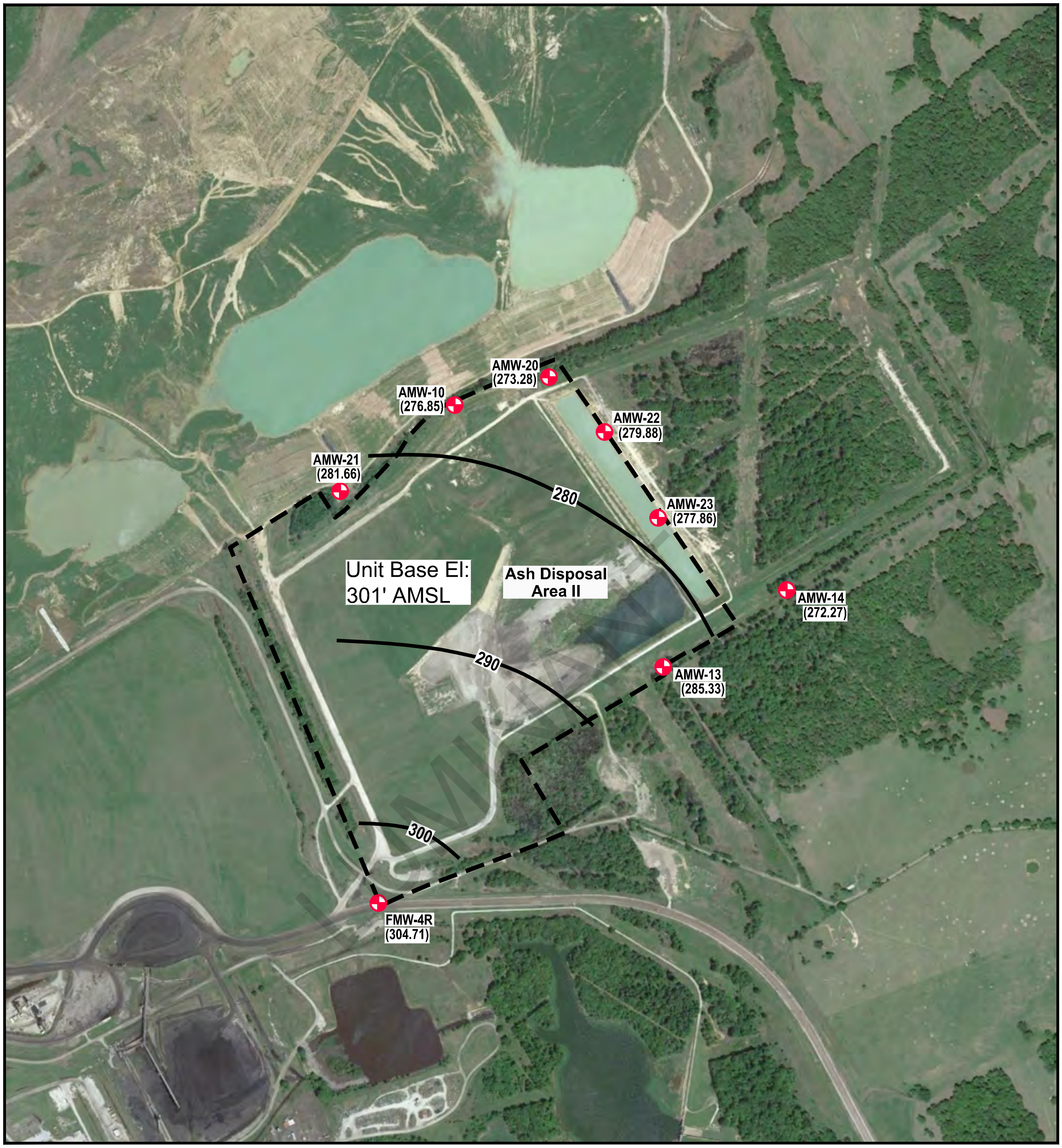
BIG BROWN STEAM ELECTRIC STATION
FAIRFIELD, TEXAS

Figure 4

ASH DISPOSAL AREA II POTENTIOMETRIC SURFACE MAP
APRIL 12, 2016

PROJECT: 5164A	BY: AJD	REVISIONS
DATE: SEPT., 2017	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS



EXPLANATION

⊕	CCR Monitoring Well Location
(294.01)	Groundwater Potentiometric Surface (ft. MSL)
— 300 —	Groundwater Potentiometric Surface Contour (C.I. = 10 ft.)

N

Scale in Feet

0 600 1200

SOURCE:
Imagery from Google Earth dated 3/30/2017.

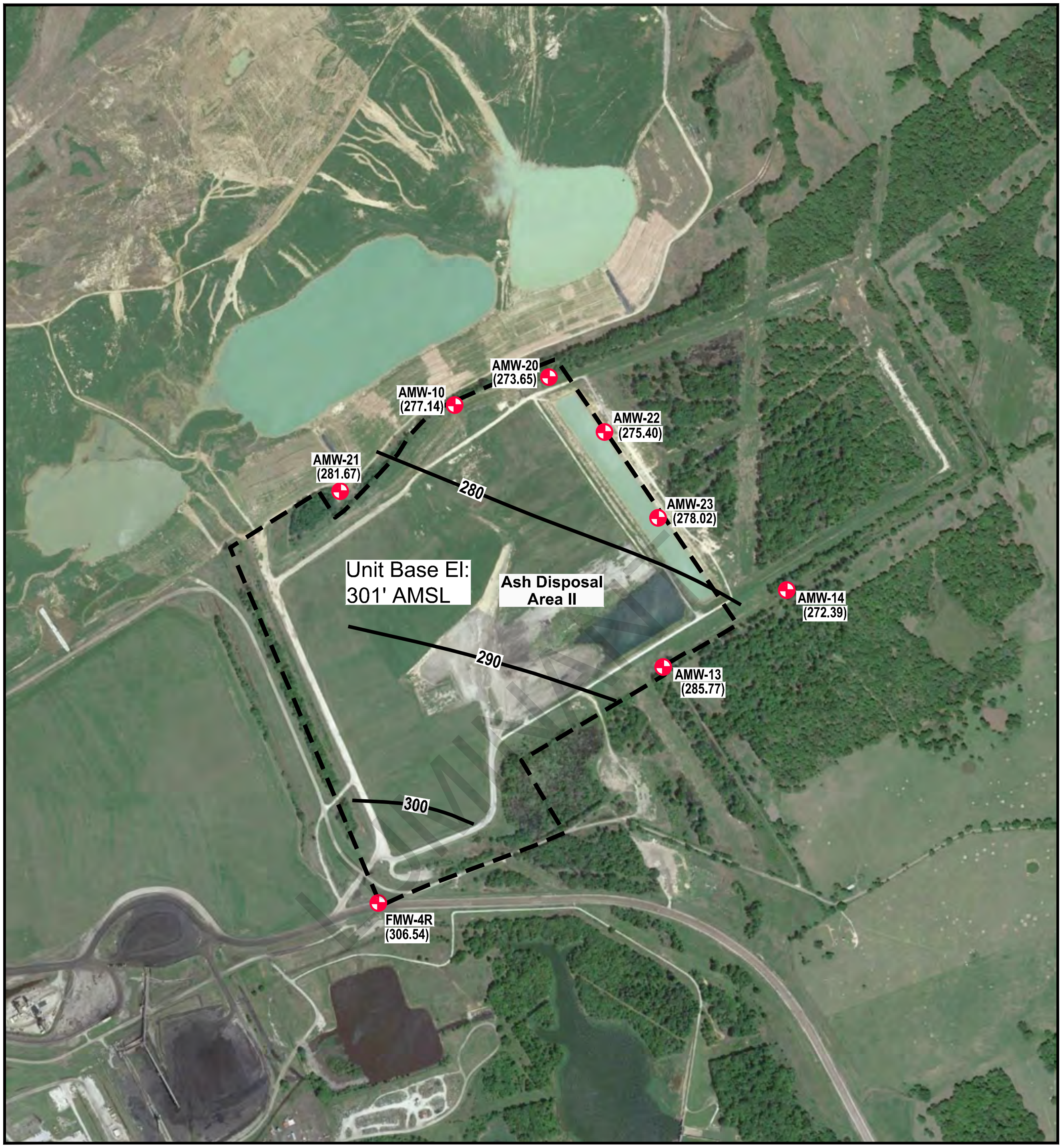
BIG BROWN STEAM ELECTRIC STATION
FAIRFIELD, TEXAS

Figure 5

ASH DISPOSAL AREA II POTENTIOMETRIC SURFACE MAP JUNE 9, 2016

PROJECT: 5164A	BY: AJD	REVISIONS
DATE: SEPT., 2017	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS



EXPLANATION

●	CCR Monitoring Well Location
(294.01)	Groundwater Potentiometric Surface (ft. MSL)
— 300 —	Groundwater Potentiometric Surface Contour (C.I. = 10 ft.)

N

Scale in Feet

0 600 1200

SOURCE:
Imagery from Google Earth dated 3/30/2017.

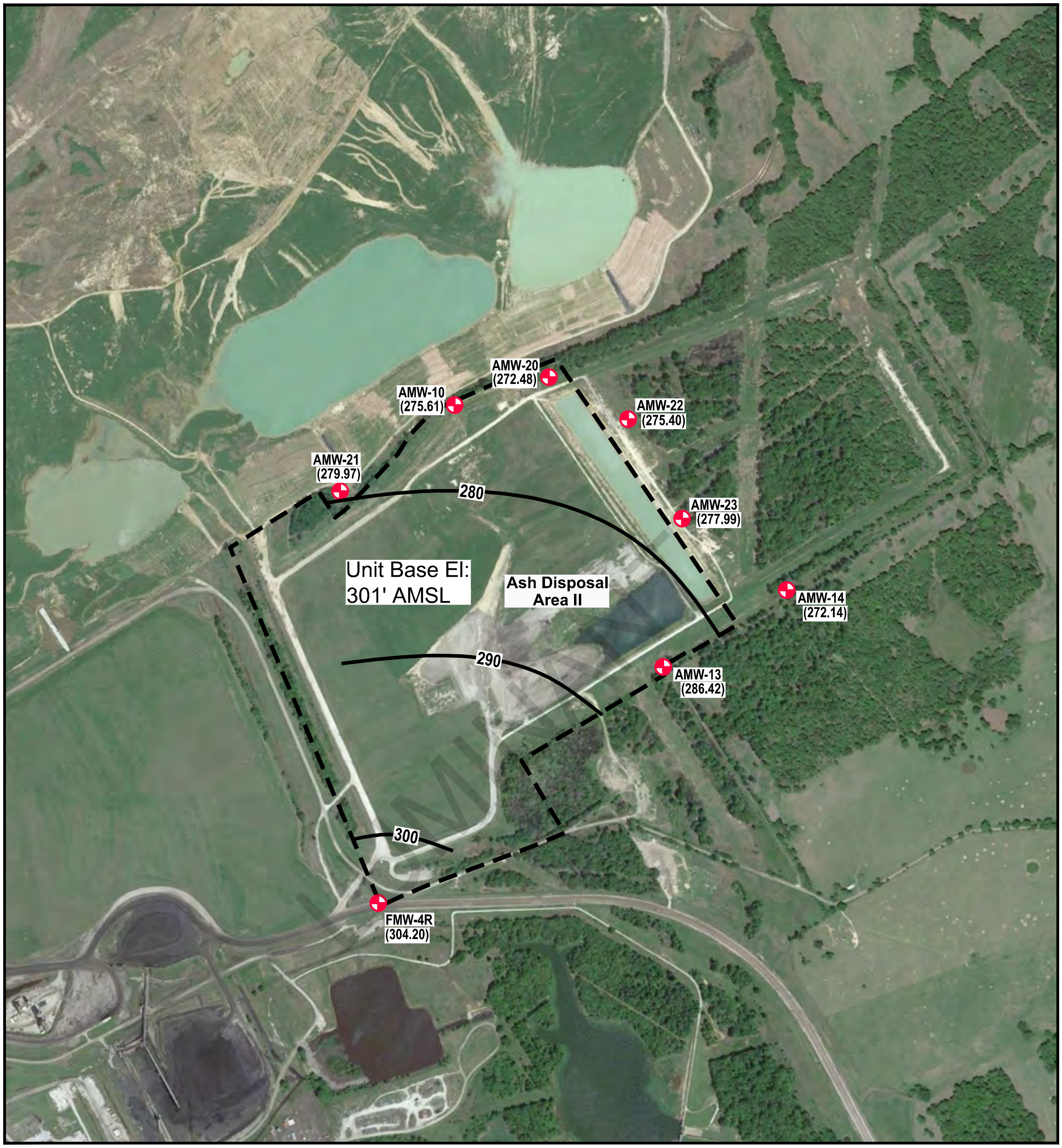
BIG BROWN STEAM ELECTRIC STATION
FAIRFIELD, TEXAS

Figure 6

ASH DISPOSAL AREA II POTENTIOMETRIC SURFACE MAP SEPTEMBER 1, 2016

PROJECT: 5164A	BY: AJD	REVISIONS
DATE: SEPT., 2017	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS



EXPLANATION

● CCR Monitoring Well Location

(294.01) Groundwater Potentiometric Surface (ft. MSL)

—300— Groundwater Potentiometric Surface Contour (C.I. = 10 ft.)

SOURCE:
Imagery from Google Earth dated 3/30/2017.

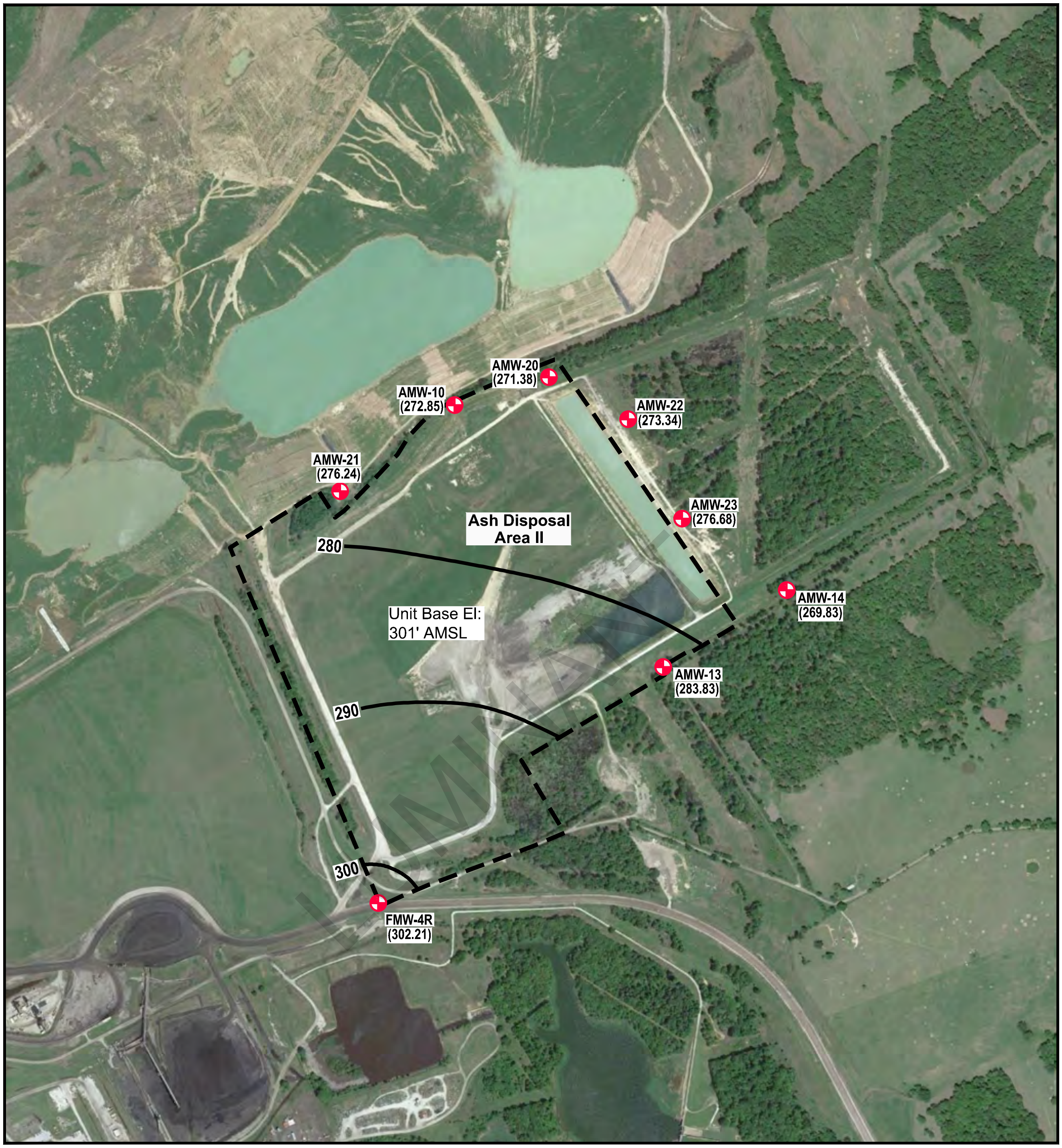
BIG BROWN STEAM ELECTRIC STATION
FAIRFIELD, TEXAS

Figure 7

ASH DISPOSAL AREA II POTENTIOMETRIC SURFACE MAP OCTOBER 6, 2016

PROJECT: 5164A	BY: AJD	REVISIONS
DATE: SEPT., 2017	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS



EXPLANATION

⊕	CCR Monitoring Well Location
(294.01)	Groundwater Potentiometric Surface (ft. MSL)
—300—	Groundwater Potentiometric Surface Contour (C.I. = 10 ft.)

N

Scale in Feet

0 600 1200

SOURCE:
Imagery from Google Earth dated 3/30/2017.

BIG BROWN STEAM ELECTRIC STATION
FAIRFIELD, TEXAS

Figure 8

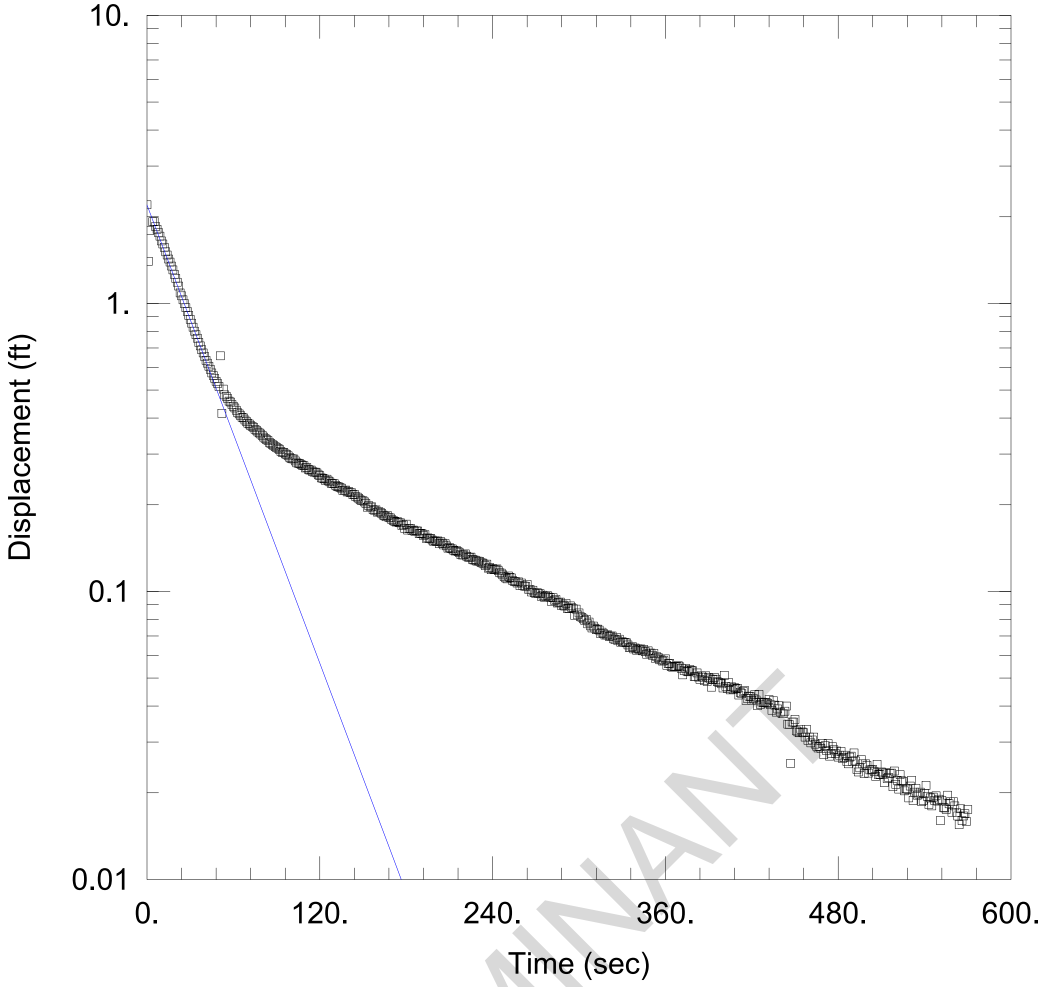
ASH DISPOSAL AREA II POTENTIOMETRIC SURFACE MAP DECEMBER 15, 2016

PROJECT: 5164A	BY: AJD	REVISIONS
DATE: SEPT., 2017	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS

Appendix D

Aquifer Test Data



WELL TEST ANALYSIS

Data Set: J:\...\AMW-21.aqt

Date: 09/29/17 Time: 16:04:57

PROJECT INFORMATION

Company: PBW
Client: Luminant
Project: 5164-A
Location: Big Brown Power Plant
Test Well: AMW-21
Test Date: 9-22-2015

AQUIFER DATA

Saturated Thickness: 13.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (AMW-21)

Initial Displacement: 2.2 ft
Total Well Penetration Depth: 20. ft
Casing Radius: 0.083 ft
Static Water Column Height: 18.91 ft
Screen Length: 20. ft
Well Radius: 0.27 ft
Gravel Pack Porosity: 0.2

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.002247 cm/sec
y0 = 2.199 ft

Data Set: J:\5164 - Luminant CCR GW Monitoring\5164-A _Big Brown\BBSES Slug Tests Sept 2015\Aqtesolv files\
Date: 09/29/17
Time: 16:05:13

PROJECT INFORMATION

Company: PBW
Client: Luminant
Project: 5164-A
Location: Big Brown Power Plant
Test Date: 9-22-2015
Test Well: AMW-21

AQUIFER DATA

Saturated Thickness: 13.5 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: AMW-21

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 2.2 ft
Static Water Column Height: 18.91 ft
Casing Radius: 0.083 ft
Well Radius: 0.27 ft
Well Skin Radius: 0.27 ft
Screen Length: 20. ft
Total Well Penetration Depth: 20. ft
Corrected Casing Radius (Bouwer-Rice Method): 0.1417 ft
Gravel Pack Porosity: 0.2

No. of Observations: 570

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
0.	0.	286.	0.0916
1.	1.401	287.	0.0918
2.	1.792	288.	0.0892
4.	1.922	289.	0.0897
5.	1.923	290.	0.089
6.	1.849	291.	0.0908
7.	1.81	292.	0.0871
8.	1.761	293.	0.0874
9.	1.713	294.	0.0891
10.	1.648	295.	0.0878
11.	1.608	296.	0.0872
12.	1.567	297.	0.0826
13.	1.511	298.	0.0868
14.	1.472	299.	0.0829
15.	1.427	300.	0.0842
16.	1.392	301.	0.0816
17.	1.348	302.	0.0813
18.	1.307	303.	0.0803
19.	1.261	304.	0.0793
20.	1.221	305.	0.08
21.	1.185	306.	0.0772
22.	1.149	307.	0.0783
23.	1.087	308.	0.0759
24.	1.063	309.	0.0747
25.	1.03	310.	0.0758
26.	0.9977	311.	0.0746
27.	0.9668	312.	0.0736
28.	0.937	313.	0.074

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
29.	0.9086	314.	0.0734
30.	0.8802	315.	0.0714
31.	0.8535	316.	0.0722
32.	0.8272	317.	0.0714
33.	0.8011	318.	0.0706
34.	0.7791	319.	0.0706
35.	0.757	320.	0.0707
36.	0.7327	321.	0.0698
37.	0.7124	322.	0.0699
38.	0.6905	323.	0.07
39.	0.6731	324.	0.0684
40.	0.6541	325.	0.0681
41.	0.6347	326.	0.0693
42.	0.6204	327.	0.0674
43.	0.6052	328.	0.0683
44.	0.5902	329.	0.0666
45.	0.5736	330.	0.0669
46.	0.5622	331.	0.0665
47.	0.5489	332.	0.0665
48.	0.5366	333.	0.0663
49.	0.5269	334.	0.0652
50.	0.5152	335.	0.0638
51.	0.6577	336.	0.0638
52.	0.415	337.	0.0644
53.	0.504	338.	0.0631
54.	0.4817	339.	0.0636
55.	0.4761	340.	0.0625
56.	0.4675	341.	0.0632
57.	0.4582	342.	0.0629
58.	0.4547	343.	0.0631
59.	0.4457	344.	0.0622
60.	0.439	345.	0.0629
61.	0.4333	346.	0.0618
62.	0.4255	347.	0.0605
63.	0.417	348.	0.0622
64.	0.4132	349.	0.0611
65.	0.4077	350.	0.0611
66.	0.4025	351.	0.06
67.	0.4005	352.	0.0609
68.	0.3938	353.	0.0586
69.	0.3895	354.	0.0593
70.	0.3841	355.	0.0589
71.	0.3816	356.	0.0579
72.	0.3768	357.	0.0579
73.	0.374	358.	0.0573
74.	0.3711	359.	0.0575
75.	0.3655	360.	0.0583
76.	0.363	361.	0.0554
77.	0.3578	362.	0.0561
78.	0.355	363.	0.0563
79.	0.3519	364.	0.0548
80.	0.348	365.	0.0546
81.	0.3436	366.	0.0549
82.	0.3401	367.	0.0549
83.	0.3366	368.	0.0549
84.	0.3342	369.	0.0552
85.	0.3294	370.	0.0547
86.	0.3266	371.	0.0541
87.	0.3239	372.	0.0513
88.	0.321	373.	0.0531
89.	0.318	374.	0.0541
90.	0.3157	375.	0.0528
91.	0.3141	376.	0.0526
92.	0.311	377.	0.0535
93.	0.3064	378.	0.0532
94.	0.3039	379.	0.053

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
95.	0.3043	380.	0.0506
96.	0.3002	381.	0.0506
97.	0.2986	382.	0.0521
98.	0.2955	383.	0.0504
99.	0.2922	384.	0.0495
100.	0.2894	385.	0.0509
101.	0.2887	386.	0.0504
102.	0.2883	387.	0.049
103.	0.2839	388.	0.0509
104.	0.2795	389.	0.0487
105.	0.2789	390.	0.0502
106.	0.2778	391.	0.0497
107.	0.2758	392.	0.0465
108.	0.2737	393.	0.0494
109.	0.2733	394.	0.0503
110.	0.2683	395.	0.0496
111.	0.2692	396.	0.0486
112.	0.2657	397.	0.0483
113.	0.264	398.	0.0483
114.	0.2638	399.	0.0478
115.	0.2605	400.	0.0462
116.	0.2595	401.	0.0511
117.	0.2594	402.	0.0468
118.	0.2578	403.	0.046
119.	0.2539	404.	0.0482
120.	0.2524	405.	0.0455
121.	0.2479	406.	0.0466
122.	0.2471	407.	0.0457
123.	0.2458	408.	0.0463
124.	0.2428	409.	0.0459
125.	0.2453	410.	0.0461
126.	0.2418	411.	0.0437
127.	0.24	412.	0.0446
128.	0.2374	413.	0.0442
129.	0.2371	414.	0.045
130.	0.2368	415.	0.0453
131.	0.2337	416.	0.0419
132.	0.2317	417.	0.0425
133.	0.2308	418.	0.0433
134.	0.2294	419.	0.0431
135.	0.2284	420.	0.0419
136.	0.2244	421.	0.0425
137.	0.2242	422.	0.0438
138.	0.225	423.	0.042
139.	0.2215	424.	0.0401
140.	0.2223	425.	0.0439
141.	0.2203	426.	0.0405
142.	0.22	427.	0.0413
143.	0.2167	428.	0.0411
144.	0.2172	429.	0.0412
145.	0.2133	430.	0.0412
146.	0.2126	431.	0.0409
147.	0.2108	432.	0.0421
148.	0.2081	433.	0.0404
149.	0.2067	434.	0.0387
150.	0.2064	435.	0.0417
151.	0.2045	436.	0.0403
152.	0.2021	437.	0.0381
153.	0.196	438.	0.0391
154.	0.1983	439.	0.0401
155.	0.1963	440.	0.0381
156.	0.1965	441.	0.0376
157.	0.1925	442.	0.0376
158.	0.1915	443.	0.0384
159.	0.1919	444.	0.04
160.	0.1884	445.	0.0346

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
161.	0.1891	446.	0.0345
162.	0.1882	447.	0.0253
163.	0.1866	448.	0.0352
164.	0.1842	449.	0.0352
165.	0.183	450.	0.0359
166.	0.1817	451.	0.0328
167.	0.1833	452.	0.0325
168.	0.1805	453.	0.0323
169.	0.1799	454.	0.0332
170.	0.1776	455.	0.0325
171.	0.1763	456.	0.0323
172.	0.1753	457.	0.0312
173.	0.1742	458.	0.0332
174.	0.1745	459.	0.0304
175.	0.1732	460.	0.0312
176.	0.1731	461.	0.0298
177.	0.1696	462.	0.0305
178.	0.1701	463.	0.0312
179.	0.1655	464.	0.0295
180.	0.1712	465.	0.029
181.	0.1633	466.	0.0286
182.	0.1653	467.	0.0289
183.	0.1655	468.	0.0285
184.	0.1626	469.	0.0297
185.	0.1633	470.	0.0271
186.	0.1616	471.	0.0291
187.	0.1623	472.	0.028
188.	0.1621	473.	0.0296
189.	0.1588	474.	0.0268
190.	0.1592	475.	0.0274
191.	0.1585	476.	0.0289
192.	0.1563	477.	0.0282
193.	0.1574	478.	0.0274
194.	0.1528	479.	0.0279
195.	0.1534	480.	0.0266
196.	0.1527	481.	0.027
197.	0.1529	482.	0.0278
198.	0.1509	483.	0.0263
199.	0.1493	484.	0.0265
200.	0.15	485.	0.027
201.	0.149	486.	0.0257
202.	0.1497	487.	0.0252
203.	0.1465	488.	0.0266
204.	0.1487	489.	0.0268
205.	0.1472	490.	0.0257
206.	0.145	491.	0.0275
207.	0.1465	492.	0.0258
208.	0.1439	493.	0.0241
209.	0.1414	494.	0.0236
210.	0.142	495.	0.0244
211.	0.1408	496.	0.0261
212.	0.1405	497.	0.0252
213.	0.139	498.	0.0233
214.	0.1382	499.	0.0252
215.	0.1384	500.	0.0249
216.	0.1374	501.	0.0234
217.	0.1362	502.	0.024
218.	0.1342	503.	0.024
219.	0.1338	504.	0.0241
220.	0.1339	505.	0.0237
221.	0.1349	506.	0.0228
222.	0.1326	507.	0.0251
223.	0.1315	508.	0.0231
224.	0.1313	509.	0.0232
225.	0.1316	510.	0.0236
226.	0.1292	511.	0.0234

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
227.	0.1285	512.	0.0217
228.	0.1284	513.	0.0235
229.	0.1275	514.	0.0224
230.	0.1275	515.	0.0226
231.	0.1271	516.	0.0233
232.	0.1258	517.	0.0234
233.	0.1255	518.	0.021
234.	0.1245	519.	0.0238
235.	0.1228	520.	0.0214
236.	0.1244	521.	0.0221
237.	0.1204	522.	0.0206
238.	0.121	523.	0.0231
239.	0.1189	524.	0.022
240.	0.1201	525.	0.0219
241.	0.1192	526.	0.0203
242.	0.1192	527.	0.0207
243.	0.1197	528.	0.0206
244.	0.118	529.	0.0192
245.	0.116	530.	0.0211
246.	0.1157	531.	0.0221
247.	0.1141	532.	0.0188
248.	0.1125	533.	0.0201
249.	0.1114	534.	0.0207
250.	0.1105	535.	0.0196
251.	0.1132	536.	0.0198
252.	0.112	537.	0.0201
253.	0.1114	538.	0.0186
254.	0.109	539.	0.0188
255.	0.1083	540.	0.0199
256.	0.1082	541.	0.0212
257.	0.107	542.	0.0194
258.	0.1079	543.	0.0182
259.	0.1048	544.	0.0192
260.	0.1069	545.	0.018
261.	0.1046	546.	0.0193
262.	0.1044	547.	0.0188
263.	0.1041	548.	0.0195
264.	0.1057	549.	0.0187
265.	0.1018	550.	0.019
266.	0.1018	551.	0.016
267.	0.0995	552.	0.0188
268.	0.101	553.	0.0178
269.	0.0989	554.	0.0177
270.	0.0983	555.	0.0175
271.	0.099	556.	0.0196
272.	0.0983	557.	0.0183
273.	0.0982	558.	0.0186
274.	0.0961	559.	0.0171
275.	0.0971	560.	0.0186
276.	0.0954	561.	0.018
277.	0.0962	562.	0.0171
278.	0.0968	563.	0.0166
279.	0.0956	564.	0.0155
280.	0.0953	565.	0.0176
281.	0.0922	566.	0.016
282.	0.0951	567.	0.0166
283.	0.0932	568.	0.0169
284.	0.0938	569.	0.0159
285.	0.0912	570.	0.0175

SOLUTION

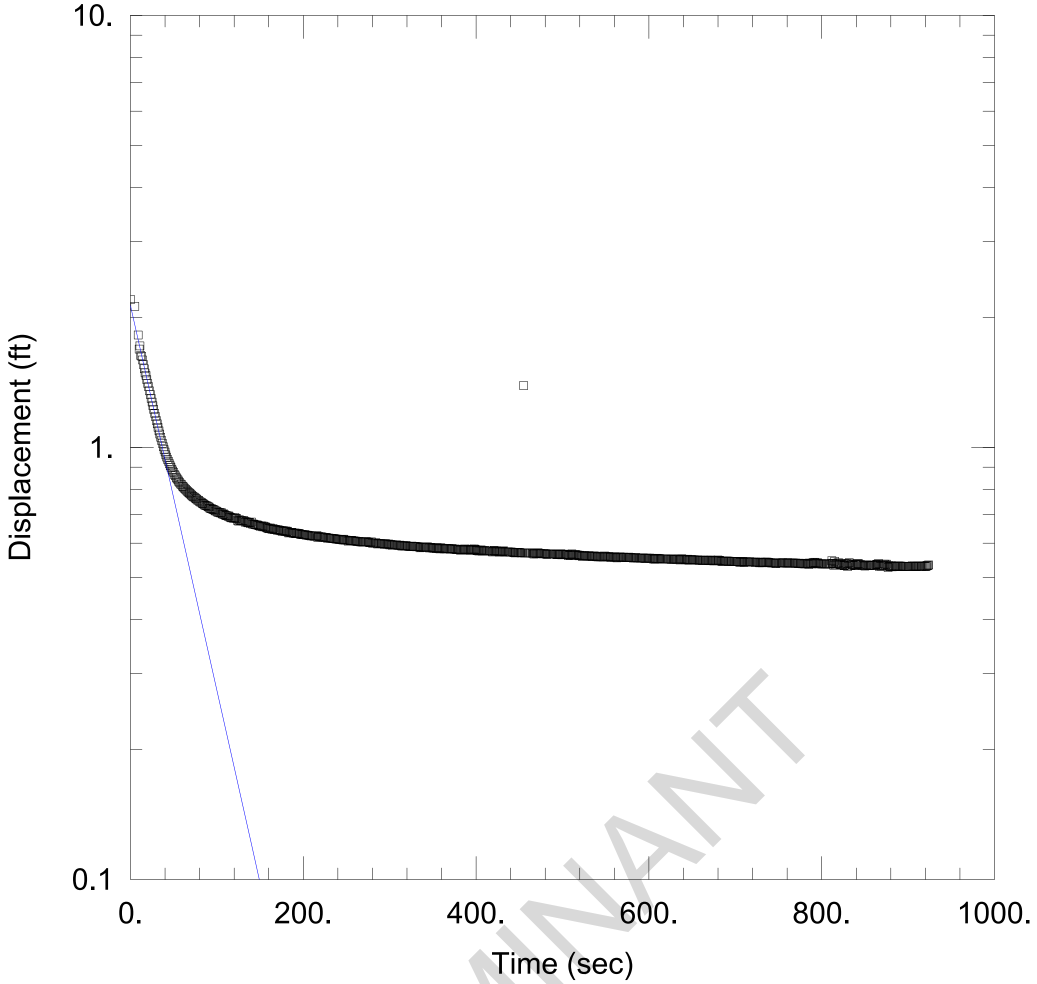
Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
ln(Re/rw): 3.306

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.002247	cm/sec
y0	2.199	ft

T = K*b = 0.9244 cm²/sec



WELL TEST ANALYSIS

Data Set: J:\...\AMW-22.aqt
Date: 09/29/17 Time: 16:06:08

PROJECT INFORMATION

Company: PBW
Client: Luminant
Project: 5164-A
Location: Big Brown Power Plant
Test Well: AMW-22
Test Date: 9-22-2015

AQUIFER DATA

Saturated Thickness: 11.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (New Well)

Initial Displacement: 2.2 ft
Total Well Penetration Depth: 20. ft
Casing Radius: 0.083 ft
Static Water Column Height: 14.5 ft
Screen Length: 20. ft
Well Radius: 0.27 ft
Gravel Pack Porosity: 0.2

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.001752 cm/sec
y0 = 2.128 ft

AQTESOLV for Windows

Data Set: J:\5164 - Luminant CCR GW Monitoring\5164-A _Big Brown\BBSES Slug Tests Sept 2015\Aqtesolv files\
Date: 09/29/17
Time: 16:06:29

PROJECT INFORMATION

Company: PBW
Client: Luminant
Project: 5164-A
Location: Big Brown Power Plant
Test Date: 9-22-2015
Test Well: AMW-22

AQUIFER DATA

Saturated Thickness: 11.5 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: New Well

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 2.2 ft
Static Water Column Height: 14.5 ft
Casing Radius: 0.083 ft
Well Radius: 0.27 ft
Well Skin Radius: 0.27 ft
Screen Length: 20. ft
Total Well Penetration Depth: 20. ft
Corrected Casing Radius (Bouwer-Rice Method): 0.1417 ft
Gravel Pack Porosity: 0.2

No. of Observations: 918

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
0.	0.	466.	0.5699
5.	2.12	467.	0.5665
9.	1.821	468.	0.5699
10.	1.689	469.	0.5686
11.	1.718	470.	0.567
12.	1.632	471.	0.5696
13.	1.625	472.	0.5701
14.	1.593	473.	0.5676
15.	1.555	474.	0.5682
16.	1.52	475.	0.5683
17.	1.488	476.	0.5674
18.	1.467	477.	0.5674
19.	1.435	478.	0.5669
20.	1.406	479.	0.5682
21.	1.382	480.	0.567
22.	1.352	481.	0.5677
23.	1.326	482.	0.5648
24.	1.298	483.	0.566
25.	1.273	484.	0.5665
26.	1.248	485.	0.566
27.	1.224	486.	0.5659
28.	1.2	487.	0.5675
29.	1.179	488.	0.5665
30.	1.154	489.	0.5673
31.	1.134	490.	0.5661
32.	1.113	491.	0.5663
33.	1.093	492.	0.567
34.	1.073	493.	0.565

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
35.	1.055	494.	0.5646
36.	1.038	495.	0.5653
37.	1.022	496.	0.5662
38.	1.004	497.	0.5651
39.	0.9886	498.	0.5672
40.	0.976	499.	0.5641
41.	0.9613	500.	0.5665
42.	0.9501	501.	0.5656
43.	0.9375	502.	0.5656
44.	0.9286	503.	0.5644
45.	0.9168	504.	0.5651
46.	0.9068	505.	0.5652
47.	0.8995	506.	0.5655
48.	0.8891	507.	0.5614
49.	0.8815	508.	0.5639
50.	0.875	509.	0.5625
51.	0.8654	510.	0.5649
52.	0.8593	511.	0.5669
53.	0.8516	512.	0.5635
54.	0.8454	513.	0.5636
55.	0.8406	514.	0.5623
56.	0.8336	515.	0.5653
57.	0.8296	516.	0.5645
58.	0.823	517.	0.5631
59.	0.8208	518.	0.5634
60.	0.8139	519.	0.5613
61.	0.8111	520.	0.5631
62.	0.8063	521.	0.5617
63.	0.8023	522.	0.5621
64.	0.7996	523.	0.5594
65.	0.7951	524.	0.5608
66.	0.7911	525.	0.5616
67.	0.7879	526.	0.562
68.	0.7845	527.	0.561
69.	0.7817	528.	0.5603
70.	0.7779	529.	0.5601
71.	0.7747	530.	0.5597
72.	0.7714	531.	0.5621
73.	0.7682	532.	0.559
74.	0.7671	533.	0.5603
75.	0.7636	534.	0.5587
76.	0.7605	535.	0.5596
77.	0.7588	536.	0.5605
78.	0.7546	537.	0.5606
79.	0.7541	538.	0.5601
80.	0.7493	539.	0.5582
81.	0.7476	540.	0.5601
82.	0.7465	541.	0.5577
83.	0.7426	542.	0.5581
84.	0.7402	543.	0.5592
85.	0.7394	544.	0.5578
86.	0.7355	545.	0.5583
87.	0.7339	546.	0.5585
88.	0.7327	547.	0.5574
89.	0.7313	548.	0.5582
90.	0.7286	549.	0.5606
91.	0.7277	550.	0.5592
92.	0.7237	551.	0.5593
93.	0.7215	552.	0.5576
94.	0.7212	553.	0.5584
95.	0.7193	554.	0.5591
96.	0.7179	555.	0.5576
97.	0.7165	556.	0.5558
98.	0.7133	557.	0.5584
99.	0.7123	558.	0.5581
100.	0.7116	559.	0.5584

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
101.	0.7083	560.	0.5569
102.	0.7071	561.	0.5587
103.	0.7073	562.	0.5574
104.	0.7051	563.	0.5551
105.	0.7069	564.	0.5569
106.	0.7022	565.	0.5566
107.	0.7004	566.	0.5563
108.	0.7014	567.	0.5584
109.	0.6988	568.	0.5559
110.	0.6961	569.	0.5567
111.	0.6951	570.	0.5569
112.	0.6948	571.	0.5571
113.	0.6926	572.	0.5566
114.	0.6941	573.	0.557
115.	0.6899	574.	0.5552
116.	0.6886	575.	0.5567
117.	0.6868	576.	0.556
118.	0.6877	577.	0.5573
119.	0.6858	578.	0.5552
120.	0.6851	579.	0.5562
121.	0.6878	580.	0.556
122.	0.685	581.	0.5553
123.	0.6844	582.	0.5545
124.	0.6776	583.	0.5556
125.	0.6754	584.	0.5549
126.	0.6806	585.	0.5562
127.	0.6766	586.	0.555
128.	0.6776	587.	0.5542
129.	0.6764	588.	0.5549
130.	0.6752	589.	0.5547
131.	0.6777	590.	0.5535
132.	0.6754	591.	0.5553
133.	0.6714	592.	0.5542
134.	0.6735	593.	0.5552
135.	0.6706	594.	0.5549
136.	0.669	595.	0.5531
137.	0.671	596.	0.5536
138.	0.6694	597.	0.5534
139.	0.6663	598.	0.5544
140.	0.6718	599.	0.5542
141.	0.6652	600.	0.5536
142.	0.6641	601.	0.5545
143.	0.6642	602.	0.5535
144.	0.6626	603.	0.5534
145.	0.6622	604.	0.5539
146.	0.6618	605.	0.5516
147.	0.6613	606.	0.5533
148.	0.6596	607.	0.5505
149.	0.6587	608.	0.5528
150.	0.6573	609.	0.554
151.	0.6579	610.	0.5521
152.	0.6579	611.	0.5535
153.	0.6548	612.	0.5526
154.	0.6576	613.	0.5531
155.	0.6549	614.	0.5512
156.	0.6552	615.	0.5523
157.	0.6534	616.	0.5522
158.	0.6509	617.	0.5516
159.	0.651	618.	0.5519
160.	0.648	619.	0.5522
161.	0.6495	620.	0.5527
162.	0.6507	621.	0.5517
163.	0.6477	622.	0.552
164.	0.6467	623.	0.5513
165.	0.649	624.	0.5507
166.	0.6456	625.	0.5512

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
167.	0.6458	626.	0.5503
168.	0.6458	627.	0.5523
169.	0.6454	628.	0.5507
170.	0.6432	629.	0.5506
171.	0.6451	630.	0.5518
172.	0.6429	631.	0.5516
173.	0.6433	632.	0.5501
174.	0.6411	633.	0.5505
175.	0.6423	634.	0.5519
176.	0.639	635.	0.5511
177.	0.642	636.	0.5489
178.	0.6405	637.	0.5505
179.	0.6387	638.	0.5524
180.	0.6407	639.	0.5502
181.	0.6379	640.	0.5513
182.	0.6398	641.	0.5505
183.	0.6339	642.	0.5491
184.	0.635	643.	0.5507
185.	0.635	644.	0.5497
186.	0.6361	645.	0.5512
187.	0.6361	646.	0.548
188.	0.6336	647.	0.5484
189.	0.6324	648.	0.5493
190.	0.6341	649.	0.5504
191.	0.6314	650.	0.5502
192.	0.6332	651.	0.5485
193.	0.633	652.	0.5496
194.	0.632	653.	0.5498
195.	0.6322	654.	0.5494
196.	0.6308	655.	0.5485
197.	0.6293	656.	0.5481
198.	0.6286	657.	0.5495
199.	0.629	658.	0.5474
200.	0.6278	659.	0.5477
201.	0.6281	660.	0.5485
202.	0.6285	661.	0.548
203.	0.6269	662.	0.5472
204.	0.6264	663.	0.5487
205.	0.6266	664.	0.5478
206.	0.6253	665.	0.5478
207.	0.6252	666.	0.548
208.	0.6248	667.	0.5473
209.	0.6237	668.	0.5485
210.	0.6246	669.	0.547
211.	0.6243	670.	0.5471
212.	0.6232	671.	0.5463
213.	0.6222	672.	0.5489
214.	0.624	673.	0.5477
215.	0.6231	674.	0.5466
216.	0.6247	675.	0.5462
217.	0.6186	676.	0.5471
218.	0.6222	677.	0.5472
219.	0.6206	678.	0.5466
220.	0.6215	679.	0.5466
221.	0.6203	680.	0.549
222.	0.6203	681.	0.5467
223.	0.6197	682.	0.5478
224.	0.6194	683.	0.5463
225.	0.6186	684.	0.5453
226.	0.6188	685.	0.5441
227.	0.6189	686.	0.5461
228.	0.6164	687.	0.5458
229.	0.6171	688.	0.545
230.	0.6169	689.	0.5458
231.	0.616	690.	0.5457
232.	0.6158	691.	0.5459

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
233.	0.6159	692.	0.5444
234.	0.6153	693.	0.5456
235.	0.6152	694.	0.5448
236.	0.6152	695.	0.5444
237.	0.6143	696.	0.5451
238.	0.6135	697.	0.5444
239.	0.613	698.	0.5447
240.	0.6131	699.	0.5441
241.	0.6123	700.	0.5445
242.	0.6119	701.	0.5443
243.	0.6123	702.	0.5438
244.	0.6123	703.	0.5441
245.	0.6112	704.	0.5444
246.	0.6108	705.	0.5425
247.	0.6131	706.	0.5419
248.	0.6101	707.	0.5448
249.	0.6103	708.	0.5439
250.	0.6098	709.	0.5448
251.	0.6096	710.	0.5415
252.	0.6072	711.	0.543
253.	0.6096	712.	0.5425
254.	0.6084	713.	0.5441
255.	0.6082	714.	0.5432
256.	0.6096	715.	0.5427
257.	0.6085	716.	0.5426
258.	0.6074	717.	0.5441
259.	0.6079	718.	0.5423
260.	0.6063	719.	0.543
261.	0.607	720.	0.5424
262.	0.6056	721.	0.5429
263.	0.6058	722.	0.5423
264.	0.6059	723.	0.5416
265.	0.6055	724.	0.5429
266.	0.6044	725.	0.5424
267.	0.6045	726.	0.5424
268.	0.6045	727.	0.5421
269.	0.6032	728.	0.5404
270.	0.6038	729.	0.5414
271.	0.6039	730.	0.5429
272.	0.6031	731.	0.5407
273.	0.6059	732.	0.542
274.	0.6037	733.	0.5409
275.	0.604	734.	0.5414
276.	0.6028	735.	0.5426
277.	0.602	736.	0.5418
278.	0.6017	737.	0.5427
279.	0.6043	738.	0.5422
280.	0.6002	739.	0.5419
281.	0.6001	740.	0.5406
282.	0.601	741.	0.5412
283.	0.5997	742.	0.5401
284.	0.602	743.	0.5407
285.	0.6004	744.	0.5407
286.	0.5978	745.	0.5404
287.	0.5993	746.	0.5404
288.	0.5993	747.	0.5381
289.	0.5989	748.	0.5408
290.	0.5994	749.	0.5406
291.	0.5983	750.	0.5411
292.	0.5985	751.	0.5408
293.	0.5984	752.	0.5396
294.	0.5961	753.	0.5398
295.	0.5992	754.	0.54
296.	0.5979	755.	0.5413
297.	0.5969	756.	0.541
298.	0.5965	757.	0.5403

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
299.	0.5977	758.	0.5401
300.	0.5947	759.	0.5391
301.	0.596	760.	0.5393
302.	0.5962	761.	0.5414
303.	0.5934	762.	0.5391
304.	0.5958	763.	0.5399
305.	0.5953	764.	0.5408
306.	0.595	765.	0.5395
307.	0.5949	766.	0.5408
308.	0.5951	767.	0.5406
309.	0.5929	768.	0.5402
310.	0.5929	769.	0.5387
311.	0.5931	770.	0.5402
312.	0.5939	771.	0.5391
313.	0.5926	772.	0.5392
314.	0.5913	773.	0.5384
315.	0.5918	774.	0.5397
316.	0.5925	775.	0.5388
317.	0.5912	776.	0.5397
318.	0.5906	777.	0.5376
319.	0.5929	778.	0.5378
320.	0.5913	779.	0.5387
321.	0.5906	780.	0.5372
322.	0.5895	781.	0.5378
323.	0.5902	782.	0.5393
324.	0.5894	783.	0.5392
325.	0.5894	784.	0.5375
326.	0.5913	785.	0.5359
327.	0.5894	786.	0.5402
328.	0.589	787.	0.5392
329.	0.5902	788.	0.538
330.	0.5901	789.	0.5373
331.	0.5887	790.	0.5413
332.	0.5895	791.	0.5379
333.	0.5893	792.	0.5425
334.	0.5893	793.	0.54
335.	0.5858	794.	0.5391
336.	0.5883	795.	0.5414
337.	0.5867	796.	0.5389
338.	0.5888	797.	0.5375
339.	0.5864	798.	0.5378
340.	0.5883	799.	0.5382
341.	0.588	800.	0.5367
342.	0.5882	801.	0.5386
343.	0.5881	802.	0.5367
344.	0.5884	803.	0.5374
345.	0.587	804.	0.5362
346.	0.5851	805.	0.5372
347.	0.5866	806.	0.5365
348.	0.587	807.	0.5382
349.	0.5849	808.	0.5375
350.	0.5863	809.	0.5378
351.	0.5834	810.	0.5377
352.	0.5855	811.	0.5387
353.	0.5852	812.	0.5463
354.	0.5829	813.	0.5394
355.	0.5865	814.	0.5334
356.	0.5838	815.	0.5449
357.	0.5847	816.	0.5349
358.	0.5823	817.	0.5388
359.	0.5862	818.	0.5381
360.	0.584	819.	0.5404
361.	0.5847	820.	0.5407
362.	0.5828	821.	0.537
363.	0.5823	822.	0.5367
364.	0.5835	823.	0.5338

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
365.	0.582	824.	0.5356
366.	0.5843	825.	0.5368
367.	0.5833	826.	0.5322
368.	0.5832	827.	0.5385
369.	0.5836	828.	0.534
370.	0.5812	829.	0.5384
371.	0.5813	830.	0.5301
372.	0.5836	831.	0.5385
373.	0.5826	832.	0.5409
374.	0.5811	833.	0.5338
375.	0.5808	834.	0.5336
376.	0.5822	835.	0.5362
377.	0.5801	836.	0.5341
378.	0.5802	837.	0.5354
379.	0.5805	838.	0.5323
380.	0.5805	839.	0.5357
381.	0.5794	840.	0.5365
382.	0.5783	841.	0.5378
383.	0.5793	842.	0.5387
384.	0.5803	843.	0.5375
385.	0.5789	844.	0.535
386.	0.5805	845.	0.5361
387.	0.5819	846.	0.5325
388.	0.5794	847.	0.5321
389.	0.5781	848.	0.5321
390.	0.5808	849.	0.5333
391.	0.5804	850.	0.5315
392.	0.5791	851.	0.5325
393.	0.5776	852.	0.535
394.	0.58	853.	0.5349
395.	0.5817	854.	0.5323
396.	0.5788	855.	0.533
397.	0.5785	856.	0.5325
398.	0.582	857.	0.5337
399.	0.5812	858.	0.5338
400.	0.579	859.	0.5325
401.	0.5769	860.	0.5335
402.	0.5787	861.	0.5331
403.	0.5759	862.	0.5336
404.	0.5771	863.	0.535
405.	0.5783	864.	0.5362
406.	0.5792	865.	0.5367
407.	0.5752	866.	0.5386
408.	0.5771	867.	0.5301
409.	0.5753	868.	0.5326
410.	0.5777	869.	0.5315
411.	0.5757	870.	0.5335
412.	0.5759	871.	0.533
413.	0.5764	872.	0.5334
414.	0.5762	873.	0.537
415.	0.5754	874.	0.5345
416.	0.576	875.	0.5367
417.	0.5753	876.	0.531
418.	0.5756	877.	0.5274
419.	0.5727	878.	0.5325
420.	0.5755	879.	0.5295
421.	0.5775	880.	0.5305
422.	0.574	881.	0.5325
423.	0.5759	882.	0.529
424.	0.5766	883.	0.5304
425.	0.5751	884.	0.5312
426.	0.5743	885.	0.5305
427.	0.5722	886.	0.5306
428.	0.5753	887.	0.5294
429.	0.5732	888.	0.5304
430.	0.5749	889.	0.5322

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
431.	0.575	890.	0.5317
432.	0.5763	891.	0.5294
433.	0.5725	892.	0.5312
434.	0.5727	893.	0.5309
435.	0.573	894.	0.5296
436.	0.5733	895.	0.5307
437.	0.5735	896.	0.5301
438.	0.5732	897.	0.5309
439.	0.572	898.	0.5303
440.	0.5727	899.	0.5301
441.	0.5722	900.	0.5303
442.	0.5721	901.	0.5299
443.	0.5713	902.	0.53
444.	0.5708	903.	0.5308
445.	0.5696	904.	0.5309
446.	0.5713	905.	0.5316
447.	0.5714	906.	0.5306
448.	0.5711	907.	0.5316
449.	0.5717	908.	0.5302
450.	0.5708	909.	0.5297
451.	0.5711	910.	0.5296
452.	0.5697	911.	0.5322
453.	0.5701	912.	0.5308
454.	0.5704	913.	0.5314
455.	1.39	914.	0.5315
456.	0.5695	915.	0.5306
457.	0.5701	916.	0.5307
458.	0.5705	917.	0.5322
459.	0.5703	918.	0.5322
460.	0.5698	919.	0.5315
461.	0.5697	920.	0.5297
462.	0.5698	921.	0.5306
463.	0.569	922.	0.5331
464.	0.5697	923.	0.5321
465.	0.5685	924.	0.5343

SOLUTION

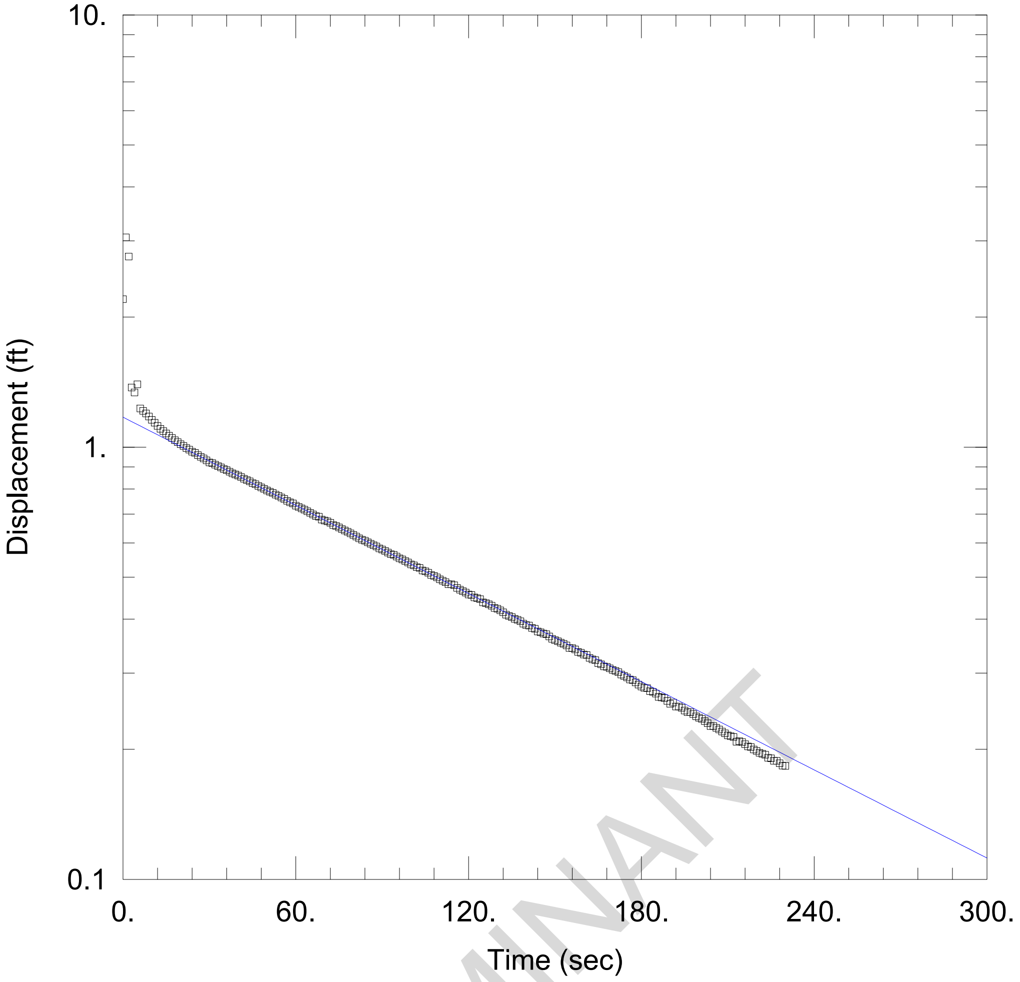
Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
ln(Re/rw): 3.306

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.001752	cm/sec
y0	2.128	ft

T = K*b = 0.6141 cm²/sec



WELL TEST ANALYSIS

Data Set: J:\...\FMW-4R Slug IN.aqt
Date: 01/18/16 Time: 12:04:23

PROJECT INFORMATION

Company: PBW
Client: Luminant
Project: 5164-A
Location: Big Brown Power Plant
Test Well: FMW-4R
Test Date: 9-22-15

AQUIFER DATA

Saturated Thickness: 18.23 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (FMW-4R)

Initial Displacement: 2.2 ft
Static Water Column Height: 18.23 ft
Total Well Penetration Depth: 18.23 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Radius: 0.27 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0002565 cm/sec
y0 = 1.173 ft

Data Set: J:\5164 - Luminant CCR Well Installation and GW Sampling\5164-A _Big Brown\BBSES Slug Tests Sept 2015
Date: 01/18/16
Time: 12:04:49

PROJECT INFORMATION

Company: PBW
Client: Luminant
Project: 5164-A
Location: Big Brown Power Plant
Test Date: 9-22-15
Test Well: FMW-4R

AQUIFER DATA

Saturated Thickness: 18.23 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: FMW-4R

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 2.2 ft
Static Water Column Height: 18.23 ft
Casing Radius: 0.083 ft
Well Radius: 0.27 ft
Well Skin Radius: 0.27 ft
Screen Length: 10. ft
Total Well Penetration Depth: 18.23 ft

No. of Observations: 231

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
0.	0.	116.	0.4723
1.	3.057	117.	0.4679
2.	2.761	118.	0.4644
3.	1.373	119.	0.4608
4.	1.339	120.	0.456
5.	1.398	121.	0.4551
6.	1.228	122.	0.4492
7.	1.213	123.	0.4473
8.	1.197	124.	0.445
9.	1.177	125.	0.4373
10.	1.156	126.	0.4357
11.	1.139	127.	0.4329
12.	1.12	128.	0.4296
13.	1.103	129.	0.4245
14.	1.089	130.	0.4229
15.	1.076	131.	0.4191
16.	1.063	132.	0.4148
17.	1.05	133.	0.4097
18.	1.038	134.	0.4068
19.	1.027	135.	0.4043
20.	1.016	136.	0.4006
21.	1.007	137.	0.3986
22.	0.9953	138.	0.3957
23.	0.9869	139.	0.3905
24.	0.9758	140.	0.3875
25.	0.97	141.	0.3865
26.	0.9583	142.	0.3815
27.	0.9501	143.	0.3799
28.	0.9417	144.	0.3746
29.	0.9323	145.	0.373

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
30.	0.9221	146.	0.3705
31.	0.9188	147.	0.3693
32.	0.9107	148.	0.3649
33.	0.9037	149.	0.3602
34.	0.8981	150.	0.3578
35.	0.8899	151.	0.3555
36.	0.8845	152.	0.3529
37.	0.8772	153.	0.3507
38.	0.8701	154.	0.3479
39.	0.8644	155.	0.343
40.	0.8597	156.	0.3428
41.	0.8529	157.	0.3405
42.	0.8452	158.	0.3358
43.	0.8393	159.	0.3345
44.	0.8335	160.	0.3313
45.	0.8259	161.	0.3304
46.	0.8205	162.	0.3253
47.	0.813	163.	0.3229
48.	0.8071	164.	0.3215
49.	0.8005	165.	0.3164
50.	0.7941	166.	0.3146
51.	0.7888	167.	0.311
52.	0.7841	168.	0.3102
53.	0.7765	169.	0.3079
54.	0.7711	170.	0.3053
55.	0.7646	171.	0.3038
56.	0.7589	172.	0.3017
57.	0.7513	173.	0.2977
58.	0.7454	174.	0.2954
59.	0.7413	175.	0.2933
60.	0.7321	176.	0.2901
61.	0.7272	177.	0.2889
62.	0.7215	178.	0.2855
63.	0.7168	179.	0.2822
64.	0.7104	180.	0.2793
65.	0.7047	181.	0.2775
66.	0.6986	182.	0.277
67.	0.6926	183.	0.2725
68.	0.6906	184.	0.2715
69.	0.6797	185.	0.269
70.	0.6764	186.	0.2643
71.	0.6734	187.	0.2635
72.	0.6685	188.	0.2626
73.	0.6606	189.	0.2587
74.	0.657	190.	0.2547
75.	0.6521	191.	0.2564
76.	0.6463	192.	0.2511
77.	0.6415	193.	0.251
78.	0.6374	194.	0.2493
79.	0.6319	195.	0.2457
80.	0.6266	196.	0.2438
81.	0.6212	197.	0.2438
82.	0.6153	198.	0.2412
83.	0.6106	199.	0.2384
84.	0.6077	200.	0.2365
85.	0.6025	201.	0.2351
86.	0.5977	202.	0.2324
87.	0.593	203.	0.2298
88.	0.5889	204.	0.2263
89.	0.5831	205.	0.2263
90.	0.5797	206.	0.2242
91.	0.5754	207.	0.2222
92.	0.5703	208.	0.2198
93.	0.5656	209.	0.2178
94.	0.5635	210.	0.2154
95.	0.5585	211.	0.2144

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
96.	0.5529	212.	0.2135
97.	0.5499	213.	0.2082
98.	0.5449	214.	0.2088
99.	0.541	215.	0.2078
100.	0.5355	216.	0.2055
101.	0.5329	217.	0.2031
102.	0.5275	218.	0.2023
103.	0.5257	219.	0.1997
104.	0.5182	220.	0.1983
105.	0.5161	221.	0.1962
106.	0.512	222.	0.1952
107.	0.5063	223.	0.1943
108.	0.5037	224.	0.1911
109.	0.4997	225.	0.1906
110.	0.4944	226.	0.1881
111.	0.4907	227.	0.188
112.	0.4869	228.	0.1857
113.	0.4815	229.	0.1833
114.	0.4815	230.	0.183
115.	0.4792		

SOLUTION

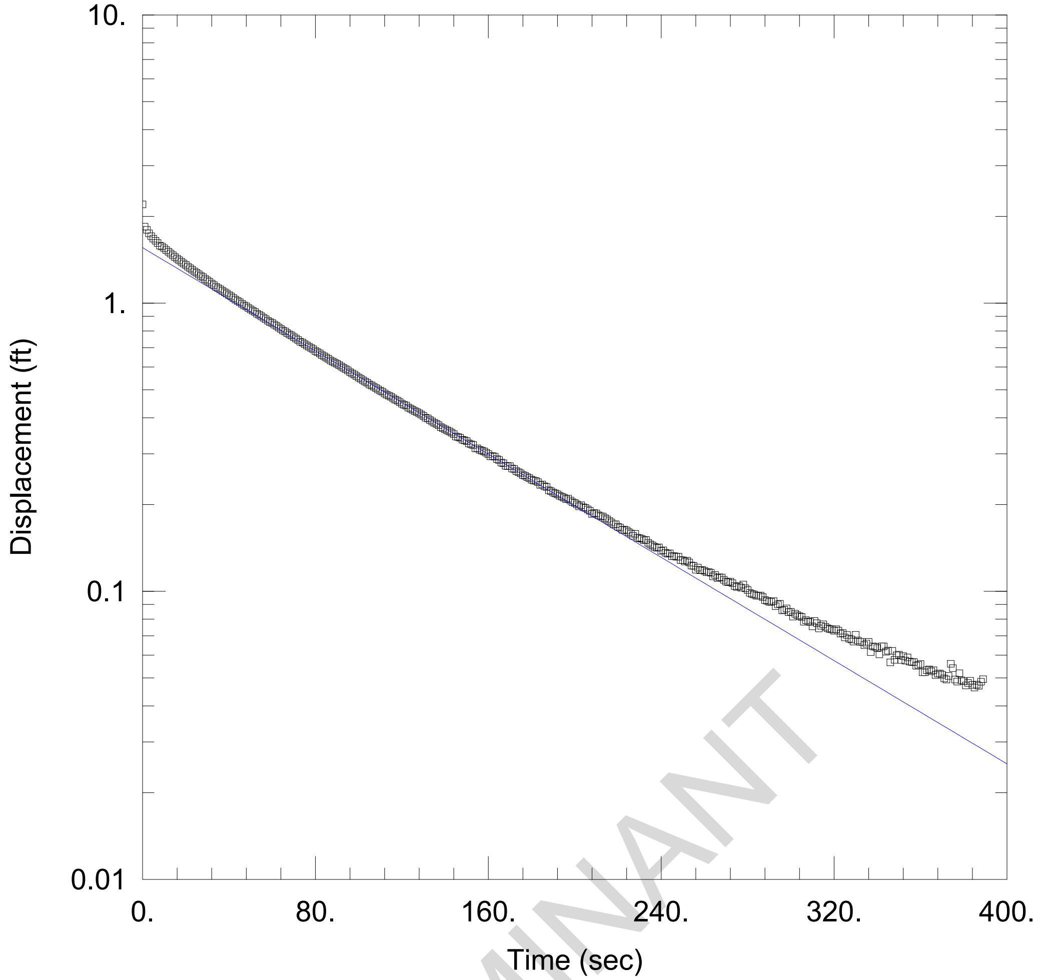
Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
ln(Re/rw): 3.12

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.0002565	cm/sec
y0	1.173	ft

T = K*b = 0.1425 cm²/sec



WELL TEST ANALYSIS

Data Set: J:\...\FMW-4R Slug OUT.aqt
Date: 01/18/16 Time: 12:05:54

PROJECT INFORMATION

Company: PBW
Client: Luminant
Project: 5164-A
Location: Big Brown Power Plant
Test Well: FMW-4R
Test Date: 9-22-15

AQUIFER DATA

Saturated Thickness: 18.23 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (FMW-4R)

Initial Displacement: 2.2 ft
Total Well Penetration Depth: 18.23 ft
Casing Radius: 0.083 ft
Static Water Column Height: 18.23 ft
Screen Length: 10. ft
Well Radius: 0.27 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0003378 cm/sec
y0 = 1.557 ft

Data Set: J:\5164 - Luminant CCR Well Installation and GW Sampling\5164-A _Big Brown\BBSES Slug Tests Sept 2015
Date: 01/18/16
Time: 12:06:13

PROJECT INFORMATION

Company: PBW
Client: Luminant
Project: 5164-A
Location: Big Brown Power Plant
Test Date: 9-22-15
Test Well: FMW-4R

AQUIFER DATA

Saturated Thickness: 18.23 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: FMW-4R

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 2.2 ft
Static Water Column Height: 18.23 ft
Casing Radius: 0.083 ft
Well Radius: 0.27 ft
Well Skin Radius: 0.27 ft
Screen Length: 10. ft
Total Well Penetration Depth: 18.23 ft

No. of Observations: 390

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
0.	0.	195.	0.2111
1.	1.841	196.	0.2087
2.	1.796	197.	0.2096
3.	1.745	198.	0.2064
4.	1.705	199.	0.2038
5.	1.673	200.	0.2024
6.	1.645	201.	0.2002
7.	1.617	202.	0.197
8.	1.582	203.	0.1989
9.	1.573	204.	0.1957
10.	1.55	205.	0.1947
11.	1.529	206.	0.1922
12.	1.507	207.	0.1903
13.	1.486	208.	0.1854
14.	1.465	209.	0.1867
15.	1.444	210.	0.1861
16.	1.426	211.	0.1836
17.	1.409	212.	0.1821
18.	1.391	213.	0.1816
19.	1.372	214.	0.1792
20.	1.356	215.	0.1774
21.	1.338	216.	0.1753
22.	1.32	217.	0.1733
23.	1.305	218.	0.1705
24.	1.288	219.	0.1709
25.	1.275	220.	0.1674
26.	1.258	221.	0.1663
27.	1.243	222.	0.1633
28.	1.229	223.	0.1636
29.	1.213	224.	0.1624

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
30.	1.198	225.	0.1604
31.	1.184	226.	0.1585
32.	1.168	227.	0.1558
33.	1.155	228.	0.1582
34.	1.139	229.	0.1534
35.	1.127	230.	0.1528
36.	1.116	231.	0.152
37.	1.102	232.	0.1503
38.	1.091	233.	0.1506
39.	1.079	234.	0.1473
40.	1.065	235.	0.1454
41.	1.055	236.	0.1441
42.	1.041	237.	0.1424
43.	1.028	238.	0.1416
44.	1.018	239.	0.1418
45.	1.007	240.	0.1382
46.	0.9948	241.	0.1386
47.	0.9821	242.	0.1361
48.	0.9743	243.	0.1349
49.	0.9614	244.	0.1353
50.	0.9509	245.	0.1322
51.	0.9409	246.	0.1325
52.	0.9313	247.	0.1317
53.	0.9184	248.	0.1318
54.	0.9097	249.	0.1282
55.	0.8999	250.	0.1281
56.	0.889	251.	0.1268
57.	0.8799	252.	0.1276
58.	0.8681	253.	0.1258
59.	0.8596	254.	0.1228
60.	0.8526	255.	0.1224
61.	0.8419	256.	0.1188
62.	0.8337	257.	0.1208
63.	0.8227	258.	0.1183
64.	0.8137	259.	0.1185
65.	0.8033	260.	0.1177
66.	0.7971	261.	0.1163
67.	0.7871	262.	0.1165
68.	0.7773	263.	0.1159
69.	0.7713	264.	0.1125
70.	0.7615	265.	0.1138
71.	0.7536	266.	0.1111
72.	0.7448	267.	0.1118
73.	0.7343	268.	0.1115
74.	0.7293	269.	0.1096
75.	0.7208	270.	0.108
76.	0.7131	271.	0.1075
77.	0.7055	272.	0.1079
78.	0.6989	273.	0.1067
79.	0.6914	274.	0.1043
80.	0.6815	275.	0.1035
81.	0.6753	276.	0.1043
82.	0.669	277.	0.1029
83.	0.6601	278.	0.1054
84.	0.6533	279.	0.1024
85.	0.6467	280.	0.101
86.	0.6401	281.	0.0987
87.	0.6319	282.	0.0978
88.	0.6269	283.	0.0974
89.	0.6211	284.	0.0966
90.	0.6152	285.	0.0964
91.	0.6091	286.	0.0965
92.	0.6018	287.	0.0954
93.	0.5958	288.	0.0932
94.	0.5897	289.	0.0927
95.	0.5839	290.	0.0918

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
96.	0.5761	291.	0.0919
97.	0.5702	292.	0.0924
98.	0.5648	293.	0.0887
99.	0.5575	294.	0.09
100.	0.551	295.	0.0904
101.	0.5465	296.	0.0858
102.	0.5391	297.	0.0862
103.	0.5341	298.	0.0872
104.	0.5289	299.	0.0846
105.	0.5219	300.	0.0848
106.	0.5181	301.	0.0816
107.	0.5126	302.	0.0836
108.	0.5072	303.	0.0826
109.	0.5015	304.	0.0819
110.	0.4963	305.	0.0814
111.	0.4928	306.	0.0784
112.	0.4858	307.	0.0794
113.	0.4806	308.	0.0786
114.	0.477	309.	0.0782
115.	0.4727	310.	0.0755
116.	0.4669	311.	0.0789
117.	0.4621	312.	0.0775
118.	0.4587	313.	0.0743
119.	0.4535	314.	0.0758
120.	0.4477	315.	0.0768
121.	0.4438	316.	0.0752
122.	0.4406	317.	0.0744
123.	0.4338	318.	0.0739
124.	0.4304	319.	0.0737
125.	0.4262	320.	0.073
126.	0.422	321.	0.0738
127.	0.4188	322.	0.073
128.	0.4144	323.	0.0713
129.	0.4105	324.	0.0716
130.	0.4056	325.	0.0691
131.	0.3998	326.	0.0705
132.	0.3977	327.	0.0684
133.	0.3927	328.	0.068
134.	0.3885	329.	0.0669
135.	0.3844	330.	0.0706
136.	0.381	331.	0.0675
137.	0.3772	332.	0.0667
138.	0.3715	333.	0.0667
139.	0.368	334.	0.065
140.	0.3646	335.	0.0658
141.	0.3615	336.	0.0667
142.	0.3586	337.	0.0615
143.	0.355	338.	0.0644
144.	0.3509	339.	0.0641
145.	0.3443	340.	0.0635
146.	0.3432	341.	0.0604
147.	0.3407	342.	0.0644
148.	0.3358	343.	0.0644
149.	0.3339	344.	0.0617
150.	0.3317	345.	0.0622
151.	0.326	346.	0.0566
152.	0.3235	347.	0.0621
153.	0.3217	348.	0.0578
154.	0.3132	349.	0.0599
155.	0.3132	350.	0.0602
156.	0.3096	351.	0.0577
157.	0.3078	352.	0.0595
158.	0.3055	353.	0.0574
159.	0.3025	354.	0.0589
160.	0.2993	355.	0.057
161.	0.2937	356.	0.0568

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
162.	0.2944	357.	0.0568
163.	0.2932	358.	0.0551
164.	0.2873	359.	0.0555
165.	0.2852	360.	0.0559
166.	0.2795	361.	0.0523
167.	0.278	362.	0.0523
168.	0.2723	363.	0.0532
169.	0.2718	364.	0.0535
170.	0.2718	365.	0.0527
171.	0.2667	366.	0.0532
172.	0.2654	367.	0.0512
173.	0.2613	368.	0.0518
174.	0.259	369.	0.0518
175.	0.2566	370.	0.0513
176.	0.253	371.	0.0498
177.	0.2517	372.	0.0494
178.	0.2489	373.	0.0508
179.	0.2469	374.	0.056
180.	0.2438	375.	0.0541
181.	0.2422	376.	0.0494
182.	0.2416	377.	0.0486
183.	0.239	378.	0.0519
184.	0.2341	379.	0.0491
185.	0.2345	380.	0.0487
186.	0.2312	381.	0.0471
187.	0.23	382.	0.048
188.	0.2239	383.	0.0489
189.	0.2226	384.	0.0473
190.	0.22	385.	0.0463
191.	0.2187	386.	0.0474
192.	0.2169	387.	0.047
193.	0.2146	388.	0.0485
194.	0.2128	389.	0.0495

SOLUTION

Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
ln(Re/rw): 3.12

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.0003378	cm/sec
y0	1.557	ft

T = K*b = 0.1877 cm²/sec