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American Electric Power Service Corporation

Stack Out Area - CCR Groundwater Monitoring Well Network Evaluation (Updated December 2023)

H.W. Pirkey Power Plant
2400 FM 3251
Harrison County
Hallsville, Texas

December 11, 2023

ARCADIS | Design & Consultancy for natural and built assets

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H.W. Pirkey Power Plant
2400 FM 3251
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Hallsville, Texas

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Acronyms and Abbreviation

AEP	American Electric Power Service Cooperation
amsl	above mean sea level
ARCADIS	Arcadis U.S., Inc.
BAP	bottom ash pond
CCR	Coal Combustion Residual
CFR	Code of Federal Regulations
EPA	U.S. Environmental Protection Agency
EPRI	Electric Power Research Institute
FAP	fly ash pond
FGD	flue gas desulfurization
ft	feet
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
PTI	Permit to Install
TDS	total dissolved solids

1. Objective

In 2016, as specified in Code of Federal Regulations (CFR) 40 CFR 257.91, ARCADIS U.S., Inc. (Arcadis) assessed the adequacy of the groundwater monitoring well network for the Stack Out Area, which is a Coal Combustion Residual (CCR) Unit at the American Electric Power (AEP) H.W. Pirkey Generating Plant (Plant). The groundwater monitoring well network evaluation report for the Stack Out Area was posted to the operating record on March 9, 2017, and posted to the publicly assessable website within 30 days thereafter.

The Plant is located at 2400 FM 3251 in Hallsville, Harrison County, Texas (**Figure 1**), and the Stack Out Area is located near the center of the Plant as shown on **Figure 2**. The Plant is currently being demolished, and one the designated downgradient monitoring wells (AD-7) for the Stack Out Area was plugged during September 2023 because it was located within the boundary (footprint) of the Stack Out Area where demolition activities are occurring. Monitoring well AD-7 has been replaced with monitoring well AD-7R, located directly west of the Stack Out Area and beyond the demolition boundary. Provided herein is the updated Groundwater Monitoring Well Network Evaluation for the Stack Out Area CCR Unit, with monitoring well AD-7R replacing monitoring well AD-7.

The CCR requirements include an evaluation of the adequacy of the groundwater monitoring well network to characterize groundwater quality up and down gradient of the CCR unit and an evaluation of whether the CCR unit meets up to 5 location restrictions, which include: the base of the CCR unit is 5 feet (ft) above and isolated from the uppermost aquifer, the CCR unit may not be located in a wetland, within 200 ft of the damage zone of a fault that has displacement during the Holocene, within a seismic impact zone, or in an unstable area.

Four regulated CCR units associated with the Plant were identified for review, which include the West Bottom Ash Pond (BAP), East BAP, Stack Out Area, and Landfill (**Figure 2**). This report summarizes the evaluation of the groundwater monitoring well network in the uppermost aquifer at the Stack Out Area. The evaluation of the location restriction criteria for the Stack Out Area is not included in this report and was completed under separate cover (Arcadis, 2016).

This evaluation included a review of AEP-provided data associated with previously completed subsurface investigation activities in the vicinity of the Stack Out Area CCR unit, as well as publicly-available geologic and hydrogeologic data. This report also presents the current Conceptual Site Model based on all documents reviewed and will

further describe the uppermost aquifer, include an evaluation of the adequacy of the existing monitoring well network, and provide recommendations for monitoring well augmentation, as necessary.

2. Background Information

The following section provides background information for the AEP H.W. Pirkey Generating Plant Stack Out Area.

2.1 Facility Location Description

The AEP H.W. Pirkey Plant is located in southern Harrison County, approximately 5 miles southeast of Hallsville, Texas, and approximately 8 miles southwest of Marshall, Texas. The Stack Out Area CCR unit is located in the central portion of the Plant, and approximately 1,200 feet northwest of Brandy Branch Reservoir (**Figures 1** and **2**).

2.2 Description of Stack Out Area CCR Unit

The following section discusses the embankment configuration, area, volume, construction and operational history, and surface water control associated with the Stack Out Area.

2.2.1 Stack Out Area Configuration

The Stack Out Area is an approximate 7-acre storage area that had been used for stabilized flue gas desulfurization (FGD) sludge until the Plant ceased operation on March 31, 2023. As shown on **Figure 3**, the Stack Out Area is located directly south of the Surge Pond, directly west of Thickener Tanks 1A and 1B, and directly east of a road that runs south to the on-site Landfill. The dimensions of the Stack Out Area are approximately 650 feet from north to south by 450 feet from east to west.

Stabilized FGD sludge was temporarily stockpiled directly above natural ground surface (native clay) in the Stack Out Area using a radial stacker. The maximum height of the stabilized FGD sludge piles were approximately 41 feet above ground surface. There are no solids retention structures in the Stack Out Area. The stabilized FGD sludge piles were located no closer than approximately 50 feet from the perimeter of the Stack Out Area, thereby preventing the stabilized FGD sludge from migrating beyond the boundaries of the Stack Out Area.

2.2.2 Area/Volume

The Stack Out Area is approximately 7 acres in size. However, as discussed above in Section 2.2.1, the CCR piles in the Stack Out Area were located no closer than approximately 50 feet from the perimeter of the Stack Out Area, therefore the effective storage area of the Stack Out Area is approximately 4.4 acres (550 feet by 350 feet), and the maximum CCR storage volume based on a maximum CCR pile height of 41 feet is 180 acre feet.

2.2.3 Construction and Operational History

The H.W. Pirkey Power Plant was constructed in 1983 and 1984 and began operation in 1985. Throughout the life of the Plant, which ceased operation on March 31, 2023, CCR materials (fly ash, bottom ash, economizer ash, FGD sludge) had been generated. The Stack Out Area received stabilized FGD sludge (**Figure 3**). Prior to storing the FGD sludge in the Stack Out Area, the FGD sludge was dewatered using belt presses, and the dewatering fluid was routed to the Surge Pond for reuse as FGD makeup water. The stabilized FGD sludge was then stockpiled in the Stack Out Area using a radial stacker with an approximate 3-foot-wide by 120-foot-long conveyor belt.

The stabilized FGD sludge was temporarily stored at the Stack Out Area. The stabilized FGD sludge was removed using front-end loaders or similar equipment, placed into trucks, and disposed of at the on-site Landfill CCR Unit located near the south end of the Plant.

Lithologic data from soil borings and monitoring wells confirm the native soils underling the Stack Out Area consist of low-permeability clay. As shown on Geologic Cross Sections B-B' (**Figure 5**), E-E' (**Figure 8**), and F-F' (**Figure 9**) the native clay directly below the Stack Out Area extends from the surface to an average depth of approximately 20 feet. Therefore, as shown on **Figures 5, 8**, and **9**, the separation distance between the base of the Stack Out Area and uppermost aquifer exceeds 5 feet.

2.2.4 Surface Water Control

The Stack Out Area contained dewatered FGD sludge that was stockpiled using a radial stacker, therefore no sluice water was present in the Stack Out Area. Storm water in the Stack Out Area follows surface topography via gravity sheet flow. The ground surface elevation in the Stack Out Area ranges from approximately 360 to 365

feet amsl (Akron Consulting, 2015). Storm water flow in the Stack Out Area is in a general northerly direction to the Surge Pond, which is a below-grade (incised) non-CCR unit. The Surge Pond is currently being utilized for storage of storm water during Plant demolition activities.

2.3 Previous Investigations

The initial soils investigation and design of the Plant was provided in a January 31, 1983 report prepared by Sargent & Lundy entitled "*Henry W. Pirkey Power Plant, Design Summary for Lignite Storage Area and Wastewater Pond Facilities*". This investigation included advancement of soil borings throughout the Plant, including the Stack Out Area.

In 2009, ETTL Engineers & Consultants (ETTL) conducted geotechnical investigations of earthen embankments associated with several ponds at the Plant. The Stack Out Area was not included in this evaluation because there are no earthen embankments in the Stack Out Area (ETTL, 2010).

In 2010 and January 2011, Apex Geoscience expanded the groundwater monitoring well system at the Plant, including installation of monitoring wells AD-16 through AD-29. Apex Geoscience also conducted video surveillance of the existing monitoring wells and plugged monitoring wells MW-1, MW-5, MW-6, MW-9, MW-11, MW-14, MW-15, M-2, and M-3 (Apex Geoscience, 2011).

In 2011, Johnson & Pace performed hydraulic analysis of several ponds at the Plant. The Stack Out Area was not included in this evaluation because there is no impounded water in the Stack Out Area (Johnson & Pace, May 2011).

In December 2015, Auckland Consulting further expanded the groundwater monitoring well system at the Plant, including installation of six monitoring wells (AD-30 through AD-35) (Auckland Consulting, 2016).

In 2019, additional monitoring wells were installed at the Plant by Burns & McDonnell, including monitoring wells AD-37, AD-38, and AD-44 through AD-47 to the west (hydraulically downgradient) of the Stack Out Area as shown on **Figure 3**.

In 2020, monitoring well AD-7R was installed directly west of the Stack Out Area by Geosyntec Consultants, Inc. as shown on **Figure 3**.

2.4 Hydrogeologic Setting

The site area is located within the West Gulf Coastal Plain. Cretaceous formations crop out in belts that extend in a northeasterly direction parallel to the Gulf of Mexico, and dip gently southeast. The central and northern portions of the Plant are located on the outcrop of the Eocene-age Reklaw Formation. The Reklaw Formation consists predominantly of clay and fine grained sand, and attains a maximum thickness of approximately 100 feet (Broom, 1966).

The Reklaw Formation is underlain by the Eocene-age Carrizo Sand, which outcrops in the topographically low southern portion of the Plant. The Carrizo Sand consists of fine to medium grained sand interbedded with silt and clay, and attains a thickness of approximately 100 feet (Broom, 1966).

These features are further illustrated on six lines of cross section that were prepared through the Stack Out Area, with four lines trending from west to east (A-A'; B-B'; C-C'; F-F'), and the other two lines trending from north to south (D-D'; E-E'). The cross section location map is included as **Figure 3** and the lines of cross section are included as **Figure 4** (A-A') through **Figure 9** (F-F').

2.4.1 Climate and Water Budget

Average temperatures in Harrison County, Texas range from 47.1˚ Fahrenheit (F) in January to 83.8˚F in July, and the mean annual growing season is 238 days. Average annual precipitation (including liquid water equivalent from snowfall) is approximately 47 inches (Broom, 1966).

2.4.2 Regional and Local Geologic Setting

The central and northern portions of the Plant, including the Stack Out Area, are located on the outcrop of the Eocene-age Recklaw Formation. The Recklaw Formation is underlain by the Eocene-age Carrizo Sand, which outcrops in the topographically low southern end of the Plant (Broom, 1966; Flawn, 1965).

Detailed regional geologic characterization can be found in several published reports including Texas Water Development Report 27 "*Ground-Water Resources of Harrison County, Texas*" (Broom, 1966), The University of Texas at Austin Bureau of Economic Geology "*Geologic Atlas of Texas – Tyler Sheet*" (Flawn, 1965), and U.S. Geological Survey Open-File Report 88-450K "*Petroleum Geology and the Distribution of*

Conventional Crude Oil, Natural Gas, and Natural Gas Liquids, East Texas Basin" (USGS, 1988).

Detailed regional and site geologic characterization can also be found in the 2010 ETTL report entitled "*Geotechnical Investigation, Pirkey Power Station, Existing Ash, Surge, Lignite and Limestone Runoff, and Landfill Stormwater Ponds Embankment Investigation, Hallsville, Texas*" (ETTL, 2010).

2.4.3 Surface Water and Surface Water Groundwater Interactions

Figure 9 is a potentiometric surface map based on January 2016 water level data for the uppermost aquifer at the Site. **Figure 10** is a current a potentiometric surface map based on September 2023 water level data for the uppermost aquifer at the Site. and water level elevations in the Site monitoring wells are summarized on **Table 1**. As shown on **Figures 9 and 10**, shallow groundwater flow direction in the Stack Out Area is southwesterly to westerly at an average hydraulic gradient of approximately 0.01 foot per foot.

The Stack Out Area is located approximately 1,200 feet northwest of Brandy Branch Reservoir, which was dammed during Plant construction in the 1980's. The normal pool level of Brandy Branch Reservoir is approximately 340 feet amsl. As shown on **Figures 9 and 10**, shallow groundwater flow direction at the Site generally follows surface topography to the west and southwest toward Hatley Creek, which is located in a topographically low area approximately one mile west of the Site. Therefore shallow groundwater in the Stack Out Area does not discharge into Brandy Branch Reservoir.

As shown on **Figure 10**, three monitoring wells (AD-7R, AD-22, AD-33) are located directly west of the Stack Out Area. The current (September 2023) water level elevation at monitoring well AD-7R is several feet higher than monitoring wells AD-22 and AD-33. As detailed above in Section 2.2.4, storm water flow in the Stack Out Area is in a general northerly direction to the Surge Pond, which is a below-grade (incised) non-CCR unit. The Surge Pond is currently being utilized for storage of storm water during Plant demolition activities, and the higher water level elevation at monitoring well AD-7R is likely due to a groundwater mound at the Surge Pond which was full of storm water at the time of the September 2023 water level measurements.

2.4.4 Water Users

An updated water well inventory was conducted by Banks Information Solutions during June 2023 (Banks, 2023). The nearest water well (Well ID 14 “Mohon #6” in **Appendix C**) was reportedly drilled approximately 1,000 feet north of the Stack Out Area in 2004 by Bennett Drilling for use as a rig supply well. The water well was screened from 350 to 430 feet below ground surface, therefore this water well is completed in a deeper water bearing unit relative to the uppermost water-bearing unit at the Site.

The second closest water well (Well ID 12 “Mohan #13” in **Appendix C**) was reportedly drilled approximately ¼-mile west (downgradient) of the Stack Out Area for NFR Energy LLC in 2008 for use as a rig supply well. The water well was screened from 250 to 310 feet below ground surface, therefore this water well is completed in a deeper water bearing unit relative to the uppermost water-bearing unit at the Site.

All of the wells identified within a 1-mile radius of the Site, excluding AEP piezometers and monitoring wells, were drilled to total depths of 160 feet or deeper except one water well (Well ID: 35-37-4E) that was drilled to a total depth of 55 feet in 1982. This water well was completed with concrete tile from the surface to total depth, and is located approximately ¼-mile east (upgradient) of the Pirkey Power Plant.

3. Groundwater Monitoring Well Network Evaluation

The existing monitoring well network present at the Site was evaluated to determine if any of the wells were viable for continued use as part of the groundwater monitoring well network or also retained as part of a larger groundwater hydraulic monitoring well network. The hydrogeologic conditions were also evaluated to determine if the uppermost aquifer unit has an effective well network. The evaluation was completed in accordance with 40 CFR 257.91 to have an established monitoring well network that effectively monitors the uppermost aquifer up gradient and down gradient of the Site. The up gradient wells represent background groundwater quality and the down gradient wells are to be placed down gradient of the CCR unit boundary to monitor water quality.

3.1 Hydrostratigraphic Units

3.1.1 Horizontal and Vertical Position Relative to CCR Unit

Geologic data from soil borings, piezometers, and monitoring wells installed at the Site show the uppermost aquifer in the Stack Out Area is a very fine to fine grained clayey and silty sand stratum with an average thickness of approximately 20 feet that is located between an elevation of approximately 320 and 340 feet amsl (**Appendix A**). The base of the Stack Out Area is at an elevation of 360 feet amsl. The separation distance between the uppermost aquifer and the base of the Stack Out Area ranges from approximately 10 to 20 feet. This separation distance is further illustrated on cross section B-B' (**Figure 5),** cross section E-E' (**Figure 8)**, and cross section F-F' (**Figure 9)**.

3.1.2 Overall Flow Conditions

Groundwater is recharged from regional precipitation infiltration. The uppermost aquifer unit (clayey and silty sand) is expected to have a hydraulic conductivity of approximately 10^{-4} centimeters per second (Fetter, 1980). Based on the hydraulic conductivity and saturated thickness in the Stack Out Area (approximately 20 feet), the yield of the uppermost aquifer is anticipated to exceed the TCEQ non-useable (Class 3) limit of 150 gallons per day (TCEQ, 2010).

Groundwater elevations from the monitoring wells at the Site are summarized on **Table 1** for 2011 through 2023. Groundwater flow direction in the Stack Out Area on January 20, 2016 and September 12, 2023 are depicted on **Figures 9** and **10**, respectively.

The groundwater flow direction in the Stack Out Area is westerly towards Hatley Creek, which is located approximately one mile west of the Site, and southwesterly towards Brandy Branch Reservoir which has a normal pool elevation of approximately 340 feet amsl.

3.2 Uppermost Aquifer

3.2.1 CCR Rule Definition

Per 40 CFR 257.60(a), new CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must be constructed with a base that is located no less than 1.52 meters (five ft) above the upper limit of the uppermost aquifer, or must demonstrate there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR unit and the uppermost aquifer due to normal fluctuations in groundwater elevations (including the seasonal high conditions).

The CCR rule definitions for an aquifer and the uppermost aquifer as specified in 40 CFR 257.53 indicates an aquifer is a geologic formation capable of yielding usable quantities of groundwater to wells or springs while an uppermost aquifer is defined as the geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers, that are hydraulically interconnected with this aquifer within the facility's property boundary. Upper limit is measured at a point nearest to the natural groundwater surface to which the aquifer rises during the wet season.

3.2.1.1 Common Definitions

An aquifer is commonly defined as a geologic unit that stores and transmits water (readily or at sufficient flow rates) to supply wells and springs (USGS, 2015; Fetter, 2001). The uppermost aquifer is considered the first encountered aquifer nearest to the CCR unit.

3.2.2 Identified Onsite Hydrostratigraphic Unit

The identified Site hydrostratigraphic unit in the Stack Out Area is the clayey and silty sand stratum that is located between an elevation of approximately 320 and 340 feet amsl within the Reklaw Formation.

3.3 Review of Existing Monitoring Well Network

3.3.1 Overview

The Site was visited by ARCADIS and AEP personnel on September 12, 2023 to review existing well network conditions and locations. A well construction table that summarizes the location, ground surface elevation, borehole depth, installation date, and associated well construction details of the monitoring well network is included as **Table 2**. Photo documentation of the located wells during the September 12, 2023 site visit is provided in **Appendix B**.

Monitoring wells AD-7, AD-7R, AD-12, AD-13, AD-22, and AD-33 were installed at the Site to monitor the uppermost water-bearing unit (clayey and silty sand stratum) associated with the Stack Out Area. As discussed above in Section 3.1.1, the uppermost water-bearing unit below the Stack Out Area is approximately 20 feet thick and is located between an elevation of approximately 320 and 340 feet amsl.

3.3.2 Gaps in Monitoring Network

As shown on Geologic Cross Sections B-B' (**Figure 5**), E-E' (**Figure 8**), and F-F' (**Figure 9**), monitoring wells AD-7, AD-7R, AD-22 and AD-33 are screened in the uppermost water-bearing unit downgradient (west) of the Stack Out Area. Monitoring well AD-7 was plugged during September 2023 due to Plant demolition activities in the area, and the State of Texas Well Plugging Report is provided in **Appendix D**.

Monitoring wells AD-7R, AD-22, and AD-23 will be utilized as downgradient monitoring wells for the Stack Out Area. Existing monitoring wells AD-12 and AD-13 are screened in the uppermost water-bearing unit up gradient (east) of the Stack Out Area, and will be utilized as up gradient monitoring wells for the Stack Out Area.

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4. Recommended Monitoring Network and PE Certification

The recommended existing groundwater monitoring well network is intended to meet specifications stated in 40 CFR 257.91. Recommended wells are further discussed with respect to location to the Stack Out Area (up gradient or down gradient), well depth, and well construction. The recommended network would provide an improved understanding of groundwater quality, hydraulics, and groundwater flow at the Stack Out Area.

4.1 Recommended Monitoring Well Network Distribution

Two up gradient well locations (existing monitoring wells AD-12 and AD-13) and three down gradient well locations (existing monitoring wells AD-7R, AD-22, and AD-33) are recommended to establish a groundwater quality monitoring well network for the Stack Out Area.

4.1.1 Location

The recommended monitoring well network for groundwater quality of the uppermost aquifer at the Stack Out Area is summarized on **Table 3** and illustrated on **Figure 12.**

4.1.2 Depth

The screen depths for the monitoring wells recommended for inclusion in the monitoring network are within the shallow saturated sand stratum (uppermost aquifer) that occurs between an elevation of approximately 320 and 340 feet amsl as shown on Geologic Cross Sections B-B' (**Figure 5**), E-E' (**Figure 8**) and F-F' (**Figure 9**). The screen elevations are presented in **Table 3**.

4.1.3 Well Construction

As discussed above in Section 3.3.2, the gap in the monitoring well network for the uppermost aquifer at the Stack Out Area by plugging of monitoring well AD-7 was addressed by installation of monitoring well AD-7R during March 2020. Monitoring well AD-7R was installed by a Texas Department of Licensing and Regulation (TDLR)-licensed water well driller. Well construction data for the monitoring well network are summarized on **Tables 2** and **3**, and the monitoring well completion diagrams are provided in **Appendix A.**

4.2 Professional Engineer's Certification

I, Kenneth J. Brandner, certify that this report was prepared under my direction and supervision, and that the information contained herein is true and accurate to the best of my knowledge. Based on my experience and knowledge of the site, the proposed groundwater monitoring system will be adequate to meet the requirements of 40 CFR Part 257.91.

Kenneth J. Brandner
Printed Name of Registered Professional Engineer

Kenneth J Brandner
Signature

69586	Texas	12-11-23
Registration No.	Registration State	Date

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Tables

Table 1
Water Level Data
AEP Pirkey Power Plant - CCR Storage Areas
Hallsville, Harrison County, Texas

Well ID	Latitude	Longitude	Ground Surface Elevation[a]	Top of Casing Elevation[a]	Borehole depth ft. bls	Date Installed	Screen Material	Well diameter inches	Top of Screen[b]		Bottom of Screen[b]		4/13/2011	12/15/2011	6/20/2012	1/23/2013	7/7/2013	1/22/2014	7/9/2014	1/28/2015	1/20/2016	9/12/2023
									Depth ft. bls	Elevation ft. msl	Depth ft. bls	Elevation ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl	GW Elev. ft. msl
Monitoring Wells																						
MW-2/AD-2	32° 27' 54.753"	94° 29' 25.282"	341.25	344.04	40	10/7/83	Sch. 40 PVC	4	20	321.25	40	301.25	326.90	327.12	327.17	327.26	326.62	327.70	327.19	328.62	328.55	326.78
MW-3/AD-3	32° 28' 6.829"	94° 29' 21.498"	372.76	375.30	57	11/4/83	Sch. 40 PVC	4	37	335.76	57	315.76	342.95	341.59	343.70	341.10	343.27	341.42	343.96	345.01	347.03	338.88
MW-4/AD-4	32° 27' 59.247"	94° 29' 4.692"	363.69	366.79	46	10/10/83	Sch. 40 PVC	4	26	337.69	46	317.69	351.45	351.24	352.44	354.42	349.22	355.58	353.33	359.00	359.16	346.98
MW-7/AD-7	32° 27' 43.611"	94° 29' 15.611"	359.61	362.79	40	10/3/83	Sch. 40 PVC	4	20	339.61	40	319.61	344.34	343.75	344.15	344.90	343.35	346.61	346.23	349.17	349.31	---
AD-7R	32.46209°	94.48839°	360.31	362.92	40	3/3/20	Sch. 40 PVC	2	20	340.31	30	330.31	---	---	---	---	---	---	---	---	---	351.10
MW-8/AD-8	32° 27' 25.095"	94° 29' 14.925"	356.92	359.84	35	10/4/83	Sch. 40 PVC	4	20	336.92	35	321.92	341.65	340.29	341.65	340.72	341.25	341.67	343.36	344.03	347.21	345.60
MW-10/AD-10	32° 27' 52.446"	94° 29' 16.545"	359.48	362.21	40	10/10/83	Sch. 40 PVC	4	20	339.48	40	319.48	342.03	341.90	342.19	341.41	339.85	342.27	342.22	344.39	343.97	338.45
MW-12/AD-12	32° 27' 51.702"	94° 29' 3.238"	378.84	381.99	51	1/30/86	Sch. 40 PVC	4	31	347.84	51	327.84	358.95	357.99	359.33	368.07	357.41	369.97	367.04	372.75	371.05	361.45
MW-13/AD-13	32° 27' 46.002"	94° 29' 5.71"	361.98	364.76	40.5	2/23/88	Sch. 40 PVC	4	30.5	331.48	40.5	321.48	349.46	348.91	349.52	350.81	348.61	351.97	351.29	354.47	354.15	348.98
AD-16	32° 27' 40.871"	94° 29' 38.637"	356.81	360.05	35	12/30/10	Sch. 40 PVC	2	15.0	341.81	35.0	321.81	338.08	335.50	337.58	335.43	336.67	339.53	340.84	343.34	347.68	340.45
AD-17	32° 28' 2.315"	94° 29' 39.45"	342.65	346.09	30	12/30/10	Sch. 40 PVC	2	10.0	332.65	30.0	312.65	322.66	322.29	323.31	323.51	323.06	325.19	324.15	328.42	326.78	323.27
AD-18	32° 28' 9.245"	94° 29' 6.469"	360.48	363.42	25	1/3/11	Sch. 40 PVC	2	15.0	345.48	25.0	335.48	355.53	351.54	357.21	355.47	357.23	360.03	358.06	359.88	360.52	353.56
AD-19	32° 27' 50.512"	94° 29' 13.973"	359.50	362.82	30	12/30/10	Sch. 40 PVC	2	10.0	349.50	30.0	329.50	344.07	343.58	344.29	344.62	342.60	345.11	345.76	347.92	347.40	342.61
AD-20	32° 27' 51.346"	94° 29' 21.576"	352.30	355.79	35	12/28/10	Sch. 40 PVC	2	15.0	337.30	35.0	317.30	334.50	334.63	334.69	334.78	333.38	335.38	334.87	336.88	336.07	333.27
AD-21	32° 27' 45.403"	94° 29' 19.195"	347.23	350.72	30	12/27/10	Sch. 40 PVC	2	10.0	337.23	30.0	317.23	340.43	340.02	340.22	341.57	339.16	342.36	341.67	345.45	343.82	340.02
AD-22	32° 27' 41.349"	94° 29' 17.779"	355.57	358.51	30	12/16/10	Sch. 40 PVC	2	10.0	345.57	30.0	325.57	343.64	343.16	343.74	344.83	342.90	346.49	345.77	350.24	350.29	344.85
AD-23	32° 27' 3.384"	94° 29' 41.258"	346.72	350.10	35	12/15/10	Sch. 40 PVC	2	15.0	331.72	35.0	311.72	319.65	318.94	319.29	318.66	318.87	319.80	319.79	319.84	321.23	320.55
AD-24	32° 27' 1.455"	94° 29' 56.388"	287.68	291.14	20	12/27/10	Sch. 40 PVC	2	5.0	282.68	20.0	267.68	282.92	284.29	285.10	285.63	285.06	288.30	287.10	288.56	---	---
AD-25	32° 27' 17.187"	94° 29' 58.998"	334.15	337.09	30	12/14/10	Sch. 40 PVC	2	10.0	324.15	30.0	304.15	324.51	321.90	323.14	321.94	322.15	322.56	324.24	326.42	327.00	326.51
AD-26	32° 27' 25.426"	94° 29' 54.775"	342.41	345.25	40	12/14/10	Sch. 40 PVC	2	10.0	332.41	40.0	302.41	324.53	323.77	323.62	322.32	322.09	323.24	322.51	323.04	326.06	329.34
AD-27	32° 27' 36.66"	94° 29' 47.272"	349.83	352.62	37.5	12/15/10	Sch. 40 PVC	2	17.5	332.33	37.5	312.33	325.82	324.54	326.13	325.39	325.35	326.39	327.91	329.69	330.89	329.05
AD-28	32° 27' 55.439"	94° 29' 39.418"	335.92	339.40	40	12/28/10	Sch. 40 PVC	2	15.0	320.92	35.0	300.92	319.67	319.16	319.92	320.21	319.69	320.65	320.22	322.16	321.39	319.92
AD-29	32° 28' 8.271"	94° 29' 31.939"	350.21	353.37	30	1/3/11	Sch. 40 PVC	2	10.0	340.21	30.0	320.21	334.68	333.37	334.74	337.47	336.84	338.55	335.85	340.57	338.48	333.54
AD-30[d]	32° 27' 56.49"	94° 29' 32.53"	339.04	342.02	25	12/8/15	Sch. 40 PVC	2	10.0	329.04	25.0	314.04	---	---	---	---	---	---	---	---	323.70	321.37
AD-31[d]	32° 28' 02.48"	94° 29' 20.90"	357.75	360.75	35	12/8/15	Sch. 40 PVC	2	20.0	337.75	35.0	322.75	---	---	---	---	---	---	---	---	346.60	337.39
AD-32[d]	32° 27' 56.20"	94° 29' 11.86"	357.23	359.18	33	12/11/15	Sch. 40 PVC	2	13.0	344.23	33.0	324.23	---	---	---	---	---	---	---	---	352.32	341.23
AD-33[d]	32° 27' 38.70"	94° 29' 15.82"	359.30	362.37	30	12/11/15	Sch. 40 PVC	2	15.0	344.30	30.0	329.30	---	---	---	---	---	---	---	---	351.13	347.36
AD-34[d]	32° 27' 10.13"	94° 29' 57.93"	304.64	307.61	25	12/11/15	Sch. 40 PVC	2	10.0	294.64	25.0	279.64	---	---	---	---	---	---	---	---	307.61	307.43
AD-35[d]	32° 27' 09.64"	94° 29' 42.74"	316.01	318.95	20	12/11/15	Sch. 40 PVC	2	3.0	313.01	18.0	298.01	---	---	---	---	---	---	---	---	309.85	---
AD-37[e]	32.46560°	94.49518°	334.00	336.60	17	3/6/19	Sch. 40 PVC	2	11.7	322.28	16.7	317.28	---	---	---	---	---	---	---	---	---	318.31
AD-38[e]	32.46277°	94.49541°	344.70	347.30	28.5	3/6/19	Sch. 40 PVC	2	13.2	331.53	18.2	326.54	---	---	---	---	---	---	---	---	---	330.77
SB-5S/AD-44[e]	32.46352°	94.49811°	338.80	341.80	25	3/25/19	Sch. 40 PVC	2	14.6	324.23	24.6	314.23	---	---	---	---	---	---	---	---	---	324.52
SB-5D/AD-45[e]	32.46349°	94.49810°	338.40	341.00	70	3/25/19	Sch. 40 PVC	2	49.6	288.83	59.6	278.83	---	---	---	---	---	---	---	---	---	299.61
SB-6S/AD-46[e]	32.45843°	94.49105°	346.40	349.40	18	3/25/19	Sch. 40 PVC	2	12.7	333.70	17.7	328.70	---	---	---	---	---	---	---	---	---	343.28
SB-6D/AD-47[e]	32.45841°	94.49105°	346.10	349.60	70	3/25/19	Sch. 40 PVC	2	54.7	291.40	64.7	281.40	---	---	---	---	---	---	---	---	---	323.91
Piezometers[c]																						
W-3 (PW-3)	32° 27' 57.6"	94° 29' 31.8"	356.30	356.30	38	10/20/09	Sch. 40 PVC	2	28.0	328.30	38.0	318.30	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

(a) Source: Apex Geoscience Inc. (March 23, 2011).
(b) Screen length and screened intervals for AD-2 through AD-12 estimated from video surveillance (Apex Geoscience Inc., March 23, 2011).
(c) Souce: EETL (October 2010).
(d) Source: Auckland Consulting LLC (January 26, 2016). Monitoring wells AD-30 through AD-35 installed during December 2015.
Groundwater Elevation Source: AEP, Pirkey Monitoring Well Groundwater Elevations through January 2015.
NM - Not Measured

Table 2
Well Construction Details
AEP Pirkey Power Plant - CCR Units
Hallsville, Harrison County, Texas

Well ID	Latitude	Longitude	Ground Surface Elevation[a]	Top of Casing Elevation[a]	Borehole depth ft. bls	Date Installed	Screen Material	Well diameter inches	Top of Filter Pack		Bottom of Filter Pack		Top of Screen[b]		Bottom of Screen[b]	
									Depth ft. bls	Elevation ft. msl	Depth ft. bls	Elevation ft. msl	Depth ft. bls	Elevation ft. msl	Depth ft. bls	Elevation ft. msl
Monitoring Wells																
MW-2/AD-2	32° 27' 54.753"	94° 29' 25.282"	341.25	344.04	40	10/7/83	Sch. 40 PVC	4	18	323	40	301	20	321.25	40	301.25
MW-3/AD-3	32° 28' 6.829"	94° 29' 21.498"	372.76	375.30	57	11/4/83	Sch. 40 PVC	4	35	338	57	316	37	335.76	57	315.76
MW-4/AD-4	32° 27' 59.247"	94° 29' 4.692"	363.69	366.79	46	10/10/83	Sch. 40 PVC	4	24	340	46	318	26	337.69	46	317.69
MW-7/AD-7 (plugged 9-12-23)	32° 27' 43.611"	94° 29' 15.611"	359.61	362.79	40	10/3/83	Sch. 40 PVC	4	18	342	40	320	20	339.61	40	319.61
AD-7R	32.46209°	94.48839°	360.31	362.92	40	3/3/20	Sch. 40 PVC	2	18	342	31.5	329	20	340.31	30	330.31
MW-8/AD-8	32° 27' 25.095"	94° 29' 14.925"	356.92	359.84	35	10/4/83	Sch. 40 PVC	4	18	339	35	322	20	336.92	35	321.92
MW-10/AD-10	32° 27' 52.446"	94° 29' 16.545"	359.48	362.21	40	10/10/83	Sch. 40 PVC	4	18	341	40	319	20	339.48	40	319.48
MW-12/AD-12	32° 27' 51.702"	94° 29' 3.238"	378.84	381.99	51	1/30/86	Sch. 40 PVC	4	29	350	51	328	31	347.84	51	327.84
MW-13/AD-13	32° 27' 46.002"	94° 29' 5.71"	361.98	364.76	40.5	2/23/88	Sch. 40 PVC	4	17.5	344.5	40.5	321.5	30.5	331.48	40.5	321.48
AD-16	32° 27' 40.871"	94° 29' 38.637"	356.81	360.05	35	12/30/10	Sch. 40 PVC	2	13	344	35	322	15.0	341.81	35.0	321.81
AD-17	32° 28' 2.315"	94° 29' 39.45"	342.65	346.09	30	12/30/10	Sch. 40 PVC	2	8	335	30	313	10.0	332.65	30.0	312.65
AD-18	32° 28' 9.245"	94° 29' 6.469"	360.48	363.42	25	1/3/11	Sch. 40 PVC	2	13	347	25	335	15.0	345.48	25.0	335.48
AD-19	32° 27' 50.512"	94° 29' 13.973"	359.50	362.82	30	12/30/10	Sch. 40 PVC	2	8	352	30	330	10.0	349.50	30.0	329.50
AD-20	32° 27' 51.346"	94° 29' 21.576"	352.30	355.79	35	12/28/10	Sch. 40 PVC	2	13	339	35	317	15.0	337.30	35.0	317.30
AD-21	32° 27' 45.403"	94° 29' 19.195"	347.23	350.72	30	12/27/10	Sch. 40 PVC	2	8	339	30	317	10.0	337.23	30.0	317.23
AD-22	32° 27' 41.349"	94° 29' 17.779"	355.57	358.51	30	12/16/10	Sch. 40 PVC	2	8	348	30	326	10.0	345.57	30.0	325.57
AD-23	32° 27' 3.384"	94° 29' 41.258"	346.72	350.10	35	12/15/10	Sch. 40 PVC	2	13	334	35	312	15.0	331.72	35.0	311.72
AD-24	32° 27' 1.455"	94° 29' 56.388"	287.68	291.14	20	12/27/10	Sch. 40 PVC	2	3	285	20	268	5.0	282.68	20.0	267.68
AD-25	32° 27' 17.187"	94° 29' 58.998"	334.15	337.09	30	12/14/10	Sch. 40 PVC	2	8	326	30	304	10.0	324.15	30.0	304.15
AD-26	32° 27' 25.426"	94° 29' 54.775"	342.41	345.25	40	12/14/10	Sch. 40 PVC	2	8	334	40	302	10.0	332.41	40.0	302.41
AD-27	32° 27' 36.66"	94° 29' 47.272"	349.83	352.62	37.5	12/15/10	Sch. 40 PVC	2	15.5	334.3	37.5	312.3	17.5	332.33	37.5	312.33
AD-28	32° 27' 55.439"	94° 29' 39.418"	335.92	339.40	40	12/28/10	Sch. 40 PVC	2	13	323	35	301	15.0	320.92	35.0	300.92
AD-29	32° 28' 8.271"	94° 29' 31.939"	350.21	353.37	30	1/3/11	Sch. 40 PVC	2	8	342	30	320	10.0	340.21	30.0	320.21
AD-30[d]	32° 27' 56.49"	94° 29' 32.53"	339.04	342.02	25	12/8/15	Sch. 40 PVC	2	8	331	25	314	10.0	329.04	25.0	314.04
AD-31[d]	32° 28' 02.48"	94° 29' 20.90"	357.75	360.75	35	12/8/15	Sch. 40 PVC	2	18	340	35	323	20.0	337.75	35.0	322.75
AD-32[d]	32° 27' 56.20"	94° 29' 11.86"	357.23	359.18	33	12/11/15	Sch. 40 PVC	2	11	346	33	324	13.0	344.23	33.0	324.23
AD-33[d]	32° 27' 38.70"	94° 29' 15.82"	359.30	362.37	30	12/11/15	Sch. 40 PVC	2	12	347	30	329	15.0	344.30	30.0	329.30
AD-34[d]	32° 27' 10.13"	94° 29' 57.93"	304.64	307.61	25	12/11/15	Sch. 40 PVC	2	8	297	25	280	10.0	294.64	25.0	279.64
AD-35[d]	32° 27' 09.64"	94° 29' 42.74"	316.01	318.95	20	12/11/15	Sch. 40 PVC	2	2.5	313.5	20	296	3.0	313.01	18.0	298.01
AD-37[e]	32.46560°	94.49518°	334.00	336.60	17	3/6/19	Sch. 40 PVC	2	8.7	325.3	17	317	11.7	322.28	16.7	317.28
AD-38[e]	32.46277°	94.49541°	344.70	347.30	28.5	3/6/19	Sch. 40 PVC	2	10.3	334.4	18	327	13.2	331.53	18.2	326.54
SB-5S/AD-44[e]	32.46352°	94.49811°	338.80	341.80	25	3/25/19	Sch. 40 PVC	2	12.0	326.8	25	314	14.6	324.23	24.6	314.23
SB-5D/AD-45[e]	32.46349°	94.49810°	338.40	341.00	70	3/25/19	Sch. 40 PVC	2	47.0	291.4	70	268	49.6	288.83	59.6	278.83
SB-6S/AD-46[e]	32.45843°	94.49105°	346.40	349.40	18	3/25/19	Sch. 40 PVC	2	10.0	336.4	18	328	12.7	333.70	17.7	328.70
SB-6D/AD-47[e]	32.45841°	94.49105°	346.10	349.60	70	3/25/19	Sch. 40 PVC	2	54.0	292.1	67	279	54.7	291.40	64.7	281.40
Piezometers[c]																
W-3 (PW-3)	32° 27' 57.6"	94° 29' 31.8"	356.30	356.30	38	10/20/09	Sch. 40 PVC	2	26	330	38	318	28.0	328.30	38.0	318.30

General Note: Elevations in feet above mean sea level.

Footnotes:

(a) Source: Apex Geoscience Inc. (March 23, 2011).

(b) Screen length and screened intervals for AD-2 through AD-12 estimated from video surveillance (Apex Geoscience Inc., March 23, 2011). Top of sand pack estimated 2 feet above top of screened interval.

(c) Souce: EETL (October 2010).

(d) Source: Aukland Consulting LLC (January 26, 2016).

(e) Source: Burns McDonnell (February 2019).

Acronyms and Abbreviations:

NA = Data not available

ft = feet

bls = below land surface

msl = mean sea level

Table 3
Proposed Well Network (Updated October 2023)
AEP Pirkey Power Plant - Stack Out Area
Hallsville, Harrison County, Texas

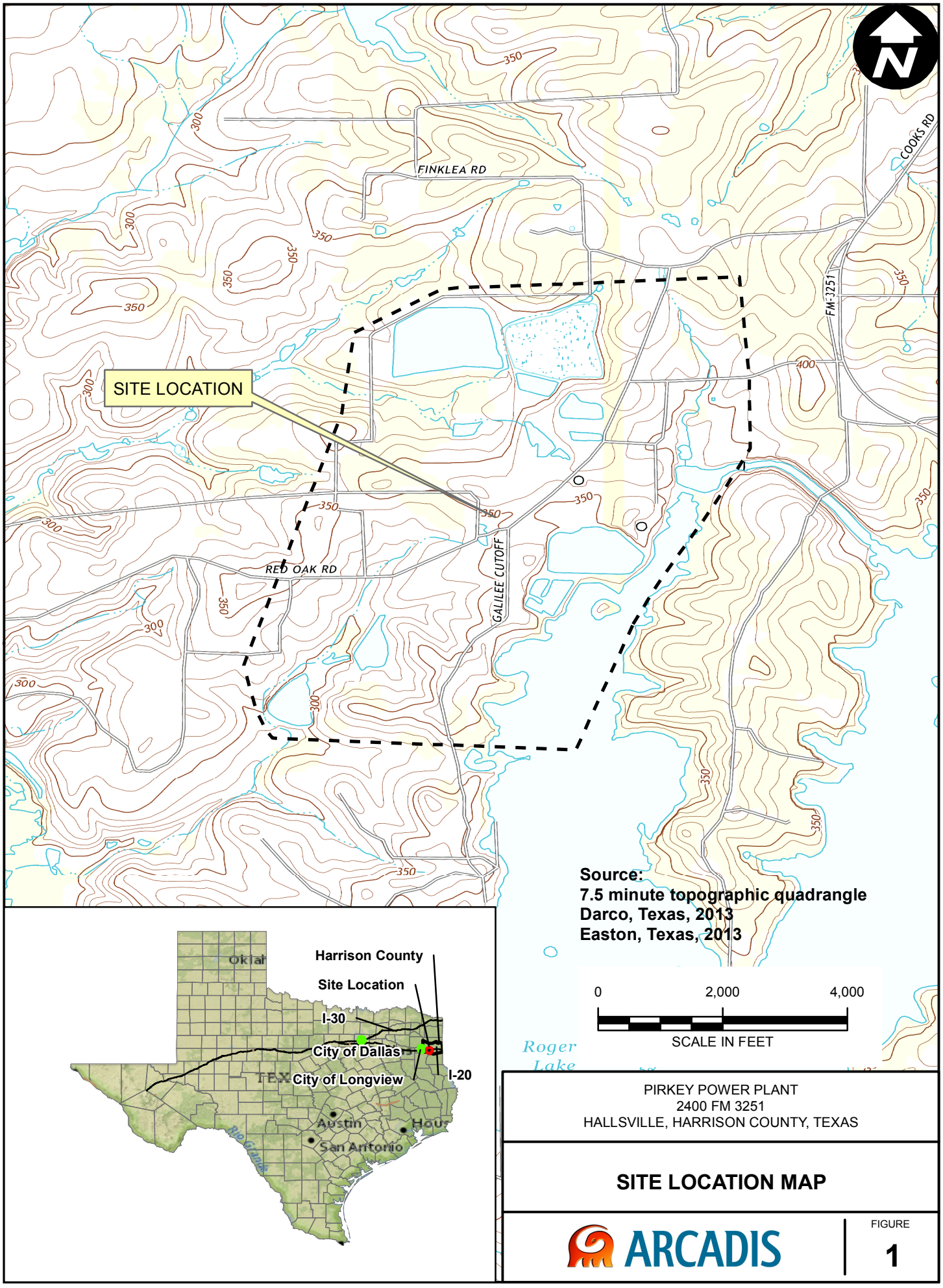
Well ID	Exisiting/ Proposed	Hydrostratigraphic Unit Target	Location Description		Screen Top Target Elevation[(a)] (ft amsl)	Screen Bottom Target Elevation[(a)] (ft amsl)	Screen Length (ft)	Comments
Upgradient								
AD-12	Exisiting	Uppermost Water-Bearing Unit	Northeast of Stack Out Area	Upgradient	347.8	327.8	20	Existing well installed in 1986; well will be utilitzed to establish backgroud water quality
AD-13	Exisiting	Uppermost Water-Bearing Unit	East of Stack Out Area	Upgradient	331.5	321.5	10	Existing well installed in 1988; well will be utilitzed to establish backgroud water quality
Downgradient								
AD-7R	Existing	Uppermost Water-Bearing Unit	Northwest of Stack Out Area	Down gradient	340.3	330.3	10	Existing well installed in 2020; uppermost shallow aquifer adjacent to Stack Out Area - downgradient
AD-22	Existing	Uppermost Water-Bearing Unit	West of Stack Out Area	Down gradient	345.6	325.6	20	Existing well installed in 2010; uppermost shallow aquifer adjacent to Stack Out Area - downgradient
AD-33	Existing	Uppermost Water-Bearing Unit	West of Stack Out Area	Down gradient	344.3	329.3	15	Existing well installed in 2015; uppermost shallow aquifer adjacent to Stack Out Area - downgradient

Footnotes:
a. Target elevations are an estimated range.

Acronyms and Abbreviations:
U=Upgradient
D=Downgradient
ft = feet
amsl = above mean sea level

ARCADIS Design & Consultancy for natural and built assets

Figures



PIRKEY POWER PLANT
2400 FM 3251
HALLSVILLE, HARRISON COUNTY, TEXAS

SITE LOCATION MAP

ARCADIS

FIGURE
1

Document Path: Z:\GISPROJECTS_ENVAEP\Pirkey Plant\MXD\Figure 1 - Site Location Map.mxd

City of Hallsville

3 miles to
City of Marshall

I-20

West Bottom Ash Pond

East Bottom Ash Pond

Stack Out Area

Existing
Landfill

Hatley Creek

2018 Landfill
Lateral Expansion

Brandy Branch
Reservoir

Brandy Branch Creek

0 4,000 8,000

SCALE IN FEET

Legend

Coal Combustion Residual (CCR) Unit

Service Layer Credits:

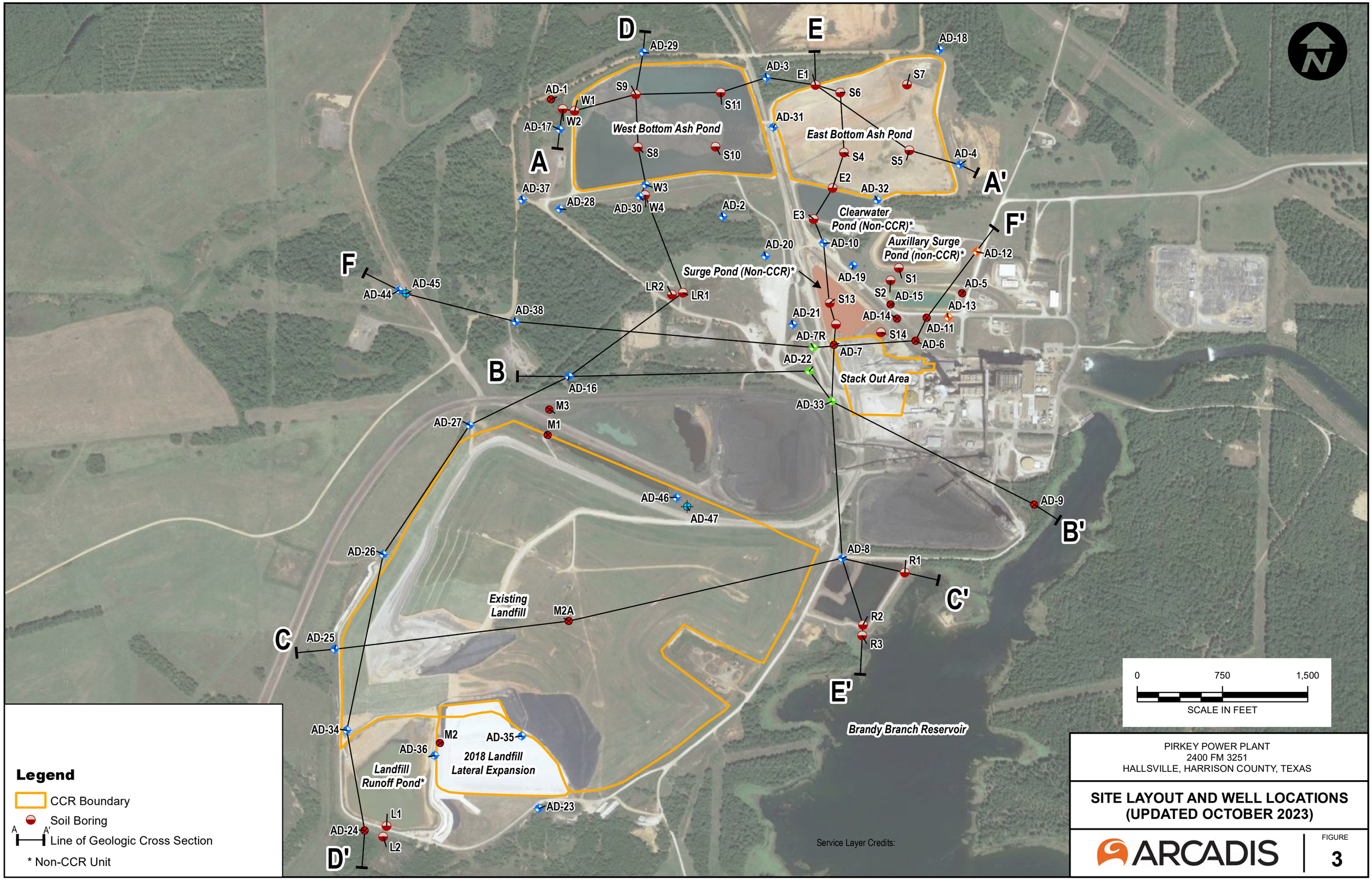
PIRKEY POWER PLANT
2400 FM 3251
HALLSVILLE, HARRISON COUNTY, TEXAS

**PLANT AND CCR UNIT LOCATION MAP
(UPDATED OCTOBER 2023)**

ARCADIS

FIGURE
2

Document Path: T:_ENV\AEP\Pirkey Plant\MXD\Updated\Figure 2 - Plant and CCR Unit Location Map2023Octrev.mxd


D
D'
E
E'
A
A'
B
B'
C
C'
F
F'
AD-29
AD-1
W1
W2
AD-17
S9
S11
S8
S10
West Bottom Ash Pond
AD-3
E1
S7
S6
AD-18
AD-31
East Bottom Ash Pond
S4
S5
AD-4
E2
AD-32
AD-37
AD-28
W3
W4
AD-30
AD-2
E3
Clearwater Pond (Non-CCR)*
AD-20
AD-10
Auxillary Surge Pond (non-CCR)*
AD-12
Surge Pond (Non-CCR)*
AD-19
S1
S2
AD-15
AD-5
AD-13
LR2
LR1
S13
AD-21
AD-14
AD-11
AD-45
AD-44
AD-38
AD-7R
AD-7
AD-6
S14
AD-22
Stack Out Area
AD-16
AD-33
M3
M1
AD-27
AD-46
AD-47
AD-9
AD-8
R1
AD-26
Existing Landfill
M2A
R2
R3
AD-25
AD-34
M2
AD-35
AD-36
2018 Landfill Lateral Expansion
Landfill Runoff Pond*
AD-23
L1
AD-24
L2
Brandy Branch Reservoir
Service Layer Credits:
0
750
1,500
SCALE IN FEET
Legend
CCR Boundary
Soil Boring
Line of Geologic Cross Section
* Non-CCR Unit
PIRKEY POWER PLANT
2400 FM 3251
HALLSVILLE, HARRISON COUNTY, TEXAS
SITE LAYOUT AND WELL LOCATIONS (UPDATED OCTOBER 2023)
ARCADIS
FIGURE
3
Document Path: T:_ENV\AEP\Pirkey Plant\MXD\Updated\Figure 3 - Site Layout and Well LocationMap2023Octrev.mxd

WEST

A

A'

EAST

WEST BOTTOM ASH POND

EAST BOTTOM ASH POND

ELEVATION (FEET MSL)

380'
370'
360'
350'
340'
330'
320'
310'

AD-17
AD-3
AD-4
W1
W2
E1
S9(C)
S11(C)
S5(C)
PERIMETER BERM (EL. 357')
PERIMETER BERM (EL. 357')
SILTY CLAY
WATER AND CCR FILL(A)
WATER AND CCR FILL(A)
COMPACTED COHESIVE SOIL FILL(B)
COMPACTED COHESIVE SOIL FILL(B)
SILTY SANDY CLAY, TAN TO GRAY.
SANDY CLAY, TAN TO GRAY.
CLAYEY SILTY SAND, TAN TO GRAY.
SILTY SANDY CLAY, RED/BROWN/GRAY.
CLAYEY SILTY SAND, TAN TO GRAY.

STATE OF TEXAS
Kenneth J. Brandner
Geology
1787
LICENSED
PROFESSIONAL GEOSCIENTIST
12-11-23

0 300'
HORIZONTAL SCALE

LEGEND

- MONITORING WELL SCREENED INTERVAL
- WATER LEVEL IN MONITORING WELL (1/20/16)
- BASE OF CCR UNIT

NOTES:

A) TOP OF WEST BOTTOM ASH POND AND EAST BOTTOM ASH POND PERIMETER BERM ELEVATION IS 357', OPERATING ELEVATION IS 354'(JOHNSON & PACE, MAY 2011). BASE ELEVATION OF WEST BOTTOM ASH POND AND EAST BOTTOM ASH POND IS 347' (SARGENT & LUNDY, JANUARY 1983).
B) COMPACTED COHESIVE SOIL FROM ELEVATION 344' TO 347' (SARGENT & LUNDY, SEPTEMBER 1984;AMEC, AUGUST 2011).
C) SOIL BORING INSTALLED BY SOUTHWESTERN LABORATORIES DURING ASH POND CONSTRUCTION IN 1983.

PIRKEY POWER PLANT
2400 FM 3251
HALLSVILLE, HARRISON COUNTY, TEXAS

CROSS SECTION A - A'

ARCADIS

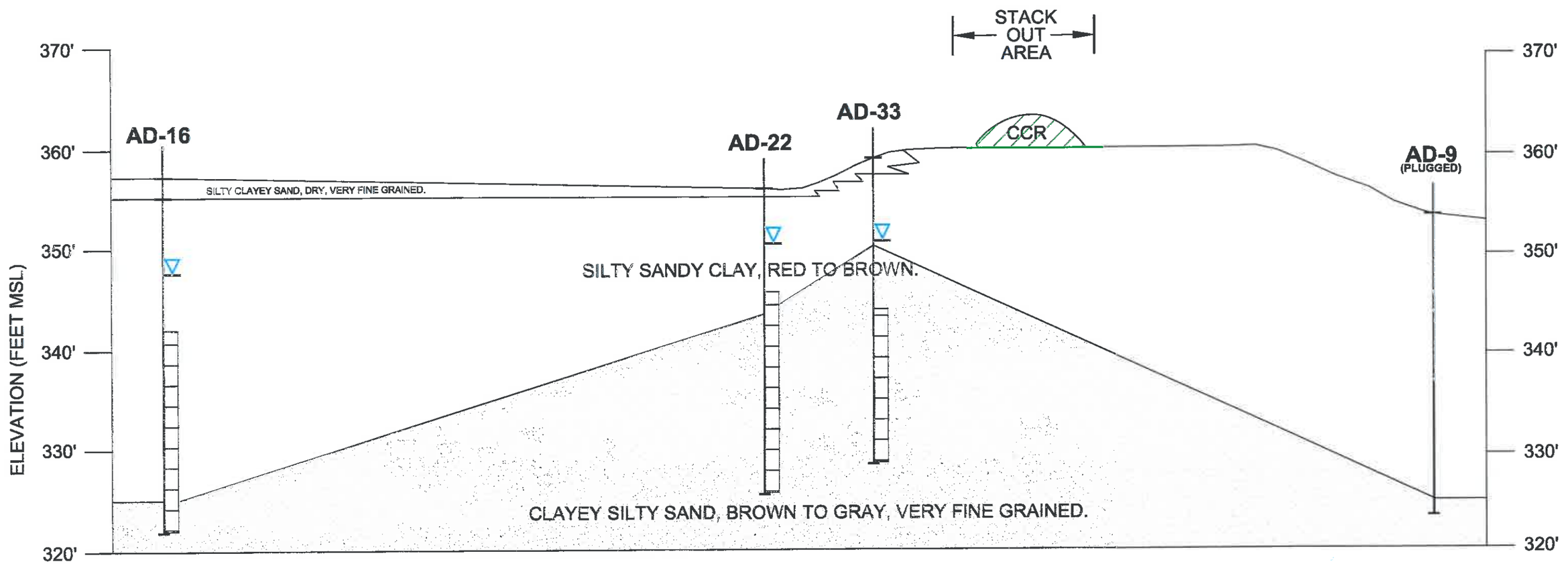
FIGURE 4

WEST

B

EAST

B'



STATE OF TEXAS
Kenneth J. Brandner
Geology
1767
LICENSED PROFESSIONAL GEOSCIENTIST
12-11-23

LEGEND

- MONITORING WELL SCREENED INTERVAL
- WATER LEVEL IN MONITORING WELL (1/20/16)
- BASE OF CCR UNIT

0 300'
HORIZONTAL SCALE

NOTES:
A) BASE OF STACK OUT AREA CCR UNIT LOCATED AT GRADE, ELEVATION TAKEN FROM MAY 2012 AND JUNE 23, 2015 TOPOGRAPHIC SURVEYS BY BEACON AVIATION.
B) ELEVATION OF CCR MATERIAL ABOVE STACK OUT AREA VARIES.

PIRKEY POWER PLANT
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CROSS SECTION
B - B'

ARCADIS

FIGURE
5

WEST

C

EAST

C'

LANDFILL

ELEVATION (FEET MSL)

370'
360'
350'
340'
330'
320'
310'
300'
290'

AD-25

CLAYEY SAND

SANDY CLAY

LANDFILL
LOW-PERMEABILITY LINER
(CLAY, PVC, OR HDPE)

CCR FILL
(HEIGHT VARIES)

AD-8

R1

SILTY SANDY CLAY.

CLAYEY SILTY SAND.

SILTY SANDY CLAY.

CLAYEY SILTY SAND, BROWN TO GRAY.

M2A
(PLUGGED)

0 500'
HORIZONTAL SCALE

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LEGEND

- MONITORING WELL SCREENED INTERVAL
- WATER LEVEL IN MONITORING WELL (1/20/16)
- BASE OF CCR UNIT

PIRKEY POWER PLANT
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CROSS SECTION
C - C'

ARCADIS

FIGURE
6

NORTH

D

SOUTH

D'

WEST BOTTOM ASH POND

PERIMETER BERM (EL. 357') (A)

W3 (PW-3)

AD-29

AD-16

AD-27

AD-26

AD-30

AD-34

AD-24

LR-1

LANDFILL

LANDFILL RUNOFF POND (NON-CCR UNIT) (C)

WATER AND CCR FILL (A)

S9

S8

COHESIVE FILL (B)

SILTY SANDY CLAY, RED/BROWN/GRAY.

SILTY SANDY CLAY, TAN TO GRAY.

SILTY CLAYEY SAND

CLAYEY SAND

SANDY CLAY AND CLAYEY GRAVEL, GRAY.

SANDY CLAY, BROWN.

CLAY, GRAY

CLAY W/CLAYEY SAND STREAKS, ORANGE/BROWN.

CLAYEY SILTY SAND, BROWN TO GRAY, VERY FINE GRAINED.

LANDFILL LOW-PERMEABILITY LINER (CLAY, PVC, OR HDPE)

BLACK LIGNITE

ELEVATION (FEET MSL)

360'
350'
340'
330'
320'
310'
300'
290'
280'
270'

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0 600'
HORIZONTAL SCALE

LEGEND

MONITORING WELL SCREENED INTERVAL

WATER LEVEL IN MONITORING WELL (1/20/16)

BASE OF CCR UNIT

NOTES:

A) TOP OF WEST BOTTOM ASH POND PERIMETER BERM ELEVATION IS 357', OPERATING LEVEL IS 354' (JOHNSON & PACE, MAY 2011); BASE ELEVATION OF WEST BOTTOM ASH POND IS 347' (SARGENT & LUNDY, JANUARY 1983).
B) COMPACTED COHESIVE SOIL FROM ELEVATION 344' TO 347' (SARGENT &LUNDY SEPTEMBER 1984; AMEC, AUGUST 2011).
C) LANDFILL RUNOFF POND PERIMETER BERM APPROXIMATE ELEVATION 302' MSL, BASE OF LANDFILL RUNOFF POND APPROXIMATE ELEVATION 286' MSL. NORMAL OPERATING LEVEL 288' MSL (JOHNSON & PACE MAY 2011).

PIRKEY POWER PLANT
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HALLSVILLE, HARRISON COUNTY, TEXAS

CROSS SECTION
D - D'

ARCADIS

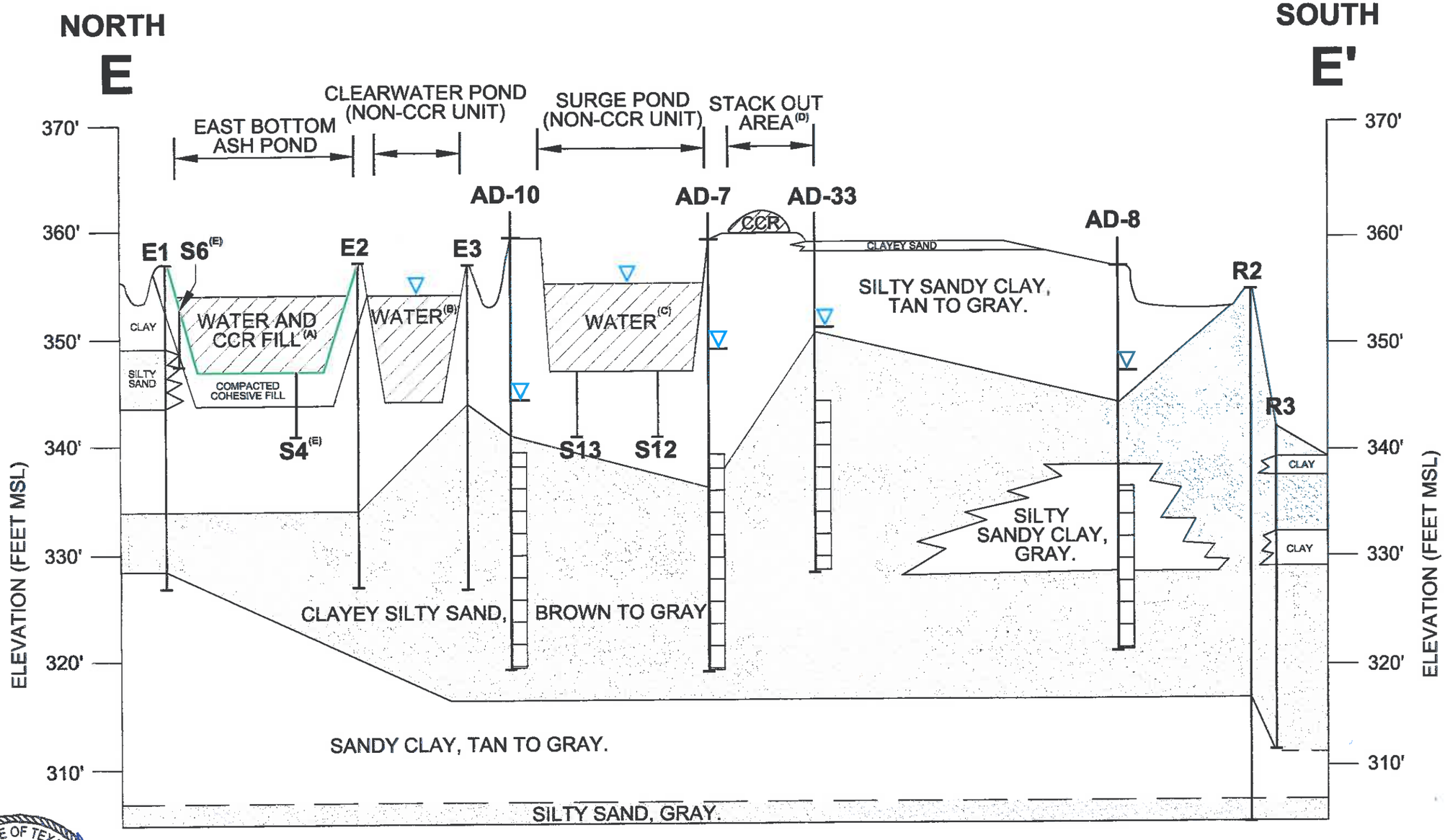
FIGURE 7

NORTH

E

SOUTH

E'



0 500'
HORIZONTAL SCALE

LEGEND

- MONITORING WELL SCREENED INTERVAL
- WATER LEVEL IN MONITORING WELL (1/20/16)
- BASE OF CCR UNIT

NOTES:

A) TOP OF EAST BOTTOM ASH POND PERIMETER BERM ELEVATION IS 357', OPERATING LEVEL IS 354' (JOHNSON & PACE, MAY 2011); BASE ELEVATION OF EAST BOTTOM ASH POND IS 347' (SARGENT & LUNDY, JANUARY 1983).
B) TOP OF CLEARWATER POND PERIMETER BERM ELEVATION IS 357',OPERATING LEVEL IS 354' (JOHNSON & PACE, MAY 2011). BASE ELEVATION OF CLEARWATER POND IS 344' (SARGENT & LUNDY, JANUARY 1983).
C) BASE ELEVATION OF SURGE POND (347-352'MSL) AND POND DESIGN LEVEL (355'MSL) TAKEN FROM JANUARY 31, 1983 SARGENT & LUNDY REPORT "DESIGN SUMMARY FOR LIGNITE STORAGE AREA AND WASTEWATER POND FACILITIES".
D) BASE OF STACK OUT AREA CCR UNIT LOCATED AT GRADE. ELEVATION TAKEN FROM MAY 2012 AND JUNE 23, 2015 TOPOGRAPHIC SURVEYS BY BEACON AVIATION.
E) SOIL BORING INSTALLED BY SOUTHWESTERN LABORATORIES DURING ASH POND CONSTRUCTION IN 1983.

PIRKEY POWER PLANT
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HALLSVILLE, HARRISON COUNTY, TEXAS

CROSS SECTION E - E'

ARCADIS

FIGURE 8

WEST

F

EAST

F'

ELEVATION (FEET MSL)

380' 370' 360' 350' 340' 330' 320' 310' 300' 290' 280' 270' 260'

AD-44 AD-45 AD-38 AD-7R AD-7 (PLUGGED) AD-6 (PLUGGED) AD-11 (PLUGGED) AD-12

STACK OUT AREA[A]

SILTY SANDY CLAY, TAN TO GRAY.

CLAYEY SILTY SAND, BROWN TO GRAY.

SILT AND CLAY, GRAY TO BROWN.

CLAY

LIGNITE

CLAYEY SILTY SAND, BROWN TO GRAY.

0 400'
HORIZONTAL SCALE

LEGEND

- MONITORING WELL SCREENED INTERVAL
- WATER LEVEL IN MONITORING WELL (9/12/23)
- BASE OF CCR UNIT

NOTES: BASE OF STACK OUT AREA CCR UNIT LOCATED AT GRADE.

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CROSS SECTION F - F'

ARCADIS

FIGURE 9

AD-29
338.48
AD-3
347.03
AD-18
360.52
AD-1
AD-31
346.60
AD-17
326.78
West Bottom Ash Pond
East Bottom Ash Pond
AD-4
359.16
AD-28
321.39
AD-30
324.70
AD-2
328.55
AD-32
352.32
Clearwater Pond (Non-CCR)*
AD-20
336.07
AD-10
343.97
Auxiliary Surge Pond (non-CCR)*
AD-12
371.05
AD-19
347.40
Surge Pond (Non-CCR)*
AD-5
AD-15
AD-11
AD-21
343.82
AD-14
AD-6
AD-13
354.15
AD-7
349.31
AD-16
347.68
AD-22
350.29
Stack Out Area
AD-27
330.69
AD-33
351.13
AD-9
AD-26
326.06
AD-8
347.21
AD-25
327.00
Landfill
M2A
Brandy Branch Reservoir
AD-34
307.61
AD-35
309.85
Landfill Runoff Pond*
AD-23
321.23
AD-24

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0 750 1,500
SCALE IN FEET

Legend

- CCR Boundary
- Monitoring Well/Piezometer
- Plugged Monitoring Well/Piezometer
- Soil Boring
- 328.55 Water Level Elevation (feet MSL)
- Groundwater Contour
- Groundwater Flow Direction
- * Non-CCR Unit

PIRKEY POWER PLANT
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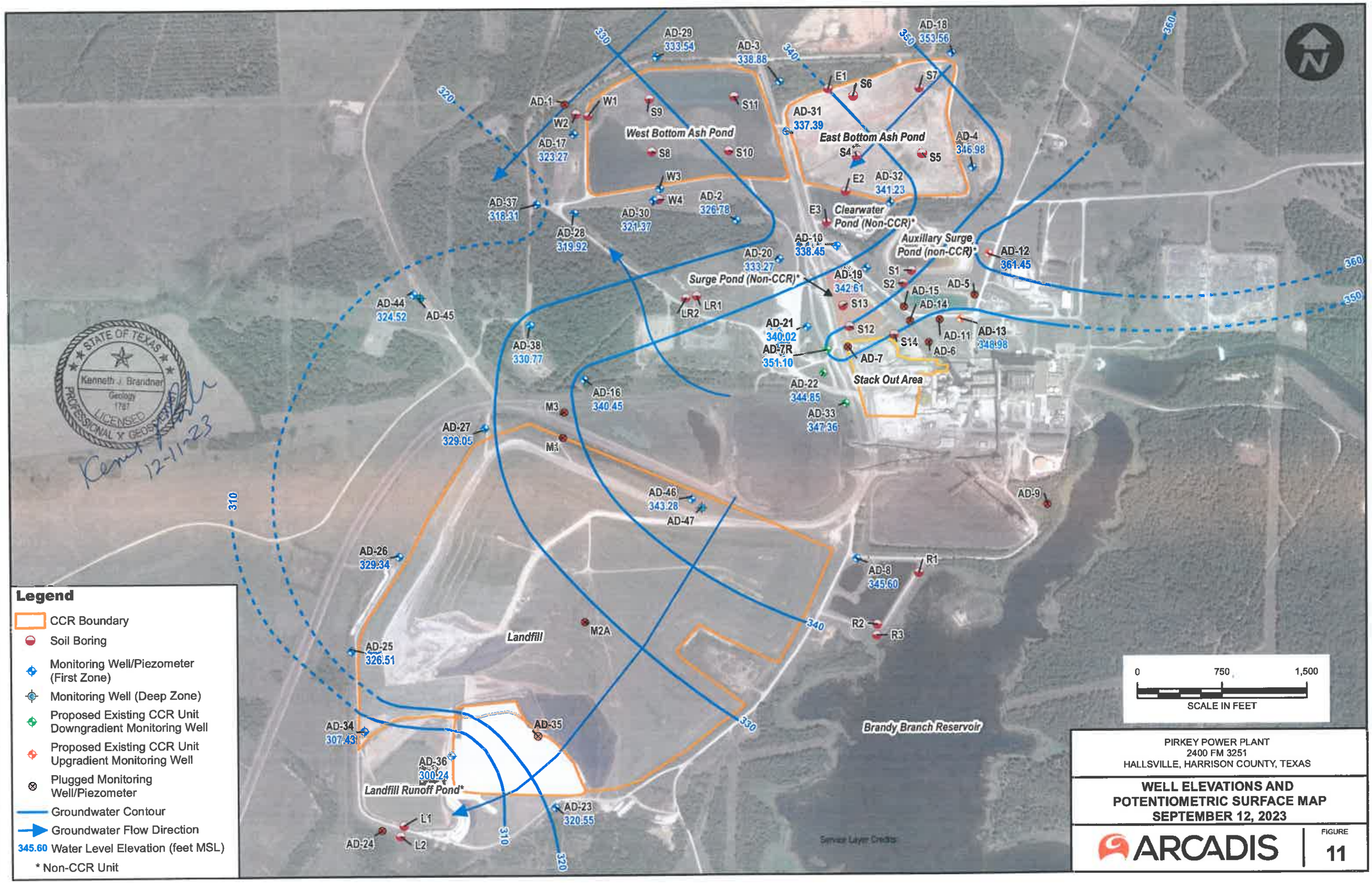
HALLSVILLE, HARRISON COUNTY, TEXAS

WELL ELEVATIONS AND POTENTIOMETRIC MAP - JANUARY 20, 2016

ARCADIS

FIGURE
10

Document Path: Z:\GISPROJECTS_ENVAEP\Pirkey Plant\MXD\Figure 9 - Well Elevations and Potentiometric Map - January 20, 2016.mxd



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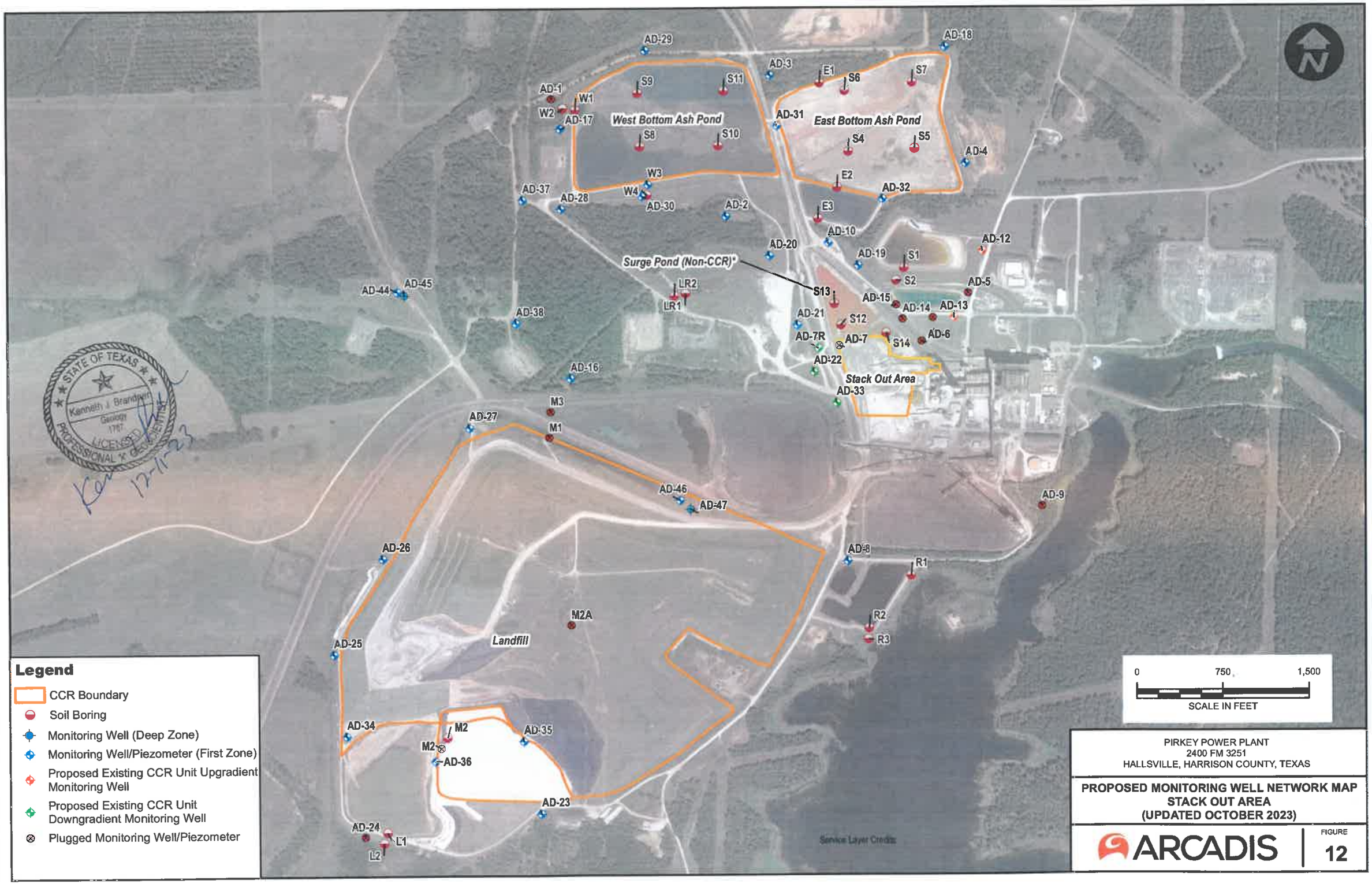
WELL ELEVATIONS AND POTENTIOMETRIC SURFACE MAP SEPTEMBER 12, 2023

ARCADIS

FIGURE 11

Document Path: T:_ENV\AEP\Pirkey Plant\MXD\Updated\Figure 11 - WellElvPotSurfMapSept2023.mxd


AD-29
AD-18
AD-3
E1
S6
S7
AD-1
S9
S11
W1
W2
AD-17
West Bottom Ash Pond
AD-31
East Bottom Ash Pond
S8
S10
S4
S5
AD-4
W3
E2
AD-37
AD-28
W4
AD-30
AD-2
AD-32
E3
AD-10
AD-12
AD-20
Surge Pond (Non-CCR)*
AD-19
S1
S2
AD-44
AD-45
LR2
LR1
S13
AD-15
AD-14
AD-13
AD-5
AD-38
AD-21
S12
AD-7R
AD-7
S14
AD-6
AD-22
AD-16
Stack Out Area
AD-33
M3
AD-27
M1
AD-46
AD-47
AD-9
AD-26
AD-8
R1
M2A
R2
R3
AD-25
Landfill
AD-34
M2
AD-35
M2
AD-36
AD-23
AD-24
L1
L2
Service Layer Credits:
0
750
1,500
SCALE IN FEET
Legend
CCR Boundary
Soil Boring
Monitoring Well (Deep Zone)
Monitoring Well/Piezometer (First Zone)
Proposed Existing CCR Unit Upgradient Monitoring Well
Proposed Existing CCR Unit Downgradient Monitoring Well
Plugged Monitoring Well/Piezometer
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12-1-23
PIRKEY POWER PLANT
2400 FM 3251
HALLSVILLE, HARRISON COUNTY, TEXAS
PROPOSED MONITORING WELL NETWORK MAP
STACK OUT AREA
(UPDATED OCTOBER 2023)
ARCADIS
FIGURE
12
Document Path: T:_ENV\AEP\Pirkey Plant\MXD\Updated\Figure 12 - PropMWNetOct23.mxd

ARCADIS Design & Consultancy for natural and built assets

Appendix A

Boring/Well Construction Logs

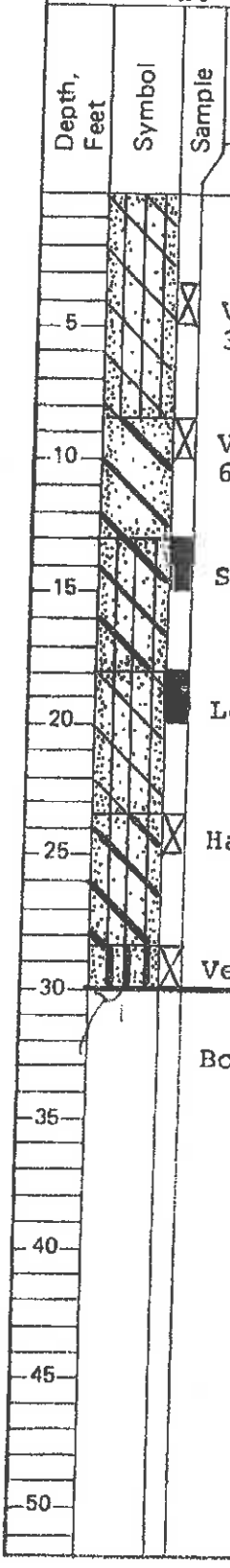
832964

LOG OF BORING

PROJECT: Waste Water Ponds
CLIENT: SWEPCO

BORING NO.: MW-1
LOCATION: Hallsville

Date: 10-6-83 Type: Auger Ground Elevation:



Legend:
■ Sample X Penetration ▼ Water

Description of Stratum

Very dense brown and grey clayey silty sand w/clay seam 33-17=7" 50 B/7"

Very stiff tan and grey very sandy clay w/iron ore 6-9-21 30 B/F

Stiff grey silty sandy clay

Loose grey clayey silty sand

Hard grey silty sandy clay lenses 30-20=11" 50 B/11"

Very dense grey clayey sandy silt 19-31=11½" 50 B/11½"

Bottom of boring at 30 feet.

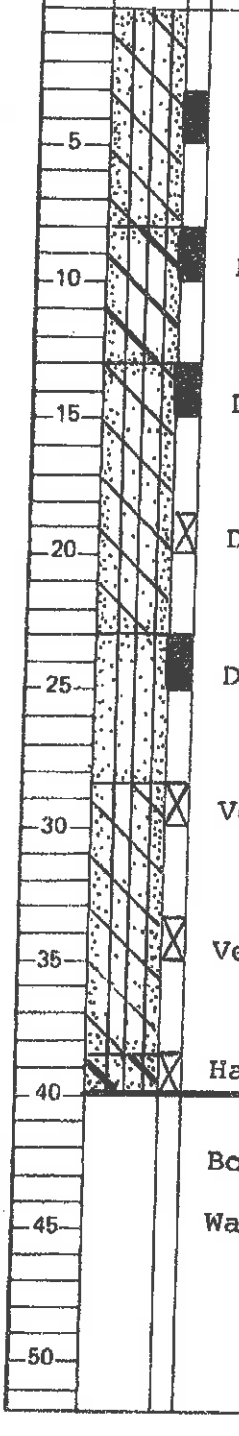
832964

LOG OF BORING

PROJECT: Waste Water Ponds
CLIENT: SWEPCO

BORING NO.: MW-2
LOCATION: Hallsville

Date: 10-7-83 Type: Auger Ground Elevation:



Legend: ■ Sample X Penetration ▼ Water

Description of Stratum
Firm tan clayey silty sand
Medium tan and grey very sandy silty clay
Dense tan and grey clayey silty sand
Dense tan clayey silty sand 10-15-16 31 B/F
Dense tan silty sand
Very dense grey clayey silty sand 15-35=12" 50 B/F
Very dense grey clayey silty sand 21-29=9" 50 B/9"
Hard grey sandy silty clay 20-30=12" 50 B/F
Bottom of boring at 40 feet.
Water encountered at 25 feet.

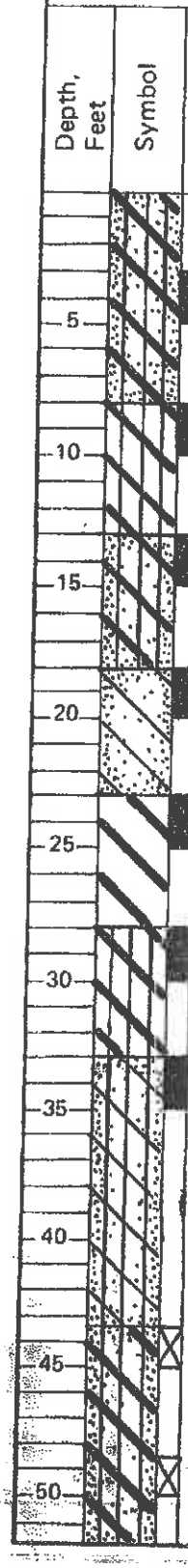
832964

LOG OF BORING

PROJECT: Waste Water Ponds
CLIENT: SWEPCO

BORING NO.: MW-3
LOCATION: Hallsville, TX

Date: 11-4-83 Type: Auger Ground Elevation:



Legend:
■ Sample X Penetration ▼ Water

Description of Stratum

Stiff red, brown and grey sandy silty clay

Stiff red, tan and grey silty clay lenses w/iron ore

Stiff brown and grey sandy silty clay

Firm brown and grey sand w/clay lenses

Stiff brown and grey clay

Stiff brown and grey clay w/silt lenses

Firm grey clayey silty sand

Hard grey clay w/silty sand lenses 43-7=6" 50 B/6"

Hard brown and grey silty sandy clay 21-29=12" 50 B/F

832964

LOG OF BORING

PROJECT: Waste Water Ponds
CLIENT: SWEPCO

BORING NO.: MW-3
LOCATION: Hallsville, TX

Date: 11-4-83 Type: Auger Ground Elevation:

Legend: ■ Sample × Penetration ▼ Water

Depth, Feet	Symbol	Sample	Description of Stratum
55			Hard grey silty sandy clay 28-22=10" 50 B/10"
60			Bottom of boring at 57 feet.
			Water encountered at 42 feet.
65			
70			
75			
80			
85			
90			
95			
100			

832964

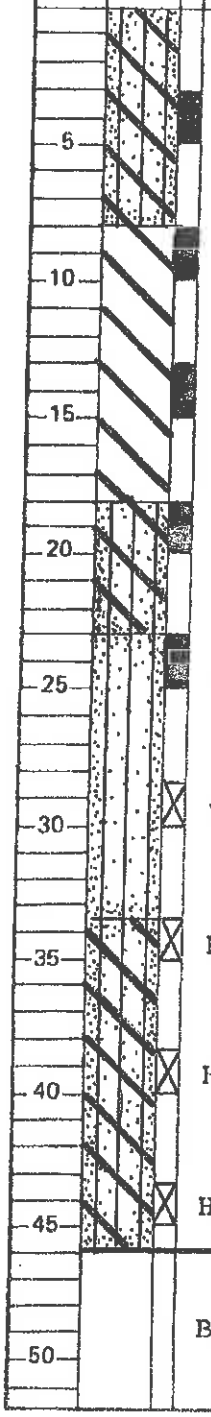
LOG OF BORING

PROJECT: Waste Water Ponds
CLIENT: SWEPCO

BORING NO.: MW-4
LOCATION: Hallsville

Date: 10-10-83 Type: Auger Ground Elevation:

Legend: ■ Sample X Penetration ▼ Water



Description of Stratum
Stiff tan and grey silty sandy clay w/iron ore
Very stiff tan and grey clay
Very stiff tan and grey clay w/iron ore seam
Stiff tan and grey silty sandy clay lenses
Firm grey silty sand
Very dense grey silty sand 30-20=12" 50 B/F
Hard grey silty sandy clay 30-20=8" 50 B/8"
Hard grey silty sandy clay 25-25=8" 50 B/8"
Hard grey silty sandy clay 25-25=10½" 50 B/10½"
Bottom of boring at 46 feet.

832964

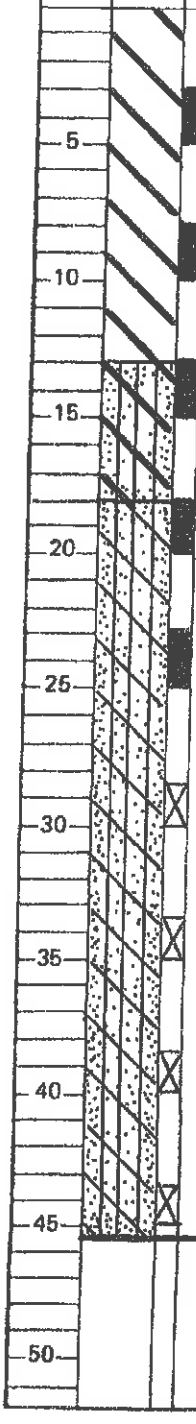
LOG OF BORING

PROJECT: Waste Water Ponds
CLIENT: SWEPCO

BORING NO.: MW-5
LOCATION: Hallsville

Date: 9-27-83 Type: Auger Ground Elevation:

Legend: ■ Sample X Penetration ▼ Water



Description of Stratum
Very stiff brown and grey clay w/iron ore
Very stiff grey clay
Very stiff brown clay w/silty sand lenses
Firm brown and grey clayey silty sand
Firm grey clayey silty sand
Very dense grey silty sand w/clay pockets 11-33=7" 50 B/7"
Very dense grey clayey silty sand 16-34=11" 50 B/11"
Very dense grey clayey silty sand 26-24=9" 50 B/9"
Very dense grey clayey silty sand 11-39=11½" 50 B/11½"
Bottom of boring at 45½'.

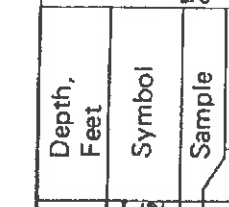
832964

LOG OF BORING

PROJECT: Waste Water Ponds
CLIENT: SWEPCO

BORING NO.: MW-6
LOCATION: Hallsville

Date: 10-3-83 Type: Auger Ground Elevation:



Legend:
■ Sample X Penetration ▼ Water

Description of Stratum
Stiff tan and grey clay w/silt lenses and iron ore
Very stiff tan and grey clay w/silt lenses and iron ore
Firm tan and grey clayey silty sand
Loose brown and grey clayey silty sand
Very dense grey clayey silty sand 25-25=11½" 50 B/11½"
Firm grey clayey silty sand 7-7-17 24 B/F
Very dense grey clayey silty sand 25-25=9" 50 B/9"
Very dense grey clayey silty sand 18-32=10½" 50 B/10½"
Bottom of boring at 40 feet.

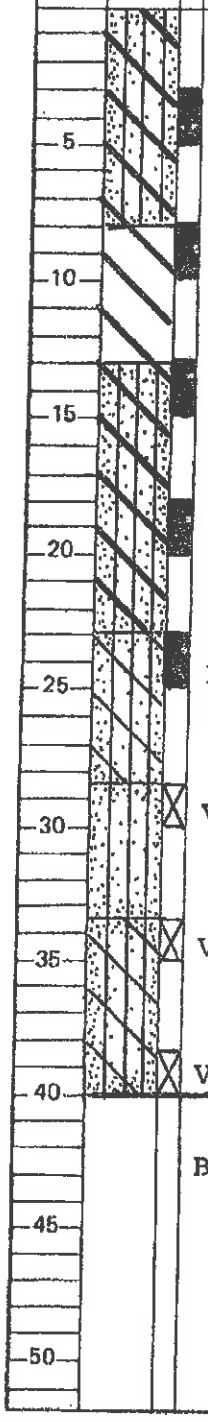
832964

LOG OF BORING

PROJECT: Waste Water Ponds
CLIENT: SWEPCO

BORING NO.: MW-7
LOCATION: Hallsville

Date: 10-3-83 Type: Auger Ground Elevation:



Legend: ■ Sample X Penetration ▼ Water

Description of Stratum
Stiff red, tan and grey sandy silty clay w/iron ore
Stiff tan and grey clay w/iron ore
Stiff tan and grey silty sandy clay lenses w/iron ore
Stiff tan and grey very sandy silty clay
Firm tan and grey clayey silty sand
Very dense grey silty sand 23-27=12" 50 B/F
Very dense grey clayey silty sand 17-35=12" 50 B/F
Very dense grey clayey silty sand 25-25=10½" 50 B/10½"
Bottom of boring at 40 feet.

Geosyntec consultants
engineers | scientists | innovators

Geosyntec Consultants, Inc
500 W Wilson Bridge Rd, Suite 250
Worthington, OH 43085
Telephone: 614-468-0415

BORING NUMBER AD-7R

CLIENT American Electric Power (AEP) Company, Inc
PROJECT NAME Pirkey
PROJECT NUMBER CHA8500B
PROJECT LOCATION Hallsville, TX
DATE STARTED 03/03/20 **COMPLETED**
GROUND ELEVATION **HOLE SIZE** 8.25 inches
DRILLING CONTRACTOR C&S Lease
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe DPT
AT TIME OF DRILLING ---
LOGGED BY Nathan Quick **CHECKED BY**
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0		SP		0.4 black SAND, (SP), with silt, moist, vegetative topsoil.
		GP		0.7 GRAVEL, (GP), poorly graded.
		ML		1.5 light gray to reddish brown clayey SILT, (ML), low to moderate cohesion.
		CL		Very stiff, red to light gray CLAY, (CL), trace silt, and low plasticity. Iron ore present.
5				
				9.4
10		CL-ML		10.0 Very stiff, red to light gray silty CLAY, (CL-ML), low plasticity.
		CL		10.7 Very stiff, reddish purple to light gray CLAY, (CL), moist, low plasticity.
				11.0 Iron ore.
		CH		Very stiff, reddish purple to gray CLAY, (CH), wet, medium plasticity. Iron ore present.
15				15.0
		CL-ML		15.3 Soft, black silty CLAY, (CL-ML), wet, medium plasticity.
		ML		16.0 reddish purple to orange clayey SILT, (ML), wet, good cohesion. Iron ore present.
		ML		gray to orange clayey SILT, (ML), wet, good cohesion. Iron ore present.
20				19.5
				No recovery.
				22.0
		ML		black clayey SILT, (ML), wet.
				23.2
		SC-SM		dark gray SAND, (SC-SM), fine grained, trace clay, wet.
				24.3
25		CL-ML		24.6 Medium stiff, black silty CLAY, (CL-ML), medium plasticity.
		SP		dark gray SAND, (SP), fine grained, poorly graded, wet.
				28.3
		SP		tan SAND, (SP), fine grained, poorly graded, wet. Iron ore present at the top foot.
30				30.0
				No recovery.
				31.9
		SP		32.0 tan SAND, (SP), fine grained, poorly graded, wet.
		SP		32.3 orange SAND, (SP), fine grained, poorly graded, wet.
		CL-ML		Medium stiff, black to dark gray silty CLAY, (CL-ML), wet, low plasticity.
35				

(Continued Next Page)

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500 W Wilson Bridge Rd, Suite 250
Worthington, OH 43085
Telephone: 614-468-0415

BORING NUMBER AD-7R

CLIENT American Electric Power (AEP) Company, Inc. **PROJECT NAME** Pirkey

PROJECT NUMBER CHA8500B **PROJECT LOCATION** Hallsville, TX

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
35		CL-ML		Medium stiff, black to dark gray silty CLAY, (CL-ML), wet, low plasticity. *(continued)*
			38.2	
40		SP		Medium dense, tan SAND, (SP), fine grained, poorly graded, wet.
			40.0	

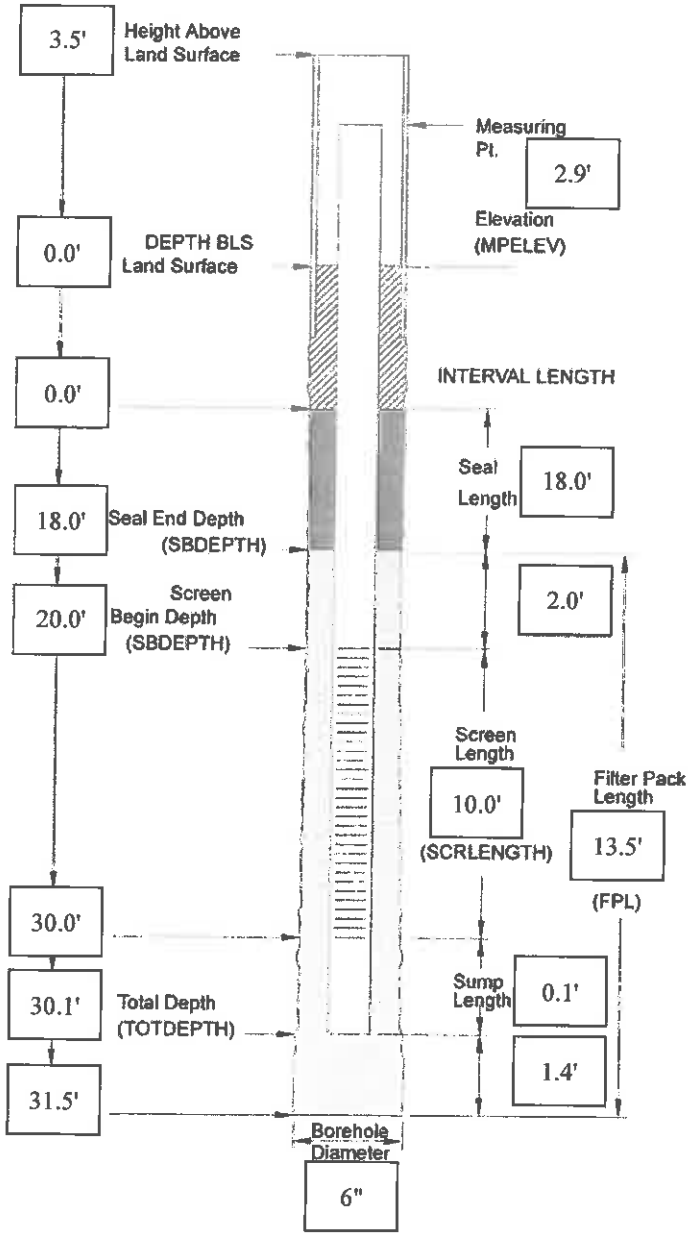
Bottom of borehole at 40.0 feet.

WELL CONSTRUCTION LOG
ABOVE GROUND COMPLETION

Well I.D.: AD-7R

Drilling Company: C & S
Drillers: DJ Diduch
Geologist/Engineer: Nathan Quick
Signature: _____

Site: AEP Pirkey
Project Number: CHA8495.12
Installation Method: Hollow Stem Auger
Casing Installation Date: 3/3/20
Well Type: Monitor Well
Well Completion Method: _____
Geologic Completion Zone: Aquifer



Comments

_____
_____
_____

Well Completion
Guard Posts **YES** Date: 3/5/2020
Surface Pad Size: 4 ft x 4 ft
Protective Casing or Cover
Diameter/Type: 4" Steel
Depth BGS: 2 Weep Hole **YES**
Grout
Composition/Proportions: NA

Placement Method: NA

Seal Date: 3/3/2020
Type: Non-coated bentonite pellets
Source: PDS
Set-up/Hydration Time: 24 hours
Placement Method: surface
Vol. Fluid Added: _____
Filter Pack
Type: 20/40 Silica Sand
Source: Pioneer Sand
Amount Used: 8 (50#) bags
Placement Method: surface
Well Riser Pipe
Casing Material: Sch. 40 PVC
Casing Inside Diameters: 2 in.
Screen
Material: Sch 40 PVC
Inside Diameter: 2 in.
Screen Slot Size: 0.01 in.
Percent Open Area: _____
Sump or Bottom Cap **YES**
Type/Length: Sch 40 PVC
Backfill Plug YES
Material: _____
Placement Method: _____
Set-up/Hydration Time: _____
Total Water Volume During Construction
Introduced (Gal): _____ Recovered (Gal): _____
Reviewed
By: _____ Date: _____

STATE OF TEXAS WELL REPORT for Tracking #540556

Owner:	**American Electric Power Company**	Owner Well #:	**AD-7R**
Address:	**502 N. Allen Street Shreveport, LA 71101**	Grid #:	**35-37-1**
Well Location:	**2400 Farm Road 3251 Hallsville, TX 75650**	Latitude:	**32° 27' 43.7" N**
		Longitude:	**094° 29' 18.3" W**
Well County:	**Harrison**	Elevation:	**No Data**
Type of Work:	**New Well**	Proposed Use:	**Monitor**

Drilling Start Date: **3/3/2020** Drilling End Date: **3/3/2020**

	Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Borehole:	**8.25**	**0**	**31.5**

Drilling Method: **Hollow Stem Auger**

Borehole Completion: **Filter Packed**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Filter Material*	*Size*
Filter Pack Intervals:	**18**	**31.5**	**Sand**	**20/40**

Annular Seal Data: **No Data**

Seal Method: **Poured**

Sealed By: **Driller**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Surface Slab Installed** **Surface Completion by Driller**

Water Level: **No Data**

Packers: **No Data**

Type of Pump: **No Data**

Well Tests: **No Test Data Specified**

	Strata Depth (ft.)	Water Type
Water Quality:	No Data	No Data

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **C&S Lease**
1873 FM 1252 E
Kilgore, TX 75663

Driller Name: **Buford E. Collier** License Number: **50089**

Apprentice Name: **David Diduch** Apprentice Number: **60297**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	1.5	Top soil, vegetation, black silt, gravel, light gray/red/brown clayey silt
1.5	10	Red/light gray clay, low plasticity, high stiffness, iron ore present, trace silt,
10	15	Maroon/light gray clay, high stiffness, low plasticity, iron ore, wet
15	20	Black silty clay, low-moderate plasticity, wet, Maroon/orange clayey silt, wet, good cohesion, iron ore, gray/orange clayey silt, iron ore present, wet, good cohesion
20	24.6	Black clayey silt, Dark gray fine grained sand, trace clay, wet, black silty clay, low-moderate plasticity, moderate to low stiffness
24.6	31.5	Dark gray fine grained sand, wet, well sorted, orange fine grained sand, wet, well sorted, tan fine grained sand, wet, well sorted, iron present

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia (in.)	Type	Material	Sch./Gage	Top (ft.)	Bottom (ft.)
2	Riser	New Plastic (PVC)	40	0	20
2	Screen	New Plastic (PVC)	40 0.010	20	30

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking Number on your written request.

Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

832964

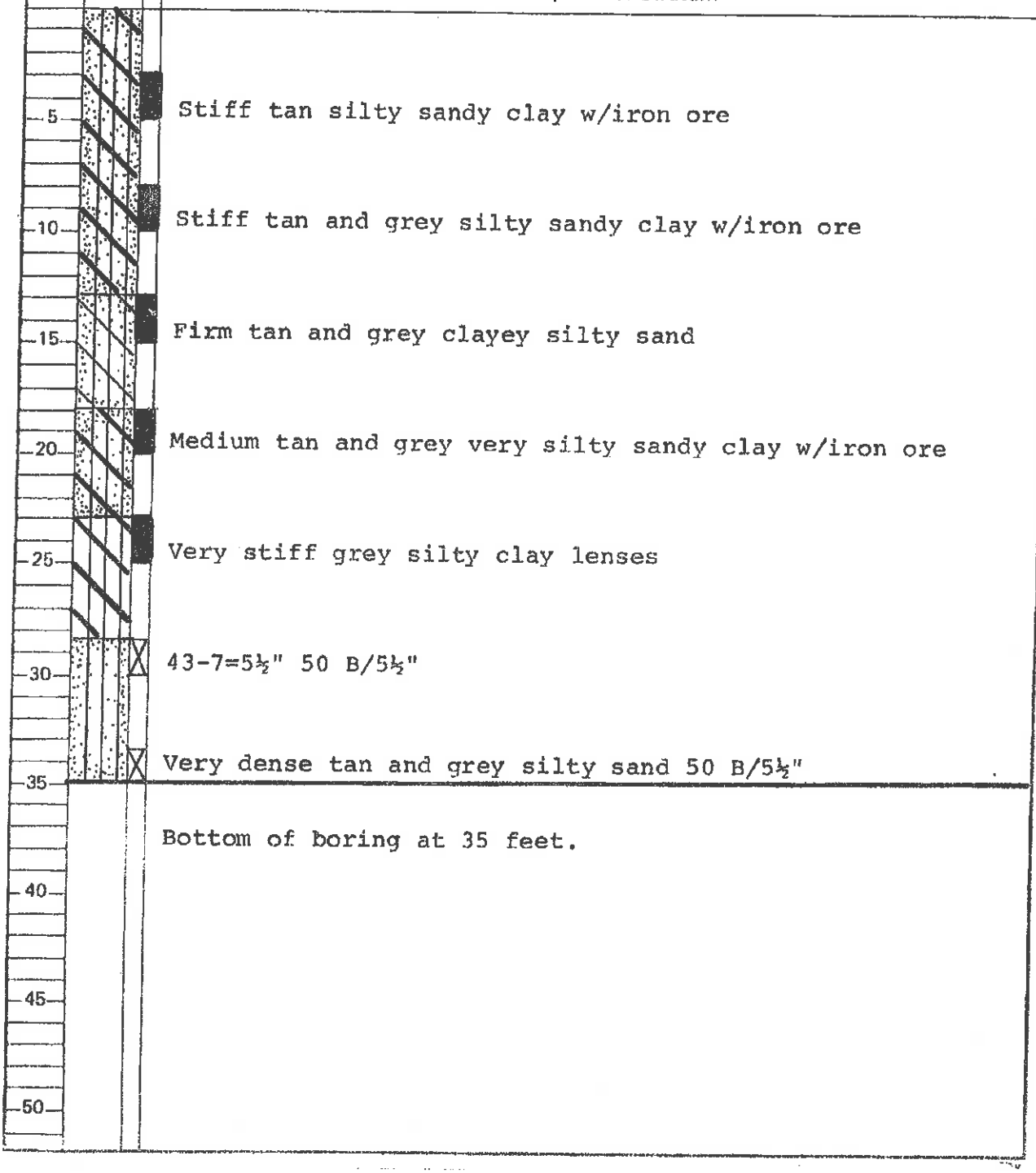
LOG OF BORING

PROJECT: Waste Water Ponds
CLIENT: SWEPCO

BORING NO.: MW-8
LOCATION: Hallsville

Date: 10-4-83 Type: Auger Ground Elevation:

Legend: ■ Sample X Penetration ▼ Water



Description of Stratum
Stiff tan silty sandy clay w/iron ore
Stiff tan and grey silty sandy clay w/iron ore
Firm tan and grey clayey silty sand
Medium tan and grey very silty sandy clay w/iron ore
Very stiff grey silty clay lenses
43-7=5½" 50 B/5½"
Very dense tan and grey silty sand 50 B/5½"
Bottom of boring at 35 feet.

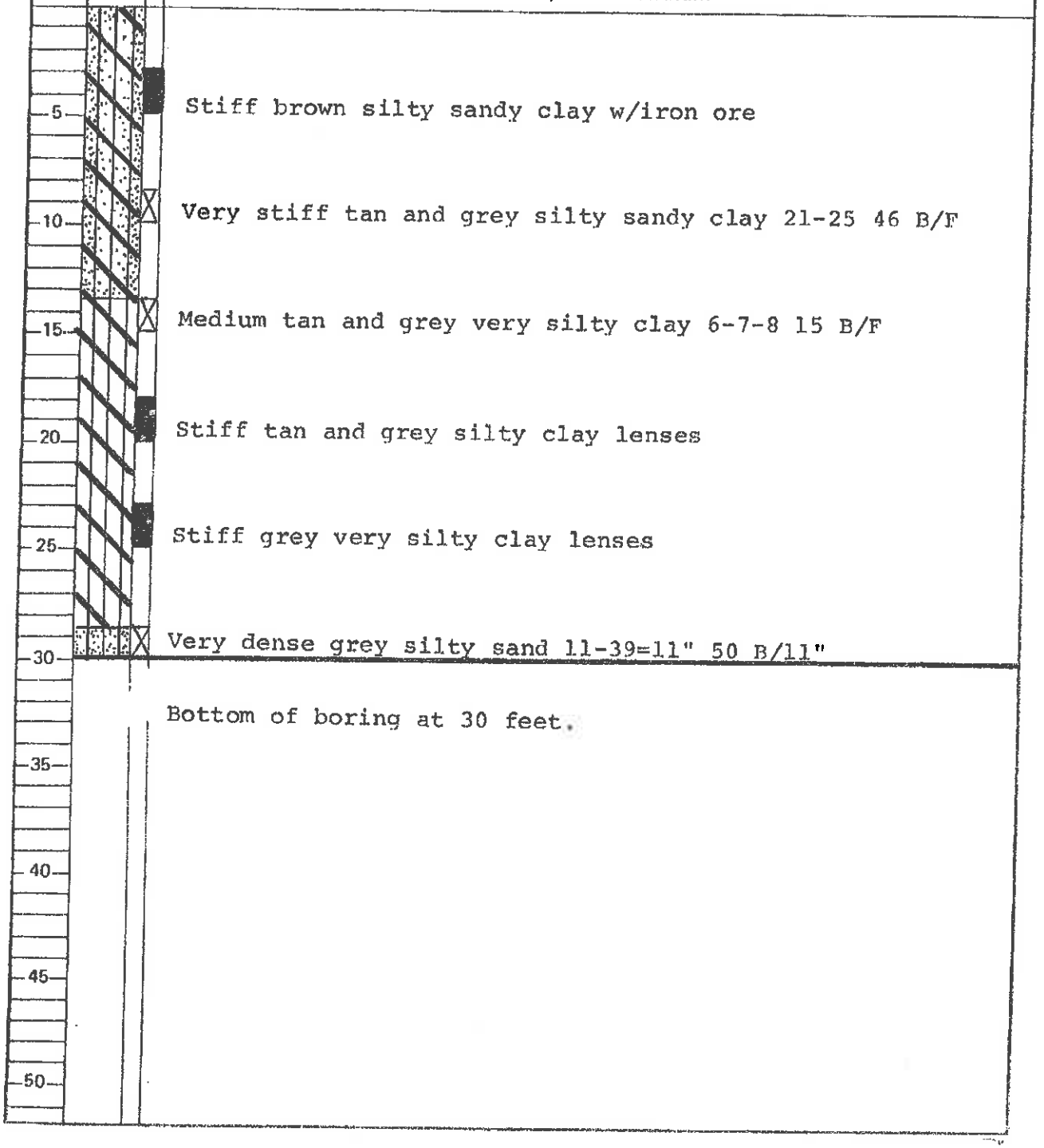
832964

LOG OF BORING

PROJECT: Waste Water Ponds
CLIENT: SWEPCO

BORING NO.: MW-9
LOCATION: Hallsville

Date: 10-4-83 Type: Auger Ground Elevation:



832964

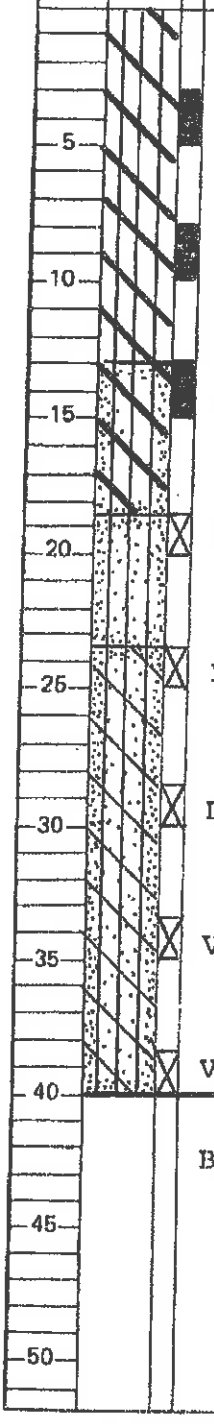
LOG OF BORING

PROJECT: Waste Water Ponds
CLIENT: SWEPCO

BORING NO.: MW-10
LOCATION: Hallsville

Date: 10-10-83 Type: Auger Ground Elevation:

Legend: ■ Sample X Penetration ▼ Water



Description of Stratum
Stiff tan and grey silty clay w/iron ore
Hard brown silty clay
Stiff tan and grey silty clay w/iron ore
Dense brown silty sand w/iron ore 13-15-19 34 B/F
Firm grey clayey silty sand 15-9-13 22 B/F
Dense grey clayey silty sand 8-12-28 40 B/F
Very dense grey clayey silty sand 19-31=11" 50 B/11"
Very dense grey clayey silty sand 24-26=10" 50 B/10"
Bottom of boring at 40 feet.

LOG OF BORING

832964
PROJECT: Monitor Wells at Metal Cleaning Waste Pond BORING NO.: MW-11
CLIENT: Southwestern Electric Power Company LOCATION: Hallsville, TX
N 0+23.50; W 10+40.49
Date: 1/30/86 Type: Rotary Ground Elevation: 361.61

Legend: ■ Sample X Penetration ▼ Water

Depth, Feet	Symbol	Sample	Description of Stratum
5			Brown and tan clay
10			Brown and tan clay w/iron ore
15			Brown and tan clay w/iron ore
20			Brown and tan sandy clay w/iron ore
25			Brown clayey silty sand
30			Brown and gray clayey silty sand
35			Gray silty sand
40			Gray silty sand
45			Bottom of Boring at 43 feet. Water encountered at 13 feet.
50			

SOUTHWESTERN LABORATORIES

832964

LOG OF BORING

PROJECT: Monitor Wells at Metal Cleaning Waste Pond BORING NO.: MW-12
CLIENT: Southwestern Electric Power Company LOCATION: Hallsville, TX

Date: 1/30/86 Type: Rotary N 6+13.25; W-6+90.36
Ground Elevation: 378.41

Legend: ■ Sample X Penetration ▼ Water

Depth, Feet	Symbol	Sample	Description of Stratum
5			Brown and tan sandy clay
10			Brown, tan and gray sandy clay
15			Tan and gray sandy clay
20			Brown and tan sandy clay
25			Gray and tan sandy clay
30			Brown and gray clay
35			Brown and gray clay
40			Gray silty sand
45			Gray silty sand
50			Gray silty sand

Water encountered at 27.5 feet.
Bottom of Boring at 51 feet.

SOUTHWESTERN LABORATORIES

Observation Well Installation Report

Location	Date	Station #	City
Pirkey Power Plant	2-23-88	Elev. 361.85 0+33.3N, 8+84.7 W	Hallsville, Texas

Project	Observation Well Number	Location
880284	MW-13	

Type of Rig	Installed By	Date	Time
CME 55	DS, DY, LM	2-23-88	

Method of Installation: Hollow-stem auger

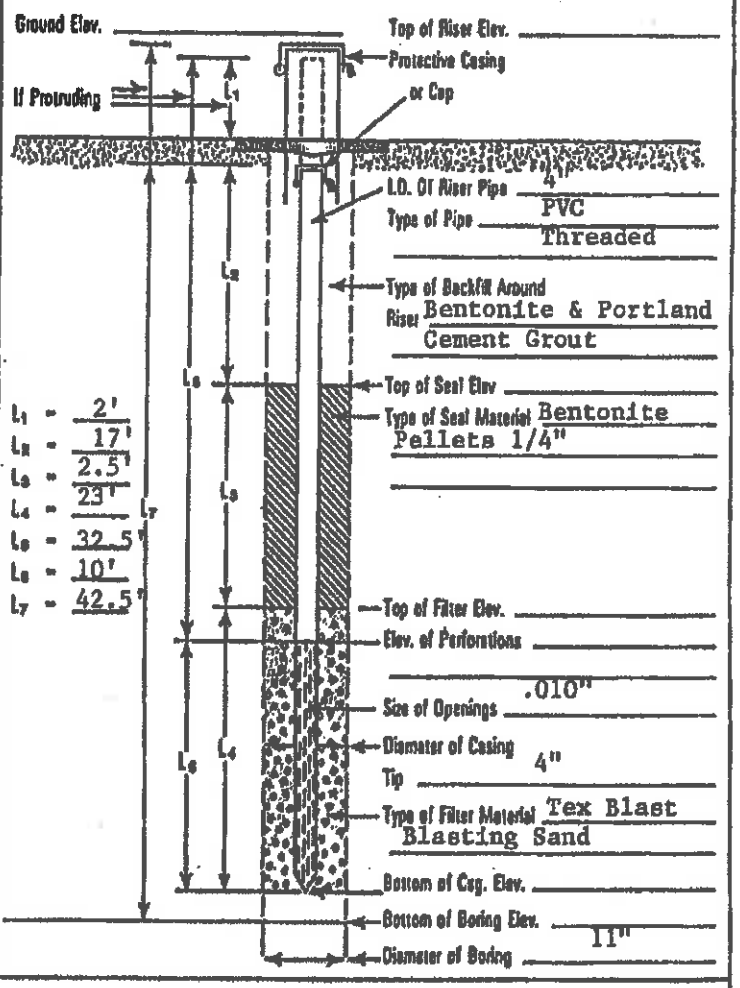
Log of Boring and Observation Well

Boring

Depth in ft.	Cored Interval	Description

Observation Well

Type of Observation Well: ☐ Flush ☒ Locking Cap ☒ Protruding ☐ Manhole



L_1 = 2'
L_2 = 17'
L_3 = 2.5'
L_4 = 23'
L_5 = 32.5'
L_6 = 10'
L_7 = 42.5'

Remarks: L2, L5, L7 are measured from the top of the PVC pipe, which protrudes 2' above the ground surface.

Inspected By

Observation Well Installation Report

Location	Date	Station #	City
Pirkey Power Plant	2-24-88 & 2-25-88	Elev. 361.81 0+36.3N, 12+34.2W	Hallsville, Texas

Project	Observation Well Number	Location
880284	MW-14	

Type of Rig	Installed By	Date	Time
CME 55	S.C., D.Y.	2-24-88 & 2-25-88	

Method of Installation: Hollow-stem auger, 4" PVC threaded, well sand pack, bentonite seal, cement bentonite grout

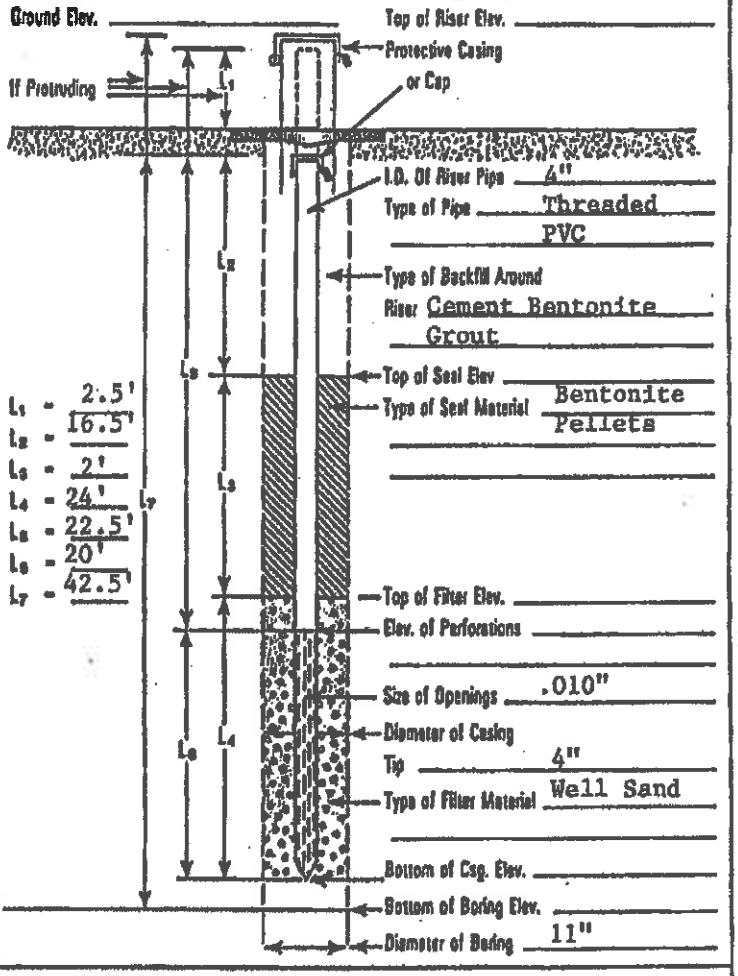
Log of Boring and Observation Well

Boring

Depth in ft.	Cored Interval	Description

Observation Well

Type of Observation Well: ☐ Flush ☒ Protruding ☒ Locking Cap ☐ Manhole



Remarks: L2, L5, L7 are measured from the top of the PVC pipe, which protrudes 2.5' above the ground surface.

Inspected By

Observation Well Installation Report

Location	Date	Station #	City
Pikey Power Plant	2-25-88 & 2-26-88	Elev. 360.27 1+30.7N, 13+14.5W	Hallsville, La.

Project	Observation Well Number	Location
880284	MW-15	

Type of Rig	Installed By	Date	Time
CME 55	S.C. & D.Y.	2-24-88	

Method of Installation: Hollow-stem auger

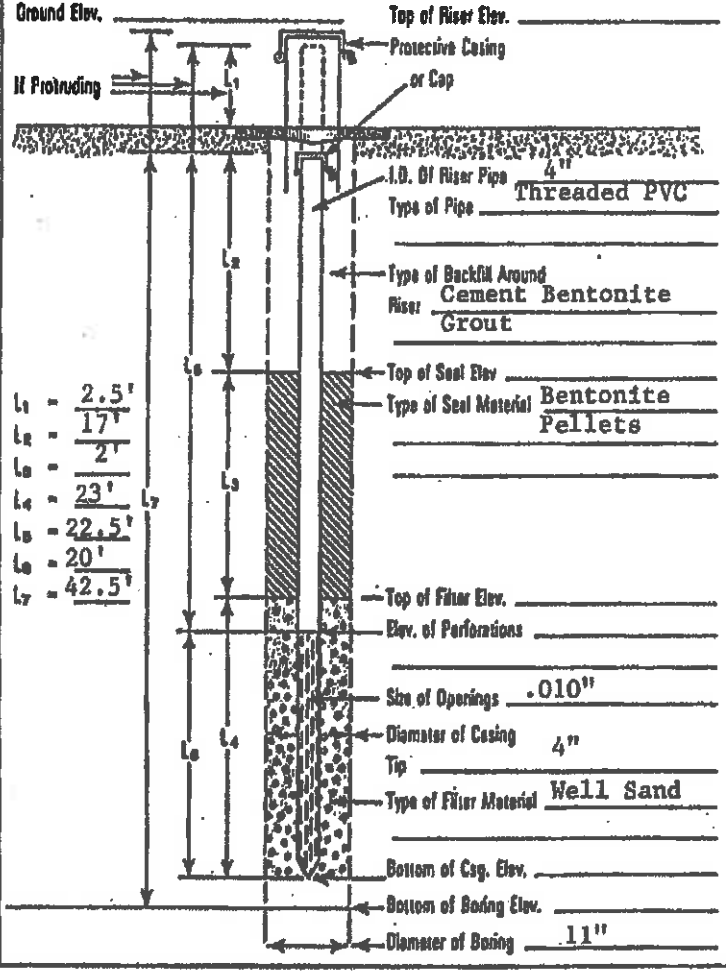
Log of Boring and Observation Well

Boring

Depth in ft.	Cored Interval	Description

Observation Well

Type of Observation Well: ☐ Flush ☒ Protruding ☒ Locking Cap ☐ Manhole



Remarks

L2, L5, L7 are measured from the top of the PVC pipe, which protrudes 2.5' above the ground surface.

Inspected By

APEX PROJECT NO.: 110-089 ☐ BORING BORING NUMBER: ____ ■ MONITOR WELL MONITOR WELL NUMBER: AD-22

FACILITY NAME: AEP- Pirkey Power Plant FACILITY ID NO.: N/A

FACILITY ADDRESS: Hallsville, Texas

DRILLING COMPANY/METHOD/RIG: Apex Geoscience Inc. / Hollow-stem Augers/ CME-55 Track Rig

DRILLER: Ed Wilson, Apex Geoscience Inc. COMPLETION DATE: 12/16/2010

PREPARED BY: David Bedford LOGGED BY: David Bedford

LATTITUDE: N 32°27'03.3" Datum: WGS-84 WELL LOCATION: Triangle- South side Quonset Hut
LONGITUDE: W94°29'41.3"

DEPTH (FEET)	PID (PPM)	SAMPLE INTERVAL	WELL LOG AND COMPLETION DETAILS	USCS CODE	SOIL DESCRIPTION AND COMMENTS	Odor	Moisture
1				0-0.5 SC	Clayey sand, light brown, very fine grained	None	Moist
2				0.5-12 CL	Lean clay, light brown mottled with light gray	None	Slightly Moist
3							
4					Few iron ore (small) pebbles in clayey sandy streaks		
5							
6							
7							
8							
9							
10							
11							
12							
13			▽	12-20 SC	Clayey sand, grayish brown with orangish brown streaks, very fine grained	None	Slightly Wet
14					Slightly wet @ 12.5' from seepage		
15					Large amount of iron ore 15-17'		
16							
17							
18					Very firm 18-18.5'		
19							
20							
21				20-25 SC	(Dense crystalline rock 21-21.1'), light brown clayey sand, greenish black, mica, black clay streaks, very fine grained, wet @ 20'	None	Wet
22							
23							
24							
25							
26				25-30 SM	Sand, greenish brown (1') grading to orangish brown, silty, very fine grained	None	Wet
27							
28							
29							
30							
31					Boring Terminated at 30'		
32							
33							
34							
35							
36							
37							
38							
39							
40							

Cement Bentonite Filter Sand ▽ Water Level

Apex geoscience inc.

Total Depth: 30 feet
Filter Sand (Size/Interval): 8-30'
Grout (Type/Interval): Grout from 0-2'; Bentonite from 2-8'
Surface Completion ☐ Flush ■ Above Ground

Riser Interval: +3 (agg)-10'
Screen Interval: 10-30'
Water level: 12.5'
3'

Note: This log is not to be used separate from this report.

Hydrex ENVIRONMENTAL, INC.

Monitor Well

Monitor Well No.: AD-33

PROJECT INFORMATION

PROJECT:	Pirkey Power Plant
PROJECT NO.:	I-04-1921
LOGGED BY:	Jeffrey D. Sammons, P.G.
SUPERVISING PG:	Jeffrey D. Sammons, P.G.
COMPLETION:	12/11/2015
DEVELOPMENT:	12/16/2015
SITE LOCATION:	3400 FM 3251, Hallsville, Texas
WELL OWNER:	AEP

DRILLING INFORMATION

DRILLER:	Buford Collier
DRILLER'S LICENSE NO.:	50069
RIG TYPE:	Geoprobe 3230DT
METHOD OF DRILLING:	Hollow Stem Auger
SAMPLING METHODS:	Split Core
SURFACE ELEVATION:	382.37 (Top of Casing)
HOLE DIAMETER:	8.25"
LATITUDE	32 27' 38.70" LONGITUDE 94 29' 16.82"

STATE OF TEXAS — JEFFREY D. SAMMONS — GEOLOGY #10070 — LICENSED PROFESSIONAL GEOSCIENTIST — 1.21.16

▼ Water Level Upon Installation ▽ Water Level at Time of Drilling ■ Geotechnical Lab Sample

TBPG No. 50027

DESCRIPTION	USCS	DEPTH	SAMPLE	% MOISTURE	% FINES	LL	PL	PI
CLAYEY SAND: very fine to fine sand, some silt, dark brownish black and brown, very moist	SC	0–1						
FAT CLAY: trace sand and silt, reddish brown and light gray - some iron ore gravel at 2.0' - some silt and ironstone in thin seams at 2.5', light gray, yellowish brown, and reddish brown,	CH	1–4						
		4		29	93	74	32	42
CLAYEY SAND: interbedded clays and fine to very fine sand and silt, some iron ore gravel, light reddish brown and light gray	SC	4–10						
- some clay and trace of iron ore gravel at 11', light gray and reddish brown, moist		10–11						
		11		21	35	35	23	12
- trace clay at 13', thin saturated ironstone and gravel seams at 13' to 16', reddish brown, light reddish brown, and light gray - dark reddish brown at 15' - clay lense at 15.5' to 16.5', light reddish brown and light gray		11–16						
SILTY CLAYEY SAND: very fine to fine sand, reddish brown, very moist to saturated	SM-SC	16–20						
- some clay lenses and iron ore gravel at 20' - clayey at 20.5' to 21' - trace clay at 21', light gray, saturated		20–21						
		21		23	19	27	18	9
- some iron ore gravel at 26', reddish brown, very moist		21–28						
CLAYEY SAND: very fine to fine sand, dark gray and gray, moist	SC	28–30						
		28		23	30	25	18	7

WELL CONSTRUCTION

- Locking Well Casing Cover
- Locking Well Cap
- Protective Well Casing
- Concrete Pad
- Ground Surface
- Cement
- Bentonite
- 2" Sch. 40 PVC Riser
- 20/40 Silica Sand
- 0.010" Slotted Sch. 40 PVC Well Screen
- PVC Bottom Cap

NOTES: This log should not be used separately from the original report. Not all USCS descriptors were laboratory verified.

Monitoring Well Construction Diagram

Project Number:	111173	**Well Number:**	AD-37
Project Name:	AEP-Pirkey	**Property Owner:**	AEP
Geologist:	David Barker	Northing:	303926.2640
Drilling Company:	Plains Environmental Services	Easting:	2926676.3187
Driller:	Jesse Kolvig	Survey Datum:	Texas State Plane North Central (4202)

Drilling Method: Hollow Stem Auger
Borehole Diameter: 8.25-inch

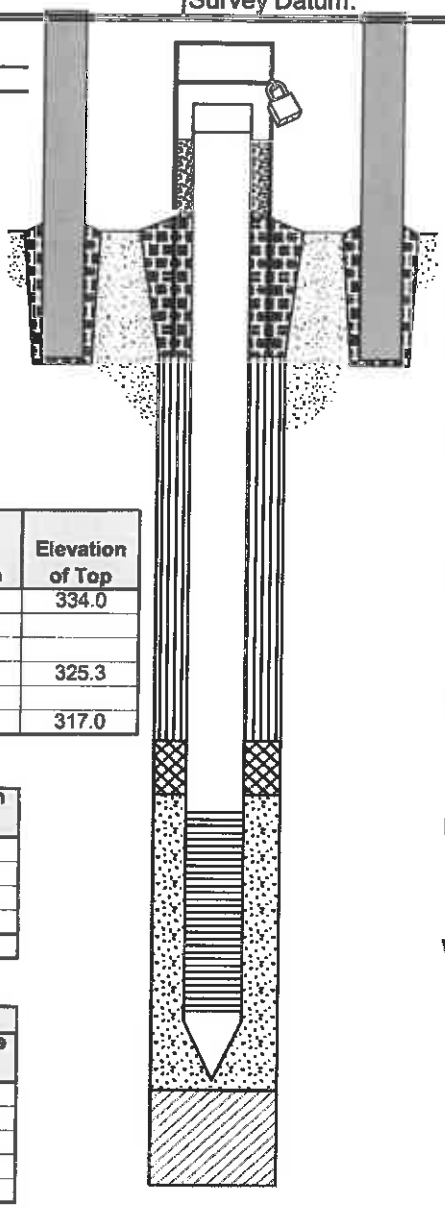
Elevations	
Top of Casing (TOC)	336.6
Ground Surface (GS)	334.0
Reference Point (RP)	protective cover

Dates	
Drilling/Installation Start	2/22/2019
Installation Complete	2/22/2019
Well Completed	3/6/2019
Development Start	2/23/2019
Development Complete	2/23/2019

Annular Material Measurements	Depth to Top from GS	Total Footage	Elevation of Top
Annular Seal		8.7	334.0
Bentonite Seal	0		
Secondary Filter Pack			
Filter Pack	8.66	8.3	325.3
Backfill	0		
Bottom of Borehole	17		317.0

Casing Materials Measurements	Total Footage	Elevation of Top
Total Riser Installed	15.01	NA
Total Riser Cutoff	0.69	NA
Screen	5.00	322.28
Bottom Cap	0.28	317.28
Total Depth from TOC	19.6	

Groundwater Levels		
Date & Time	Depth	Reference Point
02/23/2019 1225	15.12	TOC
02/24/19 1135	15.5	TOC



Cap Type: J-plug
Lock Keyed to: AEP monitoring well

Protective Cover:
Material: steel
Size: 4"
Length: 5'
Pea Gravel (Y/N): N
Weep Hole (Y/N): N
Guage Mark (Y/N): Y

Bollards (# and type): 4 - steel

Surface Pad:
Dimensions: 4' x 4' x 4"
Material: concrete

Annular Seal:
Type & Size: bentonite chips
Manufacturer: PDS
Amount Used: (included with bentonite seal)

Bentonite Seal:
Type & Size: chips 3/8"
Manufacturer: PDS
Amount Used: 4.5 bags / 225 lbs

Secondary Filter Pack:
Type & Size: --
Manufacturer: --
Amount Used: --

Primary Filter Pack:
Type & Size: sand 12/20
Manufacturer: Pioneer Sands
Amount Used: 4 bags / 200 lbs

Well Casing:
Type: PVC
Diameter: 2"
Sch. or Weight: Sch. 40
Manufacturer: Environmental Manufacturing
Screen Type: PVC factory slot
Screen Slot Size: 0.010"
Bottom Cap Type: threaded

Centralizers (Y/N): N
Material: --
Number: --
Depth(s): --

Backfill Material:
Type & Size: NA
Manufacturer: --
Amount Used: --

Drilling Log

BURNS McDONNELL

Project Name: AEP Pirkey CSM		Project No.: 111173	Boring/Monitoring Well Number: AD-37
Coordinates: N 6875889.7 E 3203425.2		Ground Elevation: 333.60	Page: 1 of 2
Total Depth (feet): 21	Hole Size (inches): 2.25"/ 8.25"	Driller: J. Kolvig	
Drilling Rig: Geoprobe 7822DT		Drilling Company: Plains Environmental Services	
Date: 2/22/2019	Logged By: D. Barker	Reviewed by:	Approved by:

Elevation (MSL)	Depth (feet bgs)	Description	Graphic Log	Sample Type	Sample Number	Blow Count	N Value	Sample Recovery/Length (feet)	Penetrometer (tsf)	PID Reading (ppm)	Remarks
333	0	SAND and SILT, dark yellowish Brown (10YR 3/4), fine grained poorly sorted, damp, loose; SM.									Depth to water while drilling ▽
	1	SAND, reddish Yellow (7.5YR 6/8), fine grained, poorly graded, damp, loose; SP.									Depth to water after drilling ▼
332	2	CLAY, yellowish Red (5YR 5/8) to dark Red (2.5YR 3/6), with sand, damp, medium density, trace to medium plasticity; CL.		MC	1		NA	4.5/5	NA	NA	
331	3										
330	4										
329	5	- sand content increasing below 5.0'									
328	6	CLAY, light Gray (7.5YR 7/1) to White (7.5YR 8/1) to dark Red (10R 3/6), damp, stiff, trace to medium plasticity; CL.		MC	2		NA	4/4	NA	NA	
327	7	- trace very fine grained sand laminations, Red (2.5YR 4/8) below 7.0'									
326	8										
325	9	SAND, yellowish Red (5YR 5/6), very fine to fine grained, poorly graded, trace clay, damp, loost to medium plasticity; SP.									
324	10										No free water observed
323	11	CLAY, light Gray (5YR 7/1) to reddish Yellow (7.5YR 6/8), some sand, damp, medium to stiff, medium plasticity; CL.		MC	3		NA	4/4	NA	NA	
322	12										
321	13										
320				MC	4		NA	4/4	NA	NA	

Drilling Log, continued

BURNS McDONNELL

Project Name	AEP Pirkey CSM
Project Number	111173
Boring/Monitoring Well Number	AD-37
Page	2 of 2
Date	2/22/2019

Elevation (MSL)	Depth (feet bgs)	Description	Graphic Log	Sample Type	Sample Number	Blow Count	N Value	Sample Recovery/Length (feet)	Penetrometer (tsf)	PID Reading (ppm)	Remarks
319	15	SAND, brownish Yellow (10YR 6/8), very fine to fine grained, poorly graded, trace to some clay, damp to moist, loose; SC. - medium to high plasticity in portions with increased clay content									
318	16	SAND and CLAY, brownish Yellow (10YR 6/8) to light Gray (10YR 7/2), very fine to fine grained sand, poorly graded, damp to moist, medium density; SC. - clay content increasing, moisture content decreasing below 15.0' - trace sand concretions below 16.0'		MC	4		NA	4/4	NA	NA	
317	17	CLAY, dark Brown (10YR 3/3), some silt, damp, stiff, medium plasticity; CL.									
316	18	CLAY, brownish Yellow (10YR 6/8), with sand, moist to wet, very soft to soft, high plasticity; CH.									
315	19	CLAY, very dark grayish Brown (10YR 3/2), trace sand, trace silt, damp, medium to stiff, medium plasticity; CL.		MC	5		NA	4/4	NA	NA	
314	20	SAND, dark Gray (10YR 4/1), very fine grained, poorly graded, with clay, damp, loose to medium; SC.									
313	21	Refusal on obstruction - End of boring at 21 feet bgs.									Monitoring well installed on 2/22/2019
	22										
	23										
	24										
	25										
	26										
	27										
	28										

Monitoring Well Construction Diagram

Project Number:	111173	**Well Number:**	AD-38
Project Name:	AEP-Pirkey	**Property Owner:**	AEP
Geologist:	David Barker	Northing:	303089.4584
Drilling Company:	Plains Environmental Services	Easting:	2926690.2076
Driller:	Jesse Kolvig	Survey Datum:	Texas State Plane North Central (4202)

Drilling Method: Hollow Stem Auger
Borehole Diameter: 8.25-inch

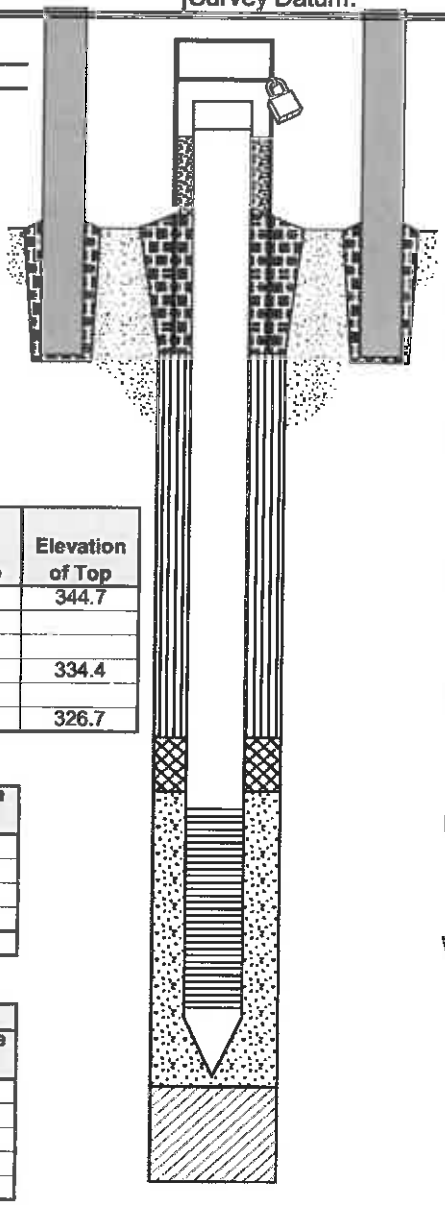
Elevations	
Top of Casing (TOC)	347.3
Ground Surface (GS)	344.7
Reference Point (RP)	protective cover

Dates	
Drilling/Installation Start	2/21/2019
Installation Complete	2/21/2019
Well Completed	3/6/2019
Development Start	2/23/2019
Development Complete	2/23/2019

Annular Material Measurements	Depth to Top from GS	Total Footage	Elevation of Top
Annular Seal		10.3	344.7
Bentonite Seal	0		
Secondary Filter Pack			
Filter Pack	10.3	7.7	334.4
Backfill	0		
Bottom of Borehole	18		326.7

Casing Materials Measurements	Total Footage	Elevation of Top
Total Riser Installed	17.30	NA
Total Riser Cutoff	1.53	NA
Screen	4.99	331.53
Bottom Cap	0.35	326.54
Total Depth from TOC	21.11	

Groundwater Levels		
Date & Time	Depth	Reference Point
2/24/2019	15.5	TOC



Cap Type: J-plug
Lock Keyed to: AEP monitoring well

Protective Cover:
Material: steel
Size: 4"
Length: 5'
Pea Gravel (Y/N): N
Weep Hole (Y/N): N
Guage Mark (Y/N): Y

Bollards (# and type): 4 - steel

Surface Pad:
Dimensions: 4' x 4' x 4"
Material: concrete

Annular Seal:
Type & Size: bentonite chips
Manufacturer: PDS
Amount Used: (included with bentonite seal)

Bentonite Seal:
Type & Size: chips 3/8"
Manufacturer: PDS
Amount Used: 5 bags / 250 lbs

Secondary Filter Pack:
Type & Size: --
Manufacturer: --
Amount Used: --

Primary Filter Pack:
Type & Size: sand 12/20
Manufacturer: Pioneer Sands
Amount Used: 4 bags / 200 lbs

Well Casing:
Type: PVC
Diameter: 2"
Sch. or Weight: Sch. 40
Manufacturer: Environmental Manufacturing
Screen Type: PVC factory slot
Screen Slot Size: 0.010"
Bottom Cap Type: threaded

Centralizers (Y/N): N
Material: --
Number: --
Depth(s): --

Backfill Material:
Type & Size: NA
Manufacturer: --
Amount Used: --

Drilling Log

BURNS McDONNELL	Project Name: AEP Pirkey CSM	Project No.: 111173	Boring/Monitoring Well Number: AD-38
	Coordinates: N 6874854.3 E 3203331.6	Ground Elevation: 344.20	Page: 1 of 3
	Total Depth (feet): 28.5 / Hole Size (inches): 2.25"/ 8.25"	Driller: J. Kolvig	
Drilling Rig: Geoprobe 7822DT		Drilling Company: Plains Environmental Services	
Date: 2/21/2019	Logged By: D. Barker	Reviewed by:	Approved by:

Elevation (MSL)	Depth (feet bgs)	Description	Graphic Log	Sample Type	Sample Number	Blow Count	N Value	Sample Recovery/Length (feet)	Penetrometer (tsf)	PID Reading (ppm)	Remarks
344	0	CLAY, Brown (2.5YR 4/3), with sand, damp, soft, trace plasticity; CL.									▽ Depth to water while drilling ▼ Depth to water after drilling
343	1	SAND, strong Brown (7.5YR 4/6) to Red (10R 4/8), very fine grained, well graded, with silt, some medium grained concretions, damp, medium density; SM.									
342	2	SAND, strong Brown (7.5YR 5/6), fine grained, poorly graded, trace coarse grains, damp, medium density; SP.									
341	3	CLAY, strong Brown (7.5YR 5/8) to dark Red (10R 3/6), to Red (4/6), some sand, damp, medium to stiff, trace to medium plasticity; CL. - sand content increasing below 2.5'		MC	1		NA	3.5/5	NA	NA	
340	4										
339	5	CLAY, light Gray (7.5YR 7/1) to White (7.5YR 8/1) to Dark Red (10R 3/6), damp stiff, trace to medium plasticity; CL. - trace very fine grained sand laminations, Red (2.5YR 4/8)									
338	6										
337	7	- trace iron staining below 7.1' SAND, strong Brown (7.5YR 5/8), very fine grained, poorly graded, trace silt, damp, medium to dense; SP.		MC	2		NA	5/5	NA	NA	
336	8										
335	9	- trace clay below 9.0' SAND, reddish Yellow (7.5YR 6/8) to strong Brown (2.5YR 5/8), very fine to fine grained, poorly graded, trace clay, damp, medium to dense; SP.									
334	10	- clay content increasing, light Gray (7.5YR 7/1) to White (2.5YR 8/1) to Gray (2.5 YR 3/1) below 10.5'									No free water observed
333	11										
332	12	SAND, strong Brown (7.5YR 5/8), very fine to fine grained, poorly graded, trace silt, damp, medium to dense; SP.		MC	3		NA	5/5	NA	NA	
331	13										

AEP_PIRKEY_SOILBORINGLOGS.GPJ 5/9/19

Drilling Log, continued

BURNS McDONNELL

Project Name	AEP Pirkey CSM
Project Number	111173
Boring/Monitoring Well Number	AD-38
Page	2 of 3
Date	2/21/2019

Elevation (MSL)	Depth (feet bgs)	Description	Graphic Log	Sample Type	Sample Number	Blow Count	N Value	Sample Recovery/Length (feet)	Penetrometer (tsf)	PID Reading (ppm)	Remarks
330	15	SAND, light Gray (7.5YR 7/1) to reddish Yellow (7.5YR 6/8), very fine to fine grained, poorly graded, with clay, damp to moist, loose to medium; SC. - medium plasticity in portions of increased clay content		MC	3		NA	5/5	NA	NA	
329	16										
328											
327	17	- sand content increasing, clay content decreasing below 16.5'		MC	4		NA	5/5	NA	NA	
326	18	CLAY, dark Brown (7.5 YR 3/2), trace sand, damp to moist, soft to medium, medium to high plasticity; CL-CH.									
325	19										
324	20	CLAY, very dark grayish Brown (10YR 3/2), trace sand, trace silt, damp, medium, medium plasticity; CL.									
323	21										
322	22			MC	5		NA	5/5	NA	NA	
321	23										
320	24	- sand content increasing below 24.0'									
319	25	SAND, dark Gray (10YR 4/1), very fine grained, poorly graded, with clay, damp to moist, loose to medium; SC.									
318	26										
317	27			MC	6		NA	3.5/3.5	NA	NA	
316	28	Refusal on obstruction - End of boring at 28.5 feet bgs.									Monitoring well installed on

AEP_PIRKEY_SOILBORINGLOGS.GPJ 5/9/19

Drilling Log, continued

BURNS McDONNELL

Project Name	AEP Pirkey CSM
Project Number	111173
Boring/Monitoring Well Number	AD-38
Page	3 of 3
Date	2/21/2019

Elevation (MSL)	Depth (feet bgs)	Description	Graphic Log	Sample Type	Sample Number	Blow Count	N Value	Sample Recovery/Length (feet)	Penetrometer (tsf)	PID Reading (ppm)	Remarks
	30										2/21/2019
	31										
	32										
	33										
	34										
	35										
	36										
	37										
	38										
	39										
	40										
	41										
	42										
	43										

Monitoring Well Construction Diagram

Project Number:	111173	**Well Number:**	**SB-5S (AD-44)**
Project Name:	AEP-Pirkey	**Property Owner:**	AEP
Geologist:	David Barker	Northing:	303116.2329
Drilling Company:	MHC X-Ploration Corporation	Easting:	2925753.9859
Driller:	Jason Smith	Survey Datum:	Texas State Plane North Central (4202)

Drilling Method: Rotary Wash
Borehole Diameter: 6.75-inch

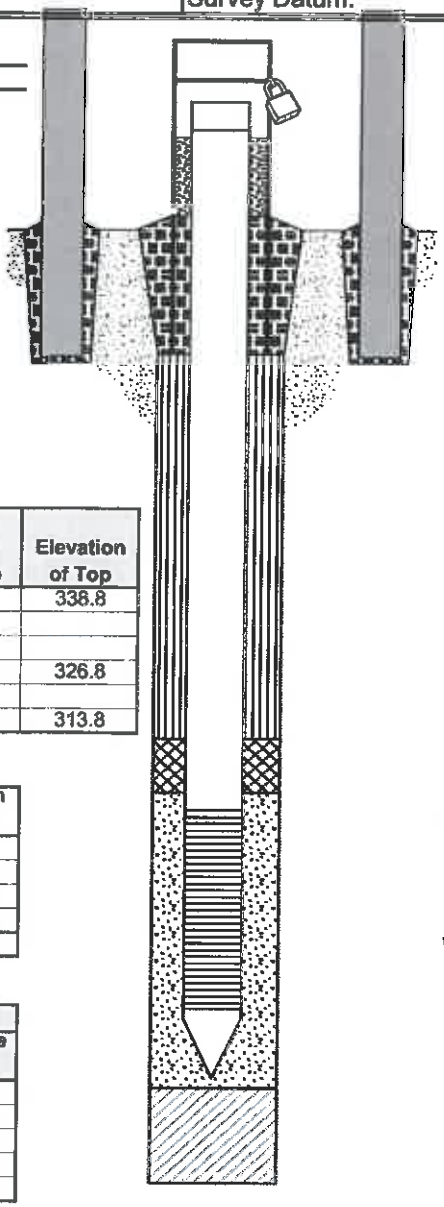
Elevations	
Top of Casing (TOC)	341.8
Ground Surface (GS)	338.8
Reference Point (RP)	ground surface

Dates	
Drilling/Installation Start	2/24/2019
Installation Complete	2/24/2019
Well Completed	3/18-25/2019
Development Start	2/25/2019
Development Complete	2/25/2019

Annular Material Measurements	Depth to Top from GS	Total Footage	Elevation of Top
Annular Seal		12.0	338.8
Bentonite Seal	0		
Secondary Filter Pack			
Filter Pack	12	13.0	326.8
Backfill	0		
Bottom of Borehole	25		313.8

Casing Materials Measurements	Total Footage	Elevation of Top
Total Riser Installed	20.00	NA
Total Riser Cutoff	2.43	NA
Screen	10.00	324.23
Bottom Cap	0.43	314.23
Total Depth from TOC	28	

Groundwater Levels		
Date & Time	Depth	Reference Point



Cap Type: J-plug
Lock Keyed to: AEP monitoring well

Protective Cover:
Material: steel
Size: 4"
Length: 5'
Pea Gravel (Y/N): N
Weep Hole (Y/N): N
Guage Mark (Y/N): Y

Bollards (# and type): 4 - steel

Surface Pad:
Dimensions: 4' x 4' x 4"
Material: concrete

Annular Seal:
Type & Size: bentonite chips 3/8"
Manufacturer: Cetco
Amount Used: 1 bag / 50 lbs

Bentonite Seal:
Type & Size: pellets 3/8"
Manufacturer: PDS
Amount Used: 1 bucket / 50 lbs

Secondary Filter Pack:
Type & Size: --
Manufacturer: --
Amount Used: --

Primary Filter Pack:
Type & Size: sand 16/30
Manufacturer: U.S. Silica Company
Amount Used: 6 bags / 300 lbs

Well Casing:
Type: PVC
Diameter: 2"
Sch. or Weight: Sch. 40
Manufacturer: Campbell Monoflex
Screen Type: PVC factory slot
Screen Slot Size: 0.010"
Bottom Cap Type: threaded

Centralizers (Y/N): N
Material: --
Number: --
Depth(s): --

Backfill Material:
Type & Size: NA
Manufacturer: --
Amount Used: --

Monitoring Well Construction Diagram

Project Number:	111173	**Well Number:**	SB-5D (AD-45)
Project Name:	AEP-Pirkey	**Property Owner:**	AEP
Geologist:	David Barker	Northing:	303126.7816
Drilling Company:	MHC X-Ploration Corporation	Easting:	2925748.8859
Driller:	Jason Smith	Survey Datum:	Texas State Plane North Central (4202)

Drilling Method: Rotary Wash
Borehole Diameter: 6.75-inch

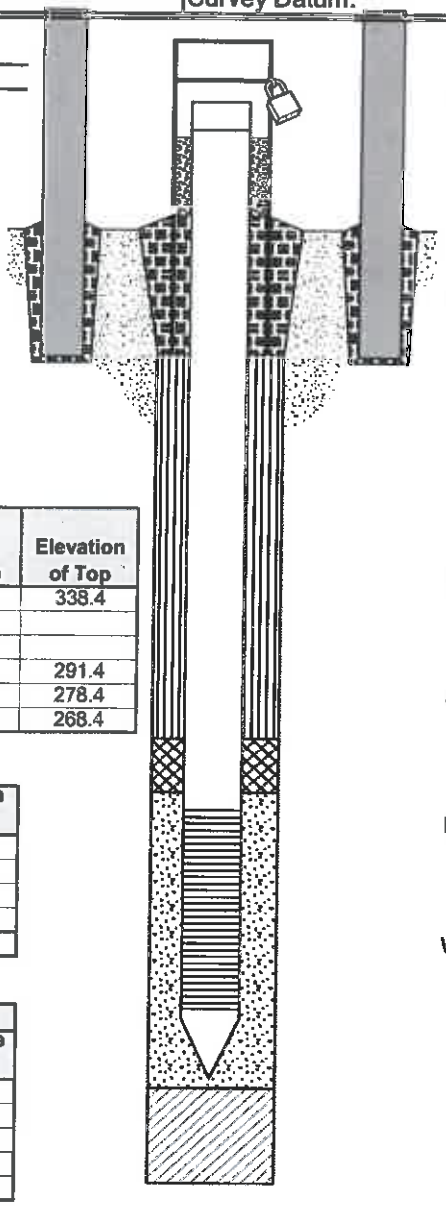
Elevations	
Top of Casing (TOC)	341.0
Ground Surface (GS)	338.4
Reference Point (RP)	ground surface

Dates	
Drilling/Installation Start	2/23/2019
Installation Complete	2/23/2019
Well Completed	3/18-25/2019
Development Start	2/27/2019
Development Complete	2/27/2019

Annular Material Measurements	Depth to Top from GS	Total Footage	Elevation of Top
Annular Seal		47.0	338.4
Bentonite Seal	0		
Secondary Filter Pack			
Filter Pack	47	13.0	291.4
Backfill	60	10.0	278.4
Bottom of Borehole	70		268.4

Casing Materials Measurements	Total Footage	Elevation of Top
Total Riser Installed	60.00	NA
Total Riser Cutoff	7.83	NA
Screen	10.00	288.83
Bottom Cap	0.43	278.83
Total Depth from TOC	62.6	

Groundwater Levels		
Date & Time	Depth	Reference Point



Cap Type: J-plug
Lock Keyed to: AEP monitoring well

Protective Cover:
- Material: steel
- Size: 4"
- Length: 5'
- Pea Gravel (Y/N): N
- Weep Hole (Y/N): N
- Guage Mark (Y/N): Y

Bollards (# and type): 4 - steel

Surface Pad:
- Dimensions: 4' x 4' x 4"
- Material: concrete

Annular Seal:
- Type & Size: bentonite chips 3/8"
- Manufacturer: Cetco
- Amount Used: 8 bags / 400 lbs

Bentonite Seal:
- Type & Size: pellets 3/8"
- Manufacturer: PDS
- Amount Used: 1 bucket / 50 lbs

Secondary Filter Pack:
- Type & Size: --
- Manufacturer: --
- Amount Used: --

Primary Filter Pack:
- Type & Size: sand 16/30
- Manufacturer: U.S. Silica Company
- Amount Used: 7 bags / 350 lbs

Well Casing:
- Type: PVC
- Diameter: 2"
- Sch. or Weight: Sch. 40
- Manufacturer: Campbell Monoflex
- Screen Type: PVC factory slot
- Screen Slot Size: 0.010"
- Bottom Cap Type: threaded

Centralizers (Y/N): N
- Material: --
- Number: --
- Depth(s): --

Backfill Material:
- Type & Size: formation
- Manufacturer: --
- Amount Used: --

Drilling Log

BURNS McDONNELL

Project Name: AEP Pirkey CSM		Project No.: 111173	Boring/Monitoring Well Number: SB-05 (AD-44 and AD-45)
Coordinates: N 6875081.7 E 3202479.7		Ground Elevation: 338.40	Page: 1 of 5
Total Depth (feet): 70	Hole Size (inches): 6.75"	Driller: J. Smith	
Drilling Rig: Ardco 4x4		Drilling Company: MHC X-Ploration	
Date: 2/23/2019	Logged By: D. Barker	Reviewed by:	Approved by:

Elevation (MSL)	Depth (feet bgs)	Description	Graphic Log	Sample Type	Sample Number	Blow Count	N Value	Sample Recovery/Length (feet)	Penetrometer (tsf)	PID Reading (ppm)	Remarks
338	0	CLAY, pinkish Gray (7.5YR 7/2) to Red (2.5YR 4/6), some sand, damp to moist, soft, high plasticity; CH.		SS	1			1/1	NA	NA	
337	1			SS	2			1/1	NA	NA	
336	2			SS	3			1/1	NA	NA	
335	3			SS	4			1/1	NA	NA	
334	4			SS	5			1/1	NA	NA	
333	5	SAND, Red (2.5YR 4/6 to 4/8) some pinkish Gray (7.5YR 7/2), very fine to fine grained, poorly graded, damp, medium density; SP.		MC	1		NA	4/5	NA	NA	
332	6	SAND, reddish Yellow (5YR 6/8) to yellowish Red (5YR 5/8), very fine grained, poorly graded, damp, loose; SP.									
331	7	SAND, pinkish Gray (7.5YR 7/2 to 6/2), very fine to fine grained, poorly graded, trae clay laminations, damp, medium density; SP.									
330	8	SAND, yellowish Red (5YR 5/8) very fine to fine grained, poorly graded, damp, medium density; SP.									
329	9	SAND, pinkish Gray (5YR 7/2), very fine to fine grained, poorly graded, trace clay, damp, dense; SP-SC. - clay content increases, strong Brown (7.5YR 5/8) below 7.5' - dark Red (10R 3/6), cemented below 7.8' - clayey below 7.9'									
328	10										No free water observed
327	11	SAND, strong Brown (7.5YR 5/8), very fine to fine grained, poorly graded, damp to moist; SP. - iron concretions, cemented laminations to thin beds below 10'		MC	2		NA	5/5	NA	NA	
326	12	CLAY, light Gray (7.5YR 7/1) to dark Red (10R 3/6), some sand, damp, medium density, medium to high plasticity, increased sand content at base; CL-CH. - ironstone concretion lens at 11.7'									
325	13	SAND, dark Red (2.5YR 3/6) to Red (2.5YR 5/6), fine grained, poorly graded, damp medium density; SP.									

▽ Depth to water while drilling

▼ Depth to water after drilling

AEP_PIRKEY_SOILBORINGLOGS.GPJ 5/9/19

Drilling Log, continued

BURNS McDONNELL

Project Name	AEP Pirkey CSM
Project Number	111173
Boring/Monitoring Well Number	SB-05 (AD-44 and AD-45)
Page	2 of 5
Date	2/23/2019

Elevation (MSL)	Depth (feet bgs)	Description	Graphic Log	Sample Type	Sample Number	Blow Count	N Value	Sample Recovery/Length (feet)	Penetrometer (tsf)	PID Reading (ppm)	Remarks
324	15	SAND, dark Red (2.5YR 3/6) to Red (2.5YR 5/6), fine grained, poorly graded, damp medium density; SP.		MC	2		NA	5/5	NA	NA	
323	16	SAND, strong Brown (7.5YR 5/8) to light Gray (7.5YR 7/1), very fine to fine grained, poorly graded, trace to some clay, damp, medium density, cemented portions throughout; SC.									
322	17										
321	18	SILT, very dark Gray (10YR 3/1), some sand, dry to damp, very stiff to hard, trace plasticity; ML.		MC	3		NA	5/5	NA	NA	
320	19										
319	20										
318	21	SAND, dark Gray (10YR 4/1) very fine to fine grained, poorly graded, damp to moist, medium to dense; SP									
317	22										
316	23			MC	4		NA	5/5	NA	NA	
315	24										
314	25	- moist, with clay below 24.5'									
313	26	SAND, dark Brown (10YR 3/2) to Brown (10YR 4/2), very fine to fine grained, trace to some silt, damp, dense; SM.									
312	27			MC	5		NA	5/5	NA	NA	
311	28										
310		SILT and SAND, dark Brown (7.5YR 3/2) to dark Gray (10YR 4/1), damp, medium to stiff, trace plasticity; ML.									

AEP_PIRKEY_SOILBORINGLOGS.GPJ 5/9/19

Drilling Log, continued

BURNS McDONNELL

Project Name	AEP Pirkey CSM
Project Number	111173
Boring/Monitoring Well Number	SB-05 (AD-44 and AD-45)
Page	3 of 5
Date	2/23/2019

Elevation (MSL)	Depth (feet bgs)	Description	Graphic Log	Sample Type	Sample Number	Blow Count	N Value	Sample Recovery/Length (feet)	Penetrometer (tsf)	PID Reading (ppm)	Remarks
309	30	SILT and SAND, dark Brown (7.5YR 3/2) to dark Gray (10YR 4/1), damp, medium to stiff, trace plasticity; ML.		MC	5		NA	5/5	NA	NA	
308		- grades to very stiff to hard below 30.2'									
307	31										
306	32										
305	33										
304	34										
303	35			MC	6		NA	7/10	NA	NA	
302	36	- medium consistency from 36.0'-36.7'									
301	37	- sand content increasing below 37.0'									
300	38										
299	39										
298	40	CLAY, dark Brown (10YR 3/2) to very dark Gray (10YR 3/1), trace sand, trace silt, damp, stiff to very stiff, trace plasticity; CL.									
297	41	SAND, dark Gray (10YR 4/1) to very dark Gray (10YR3/1), very fine grained, poorly graded, dry, very dense; SP.		MC	7		NA	10/10	NA	NA	
296	42										
295	43										

Drilling Log, continued

BURNS McDONNELL

Project Name	AEP Pirkey CSM
Project Number	111173
Boring/Monitoring Well Number	SB-05 (AD-44 and AD-45)
Page	4 of 5
Date	2/23/2019

Elevation (MSL)	Depth (feet bgs)	Description	Graphic Log	Sample Type	Sample Number	Blow Count	N Value	Sample Recovery/Length (feet)	Penetrometer (tsf)	PID Reading (ppm)	Remarks
294	45	SAND, dark Gray (10YR 4/1) to very dark Gray (10YR3/1), very fine grained, poorly graded, dry, very dense; SP.									
293	46	SAND, light Gray (10YR 7/1) to dark Gray (10YR 4/1), very fine grained, poorly graded, damp, dense; SP.									
292	47	- trace lignite at 47.0'		MC	7		NA	10/10	NA	NA	
291	48										
290	49										
289	50	SAND, Gray (10YR 5/1) to dark Brown (7.5YR 3/2), very fine grained, poorly graded, trace silt, trace lignite, damp, dense; SP.									
288	51										
287	52										
286	53	- increased silt content below 53'									
285	54										
284	55			MC	8		NA	6/10	NA	NA	
283	56	SAND, Gray (10YR 5/1), fine to medium grained, poorly graded, moist to wet, medium density; SP.									
282	57										
281	58										
280											

Drilling Log, continued

BURNS McDONNELL

Project Name	AEP Pirkey CSM
Project Number	111173
Boring/Monitoring Well Number	SB-05 (AD-44 and AD-45)
Page	5 of 5
Date	2/23/2019

Elevation (MSL)	Depth (feet bgs)	Description	Graphic Log	Sample Type	Sample Number	Blow Count	N Value	Sample Recovery/Length (feet)	Penetrometer (tsf)	PID Reading (ppm)	Remarks
279	60	SAND, Gray (10YR 5/1), fine to medium grained, poorly graded, moist to wet, medium density; SP.		MC	8		NA	6/10	NA	NA	
278	61	LIGNITE, Black (N1) to grayish Black (N2), moderately strong. - SAND laminations to thin beds throughout, Gray (10YR 5/1)									
277	62	SAND, Gray (10YR 5/1), fine to medium grained, poorly graded, moist to wet, medium density; SP.									
276	63										
275	64										
274	65										
273	66	SAND and SILT, dark Brown (7.5YR 3/2) to Brown (7.5YR 4/2), very fine grained sand, poorly graded, trace lignite, dry to damp, dense to very dense; SM.		MC	9		NA	6/10	NA	NA	
272	67										
271	68										
270	69										
269	70	Boring terminated at 70 feet bgs.									Temporary Piezometer Installed on 2/23/2019
	71										
	72										
	73										

AEP_PIRKEY_SOILBORINGLOGS.GPJ 5/9/19

Monitoring Well Construction Diagram

Project Number:	111173	**Well Number:**	SB-6S (AD-46)
Project Name:	AEP-Pirkey	**Property Owner:**	AEP
Geologist:	David Barker	Northing:	301335.6380
Drilling Company:	Plains Environmental Services	Easting:	2927978.4822
Driller:	Jesse Kolvig	Survey Datum:	Texas State Plane North Central (4202)

Drilling Method: Hollow Stem Auger
Borehole Diameter: 8.25-inch

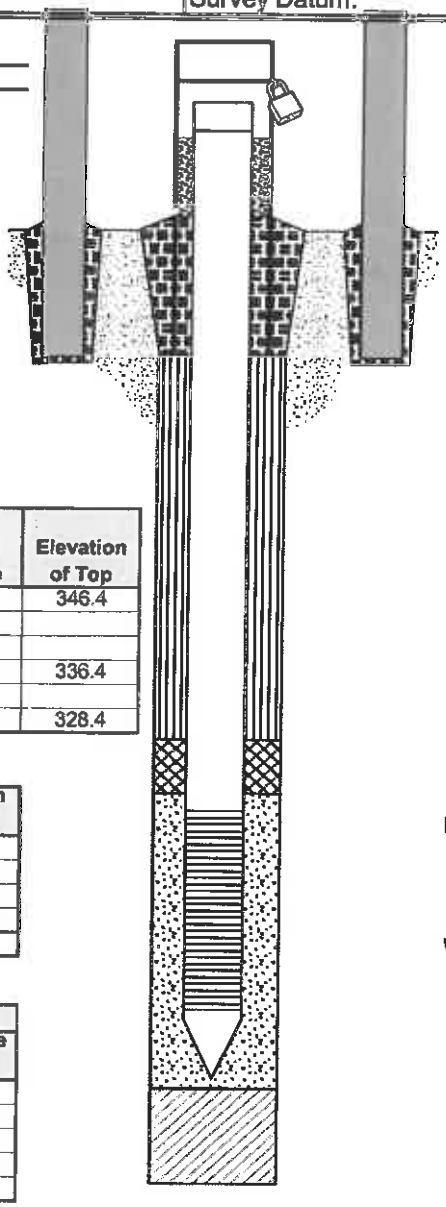
Elevations	
Top of Casing (TOC)	349.4
Ground Surface (GS)	346.4
Reference Point (RP)	ground surface

Dates	
Drilling/Installation Start	2/24/2019
Installation Complete	2/24/2019
Well Completed	3/18-25/2019
Development Start	2/27/2019
Development Complete	2/27/2019

Annular Material Measurements	Depth to Top from GS	Total Footage	Elevation of Top
Annular Seal		10.0	346.4
Bentonite Seal	0		
Secondary Filter Pack			
Filter Pack	10	8.0	336.4
Backfill	0		
Bottom of Borehole	18		328.4

Casing Materials Measurements	Total Footage	Elevation of Top
Total Riser Installed	20.00	NA
Total Riser Cutoff	4.30	NA
Screen	5.00	333.70
Bottom Cap	0.30	328.70
Total Depth from TOC	21	

Groundwater Levels		
Date & Time	Depth	Reference Point



Cap Type: J-plug
Lock Keyed to: AEP monitoring well

Protective Cover:
Material: steel
Size: 4"
Length: 5'
Pea Gravel (Y/N): N
Weep Hole (Y/N): N
Guage Mark (Y/N): Y

Bollards (# and type): 4 - steel

Surface Pad:
Dimensions: 4' x 4' x 4"
Material: concrete

Annular Seal:
Type & Size: bentonite chips 3/8"
Manufacturer: Cetco
Amount Used: 6 bags / 300 lbs

Bentonite Seal:
Type & Size: pellets 3/8"
Manufacturer: PDS
Amount Used: 1 bucket / 50 lbs

Secondary Filter Pack:
Type & Size: --
Manufacturer: --
Amount Used: --

Primary Filter Pack:
Type & Size: sand 16/30
Manufacturer: U.S. Silica Company
Amount Used: 4 bags / 200 lbs

Well Casing:
Type: PVC
Diameter: 2"
Sch. or Weight: Sch. 40
Manufacturer: Environmental Manufacturing
Screen Type: PVC factory slot
Screen Slot Size: 0.010"
Bottom Cap Type: threaded

Centralizers (Y/N): N
Material: --
Number: --
Depth(s): --

Backfill Material:
Type & Size: NA
Manufacturer: --
Amount Used: --

Monitoring Well Construction Diagram

Project Number:	111173	**Well Number:**	SB-6D (AD-47)
Project Name:	AEP-Pirkey	**Property Owner:**	AEP
Geologist:	David Barker	Northing:	301329.6318
Drilling Company:	Plains Environmental Services	Easting:	2927979.1251
Driller:	Jesse Kolvig	Survey Datum:	Texas State Plane North Central (4202)

Drilling Method: Hollow Stem Auger
Borehole Diameter: 8.25-inch

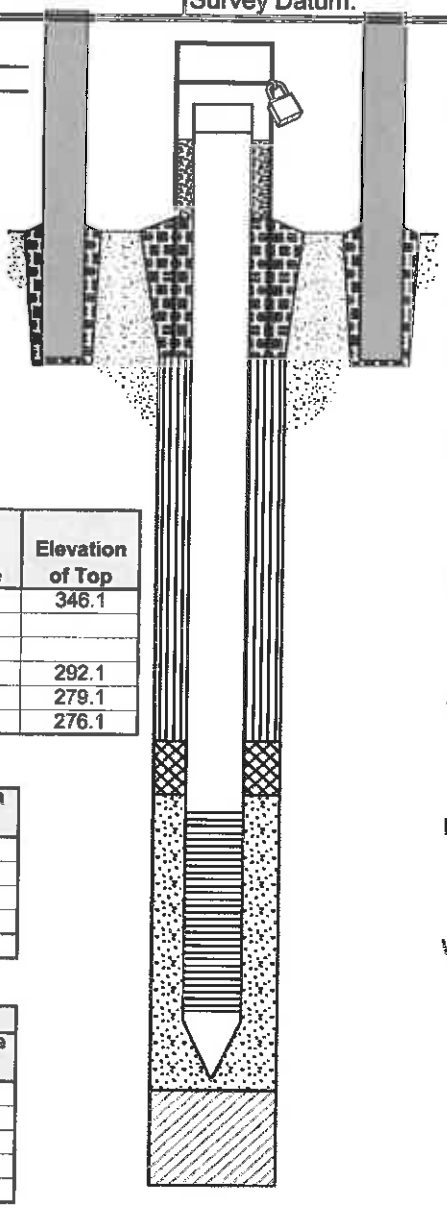
Elevations	
Top of Casing (TOC)	349.6
Ground Surface (GS)	346.1
Reference Point (RP)	ground surface

Dates	
Drilling/Installation Start	2/22/2019
Installation Complete	2/24/2019
Well Completed	3/18-25/2019
Development Start	2/27/2019
Development Complete	3/1/2019

Annular Material Measurements	Depth to Top from GS	Total Footage	Elevation of Top
Annular Seal		54.0	346.1
Bentonite Seal	0		
Secondary Filter Pack			
Filter Pack	54	13.0	292.1
Backfill	67	3.0	279.1
Bottom of Borehole	70		276.1

Casing Materials Measurements	Total Footage	Elevation of Top
Total Riser Installed	60.00	NA
Total Riser Cutoff	1.80	NA
Screen	10.00	291.40
Bottom Cap	0.30	281.40
Total Depth from TOC	68.5	

Groundwater Levels		
Date & Time	Depth	Reference Point



Cap Type: J-plug
Lock Keyed to: AEP monitoring well

Protective Cover:
- Material: steel
- Size: 4"
- Length: 5'
- Pea Gravel (Y/N): N
- Weep Hole (Y/N): N
- Guage Mark (Y/N): Y

Bollards (# and type): 4 - steel

Surface Pad:
- Dimensions: 4' x 4' x 4"
- Material: concrete

Annular Seal:
- Type & Size: bentonite chips 3/8"
- Manufacturer: Cetco
- Amount Used: 12 bags / 650 lbs

Bentonite Seal:
- Type & Size: pellets 3/8"
- Manufacturer: PDS
- Amount Used: 1 bucket / 50 lbs

Secondary Filter Pack:
- Type & Size: --
- Manufacturer: --
- Amount Used: --

Primary Filter Pack:
- Type & Size: sand 16/30
- Manufacturer: U.S. Silica Company
- Amount Used: 4 bags / 200 lbs

Well Casing:
- Type: PVC
- Diameter: 2"
- Sch. or Weight: Sch. 40
- Manufacturer: Environmental Manufacturing
- Screen Type: PVC factory slot
- Screen Slot Size: 0.010"
- Bottom Cap Type: threaded

Centralizers (Y/N): N
- Material: --
- Number: --
- Depth(s): --

Backfill Material:
- Type & Size: formation
- Manufacturer: --
- Amount Used: --

Drilling Log

BURNS McDONNELL

Project Name: AEP Pirkey CSM	Project No.: 111173	Boring/Monitoring Well Number: SB-06 (AD-46 and AD-47)	
Coordinates: N 6873305.8 E 3204726.9	Ground Elevation: 346.10	Page: 1 of 5	
Total Depth (feet): 70	Hole Size (inches): 2.25"/ 6.75"	Driller: J. Kolvig	
Drilling Rig: Geoprobe 7822DT	Drilling Company: Plains Environmental Services		
Date: 2/22/2019 to 2/23/2019	Logged By: D. Barker	Reviewed by:	Approved by:

Elevation (MSL)	Depth (feet bgs)	Description	Graphic Log	Sample Type	Sample Number	Blow Count	N Value	Sample Recovery/Length (feet)	Penetrometer (tsf)	PID Reading (ppm)	Remarks
346	0	CLAY, pinkish Gray (7.5YR 7/2) to Red (2.5YR 4/6) mottling, trace sand, damp to moist, very soft to soft, high plasticity; CH.									▽ Depth to water while drilling ▼ Depth to water after drilling
345	1										
344	2			MC	1		NA	5/5	NA	NA	
343	3	CLAY, very dark Gray (10YR 3/1) to dark Brown (7.5YR 3/2), trace silt, trace sand, damp to moist, soft, medium plasticity; CL.									
342	4	CLAY, strong Brown (7.5YR 4/6) to Red (2.5YR 4/6), damp, soft to medium, medium to high plasticity; CL-CH.									
341	5										
340	6										Sampled SB-06 6'-7'
339	7	- sand content increasing below 6.5'		MC	2		NA	5/5	NA	NA	
338	8										
337	9	- damp below 8.7' CLAY, light Gray (7.5YR 7/1) to dark Red (10R 3/6), trace to some sand, damp, medium density, medium to high plasticity; CL-CH.									
336	10	SAND, strong Brown (7.5YR 5/6), very fine grained, poorly graded, with clay, damp, loose; SC.									No free water observed
335	11	SAND, White (7.5YR 8/1) to dark Red (2.5YR 3/6) to strong Brown (7.5YR 5/8), very fine to fine grained, poorly graded, damp, medium density; SC-SP.									
334	12	- clay content decreasing below 12.0'		MC	3		NA	5/5	NA	NA	
333	13	- dense to very dense below 13.0'									

AEP_PIRKEY_SOILBORINGLOGS.GPJ 5/9/19

Drilling Log, continued

BURNS McDONNELL

Project Name: AEP Pirkey CSM
Project Number: 111173
Boring/Monitoring Well Number: SB-06 (AD-46 and AD-47)
Page: 2 of 5
Date: 2/22/2019 to 2/23/2019

Elevation (MSL)	Depth (feet bgs)	Description	Graphic Log	Sample Type	Sample Number	Blow Count	N Value	Sample Recovery/Length (feet)	Penetrometer (tsf)	PID Reading (ppm)	Remarks
332	15	SAND, White (7.5YR 8/1) to dark Red (2.5YR 3/6) to strong Brown (7.5YR 5/8), very fine to fine grained, poorly graded, damp, medium density; SC-SP. - ironstone concretions below 14.9'		MC	3		NA	5/5	NA	NA	
331											
330	16	SAND, brownish Yellow (10YR 6/8), very fine to fine grained, poorly graded, some clay, wet, very loose; SP. - medium to high plasticity in portions with increases clay content		MC	4		NA	5/5	NA	NA	Sampled SB-06 16'-17'
329	17	- clay content decreasing below 17.0'									
328	18	SAND, White (7.5YR 8/1), to strong Brown (7.5YR 5/6) to reddish Brown (2.5YR 5/6), very fine to fine grained, poorly graded, trace to some clay, damp to moist, loose, trace sand concretions throughout; SP.									
327	19										
326	20	- SAND, White (7.5YR 8/1), fine grained, wet from 19.7'-19.9'									
325	21										
324	22			MC	5		NA	5/5	NA	NA	
323	23										
322	24	- increased clay content, Brown (7.5YR 5/3), medium to high plasticity, ironstone concretions below 24.0'									
321	25	CLAY, dark Brown (7.5YR 3/4) to Brown (7.5YR 4/3), damp, medium to stiff, medium plasticity; CL.									
320	26	- grades to Black (7.5YR 2.5/1) to very dark Gray (7.5YR 3/1) at 26.0'									
319	27			MC	6		NA	5/5	NA	NA	
318	28	- sand content increasing below 28.0'									

AEP_PIRKEY_SOILBORINGLOGS.GPJ 5/8/19

Drilling Log, continued

BURNS McDONNELL

Project Name: AEP Pirkey CSM
Project Number: 111173

Boring/Monitoring Well Number: SB-06 (AD-46 and AD-47)
Page: 3 of 5
Date: 2/22/2019 to 2/23/2019

Elevation (MSL)	Depth (feet bgs)	Description	Graphic Log	Sample Type	Sample Number	Blow Count	N Value	Sample Recovery/Length (feet)	Penetrometer (tsf)	PID Reading (ppm)	Remarks
317	30	SAND and CLAY, dark Gray (7.5YR 4/1), very fine to fine grained sand, poorly graded, damp to moist, medium density; SC. - medium plasticity in portions with increased clay content		MC	6		NA	5/5	NA	NA	
316	31										
315	32			MC	7		NA	5/5	NA	NA	
314	33										
313	34										
312	35	- clay content increasing below 35.0'									
311	36										
310	37			MC	8		NA	4/5	NA	NA	
309	38										
308	39										
307	40	- trace lignite below 40.0'									
306	41										
305	42			MC	9		NA	4.5/5	NA	NA	
304	43	SAND, Gray (7.5YR 6/1), fine grained, poorly graded, damp to moist, dense; SP.									
303											

AEP_PIRKEY_SOILBORINGLOGS.GPJ 5/9/19

Drilling Log, continued

BURNS McDONNELL

Project Name	AEP Pirkey CSM
Project Number	111173
Boring/Monitoring Well Number	SB-06 (AD-46 and AD-47)
Page	4 of 5
Date	2/22/2019 to 2/23/2019

Elevation (MSL)	Depth (feet bgs)	Description	Graphic Log	Sample Type	Sample Number	Blow Count	N Value	Sample Recovery/Length (feet)	Penetrometer (tsf)	PID Reading (ppm)	Remarks
302	45	SAND and CLAY, dark Gray (7.5YR 4/1), very fine to fine grained sand, poorly graded, damp, medium density; SC.		MC	9		NA	4.5/5	NA	NA	
301											
300	46										
299	47			MC	10		NA	4.5/5	NA	NA	
298	48										
297	49	CLAY and SAND, very dark Gray (7.5YR 3/1), damp, soft, medium plasticity; CL.									
296	50	MacroCore Refusal. No sample collected from 50.0'-55.0'.		NA	NA	NA	NA	NA	NA	NA	
295	51										
294	52										
293	53										
292	54										
291	55	CLAY, dark grayish Brown (10YR 4/2), trace sand, damp, medium density, trace to medium plasticity; CL.									
290	56	SAND, dark Gray (7.5YR 4/1), very fine to fine grained, poorly graded, trace to some silt, wet, loose; SP.		MC	11		NA	3.5/3.5	NA	NA	
289	57										
288	58										
				NA	NA	NA	NA	NA	NA	NA	

AEP_PIRKEY_SOILBORINGLOGS.GPJ 5/9/19

Drilling Log, continued

BURNS McDONNELL

Project Name	AEP Pirkey CSM
Project Number	111173
Boring/Monitoring Well Number	SB-06 (AD-46 and AD-47)
Page	5 of 5
Date	2/22/2019 to 2/23/2019

Elevation (MSL)	Depth (feet bgs)	Description	Graphic Log	Sample Type	Sample Number	Blow Count	N Value	Sample Recovery/Length (feet)	Penetrometer (tsf)	PID Reading (ppm)	Remarks
287		MacroCore Refusal. No sample collected from 58.5'-65.0'.		NA	NA	NA	NA	NA	NA	NA	
286	60										
285	61										
284	62										
283	63										
282	64										
281	65	SAND, dark Gray (7.5YR 4/1), very fine to fine grained, poorly graded, trace to some silt, wet, medium density; SP.		MC	12		NA	2/2	NA	NA	
280	66										
279	67	No sample collected from 67.0'-70.0'.		NA	NA	NA	NA	NA	NA	NA	
278	68										
277	69										
	70	Boring terminated at 70 feet bgs.									Temporary Piezometer Installed on 2/23/2019
	71										
	72										
	73										

AEP_PIRKEY_SOILBORINGLOGS.GPJ 5/9/19

ARCADIS Design & Consultancy for natural and built assets

Appendix B

Photographic Log

PHOTOGRAPH LOG

Stack Out Area CCR Unit
Pirkey Power Plant
2400 FM 3251, Hallsville, TX

Photograph: 1

Description:
Monitoring well AD-7 in Stack Out Area CCR Unit prior to plugging on 9/12/2023.

Direction:
North

Photograph taken by:
Kyle DeSantis

Date: 9/12/2023

Photograph: 2

Description:
Monitoring Well AD-7R. Stack Out Area CCR Unit located in background behind railroad tracks.

Direction:
East

Photograph taken by:
Kyle DeSantis

Date: 9/12/2023

PHOTOGRAPH LOG

Stack Out Area CCR Unit
Pirkey Power Plant
2400 FM 3251, Hallsville, TX

Photograph: 3

Description:
Monitoring Well AD-22. Stack Out Area CCR Unit located in background.

Direction:
East

Photograph taken by:
Kyle DeSantis

Date: 9/12/2023

Photograph: 4

Description:
Monitoring Well AD-33. Stack Out Area CCR Unit located in background.

Direction:
East

Photograph taken by:
Kyle DeSantis

Date: 9/12/2023

ARCADIS Design & Consultancy for natural and built assets

Appendix C

Water Well Inventory – 2023

Prepared for:

ARCADIS U.S., Inc-Corpus Christi
711 North Carancahua, #1700
Corpus Christi, TX 78475-1801

BANKS ENVIRONMENTAL DATA
A DIVISION OF THE BANKS GROUP

Water Well Report

H.W. Pirkey Power Plant

2400 FM 3241

Hallsville, TX 75650

PO #: 30160167

ES-142232

Thursday, June 8, 2023

Banks Environmental Data, Inc. - PO Box 12851 - Austin, TX 78711 - 800.531.5255 P - 512.478.1433 F
www.banksenvdata.com

Table of Contents

Banks Environmental Data, Inc. - PO Box 12851 - Austin, TX 78711 - 800.531.5255 P - 512.478.1433 F
www.banksenvdata.com

Geographic Summary

Location
TX

Coordinates	
Longitude & Latitude in Degrees Minutes Seconds	-94° 29' 15", 32° 27' 17"
Longitude & Latitude in Decimal Degrees	-94.4875°, 32.4546°
X and Y in UTM	360189.26, 3591799.89 (Zone 15)

Elevation
Target Property lies 348.77 feet above sea level.

Zip Codes Searched	
Search Distance	**Zip Codes (historical zip codes included)**
Target Property	75670
1 mile	75670, 75650

Topos Searched	
Search Distance	**Topo Name**
Target Property	Darco (1983)
1 mile	Easton (1983), Darco (1983)

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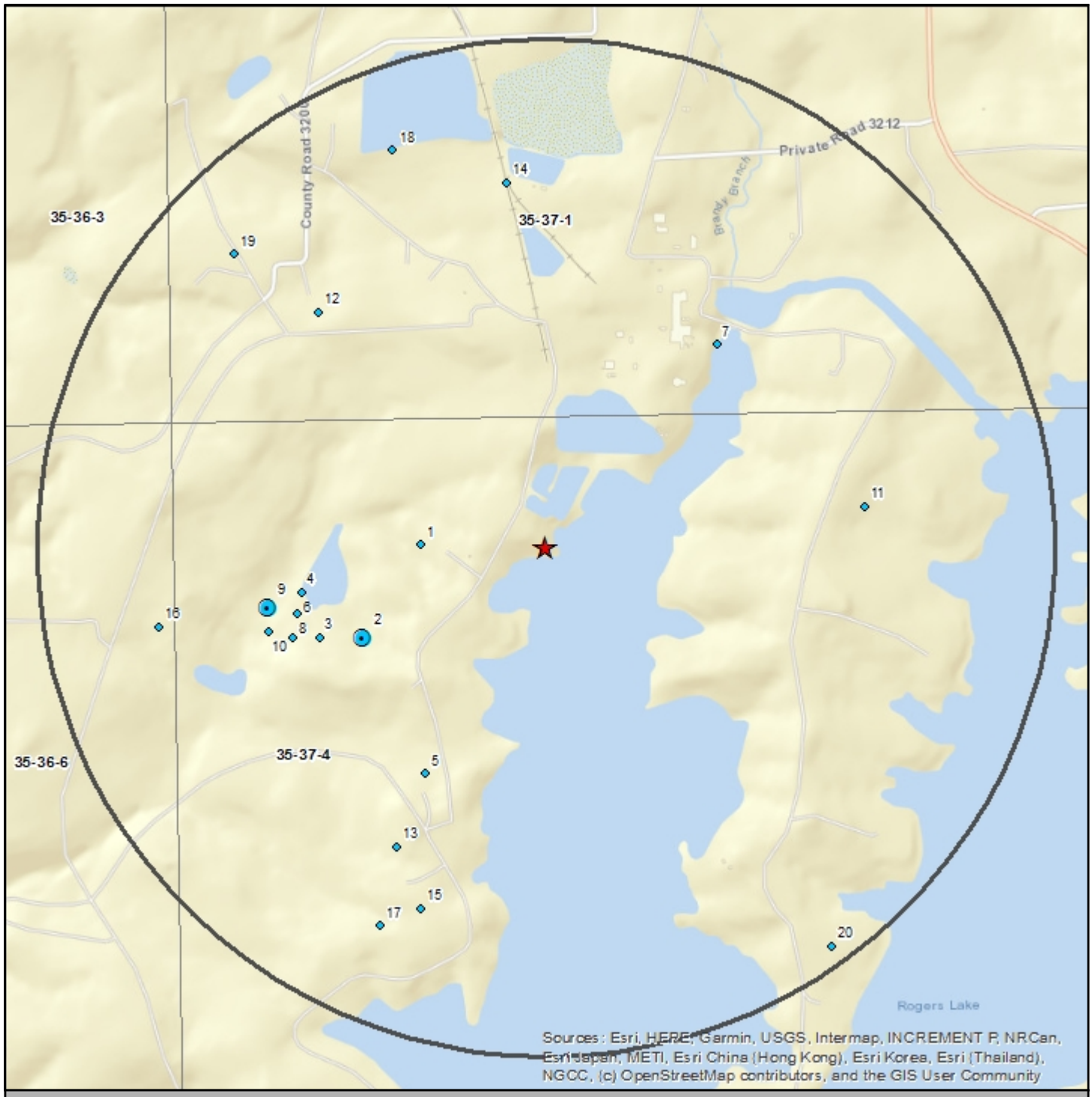
www.banksenvdata.com

Summary Map - 1 Mile Radius

BANKS ENVIRONMENTAL DATA
A DIVISION OF THE BANKS GROUP



H.W. Pirkey Power Plant

- Well
- Well Cluster
- Target Property
- Search Buffer
- Texas Quad Index

0' 1000' 2000'

1 : 18,000

1 inch = 0.284 miles
1 inch = 1500 feet
1 centimeter = 0.180 kilometers
1 centimeter = 180 meters

N

Lambert Conformal Conic Projection
1983 North American Datum
First Standard Parallel: 33 0' 00" North
Second Standard Parallel: 45 0' 00" North
Central Meridian: 96 0' 00" West
Latitude of Origin: 39 0' 00" North

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Topographic Overlay Map - 1 Mile Radius

BANKS ENVIRONMENTAL DATA
A DIVISION OF THE BANKS GROUP

H.W. Pirkey Power Plant

Well
Well Cluster
Target Property
Search Buffer

Target Property Quad Name(s)
Darco (1983)

0' 1000' 2000'

1 : 18,000
1 inch = 0.284 miles
1 inch = 1500 feet

N

Lambert Conformal Conic Projection
1983 North American Datum
First Standard Parallel: 33 0' 00" North
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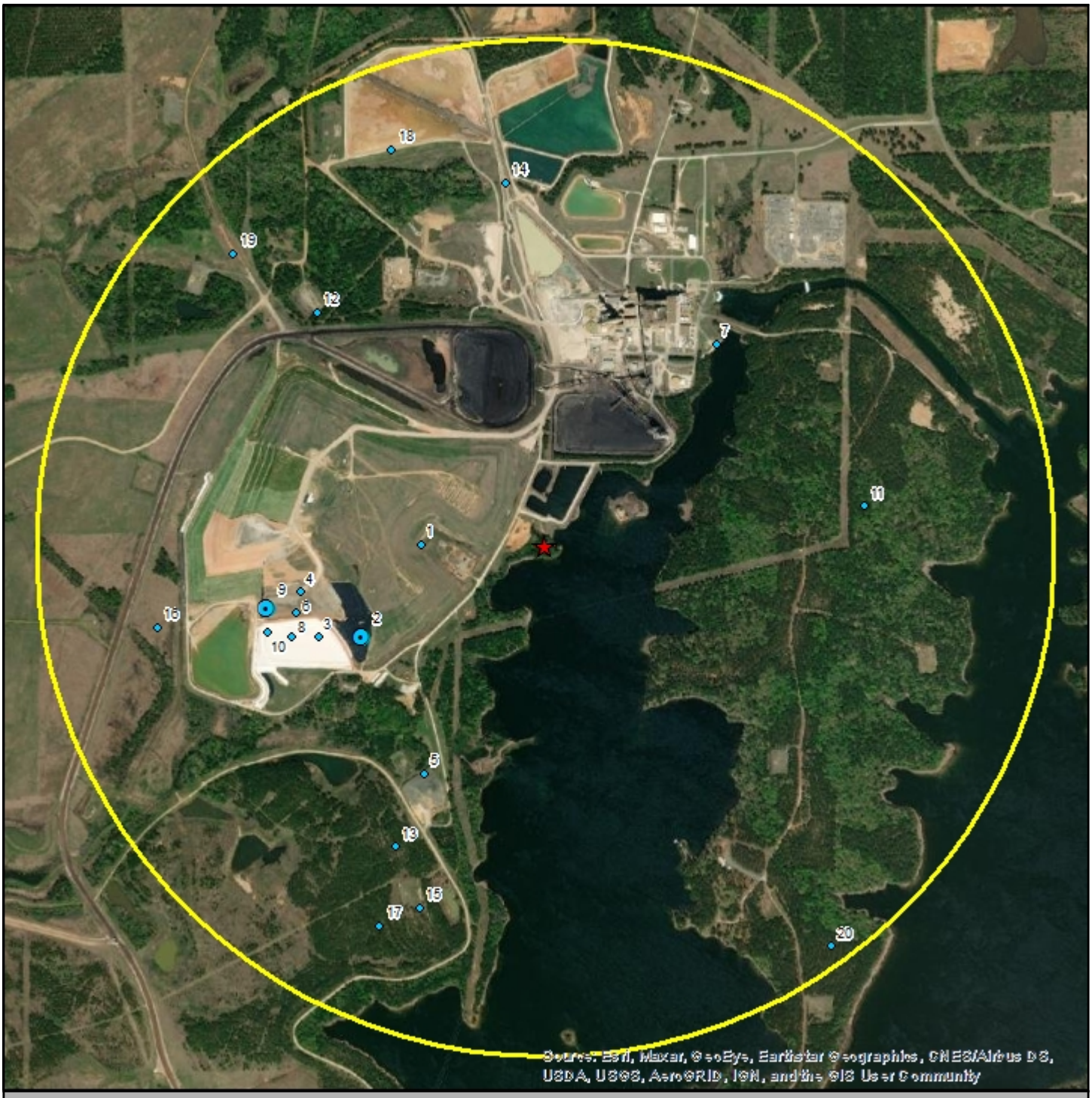
Central Meridian: 96 0' 00" West
Latitude of Origin: 39 0' 00" North

Banks Environmental Data, Inc. - PO Box 12851 - Austin, TX 78711 - 800.531.5255 P - 512.478.1433 F
www.banksenvdata.com

Current Imagery Overlay Map - 1 Mile Radius

BANKS ENVIRONMENTAL DATA
A DIVISION OF THE BANKS GROUP



H.W. Pirkey Power Plant

- Well
- Well Cluster
- Target Property
- Search Buffer

0' 1000' 2000'

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www.banksenvdata.com

Water Well Details

Map ID	Source ID	Dataset	Owner of Well	Type of Well	Depth Drilled	Completion Date	Longitude	Latitude	Elevation	Driller's Logs
1	35747	TX TWDB SDR	Tom Brown	Rig Supply	426	2/21/2004	-94.491674	32.454729	351 ft (+2)	View
2	35-37-4	TX TCEQ HIST	Amoco Production Co.	Oilfield/Rig Supply	243	11/09/1991	-94.493675	32.452116	372 ft (+23)	View
2	35-37-4	TX TCEQ HIST	Amoco Production Co.	Oilfield/Rig Supply	243	11/09/1991	-94.494062	32.452116	341 ft (-8)	View
3	482297	TX TWDB SDR	American Electric Power Company	Other	20	6/15/2018	-94.495163	32.452142	321 ft (-28)	View
4	482283	TX TWDB SDR	American Electric Power Company	Other	14	6/14/2018	-94.49574	32.453439	310 ft (-39)	View
5	35-37-4	TX TCEQ HIST	Amoco Production Company	Industrial	160	04/11/1992	-94.491669	32.448213	349 ft (+)	View
6	482286	TX TWDB SDR	American Electric Power Company	Other	14	6/14/2018	-94.495882	32.452834	304 ft (-45)	View
7	S1020059 A	TX TCEQ PWS	PIRKEY POWER PLANT SWEPCO	Public Supply	0	n/a	-94.481633	32.4603	341 ft (-8)	View
8	482295	TX TWDB SDR	American Electric Power Company	Other	20	6/15/2018	-94.49604	32.452145	324 ft (-24)	View
9	482288	TX TWDB SDR	American Electric Power Company	Other	14	6/14/2018	-94.496868	32.453009	299 ft (-50)	View
9	482280	TX TWDB SDR	American Electric Power Company	Other	14	6/14/2018	-94.496701	32.453281	305 ft (-44)	View
10	482290	TX TWDB SDR	American Electric Power Company	Other	14	6/15/2018	-94.496876	32.452312	309 ft (-40)	View
11	35-37-4E	TX TCEQ HIST	Cathy Jones	Domestic	55	06/01/1982	-94.476754	32.455617	373 ft (+24)	View
12	163503	TX TWDB SDR	NFR Energy LLC	Rig Supply	320	12/15/2008	-94.495	32.4614	349 ft ()	View
13	35-37-4	TX TCEQ HIST	Amoco Production Co.	Oilfield/Rig Supply	225	01/08/1992	-94.492688	32.446132	368 ft (+19)	View
14	167661	TX TWDB SDR	Tom Brown	Rig Supply	430	9/14/2004	-94.488618	32.465007	359 ft (+10)	View
15	35-37-4	TX TCEQ HIST	Amoco Production Co.	Oilfield Supply	225	01/08/1992	-94.491897	32.444376	372 ft (+23)	N/A
16	35-36-6	TX TCEQ HIST	Matador Operating	Industrial	420	10/17/2000	-94.500562	32.452506	312 ft (-37)	View
17	35-37-4	TX TCEQ HIST	UPRC	Oilfield Supply	500	07/13/1996	-94.493263	32.443894	346 ft (-3)	View
18	412517	TX TWDB SDR	American Electric Power Company	Other	38	12/11/2015	-94.492424	32.465978	358 ft (+9)	View
19	3537103	TX TWDB GW	White #1	N/A	2806	N/A	-94.4978	32.4631	341 ft (-7)	View
20	254371	TX TWDB SDR	Langston Drilling Co.	Rig Supply	155	12/31/2005	-94.4781	32.4431	359 ft (+10)	View

Well Summary

Water Well Dataset	# of Wells
TX TCEQ HIST	8
TX TCEQ PWS	1
TX TWDB GW	1
TX TWDB SDR	12
Total Count	**22**

STATE OF TEXAS WELL REPORT for Tracking #35747

Owner:	**Tom Brown**	Owner Well #:	**Mahon #3**
Address:	**14001 N. Dallas PKWY,ste.1000 Dallas, TX 75240**	Grid #:	**35-37-4**
		Latitude:	**32° 27' 17" N**
Well Location:	**FM2625 2.ml. Inter.FM2625+FM3251 Darco, TX**	Longitude:	**094° 29' 30" W**
Well County:	**Harrison**	Elevation:	**347 ft. above sea level**
Type of Work:	**New Well**	Proposed Use:	**Rig Supply**

Drilling Start Date: **2/20/2004** Drilling End Date: **2/21/2004**

	Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Borehole:	**7.875**	**0**	**426**

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Filter Packed; Straight Wall**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Filter Material*	*Size*
Filter Pack Intervals:	**310**	**426**	**Gravel**	

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
Annular Seal Data:	**0**	**11**	**13 Sakrete**
	300	**310**	**4 Bentinite**

Seal Method: **Manual pour**

Sealed By: **Driller**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other concentrated contamination (ft.): **NA**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **None in area**

Surface Completion: **Alternative Procedure Used**

Water Level: **104 ft.** below land surface on **2004-02-21** Measurement Method: **Unknown**

Packers: **No Data**

Type of Pump: **No Data**

Well Tests: **Jetted** **Yield: 80 GPM after 1 hours, no drawdown specified**

	Strata Depth (ft.)	*Water Type*
Water Quality:	**426**	**No Data**

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Bennett Drilling Services L.C.**

P.O. Drawer 1320
Carthage, TX 75633

Driller Name: **Randy Lovejoy** License Number: **54944**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

From (ft)	*To (ft)*	*Description*
0	**29**	**Red Clay,White Clay, Sand,Iron Ore Gravel**
29	**330**	**Grey Clay,Brown Clay,Lignite**
330	**426**	**Sand, Rock, Grey Clay, Lignite**

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.)	*New/Used*	*Type*	*Setting From/To (ft.)*
4	**New**	**Blank Plastic**	**0-330**
4	**New**	**Plastic,Slotted,Screen.**	**330-426**

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking Number on your written request.

Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

Send original copy by certified mail to: Texas Water Commission, P.O. Box 13087, Austin, Texas 78711

Please use black ink.

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

State of Texas
WELL REPORT

Texas Water Well Drillers Board
P.O. Box 13087
Austin, Texas 78711

1) **OWNER** AMOCO PRODUCTION CO. (Name) **ADDRESS** P. O. Box 9460 (Street or RFD) Longview, TX 75608 (City) (State) (Zip)

2) **LOCATION OF WELL:** County Harrison, 9.7 miles in SE (NE, SW, etc.) direction from Hallsville (Town)
Rosa Roscoe GU#2

Driller must complete the legal description below with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ **LEGAL DESCRIPTION:**
Section No. _____ Block No. _____ Township _____ Abstract No. _____ Survey Name _____
Distance and direction from two intersecting section or survey lines _____

☒ **SEE ATTACHED MAP**

3) **TYPE OF WORK (Check):**
☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) **PROPOSED USE (Check):** Rig
☐ Domestic ☐ Industrial ☐ Monitor ☒ Public Supply
☐ Irrigation ☐ Test Well ☐ Injection ☐ De-Watering

5) **DRILLING METHOD (Check):**
☒ Mud Rotary ☐ Air Hammer ☐ Jetted ☐ Bored
☐ Air Rotary ☐ Cable Tool ☐ Other _____ ☐ Driven

6) **WELL LOG:**
Date Drilling: Started 11-9 19 91 Completed 11-9 19 91

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
7 7/8	Surface	243

7) **BOREHOLE COMPLETION:**
☐ Open Hole ☐ Straight Wall ☐ Underreamed
☒ Gravel Packed ☐ Other _____
If Gravel Packed give interval . . . from 123 ft. to 243 ft.
Hole plug @120-123'

From (ft.)	To (ft.)	Description and color of formation material
0	23	Red clay & sand
23	43	Red & tan sand
43	75	Light tan sand
75	83	Gray sand w/lignite
83	103	Gray clay
103	123	Gray sand, clay & lignite
123	143	50% Sand & clay
143	240	80% Gray sand w/clay
240	243	Gray clay
243		TD

(Use reverse side if necessary)

8) **CASING, BLANK PIPE, AND WELL SCREEN DATA:**

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casting Screen
4	N	PVC Blank	0	163	Sch40
4	N	PVC Screen	163	243	.020

9) **CEMENTING DATA** [Rule 287.44(1)]
Cemented from 0 ft. to 10 ft. No. of Sacks Used 12
_____ ft. to _____ ft. No. of Sacks Used _____
Method used Hopper
Cemented by Lawrence Lohr

RECEIVED
DEC 13 1991
TEXAS WATER COMMISSION

13) **TYPE PUMP:**
☐ Turbine ☐ Jet ☒ Submersible ☐ Cylinder
☐ Other _____
Depth to pump bowls, cylinder, jet, etc., _____ ft.

10) **SURFACE COMPLETION**
☒ Specified Surface Slab Installed [Rule 287.44(2)(A)]
☐ Specified Steel Sleeve Installed [Rule 287.44(3)(A)]
☐ Pitless Adapter Used [Rule 287.44(3)(B)]
☐ Approved Alternative Procedure Used [Rule 287.71]

14) **WELL TESTS:**
Type Test: ☐ Pump ☐ Bailer ☒ Jetted ☐ Estimated
Yield: 100 gpm with _____ ft. drawdown after 1 hrs.

11) **WATER LEVEL:**
Static level 65 ft. below land surface Date 11-9-91
Artesian flow _____ gpm. Date _____

15) **WATER QUALITY:**
Did you knowingly penetrate any strata which contained undesirable constituents?
☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata _____
Was a chemical analysis made? ☐ Yes ☒ No

12) **PACKERS:**

Type	Depth
paper	11-13'

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME FAS-LINE/HARDBAND (Type or print) **WELL DRILLER'S LICENSE NO.** 2846 W

ADDRESS P. O. Box 1439 (Street or RFD) Kilgore (City) TX (State) 75663 (Zip)

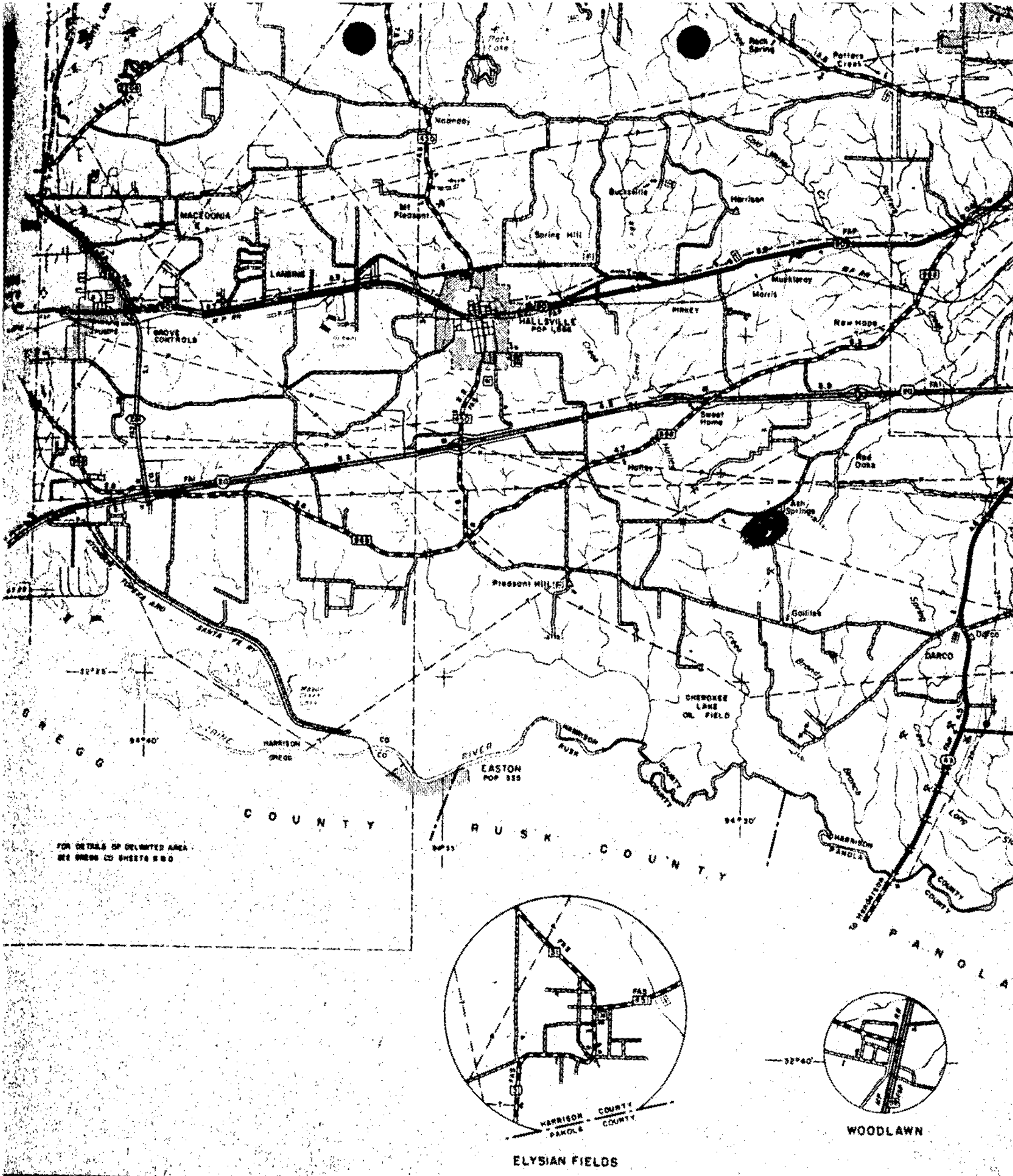
(Signed) _____ (Licensed Well Driller) **(Signed)** David Fuge (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

For TWC use only: Well No. _____ Located on map 35-37-4

WWD-012 (Rev. 05-18-90)

TEXAS WATER COMMISSION COPY


Noonday
MACEDONIA
Mt Pleasant
Spring Hill
Bucksville
Harrison
LANSING
GROVE CONTROLS
HALLSVILLE
POP 1,556
Muckleroy
Morris
PIRKEY
New Hope
Sweet Home
Hoffey
Red Oaks
Ash Springs
Pleasant Hill
Gollies
DARCO
Darco
CHEROKEE LAKE OIL FIELD
EASTON
POP 335
RIVER
HARRISON
GREGG
RUSK
PANOLA
G R E G G
C O U N T Y
R U S K   C O U N T Y
P A N O L A
FOR DETAILS OF DELIMITED AREA
SEE GREGG CO SHEETS
ELYSIAN FIELDS
HARRISON COUNTY
PANOLA COUNTY
WOODLAWN
94°40'
94°35'
94°30'
32°25'
32°40'

Send original copy by certified mail to: Texas Water Commission, P.O. Box 13087, Austin, Texas 78711

Please use black ink.

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

State of Texas WELL REPORT

Texas Water Well Drillers Board
P.O. Box 13087
Austin, Texas 78711

1) OWNER AMOCO PRODUCTION CO. (Name) ADDRESS P. O. Box 9460 (Street or RFD) Longview, TX (City) 75608 (State) (Zip)

2) LOCATION OF WELL: County Harrison, 9.7 miles in SE (NE, SW, etc.) direction from Hallsville (Town)
Rosa Roscoe GU#2

Driller must complete the legal description below with distance and direction from two intersecting section or s al
Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ LEGAL DESCRIPTION:
Section No. _____ Block No. _____ Township _____ Abstract No. _____
Distance and direction from two intersecting section or survey lines _____

☒ SEE ATTACHED MAP

01240001

3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): Rig
☐ Domestic ☐ Industrial ☐ Monitor ☒ Public Supply ☐ Irrigation ☐ Test Well ☐ Injection ☐ De-Watering

5) DRILLING METHOD (Check):
☒ Mud Rotary ☐ Air Hammer ☐ Jetted ☐ Bored ☐ Driven ☐ Air Rotary ☐ Cable Tool ☐ Other _____

6) WELL LOG:
Date Drilling: Started 11-9 19 91 Completed 11-9 19 91

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
7 7/8	Surface	243

7) BOREHOLE COMPLETION:
☐ Open Hole ☐ Straight Wall ☐ Underreamed
☒ Gravel Packed ☐ Other _____
If Gravel Packed give interval . . . from 123 ft. to 243 ft.
Hole plug @120-123'

From (ft.)	To (ft.)	Description and color of formation material
0	23	Red clay & sand
23	43	Red & tan sand
43	75	Light tan sand
75	83	Gray sand w/lignite
83	103	Gray clay
103	123	Gray sand,clay & lignite
123	143	50% Sand & clay
143	240	80% Gray sand w/clay
240	243	Gray clay
243		TD

(Use reverse side if necessary)

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casting Screen
4	N	PVC Blank	0	163	Sch40
4	N	PVC Screen	163	243	.020

9) CEMENTING DATA [Rule 287.44(1)]
Cemented from 0 ft. to 10 ft. No. of Sacks Used 12
_____ ft. to _____ ft. No. of Sacks Used _____
Method used Hopper
Cemented by Lawrence Lohr

RECEIVED
DEC 13 1991
TEXAS WATER COMMISSION

13) TYPE PUMP:
☐ Turbine ☐ Jet ☒ Submersible ☐ Cylinder ☐ Other _____
Depth to pump bowls, cylinder, jet, etc., _____

10) SURFACE COMPLETION
☒ Specified Surface Slab Installed [Rule 287.44(2)(A)]
☐ Specified Steel Sleeve Installed [Rule 287.44(3)(A)]
☐ Pitless Adapter Used [Rule 287.44(3)(B)]
☐ Approved Alternative Procedure Used [Rule 287.71]

14) WELL TESTS:
Type Test: ☐ Pump ☐ Bailer ☒ Jetted ☐ Estimated
Yield: 100 gpm with _____ ft. drawdown after 1 hrs.

11) WATER LEVEL:
Static level 65 ft. below land surface Date 11-9-91
Artesian flow _____ gpm. Date _____

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable constituents?
☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata _____
Was a chemical analysis made? ☐ Yes ☒ No

12) PACKERS:

Type	Depth
paper	11-13'

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME FAS-LINE/HARDBAND (Type or print) WELL DRILLER'S LICENSE NO. 2846 W

ADDRESS P. O. Box 1439 (Street or RFD) Kilgore (City) TX (State) 75663 (Zip)

(Signed) _____ (Licensed Well Driller)

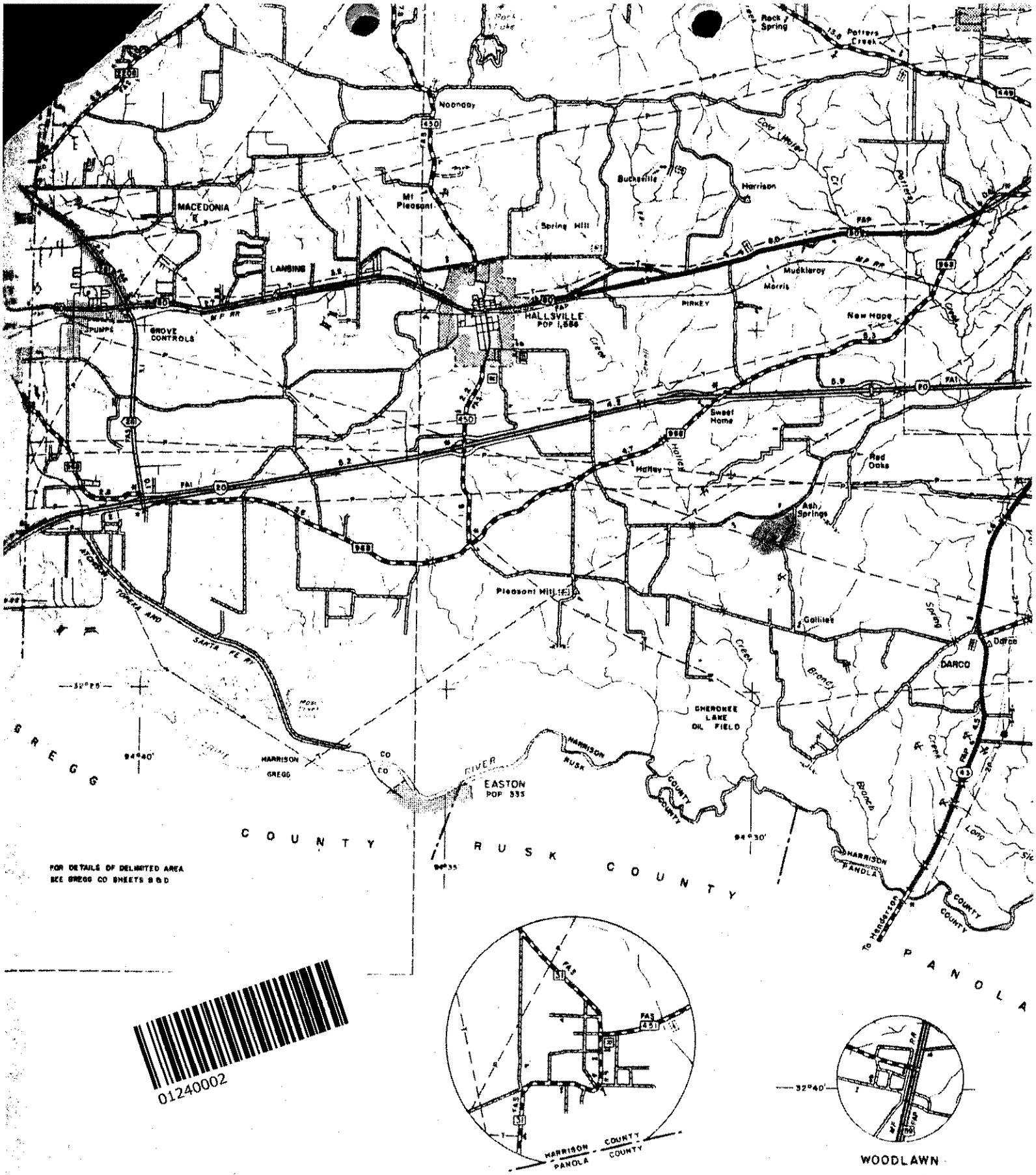
(Signed) David Faze (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

For TWC use only: Well No. _____ Located on map 35-39-4

WWD-012 (Rev. 05-18-90)

TEXAS WATER COMMISSION COPY


Rock Spring
Potters Creek
Noonday
Cow Hollow Cr
Potters Cr
Bucksville
Harrison
Mt Pleasant
MACEDONIA
Spring Hill
LANSING
Muckleroy
Morris
MP RR
HALLSVILLE
POP 1,588
PUMPS
GROVE CONTROLS
PIRKEY
New Hope
Sweet Home
Holley
Red Oaks
Ash Springs
Pleasant Hill
Gollies
Darco
DARCO
CHEROKEE LAKE OIL FIELD
Sabine
Harrison
Rusk
EASTON
POP 335
GREGG
COUNTY
RUSK
COUNTY
PANOLA
FOR DETAILS OF DELIMITED AREA
SEE GREGG CO SHEETS B & D
ELYSIAN FIELDS
WOODLAWN

STATE OF TEXAS WELL REPORT for Tracking #482297

Owner:	**American Electric Power Company**	Owner Well #:	**PZ-6**
Address:	**502 N. Allen Strreet Shreveport, LA 71101**	Grid #:	**35-37-4**
		Latitude:	**32° 27' 07.69" N**
Well Location:	**2400 Farm Road Hallsville, TX 75650**	Longitude:	**094° 29' 42.56" W**
Well County:	**Harrison**	Elevation:	**No Data**

****This well has been plugged**** **Plugging Report Tracking #179508**

Type of Work: **New Well** Proposed Use: **Piezometer**

Drilling Start Date: **6/15/2018** Drilling End Date: **6/15/2018**

	Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Borehole:	**8.25**	**0**	**20**

Drilling Method: **Hollow Stem Auger**

Borehole Completion: **Filter Packed**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Filter Material*	*Size*
Filter Pack Intervals:	**8**	**20**	**Sand**	**20/40**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
Annular Seal Data:	**0**	**1**	**Cement 1 Bags/Sacks**
	1	**8**	**Bentonite 4 Bags/Sacks**

Seal Method: **Poured**

Sealed By: **Driller**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Alternative Procedure Used** **Surface Completion by Driller**

Water Level: **No Data**

Packers: **No Data**

Type of Pump: **No Data**

Well Tests: **No Test Data Specified**

	Strata Depth (ft.)	Water Type
Water Quality:	**No Data**	**No Data**

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **C&S Lease**

1873 FM 1252 E
Kilgore, TX 75663

Driller Name: **Buford E. Collier** License Number: **50089**

Apprentice Name: **Michael Aaron Dodson** Apprentice Number: **59693**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	5	Red Soft Sandy Clay
5	10	Very Soft Red/Brown Clay
10	15	Very Soft Red/Tan Sandy Clay
15	20	Tan/Red Silty Sand

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia (in.)	Type	Material	Sch./Gage	Top (ft.)	Bottom (ft.)
2	Riser	New Plastic (PVC)	40	0	10
2	Screen	New Plastic (PVC)	40 0.010	10	20

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking Number on your written request.

Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #482283

Owner:	**American Electric Power Company**	Owner Well #:	**PZ-2**
Address:	**502 N. Allen Strreet Shreveport, LA 71101**	Grid #:	**35-37-4**
		Latitude:	**32° 27' 12.36" N**
Well Location:	**2400 Farm Road Hallsville, TX 75650**	Longitude:	**094° 29' 44.64" W**
Well County:	**Harrison**	Elevation:	**No Data**

****This well has been plugged**** **Plugging Report Tracking #179514**

Type of Work: **New Well** Proposed Use: **Piezometer**

Drilling Start Date: **6/14/2018** Drilling End Date: **6/14/2018**

	Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Borehole:	**8.25**	**0**	**14**

Drilling Method: **Hollow Stem Auger**

Borehole Completion: **Filter Packed**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Filter Material*	*Size*
Filter Pack Intervals:	**3**	**14**	**Sand**	**20/40**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
Annular Seal Data:	**0**	**1**	**Cement 1 Bags/Sacks**
	1	**3**	**Bentonite 2 Bags/Sacks**

Seal Method: **Poured**

Sealed By: **Driller**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Alternative Procedure Used** **Surface Completion by Driller**

Water Level: **No Data**

Packers: **No Data**

Type of Pump: **No Data**

Well Tests: **No Test Data Specified**

	Strata Depth (ft.)	Water Type
Water Quality:	**No Data**	**No Data**

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **C&S Lease**

1873 FM 1252 E
Kilgore, TX 75663

Driller Name: **Buford E. Collier** License Number: **50089**

Apprentice Name: **Michael Aaron Dodson** Apprentice Number: **59693**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	5	Red Soft Clay
5	10	Very Soft Red/Grey Clay
10	14	Very Soft Brown Sandy Clay

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia (in.)	Type	Material	Sch./Gage	Top (ft.)	Bottom (ft.)
2	Riser	New Plastic (PVC)	40	0	4
2	Screen	New Plastic (PVC)	40 0.010	4	14

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking Number on your written request.

Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

Send original copy by certified mail to: Texas Water Commission, P.O. Box 13087, Austin, Texas 78711 — Please use black ink.

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

State of Texas WELL REPORT

Texas Water Well Drillers Board
P.O. Box 13087
Austin, Texas 78711

1) OWNER Amoco Production Company (Name) ADDRESS Longview Operations Center P. O. Box 9460 (Street or RFD) Longview, (City) Texas (State) 75608 (Zip)

2) LOCATION OF WELL: County Harrison, 10-12 miles in SW (NE, SW, etc.) direction from Marshall (Town)
Bath B #4

Driller must complete the legal description below with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ LEGAL DESCRIPTION:
Section No. ____ Block No. ____ Township ____ Abstract No. ____ Survey Name ____
Distance and direction from two intersecting section or survey lines ____

☒ SEE ATTACHED MAP

3) TYPE OF WORK (Check): ☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☐ Domestic ☒ Industrial ☐ Monitor ☐ Public Supply ☐ Irrigation ☐ Test Well ☐ Injection ☐ De-Watering

5) DRILLING METHOD (Check): ☐ Driven ☒ Mud Rotary ☐ Air Hammer ☐ Jetted ☐ Bored ☐ Air Rotary ☐ Cable Tool ☐ Other ____

6) WELL LOG:
Date Drilling:
Started 04/11 1992
Completed 04/11 1992

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
7 7/8	Surface	160

7) BOREHOLE COMPLETION:
☐ Open Hole ☐ Straight Wall ☐ Underreamed
☒ Gravel Packed ☐ Other ____
If Gravel Packed give interval . . . from 10 ft. to 160 ft.

From (ft.)	To (ft.)	Description and color of formation material
0	20	Clay
20	40	Water Sand
40	60	Water Sand
60	80	Water Sand/Rock
80	100	Water Sand
100	120	15' Water Sand/Shale
120	140	Shale
140	160	Shale

(Use reverse side if necessary)

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casting Screen
4	N	Plastic/Solid	0	80	.030
4	N	Plastic/Perf.	80	160	

9) CEMENTING DATA [Rule 287.44(1)]
Cemented from 0 ft. to 10 ft. No. of Sacks Used ____
____ ft. to ____ ft. No. of Sacks Used ____
Method used Grout
Cemented by Keith Burstow

10) SURFACE COMPLETION
☒ Specified Surface Slab Installed [Rule 287.44(2)(A)]
☐ Specified Steel Sleeve Installed [Rule 287.44(3)(A)]
☒ Pitless Adapter Used [Rule 287.44(3)(B)]
☐ Approved Alternative Procedure Used [Rule 287.71]

11) WATER LEVEL:
Static level 15 ft. below land surface Date 4-11-92
Artesian flow ____ gpm. Date ____

12) PACKERS: Type Depth

13) TYPE PUMP:
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other ____
Depth to pump bowls, cylinder, jet, etc., ____ ft.

RECEIVED JUN 12 1992 TEXAS WATER COMMISSION

14) WELL TESTS:
Type Test: ☐ Pump ☐ Bailer ☒ Jetted ☐ Estimated
Yield: 70 gpm with 60 ft. drawdown after ____ hrs.

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable constituents?
☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? ____ Depth of strata ____
Was a chemical analysis made? ☐ Yes ☒ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME East Texas Drilling Co., Inc. (Type or print) WELL DRILLER'S LICENSE NO. 2977-W

ADDRESS P. O. Box 200 (Street or RFD) Poynor (City) Texas (State) 75782 (Zip)

(Signed) [signature] (Licensed Well Driller) ____ (Registered Driller Trainee)

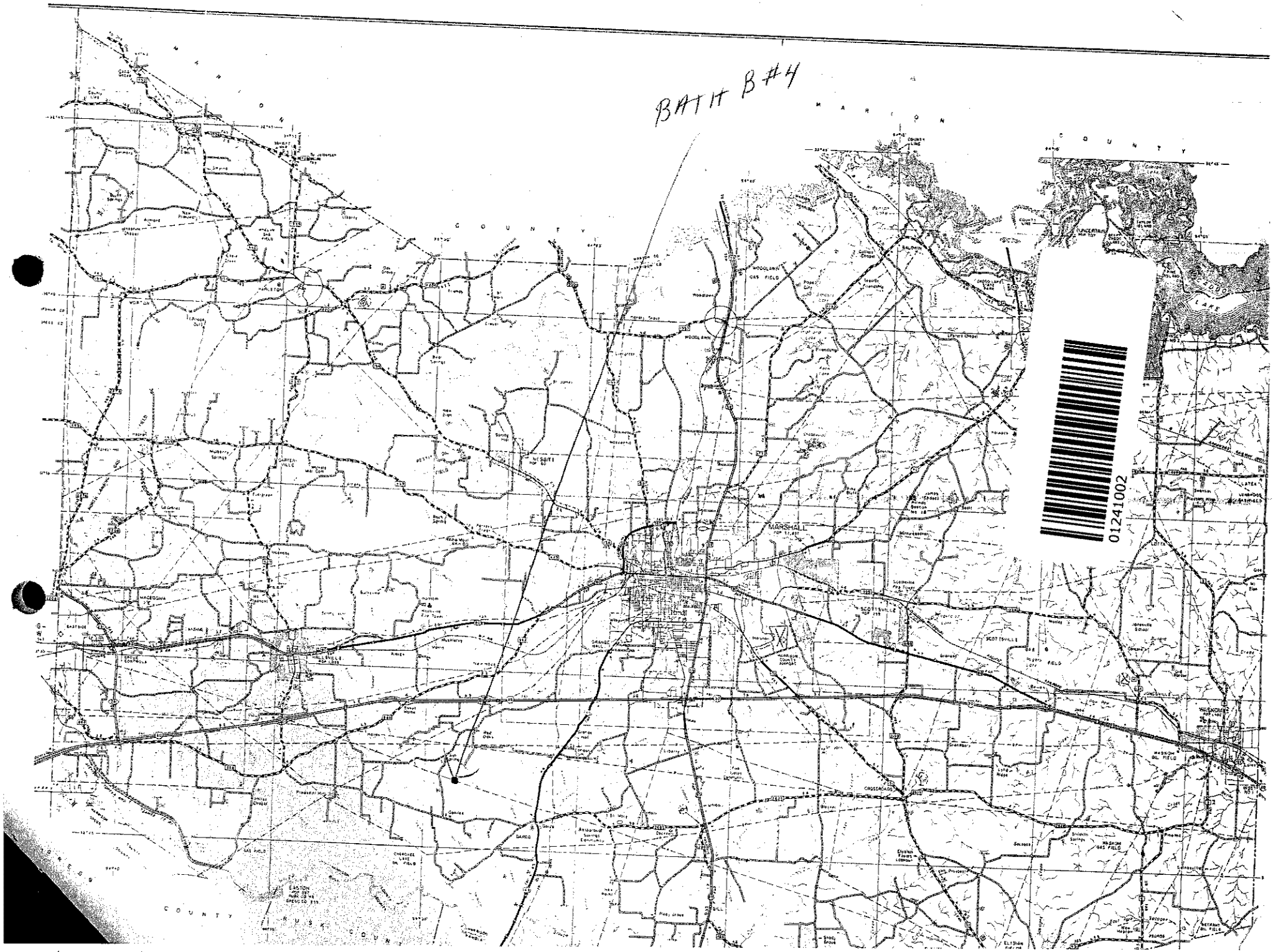
Please attach electric log, chemical analysis, and other pertinent information, if available.

Located on map 35-33-704

WWD-012 (Rev. 05-18-90)

TEXAS 01241001

BATT B #4



STATE OF TEXAS WELL REPORT for Tracking #482286

Owner:	**American Electric Power Company**	Owner Well #:	**PZ-3**
Address:	**502 N. Allen Strreet Shreveport, LA 71101**	Grid #:	**35-37-4**
		Latitude:	**32° 27' 10.18" N**
Well Location:	**2400 Farm Road Hallsville, TX 75650**	Longitude:	**094° 29' 45.15" W**
Well County:	**Harrison**	Elevation:	**No Data**

****This well has been plugged**** **Plugging Report Tracking #179513**

Type of Work: **New Well** Proposed Use: **Piezometer**

Drilling Start Date: **6/14/2018** Drilling End Date: **6/14/2018**

	Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Borehole:	**8.25**	**0**	**14**

Drilling Method: **Hollow Stem Auger**

Borehole Completion: **Filter Packed**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Filter Material*	*Size*
Filter Pack Intervals:	**3**	**14**	**Sand**	**20/40**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
Annular Seal Data:	**0**	**1**	**Cement 1 Bags/Sacks**
	1	**3**	**Bentonite 2 Bags/Sacks**

Seal Method: **Poured**

Sealed By: **Driller**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Alternative Procedure Used** **Surface Completion by Driller**

Water Level: **No Data**

Packers: **No Data**

Type of Pump: **No Data**

Well Tests: **No Test Data Specified**

	Strata Depth (ft.)	Water Type
Water Quality:	**No Data**	**No Data**

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **C&S Lease**

1873 FM 1252 E
Kilgore, TX 75663

Driller Name: **Buford E. Collier** License Number: **50089**

Apprentice Name: **Michael Aaron Dodson** Apprentice Number: **59693**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	5	Red Soft Clay
5	10	Very Soft Red/Grey Clay
10	14	Very Soft Brown Sandy Clay

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia (in.)	Type	Material	Sch./Gage	Top (ft.)	Bottom (ft.)
2	Riser	New Plastic (PVC)	40	0	4
2	Screen	New Plastic (PVC)	40 0.010	4	14

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking Number on your written request.

Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

06/08/2023
04:06:06

Texas Commission on Environmental Quality
DWW Water System Summary Sheet

PWS ID	PWS Name	Central Registry RN
TX1020059	PIRKEY POWER PLANT SWEPCO	RN101246502

Organization/Customer *	Central Registry CN
SOUTHWESTERN ELECTRIC POWER COMPANY	CN600126767

*Regulatory mail will be addressed to this organization/person

All Water System Contacts

Type	Contact	Communication
AC - Administrative Contact - VICE PRESIDENT	BOND, BRIAN 2400 FM 3251 HALLSVILLE, TX 75650-7634	**Phone Type** / **Value** BUS - Business / 903-935-3181 FAX - Facsimile / 903-927-5840
EC - Emergency Contact	GRIFFITH, MARK 2400 FM 3251 HALLSVILLE, TX 75650-7634	**Phone Type** / **Value** EMERG - Emergency / 903-927-5889
OW - Owner	SOUTHWESTERN ELECTRIC POWER COMPANY PO BOX 16428 COLUMBUS, OH 43216-6428	
PWS - Public Water System Contact - SUPERVISOR	DUFFY, DONNIE 2400 FM 3251 HALLSVILLE, TX 75650-7634	**Phone Type** / **Value** BUS - Business / 903-935-5848

Operator Grade	Number
SURFACE WATER TREATMENT OPERATOR Grade C	1

Water Operator Licenses

License Holder:	TAYLOR, DERRICK R	
CURRENT	Class: C - SURFACE WATER TREATMENT OPERATOR	WS0011891

Owner Type	Owner Type Options: COUNTY, DISTRICT, FEDERAL GOVERNMENT, INVESTOR OWNED, MUNICIPALITY, NATIVE AMERICAN, PRIVATE, STATE GOVERNMENT, WATER SUPPLY CORPORATION
Private	

System Type	System Type Options: COMMUNITY, TRANSIENT/NON-COMMUNITY, NON-PUBLIC, NON-TRANSIENT/NON-COMMUNITY
NP - NON-PUBLIC	

Population Type	Population Served	# of Connect	# I/C w/other PWS

Total Product (MGD)	Average Daily Consump.	Max Daily Demand (MGD)	Total Storage (MG)	Elev. Storage (MG)	Service Pump Cap.	Max.Purchase Cap. (MGD/GPM)	Pressure Tank Cap. (MG)

Activity Status	Inactivation Date
I - INACTIVE	07/22/2013

Last Survey Date	Surveyor	Survey Type	Region	County
11/25/2008	SAMANTHA SMITH	Sanitary Survey	TYLER	HARRISON
01/25/2008	SAMANTHA SMITH	Sanitary Survey	TYLER	HARRISON
03/22/2007	SAMANTHA SMITH	Sanitary Survey	TYLER	HARRISON

(Treatment Plant)
No Active Treatment Plant

(Entry Point)							
Distribution Point	Sample Point Name/Source Summation (Activity Status)	Entry Point Name (Activity Status)	Entry Point Num	Chemical Mon Type	Chem Sample Point	Distribution Mon Type	Dist Sample Point
DS01	TRT-TAP / No Source Listed(I)	2400 FM 3251(I)	EP001		NO		NO

(Active Sources)

Code Explanations
Monitoring Type Codes: (GW) GROUNDWATER , (GUP) GROUNDWATER UNDER THE INFLUENCE - PURCHASED , (SWP) SURFACE WATER - PURCHASED , (GU) GROUNDWATER UNDER THE INFLUENCE OF SURFACE WATER , (N) NO SOURCES , (SW) SURFACE WATER
Activity Status Codes: (A) ACTIVE , (D) DELETED/DISSOLVED , (I) INACTIVE , (P) PROPOSED ,
Operational Status Codes: (E) EMERGENCY , (I) INTERIM/PEAK (O) OTHER , (P) PERMANENT , (S) SEASONAL
Source Types: (G) GROUND WATER , (S) SURFACE WATER , (U) GROUND WATER UNDER THE INFLUENCE

- End of Report -

STATE OF TEXAS WELL REPORT for Tracking #482295

Owner:	**American Electric Power Company**	Owner Well #:	**PZ-5**
Address:	**502 N. Allen Strreet Shreveport, LA 71101**	Grid #:	**35-37-4**
Well Location:	**2400 Farm Road Hallsville, TX 75650**	Latitude:	**32° 27' 07.7" N**
		Longitude:	**094° 29' 45.72" W**
Well County:	**Harrison**	Elevation:	**No Data**

****This well has been plugged**** **Plugging Report Tracking #179509**

Type of Work: **New Well** Proposed Use: **Piezometer**

Drilling Start Date: **6/15/2018** Drilling End Date: **6/15/2018**

	Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Borehole:	**8.25**	**0**	**20**

Drilling Method: **Hollow Stem Auger**

Borehole Completion: **Filter Packed**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Filter Material*	*Size*
Filter Pack Intervals:	**8**	**20**	**Sand**	**20/40**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
Annular Seal Data:	**0**	**1**	**Cement 1 Bags/Sacks**
	1	**8**	**Bentonite 4 Bags/Sacks**

Seal Method: **Poured**

Sealed By: **Driller**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Alternative Procedure Used** **Surface Completion by Driller**

Water Level: **No Data**

Packers: **No Data**

Type of Pump: **No Data**

Well Tests: **No Test Data Specified**

	Strata Depth (ft.)	Water Type
Water Quality:	**No Data**	**No Data**

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **C&S Lease**

1873 FM 1252 E
Kilgore, TX 75663

Driller Name: **Buford E. Collier** License Number: **50089**

Apprentice Name: **Michael Aaron Dodson** Apprentice Number: **59693**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	5	Red Soft Sandy Clay
5	10	Very Soft Red/Brown Clay
10	15	Very Soft Red/Tan Sandy Clay
15	20	Tan/Red Silty Sand

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia (in.)	Type	Material	Sch./Gage	Top (ft.)	Bottom (ft.)
2	Riser	New Plastic (PVC)	40	0	10
2	Screen	New Plastic (PVC)	40 0.010	10	20

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking Number on your written request.

Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #482288

Owner:	**American Electric Power Company**	Owner Well #:	**PZ-7**
Address:	**502 N. Allen Strreet Shreveport, LA 71101**	Grid #:	**35-37-4**
		Latitude:	**32° 27' 10.81" N**
Well Location:	**2400 Farm Road Hallsville, TX 75650**	Longitude:	**094° 29' 48.7" W**
Well County:	**Harrison**	Elevation:	**No Data**

****This well has been plugged**** **Plugging Report Tracking #179512**

Type of Work: **New Well** Proposed Use: **Piezometer**

Drilling Start Date: **6/14/2018** Drilling End Date: **6/14/2018**

	Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Borehole:	**8.25**	**0**	**14**

Drilling Method: **Hollow Stem Auger**

Borehole Completion: **Filter Packed**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Filter Material*	*Size*
Filter Pack Intervals:	**3**	**14**	**Sand**	**20/40**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
Annular Seal Data:	**0**	**1**	**Cement 1 Bags/Sacks**
	1	**3**	**Bentonite 2 Bags/Sacks**

Seal Method: **Poured**

Sealed By: **Driller**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Alternative Procedure Used** **Surface Completion by Driller**

Water Level: **No Data**

Packers: **No Data**

Type of Pump: **No Data**

Well Tests: **No Test Data Specified**

	Strata Depth (ft.)	Water Type
Water Quality:	**No Data**	**No Data**

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **C&S Lease**

1873 FM 1252 E
Kilgore, TX 75663

Driller Name: **Buford E. Collier** License Number: **50089**

Apprentice Name: **Michael Aaron Dodson** Apprentice Number: **59693**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	5	Red Soft Clay
5	10	Very Soft Red/Grey Clay
10	14	Very Soft Brown Sandy Clay

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia (in.)	Type	Material	Sch./Gage	Top (ft.)	Bottom (ft.)
2	Riser	New Plastic (PVC)	40	0	4
2	Screen	New Plastic (PVC)	40 0.010	4	14

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #482280

Owner:	**American Electric Power Company**	Owner Well #:	**PZ-1**
Address:	**502 N. Allen Strreet Shreveport, LA 71101**	Grid #:	**35-37-4**
Well Location:	**2400 Farm Road Hallsville, TX 75650**	Latitude:	**32° 27' 11.79" N**
		Longitude:	**094° 29' 48.1" W**
Well County:	**Harrison**	Elevation:	**No Data**

****This well has been plugged**** **Plugging Report Tracking #179515**

Type of Work: **New Well** Proposed Use: **Piezometer**

Drilling Start Date: **6/14/2018** Drilling End Date: **6/14/2018**

	Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Borehole:	**8.25**	**0**	**14**

Drilling Method: **Hollow Stem Auger**

Borehole Completion: **Filter Packed**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Filter Material*	*Size*
Filter Pack Intervals:	**3**	**14**	**Sand**	**20/40**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
Annular Seal Data:	**0**	**1**	**Cement 1 Bags/Sacks**
	1	**3**	**Bentonite 2 Bags/Sacks**

Seal Method: **Poured**

Sealed By: **Driller**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Alternative Procedure Used** **Surface Completion by Driller**

Water Level: **No Data**

Packers: **No Data**

Type of Pump: **No Data**

Well Tests: **No Test Data Specified**

	Strata Depth (ft.)	Water Type
Water Quality:	**No Data**	**No Data**

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **C&S Lease**

1873 FM 1252 E
Kilgore, TX 75663

Driller Name: **Buford E. Collier** License Number: **50089**

Apprentice Name: **Michael Aaron Dodson** Apprentice Number: **59693**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	5	Red Soft Clay
5	10	Very Soft Red/Grey Clay
10	14	Very Soft Brown Sandy Clay

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia (in.)	Type	Material	Sch./Gage	Top (ft.)	Bottom (ft.)
2	Riser	New Plastic (PVC)	40	0	4
2	Screen	New Plastic (PVC)	40 0.010	4	14

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Please include the report's Tracking Number on your written request.

Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #482290

Owner:	**American Electric Power Company**	Owner Well #:	**PZ-4**
Address:	**502 N. Allen Strreet Shreveport, LA 71101**	Grid #:	**35-37-4**
Well Location:	**2400 Farm Road Hallsville, TX 75650**	Latitude:	**32° 27' 08.3" N**
		Longitude:	**094° 29' 48.73" W**
Well County:	**Harrison**	Elevation:	**No Data**

****This well has been plugged**** **Plugging Report Tracking #179510**

Type of Work: **New Well** Proposed Use: **Piezometer**

Drilling Start Date: **6/15/2018** Drilling End Date: **6/15/2018**

	Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Borehole:	**8.25**	**0**	**14**

Drilling Method: **Hollow Stem Auger**

Borehole Completion: **Filter Packed**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Filter Material*	*Size*
Filter Pack Intervals:	**3**	**14**	**Sand**	**20/40**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
Annular Seal Data:	**0**	**1**	**Cement 1 Bags/Sacks**
	1	**3**	**Bentonite 2 Bags/Sacks**

Seal Method: **Poured**

Sealed By: **Driller**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Alternative Procedure Used** **Surface Completion by Driller**

Water Level: **No Data**

Packers: **No Data**

Type of Pump: **No Data**

Well Tests: **No Test Data Specified**

	Strata Depth (ft.)	Water Type
Water Quality:	**No Data**	**No Data**

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **C&S Lease**

1873 FM 1252 E
Kilgore, TX 75663

Driller Name: **Buford E. Collier** License Number: **50089**

Apprentice Name: **Michael Aaron Dodson** Apprentice Number: **59693**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	5	Red Soft Clay
5	10	Very Soft Red/Grey Clay
10	14	Very Soft Brown Sandy Clay

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia (in.)	Type	Material	Sch./Gage	Top (ft.)	Bottom (ft.)
2	Riser	New Plastic (PVC)	40	0	4
2	Screen	New Plastic (PVC)	40 0.010	4	14

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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Please include the report's Tracking Number on your written request.

Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

#8

Send original copy by certified mail to the Texas Department of Water Resources P. O. Box 13087 Austin, Texas 78711

State of Texas
WATER WELL REPORT

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

For TDWR use only
Well No. 35-37-4E
Located on map Yes
Received: C.F.S.

1) OWNER Cathy Jones (Name) Address Rt-1 (Street or RFD) Marshall (City) Tx (State) 75670 (Zip)

2) LOCATION OF WELL: County Harrison 4½ miles in SW (N.E., S.W., etc.) direction from Marshall Tex (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ Legal description:
Section No. _____ Block No. _____ Township _____
Abstract No. _____ Survey Name _____
Distance and direction from two intersecting section or survey lines _____
☒ See attached map. mapon 32-29-6J

3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check):
☒ Domestic ☐ Industrial ☐ Public Supply ☐ Irrigation ☐ Test Well ☐ Other _____

5) DRILLING METHOD (Check):
☐ Mud Rotary ☐ Air Hammer ☐ Driven ☒ Bored ☐ Air Rotary ☐ Cable Tool ☐ Jetted ☐ Other _____

6) WELL LOG:
Date drilled 6-1-82

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
36	Surface	55

7) BOREHOLE COMPLETION:
☐ Open Hole ☐ Straight Wall ☐ Underreamed
☒ Gravel Packed ☐ Other _____
If Gravel Packed give interval . . . from 3 ft. to 55 ft.

From (ft.)	To (ft.)	Description and color of formation material
0	20	Red Clay
20	30	White Sandy Clay
30	35	Sand
35	55	Gray Shale

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mgf., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing Screen
30	N	Concrete Tile	0	55	

CEMENTING DATA
Cemented from _____ ft. to _____ ft.
Method used _____
Cemented by _____ (Company or Individual)

9) WATER LEVEL:
Static level 30 ft. below land surface Date 6-1-82
Artesian flow _____ gpm. Date _____

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DEPT. OF WATER RESOURCES

10) PACKERS: Type Depth

(Use reverse side if necessary)

11) TYPE PUMP:
☐ Turbine ☒ Jet ☐ Submersible ☐ Cylinder
☐ Other _____
Depth to pump bowls, cylinder, jet, etc., _____ ft.

13) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☒ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata 30 70 35
Was a chemical analysis made? ☐ Yes ☐ No

12) WELL TESTS:
☐ Type Test: ☐ Pump ☐ Bailer ☐ Jetted ☒ Estimated
Yield: 250 gpm with _____ ft. drawdown after _____ hrs.

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME Wayne Morgan (Type or Print) Water Well Drillers Registration No. [redacted] 1913

ADDRESS Box 750 (Street or RFD) Linden (City) Tx (State) 75563 (Zip)

(Signed) Wayne Morgan (Water Well Driller)

REX WATER WELLS (Name)
P. O. Box 750
LINDEN, TEXAS 75563
(214) 756-7081

Please attach electric log, chemical analysis, and other pertinent information, if available.

TDWR-0392 (Rev. 1-12-79)

DEPARTMENT OF WATER RESOURCES COPY

STATE OF TEXAS WELL REPORT for Tracking #163503

Owner:	**NFR Energy LLC**	Owner Well #:	**Mohan #13**
Address:	**1415 Louisiana Street Ste 1600 Houston, TX 77002**	Grid #:	**35-37-1**
		Latitude:	**32° 27' 41" N**
Well Location:	**Red Oak Road Marshall, TX 75670**	Longitude:	**094° 29' 42" W**
Well County:	**Harrison**	Elevation:	**326 ft. above sea level**
Type of Work:	**New Well**	Proposed Use:	**Rig Supply**

Drilling Start Date: **12/15/2008** Drilling End Date: **12/15/2008**

	Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Borehole:	**7.875**	**0**	**320**

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Filter Packed**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Filter Material*	*Size*
Filter Pack Intervals:	**220**	**320**	**Gravel**	

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
Annular Seal Data:	**0**	**12**	**10 sks cement**

Seal Method: **Unknown**

Sealed By: **Unknown**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Surface Sleeve Installed**

Water Level: **120 ft.** below land surface on **2008-12-15** Measurement Method: **Unknown**

Packers: **No Data**

Type of Pump: **Submersible** Pump Depth (ft.): **280**

Well Tests: **Jetted** **Yield: 60 GPM with 20 ft. drawdown after 1 hours**

	Strata Depth (ft.)	Water Type
Water Quality:	**No Data**	**No Data**

Chemical Analysis Made: **Unknown**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **Unknown**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Pinnergy, Ltd.**

P. O. Box 202
Carthage, TX 75633

Driller Name: **Randy Williams** License Number: **54612**

Apprentice Name: **Billy Kerry**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	20	clay, shale, sand
20	40	shale, sand, rock
40	100	shale, sand
100	120	sand
120	140	shale, sand
140	160	shale, rock
160	180	shale
180	200	shale, rock
200	240	shale
240	300	sand
300	320	shale, sand

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.)	New/Used	Type	Setting From/To (ft.)
new pvc casing sch 40 .020ga 0-250, 310-320			
new pvc screen sch 40 .020ga 250-310			

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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Please include the report's Tracking Number on your written request.

Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

Send original copy by certified mail to: Texas Water Commission, P.O. Box 13087, Austin, Texas 78711

Please use black ink.

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

State of Texas WELL REPORT

Texas Water Well Drillers Board
P.O. Box 13087
Austin, Texas 78711

1) **OWNER** AMOCO PRODUCTION CO. (Name) **ADDRESS** P. O. Box 9460 (Street or RFD) Longview (City) Tx (State) 75608 (Zip)

2) **LOCATION OF WELL:** County Harrison, 6.5 miles in SW (NE, SW, etc.) direction from Marshall (Town)
Washington #3

01235001

Driller must complete the legal description below with distance and direction from two intersecting section or survey lines, o Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ **LEGAL DESCRIPTION:**
Section No. _____ Block No. _____ Township _____ Abstract No. _____
Distance and direction from two intersecting section or survey lines _____

☒ **SEE ATTACHED MAP**

3) **TYPE OF WORK (Check):**
☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) **PROPOSED USE (Check):** Rig
☐ Domestic ☐ Industrial ☐ Monitor ☒ Public Supply ☐ Irrigation ☐ Test Well ☐ Injection ☐ De-Watering

5) **DRILLING METHOD (Check):**
☐ Driven ☒ Mud Rotary ☐ Air Hammer ☐ Jetted ☐ Bored ☐ Air Rotary ☐ Cable Tool ☐ Other _____

6) **WELL LOG:**
Date Drilling: Started 1-8 1992 Completed 1-8 1992

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
7 7/8	Surface	225

7) **BOREHOLE COMPLETION:**
☐ Open Hole ☐ Straight Wall ☐ Underreamed
☒ Gravel Packed ☐ Other _____
If Gravel Packed give interval . . . from 140 ft. to 225 ft.
Hole plug @138-140'

From (ft.)	To (ft.)	Description and color of formation material
0	30	Red sandy clay
30	40	Tan sand
40	65	Tan & gray shale
65	85	Gray clay
85	105	Soft gray clay
105	140	5%Sand w/soft clay
140	145	100% Fine gray sand
145	165	85% Fine gray sand
165	208	100% Fine gray sand
208	225	Hard gray shale

(Use reverse side if necessary)

8) **CASING, BLANK PIPE, AND WELL SCREEN DATA:**

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casting Screen
4	N	PVC Blank	0	140	Sch40
4	N	PVC Screen	140	208	.020
4	N	PVC Blank	208	225	Sch40

9) **CEMENTING DATA** [Rule 287.44(1)]
Cemented from 0 ft. to 10 ft. No. of Sacks Used 9
_____ ft. to _____ ft. No. of Sacks Used _____
Method used Hopper
Cemented by Lawrence Lohr

13) **TYPE PUMP:**
☐ Turbine ☐ Jet ☒ Submersible ☐ Cylinder ☐ Other _____
Depth to pump bowls, cylinder, jet, etc., _____ ft.

10) **SURFACE COMPLETION**
☒ Specified Surface Slab Installed [Rule 287.44(2)(A)]
☐ Specified Steel Sleeve Installed [Rule 287.44(3)(A)]
☐ Pitless Adapter Used [Rule 287.44(3)(B)]
☐ Approved Alternative Procedure Used [Rule 287.71]

RECEIVED
JAN 24 1992
TEXAS WATER WELL DRILLERS BOARD

14) **WELL TESTS:**
Type Test: ☐ Pump ☐ Bailer ☒ Jetted ☐ Estimated
Yield: 75 gpm with _____ ft. drawdown after 1 hrs.

11) **WATER LEVEL:**
Static level 60 ft. below land surface Date 1-8-92
Artesian flow _____ gpm. Date _____

15) **WATER QUALITY:**
Did you knowingly penetrate any strata which contained undesirable constituents?
☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata _____
Was a chemical analysis made? ☐ Yes ☒ No

12) **PACKERS:**

Type	Depth
Paper	10-12'

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME FAS-LINE/HARDBAND (Type or print) **WELL DRILLER'S LICENSE NO.** 2846 W

ADDRESS P. O. Box 1439 (Street or RFD) Kilgore (City) Tx (State) 75663 (Zip)

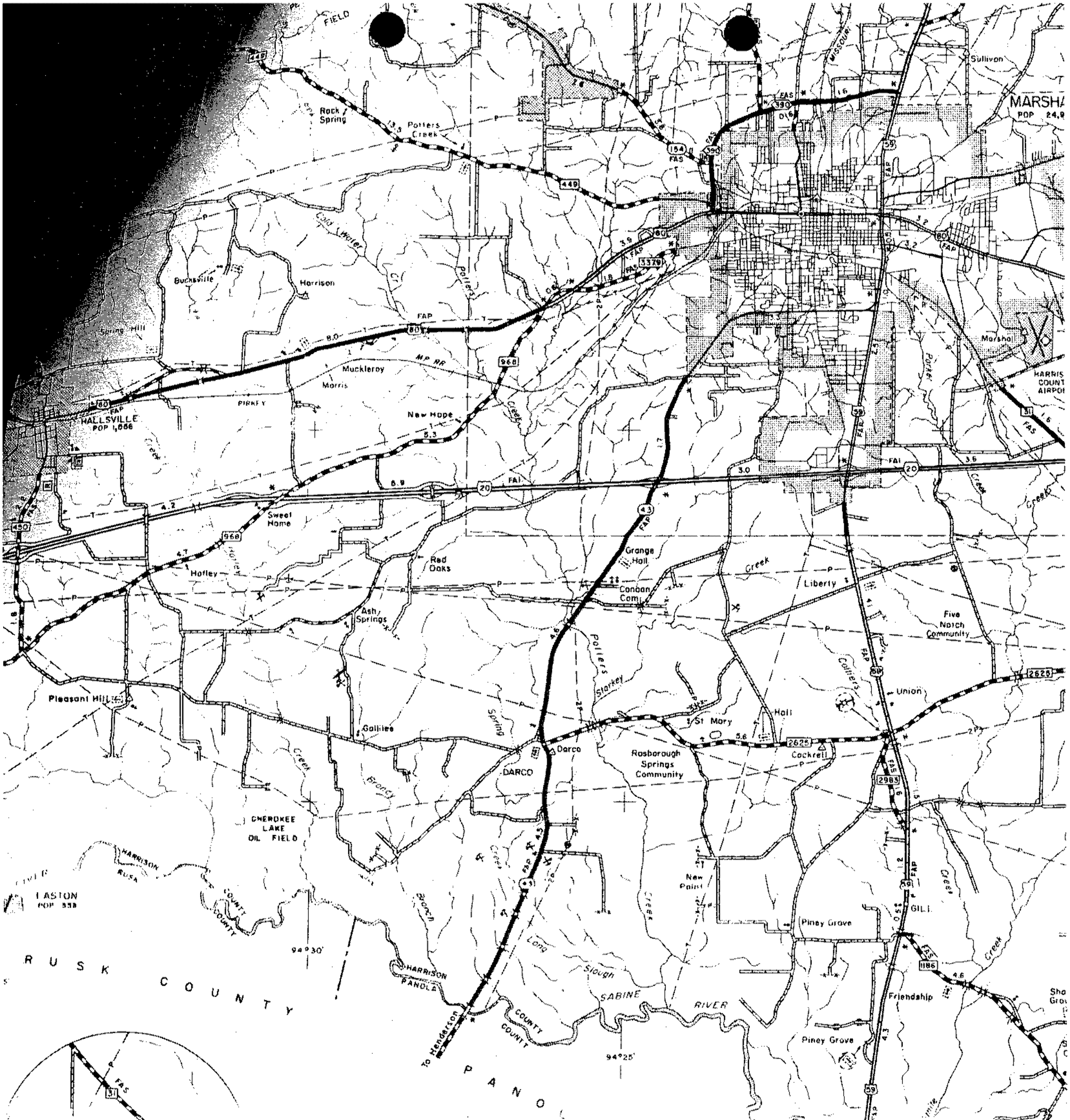
(Signed) Lawrence Lohr (Licensed Well Driller) **(Signed)** David Fogle (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

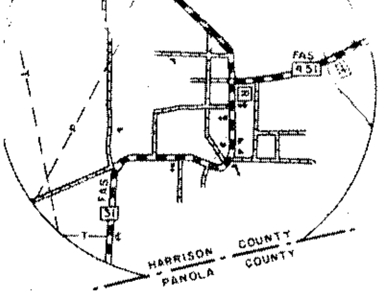
For TWC use only: Well No. _____ Located on map 35-37-4

WWD-012 (Rev. 05-18-90)

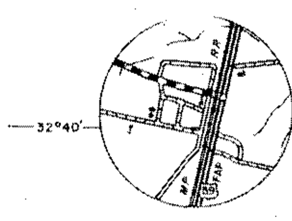
TEXAS WATER COMMISSION COPY



MARSHALL
POP 24,9
Sullivan
Rock Spring
Potters Creek
Cold Water Cr
Bucksville
Harrison
Spring Hill
Mucklerory
Morris
PIRKEY
New Hope
HALLSVILLE
POP 1,556
Sweet Home
Hofley
Red Oaks
Grange Hall
Canaan Com.
Liberty
Five Notch Community
Ash Springs
Pleasant Hill
Galilee
Darco
DARCO
Rosborough Springs Community
St Mary
Hall
Union
Cockrell
CHEROKEE LAKE OIL FIELD
New Point
Piney Grove
GILL
Friendship
EASTON
POP 558
RUSK COUNTY
HARRISON PANOLA COUNTY
SABINE RIVER
Long Slough
To Henderson
94°30'
94°25'
PANOLA
HARRIS COUNTY AIRPORT
Marshall



ELYSIAN FIELDS



WOODLAWN

01238002

NOTICE
This map has been prepared for internal departmental use and has no official status. Accuracy is limited to validity of available data as of the dates shown.

CONT

STATE OF TEXAS WELL REPORT for Tracking #167661

Owner:	**Tom Brown**	Owner Well #:	**Mohon #6**
Address:	**8340 Meadow Rd, Suite 150 Dallas, TX 75231**	Grid #:	**35-37-1**
		Latitude:	**32° 27' 54" N**
Well Location:	**CR 3200 Tatum, TX**	Longitude:	**094° 29' 19" W**
Well County:	**Harrison**	Elevation:	**No Data**
Type of Work:	**New Well**	Proposed Use:	**Rig Supply**

Drilling Start Date: **9/14/2004** Drilling End Date: **9/14/2004**

	Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Borehole:	**7.875**	**0**	**430**

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Filter Packed**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Filter Material*	*Size*
Filter Pack Intervals:	**320**	**430**	**Gravel**	**#9**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
Annular Seal Data:	**0**	**10**	**8 Cement**

Seal Method: **Sackrete**

Sealed By: **Bennett**

Distance to Property Line (ft.): **na**

Distance to Septic Field or other concentrated contamination (ft.): **na**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **none in area**

Surface Completion: **Surface Sleeve Installed**

Water Level: **186 ft.** below land surface on **2004-09-14** Measurement Method: **Unknown**

Packers: **No Data**

Type of Pump: **Submersible**

Well Tests: **Jetted** **Yield: 55 GPM**

	Strata Depth (ft.)	*Water Type*
Water Quality:	**348 - 430**	**na**

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Bennett Drilling**

P.O. Box 1320
Carthage, TX 75633

Driller Name: **Randall E. Bowman** License Number: **54535**

Comments: **$mew**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	*Bottom (ft.)*	*Description*
0	**30**	**Brown Sand**
30	**60**	**Gray Clay**
60	**190**	**Brown Sandy Clay**
190	**348**	**Gray Clay**
348	**430**	**Sandy**

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.)	*New/Used*	*Type*	*Setting From/To (ft.)*
4"	**New**	**Plastic**	**0 - 350 Casing**
4"	**New**	**Plastic**	**.020 350 - 430 Screen**

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking Number on your written request.

Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

Attention Owner: Confidentiality Privilege Notice on reverse side of owner's copy.

Texas Department of License and Regulation

Water Well Driller/Pump Installer Program
P.O. Box 12157 Austin, Texas 78711 (512) 463-7880 FAX (512) 463-8616
Toll free (800) 803-9202
Email address: water.well@license.state.tx.us

This form must be completed and filed with the department and owner within 60 days upon completion of the well.

WELL REPORT

A. WELL IDENTIFICATION AND LOCATION DATA

1) OWNER

Name	Address	City	State	Zip
Matador Operating	8340 Meadow Rd.	Dallas	TX	75231

2) WELL LOCATION

County	Physical Address	City	State	Zip
Harrison	FM 2625	Marshall	TX	75231

Lat. 32 | 26 | 69 Long. 094 | 30 | 02 Grid # 35-36-6

3) Type of Work
☑ New Well ☐ Deepening ☐ Reconditioning

4) Proposed Use (check) ☐ Monitor ☐ Environmental Soil Boring ☐ Domestic ☑ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

5) N↑

6) Drilling Date
Started 10/17/00
Completed 10/17/00

Diameter of Hole

Dia. (in)	From (ft)	To (ft)
7 7/8	0	420

7) Drilling Method (check) ☐ Driven ☐ Air Rotary ☑ Mud Rotary ☐ Bored ☐ Air Hammer ☐ Cable Tool ☐ Jetted ☐ Other

From (ft)	To (ft)	Description and color of formation material
0	20	clay, sand
20	40	shale, water sand, lignite
40	60	water sand
60	80	shale, water sand, lignite
80	120	shale, lignite, rock
120	140	shale, water sand
140	160	shale, lignite
160	240	shale, water sand
240	260	shale, rock
260	360	shale, water sand
360	420	water sand

(Use reverse side of Well Owner's copy, If nece

8) Borehole Completion ☐ Open Hole ☑ Straight Wall ☐ Under-reamed ☑ Gravel Packed ☐ Other
If Gravel Packed give the interval from 10 ft. to 420 ft.

Casing, Blank Pipe, and Well Screen Data

Dia. (in.)	New Or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft) From	Setting (ft) To	Gage Casing Screen
4	N	PVC	0	340	
4	N	PVC Screen	340	420	.020

9) Cementing Data
Cementing from 10 ft. to 0 ft. # of sacks used n/a
ft. to ft. # of sacks used
Method Used grout
Cementing By Keith Bristow
Distance to septic system field or other concentrated contamination n/a ft.
Method of verification of above distance n/a

13) Plugged ☐ Well plugged within 48 hours
Casing left in well: Cement/Bentonite placed in w

From (ft)	To (ft)	From (ft)	To (ft)

10) Surface Completion
☑ Specified Surface Slab Installed
☐ Specified Surface Sleeve Installed
☐ Pitless Adapter Used
☐ Approved Alternative Procedure Used

14) Type pump
☐ Turbine ☐ Jet ☑ Submersible ☐ Cylinder ☐ Other
Depth to pump bowls, cylinder, jet, etc., 300 ft.

11) Water Level
Static level 110 ft. below Date 10/17/00
Artesian Flow gpm. Date / /

15) Water Test
Type test ☑ Pump ☐ Bailer ☑ Jetted ☑ Estimated
Yield: 45 gpm with 125 ft. drawdown after 1 hrs.

12) Packers

Type	Depth
n/a	

16) Water Quality
Did you knowingly penetrate any strata which contain undesirable constituents?
☐ Yes ☑ NO If yes, did you submit a REPORT OF UNDESIRABLE WATER?
Type of water Depth of Strata
Was a chemical analysis made? ☐ Yes ☑ No

Company or Individual's Name (type or print) East Texas Drilling Co., Inc. Water Well Drillers License #: 2977WPK
Address P. O. Box 200 City Poynor State TX Zip 75782

Signature Licensed Driller/Pump Installer — Date 12 / 29 / 2000
Signature Apprentice — Date / /

TDLR FORM 004WWD Copies to TDLR - Owner - Driller/Pump Installer

Send original copy by certified return receipt requested mail TNRCC, MC 177, P.O. Box 13087, Austin, TX 78711-3087

ATTENTION OWNER: *Confidentiality Privilege Notice on on reverse side of Well Owner's copy (pink)*

State of Texas WELL REPORT

Texas Water Well Drillers Advisory Council
MC 177
P.O. Box 13087
Austin, TX 78711-3087
512-239-0530

1) OWNER UPRC (Name) ADDRESS PO Box 901077, Ft Worth, Tx 76101 (Street or RFD) (City) (State) (Zip)

2) ADDRESS OF WELL: County Harrison Co 10 miles SE Longview Tx (Street, RFD or other) (City) (State) (Zip) GRID # 87

3) TYPE OF WORK (Check): ☐ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☐ Monitor ☐ Environmental Soil Boring ☐ Domestic ☐ Industrial ☐ Irrigation ☐ Injection ☒ Public Supply (Rig) ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

5) 35-37-4

6) WELL LOG:
Date Drilling:
Started 7/13 1996
Completed 7/13 1996

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
7 7/8	Surface	500

7) DRILLING METHOD (Check): ☐ Driven ☐ Air Rotary ☒ Mud Rotary ☐ Bored ☐ Air Hammer ☐ Cable Tool ☐ Jetted ☐ Other

From (ft.)	To (ft.)	Description and color of formation material
0	10	orange clay dirt
10	110	Clay gravel ash shale
110	400	Shale, Sand
400	500	Sand (6-570) gray

01225001

(Use reverse side of Well Owner's copy, if necessary)

8) Borehole Completion (Check): ☐ Open Hole ☐ Straight Wall ☐ Underreamed ☒ Gravel Packed (Blasting Sand) ☒ Other 10-50 Mud fill
If Gravel Packed give interval ... from 50 ft. to 500 ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casting Screen
4	N	PVC Casing	0	400	Sch40
4	N	PVC Screen	400	500	.020

9) CEMENTING DATA [Rule 338.44(1)]
Cemented from 0 ft. to 10 ft. No. of sacks used 10
ft. to ft. No. of sacks used
Method used Hopper
Cemented by Burnt Yadin
Distance to septic system field lines or other concentrated contamination ft.
Method of verification of above distance

13) TYPE PUMP: ☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder ☒ Other N/A
Depth to pump bowls, cylinder, jet, etc., ft.

10) SURFACE COMPLETION
☒ Specified Surface Slab Installed [Rule 338.44(2)(A)]
☐ Specified Steel Sleeve Installed [Rule 338.44(3)(A)]
☐ Pitless Adapter Used [Rule 338.44(3)(b)]
☐ Approved Alternative Procedure Used [Rule 338.71]

14) WELL TESTS:
Type test: ☐ Pump ☐ Bailer ☒ Jetted ☐ Estimated
Yield: 50 gpm with 107 ft. drawdown after 1 hrs.

11) WATER LEVEL:
Static level 130 ft. below land surface Date 7/13/96
Artesian flow gpm. Date

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable constituents?
☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? Depth of strata
Was a chemical analysis made? ☐ Yes ☒ No

12) PACKERS: Type Depth

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME Custom Water Well (Type or print) WELL DRILLER'S LICENSE NO. 2936W

ADDRESS Rt 1, Box 426Q (Street or RFD) Longview (City) Tx (State) 75602 (Zip)

(Signed) (Licensed Well Driller) (Signed) (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

TNRCC-0199 (Rev. 05-21-96) White - TNRCC Yellow - DRILLER Pink - WELL OWNER

STATE OF TEXAS WELL REPORT for Tracking #412517

Owner:	**American Electric Power Company**	Owner Well #:	**W-3**
Address:	**502 N. Allen Street Shreveport, LA 71101**	Grid #:	**35-37-1**
		Latitude:	**32° 27' 57.5" N**
Well Location:	**2400 Farm Road Hallsville, TX 75650**	Longitude:	**094° 29' 32.7" W**
Well County:	**Harrison**	Elevation:	**No Data**
Type of Work:	**New Well**	Proposed Use:	**Piezometer**

Drilling Start Date: **12/11/2015** Drilling End Date: **12/11/2015**

	Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Borehole:	**8.25**	**0**	**38**

Drilling Method: **Hollow Stem Auger**

Borehole Completion: **Filter Packed**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Filter Material*	*Size*
Filter Pack Intervals:	**26**	**38**	**Sand**	**20/40**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
Annular Seal Data:	**0**	**2**	**Cement 1 Bags/Sacks**
	2	**26**	**Bentonite 12 Bags/Sacks**

Seal Method: **Gravity**

Sealed By: **Driller**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Surface Slab Installed** **Surface Completion by Driller**

Water Level: **No Data**

Packers: **No Data**

Type of Pump: **No Data**

Well Tests: **No Test Data Specified**

	Strata Depth (ft.)	Water Type
Water Quality:	**No Data**	**No Data**

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **C & S Lease Service**

1873 FM 1252 E
Kilgore, TX 75663

Driller Name: **Buford Collier** License Number: **50089**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	2.5	Sandy lean clay, stiff, white and tan
2.5	9	Sandy fat clay, very stiff, red, tan, and white
9	14	Sandy lean clay, very stiff, red and yellow
14	29	Fat clay with sand, very stiff, red and yellow
29	33	Silty sand, very dense, yellow and red
33	38	Sandy lean clay, very stiff, gray with iron oxide cemented sandstone gravel

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia (in.)	Type	Material	Sch./Gage	Top (ft.)	Bottom (ft.)
2	Riser	New Plastic (PVC)	40	0	28
2	Screen	New Plastic (PVC)	40 0.010	28	38

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Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

CROSS REFERENCE SHEET

Name or Subject CR-GWTD
HARRISON Located Well Data
LK 35-37-103

Date

Regarding Electric Log

SEE

Name or Subject GW-SC
ELECTRIC LOG FILE Q-169

B-152(62-1)

STATE OF TEXAS WELL REPORT for Tracking #254371

Owner:	**Langston Drilling Co.**	Owner Well #:	**1**
Address:	**P.O. Box 746 Shreveport, LA 71162**	Grid #:	**35-37-4**
		Latitude:	**32° 26' 35" N**
Well Location:	**Waskom Prop. TX**	Longitude:	**094° 28' 41" W**
Well County:	**Harrison**	Elevation:	**No Data**
Type of Work:	**New Well**	Proposed Use:	**Rig Supply**

Drilling Start Date: **12/31/2005** Drilling End Date: **12/31/2005**

	Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Borehole:	**7.875**	**0**	**155**

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Filter Packed**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Filter Material*	*Size*
Filter Pack Intervals:	**115**	**155**	**Gravel**	

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
Annular Seal Data:	**0**	**60**	**4**

Seal Method: **Pumped**

Sealed By: **Driller**

Distance to Property Line (ft.): **> 50**

Distance to Septic Field or other concentrated contamination (ft.): **>100**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **sight**

Surface Completion: **Surface Slab Installed**

Water Level: **50 ft.** below land surface on **2005-12-31** Measurement Method: **Unknown**

Packers: **0**

Type of Pump: **Submersible** Pump Depth (ft.): **126**

Well Tests: **Jetted** **Yield: 50 GPM**

	Strata Depth (ft.)	Water Type
Water Quality:	**No Data**	**No Data**

Chemical Analysis Made: **Unknown**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Keithville Well Service**

11719 Mansfield Rd
Keithville, LA 71047

Driller Name: **Howard C. Talley** License Number: **4403**

Comments: **$mew**
Note: point and grid # given on form plots our in/near Brady Branch Reservoir; was unable to confirm location.

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	**30**	**Clay**
30	**60**	**Stripping Sand**
60	**100**	**Shale**
100	**150**	**Sand**

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.)	New/Used	Type	Setting From/To (ft.)
4	**New**	**PVC**	**0 - 115**
4	**New**	**PVC Screen**	**115 - 155 .032**

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Please include the report's Tracking Number on your written request.

Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

Dataset Descriptions and Sources

Dataset	Source	Dataset Description	Update Schedule	Data Requested	Data Obtained	Data Updated	Source Updated
TX HGSD - Texas HGSD	Harris Galveston Subsidence District/Fort Bend Subsidence District	This dataset contains all groundwater well records compiled by Harris Galveston Subsidence District/Fort Bend Subsidence District.	Quarterly	06/06/2023	06/07/2023	06/08/2023	06/07/2023
TX TCEQ HIST - Texas TCEQ Historical	Texas Commission on Environmental Quality	This dataset contains all historical water well records searched from the TCEQ Public Water Well Viewer. Banks Environmental Data plots each well record based on location information found on the log.	As requested	N/A	N/A	N/A	N/A
TX TCEQ PWS - Texas TCEQ PWS	Texas Commission on Environmental Quality	This dataset contains a collection of records from Texas Water Districts, Public Drinking Water Systems and Water and Sewer Utilities who submit information to the TCEQ.	Quarterly	04/05/2023	04/06/2023	04/06/2023	04/06/2023
TX TWDB GW - Texas TWDB Groundwater Database	Texas Water Development Board	This dataset contains water well records contained within Texas Water Development Board Groundwater Database.	Quarterly	05/04/2023	05/04/2023	05/04/2023	05/04/2023
TX TWDB SDR - Texas TWDB Submitted Drillers Reports	Texas Water Development Board	This dataset contains water well records from the Texas Water Development Board Submitted Drillers Reports Database.	Quarterly	05/04/2023	05/04/2023	05/04/2023	05/04/2023
USGS WW - USGS Water Wells	U.S. Geological Survey	This dataset contains groundwater well records from the U.S. Geological Survey.	Semi-annually	04/05/2023	04/05/2023	04/05/2023	04/05/2023

Banks Environmental Data, Inc. - PO Box 12851 - Austin, TX 78711 - 800.531.5255 P - 512.478.1433 F
www.banksenvdata.com

Disclaimer

The Banks Environmental Data Water Well Report was prepared from existing state water well databases and/or additional file data/records research conducted at the state agency and the U.S. Geological Survey. Banks Environmental Data has performed a thorough and diligent search of all groundwater well information provided and recorded. All mapped locations are based on information obtained from the source. Although Banks performs quality assurance and quality control on all research projects, we recognize that any inaccuracies of the records and mapped well locations could possibly be traced to the appropriate regulatory authority or the actual driller. It may be possible that some water well schedules and logs have never been submitted to the regulatory authority by the water driller and, thus, may explain the possible unaccountability of privately drilled wells. It is uncertain if the above listing provides 100% of the existing wells within the area of review. Therefore, Banks Environmental Data cannot fully guarantee the accuracy of the data or well location(s) of those maps and records maintained by the regulatory authorities.

Banks Environmental Data, Inc. - PO Box 12851 - Austin, TX 78711 - 800.531.5255 P - 512.478.1433 F
www.banksenvdata.com

ARCADIS Design & Consultancy for natural and built assets

Appendix D

Monitoring Well AD-7 Plugging Report

STATE OF TEXAS PLUGGING REPORT for Tracking #232687

Owner:	**SWEPCO**	Owner Well #:	**MW-7 (AD-7)**
Address:	**2400 FM 3251 Hallsville, TX 75650**	Grid #:	**35-37-1**
Well Location:	**2400 FM 3251 Hallsville, TX 75650**	Latitude:	**32° 27' 40.81" N**
		Longitude:	**094° 29' 12.31" W**
Well County:	**Harrison**	Elevation:	**No Data**

Well Type: **Monitor**

Drilling Information

Company: **No Data** Date Drilled: **10/3/1983**

Driller: **No Data** License Number: **No Data**

	Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Borehole:	**10**	**0**	**40**

Plugging Information

Date Plugged: **9/12/2023** Plugger: **Rich Herman**

Plug Method: **Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet**

Casing Left in Well:

DIa (in.)	*Top (ft.)*	*Bottom (ft.)*
4	**0**	**40**

Plug(s) Placed in Well:

Top (ft.)	*Bottom (ft.)*	*Description (number of sacks & material)*
0	**40**	**Bentonite 9 Bags/Sacks**

Certification Data: The driller certified that the driller plugged this well (or the well was plugged under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the reports(s) being returned for completion and resubmittal.

Company Information: **ETTL Engineers & Consultants, Inc.**

1717 East Erwin Street
Tyler, TX 75702

Driller Name: **Rich Herman** License Number: **59385**

Comments: **All casing and screen left in the hole. When attempting to pull, 3' of stickup was all that came out. No cement cap per client request due to grading that is currently going on**