

**American Electric Power Service
Corporation**

**Landfill – CCR Location
Restriction Evaluation**

J. Robert Welsh Power Plant
1187 County Road 4865
Titus County
Pittsburg, Texas

May 2, 2016



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Pittsburg, Texas

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AEP

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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
EPRI	Electric Power Research Institute
FAP	fly ash pond
FGD	flue gas desulfurization
ft	feet
PTI	Permit to Install
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality

1. Objective

This report was prepared by ARCADIS U.S., Inc. (ARCADIS) for American Electric Power Service Corporation (AEP) to assess the location of the existing landfill relative to the location restrictions included in the Coal Combustion Residual (CCR) requirements, as specified in the Code of Federal Regulations (CFR) 40 CFR 257.60 to 257.64, at the AEP Generating Plant (Plant) located at 1187 County Road 4865 in Pittsburg, Titus County, Texas (**Figure 1**). 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 for new landfills, existing and new CCR surface impoundments, and lateral expansions include: the base of the CCR unit is 5 feet (ft) above 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 zones, or in an unstable area. However, because the subject CCR unit for this report is an existing landfill with no lateral expansions, this CCR unit is subject to one location restriction: unstable area.

Three regulated CCR units associated with the Plant were identified for review, which include the primary ash pond, existing landfill, and bottom ash storage pond (**Figure 2**). This report summarizes the evaluation of the location restriction criteria for the existing landfill (landfill). The evaluation of the groundwater monitoring well network in the uppermost aquifer is not included in this report and will be completed under separate cover.

This evaluation included a review of AEP-provided data associated with previously completed subsurface investigation activities in the vicinity of the landfill CCR unit, as well as publically-available geologic and hydrogeologic data. The following report also presents the current Conceptual Site Model based on documents reviewed and will further describe the uppermost aquifer.

2. Background Information

The following section provides background information for the AEP J. Robert Welsh Generating Plant landfill.

2.1 Facility Location Description

The AEP J. Robert Welsh Plant is located in southern Titus County, approximately 8 miles northeast of Pittsburg, Texas, and approximately two miles northwest of Cason, Texas. The landfill CCR unit is located approximately 2,000 feet southwest of the Plant generating units, directly south of the primary ash pond CCR unit, and approximately 800 feet west of the Welsh Reservoir (**Figures 1 and 2**).

2.2 Description of Landfill CCR Unit

The following section will discuss the embankment configuration, area, volume, construction and operational history, and surface water control associated with the landfill.

2.2.1 Embankment Configuration

The landfill was placed into operation in approximately 1977, and is located in a topographically high area south of the primary ash pond. The landfill is approximately 40 acres in size, and is located directly above native clayey soils. The base of the landfill ranges in elevation from approximately 355 feet amsl on the west side to 345 feet amsl on the east side. These landfill base elevations were confirmed by soil borings installed through the landfill in 2014 (ETTL, 2015).

The western two thirds of the landfill is used as a temporary storage and processing area for marketable ash material that is sold for beneficial reuse including road base material. The eastern third of the landfill is an approximate 13-acre active ash disposal area where ash is placed above the base of the landfill to a top surface elevation that currently ranges from approximately 364 to 380 feet amsl. In the future, the top planned elevation of the landfill will be approximately 430 feet amsl (ETTL, 2015).

Ash material had previously been placed into the landfill against an earthen embankment with 2:1 side slopes (2 feet horizontal, 1 foot vertical). However, to reduce the potential for slope failure, the side slopes of the landfill embankment were re-graded to 3:1 (3 feet horizontal, 1 foot vertical) in 2010. Horizontal benches approximately 25 feet wide are also planned to be emplaced into the side slopes at

approximate elevations of 373 feet amsl (Level 1 bench) and 400 feet amsl (Level 2 bench) (ETTL, 2015).

2.2.2 Area/Volume

The landfill occupies an area of approximately 40 acres. A capacity analysis of the landfill was conducted by AEP in 2008 (AEP, 2008). The capacity analysis concluded the landfill has a maximum ash storage capacity of approximately 1,770,000 cubic yards beyond April 2008. Based on soil borings installed through the landfill (ETTL, 2015), the maximum ash thickness is approximately 33 feet, and the average ash thickness within the 40-acre landfill is approximately 20 feet. This corresponds to a current ash volume of approximately 800 acre-feet (1,290,000 cubic yards).

2.2.3 Construction and Operational History

The AEP J. Robert Welsh Plant began operations in 1977 with three coal-fired generating units (Units 1, 2, and 3). Throughout the life of the generating plant, CCR materials (fly ash, bottom ash, economizer ash) have been generated. All of these byproducts were stored in the primary ash pond or in the landfill that was constructed in the late 1970's. In 2000, the 22-acre bottom ash storage pond was installed south of the landfill (**Figure 3**).

The landfill received fly ash, bottom ash, and economizer ash from the generating plant. The ash was sluiced to the landfill between approximately 1982 and 2000. Now dry ash is trucked to the landfill. The landfill is also utilized for disposal of ash dredged from the Bottom Ash Storage Pond that was constructed in 2000. The ash is currently stored in the eastern third of the landfill, and the western two thirds of the landfill is currently used as a temporary storage and processing area for marketable ash material that is sold for beneficial reuse, loaded into trucks, and transported offsite for reuse (highway road base, etc.).

2.2.4 Surface Water Control

Surface water flow within the landfill is controlled by drainage ditches at the north and east toes of the landfill. Surface water in the drainage ditches flows to a culvert at the northeast corner of the landfill, then discharges into the primary ash pond directly north of the landfill.

2.3 Previous Investigations

The initial soils investigation for the site was provided in a 1973 report prepared by McClelland Engineers, Inc. entitled “*Soils Investigation, Welsh Power Plant, Cason, Texas*”. This investigation included advancement of soil borings in the primary ash pond area, and geotechnical soil testing to characterize the area encompassed by the primary ash pond.

In 2001, five monitoring wells (AD-1 through AD-5) were installed in the area of the primary ash pond and bottom ash storage pond to obtain hydrologic data for the uppermost water-bearing unit. Twelve additional monitoring wells (AD-4a, AD-4b, AD-4c, AD-6 through AD-14) were installed in the area of the primary ash pond, bottom ash storage pond, and landfill by Eagle Environmental Services in 2009 to obtain more detailed hydrologic data for the uppermost water-bearing unit. In December 2015, Auckland Consulting further expanded the groundwater monitoring well system at the Plant by installation of monitoring wells AD-15 through AD-18 (Auckland Consulting, 2016). Monitoring well completion diagrams are provided in **Appendix A**.

In 2015, E TTL conducted a *Geotechnical Investigation of the Landfill* (E TTL, 2015). The report concluded the risk of slope failure due to liquefaction is very low, and recommended regrading of the top surface of the existing ash at the southeast corner of the landfill to eliminate ponding of surface water. The report also recommended dredged ash be spread out to drain water prior to placement in the landfill, emplacement of a 3-foot-thick clay cap on the existing side slopes in the eastern third of the landfill on a 3:1 slope (3 feet horizontal, 1 foot vertical), and improve drainage along the toe of the eastern third of the landfill using either horizontal drains at the toe of the slope or trenches containing perforated pipe with a geotextile cover.

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 Site is located on the outcrop of the Eocene-age Recklaw Formation, which consists of very fine to fine grained sand and clay (Flawn, 1966).

These features are further illustrated on five lines of cross section that were prepared through the landfill area, with three lines trending from west to east (A-A'; B-B'; C-C'), 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 8** (E-E').

2.4.1 Climate and Water Budget

The climate of Titus County, Texas is moist sub-humid. Average temperatures range from 45° Fahrenheit (F) in January to 82.9°F in July. The mean annual growing season is 228 days (Broom, 1965). Average annual precipitation (including liquid water equivalent from snowfall) is approximately 47 inches according to weatherdb.com.

2.4.2 Regional and Local Geologic Setting

The Site is located on the outcrop of the Eocene-age Recklaw Formation, which consists of very fine to fine grained sand and clay (Flawn, 1966). The Recklaw Formation attains a thickness of approximately 110 feet in Titus County, and is underlain by the Eocene-age Carrizo Sand which consists of fine to coarse sand, silt, and clay (Broom, 1965). In the topographically low areas underlying the Welsh Reservoir to the east of the CCR units, Quaternary alluvial sediments associated with the Swauano Creek are present (Flawn, 1966).

Detailed regional geologic characterization can be found in several published reports including Texas Water Commission Bulletin 6517 “*Ground-Water Resources of Camp, Franklin, Morris and Titus Counties, Texas*” (Broom, 1965), and The University of Texas at Austin Bureau of Economic Geology “*Geologic Atlas of Texas – Texarkana Sheet*” (Flawn, 1966).

Detailed regional and site geologic characterization can be found in the 2015 E TTL report entitled “*Geotechnical Investigation, Phase 1 Landfill Seepage Evaluation and Vertical Expansion, Pittsburg, Texas*” (E TTL, 2015).

2.4.3 Surface Water and Surface Water Groundwater Interactions

The Site is generally less than one-half mile from Swauano Creek, which was dammed near the southern end of the site during plant development to form the Welsh Reservoir. Groundwater flow direction at the Site is generally from west to east, following surface topography towards the Welsh Reservoir. The Welsh Reservoir is likely a gaining surface water feature, and groundwater elevations on site are higher than the normal stage elevation of the Welsh Reservoir (approximately 320 feet amsl).

Figure 9 is a potentiometric surface map based on March 2016 water level data for the uppermost water bearing unit at the Site, and water level elevations in the Site monitoring wells are summarized on **Table 1**. As shown on **Figure 9**, shallow groundwater flow direction in the area of the landfill is easterly toward the Welsh Reservoir at an average hydraulic gradient of approximately 0.01 foot per foot.

2.4.4 Water Users

A water well inventory conducted by Banks Information Solutions showed one water well within a ½-mile radius of the Site (Banks, 2013). The water well is located on-site to the northwest (up gradient) of the landfill, and was installed for Southwestern Electric Company in 1974 with a screened interval from 515 to 535 ft below ground surface, and plugged at a later date.

3. Unstable Areas

CCR Rule 40 CFR Part 257.64 requires that existing landfills must not be located within an unstable area unless the owner or operator demonstrates that the design of the unit will ensure the integrity of the structural components of the unit.

3.1 Definition of Unstable Area and local Conditions

3.1.1 CCR Rule Definition

CCR Rule 40 CFR Part 257.53 defines an unstable area as a location that is susceptible to natural or human-induced events or forces capable of impairing the integrity of the CCR unit. These may include poor foundation conditions, areas susceptible to mass movements (landslides), and karst terrains.

3.1.2 Poor Foundation Soils

A soil stability report has been prepared for the landfill by E TTL in 2015. This report stated the native soil profile beneath the landfill consists generally of 5 to 15 feet of clay, and report concluded the foundation soils are not susceptible to liquefaction, and seismicity is not generally a concern (E TTL, 2015).

3.1.3 Mass Movements

The eastern third of the landfill (approximate 13-acre area) currently contains ash up to 33 feet in height above the native clayey soils. The E TTL 2015 soil stability report indicated a potential for shallow surface slides up to about 5 feet deep in the eastern third of the landfill in areas where the side slopes are saturated by rainfall and where weak (loose granular uncemented) ash constituent is present. The report recommended re-grading the top surface of the existing ash at the southeast corner of the landfill to eliminate ponding of surface water. The report also recommended dredged ash be spread out to drain water prior to placement in the landfill, emplacement of a 3-foot-thick clay cap on the existing ash side slopes in the eastern third of the landfill on a 3:1 slope (3 feet horizontal, 1 foot vertical), and improve drainage along the toe of the eastern third of the landfill using either horizontal drains at the toe of the slope or trenches containing perforated pipe with a geotextile cover.

3.1.4 Karst

The site area is located on the outcrop of unconsolidated Cretaceous Formations consisting predominantly of sand and clay (Broom, 1965; Flawn, 1966). The landfill is not located in a karst area.

3.1.5 Subsurface Mining

No subsurface mines are known to exist below the CCR units at the Site.

3.2 Compliance with Unstable Areas Restriction

Based on our site visit and review of available information, the landfill is not currently located within unstable areas. Therefore, this CCR unit meets the location restriction requirements for unstable areas. However, future vertical expansion of the landfill is planned, and the ETTL 2015 soil stability report indicated a potential for shallow surface slides up to about 5 feet deep in the eastern third of the landfill in areas where the side slopes are saturated by rainfall and where weak (loose granular uncemented) ash constituent is present. The report recommended re-grading the top surface of the existing ash at the southeast corner of the landfill to eliminate ponding of surface water. The report also recommended dredged ash be spread out to drain water prior to placement in the landfill, emplacement of a 3-foot-thick clay cap on the existing ash side slopes in the eastern third of the landfill on a 3:1 slope (3 feet horizontal, 1 foot vertical), and improve drainage along the toe of the eastern third of the landfill using either horizontal drains at the toe of the slope or trenches containing perforated pipe with a geotextile cover.

4. Summary, Conclusions, and PE Certification

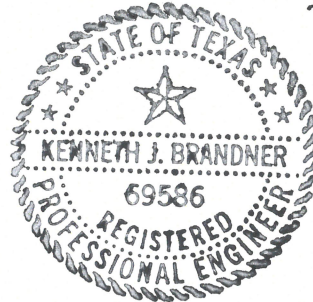
I, Kenneth J. Brandner, certify that this report was prepared under my direction and supervision, and that the information contained herein is true and accurate to the best of my knowledge. Based on my experience and knowledge of the site, as well as the evaluations discussed within this report, the J. Robert Welsh Power Plant landfill meets the CCR existing landfill restrictions of 40 CFR Part 257 for unstable areas. However, prior to future vertical expansion of the landfill, the recommendations provided in the E TTL 2015 *Geotechnical Investigation* report should be implemented.

Kenneth J. Brandner

Printed Name of Registered Professional Engineer

Kenneth J Brandner

Signature



69586

Registration No.

Texas

Registration State

5-2-16

Date

5. References

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Titus County
Pittsburg, Texas

USGS, "Petroleum Geology and the Distribution of Conventional Crude Oil, Natural Gas, and Natural Gas Liquids, East Texas Basin", Open-File Report 88-450K, 1988.

USGS, "Texas Seismic Hazard Map", 2014.



Tables

Table 1
Water Level Data
AEP J. Robert Welsh Power Plant - CCR Storage Areas
Pittsburg, Tlute County, Texas

Well ID	Longitude	Latitude	Ground Surface Elevation	Top of Casing Elevation	Borehole depth ft. bis	Date Installed	Screen Material	Well diameter inches	Depth ft. bis	Elevation ft. msl	Bottom of Screen Elevation ft. msl	6/7/2011 GW Elev. ft. msl	12/6/2011 GW Elev. ft. msl	5/2/2012 GW Elev. ft. msl	11/1/2012 GW Elev. ft. msl	5/14/2013 GW Elev. ft. msl	11/10/2013 GW Elev. ft. msl	5/12/2014 GW Elev. ft. msl	11/16/2014 GW Elev. ft. msl	5/12/2015 GW Elev. ft. msl	3/4/2016 GW Elev. ft. msl	
Monitoring Wells																						
AD-1 (e)	94° 50' 47"	33° 02' 48"	355.57	357.57	25.0	1/11/01	Sch. 40 PVC	2	15.0	340.57	25.0	330.57	334.92	337.88	337.18	337.43	336.73	338.03	337.64	338.03	340.82	342.83
AD-2 (e)	94° 50' 44"	33° 02' 37"	344.16	346.16	25.0	4/26/01	Sch. 40 PVC	2	15.0	329.16	25.0	319.16	330.16	329.00	329.26	329.83	329.70	330.09	329.69	329.69	332.56	332.32
AD-3 (e)	94° 50' 37"	33° 02' 38"	331.10	333.10	17.0	4/26/01	Sch. 40 PVC	2	7.0	324.10	17.0	314.10	323.19	323.99	323.29	323.77	323.98	324.12	323.28	323.28	325.58	325.12
AD-4 (e)	94° 50' 33"	33° 02' 43"	340.61	342.61	30.0	4/26/01	Sch. 40 PVC	2	15.0	327.61	30.0	311.61	324.84	324.62	324.40	324.74	325.52	325.44	325.13	327.00	327.00	326.90
AD-4a (e)	94° 48' 25"	33° 04' 52"	340.19	342.85	30.0	9/22/09	Sch. 40 PVC	2	15.0	320.19	30.0	310.19	324.84	324.62	324.40	324.74	325.52	325.44	325.13	327.00	327.00	326.90
AD-4b (e)	94° 48' 25"	33° 04' 52"	340.19	342.85	30.0	9/22/09	Sch. 40 PVC	2	15.0	320.19	30.0	310.19	324.84	324.62	324.40	324.74	325.52	325.44	325.13	327.00	327.00	326.90
AD-4c (e)	94° 48' 25"	33° 04' 52"	340.19	342.85	30.0	9/22/09	Sch. 40 PVC	2	15.0	320.19	30.0	310.19	324.84	324.62	324.40	324.74	325.52	325.44	325.13	327.00	327.00	326.90
AD-5 (e)	94° 51' 00"	33° 03' 13"	349.00	351.00	30.0	9/23/09	Sch. 40 PVC	2	5.0	324.55	15.0	314.55	324.35	324.30	324.37	324.11	325.06	325.01	324.71	326.50	326.50	326.19
AD-6 (e)	94° 51' 00"	33° 02' 55"	343.31	345.31	33.0	9/23/09	Sch. 40 PVC	2	23.0	320.00	30.0	310.00	324.50	324.64	324.37	324.11	325.06	325.01	324.71	326.50	326.50	326.19
AD-7 (e)	94° 51' 00"	33° 02' 55"	343.31	345.31	33.0	9/23/09	Sch. 40 PVC	2	23.0	320.00	30.0	310.00	324.50	324.64	324.37	324.11	325.06	325.01	324.71	326.50	326.50	326.19
AD-8 (e)	94° 51' 00"	33° 02' 55"	343.31	345.31	33.0	9/23/09	Sch. 40 PVC	2	23.0	320.00	30.0	310.00	324.50	324.64	324.37	324.11	325.06	325.01	324.71	326.50	326.50	326.19
AD-9 (e)	94° 51' 00"	33° 02' 55"	343.31	345.31	33.0	9/23/09	Sch. 40 PVC	2	23.0	320.00	30.0	310.00	324.50	324.64	324.37	324.11	325.06	325.01	324.71	326.50	326.50	326.19
AD-10 (e)	94° 51' 00"	33° 02' 55"	343.31	345.31	33.0	9/23/09	Sch. 40 PVC	2	23.0	320.00	30.0	310.00	324.50	324.64	324.37	324.11	325.06	325.01	324.71	326.50	326.50	326.19
AD-11 (e)	94° 51' 00"	33° 02' 55"	343.31	345.31	33.0	9/23/09	Sch. 40 PVC	2	23.0	320.00	30.0	310.00	324.50	324.64	324.37	324.11	325.06	325.01	324.71	326.50	326.50	326.19
AD-12 (e)	94° 51' 00"	33° 02' 55"	343.31	345.31	33.0	9/23/09	Sch. 40 PVC	2	23.0	320.00	30.0	310.00	324.50	324.64	324.37	324.11	325.06	325.01	324.71	326.50	326.50	326.19
AD-13 (e)	94° 51' 00"	33° 02' 55"	343.31	345.31	33.0	9/23/09	Sch. 40 PVC	2	23.0	320.00	30.0	310.00	324.50	324.64	324.37	324.11	325.06	325.01	324.71	326.50	326.50	326.19
AD-14 (e)	94° 50' 27"	33° 03' 04"	342.32	344.32	20.0	9/22/09	Sch. 40 PVC	2	20.0	320.32	35.0	305.32	324.46	325.53	325.15	324.13	324.13	324.13	324.13	324.13	324.13	324.13
AD-15 (e)	94° 50' 27"	33° 03' 04"	342.32	344.32	20.0	9/22/09	Sch. 40 PVC	2	20.0	320.32	35.0	305.32	324.46	325.53	325.15	324.13	324.13	324.13	324.13	324.13	324.13	324.13
AD-16 (e)	94° 50' 27"	33° 02' 49"	340.21	342.21	19.0	9/22/09	Sch. 40 PVC	2	6.0	334.32	18.0	324.32	330.40	329.80	331.67	330.34	331.69	332.12	330.17	332.12	336.63	334.63
AD-17 (e)	94° 51' 06"	33° 02' 57"	350.86	352.86	21.0	12/10/15	Sch. 40 PVC	2	11.0	339.86	21.0	329.86	---	---	---	---	---	---	---	---	---	---
AD-18 (e)	94° 51' 03"	33° 03' 03"	346.17	348.17	29.0	12/11/15	Sch. 40 PVC	2	14.0	332.17	29.0	317.17	---	---	---	---	---	---	---	---	---	---
Piezometers																						
B-2 (e)	94° 50' 44"	33° 03' 07"	339.7	339.7	50.0	10/28/09	Sch. 40 PVC	2	10.0	329.70	20.0	319.70	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
B-4 (e)	94° 50' 46"	33° 05' 01"	340.6	340.6	50.0	10/27/09	Sch. 40 PVC	2	8.0	332.60	18.0	322.60	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
B-5 (e)	94° 50' 42"	33° 02' 56"	340.0	340.0	50.0	10/27/09	Sch. 40 PVC	2	10.0	330.00	20.0	320.00	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
B-6 (e)	94° 50' 46"	33° 02' 51"	340.1	340.1	50.0	10/28/09	Sch. 40 PVC	2	12.0	328.10	22.0	318.10	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

NM - Not measured.

(a) Source: Eagle Environmental Services Well Logs (2009).

(b) Source: ETL Engineers & Consultants Inc. (June 21, 2010).

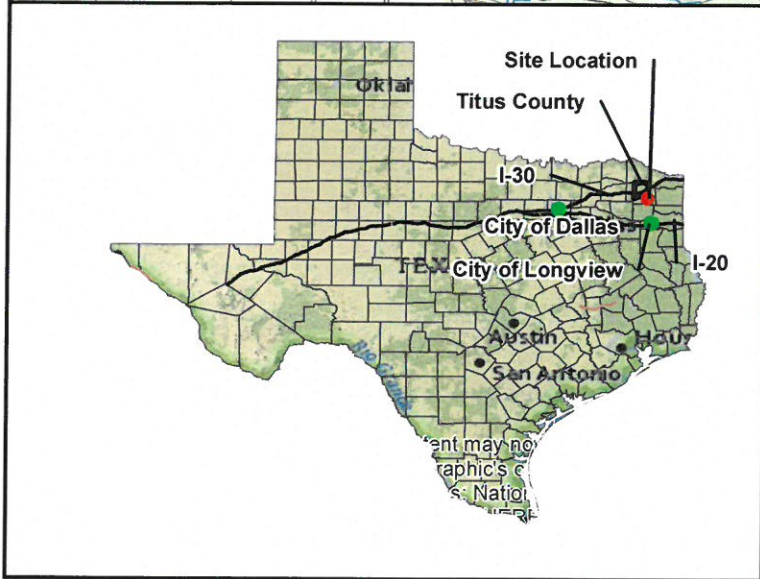
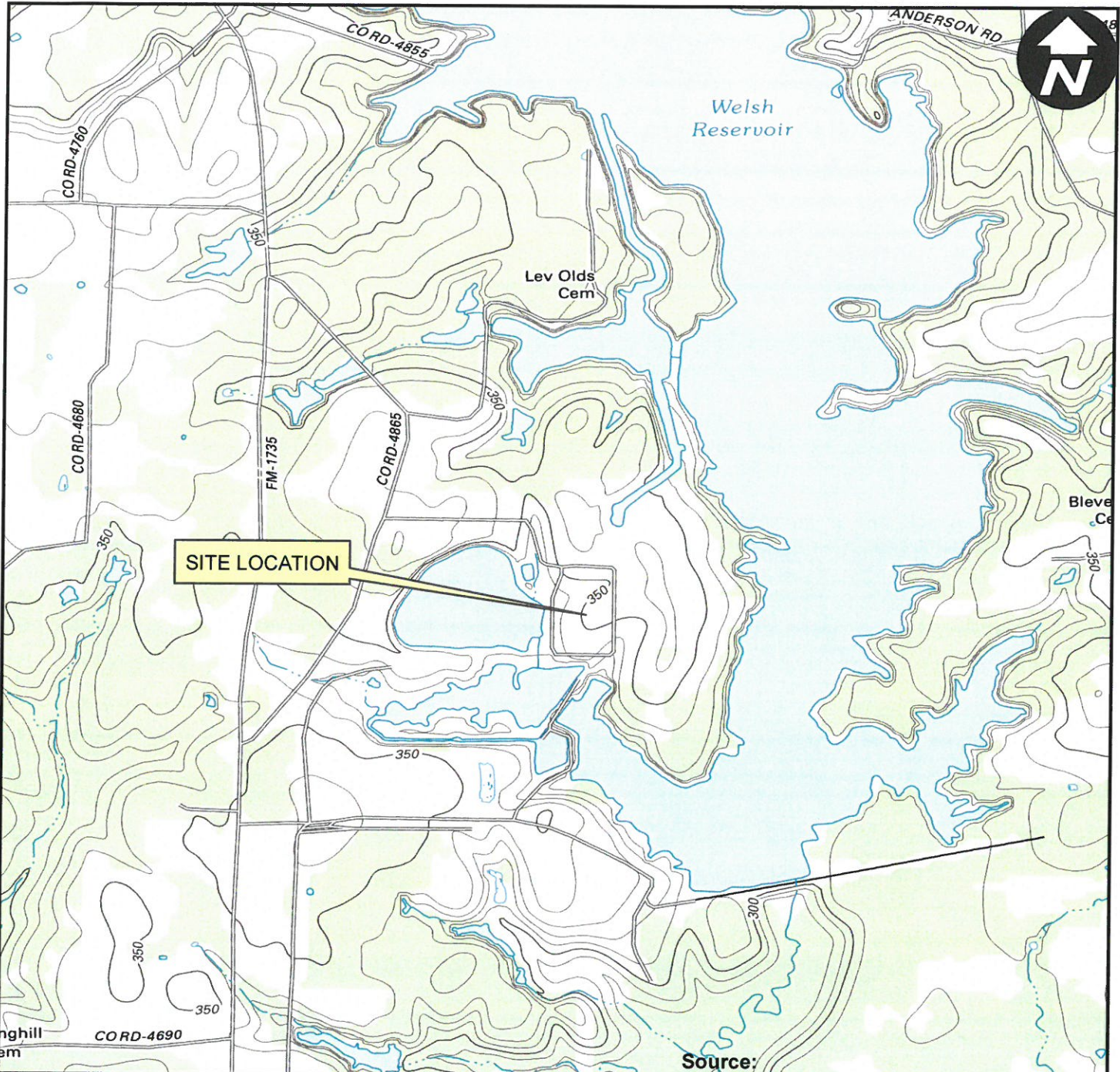
(c) Source: Southwest Electric Power, State of Texas Well Report (2001).

(d) Source: Auckland Consulting LLC (January 26, 2016). Monitoring wells AD-15 through AD-18 installed during December 2015.

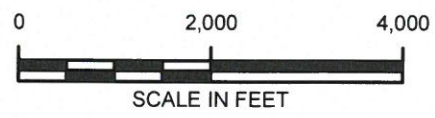
Groundwater Elevation Source: AEP, Shallow Groundwater Data Summary through March 2016.



Figures



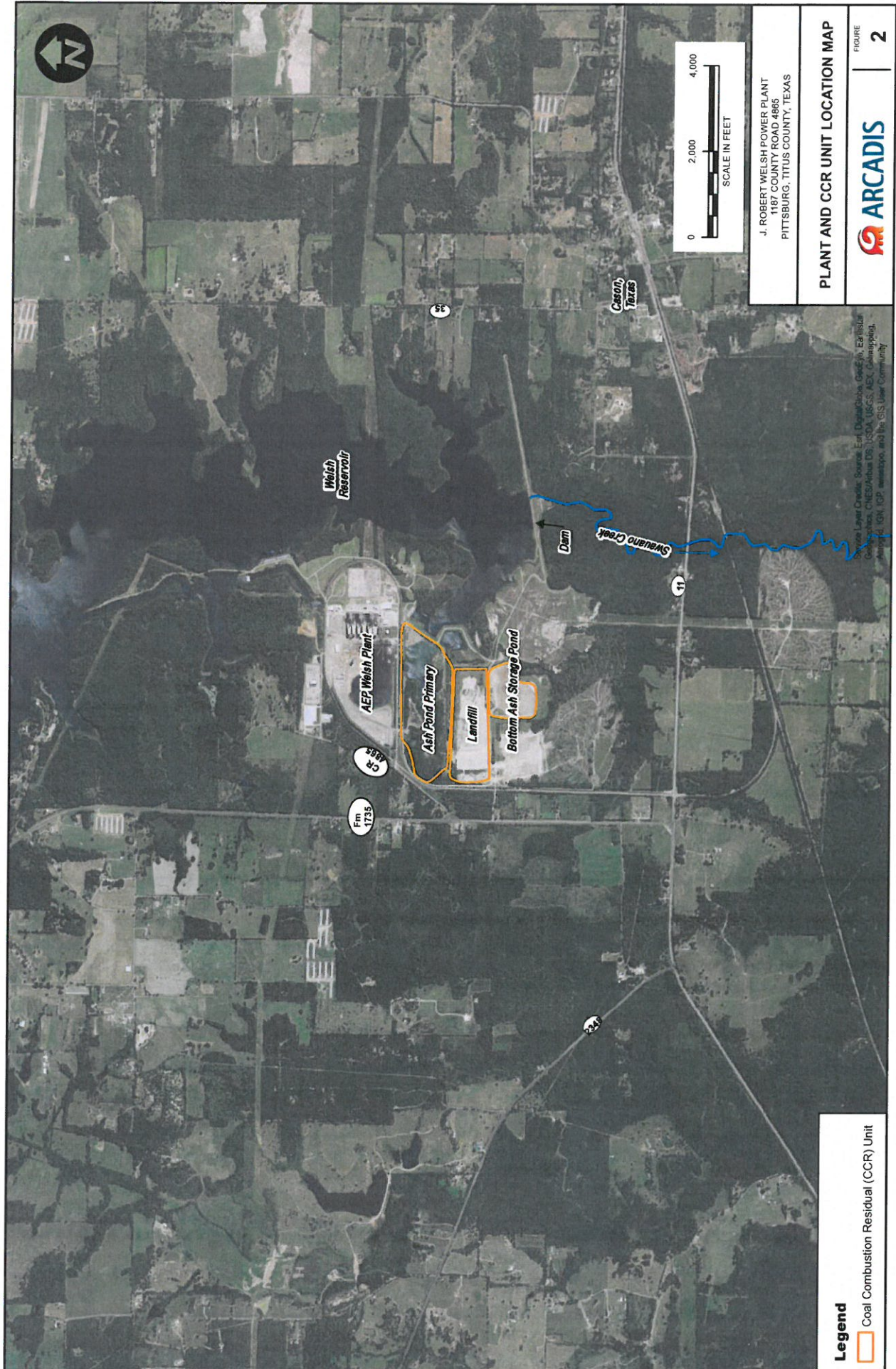
Source:
7.5 minute topographic quadrangle
Cason, Texas, 2013



J. ROBERT WELSH POWER PLANT
1187 COUNTY ROAD 4865
PITTSBURG, TITUS COUNTY, TEXAS

SITE LOCATION MAP





Source Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar
 GeoInt, CNES/Airbus DS, USDA, USGS, Aero, GeoEye, IGN,
 GeoEye, IGN, GeoEye, and the GIS User Community

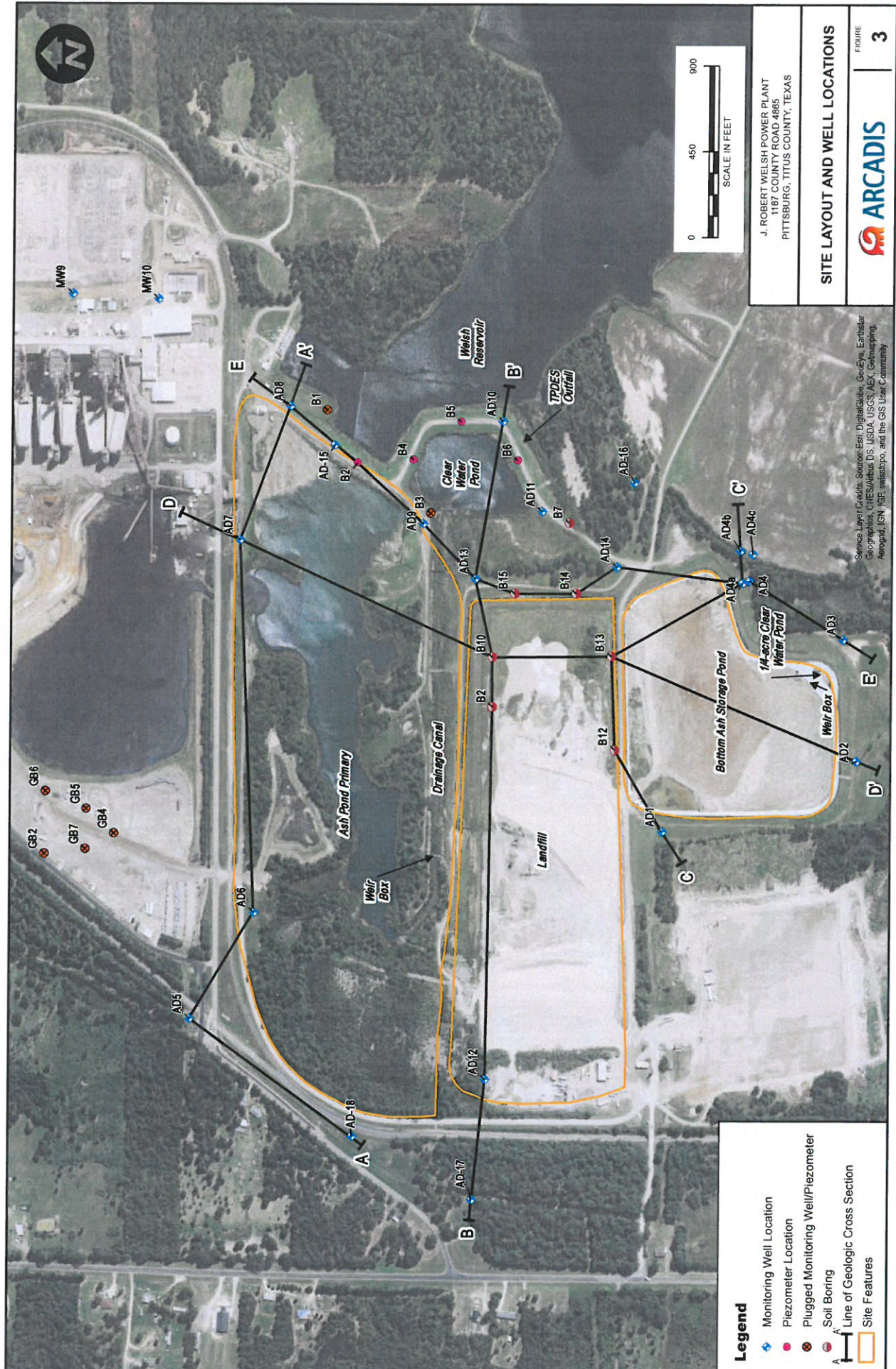
J. ROBERT WELSH POWER PLANT
 1187 COUNTY ROAD 4865
 PITTSBURG, TITUS COUNTY, TEXAS

PLANT AND CCR UNIT LOCATION MAP

FIGURE
2



Legend
 Coal Combustion Residual (CCR) Unit



J. ROBERT WELSH POWER PLANT
 1187 COUNTY ROAD 4885
 PITTSBURG, TITUS COUNTY, TEXAS

SITE LAYOUT AND WELL LOCATIONS

FIGURE
3

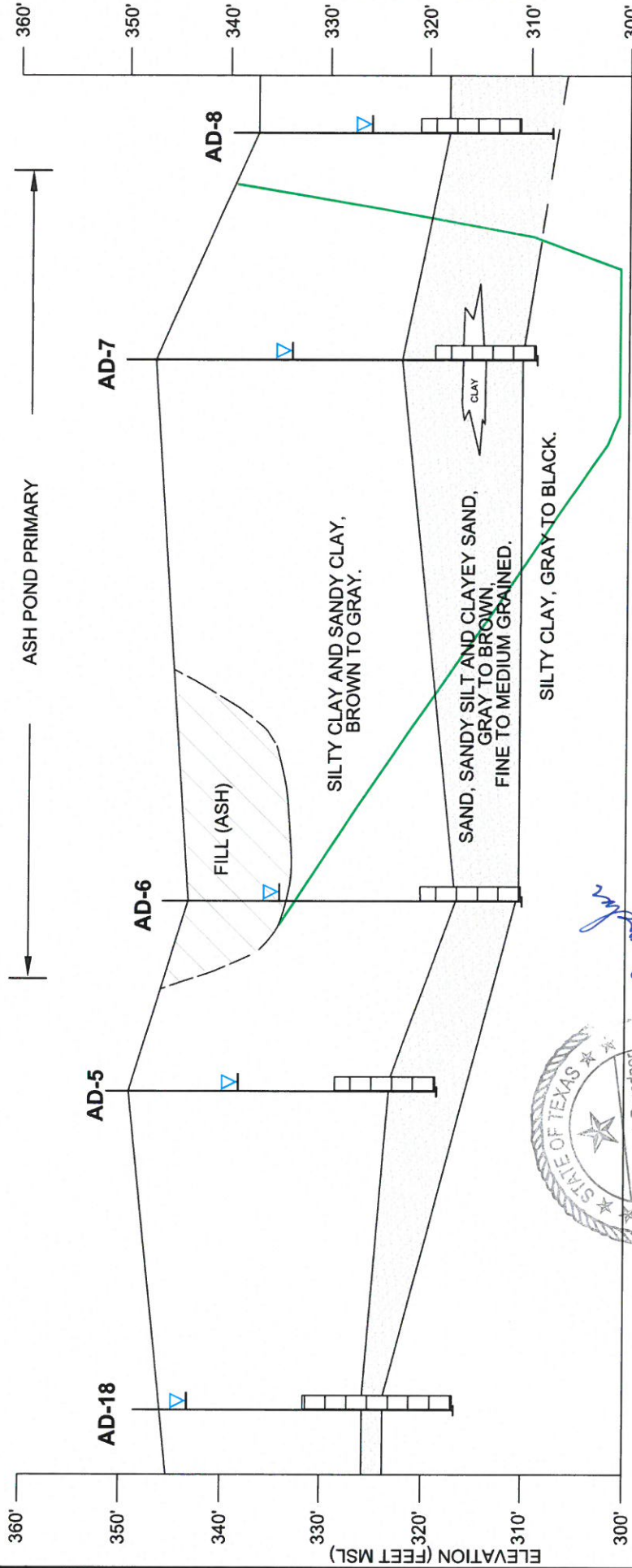
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar
 Geographics, CNES/Airbus DS, USDA, USGS, Aero, GeoMapping,
 Aeroglyph, IGN, swisstopo, and the GIS User Community

- Legend**
- Monitoring Well Location
 - Piezometer Location
 - Plugged Monitoring Well/Piezometer
 - Soil Boring
 - Line of Geologic Cross Section
 - Site Features

WEST
A

EAST
A'

ASH POND PRIMARY



Kenneth J. Brandner
 5-6-16

NOTE: BASE OF ASH POND TAKEN FROM WELSH POWER PLANT UNIT 1 FLY ASH STORAGE PILE SURVEY DATA DATED 12-3-76 AND U.S. GEOLOGICAL SURVEY 1/2 MINUTE SERIES TOPOGRAPHIC MAP, CASON, TX QUADRANGLE, 1964 (PHOTO REVISED 1980).



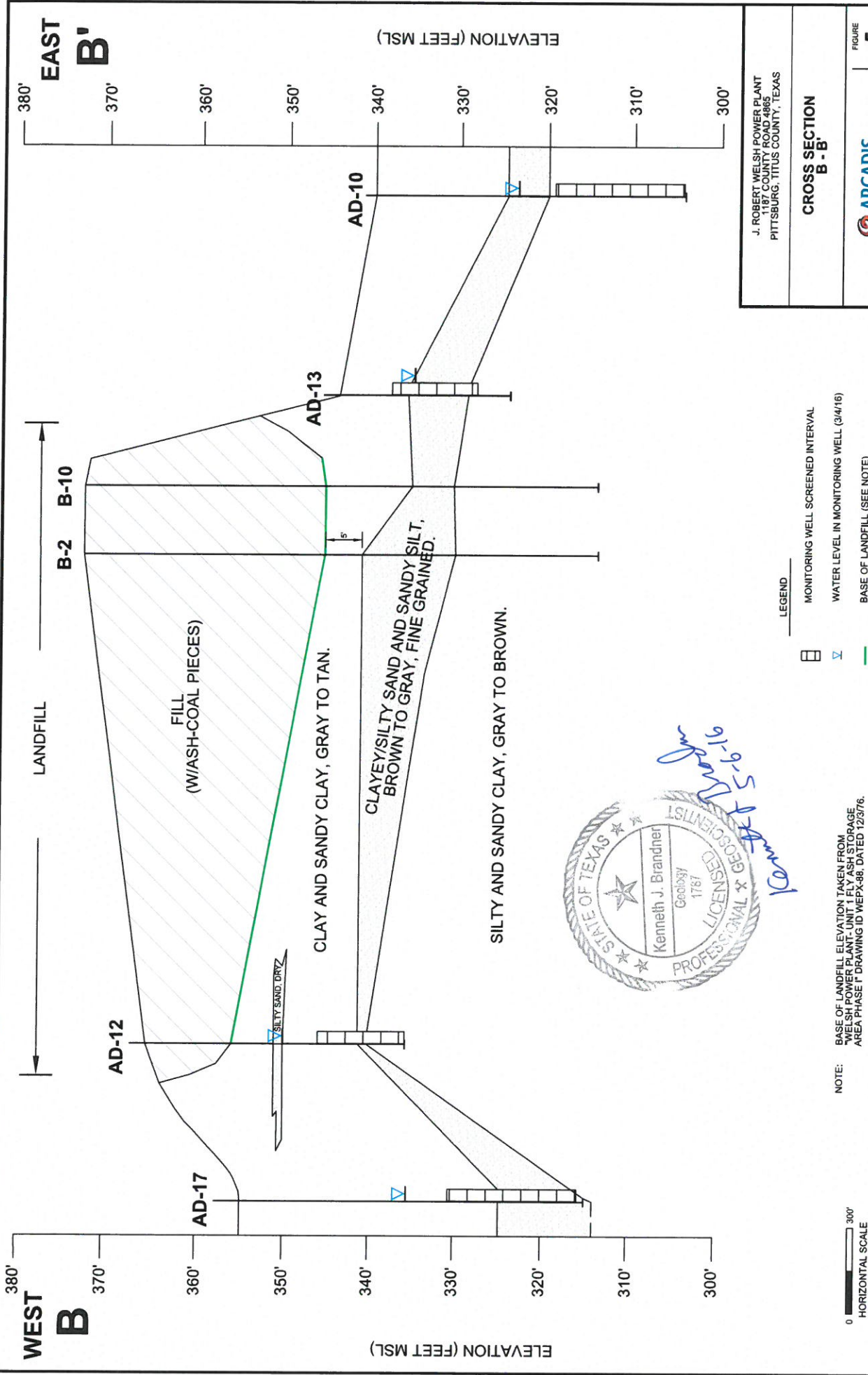
- LEGEND
- MONITORING WELL SCREENED INTERVAL
 - WATER LEVEL IN MONITORING WELL (3/4/16)
 - PROJECTED BASE OF ASH POND (SEE NOTE)

J. ROBERT WELSH POWER PLANT
 1187 COUNTY ROAD 4865
 PITTSBURG, TITUS COUNTY, TEXAS

CROSS SECTION
 A - A'



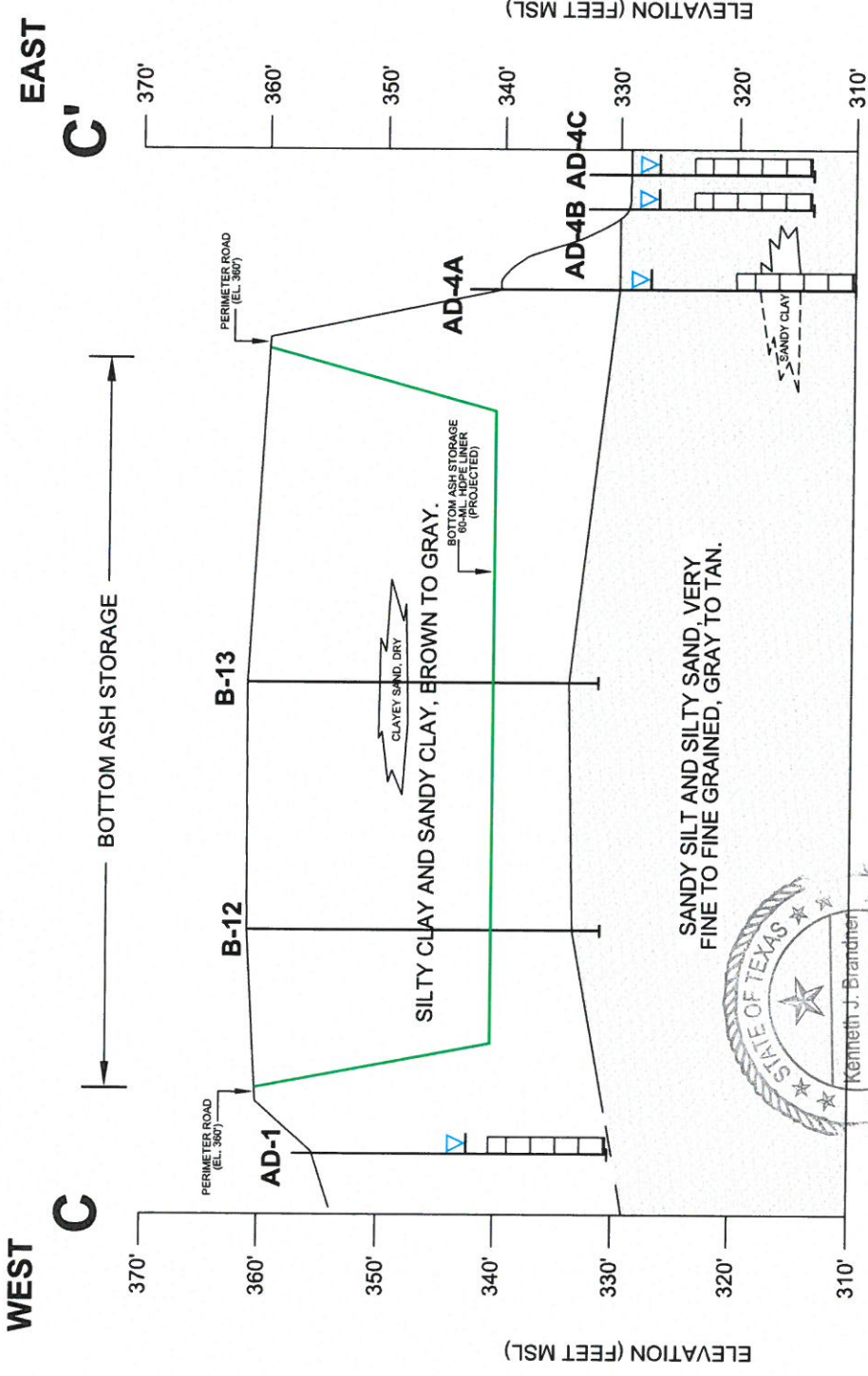
FIGURE
4



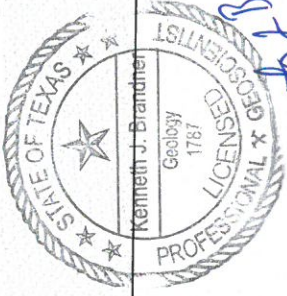
J. ROBERT WELSH POWER PLANT
1187 COUNTY ROAD 4865
PITTSBURG, TITUS COUNTY, TEXAS

CROSS SECTION
B - B'

FIGURE
5



SANDY SILT AND SILTY SAND, VERY FINE TO FINE GRAINED, GRAY TO TAN.



NOTE: BASE OF BOTTOM ASH STORAGE HAS A 60-MIL HOPE LINER AT ELEVATION 340.0'. TAKEN FROM FREEZE AND NICHOLS' HYDRAULIC ANALYSIS OF WELSH POWER PLANT ASH PONDS. AMERICAN ELECTRIC POWER COMPANY, DATED DECEMBER 2010.

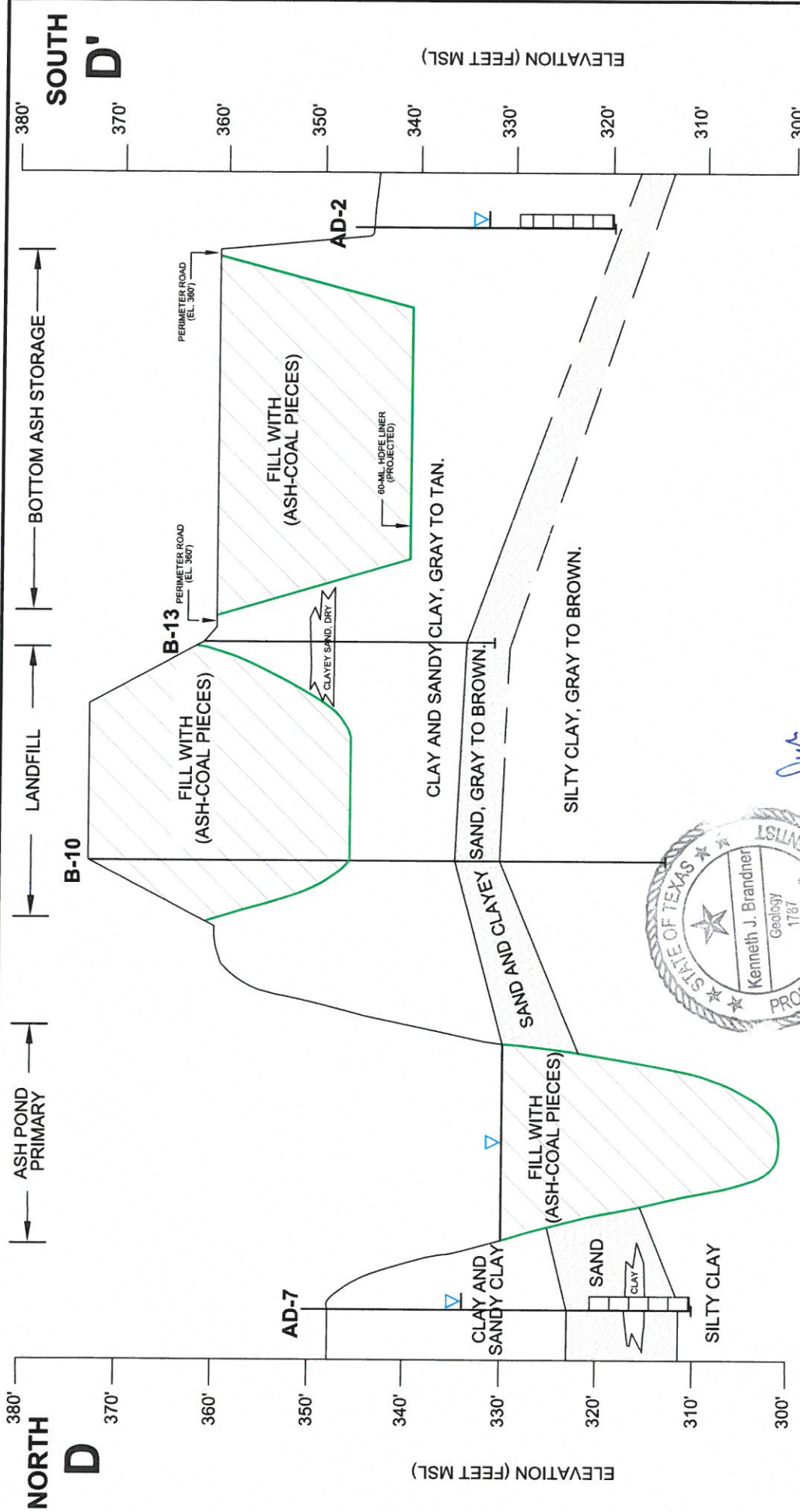
- LEGEND
- MONITORING WELL SCREENED INTERVAL
 - WATER LEVEL IN MONITORING WELL (3/4/16)
 - PROJECTED BASE OF ASH STORAGE (SEE NOTE)



J. ROBERT WELSH POWER PLANT
1187 COUNTY ROAD 4865
PITTSBURG, TITUS COUNTY, TEXAS

CROSS SECTION
C-C'



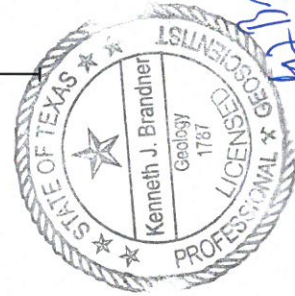


CROSS SECTION
D - D'

J. ROBERT WELSH POWER PLANT
1187 COUNTY ROAD 4865
PITTSBURG, TITUS COUNTY, TEXAS

ARCADIS

FIGURE
7



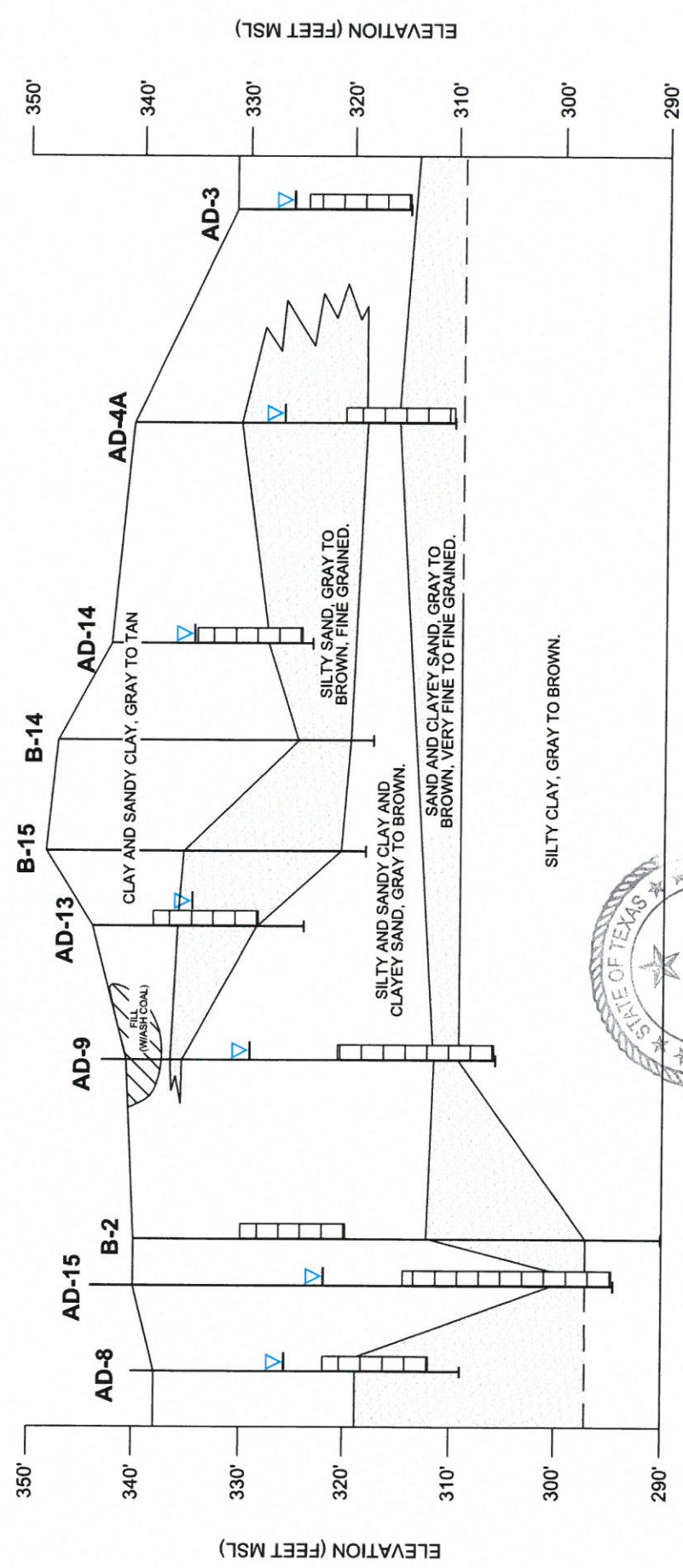
Handwritten signature: Kenneth J. Brandler
Handwritten date: 11-6-2016

LEGEND

- Monitoring Well Screened Interval
- Water Level in Monitoring Well (3/4/16)
- Base of CCR Unit

NOTE: BASE OF ASH POND TAKEN FROM "WELSH POWER PLANT-UNIT 1 FLY ASH STORAGE AREA PHASE 1" DRAWING ID WEPX-88, DATED 12-3-76; AND U.S. GEOLOGICAL SURVEY 7 1/2 MINUTE SERIES TOPOGRAPHIC MAP, CASON, TX QUADRANGLE, 1964 (PHOTO REVISED 1980).

NORTH E SOUTH E'



Kenneth J. Brandner
 5-16-16



LEGEND

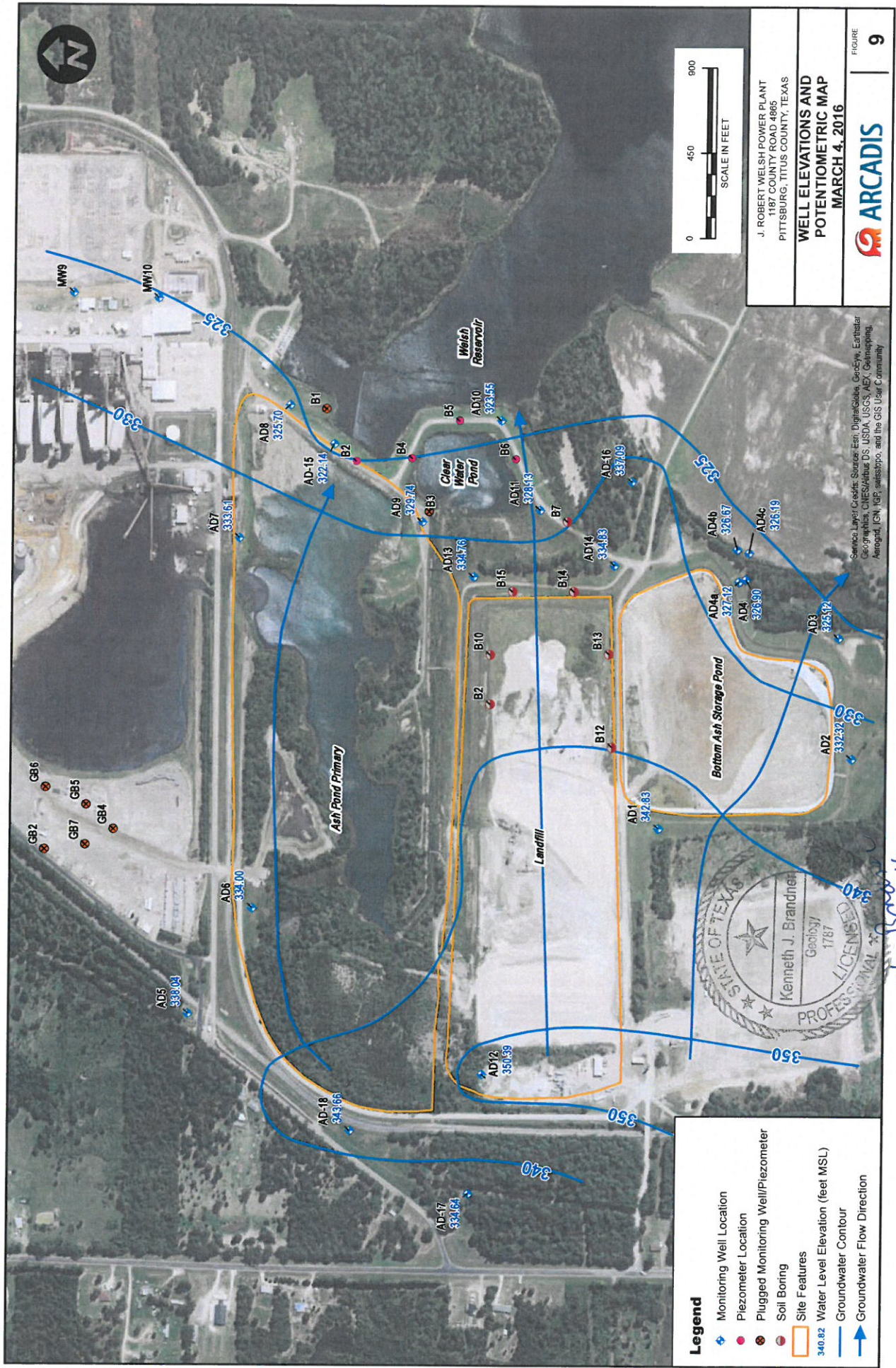
- MONITORING WELL SCREENED INTERVAL
- WATER LEVEL IN MONITORING WELL (3/4/16)
- PROJECTED BASE OF ASH STORAGE (SEE NOTE)

J. ROBERT WELSH POWER PLANT
 1187 COUNTY ROAD 4865
 PITTSBURG, TITUS COUNTY, TEXAS

CROSS SECTION E-E'

ARCADIS

FIGURE **8**



J. ROBERT WELSH POWER PLANT
 1187 COUNTY ROAD 4865
 PITTSBURG, TITUS COUNTY, TEXAS

**WELL ELEVATIONS AND
 POTENTIOMETRIC MAP**
 MARCH 4, 2016



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar
 Geographics, CNES/Airbus DS, USDA, USGS, AEX, Geomatics,
 AeroGRID, IGN, SPP, swisstopo, and the GIS User Community

- Legend**
- + Monitoring Well Location
 - + Piezometer Location
 - + Plugged Monitoring Well/Piezometer
 - + Soil Boring
 - + Site Features
 - 340.82 Water Level Elevation (feet MSL)
 - Groundwater Contour
 - Groundwater Flow Direction

Document Path: Z:\GIS\PROJECTS\ENV\REP\Welsh Plant\XDLandfill\reporting 9 - Mar2016_POT.mxd



1 Contour 350-16



Appendix A

Boring/Well Construction Logs

AD-1

Send original copy by certified mail to: TNRCC, P.O. Box 13087, Austin, TX 78711-3087

Please use black ink.

ATTENTION OWNER: Confidentiality Privilege Notice on Reverse Side		State of Texas WELL REPORT		Texas Water Well Drillers Advisory Council P.O. Box 13087 Austin, TX 78711-3087 512-238-0530	
1) OWNER <u>Southwestern Electric Power</u> (Name)		ADDRESS <u>Rt. 4, Box 221 Pittsburg Tx</u> (Street or RFD) (City) (State) (Zip)		<u>75686</u>	
2) ADDRESS OF WELL: County <u>Titus</u> <u>Titus</u>		<u>Rt. 4, Box 221 Pittsburg Tx</u> (Street, RFD or other) (City) (State) (Zip)		GRID # <u>16-58-4</u>	
3) TYPE OF WORK (Check): <input checked="" type="checkbox"/> New Well <input type="checkbox"/> Deepening <input type="checkbox"/> Reconditioning <input type="checkbox"/> Plugging		4) PROPOSED USE (Check): <input checked="" type="checkbox"/> Monitor <input type="checkbox"/> Environmental Soil Boring <input type="checkbox"/> Domestic <input type="checkbox"/> Industrial <input type="checkbox"/> Irrigation <input type="checkbox"/> Injection <input type="checkbox"/> Public Supply <input type="checkbox"/> De-watering <input type="checkbox"/> Testwell If Public Supply well, were plans submitted to the TNRCC? <input type="checkbox"/> Yes <input type="checkbox"/> No		5) <u>BPS</u> <u>33° 02' 48" N</u> <u>94° 50' 47" W</u> N	
6) WELL LOG: Date Drilling: Started <u>1-11-2001</u> Completed <u>1-11-2001</u>		DIAMETER OF HOLE Dia. (In.) From (ft.) To (ft.) <u>8 1/4</u> Surface <u>25</u>		7) DRILLING METHOD (Check): <input type="checkbox"/> Driven <input type="checkbox"/> Air Rotary <input type="checkbox"/> Mud Rotary <input checked="" type="checkbox"/> Bored <input type="checkbox"/> Air Hammer <input type="checkbox"/> Cable Tool <input type="checkbox"/> Jetted <input type="checkbox"/> Other _____	
From (ft.) To (ft.) Description and color of formation material		8) Borehole Completion (Check): <input type="checkbox"/> Open Hole <input type="checkbox"/> Straight Well <input type="checkbox"/> Underreamed <input checked="" type="checkbox"/> Gravel Packed <input type="checkbox"/> Other _____ If Gravel Packed give interval - from <u>1.9</u> ft. to <u>2.5</u> 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 To Gage Casting Screen	
		<u>2 N riser</u>		<u>+ 2 15 sch 40</u>	
		<u>2 N #10s/ot screen</u>		<u>15 25 sch 40</u>	
		9) CEMENTING DATA [Rule 338.44(1)] Cemented from <u>13</u> ft. to <u>0</u> ft. No. of sacks used <u>6-50#</u> ft. to _____ ft. No. of sacks used _____ Method used <u> Bentonite</u> Cemented by _____ Distance to septic system field lines or other concentrated contamination _____ ft. Method of verification of above distance _____			
13) TYPE PUMP: <u>NA</u> <input type="checkbox"/> Turbine <input type="checkbox"/> Jet <input type="checkbox"/> Submersible <input type="checkbox"/> Cylinder <input type="checkbox"/> Other _____ Depth to pump bowls, cylinder, jet, etc., _____ ft.		10) SURFACE COMPLETION <input checked="" type="checkbox"/> Specified Surface Slab Installed [Rule 338.44(2)(A)] <input checked="" type="checkbox"/> Specified Steel Sleeve Installed [Rule 338.44(3)(A)] <input type="checkbox"/> Pileless Adapter Used [Rule 338.44(3)(b)] <input type="checkbox"/> Approved Alternative Procedure Used [Rule 338.71]			
14) WELL TESTS: <u>NA</u> Type test: <input type="checkbox"/> Pump <input type="checkbox"/> Boiler <input type="checkbox"/> Jetted <input type="checkbox"/> Estimated Yield: _____ gpm with _____ ft. drawdown after _____ hrs.		11) WATER LEVEL: Static level <u>12' 8"</u> ft. below land surface Date <u>1-11-01</u> Artesian flow _____ gpm. Date _____			
15) WATER QUALITY: Did you knowingly penetrate any strata which contained undesirable constituents? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, submit "REPORT OF UNDESIRABLE WATER" Type of water? _____ Depth of strata _____ Was a chemical analysis made? <input type="checkbox"/> Yes <input type="checkbox"/> No		12) PACKERS: <u>NA</u> 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 _____ (Type or print)		WELL DRILLER'S LICENSE NO. <u>TX-52694-M</u>			
ADDRESS _____ (Street or RFD) (City) (State) (Zip)					
(Signed) <u>Dwight M. [Signature]</u> (Licensed Well Driller)		(Signed) _____ (Registered Driller Trainee)			
Please attach electric log, chemical analysis, and other pertinent information, if available.					

AD-2

Send original copy by certified mail to: TNRCC, P.O. Box 13067, Austin, TX 78711-3067

Please use black ink.

ATTENTION OWNER: Confidentiality
Privilege Notice on Reverse Side

State of Texas WELL REPORT

Texas Water Well Drillers Advisory Council
P.O. Box 13067
Austin, TX 78711-3067
512-238-0530

1) OWNER Southwestern Electric ADDRESS Rt. 4, Box 221 Pittsburg Tx 75686
(Name) (Street or RFD) (City) (State) (Zip)

2) ADDRESS OF WELL: Rt. 4 Box 221 Pittsburg Tx 75686 GRID # 16-58-4
County Camp (Street, RFD or other) (City) (State) (Zip)
Titus

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

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) GPS
33°02'37"N
94°50'44"W
N

6) WELL LOG:
Date Drilling: _____
Started 4/26 ^{to} 2001
Completed 4/26 ^{to} 2001

DIAMETER OF HOLE		
Dia. (in.)	From (ft.)	To (ft.)
<u>8 1/4</u>	Surface	<u>25</u>

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
<u>0</u>	<u>2</u>	<u>top soil</u>
<u>2</u>	<u>5</u>	<u>red & gray clay w/ silt</u>
<u>5</u>	<u>10</u>	<u>red & gray clay w/ silt</u>
<u>10</u>	<u>25</u>	<u>gray silty clay w/ tan streaks</u>

8) Borehole Completion (Check): Open Hole Straight Wall
 Underreamed Gravel Packed Other _____
If Gravel Packed give interval ... from 12 ft. to 25 ft.

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mig., if commercial	Setting (ft.)		Gage Casting Screen
			From	To	
<u>2</u>	<u>N</u>	<u>Riser</u>	<u>+2</u>	<u>15</u>	<u>Set to</u>
<u>2</u>	<u>N</u>	<u>#10 slot screen</u>	<u>15</u>	<u>25</u>	<u>Set to</u>

AP-2

9) CEMENTING DATA [Rule 338.44(1)]
Cemented from 12 ft. to 2 ft. No. of sacks used 5-50#
_____ ft. to _____ ft. No. of sacks used _____
Method used bentonite pellets
Cemented by _____
Distance to septic system field lines or other concentrated contamination _____ ft.
Method of verification of above distance _____

13) TYPE PUMP: NA
 Turbine Jet Submersible Cylinder
 Other _____
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)]
 Pileless Adapter Used [Rule 338.44(3)(b)]
 Approved Alternative Procedure Used [Rule 338.71]

14) WELL TESTS: NA
Type test: Pump Bailor Jetted Estimated
Yield: _____ gpm with _____ ft. drawdown after _____ hrs.

11) WATER LEVEL:
Static level _____ ft. below land surface Date _____
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: NA 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 _____ (Type or print) WELL DRILLER'S LICENSE NO. TX-521694-M
ADDRESS _____ (Street or RFD) (City) (State) (Zip)
(Signed) Richard M. Kelly (Signed) _____ (Registered Driller Trainee)
(Licensed Well Driller)

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

AD-3

Send original copy by certified mail to: TNRCC, P.O. Box 13087, Austin, TX 78711-3087

Please use black ink.

State of Texas
WELL REPORT

Texas Water Well Drillers Advisory Council
P.O. Box 13087
Austin, TX 78711-3087
512-238-0530

1) OWNER Southwestern Electric ADDRESS Rt. 4, Box 221 Pittsburg Tx 75686
(Name) (Street or RFD) (City) (State) (Zip)

2) ADDRESS OF WELL: Rt. 4 Box 221 Pittsburg Tx 75686 GRID # 16-58-4
County Titus (Street, RFD or other) (City) (State) (Zip)

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

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) GPS
33°02'38"N
94°50'37"W
 N

6) WELL LOG:
 Date Drilling: _____
 Started 4/26 ²⁰⁰¹
 Completed 4/26 ²⁰⁰¹

DIAMETER OF HOLE		
Dis. (in.)	From (ft.)	To (ft.)
8 1/4	Surface	17

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	12	gray silty clay w/ tan streaks
12	15	very stiff gray/blue rd clay
15	17	very stiff gray clay w/ red nodules and tan streaks

8) Borehole Completion (Check): Open Hole Straight Wall
 Undreamed Gravel Packed Other _____
 If Gravel Packed give interval ... from 5 ft. to 17 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.)		Gage Casting Screen
			From	To	
2	N	1 1/2" pipe	+2	7	Sch 40
2	N	#10 slot screen	7	17	Sch 40

9) CEMENTING DATA [Rule 338.44(1)]
 Cemented from 2 ft. to 5 ft. No. of sacks used 2 1/2 - 50
 _____ ft. to _____ ft. No. of sacks used _____
 Method used bentonite pellets
 Cemented by _____
 Distance to septic system field lines or other concentrated contamination _____ ft.
 Method of verification of above distance _____

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

14) WELL TESTS: NA
 Type test Pump Bailor Jetted Estimated
 Yield: _____ gpm with _____ 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

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

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

12) PACKERS: NA 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 _____ (Type or print) WELL DRILLER'S LICENSE NO. TX 52494-M

ADDRESS _____ (City) (State) (Zip)

(Signed) [Signature] (Licensed Well Driller) (Signed) _____ (Registered Driller Trainee)

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

AD-4

Send original copy by certified mail to: TNRCC, P.O. Box 13067, Austin, TX 78711-3067

Please use black ink.

**State of Texas
WELL REPORT**

Texas Water Well Drillers Advisory Council
P.O. Box 13067
Austin, TX 78711-3067
512-239-0530

ATTENTION OWNER: Confidentiality
Privilege Notice on Reverse Side

1) OWNER Southwestern Electric Power ADDRESS Pt. 4, Box 221 Pittsburg Tx 75686
(Name) (Street or RFD) (City) (State) (Zip)

2) ADDRESS OF WELL: Pt. 4 Box 221 Pittsburg Tx 75686 GRID # 16-584
County Camp (Street, RFD or other) (City) (State) (Zip)
Titus

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

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) GPS
33° 02' 43" N
94° 50' 33" W

6) WELL LOG:
Date Drilling: 4/26 2001
Started 4/26 19
Completed 4/26 19 2001

DIAMETER OF HOLE		
Dis. (in.)	From (ft.)	To (ft.)
<u>8 1/4</u>	<u>Surface</u>	<u>30</u>

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

8) Borehole Completion (Check): Open Hole Straight Wall
 Underreamed Gravel Packed Other _____
If Gravel Packed give interval ... from 16 ft. to 30 ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dis. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., If commercial	Setting (ft.)		Gage Casing Screen
			From	To	
<u>2</u>	<u>N</u>	<u>Riser</u>	<u>+2</u>	<u>19</u>	<u>Sch 40</u>
<u>2</u>	<u>N</u>	<u>#10 slot screen</u>	<u>19</u>	<u>29</u>	<u>Sch 40</u>

9) CEMENTING DATA [Rule 338.44(1)]
Cemented from 16 ft. to 2 ft. No. of sacks used 8-50 #
ft. to _____ ft. No. of sacks used _____
Method used Bentonite pellets
Cemented by _____
Distance to septic system field lines or other concentrated contamination _____ ft.
Method of verification of above distance _____

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

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

12) PACKERS: NA Type _____ Depth _____

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

14) WELL TESTS: NA
Type test: Pump Bailor Jetted Estimated
Yield: _____ gpm with _____ 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 _____ (Type or print) WELL DRILLER'S LICENSE NO. TX 52694-M

ADDRESS _____ (Street or RFD) (City) (State) (Zip)

(Signed) [Signature] (Signed) _____ (Registered Driller Trainee)
(Licensed Well Driller)

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



SOIL BORING LOG

BORING/WELL NO.: AD-4A
 TOTAL DEPTH: 30'
 TOP OF CASING ELEV.: 342.85 ft. NGVD
 GROUND SURFACE ELEV.: 340.19 ft. NGVD

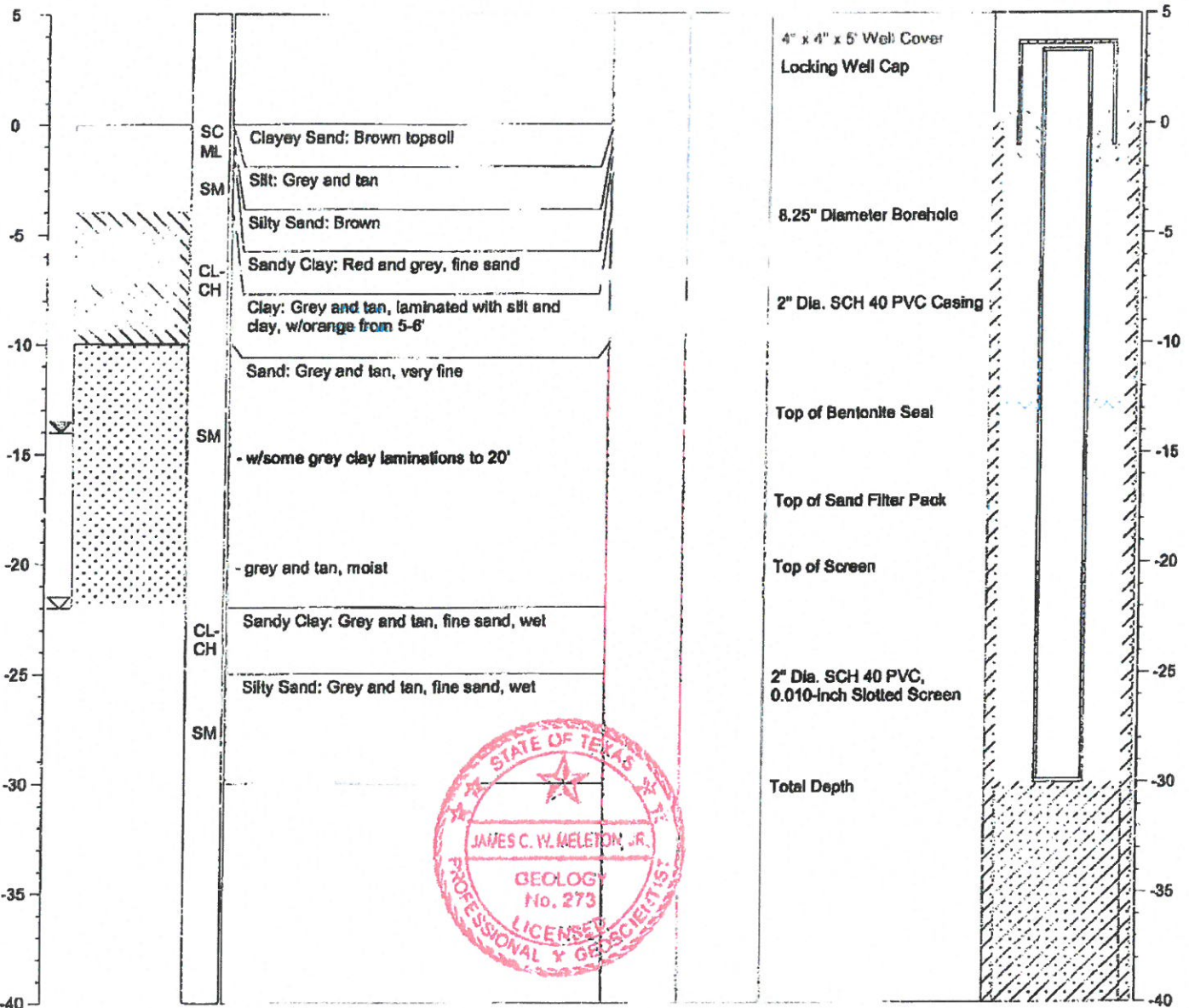
CLIENT: AEP
 PROJECT: Ash Disposal Area
 SITE LOCATION: Welsh Power Plant
 PROJECT NO.: S-08-0109
 LOGGED BY: James Meleton, Jr.

DRILLING CO.: WEST Drilling
 DRILLER: Tom McCullough
 METHOD OF DRILLING: Hollow-stem Auger
 SAMPLING METHODS: Split-spoon
 DATE DRILLED: 9/22/09

NOTES: Latitude: 33.04527
 Longitude: 94.84258

≡ Water level during drilling
 ≡ Water level in completed well
 Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	CORE RECOVERY (Percent)	PID (ppm)	WELL DESCRIPTION	WELL CONSTRUCTION
-------	--------------	------	------------------	-------------------------	-----------	------------------	-------------------





SOIL BORING LOG

BORING/WELL NO.: AD-4B
 TOTAL DEPTH: 15'
 TOP OF CASING ELEV.: 333.23 ft. NGVD
 GROUND SURFACE ELEV.: 329.55 ft. NGVD

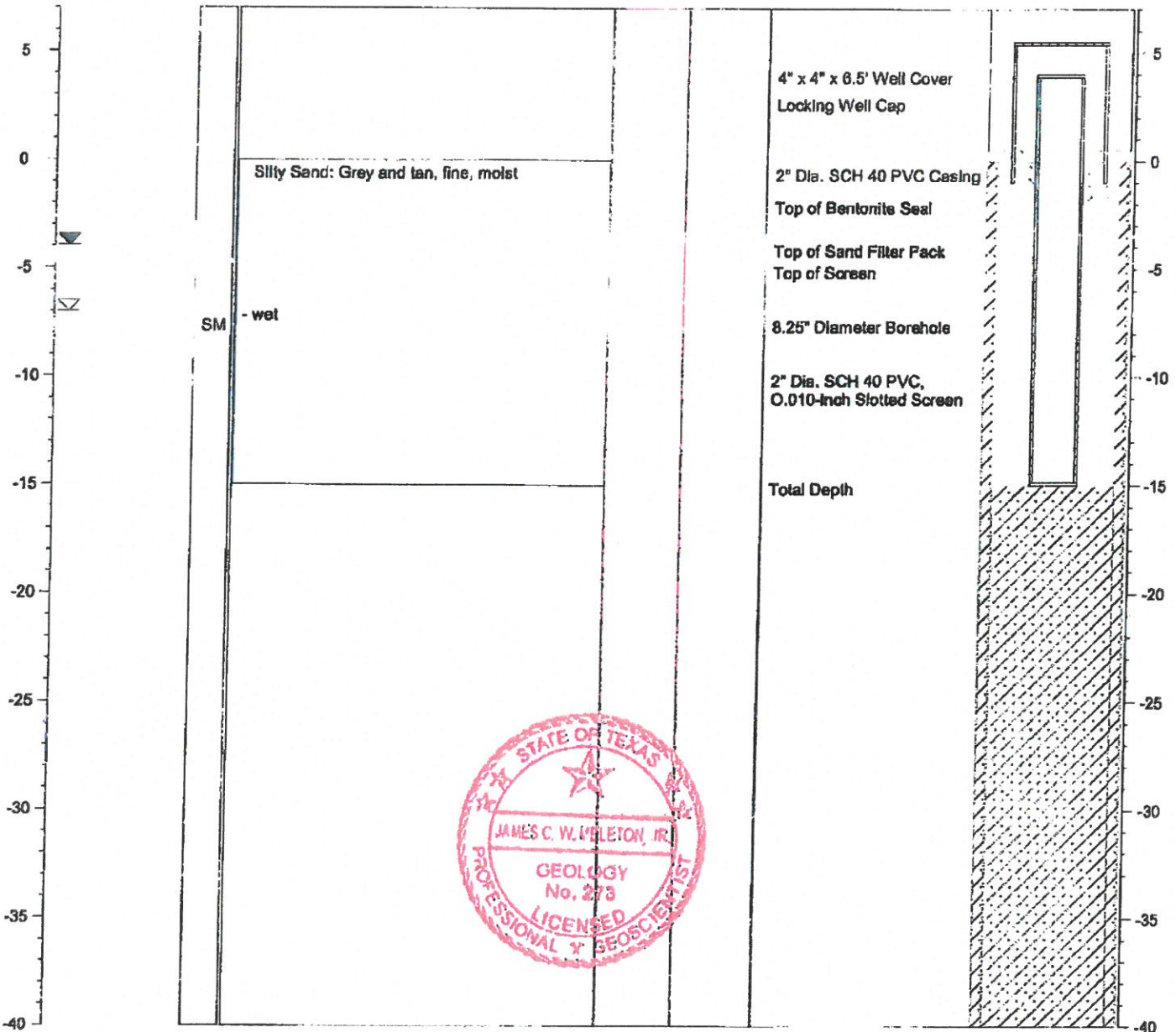
CLIENT: AEP
 PROJECT: Ash Disposal Area
 SITE LOCATION: Welsh Power Plant
 PROJECT NO.: S-08-0109
 LOGGED BY: James Meleton, Jr.

DRILLING CO.: WEST Drilling
 DRILLER: Tom McCullough
 METHOD OF DRILLING: Hollow-stem Anger
 SAMPLING METHODS: Split-spoon
 DATE DRILLED: 9/23/09

NOTES: Latitude: 33.04531
 Longitude: 94.84230

≈ Water level during drilling
 ≈ Water level in completed well
 Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	CORE RECOVERY (Percent)	PID (ppm)	WELL DESCRIPTION	WELL CONSTRUCTION
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SOIL BORING LOG

BORING/WELL NO.: AD-4C
 TOTAL DEPTH: 15'
 TOP OF CASING ELEV.: 333.28 ft. NGVD
 GROUND SURFACE ELEV.: 329.15 ft. NGVD

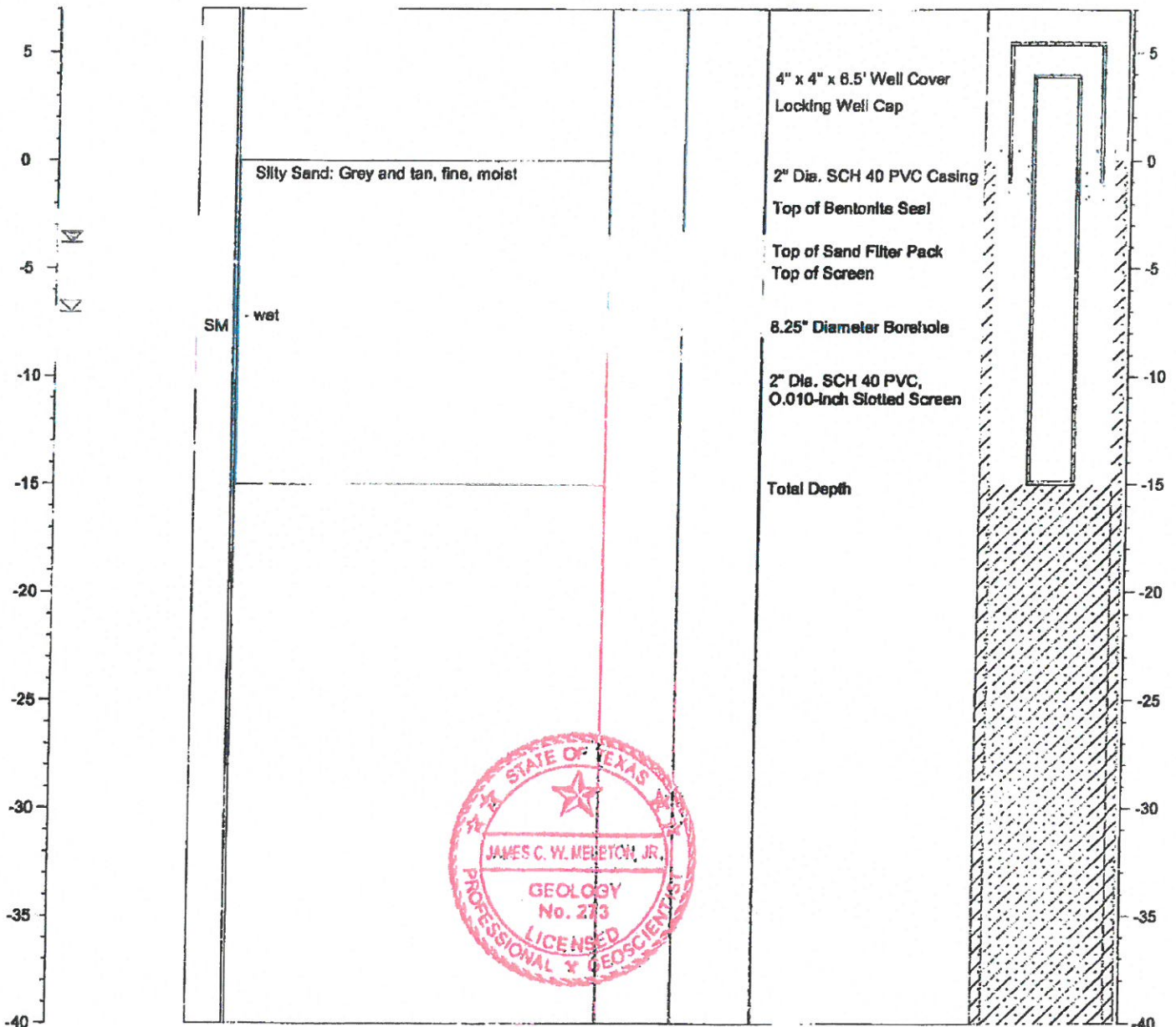
CLIENT: AEP
 PROJECT: Ash Disposal Area
 SITE LOCATION: Welsh Power Plant
 PROJECT NO.: S-08-0109
 LOGGED BY: James Meleton, Jr.

DRILLING CO.: WEST Drilling
 DRILLER: Tom McCullough
 METHOD OF DRILLING: Hollow-stem Auger
 SAMPLING METHODS: Split-spoon
 DATE DRILLED: 9/23/09

NOTES: Latitude: 33.04507
 Longitude: 94.84244

≡ Water level during drilling
 ≡ Water level in completed well
 Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	CORE RECOVERY (Percent)	PID (ppm)	WELL DESCRIPTION	WELL CONSTRUCTION
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AD-5

Send original copy by certified mail to: TNRCC, P.O. Box 13087, Austin, TX 78711-3087

Please use black ink.

ATTENTION OWNER: Confidentiality Privilege Notice on Reverse Side		State of Texas WELL REPORT		Texas Water Well Drillers Advisory Council P.O. Box 13087 Austin, TX 78711-3087 512-239-0530	
1) OWNER <u>Southwestern Electric Power</u> (Name)		ADDRESS <u>Rt. 4, Box 221 Pittsburg Tx</u> (Street or RFD) (City) (State) (Zip) <u>75686</u>			
2) ADDRESS OF WELL: County <u>Camp</u> <u>Titus</u> (Street, RFD or other) (City) (State) (Zip) <u>75686</u>		GRID # <u>16-58-4</u>			
3) TYPE OF WORK (Check): <input checked="" type="checkbox"/> New Well <input type="checkbox"/> Deepening <input type="checkbox"/> Reconditioning <input type="checkbox"/> Plugging		4) PROPOSED USE (Check): <input checked="" type="checkbox"/> Monitor <input type="checkbox"/> Environmental Soil Boring <input type="checkbox"/> Domestic <input type="checkbox"/> Industrial <input type="checkbox"/> Irrigation <input type="checkbox"/> Injection <input type="checkbox"/> Public Supply <input type="checkbox"/> De-watering <input type="checkbox"/> Testwell If Public Supply well, were plans submitted to the TNRCC? <input type="checkbox"/> Yes <input type="checkbox"/> No		5) <u>33°03'13"N</u> <u>94°51'00"W</u>	
6) WELL LOG: Date Drilling: Started <u>1-11-2001</u> Completed <u>1-11-2001</u>		DIAMETER OF HOLE Dis. (in.) From (ft.) To (ft.) <u>8 1/4</u> Surface <u>30</u>		7) DRILLING METHOD (Check): <input type="checkbox"/> Driven <input type="checkbox"/> Air Rotary <input type="checkbox"/> Mud Rotary <input checked="" type="checkbox"/> Bored <input type="checkbox"/> Air Hammer <input type="checkbox"/> Cable Tool <input type="checkbox"/> Jetted <input type="checkbox"/> Other _____	
From (ft.) To (ft.) Description and color of formation material		8) Borehole Completion (Check): <input type="checkbox"/> Open Hole <input type="checkbox"/> Straight Well <input type="checkbox"/> Underreamed <input checked="" type="checkbox"/> Gravel Packed <input type="checkbox"/> Other _____ If Gravel Packed give interval ... from <u>16</u> ft. to <u>30</u> ft.			
<u>0 - 10 red & gray clay with orange streaks</u>		CASING, BLANK PIPE, AND WELL SCREEN DATA: Dis. (in.) New or Used Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial Setting (ft.) From To Gege Casing Screen <u>2 N riser +2 20 Schl 40</u> <u>2 N #10 slot screen 20 30 Schl 40</u>			
<u>10 - 20 gray/black clay with tan clay</u>					
<u>20 - 25 stiff clay with lignite streaks</u>					
<u>25 - 30 fine gray sand</u>		9) CEMENTING DATA [Rule 338.44(1)] Cemented from <u>16</u> ft. to <u>0</u> ft. No. of sacks used _____ ft. to _____ ft. No. of sacks used _____ Method used <u>Dentonite</u> Cemented by _____ Distance to septic system field lines or other concentrated contamination _____ ft. Method of verification of above distance _____			
13) TYPE PUMP: <input type="checkbox"/> Turbine <input type="checkbox"/> Jet <input type="checkbox"/> Submersible <input type="checkbox"/> Cylinder <input type="checkbox"/> Other _____ Depth to pump bowls, cylinder, jet, etc., _____ ft.		10) SURFACE COMPLETION <input checked="" type="checkbox"/> Specified Surface Slab Installed [Rule 338.44(2)(A)] <input checked="" type="checkbox"/> Specified Steel Sleeve Installed [Rule 338.44(3)(A)] <input type="checkbox"/> Pileless Adapter Used [Rule 338.44(3)(b)] <input type="checkbox"/> Approved Alternative Procedure Used [Rule 338.71]			
14) WELL TESTS: Type test: <input type="checkbox"/> Pump <input type="checkbox"/> Baller <input type="checkbox"/> Jetted <input type="checkbox"/> Estimated Yield: _____ gpm with _____ ft. drawdown after _____ hrs.		11) WATER LEVEL: Static level <u>11' 9"</u> ft. below land surface Date <u>1-11-01</u> Artesian flow _____ gpm. Date _____			
15) WATER QUALITY: Did you knowingly penetrate any strata which contained undesirable constituents? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, submit "REPORT OF UNDESIRABLE WATER" Type of water? _____ Depth of strata _____ Was a chemical analysis made? <input type="checkbox"/> Yes <input type="checkbox"/> No		12) PACKERS: <u>NA</u> 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 _____ (Type or print)		WELL DRILLER'S LICENSE NO. <u>TX 52694-M</u>			
ADDRESS _____ (Street or RFD) (City) (State) (Zip)					
(Signed) <u>[Signature]</u> (Licensed Well Driller)		(Signed) _____ (Registered Driller Trainee)			
Please attach electric log, chemical analysis, and other pertinent information, if available.					



SOIL BORING LOG

BORING/WELL NO.: AD-6
 TOTAL DEPTH: 33'
 TOP OF CASING ELEV.: 346.33 ft. NGVD
 GROUND SURFACE ELEV.: 343.31 ft. NGVD

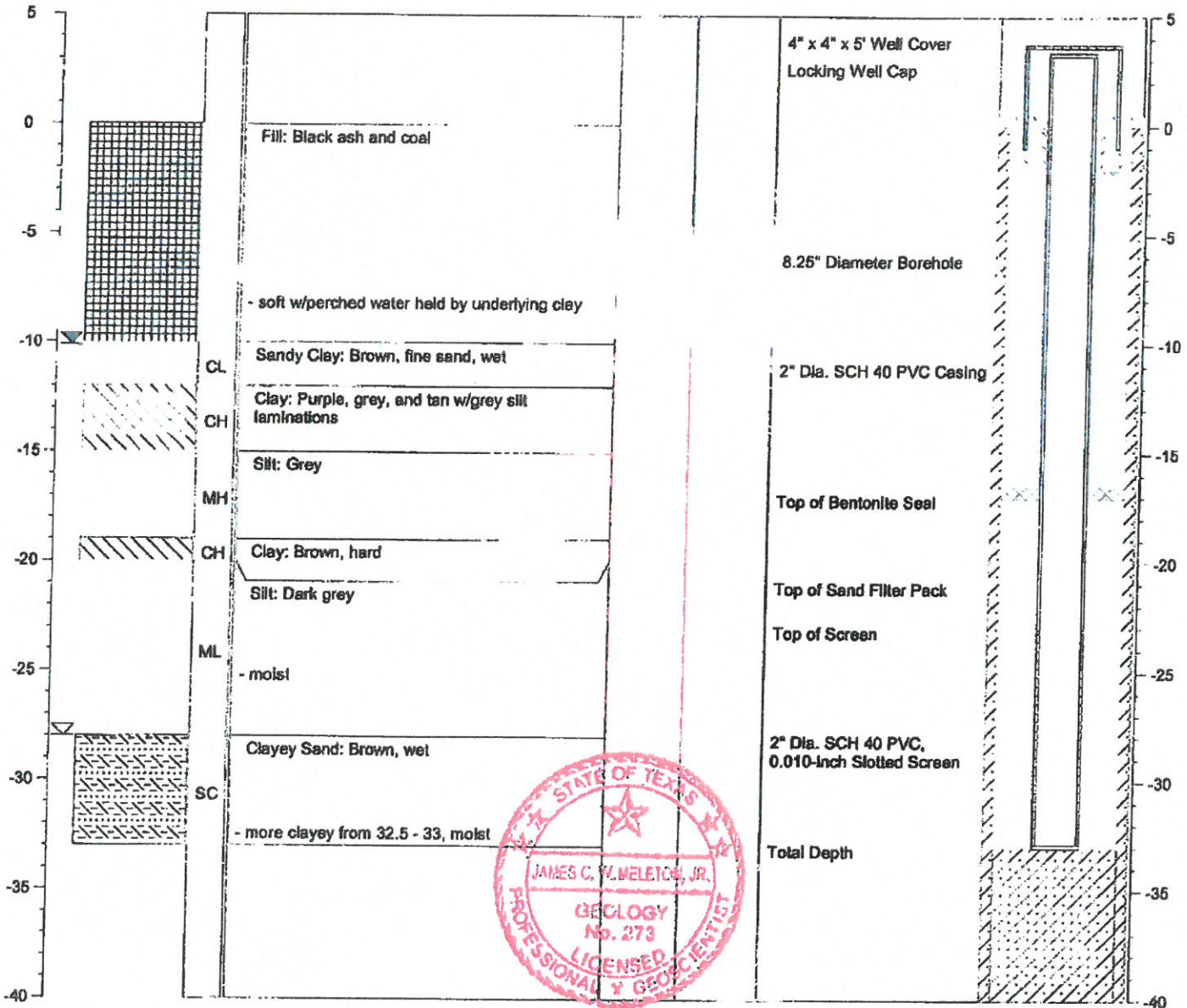
CLIENT: AEP
 PROJECT: Ash Disposal Area
 SITE LOCATION: Welsh Power Plant
 PROJECT NO.: S-08-0109
 LOGGED BY: James Meleton, Jr.

DRILLING CO.: WEST Drilling
 DRILLER: Tom McCullough
 METHOD OF DRILLING: Hollow-stem Auger
 SAMPLING METHODS: Split-spoon
 DATE DRILLED: 9/23/09

NOTES: Latitude: 33.05235
 Longitude: 94.84757

☒ Water level during drilling
 ☒ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	CORE RECOVERY (Percent)	PID (ppm)	WELL DESCRIPTION	WELL CONSTRUCTION
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SOIL BORING LOG

BORING/WELL NO.: AD-7
 TOTAL DEPTH: 38'
 TOP OF CASING ELEV.: 350.82 ft. NGVD
 GROUND SURFACE ELEV.: 347.86 ft. NGVD

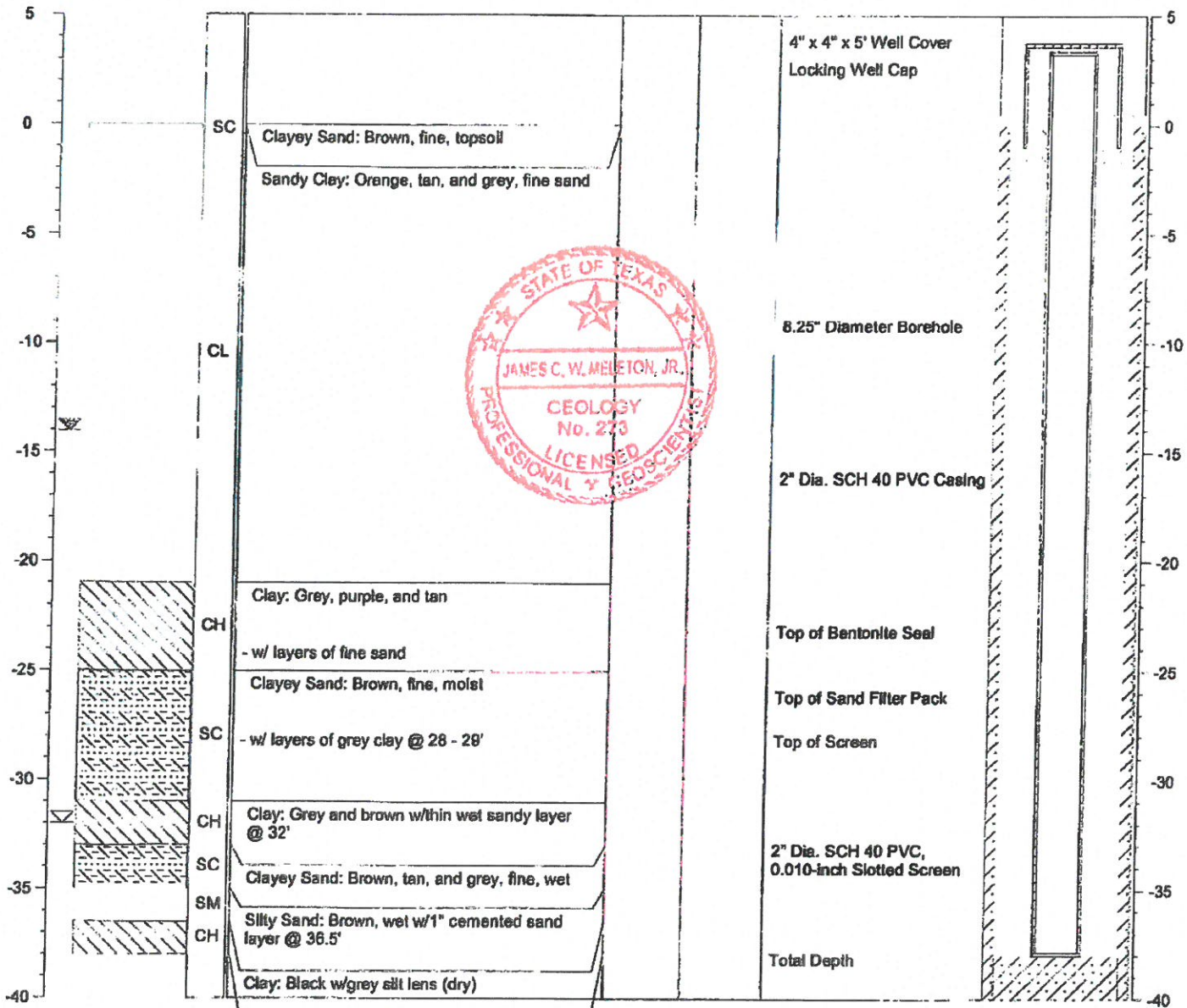
CLIENT: AEP
 PROJECT: Ash Disposal Area
 SITE LOCATION: Welsh Power Plant
 PROJECT NO.: S-08-0109
 LOGGED BY: James Meleton, Jr.

DRILLING CO.: WEST Drilling
 DRILLER: Tom McCullough
 METHOD OF DRILLING: Hollow-stem Auger
 SAMPLING METHODS: Split-spoon
 DATE DRILLED: 9/24/09

NOTES: Latitude: 33.05257
 Longitude: 94.84219

≡ Water level during drilling
 ≡ Water level in completed well
 Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	CORE RECOVERY (Percent)	PID (ppm)	WELL DESCRIPTION	WELL CONSTRUCTION
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SOIL BORING LOG

BORING/WELL NO.: AD-8
 TOTAL DEPTH: 29'
 TOP OF CASING ELEV.: 340.01 ft. NGVD
 GROUND SURFACE ELEV.: 337.53 ft. NGVD

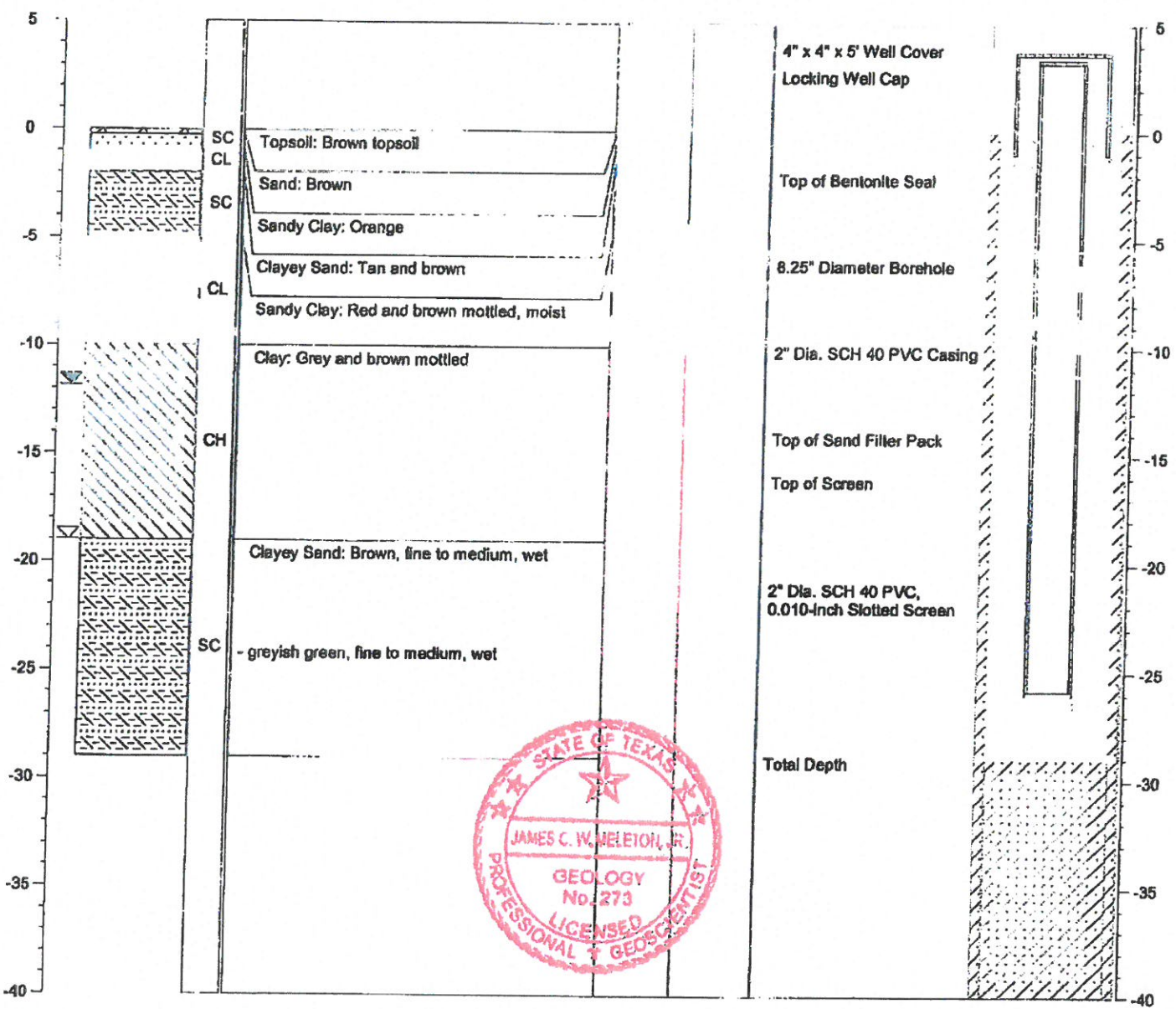
CLIENT: AEP
 PROJECT: Ash Disposal Area
 SITE LOCATION: Welsh Power Plant
 PROJECT NO.: S-08-0109
 LOGGED BY: James Meleton, Jr.

DRILLING CO.: WEST Drilling
 DRILLER: Tom McCullough
 METHOD OF DRILLING: Hollow-stem Auger
 SAMPLING METHODS: Split-spoon
 DATE DRILLED: 9/21/09

NOTES: Latitude: 33.05187
 Longitude: 94.84026

☒ Water level during drilling
 ☒ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	CORE RECOVERY (Percent)	PID (ppm)	WELL DESCRIPTION	WELL CONSTRUCTION
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SOIL BORING LOG

BORING/WELL NO.: AD-9
 TOTAL DEPTH: 35'
 TOP OF CASING ELEV.: 343.09 ft. NGVD
 GROUND SURFACE ELEV.: 340.32 ft. NGVD

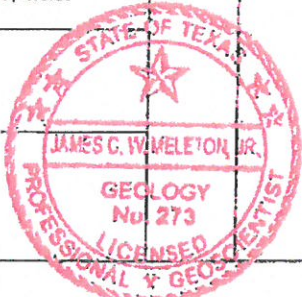
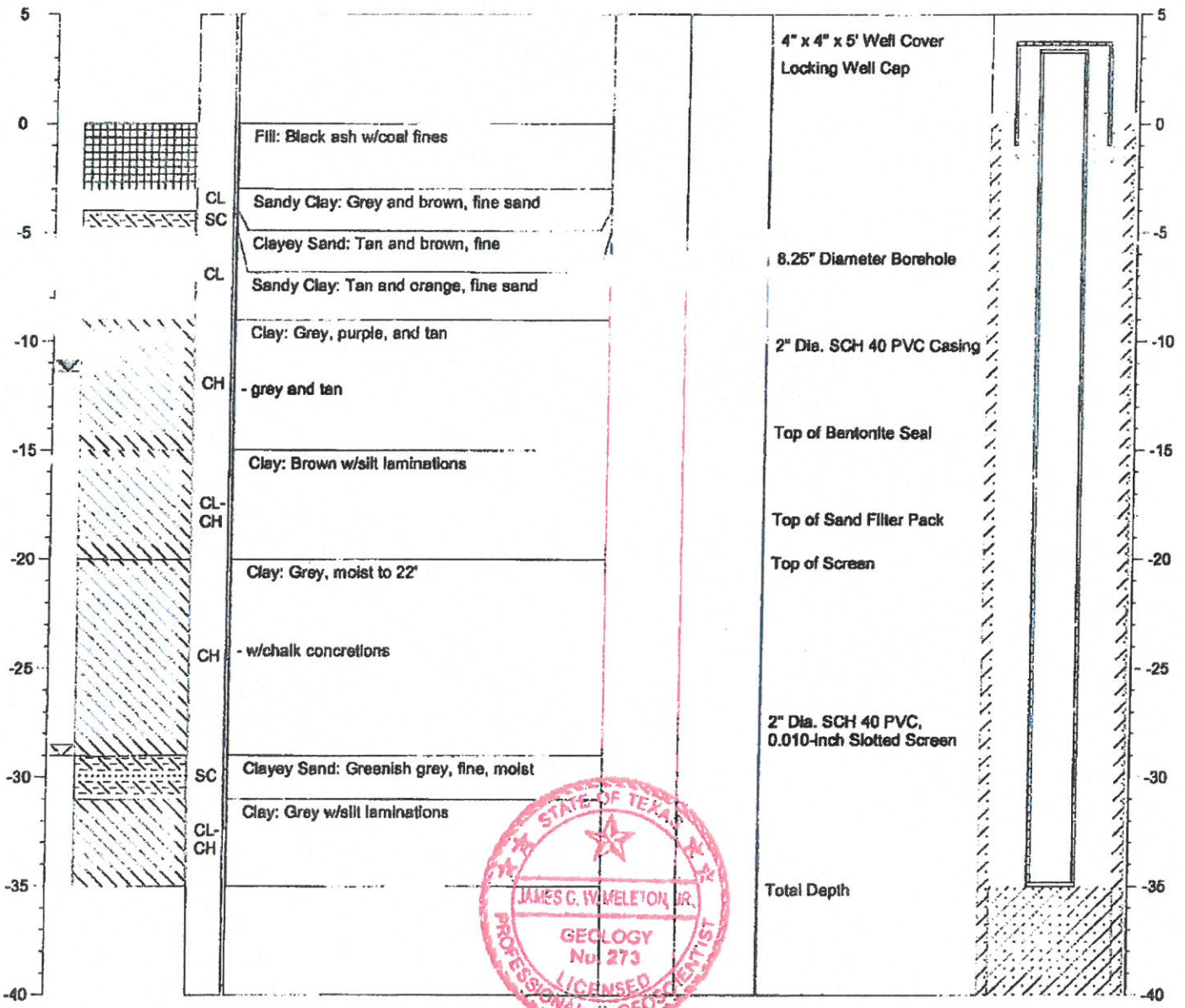
CLIENT: AEP
 PROJECT: Ash Disposal Area
 SITE LOCATION: Welsh Power Plant
 PROJECT NO.: S-08-0109
 LOGGED BY: James Meleton, Jr.

DRILLING CO.: WEST Drilling
 DRILLER: Tom McCullough
 METHOD OF DRILLING: Hollow-stem Auger
 SAMPLING METHODS: Split-spoon
 DATE DRILLED: 9/21/09

NOTES: Latitude: 33.04995
 Longitude: 94.84196

☒ Water level during drilling
 ☒ Water level in completed well
 Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	CORE RECOVERY (Percent)	PID (ppm)	WELL DESCRIPTION	WELL CONSTRUCTION
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SOIL BORING LOG

BORING/WELL NO.: AD-10
 TOTAL DEPTH: 35'
 TOP OF CASING ELEV.: 343.01 ft. NGVD
 GROUND SURFACE ELEV.: 340.23 ft. NGVD

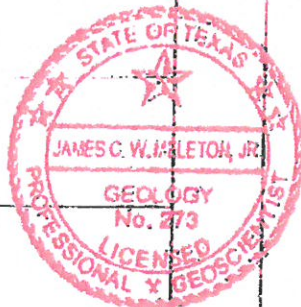
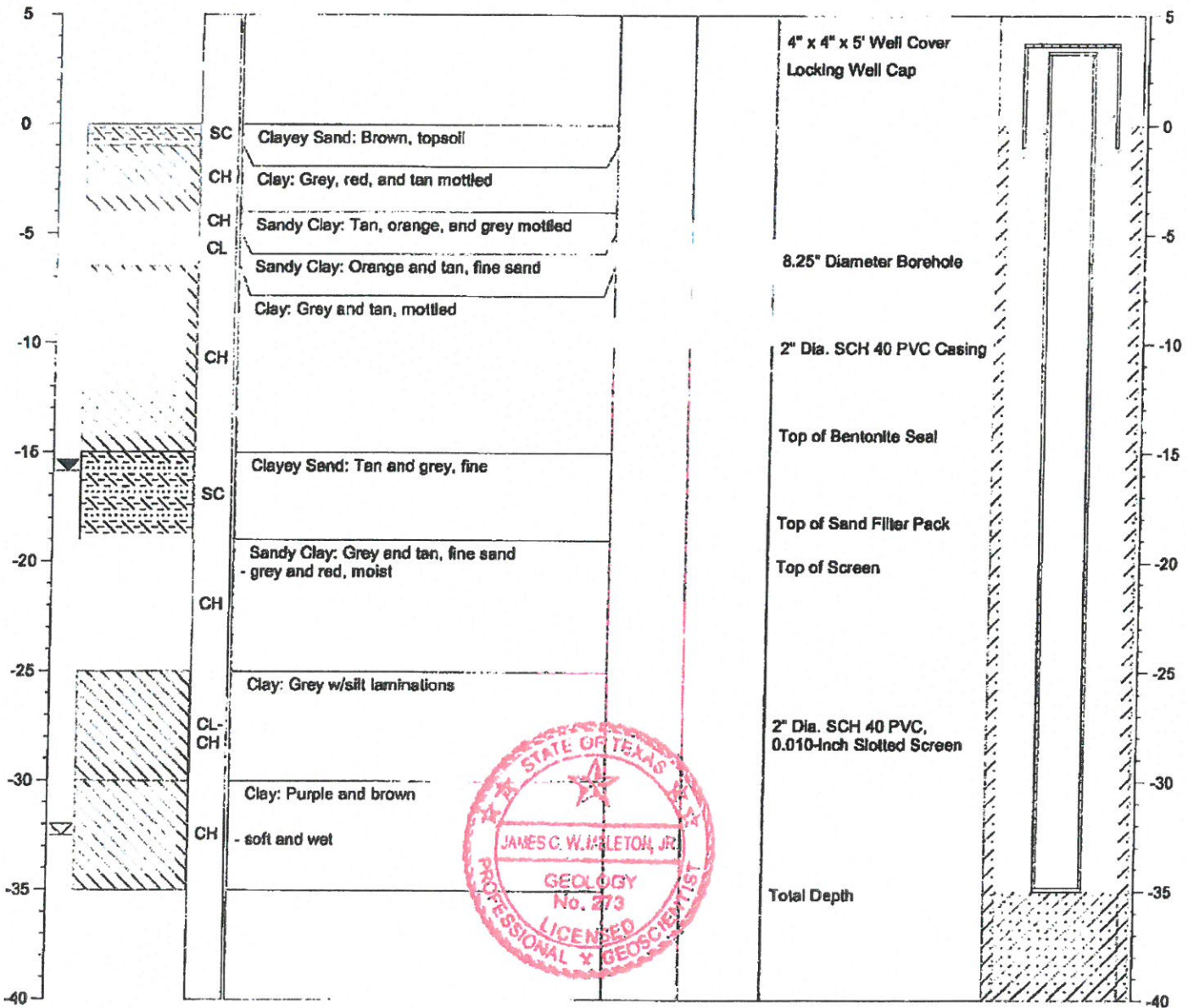
CLIENT: AEP
 PROJECT: Ash Disposal Area
 SITE LOCATION: Welsh Power Plant
 PROJECT NO.: S-08-0109
 LOGGED BY: James Meleton, Jr.

DRILLING CO.: WEST Drilling
 DRILLER: Tom McCullough
 METHOD OF DRILLING: Hollow-stem Auger
 SAMPLING METHODS: Split-spoon
 DATE DRILLED: 9/22/09

NOTES: Latitude: 33.04881
 Longitude: 94.84047

☒ Water level during drilling
 ☒ Water level in completed well
 Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	CORE RECOVERY (Percent)	PID (ppm)	WELL DESCRIPTION	WELL CONSTRUCTION
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SOIL BORING LOG

BORING/WELL NO.: AD-11
 TOTAL DEPTH: 20'
 TOP OF CASING ELEV.: 342.18 ft. NGVD
 GROUND SURFACE ELEV.: 339.61 ft. NGVD

CLIENT: AEP
 PROJECT: Ash Disposal Area
 SITE LOCATION: Welsh Power Plant
 PROJECT NO.: S-08-0109
 LOGGED BY: James Meleton, Jr.

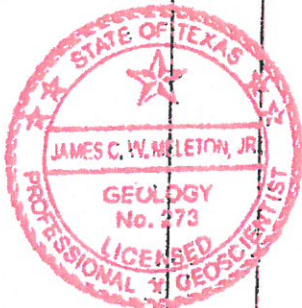
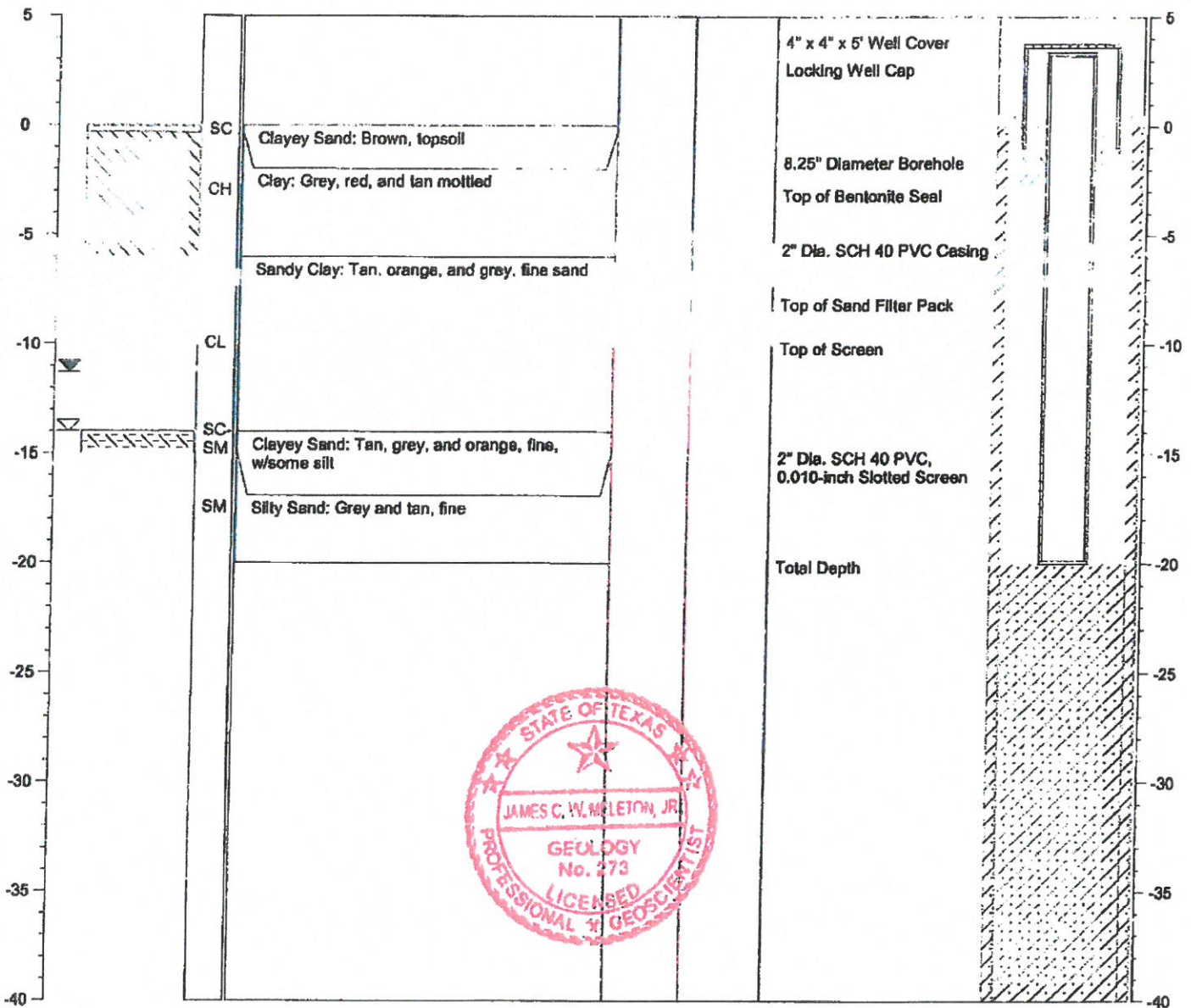
DRILLING CO.: WEST Drilling
 DRILLER: Tom McCullough
 METHOD OF DRILLING: Hollow-stem Auger
 SAMPLING METHODS: Split-spoon
 DATE DRILLED: 9/22/09

NOTES: Latitude: 33.04824
 Longitude: 94.84177

☒ Water level during drilling
 ☒ Water level in completed well

Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	CORE RECOVERY (Percent)	PID (ppm)	WELL DESCRIPTION	WELL CONSTRUCTION
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SOIL BORING LOG

BORING/WELL NO.: AD-12
 TOTAL DEPTH: 30'
 TOP OF CASING ELEV.: 369.33 ft. NGVD
 GROUND SURFACE ELEV.: 366.27 ft. NGVD

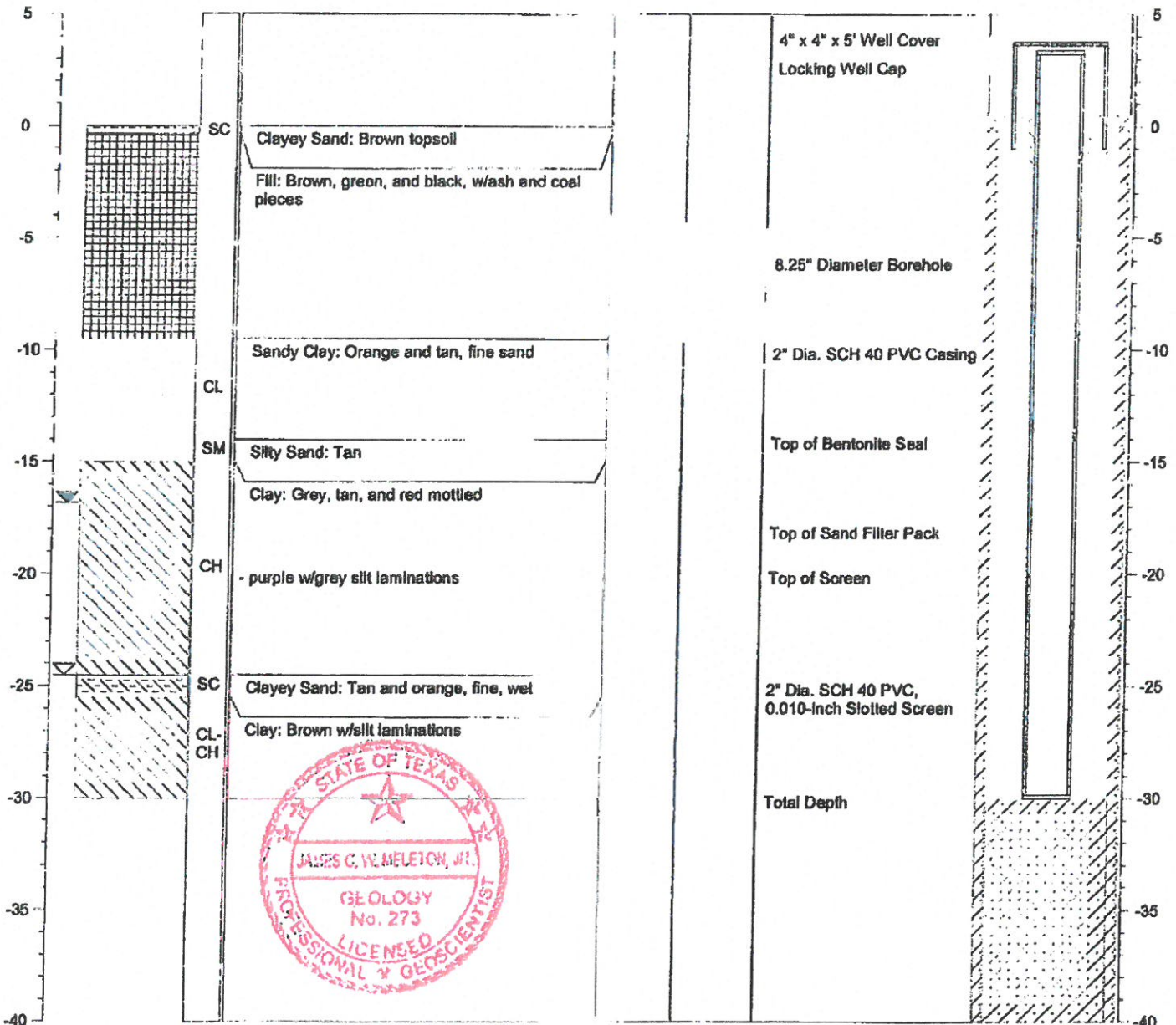
CLIENT: AEP
 PROJECT: Ash Disposal Area
 SITE LOCATION: Welsh Power Plant
 PROJECT NO.: S-08-0109
 LOGGED BY: James Meleton, Jr.

DRILLING CO.: WEST Drilling
 DRILLER: Tom McCullough
 METHOD OF DRILLING: Hollow-stem Auger
 SAMPLING METHODS: Split-spoon
 DATE DRILLED: 9/24/09

NOTES: Latitude: 33.04901
 Longitude: 94.84977

☒ Water level during drilling
 ☒ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	CORE RECOVERY (Percent)	PID (ppm)	WELL DESCRIPTION	WELL CONSTRUCTION
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SOIL BORING LOG

BORING/WELL NO.: AD-13
 TOTAL DEPTH: 20'
 TOP OF CASING ELEV.: 347.00 ft. NGVD
 GROUND SURFACE ELEV.: 344.12 ft. NGVD

CLIENT: AEP
 PROJECT: Ash Disposal Area
 SITE LOCATION: Welsh Power Plant
 PROJECT NO.: S-08-0109
 LOGGED BY: James Meleton, Jr.

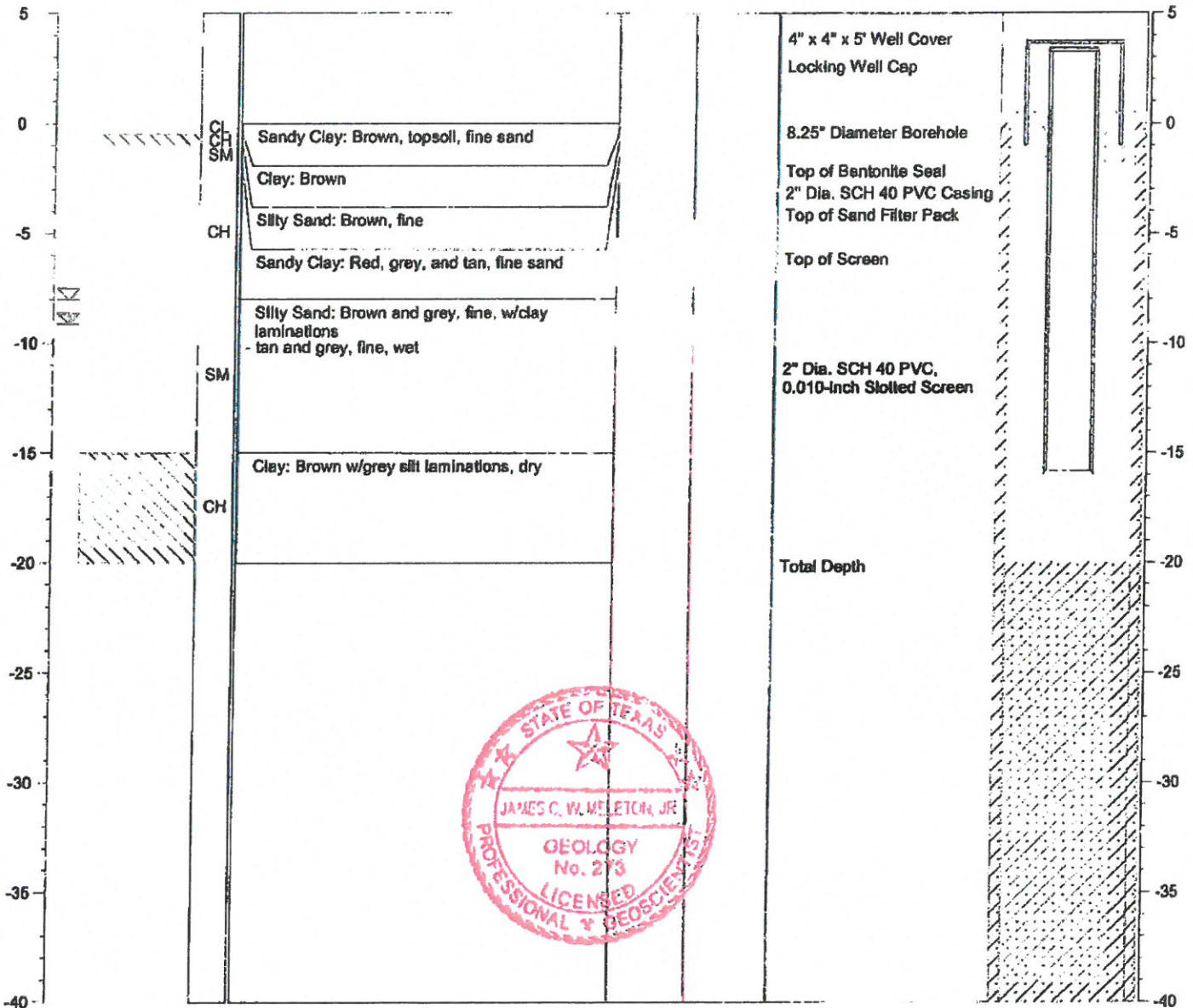
DRILLING CO.: WEST Drilling
 DRILLER: Tom McCullough
 METHOD OF DRILLING: Hollow-stem Auger
 SAMPLING METHODS: Split-spoon
 DATE DRILLED: 9/22/09

NOTES: Latitude: 33.04918
 Longitude: 94.84275

☒ Water level during drilling
 ☒ Water level in completed well

Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	CORE RECOVERY (Percent)	PID (ppm)	WELL DESCRIPTION	WELL CONSTRUCTION
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SOIL BORING LOG

BORING/WELL NO.: AD-14
 TOTAL DEPTH: 18.5'
 TOP OF CASING ELEV.: 345.43 ft. NGVD
 GROUND SURFACE ELEV.: 342.32 ft. NGVD

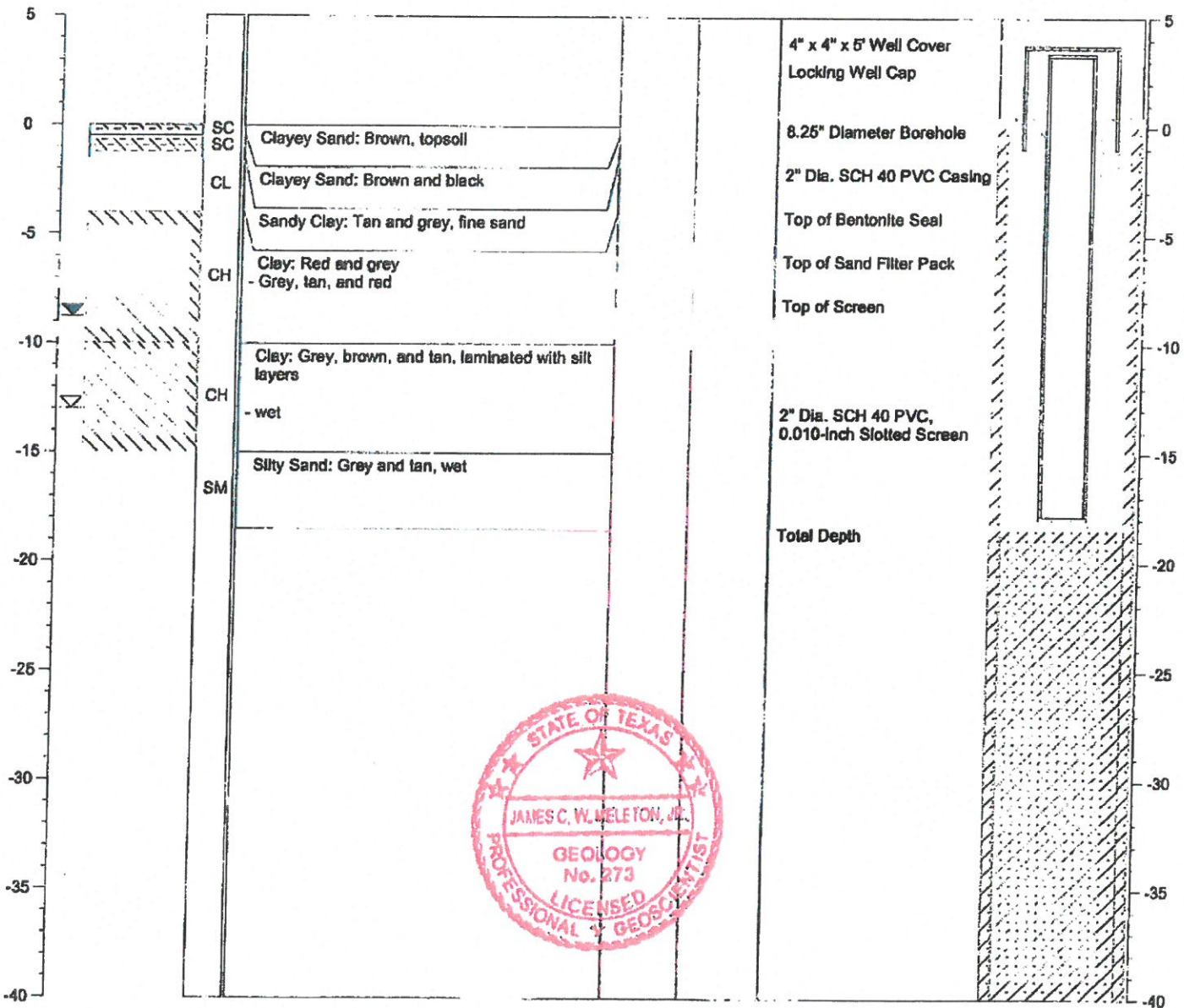
CLIENT: AEP
 PROJECT: Ash Disposal Area
 SITE LOCATION: Welsh Power Plant
 PROJECT NO.: S-08-0109
 LOGGED BY: James Meleton, Jr.

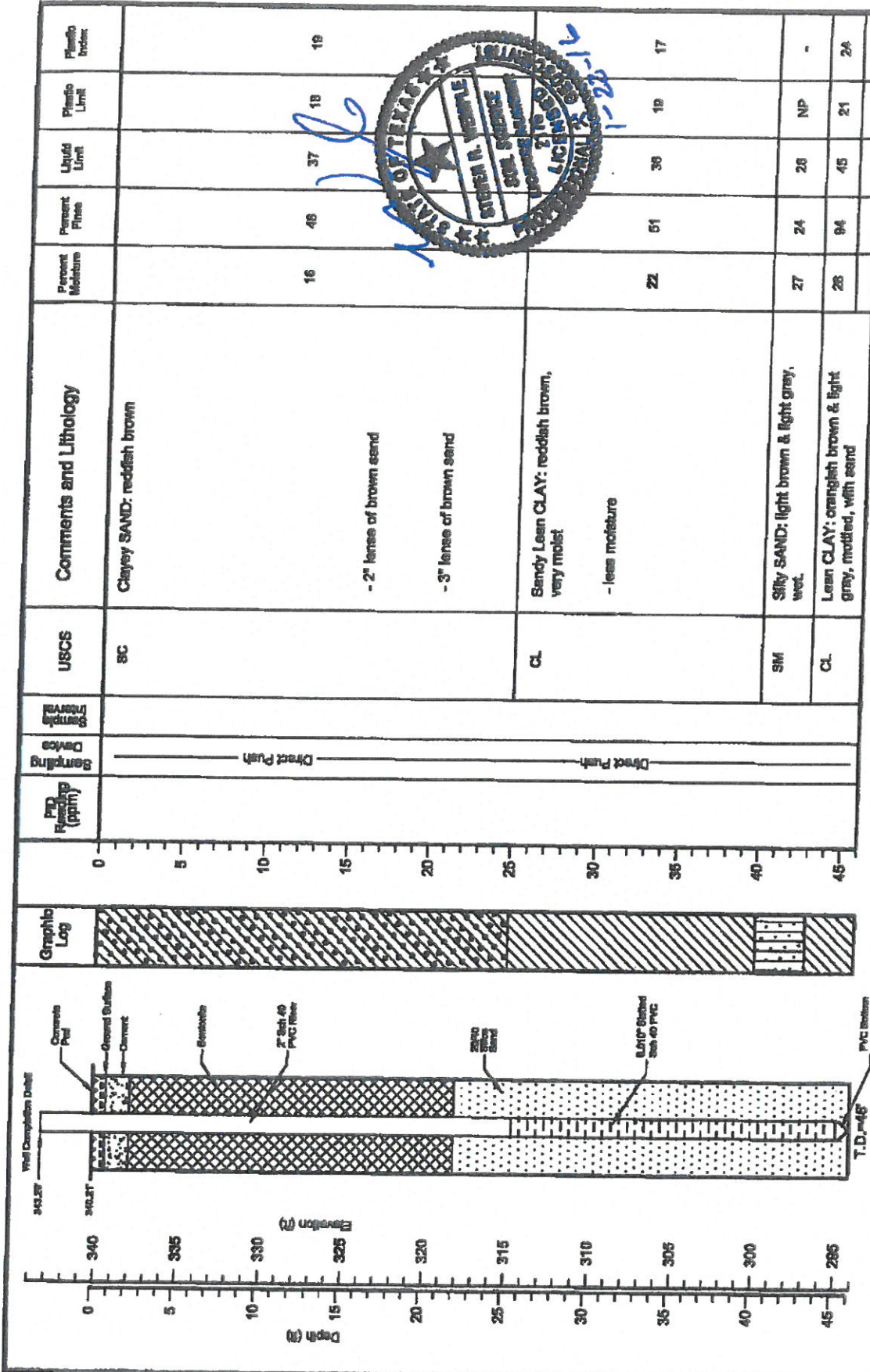
DRILLING CO.: WEST Drilling
 DRILLER: Tom McCullough
 METHOD OF DRILLING: Hollow-stem Auger
 SAMPLING METHODS: Split-spoon
 DATE DRILLED: 9/22/09

NOTES: Latitude: 33.04715
 Longitude: 94.84256

☒ Water level during drilling
 ☒ Water level in completed well
 Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	CORE RECOVERY (Percent)	PID (ppm)	WELL DESCRIPTION	WELL CONSTRUCTION
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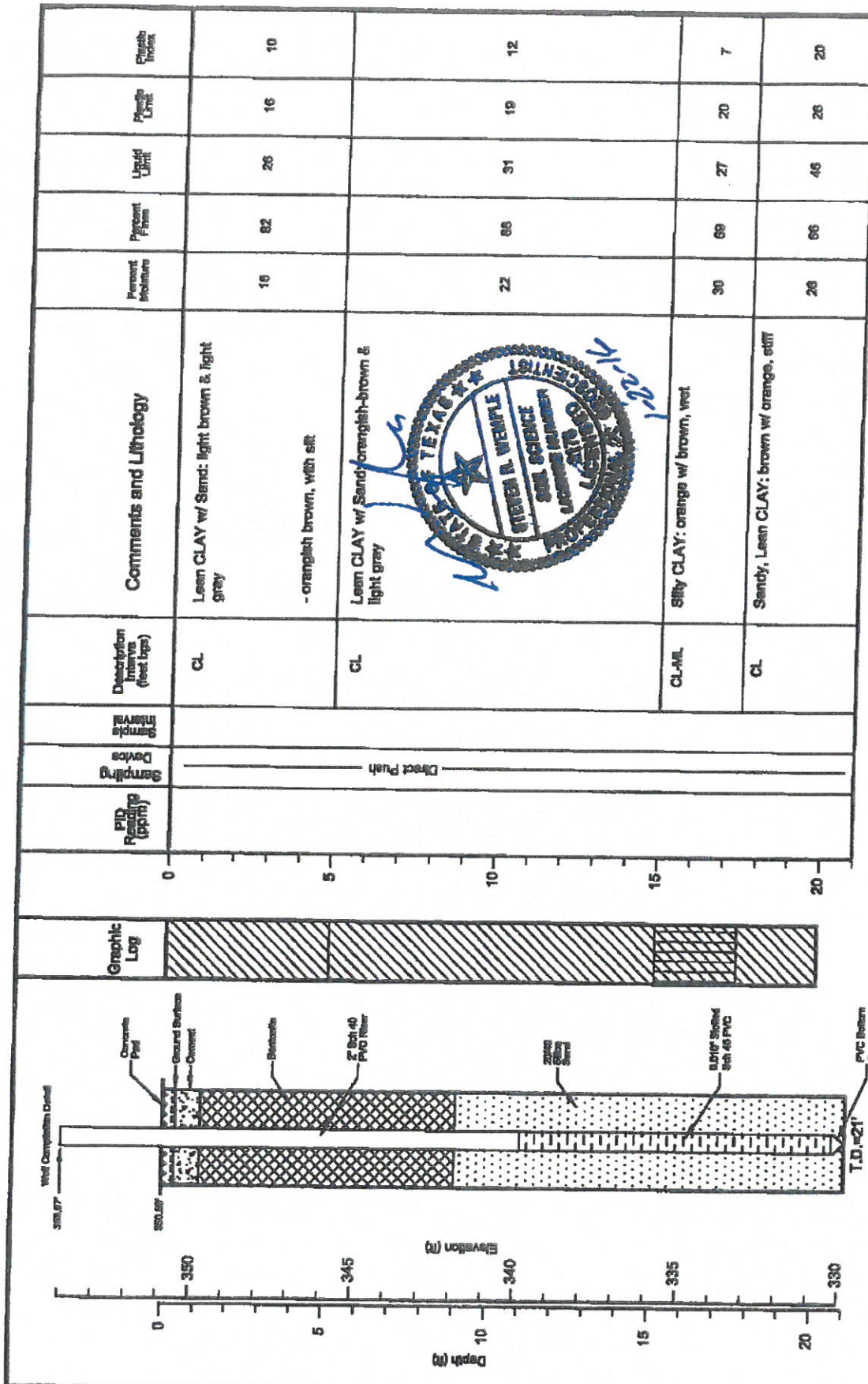


DATE: 12/12/15
 Drilling Method: H.S.A.
 Bit Diameter: 7.25"
 Depth to Water: -

Logged by: Robert Williams, PE
 Driller: Robert Williams
 Date Completed: 12/12/15
 Depth to Product: NA

Welsh Power Station
 Pittsburg, Texas
 DRAWN BY: HOS
 CHECKED BY: SRW

Log of Boring
 AD-15
 PROJECT NO. -
 BORED AS SHOWN
 FILE UNDER: AD-15



Log of Boring AD-16

WELSH POWER STATION
PITTSBURGH, TEXAS

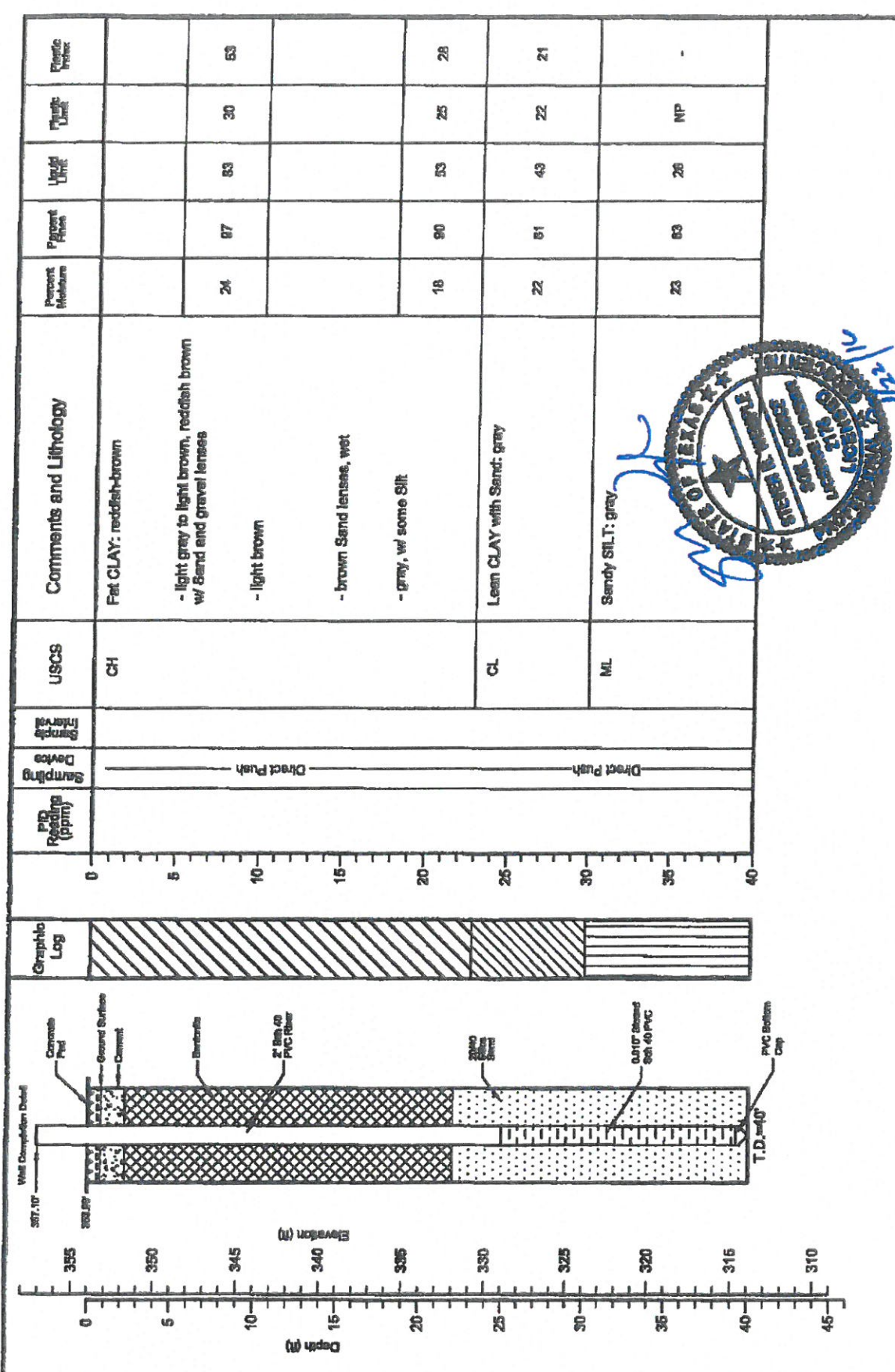
Logged by: Robert Williams, PE
Driller: Robert Williams
Date Completed: 12/10/15
Depth to Product: NA

DATE: 12/10/15
Drilling Method: H.S.A.
Bit Diameter: 7.25"
Depth to Water: --

PROJECT NO.: ---
DRAWN BY: HDS
CHECKED BY: SRW

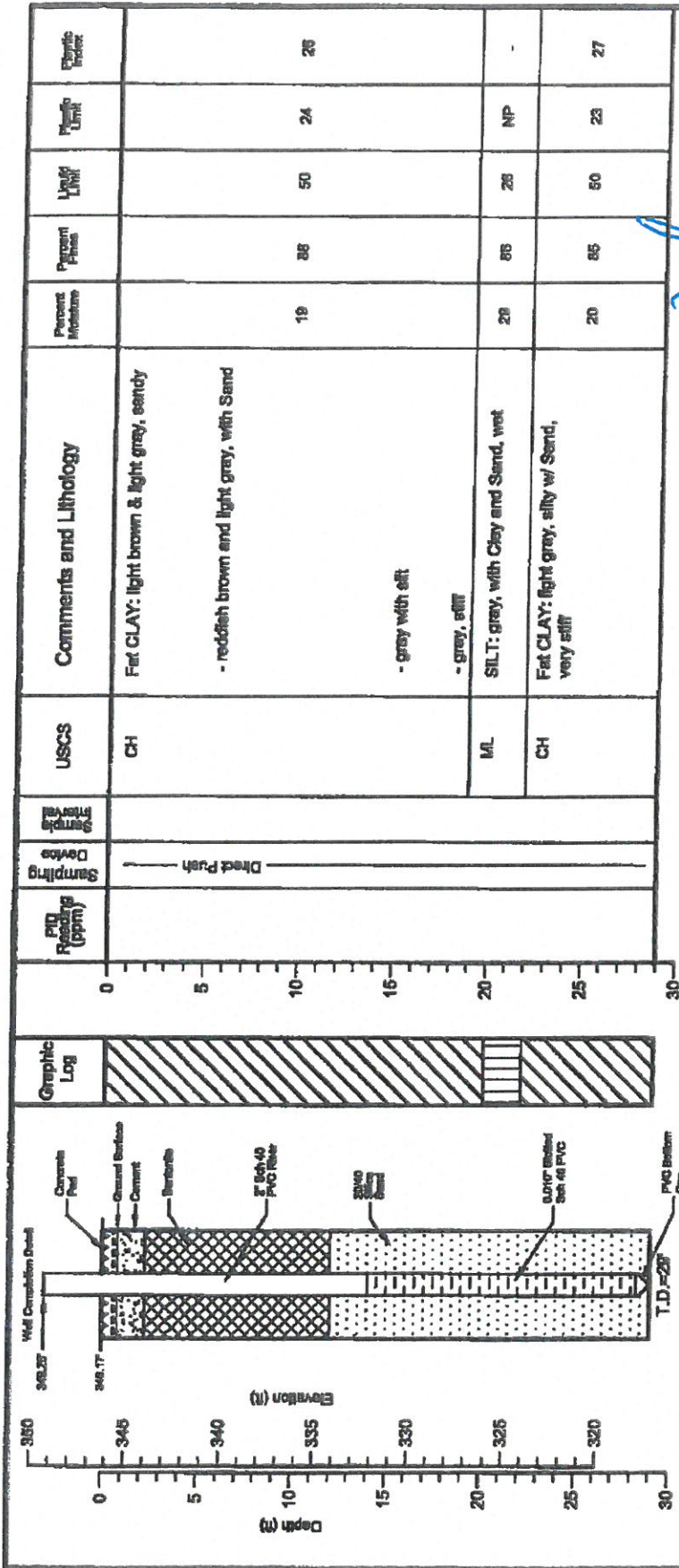
FILE NUMBER: JR Walsh Power Plant LOGS-16g





DATE: 12/10/15		Logged by: Robert Williams, PE		Welsh Power Station Pittsburg, Texas		Log of Boring AD-17	
Drilling Method: H.S.A.		Driller: Robert Williams		DRAWN BY: HDS		PROBATION NO. ---	
Bt Diameter: 7.25"		Date Completed: 12/11/15		CHECKED BY: SRW		SCALE: AS SHOWN	
Depth to Water: --		Depth to Product: NA		PLEASE PRINT OR Make Proper Print Legible			

west
D R I L L I N G
 environmental & geotechnical
 WEST Drilling, Inc.
 101 Industrial Drive
 Waukegan, Illinois 60085



PTD Reading (ppm)	Sampling Depth	USCS	Comments and Lithology	Percent Moisture	Percent Plastic	Liquid Limit	Plastic Limit	Plastic Index
	Direct Push	CH	Fat CLAY: light brown & light gray, sandy - reddish brown and light gray, with Sand - gray with silt - gray, silt	19	38	50	24	26
		ML	SILT: gray, with Clay and Sand, wet	28	86	26	NP	-
		CH	Fat CLAY: light gray, silty w/ Sand, very silt	20	85	60	23	27



DATE: 12/11/15
 Drilling Method: H.S.A.
 Bit Diameter: 7.25"
 Depth to Water: --

Logged by: Robert Williams, PE
 Driller: Robert Williams
 Date Completed: 12/11/15
 Depth to Product: NA

Welsh Power Station
 Pittsburg, Texas
 DRAWN BY: HDS
 CHECKED BY: SRW

Log of Boring
 AD-18

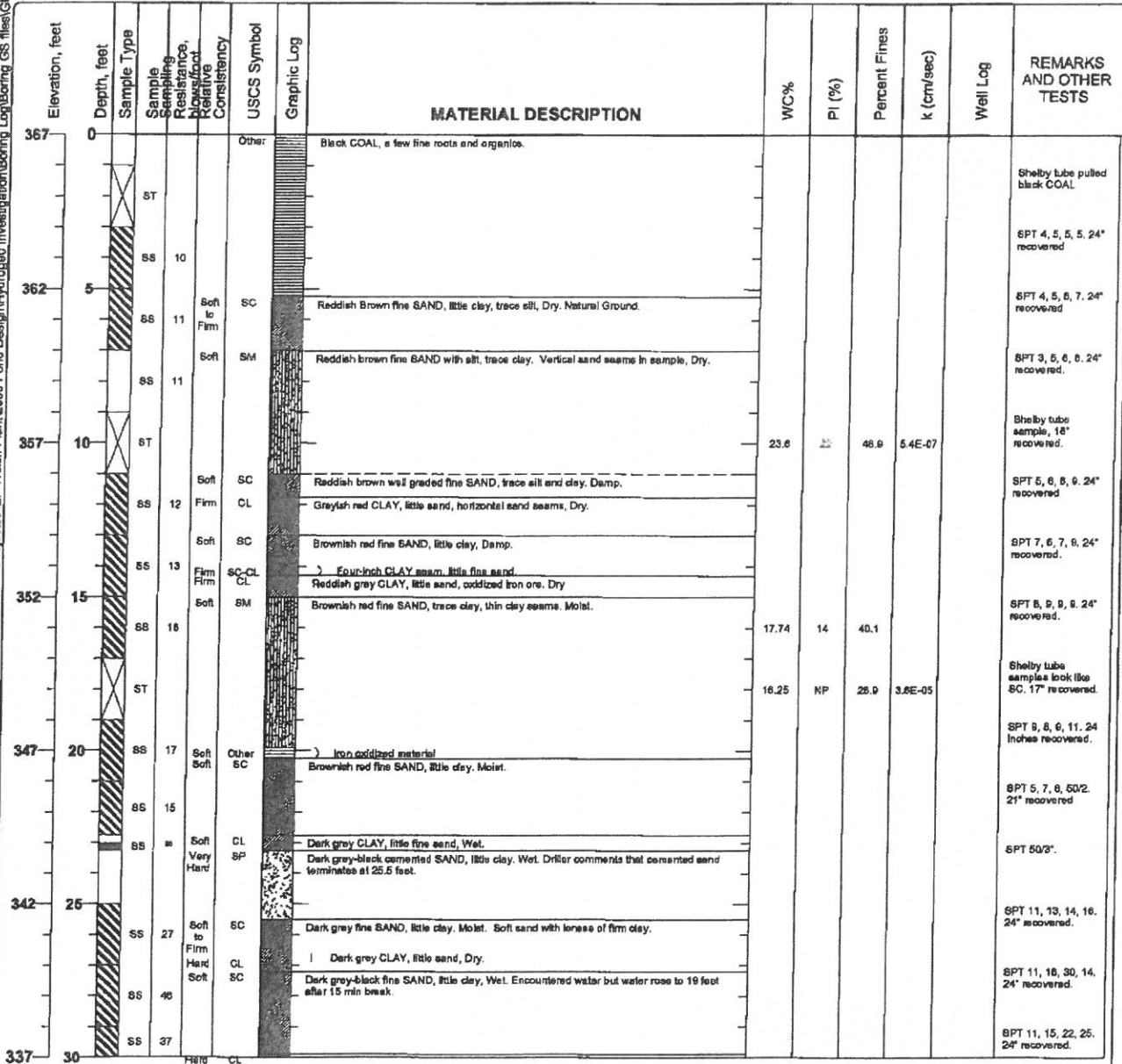
PREPARED BY: --
 SCALE: AS SHOWN
 FILE REFER: 02 Welsh Power Plant Logging

Project: AEP Welsh Power Plant
 Project Location: Cason, TX
 Project Number: TXL0064

Log of Boring GB-1
 Sheet 1 of 2

Date(s) Drilled	July 23, 2009	Logged By	Kush S. Chohan	Checked By	
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type		Total Depth of Borehole	37 feet bgs
Drill Rig Type	Mobil B61	Drilling Contractor	Total Support Services	Approximate Surface Elevation	367 feet MSL
Groundwater Level and Date Measured		Sampling Method(s)	SPT, Tube	Hammer Data	140 lb, 30 in drop, Auto-hammer
Borehole Backfill	Bentonite Chips	Location	On the Northern edge of proposed chemical pond along the screening berm.		

Printed with a trial version of BorinGS - visit www.gookinsoftware.com for purchase information. P:\Projects\AEP Welsh Plant\2009 Pond Design\HydroSpec Investigation\Boring Log\Boring_GS_files\GB-1.bgs [KSC:AEP.rpt]



Figure

Project: AEP Welsh Power Plant
 Project Location: Cason, TX
 Project Number: TXL0064

Log of Boring GB-1
 Sheet 2 of 2

Elevation, feet	Depth, feet	Sample Type	Sample Sampling Resistance, blowcount Relative Consistency	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	WC%	PI (%)	Percent Fines	k (cm/sec)	Well Log	REMARKS AND OTHER TESTS
337	30	SS	37	Hard CL	[Hatched Pattern]	Dark gray CLAY, little fine sand, occasional horizontal sand seams. Wet. (cont.)						SPT 11, 16, 22, 25, 24' recovered.
		SS	29	Soft ML	[Vertical Line Pattern]	Dark grey-black fine SAND, with clay, frequent hard clay lenses (1-3"). Wet.	26.37	NP	57.5			SPT 6, 11, 16, 24, 24' recovered.
332	35	SS	34	Hard CL	[Hatched Pattern]	Black CLAY, trace to little fine sand, trace silt. Dry						SPT 9, 16, 18, 23, 24' recovered.
						Bottom of Boring at 37 feet bgs						
327	40											
322	45											
317	50											
312	55											
307	60											
302	65											

Printed with a trial version of BorntCS - visit www.gsoftsoftware.com for purchase information: P:\Projects\AEP Welsh Plant\2009 Pond Design\Hydrogeo Investigation\Boring Log\Boring_GS_SheetGB-1_Log_BorntCS-AEP.dwg

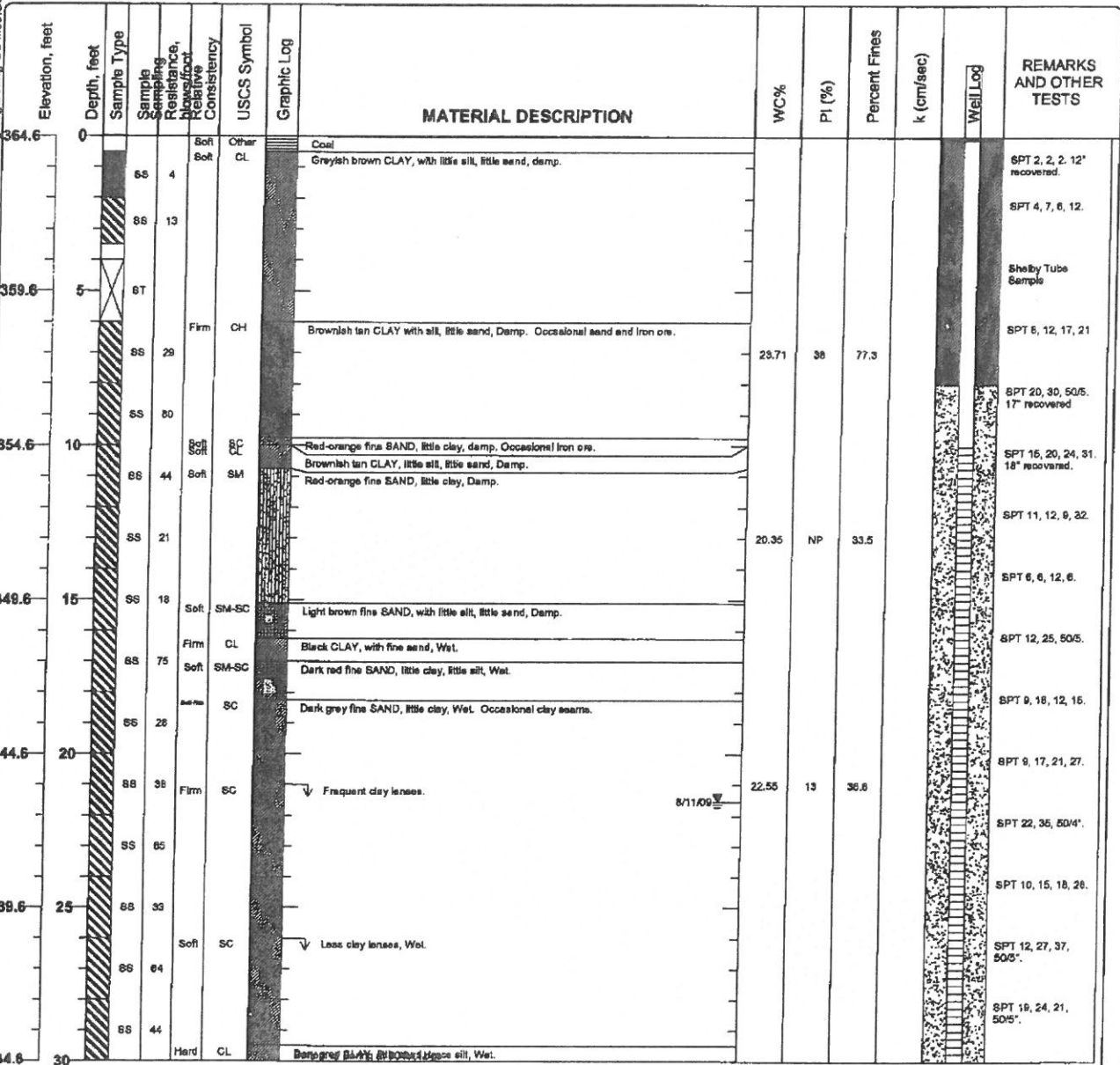
Figure

Project: AEP Welsh Power Plant
 Project Location: Cason, Texas
 Project Number: TXL0064

Log of Boring GB-02
 Sheet 1 of 1

Date(s) Drilled	August 14, 2009	Logged By	Kush S. Chohan	Checked By	
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type		Total Depth of Borehole	30 feet bgs
Drill Rig Type	Mobil B61	Drilling Contractor	Total Support Services	Approximate Surface Elevation	364.56 feet MSL
Groundwater Level and Date Measured	21.53 feet measured on 8/11/09	Sampling Method(s)	SPT, Tube	Hammer Data	140 lb, 30 in drop, rope & cathead
Borehole Backfill	Well Completion	Location	Western edge of proposed chemical pond near perimeter fence.		

Printed with a trial version of BorinGS - visit www.gsoftsoftware.com for purchase information: P:\Projects\AEP Welsh Plant\2009 Pond Design\Hydrogeologic Investigation\Boring Log\Boring GS files\GB-02.rpt [KSC AEP.rpt]



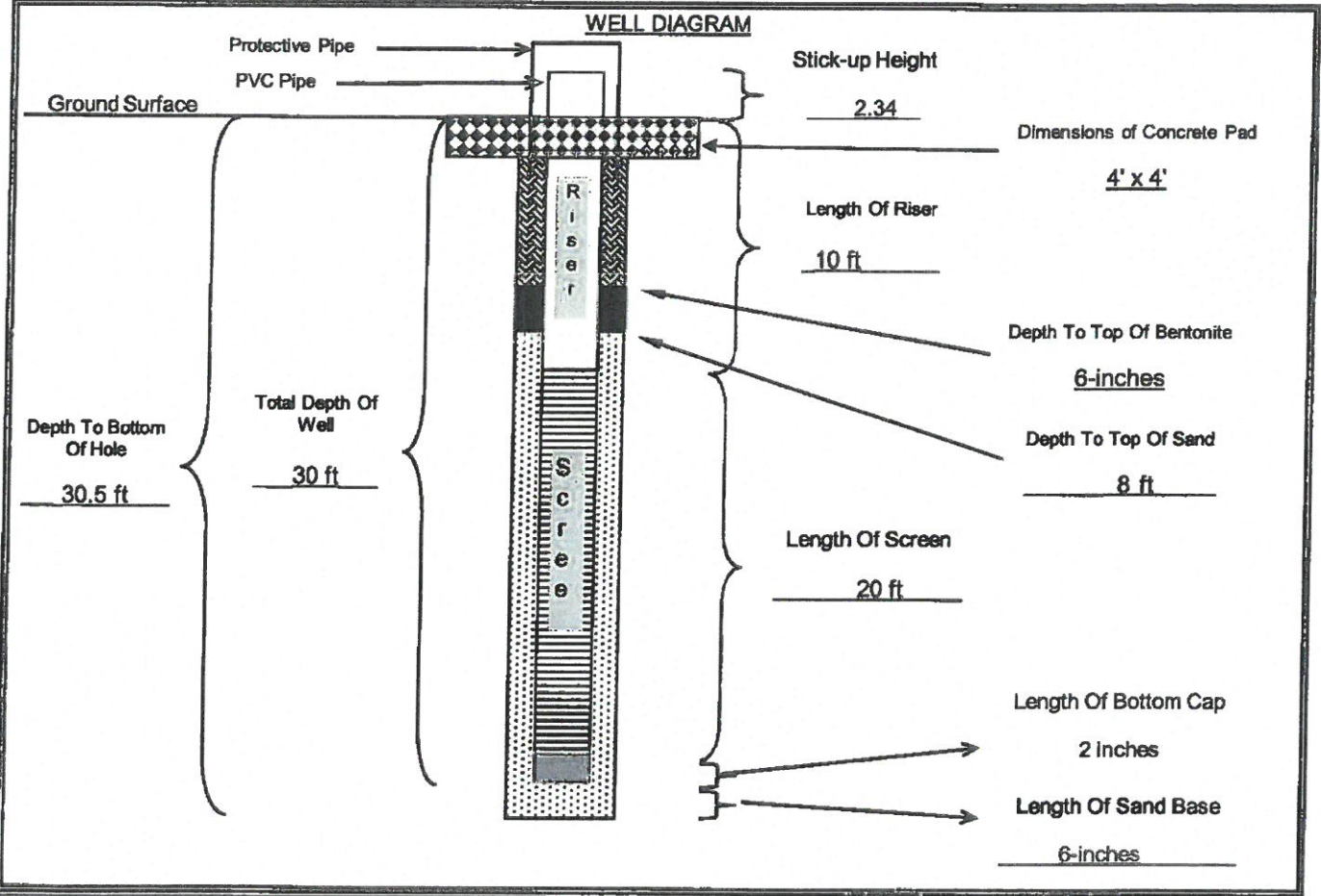
Figure

WELL CONSTRUCTION DIAGRAM - EPA TYPE II WELL (STICK-UP)



JOB NAME: <u>AEP Welsh Power Plant</u>	GB-02
JOB NO.: <u>TXL0064</u>	
DATE/TIME: <u>8/7/2009</u>	WELL NO.:
WELL LOCATION:	FIELD REP: <u>Kush Chohan</u>

GROUND SURFACE ELEVATION: <u>364.56</u> (ft, msl)	BENTONITE TYPE: <u>Western Bentonite</u>
TOP OF SCREEN ELEVATION: <u>354.56</u> (ft, msl)	MANUFACTURER: <u>PDS</u>
BOTTOM OF WELL ELEVATION: <u>334.06</u> (ft, msl)	CEMENT TYPE: <u>Not used-sealed with bentonite chips</u>
NORTHING: <u>747.0223</u> EASTING: <u>-2442.888</u>	CEMENT MANUFACTURER: _____
SCREEN MATERIAL: <u>PVC</u>	SAND PACK TYPE AND SIZE: <u>Silica 20/40</u>
SCREEN MANUFACTURER: _____	SAND MANUFACTURER: <u>Uninum</u>
RISER MATERIAL: <u>PVC</u>	DRILLING CONTRACTOR: <u>Total Support Services</u>
RISER MANUFACTURER: _____	AMOUNT BENTONITE USED: <u>4</u> bags lbs
RISER DIAMETER: <u>2</u> (in) Length: <u>10</u> (ft)	AMOUNT CEMENT USED: _____ bags lbs
SCREEN DIAMETER: <u>2</u> (in) Length: <u>20</u> (ft)	AMOUNT SAND USED: <u>13</u> bags lbs
BOREHOLE DIAMETER: <u>8</u> (in)	STATIC WATER: <u>21.53</u> depth from TOC
DRILLING TECHNIQUE: <u>Hollow stem</u> Size: _____ (in)	ENCOUNTERED WATER: _____ depth from ground



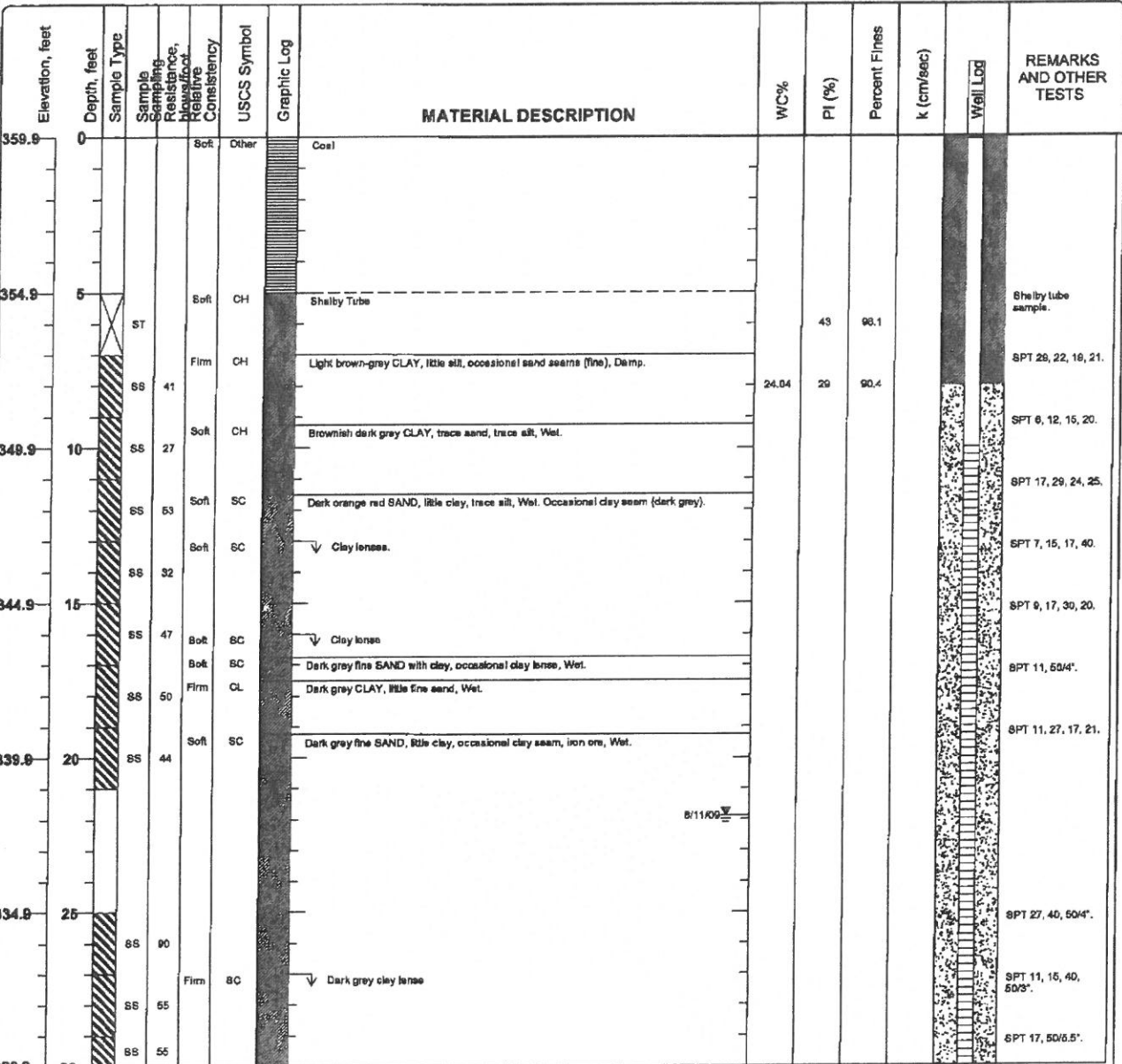
QA/QC	INSTALLED BY: <u>Total Support Services</u>	OBSERVED BY: <u>Kush Chohan</u>
	DATE: <u>August 7th, 2009</u>	CHECKED BY: _____ DATE: _____

Project: AEP Welsh Power Plant
 Project Location: Cason, Texas
 Project Number: TXL0064

Log of Boring GB-03
 Sheet 1 of 2

Date(s) Drilled	August 7, 2009	Logged By	Kush S. Chohan	Checked By	
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type		Total Depth of Borehole	31 feet bgs
Drill Rig Type	Mobil B61	Drilling Contractor	Total Support Services	Approximate Surface Elevation	359.91 feet MSL
Groundwater Level and Date Measured	21.89 feet measured on 8/11/09	Sampling Method(s)	SPT, Tube	Hammer Data	140 lb, 30 in drop, rope & cathead
Borehole Backfill	Well Completion	Location	Southwest corner of proposed chemical pond near screening pile.		

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Figure

Project: AEP Welsh Power Plant
 Project Location: Cason, Texas
 Project Number: TXL0064

Log of Boring GB-03
 Sheet 2 of 2

Elevation, feet	Depth, feet	Sample Type	Sample Sampling Resistance, blows/foot Relative Consistency	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	WC%	PI (%)	Percent Fines	k (cm/sec)	Well Log	REMARKS AND OTHER TESTS
329.9	30	SS	SS	Hard	CL	Dark gray CLAY, trace silt, trace fine sand.						BPT 17, 50/6.5.
						Bottom of Boring at 31 feet bgs						
324.9	35											
319.9	40											
314.9	45											
309.9	50											
304.9	55											
299.9	60											
294.9	65											

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 Log\Boring_CS_BorlogGB03.bgs, KISSC_AEP.plt

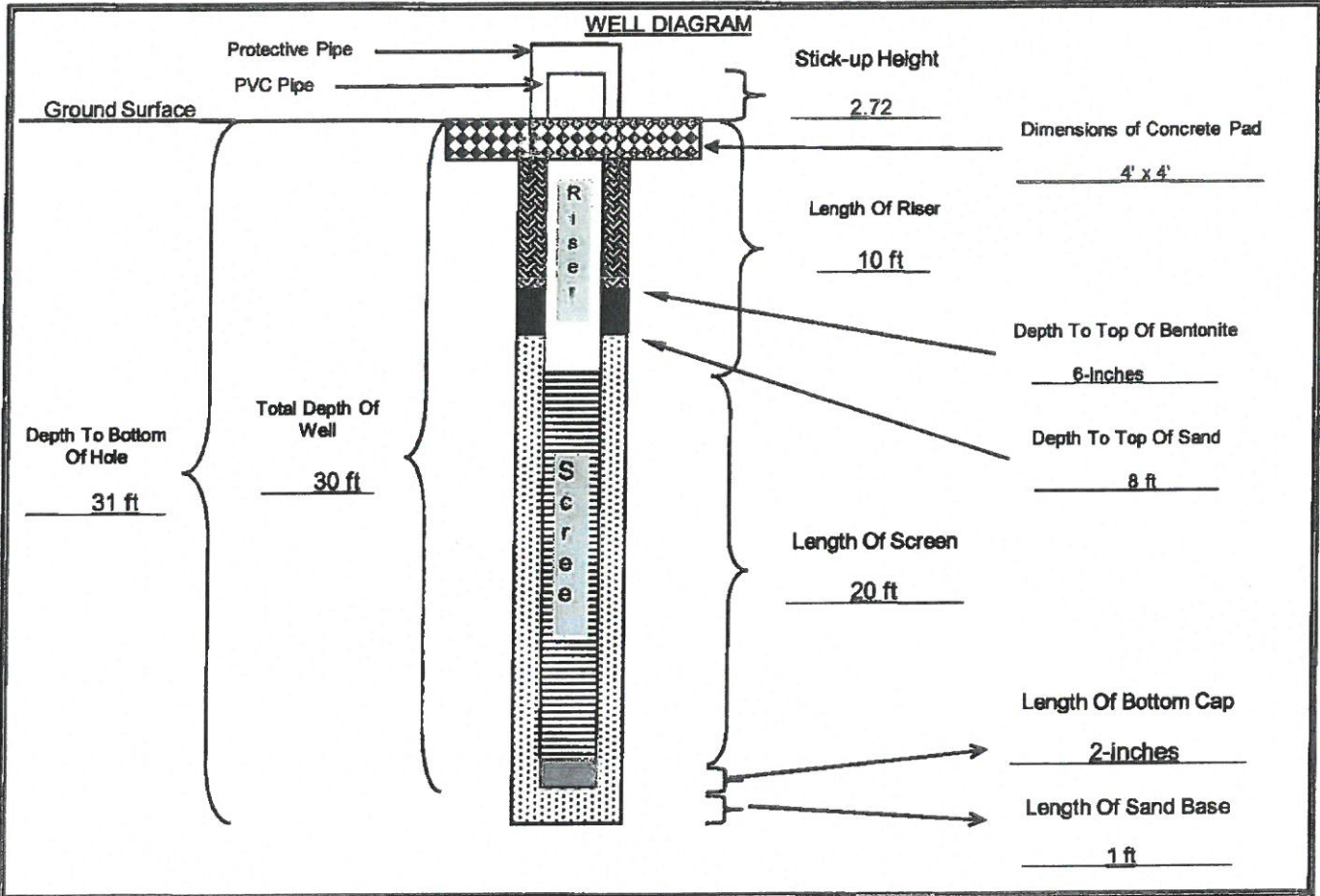
Figure

WELL CONSTRUCTION DIAGRAM - EPA TYPE II WELL (STICK-UP)



JOB NAME: <u>AEP Welsh Power Plant</u>	GB-03
JOB NO.: <u>TXL0064</u>	
DATE/TIME: <u>8/7/2009</u>	WELL NO.:
WELL LOCATION:	FIELD REP: <u>Kush Chohan</u>

GROUND SURFACE ELEVATION: <u>359.57</u> (ft. msl)	BENTONITE TYPE: <u>Western Bentonite</u>
TOP OF SCREEN ELEVATION: <u>349.57</u> (ft. msl)	MANUFACTURER: <u>PDS</u>
BOTTOM OF WELL ELEVATION: <u>328.57</u> (ft. msl)	CEMENT TYPE: <u>None used-sealed with bentonite chips</u>
NORTHING: <u>480.5803</u> EASTING: <u>-2507.6332</u>	CEMENT MANUFACTURER: _____
SCREEN MATERIAL: <u>PVC</u>	SAND PACK TYPE AND SIZE: <u>Silica 20/40</u>
SCREEN MANUFACTURER: _____	SAND MANUFACTURER: <u>Uninum</u>
RISER MATERIAL: <u>PVC</u>	DRILLING CONTRACTOR: <u>Total Support Services</u>
RISER MANUFACTURER: _____	AMOUNT BENTONITE USED: <u>4</u> bags lbs
RISER DIAMETER: <u>2</u> (in) Length: <u>10</u> (ft)	AMOUNT CEMENT USED: _____ bags lbs
SCREEN DIAMETER: <u>2</u> (in) Length: <u>20</u> (ft)	AMOUNT SAND USED: <u>12</u> bags lbs
BOREHOLE DIAMETER: <u>8</u> (in)	STATIC WATER: <u>21.89</u> depth from TOC
DRILLING TECHNIQUE: <u>Hollow Stem</u> Size: <u>8</u> (in)	ENCOUNTERED WATER: _____ depth from ground

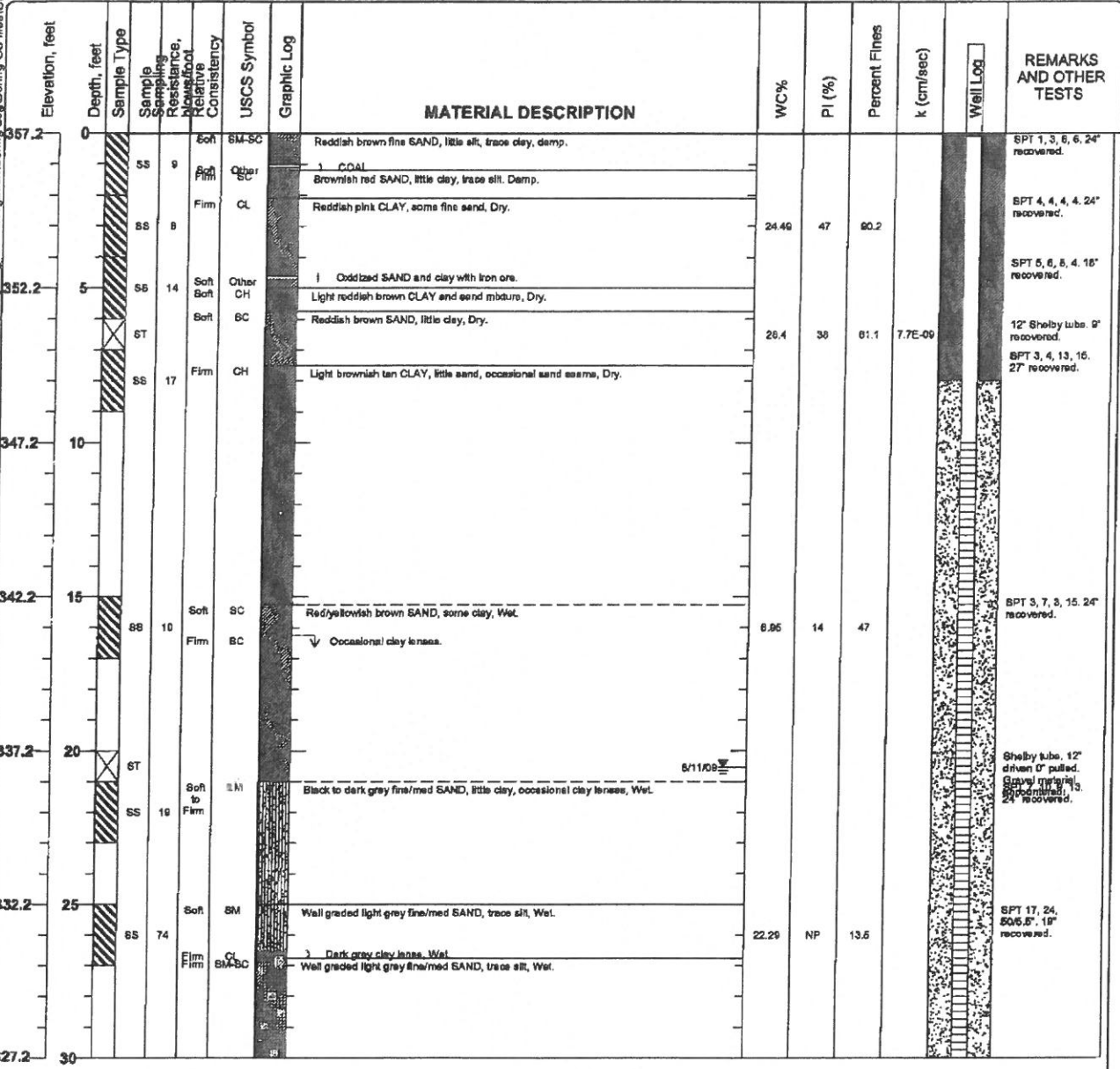


Cement/Bentonite Grout	Sand Pack	Neat Concrete	Bentonite	Bottom Cap
QA/QC	INSTALLED BY: <u>Total Support Services</u>	OBSERVED BY: <u>Kush S. Chohan</u>		
	DATE: <u>7-Aug-09</u>	CHECKED BY: _____	DATE: _____	

Project: AEP Welsh Power Plant
 Project Location: Cason, Texas
 Project Number: TXL0064

Log of Boring GB-04
 Sheet 1 of 2

Date(s) Drilled: July 24, 2009	Logged By: Kush S. Chohan	Checked By:
Drilling Method: Hollow Stem Auger	Drill Bit Size/Type:	Total Depth of Borehole: 34 feet bgs
Drill Rig Type: Mobil B61	Drilling Contractor: Total Support Services	Approximate Surface Elevation: 357.22 feet MSL
Groundwater Level and Date Measured: 20.54 feet measured on 8/11/09	Sampling Method(s): SPT, Tube	Hammer Data: 140 lb, 30 in drop, Auto-hammer
Borehole Backfill: Well Completion	Location: Southeast corner of proposed chemical evaporation pond. Located in a grassy field.	



Figure

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Project: AEP Welsh Power Plant
 Project Location: Cason, Texas
 Project Number: TXL0064

Log of Boring GB-04
 Sheet 2 of 2

Elevation, feet	Depth, feet	Sample Type	Sample Sampling Resistance, lb./sq. foot	Relative Consistency	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	WC%	PI (%)	Percent Fines	K (cm/sec)	Well Log	REMARKS AND OTHER TESTS
327.2	30	ST		Hard	ML		Dark grey CLAY, little sand, Wet.						12' Shelby tube. Bent shaly tube.
		ST						21.3	NP	84.2	2.0E-08		12' Shelby tube.
		SS	38	Hard	CL		Dark grey CLAY, trace sand, Wet.	25.44	18	92.5			SPT 15, 16, 19, 25. 2'4" recovered.
							Bottom of Boring at 34 feet bgs						
322.2	35												
317.2	40												
312.2	45												
307.2	50												
302.2	55												
297.2	60												
292.2	65												

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 Log\Boring_GS_files\GB-04_bgs JKSC-AEP.tbl

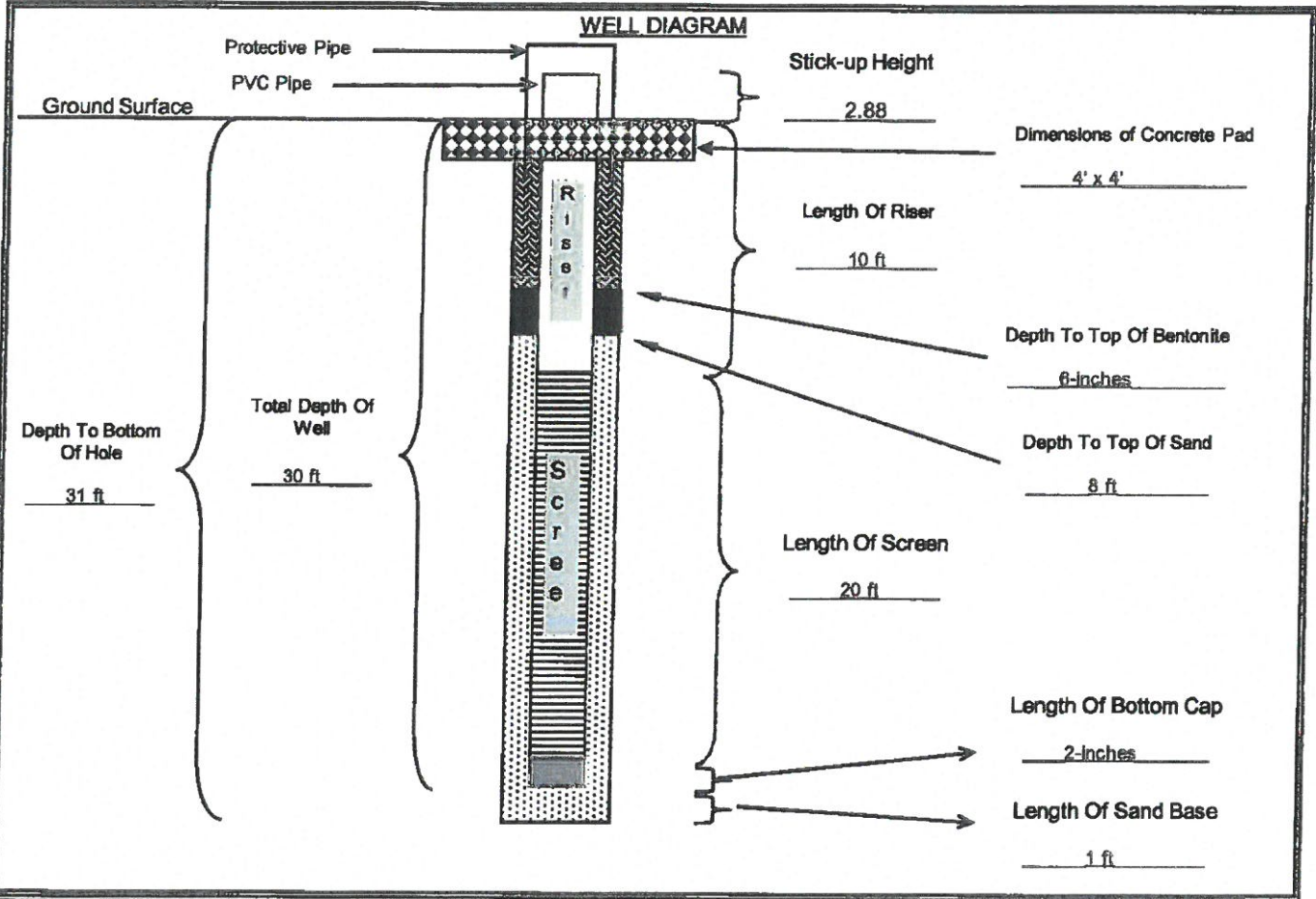
Figure

WELL CONSTRUCTION DIAGRAM - EPA TYPE II WELL (STICK-UP)



JOB NAME: <u>AEP Welsh Power Plant</u>	GB-04
JOB NO.: <u>TXL0064</u>	
DATE/TIME: <u>24-Jul-09</u>	WELL NO.:
WELL LOCATION:	FIELD REP: <u>Kush Chohan</u>

GROUND SURFACE ELEVATION: <u>357.22</u> (ft, msl)	BENTONITE TYPE: <u>Western Bentonite</u>
TOP OF SCREEN ELEVATION: <u>347.22</u> (ft, msl)	MANUFACTURER: <u>PDS</u>
BOTTOM OF WELL ELEVATION: <u>326.22</u> (ft, msl)	CEMENT TYPE: _____
NORTHING: <u>-384.9666</u> EASTING: <u>-2353.7375</u>	CEMENT MANUFACTURER: _____
SCREEN MATERIAL: <u>PVC</u>	SAND PACK TYPE AND SIZE: <u>Silica 20/40</u>
SCREEN MANUFACTURER: _____	SAND MANUFACTURER: <u>Uninum</u>
RISER MATERIAL: <u>PVC</u>	DRILLING CONTRACTOR: <u>Total Support Services</u>
RISER MANUFACTURER: _____	AMOUNT BENTONITE USED: <u>3</u> bags lbs
RISER DIAMETER: <u>2</u> (in) Length: <u>10</u> (ft)	AMOUNT CEMENT USED: _____ bags lbs
SCREEN DIAMETER: <u>2</u> (in) Length: <u>20</u> (ft)	AMOUNT SAND USED: <u>7</u> bags lbs
BOREHOLE DIAMETER: <u>6.75</u> (in)	STATIC WATER: <u>20.54</u> depth from TOC
DRILLING TECHNIQUE: <u>Hollow Stem</u> Size: <u>6.75</u> (in)	ENCOUNTERED WATER: _____ depth from ground



Cement/Bentonite Grout	Sand Pack	Neat Concrete	Bentonite	Bottom Cap

QA/QC	INSTALLED BY: <u>Total Support Services</u>	OBSERVED BY: <u>Kush S. Chohan</u>
	DATE: <u>24-Jul-09</u>	CHECKED BY: _____ DATE: _____

Project: AEP Welsh Power Plant
 Project Location: Cason, Texas
 Project Number: TXL0064

Log of Boring GB-05
 Sheet 1 of 2

Date(s) Drilled	July 24, 2009	Logged By	Kush S. Chohan	Checked By	
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type		Total Depth of Borehole	30.5 feet bgs
Drill Rig Type	Mobil B61	Drilling Contractor	Total Support Services	Approximate Surface Elevation	357.49 feet MSL
Groundwater Level and Date Measured	15.3 feet measured on 8-11-09	Sampling Method(s)	SPT, Tube	Hammer Data	140 lb, 30 in drop, Auto-hammer
Borehole Backfill	Well Completion	Location	Eastern edge of proposed chemical evaporation pond.		

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Elevation, feet	Depth, feet	Sample Type	Sample Resistance, blows/foot	Relative Consistency	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	W/C%	PI (%)	Percent Fines	k (cm/sec)	Well Log	REMARKS AND OTHER TESTS
357.5	0	SS	7	Firm	CH	Dark fine SAND with brown organic material and roots.							SPT 2, 2, 5, 6, 24' recovered
	5	SS	11	Firm	CH	Dark red/gray CLAY, trace silt. Dry.	23.37	44	88.8				BPT 4, 4, 7, 9, 24' recovered.
	10	SS	14	Firm	CH	Trace of sand					7E-07		SPT 5, 5, 8, 13, 24' recovered
352.5	15	ST	18	Firm	CH	Dark red fine SAND, trace clay, Damp.	16.5	41	73.8	3.2E-08			Shelby tube. Pushed 12' recovered. BPT 5, 7, 11, 24' recovered.
	20	SS	18	Soft	SC	Light tan CLAY, trace sand, Dry.							SPT 5, 7, 11, 14, 24' recovered.
	25	SS	18	Soft	SC	Dark red SAND, trace of CLAY, Damp.							SPT 5, 7, 11, 14, 24' recovered.
	30	SS	18	Soft	SC	Light tan CLAY, trace fine sand, Dry.							SPT 5, 7, 11, 14, 24' recovered.
347.5	35	SS	35	Soft	SC	Dark red SAND, little clay, frequent clay seams. Damp							SPT 11, 22, 13, 14, 24' recovered.
	40	SS	77	Firm	CL	Frequent clay seams							SPT 17, 27, 50.5', 17' recovered.
	45	ST	77	Firm	CL	Brownish grey CLAY, trace sand, Moist.							SPT 17, 27, 50.5', 17' recovered.
342.5	50	ST	77	Firm	CL	Tanish grey fine SAND, some clay, Wet.	19.9	13	35.7	8.6E-07			Shelby tube. Pushed 12' recovered. BPT 11, 13, 10, 14, 24' recovered.
	55	SS	23	Soft	SM	Dark grey coarse SAND/GRAVEL mix, some fine sand, trace clay, Wet.	27.08	NP	32.3				BPT 7, 6, 11, 13, 24' recovered.
	60	SS	19	Soft	SM-SC	Red fine SAND, trace clay, Moist. cemented. Moist.							BPT 7, 6, 11, 13, 24' recovered.
	65	SS	22	Firm	SC	Black fine SAND, occasional clay, Wet.							SPT 8, 10, 12, 15, 24' recovered.
	70	SS	22	Firm	SM	Dark grey CLAY, little sand, Wet.	32.23	NP	35.5				SPT 8, 11, 17, 21, 24' recovered.
	75	SS	22	Firm	SM	Black fine SAND, some medium sand, some clay, Wet.							SPT 8, 11, 17, 21, 24' recovered.
	80	SS	28	Firm	SM	Dark grey CLAY, little sand, Wet.							SPT 8, 11, 17, 21, 24' recovered.
	85	SS	28	Firm	SM	Frequent clay seams							SPT 8, 11, 17, 21, 24' recovered.
	90	SS	28	Firm	SM	Frequent clay seams.							SPT 8, 11, 17, 21, 24' recovered.
332.5	95	SS	40	Hard	CL	Dark grey CLAY, trace of sand, Dry.							Shelby tube. 12' driven 0' recovered. BPT 15, 18, 21, 27, 24' recovered.
	100	SS	22	Very Hard	CL	Dark grey CLAY, frequent iron zones/ore. Rig chatter driller comments	24.8	15	76.0	1.0E-07			SPT 10, 11, 11, 50.5', 23' recovered.
327.5	105	SS	22	Very Hard	CL	Dark grey CLAY, frequent iron zones/ore. Rig chatter driller comments	24.8	15	76.0	1.0E-07			Shelby tube. 12' driven 8' recovered.

Figure

Project: AEP Welsh Power Plant
 Project Location: Cason, Texas
 Project Number: TXL0064

Log of Boring GB-05
 Sheet 2 of 2

Elevation, feet	Depth, feet	Sample Type	Sample Sampling	Resistance, blow/foot	Relative Consistency	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	WC%	PI (%)	Percent Fines	k (cm/sec)	Well Log	REMARKS AND OTHER TESTS
327.5	30	X	ST		Hard	CL		Dark grey CLAY, trace of sand, Dry. (cont.) Bottom of Boring at 30.5 feet bgs	24.9	15	75.0	1.0E-07		Shelby tube, 12" driven & recovered.
322.5	35													
317.5	40													
312.5	45													
307.5	50													
302.5	55													
297.5	60													
292.5	65													

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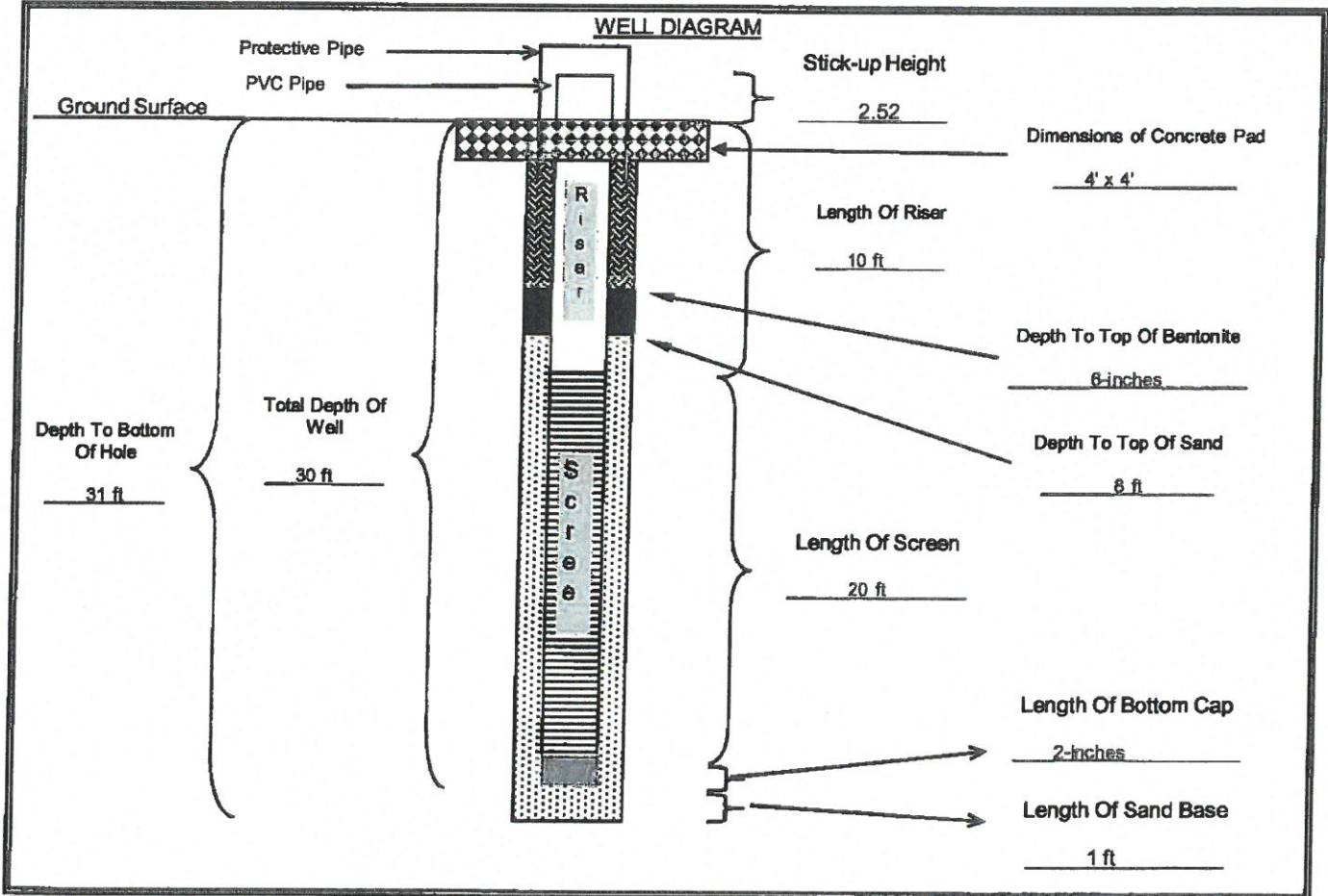
Figure

WELL CONSTRUCTION DIAGRAM - EPA TYPE II WELL (STICK-UP)



JOB NAME: <u>AEP Welsh Power Plant</u>	GB-05
JOB NO.: <u>TXL0064</u>	
DATE/TIME: <u>August 6 2009</u>	WELL NO.:
WELL LOCATION:	FIELD REP: <u>Kush Chohan</u>

GROUND SURFACE ELEVATION: <u>357.49</u> (ft, msl)	BENTONITE TYPE: <u>Western Bentonite</u>
TOP OF SCREEN ELEVATION: <u>347.49</u> (ft, msl)	MANUFACTURER: <u>PDS</u>
BOTTOM OF WELL ELEVATION: <u>326.49</u> (ft, msl)	CEMENT TYPE: _____
NORTHING: <u>529.1865</u> EASTING: <u>-2243.9973</u>	CEMENT MANUFACTURER: _____
SCREEN MATERIAL: <u>PVC</u>	SAND PACK TYPE AND SIZE: <u>Silica 20/40</u>
SCREEN MANUFACTURER: _____	SAND MANUFACTURER: <u>Uninum</u>
RISER MATERIAL: <u>PVC</u>	DRILLING CONTRACTOR: <u>Total Support Services</u>
RISER MANUFACTURER: _____	AMOUNT BENTONITE USED: <u>3</u> bags lbs
RISER DIAMETER: <u>2</u> (in) Length: <u>10</u> (ft)	AMOUNT CEMENT USED: _____ bags lbs
SCREEN DIAMETER: <u>2</u> (in) Length: <u>20</u> (ft)	AMOUNT SAND USED: <u>7</u> bags lbs
BOREHOLE DIAMETER: <u>8</u> (in)	STATIC WATER: <u>17.33</u> depth from TOC
DRILLING TECHNIQUE: <u>Hollow Stem</u> Size: <u>8</u> (in)	ENCOUNTERED WATER: _____ depth from ground

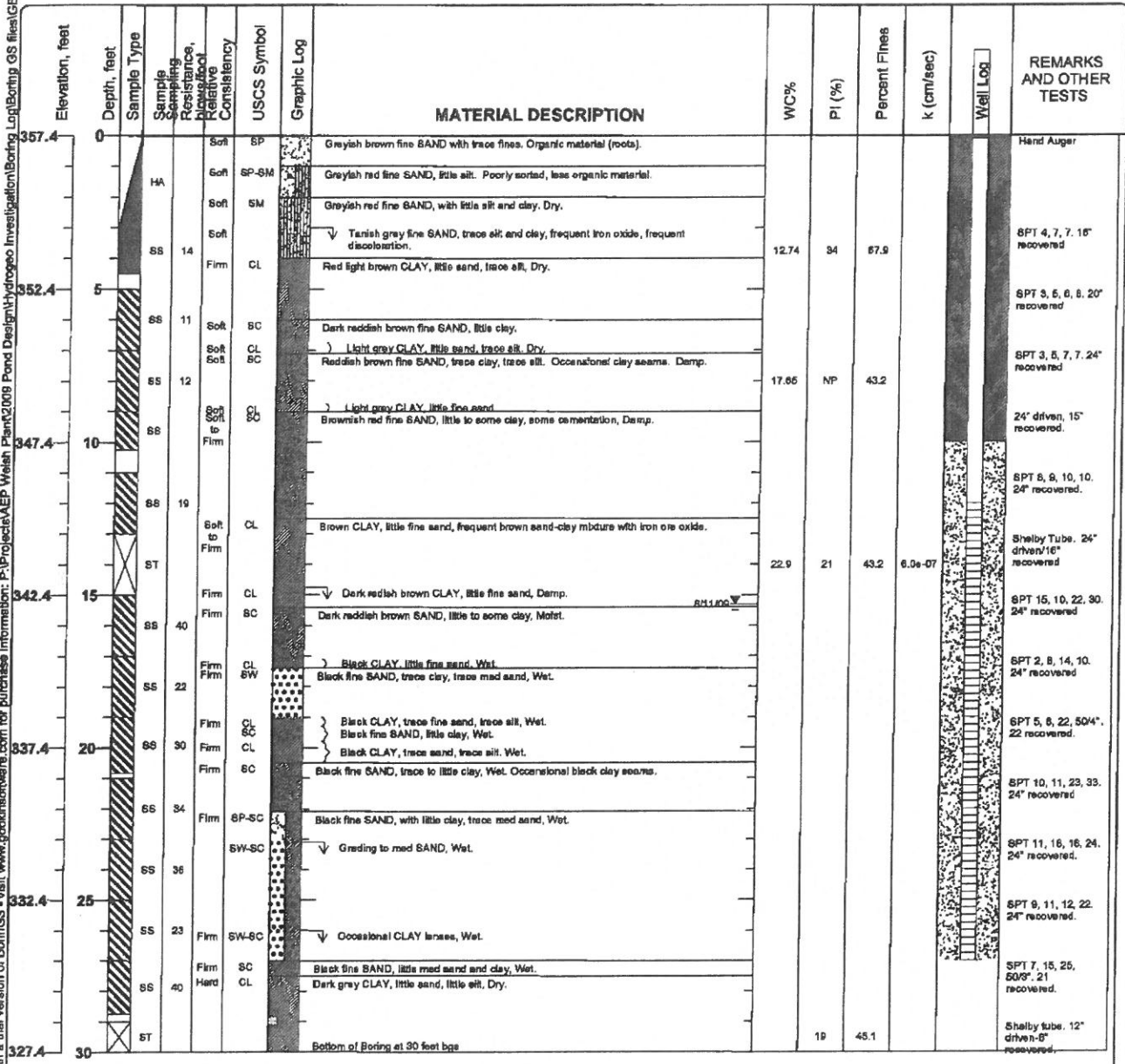


Cement/Bentonite Grout	Sand Pack	Neat Concrete	Bentonite	Bottom Cap
QA/QC	INSTALLED BY: <u>Total Support Services</u>	OBSERVED BY: <u>Kush Chohan</u>		
	DATE: <u>6-Aug-09</u>	CHECKED BY: _____	DATE: _____	

Project: AEP Welsh Power Plant
 Project Location: Cason, Texas
 Project Number: TXL0064

Log of Boring GB-06
 Sheet 1 of 1

Date(s) Drilled: 7/23/2009	Logged By: Kush S. Chohan	Checked By:
Drilling Method: Hollow Stem Auger	Drill Bit Size/Type:	Total Depth of Borehole: 30 feet bgs
Drill Rig Type: Mobil B61	Drilling Contractor: Total Support Services	Approximate Surface Elevation: 357.41 feet MSL
Groundwater Level and Date Measured: 15.3 feet measured on 8/11/09	Sampling Method(s): SPT, Tube, Other	Hammer Data: 140 lb, 30 in drop, auto hammer
Borehole Backfill: Well Completion	Location: Northeast corner of proposed chemical pond in the middle of open grass field.	



Figure

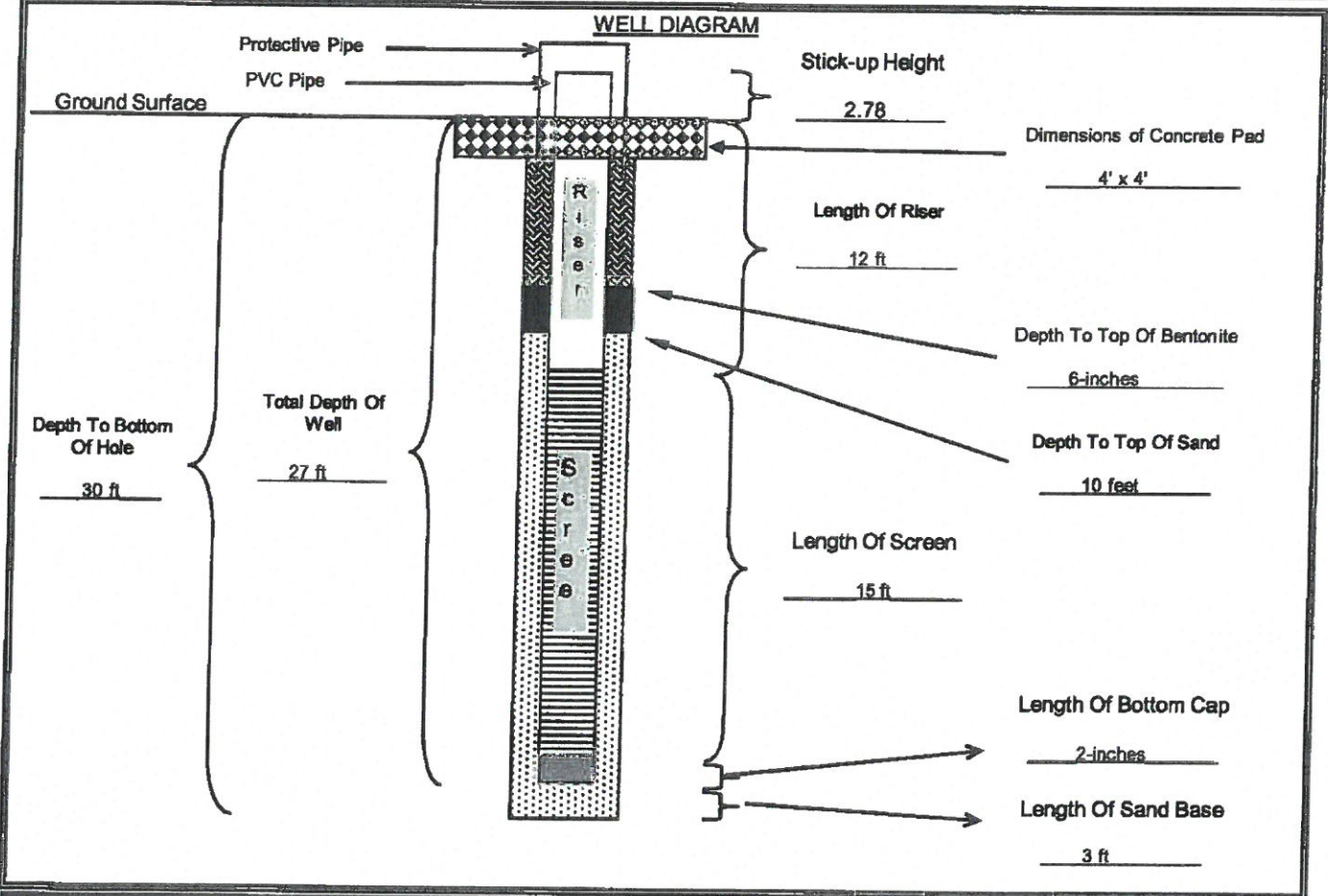
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WELL CONSTRUCTION DIAGRAM - EPA TYPE II WELL (STICK-UP)



JOB NAME: <u>AEP Welsh Power Plant</u>	GB-06
JOB NO.: <u>TXL0084</u>	
DATE/TIME: <u>23-Jul-09</u>	WELL NO.:
WELL LOCATION:	FIELD REP: <u>Kush Chohan</u>

GROUND SURFACE ELEVATION: <u>357.41</u> (ft, msl)	BENTONITE TYPE: <u>Western Bentonite</u>
TOP OF SCREEN ELEVATION: <u>345.41</u> (ft, msl)	MANUFACTURER: <u>PDS</u>
BOTTOM OF WELL ELEVATION: <u>327.41</u> (ft, msl)	CEMENT TYPE: _____
NORTHING: <u>740.4893</u> EASTING: <u>-2166.134</u>	CEMENT MANUFACTURER: _____
SCREEN MATERIAL: <u>PVC</u>	SAND PACK TYPE AND SIZE: <u>Silica 20/40</u>
SCREEN MANUFACTURER: _____	SAND MANUFACTURER: <u>Uninum</u>
RISER MATERIAL: <u>PVC</u>	DRILLING CONTRACTOR: <u>Total Support Services</u>
RISER MANUFACTURER: _____	AMOUNT BENTONITE USED: <u>2.5</u> bags lbs
RISER DIAMETER: <u>2</u> (in) Length: <u>12</u> (ft)	AMOUNT CEMENT USED: _____ bags lbs
SCREEN DIAMETER: <u>2</u> (in) Length: <u>15</u> (ft)	AMOUNT SAND USED: <u>7</u> bags lbs
BOREHOLE DIAMETER: <u>6.75</u> (in)	STATIC WATER: <u>15.3</u> depth from TOC
DRILLING TECHNIQUE: <u>Hollow Stem</u> Size: <u>6.75</u> (in)	ENCOUNTERED WATER: _____ depth from ground



Cement/Bentonite Grout	Sand Pack	Neat Concrete	Bentonite	Bottom Cap

QA/QC	INSTALLED BY: <u>Total Support Services</u>	OBSERVED BY: <u>Kush Chohan</u>
	DATE: <u>23-Jul-09</u>	CHECKED BY: _____ DATE: _____



SOIL BORING LOG

BORING/WELL NO.: GB-07/MW-7
 TOTAL DEPTH: 34'
 TOP OF CASING ELEV.: 362.75 ft. NGVD
 GROUND SURFACE ELEV.: 360.20 ft. NGVD

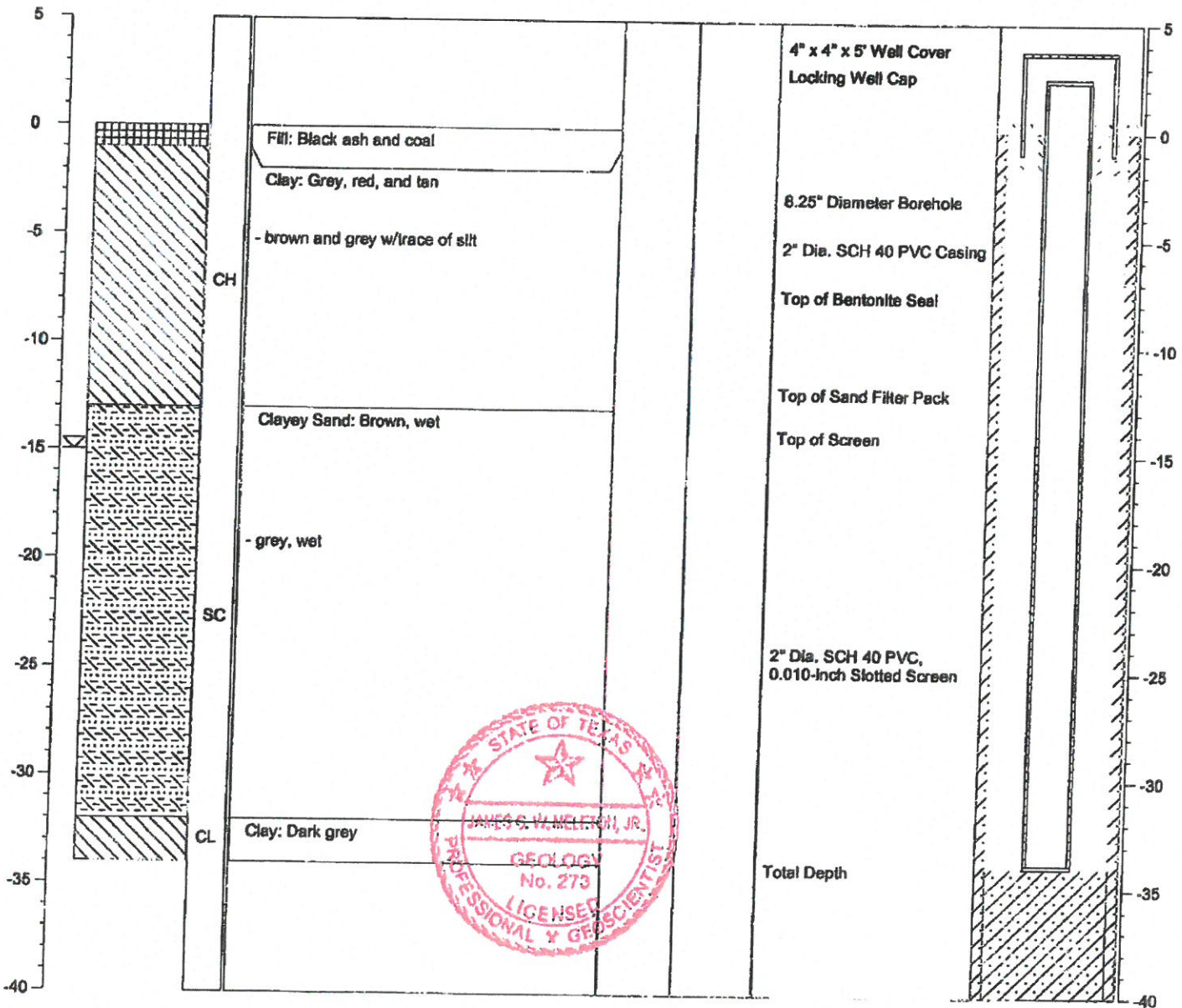
CLIENT: AEP
 PROJECT: Metal Cleaning Waste Pond
 SITE LOCATION: Welsh Power Plant
 PROJECT NO.: S-08-0120
 LOGGED BY: James Meleton, Jr.

DRILLING CO.: WEST Drilling
 DRILLER: Tom McCullough
 METHOD OF DRILLING: Hollow-stem Auger
 SAMPLING METHODS: Split-spoon
 DATE DRILLED: 12/1/09

NOTES: Latitude: 33.05455
 Longitude: 94.84674

≡ Water level during drilling
 ≡ Water level in completed well
 Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	CORE RECOVERY (Percent)	PID (ppm)	WELL DESCRIPTION	WELL CONSTRUCTION
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**ETTL
ENGINEERS &
CONSULTANTS**

MAIN OFFICE
1717 East Ewln
Tyler, Texas 75702
(803) 595-4421

LOG OF BORING B-1

PROJECT: Welsh Power Plant
Pittsburgh, Texas
PROJECT NO.: G3242-09

BORING TYPE: Flight Auger

DATE

10/27/08

SURFACE ELEVATION
324.1

DEPTH (ft)	USC	GEOLOGIC UNIT	WATER LEVEL	FIELD STRENGTH DATA	BLOW COUNT	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (ksf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psf)	Natural Moisture Content and Atterberg Limits	MOISTURE CONTENT (%)			OTHER TESTS PERFORMED (Page Ref. #)		
											TL	PL	PI			
0											20	54	16	38	63	+40 Sieve=10% +4 Sieve=1%
5	CL	SANDY LEAN CLAY (CL) very stiff; brownish orange		P=4.0 SF	1						30	30	15	30		
	SM	SILTY SAND (SM) tannish orange		N=7	2						40	35	15	35		
	CH	SANDY FAT CLAY (CH) medium stiff; tannish orange -stiff		P=1.5	3						50	30	15	30		
10	SC	CLAYEY SAND (SC) medium dense; tannish orange; with clay seams		P=1.75	4						60	30	15	30		
	CL	SANDY LEAN CLAY (CL) stiff; orange		N=15							70	30	15	30		
15	SC	CLAYEY SAND (SC) medium dense; orange; saturated; with iron oxide cemented sandstone rock		N=35							80	30	15	30		
20	CL	LEAN CLAY WITH SAND (CL) hard; dark gray; with clay seams		P=4.5+							21	41	21	20	75	+40 Sieve=2% +4 Sieve=0%
25	CL	SANDY LEAN CLAY (CL) hard; dark brown		P=4.5+							15	33	17	16	52	+40 Sieve=1% +4 Sieve=0%
30		-grayish brown; laminated with silt														
		Bottom of Boring @ 30'														

Key to Abbreviations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (ksf)
T - Torvane (ksf)
L - Lab Vane Shear (ksf)

Notes:
GPS Coordinates: N 33°03.080', W 94°50.417'

Water Level
Water Observations:
Seepage @ 5' while drilling. Water level @ 4' and open to 30' upon completion.

Piezo B-2

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MAIN OFFICE
 1717 East Erwin
 Tyler, Texas 75702
 (800) 595-4421

PROJECT: Welsh Power Plant
 Pittsburg, Texas

PROJECT NO.: G3242-09

LOG OF BORING B-2

BORING TYPE: Flight Auger

DATE

10/28/09

SURFACE ELEVATION
 339.7

DEPTH (ft)	USC	GEOLOGIC UNIT	WATER LEVEL	FIELD STRENGTH DATA	BLOW COUNT				DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (ksf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psf)	Atterberg Limits		MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			OTHER TESTS PERFORMED (Page Ref. #)
					1	2	3	4					PL	LL		PL	PL	LI	
0																			
5	CL	SANDY LEAN CLAY (CL) hard; red and tan		P=4.5+									13	28	14	14	61	+40 Sieve=3%, +4 Sieve=0%	
5		-very stiff		P=3.5									14	40	16	24	65	+40 Sieve=0%, +4 Sieve=0%	
5		-stiff		N=14									13	30	14	16	58	+40 Sieve=0%, +4 Sieve=0%	
5		-very stiff, reddish brown		P=2.75									14	30	14	16	58	+40 Sieve=0%, +4 Sieve=0%	
15	CL	SANDY LEAN CLAY (CL) hard; red and tan		P=4.5+									14	34	15	19	54	+40 Sieve=0%, +4 Sieve=0%	
15		-very stiff		P=3.5									14	34	15	19	54	+40 Sieve=0%, +4 Sieve=0%	
25				P=4.0									15	37	16	21	47	+40 Sieve=5%, +4 Sieve=3%	
30	SC	CLAYEY SAND (SC) medium dense; tan, red, and gray		P=4.5									15	37	16	21	47	+40 Sieve=5%, +4 Sieve=3%	

Key to Abbreviations:
 N - SPT Data (Blows/Ft)
 P - Proctor Parameters (ksf)
 T - Torvane (ksf)
 L - Lab Vane Shear (ksf)

Water Observations:
 completion.
 Water level @ 19' and open to 24' upon completion.

Notes:
 GPS Coordinates: N 33°03.078', W 94°50.449'



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MATERIAL DESCRIPTION

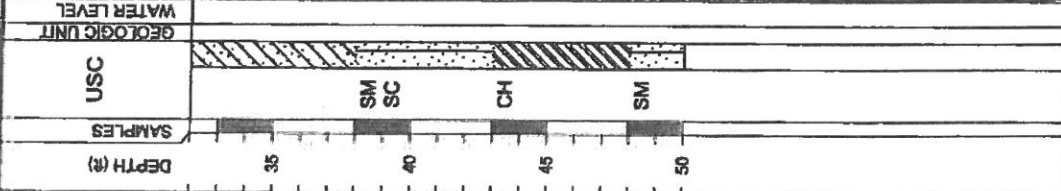
-red and tan

SILTY CLAYEY SAND(SM-SC) red, tan, and gray; saturated

FAT CLAY(CH) hard; brown, tan, and gray; with ferric joints; with lignite and sand seams

SILTY SAND(SM) black and gray

Bottom of Boring @ 50'



Water Level

Water Observations: completion.

Est: Measured: Punched:

Water level @ 19' and open to 24' upon completion.

LOG OF BORING B-2

PROJECT: Welsh Power Plant
 Pittsburg, Texas
 PROJECT NO.: G3242-09

BORING TYPE: Flight Auger

FIELD STRENGTH DATA	BLOW COUNT				PPR (tsf)	Torrans (tsf)	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	Atterberg Limits and Natural Moisture Content	
	1	2	3	4							Plastic Limit	Liquid Limit
P=2.5	1.0	2.0	3.0	4.0							PL	LL
SF	1.0	2.0	3.0	4.0							PL	LL
P=4.5+	1.0	2.0	3.0	4.0							PL	LL
SF	1.0	2.0	3.0	4.0							PL	LL

Key to Abbreviations:
 N - SPT Data (Blows/FT)
 P - Pocket Penetrometer (tsf)
 T - Torrans (tsf)
 L - Lab Vane Shear (tsf)

Notes:

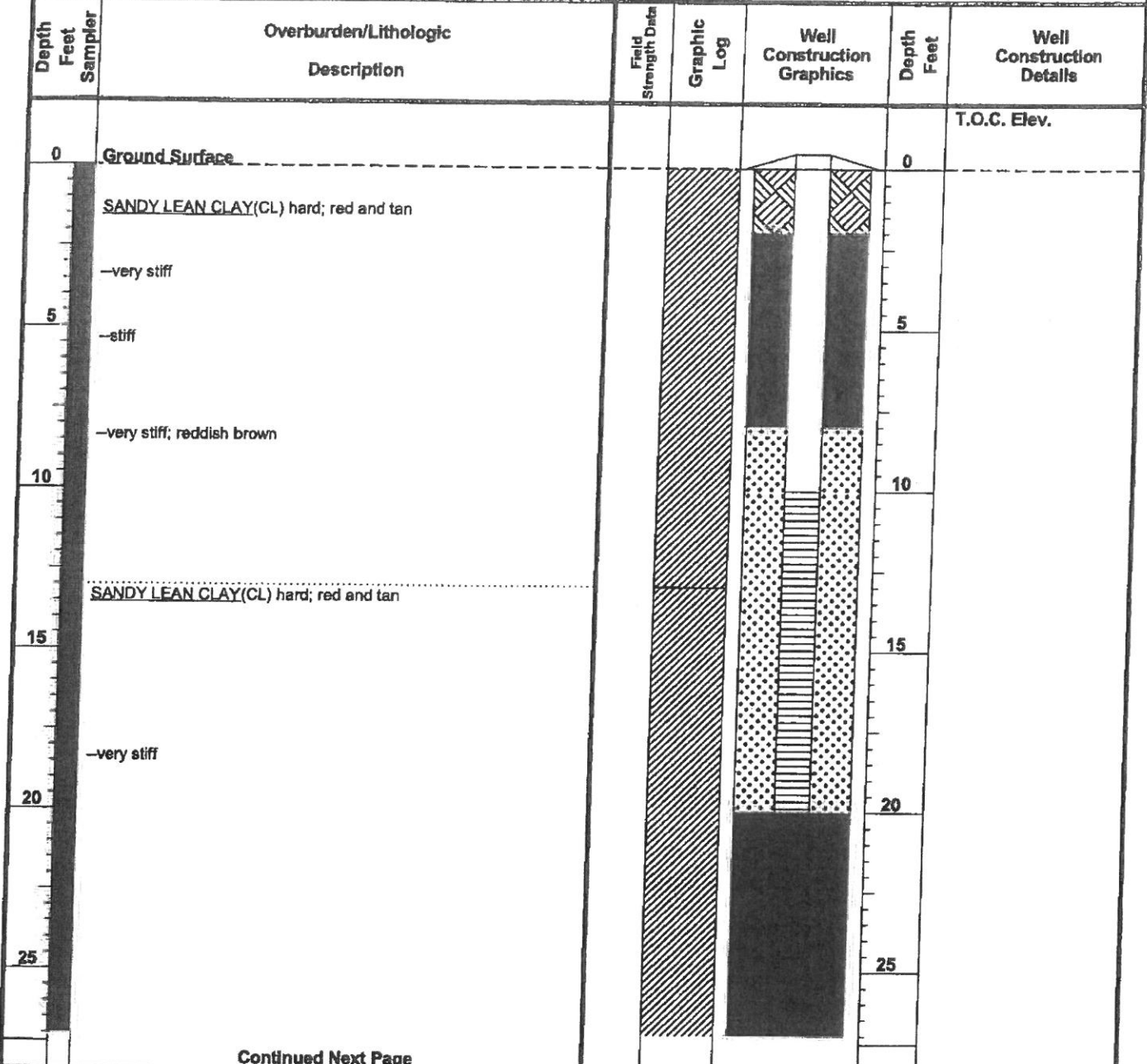
GPS Coordinates: N 33°03.076', W 94°50.449'

DATE: 10/28/09
 SURFACE ELEVATION: 339.7

ATTEBERG LIMITS(%)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	MINUS #200 SIEVE (%)	OTHER TESTS PERFORMED (Page Ref. #)
	22	15	7	48	+40 Sieve=0%, +4 Sieve=0%

Piezometer B-2

ENVIRONMENTAL LOG
 Client: Welsh Power Plant
 Project No: G3242-095 Phase Task
 Well No. B-2
 Location Pittsburg, Texas
 Surface Elev. Page 1 of 2



Continued Next Page

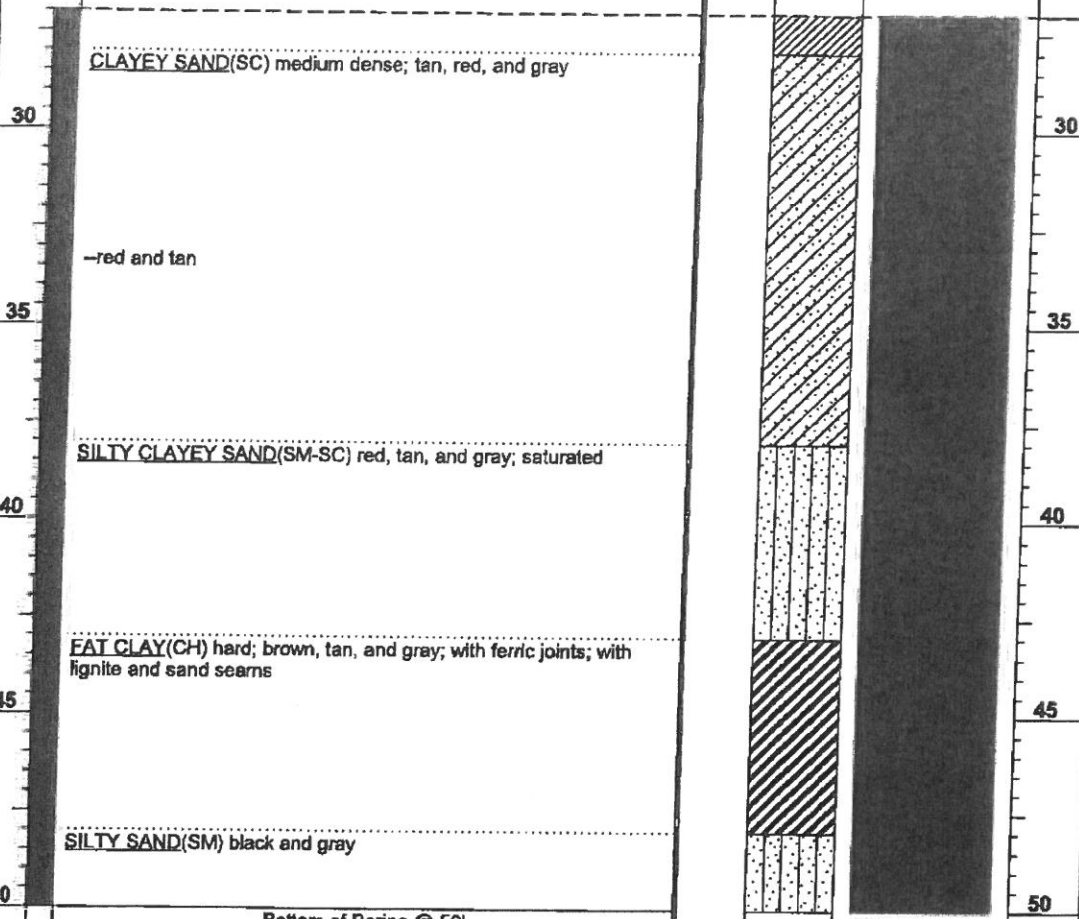
Driller <u>Doug Hinds</u>	Drilling Method <u>Solid Stem Auger</u>	Bentonite Seal <u>2-8' & 20-50'</u>
Logged By <u>James Griffith</u>	Borehole Diameter <u>6.5"</u>	Filter Pack Qty. <u>8-20'</u>
Drilling Started <u>10/28/09</u>	Well Casing <u>2.0" Dia. 0.0' to 10.0'</u>	Filter Pack Type <u>20/40 Sand</u>
Drilling Completed <u>10/28/09</u>	Casing Type <u>PVC</u>	Static Water Level _____
Construction Completed _____	Well Screen <u>2.0" Dia. 10.0' to 20.0'</u>	Notes: _____ _____ _____
Development Completed _____	Screen Type <u>Slotted</u>	
Type of Well _____	Slot Size <u>0.010"</u>	
	Grout Type <u>Bentonite</u>	

ENVIRONMENTAL LOG
 Client: Welsh Power Plant
 Project No: G3242-095 Phase Task

Well No. B-2
 Location Pittsburg, Texas
 Surface Elev. Page 2 of 2

Depth Feet Sampler	Overburden/Lithologic Description	Field Strength Data	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
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Continued from previous page



Bottom of Boring @ 50'





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 1717 East Exhln
 Tyler, Texas 75702
 (903) 595-4421

LOG OF BORING B-3

PROJECT: Welsh Power Plant
 Pittsburg, Texas
 PROJECT NO.: G3242-09

BORING TYPE: Flight Auger

DATE: 10/27/09
 SURFACE ELEVATION: 339.6

DEPTH (ft)	USC	GEOLOGIC UNIT	WATER LEVEL	FIELD STRENGTH DATA	BLOW COUNT ● 20 40 60 80 ▲ Cu (pcf) ▲ 1 2 3 4 ■ PPR (pcf) ■ 1.0 2.0 3.0 4.0 ◆ Torvans (pcf) ◆	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (ks)	FAILURE STRAIN (%)	CONFINING PRESSURE (psf)	Natural Moisture Content and Atterberg Limits		MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			OTHER TESTS PERFORMED (Page Ref. #)
										Plastic Limit	Liquid Limit		LL	PL	PI	
0	SC			N=11	●						23	52	18	34	87	+40 Sieve=3%, +4 Sieve=0%
5	CH			P=1.0	■						21	51	19	32	86	+40 Sieve=3%, +4 Sieve=0%
10				P=3.5	■						21	54	20	34	85	+40 Sieve=10%, +4 Sieve=1%
15	CH			P=3.75	■						23	61	24	37	81	+40 Sieve=11%, +4 Sieve=0%
20				P=2.5	■											
25	CH			P=4.5+	■											
30	SC			N=56	●						22	42	22	20	35	+40 Sieve=1%, +4 Sieve=0%

Key to Abbreviations:
 N - SPT Data (Blows/ft)
 P - Pocket Penetrometer (pcf)
 T - Torvans (pcf)
 L - Lab Vane Shear (pcf)

Notes:
 GPS Coordinates: N 33°02.998', W 94°50.514'

Water Level: Est. Measured: Perched:
 Water Observations: Seepage @ 13' while drilling. Water level @ 19' and open to 24' upon completion.



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MAIN OFFICE
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Tyler, Texas 75702
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MATERIAL DESCRIPTION

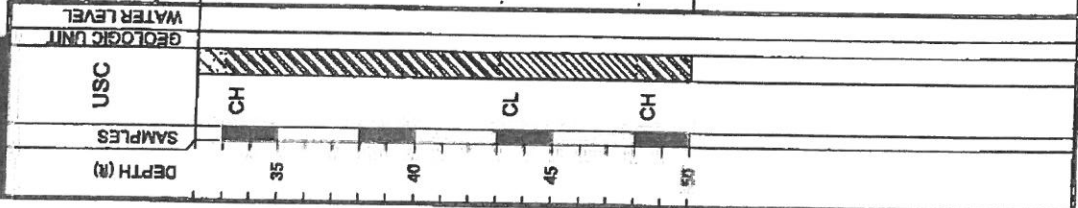
FAT CLAY(CH) hard; brown; layered and with sand seams

-gray and green

SANDY LEAN CLAY(CL) very stiff; gray and dark green; layered; with sand seams

FAT CLAY(CH) hard; gray and dark green; layered; with silt seams

Bottom of Boring @ 50'



Water Level

Water Observations:
@ 19' and open to 24' upon completion.

ETL: Measured Perched

Seepage @ 13' while drilling. Water level @ 19' and open to 24' upon completion.

Key to Abbreviations:

- N - SPT Data (Blow/Ft)
- P - Pocket Penetrometer (pcf)
- T - Torvane (pcf)
- L - Lab Vane Shear (pcf)

LOG OF BORING B-3

PROJECT: Welsh Power Plant
Pittsburgh, Texas
PROJECT NO.: G3242-08

BORING TYPE: Flight Auger

DATE: 10/27/09
SURFACE ELEVATION: 339.6

FIELD STRENGTH	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psf)	Natural Moisture Content and Atterberg Limits	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	MINUS #200 SIEVE (%)	OTHER TESTS PERFORMED (Page Ref. #)
P=4.5+	4.0				Moisture Content: 21% Liquid Limit: 80 Plastic Limit: 24	21	80	24	36	85	+40 Sieve=1% +4 Sieve=0%
P=4.5+	4.0										
P=3.5	3.5										
P=4.5+	4.0										

Note:

GPS Coordinates: N 33°02.998', W 94°50.514'

Pipe Bender B-4

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MAIN OFFICE
1717 East Erwin
Tyler, Texas 75702
(800) 595-4421

MATERIAL DESCRIPTION

SILTY SAND(SM) medium dense; tan; with gravel
SANDY LEAN CLAY(CL) dark brown
-fannish orange
-hard; orangish tan

-very stiff; white

CLAYEY SAND(SC) medium dense; tan
-orangish gray; with sand seams

SANDY LEAN CLAY(CL) stiff; orangish tan

FAT CLAY(CH) very stiff; orangish tan; with ferric seams

-fannish brown; with iron ore seams

LOG OF BORING B-4

PROJECT: Welsh Power Plant
Pittsburgh, Texas
PROJECT NO.: G3242-08

BORING TYPE: Flight Auger

DEPTH (ft)	USC	GEOLOGIC UNIT	WATER LEVEL	FIELD STRENGTH DATA	BLOW COUNT	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psf)	Natural Moisture Content and Atterberg Limits	MOISTURE CONTENT (%)			ATTERBERG LIMITS (%)			MINUS #200 SIEVE (%)	OTHER TESTS PERFORMED (Page Ref. #)	
											PL	LL	PL	PL	PL	PL			
0				N=19	1					24	15	9							
5				SF	2					24	15	9							
10				P=4.5	3					24	15	9							
15				P=3.25	4					24	15	9							
20				P=3.25						24	15	9							
25				N=9						24	15	9							
30				P=4.0						24	15	9							
35				P=2.75						24	15	9							
38										24	15	9							
40										24	15	9							
45										24	15	9							
50										24	15	9							
55										24	15	9							
60										24	15	9							
65										24	15	9							
70										24	15	9							
75										24	15	9							
80										24	15	9							
85										24	15	9							
90										24	15	9							
95										24	15	9							
100										24	15	9							

DATE: 10/27/09

SURFACE ELEVATION: 340.6

GPS Coordinates: N 33°03.011', W 94°50.462'

Water Observations: completion.

Water Level

Err: Measured: Predicted:

Water level @ 18' and open to 48' upon completion.

Key to Abbreviations:

N - SPT Data (blows/ft)

P - Proctor Parameters (tsf)

T - Terrene (tsf)

L - Lab Vane Shear (tsf)



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MAIN OFFICE
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Tyler, Texas 75702
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MATERIAL DESCRIPTION

-hard; light gray; layered and with silt seams

 LEAN CLAY (CL) hard; light gray; layered and with silt seams

 -light gray

 -layered and with sand seams; with lignite

 Bottom of Boring @ 50'

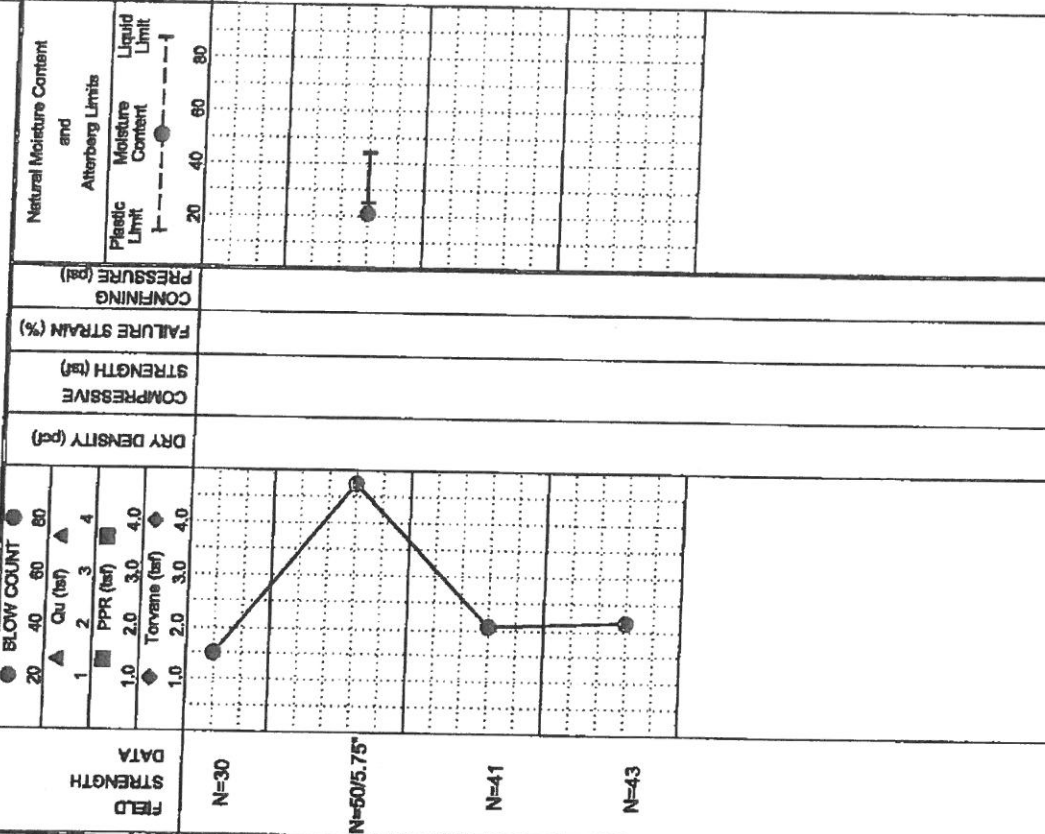
DEPTH (ft)	
SAMPLES	
USC	
GEOLOGIC UNIT	
WATER LEVEL	

LOG OF BORING B-4

PROJECT: Welsh Power Plant
Pittsburgh, Texas
PROJECT NO.: G3242-09

BORING TYPE: Flight Auger

DATE: 10/27/09
SURFACE ELEVATION: 340.6



Key to Abbreviations:
 N - SPT Data (Blow/ft)
 P - Pocket Penetrometer (lbf)
 T - Torvane (lbf)
 L - Lab Vane Shear (lbf)

Notes:
 GPS Coordinates: N 33°03.011', W 94°50.462'

Water Level
 Water Observations:
 completion.

Water Level
 Measured: Purchased:
 Water level @ 18' and open to 48' upon completion.

Piezometer B-4


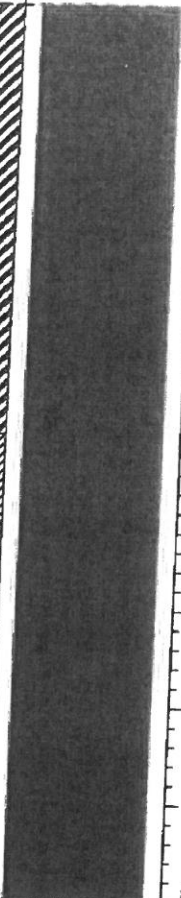

ENVIRONMENTAL LOG
 Client: Welsh Power Plant
 Project No: G3242-095 Phase Task Well No. B-4
 Location Pittsburg, Texas
 Surface Elev. Page 1 of 2

Depth Feet	Sampler	Overburden/Lithologic Description	Field Strength Data	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0		Ground Surface				0	T.O.C. Elev.
		SILTY SAND(SM) medium dense; tan; with gravel					
		SANDY LEAN CLAY(CL) dark brown -tannish orange -hard; orangish tan				5	
		-very stiff; white				10	
		CLAYEY SAND(SC) medium dense; tan -orangish gray; with sand seams				15	
		SANDY LEAN CLAY(CL) stiff; orangish tan				20	
		FAT CLAY(CH) very stiff; orangish tan; with ferric seams				25	

Continued Next Page

Driller <u>Doug Hinds</u>	Drilling Method <u>Soild Stem Auger</u>	Bentonite Seal <u>2-8' & 18-50'</u>
Logged By <u>James Griffith</u>	Borehole Diameter <u>6.5"</u>	Filter Pack Qty. <u>6-18'</u>
Drilling Started <u>10/27/09</u>	Well Casing <u>2.0"</u> Dia. <u>0.0'</u> to <u>8.0'</u>	Filter Pack Type <u>20/40 Sand</u>
Drilling Completed <u>10/27/09</u>	Casing Type <u>PVC</u>	Static Water Level _____
Construction Completed _____	Well Screen <u>2.0"</u> Dia. <u>8.0'</u> to <u>18.0'</u>	Notes: _____
Development Completed _____	Screen Type <u>Slotted</u>	_____
Type of Well _____	Slot Size <u>0.010"</u>	_____
	Grout Type <u>Bentonite</u>	_____



Depth Feet Sampler	Overburden/Lithologic Description	Field Strength Data	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
Continued from previous page						
30	-tannish brown; with iron ore seams				30	
35	-hard; light gray; layered and with silt seams				35	
40	<u>LEAN CLAY (CL)</u> hard; light gray; layered and with silt seams				40	
45	-light gray				45	
50	-layered and with sand seams; with lignite				50	
	Bottom of Boring @ 50'					
55						
60						



P.I.E 2020 for B-5

LOG OF BORING B-5

PROJECT: Welsh Power Plant
Pittsburgh, Texas
PROJECT NO.: G3242-09
BORING TYPE: Flight Auger
DATE: 10/27/09
SURFACE ELEVATION: 340.0

DEPTH (ft)	SAMPLES	USC	GEOLOGIC UNIT	WATER LEVEL	FIELD STRENGTH DATA	BLOW COUNT	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	Natural Moisture Content and Atterberg Limits	MOISTURE CONTENT (%)			ATTERBERG LIMITS (%)			MINUS #200 SIEVE (%)	OTHER TESTS PERFORMED (Page Ref. #)
												LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX		
0												22	47	19	28	81	+40 Sieve=8%, +4 Sieve=3%		
5					P=2.0							21	46	18	28	94	+40 Sieve=3%, +4 Sieve=0%		
10					P=4.5+							22	52	24	28	88	+40 Sieve=3%, +4 Sieve=0%		
15					P=3.0							19	33	17	16	44	+40 Sieve=1%, +4 Sieve=0%		
20					P=0.5							25	61	19	42	83	+40 Sieve=5%, +4 Sieve=3%		
25					P=2.0														
30																			

PROJECT: Welsh Power Plant
Pittsburgh, Texas
PROJECT NO.: G3242-09
BORING TYPE: Flight Auger
DATE: 10/27/09
SURFACE ELEVATION: 340.0

LOG OF BORING B-5

PROJECT: Welsh Power Plant
Pittsburgh, Texas
PROJECT NO.: G3242-09
BORING TYPE: Flight Auger
DATE: 10/27/09
SURFACE ELEVATION: 340.0

DEPTH (ft)	SAMPLES	USC	GEOLOGIC UNIT	WATER LEVEL	FIELD STRENGTH DATA	BLOW COUNT	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	Natural Moisture Content and Atterberg Limits	MOISTURE CONTENT (%)			ATTERBERG LIMITS (%)			MINUS #200 SIEVE (%)	OTHER TESTS PERFORMED (Page Ref. #)
												LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX		
0												22	47	19	28	81	+40 Sieve=8%, +4 Sieve=3%		
5					P=2.0							21	46	18	28	94	+40 Sieve=3%, +4 Sieve=0%		
10					P=4.5+							22	52	24	28	88	+40 Sieve=3%, +4 Sieve=0%		
15					P=3.0							19	33	17	16	44	+40 Sieve=1%, +4 Sieve=0%		
20					P=0.5							25	61	19	42	83	+40 Sieve=5%, +4 Sieve=3%		
25					P=2.0														
30																			

PROJECT: Welsh Power Plant
Pittsburgh, Texas
PROJECT NO.: G3242-09
BORING TYPE: Flight Auger
DATE: 10/27/09
SURFACE ELEVATION: 340.0



ETTL ENGINEERS & CONSULTANTS
MAIN OFFICE
1717 East Erwin
Tyler, Texas 75702
(903) 595-4421

MATERIAL DESCRIPTION
LEAN CLAY WITH SAND (CL) stiff; red and tan
LEAN CLAY (CL) hard; red and tan
-very stiff
FAT CLAY (CL) very stiff; brown and tan
FAT CLAY WITH SAND (CH) hard; red and tan
SANDY LEAN CLAY (CL) very stiff; red and gray, with sand seams
CLAYEY SAND (SC) very loose; tan, red, and gray
FAT CLAY WITH SAND (CH) stiff; red and gray

Water Observations:
Seepage @ 35' while drilling. Water level @ 31' and open to 35' upon completion and after 30 minutes.

Key to Abbreviations:
N - SPT Data (Blows/Ft)
P - Probed Perimeter (tsf)
T - Torque (tsf)
L - Lab Vane Shear (tsf)

Notes:
GPS Coordinates: N 33°02.964', W 94°50.428'



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1717 East Erwin
Tyler, Texas 75702
(903) 686-4421

LOG OF BORING B-5

PROJECT: Welsh Power Plant
Pittsburgh, Texas

PROJECT NO.: G3242-09

BORING TYPE: Flight Auger

DATE

10/27/09

SURFACE ELEVATION
340.0

DEPTH (ft)	USC	GEOLOGIC UNIT	WATER LEVEL	FIELD STRENGTH DATA	BLOW COUNT 20 40 60 80 ▲ Qu (tsf) ▲ 1 2 3 4 ■ PPR (tsf) 1.0 2.0 3.0 4.0 ◆ Torvane (tsf) 1.0 2.0 3.0 4.0	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psf)	Natural Moisture Content and Atterberg Limits		MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			MINUS #200 SIEVE (%)	OTHER TESTS PERFORMED (Page Ref. #)
										Plastic Limit	Liquid Limit		LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX		
35	SC	SILTY CLAYEY SAND(SC) gray and red; saturated		SF							25	51	31	20	87	+40 Sieve=6%, +4 Sieve=0%	
40	CH	FAT CLAY(CH) hard; red and gray, with sand seams		P=4.5+													
45		-gray, tan, and red; with sand seams		P=4.5+													
50	SM SC	SILTY SAND(SM-SC) red and gray Bottom of Boring @ 50'		SF													



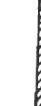

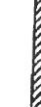


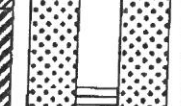

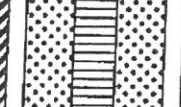

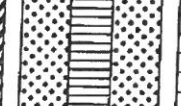

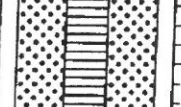





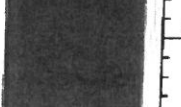

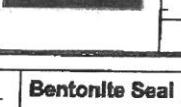
Ent: Measured Perched
 Water Observations:
 Seepage @ 35' while drilling. Water level @ 31' and open to 35' upon completion and after 30 minutes.

Key to Abbreviations:
 N - SPT Data (Blow/ft)
 P - Pocket Penetrometer (tsf)
 T - Torvane (tsf)
 L - Lab Vane Shear (tsf)

Notes:
 GPS Coordinates: N 33°02.964', W 94°50.428'











Appendix B-5

ENVIRONMENTAL LOG			Well No. B-5
Client: Welsh Power Plant		Location Pittsburg, Texas	
Project No: G3242-095	Phase	Task	Surface Elev. Page 1 of 2

Depth Feet	Sampler	Overburden/Lithologic Description	Field Strength Data	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0		Ground Surface				0	T.O.C. Elev.
		LEAN CLAY WITH SAND(CL) stiff; red and tan					
		LEAN CLAY(CL) hard; red and tan					
5		very stiff				5	
		FAT CLAY(CL) very stiff; brown and tan					
10						10	
		FAT CLAY WITH SAND(CH) hard; red and tan					
15						15	
		SANDY LEAN CLAY(CL) very stiff; red and gray; with sand seams					
20						20	
		CLAYEY SAND(SC) very loose; tan, red, and gray					
25						25	

Continued Next Page

Driller <u>Doug Hinds</u>	Drilling Method <u>Soild Stem Auger</u>	Bentonite Seal <u>2-5' & 20-50'</u>
Logged By <u>James Griffith</u>	Borehole Diameter <u>6.5"</u>	Filter Pack Qty. <u>5-20'</u>
Drilling Started <u>10/27/09</u>	Well Casing <u>2.0" Dia. 0.0' to 10.0'</u>	Filter Pack Type <u>20/40 Sand</u>
Drilling Completed <u>10/27/09</u>	Casing Type <u>PVC</u>	Static Water Level _____
Construction Completed _____	Well Screen <u>2.0" Dia. 10.0' to 20.0'</u>	Notes: _____
Development Completed _____	Screen Type <u>Slotted</u>	_____
Type of Well _____	Slot Size <u>0.010"</u>	_____
	Grout Type <u>Bentonite</u>	_____

Depth Feet Sampler	Overburden/Lithologic Description	Field Strength Data	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
Continued from previous page						
30	FAT CLAY WITH SAND(CH) stiff; red and gray				30	
35	SILTY CLAYEY SAND(SC) gray and red; saturated				35	
40	FAT CLAY(CH) hard; red and gray; with sand seams				40	
45	-gray, tan, and red; with sand seams				45	
50	SILTY SAND(SM-SC) red and gray				50	
	Bottom of Boring @ 50'					
55						
60						

1916
JUL

Pit # B-6

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LOG OF BORING B-6

PROJECT: Welsh Power Plant
 Pittsburgh, Texas
 PROJECT NO.: G3242-08

BORING TYPE: Flight Auger

DATE: 10/27/09
 SURFACE ELEVATION: 340.1

DEPTH (ft)	USC	WATER LEVEL	MATERIAL DESCRIPTION	FIELD STRENGTH DATA	BLOW COUNT				DRY DENSITY (pcf)	COMPRESSIONIVE STRENGTH (ksf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psf)	Natural Moisture Content and Atterberg Limits		MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			MINUS #200 SIEVE (%)	OTHER TESTS PERFORMED (Page Ref. #)
					1	2	3	4					PL	LL		PI				
0	CH		EAT CLAY(CH) very stiff; red and gray; with ferric seams	P=4.0	1.0	2.0	3.0	4.0					20	32	14	18	60	+40 Sieve=0%, +4 Sieve=0%		
5	CL		SANDY LEAN CLAY(CL) hard; red and tan	P=4.5+	1.0	2.0	3.0	4.0					21	49	20	29	93	+40 Sieve=2%, +4 Sieve=0%		
10			-very stiff; red, gray, and brown; with gravel -with sand seams	P=3.0	1.0	2.0	3.0	4.0					14	49	18	31	65	+40 Sieve=0%, +4 Sieve=0%		
15				P=3.0	1.0	2.0	3.0	4.0					20				18	+40 Sieve=0%, +4 Sieve=0%		
20	SM		SILTY SAND(SM) gray; saturated	P=4.0	1.0	2.0	3.0	4.0												
25			-very dense; gray and red	P=3.0	1.0	2.0	3.0	4.0												
30				N=50/5.25"																
				SF																

Key to Abbreviations:
 N - SPT Data (Blows/ft)
 P - Pocket Penetrometer (ksf)
 T - Torvans (ksf)
 L - Lab Vane Shear (ksf)

Notes:
 GPS Coordinates: N 33°02.912', W 94°50.462'

Water Observations:
 Seepage @ 17' while drilling. Water level @ 13' and open to 15' upon completion and after 30 minutes.





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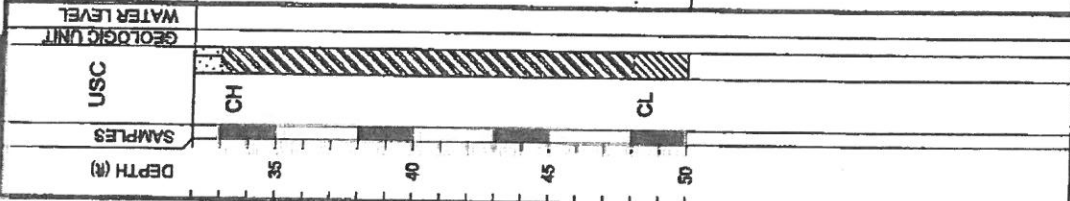
MATERIAL DESCRIPTION

FAT CLAY (CH) hard; brown; with sand
seems

-dark green

LEAN CLAY (CL) hard; dark green; laminated
with lignite

Bottom of Boring @ 50'



Water Level: Measured Perched
 Water Observations: Seepage @ 17' while drilling. Water level @ 13' and open to 15' upon completion and after 30 minutes.

LOG OF BORING B-6

PROJECT: Welsh Power Plant
Pittsburgh, Texas

PROJECT NO.: G3242-09

BORING TYPE: Flight Auger

DATE

10/27/09

SURFACE ELEVATION
340.1








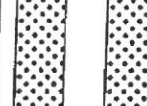

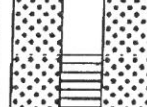

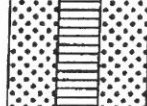
FIELD STRENGTH DATA	BLOW COUNT 20 40 60 80	Cu (pcf) ▲ 1 2 3 4	PPR (pcf) ■ 1.0 2.0 3.0 4.0	Torvane (pcf) ◆ 1.0 2.0 3.0 4.0	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (ksf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	Natural Moisture Content and Atterberg Limits			MOISTURE CONTENT (%)	OTHER TESTS PERFORMED (Page Ref. #)
									Plastic Limit	Moisture Content	Liquid Limit		
P=4.5+	20	1	1.0	1.0	110				20	24	44	22	+40 Sieve=0%, +4 Sieve=0%
P=4.5+	40	2	2.0	2.0	110				40	24	44	22	
P=4.5+	60	3	3.0	3.0	110				60	24	44	22	
P=4.5+	80	4	4.0	4.0	110				80	24	44	22	

Key to Abbreviations:
 N - SPT Data (Blow/m)
 P - Proctor Permeometer (pcf)
 T - Torvane (pcf)
 L - Lab Vane Shear (pcf)

Notes:
 GPS Coordinates: N 33°02.912', W 94°50.462'

Pipe Pile B-6

ENVIRONMENTAL LOG			Well No. B-6
Client: Welsh Power Plant			Location Pittsburg, Texas
Project No: G3242-095	Phase	Task	Surface Elev. _____

Depth Feet	Sampler	Overburden/Lithologic Description	Field Strength Data	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0		Ground Surface				0	T.O.C. Elev.
		<u>FAT CLAY(CH)</u> very stiff, red and gray; with ferric seams					
		<u>SANDY LEAN CLAY(CL)</u> hard; red and tan				5	
		—very stiff, red, gray, and brown; with gravel —with sand seams				10	
		<u>SILTY SAND(SM)</u> gray; saturated				15	
		—very dense; gray and red				20	
						25	

Continued Next Page

Driller <u>Doug Hinds</u>	Drilling Method <u>Solid Stem Auger</u>	Bentonite Seal <u>1.5-4' & 22-50'</u>
Logged By <u>James Griffith</u>	Borehole Diameter <u>6.5"</u>	Filter Pack Qty. <u>4-22'</u>
Drilling Started <u>10/28/09</u>	Well Casing <u>2.0" Dia. 0.0' to 12.0'</u>	Filter Pack Type <u>20/40 Sand</u>
Drilling Completed <u>10/28/09</u>	Casing Type <u>PVC</u>	Static Water Level _____
Construction Completed _____	Well Screen <u>2.0" Dia. 12.0' to 22.0'</u>	Notes: _____
Development Completed _____	Screen Type <u>Slotted</u>	_____
Type of Well _____	Slot Size <u>0.010"</u>	_____
	Grout Type <u>Bentonite</u>	_____



ENVIRONMENTAL LOG

Client: Welsh Power Plant

Project No: G3242-095

Phase

Task

Well No. B-6

Location Pittsburg, Texas

Surface Elev.

Depth Feet Sampler	Overburden/Lithologic Description	Field Strength Data	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
Continued from previous page						
30					30	
	FAT CLAY(CH) hard; brown; with sand seams					
35					35	
40					40	
45	-dark green				45	
50	LEAN CLAY(CL) hard; dark green; laminated with lignite				50	
	Bottom of Boring @ 50'				50	
55						
60						





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MATERIAL DESCRIPTION

SILTY SAND(SM) dense; tan

--gray; saturated

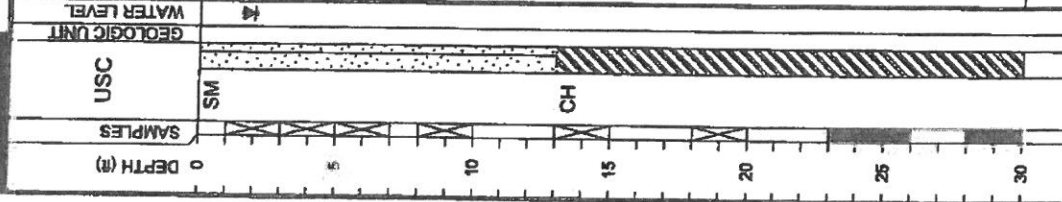
--very dense

EAT CLAY(CH) very stiff; dark gray; with silt and ferric seams

--hard; gray and black; with trace of lignite

--gray

Bottom of Boring @ 30'



Water Level

Soe page @ 4' while drilling. Water level @ 2' and open to 7' upon completion.

Est: Measured: Punched:

Notes:

Key to Abbreviations:

N - SPT Data (Blow/Ft)

P - Pocket Penetrometer (tsf)

T - Torvane (tsf)

L - Lab Vane Shear (tsf)

GPS Coordinates: N 33°02.898', W 94°50.519'

LOG OF BORING B-7

PROJECT: Welsh Power Plant
 Pittsburgh, Texas

PROJECT NO.: G3242-09

BORING TYPE: Flight Auger

DATE: 10/27/09

SURFACE ELEVATION: 340.4

FIELD STRENGTH	BLOW COUNT	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psf)	Natural Moisture Content and Atterberg Limits		MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			MINUS #200 SIEVE (%)	OTHER TESTS PERFORMED (Page Ref, #)
						Plastic Limit	Liquid Limit		LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX		
N=31	20	1.5	2.0	10	10	20	20	21	21	15	21	+40 Sieve=0%, +4 Sieve=0%	
N=36	20	1.8	2.5	15	15	20	20	23	23	15	23	+40 Sieve=0%, +4 Sieve=0%	
N=38	20	1.8	2.5	15	15	20	20	23	23	15	23	+40 Sieve=0%, +4 Sieve=0%	
N=59	20	2.5	3.5	20	20	25	25	23	23	15	23	+40 Sieve=0%, +4 Sieve=0%	
N=26	20	1.5	2.0	10	10	15	15	14	14	58	36	+40 Sieve=0%, +4 Sieve=0%	
P=4.5+								14	14	58	36	+40 Sieve=0%, +4 Sieve=0%	
P=4.5+								14	14	58	36	+40 Sieve=0%, +4 Sieve=0%	

Notes:

GPS Coordinates: N 33°02.898', W 94°50.519'

Landfill Boring B-2

LOG OF BORING B-2

DATE: 10/8/14
 SURFACE ELEVATION: 373.8

PROJECT: Phase 1 Fly Ash Storage Area Embankment Seepage & Vertical Expansion Invest.
 Welsh Power Station - Cason, Texas
 DRILL RIG: B-61 HDX
 BORING TYPE: Rotary Wash/Fight Auger

PROJECT NO.: G4207-146

FIELD STRENGTH	BLOW COUNT				DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (ksf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	Natural Moisture Content and Atterberg Limits		MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			OTHER TESTS PERFORMED (Page Ref. #)
	N	Qu (tsf)	PPR (tsf)	Torvane (tsf)					Plastic Limit	Liquid Limit		T	P	PI	
N=13	20	1.0	1.0	1.0					46	46	59	40	27	+40 Sieve=27% +4 Sieve=16%	
N=29	20	1.0	1.0	1.0					40	40	40	19	2	+40 Sieve=19% +4 Sieve=2%	
N=18	20	1.0	1.0	1.0					200	200	134	92	42	+40 Sieve=0% +4 Sieve=0%	
N=9	20	1.0	1.0	1.0					91	91	61	11	1	+40 Sieve=11% +4 Sieve=1%	
N=0	20	1.0	1.0	1.0					18	18	30	15	15	+40 Sieve=1% +4 Sieve=0%	
N=1	20	1.0	1.0	1.0											
N=7	20	1.0	1.0	1.0											
N=6	20	1.0	1.0	1.0											

Notes:
 GPS Coordinates: N33.04860°, W94.84451°
 Driller: Tommy Cook
 Logger: B. Hobbs/O. Sanderson

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MATERIAL DESCRIPTION

ASH (SILTY WITH GRAVEL (ML)) medium dense; light grayish brown; with coarse-grained sand and lightly cemented gravel pieces; dry

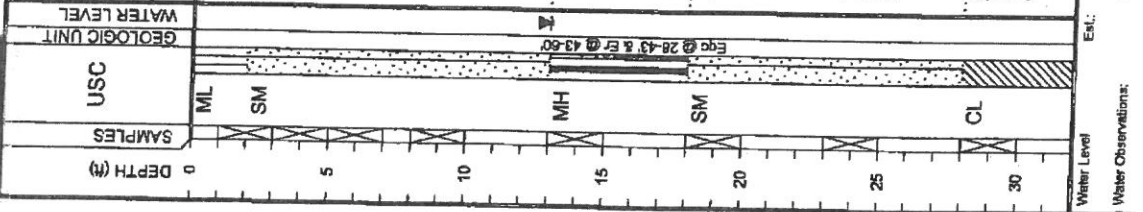
ASH (SILTY SAND (SM)) medium dense; dark brown and light brown; with coarse-grained sand and lightly cemented gravel pieces
 -loose; moist

ASH (ELASTIC SILT (MH)) very loose; black; with fine-grained sand and lightly cemented gravel pieces; saturated

ASH (SILTY SAND (SM)) very loose; dark brown; with coarse-grained sand and lightly cemented gravel pieces; moist

-loose; dark brown and light brown; with coarse-grained sand and lightly cemented gravel pieces; moist

SANDY LEAN CLAY (CL) medium stiff; dark brown and black; with fine-grained sand and cemented gravel pieces; saturated



Key to Abbreviations:
 N - SPT Data (Blows/Ft)
 P - Pocket Penetrometer (tsf)
 T - Torvane (tsf)
 L - Lab Vane Shear (tsf)



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DEPTH (ft)	SAMPLES	USC	GEOLOGIC UNIT	WATER LEVEL
35		SC		
40		SM		
45		CH		
50				
55				
60				

MATERIAL DESCRIPTION

CLAYEY SAND(SC) dense; light brown, light gray and reddish brown; moist; with fine-grained sand; mottled

SILTY SAND(SM) very dense; light brown, yellowish brown and light gray; moist; mottled; with fine-grained sand

EAT CLAY(CH) very stiff; dark brown and light brown; moist; with sand seams; laminated

-dark brown with light gray; moist; with silt seams

-hard; dark brown; moist

Bottom of Boring @ 60'

Water Level
Water Observations:
Ent.: Measured: Water level @ 13'.
Patched:

LOG OF BORING B-2 (cont.)

PROJECT: Phase 1 Fly Ash Storage Area Embankment Seepage & Vertical Expansion Invest.
Welsh Power Station - Cason, Texas
PROJECT NO.: G4207-146
DRILL RIG: B-61 HDX
BORING TYPE: Rotary Wash/Flight Auger

DATE: 10/8/14

SURFACE ELEVATION: 373.8

FIELD STRENGTH DATA	BLOW COUNT 20 40 60 80 Qu (tsf) ▲ 1 2 3 4 PPR (tsf) ■ 1.0 2.0 3.0 4.0 Torvane (tsf) ◆	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	Atterberg Limits		MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)	MINUS #200 SIEVE (%)	OTHER TESTS PERFORMED (Page Ref. #)
						Plastic Limit	Liquid Limit				
P=3.5 P=2.75		110	1.39	4.3	21	20	30	18	PL 15 LL 30	39	+40 Sieves=0% +4 Sieves=0%
N=78						40	60	21	PL 15 LL 30	24	+40 Sieves=0% +4 Sieves=0%
N=27						60	80	25	PL 15 LL 30	96	+40 Sieves=2% +4 Sieves=0%
P=4.0		98				80		24	PL 15 LL 30		
N=37											

Notes:

Key to Abbreviations:

- N - SPT Data (Blows/Ft)
- P - Pocket Penetrometer (tsf)
- T - Torvane (tsf)
- L - Lab Vane Shear (tsf)

GPS Coordinates: N33.04890° W94.84451°

Driller: Tommy Cook

Logger: B. Hobbs/O. Sanderson

Landfill boring B-10

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LOG OF BORING B-10

PROJECT: Phase 1 Fly Ash Storage Area Embankment Seepage & Vertical Expansion Invest.
 Welsh Power Station - Cason, Texas
 PROJECT NO.: G4207-146
 BORING TYPE: Rotary Wash/Flight Auger

DATE: 10/8/14

SURFACE ELEVATION: 373.2

DEPTH (ft)	SAMPLES	USC	GEOLOGIC UNIT	WATER LEVEL	FIELD STRENGTH DATA	BLOW COUNT	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	Atterberg Limits		MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)	MINUS #200 SIEVE (%)	OTHER TESTS PERFORMED (Page Ref. #)
											Plastic Limit	Liquid Limit				
0																
5			SC		N=7	1					20	31	19	12	41	+40 Sieve=21% +4 Sieve=11%
10			MH		N=3	2					40					
15					N=0	3					60					
20			SM		N=50/1"	4					80				14	+40 Sieve=71% +4 Sieve=28%
25					N=50/4"											
30			CL		N=4						20	23	14	9	57	+40 Sieve=1% +4 Sieve=0%

MATERIAL DESCRIPTION

ASH (CLAYEY SAND(SC)) loose; dark brown and light brown; with coarse-grained sand and lightly cemented gravel pieces; moist

ASH (ELASTIC SILT(MH)) very loose; black; moist

--wet

ASH (SILTY SAND WITH GRAVEL(SM)) very dense; light brown and dark brown; with lightly cemented gravel pieces and coarse-grained sand; moist; cemented layer from 17.5' to 21'

--cemented layer from 23' to 27'

SANDY LEAN CLAY(CL) medium stiff; grayish brown and yellowish brown; saturated; mottled

Notes:

Key to Abbreviations:
 N - SPT Data (Blows/Ft)
 P - Pocket Penetrometer (tsf)
 T - Torvane (tsf)
 L - Lab Vane Shear (tsf)

GPS Coordinates: N33.04895°, W94.84390°

Diller: Tommy Cook
 Logger: B. Hobbs/O. Sanderson



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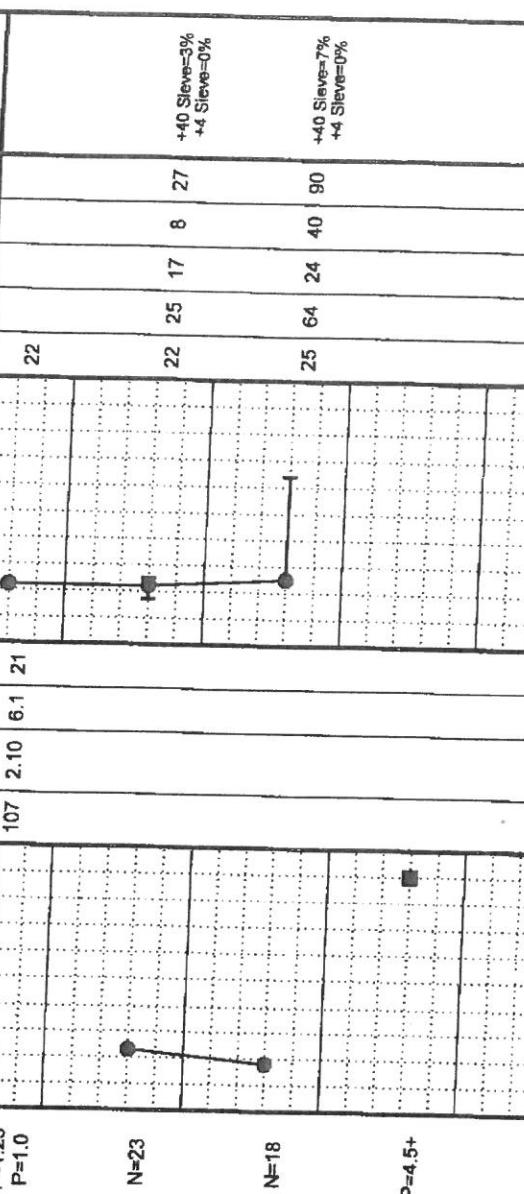
LOG OF BORING B-10 (cont.)

PROJECT: Phase 1 Fly Ash Storage Area Embankment Seepage & Vertical Expansion Invest.
Welsh Power Station - Cason, Texas
DRILL RIG: B-61 HDX
BORING TYPE: Rotary Wash/Flight Auger
PROJECT NO.: G4207-146

DATE: 10/8/14
SURFACE ELEVATION: 373.2

ATTERBERG LIMITS(%)		MOISTURE CONTENT (%)	OTHER TESTS PERFORMED (Page Ref. #)
LIQUID LIMIT (LL)	PLASTIC LIMIT (PL)		
64	24	25	+40 Sieve=7% +4 Sieve=0%
25	17	22	+40 Sieve=3% +4 Sieve=0%
8	8	22	+40 Sieve=3% +4 Sieve=0%
27			
90			

FIELD STRENGTH	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	Natural Moisture Content and Atterberg Limits
P=1.25 P=1.0	107	2.10	6.1	21	Plastic Limit: 20, Liquid Limit: 25
N=23					Plastic Limit: 20, Liquid Limit: 25
N=18					Plastic Limit: 20, Liquid Limit: 25
P=4.5+					Plastic Limit: 20, Liquid Limit: 25
P=4.5+					Plastic Limit: 20, Liquid Limit: 25



DEPTH (ft)	USC	GEOLOGIC UNIT	WATER LEVEL
35			
40	SC		
45	CH		
50			
55			
60			

MATERIAL DESCRIPTION

CLAYEY SAND(SC) medium dense; reddish brown and grayish brown; moist; mottled

EAT CLAY(CH) very stiff; dark brown with light gray; with silt seams; moist

-hard

Bottom of Boring @ 60'

Water Level Est. Measured: Perched:

Water Observations: Seepage @ 13' while drilling.

Key to Abbreviations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Notes:

GPS Coordinates: N33.04895° W94.84390°

Driller: Tommy Cook
Logger: B. Hobbs/O. Sanderason

Landfill Boring B-12

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LOG OF BORING B-12

PROJECT: Phase 1 Fly Ash Storage Area Embankment Seepage & Vertical Expansion Invest.
Weish Power Station - Cason, Texas
DRILL RIG:
PROJECT NO.: G4207-146
BORING TYPE: Flight Auger

DATE: 10/15/14
SURFACE ELEVATION: 361.7

DEPTH (ft)	USC	GEOLOGIC UNIT	WATER LEVEL	FIELD STRENGTH DATA	BLOW COUNT 20 40 60 80 ▲ Qu (tsf) ▲ ■ PPR (tsf) ■ ◆ Torvane (tsf) ◆	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	Natural Moisture Content and Atterberg Limits Plastic Limit Moisture Content Liquid Limit	MOISTURE CONTENT (%)			ATTERBERG LIMITS (%)			OTHER TESTS PERFORMED (Page Ref. #)	
											LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	LIQUID LIMIT	PLASTIC LIMIT	PI		
0																		
5	CL			P=3.75														
10	CL			N=15														
15				N=11														
20	CH			P=3.75														
25	CL			N=14														
30	ML			N=53														
30																		

Notes:
 Key to Abbreviations:
 N - SPT Data (Blows/Ft)
 P - Pocket Penetrometer (tsf)
 T - Torvane (tsf)
 L - Lab Vane Shear (tsf)

Water Observations:
 Water level @ 27' and open upon completion.

Water Level: Measured: Perched:

Bottom of Boring @ 30'

GPS Coordinates:
 N33 04'13" W94 84'48"

Driller: Lewis Drilling, Inc.
 Logger: O. Sanderson

Lead Hill Boring B-13

LOG OF BORING B-13

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PROJECT: Phase 1 Fly Ash Storage Area Embankment Seepage & Vertical Expansion Invest
Welsh Power Station - Cason, Texas
DRILL RIG:
BORING TYPE: Flight Auger

PROJECT NO.: G4207-146

DATE: 10/15/14

SURFACE ELEVATION: 361.4

DEPTH (ft)	SAMPLES	USC	GEOLOGIC UNIT	WATER LEVEL	FIELD STRENGTH DATA	BLOW COUNT	DRY DENSITY (pcf)	COMPRESSIONIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psf)	Natural Moisture Content and Atterberg Limits	MOISTURE CONTENT (%)			OTHER TESTS PERFORMED (Page Ref. #)	
												LL	PL	P		
0											Plastic Limit Moisture Content Liquid Limit	LL	PL	P		
5		CL			N=7	20					20	45	17	28	76	+40 Sieve=1% +4 Sieve=0%
10		CL			P=4.0											
15		SC			N=11											
20		CH			N=8											
25		CL			N=21											+40 Sieve=1% +4 Sieve=0%
30		ML			N=50/5"											+40 Sieve=0% +4 Sieve=0%

MATERIAL DESCRIPTION

LEAN CLAY WITH SAND(CL) medium stiff, reddish brown with light gray; moist

SANDY LEAN CLAY(CL) very stiff; light brown, gray and reddish brown; moist; mottled

CLAYEY SAND(SC) medium dense; grayish brown; moist

EAT CLAY WITH SAND(CH) medium stiff; reddish brown and light gray; moist; mottled

LEAN CLAY(CL) very stiff; light gray and grayish brown; moist; layered with silt

SILT WITH SAND(ML) very dense; light gray and yellowish brown; wet; with clay seams

Bottom of Boring @ 30'

Water Level: Est. Measured: Perched:
Water Observations: Water level @ 28' and open upon completion.

Key to Abbreviations:
N - SPT Data (Blow/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Notes:

GPS Coordinates: N33.047160°, W94.843884°

Driller: Lewis Drilling, Inc.

Logger: O. Sanderson

Landfill Boring B-14

ETTTL ENGINEERS & CONSULTANTS

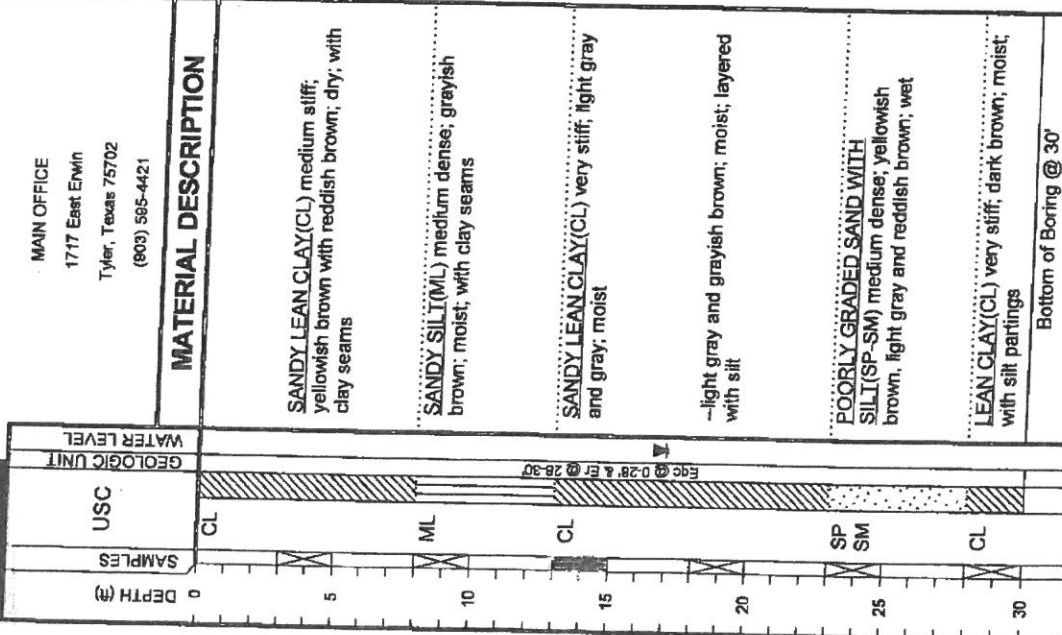
MAIN OFFICE
1717 East Erwin
Tyler, Texas 75702
(803) 585-4421

LOG OF BORING B-14

PROJECT: Phase 1 Fly Ash Storage Area Embankment Seepage & Vertical Expansion Invest.
Welsh Power Station - Cason, Texas
PROJECT NO.: G4207-148
DRILL RIG:
BORING TYPE: Flight Auger

DATE: 10/14/14
SURFACE ELEVATION: 347.2

FIELD STRENGTH DATA	BLOW COUNT	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	Natural Moisture Content and Atterberg Limits		MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)	MINUS #200 SIEVE (%)	OTHER TESTS PERFORMED (Page Ref. #)
						Plastic Limit	Liquid Limit				
N=9	1.0, 2.0, 3.0, 4.0					20	40	108	17	17	+40 Sieve=1% +4 Sieve=1%
N=11	1.0, 2.0, 3.0, 4.0					20	40		17	NP	
P=4.0	1.0, 2.0, 3.0, 4.0					20	40		16	24	
N=34	1.0, 2.0, 3.0, 4.0					20	40	26	40	16	+40 Sieve=1% +4 Sieve=0%
N=27	1.0, 2.0, 3.0, 4.0					20	40		24	67	
N=26	1.0, 2.0, 3.0, 4.0					20	40	25	40	10	+40 Sieve=0% +4 Sieve=0%



USC
WATER LEVEL
GEOLOGIC UNIT
SAMPLER
DEPTH (ft)

Est.: Measured: Perched:
Water level @ 17' and caved to 23' upon completion.

Key to Abbreviations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Notes:
GPS Coordinates: N33.04774°, W94.84290°
Driller: Lewis Drilling, Inc.
Logger: O. Sanderson

Landfill Boring B-15

ETTL ENGINEERS & CONSULTANTS

MAIN OFFICE
1717 East Ewin
Tyler, Texas 75702
(800) 595-4421

LOG OF BORING B-15

PROJECT: Phase 1 Fly Ash Storage Area Embankment Seepage & Vertical Expansion Invest.
Welsh Power Station - Cason, Texas
DRILL RIG:
PROJECT NO.: G4207-146
BORING TYPE: Flight Auger

DATE: 10/14/14
SURFACE ELEVATION: 348.2

DEPTH (ft)	USC SAMPLES	MATERIAL DESCRIPTION	FIELD STRENGTH	DATA				DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psf)	Atterberg Limits and Natural Moisture Content		MOISTURE CONTENT (%)	LL	PL	PI	MINUS #200 SIEVE (%)	OTHER TESTS PERFORMED (Page Ref. #)
				BLOW COUNT	Qu (tsf)	PPR (tsf)	Tonvane (tsf)					Plastic Limit	Liquid Limit						
0	CH	FAT CLAY (CH) stiff; reddish brown and light gray; moist; mottled	N=10	20	1.0	1.0	1.0					24	59	21	38	85	+40 Sieve=0% +4 Sieve=0%		
5																			
10		--very stiff, light gray, grayish brown and reddish brown; moist; layered	P=3.75																
15	SM	SILTY SAND (SM) very dense; light brown; dry	N=59															+40 Sieve=0% +4 Sieve=0%	
20		--medium dense; wet	N=21																
25		--very dense	N=56															+40 Sieve=0% +4 Sieve=0%	
30	CL	LEAN CLAY (CL) hard; dark brown; moist; with silt partings Bottom of Boring @ 30'	P=4.5															+40 Sieve=0% +4 Sieve=0%	

Key to Abbreviations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (tsf)
T - Tonvane (tsf)
L - Lab Vane Shear (tsf)

Water Observations:
Water level @ 17' and caved to 19' upon completion.

Notes:
GPS Coordinates: N33.04857° W94.84286°
Driller: Lewis Drilling, Inc.
Logger: O. Sanderson



Appendix B

Photographic Log



PHOTOGRAPHIC LOG

Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

Photo No.
1

Date:
8/20/2015

Direction Photo Taken:
North

Description:
Staging area west of landfill.

P8200493



PHOTOGRAPHIC LOG

Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

Photo No.
2

Date:
8/20/2015

Direction Photo Taken:
South Southeast

Description:
Potential wetland on the top (west) end of the Primary Ash Pond.

P8200495



Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

Photo No.
3

Date:
8/20/2015

Direction Photo Taken:
West Northwest

Description:
Ditch between road and railway west of landfill, this ditch would be non-jurisdictional.

P8200497



Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

Photo No.
4

Date:
8/20/2015

Direction Photo Taken:
Northeast

Description:
Ground Water Monitoring Well AD-12 near northwest end of landfill.

P8200501



Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

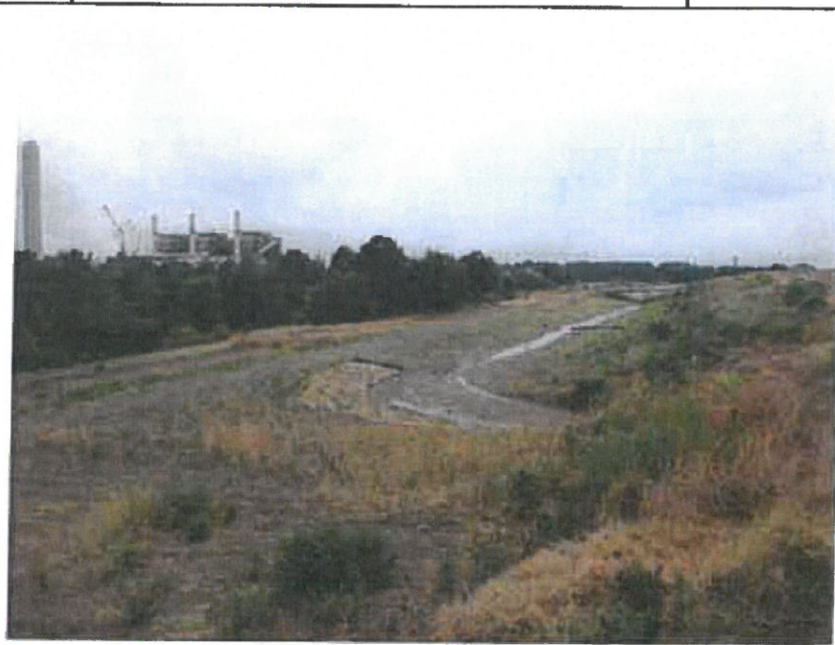
Photo No.
5

Date:
8/20/2015

Direction Photo Taken:
East Northeast

Description:
View of plant from top of landfill. Primary ash pond is within the wooded area on left.

P8200506



Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

Photo No.
6

Date:
8/20/2015

Direction Photo Taken:
East Northeast

Description:
Drainage canal that drains from primary ash pond to clear water pond.

P8200510



Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

Photo No.
7

Date:
8/20/2015

Direction Photo Taken:

West Northwest

Description:

Vegetated strip between landfill and road. This would be isolated due to lack of connectivity.

P8200521



Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

Photo No.
8

Date:
8/20/2015

Direction Photo Taken:

North

Description:

Dike between landfill and primary ash pond. Facility in the background.

P8200522



Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

Photo No.
9

Date:
8/20/2015

Direction Photo Taken:
West

Description:
Vegetated strip between landfill and road. This area would be isolated due to lack of connectivity.

P8200527



Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

Photo No.
10

Date:
8/20/2015

Direction Photo Taken:
North Northeast

Description:
Road east of landfill running toward facility and clear water pond.

P8200530



Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

Photo No.
11

Date:
8/20/2015

Direction Photo Taken:
South

Description:
Top of landfill.

P8200534



Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

Photo No.
12

Date:
8/20/2015

Direction Photo Taken:
Southeast

Description:
View of lined bottom ash storage pond.

P8200538



Project Name:
 AEP – J. ROBERT WELSH POWER PLANT

Location:
 PITTSBURG, TITUS COUNTY, TEXAS

Project No.
 OK001625.0001

Photo No.
13
Date:
 8/20/2015

Direction Photo Taken:

Southeast

Description:

Lined bottom ash storage pond.

P8200545


Project Name:
 AEP – J. ROBERT WELSH POWER PLANT

Location:
 PITTSBURG, TITUS COUNTY, TEXAS

Project No.
 OK001625.0001

Photo No.
14
Date:
 8/20/2015

Direction Photo Taken:

South

Description:

Southside of lined bottom ash storage pond.

P8200547



Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

Photo No.
15

Date:
8/20/2015

Direction Photo Taken:
West

Description:
East side of lined bottom ash storage pond.

P8200560



Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

Photo No.
16

Date:
8/20/2015

Direction Photo Taken:
North

Description:
Upland with pine and ground water monitoring well AD-2 south of lined bottom ash storage pond.

P8200563



Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

Photo No.
17

Date:
8/20/2015

Direction Photo Taken:

Description:

Outflow of water from plant into the northeast portion of the Primary Ash Pond.

P8200577



Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

Photo No.
18

Date:
8/20/2015

Direction Photo Taken:

South Southwest

Description:

Northeast portion of primary ash pond, view facing south-southwest.

P8200578

