



## CCR Groundwater Monitoring System



Omaha Public Power District

North Omaha Station  
North Omaha Ash Landfill

*Omaha, Nebraska*

June 2016

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# OPPD North Omaha Station North Omaha Ash Landfill CCR Groundwater Monitoring System

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# Professional Engineer Certification

"I hereby certify that the groundwater monitoring system described in this report for the CCR landfill known as the North Omaha Ash Landfill at the North Omaha Generating Station, owned and operated by the Omaha Public Power District, has been designed and constructed to meet the requirements of the Coal Combustion Residual Rule 40 CFR 257.91. I am a duly licensed Professional Engineer under the laws of the State of Nebraska."

Print Name: Lara L. Syrocki

Signature: 

Date: 6/23/2016

License #: E-11855

My license renewal date is December 31, 2016.



## 1.0 Introduction

On April 17, 2015 the U.S. Environmental Protection Agency (EPA) published the final rule for the regulation and management of Coal Combustion Residuals (CCR) under the Resource Conservation and Recovery Act (RCRA). The rule – effective on October 19, 2015 – applies to Omaha Public Power District's (OPPD's) North Omaha Generating Station.

The purpose of this report is to assess the North Omaha Ash Landfill and the existing groundwater monitoring system for compliance with the. Hydrogeologic conditions of the North Omaha Ash Landfill and recommended locations and depths of new groundwater monitoring wells, including recommended well design, required for compliance with the CCR rule, are provided.

The CCR Rule, 40 CFR Subpart D-Standards for the Disposal of CCRs, Section §257.91 requires a groundwater monitoring system that consists of sufficient number of wells at appropriate locations and depths, based on site-specific technical information, to yield groundwater samples from the uppermost aquifer that:

- Accurately represent the quality of both background groundwater, and groundwater passing the boundary of the CCR unit
- Monitor potential contaminant pathways

The groundwater monitoring system at the North Omaha Ash Landfill meets those requirements. This report includes the following sections in support of the certification.

- Section 1.0 Introduction
- Section 2.0 Facility Background
- Section 3.0 Site Hydrogeology Summary
- Section 4.0 Groundwater Monitoring System

## 2.0 Facility Background

OPPD has a five-unit, 663-megawatt (MW) fossil fuel-fired generating plant at the North Omaha Station (Station) in Omaha, Nebraska. Recently Units 1-3 were retired; Units 4 and 5 were retrofitted with air pollution control equipment and are still operating. The Station is located east of Pershing Drive and Craig Street, approximately 3.5 miles northwest of Eppley Airfield, along the west bank of the Missouri River at river mile 625.2. The first generating unit was placed in service in July 1954, and the fifth unit was placed in operation in 1968. Beneficial use and disposal of the fossil fuel combustion ash has occurred on the Station site since the 1950s.

The North Omaha Ash Landfill is an unlined CCR landfill of approximately 18 acres that has historically received CCR for disposal and is permitted with the State of Nebraska. The North Omaha Ash Landfill is an active, existing CCR landfill as defined by the CCR rule.

According to the Locational Criteria Report and Hydrogeologic Investigations Report (SCS Engineers, 1995) completed for the NDEQ Title 132 permit, the majority of the Station site is underlain by approximately 15 feet of fill consisting of low-to-medium plasticity clayey soils and a mixture of fly ash and bottom ash beneficially used as fill.

### 3.0 Site Hydrogeology Summary

Site geology and hydrogeology are described in a previous report entitled 'Hydrogeologic Investigations Report North Omaha Power Station Solid Waste Landfill Omaha Public Power District' (SCS Engineers, 1995). The site is composed of two primary types of geologic materials: 1) Quaternary age unconsolidated fill and alluvium, and 2) Pennsylvanian age limestone and shale bedrock. The majority of the site is underlain by approximately 15 to 18 feet of clayey and silty soils and a mixture of fly ash and bottom ash beneficially used as fill material. The ash fill texture ranges generally from silt to silty sand. Near the southeastern boundary of the site, deposits of fine sand are found, with thicknesses generally between 0.5 and 1.5 feet, occurring at depths of 6.5 to 14 feet. Directly underlying the fill material unconsolidated alluvium occurs, comprised of laterally and vertically discontinuous fine-grained, cohesive clayey sands and sandy clays, and non-cohesive silts and fine sands. In general, grain size increases with depth, and coarse sand and gravel are typically found in the lowermost portions of the alluvium. Coarser grained soils are generally found below elevations of approximately 970 and 980 feet above National Geodetic Vertical Datum (NGVD), and are comprised primarily of medium to coarse sand with minor gravel.

The Quaternary age Missouri River alluvium unconformably overlies the Pennsylvanian age limestone bedrock. The bedrock consists primarily of alternating layers of limestone and shale, which are collectively part of the Kansas City Group. The limestone unit at the site is tentatively has been identified as the Hertha Formation. The depth to bedrock ranges from approximately 35 feet, elevation 963 feet above NGVD, to approximately 77 feet, elevation 961 feet above NGVD. This is consistent with the elevation of the bedrock reported for the nearest NDNR test hole, located approximately 2.8 miles north of the study site. A production well located at the southeast corner of the site (off-site) has a depth to bedrock of approximately 103 feet. This is consistent with the general deepening of the bedrock near the center of the Valley across the River into Iowa.

One primary aquifer underlies the site, comprised of coarse-grained Missouri River alluvium. Thickness and permeability of this aquifer vary greatly by location because of the transient nature of the Missouri River flows during deposition of the sediments. Geologic materials described in the available well records do not support the existence of a continuous low-permeability confining layer within the alluvium that would separate upper from lower aquifers. Although, paired monitoring wells indicate that water levels are almost always higher in shallower monitoring wells than deeper monitoring wells. This is thought to be attributed to the screened interval of shallow wells being within the upper 15 to 18 feet of clays, silts, and silty sands of the fill and alluvium overlying the aquifer. Flows generally have a strong vertical component in materials of lower permeability.

Between December, 2001 and April, 2015, 14 monitoring wells were measured for water table depth twice annually. Depth to groundwater ranged across the site from approximately 2 to 37 feet below ground surface (bgs). The typical water level fluctuations recorded at the site ranged from approximately 5.3 to 12.9 feet. In June, 2013 the depth to water at MW-6 was 20.7 feet bgs which was larger than the typical range of 4 feet bgs to 12 feet bgs.

Groundwater flow direction in 1995 was reportedly to the easterly and northeasterly direction primarily toward the Missouri River, which forms the eastern boundary of the site. Between 2011 and 2015, groundwater flow direction is primarily easterly and northeasterly north of MW-15, located in the center of the site, and easterly and southeasterly south of MW-15.

According to analysis by SCS Engineers (1995), groundwater velocities calculated with hydraulic gradients from the four 1995 sampling dates ranged from 5.6 feet per day, to approximately 0.0001 feet per day. These velocities have a large range, of more than five orders of magnitude, primarily because of the large range of hydraulic conductivities determined at the site from slug tests. Hydraulic conductivity determined from slug tests were reportedly measured at MW-3 as  $1.3 \times 10^{-6}$  cm/sec and at MW-5 as  $1.0 \times 10^{-2}$  cm/sec. At MW-4, SCS Engineers (1995) determined a hydraulic conductivity of  $1.5 \times 10^{-5}$  cm/sec. The wide range of hydraulic conductivity may be due to the different lithologies the wells were screened in. MW-3 was screened in silty sand and in silt of high plasticity, MW-4 was screened in silty sand and in well-graded sand and fine to coarse sand, and MW-5 was screened in silty sand and in clay of high plasticity.

Groundwater flow velocity at North Omaha Station has been calculated based on hydraulic conductivity range of  $1.3 \times 10^{-6}$  cm/sec to  $9.98 \times 10^{-3}$  cm/sec as reported by SCS 1995 and an estimated porosity of 0.3. Based on monitoring reports since 2011, the gradient ranged from 0.01 ft/ft to 0.024 ft/ft with a velocity range of 0.1 to 835 ft/year.

From slug test data performed by Terracon (2016) on recently installed wells MW-18, MW-19 and MW-20, hydraulic conductivity ranged from  $1.92 \times 10^{-5}$  cm/sec to  $1.33 \times 10^{-3}$  cm/sec. This is within the range of previously recorded data.

## 4.0 Groundwater Monitoring System

Based on the site-specific specific hydrogeologic information and location of the existing CCR landfill, the groundwater monitoring system for the North Omaha Ash Landfill for detection monitoring program consists of three (3) upgradient/background wells and five (5) downgradient wells. This exceeds the minimum number of monitoring wells required by 40 CFR 257.91(c) (i.e. one upgradient and three downgradient). Nine (9) additional wells are included for water level measurements only and select wells to serve for future 'nature and extent determinations'. The groundwater monitoring system network for the North Omaha Ash Landfill is summarized below in Table 1.

**Table 1**  
**OPPD North Omaha Ash Landfill, Groundwater Monitoring Well System**

Monitoring Well	Date Installed	Well Depth (feet bgs) <sup>1</sup>	Well Depth (feet from TOC) <sup>2</sup>	Gradient	Monitoring Program Use
<b>Detection Monitoring Program</b>					
MW-9 <sup>3</sup>	5/4/96	63	61.72	Background/Upgradient	Detection
MW-18 <sup>3</sup>	12/1/15	71	70.70	Background/Upgradient	Detection
MW-19 <sup>3</sup>	1/20/16	76.5	76.30	Background/Upgradient	Detection
MW-2	3/6/95	30	32.98	Downgradient	Detection
MW-13	4/12/01	30	32.89	Down/Crossgradient	Detection
MW-15	4/12/01	15	17.59	Downgradient	Detection
MW-16	9/9/02	35	37.14	Downgradient	Detection
MW-17	5/10/07	30	32.94	Downgradient	Detection
<b>Water Level Measurements Only</b>					
MW-4	3/6/95	33	36.45	Downgradient	Water Level/Nature & Extent Determinations <sup>4</sup>
MW-5	3/2/95	30	32.73	Downgradient	Water Level/Nature & Extent Determinations <sup>4</sup>



Monitoring Well	Date Installed	Well Depth (feet bgs) <sup>1</sup>	Well Depth (feet from TOC) <sup>2</sup>	Gradient	Monitoring Program Use
MW-6	3/8/95	31	34.01	Downgradient	Water Level/Nature & Extent Determinations <sup>4</sup>
MW-7	3/8/95	30	33.04	Downgradient	Water Level/Nature & Extent Determinations <sup>4</sup>
MW-8	3/7/95	30	32.94	Downgradient	Water Level/Nature & Extent Determinations <sup>4</sup>
MW-10	4/11/01	15	17.35	Downgradient	Water Level Only
MW-11	4/11/01	15	17.50	Downgradient	Water Level Only
MW-12	4/11/01	15	17.43	Downgradient	Water Level Only
MW-20	11/9/15	35	37.57	Downgradient	Water Level/Nature & Extent Determinations <sup>4</sup>
<b>Abandoned Wells</b>					
MW-1	3/6/95 (Abandoned 4/17/01)	29	32.07	NA	NA
MW-3	3/3/95 (Abandoned 4/15/03)	52	55.19	NA	NA
MW-14	4/12/01 (Abandoned 9/9/02)	33	35.59	NA	NA

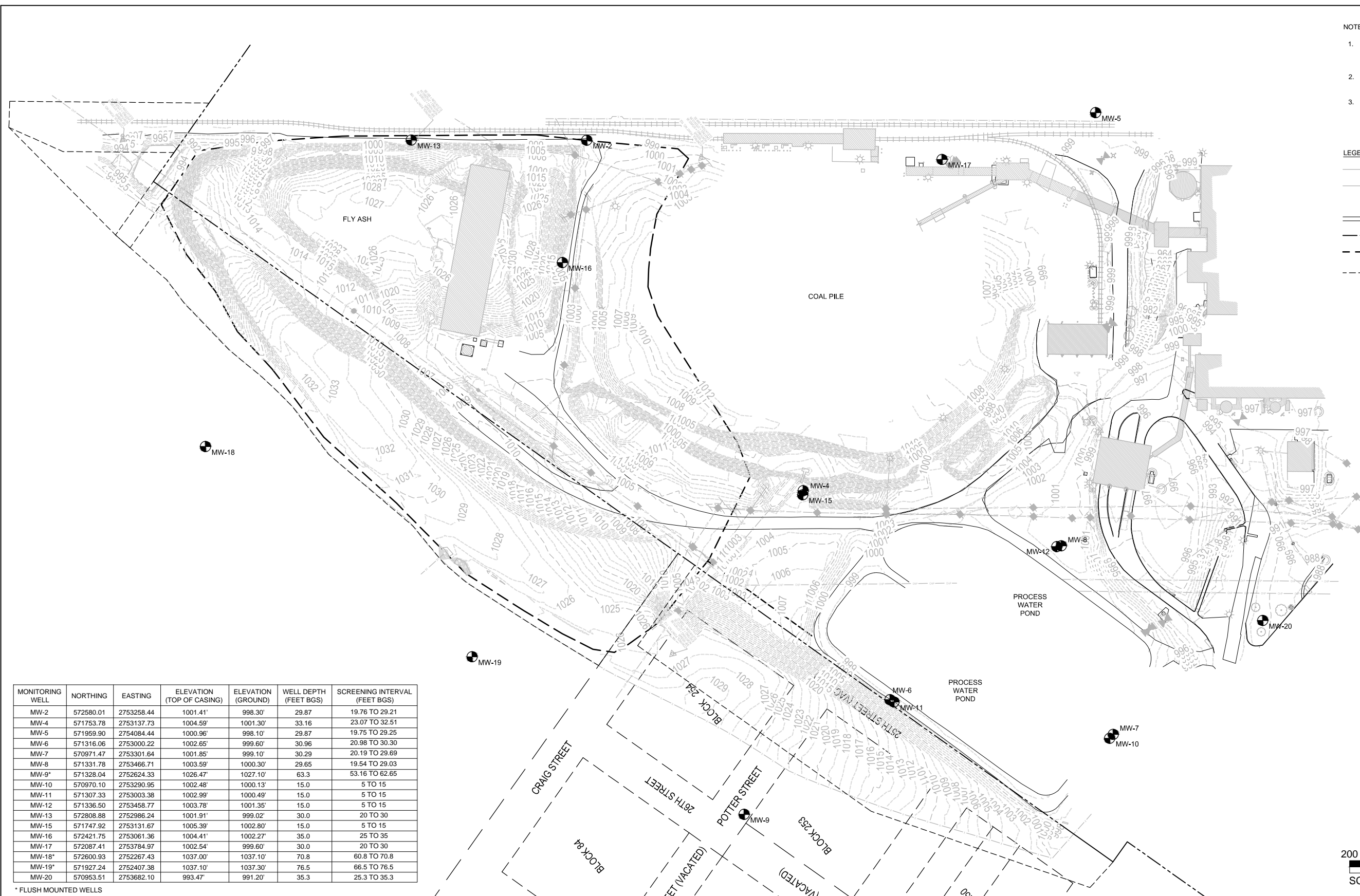
Notes:

1. Depth from ground surface to bottom of installed well (screen depth). Actual boring depth may be deeper.
2. Depth from top of casing to bottom of installed well (screen depth).
3. Flush mounted wells. Ground surface in these locations are approximately 25 feet to 39 feet higher than most of Station site.
4. Monitoring wells to be sampled for nature and extent determinations if an Appendix IV constituent is detected in one or more of the detection monitoring wells at statistically significant level above groundwater protection standard.

The monitoring well locations are shown in Figure 1 attached. The groundwater monitoring wells were constructed of 2-inch-diameter, schedule 40 PVC, flush threaded riser pipe, and machine slotted 10-slot (0.010 inch) screen. The surface completion for each well consists of a steel protective casing, concrete apron, and three bollards/posts. Monitoring well construction logs and registrations for the groundwater monitoring wells are contained in Appendix A of this report.

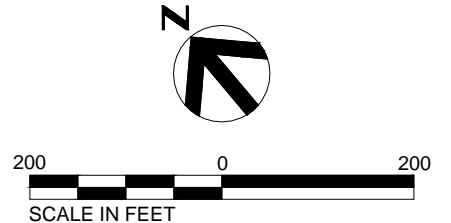
- NOTES:
1. MONITORING WELL LOCATIONS BASED ON A JULY AND OCTOBER 2014 SURVEY PERFORMED BY E&A CONSULTING GROUP, INC.
  2. MONITORING WELL ELEVATIONS OBTAINED FROM WELL LOGS.
  3. COORDINATE SYSTEM IS A MODIFIED STATE PLANE.

- LEGEND
- \*— EXST FENCE
  - OHP— EXST HIGH TENSION POWER LINES
  - MW-2 EXST MONITORING WELL
  - ==== EXST ROADWAYS
  - OPPD PROPERTY LINE
  - - - - - PERMIT DISPOSAL BOUNDARY
  - - - - - EASEMENTS AND LEASE AGREEMENTS BOUNDARY



MONITORING WELL	NORTHING	EASTING	ELEVATION (TOP OF CASING)	ELEVATION (GROUND)	WELL DEPTH (FEET BGS)	SCREENING INTERVAL (FEET BGS)
MW-2	572580.01	2753258.44	1001.41'	998.30'	29.87	19.76 TO 29.21
MW-4	571753.78	2753137.73	1004.59'	1001.30'	33.16	23.07 TO 32.51
MW-5	571959.90	2754084.44	1000.96'	998.10'	29.87	19.75 TO 29.25
MW-6	571316.06	2753000.22	1002.65'	999.60'	30.96	20.98 TO 30.30
MW-7	570971.47	2753301.64	1001.85'	999.10'	30.29	20.19 TO 29.69
MW-8	571331.78	2753466.71	1003.59'	1000.30'	29.65	19.54 TO 29.03
MW-9*	571328.04	2752624.33	1026.47'	1027.10'	63.3	53.16 TO 62.65
MW-10	570970.10	2753290.95	1002.48'	1000.13'	15.0	5 TO 15
MW-11	571307.33	2753003.38	1002.99'	1000.49'	15.0	5 TO 15
MW-12	571336.50	2753458.77	1003.78'	1001.35'	15.0	5 TO 15
MW-13	572808.88	2752986.24	1001.91'	999.02'	30.0	20 TO 30
MW-15	571747.92	2753131.67	1005.39'	1002.80'	15.0	5 TO 15
MW-16	572421.75	2753061.36	1004.41'	1002.27'	35.0	25 TO 35
MW-17	572087.41	2753784.97	1002.54'	999.60'	30.0	20 TO 30
MW-18*	572600.93	2752267.43	1037.00'	1037.10'	70.8	60.8 TO 70.8
MW-19*	571927.24	2752407.38	1037.10'	1037.30'	76.5	66.5 TO 76.5
MW-20	570953.51	2753682.10	993.47'	991.20'	35.3	25.3 TO 35.3

\* FLUSH MOUNTED WELLS



**OPPD**  
**NORTH OMAHA STATION**  
**OMAHA, NEBRASKA**  
 MONITORING WELL LOCATION MAP

DATE  
 JUNE 2016  
 FIGURE  
 1

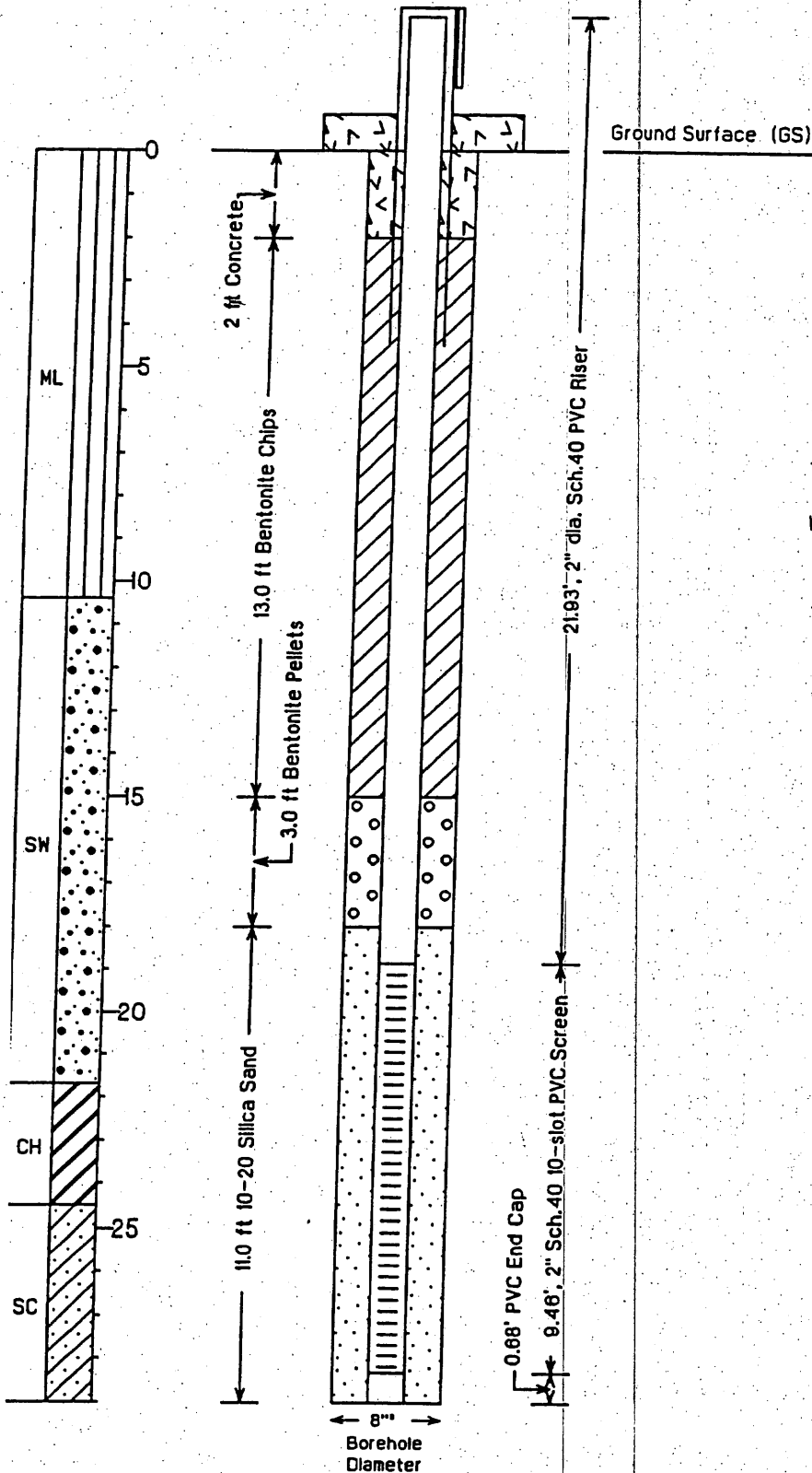


**Appendix A**  
Monitoring Well  
Documentation

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# MONITORING WELL CONSTRUCTION RECORD

Project Name Omaha Public Power District - North Omaha, Nebraska		Project Number 08 94037.02	Well Number <b>MW-1</b>
Location Description N of fly ash disp. area, N side of access road		Location NW1/4, NW1/4, NE1/4, NE1/4, Sec 28, T75N, R13E	Total Depth (TOC) 32.07 feet
Ground Surface Elevation 994.0 ft above NGVD	Marker in Concrete Well Pad EL	Boring Location Coordinates 572781.1 North 2751628.0 East	Date Installed 03/06/95



Elevation Top of Well Casing:	997.07 ft above NGVD
Elevation Top of Well Screen:	975.12 ft above NGVD
Elevation Bot. of Well Screen:	965.88 ft above NGVD
Total Depth of Boring:	29.0 ft below GS
Total Depth of Well:	29.00 ft below GS
Well Casing Above GS:	3.07 feet

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# DRILLING LOG

Project Name Omaha Public Power District - North Omaha, Nebraska				Project Number 08 94037.02		Boring Number <b>MW-1</b>	
Boring Location Description N of fly ash disp. area, N side of access road			Boring Location NW1/4, NW1/4, NE1/4, NE1/4, Sec 28, T75N, R13E			Page 1 of 2	
Ground Surface Elevation 994.0 ft above NGVD (surv.)		Top of Well Casing Elevation 997.07 ft above NGVD (surv.)		Boring Location Coordinates 572781.1 North 2751628.0 East		Total Footage 29.0 ft.	
Drilling Method (s) 6 1/4" ID HSA		Borehole Size 8"	Overburden Footage 29.0 feet	Bedrock Footage 0 feet	No. Of Samples None	No. Core Boxes None	Depth to Water See Remarks
Drilling Co. Layne, Inc, Omaha, Nebraska				Driller (s) Lyle Porter, Rick Keith			
Drilling Rig Acker Soilmax 80 Truck Mounted				Type of Sampler Split-spoon (standard penetration test)			
Date Started 03/06/95		Date Completed 03/06/95		Field Observer (s) Carmelo Blazekovic			

Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
1	CLAYEY SILT, medium brown, loose, moist, nonplastic, with minor fine grains (fill).				1			Start at 11:20 am HSA = Hollow Stem Augers NGVD = National Geodetic Vertical Datum
2					2			
3					3			
4					4			
5	SILT, greyish brown, loose, wet, trace plasticity (fill).	ML			5			
6					6	SS-1		
7					7			
8	SAND, blueish grey, fine grained, well graded, medium density, very wet, mostly quartz with some rock grains, with some silt and clay.				8			
9					9			
10					10			
11					11	SS-2		
12		SW			12			
13					13			
14					14			

# Drilling Log, continued

Project Name Omaha Public Power District - North Omaha, Nebraska				Project No. 08 94037.02		Boring Number <b>MW-1</b>		
Boring Location Description N of fly ash disp. area, N side of access road			Boring Location NW1/4, NW1/4, NE1/4, NE1/4, Sec 28, T75N, R13E			Page 2 of 2		
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
15	SAND, blueish grey, fine grained, well graded, medium density, very wet, mostly quartz with some rock grains, with some silt and clay.	SW			15			
16	SAND, medium grey, medium grained, well graded, very moist, with minor silt, mostly quartz and rock grains.		3/4/7/8	1.6'/2.0'	16	SS-3		
17					17			
18					18			
19					19			
20					20			
21			3/3/2/5	2.0'/2.0'	21	SS-4		
22	SILTY CLAY, dark grey, soft, very moist, high plasticity, with minor silt.	CH			22			
23					23			
24					24			
25	CLAYEY SAND, dark grey, loose, well graded, wet, trace plasticity with minor silt.	SC			25			
26			2/3/3/5	2.0'/2.0'	26	SS-5		
27					27			Advanced augers to 29.0'
28					28			
29					29			Monitoring well installed 2:00 pm
30	TOTAL DEPTH = 29.0 Feet				30			
31					31			





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# DRILLING LOG

Project Name Omaha Public Power District - North Omaha, Nebraska				Project Number 08 94037.02		Boring Number <b>MW-2</b>	
Boring Location Description NW of coal pile, NW corner of access rd intersec.			Boring Location NE1/4, SW1/4, NE1/4, NE1/4, Sec 28, T75N, R13E			Page 1 of 2	
Ground Surface Elevation 998.3 ft above NGVD (surv.)		Top of Well Casing Elevation 1001.41 ft above NGVD (surv.)		Boring Location Coordinates 572361.1 North 2752199.2 East		Total Footage 30.0 ft.	
Drilling Method (s) 6 1/4" ID HSA		Borehole Size 8"	Overburden Footage 29.0 feet	Bedrock Footage 0 feet	No. Of Samples None	No. Core Boxes None	Depth to Water See Remarks
Drilling Co. Layne, Inc, Omaha, Nebraska				Driller (s) Lyle Porter, Rick Keith			
Drilling Rig Acker Soilmax 80 Truck Mounted				Type of Sampler Split-Spoon			
Date Started 03/06/95		Date Completed 03/06/95		Field Observer (s) Carmelo Blazekovic			

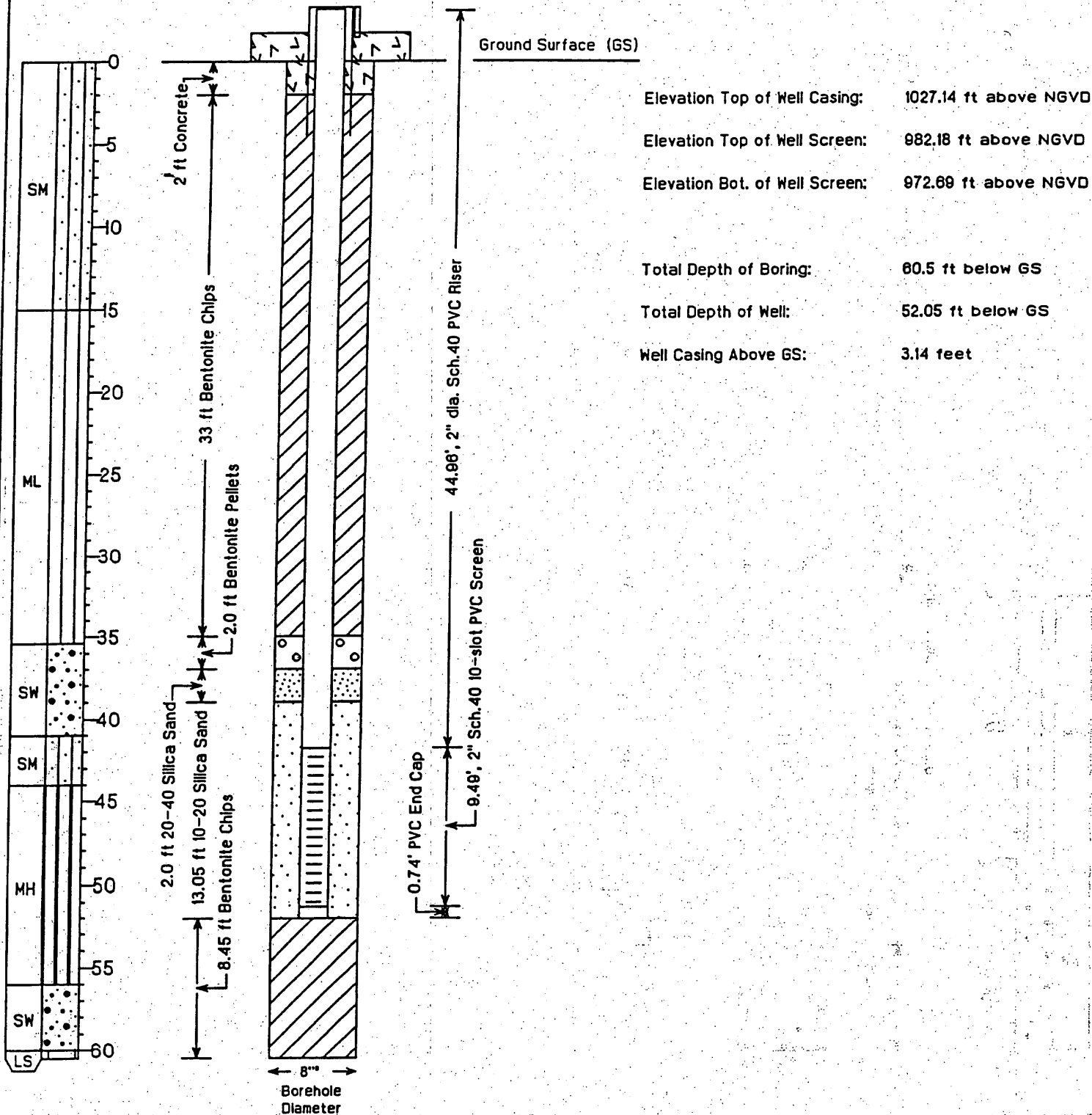
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
1	SILT, medium brown, soft, moist, nonplastic, with minor clay and gravel (fill).				1			Start at 3:00 pm.  HSA = Hollow Stem Augers NGVD = National Geodetic Vertical Datum
2								
3								
4								
5								
6	SILT, blueish gray, soft, nonplastic, moist, with minor sand and some silt size coal grains (fill).	ML	3/19/14/4	1.4'/2.0'	6	SS-1		Spoon penetrated a weathered limestone cobble.
7								
8								
9								
10								
11								
12								
13								
14								
14								

# Drilling Log, continued

Project Name Omaha Public Power District - North Omaha, Nebraska				Project No. 08 94037.02		Boring Number <b>MW-2</b>		
Boring Location Description NW of coal pile, NW corner of access rd intersec.			Boring Location NE1/4, SW1/4, NE1/4, NE1/4, Sec 28, T75N, R13E			Page 2 of 2		
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
15	SILT, blueish gray, soft, nonplastic, moist, with minor sand and some silt size coal grains (fill).	ML			15			
16	CLAYEY SILT, yellowish brown, soft, very moist, low plasticity, with minor fine sand.		2/3/4/5	1.6'/2.0'	16	SS-3		
17					17			
18					18			
19					19			
20					20			
21	SAND, medium gray, medium to fine grained, well graded, dense, very moist, with minor silt, mostly quartz and black rock grains.	SW	1/5/19/20	1.7'/2.0'	21	SS-4		
22					22			
23					23			
24	CLAYEY SAND, medium gray, fine grained, well graded, loose, wet, mostly quartz with rock grains in clay.	SC			24			
25					25			
26			1/3/5/3	2.0'/2.0'	26	SS-5		
27					27			Advanced augers to 30.0'
28					28			Quit drilling at 5:20 pm.
29					29			Monitoring Well installed at 6:00 PM.
30	TOTAL DEPTH = 30.0 Feet				30			
31					31			

# MONITORING WELL CONSTRUCTION RECORD

Project Name Omaha Public Power District - North Omaha, Nebraska		Project Number 08 94037.02	Well Number <b>MW-3</b>
Location Description W of fly ash disp. area, 20'E of Pershing Drive		Location NW1/4, SW1/4, NE1/4, NE1/4, Sec 28, T75N, R13E	Total Depth (TOC) 55.19 feet
Ground Surface Elevation 1024.0 ft. above NGVD	Marker in Concrete Well Pad El.	Boring Location Coordinates 571609.5 North 2751547.5 East	Date Installed 03/03/95



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# DRILLING LOG

Project Name Omaha Public Power District - North Omaha, Nebraska				Project Number 08 94037.02		Boring Number <b>MW-3</b>	
Boring Location Description W of fly ash disp. area, 20'E of Pershing Drive			Boring Location NW1/4, SW1/4, NE1/4, NE1/4, Sec 28, T75N, R13E			Page 1 of 4	
Ground Surface Elevation 1024.0 ft above NGVD (surv.)		Top of Well Casing Elevation 1027.14 ft above NGVD (surv.)		Boring Location Coordinates 571609.5 North 2751547.5 East		Total Footage 60.5 ft.	
Drilling Method (s) 6 1/4" ID HSA		Borehole Size 8"	Overburden Footage 60.0 feet	Bedrock Footage 0.5 feet	No. Of Samples None	No. Core Boxes None	Depth to Water See Remarks
Drilling Co. Layne, Inc, Omaha, Nebraska				Driller (s) Lyle Porter, Rick Keith			
Drilling Rig Acker Soilmax 80 Truck Mounted				Type of Sampler Split-spoon (standard penetration test)			
Date Started 03/02/95			Date Completed 03/03/95		Field Observer (s) Carmelo Blazekovic		

Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks	
1	SILTY SAND, brownish grey, fine grained, well graded, moist, loose (fly ash fill).	SM			1			Start at 5:20 PM HSA = Hollow Stem Augers  NGVD = National Geodetic Vertical Datum	
2									
3									
4									
5									
6									
7									
8									
9									
10									
11					2/3/5/2	0.3'/2.0'	11	SS-1	
12							12		
13							13		
14							14		

# Drilling Log, continued

Project Name Omaha Public Power District - North Omaha, Nebraska				Project No. 08 94037.02		Boring Number <b>MW-3</b>		
Boring Location Description W of fly ash disp. area, 20'E of Pershing Drive			Boring Location NW1/4, SW1/4, NE1/4, NE1/4, Sec 28, T75N, R13E			Page 2 of 4		
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
15	SILTY SAND, brownish grey, fine grained, well graded, moist, loose (fill).	SM			15			
16	SANDY SILT, light grey, loose, moist, with some fine sand, plant remains throughout.		2/2/3/4	0.3'/2.0'	16	SS-2		
17					17			
18					18			
19					19			
20					20			
21			2/3/3/2	1.0'/2.0'	21	SS-3		
22					22			
23		ML			23			
24	SILT, yellowish brown, medium density, very moist, with minor clay, vertical, carbonized roots throughout.				24			
25						25		
26			4/6/7/8	2.0'/2.0'	26	SS-4		
27					27			
28					28			
29	SILT, light grey, medium density, very moist with minor clay and fine sand.				29			
30						30		
31			5/7/6/7	1.0'/2.0'	31	SS-5		Quit drilling at 6:40 pm.



# Drilling Log, continued

Project Name Omaha Public Power District - North Omaha, Nebraska				Project No. 08 94037.02		Boring Number <b>MW-3</b>		
Boring Location Description W of fly ash disp. area, 20'E of Pershing Drive			Boring Location NW1/4, SW1/4, NE1/4, NE1/4, Sec 28, T75N, R13E			Page 3 of 4		
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
32	SILT, light grey, medium density, very moist, with minor clay and fine sand.	ML	5/7/6/7	1.0'/2.0'	32	SS-5		03/03/95 Start @ 830 am.
33					33			
34					34			
35	SAND, blueish grey, fine to medium grained, well graded, medium density, very moist, mostly quartz with some rock grains, minor silt and trace of clay.	SW	2/8/11/12	1.4'/2.0'	35	SS-6		Auger cuttings wet at 40'
36					36			
37					37			
38	SILTY SAND, brownish grey, well graded, fine grained, medium density, moist, trace of clay.	SM	4/7/9/11	2.0'/2.0'	38	SS-7		Auger cuttings wet at 45'
39					39			
40					40			
41	CLAYEY SILT, blueish grey, high plasticity, medium density, very moist, with some fine sand.	MH	10/7/8/8	2.0'/2.0'	41	SS-8		
42					42			
43					43			
44					44			
45					45			
46					46			
47					47			
48					48			

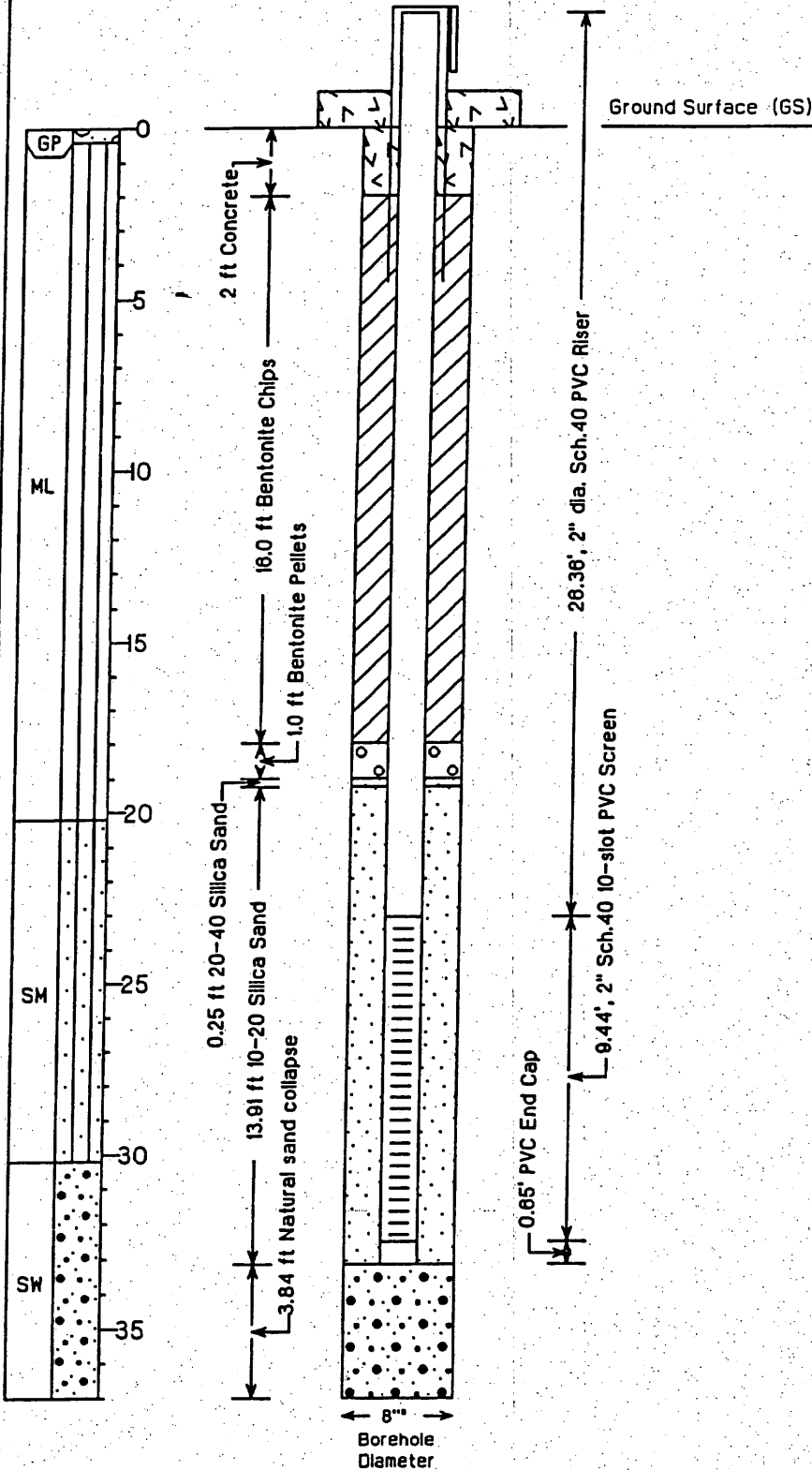
# Drilling Log, continued

Project Name Omaha Public Power District - North Omaha, Nebraska				Project No. 08 94037.02		Boring Number <b>MW-3</b>		
Boring Location Description W of fly ash disp. area, 20'E of Pershing Drive			Boring Location NW1/4, SW1/4, NE1/4, NE1/4, Sec 28, T75N, R13E			Page 4 of 4		
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
49	CLAYEY SILT, blueish grey, high plasticity, medium density, very moist, with some fine sand.				49			
50					50			
51			3/4/8/12	2.0'/2.0'	51	SS-9		
52	CLAYEY SILT, brownish grey, medium density, very moist, high plasticity.	MH			52			
53					53			
54	CLAYEY SILT, brownish grey, medium density, wet, high plasticity.				54			
55					55			
56			8/9/26/27	2.0'/2.0'	56	SS-10		
57	SAND, blueish grey, dense, medium to fine grained, wet, well graded, with minor silt, mostly quartz with some rock grains.				57			
58		SW			58			
59					59			
60	LIMESTONE, light grey, extremely weathered, very weak.				60			Drilling hard at 60'.
61	LIMESTONE, light grey, weathered, weak.	LS	50/0.5	0.5'/0.5'	61	SS-11		Auger refusal (with sampler) at 60.5. Pulled augers. Borehole open to 57.5'. Backfilled boring with bentonite chips to approx. 52'. Installed monitoring well 03/03/85.
62	TOTAL DEPTH = 60.5 Feet				62			
63					63			
64					64			
65					65			

**SCS ENGINEERS**  
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# MONITORING WELL CONSTRUCTION RECORD

Project Name Omaha Public Power District - North Omaha, Nebraska		Project Number 08 94037.02	Well Number <b>MW-4</b>
Location Description SW of coal pile, W of drainage		Location NE1/4.NW1/4.SE1/4.NE1/4, Sec. 28, T75N, R13E	Total Depth (TOC) 36.45 feet
Ground Surface Elevation 1001.3 ft above NGVD	Marker In Concrete Well Pad EL	Boring Location Coordinates 571534.6 North 2752078.0 East	Date Installed 03/08/95



Elevation Top of Well Casing:	1004.59 ft above NGVD
Elevation Top of Well Screen:	978.23 ft above NGVD
Elevation Bot. of Well Screen:	968.79 ft above NGVD
Total Depth of Boring:	37.0 ft below GS
Total Depth of Well:	33.16 ft below GS
Well Casing Above GS:	3.29 feet

# DRILLING LOG

Project Name Omaha Public Power District - North Omaha, Nebraska				Project Number 08 94037.02		Boring Number <b>MW-4</b>	
Boring Location Description SW of coal pile, W of drainage			Boring Location NE1/4,NW1/4,SE1/4,NE1/4, Sec. 28, T75N, R13E			Page 1 of 3	
Ground Surface Elevation 1001.3 ft above NGVD (surv.)		Top of Well Casing Elevation 1004.59 ft above NGVD (surv.)		Boring Location Coordinates 571534.6 North 2752078.0 East		Total Footage 37.0 ft.	
Drilling Method (s) 6 1/4" ID HSA		Borehole Size 8"	Overburden Footage 37.0 feet	Bedrock Footage 0 feet	No. Of Samples None	No. Core Boxes None	Depth to Water See Remarks
Drilling Co. Layne, Inc, Omaha, Nebraska				Driller (s) Lyle Porter, Rick Keith			
Drilling Rig Acker Soilmax 80 Truck Mounted				Type of Sampler Split-spoon (standard penetration test)			
Date Started 03/08/95		Date Completed 03/08/95		Field Observer (s) Carmelo Blazekovic			

Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
1	GRAVEL	GP			1			Start at 4:30 PM  HSA = Hollow Stem Augers  NGVD = National Geodetic Vertical Datum
1	SANDY SILT, light grey (fill), loose, wet; ash with cinders and a few grains of coal (fill).				2			
2					3			
3					4			
4					5			
5					6	SS-1		
6			2/7/7/5	2.0'/2.0'	7			
7		ML			8			
8					9			
9					10			
10					11	SS-2		
11			1/1/1/2	2.0'/2.0'	12			
12					13			
13					14			

# Drilling Log, continued

Project Name Omaha Public Power District - North Omaha, Nebraska		Project No. 08 94037.02	Boring Number <b>MW-4</b>
Boring Location Description SW of coal pile, W of drainage		Boring Location NE1/4,NW1/4,SE1/4,NE1/4, Sec. 28, T75N, R13E	Page 2 of 3

Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
15	SANDY SILT, light grey (fill), loose, wet, ash with cinders and a few grains of coal (fill).	ML			15			Quit drilling at 5:45 pm. Started at 7:50 on 03/02/95
16	SILT, olive grey, loose, moist, nonplastic.		4/1/5/9	1.3'/2.0'	16	SS-3		
17					17			
18				18				
19				19				
20				20				
21	SILTY SAND AND CLAYEY SAND, interbedded 1"-2" layers. Silty sand is yellowish brown, wet, loose, with minor clay. Clayey sand is olive, wet, loose, well graded, with minor silt.	SM	2/3/4/5	1.5'/2.0'	21	SS-4		
22					22			
23					23			
24				24				
25				25				
26				26				
27				27				
28				28				
29				29				
30				30				
31	SAND, olive grey, fine grained, well graded, loose, wet, silty with some clay.	SW	1/2/3/5	1.3'/2.0'	31	SS-6		

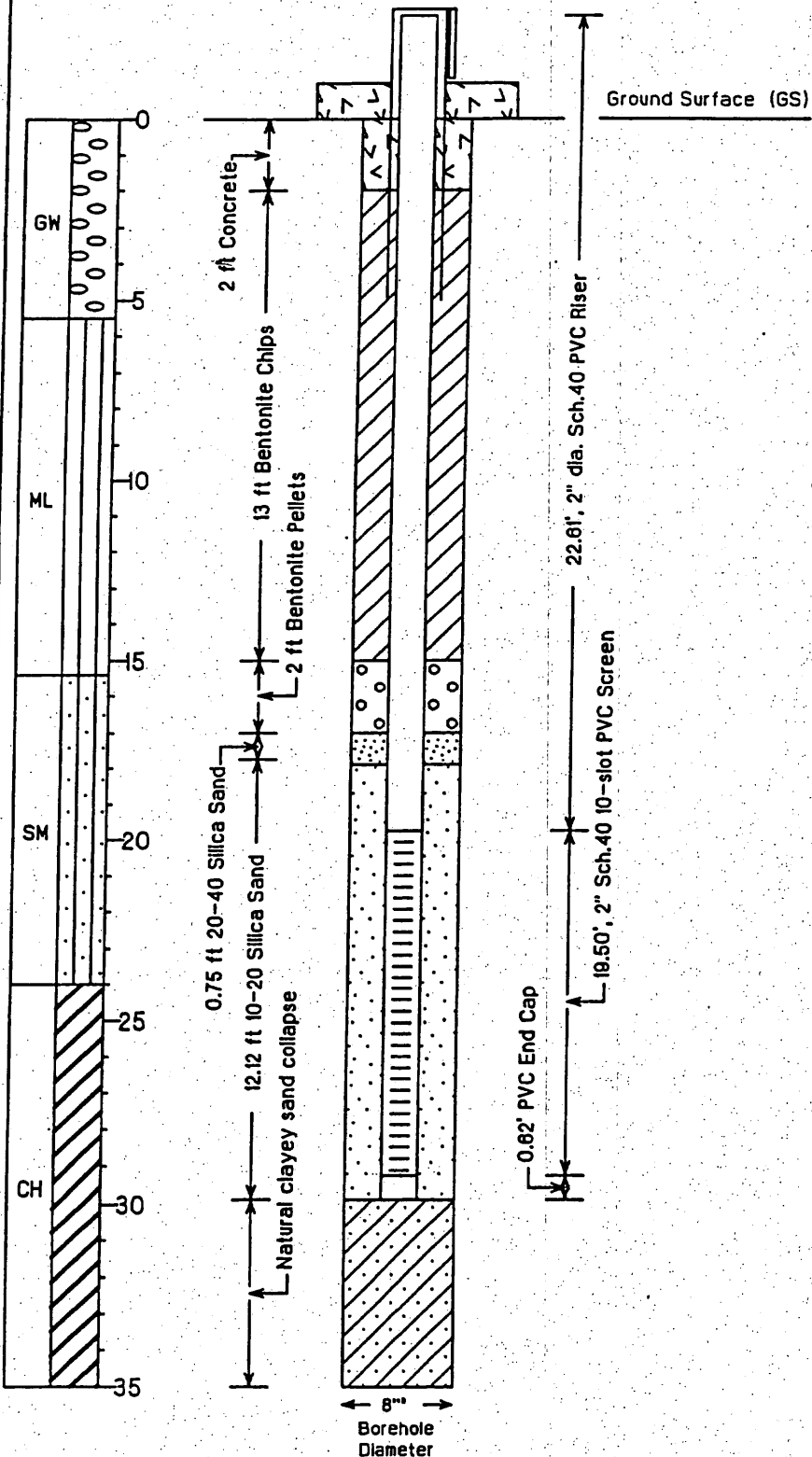
# Drilling Log, continued

Project Name Omaha Public Power District - North Omaha, Nebraska	Project No. 08 94037.02	Boring Number <b>MW-4</b>
Boring Location Description SW of coal pile, W of drainage	Boring Location NE1/4,NW1/4,SE1/4,NE1/4, Sec. 28, T75N, R13E	Page 3 of 3

Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
32	SAND, olive grey, fine grained, loose, wet, well graded, silty with some clay.	SW	1/2/3/5	1.3'/2.0'	32	SS-6		Withdrew augers to 32.5'. Tried to install the well, there is approximately 5' of sand in the bottom of hollow stem of augers. Decided to pull augers and install the plug.  10:30 Borehole open to 32.5'  "Heaving sand" 32.5' to 37.0'
33	SAND, olive grey, medium to fine grained, well graded, loose, wet, mostly quartz with rock fragments, trace of silt.				33			
34					34			
35					35			
36			3/4/5/5	2.0'/2.0'	36	SS-7		
37	TOTAL DEPTH = 37.0 Feet				37			
38					38			
39					39			
40					40			
41					41			
42					42			
43					43			
44					44			
45					45			
46					46			
47					47			
48					48			

# MONITORING WELL CONSTRUCTION RECORD

Project Name Omaha Public Power District - North Omaha, Nebraska		Project Number 08 94037.02	Well Number <b>MW-5</b>
Location Description E part of the site, next to Missouri River		Location NW1/4, NW1/4, SW1/4, NW1/4, Sec 27, T75N, R13E	Total Depth (TOC) 32.73 feet
Ground Surface Elevation 998.1 ft above NGVD	Marker in Concrete Well Pad EL	Boring Location Coordinates 571740.3 North 2753024.9 East	Date Installed 03/02/95



Elevation Top of Well Casing:	1000.96 ft above NGVD
Elevation Top of Well Screen:	978.35 ft above NGVD
Elevation Bot. of Well Screen:	968.85 ft above NGVD
Total Depth of Boring:	35.0 ft below GS
Total Depth of Well:	29.87 ft below GS
Well Casing Above GS:	2.88 feet

# DRILLING LOG

Project Name Omaha Public Power District - North Omaha, Nebraska				Project Number 08 94037.02		Boring Number <b>MW-5</b>	
Boring Location Description E part of the site, next to Missouri River			Boring Location NW1/4, NW1/4, SW1/4, NW1/4, Sec 27, T75N, R13E			Page 1 of 3	
Ground Surface Elevation 998.1 ft above NGVD (surv.)		Top of Well Casing Elevation 1000.96 ft above NGVD (surv.)		Boring Location Coordinates 571740.3 North 2753024.9 East		Total Footage 35.0 ft.	
Drilling Method (s) 6 1/4" ID HSA		Borehole Size 8"	Overburden Footage 35.0 feet	Bedrock Footage 0 feet	No. Of Samples None	No. Core Boxes None	Depth to Water See Remarks
Drilling Co. Layne, Inc, Omaha, Nebraska				Driller (s) Lyle Porter, Rick Keith			
Drilling Rig Acker Soilmax 80 Truck Mounted				Type of Sampler Split-spoon (standard penetration test)			
Date Started 03/02/95		Date Completed 03/02/95		Field Observer (s) Carmelo Blazekovic			

Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
1	GRAVEL, COBBLES, SAND, AND SILT (fill).	GW			1			Start at 11:20 AM HSA = Hollow Stem Augers NGVD = National Geodetic Vertical Datum
2								
3								
4								
5								
6	CLAYEY SILT, yellowish brown, medium density, very moist, with up to 1/4" oval shaped light blueish grey silt mottles (fill).	ML			6			
7								
8								
9								
10								
11								
12								
13								
14								
11			5/11/14/15	1.5'/2.0'	11	SS-1		
12					12			
13					13			
14					14			



# Drilling Log, continued

Project Name Omaha Public Power District - North Omaha, Nebraska					Project No. 08 94037.02		Boring Number <b>MW-5</b>	
Boring Location Description E part of the site, next to Missouri River			Boring Location NW1/4, NW1/4, SW1/4, NW1/4, Sec 27, T75N, R13E			Page 2 of 3		
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
15	CLAYEY SILT, yellowish brown, medium density, very moist, with up to 1/4" oval shaped light blueish grey silt mottles (fill).	ML			15			
16	SILTY SAND, blueish grey, fine grained, medium density, well graded, very moist, minor clay and trace wood and coal particles.		10/7/8/12	2.0'/2.0'	16	SS-2		
17					17			
18					18			
19					19			
20		SM			20			
21			2/2/5/2	1.8'/2.0'	21	SS-3		
22					22			
23					23			
24	SANDY CLAY, light grey, high plasticity, soft, very moist.				24			
25						25		
26			3/4/5/6	2.0'/2.0'	26	SS-4		
27					27			
28		CH			28			
29					29			
30					30			
31			1/2/2/3	2.0'/2.0'	31	SS-5		

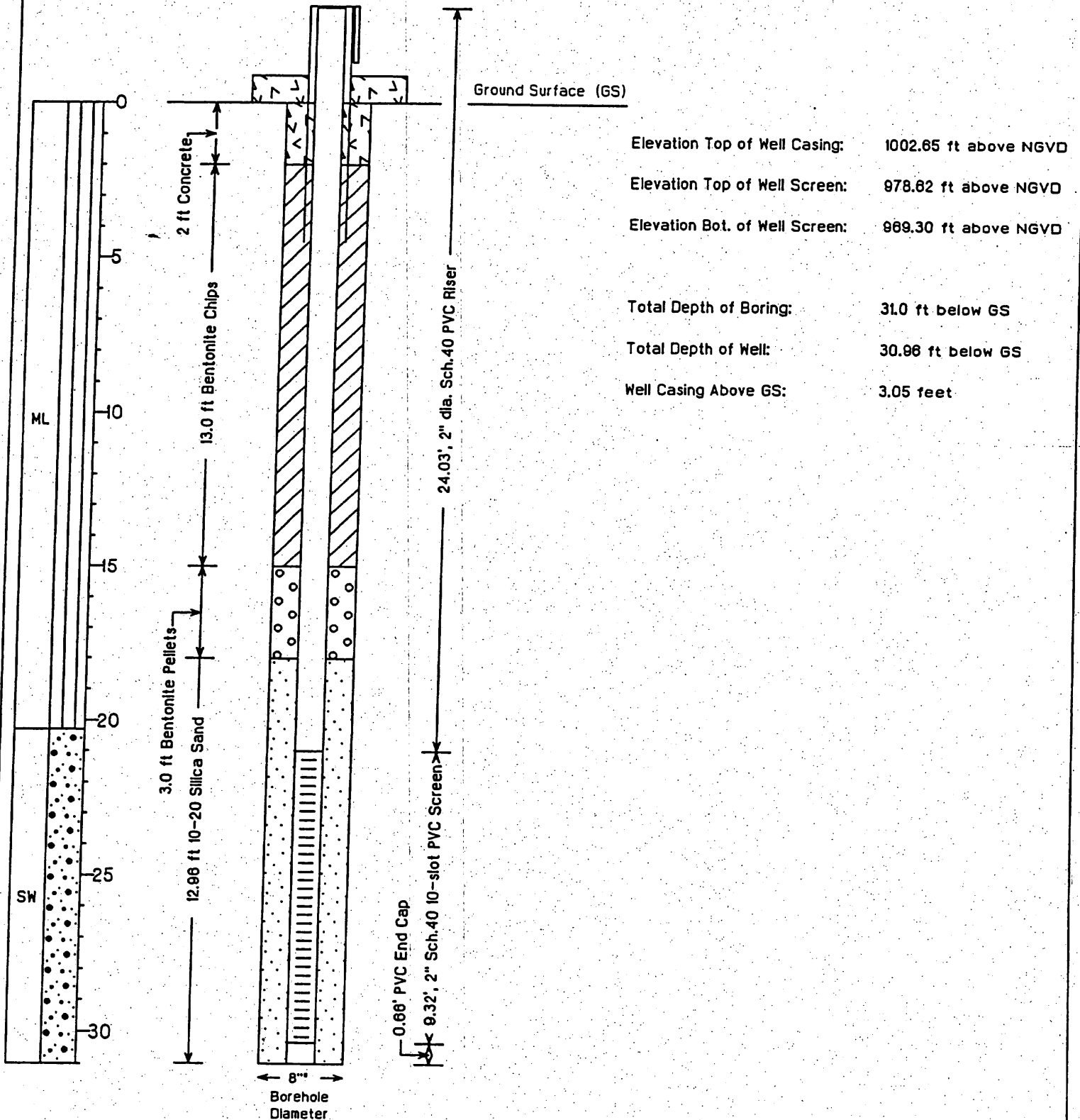
# Drilling Log, continued

Project Name Omaha Public Power District - North Omaha, Nebraska	Project No. 08 94037.02	Boring Number <b>MW-5</b>
Boring Location Description E part of the site, next to Missouri River	Boring Location NW1/4, NW1/4, SW1/4, NW1/4, Sec 27, T75N, R13E	Page 3 of 3

Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
32	SANDY CLAY, light grey, high plasticity, soft, very moist.	CH	1/2/2/3	2.0'/2.0'	32	SS-5		Advanced augers to 35.  Pulled Augers. Borehole open to 34.5'. Backfilled borehole with sand to 30'. Well installed 3:00 PM.
33					33			
34					34			
35					35			
36	TOTAL DEPTH = 35.0 Feet				36			
37					37			
38					38			
39					39			
40					40			
41					41			
42					42			
43					43			
44					44			
45					45			
46					46			
47					47			
48					48			

# MONITORING WELL CONSTRUCTION RECORD

Project Name Omaha Public Power District - North Omaha, Nebraska		Project Number 08 94037.02	Well Number <b>MW-6</b>
Location Description NW of Western Bottom Ash Pond		Location NW1/4, SW1/4, SE1/4, NE1/4, Sec. 28, T75N, R13E	Total Depth (TOC) 34.01 feet
Ground Surface Elevation 999.6 ft above NGVD	Marker in Concrete Well Pad EL	Boring Location Coordinates 571097.1 North 2751940.2 East	Date Installed 03/08/95



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# DRILLING LOG

Project Name Omaha Public Power District - North Omaha, Nebraska				Project Number 08 94037.02		Boring Number <b>MW-6</b>	
Boring Location Description NW of Western Bottom Ash Pond			Boring Location NW1/4, SW1/4, SE1/4, NE1/4, Sec. 28, T75N, R13E			Page 1 of 2	
Ground Surface Elevation 999.6 ft above NGVD (surv.)		Top of Well Casing Elevation 1002.65 ft above NGVD (surv.)		Boring Location Coordinates 571097.1 North 2751940.2 East		Total Footage 31.0 ft.	
Drilling Method (s) 6 1/4" ID HSA		Borehole Size 8"	Overburden Footage 31.0 feet	Bedrock Footage 0 feet	No. Of Samples None	No. Core Boxes None	Depth to Water See Remarks
Drilling Co. Layne, Inc, Omaha, Nebraska				Driller (s) Lyle Porter, Rick Keith			
Drilling Rig Acker Soilmax 80 Truck Mounted				Type of Sampler Split-spoon (standard penetration test)			
Date Started 03/08/95		Date Completed 03/08/95		Field Observer (s) Carmelo Blazekovic			

Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks	
1	SILT, medium brown, medium to loose, moist, non-plastic, with minor clay (fill).	ML			1			Start at 10:00 HSA = Hollow Stem Augers NGVD = National Geodetic Vertical Datum	
2					2				
3					3				
4					4				
5	SILT, medium brown, loose, wet, non-plastic with minor clay and trace fine sand (fill).	ML			5				
6					6				SS-1
7					7				
8					8				
9		ML			9				
10					10				
11					11				SS-2
12					12				
13		ML			13				
14					14				

# Drilling Log, continued

Project Name Omaha Public Power District - North Omaha, Nebraska				Project No. 08 94037.02		Boring Number <b>MW-6</b>		
Boring Location Description NW of Western Bottom Ash Pond			Boring Location NW1/4, SW1/4, SE1/4, NE1/4, Sec. 28, T75N, R13E			Page 2 of 2		
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
15	SILT, medium brown, loose, wet, non-plastic with minor clay and trace fine sand (fill).				15			
16			2/1/4/10	1.9'/2.0'	16	SS-3		
17	CLAYEY SILT, brown, medium consistency, very moist, medium to low plasticity with minor fine sand.	ML			17			
18					18			
19					19			
20					20			
21	SAND, yellowish brown, fine grained, loose, wet, well graded, with minor silt, mostly quartz with rock grains.		2/2/5/6	2.0'/2.0'	21	SS-4		
22					22			
23					23			
24					24			
25					25			
26	SAND, bluish grey, fine grained, loose, wet, well graded, with silt and minor clay, mostly quartz and rock grains.	SW	2/2/1/2	2.0'/2.0'	26	SS-5		
27					27			
28					28			
29					29			Installed monitoring well 12:00 pm.
30					30			
31	TOTAL DEPTH = 31.0 Feet				31			



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# DRILLING LOG

Project Name Omaha Public Power District - North Omaha, Nebraska				Project Number 08 94037.02		Boring Number <b>MW-7</b>	
Boring Location Description Approximately 20' South of Bottom Ash Ponds			Boring Location SW1/4,SE1/4,SE1/4,NE1/4,Sec.28,T75N,R13E			Page 1 of 2	
Ground Surface Elevation 999.1 ft above NGVD (surv.)		Top of Well Casing Elevation 1001.85 ft above NGVD (surv.)		Boring Location Coordinates 570752.6 North 2752241.6 East		Total Footage 30.5 ft.	
Drilling Method (s) 6 1/4" ID HSA		Borehole Size 8"	Overburden Footage 30.5 feet	Bedrock Footage 0 feet	No. Of Samples None	No. Core Boxes None	Depth to Water See Remarks
Drilling Co. Layne, Inc, Omaha, Nebraska				Driller (s) Lyle Porter, Rick Keith			
Drilling Rig Acker Soilmax 80 Truck Mounted				Type of Sampler Split-spoon (standard penetration test)			
Date Started 03/08/95		Date Completed 03/08/95		Field Observer (s) Carmelo Blazekovic			

Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
1	SILT, medium brown, loose, moist, non-plastic with some clay and trace fine sand (fill).	ML			1			Start at 1:00 pm  HSA = Hollow Stem Augers NGVD = National Geodetic Vertical Datum
2					2			
3					3			
4					4			
5	SILT, medium brown, loose, wet, non-plastic with some clay and trace fine sand (fill).	ML			5			
6					6			
7					7			
8					8			
9					9			
10					10			
11					11	SS-2		
12					12			
13					13			
14					14			

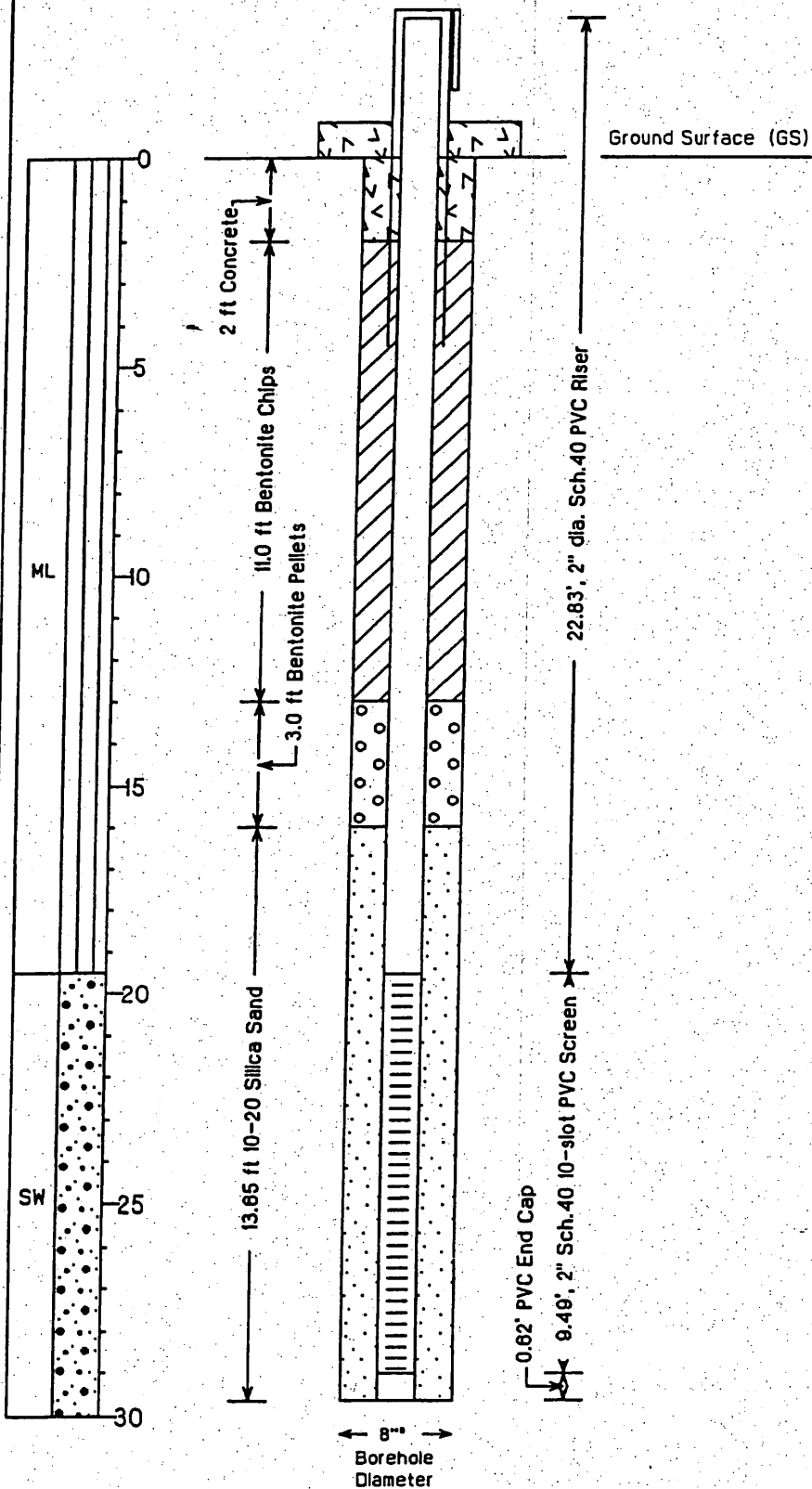
# Drilling Log, continued

Project Name Omaha Public Power District - North Omaha, Nebraska				Project No. 08 94037.02		Boring Number <b>MW-7</b>		
Boring Location Description Approximately 20' South of Bottom Ash Ponds			Boring Location SW1/4,SE1/4,SE1/4,NE1/4,Sec.28,T75N,R13E			Page 2 of 2		
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
15	SILT, medium brown, loose, wet, non-plastic with some clay and trace fine sand (fill).	ML			15			
16	CLAYEY SILT, bluish grey, medium consistency, moist, medium plasticity with trace fine sand.		4/2/4/7	0.4'/2.0'	16	SS-3		
17					17			
18					18			
19	SAND, yellowish brown, fine grained, well graded, loose, wet with some silt, mostly quartz with rock grains.	SW			19			
20					20			
21			2/3/2/5	1.8'/2.0'	21	SS-4		
22					22			
23					23			
24	SAND, dark grey, fine grained, well graded, loose, wet, with silt, mostly quartz and rock grains.				24			
25					25			
26		2/2/2/4	2.0'/2.0'	26	SS-5			
27				27				
28				28				Quit drilling at 3:00 pm.
29				29				Installed monitoring well @ 3:30 pm
30				30				
31	TOTAL DEPTH = 30.5 FEET				31			

**SCS ENGINEERS**  
Kansas City, Missouri

# MONITORING WELL CONSTRUCTION RECORD

Project Name Omaha Public Power District - North Omaha, Nebraska		Project Number 08 94037.02	Well Number <b>MW-8</b>
Location Description East of Eastern Bottom Ash Pond		Location NW1/4,SE1/4,SE1/4,NE1/4,Sec.28,T75N,R13E	Total Depth (TOC) 32.94 feet
Ground Surface Elevation 1000.3 ft above NGVD	Marker in Concrete Well Pad EL	Boring Location Coordinates 571112.4 North 2752406.5 East	Date Installed 03/07/95



Elevation Top of Well Casing:	1003.59 ft above NGVD
Elevation Top of Well Screen:	980.78 ft above NGVD
Elevation Bot. of Well Screen:	971.27 ft above NGVD
Total Depth of Boring:	30.0 ft below GS
Total Depth of Well:	29.65 ft below GS
Well Casing Above GS:	3.29 feet

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# DRILLING LOG

Project Name Omaha Public Power District - North Omaha, Nebraska				Project Number 08 94037.02		Boring Number <b>MW-8</b>	
Boring Location Description East of Eastern Bottom Ash Pond			Boring Location NW1/4,SE1/4,SE1/4,NE1/4,Sec.28,T75N,R13E			Page 1 of 2	
Ground Surface Elevation 1000.3 ft above NGVD (surv.)		Top of Well Casing Elevation 1003.59 ft above NGVD (surv.)		Boring Location Coordinates 571112.4 North 2752406.5 East		Total Footage 30.0 ft.	
Drilling Method (s) 6 1/4" ID HSA		Borehole Size 8"	Overburden Footage 30.0 feet	Bedrock Footage 0 feet	No. Of Samples None	No. Core Boxes None	Depth to Water See Remarks
Drilling Co. Layne, Inc, Omaha, Nebraska				Driller (s) Lyle Porter, Rick Keith			
Drilling Rig Acker Soilmax 80 Truck Mounted				Type of Sampler Split-spoon (standard penetration test)			
Date Started 03/07/95		Date Completed 03/07/95		Field Observer (s) Carmelo Blazekovic			

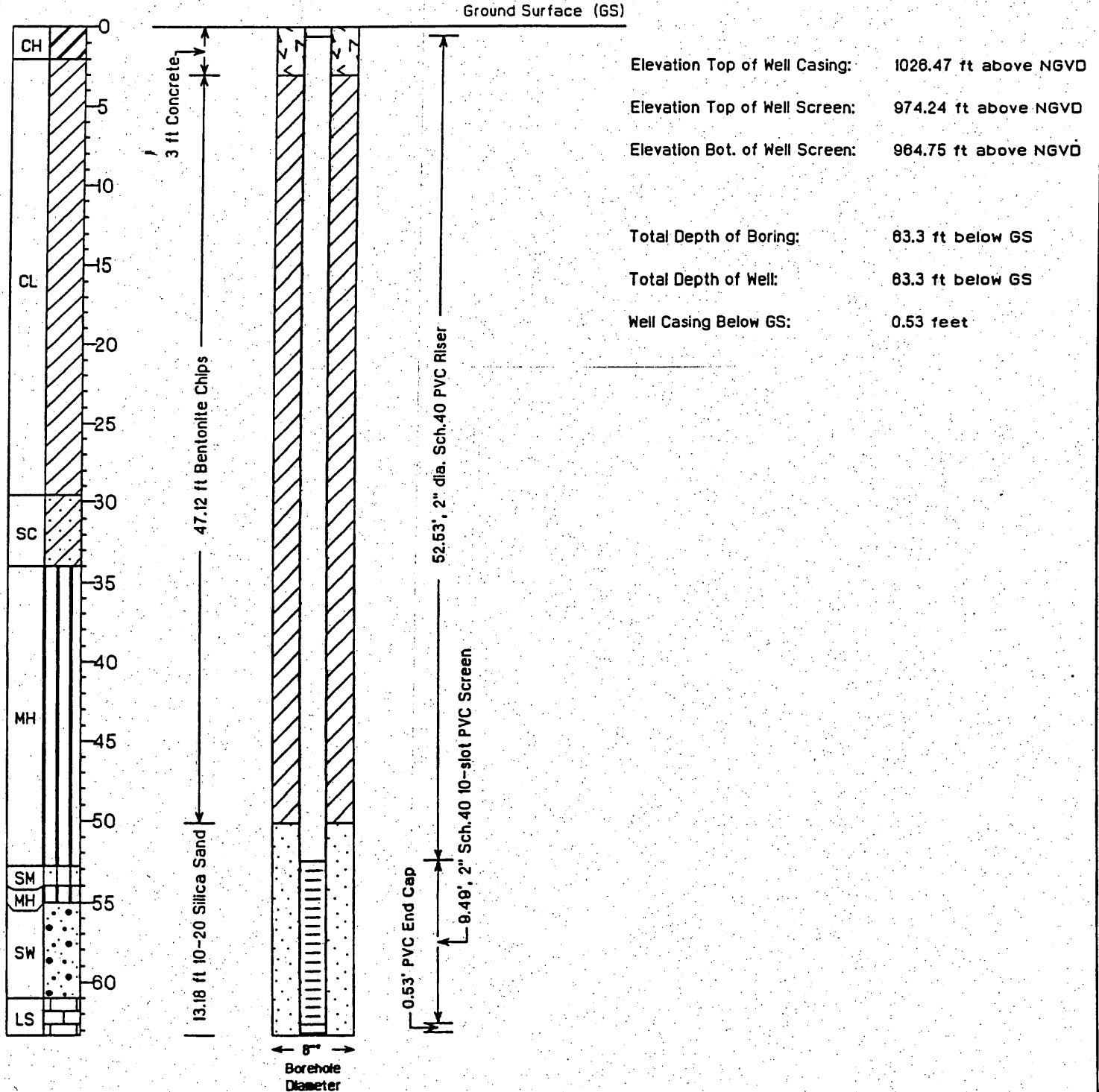
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
1	SANDY SILT, dark grey, loose, moist, with minor clay, mostly cinders and coal particles with silt (fill).	ML			1			Start at 12:45 p.m.
2								
3								
4								
5								
6	SANDY SILT, dark grey, loose, wet, with minor clay, mostly cinders and coal particles with silt (fill).	ML	2/20/30	1.0'/1.3'	6	SS-1		Hammer bouncing at 6.3'
7					7			
8	SILT, brownish grey, loose, wet, with some clay and minor coarse sand (fill).	ML			8			
9								
10								
11								
11	SILT, brownish grey, loose, wet, with some clay and minor coarse sand (fill).	ML		1/4/2/2	2.0'/2.0'	11	SS-2	
12						12		
13						13		
14					14			

# Drilling Log, continued

Project Name Omaha Public Power District - North Omaha, Nebraska				Project No. 08 94037.02		Boring Number <b>MW-8</b>		
Boring Location Description East of Eastern Bottom Ash Pond			Boring Location NW1/4,SE1/4,SE1/4,NE1/4,Sec.28,T75N,R13E			Page 2 of 2		
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
15	SILT, brownish grey, loose, wet, with some clay and minor coarse sand (fill).	ML			15			
16	CLAYEY SILT (alluvium), dark grey, soft, moist, trace plasticity, with some fine sand.		1/2/5/2	1.7'/2.0'	16	SS-3		
17					17			
18					18			
19					19			
20	SAND, yellowish brown, fine grained, well graded, wet, mostly quartz with some rock grains, trace silt.	SW			20			
21			2/3/2/8	1.2'/2.0'	21	SS-4		
22					22			
23					23			
24					24			
25					25			
26			1/1/2/3	2.0'/2.0'	26	SS-5		
27					27			Installed monitoring well at 1:45 pm
28					28			
29					29			
30					30			
31	TOTAL DEPTH = 30.0 Feet				31			

# MONITORING WELL CONSTRUCTION RECORD

Project Name Omaha Public Power District - North Omaha, Nebraska		Project Number 08 94037.02	Well Number <b>MW-9</b>
Location Description W of fly ash disp. area, 40'W of Pershing Drive		Location SW1/4, NW1/4, SE1/4, NE1/4, Sec 28, T75N, R13E	Total Depth (TOC) 62.55 feet
Ground Surface Elevation 1027.1 ft above NGVD	Marker in Concrete Well Pad El.	Boring Location Coordinates 571109.4 North 2751564.3 East	Date Installed 05/04/96



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# DRILLING LOG

Project Name Omaha Public Power District - North Omaha, Nebraska				Project Number 08 94037.02		Boring Number <b>MW-9</b>	
Boring Location Description W of fly ash disp. area, 40'W of Pershing Drive			Boring Location SW1/4, NW1/4, SE1/4, NE1/4, Sec 28, T75N, R13E			Page 1 of 4	
Ground Surface Elevation 1027.1 ft above NGVD (surv.)		Top of Well Casing Elevation 1026.47 ft above NGVD (surv.)		Boring Location Coordinates 571109.4 North 2751564.3 East		Total Footage 63.3 ft.	
Drilling Method (s) 6 1/4" ID HSA		Borehole Size 8"	Overburden Footage 61.0 feet	Bedrock Footage 2.3 feet	No. Of Samples None	No. Core Boxes None	Depth to Water See Remarks
Drilling Co. Layne, Inc, Omaha, Nebraska				Driller (s) Rick Keith			
Drilling Rig Acker Soilmax 80 Truck Mounted				Type of Sampler Continuous Soil Sampler (CSS)			
Date Started 05/03/96		Date Completed 05/04/96		Field Observer (s) Carmelo Blazekovic			

Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
1	SILTY CLAY, dark gray, soft, moist, high plasticity, some roots.	CH			1			Start at 2:00 PM HSA = Hollow Stem Augers.  NGVD = National Geodetic Vertical Datum
2	CLAYEY SILT, orange brown, soft, moist, low plasticity.				4.2'/5.0'	2	CSS-1	
3					3			
4					4			
5	CLAYEY SILT, grayish brown, damp, soft, low plasticity, some roots.	CL			5			
6						6		
7					3.6'/5.0'	7	CSS-2	
8						8		
9					9			
10						10		
11						11		
12					5.0'/5.0	12	CSS-3	
13						13		
14						14		

# Drilling Log, continued

Project Name Omaha Public Power District - North Omaha, Nebraska				Project No. 08 94037.02		Boring Number <b>MW-9</b>		
Boring Location Description W of fly ash disp. area, 40'W of Pershing Drive			Boring Location SW1/4, NW1/4, SE1/4, NE1/4, Sec 28, T75N, R13E			Page 2 of 4		
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
15	CLAYEY SILT, grayish brown, damp, soft, low plasticity, some roots.	CL		5.0'/5.0'	15			
16								
17					17			
18	SILT, reddish brown, soft, very moist, low plasticity.	CL		3.0'/5.0'	18	CSS-4		
19							19	CSS-3
20					20			
21					21			
22					22			
23					23			
24					24			
25	SILT, brownish gray, soft, very moist, low plasticity.	CL		4.0'/5.0'	25	CSS-5		
26							26	
27					27			
28					28			
29					29			
30	CLAYEY SAND, reddish brown, medium grained sand and clay mixture, loose, very moist, poorly graded.	SC		5.0'/5.0'	30	CSS-6		
31							31	CSS-7

# Drilling Log, continued

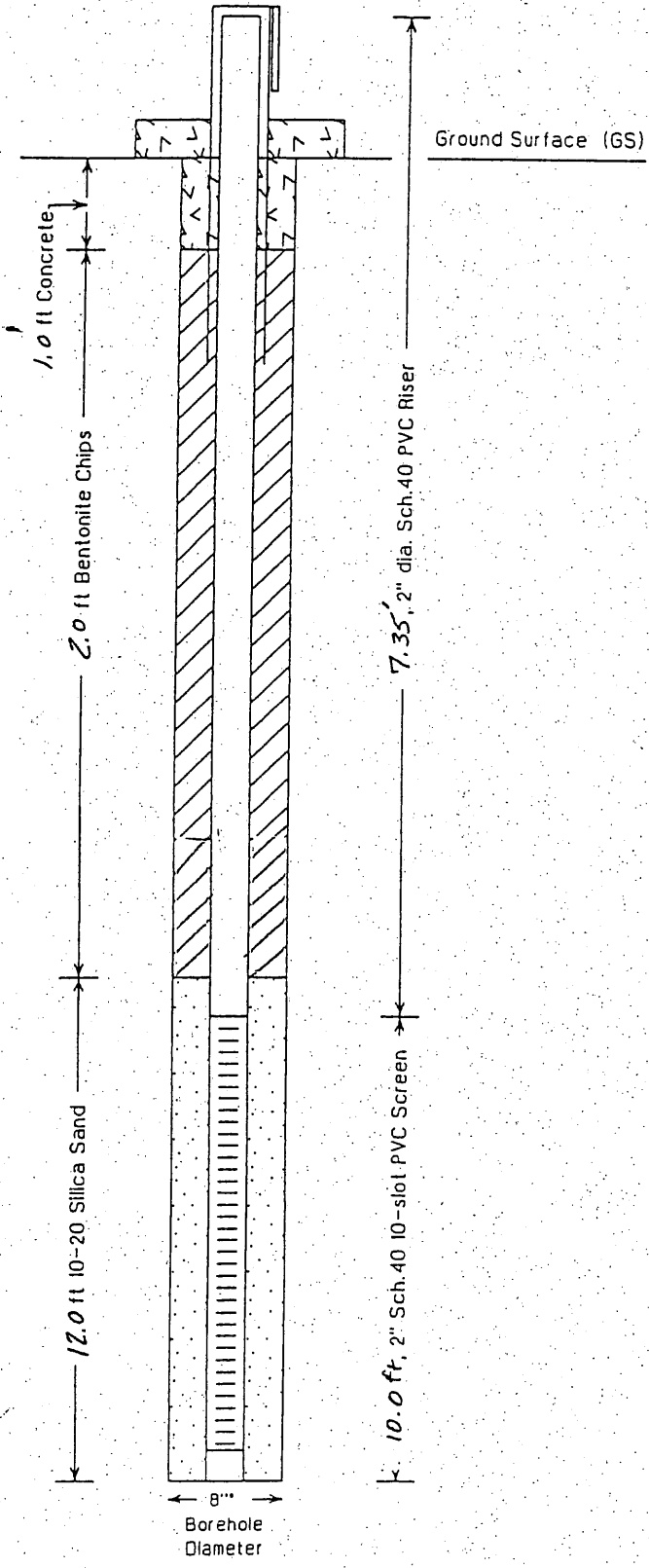
Project Name Omaha Public Power District - North Omaha, Nebraska						Project No. 08 94037.02		Boring Number <b>MW-9</b>		
Boring Location Description W of fly ash disp. area, 40'W of Pershing Drive				Boring Location SW1/4, NW1/4, SE1/4, NE1/4, Sec 28, T75N, R13E			Page 3 of 4			
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks		
32	CLAYEY SAND, reddish brown, medium grained sand and clay mixture, loose, very moist, poorly graded.	SC			32					
33					33					CSS-7
34	SANDY CLAY, brownish gray, very moist, soft, high plasticity, fine and medium grained sand and clay mixture.	MH			34					
35					35					
36					36					
37	SANDY CLAY, blueish gray with reddish black laminae, soft, very moist, high plasticity, fine to very fine sand and clay mixture, some rootlets, foul odor.	MH			37					
38					38					CSS-8
39		MH			39					
40					40					
41					41					
42		MH			42					
43					43					CSS-9
44		MH			44					
45					45					
46					46					CSS-10
47		MH			47					
48					48					

# Drilling Log, continued

Project Name Omaha Public Power District - North Omaha, Nebraska				Project No. 08 94037.02		Boring Number <b>MW-9</b>		
Boring Location Description W of fly ash disp. area, 40'W of Pershing Drive			Boring Location SW1/4, NW1/4, SE1/4, NE1/4, Sec 28, T75N, R13E			Page 4 of 4		
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
49	SANDY CLAY, blueish gray with reddish black laminae, soft, very moist, high plasticity, fine to very fine sand and clay mixture, some rootlets, foul odor.	MH		5.0'/5.0'	49	CSS-10		
50								
51								
52	SAND, gray, fine grained, loose, wet, poorly graded.	SM		5.0'/5.0'	52	CSS-11		
53								
54	SANDY CLAY, gray, soft, wet, high plasticity.	MH			54			
55	SAND, gray, medium grained, wet, loose, well graded.	SW		5.0'/5.0'	55			
56	SAND, blueish gray, fine grained, loose, wet, well graded.				56			
57					57			
58	SAND, dark gray, medium grained, loose, wet, well graded.				58	CSS-12		Quit drilling at 6:40 pm. Will install well tomorrow.
59					59			05/04/96 Start @ 8:30 am.
60					60			Well installed 11:00 am.
61	LIMESTONE, light grey, weathered, weak.	LS			61			
62					62			
63					63			
64	TOTAL DEPTH = 63.3 Feet				64			
65					65			

# MONITORING WELL CONSTRUCTION RECORD

Project Name Omaha Public Power District - North Omaha, Nebraska		Project Number 08 94037.02	Well Number MW-10
Location Description Approximately 20' S of Bottom Ash Ponds		Location SW 1/4, SE 1/4, SE 1/4, NE 1/4, SEC 28 T15N, R13E	Total Depth (TOC) 15.0 feet
Ground Surface Elevation 1000.13 ft above NGVD	Marker In Concrete Well Pad El. NA	Boring Location Coordinates 570970.19 N 2753290.89 E	Date Installed 04/11/01



- Elevation Top of Well Casing: 1002.48 ft above NGVD
- Elevation Top of Well Screen: 995.13 ft above NGVD
- Elevation Bot. of Well Screen: 985.13 ft above NGVD
- Total Depth of Boring: 15.0 ft below GS
- Total Depth of Well: 15.0 ft below GS
- Well Casing Above GS: 2.35 feet

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# DRILLING LOG

Project Name Omaha Public Power District - North Omaha, Nebraska				Project Number 08 94037.02		Boring Number MW-10	
Boring Location Description approximately 20' S of Bottom Ash Ponds			Boring Location SW 1/4, SE 1/4, SE 1/4, NE 1/4 SEC 20 T5N R3E			Page 1 of 2	
Ground Surface Elevation 1000.13 ft above NGVD (surv.)		Top of Well Casing Elevation 1002.48 ft above NGVD (surv.)		Boring Location Coordinates 570970.19 N 2753290.89 E		Total Footage 15.0 ft	
Drilling Method (s) 6 1/4" ID HSA		Borehole Size 8"	Overburden Footage 15.0 ft	Bedrock Footage 0 feet	No. Of Samples None	No. Core Boxes None	Depth to Water See Remarks
Drilling Co. Layne, Inc., Omaha, Nebraska				Driller (s) Lyle Porter			
Drilling Rig Acker Soilmax 80 Truck Mounted				Type of Sampler Split-spoon			
Date Started 4/11/01		Date Completed 4/11/01		Field Observer (s) Carmelo Blazekovic			

Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
1	SILT, medium brown, loose, moist, non-plastic with some clay and trace fine sand (fill)	ML			1			
2					2			
3					3			
4					4			
5	SILT, medium brown, loose, wet, non-plastic with some clay and trace fine sand (fill)	ML			5			Wet at 5 ft
6					6			
7					7			
8	3" layer of black-brown siltstone material at 6.5'	ML			8			
9					9			
10	SILT, medium brown, loose wet, some clay and med-coarse sand (fill)	ML			10			
11					11			
12					12			
13					13			
14					14			

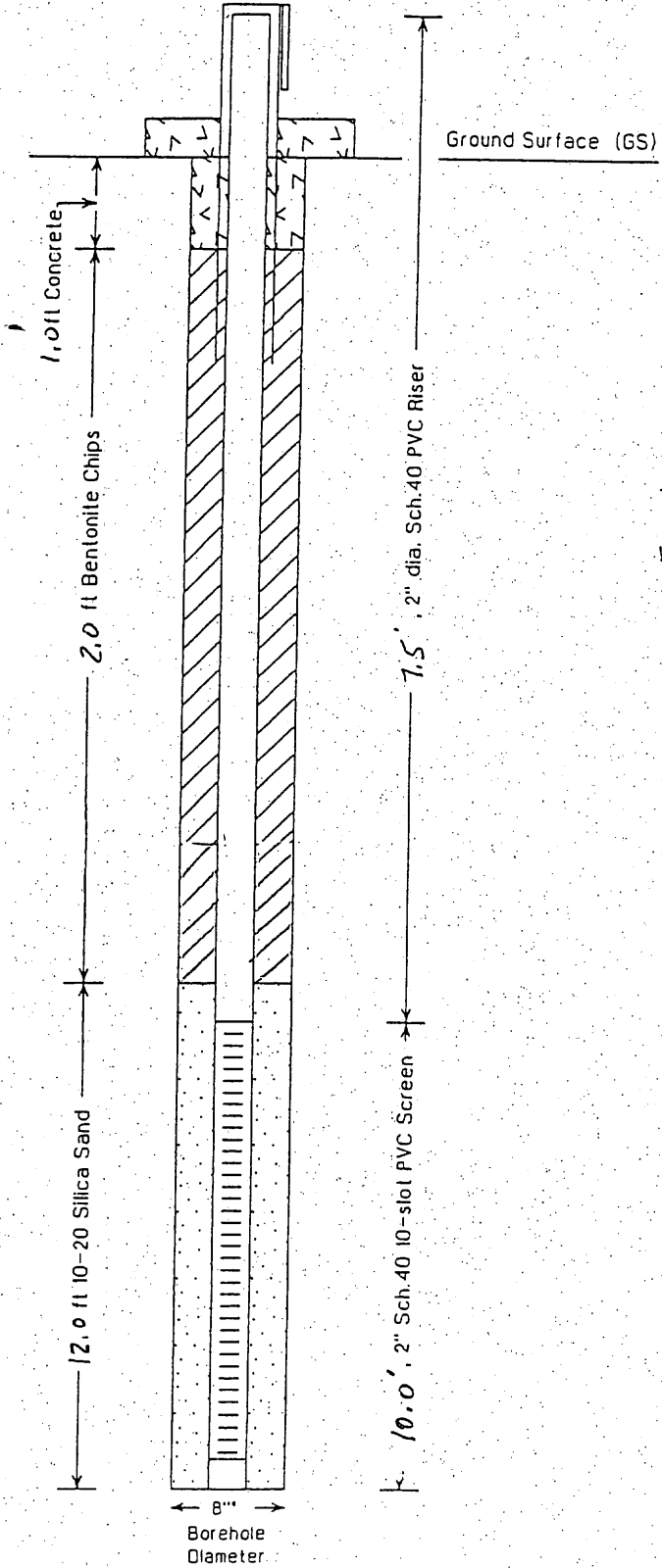
# Drilling Log, continued

Project Name Omaha Public Power District - North Omaha, Nebraska					Project No. 08 94037.02		Boring Number MW-10	
Boring Location Description Approximately 20' S of Bottom Ash Ponds				Boring Location SW 1/4, SE 1/4, SE 1/4, NE 1/4 SEC 28, T75N R13E			Page 2 of 2	
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
15	SILT and SAND fine, lt. brown, tan, black, wet, interbedded 1" layers (fill)	ML			15			
16	TOTAL DEPTH 15 ft				16			
17					17			
18					18			
19					19			
20					20			
21					21			
22					22			
23					23			
24					24			
25					25			
26					26			
27					27			
28					28			
29					29			
30					30			
31					31			



# MONITORING WELL CONSTRUCTION RECORD

Project Name Omaha Public Power District - North Omaha, Nebraska		Project Number 08 94037.02	Well Number MW-11
Location Description NW of Western Bottom Ash Pond		Location NW 1/4, SW 1/4, SE 1/4, NE 1/4 SEC 28 T15N R13 E	Total Depth (TOC) 15.0 feet
Ground Surface Elevation 1000.49 ft above NGVD	Marker in Concrete Well Pad El. NA	Boring Location Coordinates 571307.49 N 2753003.38 E	Date Installed 04/11/01



Elevation Top of Well Casing: 1002.99 ft above NGVD

Elevation Top of Well Screen: 995.49 ft above NGVD

Elevation Bot. of Well Screen: 985.49 ft above NGVD

Total Depth of Boring: 15.0 ft below GS

Total Depth of Well: 15.0 ft below GS

Well Casing Above GS: 2.5 feet

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# DRILLING LOG

Project Name Omaha Public Power District - North Omaha, Nebraska				Project Number 08 94037.02		Boring Number MW-11	
Boring Location Description W of Western Bottom Ash Pond				Boring Location NW 1/4, SW 1/4, SE 1/4, NE 1/4, SEC 28, T75N, R13E		Page 1 of 2	
Ground Surface Elevation 1000.49 ft above NGVD (surv.)		Top of Well Casing Elevation 1002.99 ft above NGVD (surv.)		Boring Location Coordinates 571307.49 N 2753003.38 E		Total Footage 15.0 ft	
Drilling Method (s)		Borehole Size	Overburden Footage	Bedrock Footage	No. Of Samples	No. Core Boxes	Depth to Water
6 1/4" ID HSA		8"	15.0 ft	0 ft	None	None	See Remarks
Drilling Co. Layne, Inc, Omaha, Nebraska				Driller (s) Lyle Porter			
Drilling Rig Acker Soilmax 80 Truck Mounted				Type of Sampler Split-spoon			
Date Started 04/11/01		Date Completed 04/11/01		Field Observer (s) Carmelo Blazekovic			

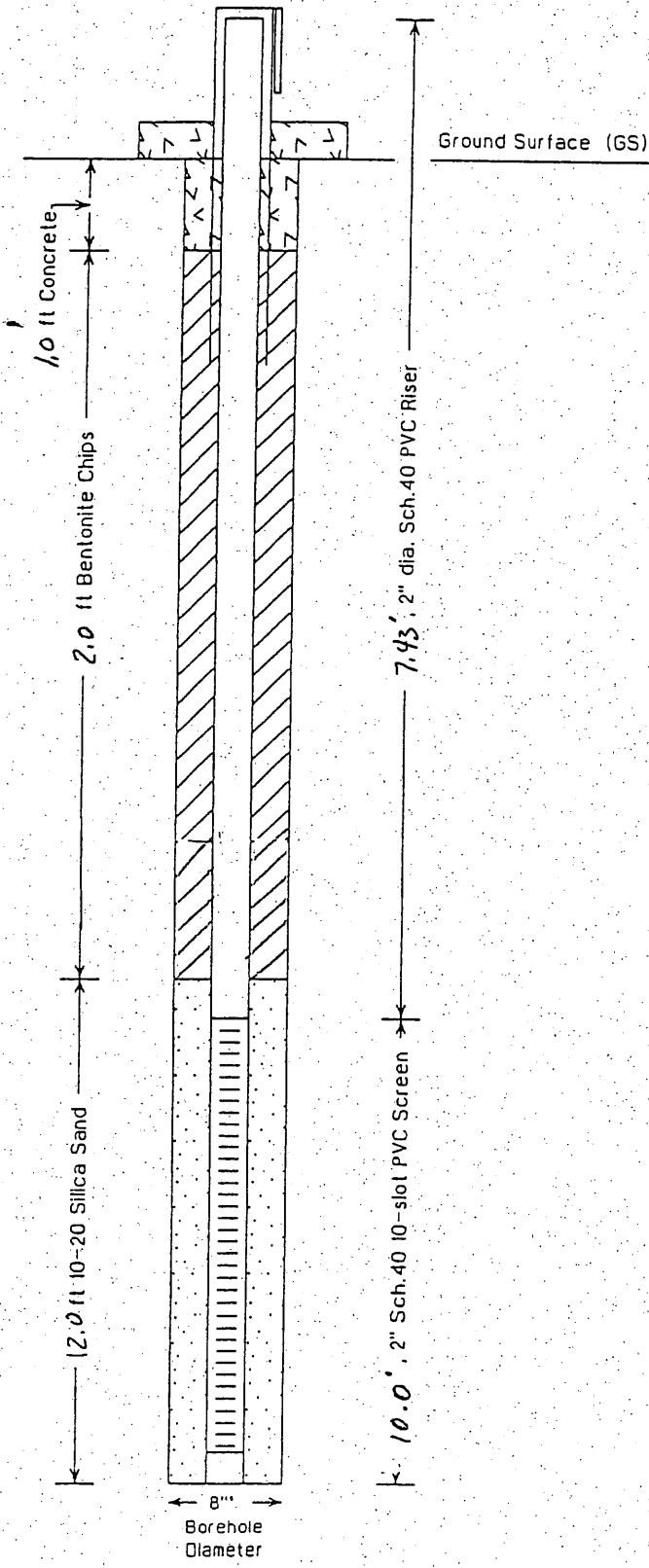
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
1	SILT, medium brown, medium to loose, moist, non-plastic, with minor clay (fill)	ML			1			
2					2			
3					3			
4					4			
5	-----							
6	SILT, light gray, black, brown, loose, wet, non-plastic, 1 inch layers with some fine sand (fill)	ML			5			wet at 5'
7					6			
8					7			
9					8			
10	-----							
11	SILT, brown, loose, wet, some medium-coarse sand (fill)	ML			10			
12					11			
13					12			
14					13			

# Drilling Log, continued

Project Name Omaha Public Power District - North Omaha, Nebraska					Project No. 08 94037.02		Boring Number MW-11	
Boring Location Description NW of Western Bottom Ash Pond				Boring Location NW 1/4, SW 1/4, SE 1/4, NE 1/4, SEC 28, T.75N, R.13E			Page 2 of 2	
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
15	SAND dark brown, wet with silt (fill)	SM			15			
16	TOTAL DEPTH 15 ft				16			
17					17			
18					18			
19					19			
20					20			
21					21			
22					22			
23					23			
24					24			
25					25			
26					26			
27					27			
28					28			
29					29			
30					30			
31					31			

# MONITORING WELL CONSTRUCTION RECORD

Project Name Omaha Public Power District - North Omaha, Nebraska		Project Number 08 94037.02	Well Number MW-12
Location Description East of Eastern Bottom Ash Pond		Location NW¼, SE¼, NE¼ SE28, T75N, R13E	Total Depth (TOC) 15.0 feet
Ground Surface Elevation 1001.35 ft above NGVD	Marker In Concrete Well Pad El. NA	Boring Location Coordinates 571336.55N 2753458.40 E	Date Installed 04/11/01



Elevation Top of Well Casing:	1003.78 ft above NGVD
Elevation Top of Well Screen:	996.35 ft above NGVD
Elevation Bot. of Well Screen:	986.35 ft above NGVD
Total Depth of Boring:	15.0 ft below GS
Total Depth of Well:	15.0 ft below GS
Well Casing Above GS:	2.43 feet

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# DRILLING LOG

Project Name Omaha Public Power District - North Omaha, Nebraska				Project Number 08 94037.02		Boring Number MW-12	
Location Description East of Eastern Bottom Ash Pond			Boring Location NW 1/4, SE 1/4 NE 1/4, SEC 28 T75N, R13E			Page 1 of 2	
Ground Surface Elevation 1001.35 ft above NGVD (surv.)		Top of Well Casing Elevation 1003.78 ft above NGVD (surv.)		Boring Location Coordinates 571330.55 N 2753458.40 E		Total Footage 15.0 ft	
Drilling Method (s) 6 1/4" ID HSA		Borehole Size 8"	Overburden Footage 15.0 ft	Bedrock Footage 0 ft	No. Of Samples None	No. Core Boxes None	Depth to Water See Remarks
Drilling Co. Layne, Inc, Omaha, Nebraska				Driller (s) Lyle Porter			
Drilling Rig Acker Soilmax 80 Truck Mounted				Type of Sampler Split-spoon			
Date Started 04/11/01		Date Completed 04/11/01		Field Observer (s) Carmelo Blazekovic			

Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
1	SANDY SILT, dark grey, loose, moist, with minor clay, mostly cinders and coal particles with silt (fill)				1			
2					2			
3					3			
4					4			
5	SANDY SILT, dark grey-black, loose, wet, with minor clay, mostly cinders and coal particles with silt (fill) 6 inch layer of clayey silt, grey brown at 9.5 ft.				5			WET at 5 ft.
6					6			
7					7			
8					8			
9					9			
10	SILT, brownish grey, loose, wet, with some clay and minor coarse sand (fill)				10			
11					11			
12					12			
13					13			
14					14			

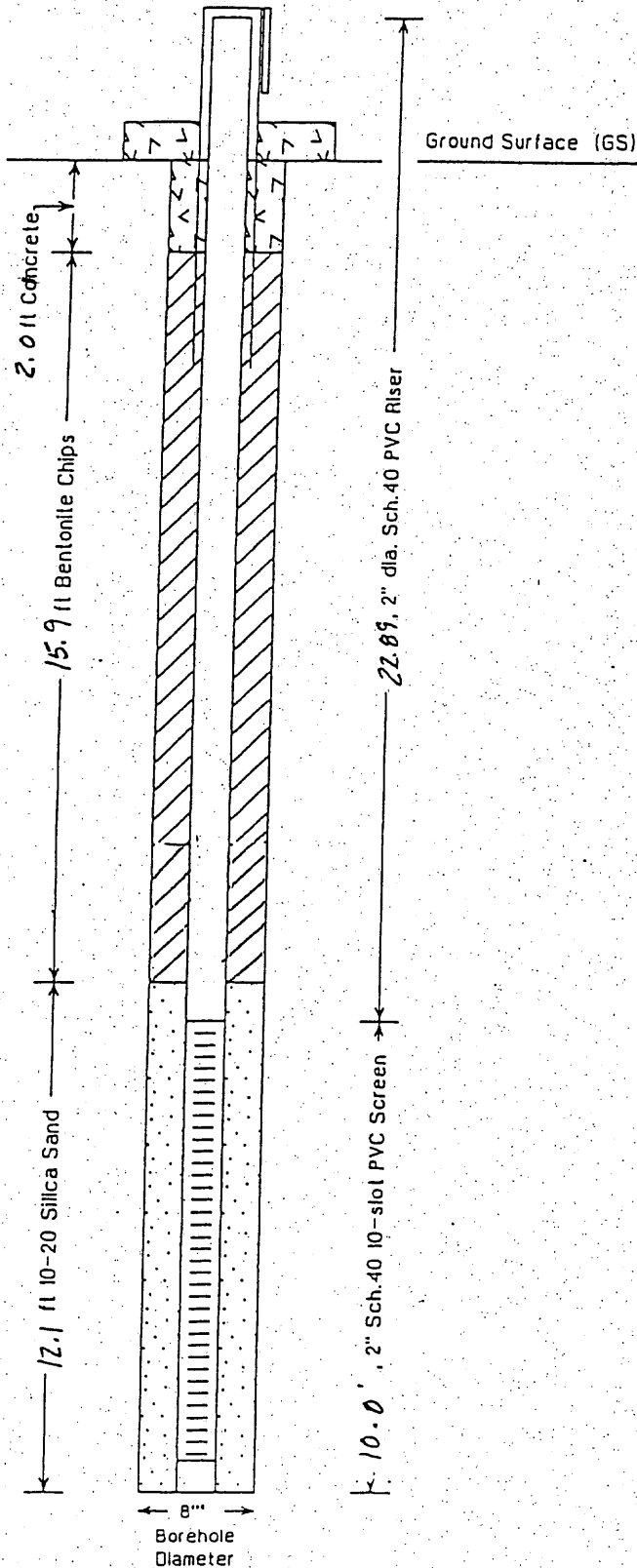
# Drilling Log, continued

Project Name Omaha Public Power District - North Omaha, Nebraska					Project No. 08 94037.02		Boring Number MW-12	
Boring Location Description East of Eastern Bottom Ash Pond				Boring Location NW 1/4, SE 1/4, SE 1/4, NE 1/4 SEC 28, T15N, R13E			Page 2 of 2	
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
15	SILT, brownish grey, loose, wet with some clay and minor coarse sand (fill)				15			
16	TOTAL DEPTH 15 ft				16			
17					17			
18					18			
19					19			
20					20			
21					21			
22					22			
23					23			
24					24			
25					25			
26					26			
27					27			
28					28			
29					29			
30					30			
31					31			



# MONITORING WELL CONSTRUCTION RECORD

Project Name Omaha Public Power District - North Omaha, Nebraska		Project Number 08 94037.02	Well Number MW-13
Location Description W of Ash Storage Building		Location NE 1/4 SW 1/4, NE 1/4, NE 1/4 SEC 28, T75N R13E	Total Depth (TOC) 30.0 feet
Ground Surface Elevation 999.02 ft above NGVD	Marker In Concrete Well Pad El. NA	Boring Location Coordinates 572809, 32N 2752986.38 E	Date Installed 04/12/01



Elevation Top of Well Casing:	1001.91 ft above NGVD
Elevation Top of Well Screen:	984.02 ft above NGVD
Elevation Bot. of Well Screen:	969.02 ft above NGVD
Total Depth of Boring:	30.0 ft below GS
Total Depth of Well:	30.0 ft below GS
Well Casing Above GS:	2.89 feet

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# DRILLING LOG

Project Name Omaha Public Power District - North Omaha, Nebraska				Project Number 08 94037.02		Boring Number MW-13	
Boring Location Description North Ash Storage Building			Boring Location NE 1/4, SW 1/4, NE 1/4, NE 1/4 SEC 28, T75N, R13E			Page 1 of 2	
Ground Surface Elevation 79.02 ft above NGVD (surv.)		Top of Well Casing Elevation 1001.91 ft above NGVD (surv.)		Boring Location Coordinates 572809.32 N, 2752986.38 E		Total Footage 30.0 ft	
Drilling Method (s) 6 1/4" ID HSA		Borehole Size 8"	Overburden Footage 30.0 ft	Bedrock Footage 0 ft	No. Of Samples None	No. Core Boxes None	Depth to Water See Remarks
Drilling Co. Layne, Inc, Omaha, Nebraska				Driller (s) Lyle Porter			
Drilling Rig. Acker Soilmax 80 Truck Mounted				Type of Sampler Split-spoon			
Date Started 04/12/01		Date Completed 04/12/01		Field Observer (s) Carmelo Blazekovic			

Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
1	SILT, medium brown, soft, moist, nonplastic, with minor clay and gravel (fill)	ML			1			
2								
3								
4								
5	SILT, blueish gray, soft, nonplastic, moist, with minor sand and some silt (fill)	ML			5			
6								
7								
8								
9	SILT, greenish gray, soft, nonplastic, moist, with minor sand and silt (fill)	ML			9			
10								
11								
12								
13					13			
14					14			

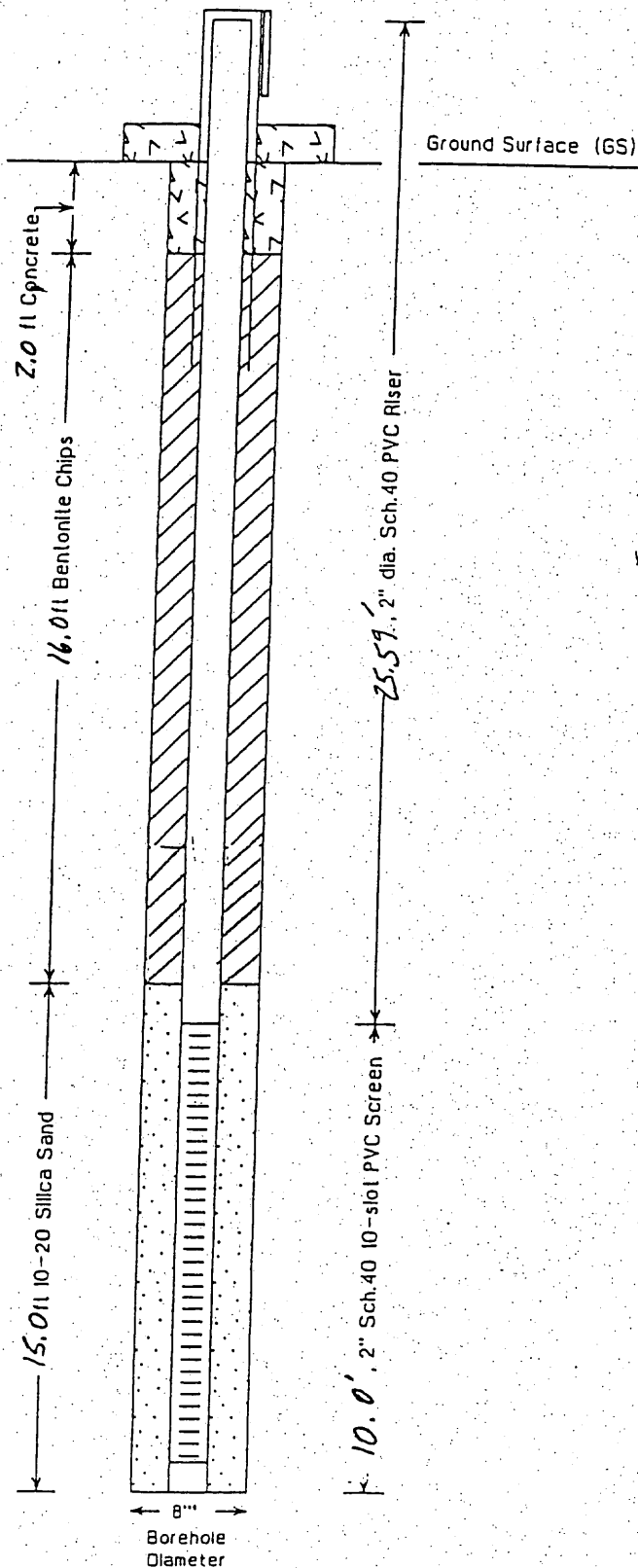
# Drilling Log, continued

Project Name Omaha Public Power District - North Omaha, Nebraska	Project No. 08 94037.02	Boring Number MW-13
Boring Location Description N of Ash Storage Building	Boring Location NE 1/4, SW 1/4, NE 1/4, NE 1/4 SEC 28 T 7 S R 13 E	Page 2 of 2

Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks	
15	CLAYEY SILT, light brown, soft, very moist low plasticity, trace fine sand	ML			15				
16					16				
17					17				
18					18				
19					19				
20	SAND, fine-medium, grey black, well graded, wet, with minor silt	SW			20			WET AT 20 ft.	
21					21				
22					22				
23					23				
24					24				
25					25				
26					26				
27					27				
28					28				
29	SILTY CLAY, grey, stiff, moist	ML			29				
30	TOTAL DEPTH 30.0 ft.				30				
31					31				

# MONITORING WELL CONSTRUCTION RECORD

Project Name Omaha Public Power District - North Omaha, Nebraska		Project Number 08 94037.02	Well Number MW-14
Well Description Well at Coal Pile		Location NE 1/4 SW 1/4, NE 1/4, NE 1/4, SEC 28, T75N, R13E	Total Depth (TOC) 35.0 feet
Ground Surface Elevation 1004.85 ft above NGVD	Marker in Concrete Well Pad El. NA	Boring Location Coordinates 572277.35N 2753149.82E	Date Installed 04/12/01



Elevation Top of Well Casing: 1007.44 ft above NGVD

Elevation Top of Well Screen: 981.85 ft above NGVD

Elevation Bot. of Well Screen: 971.85 ft above NGVD

Total Depth of Boring: 35.0 ft below GS

Total Depth of Well: 33.0 ft below GS

Well Casing Above GS: 2.59 feet

# DRILLING LOG

Project Name Public Power District - North Omaha, Nebraska			Project Number 08 94037.02		Boring Number MW-14	
Boring Location Description JW of Coal Pile			Boring Location NE 1/4, SW 1/4, NE 1/4, NE 1/4 SEC 28, T 75N, R 13E			Page 1 of 3
Ground Surface Elevation 4.85 ft above NGVD (surv.)		Top of Well Casing Elevation 1007.49 ft above NGVD (surv.)		Boring Location Coordinates 572277.05 N 2753149.82 E		Total Footage 35.0 ft
Drilling Method (s) 6 1/4" ID HSA		Borehole Size 8"	Overburden Footage 35.0 ft	Bedrock Footage 0 ft	No. Of Samples None	No. Core Boxes None
Depth to Water See Remarks						
Drilling Co. Layne, Inc, Omaha, Nebraska				Driller (s) Lyle Porter		
Drilling Rig Acker Soilmax 80 Truck Mounted				Type of Sampler Split-spoon		
Date Started 04/12/01		Date Completed 04/12/01		Field Observer (s) Carmelo Blazekovic		

Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
1	SILT, medium brown, moist non plastic, with minor clay and gravel (fill)				1			
2					2			
3					3			
4					4			
5					5			
6	SILT, light brown - tan with fly ash (fill)				6			
7					7			
8					8			
9					9			
10	SILT, bluish gray, non plastic moist, with minor sand and silt (fill)				10			
11					11			
12					12			
13					13			
14					14			

# Drilling Log, continued

Project Name Omaha Public Power District - North Omaha, Nebraska	Project No. 08 94037.02	Boring Number MW-14
Boring Location Description NW of Coal Pile	Boring Location NE 1/4, SW 1/4, NE 1/4, NE 1/4 SEC 28 T75N R13E	
		Page 2 of 3

Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
15	SILT, light brown - tan non plastic, moist with gravel and some fine sand (fill)				15			
16					16			
17					17			
18					18			
19	SILT, black, wet with some coal particles				19			WET AT 19 FT
20	SILTY CLAY, grey-tan mottled stiff moist				20			
21					21			
22					22			
23					23			
24					24			
25	SILTY CLAY, grey-tan - black layered very moist				25			
26					26			
27					27			
28	SAND, fine grey-yellow-brown wet, dense, with some silt				28			
29					29			
30					30			
31					31			

# Drilling Log, continued

Project Name Omaha Public Power District - North Omaha, Nebraska	Project No. 08 94037.02	Boring Number. MW-14
Boring Location Description NW of Coal Pile		Boring Location NE 1/4, SW 1/4, NE 1/4, NE 1/4 SEC 28 T75N R13E
Page 3 of 3		

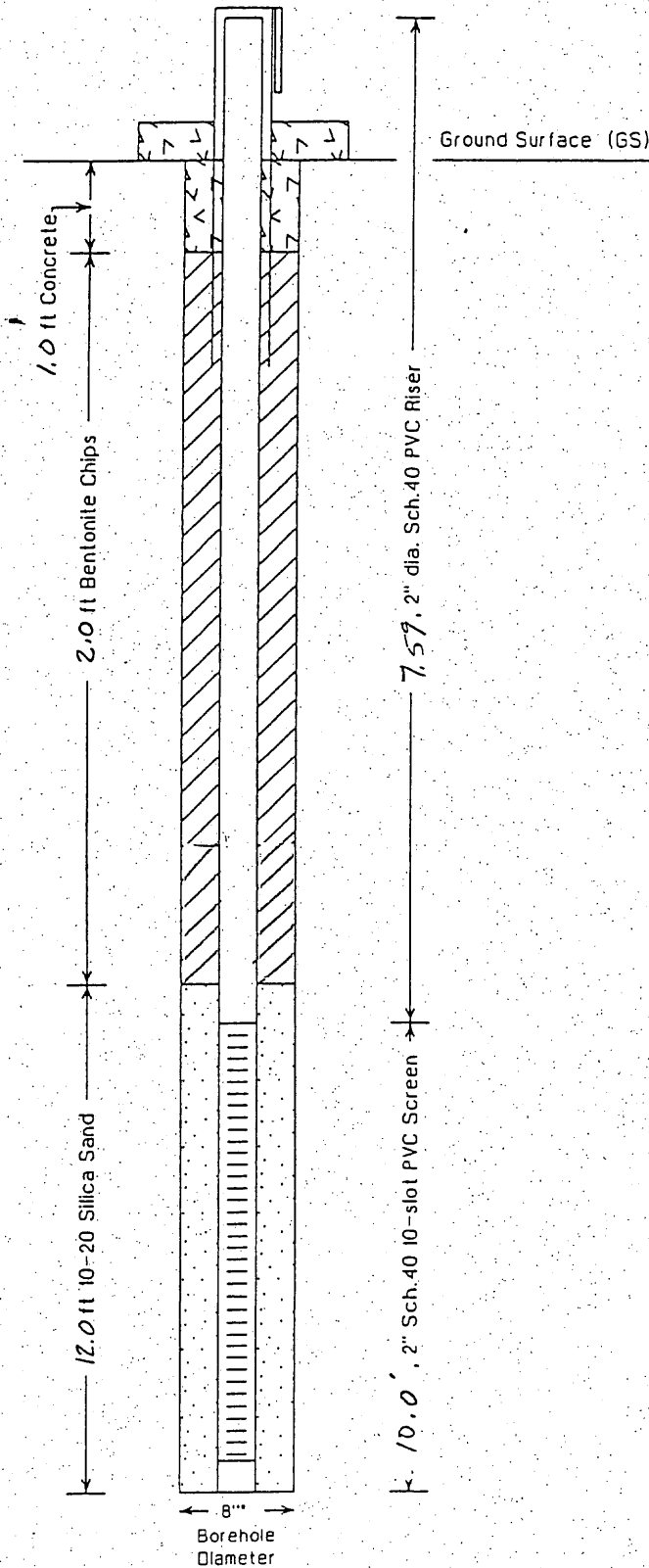
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
32	SAND, fine grey-yellow-brown wet, dense, with some silt				32			
33					33			
34					34			
35					35			
36					36			
37					37			
38					38			
39					39			
40					40			
41					41			
42					42			
43					43			
44					44			
45					45			
46					46			
47					47			
48					48			

TOTAL DEPTH 35.0 ft



# MONITORING WELL CONSTRUCTION RECORD

Project Name Omaha Public Power District - North Omaha, Nebraska		Project Number 08 94037.02	Well Number MW-15
Location Description SW of Coal Pile, W of Drainage		Location NE 1/4, NW 1/4, SE 1/4, NE 1/4 SEC 28, T75N R13E	Total Depth (TOC) 15.0 feet
Ground Surface Elevation 1002.80 ft above NGVD	Marker in Concrete Well Pad El. NA	Boring Location Coordinates 571747.86 N 2753131.91 E	Date Installed 04/16/01



Elevation Top of Well Casing: 1005.39 ft above NGVD

Elevation Top of Well Screen: 997.8 ft above NGVD

Elevation Bot. of Well Screen: 987.8 ft above NGVD

Total Depth of Boring: 15.0 ft below GS

Total Depth of Well: 15.0 ft below GS

Well Casing Above GS: 2.59 feet

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# DRILLING LOG

Project Name Omaha Public Power District - North Omaha, Nebraska				Project Number 08 94037.02		Boring Number MW-15	
Boring Location Description J of coal pile, w of drainage			Boring Location NE 1/4, NW 1/4, SE 1/4, NE 1/4 SEC 28, T15N, R13E			Page 1 of 2	
Ground Surface Elevation 1002.80 ft above NGVD (surv.)		Top of Well Casing Elevation 1005.39 ft above NGVD (surv.)		Boring Location Coordinates 571747.86 N 2753131.91 E		Total Footage 15.0 ft.	
Drilling Method (s) 6 1/4" ID HSA		Borehole Size 8"	Overburden Footage 15.0 ft	Bedrock Footage 0 ft	No. Of Samples None	No. Core Boxes None	Depth to Water See Remarks
Drilling Co. Layne, Inc, Omaha, Nebraska				Driller (s) Lyle Porter			
Drilling Rig Acker Soilmax 80 Truck Mounted				Type of Sampler Split-spoon			
Date Started 04/16/01		Date Completed 04/16/01		Field Observer (s) Carmelo Blazekovic			

Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
	GRAVEL	GP						
1	SANDY SILT, light grey, loose, moist, ash with cinders and a few grains of coal (fill)	ML			1			
2					2			
3					3			
4					4			
5	SANDY SILT, light grey, wet, ash with cinders and a few grains of coal (fill)	ML			5			Wet at 5 ft.
6					6			
7					7			
8					8			
9					9			
10					10			
11					11			
12					12			
13					13			
14					14			

# Drilling Log, continued

Project Name Omaha Public Power District - North Omaha, Nebraska				Project No. 08 94037.02		Boring Number MW-15		
Boring Location Description SW of coal pile, w of drainage			Boring Location NE <sup>1</sup> / <sub>4</sub> , NW <sup>1</sup> / <sub>4</sub> , SE <sup>1</sup> / <sub>4</sub> , NE <sup>1</sup> / <sub>4</sub> , SEC 28, T75N, R13E			Page 2 of 2		
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
15	SANDY SILT, light grey, loose, wet, ash with cinders and a few grains of coal (fill)	ML			15			
16	TOTAL DEPTH 15.0 ft				16			
17					17			
18					18			
19					19			
20					20			
21					21			
22					22			
23					23			
24					24			
25					25			
26					26			
27					27			
28					28			
29					29			
30					30			
31					31			

# DRILLING LOG

Project Name Omaha Public Power District - North Omaha, Nebraska				Project Number		Boring Number MW-16	
Boring Location Description Top of Coal Pile			Boring Location NE 1/4, SW 1/4, NE 1/4, NE 1/4 SEC 28, T75N, R13E			Page 1 of 3	
Ground Surface Elevation 2.2 ft above NGVD (surv.)		Top of Well Casing Elevation 1007.4 ft above NGVD (surv.)		Boring Location Coordinates 572201.43 N 275200.71 E		Total Footage 35.0 ft	
Drilling Method (s) 6 1/4" ID HSA		Borehole Size 8"	Overburden Footage 35.0 ft	Bedrock Footage 0 ft	No. of Samples None	No. Core Boxes None	Depth to Water See Remarks
Drilling Co. Layne, Inc, Omaha, Nebraska					Driller (s) Lyle Porter		
Drilling Rig Acker Soilmax 80 Truck Mounted					Type of Sampler Split-spoon.		
Date Started 09/09/02		Date Completed 09/09/02		Field Observer (s) Jim Krajicek, Tom Cole			

Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
1	SILT, light-medium brown non plastic with fly Ash (fill)				1			
2					2			
3					3			
4					4			
5					5			
6	SILT, light brown-gray with fly ash (fill)				6			
7					7			
9	1-2 ft coal dust particles moist, non plastic				9			
10					10			
11	SILT, brownish gray, non plastic moist, with minor sand and silt (fill)				11			
12					12			
13					13			
14					14			

# Drilling Log, continued

Project Name Omaha Public Power District - North Omaha, Nebraska	Project No.	Boring Number MW-16
Boring Location Description NW of Coal Pile	Boring Location NE 1/4, SW 1/4, NE 1/4, NE 1/4 SEC 28 T75N R13E	
		Page 2 of 3

Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
15	sedimented - stratified (fill)				15			
16	SILT, light brown - tan somewhat plastic, wet with gravel and some fine sand (fill)				16			Wet at 16 ft
17					17			
18					18			
19					19			
20					20			
21	SILTY CLAY, blueish tan mottled stiff moist				21			
22					22			
23					23			
24					24			
25					25			
26	SILTY CLAY, grey-tan-black layered very moist				26			
27					27			
28	SAND, fine grey-yellow-brown wet dense, with some silt				28			
29					29			
30					30			
31					31			

# Drilling Log, continued

Project Name Omaha Public Power District - North Omaha, Nebraska	Project No. (	Boring Number MW-16
Location Description of Coal Pile	Boring Location NE 1/4, SW 1/4, NE 1/4, NE 1/4 SEC 28 T 75N R 13E	
		Page 3 of 3

Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
32	SAND, fine grey-yellow-brown wet, dense, with some silt				32			
33					33			
34					34			
35					35			
36					36			
37					37			
38					38			
39					39			
40					40			
41					41			
42					42			
43					43			
44					44			
45					45			
46					46			
47					47			
48					48			

TOTAL DEPTH 35.0 ft

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10702004 - 145975 - NWRf (2)

Department of Natural Resources

January 2004  
DNR Form 145

Mail to  
DNR  
PO Box 94676  
Lincoln, NE 68509-1676  
Phone (402)471-2363

STATE OF NEBRASKA  
DEPARTMENT OF NATURAL RESOURCES  
WATER WELL REGISTRATION

FOR DEPARTMENT USE ONLY

Registration Date 10-20-2004 Sequence No. 145975 Registration No. 9-130329  
Owner Code No. 40226 Receipt No. B11946 Papio Missouri River

1. a. Well Owner's First Name \_\_\_\_\_ Last Name \_\_\_\_\_  
b. Company Name Omaha Public Power District  
c. Correspondent Name James Krajcek Attention \_\_\_\_\_  
Address 444 South 16th Street Mall  
City Omaha State NE Zip 68102 Telephone 402-636-2309

2. a. Contractor's License No. 39266 Contractor's Name Layne Western  
Contractor's Email Address 1072@Laynechristensen.com  
b. Drilling Firm Name Layne Western  
Address 4601 North 252nd Street  
City Valley State NE Zip 68064 Telephone 402-359-2042  
Drilling Firm's Email Address \_\_\_\_\_

3. a. Well location NE 1/4 of the NE 1/4 of Section 28, Township 16 North, Range 13 E  W  Douglas County County.  
b. Natural Resources District Papio-Missouri River Natural Resource District  
c. The well is 980.5 feet from the (N  S ) section line and 770 W feet from the (E  W ) section line  
(circle one) (circle one)  
or Latitude Degree 41 Minute 19 Second 58.00  
Longitude Degree 95 Minute 56 Second 59.00  
d. Street address and subdivision, if applicable 7475 Pershing Drive, Omaha NE  
Block \_\_\_\_\_ Lot \_\_\_\_\_  
e. Location of water use, if applicable (give legal descriptions) NA  
f. If for irrigation, the land to be irrigated is \_\_\_\_\_ acres.  
g. Well reference letter(s), if applicable MW-16 HHSS PWSID \_\_\_\_\_

4. Permits  
Management Area Permit Number \_\_\_\_\_ Surface Water Permit Number \_\_\_\_\_  
Geothermal Permit Number \_\_\_\_\_ Industrial Permit Number \_\_\_\_\_  
Municipal Permit Number \_\_\_\_\_ Transfer Out-Of-State Permit Number \_\_\_\_\_  
Well Spacing Permit Number \_\_\_\_\_ Conduct Permit Number \_\_\_\_\_  
HHSS \_\_\_\_\_ Other Permit Number \_\_\_\_\_  
NDEQ \_\_\_\_\_

5. Purpose of well (indicate one)  Aquaculture  Commercial/Industrial  Dewatering (over 90 days)  
 Domestic  Ground Heat Exchanger  Groundwater Source Heat Pump  Irrigation  Injection  
 Livestock  Monitoring  Observation  Public Water Supply (with spring (46-638))  
 Public Water Supply (without spring)  Recovery  Other \_\_\_\_\_  
(indicate use)

6. Wells in a Series.  
a. Is this well a part of a series?  Yes go to part b of this section  No go to part 7 of this application  
b. If one or more of the wells in the series is currently registered, give the well registration number \_\_\_\_\_  
c. How many wells in the series are you registering at this time? \_\_\_\_\_

7. Replacement and abandoned well information.  
a. Is this well a replacement well?  Yes  No  
b. Registration number of abandoned well \_\_\_\_\_ If not registered, date abandoned well was constructed (m) 4 / (d) 12 / (y) 2001  
c. Replacement well is 1,150 feet from abandoned well. d. Abandoned well last operated (m) 9 / (d) 9 / (y) 2002  
e. Original well pump column size 2 inches. f. Completion of original well abandonment on (m) 9 / (d) 9 / (y) 2002  
g. Location of water use of abandoned well Coal combustion ash landfill monitoring well MW-14

G-130329

8. Pump Information.

- a. Is pump installed at this time  Yes  No  
 Is pump installed by well owner in section 1?  Yes  No Is pump installed by contractor in section 2?  Yes  No  
 If pump installed by pump installer, please fill out license number below
- b. Pump Installer's License No. \_\_\_\_\_ Pump Installer's Name \_\_\_\_\_  
 Pump Installer's Email Address \_\_\_\_\_  
 Pump Installer's Firm Name \_\_\_\_\_  
 Pump Installer's Firm Address \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_ Telephone \_\_\_\_\_  
 Pump Installer's Firm Email Address \_\_\_\_\_
- c. Pumping rate \_\_\_\_\_ gallons per minute  Measured  Estimated
- d. Drop pipe diameter \_\_\_\_\_ inches e. Length of drop pipe \_\_\_\_\_ feet
- f. Pumping equipment installed (m) \_\_\_\_\_ / (d) \_\_\_\_\_ / (y) \_\_\_\_\_ g. Pump Brand \_\_\_\_\_
- h. This well is designed and constructed to pump less than 50 gpm  Yes  No

9. Well Construction Information.

- a. Total well depth 35.0 feet. b. Static water level \_\_\_\_\_ feet.  
 c. Pumping water level \_\_\_\_\_ feet d. Well Construction began (month) 9 / (day) 9 / (year) 2002  
 e. Well Construction completed (month) 9 / (day) 9 / (year) 2002 f. Bore hole diameter in inches Top 8.00 Bottom 8.00  
 g. Casing and Screen Joints are Welded  Glued  Threaded  Other \_\_\_\_\_

10. Well Construction (Casing & Screen)- c, d, e, & g measurements should be in inches to three decimal places

a Placement Depth in Feet		b Casing or Screen	c Inside Diameter	d Outside Diameter	e Wall Thickness	f Screen Slot Size	g Type of Material	h Trade Name
From	To							
0.0	25.0	Casing	2.067	2.375	0.154		PVC	Monoflex
25.0	35.0	Screen	20.067	2.375	0.154	0.010	PVC	Monoflex

11. Grout and Gravel Pack

Placement Depth in Feet		Grout or Gravel Pack	Material Description
From	To		
0.0	4.0	Grout	Cement Grout
4.0	23.0	Grout	Bentonite Chips
23.0	35.0	Gravel Pack	Gravel Pack (20-40)

12. Geologic Materials Logged

Depth in Feet		Description	Depth in Feet		Description
From	To		From	To	
0.0	5.0	silt, light medium brown, flyash fill	20.0	25.0	silty clay, bluish tan mottled stiff moist
5.0	10.0	silt, light brown-gray, non plastic ash-fill	25.0	30.0	silty clay, grey-tan-black layered very moist
10.0	15.0	silt, brownish gray, moist, minor sand-silt	30.0	35.0	sand, fine grey-yellow brown, wet dense with silt
15.0	20.0	silt, light brown, tan some plastic, wet gravel			

(Additional sheets may be submitted)

13. I am familiar with the information submitted on this registration, and to the best of my knowledge it is true.

Water Well Contractor's Signature \_\_\_\_\_

Date \_\_\_\_\_

*Jamo J. Krijak*


Well Owner's Signature \_\_\_\_\_

if Contractor is unknown or Deceased

10/12/04  
Date

# LOG OF WELL NO. MW-17

<b>CLIENT</b> OPPD	<b>Project Manager</b> Mike Reif
<b>SITE</b> North Omaha Station Omaha, Nebraska	<b>PROJECT</b> North Omaha Station

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	DEPTH, ft.	USCS SYMBOL	SAMPLES				TESTS			
					NUMBER	TYPE	RECOVERY, in.	SPT - N ** BLOWS / ft.	WATER CONTENT, %	FIELD VAPOR TEST (PPM)*	SAMPLE SENT TO LAB	
	BOREHOLE DIA.: 8.25 in WELL DIA.: 2 in CASING AND SCREEN: PVC (sch. 40); 0.01 slotted screen TOP OF CASING: 1002.54 ft GROUND SURFACE ELEV.: 999.6 ft											
3.7	Coal dust at surface <u>LEAN CLAY</u> , trace sand Light brown	996										
	<u>LEAN CLAY</u> Brown 2 inches of sandy lean clay at 4.5 feet		5									
	Light brown-light gray, very soft, mottled, wet with ferrous stains from 7 to 13.5 feet											
	Light brown, moist with ferrous stains 13.5 to 14.5 feet											
14.5	3 inches of light brown fine clayey sand at 14.5 feet <u>LEAN CLAY</u> with very fine sand Brown-gray Moist	985										

Continued Next Page

The stratification lines represent the approximate boundaries between soil and rock types: in-situ, the transition may be gradual.

\* ND indicates a reading of less than the field detection limit of one (1) part per million (ppm) isobutylene equivalents.

WATER LEVEL OBSERVATIONS, ft			
WL	18	WD	
WL		WD	
WL		WD	



BORING STARTED	5-10-07 10:20
BORING COMPLETED	5-10-07 14:30
RIG	CME 75
DRILLER	BC
LOGGED	KAC
JOB #	05027041

WELL 05027041 NORTH OMAHA LOGS.GPJ TERRACON.GDT 5/17/07

# LOG OF WELL NO. MW-17

<b>CLIENT</b> OPPD	<b>Project Manager</b> Mike Reif
<b>SITE</b> North Omaha Station Omaha, Nebraska	<b>PROJECT</b> North Omaha Station

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	DEPTH, ft.	USCS SYMBOL	SAMPLES			TESTS		
					NUMBER	TYPE	RECOVERY, in.	SPT - N ** BLOWS / ft.	WATER CONTENT, %	FIELD VAPOR TEST (PPM)*
18	▽ 981.5									
	<b>SILTY VERY FINE SAND</b> , trace clay Light gray Soft, wet, ferrous stains, and trace roots				4	SS	18	3		ND
20.75	▽ 979									
	<b>LEAN CLAY</b> Dark gray-brown Moist with organics and ferrous stains					HS				
23.25	▽ 976.5									
	<b>SILTY VERY FINE SAND</b> with clay Light gray-light brown Wet, ferrous stains				5	SS	18	1		ND
25	▽ 974.5									
	<b>SANDY LEAN CLAY</b> Light gray Wet, trace roots, trace magnesium staining					HS				
30	▽ 969.5									
	<b>BOTTOM OF BORING</b> Note: Soil classifications were based on visual observations made by the field crew.									

The stratification lines represent the approximate boundaries between soil and rock types: in-situ, the transition may be gradual. \* ND indicates a reading of less than the field detection limit of one (1) part per million (ppm) isobutylene equivalents

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 18	WD	▽
WL	▽		▽
WL			



BORING STARTED		5-10-07 10:20	
BORING COMPLETED		5-10-07 14:30	
RIG	CME 75	DRILLER	BC
LOGGED	KAC	JOB #	05027041

WELL 05027041 NORTH OMAHA LOGS.GPJ TERRACON.GDT 5/17/07

Mail to  
Department of Natural Resources  
PO Box 94676  
Lincoln, NE 68509-4676  
Phone (402)471-2363

July 2006  
DNR Form 145

STATE OF NEBRASKA  
DEPARTMENT OF NATURAL RESOURCES  
WATER WELL REGISTRATION

FOR DEPARTMENT USE ONLY

Date Filed 01/25/07 Owner Code No. 40226 Registration No. B-145159  
010252007 - 189056 - WNRF(S) 1221879 PMK NRD

1. a. Well Owner's First Name \_\_\_\_\_ Last Name \_\_\_\_\_

OR Company Name Omaha Public Power District

b. Attention Name Jim Krajicek

c. Address 444 South 16th Street Mall

City Omaha

State NE

Zip 68102

Telephone 402-636-2309

2. a. Contractor's License No. 39325 Contractor's Name \_\_\_\_\_

Contractor's Email Address lebazer@terracon.com

b. Drilling Firm Name Terracon Consultants, Inc.

Address 2211 South 156th Circle

City Omaha

State NE

Zip 68130-2506

Telephone 402-330-2202

Drilling Firm's Email Address lebazer@terracon.com

3. a. Well location NE  $\frac{1}{4}$  of the NE  $\frac{1}{4}$  of Section 28, Township 16 North, Range 13  W  Douglas County.

b. Natural Resources District Papio-Missouri River Natural Resource District

c. The well is ~1,380 feet from the (N  S ) section line and ~70 feet from the (E  W ) section line

OR Latitude Degree \_\_\_\_\_ Minute \_\_\_\_\_ Second \_\_\_\_\_

Longitude Degree \_\_\_\_\_ Minute \_\_\_\_\_ Second \_\_\_\_\_

d. Street address and subdivision, if applicable 7475 Pershing Drive, Omaha, NE

Block \_\_\_\_\_ Lot \_\_\_\_\_

e. Location of water use (give legal descriptions) \_\_\_\_\_

f. If for irrigation, the land to be irrigated is \_\_\_\_\_ acres.

g. Well reference letter(s), if applicable MW-17 HHSS PWSID \_\_\_\_\_

4. Permits

Management Area Permit Number \_\_\_\_\_

Geothermal Permit Number \_\_\_\_\_

Municipal Permit Number \_\_\_\_\_

Well Spacing Permit Number \_\_\_\_\_

HHSS \_\_\_\_\_

Surface Water Permit Number \_\_\_\_\_

Industrial Permit Number \_\_\_\_\_

Transfer Out-Of-State Permit Number \_\_\_\_\_

Conduct Permit Number \_\_\_\_\_

Other Permit Number \_\_\_\_\_

NDEQ \_\_\_\_\_

5. Purpose of well (indicate one)  Aquaculture  Commercial/Industrial  Dewatering (over 90 days)  
 Domestic  Ground Heat Exchanger  Groundwater Source Heat Pump  Irrigation  Injection  
 Livestock  Monitoring  Observation  Public Water Supply (with spacing (46-638))  
 Public Water Supply (without spacing)  Recovery  Other \_\_\_\_\_  
(indicate use)

6. Wells in a Series.

a. Is this well a part of a series?  Yes go to part b of this section  No go to part 7 of this application

b. If one or more of the wells in the series is currently registered, give all well registration numbers \_\_\_\_\_

c. How many wells in the series are you registering at this time? \_\_\_\_\_





6-145159

**LOG OF WELL NO. MW-17**

CLIENT **OPPD** Project Manager **Mike Reif**

SITE **North Omaha Station  
Omaha, Nebraska** PROJECT **North Omaha Station**

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	DEPTH, ft.	USCS SYMBOL	SAMPLES				TESTS		
					NUMBER	TYPE	RECOVERY, in.	SPT - N ** BLOWS / ft.	WATER CONTENT, %	FIELD VAPOR TEST (PPM)*	SAMPLE SENT TO LAB
	BOREHOLE DIA.: 8.25 in WELL DIA.: 2 in CASING AND SCREEN: PVC (sch. 40); 0.01 slotted screen TOP OF CASING: 1002.54 ft GROUND SURFACE ELEV.: 999.6 ft										
	Coal dust at surface <u>LEAN CLAY</u> , trace sand Light brown										
	3.7 <u>LEAN CLAY</u> Brown 2 inches of sandy lean clay at 4.5 feet		5		1	SS	22	6		ND	
	Light brown-light gray, very soft, mottled, wet with ferrous stains from 7 to 13.5 feet										
	2 Light brown, moist with ferrous stains 13.5 to 14.5 feet		10		2	SS	16	1		ND	
	14.5 3 inches of light brown fine clayey sand at 14.5 feet <u>LEAN CLAY</u> with very fine sand Brown-gray Moist		15		3	SS	20	7		ND	

Continued Next Page

RECEIVED  
JUN 25 2007  
DEPARTMENT OF  
NATURAL RESOURCES

The stratification lines represent the approximate boundaries between soil and rock types: in-situ, the transition may be gradual. \* ND indicates a reading of less than the field detection limit of one (1) part per million (ppm) isobutylene equivalents.

WATER LEVEL OBSERVATIONS, ft

WL	▽ 18	WD	▽
WL	▽		▽
WL			



BORING STARTED	5-10-07 10:20
BORING COMPLETED	5-10-07 14:30
RIG	CME 75
DRILLER	BC
LOGGED	KAC
JOB #	05027041

WELL 05027041 NORTH OMAHA LOGS.GPJ TERRACON.GDT 5/17/07





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# WELL LOG NO. MW-18

**PROJECT: OPPD North Omaha Station**

**CLIENT: Omaha Public Power District**

**SITE: 7475 Pershing Drive  
Omaha, Nebraska**

GRAPHIC LOG	LOCATION - Latitude: 41.3333153° Longitude: -95.9525745°	INSTALLATION DETAILS Top Casing Elev: 1037.00 Well Completion: Surface Mount	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	SPT N-VALUE
DEPTH	MATERIAL DESCRIPTION	Surface Elev.: 1037.1 (Ft.) ELEVATION (Ft.)					
2.5	<b>LEAN CLAY (CL)</b> , dark brown, moist, Grass at surface	1034.6				8	2-1-2-3 N=3
	<b>LEAN CLAY (CL)</b> , with fine sand, gray, moist with oxidized mottles		5			10	2-4-5-6 N=9
	becomes dry					12	2-2-4-4 N=6
	with trace black oxidized mottles					14	2-2-5-5 N=7
						18	2-3-5-5 N=8
13.5	<b>LEAN CLAY (CL)</b> , brown, dry, with iron mottles	1023.6				16	2-2-4-5 N=6
15.0	<b>SILT (ML)</b> , gray to brown, dry	1022.1				20	3-4-5-5 N=9
						16	2-4-4-6 N=8
19.0	<b>LEAN CLAY (CL)</b> , gray, dry, with orange mottles	1018.1				16	2-5-7-9 N=12
						16	2-6-6-8 N=12
23.0	<b>LEAN CLAY (CL)</b> , red to brown, with red mottles becomes moist	1014.1				18	3-4-7-7 N=11
						18	3-6-7-7 N=13
						16	2-2-3-4

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Hammer Type: Automatic

Advancement Method:  
Mud rotary / split spoon sample hole  
Hollow stem auger, 8.25-inch diameter borehole

Abandonment Method:  
N/A-Well installed

See Appendices for explanation of symbols and abbreviations.

Notes:

Soil descriptions are based on visual observations made by the field crew. Actual conditions may vary.

**WATER LEVEL OBSERVATIONS**

33 ft while drilling



Well Started: 12/1/2015

Well Completed: 12/1/2015

Drill Rig: 770

Driller: JM

Project No.: 05157581

Exhibit: --1

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ENVIRONMENTAL SMART LOG 05157581 LOGS.GPJ TERRACON2012.GDT 2/4/16

# WELL LOG NO. MW-18

**PROJECT: OPPD North Omaha Station**

**CLIENT: Omaha Public Power District**

**SITE: 7475 Pershing Drive  
Omaha, Nebraska**

GRAPHIC LOG	LOCATION - Latitude: 41.3333153° Longitude: -95.9525745°	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	SPT N-VALUE
	Surface Elev.: 1037.1 (Ft.) ELEVATION (Ft.)					
	DEPTH MATERIAL DESCRIPTION					
	<b>LEAN CLAY (CL)</b> , red to brown, with red mottles ( <i>continued</i> )				16	N=5
					18	4-6-5-6 N=11
	becomes gray	30			14	3-3-3-3 N=6
					14	1-1-2-4 N=3
	becomes wet		▽		16	2-2-4-5 N=6
	becomes oxidized	35			18	1-1-3-5 N=4
	becomes gray with black mottles				24	2-4-4-5 N=8
	becomes gray, trace black & orange mottles				24	3-4-4-6 N=8
		40			20	2-3-3-4 N=6
	becomes gray with black mottles				20	2-4-5-5 N=9
		45			18	3-4-6-7 N=10
					18	7-7-6-7 N=13
	48.0 <b>LEAN CLAY (CL)</b> , gray, wet, trace fine sand 989.1				20	2-4-4-5 N=8
		50				

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Hammer Type: Automatic

Advancement Method:  
Mud rotary / split spoon sample hole  
Hollow stem auger, 8.25-inch diameter borehole

Notes:

Abandonment Method:  
N/A-Well installed

See Appendices for explanation of symbols and abbreviations.

**WATER LEVEL OBSERVATIONS**  
▽ 33 ft while drilling



Well Started: 12/1/2015

Well Completed: 12/1/2015

Drill Rig: 770

Driller: JM

Project No.: 05157581

Exhibit: --1

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ENVIRONMENTAL SMART LOG 05157581 LOGS.GPJ TERRACON2012.GDT 2/4/16

# WELL LOG NO. MW-18

**PROJECT: OPPD North Omaha Station**

**CLIENT: Omaha Public Power District**

**SITE: 7475 Pershing Drive  
Omaha, Nebraska**

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ENVIRONMENTAL SMART LOG 05157581 LOGS.GPJ TERRACON2012.GDT 2/4/16

GRAPHIC LOG	LOCATION -		DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	SPT N-VALUE
	Latitude: 41.3333153° Longitude: -95.9525745°	Surface Elev.: 1037.1 (Ft.)					
	DEPTH	MATERIAL DESCRIPTION	ELEVATION (Ft.)				
	<b>LEAN CLAY (CL)</b> , gray, wet, trace fine sand ( <i>continued</i> )		52.0			20	3-4-4-6 N=8
	<b>SANDY LEAN CLAY (CL)</b> , trace organics, brown, moist  becomes gray at 54.5  becomes dark brown at 55.5		57.0			18	5-7-8-11 N=15
	<b>LEAN CLAY (CL)</b> , trace sand, trace organics, dark gray		58.0			24	2-8-7-10 N=15
	<b>FAT CLAY (CH)</b> , gray		59.0			14	5-8-11-11 N=19
	<b>LEAN CLAY (CL)</b> , gray		60.0			16	4-5-6-5 N=11
	<b>LEAN CLAY (CL)</b> , trace sand, gray		60.0			20	1-3-3-5 N=6
			70.1			14	4-5-5-6 N=10
			70.1			14	4-6-7-11 N=13
			70.1			12	3-6-7-8 N=13
			70.1			15	2-8-10-15 N=18
	<b>LIMESTONE*</b>		71.0			0	25-50/0"
<b>Boring Terminated at 71 Feet</b>							

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Hammer Type: Automatic

Advancement Method:  
Mud rotary / split spoon sample hole  
Hollow stem auger, 8.25-inch diameter borehole

Abandonment Method:  
N/A-Well installed

See Appendices for explanation of symbols and abbreviations.

Notes:

**WATER LEVEL OBSERVATIONS**  
▽ 33 ft while drilling



Well Started: 12/1/2015

Well Completed: 12/1/2015

Drill Rig: 770

Driller: JM

Project No.: 05157581

Exhibit: --1

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# Well Registration or Area Permit

Fee Paid: 0.00 HHSS Fee: 0.00  
 DNR Cash Fund: 0.00 WWDF: 0.00  
 Billing ID: 53643

Source: Nebraska On Line Import Status: Accepted Use: Monitoring (Ground Water Quality) Owner ID: 49927  
 Import ID: 14550553852650 Status: Active Registered Well Decommission Date: — Registration Number: G-178704B  
 Well ID: 241804 NRD: Papio-Missouri River Registration Date: 2/19/2016  
 Last Change User: hmcpherson Call Up Code: — Call Up Date: — Last Change Date: 2/19/2016

Owner:

Contact ID	Type	SeqNum	Begin Date	End Date	Name
<a href="#">Display</a> 49927	Owner	1	2/19/2016		Omaha Public Power District,

Contractor: 

Certificate ID	FirstName	LastName
39570	Michael B	Reif

Drilling Firm: 

EmployerID	Employer
159781	Terracon Consultants, Inc.

A. Well Location: NW1/4NE1/4 of Section 28  
 Township 16 North, Range 13 ( East E/W), Douglas County

B. Natural Resource District: Papio-Missouri River

Well GPS Coordinates: Latitude 41° 19' 59.93" Longitude -095° 57' 09.27"  
 Lat/Long DD 41.33331 -95.95258 GPS Required

C. The well is: — feet from the — Section line and — feet from the — section line.

D. Street address or block, lot and subdivision: Addr/Sub Div 7475 Pershing Drive Block No — Lot —

E. Location of water use, if applicable (give legal description): NWNE S28 T16 R13E

G. Well reference letter(s) if applicable: MW-18

Well In A Series

Well Part of a Series with Site Plan: Yes

Series	# of Wells Reg	Total # Wells	Acres	Acres Cert	NRD Appr	StartDate	EndDate	Comment	Series Reg Num (External Source)	Code	Description	Wells in the Series			
<a href="#">244878</a>	3	4	No	No		12/1/2015			G-145159	DEQ	Part of a DEQ site plan for spill or underground storage	<a href="#">WellID</a>	<a href="#">RegCD</a>	<a href="#">StartDate</a>	<a href="#">EndDate</a>
												<a href="#">185656</a>	G-	2/19/2016	
												<a href="#">241802</a>	G-	1/20/2016	
												<a href="#">241804</a>	G-	12/1/2015	
												<a href="#">241805</a>	G-	11/9/2015	

Permits

	Aprvd Date(s)	Aprvd Date(s)
Area Permit	— —	— — —
GeoPermit	— —	— — —
MWF	— —	— — —
WSP	— —	— — —
HHSS	—	— —
HHSS PWS ID	—	— —
NDEQ	<u>NE0054739</u>	

5. Purpose of Well Monitoring (Ground Water Quality)

Other Use —  
 Notes —

7. Replacement well information.

Well Considered a replacement by NRD(WellID, RegCD)

- A. Is this well a Replacement well? No Repl No — NRD Approval Date — Well Replacement Reg CD —  
 B. Registration number of abandoned well: — If not registered, date abandoned well was constructed —  
 C. Abandoned well last operated — D. Replacement well is — feet from abandoned well.  
 E. Original well pump column size: — inches.  
 F.  Original water well decommissioned —  
 I hereby certify that the original water well will be decommissioned within 180 days after such construction of the replacement water well.  
 I hereby certify that the original water well will be modified and equipped to pump 50 gallons per minute or less within 180 days after such construction of the replacement water well.

- Livestock
- Monitoring
- Observation
- Nonconsumptive or de minimus use approved by the applicable natural resources district. \_\_\_
- Decommission/Modification certification form is submitted by landowner (Must be submitted before registering well)

G. Location of water use of original well: \_\_\_

Decommission Information

Decommission Date: \_\_\_ By

8. Pump Information.

- A. Is Pump installed at this time? No Pump present but Well Inactive: No
- Free Flowing Well: No Well active, no pump installed: Yes
- B. License No.
- C. Pumping Rate \_\_\_ gallons per minute. D. Pumping water level \_\_\_ feet.
- E. Drop pipe diameter \_\_\_ inches. F. Length of pipe \_\_\_ in feet.
- G. Pump equipment installed: \_\_\_ H. Pump Brand/Type \_\_\_
- I. Will this well be used to pump 50 gpm or less? Yes

9. Well Construction Information

- A. Total well depth: 70.8 feet. B. Static water level 33 feet.
- C. Well Construction began: 12/1/2015 D. Well Construction Completed: 12/1/2015
- E. Bore hole diameter in inches. Top 8.25 Bottom 8.25
- F. Casing and Screen Joints are: Threaded Other Joints description: \_\_\_
- H. Total Estimate Capacity of Well \_\_\_ gallons per minute. I. Pumping water level at capacity: \_\_\_ feet.

10. Well Construction (Casing & Screen) - c, d, e & f measurements should be in inches to three decimal places

Record Count = 2

WellID	FromDepth*	ToDepth*	Case/Screen	InsideDiam	OutsideDiam	CaseThickness	ScrnSlotSize	Material	ScreenName
241804	0	60.8	casing	2.07	2.38	0.154		PVC	EMI
241804	60.8	70.8	screen	2.07	2.38	0.154	0.01	PVC	EMI

\* are in Feet, all else is in inches

11. Grout and Gravel Pack

Record Count = 6

WellID	FromDepth	ToDepth	Grout/Gravel	Material Description <sup>1</sup>	Quantity Gravel <sup>2</sup>	Volume & Type Grout <sup>3</sup>
241804	0	0.5	grout	Concrete and well vault		4.5 bags
241804	0.5	1.5	grout	Bentonite chips		0.5 bags
241804	1.5	52.8	grout	Bentonite cement grout		4 bent/8 portland
241804	52.8	54.8	gravel	#16-30 Silica sand	1 bag	
241804	54.8	59.8	grout	Bentonite pellets		2.5 buckets
241804	59.8	70.8	gravel	#16-30 Silica sand	7 bags	

\* are in Feet, all else is in inches

<sup>1</sup>Description of gravel pack, i.e. engineered gravel pack, or gravel pit description (1/4 down) or brand name (best sand) natural formation, drilling cuttings, soil backfill

<sup>2</sup>Quantity #cubic yards, #Tons, #Sacks - (for drilling cuttings and soil backfill estimate quantity) Calculation assistance available on web

<sup>3</sup>Volume & Type: #gallons of a slurry, #Barrels of a slurry, #sacks used in the slurry, #Bags of non-slurry bentonite (chip-pellet-granular)

12. Well Geologic Materials Logged

WellID	FromDepth*	ToDepth*	Type	Hardness	Color	Other/Drilling Action
241804	0	15	Other		Brown	Lean Clay
241804	15	19	Silt		Brown	
241804	19	52	Other		Brown	Lean Clay
241804	52	57	Other		Brown	Sandy Lean Clay
241804	57	58	Other		Brown	Lean Clay
241804	58	59	Other		Gray	Fat Clay
241804	59	70.1	Other		Gray	Lean Clay
241804	70.1	70.8	Limestone		Gray	

\* are in Feet.



# WELL LOG NO. MW-19

**PROJECT: OPPD North Omaha Station**

**CLIENT: Omaha Public Power District**

**SITE: 7475 Pershing Drive  
Omaha, Nebraska**

GRAPHIC LOG	LOCATION -	INSTALLATION DETAILS	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	SPT N-VALUE
	Latitude: 41.3314505° Longitude: -95.9521803°	Top Casing Elev: 1037.10					
	Surface Elev.: 1037.3 (Ft.)	Well Completion: Surface Mount					
	DEPTH MATERIAL DESCRIPTION ELEVATION (Ft.)						
	<b>LEAN CLAY (CL)</b> , brown, Grass at surface	Concrete				10	6-4-4-3 N=8
	2.0						
	<b>LEAN CLAY (CL)</b> , light brown					6	2-3-2-3 N=5
	4.0						
	<b>LEAN CLAY (CL)</b> , light brown, oxidized	Grout portland bentonite grout	5			17	2-3-4-5 N=7
							2-3-5-7 N=8
			10			18	2-5-5-7 N=10
							2-3-5-8 N=8
			15			15	4-7-9-9 N=16
							2-3-6-7 N=9
			20			20	4-6-7-6 N=13
							3-3-5-5 N=8
	no oxides		20			22	2-3-4-4 N=7
							2-4-4-5 N=8
			25			24	2-3-4-4

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Hammer Type: Automatic

Advancement Method:  
Mud rotary / split spoon sample hole  
Hollow stem auger, 8.25-inch diameter borehole

Abandonment Method:  
N/A-Well installed

See Appendices for explanation of symbols and abbreviations.

Notes:

Soil descriptions are based on visual observations made by the field crew. Actual conditions may vary.

**WATER LEVEL OBSERVATIONS**

30 ft while drilling



Well Started: 1/20/2016

Well Completed: 1/20/2016

Drill Rig: 770

Driller: JM

Project No.: 05157581

Exhibit: --2

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ENVIRONMENTAL SMART LOG 05157581 LOGS.GPJ TERRACON2012.GDT 2/4/16

# WELL LOG NO. MW-19

**PROJECT: OPPD North Omaha Station**

**CLIENT: Omaha Public Power District**

**SITE: 7475 Pershing Drive  
Omaha, Nebraska**

GRAPHIC LOG	LOCATION - Latitude: 41.3314505° Longitude: -95.9521803°	Surface Elev.: 1037.3 (Ft.) ELEVATION (Ft.)	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	SPT N-VALUE
DEPTH	MATERIAL DESCRIPTION						
41.0	<b>LEAN CLAY (CL)</b> , light brown, oxidized (continued)  becomes moist	996.3	30	▽		24	N=7
			35			24	2-2-3-2 N=5
			40			24	1-1-2-3 N=3
			45			24	2-3-3-3 N=6
			50			24	1-3-3-3 N=6
						24	3-3-4-5 N=7
						24	2-3-3-3 N=6
						24	3-3-4-3 N=7
						18	2-3-2-3 N=5
						12	3-4-9-4 N=13
						12	3-9-5-4 N=14
						12	3-4-5-7 N=9

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Hammer Type: Automatic

Advancement Method:  
Mud rotary / split spoon sample hole  
Hollow stem auger, 8.25-inch diameter borehole

Abandonment Method:  
N/A-Well installed

See Appendices for explanation of symbols and abbreviations.

Notes:

**WATER LEVEL OBSERVATIONS**  
▽ 30 ft while drilling



Well Started: 1/20/2016

Well Completed: 1/20/2016

Drill Rig: 770

Driller: JM

Project No.: 05157581

Exhibit: --2

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ENVIRONMENTAL SMART LOG 05157581 LOGS.GPJ TERRACON2012.GDT 2/4/16

# WELL LOG NO. MW-19

**PROJECT: OPPD North Omaha Station**

**CLIENT: Omaha Public Power District**

**SITE: 7475 Pershing Drive  
Omaha, Nebraska**

GRAPHIC LOG	LOCATION - Latitude: 41.3314505° Longitude: -95.9521803°	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	SPT N-VALUE
DEPTH	MATERIAL DESCRIPTION Surface Elev.: 1037.3 (Ft.) ELEVATION (Ft.)					
54.0	<b>LEAN CLAY (CL)</b> , gray (continued)	983.3			18	3-5-5-7 N=10
					12	3-4-6-7 N=10
	<b>LEAN CLAY (CL)</b> , brown, iron staining				24	3-5-5-7 N=10
					18	4-4-7-8 N=11
60.0	<b>LEAN CLAY (CL)</b> , gray	977.3			24	4-4-6-7 N=10
					24	2-4-6-5 N=10
64.0	<b>LEAN CLAY (CL)</b> , brown	973.3			24	3-4-5-5 N=9
					24	3-6-5-6 N=11
66.0	<b>LEAN CLAY (CL)</b> , dark brown, trace shells	971.3				
					17	2-5-6-6 N=11
68.0	<b>SILTY CLAY (CL)</b> , gray	969.3				
					24	3-3-3-4 N=6
71.0	<b>SILTY CLAY (CL)</b> , gray, and limestone gravel	966.3				
						3-14-26-24 N=40
73.0	<b>LEAN CLAY (CL)</b> , trace sand, gray, (glacial till)	964.3			18	18-26-6-7 N=32
					16	3-6-7-8

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Hammer Type: Automatic

Advancement Method:  
Mud rotary / split spoon sample hole  
Hollow stem auger, 8.25-inch diameter borehole

Abandonment Method:  
N/A-Well installed

See Appendices for explanation of symbols and abbreviations.

Notes:

**WATER LEVEL OBSERVATIONS**  
▽ 30 ft while drilling



Well Started: 1/20/2016

Well Completed: 1/20/2016

Drill Rig: 770

Driller: JM

Project No.: 05157581

Exhibit: --2

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ENVIRONMENTAL SMART LOG 05157581 LOGS.GPJ TERRACON2012.GDT 2/4/16

# WELL LOG NO. MW-19

**PROJECT: OPPD North Omaha Station**

**CLIENT: Omaha Public Power District**

**SITE: 7475 Pershing Drive  
Omaha, Nebraska**

GRAPHIC LOG	LOCATION -		DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	SPT N-VALUE
	Latitude: 41.3314505° Longitude: -95.9521803°						
		Surface Elev.: 1037.3 (Ft.)					
		ELEVATION (Ft.)					
	<b>LEAN CLAY (CL)</b> , trace sand, gray, (glacial till) ( <i>continued</i> )	961.3	slot		X	16	N=13
	<b>FAT CLAY (CH)</b> , with limestone, gray, (weathered limestone)	960.4			X		
	<b>LIMESTONE*</b>	960.3			X	12	6-10-30-38 N=40
	<b>Boring Terminated at 77 Feet</b>						

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Hammer Type: Automatic

Advancement Method:  
Mud rotary / split spoon sample hole  
Hollow stem auger, 8.25-inch diameter borehole

Abandonment Method:  
N/A-Well installed

See Appendices for explanation of symbols and abbreviations.

Notes:

**WATER LEVEL OBSERVATIONS**  
▽ 30 ft while drilling



Well Started: 1/20/2016

Well Completed: 1/20/2016

Drill Rig: 770

Driller: JM

Project No.: 05157581

Exhibit: --2

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ENVIRONMENTAL SMART LOG 05157581 LOGS.GPJ TERRACON2012.GDT 2/4/16

# Well Registration or Area Permit

Fee Paid: **\$130.00** HHSS Fee: **\$90.00**  
 DNR Cash Fund: **\$18.50** WWDF: **21.50**  
 Billing ID: **53643**

Source: Nebraska On Line Import Status: Accepted Use: Monitoring (Ground Water Quality) Owner ID: 49927  
 Import ID: 145505413029741 Status: Active Registered Well Decommission Date: — Registration Number: G-178704A  
 Well ID: 241802 NRD: Papio-Missouri River Registration Date: 2/19/2016  
 Last Change User: hmcpherson Call Up Code: — Call Up Date: — Last Change Date: 2/19/2016

Owner:

Contact ID	Type	SeqNum	Begin Date	End Date	Name
<a href="#">Display</a> 49927	Owner	1	2/19/2016		Omaha Public Power District,

Contractor: 

Certificate ID	FirstName	LastName
39570	Michael B	Reif

Drilling Firm: 

EmployerID	Employer
159781	Terracon Consultants, Inc.

- A. Well Location: SW1/4NE1/4 of Section 28  
 Township 16 North, Range 13 ( East E/W), Douglas County
- B. Natural Resource District: Papio-Missouri River
- Well GPS Coordinates: Latitude 41° 19' 53.22" Longitude -095° 57' 07.85"  
 Lat/Long DD 41.33145 -95.95218 GPS Required
- C. The well is: — feet from the — Section line and — feet from the — section line.
- D. Street address or block, lot and subdivision: Addr/Sub Div 7475 Pershing Drive Block No — Lot —
- E. Location of water use, if applicable (give legal description): SWNE S28 T16 R13E
- G. Well reference letter(s) if applicable: MW-19

Well In A Series

Well Part of a Series with Site Plan: Yes

Series	# of Wells Reg	Total # Wells	Acres	Acres Cert	NRD Appr	StartDate	EndDate	Comment	Series Reg Num (External Source)	Code	Description	Wells in the Series					
<a href="#">244878</a>	3	4	No	No		1/20/2016			G-145159	DEQ	Part of a DEQ site plan for spill or underground storage	<a href="#">185656</a>	G-	2/19/2016			
													145159				
												<a href="#">241802</a>	G-	1/20/2016			
													178704A				
												<a href="#">241804</a>		12/1/2015			
												<a href="#">241805</a>		11/9/2015			

Permits

	Aprvd Date(s)	Aprvd Date(s)
Area Permit	— — —	SWater App Code
GeoPermit	— — —	Industrial
MWF	— — —	Transfer
WSP	— — —	Swater Conduct Code
HHSS	— — —	Other
HHSS PWS ID	— — —	ITN
NDEQ	<u>NE0054739</u>	

5. Purpose of Well Monitoring (Ground Water Quality)

Other Use —  
 Notes —

7. Replacement well information.

Well Considered a replacement by NRD(WellID, RegCD)

- A. Is this well a Replacement well? No Repl No — NRD Approval Date — Well Replacement Reg CD —
- B. Registration number of abandoned well: — If not registered, date abandoned well was constructed —
- C. Abandoned well last operated — D. Replacement well is — feet from abandoned well.
- E. Original well pump column size: — inches.
- F.  Original water well decommissioned —  
 I hereby certify that the original water well will be decommissioned within 180 days after such construction of the replacement water well.  
 I hereby certify that the original water well will be modified and equipped to pump 50 gallons per minute or less within 180 days after such construction of the replacement water well.  
 Livestock

- Monitoring
- Observation
- Nonconsumptive or de minimus use approved by the applicable natural resources district. \_\_\_
- Decommission/Modification certification form is submitted by landowner (Must be submitted before registering well)

G. Location of water use of original well: \_\_\_

Decommission Information

Decommission Date: \_\_\_ By

8. Pump Information.

- A. Is Pump installed at this time? No Pump present but Well Inactive: No  
Free Flowing Well: No Well active, no pump installed: Yes
- B. License No.
- C. Pumping Rate \_\_\_ gallons per minute. D. Pumping water level \_\_\_ feet.
- E. Drop pipe diameter \_\_\_ inches. F. Length of pipe \_\_\_ in feet.
- G. Pump equipment installed: \_\_\_ H. Pump Brand/Type \_\_\_
- I. Will this well be used to pump 50 gpm or less? Yes

9. Well Construction Information

- A. Total well depth: 76.5 feet. B. Static water level 30 feet.
- C. Well Construction began: 1/20/2016 D. Well Construction Completed: 1/20/2016
- E. Bore hole diameter in inches. Top 8.25 Bottom 8.25
- F. Casing and Screen Joints are: Threaded Other Joints description: \_\_\_
- H. Total Estimate Capacity of Well \_\_\_ gallons per minute. I. Pumping water level at capacity: \_\_\_ feet.

10. Well Construction (Casing & Screen) - c, d, e & f measurements should be in inches to three decimal places

Record Count = 2

WellID	FromDepth*	ToDepth*	Case/Screen	InsideDiam	OutsideDiam	CaseThickness	ScrnSlotSize	Material	ScreenTname
241802	0	66.5	casing	2.07	2.38	0.154		PVC	EMI
241802	66.5	76.5	screen	2.07	2.38	0.154	0.01	PVC	EMI

\* are in Feet, all else is in inches

11. Grout and Gravel Pack

Record Count = 5

WellID	FromDepth	ToDepth	Grout/Gravel	Material Description <sup>1</sup>	Quantity Gravel <sup>2</sup>	Volume & Type Grout <sup>3</sup>
241802	0	0.5	grout	Concrete and well vault		4.5 bags
241802	0.5	58.5	grout	Bentonite cement grout		6 bent/12port
241802	58.5	60.5	gravel	#16-30 Silica sand	1 bags	
241802	60.5	65.5	grout	Bentonite pellets		2.5 buckets
241802	65.5	76.5	gravel	#16-30 Silica sand	7 bag	

\* are in Feet, all else is in inches

<sup>1</sup>Description of gravel pack, i.e. engineered gravel pack, or gravel pit description (1/4 down) or brand name (best sand) natural formation, drilling cuttings, soil backfill

<sup>2</sup>Quantity #cubic yards, #Tons, #Sacks - (for drilling cuttings and soil backfill estimate quantity) Calculation assistance available on web

<sup>3</sup>Volume & Type: #gallons of a slurry, #Barrels of a slurry, #sacks used in the slurry, #Bags of non-slurry bentonite (chip-pellet-granular)

12. Well Geologic Materials Logged

WellID	FromDepth*	ToDepth*	Type	Hardness	Color	Other/Drilling Action
241802	0	68	Other		Gray	Lean Clay
241802	68	73	Other		Gray	Silty Clay
241802	73	76.5	Other		Gray	Fat Clay

\* are in Feet.

# WELL LOG NO. MW-20

**PROJECT: OPPD North Omaha Station**

**CLIENT: Omaha Public Power District**

**SITE: 7475 Pershing Drive  
Omaha, Nebraska**

GRAPHIC LOG	LOCATION - Latitude: 41.3286174° Longitude: -95.9477104°	INSTALLATION DETAILS	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	SPT N-VALUE
	Surface Elev.: 991.2 (Ft.) ELEVATION (Ft.)	Top Casing Elev: 993.47 Well Completion: Aboveground					
	DEPTH	MATERIAL DESCRIPTION					
	1.0	<b>LEAN CLAY (CL)</b> , dark brown, Grass at surface	990.2			10	4-5-9-12 N=14
		<b>LEAN CLAY WITH SAND (CL)</b> , brown, dry				13	4-10-13-12 N=23
	5.5	becomes black and moist	985.7			15	4-6-6-5 N=12
		<b>FAT CLAY (CH)</b> , trace fine sand, gray, moist				0	3-4-4-4 N=8
		becomes wet		▽		24	1-2-3-3 N=5
	10.0	<b>SANDY FAT CLAY (CH)</b> , gray	981.2			15	2-3-3-2 N=6
		becomes oxidized				16	2-2-2-3 N=4
						16	3-6-3-4 N=9
		becomes dark gray				20	-1-2
	25.0		966.2			19	1-1-1-1 N=2
						20	2-1-1-1 N=2
						24	
						24	

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown. Hammer Type: Automatic

Advancement Method: Mud rotary / split spoon sample hole Hollow stem auger, 8.25-inch diameter borehole	See Appendices for explanation of symbols and abbreviations.	Notes: Soil descriptions are based on visual observations made by the field crew. Actual conditions may vary.
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Abandonment Method: N/A-Well installed		
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<b>WATER LEVEL OBSERVATIONS</b> ▽ 9 ft while drilling	<p style="font-size: 0.8em; color: #a52a2a;">15080 A Circle Omaha, Nebraska</p>	Well Started: 11/9/2015 Well Completed: 11/9/2015 Drill Rig: 770 Driller: JM Project No.: 05157581 Exhibit: --3
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THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ENVIRONMENTAL SMART LOG 05157581 LOGS.GPJ TERRACON2012.GDT 2/4/16





# Well Registration or Area Permit

Fee Paid: 0.00 HHSS Fee: 0.00  
 DNR Cash Fund: 0.00 WWDF: 0.00  
 Billing ID: 53643

Source:	<u>Nebraska On Line</u>	Import Status:	<u>Accepted</u>	Use:	<u>Monitoring (Ground Water Quality)</u>	Owner ID:	<u>49927</u>
Import ID:	<u>14550559217013</u>	Status:	<u>Active Registered Well</u>	Decommission Date:	<u>---</u>	Registration Number:	<u>G-178704C</u>
Well ID:	<u>241805</u>	NRD:	<u>Papio-Missouri River</u>	Registration Date:	<u>2/19/2016</u>	Last Change Date:	<u>2/19/2016</u>
Last Change User:	<u>hmcpherson</u>	Call Up Code:	<u>---</u>	Call Up Date:	<u>---</u>		

Owner:

Contact ID	Type	SeqNum	Begin Date	End Date	Name
<a href="#">Display</a> 49927	Owner	1	2/19/2016		Omaha Public Power District,

Contractor:

Certificate ID	FirstName	LastName
39570	Michael B	Reif

Drilling Firm:

EmployerID	Employer
159781	Terracon Consultants, Inc.

- A. Well Location: SE1/4NE1/4 of Section 28  
 Township 16 North, Range 13 ( East E/W), Douglas County
- B. Natural Resource District: Papio-Missouri River
- Well GPS Coordinates: Latitude 41° 19' 43.02" Longitude -095° 56' 51.76"  
 Lat/Long DD 41.32862 -95.94771 GPS Required
- C. The well is: --- feet from the --- section line and --- feet from the --- section line.
- D. Street address or block, lot and subdivision: Addr/Sub Div 7475 Pershing Drive Block No --- Lot ---
- E. Location of water use, if applicable (give legal description): SENE S28 T16 R13E
- G. Well reference letter(s) if applicable: MW-20

Well In A Series

Well Part of a Series with Site Plan: Yes

Series	# of Wells Reg	Total # Wells	Acres	Acres Cert	NRD Appr	StartDate	EndDate	Comment	Series Reg Num (External Source)	Code	Description	Wells in the Series					
<a href="#">244878</a>	3	4	No	No		11/9/2015			G-145159	DEQ	Part of a DEQ site plan for spill or underground storage	<a href="#">185656</a>	G-	2/19/2016			
													145159				
												<a href="#">241802</a>	G-	1/20/2016			
												<a href="#">241804</a>	G-	12/1/2015			
												<a href="#">241805</a>	G-	11/9/2015			
													178704A				
													178704B				
													178704C				

Permits

	Aprvd Date(s)	Aprvd Date(s)
Area Permit	<u>---</u>	<u>---</u>
GeoPermit	<u>---</u>	<u>---</u>
MWF	<u>---</u>	<u>---</u>
WSP	<u>---</u>	<u>---</u>
HHSS	<u>---</u>	<u>---</u>
HHSS PWS ID	<u>---</u>	<u>---</u>
NDEQ	<u>NE0054739</u>	

## 5. Purpose of Well Monitoring (Ground Water Quality)

Other Use ---  
 Notes ---

## 7. Replacement well information.

Well Considered a replacement by NRD(WellID, RegCD)

- A. Is this well a Replacement well? No Repl No --- NRD Approval Date --- Well Replacement Reg CD ---
- B. Registration number of abandoned well: --- If not registered, date abandoned well was constructed ---
- C. Abandoned well last operated --- D. Replacement well is --- feet from abandoned well.
- E. Original well pump column size: --- inches.
- F.  Original water well decommissioned ---  
 I hereby certify that the original water well will be decommissioned within 180 days after such construction of the replacement water well.  
 I hereby certify that the original water well will be modified and equipped to pump 50 gallons per minute or less

within 180 days after such construction of the replacement water well.

- Livestock
- Monitoring
- Observation
- Nonconsumptive or de minimus use approved by the applicable natural resources district. \_\_\_
- Decommission/Modification certification form is submitted by landowner (Must be submitted before registering well)

G. Location of water use of original well: \_\_\_

Decommission Information

Decommission Date: \_\_\_ By

8. Pump Information.

- A. Is Pump installed at this time? No Pump present but Well Inactive: No
- Free Flowing Well: No Well active, no pump installed: Yes
- B. License No.
- C. Pumping Rate \_\_\_ gallons per minute. D. Pumping water level \_\_\_ feet.
- E. Drop pipe diameter \_\_\_ inches. F. Length of pipe \_\_\_ in feet.
- G. Pump equipment installed: \_\_\_ H. Pump Brand/Type \_\_\_
- I. Will this well be used to pump 50 gpm or less? Yes

9. Well Construction Information

- A. Total well depth: 35.3 feet. B. Static water level 9 feet.
- C. Well Construction began: 11/9/2015 D. Well Construction Completed: 11/9/2015
- E. Bore hole diameter in inches. Top 8.25 Bottom 8.25
- F. Casing and Screen Joints are: Threaded Other Joints description: \_\_\_
- H. Total Estimate Capacity of Well \_\_\_ gallons per minute. I. Pumping water level at capacity: \_\_\_ feet.

10. Well Construction (Casing & Screen) - c, d, e & f measurements should be in inches to three decimal places

Record Count = 2

WellID	FromDepth*	ToDepth*	Case/Screen	InsideDiam	OutsideDiam	CaseThickness	ScrnSlotSize	Material	ScreenTname
241805	0	25.3	casing	2.07	2.38	0.154		PVC	EMI
241805	25.3	35.3	screen	2.07	2.38	0.154	0.01	PVC	EMI

\* are in Feet, all else is in inches

11. Grout and Gravel Pack

Record Count = 5

WellID	FromDepth	ToDepth	Grout/Gravel	Material Description <sup>1</sup>	Quantity Gravel <sup>2</sup>	Volume & Type Grout <sup>3</sup>
241805	0	0.5	grout	Concrete and well vault		4 bags
241805	0.5	17	grout	Bentonite cement grout		4 bent/6 port
241805	17	19	gravel	#16-30 Silica sand	1 bag	
241805	19	24.5	grout	Bentonite pellets		3 buckets
241805	24.5	35.3	gravel	#16-30 Silica sand	7 bags	

\* are in Feet, all else is in inches

<sup>1</sup>Description of gravel pack, i.e. engineered gravel pack, or gravel pit description (1/4 down) or brand name (best sand) natural formation, drilling cuttings, soil backfill

<sup>2</sup>Quantity #cubic yards, #Tons, #Sacks - (for drilling cuttings and soil backfill estimate quantity) Calculation assistance available on web

<sup>3</sup>Volume & Type: #gallons of a slurry, #Barrels of a slurry, #sacks used in the slurry, #Bags of non-slurry bentonite (chip-pellet-granular)

12. Well Geologic Materials Logged

WellID	FromDepth*	ToDepth*	Type	Hardness	Color	Other/Drilling Action
241805	0	1	Other		Brown	Lean Clay
241805	1	5.5	Other		Brown	Lean Clay w/Sand
241805	5.5	10	Other		Brown	Fat Clay
241805	10	25	Other		Brown	Sandy Fat Clay
241805	25	32	Other		Brown	Clayey Sand
241805	32	33.5	Gravel		Gray	
241805	33.5	35.3	Shale		Gray	

\* are in Feet.