



CCR Groundwater Monitoring System



Omaha Public Power District

Nebraska City Station
NC1 Ash Disposal Area

Nebraska City, Nebraska

June 2016

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OPPD Nebraska City Station NC1 Ash Disposal Area CCR Groundwater Monitoring System

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Appendix A Monitoring Well Documentation

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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 NC1 Ash Disposal Area at the Nebraska City 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."

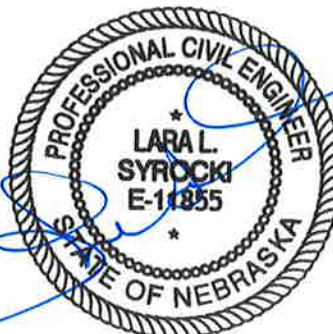
Print Name: Lara L. Syrocki

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) Nebraska City Generating Station. The Station, located southeast of Nebraska City, Nebraska has two coal-fired combustion units – Unit 1 and Unit 2. CCR from both units may be disposed in the NC1 Ash Disposal Area.

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 NC1 Ash Disposal Area 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 two-unit (Unit 1 and Unit 2) fossil fuel-fired generating plant at the Nebraska City Station (Station) southeast of Nebraska City, Nebraska. This Station has two existing CCR landfills that are permitted under the current NDEQ Title 132 regulations for fossil fuel combustion ash disposal (the NC1 Ash Disposal Area and NC2 Ash Disposal Area).

The NC1 Ash Disposal Area is an unlined CCR landfill of approximately 52 acres that has historically received CCR for disposal and is permitted with the State of Nebraska. NC1 Ash Disposal Area is an active, existing CCR landfill as defined by the CCR rule.

3.0 Site Hydrogeology Summary

Based on soil boring advanced at the Station in 2006, the bedrock, in the form of shale, was encountered at a depth of 89 feet below ground surface. The uppermost aquifer, Missouri River Alluvium, depth is anticipated to be from 2 feet to 89 feet below ground surface (bgs).

According to the hydrology assessment conducted at the site in 1995 by SCS Engineers titled *Hydrologic Investigations Report*. The broad upland areas of the Station are underlain by the unconsolidated wind-blown and glacial deposits of Pleistocene age. The surface of the site is generally overlain by fine-grained or cohesive deposits near the surface, based on a study conducted by D’Appolonia Consulting Engineers in 1975. These deposits consist of silty clays, clayey silts, silty sands and fine sands. The bedrock underlying the Station area is medium hard

red to gray shale. Several areas outside the Station area are underlain by a thin formation of limestone interbedded with shale.

Data from the boring logs for the monitoring wells and soil borings at the Station indicates that the subsurface geology at the ash disposal area consists of the following:

- 3 feet of light brown to dark grayish brown lean clay (CL) (Fill/Topsoil), overlying,
- Approximately 9 feet of alluvium consisting of light brown to grayish brown silty clayey sand (SM), poorly graded sand with silty sand (SP-SM), silt with very fine sand to silty very fine sand (ML/SM), and high plastic clay (CH), overlying,
- 28 to 77 feet of gray poorly graded sand (SP) to the boring completion depths varying from 40 to 89 feet.
- Some borings indicate that bedrock was encountered at a depth of 103.5 feet.

In the general vicinity of the Station, two primary sources of groundwater are present, Missouri River alluvium and glacial deposits in the upland area west of the Station property. Groundwater in the Missouri River alluvium is found at starting depths of approximately 2 to 17 feet bgs and is largely affected by the river stages. Based on recent monitoring well survey data and assessment of the existing groundwater monitoring wells installed at the site, groundwater flow direction is generally to the southeasterly direction towards the Missouri River.

Slug tests conducted in 1995 on three monitoring wells (MW-1, MW-4 and MW-6) indicate that the horizontal hydraulic conductivity values ranged from 5.7×10^{-4} cm/sec to 8.2×10^{-3} cm/sec. A pump test was conducted in 2003 by HDR on an 83-foot-deep, 16-inch-diameter well that was installed and pumped at a rate of 1225 gallons per minute for 72 hours. Water levels were monitored during the pumping period and recovery period in the pumped well and in three observation wells installed for the test. The results of the test indicated that hydraulic conductivity of the aquifer is approximately 2.0×10^{-1} cm/sec, which is in the upper end of the range of literature values for clean sands. It should be noted that the tested interval in the 2003 investigation is deeper (and the sediments coarser) than was tested during the slug tests that were conducted in 1995. The difference seen between the HDR data and the SCS data could be attributed to lateral and vertical heterogeneity common for alluvial deposits. The aquifer is known to become coarser and consequently more permeable with depth. Since the HDR pumping test was a measure of deeper sediments, the results are reasonably consistent with the geology.

Monitoring wells installed on the Station north of the NC1 Ash Disposal Area (near the NC2 Ash Disposal Area) have hydraulic conductivity values ranging from 1.39×10^{-2} cm/sec to 2.42×10^{-3} cm/sec as reported in the NC2 Hydrogeologic Characterization Report (HDR 2006). Groundwater flow velocity at NC1 is calculated based on hydraulic conductivity range of 5.7×10^{-4} cm/sec to 1.39×10^{-2} cm/sec (SCS 1995 and HDR 2006) and an effective porosity of 0.405 as reported in HDR 2006. Based on quarterly monitoring reports since 2006 for NC1, the gradient ranged from 0.0027 ft/ft to 0.0031 ft/ft with a velocity range of 3.5 to 108 ft/year.

From slug test data performed by Terracon (2016) on recently installed well MW-13, the hydraulic conductivity was reported as 3.38×10^{-3} cm/sec. This is within the range of previously recorded data.

4.0 Groundwater Monitoring System

Based on the site hydrogeology and groundwater flow to the southeasterly direction, the groundwater monitoring system for the NC1 Ash Disposal Area for the detection monitoring program consists of three (3) upgradient/background wells and four (4) downgradient wells. This exceeds the minimum number of monitoring wells required by 40 CFR 257.91(c) (i.e. one upgradient and three downgradient). Five (5) 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 NC1 Ash Disposal Area is summarized below in Table 1.

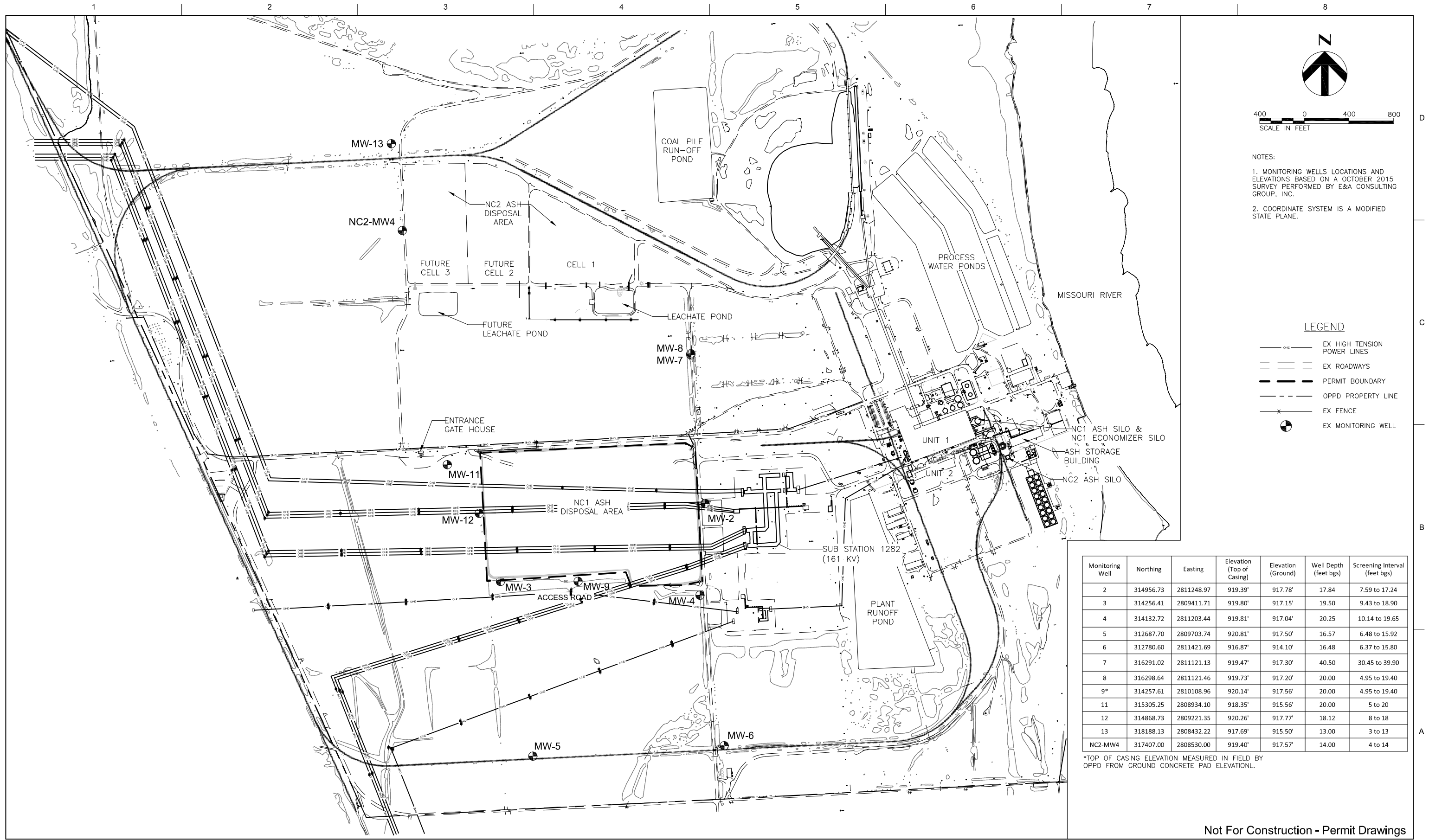
Table 1
OPPD NC1 Ash Disposal Area, Groundwater Monitoring Well System

Monitoring Well	Date Installed	Well Depth (feet bgs) ¹	Well Depth (feet from TOC) ²	Gradient	Monitoring Program Use
Detection Monitoring Program					
MW-13	1/26/16	13.0	15.19	Background/Up	Detection
MW-11	1/16/04	20.0	21.85	Background/Up	Detection
NC2MW-4	9/8/04	14.0	16.01	Background/Up	Detection
MW-2	3/14/95	17.8	20.38	Down	Detection
MW-3	3/14/95	19.5	22.42	Down/Crossgradient	Detection
MW-4	3/13/95	20.3	23.07	Down	Detection
MW-9	1/21/99	20.0	22.53	Down	Detection
Water Level Measurements Only					
MW-5	3/17/95	16.6	19.99	Down/Crossgradient	Water Level/Nature & Extent Determinations ³
MW-6	3/15/95	16.5	19.24	Down	Water Level/Nature & Extent Determinations ³
MW-7 (deep well)	1/20/99	40.5	42.53	Crossgradient	Water Level Only
MW-8	1/21/99	20.0	22.46	Crossgradient	Water Level Only
MW-12	3/26/04	18.1	20.78	Up/Crossgradient	Water Level Only
Abandoned Wells⁴					
MW-1 (replaced with MW-11)	3/14/95 (Abandoned 1/16/04)	20.8	23.64	NA	NA
MW-10 (replaced with MW-12)	1/21/99 (Abandoned 10/17/03)	20.0	21.99	NA	NA

Notes:

1. Depth from ground surface to bottom of installed well. Actual boring depth may be deeper.
2. Depth from top of casing to bottom of installed well.
3. 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.
4. Abandoned in accordance with State of Nebraska regulations.

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, registrations or abandonment forms for the groundwater monitoring wells are contained in Appendix A of this report.



NOTES:
 1. MONITORING WELLS LOCATIONS AND ELEVATIONS BASED ON A OCTOBER 2015 SURVEY PERFORMED BY E&A CONSULTING GROUP, INC.
 2. COORDINATE SYSTEM IS A MODIFIED STATE PLANE.

LEGEND

- EX HIGH TENSION POWER LINES
- EX ROADWAYS
- PERMIT BOUNDARY
- OPPD PROPERTY LINE
- EX FENCE
- EX MONITORING WELL

Monitoring Well	Northing	Easting	Elevation (Top of Casing)	Elevation (Ground)	Well Depth (feet bgs)	Screening Interval (feet bgs)
2	314956.73	2811248.97	919.39'	917.78'	17.84	7.59 to 17.24
3	314256.41	2809411.71	919.80'	917.15'	19.50	9.43 to 18.90
4	314132.72	2811203.44	919.81'	917.04'	20.25	10.14 to 19.65
5	312687.70	2809703.74	920.81'	917.50'	16.57	6.48 to 15.92
6	312780.60	2811421.69	916.87'	914.10'	16.48	6.37 to 15.80
7	316291.02	2811121.13	919.47'	917.30'	40.50	30.45 to 39.90
8	316298.64	2811121.46	919.73'	917.20'	20.00	4.95 to 19.40
9*	314257.61	2810108.96	920.14'	917.56'	20.00	4.95 to 19.40
11	315305.25	2808934.10	918.35'	915.56'	20.00	5 to 20
12	314868.73	2809221.35	920.26'	917.77'	18.12	8 to 18
13	318188.13	2808432.22	917.69'	915.50'	13.00	3 to 13
NC2-MW4	317407.00	2808530.00	919.40'	917.57'	14.00	4 to 14

*TOP OF CASING ELEVATION MEASURED IN FIELD BY OPPD FROM GROUND CONCRETE PAD ELEVATIONL.

Not For Construction - Permit Drawings



ISSUE	DATE	DESCRIPTION

PROJECT MANAGER	L. CALUB, P.E.
PROJECT NUMBER	000000000257427

OPPD
 Omaha Public Power District
Nebraska City Station
 NC1 Ash Disposal Area - Permit Drawings

MONITORING WELL LOCATION MAP

0 1" 2" FILENAME | 2015-GWC.DWG SHEET |
 SCALE | 1" = 400' FIG 1



Appendix A
Monitoring Well
Documentation

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DRILLING LOG

Project Name Omaha Public Power District - Nebraska City, Nebraska				Project Number 08 94037.01		Boring Number MW-1	
Boring Location Description NW of fly ash disposal area			Boring Location NW1/4, NW1/4, SW1/4, NE1/4, Sec. 36, T8N, R14E			Page 1 of 2	
Ground Surface Elevation 910.2 ft above NGVD (surv.)		Top of Well Casing Elevation 913.01 ft above NGVD (surv.)		Boring Location Coordinates 3270.1 North 4448.5 East		Total Footage 22.0 ft.	
Drilling Method (s) 6 1/4" ID HSA		Borehole Size 8	Overburden Footage 22.0 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 03/14/95		Date Completed 03/14/95		Field Observer (s) Carmelo Blazekovic			

Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
1	SAND, GRAVEL, SILT mixture, dark grey, loose, wet, fill - ash and coal with silt sand and gravel.	GM			1			Started drilling at 1:35 pm. HSA = Hollow Stem Auger. NGVD = National Geodetic Vertical Datum Sample wet at 5.0 feet (free water).
2	SILTY CLAY, medium grey, soft, very moist, high plasticity with trace medium sand; sticky and a few 1" coarse sand lenses	CH			2			
3					3			
4					4			
5	SILTY CLAY, medium grey, soft, wet, high plasticity with trace medium sand; sticky and a few 1" coarse sand lenses	SC			5			
6				3/3/3/3	1.6'/2.0'	6	SS-1	
7	CLAYEY SAND, dark grey, fine grained, loose, well graded, wet high plasticity, sticky clay and fine sand mixture	SM			7			
8						8		
9					9			
10					10			
11			3/2/2/3	2.0'/2.0'	11	SS-2		
12	SILTY SAND, dark grey, fine grained, well graded, loose, wet, with trace clay				12			
13					13			
14					14			

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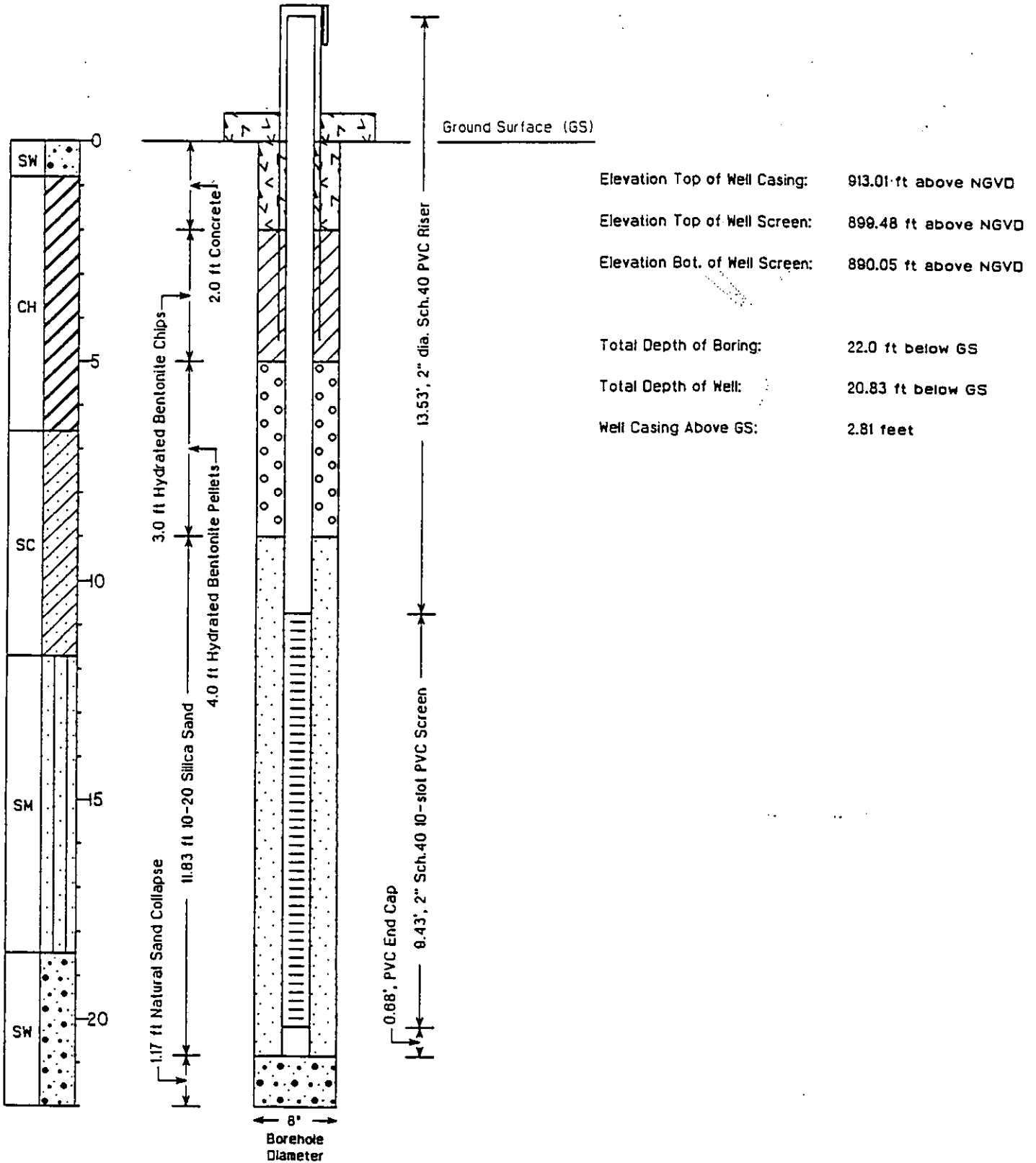
Drilling Log, continued

Project Name Omaha Public Power District - Nebraska City, Nebraska				Project No. 08 94037.01		Boring Number MW-1		
Boring Location Description NW of fly ash disposal area			Boring Location NW1/4, NW1/4, SW1/4, NE1/4, Sec. 36, T8N, R14E			Page 2 of 2		
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
15	SILTY SAND, dark grey, fine grained, well graded, loose, wet, with trace clay	SM			15			
16			3/3/4/3	0.6'/2.0'	16	SS-3		
17					17			
18					18			
19	SAND, medium grey, medium grained, well graded, medium density, wet; mostly quartz and rock grains; trace silt	SW			19			
20					20			
21			5/5/7/6	2.0'/2.0'	21	SS-4		
22					22			
	TOTAL DEPTH = 22.0 Feet							Monitoring well installed @ 3:30 pm.
23					23			
24					24			
25					25			
26					26			
27					27			
28					28			
29					29			
30					30			
31					31			

SCS ENGINEERS
Kansas City, Missouri

MONITORING WELL CONSTRUCTION RECORD

Project Name Omaha Public Power District - Nebraska City, Nebraska		Project Number 08 94037.01	Well Number MW-1
Location Description NW of fly ash disposal area		Location NW1/4, NW1/4, SW1/4, NE1/4, Sec. 36, T8N, R14E	Total Depth (TOC) 23.64 feet
Ground Surface Elevation 910.2 ft above NGVD	Marker in Concrete Well Pad EL	Boring Location Coordinates 3270.1 North 4448.5 East	Date Installed 3/14/95



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DRILLING LOG

Project Name Omaha Public Power District - Nebraska City, Nebraska				Project Number 08 94037.01		Boring Number MW-2	
Boring Location Description E SE of fly ash disposal area				Boring Location NW1/4, SW1/4, SW1/4, NW1/4, Sec. 31, T8N, R15E		Page 1 of 2	
Ground Surface Elevation 916.4 ft above NGVD (surv.)		Top of Well Casing Elevation 918.94 ft above NGVD (surv.)		Boring Location Coordinates 2717.5 North 6757.4 East		Total Footage 18.0 ft.	
Drilling Method (s) 6 1/4" ID HSA		Borehole Size 8	Overburden Footage 18.0 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 03/14/95		Date Completed 03/14/95		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, brownish grey, loose, very moist, well-graded, fine sand and silt.	ML			1			Start drilling at 4:05 p.m. HSA = Hollow Stem Auger. NGVD = National Geodetic Vertical Datum
2								
3								
4								
5								
6	SILTY SAND, brownish grey, trace gravel, well graded, moist, medium density, quartz and rock grains.	SM	1/4/10/10	1.9'/2.0'	6	SS-1		Auger cuttings wet at 8 feet (free water).
7					7			
8	SAND, dark grey, well to fine grained, well graded, medium density, wet, mostly quartz with rock grains.	SW	1/4/11/17	0.6'/2.0'	8			
9								
10								
11	SAND, light grey, medium to coarse grained, well graded, medium to loose, wet; quartz and rock grains with oval shaped, rounded pebble size rock grains, trace coal grains to 1/16" in diameter.	SW			11	SS-2		
12								
13								
14					14			

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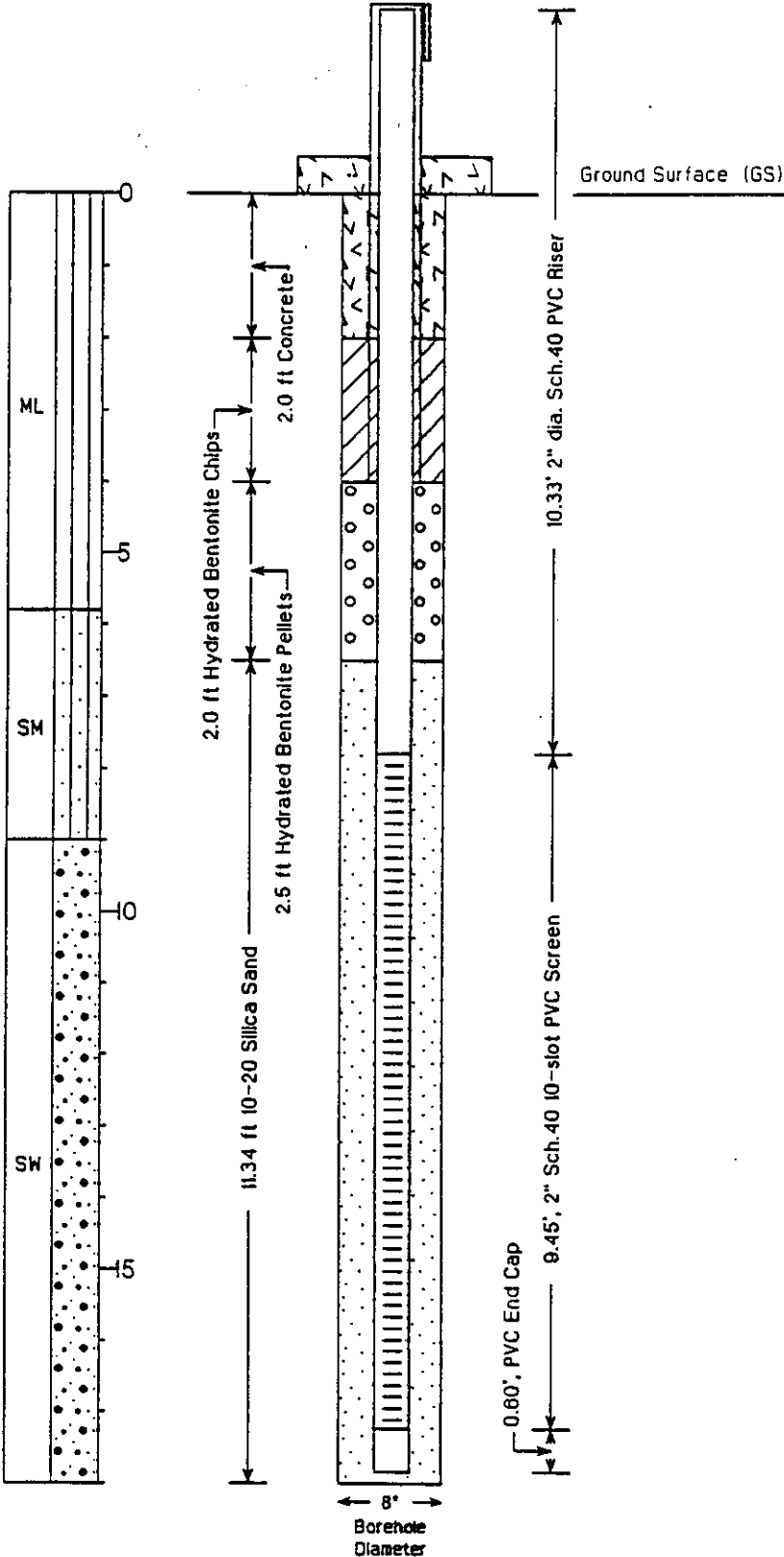
Drilling Log, continued

Project Name Omaha Public Power District - Nebraska City, Nebraska				Project No. 08 94037.01		Boring Number MW-2		
Boring Location Description E SE of fly ash disposal area			Boring Location NW1/4, SW1/4, SW1/4, NW1/4, Sec. 31, T8N, R15E			Page 2 of 2		
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
15	SAND, light grey, medium to coarse grained, well graded, medium to loose, wet; quartz and rock grains with oval shaped, rounded pebble size rock grains, trace coal grains to 1/16" in diameter.	SW	1/2/4/10	2.0'/2.0'	15	SS-3		Advanced augers to 18'. Pulled augers and installed PVC plug. Borehole open to 8.0'.
16					16			
17					17			
18	TOTAL DEPTH = 18.0 Feet				18			Monitoring well installed @ 6:00 pm.
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			

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Kansas City, Missouri

MONITORING WELL CONSTRUCTION RECORD

Project Name Omaha Public Power District - Nebraska City, Nebraska		Project Number 08 94037.01	Well Number MW-2
Location Description E SE of fly ash disposal area		Location NW1/4, SW1/4, SW1/4, NW1/4, Sec. 31, T8N, R15E	Total Depth (TOC) 20.38 feet
Ground Surface Elevation 916.4 ft above NGVD	Marker in Concrete Well Pad El.	Boring Location Coordinates 2717.5 North 6757.4 East	Date Installed 03/14/95



Elevation Top of Well Casing:	918.94 ft above NGVD
Elevation Top of Well Screen:	908.81 ft above NGVD
Elevation Bot. of Well Screen:	899.18 ft above NGVD
Total Depth of Boring:	18.0 ft below GS
Total Depth of Well:	17.84 ft below GS
Well Casing Above GS:	2.54 feet

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DRILLING LOG

Project Name Omaha Public Power District - Nebraska City, Nebraska			Project Number 08 94037.01		Boring Number MW-3	
Boring Location Description S of SW corner of fly ash disposal area			Boring Location SW1/4, SE1/4, SW1/4, NE1/4, Sec. 36, T8N, R14E			Page 1 of 2
Ground Surface Elevation 911.0 ft above NGVD (surv.)		Top of Well Casing Elevation 913.92 ft above NGVD (surv.)		Boring Location Coordinates 2107.8 North 4888.1 East		Total Footage 22.0 ft.
Drilling Method (s) 6 1/4" ID HSA		Borehole Size 8	Overburden Footage 22.0 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 03/14/95			Date Completed 03/14/95		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, loose, very moist, well graded, quartz and rock grains with traces of clay, nonplastic.	SM			1			Start drilling at 10:20 am. HSA = Hollow Stem Auger. NGVD = National Geodetic Vertical Datum
2								
3								
4								
5								
6	SAND, light brownish grey, medium to fine grained, well graded, loose, moist, mostly quartz and rock grains (salt and pepper appearance).		2/3/3/4	1.7'/2.0'	6	SS-1		Sample wet at 6.2 feet (free water).
7					7			
8	SAND, light brownish grey, medium to fine grained, well graded, loose, wet, mostly quartz and rock grains (salt and pepper appearance).	SW			8			
9								
10								
11								
11			1/8/8/5	1.8'/2.0'	11	SS-2		
12								
13								
14					14			

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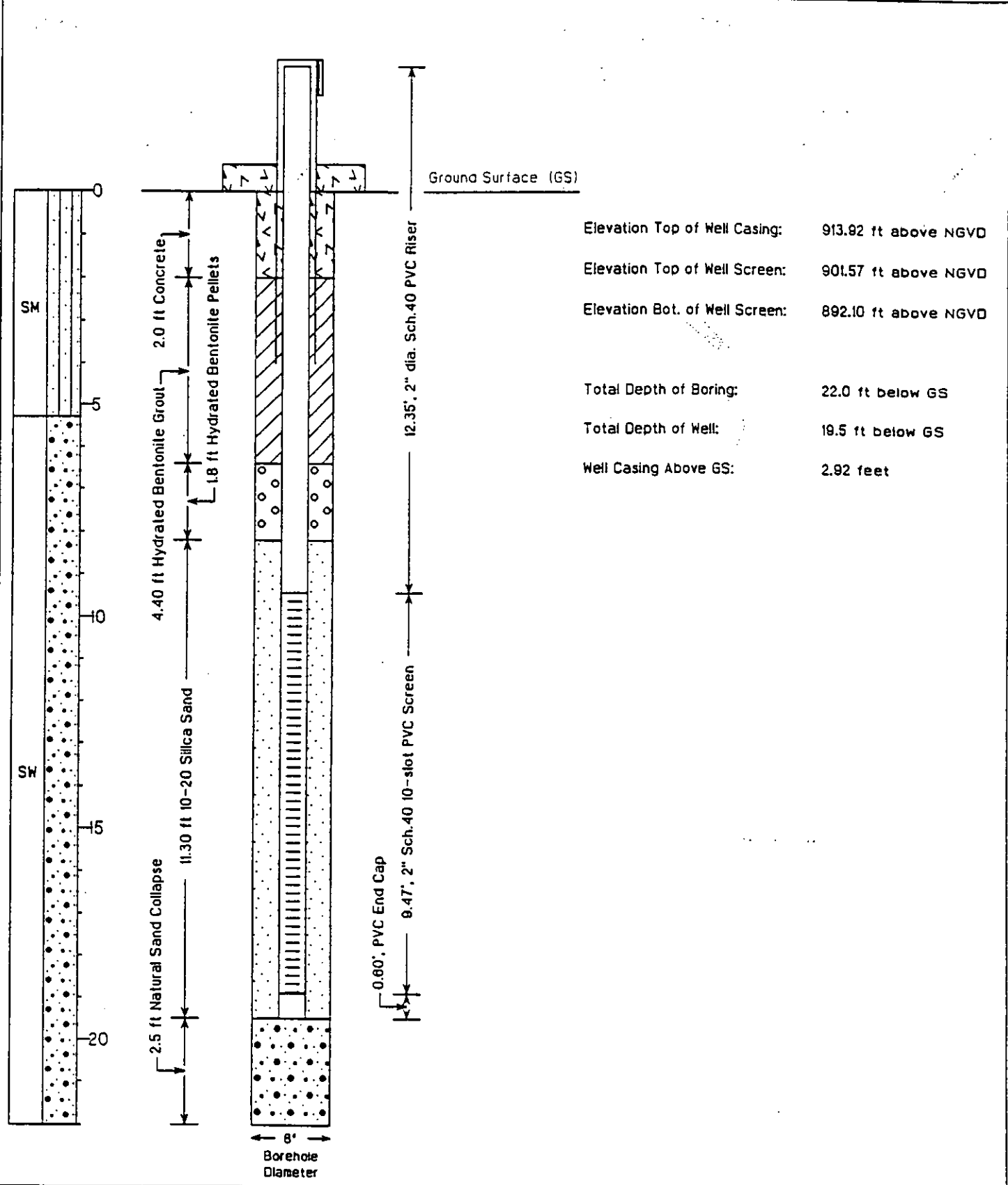
Drilling Log, continued

Project Name Omaha Public Power District - Nebraska City, Nebraska				Project No. 08 94037.01		Boring Number MW-3		
Boring Location Description S of SW corner of fly ash disposal area			Boring Location SW1/4, SE1/4, SW1/4, NE1/4, Sec. 36, T8N, R14E			Page 2 of 2		
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
15	SAND, light brownish grey, medium to fine grained, well graded, loose, wet, mostly quartz and rock grains (salt and pepper appearance).	SW			15			
16			4/2/7/11	1.6'/2.0'	16	SS-3		
17	SAND, light brownish grey, medium grained, well graded, medium density, wet; with some fine grained quartz sand and trace oval shaped rock pebbles, trace coal to 1/8" inch in diameter.	SW			17			
18					18			
19					19			
20					20			
21			4/4/4/3	1.8'/2.0'	21	SS-4		Advanced augers to 22'.
22	TOTAL DEPTH = 22 Feet				22			There is 1.5' of sand in the hollow stem of the augers. Pulled augers and installed PVC plug. Borehole open to 7.0'. Free water in borehole @ 6.0'.
23					23			
24					24			Installed monitoring well @ 11:40 am.
25					25			
26					26			
27					27			
28					28			
29					29			
30					30			
31					31			

SCS ENGINEERS
Kansas City, Missouri

MONITORING WELL CONSTRUCTION RECORD

Project Name Omaha Public Power District - Nebraska City, Nebraska		Project Number 08 94037.01	Well Number MW-3
Location Description S of SW corner of fly ash disposal area		Location SW1/4, SE1/4, SW1/4, NE1/4, Sec. 36, T8N, R14E	Total Depth (TOC) 22.42 feet
Ground Surface Elevation 911.0 ft above NGVD	Marker in Concrete Well Pad EL.	Boring Location Coordinates 2107.8 North 4888.1 East	Date Installed 3/14/95



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Kansas City, Missouri

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DRILLING LOG

Project Name Omaha Public Power District - Nebraska City, Nebraska				Project Number 08 94037.01		Boring Number MW-4	
Boring Location Description S of SE corner of fly ash disposal area			Boring Location NE1/4, NE1/4, NE1/4, SE1/4, Sec. 36, T8N, R14E			Page 1 of 2	
Ground Surface Elevation 916.6 ft above NGVD (surv.)		Top of Well Casing Elevation 919.42 ft above NGVD (surv.)		Boring Location Coordinates 1896.9 North 6671.1 East		Total Footage 22.0 ft.	
Drilling Method (s) 6 1/4" ID HSA		Borehole Size 8	Overburden Footage 22.0 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 03/13/95		Date Completed 03/13/95		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, dark grey, fine grained, loose, well graded, very moist, with traces of clay, mostly quartz with some rock grains.	SM			1			Start drilling at 1:00 pm. HSA = Hollow Stem Auger. NGVD = National Geodetic Vertical Datum
2								
3								
4								
5								
6	SAND, light brownish grey, medium to fine grained, well graded, medium density, moist, mostly quartz with rock grains.	SW	4/6/8/6	1.1'/2.0'	6	SS-1		
7								
9	CLAYEY SAND, medium brown, fine grained, soft, very moist, low plasticity, well graded with silt.	SC			9			
10								
11	SAND, brownish grey, medium to fine grained, well graded, wet, loose, mostly quartz with rock grains.	SW	2/4/5/7	1.5'/2.0'	11	SS-2		Sample wet at 10 feet (free water).
12								
13								
14								

SCS ENGINEERS
Kansas City, Missouri

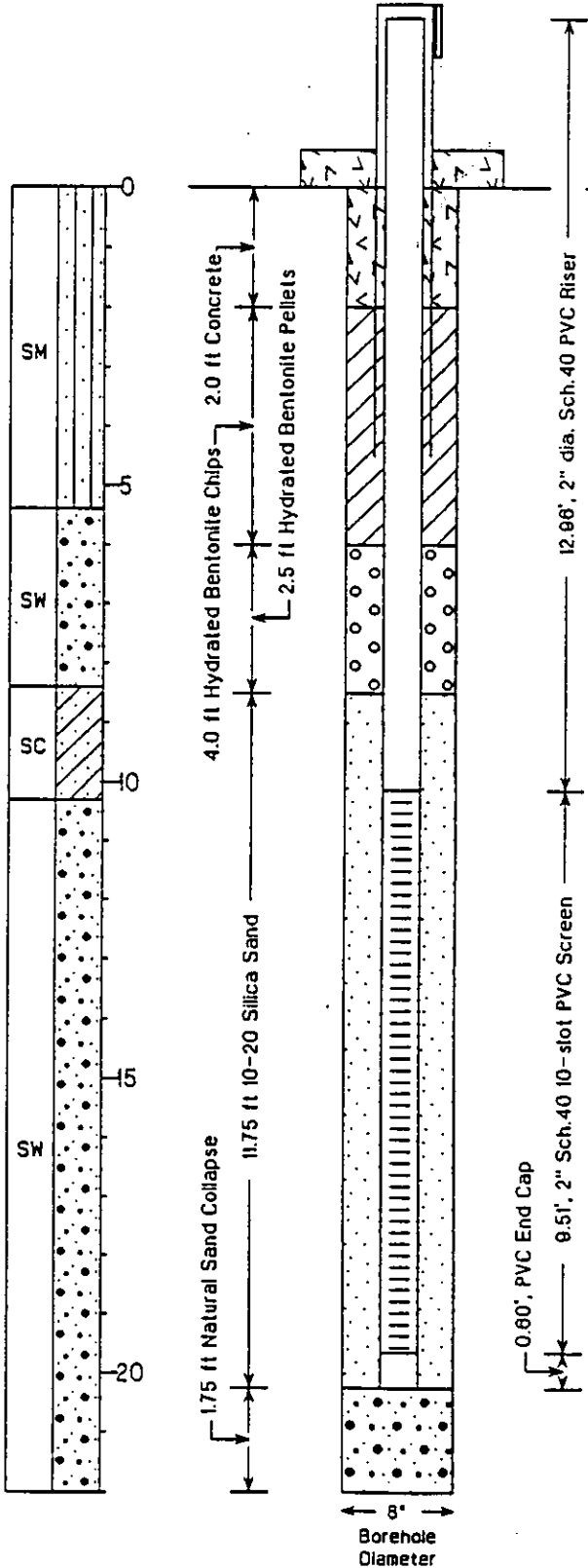
Drilling Log, continued

Project Name Omaha Public Power District - Nebraska City, Nebraska				Project No. 08 94037.01		Boring Number MW-4		
Boring Location Description S of SE corner of fly ash disposal area			Boring Location NE1/4, NE1/4, NE1/4, SE1/4 Sec. 36, T8N, R14E			Page 2 of 2		
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
15	SAND, brownish grey, medium to fine grained, well graded, wet, loose, mostly quartz with rock grains.	SW			15			
16	SAND, medium grey, medium grained, well graded, loose, wet, quartz and some fine grained rock grains and trace coal (in situ).		4/4/6/8	1.0'/2.0'	16	SS-3		
17					17			
18					18			
19					19			
20					20			
21			1/1/7/10	1.8'/2.0'	21	SS-4		
22	TOTAL DEPTH = 22.0 Feet				22			Advanced augers to 22'.
23					23			Pulled augers. Borehole open to 10.0'. Installed PVC plug.
24					24			Monitoring well installed @ 3:15 pm.
25					25			
26					26			
27					27			
28					28			
29					29			
30					30			
31					31			

SCS ENGINEERS
Kansas City, Missouri

MONITORING WELL CONSTRUCTION RECORD

Project Name Omaha Public Power District - Nebraska City, Nebraska		Project Number 08 94037.01	Well Number MW-4
Location Description S of SE corner of fly ash disposal area		Location NE1/4, NE1/4, NE1/4, SE1/4, Sec. 36, T8N, R14E	Total Depth (TOC) 23.07 feet
Ground Surface Elevation 916.6 ft above NGVD	Marker in Concrete Well Pad El.	Boring Location Coordinates 1896.9 North 6671.1 East	Date Installed 3/13/95



Elevation Top of Well Casing:	919.42 ft above NGVD
Elevation Top of Well Screen:	908.48 ft above NGVD
Elevation Bot. of Well Screen:	898.95 ft above NGVD
Total Depth of Boring:	22.0 ft below GS
Total Depth of Well:	20.25 ft below GS
Well Casing Above GS:	2.82 feet

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DRILLING LOG

Project Name Omaha Public Power District - Nebraska City, Nebraska				Project Number 08 94037.01		Boring Number MW-5	
Boring Location Description Approx. 1/2 mi. S of SW corner of fly ash			Boring Location NW1/4, NE1/4, SW1/4, SE1/4, Sec. 36, T8N, R14E			Page 1 of 2	
Ground Surface Elevation 911.4 ft above NGVD (surv.)		Top of Well Casing Elevation 914.82 ft above NGVD (surv.)		Boring Location Coordinates 526.7 North 5103.4 East		Total Footage 20.0 ft.	
Drilling Method (s) 6 1/4" ID HSA		Borehole Size 8	Overburden Footage 20.0 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 03/17/95		Date Completed 03/17/95		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, medium brown, loose, moist, non-plastic, trace clay.	SM			1			Start drilling at 10:30 am. HSA = Hollow Stem Auger. NGVD = National Geodetic Vertical Datum	
2					2				
3						3			
4	SAND, medium brown, fine grained, well graded, medium density, mostly quartz and rock grains with silt, moist.	SM			4				
5					5				
6			9/8/9/20	1.1'/2.0'	6	SS-1			
7					7				
8	SAND, medium brown, fine grained, well graded, medium density, mostly quartz and rock grains with silt, wet.	SW			8				Auger cuttings wet at 8 feet (free water).
9					9				
10						10			
11	SAND, medium brown, medium to fine grained, well graded, loose, wet.	SW			11				
12			3/4/4/8	1.2'/2.0'	11	SS-2			
13						12			
14					13				
14					14				

SCS ENGINEERS
Kansas City, Missouri

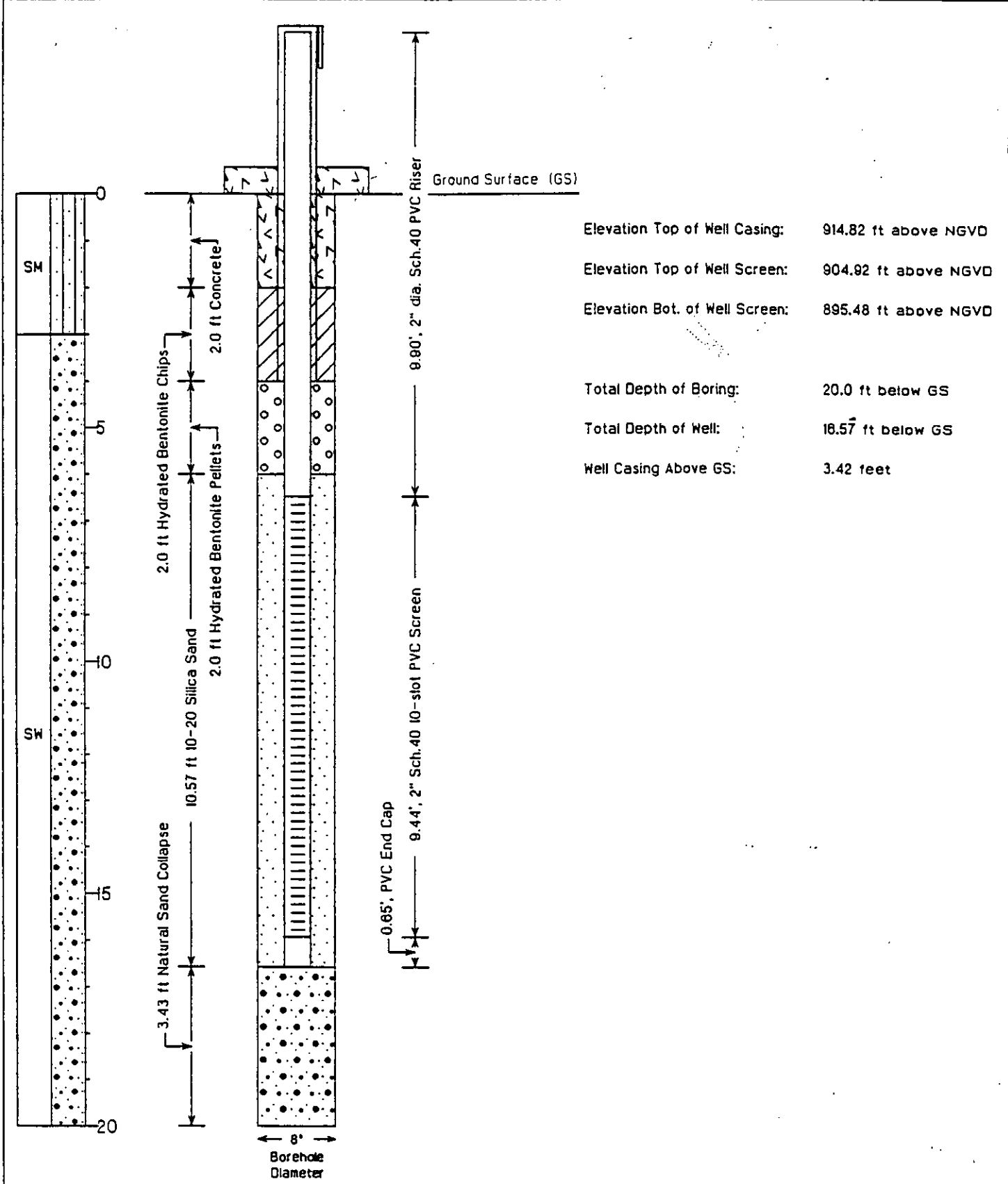
Drilling Log, continued

Project Name Omaha Public Power District - Nebraska City, Nebraska				Project No. 08 94037.01		Boring Number MW-5		
Boring Location Description Approx. 1/2 mi. S of SW corner of fly ash			Boring Location NW1/4, NE1/4, SW1/4, SE1/4 Sec. 36, T8N, R14E			Page 2 of 2		
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
15	SAND, medium brown, medium to fine grained, well graded, loose, wet.	SW			15			Advanced augers to 20'. Pulled augers and installed PVC plug. Borehole open to 5.3'. There was 4' of fine sand in the augers ('heaving sand').
16			5/6/6/8	1.8'/2.0'	16	SS-3		
17					17			
18					18			
19					19			
20	TOTAL DEPTH = 20.0 Feet				20			
21					21			Monitoring well installed @ 10:30 am.
22					22			
23					23			
24					24			
25					25			
26					26			
27					27			
28					28			
29					29			
30					30			
31					31			

SCS ENGINEERS
Kansas City, Missouri

MONITORING WELL CONSTRUCTION RECORD

Project Name Omaha Public Power District - Nebraska City, Nebraska		Project Number 08 94037.01	Well Number MW-5
Location Description Approx. 1/2 mi. S of SW corner of fly ash		Location NW1/4, NE1/4, SW1/4, SE1/4, Sec. 36, T8N, R14E	Total Depth (TOC) 19.99 feet
Ground Surface Elevation 911.4 ft above NGVD	Marker In Concrete Well Pad El.	Boring Location Coordinates 526.7 North 5103.4 East	Date Installed 3/17/95



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DRILLING LOG

Project Name Omaha Public Power District - Nebraska City, Nebraska				Project Number 08 94037.01		Boring Number MW-6	
Boring Location Description E of country rd., N of RR, 1/2 mi S of substation				Boring Location NW1/4, NW1/4, NW1/4, SW1/4, Sec. 31, T8N, R15E		Page 1 of 2	
Ground Surface Elevation 913.6 ft above NGVD (surv.)		Top of Well Casing Elevation 916.36 ft above NGVD (surv.)		Boring Location Coordinates 535.9 North 6824.0 East		Total Footage 17.0 ft.	
Drilling Method (s) 6 1/4" ID HSA		Borehole Size 8	Overburden Footage 17.0 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 03/15/95		Date Completed 03/15/95		Field Observer (s) Carmelo Blazekovic			

Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
1	SILT, dark grey, loose, moist, non-plastic with roots.	ML			1			Start drilling at 9:30 am. HSA = Hollow Stem Auger. NGVD = National Geodetic Vertical Datum Auger cuttings wet at 9 feet (free water).
2					2			
3	SILTY SAND, light brownish grey, fine grained, well graded, moist, medium density.				3			
4					4			
5					5			
6		SM	4/8/5/7	1.6'/2.0'	6	SS-1		
7					7			
8					8			
9	SAND, medium brownish grey, fine grained, well graded, medium to loose, wet, with some silt.				9			
10					10			
11					11	SS-2		
12					12			
13		SW	3/3/8/13	1.9'/2.0'	13			
14					14			

SCS ENGINEERS
Kansas City, Missouri

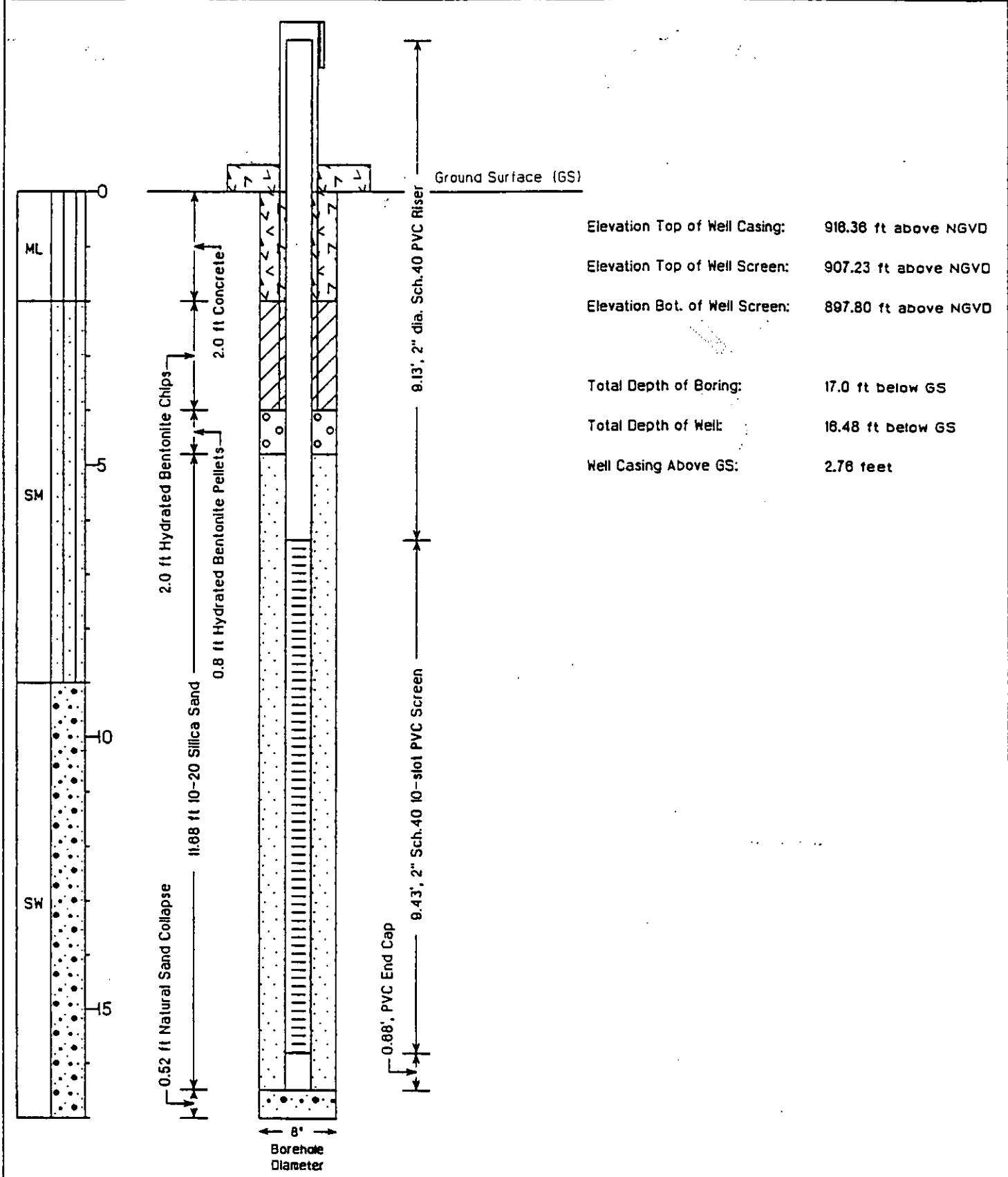
Drilling Log, continued

Project Name Omaha Public Power District - Nebraska City, Nebraska				Project No. 08 94037.01		Boring Number MW-6		
Boring Location Description E of country rd., N of RR. 1/2 mi S of substation			Boring Location T8N1/4, NW1/4, NW1/4, SW1/4 Sec. 31, T8N, R15E			Page 2 of 2		
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
15	SAND, medium brownish grey, fine grained, well graded, medium to loose, wet, with some silt.	SW			15			Advanced augers to 17.0'.
16	SAND, light grey, medium grained, well graded, medium density, wet; mostly quartz and rock grains with some pebble-size, oval shaped, rounded rock grains.		4/6/8/13	2.0'/2.0'	16	SS-3		Pulled augers and installed PVC plug. There was 3.5' of sand in the hollow stem of the augers ("heaving sand").
17					17			
18	TOTAL DEPTH = 17.0 Feet				18			Borehole open to 6.0'.
19					19			Monitoring well installed at 11:00 am.
20					20			
21					21			
22					22			
23					23			
24					24			
25					25			
26					26			
27					27			
28					28			
29					29			
30					30			
31					31			

SCS ENGINEERS
Kansas City, Missouri

MONITORING WELL CONSTRUCTION RECORD

Project Name Omaha Public Power District - Nebraska City, Nebraska		Project Number 08 94037.01	Well Number MW-6
Location Description E of country rd., N of RR, 1/2 mi S of substation		Location NW1/4, NW1/4, NW1/4, SW1/4, Sec. 31, T8N, R15E	Total Depth (TOC) 19.24 feet
Ground Surface Elevation 913.6 ft above NGVD	Marker in Concrete Well Pad El.	Boring Location Coordinates 535.9 North 6824.0 East	Date Installed 3/15/95



SCS ENGINEERS
Kansas City, Missouri

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DRILLING LOG

Project Name Omaha Public Power District - Nebraska City, Nebraska					Project Number 08 94037.01		Boring Number MW-7	
Boring Location Description N of fly ash disposal area				Boring Location NE 1/4 NW 1/4 SEC 31, T0N, R1E			Page 1 of 3	
Ground Surface Elevation ft above NGVD (surv.)		Top of Well Casing Elevation 918.9 ft above NGVD (surv.)		Boring Location Coordinates 4056.8 North 6694.9 East			Total Footage 42.0 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	42.0 feet	0 feet	None	None	See Remarks	
Drilling Co. Layne, Inc, Omaha, Nebraska					Driller (s) Lyle Porter, Rick Keith			
Drilling Rig Acker Soilmax 80 Truck Mounted					Type of Sampler CONTINUOUS			
Date Started 01/20/99			Date Completed 01/20/99		Field Observer (s) JOHN BUCKLEY			

Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
1	SANDY SILT, brownish grey, loose, well graded, fine sand and silt, moist	ML			1			
2					2			
3					3			
4	SILTY SAND, brownish grey, well graded, medium density quartz and rock grains, moist.	SM			4			
5					5			
6	SAME AS ABOVE	SM			6			
7					7			
8					8			
9					9			
10	SAND, dark grey, med to fine grained, well graded, medium density, wet, mostly quartz with rock grains	SW			10			
11					11			
12					12			
13					13			
14					14			

AVGER CUTTINGS WET AT 9.0 feet

Drilling Log, continued

Project Name Omaha Public Power District - Nebraska City, Nebraska					Project No. 08 94037.01		Boring Number MW-7	
Boring Location Description N of fly ash disposal area				Boring Location NE 1/4, NW 1/4, SEC 31, T0N, R15E			Page 2 of 3	
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
15	SAME AS ABOVE				15			
16					16			
17					17			
18					18			
19					19			
20	SAME AS ABOVE				20			
21					21			
22					22			
23					23			
24					24			
25	SAND, light grey, medium to coarse grained, well graded, medium to loose, wet, quartz and rock grains with oval shaped, rounded pebble size rock grains				25			
26					26			
27					27			
28					28			
29					29			
30	SAME AS ABOVE				30			
31					31			

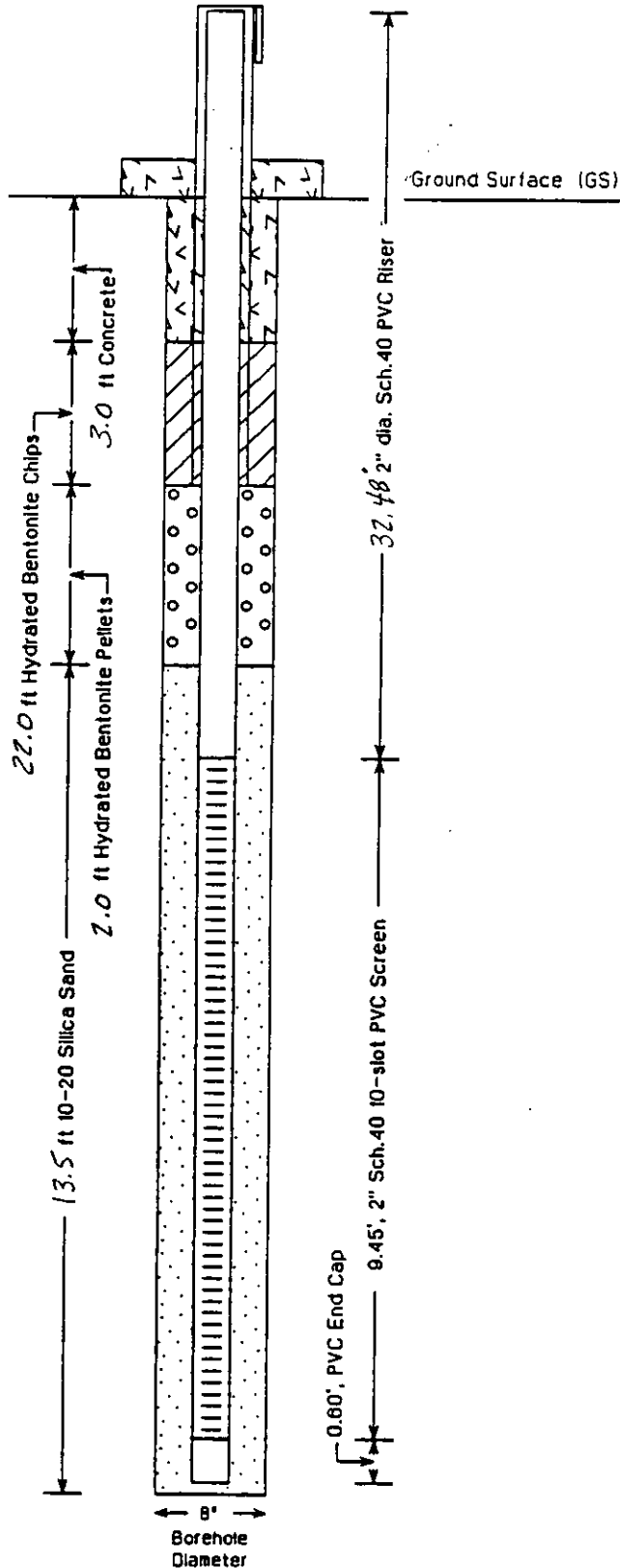
Drilling Log, continued

Project Name Omaha Public Power District - North Omaha, Nebraska	Project No. 08 94037.02	Boring Number MW-7
Boring Location Description N of fly ash disposal area	Boring Location NE 1/4, NW 1/4, SEC 31, T8N, R15E	Page 3 of 3

Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
32	SAME AS ABOVE	SW			32			
33					33			
34					34			
35					35			
36	SAME AS ABOVE	SW			36			
37					37			
38					38			
39					39			
40					40			
41	SAME AS ABOVE	SW			41			
42	BOTTOM OF BORING				42			
43					43			
44					44			
45					45			
46					46			
47					47			
48					48			

MONITORING WELL CONSTRUCTION RECORD

Project Name Omaha Public Power District - Nebraska City, Nebraska		Project Number 08 94037.01	Well Number MW-7
Location Description N of fly ash disposal area		Location NE 1/4, NW 1/4, SEC 31, T8N, R15E	Total Depth (TOC) 42.53 feet
Ground Surface Elevation ft above NGVD	Marker in Concrete Well Pad El.	Boring Location Coordinates 4056.8 North 6694.9 East	Date Installed 01/20/99



Elevation Top of Well Casing: 918.93 ft above NGVD
 Elevation Top of Well Screen: 886.45 ft above NGVD
 Elevation Bot. of Well Screen: 877.0 ft above NGVD
 Total Depth of Boring: 42.0 ft below GS
 Total Depth of Well: 40.5 ft below GS
 Well Casing Above GS: 2.03 feet

STATE OF NEBRASKA
DEPARTMENT OF WATER RESOURCES
WATER WELL REGISTRATION

Registration Date 7-1-99 Sequence No. 118729 Registration No. G-10111A
 Owner Code No. 40226 Receipt No. 102038 Nemaha NRD
 + 102039

1. Well Owner Omaha Public Power District Telephone Number (402) 636-2304
 Address 444 South 16th Street Mail
 City Omaha State NE Zip Code 68102 + 2247

2. Drilling Firm Layne-Western Company Telephone Number (402) 359-2042
 Address 25450 Highway 275, P.O. Box 597 Contractor's License No. 39266
 City Valley State NE Zip Code 68064 + 0597

3. Permit Number(s) _____

4. Purpose of well(indicate one): Dewatering (over 90 days) Domestic Geothermal Ground Heat Exchanger
 Ground Water Source Heat Pump Industrial Injection Irrigation Livestock Monitoring
 Observation Public Water Supply (with spacing (40-638)) Public Water Supply (without spacing) Recovery Aquaculture
 Other _____ (Indicate use)

5. Replacement and abandoned well information.
 A. Is this well a replacement well? Yes No
 B. Registration number of abandoned well: _____
 C. Replacement well is _____ feet from abandoned well.
 D. Abandoned well last operated _____, 19____
 E. Original well pump column size: _____ inches.
 F. Completion of original well abandonment on _____, 19____
 G. Location of water use of abandoned well: _____

6. A. Well location: NE 1/4 of the NW 1/4 of Section 31, Township 8, North, Range 15 (East) West, Otoe County.
 B. The well is 550 feet from the (North or South) section line and 1950 feet from the (East or West) section line
 C. Street address or block, lot and subdivision, if applicable: Omaha Public Power District
Nebraska City Station
 D. Location of water use, if applicable (give legal descriptions): N/A
 E. If for irrigation, the land to be irrigated is N/A acres.
 F. Well reference letter(s), if applicable: Monitoring Well 1

7. Pump Information.
 Is pump installed at this time? Yes No
 If Yes, complete items A through F.
 If No, complete items A and D with estimated information for those wells in which pump will be installed.
 A. Actual pumping rate, if applicable: _____ gallons per minute. Measured Estimated
 B. Pump column diameter: _____ inches. C. Length of pump column: _____ feet
 D. Pumping equipment installed: _____, 19____ E. Brand/Type: _____
 F. Pump installed by: Contractor Owner Pump Installer License No. _____

G-10111A

8. Well Construction Information.

- A. Total well depth: 40 feet. B. Static water level: 9 feet. C. Pumping water level: _____ feet.
 Estimated or Measured
- D. Well Construction began: 20-Jan, 1999 E. Well Construction completed: 20-Jan 1999
- F. Bore hole diameter: 8 inches.
- G. Plain casing: Diameter 2.1 ID 2.4 OD inches. Type of Material: PVC
 Wall thickness: 0.15 inches. Joints--Welded/Glued/Threaded/Other.
 Length(s) and placement(s) depth from 0' to 30 feet. _____ feet to 0 feet.
- H. Screen: 2.1 ID 2.4 OD inches. Type of Material: PVC
 Screen openings (slot size): 0.010" Trade Name: Monoflex Guides at _____ feet.
 Length(s) and placement(s) depth from 30 ft. to 40 feet from _____ feet to _____ feet.
- I. Gravel pack interval(s) from 26 feet to 40 feet. _____ feet to _____ feet. Gravel size: 20-40
- J. Grouted/Sealed from 0 feet to 4 feet with Cement Grout
 _____ (type)
 from 4 feet to 26 feet with Bentonite grout
 _____ (type)
- K. Drilling method: Hollow Stem L. Drilling fluid: None
- M. Well development technique (total time and method): Surge, bail, pump --1 hours
- N. Will chemicals, fertilizer or antifreeze be injected or utilized in the system? Yes No
 If yes, what will be used: _____

9. Geologic Materials Logged

Depth in Feet		DESCRIPTION	Depth in Feet		DESCRIPTION
From	To		From	To	
0	5	Topsoil			
5	10	Clay -- brown			
10	25	Fine Sand			
25	30	Fine Sand with gravel			
30	40	Fine Sand with medium gravel			

(Additional sheets may be submitted)

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

T. G. Conell
Water well Contractor's Signature

3-1-99
Date

James A. Anderson
Water Well Owner's Signature

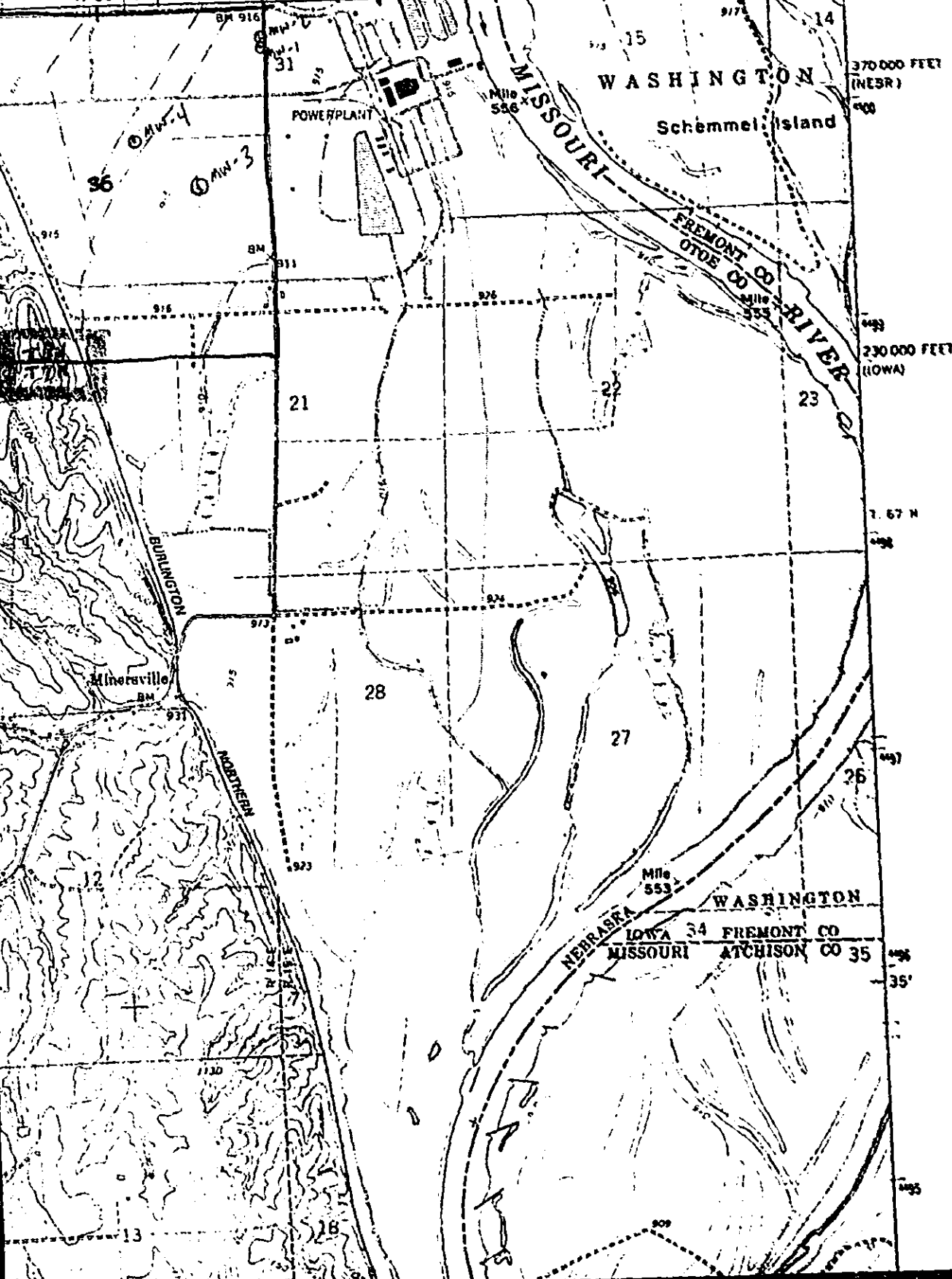
6-1-99
Date

G-10111A-D

JULIAN QUADRANGLE
NEBRASKA-MISSOURI-IOWA
7.5 MINUTE SERIES (TOPOGRAPHIC)

800 R 800
(FROM NET)

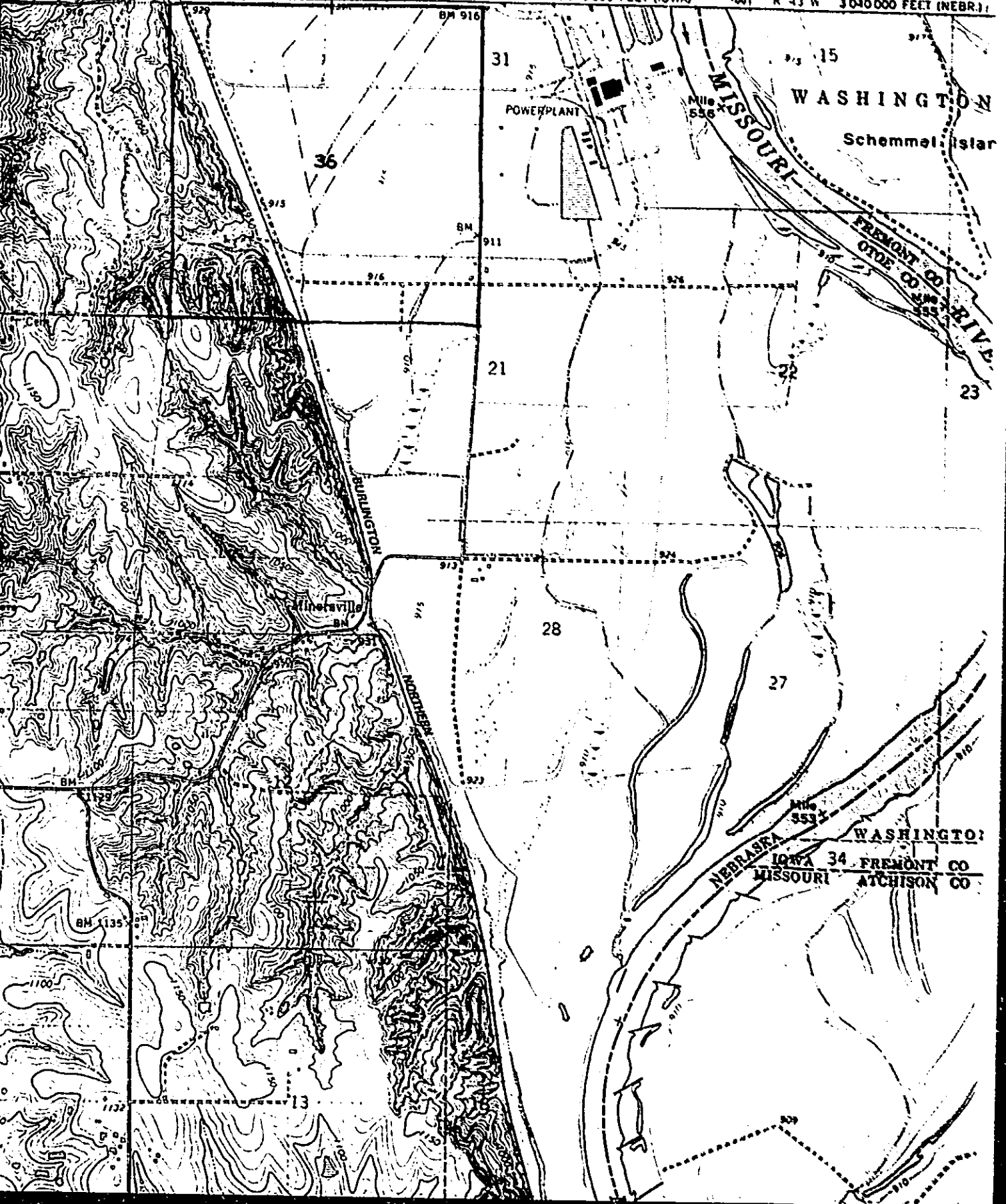
47°30' 764 R 14 E R 15 E 1370 000 FEET (IOWA) 756 R 43 W 3040 000 FEET (NEBR.) 95°45' 140°37'30"



G-10111A-D

JULIAN QUADRANGLE
NEBRASKA-MISSOURI-IOWA
7.5 MINUTE SERIES (TOPOGRAPH)

763 47°30' 764 R 14 E R 15 E 12370000 FEET (IOWA) 7661 R 13 W 3040000 FEET (NEBR.)



STATE OF NEBRASKA

G-10111A-D



DEPARTMENT OF WATER RESOURCES
Roger K. Patterson
Director

Mike Johanns
Governor

June 10, 1999

IN REPLY REFER TO:

Omaha Public Power District
444 South 16th St. Mall
Omaha, NE 68102-2247

LOCATION OF THE WELLS:

Otoe County

The following items were submitted to register the four wells but are being returned to you:

- Water Well Registration Forms
- \$120.00 Fee (State Auditors require that checks be returned for all unregistered wells.)
- Quadrangle map

The four wells have not been registered for the following reasons:

- The Water Well Registration form is incomplete. Please complete items 6A and 6B.
- Township 67 is not in Nebraska. The wells are either in Township 7 North or Township 8 North.
- Please mark the location of the wells on the map.
- The fee should be \$240.00. Please refer to the enclosed instruction sheet.

Please resubmit the enclosures along with the items requested by July 12, 1999. As required by law, we are obligated to inform you that failure to register the well is a Class IV misdemeanor. If not promptly resolved, matters involving unregistered wells may be sent to the county attorney for possible prosecution. If you have any questions, please call me.

Sincerely,

A handwritten signature in cursive script that reads "Stacey Evans".

Stacey Evans
Accounting Clerk, Ground Water
(402) 471-4084

pjb



Omaha Public Power District
444 South 16th Street Hall
Omaha, Nebraska 68102-2247

G-10111A-D

June 29, 1999
99-EA-143

State of Nebraska
Department of Water Resources
P.O. Box 94676
Lincoln, NE 68509-4676

Please find enclosed Water Well Registration forms for four groundwater monitoring wells installed at our Nebraska City Station. Also enclosed are two checks, each for \$120 for the registration fees.

If you have any questions regarding the enclosed material, please contact John Buckley at (402)636-2318 or me directly at (402)636-2313.

Sincerely,

A handwritten signature in cursive script that reads "D. C. Hutchens".

D. C. Hutchens
Manager - Environmental Affairs
Environmental & Governmental Affairs

JEB:dn

Encl.

WATER WELL REGISTRATION CORRECTION
FOR DEPARTMENT USE ONLY

Registration Number G-101111A
Sequence Number 118729
Correction Date September 13, 1999
Person Processing Correction Wendy Evans

Information regarding the water well referenced above has been changed in the Department's water well registration records. Please note the following changes and the reason changes were made:

Well Location (Item 6A) and Footage (Item 6B): According to the marking on the quadrangle map, the well is estimated to be located in Range 14E, Section 36 in the NE¼ of the NE¼, 475 feet from the North section line, and 10 feet from the East section line (475S 10W).

This correction has modified section(s) 6A and 6B of DWR Registration Form #145. If these changes are inaccurate, please contact the Department of Water Resources at P.O. Box 94676, Lincoln, NE, 68509-4676. Phone (402)471-3458.

I certify that this Correction Form has been forwarded to the owner of the referenced water well and is now a part of the registration records.

Wendy Evans
Department of Water Resources

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DRILLING LOG

Project Name Omaha Public Power District - Nebraska City, Nebraska					Project Number 08 94037.01		Boring Number MW-8	
Boring Location Description N of fly ash disposal area				Boring Location NE 1/4, NW 1/4, SEC 31, T8N, R15E			Page 1 of 2	
Ground Surface Elevation 916.8 ft above NGVD (surv.)		Top of Well Casing Elevation 919.3 ft above NGVD (surv.)		Boring Location Coordinates 4064.5 North 6695.7 East			Total Footage 22.0 ft.	
Drilling Method (s) 6 1/4" ID HSA		Borehole Size 8	Overburden Footage 22.0 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 CONTINUOUS			
Date Started 01/21/99			Date Completed 01/21/99		Field Observer (s) JOHN BUCKLEY			

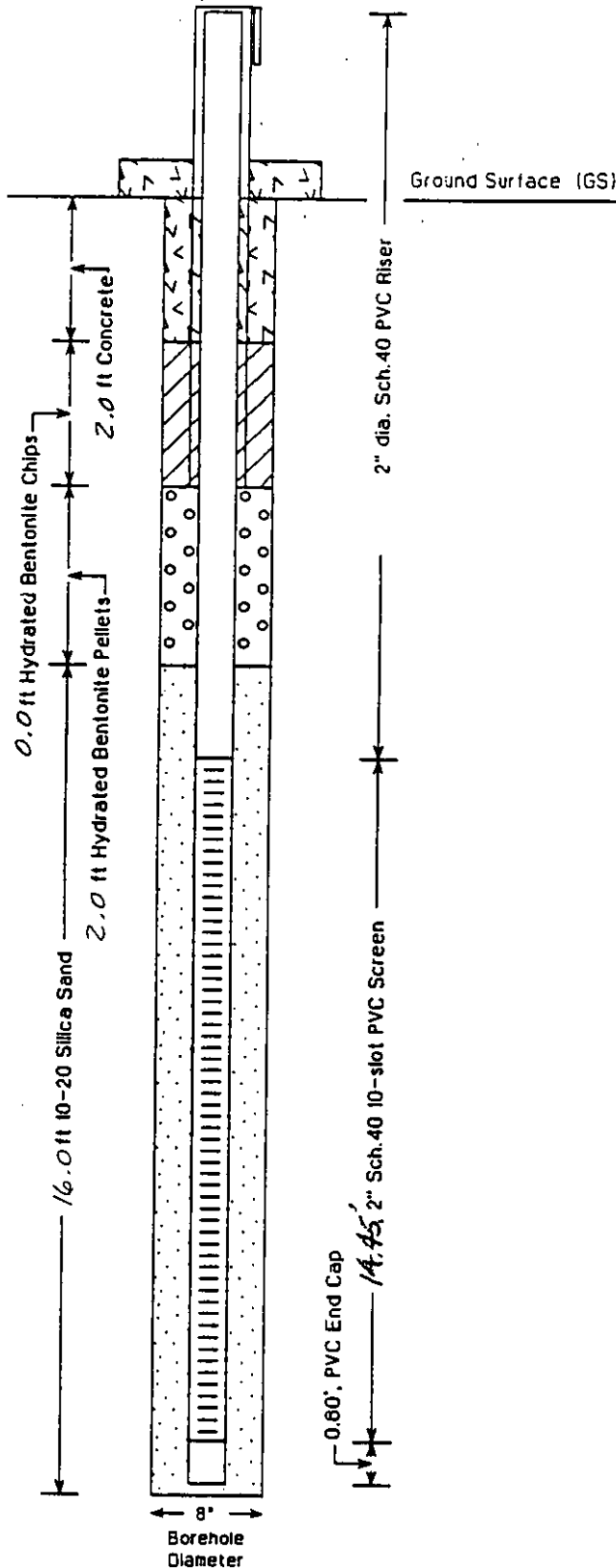
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
1	SANDY SILT, brownish grey, loose, well graded, fine sand and silt, moist	ML			1			
2								
3								
4	SILTY SAND, brownish grey, well graded, medium density quartz & rock grains	SM			4			
5								
6	SAME AS ABOVE	SM			6			
7								
8								
9								
10	SAND, dark grey, med. to fine grained, well graded, medium density, wet, mostly quartz with rock grains.	SW			10			AUGER CUTTINGS WET AT 9.0 feet
11								
12								
13								
14								

Drilling Log, continued

Project Name Omaha Public Power District - Nebraska City, Nebraska					Project No. 08 94037.01		Boring Number MW - 8	
Boring Location Description N of fly ash disposal area				Boring Location NE 1/4, NW 1/4, SEC 31, T8N, R15E			Page 2 of 2	
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
15	SAME AS ABOVE	SW			15			
16					16			
17					17			
18					18			
19					19			
20					20			
21	SAME AS ABOVE	SW			21			
22					22			
23	BOTTOM OF BORING				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 - Nebraska City, Nebraska		Project Number 08 94037.01	Well Number MW-8
Location Description N of fly ash disposal area		Location NE 1/4, NW 1/4, SEC 31, T8N, R15E	Total Depth (TOC) 22.46 feet
Ground Surface Elevation ft above NGVD	Marker in Concrete Well Pad El.	Boring Location Coordinates 4064.5 North 6695.7 East	Date Installed 01/21/99



Elevation Top of Well Casing:	919.26	ft above NGVD
Elevation Top of Well Screen:	911.85	ft above NGVD
Elevation Bot. of Well Screen:	877.40	ft above NGVD
Total Depth of Boring:	22.0	ft below GS
Total Depth of Well:	20.0	ft below GS
Well Casing Above GS:	2.46	feet

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STATE OF NEBRASKA
DEPARTMENT OF WATER RESOURCES
WATER WELL REGISTRATION

Registration Date 7-1-99 Sequence No. 118730 Registration No. G-10111B
 Owner Code No. 40226 Receipt No. 02038 Nemaha NRD
102039

1. Well Owner Omaha Public Power District Telephone Number (402) 636-2304
 Address 444 South 16th Street Mall
 City Omaha State NE Zip Code 68102 + 2247

2. Drilling Firm Layne-Western Company Telephone Number (402) 359-2042
 Address 25450 Highway 275, P.O. Box 597 Contractor's License No. 39268
 City Valley State NE Zip Code 68064 + 0597

3. Permit Number(s) _____

4. Purpose of well(indicate one): Dewatering (over 90 days) Domestic Geothermal Ground Heat Exchanger
 Ground Water Source Heat Pump Industrial Injection Irrigation Livestock Monitoring
 Observation Public Water Supply (with spacing (48-538)) Public Water Supply (without spacing) Recovery Aquaculture
 Other _____ (indicate use)

5. Replacement and abandoned well information.
 A. Is this well a replacement well? Yes No
 B. Registration number of abandoned well: _____
 C. Replacement well is _____ feet from abandoned well.
 D. Abandoned well last operated _____, 19____
 E. Original well pump column size: _____ inches.
 F. Completion of original well abandonment on _____, 19____
 G. Location of water use of abandoned well: _____

6. A. Well location: NE 1/4 of the NW 1/4 of Section 31, Township 8 North, Range 15 East, Cole County.
 B. The well is 545 feet from the (North or South) section line and 1950 feet from the (East or West) section line.
 C. Street address or block, lot and subdivision, if applicable: Omaha Public Power District
Nebraska City Station
 D. Location of water use, if applicable (give legal descriptions): N/A
 E. If for irrigation, the land to be irrigated is N/A acres.
 F. Well reference letter(s), if applicable: Monitoring Well 2

7. Pump Information.
 Is pump installed at this time? Yes No
 If Yes, complete items A through F.
 If No, complete items A and D with estimated information for those wells in which pump will be installed.
 A. Actual pumping rate, if applicable: _____ gallons per minute. Measured Estimated
 B. Pump column diameter: _____ inches. C. Length of pump column: _____ feet
 D. Pumping equipment installed: _____, 19____ E. Brand/Type: _____
 F. Pump installed by: Contractor Owner Pump Installer License No. _____

G-10111B

8. Well Construction Information.

- A. Total well depth: 20 feet. B. Static water level: 9 feet. C. Pumping water level: _____ feet.
 Estimated or Measured
- D. Well Construction began: 21-Jan, 1999 E. Well Construction completed: 21-Jan 1999
- F. Bore hole diameter: 8 inches.
- G. Plain casing: Diameter 2.1 ID 2.4 OD inches. Type of Material: PVC
 Wall thickness: 0.15 inches. Joints--Welded/Glued/Threaded/Other: _____
 Length(s) and placement(s) depth from 0' to 5 feet. _____ feet to 0 feet.
- H. Screen: 2.1 ID 2.4 OD inches. Type of Material: PVC
 Screen openings (slot size): 0.010" Trade Name: Monoflex Guides at _____ feet.
 Length(s) and placement(s) depth from 15 ft. to 20 feet from _____ feet to _____ feet.
- I. Gravel pack interval(s) from 4 feet to 20 feet. _____ feet to _____ feet. Grade size: 20-40
- J. Grouted/Sealed from 0 feet to 3 feet with Cement Grout
 (type)
 from 3 feet to 4 feet with Bentonite
 (type)
- K. Drilling method: Hollow Stem Auger L. Drilling fluid: None
- M. Well development technique (total time and method): Surge, bail, pump -- 1 hours
- N. Will chemicals, fertilizer or antifreeze be injected or utilized in the system? Yes No
 If yes, what will be used: _____

9. Geologic Materials Logged

Depth in Feet		DESCRIPTION	Depth in Feet		DESCRIPTION
From	To		From	To	
0	5	Topsoil			
5	10	Clay -- brown			
10	20	Fine Sand			

(Additional sheets may be submitted)

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

[Signature]
Water well Contractor's Signature

3-1-99
Date

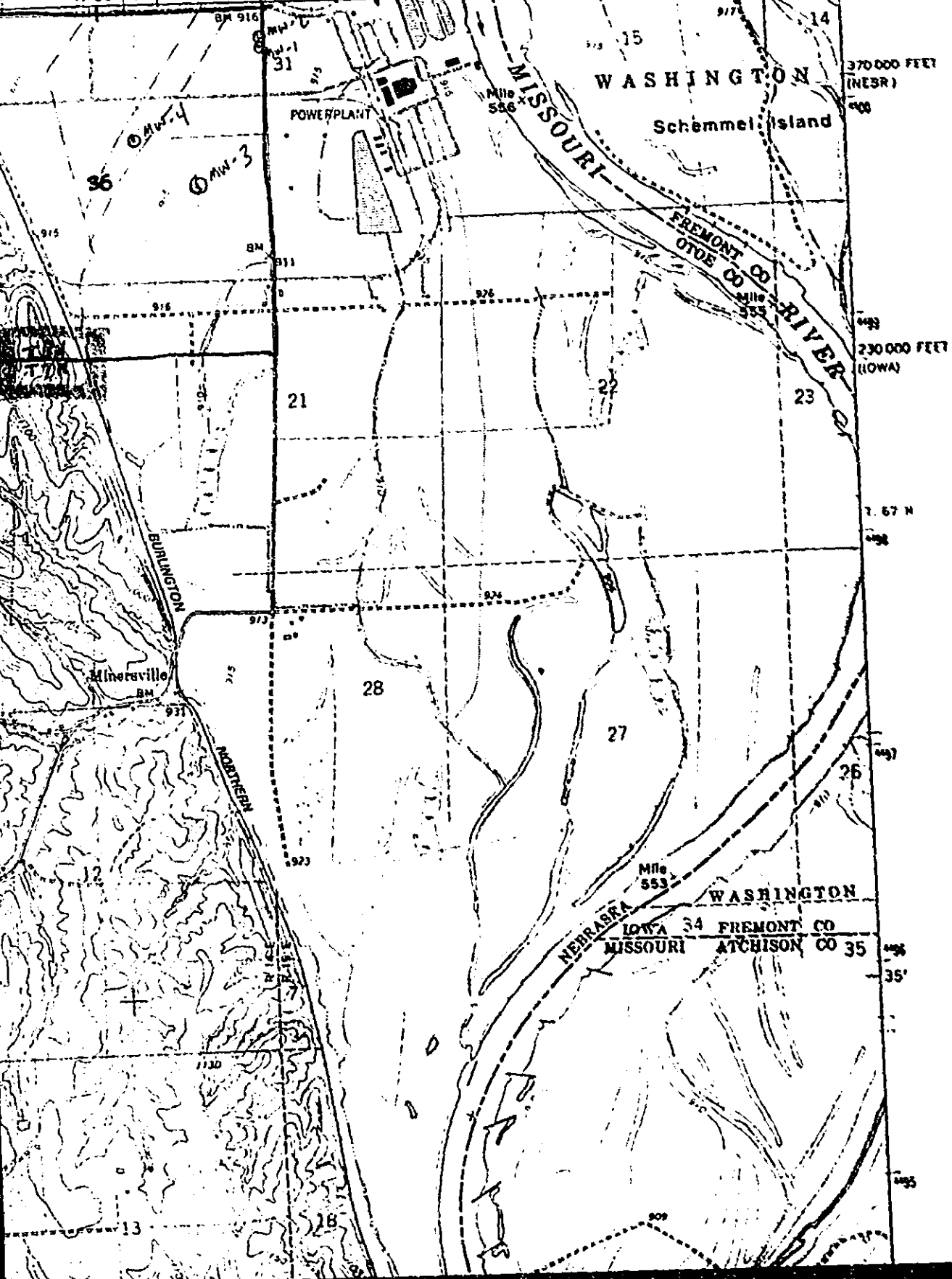
[Signature] 6-1-99
Water Well Owner's Signature Date

G-10111A-D

JULIAN QUADRANGLE
NEBRASKA-MISSOURI-IOWA
7.5 MINUTE SERIES (TOPOGRAPHIC)

800 H 500
(FROUNT)

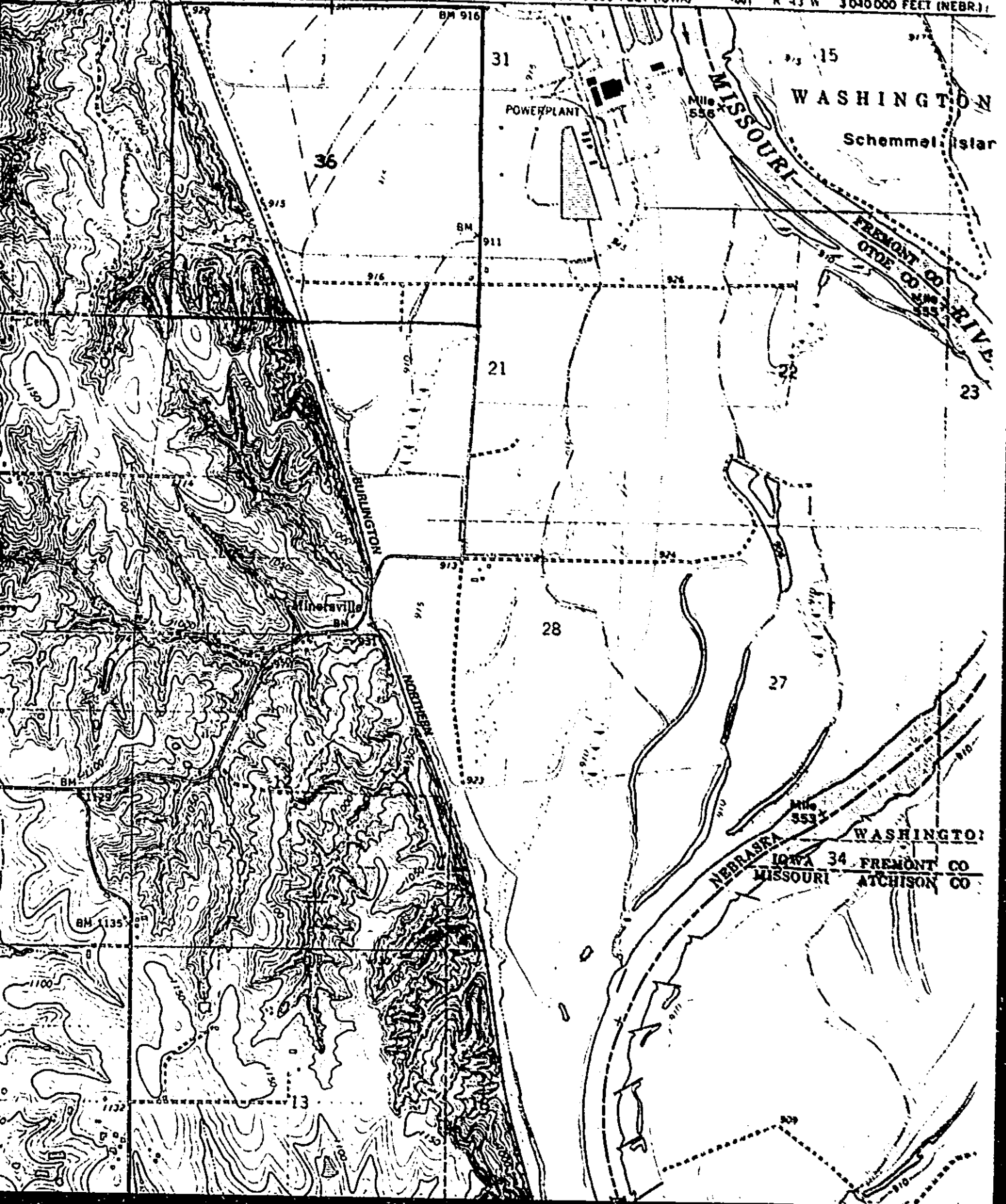
47°30' 764 R 14 E R 15 E 1370 000 FEET (IOWA) 756 R 43 W 3040 000 FEET (NEBR.) 95°45' 140°37'30"



G-10111A-D

JULIAN QUADRANGLE
NEBRASKA-MISSOURI-IOWA
7.5 MINUTE SERIES (TOPOGRAPH)

763 47°30' 764 R 14 E R 15 E 12370000 FEET (IOWA) 7661 R 13 W 3040000 FEET (NEBR.)



STATE OF NEBRASKA

G-10111A-D



DEPARTMENT OF WATER RESOURCES
Roger K. Patterson
Director

Mike Johanns
Governor

June 10, 1999

IN REPLY REFER TO:

Omaha Public Power District
444 South 16th St. Mall
Omaha, NE 68102-2247

LOCATION OF THE WELLS:

Otoe County

The following items were submitted to register the four wells but are being returned to you:

- Water Well Registration Forms
- \$120.00 Fee (State Auditors require that checks be returned for all unregistered wells.)
- Quadrangle map

The four wells have not been registered for the following reasons:

- The Water Well Registration form is incomplete. Please complete items 6A and 6B.
- Township 67 is not in Nebraska. The wells are either in Township 7 North or Township 8 North.
- Please mark the location of the wells on the map.
- The fee should be \$240.00. Please refer to the enclosed instruction sheet.

Please resubmit the enclosures along with the items requested by July 12, 1999. As required by law, we are obligated to inform you that failure to register the well is a Class IV misdemeanor. If not promptly resolved, matters involving unregistered wells may be sent to the county attorney for possible prosecution. If you have any questions, please call me.

Sincerely,

A handwritten signature in cursive script that reads "Stacey Evans".

Stacey Evans
Accounting Clerk, Ground Water
(402) 471-4084

pjb



Omaha Public Power District
444 South 16th Street Hall
Omaha, Nebraska 68102-2247

G-10111A-D

June 29, 1999
99-EA-143

State of Nebraska
Department of Water Resources
P.O. Box 94676
Lincoln, NE 68509-4676

Please find enclosed Water Well Registration forms for four groundwater monitoring wells installed at our Nebraska City Station. Also enclosed are two checks, each for \$120 for the registration fees.

If you have any questions regarding the enclosed material, please contact John Buckley at (402)636-2318 or me directly at (402)636-2313.

Sincerely,

A handwritten signature in cursive script that reads "D. C. Hutchens".

D. C. Hutchens
Manager - Environmental Affairs
Environmental & Governmental Affairs

JEB:dn

Encl.

WATER WELL REGISTRATION CORRECTION
FOR DEPARTMENT USE ONLY

Registration Number G-101111B
Sequence Number 118730
Correction Date September 13, 1999
Person Processing Correction Wendy Evans

Information regarding the water well referenced above has been changed in the Department's water well registration records. Please note the following changes and the reason changes were made:

Well Location (Item 6A) and Footage (Item 6B): According to the marking on the quadrangle map, the well is estimated to be located in Range 14E, Section 36 in the NE¼ of the NE¼, 600 feet from the North section line, and 10 feet from the East section line (600S 10W).

Casing Length & Placement Depth (Item 8G): Based on the total well depth and the length and placement depth of the screen, the length and placement depth of the casing is estimated to be 0 feet to 15 feet.

This correction has modified section(s) 6A, 6B and 8G of DWR Registration Form #145. If these changes are inaccurate, please contact the Department of Water Resources at P.O. Box 94676, Lincoln, NE, 68509-4676. Phone (402)471-3458.

I certify that this Correction Form has been forwarded to the owner of the referenced water well and is now a part of the registration records.

Wendy Evans
Department of Water Resources

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DRILLING LOG

Project Name Omaha Public Power District - Nebraska City, Nebraska				Project Number 08 94037.01		Boring Number MW-9	
Boring Location Description S of fly ash disposal area			Boring Location NW 1/4 SW 1/4 SEC 31 T8N R15E			Page 1 of 2	
Ground Surface Elevation 917.1 ft above NGVD (surv.)		Top of Well Casing Elevation 919.6 ft above NGVD (surv.)		Boring Location Coordinates 2074.6 North 5584.8 East		Total Footage 22.0	
Drilling Method (s) 6 1/4" ID HSA		Borehole Size 8	Overburden Footage 22.0 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 CONTINUOUS			
Date Started 01/21/99		Date Completed 01/21/99		Field Observer (s) JOHN BUCKLEY			

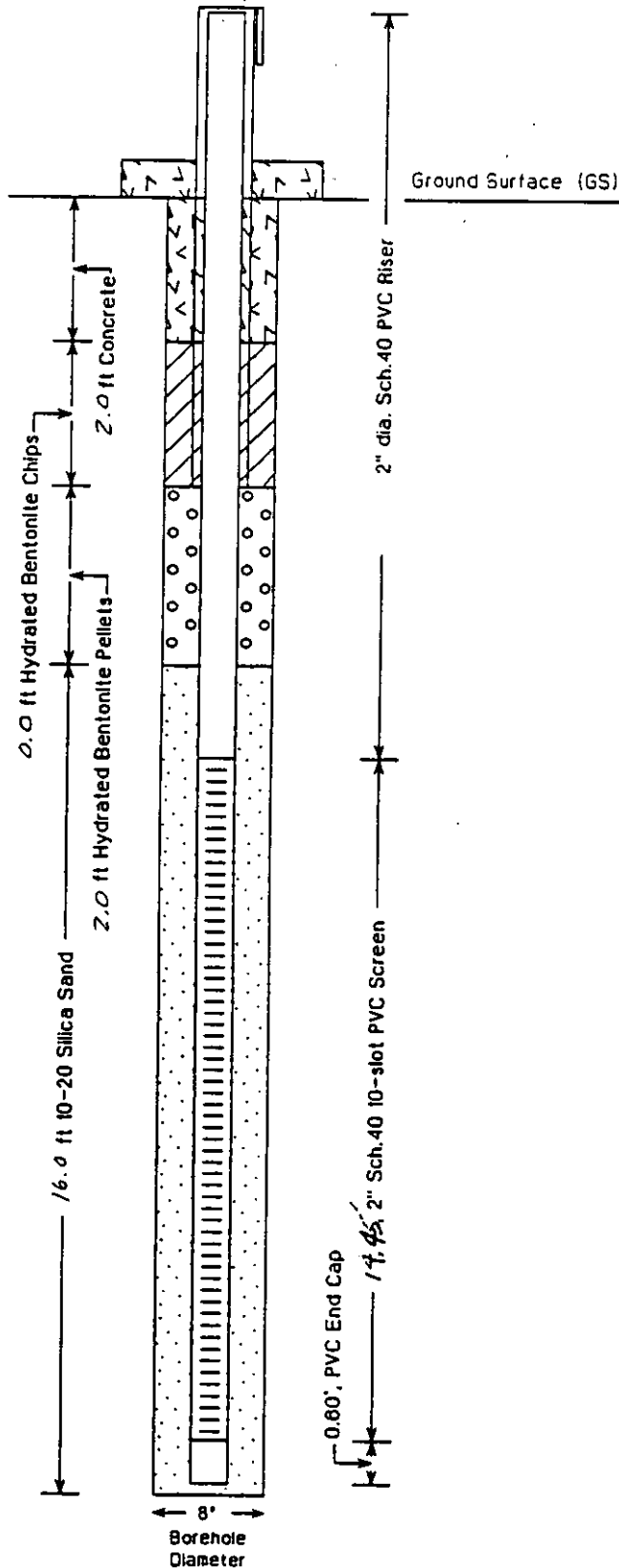
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
1	SILTY SAND, brownish grey, loose, moist, well graded, quartz and rock grains with little clay.	SM			1			
2			2					
3			3					
4			4					
5			5					
6	SAND, light brownish grey, medium to fine grained, well graded, loose, moist, mostly quartz and rock grains (salt and pepper appearance)	SW			6			
7			7					
8			8					
9			9				AUGER CUTTINGS WET AT 9.0 feet	
10	SAME AS ABOVE	SW			10			
11			11					
12			12					
13			13					
14					14			

Drilling Log, continued

Project Name Omaha Public Power District - Nebraska City, Nebraska					Project No. 08 94037.01		Boring Number MW-9	
Boring Location Description S of fly ash disposal area				Boring Location NW 1/4, SW 1/4, SEC 31 T8N R15E			Page 2 of 2	
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
15	SAME AS ABOVE	SW			15			
16	SAND, light brownish grey, medium grained, well graded, medium density, wet. with some fine grained quartz sand and trace oval shaped rock pebbles.	SW			16			
17					17			
18					18			
19					19			
20					20			
21					21			
22	BOTTOM OF BORING				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 - Nebraska City, Nebraska		Project Number 08 94037.01	Well Number MW-9
Location Description S of fly. ash disposal area		Location NW 1/4, SW 1/4, SEC 31, T8N, R15E	Total Depth (TOC) 22.53 feet
Ground Surface Elevation 917.1 ft above NGVD	Marker in Concrete well Pad El.	Boring Location Coordinates 2074.6 North 5584.8 East	Date Installed 01/21/99



Elevation Top of Well Casing:	919.63 ft above NGVD
Elevation Top of Well Screen:	912.15 ft above NGVD
Elevation Bot. of Well Screen:	897.10 ft above NGVD
Total Depth of Boring:	22.0 ft below GS
Total Depth of Well:	20.0 ft below GS
Well Casing Above GS:	2.53 feet

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STATE OF NEBRASKA
DEPARTMENT OF WATER RESOURCES
WATER WELL REGISTRATION

Registration Date	<u>7-1-99</u>	Sequence No.	<u>118731</u>	Registration No.	<u>G-10111C</u>
Owner Code No.	<u>40226</u>	Receipt No.	<u>102038</u>	<u>Nemaha</u> NRD	
			<u>4 102039</u>		

1. Well Owner Omaha Public Power District Telephone Number (402) 636-2304
 Address 444 South 16th Street Mall
 City Omaha State NE Zip Code 68102 + 2247

2. Drilling Firm Layne-Western Company Telephone Number (402) 359-2042
 Address 25450 Highway 275, P.O. Box 597 Contractor's License No. 39268
 City Valley State NE Zip Code 68064 + 0597

3. Permit Number(s) _____

4. Purpose of well (indicate one): Dewatering (over 90 days) Domestic Geothermal Ground Heat Exchanger
 Ground Water Source Heat Pump Industrial Injection Irrigation Livestock Monitoring
 Observation Public Water Supply (with spacing (40-635)) Public Water Supply (without spacing) Recovery Aquaculture
 Other _____ (indicate use)

5. Replacement and abandoned well information.
 A. Is this well a replacement well? Yes No
 B. Registration number of abandoned well: _____
 C. Replacement well is _____ feet from abandoned well.
 D. Abandoned well last operated _____, 19____
 E. Original well pump column size: _____ inches.
 F. Completion of original well abandonment on _____, 19____
 G. Location of water use of abandoned well: _____

6. A. Well location: SW 1/4 of the SW 1/4 of Section 31, Township 8 North, Range 15 East, Otoe County.
 B. The well is 2,100 feet from the (North or South) section line and 850 feet from the (East or West) section line.
 C. Street address or block, lot and subdivision, if applicable: Omaha Public Power District
Nebraska City Station
 D. Location of water use, if applicable (give legal descriptions): N/A
 E. If for irrigation, the land to be irrigated is _____ acres.
 F. Well reference letter(s), if applicable: Monitoring Well 3

7. Pump Information.
 Is pump installed at this time? Yes No
 If Yes, complete items A through F.
 If No, complete items A and D with estimated information for those wells in which pump will be installed.
 A. Actual pumping rate, if applicable: _____ gallons per minute. Measured Estimated
 B. Pump column diameter: _____ inches. C. Length of pump column: _____ feet.
 D. Pumping equipment installed: _____, 19____ E. Brand/Type: _____
 F. Pump installed by: Contractor Owner Pump installer License No. _____

G-10111C

8. Well Construction Information.

A. Total well depth: 20 feet. B. Static water level: 9 feet. C. Pumping water level: _____ feet.
 Estimated or Measured
 D. Well Construction began: 21-Jan, 1999 E. Well Construction completed: 21-Jan 1999
 F. Bore hole diameter: 8 inches.
 G. Plain casing: Diameter 2.1 ID 2.4 OD inches. Type of Material: PVC
 Wall thickness: 0.15 inches. Joints--Welded/Glued/Threaded/Other: _____
 Length(s) and placement(s) depth from 0' to 5 feet. _____ feet to _____ feet.
 H. Screen: 2.1 ID 2.4 OD inches. Type of Material: PVC
 Screen openings (slot size): 0.010" Trade Name: Monoflex Guides at _____ feet.
 Length(s) and placement(s) depth from 15 ft. to 20 feet from _____ feet to _____ feet.
 I. Gravel pack interval(s) from 4 feet to 20 feet. _____ feet to _____ feet. Grade size: 20-40
 J. Grouted/Sealed from 0 feet to 3 feet with Cement Grout
 (type)
 from 3 feet to 4 feet with Bentonite
 (type)
 K. Drilling method: Hollow Stem Auger L. Drilling fluid: None
 M. Well development technique (total time and method): Surge, ball, pump --1 hours
 N. Will chemicals, fertilizer or antifreeze be injected or utilized in the system? Yes No
 If yes, what will be used: _____

9. Geologic Materials Logged

Depth in Feet		DESCRIPTION	Depth in Feet		DESCRIPTION
From	To		From	To	
0	5	Topsoil			
5	10	Clay -- brown			
10	20	Fine Sand			

(Additional sheets may be submitted)

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

T.B. Conard
 Water well Contractor's Signature

3-1-99
 Date

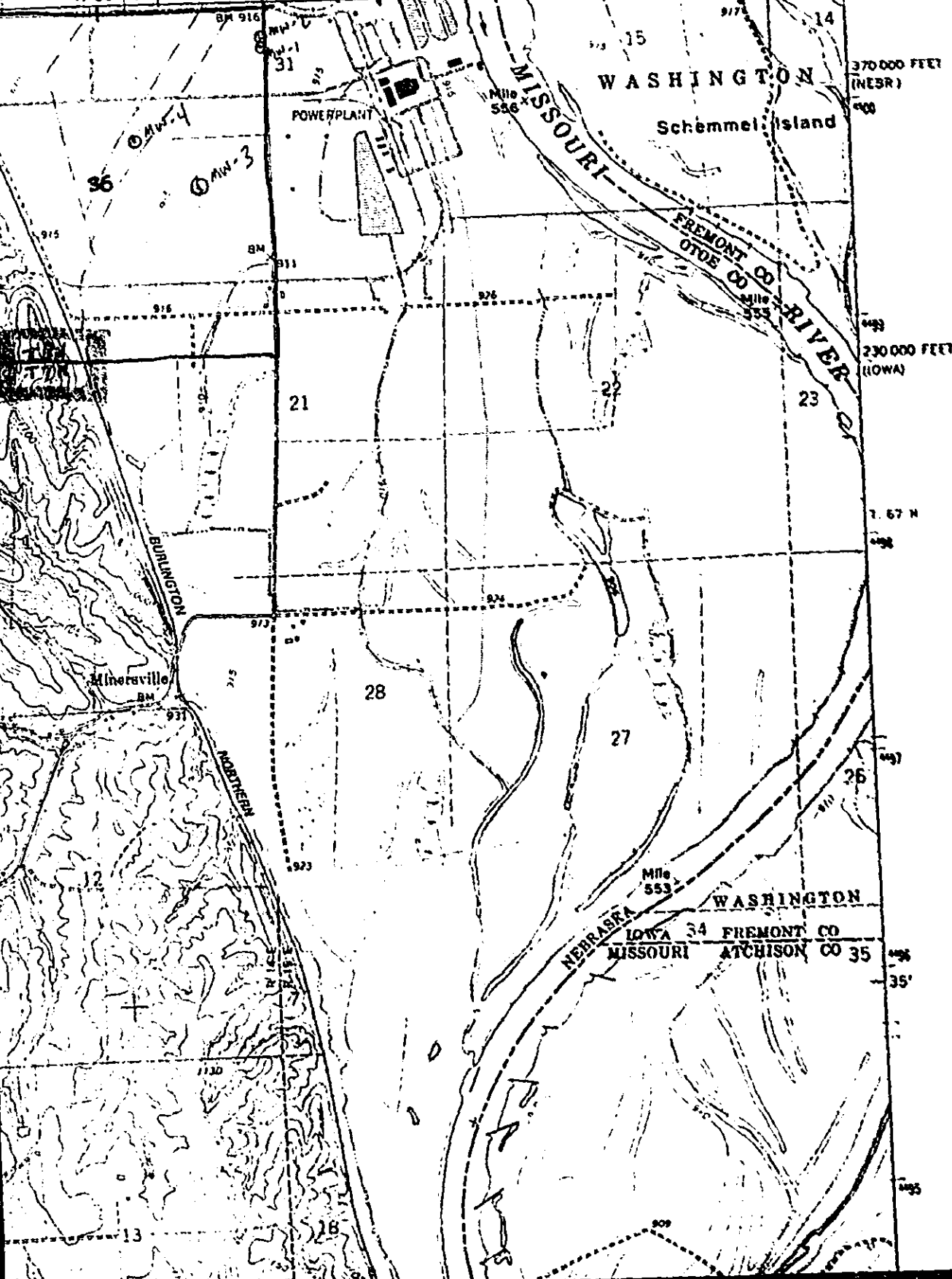
Donald H. Huber 6-1-99
 Water Well Owner's Signature Date

G-10111A-D

JULIAN QUADRANGLE
NEBRASKA-MISSOURI-IOWA
7.5 MINUTE SERIES (TOPOGRAPHIC)

5000 FT
(EQUIV)

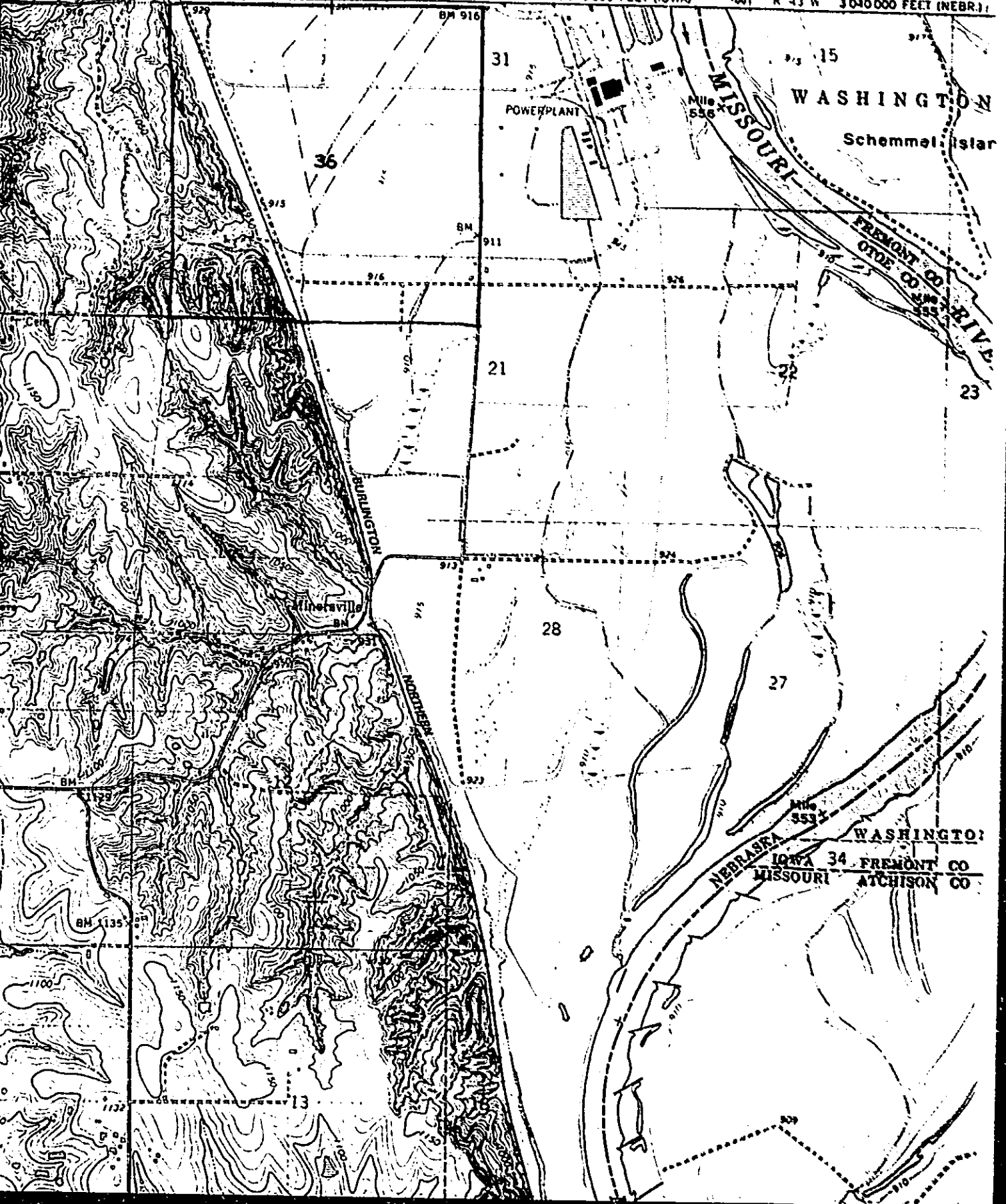
47°30' 764 R 14 E R 15 E 1370 000 FEET (IOWA) 756 R 43 W 3040 000 FEET (NEBR) 95°45' 140°37'30"



G-10111A-D

JULIAN QUADRANGLE
NEBRASKA-MISSOURI-IOWA
7.5 MINUTE SERIES (TOPOGRAPH)

763 47°30' 764 R 14 E R 15 E 12370000 FEET (IOWA) 7661 R 13 W 3040000 FEET (NEBR.)





Omaha Public Power District
444 South 16th Street Hall
Omaha, Nebraska 68102-2247

G-10111A-D

June 29, 1999
99-EA-143

State of Nebraska
Department of Water Resources
P.O. Box 94676
Lincoln, NE 68509-4676

Please find enclosed Water Well Registration forms for four groundwater monitoring wells installed at our Nebraska City Station. Also enclosed are two checks, each for \$120 for the registration fees.

If you have any questions regarding the enclosed material, please contact John Buckley at (402)636-2318 or me directly at (402)636-2313.

Sincerely,

A handwritten signature in cursive script, appearing to read "D. C. Hutchens", is written over a horizontal line.

D. C. Hutchens
Manager - Environmental Affairs
Environmental & Governmental Affairs

JEB:dn

Encl.

STATE OF NEBRASKA

G-10111A-D



DEPARTMENT OF WATER RESOURCES
Roger K. Patterson
Director

Mike Johanns
Governor

June 10, 1999

IN REPLY REFER TO:

Omaha Public Power District
444 South 16th St. Mall
Omaha, NE 68102-2247

LOCATION OF THE WELLS:

Otoe County

The following items were submitted to register the four wells but are being returned to you:

- Water Well Registration Forms
- \$120.00 Fee (State Auditors require that checks be returned for all unregistered wells.)
- Quadrangle map

The four wells have not been registered for the following reasons:

- The Water Well Registration form is incomplete. Please complete items 6A and 6B.
- Township 67 is not in Nebraska. The wells are either in Township 7 North or Township 8 North.
- Please mark the location of the wells on the map.
- The fee should be \$240.00. Please refer to the enclosed instruction sheet.

Please resubmit the enclosures along with the items requested by July 12, 1999. As required by law, we are obligated to inform you that failure to register the well is a Class IV misdemeanor. If not promptly resolved, matters involving unregistered wells may be sent to the county attorney for possible prosecution. If you have any questions, please call me.

Sincerely,

A handwritten signature in cursive script that reads "Stacey Evans".

Stacey Evans
Accounting Clerk, Ground Water
(402) 471-4084

pjb

WATER WELL REGISTRATION CORRECTION
FOR DEPARTMENT USE ONLY

Registration Number G-101111C
Sequence Number 118731
Correction Date September 13, 1999
Person Processing Correction Wendy Evans

Information regarding the water well referenced above has been changed in the Department's water well registration records. Please note the following changes and the reason changes were made:

Well Location (Item 6A) and Footage (Item 6B): According to the marking on the quadrangle map, the well is estimated to be located in Range 14E, Section 36 in the NE¼ of the SE¼, 2600 feet from the South section line, and 1100 feet from the East section line (2600N 1100W).

Casing Length & Placement Depth (Item 8G): Based on the total well depth and the length and placement depth of the screen, the length and placement depth of the casing is estimated to be 0 feet to 15 feet.

This correction has modified section(s) 6A, 6B and 8G of DWR Registration Form #145. If these changes are inaccurate, please contact the Department of Water Resources at P.O. Box 94676, Lincoln, NE, 68509-4676. Phone (402)471-3458.

I certify that this Correction Form has been forwarded to the owner of the referenced water well and is now a part of the registration records.

Wendy Evans
Department of Water Resources

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DRILLING LOG

Project Name Omaha Public Power District - Nebraska City, Nebraska					Project Number 08 94037.01		Boring Number MW-10	
Boring Location Description W of fly ash disposal area				Boring Location NE 1/4 SE 1/4 SEC 36 T8N R14E			Page 1 of 2	
Ground Surface Elevation 918.1 ft above NGVD (surv.)		Top of Well Casing Elevation 920.2 ft above NGVD (surv.)		Boring Location Coordinates 274.0 North 4773.7 East			Total Footage 22.0	
Drilling Method (s)		Borehole Size	Overburden Footage	Bedrock Footage	No. Of Samples	No. Core Boxes	Depth to Water	
6 1/4" ID HSA		8	22.0 feet	0 feet	None	None	See Remarks	
Drilling Co. Layne, Inc. Omaha, Nebraska					Driller (s) Lyle Porter, Rick Keith			
Drilling Rig Acker Soilmax 80 Truck Mounted					Type of Sampler CONTINUOUS			
Date Started 01/21/99			Date Completed 01/21/99		Field Observer (s) JOHN BUCKLEY			

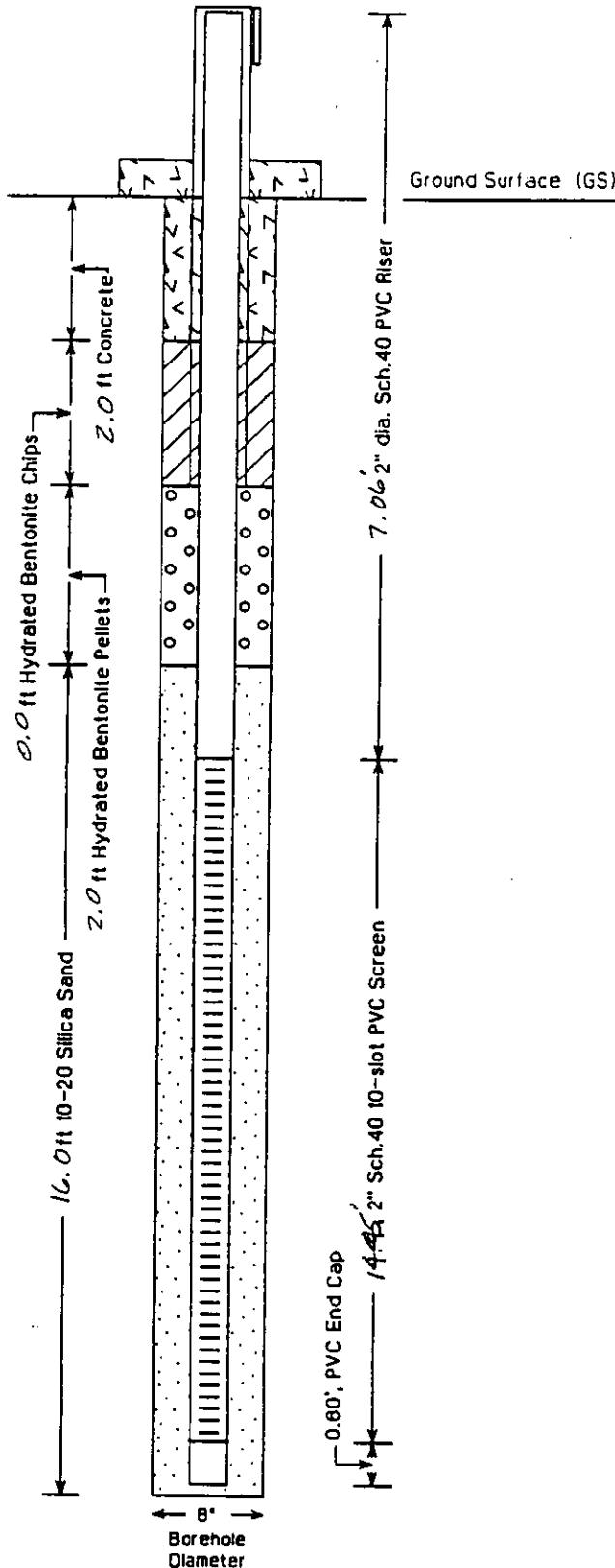
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
1	SILTY CLAY, medium grey, soft, moist, high plasticity with trace medium sand	CH			1			
2								
3								
4								
5								
6	SILTY CLAY, medium grey, soft moist, high plasticity with trace medium sand	CH			6			
7								
8	CLAYEY SAND, dark grey, fine grained, loose, well graded very moist, high plasticity	SC			8		AUGER CUTTINGS WET AT 8.5 feet	
9								
10	SILTY SAND, dark grey fine grained, well graded, loose, wet, with trace clay.	SM			10			
11								
12								
13								
14					14			

Drilling Log, continued

Project Name Omaha Public Power District - Nebraska City, Nebraska				Project No. 08 94037.01		Boring Number MW-10		
Boring Location Description W of fly ash disposal area			Boring Location NE 1/4, SE 1/4 SEC 36 T8N R14E			Page 2 of 2		
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
15	SAME AS ABOVE	SM			15			
16	SAME AS ABOVE	SM			16			
17					17			
18					18			
19	SAND, medium grey, medium grained, well graded, medium density, wet, mostly quartz and rock grains, trace silt	SW			19			
20					20			
21					21			
22	BOTTOM OF BORING				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 - Nebraska City, Nebraska		Project Number 08 94037.01	Well Number MW-10
Location Description W of fly ash disposal area		Location NE 1/4, SE 1/4 SEC 36, T8N, R14E	Total Depth (TOC) 22.0 feet
Ground Surface Elevation ft above NGVD	Marker in Concrete Well Pad EL	Boring Location Coordinates 2741.0 North 4773.7 East	Date Installed 01/21/99



920.09

Elevation Top of Well Casing: ~~920.21~~* ft above NGVD

Elevation Top of Well Screen: 913.15 ft above NGVD

Elevation Bot. of Well Screen: 898.10 ft above NGVD

Total Depth of Boring: 22.0 ft below GS

Total Depth of Well: 20.0 ft below GS

Well Casing Above GS: 2.11 feet

* removed 0.12 ft from TOC for pump installation

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STATE OF NEBRASKA
DEPARTMENT OF WATER RESOURCES
WATER WELL REGISTRATION

Registration Date 7-1-99 Sequence No. 118732 Registration No. G-101111D
 Owner Code No. 40226 Receipt No. 102038
+ 102039 Nemaha NRD

1. Well Owner Omaha Public Power District Telephone Number (402) 636-2304
 Address 444 South 16th Street Mall
 City Omaha State NE Zip Code 68102 + 2247

2. Drilling Firm Layne-Western Company Telephone Number (402) 359-2042
 Address 25450 Highway 275, P.O. Box 597 Contractor's License No. 39268
 City Valley State NE Zip Code 68064 + 0597

3. Permit Number(s) _____

4. Purpose of well(indicate one): Dewatering (over 90 days) Domestic Geothermal Ground Heat Exchanger
 Ground Water Source Heat Pump Industrial Injection Irrigation Livestock Monitoring
 Observation Public Water Supply (with spacing (48-533)) Public Water Supply (without spacing) Recovery Aquaculture
 Other _____ (Indicate use)

5. Replacement and abandoned well information.
 A. Is this well a replacement well? Yes No
 B. Registration number of abandoned well: _____
 C. Replacement well is _____ feet from abandoned well.
 D. Abandoned well last operated _____, 19____
 E. Original well pump column size: _____ inches.
 F. Completion of original well abandonment on _____, 19____
 G. Location of water use of abandoned well: _____

6. A. Well location: NE 1/4 of the 5th 1/4 of Section 36, Township 8, North, Range 15 (East/West), Otoe County.
 B. The well is 2000 feet from the (North or South) section line and 100 feet from the (East or West) section line.
 C. Street address or block, lot and subdivision, if applicable: Omaha Public Power District
Nebraska City Station
 D. Location of water use, if applicable (give legal descriptions): N/A
 E. If for irrigation, the land to be irrigated is N/A acres.
 F. Well reference letter(s), if applicable: Monitoring Well 4

7. Pump Information.
 Is pump installed at this time? Yes No
 If Yes, complete items A through F.
 If No, complete items A and D with estimated information for those wells in which pump will be installed.
 A. Actual pumping rate, if applicable: _____ gallons per minute. Measured Estimated
 B. Pump column diameter: _____ inches. C. Length of pump column: _____ feet.
 D. Pumping equipment installed: _____, 19____ E. Brand/Type: _____
 F. Pump installed by: Contractor Owner Pump Installer License No. _____

MW-10

MW-4

G-10111 D

8. Well Construction Information.

A. Total well depth: 20 feet. B. Static water level: 9 feet. C. Pumping water level: _____ feet.
 Estimated or Measured
 D. Well Construction began: 21-Jan, 1999 E. Well Construction completed: 21-Jan 1999
 F. Bore hole diameter: 8 inches.
 G. Plain casing: Diameter 2.1 ID 2.4 OD inches. Type of Material: PVC
 Wall thickness: 0.15 inches. Joints--Welded/Glued/Threaded/Other: _____
 Length(s) and placement(s) depth from 0' to 5 feet. _____ feet to 0 feet.
 H. Screen: 2.1 ID 2.4 OD inches. Type of Material: PVC
 Screen openings (slot size): 0.010" Trade Name: Monoflex Guides at _____ feet.
 Length(s) and placement(s) depth from 15 ft. to 20 feet from _____ feet to _____ feet.
 I. Gravel pack interval(s) from 4 feet to 20 feet. _____ feet. to _____ feet. Grade size: 20-40
 J. Grouted/Sealed from 0 feet to 3 feet with Cement Grout
 (type)
 from 3 feet to 4 feet with Bentonite
 (type)
 K. Drilling method: Hollow Stem Auger L. Drilling fluid: None
 M. Well development technique (total time and method): Surge, ball, pump --1 hours
 N. Will chemicals, fertilizer or antifreeze be injected or utilized in the system? Yes No
 If yes, what will be used: _____

9. Geologic Materials Logged

Depth in Feet		DESCRIPTION	Depth in Feet		DESCRIPTION
From	To		From	To	
<u>0</u>	<u>5</u>	<u>Topsoil</u>	_____	_____	_____
<u>5</u>	<u>10</u>	<u>Clay -- brown</u>	_____	_____	_____
<u>10</u>	<u>20</u>	<u>Fine Sand</u>	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

(Additional sheets may be submitted)

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

[Signature] 3-1-99 [Signature] 6-1-99
 Water well Contractor's Signature Date Water Well Owner's Signature Date

NOTICE OF WATER WELL ABANDONMENT

Instructions

Complete by printing in ink or typing the appropriate information. Submit the completed form to the above address within 60 days of decommissioning. This form is to be completed by water well contractor (owner signature not required) for all wells decommissioned after 7/1/2001. For wells decommissioned prior to 7/1/2001, or for a sand point well, the well owner may complete and sign the form if they did the actual decommissioning, or if the well no longer exists, and it is unknown when the decommissioning occurred or who decommissioned the well.

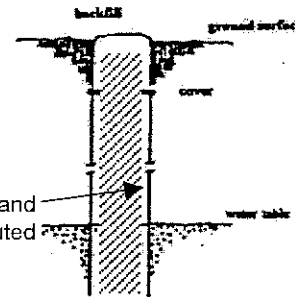
1. Well Owner Name: Omaha Public Power District
 Address: 444 S. 16th St. Mall, Attn: Jim Krajicek
 City: Omaha State: NE Zip: 68102
 () (402) 636-2309
 Home Phone Number Work Phone Number

2. Person Completing Decommissioning (if not owner)
 Name: Terracon
 Address: 2211 South 156th Circle
 City: Omaha State: NE Zip: 68130-2506
 (402) 330-2202 39325
 Business Phone Number Contractor's License Number

3a. Well Registration No. G-10111D
 3b. Purpose of Well Monitoring
 3c. Date Well Last Operated Not Applicable
 3d. Date of Decommissioning 10/17/2003
 3e. Location of Well: County Otoe
 Township 8N Range 14 (E) / W Section 36
SW 1/4 of the NE 1/4
 3f. The well is 2,000 feet from the (North) / South section line
(circle one)
 and 2,000 feet from the (East) / West section line or
(circle one)
 Latitude Degree _____ Minutes _____ Second _____
 Longitude Degree _____ Minutes _____ Second _____
 3g. Street Address of Block, Lot and Subdivision (if applicable).
Nebraska City Station
 3h. Location of Water Use: County NA
 Township _____ Range _____ (E) / W Section _____
 _____ 1/4 of the _____ 1/4

FOR DEPARTMENT USE ONLY	
Filing Date <u>12-11-2003</u>	Registration Number <u>G-10111D</u>
Owner Code <u>402260</u>	Sequence Number <u>118732</u>
<u>NEMAHA</u> NRD	

4a. Actual Method for Decommissioning of Well. Use Sketch below (if appropriate), or illustrate method of decommissioning on a separate sheet.



4b. Type of Back Fill Used in Upper Plug (If excavated area is greater than three feet, indicate depth of excavation.)

Grading was performed in the area of the well to lower the ground surface elevation approximately six feet. The well was grouted before the grading occurred. The protector pipe and concrete pad were removed during the grading, and later efforts to locate the well to install a concrete cap below finished grade were unsuccessful.

4c. Illustrate method to create upper plug.

4d. Type, Amount, and Location of Materials Used in Lower Casing.

Bentonite Grout, 0.5 cubic feet, entire casing

4e. Type and Thickness of Materials Used Between Confining Layers and at static water levels. Indicate plug depth(s) on left side of sketch.

Bentonite Grout, entire casing

4f. Well Casing Size Not Applicable

FEB 20 2004

4g. Well Diameter 2 inch

DEPARTMENT OF NATURAL RESOURCES

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

Dan M. Sturgeon 12/8/03
 Water Well Contractor's Signature Date

Not Required
 Water Well Owner's Signature

RECEIVED
 Date DEC 11 2003

DEPARTMENT OF NATURAL RESOURCES

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LOG OF WELL NO. MW-11

CLIENT <p style="text-align: center; font-weight: bold;">OPPD</p>	Project Manager <p style="text-align: center; font-weight: bold;">Mike Reif</p>
--	--

SITE <p style="text-align: center; font-weight: bold;">Nebraska City, Nebraska</p>	PROJECT <p style="text-align: center; font-weight: bold;">Nebraska City Station</p>
---	--

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	DEPTH, ft	SAMPLES				TESTS	
				USCS SYMBOL	NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft	WATER CONTENT, %
2	cornfield at surface LEAN CLAY with organics dark brown	[Well Diagram]	0			HS			
5.5	LEAN TO FAT CLAY brown	[Well Diagram]	5	1	SS	8			
6	SILTY VERY FINE TO FINE SAND , trace lean clay brown	[Well Diagram]	6	2	SS	20			
13	SILTY VERY FINE TO FINE SAND brown	[Well Diagram]	10	3	SS	11			
20	SILTY VERY FINE TO FINE SAND with mica light brown/light gray (Mn staining in stratified layers at 15')	[Well Diagram]	15	4	SS	16			
	BOTTOM OF BORING NOTE: Soil classifications were based on visual observations made by the field crew.	[Well Diagram]	20						

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

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

WATER LEVEL OBSERVATIONS, ft

WL	▽ ~5	WD	▽
WL	▽		▽
WL			



BORING STARTED		1-16-04
BORING COMPLETED		1-16-04
RIG	CME 55	DRILLER D.Mather
LOGGED	KAO	JOB # 05027041A

WELL 05027041A.GPJ TERRACON.GDT 2/10/04

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Mail To:
DNR
PO Box 94676
Lincoln, NE 68509-4676
Phone: (402) 471-2363

STATE OF NEBRASKA
DEPARTMENT OF NATURAL RESOURCES
WATER WELL REGISTRATION

FOR DEPARTMENT USE ONLY

Registration Date _____ Sequence No. _____ Registration No. _____
Owner Code No. _____ Receipt No. _____ NRD _____

1. a. Well Owner's First Name _____ Last Name _____
b. Company Name Omaha Public Power District
c. Correspondent Name Omaha Public Power District Attention Mr. Jim Krajicek
Address 444 South 16th Street Mall, 5E/EP5
City Omaha State NE Zip Code 68102 Telephone (402) 636-2309

2. a. Contractor's License No. 39325 Contractor's Name Terracon
Contractor's E-mail Address lebazer@terracon.com
b. Drilling Firm Name Terracon
Address 2211 South 156th Circle
City Omaha State NE Zip 68130 Telephone (402) 330-2202
Drilling Firm's E-mail Address lebazer@terracon.com

3 a. Well Location SW 1/4 of the NE 1/4 of Section 36, Township 8 North, Range 14 East/West, Otoe County,
b. Natural Resources District Nemaha
c. The well is 1,500 feet from the (North/South) section line and 2,300 feet from the (East/West) section line
(circle one) (circle one)
or Latitude Degree _____ Minute _____ Second _____
Longitude Degree _____ Minute _____ Second _____
d. Street address and subdivision, if applicable _____
Block _____ Lot _____
e. Location of water use, if applicable (give legal descriptions) Not Applicable
f. If for irrigation, the land to be irrigated is NA acres.
g. Well reference letter(s), if applicable MW-11 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 _____ UG No. _____

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

6. Wells in a Series.
a. Is this well a part of a series? _____ Yes go to part b of this section X 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? X Yes _____ No _____
b. Registration number of abandoned well NA If not registered, date abandoned well was constructed (m) 3 / (d) 14 / (y) 1995
c. Replacement well is 85 feet from abandoned well. d. Abandoned well last operated (m) / (d) / (y)
e. Original well pump column size _____ inches. f. Completion of original well abandonment on (m) 1 / (d) 16 / (y) 2004
g. Location of water use of abandoned well not applicable - monitoring well

Terracon Project No.: 05027041 Terracon Job Name: OPPD Landfills - NE City

8. Pump Information

- a. Is pump installed at this time X Yes No
 Is pump installed by well owner in Section 1? Yes X No Is pump installed by contractor in Section 2? X Yes No
 If pump installed by pump installer, please fill out license number below
- b. Pump Installer's License No. 39325 Pump Installer's Name David M. Svingen
 Pump Installer's E-mail Address dmsvingen@terracon.com
 Pump Installer's Firm Name Terracon
 Pump Installer's Firm Address 2211 S. 156th Cir
 City Omaha State NE Zip 68130 Telephone (402) 330-2202
 Pump Installer's Firm E-mail Address lebazer@terracon.com
- c. Pumping rate 0.5 gallons per minute X Measured Estimated
- d. Drop pipe diameter 0.5 inches e. Length of drop pipe 15 feet
- f. Pumping equipment installed (m) 2 / (d) 27 / (y) 2004 g. Pump Brand QED Wizard (low flow sampling pump)
- h. This well is designed and constructed to pump less than 50 gpm X Yes No

9. Well Construction Information

- a. Total well depth 20 feet b. Static water level 10 feet
- c. Pumping water level NA feet. d. Well construction began (m) 1 / (d) 16 / (y) 04
- e. Well Construction completed (m) 1 / (d) 16 / (y) 04 f. Bore hole diameter in inches: Top 8.25 Bottom 8.25
- g. Casing and screen joints are Welded Glued Threaded X Other

10. Well construction (casing & screen) - c, d, e, & g measurements should be in inches to three decimal places

a		b	c	d	e	f	g	h
Placement Depth in Feet		Casing or Screen	Inside Diameter	Outside Diameter	Wall Thickness	Screen Slot Size	Type of Material	Trade Name
From	To							
0	5	Casing	1.970	2.350	0.190		PVC	Aurora
5	20	Screen	1.970	2.350	0.190	0.010	PVC	Aurora

11. Grout and Gravel Pack

Placement Depth in Feet		Grout or Gravel Pack	Material Description
From	To		
0	1	Concrete	Concrete
1	4	Bentonite	Bentonite holeplug
4	20	Gravel Pack	#20-40 sand

12. Geologic Materials Logged

Depth in Feet			Depth in Feet		
From	To	Description	From	To	Description
		SEE ATTACHED BORING LOG			

(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.

David M. Svingen 3/11/04
 Water Well Contractor's Signature Date Well Owner's Signature Date
 if Contractor is unknown or Deceased

Terracon Project No.: 05027041

Terracon Job Name: OPPD Landfills - NE City

Well ID: MW-11

LOG OF WELL NO. MW-12

CLIENT OPPD		Project Manager Mike Reif							
SITE Nebraska City, Nebraska		PROJECT Nebraska City Station							
Boring Location Coordinates: 2695.3 North 4727.5 East									
GRAPHIC LOG	DESCRIPTION	WELL DETAIL	SAMPLES		TESTS				
	BOREHOLE DIA.: 8.25 in WELL DIA.: 2 in CASING AND SCREEN: PVC (sch. 40); 0.01 slotted screen TOP OF CASING: 914.28 ft GROUND SURFACE ELEV.: 911.62 ft		DEPTH, ft.	USCS SYMBOL	NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %
3	cornfield at surface LEAN CLAY (Topsoil) brown	908.5			HS				
8	VERY FINE TO FINE SILTY SAND light brown	903.5	5	1	SS	22	11		
13	brown, saturated at 8' to 13' ∇ ∇	898.5	10	2	SS	14	4		
18	FINE SILTY SAND gray/brown saturated	893.5	15	3	SS	24	7		
19	892.5 BOTTOM OF BORING NOTE: Soil classifications were based on visual observations made by the field crew.	892.5			HS				

WELL 05027041A LOGS.GPJ TERRACON.GDT 3/31/04

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

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

WATER LEVEL OBSERVATIONS, ft			
WL	∇ 10	WS	∇ 12
		WD	
WL	∇ 12.31	1-2 hr AB	∇
WL			



BORING STARTED		3-26-04	
BORING COMPLETED		3-26-04	
RIG	CME 75	FOREMAN	SM
LOGGED	KAO	JOB #	05027041A

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Mail To:
DNR
PO Box 94676
Lincoln, NE 68509-4676
Phone: (402) 471-2363

STATE OF NEBRASKA
DEPARTMENT OF NATURAL RESOURCES
WATER WELL REGISTRATION

FOR DEPARTMENT USE ONLY

Registration Date _____ Sequence No. _____ Registration No. _____
Owner Code No. _____ Receipt No. _____ NRD

1. a. Well Owner's First Name _____ Last Name _____
b. Company Name Omaha Public Power District
c. Correspondent Name Omaha Public Power District Attention Mr. Jim Krajicek
Address 444 South 16th Street Mall, 5E/EP5
City Omaha State NE Zip Code 68102 Telephone (402) 636-2309

2. a. Contractor's License No. 39325 Contractor's Name Terracon
Contractor's E-mail Address lebazer@terracon.com
b. Drilling Firm Name Terracon
Address 2211 South 156th Circle
City Omaha State NE Zip 68130 Telephone (402) 330-2202
Drilling Firm's E-mail Address lebazer@terracon.com

3. a. Well Location SW 1/4 of the NE 1/4 of Section 36, Township 8 North, Range 14 East/West, Otoe County,
b. Natural Resources District Nemaha
c. The well is 2,000 feet from the (North/South) section line and 1,950 feet from the (East/West) section line
(circle one) (circle one)
or Latitude Degree _____ Minute _____ Second _____
Longitude Degree _____ Minute _____ Second _____
d. Street address and subdivision, if applicable _____
Block _____ Lot _____
e. Location of water use, if applicable (give legal descriptions) Not Applicable
f. If for irrigation, the land to be irrigated is NA acres.
g. Well reference letter(s), if applicable MW-12 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 _____ UG No. _____

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

6. Wells in a Series.
a. Is this well a part of a series? X 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 G-126306
c. How many wells in the series are you registering at this time? One

7. Replacement and abandoned well information.
a. Is this well a replacement well? _____ Yes X No _____
b. Registration number of abandoned well _____ If not registered, date abandoned well was constructed _____
c. Replacement well is _____ feet from abandoned well. d. Abandoned well last operated (m) /(d) /(y)
e. Original well pump column size _____ inches. f. Completion of original well abandonment on _____
g. Location of water use of abandoned well _____

Terracon Project No.: 05027041 Terracon Job Name: OPPD Landfills - NE City

8. Pump Information

- a. Is pump installed at this time X Yes No
 Is pump installed by well owner in Section 1? Yes X No Is pump installed by contractor in Section 2? X Yes No
 If pump installed by pump installer, please fill out license number below
- b. Pump Installer's License No. 39325 Pump Installer's Name David M. Svingen
 Pump Installer's E-mail Address dmsvingen@terracon.com
 Pump Installer's Firm Name Terracon
 Pump Installer's Firm Address 2211 S. 156th Cir
 City Omaha State NE Zip 68130 Telephone (402) 330-2202
 Pump Installer's Firm E-mail Address lebazer@terracon.com
- c. Pumping rate 0.5 gallons per minute X Measured Estimated
 d. Drop pipe diameter 0.5 inches e. Length of drop pipe 13 feet
 f. Pumping equipment installed (m) 3 / (d) 31 / (y) 2004 g. Pump Brand QED Wizard (low flow sampling pump)
 h. This well is designed and constructed to pump less than 50 gpm X Yes No

9. Well Construction Information

- a. Total well depth 18 feet b. Static water level 12 feet
 c. Pumping water level NA feet. d. Well construction began (m) 3 / (d) 26 / (y) 04
 e. Well Construction completed (m) 3 / (d) 26 / (y) 04 f. Bore hole diameter in inches: Top 8.25 Bottom 8.25
 g. Casing and screen joints are Welded Glued Threaded X Other

10. Well construction (casing & screen) - c, d, e, & g measurements should be in inches to three decimal places

a		b	c	d	e	f	g	h
Placement Depth in Feet		Casing or Screen	Inside Diameter	Outside Diameter	Wall Thickness	Screen Slot Size	Type of Material	Trade Name
From	To							
0	8	Casing	1.970	2.350	0.190		PVC	Aurora
8	18	Screen	1.970	2.350	0.190	0.010	PVC	Aurora

11. Grout and Gravel Pack

Placement Depth in Feet		Grout or Gravel Pack	Material Description
From	To		
0	1	Concrete	Concrete
1	7	Bentonite	Bentonite holeplug
7	19	Gravel Pack	#20-40 sand

12. Geologic Materials Logged

Depth in Feet			Depth in Feet		
From	To	Description	From	To	Description
		SEE ATTACHED BORING LOG			

(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.

David M. Svingen 04/07/04
 Water Well Contractor's Signature Date Well Owner's Signature Date
 if Contractor is unknown or Deceased

Terracon Project No.: 05027041 Terracon Job Name: OPPD Landfills - NE City Well ID: MW-12

WELL LOG NO. MW-13

PROJECT: OPPD Nebraska City Station

CLIENT: Omaha Public Power District

**SITE: 7264 L RD
Nebraska City, Nebraska**

GRAPHIC LOG	LOCATION - Latitude: 40.6286073° Longitude: -95.7921889°	INSTALLATION DETAILS	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	SPT N-VALUE
	Surface Elev.: 915.5 (Ft.) ELEVATION (Ft.)	Top Casing Elev: 917.69 Well Completion: Aboveground					
DEPTH	MATERIAL DESCRIPTION						
2.0	LEAN CLAY (CL) , with organics, brown, Grass at surface	Concrete Seal hydrated chip bentonite		▽		10	2-2-2-3 N=4
5.0	LEAN CLAY (CL) , light brown	Riser Pipe 2" diameter schedule 40 PVC. Flush threaded to PVC Screen				12	3-4-4-4 N=8
7.0	SILTY CLAY WITH SAND (CL-ML) , fine		5	▽		18	2-2-2-2 N=4
13.0	SILTY SAND (SM) , fine	Filter Material silica sand, 16/30 grade Screen 2" diameter schedule 40 PVC slotted screen, 0.010" slot				20	1-2-2-5 N=4
13.0	Boring Terminated at 13 Feet					18	2-5-7-5 N=12
						20	2-1-2-2 N=3

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:
Hollow Stem Auger, 8.25-inch diameter borehole

Abandonment Method:
NA - 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

- ▽ 5 ft while sampling
- ▽ 1 ft bgs on 2/4/16



Well Started: 1/26/2016

Well Completed: 1/26/2016

Drill Rig: 770

Driller: JM

Project No.: 05157663

Exhibit: --1

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ENVIRONMENTAL SMART LOG 05157663 LOGS.GPJ TERRACON2012.GDT 2/4/16

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Well Registration or Area Permit

Fee Paid: \$70.00 HHSS Fee: \$30.00
 DNR Cash Fund: \$18.50 WWDF: 21.50
 Billing ID: 53636

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>14551191495806</u>	Status:	<u>Active Registered Well</u>	Decommission Date:	<u>---</u>	Registration Number:	<u>G-178697</u>
Well ID:	<u>241806</u>	NRD:	<u>Nemaha</u>			Registration Date:	<u>2/19/2016</u>
Last Change User:	<u>hmcpherson</u>	Call Up Code:	<u>---</u>	Call Up Date:	<u>---</u>	Last Change Date:	<u>2/19/2016</u>

Owner:

ContactID	Type	SeqNum	Begin Date	End Date	Name
Display 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: NW1/4SE1/4 of Section 25
 Township 8 North, Range 14 (East E/W), Otoe County
- B. Natural Resource District: Nemaha
- Well GPS Coordinates: Latitude 40° 37' 42.99" Longitude -095° 47' 31.88"
 Lat/Long DD 40.62861 -95.79219 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 7264 L Road Block No --- Lot ---
- E. Location of water use, if applicable (give legal description): NWSE S25 T8 R14E
- G. Well reference letter(s) if applicable: MW-13

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			
												WellID	RegCD	StartDate	EndDate
244881	1	2	No	No		1/26/2016			G-126717	DEQ	Part of a DEQ site plan for spill or underground storage	158167	G-	2/19/2016	
												126717			
												241806	G-	1/26/2016	
												178697			

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>NE0054712, NE0204421</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: 13 feet. B. Static water level 1 feet.
- C. Well Construction began: 1/26/2016 D. Well Construction Completed: 1/26/2016
- 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
241806	0	3	casing	2.07	2.38	0.154		PVC	EMI
241806	3	13	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 = 3

WellID	FromDepth	ToDepth	Grout/Gravel	Material Description ¹	Quantity Gravel ²	Volume & Type Grout ³
241806	0	0.5	grout	Concrete and well vault		Concrete and well vault
241806	0.5	2	grout	non-slurry bentonite		1.5 bags
241806	2	13	gravel	#16-30 Silica sand	5 bags	

* are in Feet, all else is in inches

¹Description 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

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

³Volume & 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
241806	0	5	Other		Brown	Lean Clay
241806	5	7	Other		Brown	Sily Clay w/sand
241806	7	13	Other		Brown	Silty Sand

* are in Feet.

LOG OF BORING NO. MW-4

BOREHOLE LOCATION		ELEVATION DATUM		DRILLER		LOGGER								
See Boring Location Plan		USGS		Abel Monnarez		Bruce Birge								
BORING STARTED		BORING COMPLETED		DRILL RIG		DRILLING METHOD								
9-9-04		9-10-04		CME-75		4.25" HSA								
SAMPLE NO.	SAMPLE TYPE	RECOVERY, in.	PENETRATION RESISTANCE - BLOWS/FT.	POCKET PENETROMETER - TSF	UNCONFINED COMPRESSION - TSF	MOISTURE CONTENT - %	DRY DENSITY - PCF	OTHER	GRAPHIC LOG	DEPTH, FT.	SURFACE TYPE		TOTAL DEPTH (FT.)	WELL LOG
											Weedy, Grassy Shoulder of Gravel Road			
WATER LEVEL OBSERVATIONS (FT.)														
7 8.0 ATD 4 6.1 @ 1 Day AD														
DESCRIPTION											Surface Elevation: 916.5			
1	2S	16		3.0							Very Stiff, Moist, Light Brown to Grayish Brown, Low Plastic Silty Clay to Silt (CL) (Roadbed Fill)			
2	2S	5		2.1										
3	2S	18		2.6 4.5+						5	5.0	911.5		
4	2S	24		0.5						6.0	Hard, Slightly Moist, Dark Brownish Gray, Low Plastic Silty Clay (CL) (Buried Soil)	910.5		
										9.0	Firm to Soft, Well Completed Using 3' Stick Up and Concrete Padery Moist, Grayish Brown, Silt with Very Fine Sand to Silty Very Fine Sand (ML/SM) (Alluvium)	907.5		
5	2S	24								10	Becomes Wet Loose, Wet, Grayish Brown, Poorly Graded Sand with Some Silt, Very Fine-Grained (SP/SP-SM) (Alluvium)			
										14.0	Bottom of Boring @ 14' in Sandy Alluvium	902.5		
											Well Completed Using 3' Stick Up and Concrete Pad			

The stratification lines represent the approximate boundary lines between soil and rock types. In situ the transition may be gradual.



9312 G Court, Omaha, Nebraska 68127 (402) 331-2260

PROJECT NAME	OPPD Flyash Monofill
LOCATION	Nebraska City, Nebraska
PROJECT NUMBER	47962

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Mail to
DNR
PO Box 94676
Lincoln, NE 68509-4676
Phone (402)471-2363

STATE OF NEBRASKA
DEPARTMENT OF NATURAL RESOURCES
WATER WELL REGISTRATION

FOR DEPARTMENT USE ONLY

Registration Date 10-26-2004 Sequence No. 162827 Registration No. 9-130442D
Owner Code No. 40226 Receipt No. B16991 Nemaha NRD

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

2. a. Contractor's License No. 19245 Contractor's Name Kleinfelder
Contractor's Email Address locoabel@cox.net
b. Drilling Firm Name Kleinfelder
Address 9312 G Court
City Omaha State NE Zip 68127 Telephone (402) 331-2260
Drilling Firm's Email Address bhavens@kleinfelder.com

3. a. Well location SW 1/4 of the SE 1/4 of Section 25, Township 8 North, Range 14 East/West, Otoe County.
b. Natural Resources District Nemaha NRD
c. The well is _____ feet from the (North/ South) section line and _____ feet from the (East/West) section line
(circle one) (circle one)
or Latitude Degree 40 Minute 37 Second 37
Longitude Degree 95 Minute 47 Second 32
d. Street address and subdivision, if applicable _____
Block _____ Lot _____
e. Location of water use, if applicable (give legal descriptions) _____
f. If for irrigation, the land to be irrigated is _____ acres.
g. Well reference letter(s), if applicable MW-4

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 _____
Other Permit Number _____

5. Purpose of well (indicate one) Aquaculture Commercial/Industrial Dewatering (over 90 days)
Domestic Ground Heat Exchanger Groundwater Source Heat Pump Irrigation Injection
Livestock X 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 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 NA
c. How many wells in the series are you registering at this time? 6

7. Replacement and abandoned well information.
a. Is this well a replacement well? Yes X No
b. Registration number of abandoned well _____ If not registered, date abandoned well was constructed (m) / (d) / (y) _____
c. Replacement well is _____ feet from abandoned well. d. Abandoned well last operated (m) / (d) / (y) _____
e. Original well pump column size _____ inches. f. Completion of original well abandonment on (m) / (d) / (y) _____
g. Location of water use of abandoned well _____

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 (in) _____ / (ft) _____ / (yr) _____ g. Pump Brand _____
- h. This well will be used to pump less than 50 gpm ___ Yes ___ No

9. Well Construction Information.

- a. Total well depth _____ ~ 14 _____ feet.
- b. Static water level _____ ~ 6.1 _____ feet.
- c. Pumping water level _____ NA _____ feet
- d. Well Construction began (month) _____ / (day) _____ / (year) 2004
- e. Well Construction completed (month) _____ / (day) _____ / (year) 2004
- f. Bore hole diameter in inches Top 6.5 _____ Bottom 6.5 _____
- 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		b	c	d	e	f	g	h
Placement Depth in Feet		Casing or Screen	Inside Diameter	Outside Diameter	Wall Thickness	Type of Material	Screen Slot Size	Trade Name
From	To							
0	4	Casing	2.047	2.375	0.328	PVC	N/A	Johnson Screens
4	14	Screen	2.000	2.560	0.560	PVC	0.010	Johnson Screens

11. Grout and Gravel Pack


Placement Depth in Feet		Grout or Gravel Pack	Material Description
From	To		
0	2	Bentonite	3/8" Bentonite Holeplug
2	14	Gravel Pack	12-20 Sand

12. Geologic Materials Logged

Depth in Feet	Description	See Attached Boring Log	Depth in Feet	Description
From	To		From	To

(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
 10.13.04
 Date

G130442D

LOG OF BORING NO. MW-4

BOREHOLE LOCATION				ELEVATION DATUM				DRILLER				LOGGER					
See Boring Location Plan				USGS				Abel Monnarez				Bruce Birge					
BORING STARTED				BORING COMPLETED				DRILL RIG				DRILLING METHOD					
												4.25" HSA					
SAMPLE NO.	SAMPLE TYPE	RECOVERY, in.	PENETRATION RESISTANCE - BLOWS/FT.	POCKET PENETROMETER - TSF	UNCONFINED COMPRESSION - TSF	MOISTURE CONTENT - %	DRY DENSITY - PCF	OTHER	GRAPHIC LOG	DEPTH, FT.	SURFACE TYPE		TOTAL DEPTH (FT.)		WELL LOG		
											Weedy, Grassy Shoulder of Gravel Road						
												WATER LEVEL OBSERVATIONS (FT.)					
												▽ 8.0 ATD					
												▽ 6.1 @ 1 Day AD					
												DESCRIPTION				Surface Elevation: 916.5	
1	2S	16		3.0							Very Stiff, Moist, Light Brown to Grayish Brown, Low Plastic Silty Clay to Silt (CL) (Roadbed Fill)						
2	2S	5		2.1													
3	2S	18		2.6 4.5+						5	5.0	911.5					
4	2S	24		0.5						6	6.0	910.5	Hard, Slightly Moist, Dark Brownish Gray, Low Plastic Silty Clay (CI) (Buried Soil)				
										9	9.0	907.5	Firm to Soft, Well Completed Using 3' Stick Up and Concrete Padery Moist, Grayish Brown, Silt with Very Fine Sand to Silty Very Fine Sand (ML/SM) (Alluvium)				
5	2S	24								10			Becomes Wet Loose, Wet, Grayish Brown, Poorly Graded Sand with Some Silt, Very Fine-Grained (SP/SP-SM) (Alluvium)				
										14	14.0	902.5	Bottom of Boring @ 14' in Sandy Alluvium				
												Well Completed Using 3' Stick Up and Concrete Pad					

The stratification lines represent the approximate boundary lines between soil and rock types. In situ the transition may be gradual.



9312 G Court, Omaha, Nebraska 68127 (402) 331-2260

PROJECT NAME	OPPD Flyash Monofill
LOCATION	Nebraska City, Nebraska
PROJECT NUMBER	47962



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Nebraska City NE

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Notes:

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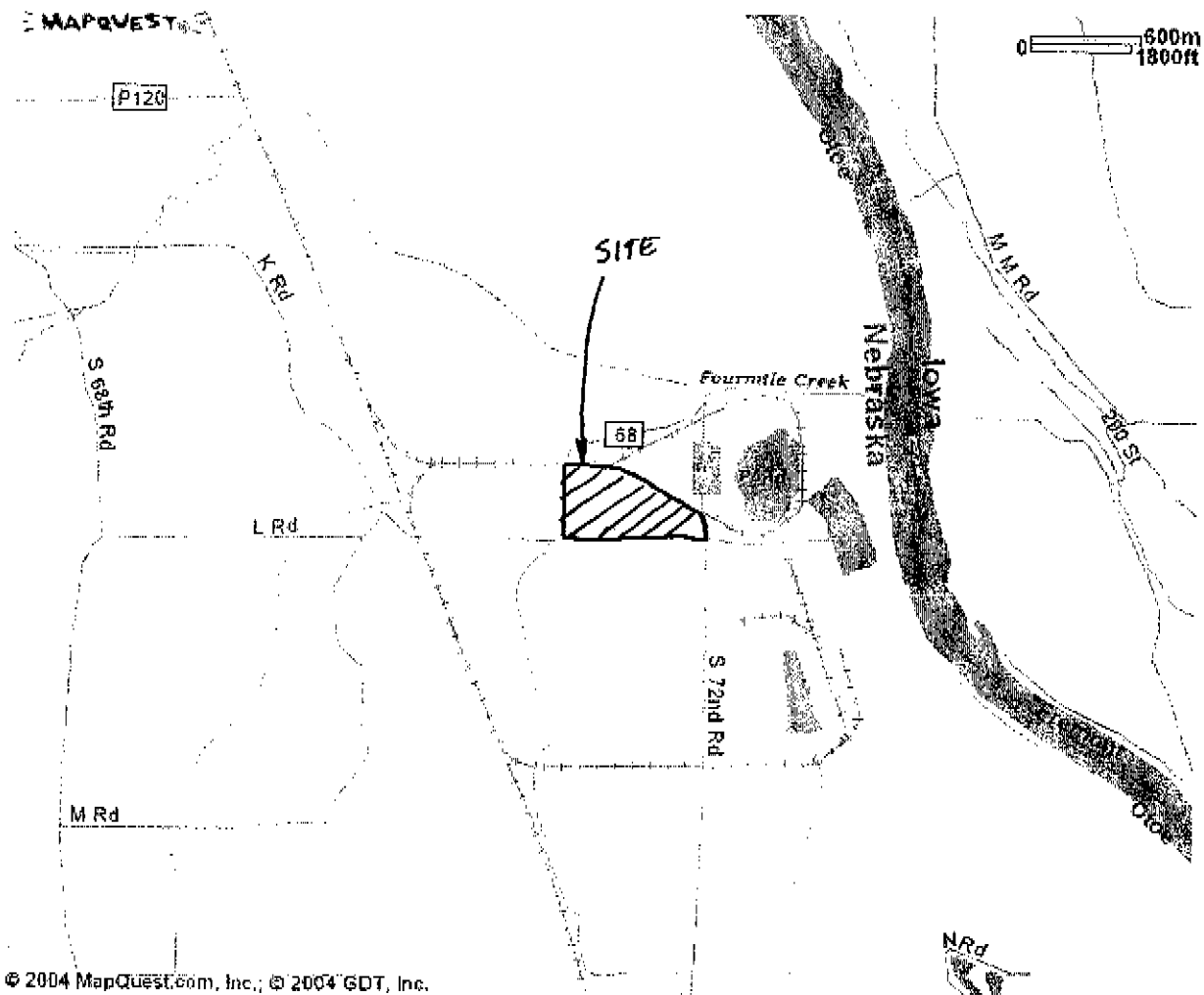
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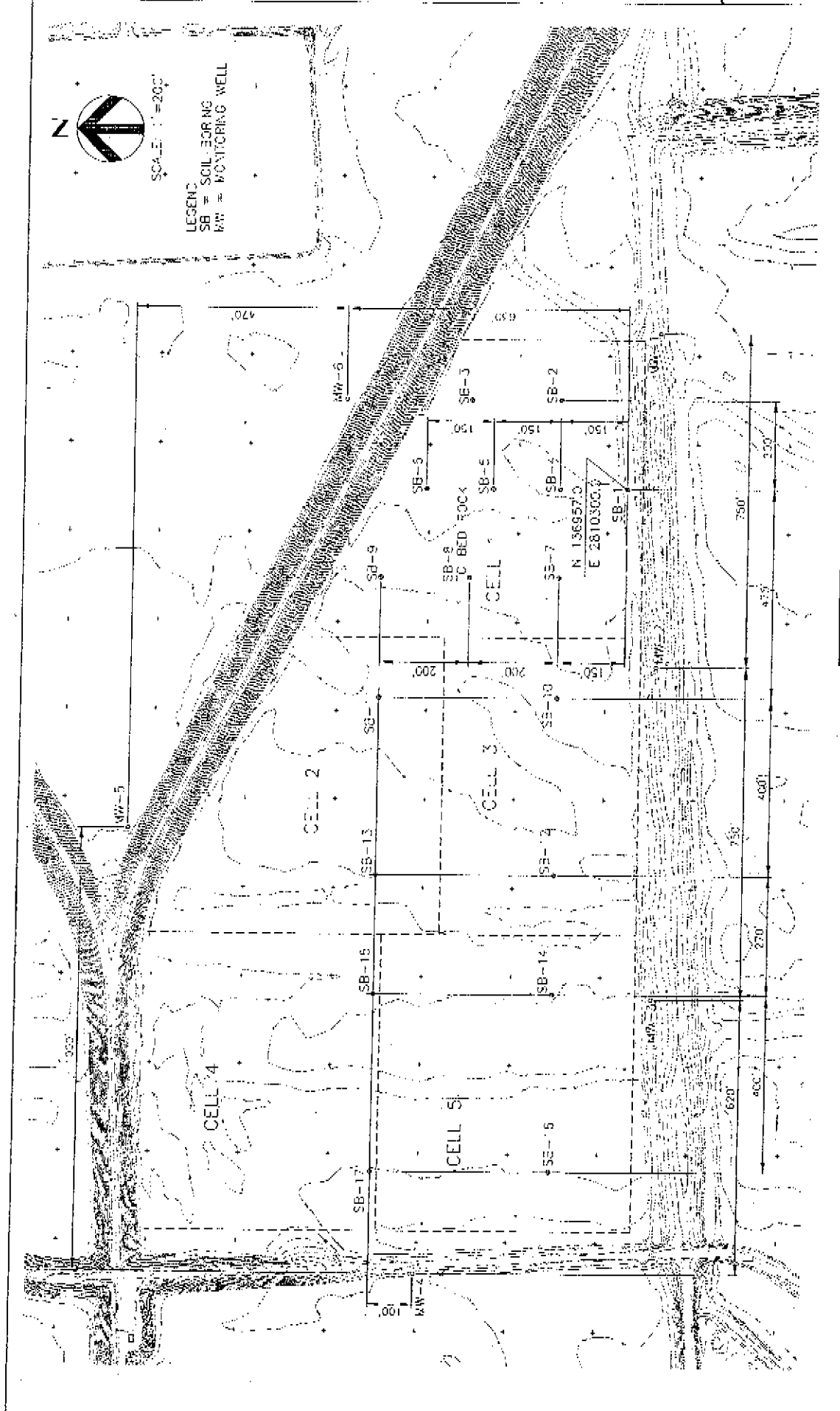
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SITE LOCATION PLAN

6130442



Soil Borings

WELL LOCATION PLAN

HDR

DATE 7/15/04

ISSUE

5E0-1

OPPD Nebraska City Station Unit 2

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