

# CCR Groundwater Monitoring System



Omaha Public Power District Nebraska City Station NC1 Ash Disposal Area

Nebraska City, Nebraska

June 1, 2016

Updated June 2019

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### **Professional Engineer Certificate**

"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:	Megan B. Seymour
Signature:	Men B Sup
Date:	6-21-2019
License #:	E-15931



My license renewal date is December 31, 2020

## 1 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 Federal CCR Rule – effective on October 19, 2015 – applies to Omaha Public Power District's (OPPD's) Nebraska City Generating Station (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 was established in 2016 to meet the requirements of the Federal CCR Rule. The groundwater monitoring network has been updated, as part of this April 2019 revision, to include an additional upgradient monitoring well (MW-14). 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 Facility Background

OPPD has a two-unit (Unit 1 and Unit 2) fossil fuel-fired generating plant at the 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 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 generally 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 Station, groundwater flow direction is generally to the south/southeast.

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  $5.7 \times 10^{-4}$  cm/sec to  $8.2 \times 10^{-3}$  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  $2.0 \times 10^{-1}$  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 at the Station north of the NC1 Ash Disposal Area (near the NC2 Ash Disposal Area) have hydraulic conductivity values ranging from  $1.39 \times 10^{-2}$  cm/sec to  $2.42 \times 10^{-3}$  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  $5.7 \times 10^{-4}$  cm/sec to  $1.39 \times 10^{-2}$  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  $3.38 \times 10^{-3}$  cm/sec. This is within the range of previously recorded data.

## 4 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 four (4) 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.

The monitoring well locations are shown in the attached Figure 1. 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.

	DINOTASI	і Бізрозаі А	iea, oroun	awater monitoring went	Jystem
Monitoring	Date	Well	Well	Gradient	Monitoring
Well	Installed	Depth	Depth		Program Use
		(feet bgs) <sup>1</sup>	(feet from		
			TOC) <sup>2</sup>		
Monitoring W	Vell Networl	K		•	
MW-14	7/12/18	18.0	21.00	Background/Upgradient	Detection/Assessment
MW-13	1/26/16	13.0	15.19	Background/Upgradient	Detection/Assessment
MW-11	1/16/04	20.0	21.85	Background/Upgradient	Detection /Assessment
NC2-MW-4	9/8/04	14.0	16.01	Background/Upgradient	Detection/Assessment
NC1-MW-2	3/14/95	17.8	20.38	Downgradient	Detection/Assessment
NC1-MW-3	3/14/95	19.5	22.42	Down/Crossgradient	Detection/Assessment
NC1-MW-4	3/13/95	20.3	23.07	Downgradient	Detection/Assessment
NC1-MW-9	1/21/99	20.0	22.53	Downgradient	Detection /Assessment
Water Level	Measureme	nts Only	•		
NC1-MW-5	3/17/95	16.6	19.99	Down/Crossgradient	Water Level/Nature &
					Extent Determinations <sup>3</sup>
NC1-MW-6	3/15/95	16.5	19.24	Downgradient	Water Level/Nature &
					Extent Determinations <sup>3</sup>
NC1-MW-7	1/20/99	40.5	42.53	Down/Crossgradient	Water Level Only
(deep well)					
NC1-MW-8	1/21/99	20.0	22.46	Down/Crossgradient	Water Level Only
MW-12	3/26/04	18.1	20.78	Upgradient/Crossgradient	Water Level Only
Abandoned V	Nells <sup>4</sup>				
MW-1	3/14/95	20.8	23.64	NA	NA
(replaced with	(Abandoned				
MW-11)	1/16/04)				
MW-10	1/21/99	20.0	21.99	NA	NA
(replaced with	(Abandoned				
MW-12)	10/17/03)				

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

Notes:

Depth from ground surface to bottom of installed well. Actual boring depth may be deeper. Depth from top of casing to bottom of installed well. 1.

2.

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. Abandoned in accordance with State of Nebraska regulations. 3.

4.

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# Figure 1

NC1 Ash Disposal Area Groundwater Monitoring Network



·				
	ISSUE	DATE	DESCRIPTION	

PROJECT MANAGER	G. WILLIAMS
ENVIRONMENTAL	M. SEYMOUR
CAD	W. NICHOLSON
PROJECT NUMBER	10111074



OPPD Nebraska City Ash Landfill NC1 Ash Disposal Area - Permit Drawings Monitoring Well Network



			MONITORING	WELL NE	TWORK
ring Well	Northing	Easting	Elevation (Top of Casing)	Well Depth (Feet BGS)	Location with Respect to Temporary Ash Disposal Area
W-11	315305.14	2808934.31	918.44	20.0	Background/Upgradient
V-12	314868.77	2809221.22	920.36	18.1	Upgradient/Crossgradient
V-13	318186.64	2808434.68	918.05	13.0	Background/Upgradient
V-14	316786.47	2808244.03	920.99	18.0	Background/Upgradient
-MW-2	314956.72	2811249.03	919.42	17.8	Downgradient
-MW-3	314256.45	2809411.68	919.85	19.5	Downgradient/Crossgradient
-MW-4	314132.49	2811203.55	919.63	20.3	Downgradient
-MW-5	312687.59	2809703.50	920.70	16.6	Downgradient/Crossgradient
-MW-6	312780.75	2811421.64	914.01	16.5	Downgradient
-MW-7	316290.86	2811121.03	919.20	40.5	Upgradient/Crossgradient
-MW-8	316298.57	2811121.28	919.68	20.0	Upgradient/Crossgradient
-MW-9	314257.38	2810108.93	920.09	20.0	Downgradient
-MW-4	317405.90	2808530.80	919.62	14.0	Background/Upgradient

1. TOP OF CASING ELEVATION DETERMINED BY SURVEY DATA OBTAINED JUNE 2019.

7

2. BGS = BELOW GROUND SURFACE 3. THE FOLLOWING MONITORING WELL LOCATIONS ARE FOR WATER LEVEL DATA ONLY : NC1-MW-5,

NC1-MW-6, NC1-MW-7, NC1-MW-8, AND MW-12.

## MONITORING WELL LOCATION MAP

**SCALE** 1" = 400'

FILENAME Figure 1 - NC1.dwg

SHEET

1



# Appendix A

Monitoring Well Documentation

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#### DRILLING LOG

Borting Location Description     Trice Joint Processing Over The State	Project Na Omaha	ame Public Power Distric	– Nebraska (	Titv Ne	braska			Pro	ect Numi	ber 17.01	Boring Number	
INM OF IV 35R 01500501 3/263       Top of Ner Casing Elevation Soried Survace Elevation 910.2 It above NEVD (surv.)       Top of Ner Casing Elevation 90.0 211 above NEVD (surv.)       Top of Ner Casing Elevation 90.0 211 above NEVD (surv.)       Top of Ner Casing Elevation 90.0 211 above NEVD (surv.)       Top of Ner Casing Elevation 90.0 211 above NEVD (surv.)       Top of Ner Casing Elevation 90.0 211 above NEVD (surv.)       Top of Ner Casing Elevation 90.0 211 above NEVD (surv.)       Top of Ner Casing Elevation 90.0 211 above NEVD (surv.)       Top of Ner Casing Elevation 90.0 210 above NEVD (surv.)       Top of Ner Casing Elevation 90.0 210 above NEVD (surv.)       Top of Ner Casing Elevation 90.0 210 above NEVD (surv.)       Top of Ner Casing Elevation 90.0 200 above NEVD (surv.)       Top of Ner Casing Elevation 90.0 200 above NEVD (surv.)       Top of Ner Casing Elevation 90.0 200 above NEVD (surv.)       Top of Ner Casing Elevation 90.0 200 above NEVD (surv.)       Top of Ner Casing Elevation 90.0 200 above NEVD (surv.)       Top of Ner Casing Elevation 90.0 200 above NEVD (surv.)       Top of Ner Casing Elevation 90.0 200 above NEVD (surv.)       Top of Ner Casing Elevation 90.0 200 above NEVD (surv.)       Top of Ner Casing Elevation 90.0 200 above NEVD (surv.)       Top of Ner Casing Elevation 90.0 200 above NEVD (surv.)       Top of Ner Casing Elevation 90.0 200 above NEVD (surv.)       Top of Ner Casing Elevation 90.0 200 above NEVD (surv.)       Top of Ner Casing Elevation 90.0 200 above NEVD (surv.)       Top of Ner Casing Elevation 90.0 200 above NEVD (surv.)       Top of Ner Casing Elevation 90.0 200 above NEVD (surv.)       Top of Ner Casing Elevation 90.0 200 above NEVD (surv.)       Top of Ner Casing Elevation 9	Boring Loo	ation Description			Boring Lo	cation				<u></u>	Page	
910.2 If above NGVD (surv.)     913.01 if above NGVD (surv.)     3270.1 North     4448,5 East     Intervolvede       0rilling Method (s)     Borehole Size     Overwarden Footage     No. 01 Samples     No. Core Boxes     Dec       0 rilling Nethod (s)     Borehole Size     Overwarden Footage     No. 01 Samples     No. 02 eastes     Dec       0 rilling Nethod (s)     Borehole Size     Overwarden Footage     No. 01 Samples     No. 02 eastes     Dec       0 rilling Nethod (s)     Borehole Size     Overwarden Footage     No. 01 Samples     No. 02 eastes     Dec       0 rilling Nethod (s)     Borehole Size     Oreation Footage     No. 01 Samples     No. 02 eastes     Dec       0 rilling Nethod (s)     Borehole Size     Offeet     None     None     None     Sampler Splith-spoon       0 rescription     USCS     Blow     Count     Peet     Decotin     No.     Oreate drilling at the Vith sit sand and gravel.       1     Started 03/14/95     Det Redium Sand, Sicky and a few I''     Coarse sand lenses     2-     Started drilling at the Vith sit sand and gravel.       1     Started and gravel.     CH     Image: Site Sicky and a few I''     Started drilling at the Vith sit sand and gravel.     Started drilling at the Vith sit sand and gravel.     Started drilling at the Vith sit sand and gravel.       3     Started	Ground Su	IV ash disposal area	of Well Casing Fleva	ution	801/4,1	<u>1W1/4, 9</u> Ication (	SW1/4. NET/	<u>4. Sec.</u>	36, T8N	<u>, RI4E</u>	Tatel Featres	t of 2
Dritting Method (a)         Borenole Size         Overbarcen.Postage         Nex. Or Samples         No. Core Bores         Dec           6 //4" ID HSA         8         22.0 feet         0 feet         None         None         Se           Dritting Co. Layne, Inc. Omaha, Nebraska         Dritter (sl. Lytle Porter, Rick Keith)         Tritter (sl. Lytle Porter, Rick Keith)           Dritting Rig Acker Solinax 80 Truck Mounted         Truck Mounted         Truck Sampler Solit-Spoon (standard penetration t)           Date Started 03/14/95         Date Completed 03/14/95         Fleid Observer (sl. Carmelo BlazeKovic)           Depth         0escription         USCS         Blow Recovery         Peet No.0         Problem No.0           SAND, GRAVEL, SILT mixture, dark grey, loose, wet, fill – as and coal with sits and and gravel.         Immark GM         Immark GM         Started drilling at HSA = Holkow Ster Notes           1         SLTY CLAY, medium grey, sort, wet, iff – as and coal with sits and and gravel.         Immark GM         Immark GM         Sample wet at 5.0           3         Sill TY CLAY, medium grey, sort, wet, iff GM         Sample wet at 5.0         Sample wet at 5.0         Sample wet at 5.0           4         Garse sand lenses         J/J/J/J         I.6?/2.0"         Sample wet at 5.0           7         CLAYEY SAND, dark grey, fine graned, loose, well graded, wet high Matth	910.2 ft	above NGVD (surv.) 913	B.OI ft above NGVD	(surv.)	3270.	Norti	n 4448	.5 Eas	st			<u>22.0 ft.</u>
6 I/4" ID HSA     8     22.0 feet     0 feet     None     None     Se       Dritting Co. Layne, Inc. Omana, Nebraska     Ontier (s) Lyle Porter, Rick Keith       Orting Rig Acker Solimax 80 Truck Mounted     Type of split-spoon (standard penetration t)       Date Started 03/14/95     Date Completed 03/14/95     Field Observer (a) Carmelo Blazekovic       Depth in Feet     Description     USCS Blow Count Recovery Peet     Sample PID Receiver (a) Carmelo Blazekovic       SAND, GRAVEL, SILT mixture, dark grey, loose, wet, fill - ash and coal with sult sand and gravel.     Started drilling at No.     No.       Vertical Daticity with race medium sand; sticky and a few I' coarse sand lenses     2-     Sample Recovery Receiver (a) Started drilling at No.       3-     SitrY CLAY, medium grey, soft, wet, nigh plasticity with race medium sand; sticky and a few I' coarse sand lenses     3-     3-       4-     Sample Receiver (a) SitrY CLAY, medium grey, soft, wet, nigh plasticity with race medium sand; sticky and a few I' coarse sand lenses     3/3/3/3     16/2.0°       7-     CLAYEY SAND, dark grey, fine grained, loose, wetl graded, wet high mixture     3/3/3/3     16/2.0°     8-       9-     Sc     9-     9-     9-     9-	ļ	Orilling Method (s)	Borehole Size	Overburd	en Footage	Bedro	ck Footage	No. C	) Sample	s No	o. Core Boxes	Oepth to Water
Driffing Co. Layne, Inc. Omana, Nebraska Driffing Rig Acker Solimax 80 Truck Mounted Diffing Rig Acker Solimax 80 Truck Mounted Date Started 03/14/95 Depth Peet Description SAND, GRAVEL, SLT mixture, dark grey, loose, wet, fill – ash and coal with sitt sand and gravel. SILTY CLAY, medium grey, solt, very medium sand; sticky and a tew !" Coarse sand lenses CH CH CH CH CH CH CH CH CH CH		6 I/4" ID HSA	8	22.0	feet	C	) feet	l.	None		None	See Remarks
Drilling Rig     Acker Spill-spoon     (standard penetration t Sampler Spilt-spoon)       Date Started     03/14/95     Date Completed     03/14/95       Depth Feet     Oescription     USCS Class.     Blow Count     Plot       SAND, GRAVEL, SILT mixture, dark grey, loose, wet, fill - ash and coal with sitt sand and gravel.     Image: Sitt of the spin of the s	Drilling Co.	Layne, Inc. Omaha, No				Oriller (s	) Lyle	Porter,	Rick K	eith		
Date Started 03/14/95     Date Completed 03/14/95     Field Observer (s) Carmelo Blazekovic       Depth Feet     Description     USCS Class.     Blow Count     Depth Peet     Sample PID Peet     Sample PID (ppm)     Remark       SAND, GRAVEL, SILT mixture, dark grey, loose, weti, fill – ash and coal with sitt sand and gravel.     Image: Count of the count of	OriWing Rig	Acker Soilmax 80 Truc	_			Type of Sampler	Split-	spoon	(standa	ard penetrat	ion test)	
Depth in Feet     Description     USCS Class.     Blow Count     Depth Recovery     Sample Feet     PID (ppm)     Remark       SAND, GRAVEL, SLT mixture, dark grey, loose, wet, fill – ash and coal with sit sand and gravel.     Image: Count and coal with sit sand and gravel.	Date Star	ted 03/14/95	<b>d</b> 03/14	/95		Field Ob	server (:	s) Carm	elo Bia	zekovic	· ·	
Pret     Description     OBJES     Count     Recovery     Pret     No.     (ppm)     Remark       SAND, GRAVEL, SILT mixture, dark grey, loose, wet, fill - ash and coal     I     GM     I     Started drilling at       With silt sand and gravel.     SILTY CLAY, medium grey, soft, very moist, high plasticity with trace     I     GM     I     HSA = Holiow Ster NGVO = National C       2-     Coarse sand lenses     2-     I     HSA = Holiow Ster NGVO = National C     HSA = Holiow Ster NGVO = National C       3-     SiltY CLAY, medium grey, soft, wet, high plasticity with trace medium asind; sticky and a few I" coarse sand lenses     CH     4-     5-     Sample wet at 5.0       7-     CLAYEY SAND, dark grey, fine grained, loose, well graded, wet high plasticry, sticky clay and fine sand mixture     3/3/3/3     1.5'/2.0"     6-     SS-1       9-     Sticky clay and fine sand     SC     9-     9-     9-	Depth	,				0		Depth				
SAND, GRAVEL, SILT mixture, dark grey, loose, wet, fill – ash and coal with suit sand and gravel. SILTY CLAY, medium grey, soft, very medium sand; sticky and a few 1" coarse sand lenses 3- 4- 5- 5- 5- 5- 5- 5- 5- 5- 5	Feet	Descrip	otion		ass. (	Blow Count	Recovery	n Feet	No.	PID (ppm)	R	emarks
10-     10-     10-       11-     3/2/2/3     2.0'/2.0'       12-     SILTY SAND, dark grey, fine grained, well graded, loose, wet, with trace clay     12-       13-     SM     13-	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	SAND, GRAVEL, SILT grey, loose, wet, fill with silt sand and gra SILTY CLAY, medium moist, high plasticity medium sand; sticky a coarse sand lenses SILTY CLAY, medium high plasticity with tr sand; sticky and a fe sand lenses CLAYEY SAND, dark grained, loose, well g plasticity, sticky clay mixture SILTY SAND, dark gr well graded, loose, w clay		GM CH 3/ SC 3/	3/3/3	2.0'/2.0'		SS-1 SS-2		Started drilli HSA = Hollou NGVD = Nati Vertical Dati water).	ng at 1:35 pm. « Stem Auger. onal Geodetic Jm at 5.0 feet (free	

SUS ENGINEERS Kansas City, Missouri

### Drilling Log, continued

Omaha	ame <u>  Public_</u> Power District - Nebraska Citv	. Ne	bras	ka -		. Of	<b>ject No.</b> 8 9403	37.01	Boring Number
Boring Lo NW of	cation Description fly ash disposal area		Boring NW1/	Location	W1/4 NE1/4	Sec 76	TAN Q		Page 2. s.f. 2
Depth in Feet	Description	US	SCS SSS.	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					15-			
16-			SM	3/3/4/3	0.6'/2.0'	16-	SS-3	•	
17-						17 - - - -			· ·
18-	SAND, medium grev, medium grained					- 81 81 			
19-	well graded, medium density, wet: mostly quartz and rock grains: trace silt	• • • • • • • • • • • • • • • • • • •				19 -			
20-		•	SW			20-		:	
21-		• •		5/5/7/6	2.0'/2.0'	21	SS-4		
22	TOTAL DEPTH = 22.0 Feet					22			Monitoring well installed @ 3:30 pm.
23-	· ·					23-			
24-						24			
25-						25-			
26-						26			
27-						27_			
28-						28-			
29-						29-			
30-						30-			

SCS ENGINEERS Kansas City, Missouri

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#### MONITORING WELL CONSTRUCTION RECORD



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#### DRILLING LOG

Project N Omaha	ame Public Power Dis	trict	- Nebraska (	THV NA	ahra	eka		Pro		ber	Boring Number	
Boring Lo	cation Description				Borin	ig Locati	on	<u> </u>	0 3400	<u>. 1.01</u>	Page	
Ground S	f fly ash disposal	are Itop	a of Well Casing Eleva		NW1/4, SW1/4, SW1/4, NW1/			/4. Sec	<u>. 31, T8N</u>	<u>. 815E</u>	1 of 2	
<u>916.4 f</u>	above NGVD (surv.)	918	.94 ft above NGVD	_(surv.)	271	17.5 No	orth 6757.	4 East			Total Footage	
, <i>i</i>	Drilling Method (s)	Borehole Size	en Faal	tage 8e	drock Footage	No.	Of Sample	s No	o. Core Boxes	Depth to Water		
<u> </u>	6 1/4" ID HSA		8	18.0	feei	t	0 feet		None		None	See Remarks
Orilling Co	. Layne, Inc. Omaha	a. Ne	braska				Or#er (;	s) Lyle	Porter.	Rick K	eith	
Orllling Rig	Acker Soilmax 80	Truc	k Mounted				Type of Sampler	Split-	spoon	(standa	ard penetrat	ion test)
Date Star	ted 03/14/95		Date Completed	03/14	/95		Field Ot	oserver (	s) Carm	elo Bla	zekovic	
Depth								Depth				<u> </u>
Feet	De	scrip	tion		SCS ass.	Biow Coun	t Recovery	in Feet	Sample No.	PID (ppm)	R	emarks
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	SANDY SILT, bro very moist, well-o and silt. SILTY SAND, bro gravel, well grade density, quartz an SAND, dark grey, well graded, medi mostly quartz with SAND, light grey, grained, well grad wet: quartz and r shaped, rounded grains, trace coa diameter.	wnish wnish ed, mi nd roc medi led, r ock ( p bgra	to fine grained, ensity, wet. k grains. to fine grained, ensity, wet. k grains.		SM	1/4/10/	10 1.9'/2.0' 10 1.9'/2.0' 17 0.6'/2.0'	$\begin{array}{c} 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \\ 9 \\ 10 \\ 11 \\ 12 \\ 13 \\ 14 \\ 13 \\ 14 \\ 12 \\ 13 \\ 14 \\ 13 \\ 14 \\ 12 \\ 13 \\ 14 \\ 14 \\ 14 \\ 14 \\ 14 \\ 14 \\ 14$	SS-1 SS-2		Auger cutting Auger cutting (free water)	at 4:05 p.m. A Stem Auger, conal Geodetic im as wet at 8 feet

SCS ENGINEERS Kansas City, Missouri

### Drilling Log, continued

Project N Omaha	ame Public Power District – Nebraska City	. Ne	bras	ska		Pro	iect No. 8 9403	37.01	Boring Number MW-2
Boring Loo	cation Description		Boring Location		WI/A NWI/A	Sec 31 TBN RISE			Page
Depth				Disc		Depth		<u>JE</u>	
Feet	Description	Cla	355.	Count	Recovery	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					15-			
16-		•••	SW	1/2/4/10	2.0'/2.0'	16-	SS-3		Advanced augers to 18".
17-	• •• • •	•				17-			Pulled augers and installed PVC plug. Borehole open to 8.0'.
18-		•••				- 18 -			
10	IUTAL UEPTH = 18.0 Peet					5		- 24. 29	
								;- -	Monitoring well installed @ 6:00 pm.
20-						20-		:	
21-						21-	1		
22						22-			
23-	· .					23-			
24-						24-			
25-						25-			
26-						26-			
27-						27			
28-					- - -	28-			
29						29-			
30-						30-			
						31 -			

#### SCS ENGINEERS Kansas City, Missouri

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#### MONITORING WELL CONSTRUCTION RECORD



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#### DRILLING LOG

Borner Location Description     Borner Location     Borner Location<	Omaha	ame Public Power Ni	strict	- Nebraska (	Tity Ne	ebraska				Pro	oject Num	iber			
S. D. SW _ 20106*         01/01 ash _ 0500581 area         1 switz _ S214 _ SW44, NEV4, NEV4, Sec. 48, Tow, Ref         1 of 2           Grand Switze Beweint         Total Feedage         Total Feedage         22.0 rt.           Grand Switze Beweint         Total Sectors         No. Core Boes         Desh to kater           B/LD It dove MIXD Isrv.1         S210.2 rt.         22.0 rt.         22.0 rt.           Grand Switze Beweint         Total Feedage         22.0 rt.         22.0 rt.           B/L D It dove MIXD Isrv.1         S210.2 rt.         20.7 rt.         No. Core Boes         Desh to kater           B/L D It dove MIXD Isrv.1         B         22.0 rt.         No. Core Boes         Desh to kater           B/L D It dove MIXD Isrv.1         B         22.0 rt.         No. Engle         Desh to kater           B/L D It dove MIXD Isrv.1         Date Completed 03/14/05         Pred Downer 10 Completed Diazenov         Desh to kater           Begin E Starte D 03/14/05         Date Completed 03/14/05         Pred Downer 10 Completed Diazenov         Desh to kater           Str.1 Y SAND, brownsn grey, toose, mergenage         Date Completed 03/14/05         Pred Downer 10 Completed Diazenov         Str.1 work weet readed on to kater           Str.1 Y SAND, brownsn grey, toose, most, weet graded, opse, end, most, most, weet graded, opser, end, most, most, weet graded, opser, end, most, most,	Boring Lo	cation Description	<u> </u>	1.00103.03		Boring Location					0 940.	31.01	Page		
Gill Of treburg KEVI Junul     Bill of an Lange detailed d	S OT S	<u>A Corner of fly a</u>	ash di	sposal area		SWI/4, SEI/4, SWI/4, NEI/4,			/4 <u>.</u> Sec	<u>. 36, T8</u>	N, R14E	1 of 2			
Drilling Method 101         Bortenore Size         Orestand-Relation         Reduces: Foolage         No. Of Samples         No. Core Bases         Date Name           8         1/4" ID HSA         8         22.0 Test         O feet         NO.06         See Remarks           01/100 CL. Layne (Inc., Omaha, Neoraska          Orestand 10 Lyte Porter, Rick Keith            01/100 CL Layne (Inc., Omaha, Neoraska          Speciel Solit - Solon I Skedard perfectation test)           01/100 CL Layne (Inc., Omaha, Neoraska         Date Compando 03/14/95         Preed Observer (Ia) Camero Bioteckovic           01/100 CL Layne (Inc., Omaha, Neoraska         Date Compando 03/14/95         Preed Observer (Ia) Camero Bioteckovic           0201 h         Bate Compando 03/14/95         Preed Observer (Ia) Camero Bioteckovic         Bioteckovic           0201 h         Second grains         USCS         Bion         Recovery (Peet Solit - Solon)         Bate Compando 03/14/95           0201 h         Second grains         USCS         Bion         Recovery (Peet Solit - Solon)         Sample status         Sample status           1         Oescription         USCS         Bion         Recovery (Peet Solit - Solon)         Sample status           2         Sample status         USCS         Bion         Sample status         Samp	911.0 ft	above NGVD (surv.)	913	.92 It above NGVD	(surv.)	210	7.8 Norl	th	<u>4888</u>	.1 Eas	t		Total Footage		
8 I/4* ID HSA     8     22.0 feet     None     None     See Remarks       Ontime Co. Layne (nc., Omaha, Neoraska)     Order (s) Lyte Porter, Rick Keith     Order (s) Lyte Porter, Rick Keith       Ontime Rig Acker Solimas 80 Truck Mounted     Samper Solit=sooon (standard penetration test)       Depth Pet     Description     USCS     Blow     Peter Solit=sooon (standard penetration test)       Depth Pet     Description     USCS     Blow     Peter Solit=Solit     Camelo Biszekovic       1     Sill TY SAND. brownish grey, noise, rock grans with traces of clay, nonplastic.     Sill TY SAND. brownish grey, noise, rock grans with traces of clay, nonplastic.     Sill TY SAND. Brownish grey, nedium to fine graned, weil graded, loose, molist weil graded, loose, rock grans with races of clay, nonplastic.     Sill TY SAND. Brownish grey, nedium to fine graned, weil graded, loose, molist and pepper appearance!.     Sill TY/20     Sill TY/20     Sill TY/20       3     Sandbe figth brownish grey, nedium to fine graned, weil graded, loose, weil, monplastic.     Sill TY/20     Sill TY/20     Sill TY/20       4     Sill TY Grane Grade grans (salt and pepper appearance).     Sill TY/20     Sill TY/20     Sill TY/20       5     Sill TY Grade Grade grane (salt and pepper appearance).     Sill TY/20     Sill TY/20     Sill TY/20       1     Sill TY Grade Grade grane (salt and pepper appearance).     Sill TY/20     Sill TY/20     Sill TY/20       1		Drilling Method (s)		Borehole Size	Overburd	en Foota	ige Bedr	ock í	Footage	No.	Of Sample	es N	o. Core Boxes	Depth to Wat	er
Chilling Ca. Layne Inc., Omaha, Nebraska     Order fal. Lyle Porter, Rick Keith       Order Sature 03/14/95     Date Completed 03/14/95     Fed Observer (a) Carnelo Blacehourc       Depth Feet     Description     USCS USCS     Diew Count     Recovery Feet     Date for the feet Sature 03/14/95     Sature 03/14/95       SILTY SAND, brownsh grey, loose, very most, ueit graded, quartz and nonplastic.     USCS Site feet Sature 03/14/95     Diew Very most, ueit graded, quartz and nonplastic.     Sature 03/14/95     Sature 710 Remarks       1     SSLTY SAND, brownsh grey, loose, very most, ueit graded, quartz and nonplastic.     USCS Site feet (loon)     Sature of feet Sature 04/14/95     Sature of feet (loon)     Sature 04/14/95       2     Sature of grade sature 03/14/95     Sature of feet (loon)     Sature of feet (loon)     Sature of feet (loon)     Sature of feet (loon)       3     Sature of feet (loon)       4		6 1/4" ID HSA	22.0	feet		0 fe	et	1.	None		None	See Remark	ks		
Orthog Rig Acker Solinax 80 Truck Mounted         Type of Solit-solon (standard penétration test)           Ode Surrer 0.37/4/95         Date Completed 0.37/4/95         Ped Observer (s) Carmeto Blazekowc           Depth Feet         Description         USCS Blow Cashs         Blow Cashs         Ped Observer (s) Carmeto Blazekowc           SILTY SAND, brownish grey, loose, very moist, weil graded, quartz and nonplastic.         Very moist, weil graded, quartz and nonplastic.         NS.         Pint Saap         Slow Cashs           SAND, light brownish grey, medium to thing graded, weil graded, loose, medium to thing the parameter is for the parameter is the start at 8.2 feet (tree thing graded, loose, medium to thing the parameter is the parameter is the start at 8.2 feet (tree thing graded, loose, medium to thing the parameter is the start at 8.2 feet (tree thing graded, loose, medium to thing the parameter is the parameter is the start at 8.2 feet (tree thing graded, loose, medium to thing the parameter is the par	Orling Co	. Layne Inc., Oma					Ordler (s	l Lyle	Porter,	, Rick K	eith				
Date Started         03/14/95         Description         USCS Class.         Blow Class.         Ped Observer (s)         Cambe of Sample No.         PID (ppn)         Remarks           1	Orilling Rig	Acker Soilmax 80					Type of Sampler	Split-	spoon	(stand	ard penetrat	ion test)			
Depth Feet     Description     USCS Class.     Blow Count     Description Feet     Description Sample     PID (pom)     Remarks       1     SILTY SAND, brownsh grey, loose, roch grans with traces of Clay, nonplastic.     SILTY GAID, or ownsh grey, loose, roch grans with traces of Clay, nonplastic.     Image: Sinter Grand grand, sinter Grand Feet     Sinter Grain grait 0.20 an, HSA = Hotory Stem Auger, With 0 = Matter Sinter Grain grait 0.20 an, HSA = Hotory Stem Auger, With 0 = Matter Sinter Grain grait 0.20 an, HSA = Hotory Stem Auger, With 0 = Matter Sinter Grain grait 0.20 an, HSA = Hotory Stem Auger, With 0 = Matter Sinter Grain grait 0.20 an, HSA = Hotory Stem Auger, With 0 = Matter Sinter Grain grait 0.20 an, HSA = Hotory Stem Auger, With 0 = Matter Sinter Grain grait 0.20 an, HSA = Hotory Stem Auger, With 0 = Matter Sinter Grain grait 0.20 an, HSA = Hotory Stem Auger, With 0 = Matter Sinter Grain grait 0.20 an, HSA = Hotory Stem Auger, With 0 = Matter Sinter Grain grait 0.20 an, HSA = Hotory Stem Auger, With 0 = Matter Sinter Grain grait 0.20 an, HSA = Hotory Stem Auger, With 0 = Matter Sinter Grain grait 0.20 an, HSA = Hotory Stem Auger, With 0 = Matter Sinter Grain grait 0.20 an, HSA = Hotory Stem Auger, With 0 = Matter Sinter Grain grait 0.20 an, HSA = Sinter Grain grait 0.20 an, HSA = Sinter HSA = Sinter HSA = Sinter HSA = Sinter H	Date Star	ted 03/14/95	a 03/14	/95			Field Ob	server	(s) Carn	nelo Bla	zekovic				
Free     Description     Class     Biology Count     Recovery     Fact     Stample (pm)       SLTY SAND, brownish grey, loose, rock grains with traces of clay, nonplastic.     Stample (pm)     Remarks       3- 3- 3- 3- 3- 4- 4- 5- 5- 5- 5- 5- 5- 5- 5- 5- 5- 5- 5- 5-	Depth	· ·		3 <sup>4</sup>			<b>D</b>			Depth					
SILTY SAND, brownish grey, loose, very most, well graded, quartz and nonplastic. SM SM SM SM SM SM SM SM SM SM SM SM SM	Feet	c c		ass.	Count	Re	covery	in Feet	Sample No.	PID (ppm)	Re	emarks			
	1 2 3 4 5 6 7 8 9 10 11 12 13 14	SILTY SAND, be very moist, well rock grains with nonplastic. SAND, light brow fine grained, we moist, mostly qu ' (salt and pepper SAND, light brow fine grained, we mostly quartz a and pepper app	whish ( line) whish ( line) wh	grey, medium to so of clay, grey, medium to fed, loose, nd rock grains earance). grey, medium to fed, loose, wet, k grains (salt ce).		SM	2/3/3/4	1.8	.'/2.0'	1- 2- 3- 4- 5- 7- 8- 7- 10- 11- 12- 13- 14-	SS-1		Start drilling HSA = Hollow NGVD = Nativ Vertical Date Sample wet a water).	at 10:20 am. I Stem Auger. onal Geodetic Im	e

Kansas City, Missouri

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### Drilling Log, continued

Omaha	ame <u>Public Power District – Nebraska Citv</u>	. Nei	bras	ska		Pro	iect No. 8 9403	37.01	
Boring Location Description S of SW corner of fly ash disposal area				g Location		<u> </u>			Page
Depth			5907	4, 581/4, 5	<u>W174, NE174</u>	Depth	<u>, T8N, R</u>	14E	<u>2 of 2</u>
in Feet	Description	US Cla	CS Iss.	Blow Count	Recovery	in Feet	Sample No.	PID (ppm)	Remarks
15   16	SAND, light brownish grey, medium to fine grained, well graded, loose, wet, mostly quartz and rock grains (salt and pepper appearance).			4/2/7/11	1.6'/2.0'	15-	SS-3		
17 18 19 20 21	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	4/4/4/3	1.8'/2.0'	17   18   19   20   21	SS-4		Advanced augers to 22°.
22						22-			There is 1.5' of sand in the
23-	TOTAL DEPTH = 22 Feet					23			hollow stem of the augers. Pulled augers and installed PVC plug. Borehole open to 7.0'. Free water in borehole @ 6.0'.
24-						24-			Installed monitoring well @ it:40 am,
25-						25-			
26-						26-			
27_						27			
28-						28			
29-						29-			
30-						30-			
31 -									

#### MONITORING WELL CONSTRUCTION RECORD



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#### DRILLING LOG

Omaha	ame L'Public Power Dis	- Nebraska (	Project Number Boring Number ebraska 08 94037.01										
Boring Lo	cation Description		Hebreake s		Boring Location Page							111 4	
	<u>corner of fly as</u>	sh dis	soosal area		NEI/4, NEI/4, NEI/4, SEI/4, Sec. 36, T8N, RI4E							<u>  of 2</u>	
916.6 ft	above NGVO (surv.)	919.	42 It above NGVD	(surv.)	1896	<u>6.9 Nort</u>	<u>h 667].</u>	l Eas	t		lotal Footage 22.0 ft.		
	Drilling Method (s)	wrden Footage   Sedr		ck Footage	No.	No. Of Samples		o. Core Boxes	Depth to Water				
	6 1/4" ID HSA		8	22.0	feet	0	) feet		None		None	See Remarks	
Orllling Co	. Layne, Inc. Omaha	a, Ne	braska				Oriller (s	s) Eyle	e Porter,	Rick K	eith		
Orilling Rig	Acker Soilmax 80	Truc	(Mounted				Sampler	Split	-Spoon	(stand	ard penetrat	ion test)	
Date Star	ted 03/13/95		Date Completed	03/13/	95		Field Ot	server	(s) Carm	eto Bla	izekovic		
Depth in			· · ·			01		Depti					
Feet	De	scrip	ion	Ci	355.	Count	Recovery	ึก Feet	No.	PID (ppm)	R	emarks	
1 2 3 4 5 6 7 8 9 10 11 12 13 13 13 13 13 13 13 13 13 13	SAND, light brown fine grained, well density, moist, mo rock grains.	scriptic scription is a scription of the	ry, fine grained. ry moist, with quartz with rey, medium to ed, medium quartz with brown, fine ist, low with silt. medium to fine wet, loose, k grains.		SM SW SC	4/6/8/6 2/4/5/7	1.5'/2.0'	Feet 1- 2- 3- 4- 5- 6- 7- 8- 9- 10- 11- 12- 13-	No.		Start drilling HSA = Hollow NGVD = Nati Vertical Datu Sample wet a water).	at 1:00 pm. o Stem Auger. onal Geodetic im	
14				• •				14	<u>i  </u>		ļ		

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### Drilling Log, continued

Project Na Omaha	ame Public Power District – Nebraska City	v. Neb	oras	ka		Pro 08	lect No. 3 940.3	17.01	
Boring Loc Sof S	ation Description E corner of fly ash disposal area	E	Boring	g Location	51/4 551/4	Soc. 16	T 9N D		Page
Depth					<u> </u>	Depth	C. TON, RI	4	2.012
Feet	Description	Cla	CS ss.	Blow Count	Recovery	in Feet	Sample No.	PID (ppm)	Remarks
15-	SAND, brownish grey, medium to fine grained, well graded, wet, loose, mostly quartz with rock grains.					15-		<u>-</u>	
16- 17-	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 17	SS-3		
18-			SW			181			
19-1 20-1						19 - - 20			
21-				1/1/7/10	t.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					2   	29			
30-						30-			
31 -	······································					31 -		-	
		SCS	SΕ	NGINE	ERS				

Kansas City, Missouri



#### MONITORING WELL CONSTRUCTION RECORD

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### DRILLING LOG

Omaha	Public Power Dist	hrasi	-		Pro		ber						
Boring Loo	cation Description			<u>, , , , , , , , , , , , , , , , , , , </u>	Boring	Location		<u>. 10</u>	<u>,0 940,</u>	01_01	Page		
	<u>. 1/2 mi. S of SW c</u> Inface Elevation	corne Itan	r of fly ash		NW1/4	. NE1/4,	<u>SW1/4, SE1/</u>	4, Sec	<u>. 36, T8</u> M	I. R14E	l of 2		
911.4 ft	above NGVD (surv.)	914	B2 ft above NGVD	(surv.)	526.	7 North	<u>5103.4</u>	East	•		Total Footage 20.0 ft		
	Orilling Method (s)	Borehole Size Overburden Footage Bedrock Footage No. Of Samples							S N	o. Core Boxes	Depth to Water		
	6 1/4" ID HSA		8	20.0	feet	(	) feet		None		None	See Remarks	
Orilling Co.	. Layne, Inc, Omaha	a, Net	oraska	······			Orliter (s	) Lyle	Porter,	Rick K	eith	· · _ · _ · _ ·	
Dritting Rig	Acker Solimax 80	Truck	Mounted				Type of Sampler	Split-	Spoon	(stand	ard penetra	ion test)	
Date Star	ted 03/17/95		Date Completed	03/17/	95		Field Ob	server	(s) Carm	ielo Bla	zekovic		
0epth in			•			Oles -		Depth					
Feet	. De	scripti	ion '		355.	Count	Recovery	in Feet	No.	PID (ppm)	. R	emarks	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	SAND, medium bro well graded, medi quartz and rock of moist. SAND, medium bro well graded, medi quartz and rock of grained, well graded	dium b c, trad own, f um de grains own, f um de grains	rown, loose, ce clay. ine grained, msity, mostly with silt, ine grained, msity, mostly with silt, wet.	I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I	SM	/8/9/20	1.1'/2.0'	1- 2- 3- 4- 5- 6- 7- 8- 10- 11- 12- 13-	SS-1 SS-2		Start driffing HSA = Hollov NGVD = Nati Vertical Date	at (0:30 am. A Stem Auger. onal Geodetic im gs wet at 8 feet	
14				••				14					

SCS ENGINEERS Kansas City, Missouri . -

### Drilling Log, continued

oring Loc		<u>. Nepias</u>	ska		. 0	8 9403	37.01	MW-5
<u>Aoprox</u>	ation Description . <u>1/2 mi. S of SW corner of fly ash</u>	8orin NW1/	g Location (4. NEI/4. S	WI/4. 5E!/4.	Sec. 36	5. T8N. R	14E	Page 2.0f2
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PIO (ppm)	Remarks
15-	SAND, medium brown, medium to fine grained, well graded, loose, wet.	• •			15-			
16-	· ·		5/6/6/8	1.8'/2.0'	16-	SS-3		Advanced augers to 20'. Pulled augers and installed
17 -	·· · · · ·	SW			17-			PVC plug. Borehole open to 5.3'. There was 4' of fine sand in the augers ('heavin sand').
18-					18   1		- - -	
19-1		• • • • • • • • • • • • • • • • • • •			19-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-			
20-	TOTAL DEPTH = 20.0 Feet				20-		÷	Monitoring well installed @
22-			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		22			IC:30 am,
23-	· · · · · · · · · · · · · · · · · · ·				23-			
24					24			
25-					25			
26-					26			
28-					21	:		
29					29			
30					30			•

SCS ENGINEERS Kansas City, Missouri

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#### MONITORING WELL CONSTRUCTION RECORD

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#### DRILLING LOG

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Project Na Omaha	ame Public Power District	– Nebraska (	ebras	ka		Pro Ot	lect Numi 8 9403	ber 17.01	Boring Number MW-6		
Boring Loc	ation Description	2 mi C of subst	ation	Boring	Location					Page	
Ground Su	rface Elevation Top	of Well Casing Eleva	tion	Boring	Location (	Coordinates	<u>4. 5ec.</u>	<u> </u>	<u>RI5</u> E	Total Footage	
<u>913,6 ft</u>	above NGVD (surv.) 916	.36 ft above NGVD	(SUTV.)	(V.) 535.9 North 6			6824.0 East				<u>17.0 ft.</u>
						) feet				Nore Boxes	Depth to water
	Lave Inc. Omata Ne	U Draska	17.0	1201				Portor		None	See Remarks
Drilling Dia	Acker Solmax 80 True	k Mounted				Type of					
			. 03/15	/05		Sampler	Spiit-:		(stand	ard penetra	tion test)
			1 0 3 4 1 3	195	<u>.</u>		Benth				
in			i U	SCS	Blow		່ທ	in Sample			:
Feet	Descrip	tion		ass.	Count	Recovery	Feet	No.	(ppm)	8	emarks
	<ul> <li>SILT, dark grey, loos</li> <li>non-plastic with root;</li> </ul>	e, moist. s.					-			Start drilling	at 9:30 am.
-1				ML			.1			HSA + Holio	v Stem Auger.
							·			NGVO = Nati	onal Geodetic
2		·····					2-			vertical Dat	ura
	SILTY SAND, light bro	whish grey, fine									
	density.	moist, mealum							:		
			· .				- J				
			·				4-				
				•							
5-							5-				
			•	SM			1				
6-					4/8/5/7	1.6'/2.0'	6-	SS-1			
							-				
7-							7-				
							-				
8-]							8-				
							-				
9-							9-			Auger cuttin	gs wet at 9 feet
] ]	SAND, medium brownis	sh grey, fine medium to loose	•••	•			-			(free water	).
	wet, with some silt.		`  •••				10-				
			••				-				
<sub>11</sub>			•		3/3/8/17	19'/2 0'		55-2			
			•				-	0.0.12			
			••	. 5W 							
			••				-21				
							-				
13-				•			13-				
			•••				14				
( <del> )</del>			• •	•]			14	<u> </u>		<u>t</u>	

SCS ENGINEERS Kansas City, Missouri

#### Drilling Log, continued

Project N. Omaba	ame Public Royar District - Nobroaka City	ject No.	17.01						
Boring Lo	cation Description		or a s Boring	Location		<u> </u>	5 940.	<u>101  </u>	
Eofc	<u>ountry rd., N of RR. 1/2 mi S of substati</u>	onl	<u>tiw1/</u>	4. NW1/4. N	W1/4. SW1/4	Sec. 31	T8N. R1	SE	2 of 2
Depth in Feet	. Description	US Cla	CS Iss.	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	•••		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
17_	quartz and rock grains with some pebble-size, oval shaped, rounded rock grains.	•••				17-			augers ("heaving sand").
18-	TOTAL DEPTH = 17.0 Feet					18 - 18 -		 	Borehole open to 6.0".
19-						19-1 19-1			Monitoring well installed at II: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 -		<u>.</u>	

SCS ENGINEERS Kansas City, Missouri

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#### MONITORING WELL CONSTRUCTION RECORD

SCS ENGINEERS Kansas City, Hissouri This page intentionally left blank.
### DRILLING LOG

Project Nam	ne						Pre	Niect Nur		Retine Number	
Omaha F	Public Power District	– Nebraska Ci	ty, Nebi	<u>aska</u>			: 0	8 940	37.01		MW-7
Not	rly ash disposal	area	8c	pring Locatio NE 1/4 パッ	n <u>N</u> '/4	sec.	31, TB	N, RIS	SE	Page 1 of	2 3
Ground Surt It a	ace Elevation Top ( bove NGVD (surv.) 918	of Well Casing Elevatio - 9 (Labove NGVD) (	on Bo	ring Locatio	n Coo	ordinate:	9 E 2 2			Total Footage	42.0 ft.
	rilling Method (s)	Borehole Size	Overburden F	ootage Bec	Irock	Footage		Of Sampi	es N	o. Core Boxes	Depth to Water
6	I/4" ID HSA	8	42.0 fe	et	0 f	eet		None		None	See Remarks
Drilling Co.	Layne, Inc. Omaha, Nei	braska				Oriller (	s) Lyle	Porter	, Rick K	Ceith	·
Drilling Rig	Acker Soilmax 80 Truck	Mounted				Type o Sample	t Con	tinu	ous		
Date Starte	01/20/99	Date Completed	01/20	99		Field O	bserver (	s) ' JC	24~ B	BUCKLEY	
Depth in Feet	Descript	ion	USCS Class	Blow Count	Re	covery	Depth in Feet	Sample No,	PID (ppm)	Ri	emarks
2-1	SANDY SILT, br loose, well grad sand and silt, SILTY SAND, b	ownish grey ded, fine moist	, ML	-			2-1				
4	grey, well graded density quartz grains, mois	and rock	SM				4 4 5				
6 7 8 9 10	SAME AS AB	ové	SM				6 7 8 9 10			AVGER C WET AT	umN45 9.0 feet
11- 12- 13- 14-	SAND, dark g to fine grain graded , medium wet, mostly q with rock gu	rey, med ed, well n donsity, vartz rains	SW				12 13 14				

Project	Name				Pro	ject No.		Boring Number
Boring L	a PUDIIC POWER District - Nebraska City ocation Description	<u>/. Nebra</u>	iska na Location		<u>  0</u>	8 940	37.01	MW-7
No	f fly ash disposal area		= 1/4. Nu	1/4, SEC	31,78	ON, RI	ISE .	rage 2 of 3
Depth in					Depth			
Feet	Description	Class.	Count	Recovery	r Feet	No.	(ppm)	Remarks
ĺ	-	1			-	1		
بر	- SAME AS ARD/F	-			-			
15-					15-			
:	-							
16-		17		]	16-			
	-							
17 -					17	,		
18-	4				18_		, <sup>,</sup>	
-	]					5.		
19-								
							•	
20-						ļ		
20-		† <b>-</b>			20-	ĺ		
- 	SAME AS ABOVE				]			
21-					21-			
					4			
22-					22-]			
-					4			
23-					23-	1		
-					-		ĺ	
24-					24			·
-					-		i	
25–					25-			
26-	SAND. light grey,				26			
-	medium to coarse grained,				201			
27	well graded, medium to	ĺ			<u> </u>			
	loose, wet, quartz and				27-			
201	rock grains with oral				]			
20-	swaped, rounded pebble			ľ	28-			
	site mark grains				Ę			
29-					29-]			
]					4			
30-]					30-			
	SAME AS ABOYE		ľ		]			
<u>31</u>			1		31-			

# Drilling Log, continued

## Drilling Log, continued

Project N Omaha	ame Public Power District - North Omaha.	Nebrask	a		Pro : Oi	<b>ject No.</b> 8 9403	37.02	Boring Number MW - 7
Boring Loi	of fly ash disposal area	Borin NE	g Location 1/4 , NW 14	550 31	, 781	J, RIS	ξΕ.	Page 3 of 3
Depth		USCS	Blow		Depth in	Samole	PIN	
Feet	Description	Class.	Count	Recovery	Feet	No.	(ppm)	Remarks
32-	SAME AS ABOVE	5W			32-			
			-		-			
33-					33-			
								•
34-					34-		2	
35-		 			35-			
	SAME AS ABOVE	S₩						
36-					36-			
		ſ					;	
37-	-				37-		· ·	· · · · · · · · · · · ·
- २ २ -								
39-					39-			
-								
40-	· · · · · · · · · · · · · · · · · · ·				40-			
	SAME AS ABOVE	SVU			-			
41-					417			
42					42-			
	BOTTOM OF BORING				-			
43-			1		43-			
					44-			
45-					45-			
			1		-			
46-					46-			
-					· -			
47-					47-		1	
48					48			



#### MONITORING WELL CONSTRUCTION RECORD

MW-7

STATE OF NEBRASKA
DEPARTMENT OF WATER RESOURCES
WATER WELL REGISTRATION
Registration Date 7-1-99 Security 118029
Owner Code No. 4020C Besiert No. 11010C Registration No. 1.101117
Redeptive. 102030 NEMONAL_NRD
/0×001
1. Well Owner Omaha Public Power District Telephone Number (402) 535 3304
Address 444 South 16th Street Mall
City Omaha State NE Zip Code 68102 + 2247
2 Drilling Firm Launa Wester Company
Address 25450 Highway 275 B.O. Bay 507 Oracle Address (402) 359-2042
City Valley State NE 75 Contractor's License No. 39266
State_IVEZEp Code 68084 + 0597
3. Permit Number(s)
Ground Water Source Heat Pump Industrial Injection Irrigotion Livestock X Monitoring Observation Public Water Supply (wen spacing (48-538)) Public Water Supply (wencut spacing) Aquisculture Other(Indicate use)
5. Replacement and ebandoned well information.         A. Is this well a replacement well?       Yes X No         B. Registration number of abandoned well:         C. Replacement well isfeet from abandoned well.       D. Abandoned well last operated
6. A. Well location: NE 1/4 of the file 1/4 of Section 3/ , Township 8 , North, Range /5 (EadWest, Otos County B. The well is 50 feet from the (North of Solid) section line and 1950 feet from the (East or Well) exclion line C. Street address or block, lot and subdivision, if applicable: Omaha Public Power District
D. Location of water use, if applicable (alve legal description)
E. If for irrigation, the land to be irrigated is N/A
F. Well reference letter(s), if applicable: Monitoring Wall 1
7. Pump Information. Is pump installed at this time? Yes X 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 Fatmatart
B. Pump column diameter: inches. C. Length of pump column:
D. Pumping equipment installed:, 19E. Brand/Type:
r. rump installed by: Contractor Owner Pump Installer I konsa No

		N	1W-7												
3.	W	I Construction Inform	nation.									6	2	101	ШΑ
	A.	Total well depth:	40	feet.	8. St	atic water le	vei:	9	_ feet.	C. P	umpin – Cati-	g wat	or lev		foet.
	D.	Well Construction b	egan:	2	0-Jan	.1999	두	Well C	oneta	Johon	ຼືະຣຸບເ	THE COC	O7	20.1	Moasures
	F.	Bore hole diameter:	•		8	inches	-	11010	Q112(11	oction	compi	<b>G(ÓO</b> )		20-181	<u>n 1999</u>
	G.	Plain casing: Diam Wall thickness:	eter 0,1	2.1   5 inche:	D 5. Joi	2.4 ntsWelded	OD Glue	inches.	_Type	of Ma Mar	teriai:	•	P٧	10	
		Length(s) and place	ment(s)	depth f	rom	0' to	30	feet.				feet	to	0	fast
	H.	Screen:	2.	<u>1 ID</u>	-	2.4	OD	inches.	Туре	of Ma	terial:		ΡV	rc	
		Screen openings (si	ot size):	0.010	*	Trade Nam	e:		Mon	oflex	Guid	es at			fact.
	I.	Gravel pack Interval	s) from	26 fee	t to	40 feet	-	40	ICOL	Tron	n <u> </u>		t tex	0	foot.
	J.	Grouted/Sealed from	0	feet	to	4	feel		with	10,	Cem	, reet. Ient G	irout	iço 115:	20-40
		from	_4	feet	to	26	feet		with _		Bent	(type onite	e) grou	1	
	ĸ	Drilling method:		Hollov	v Ste	m	ł	Drillia			None	(ty	pe)		
	М.	Well development te	chnique	(total ti	me ar	nd method):			Sum	n. D. Dai			hour		
	N.	Will chemicals, fertili If yes, what will be u	zer or a sed:	ntifreeze	be in	ijected or uti	ized	in the s	ystem	?		Yes	_X	No	·····

### 9. Geologic Materials Logged

1

3 •

Depth	in Feet	DESCRIPTION	Daoth	in Feet	DESCRIPTION
From	То		From	To	UCSCRIPT (UN
0	5	Topsoll		10	
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.

Water well Contractor's Signature

1-19 Water Well Owner's Signature Date





# STATE OF NEBRASKA

G-IOIIIA-D



DEPARTMENT OF WATER RESOURCES Roger K. Patterson Discor

June 10, 1999

IN REPLY REFER TO:

Mike Johanns Governor

> 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, 71001

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

pjb

clrshare\ground water\returns 301 Centennial Mail South, 4th Floor • P.O. Box 94676 • Lincoln, Nebraska 68509-4676 • Phone (402) 471-2363 • Tuleiax (402) 471-2900 An Equal Opportunity/Affirmative Action Employer

Printed with soy ink on recycled paper



Omaha, Nebraska 68102-2247

# G-IOIIII A-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,

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

JEB:dn

Encl.

State of Nebraska Department of Water Resources

### WATER WELL REGISTRATION CORRECTION

FOR DEPARTMENT USE ONLY

Registration Number <u>G-101111A</u>

Sequence Number 118729

Correction Date September 13, 1999

Person Processing Correction <u>Wendy Evans</u>

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)  $\underline{6A}$  and  $\underline{6B}$  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 N Omaha	Name 3 Public Power District – Nebraska Ci	tv Nøb	racka	:	Project Nu	mber	Boring Number	MW. 8
Boring Lo	Decation Description	B	oring Locatio		100 940	137,01	Page 1	F 7
Ground S	urface Elevation Top of Well Casing Elevation	on Bo	NE 1/4 . /	VW'/4, SEC	31, TON	RISE		
916.81	tabove NGVD (surv.) 919.3 (tabove NGVD )	surv.) 4	-064.5NO	rth 6695.7	Zeast		Total Footage	22.0 ft.
	6 1/4" ID UCA	Overburden f	Foolage Be	drock Footage	No. Of Samp	les No	o. Core Boxes	Depth to Water
		22,0 ie	eet	Ofeet .	None		None	See Remarks
	. Layne, Inc. Umana, Nebraska		··	Orliler (s)	Lyle Porter	, Rick K	eith	
Oriting Rig	g Acker Sollmax 80 Truck Mounted	. <u> </u>	<u>,                                     </u>	Sampler	Continu	ious		·
Date Star	Tited 01/21/99 Date Completed	01/21	199	Field Obs	) ل : (server (s	JHN E	JUCKLEY	
Depth in Feet	Description	USC	S Blow s. Count	Recovery	Depth in Sample Feet No.	PID	B	omark s
1 2 3 4 5	SANDY SILT, brownish grey loose, well graded, fine sand and silt, moist SILTY SAND, brownish grey, well graded, medium density quartz ; rock grains	, ML SM	-		2 3 4 5			
6 7 8 9 10 11 12 13 14	SAND . dark grey, med. to fine grained well graded . medium density, wet, mostly guartz with rock grains.	SM SW			6 7 10 11 12 13 14		AUGER WET A	CUTTINGS T 9.0 feet

Project N. Omaha	ame Public Power District - Nebraska City	. Nebra	ska	·	:  Pro	iect No. 8 9401	37.01	Boring Number NW - 8
Boring Loo NO	cation Description f fly ash disposal area	Borir NE	Ig Location	1/4 , SEC	31 , T	8N, R1	15E	Page ZofZ
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
15 -	SAME AS ABOVE	SW			15			
16- 17-		, (			16			
18-1					18 - 18 - - - -		N. N. N.	
20	SAME AS ABOVE	Ŵ			20-1		÷	
21- 22-					21-			
23	BOTTOM OF BOKING				23			
24-					24			
26-					26-			
28-					28			
29					29-1			
31					30			

# Drilling Log, continued



#### MONITORING WELL CONSTRUCTION RECORD

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MW-8

AW L

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		STATE OF	F NEBRASKA		
	DEPART				
	0217444	WATER WEI		UURCES	
	and the second states of				
	M 1 00	·····	6.0.0		· · · · · · · · · · · · · · · · · · ·
Registration Date	e Sequ	uence No.	8130	Registration No (	3-10111B
Owner Code No	o. 40226	Reciept No.	02038	Nemaha	NRD
	الن الي مواد الأفر بورب فقال بود فقال المحال	4	02039		
1. Well Owner	Omaha Public Po	war Dichiat			
Address	444 South 16th S	treet Mail	I elephone Num	ber <u>(402)</u> 63	36-2304
City	Omaha	Sta	te NF Zin (	Code 69102	
					- 224
		يبرانين ويوجوها الوالي بالشناكية			
2. Orifling Firm_	Lavne-Western Comr	pany	Telephone Nur	nber (4	02) 359-2042
Address	25450 Highway 275, F	<u>P.O. Box 597</u>	Contractor's Li	cense No.	39266
Спу	Valley	State_	<u>NE</u> Zip Code	68064	+ 0597
			ي و بر بر الله الله الله الله الله الله الله الل		
3 Permit Numbe	at(a)				
· · · · · · · · · · · · · · · · · · ·	л(э)				
Purpose or well     Ground Water    Observation     Other	(indicate one) Dewate r Source Hest Pump Indi Public Water Supply (w	ning (over 90 days) ustrialinjectic r8h specing (48-838))	Domestic on Irrigetion Public Water Sup	Geothermal ( Livestock X Mo phy (wowstassong)	Ground Heet Exchanger nitoring Recovery <u>Aquacultur</u>
Ground Water Observation Other	(indicate one) Dewate r Source Heat Pump Indi Public Water Supply (n	ering (over 90 days) ustrialinjectic vth specing (48-838))	Domestic on Irrigation Public Water Sup (Indicate use)	Geothermal ( Livestock X Mo XPIY (when searing) F	Bround Heat Exchanger Initioning Recovery <u>Aquacultur</u>
Ground Water Observation Other	(indicate one) Dewate r Source Heat Pump Indi Public Water Supply (n	ning (over 90 days) ustrialinjectic vth spacing (48-838))	Domestic onIrrigation Public Water Sug (Indicate use)	Geothermal ( Livestock X Mo phy (works securp)	Ground Heat Exchanger Intoxing Recovery <u>Aquacultur</u>
Ground Water Ground Water Observation Othor     Othor	(indicate one) Dewate r Source Heat Pump Indi Public Water Supply (n	rmation.	Domestic nfrrigation Public Water Sug (Indicate use)	Geothermal Livestock XMo xbly (woreut spaceg)	Ground Heat Exchanger nitoring Recovery <u>Aquacultur</u>
Ground Water Ground Water Observation Other     Other     S. Replacement a A. Is this well a C. Replacement	(indicate one) Dewate r Source Heat Pump Indi Public Water Supply (n 	Ining (over 90 days) ustrial(vjectic v0 spacing (46-538)) //mation. /es _XNo v abandoned well.	Domestic nfrrigetion Public Water Sup (indicate use)  B. Registration numb	Geothermal ( Uvestock X Mo phy (wheet search) F	Bround Heet Exchanger nitoring Recovery Aquecultur
Ground Water Ground Water Observation Other Other Replacement a A. Is this well a C. Replacement E. Original well	Indicate one) Dewate r Source Heat Pump Indi Public Water Supply (n and ebandoned well info a replacement wet? nt well is feet from I pump column size;	Ing (over 90 days) ustrialinjectic vbi specing (46-638)) irmation. res _X No habandoned well, inches.	Domestic irrigation Public Water Sug (indicate use) B. Registration numb D. Abandoned well is F. Completion of oric	Geothermal ( Livestock X Mo ply (weieurusscrip) per of abandoned well: set operated inal well abandonment on	Ground Heet Exchanger Intoring Recovery Aquacultur
Cround Water Cround Water Cobservation Other Cohor Cher Cher Cher Cher Cher Cher Cher Che	Indicate one) Dewate r Source Heat Pump Indi Public Water Supply (w and ebandoned well info a replacement well? nt well is feet from I pump column size; water use of sbandoned well;	Ing (over 90 days) ustrialinjectic whapsong (48-538)) //mation. /res _XNo habandoned well, inches,	Domestic Public Water Sug Public Water Sug (indicate use) B. Registration numb D. Abandoned well it F. Completion of orig	Geothermal ( Livestock X Mo xply (woreur specing) F per of abandoned well: set operated inal well abandonment on	Bround Heat Exchanger Intoring Recovery <u>Aquacultur</u> 
Cround Water Ground Water Observation Othor Chor Chor Chor Chor Chor Chor Chor C	(indicate one) Dewate r Source Heat Pump Indi Public Water Supply (w and ebandoned well info a replacement wet? nt wet! is feet from it pump column size: water use of sbandoned well;	Inches	Domestic nfrrigetion Public Water Sug (indicate use) B. Registration numb D. Abandoned well is F. Completion of orig	Geothermal ( Livestock X Mo ply (wheelessing) per of abandoned well: set operated phal well abandonment on	Bround Heat Exchanger nitoring Recovery Aquacultur 
Cround Water Cround Water Cobservation Cohor Co	(indicate one) Dewate r Source Heat Pump Indi Public Water Supply (w 	Ining (over 90 days) ustrialinjectic wh spacing (48-538)) Immation. res _X No h sbandoned well, inches.	Domestic Irrigation Public Water Sug (Indicate use) B. Registration numb D. Abandoned well it F. Completion of orig	Geothermal ( Livestock X Mo xply (woreut use(vg) per of abandoned well: sst operated inal well abandonment on	Bround Heat Exchanger Intoxing Recovery <u>Aquacultur</u>
A. Vell location: B. The well is 54	(indicate one)       Dewate         r Source Heat Pump       Indicate one)         Public Water Supply (w         Bind ebandoned well info         a replacement well?         mt well is         feet from         NE         1/4 of the x <sup>1</sup> /2 <sup>-1</sup> /4 of Se         feet from the storing or	Ing (over 90 days) ustrialinjectic whispecing (48-638)) //mation. Yes _X No hisbandoned well, inches. // Tow South) section line	Domestic nPublic Water Sug Public Water Sug (indicate use) B. Registration numb D. Abandoned well is F. Completion of orig mship 8North, i andfor 50 for for for	Geothermal ( Livestock X Mo xply (woreut spacing) F per of abandoned well: set operated inal well abandonment on Range <u>/5 (ap</u> )West, C	Bround Heat Exchanger nitoring RecoveryAquacultur , 19 , 19 toe
Cround Water Cround Water Cobservation Cohor Co	(indicate one) Dewate r Source Heat Pump Indi Public Water Supply (w Public Water Supply (w Public Water Supply (w a replacement well) info a replacement well? nt well is feet from the pump column size: water use of sbandoned well:  N & 1/4 of the v <sup>12/</sup> _1/4 of Se 5 feet from the (voriit or is r block, lot and subdivision. if	Ining (over 90 days) ustrialinjectic white apacing (48-638)) inimation. Yes _XNo in abandoned well, inches. 	Domestic Domestic Irrigation Public Water Sup (Indicate use) B. Registration numb D. Abandoned well is F. Completion of orig mahip 8 North, i and <u>(950</u> feet fro Omaha Public Brauer	Geothermal ( Livestock X Mo xply (wowarasscrip) f ber of abandoned well: est operated inal well abandonment on Range <u>/5 (ab</u> West, C m the (East or Well) bect District	Bround Heat Exchanger nitoring Recovery Aquacultur 
A. Well location: B. The well is	(indicate one)       Dewate         r Source Heat Pump       Indicate one)         Public Water Supply (n         Bind ebandoned well info         a replacement wet?         Int wett is         feet from the size:         water use of sbandoned well:         N & 1/4 of the size:         Yet from the size:         y ater use of sbandoned well:         Size from the size:         y ater use of sbandoned well:         Size from the size:         y ater use of sbandoned well:         Size from the si	Introg (over 90 days) ustrialinjectic white specing (46-638)) introduced well, inches, inches, inctioni South) section line is applicable;	Domestic Domestic Irrigation Public Water Sug (Indicate use) B. Registration numb D. Abandoned well is F. Completion of orig mship 8 North, i and 1950 feet fro Omathe Public Power Nebraska City Str	Geothermal ( Livestock X Mo xply (wown spaces) f per of abandoned well: set operated shal well abandonment on Range <u>/5 (ast</u> West, C m the (East or Well) sect District ation	Bround Heat Exchanger nitoring Recovery Aquacultur . 19 
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#### MW-8

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#### 9. Geologic Materials Logged

Depth	in Feet	DESCRIPTION	Depth	in Feet	DESCRIPTION
From	То		From	То	
0	5	Topsoil			
5	10	Clay brown		• <del>• • • • • • • •</del>	
10	20	Fine Sand			
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(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.

er

Water well Contractor's Signature

3-1-99 Date

9.9 EU K Water Well Owner's Signature Date





# STATE OF NEBRASKA

G-IOIIIA-D



DEPARTMENT OF WATER RESOURCES Roger K. Patterson Discor

June 10, 1999

IN REPLY REFER TO:

Mike Johanns Governor

> 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, 71001

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

pjb

clrshare\ground water\returns 301 Centennial Mail South, 4th Floor • P.O. Box 94676 • Lincoln, Nebraska 68509-4676 • Phone (402) 471-2363 • Tuleiax (402) 471-2900 An Equal Opportunity/Affirmative Action Employer

Printed with soy ink on recycled paper



Omaha, Nebraska 68102-2247

# G-IOIIII A-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,

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

JEB:dn

Encl.

State of Nebraska **Department of Water Resources** 

#### 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.

<u>Mendy Juans</u> Department of Water Resources

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### DRILLING LOG

Project Na	me	• • • • • •			·		Pre	vient Num			
Omaha	Omaha Public Power District - Nebraska City, Nebraska 08 94037.01										
Boring Location Description S of fly ash disposal area NW14 SW 14 SEC 31 T8N RISE Page lof Z										f Z	
917.1 ft ;	above NGVD (surv.) 919	of Well Casing Eleval	tion Bor (surv.) <b>2(</b>	ing Loca 074.6N	tion Co Orth	ordinates 5584.	8 Fas	t		Total Footage	22.0
	Brilling Method (s)	Borehole Size	Overburden Fo	iotage E	edrock	Footage	No. (	)t Sampli	e's No	o. Core Boxes	Oepth to Water
	6 1/4" ID HSA	22.0 iee	et	. O f	eet		None	ļ	None	See Remarks	
Drilling Co.	Layne, Inc. Omaha, Nel	oraska	• .			Oriller (	s) Lyle	Porter,	, Rick K	eith	
Drilling Rig	Acker Soilmax 80 Truck				Type of Sampler	Co	ntin	000			
Date Starts	ed 01/21/99	Date Completed	01/2	1]99		Field Ot	oserver (	s) JO	HN BI	UCKLEY	
Depth in Feet	Descript	ion	USCS Class.	Blo Cou	w nt Ri	ecovery	Depth in Feet	Sample No.	PID (ppm)	R	emarks
2 3 4 5 6 7 8 9 10 11 12 13 14	SILTY SAND, grey, loose, w graded, quartz grains with SAND, light grey; medium grained, well loose, moist quartz and grains (sall appearance SAME AS AB	brownish noist. well and rock little clay. brownish to fine graded, -, mostly rock t and pepper ) ove	SM SW				$\begin{array}{cccccccccccccccccccccccccccccccccccc$			AUGER C WET AT	umnus 9.0 feet

Drilling Log, continued

Project N Omaha	ame ) Public Power District - Nebraska City	Nebra	sk =		• 1910	iect No.		Boring Number
Boring Lo らく	cation Description of fly ash disposal area	Page ZofZ						
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
15	SAME AS ABOVE	sw			15			
17 17 18 19 19	SAND, light brownish grey, medium grained, well graded, medium density, wet. with some fine grained quartz sand and trace oval shaped rock pebbles.	514	-		16 17 17 18 19 19			
22	BOTTOM OF BOKING				21 22 23			
24-					24			
25-					25			
26-					26			
27					27-			
28-					28-			
29					29			
30-					30-1-1-1			



#### MONITORING WELL CONSTRUCTION RECORD

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, <b>'</b> MV	V-9					
	DEPARTI	STATE OF N	EBRASKA ATER RESO	URCES		
	the second second second	WATER WELL R	EGISTRATION			
Registration Date Owner Code No.	1-1-99 seque 402.26	ence No8" Reciept No. [0]	7 <u>31</u> F 2038 2039	Registration No(-	7-101111( 10NRD	•
1. Well Owner Address	Omaha Public Pov 444 South 16th St	ver District T reet Mali	elephone Number	(402) 6	536-2304	
	Unidid	51810		e <u>68102</u>	+	2247
2. Drilling Firm Address City	Lavne-Western Comp 25450 Highway 275, P Valley	0. 80x 597 State NE	Telephone Numbe Contractor's Licen Zip Code	se No. 68064	402) 359-2042 39268 + 0597	
3. Permit Number	(8)					
Ground Water : Observation Other 5. Replacement ar	Source Heat Pump Indus Public Water Supply (we nd ebandoned well inform	tirial <u>Injection</u> h specny (48-635)) (in mation.	Irrigation Li Public Water Supply ( ficate use)	westock X M	Contoring Recovery Aqu	
A. Is this well a C. Replacement	replacement well? Ye	₩ <u>X</u> No B.	Registration number o	f abandoned well:		
E. Original well G. Location of w	pump column size:	inches. F.	Abandoned well last o Completion of original	perateci well abandonment o	, 19 n, 19	
6. A. Well location: B. The well ls 2,10 C. Street address or	Market And Sector 1/4 of Sector 1/4 of Sector 1/4 of the Sector 1/4 of S	tion <u>3/</u> Township outh) section line and opplicable: On Ne	0 0 North, Ran 0 5 0 feet from th wha Public Power Dist braska City Statio	00 <u>/.5</u> (E33)Weet, 10 (East of Weet) rict	Otoe County, ction line.	
D. Location of wa	ater use, if applicable (gi	ve legal description	ns): N/A			<del></del> _
E. If for infigation, F. Well reference	, the land to be irrigated letter(s), if applicable:	is N/ Monitoring We	A	_acres.		
7. Pump Informatio Is pump installed If Yes, complet	n. I at this time? te items A through F.	Yes X No				
	e nems A and D with est	imated information	for those wells in	which pump will	be installed,	
B. Pump column di	mater:	gai	ons per minute.	Measured	Estimated	]
D. Pumping equipm F. Pump installed by	ient installed: y: Contractor	, 19	E. Brand/I	Vi pump column: Type: License No	fet	). 
		· · · · · ·	· · · · · · · · · · · · · · · · · · ·			

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Page 1

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#### **MW-9**

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1	We	Il Construction	Informa	ation.	8 h	<b>D</b> 01					6	$\frac{1}{3} - 10$	$\mathbf{n}$	Ċ	
	<i>n</i> .	rotar wen dap	un:	20	T&@[.	B. St	atic water l	evel:	9	feet	C. PI	imping we	ter lev	el:	feet.
	D.	Well Construc	tion beg	gan:	2	1-Jan	.1999	E.	Well C	Constra	C.	<u>;</u> Estimate	d or	24.15	Meosure
	F.	Bore hole diar	neter:	_	_	8	inches				WWW11 1	withleted		21-24	1 1939
	G.	Plain casing: Wall thicknes	Diamet	er	2.1	ID	2.	4 OD II	iches.	Туре	of Ma	terial:	PV	<u>c</u>	
		Length(s) and	a. I placar	0.10		15. JDI 1	ntsvveide	d/Glued	/ (hree	ided/C	ther:				
	ы	Servera:	i piacen	voin(8)	aepta i	- 100	0.10	<u>5 te</u>	<u>er.</u>			feet	to_	0	feat.
	п.	Screen:		2.1	- 10		2,4	OD ir	ich <del>a</del> s.	Туре	of Mat	terial:	PV	°C T	
		Length(s) and	ngs (siot I placem	( SIZ <del>0</del> ); hent/s) i	0.010 depth f	)" Irom	Trade Nan	ne:	20	Mon	oflex fear	Guides a			feet.
	I.	Gravel pack in	terval/s	from		to	20 feet		20	1001		·		<u>o</u>	Tool.
	J.	Grouted/Seale	d from	, <u>.</u>	feet	to.	201666.	3 (00)			10	100	t. Gre	nie size:	20-40
						٠.	· · · · · · · · · · · · · · · · · · ·			wito-		Cement	Grout		
			from_	3	feet	to		4 feet		with		(ty) Bentonit	жа) Э		
1	К.	Drilling method	d:		Hollo	w Ste	m Auger	L	Drillin	na fluic	Ŀ	(I None	ура)		
1	М.	Weli davelopn	nent teci	hnique	(total t	ime ar	nd method):			Sura	e. bail	. חחתם	1 hou		
1	N.	Will chemicals If yes, what wi	, fertilize Il be use	er or an ed:	tifreez	e be In	njected or u	lilized in	the s	ystem	?	Yes	X	No	

9. Geologic Materials Logged

Depth From	in Feet To	DESCRIPTION	Depth From	in Feet To	DESCRIPTION		
0	5	Topsoil					
<u> </u>	10	Clay brown					
		Pine Sand		<del></del>			
			·	<del></del>			
·							
	<del></del>						
				<u> </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.

Water well Contractor's Signature

<u>3-/-99</u> Date

ator 6-1-99 Water Well Owner's Signature Date







Omaha, Nebraska 68102-2247

# G-IOIIII A-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,

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

JEB:dn

Encl.

# STATE OF NEBRASKA

G-IOIIIA-D



DEPARTMENT OF WATER RESOURCES Roger K. Patterson Discor

June 10, 1999

IN REPLY REFER TO:

Mike Johanns Governor

> 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, 71001

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

pjb

clrshare\ground water\returns 301 Centennial Mail South, 4th Floor • P.O. Box 94676 • Lincoln, Nebraska 68509-4676 • Phone (402) 471-2363 • Tuleiax (402) 471-2900 An Equal Opportunity/Affirmative Action Employer

Printed with soy ink on recycled paper

State of Nebraska **Department of Water Resources** 

#### 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.

<u>Mondy Luns</u> Department of Water Resources

and the second second second

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# DRILLING LOG

Project Na	ame Dublic Dovier District					; Pro	ject Nur	Der	Boring Number.	
Boring Loc	ation Description	<u>– Nebraska (</u>	<u>Jity, Nebra</u> Bori	<u>ska</u>		0	<u>8 940</u>	37.01		
W O	f fly ash dispos	sal area	N	E1/4 St	= 1/4 SEC	36 T.	8N R	214E	Page 10	fΖ
<u>918.11</u>	above NGVD (surv.) 920	2. Z <u>ft above NGVD</u>	(surv.) 274	ng Location <i>H.0</i> Nor	Coordinates th <b>477<i>3</i></b>	7Easi	t		Total Footage	22.0
	Brilling Method (s)	Borehole Size	Overburden Foo	tage Bedi	ock Footage	No. C	)f Sampi	es No	o. Core Boxes	Depth to Water
	6 1/4" ID HSA	88	22.0 fee	t	0 feet		None		None	See Remarks
Orllling Co.	Layne, Inc. Omaha, Net	oraska			Oriller (:	s) Lyle	Porter.	, Rick K	eith	
Orilling Rig	Acker Soilmax 80 Truck	Mounted			Type of Sampler	Con	tinu	ous	· · · · · · · · · · · · · · · · · · ·	
Oate Start	ted 01/21/99	Date Completed	01/21	99	Field Ot	oserver (s	a) , jo	NHN .	BUCKLE	Ý
Depth in				Blow		Depth	C an a la		]	
Feet	Descripti	ion	Class.	Count	Recovery	Feet	No.	(ppm)	Re	emarks
	SILTY CLAY, Soft, moist. Plasticity wi medium sand	medium grev high Hh trace t	1. СН			1 2 3 4 5				
6 1 7 7	SILTY CLAY, med moist, high plas trace medium s	iumgrey, sol hicity with sand	ft CH			6 7 7				
8 9 10 10	CLAYEY SAND, fine grained, graded very high plastic	dart grey, loose, well moist, ity	sc						AUGER C WET AT E	UTTINGS 3.5 fee+
11 12 13 13	SILTY SAND, do fine grained graded, loose trace clay	ark grey , well .wet, with	SM			11 12 13 14				

Project N Omaha	ame 3 Public Power District - Nebraska Citv	. Nebra	ska		: Pro	iect No. 8 940	37.01	Boring Number $MW - 10$
Boring Lo	cation Description f fly ash dis Dosal area	Borin N	g Location E 14, St	E 1/4 SEC	36 T	8N R	14E	Page ZofZ
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No,	PID (ppm)	Remarks
15-	SAME AS ABOVE	SM						
16 - 17 -	SAME AS ABOVE	SM	· · ·		16 16 17			
18-	SAND, medium grey,	ŚW			18-		2. 17 -	
20-	medium grained, well graded, medium density, wet. mostly quartz and rock grains, trace silt				19			
22	BOTTOM OF ROPING				22			
23-	i solendy				23-			
24-					24-			
25-					25-			
26-					26-			
2/-					27-			
201					28-			
297					29			
					JU- - - - - -			

# Drilling Log, continued

# MONITORING WELL CONSTRUCTION RECORD



, MW-10	
STATE OF NEBRASKA	
WATER WELL REGISTRATION	
NATER WELL REDSTRATION	
Registration Date     1-1.44     Sequence No.     18732     Registration No.     Generation No.       Owner Code No.     40226     Reciept No.     102038     Nemation	
1. Well Owner Omaha Public Power District Telephone Number 636-23	04
City Ometeo	
State NE Zip Code 68102 +	2247
2. Drilling Firm       Lavne-Western Company       Telephone Number       (402) 3:         Address       25450 Highway 275, P.O. Box 597       Contractor's License No.       392         City       Valley       State       NE       Zip Code       68064 + (111)	59-2042 68 0597
3. Permit Number(s)	
Observation Public Water Supply (wer spacing (48-833)) Public Water Supply (wereast spacing) Recover Other (Indicate use)	y Aqueculture
5. Replacement and ebandoned well information.	
A. Is this well a replacement well? Yes X No B. Registration number of abandoned well:	
C. Replacement well as rest from abandoned well. D. Abandoned well isst operated      E. Original well pump column size;inches. F. Completion of original well abandonment on      G. Location of water use of abandoned well;	19 19
6. A. Weil location: NE 1/4 of the SE 1/4 of Section 36, Township 8. North, Range / Essewest, Otoe C 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	ounty,
D. Location of water use, if applicable (give legal descriptions): N/A	
E. If for irrigation, the land to be irrigated is <u>N/A</u> acres. F. Well reference letter(s), if applicable: <u>Monitoring Well 4</u>	
7. Pump Information. Is pump installed at this time? Yes X 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 inst	alled.
A. Actual pumping rate, if applicable: gallons per minute. Measured 🔂 Est	mated 🦳
b. Pump column diameter; inches. C. Length of pump column;	feet.
F. Pump installed by: Contractor Qupar Burns Installed	

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 Page 1

mw.+

## MW-10

A.	Total well dep	th:	20	_feet.	B. SI	latic water I	evel:	9	feet.	( ~ C. Pi	n Un J w pniqmu	u i ater	level:		faat
D. F.	Well Construct Bore hole dian	tion be	gan:	2	<u>1-Jan</u> 8	1999 inches.	E.	Well C	- Constru	Z Inction of	Estimat	ed or d:	2	1-Jan	Moasure 1999
G.	Plain casing: Well thickness	Diamei s:	er 0.15	2.1 5 inche	ID s. Joi	2. IntsWeide	4 OD II d/Glued	nches. /(Inree	_Type ided/0	of Ma Ither:	ləriəl;		PVC		
H.	Length(s) and Screen:	placen	nent(s) 2.1	depth (		0' to 2.4	<u>5 fe</u> _ OD in	et. Iches.	Туре	of Mai	fee Iorial:	tt	0_0 PVC		foot.
	Screen openir Longth(s) and	igs (slo placen	t size): nent(s)	0.010 depth f	)" 'rom	Trade Nar 15 ft. to	ne:	20	Mon feet	<u>xeilo</u> non	Guides	it foot	to		foot. foot.
J.	Grouted/Sealer	d from		<u>feet</u>	to to	20 feet.	3 feet		_feet. _with_	to	fe Cemen	et. ( Gro	Grade Xut	SIZO:	20-40
		from	3	feet	to		4_feet		with _		(h Bentoni	rpe) te			
К.	Drilling method	l:		Hollo	w Ste	m Auger	_ L.	Drillin	ng fluid	l:	None	(type	))		
M, N	Well developm Will chemicale	ient tec	hnique of of of	(total t	ime ar	nd method):			Surg	e, bail	, pump -	-1 h	ours		
• •.	If ves, what wi	i toruitzi li he usi	or or ar ed:	urreez	e de ir	lected of a	unized ir	the s	ystem	? _	Ye	<u>ہ</u>	<u>X</u>	No	

# 9. Geologic Materials Logged

Depth i	n Feet	DESCRIPTION	Depth	in Feet	DESCRIPTION
From	То		From	To	DESCRIPTION
0	5	Topsoil			
5	10	Clay - brown			
10	20	Fine Sand		·	
				<u> </u>	
				<u> </u>	
	<u> </u>				
<u> </u>					
	······			<u> </u>	·
	<u> </u>				······································
	<u> </u>				
<del></del>					
			_		

(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.

Water well Contractor's Signature

3-Date

1-99 31340 Water Well Owner's Signature Date

NEBRASKA DEPARTMENT OF NATURAL RESOURCES P.O. BOX 94676, LINCOLN, NEBRASKA 68509-4676 (402)471-2363



FILE REF #

NATURAL RESOURCES

# 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	FOR DEPARTMENT USE ONLY								
Address: 444 S. 16th St. Mall, Attn: Jim Krajicek	Filing Date $72-1/-2003 = 7-101117$								
City: Omaha State: <u>NE</u> Zip: <u>68102</u>	Owner Code Sequence Number 41220 118732								
( ) ( 402 ) 636-2309	NEWHAHA NRD								
Home Phone Number Work Phone Number									
2. Person Completing Decommissioning (if not owner) Name: Terracon	4a. Actual Method for Decommissioning of well. Use Sketch - below (if appropriate), or illustrate method of decommissioning on a separate sheet.								
Address: 2211 South 156th Circle	backES ground surface								
City: Omaha State: NE Zip: 68130-2506									
( 402 ) 330-220239325Business Phone NumberContractor's License Number									
3a. Well Registration No. <u>G-101111D</u>	Entire screen and								
3b. Purpose of Well Monitoring	Casing grouted *****								
3c. Date Well Last Operated Not Applicable	4b. Type of Back Fill Used in Upper Plug (If excavated area is								
3d. Date of Decommissioning10/17/2003	greater than three feet, indicate depth of excavation.)								
3e.     Location of Well: County     Otoe       Township     8N     Range     14     (E)W Section     36	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 the locate the well to								
<u>SW</u> '/4 of the <u>NE</u> '/4	install a concrete cap below finished grade were unsuccessful,								
3f. The well is 2,000 feet from the (North /South) section line	4c. Illustrate method to create upper plug.								
and $2,000$ feet from the $(East)$ West) section line or (circle one)	4d. Type, Amount, and Location of Materials Used in Lower Casing.								
Latitude Degree Minutes Second									
Longitude Degree Minutes Second	Bentomie Grout, U.S cubic feet, entire casing								
3g. Street Address of Block, Lot and Subdivision (if applicable). Nebraska City Station	4e. Type and Thickness of Materials Used Between Confining Layers and at static water levels. Indictate plug depth(s) on left side of sketch.								
3h. Location of Water Use: County NA	Bentonite Grout, entire casing								
Township Range E W Section	4f. Well Casing Size Not Applicable								
'/4 of the'/4	4g. Well Diameter <u>2 inch</u> <u>DEPARTMENT OF</u> NATURAL RESOURCES								
I'an familiar with the information submitted on this form and to the best of	my knowledge, it is true.								
Dann M. Muncon 12/8/03									
Water Well Contractor's Signature Date	Water Well Owner's Signature Date DEC 1 1 2003								

NCS MW10 abandon.xls[MW-1]

$\bigcap$	LOG OF WEL	L NC	). MV	N-1	1					P	age 1 of 1
CL		Proje	ct Man	ager							
SIT	Ë	PRO	JECT				MIK	e Reit			
	Nebraska City, Nebraska		<del></del>		<u> </u>	lebra	aska	City S	tation		
		WELL		· ·		SAN	APLES	<u>s</u>		TES	STS
<b>GRAPHIC LOG</b>	DESCRIPTION BOREHOLE DIA.: 8.25 in WELL DIA.: 2 in CASING AND SCREEN: PVC (sch. 40); 0.01 slotted screen TOP OF CASING: GROUND SURFACE ELEV.:		DEPTH, ft.	USCS SYMBOL	NUMBER	ТҮРЕ	RECOVERY, in.	SPT - N BLOWS / ft	WATER CONTENT, %	FIELD VAPOR TEST (PPM)*	
	cornfield at surface <u>LEAN CLAY</u> with organics dark brown 2		-			HS					
	LEAN TO FAT CLAY brown				1	SS	8				
	5.5 6 SILTY VERY FINE TO FINE SAND, trace lean clay				2	SS	20				
	brown SILTY VERY FINE TO FINE SAND					нs					
	brown				3	SS	11				
						HS					
	12					HS					
	SILTY VERY FINE TO FINE SAND with				4	SS	16		· .		
	light brown/light gray										
	(Mn staining in stratified layers at 15')					HS					
	20		20-								
	<b>BOTTOM OF BORING</b> NOTE: Soil classifications were based on visual observations made by the field crew.		20								
The betw	stratification lines represent the approximate boundary lines een soil and rock types: in-situ, the transition may be gradual.		۴ N (FDL)	ID inc	ficates	s a re	ading er mill	of less t	han the	field de	etection limit
WA	TER LEVEL OBSERVATIONS, ft				BOI	RING	S STA			-40170	1-16-04
WL					BO	RINC	G CO	MPLET	ED		1-16-04
WL		JL	U		RIG		<u> </u>	ME 55		LLER	D.Mather
L.L.				1	LUC	2 GEI		KAC	I JOE	s# 08	5027041A

WELL 05027041A GPJ TERRACON GDT 210/04

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

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# 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	C Power District	Attention An Un Knottent	
	Address AAA South 16th Stro	et Mall 5E/EP5	Allenuon Mr. JIM Krajiček	
	City Omaha	StateNE	Zip Code 68102 Telephone (402) 63	6-2309
2.	a. Contractor's License No. 39325	Contract	or's Name Terracon	
	Contractor's E-mail Address	ebazer@terracon.com		· · · · · · · · · · · · · · · · · · ·
	b. Drilling Firm Name Terracon			
	Address 2211 South 156th Circl	e		
	City Omaha	State NE Zip 681	30 Telephone (402) 330-2202	
	Drilling Firm's E-mail Address	lebazer@terracon.com		
3	a. Well Location SW $\frac{1}{4}$ of the N	$1E$ $\frac{1}{4}$ of Section <u>36</u> , To	wnship <u>8</u> North, Range 14 East/West, Otoe	County,
	b. Natural Resources District N	lemaha		
	c. the well is <u>1,500</u> feet fro	m the (North /)South) section line	e and teet from the (East / West) section	i line
	or Latitude Degree	Minute Sec	ond	
	Longitude Degree	Minute Sec	ond	
	<ul> <li>d. Street address and subdivision, if app Plack</li> </ul>	licable	Lat	
	e Location of water use if applicable (	vive legal descriptions) Not		
	f. If for irrigation, the land to be irrigate	ed is <u>NA</u> acre	S,	
	g. Well reference letter(s), if applicable	MW-11	HHSS PWSID	
4.	Permits		Suface Water Permit Number	
	Management Area Permit Number		Industrial Permit Number	
	Geothermal Permit Number		Transfer Out-Of-State Permit Number	
	Municipal Permit Number		Conduct Permit Number	
	HHSS		NDEO UG No.	
e		A auga-16		- 00 day=>
э.	Domestic Ground	Aquaculture	Unimercial/industrial Dewatering (ove	r 90 days) niection
	Livestock X	Monitoring	Observation Public Water Supply (with sp.	acing (46-638))
	Public Water Supply (without sp	pacing) Recov	very Other	
6	Wells in a Series			
<i>.</i> .	a. Is this well a part of a series?	Yes go to part b of this se	ction X No, go to part 7 of this application	
	b. If one or more of the wells in the seri	es 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	ation.		
,.	a. Is this well a replacement well?	X Yes No		
	b. Registration number of abandoned we	ell NA If no	ot registered, date abandoned well was constructed (m) 3 / (d	) 14 / (y) 1995
	c. Replacement well is <u>85</u> feet fro	m abandoned well. d. Aba	andoned well last operated (m) /(d) /(y)	
	e. Original well pump column size	inches. f. Cor	npletion of original well abandonment on (m) 1 / (d) 16 /	(y) 2004
	g. Location of water use of abandoned v	vell not applicable - mo	nitoring well	
	Terracon Project No.: 05027041	Terracon Job Name: OPPD Land	fills - NE City	

8.	Pump	Information
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1 ja

8. Pu	mp Inform	ation									
a.	Is pump	installed at this	stime <u>X</u>	_ Ye	s	No					
	Is pump	installed by we	ell owner in Section	1?	_ Yes <u>X</u>	No Is pump ins	stalle	d by conti	ractor in Sec	tion 2?	X Yes N
	lf pump	installed by pu	mp installer, please	fill out	license r	number below					
b.	Pump In	staller's Licens	e No. 3932	25	Pum	p Installer's Name	Dav	id M. Sv	ingen		
	Pump In	staller's E-mail	Address dmsvi	ngen@	terracor	n.com					
	Pump In	staller's Firm N	ame Terracor	<u>ייי</u>							
	Pump In	staller's Firm A	ddress 2211 S	156th (	Cir						
	City	Omaha		State	NF	Zin 68130			Telephone	(402)	330-2202
	Pump In	staller's Firm F	mail Address	lehaze	r@terra	con com				<u>( ···-/ ·</u>	
0	Dumpin	arate (	n 5 gallons	per mi	nute	X Measured	1		Estimat	ed	
С. А	Prop ni	g late		inches		<u> </u>		on nine		fe fe	et
u. 5	Drummin			menes	7 (()	c. Dengin	Drond	0ED.	Mizard (low		
1. L	This wa	g equipinent nis	$\frac{(n)}{2}$	/(u) Z/	( )(y)	<u>2004</u> g.rump	U V	<u> </u>	No.	1000 30	nping punp)
n.	I his we	If is designed a	na constructed to p	ump les:	s man 50		- <sup>I</sup>	<u> </u>	140		
9 W	ell Constru	ction Informati	ion								
, я	Total w	ell denth	20 feet			b. Stat	tic wa	ter level	10	feet	
<b>u</b> .	Pumpin	a water level	NA feet			d. We	ll con	struction	began (m	ייי א 1 <i>ו</i> ומ	0 16 /(v) 04
U. 0	Well Co	petruction com	<u></u>	//d) 16	3 //w (	14 f Bor	e hol	e diamete	r in inches:	Ton 8.2	5 Bottom 8.2
с. ~	Coology	and coreen ioint	core Welded	/(u/ I		Threade	с пол Л	Y	Other	100	<u></u>
g.	Casing o	and screen joint			Giuça	I meude	ч —	<u></u>	- Other		
10 W	ell constru	ction (casing &	screen) - c. d. e. &	g meas	urement	s should be in inch	es to	three dec	imal places		
				J			T				
			<sub>k</sub>		~	4		م	f	0	ь
	Di-	<u>a</u>			<u> </u>	<u> </u>	+	<u> </u>		<u> </u>	11
	Plac	cement	Casing or	In	side	Outside	1	Wall	Screen Slot	Type of	<b>—</b> 1 33
·	Depu		Screen	Dia	meter	Diameter	Т	nickness	Size	Material	Trade Name
From		То									
		_									
	0	5	Casing	1.	970	2.350		0.190		PVC	Aurora
,	5	20	Screen	1	970	2 350		0 190	0.010	PVC	Aurora
			Ociden			2.000		0.100			
									1		
			<u> </u>	1		l				L	
<u>11. G</u>	rout and G	ravel Pack						1			
		Placement D	epth in Feet			Grout or					
From		Т	0			Gravel Pack			Material	Descriptio	n
		0	1			Concrete			<u>C</u> o	ncrete	
		1	4			Bentonite			Bentoni	te holeplu	g
		4	20			Gravel Pack			#20-	40 sand	
12. G	eologic Ma	aterials Logged									
De	epth in Feet					Depth in Feel	t				
Fn	om To	Descrip	otion			From T	0	Des	cription		
	SEE	ATTACHED BO					• •				
						_					
						- •					
	-			Additic	nal shee	ts may be submitte	d)				
13.	I am fapaij	liar with the inf	ormation submitted	on this	registrat	ion, and to the best	t of m	y knowle	dge it is true	-	
$\mathcal{Y}$	/ /A	$1 \sim 1$			11/0-	1					
Ja	wp/M	Sun	5m	3/	1104	4					
	Water We	Il Contractor's	Signature		Date	Well	Owne	r's Signa	ture		Date
			, -			if Cor	itract	or is unkr	own or Dec	eased	
Torra	con Project	No · 05027041	Terracon Job N	lame <sup>,</sup> Of	PD1 and	fills - NE City W	ell ID <sup>.</sup>	MW-11			
1 CII di	້ວວາເຈັບປີເປັ										

$\bigcap$	LOG OF WEL	L NO.	MV	V-1	2					Pa	age 1 of 1
CL	ENT OPPD	Projec	t Mana	iger			Mik	e Reif			
SIT	E Nobraska City, Nobraska	PROJ	ECT			ohra	eka	City Si	ation		
	Nebraska City, Nebraska	[		=		SAN	ISKA	City S	lauon	TES	275
	Boring Location Coordinates: 2695.3 North 4727.5 East	WELL DETAIL				341		<u> </u>		TEC	
500	BOREHOLE DIA.: 8.25 in		Ŀ.	rmbo	~		:RΥ, ir	ſft.	П, %	APOR M)*	
APHIC	WELL DIA.: 2 in CASING AND SCREEN: PVC (sch. 40); 0.01 slotted screen TOP OF CASING: 914.28 ft		ЕРТН,	scs s)	MBEF	ΡE	COVE	N-T-N	ATER	ELD V/	
GF	GROUND SURFACE ELEV.: 911.62 ft		Ы	Sn	ž	₽	R	ВГ	≩ö		
	comfield at surface <u>LEAN CLAY</u> (Topsoil) brown	) N	1			HS					
	009 5		_								
	VERY FINE TO FINE SILTY SAND light brown		†		1	SS	22	11			
			_								
			5			HS					
			-	· ·							
			1								
	8 903.5 brown, saturated at 8' to 13'				2	SS	14	4		<u></u>	
			1 1								
	₽		10			HS					
			1								
	13 <b>¥</b> 898.5										
	FINE SILTY SAND gray/brown				3	SS	24	7			
	saturated										
						HS					
			Ĺ.								
	18 893.5										
	10 802.5		_								
3. 5	BOTTOM OF BORING		_								
31311	NOTE: Soil classifications were based on visual observations made by the field crew.									ĺ	
601										ļ	
ACON											
ERR											
Th 50 be	e stratification lines represent the approximate boundary lines ween soil and rock types: in-situ, the transition may be gradual.		* ( (FDL)	ND in of o	dicate ne (1)	s a re part p	eading ber mi	of less Ilion iso	than th outylen	e field o e equivi	detection limit alents (ppmi).
v ≩	ATER LEVEL OBSERVATIONS, ft				во	RING	G ST	ARTE	כ		3-26-04
WI	- ¥ 10 WS ¥ 12 WD				во	RIN	G CC	MPLE	TED		3-26-04
S WI	- ¥ 12.31 1-2 hr AB ¥	٢L	J		RIG	6	(	CME 7	5 FO	REMA	N SM
u M	-				LO	GGE	Ð	KA	O I O	<b>B</b> # C	5027041A

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

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# **STATE OF NEBRASKA DEPARTMENT OF NATURAL RESOURCES** WATER WELL REGISTRATION

### FOR DEPARTMENT USE ONLY

R	egistration Date	Sequence No	Registration No.
0	wner Code No.	Receipt No	NRD
1. a. b.	Well Owner's First Nam Company Name O	e naha Public Power District	Last Name
c.	Correspondent Name	Omaha Public Power District	Attention Mr. Jim Krajicek
	City Omaha	State NE Zin C	ode 68102 Telephone (402) 636-2309
	Contracto de Librario No		
2. a.	Contractor's License No	. <u>39325</u> Contractor's Nam	ne lerracon
b.	Drilling Firm Name T	erracon	
	Address 2211 South	56th Circle	
	City Omaha	State NEZip68130	Telephone (402) 330-2202
	Drilling Firm's E-mail Ad		
3a. հ	Well Location SW	$\frac{1}{4}$ of the <u>NE</u> $\frac{1}{4}$ of Section <u>36</u> , Township	8 North, Range 14 East/West, Otoe County,
о. с.	The well is 2.000	feet from the (North )South) section line and	1 950 feet from the (Fast / West) section line
		(circle one)	(circle one)
	Longitude Degree	Minute Second	
d.	Street address and subdiv	ision, if applicable	
	Block		Lot
e. f	Location of water use, if a	pplicable (give legal descriptions) Not Applicable of the irrigated is	le
g.	Well reference letter(s), if	applicable MW-12 HHSS	S PWSID
4. Pe	ermits		Suface Water Permit Number
М	anagement Area Permit Nu	nber	Industrial Permit Number
G	eothermal Permit Number		Transfer Out-Of-State Permit Number
M	unicipal Permit Number		Conduct Permit Number
H	HSS		NDEO UG No.
ζ D,	irnora of wall (indicate one)	Acuscultura	
J. 11	Domestic	Ground Heat Exchanger Groundwater	Source Heat Pump Irrigation Injection
_	Livestock	X Monitoring O	bservation Public Water Supply (with spacing (46-638))
	Public Water Supply	(without spacing) Recovery	Other
6. W	'ells in a Series.		
a.	Is this well a part of a seri	es? X Yes go to part b of this section	No. go to part 7 of this application
b.	If one or more of the well	s in the series is currently registered, give the well regi	istration number G-126306
с.	How many wens in the se	hes are you registering at this time? One	
7. R	eplacement and abandoned	vell information.	
a.	Is this well a replacement	well? Yes X No	
b.	Replacement wait is	first from phandoned wall d Abardoned wall	d, date abandoned well was constructed
с. с.	Original well pump colum	in size inches. f. Completion c	of original well abandonment on
g.	Location of water use of a	bandoned well	

Terracon Project No.: 05027041

#### 0 Pump Informatio

• i 4

ð.	Pump Inform	ation										
	a. Is pump	installed at this	stime X	Y	es	No						
	Is pump	installed by we	ell owner in Section	n 1? 🔔	Yes <u>X</u>	No Is pump ins	stalled	i by contr	actor in Sec	tion 2?	XYes	No
	If pump	installed by pu	mp installer, please	e fill out	license n	umber below						
	b. Pump In	staller's Licens	e No. 393	25	Pum	p Installer's Name	Dav	id M. Svi	ngen			
	Pump In	staller's E-mail	Address dmsvi	ngen@	terracon	i.com						
	Pump In	staller's Firm N	lame Terraco	n								
	Pump In	staller's Firm A	ddress 2211 S.	156th	Cir						,	_
	City	Omaha		State	NE	Zip 68130			Telephone	(402)	330-2202	
	Pump In	staller's Firm E	-mail Address	lebaze	er@terrad	con.com						
	c. Pumping	z rate	0.5 gallon	s per mi	inute	X Measured	l		Estimat	ed		
	d. Drop pir	e diameter	0.5	inches	_	e. Length	of dro	p pipe	13	fe	et	
	f. Pumping	equipment ins	stalled (m) 3	/(d) 3	1 /(v)	2004 g. Pump I	Brand		Wizard (low	flow sar	nolina pump	I
	h. This wel	l is designed a	nd constructed to p	ump les	s than 50	gom X	Y	es	No			-
						<u></u>	-					_
9	Well Constru	ction Informati	ion									
	a. Total we	ell depth	18 feet			b. Stat	ic wa	ter level	12	feet		
	c. Pumping	g water level	NA feet	•		d. Wel	ll con	struction	began <u>(</u> m	) <u>3</u> /(d	) 26 /(y) 0	4
	e. Well Co	nstruction com	pleted (m) 3	/(d) 2	6 /(y) 0	4 f. Bor	e hole	e diamete	r in inches:	Top <u>8.2</u>	<u>5</u> Bottom <u>8.</u>	25
	g. Casing a	ind screen joint	ts are Welded		Glued	Threade	d	Χ	Other			
												_
10.	Well construe	ction (casing &	: screen) - c, d, e, &	k g mea	surements	s should be in inche	es to f	hree deci	mal places			
							T					-
		a	ь		c	d		e	f	g	h	_
	Plac	ement		,	• •	0.1.1.1		117-11	0 01-4	<b>T</b> C		
	Depth	1 in Feet	Casing or		ISIDE	Outside	<b></b>	wan	Screen Slot	I ype or	Trade Name	
Fror	<b>n</b>	То	Screen		ameter	Diameter	11	nexness	Size	Material		
1101	<u>11</u>	10			-							-
	0	8	Casing	1	.970	2.350		0.190		PVC	Aurora	
			0		070	0.050		n 400	0.010		Auroro	
	8	18	Screen	!	.970	2.330	-	J. 190	0.010	PVC	Aurora	—
		1				<u> </u>						
												_
<u>11.</u>	Grout and G	ravel Pack	·····		·							
		Placement D	epth in Feet		ļ	Grout or						
Fro	m	T	o		[	Gravel Pack			Material	Descriptio	מ	
	(	)	1			Concrete			Co	ncrete		
		1	7			Bentonite			Bentoni	te holeplu	g	_
		7	19			Gravel Pack			#20-	40 sand		
		ł										
10	Caalagia Ma	taniala Laggad					_					
12.	Geologic Ma	iteriais Loggeo				I Builden	_					
	Depth in Feet					Depth in Feel	C .	•				
	From To	Descri	otion			From	0	Des	cription			
	SEE	ATTACHED BO										
						_					<del></del>	
	<u></u>					-						
						_						
				( 4 4 4 4 4 4	onal cheer	te may he cubmitte	d)					
-				יעתחחות	onar snee	is may be submitte	4) 4					—
1.7	I am famil	iar with the inf	ormation submitter	t on this	registrot	ion and to the best	ofm	v knowle	døe it is true			
1.3			~	a on un:		ion, and to the best	. 01 111	y 100000	-50 it is aut	•		
	Dr. L	M XI.	maan	<u>^</u>	loral	d						
	Watan Wa		Signatura	- 4	Date Date	-7	<u></u>	r'e Signer	ure			
	water we	n Comractor S		,	Date	went -		a s original	own or Dec	ancad	Date	
						11 COP	macte	л із цпкг.	IOWIL OF DEC	cased		

Terracon Project No.: 05027041

Terracon Job Name: OPPD Landfills - NE City

Well ID: MW-12

			WELL LO	G NO. MW-	-13			F	age	1 of 1	
PR	OJECT:	OPPD Nebraska City Station		CLIENT: Omaha Public Power District							
SIT	E:	7264 L RD Nebraska City, Nebraska		-							
GRAPHIC LOG	LOCATIO Latitude: 40 -95.792188	N - 0.6286073° Longitude: 9°	TION	Surface Elev.: 915.5 (Ft.)	INSTALLATION DETAILS Top Casing Elev: 917.69 Well Completion: Aboveground	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	SPT N-VALUE	
	2.0	NCLAY (CL), with organics, brown, Grass a	t surface	913.5	-Concrete →	-			10	2-2-2-3 N=4	
	LEAI	N CLAY (CL), light brown			- Riser Pipe 2" - diameter schedule 40 PVC. Flush threaded to PVC Screen		-		12	3-4-4-4 N=8	
	5.0 <u>SILT</u>	Y CLAY WITH SAND (CL-ML), fine		910.5		5 -			18	2-2-2-2 N=4	
	7.0 <u>SILT</u>	<u>Y SAND (SM)</u> , fine		908.5	-Filter Materiai ► silica sand. 16/30 grade				20	1-2-2-5 N=4	
					-Screen 2" diameter schedule 40 PVC slotted screen, 0.010"	- 10-	_		18	2-5-7-5 N=12	
						-	-		20	2-1-2-2 N=3	
	13.0 <b>B</b> ari	na Taumin dad of 42 Fact		902.5		· .: 					
	The stratil	ication lines represent the approximate transition situ these transitions may be gradual or may occur	between differing soil typ at different depths than	bes and/or rock shown.	Hammer Type: Automa	tic					
Advand Holle Abande	cement Met ow Stem Au onment Met	nod: ger, 8.25-inch diameter borehole	See Appendices for exp	planation of symbols and	Notes: Soil descriptions are bas field crew. Actual condit	sed on vis tions may	sual ob / vary.	serva	tions m	nade by the	
NA -	- Well instal		appreviations.								
$\Box$	5 ft while	ER LEVEL OBSERVATIONS	1600	2000	Well Started: 1/26/2016		Well C	omple	eted: 1/	/26/2016	
$\square$	1 ft bgs o	on 2/4/16			Drill Rig: 770		Driller:	JM			
			Nebraska	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

IV

WIP Wells - Reg P	Print										
Well Reç	gistration o	r Area	Permit		Fe Dî	e Paid: NR Cash Fund:	<u>\$70.00</u> HHSS F <u>\$18.50</u> WWDF: Billing	ee: <u>\$30.00</u> <u>21.50</u> D: <u>53636</u>			
Source:	Nebraska On Line	Import Status:	Accepted	Use:	Monitoring Water Qua	<u>(Ground</u> lity)	Owner ID:	<u>49927</u>			
Import ID:	<u>1455119149580</u>	<u>6</u> Status:	<u>Active</u> <u>Registered</u> <u>Well</u>	Decommission Date:	_		Registration Number:	<u>G-178697</u>			
Well ID:	241806	NRD:	<u>Nemaha</u>				Registration Date:	2/19/2016			
Last Change User:	hmcpherson	Call Up Code:	_	Call Up Date:	_		Last Change Date:	<u>2/19/2016</u>			
Owner:											
	ContactID Type	SeqNum Be	egin Date End Da	te Name							
Display	49927 Owner	1 2/	19/2016	Omaha Public Po	ower District,						
Contractor:	Certificate ID Firs 39570 Mic	stName Las chael B Reif	tName								
Drilling Firm:	Employ 159781	erID Emplo Terrac	yer on Consultants, I	nc.							
A. Well Locati Township	ion: <u>NW1/4SE1/4</u> <u>8</u> North, Range <u>14</u>	_ of Section L ( <u>East</u> E/V	n <u>25</u> V), <u>Otoe</u> County								
<ul> <li>B. Natural Re</li> <li>Well GPS (</li> <li>Lat/Long I</li> <li>C. The well is</li> </ul>	esource District: <u>N</u> Coordinates: DD s: <u>                feet from the</u>	<u>emaha</u> Latitude <u>40° 37' 4</u> <u>40.6286</u> e Sectio	Long <u>42.99'' -095</u> 1 <u>-95.</u> n line and fee	gitude <u>° 47' 31.88''</u> <u>79219</u> et from the s	<u>GPS Requi</u> section line.	red					
D. Street add	dress or block, lot a	and subdivi	sion: Addr/Sub [	Div 7264 L Road	Block No	_ Lot					
E. Location of G. Well refere	f water use, if app ence letter(s) if ap	licable (give plicable: <u>M</u>	e legal descriptio <u>N-13</u>	n): <u>NWSE S25 I</u>	<u>8 R14E</u>						
Well In A Serie	es										
Well Part of a	a Series with Site F	Plan: <u>Yes</u>									
Series # of W	Vells Reg Total # V	Vells Acres	Acres Cert NRD /	Appr StartDate En	ndDate Comm	ent Series Re	g Num (Externa	l Source) Code	Description	Wells in the Se	eries
244881 1	2		No No	1/26/2016		G-126717		DEQ	Part of a DEQ site plan for spill or underground storage	WellID RegCI <u>158167</u> G- <u>12671</u> <u>241806</u> G- 17869	<ul> <li>StartDate</li> <li>2/19/2016</li> <li>7</li> <li>1/26/2016</li> <li>7</li> </ul>

Permits				
		Aprvd Date(s)		Aprvd Date(s)
Area Permit		_	SWater App Code	
GeoPermit		_	Industrial	
MWF		_	Transfer	
WSP		_	Swater Conduct Code	
HHSS	_		Other	
HHSS PWS ID	_		ITN	
NDEQ	<u>NE0054712, NE0204421</u>			
5 Purpose of W	ell Monitoring (Ground Water O	uality)		
5. Turpose or W	Other Use	<u>anty)</u>		
	Notes	-		
		-		
7. Replacement	well information.		Well Considered a replac RegCD)	ement by NRD(WellID,
A. Is this well a	Replacement well? No Repl No	NRD Approval Date _	Well Replacement Reg Cl	D
B. Registration r	number of abandoned well:	If not registered, dat	e abandoned well was cons	tructed
C. Abandoned w	vell last operated	D. Replacement well	is feet from abandoned	well.
E. Original well	pump column size: inches.			
F. [ ] Original [ ] I hereby the replace	water well decommissioned _ v certify that the original water ment water well.	well will be decommis	ssioned within 180 days a	fter such construction of
[ ] I hereby within 180	certify that the original water days after such construction of	r well will be modified a find the replacement wate	and equipped to pump 50 er well.	gallons per minute or less
[ ] Lives [ ] Monit	tock oring			

WellID RegCD StartDate EndDate

 $http://private/IWIP/Wells/Registration/RegistrationPrint.aspx?Print=true\&ReferenceID=241806 [2/19/2016\ 8:25:29\ AM]$ 

IWIP Wells - Reg Print

[] 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	? <u>Yes</u>
9. Well Construction Information	
A. Total well depth: <u>13</u> feet.	B. Static water level <u>1</u> feet.
C. Well Construction began: 1/26/2016	D. Well Construction Completed: 1/26/2016
E. Bore hole diameter in inches. Top 8.25 Bot	ttom <u>8.25</u>
F. Casing and Screen Joints are: <u>Threaded</u>	Other Joints description:
H. Total Estimate Capacity of Well gallons pe	er 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 <sup>1</sup>	Quantity Gravel <sup>2</sup>	Volume &Type Grout <sup>3</sup>
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

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

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

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

#### 12. Well Geologic Materials Logged

WellID	FromDepth*	ToDepth*	Туре	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.

### NC2MW-4

e fr

BOP	e Bor	ing l	NOITE Locat	ion I	lan	ELEV	ATION ISGS	DATUN			DRILLER LOGGER Abel Monnarez Bruce Birge	
9	1-9-1	04-				9-	10-0	4	Ð		CME-75 4.25" HSA	
- SAMPLENO.	54 SAMPLE TYPE	a RECOVERY, in.	PENETRATION RESISTANCE - BLOWS/FT.	POCKET PENETROMETER - TSF	UNCOMPINED COMPRESSION - TSP	MOISTURE CONTENT - %	DRY DENSITY - PCF	OTHER	GRAFHIC LOG	DEPTH, FT.	SURFACE TYPE     TOTAL DEPTH (FT.)       Weedy, Grassy Shoulder of Gislvel Road       WATER LEVEL OBSERVATIONS (FT.)       \$\bar{Y}\$ 8.0 ATD       \$\bar{Y}\$ 6.1 @ 1 Day AD       DESCRIPTION     Surface Elevation: 916.3       Very Stiff, Moist, Light Brown to Grayish Brown, Low Plastic Silty Clay to Silt	WEILING
			-	-		-	-	-	-111		(CL) (Roadbed Fill)	82
2	25	5		2.1	-	-	-		-	3		
3	78	18		2.6							5.0 911.	
_		14	_	4,5+		_	_				6.0 Hard, Slightly Moist, Dark Brownish Gray, Low Plastic Silty Clay (CL) 910.	48
4	28	24		0.5						10-		
5	28	24			-						Loose, Wet, Grayish Brown, Poorly Graded Sand with Some Silt, Very Fine-Grained (SP/SP-SM) (Alluvium)	
									<u>eo 64</u>		902. Bottom of Boring @ 14' in Sandy Alluvium Well Completed Using 3' Stick Up and Concrete Pad	
	-	-					_				An age of the second second	
-	The st	ralific	ation li	nes rei	onesent	the an	proxin	nate bo	undary l	ines bet	ween soil and rock types. In situ the transition may be gradual. PROJECT NAME	-
ł		<b>I F</b>	(L)	EI	N F	EI	L D	E R		÷	OPPD Flyash Monofill LOCATION Nebraska City, Nebraska PROJECT NUMBER 47962	

Mail to		<u>102</u> Depa	62004 - 162827 - J rtment of Natural Resour	<u>VW</u> RF ccs (3) minut
PO Box 94676 Lincoln, NE 68509-4676 Phone (402)471-2363	STATE OF DEPARTMENT OF N WATER WEL	F NEBRASKA ATURAL RESO L registration	URCES	DNR Form
	FOR DEPART	MENT USE ONLY		
Registration Date 💋 😞 Owner Code No 40	<u>26 - 2004</u> Sequence No 2222 Receipt No	/ <u>62827</u> Regi. /6991	stration No. <u>J-130</u> Umaka	<u>9442 X</u>
<ol> <li>a. Well Owner's First Nam</li> <li>b. Company Name <u>Oma</u></li> <li>c. Correspondent Name <u>Address 444 South 16</u></li> </ol>	lel.ast <u>ha Public Power District</u> Om <u>aha Public Power District</u> <sup>h</sup> Street Mall	NameAttention	James J. Krajicek	····
2. a. Contractor's License No Contractor's Email Add b. Drilling Firm Name	StateNE Contractor's Name resslocoabel@cox.net Kleinfelder	Zip <u>68102</u> Kleinfelder	Telephone (402) 63	<u>6-2309</u>
Address City <u>Oma</u> Drilling Firm's Email Ad	<u>9312 G Court</u> ha State <u>NE</u> ddress <u>bhavens@</u> kle	Zip68127 infelder.com	Telephone (40	)2) 331-2260
<ul> <li>b. Natural Resources District.</li> <li>c. The well is</li> <li>or Latitude Degree 40_ Longitude Degree 95_</li> <li>d. Street address and subdive Block</li> <li>e. Location of water use, if</li> <li>f. If for irrigation, the land</li> <li>g. Well reference letter(s), it</li> </ul>	ict Nemaha NRF         feet from the (North/ South) sec         feet from the (North/ South) sec         Minute 37 Second         Minute 47 Second         Minute 47 Second         Minute 47 Second         applicable (give legal descriptions)         to be irrigated is         MW-4	acres.       North, Range         b       b         stion line and	I4East/West,Oto	e County. est) section line cle one)
<ol> <li>Permits         Management Area Permit Nur Geothermal Permit Number Municipal Permit Number Well Spacing Permit Number     </li> </ol>	mber	Surface Water Permit Nur Industrial Permit Number Transfer Out-Of-State Per Conduct Permit Number Other Permit Number	mit Number	······································
5. Purpose of well (indicate one DomesticGree Livestock? Public Water Supply (with	)AquacultureC nund Heat Exchanger Ground KMonitoring Observat root spacing)RecoveryOt	ommercial/Industria] lwater Source Heat Pump tionPublic Wat her	Dewatering (over Irrigation er Supply (with spacing (46 638)) (indicate use)	90 days) Injection
<ul> <li>6. Wells in a Series.</li> <li>a. Is this well a part of a ser</li> <li>b. If one or more of the well</li> <li>c. How many wells in the series.</li> </ul>	ies?yes Yes go to part b of this ls in the series is currently registered rics are you registering at this time?	sectionNo go to par d, give the well registration 6	rt 7 of this application 1 numberNA	
<ul> <li>7. Replacement and abandoned v</li> <li>a. Is this well a replacement</li> <li>b. Registration number of all</li> <li>c. Replacement well is</li> <li>e. Original well pump colum</li> </ul>	well information. well? Yes X No bandoned well If no feet from abandoned well. nn size inches.	ot registered, date abandor d. Abandoned well last f. Completion of origin	ned well was constructed (n operated (m) /(d) nal well abandonment on (n	o)/(d/(y) /(y) _)/(d/(y)

g.	Location of water use of abandoned well
----	-----------------------------------------

				G130442	D
8. F	unp Information.				
а	Is pump installed at this time YesX	No			
I	s pump installed by well owner in section 1? Yes	No 1s pump install	led by contractor in se	ction 2? Yes	No
Ł	Foump installed by pump installer, please fill out licen	se number below			
b	Pump Installer's License No. Pum	ip Installer's Name			
	Pump Installer's Email Address	• ••• • •••			
	Pump Installer's Firm Name				
	Pump Installer's Firm Address				
	CityState	Zip	Telept	 100e	
	Pump Installer's Firm Email Address	<b>_</b>			
C.	Pumping rate gallons per minute	Measured	Estimated	···	
d	Drop pipe diameter inches	e. Length of	drop pipe	feet	
f.	Pumping equipment installed $(m) = \frac{1}{m} \frac{1}{m}$	g. Pump Brar	nd		
h.	This well will be used to pump less than 50 gpm	_YesNo			
9. Wo	Il Construction Information.			-	
a,	Total well depth 14 . feet.	b. Static wat	ter level ~ 6 1	feet	
с.	Pumping water level NA leet	d. Well Con	struction began (month)	/(day) / (year 20	04
c,	Well Construction completed (month) /(day) / (ye	<sub>ent.</sub> 2004_ f. Bore hole	diameter in inches To	op 6.5 Bottom	6.5
g.	Casing and Screen Joints are Welded Glued	I Threaded	X Other	•	

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

а	Ь	c	d	e	f	g	h
Placement		Inside	Outside	Wall	Type of	Screen Slot	Trade Name
h in Feet	Screen	Diameter	Diameter	Thickness	Material	Size	
То							
4	Casing	2.047	2.375	0.328	PVC	N/A	Johnson Screens
14	Screen	2.000	2.560	0.560	PVC	0.010	Johnson Screens
	a cement h in Feet To 4 14	a b cement Casing or h in Feet Screen To 4 Casing 14 Screen	abccementCasing orInsideh in FeetScreenDiameterTo4Casing2.04714Screen2.000	abcdcementCasing orInsideOutsideh in FeetScreenDiameterDiameterTo4Casing2.0472.37514Screen2.0002.560	abcdecementCasing orInsideOutsideWallh in FeetScreenDiameterDiameterDiameterTo4Casing2.0472.3750.32814Screen2.0002.5600.560	abcdefcementCasing orInsideOutsideWallType ofh in FeetScreenDiameterDiameterThicknessMaterialTo4Casing2.0472.3750.328PVC14Screen2.0002.5600.560PVC	abcdefgcementCasing orInsideOutsideWallType ofScreen Sloth in FeetScreenDiameterDiameterThicknessMaterialSizeTo4Casing2.0472.3750.328PVCN/A14Screen2.0002.5600.560PVC0.010

11. Grout and Gravel Pack

Pla	accment Depth in Feet	Grout or	Material Description		
From	То	Gravel Pack	•		
0	2	Bentonite	3/8" Bentonite Holephug		
2	I4	Gravel Pack	12-20 Sand		

#### 12. Geologic Materials Logged

.....

IZ.	Geologic Mater	hals Logged		1
De <sub>j</sub> Fro	oth in Feet m To	Description	See Attached Boring Log	De Fre

epth in Feet oт To Description

(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

 $\frac{0.304}{\text{Date}}$ 

r											<u> </u>	<u>142</u>	<u>D</u>
								LOC	g of	BO	RING NO. MW-4	Page	l of 1
BOREHOLE LOCATION ELEVATION DATUM See Boring Location Plan USGS BORING STARTED					/	····	DRILLER LOGGER Abel Monnarez Bruce Birge						
	1		.u -ı	1		BURI	NG CC		-1)	-	DRILL RIG DRILLING METHOD 4.25" HSA		
Z I SAMPLE NO.	2S SAMPLE TYPE	91 RECOVERY, in.	PENETRATION RESISTANCE - BLOWS/FT.	POCKET 0.2 POCKET 1.2 POCKET	UNCONFINED COMPRESSION - TSF	· MOISTURE CONTENT - %	DRY DENSITY - PCF	OTHER	GRAPHIC LOG	DEPTH, FT.	SURFACE TYPE       TOTAL DEPTH (FT)         Weedy, Grassy Shoulder of Gtavel Road         WATER LEVEL OBSERVATIONS (FT.)         ✓       8.0 ATD         ✓       6.1 @ 1 Day AD         DESCRIPTION       Surface Elevation:         Very Stiff, Moist, Light Brown to Grayish Brown, Low Plastic Silty Clay to Silt (CL) (Roadbed Fill)	916.5	90'I TTAM
3	28	18	1	2.6 4.5+						5-	5.0 A Hard, Slightly Moist, Dark Brownish	911.5	
4	25	24		0.5						10	<ul> <li>6.0 Gray, Low Plastic Silty Clay (CL) (Buried Soil)</li> <li>Firm to Soft, Well Completed Using 3' Stick Up and Concrete Padery Moist, <i>又</i> Grayish Brown, Silt with Very Fine Sand to Silty Very Fine Sand (ML/SM) (Alluvium)</li> <li>Becomes Wet</li> <li>Loose, Wet, Grayish Brown, Poorly Graded Sand with Some Silt, Very Fine-Grained (SP/SP-SM) (Alluvium)</li> <li>14.0</li> <li>Bottom of Boring @ 14' in Sandy Alluvium</li> <li>Well Completed Using 3' Stick Up and Concrete Pad</li> </ul>	910.5 907.5	
	The stri	atificat	<u>ion lin</u>	es repr	<u>esen</u> t t	he app	noxim	ate bour	ndary lii	nes betw	een soil and rock types. In situ the transition may be gradual		
		K	LE	11	N F	EL	D	ER	<u></u>		PROJECT NAME OPPD Flyash Monofill LOCATION Nebraska City, Nebraska PROJECT NUMBER		

G130442



B Se<u>nd To Print</u>er Back t<u>o Map</u> Nebraska City NE US

#### Notes:



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# SITE LOCATION PLAN



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	В	ORING LOG NO. MW-1	14	Page 1 of 1		
PR	ROJECT: OPPD Nebraska City- Monitor Installation	ing Well CLIENT: HDR E Omaha	ngineering, Inc. a, NE			
SI	TE: 7264 L Rd Nebraska City, NE					
GRAPHIC LOG	LOCATION: See Exhibit A-1 Latitude: 40.6248° Longitude: -95.7929°	Surface Elev.: 917 (Ft.) ELEVATION (Ft.)	-3' stick up	WATER LEVEL OBSERVATIONS SAMPLE TYPE FIELD TEST RESULTS		
	Gravel at surface <u>SILTY CLAY (CL/ML)</u> , dark gray		-Concrete	1-3-3-2 N=6		
18	4.0	913	-Seal hydrated ► - bentonite 3 chips	4-7-7-11 N=14		
E.GDT 8/13/	LEAN TO FAT CLAY (CL/CH), dark gray		5-			
TATEMPLAT	8.0	909	- <b>Riser Pipe 2</b>			
RRACON_DP	<u>SILTY CLAY (CL/ML)</u> , gray		PVC. Flush threaded to PVC Screen	2-1-1-2 N=2		
CIT.GPJ TE			- <b>Filter Material</b>	1-1-1-1 N=2		
) NEBRASKA				1-1-1-1 N=2		
185019 OPPI			-Screen 2" + 15 diameter schedule 40	0-0-0-0 N=0		
G-WELL D91	18.0	899	PVC slotted screen, 0.010"			
ED FROM ORIGINAL REPORT. GEO SMART LO	Boring Terminated at 18 Feet					
SEPARAT	Stratification lines are approximate. In-situ, the transition m	ay be gradual.	Hammer Type: Automatic			
Advar 41/4 Abanc We	coment Methoa: -inch ID Hollow Stem Auger donment Method: ell installed	_	Notes: Bottom of well at depth of 18 fee Concrete pad, protector pipe, an surface. Ground elevation estimated usin Energy Transfer Ratio 84.6%. H: 1.41 (October, 2017).	ot. d 3 bollards installed at ground g Google Earth. ammer Efficiency Correction =		
	6 ft. while drilling	Terraron	Boring Started: 07-12-2018 Boring Completed: 07-12-2018			
THIS BC		15080 A Cir Omaha, NE	Project No.: D9185019			