

# CCR Groundwater Monitoring System



Omaha Public Power District North Omaha Station North Omaha Ash Landfill Disposal Area *Omaha, Nebraska* 

January 24, 2020

#### OPPD North Omaha Station Groundwater Monitoring System Certification

#### **Revision Log**

This Plan may be revised from time to time when procedures are changed. Because revisions to this document can be made on a periodic basis, document control is necessary. The most recent version of this Plan is required to be posted on the CCR website. The revision log below will be updated every time the plan is amended.

Revision No.	Revision Date	Revised Sections	Originator	Notes
0	June 23, 2016	NA	HDR	Per CCR Rule
1	January 24, 2020	Table 1	HDR	Added MW-5, MW-6, & MW-8 to well network to align with NDEE State Monitoring Program. Removed MW-16 (abandoned well).

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

Print Name:	Megan B. Seymour	- CNVIRONMENT
Signature:	Mag. B. Sym	- Stan MECKANAN ST
Date:	//24/2020	- E-15931
License #:	E-15931	ATE OF NEBRAS

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) North Omaha Generating Station (Station). The Station, located north of Omaha, Nebraska has five coal-fired combustion units.

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

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

The groundwater monitoring system at the North Omaha Ash 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 January 2020 revision, to include additional downgradient monitoring wells (MW-5, MW-6, and MW-8). 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 five-unit, 663-megawatt (MW) fossil fuel-fired generating plant at the North Omaha Station (Station) in Omaha, Nebraska. Recently Units 1-3 were retired; Units 4 and 5 were retrofitted with air pollution control equipment and are still operating. The Station is located east of Pershing Drive and Craig Street, approximately 3.5 miles northwest of Eppley Airfield, along the west bank of the Missouri River at river mile 625.2. The first generating unit was placed in service in July 1954, and the fifth unit was placed in operation in 1968. Beneficial use and disposal of the fossil fuel combustion ash has occurred on the Station site since the 1950s.

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

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

# 3 Site Hydrogeology Summary

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

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

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

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

Groundwater flow direction in 1995 was reportedly to the easterly and northeasterly direction primarily toward the Missouri River, which forms the eastern boundary of the site. Generally groundwater flow direction is primarily easterly and northeasterly north of MW-15, located in the center of the site, and easterly and southeasterly south of MW-15. Semi-annual groundwater monitoring reports which documents ground water flow direction are on file with the NDEQ.

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

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

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

# 4 Groundwater Monitoring System

Based on the site-specific specific hydrogeologic information and location of the existing CCR landfill, the groundwater monitoring system for the North Omaha Ash Landfill for detection monitoring program consists of three (3) upgradient/background wells and seven (7) downgradient wells. The number of monitoring wells exceeds the minimum number of monitoring wells required by 40 CFR 257.91(c) (i.e. one upgradient and three downgradient). Six (6) additional wells are included for water level measurements only. The groundwater monitoring system network for the North Omaha Ash Landfill is summarized below in **Table 1**.

The groundwater contour at the site is typically mapped utilizing a shallow water table zone. The monitoring well locations are shown in **Figure 1** (attached). The groundwater monitoring wells were constructed of 2-inch-diameter, schedule 40 PVC, flush threaded riser pipe, and machine slotted 10-slot (0.010 inch) screen. The filter pack consisted of #16-30 silica sand with hydrated bentonite chips to create the seal and cement grout to fill the annulus. The surface completion for each well consists of a steel protective casing, concrete apron, and three bollards/posts. Monitoring well construction logs and registrations for the groundwater monitoring wells are contained in **Appendix A** of this report.

Monitoring Well	Date Installed	Well Depth (feet bgs) <sup>1</sup>	Well Depth (feet from TOC) <sup>2</sup>	Location with Respect to Landfill	Monitoring Program Use
Assessment	t Monitoring	g Program			
MW-2	3/6/95	30	32.98	Downgradient	Assessment
MW-5	3/2/95	30	32.73	Downgradient	Assessment
MW-6	3/8/95	31	34.01	Downgradient	Assessment
MW-8	3/7/95	30	32.94	Downgradient	Assessment
MW-9	5/4/96	63	61.72	Background/Upgradient	Assessment
MW-13	4/12/01	30	32.89	Downgradient	Assessment
MW-15	4/12/01	15	17.59	Downgradient	Assessment
MW-17	5/10/07	30	32.94	Downgradient	Assessment
MW-18	12/1/15	71	70.70	Background/Upgradient	Assessment
MW-19	1/20/16	76.5	76.30	Background/Upgradient	Assessment
Water Level	Measureme	ents Only			
MW-4	3/6/95	33	36.45	Downgradient	Water Level Only
MW-7	3/8/95	30	33.04	Downgradient	Water Level Only
MW-10	4/11/01	15	17.35	Downgradient	Water Level Only
MW-11	4/11/01	15	17.50	Downgradient	Water Level Only
MW-12	4/11/01	15	17.43	Downgradient	Water Level Only
MW-20	11/9/15	35	37.57	Downgradient	Water Level Only
Abandoned	Wells <sup>3</sup>				
MW-1	3/6/95 (Abandoned 4/17/01)	29	32.07	NA	NA
MW-3	3/3/95 (Abandoned 4/15/03)	52	55.19	NA	NA
MW-14	4/12/01 (Abandoned 9/9/02)	33	35.59	NA	NA
MW-16	9/9/02 (Abandoned 08/04/17))	35	37.14	Downgradient	NA

Table 1: OPPD North Omaha Ash Disposal Area, Groundwater Monitoring Well System

Notes:

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

2. 3.

Depth from top of casing to bottom of installed well. Abandoned in accordance with State of Nebraska regulations.



North Omaha Ash Disposal Area

Groundwater Monitoring Network





# Appendix A

Monitoring Well Documentation

#### MONITORING WELL CONSTRUCTION RECORD

Project Name Omaha Public Power District – North Omaha, Nebraska	Project Number 08 94037.02	
	E1/4 NE1/4 Sec 28 T75N BI3E	Total Depth (TOC) 32.98. feet
Ground Surface Elevation Marker in Concrete Well Pad EL Boring Location C	pordinates	Date Installed
998.3 It above NGVD 572361.1 Nor	th 2752199.2 East	03/06/95



## DRILLING LOG

Project	Name						P	niect Num	her	Boring Number	
Omah	a Public Power District	- North Omal	ha, Net	oraska	· * .			08 940	37.02	Bornig Homber	MW-2
Boring L	ocation Description	Lacoss rd intr		Boring L	ocation	1				Page	
Ground	Surface Elevation Top	of Well Casing Eleva	ition	Boring Lo	Coordinate:	1/4, Se s	<u>c 28, 175</u>	<u>N, RIJE</u>	Total Footage		
998.3	ft above NGVD (surv.) 100	1.41 ft above NGVD	) (surv.)	57236	<u> 1.1 N</u>	orth 275	52199.	99.2 East			30.0 ft.
ļ	Drilling Method (s)	Borehole Size	Overburd	en Footage	Bedr	ock Footage	e No.	Of Sample	es N	o. Core Boxes	Depth to Water
	6 1/4" ID HSA	8"	29.0	feet		0 feet		None		None	See Remarks
Drilling C	o. Layne, Inc, Omaha, Net	oraska		•	. • •	Driller (:	s) Lyle	e Porter,	Rick K	eith	
Drilling R	ig Acker Soilmax 80 Truck	Mounted			:	Type of Sampler	Split-	-Spoon		· · ·	
Date Sta	orted 03/06/95	Date Completed	03/06	/95		Fleid Ot	oserver	(s) Carm	elo Bla	zekovic	· . · · ·
Depth							Depth		• • •		-
Feet	Descripti	on	Cla	5CS   1 535.   C	Blow Sount	Recovery	in Feet	Sample No.	PID (ppm)	Re	emarks
1- 2- 3 4 5 6 	SILT, medium brown, so nonplastic, with minor c (fill). SILT, blueish gray, soft, moist, with minor sand an size coal grains (fill).	nonplastic; d some silt		3/19, ML 5/6/1	/14/4	1.4'/2.0' 2.0'/2.0'	1 - 2 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3	SS-1 SS-2		Start at 3:00 HSA = Hollow NGVD = Natio Vertical Datu Spoon penetra weathered lime	pm. Stem Augers inal Geodetic m
E							Ę				
14 7			Щ				14 1				

SCS ENGINEERS

Project I Omah								
Boring Lo NW of	ocation Description coal pile NW corner of acess rd inters		Ing Location	E1/4 NE1/4	Sec 28	T75N F	NISE	Page 2 of 2
Depth in Feet	Description	USCS Class	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
15- 16-	SILT, blueish gray, soft, nonplastic, moist, with minor sand and some silt size coal grains (fill). CLAYEY SILT, yellowish brown, soft, very moist, low plasticity, with minor fine sand.		2/3/4/5	1.6'/2.0'	15- 16-	SS-3		
17 - 18 -		ML			17 - 17 - 18 -			
19- 20-					19- 19- 20-			
21- 22-	SAND, medium gray, medium to fine grained, well graded, dense, very moist, with minor silt, mostly quartz and black rock grains.	• • • • • •	1/5/19/20	1.7'/2.0'	21- 	SS-4		
23-					23-			
25-	CLAYEY SAND, medium gray, fine grained, well graded, loose, wet, mostly quartz with rock grains in clay.				25			
26-			1/3/5/3	2.0'/2.0'	26-	SS-5		Advanced augers to 30.0'
28-					28-			Guit drilling at 5:20 pm.
29-					29-			Monitoring Well installed at 6:00 PM.
31 -	TOTAL DEPTH = 30.0 Feet				30-			

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SCS ENGINEERS

Kaneze City Missouri



#### MONITORING WELL CONSTRUCTION RECORD

SCS ENGINEERS

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30

5

8 Borehole Diameter

# DRILLING LOG

Project I	Name a Public <sup>®</sup> Power District	– North Omal	ha, Nel	oraska			Pro O	lect Numl 8 9403	ber 37.02	Boring Number	MW-5	
Boring L	ocation Description	issouri Biyor		Boring L	ocation	<u></u>		07 775		Page	Lof 3	
E part	of the site, next to M	of Well Casing Eleva	tion	Boring L	<u>NW1/4,</u> ocation	Coordinates	<u>4, Sec</u>	21, 1751	N RIJE	Total Footage	1015	
998.11	t above NGVD (surv.) 100	0.96 It above NG	/D (surv.	57174	0.3 N	orth 27	53024	<u>9 Eas</u>	t		35.0 ft.	
	Drilling Method (s)	Borehole Size	Overbur	ten Footage	Bedr	ock Footage	No. (	Of Sample		o. Core Boxes	Depth to Water	
	6 1/4" ID HSA	8"	35.0	) feet		0 feet		None		None	See Remarks	
Drilling Co	rilling Co. Layne, Inc, Omaha, Nebraska Driller (s) Lyle Porter, Rick Keith											
Orilling Ri	Acker Soilmax 80 Truci	k Mounted			*	Type of Sampler	Split-	spoon	(standa	ard penetrat	ion test)	
Date Sta	rted 03/02/95	Date Completed	1 03/0	2/95		Field Ob	server (	s) Carm	elo Bla	izekovic		
Depth				SCS	Blow		Depth in	Sample	PID			
Feet	Descript	ion	c	ass.	Count	Recovery	Feet	No.	(ppm)	Re	emarks	
-	GRAVEL, COBBLES, SA	ND, AND SILT	þ				-		•	Start at 11:20	AM	
-			þ				1		·		Stem Augers	
· · · · · ·	-				in the second se					Vertical Datu	m	
							, - , -					
2-												
				GW								
3-			Lo Lo				3-					
-			D D				-					
4-							4-					
-			Lo		• • • •		]					
5-]							5-					
	CLAVEY STLT vellowist						-					
6-	medium density, very m	oist, with up to					6-]					
]	silt mottles (fill).	Sideisit grey					- 1					
7-							7-					
							- 1					
Ea							8-					
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97							Ĭ,					
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10-1							₩ <u></u>					
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				5/11	/14/15	1.5'/2.0'	"-	SS-1				
							]					
12-]							12-					
-							4					
13-							13-					
4							]					
14 -							14 -					
		e de la constance de la constan	000		TNIC	CDC ···	e de la composition d					

Kansas Citv. Missouri

Project N	ame	Not	rack			Pro	ject No. 8 9403	37 02	Boring N	umber MW	-5
Omana Boring Loo	cation Description	inc.	Borin	g Location			77511 0		Page	2 of 3	2
E part	of the site, next to Missouri River	<u></u>	NW1/	4. NW1/4, S	<u>W1/4, NW1/4</u>	Sec 27	<u>1/5N, H</u>	(13E		201	<b>)</b>
in Feet	Description	U Cl	SCS ass.	Blow Count	Recovery	in Feet	Sample No.	PID (ppm)		Remarl	(5
15-	CLAYEY SILT, yellowish brown, medium density, very moist, with up tp 1/4" oval shaped light blueish grey silt mottles (fill).		MĻ			- 15-					
16-	SILTY SAND, blueish grey, fine grained, medium density, well graded, very moist, minor clay and trace wood and coal particles.		• • • • •	10/7/8/12	2.0'/2.0'	- 16- -	SS-2				
17-		•	•			17-					
18-			•		•	18					
19-						19					
20-			SM			20-					
21-		-   -		2/2/5/2	1.8'/2.0'	21	SS-3				
22						22-					
23-		•				23-					
24	SANDY CLAY light grey bigh					24-					
25-	plasticity, soft, very moist.					25					
26-				3/4/5/6	2.0'/2.0'	26-	SS-4				
						- - - 27					
2/			сн								
28-						28					
29-						29-					
30-			-	1/2/2/3	2.0'/2.0'	30-	SS-5				
<u>31</u>						31 -		<b>e</b> et -			

Project Na Omaha	ame Public Power District - North Omaha	i, Nebrask	(a	• • •	Pro 0	lect No. 8 9403	37.02	Boring Number MW-5
Borling Loo È part	cation Description of the site, next to Missouri River	Borin NW1/	g Location (4, NW1/4, 5	5WI/4, NWI/4	Sec 27	. T75N, R	13E	Page 3 of 3
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
32-	SANDY CLAY, light grey , high plasticity, soft, very moist.		1/2/2/3	2.0'/2.0'	32	SS-5		Advanced augers to 35.
33- 34-		СН			33- 			Pulled Augers. Borehole open to 34.5'. Backfilled borehole with sand to 30'. Well installed 3:00 PM.
35-	TOTAL DEPTH = 35.0 Feet				35-			
37-					30- - - - 37-			
38-					38-			
39-					39-			
40- 					40			
42-					42			
43-					43-			
44					44			
45-					45-			
40-					40			
48					48			

Kansas Citv. Missouri

#### MONITORING WELL CONSTRUCTION RECORD

ť,

Project Name	Pro	plect Number	Well Number	
<u> Omaha Public Power District - North Omaha, Net</u>	oraska 0	8 94037.02		MW-6
Location Description	Location		Total Depth	(TOC)
NW of Western Bottom Ash Pond	NW1/4,SW1/4,SE1/4,NE1/4,Sec.28	T75N R13E		34.01 feet
Ground Surface Elevation Marker in Concrete Well Pad EL	Boring Location Coordinates		Date Installe	d
999.6 ft above NGVD	571097.1 North 2751940.	2 East		03/08/95



Kansas City, Missouri

# DRILLING LOG

11

Project I Omah	Name a Public Power District	- North Omal	ha, N	lebras	ka			Pr (	olect Nu 08 940	mber 37.02	Boring Number	MW-6
Boring Lo NW of	ocation Description Western Bottom Ash P	ond		Bori NW	ng Locatic 1/4,SWI/4	on . <u>SE1/4</u>	4.NE1/4	,Sec.28	3,T75N,R	13E	Page	l of 2
Ground 5 999.6	Surface Elevation Top ft above NGVD (surv.) 100	of Well Casing Eleva 2.65 ft above NGV	ition /D (su	rv.) 57	ng Locatio 1097.1 N	n <mark>Coo</mark> Iorth	rdinates	<b>s</b> 51940.	.2 East		Total Footage	31.0 ft.
	Drilling Method (s)	Borehole Size	Over	burden Foo	otage Bec	lrock	Footage	e No.	Of Samp	les N	o. Core Boxes	Depth to Water
	6 1/4" ID HSA	8"	3	1.0 fee	t -	0 fe	eet		None		None	See Remarks
Drilling Co	o. Layne, Inc, Omaha, Nel	braska					Driller (:	s) Lyle	e Porter	, Rick K	eith	
Drilling Ri	g Acker Soilmax 80 Truck	Mounted	;	1			Type o Sampler	Split-	spoon	(standa	ard penetrat	on test)
Date Sta	rted 03/08/95	Date Completed	03/	08/95		· · ·	Field Ot	oserver	(s) Carr	nelo Bla	zekovic	-
Depth in Feet	Descript	ion		USCS Ciass.	Blow Count	Re	covery	Depth in Feet	Sample No.	PID (ppm)	Re	marks
	SILT, medium brown, m moist, non-plastic, with (fill).	edium to loose, n minor clay						1-			Start at 10:00 HSA = Hollow NGVD = Natio Vertical Datu	) Stem Augers nal Geodetic n
2- 3-								2				
4 	SILT, medium brown, loc non-plastic with minor of fine sand (fill).	ose, wet, clay and trace						4 4 5				
6-					6/4/4/2	1.6'	/2.0'	6	SS-1			
7-				ML -				7-				
9-1-1								- 9- - -				
10-								10 - - - -				
11-					2/3/1/2	1.3'/	2.0'	11	SS-2.			
12-								12				
13-								13-				
1-4 ]					<u> </u>			14		<u>.                                    </u>		J

Backg Leaden Description         Pace         P	Project N Omaha	Name a Public Power District – North Omaha, I	Nebrasl	ka		Pro O	<b>ject No.</b> 8 9403	37.02	
Depth Feet         Description         USCS Count         Blow Recovery         Depth Feet         Sample No.e         FID (pm)         Remarks           15         SILT, medum brown, loose, wet, non-plastic with minor clay and trace; interaction clay and trace; interactio	Boring Lo NW of	western Bottom Ash Pond	Borir	ng Location /4,SW1/4,SE	1/4.NE1/4.S	ec.28,T7	5N,R13E		Page 2 of 2
SLT_ nedum brown, toose, wet. fine sand (fill).       15         IS       IS	Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
16       2///4//0       L8 / 2.0       18       5S-3         17       CLAYEY SILT, brown, medium to low plasticity with minor fine sand.       17       17         18       19       19       20         20       SANO, yellowish brown, fine grained, loose, wet, well graded, with minor silt, end to ck grains.       20       20         21       SANO, yellowish brown, fine grained, loose, wet, well graded, with minor silt, end to ck grains.       20//2.0       21       5S-4         22       23       24       24       24       25         23       24       24       25       26       5S-4         24       25       20       26       5S-4       26         24       24       25       26       5S-4       26         24       24       25       26       5S-4       26         26       SANO, build greev, fine grained, loose, wet, well graded, more grained, loose, cky, mostly quertz and rock grains.       27       26       5S-4         27       28       28       28       28       28         29       30       30       30       30       30         31       000       30       31       31       31	15-	SILT, medium brown, loose, wet. non-plastic with minor clay and trace fine sand (fill).				15			
17       CLAYEY SILT, brown, medium to consistency, very moist, medium to consistency, very moist, medium to low plasticity with minor ine sand.       17       18         18       19       20       20       20         20       SAND, yellowish brown, fine grained, mostly quartz with rock grains.       212/2/5/8       20/2/2.0°       21       55-4         21       mostly quartz with rock grains.       212/2/5/8       20/2/2.0°       21       55-4         22       23       24       24       24       24         25       26       SAND, bluish grey, fine grained, loose, wet, well graded, with mill millor class, mostly quartz and rock grains.       5W       2/2/1/2       20/2.0°       28       55-5         26       SAND, bluish grey, fine grained, loose, wet, well graded, with sill end minor class, mostly quartz and rock grains.       27       28       28       29         27       28       29       20       20       20       20       20         29       30       30       30       30       31       31	16-			2/1/4/10	1.9'/2.0'	16	SS-3		
18- 19- 20- 21- bose, wet, well graded, with minor sitt, mostly quartz with rock grains.       2/2/5/6       20/2.0'       21- 21- 22- 23- 24- 24- 25- 24- 25- 26- 26- 27- 26- 27- 28- 28- 29- 10TAL DEPTH = 310 Feet       SM0, bluish grey, line grained, hoose, clay, mostly quartz and rock grains.       2/2/5/6       2.0/2.0'       21- 25- 26- 27- 28- 29- 30- 31-       SM0, bluish grey, line grained, hoose, clay, mostly quartz and rock grains.       SM       2/2/1/2       2.0/2.0'       26- 26- 27- 28- 29- 30- 31-       SM0, bluish grey, line grained, hoose, clay, mostly quartz and rock grains.       SM       2/2/1/2       2.0/2.0'       26- 26- 27- 28- 29- 31-       SS-5- 29- 31-       SM0, bluish grey, line grained, hoose, clay, mostly quartz and rock grains.       SM0, bluish grey, line grained, hoose, clay, mostly quartz and rock grains.       SM0, bluish grey, line grained, hoose, clay, mostly quartz and rock grains.       SM0, bluish grey, line grained, hoose, clay, mostly quartz and rock grains.       SM0, bluish grey, line grained, hoose, clay, mostly quartz and rock grains.       SM0, bluish grey, line grained, hoose, clay, mostly quartz and rock grains.       SM0, bluish grey, line grained, hoose, clay, mostly quartz and rock grains.       SM0, bluish grey, line grained, hoose, clay, mostly quartz and rock grains.       SM0, bluish grey, line grained, hoose, grain duarts and rock grains.       SM0, bluish grey, line grained, hoose, grain duarts and rock grains.       SM0, bluish grey, line grained, hoose, grain duarts and rock grains.	17_	CLAYEY SILT, brown, medium consistency, very moist, medium to low plasticity with minor fine sand.	ML			- 17			
19       19         20       SAND, yellowish brown, fine grained, loose, wet, well graded, with minor sitt, mostly quartz with rock grains.         21       mostly quartz with rock grains.         22       23         23       24         25       24         26       SAND, bluish grey, fine grained, loose, wet, well graded, with silt and minor clay, mostly quartz and rock grains.         26       SAND, bluish grey, fine grained, loose, wet, well graded, with silt and minor clay, mostly quartz and rock grains.         27       28         28       29         29       30         30       30         31       TOTAL DEPTH = 310 Feet	18-					18			
20- 21- 22- 23- 24- 25- 26- 26- 27- 28- 29- 31- 20- 21- 23- 24- 22- 23- 24- 24- 25- 26- 26- 27- 27- 28- 29- 31- 20/2.0'       20- 20- 21- 23- 24- 22- 23- 24- 24- 25- 26- 25- 26- 25- 26- 27- 27- 28- 27- 28- 27- 28- 27- 28- 29- 27- 28- 29- 29- 29- 20- 27- 28- 29- 29- 20- 27- 28- 29- 29- 20- 27- 28- 29- 29- 20- 27- 28- 29- 29- 20- 27- 28- 29- 29- 20- 27- 28- 29- 29- 20- 20- 20- 20- 20- 20- 20- 20- 20- 20	19-					19-			
SAND, yellowish brown, fine grained, inostiy guartz with rock grains.       2/2/5/6       2.0'/2.0'       21-       SS-4         22-       23-       23-       23-       23-       23-         24-       24-       24-       24-       24-         25-       26-       SAND, bluish grey, fine grained, loose, etw, well graded, with sit and minor cley, mostly quartz and rock grains.       SW       2/2/1/2       2.0'/2.0'       26-       SS-5         26-       wet, well graded, with sit and minor cley, mostly quartz and rock grains.       27-       27-       27-       27-         28-       29-       30-       30-       30-       30-       30-         31-       TOTAL DEPTH = 31.0 Feet       COOD ENDINEERED       COOD ENDINEERED       Installed monitoring well 12:00	20-					20			
22- 23- 24- 25- 26- 26- 27- 28- 29- 20- 20- 20- 20- 20- 20- 20- 20	21-	SAND, yellowish brown, fine grained, loose, wet, well graded, with minor silt, mostly quartz with rock grains.		2/2/5/6	2.0'/2.0'	21-	SS-4		
23 24 25 26 SAND, bluish grey, fine grained, loose, wet, well graded, with silt and minor clay, mostly quartz and rock grains. 27 28 29 30 30 31 TOTAL DEPTH = 31.0 Feet	22-					22			
24       24         25       25         26       SAND, bluish grey, fine grained, loose, wet, well graded, with silt and minor clay, mostly quartz and rock grains.       27         27       27         28       29         29       29         30       30         31       TOTAL DEPTH = 31.0 Feet	23-					23-			
25-       25-         26-       SAND, bluish grey, fine grained, loose, wet, well graded, with silt and minor clay, mostly quartz and rock grains.       26-       SS-5         27-       27-       27-       27-         28-       29-       28-       29-         29-       30-       30-       30-         31-       TOTAL DEPTH = 31.0 Feet       0000       5000       31-	24-		• • • • • • • • • • • • • • • • • • •			24-			
26       SAND, bluish grey, fine grained, loose, wet, well graded, with silt and minor clay, mostly quartz and rock grains.       20       26       SS-5         27       27       27       27       27         28       29       28       29       29         30       30       30       30         31       TOTAL DEPTH = 31.0 Feet       31       31	25-		•			25			
27- 28- 29- 30- 30- 30- 30- 31- TOTAL DEPTH = 31.0 Feet	26	SAND, bluish grey, fine grained, loose, wet, well graded, with silt and minor clay, mostly quartz and rock grains.	• Sw	2/2/1/2 2	.0'/2.0'	26- s	S-5		
28- 29- 30- 31- TOTAL DEPTH = 31.0 Feet	27-					27			
29- 30- 31- TOTAL DEPTH = 31.0 Feet	28-					28-			
30- 31 - TOTAL DEPTH = 31.0 Feet	29-					29-			Installed monitoring well 12:00 pm.
31 - TOTAL DEPTH = 31.0 Feet	30-				3	30-			
	31 - T	OTAL DEPTH = 31.0 Feet				31 -			

Kansas City, Missouri

#### MONITORING WELL CONSTRUCTION RECORD

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



# DRILLING LOG

Projec	t Name							P	roject Nu	mber	Boring Number	41.1 0	
Boring	Ina Public Power District	<u>– North Omar</u>	<u>na, N</u>	lebras Bori	ka -				<u>08 940</u>	37.02	82.00	MM-8	
East	of Eastern Bottom Ash	Pond		NW	1/4,SE1/	4,SE1/	4.NE1/4	1.Sec.2	8, T75N, R	13E	rage	1 of 2	
Ground	3 Surface Elevation Top 3 ft above NGVD (surv.) 100	of Well Casing Eleva 3 59 ft above NGV	tion ( n / eu	Bori	ng Locat	ion Coo	rdinate	s ·	E E a a		Total Footage		
1000	Drilling Method (s)	Borehole Size	Over	burden Foo	tage B	edrock	<u> </u>	e No.	01 Samo	les N		<u>30.0 ft.</u> Benth to Wa	
-	6 1/4" ID HSA	8"	3(	0.0 fee	et i	0 f			None		None	See Pomo	
Drilling	co. Layne, Inc, Omaha, Ne	braska					Driller (	s) Lvie	Porter	Bick K	eith		142
Drilling	RIg Acker Soilmax 80 Truck	Mounted			<u></u> 11	· ·	Туре о	f Split-	- 50000	(standa	ard penetrati	on test)	
Date S	tarted 03/07/95	Date Completed	03/	07/95			Field O	bserver	(s) Carr		zekovic		
Depth			Ť					Denth					
in Feet	Descript	ion	· · ·	USCS Class.	Blow Coun	t Re	covery	in Feet	Sample No.	PID (ppm)	Re	marks	
1 2 3- 4- 5- 7- 8- 10-	SANDY SILT, dark gre with minor clay, mostly coal particles with silt SANDY SILT, dark grey with minor clay, mostly coal particles with silt (	y, loose, moist, cinders and (fill).			2/20/30	1.0	<b>Λι3.</b>	2	SS-1		Start at 12:45 Hammer bouncir	p.m.	
10 11 12 12 13	SILT, brownish grey, loos some clay and minor coar (fill).	e, wet, with se sand			/4/2/2	2.0'/	2.0'	10	55-2				
E ⊿1								+					
			Ш				^	14,7		<u> </u>			

US ENGINEERS

Project N Omaha	ane a Public Power District - North Omaha,	Nebr	ask	(a		Pro O	9403	37.02	
Boring Lo East o	cation Description of Eastern Bottom Ash Pond	E	Borin NWI	d Location	1/4 NE1/4 S	ec.28.T7	5N R13E		Page 2 of 2
Depth in Feet	Description	US( Clas	CS ss.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
15-	SILT, brownish grey, loose, wet, with some clay and minor coarse sand (fiil).					15-			
16-	CLAYEY SILT (alluvium), dark grey, soft, moist, trace plasticity, with some fine sand.			1/2/5/2	1.7'/2.0'	16	SS-3		
17_			ML			17-			
18-					•	18-		· · · · · · · · · · · · · · · · · · ·	
19-1	CAND vollouish brown fing grained					19-			
20-	well graded, wet, mostly quartz with some rock grains, trace silt.	•••				20-			
21-		•••		2/3/2/8	1.2'/2.0'	21	SS-4		
22-			-			22			
23-						23-			
24						24-			
25-		SI	w			25			
26-				1/1/2/3	2.0'/2.0'	26-	SS-5		
27-						27	· · · · · · · · · · · · · · · · · · ·		Installed monitoring well at 1:45 pm
28-						28-			
29		•				29-			
30-		•••				30- -			
31	TOTAL DEPTH = 30.0 Feet					31 -			

SCS ENGINEERS Kansas City, Missouri

#### MONITORING WELL CONSTRUCTION RECORD

Project Number	Well Number
oraska 08 94037.0	2 <b>MW-9</b>
Location	Total Depth (TOC)
SW1/4, NW1/4, SE1/4, NE1/4, Sec 28, T75N, R1	3E 62.55 feet
Boring Location Coordinates	Date Installed
571109.4 North 2751564.3 East	05/04/96
	Project Number 08 94037.0 Location SW1/4, NW1/4, SE1/4, NE1/4, Sec 28, T75N, R1 Boring Location Coordinates 571109.4 North 2751564.3 East



Borehole Diameter

## DRILLING LOG

Project N Omaha	ame Public Power District	- North Omat	na, Neb	raska			Pro	ect Numb 8 9403	er 7.02	Boring Number	MW-9
Boring Loo Woffly	cation Description	of Pershing D	rive	Boring I SW1/4		E1/4 NE1	/A Sec	28 T75N	I BIJE	Page	lof 4
Ground Su	Inface Elevation Top (	of Well Casing Eleva		Boring	Location C	oordinates				Total Footage	02.2.4
1027.11	Drilling Method (s)	Borehole Size	Overburd	en Footage	e Bedro	k Footage	No.	of Sample:	s No	. Core Boxes	Depth to Water
. ·	6 1/4" ID HSA	8"	61.0	feet	2.	3 feet		None		None	See Remarks
Drilling Co.	. Layne, Inc, Omaha, Nel	braska		· :		Driller (:	s) Ricķ	Keith			
Orilling Rig	Acker Soilmax 80 Truck	k Mounted		•		Type of Sampler	Contir	nuous Sc	il Sam	pler (CSS)	•
Date Started 05/03/96 Date Completed 05/0			05/04	/96		Field Ob	server	s) Carm	elo Bla	zekovic	
Depth in Feet	Descript	lion	US Cla	SCS ass.	Blow Count	Recover y	Depth in Feet	Sample No.	PID (ppm)	Re	emarks
	SILTY CLAY, dark gra high plasticity, some r	y, soft, moist, oots.		сн			1-			Start at 2:00 HSA = Hollow	) PM , Stem Augers
2	CLAYEY SILT, orange moist, low plasticity.	brown, soft,				4.2'/5.0'	2	CSS-1		NGVD ⇒ Natio Vertical Datu	onal Geodetic M
4-							4-				
5- 6-							5- 6-				
7- - 8-	CLAYEY SILT, grayish	brown, damp,		CL		3.6'/5.0'	7 8	CSS-2			
9-	soft, Iow plasticity, soi	me roots.					9-				
10- 10-							10-				
11-							11				
12-						5.0'/5.0	12-	CSS-3			
13- 1⊿							13- - 14 -				

SCS ENGINEERS

Kansas Citv. Missouri

Project N Omaha	ame Public Power District - North Omaha,	Nebras	ka		Pro 0	<b>ject No.</b> 8 9403	37.02	Boring Num	berMW-9	299
Boring Lo Woff	cation Description Iv ash disp. area, 40'W of Pershing Dri	ve swi	ng Location 1/4, NWI/4, S	E1/4, NE1/4	Sec 28	. T75N, F	RI3E	Page	2 of 4	· .
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)		Remarks	
-	CLAYEY SILT, grayish brown, damp, soft, low plasticity, some roots.			5.0:/5.0			•			
15-					15-					
16-					16-					•
17-				3 0'/5 0'	17_ -	C55-4				
18-	SILT, reddish brown, soft, very moist,			3.075.0	- 18-  -	600-4				
19-					19-1 19-1	000 3				
20-					20-					
21-					21					
22-		CL			22-					
23-				4.075.0	23-	155-5				
24-					24-					
25-	SILT, brownish gray, soft, very moist, low plasticity.				25					
26-					26-					
27-				5.0'/5.0'	27-	CSS-6				
28-					28-					
29-					29- -					
30-	CLAYEY SAND, reddish brown, medium grained sand and clay mixture, loose, very moist, poorly graded.	SC			30-					
31				5.0 /5.0	31 -	-55-7				

SCS ENGINEERS Kansas City, Missouri

Project N	ame Public Power District – North Omaha, I	Nebras	ka		Pro 0	ect No. 8 9403	37.02	Boring		-9	
Boring Lo	cation Description	Bori	ng Location		Sec. 28	T75N 8		Page	a of	A .	
Depth	y ash disp. area, 40 w of Persning Drive	<u>=   5M</u>	1/4, NH1/4, 3	1/4, NE1/4	Depth				0	<u>+</u>	
in	Description	USCS	Blow	Recovery	in Feet	Sample No	PID		Remark		
Feet		V.A	Count	liccorciy	-		(PP#//				
-	drained sand and clav mixture, loose,				-						
32-	very moist, poorly graded.				32-						
-		i sc			_						
22				5.0'/5.0'	33-	CSS-7					
55-					-						
					-						•
34-	SANDY CLAY, brownish gray, very		1		- 54						
]	moist, soft, high plasticity, fine and				-					- X	
35-	medium grained sand and clay				35-						
-					-						
36-					36-					e, n	
				ar an Tagairtean	-		· · ·				
37-	SANDY CLAY, blueish gray with				37-	at sur Second	· · · · ·				
<b>°</b>	reddish black laminae, soft, very			5.0'/5.0'		CSS-8					
201	moist, high plasticity, fine to very fine				38-						
30-	foul odor.				-		n en				
					20						
39-					39-		1. A.				
]											
40-					40-						
4						an an Shi An ang Shi					
41-		мн			41-						
-					-						
42-					42-						
				5.0'/5.0'		CSS-9					
13-					43-						
					44-						
44-							· · · · · ·				
]					-					an a	
45-					45-						
-											
46-					46-		· · · ·				
]				5.0'/5.0'		css-10	· · · · · · · · · · · · · · · · · · ·				
<u>47</u>					47-						
										::	
48 -					48 -		•••				

SCS ENGINEERS

Project Omah	Name a Public Power District — North Omaha, N	Vebras	ka.	9	Pro	8 940	37.02	Boring Number
Boring L W of	ocation Description fly ash disp. area, 40'W of Pershing Drive	Borin SWI	ng Location /4, NWI/4, S	EI/4. NEI/4	Sec 28	3. T75N F	113F	Page A of A
Depth in Feet	Description	USCS Class.	Blo <del>w</del> Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
49-	SANDY CLAY, blueish gray with reddish black laminae, soft, very moist, high plasticity, fine to very fine sand and clay mixture, some rootlets, foul odor.			5.0'/5.0'	49-	CSS-10		
50-		мн			50-			
51-					51-			
52-				5.0'/5.0'	52-	CSS-11		
53-	SAND, gray, fine grained, loose, wet, poorly graded.	SM			53-			
54	SANDY CLAY, gray, soft, wet, high plasticity.	мн			54			
56-	SAND, gray, medium grained, wet, loose, well graded.							
57-	SAND, blueish gray, fine grained, loose, wet, well graded.	•			57-			
58-		• • •		5.0'/5.0'	58-	SS-12		Quit drilling at 6'40 nm Will
59-	SAND, dark gray, medium grained, loose, wet, well graded.	•			59-			05/04/96 Start @ 830 am.
60-					60			Well installed 11:00 am.
61	LIMESTONE, light grey, weathered,				61-			
62-					62-			
63-					63-			
64-	TOTAL DEPTH = 63.3 Feet				64-			
<u>65 -</u>					65 -		<u> </u>	

Kansas City, Missouri



#### MONITORING WELL CONSTRUCTION RECORD

# DRILLING LOG

oject i )m	Name 9 Public Power District	– North Omal	na, Nebras	ka			Pr (	oject Nur )8 940	nder 37.02	Boring Numb	<sup>er</sup> MW-13
N of	ation Description Ash Storage B	uilding	Borli NE	ng Location 1/4.5~1/4	NE	4 NE H	SEC Z	8.T751	I,RIJE	Page   C	of Z
79,02	It above NGVD (surv.) 1001	1.91 It above NGV	tion Borlin D (surv.) 57	12 809.3	n Coo 12 M	V 275	2986.	38.E		Total Foota	<sup>se</sup> 30.0 ft
	Drilling Method (s)	Borehole Size	Overburden Foo	tage Bed	rock	Footage	No.	Of Sampl	es N	io. Core Boxe:	Depth to Water
	6 I/4" ID HSA	8"	30.0 f	+ :	0	f † '		None		None	See Remarks
IIIng Co	o. Layne, Inc, Omaha, Net	oraska			:	Oriller (:	s) Lyle	Porter		· · · ·	
illing Al	g Acker Soilmax 80 Truck	Mounted				Type o Sampler	Split-	spoon	· ·		
te Sta	rted 04/12/01	Date Completed	04/12/0	1		Field Ob	server	(s) Carn	nelo Bla	azekovic	
epth in Feet	Descripti	on	USCS Class.	Blow Count	Re	covery	Depth in Feet	Sample No.	PID (ppm)		Remarks
2	SILT, medium bi moist, non plast minor clay and	nwn i softi ic i with gravel (fil	N N				1				
0 5 0 	SILT, blueich gi	ray, soft,	- ML				5 4 5 5 6				
7-1-1- 8-1-1-	Sand and some	silt (fill)					7				
9	SILT, greenish gra non plastic, moist minor sand and	17, soft. , with sill (fill)	ML				9				
3-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1							13-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-				

Project Omah	Name a Public Power District - North Omaha,	Nebrask	(a		Pro	8 940	37.02	Boring Number MW-13
ring L	ocation Description of Ash Storage Building	Borin	lg Location	NE 4, NE	ly sec	2877	N RIJE	Page ZofZ
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth in Feet	Sample No.	PID (ppm)	Remarks
15-					15			
	CLAYEY SILT, light brown,	ML			-			
16-	soft, very moist low				16-			
17	plasticity, trace fine sound							
·//					17			
18-					- 18			
19-					- 19 			
20-	SAND. fine-medium, grey	SW			20			WET AT ZO Ff.
21-	black, well graded, wet, with minor sult				21-			
22-					22-			
23-					23-			
24-					24-			
25-			•		25			
26-					26			
27_					27-			
28-					28-	-		
29-]- 1	SILTY CLAY, grey, Shift, moist N	۱L			29			
1 30 1 1	TOTAL DEPTH 30,0 Ft.				30			
31-					- 			

MONITORING W	ELL CONSTRUCTION RECORD	
Project Name Omaha Public Power District - North Omaha. Neb	raska 08 94037.02	Well Number MW-15
Sw of Coal Pile, W of annage	Location NEAL, NWAY, SEAL NEASER 28, TISN RIJE	Total Depth (TOC) /5,0 feet
Ground Surface Elevation Marker in Concrete Well Pad El.	Boring Location Coordinates 571747, 86 ベ 2753131, 91 E	Date Installed

 $\overline{\mathcal{C}}$ 



Borehole Dlameter

## DRILLING LOG

Project Name				Project Number		Mul-15
g Location Description	of drainage	Boring Lo	cation	SEC 28 T15N .RI	3E Page 10	- Z
Ground Surface Elevation	Top of Well Casing Elevat	ion Boring Lo	cation Coordinates	3131.91 5	Total Footage	15.0 ft.
Drilling Method (s)	Borehole Size	Overburden Foolage	Bedrock Footage	No. Of Samples	No. Core Boxes	Depth to Water
6 1/4" ID HSA	8"	15.0 ft	0 ft	None	None	See Remarks
Drilling Co. Layne, Inc, Oman	ia, Nebraska		Driller (s)	Lyle Porter		
Drilling Rig Acker Soilmax 80	Truck Mounted		Type of Sampler	Split-spoon		
Date Started 04 16 01	Date Completed	04/16/01	Field Ob:	server(s) Carmelo	o Blazekovic	
Depth in Feet Di	escription	USCS Class. C	Blow Count Recovery	Depth in Sample F Feet No. (p	PID ppm) Re	marks
Feet GRHVEL 1- SANDY SIL loose, mon 2- Cinders a of call 3- 4- 5- 5- 5- 5- 5- 5- 5- 5- 5- 5	T. light grey ( st, ash with nd a few grains (fill) (LT, light grey, with cinders (w grains & )	Class. GP ML	ount Recovery	Feet No. (( 	ppm) Re Wet at	5 ft.
10- 11- 12- 13-				10		

·	Drillin	g Lo	bg, c	ontir	nue	d	_	
Project N Omaha	ame Public Power District – North Omaha. I	Nebrask	а		Pro	B 940	37 02	Boring Number MW-15
Boring Loo SvJ (	cation Description of Coal pile, w of drainage	Borin NE 14	g Location	K4, NE K4 S	SEC 28,	T75N,	R13E	Page Zot Z
Depth in Feet	Description	USCS Class.	Blow Count	Recovery	Depth In Feet	Sample No.	PID (ppm)	Remarks
15	SANDY SILT, light grey, loose, wet, ash with cinders and a few grains of coal (fill)	ML			15-			
16-	TOTAL DEPTY 15.0 ft				16			
17					17			
18-					18			
20-					19			
21-					21-			
22-					22-			
23-					23-			
24-					24			
25-					25-			
26-					26-			

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29-30-31

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LOG OF WEL	L NO	. MV	V-1	7					Pa	ige 1 d	of 2
CLIENT	Projec	ct Mana	ager			Mike	Reif				
SITE North Omaha Station Omaha, Nebraska	PRO.	JECT		N	orth	Oma	aha St	ation	TES	STS	
O     DESCRIPTION       O     BOREHOLE DIA.:     8.25 in       O     Image: Construction of the state o		DEPTH, A.	USCS SYMBOL	NUMBER	ТҮРЕ	RECOVERY, in.	SPT - N ** BLOWS / ft.	WATER CONTENT, %	FIELD VAPOR TEST (PPM)*	SAMPLE SENT TO LAB	
Coal dust at surface <u>LEAN CLAY</u> , trace sand Light brown		-		1	HS	22	6		ND		
3.7 95 LEAN CLAY Brown 2 inches of sandy lean clay at 4.5 feet			-		HS						
Light brown-light gray, very soft, mottled, wet with ferrous stains from 7 to 13.5 feet		-	-	2	SS	16	1		ND		
Light brown, moist with ferrous stains 13.5 to 14.5 feet				3	HS S	3 20	7		NE		
14.5       3 inches of light brown fine clayey sand at         14.5       14.5 feet         LEAN CLAY with very fine sand         Brown-gray         Moist         Continued Next Page	985	15			H	5					H 0.
The stratification lines represent the approximate boundaries between soil and rock types: in-situ, the transition may be gradual.			* NE	) indic of one	ates a (1) pa	readi rt per	ng of le million	ss than (ppm) i	the fiel sobutyle	d detec ane equ	tion lin
WATER LEVEL OBSERVATIONS, ft				E	BORI	NG S	TART	ED	5	-10-07	10:2
	17	ſſ			RIG	NGC	CME	75	DRILLEI	- 10-07 R	-14.3 E
				- 1	.OGG	ED .	K	AC .	IOB #	050	)2704

C

CL	IENT		Proied	t Man	ager						F	age 2	! (
-10	OPPD				-901			Mik	e Reif				
511	North Omaha Station		PROJ	ECT						-			_
	Omaha, Nebraska						Nort	h Om	iaha S	tation			
							SA	MPLE	S		TE	STS	-
Q	DESCRIPTION		DETAIL				9916						Γ
LO LO	DEGOMPTION		1.1		BOL			, E		8	щ,	Ł	
EHC HC				÷.	XW	2		ERY	±€	Ę	PW)	SE	Ĺ
RA				H	S	ABE	μ	S	NN.	E E	26	ABLE	
0		1.00		Ξ	nsc	N	۲ ۲	REC	SP1	₩¥0		N N N N N	i.
												0)F	
				-							-		
4	18 SH TY VERY SINE OAND IN	<u>7 981.5</u>											
	Light gray			_		4	SS	18	3		ND		-
	Soft, wet, ferrous stains, and trace roots			· _									
												2	
				20-							Ξ		
	20.75	979		_	4		HS						-
	Moist with organics and ferrous stains	2		_									
	the for the organics and remous starts												
	23.25	976 5	目	-		_							
	SILTY VERY FINE SAND with clay			_		5	SS	18	1		ND		
	Wet, ferrous stains			4									
,	25												
1	SANDY LEAN CLAY	974.5	目	25									
	Light gray		目				no						
2	wer, nace roots, trace magnesium staining		目	-									
			目	4									
			目	-									
2			目										
2			目	+		6	sst	24	1				
			目上	-									
2			目										
430	0	969.5											
	BOTTOM OF BORING			50									_
	visual observations made by the field crew	1								153			
e str wee	ratification lines represent the approximate boundaries			* ND	Indic	ates	a read	ling of	less the	an the fi	eld det	ection li	irv
ATF				0	f оле	(1) p	art pe	r millio	n (ppm)	) isobuty	lene e	quivaler	nt
					E	BOR	ING	STAF	RTED		5-10-(	07 10:	2
					E	BOR	ING	COM	PLETE	D	5-10-(	7 14	3
1	<u>+</u>				F	RIG		CM	E 75		R		
1											-1 \		5

Mail to Department of Natural Resources PO Box 94676 Lincoln, NE 68509-4676 Phone (402)471-2363 DEPARTMENT OF NATURAL RESOURCES WATER WELL REGISTRATION										
		FC	R DEPART	MENT USE ONLY						
	Filed 12510 1 52007 - 1856	Owner Code No 56 - WWEF	402 (5)	Registra 121879	tion No. <u>6-14-55</u> IMR	NRD				
1. a.	Well Owner's First Name	8		Last Name						
OF	Company Name_Omaha	a Public Power Distr	ict							
b.	Attention Name _ Jim Kr	ajicek								
c.	Address _ 444 South 16th	n Street Mall								
	City_Omaha		State NE	Zip 68102	Telephone402-636-2309	)				
2. a.	Contractor's License No	39325 Contrac	ctor's Name							
	Contractor's Email Addre	ess_lebazer@terrac	con.com							
b.	Drilling Firm Name <u>Te</u>	rracon Consultants,	Inc.							
	Address 2211 South 15	6th Circle								
	City Omana		_State_NE	Zip_68130-2506	Telephone_402-330-2202					
_	Drilling Firm's Email Ad	dress_lebazer@tern	racon.com							
3. a.	Well location <u>NE</u> 1/4 of	the <u>NE</u> ¼ of Section	on 28, Tow	nship <u>16</u> North, Ran	ge $13$ E $W$ , Douglas	Count				
b.	Natural Resources Distric	et Papio-Missouri	River Natural	Resource District						
C.	The well is $-1,380$	feet from the (N)	SL) sect	tion line and $\frac{-70}{-70}$	feet from the (ELUWL) se	ection line				
	OR Latitude Degree	Minute	S	econd						
d	Longitude Degree_	Minute	7475 Pershin	a Drive Omaha NF						
u.	Block	ision, il applicable _	1415 Tershin	Lot						
e	Location of water use (gi	ve legal descriptions	3)	LO(						
		ve regar desemptions								
f.	If for irrigation, the land	to be irrigated is		acres.						
g.	Well reference letter(s), i	f applicable <u>MW-1</u>	7	HHSS PWSID	and the second second					
4. Per	mits			Surface Water Permit	Number					
Ma	nagement Area Permit Nun othermal Permit Number	mber		Industrial Permit Num Transfer Out-Of-State	ber Permit Number					
Mu	nicipal Permit Number			Conduct Permit Numb	er					
HH	ell Spacing Permit Number ISS			Other Permit Number						
5. Pu	rpose of well (indicate one	) Aquacult	ure 0	Commercial/Industrial	Dewatering (over 90 da	avs)				
	Domestic Gro	und Heat Exchanger	Groun	dwater Source Heat Pur	np Irrigation	Injection				
F		Monitoring	Observati	on Public Wa	ater Supply (with spacing (46-638))					
	Public Water Supply (with	out spacing) Recov	ery <u>1</u> 0	ther	(indicate use)					
6. W	ells in a Series			-						
a.	Is this well a part of a ser	ries? Yes go to r	part b of this s	ection <b>I</b> No go to	part 7 of this application					
b.	If one or more of the wel	ls in the series is cur	rently register	ed, give all well registra	tion numbers					
C.	How many wells in the se	eries are you register	ing at this tim	e?						

•							- 3	8-145159
7. Repla a. Is b. R c. C e. L	cement and de s this well a rep Registration nur Driginal well la Location of wat	commissioned/mo placement well? mber of original v st operated (m) er use of original	odified well inf Yes • 1 vell/(d)/(y) well/	Formation. No go to part f If n d.	8 of this applica ot registered, d Replacement w	tion ate original well w ell is	vas constructed feet from origi	l (m) /(d /(y) nal well.
Please	e Select One:							
f.1.	Original wa	ter well decommi	ssioned on (m)_	/(d/(y)	OR			
2.	I hereby cer water well.	tify that the origin OR	nal water well v	vill be decom	missioned withi	n 180 days after s	such construction	on of the replacement
3.	I hereby cer days after s b. Mon d. nonco	tify that the origination of the construction of the construction of the consumptive or de consumpti de consumptive or d	nal water well of the replacem servation minimus use ap	will be modifi ent water wel oproved by the	ed and equipped l. It will be use e applicable nat	d to pump 50 galle d for one of the fo ural resources dist	ons per minute bllowing: a.	or less within 180 Livestock
	If 3d is cho	sen. NRD signatu	re is required.					
	NRD signa	ture			Dat	te	OR	
4.	Decommiss	ion/Modification	Certification fo	orm is submitte	ed by landowne	r.		
a. Is Is pun If pun b. P P P P C P c. P d. D f. P	s pump installe np installed by np installed by ump Installer's ump Installer's ump Installer's ump Installer's ump Installer's ump Installer's umping rate orop pipe diamo umping equipm	d at this time L well owner in sec pump installer, p s License Nos s Email Addresss s Firm Names s Firm Addresss s Firm Email Add gallo eter nent installed (m)	Yes Yes ction 1? Yes lease fill out lid P State P State P inches /(d_/(y)	No Yes No eense number ump Installer' Zip M	Is pump installe below 's Name es eLength of c gump Bran	ed by contractor ir Tel Estimated drop pipe d	ephonefe	Yes No
h. T	his well is desi	gned and construe	cted to pump le	ss than 50 gpi	m Yes	No		
9. Well Co a. To d. Wo Wo mc	onstruction Inf tal well depth ell Constructio ells drilled pric pratoriums requ	ormation. 30 n began <sub>(m)</sub> <u>5</u> or to stays or hire NRD signatur	feet. b. Sta / <sub>(d)</sub> 10/ , e <b>NRD sig</b>	atic water leve <sub>y)</sub> 2007 gnature	el <u>15</u> e. Well Cons	feet. c. Pur struction complete	nping water le d (m) 5 /( Date	vel <u>NA</u> feet <u>a) 10 /<sub>(y)</sub> 2007</u>
f. Bo g. Ca	ore hole diamet using and Scree	er in inches Top <u>1</u> en Joints are Weld	8.25 Botton led Gh	8.25 ued	_ Threaded _	•Othe	er	
10. Well C	onstruction (C	asing & Screen)-	c, d, e, & g me	asurements sh	ould be in inche	es to three decima	l places	
	a	b	c	d	e	f	g	h
Pla	acement	Casing or	Inside	Outside	Wall	Screen Slot	Type of	Trade Name
From	To	Screen	Diameter	Diameter	Inickness	Size	Material	
0	20	Casing	2.067	2 375	0.154	NA	DVC	Titon
20	30	Screen	2.007	2.375	0.154	NA 0.010	PVC	Titan
20	50		2.007		0.134	0.010	rvc	i itali
	-		-		1			
					1			
1								

6-145159

Placem	ent Depth in Feet	Grout or	Material Description
From	То	Gravel Pack	
)	0.75	Cement	Cement
).75	15	Grout	Bentonite Grout
15	18	Grout	Bentonite Chips
18	30	Gravel Pack	Gravel Pack (20-40)
12. Geolog	ic Materials Logged	1	
Depth in Feet From To	Descripti	on	Depth in Feet Description From To
	SEE ATTACHED E	BORING LOG	
بنتتم استنب	-		
	-		
			2
	-		
		5.1	
	-		

(Additional sheets may be submitted)

13. I hereby certify that the information provided on this registration is true and accurate to the best of my knowledge.

or's Signature 6/18/07 gnature Water Well Contractor's S

Well Owner's Signature if Contractor is unknown or Deceased

Date

Please note this document contains three pages.

									6-	MS	150	1	
	LOG OF WEL	LN	0.	MV	V-1	7					P	age 1 o	f 2
CL	IENT OPPD	Pro	oject	t Mana	ager		Υ.	Mike	Reif				
SIT	E North Omaha Station	PR	OJE	ECT				WIIK	e ixeli		_		-
	Omaha, Nebraska	100	-		-	1	North	Om	aha St	tation	TEC	TO	_
		WE	i				SAN	APLE:					-
<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: 1002.54 ft GROUND SURFACE ELEV.: 999.6 ft	DET		DEPTH, ft.	USCS SYMBOL	NUMBER	түре	RECOVERY, in.	SPT - N ** BLOWS / ft.	WATER CONTENT, %	FIELD VAPOR TEST (PPM)*	SAMPLE SENT TO LAB	
	Coal dust at surface <u>LEAN CLAY</u> , trace sand Light brown					4	HS	22	6		ND		
	3.7 996			-		1	55	22	0		ND		
	LEAN CLAY Brown 2 inches of sandy lean clay at 4.5 feet												
	Light brown-light gray, very soft, mottled,						нъ						
	wet with ferrous stains from 7 to 13.5 feet			-	-	2	SS	16	1		ND		
							HS						
	Light brown, moist with ferrous stains 13.5 to 14.5 feet			1 1 1		3	SS	20	7		ND		
	14.5 3 inches of light brown fine clayey sand at 985									F	ECEN	ED	
	LEAN CLAY with very fine sand Brown-gray Moist						HS				N Z	ENT OF	S
The	e stratification lines represent the approximate boundaries				ND in	dicate	es a re	eading	of less	than th	e field (	detection	lim
bet	ween soil and rock types: in-situ, the transition may be gradual.	-	_	-	of c	ne (1	) part	per m		om) isot	5 1		ents
W						BC	RIN	3 21			5-1	0-07 10	.20
W/L		7	Г			RI	G	100	CMF 7			0-07 14	B
VVL						10	GGED		KA	C 10	B #	05027	04

								E	3-14	1519	59	
	LOG OF W	ELL NO	). M\	N-1	7					P	age 2	of 2
CLIE	ENT	Proje	ect Man	ager			Mik	e Reif				
SITE	E North Omaha Station	PRC	JECT			North	Om	aha Si	ation			
	Omana, Nebraska			-		SAN	<b>NPLE</b> S	S		TES	STS	
GRAPHIC LOG	DESCRIPTION	DETAI	DEPTH, ft.	USCS SYMBOL	NUMBER	ТҮРЕ	RECOVERY, in.	SPT - N ** BLOWS / ft.	WATER CONTENT, %	FIELD VAPOR TEST (PPM)*	SAMPLE SENT TO LAB	
	18	981.5										
	SILTY VERY FINE SAND, trace clay Light gray Soft, wet, ferrous stains, and trace roots				4	SS	18	3		ND		
	20.75	979	-	-		HS					17	
	<u>LEAN CLAY</u> Dark gray-brown Moist with organics and ferrous stains											
		976.5			5	SS	18	1		ND		
	Light gray-light brown Wet, ferrous stains		-			T					84	
		974.5	25-	-		HS						-
	Light gray Wet, trace roots, trace magnesium staining			-	6	SS	24	1		ND		
									1			
1	30 BOTTOM OF BORING	969.5	- 30-	-	-			R	ECEIV	ED		
	Note: Soil classifications were based on visual observations made by the field crew.							JL NATU	N 25	200 ENT O SOUR	7 CES	
The	stratification lines represent the approximate boundaries			ND in	ndicat	es a re	eading	of less	than th	e field outvlen	detectio e equiva	n limit alents
WA	TER LEVEL OBSERVATIONS, ft			JI	BC	RIN	G ST	ARTE	)	5-1	0-07 1	0:20
WL	¥ 18 WD ¥ <b>7 Г</b>			-	BC	RIN	G CC	MPLE	TED	5-1	0-07 1	4:30
WL	ž ž IG	<b>T</b> al			RI	G	(	CME 7	5 DRI	LLER		BC
WL					LO	GGED	)	KA	C JO	B #	0502	7041

	Ν	VELL LOG NO. MW	-18			Pag	e 1 of 3
PR	OJECT: OPPD North Omaha Station	CLIENT: Omah	a Public Power D	istric	t		
SI	TE: 7475 Pershing Drive Omaha, Nebraska						
00	LOCATION -		INSTALLATION DETAILS	()	/EL ONS	- (II)	
HICL	Latitude: 41.3333153° Longitude:		Top Casing Elev: 1037-00	TH (ft	ATIC	ËRY   E	
GRAP		Surface Elev.: 1037.1 (Ft.)	Well Completion: Surface Mount	DEP	WATE OBSER	RECOV	s N N N N N
	LEAN CLAY (CL), dark brown, moist, Grass at surface	e ELEVATION (Ft.)	-Concrete —			7	
			-Seal hydrated ► chip bentonite	_		8	2-1-2-3 N=3
	2.5 LEAN CLAY (CL), with fine sand, gray, moist	1034.6				10	2-4-5-6
	with oxidized mottles			_			N=9
				5-		12	2 <b>-2-4-</b> 4 N=6
	becomes drv					14	2-2-5-5 N=7
						18	2-3-5-5
	with trace black oxidized mottles		- <b>Grout</b> portla <del>nd</del>	10-			N=8
						16	2-2-4-5 N=6
	13.5	1023.6				20	3 <b>-4-5-</b> 5 N=9
	15.0	1022.1		- 15		16	2-4-4-6
	<u>SILT (ML)</u> , gray to brown, dry			-			N=8
						16	2-5-7-9 N=12
	19.0 LEAN CLAY (CL), gray, dry, with orange mottles	1018.1				16	2-6-6-8 N=12
				20-		18	3-4-7-7 N=11
		1014.1		-		18	3-6-7-7
	LEAN CLAY (CL), red to brown, with red motules becomes moist					16	2-2-3-4
	The stratification lines represent the approximate transition betwee types; in-situ these transitions may be gradual or may occur at dif	een differing soil types and/or rock fferent depths than shown,	Hammer Type: Automat	ic 25–	1 [	1	
Advan Muq	cement Method: d rotary / split spoon sample hole		Notes:	ed on vie	ual obso	vation	made by the
Hol	Ionment Method: See	Appendices for explanation of symbols and	field crew. Actual conditi	ons may	vary.	10118	made by the
N/A	-Well installed abbr	reviations.					
$\bigtriangledown$	WATER LEVEL OBSERVATIONS		Well Started: 12/1/2015		Well Con	pleted:	12/1/2015
<u> </u>			Drill Rig: 770		Driller: JN	Λ	
		15080 A Circle Omaha, Nebraska	Project No.: 05157581		Exhibit:	1	

	WELL LOG NO. MW-18 Page 2 of 3											
PF	ROJECT: OPPD North Omaha Station	CLIENT: Omat	na Public Power Distri	ct	;t							
S	TE: 7475 Pershing Drive Omaha, Nebraska											
GRAPHIC LOG	LOCATION - Latitude: 41.3333153° Longitude: -95.9525745°	Surface Elev.: 1037.1 (Ft.	DEPTH (ft)	WATER LEVEL DBSERVATIONS SAMPLE TYPE	RECOVERY (In.)	SPT N-VALUE						
////	DEPTH MATERIAL DESCRIPTI	ON ELEVATION (Ft.			16	N=5						
					18	4-6-5-6						
				-		N=11						
	becomes gray		30		14	3-3-3-3 N=6						
					14	1-1-2-4 N=3						
3DT 2/4/16	becomes wet				16	2-2-4-5 N=6						
ACON2012.0			35		18	1-1-3-5 N=4						
PJ TERR	becomes gray with black mottles				24	2-4-4-5 N=8						
DGS.G	becomes gray trace black & orange mottles			-		-						
15157581 L	becomes gray, trace black a orange moraes		40		24	3-4-4-6 N=8						
ART LOG 0	becomes gray with black mottles		40		20	2-3-3-4 N=6						
MENTAL SM				-	20	2-4-5-5 N=9						
ENVIRON			45	-	18	3-4-6-7 N=10						
L REPORT.					18	7-7-6-7 N=13						
ORIGINA	48.0 LEAN CLAY (CL), gray, wet, trace fine sand	989.1			20	2-4-4-5 N=8						
ED FRG			50	$\dashv$								
ARATE	The stratification lines represent the approximate transition be types; in-situ these transitions may be gradual or may occur a	etween differing soil types and/or rock at different depths than shown.	Hammer Type: Automatic									
Adva Mu Hc	ncement Method: ud rotary / split spoon sample hole Illow stem auger, 8.25-inch diameter borehole		Notes:									
Abar N/	donment Method: A-Well installed	See Appendices for explanation of symbols and abbreviations.										
	WATER LEVEL OBSERVATIONS		Well Started: 12/1/2015	Well Compl	eted: 12/*	1/2015						
	33 ft while drilling	llerracon	Drill Rig: 770	Driller: JM								
THIS		Project No.: 05157581	Exhibit:	1								

	WELL LOG NO. MW-18 Page 3 of 3												
	PR	OJE	ECT: OPPD North Omaha Station		CLIENT: Omah	a Public Power D	istric	t					
	SIT	E:	7475 Pershing Drive Omaha, Nebraska										
	פראדאוט בטפ	LOC Latiti -95.9	CATION - ude: 41.3333153° Longitude: 1525745°		Surface Elev.: 1037.1 (Ft.)		DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	SPT N-VALUE		
		DEPT	H MATERIAL DESCRIPT LEAN CLAY (CL), gray, wet, trace fine sand (con	rion tinued)	ELEVATION (Ft.)		_			20	3-4-4-6 N=8		
		<u>52.0</u>	SANDY LEAN CLAY (CL), trace organics, brown,	, moist	985.1	-Sand silica	_	-		18	5-7-8-11 N=15		
			becomes gray at 54.5 becomes dark brown at 55.5			sand. 16/30 grade	- 55	-		24	2 <b>-8-7-</b> 10 N=15		
4/16		<u>57.0</u>	LEAN CLAY (CL), trace sand, trace organics, dat	rk gray	980.1		_			14	5-8-11-11 N=19		
12.GDT 2/4		<u>58.0</u> 59.0	FAT CLAY (CH), gray		979.1	<b>Seal</b> hydrate <del>d →</del> pellet bentonite	_		$\square$	16	4-5-6-5 N=11		
IERRACON20		<u>60.0</u>	LEAN CLAY (CL), trace sand, gray		977.1	-Riser Pipe 2"	60— _			20	1-3-3-5 N=6		
1 LOGS GPJ						threaded to PVC Screen	_			14	4 <b>-5-5-</b> 6 N=10		
LOG 0515758						-Filter Material	- 65			14	4-6-7-11 N=13		
UTAL SMART						-Screen 2"	_	-	X	12	3-6-7-8 N=13		
ENVIRONMEN		70.1			967	schedule 40 PVC slotted screen, 0.010" slot	- 70-	-	X	15	2-8-10-15 N=18		
RT.		71.0	LIMESTONE* Boring Terminated at 71 Feet		966.1		_			0	25-50/0		
D FROM ORIGINAL REPO			J										
PARATE		The typ	e stratification lines represent the approximate transition les; in-situ these transitions may be gradual or may occur	between differing soil typ at different depths than	es and/or rock shown.	Hammer Type: Automat	с		<u> </u>				
T VALID IF SE	vano Mud Hollo	ceme rotar ow st	nt Method: y / split spoon sample hole em auger, 8.25-inch diameter borehole			Notes:							
	ando N/A-	onme Well	nt Method: installed	See Appendices for exp abbreviations.	Dianation of symbols and								
		33	NATER LEVEL OBSERVATIONS			Well Started: 12/1/2015		Well C	omple	eted: 1	2/1/2015		
IS BOR				15080		Drill Rig: 770		Driller:	JM				
王				Omaha,	Nebraska	Project No.: 05157581	- II	Exhibit	:	1			

Well Reg	gistration o	r Area	Permit		F	ee Paid: DNR Cash Fu	0.00 HHSS Ind: <u>0.00</u> WWD Billing	Fee: <u>0.00</u> F: <u>0.00</u> ID: <u>53643</u>		
Source:	Nebraska On Line	Import Status:	Accepted	Use:	<u>Monitoring (G</u> <u>Water Qualit</u>	round y)	Owner ID:	<u>49927</u>		
Import ID:	14550553852650	Status:	<u>Active</u> <u>Registered</u> Well	Decommission Date:	_		Registration Number:	<u>G-</u> <u>178704B</u>		
Well ID:	<u>241804</u>	NRD:	Papio-Missour	<u>i River</u>			Registration Date:	<u>2/19/2016</u>		
Last Change User:	<u>hmcpherson</u>	Call Up Code:	_	Call Up Date:	_		Last Change Date:	<u>2/19/2016</u>		
Owner: Select Contact	ContactID Type	SeqNum B	egin Date <mark>End D</mark>	ate Name						
	49927 Owner	1 2,	/19/2016	Omaha Public Po	ower District,	Delete				
Contractor:	Certificate ID Firs 39570 Mic	stName Las hael B Re	stName if							
Drilling Firm:	Employe Delete 159781	erID Emplo Terrad	oyer con Consultants,	Inc.						
B. Natural Re Well GPS Lat/Long I C. The well is D. Street add E. Location of G. Well refere Well In A Serie Well Part of a	Lo North, Range 1 esource District: <u>Pr</u> Coordinates: DD S: feet from the ress or block, lot a f water use, if appl ence letter(s) if app es Series with Site P /ells Reg Total # W	2 ( <u>East</u> E apio-Misso Latitu <u>41° 1</u> 41.33 e Sectio and subdiv icable (giv plicable: <u>M</u> lan: <u>Yes</u>	/W), <u>Douglas</u> Co uri River (de <u>9' 59.93''</u> 3331 on line and fe ision: Addr/Sub e legal descripti W-18 Acres Cert NRD	Longitude <u>-095° 57' 09.27''</u> <u>-95.95258</u> eet from the Div <u>7475 Pershin</u> on): <u>NWNE S28 T</u>	<u>GPS R</u> section line. <u>g Drive</u> Block <u>16 R13E</u> ndDate Comme	equired No Lot	g Num (Extern	al Source) Cod	e Description	Wells in the Series
<u>244878</u> 3	4		No No	12/1/2015		G-145159		DEQ	Part of a DEQ site plan for spill or underground storage	WellID         RegCD         S           185656         G-         2           145159         -         1           241802         G-         1           178704A         2         -           241804         G-         1           178704B         -         -           241805         1         -
Permits			Aprild Date(c)				Apryd D	ate(s)		
Area Permit GeoPermit				SWater A Industria	App Code II	_	·			
MWF			—	Transfer	onduct Cada		·			
WSP HHSS			—	Swater C Other	onduct Code		·			
HHSS PWS II				ITN						
NDEQ	<u>NE00</u>	<u>54739</u>								
5. Purpose of	Well <u>Monitoring (C</u> Other Use Notes	Ground Wa	iter Quality) 							
7. Replaceme	ent well information	۱.	_	١	Well Considered	l a replacen	nent by NRD(W	ellID,		
A. Is this wel B. Registratic C. Abandoneo	l a Replacement we on number of aband d well last operated	ell? <u>No</u> Rej doned well d	ol No NRD A I: If not D. Rep	opproval Date \ registered, date a placement well is _	RegCD) Well Replaceme bandoned well feet from at	ent Reg CD was constru pandoned we	ucted ell.			

WellID RegCD StartDate EndDate

2/19/2016

1/20/2016

12/1/2015

11/9/2015

F. [ ] Original water well decommissioned \_\_\_\_\_ [ ] I hereby certify that the original water well will be decommissioned within 180 days after such construction of the replacement water well.

[] I hereby certify that the original water well will be modified and equipped to pump 50 gallons per minute or less within 180 days after such construction of the replacement water well.

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

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

Decommission Information Decommission Date: By	
8. Pump Information.	
A. Is Pump installed at this time? No	Pump present but Well Inactive: <u>No</u>
Free Flowing Well: <u>No</u>	Well active, no pump installed: <u>Yes</u>
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	5? <u>Yes</u>
9. Well Construction Information	
A. Total well depth: 70.8 feet.	B. Static water level <u>33</u> feet.
C. Well Construction began: <u>12/1/2015</u>	D. Well Construction Completed: <u>12/1/2015</u>
E. Bore hole diameter in inches. Top 8.25 Bo	ttom <u>8.25</u>
F. Casing and Screen Joints are: <u>Threaded</u>	Other Joints description:
H. Total Estimate Capacity of Well gallons p	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
241804 0	60.8	casing	2.07	2.38	0.154		PVC	EMI
241804 60.8	70.8	screen	2.07	2.38	0.154	0.01	PVC	EMI

\* are in Feet, all else is in inches

#### 11. Grout and Gravel Pack

Record Count = 6

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

\* are in Feet, all else is in inches

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

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

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

#### 12. Well Geologic Materials Logged

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

\* are in Feet.

		WELL LO	g no. Mw	-19				F	Page	1 of 4
PR	OJECT: OPPD North Omaha Station		CLIENT: Omah	na Public Pov	wer	Distric	t			
SIT	E: 7475 Pershing Drive Omaha, Nebraska		-							
00	LOCATION -		+	INSTALLATION D	ETAIL	s 🙃	/EL	ΡE	(In.)	
HICL	Latitude: 41.3314505° Longitude: -95.9521803°			Top Casing Elev: 1037.10		TH (ft	R LEV	LE TY	VERY	SPT /ALUE
GRAI			Surface Elev.: 1037.3 (Ft.)	Well Completion: Surface Mount		DEF	WATE	SAMP	RECO	ž
/////	DEPTH MATERIAL DESCRIP LEAN CLAY (CL), brown, Grass at surface	TION	ELEVATION (Ft.)	-Concrete>					_	
	20		1035.3			-	-	X	10	6-4-4-3 N=8
	LEAN CLAY (CL), light brown		100010		$\left  \right $	-		$\square$	_	2-3-2-3
	4.0		1033.3					M	6	N=5
	LEAN CLAY (CL), light brown, oxidized			- <b>Grout</b> portla <del>nd &gt;</del>		5-	-	$\square$	17	2-3-4-5 N=7
				Sontointe grout		-		$\bigcirc$		2-3-5-7
						-	_	$\square$		N=8
						-		$\square$	18	2-5-5-7 N=10
						-	-	$\square$	20	2-3-5-8 N=8
						-	_	X	15	4-7-9-9 N=16
						15-		X	16	2-3-6-7 N=9
						-	-	$\square$	20	4-6-7-6 N=13
						-	-	$\square$	21	3-3-5-5 N=8
	no oxides					20-	-	$\square$	22	2-3-4-4 N=7
						-	-	$\left \right $	19	2-4-4-5 N=8
					71	25-		$\mid$	24	2-3-4-4
	The stratification lines represent the approximate transition types; in-situ these transitions may be gradual or may occur	between differing soil typ r at different depths than	es and/or rock shown.	Hammer Type: 7	Autom	atic				
Advan	cement Method:			Notes:						
Holl	ow stem auger, 8.25-inch diameter borehole			Soil descriptions field crew. Actua	are ba I cond	ased on vis itions may	sual ob ⁄ vary <b>.</b>	serva	tions m	nade by the
Aband N/A-	onment Method: Well installed	See Appendices for exp abbreviations.	planation of symbols and							
	WATER LEVEL OBSERVATIONS			Well Started: 1/20/	2016		Well C	omple	eted: 1	/20/2016
	30 ft while drilling	llerr	acon	Drill Rig: 770			Driller:	JM		
		15080 Omaha,	A Circle Nebraska	Project No.: 05157	581		Exhibit	:	2	

		WELL LO	G NO. MW-	-19				F	Page	2 of 4
PR	OJECT: OPPD North Omaha Station		CLIENT: Omah	na Public Pow	er D	istric	t			
SIT	E: 7475 Pershing Drive Omaha, Nebraska		_							
GRAPHIC LOG	LOCATION - Latitude: 41.3314505° Longitude: -95.9521803°		Surface Elev.: 1037.3 (Ft.)			DEPTH (ft)	WATER LEVEL DBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	SPT N-VALUE
	DEPTH MATERIAL DESCRIF LEAN CLAY (CL), light brown, oxidized (continu	PTION led)	ELEVATION (Ft.)					$\mathbf{X}$	24	N=7
						-	-			
						-		X	24	2-2-3-2 N=5
	becomes moist					-	-	X	24	1-1-2-3 N=3
						-	-	$\square$	24	2-3-3-3 N=6
						35-	-	$\square$	24	1-3-3-3 N=6
						-	-	$\square$	24	3-3-4-5 N=7
						-	_	X	24	2-3-3-3 N=6
	41.0		996.3			40-		$\mathbb{N}$	24	3-3-4-3
	<u>LEAN CLAY (CL)</u> , gray					-	-	$\left  \right\rangle$	18	N=7 2-3-2-3 N=5
						-	_	$\left  \right\rangle$		3-4-9-4
	manganese and iron inclusions					45	_	$\left  \right\rangle$	12	N=13
						-	-	Å	12	3-9-5-4 N=14
						-	-	X	12	3 <b>-4-5-</b> 7 N=9
	The stratification lines represent the approximate transition	n between differing soil typ ur at different depths than	pes and/or rock shown.	Hammer Type: Au	utomat	ic				
Advano Mud Hollo	xement Method: rotary / split spoon sample hole bw stem auger, 8.25-inch diameter borehole			Notes:						
Abando N/A-	onment Method: Well installed	See Appendices for ex abbreviations.	planation of symbols and							
	WATER LEVEL OBSERVATIONS		5-31 C	Well Started: 1/20/20	016	,	Well C	omple	eted: 1	/20/2016
$\square$	30 ft while drilling	llerr	acon	Drill Rig: 770			Driller:	JM		
		15080 Omaha.	A Circle Nebraska	Project No.: 0515758	81		Exhibit	:	2	

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

	W	ELL LOG NO. MW-	-19		P	age	3 of 4
PF	ROJECT: OPPD North Omaha Station	CLIENT: Omah	a Public Power Dis	trict			
SI	TE: 7475 Pershing Drive Omaha, Nebraska						
GRAPHIC LOG	LOCATION - Latitude: 41.3314505° Longitude: -95.9521803°	Surface Elev.: 1037.3 (Ft.) ELEV/ATION (Ft.)		DEPTH (ft) WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	SPT N-VALUE
	LEAN CLAY (CL), gray (continued)			_	X	18	3-5-5-7 N=10
	54.0	983 3				12	3 <b>-</b> 4-6-7 N=10
	LEAN CLAY (CL), brown, iron staining			55—		24	3-5-5-7 N=10
0/4/16				_		18	4 <b>-4-7-</b> 8 N=11
N2012.GDT 2	60.0	977.3	-Sand sand	- 	$\square$	24	4-4-6-7 N=10
J TERRACO	LEAN CLAY (CL), gray			_	M	24	2-4-6-5 N=10
31 LOGS.GP.	64.0	973.3	- <b>Seal</b> hydrate <del>d →</del> bentonite pellet	_	M	24	3-4-5-5 N=9
.0G 0515758	LEAN CLAY (CL), brown	971.3	Discreption Office	65-	M	24	3-6-5-6 N=11
AL SMART L	LEAN CLAY (CL), dark brown, trace shells	969.3	diameter schedule 40 PVC. Flush threaded to		M	17	2-5-6-6 N=11
IVIRONMEN	<u>SILTY CLAY (CL)</u> , gray			70	M	24	3-3-3-4 N=6
EPORT. EN	71.0 SILTY CLAY (CL), gray, and limestone gravel	966.3	silica sand. 16/30 grade	-	M		3-14-26-24 N=40
ORIGINAL R	73.0 LEAN CLAY (CL), trace sand, gray, (glacial till)	964.3	-Screen 2"	_	$\square$	18	18 <b>-</b> 26-6-7 N=32
TED FROM	The stratification lines represent the approximate transition betwee	en differing soil types and/or rock	PVC slotted screen, 0.010"	75—	$\times$	16	3-6-7-8
EPARA	types; in-situ these transitions may be gradual or may occur at diff	ferent depths than shown.					
	ncement Method: Id rotary / split spoon sample hole Illow stem auger, 8.25-inch diameter borehole	Appendices for evaluation of outputs and	Notes:				
S Aban	A-Well installed	eviations.					
	WATER LEVEL OBSERVATIONS 30 ft while drilling		Well Started: 1/20/2016	Well C	omple	ted: 1	/20/2016
S BOF			Drill Rig: 770	Driller	JM		
Ξ		Omaha, Nebraska	Project No.: 05157581	Exhibit	t: -	2	

	WELL LOG NO. MW-	-19	Page 4 of 4
PROJECT: OPPD North Omaha Station	CLIENT: Omah	a Public Power Distri	ct
SITE: 7475 Pershing Drive			
Omaha, Nebraska			
Omaha, Nebraska         Output         LOCATION -         Latitude: 41.3314505° Longitude:         -95.9521803°         DEPTH         MATERIAL DESCRI         LEAN CLAY (CL), trace sand, gray, (glacial till)         76.9         FAT CLAY (CH), with limestone, gray, (weather         76.9         VIO LIMESTONE*         Boring Terminated at 77 Feet	Elev: 1037.3 (Ft.) PTION ELEVATION (Ft.) (continued) 961.3 ed limestone) 960.4 960.4 960.9		Invertieve and the second seco
The stratification lines represent the approximate transition types; in-situ these transitions may be gradual or may occu Advancement Method: Mud rotary / split spoon sample hole Hollow stem auger, 8,25-inch diameter borehole	n between differing soil types and/or rock ur at different depths than shown.	Hammer Type: Automatic	
Abandonment Method: N/A-Well installed	See Appendices for explanation of symbols and abbreviations.		
WATER LEVEL OBSERVATIONS		Well Started: 1/20/2016	Well Completed: 1/20/2016
30 ft while drilling	llerraron	Drill Rig: 770	
	15080 A Circle	Project No - 05157591	Evhibit: 2
	Umana, Nebraska	FT0JECLIND.: 05157581	

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

IWIP Wells - Reg Print

Source: Import ID:	gistration or	Area	Permit		Fee Paid: DNR Cash Fur	<u>\$130.00</u> HHSS F nd: <u>\$18.50</u> WWDF: Billing I	ee: <u>\$90.00</u> <u>21.50</u> D: <u>53643</u>			
Import ID:	<u>Nebraska On Line</u>	Import Status:	Accepted	Use:	Monitoring (Ground Water Quality)	Owner ID:	<u>49927</u>			
	<u>145505413029741</u>	Status:	<u>Active</u> <u>Registered</u> <u>Well</u>	Decommission Date:	_	Registration Number:	<u>G-</u> <u>178704A</u>			
Well ID:	<u>241802</u>	NRD:	<u>Papio-Missouri I</u>	River		Registration Date:	2/19/2016			
Last Change User:	hmcpherson	Call Up Code:	_	Call Up Date:	_	Last Change Date:	<u>2/19/2016</u>			
)wner:										
Select Contact										
	ContactID Type         S           49927         Owner 1	eqNum Bo 2/	egin Date End Date 19/2016	Name Omaha Public Por	wer District,					
Contractor:	Certificate ID First 39570 Mich	Name Las ael B Rei	stName f	_						
Drilling Firm:	Employer Delete 159781	r <b>ID Emplo</b> Terrac	oyer con Consultants, Inc							
A. Well Locat Township B. Natural R Well GPS Lat/Long C. The well i D. Street add E. Location o G. Well refer Vell In A Seri Well Part of a Series # of V 244878 3	ion: <u>SW1/4NE1/4</u> <u>16</u> North, Range <u>13</u> esource District: <u>Par</u> Coordinates: DD s: feet from the dress or block, lot ar f water use, if applic ence letter(s) if applic es a Series with Site Pla <u>Vells Reg Total # We</u> 4	of Sectio ( <u>East</u> E, <u>bio-Missor</u> Latitu <u>41° 1'</u> <u>41.33</u> Sectic d subdivi icable (give icable: <u>M</u>  ess ess ess ess ess ess	n 28 /W), <u>Douglas</u> Coun <u>uri River</u> de Lc 9' 53.22'' -0 145 -9 n line andfeet sion: Addr/Sub Div e legal description) W-19 Acres Cert NRD Ap No No	hty pogitude 195° 57' 07.85" 15.95218 from the s v 7475 Pershing v 7475 Pershing	<u>GPS Required</u> ection line. LDrive Block No 16 R13E HDate Comment Series G-145	Lot : Reg Num (Externa 159	l <u>Source) Code</u> DEQ	e Description Part of a DEQ site plan for spill or underground storage	Wells in the Se WellID RegCD 185656 G- 145159 1241802 G- 178704 241804 241805	ries Si 2/ 1/ 12 11
ermits	-									_
			Aprvd Date(s)			Aprvd Da	te(s)			
Area Permit			—	SWater Ap	pp Code					
MWF			—	Transfer						
WSD				Swater Co	onduct Code					
VV.JF			_	Other						
HHSS				ITN						
HHSS HHSS PWS I	 NE0054	4739								
HHSS HHSS PWS I NDEQ	INLOUJ-	1/02								
HHSS HHSS PWS I NDEQ 5. Purpose o	f Well <u>Monitoring (G</u>	round Wa	ter Quality)							
HHSS HHSS PWS I NDEQ 5. Purpose o	f Well <u>Monitoring (Gi</u> Other Use Notes	round Wa	ter Quality) 							
HHSS HHSS PWS I. NDEQ 5. Purpose o	f Well <u>Monitoring (Gi</u> Other Use Notes	round Wa	ter Quality)  	w	'ell Considered a repla	cement by NRD(We	lIID,			
HHSS HHSS PWS I NDEQ 5. Purpose o 7. Replacem	f Well <u>Monitoring (Gi</u> Other Use Notes ent well information.	round Wa	ter Quality) — —	W R Roval Data	fell Considered a repla RegCD)	cement by NRD(We	lIID,			
HHSS HHSS PWS I NDEQ 5. Purpose o 7. Replacemo A. Is this wel B. Repistratio	f Well <u>Monitoring (Gi</u> Other Use Notes ent well information.	round Wa	ter Quality) — DI No NRD App If pot rec	W R roval Date <u> </u> W	fell Considered a repla RegCD) fell Replacement Reg ( andoned well was con	cement by NRD(We CD structed	lIID,			
HHSS HHSS PWS I NDEQ 5. Purpose o 7. Replacemo A. Is this wel B. Registratio	f Well <u>Monitoring (Gi</u> Other Use Notes ent well information. I a Replacement well on number of abando d well last operated	round Wa I? <u>No</u> Rep oned well	ter Quality) — bl No NRD App : If not reg D. Replace	W R roval Date W jistered, date ab cement well is	'ell Considered a repla tegCD) 'ell Replacement Reg ( andoned well was con _ feet from abandoned	cement by NRD(We CD structed d well.	lIID,			

WellID RegCD StartDate EndDate 185656 G- 2/19/2016 145159

1/20/2016

12/1/2015 11/9/2015

 $http://private/IWIP/Wells/Registration/RegistrationPrint.aspx?Print=true\&ReferenceID=241802[2/19/2016\ 8:54:04\ AM]$ 

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

well)

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

Decommission Information Decommission Date:By	
8. Pump Information.	
A. Is Pump installed at this time? No	Pump present but Well Inactive: No
Free Flowing Well: No	Well active, no pump installed: Yes
B. License No.	
C. Pumping Rate gallons per minute.	D. Pumping water level feet.
E. Drop pipe diameter 🔛 inches.	F. Length of pipe in feet.
G. Pump equipment installed:	H. Pump Brand/Type
I. Will this well be used to pump 50 gpm or less	? <u>Yes</u>
9. Well Construction Information	
A. Total well depth: 76.5 feet.	B. Static water level <u>30</u> feet.
C. Well Construction began: <u>1/20/2016</u>	D. Well Construction Completed: 1/20/2016
E. Bore hole diameter in inches. Top 8.25 Both	tom <u>8.25</u>
F. Casing and Screen Joints are: <u>Threaded</u>	Other Joints description:
H. Total Estimate Capacity of Well gallons pe	r 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 Fro	omDepth*	ToDepth*	Case/Screen	InsideDiam	OutsideDiam	CaseThickness	ScrnSlotSize	Material	ScreenTname
241802 0		66.5	casing	2.07	2.38	0.154		PVC	EMI
241802 66.	.5	76.5	screen	2.07	2.38	0.154	0.01	PVC	EMI

\* are in Feet, all else is in inches

11. Grout and Gravel Pack

Record Count = 5

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

\* are in Feet, all else is in inches

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

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

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

12. Well Geologic Materials Logged

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

\* are in Feet.