

Date Started: 10/03/2019	Surface Elevation: 545.6 ft amsl	<b>Well ID: MW-88-107d</b>
Date Completed: 10/04/2019	Shallow Well Elevation: NA	
Drilling Co.: Cascade	Deep Well Elevation: NA	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): 2100555.9	Project: Final GW Remedy Phase 1
Driller Name: John Colon	Easting (NAD83): 7614695.2	Location: PG&E Topock, Needles, California
Drilling Asst: L. Amaya / O. Floures	Borehole Diameter: 4-12 inches	
Logger: Chris Bonessi	Water Level Start: 89.14 ft bgs	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: N/A	
Total Depth: 117.1 ft bgs	Well Completion: <input type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
1		Topock - Fluvial Deposits	SM		(0.0 - 2.0') Native surface soils		Note: Native soils obtained from grading area around borehole.
2							
3		Topock - Fluvial Deposits	SW		(0.0 - 8.0') 12.0" Borehole		Note: The majority of the well construction materials were removed by overdrilling to a depth of approximately 82 ft. bgs. Materials removed included approximately 47 ft of intact PVC well casing and PVC pieces mixed with grout.
4							
5		Topock - Fluvial Deposits	SW		(2.0 - 82.0') Portland Cement 6% Bentonite	(2.0 - 82.0') 238 gallons	(2.0 - 82.0') 335 gallons (141%) Note: Type I, II and V with Hydrogel, used >20% of the calculated volume due to grout migration potentially in to the remaining well screen, filter pack and into the formation or potential voids.
6		Topock - Fluvial Deposits	SW				
7		Topock - Fluvial Deposits	NR		(8.0 - 82.0') 8.0" Borehole		
8							
9		Topock - Alluvium Deposits	SW				
10							
11		Topock - Alluvium Deposits	SW				
12							
13		Topock - Alluvium Deposits	NR				
14							
15		Topock - Alluvium Deposits	SW-SM				
16							
17		Topock - Alluvium Deposits	SM				
18							
19		Topock - Alluvium Deposits	NR				
20							
20		Topock - Alluvium Deposits	SW				

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

WELL CONSTRUCTION DETAILS\_PG&E\_TOPOCK DRAFT BORING LOGS\GINT FILES\04.14.20\TOPOCK DATABASE FOR PLOG.GPJ\_TOPOCK DATA TEMPLATE FOR PLOG.GDT\_04/15/20 14:41

Date Started: 10/03/2019	Surface Elevation: 545.6 ft amsl	<b>Well ID: MW-88-107d</b>
Date Completed: 10/04/2019	Shallow Well Elevation: NA	
Drilling Co.: Cascade	Deep Well Elevation: NA	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): 2100555.9	Project: Final GW Remedy Phase 1
Driller Name: John Colon	Easting (NAD83): 7614695.2	Location: PG&E Topock, Needles, California
Drilling Asst: L. Amaya / O. Floures	Borehole Diameter: 4-12 inches	
Logger: Chris Bonessi	Water Level Start: 89.14 ft bgs	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: N/A	
Total Depth: 117.1 ft bgs	Well Completion: <input type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
21		Topock - Alluvium Deposits	SW		<p>(2.0 - 82.0') Portland Cement 6% Bentonite</p> <p>(8.0 - 82.0') 8.0" Borehole</p>	(2.0 - 82.0') 238 gallons	<p>(2.0 - 82.0') 335 gallons (141%) Note: Type I, II and V with Hydrogel, used &gt;20% of the calculated volume due to grout migration potentially in to the remaining well screen, filter pack and into the formation or potential voids.</p>
22		Topock - Alluvium Deposits	SW-SM				
23		Topock - Alluvium Deposits	SM				
24			NR				
25		Topock - Alluvium Deposits	GM				
26							
27		Topock - Alluvium Deposits	SM				
28		Topock - Alluvium Deposits	SM				
29			NR				
30		Topock - Alluvium Deposits	SM				
31							
32		Topock - Alluvium Deposits	SM				
33			NR				
34		Topock - Alluvium Deposits	SM				
35							
36		Topock - Alluvium Deposits	SW				
37		Topock - Alluvium Deposits	SM				
38		Topock - Alluvium Deposits	SM				
39		Topock - Alluvium Deposits	NR				
40		Topock - Alluvium Deposits	ML				

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WELL CONSTRUCTION DETAILS\_PG&E\_TOPOCK C:\USERS\MCGRANE\DOCUMENTS\PG&E\_TOPOCK\DRIFT BORING LOGS\GINT FILES\04.14.20\TOPOCK DATABASE FOR PLOG.GPJ\_TOPOCK DATA TEMPLATE FOR PLOG.GDT 04/15/20 14:41

Date Started: 10/03/2019	Surface Elevation: 545.6 ft amsl	<b>Well ID: MW-88-107d</b>
Date Completed: 10/04/2019	Shallow Well Elevation: NA ft amsl	
Drilling Co.: Cascade	Deep Well Elevation: NA ft amsl	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): 2100555.9	Project: Final GW Remedy Phase 1
Driller Name: John Colon	Easting (NAD83): 7614695.2	Location: PG&E Topock, Needles, California
Drilling Asst: L. Amaya / O. Floures	Borehole Diameter: 4-12 inches	
Logger: Chris Bonessi	Water Level Start: 89.14 ft bgs	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: N/A	
Total Depth: 117.1 ft bgs	Well Completion: <input type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
41		Topock - Alluvium Deposits	ML				
42							
43		Topock - Alluvium Deposits	SM				
44							
45		Topock - Alluvium Deposits	SM				
46							
47		Topock - Alluvium Deposits	NR	X			
48							
49		Topock - Alluvium Deposits	SM				
50							
51		Topock - Alluvium Deposits	SM		(2.0 - 82.0') Portland Cement 6% Bentonite		
52							
53		Topock - Alluvium Deposits	SM				
54							
55		Topock - Alluvium Deposits	SM				
56							
57		Topock - Alluvium Deposits	SM				
58							
59		Topock - Alluvium Deposits	SM				
60							

Final - Revised 04/15/20

(2.0 - 82.0') 335 gallons (14%)  
 Note: Type I, II and V with Hydrogel, used >20% of the calculated volume due to grout migration potentially in to the remaining well screen, filter pack and into the formation or potential voids.

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WELL CONSTRUCTION DETAILS\_PG&E\_TOPOCK C:\USERS\MCGRANE\DOCUMENTS\PG&E\_TOPOCK\DRIFT BORING LOGS\GINT FILES\041420\TOPOCK DATABASE FOR PLOG.GPJ\_TOPOCK DATA TEMPLATE FOR PLOG.GDT 04/15/20 14:41

Date Started: 10/03/2019	Surface Elevation: 545.6 ft amsl	<b>Well ID: MW-88-107d</b>
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Drilling Method: Sonic Drilling	Northing (NAD83): 2100555.9	Project: Final GW Remedy Phase 1
Driller Name: John Colon	Easting (NAD83): 7614695.2	Location: PG&E Topock, Needles, California
Drilling Asst: L. Amaya / O. Floures	Borehole Diameter: 4-12 inches	
Logger: Chris Bonessi	Water Level Start: 89.14 ft bgs	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: N/A	
Total Depth: 117.1 ft bgs	Well Completion: <input type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
61		Topock - Alluvium Deposits	SM		<p>(2.0 - 82.0') Portland Cement 6% Bentonite</p> <p>(8.0 - 82.0') 8.0" Borehole</p>	(2.0 - 82.0') 238 gallons	<p>(2.0 - 82.0') 335 gallons (141%) Note: Type I, II and V with Hydrogel, used &gt;20% of the calculated volume due to grout migration potentially in to the remaining well screen, filter pack and into the formation or potential voids.</p>
62		Topock - Alluvium Deposits	SW-SM				
63		Topock - Alluvium Deposits	SM				
64		Topock - Alluvium Deposits	SM				
65		Topock - Alluvium Deposits	SM				
66		Topock - Alluvium Deposits	SM				
67		Topock - Alluvium Deposits	SM				
68		Topock - Alluvium Deposits	NR				
69		Topock - Alluvium Deposits	GM				
70		Topock - Alluvium Deposits	SM				
71		Topock - Alluvium Deposits	SM				
72		Topock - Alluvium Deposits	SM				
73		Topock - Alluvium Deposits	SM				
74		Topock - Alluvium Deposits	SM				
75		Topock - Alluvium Deposits	SM				
76		Topock - Alluvium Deposits	NR				
77		Topock - Alluvium Deposits	SM				
78		Topock - Alluvium Deposits	NR				
79		Topock - Alluvium Deposits	SM				
80		Topock - Alluvium Deposits	SM				

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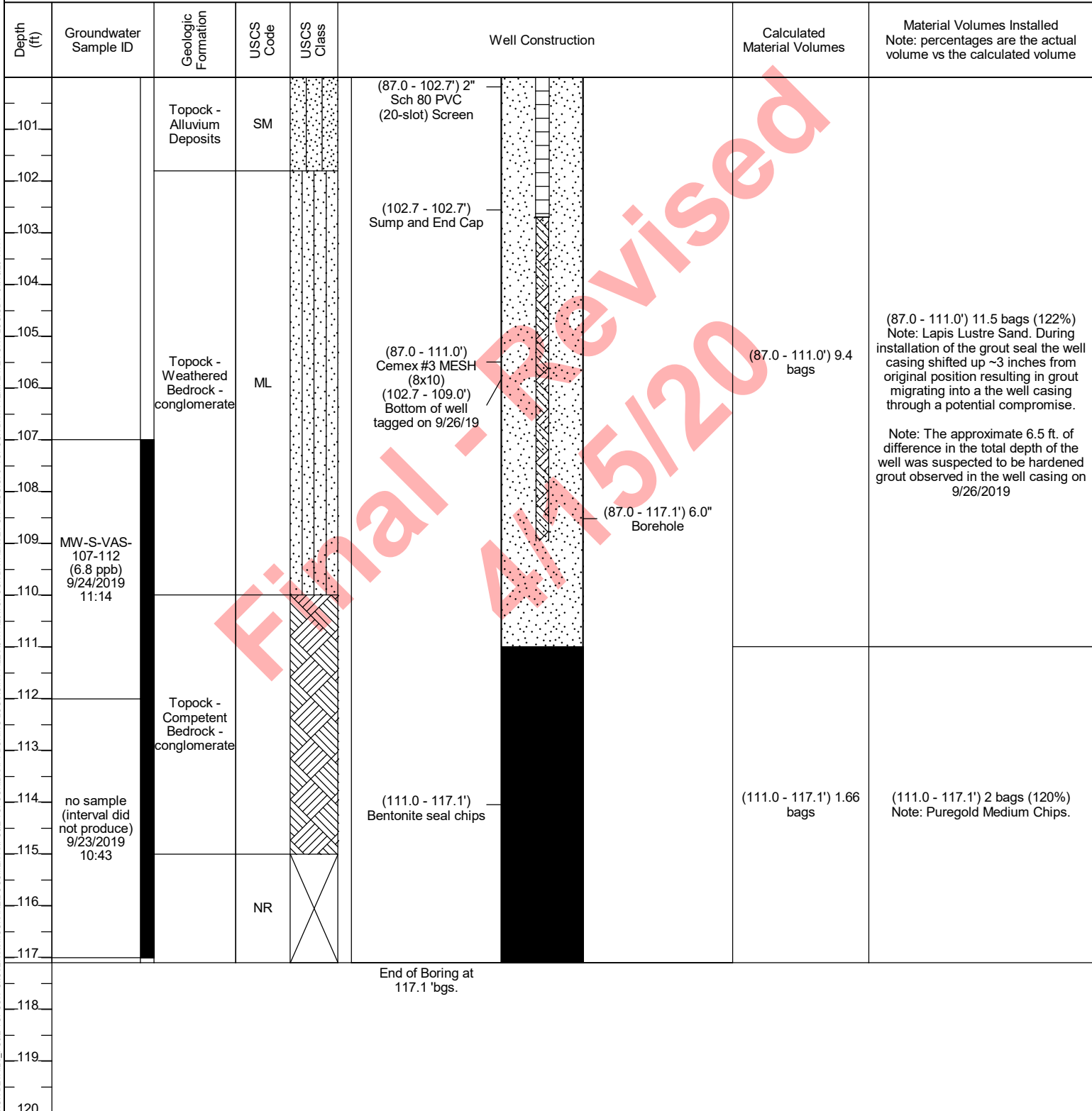
Date Started: 10/03/2019	Surface Elevation: 545.6 ft amsl	<b>Well ID: MW-88-107d</b>
Date Completed: 10/04/2019	Shallow Well Elevation: NA ft amsl	
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Drilling Method: Sonic Drilling	Northing (NAD83): 2100555.9	Project: Final GW Remedy Phase 1
Driller Name: John Colon	Easting (NAD83): 7614695.2	Location: PG&E Topock, Needles, California
Drilling Asst: L. Amaya / O. Floures	Borehole Diameter: 4-12 inches	
Logger: Chris Bonessi	Water Level Start: 89.14 ft bgs	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: N/A	
Total Depth: 117.1 ft bgs	Well Completion: <input type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
81		Topock - Alluvium Deposits	SM		(8.0 - 82.0') 8.0" Borehole	(2.0 - 82.0') 238 gallons	Note: Well construction materials were decommissioned in place below approximately 82 ft. bgs.
82					(82.0 - 87.0') 2" PVC Sch 80 Casing		
83		Topock - Alluvium Deposits	ML		(82.0 - 87.0') Bentonite seal chips	(82.0 - 87.0') 0.6 bags	(82.0 - 87.0') 1 bags (167%) Note: Puregold Medium Chips, used >20% of the calculated volume due to potential voids. Bentonite was used to abandon 4 inch diameter rathole drilled to confirmed the overdrill had drifted off the original borehole.
84					(82.0 - 87.0') 4.0" Borehole		
85		Topock - Alluvium Deposits	SM	NR	(87.0 - 102.7') 2" Sch 80 PVC (20-slot) Screen		
86							
87		Topock - Alluvium Deposits	SM				
88							
89		Topock - Alluvium Deposits	ML		(87.0 - 111.0') Cemex #3 MESH (8x10)	(87.0 - 111.0') 9.4 bags	(87.0 - 111.0') 11.5 bags (122%) Note: Lapis Lustre Sand. During installation of the grout seal the well casing shifted up ~3 inches from original position resulting in grout migrating into a the well casing through a potential compromise.
90							
91		Topock - Alluvium Deposits	SM				
92							
93	MW-S-VAS-92-97 (26 ppb) 9/22/2019 10:14	Topock - Alluvium Deposits	ML				
94							
95		Topock - Alluvium Deposits	SM				
96							
97		Topock - Alluvium Deposits	ML	NR			
98							
99		Topock - Alluvium Deposits	SM				
100							

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Date Started: 10/03/2019	Surface Elevation: 545.6 ft amsl	<b>Well ID: MW-88-107d</b>
Date Completed: 10/04/2019	Shallow Well Elevation: NA ft amsl	
Drilling Co.: Cascade	Deep Well Elevation: NA ft amsl	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): 2100555.9	Project: Final GW Remedy Phase 1
Driller Name: John Colon	Easting (NAD83): 7614695.2	Location: PG&E Topock, Needles, California
Drilling Asst: L. Amaya / O. Floures	Borehole Diameter: 4-12 inches	
Logger: Chris Bonessi	Water Level Start: 89.14 ft bgs	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: N/A	
Total Depth: 117.1 ft bgs	Well Completion: <input type="checkbox"/> Flush <input type="checkbox"/> Stick-up	



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WELL CONSTRUCTION DETAILS\_PG&E\_TOPOCK\_C:\USERS\MCGRANE\DOCUMENTS\PG&E\_TOPOCK\DATABASE FOR PLOG.GPJ\_TOPOCK DATA TEMPLATE FOR PLOG.GDT\_04/15/20\_14.41



Date Started:	09/25/2019	Surface Elevation:	545.6 ft amsl	<b>Boring No.: MW-88d</b>	
Date Completed:	09/25/2019	Northing (NAD83):	2100555.9		
Drilling Co.:	Cascade	Easting (NAD83):	7614695.2	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	117.1 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	10-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Steve Vasquez	Depth to First Water:	89.14 ft bgs	Project Number:	RC000753.0051
Drilling Asst:	L. Amaya / O. Floures	Sampling Method:	Split spoon, Cal Mod	Hammer Type:	Auto Hammer
Logger:	Sean McGrane	Sampling Interval:	Continuous	Hammer Weight:	140 lbs
Editor:	Chris Bonessi	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Hammer Drop:	30 inches

Depth (ft)	Blow Counts [N Value]	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
1					Topock - Fluvial Deposits	SM		(0.0 - 3.0') Topock - Fluvial Deposits; Silty sand with gravel (SM); brown (7.5YR 4/3); very fine grained to very coarse grained, angular to subround; some granules to very large pebbles, angular to subangular; little silt; trace small cobbles, angular to subangular; trace clay; trace mica; well graded; dry; 25,55,20 logged from hand auger cuttings, moisture from water added for hand augering	(0.0 - 3.0') Hand augered for utility clearance, refusal at 3.0 ft.	
2										
3			MW-S-SG-0.0-5.0 9/20/2019 10:40		Topock - Fluvial Deposits	SW		(3.0 - 4.3') Topock - Fluvial Deposits; Well graded sand with gravel (SW); brown (7.5YR 5/3); very fine grained to very coarse grained, angular to subround; some granules to very large pebbles, angular to subround; trace large cobbles, subangular; trace silt; trace clay; trace mica; well graded; wet; 25,70,5, moisture due to water added for hand augering	(4.0 - 5.0') Hard drilling	
4		24			Topock - Fluvial Deposits	SW		(4.3 - 5.0') Topock - Fluvial Deposits; Well graded sand with gravel (SW); reddish brown (2.5YR 5/3); very fine grained to granules, angular to subangular; and small to very large pebbles, angular to subangular; trace small cobbles, subangular; trace silt; trace clay; coarser clasts composed of metadiorite; well graded; dry; 45,50,5		(5.0') 2 gallons of water used; gallons of water recovered; gallons of water lost
5	25-25/3 (null/0.25')	6	MW-S-SP-5.0-5.6 9/20/2019 11:10		Topock - Fluvial Deposits	SW		(5.0 - 5.6') Topock - Fluvial Deposits; Well graded sand with gravel (SW); weak red (2.5YR 5/2); very fine grained to granules, angular to subround; little small to very large pebbles, angular to subangular; trace silt; trace clay; well graded; dry; very loose; 15,80,5		(7.0') 2 gallons of water used; gallons of water recovered; gallons of water lost
6					Topock - Fluvial Deposits	NR		(5.6 - 6.5') No recovery (NR); very loose; split spoon refusal		
7		6			Topock - Fluvial Deposits	SW		(6.5 - 7.0') Topock - Fluvial Deposits; Well graded sand with gravel (SW); (GLE Y1 5/4); very fine grained to granules, angular to subangular; and small to very large pebbles, angular to subangular; trace small cobbles, subangular; trace silt; coarser clasts composed of metadiorite; dry; 45,50,5	(8.5 - 12.0') Rough drilling	
8	12-28-30 (58)	12	MW-S-CM-7.0-7.5 9/20/2019 11:38 MW-S-CM-7.5-8.0 9/20/2019 11:34		Topock - Fluvial Deposits	SW		(7.0 - 8.0') Topock - Fluvial Deposits; Well graded sand with gravel (SW); weak red (2.5YR 5/2); very fine grained to granules, angular to subround; little small to very large pebbles, angular to subangular; trace silt; trace clay; well graded; dry to moist; very dense; 20,75,5		
9					Topock - Alluvium Deposits	SW		(8.0 - 8.5') No recovery (NR); missing from sampler		
10		42						(8.5 - 12.0') Topock - Alluvium Deposits; Well graded sand with gravel (SW); brown (10YR 4/3) and reddish gray (2.5YR 5/1); very fine grained to granules, angular to subangular; and small to very large pebbles, angular to subangular; trace boulders, subround; trace silt; coarser clasts composed of metadiorite; dry; lensed; 45,50,5		(12.0') 2 gallons of water used; gallons of water recovered; gallons of water lost
11			MW-S-SP-12.0-13.2 9/20/2019 13:59		Topock - Alluvium Deposits	SW		(12.0 - 13.2') Topock - Alluvium Deposits; Well graded sand with gravel (SW); grayish brown (10YR 5/2); very fine grained to granules, angular to subround; little small to large pebbles, angular to subangular; trace silt; trace clay; trace mica; well graded; dry; very dense; 20,75,5	(13.5 - 17.0') Rough drilling	
12	34-35-30 (65)	14.4			Topock - Alluvium Deposits	NR		(13.2 - 13.5') Topock - Alluvium Deposits; No recovery (NR); slough from casing advancement		
13					Topock - Alluvium Deposits	SW-SM		(13.5 - 16.3') Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); dark reddish gray (2.5YR 4/1) and weak red (2.5YR 5/2); very fine grained to granules, angular to round; and small to very large pebbles, angular to subround; little silt; trace small cobbles, subangular to subround; trace clay; coarser clasts composed of metadiorite; 40,50,10, cobbles composed of gabbro		
14		42			Topock - Alluvium Deposits	SM		(16.3 - 17.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); weak red (2.5YR 5/2); very fine grained to granules, angular to subround; some silt; little small to very large pebbles, angular to subangular; trace small cobbles, angular; trace clay; coarser clasts composed of metadiorite; well graded; dry; 20,55,25, some silt content maybe rock flour from pulverized cobbles and boulders	(17.0 - 18.5') Poor recovery sample maybe slough	(17.0') 2 gallons of water used; gallons of water recovered; gallons of water lost
15	50/4 (null/0.35')	4.8	MW-S-CM-17.0-17.4 9/20/2019 14:31		Topock - Alluvium Deposits	NR		(17.0 - 17.2') Topock - Alluvium Deposits; Silty sand with gravel (SM); dark gray / olive gray (5Y 4/1); very fine grained to granules, angular to subround; little small to medium pebbles, angular to	(18.5 - 22.0') Rough drilling	
16					Topock - Alluvium Deposits	SW				
17					Topock - Alluvium Deposits	SW				
18					Topock - Alluvium Deposits	SW				
19					Topock - Alluvium Deposits	SW				
20					Topock - Alluvium Deposits	SW				

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Date Completed:	09/25/2019	Northing (NAD83):	2100555.9		
Drilling Co.:	Cascade	Easting (NAD83):	7614695.2	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	117.1 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	10-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Steve Vasquez	Depth to First Water:	89.14 ft bgs	Project Number:	RC000753.0051
Drilling Asst:	L. Amaya / O. Floures	Sampling Method:	Split spoon, Cal Mod	Hammer Type:	Auto Hammer
Logger:	Sean McGrane	Sampling Interval:	Continuous	Hammer Weight:	140 lbs
Editor:	Chris Bonessi	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Hammer Drop:	30 inches

Depth (ft)	Blow Counts [N Value]	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
21		42			Topock - Alluvium Deposits	SW		subangular; little silt; trace clay; trace mica; well graded; dry; very dense; 20,65,15		
22	50/6	6	MW-S-SP-22.0-22.5 9/20/2019 14:59		Topock - Alluvium Deposits	SW-SM		(17.2 - 18.5') Topock - Alluvium Deposits; No recovery (NR); top 0.3 ft of spoon was slough.	(22.0 - 23.5') Poor recovery	(22.0') 2 gallons of water used; gallons of water recovered; gallons of water lost
23					Topock - Alluvium Deposits	SM		(18.5 - 21.0') Topock - Alluvium Deposits; Well graded sand with gravel (SW); weak red (2.5YR 5/2); very fine grained to granules, subangular to subround; some small to very large pebbles, angular to subangular; trace small cobbles, subangular; trace silt; coarser clasts composed of metadiorite; dry; lensed; 30,65,5 (19.5'); and small to very large pebbles, angular to subangular; 40, 55, 5, decrease in sand	(23.5 - 27.0') Rough drilling	
24					Topock - Alluvium Deposits	NR		(21.0 - 22.0') Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); olive gray (5Y 4/2); very fine grained to granules, angular to subround; some small to very large pebbles, angular to subangular; little silt; trace small cobbles, subangular; trace boulders, subangular; coarser clasts composed of metadiorite; dry; 35,65,10, some silt rock flour from pulverized cobbles and boulders		
25		42			Topock - Alluvium Deposits	GM		(22.0 - 22.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); gray (2.5Y 5/1); very fine grained to granules, angular to subround; little small to large pebbles, angular to subangular; little silt; trace clay; trace mica; well graded; moist to dry; very dense; 15, 70, 15, seams of silt		
26					Topock - Alluvium Deposits	SM		(22.5 - 23.5') No recovery (NR); split spoon refusal		
27	50/4 (null/0.35')	4.8	MW-S-CM-27.0-27.4 9/20/2019 15:35		Topock - Alluvium Deposits	SM		(23.5 - 26.3') Topock - Alluvium Deposits; Silty gravel with sand (GM); grayish brown (2.5Y 5/2); granules to very large pebbles, angular to subangular; some very fine to very coarse grained sand, angular to subround; some silt; trace small cobbles, angular to subangular; coarser clasts composed of metadiorite; trace coarser clast composed of conglomerate; well graded; dry; 35,25,30	(27.0 - 28.5') Poor recovery sample may have slough in it	(27.0') 2 gallons of water used; gallons of water recovered; gallons of water lost
28					Topock - Alluvium Deposits	NR		(26.3 - 27.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); grayish brown (2.5Y 5/2); very fine grained to granules, angular to round; some small to very large pebbles, angular to subangular; little silt; coarser clasts composed of metadiorite; well graded; dry; 30,55,15	(28.5 - 32.0') Rough drilling	
29					Topock - Alluvium Deposits	SM		(27.0 - 27.4') Topock - Alluvium Deposits; Silty sand with gravel (SM); grayish brown (2.5Y 5/2); very fine grained to granules, angular to subround; little small to large pebbles, angular to subangular; little silt; trace clay; dry to moist; very dense; 20,60,20		
30		42			Topock - Alluvium Deposits	SM		(27.4 - 28.5') No recovery (NR); Cal Mod refusal		
31					Topock - Alluvium Deposits	NR		(28.5 - 32.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (10YR 5/3); very fine grained to granules, angular to subround; some small to very large pebbles, angular to subangular; some silt; coarser clasts composed of metadiorite; well graded; dry; 25,40,35 (31'); little silt; trace small cobbles, angular; 30,55,15, increase in sand and pebbles	(32.0 - 33.5') Poor recovery top 0.2 ft slough	(32.0') 2 gallons of water used; gallons of water recovered; gallons of water lost
32	50/5 (null/0.40')	4.8	MW-S-SP-32.0-32.4 9/20/2019 16:17		Topock - Alluvium Deposits	SM		(32.0 - 32.4') Topock - Alluvium Deposits; Silty sand with gravel (SM); grayish brown (2.5Y 5/2); very fine grained to granules, angular to subround; little small to large pebbles, angular to subangular; little silt; trace clay; well graded; dry to moist; very dense; 20,65,15	(33.5 - 37.0') Normal Drilling	
33					Topock - Alluvium Deposits	NR		(32.4 - 33.5') No recovery (NR); split spoon refusal		
34					Topock - Alluvium Deposits	SM		(33.5 - 35.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 5/3); very fine grained to granules, angular to subround; some small to very large pebbles, angular to subangular; little silt; trace small cobbles, subangular; trace coarser clast composed of conglomerate; coarser clasts composed of metadiorite; well graded; dry; 35,45,20		
35		42			Topock - Alluvium Deposits	SM		(35.5 - 36.5') Topock - Alluvium Deposits; Well graded sand with gravel (SW); grayish brown (10YR 5/2); very fine grained to granules, angular to subround; little small to very large pebbles, angular to subangular; trace silt; coarser clasts composed of metadiorite; dry; 20,75,5	(37.0 - 38.5') Cal Mod refusal after 5 inches, approximately 1 to 2 inches of slough in sample	(37.0') 2 gallons of water used; gallons of water recovered; gallons of water lost
36	50/5 (null/0.40')	8.4	MW-S-CM-37.0-37.5 9/21/2019 09:12		Topock - Alluvium Deposits	NR		(36.5 - 37.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 5/3); very fine grained to very coarse grained, angular to round; some small to very large pebbles, angular to	(38.5 - 46.5') Rough drilling	
37					Topock - Alluvium Deposits	SM				
38					Topock - Alluvium Deposits	NR				
39					Topock - Alluvium Deposits	NR				
40		102			Topock - Alluvium Deposits	ML				

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

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Date Started:	09/25/2019	Surface Elevation:	545.6 ft amsl	<b>Boring No.: MW-88d</b>	
Date Completed:	09/25/2019	Northing (NAD83):	2100555.9		
Drilling Co.:	Cascade	Easting (NAD83):	7614695.2	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	117.1 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	10-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Steve Vasquez	Depth to First Water:	89.14 ft bgs	Project Number:	RC000753.0051
Drilling Asst:	L. Amaya / O. Floures	Sampling Method:	Split spoon, Cal Mod	Hammer Type:	Auto Hammer
Logger:	Sean McGrane	Sampling Interval:	Continuous	Hammer Weight:	140 lbs
Editor:	Chris Bonessi	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Hammer Drop:	30 inches

Depth (ft)	Blow Counts [N Value]	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
41					Topock - Alluvium Deposits	ML		subangular; some silt; trace small cobbles, angular to subangular; trace coarser clast composed of conglomerate; coarser clasts composed of metadiorite; well graded; dry; 30,45,25		
42				(37.0 - 37.4') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (10YR 5/3); very fine grained to granules, angular to subround; some small to very large pebbles, angular to subangular; little silt; coarser clasts composed of metadiorite; well graded; moist; very dense; 25,55,20						
43					Topock - Alluvium Deposits	SM		(37.4 - 38.5') Topock - Alluvium Deposits; No recovery (NR); Cal Mod refusal		
44				(38.5 - 44.5') Topock - Alluvium Deposits; Sandy silt with gravel (ML); dark grayish brown / dark yellowish brown (10YR 4/2); low plasticity; some granules to very large pebbles, angular to subangular; some very fine to very coarse grained sand, angular to subround; trace small cobbles, angular; coarser clasts composed of metadiorite; dry; 30,30,40						
45					Topock - Alluvium Deposits	SM		(44') brown (7.5YR 5/3)		
46				(44.5 - 47.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); gray (2.5Y 5/1); very fine grained to granules, angular to subround; some small to very large pebbles, angular to subangular; little silt; coarser clasts composed of metadiorite; trace coarser clast composed of conglomerate; well graded; dry; 30,55,15						
47	50/4 (null/0.35')	4.8	MW-S-SP-47.0-47.4 9/21/2019 09:57		Topock - Alluvium Deposits	SM		(46.5 - 47.0') Very hard drilling	(47.0 - 48.5') Split spoon refusal, 2 inches of slough in spoon not sampled.	(47.0') 2 gallons of water used; gallons of water recovered; gallons of water lost
48				NR			(47.0 - 47.4') Topock - Alluvium Deposits; Silty sand with gravel (SM); grayish brown (10YR 5/2); very fine grained to granules, angular to subround; some small to large pebbles, angular to subangular; some silt; trace clay; well graded; moist to dry; very dense; 25,45,30, silt nodules			
49					Topock - Alluvium Deposits	SM		(47.4 - 48.5') No recovery (NR); split spoon refusal		
50					Topock - Alluvium Deposits	SM		(48.5 - 49.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); grayish brown (10YR 5/2); very fine grained to granules, angular to round; some small to very large pebbles, angular to subangular; little silt; trace clay; coarser clasts composed of metadiorite; well graded; dry; 30,50,20	(48.5 - 57.0') Hard drilling, core moist to dry and hot	
51				(49.5 - 53.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown (5YR 4/4); very fine grained to granules, angular to round; some small to very large pebbles, angular to subangular; little silt; trace clay; trace coarser clast composed of conglomerate; coarser clasts composed of metadiorite; well graded; dry; 35,45,20						
52					Topock - Alluvium Deposits	SM		(53.0 - 57.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 5/3); very fine grained to granules, angular to subround; some small to very large pebbles, angular to subangular; some silt; trace small cobbles, angular; trace clay; trace coarser clast composed of conglomerate; coarser clasts composed of metadiorite; well graded; dry; 35,40,25		
53				(55.8') brown (7.5YR 4/3); little silt; 35,50,15, increase in sand, no cobbles						
54					Topock - Alluvium Deposits	SM		(57.0 - 57.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (10YR 5/3); very fine grained to granules, angular to subangular; little small to large pebbles, angular to subangular; little silt; well graded; dry; very dense; 15,65,20	(57.0 - 58.5') Poor recovery, top 2 to 3 inches of sample is slough	(57.0') 2 gallons of water used; gallons of water recovered; gallons of water lost
55				(57.5 - 58.5') No recovery (NR); Cal Mod refusal						
56					Topock - Alluvium Deposits	SM		(58.5 - 62.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 5/3) with brown (10YR 5/3); very fine grained to granules, angular to subround; some small to very large pebbles, angular to subangular; little silt; trace small cobbles, subangular; trace clay; coarser clasts composed of metadiorite;	(58.5 - 67.0') Hard drilling, hole stayed open running split spoon	
57	50/5 (null/0.40')	6	MW-S-CM-57.0-57.5 9/21/2019 10:39							
58										
59										
60										

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Date Started:	09/25/2019	Surface Elevation:	545.6 ft amsl	<b>Boring No.: MW-88d</b>	
Date Completed:	09/25/2019	Northing (NAD83):	2100555.9		
Drilling Co.:	Cascade	Easting (NAD83):	7614695.2	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	117.1 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	10-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Steve Vasquez	Depth to First Water:	89.14 ft bgs	Project Number:	RC000753.0051
Drilling Asst:	L. Amaya / O. Floures	Sampling Method:	Split spoon, Cal Mod	Hammer Type:	Auto Hammer
Logger:	Sean McGrane	Sampling Interval:	Continuous	Hammer Weight:	140 lbs
Editor:	Chris Bonessi	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Hammer Drop:	30 inches

Depth (ft)	Blow Counts [N Value]	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
61					Topock - Alluvium Deposits	SM		well graded; dry; 35,45,20	without casing to 67.	
62					Topock - Alluvium Deposits	SW-SM		(61') grayish brown (2.5Y 5/2); some silt; 30,45,25, decrease pebbles, no cobbles		
63		102			Topock - Alluvium Deposits	SW-SM		(62.0 - 64.5') Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); brown (7.5YR 5/4); very fine grained to granules, angular to subround; some small to very large pebbles, angular to subangular; little silt; trace small cobbles, angular; trace clay; trace coarser clast composed of conglomerate; coarser clasts composed of metadiorite; well graded; dry; 35,55,10		
64					Topock - Alluvium Deposits	SM		(64.5 - 67.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 5/3); very fine grained to granules, angular to subround; some small to very large pebbles, angular to subangular; little silt; trace small cobbles, angular; trace clay; coarser clasts composed of metadiorite; well graded; dry; 35,45,20		
65					Topock - Alluvium Deposits	SM		(64.5 - 67.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 5/3); very fine grained to granules, angular to subround; some small to very large pebbles, angular to subangular; little silt; trace small cobbles, angular; trace clay; coarser clasts composed of metadiorite; well graded; dry; 35,45,20		
66					Topock - Alluvium Deposits	SM		(64.5 - 67.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 5/3); very fine grained to granules, angular to subround; some small to very large pebbles, angular to subangular; little silt; trace small cobbles, angular; trace clay; coarser clasts composed of metadiorite; well graded; dry; 35,45,20		
67	50/6	6	MW-S-SP-67.0-67.5 9/21/2019 12:53		Topock - Alluvium Deposits	SM		(67.0 - 67.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); dark yellowish brown (10YR 4/4); very fine grained to granules, angular to subround; some small to very large pebbles, angular to subangular; some silt; well graded; dry; very dense; 25,45,30, potential slough	(67.0 - 68.5') Split spoon refusal, most of sample most likely slough.	(67.0') 2 gallons of water used; gallons of water recovered; gallons of water lost
68					Topock - Alluvium Deposits	NR		(67.0 - 67.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); dark yellowish brown (10YR 4/4); very fine grained to granules, angular to subround; some small to very large pebbles, angular to subangular; some silt; well graded; dry; very dense; 25,45,30, potential slough		
69					Topock - Alluvium Deposits	GM		(67.5 - 68.5') No recovery (NR); split spoon refusal	(68.5 - 77.0') Formation tight, lost bottom 1.5 ft of core	
70					Topock - Alluvium Deposits	GM		(68.5 - 69.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); grayish brown (2.5Y 5/2); granules to very large pebbles, angular to subangular; some very fine to very coarse grained sand, angular to subround; some silt; trace small to large cobbles, angular; trace clay; well graded; moist to dry; 40,35,25		
71					Topock - Alluvium Deposits	SM		(69.0 - 72.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); dark yellowish brown (10YR 4/4); very fine grained to granules, angular to subround; some small to very large pebbles, angular to subangular; some silt; trace clay; trace coarser clast composed of conglomerate; coarser clasts composed of metadiorite; well graded; dry to moist; 35,40,25		
72					Topock - Alluvium Deposits	SM		(70.5') little silt; 35,45,20, increase in sand		
73		84			Topock - Alluvium Deposits	SM		(72.0 - 74.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); yellowish brown / moderate yellowish brown (10YR 5/4); very fine grained to granules, angular to subround; and small to very large pebbles, angular to subround; little silt; trace clay; coarser clasts composed of metadiorite; well graded; moist to dry; 40,45,15, lithology has rock flour from pulverized pebbles		
74					Topock - Alluvium Deposits	SM		(74.0 - 75.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 5/4); very fine grained to granules, angular to subround; some small to very large pebbles, angular to subangular; little silt; trace small cobbles, angular; trace coarser clast composed of conglomerate; well graded; moist to dry; 35,45,20		
75					Topock - Alluvium Deposits	SM		(74.0 - 75.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 5/4); very fine grained to granules, angular to subround; some small to very large pebbles, angular to subangular; little silt; trace small cobbles, angular; trace coarser clast composed of conglomerate; well graded; moist to dry; 35,45,20		
76					Topock - Alluvium Deposits	NR		(75.5 - 77.0') No recovery (NR); see drilling notes		
77	50/3 (null/0.30')	6			Topock - Alluvium Deposits	SM		(77.0 - 77.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); dark yellowish brown (10YR 4/4); very fine grained to granules, angular to subround; some small to very large pebbles, angular to subangular; some silt; coarser clasts composed of metadiorite; trace mica; well graded; moist; very dense; 25,45,30	(77.0 - 78.5') Cal Mod refusal, top 0.3 ft of sample most likely slough	(77.0') 2 gallons of water used; gallons of water recovered; gallons of water lost
78					Topock - Alluvium Deposits	NR		(77.5 - 78.5') No recovery (NR); Cal Mod refusal		
79		102			Topock - Alluvium Deposits	SM		(78.5 - 83.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 5/4); very fine grained to granules, angular to subround; little silt; trace clay; well graded; moist to dry; 35	(78.5 - 87.0') Normal drilling	(78.0 - 112.0') No water used

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

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Date Started:	09/25/2019	Surface Elevation:	545.6 ft amsl	<b>Boring No.: MW-88d</b>	
Date Completed:	09/25/2019	Northing (NAD83):	2100555.9		
Drilling Co.:	Cascade	Easting (NAD83):	7614695.2	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	117.1 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	10-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Steve Vasquez	Depth to First Water:	89.14 ft bgs	Project Number:	RC000753.0051
Drilling Asst:	L. Amaya / O. Floures	Sampling Method:	Split spoon, Cal Mod	Hammer Type:	Auto Hammer
Logger:	Sean McGrane	Sampling Interval:	Continuous	Hammer Weight:	140 lbs
Editor:	Chris Bonessi	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Hammer Drop:	30 inches

Depth (ft)	Blow Counts [N Value]	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
81					Topock - Alluvium Deposits	SM				
82										
83		102								
84					Topock - Alluvium Deposits	ML		(83.5 - 87.0') Topock - Alluvium Deposits; Sandy silt with gravel (ML); brown (10YR 5/3); some very fine to very coarse grained sand, angular to subround; little granules to very large pebbles, angular to subangular; little clay; moist to dry; 20,35,45		
85										
86										
87					Topock - Alluvium Deposits	SM		(87.0 - 87.4') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 5/4); very fine grained to granules, angular to subround; some small to large pebbles, angular to subangular; little silt; trace clay; coarser clasts composed of metadiorite; well graded; moist; very dense; 25,60,15	(87.0 - 88.5') Spilt spoon refusal	
88	50/5 (null/0.40')	4.8	MW-S-SP-87.0-87.4 9/21/2019 15:17		Topock - Alluvium Deposits	NR		(87.4 - 88.5') No recovery (NR)		
89								(88.5 - 92.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 5/3); very fine grained to granules, angular to subround; some small to very large pebbles, angular to subround; some silt; little clay; trace small cobbles, angular to subround; coarser clasts composed of metadiorite; well graded; moist; 25,40,35 (89.7'); dry (90'); moist	(88.5 - 97.0') Normal drilling (89.0') Approximate depth to water table	
90					Topock - Alluvium Deposits	SM				
91										
92										
93		102			Topock - Alluvium Deposits	ML		(92.0 - 94.5') Topock - Alluvium Deposits; Sandy silt with gravel (ML); brown (7.5YR 5/2); low plasticity; some granules to very large pebbles, angular to subangular; some very fine to very coarse grained sand, angular to subround; little clay; trace small cobbles, angular to subangular; coarser clasts composed of metadiorite; moist to wet; 25,35,40		
94										
95					Topock - Alluvium Deposits	SM		(94.5 - 97.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 5/3); very fine grained to granules, angular to subangular; some small to very large pebbles, angular to subangular; little silt; trace clay; coarser clasts composed of metadiorite; well graded; wet; 25,50,25 (96'); little clay; 25,40,35, decrease in sand		
96										
97										
98	25-50/2 (null/0.17')	12	MW-S-CM-97.0-97.5 9/22/2019 11:29		Topock - Alluvium Deposits	ML		(97.0 - 98.0') Topock - Alluvium Deposits; Sandy silt with gravel (ML); brown (10YR 4/3); low plasticity; some granules to very large pebbles, angular to subround; some very fine to very coarse grained sand, angular to subround; moist to wet; soft; 25,30,45	(97.0 - 98.5') Top 4 to 6 inches of sample most likely slough	
99			MW-S-CM-97.5-98.0 9/22/2019 11:27		Topock - Alluvium Deposits	NR		(98.0 - 98.5') No recovery (NR)		
100		102			Topock - Alluvium Deposits	SM		(98.5 - 101.8') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (10YR 5/3); very fine grained to granules, angular to subround; some small to very large pebbles, angular to subangular; little silt; little clay; coarser clasts composed of metadiorite; well graded; wet; 30,40,35	(98.5 - 107.0') Tight formation	

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Date Started:	09/25/2019	Surface Elevation:	545.6 ft amsl	<b>Boring No.: MW-88d</b>	
Date Completed:	09/25/2019	Northing (NAD83):	2100555.9		
Drilling Co.:	Cascade	Easting (NAD83):	7614695.2	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	117.1 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	10-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Steve Vasquez	Depth to First Water:	89.14 ft bgs	Project Number:	RC000753.0051
Drilling Asst:	L. Amaya / O. Floures	Sampling Method:	Split spoon, Cal Mod	Hammer Type:	Auto Hammer
Logger:	Sean McGrane	Sampling Interval:	Continuous	Hammer Weight:	140 lbs
Editor:	Chris Bonessi	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Hammer Drop:	30 inches

Depth (ft)	Blow Counts [N Value]	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
101.0					Topock - Alluvium Deposits	SM				
102.0		102			Topock - Weathered Bedrock - conglomerate	ML		(101.8 - 110.0') Topock - Weathered Bedrock - conglomerate; Sandy silt with gravel (ML); reddish brown (5YR 5/4); low plasticity; some very fine to very coarse grained sand, angular to subangular; little granules to very large pebbles, angular to subangular; little clay; coarser clasts composed of metadiorite; moist to wet; 20,35,45		
103.0										
104.0										
105.0										
106.0										
107.0										
108.0									(107.0 - 115.0') Very hard drilling, could not advance past 115 ft. sediments compacted in bag.	
109.0										
110.0				MW-S-VAS-107-112 (6.8 ppb) 9/24/2019 11:14						
111.0		90			Topock - Competent Bedrock - conglomerate			(110.0 - 115.0') Topock - Competent Bedrock - conglomerate; reddish brown / moderate brown (5YR 4/4); moist to dry; friable, pulverized,		
112.0										
113.0										
114.0				no sample (interval did not produce) 9/23/2019 10:43						
115.0										
116.0		6				NR		(115.0 - 117.1') No recovery (NR); lost core downhole what was recovered was highly disturbed and not log able	(115.0 - 117.1') Lost core down hole what was retrieved was highly disturbed.	
117.0										

End of Boring at 117.1' bgs.

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

GEOTECH BORING LOG C:\USERS\SMCGRANE\DOCUMENTS\PG&E\TOPOCK\DRIFT BORING LOGS\GINT FILES\01.03.20\TOPOCK DATABASE FOR PLOG.GPJ TOPOCK DATA TEMPLATE FOR PLOG.GDT 01/03/20 11:10



Date Started:	10/01/2019	Surface Elevation:	545.6 ft amsl	<b>Boring No.: MW-88d</b>
Date Completed:	10/03/2019	Northing (NAD83):	2100555.9	
Drilling Co.:	Cascade	Easting (NAD83):	7614695.2	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	117.1 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Conductor Casing Diameter:	12 inches	Location: PG&E Topock, Needles, California
Driller Name:	John Colon	Drill Casing Diameter:	6 inches	
Drilling Asst:	L. Amaya / O. Floures	Drill Bit:	Cutting Shoe	Project Number: RC000753.0051
Tool-Pusher:	Arnold Lamon	Depth to First Water:	89.14 ft bgs	
Rig Geologist:	Chris Bonessi	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Drilling Run and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling Notes	Drilling Fluid	
1	(0.0 - 8.0) mins/ft	SM		(0.0 - 8.0') 12.0" Steel Casing	(0.0 - 3.0') Topock - Fluvial Deposits; Silty sand with gravel (SM); brown (7.5YR 4/3)	(0.0 - 59.0') The 8-inch casing was advanced over the damaged well. As the casing was advanced, well construction materials were cored/driven into the casing. Grout and approximately 40 ft of PVC well casing was removed with the 7-inch core barrel.	(0.0 - 57.0') 1650 gallons of water used; 1650 gallons of water recovered; 0 gallons of water lost	
2								
3								
4					SW			(3.0 - 4.3') Topock - Fluvial Deposits; Well graded sand with gravel (SW); brown (7.5YR 5/3)
5					SW			(4.3 - 5.0') Topock - Fluvial Deposits; Well graded sand with gravel (SW); reddish brown (2.5YR 5/3)
6					NR			(5.0 - 5.6') Topock - Fluvial Deposits; Well graded sand with gravel (SW); weak red (2.5YR 5/2)
7					SW			(5.6 - 6.5') No recovery (NR)
8					SW			(6.5 - 7.0') Topock - Fluvial Deposits; Well graded sand with gravel (SW); (GLEYS 5/4)
9	(8.0 - 82.0) mins/ft	NR		(8.0 - 82.0') 8.0" Steel Casing	(7.0 - 8.0') Topock - Fluvial Deposits; Well graded sand with gravel (SW); weak red (2.5YR 5/2)			
10					SW			(8.0 - 8.5') No recovery (NR)
11					SW			(8.5 - 12.0') Topock - Alluvium Deposits; Well graded sand with gravel (SW); brown (10YR 4/3)
12								(12.0 - 13.2') Topock - Alluvium Deposits; Well graded sand with gravel (SW); grayish brown (10YR 5/2)
13					NR			(13.2 - 13.5') Topock - Alluvium Deposits; No recovery (NR)
14					SW-SM			(13.5 - 16.3') Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); dark reddish gray (2.5YR 4/1)
15								(16.3 - 17.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); weak red (2.5YR 5/2)
16					SM			(17.0 - 17.2') Topock - Alluvium Deposits; Silty sand with gravel (SM); dark gray / olive gray (5Y 4/1)
17					NR			(17.2 - 18.5') Topock - Alluvium Deposits; No recovery (NR)
18					SW			(18.5 - 21.0') Topock - Alluvium Deposits; Well graded sand with gravel (SW); weak red (2.5YR 5/2)
19								
20								

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 Remarks: NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval, penetration rates where not documented during overdrill

REZ: DRILLING LOG - PG&E - TOPOCK - C:\USERS\SSM\GRAND\DOCUMENTS\PG&E - TOPOCK\DRIFT BORING LOGS\GINT FILES\01.03.20\TOPOCK DATABASE FOR PLOG.GPJ TOPOCK DATA TEMPLATE FOR PLOG.GDT 01/03/20 12:22



Date Started:	10/01/2019	Surface Elevation:	545.6 ft amsl	<b>Boring No.: MW-88d</b>
Date Completed:	10/03/2019	Northing (NAD83):	2100555.9	
Drilling Co.:	Cascade	Easting (NAD83):	7614695.2	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	117.1 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Conductor Casing Diameter:	12 inches	Location: PG&E Topock, Needles, California
Driller Name:	John Colon	Drill Casing Diameter:	6 inches	
Drilling Asst:	L. Amaya / O. Floures	Drill Bit:	Cutting Shoe	Project Number: RC000753.0051
Tool-Pusher:	Arnold Lamon	Depth to First Water:	89.14 ft bgs	
Rig Geologist:	Chris Bonessi	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Drilling Run and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling Notes	Drilling Fluid
21		SW					
22		SW-SM			(21.0 - 22.0') Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); olive gray (5Y 4/2)		
23		SM			(22.0 - 22.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); gray (2.5Y 5/1)		
24		NR			(22.5 - 23.5') No recovery (NR)		
25		GM			(23.5 - 26.3') Topock - Alluvium Deposits; Silty gravel with sand (GM); grayish brown (2.5Y 5/2)		
26							
27		SM			(26.3 - 27.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); grayish brown (2.5Y 5/2)		
28		SM			(27.0 - 27.4') Topock - Alluvium Deposits; Silty sand with gravel (SM); grayish brown (2.5Y 5/2)		
29		NR			(27.4 - 28.5') No recovery (NR)		
30	(8.0 - 82.0) mins/ft	SM		(8.0 - 82.0') 8.0" Steel Casing	(28.5 - 32.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (10YR 5/3)		
31							
32		SM			(32.0 - 32.4') Topock - Alluvium Deposits; Silty sand with gravel (SM); grayish brown (2.5Y 5/2)		
33		NR			(32.4 - 33.5') No recovery (NR)		
34		SM			(33.5 - 35.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 5/3)		
35							
36		SW			(35.5 - 36.5') Topock - Alluvium Deposits; Well graded sand with gravel (SW); grayish brown (10YR 5/2)		
37		SM			(36.5 - 37.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 5/3)		
38		SM			(37.0 - 37.4') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (10YR 5/3)		
39		NR			(37.4 - 38.5') Topock - Alluvium Deposits; No recovery (NR)		
40		ML			(38.5 - 44.5') Topock - Alluvium Deposits; Sandy silt with gravel (ML); dark grayish brown / dark		

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Date Started:	10/01/2019	Surface Elevation:	545.6 ft amsl	<b>Boring No.: MW-88d</b>
Date Completed:	10/03/2019	Northing (NAD83):	2100555.9	
Drilling Co.:	Cascade	Easting (NAD83):	7614695.2	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	117.1 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Conductor Casing Diameter:	12 inches	Location: PG&E Topock, Needles, California
Driller Name:	John Colon	Drill Casing Diameter:	6 inches	
Drilling Asst:	L. Amaya / O. Floures	Drill Bit:	Cutting Shoe	Project Number: RC000753.0051
Tool-Pusher:	Arnold Lamon	Depth to First Water:	89.14 ft bgs	
Rig Geologist:	Chris Bonessi	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Drilling Run and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling Notes	Drilling Fluid									
41	(8.0 - 82.0) mins/ft	ML	[Symbol]	(8.0 - 82.0') 8.0" Steel Casing	yellowish brown (10YR 4/2)											
42					(44.5 - 47.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); gray (2.5Y 5/1)											
43								(47.0 - 47.4') Topock - Alluvium Deposits; Silty sand with gravel (SM); grayish brown (10YR 5/2)								
44									(47.4 - 48.5') No recovery (NR)							
45										(48.5 - 49.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); grayish brown (10YR 5/2)						
46											(49.5 - 53.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown (5YR 4/4)					
47												(53.0 - 57.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 5/3)				
48													(57.0 - 57.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (10YR 5/3)			
49														(57.5 - 58.5') No recovery (NR)		
50															(58.5 - 62.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 5/3)	
51																(59.0 - 77.0') During advancement of the 7-inch core barrel, the core barrel kept hanging up. During the last attempt to advance the core barrel there was loud and violent
52																
53																
54																
55																
56																
57																
58																
59																
60																

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 Remarks: NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval, penetration rates where not documented during overdrill

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Date Started:	10/01/2019	Surface Elevation:	545.6 ft amsl	<b>Boring No.: MW-88d</b>
Date Completed:	10/03/2019	Northing (NAD83):	2100555.9	
Drilling Co.:	Cascade	Easting (NAD83):	7614695.2	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	117.1 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Conductor Casing Diameter:	12 inches	Location: PG&E Topock, Needles, California
Driller Name:	John Colon	Drill Casing Diameter:	6 inches	
Drilling Asst:	L. Amaya / O. Floures	Drill Bit:	Cutting Shoe	Project Number: RC000753.0051
Tool-Pusher:	Arnold Lamon	Depth to First Water:	89.14 ft bgs	
Rig Geologist:	Chris Bonessi	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Drilling Run and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling Notes	Drilling Fluid		
61		SM				chattering of the rig. During retrieve of the core barrel it was determined that approximately 19 feet of core barrel broke off down hole. Crew was able to retrieve the core barrel.			
62		SW-SM			(62.0 - 64.5') Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); brown (7.5YR 5/4)				
63									
64									
65		SM			(64.5 - 67.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 5/3)				
66		SM							
67		SM			(67.0 - 67.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); dark yellowish brown (10YR 4/4)				
68		NR			(67.5 - 68.5') No recovery (NR)				
69		GM			(68.5 - 69.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); grayish brown (2.5Y 5/2)				
70	(8.0 - 82.0) mins/ft	SM		(8.0 - 82.0') 8.0" Steel Casing	(69.0 - 72.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); dark yellowish brown (10YR 4/4)				
71									
72									(72.0 - 74.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); yellowish brown / moderate yellowish brown (10YR 5/4)
73									
74									(74.0 - 75.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 5/4)
75									
76					NR			(75.5 - 77.0') No recovery (NR)	
77					SM			(77.0 - 77.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); dark yellowish brown (10YR 4/4)	
78					NR			(77.5 - 78.5') No recovery (NR)	
79					SM			(78.5 - 83.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 5/4)	
80					(77.0 - 82.0') Advanced 8-inch casing, inspected material from clean out run 77 to 82 feet bgs for well construction materials. Materials observed appeared to be native material, reddish brown fine to coarse grained sand and gravel, subangular to angular indicating that the borehole had walked off the hole. Pulled 8-inch casing and attempted to get back on borehole with 4-inch core barrel and 6-inch casing. At approximately 82 ft. hit resistance pulled core barrel and observed some filter pack with mostly native material. Clean out run from 82 to 87 ft bgs appeared to be undisturbed native material, reddish brown, stiff fine to				

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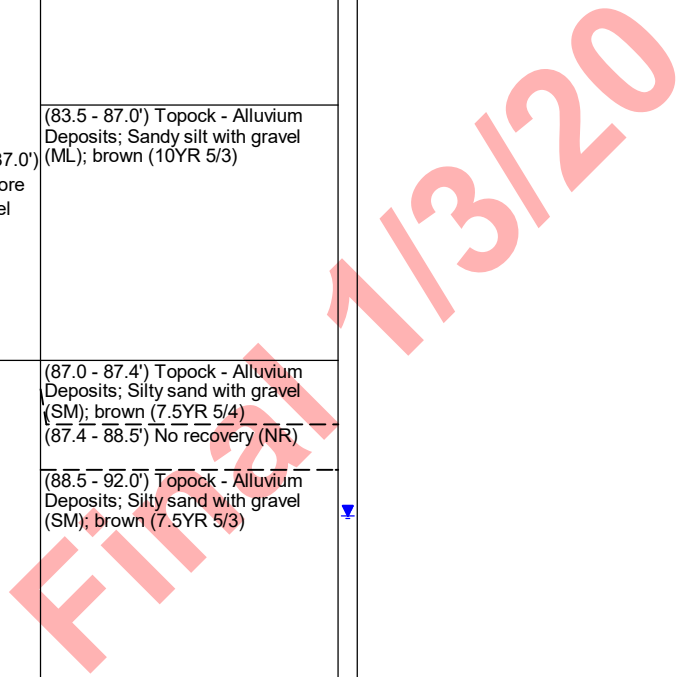
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Date Started:	10/01/2019	Surface Elevation:	545.6 ft amsl	<b>Boring No.: MW-88d</b>
Date Completed:	10/03/2019	Northing (NAD83):	2100555.9	
Drilling Co.:	Cascade	Easting (NAD83):	7614695.2	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	117.1 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Conductor Casing Diameter:	12 inches	Location: PG&E Topock, Needles, California
Driller Name:	John Colon	Drill Casing Diameter:	6 inches	
Drilling Asst:	L. Amaya / O. Floures	Drill Bit:	Cutting Shoe	Project Number: RC000753.0051
Tool-Pusher:	Arnold Lamon	Depth to First Water:	89.14 ft bgs	
Rig Geologist:	Chris Bonessi	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Drilling Run and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling Notes	Drilling Fluid		
81	(8.0 - 82.0) mins/ft	SM		(8.0 - 82.0')					
82				8.0" Steel Casing					
83	(82.0 - 87.0) mins/ft	ML		(82.0 - 87.0')					
84								(83.5 - 87.0') Topock - Alluvium Deposits; Sandy silt with gravel (ML); brown (10YR 5/3)	
85									
86									
87		SM			(87.0 - 87.4') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 5/4)				
88		NR			(87.4 - 88.5') No recovery (NR)				
89		SM			(88.5 - 92.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 5/3)				
90									
91		ML							(92.0 - 94.5') Topock - Alluvium Deposits; Sandy silt with gravel (ML); brown (7.5YR 5/2)
92									
93		SM							(94.5 - 97.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 5/3)
94									
95		ML							(97.0 - 98.0') Topock - Alluvium Deposits; Sandy silt with gravel (ML); brown (10YR 4/3)
96									
97	NR			(98.0 - 98.5') No recovery (NR)					
98									
99	SM			(98.5 - 101.8') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (10YR 5/3)					
100									

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Date Started:	10/01/2019	Surface Elevation:	545.6 ft amsl	<b>Boring No.: MW-88d</b>
Date Completed:	10/03/2019	Northing (NAD83):	2100555.9	
Drilling Co.:	Cascade	Easting (NAD83):	7614695.2	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	117.1 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Conductor Casing Diameter:	12 inches	Location: PG&E Topock, Needles, California
Driller Name:	John Colon	Drill Casing Diameter:	6 inches	
Drilling Asst:	L. Amaya / O. Floures	Drill Bit:	Cutting Shoe	Project Number: RC000753.0051
Tool-Pusher:	Arnold Lamon	Depth to First Water:	89.14 ft bgs	
Rig Geologist:	Chris Bonessi	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Drilling Run and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling Notes	Drilling Fluid
101		SM					
102					(101.8 - 110.0') Topock - Weathered Bedrock - conglomerate; Sandy silt with gravel (ML); reddish brown (5YR 5/4)		
103							
104							
105							
106		ML					
107							
108							
109							
110					(110.0 - 115.0') Topock - Competent Bedrock - conglomerate; reddish brown / moderate brown (5YR 4/4)		
111							
112							
113							
114							
115							
116		NR			(115.0 - 117.1') No recovery (NR)		
117							
End of Boring at 117.1 'bgs.							
118							
119							
120							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater  
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