

Date Started: 10/07/2019	Surface Elevation: 479.71 ft amsl	<b>Well ID: RB-2</b>
Date Completed: 06/28/2020	Shallow Well Elevation: 480.03 ft amsl	
Drilling Co.: Cascade	Deep Well Elevation: NA ft amsl	Client: PG&E
Drilling Method: Dual Rotary	Northing (NAD83): 2103398.54	Project: Final GW Remedy Phase 1
Driller Name: Jon Martinez	Easting (NAD83): 7616015.77	Location: PG&E Topock, Needles, California
Drilling Asst: A. & H. Amezguita	Borehole Diameter: 16 inches	
Logger: D. Cornell / E. Redner	Static Water Level: See Log for Depths	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: 1/30/2020	
Total Depth: 254.35 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

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
0					(+0.8 - 3.0') Temporary surface completion		(+0.8 - 3.0') 23 bags Note: 30 inch diameter Quickcrete and Kon-Crete cement pad dyed buff with 18 inch diameter lockable vault.
1		Topock - Fill	SP		(+0.3 - 38.0') 8" SHUR-GRIP SDR17 PVC Casing		Note: 12 inch diameter sonotube around well casing filled with native sand.
2							
3							
4					(3.0 - 4.0') Cemex #0/30 Mesh (30x50) Lapis Lustre Sand	(3.0 - 4.0') 11.3 bags	(3.0 - 4.0') 20 bags (177%) Note: Surface sand seal, used >20% of calculated volume due to subsidence around borehole. Upper 3 feet removed during installation of temporary surface completion.
5			NR		(4.5 - 5.5') Centralizer		
6							
7							
8							
9		Topock - Fill	SP				
10							
11							
12					(4.0 - 24.6') Portland Cement 3% Bentonite Type I, II and V with Hydrogel	(4.0 - 24.6') 218.4 gallons	(4.0 - 24.6') 253 gallons (116%) Note: Grout seal.
13							
14			NR				
15							
16							
17							
18		Topock - Fill	SP				
19		Topock - Fluvial	SP				


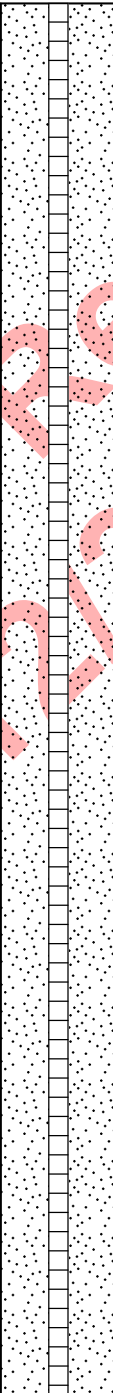


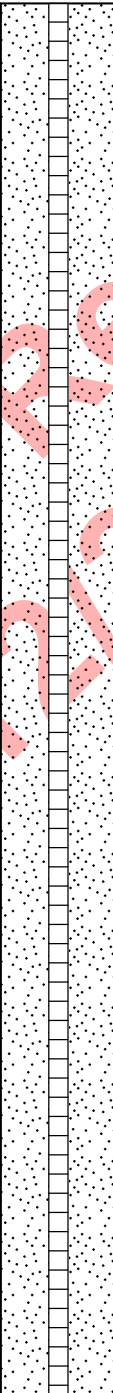




Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) measured pre-specific capacity for the shallow and deep screens respectively

Date Started:	10/07/2019	Surface Elevation:	479.71 ft amsl	Well ID: RB-2
Date Completed:	06/28/2020	Shallow Well Elevation:	480.03 ft amsl	
Drilling Co.:	Cascade	Deep Well Elevation:	NA ft amsl	Client: PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2103398.54	Project: Final GW Remedy Phase 1
Driller Name:	Jon Martinez	Easting (NAD83):	7616015.77	Location: PG&E Topock, Needles, California
Drilling Asst:	A. & H. Amezguita	Borehole Diameter:	16 inches	
Logger:	D. Cornell / E. Redner	Static Water Level:	See Log for Depths	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	1/30/2020	
Total Depth:	254.35 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

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
20		Deposits	SP		(+0.3 - 38.0') 8" SHUR-GRIP SDR17 PVC Casing		
21							
22					(4.0 - 24.6') Portland Cement 3% Bentonite Type I, II and V with Hydrogel	(4.0 - 24.6') 218.4 gallons	(4.0 - 24.6') 253 gallons (116%) Note: Grout seal.
23							
24			NR				
25							
26					(24.6 - 27.0') Bentonite seal chips Puregold medium chips	(24.6 - 27.0') 4.7 bags	(24.6 - 27.0') 4 bags (85%) Note: Seal between transition sand and grout seal.
27							
28					(27.0 - 29.3') Cemex #60 Mesh (40x70) Lapis Lustre Sand	(27.0 - 29.3') 6.4 bags	(27.0 - 29.3') 7 bags (109%) Note: Transition sand
29		Topock - Fluvial Deposits	SP				
30							
31							
32							
33							
34			NR		(29.3 - 106.0') Cemex #0/30 Mesh (30x50) Lapis Lustre Sand	(29.3 - 106.0') 223.8 bags	(29.3 - 106.0') 196 bags (88%) Note: Filter pack, swabbed filter pack for approximately 115 minutes prior to the installation of additional well materials.
35							
36					(35.5 - 36.5') Centralizer		
37							
38	RB-2-VAS- 36.5-41.5 ( $<0.033$ U ppb) 6/29/2019 11:43	Topock - Fluvial Deposits	SP-SM				
39		Topock - Fluvial Deposits	SM		(38.0 - 103.0') 8" 10-slot 316L SS Wire Wrap Screen		

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) measured pre-specific capacity for the shallow and deep screens respectively

Date Started: 10/07/2019	Surface Elevation: 479.71 ft amsl	<b>Well ID: RB-2</b>
Date Completed: 06/28/2020	Shallow Well Elevation: 480.03 ft amsl	
Drilling Co.: Cascade	Deep Well Elevation: NA ft amsl	Client: PG&E
Drilling Method: Dual Rotary	Northing (NAD83): 2103398.54	Project: Final GW Remedy Phase 1
Driller Name: Jon Martinez	Easting (NAD83): 7616015.77	Location: PG&E Topock, Needles, California
Drilling Asst: A. & H. Amezguita	Borehole Diameter: 16 inches	
Logger: D. Cornell / E. Redner	Static Water Level: See Log for Depths	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: 1/30/2020	
Total Depth: 254.35 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

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
40	RB-2-VAS-36.5-41.5 (<0.033 U ppb) 6/29/2019 11:43	Topock - Fluvial Deposits	GW-GM		(38.0 - 103.0') 8" 10-slot 316L SS Wire Wrap Screen		(39.3 - 41.0') 18.0" Borehole	
41			GW-GM					
42		Topock - Fluvial Deposits	SM		(29.3 - 106.0') Cemex #0/30 Mesh (30x50) Lapis Lustre Sand		(41.0 - 58.1') 18.0" Borehole	(29.3 - 106.0') 223.8 bags
43								
44		Topock - Fluvial Deposits	GW-GM					
45								
46		Topock - Alluvium Deposits	GM					
47								
48								
49								
50		Topock - Alluvium Deposits	GM					
51								
52	Topock - Alluvium Deposits	SM						
53								
54								
55								
56								
57								
58								
59								
							(58.1 - 77.6') 18.0" Borehole	

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) measured pre-specific capacity for the shallow and deep screens respectively

Date Started: 10/07/2019	Surface Elevation: 479.71 ft amsl	<b>Well ID: RB-2</b>
Date Completed: 06/28/2020	Shallow Well Elevation: 480.03 ft amsl	
Drilling Co.: Cascade	Deep Well Elevation: NA ft amsl	Client: PG&E
Drilling Method: Dual Rotary	Northing (NAD83): 2103398.54	Project: Final GW Remedy Phase 1
Driller Name: Jon Martinez	Easting (NAD83): 7616015.77	Location: PG&E Topock, Needles, California
Drilling Asst: A. & H. Amezcuita	Borehole Diameter: 16 inches	
Logger: D. Cornell / E. Redner	Static Water Level: See Log for Depths	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: 1/30/2020	
Total Depth: 254.35 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

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
60		Topock - Alluvium Deposits	SC	SC	(38.0 - 103.0') 8" 10-slot 316L SS Wire Wrap Screen		
61							
62							
63		Topock - Alluvium Deposits	GM	GM			
64							
65							
66							
67							
68							
69					(29.3 - 106.0') Cemex #0/30 Mesh (30x50) Lapis Lustre Sand		
70		Topock - Alluvium Deposits	GW	GW	(58.1 - 77.6') 18.0" Borehole	(29.3 - 106.0') 223.8 bags	(29.3 - 106.0') 196 bags (88%) Note: Filter pack, swabbed filter pack for approximately 115 minutes prior to the installation of additional well materials.
71							
72							
73							
74	RB-2-VAS-72-77 (<0.033 U ppb) 6/30/2019 14:10	Topock - Alluvium Deposits	GC	GC			
75		Topock - Alluvium Deposits	SW	SW			
76							
77							
78		Topock - Alluvium Deposits	SW-SM	SW-SM	(77.6 - 82.0') 18.0" Borehole		
79							






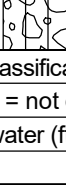
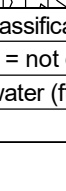
Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) measured pre-specific capacity for the shallow and deep screens respectively

Date Started: 10/07/2019	Surface Elevation: 479.71 ft amsl	<b>Well ID: RB-2</b>
Date Completed: 06/28/2020	Shallow Well Elevation: 480.03 ft amsl	
Drilling Co.: Cascade	Deep Well Elevation: NA ft amsl	Client: PG&E
Drilling Method: Dual Rotary	Northing (NAD83): 2103398.54	Project: Final GW Remedy Phase 1
Driller Name: Jon Martinez	Easting (NAD83): 7616015.77	Location: PG&E Topock, Needles, California
Drilling Asst: A. & H. Amezcuita	Borehole Diameter: 16 inches	
Logger: D. Cornell / E. Redner	Static Water Level: See Log for Depths	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: 1/30/2020	
Total Depth: 254.35 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

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
80		Topock - Alluvium Deposits	SW-SM		(38.0 - 103.0') 8" 10-slot 316L SS Wire Wrap Screen		
81						(77.6 - 82.0') 18.0" Borehole	
82							
83		Topock - Alluvium Deposits	ML				
84							
85							
86							
87						(82.0 - 92.0') 18.0" Borehole	
88		Topock - Alluvium Deposits	GC				
89					(29.3 - 106.0') Cemex #0/30 Mesh (30x50) Lapis Lustre Sand	(29.3 - 106.0') 223.8 bags	(29.3 - 106.0') 196 bags (88%) Note: Filter pack, swabbed filter pack for approximately 115 minutes prior to the installation of additional well materials.
90							
91		Topock - Alluvium Deposits	GC				
92							
93							
94		Topock - Alluvium Deposits	GM			(92.0 - 97.0') 18.0" Borehole	
95							
96							
97							
98		Topock - Alluvium Deposits	GM			(97.0 - 119.3') 18.0" Borehole	
99							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) measured pre-specific capacity for the shallow and deep screens respectively

Date Started:	10/07/2019	Surface Elevation:	479.71 ft amsl	Well ID: RB-2
Date Completed:	06/28/2020	Shallow Well Elevation:	480.03 ft amsl	
Drilling Co.:	Cascade	Deep Well Elevation:	NA ft amsl	Client: PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2103398.54	Project: Final GW Remedy Phase 1
Driller Name:	Jon Martinez	Easting (NAD83):	7616015.77	Location: PG&E Topock, Needles, California
Drilling Asst:	A. & H. Amezcuita	Borehole Diameter:	16 inches	
Logger:	D. Cornell / E. Redner	Static Water Level:	See Log for Depths	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	1/30/2020	
Total Depth:	254.35 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

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
100	RB-2-VAS-102-107 ( $<0.033$ U ppb) 7/1/2019 15:21	Topock - Alluvium Deposits	GC		(38.0 - 103.0') 8" 10-slot 316L SS Wire Wrap Screen		
101			GC				
102		Topock - Alluvium Deposits	GM		(29.3 - 106.0') Cemex #0/30 Mesh (30x50) Lapis Lustre Sand	(29.3 - 106.0') 223.8 bags	(29.3 - 106.0') 196 bags (88%) Note: Filter pack, swabbed filter pack for approximately 115 minutes prior to the installation of additional well materials.
103					(103.0 - 133.0') 8" SHUR-GRIP SDR17 PVC Casing		
104					(104.0 - 105.0') Centralizer		
105		Topock - Alluvium Deposits	GC		(106.0 - 106.7') Cemex #60 Mesh (40x70) Lapis Lustre Sand	(106.0 - 106.7') 2.1 bags	(106.0 - 106.7') 2 bags (95%) Note: Transition sand
106							
107		Topock - Alluvium Deposits	GM		(97.0 - 119.3') 18.0" Borehole	(106.7 - 117.0') 23.2 buckets	(106.7 - 117.0') 22.5 buckets (97%) Note: Intermediate seal
108							
109							
110		Topock - Alluvium Deposits	GM		(106.7 - 117.0') Bentonite seal pellets Pel-Plug (TR30) 3/8" (111.5 - 112.5') Centralizer	(117.0 - 118.0') 2.9 bags	(117.0 - 118.0') 5 bags (172%) Note: Transition sand, used >20% of the calculated volume due to potential voids that formed during drilling.
111							
112		Topock - Alluvium Deposits	GM		(117.0 - 118.0') Cemex #60 Mesh (40x70) Lapis Lustre Sand	(118.0 - 254.4') 293.8 bags	
113							
114							
115		Topock - Alluvium Deposits	GM				
116							
117							
118							
119							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) measured pre-specific capacity for the shallow and deep screens respectively

Date Started: 10/07/2019	Surface Elevation: 479.71 ft amsl	<b>Well ID: RB-2</b>
Date Completed: 06/28/2020	Shallow Well Elevation: 480.03 ft amsl	
Drilling Co.: Cascade	Deep Well Elevation: NA ft amsl	Client: PG&E
Drilling Method: Dual Rotary	Northing (NAD83): 2103398.54	Project: Final GW Remedy Phase 1
Driller Name: Jon Martinez	Easting (NAD83): 7616015.77	Location: PG&E Topock, Needles, California
Drilling Asst: A. & H. Amezcuita	Borehole Diameter: 16 inches	
Logger: D. Cornell / E. Redner	Static Water Level: See Log for Depths	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: 1/30/2020	
Total Depth: 254.35 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

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
120		Topock - Alluvium Deposits	GM		(103.0 - 133.0') 8" SHUR-GRIP SDR17 PVC Casing		
121							
122							
123		Topock - Alluvium Deposits	GM				
124							
125					(119.3 - 130.0') 16.0" Borehole		
126							
127							
128		Topock - Alluvium Deposits	ML		(118.0 - 254.4') Cemex #0/30 Mesh (30x50) Lapis Lustre Sand	(118.0 - 254.4') 293.8 bags	(118.0 - 254.4') 334 bags (114%) Note: Filter pack, swabbed filter pack for approximately 175 minutes prior to the installation of additional well materials.
129							
130							
131					(131.0 - 132.0') Centralizer		
132						(130.0 - 137.1') 16.0" Borehole	
133		Topock - Alluvium Deposits	GM			(133.0 - 238.0') 8" 10-slot 316L SS Wire Wrap Screen	
134							
135							
136							
137							
138		Topock - Alluvium Deposits	SM			(137.1 - 157.1') 16.0" Borehole	
139							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) measured pre-specific capacity for the shallow and deep screens respectively

Date Started: 10/07/2019	Surface Elevation: 479.71 ft amsl	<b>Well ID: RB-2</b>
Date Completed: 06/28/2020	Shallow Well Elevation: 480.03 ft amsl	
Drilling Co.: Cascade	Deep Well Elevation: NA ft amsl	Client: PG&E
Drilling Method: Dual Rotary	Northing (NAD83): 2103398.54	Project: Final GW Remedy Phase 1
Driller Name: Jon Martinez	Easting (NAD83): 7616015.77	Location: PG&E Topock, Needles, California
Drilling Asst: A. & H. Amezcuita	Borehole Diameter: 16 inches	
Logger: D. Cornell / E. Redner	Static Water Level: See Log for Depths	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: 1/30/2020	
Total Depth: 254.35 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

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
140		Topock - Alluvium Deposits	SM		(133.0 - 238.0') 8" 10-slot 316L SS Wire Wrap Screen		
141							
142							
143		Topock - Alluvium Deposits	GM				
144	RB-2-VAS-142-147 ( $<0.17$ U ppb) 7/9/2019 13:10						
145							
146		Topock - Alluvium Deposits	SM				
147							
148		Topock - Alluvium Deposits	SM				
149					(118.0 - 254.4') Cemex #0/30 Mesh (30x50) Lapis Lustre Sand		
150						(118.0 - 254.4') 293.8 bags	(118.0 - 254.4') 334 bags (114%) Note: Filter pack, swabbed filter pack for approximately 175 minutes prior to the installation of additional well materials.
151		Topock - Alluvium Deposits	SM				
152							
153							
154		Topock - Alluvium Deposits	GM				
155							
156							
157							
158		Topock - Alluvium Deposits	GM				
159					(157.1 - 176.7') 16.0" Borehole		

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) measured pre-specific capacity for the shallow and deep screens respectively

Date Started: 10/07/2019	Surface Elevation: 479.71 ft amsl	<b>Well ID: RB-2</b>
Date Completed: 06/28/2020	Shallow Well Elevation: 480.03 ft amsl	
Drilling Co.: Cascade	Deep Well Elevation: NA ft amsl	Client: PG&E
Drilling Method: Dual Rotary	Northing (NAD83): 2103398.54	Project: Final GW Remedy Phase 1
Driller Name: Jon Martinez	Easting (NAD83): 7616015.77	Location: PG&E Topock, Needles, California
Drilling Asst: A. & H. Amezguita	Borehole Diameter: 16 inches	
Logger: D. Cornell / E. Redner	Static Water Level: See Log for Depths	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: 1/30/2020	
Total Depth: 254.35 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

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
160		Topock - Alluvium Deposits	GM		(133.0 - 238.0') 8" 10-slot 316L SS Wire Wrap Screen		
161		Topock - Alluvium Deposits	GM				
162		Topock - Alluvium Deposits	GM				
163		Topock - Alluvium Deposits	GM				
164		Topock - Alluvium Deposits	GM				
165		Topock - Alluvium Deposits	GM				
166		Topock - Alluvium Deposits	GM				
167		Topock - Alluvium Deposits	GM				
168		Topock - Alluvium Deposits	SM		(157.1 - 176.7') 16.0" Borehole		
169		Topock - Alluvium Deposits	SM		(118.0 - 254.4') Cemex #0/30 Mesh (30x50) Lapis Lustre Sand	(118.0 - 254.4') 293.8 bags	(118.0 - 254.4') 334 bags (114%) Note: Filter pack, swabbed filter pack for approximately 175 minutes prior to the installation of additional well materials.
170		Topock - Alluvium Deposits	SM				
171		Topock - Alluvium Deposits	SM				
172		Topock - Alluvium Deposits	SM				
173		Topock - Alluvium Deposits	SM				
174	RB-2-VAS-172-177 (<0.17 U ppb) 7/12/2019 14:55	Topock - Alluvium Deposits	SM				
175		Topock - Alluvium Deposits	SM				
176		Topock - Alluvium Deposits	SM				
177		Topock - Alluvium Deposits	SM				
178		Topock - Alluvium Deposits	SM		(176.7 - 197.0') 16.0" Borehole		
179		Topock - Alluvium Deposits	SM				

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) measured pre-specific capacity for the shallow and deep screens respectively

Date Started: 10/07/2019	Surface Elevation: 479.71 ft amsl	<b>Well ID: RB-2</b>
Date Completed: 06/28/2020	Shallow Well Elevation: 480.03 ft amsl	
Drilling Co.: Cascade	Deep Well Elevation: NA ft amsl	Client: PG&E
Drilling Method: Dual Rotary	Northing (NAD83): 2103398.54	Project: Final GW Remedy Phase 1
Driller Name: Jon Martinez	Easting (NAD83): 7616015.77	Location: PG&E Topock, Needles, California
Drilling Asst: A. & H. Amezguita	Borehole Diameter: 16 inches	
Logger: D. Cornell / E. Redner	Static Water Level: See Log for Depths	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: 1/30/2020	
Total Depth: 254.35 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

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
180		Topock - Alluvium Deposits	SM				
181			SM				
182							
183							
184		Topock - Alluvium Deposits	SW				
185							
186							
187							
188		Topock - Alluvium Deposits	GW-GM				
189		Topock - Alluvium Deposits	SM		(118.0 - 254.4') Cemex #0/30 Mesh (30x50) Lapis Lustre Sand	(118.0 - 254.4') 293.8 bags	(118.0 - 254.4') 334 bags (114%) Note: Filter pack, swabbed filter pack for approximately 175 minutes prior to the installation of additional well materials.
190		Topock - Alluvium Deposits	GM				
191							
192							
193		Topock - Alluvium Deposits	SW-SM				
194							
195							
196							
197							
198		Topock - Alluvium Deposits	SM			(197.0 - 216.7') 16.0" Borehole	
199							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) measured pre-specific capacity for the shallow and deep screens respectively

Date Started:	10/07/2019	Surface Elevation:	479.71 ft amsl	Well ID: RB-2
Date Completed:	06/28/2020	Shallow Well Elevation:	480.03 ft amsl	
Drilling Co.:	Cascade	Deep Well Elevation:	NA ft amsl	Client: PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2103398.54	Project: Final GW Remedy Phase 1
Driller Name:	Jon Martinez	Easting (NAD83):	7616015.77	Location: PG&E Topock, Needles, California
Drilling Asst:	A. & H. Amezguita	Borehole Diameter:	16 inches	
Logger:	D. Cornell / E. Redner	Static Water Level:	See Log for Depths	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	1/30/2020	
Total Depth:	254.35 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

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
200			SM				
201		Topock - Alluvium Deposits	ML				
202							
203		Topock - Alluvium Deposits	SM				
204	RB-2-VAS-202-207 ( $<0.17$ U ppb) 7/14/2019 09:20	Topock - Alluvium Deposits	SM				
205		Topock - Alluvium Deposits	ML				
206		Topock - Alluvium Deposits					
207		Topock - Alluvium Deposits	SM				
208							
209					(118.0 - 254.4') Cemex #0/30 Mesh (30x50) Lapis Lustre Sand		
210						(118.0 - 254.4') 293.8 bags	(118.0 - 254.4') 334 bags (114%) Note: Filter pack, swabbed filter pack for approximately 175 minutes prior to the installation of additional well materials.
211							
212		Topock - Alluvium Deposits	SC				
213							
214							
215							
216							
217							
218		Topock - Alluvium Deposits	SC				
219							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) measured pre-specific capacity for the shallow and deep screens respectively

Date Started: 10/07/2019	Surface Elevation: 479.71 ft amsl	<b>Well ID: RB-2</b>
Date Completed: 06/28/2020	Shallow Well Elevation: 480.03 ft amsl	
Drilling Co.: Cascade	Deep Well Elevation: NA ft amsl	Client: PG&E
Drilling Method: Dual Rotary	Northing (NAD83): 2103398.54	Project: Final GW Remedy Phase 1
Driller Name: Jon Martinez	Easting (NAD83): 7616015.77	Location: PG&E Topock, Needles, California
Drilling Asst: A. & H. Amezguita	Borehole Diameter: 16 inches	
Logger: D. Cornell / E. Redner	Static Water Level: See Log for Depths	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: 1/30/2020	
Total Depth: 254.35 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

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
220			SC		(133.0 - 238.0') 8" 10-slot 316L SS Wire Wrap Screen		
221		Topock - Alluvium Deposits	GC				
222							
223							
224							
225							
226							
227							
228							
229		Topock - Alluvium Deposits	SC		(118.0 - 254.4') Cemex #0/30 Mesh (30x50) Lapis Lustre Sand	(118.0 - 254.4') 293.8 bags	(118.0 - 254.4') 334 bags (114%) Note: Filter pack, swabbed filter pack for approximately 175 minutes prior to the installation of additional well materials.
230							
231							
232							
233							
234							
235							
236							
237							
238	RB-2-VAS-237-242 (<0.17 U ppb) 7/15/2019 13:48	Topock - Alluvium Deposits	GC		(236.9 - 254.4') 16.0" Borehole		
239							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) measured pre-specific capacity for the shallow and deep screens respectively

Date Started: 10/07/2019	Surface Elevation: 479.71 ft amsl	<b>Well ID: RB-2</b>
Date Completed: 06/28/2020	Shallow Well Elevation: 480.03 ft amsl	
Drilling Co.: Cascade	Deep Well Elevation: NA ft amsl	Client: PG&E
Drilling Method: Dual Rotary	Northing (NAD83): 2103398.54	Project: Final GW Remedy Phase 1
Driller Name: Jon Martinez	Easting (NAD83): 7616015.77	Location: PG&E Topock, Needles, California
Drilling Asst: A. & H. Amezguita	Borehole Diameter: 16 inches	
Logger: D. Cornell / E. Redner	Static Water Level: See Log for Depths	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: 1/30/2020	
Total Depth: 254.35 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

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
240	RB-2-VAS-237-242 (<0.17 U ppb) 7/15/2019 13:48	Topock - Alluvium Deposits	GC		(240.0 - 241.0') Centralizer		
241							
242		Topock - Weathered Bedrock - conglomerate	CL				
243							
244		Topock - Weathered Bedrock - conglomerate	SC		(238.0 - 243.9') Sump and PVC End Cap		
245							
246							
247					(118.0 - 254.4') Cemex #0/30 Mesh (30x50) Lapis Lustre Sand	(118.0 - 254.4') 293.8 bags	(118.0 - 254.4') 334 bags (114%) Note: Filter pack, swabbed filter pack for approximately 175 minutes prior to the installation of additional well materials.
248							
249							
250		Topock - Weathered Bedrock - conglomerate	CL				
251							
252							
253							
254							
255	End of Boring at 254.4 ft bgs.						
256							
257							
258							
259							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) measured pre-specific capacity for the shallow and deep screens respectively

# Drilling Log

Sheet: 1 of 13

Date Started:	09/24/2019	Surface Elevation:	479.71 ft amsl	Boring No.: <b>RB-2</b>	
Date Completed:	10/05/2019	Northing (NAD83):	2103398.54		
Drilling Co.:	Cascade	Easting (NAD83):	7616015.77	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	254.4 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location:	PG&E Topock, Needles,
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches		California
Drilling Asst:	A. & H. Amezguita	Drill Bit:	Tricone	Project Number:	RC000753.0051
Tool-Pusher:	Arnold Lamon	Depth to First Water:	26.8 ft bgs		
Rig Geologist:	D. Cornell / E. Redner	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
1		SP			(0.0 - 3.0') Topock - Fill; Poorly graded sand (SP); brown (10YR 4/3)		(0.0 - 19.8') 740 gallons of water used; 700 gallons of water recovered; 40 gallons of water lost
2							
3					(3.0 - 7.0') No recovery (NR)		
4							
5		NR					
6							
7					(7.0 - 11.0') Topock - Fill; Poorly graded sand (SP); brown (7.5YR 4/3)		
8		SP					
9							
10	(0.0 - 19.8) 2.18 mins/ft			(0.0 - 19.8') 18.0" Steel Casing		(10.0') Observed trace amounts of Cemex #3 Mesh (8x20) Lapis Luster Sand in drill cuttings.	
11					(11.0 - 17.0') No recovery (NR)		
12							
13							
14		NR					
15							
16							
17					(17.0 - 18.5') Topock - Fill; Poorly graded sand (SP); brown (10YR 4/3)		
18		SP					
19		SP			(18.5 - 20.0') Topock - Fluvial Deposits; Poorly graded sand (SP); light yellowish brown (10YR 6/4)		
20							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: depth to water collected post development prior to specific capacity test

# Drilling Log








Sheet: 2 of 13

Date Started:	09/24/2019	Surface Elevation:	479.71 ft amsl	Boring No.: <b>RB-2</b>	
Date Completed:	10/05/2019	Northing (NAD83):	2103398.54		
Drilling Co.:	Cascade	Easting (NAD83):	7616015.77	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	254.4 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location:	PG&E Topock, Needles,
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches		California
Drilling Asst:	A. & H. Amezguita	Drill Bit:	Tricone	Project Number:	RC000753.0051
Tool-Pusher:	Arnold Lamon	Depth to First Water:	26.8 ft bgs		
Rig Geologist:	D. Cornell / E. Redner	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
21					(20.0 - 27.0') No recovery (NR)	(20.0') Observed trace amounts of Cemex #3 Mesh (8x20) Lapis Luster Sand in drill cuttings.	(19.8 - 39.3') 5300 gallons of water used; 5540 gallons of water recovered; 240 gallons of water gained
22							
23							
24			NR				
25							
26							
27							
28					(27.0 - 31.5') Topock - Fluvial Deposits; Poorly graded sand (SP); light yellowish brown (10YR 6/4)		
29			SP	(19.8 - 39.3') 18.0" Steel Casing			
30	(19.8 - 39.3) 3.87 mins/ft					(30.0') Observed trace amounts of Cemex #3 Mesh (8x20) Lapis Luster Sand in drill cuttings.	
31							
32					(31.5 - 37.0') No recovery (NR)		
33			NR				
34							
35							
36							
37					(37.0 - 38.0') Topock - Fluvial Deposits; Poorly graded sand with silt (SP-SM); brown (10YR 5/3)		
38			SP-SM			(38.0 - 50.0') Rough drilling.	
39			SM		(38.0 - 39.0') Topock - Fluvial Deposits; Silty sand (SM); brown (10YR 5/3)		
40	(39.3 - 41.0) 21.83 mins/ft			(39.3 - 41.0') 18.0" Steel	(39.0 - 42.0') Topock - Fluvial Deposits; Well graded gravel with silt and sand (GW-GM);	(39.3') Tripped out drill string to install BHA 5000 lbs.	(39.3 - 58.1') 30153 gallons of water used;

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: depth to water collected post development prior to specific capacity test

Date Started:	09/24/2019	Surface Elevation:	479.71 ft amsl	<b>Boring No.: <u>RB-2</u></b>	
Date Completed:	10/05/2019	Northing (NAD83):	2103398.54		
Drilling Co.:	Cascade	Easting (NAD83):	7616015.77	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	254.4 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location:	PG&E Topock, Needles,
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches		California
Drilling Asst:	A. & H. Amezguita	Drill Bit:	Tricone	Project Number:	RC000753.0051
Tool-Pusher:	Arnold Lamon	Depth to First Water:	26.8 ft bgs		
Rig Geologist:	D. Cornell / E. Redner	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
41	(39.3 - 41.0) 21.83 mins/ft	GW-GM		Casing (39.3 - 41.0') 18.0" Steel Casing	grayish brown (10YR 5/2)	(40.0') Observed trace amounts of Cemex #3 Mesh (8x20) Lapis Luster Sand in drill cuttings.	7746 gallons of water recovered; 22407 gallons of water lost
42					(42.0 - 45.0') Topock - Fluvial Deposits; Silty sand (SM); dark yellowish brown (10YR 4/4)	(41.0') Sheared off bolts on the diverter plate, cut casing to trip out pipe to access diverter.	
43		SM					
44							
45					(45.0 - 48.0') Topock - Fluvial Deposits; Well graded gravel with silt and sand (GW-GM); dark gray (10YR 4/1)		
46		GW-GM					
47							
48					(48.0 - 54.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); reddish brown (5YR 5/4)		
49							
50	(41.0 - 58.1) 7.37 mins/ft			(41.0 - 58.1') 18.0" Steel Casing		(50.0') Observed trace amounts of Cemex #3 Mesh (8x20) Lapis Luster Sand in drill cuttings.	
51		GM					
52							
53							
54		GM			(54.0 - 55.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); reddish brown (5YR 5/4)		
55					(55.0 - 59.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown (5YR 5/4)		
56							
57		SM					
58							
59	(58.1 - 77.6) 4.80 mins/ft			(58.1 - 77.6') 18.0" Steel Casing	(59.0 - 60.0') Topock - Alluvium Deposits; Clayey sand with gravel (SC); reddish brown	(58.1') Added additional bolts to the diverter.	(58.1 - 77.6') 4920 gallons of water used; 5527 gallons of water recovered; 607 gallons of water gained
60		SC					

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: depth to water collected post development prior to specific capacity test

Date Started:	09/24/2019	Surface Elevation:	479.71 ft amsl	Boring No.: <u>RB-2</u>	
Date Completed:	10/05/2019	Northing (NAD83):	2103398.54		
Drilling Co.:	Cascade	Easting (NAD83):	7616015.77	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	254.4 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location:	PG&E Topock, Needles,
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches		California
Drilling Asst:	A. & H. Amezguita	Drill Bit:	Tricone	Project Number:	RC000753.0051
Tool-Pusher:	Arnold Lamon	Depth to First Water:	26.8 ft bgs		
Rig Geologist:	D. Cornell / E. Redner	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
61					(5YR 5/4) (60.0 - 67.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); reddish brown (5YR 5/4)	(60.0') Observed trace amounts of Cemex #3 Mesh (8x20) Lapis Luster Sand in drill cuttings.	
62							
63							
64							
65							
66							
67							
68					(67.0 - 74.0') Topock - Alluvium Deposits; Well graded gravel (GW); reddish gray / pale brown (5YR 5/2)		
69	(58.1 - 77.6) 4.80 mins/ft			(58.1 - 77.6') 18.0" Steel Casing			
70						(70.0') Observed trace amounts of Cemex #3 Mesh (8x20) Lapis Luster Sand in drill cuttings.	
71							
72							
73							
74					(74.0 - 75.0') Topock - Alluvium Deposits; Clayey gravel with sand (GC); dark reddish gray (5YR 4/2)		
75						(75.0 - 77.0') Drill rods chattering	
76					(75.0 - 77.0') Topock - Alluvium Deposits; Well graded sand with gravel (SW); reddish brown / moderate brown (5YR 4/4)		
77						(77.0') Drill rods chattering.	
78					(77.0 - 81.5') Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); reddish gray / pale brown (5YR 5/2)		
79	(77.6 - 82.0) 6.18 mins/ft			(77.6 - 82.0') 18.0" Steel Casing		(78.0 - 82.0') Rough drilling.	(77.6 - 119.3') 14976 gallons of water used; 18999 gallons of water recovered; 4023 gallons of water gained
80							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: depth to water collected post development prior to specific capacity test

Date Started:	09/24/2019	Surface Elevation:	479.71 ft amsl	Boring No.: <b><u>RB-2</u></b>	
Date Completed:	10/05/2019	Northing (NAD83):	2103398.54		
Drilling Co.:	Cascade	Easting (NAD83):	7616015.77	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	254.4 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location:	PG&E Topock, Needles,
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches		California
Drilling Asst:	A. & H. Amezguita	Drill Bit:	Tricone	Project Number:	RC000753.0051
Tool-Pusher:	Arnold Lamon	Depth to First Water:	26.8 ft bgs		
Rig Geologist:	D. Cornell / E. Redner	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
81	(77.6 - 82.0) 6.18 mins/ft	SW-SM		(77.6 - 82.0') 18.0" Steel Casing		(80.0') Observed trace amounts of Cemex #3 Mesh (8x20) Lapis Luster Sand in drill cuttings.	
82					(81.5 - 86.5') Topock - Alluvium Deposits; Silt with gravel (ML)	(82.0') Rough drilling, loss of returns, hole plugs up, crew works to get it cleared out.	
83						(83.0 - 98.0') Rough drilling.	
84		ML					
85							
86							
87	(82.0 - 92.0) 3.01 mins/ft			(82.0 - 92.0') 18.0" Steel Casing	(86.5 - 90.0') Topock - Alluvium Deposits; Clayey gravel (GC); yellowish red / light brown (5YR 5/6)		
88		GC					
89							
90							
91		GC			(90.0 - 93.0') Topock - Alluvium Deposits; Clayey gravel (GC); brown (7.5YR 5/4)	(90.0') Observed trace amounts of Cemex #3 Mesh (8x20) Lapis Luster Sand in drill cuttings.	
92							
93							
94	(92.0 - 97.0) 15.77 mins/ft			(92.0 - 97.0') 18.0" Steel Casing	(93.0 - 96.5') Topock - Alluvium Deposits; Silty gravel (GM); strong brown (7.5YR 5/6)	(94.0 - 95.0') Drill rods chattering.	
95		GM					
96							
97					(96.5 - 99.0') Topock - Alluvium Deposits; Silty gravel (GM); strong brown (7.5YR 5/6)	(97.0') Added small section of casing 1.95 ft.	
98	(97.0 - 119.3) 5.03 mins/ft	GM		(97.0 - 119.3') 18.0" Steel Casing			
99							
100		GC			(99.0 - 104.0') Topock - Alluvium Deposits; Clayey gravel (GC); yellowish red /		

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: depth to water collected post development prior to specific capacity test

# Drilling Log





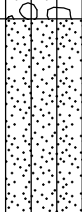
Sheet: 6 of 13

Date Started:	09/24/2019	Surface Elevation:	479.71 ft amsl	<b>Boring No.: <u>RB-2</u></b>	
Date Completed:	10/05/2019	Northing (NAD83):	2103398.54		
Drilling Co.:	Cascade	Easting (NAD83):	7616015.77	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	254.4 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location:	PG&E Topock, Needles,
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches		California
Drilling Asst:	A. & H. Amezguita	Drill Bit:	Tricone	Project Number:	RC000753.0051
Tool-Pusher:	Arnold Lamon	Depth to First Water:	26.8 ft bgs		
Rig Geologist:	D. Cornell / E. Redner	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
101					light brown (5YR 5/6)	(100.0') Observed trace amounts of Cemex #3 Mesh (8x20) Lapis Luster Sand in drill cuttings.	
102		GC					
103							
104					(104.0 - 107.0') Topock - Alluvium Deposits; Silty gravel (GM); yellowish red / light brown (5YR 5/6)	(104.0 - 119.0') Rough drilling	
105		GM					
106							
107					(107.0 - 109.0') Topock - Alluvium Deposits; Clayey gravel with sand (GC); yellowish red / light brown (5YR 5/6)		
108		GC					
109					(109.0 - 111.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); yellowish brown (10YR 5/6)		
110	(97.0 - 119.3) 5.03 mins/ft	GM		(97.0 - 119.3') 18.0" Steel Casing			
111					(111.0 - 112.0') Topock - Alluvium Deposits; Silty gravel (GM); yellowish brown (10YR 5/6)		
112		GM					
113					(112.0 - 114.0') Topock - Alluvium Deposits; Silty gravel (GM); strong brown (7.5YR 5/6)		
114		GM					
115					(114.0 - 121.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); yellowish brown (10YR 5/6)		
116							
117		GM					
118							
119						(119.0') Observed trace amounts of Cemex #3 Mesh (8x20) Lapis Luster Sand in drill cuttings.	
120	(119.3 - 130.0) 2.00 mins/ft			(119.3 - 130.0') 16.0" Steel		(119.3') Conductor casing cannot be advanced deeper due	(119.3 - 176.7') 13778 gallons of water used;

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: depth to water collected post development prior to specific capacity test

Date Started:	09/24/2019	Surface Elevation:	479.71 ft amsl	Boring No.: <b><u>RB-2</u></b>	
Date Completed:	10/05/2019	Northing (NAD83):	2103398.54		
Drilling Co.:	Cascade	Easting (NAD83):	7616015.77	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	254.4 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location:	PG&E Topock, Needles,
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches		California
Drilling Asst:	A. & H. Amezguita	Drill Bit:	Tricone	Project Number:	RC000753.0051
Tool-Pusher:	Arnold Lamon	Depth to First Water:	26.8 ft bgs		
Rig Geologist:	D. Cornell / E. Redner	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid	
121	(119.3 - 130.0) 2.00 mins/ft	GM		Casing  (119.3 - 130.0') 16.0" Steel Casing		to increased torque during run, formation is very tight.	13310 gallons of water recovered; 468 gallons of water lost	
122					(121.0 - 127.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); yellowish brown (10YR 5/6)			
123								
124								
125								
126		GM		(119.3 - 130.0') 16.0" Steel Casing				
127								
128								
129								
130		ML			(127.0 - 131.5') Topock - Alluvium Deposits; Gravelly silt with sand (ML); brown (7.5YR 5/4)			
131	(130.0 - 137.1) 3.01 mins/ft			(130.0 - 137.1') 16.0" Steel Casing		(130.0') Observed trace amounts of Cemex #3 Mesh (8x20) Lapis Luster Sand in drill cuttings.		
132								
133								
134								
135								
136		GM		(130.0 - 137.1') 16.0" Steel Casing				
137								
138								
139								
140								
138	(137.1 - 157.1) 1.49 mins/ft	SM		(137.1 - 157.1') 16.0" Steel Casing	(137.0 - 142.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); dark yellowish brown (10YR 4/6)			
139								
140								

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: depth to water collected post development prior to specific capacity test

Date Started:	09/24/2019	Surface Elevation:	479.71 ft amsl	<b>Boring No.: <u>RB-2</u></b>	
Date Completed:	10/05/2019	Northing (NAD83):	2103398.54		
Drilling Co.:	Cascade	Easting (NAD83):	7616015.77	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	254.4 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location:	PG&E Topock, Needles,
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches		California
Drilling Asst:	A. & H. Amezguita	Drill Bit:	Tricone	Project Number:	RC000753.0051
Tool-Pusher:	Arnold Lamon	Depth to First Water:	26.8 ft bgs		
Rig Geologist:	D. Cornell / E. Redner	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
141		SM					
142					(142.0 - 145.5') Topock - Alluvium Deposits; Silty gravel with sand (GM); strong brown (7.5YR 5/6)		
143		GM					
144							
145							
146		SM			(145.5 - 147.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); strong brown (7.5YR 5/6)		
147							
148		SM			(147.0 - 149.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown (5YR 4/4)		
149	(137.1 - 157.1) 1.49 mins/ft			(137.1 - 157.1') 16.0" Steel Casing	(149.0 - 153.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); yellowish brown (10YR 5/6)		
150							
151		SM					
152							
153							
154		GM			(153.0 - 156.5') Topock - Alluvium Deposits; Silty gravel with sand (GM); strong brown (7.5YR 5/6)		
155							
156							
157					(156.5 - 159.5') Topock - Alluvium Deposits; Silty gravel (GM); strong brown (7.5YR 5/6)		
158		GM					
159	(157.1 - 176.7) 1.48 mins/ft			(157.1 - 176.7') 16.0" Steel Casing			
160		GC			(159.5 - 160.0') Topock -		

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: depth to water collected post development prior to specific capacity test

Date Started:	09/24/2019	Surface Elevation:	479.71 ft amsl	<b>Boring No.: <u>RB-2</u></b>	
Date Completed:	10/05/2019	Northing (NAD83):	2103398.54		
Drilling Co.:	Cascade	Easting (NAD83):	7616015.77	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	254.4 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location:	PG&E Topock, Needles,
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches		California
Drilling Asst:	A. & H. Amezguita	Drill Bit:	Tricone	Project Number:	RC000753.0051
Tool-Pusher:	Arnold Lamon	Depth to First Water:	26.8 ft bgs		
Rig Geologist:	D. Cornell / E. Redner	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
161		GM			Alluvium Deposits; Clayey gravel (GC); yellowish brown (10YR 5/6)		
162					(160.0 - 163.0') Topock - Alluvium Deposits; Silty gravel (GM); strong brown (7.5YR 5/6)		
163		GM			(163.0 - 167.0') Topock - Alluvium Deposits; Silty gravel (GM); reddish yellow (7.5YR 6/8)		
164							
165		SM			(167.0 - 171.0') Topock - Alluvium Deposits; Silty sand (SM); reddish brown / moderate brown (5YR 4/4)		
166							
167		SM			(171.0 - 172.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown (5YR 4/4)		
168							
169		SM			(172.5 - 177.0') Topock - Alluvium Deposits; Silty sand (SM); reddish brown / moderate brown (5YR 4/4)		
170							
171		SM			(177.0 - 178.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown (5YR 5/4)		
172							
173		SM			(178.0 - 179.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown (5YR 4/4)		
174							
175		SM			(179.0 - 181.0') Topock - Alluvium Deposits; Silty sand		
176							
177		SM					
178							
179		SM					
180							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: depth to water collected post development prior to specific capacity test

Date Started:	09/24/2019	Surface Elevation:	479.71 ft amsl	<b>Boring No.: <u>RB-2</u></b>	
Date Completed:	10/05/2019	Northing (NAD83):	2103398.54		
Drilling Co.:	Cascade	Easting (NAD83):	7616015.77	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	254.4 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location:	PG&E Topock, Needles,
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches		California
Drilling Asst:	A. & H. Amezguita	Drill Bit:	Tricone	Project Number:	RC000753.0051
Tool-Pusher:	Arnold Lamon	Depth to First Water:	26.8 ft bgs		
Rig Geologist:	D. Cornell / E. Redner	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
181		SM			(SM); reddish brown / moderate brown (5YR 4/4)	(180.0') Observed trace amounts of Cemex #3 Mesh (8x20) Lapis Luster Sand in drill cuttings.	
182					(181.0 - 188.0') Topock - Alluvium Deposits; Well graded sand with gravel (SW); strong brown (7.5YR 5/6)		
183							
184							
185		SW					
186							
187							
188							
189	(176.7 - 197.0) 1.09 mins/ft	GW-GM		(176.7 - 197.0') 16.0" Steel Casing	(188.0 - 189.0') Topock - Alluvium Deposits; Well graded gravel with silt and sand (GW-GM); strong brown (7.5YR 5/6)		
190		SM			(189.0 - 189.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); strong brown (7.5YR 5/6)	(190.0') Observed trace amounts of Cemex #3 Mesh (8x20) Lapis Luster Sand in drill cuttings.	
191		GM			(189.5 - 192.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); strong brown (7.5YR 5/6)		
192					(192.0 - 197.0') Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); strong brown (7.5YR 5/6)		
193							
194							
195		SW-SM					
196							
197							
198	(197.0 - 216.7) 1.35 mins/ft	SM		(197.0 - 216.7') 16.0" Steel Casing	(197.0 - 199.5') Topock - Alluvium Deposits; Silty sand (SM); strong brown (7.5YR 5/6)		
199							
200		ML			(199.5 - 202.0') Topock -		

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: depth to water collected post development prior to specific capacity test

Date Started:	09/24/2019	Surface Elevation:	479.71 ft amsl	<b>Boring No.: <u>RB-2</u></b>	
Date Completed:	10/05/2019	Northing (NAD83):	2103398.54		
Drilling Co.:	Cascade	Easting (NAD83):	7616015.77	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	254.4 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location:	PG&E Topock, Needles,
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches		California
Drilling Asst:	A. & H. Amezguita	Drill Bit:	Tricone	Project Number:	RC000753.0051
Tool-Pusher:	Arnold Lamon	Depth to First Water:	26.8 ft bgs		
Rig Geologist:	D. Cornell / E. Redner	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
201		ML			Alluvium Deposits; Gravelly silt with sand (ML); strong brown (7.5YR 5/6)	(200.0') Observed trace amounts of Cemex #3 Mesh (8x20) Lapis Luster Sand in drill cuttings.	
202					(202.0 - 204.0') Topock - Alluvium Deposits; Silty sand (SM); strong brown (7.5YR 5/6)		
203		SM					
204		SM			(204.0 - 204.5') Topock - Alluvium Deposits; Silty sand (SM); strong brown (7.5YR 5/6)		
205		ML			(204.5 - 205.0') Topock - Alluvium Deposits; Gravelly silt with sand (ML); strong brown (7.5YR 5/6)		
206		SM			(205.0 - 207.5') Topock - Alluvium Deposits; Silty sand (SM); strong brown (7.5YR 5/6)		
207							
208	(197.0 - 216.7) 1.35 mins/ft			(197.0 - 216.7') 16.0" Steel Casing	(207.5 - 217.0') Topock - Alluvium Deposits; Clayey sand with gravel (SC); brown (7.5YR 4/4)		
209						(210.0') Observed trace amounts of Cemex #3 Mesh (8x20) Lapis Luster Sand in drill cuttings.	
210						(211.0 - 212.0') Rough drilling	
211							
212		SC					
213							
214							
215							
216							
217							
218	(216.7 - 236.9) 1.18 mins/ft	SC		(216.7 - 236.9') 16.0" Steel Casing	(217.0 - 219.5') Topock - Alluvium Deposits; Clayey sand (SC); (7.5R 4/4)		
219							
220		GC			(219.5 - 222.0') Topock -		

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: depth to water collected post development prior to specific capacity test

Date Started:	09/24/2019	Surface Elevation:	479.71 ft amsl	<b>Boring No.: <u>RB-2</u></b>	
Date Completed:	10/05/2019	Northing (NAD83):	2103398.54		
Drilling Co.:	Cascade	Easting (NAD83):	7616015.77	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	254.4 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location:	PG&E Topock, Needles,
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches		California
Drilling Asst:	A. & H. Amezguita	Drill Bit:	Tricone	Project Number:	RC000753.0051
Tool-Pusher:	Arnold Lamon	Depth to First Water:	26.8 ft bgs		
Rig Geologist:	D. Cornell / E. Redner	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
221		GC			Alluvium Deposits; Clayey gravel with sand (GC); strong brown (7.5YR 5/6)	(220.0') Observed trace amounts of Cemex #3 Mesh (8x20) Lapis Luster Sand in drill cuttings.	
222					(222.0 - 237.0') Topock - Alluvium Deposits; Clayey sand with gravel (SC); brown (7.5YR 5/4)		
223							
224							
225							
226							
227							
228							
229	(216.7 - 236.9) 1.18 mins/ft	SC		(216.7 - 236.9') 16.0" Steel Casing			
230						(230.0') Observed trace amounts of Cemex #3 Mesh (8x20) Lapis Luster Sand in drill cuttings.	
231							
232							
233							
234							
235							
236							
237							
238	(236.9 - 254.4) 1.07 mins/ft	GC		(236.9 - 254.4') 16.0" Steel Casing	(237.0 - 241.0') Topock - Alluvium Deposits; Clayey gravel with sand (GC); reddish brown / moderate brown (5YR 4/4)		
239							
240							

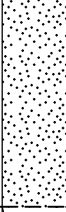



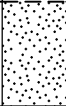
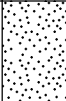
Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: depth to water collected post development prior to specific capacity test

Date Started:	09/24/2019	Surface Elevation:	479.71 ft amsl	<b>Boring No.: <u>RB-2</u></b>	
Date Completed:	10/05/2019	Northing (NAD83):	2103398.54		
Drilling Co.:	Cascade	Easting (NAD83):	7616015.77	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	254.4 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location:	PG&E Topock, Needles,
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches		California
Drilling Asst:	A. & H. Amezguita	Drill Bit:	Tricone	Project Number:	RC000753.0051
Tool-Pusher:	Arnold Lamon	Depth to First Water:	26.8 ft bgs		
Rig Geologist:	D. Cornell / E. Redner	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
241		GC				(240.0') Observed trace amounts of Cemex #3 Mesh (8x20) Lapis Luster Sand in drill cuttings.	
242					(241.0' - 244.0') Topock - Weathered Bedrock - conglomerate; Sandy lean clay with gravel (CL); reddish brown (5YR 5/4)		
243		CL					
244							
245					(244.0' - 247.0') Topock - Weathered Bedrock - conglomerate; Clayey sand with gravel (SC); yellowish red / light brown (5YR 5/6)		
246		SC					
247	(236.9 - 254.4) 1.07 mins/ft			(236.9 - 254.4') 16.0" Steel Casing	(247.0' - 254.3') Topock - Weathered Bedrock - conglomerate; Gravelly lean clay with sand (CL); reddish brown (2.5YR 4/4)		
248							
249							
250						(250.0') Observed trace amounts of Cemex #1/20 Mesh (20x40) Lapis Luster Sand in drill cuttings.	
251		CL					
252							
253							
254						(254.0') Observed trace amounts of Cemex #1/20 Mesh (20x40) Lapis Luster Sand in drill cuttings.	
255					End of Boring at 254.4 ft bgs.		
256							
257							
258							
259							
260							


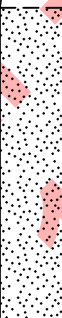




Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: depth to water collected post development prior to specific capacity test

Date Started:	06/28/2019	Surface Elevation:	480.91 ft amsl	<b>Boring No.: <u>RB-2 Pilot</u></b>	
Date Completed:	07/26/2019	Northing (NAD83):	2103398.89		
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles,
Driller Name:	TA / DO / SV	Depth to First Water:	23.8 ft bgs		California
Drilling Asst:	J. Condelaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous		
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid		
1	36			Topock - Fill	SP		(0.0 - 3.0') Topock - Fill; Poorly graded sand (SP); brown (10YR 4/3); fine grained to medium grained, subround; dry	(0.0 - 7.0') Soft drilling.	2 gallons used; 0 gallons recovered; 2 gallons lost		
2											
3									(3.0 - 7.0') No recovery (NR)	(3.0 - 7.0') Lost recovery due to soft sands falling out of or locking up in core barrel.	
4					NR						
5											
6											
7	48			Topock - Fill	SP		(7.0 - 11.0') Topock - Fill; Poorly graded sand (SP); brown (7.5YR 4/3); fine grained to medium grained, subangular to subround; dry	(7.0 - 17.0') Heaving sands. No recovery 11 to 17 ft bgs due to loose sands falling out of or locking up core barrel.	1 gallons used; 0 gallons recovered; 1 gallons lost		
8											
9					NR						
10											
11											
12											
13					(11.0 - 17.0') No recovery (NR)						
14											
15											
16											
17	36			Topock - Fill	SP		(17.0 - 18.5') Topock - Fill; Poorly graded sand (SP); brown (10YR 4/3); fine grained to medium grained, subangular to subround; dry	(17.0 - 27.0') Heaving sands, no recovery 20 to 27 ft bgs due to loose sands falling out of or locking up core barrel. During			
18											
19					Topock - Fluvial Deposits	SP		(18.5 - 20.0') Topock - Fluvial Deposits; Poorly graded sand (SP); light yellowish brown (10YR 6/4); very fine grained to fine grained, round; trace silt; dry			
20											











Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: blue water table symbol represents depth to water measured during the first VAS interval; apparent partial recoveries can be the result of potential compaction of sediments in the core bag

Date Started:	06/28/2019	Surface Elevation:	480.91 ft amsl	<b>Boring No.: <u>RB-2 Pilot</u></b>	
Date Completed:	07/26/2019	Northing (NAD83):	2103398.89		
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles,
Driller Name:	TA / DO / SV	Depth to First Water:	23.8 ft bgs		California
Drilling Asst:	J. Condalaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous		
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid	
21	36				NR		(20.0 - 27.0') No recovery (NR)	backfilling the sand dropped ~12 ft. indicating void at ~15 to 25 ft bgs.		
22										
23										
24										
25										
26										
27	48	RB-2-SS-27-31 7/15/2019 09:31		Topock - Fluvial Deposits	SP		(27.0 - 31.5') Topock - Fluvial Deposits; Poorly graded sand (SP); light yellowish brown (10YR 6/4); very fine grained to fine grained, subangular to round; trace silt; moist	(27.0 - 37.0') Heaving sands. No recovery 31.5 to 37 ft bgs due to loose sands falling out of or locking up core barrel.	2 gallons used; 0 gallons recovered; 2 gallons lost	
28										
29										
30										
31										
32						NR		(31.5 - 37.0') No recovery (NR)	(34.0') Approximate depth to water table.	
33										
34										
35										
36										
37	60	RB-2-SS-37-42 7/15/2019 09:46	RB-2-VAS-36.5-41.5 (<0.033 U ppb) 6/29/2019 11:43	Topock - Fluvial Deposits	SP-SM		(37.0 - 38.0') Topock - Fluvial Deposits; Poorly graded sand with silt (SP-SM); brown (10YR 5/3); fine grained, subangular to round; little silt; moist		(37.0 - 307.0') No used	
38				Topock - Fluvial Deposits	SM		(38.0 - 39.0') Topock - Fluvial Deposits; Silty sand (SM); brown (10YR 5/3); very fine grained to fine grained, round; little silt; moist			
39				Topock - Fluvial Deposits	GW-GM		(39.0 - 42.0') Topock - Fluvial Deposits; Well graded gravel with silt and sand (GW-GM); grayish brown (10YR 5/2); granules to very large pebbles, subangular to subround; some very fine			
40										






Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: blue water table symbol represents depth to water measured during the first VAS interval; apparent partial recoveries can be the result of potential compaction of sediments in the core bag

Date Started:	06/28/2019	Surface Elevation:	480.91 ft amsl	<b>Boring No.: <u>RB-2 Pilot</u></b>	
Date Completed:	07/26/2019	Northing (NAD83):	2103398.89		
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles,
Driller Name:	TA / DO / SV	Depth to First Water:	23.8 ft bgs		California
Drilling Asst:	J. Condelaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous		
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
41	60	RB-2-SS-37-42 7/15/2019 09:46		Topock - Fluvial Deposits	GW-GM		grained to very coarse grained sand; little small cobbles; little silt; trace caliche; trace coarser clasts composed of metadiorite; wet		
42								(41.5') Bottom of sampler set at 41.5 instead of 42 ft bgs because of formation collapse.	
43				Topock - Fluvial Deposits	SM		(42.0 - 45.0') Topock - Fluvial Deposits; Silty sand (SM); dark yellowish brown (10YR 4/4); very fine grained, round; little silt; trace clay; wet		
44		RB-2-SS-42-47 7/15/2019 10:00							
45				Topock - Fluvial Deposits	GW-GM		(45.0 - 48.0') Topock - Fluvial Deposits; Well graded gravel with silt and sand (GW-GM); dark gray (10YR 4/1); granules to very large pebbles, round; little very fine grained to very coarse grained sand; little silt; trace small cobbles; trace clay; little caliche; little coarser clasts composed of metadiorite; wet		
46									
47				Topock - Fluvial Deposits	GW-GM				
48		RB-2-SS-47-50 7/15/2019 10:06							
49	180			Topock - Alluvium Deposits	GM		(48.0 - 54.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); reddish brown (5YR 5/4); small pebbles to very large pebbles, angular to subangular; some very fine grained to very coarse grained sand; little silt; trace clay; some coarser clasts composed of metadiorite; wet		
50									
51				Topock - Alluvium Deposits	GM				
52		RB-2-SS-50-55 7/15/2019 10:10							
53				Topock - Alluvium Deposits	GM		(54.0 - 55.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); reddish brown (5YR 5/4); small pebbles to very large pebbles, angular to subangular; some very fine grained to very coarse grained sand; some clay; little silt; some coarser clasts composed of metadiorite; moist		
54									
55				Topock - Alluvium Deposits	SM		(55.0 - 59.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown (5YR 5/4); fine grained to medium grained, subangular; some granules to medium pebbles; little silt; trace clay; little coarser clasts composed of metadiorite; little coarser clast composed of quartz; moist		
56		RB-2-SS-55-60 7/15/2019 10:15							
57				Topock - Alluvium Deposits	SM				
58	120								
59				Topock - Alluvium Deposits	SC		(59.0 - 60.0') Topock - Alluvium Deposits; Clayey sand with gravel (SC); reddish brown (5YR 5/4); fine grained to coarse grained, angular to subangular; little granules to large pebbles, angular to		
60									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: blue water table symbol represents depth to water measured during the first VAS interval; apparent partial recoveries can be the result of potential compaction of sediments in the core bag

Date Started:	06/28/2019	Surface Elevation:	480.91 ft amsl	<b>Boring No.: <u>RB-2 Pilot</u></b>	
Date Completed:	07/26/2019	Northing (NAD83):	2103398.89		
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles,
Driller Name:	TA / DO / SV	Depth to First Water:	23.8 ft bgs		California
Drilling Asst:	J. Condelaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous		
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
61	120	RB-2-SS-60-65 7/15/2019 10:20		Topock - Alluvium Deposits	GM		subangular; little clay; trace silt; little coarser clasts composed of metadiorite; little granite; moist (60.0 - 67.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); reddish brown (5YR 5/4); granules to large pebbles, angular to subangular; some very fine grained to very coarse grained sand; little silt; trace coarser clasts composed of metadiorite; moist		
62									
63									
64									
65	120	RB-2-SS-65-70 7/15/2019 10:25		Topock - Alluvium Deposits	GW		(67.0 - 74.0') Topock - Alluvium Deposits; Well graded gravel (GW); reddish gray / pale brown (5YR 5/2); granules to small cobbles, angular to subangular; and medium to very coarse grained sand, angular to subangular; trace small cobbles; trace silt; some coarser clasts composed of metadiorite, quartz, granite, and basalt; wet		
66									
67									
68									
69									
70									
71									
72									
73									
74									
75	120	RB-2-SS-70-75 7/15/2019 11:38		Topock - Alluvium Deposits	GC		(74.0 - 75.0') Topock - Alluvium Deposits; Clayey gravel with sand (GC); dark reddish gray (5YR 4/2); granules to medium pebbles, subangular; some very fine grained to very coarse grained sand; little clay; trace silt; some coarser clasts composed of metadiorite; moist		
76				Topock - Alluvium Deposits	SW		(75.0 - 77.0') Topock - Alluvium Deposits; Well graded sand with gravel (SW); reddish brown / moderate brown (5YR 4/4); medium grained to very coarse grained, angular to subround; some granules to medium pebbles, angular; trace silt; and coarser clasts composed of metadiorite; wet		
77				Topock - Alluvium Deposits	SW-SM		(77.0 - 81.5') Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); reddish gray / pale brown (5YR 5/2); medium grained to coarse grained, angular to subround; some granules to large pebbles, angular to subangular; little silt; little coarser clasts composed of metadiorite; little granite; moist		
78									
79									
80									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: blue water table symbol represents depth to water measured during the first VAS interval; apparent partial recoveries can be the result of potential compaction of sediments in the core bag

Date Started:	06/28/2019	Surface Elevation:	480.91 ft amsl	<b>Boring No.: <u>RB-2 Pilot</u></b>	
Date Completed:	07/26/2019	Northing (NAD83):	2103398.89		
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles,
Driller Name:	TA / DO / SV	Depth to First Water:	23.8 ft bgs		California
Drilling Asst:	J. Condelaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous		
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
81				Topock - Alluvium Deposits	SW-SM				
82		RB-2-SS-80-85					(81.5 - 86.5') Topock - Alluvium Deposits; Silt with gravel (ML); low plasticity; some granules to large pebbles, angular to subangular; little very fine grained to very coarse grained sand; little clay; little coarser clasts composed of metadiorite; wet		
83	120	7/15/2019 12:21		Topock - Alluvium Deposits	ML				
84									
85									
86									
87		RB-2-SS-85-90		Topock - Alluvium Deposits	GC		(86.5 - 90.0') Topock - Alluvium Deposits; Clayey gravel (GC); yellowish red / light brown (5YR 5/6); granules to large pebbles, angular to subangular; some clay; little silt; trace fine to coarse grained sand, subangular to subround; some coarser clasts composed of metadiorite; wet		
88		7/15/2019 14:00							
89									
90									
91				Topock - Alluvium Deposits	GC		(90.0 - 93.0') Topock - Alluvium Deposits; Clayey gravel (GC); brown (7.5YR 5/4); granules to very large pebbles, angular to subangular; some clay; trace very fine grained to very coarse grained sand; trace silt; some coarser clasts composed of metadiorite; trace granite; moist	(90.0 - 103.0') Rough drilling.	
92	120	RB-2-SS-90-95							
93		7/16/2019 08:04							
94				Topock - Alluvium Deposits	GM		(93.0 - 96.5') Topock - Alluvium Deposits; Silty gravel (GM); strong brown (7.5YR 5/6); granules to very large pebbles, angular to subangular; little silt; trace very fine grained to very coarse grained sand; trace clay; and coarser clasts composed of metadiorite; dry		
95									
96									
97		RB-2-SS-95-100		Topock - Alluvium Deposits	GM		(96.5 - 99.0') Topock - Alluvium Deposits; Silty gravel (GM); strong brown (7.5YR 5/6); granules to very large pebbles, angular to subangular; some silt; little clay; trace very fine grained to very coarse grained sand; some coarser clasts composed of metadiorite; moist		
98	120	7/16/2019 08:12							
99									
100				Topock - Alluvium Deposits	GC		(99.0 - 104.0') Topock - Alluvium Deposits; Clayey gravel (GC); yellowish red / light brown (5YR 5/6); granules to very large pebbles, angular to subangular; some clay; little silt; trace very		

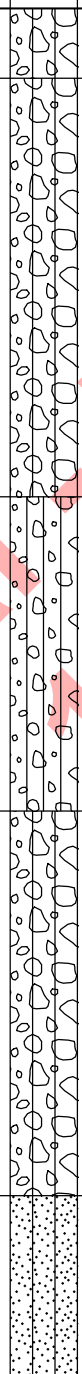
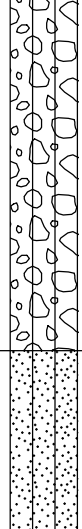
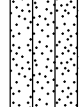
Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: blue water table symbol represents depth to water measured during the first VAS interval; apparent partial recoveries can be the result of potential compaction of sediments in the core bag

Date Started:	06/28/2019	Surface Elevation:	480.91 ft amsl	<b>Boring No.: <u>RB-2 Pilot</u></b>	
Date Completed:	07/26/2019	Northing (NAD83):	2103398.89		
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles,
Driller Name:	TA / DO / SV	Depth to First Water:	23.8 ft bgs		California
Drilling Asst:	J. Condelaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous		
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
101							fine grained to very coarse grained sand; some coarser clasts composed of metadiorite; moist		
102		RB-2-SS-100-105 7/16/2019 08:20		Topock - Alluvium Deposits	GC				
103									
104	120		RB-2-VAS-102-107 ( $<0.033$ U ppb) 7/1/2019 15:21						
105				Topock - Alluvium Deposits	GM		(104.0 - 107.0') Topock - Alluvium Deposits; Silty gravel (GM); yellowish red / light brown (5YR 5/6); granules to medium pebbles, angular to subangular; some silt; little clay; little coarser clasts composed of metadiorite; wet		
106									
107		RB-2-SS-105-110 7/16/2019 08:33		Topock - Alluvium Deposits	GC		(107.0 - 109.0') Topock - Alluvium Deposits; Clayey gravel with sand (GC); yellowish red / light brown (5YR 5/6); granules to medium pebbles, angular to subangular; little very fine grained to very coarse grained sand; little silt; little clay; trace mica; little coarser clasts composed of metadiorite; moist		
108									
109				Topock - Alluvium Deposits	GM		(109.0 - 111.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); yellowish brown (10YR 5/6); granules to large pebbles, subangular; some silt; little very fine grained to very coarse grained sand; little clay; little coarser clasts composed of metadiorite; moist		
110									
111				Topock - Alluvium Deposits	GM		(111.0 - 112.0') Topock - Alluvium Deposits; Silty gravel (GM); yellowish brown (10YR 5/6); granules to large pebbles, angular to subangular; little very fine grained to very coarse grained sand; little silt; little clay; little coarser clasts composed of metadiorite; moist		
112	120	RB-2-SS-110-115 7/16/2019 08:40		Topock - Alluvium Deposits	GM		(112.0 - 114.0') Topock - Alluvium Deposits; Silty gravel (GM); strong brown (7.5YR 5/6); granules to large pebbles, angular to subangular; some silt; little very fine grained to very coarse grained sand; trace clay; trace caliche; some coarser clasts composed of metadiorite; moist		
113									
114				Topock - Alluvium Deposits	GM		(114.0 - 121.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); yellowish brown (10YR 5/6); granules to small pebbles, subangular; some silt; little granules to small pebbles, subangular; trace clay; trace coarser clasts composed of metadiorite; moist		
115									
116									
117		RB-2-SS-115-120 7/16/2019 08:51		Topock - Alluvium Deposits	GM				
118	120								
119									
120							(119.5'); less silt, more clay		

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: blue water table symbol represents depth to water measured during the first VAS interval; apparent partial recoveries can be the result of potential compaction of sediments in the core bag

Date Started:	06/28/2019	Surface Elevation:	480.91 ft amsl	<b>Boring No.: <u>RB-2 Pilot</u></b>	
Date Completed:	07/26/2019	Northing (NAD83):	2103398.89		
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles,
Driller Name:	TA / DO / SV	Depth to First Water:	23.8 ft bgs		California
Drilling Asst:	J. Condelaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous		
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid			
121	120	RB-2-SS-120-125 7/16/2019 09:00		Topock - Alluvium Deposits	GM		(121.0 - 127.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); yellowish brown (10YR 5/6); granules to small pebbles, subangular; some silt; little granules to small pebbles, subangular; trace clay; trace coarser clasts composed of metadiorite; moist					
122				Topock - Alluvium Deposits	GM							
123				RB-2-SS-125-129 7/16/2019 09:09	Topock - Alluvium Deposits		ML			(127.0 - 131.5') Topock - Alluvium Deposits; Gravelly silt with sand (ML); brown (7.5YR 5/4); low plasticity; some granules to small pebbles, angular to subangular; little very fine grained to very coarse grained sand; little clay; little coarser clasts composed of metadiorite; wet		
124					Topock - Alluvium Deposits		GM					
125	RB-2-SS-129-134 7/16/2019 09:22		Topock - Alluvium Deposits		GM		(131.5 - 137.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); yellowish brown (10YR 5/6); granules to very large pebbles, subangular; some silt; little very fine grained to very coarse grained sand; trace clay; trace coarser clasts composed of metadiorite; moist					
126												
127				RB-2-SS-134-139 7/16/2019 10:36				Topock - Alluvium Deposits	SM		(137.0 - 142.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); dark yellowish brown (10YR 4/6); very fine grained to very coarse grained, angular to subround; some granules to large pebbles, angular; some silt; some coarser clasts composed of metadiorite; moist	
128												
129	RB-2-SS-139-144 7/16/2019											
130												
131												
132												
133												
134												
135												
136												
137												
138	120											
139												
140												



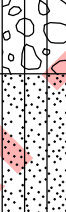
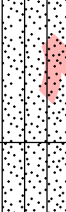

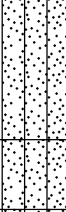
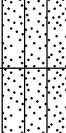
Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: blue water table symbol represents depth to water measured during the first VAS interval; apparent partial recoveries can be the result of potential compaction of sediments in the core bag

Date Started:	06/28/2019	Surface Elevation:	480.91 ft amsl	<b>Boring No.: <u>RB-2 Pilot</u></b>	
Date Completed:	07/26/2019	Northing (NAD83):	2103398.89		
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles,
Driller Name:	TA / DO / SV	Depth to First Water:	23.8 ft bgs		California
Drilling Asst:	J. Condelaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous		
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
141		10:45		Topock - Alluvium Deposits	SM				
142		RB-2-SS-139-144 7/16/2019 10:45					(142.0 - 145.5') Topock - Alluvium Deposits; Silty gravel with sand (GM); strong brown (7.5YR 5/6); granules to very large pebbles, angular; little silt; trace small cobbles; some coarser clasts composed of metadiorite; moist		
143				Topock - Alluvium Deposits	GM				
144			RB-2-VAS-142-147 ( $<0.17$ U ppb) 7/9/2019 13:10						
145									
146		RB-2-SS-144-149 7/16/2019 10:56		Topock - Alluvium Deposits	SM		(145.5 - 147.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); strong brown (7.5YR 5/6); very fine grained to very coarse grained, subangular to subround; some granules to large pebbles, angular to subangular; little coarser clasts composed of metadiorite; trace granite; moist		
147									
148				Topock - Alluvium Deposits	SM		(147.0 - 149.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown (5YR 4/4); very fine grained to coarse grained, subangular to subround; little granules to medium pebbles, angular; little silt; trace coarser clasts composed of metadiorite; little granite; wet		
149									
150				Topock - Alluvium Deposits	SM		(149.0 - 153.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); yellowish brown (10YR 5/6); medium grained to very coarse grained, angular to subround; little granules to very large pebbles, subangular; little silt; trace coarser clasts composed of metadiorite; trace granite; wet		
151		RB-2-SS-149-154 7/16/2019 11:06							
152									
153				Topock - Alluvium Deposits	GM		(153.0 - 156.5') Topock - Alluvium Deposits; Silty gravel with sand (GM); strong brown (7.5YR 5/6); granules to very large pebbles, angular to subangular; some medium to very coarse grained sand, subangular to subround; little silt; trace coarser clasts composed of metadiorite; wet		
154		RB-2-SS-154-157 7/16/2019 11:14							
155									
156				Topock - Alluvium Deposits	GM		(156.5 - 159.5') Topock - Alluvium Deposits; Silty gravel (GM); strong brown (7.5YR 5/6); granules to very large pebbles, angular to subangular; some silt; little very fine to very coarse grained sand, subangular to subround; trace clay; some coarser clasts composed of metadiorite; wet		
157									
158		RB-2-SS-157-162 7/16/2019 11:20							
159									
160				Topock -	GC		(159.5 - 160.0') Topock - Alluvium Deposits; Clayey gravel (GC);		

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: blue water table symbol represents depth to water measured during the first VAS interval; apparent partial recoveries can be the result of potential compaction of sediments in the core bag

Date Started:	06/28/2019	Surface Elevation:	480.91 ft amsl	<b>Boring No.: <u>RB-2 Pilot</u></b>	
Date Completed:	07/26/2019	Northing (NAD83):	2103398.89		
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles,
Driller Name:	TA / DO / SV	Depth to First Water:	23.8 ft bgs		California
Drilling Asst:	J. Condelaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous		
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid				
161	120	RB-2-SS-157-162 7/16/2019 11:20		Alluvium Deposits	GM		yellowish brown (10YR 5/6); granules to very large pebbles, angular to subangular; some clay; little very fine to very coarse grained sand, subangular to subround; little silt; little coarser clasts composed of metadiorite; moist						
162		Topock - Alluvium Deposits		(160.0 - 163.0') Topock - Alluvium Deposits; Silty gravel (GM); strong brown (7.5YR 5/6); granules to very large pebbles, angular to subangular; some silt; little very fine to very coarse grained sand, subangular to subround; trace clay; some coarser clasts composed of metadiorite; wet									
163		RB-2-SS-162-165 7/16/2019 11:58		Topock - Alluvium Deposits	GM		(160.5'); 0.3' lens of grayish green color change						
164							(163.0 - 167.0') Topock - Alluvium Deposits; Silty gravel (GM); reddish yellow (7.5YR 6/8); granules to very large pebbles, angular to subangular; and silt; little very fine to very coarse grained sand, subangular to subround; trace clay; some coarser clasts composed of metadiorite; moist						
165	120	RB-2-SS-165-170 7/16/2019 12:07	RB-2-VAS-172-177 (<0.17 U ppb) 7/12/2019 14:55	Topock - Alluvium Deposits	SM		(167.0 - 171.0') Topock - Alluvium Deposits; Silty sand (SM); reddish brown / moderate brown (5YR 4/4); very fine grained to fine grained, subangular to subround; and silt; little granules to medium pebbles, subangular; trace clay; little coarser clasts composed of metadiorite; wet	(167.0 - 177.0') Rough drilling.					
166							(170'); moist; 0.2' lens of grayish green color change						
167		RB-2-SS-170-172 7/16/2019 12:18		Topock - Alluvium Deposits	SM		(171.0 - 172.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown (5YR 4/4); very fine grained to coarse grained, angular; little granules to medium pebbles, angular; little silt; little coarser clasts composed of metadiorite; wet						
168							(172.5 - 177.0') Topock - Alluvium Deposits; Silty sand (SM); reddish brown / moderate brown (5YR 4/4); very fine grained to fine grained, subangular to subround; and silt; little granules to medium pebbles, subangular; trace clay; little coarser clasts composed of metadiorite; moist						
169	120	RB-2-SS-172-177 7/16/2019 12:29		Topock - Alluvium Deposits	SM		(174'); saturated zone						
170							(175.5'); 0.2' lens of grayish green color change						
171							RB-2-SS-177-180 7/17/2019 07:59			Topock - Alluvium Deposits	SM		(177.0 - 178.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown (5YR 5/4); very fine grained to coarse grained, angular; and silt; little granules to medium pebbles, angular to subangular; trace clay; little coarser clasts composed of metadiorite; wet
172													(178.0 - 179.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown (5YR 4/4); very fine grained to coarse grained, angular; little granules to medium pebbles, angular; little silt; little coarser clasts composed of metadiorite; wet
173	120			Topock - Alluvium Deposits	SM								
174													
175													
176	120			Topock - Alluvium Deposits	SM								
177													
178													
179	120			Topock - Alluvium Deposits	SM								
180													

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: blue water table symbol represents depth to water measured during the first VAS interval; apparent partial recoveries can be the result of potential compaction of sediments in the core bag

Date Started:	06/28/2019	Surface Elevation:	480.91 ft amsl	<b>Boring No.: <u>RB-2 Pilot</u></b>	
Date Completed:	07/26/2019	Northing (NAD83):	2103398.89		
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles,
Driller Name:	TA / DO / SV	Depth to First Water:	23.8 ft bgs		California
Drilling Asst:	J. Condelaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous		
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
181		RB-2-SS-180-182 7/17/2019 08:08		Topock - Alluvium Deposits	SM		(179.0 - 181.0') Topock - Alluvium Deposits; Silty sand (SM); reddish brown / moderate brown (5YR 4/4); very fine grained to fine grained, subangular to subround; and silt; little granules to medium pebbles, subangular; trace clay; little coarser clasts composed of metadiorite; wet		
182							(181.0 - 188.0') Topock - Alluvium Deposits; Well graded sand with gravel (SW); strong brown (7.5YR 5/6); very fine grained to very coarse grained, angular; some granules to large pebbles, angular; trace silt; some coarser clasts composed of metadiorite; wet		
183	120								
184		RB-2-SS-182-187 7/17/2019 08:17		Topock - Alluvium Deposits	SW				
185									
186									
187									
188		RB-2-SS-187-190 7/17/2019 08:25		Topock - Alluvium Deposits	GW-GM		(188.0 - 189.0') Topock - Alluvium Deposits; Well graded gravel with silt and sand (GW-GM); strong brown (7.5YR 5/6); granules to very large pebbles, angular; and very fine to very coarse grained sand, angular; trace clay; little coarser clasts composed of metadiorite; trace coarser clast composed of quartz; wet		
189				Topock - Alluvium Deposits	SM		(189.0 - 189.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); strong brown (7.5YR 5/6); very fine grained to very coarse grained, angular; some granules to large pebbles, angular; some silt; trace clay; little coarser clasts composed of metadiorite; trace coarser clast composed of quartz; wet		
190				Topock - Alluvium Deposits	GM		(189.5 - 192.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); strong brown (7.5YR 5/6); granules to very large pebbles, angular; some very fine to very coarse grained sand, angular; little silt; trace clay; little coarser clasts composed of metadiorite; trace coarser clast composed of quartz; wet		
191	120	RB-2-SS-190-195 7/17/2019 08:33					(192.0 - 197.0') Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); strong brown (7.5YR 5/6); very fine grained to very coarse grained, angular; some granules to very large pebbles, angular; little silt; trace clay; little coarser clasts composed of metadiorite; trace coarser clast composed of quartz; wet; green staining		
192				Topock - Alluvium Deposits	SW-SM				
193									
194									
195									
196		RB-2-SS-195-198 7/17/2019 08:40							
197									
198	120	RB-2-SS-198-203 7/17/2019 09:03		Topock - Alluvium Deposits	SM		(197.0 - 199.5') Topock - Alluvium Deposits; Silty sand (SM); strong brown (7.5YR 5/6); very fine grained to medium grained, angular; and silt; little granules to small pebbles, angular; trace clay; trace coarser clasts composed of metadiorite; moist		
199									
200					ML		(199.5 - 202.0') Topock - Alluvium Deposits; Gravelly silt with sand		



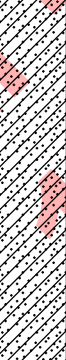



Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: blue water table symbol represents depth to water measured during the first VAS interval; apparent partial recoveries can be the result of potential compaction of sediments in the core bag

Date Started:	06/28/2019	Surface Elevation:	480.91 ft amsl	<b>Boring No.: <u>RB-2 Pilot</u></b>	
Date Completed:	07/26/2019	Northing (NAD83):	2103398.89		
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles,
Driller Name:	TA / DO / SV	Depth to First Water:	23.8 ft bgs		California
Drilling Asst:	J. Condelaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous		
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
201		RB-2-SS-198-203 7/17/2019 09:03		Topock - Alluvium Deposits	ML		(ML); strong brown (7.5YR 5/6); low plasticity; some granules to small pebbles, angular; little very fine to medium grained sand, angular; little clay; little coarser clasts composed of metadiorite; wet		
202									
203	120			Topock - Alluvium Deposits	SM		(202.0 - 204.0') Topock - Alluvium Deposits; Silty sand (SM); strong brown (7.5YR 5/6); very fine grained to medium grained, angular; and silt; little small to very large pebbles, angular; trace clay; trace coarser clasts composed of metadiorite; wet (202.5'); green staining		
204									
205		RB-2-SS-203-207 7/17/2019 09:09	RB-2-VAS-202-207 ( $<0.17$ U ppb) 7/14/2019 09:20	Topock - Alluvium Deposits	SM		(204.0 - 204.5') Topock - Alluvium Deposits; Silty sand (SM); strong brown (7.5YR 5/6); fine grained to coarse grained, angular; little granules to small pebbles, angular; little silt; trace clay; trace coarser clasts composed of metadiorite; wet		
206				Topock - Alluvium Deposits	ML				
207				Topock - Alluvium Deposits	SM		(204.5 - 205.0') Topock - Alluvium Deposits; Gravelly silt with sand (ML); strong brown (7.5YR 5/6); low plasticity; some small to very large pebbles, angular; little very fine to medium grained sand, angular; little clay; little coarser clasts composed of metadiorite; wet		
208		RB-2-SS-207-209 7/17/2019 09:15					(205.0 - 207.5') Topock - Alluvium Deposits; Silty sand (SM); strong brown (7.5YR 5/6); very fine grained to medium grained, angular; and silt; little small to very large pebbles, angular; trace clay; trace coarser clasts composed of metadiorite; moist		
209									
210									
211		RB-2-SS-209-214 7/17/2019 09:22		Topock - Alluvium Deposits	SC		(207.5 - 217.0') Topock - Alluvium Deposits; Clayey sand with gravel (SC); brown (7.5YR 4/4); very fine grained to very coarse grained, angular to subround; some small to very large pebbles, angular; little clay; trace silt; little coarser clasts composed of metadiorite; moist	(207.0') Switched driller T. Alymer with D. O'Mara.	
212	120								
213									
214									
215		RB-2-SS-214-217 7/17/2019 09:28							
216									
217									
218		RB-2-SS-217-222 7/17/2019 09:35		Topock - Alluvium Deposits	SC		(217.0 - 219.5') Topock - Alluvium Deposits; Clayey sand (SC); (7.5R 4/4); medium grained to very coarse grained, angular; some clay; trace granules, angular; trace silt; trace coarser clasts composed of metadiorite; wet		
219	180								
220					GC		(219.5 - 222.0') Topock - Alluvium Deposits; Clayey gravel with		

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: blue water table symbol represents depth to water measured during the first VAS interval; apparent partial recoveries can be the result of potential compaction of sediments in the core bag

Date Started:	06/28/2019	Surface Elevation:	480.91 ft amsl	<b>Boring No.: <u>RB-2 Pilot</u></b>	
Date Completed:	07/26/2019	Northing (NAD83):	2103398.89		
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles,
Driller Name:	TA / DO / SV	Depth to First Water:	23.8 ft bgs		California
Drilling Asst:	J. Condelaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous		
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
221	180	RB-2-SS-217-222 7/17/2019 09:35		Topock - Alluvium Deposits	GC		sand (GC); strong brown (7.5YR 5/6); granules to very large pebbles, angular; some fine to very coarse grained sand, angular to subround; little clay; some coarser clasts composed of metadiorite; trace granite; wet		
222									
223									
224		RB-2-SS-222-227 7/17/2019 09:40					(222.0 - 237.0') Topock - Alluvium Deposits; Clayey sand with gravel (SC); brown (7.5YR 5/4); very fine grained to very coarse grained, angular to subround; some small to very large pebbles, angular; little clay; trace silt; little coarser clasts composed of metadiorite; moist		
225									
226	60								
227									
228								(227.0 - 244.0') Rough drilling.	
229		RB-2-SS-227-233 7/17/2019 09:45		Topock - Alluvium Deposits	SC				
230									
231	84								
232									
233		RB-2-SS-233-235 7/17/2019 09:50					(234'); greenish gray staining		
234									
235									
236									
237		RB-2-SS-235-240 7/17/2019 10:30					(237.0 - 241.0') Topock - Alluvium Deposits; Clayey gravel with sand (GC); reddish brown / moderate brown (5YR 4/4); granules to small pebbles, angular; some fine to coarse grained sand, subangular to subround; some clay; trace silt; little coarser clasts composed of metadiorite; moist	(237.0') Switched driller D. O'Mara with S. Vasquez.	
238			RB-2-VAS-237-242 (<0.17 U ppb) 7/15/2019 13:48	Topock - Alluvium Deposits	GC				
239									
240									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: blue water table symbol represents depth to water measured during the first VAS interval; apparent partial recoveries can be the result of potential compaction of sediments in the core bag

Date Started:	06/28/2019	Surface Elevation:	480.91 ft amsl	<b>Boring No.: <u>RB-2 Pilot</u></b>	
Date Completed:	07/26/2019	Northing (NAD83):	2103398.89		
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles,
Driller Name:	TA / DO / SV	Depth to First Water:	23.8 ft bgs		California
Drilling Asst:	J. Condelaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous		
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
241			RB-2-VAS-237-242 (<0.17 U ppb) 7/15/2019 13:48	Topock - Alluvium Deposits	GC		(241.0 - 244.0') Topock - Weathered Bedrock - conglomerate; Sandy lean clay with gravel (CL); reddish brown (5YR 5/4); low plasticity; some granules to very large pebbles, angular; little fine to coarse grained sand, subangular to subround; little silt; little coarser clasts composed of metadiorite; dry		
242	84	RB-2-SS-240-245 7/17/2019 10:35		Topock - Weathered Bedrock - conglomerate	CL				
243									
244									
245	36			Topock - Weathered Bedrock - conglomerate	SC		(244.0 - 247.0') Topock - Weathered Bedrock - conglomerate; Clayey sand with gravel (SC); yellowish red / light brown (5YR 5/6); very fine grained to medium grained, subangular to subround; some granules to large pebbles, angular to subangular; little clay; trace silt; little coarser clasts composed of metadiorite; moist		
246									
247		RB-2-SS-245-250 7/17/2019 10:40					(247.0 - 274.0') Topock - Weathered Bedrock - conglomerate; Gravelly lean clay with sand (CL); reddish brown (2.5YR 4/4); low plasticity; some granules to medium pebbles, angular to subangular; little very fine to fine grained sand, subangular to subround; trace silt; little coarser clasts composed of metadiorite; trace coarser clasts composed of granite; moist		
248									
249									
250	84								
251									
252		RB-2-SS-250-255 7/17/2019 10:45		Topock - Weathered Bedrock - conglomerate	CL		(252') dark reddish brown (2.5YR 3/4); decrease in moisture content, white mottling	(251.0 - 254.0') Rough drilling.	
253									
254							(254') reddish brown (2.5YR 4/4); increase in moisture content		
255									
256									
257	84	RB-2-SS-255-260 7/17/2019 10:50					(257') dark reddish brown (2.5YR 3/4); decrease in moisture content		
258									
259									
260									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: blue water table symbol represents depth to water measured during the first VAS interval; apparent partial recoveries can be the result of potential compaction of sediments in the core bag

Date Started:	06/28/2019	Surface Elevation:	480.91 ft amsl	<b>Boring No.: <u>RB-2 Pilot</u></b>	
Date Completed:	07/26/2019	Northing (NAD83):	2103398.89		
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles,
Driller Name:	TA / DO / SV	Depth to First Water:	23.8 ft bgs		California
Drilling Asst:	J. Condelaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous		
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
261	84								
262		RB-2-SS-260-265 7/17/2019 10:55							
263									
264	72						(264') reddish brown / moderate brown (5YR 4/4); decrease in moisture content		
265								(265.0 - 267.0') Rough drilling.	
266									
267		RB-2-SS-265-270 7/17/2019 11:00		Topock - Weathered Bedrock - conglomerate	CL				
268									
269									
270	84								(269.0 - 274.0') Rough drilling, drill rig ran out of fuel mid-drill run.
271									
272		RB-2-SS-270-275 7/17/2019 12:49							
273									
274									
275							(274.0 - 277.0') Topock - Weathered Bedrock - conglomerate; Clayey sand with gravel (SC); brown (7.5YR 4/4); very fine grained to very coarse grained, subangular to subround; some medium to very large pebbles, angular; little clay; trace small cobbles; trace silt; little coarser clasts composed of metadiorite; wet		
276		RB-2-VAS-274-279 (<0.17 U ppb) 7/18/2019 09:17		Topock - Weathered Bedrock - conglomerate	SC				
277	108	RB-2-SS-275-280 7/17/2019 12:56		Topock - Weathered Bedrock - conglomerate	CL		(277.0 - 279.0') Topock - Weathered Bedrock - conglomerate; Sandy lean clay with gravel (CL); reddish brown / moderate brown (5YR 4/4); low plasticity; some very fine to medium grained sand, subangular to subround; little granules to very large pebbles, subangular; trace silt; little coarser clasts composed of metadiorite; moist		
278									
279				Topock - Weathered Bedrock -	CL		(279.0 - 285.0') Topock - Weathered Bedrock - conglomerate; Gravely lean clay with sand (CL); reddish brown / moderate brown (5YR 4/4); low plasticity; some granules to very large		
280									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: blue water table symbol represents depth to water measured during the first VAS interval; apparent partial recoveries can be the result of potential compaction of sediments in the core bag


Date Started:	06/28/2019	Surface Elevation:	480.91 ft amsl	<b>Boring No.: <u>RB-2 Pilot</u></b>	
Date Completed:	07/26/2019	Northing (NAD83):	2103398.89		
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles,
Driller Name:	TA / DO / SV	Depth to First Water:	23.8 ft bgs		California
Drilling Asst:	J. Condelaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous		
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
281	108	RB-2-SS-280-283 7/17/2019 13:03		conglomerate  Topock - Weathered Bedrock - conglomerate	CL		pebbles, angular to subangular; little very fine to medium grained sand, subangular to subround; trace small cobbles; trace silt; little coarser clasts composed of metadiorite; trace mica; moist; some white and dark brown mottling	(283.0 - 293.0') Rough drilling.	
282									
283									
284	120	RB-2-SS-283-288 7/18/2019 11:15					(285.0 - 294.0') Topock - Weathered Bedrock - conglomerate; Gravely lean clay with sand (CL); reddish brown / moderate brown (5YR 4/4); low plasticity; some granules to very large pebbles, angular to subround; some fine to medium grained sand, subangular to subround; trace silt; little coarser clasts composed of metadiorite; trace granite; moist		
285									
286									
287									
288									
289									
290	RB-2-SS-288-293 7/18/2019 11:20	RB-2-VAS-287-292 ( $<0.17$ U ppb) 7/26/2019 11:56		Topock - Weathered Bedrock - conglomerate	CL				
291									
292									
293	168						(294.0 - 307.0') Topock - Competent Bedrock - conglomerate; reddish brown / moderate brown (5YR 4/4); little granules to medium pebbles, angular to subangular; little very fine to medium grained sand; trace silt; little coarser clasts composed of metadiorite; dry to moist; friable conglomerate, highly pulverized and fractured	(293.0 - 307.0') 10' of slough in core barrel. From 303 to 307 very rough drilling. (294.0') Independent QC inspector on-site to confirm bedrock.	
294									
295									
296									
297									
298									
299									
300									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: blue water table symbol represents depth to water measured during the first VAS interval; apparent partial recoveries can be the result of potential compaction of sediments in the core bag


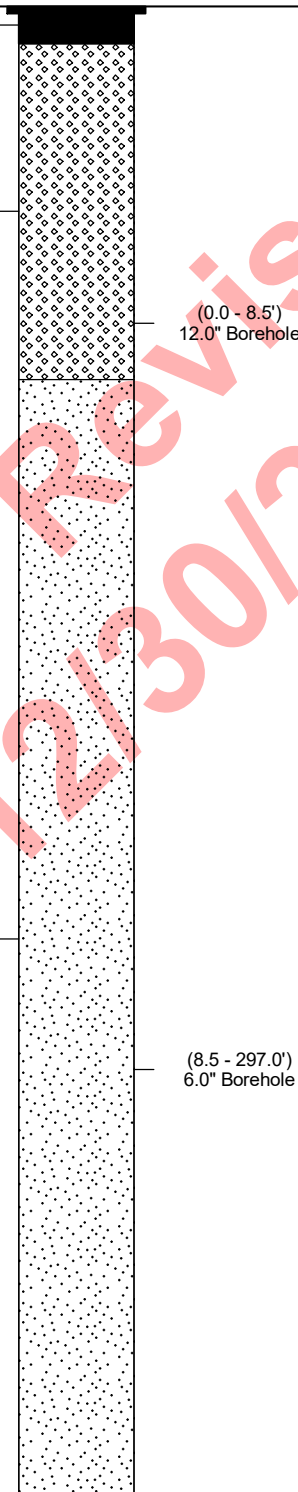






# Boring Log

Date Started:	06/28/2019	Surface Elevation:	480.91 ft amsl	<b>Boring No.: RB-2 Pilot</b>	
Date Completed:	07/26/2019	Northing (NAD83):	2103398.89		
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	TA / DO / SV	Depth to First Water:	23.8 ft bgs	Project Number:	RC000753.0051
Drilling Asst:	J. Condelaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel		
Logger:	Joe Latham	Sampling Interval:	Continuous		
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
301	168			Topock - Competent Bedrock - conglomerate			(303'); dry, friable conglomerate, moderately pulverized and fractured		
302									
303									
304									
305									
306									
307									
308							End of Boring at 307.0 ft bgs.		
309									
310									
311									
312									
313									
314									
315									
316									
317									
318									
319									
320									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: blue water table symbol represents depth to water measured during the first VAS interval; apparent partial recoveries can be the result of potential compaction of sediments in the core bag

Date Started:	07/27/2019	Surface Elevation:	480.91 ft amsl	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	2103398.89	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	TA / DO / SV	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	J. Condelaria, G. Angiano	Depth to First Water:	23.8 ft bgs	
Logger:	Joe Latham	Editor:	Grant Willford	Project Number: RC000753.0051

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 - Fill	SP		(0.0 - 0.5') Steel Plate			Note: Steel plates with BMPs in place		
2										
3									(0.5 - 5.0') Cemex #1/20 Mesh (20x40) Lapis Lustre Sand	(0.5 - 5.0') 7.9 bags
4			NR			(0.0 - 8.5') 12.0" Borehole				
5										
6										
7		Topock - Fill	SP							
8										
9										
10			NR							
11										
12								(5.0 - 243.5') Cemex #3 Mesh (8x20) Lapis Lustre Sand	(5.0 - 243.5') 97.7 bags	(5.0 - 243.5') 126 bags (129%) Note: Backfill sand, used >20% of the calculated volume due to potential voids that formed during drilling.
13			NR							
14										
15								(8.5 - 297.0') 6.0" Borehole		
16		Topock - Fill	SP							
17										
18										
19		Topock - Fluvial Deposits	SP							
20										

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, BMP = Best Management Practices for stormwater, U = not detected above the laboratory reporting limit, NR = no recovery;

Notes: blue water table symbol represents depth to water measured during the first VAS interval; granular backfill material was removed during overdrilling of the pilot borehole

Date Started:	07/27/2019	Surface Elevation:	480.91 ft amsl	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	2103398.89	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	TA / DO / SV	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	J. Condelaria, G. Angiano	Depth to First Water:	23.8 ft bgs	
Logger:	Joe Latham	Editor:	Grant Willford	Project Number: RC000753.0051

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							
22							
23							
24			NR				
25							
26							
27							
28							
29		Topock - Fluvial Deposits	SP		(5.0 - 243.5') Cemex #3 Mesh (8x20) Lapis Lustre Sand	(5.0 - 243.5') 97.7 bags	(5.0 - 243.5') 126 bags (129%) Note: Backfill sand, used >20% of the calculated volume due to potential voids that formed during drilling.
30					(8.5 - 297.0') 6.0" Borehole		
31							
32							
33							
34			NR				
35							
36							
37							
38	RB-2-VAS-36.5-41.5 (<0.033 U ppb) 6/29/2019 11:43	Topock - Fluvial Deposits	SP-SM				
39		Topock - Fluvial Deposits	SM				
40		Topock - Fluvial Deposits	GW-GM				

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, BMP = Best Management Practices for stormwater, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: blue water table symbol represents depth to water measured during the first VAS interval; granular backfill material was removed during overdrilling of the pilot borehole

Date Started:	07/27/2019	Surface Elevation:	480.91 ft amsl	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	2103398.89	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	TA / DO / SV	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	J. Condellaria, G. Angiano	Depth to First Water:	23.8 ft bgs	
Logger:	Joe Latham	Editor:	Grant Willford	Project Number: RC000753.0051

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 - Fluvial Deposits	GW-GM				
42							
43		Topock - Fluvial Deposits	SM				
44							
45							
46		Topock - Fluvial Deposits	GW-GM				
47							
48							
49							
50		Topock - Alluvium Deposits	GM		(5.0 - 243.5') Cemex #3 Mesh (8x20) Lapis Lustre Sand	(8.5 - 297.0') 6.0" Borehole	(5.0 - 243.5') 97.7 bags
51							(5.0 - 243.5') 126 bags (129%) Note: Backfill sand, used >20% of the calculated volume due to potential voids that formed during drilling.
52							
53							
54		Topock - Alluvium Deposits	GM				
55							
56		Topock - Alluvium Deposits	SM				
57							
58							
59		Topock - Alluvium Deposits	SC				
60							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, BMP = Best Management Practices for stormwater, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: blue water table symbol represents depth to water measured during the first VAS interval; granular backfill material was removed during overdrilling of the pilot borehole

Date Started:	07/27/2019	Surface Elevation:	480.91 ft amsl	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	2103398.89	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	TA / DO / SV	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	J. Condellaria, G. Angiano	Depth to First Water:	23.8 ft bgs	
Logger:	Joe Latham	Editor:	Grant Willford	Project Number: RC000753.0051

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	GM						
62									
63									
64									
65									
66	RB-2-VAS-72-77 ( $<0.033$ U ppb) 6/30/2019 14:10	Topock - Alluvium Deposits	GW					(5.0 - 243.5') 97.7 bags	(5.0 - 243.5') 126 bags (129%) Note: Backfill sand, used $>20\%$ of the calculated volume due to potential voids that formed during drilling.
67									
68									
69									
70									
71		Topock - Alluvium Deposits	GC						
72									
73									
74									
75									
76		Topock - Alluvium Deposits	SW						
77									
78									
79									
80									
		Topock - Alluvium Deposits	SW-SM						


Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, BMP = Best Management Practices for stormwater, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: blue water table symbol represents depth to water measured during the first VAS interval; granular backfill material was removed during overdrilling of the pilot borehole

Date Started:	07/27/2019	Surface Elevation:	480.91 ft amsl	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	2103398.89	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	TA / DO / SV	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	J. Condelaria, G. Angiano	Depth to First Water:	23.8 ft bgs	
Logger:	Joe Latham	Editor:	Grant Willford	Project Number: RC000753.0051

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	SW-SM				
82							
83							
84		Topock - Alluvium Deposits	ML				
85							
86							
87							
88		Topock - Alluvium Deposits	GC				
89							
90					(5.0 - 243.5') Cemex #3 Mesh (8x20) Lapis Lustre Sand	(5.0 - 243.5') 97.7 bags	(5.0 - 243.5') 126 bags (129%) Note: Backfill sand, used >20% of the calculated volume due to potential voids that formed during drilling.
91		Topock - Alluvium Deposits	GC				
92							
93							
94		Topock - Alluvium Deposits	GM				
95							
96							
97							
98		Topock - Alluvium Deposits	GM				
99							
100		Topock - Alluvium Deposits	GC				

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, BMP = Best Management Practices for stormwater, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: blue water table symbol represents depth to water measured during the first VAS interval; granular backfill material was removed during overdrilling of the pilot borehole

Date Started:	07/27/2019	Surface Elevation:	480.91 ft amsl	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	2103398.89	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	TA / DO / SV	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	J. Condelaria, G. Angiano	Depth to First Water:	23.8 ft bgs	
Logger:	Joe Latham	Editor:	Grant Willford	Project Number: RC000753.0051

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
101	RB-2-VAS-102-107 ( $<0.033$ U ppb) 7/1/2019 15:21	Topock - Alluvium Deposits	GC				
102							
103							
104		Topock - Alluvium Deposits	GM				
105							
106		Topock - Alluvium Deposits	GC		(5.0 - 243.5') Cemex #3 Mesh (8x20) Lapis Lustre Sand	(8.5 - 297.0') 6.0" Borehole	(5.0 - 243.5') 97.7 bags
107							
108		Topock - Alluvium Deposits	GC				
109							
110		Topock - Alluvium Deposits	GM				
111							
112		Topock - Alluvium Deposits	GM				(5.0 - 243.5') 126 bags (129%) Note: Backfill sand, used >20% of the calculated volume due to potential voids that formed during drilling.
113							
114		Topock - Alluvium Deposits	GM				
115							
116		Topock - Alluvium Deposits	GM				
117							
118		Topock - Alluvium Deposits	GM				
119							
120							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, BMP = Best Management Practices for stormwater, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: blue water table symbol represents depth to water measured during the first VAS interval; granular backfill material was removed during overdrilling of the pilot borehole

Date Started:	07/27/2019	Surface Elevation:	480.91 ft amsl	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	2103398.89	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	TA / DO / SV	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	J. Condelaria, G. Angiano	Depth to First Water:	23.8 ft bgs	
Logger:	Joe Latham	Editor:	Grant Willford	Project Number: RC000753.0051

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
121		Topock - Alluvium Deposits	GM				
122							
123							
124		Topock - Alluvium Deposits	GM				
125							
126							
127							
128							
129		Topock - Alluvium Deposits	ML				
130					(5.0 - 243.5') Cemex #3 Mesh (8x20) Lapis Lustre Sand	(8.5 - 297.0') 6.0" Borehole	(5.0 - 243.5') 126 bags (129%) Note: Backfill sand, used >20% of the calculated volume due to potential voids that formed during drilling.
131							
132							
133							
134		Topock - Alluvium Deposits	GM				
135							
136							
137							
138							
139		Topock - Alluvium Deposits	SM				
140							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, BMP = Best Management Practices for stormwater, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: blue water table symbol represents depth to water measured during the first VAS interval; granular backfill material was removed during overdrilling of the pilot borehole

Date Started:	07/27/2019	Surface Elevation:	480.91 ft amsl	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	2103398.89	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	TA / DO / SV	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	J. Condelaria, G. Angiano	Depth to First Water:	23.8 ft bgs	
Logger:	Joe Latham	Editor:	Grant Willford	Project Number: RC000753.0051

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
141		Topock - Alluvium Deposits	SM				
142							
143		Topock - Alluvium Deposits	GM				
144							
145							
146		Topock - Alluvium Deposits	SM				
147							
148		Topock - Alluvium Deposits	SM				
149							
150		Topock - Alluvium Deposits	SM		(5.0 - 243.5') Cemex #3 Mesh (8x20) Lapis Lustre Sand	(8.5 - 297.0') 6.0" Borehole	(5.0 - 243.5') 97.7 bags
151							
152							
153		Topock - Alluvium Deposits	GM				
154							
155							
156		Topock - Alluvium Deposits	GM				
157							
158							
159		Topock - Alluvium Deposits	GM				
160							
160		Topock - Alluvium	GC				

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, BMP = Best Management Practices for stormwater, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: blue water table symbol represents depth to water measured during the first VAS interval; granular backfill material was removed during overdrilling of the pilot borehole

Date Started:	07/27/2019	Surface Elevation:	480.91 ft amsl	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	2103398.89	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	TA / DO / SV	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	J. Condelaria, G. Angiano	Depth to First Water:	23.8 ft bgs	
Logger:	Joe Latham	Editor:	Grant Willford	Project Number: RC000753.0051

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
161		Deposits					
162		Topock - Alluvium Deposits	GM				
163							
164		Topock - Alluvium Deposits	GM				
165							
166							
167							
168		Topock - Alluvium Deposits	SM				
169							
170					(5.0 - 243.5') Cemex #3 Mesh (8x20) Lapis Lustre Sand	(8.5 - 297.0') 6.0" Borehole	(5.0 - 243.5') 97.7 bags
171							
172		Topock - Alluvium Deposits	SM				
173							
174	RB-2-VAS-172-177 (<0.17 U ppb) 7/12/2019 14:55	Topock - Alluvium Deposits	SM				
175							
176							
177		Topock - Alluvium Deposits	SM				
178							
179		Topock - Alluvium Deposits	SM				
180		Topock - Alluvium Deposits	SM				

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, BMP = Best Management Practices for stormwater, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: blue water table symbol represents depth to water measured during the first VAS interval; granular backfill material was removed during overdrilling of the pilot borehole

Date Started:	07/27/2019	Surface Elevation:	480.91 ft amsl	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	2103398.89	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	TA / DO / SV	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	J. Condelaria, G. Angiano	Depth to First Water:	23.8 ft bgs	
Logger:	Joe Latham	Editor:	Grant Willford	Project Number: RC000753.0051

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
181		Topock - Alluvium Deposits	SM				
182							
183							
184		Topock - Alluvium Deposits	SW				
185							
186							
187							
188		Topock - Alluvium Deposits	GW-GM				
189		Topock - Alluvium Deposits	SM				
190		Topock - Alluvium Deposits	GM		(5.0 - 243.5') Cemex #3 Mesh (8x20) Lapis Lustre Sand	(8.5 - 297.0') 6.0" Borehole	(5.0 - 243.5') 97.7 bags
191							
192							
193		Topock - Alluvium Deposits	SW-SM				
194							
195							
196							
197							
198		Topock - Alluvium Deposits	SM				
199							
200			ML				

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, BMP = Best Management Practices for stormwater, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: blue water table symbol represents depth to water measured during the first VAS interval; granular backfill material was removed during overdrilling of the pilot borehole

Date Started:	07/27/2019	Surface Elevation:	480.91 ft amsl	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	2103398.89	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	TA / DO / SV	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	J. Condelaria, G. Angiano	Depth to First Water:	23.8 ft bgs	
Logger:	Joe Latham	Editor:	Grant Willford	Project Number: RC000753.0051

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
201		Topock - Alluvium Deposits	ML				
202							
203		Topock - Alluvium Deposits	SM				
204		Topock - Alluvium Deposits	SM				
205	RB-2-VAS-202-207 (<0.17 U ppb) 7/14/2019 09:20	Topock - Alluvium Deposits	ML				
206		Topock - Alluvium Deposits					
207		Topock - Alluvium Deposits	SM				
208							
209							
210					(5.0 - 243.5') Cemex #3 Mesh (8x20) Lapis Lustre Sand	(8.5 - 297.0') 6.0" Borehole	(5.0 - 243.5') 126 bags (129%) Note: Backfill sand, used >20% of the calculated volume due to potential voids that formed during drilling.
211							
212		Topock - Alluvium Deposits	SC				
213							
214							
215							
216							
217							
218		Topock - Alluvium Deposits	SC				
219							
220			GC				


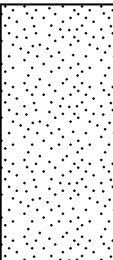




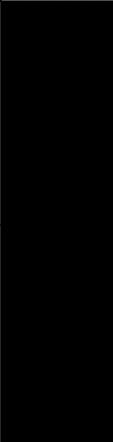
Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, BMP = Best Management Practices for stormwater, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: blue water table symbol represents depth to water measured during the first VAS interval; granular backfill material was removed during overdrilling of the pilot borehole

Date Started:	07/27/2019	Surface Elevation:	480.91 ft amsl	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	2103398.89	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	TA / DO / SV	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	J. Condellaria, G. Angiano	Depth to First Water:	23.8 ft bgs	
Logger:	Joe Latham	Editor:	Grant Willford	Project Number: RC000753.0051

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
221		Topock - Alluvium Deposits	GC				
222							
223							
224							
225							
226							
227							
228							
229		Topock - Alluvium Deposits	SC		(5.0 - 243.5') Cemex #3 Mesh (8x20) Lapis Lustre Sand	(8.5 - 297.0') 6.0" Borehole	(5.0 - 243.5') 97.7 bags
230							
231							
232							
233							
234							
235							
236							
237							
238	RB-2-VAS-237-242 (<0.17 U ppb) 7/15/2019 13:48	Topock - Alluvium Deposits	GC				
239							
240							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, BMP = Best Management Practices for stormwater, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: blue water table symbol represents depth to water measured during the first VAS interval; granular backfill material was removed during overdrilling of the pilot borehole

Date Started:	07/27/2019	Surface Elevation:	480.91 ft amsl	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	2103398.89	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	TA / DO / SV	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	J. Condelaria, G. Angiano	Depth to First Water:	23.8 ft bgs	
Logger:	Joe Latham	Editor:	Grant Willford	Project Number: RC000753.0051

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	
241	RB-2-VAS-237-242 (<0.17 U ppb) 7/15/2019 13:48	Topock - Alluvium Deposits	GC		(5.0 - 243.5') Cemex #3 Mesh (8x20) Lapis Lustre Sand		(5.0 - 243.5') 97.7 bags	(5.0 - 243.5') 126 bags (129%) Note: Backfill sand, used >20% of the calculated volume due to potential voids that formed during drilling.	
242		Topock - Weathered Bedrock - conglomerate	CL						
243									
244									
245		Topock - Weathered Bedrock - conglomerate	SC		(243.5 - 254.0') Cemex #1/20 Mesh (20x40) Lapis Lustre Sand		(243.5 - 254.0') 4.1 bags	(243.5 - 254.0') 8 bags (195%) Note: Indicator Sand, used >20% of the calculated volume due to potential voids that formed during drilling.	
246									
247	Topock - Weathered Bedrock - conglomerate	CL							
248									
249									
250									
251									
252	(254.0 - 307.0') Bentonite seal chips Puregold Medium Chips		(8.5 - 297.0') 6.0" Borehole	(254.0 - 307.0') 12.9 bags					(254.0 - 307.0') 18.5 bags (143%) Note: Decommissioned rathole, used >20% of the calculated volume due to potential voids that formed during drilling.
253									
254									
255									
256									
257									
258									
259									
260									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, BMP = Best Management Practices for stormwater, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: blue water table symbol represents depth to water measured during the first VAS interval; granular backfill material was removed during overdrilling of the pilot borehole

Date Started:	07/27/2019	Surface Elevation:	480.91 ft amsl	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	2103398.89	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	TA / DO / SV	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	J. Condellaria, G. Angiano	Depth to First Water:	23.8 ft bgs	
Logger:	Joe Latham	Editor:	Grant Willford	Project Number: RC000753.0051

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
261							
262							
263							
264							
265							
266							
267		Topock - Weathered Bedrock - conglomerate	CL				
268							
269							
270					(254.0 - 307.0') Bentonite seal chips Puregold Medium Chips	(8.5 - 297.0') 6.0" Borehole	(254.0 - 307.0') 12.9 bags
271							
272							
273							
274							
275		Topock - Weathered Bedrock - conglomerate	SC				
276	RB-2-VAS-274-279 (<0.17 U ppb) 7/18/2019 09:17						
277							
278		Topock - Weathered Bedrock - conglomerate	CL				
279							
280		Topock - Weathered Bedrock -	CL				

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, BMP = Best Management Practices for stormwater, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: blue water table symbol represents depth to water measured during the first VAS interval; granular backfill material was removed during overdrilling of the pilot borehole

Date Started:	07/27/2019	Surface Elevation:	480.91 ft amsl	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	2103398.89	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	TA / DO / SV	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	J. Condellaria, G. Angiano	Depth to First Water:	23.8 ft bgs	
Logger:	Joe Latham	Editor:	Grant Willford	Project Number: RC000753.0051

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
281		conglomerate					
282		Topock - Weathered Bedrock - conglomerate	CL				
283							
284							
285							
286							
287							
288							
289	RB-2-VAS-287-292 (<0.17 U ppb) 7/26/2019 11:56	Topock - Weathered Bedrock - conglomerate	CL		(8.5 - 297.0') 6.0" Borehole		
290					(254.0 - 307.0') Bentonite seal chips Puregold Medium Chips	(254.0 - 307.0') 12.9 bags	(254.0 - 307.0') 18.5 bags (143%) Note: Decommissioned rathole, used >20% of the calculated volume due to potential voids that formed during drilling.
291							
292							
293							
294							
295							
296							
297		Topock - Competent Bedrock - conglomerate					
298					(297.0 - 307.0') 4" Borehole		
299							
300							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, BMP = Best Management Practices for stormwater, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: blue water table symbol represents depth to water measured during the first VAS interval; granular backfill material was removed during overdrilling of the pilot borehole

Date Started:	07/27/2019	Surface Elevation:	480.91 ft amsl	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	2103398.89	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.81	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	TA / DO / SV	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	J. Condelaria, G. Angiano	Depth to First Water:	23.8 ft bgs	
Logger:	Joe Latham	Editor:	Grant Willford	Project Number: RC000753.0051

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
301							
302							
303		Topock - Competent Bedrock - conglomerate			(254.0 - 307.0') Bentonite seal chips Puregold Medium Chips	(254.0 - 307.0') 12.9 bags	(254.0 - 307.0') 18.5 bags (143%) Note: Decommissioned rathole, used >20% of the calculated volume due to potential voids that formed during drilling.
304							
305							
306							
307							
308							
309							
310							
311							
312							
313							
314							
315							
316							
317							
318							
319							
320							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, BMP = Best Management Practices for stormwater, U = not detected above the laboratory reporting limit, NR = no recovery; Notes: blue water table symbol represents depth to water measured during the first VAS interval; granular backfill material was removed during overdrilling of the pilot borehole

Final - Revised 12/30/20