

Date Started: 07/31/2019	Surface Elevation: 465.4 ft amsl	<b>Well ID: MW-91-170, MW-91-320</b>
Date Completed: 09/23/2019	Shallow Well Elevation: 465.4 ft amsl	
Drilling Co.: Cascade	Deep Well Elevation: 465.3 ft amsl	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): 2103798.1	Project: Final GW Remedy Phase 1
Driller Name: E. Ramos / S. Vasquez	Easting (NAD83): 7616739.7	Location: PG&E Topock, Needles, California
Drilling Asst: O. Flores / L. Amaya	Borehole Diameter: 6-12 inches	Project Number: RC000753.0051
Logger: GJ / SM / CS / DC / AM	Water Level Start: 10.5 ft bgs	
Editor: Grant Willford	Development End Date: 11/23/2019	
Total Depth: 417 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
0					(0.0 - 150.8') 2" PVC Sch 80 Casing		(+0.5 - 1.0') 22 bags Note: 30-inch Diameter Concrete Pad with 18-inch Diameter Lockable Vault, Quickcrete Concrete Mix with Buff dye
1					(+0.5 - 1.0') Concrete Pad		
2							
3					(2.2 - 5.0') Bentonite seal chips	(2.2 - 5.0') 2.92	(2.2 - 5.0') 7 (140%) Note: Puregold Medium Chips, installed due to void and heat of hydration concerns, installed >20% of calculated volume to fill void
4							
5							
6		Topock - Fill	SP				
7							
8							
9							
10					(0.0 - 42.0') 12.0" Borehole		
11					(5.0 - 16.9') Portland Cement 6% Bentonite	(5.0 - 16.9') 66 gallons	(5.0 - 16.9') 100 gallons (52%) Note: Type I, II and V and Benseal, used >20% of the calculated volume due to potential voids forming during flushing of the 10-inch casing
12							
13							
14	MW-X-VAS-12-17 (<0.033 U ppb) 6/25/2019 15:10						
15			NR				
16							
17							
18					(16.9 - 118.2') Bentonite seal chips	(16.9 - 118.2') 78.93 bags	(16.9 - 118.2') 77 bags (-2%) Note: Puregold Medium Chips
19		Topock - Fill	SW				

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

WELL CONSTRUCTION DETAILS\_PG&E\_TOPOCK C:\USERS\SMC\GRANDOCUMENTS\PG&E\_TOPOCK\DRIFT BORING LOGS\GINT FILES\12.31.19\TOPOCK DATABASE FOR PLOG.GPJ\_TOPOCK DATA TEMPLATE FOR PLOG.GDT\_1.25/1/19\_1.25/0

Date Started: 07/31/2019	Surface Elevation: 465.4 ft amsl	<b>Well ID: MW-91-170, MW-91-320</b>
Date Completed: 09/23/2019	Shallow Well Elevation: 465.4 ft amsl	
Drilling Co.: Cascade	Deep Well Elevation: 465.3 ft amsl	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): 2103798.1	Project: Final GW Remedy Phase 1
Driller Name: E. Ramos / S. Vasquez	Easting (NAD83): 7616739.7	Location: PG&E Topock, Needles, California
Drilling Asst: O. Flores / L. Amaya	Borehole Diameter: 6-12 inches	
Logger: GJ / SM / CS / DC / AM	Water Level Start: 10.5 ft bgs	Project Number: RC000753.0051
Editor: Grant Willford	Development End Date: 11/23/2019	
Total Depth: 417 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
20					(19.5 - 20.5') Centralizer		
21					(0.0 - 150.8') 2" PVC Sch 80 Casing		
22							
23							
24							
25							
26							
27							
28		Topock - Fill	SW				
29							
30					(16.9 - 118.2') Bentonite seal chips	(16.9 - 118.2') 78.93 bags	(16.9 - 118.2') 77 bags (-2%) Note: Puregold Medium Chips
31							
32							
33							
34	MW-X-VAS-32-37 (<0.033 U ppb) 6/26/2019 11:45						
35							
36							
37							
38		Topock - Fluvial Deposits	SW				
39							

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WELL CONSTRUCTION DETAILS\_PG&E\_TOPOCK\_C:\USERS\SMC\GRANDOCUMENTS\PG&E\_TOPOCK\DRIFT BORING LOGS\GINT FILES\12.31.19\TOPOCK DATABASE FOR PLOG.GPJ\_TOPOCK DATA TEMPLATE FOR PLOG.GDT\_1.25/1/19\_12:50

Date Started: 07/31/2019	Surface Elevation: 465.4 ft amsl	<b>Well ID: MW-91-170, MW-91-320</b>
Date Completed: 09/23/2019	Shallow Well Elevation: 465.4 ft amsl	
Drilling Co.: Cascade	Deep Well Elevation: 465.3 ft amsl	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): 2103798.1	Project: Final GW Remedy Phase 1
Driller Name: E. Ramos / S. Vasquez	Easting (NAD83): 7616739.7	Location: PG&E Topock, Needles, California
Drilling Asst: O. Flores / L. Amaya	Borehole Diameter: 6-12 inches	Project Number: RC000753.0051
Logger: GJ / SM / CS / DC / AM	Water Level Start: 10.5 ft bgs	
Editor: Grant Willford	Development End Date: 11/23/2019	
Total Depth: 417 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
40			SW		(0.0 - 150.8') 2" PVC Sch 80 Casing		
41					(0.1 - 300.8') 2" PVC Sch 80 Casing		
42					(0.0 - 42.0') 12.0" Borehole		
43			NR				
44							
45							
46							
47							
48		Topock - Fluvial Deposits	SW				
49		Topock - Fluvial Deposits	GW		(16.9 - 118.2') Bentonite seal chips	(16.9 - 118.2') 78.93 bags	(16.9 - 118.2') 77 bags (-2%) Note: Puregold Medium Chips
50							
51					(42.0 - 324.0') 10.0" Borehole		
52		Topock - Fluvial Deposits	SW				
53							
54							
55		Topock - Fluvial Deposits	SP				
56							
57							
58		Topock - Fluvial Deposits	SW				
59							

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WELL CONSTRUCTION DETAILS\_PG&E\_TOPOCK\_TOPOCK DRAFT BORING LOGS\GINT FILES\1231.19\TOPOCK DATABASE FOR PLOG.GPJ\_TOPOCK DATA TEMPLATE FOR PLOG.GDT 12/31/19 12:50

Date Started: 07/31/2019	Surface Elevation: 465.4 ft amsl	<b>Well ID: MW-91-170, MW-91-320</b>
Date Completed: 09/23/2019	Shallow Well Elevation: 465.4 ft amsl	
Drilling Co.: Cascade	Deep Well Elevation: 465.3 ft amsl	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): 2103798.1	Project: Final GW Remedy Phase 1
Driller Name: E. Ramos / S. Vasquez	Easting (NAD83): 7616739.7	Location: PG&E Topock, Needles, California
Drilling Asst: O. Flores / L. Amaya	Borehole Diameter: 6-12 inches	Project Number: RC000753.0051
Logger: GJ / SM / CS / DC / AM	Water Level Start: 10.5 ft bgs	
Editor: Grant Willford	Development End Date: 11/23/2019	
Total Depth: 417 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
60		Topock - Fluvial Deposits	SW	[Pattern]	(0.0 - 150.8') 2" PVC Sch 80 Casing		
61					(0.1 - 300.8') 2" PVC Sch 80 Casing		
62		Topock - Fluvial Deposits	SP	[Pattern]			
63							
64		Topock - Fluvial Deposits	SW	[Pattern]			
65							
66							
67							
68							
69				(16.9 - 118.2') Bentonite seal chips			
70				(69.5 - 70.5') Centralizer	(42.0 - 324.0') 10.0" Borehole	(16.9 - 118.2') 78.93 bags	(16.9 - 118.2') 77 bags (-2%) Note: Puregold Medium Chips
71							
72							
73	MW-X-VAS-71-76 (<0.033 U ppb) 6/27/2019 08:52						
74							
75							
76		Topock - Fluvial Deposits	SP	[Pattern]			
77							
78		Topock - Fluvial Deposits	SW	[Pattern]			
79							

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Date Started: 07/31/2019	Surface Elevation: 465.4 ft amsl	<b>Well ID: MW-91-170, MW-91-320</b>
Date Completed: 09/23/2019	Shallow Well Elevation: 465.4 ft amsl	
Drilling Co.: Cascade	Deep Well Elevation: 465.3 ft amsl	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): 2103798.1	Project: Final GW Remedy Phase 1
Driller Name: E. Ramos / S. Vasquez	Easting (NAD83): 7616739.7	Location: PG&E Topock, Needles, California
Drilling Asst: O. Flores / L. Amaya	Borehole Diameter: 6-12 inches	Project Number: RC000753.0051
Logger: GJ / SM / CS / DC / AM	Water Level Start: 10.5 ft bgs	
Editor: Grant Willford	Development End Date: 11/23/2019	
Total Depth: 417 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
80		Topock - Fluvial Deposits	SW		(0.0 - 150.8') 2" PVC Sch 80 Casing		
81					(0.1 - 300.8') 2" PVC Sch 80 Casing		
82		Topock - Fluvial Deposits	SW				
83							
84							
85		Topock - Fluvial Deposits	SW				
86							
87		Topock - Fluvial Deposits	SW-SM				
88							
89							
90		Topock - Fluvial Deposits	GW-GM		(16.9 - 118.2') Bentonite seal chips	(16.9 - 118.2') 78.93 bags	(16.9 - 118.2') 77 bags (-2%) Note: Puregold Medium Chips
91							
92		Topock - Fluvial Deposits	SP				
93							
94		Topock - Fluvial Deposits	SW				
95							
96		Topock - Fluvial Deposits	NR				
97							
98		Topock - Fluvial Deposits	SW				
99							

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WELL CONSTRUCTION DETAILS\_PG&E\_TOPOCK\_TOPOCK DRAFT BORING LOGS\GINT FILES\123119\TOPOCK DATABASE FOR PLOG.GPJ\_TOPOCK DATA TEMPLATE FOR PLOG.GDT\_12/31/19 12:50

Date Started: 07/31/2019	Surface Elevation: 465.4 ft amsl	<b>Well ID: MW-91-170, MW-91-320</b>
Date Completed: 09/23/2019	Shallow Well Elevation: 465.4 ft amsl	
Drilling Co.: Cascade	Deep Well Elevation: 465.3 ft amsl	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): 2103798.1	Project: Final GW Remedy Phase 1
Driller Name: E. Ramos / S. Vasquez	Easting (NAD83): 7616739.7	Location: PG&E Topock, Needles, California
Drilling Asst: O. Flores / L. Amaya	Borehole Diameter: 6-12 inches	Project Number: RC000753.0051
Logger: GJ / SM / CS / DC / AM	Water Level Start: 10.5 ft bgs	
Editor: Grant Willford	Development End Date: 11/23/2019	
Total Depth: 417 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
-100		Topock - Fluvial Deposits	SW		(0.0 - 150.8') 2" PVC Sch 80 Casing		
-101					(0.1 - 300.8') 2" PVC Sch 80 Casing		
-102							
-103		Topock - Fluvial Deposits	SW				
-104							
-105		Topock - Fluvial Deposits	SW				
-106							
-107		Topock - Fluvial Deposits	GW				
-108							
-109	MW-X-VAS-107-112 (<0.033 U ppb) 6/27/2019 15:04	Topock - Fluvial Deposits	SM		(16.9 - 118.2') Bentonite seal chips	(16.9 - 118.2') 78.93 bags	(16.9 - 118.2') 77 bags (-2%) Note: Puregold Medium Chips
-110					(42.0 - 324.0') 10.0" Borehole		
-111		Topock - Fluvial Deposits	GW				
-112							
-113		Topock - Fluvial Deposits	SM				
-114	MW-X-VAS-112-117 (<0.033 U ppb) 6/28/2019 09:56						
-115		Topock - Fluvial Deposits	SM				
-116							
-117		Topock - Alluvium Deposits	SM				
-118							
-119					(118.2 - 146.8') Bentonite seal pellets	(118.2 - 146.8') 22.9 buckets	(118.2 - 146.8') 25 buckets (9%) Note: Pel-Plug (TR30) 3/8"

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WELL CONSTRUCTION DETAILS\_PG&E\_TOPOCK C:\USERS\MCGRANE\DOCUMENTS\PG&E\_TOPOCK\DATABASE FOR PLOG.GPJ\_TOPOCK DATA TEMPLATE FOR PLOG.GDT 12/31/19 12:50

Date Started: 07/31/2019	Surface Elevation: 465.4 ft amsl	<b>Well ID: MW-91-170, MW-91-320</b>
Date Completed: 09/23/2019	Shallow Well Elevation: 465.4 ft amsl	
Drilling Co.: Cascade	Deep Well Elevation: 465.3 ft amsl	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): 2103798.1	Project: Final GW Remedy Phase 1
Driller Name: E. Ramos / S. Vasquez	Easting (NAD83): 7616739.7	Location: PG&E Topock, Needles, California
Drilling Asst: O. Flores / L. Amaya	Borehole Diameter: 6-12 inches	
Logger: GJ / SM / CS / DC / AM	Water Level Start: 10.5 ft bgs	Project Number: RC000753.0051
Editor: Grant Willford	Development End Date: 11/23/2019	
Total Depth: 417 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed	
120					(119.5 - 120.5') Centralizer			
121					(0.0 - 150.8') 2" PVC Sch 80 Casing			
122								
123								
124								
125								
126								
127								
128								
129		Topock - Alluvium Deposits	SM		(118.2 - 146.8') Bentonite seal pellets	(42.0 - 324.0') 10.0" Borehole	(118.2 - 146.8') 22.9 buckets	(118.2 - 146.8') 25 buckets (9%) Note: Pel-Plug (TR30) 3/8"
130								
131								
132								
133								
134								
135								
136								
137								
138								
139								

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Date Started: 07/31/2019	Surface Elevation: 465.4 ft amsl	<b>Well ID: MW-91-170, MW-91-320</b>
Date Completed: 09/23/2019	Shallow Well Elevation: 465.4 ft amsl	
Drilling Co.: Cascade	Deep Well Elevation: 465.3 ft amsl	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): 2103798.1	Project: Final GW Remedy Phase 1
Driller Name: E. Ramos / S. Vasquez	Easting (NAD83): 7616739.7	Location: PG&E Topock, Needles, California
Drilling Asst: O. Flores / L. Amaya	Borehole Diameter: 6-12 inches	Project Number: RC000753.0051
Logger: GJ / SM / CS / DC / AM	Water Level Start: 10.5 ft bgs	
Editor: Grant Willford	Development End Date: 11/23/2019	
Total Depth: 417 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
140 - 146.8					(0.0 - 150.8') 2" PVC Sch 80 Casing (0.1 - 300.8') 2" PVC Sch 80 Casing		
146.8 - 147.4					(118.2 - 146.8') Bentonite seal pellets	(118.2 - 146.8') 22.9 buckets	(118.2 - 146.8') 25 buckets (9%) Note: Pel-Plug (TR30) 3/8"
147.4 - 152.0		Topock - Alluvium Deposits	SM		(42.0 - 324.0') 10.0" Borehole (150.8 - 170.8') 2" Sch 80 PVC (20-slot) Screen		
152.0 - 153.0	MW-X-VAS-152-157 (<0.17 U ppb) 6/29/2019 09:19				(146.8 - 174.0') Cemex #3 MESH (8x10)	(146.8 - 174.0') 26.6 bags	(146.8 - 174.0') 34 bags (28%) Note: Lapis Lustre Sand
153.0 - 157.0							
157.0 - 158.0			NR				
158.0 - 159.0							

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Driller Name: E. Ramos / S. Vasquez	Easting (NAD83): 7616739.7	Location: PG&E Topock, Needles, California
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Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
160			NR		(150.8 - 170.8') 2" Sch 80 PVC (20-slot) Screen		
161							
162							
163							
164		Topock - Alluvium Deposits	CL				
165							
166							
167					(146.8 - 174.0') Cemex #3 MESH (8x10)	(146.8 - 174.0') 26.6 bags	(146.8 - 174.0') 34 bags (28%) Note: Lapis Lustre Sand
168							
169							
170		Topock - Alluvium Deposits	CL		(42.0 - 324.0') 10.0" Borehole		
171							
172					(170.5 - 172.0') Centralizer		
173					(170.8 - 173.2') Sump and End Cap		
174							
175		Topock - Alluvium Deposits	SM				
176							
177		Topock - Alluvium Deposits	GP		(174.0 - 297.4') Bentonite seal pellets	(174.0 - 297.4') 103.3 buckets	(174.0 - 297.4') 119 buckets (15%) Note: Pel-Plug (TR30) 3/8"
178							
179			NR				

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Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
180			NR	X	(0.1 - 300.8') 2" PVC Sch 80 Casing		
181							
182							
183							
184	MW-X-VAS-182-187 (<0.17 U ppb) 6/29/2019 15:28	Topock - Alluvium Deposits	SM				
185							
186							
187		Topock - Alluvium Deposits	SC				
188		Topock - Alluvium Deposits	ML				
189		Topock - Alluvium Deposits	SM				
190		Topock - Alluvium Deposits	CL		(174.0 - 297.4') Bentonite seal pellets	(42.0 - 324.0') 10.0" Borehole	(174.0 - 297.4') 103.3 buckets
191		Topock - Alluvium Deposits	MH				(174.0 - 297.4') 119 buckets (15%) Note: Pel-Plug (TR30) 3/8"
192							
193							
194							
195		Topock - Alluvium Deposits	ML				
196							
197							
198		Topock - Alluvium Deposits	ML				
199			CL				

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Drilling Asst: O. Flores / L. Amaya	Borehole Diameter: 6-12 inches	Project Number: RC000753.0051
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Editor: Grant Willford	Development End Date: 11/23/2019	
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Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
200		Topock - Alluvium Deposits	CL		(0.1 - 300.8') 2" PVC Sch 80 Casing		
201							
202		Topock - Alluvium Deposits	SM				
203							
204							
205							
206							
207							
208							
209	MW-X-VAS-207-212 (<0.17 U ppb) 6/30/2019 13:28						
210							
211							
212							
213							
214							
215							
216							
217							
218							
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

WELL CONSTRUCTION DETAILS\_PG&E\_TOPOCK C:\USERS\SMC\GRANDOCUMENTS\PG&E\_TOPOCK\DRIFT BORING LOGS\GINT FILES\1231.1\TOPOCK DATABASE FOR PLOG.GPJ\_TOPOCK DATA TEMPLATE FOR PLOG.GDT 12/31/19 12:50

Date Started: 07/31/2019	Surface Elevation: 465.4 ft amsl	<b>Well ID: MW-91-170, MW-91-320</b>
Date Completed: 09/23/2019	Shallow Well Elevation: 465.4 ft amsl	
Drilling Co.: Cascade	Deep Well Elevation: 465.3 ft amsl	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): 2103798.1	Project: Final GW Remedy Phase 1
Driller Name: E. Ramos / S. Vasquez	Easting (NAD83): 7616739.7	Location: PG&E Topock, Needles, California
Drilling Asst: O. Flores / L. Amaya	Borehole Diameter: 6-12 inches	
Logger: GJ / SM / CS / DC / AM	Water Level Start: 10.5 ft bgs	Project Number: RC000753.0051
Editor: Grant Willford	Development End Date: 11/23/2019	
Total Depth: 417 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed			
220		Topock - Alluvium Deposits	SM	SM	(0.1 - 300.8') 2" PVC Sch 80 Casing					
221										
222										
223										
224										
225										
226										
227		Topock - Alluvium Deposits	SM	SM	(174.0 - 297.4') Bentonite seal pellets					
228										
229										
230								(42.0 - 324.0') 10.0" Borehole	(174.0 - 297.4') 103.3 buckets	(174.0 - 297.4') 119 buckets (15%) Note: Pel-Plug (TR30) 3/8"
231								(229.5 - 230.5') Centralizer		
232										
233										
234										
235										
236										
237										
238										
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

WELL CONSTRUCTION DETAILS\_PG&E\_TOPOCK C:\USERS\SMC\GRANDOCUMENTS\PG&E\_TOPOCK\DRIFT BORING LOGS\GINT FILES\12.31.19\TOPOCK DATABASE FOR PLOG.GPJ\_TOPOCK DATA TEMPLATE FOR PLOG.GDT\_12/31/19 12:50

Date Started: 07/31/2019	Surface Elevation: 465.4 ft amsl	<b>Well ID: MW-91-170, MW-91-320</b>
Date Completed: 09/23/2019	Shallow Well Elevation: 465.4 ft amsl	
Drilling Co.: Cascade	Deep Well Elevation: 465.3 ft amsl	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): 2103798.1	Project: Final GW Remedy Phase 1
Driller Name: E. Ramos / S. Vasquez	Easting (NAD83): 7616739.7	Location: PG&E Topock, Needles, California
Drilling Asst: O. Flores / L. Amaya	Borehole Diameter: 6-12 inches	
Logger: GJ / SM / CS / DC / AM	Water Level Start: 10.5 ft bgs	Project Number: RC000753.0051
Editor: Grant Willford	Development End Date: 11/23/2019	
Total Depth: 417 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
240			SM		(0.1 - 300.8') 2" PVC Sch 80 Casing		
241							
242							
243		Topock - Alluvium Deposits	SM				
244							
245							
246							
247	MW-X-VAS-245-255 (<0.033 U ppb) 7/1/2019 13:35						
248							
249							
250					(174.0 - 297.4') Bentonite seal pellets	(174.0 - 297.4') 103.3 buckets	(174.0 - 297.4') 119 buckets (15%) Note: Pel-Plug (TR30) 3/8"
251		Topock - Alluvium Deposits	SM				
252							
253							
254							
255							
256		Topock - Alluvium Deposits	SM				
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

WELL CONSTRUCTION DETAILS\_PG&E\_TOPOCK C:\USERS\SMC\GRANDOCUMENTS\PG&E\_TOPOCK\DRIFT BORING LOGS\GINT FILES\1231.18\TOPOCK DATABASE FOR PLOG.GPJ\_TOPOCK DATA TEMPLATE FOR PLOG.GDT 12/31/19 12:50

Date Started: 07/31/2019	Surface Elevation: 465.4 ft amsl	<b>Well ID: MW-91-170, MW-91-320</b>
Date Completed: 09/23/2019	Shallow Well Elevation: 465.4 ft amsl	
Drilling Co.: Cascade	Deep Well Elevation: 465.3 ft amsl	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): 2103798.1	Project: Final GW Remedy Phase 1
Driller Name: E. Ramos / S. Vasquez	Easting (NAD83): 7616739.7	Location: PG&E Topock, Needles, California
Drilling Asst: O. Flores / L. Amaya	Borehole Diameter: 6-12 inches	
Logger: GJ / SM / CS / DC / AM	Water Level Start: 10.5 ft bgs	Project Number: RC000753.0051
Editor: Grant Willford	Development End Date: 11/23/2019	
Total Depth: 417 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed			
260		Topock - Alluvium Deposits	SM	[Dotted pattern]	(0.1 - 300.8') 2" PVC Sch 80 Casing					
261										
262										
263										
264										
265										
266										
267										
268								(174.0 - 297.4') Bentonite seal pellets		
269								(269.5 - 270.5') Centralizer		
270		Topock - Alluvium Deposits	SM	[Dotted pattern]	(42.0 - 324.0') 10.0" Borehole	(174.0 - 297.4') 103.3 buckets	(174.0 - 297.4') 119 buckets (15%) Note: Pel-Plug (TR30) 3/8"			
271										
272										
273										
274										
275										
276										
277										
278										
279										

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

WELL CONSTRUCTION DETAILS\_PG&E\_TOPOCK C:\USERS\SMC\GRANDOCUMENTS\PG&E\_TOPOCK\DRIFT BORING LOGS\GINT FILES\12.31.19\TOPOCK DATABASE FOR PLOG.GPJ\_TOPOCK DATA TEMPLATE FOR PLOG.GDT\_12/31/19 12:50

Date Started: 07/31/2019	Surface Elevation: 465.4 ft amsl	<b>Well ID: MW-91-170, MW-91-320</b>
Date Completed: 09/23/2019	Shallow Well Elevation: 465.4 ft amsl	
Drilling Co.: Cascade	Deep Well Elevation: 465.3 ft amsl	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): 2103798.1	Project: Final GW Remedy Phase 1
Driller Name: E. Ramos / S. Vasquez	Easting (NAD83): 7616739.7	Location: PG&E Topock, Needles, California
Drilling Asst: O. Flores / L. Amaya	Borehole Diameter: 6-12 inches	Project Number: RC000753.0051
Logger: GJ / SM / CS / DC / AM	Water Level Start: 10.5 ft bgs	
Editor: Grant Willford	Development End Date: 11/23/2019	
Total Depth: 417 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
280					(0.1 - 300.8') 2" PVC Sch 80 Casing		
281							
282							
283							
284							
285							
286		Topock - Alluvium Deposits	SM		(174.0 - 297.4') Bentonite seal pellets	(174.0 - 297.4') 103.3 buckets	(174.0 - 297.4') 119 buckets (15%) Note: Pel-Plug (TR30) 3/8"
287							
288							
289							
290					(42.0 - 324.0') 10.0" Borehole		
291							
292							
293							
294	MW-X-VAS-292-297 (<0.17 U ppb) 7/2/2019 14:45						
295							
296							
297							
298					(297.4 - 324.0') Cemex #3 MESH (8x10)	(297.4 - 324.0') 28 bags	(297.4 - 324.0') 33 bags (18%) Note: Lapis Lustre Sand
299							

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

WELL CONSTRUCTION DETAILS\_PG&E\_TOPOCK C:\USERS\SMC\GRANDDOCUMENTS\PG&E\_TOPOCK\DRIFT BORING LOGS\GINT FILES\1231.18\TOPOCK DATABASE FOR PLOG.GPJ\_TOPOCK DATA TEMPLATE FOR PLOG.GDT 12/31/19 12:50

Date Started: 07/31/2019	Surface Elevation: 465.4 ft amsl	<b>Well ID: MW-91-170, MW-91-320</b>
Date Completed: 09/23/2019	Shallow Well Elevation: 465.4 ft amsl	
Drilling Co.: Cascade	Deep Well Elevation: 465.3 ft amsl	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): 2103798.1	Project: Final GW Remedy Phase 1
Driller Name: E. Ramos / S. Vasquez	Easting (NAD83): 7616739.7	Location: PG&E Topock, Needles, California
Drilling Asst: O. Flores / L. Amaya	Borehole Diameter: 6-12 inches	
Logger: GJ / SM / CS / DC / AM	Water Level Start: 10.5 ft bgs	Project Number: RC000753.0051
Editor: Grant Willford	Development End Date: 11/23/2019	
Total Depth: 417 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
300					(0.1 - 300.8') 2" PVC Sch 80 Casing		
301					(300.8 - 320.8') 2" Sch 80 PVC (20-slot) Screen		
302							
303							
304							
305							
306							
307							
308							
309		Topock - Alluvium Deposits	SM		(297.4 - 324.0') Cemex #3 MESH (8x10)	(297.4 - 324.0') 28 bags	(297.4 - 324.0') 33 bags (18%) Note: Lapis Lustre Sand
310					(42.0 - 324.0') 10.0" Borehole		
311							
312							
313							
314							
315							
316							
317							
318							
319							

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

WELL CONSTRUCTION DETAILS\_PG&E\_TOPOCK\_TOPOCK DRAFT BORING LOGS\GINT FILES\1231.18\TOPOCK DATABASE FOR PLOG.GPJ\_TOPOCK DATA TEMPLATE FOR PLOG.GDT\_12/31/19 12:50



Date Started: 07/31/2019	Surface Elevation: 465.4 ft amsl	<b>Well ID: MW-91-170, MW-91-320</b>
Date Completed: 09/23/2019	Shallow Well Elevation: 465.4 ft amsl	
Drilling Co.: Cascade	Deep Well Elevation: 465.3 ft amsl	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): 2103798.1	Project: Final GW Remedy Phase 1
Driller Name: E. Ramos / S. Vasquez	Easting (NAD83): 7616739.7	Location: PG&E Topock, Needles, California
Drilling Asst: O. Flores / L. Amaya	Borehole Diameter: 6-12 inches	Project Number: RC000753.0051
Logger: GJ / SM / CS / DC / AM	Water Level Start: 10.5 ft bgs	
Editor: Grant Willford	Development End Date: 11/23/2019	
Total Depth: 417 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
320		Topock - Alluvium Deposits	SM	[Pattern]	(300.8 - 320.8') 2" Sch 80 PVC (20-slot) Screen	(297.4 - 324.0') 28 bags	(297.4 - 324.0') 33 bags (18%) Note: Lapis Lustre Sand
321	(320.5 - 321.5') Centralizer (297.4 - 324.0') Cemex #3 MESH (8x10)				(42.0 - 324.0') 10.0" Borehole		
322					(320.8 - 323.2') Sump and End Cap		
323							
324							
325							
326							
327		Topock - Alluvium Deposits	MH	[Pattern]			
328							
329		Topock - Alluvium Deposits	SM	[Pattern]			
330							
331		Topock - Alluvium Deposits	MH	[Pattern]	(324.0 - 417.0') Bentonite seal chips	(324.0 - 417.0') 24.9 bags	(324.0 - 417.0') 34 bags (37%) Note: Puregold Medium Chips, used >20% of the calculated volume due to potential voids that formed during drilling
332							
333							
334							
335		Topock - Alluvium Deposits	MH	[Pattern]			
336							
337							
338	MW-X-VAS-337-342 (<0.17 U ppb) 7/11/2019 11:30	Topock - Alluvium Deposits	ML	[Pattern]			
339		Topock - Alluvium Deposits	ML	[Pattern]			

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WELL CONSTRUCTION DETAILS\_PG&E\_TOPOCK C:\USERS\SMC\GRANDOCUMENTS\PG&E\_TOPOCK\DRIFT BORING LOGS\GINT FILES\123119\TOPOCK DATABASE FOR PLOG.GPJ\_TOPOCK DATA TEMPLATE FOR PLOG.GDT 12/31/19 12:50

Date Started: 07/31/2019	Surface Elevation: 465.4 ft amsl	<b>Well ID: MW-91-170, MW-91-320</b>
Date Completed: 09/23/2019	Shallow Well Elevation: 465.4 ft amsl	
Drilling Co.: Cascade	Deep Well Elevation: 465.3 ft amsl	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): 2103798.1	Project: Final GW Remedy Phase 1
Driller Name: E. Ramos / S. Vasquez	Easting (NAD83): 7616739.7	Location: PG&E Topock, Needles, California
Drilling Asst: O. Flores / L. Amaya	Borehole Diameter: 6-12 inches	Project Number: RC000753.0051
Logger: GJ / SM / CS / DC / AM	Water Level Start: 10.5 ft bgs	
Editor: Grant Willford	Development End Date: 11/23/2019	
Total Depth: 417 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

WELL CONSTRUCTION DETAILS\_PG&E\_TOPOCK C:\USERS\SMC\GRANDOCUMENTS\PG&E\_TOPOCK\DATABASE FOR PLOG.GPJ\_TOPOCK DATA TEMPLATE FOR PLOG.GDT 12/31/19 12:50

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
340	MW-X-VAS-337-342 (<0.17 U ppb) 7/11/2019 11:30	Topock - Alluvium Deposits	ML				
341		Topock - Alluvium Deposits	GM				
342		Topock - Alluvium Deposits	SM				
343		Topock - Alluvium Deposits	ML				
344		Topock - Alluvium Deposits	MH				
345		Topock - Alluvium Deposits	ML				
346		Topock - Alluvium Deposits	ML				
347		Topock - Alluvium Deposits	ML				
348		Topock - Alluvium Deposits	ML				
349		Topock - Alluvium Deposits	ML				
350		Topock - Alluvium Deposits	SW-SM				
351		Topock - Alluvium Deposits	MH				
352		Topock - Weathered Bedrock - conglomerate	ML				
353		Topock - Weathered Bedrock - conglomerate	ML				
354		Topock - Weathered Bedrock - conglomerate	ML				
355		Topock - Weathered Bedrock - conglomerate	ML				
356		Topock - Weathered Bedrock - conglomerate	ML				
357		Topock - Weathered Bedrock - conglomerate	ML				
358		Topock - Weathered Bedrock - conglomerate	ML				
359		Topock - Weathered Bedrock - conglomerate	ML				

Final 2131179

(324.0 - 417.0')  
Bentonite seal chips

(324.0 - 414.0') 6.0"  
Borehole

(324.0 - 417.0') 24.9  
bags

(324.0 - 417.0') 34 bags (37%)  
Note: Puregold Medium Chips, used >20% of the calculated volume due to potential voids that formed during drilling

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

Date Started: 07/31/2019	Surface Elevation: 465.4 ft amsl	<b>Well ID: MW-91-170, MW-91-320</b>
Date Completed: 09/23/2019	Shallow Well Elevation: 465.4 ft amsl	
Drilling Co.: Cascade	Deep Well Elevation: 465.3 ft amsl	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): 2103798.1	Project: Final GW Remedy Phase 1
Driller Name: E. Ramos / S. Vasquez	Easting (NAD83): 7616739.7	Location: PG&E Topock, Needles, California
Drilling Asst: O. Flores / L. Amaya	Borehole Diameter: 6-12 inches	
Logger: GJ / SM / CS / DC / AM	Water Level Start: 10.5 ft bgs	Project Number: RC000753.0051
Editor: Grant Willford	Development End Date: 11/23/2019	
Total Depth: 417 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
360		Topock - Weathered Bedrock - conglomerate	ML			(324.0 - 417.0') 24.9 bags	(324.0 - 417.0') 34 bags (37%) Note: Puregold Medium Chips, used >20% of the calculated volume due to potential voids that formed during drilling
361							
362							
363							
364							
365							
366							
367							
368							
369							
370							
371		Topock - Weathered Bedrock - conglomerate	SM			(324.0 - 417.0') 24.9 bags	(324.0 - 417.0') 34 bags (37%) Note: Puregold Medium Chips, used >20% of the calculated volume due to potential voids that formed during drilling
372							
373							
374		Topock - Weathered Bedrock - conglomerate	GW-GM			(324.0 - 417.0') 24.9 bags	(324.0 - 417.0') 34 bags (37%) Note: Puregold Medium Chips, used >20% of the calculated volume due to potential voids that formed during drilling
375							
376		Topock - Weathered Bedrock - conglomerate	GM			(324.0 - 417.0') 24.9 bags	(324.0 - 417.0') 34 bags (37%) Note: Puregold Medium Chips, used >20% of the calculated volume due to potential voids that formed during drilling
377							
378							
379							

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

WELL CONSTRUCTION DETAILS\_PG&E\_TOPOCK C:\USERS\MCGRANE\DOCUMENTS\PG&E\_TOPOCK\DRIFT BORING LOGS\GINT FILES\123119\TOPOCK DATABASE FOR PLOG.GPJ\_TOPOCK DATA TEMPLATE FOR PLOG.GDT 12/31/19 12:50

Date Started: 07/31/2019	Surface Elevation: 465.4 ft amsl	<b>Well ID: MW-91-170, MW-91-320</b>
Date Completed: 09/23/2019	Shallow Well Elevation: 465.4 ft amsl	
Drilling Co.: Cascade	Deep Well Elevation: 465.3 ft amsl	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): 2103798.1	Project: Final GW Remedy Phase 1
Driller Name: E. Ramos / S. Vasquez	Easting (NAD83): 7616739.7	Location: PG&E Topock, Needles, California
Drilling Asst: O. Flores / L. Amaya	Borehole Diameter: 6-12 inches	
Logger: GJ / SM / CS / DC / AM	Water Level Start: 10.5 ft bgs	Project Number: RC000753.0051
Editor: Grant Willford	Development End Date: 11/23/2019	
Total Depth: 417 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

WELL CONSTRUCTION DETAILS\_PG&E\_TOPOCK C:\USERS\MCGRANE\DOCUMENTS\PG&E\_TOPOCK\DRIFT BORING LOGS\GINT FILES\123119\TOPOCK DATABASE FOR PLOG.GPJ\_TOPOCK DATA TEMPLATE FOR PLOG.GDT 12/31/19 12:50

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
380		Topock - Weathered Bedrock - conglomerate	GM				
381		Topock - Weathered Bedrock - conglomerate	GM				
382		Topock - Weathered Bedrock - conglomerate	GM				
383		Topock - Weathered Bedrock - conglomerate	CL				
384	MW-X-VAS-382-387 (<0.17 U ppb) 7/13/2019 14:43						
385		Topock - Weathered Bedrock - conglomerate	CL				
386		Topock - Weathered Bedrock - conglomerate	CL				
387		Topock - Weathered Bedrock - conglomerate	CL				
388		Topock - Weathered Bedrock - conglomerate	CL				
389		Topock - Weathered Bedrock - conglomerate	CL				
390		Topock - Weathered Bedrock - conglomerate	CL		(324.0 - 417.0') Bentonite seal chips	(324.0 - 417.0') 24.9 bags	(324.0 - 417.0') 34 bags (37%) Note: Puregold Medium Chips, used >20% of the calculated volume due to potential voids that formed during drilling
391		Topock - Weathered Bedrock - conglomerate	CL				
392		Topock - Weathered Bedrock - conglomerate	CL				
393		Topock - Weathered Bedrock - conglomerate	CL				
394		Topock - Weathered Bedrock - conglomerate	CL				
395		Topock - Weathered Bedrock - conglomerate	CL				
396		Topock - Weathered Bedrock - conglomerate	CL				
397		Topock - Weathered Bedrock - conglomerate	CL				
398		Topock - Weathered Bedrock - conglomerate	CL				
399		Topock - Weathered Bedrock - conglomerate	CL				

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

Date Started: 07/31/2019	Surface Elevation: 465.4 ft amsl	<b>Well ID: MW-91-170, MW-91-320</b>
Date Completed: 09/23/2019	Shallow Well Elevation: 465.4 ft amsl	
Drilling Co.: Cascade	Deep Well Elevation: 465.3 ft amsl	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): 2103798.1	Project: Final GW Remedy Phase 1
Driller Name: E. Ramos / S. Vasquez	Easting (NAD83): 7616739.7	Location: PG&E Topock, Needles, California
Drilling Asst: O. Flores / L. Amaya	Borehole Diameter: 6-12 inches	Project Number: RC000753.0051
Logger: GJ / SM / CS / DC / AM	Water Level Start: 10.5 ft bgs	
Editor: Grant Willford	Development End Date: 11/23/2019	
Total Depth: 417 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed	
400		Topock - Weathered Bedrock - conglomerate	CL		<p>(324.0 - 417.0') Bentonite seal chips</p> <p>(324.0 - 414.0') 6.0" Borehole</p> <p>(414.0 - 417.0') 4.0" Borehole</p> <p>End of Boring at 417.0' bgs.</p>			
401		Topock - Weathered Bedrock - conglomerate	CL					
402		Topock - Weathered Bedrock - conglomerate	GC					
403		Topock - Weathered Bedrock - conglomerate	ML					
404		Topock - Weathered Bedrock - conglomerate	GC					
405		Topock - Weathered Bedrock - conglomerate	SM					
406		Topock - Weathered Bedrock - conglomerate	CL					
407		Topock - Weathered Bedrock - conglomerate	SM					
408		Topock - Weathered Bedrock - conglomerate	GC				(324.0 - 417.0') 24.9 bags	(324.0 - 417.0') 34 bags (37%) Note: Puregold Medium Chips, used >20% of the calculated volume due to potential voids that formed during drilling
409		Topock - Weathered Bedrock - conglomerate	GC					
410		Topock - Weathered Bedrock - conglomerate	GC					
411		Topock - Weathered Bedrock - conglomerate	GC					
412		Topock - Weathered Bedrock - conglomerate	SM					
413		Topock - Weathered Bedrock - conglomerate	SM					
414	MW-X-VAS-412-417 (<0.17 U ppb) 7/15/2019 12:43	Topock - Weathered Bedrock - conglomerate	SM					
415		Topock - Weathered Bedrock - conglomerate	GM					
416		Topock - Weathered Bedrock - conglomerate	GM					
417		Topock - Weathered Bedrock - conglomerate	GM					
418								
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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

WELL CONSTRUCTION DETAILS\_PG&E\_TOPOCK C:\USERS\SMC\GRANDOCUMENTS\PG&E\_TOPOCK\DRIFT BORING LOGS\GINT FILES\123119\TOPOCK DATABASE FOR PLOG.GPJ\_TOPOCK DATA TEMPLATE FOR PLOG.GDT 12/31/19 12:50