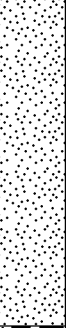








Date Started:	06/05/2019	Surface Elevation:	498.7 ft amsl	Well ID: IRZ-21
Date Completed:	06/15/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2102688.4	Project: Final GW Remedy Phase 1
Driller Name:	Jon Martinez	Easting (NAD83):	7615817.1	Location: PG&E Topock, Needles, California
Drilling Asst:	E. Martinez / W. Saylor	Borehole Diameter:	18-24 inches	
Logger:	KK / AM / ER	Water Level Start:	45.75 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	11/16/2019	
Total Depth:	166.5 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
1		Topock - Fluvial Deposits	SP		(0.0 - 47.4') 10" Suregrip 17 Casing		(0.0 - 4.0') 29 bags (39%) Note: Lapis Lustre Sand, used >20% of calculated volume due to potential voids forming during drilling
2					(0.0 - 4.0') Cemex #8 0/30 Mesh	(0.0 - 4.0') 20.8 bags	
3							
4							
5		Topock - Fluvial Deposits	GW		(0.0 - 21.8') 24.0" Borehole	(4.0 - 35.2') 459.2 gallons	(4.0 - 35.2') 523 gallons (14%) Note: Type I, II and V and Benseal
6							
7							
8							
9		Topock - Fluvial Deposits	SP		(4.0 - 35.2') Portland Cement 3% Bentonite		
10							
11		Topock - Fluvial Deposits	GW				
12							
13		Topock - Fluvial Deposits	SP				
14							
15		Topock - Fluvial Deposits	SP				
16							
17		Topock - Fluvial Deposits	GM				
18							
19							
20							

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Date Started:	06/05/2019	Surface Elevation:	498.7 ft amsl	Well ID: IRZ-21
Date Completed:	06/15/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2102688.4	Project: Final GW Remedy Phase 1
Driller Name:	Jon Martinez	Easting (NAD83):	7615817.1	Location: PG&E Topock, Needles, California
Drilling Asst:	E. Martinez / W. Saylor	Borehole Diameter:	18-24 inches	
Logger:	KK / AM / ER	Water Level Start:	45.75 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	11/16/2019	
Total Depth:	166.5 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
21		Topock - Fluvial Deposits	GM		(0.0 - 47.4') 10" Suregrip 17 Casing		
22							
23		Topock - Fluvial Deposits	GM				
24							
25							
26							
27							
28					(4.0 - 35.2') Portland Cement 3% Bentonite	(4.0 - 35.2') 459.2 gallons	(4.0 - 35.2') 523 gallons (14%) Note: Type I, II and V and Benseal
29							
30		Topock - Alluvium Deposits	GM				
31							
32							
33							
34							
35					(34.5 - 35.5') Centralizer		
36		Topock - Alluvium Deposits	GM		(35.2 - 36.7') Bentonite seal chips	(35.2 - 36.7') 2.5 bags	(35.2 - 36.7') 3 bags (20%) Note: Puregold Medium Chips, drillers requested to add bentonite chip seal to prevent grout migration
37							
38		Topock - Alluvium Deposits	GM		(36.7 - 40.4') Cemex Bunker # 8 0/30 mesh	(36.7 - 40.4') 9 bags	(36.7 - 40.4') 10 bags (11%) Note: Lapis Lustre Sand
39							
40							

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Date Started:	06/05/2019	Surface Elevation:	498.7 ft amsl	Well ID: IRZ-21
Date Completed:	06/15/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2102688.4	Project: Final GW Remedy Phase 1
Driller Name:	Jon Martinez	Easting (NAD83):	7615817.1	Location: PG&E Topock, Needles, California
Drilling Asst:	E. Martinez / W. Saylor	Borehole Diameter:	18-24 inches	
Logger:	KK / AM / ER	Water Level Start:	45.75 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	11/16/2019	
Total Depth:	166.5 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
41		Topock - Alluvium Deposits	GM		(0.0 - 47.4') 10" Suregrip 17 Casing	(36.7 - 40.4') 9 bags	
42		Topock - Alluvium Deposits	SM				
43							
44							
45							
46							
47							
48		Topock - Alluvium Deposits	SM		(47.4 - 65.4') 10" 25-slot 316L SS Wire Wrap Screen		
49							
50					(40.4 - 69.1') Cemex # 2/16 mesh (16x30)	(40.4 - 69.1') 70.1 bags	(40.4 - 69.1') 91 bags (30%) Note: Lapis Lustre Sand, used >20% of calculated volume due to potential voids forming during drilling
51					(41.8 - 61.8') 18.0" Borehole		
52							
53							
54	IRZ-21-VAS-52-57-EB (97 ppb) 12/15/2018 14:50	Topock - Alluvium Deposits	SM				
55							
56							
57							
58		Topock - Alluvium Deposits	ML				
59							
60							

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Date Started:	06/05/2019	Surface Elevation:	498.7 ft amsl	Well ID: IRZ-21
Date Completed:	06/15/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2102688.4	Project: Final GW Remedy Phase 1
Driller Name:	Jon Martinez	Easting (NAD83):	7615817.1	Location: PG&E Topock, Needles, California
Drilling Asst:	E. Martinez / W. Saylor	Borehole Diameter:	18-24 inches	
Logger:	KK / AM / ER	Water Level Start:	45.75 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	11/16/2019	
Total Depth:	166.5 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
61		Topock - Alluvium Deposits	ML		(47.4 - 65.4') 10" 25-slot 316L SS Wire Wrap Screen		
62							
63		Topock - Alluvium Deposits	SM				
64							
65		Topock - Alluvium Deposits	SM		(40.4 - 69.1') Cemex # 2/16 mesh (16x30)	(40.4 - 69.1') 70.1 bags	(40.4 - 69.1') 91 bags (30%) Note: Lapis Lustre Sand, used >20% of calculated volume due to potential voids forming during drilling
66							
67		Topock - Alluvium Deposits	SM		(65.4 - 140.4') 10" Suregrip 17 Casing		
68							
69							
70					(69.1 - 70.2') Cemex Bunker #8 0/30 Mesh	(69.1 - 70.2') 2.8 bags	(69.1 - 70.2') 4 bags (43%) Note: Lapis Lustre Sand, used >20% of calculated volume due to potential voids forming during drilling
71		Topock - Alluvium Deposits	SC				
72							
73							
74							
75					(70.2 - 132.1') Bentonite seal chips	(70.2 - 132.1') 104.9 bags	(70.2 - 132.1') 123 bags (17%) Note: Puregold Medium Chips
76							
77		Topock - Alluvium Deposits	SM				
78	IRZ-21-VAS-77-82 (1.1 ppb) 12/16/2018 09:25						
79							
80					(79.5 - 80.5') Centralizer		

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Date Started:	06/05/2019	Surface Elevation:	498.7 ft amsl	Well ID: IRZ-21
Date Completed:	06/15/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2102688.4	Project: Final GW Remedy Phase 1
Driller Name:	Jon Martinez	Easting (NAD83):	7615817.1	Location: PG&E Topock, Needles, California
Drilling Asst:	E. Martinez / W. Saylor	Borehole Diameter:	18-24 inches	
Logger:	KK / AM / ER	Water Level Start:	45.75 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	11/16/2019	
Total Depth:	166.5 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				
81	IRZ-21-VAS-77-82 (1.1 ppb) 12/16/2018 09:25	Topock - Alluvium Deposits	SM		<div></div>	<div></div>	(65.4 - 140.4') 10" Suregrip 17 Casing (61.8 - 81.8') 18.0" Borehole					
82												
83		Topock - Alluvium Deposits	ML									
84												
85												
86												
87												
88		Topock - Alluvium Deposits	SM		<div></div>	<div></div>	(70.2 - 132.1') 104.9 bags	(70.2 - 132.1') 123 bags (17%) Note: Puregold Medium Chips				
89												
90	Topock - Alluvium Deposits	SM		(70.2 - 132.1') Bentonite seal chips					(81.8 - 101.8') 18.0" Borehole			
91												
92												
93		Topock - Alluvium Deposits	SM									
94												
95												
96												
97												
98		Topock - Alluvium Deposits	SM									
99												
100												

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Date Started:	06/05/2019	Surface Elevation:	498.7 ft amsl	Well ID: IRZ-21
Date Completed:	06/15/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2102688.4	Project: Final GW Remedy Phase 1
Driller Name:	Jon Martinez	Easting (NAD83):	7615817.1	Location: PG&E Topock, Needles, California
Drilling Asst:	E. Martinez / W. Saylors	Borehole Diameter:	18-24 inches	
Logger:	KK / AM / ER	Water Level Start:	45.75 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	11/16/2019	
Total Depth:	166.5 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
101					(65.4 - 140.4') 10" Suregrip 17 Casing (81.8 - 101.8') 18.0" Borehole		
102							
103							
104							
105							
106							
107							
108							
109		Topock - Alluvium Deposits	SM				
110					(70.2 - 132.1') Bentonite seal chips	(70.2 - 132.1') 104.9 bags	(70.2 - 132.1') 123 bags (17%) Note: Puregold Medium Chips
111					(101.8 - 121.8') 18.0" Borehole		
112							
113							
114	IRZ-21-VAS-112-117 (< 0.17 U ppb) 12/16/2018 14:47						
115							
116							
117							
118		Topock - Alluvium Deposits	SM				
119							
120					(119.5 - 120.5') Centralizer		

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Date Started:	06/05/2019	Surface Elevation:	498.7 ft amsl	Well ID: IRZ-21
Date Completed:	06/15/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2102688.4	Project: Final GW Remedy Phase 1
Driller Name:	Jon Martinez	Easting (NAD83):	7615817.1	Location: PG&E Topock, Needles, California
Drilling Asst:	E. Martinez / W. Saylor	Borehole Diameter:	18-24 inches	
Logger:	KK / AM / ER	Water Level Start:	45.75 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	11/16/2019	
Total Depth:	166.5 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
121		Topock - Alluvium Deposits	SM		(65.4 - 140.4') 10" Suregrip 17 Casing (101.8 - 121.8') 18.0" Borehole		
122							
123							
124		Topock - Alluvium Deposits	ML				
125							
126					(70.2 - 132.1') Bentonite seal chips	(70.2 - 132.1') 104.9 bags	(70.2 - 132.1') 123 bags (17%) Note: Puregold Medium Chips
127							
128		Topock - Alluvium Deposits	ML				
129							
130							
131		Topock - Alluvium Deposits	SM		(121.8 - 141.8') 18.0" Borehole		
132							
133					(132.1 - 133.1') #6 60 mesh sand	(132.1 - 133.1') 2.6	(132.1 - 133.1') 4 (54%) Note: Lapis Lustre Sand, used >20% of calculated volume due to potential voids forming during drilling
134	IRZ-21-VAS-132-137-EB (< 0.17 U ppb) 12/17/2018 17:24	Topock - Alluvium Deposits	GC				
135							
136							
137					(133.1 - 166.5') Cemex #1/20 MESH (20x40)	(133.1 - 166.5') 83.6 bags	(133.1 - 166.5') 89 bags (6%) Note: Lapis Lustre Sand
138		Topock - Alluvium Deposits	ML				
139							
140							

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Date Started:	06/05/2019	Surface Elevation:	498.7 ft amsl	Well ID: IRZ-21
Date Completed:	06/15/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2102688.4	Project: Final GW Remedy Phase 1
Driller Name:	Jon Martinez	Easting (NAD83):	7615817.1	Location: PG&E Topock, Needles, California
Drilling Asst:	E. Martinez / W. Saylor	Borehole Diameter:	18-24 inches	
Logger:	KK / AM / ER	Water Level Start:	45.75 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	11/16/2019	
Total Depth:	166.5 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
141							
142							
143		Topock - Alluvium Deposits	ML		(140.4 - 157.3') 10" 15-slot 316L SS Wire Wrap Screen		
144							
145							
146							
147							
148							
149	IRZ-21-VAS-147-152 (3600 ppb) 12/18/2018 10:07	Topock - Alluvium Deposits	SM		(121.8 - 141.8') 18.0" Borehole		
150					(133.1 - 166.5') Cemex #1/20 MESH (20x40)	(133.1 - 166.5') 83.6 bags	(133.1 - 166.5') 89 bags (6%) Note: Lapis Lustre Sand
151					(141.8 - 161.8') 18.0" Borehole		
152							
153							
154							
155		Topock - Weathered Bedrock - conglomerate	ML				
156							
157							
158							
159		Topock - Competent Bedrock - conglomerate					
160							








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Date Started: 06/05/2019	Surface Elevation: 498.7 ft amsl	Well ID: IRZ-21
Date Completed: 06/15/2019	Shallow Well Elevation: N/A	
Drilling Co.: Cascade	Deep Well Elevation: N/A	Client: PG&E
Drilling Method: Dual Rotary	Northing (NAD83): 2102688.4	Project: Final GW Remedy Phase 1
Driller Name: Jon Martinez	Easting (NAD83): 7615817.1	Location: PG&E Topock, Needles, California
Drilling Asst: E. Martinez / W. Saylor	Borehole Diameter: 18-24 inches	
Logger: KK / AM / ER	Water Level Start: 45.75 ft bgs	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: 11/16/2019	
Total Depth: 166.5 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
161		Topock - Competent Bedrock - conglomerate			(160.0 - 161.0') Centralizer	(141.8 - 161.8') 18.0" Borehole	(133.1 - 166.5') 83.6 bags	(133.1 - 166.5') 89 bags (6%) Note: Lapis Lustre Sand
162								
163					(157.3 - 163.0') Sump and End Cap			
164					(133.1 - 166.5') Cemex #1/20 MESH (20x40)	(161.8 - 166.5') 18.0" Borehole		
165								
166								
167					End of Boring at 166.5' bgs.			
168								
169								
170								
171								
172								
173								
174								
175								
176								
177								
178								
179								
180								







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Date Started:	12/15/2018	Surface Elevation:	498.7 ft amsl	Boring No.: <u>IRZ-21-Pilot</u>	
Date Completed:	12/19/2018	Northing (NAD83):	2102688.4		
Drilling Co.:	Cascade	Easting (NAD83):	7615817.1	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	166 ft bgs	Project:	Final Groundwater Remedy Phase
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	4-12 inches	Location:	1
Driller Name:	Steve Vasquez	Depth to First Water:	44.5 ft bgs	PG&E Topock, Needles, California	
Drilling Asst:	N. Dominguez/C. Alvarez	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Connor Mills	Sampling Interval:	Continuous		
Editor:	Sean McGrane	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	84			Topock - Fluvial Deposits	SP		(0.0 - 4.5') Topock - Fluvial Deposits; Poorly graded sand with gravel (SP); yellowish brown / moderate yellowish brown(10YR 5/4); very fine grained to medium grained, subangular to subround; some granules to very large pebbles, subangular to subround; trace silt; dry		(0.0 - 158.0') No water used
2									
3				Topock - Fluvial Deposits	GW		(4.5 - 11.5') Topock - Fluvial Deposits; Well graded gravel with sand (GW); brown (10YR 5/3); granules to very large pebbles, subangular to subround; some very fine to medium grained sand, angular to subround; trace cobbles, angular to subround; trace silt; dry		
4									
5									
6									
7	120			Topock - Fluvial Deposits	SP		(11.5 - 13.0') Topock - Fluvial Deposits; Poorly graded sand (SP); yellowish brown (10YR 5/6); very fine grained to fine grained, subangular to round; trace granules, angular to subround; trace silt; dry		
8									
9				Topock - Fluvial Deposits	GW		(13.0 - 16.0') Topock - Fluvial Deposits; Well graded gravel with sand (GW); yellowish brown / moderate yellowish brown(10YR 5/4); granules to very large pebbles, subangular to subround; some very fine to medium grained sand, subangular to subround; trace silt; dry		
10									
11	120			Topock - Fluvial Deposits	SP		(16.0 - 17.0') Topock - Fluvial Deposits; Poorly graded sand (SP); yellowish brown (10YR 5/6); very fine grained to fine grained, subangular to round; trace granules, angular to subround; trace cobbles, angular to subangular; trace silt; dry		
12									
13				Topock - Fluvial Deposits	SP		(17.0 - 19.0') Topock - Fluvial Deposits; Poorly graded sand with gravel (SP); yellowish brown / moderate yellowish brown(10YR 5/4); very fine grained to medium grained, subangular to subround; some granules to very large pebbles, subangular to subround; trace silt; dry		
14									
15	120			Topock - Fluvial Deposits	GM		(19.0 - 23.0') Topock - Fluvial Deposits; Silty gravel with sand (GM); light yellowish brown (10YR 6/4); granules to very large pebbles, angular to subround; little very fine to coarse grained		
16									


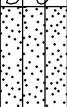
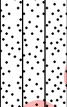
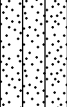

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Date Started:	<u>12/15/2018</u>	Surface Elevation:	<u>498.7 ft amsl</u>	Boring No.: <u>IRZ-21-Pilot</u>
Date Completed:	<u>12/19/2018</u>	Northing (NAD83):	<u>2102688.4</u>	
Drilling Co.:	<u>Cascade</u>	Easting (NAD83):	<u>7615817.1</u>	Client: <u>PG&E</u>
Drilling Method:	<u>Sonic Drilling</u>	Total Depth:	<u>166 ft bgs</u>	Project: <u>Final Groundwater Remedy Phase</u>
Drill Rig Type:	<u>Prosonic Truck Mount</u>	Borehole Diameter:	<u>4-12 inches</u>	Location: <u>1</u>
Driller Name:	<u>Steve Vasquez</u>	Depth to First Water:	<u>44.5 ft bgs</u>	<u>PG&E Topock, Needles, California</u>
Drilling Asst:	<u>N. Dominguez/C. Alvarez</u>	Sampling Method:	<u>4 inch x 10 ft Core Barrel</u>	Project Number: <u>RC000753.0051</u>
Logger:	<u>Connor Mills</u>	Sampling Interval:	<u>Continuous</u>	
Editor:	<u>Sean McGrane</u>	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	120			Topock - Fluvial Deposits	GM		sand, angular to subangular; little silt; trace boulders; dry		(0.0 - 158.0') No water used
22							(21'); one foot solid rock core from a boulder composed of basalt		
23				Topock - Fluvial Deposits	GM		(23.0 - 25.0') Topock - Fluvial Deposits; Silty gravel with sand (GM); light brownish gray / pale yellowish brown (10YR 6/2); granules to very large pebbles, subangular to subround; some silt; little very fine to very coarse grained sand, angular to subangular; trace boulders; dry; pulverized boulder from 23-24		
24							(25.0 - 34.5') Topock - Alluvium Deposits; Silty gravel with sand (GM); yellowish brown / moderate yellowish brown (10YR 5/4); granules to large pebbles, angular to subangular; some silt; little very fine to very coarse grained sand, angular to subangular; dry		
25	120			Topock - Alluvium Deposits	GM				
26									
27				Topock - Alluvium Deposits	GM				
28									
29	60			Topock - Alluvium Deposits	GM		(34.5 - 37.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); light reddish brown / light brown (5YR 6/4); granules to very large pebbles; some very fine to coarse grained sand, angular to subangular; little silt; dry		
30									
31				Topock - Alluvium Deposits	GM		(37.0 - 42.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); granules to very large pebbles, angular to subangular; some very fine to coarse grained sand, angular to subround; little silt; dry		
32									
33									
34									
35									
36									
37									
38									
39									
40									

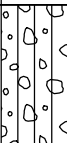

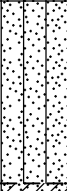

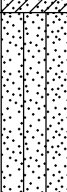


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Date Started:	12/15/2018	Surface Elevation:	498.7 ft amsl	Boring No.: <u>IRZ-21-Pilot</u>	
Date Completed:	12/19/2018	Northing (NAD83):	2102688.4		
Drilling Co.:	Cascade	Easting (NAD83):	7615817.1	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	166 ft bgs	Project:	Final Groundwater Remedy Phase
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	4-12 inches	Location:	1
Driller Name:	Steve Vasquez	Depth to First Water:	44.5 ft bgs	PG&E Topock, Needles, California	
Drilling Asst:	N. Dominguez/C. Alvarez	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Connor Mills	Sampling Interval:	Continuous		
Editor:	Sean McGrane	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			Topock - Alluvium Deposits	GM				(0.0 - 158.0') No water used
42				Topock - Alluvium Deposits	SM		(42.0 - 43.5') Topock - Alluvium Deposits; Silty sand (SM); yellowish brown / moderate yellowish brown (10YR 5/4); fine grained to very coarse grained, subangular to subround; little granules to medium pebbles, angular to subangular; little silt; dry		
43									
44	60						(43.5 - 52.0') Topock - Alluvium Deposits; Silty sand (SM); light yellowish brown (10YR 6/4); fine grained to very coarse grained, angular to subround; some silt; little granules to large pebbles, angular to subround; little clay; moist	(44.5') Approximate depth of water table	
45		IRZ-21-SS-43-48 12/19/2018 08:35					(44.5'); wet		
46									
47									
48				Topock - Alluvium Deposits	SM				
49									
50		IRZ-21-SS-48-53 12/19/2018 08:40							
51									
52	120								
53							(52.0 - 57.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); light yellowish brown (10YR 6/4); no plasticity; some very fine to very coarse grained sand grained sand, angular to subangular; some silt; little granules to small pebbles, angular to subangular; little clay; wet		
54		IRZ-21-SS-52-57 12/19/2018 08:45	IRZ-21-VAS-52-57 (97 ppb) 12/15/2018 14:14	Topock - Alluvium Deposits	SM				
55									
56									
57									
58	108	IRZ-21-SS-57-62 12/19/2018 08:50		Topock - Alluvium Deposits	ML		(57.0 - 62.0') Topock - Alluvium Deposits; Gravelly silt with sand (ML); yellowish brown / moderate yellowish brown (10YR 5/4); no plasticity; some granules to very large pebbles, angular to subangular; little very fine to coarse grained sand, angular to subangular; little clay; wet		
59									
60									

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Date Started:	12/15/2018	Surface Elevation:	498.7 ft amsl	Boring No.: <u>IRZ-21-Pilot</u>	
Date Completed:	12/19/2018	Northing (NAD83):	2102688.4		
Drilling Co.:	Cascade	Easting (NAD83):	7615817.1	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	166 ft bgs	Project:	Final Groundwater Remedy Phase
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	4-12 inches	Location:	1
Driller Name:	Steve Vasquez	Depth to First Water:	44.5 ft bgs	PG&E Topock, Needles, California	
Drilling Asst:	N. Dominguez/C. Alvarez	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Connor Mills	Sampling Interval:	Continuous		
Editor:	Sean McGrane	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	108	IRZ-21-SS-57-62 12/19/2018 08:50		Topock - Alluvium Deposits	ML				(0.0 - 158.0') No water used
62		IRZ-21-SS-62-67 12/19/2018 08:55		Topock - Alluvium Deposits	SM		(62.0 - 64.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 5/3); very fine grained to very coarse grained, angular to subangular; some granules to very large pebbles, angular to subangular; some silt; wet; @ 64.5 ft bgs trace small cobbles of weathered metadiorite		
63				Topock - Alluvium Deposits	SM		(64.5 - 67.0') Topock - Alluvium Deposits; Silty sand (SM); brown (10YR 5/3); fine grained to very coarse grained, subround to round; some silt; little granules to small pebbles, angular to subround; wet		
64									
65				IRZ-21-SS-67-72 12/19/2018 09:00	Topock - Alluvium Deposits	SC			
66									
67									
68	108	IRZ-21-SS-72-77 12/19/2018 09:05		Topock - Alluvium Deposits	SM		(74.5 - 82.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown(5YR 4/4); fine grained to very coarse grained, angular to subround; some granules to very large pebbles, angular to subangular; some silt; wet; trace very large pebbles		
69									
70									
71		IRZ-21-SS-77-82 12/19/2018 09:10		IRZ-21-VAS-77-82 (1.1 ppb) 12/16/2018 09:25	Topock - Alluvium Deposits	SM			
72									
73									
74	120			Topock - Alluvium Deposits	SM				
75									
76									
77									
78									
79									
80									

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Date Started:	12/15/2018	Surface Elevation:	498.7 ft amsl	Boring No.: <u>IRZ-21-Pilot</u>	
Date Completed:	12/19/2018	Northing (NAD83):	2102688.4		
Drilling Co.:	Cascade	Easting (NAD83):	7615817.1	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	166 ft bgs	Project:	Final Groundwater Remedy Phase
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	4-12 inches	Location:	1
Driller Name:	Steve Vasquez	Depth to First Water:	44.5 ft bgs	PG&E Topock, Needles, California	
Drilling Asst:	N. Dominguez/C. Alvarez	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Connor Mills	Sampling Interval:	Continuous		
Editor:	Sean McGrane	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		IRZ-21-SS-77-82 12/19/2018 09:10	IRZ-21-VAS-77-82 (1.1 ppb) 12/16/2018 09:25	Topock - Alluvium Deposits	SM				(0.0 - 158.0') No water used
82									
83	120						(82.0 - 87.0') Topock - Alluvium Deposits; Sandy silt with gravel (ML); brown (7.5YR 5/4); no plasticity; some clay; little granules to large pebbles, angular to subangular; little very fine to medium grained sand, angular to subangular; trace boulders, angular to subangular; dry to moist; tightly packed		
84		IRZ-21-SS-82-87 12/19/2018 09:15		Topock - Alluvium Deposits	ML				
85									
86									
87							(86.6'); trace 4 inch boulder fragment		
88									
89		IRZ-21-SS-87-92 12/19/2018 09:20		Topock - Alluvium Deposits	SM		(87.0 - 89.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown (5YR 5/4); very fine grained to very coarse grained, subangular to subround; some silt; little medium to very large pebbles, angular to subangular; little clay; wet		
90									
91									
92	120								
93									
94		IRZ-21-SS-92-97 12/19/2018 09:25		Topock - Alluvium Deposits	SM		(89.5 - 92.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown (5YR 5/4); very fine grained to very coarse grained, subangular to subround; some medium to very large pebbles, angular to subangular; little silt; little clay; wet		
95									
96									
97									
98	120	IRZ-21-SS-97-102 12/19/2018 09:30		Topock - Alluvium Deposits	SM		(92.0 - 97.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown (5YR 5/4); very fine grained to very coarse grained, angular to subangular; some granules to large pebbles, angular; some silt; little clay; wet		
99									
100							(97.0 - 117.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown(5YR 4/4); very fine grained to very coarse grained, angular to subround; some small to large pebbles, angular to subangular; some silt; wet; composed of metadiorite		

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Date Started:	12/15/2018	Surface Elevation:	498.7 ft amsl	Boring No.: <u>IRZ-21-Pilot</u>	
Date Completed:	12/19/2018	Northing (NAD83):	2102688.4		
Drilling Co.:	Cascade	Easting (NAD83):	7615817.1	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	166 ft bgs	Project:	Final Groundwater Remedy Phase
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	4-12 inches	Location:	1
Driller Name:	Steve Vasquez	Depth to First Water:	44.5 ft bgs	PG&E Topock, Needles, California	
Drilling Asst:	N. Dominguez/C. Alvarez	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Connor Mills	Sampling Interval:	Continuous		
Editor:	Sean McGrane	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		IRZ-21-SS-97-102 12/19/2018 09:30							(0.0 - 158.0') No water used
102									
103	120								
104		IRZ-21-SS-102-107 12/19/2018 09:35							
105									
106									
107									
108									
109		IRZ-21-SS-107-112 12/19/2018 09:40		Topock - Alluvium Deposits	SM				
110									
111									
112	120						(111.5'); trace cobbles		
113									
114		IRZ-21-SS-112-117 12/19/2018 09:45	IRZ-21-VAS-112-117 (< 0.17 U ppb) 12/16/2018 14:47						
115									
116									
117									
118	120	IRZ-21-SS-117-122 12/19/2018 09:50		Topock - Alluvium Deposits	SM		(117.0 - 121.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown(5YR 4/4); very fine grained to very coarse grained, subangular to round; little small to large pebbles, angular; little silt; little clay; wet; gravel composed of metadiorite		
119									
120									

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Date Started:	12/15/2018	Surface Elevation:	498.7 ft amsl	Boring No.: IRZ-21-Pilot	
Date Completed:	12/19/2018	Northing (NAD83):	2102688.4		
Drilling Co.:	Cascade	Easting (NAD83):	7615817.1	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	166 ft bgs	Project:	Final Groundwater Remedy Phase
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	4-12 inches	Location:	1
Driller Name:	Steve Vasquez	Depth to First Water:	44.5 ft bgs	PG&E Topock, Needles, California	
Drilling Asst:	N. Dominguez/C. Alvarez	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number: RC000753.0051	
Logger:	Connor Mills	Sampling Interval:	Continuous		
Editor:	Sean McGrane	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	IRZ-21-SS-117-122 12/19/2018 09:50		Topock - Alluvium Deposits	SM		(121.0 - 127.0') Topock - Alluvium Deposits; Silt with sand (ML); yellowish red (5YR 4/6); low plasticity; some clay; little granules to medium pebbles, angular to subangular; little very fine to very coarse grained sand, angular to subround; wet; gravel composed of metadiorite		(0.0 - 158.0') No water used
122									
123									
124		IRZ-21-SS-122-127 12/19/2018 09:55		Topock - Alluvium Deposits	ML				
125									
126	1644								
127									
128				Topock - Alluvium Deposits	ML		(127.0 - 129.5') Topock - Alluvium Deposits; Sandy silt (ML); reddish brown (5YR 5/4); low plasticity; little granules to large pebbles, angular to subangular; little very fine to very coarse grained sand, angular to subround; wet; gravel composed of metadiorite		
129		IRZ-21-SS-127-132 12/19/2018 10:00							
130				Topock - Alluvium Deposits	SM		(129.5 - 132.0') Topock - Alluvium Deposits; Silty sand (SM); reddish brown (5YR 5/4); very fine grained to very coarse grained, angular to subangular; and silt; little granules to medium pebbles, angular to subangular; wet; gravel composed of metadiorite		
131	120								
132									
133		IRZ-21-SS-132-137 12/19/2018 10:05	IRZ-21-VAS-132-137 (< 0.17 U ppb) 12/17/2018 11:12	Topock - Alluvium Deposits	GC		(132.0 - 136.0') Topock - Alluvium Deposits; Clayey gravel with sand (GC); reddish brown (5YR 5/4); granules to large pebbles, angular to subangular; some clay; little very fine to very coarse grained sand, angular to subangular; little silt; wet; gravel composed of metadiorite		
134									
135									
136	120								
137									
138		IRZ-21-SS-137-142 12/19/2018 10:10		Topock - Alluvium Deposits	ML		(136.0 - 146.0') Topock - Alluvium Deposits; Sandy silt (ML); reddish brown (5YR 5/4); no plasticity; some clay; little granules to medium pebbles, angular to subangular; little very fine to very coarse grained sand, angular to subangular; moist; gravel composed of metadiorite		
139									
140									

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Date Started:	12/15/2018	Surface Elevation:	498.7 ft amsl	Boring No.: <u>IRZ-21-Pilot</u>	
Date Completed:	12/19/2018	Northing (NAD83):	2102688.4		
Drilling Co.:	Cascade	Easting (NAD83):	7615817.1	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	166 ft bgs	Project:	Final Groundwater Remedy Phase
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	4-12 inches	Location:	1
Driller Name:	Steve Vasquez	Depth to First Water:	44.5 ft bgs	PG&E Topock, Needles, California	
Drilling Asst:	N. Dominguez/C. Alvarez	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Connor Mills	Sampling Interval:	Continuous		
Editor:	Sean McGrane	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	120	IRZ-21-SS-137-142 12/19/2018 10:10		Topock - Alluvium Deposits	ML				(0.0 - 158.0') No water used
142									
143									
144									
145	54	IRZ-21-SS-142-147 12/19/2018 10:15		Topock - Alluvium Deposits	SM		(146.0 - 153.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown (5YR 4/4); fine grained to very coarse grained, subangular to round; some silt; little granule to medium pebble, subangular to subround; wet; gravel composed of metadiorite		
146									
147									
148									
149	102	IRZ-21-SS-147-152 12/19/2018 10:20	IRZ-21-VAS-147-152 (3600 ppb) 12/18/2018 10:07	Topock - Alluvium Deposits	SM				
150									
151									
152									
153	102	IRZ-21-SS-152-158 12/19/2018 10:25		Topock - Weathered Bedrock - conglomerate	ML		(153.0 - 158.0') Topock - Weathered Bedrock - conglomerate; Sandy silt (ML); yellowish red (5YR 4/6); no plasticity; some very fine to very coarse grained sand, angular to subround; little granule to large pebble, subangular to subround; dry to moist; gravel composed of metadiorite, some metadiorite has iron oxidation		
154									
155									
156									
157	102			Topock - Competent Bedrock - conglomerate			(158.0 - 166.0') Topock - Competent Bedrock - conglomerate; red (2.5YR 5/6); dry; friable	(158.0 - 161.0') Rough drilling encountered bedrock at approximately 158 feet bgs	
158									
159									
160									

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Date Started:	12/15/2018	Surface Elevation:	498.7 ft amsl	Boring No.: IRZ-21-Pilot	
Date Completed:	12/19/2018	Northing (NAD83):	2102688.4		
Drilling Co.:	Cascade	Easting (NAD83):	7615817.1	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	166 ft bgs	Project:	Final Groundwater Remedy Phase
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	4-12 inches	Location:	1
Driller Name:	Steve Vasquez	Depth to First Water:	44.5 ft bgs	PG&E Topock, Needles, California	
Drilling Asst:	N. Dominguez/C. Alvarez	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number: RC000753.0051	
Logger:	Connor Mills	Sampling Interval:	Continuous		
Editor:	Sean McGrane	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	102								
162									
163				Topock - Competent Bedrock - conglomerate				(161.0 - 166.0') Rough drilling drilled an additional 5 feet to confirm bedrock	
164	60								
165									
166									
167									
168									
169									
170									
171									
172									
173									
174									
175									
176									
177									
178									
179									
180									

End of Boring at 166.0 'bgs.

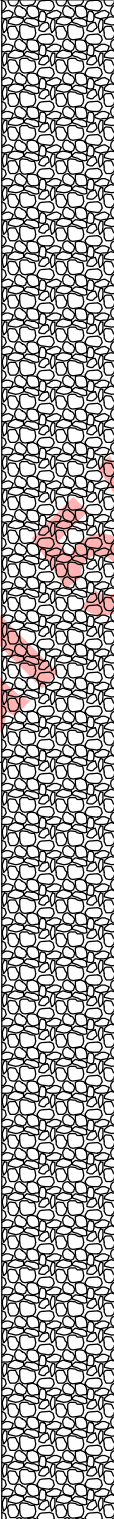
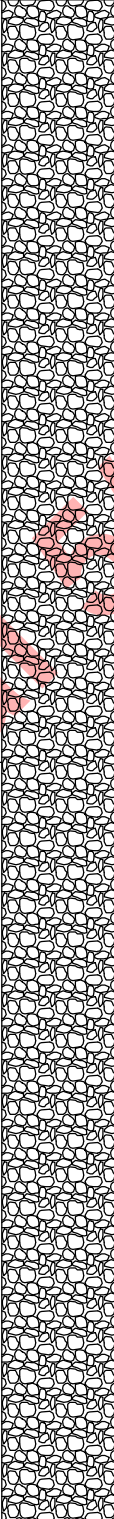
Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, blue water table symbol represents depth to water measured during the first VAS interval

Date Started:	12/15/2018	Surface Elevation:	498.7 ft amsl	Well ID: IRZ-21-Pilot
Date Completed:	12/19/2018	Northing (NAD83):	2102688.4	
Drilling Co.:	Cascade	Easting (NAD83):	7615817.1	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	166 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Steve Vasquez	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	N. Dominguez/C. Alvarez	Depth to First Water:	44.5 ft bgs	
Logger:	Connor Mills	Editor:	Sean McGrane	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction		Calculated Material Volumes	Material Volumes Installed			
1		Topock - Fluvial Deposits	SP		(0.0 - 0.5') Temporary Steel Plate with BMP		(0.0 - 0.5') 1	(0.0 - 0.5') 1 (0%)			
2											
3								(0.5 - 5.0') Cemex # 2/12 Mesh (16x30)	(0.0 - 5.0') 12" Borehole	(0.5 - 5.0') 7.9 bags	(0.5 - 5.0') 7 bags (-11%) Note: Lapis Lustre Sand
4											
5		Topock - Fluvial Deposits	GW								
6											
7											
8											
9		Topock - Fluvial Deposits	SP								
10											
11											
12											
13		Topock - Fluvial Deposits	GW		(5.0 - 156.0') Pea Gravel	(5.0 - 156.0') 6" Borehole	(5.0 - 156.0') 63.3 bags	(5.0 - 156.0') 61 bags (-4%) Note: Cal-silica 3/8" x 1/4"			
14											
15											
16											
17		Topock - Fluvial Deposits	SP								
18											
19											
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, blue water table symbol represents depth to water measured during the first VAS interval Note: Granule backfill material will be excavated from the pilot borehole during drilling for the construction of the well.

Date Started:	12/15/2018	Surface Elevation:	498.7 ft amsl	Well ID: IRZ-21-Pilot
Date Completed:	12/19/2018	Northing (NAD83):	2102688.4	
Drilling Co.:	Cascade	Easting (NAD83):	7615817.1	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	166 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Steve Vasquez	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	N. Dominguez/C. Alvarez	Depth to First Water:	44.5 ft bgs	
Logger:	Connor Mills	Editor:	Sean McGrane	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction		Calculated Material Volumes	Material Volumes Installed
21		Topock - Fluvial Deposits	GM					
22								
23								
24		Topock - Fluvial Deposits	GM					
25								
26								
27								
28								
29								
30		Topock - Alluvium Deposits	GM					
31							(5.0 - 156.0') 63.3 bags	(5.0 - 156.0') 61 bags (-4%) Note: Cal-silica 3/8" x 1/4"
32								
33								
34								
35								
36		Topock - Alluvium Deposits	GM					
37								
38								
39		Topock - Alluvium Deposits	GM					
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, blue water table symbol represents depth to water measured during the first VAS interval Note: Granule backfill material will be excavated from the pilot borehole during drilling for the construction of the well.

Temporary Backfill Log

Date Started:	12/15/2018	Surface Elevation:	498.7 ft amsl	Well ID: IRZ-21-Pilot
Date Completed:	12/19/2018	Northing (NAD83):	2102688.4	
Drilling Co.:	Cascade	Easting (NAD83):	7615817.1	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	166 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Steve Vasquez	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	N. Dominguez/C. Alvarez	Depth to First Water:	44.5 ft bgs	
Logger:	Connor Mills	Editor:	Sean McGrane	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
41		Topock - Alluvium Deposits	GM				
42		Topock - Alluvium Deposits	SM				
43							
44							
45							
46							
47							
48		Topock - Alluvium Deposits	SM				
49							
50					(5.0 - 156.0') Pea Gravel	(5.0 - 156.0') 6" Borehole	(5.0 - 156.0') 63.3 bags
51							
52							
53							
54	IRZ-21-VAS-52-57 (97 ppb) 12/15/2018 14:14	Topock - Alluvium Deposits	SM				
55							
56							
57							
58		Topock - Alluvium Deposits	ML				
59							
60							

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Date Started:	12/15/2018	Surface Elevation:	498.7 ft amsl	Well ID: IRZ-21-Pilot
Date Completed:	12/19/2018	Northing (NAD83):	2102688.4	
Drilling Co.:	Cascade	Easting (NAD83):	7615817.1	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	166 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Steve Vasquez	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	N. Dominguez/C. Alvarez	Depth to First Water:	44.5 ft bgs	
Logger:	Connor Mills	Editor:	Sean McGrane	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
61		Topock - Alluvium Deposits	ML				
62							
63		Topock - Alluvium Deposits	SM				
64							
65		Topock - Alluvium Deposits	SM				
66							
67							
68							
69							
70		Topock - Alluvium Deposits	SC		(5.0 - 156.0') Pea Gravel	(5.0 - 156.0') 6" Borehole	(5.0 - 156.0') 63.3 bags
71							(5.0 - 156.0') 61 bags (-4%) Note: Cal-silica 3/8" x 1/4"
72							
73							
74							
75							
76							
77		Topock - Alluvium Deposits	SM				
78	IRZ-21-VAS-77-82 (1.1 ppb) 12/16/2018 09:25						
79							
80							

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Date Started:	12/15/2018	Surface Elevation:	498.7 ft amsl	Well ID: IRZ-21-Pilot
Date Completed:	12/19/2018	Northing (NAD83):	2102688.4	
Drilling Co.:	Cascade	Easting (NAD83):	7615817.1	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	166 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Steve Vasquez	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	N. Dominguez/C. Alvarez	Depth to First Water:	44.5 ft bgs	
Logger:	Connor Mills	Editor:	Sean McGrane	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction		Calculated Material Volumes	Material Volumes Installed
81	IRZ-21-VAS-77-82 (1.1 ppb) 12/16/2018 09:25	Topock - Alluvium Deposits	SM				(5.0 - 156.0') 63.3 bags	(5.0 - 156.0') 61 bags (-4%) Note: Cal-silica 3/8" x 1/4"
82								
83								
84								
85								
86		Topock - Alluvium Deposits	ML					
87								
88		Topock - Alluvium Deposits	SM					
89								
90		Topock - Alluvium Deposits	SM					
91								
92								
93		Topock - Alluvium Deposits	SM					
94								
95								
96								
97								
98		Topock - Alluvium Deposits	SM					
99								
100								

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Date Started:	12/15/2018	Surface Elevation:	498.7 ft amsl	Well ID: IRZ-21-Pilot
Date Completed:	12/19/2018	Northing (NAD83):	2102688.4	
Drilling Co.:	Cascade	Easting (NAD83):	7615817.1	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	166 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Steve Vasquez	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	N. Dominguez/C. Alvarez	Depth to First Water:	44.5 ft bgs	
Logger:	Connor Mills	Editor:	Sean McGrane	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
101							
102							
103							
104							
105							
106							
107							
108							
109		Topock - Alluvium Deposits	SM				
110					(5.0 - 156.0') Pea Gravel	(5.0 - 156.0') 6" Borehole	(5.0 - 156.0') 63.3 bags
111							
112							
113							
114	IRZ-21-VAS-112-117 (< 0.17 U ppb) 12/16/2018 14:47						
115							
116							
117							
118		Topock - Alluvium Deposits	SM				
119							
120							

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Temporary Backfill Log

Date Started:	12/15/2018	Surface Elevation:	498.7 ft amsl	Well ID: IRZ-21-Pilot
Date Completed:	12/19/2018	Northing (NAD83):	2102688.4	
Drilling Co.:	Cascade	Easting (NAD83):	7615817.1	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	166 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Steve Vasquez	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	N. Dominguez/C. Alvarez	Depth to First Water:	44.5 ft bgs	
Logger:	Connor Mills	Editor:	Sean McGrane	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
121		Topock - Alluvium Deposits	SM				
122							
123							
124		Topock - Alluvium Deposits	ML				
125							
126							
127							
128		Topock - Alluvium Deposits	ML				
129							
130		Topock - Alluvium Deposits	SM		(5.0 - 156.0') Pea Gravel	(5.0 - 156.0') 63.3 bags	(5.0 - 156.0') 61 bags (-4%) Note: Cal-silica 3/8" x 1/4"
131							
132							
133							
134	IRZ-21-VAS-132-137 (< 0.17 U ppb) 12/17/2018 11:12	Topock - Alluvium Deposits	GC				
135							
136							
137							
138		Topock - Alluvium Deposits	ML				
139							
140							

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Date Started:	12/15/2018	Surface Elevation:	498.7 ft amsl	Well ID: IRZ-21-Pilot
Date Completed:	12/19/2018	Northing (NAD83):	2102688.4	
Drilling Co.:	Cascade	Easting (NAD83):	7615817.1	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	166 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Steve Vasquez	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	N. Dominguez/C. Alvarez	Depth to First Water:	44.5 ft bgs	
Logger:	Connor Mills	Editor:	Sean McGrane	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
141							
142							
143		Topock - Alluvium Deposits	ML				
144							
145							
146							
147							
148	IRZ-21-VAS-147-152 (3600 ppb) 12/18/2018 10:07						
149		Topock - Alluvium Deposits	SM		(5.0 - 156.0') Pea Gravel	(5.0 - 156.0') 6" Borehole	(5.0 - 156.0') 63.3 bags
150							(5.0 - 156.0') 61 bags (-4%) Note: Cal-silica 3/8" x 1/4"
151							
152							
153							
154							
155		Topock - Weathered Bedrock - conglomerate	ML				
156							
157							
158					(156.0 - 166.0') Cemex # 2/12 Mesh (16x30)	(156.0 - 166.0') 4" Borehole	(156.0 - 166.0') 2.8 bags
159		Topock - Competent Bedrock - conglomerate					(156.0 - 166.0') 3 bags (7%) Note: Lapis Lustre Sand
160							

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Date Started:	12/15/2018	Surface Elevation:	498.7 ft amsl	Well ID: IRZ-21-Pilot
Date Completed:	12/19/2018	Northing (NAD83):	2102688.4	
Drilling Co.:	Cascade	Easting (NAD83):	7615817.1	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	166 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Steve Vasquez	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	N. Dominguez/C. Alvarez	Depth to First Water:	44.5 ft bgs	
Logger:	Connor Mills	Editor:	Sean McGrane	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction			Calculated Material Volumes	Material Volumes Installed
161									
162									
163		Topock - Competent Bedrock - conglomerate			(156.0 - 166.0') Cemex # 2/12 Mesh (16x30)	(156.0 - 166.0') 4" Borehole		(156.0 - 166.0') 2.8 bags	(156.0 - 166.0') 3 bags (7%) Note: Lapis Lustre Sand
164									
165									
166									
167									
168									
169									
170									
171									
172									
173									
174									
175									
176									
177									
178									
179									
180									

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