ARCA	DIS built asset	Consultancy al and ts		Well Consti	ruction Log	;	Sheet: 1 of 9
Date Started:	05/12/2019			_Surface Elevation:	500.4 ft amsl	Well ID: IR	Z-25
Date Completed				_Shallow Well Elevation:	N/A		_
Drilling Co.:	Cascade			_ Deep Well Elevation:	N/A	Client: PG&I	
Drilling Method:	Dual Rotary			_Northing (NAD83):	2102414.6		GW Remedy Phase 1
Driller Name: Drilling Asst:	Jon Martinez E. Martinez / Y	M Sayl	ore	_Easting (NAD83): _Borehole Diameter:	7615824.5 15.5-18 inches	Location: PG&L	E Topock, Needles, California
Logger:	D Cornell / K.	-	015	Boreriole Diameter. Water Level Start:	44.95 ft bgs	— Project Numbe	r: <u>RC000753.0051</u>
Editor:	Sean McGrar			Development End Date:		r roject rumbe	1. 11. 11. 11. 11. 11. 11. 11. 11. 11.
Total Depth:	174 ft bgs			Well Completion:			
	o 5			·	•		
Groundwa Sample I		Code	USCS Class		onstruction	Calculated Material Volumes	Material Volumes Installed
	Topock - Fluvial Deposits	SP-SM		(0.0 - 50.1') 10" Suregrip 17 Casing (0.0 - 4.0') Cemex #0/30 MESH		(0.0 - 4.0') 9 bags	(0.0 - 4.0') 17 bags (89%) Note: Lapis Lustre Sand, used >20% of the calculated volume due to potentialvoids forming during drilling
	Topock - Fluvial Deposits	SP-SM		(4.0 - 31.1') Grout	(0.0 - 21.2') 18.0" Borehole	(4.0 - 31.1') 211.4	(4.0 - 31.1') 413 gallons (95%) Note: Type I, II, and V 3% Benseal, grout not tagged will be tagged in morning, used > 20% of the
13	Topock - Fluvial Deposits	SW-SM				gallons	calculated volume due to potentail grout migration and voids forming during drilling
18	Topock - Fluvial Deposits	SM					and level. CW = groundwater

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, groundwater data was collected during drilling of the pilot borehole

Date Completed: 05/29/2019 Shallow Well Elevation: N/A Drilling Co.: Cascade Deep Well Elevation: N/A Drilling Method: Dual Rotary Northing (NAD83): 2102414.6 Project: Final GW Remedy Phase 1 Driller Name: Jon Martinez Easting (NAD83): 7615824.5 Location: PG&E Topock, Needles, California Drilling Asst: E. Martinez / W. Saylors Borehole Diameter: 15.5-18 inches Logger: D Cornell / K. Keon Water Level Start: 44.95 ft bgs Project Number: RC000753.0051 Editor: Sean McGrane Development End Date: 10/1/2019	ARC	AL	ols built asset	l and ts		Well Const	ruction Log	:	Sheet: 2 of 9	
Dilling Notes Dilling Note	Date Started:							Well ID: IR	Z-25	
Deling Member Dutal Rotary Northing (NAD93) 2102414.6 Project Final GW Remedy Phase 1	-									
Driller Name: Driller Name	_									
Deling Ast E. Matrinez / W. Saylors Borehole Diameter 15.5.18 inches Logger December Material Victoria Deling Ast San McGrare Development End Date 100/12/03 Development Dev	_		-			- ', ,				
D_Committed				N Sav	lors	- , ,		Location. PG&E Topock, Needles, Callionia		
Development End Date 10/1/2019 Total Depth 174 ft bgs	_			-	1010			Proiect Numbe	er: RC000753.0051	
Concorderator	Editor:									
SM SM Surregipt 17 Casing Surregipt 17 Casing Co 50.17 16.7 Co	Total Depth:					· ·				
21	Ground Sampl		Geologic Formation	USCS	USCS Class	Well C	onstruction			
32	22		Fluvial			Suregrip 17 Casing	(21.2 - 30.0') 18.0" Borehole		Note: Type I, II, and V 3% Benseal, grout not tagged will be tagged in morning, used > 20% of the calculated volume due to potentail grout migration and voids forming	
			Fluvial	SM		(31.1 - 35.1') Bentonite seal chips (35.1 - 45.0') Cemex Bunker #6 60 Mesh		(35.1 - 45.0') 16.6	Note: Puregold Medium Chips, bentonite installed because of concerns with grout migration due potential large void from 29 to 32 ft. bgs, used >20% of the calculated volume due to potential voids forming during drilling (35.1 - 45.0') 51 bags (207%) Note: Lapis Lustre Sand, used >20% of the claulated volume due to	
Approximation of the State Initial Soil Classification System the toot has a hologramound ourteen amal a characteristic for the energy of the	Abbrovictions	LIC	26 - H2:4:24	Scil (2)	1. : : 200 fine	tion System ft - fact bar	- bolow ground surface	mel = chave mass	soa lovol CM = groundwater	

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater by be possible problems. Used = parts per billion, U = not detected above the laboratory reporting limit, groundwater data was collected during drilling of the pilot borehole.

## Bunker ## 60 Mesh Lapis Lustre Sand ## 1	ARCA	DIS Design & Consultancy for natural and built assets	Well Const	ruction Log	\$	Sheet: 3 of 9	
Drilling Method: Drilling Method: Dual Rotary Drilling Method: Dual Rotary Northing (NAD83): Drilling Asst: Location: PG&E Topock. Needles, Cal Drilling Asst: Logger: Drilling Asst: Logger: Documel K. Keon Water Level Start: Sean McGrane Development End Date: Dovelopment End Date: Dov					Well ID: IR	Z-25	
Driller Marriez Driller Name:	•						
Driller Asset: Driller Asset: Driller Asset: Development End Date: Cogger: Development End Date: Control IV. Keon Well Construction Calculated Material Volumes Installed Calculated Material Volumes Installed Calculated Material Volumes Installed (41.0 - 48.07) 16.07 Borehole Control IV. Control Deposits Topock-Floridal Deposits Topock-	-		-				
Defining Asst: E. Martinez / W. Saylors Borrehole Diameter: 15.5-18 inches	-	•	<u> </u>		•	-	
Content Con			,		Location: <u>PG&E</u>	<u> Topock, Needles, California</u>	
Editor: Sean McGrane	-	·			Project Number: RC000753.0051		
Topock - Fluvial Deposits 174 ft bgs Well Completion: Flush Stick-up Stick-up					1 10,000114011150	1. 11.0000100.0001	
1							
1	_	ig o g					
1	Groundwate Sample ID	Code Code	Well C	onstruction			
43	41	Topock - GM	(0.0 - 50.1') 10" — % % % % % % % % % % % % % % % % % %				
Topock - Fluvial Deposits GW-GM Depo	43 - 44	Deposits	Bunker #6 60 Mesh — ႏွိႏွိ∘ို			(35.1 - 45.0') 51 bags (207%) Note: Lapis Lustre Sand, used >20% of the claulated volume due to potential voids forming during drilling	
Topock - Alluvium Deposits SM (50.1 - 67.1') 10" (10-slot 316 SS Wire Wrap Screen Size Size Size Size Size Size Size Size	46	Fluvial GW-GM					
- 53 - 54 - IRZ-25-VAS- 52-57 Topock - (3500 ppb) Alluvium GM 12/5/2018 Deposits (45.0 - 69.0') Cemex Bunker #11 (30x70) Lapis Lustre Sand (45.0 - 69.0') 36.5 bags of calculated volume due to voids forming during dri swabbed filter pack for approximately 1.5 hours pri installation of the bentonity of the	_ 51 <u>_</u> _	Alluvium SM	10-slot 316 SS Wire			(45.0 - 69.0') 200 bags (448%) Note: Lapis Lustre Sand, used >20%	
	54 — IRZ-25-VAS- 52-57 (3500 ppb) 12/5/2018 10:40 56 —	Topock - O O O O	Bunker #11 (30x70)			of calculated volume due to potential voids forming during drilling, swabbed filter pack for approximately 1.5 hours prior to the installation of the bentonite seal	
Topock - Alluvium Deposits ML	_ 58 _	Alluvium ML					
	60	GM 6					

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, groundwater data was collected during drilling of the pilot borehole

ARC	DIS Design & for natura built asse	Consultancy Il and ts		Well Const	ruction Log	:	Sheet: 4 of 9
Date Started:	05/12/2019			_Surface Elevation:	500.4 ft amsl	Well ID: IR	Z-25
Date Completed	05/29/2019			_Shallow Well Elevation:	N/A		
Drilling Co.:	Cascade			_Deep Well Elevation:	N/A	Client: PG&	
Drilling Method:	Dual Rotary			_Northing (NAD83):	2102414.6	•	GW Remedy Phase 1
Driller Name:	Jon Martinez		1	_Easting (NAD83):	7615824.5	Location: <u>PG&I</u>	E Topock, Needles, California
Drilling Asst:	E. Martinez / \\ D Cornell / K.	-	iors	_Borehole Diameter: Water Level Start:	15.5-18 inches 44.95 ft bgs	Project Number: <u>RC000753.0051</u>	
Logger: Editor:	Sean McGran			Development End Date: 10/1/2019		Froject Numbe	1. <u>NC000733.0031</u>
Total Depth:	174 ft bgs	ic		_Bevelopment End Bate. _Well Completion:			
'				'			
Groundwa Sample II		Code	USCS Class		onstruction	Calculated Material Volumes	Material Volumes Installed
6162636362-67620 ppb) 12/5/2018	Deposits	GM		(45.0 - 69.0') Cemex Bunker #11 (30x70) Lapis Lustre Sand (68.0 - 69.0') Centralizer	(43.0 - 61.5') 16.0" Borehole (67.1 - 77.1') 10" Suregrip 17 Casing	(45.0 - 69.0') 36.5 bags	(45.0 - 69.0') 200 bags (448%) Note: Lapis Lustre Sand, used >20% of calculated volume due to potential voids forming during drilling, swabbed filter pack for approximately 1.5 hours prior to the installation of the bentonite seal
	Topock - Alluvium Deposits	SM		(70.5 - 71.5') — Centralizer (69.0 - 74.0') Bentonite seal chips	(61.5 - 81.5') 16.0" Borehole	(69.0 - 74.0') 5.3 bags	(69.0 - 74.0') 28 bags (428%) Note: Puregold Medium Chips, used >20% of the calculated volume due to potential voids forming during drilling
	Topock - Alluvium Deposits	SM		(74.0 - 103.8') Cemex #3 Mesh (8x20)	— (77.1 - 100.0') 10" 30-slot 316 SS Wire Wrap Screen	(74.0 - 103.8') 45.3 bags	(74.0 - 103.8') 172 bags (280%) Note: Lapis Lustre Sand, used >20% of the calculated volume due to potential voids forming during drilling, filter pack was swabbed for approximately 30 minutes prior to installation of the bentonite seal
	Topock - Alluvium Deposits	SM		tion System # - foot has		mel – above meen	sea level, GW = groundwater,

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, groundwater data was collected during drilling of the pilot borehole

9/-	ARCA	DIS Design & for natura built asse	consultancy al and ts		Well Const	ruction Log	;	Sheet: 5 of 9
	Started:	05/12/2019			_Surface Elevation:	500.4 ft amsl	Well ID: IR	Z-25
	-	05/29/2019			_Shallow Well Elevation:	•		
Drilling		Cascade			_ Deep Well Elevation:	N/A	Client: PG&I	
Driller I		Dual Rotary Jon Martinez			_Northing (NAD83): _Easting (NAD83):	2102414.6 7615824.5	•	GW Remedy Phase 1 E Topock, Needles, California
Drilling		E. Martinez / \	W Sav	lors	Borehole Diameter:	15.5-18 inches	Location. <u>F Gxt</u>	_ Topock, Needles, Calliottia
Logge		D Cornell / K.	-	1013	Water Level Start:	44.95 ft bgs	Project Number: <u>RC000753.0051</u>	
Editor:		Sean McGrar			_ Development End Date:	_	r rojoce rearriso	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1
Total D		174 ft bgs			 Well Completion:			
		in P						
Depth (ft)	Groundwater Sample ID Scale Code S S S S S S S S S S S S S S S S S S S			USCS Class	Well Construction		Calculated Material Volumes	Material Volumes Installed
	IRZ-25-VAS 92-97 (130 ppb) 12/6/2018 09:07	Topock - Alluvium Deposits Topock - Alluvium Deposits	SM SM		(74.0 - 103.8°) Cemex #3 Mesh (8x20)	(81.5 - 101.5') 16.0" Borehole	(74.0 - 103.8') 45.3 bags	(74.0 - 103.8') 172 bags (280%) Note: Lapis Lustre Sand, used >20% of the calculated volume due to potential voids forming during drilling, filter pack was swabbed for approximately 30 minutes prior to installation of the bentonite seal
98 —		Topock - Alluvium Deposits	SW-SM					
100 Abbrev	viations: II	SCS = Unified	l Soil Cl	assifica	tion System ft = feet has	= below ground surface :	amsl = ahove mean	sea level. GW = groundwater.

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, groundwater data was collected during drilling of the pilot borehole

9/-	ARCA	DIS of built	gn & Consultancy eatural and tassets		Well Const	ruction Log	\$	Sheet: 6 of 9
Date S		05/12/2019			_Surface Elevation:	500.4 ft amsl	Well ID: IR	Z-25
I .	-	05/29/2019)		_Shallow Well Elevation:	N/A		
Drilling		Cascade			_ Deep Well Elevation:	N/A	Client: PG&E	
Driller I		Dual Rotary Jon Martine	•		_Northing (NAD83): _Easting (NAD83):	2102414.6 7615824.5	-	GW Remedy Phase 1 Topock, Needles, California
Drilling		E. Martinez		lors	Easting (NADos). Borehole Diameter:	15.5-18 inches	Location. <u>PG&E</u>	z Topock, Needles, Calliomia
Logge		D Cornell /	-	1010	Water Level Start:	44.95 ft bgs	Proiect Numbe	r: RC000753.0051
Editor:		Sean McG			_ _Development End Date:		, 	
Total D	Depth:	174 ft bgs			_Well Completion:			
Depth (ft)	Groundwat Sample ID		USCS Code	USCS Class	Well C	onstruction	Calculated Material Volumes	Material Volumes Installed
 101 102		Topock Alluviun Deposit	n SW-SM		(74.0 - 103.8') Cemex#3 Mesh	(81.5 - 101.5') 16.0" (81.5 - 101.5') 16.0" Borehole	(74.0 - 103.8') 45.3 bags	(74.0 - 103.8') 172 bags (280%) Note: Lapis Lustre Sand, used >20% of the calculated volume due to potential voids forming during
 103		Topock Alluviun Deposit	n ML		(8x20)		Days	drilling, filter pack was swabbed for approximately 30 minutes prior to installation of the bentonite seal
104 105 106 107 108 109		Topock Alluviun Deposit	n GM					
110111112113114115116117	IRZ-25-VAS 112-117 (< 0.17 U ppb) 12/11/2018 10:34		n SM		(103.8 - 126.0') Bentonite seal chips (114.5 - 115.5') Centralizer	(101.5 - 121.5') 16.0" Borehole	(103.8 - 126.0') 23.4 bags	(103.8 - 126.0') 34 bags (45%) Note: Puregold Medium Chips, used >20% of the calculated volume due to potential voids forming during drilling
118 118 119		Topock Alluviun Deposit	n SM					
120	<u> </u>		IVIL	<u>14:14:</u>			L	1

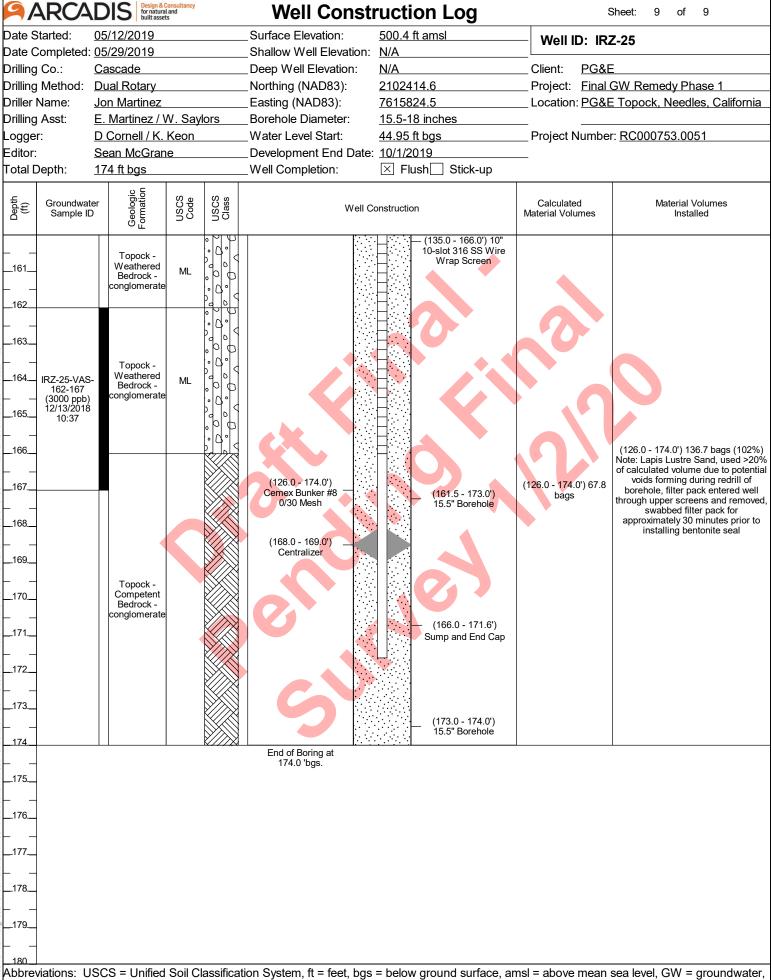
Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, groundwater data was collected during drilling of the pilot borehole

SA	RCA	DIS Design & for natura built asse	l and ts		Well Const	ruction Log	\$	Sheet: 7 of 9	
Date St		05/12/2019			_Surface Elevation:	500.4 ft amsl	Well ID: IR	Z-25	
		05/29/2019			_Shallow Well Elevation:	N/A		<u> </u>	
Drilling (Cascade Dual Rotary			Deep Well Elevation: Northing (NAD83):	N/A 2102414.6	Client: PG&E	= GW Remedy Phase 1	
Driller N		Jon Martinez			Resting (NAD83):	7615824.5	•	E Topock, Needles, California	
Drilling A		E. Martinez / \		lors	Borehole Diameter:	15.5-18 inches			
Logger:		D Cornell / K.	-		 Water Level Start:	44.95 ft bgs	Project Number: <u>RC000753.0051</u>		
Editor:		Sean McGrar	<u>1e</u>		Development End Date:				
Total De	epth:	174 ft bgs			Well Completion:				
Depth (ft)	Groundwat Sample ID		USCS	USCS Class	Well C	onstruction	Calculated Material Volumes	Material Volumes Installed	
121 122 123 124		Topock - Alluvium Deposits	ML		(103.8 - 126.0') — Bentonite seal chips	— (100.0 - 135.0') 10" Suregrip 17 Casing — (101.5 - 121.5') 16.0" Borehole	(103.8 - 126.0') 23.4 bags	(103.8 - 126.0') 34 bags (45%) Note: Puregold Medium Chips, used >20% of the calculated volume due to potential voids forming during drilling	
125 126 		Topock - Alluvium Deposits	SM						
128 129 130 131 132		Topock - Alluvium Deposits	GM			(121.5 - 141.5') 16.0" Borehole		(126.0 - 174.0') 136.7 bags (102%)	
133 134 135 136 		Topock - Alluvium Deposits	ML		(126.0 - 174.0') Cemex Bunker #8 0/30 Mesh	(135.0 - 166.0') 10" 10-slot 316 SS Wire Wrap Screen	(126.0 - 174.0') 67.8 bags	Note: Lapis Lustre Sand, used >20% of calculated volume due to potential voids forming during redrill of borehole, filter pack entered well through upper screens and removed, swabbed filter pack for approximately 30 minutes prior to installing bentonite seal	
138		Topock - Alluvium Deposits	ML						
_140		1	ML				1	and lovel CW = groundwater	

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, groundwater data was collected during drilling of the pilot borehole

ARCADIS of the state of the sta					Well Const	ruction Log	Sheet: 8 of 9		
	Started:	05/12/2019			_Surface Elevation:	500.4 ft amsl	Well ID: IR	Z-25	
	-	05/29/2019			_Shallow Well Elevation:	N/A			
Drilling		Cascade			_Deep Well Elevation:	N/A	Client: <u>PG&E</u>		
_		Dual Rotary			_Northing (NAD83):	2102414.6	Project: Final GW Remedy Phase 1		
	Name:	Jon Martinez		l = u =	_Easting (NAD83):	7615824.5	Location: PG&E Topock, Needles, California		
Drilling		E. Martinez / D Cornell / K.	-	iors	_Borehole Diameter: _Water Level Start:	15.5-18 inches 44.95 ft bgs	— Project Numbe	r: RC000753.0051	
Logge Editor:		Sean McGrai			vvaler Level Start. Development End Date:		Floject Numbe	1. <u>NC000733.0031</u>	
Total D		174 ft bgs	10		Well Completion: X Flush Stick-up				
	' 								
Depth (ft)	Groundwat Sample II		Code	USCS Class	Well C	onstruction	Calculated Material Volumes	Material Volumes Installed	
						(135.0 - 166.0') 10" 10-slot 316 SS Wire Wrap Screen			
141						wrap Screen			
142									
143		Topock -							
<u> </u>		Alluvium Deposits	ML						
144		Boposito							
145									
146						H			
146						H: (1			
 147									
14/						H			
 148									
140							•		
149	ID7 05 VAC							(126.0 - 174.0') 136.7 bags (102%)	
	1RZ-25-VAS 147-152	-				H		Note: Lapis Lustre Sand, used >20% of calculated volume due to potential	
150	(3600 ppb) 12/11/2018				(126.0 - 174.0')		(126.0 - 174.0') 67.8	voids forming during redrill of borehole, filter pack entered well	
	13:54				Cemex Bunker #8	FI. VI	bags	through upper screens and removed,	
151						(141.5 - 161.5') 16" Borehole		swabbed filter pack for approximately 30 minutes prior to	
								installing bentonite seal	
152		Topock - Alluvium	SM						
		Deposits	"						
153									
154									
L _									
155									
156									
<u> </u>									
157									
<u> </u>				600					
158		Topock -							
<u> </u>		Weathered Bedrock -	ML	[.4.]					
159		conglomerate	e						
<u> </u>						H:::			
160	viations: II		1 Soil C	PallolY	tion System ft - feet has	= below ground surface or	msl = ahove mean	sea level GW = groundwater	

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, groundwater data was collected during drilling of the pilot borehole



Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwate ppb = parts per billion, U = not detected above the laboratory reporting limit, groundwater data was collected during drilling of the pilot borehole

ARCA	DIS	esign & Consultan or natural and uilt assets	су	Drilling Log						Sheet:	1 of 9
Date Started:	04/26/20	19	Sı	urface Elevation:	50	00.4 ft a	amsl		Borin	ng No.: IRZ	7-25
Date Completed:	05/12/20	19	N	orthing (NAD83):	<u>2</u>	102414	l.6			ig 140 <u>ii u</u>	<u>20</u>
Drilling Co.:	Cascade	:	E	asting (NAD83):	76	315824	l.5		Client:	PG&E	
Drilling Method:	Dual Rot	ary	To	otal Depth:	17	74 ft bg	ıs		Project:	Final GW Re	medy Phase 1
Drill Rig Type:	Foremos	t DR-24	HDC	onductor Casing Diameter:	<u>18</u>	3 inche	s		Location	PG&E Topod	k, Needles, California
Driller Name:	Jon Mart			rill Casing Diameter:	<u>16</u>	3 inche	s		_		
Drilling Asst:	E. Martin	ez / W. S	<u>Saylors</u> D	rill Bit:	<u>15</u>	5.5 & 1	7.5 inc	<u>h Tri-cone</u>	Project N	lumber: RC00	0753.0051
Tool-Pusher:	Arnold L			epth to First Water:		3.4 ft bo			_		
Rig Geologist:	A. Mack	/ D Corn	ell C	onverted to Well:	×	Yes	No)			T
Depth Drilling Run		USCS	Casing	Description							
(ft) and Averag Penetration R	e Codo		Diameter	(See Pilot boring log for full geologic descriptions)				·	g Notes		Drilling Fluid
1	SP-SM SP-SM		(0.0 - 21.2') 18.0" Steel Casing	(0.0 - 4.5') Topock - Fluvial Deposits; Poorly graded sand wit silt and gravel (SP-SM) (4.5 - 12.0') Topock - Fluvial Deposits; Poorly graded sand wit silt (SP-SM); pale brown (10YR 6/3) (12.0 - 17.0') Topock - Fluvial Deposits; Well graded sand with silt and gravel (SW-SM); pale brown (10YR 6/3) (17.0 - 20.5') Topock - Fluvial Deposits; Silty sand with gravel (SM); brown (10YR 5/3)				ough drilling.	er.		(0.0 - 21.2') 845.46 gallons of water used; 615.18 gallons of water recovered; 230.28 gallons of water lost
20											
Abbreviations: US	SCS = Un	ified Soil	Classificati	on System, ft = feet, bgs =	bel	ow gro	und si	ırface, ams	sl = above	mean sea leve	I, GW = groundwater

Remarks: blue water table symbol represents depth to water measured during the first VAS interval of the pilot borehole

ARC		S Desi	ign & Consultani natural and t assets	cy	Drilling Log					Sheet:	2 of 9
Date Started:	04/	26/201	9	Sı	urface Elevation:	50	00.4 ft a	amsl	Borin	ng No.: IRZ	'-25
Date Completed	d: <u>05/</u>	12/201	9	N	orthing (NAD83):	21	102414	6	Dom	ig 110 <u>iitz</u>	<u>20</u>
Drilling Co.:	<u>Cas</u>	scade		E	asting (NAD83):	<u>76</u>	315824	5	Client:	PG&E	
Drilling Method:	<u>Dua</u>	al Rota	ry	To	otal Depth:	<u>17</u>	74 ft bg	S	Project:	Final GW Rer	nedy Phase 1
Drill Rig Type:	For	emost	DR-24	HDC	onductor Casing Diameter:	<u>18</u>	3 inche	<u>s</u>	Location:	PG&E Topoc	k, Needles, California
Driller Name:		<u>Martir</u>			rill Casing Diameter:		inche:				
Drilling Asst:				<u>Saylors</u> Di				7.5 inch Tri-cone	Project N	lumber: RC000	0753.0051
Tool-Pusher:		<u>ıold Laı</u>			epth to First Water:		3.4 ft bo				
Rig Geologist:	<u>A. I</u>	Mack /	D Corn	ell Co	onverted to Well:	×	Yes	No			
Depth Drilling	Run	USCS	USCS	Cooling	Description						
(ft) and Aver		Code	Class	Casing Diameter	(See Pilot boring log for full geologic descriptions)			Drilling	Notes		Drilling Fluid
		SM		(0.0 - 21.2')							
(0.0 - 21. 8.02 mins	2) - s/ft -			18.0" Steel	(20.5 - 32.0') Topock - Fluvial						
_21	,,,,			Casing	Deposits; Sandy silt with gravel (ML); light yellowish brown (10YF		(04.0	00.00 4.1			(04.0, 04.0), 4005.00
					6/4)		àdvanc	30.0') Advanced 9 ft d ement during 3rd hou	r. Volume of	waste water	(21.2 - 31.0') 1065.06 gallons of water used;
22								d from beginning to en be from backflow to cu			-121.6 gallons of water recovered; 1186.66
											gallons of water lost
23											
24											
25											
_ (21.2 - 30	.0)			(21.2 - 30.0') 18.0" Steel							
26 23.89 min	s/ft			Casing		1					
		ML				4					
27								•			
_28											
29											
30											
(30.0 - 31				(30.0 - 31.0') 18.0" Steel				31.0') Borehole only a on a boulder.	dvanced 1 fc	oot in 4 hrs, likely	
197.18 mii	ns/ft			Casing							(0.4.0
							(31.0 -	41.0') Drilled with wat	er.		(31.0 - 41.0') 1087.02 gallons of water used;
32											2478 gallons of water recovered; 1390.98
					(32.0 - 40.0') Topock - Fluvial Deposits; Silty sand with gravel						gallons of water gained
_33					(SM); pale brown (10YR 6/3)						
_34											
(31.0 - 41	.0)			(31.0 - 41.0')							
12.09 min				18.0" Steel Casing							
		SM									
37											
-3'-											
38											
39											
Abbreviations:	USCS	= Unif	ied Soil	Classificati	on System, ft = feet, bgs =	bel	ow aro	und surface. ams	l = above	mean sea level	GW = groundwater

Remarks: blue water table symbol represents depth to water measured during the first VAS interval of the pilot borehole

9/	ARCA					Drilling Log	Sheet: 3 of 9				
Date S	Started:	04/2	6/201	9	Sı	urface Elevation:	500.4 ft amsl	Borin	g No.: IR	7-25	
	Completed:	05/1	2/201	9	N	orthing (NAD83):	2102414.6		19 110 <u>II 1</u>	<u> </u>	
Drilling	Co.:	Caso	cade		E	asting (NAD83):	7615824.5	Client:	PG&E		
Drilling	Method:	<u>Dual</u>	l Rota	ry	To	otal Depth:	174 ft bgs	Project:	Final GW Re	emedy Phase 1	
Drill Ri	g Type:	Fore	most	DR-24	HDC	onductor Casing Diameter:	18 inches	Location:	PG&E Topo	ck, Needles, California	
Driller	Name:	<u>Jon</u>	Martir	nez	Dı	rill Casing Diameter:	16 inches	,			
Drilling	Asst:	<u>E. M</u>	lartine	z/W.	<u>Saylors</u> Di	rill Bit:	15.5 & 17.5 inch Tri-cone	Project N	lumber: RC0	00753.0051	
Tool-P	usher:	Arno	old La	mon	D	epth to First Water:	48.4 ft bgs	:			
Rig Ge	eologist:	<u>A. M</u>	lack /	D Corn	ell Co	onverted to Well:	× Yes No				
Depth (ft)	Drilling Rur and Averag Penetration R	e '	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling	Notes		Drilling Fluid	
41	(31.0 - 41.0) 12.09 mins/ft		GM		(31.0 - 41.0') 18.0" Steel Casing	(40.0 - 41.5') Topock - Fluvial Deposits; Silty gravel with sand (GM); pale brown (10YR 6/3)	(41.0 - 43.0') Drilled with wat	er.		(41.0 - 43.0') 230.58	
 42 43	(41.0 - 43.0) 8.50 mins/ft				(41.0 - 43.0') 16.0" Steel Casing	(41.5 - 49.5') Topock - Fluvial Deposits; Well graded gravel with silt and sand (GW-GM); light brown (7.5YR 6/4)	1			gallons of water used; 0 gallons of water recovered; 230.58 gallons of water lost	
44 44							(43.0 - 61.5') Drilled with wat	er.		(43.0 - 61.5') 684.42 gallons of water used; 526.16 gallons of water recovered; 158.26 gallons of water lost	
45 		G	w-GM								
46 47		ı									
 48		ı									
 49 		ŀ				(49.5 - 52.0') Topock - Alluvium					
50 51		ı	SM			Deposits; Silty sand with gravel (SM); brown (10YR 5/3)					
 52	(43.0 - 61.5) 7.04 mins/ft	L			(43.0 - 61.5') 16.0" Steel Casing	(52.0 - 57.0') Topock - Alluvium					
 53		ı				Deposits; Silty gravel with sand (GM); reddish brown (5YR 5/4)					
54		ı	GM								
55		ı	Givi								
56 56 57											
58			ML			(57.0 - 59.5') Topock - Alluvium Deposits; Sandy silt (ML); reddish brown (5YR 5/4)					
 59 			GM			(59.5 - 68.0') Topock - Alluvium					
60	l		UIVI	10 (Vol. o						1 011/	

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater Remarks: blue water table symbol represents depth to water measured during the first VAS interval of the pilot borehole

Date Surface D4/26/20/19 Surface Elevation 500.4 ft amb 20/24/19 Description 500.20/20 Control	9/	ARCA	ADIS Design & Consultancy for natural and built assets			Drilling Log			Sheet: 4 of 9		
Diffusion Dif	Date S	Started:	04/26/2	019	Sı	urface Elevation:	500.4 ft amsl	Borin	a No · IR	7-25	
Drilling Mathematics Drilling Assets Frequent Final GW Remedy Phase Location: PG&E Topock, Needles, California Sinches Location: PG&E Topock, Needles, California Location: PG&E Topock, Needles, California Sinches Location: PG&E Topock, Needles, California Location: PG&		-	05/12/2	019	N	orthing (NAD83):	2102414.6		.g.110 <u></u>	<u> </u>	
Dotal R Type:	Drilling	Co.:	Cascad	е	E	asting (NAD83):	7615824.5	Client:	PG&E		
Delition Assist Delition Assist American Delition Assist American Delition Assist American Delition Assist American Delition Delition Assist American Delition	Drilling	Method:	Dual Ro	tary	To	otal Depth:	174 ft bgs	Project:	Final GW Re	medy Phase 1	
Description Convention Description Convented to Wells Description Convent	Drill Ri	g Type:	Foremo	st DR-24	HDC	onductor Casing Diameter:	18 inches	Location:	PG&E Topo	ck, Needles, California	
Tool-Purples Amold Lamon	Driller	Name:	Jon Ma	tinez	D	rill Casing Diameter:	16 inches	,			
Description	Drilling	Asst:	E. Marti	nez / W.	Saylors D	rill Bit:	15.5 & 17.5 inch Tri-cone	Project N	umber: RC00	0753.0051	
Description California Ca	Tool-P	usher:	Arnold I	<u>amon</u>	D	epth to First Water:	48.4 ft bgs				
Depth Control Contro	Rig Ge	eologist:	A. Mack	/ D Corr	nell C	onverted to Well:	× Yes No				
43.0 - 81.5 7.04 mine		and Averag	e 030			(See Pilot boring log for full geologic descriptions)	Drilling	Notes		Drilling Fluid	
SA	61			54K	16.0" Steel	Deposits; Silty gravel with sand (GM); reddish brown (5YR 5/4)				(04.5.04.5) 507.04	
	636465666677071727374757677576		SM		16.0" Steel	Deposits; Silty sand with gravel (SM); reddish brown (5YR 5/4) (72.0 - 77.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); yellowish brown / moderate yellowish brown (10YR 5/4) (77.0 - 79.5') Topock - Alluvium Deposits; Silty gravel with sand		er.		gallons of water used; 848.24 gallons of water recovered; 321.2 gallons	
i ————————————————————————————————————			SM		q	(79.5 - 87.0') Topock - Alluvium					

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater Remarks: blue water table symbol represents depth to water measured during the first VAS interval of the pilot borehole

ARCADIS Design & Consultancy for natural and built assets					псу	Drilling Log						Sheet:	5 of 9
Date S			/26/201		Sı	urface Elevation:	<u>50</u>	0.4 ft a	amsl		Borin	g No.: IRZ	Z-25
	completed:			9		orthing (NAD83):		<u>02414</u>					<u></u>
Drilling			scade			asting (NAD83):		15824			Client:	PG&E	
	Method:		al Rota	-		otal Depth:		4 ft bg			Project:		medy Phase 1
Driller I	g Type:		<u>remost</u> n Martir			onductor Casing Diameter: rill Casing Diameter:		inche			Location:	PG&E TOPOC	k, Needles, California
Drilling					Saylors D	-				ri-cone	Project N	umber: RC00	0753 0051
Tool-P			nold La		-	epth to First Water:		.4 ft bo		11 00110		14000	0100.0001
	ologist:		Mack /			onverted to Well:		Yes	No				
	Drilling Ru	,				Description							
Depth (ft)	and Averag Penetration R	e l	USCS Code	USCS Class	Casing Diameter	(See Pilot boring log for full geologic descriptions)				Drilling	Notes		Drilling Fluid
					(04.504.51)	Deposits; Silty sand with gravel (SM); reddish brown (5YR 5/4)							
	(61.5 - 81.5) 3.67 mins/ft				(61.5 - 81.5') 16.0" Steel	(SM); reddish brown (SYR 5/4)							
	0.07				Casing								
82								(81.5 -	101.5') Drille	ed with wa	iter.		(81.5 - 101.5') 475.8 gallons of water used;
													1816.12 gallons of water recovered; 1340.32
83													gallons of water gained
			SM										
84													
					1								
85					.]								
					}								
86					1								
 87					.]		Y						
0/					1	(87.0 - 94.5') Topock - Alluvium Deposits; Silty sand with gravel	1	Ť					
88					1	(SM); reddish brown (5YR 5/4)							
					-}								
89													
					}								
90													
	(81.5 - 101.5)	014		(81.5 - 101.5'								
91	4.60 mins/ft		SM		16.0" Steel Casing								
					1	•							
92													
 93					1								
93													
94													
]								
95			ML	. 0.	,	(94.5 - 95.5') Topock - Alluvium Deposits; Gravelly silt (ML);							
						reddish brown (5YR 5/4)							
96						(95.5 - 97.0') Topock - Alluvium Deposits; Silty sand with gravel							
			SM		1	(SM); reddish brown / moderate brown (5YR 4/4)							
97					·}	(97.0 - 102.0') Topock - Alluvium	\dashv						
-					•	Deposits; Well graded sand with silt and gravel (SW-SM); light							
98					o o	reddish brown / light brown (5YR 6/4)							
F			SW-SM		•	J ,							
99					•								
100					o o								
	iotiono: III		_ I I _ :c	C-:	Classificati	on System ft - foot has -	<u>.</u>				l — alaassa		L CM - analysis divistan

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater Remarks: blue water table symbol represents depth to water measured during the first VAS interval of the pilot borehole

9/	ARCAI	DIS for buil	sign & Consultar natural and lt assets	псу	Drilling Log			Sheet:	6 of 9
	Started:	04/26/201		Sı	urface Elevation:	500.4 ft amsl	Borin	ng No.: IRZ	7-25
	Completed:	05/12/201	19	N	orthing (NAD83):	2102414.6			<u></u>
Drilling		Cascade			asting (NAD83):	7615824.5	Client:	PG&E	
_		Dual Rota	-		otal Depth:	174 ft bgs	Project:	Final GW Rei	_
	g Type:	Foremost			onductor Casing Diameter:		Location	: PG&E Topoc	k, Needles, California
	Name:	Jon Marti			rill Casing Diameter:	16 inches			
Drilling				Saylors D		15.5 & 17.5 inch Tri-cone	Project N	lumber: RC00	0753.0051
	usher:	Arnold La			epth to First Water: onverted to Well:	48.4 ft bgs			
rig Ge	eologist:	A. Wack /	D Com	leli C	T	× Yes No			
Depth	Drilling Rur and Averag	_ 0303	USCS	Casing	Description	Drilling	Notes		Drilling Fluid
(ft)	Penetration R	ate Code	Class	Diameter	(See Pilot boring log for full geologic descriptions)	Drilling	Notes		Drilling Fluid
				•	in georgic accorpanie,				
-	(81.5 - 101.5)			(81.5 - 101.5') 16.0" Steel					
101	4.60 mins/ft	SW-SM		Casing					
				•		(101.5 - 121.5') Drilled with w	vater.		(101.5 - 121.5') 325.74
102				•	(102.0 - 103.5') Topock - Alluvium	1			gallons of water used; 4086.84 gallons of water
		ML			Deposits; Sandy silt with gravel (ML); light reddish brown / light				recovered; 3761.1 gallons
103		IVIL			brown (5YR 6/4)				of water gained
			6 4 (1)	-	(103.5 - 109.5') Topock - Alluvium				
104			60°C	9	Deposits; Silty gravel (GM); reddish brown (5YR 5/4)				
				1	reddish brown (311(3/4)				
105				d					
			Pal P	-					
106				9					
		GM	PJO.]					
107			120						
]					
108			12 P						
			BY.K						
109			690						
			19 P.C		(400 F 447 0)) T 1 All a i a				
110					(109.5 - 117.0') Topock - Alluvium Deposits; Silty sand with gravel	1			
L -	(101.5 - 121.5			(101.5 -	(SM); (5YR 4/)				
111	6.21 mins/ft	"		121.5') 16.0" Steel Casing					
L _									
112				}					
				.]					
113				1					
L _		SM		1					
_114				.]					
				}					
115				1					
				.]					
116				1					
117				1					
		T]	(117.0 - 119.5') Topock - Alluviun Deposits; Silty sand with gravel	i']			
118				1	(SM); reddish brown / moderate				
		SM		1	brown (5YR 4/4)				
119				1					
				1					
120		ML		<u>.</u>	(119.5 - 124.5') Topock - Alluviun	1			
		 		 					

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater Remarks: blue water table symbol represents depth to water measured during the first VAS interval of the pilot borehole

9/	ARCA	DI	S Des	sign & Consultar natural and ilt assets	ncy	Drilling Log		Sheet:	7 of 9
Date S	Started:	04/	26/201	19	S	urface Elevation:	500.4 ft amsl	Boring No.: IRZ	7-25
Date 0	Completed:	05/	12/201	19	N	orthing (NAD83):	2102414.6	Donnig iton ita	<u> </u>
Drilling		<u>Cas</u>	<u>scade</u>		E	asting (NAD83):	7615824.5	Client: PG&E	
Drilling	Method:	<u>Dua</u>	al Rota	ary	T	otal Depth:	174 ft bgs	Project: Final GW Rei	medy Phase 1
Drill R	g Type:	<u>For</u>	<u>remost</u>	DR-24	HDC	onductor Casing Diameter:	18 inches	Location: PG&E Topoc	k, Needles, California
	Name:		<u> Martii</u>			rill Casing Diameter:	16 inches		
Drilling		<u>E. I</u>	Martine	ez / W. :	<u>Saylors</u> D		15.5 & 17.5 inch Tri-cone	Project Number: RC00	0753.0051
	usher:		<u>ıold La</u>			epth to First Water:	48.4 ft bgs		
Rig G	eologist:	<u>A. I</u>	Mack /	D Corn	nell C	onverted to Well:	× Yes No		
Depth	Drilling Ru		USCS	USCS	Casing	Description			
(ft)	and Average Penetration F	ge Rate	Code	Class	Diameter	(See Pilot boring log for full geologic descriptions)	Drilling	Notes	Drilling Fluid
						Deposits: Sandy silt with gravel			
-	(101.5 - 121.				(101.5 - 121.5') 16.0"	(ML); reddish brown / moderate brown (5YR 4/4)			
121	6.21 mins/ft	t			Steel Casing				
-					<u> </u>	_	(121.5 - 141.5') Drilled with w	ater.	(121.5 - 141.5') 118.34
122							(12116 11116) 2111164 1111111		gallons of water used; 1244.4 gallons of water
			ML						recovered; 1126.06
123									gallons of water gained
124									
16.2					-				
125						(124.5 - 127.0') Topock - Alluvium Deposits; Silty sand (SM); reddish			
						brown / moderate brown (5YR 4/4	4)		
126			SM						
Ę									
					1				
<u> </u>				440		(127.0 - 132.0') Topock - Alluvium Deposits; Silty gravel with sand	(127.0') During the first attem	pt of installing the well the emoval of the drill casing. The	(127.0 - 174.0') 280 gallons of water used;
128_				P. Y.		(GM); reddish brown (5YR 5/4)	well was removed from the bo	orehole and the borehole was	12440 gallons of water
120_				620			redrilled. Cascasde recomme casing and install the well in a		recovered; 12160 gallons of water gained
				BYK]				
J_123_				90					
5 5 <u>- 130</u>			GM	1°4°K	q T				
				199	1				
٠	(121.5 - 141. 1.75 mins/fi			6 Por	(121.5 - 141.5') 16.0"				
131	1.75 111115/11				Steel Casing				
122					d				
132					-	(132.0 - 137.0') Topock - Alluvium	1		
<u>-</u>					:	Deposits; Sandy silt with gravel (ML); reddish brown / moderate			
<u>133_</u>						brown (5YR 4/4)			
134					1				
			ML						
135									
<u> </u>									
136					-				
5					1				
137]	(407.0. 400.50.7	_		
						(137.0 - 139.5') Topock - Alluvium Deposits; Sandy silt (ML); reddish	ı		
138					:	brown / moderate brown (5YR 4/4	9)		
180			ML]				
139_									
					·				
140			ML		<u> </u>	(139.5 - 147.0') Topock - Alluvium	1		
	viations: U	SCS	= Unit	fied Soil	Classificat	ion System. ft = feet. bas =	below ground surface ams	= above mean sea leve	I. GW = groundwater

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW Remarks: blue water table symbol represents depth to water measured during the first VAS interval of the pilot borehole

9/	ARCA	DIS	Desig for na built a	n & Consultar atural and assets	псу	Drilling Log				Sheet:	8 of 9
Date St		04/26				urface Elevation:		0.4 ft amsl	Borir	ng No.: IRZ	Z-25
	ompleted:			9		orthing (NAD83):		02414.6			
Drilling		Casc				asting (NAD83):		315824.5	Client:	PG&E	
_	Method:	<u>Dual</u>		-		otal Depth:		'4 ft bgs	Project:	Final GW Rer	-
Drill Rig Driller N		Jon N		DR-24		onductor Casing Diameter: rill Casing Diameter:		inches	Location	PG&E TOPOC	k, Needles, California
Drilling					Saylors D	-		5.5 & 17.5 inch Tri-cone	Project N	lumber: RC00	0753 0051
Tool-Pu		Arnol			-	epth to First Water:		8.4 ft bgs		.abor. <u>11000</u>	0100.0001
Rig Ge				O Corn		onverted to Well:		Yes No			
	Drilling Rui	n				Description					
Depth (ft)	and Averag Penetration R	e C	SCS Code	USCS Class	Casing Diameter	(See Pilot boring log for full geologic descriptions)		Drilling	Notes		Drilling Fluid
						Deposits; Sandy silt with gravel (ML); reddish brown / moderate	+				
	(121.5 - 141.5				(121.5 - 141.5') 16.0"	(ML); reddish brown / moderate brown (5YR 4/4)					
_141	1.75 mins/ft				Steel Ćasing						
142								(141.5 - 161.5') Drilled with w	/ater.		(141.5 - 161.5') 161.04 gallons of water used;
142			-								1726.08 gallons of water
143			ŀ								recovered; 1565.04 gallons of water gained
			ML :								
_144			IVIL								
			-								
_145					•			$\Delta \Omega \lambda^{*}$			
146					•						
							4				
147					1	(147.0 - 157.0') Topock - Alluviun	\vdash				
					1	Deposits; Silty sand with gravel (SM); reddish brown (5YR 4/3)					
148					1	(OW), reddish brown (OTT 4/0)					
					1						
_149					}						
 150											
130					4415						
151	(141.5 - 161.5 2.10 mins/ft				(141.5 - 161.5') 16"						
					Steel Casing						
152			SM :		}						
153					}						
					1						
154					1						
155					1			(155.0') During redrill the loss	s returns due	e to a plug in the	
			[:		1			drill pipe tripped out drill rods hole assembly.	and installe	d normal bottom	
156			ŀ		1						
 			:		1						
157				֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓		(157.0 - 162.0') Topock -					
150						Weathered Bedrock - conglomerate; Gravelly silt (ML);					
158				, p [d		reddish brown (5YR 5/4)					
159			ML		_						
			d								
160											
، د ح ما ما ۱۸	iotiono: IIC	- 202	Linifi	~4 C~!!	Closoificati	on System ft - foot has -	hala	ow around ourfood ama	I - abova	moon oog level	CM - aroundwater

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater Remarks: blue water table symbol represents depth to water measured during the first VAS interval of the pilot borehole

A	RCA	DIS	Design & Consultar for natural and puilt assets	псу	Drilling Log					Shee	et: 9	of 9
Date St	tarted:	04/26/20)19	Sı	urface Elevation:	500	0.4 ft a	amsl	Borin	ng No.:	IRZ-2	25
	ompleted:				orthing (NAD83):		02414					<u></u>
Drilling		Cascade			asting (NAD83):		15824		Client:	PG&E		
_	Method:	Dual Ro	-		otal Depth:		4 ft bg		Project:			dy Phase 1
Drill Rig Driller N		Foremos Jon Mar			onductor Casing Diameter: rill Casing Diameter:		inche:		Location	: PG&E TO	ороск, і	Needles, California
Drilling A				Di <u>Saylors_</u> Di	_			5. 7.5 inch Tri-cone	Project N	Jumber: R	C0007!	53 0051
Tool-Pu		Arnold L		•	epth to First Water:		.4 ft bo		, i rojocci			00.0001
Rig Geo		A. Mack			onverted to Well:		Yes	No				
	D.:II: D				Description	Ŧ		<u> </u>				
Depth (ft)	Drilling Rui and Averag	e Codo		Casing Diameter	(See Pilot boring log for			Drilling	Notes			Drilling Fluid
	Penetration F	ate			full geologic descriptions)							
	(4.44.5404.5	-,	1.0.	(141.5 -								
_161	141.5 - 161.5) 2.10 mins/ft			161.5') 16" Steel Casing								
			.00	100000000000000000000000000000000000000			(404.5	470 01\ D :11 1 :11				
162		-			(400 0 400 0l) Tl	41	bedroc	 173.0') Drilled with w k attempted to dislodg 	ge while adva			
L 4			[.0.]		(162.0 - 166.0') Topock - Weathered Bedrock -		Circula	ted water to clean out	borehole.			
163					conglomerate; Gravelly silt (ML); reddish brown / moderate brown							
 					(5YR 4/4)							
164		ML										
165				-								
2166				1	(166.0 - 174.0') Topock -	$+$ \mathbb{R}						
3					Competent Bedrock - conglomerate; reddish brown (5Y	R		•				
167	(161.5 - 173.0			(161.5 - 173.0') 15.5"	5/4)							
<u></u> 400 −	6.22 mins/ft			Open Hole								
<u>168</u>												
				1								
170												
A I ABAS												
171_												
172_				1								
				1								
173		-		(470.0	-							
	(173.0 - 174.0 mins/ft	0)		(173.0 - 174.0') 15.5"								
174			V//)X	Open Hole	End of Boring at 174.0 'bgs.							
*												
Ž175												
<u>176</u>												
177												
3 470												
178												
ਫ਼ਿੱ <mark>– 179</mark> _												
D 1/9												
180												
Abbrevi					ion System, ft = feet, bgs =						level, G	GW = groundwater
Remark	cs: blue w	ater table	symbol r	enresents o	depth to water measured du	ırina	the fi	rst VAS interval o	f the pilot	horehole		

IRZ DF

9/	ARC	A	DIS	Design & Consultancy for natural and built assets		Во	ring	Log	g			Sh	eet: 1 of	9
Date S			12/04/2			Surface			500.4 ft am		Borir	na No.:	: <u>IRZ-25-</u> P	ilot
	•		<u>12/12/2</u>			Northing		,	2102414.6					<u></u>
Drilling			Cascad			Easting	•	3):	<u>7615824.5</u>		Client:	PG&E		
Drilling			Sonic E	•		Total De	•		<u>172 ft bgs</u>		Project:		roundwater Re	emedy Phase
Drill Rio				<u>ic Truck Mou</u> ,		Borehol			6-12 inches		Location		T N	0 1:0
Driller N				/asquez ninguez/C. Al		-			48.4 ft bgs		— Droiget N		Topock, Needl	
Drilling			Connor	-		Samplin Samplin	-		Continuous	ft Core Barrel	Project i	number.	RC000753.00	<u> </u>
Logger Editor:				lcGrane		Convert	-			No				
Luitor.			<u>Ocan iv</u>	loorano				V CIII.						1
Depth (ft)	Recovery (in)		ieve nple ID	Groundwater Sample ID	Geologic Formation	USCS	USCS Class			Soil Description			Drilling Notes	Drilling Fluid
1	84				Topock - Fluvial Deposits	SP-SM		and grato subance (4.0 - 4) (4.5 - 1) (SP-SN) angula	avel (SP-SM); wound; little gran gular; little silt; d e.5'); lens of gra 2.0') Topock - F l); pale brown (r to subround; li	uvial Deposits; Poorlery fine grained to finules to very large pelfry nules to medium peb Fluvial Deposits; Poorley (10YR 6/3); very fine of the silt; trace granule und; trace cobbles, si	bles rly graded sand grained to fine se to very large	d with silt grained,		(0.0 - 172.0') No water used
_ 7 _ 8 _ 9 _ 10 _ 11 _ 12	120				Topock - Fluvial Deposits	SP-SM							(7.0') Rough drilling	
13	120				Topock - Fluvial Deposits	SW-SM		and gra coarse pebble subanc (14') ve	avel (ŚW-SM); p grained, angula s, angular to su gular; trace boul	Fluvial Deposits; We pale brown (10YR 6/3 art to subround; some bangular; little silt; triders, angular to subators, angular to subator	B); very fine gra granules to ve ace cobbles, an angular; dry	ined to ery large ngular to		
17	120				Topock - Fluvial Deposits	SM	* * * * * * * * * * * * * * * * * * *	(SM); k angula pebble subang	prown (10YR 5/3 r to subangular; s, angular to su gular; trace boul 20.5') gray (7.5	Fluvial Deposits; Silt 3); very fine grained to 5; some silt; little grant bround; trace cobble iders, angular to suba YR 6/1) and white (10 and of metadiorite, very	o coarse graine ules to very larg s, angular to angular; dry 0YR 8/1); rock	ed, ge		

ARCADIS Design & Consultancy for natural and built assets					Во	ring	Log		She	eet: 2 of	9	
Date S	tarted:		12/04/2	018		Surface	Elevat	tion: <u>500.4 ft amsl</u>	Borin	a No .	IRZ-25-P	ilot
Date C	omple	ted:	12/12/2	018		Northing	j (NAD	083): <u>2102414.6</u>		9	<u></u>	<u></u>
Drilling			Cascad	е		Easting	(NAD8	33): <u>7615824.5</u>	Client:	PG&E		
Drilling			Sonic D	<u> Prilling</u>		Total De	epth:	172 ft bgs	Project:	Final G	<u>roundwater Re</u>	emedy Phase
Drill Ri	g Type	: :	Proson	<u>ic Truck Mou</u>	nt	Borehol	e Diam	neter: 6-12 inches	Location:	1		
Driller I	Name:		Steve V	'asquez		Depth to	First \	Water: 48.4 ft bgs	-	PG&E	<u> Topock, Needl</u>	es, California
Drilling	Asst:		N. Dom	inguez/C. Alv	verez	Samplin	g Meth	nod: 4 inch x 10 ft Core Barrel	Project N	umber: ˌ	RC000753.00	51
Loggei	r:		Connor	Mills		Samplin	g Inter	val: <u>Continuous</u>	-			
Editor:			Sean M	lcGrane		Convert	ed to V	Well: ⊠ Yes □ No				1
Depth (ft)	Recovery (in)		Sieve nple ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description			Drilling Notes	Drilling Fluid
						SM						(0.0 - 172.0') No water used
21	120				Topock - Fluvial Deposits	ML		(20.5 - 32.0') Topock - Fluvial Deposits; Sand (ML); light yellowish brown (10YR 6/4); no plat to large pebbles, angular to subround; little ve grained sand, angular to subround; trace cobl subround; trace boulders, angular to subangular to subangular to subround; trace for metadiorite. (29.5'); to 32' powerdized rock and solid cores composed of metadiorite. (32.0 - 40.0') Topock - Fluvial Deposits; Silty (SM); pale brown (10YR 6/3); very fine graine angular to subround; and granules to very larg subangular to subround; little silt; trace cobble	sticity; little gray fine to fine bles, angular lar; dry	ranules to rs vel grained,		No water used
	108				Topock - Fluvial Deposits	SM		subround; dry				

9/	ARC	CAD	IS	Design & Consultancy for natural and built assets		Во	ring	Lo	g		She	eet: 3 of	9
Date S	Started	: 12	2/04/2	2018		Surface	Elevat	tion:	500.4 ft amsl	Borine	a No .	IRZ-25-P	ilot
Date C	Comple	ted: <u>12</u>	2/12/2	2018		Northing	g (NAE	083):	2102414.6		y 110	11 VE-20-1	<u></u>
Drilling	Co.:	<u>C</u>	ascac	de		Easting	(NAD	33):	7615824.5	Client:	PG&E		
Drilling	Metho					Total De	-		172 ft bgs	Project:	Final G	roundwater Re	medy Phase
Drill Ri				<u>ic Truck Mou</u>	nt	Borehol			6-12 inches	Location:			
Driller				/asquez		•			48.4 ft bgs			Topock, Needl	
Drilling				ninguez/C. Alv	/erez	Samplin	-		4 inch x 10 ft Core Barrel	Project No	umber:	RC000753.00	51
Logge				r Mills		Samplin	-		Continuous				
Editor:		<u>S</u>	ean N	<u>//cGrane</u>		Convert	ed to \	Vell:					Г
Depth (ft)	Recovery (in)	Siev Sampl		Groundwater Sample ID	Geologic Formation	USCS	USCS		Soil Description			Drilling Notes	Drilling Fluid
 41					Topock - Fluvial Deposits	GM		(GM); angula angula	 41.5') Topock - Fluvial Deposits; Silty g pale brown (10YR 6/3); granules to very ar to subround; some very fine to mediur ar to subangular; little silt; trace cobbles, and; dry 	, large pebble m grained sar	s,		(0.0 - 172.0') No water used
42 43 44 45 46 47	108				Topock - Fluvial Deposits	GW-GM		(41.5 - silt and large p subrou round;	49.5') Topock - Fluvial Deposits; Well of sand (GW-GM); light brown (7.5YR 6/bebbles, subangular to subround; some und; little very fine to medium grained salittle silt; dry	 granules to cobbles, angi 	o very ular to		
48 49 50 51 52	114	IRZ-25- 47-52 12/14/20 10:35	2 018		Topock - Alluvium Deposits	SM		(SM); I suban angula	52.0') Topock - Alluvium Deposits; Silty brown (10YR 5/3); very fine grained to w gular to subround; some granules to me ar to subangular; some silt; wet	ery coarse gra edium pebbles	ained,	(49.5') Approximate depth to water table	
53545556		IRZ-25-5 52-57 12/14/20 10:40	7 018	IRZ-25-VAS- 52-57 (3500 ppb) 12/5/2018 10:40	Topock - Alluvium Deposits	GM		(GM); fine to	· 57.0') Topock - Alluvium Deposits; Silty reddish brown (5YR 5/4); angular to sub coarse grained sand, angular to subang lry to moist	oangular; som	ne very		
57 58 59	120	IRZ-25-5 57-62 12/14/20 10:45	2 018		Topock - Alluvium Deposits	ML		brown sand, angula	59.5') Topock - Alluvium Deposits; Sar (5YR 5/4); no plasticity; and very fine to angular to subangular; little granules to ar to subangular; wet to dry; stiff; strong	very coarse of small pebble, cementation	grained		
60						GM	1.7.	(59.5 -	· 68.0') Topock - Alluvium Deposits; Silty	y gravei with s	sand		

9/	1RC	CADIS	Design & Consultancy for natural and built assets		Во	ring	Log	Sh	neet: 4 of	9
Date S	tarted	: <u>12/04/</u>	2018		Surface	Elevat	ion: <u>500.4 ft amsl</u>	Boring No.	: IRZ-25-P	ilot
Date C	comple	eted: <u>12/12/</u>	2018		Northing	g (NAD	83): <u>2102414.6</u>		<u></u>	<u></u>
Drilling		<u>Casca</u>	<u>de</u>		Easting	(NAD8	3): <u>7615824.5</u>	_ Client: <u>PG&E</u>		
Drilling	Metho	od: <u>Sonic</u>	Drilling		Total De	epth:	172 ft bgs	_ Project: Final C	<u> Groundwater Re</u>	emedy Phase
Drill Ri	g Type	: <u>Prosor</u>	<u>nic Truck Μοι</u>	<u>unt</u>	Borehol	le Diam	eter: <u>6-12 inches</u>	_ Location: <u>1</u>		
Driller			Vasquez		•		Water: 48.4 ft bgs		Topock, Needl	
Drilling			minguez/C. Al	verez	Samplin	_		Project Number:	RC000753.00	51
Logge		<u>Conno</u>			Samplin	•		_		
Editor:		<u>Sean I</u>	McGrane		Convert	ted to V	Vell: ⊠ Yes □ No			
Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS	USCS	Soil Description		Drilling Notes	Drilling Fluid
 61 62		IRZ-25-SS- 57-62 12/14/2018 10:45					(GM); reddish brown (5YR 5/4); granules to value angular to subangular; some very fine to coal angular to subangular; some silt; little clay; d	rse grained sand,		(0.0 - 172.0') No water used
63	120							9		
64		IRZ-25-SS- 62-67 12/14/2018	IRZ-25-VAS- 62-67 (620 ppb) 12/5/2018	Topock - Alluvium Deposits	GM					
65 66		10:55	14:17							
 67							'0'			
68					_		(68.0 - 72.0') Topock - Alluvium Deposits; Sil (SM); reddish brown (5YR 5/4); very fine grai			
69		IRZ-25-SS- 67-72 12/14/2018		Topock -			grained, subangular to subround; some silt; l medium pebble, angular to subangular; wet			
70 71		10:55		Alluvium Deposits	SM					
72	120						(72.0 - 77.0') Topock - Alluvium Deposits; Sil (SM); yellowish brown / moderate yellowish b	prown(10YR 5/4); fine		
73 							grained to very coarse grained, subangular to little granules to medium pebble, angular to s	o subround; some silt; subround; wet		
74 75		IRZ-25-SS- 72-77 12/14/2018 11:05		Topock - Alluvium Deposits	SM					
 78	60	IRZ-25-SS- 77-82 12/14/2018		Topock - Alluvium Deposits	GM		(77.0 - 79.5') Topock - Alluvium Deposits; Sil (GM); reddish brown (5YR 5/4); granules to l to subangular; some very fine to very coarse angular to subround; little silt; wet	arge pebbles, angular		
79 80	79 12/14/2018 11:05				SM		(79.5 - 87.0') Topock - Alluvium Deposits; Sil	ty sand with gravel		

9/	RC	ADIS	Design & Consultancy for natural and built assets		Во	ring	Log		Sh	eet: 5 of	9
Date St					Surface			Borin	a No.:	IRZ-25-P	ilot
	•	ted: <u>12/12/2</u>			Northing		•				
Drilling		Cascac			Easting	•		Client:	PG&E		
Drilling			•		Total De	•	172 ft bgs	Project: Location:		roundwater Re	medy Phase
Drill Rig Driller N	• • •		iic Truck Mou ∕asquez		Borehol		eter: <u>6-12 inches</u> Water: <u>48.4 ft bgs</u>	_ Location:		Topock, Needl	es California
Drilling .			ninguez/C. Al		Samplin			- Project N		RC000753.00	
Logger		Connoi	•		Samplin	•		_ 1 10,00011	idinibor.	110000700.00	01
Editor:			/lcGrane		Convert	-		_			
	7			υ <u>Ε</u>							
Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	Code	USCS Class	Soil Description			Drilling Notes	Drilling Fluid
81 81 82	60	IRZ-25-SS- 77-82 12/14/2018 11:05					(SM); reddish brown (5YR 5/4); very fine grain grained, subangular to round; little granules to angular to subangular; little silt; trace cobbles subangular; wet; cobbles composed of metac	o medium pe s, angular to			(0.0 - 172.0') No water used
83 84		IRZ-25-SS- 82-87		Topock - Alluvium Deposits	SM						
85 86 87		12/14/2018 11:10									
88 89 90 91	108	IRZ-25-SS- 87-92 12/14/2018 11:15		Topock - Alluvium Deposits	SM		(87.0 - 94.5') Topock - Alluvium Deposits; Silt (SM); reddish brown (5YR 5/4); fine grained to grained, subangular to round; some silt; little pebble, angular to subangular; wet; trace larg	o very coarse granules to n			
93 94 	100	IRZ-25-SS- 92-97 12/14/2018	IRZ-25-VAS- 92-97 (130 ppb) 12/6/2018	Topock -		<u> </u>	(94.5 - 95.5') Topock - Alluvium Deposits; Gra	avelly silt (ML):		
95		11:20	09:07	Alluvium Deposits	ML		reddish brown (5YR 5/4); no plasticity; little gr pebble, angular to subangular; little very fine t grained sand, angular to subangular; dry to m	ranules to me to very coarse	edium e		
96 97				Topock - Alluvium Deposits	SM	* • • • • • • • • • • • • • • • • • • •	composed of metadiorite (95.5 - 97.0') Topock - Alluvium Deposits; Silt (SM); reddish brown / moderate brown(5YR 4 to very coarse grained, angular to subround; selarge pebble, angular to subangular; some sil	ty sand with g l/4); very fine some granule	gravel grained es to		
98 99 99	114	IRZ-25-SS- 97-102 12/14/2018 11:25		Topock - Alluvium Deposits	SW-SM		cobbles composed of metadiorite (97.0 - 102.0') Topock - Alluvium Deposits; W silt and gravel (SW-SM); light reddish brown / 6/4); fine grained to very coarse grained, ang small to large pebbles, angular to subangular trace very large pebbles composed of metadional composed	/ light brown(ular to round; r; some silt; w	5YR some		

9/	ARC	ADIS	Design & Consultancy for natural and built assets		Во	ring	Lo	g		S	Sheet: 6 of	9
Date S	tarted:	12/04	1/2018		Surface	Elevat	tion:	500.4 ft amsl	Boi	ina No	.: <u>IRZ-25-P</u>	Pilot
Date C	Comple	ted: <u>12/12</u>	2/2018		Northing	g (NAE	083):	2102414.6		9 110	<u>II LE LO I</u>	<u> </u>
Drilling	Co.:	Casc	ade		Easting	(NAD	33):	7615824.5	Client:	PG&E	<u> </u>	
Drilling	Metho	od: <u>Soni</u>	Drilling		Total De	epth:		172 ft bgs	Projec	t: <u>Final</u>	Groundwater Re	emedy Phase
Drill Ri	д Туре	: <u>Prose</u>	onic Truck Mou	<u>ınt</u>	Borehol	e Dian	neter:	6-12 inches	Locati	on: <u>1</u>		
Driller	Name:	Steve	· Vasquez		Depth to	First	Water:	48.4 ft bgs		PG&E	E Topock, Need	les, California
Drilling	Asst:	<u>N. Do</u>	minguez/C. Al	verez	Samplin	ig Meth	nod:	4 inch x 10 ft Core Barrel	Projec	t Number	: RC000753.00)51
Logge	r:	<u>Conr</u>	or Mills		Samplin	ig Inter	val:	Continuous				
Editor:		<u>Sean</u>	McGrane		Convert	ed to \	Nell:					
Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	Code	USCS		Soil Description			Drilling Notes	Drilling Fluid
 101 102		IRZ-25-SS- 97-102 12/14/2018 11:25		Topock - Alluvium Deposits	SW-SM		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0					(0.0 - 172.0') No water used
103				Topock - Alluvium Deposits	ML		(ML); li large p	 103.5') Topock - Alluvium Depos ght reddish brown / light brown(5Y ebbles, angular to subangular; little d sand, subangular to subround; litt 0 mm cobble composed of metadi 	R 6/4); little g e very fine to v tle clay; trace	ranules to ery coarse		
104	114	IRZ-25-SS- 102-107 12/14/2018					reddish subrou	- 109.5') Topock - Alluvium Depos n brown (5YR 5/4); granules to larg nd; some silt; little very fine to very r to subround; trace; wet; trace ver	e pebbles, an coarse grain	gular to ed sand,		
105 106 107		11:30		Topock - Alluvium Deposits	GM			6/1/1/1				
108 109		IRZ-25-SS- 107-112			*							
110111111	120	12/14/2018 11:35					(SM); (subrou subrou	- 117.0') Topock - Alluvium Depos 5YR 4/); fine grained to very coars nd; some granules to very large pe nd; some silt; trace cobbles; wet; v s composed of trace amounts of m	e grained, sub bbles, angula very large peb	angular to r to		
	120											
113				Topock -								
114			IRZ-25-VAS-	Alluvium Deposits	SM							
114		IRZ-25-SS- 112-117	112-117 (< 0.17 U									
115		12/14/2018 11:40	ppb) 12/11/2018									
L -			10:34									
_116												
L _							:					
_117				L			1 ,				<u> </u>	
118	120	IRZ-25-SS- 117-122 12/14/2018		Topock - Alluvium Deposits	SM		(SM); r	 - 119.5') Topock - Alluvium Depos eddish brown / moderate brown(5) coarse grained, subangular to sub n pebbles, angular to subround; lit 	/R 4/4); very f round; little g	ne grained anules to		
119		11:45										
120					ML		(119.5	- 124.5') Topock - Alluvium Depos	its; Sandy silt	with gravel		

ARCADIS Design & Consultancy for natural and built assets					Во	ring	Log		She	eet: 7 of	9
Date S	tarted:	: <u>12/04</u>	/2018		Surface	Elevat	on: <u>500.4 ft amsl</u>	Borin	a No:	IRZ-25-P	ilot
Date C	omple	eted: <u>12/12</u>	<u>/2018</u>		Northing	g (NAD	83): <u>2102414.6</u>		9	<u></u>	<u></u>
Drilling		<u>Casca</u>	ıde		Easting	(NAD8	3): <u>7615824.5</u>	Client:	PG&E		
Drilling	Metho	od: <u>Sonic</u>	Drilling		Total De	epth:	<u>172 ft bgs</u>	Project:	Final G	<u>roundwater Re</u>	emedy Phase
Drill Ri	д Туре	e: <u>Proso</u>	<u>nic Truck Μοι</u>	<u>unt</u>	Borehol	e Diam	eter: <u>6-12 inches</u>	Location:	1		
Driller I	Name:	<u>Steve</u>	Vasquez		Depth to	First \	Vater: 48.4 ft bgs		PG&E	<u> Topock, Needl</u>	es, California
Drilling	Asst:	N. Do	<u>minguez/C. Al</u>	lverez	Samplin	ig Meth	od: 4 inch x 10 ft Core Barrel	Project N	umber: ˌ	RC000753.00	51
Logge	r:		or Mills		Samplin	-		-			
Editor:		<u>Sean</u>	McGrane		Convert	ed to V	Vell: ⊠ Yes □ No				
Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS	USCS	Soil Description			Drilling Notes	Drilling Fluid
	120	IRZ-25-SS- 117-122 12/14/2018 11:45		Topock - Alluvium Deposits	ML		(ML); reddish brown / moderate brown(5YR 4, very coarse grained sand, angular to subroun-medium pebbles, angular to subangular; wet	d; little granul	es to		(0.0 - 172.0°) No water used
125 126 127		12/14/2018 10:50		Topock - Alluvium Deposits	SM		(124.5 - 127.0') Topock - Alluvium Deposits; S reddish brown / moderate brown(5YR 4/4); ve coarse grained, subangular to subround; som to medium pebbles, angular to subangular; we	ery fine graine le silt; little gra et	d to anules		
	120	IRZ-25-SS- 127-132 12/14/2018 11:55		Topock - Alluvium Deposits	GM		(127.0 - 132.0') Topock - Alluvium Deposits; S (GM); reddish brown (57R 5/4); granules to la to subangular; and silt; little very fine to coarse angular to subangular; dry to moist; moderate	arge pebbles, e grained san e cementation	angular d,		
133 134 135 136 137	120	IRZ-25-SS- 132-137 12/14/2018 12:00		Topock - Alluvium Deposits	ML		(132.0 - 137.0') Topock - Alluvium Deposits; S (ML); reddish brown / moderate brown(5YR 4. granules to medium pebbles, angular to subato very coarse grained sand, angular to subro	/4); no plastic ngular; little v	ity; little ery fine		
138 138 139	120	IRZ-25-SS- 137-142 12/14/2018 12:05		Topock - Alluvium Deposits	ML		(137.0 - 139.5') Topock - Alluvium Deposits; S reddish brown / moderate brown(5YR 4/4); no very fine to coarse grained sand, angular to su granules to medium pebbles, angular to suba wet; dessicated (139.5 - 147.0') Topock - Alluvium Deposits; S	o plasticity; so ubround; little ngular; little c	me lay;		
140					ML	<u> 11:11:</u>	(100.0 - 147.0) Topook - Alluvium Deposits, e	Januay Jul Willi	gravel		

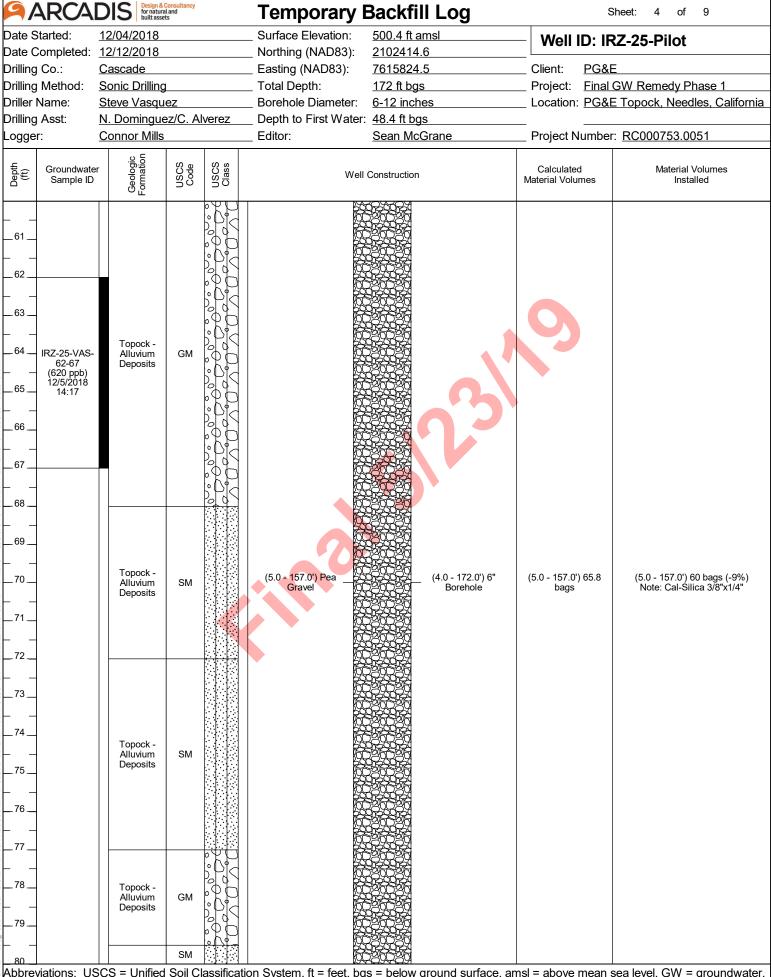
9/	4K(ADIS	for natural and built assets		Во	ring	Log	She	eet: 8 of	9
Date Started: <u>12/04/2018</u>					Surface			Boring No.:	IRZ-25-P	ilot
-					_ Northing (NAD83):		•	_		
_					Easting (NAD83):		•	_ Client: PG&E		
-					_ Total Depth: _ Borehole Diameter:		172 ft bgs	•	roundwater Re	medy Phase
Driller			nic Truck iviot Vasquez	unt			eter: 6-12 inches Water: 48.4 ft bgs	Location: 1	Topock, Needl	oc California
Drilling			<u>vasquez</u> minguez/C. Al	lverez	Samplin		_		•	
Logge		Conno	•	110102	Samplin	-		_ r rojout rtarribor.	1.00007.00.00	01
Editor			McGrane		Convert	-		_		
oth (1	very (r	Sieve	Gronndwater Samble ID Genation		de SS	SS	0.10		D. W N. t	D. W
Depth (ft)	Recovery (in)	Sample ID			USCS	USCS	Soil Description		Drilling Notes	Drilling Fluid
141142143		IRZ-25-SS- 137-142 12/14/2018 12:05					(ML); reddish brown / moderate brown(5YR 4 granules to medium pebbles, angular to subato coarse grained sand, angular to subangular	angular; little very fine		(0.0 - 172.0') No water used
-	120			Topock - Alluvium	ML					
144	-	IRZ-25-SS-		Deposits						
 145		142-147 12/14/2018 00:10	2018			.0\	*			
 146										
140										
147							(147.0 - 157.0') Topock - Alluvium Deposits;	Silty sand with gravel	(147.0 - 157.0')	
 148			i i				(SM); reddish brown (5YR 4/3); fine grained t grained, subangular to round; some granules angular to subround; little silt; trace cobbles,	to large pebbles,	Very saturated material with potential to	
							subangular; wet; cobbles composed of metad		poduce water	
149		IRZ-25-SS- 147-152	IRZ-25-VAS- 147-152		•					
150		12/14/2018 12:15	(3600 ppb) 12/11/2018 13:54							
151			i i							
			i i	Topock -						
152	108			Alluvium Deposits	SM					
153										
154		IRZ-25-SS-	52-157 /14/2018							
155		152-157 12/14/2018 00:20								
156	<u> </u>									
	1									
157				<u> </u>			(157.0 - 162.0') Topock - Weathered Bedrock	c - conglomerate;		
158				Topode			Gravelly silt (ML); reddish brown (5YR 5/4); n granules to large pebbles, angular to subang medium grained sand, angular to subangular	ular; little very fine to		
L -	108			Topock - Weathered Bedrock -	d ML		,ga.igaia.			
159				conglomera	te	الم الم				
-										
160 Abbro	viation	e: 11909 - 1	Inified Soil C	laccification	n Sveton	<u> </u>	eet has = helow around surface amo	sl – ahove mean se	a level GW =	groundwater

Date Started: 12/04/2018 Surface Elevation: 500.4 ft amsl Boring No Date Completed: 12/12/2018 Northing (NAD83): 2102414.6	o.: <u>IRZ-25-P</u>	ilot	
Date Completed: 12/12/2018 Northing (NAD82): 2402444.6	<u></u>	o.: IR7-25-Pilot	
		<u></u>	
Drilling Co.: <u>Cascade</u> Easting (NAD83): <u>7615824.5</u> Client: <u>PG&</u>			
	Groundwater Re	emedy Phase	
Drill Rig Type: Prosonic Truck Mount Borehole Diameter: 6-12 inches Location: 1			
	E Topock, Need		
	r: RC000753.00	151	
Logger: Connor Mills Sampling Interval: Continuous Editor: Sean McGrane Converted to Well: ∑ Yes No			
Sieve Sample ID Sieve Si	Drilling Notes	Drilling Fluid	
Topock - Weathered Bedrock - conglomerate		(0.0 - 172.0') No water used	
162 (162.0 - 166.0') Topock - Weathered Bedrock - conglomerate; Gravelly silt (ML); reddish brown / moderate brown(5YR 4/4); low plasticity; some granules to medium pebbles, angular to	(162.0 - 172.0') Drill rods chattering,		
subround; little very fine to coarse grained sand, angular to subround; wet; stiff	rough drilling		
12/14/2018 162-167 Bedrock - WIL O O O O O O O O O			
166. (166.0 - 172.0') Topock - Competent Bedrock - conglomerate; reddish brown (5YR 5/4); dry; moderate cementation; friable			
167			
5168			
Topock - Competent Bedrock -			
conglomerate			
172			
End of Boring at 172.0 'bgs.			
_173			
5 - 178_			
179_			
	sea level GW -	groundwater	

ARCADIS Design & Consult for natural and built assets **Temporary Backfill Log** Sheet: Surface Elevation: 500.4 ft amsl Date Started: 12/04/2018 Well ID: IRZ-25-Pilot 2102414.6 Date Completed: 12/12/2018 Northing (NAD83): Drilling Co.: <u>Cascade</u> Easting (NAD83): 7615824.5 Client: PG&E Drilling Method: Total Depth: Project: Final GW Remedy Phase 1 Sonic Drilling 172 ft bgs Location: PG&E Topock, Needles, California Driller Name: Steve Vasquez Borehole Diameter: 6-12 inches N. Dominguez/C. Alverez Depth to First Water: 48.4 ft bgs Drilling Asst: Editor: Sean McGrane Project Number: RC000753.0051 Logger: Connor Mills Geologic Formation USCS Class USCS Code Depth (ft) Groundwater Calculated Material Volumes Well Construction Sample ID Material Volumes Installed (0.0 - 0.5') 1 (0.0 - 0.5') 1 (0%) Temporary Steel Plate with BMP (0.0 - 4.0') 12"Topock -Borehole SP-SM Fluvial Deposits (0.5 - 5.0') 4 bags (-49%) Note: Wildcat Washed (0.5 - 5.0') Plastered (0.5 - 5.0') 7.9 bags Sand 5 Topock -Fluvial SP-SM Deposits (4.0 - 172.0') 6" Borehole - 157.0') Pea (5.0 - 157.0') 65.8 (5.0 - 157.0') 60 bags (-9%) Note: Cal-Śilica 3/8"x1/4" Topock -SW-SM Fluvial Deposits 16 18 Topock -SM Fluvial Deposits Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater,

9/-	ARCAI	DIS Design & for natur built asso	Consultancy ral and ets		Temporary Back	fill Log	Sheet: 2 of 9		
Date Started: <u>12/04/2018</u>					_ Surface Elevation: 500.4	ft amsl	Well ID: IRZ-25-Pilot		
Date Completed: 12/12/2018				Northing (NAD83): 2102414.6		Well ID. IKZ-25-Pilot			
Drilling	Co.:	Cascade			_ Easting (NAD83): <u>7615</u>	324.5	Client: PG&E		
-		Sonic Drilling	a		_ Total Depth: <u>172 f</u>		Project: Final GW Remedy Phase 1		
Driller I		Steve Vasqu	-			nches		Topock, Needles, California	
Drilling		N. Domingu		lverez					
Logge		Connor Mills				McGrane	_ _ Project Number	: RC000753.0051	
		<u>5</u> 6	(0. =	(0, 10			-		
Depth (ft)	Groundwater Sample ID	Geologic Formation	Code	USCS	Well Constru	tion	Calculated Material Volumes	Material Volumes Installed	
			SM						
21									
22									
						X			
						X			
23						X			
24									
_									
25									
_									
26									
26		Topock - Fluvial	ML						
		Deposits				8			
27									
28									
						2			
20						2			
29						/			
						3			
30					(5.0 - 157.0') Pea Gravel	(4.0 - 172.0') 6" Borehole	(5.0 - 157.0') 65.8 bags	(5.0 - 157.0') 60 bags (-9%) Note: Cal-Silica 3/8"x1/4"	
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33						7			
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34						4			
35									
36		Topock - Fluvial	SM			₹			
		Deposits				Şi			
27						Ş			
37						8			
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ARCA	DIS Design & for natu built ass	& Consultancy ral and sets	Temporary Backfill Log	Sheet: 3 of 9
Date Started: Date Completed: Drilling Co.: Drilling Method: Driller Name:	12/04/2018 12/12/2018 Cascade Sonic Drilling Steve Vasqu	g	Surface Elevation: 500.4 ft amsl Northing (NAD83): 2102414.6 Easting (NAD83): 7615824.5 Total Depth: 172 ft bgs Borehole Diameter: 6-12 inches	Client: PG&E Project: Final GW Remedy Phase 1 Location: PG&E Topock, Needles, California
Drilling Asst: Logger:	-	ez/C. Alverez	Depth to First Water: 48.4 ft bgs Editor: Sean McGrane	Project Number: RC000753.0051
Groundwate Sample ID		USCS Code USCS Class	Well Construction	Calculated Material Volumes Material Volumes Installed
41	Topock - Fluvial Deposits	GM 0		
42 43 44 45 46 47 48 49	Topock - Fluvial Deposits	GW-GM		
505152	Topock - Alluvium Deposits	SM	(5.0 - 157.0') Pea (4.0 - 172. Boreho	0') 6" (5.0 - 157.0') 65.8 (5.0 - 157.0') 60 bags (-9%) Note: Cal-Silica 3/8"x1/4"
53	Topock -	GM		
58 59	Topock - Alluvium Deposits	ML		
60	200 = 11	GM Classificati		rface, amsl = above mean sea level, GW = groundwater,

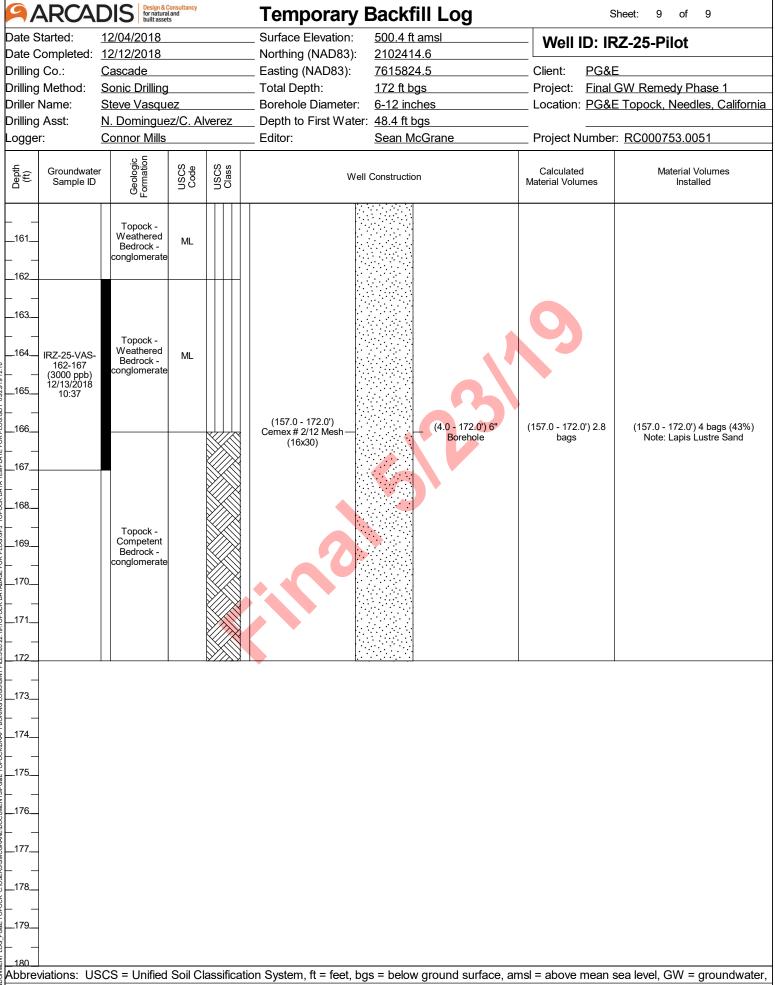


ARCADIS Design & Consultry for natural and for natural and unit assets **Temporary Backfill Log** Sheet: Date Started: Surface Elevation: 12/04/2018 500.4 ft amsl Well ID: IRZ-25-Pilot Northing (NAD83): 2102414.6 Date Completed: 12/12/2018 Drilling Co.: <u>Cascade</u> Easting (NAD83): 7615824.5 Client: PG&E Drilling Method: Total Depth: Project: Final GW Remedy Phase 1 Sonic Drilling 172 ft bgs Driller Name: Steve Vasquez Borehole Diameter: 6-12 inches Location: PG&E Topock, Needles, California N. Dominguez/C. Alverez Depth to First Water: 48.4 ft bgs Drilling Asst: Connor Mills Editor: Sean McGrane Project Number: RC000753.0051 Logger: Geologic Formation USCS Class USCS Code Depth (ft) Groundwater Calculated Material Volumes Well Construction Sample ID Material Volumes Installed 81 82 83 Topock -Alluvium SM Deposits 85 .86 88 89 (5.0 - 157.0') Pea (4.0 - 172.0') 6" (5.0 - 157.0') 65.8 (5.0 - 157.0') 60 bags (-9%) 90 Gravel Borehole Note: Cal-Silica 3/8"x1/4" Topock -Alluvium Deposits SM 91 92 93 IRZ-25-VAS-92-97 (130 ppb) 12/6/2018 Topock -.95 M 09:07 Alluvium Deposits 96 Topock -SM Alluvium Deposits 97 98 Topock -SW-SM Alluvium Deposits .99 Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater,

ARCADIS Design & Consultry for natural and for natural and unit assets **Temporary Backfill Log** Sheet: Date Started: Surface Elevation: 12/04/2018 500.4 ft amsl Well ID: IRZ-25-Pilot 12/12/2018 Northing (NAD83): 2102414.6 Date Completed: Drilling Co.: <u>Cascade</u> Easting (NAD83): 7615824.5 Client: PG&E Drilling Method: Total Depth: Project: Final GW Remedy Phase 1 Sonic Drilling 172 ft bgs Driller Name: Steve Vasquez Borehole Diameter: 6-12 inches Location: PG&E Topock, Needles, California N. Dominguez/C. Alverez Depth to First Water: 48.4 ft bgs Drilling Asst: Connor Mills Editor: Sean McGrane Project Number: RC000753.0051 Logger: Geologic Formation USCS Class USCS Code Depth (ft) Groundwater Calculated Material Volumes Well Construction Sample ID Material Volumes Installed Topock -_101_ SW-SM Alluvium Deposits 102 Topock -ML Alluvium _103_ Deposits 104 _105_ _106_ Topock -Alluvium Deposits 107 108 109 (5.0 - 157.0') Pea (4.0 - 172.0') 6" (5.0 - 157.0') 65.8 (5.0 - 157.0') 60 bags (-9%) Note: Cal-Śilica 3/8"x1/4" Gravel Borehole Topock -Alluvium SM Deposits IRZ-25-VAS-112-117 (< 0.17 U ppb) 12/11/2018 116 _118_ Topock -Alluvium SM Deposits _119_

	9/-	ARCA	DIS Design & for natur built ass	Consultancy al and ets		Temporary I	Backfill Log		Sheet: 7 of 9		
Date Completed 12/12/2018								Well ID: IRZ-25-Pilot			
Total Depth: Some Drilling Total Depth: 172 ft bgs	Drilling Co.: Drilling Method:					- '					
Drief Name Steve Vasquez Borshole Diameter 6-12 mches Location: PG&E Topock, Needles, California Drief Name Connor Mills Editor: Editor: Project Number: RC000753.0051											
Deling Asset N. Deminguez/C. Alwereu Pethro Fra Water 48.4 ft Discourse Project Number RC000753.0051			-	-			•	•	-		
Connot Mile February Februa					lverez			Location. PGo	kE TOPOCK, Needles, California		
Secure S	_		-		IVCICZ			Project Numbe	Project Number: RC000753.0051		
122											
122	Depth (ft)		Geologi Formatic	Code	USCS	Well	Construction				
Topock Alluvium Deposits SM (5.0 - 157.0') 80 Bags (6.0 - 157.0') 80	122 123 		Alluvium	ML				9			
130. 130. 131. 132. 133. 134. 135. 136. 137. 138. 140. ML ML ML ML ML ML ML ML ML M	 126 		Alluvium	SM							
	128 129 130 131		Alluvium	GM		(5.0 - 157.0') Pea Gravel	(4.0 - 172.0') 6" Borehole		(5.0 - 157.0') 60 bags (-9%) Note: Cal-Silica 3/8"x1/4"		
	134 135 136		Alluvium	ML							
	138 139 140		Alluvium Deposits	ML							

ARCADIS Design & Consult for natural and built assets **Temporary Backfill Log** Sheet: 12/04/2018 Surface Elevation: 500.4 ft amsl Date Started: Well ID: IRZ-25-Pilot 2102414.6 Date Completed: 12/12/2018 Northing (NAD83): Drilling Co.: <u>Cascade</u> Easting (NAD83): 7615824.5 Client: PG&E Drilling Method: Total Depth: Project: Final GW Remedy Phase 1 Sonic Drilling 172 ft bgs Driller Name: Steve Vasquez Borehole Diameter: 6-12 inches Location: PG&E Topock, Needles, California N. Dominguez/C. Alverez Depth to First Water: 48.4 ft bgs Drilling Asst: Editor: Sean McGrane Project Number: RC000753.0051 Logger: Connor Mills Geologic Formation USCS Class USCS Code Depth (ft) Groundwater Calculated Material Volumes Well Construction Sample ID Material Volumes Installed _141_ 142 _143. Topock -Alluvium ML Deposits 144 _145_ _146_ _148_ (5.0 - 157.0') 60 bags (-9%) Note: Cal-Silica 3/8"x1/4" (5.0 - 157.0') Pea (5.0 - 157.0') 65.8 Gravel bags 149 IRZ-25-VAS-147-152 (3600 ppb) 12/11/2018 (4.0 - 172.0') 6" 150 13:54 Borehole 151 Topock -152 Alluvium Deposits 153 _155_ 156 157 158_ Topock -(157.0 - 172.0') Weathered (157.0 - 172.0') 2.8 (157.0 - 172.0') 4 bags (43%) Cemex # 2/12 Mesh ML Bedrock -Note: Lapis Lustre Sand (16x30) conglomerate _159_ 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.