TOPOCK WELL COMPLETION AND ACCEPTANCE REPORT - REMEDIATION WELLS

Well Name: ER-02 (Note: Documentation referencing ER-2 is in reference to ER-02.)

Screen Zone (feet below ground surface [bgs]): 47 – 136 (see *Meets Design Criteria for Construction Section* below for additional details)

Dates Pilot Borehole Drilling: 3/31/2022 – 5/08/2022

Dates Well Installation: 5/08/2022 – 5/10/2022 (6/8/2022 for Well Bung Installation)

Dates Well Head Completion: 5/10/2022

Dates of Development: 6/04/2022 – 6/28/2022

Note: Well Testing was completed successfully and in accordance with Well Specification 33 22 00 unless noted below.

Well Testing Conducted	Required (Y/N)	Dates	Comments
Alignment Test	Y	6/29/2022	Completed Successfully
Specific Capacity Test	Y	6/29/2022	See comments below related to Specific Capacity.
Injectivity Test	N	--	--
Plumbness Test (Gyroscope)	N	--	--
Spinner Log	N	--	--
Downhole Video	Y	6/30/2022	None
Other	--	--	--
48-hour Constant Rate Test	Added to Phase 2a SOW	11/3/22-11/10/2022	See comments below related to Specific Capacity.

Acceptance Criteria

☒ **Meets Design Criteria for Construction** - Well installed in accordance with well specifications and final design.
Comments: As-built well construction consistent with the final well design (see Attached Logs). The Phase 2a scope of work preliminary design included the installation of a conductor casing to the top of the competent bedrock. The bedrock was planned to be reamed to a diameter of 6-inches and the well was to be completed as an open bedrock well to an estimated depth of 138 ft bgs.

However, drilling conditions and lithologic descriptions from the pilot borehole suggested the bedrock was not fully competent (See boring log). To avoid installing a well with the potential for collapse, the well was redesigned as a fully cased well with well screen depths consistent with the depth of the originally open bedrock well (See Final Well Design and Well Construction Log). After observing drilling conditions during the pilot borehole of ER-01, the drillinger company recommended that a pilot hole be drilled using 4-inch and 6-inch diameter tooling. Once the pilot hole was drilling to total depth, larger diameter tooling would washed over the 6-inch the diameter drill casing using water. This process would continue until the borehole was reamed to a minimum 10-inch diameter for the installation of the 6-inch diameter well. During various diameters of drill tooling became temporarily locked up in the formation. As result the larger diameter casing could not be flushed over the 6-inch casing. Due to challenging drilling conditions, the borehole was reamed using tooling with multiple diameters e drilling logs various diameter(see attachments).

During development, filter pack material was observed in the sediments removed by bailing. As the sediments and filter pack were removed by bailing additional filter pack would enter the well, indicating potential damage to the well. A camera survey of the well, conducted on 6 June 2022 (results attached) did not identify damage above approximately 133 feet bgs. The video log could not assess well condition below the 133 foot bgs depth due to poor visibility and sediment/filter pack in the well. The location of the sediment/filter pack indicated potential damage to the lower portion of the screen or in the joint connecting the sump to the screen. To prevent additional filter pack from entering the well and repair the well, a well bung (plug) was installed to approximately 136 to 137 feet bgs. (approximately 2 feet above screen bottom) and well development resumed.
Trace amounts of fine-grained filter pack sand continued to be observed in the sediments material removed by bailing during well development. As discussed in the call with PGE, PMO, ABC, and Arcadis, a sample of the filter pack material used at ER-2 was submitted to Western Labs for grain size analysis. The analysis was conducted to evaluate if the filter pack material installed met the grain size distribution specifications grading parameters provided by the manufacture and approved in the submittal. Results of the analysis of the filter pack sand used for the installation of the well showed a higher percentage of fine-grained sand compared to the grading parameter grain distribution specifications s provided by the manufacturer in the submittal. On 6/23/22 ABC provide a The certificate of compliance supplied by the manufacture. The grain size distribution data from the manufacturer's certificate of compliance and the results of the grain-size analysis grain size results from the sample submitted to Western Technologies by Arcadis where plotted in a grain-size distribution curve for comparison. The grain-size distribution plots showed that the submittal data and certificate of compliance data where not consistent with the results of the Western Technologies sieve grain-size analysis provided to Arcadis as a submittal. The grain-size analysis showed that the filter pack installed had a higher percentage of fine-grained sand and did not meet the published submittal or certificate of compliance grain-size distribution. The higher percentage of fine-grained sand in the filter pack most likely resulted in an increase in the volume of filter pack sand passing through the 0.020-inch slot well screen during bailing activities. Based on the results of the grain size analysis, it is likely that the increased volume of sand observed entering the well was due to the filter pack sand not meeting the manufacturer's published grain-sized distribution specifications and not from a damaged well screen or sump. The fine-grained sand observed in the sediments removed from the well during well development was the result of the fine-grained filter pack passing through the 0.020" slot well screen.

☒ **Meets Design Criteria for Specific Capacity Testing**

Goal from 100% Design:	0.5 gpm
Tested Rates (gallons per minute [gpm]):	0.25
Specific Capacity	0.0125 gpm/ft per 20.05 ft of drawdown at an extraction rate of ~0.25 gpm.
Comments	Drawdown did not stabilize after approximately 244 minutes of pumping during the specific capacity evaluation and the test was ended. A constant-rate pump test was later conducted to further evaluate the well yield. The results of the constant-rate test will be submitted separately. Although this well did not meet the target pumping rate, the other the ER-01 bedrock wells exceeded its target extraction rates. Flow in bedrock is highly variable and dependent on a variety of factors including distribution of fractures and variability of cementation.

☒ **Well Functions as Designed**

the installation of the well bung (plug), well development was able to be completed. The downhole camera survey showed that the well
criteria for the intended use.

Comments:

☒ **Meets Design Criteria for Plumbness and Equipment Install** – The well was free of blockages and of sufficient plumbness and alignment to allow for well development, “Dummy Tool” alignment testing, well testing, and well sampling.

Comments: Downhole equipment has not been installed as of the submittal of this Completion Report. Installation is planned to be completed in 2023.

☒ **Meets Design Criteria for Turbidity (Turbidity less than 50 NTU)**

Comments: Turbidity following well development meets the design criteria.

Final Turbidity at End of Well Development

Screen Zone	Turbidity (NTUs)
48 – 136’	25.8

☒ **Other Water Quality Parameters**

Water Quality Parameters at End of Development

Screen Depths	Temp (C)	pH	ORP (mV)	Cond (m*S*/cm)	DO
47 – 136 feet bgs	33.5	9.12	42.2	13840	2.07

ATTACHMENTS

- Final Well Design
- Boring Log
- Drilling Logs (logs for multiple diameter boreholes)
- Well Construction Log
- Well Development Log
- Specific Capacity Testing Package
- Photo Logs
- Filter Pack Sand Issue Summary and Plots
- Video Survey Reports
    - Investigative Video Log on 5 June 2022
    - Final Video Log 30 June 2022

NOTE:
Field documentation for all phases of well installation, well development and testing are included in the Daily Well Construction Reports. The Daily Well Construction Reports and DoR Daily Well Construction Quality Control Reports are compiled and organized by date on *AutodeskBuild*. The parent folder for both daily reports are located on *AutodeskBuild* in the following location: Files/For the Field/DOR Drilling Quality Control/01 QC Documentation. Analytical reports are compiled and uploaded to *AutodeskBuild* in the same folder. The technical scopes were performed by or under the direct supervision of Designer of Record (DoR) Professional Geologists (see attached Certification Statement).

Acceptance APPROVAL
DoR Approver Name: Greg Foote

Approval Signature/Date:  1/27/23

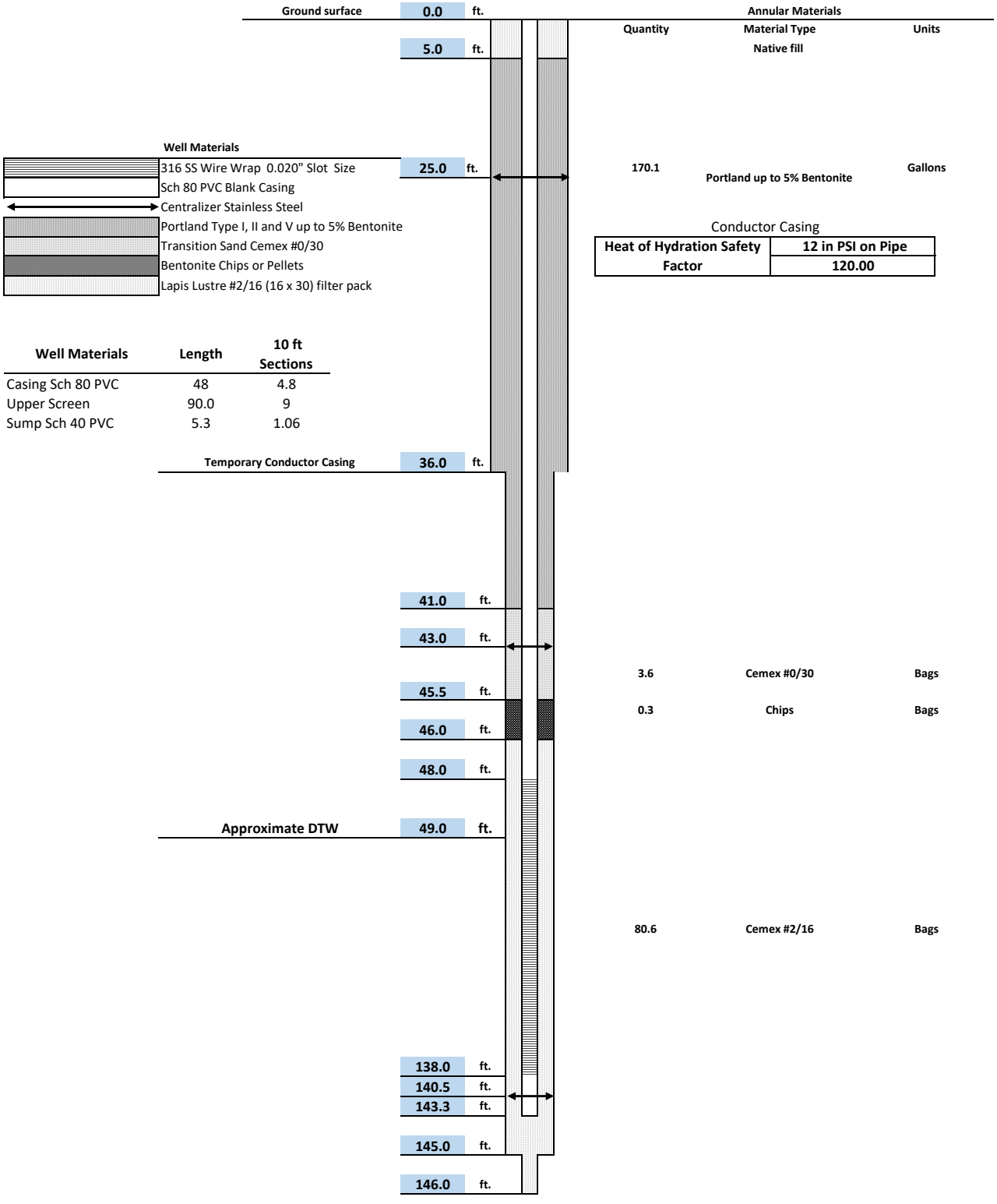
Attachment 1

Final Well Design

ER-02 Final Well Design 05/08/22

Conductor casing Dia:	12	Well Casing Outer Diameter:	6.5
Drill casing Dia:	10.75	Well Casing Inner Diameter:	6
Rathole Dia:	8		

Surface Completion:



Annular Materials

Quantity	Material Type	Units
	Native fill	
170.1	Portland up to 5% Bentonite	Gallons
3.6	Cemex #0/30	Bags
0.3	Chips	Bags
80.6	Cemex #2/16	Bags

Well Materials

- 316 SS Wire Wrap 0.020" Slot Size
- Sch 80 PVC Blank Casing
- Centralizer Stainless Steel
- Portland Type I, II and V up to 5% Bentonite
- Transition Sand Cemex #0/30
- Bentonite Chips or Pellets
- Lapis Lustre #2/16 (16 x 30) filter pack

Well Materials	Length	10 ft Sections
Casing Sch 80 PVC	48	4.8
Upper Screen	90.0	9
Sump Sch 40 PVC	5.3	1.06

Conductor Casing

Heat of Hydration Safety Factor	12 in PSI on Pipe
	120.00

Attachment 2

Boring Log

Boring Log

ARCADIS

Sheet: 1 of 8

Boring No.: ER-02

Date Started:	03/31/2022	Surface Elevation:	506.35 ft amsl		
Date Completed:	05/08/2022	Northing (NAD83):	2101009.50		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	146 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mounted	Borehole Diameter:	8-12 inches	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Depth to First Water:	60.0 ft bgs		
Drilling Asst:	J. Candelaria / F. Perez	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Grant Willford	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
1		No Sieve Samples Collected	No Groundwater Samples Collected	Fill	SM		(0-1.5 ft) Silty sand with gravel (SM); reddish brown (5YR 5/4); very fine to very coarse grained, angular to subround; little silt; little small to very large pebbles, angular to subangular; little granules, angular to subangular; trace small cobbles, angular; trace clay; dry.		
2	5.5			Weathered Bedrock - Conglomerate	N/A		(1.5-7 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; very intensely fractured; massive; some competent rock fragments observed, 1-4 inches in length; most fragments are weak and friable; dry; NOTE: Core sample mostly pulverized by drilling process.		
7	5			Weathered Bedrock - Conglomerate	N/A		(7-22 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; very intensely fractured; massive; most fragments observed are weak and friable with a few competent rock fragments; dry; NOTE: Core sample mostly pulverized by drilling process.	(7.0 - 50.0') Rough drilling	(7.0 - 50.0') No drilling fluid used
12	5								
17	5								
20									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered during drilling and approximate static measured during pre-development, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.

Boring Log

ARCADIS

Boring No.: ER-02

Date Started:	03/31/2022	Surface Elevation:	506.35 ft amsl		
Date Completed:	05/08/2022	Northing (NAD83):	2101009.50		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	146 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mounted	Borehole Diameter:	8-12 inches	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Depth to First Water:	60.0 ft bgs		
Drilling Asst:	J. Candelaria / F. Perez	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Grant Willford	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
21	5	No Sieve Samples Collected	No Groundwater Samples Collected	Weathered Bedrock - Conglomerate	N/A		(7-22 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; very intensely fractured; massive; most fragments observed are weak and friable with a few competent rock fragments; dry; NOTE: Core sample mostly pulverized by drilling process.		
22					NR		(22-23 ft) No Recovery; see Drilling Notes.	(22.0 - 27.0') Top foot of drill run fell out of core barrel during extraction onto drill deck/into hopper.	(22.0 - 27.0') No drilling fluid used
23									
24	4						(23-50 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; very intensely fractured; massive; most fragments observed are weak and friable with a few competent rock fragments; dry; NOTE: Core sample mostly pulverized by drilling process.		
25									
26									
27									
28	5								
29									
30									
31				Weathered Bedrock - Conglomerate	N/A				
32									
33	5								
34									
35								(35.0') 6-inch casing getting hung up at approxmately 35 ft. bgs. Trip out 6-inch to drill with larger diameter tooling (see Drilling Logs). 6-inch pilot hole drilling resumes on 4/25/22.	(35.0') No drilling fluid used
36									
37									
38	6								
39									
40									

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Boring Log

ARCADIS

Boring No.: ER-02

Date Started:	03/31/2022	Surface Elevation:	506.35 ft amsl		
Date Completed:	05/08/2022	Northing (NAD83):	2101009.50		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	146 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mounted	Borehole Diameter:	8-12 inches	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Depth to First Water:	60.0 ft bgs		
Drilling Asst:	J. Candelaria / F. Perez	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Grant Willford	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
41	6	No Sieve Samples Collected	No Groundwater Samples Collected	Weathered Bedrock - Conglomerate	N/A		(23-50 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; very intensely fractured; massive; most fragments observed are weak and friable with a few competent rock fragments; dry; NOTE: Core sample mostly pulverized by drilling process.		
42									
43									
44	4								
45									
46									
47	5								
48									
49									
50									
51				Weathered Bedrock - Conglomerate	N/A		(50-72 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; very intensely fractured; massive; most fragments observed are weak and friable with a few competent rock fragments; dry; NOTE: Core sample mostly pulverized by drilling process.	(50.0 - 52.0') Drilling becoming significantly rougher.	(50.0 - 52.0') No drilling fluid used
52									
53	5							(52.0 - 64.0') Rough drilling	(52.0 - 64.0') No drilling fluid used
54									
55									
56									
57									
58	5								
59									
60									

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Boring Log

ARCADIS

Sheet: 4 of 8

Date Started:	03/31/2022	Surface Elevation:	506.35 ft amsl	**Boring No.:**	**ER-02**
Date Completed:	05/08/2022	Northing (NAD83):	2101009.50		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	146 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mounted	Borehole Diameter:	8-12 inches	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Depth to First Water:	60.0 ft bgs		
Drilling Asst:	J. Candelaria / F. Perez	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Grant Willford	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
61	5	No Sieve Samples Collected	No Groundwater Samples Collected	Weathered Bedrock - Conglomerate	N/A		(50-72 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; very intensely fractured; massive; most fragments observed are weak and friable with a few competent rock fragments; dry; NOTE: Core sample mostly pulverized by drilling process. (60 ft) Observed slight moisture on rock fragment.		
62									
63									
64	5							(64.0 - 67.0') Drilling becoming significantly rougher.	(64.0 - 67.0') No drilling fluid used
65									
66									
67									
68	5							(67.0 - 105.0') Rough drilling	(67.0 - 105.0') No drilling fluid used
69									
70									
71									
72									
73				Weathered Bedrock - Conglomerate	N/A		(72-73.5 ft) No Recovery; see Drilling Notes.	(72.0 - 77.0') Top portion of drill run fell out of core barrel during extraction onto drill deck/soil hopper.	(72.0 - 77.0') No drilling fluid used
74							(73.5-82 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; very intensely fractured; massive; most fragments observed are weak and friable with a few competent rock fragments; dry; NOTE: Core sample mostly pulverized by drilling process. (74-74.3 ft) Rock fragments are moist.		
75	3.5								
76									
77				Weathered Bedrock - Conglomerate	N/A				
78	5								
79									
80									

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Boring Log

ARCADIS

Sheet: 5 of 8

Date Started:	03/31/2022	Surface Elevation:	506.35 ft amsl	**Boring No.:**	**ER-02**
Date Completed:	05/08/2022	Northing (NAD83):	2101009.50		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	146 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mounted	Borehole Diameter:	8-12 inches	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Depth to First Water:	60.0 ft bgs		
Drilling Asst:	J. Candelaria / F. Perez	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Grant Willford	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
81	5	No Sieve Samples Collected	No Groundwater Samples Collected	Weathered Bedrock - Conglomerate	N/A		(73.5-82 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; very intensely fractured; massive; most fragments observed are weak and friable with a few competent rock fragments; dry; NOTE: Core sample mostly pulverized by drilling process.		
82									
83	2.5			Weathered Bedrock - Conglomerate	NR		(82-84.5 ft) No Recovery; see Drilling Notes.	(82.0 - 87.0') Top portion of drill run fell out of core barrel during extraction onto drill deck/soil hopper.	(82.0 - 87.0') No drilling fluid used
84									
85							(84.5-117 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; very intensely fractured; massive; most fragments observed are weak and friable with a few competent rock fragments; dry; NOTE: Core sample mostly pulverized by drilling process.		
86									
87									
88	5								
89									
90									
91									
92				Weathered Bedrock - Conglomerate	N/A				
93									
94	5						(94 ft) Slight increase in competent rock fragments.		
95									
96									
97									
98	6							(97.0 - 127.0') Began using water to advance in 6-inch casing.	(97.0 - 127.0') 500 gallons of water used; 450 gallons of water recovered; 50 gallons of water lost
99									
100									

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Boring Log

ARCADIS

Boring No.: ER-02

Date Started:	03/31/2022	Surface Elevation:	506.35 ft amsl	Client:	PG&E
Date Completed:	05/08/2022	Northing (NAD83):	2101009.50	Project:	Final GW Remedy Phase 2A
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75	Location:	PG&E Topock, Needles California
Drilling Method:	Sonic Drilling	Total Depth:	146 ft bgs		
Drill Rig Type:	Terra Sonic Truck Mounted	Borehole Diameter:	8-12 inches		
Driller Name:	Eddie Ramos	Depth to First Water:	60.0 ft bgs		
Drilling Asst:	J. Candelaria / F. Perez	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Grant Willford	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
101	6	No Sieve Samples Collected	No Groundwater Samples Collected	Weathered Bedrock - Conglomerate	N/A		(84.5-117 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; very intensely fractured; massive; most fragments observed are weak and friable with a few competent rock fragments; dry; NOTE: Core sample mostly pulverized by drilling process. (100.7-101 ft) Rock fragments are moist.		
102									
103									
104									
105								(105.0 - 107.0') Significantly rougher drilling.	(105.0 - 107.0') No drilling fluid used
106									
107	9								
108									
109									
110									
111									
112									
113	3								
114									
115									
116	1.5								
117									
118	6				NR		(117-120 ft) No Recovery; see Drilling Notes.	(117.0 - 120.0') Top portion of drill run fell out of core barrel during extraction onto drill deck/soil hopper.	(117.0 - 120.0') No drilling fluid used
119									
120									

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Boring Log

ARCADIS

Boring No.: ER-02

Date Started:	03/31/2022	Surface Elevation:	506.35 ft amsl		
Date Completed:	05/08/2022	Northing (NAD83):	2101009.50		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	146 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mounted	Borehole Diameter:	8-12 inches	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Depth to First Water:	60.0 ft bgs		
Drilling Asst:	J. Candelaria / F. Perez	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Grant Willford	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
121	6	No Sieve Samples Collected	No Groundwater Samples Collected	Weathered Bedrock - Conglomerate	N/A		(120-127 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; very intensely fractured; massive; most fragments observed are weak and friable with a few competent rock fragments; dry; NOTE: Core sample mostly pulverized by drilling process. (120.01-122 ft) Rock fragments are moist.		
122									
123								(123.0 - 127.0') Drilling becoming significantly rougher. Core fell out of core barrel took two attempts to recover.	(123.0 - 127.0') No drilling fluid used
124	4								
125									
126									
127									
128	2.6				NR		(127-129.4 ft) No Recovery; see Drilling Notes.	(127.0 - 132.0') Top portion of drill run fell out of core barrel during extraction onto drill deck/soil hopper.	(127.0 - 132.0') No drilling fluid used (127.0 - 137.0') 500 gallons of water used; 400 gallons of water recovered; 100 gallons of water lost
129									
130				Weathered Bedrock - Conglomerate	N/A		(129.4-145 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; very intensely fractured; massive; most fragments observed are weak and friable with a few competent rock fragments; dry; NOTE: Core sample mostly pulverized by drilling process.	(127.0 - 137.0') Drilled with water to advance 6-inch casing.	
131									
132									
133	5								
134									
135									
136									
137									
138	8							(137.0 - 145.0') Drilled with water to advance 6-inch casing.	(137.0 - 145.0') 300 gallons of water used; 200 gallons of water recovered; 100 gallons of water lost
139									
140									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered during drilling and approximate static measured during pre-development, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.

Boring Log

ARCADIS

Sheet: 8 of 8

Boring No.: ER-02

Date Started:	03/31/2022	Surface Elevation:	506.35 ft amsl		
Date Completed:	05/08/2022	Northing (NAD83):	2101009.50		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	146 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mounted	Borehole Diameter:	8-12 inches	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Depth to First Water:	60.0 ft bgs		
Drilling Asst:	J. Candelaria / F. Perez	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Grant Willford	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
141–145	8	No Sieve Samples Collected	No Groundwater Samples Collected	Weathered Bedrock - Conglomerate	N/A		(129.4-145 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; very intensely fractured; massive; most fragments observed are weak and friable with a few competent rock fragments; dry; NOTE: Core sample mostly pulverized by drilling process.		
145–146	0				NR		(145-146 ft) No Recovery; see Drilling Notes.	(145.0 - 146.0') Drilled during cleanout of 10-inch casing. Sample not bagged or logged.	(145.0 - 146.0') No drilling fluid used
							End of Boring at 146 ft bgs.		

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered during drilling and approximate static measured during pre-development, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.

Attachment 3

Drilling Logs (for multiple diameter boreholes)

Drilling Log

Sheet: 1 of 8

Date Started:	04/26/2022	Surface Elevation:	506.35 ft amsl
Date Completed:	04/27/2022	Northing (NAD83):	2101009.50
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75
Drilling Method:	Roto-Sonic	Total Depth:	145.0 ft bgs
Drill Rig Type:	Terra Sonic Truck Mount	Conductor Casing Diameter:	9 inches
Driller Name:	Eddie Ramos	Drill Casing Diameter:	8 inches
Drilling Asst:	J. Candelaria / F. Perez	Drill Bit:	8 inches
Tool-Pusher:	N/A	Depth to First Water:	60.0 ft bgs
Rig Geologist:	G. Wilford / A. McIntyre	Converted to Well:	[X] Yes [ ] No

Boring No.: ER-02 8-inch

Client: PG&E
Project: Final GW Remedy Phase 2A
Location: PG&E Topock, Needles California
Project Number: 30126255

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
1	Penetration rates not documented for sonic drilling not required per Specification 33 22 00	SM		(0-1.5 ft) Silty sand with gravel (SM); reddish brown (5YR 5/4).	(0.0 - 37.0') Flushing the 8-inch diameter drill casing over the 6-inch diameter drill casing through 9-inch diameter temporary conductor casing.	(0.0 - 37.0') 100 gallons of water used; 0 gallons of water recovered; 100 gallons of water lost
2		N/A		(1.5-7 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		
7		N/A		(7-22 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		
20						

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered during drilling and approximate static measured during drilling, respectively.

Drilling Log

Date Started:	04/26/2022	Surface Elevation:	506.35 ft amsl
Date Completed:	04/27/2022	Northing (NAD83):	2101009.50
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75
Drilling Method:	Roto-Sonic	Total Depth:	145.0 ft bgs
Drill Rig Type:	Terra Sonic Truck Mount	Conductor Casing Diameter:	9 inches
Driller Name:	Eddie Ramos	Drill Casing Diameter:	8 inches
Drilling Asst:	J. Candelaria / F. Perez	Drill Bit:	8 inches
Tool-Pusher:	N/A	Depth to First Water:	60.0 ft bgs
Rig Geologist:	G. Wilford / A. McIntyre	Converted to Well:	[X] Yes [ ] No

Boring No.: ER-02 8-inch

Client: PG&E
Project: Final GW Remedy Phase 2A
Location: PG&E Topock, Needles California
Project Number: 30126255

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
21		N/A		(7-22 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		
22		NR		(22-23 ft) No Recovery; see Drilling Notes.		
23		N/A		(23-50 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		
24						
25						
26						
27						
28						
29	Penetration rates not documented for sonic drilling not required per Specification 33 22 00					
30						
31						
32						
33						
34						
35						
36						
37					(37.0 - 47.0') Flushing the 8-inch diameter drill casing over the 6-inch diameter drill casing.	(37.0 - 47.0') 100 gallons of water used; 75 gallons of water recovered; 25 gallons of water lost
38						
39						
40						

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered during drilling and approximate static measured during drilling, respectively.

Drilling Log

Sheet: 3 of 8

Date Started:	04/26/2022	Surface Elevation:	506.35 ft amsl	**Boring No.: ER-02 8-inch**	
Date Completed:	04/27/2022	Northing (NAD83):	2101009.50		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75	Client:	PG&E
Drilling Method:	Roto-Sonic	Total Depth:	145.0 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mount	Conductor Casing Diameter:	9 inches	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Drill Casing Diameter:	8 inches		
Drilling Asst:	J. Candelaria / F. Perez	Drill Bit:	8 inches	Project Number:	30126255
Tool-Pusher:	N/A	Depth to First Water:	60.0 ft bgs		
Rig Geologist:	G. Wilford / A. McIntyre	Converted to Well:	[X] Yes [ ] No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
41				(23-50 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		
42						
43						
44						
45		N/A				
46						
47					(47.0 - 57.0') Flushing the 8-inch diameter drill casing over the 6-inch diameter drill casing.	(47.0 - 57.0') 300 gallons of water used; 50 gallons of water recovered; 250 gallons of water lost
48	Penetration rates not documented for sonic drilling not required per Specification 33 22 00					
49						
50				(50-72 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		
51						
52						
53						
54						
55		N/A				
56						
57					(57.0 - 67.0') Flushing the 8-inch diameter drill casing over the 6-inch diameter drill casing.	(57.0 - 67.0') 200 gallons of water used; 90 gallons of water recovered; 110 gallons of water lost
58						
59						
60						

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Drilling Log

Sheet: 4 of 8

Date Started:	04/26/2022	Surface Elevation:	506.35 ft amsl	**Boring No.:**	**ER-02 8-inch**
Date Completed:	04/27/2022	Northing (NAD83):	2101009.50		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75	Client:	PG&E
Drilling Method:	Roto-Sonic	Total Depth:	145.0 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mount	Conductor Casing Diameter:	9 inches	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Drill Casing Diameter:	8 inches		
Drilling Asst:	J. Candelaria / F. Perez	Drill Bit:	8 inches	Project Number:	30126255
Tool-Pusher:	N/A	Depth to First Water:	60.0 ft bgs		
Rig Geologist:	G. Wilford / A. McIntyre	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
61				(50-72 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4). (60 ft) Observed slight moisture on rock fragment.		
62						
63						
64						
65						
66		N/A				
67					(67.0 - 77.0') Flushing the 8-inch diameter drill casing over the 6-inch diameter drill casing.	(67.0 - 77.0') 300 gallons of water used; 270 gallons of water recovered; 30 gallons of water lost
68						
69	Penetration rates not documented for sonic drilling not required per Specification 33 22 00					
70						
71						
72		N/A		(72-73.5 ft) No Recovery; see Drilling Notes.		
73						
74		N/A		(73.5-82 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4). (74-74.3 ft) Rock fragments are moist.		
75						
76						
77					(77.0 - 87.0') Flushing the 8-inch diameter drill casing over the 6-inch diameter drill casing.	(77.0 - 87.0') 300 gallons of water used; 270 gallons of water recovered; 30 gallons of water lost
78						
79						
80						

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered during drilling and approximate static measured during drilling, respectively.

Drilling Log

Sheet: 5 of 8

Date Started:	04/26/2022	Surface Elevation:	506.35 ft amsl
Date Completed:	04/27/2022	Northing (NAD83):	2101009.50
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75
Drilling Method:	Roto-Sonic	Total Depth:	145.0 ft bgs
Drill Rig Type:	Terra Sonic Truck Mount	Conductor Casing Diameter:	9 inches
Driller Name:	Eddie Ramos	Drill Casing Diameter:	8 inches
Drilling Asst:	J. Candelaria / F. Perez	Drill Bit:	8 inches
Tool-Pusher:	N/A	Depth to First Water:	60.0 ft bgs
Rig Geologist:	G. Wilford / A. McIntyre	Converted to Well:	[X] Yes [ ] No

Boring No.: ER-02 8-inch

Client: PG&E
Project: Final GW Remedy Phase 2A
Location: PG&E Topock, Needles California
Project Number: 30126255

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
81		N/A		(73.5-82 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		
82						
83		NR		(82-84.5 ft) No Recovery; see Drilling Notes.		
84						
85				(84.5-117 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		
86						
87					(87.0 - 97.0') Flushing the 8-inch diameter drill casing over the 6-inch diameter drill casing.	(87.0 - 97.0') 400 gallons of water used; 360 gallons of water recovered; 40 gallons of water lost
88						
89	Penetration rates not documented for sonic drilling not required per Specification 33 22 00					
90						
91						
92		N/A				
93						
94				(94 ft) Slight increase in competent rock fragments.		
95						
96						
97						
98					(97.0 - 107.0') Flushing the 8-inch diameter drill casing over the 6-inch diameter drill casing.	(97.0 - 107.0') 300 gallons of water used; 270 gallons of water recovered; 30 gallons of water lost
99						
100						

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered during drilling and approximate static measured during drilling, respectively.

Drilling Log

Sheet: 6 of 8

Date Started:	04/26/2022	Surface Elevation:	506.35 ft amsl
Date Completed:	04/27/2022	Northing (NAD83):	2101009.50
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75
Drilling Method:	Roto-Sonic	Total Depth:	145.0 ft bgs
Drill Rig Type:	Terra Sonic Truck Mount	Conductor Casing Diameter:	9 inches
Driller Name:	Eddie Ramos	Drill Casing Diameter:	8 inches
Drilling Asst:	J. Candelaria / F. Perez	Drill Bit:	8 inches
Tool-Pusher:	N/A	Depth to First Water:	60.0 ft bgs
Rig Geologist:	G. Wilford / A. McIntyre	Converted to Well:	[X] Yes [ ] No

Boring No.: ER-02 8-inch

Client: PG&E
Project: Final GW Remedy Phase 2A
Location: PG&E Topock, Needles California
Project Number: 30126255

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
101	Penetration rates not documented for sonic drilling not required per Specification 33 22 00	N/A		(84.5-117 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4). (100.7-101 ft) Rock fragments are moist.		
107					(107.0 - 117.0') Flushing the 8-inch diameter drill casing over the 6-inch diameter drill casing.	(107.0 - 117.0') 200 gallons of water used; 200 gallons of water recovered; 0 gallons of water lost
117		NR		(117-120 ft) No Recovery; see Drilling Notes.	(117.0 - 127.0') Flushing the 8-inch diameter drill casing over the 6-inch diameter drill casing.	(117.0 - 127.0') 150 gallons of water used; 150 gallons of water recovered; 0 gallons of water lost
120						

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered during drilling and approximate static measured during drilling, respectively.

Drilling Log

Date Started:	04/26/2022	Surface Elevation:	506.35 ft amsl	**Boring No.:**	**ER-02 8-inch**
Date Completed:	04/27/2022	Northing (NAD83):	2101009.50		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75	Client:	PG&E
Drilling Method:	Roto-Sonic	Total Depth:	145.0 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mount	Conductor Casing Diameter:	9 inches	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Drill Casing Diameter:	8 inches		
Drilling Asst:	J. Candelaria / F. Perez	Drill Bit:	8 inches	Project Number:	30126255
Tool-Pusher:	N/A	Depth to First Water:	60.0 ft bgs		
Rig Geologist:	G. Wilford / A. McIntyre	Converted to Well:	[X] Yes [ ] No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
121				(120-127 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4). (120.01-122 ft) Rock fragments are moist.		
122						
123		N/A				
124						
125						
126						
127						
128	Penetration rates not documented for sonic drilling not required per Specification 33 22 00	NR		(127-129.4 ft) No Recovery; see Drilling Notes.	(127.0 - 137.0') Approximately 20 ft of drill casing was retracted to free up the casing, prior to continuing to advance 8-inch diameter casing.	(127.0 - 137.0') 300 gallons of water used; 270 gallons of water recovered; 30 gallons of water lost
129						
130		N/A		(129.4-145 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		
131						
132						
133						
134						
135						
136						
137					(137.0 - 145.0') Flushing the 8-inch diameter drill casing over the 6-inch diameter drill casing. Tripped out the 6-inch diameter drill casing.	(137.0 - 145.0') 250 gallons of water used; 225 gallons of water recovered; 25 gallons of water lost
138						
139						
140						

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered during drilling and approximate static measured during drilling, respectively.

Drilling Log

ARCADIS

Date Started:	04/26/2022	Surface Elevation:	506.35 ft amsl	**Boring No.:**	**ER-02 8-inch**
Date Completed:	04/27/2022	Northing (NAD83):	2101009.50		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75	Client:	PG&E
Drilling Method:	Roto-Sonic	Total Depth:	145.0 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mount	Conductor Casing Diameter:	9 inches	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Drill Casing Diameter:	8 inches		
Drilling Asst:	J. Candelaria / F. Perez	Drill Bit:	8 inches	Project Number:	30126255
Tool-Pusher:	N/A	Depth to First Water:	60.0 ft bgs		
Rig Geologist:	G. Wilford / A. McIntyre	Converted to Well:	[X] Yes [ ] No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
141	Penetration rates not documented for sonic drilling not required per Specification 33 22 00	N/A		(129.4-145 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		
142						
143						
144						
145				End of Boring at 145 ft bgs.		
146						
147						
148						
149						
150						
151						
152						
153						
154						
155						
156						
157						
158						
159						
160						

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered during drilling and approximate static measured during drilling, respectively.

Drilling Log

ARCADIS

Sheet: 1 of 8

Boring No.: ER-02 9-inch

Date Started:	04/24/2022	Surface Elevation:	506.35 ft amsl
Date Completed:	05/03/2022	Northing (NAD83):	2101009.50
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75
Drilling Method:	Roto-Sonic	Total Depth:	145.0 ft bgs
Drill Rig Type:	Terra Sonic Truck Mount	Conductor Casing Diameter:	N/A
Driller Name:	Eddie Ramos	Drill Casing Diameter:	9 inches
Drilling Asst:	J. Candelaria / F. Perez	Drill Bit:	9 inches
Tool-Pusher:	N/A	Depth to First Water:	60.0 ft bgs
Rig Geologist:	G. Wilford / A. McIntyre	Converted to Well:	[X] Yes [ ] No

Client: PG&E
Project: Final GW Remedy Phase 2A
Location: PG&E Topock, Needles California
Project Number: 30126255

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
1	Penetration rates not documented for sonic drilling not required per Specification 33 22 00	SM		(0-1.5 ft) Silty sand with gravel (SM); reddish brown (5YR 5/4).	(0.0 - 25.0') Drilled to act as temporary conductor casing for drilling with 6-inch diameter drill casing.	(0.0 - 25.0') No drilling fluid used
2		N/A		(1.5-7 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		
7		N/A		(7-22 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered during drilling and approximate static measured during drilling, respectively.

Drilling Log

Sheet: 2 of 8

Date Started:	04/24/2022	Surface Elevation:	506.35 ft amsl
Date Completed:	05/03/2022	Northing (NAD83):	2101009.50
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75
Drilling Method:	Roto-Sonic	Total Depth:	145.0 ft bgs
Drill Rig Type:	Terra Sonic Truck Mount	Conductor Casing Diameter:	N/A
Driller Name:	Eddie Ramos	Drill Casing Diameter:	9 inches
Drilling Asst:	J. Candelaria / F. Perez	Drill Bit:	9 inches
Tool-Pusher:	N/A	Depth to First Water:	60.0 ft bgs
Rig Geologist:	G. Wilford / A. McIntyre	Converted to Well:	[X] Yes [ ] No

Boring No.: ER-02 9-inch

Client: PG&E
Project: Final GW Remedy Phase 2A
Location: PG&E Topock, Needles California
Project Number: 30126255

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
21	Penetration rates not documented for sonic drilling not required per Specification 33 22 00	N/A		(7-22 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		
22		NR		(22-23 ft) No Recovery; see Drilling Notes.		
23		N/A		(23-50 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		
25					(25.0 - 37.0') Flush 9-inch diameter drill casing over 8-inch diameter drill casing to free it up.	(25.0 - 37.0') 350 gallons of water used; 150 gallons of water recovered; 200 gallons of water lost
36					(36.0') 8-inch diameter drill casing became stuck.	(36.0') No drilling fluid used
37					(37.0 - 47.0') Flush 9-inch diameter drill casing over 8-inch diameter drill casing.	(37.0 - 47.0') 325 gallons of water used; 293 gallons of water recovered; 32 gallons of water lost
40						

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered during drilling and approximate static measured during drilling, respectively.

Drilling Log

Sheet: 3 of 8

Date Started:	04/24/2022	Surface Elevation:	506.35 ft amsl	**Boring No.:**	**ER-02 9-inch**
Date Completed:	05/03/2022	Northing (NAD83):	2101009.50		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75	Client:	PG&E
Drilling Method:	Roto-Sonic	Total Depth:	145.0 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mount	Conductor Casing Diameter:	N/A	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Drill Casing Diameter:	9 inches		
Drilling Asst:	J. Candelaria / F. Perez	Drill Bit:	9 inches	Project Number:	30126255
Tool-Pusher:	N/A	Depth to First Water:	60.0 ft bgs		
Rig Geologist:	G. Wilford / A. McIntyre	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
41				(23-50 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		
42						
43						
44						
45		N/A				
46						
47					(47.0 - 57.0') Flush 9-inch diameter drill casing over 8-inch diameter drill casing.	(47.0 - 57.0') 325 gallons of water used; 293 gallons of water recovered; 32 gallons of water lost
48						
49	Penetration rates not documented for sonic drilling not required per Specification 33 22 00					
50				(50-72 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		
51						
52						
53						
54						
55		N/A				
56						
57					(57.0 - 67.0') Flush 9-inch diameter drill casing over 8-inch diameter drill casing.	(57.0 - 67.0') 175 gallons of water used; 0 gallons of water recovered; 175 gallons of water lost
58						
59						
60						

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered during drilling and approximate static measured during drilling, respectively.

Drilling Log

Sheet: 4 of 8

Date Started:	04/24/2022	Surface Elevation:	506.35 ft amsl	**Boring No.:**	**ER-02 9-inch**
Date Completed:	05/03/2022	Northing (NAD83):	2101009.50		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75	Client:	PG&E
Drilling Method:	Roto-Sonic	Total Depth:	145.0 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mount	Conductor Casing Diameter:	N/A	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Drill Casing Diameter:	9 inches		
Drilling Asst:	J. Candelaria / F. Perez	Drill Bit:	9 inches	Project Number:	30126255
Tool-Pusher:	N/A	Depth to First Water:	60.0 ft bgs		
Rig Geologist:	G. Wilford / A. McIntyre	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
61				(50-72 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4). (60 ft) Observed slight moisture on rock fragment.		
62						
63						
64						
65						
66		N/A				
67					(67.0 - 77.0') Flush 9-inch diameter drill casing over 8-inch diameter drill casing.	(67.0 - 77.0') 125 gallons of water used; 0 gallons of water recovered; 125 gallons of water lost
68						
69	Penetration rates not documented for sonic drilling not required per Specification 33 22 00					
70						
71						
72						
73		N/A		(72-73.5 ft) No Recovery; see Drilling Notes.		
74				(73.5-82 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4). (74-74.3 ft) Rock fragments are moist.		
75						
76						
77		N/A			(77.0 - 87.0') Flush 9-inch diameter drill casing over 8-inch diameter drill casing.	(77.0 - 87.0') 225 gallons of water used; 0 gallons of water recovered; 225 gallons of water lost
78						
79						
80						

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered during drilling and approximate static measured during drilling, respectively.

Drilling Log

Sheet: 5 of 8

Date Started:	04/24/2022	Surface Elevation:	506.35 ft amsl
Date Completed:	05/03/2022	Northing (NAD83):	2101009.50
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75
Drilling Method:	Roto-Sonic	Total Depth:	145.0 ft bgs
Drill Rig Type:	Terra Sonic Truck Mount	Conductor Casing Diameter:	N/A
Driller Name:	Eddie Ramos	Drill Casing Diameter:	9 inches
Drilling Asst:	J. Candelaria / F. Perez	Drill Bit:	9 inches
Tool-Pusher:	N/A	Depth to First Water:	60.0 ft bgs
Rig Geologist:	G. Wilford / A. McIntyre	Converted to Well:	[X] Yes [ ] No

Boring No.: ER-02 9-inch

Client: PG&E
Project: Final GW Remedy Phase 2A
Location: PG&E Topock, Needles California
Project Number: 30126255

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
81	Penetration rates not documented for sonic drilling not required per Specification 33 22 00	N/A		(73.5-82 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		
82						
83		NR		(82-84.5 ft) No Recovery; see Drilling Notes.		
84						
85				(84.5-117 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		
86						
87					(87.0 - 97.0') Flush 9-inch diameter drill casing over 8-inch diameter drill casing.	(87.0 - 97.0') 75 gallons of water used; 0 gallons of water recovered; 75 gallons of water lost
88						
89						
90						
91						
92		N/A				
93						
94				(94 ft) Slight increase in competent rock fragments.		
95						
96						
97						
98					(97.0 - 107.0') Flush 9-inch diameter drill casing over 8-inch diameter drill casing.	(97.0 - 107.0') 100 gallons of water used; 0 gallons of water recovered; 100 gallons of water lost
99						
100						

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered during drilling and approximate static measured during drilling, respectively.

Drilling Log

Date Started:	04/24/2022	Surface Elevation:	506.35 ft amsl
Date Completed:	05/03/2022	Northing (NAD83):	2101009.50
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75
Drilling Method:	Roto-Sonic	Total Depth:	145.0 ft bgs
Drill Rig Type:	Terra Sonic Truck Mount	Conductor Casing Diameter:	N/A
Driller Name:	Eddie Ramos	Drill Casing Diameter:	9 inches
Drilling Asst:	J. Candelaria / F. Perez	Drill Bit:	9 inches
Tool-Pusher:	N/A	Depth to First Water:	60.0 ft bgs
Rig Geologist:	G. Wilford / A. McIntyre	Converted to Well:	[X] Yes [ ] No

Boring No.: ER-02 9-inch

Client: PG&E
Project: Final GW Remedy Phase 2A
Location: PG&E Topock, Needles California
Project Number: 30126255

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
101	Penetration rates not documented for sonic drilling not required per Specification 33 22 00	N/A		(84.5-117 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4). (100.7-101 ft) Rock fragments are moist.		
107					(107.0 - 117.0') Flush 9-inch diameter drill casing over 8-inch diameter drill casing.	(107.0 - 117.0') 125 gallons of water used; 0 gallons of water recovered; 125 gallons of water lost
117		NR		(117-120 ft) No Recovery; see Drilling Notes.	(117.0 - 127.0') Flush 9-inch diameter drill casing over 8-inch diameter drill casing.	(117.0 - 127.0') 175 gallons of water used; 0 gallons of water recovered; 175 gallons of water lost
120						

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered during drilling and approximate static measured during drilling, respectively.

Drilling Log

Date Started:	04/24/2022	Surface Elevation:	506.35 ft amsl	**Boring No.:**	**ER-02 9-inch**
Date Completed:	05/03/2022	Northing (NAD83):	2101009.50		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75	Client:	PG&E
Drilling Method:	Roto-Sonic	Total Depth:	145.0 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mount	Conductor Casing Diameter:	N/A	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Drill Casing Diameter:	9 inches		
Drilling Asst:	J. Candelaria / F. Perez	Drill Bit:	9 inches	Project Number:	30126255
Tool-Pusher:	N/A	Depth to First Water:	60.0 ft bgs		
Rig Geologist:	G. Wilford / A. McIntyre	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
121				(120-127 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4). (120.01-122 ft) Rock fragments are moist.		
122						
123		N/A				
124						
125						
126						
127						
128		NR		(127-129.4 ft) No Recovery; see Drilling Notes.	(127.0 - 137.0') Flush 9-inch diameter drill casing over 8-inch diameter drill casing.	(127.0 - 137.0') 100 gallons of water used; 0 gallons of water recovered; 100 gallons of water lost
129	Penetration rates not documented for sonic drilling not required per Specification 33 22 00					
130				(129.4-145 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		
131						
132						
133						
134						
135		N/A				
136						
137						
138					(137.0 - 145.0') Flush 9-inch diameter drill casing over 8-inch diameter drill casing. Tripped out 8 diameter drill casing.	(137.0 - 145.0') 300 gallons of water used; 0 gallons of water recovered; 300 gallons of water lost
139						
140						

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered during drilling and approximate static measured during drilling, respectively.

Drilling Log

Sheet: 8 of 8

Date Started:	04/24/2022	Surface Elevation:	506.35 ft amsl	**Boring No.:**	**ER-02 9-inch**
Date Completed:	05/03/2022	Northing (NAD83):	2101009.50		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75	Client:	PG&E
Drilling Method:	Roto-Sonic	Total Depth:	145.0 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mount	Conductor Casing Diameter:	N/A	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Drill Casing Diameter:	9 inches		
Drilling Asst:	J. Candelaria / F. Perez	Drill Bit:	9 inches	Project Number:	30126255
Tool-Pusher:	N/A	Depth to First Water:	60.0 ft bgs		
Rig Geologist:	G. Wilford / A. McIntyre	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
141	Penetration rates not documented for sonic drilling not required per Specification 33 22 00	N/A		(129.4-145 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		
142						
143						
144						
145				End of Boring at 145 ft bgs.		
146						
147						
148						
149						
150						
151						
152						
153						
154						
155						
156						
157						
158						
159						
160						

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered during drilling and approximate static measured during drilling, respectively.

Drilling Log

Sheet: 1 of 8

Date Started:	05/03/2022	Surface Elevation:	506.35 ft amsl	**Boring No.:**	**ER-02 10 & 12-inch**
Date Completed:	05/08/2022	Northing (NAD83):	2101009.50		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75	Client:	PG&E
Drilling Method:	Roto-Sonic	Total Depth:	146.0 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mount	Conductor Casing Diameter:	12 inches	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Drill Casing Diameter:	10.5-12 inches		
Drilling Asst:	J. Candelaria / F. Perez	Drill Bit:	10.5-12 inches	Project Number:	30126255
Tool-Pusher:	N/A	Depth to First Water:	60.0 ft bgs		
Rig Geologist:	Alexis McIntyre	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
1	Penetration rates not documented for sonic drilling not required per Specification 33 22 00	SM		(0-1.5 ft) Silty sand with gravel (SM); reddish brown (5YR 5/4).	(0.0 - 16.0') Flushed 12-inch diameter drill casing over 10.5-inch diameter drill casing.	(0.0 - 16.0') 150 gallons of water used; 30 gallons of water recovered; 120 gallons of water lost
2		N/A		(1.5-7 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		
7		N/A		(7-22 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		
16					(16.0 - 26.0') Flushed 12-inch diameter drill casing over 10.5-inch diameter drill casing.	(16.0 - 26.0') 350 gallons of water used; 295 gallons of water recovered; 55 gallons of water lost

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered during drilling and approximate static measured during drilling, respectively.

Drilling Log

Sheet: 2 of 8

Date Started:	05/03/2022	Surface Elevation:	506.35 ft amsl	**Boring No.:**	**ER-02 10 & 12-inch**
Date Completed:	05/08/2022	Northing (NAD83):	2101009.50		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75	Client:	PG&E
Drilling Method:	Roto-Sonic	Total Depth:	146.0 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mount	Conductor Casing Diameter:	12 inches	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Drill Casing Diameter:	10.5-12 inches		
Drilling Asst:	J. Candelaria / F. Perez	Drill Bit:	10.5-12 inches	Project Number:	30126255
Tool-Pusher:	N/A	Depth to First Water:	60.0 ft bgs		
Rig Geologist:	Alexis McIntyre	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
21		N/A		(7-22 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		
22		NR		(22-23 ft) No Recovery; see Drilling Notes.		
23				(23-50 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		
24						
25						
26					(26.0 - 36.0') Flushed 12-inch diameter drill casing over 10.5-inch diameter drill casing.	(26.0 - 36.0') 400 gallons of water used; 135 gallons of water recovered; 265 gallons of water lost
27						
28						
29	Penetration rates not documented for sonic drilling not required per Specification 33 22 00					
30						
31						
32		N/A				
33						
34						
35						
36					(36.0 - 46.0') Advancing 10.5-inch diameter drill casing.	(36.0 - 46.0') 350 gallons of water used; 80 gallons of water recovered; 270 gallons of water lost
37						
38						
39						
40						

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered during drilling and approximate static measured during drilling, respectively.

Drilling Log

ARCADIS

Date Started:	05/03/2022	Surface Elevation:	506.35 ft amsl	**Boring No.:**	**ER-02 10 & 12-inch**
Date Completed:	05/08/2022	Northing (NAD83):	2101009.50		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75	Client:	PG&E
Drilling Method:	Roto-Sonic	Total Depth:	146.0 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mount	Conductor Casing Diameter:	12 inches	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Drill Casing Diameter:	10.5-12 inches		
Drilling Asst:	J. Candelaria / F. Perez	Drill Bit:	10.5-12 inches	Project Number:	30126255
Tool-Pusher:	N/A	Depth to First Water:	60.0 ft bgs		
Rig Geologist:	Alexis McIntyre	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
41				(23-50 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		
42						
43						
44						
45		N/A				
46					(46.0 - 56.0') Advancing 10.5-inch diameter drill casing.	(46.0 - 56.0') 100 gallons of water used; 90 gallons of water recovered; 10 gallons of water lost
47						
48						
49	Penetration rates not documented for sonic drilling not required per Specification 33 22 00					
50				(50-72 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		
51						
52						
53						
54						
55		N/A				
56						
57					(56.0 - 66.0') Advanced 10.5-inch diameter casing by dry drilling and cleaning out casing with 8-inch diameter core barrel. Mud tub seal broke compliance notified. Tripped out 9-inch diameter casing to drill dry.	(56.0 - 66.0') No drilling fluid used
58						
59						
60						

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered during drilling and approximate static measured during drilling, respectively.

Drilling Log

Sheet: 4 of 8

Date Started:	05/03/2022	Surface Elevation:	506.35 ft amsl	**Boring No.:**	**ER-02 10 & 12-inch**
Date Completed:	05/08/2022	Northing (NAD83):	2101009.50		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75	Client:	PG&E
Drilling Method:	Roto-Sonic	Total Depth:	146.0 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mount	Conductor Casing Diameter:	12 inches	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Drill Casing Diameter:	10.5-12 inches		
Drilling Asst:	J. Candelaria / F. Perez	Drill Bit:	10.5-12 inches	Project Number:	30126255
Tool-Pusher:	N/A	Depth to First Water:	60.0 ft bgs		
Rig Geologist:	Alexis McIntyre	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
61				(50-72 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		
62				(60 ft) Observed slight moisture on rock fragment.		
63						
64						
65						
66		N/A			(66.0 - 76.0') Advanced 10.5-inch diameter casing by dry drilling and cleaning out casing with 8-inch diameter core barrel.	(66.0 - 76.0') No drilling fluid used
67						
68						
69	Penetration rates not documented for sonic drilling not required per Specification 33 22 00					
70						
71						
72						
73		N/A		(72-73.5 ft) No Recovery; see Drilling Notes.		
74				(73.5-82 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		
75				(74-74.3 ft) Rock fragments are moist.		
76					(76.0 - 86.0') Advanced 10.5-inch diameter casing by dry drilling and cleaning out casing with 8-inch diameter core barrel.	(76.0 - 86.0') No drilling fluid used
77		N/A				
78						
79						
80						

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered during drilling and approximate static measured during drilling, respectively.

Drilling Log

Sheet: 5 of 8

Date Started:	05/03/2022	Surface Elevation:	506.35 ft amsl	**Boring No.:**	**ER-02 10 & 12-inch**
Date Completed:	05/08/2022	Northing (NAD83):	2101009.50		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75	Client:	PG&E
Drilling Method:	Roto-Sonic	Total Depth:	146.0 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mount	Conductor Casing Diameter:	12 inches	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Drill Casing Diameter:	10.5-12 inches		
Drilling Asst:	J. Candelaria / F. Perez	Drill Bit:	10.5-12 inches	Project Number:	30126255
Tool-Pusher:	N/A	Depth to First Water:	60.0 ft bgs		
Rig Geologist:	Alexis McIntyre	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
81		N/A		(73.5-82 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		
82						
83		NR		(82-84.5 ft) No Recovery; see Drilling Notes.		
84						
85				(84.5-117 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		
86					(86.0 - 96.0') Advanced 10.5-inch diameter casing by dry drilling and cleaning out casing with 8-inch diameter core barrel.	(86.0 - 96.0') No drilling fluid used
87						
88						
89	Penetration rates not documented for sonic drilling not required per Specification 33 22 00					
90						
91						
92		N/A				
93						
94				(94 ft) Slight increase in competent rock fragments.		
95						
96					(96.0 - 116.0') Advanced 10.5-inch diameter casing by dry drilling and cleaning out casing with 8-inch diameter core barrel. A hydraulic line on the drill head ruptured relasing hydraulic fluid. Compliance was immediately notified. Confirmed hydraulic fluid did not go down borehole. Once drilling resumed hard material was encountered and cleaned out with 8-inch diameter core barrel.	(96.0 - 116.0') No drilling fluid used
97						
98						
99						
100						

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered during drilling and approximate static measured during drilling, respectively.

Drilling Log

Date Started:	05/03/2022	Surface Elevation:	506.35 ft amsl	**Boring No.:**	**ER-02 10 & 12-inch**
Date Completed:	05/08/2022	Northing (NAD83):	2101009.50		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75	Client:	PG&E
Drilling Method:	Roto-Sonic	Total Depth:	146.0 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mount	Conductor Casing Diameter:	12 inches	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Drill Casing Diameter:	10.5-12 inches		
Drilling Asst:	J. Candelaria / F. Perez	Drill Bit:	10.5-12 inches	Project Number:	30126255
Tool-Pusher:	N/A	Depth to First Water:	60.0 ft bgs		
Rig Geologist:	Alexis McIntyre	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
101	Penetration rates not documented for sonic drilling not required per Specification 33 22 00	N/A		(84.5-117 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4). (100.7-101 ft) Rock fragments are moist.		
116					(116.0 - 145.0') Advanced 10.5-inch diameter casing by dry drilling and cleaning out casing with 8-inch diameter core barrel.	(116.0 - 145.0') No drilling fluid used
117		NR		(117-120 ft) No Recovery; see Drilling Notes.		
120						

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered during drilling and approximate static measured during drilling, respectively.

Drilling Log

Sheet: 7 of 8

Date Started:	05/03/2022	Surface Elevation:	506.35 ft amsl	**Boring No.:**	**ER-02 10 & 12-inch**
Date Completed:	05/08/2022	Northing (NAD83):	2101009.50		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75	Client:	PG&E
Drilling Method:	Roto-Sonic	Total Depth:	146.0 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mount	Conductor Casing Diameter:	12 inches	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Drill Casing Diameter:	10.5-12 inches		
Drilling Asst:	J. Candelaria / F. Perez	Drill Bit:	10.5-12 inches	Project Number:	30126255
Tool-Pusher:	N/A	Depth to First Water:	60.0 ft bgs		
Rig Geologist:	Alexis McIntyre	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
121				(120-127 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4). (120.01-122 ft) Rock fragments are moist.		
122						
123		N/A				
124						
125						
126						
127						
128		NR		(127-129.4 ft) No Recovery; see Drilling Notes.		
129	Penetration rates not documented for sonic drilling not required per Specification 33 22 00					
130				(129.4-145 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		
131						
132						
133						
134						
135		N/A				
136						
137						
138						
139						
140						

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered during drilling and approximate static measured during drilling, respectively.

Drilling Log

Sheet: 8 of 8

Date Started:	05/03/2022	Surface Elevation:	506.35 ft amsl	**Boring No.:**	**ER-02 10 & 12-inch**
Date Completed:	05/08/2022	Northing (NAD83):	2101009.50		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75	Client:	PG&E
Drilling Method:	Roto-Sonic	Total Depth:	146.0 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mount	Conductor Casing Diameter:	12 inches	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Drill Casing Diameter:	10.5-12 inches		
Drilling Asst:	J. Candelaria / F. Perez	Drill Bit:	10.5-12 inches	Project Number:	30126255
Tool-Pusher:	N/A	Depth to First Water:	60.0 ft bgs		
Rig Geologist:	Alexis McIntyre	Converted to Well:	☒ Yes ☐ No		

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
141	Penetration rates not documented for sonic drilling not required per Specification 33 22 00	N/A		(129.4-145 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4).		
142						
143						
144						
145						
146		NR		(145-146 ft) No Recovery; see Drilling Notes.	(145.0 - 146.0') Advanced with 8-inch diameter core barrel to plug the core barrel to clean out prior to well installation. Core not bagged or logged.	(145.0 - 146.0') No drilling fluid used
				End of Boring at 146 ft bgs.		
147						
148						
149						
150						
151						
152						
153						
154						
155						
156						
157						
158						
159						
160						

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered during drilling and approximate static measured during drilling, respectively.

Attachment 4

Well Construction Log

Well Construction Log

Sheet: 1 of 8

Date Started:	05/08/2022	Surface Elevation:	506.35 ft amsl	**Well ID:**	**ER-02**
Date Completed:	05/10/2022	Shallow Well Elevation:	506.02 ft amsl		
Drilling Co.:	ABC LIOVIN	Deep Well Elevation:	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	2101009.50	Project:	Final GW Remedy Phase 2A
Driller Name:	Eddie Ramos	Easting (NAD83):	7616642.75	Location:	PG&E Topock, Needles California
Drilling Asst:	J. Candelaria / F. Perez	Borehole Diameter:	8-12 inches		
Logger:	Alexis McIntyre	Static Water Level:	See Log for Depths	Project Number:	30126255
Editor:	Sean McGrane	Development End Date:	6/28/2022		
Total Depth:	146 ft bgs	Well Completion:	☒ Flush ☐ Stick-up ☐ To Be Completed in Well Vault		

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
1	No Groundwater Samples Collected	Fill	SM		(0.0 - 1.0') Temporary Surface Completion (0.0 - 36.0') 12" Diameter Borehole (1.0 - 2.0') Cemex #2/16 (16x30) Lapis Lustre Sand		(0.0 - 1.0') 7 bags Note: 2.5 x 2.5 ft. concrete pad with 18 inch diameter lockable vault, High Sped 4,500 PSI Concrete. Note: Cemex #2/16 (16x30) Lapis Lustre Sand extended into skirt of vault.
2							
3					(2.0 - 5.0') Navite Material		Note: Material used to back fill was from the SPY.
4		Weathered Bedrock - Conglomerate	N/A		(0.3 - 47.1') 6" Sch. 80 PVC Casing		
5							
6							
7							
8							
9							
10							
11							
12					(5.0 - 39.6') Portland Cement 5% Bentonite Type I, II, and V with Hydrogel	(5.0 - 39.6') 139.4 gallons	(5.0 - 39.6') 175 gallons (126%) Note: Grout seal, used >20% of the caculated voume due to potential voids that formed during drilling and grout migration.
13		Weathered Bedrock - Conglomerate	N/A				
14							
15							
16							
17							
18							
19							
20							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steal, NR = No Recovery, N/A = Not Applicable, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) static water measured during development and approximate static measured during drilling, respectively.

Well Construction Log

Sheet: 2 of 8

Date Started:	05/08/2022	Surface Elevation:	506.35 ft amsl	**Well ID: ER-02**	
Date Completed:	05/10/2022	Shallow Well Elevation:	506.02 ft amsl		
Drilling Co.:	ABC LIOVIN	Deep Well Elevation:	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	2101009.50	Project:	Final GW Remedy Phase 2A
Driller Name:	Eddie Ramos	Easting (NAD83):	7616642.75	Location:	PG&E Topock, Needles California
Drilling Asst:	J. Candelaria / F. Perez	Borehole Diameter:	8-12 inches		
Logger:	Alexis McIntyre	Static Water Level:	See Log for Depths	Project Number:	30126255
Editor:	Sean McGrane	Development End Date:	6/28/2022		
Total Depth:	146 ft bgs	Well Completion:	☒ Flush ☐ Stick-up ☐ To Be Completed in Well Vault		

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
21		Weathered Bedrock - Conglomerate	N/A		(0.3 - 47.1') 6" Sch. 80 PVC Casing		
22							
			NR				
23							
24							
25					(24.5 - 25.5') SS Centralizer		
26							
27							
28							
29							
30	No Groundwater Samples Collected				(5.0 - 39.6') Portland Cement 5% Bentonite Type I, II, and V with Hydrogel	(5.0 - 39.6') 139.4 gallons	(5.0 - 39.6') 175 gallons (126%) Note: Grout seal, used >20% of the caculated voume due to potential voids that formed during drilling and grout migration.
31		Weathered Bedrock - Conglomerate	N/A				
32							
33							
34							
35							
36					(36.0 - 145.0') 10.75" Diameter Borehole		
37							
38							
39							
40						(39.6 - 45.2')	(39.6 - 45.2') 4 bags (89%)

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steal, NR = No Recovery, N/A = Not Applicable, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) static water measured during development and approximate static measured during drilling, respectively.

Well Construction Log

ARCADIS

Date Started:	05/08/2022	Surface Elevation:	506.35 ft amsl	**Well ID:**	**ER-02**
Date Completed:	05/10/2022	Shallow Well Elevation:	506.02 ft amsl		
Drilling Co.:	ABC LIOVIN	Deep Well Elevation:	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	2101009.50	Project:	Final GW Remedy Phase 2A
Driller Name:	Eddie Ramos	Easting (NAD83):	7616642.75	Location:	PG&E Topock, Needles California
Drilling Asst:	J. Candelaria / F. Perez	Borehole Diameter:	8-12 inches		
Logger:	Alexis McIntyre	Static Water Level:	See Log for Depths	Project Number:	30126255
Editor:	Sean McGrane	Development End Date:	6/28/2022		
Total Depth:	146 ft bgs	Well Completion:	☒ Flush ☐ Stick-up ☐ To Be Completed in Well Vault		

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
41					(0.3 - 47.1') 6" Sch. 80 PVC Casing	4.5 bags	Note: Transition sand seal
42							
43					(39.6 - 45.2') Cemex #0/30 (30x50) Lapis Lustre Sand; (42.5 - 43.5') SS Centralizer	(39.6 - 45.2') 4.5 bags	(39.6 - 45.2') 4 bags (89%) Note: Transition sand seal
44							
45		Weathered Bedrock - Conglomerate	N/A		(45.2 - 45.7') Enviroplug Medium Chips	(45.2 - 45.7') 0.3 bags	(45.2 - 45.7') 0.25 bags (83%) Note: Bentonite seal
46							
47					(47.1 - 138.0') 6" 0.02-Slot 316 SS Wire Wrap Screen		
48							
49							
50	No Groundwater Samples Collected						
51							
52							(45.7 - 146.0') 83 bags (103%) Note: Filter pack. Ran dummy tool and swabbed filter pack for approximately 20 minutes prior to the installation of the bentonite/transition sand seal. Grain-size analysis of the filter pack sand showed a higher percentage of fine-grained sand.
53					(45.7 - 146.0') Cemex #2/16 (16x30) Lapis Lustre Sand	(45.7 - 146.0') 80.9 bags	
54							
55		Weathered Bedrock - Conglomerate	N/A				
56							
57							
58							
59							
60							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steal, NR = No Recovery, N/A = Not Applicable, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) static water measured during development and approximate static measured during drilling, respectively.

Well Construction Log

ARCADIS

Date Started:	05/08/2022	Surface Elevation:	506.35 ft amsl	**Well ID:**	**ER-02**
Date Completed:	05/10/2022	Shallow Well Elevation:	506.02 ft amsl		
Drilling Co.:	ABC LIOVIN	Deep Well Elevation:	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	2101009.50	Project:	Final GW Remedy Phase 2A
Driller Name:	Eddie Ramos	Easting (NAD83):	7616642.75	Location:	PG&E Topock, Needles California
Drilling Asst:	J. Candelaria / F. Perez	Borehole Diameter:	8-12 inches		
Logger:	Alexis McIntyre	Static Water Level:	See Log for Depths	Project Number:	30126255
Editor:	Sean McGrane	Development End Date:	6/28/2022		
Total Depth:	146 ft bgs	Well Completion:	☒ Flush ☐ Stick-up ☐ To Be Completed in Well Vault		

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
61					(47.1 - 138.0') 6" 0.02-Slot 316 SS Wire Wrap Screen		
62							
63							
64							
65							
66		Weathered Bedrock - Conglomerate	N/A				
67							
68							
69							
70	No Groundwater Samples Collected				(45.7 - 146.0') Cemex #2/16 (16x30) Lapis Lustre Sand	(45.7 - 146.0') 80.9 bags	(45.7 - 146.0') 83 bags (103%) Note: Filter pack. Ran dummy tool and swabbed filter pack for approximately 20 minutes prior to the installation of the bentonite/transition sand seal. Grain-size analysis of the filter pack sand showed a higher percentage of fine-grained sand.
71							
72							
73		Weathered Bedrock - Conglomerate	N/A				
74							
75							
76							
77		Weathered Bedrock - Conglomerate	N/A				
78							
79							
80							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steal, NR = No Recovery, N/A = Not Applicable, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) static water measured during development and approximate static measured during drilling, respectively.

Well Construction Log

ARCADIS

Sheet: 5 of 8

Date Started:	05/08/2022	Surface Elevation:	506.35 ft amsl	**Well ID:**	**ER-02**
Date Completed:	05/10/2022	Shallow Well Elevation:	506.02 ft amsl		
Drilling Co.:	ABC LIOVIN	Deep Well Elevation:	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	2101009.50	Project:	Final GW Remedy Phase 2A
Driller Name:	Eddie Ramos	Easting (NAD83):	7616642.75	Location:	PG&E Topock, Needles California
Drilling Asst:	J. Candelaria / F. Perez	Borehole Diameter:	8-12 inches		
Logger:	Alexis McIntyre	Static Water Level:	See Log for Depths	Project Number:	30126255
Editor:	Sean McGrane	Development End Date:	6/28/2022		
Total Depth:	146 ft bgs	Well Completion:	☒ Flush ☐ Stick-up ☐ To Be Completed in Well Vault		

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
81		Weathered Bedrock - Conglomerate	N/A		(47.1 - 138.0') 6" 0.02-Slot 316 SS Wire Wrap Screen		
82							
83		Weathered Bedrock - Conglomerate	NR				
84							
85							
86							
87							
88							
89							
90	No Groundwater Samples Collected				(45.7 - 146.0') Cemex #2/16 (16x30) Lapis Lustre Sand	(45.7 - 146.0') 80.9 bags	(45.7 - 146.0') 83 bags (103%) Note: Filter pack. Ran dummy tool and swabbed filter pack for approximately 20 minutes prior to the installation of the bentonite/transition sand seal. Grain-size analysis of the filter pack sand showed a higher percentage of fine-grained sand.
91							
92		Weathered Bedrock - Conglomerate	N/A				
93							
94							
95							
96							
97							
98							
99							
100							

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Well Construction Log

ARCADIS

Date Started:	05/08/2022	Surface Elevation:	506.35 ft amsl	**Well ID: ER-02**	
Date Completed:	05/10/2022	Shallow Well Elevation:	506.02 ft amsl		
Drilling Co.:	ABC LIOVIN	Deep Well Elevation:	N/A	PG&E	
Drilling Method:	Sonic Drilling	Northing (NAD83):	2101009.50	Final GW Remedy Phase 2A	
Driller Name:	Eddie Ramos	Easting (NAD83):	7616642.75	PG&E Topock, Needles California	
Drilling Asst:	J. Candelaria / F. Perez	Borehole Diameter:	8-12 inches		
	Alexis McIntyre	Static Water Level:	See Log for Depths		
	Sean McGrane	Development End Date:	6/28/2022		
	146 ft bgs	Well Completion:	☒ Flush ☐ Stick-up ☐ To Be Completed in Well Vault		

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
101	No Groundwater Samples Collected	Weathered Bedrock - Conglomerate	N/A		(47.1 - 138.0') 6" 0.02-Slot 316 SS Wire Wrap Screen	(45.7 - 146.0') 80.9 bags	(45.7 - 146.0') 83 bags (103%) Note: Filter pack. Ran dummy tool and swabbed filter pack for approximately 20 minutes prior to the installation of the bentonite/transition sand seal. Grain-size analysis of the filter pack sand showed a higher percentage of fine-grained sand.
102							
103							
104							
105							
106							
107							
108							
109							
110					(45.7 - 146.0') Cemex #2/16 (16x30) Lapis Lustre Sand		
111							
112							
113							
114							
115							
116							
117							
118			NR				
119							
120							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steal, NR = No Recovery, N/A = Not Applicable, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) static water measured during development and approximate static measured during drilling, respectively.

Well Construction Log

Sheet: 7 of 8

Date Started:	05/08/2022	Surface Elevation:	506.35 ft amsl	**Well ID:**	**ER-02**
Date Completed:	05/10/2022	Shallow Well Elevation:	506.02 ft amsl		
Drilling Co.:	ABC LIOVIN	Deep Well Elevation:	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	2101009.50	Project:	Final GW Remedy Phase 2A
Driller Name:	Eddie Ramos	Easting (NAD83):	7616642.75	Location:	PG&E Topock, Needles California
Drilling Asst:	J. Candelaria / F. Perez	Borehole Diameter:	8-12 inches		
Logger:	Alexis McIntyre	Static Water Level:	See Log for Depths	Project Number:	30126255
Editor:	Sean McGrane	Development End Date:	6/28/2022		
Total Depth:	146 ft bgs	Well Completion:	☒ Flush ☐ Stick-up ☐ To Be Completed in Well Vault		

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
121					(47.1 - 138.0') 6" 0.02-Slot 316 SS Wire Wrap Screen		
122							
123		Weathered Bedrock - Conglomerate	N/A				
124							
125							
126							
127							
128			NR				
129							(45.7 - 146.0') 83 bags (103%) Note: Filter pack. Ran dummy tool and swabbed filter pack for approximately 20 minutes prior to the installation of the bentonite/transition sand seal. Grain-size analysis of the filter pack sand showed a higher percentage of fine-grained sand.
130	No Groundwater Samples Collected				(45.7 - 146.0') Cemex #2/16 (16x30) Lapis Lustre Sand	(45.7 - 146.0') 80.9 bags	
131							
132							
133							
134							
135		Weathered Bedrock - Conglomerate	N/A				
136							
137					(136.2 - 137.2') PVC Well Bung (Plug)		(136.2 - 137.2') Note: Well bung was installed on 6/8/22 to reduce additional filterp ack from entering the well from potential damage to the sump.
138							(137.2 - 143.4') Note: Filter pack sand and sediment in the bottom of the well, due to potential damage to the sump or a higher percentage of fines in the filter pack material.
139					(137.2 - 143.4') Cemex #2/16 (16x30) Lapis Lustre Sand and sediment.		
140							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steal, NR = No Recovery, N/A = Not Applicable, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) static water measured during development and approximate static measured during drilling, respectively.

Well Construction Log

ARCADIS

Sheet: 8 of 8

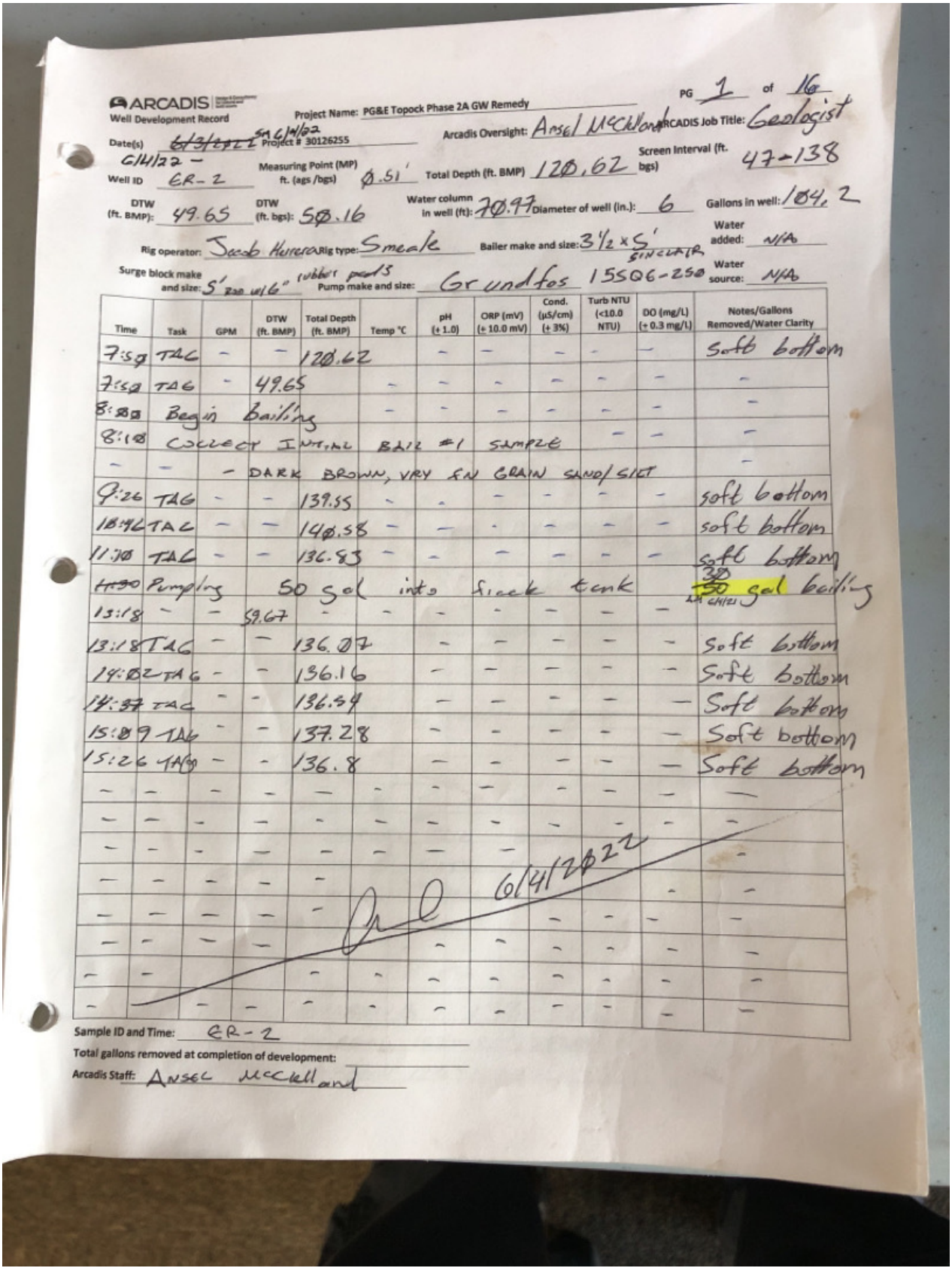
Date Started:	05/08/2022	Surface Elevation:	506.35 ft amsl	**Well ID:**	**ER-02**
Date Completed:	05/10/2022	Shallow Well Elevation:	506.02 ft amsl		
Drilling Co.:	ABC LIOVIN	Deep Well Elevation:	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	2101009.50	Project:	Final GW Remedy Phase 2A
Driller Name:	Eddie Ramos	Easting (NAD83):	7616642.75	Location:	PG&E Topock, Needles California
Drilling Asst:	J. Candelaria / F. Perez	Borehole Diameter:	8-12 inches		
Logger:	Alexis McIntyre	Static Water Level:	See Log for Depths	Project Number:	30126255
Editor:	Sean McGrane	Development End Date:	6/28/2022		
Total Depth:	146 ft bgs	Well Completion:	☒ Flush ☐ Stick-up ☐ To Be Completed in Well Vault		

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
141	No Groundwater Samples Collected	Weathered Bedrock - Conglomerate	N/A		(140.0 - 141.0') SS Centralizer (45.7 - 146.0') Cemex #2/16 (16x30) Lapis Lustre Sand (137.2 - 143.4') Cemex #2/16 (16x30) Lapis Lustre Sand and sediment. (138.0 - 143.4') Sump and 316 SS End Cap (145.0 - 146.0') 8" Diameter Borehole	(45.7 - 146.0') 80.9 bags	(45.7 - 146.0') 83 bags (103%) Note: Filter pack. Ran dummy tool and swabbed filter pack for approximately 20 minutes prior to the installation of the bentonite/transition sand seal. Grain-size analysis of the filter pack sand showed a higher percentage of fine-grained sand. (137.2 - 143.4') Note: Filter pack sand and sediment in the bottom of the well, due to potential damage to the sump or a higher percentage of fines in the filter pack material.
142							
143							
144							
145							
146			NR				
147							
148							
149							
150							
151							
152							
153							
154							
155							
156							
157							
158							
159							
160							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steal, NR = No Recovery, N/A = Not Applicable, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) static water measured during development and approximate static measured during drilling, respectively.

Attachment 5

Well Development Log



ARCADIS Design & Consultancy for natural and built assets

Well Development Record

Project Name: PG&E Topock Phase 2A GW Remedy

PG 1 of 16

Date(s): ~~6/3/2022~~ 5/6/1/22 Project # 30126255

Arcadis Oversight: Ansel McClelland ARCADIS Job Title: Geologist

6/14/22 –

Well ID ER-2 Measuring Point (MP) ft. (ags /bgs) Ø.51' Total Depth (ft. BMP) 120.62 Screen Interval (ft. bgs) 47-138

DTW (ft. BMP): 49.65 DTW (ft. bgs): 50.16 Water column in well (ft): 70.97 Diameter of well (in.): 6 Gallons in well: 104.2

Rig operator: Jacob Herrera Rig type: Smeale Bailer make and size: 3½ x 5' SINCLAIR Water added: N/A

Surge block make and size: 5' Zoo w/6" rubber pads Pump make and size: Grundfos 15SQE-250 Water source: N/A

Time	Task	GPM	DTW (ft. BMP)	Total Depth (ft. BMP)	Temp °C	pH (± 1.0)	ORP (mV) (± 10.0 mV)	Cond. (µS/cm) (± 3%)	Turb NTU (<10.0 NTU)	DO (mg/L) (± 0.3 mg/L)	Notes/Gallons Removed/Water Clarity
7:59	TAG	-	-	120.62	-	-	-	-	-	-	Soft bottom
7:59	TAG	-	49.65	-	-	-	-	-	-	-	-
8:00	Begin Bailing			-	-	-	-	-	-	-	-
8:10	COLLECT INITIAL BAIL #1 SAMPLE								-	-	-
-	-	-	DARK BROWN, VRY FN GRAIN SAND/SILT								-
9:26	TAG	-	-	139.55	-	-	-	-	-	-	soft bottom
10:46	TAG	-	-	140.58	-	-	-	-	-	-	soft bottom
11:10	TAG	-	-	136.83	-	-	-	-	-	-	soft bottom
~~11:30~~	Pumping		50 gal into				Stock	tank			~~30~~ 150 gal bailing
13:18	-	-	59.67	-	-	-	-	-	-	-	
13:18	TAG	-	-	136.07	-	-	-	-	-	-	Soft bottom
14:02	TAG	-	-	136.16	-	-	-	-	-	-	Soft bottom
14:37	TAG	-	-	136.54	-	-	-	-	-	-	Soft bottom
15:09	TAG	-	-	137.28	-	-	-	-	-	-	Soft bottom
15:26	TAG	-	-	136.8	-	-	-	-	-	-	Soft bottom
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-							-
-	-	-	-	-					-	-	-
-	-	-	-	-					-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

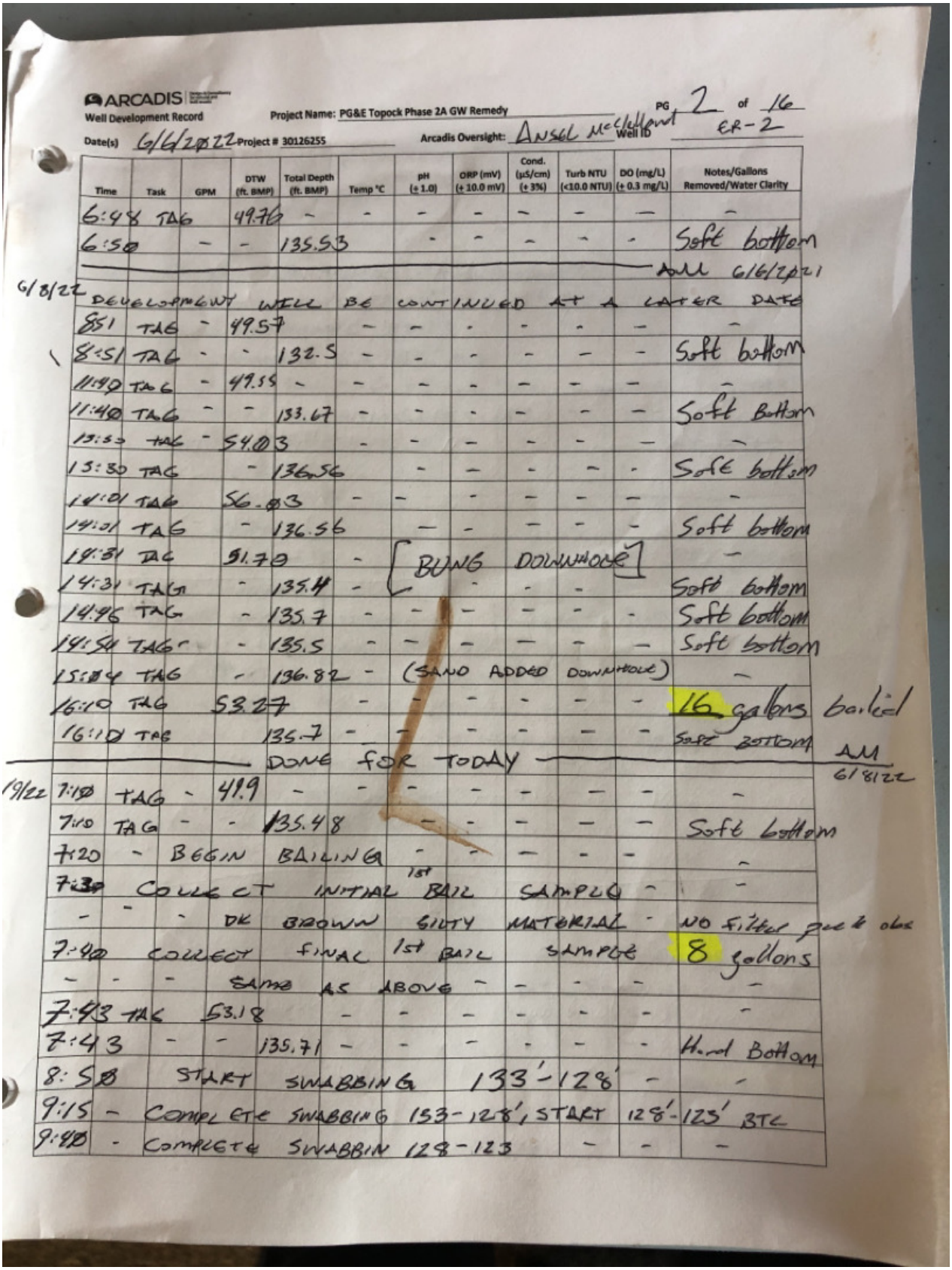
6/14/2022

Sample ID and Time: ER-2

Total gallons removed at completion of development:

Arcadis Staff: Ansel McClelland

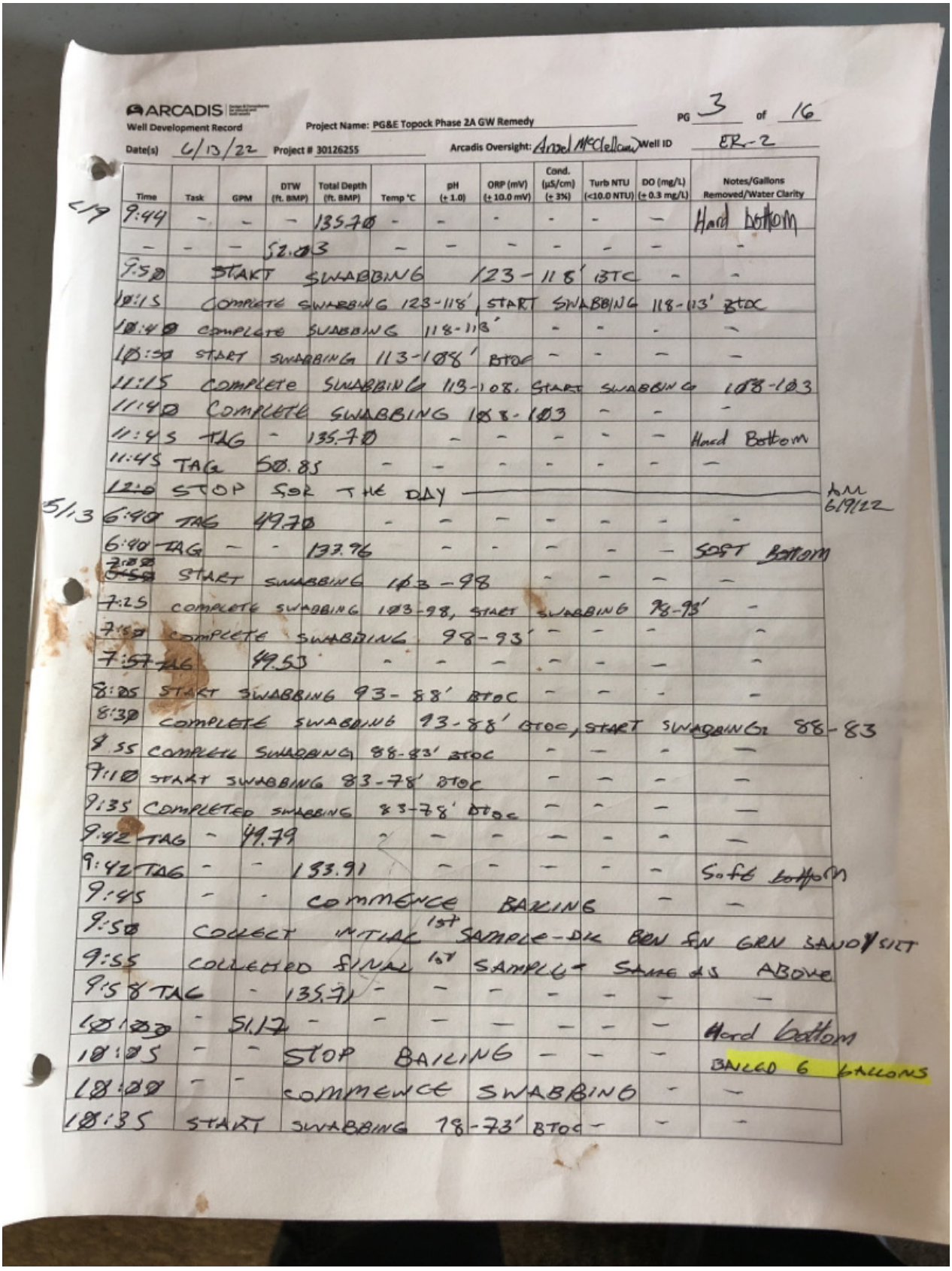
ER-2 - Well Development Record



ARCADIS
Well Development Record
Project Name: PG&E Topock Phase 2A GW Remedy
PG 2 of 16
Date(s) 6/6/2022 Project # 30126255
Arcadis Oversight: ANSEL McClelland
Well ID ER-2

Time	Task	GPM	DTW (ft. BMP)	Total Depth (ft. BMP)	Temp °C	pH (± 1.0)	ORP (mV) (± 10.0 mV)	Cond. (µS/cm) (± 3%)	Turb NTU (<10.0 NTU)	DO (mg/L) (± 0.3 mg/L)	Notes/Gallons Removed/Water Clarity
6:48	TAG	-	49.76	-	-	-	-	-	-	-	-
6:50	-	-	-	135.53		-	-	-	-	-	Soft bottom
											AM 6/6/2021
6/8/22	DEVELOPMENT WILL BE CONTINUED AT A LATER DATE										
8:51	TAG	-	49.57		-	-	-	-	-	-	-
8:51	TAG	-	-	132.5	-	-	-	-	-	-	Soft bottom
11:40	TAG	-	49.55		-	-	-	-	-	-	-
11:40	TAG	-	-	133.67	-	-	-	-	-	-	Soft Bottom
13:33	TAG	-	54.03		-	-	-	-	-	-	-
13:30	TAG		-	136.56		-	-	-	-	-	Soft bottom
14:01	TAG		56.03		-	-	-	-	-	-	-
14:01	TAG		-	136.56		-	-	-	-	-	Soft bottom
14:31	TAG		51.70		-	[BUNG DOWNHOLE]					-
14:34	TAG		-	135.44	-		-	-	-		Soft bottom
14:46	TAG		-	135.7	-	-	-	-	-	-	Soft bottom
14:54	TAG		-	135.5	-	-	-	-	-	-	Soft bottom
15:04	TAG		-	136.82	-	(SAND ADDED DOWNHOLE)					-
16:10	TAG		53.27		-	-	-	-	-	-	16 gallons bailed
16:10	TAG			135.7	-	-	-	-	-	-	Soft BOTTOM
			DONE FOR TODAY								AM 6/8/22
9/22 7:10	TAG	-	49.9		-	-	-	-	-	-	-
7:10	TAG	-	-	135.48		-	-	-	-	-	Soft bottom
7:20	-	BEGIN	BAILING		-	-	-	-	-		-
7:30	COLLECT		INITIAL	1st	BAIL	SAMPLE	-				-
-	-	-	DK	BROWN	SILTY	MATERIAL	-	NO filter pack obs			
7:40	COLLECT		FINAL	1st	BAIL	SAMPLE		8 gallons			
-	-	-	SAME	AS	ABOVE	-	-	-	-		-
7:43	TAG		53.18		-	-	-	-	-	-	-
7:43	-	-	-	135.71	-	-	-	-	-	-	Hard Bottom
8:50	START		SWABBING		133'-128'		-				-
9:15	-	COMPLETE	SWABBING	133-128', START			128'-123'	BTC			
9:40	-	COMPLETE	SWABBIN	128-123			-	-	-		-

ER-2 - Well Development Record

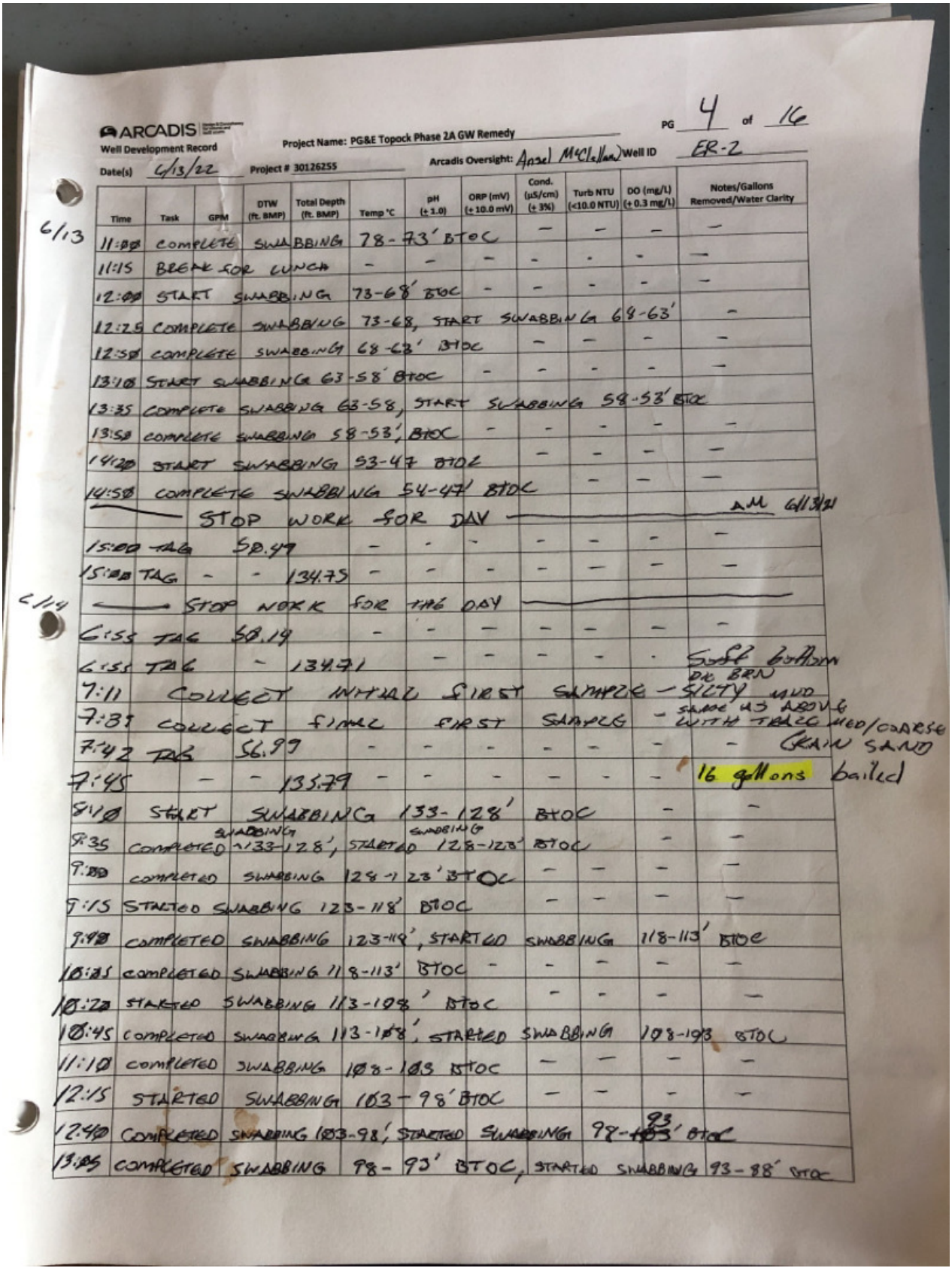


ARCADIS Well Development Record — Project Name: PG&E Topock Phase 2A GW Remedy — PG 3 of 16

Date(s) 6/13/22 — Project # 30126255 — Arcadis Oversight: Arnel McClellan — Well ID ER-2

Time	Task	GPM	DTW (ft. BMP)	Total Depth (ft. BMP)	Temp °C	pH (± 1.0)	ORP (mV) (± 10.0 mV)	Cond. (µS/cm) (± 3%)	Turb NTU (<10.0 NTU)	DO (mg/L) (± 0.3 mg/L)	Notes/Gallons Removed/Water Clarity
9:44	-	-	-	135.70	-	-	-	-	-	-	Hard bottom
-	-	-	52.03	-	-	-	-	-	-	-	-
9:50	START SWABBING 123-118' BTOC										
10:15	COMPLETE SWABBING 123-118', START SWABBING 118-113' BTOC										
10:40	COMPLETE SWABBING 118-113'							-	-	-	-
10:50	START SWABBING 113-108' BTOC							-	-	-	-
11:15	COMPLETE SWABBING 113-108, START SWABBING 108-103										
11:40	COMPLETE SWABBING 108-103							-	-	-	-
11:45	TAG	-	135.70		-	-	-	-	-	-	Hard Bottom
11:45	TAG		50.85		-	-	-	-	-	-	-
12:00	STOP FOR THE DAY										AM 6/14/22
5/13 6:40	TAG		49.70		-	-	-	-	-	-	-
6:40	TAG	-	-	137.96		-	-	-	-	-	SOFT Bottom
7:00	START SWABBING 103-98							-	-	-	-
7:25	COMPLETE SWABBING 103-98, START SWABBING 98-93'										-
7:50	COMPLETE SWABBING 98-93'							-	-	-	-
7:57	TAG		49.53		-	-	-	-	-	-	-
8:05	START SWABBING 93-88' BTOC							-	-	-	-
8:30	COMPLETE SWABBING 93-88' BTOC, START SWABBING 88-83										
8:55	COMPLETE SWABBING 88-83' BTOC							-	-	-	-
9:10	START SWABBING 83-78' BTOC							-	-	-	-
9:35	COMPLETED SWABBING 83-78' BTOC							-	-	-	-
9:42	TAG	-	49.79		-	-	-	-	-	-	-
9:42	TAG	-	-	133.91		-	-	-	-	-	Soft bottom
9:45	-	-	COMMENCE BAILING							-	-
9:50	COLLECT INITIAL 1ST SAMPLE - DK BRN FN GRN SAND/SILT										
9:55	COLLECTED FINAL 1ST SAMPLE - SAME AS ABOVE										
9:58	TAG	-	135.71		-	-	-	-	-	-	-
10:00	-		51.17		-	-	-	-	-	-	Hard bottom
10:05	-	-	STOP BAILING					-	-	-	BAILED 6 GALLONS
10:00	-	-	COMMENCE SWABBING					-	-	-	-
10:35	START SWABBING 78-73' BTOC							-	-	-	-

ER-2 - Well Development Record



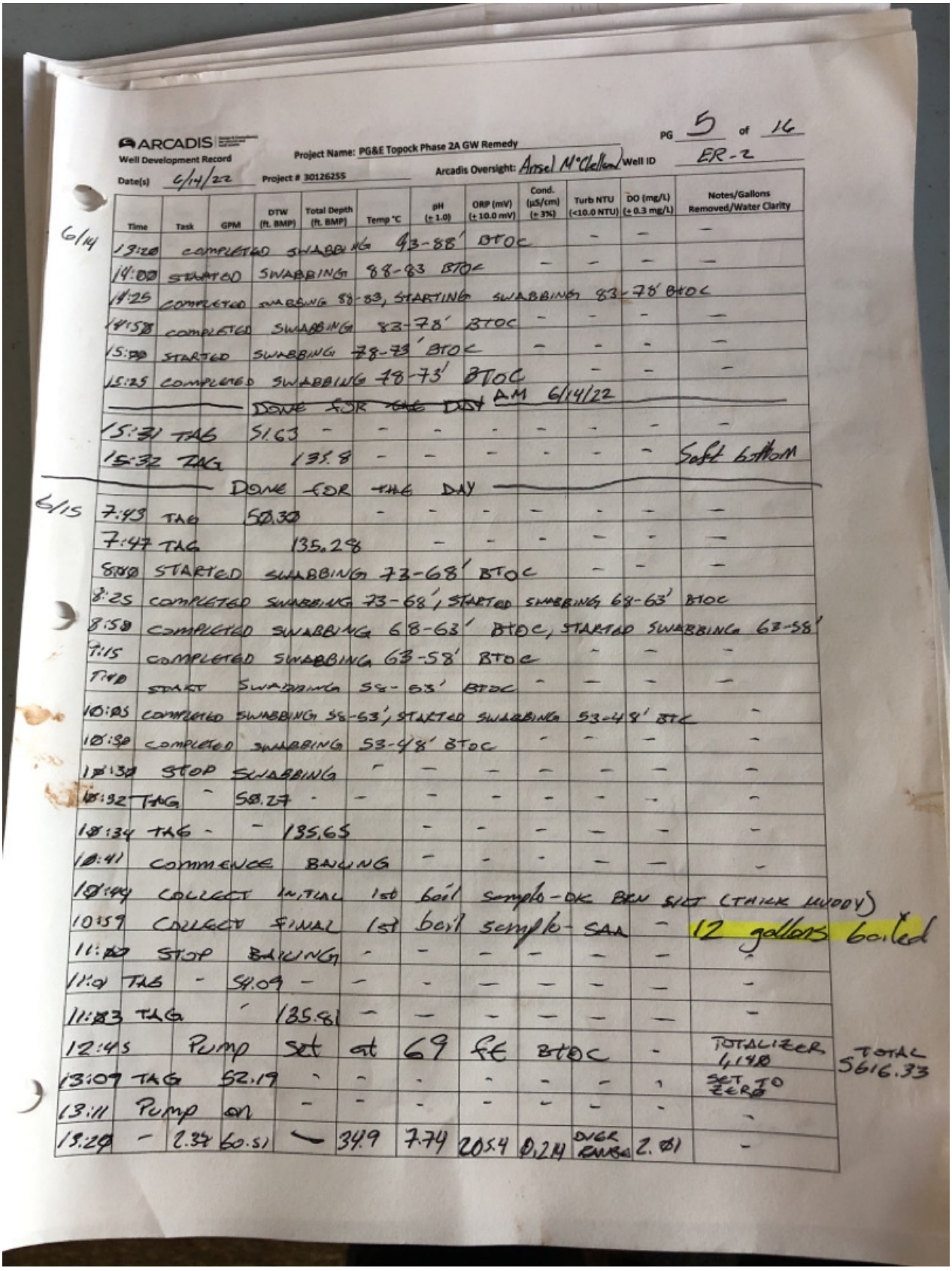
ARCADIS Well Development Record — PG 4 of 16

Project Name: PG&E Topock Phase 2A GW Remedy

Date(s): 6/13/22 Project # 30126255 Arcadis Oversight: Angel McClellan Well ID ER-2

Time	Task	GPM	DTW (ft. BMP)	Total Depth (ft. BMP)	Temp °C	pH (± 1.0)	ORP (mV) (± 10.0 mV)	Cond. (µS/cm) (± 3%)	Turb NTU (<10.0 NTU)	DO (mg/L) (± 0.3 mg/L)	Notes/Gallons Removed/Water Clarity
6/13											
11:00	COMPLETE SWABBING				78-73' BTOC			–	–	–	–
11:15	BREAK FOR LUNCH		–	–	–	–	–	–	–	–	–
12:00	START SWABBING				73-68' BTOC	–	–	–	–	–	–
12:25	COMPLETE SWABBING				73-68, START SWABBING 68-63'						–
12:50	COMPLETE SWABBING				68-63' BTOC			–	–	–	–
13:10	START SWABBING				63-58' BTOC	–	–	–	–	–	–
13:35	COMPLETE SWABBING				63-58, START SWABBING 58-53' BTOC						
13:50	COMPLETE SWABBING				58-53', BTOC	–	–	–	–	–	–
14:20	START SWABBING				53-47 BTOC			–	–	–	–
14:50	COMPLETE SWABBING				54-47' BTOC			–	–	–	–
	STOP WORK FOR DAY										AM 6/13/22
15:00	TAG		50.49		–	–	–	–	–	–	–
15:00	TAG		–	134.75	–	–	–	–	–	–	–
6/14	STOP WORK FOR THE DAY										
6:55	TAG		50.19		–	–	–	–	–	–	–
6:55	TAG		–	134.71	–	–	–	–	–	·	Soft bottom DK BRN
7:11	COLLECT INITIAL FIRST SAMPLE									–	SILTY MUD
7:31	COLLECT FINAL FIRST SAMPLE									–	SLIME 43 ABOVE WITH TRACE MED/COARSE GRAIN SAND
7:42	TAG		56.99		–	–	–	–	–	–	–
7:45	–		–	133.79	–	–	–	–	–	–	16 gallons bailed
8:10	START SWABBING				133-128' BTOC					–	–
9:35	COMPLETED SWABBING 133-128', STARTED SWABBING				128-123' BTOC					–	–
9:50	COMPLETED SWABBING				124-123' BTOC			–	–	–	–
9:15	STARTED SWABBING				123-118' BTOC			–	–	–	–
9:40	COMPLETED SWABBING				123-118', STARTED SWABBING 118-113' BTOC						
10:25	COMPLETED SWABBING				118-113' BTOC	–	–	–	–	–	–
10:20	STARTED SWABBING				113-108' BTOC			–	–	–	–
10:45	COMPLETED SWABBING				113-108', STARTED SWABBING 108-103 BTOC						
11:10	COMPLETED SWABBING				108-103 BTOC			–	–	–	–
12:15	STARTED SWABBING				103-98' BTOC			–	–	–	–
12:40	COMPLETED SWABBING 103-98', STARTED SWABBING 98-93' BTOC										
13:05	COMPLETED SWABBING				98-93' BTOC, STARTED SWABBING 93-88' BTOC						

ER-2 - Well Development Record

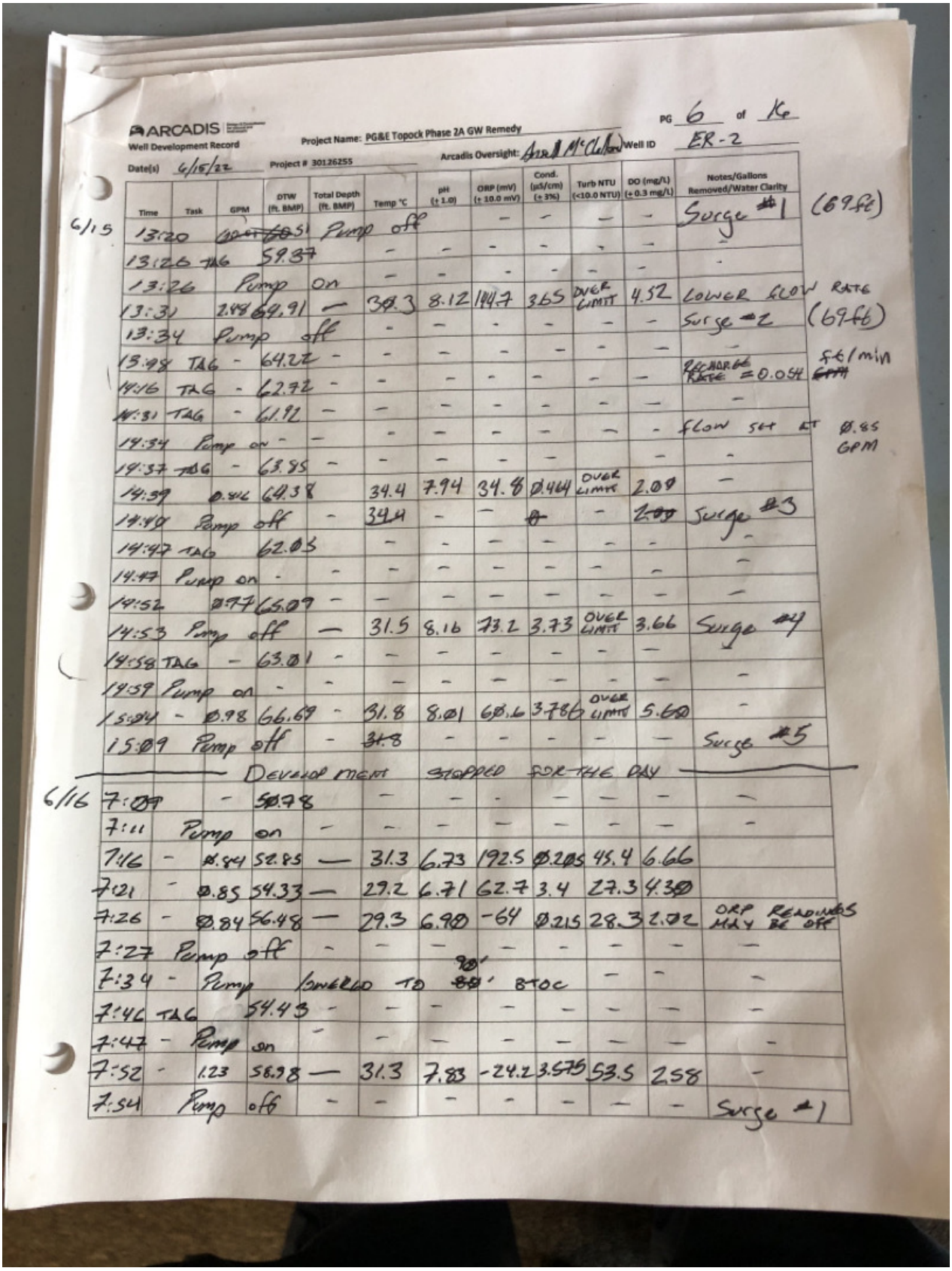


ARCADIS Well Development Record — Project Name: PG&E Topock Phase 2A GW Remedy — PG 5 of 16

Date(s) 6/14/22 — Project # 30126255 — Arcadis Oversight: Arisel M°Clellan — Well ID ER-2

	Time	Task	GPM	DTW (ft. BMP)	Total Depth (ft. BMP)	Temp °C	pH (± 1.0)	ORP (mV) (± 10.0 mV)	Cond. (µS/cm) (± 3%)	Turb NTU (<10.0 NTU)	DO (mg/L) (± 0.3 mg/L)	Notes/Gallons Removed/Water Clarity
6/14	13:20	COMPLETED SWABBING 93-88' BTOC							-	-	-	-
	14:00	STARTED SWABBING 88-83 BTOC							-	-	-	-
	14:25	COMPLETED SWABBING 88-83, STARTING SWABBING 83-78' BTOC										
	14:58	COMPLETED SWABBING 83-78' BTOC							-	-	-	-
	15:00	STARTED SWABBING 78-73' BTOC							-	-	-	-
	15:25	COMPLETED SWABBING 78-73' BTOC							-	-	-	-
		DONE FOR ~~THE~~ ~~DAY~~ AM 6/14/22										
	15:31	TAG		51.63	-	-	-	-	-	-	-	-
	15:32	TAG		135.8	-	-	-	-	-	-	-	Soft bottom
		DONE FOR THE DAY										
6/15	7:43	TAG		50.30	-	-	-	-	-	-	-	-
	7:47	TAG		135.28	-	-	-	-	-	-	-	-
	8:00	STARTED SWABBING 73-68' BTOC							-	-	-	-
	8:25	COMPLETED SWABBING 73-68', STARTED SWABBING 68-63' BTOC										
	8:58	COMPLETED SWABBING 68-63' BTOC, STARTED SWABBING 63-58'										
	9:15	COMPLETED SWABBING 63-58' BTOC							-	-	-	-
	9:40	START SWABBING 58-53' BTOC							-	-	-	-
	10:05	COMPLETED SWABBING 58-53', STARTED SWABBING 53-48' BTC										-
	10:30	COMPLETED SWABBING 53-48' BTOC							-	-	-	-
	10:30	STOP SWABBING		-	-	-	-	-	-	-	-	-
	10:32	TAG	-	50.27	-	-	-	-	-	-	-	-
	10:34	TAG	-	-	135.65	-	-	-	-	-	-	-
	10:41	COMMENCE BAILING				-	-	-	-	-	-	-
	10:44	COLLECT INITIAL 1st bail sample - OK BRN SLT (TAN & WOODY)										
	10:59	COLLECT FINAL 1st bail sample - SAA							-	-	-	12 gallons bailed
	11:00	STOP BAILING				-	-	-	-	-	-	-
	11:02	TAG	-	54.09	-	-	-	-	-	-	-	-
	11:03	TAG			135.81	-	-	-	-	-	-	-
	12:45	Pump set at 69 ft BTOC							-			TOTALIZER 4,148 SET TO ZERO — TOTAL 5616.33
	13:09	TAG		52.19	-	-	-	-	-	-	-	
	13:11	Pump on		-	-	-	-	-	-	-	-	-
	13:29	-	2.34	60.51	-	34.9	7.74	205.4	0.24	OVER RANGE	2.01	-

ER-2 - Well Development Record



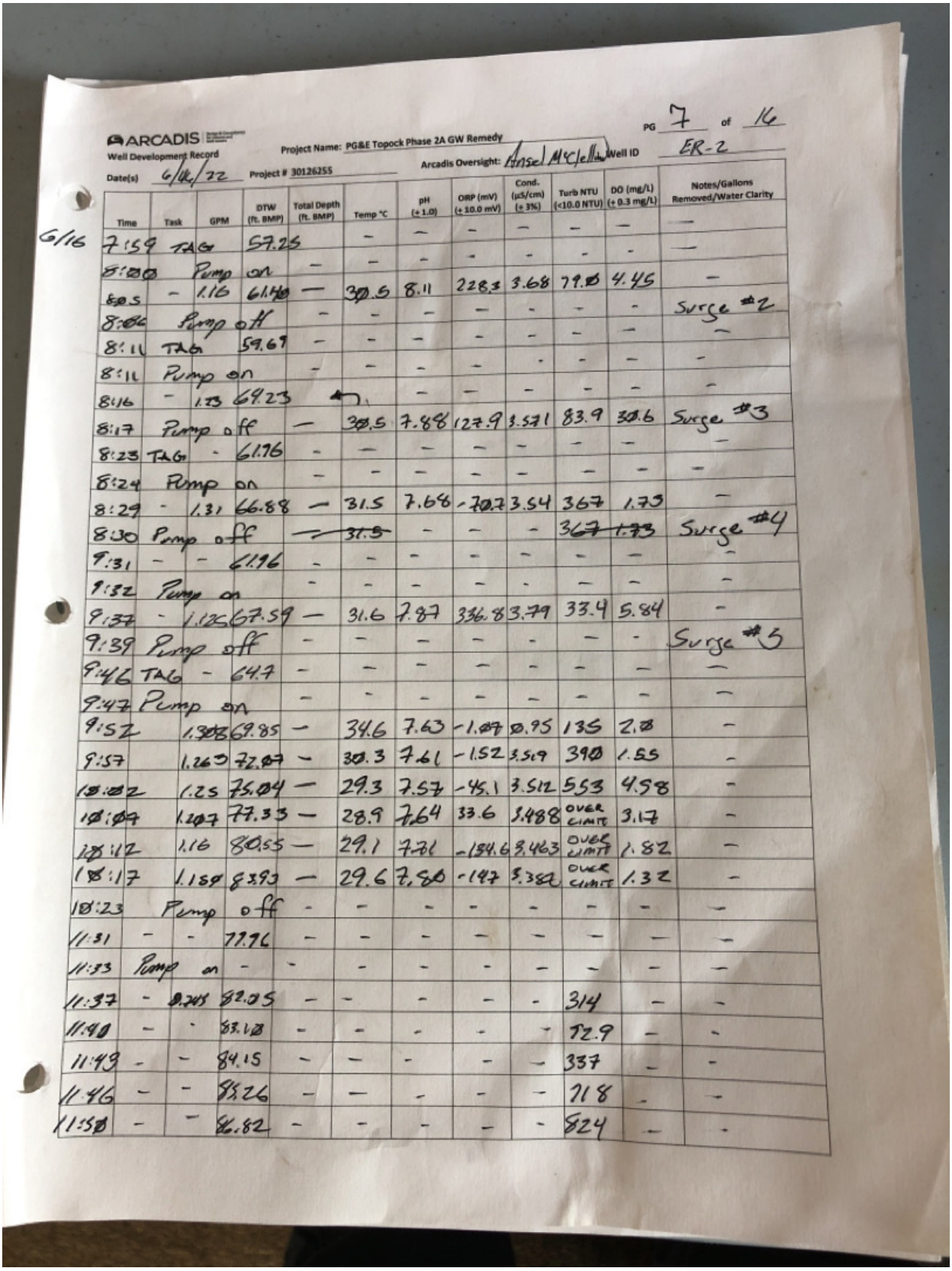
ARCADIS Design & Consultancy for natural and built assets

Well Development Record — Project Name: PG&E Topock Phase 2A GW Remedy — PG 6 of 16

Date(s): 6/15/22 — Project # 30126255 — Arcadis Oversight: Andrew McClellan — Well ID: ER-2

Time	Task	GPM	DTW (ft. BMP)	Total Depth (ft. BMP)	Temp °C	pH (± 1.0)	ORP (mV) (± 10.0 mV)	Cond. (µS/cm) (± 3%)	Turb NTU (<10.0 NTU)	DO (mg/L) (± 0.3 mg/L)	Notes/Gallons Removed/Water Clarity
6/15 13:20			~~60.51~~	Pump off			–	–	–	–	Surge #1 (69 ft)
13:26	TAG		59.37		–	–	–	–	–	–	–
13:26	Pump on				–	–	–	–	–	–	–
13:31		2.88	64.91	–	30.3	8.12	144.7	365	OVER LIMIT	4.52	LOWER FLOW RATE
13:34	Pump off				–	–	–	–	–	–	Surge #2 (69 ft)
13:38	TAG	–	64.22	–	–	–	–	–	–	–	–
14:16	TAG	–	62.92	–	–	–	–	–	–	–	RECHARGE RATE = 0.054 ~~GPM~~ ft/min
14:31	TAG	–	61.92	–	–	–	–	–	–	–	–
14:34	Pump on	–	–	–	–	–	–	–	–	–	FLOW SET AT 0.85 GPM
14:37	TAG	–	63.85	–	–	–	–	–	–	–	–
14:39		0.46	64.38		34.4	7.94	34.8	0.464	OVER LIMIT	2.09	–
14:40	Pump off			–	34.4	–	–	~~0~~	–	~~2.09~~	Surge #3
14:47	TAG		62.05		–	–	–	–	–	–	–
14:47	Pump on	–	–		–	–	–	–	–	–	–
14:52		0.97	65.09	–	–	–	–	–	–	–	–
14:53	Pump off			–	31.5	8.16	73.2	3.73	OVER LIMIT	3.66	Surge #4
14:58	TAG	–	63.01	–	–	–	–	–	–	–	–
14:59	Pump on	–	–		–	–	–	–	–	–	–
15:04	–	0.98	66.69	–	31.8	8.01	60.6	3.786	OVER LIMIT	5.60	–
15:09	Pump off			–	~~31.8~~	–	–	–	–	–	Surge #5
			DEVELOPMENT STOPPED FOR THE DAY								
6/16 7:09	–		59.78		–	–	–	–	–	–	–
7:11	Pump on			–	–	–	–	–	–	–	–
7:16	–	0.84	52.85	–	31.3	6.73	192.5	0.205	45.4	6.66	
7:21	–	0.85	54.33	–	29.2	6.71	62.7	3.4	27.3	4.30	
7:26	–	0.84	56.48	–	29.3	6.90	-64	0.215	28.3	2.02	ORP READINGS MAY BE OFF
7:27	Pump off			–	–	–	–	–	–	–	–
7:34	–	Pump lowered to ~~80~~ 90' BTOC							–	–	–
7:46	TAG		54.43	–	–	–	–	–	–	–	–
7:47	–	Pump on		–	–	–	–	–	–	–	–
7:52	–	1.23	58.98	–	31.3	7.83	-24.2	3.575	53.5	2.58	–
7:54	Pump off			–	–	–	–	–	–	–	Surge #1

ER-2 - Well Development Record



ARCADIS Design & Consultancy for natural and built assets

Well Development Record

Project Name: PG&E Topock Phase 2A GW Remedy

Arcadis Oversight: Ansel McClellan

Well ID: ER-2

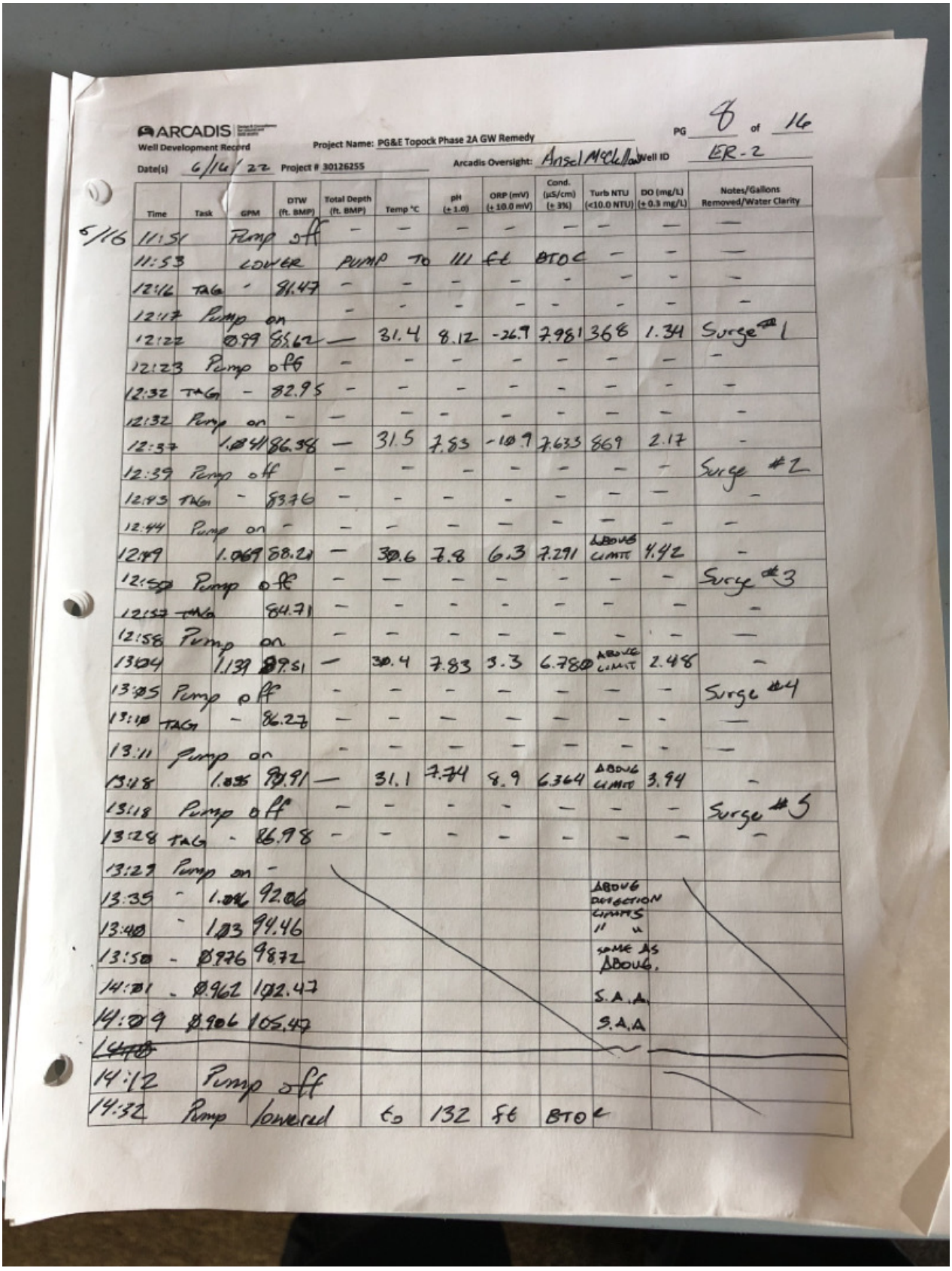
Date(s): 6/16/22

Project #: 30126255

PG 7 of 16

Time	Task	GPM	DTW (ft. BMP)	Total Depth (ft. BMP)	Temp °C	pH (± 1.0)	ORP (mV) (± 10.0 mV)	Cond. (µS/cm) (± 3%)	Turb NTU (<10.0 NTU)	DO (mg/L) (± 0.3 mg/L)	Notes/Gallons Removed/Water Clarity
6/16 7:59	TAG		57.25		-	-	-	-	-	-	-
8:00	Pump on			-	-	-	-	-	-	-	-
8:05	-	1.16	61.46	-	30.5	8.11	228.3	3.68	79.0	4.45	-
8:06	Pump off			-	-	-	-	-	-	-	Surge #2
8:11	TAG		59.69	-	-	-	-	-	-	-	-
8:11	Pump on			-	-	-	-	-	-	-	-
8:16	-	1.13	64.23	-	-	-	-	-	-	-	-
8:17	Pump off			-	30.5	7.88	127.9	3.571	83.9	30.6	Surge #3
8:23	TAG	-	61.76	-	-	-	-	-	-	-	-
8:24	Pump on			-	-	-	-	-	-	-	-
8:29	-	1.31	66.88	-	31.5	7.64	-70.7	3.54	367	1.73	-
8:30	Pump off			-	~~31.5~~	-	-	-	~~367~~	~~1.73~~	Surge #4
9:31	-	-	61.96	-	-	-	-	-	-	-	-
9:32	Pump on			-	-	-	-	-	-	-	-
9:37	-	1.12	67.59	-	31.6	7.87	336.8	3.79	33.4	5.84	-
9:39	Pump off			-	-	-	-	-	-	-	Surge #5
9:46	TAG	-	64.7	-	-	-	-	-	-	-	-
9:47	Pump on			-	-	-	-	-	-	-	-
9:52		1.308	69.85	-	34.6	7.63	-1.07	0.95	135	2.0	-
9:57		1.263	72.07	-	30.3	7.61	-1.52	3.519	390	1.55	-
10:02		1.25	75.04	-	29.3	7.57	-45.1	3.512	553	4.58	-
10:07		1.207	77.33	-	28.9	7.64	33.6	3.488	OVER LIMIT	3.17	-
10:12		1.16	80.55	-	29.1	7.71	-134.6	3.463	OVER LIMIT	1.82	-
10:17		1.158	83.93	-	29.6	7.80	-147	3.382	OVER LIMIT	1.32	-
10:23	Pump off			-	-	-	-	-	-	-	-
11:31	-	-	77.96	-	-	-	-	-	-	-	-
11:33	Pump on		-	-	-	-	-	-	-	-	-
11:37	-	0.748	82.05	-	-	-	-	-	314	-	-
11:40	-	-	83.10	-	-	-	-	-	72.9	-	-
11:43	-	-	84.15	-	-	-	-	-	337	-	-
11:46	-	-	85.26	-	-	-	-	-	718	-	-
11:50	-	-	86.82	-	-	-	-	-	824	-	-

ER-2 - Well Development Record



ARCADIS Well Development Record

Project Name: PG&E Topock Phase 2A GW Remedy

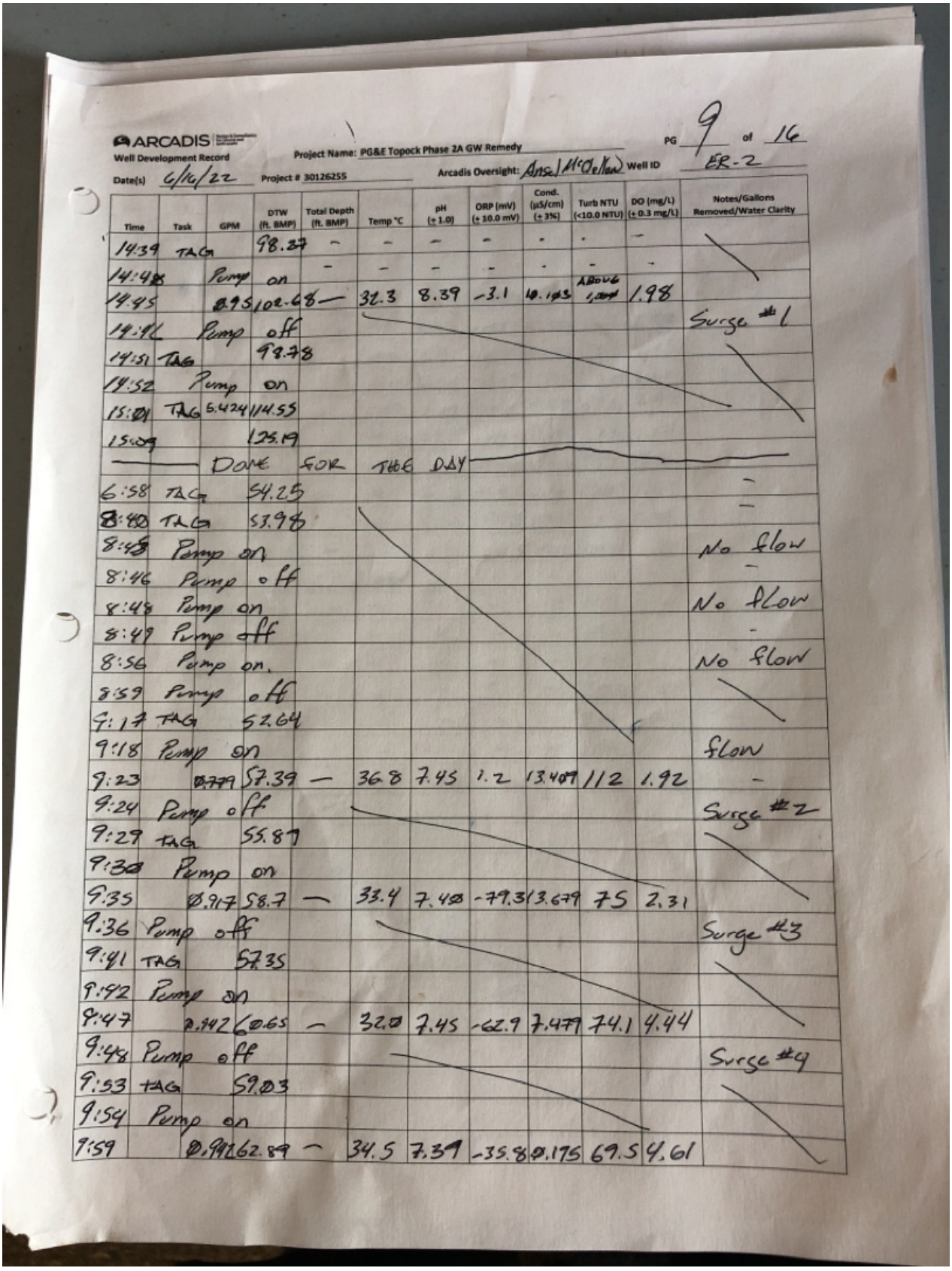
PG 8 of 16

Date(s): 6/16/22 Project #: 30126255

Arcadis Oversight: Ansel McClellan Well ID: ER-2

	Time	Task	GPM	DTW (ft. BMP)	Total Depth (ft. BMP)	Temp °C	pH (± 1.0)	ORP (mV) (± 10.0 mV)	Cond. (µS/cm) (± 3%)	Turb NTU (<10.0 NTU)	DO (mg/L) (± 0.3 mg/L)	Notes/Gallons Removed/Water Clarity
6/16	11:51	Pump off		–	–	–	–	–	–	–	–	–
	11:53	LOWER PUMP TO 111 ft BTOC								–	–	–
	12:16	TAG - 81.47		–	–	–	–	–	–	–	–	–
	12:17	Pump on		–	–	–	–	–	–	–	–	–
	12:22		0.99	83.62	–	31.4	8.12	-26.9	7981	368	1.34	Surge #1
	12:23	Pump off		–	–	–	–	–	–	–	–	–
	12:32	TAG - 82.95		–	–	–	–	–	–	–	–	–
	12:32	Pump on		–	–	–	–	–	–	–	–	–
	12:37		1.041	86.38	–	31.5	7.83	-10.9	7.633	869	2.17	–
	12:39	Pump off		–	–	–	–	–	–	–	–	Surge #2
	12:43	TAG - 83.76		–	–	–	–	–	–	–	–	–
	12:44	Pump on		–	–	–	–	–	–	–	–	–
	12:49		1.069	88.21	–	30.6	7.8	6.3	7.291	ABOVE LIMIT	4.42	–
	12:50	Pump off		–	–	–	–	–	–	–	–	Surge #3
	12:52	TAG		84.71	–	–	–	–	–	–	–	–
	12:58	Pump on		–	–	–	–	–	–	–	–	–
	13:04		1.139	89.51	–	30.4	7.83	3.3	6.780	ABOVE LIMIT	2.48	–
	13:05	Pump off		–	–	–	–	–	–	–	–	Surge #4
	13:10	TAG - 86.27		–	–	–	–	–	–	–	–	–
	13:11	Pump on		–	–	–	–	–	–	–	–	–
	13:18		1.035	89.91	–	31.1	7.74	8.9	6364	ABOVE LIMIT	3.94	–
	13:18	Pump off		–	–	–	–	–	–	–	–	Surge #5
	13:28	TAG - 86.98		–	–	–	–	–	–	–	–	–
	13:29	Pump on										
	13:35		1.026	92.06						ABOVE DETECTION LIMITS " "		
	13:40		1.03	94.46								
	13:50		0.976	98.72						SAME AS ABOVE.		
	14:01		0.962	102.47						S.A.A.		
	14:09		0.906	105.47						S.A.A.		
	~~14:08~~											
	14:12	Pump off										
	14:32	Pump lowered				to	132	ft	BTOC			

ER-2 - Well Development Record



ARCADIS Design & Consultancy for natural and built assets

Well Development Record

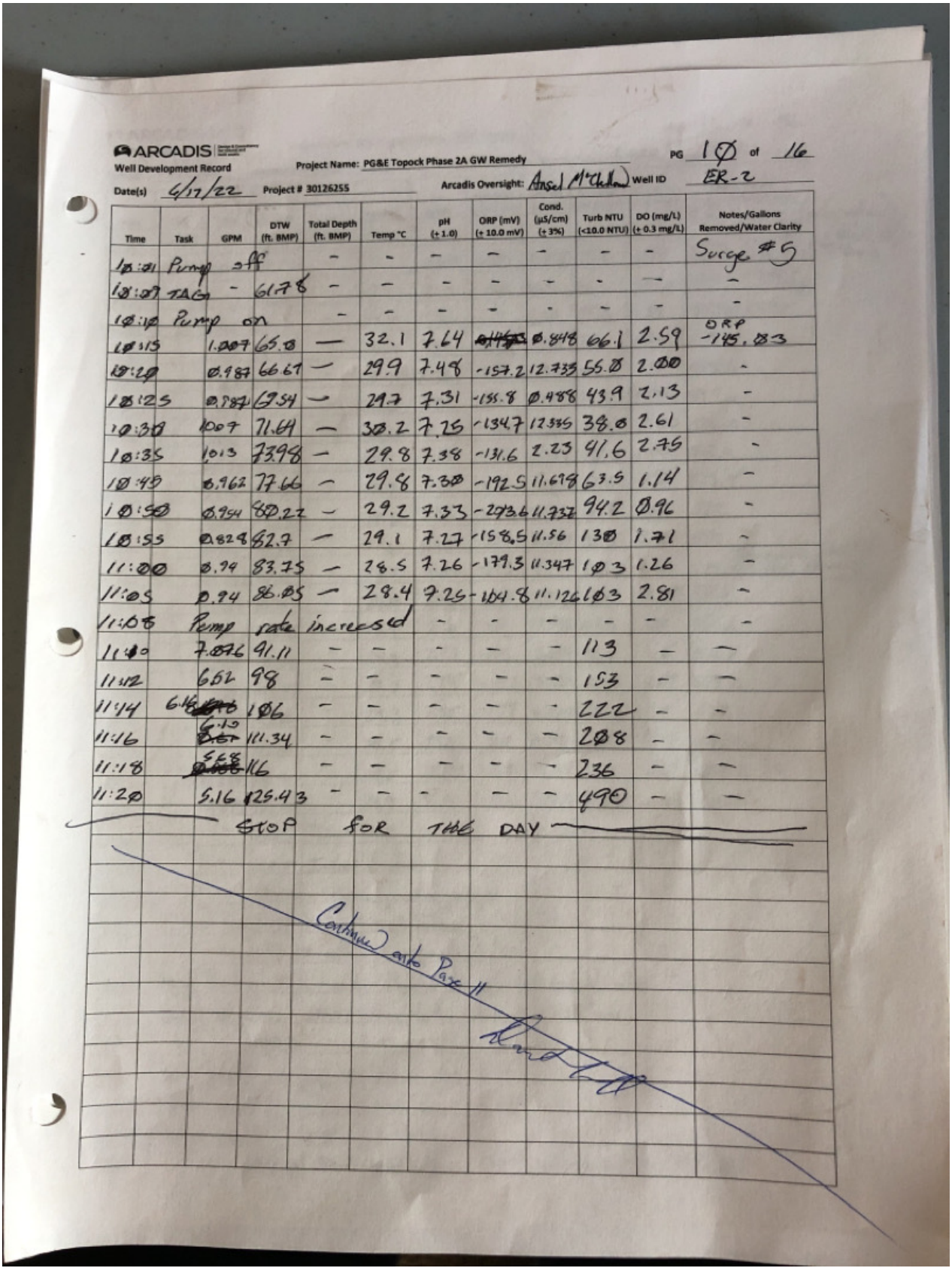
Project Name: PG&E Topock Phase 2A GW Remedy

PG 9 of 16

Date(s) 6/16/22 Project # 30126255 Arcadis Oversight: Ansel McClellan Well ID ER-2

Time	Task	GPM	DTW (ft. BMP)	Total Depth (ft. BMP)	Temp °C	pH (± 1.0)	ORP (mV) (± 10.0 mV)	Cond. (µS/cm) (± 3%)	Turb NTU (<10.0 NTU)	DO (mg/L) (± 0.3 mg/L)	Notes/Gallons Removed/Water Clarity
14:39	TAG		98.27	–	–	–	–	–	–	–	
14:48	Pump	on	–	–	–	–	–	–	–	–	
14:45		0.95	102.68	–	32.3	8.39	-3.1	10.193	ABOVE 1,000	1.98	
14:46	Pump	off									Surge #1
14:51	TAG		98.78								
14:52	Pump	on									
15:01	TAG		6.424	114.55							
15:09			125.19								
	DONE FOR THE DAY										
6:58	TAG		54.25								–
8:40	TAG		53.98								–
8:45	Pump	on									No flow
8:46	Pump	off									–
8:48	Pump	on									No flow
8:49	Pump	off									–
8:56	Pump	on									No flow
8:59	Pump	off									
9:17	TAG		52.64								
9:18	Pump	on									flow
9:23		0.779	57.39	–	36.8	7.45	1.2	13.409	112	1.92	–
9:24	Pump	off									Surge #2
9:29	TAG		55.87								
9:30	Pump	on									
9:35		0.917	58.7	–	33.4	7.48	-79.3	13.679	75	2.31	
9:36	Pump	off									Surge #3
9:41	TAG		57.35								
9:42	Pump	on									
9:47		0.942	60.65	–	32.0	7.45	-62.9	7.479	74.1	4.44	
9:48	Pump	off									Surge #4
9:53	TAG		59.03								
9:54	Pump	on									
9:59		0.992	62.89	–	34.5	7.39	-35.8	0.175	69.5	4.61	

ER-2 - Well Development Record



ARCADIS Design & Consultancy for natural and built assets

Well Development Record

Project Name: PG&E Topock Phase 2A GW Remedy

PG 10 of 16

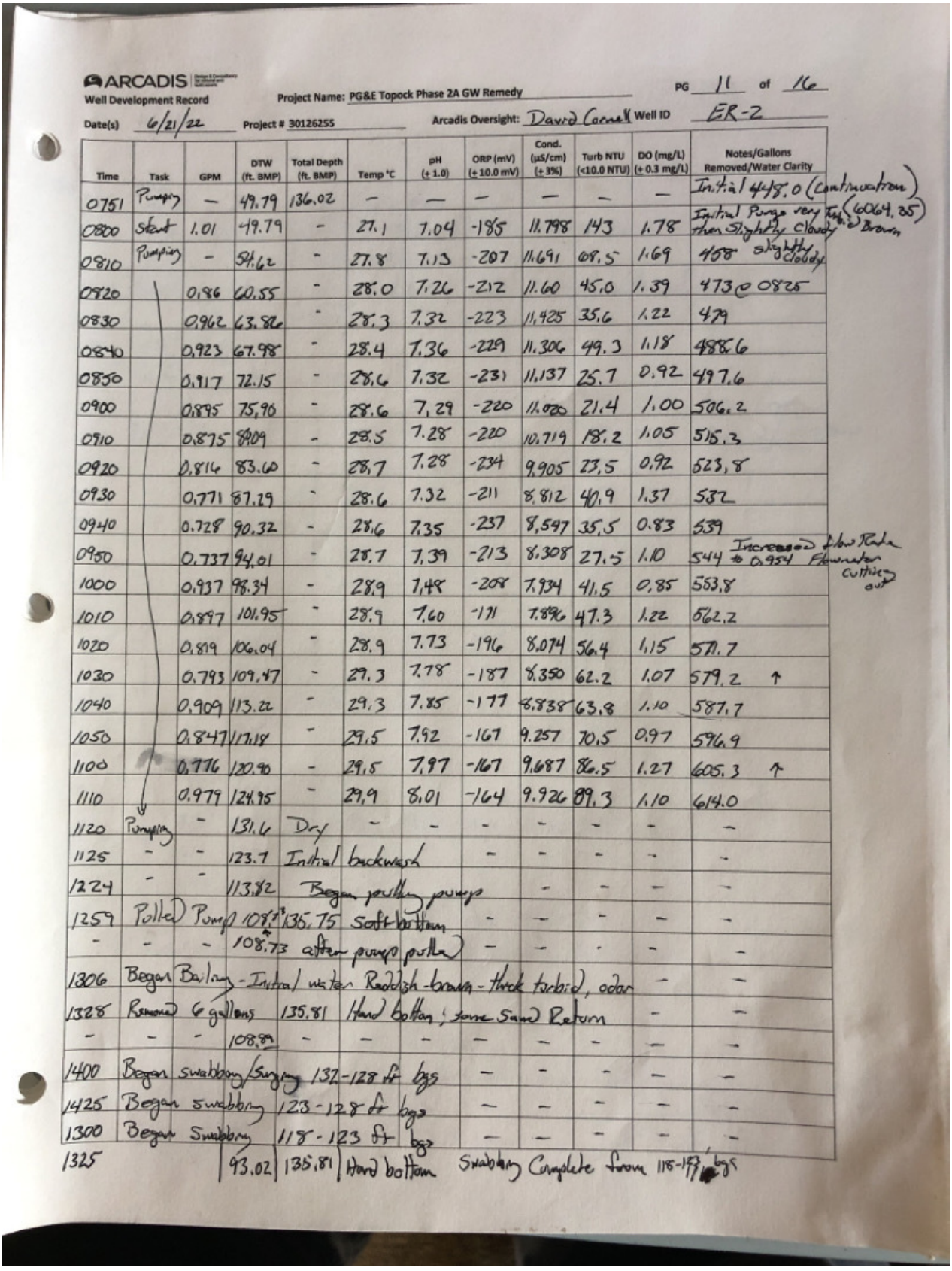
Date(s) 6/17/22 Project # 30126255 Arcadis Oversight: Ansel McClellan Well ID ER-2

Time	Task	GPM	DTW (ft. BMP)	Total Depth (ft. BMP)	Temp °C	pH (± 1.0)	ORP (mV) (± 10.0 mV)	Cond. (µS/cm) (± 3%)	Turb NTU (<10.0 NTU)	DO (mg/L) (± 0.3 mg/L)	Notes/Gallons Removed/Water Clarity
10:01	Pump off	-	-	-	-	-	-	-	-	-	Surge #5
10:07	TAG	-	61.78	-	-	-	-	-	-	-	-
10:10	Pump on			-	-	-	-	-	-	-	-
10:15		1.007	65.0	—	32.1	7.64	~~0.1465~~	0.848	66.1	2.59	ORP -145.83
10:20		0.987	66.67	—	29.9	7.48	-157.2	12.735	55.8	2.00	-
10:25		0.987	69.54	—	29.7	7.31	-155.8	0.488	43.9	2.13	-
10:30		1.007	71.64	—	30.2	7.25	-134.7	12.335	38.8	2.61	-
10:35		1.013	73.98	—	29.8	7.38	-131.6	2.23	41.6	2.75	-
10:45		0.962	77.66	—	29.8	7.30	-192.5	11.698	63.5	1.14	-
10:50		0.954	80.27	—	29.2	7.33	-293.6	11.737	94.2	0.96	-
10:55		0.828	82.7	—	29.1	7.27	-158.5	11.56	130	1.71	-
11:00		0.99	83.75	—	28.5	7.26	-179.3	11.347	103	1.26	-
11:05		0.94	86.05	—	28.4	7.25	-104.8	11.126	103	2.81	-
11:08	Pump rate increased				-	-	-	-	-	-	-
11:10		7.876	91.11	-	-	-	-	-	113	-	-
11:12		6.62	98	-	-	-	-	-	153	-	-
11:14		6.6 ~~6.76~~	106	-	-	-	-	-	222	-	-
11:16		6.10 ~~6.67~~	111.34	-	-	-	-	-	208	-	-
11:18		5.68 ~~6.06~~	116	-	-	-	-	-	236	-	-
11:20		5.16	125.43	-	-	-	-	-	490	-	-

Stop for the day

Continued onto Page 11

ER-2 - Well Development Record



ARCADIS Design & Consultancy for natural and built assets

Well Development Record

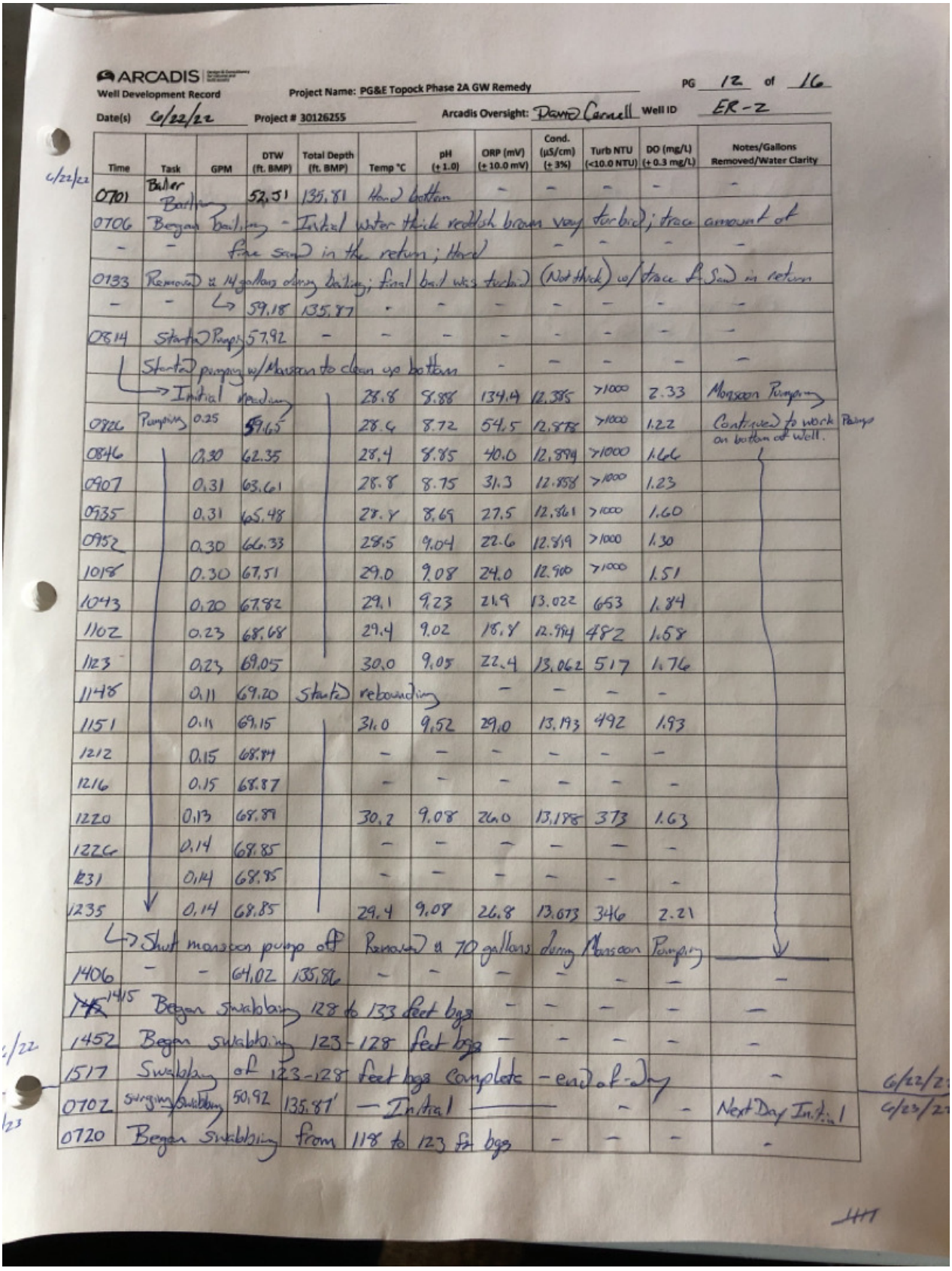
Project Name: PG&E Topock Phase 2A GW Remedy

PG 11 of 16

Date(s): 6/21/22 Project # 30126255 Arcadis Oversight: David Carnell Well ID ER-2

Time	Task	GPM	DTW (ft. BMP)	Total Depth (ft. BMP)	Temp °C	pH (± 1.0)	ORP (mV) (± 10.0 mV)	Cond. (µS/cm) (± 3%)	Turb NTU (<10.0 NTU)	DO (mg/L) (± 0.3 mg/L)	Notes/Gallons Removed/Water Clarity
0751	Pumping	–	49.79	136.02	–	–	–	–	–	–	Initial 448.0 (continuation)
0800	Start	1.01	49.79	-	27.1	7.04	-185	11.798	143	1.78	Initial Purge very Turbid Brown then Slightly Cloudy (6064.25)
0810	Pumping	-	54.62	-	27.8	7.13	-207	11.691	68.5	1.69	458 slightly cloudy
0820		0.86	60.55	-	28.0	7.26	-212	11.60	45.0	1.39	473 @ 0825
0830		0.962	63.86	-	28.3	7.32	-223	11,425	35.6	1.22	479
0840		0.923	67.98	-	28.4	7.36	-229	11.306	49.3	1.18	488.6
0850		0.917	72.15	-	28.6	7.32	-231	11,137	25.7	0.92	497.6
0900		0.895	75.96	-	28.6	7.29	-220	11.020	21.4	1.00	506.2
0910		0.875	80.09	-	28.5	7.28	-220	10.719	18.2	1.05	515.3
0920		0.816	83.60	-	28.7	7.28	-234	9,905	23.5	0.92	523.8
0930		0.771	87.29	-	28.6	7.32	-211	8,812	40.9	1.37	532
0940		0.728	90.32	-	28.6	7.35	-237	8,547	35.5	0.83	539
0950		0.737	94.01	-	28.7	7.39	-213	8.308	27.5	1.10	544 Increased flow Rate to 0.954 Flowmeter cutting out
1000		0.937	98.34	-	28.9	7.48	-208	7.934	41.5	0.85	553.8
1010		0.897	101.95	-	28.9	7.60	-171	7.896	47.3	1.22	562.2
1020		0.819	106.04	-	28.9	7.73	-196	8.074	56.4	1.15	571.7
1030		0.793	109.47	-	29.3	7.78	-187	8.350	62.2	1.07	579.2 ↑
1040		0.909	113.22	-	29.3	7.85	-177	8.838	63.8	1.10	587.7
1050		0.847	117.18	-	29.5	7.92	-167	9.257	70.5	0.97	596.9
1100		0.776	120.90	-	29.5	7.97	-167	9.687	86.5	1.27	605.3 ↑
1110		0.979	124.95	-	29.9	8.01	-164	9.926	89.3	1.10	614.0
1120	Pumping	-	131.6	Dry	-	-	-	-	-	-	-
1125	-	-	123.7	Initial backwash			-	-	-	-	-
1224	-	-	113.82	Began pulling pump			-	-	-	-	-
1259	Pulled Pump		108.73	135.75	Soft bottom		-	-	-	-	-
-	-	-	108.73	after pump pulled			-	-	-	-	-
1306	Began Bailing - Initial water Reddish-brown - thick turbid, odor									-	-
1328	Removed 6 gallons			135.81	Hard bottom; some Sand Return					-	-
-	-	-	108.89	-	-	-	-	-	-	-	-
1400	Began swabbing/surging 132-128 ft bgs						-	-	-	-	-
1425	Began swabbing 123-128 ft bgs						-	-	-	-	-
1300	Began Swabbing 118-123 ft bgs						-	-	-	-	-
1325			93.02	135.81	Hard bottom	Swabbing Complete from 118-132 ft bgs					

ER-2 - Well Development Record



ARCADIS Design & Consultancy for natural and built assets

Well Development Record

Project Name: PG&E Topock Phase 2A GW Remedy

PG 12 of 16

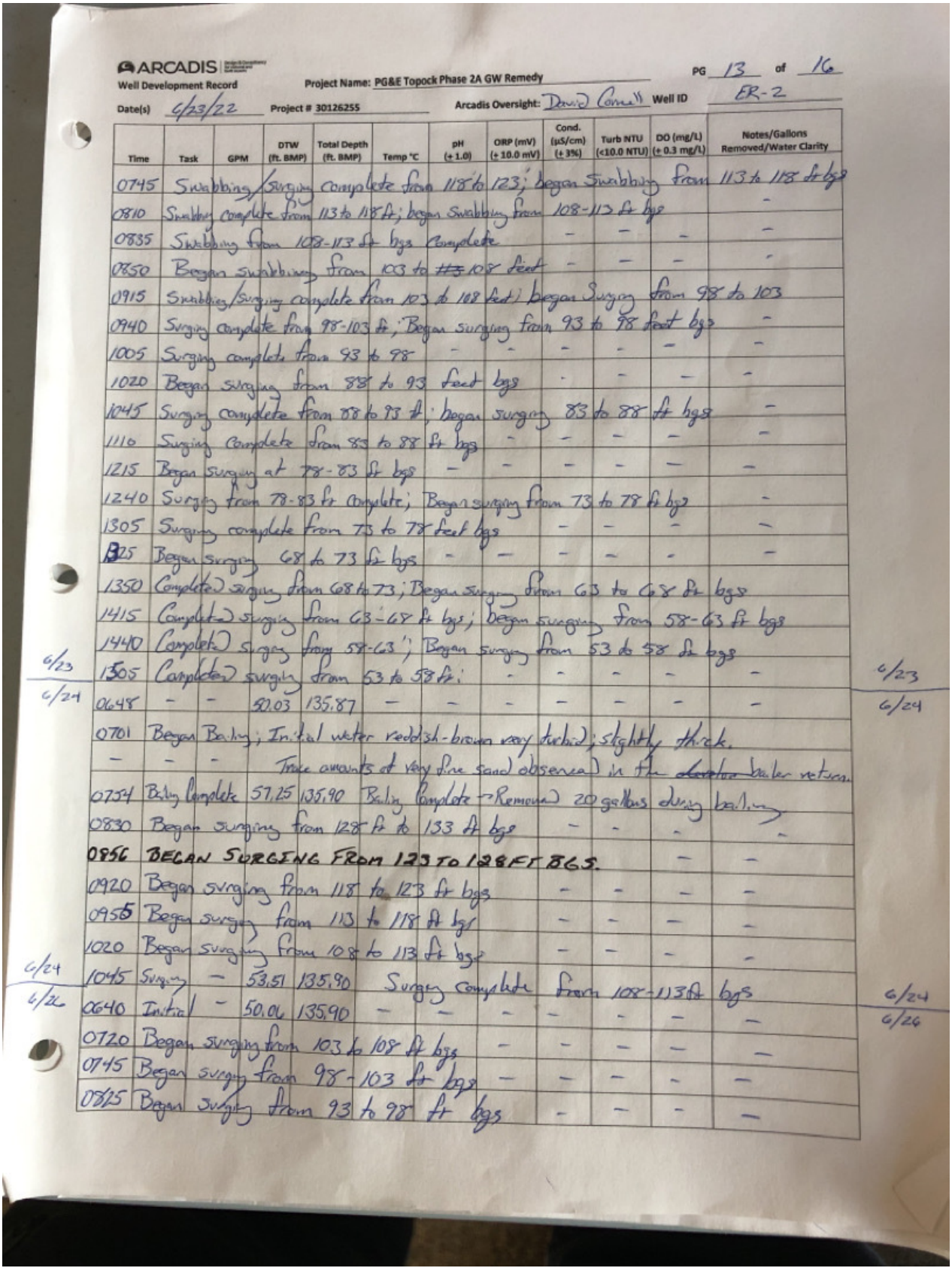
Date(s): 6/22/22 Project # 30126255 Arcadis Oversight: David Carnell Well ID ER-2

Time	Task	GPM	DTW (ft. BMP)	Total Depth (ft. BMP)	Temp °C	pH (+ 1.0)	ORP (mV) (+ 10.0 mV)	Cond. (µS/cm) (+ 3%)	Turb NTU (<10.0 NTU)	DO (mg/L) (+ 0.3 mg/L)	Notes/Gallons Removed/Water Clarity
6/22/22											
0701	Bailer Bailing		52.51	135.81	Hard bottom	-	-	-	-	-	
0706	Began bailing - Initial water thick reddish brown very turbid; trace amount of										
-	-		fine sand in the return; Hard					-	-	-	-
0733	Removed ≈ 14 gallons during bailing; final bail was turbid (Not thick) w/ trace of Sand in return										
-	-	↳	59.18	135.87	-	-	-	-	-	-	-
0814	Started Pumps		57.92	-	-	-	-	-	-	-	-
	Started pumping w/ Monsoon to clean up bottom						-	-	-	-	-
	↳ Initial reading				28.8	8.88	134.4	12.385	>1000	2.33	Monsoon Pumping
0826	Pumping	0.25	59.65		28.4	8.72	54.5	12.878	>1000	1.22	Continued to work Pump on bottom of well.
0846		0.30	62.35		28.4	8.85	40.0	12.894	>1000	1.66	
0907		0.31	63.61		28.8	8.75	31.3	12.858	>1000	1.23	
0935		0.31	65.48		28.8	8.69	27.5	12.861	>1000	1.60	
0952		0.30	66.33		28.5	9.04	22.6	12.819	>1000	1.30	
1018		0.30	67.51		29.0	9.08	24.0	12.900	>1000	1.51	
1043		0.20	67.82		29.1	9.23	21.9	13.022	653	1.84	
1102		0.23	68.68		29.4	9.02	18.8	12.994	482	1.58	
1123		0.23	69.05		30.0	9.05	22.4	13.062	517	1.76	
1148		0.11	69.20	Started	rebounding		-	-	-	-	
1151		0.11	69.15		31.0	9.52	29.0	13.193	492	1.93	
1212		0.15	68.84		-	-	-	-	-	-	
1216		0.15	68.87		-	-	-	-	-	-	
1220		0.13	68.89		30.2	9.08	26.0	13.188	373	1.63	
1226		0.14	68.85		-	-	-	-	-	-	
1231		0.14	68.85		-	-	-	-	-	-	
1235		0.14	68.85		29.4	9.08	26.8	13.073	346	2.21	
	↳ Shut monsoon pump off				Removed ≈ 70 gallons during Monsoon Pumping						
1406	-	-	64.02	135.86	-	-	-	-	-	-	-
~~1415~~ 1415	Began swabbing 128 to 133 feet bgs						-	-	-	-	-
1452	Began swabbing 123-128 feet bgs						-	-	-	-	-
1517	Swabbing of 123-128 feet bgs complete - end of day										-
0702	surging/swabbing		50.92	135.87'	- Initial				-	-	Next Day Initial
0720	Began swabbing from 118 to 123 ft bgs							-	-	-	-

6/22/22 6/23/22

HH

ER-2 - Well Development Record



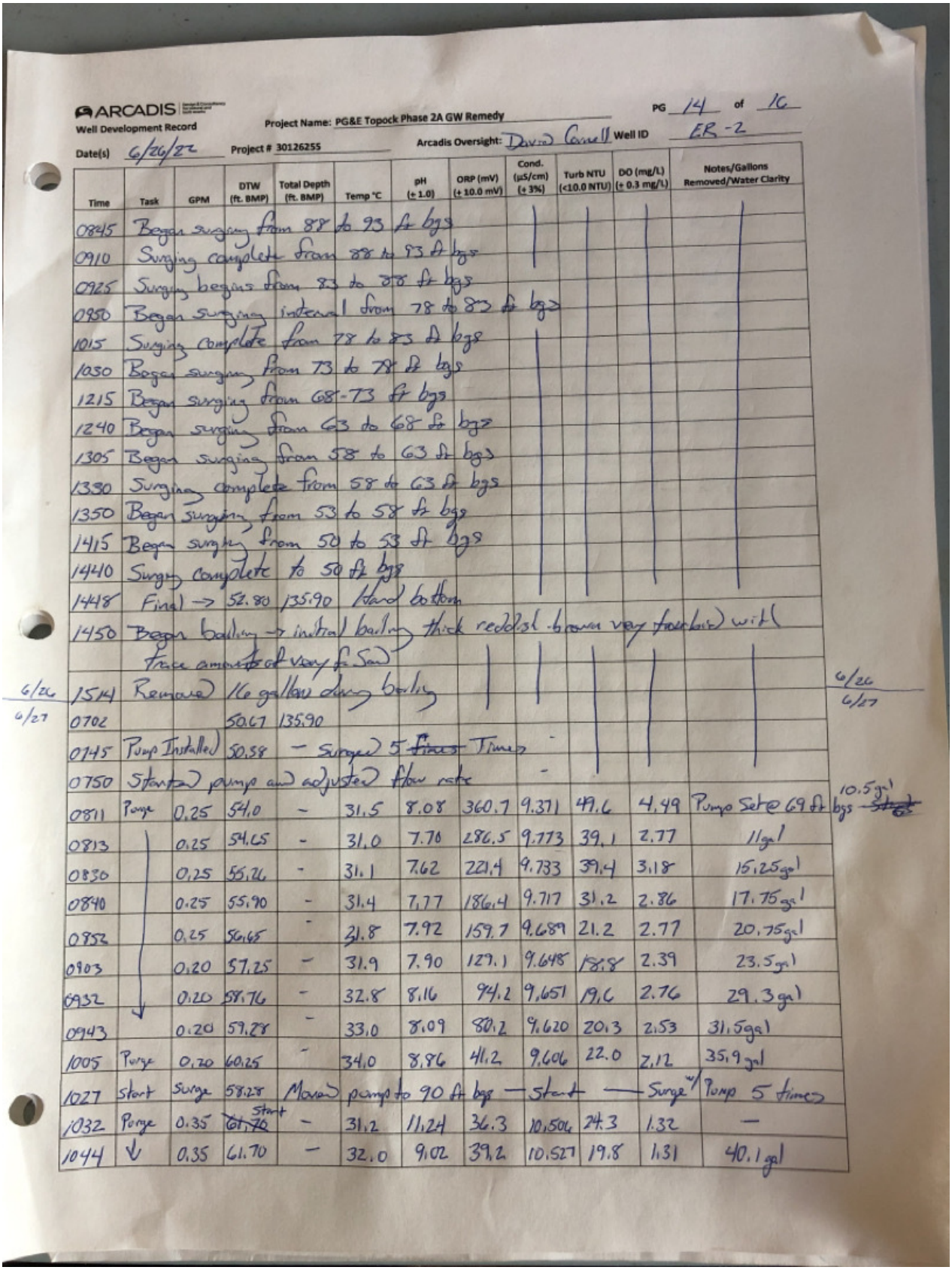
ARCADIS Well Development Record

Project Name: PG&E Topock Phase 2A GW Remedy — PG 13 of 16

Date(s): 6/23/22 — Project # 30126255 — Arcadis Oversight: David Connell — Well ID: ER-2

Time	Task	GPM	DTW (ft. BMP)	Total Depth (ft. BMP)	Temp °C	pH (+ 1.0)	ORP (mV) (+ 10.0 mV)	Cond. (µS/cm) (+ 3%)	Turb NTU (<10.0 NTU)	DO (mg/L) (+ 0.3 mg/L)	Notes/Gallons Removed/Water Clarity
0745	Swabbing/Surging complete from 118 to 123; began Swabbing from 113 to 118 ft bgs										-
0810	Swabbing complete from 113 to 118 ft; began Swabbing from 108-113 ft bgs										-
0835	Swabbing from 108-113 ft bgs Complete							-	-	-	-
0850	Began swabbing from 103 to ~~##~~ 108 feet							-	-	-	-
0915	Swabbing/Surging complete from 103 to 108 feet; began Surging from 98 to 103										-
0940	Surging complete from 98-103 ft; Began surging from 93 to 98 feet bgs										-
1005	Surging complete from 93 to 98							-	-	-	-
1020	Began surging from 88 to 93 feet bgs							-	-	-	-
1045	Surging complete from 88 to 93 ft; began surging 83 to 88 ft bgs										-
1110	Surging Complete from 83 to 88 ft bgs							-	-	-	-
1215	Began surging at 78-83 ft bgs							-	-	-	-
1240	Surging from 78-83 ft complete; Began surging from 73 to 78 ft bgs										-
1305	Surging complete from 73 to 78 feet bgs							-	-	-	-
1325	Began surging 68 to 73 ft bgs							-	-	-	-
1350	Completed surging from 68 to 73; Began surging from 63 to 68 ft bgs										-
1415	Completed surging from 63-68 ft bgs; began surging from 58-63 ft bgs										-
1440	Completed surging from 58-63; Began surging from 53 to 58 ft bgs										-
6/23 1505	Completed surging from 53 to 58 ft;							-	-	-	-
6/24 0648		-	-	50.03	135.87	-	-	-	-	-	-
0701	Began Bailing; Initial water reddish-brown very turbid; slightly thick.										
		-	-	-	Trace amounts of very fine sand observed in the ~~bailer~~ bailer return.						
0754	Bailing complete 57.25 135.90 Bailing Complete → Removed 20 gallons during bailing										
0830	Began surging from 128 ft to 133 ft bgs							-	-	-	-
0856	BEGAN SURGING FROM 123 TO 128 FT BGS.									-	-
0920	Began surging from 118 to 123 ft bgs							-	-	-	-
0955	Began surging from 113 to 118 ft bgs							-	-	-	-
1020	Began surging from 108 to 113 ft bgs							-	-	-	-
6/24 1045	Surging	-	53.51	135.90	Surging complete from 108-113 ft bgs						
6/26 0640	Initial	-	50.06	135.90	-	-	-	-	-	-	-
0720	Began surging from 103 to 108 ft bgs							-	-	-	-
0745	Began surging from 98-103 ft bgs							-	-	-	-
0825	Began surging from 93 to 98 ft bgs							-	-	-	-

ER-2 - Well Development Record



ARCADIS Design & Consultancy for natural and built assets

Well Development Record

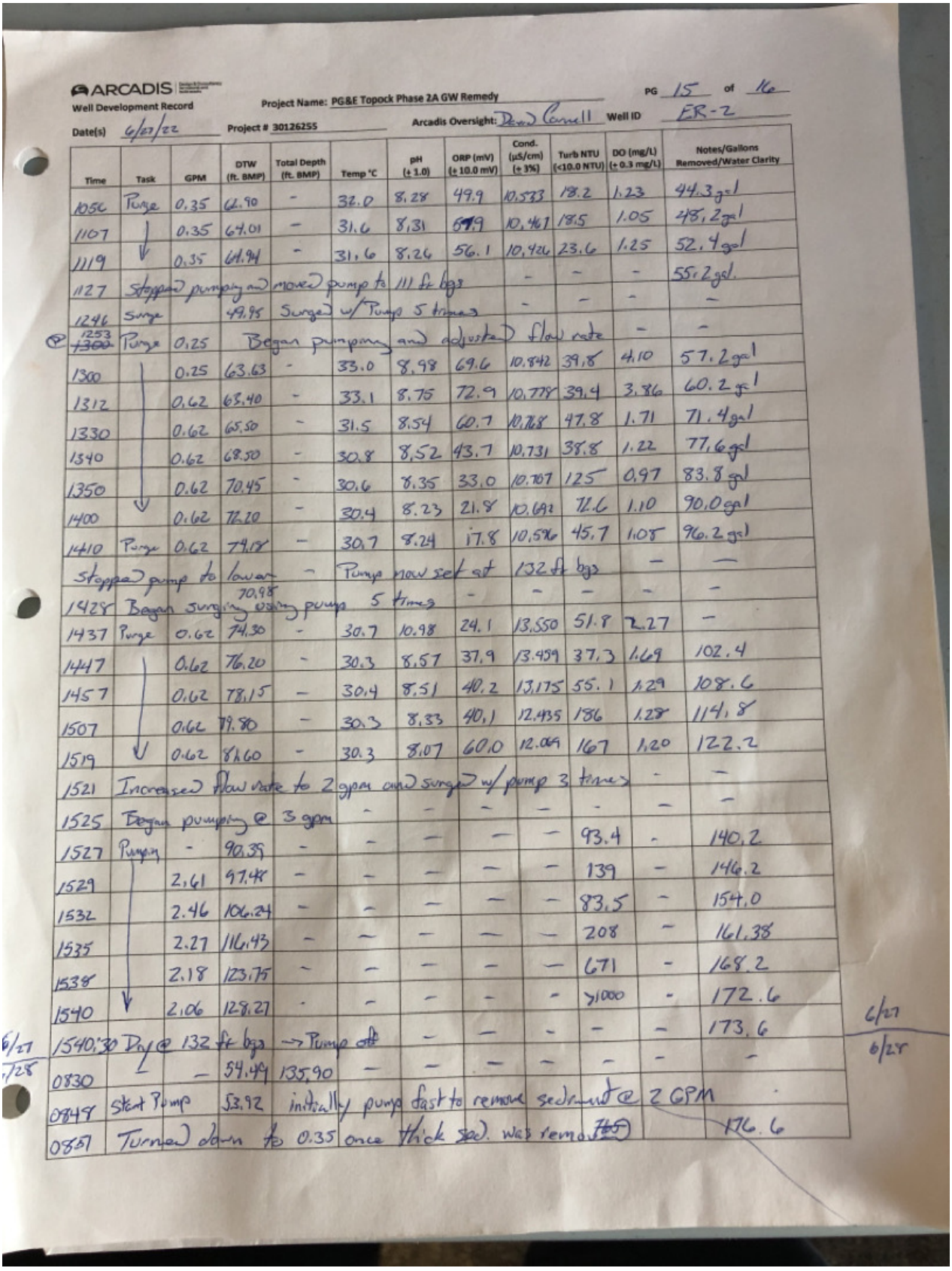
Project Name: PG&E Topock Phase 2A GW Remedy

PG 14 of 16

Date(s) 6/26/22 Project # 30126255 Arcadis Oversight: David Cornell Well ID ER-2

Time	Task	GPM	DTW (ft. BMP)	Total Depth (ft. BMP)	Temp °C	pH (± 1.0)	ORP (mV) (± 10.0 mV)	Cond. (µS/cm) (± 3%)	Turb NTU (<10.0 NTU)	DO (mg/L) (± 0.3 mg/L)	Notes/Gallons Removed/Water Clarity
0845	Began surging from 88 to 93 ft bgs										
0910	Surging complete from 88 to 93 ft bgs										
0925	Surging begins from 83 to 88 ft bgs										
0950	Began surging interval from 78 to 83 ft bgs										
1015	Surging complete from 78 to 83 ft bgs										
1030	Began surging from 73 to 78 ft bgs										
1215	Began surging from 68-73 ft bgs										
1240	Began surging from 63 to 68 ft bgs										
1305	Began surging from 58 to 63 ft bgs										
1330	Surging complete from 58 to 63 ft bgs										
1350	Began surging from 53 to 58 ft bgs										
1415	Began surging from 50 to 53 ft bgs										
1440	Surging complete to 50 ft bgs										
1448	Final ->		52.80	135.90	Hard bottom						
1450	Began bailing -> initial bailing thick reddish-brown very fine(sand) with trace amounts of very fine sand										
1514	Removed 16 gallons during bailing										6/26 6/27
0702			50.67	135.90							
0745	Pump Installed		50.58	- Surged 5 ~~times~~ Times							
0750	Started pump and adjusted flow rate										
0811	Purge	0.25	54.0	-	31.5	8.08	360.7	9.371	49.6	4.49	Pump Set @ 69 ft bgs 10.5 gal ~~Start 0811~~
0813		0.25	54.65	-	31.0	7.70	286.5	9.773	39.1	2.77	11 gal
0830		0.25	55.26	-	31.1	7.62	221.4	9.733	39.4	3.18	15.25 gal
0840		0.25	55.90	-	31.4	7.77	186.4	9.717	31.2	2.86	17.75 gal
0852		0.25	56.65	-	31.8	7.92	159.7	9.689	21.2	2.77	20.75 gal
0903		0.20	57.25	-	31.9	7.90	127.1	9.648	18.8	2.39	23.5 gal
0932		0.20	58.76	-	32.8	8.16	94.2	9.651	19.6	2.76	29.3 gal
0943		0.20	59.28	-	33.0	8.09	80.2	9.620	20.3	2.53	31.5 gal
1005	Purge	0.20	60.25	-	34.0	8.86	41.2	9.606	22.0	2.12	35.9 gal
1027	start	Surge	58.28	Moved pump to 90 ft bgs — start — Surge w/ Pump 5 times							
1032	Purge	0.35	~~61.70~~ start 61.70	-	31.2	11.24	36.3	10,506	24.3	1.32	—
1044	↓	0.35	61.70	-	32.0	9.02	39.2	10,527	19.8	1.31	40.1 gal

ER-2 - Well Development Record



ARCADIS Well Development Record

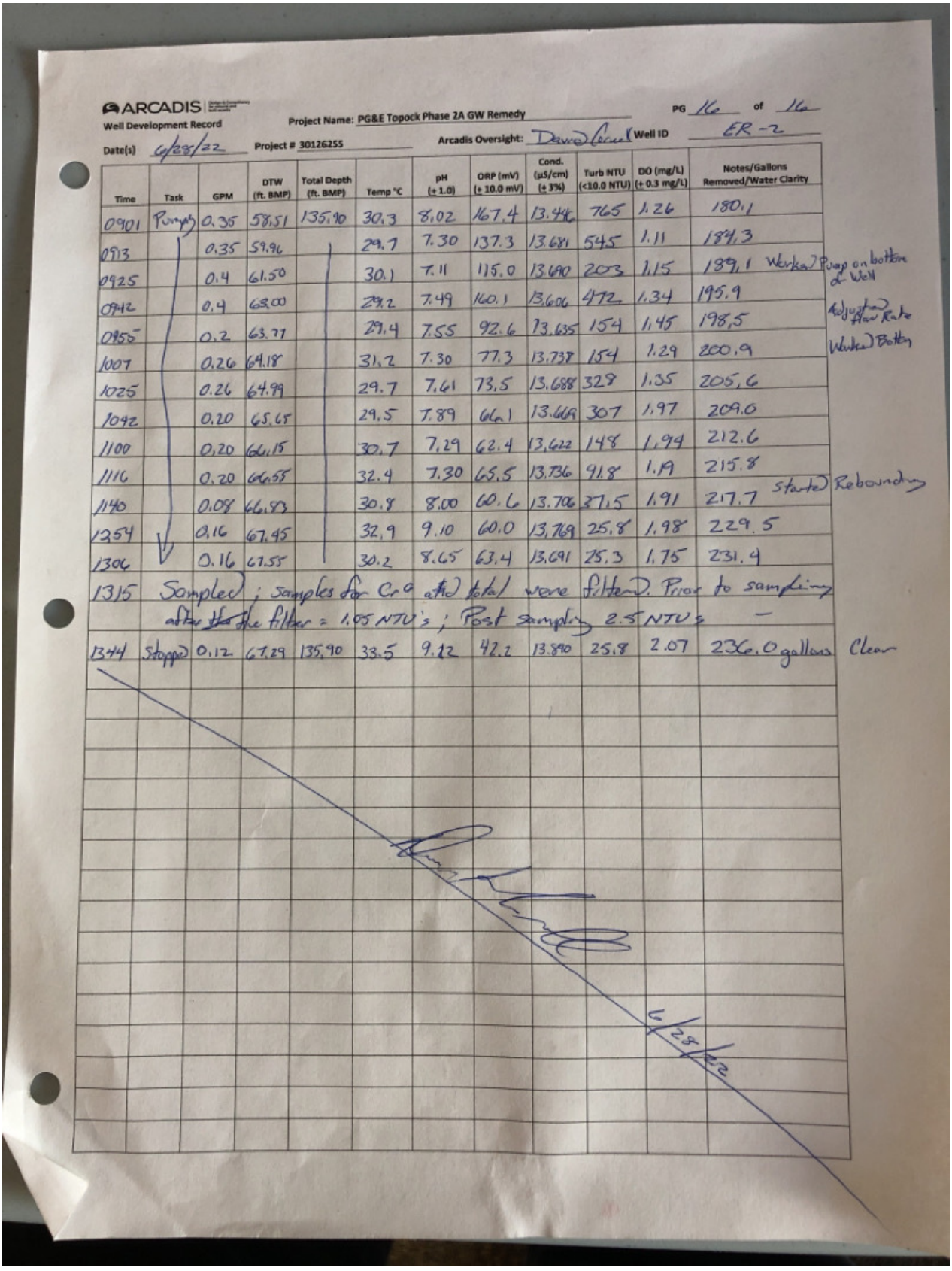
Project Name: PG&E Topock Phase 2A GW Remedy — PG 15 of 16

Date(s) 6/27/22 — Project # 30126255 — Arcadis Oversight: Dean Cornell — Well ID ER-2

Time	Task	GPM	DTW (ft. BMP)	Total Depth (ft. BMP)	Temp °C	pH (± 1.0)	ORP (mV) (± 10.0 mV)	Cond. (µS/cm) (± 3%)	Turb NTU (<10.0 NTU)	DO (mg/L) (± 0.3 mg/L)	Notes/Gallons Removed/Water Clarity
1056	Purge	0.35	62.90	-	32.0	8.28	49.9	10,533	18.2	1.23	44.3 gal
1107	↓	0.35	64.01	-	31.6	8.31	54.9	10,461	18.5	1.05	48.2 gal
1119	↓	0.35	64.94	-	31.6	8.26	56.1	10,426	23.6	1.25	52.4 gal
1127	Stopped pumping and moved pump to 111 ft bgs							-	-	-	55.2 gal.
1246	Surge		49.95	Surged w/ Pump 5 times				-	-	-	-
~~1253~~ 1300	Purge	0.25	Began pumping and adjusted flow rate							-	-
1300	↓	0.25	63.63	-	33.0	8.98	69.6	10.842	39.8	4.10	57.2 gal
1312	↓	0.62	68.40	-	33.1	8.75	72.9	10,778	39.4	3.86	60.2 gal
1330	↓	0.62	65.50	-	31.5	8.54	60.7	10,768	47.8	1.71	71.4 gal
1340	↓	0.62	68.50	-	30.8	8.52	43.7	10,731	38.8	1.22	77.6 gal
1350	↓	0.62	70.45	-	30.6	8.35	33.0	10.707	125	0.97	83.8 gal
1400	↓	0.62	72.20	-	30.4	8.23	21.8	10,692	72.6	1.10	90.0 gal
1410	Purge	0.62	74.18	-	30.7	8.24	17.8	10,596	45.7	1.08	96.2 gal
Stopped pump to lower - Pump now set at 132 ft bgs										-	-
1428	Began surging using pump 5 times		70.98					-	-	-	-
1437	Purge	0.62	74.30	-	30.7	10.98	24.1	13,550	51.8	2.27	-
1447	↓	0.62	76.20	-	30.3	8.57	37.9	13.459	37.3	1.69	102.4
1457	↓	0.62	78.15	-	30.4	8.51	40.2	13,175	55.1	1.29	108.6
1507	↓	0.62	79.80	-	30.3	8.33	40.1	12.435	186	1.28	114.8
1519	↓	0.62	81.60	-	30.3	8.07	60.0	12.069	167	1.20	122.2
1521	Increased flow rate to 2 gpm and surged w/ pump 3 times							-	-	-	-
1525	Began pumping @ 3 gpm		-	-	-	-	-	-	-	-	-
1527	Purging	-	90.35	-	-	-	-	-	93.4	-	140.2
1529	↓	2.61	97.48	-	-	-	-	-	139	-	146.2
1532	↓	2.46	106.24	-	-	-	-	-	83.5	-	154.0
1535	↓	2.27	116.43	-	-	-	-	-	208	-	161.38
1538	↓	2.18	123.75	-	-	-	-	-	671	-	168.2
1540	↓	2.06	128.27	-	-	-	-	-	>1000	-	172.6
6/27 1540:30	Dry @ 132 ft bgs → Pump off				-	-	-	-	-	-	173.6
6/28 0830	↓	-	54.49	135.90	-	-	-	-	-	-	-
0849	Start Pump		53.92	initially pump fast to remove sediment @ 2 GPM							
0857	Turned down to 0.35 once thick sed. was removed										176.6

6/27 6/28

ER-2 - Well Development Record



ARCADIS Design & Consultancy for natural and built assets

Well Development Record

Project Name: PG&E Topock Phase 2A GW Remedy

PG 16 of 16

Date(s): 6/28/22

Project # 30126255

Arcadis Oversight: David Locus

Well ID ER-2

Time	Task	GPM	DTW (ft. BMP)	Total Depth (ft. BMP)	Temp °C	pH (± 1.0)	ORP (mV) (± 10.0 mV)	Cond. (µS/cm) (± 3%)	Turb NTU (<10.0 NTU)	DO (mg/L) (± 0.3 mg/L)	Notes/Gallons Removed/Water Clarity
0901	Pumping	0.35	58.51	135.90	30.3	8.02	167.4	13.446	765	1.26	180.1
0913		0.35	59.96		29.7	7.30	137.3	13.681	545	1.11	184.3
0925		0.4	61.50		30.1	7.11	115.0	13.690	203	1.15	189.1 Worked Pump on bottom of Well
0942		0.4	63.00		29.2	7.49	160.1	13.606	472	1.34	195.9 Adjusted Flow Rate
0955		0.2	63.77		29.4	7.55	92.6	13.635	154	1.45	198.5
1007		0.26	64.18		31.2	7.30	77.3	13.738	154	1.29	200.9 Worked Both
1025		0.26	64.99		29.7	7.61	73.5	13.688	328	1.35	205.6
1042		0.20	65.65		29.5	7.89	66.1	13.669	307	1.97	209.0
1100		0.20	66.15		30.7	7.29	62.4	13.622	148	1.94	212.6
1116		0.20	66.55		32.4	7.30	65.5	13.736	91.8	1.19	215.8
1140		0.08	66.83		30.8	8.00	60.6	13.706	37.5	1.91	217.7 started Rebounding
1254		0.16	67.45		32.9	9.10	60.0	13.769	25.8	1.98	229.5
1306		0.16	67.55		30.2	8.65	63.4	13.691	25.3	1.75	231.4
1315	Sampled; samples for Cr6 and total were filtered. Prior to sampling ~~after the~~ the filter = 1.05 NTU's; Post sampling 2.5 NTU's										
1344	Stopped	0.12	67.29	135.90	33.5	9.12	42.2	13.890	25.8	2.07	236.0 gallons Clear

6/28/22

ER-2 - Well Development Record

Attachment 6

Specific Capacity Testing Package

Specific Capacity Test

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	**ER-02**
Date	**6/29/2022**
Screened Interval Tested	**47 to 136 ft bgs**
Packer Set Depth	**N/A**
Packer Seal Test	**N/A**
Tests Conducted	Single capacity test was performed at 0.25 GPM
Purpose	Well performance test
Summary	Specific capacity: 0.25 gpm = 0.0125 gpm/ft
Notes	Transducer dropped twice during the test but was retrieved and restored to the original position in the well. Affected data was omitted from the plot. Drawdown drawdown did not stablize during the test due to time constraints.
Oversight Signature	
Date	7/27/2022

Specific Capacity Test

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	ER-02
Date	6/29/2022
Screened Interval	47 - 136 ft.
Pump Depth (ft btoc)	135
Packer Depth (ft btoc)	N/A
Packer Leak Test (Pass/Fail)	N/A
Initial Water Level (ft btoc)	50.95
Initial Totalizer Reading (gal)	N/A
Final Totalizer Reading (gal)	N/A
Approx Pumped Volume (gal)	77.28
Calculated Volume Purged (gal)	58.25
Difference in Volume Pumped vs. Calculated	19.03
Number of Specific Capacity Steps	1
Pumping Rates (in order)	0.25

Step 1 (1.5 GPM) Time (HR:MN:SEC)	Change in Time Between Measurements (min)	Elapsed Time (min)	Pumping Rate (gpm)	Total Volume Pumped (gal)	Depth to Water (ft)	Drawdown (ft)
7:59:00	0.00	0.00	-	0.00	50.95	0.00
8:00:00	0.00	0.00	-	0.00	50.95	0.00
8:00:15	0.25	0.25	1.00	0.25	50.95	0.00
8:00:30	0.25	0.50	0.25	0.31	51.05	0.10
8:00:40	0.17	0.67	0.25	0.35	51.11	0.16
8:00:50	0.17	0.83	0.25	0.40	51.11	0.16
8:01:05	0.25	1.08	0.25	0.46	51.13	0.18
8:01:20	0.25	1.33	0.25	0.52	51.15	0.20
8:01:35	0.25	1.58	0.25	0.58	51.16	0.21
8:01:50	0.25	1.83	0.25	0.65	51.17	0.22
8:02:13	0.38	2.22	0.25	0.74	51.18	0.23
8:02:30	0.28	2.50	0.25	0.81	51.20	0.25
8:03:00	0.50	3.00	0.25	0.94	51.21	0.26
8:04:00	1.00	4.00	0.25	1.19	51.26	0.31
8:05:00	1.00	5.00	0.25	1.44	51.31	0.36
8:06:00	1.00	6.00	0.25	1.69	51.35	0.40
8:07:00	1.00	7.00	0.25	1.94	51.40	0.45
8:08:00	1.00	8.00	0.25	2.19	51.44	0.49
8:09:00	1.00	9.00	0.25	2.44	51.50	0.55
8:10:00	1.00	10.00	0.25	2.69	51.56	0.61
8:12:00	2.00	12.00	0.25	3.19	51.69	0.74
8:14:00	2.00	14.00	0.24	3.67	51.77	0.82
8:16:30	2.50	16.50	0.25	4.29	52.00	1.05
8:18:00	1.50	18.00	0.26	4.68	52.16	1.21
8:20:00	2.00	20.00	0.25	5.18	52.33	1.38
8:22:00	2.00	22.00	0.24	5.66	52.51	1.56
8:24:00	2.00	24.00	0.23	6.12	52.68	1.73
8:26:00	2.00	26.00	0.24	6.60	52.83	1.88
8:28:15	2.25	28.25	0.28	7.23	53.09	2.14

Specific Capacity Test

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	ER-02
Date	6/29/2022
Screened Interval	47 - 136 ft.
Pump Depth (ft btoc)	135
Packer Depth (ft btoc)	N/A
Packer Leak Test (Pass/Fail)	N/A
Initial Water Level (ft btoc)	50.95
Initial Totalizer Reading (gal)	N/A
Final Totalizer Reading (gal)	N/A
Approx Pumped Volume (gal)	77.28
Calculated Volume Purged (gal)	58.25
Difference in Volume Pumped vs. Calculated	19.03
Number of Specific Capacity Steps	1
Pumping Rates (in order)	0.25

Step 1 (1.5 GPM) Time (HR:MN:SEC)	Change in Time Between Measurements (min)	Elapsed Time (min)	Pumping Rate (gpm)	Total Volume Pumped (gal)	Depth to Water (ft)	Drawdown (ft)
8:30:00	1.75	30.00	0.27	7.70	53.28	2.33
8:35:00	5.00	35.00	0.25	8.96	53.75	2.80
8:40:00	5.00	40.00	0.24	10.16	54.22	3.27
8:45:00	5.00	45.00	0.25	11.41	54.68	3.73
8:51:40	6.67	51.67	0.19	12.67	55.25	4.30
8:55:00	3.33	55.00	0.25	13.51	55.50	4.55
9:00:30	5.50	60.50	0.25	14.88	56.00	5.05
9:05:28	4.97	65.47	0.21	15.92	56.38	5.43
9:10:00	4.53	70.00	0.30	17.28	56.77	5.82
9:20:00	10.00	80.00	0.25	19.78	57.74	6.79
9:30:00	10.00	90.00	0.19	21.68	58.68	7.73
9:40:00	10.00	100.00	0.29	24.58	59.64	8.69
9:50:00	10.00	110.00	0.28	27.38	60.75	9.80
10:00:00	10.00	120.00	0.25	29.88	61.68	10.73
10:11:00	11.00	131.00	0.22	32.30	62.48	11.53
10:20:20	9.33	140.33	0.25	34.64	63.21	12.26
10:30:00	9.67	150.00	0.25	37.05	63.91	12.96
10:41:00	11.00	161.00	0.24	39.69	64.70	13.75
10:51:15	10.25	171.25	0.23	42.05	65.27	14.32
11:00:45	9.50	180.75	0.31	45.00	66.15	15.20
11:10:00	9.25	190.00	0.25	47.31	66.95	16.00
11:21:00	11.00	201.00	0.25	50.06	67.95	17.00
11:31:00	10.00	211.00	0.24	52.46	68.60	17.65
11:40:10	9.17	220.17	0.27	54.93	69.05	18.10
11:51:00	10.83	231.00	0.26	57.75	69.76	18.81
12:04:00	13.00	244.00	0.25	61.00	70.60	19.65
12:11:10	7.17	251.17	-	-	71.00	20.05
12:15:00	3.83	255.00	-	-	70.51	19.56
12:21:00	6.00	261.00	-	-	70.09	19.14

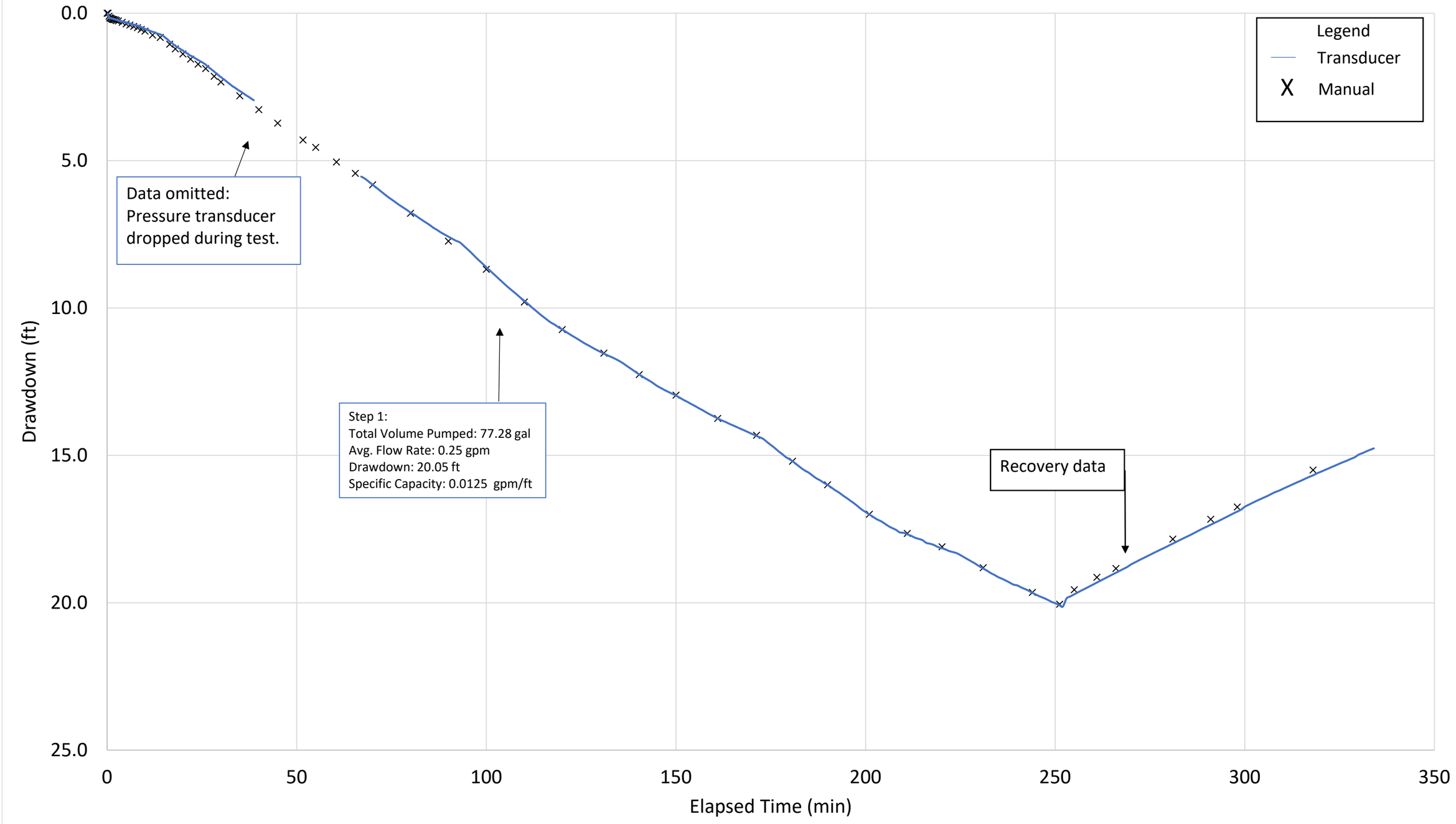
Specific Capacity Test

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	ER-02
Date	6/29/2022
Screened Interval	47 - 136 ft.
Pump Depth (ft btoc)	135
Packer Depth (ft btoc)	N/A
Packer Leak Test (Pass/Fail)	N/A
Initial Water Level (ft btoc)	50.95
Initial Totalizer Reading (gal)	N/A
Final Totalizer Reading (gal)	N/A
Approx Pumped Volume (gal)	77.28
Calculated Volume Purged (gal)	58.25
Difference in Volume Pumped vs. Calculated	19.03
Number of Specific Capacity Steps	1
Pumping Rates (in order)	0.25

Step 1 (1.5 GPM) Time (HR:MN:SEC)	Change in Time Between Measurements (min)	Elapsed Time (min)	Pumping Rate (gpm)	Total Volume Pumped (gal)	Depth to Water (ft)	Drawdown (ft)
12:26:00	5.00	266.00	-	-	69.79	18.84
12:41:00	15.00	281.00	-	-	68.79	17.84
12:51:00	10.00	291.00	-	-	68.12	17.17
12:58:00	7.00	298.00	-	-	67.70	16.75
13:18:00	20.00	318.00	-	-	66.45	15.50
13:33:00	15.00	333.00	-	-	65.62	14.67
13:38:00	5.00	338.00	-	-	-	-

ER-02 Specific Capacity Test: Linear Drawdown Plot



Attachment 7

Photo Logs

ARCADIS

CLIENT NAME: PG&E	**WELL CORE PHOTO LOG**	**PROJECT NAME / LOCATION:** Topock Compressor Station, Needles, California
Arcadis PROJECT NO: 30126255	**ER-02 0 to 145 ft**	**PHOTOS LAST ADDED:** 4/25/2022

Core Depth: 1.5 to 7
Description: Samples (0-7' bgs) previously collected for logging during air knifing activities.
Date: 4/22/2022

Core Depth: 7 to 12
Description:
Date: 4/23/2022

Core Depth: 12 to 17
Description:
Date: 4/23/2022

Core Depth: 17 to 22
Description:
Date: 4/23/2022

Core Depth: 22 to 27
Description:
Date: 4/23/2022

Core Depth: 27 to 32
Description:
Date: 4/23/2022

ARCADIS

CLIENT NAME: PG&E	**WELL CORE PHOTO LOG**	**PROJECT NAME / LOCATION:** Topock Compressor Station, Needles, California
Arcadis PROJECT NO: 30126255	**ER-02 0 to 145 ft**	**PHOTOS LAST ADDED:** 4/25/2022

Core Depth: 32 to 37
Description:
Date: 4/23/2022

Core Depth: 37 to 43
Description:
Date: 4/23/2022

Core Depth: 43 to 47
Description:
Date: 4/23/2022

Core Depth: 47 to 52
Description:
Date: 4/23/2022

Core Depth: 52 to 57
Description:
Date: 4/23/2022

Core Depth: 57 to 62
Description:
Date: 4/23/2022

ARCADIS

CLIENT NAME: PG&E	**WELL CORE PHOTO LOG**	**PROJECT NAME / LOCATION:** Topock Compressor Station, Needles, California
Arcadis PROJECT NO: 30126255	**ER-02 0 to 145 ft**	**PHOTOS LAST ADDED:** 4/25/2022

Core Depth: 62 to 67
Description:
Date: 4/23/2022

Core Depth: 67 to 72
Description:
Date: 4/23/2022

Core Depth: 72 to 77
Description:
Date: 4/23/2022

Core Depth: 77 to 82
Description:
Date: 4/23/2022

Core Depth: 82 to 87
Description:
Date: 4/23/2022

Core Depth: 92 to 97
Description:
Date: 4/23/2022

ARCADIS

CLIENT NAME: PG&E	**WELL CORE PHOTO LOG**	**PROJECT NAME / LOCATION:** Topock Compressor Station, Needles, California
Arcadis PROJECT NO: 30126255	**ER-02 0 to 145 ft**	**PHOTOS LAST ADDED:** 4/25/2022

Core Depth: 97 to 103
Description:
Date: 4/23/2022

Core Depth: 103 to 105
Description:
Date: 4/24/2022

Core Depth: 105 to 110
Description:
Date: 4/24/2022

Core Depth: 110 to 112
Description:
Date: 4/24/2022

Core Depth: 112 to 115
Description:
Date: 4/24/2022

Core Depth: 115 to 117
Description:
Date: 4/24/2022

ARCADIS

CLIENT NAME: PG&E	**WELL CORE PHOTO LOG**	**PROJECT NAME / LOCATION:** Topock Compressor Station, Needles, California
Arcadis PROJECT NO: 30126255	**ER-02 0 to 145 ft**	**PHOTOS LAST ADDED:** 4/25/2022

Core Depth: 117 to 123
Description:
Date: 4/24/2022

Core Depth: 123 to 127
Description:
Date: 4/24/2022

Core Depth: 127 to 132
Description:
Date: 4/25/2022

Core Depth: 132 to 137
Description:
Date: 4/25/2022

Core Depth: 137 to 139
Description:
Date: 4/25/2022

Core Depth: 139 to 145
Description:
Date: 4/25/2022

CLIENT NAME: PG&E	WELL CONSTRUCTION PHOTO LOG	PROJECT NAME / LOCATION: Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		WELL ID: ER-02

5/8/2022 – ER-02:
6-inch diameter Schedule 80 PVC well casing

5/8/2020 – ER-02:
6-inch diameter Schedule 80 PVC well casing

5/8/2020 – ER-02:
6-inch diameter 20 slot 316L Stainless Steel Wire Wrapped Screen

ARCADIS

CLIENT NAME: PG&E	WELL CONSTRUCTION PHOTO LOG	PROJECT NAME / LOCATION: Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		WELL ID: ER-02

5/8/2020 – ER-02:
Confirmation gauging of the 20 slot Wire Wrapped Screen

5/8/2020 – ER-02:
Confirmation gauging of the 20 slot Wire Wrapped Screen

5/8/2020 – ER-02:
Cemex #0/30 (30 x 50) Lapis Lustre Sand for transition sand seal

CLIENT NAME: PG&E	WELL CONSTRUCTION PHOTO LOG	PROJECT NAME / LOCATION: Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		WELL ID: ER-02

5/8/2020 – ER-02:
Cemex #0/30 (30 x 50) Lapis Lustre Sand for transition sand seal

5/8/2022 – ER-02:
Cemex #2/16 (16 x 30) Lapis Lustre Sand for filter pack

5/8/2020 – ER-02:
Enviroplug: Medium Bentonite Chips used for bentonite seal

CLIENT NAME: PG&E	WELL CONSTRUCTION PHOTO LOG	PROJECT NAME / LOCATION: Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		WELL ID: ER-02

5/8/2022 – ER-02:
Hydrogel Wyoming Bentonite used in grout

5/8/2022 – ER-02:
Type I, II, and V Portland Cement used in grout

5/8/2022 – ER-02:
6-inch diameter Schedule 80 PVC sump with 316L stainless steel endcap and centralizer

CLIENT NAME: PG&E	WELL CONSTRUCTION PHOTO LOG	PROJECT NAME / LOCATION: Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		WELL ID: ER-02

5/8/2022 – ER-02:
316L Wire Wrapped Screen and Schedule 80 sump threaded connection

5/8/2022 – ER-02:
Installing Schedule 80 PVC well casing with stainless steel centralizer

5/8/2022 – ER-02:
Installing Schedule 80 PVC well casing with stainless steel centralizer

CLIENT NAME: PG&E	WELL CONSTRUCTION PHOTO LOG	PROJECT NAME / LOCATION: Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		WELL ID: ER-02

5/10/2022 – ER-02:
Measuring the distance from top of casing to ground surface

5/10/2022 – ER-02:
Concrete form set for flush mount

5/10/2022 – ER-02:
Flush-mounted manhole cover installed

ARCADIS

CLIENT NAME: PG&E	WELL CONSTRUCTION PHOTO LOG	PROJECT NAME / LOCATION: Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		WELL ID: ER-02

5/10/2022 – ER-02:
High Spec 4,500 PSI Concrete used for the flush mount manhole

6/3/2022 – ER-02:
Confirming outside diameter of the "Dummy Tool" is to specification

6/3/2022 – ER-02:
Dummy tool used for completing alignment test

CLIENT NAME: PG&E	WELL CONSTRUCTION PHOTO LOG	PROJECT NAME / LOCATION: Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		WELL ID: ER-02

6/3/2022 – ER-02:
Installing the "Dummy Tool" into the well

6/3/2022 – ER-02:
Lowering "Dummy Tool" into the well

6/3/2022 – ER-02:
Securing the dummy tool to the sand line

ARCADIS

CLIENT NAME: PG&E	WELL CONSTRUCTION PHOTO LOG	PROJECT NAME / LOCATION: Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		WELL ID: ER-02

6/4/2022 – ER-02:
Filter pack observed in sediment removed by bailing during well development plan

6/4/2022 – ER-02:
Filter pack observed in sediment removed by bailing during well development plan

6/4/2022 – ER-02:
Filter pack observed in sediment removed by bailing during well development plan

CLIENT NAME: PG&E	WELL CONSTRUCTION PHOTO LOG	PROJECT NAME / LOCATION: Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		WELL ID: ER-02

6/8/2022 – ER-02:
PVC well bung (plug) used to repair the well

6/8/2022 – ER-02:
Installing the well bung (plug)

6/8/2022 – ER-02:
Installing the well bung (plug)

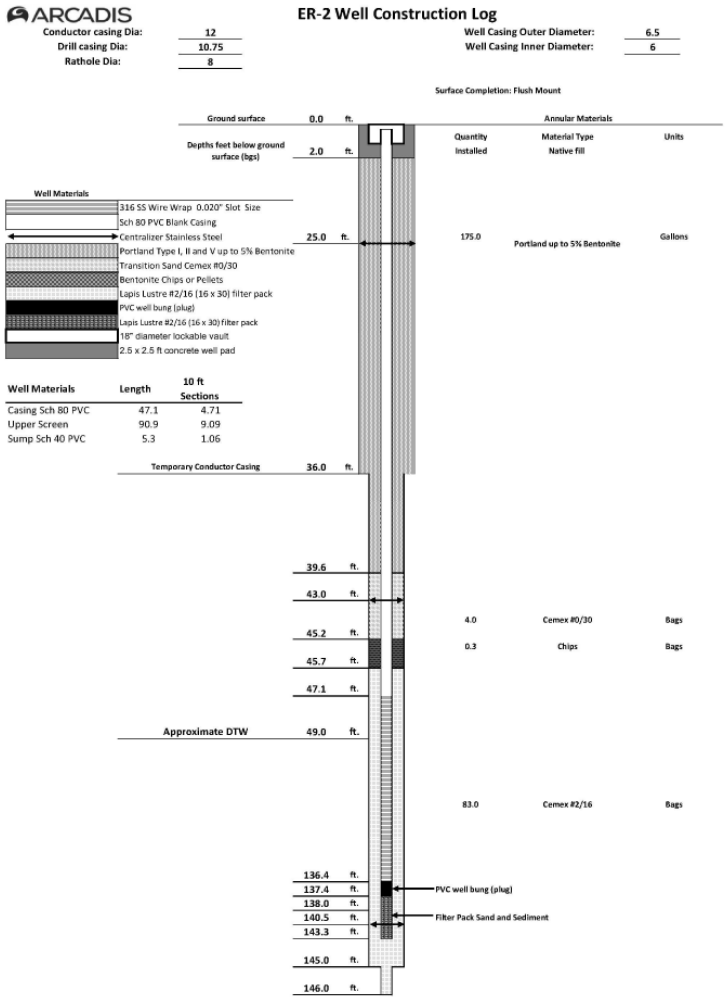
CLIENT NAME: PG&E	WELL CONSTRUCTION PHOTO LOG	PROJECT NAME / LOCATION: Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		WELL ID: ER-02

6/8/2022 – ER-02:
Installing the well bung (plug)

Attachment 8

Filter Sand Issue Summary and Plots

ER-2 Well Construction Log



Well Development Issues

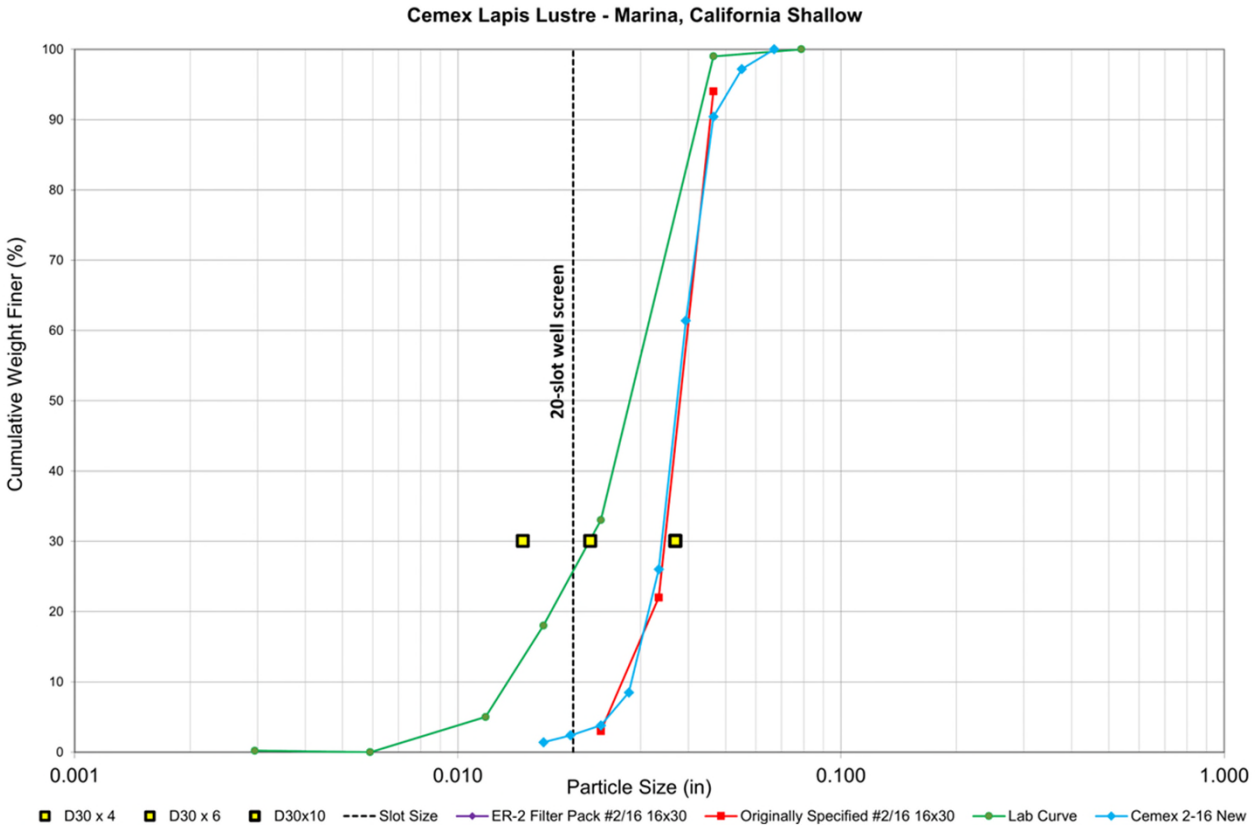
- ER-02 well construction was finalized on May 10, 2022.
- Approximately 22 feet of sediment was measured in the well at the beginning of well development on June 4, 2022. The 8 feet of sand at the bottom was visually similar to filter pack sand.
- Additional sand, more than expected during well development, appeared to enter the well during bailing indicating potential damage to the well. Well Development activities paused to assess path forward.
- On June 5, 2022, a downhole video log was conducted but the water was too turbid to provide useful observations.

Well Survey and Plug Installation

- Project discussions on June 6, 2022, resulted in the solution to install a bung (plug) just above the suspected damaged in the well. Conduct a video log following partial well development. This solution assumed the potentially damaged portion of the bottom of the well would minimize additional sand entering the well and should allow the well to function as designed.
- Preliminary Video log was completed on June 8, 2022 prior to installation of plug after partial development. No damage observed.
- A well bung (plug) was installed at 136 to 137 feet bgs. (approximately 2 feet above the bottom of the screen).
- Post repair, development was continued and completed. A small volume of fine sand was observed during well development.

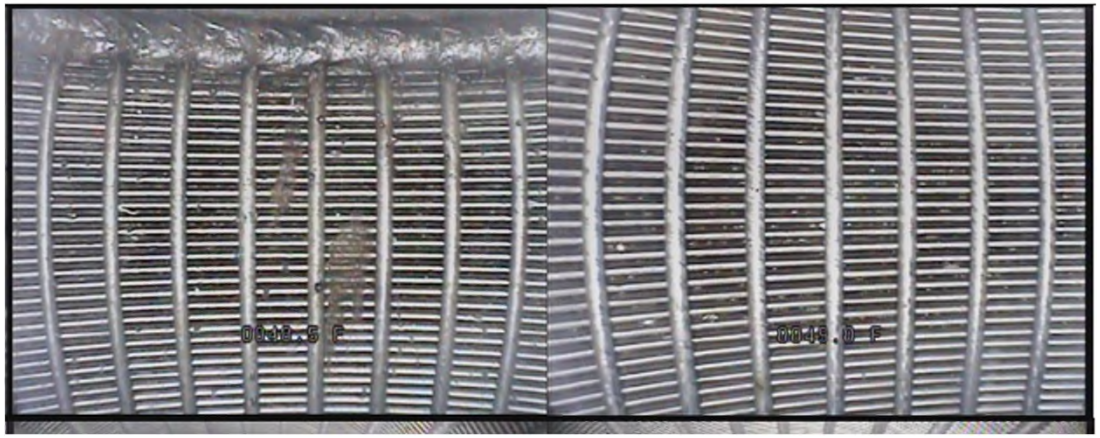
Extent of the Plume

- On June 8, 2022, concurrent with well development, DoR submitted a representative sample of the filter pack installed in ER-2 for grain-size analysis.
- By June 27, 2022, results from the grain-size analysis of the filter pack used in well construction were compared to the original grain-size submittal (CEMEX) and the supplemental grain-size Certification of Compliance (CEMEX).
- Filter pack delivered was different than the manufacturers specified grain size distribution. The percent passing of the designed filter pack was <3%. The actual percent passing of the filter pack installed was approximately 28%.



Extent of the Plume

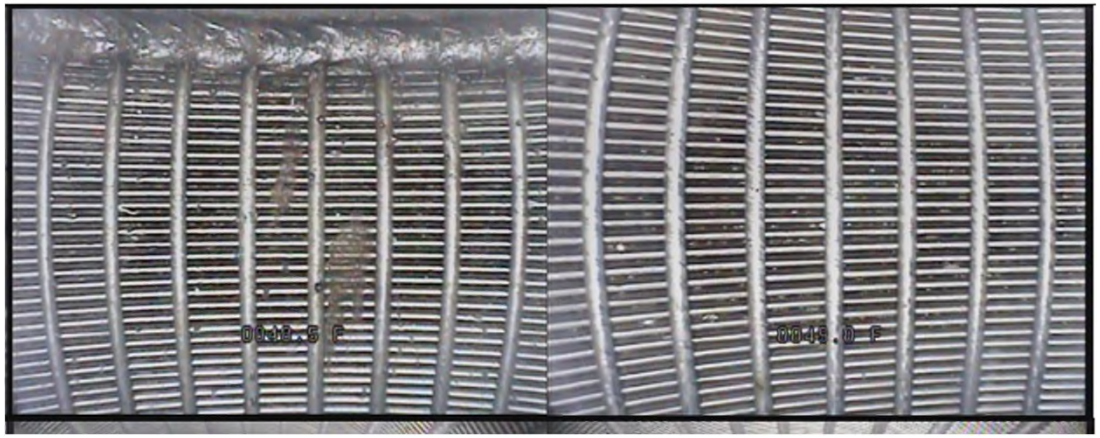
- June 29, 2022: End of Development and Testing. Well testing which showed the sustainable pumping rate is consistent with objectives in the BOD (< 1 GPM). Turbidity measured ~25 NTUs (goal was <50 NTUs).
- Successfully completed alignment test using “dummy” tool.
- The Video Survey conducted after well installation and development showed filter pack sand behind the top of the screen and throughout the length of the screen. Well screen observed to be in good condition.

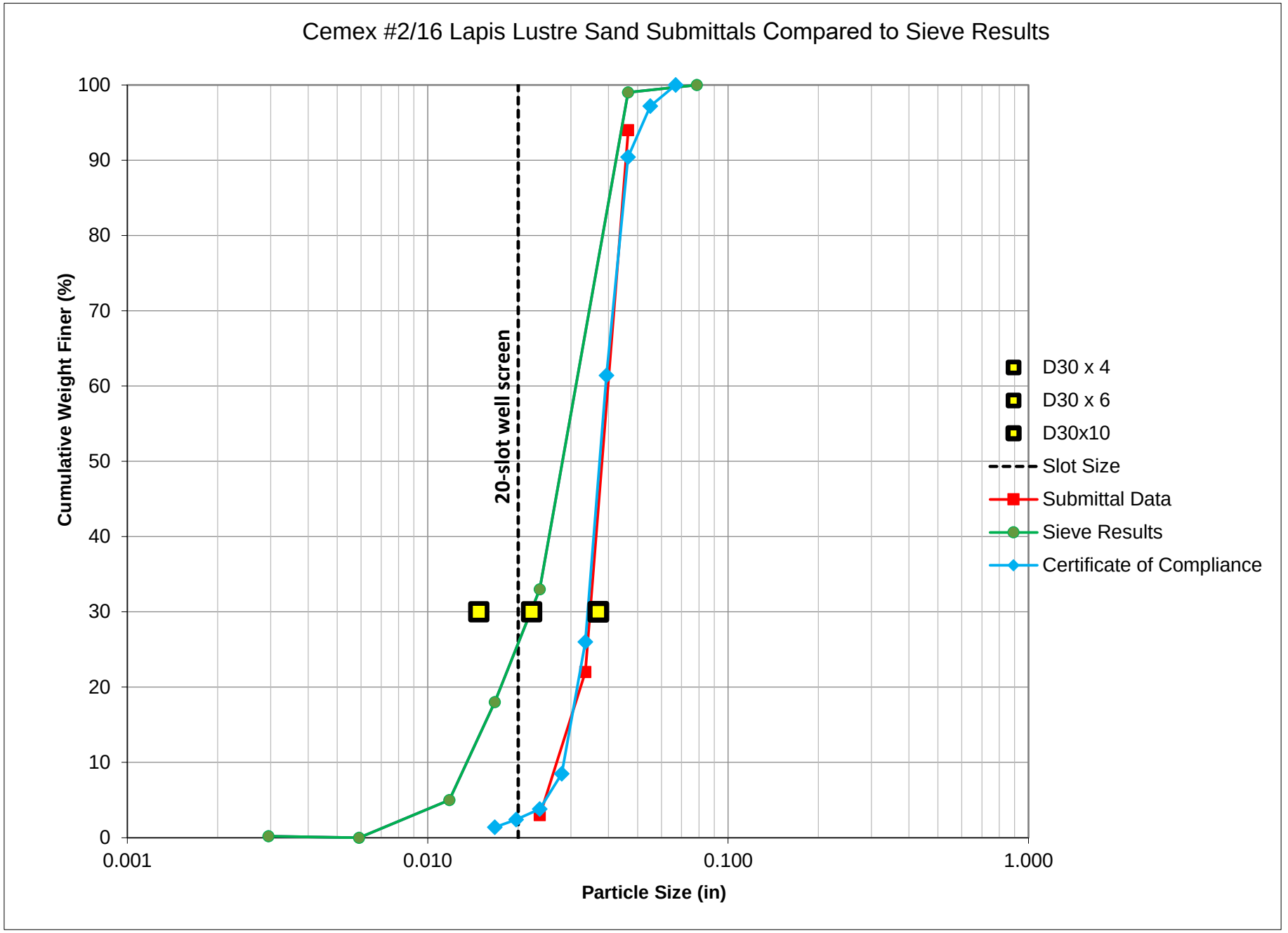


Conclusion

Arcadis reviewed the available data and documentation. The results of the review are presented below.

- The filter pack material supplied by the manufacturer was finer than the designed filter pack.
- The percent passing of the designed filter pack was <3%. The actual percent passing of the filter pack installed was approximately 28%.
- The filter pack manufacturer was notified regarding this issue.
- Well development and testing indicates that the well will meet the target pumping rate of <1 gpm. The well was tested at 0.25 gpm.
- Photo evidence from the video log indicates that filter pack is present throughout the length of the screen and the screen is not damaged.




Cemex #2/16 Lapis Lustre Sand Submittals Compared to Sieve Results
Cumulative Weight Finer (%)
100
90
80
70
60
50
40
30
20
10
0
0.001
0.010
0.100
1.000
Particle Size (in)
20-slot well screen
D30 x 4
D30 x 6
D30x10
Slot Size
Submittal Data
Sieve Results
Certificate of Compliance

Sieve Results supplied #2/16 (16x30)

Cemex Lapis Lustre Sand (Marina, California) -

Mesh Sieve Size	Sieve Size inches	Sieve Size mm	#2/16 (16x30)
3/8	0.3748	9.520	
3	0.2638	6.700	
1/4	0.2500	6.350	
4	0.1870	4.750	
6	0.1319	3.350	
8	0.0929	2.360	
10	0.0787	2.000	100
16	0.0465	1.180	99
30	0.0236	0.6000	33
40	0.0167	0.4250	18
50	0.0118	0.3000	5
100	0.0059	0.1500	0
200	0.0030	0.0750	0.2

Original Specified #2/16 Mesh

Cemex Lapis Lustre Sand

Sieve Size	Sieve Size inches	Sieve Size mm	#2/16 (16x30)
3/8	0.3748	9.520	
3	0.2638	6.700	
1/4	0.2500	6.350	
4	0.1870	4.750	
6	0.1319	3.350	
8	0.0929	2.360	
12	0.0669	1.700	100
16	0.0465	1.180	94
20	0.0335	0.8500	22
30	0.0236	0.6000	3
40	0.0167	0.4250	
50	0.0118	0.3000	
70	0.0083	0.2120	
100	0.0059	0.1500	
140	0.0042	0.1060	
200	0.0030	0.0750	

Lab Sieve Sieve Results supplied #2/16

Cemex Lapis Lustre Sand (Marina, California) - Submitted

Mesh Sieve Size	Sieve Size inches	Sieve Size mm	#2/16 (16x30)
3/8	0.3748	9.520	
3	0.2638	6.700	
1/4	0.2500	6.350	
4	0.1870	4.750	
6	0.1319	3.350	
8	0.0929	2.360	
10	0.0787	2.000	100
16	0.0465	1.180	99
30	0.0236	0.6000	33
40	0.0167	0.4250	18
50	0.0118	0.3000	5
100	0.0059	0.1500	0
200	0.0030	0.0750	0.2

Aquifer Grain Size (finest Interval)

4*D30	0.015	in	6*D30	0.022	in	10*D30	0.037	in
30			30			30		

Selected Slot Size

0.0	**0.0200**
100	0.0200

CEMEX #2/16 New			
Cemex Lapis Lustre Sand (Marina, California) -			
Mesh Sieve Size	Sieve Size inches	Sieve Size mm	#2/16 (16x30)
3/8	0.3748	9.520	
3	0.2638	6.700	
1/4	0.2500	6.350	
4	0.1870	4.750	
6	0.1319	3.350	
8	0.0929	2.360	
10	0.0787	2.000	
12	0.0669	1.700	100
14	0.0551	1.400	97.2
16	0.0465	1.180	90.4
18	0.0394	1.000	61.4
20	0.0335	0.850	26
25	0.0280	0.710	8.5
30	0.0236	0.6000	3.8
35	0.0197	0.500	2.4
40	0.0167	0.4250	1.4
50	0.0118	0.3000	
100	0.0059	0.1500	
200	0.0030	0.0750	

CEMEX
TECHNICAL SERVICES

LAPIS LUSTRE SAND GRADING PARAMETERS
Cumulative percent passing US Sieves

Summary of Test Results

PRODUCT		Special Blend	Coarse Aquarium	Medium Aquarum	4 x 16 6 Mesh	8 Mesh	#3	#2/12
Nominal Sieve Size		3/8" x #6	4 x 12	6 x 16	4 x 16	8 x 16	8 x 20	12 x 20
US	mm							
3/8"	9.52	100 ± 0						
#3	6.70	77 ± 24						
1/4"	6.35	65 ± 33	100 ± 0	100 ± 0	100 ± 0			
#4	4.75	21 ± 20	97 ± 3	98 ± 2	99 ± 1			
#6	3.35	4 ± 4	78 ± 10	87 ± 14	79 ± 7	100 ± 0	100 ± 0	
#8	2.36	2 ± 1	31 ± 7	37 ± 18	39 ± 17	99 ± 1	99 ± 1	100 ± 0
#12	1.70		1 ± 1	9 ± 5	6 ± 5	40 ± 15	59 ± 12	96 ± 3
#16	1.18			2 ± 1	2 ± 2	4 ± 3	9 ± 5	20 ± 8
#20	0.850			1 ± 1	1 ± 1	2 ± 2	2 ± 1	1 ± 1
#30	0.600						1 ± 1	1 ± 1

PRODUCT		#2/16	#1C	#1/20	#0/30	30 Mesh	#60	All Purpose
Nominal Sieve Size		16 x 30	16 x 40	20 x 40	30 x 50	30 x 70	40 x 70	4 x 50
US	mm							
#4	4.75							100 ± 0
#8	2.36							99 ± 1
#12	1.70	100 ± 0	100 ± 0					
#16	1.18	94 ± 5	95 ± 3	100 ± 0				76 ± 21
#20	0.850	22 ± 16	55 ± 9	88 ± 8	100 ± 0	100 ± 0	100 ± 0	
#30	0.600	3 ± 3	10 ± 6	18 ± 11	77 ± 5	95 ± 5	99 ± 1	42 ± 25
#40	0.425		1 ± 1	1 ± 1	12 ± 6	73 ± 23	80 ± 12	
#50	0.300				2 ± 2	25 ± 11	30 ± 11	13 ± 7
#70	0.212				0.5 ± 0.5	3 ± 2	5 ± 4	
#100	0.150					1 ± 1	1 ± 1	1 ± 1

THESE ARE GENERAL GRADINGS ONLY. FOR CURRENT INDIVIDUAL GRADING DATA A CERTIFICATE OF COMPLIANCE IS AVAILABLE ON REQUEST FROM THE TECHNICAL SERVICES LABORATORY. FOR PRICING OR AVAILABILITY INFORMATION CONTACT THE INDUSTRIAL SAND SALES DESK AT 925-200-6207.

Cemex Lapis Lustre Sand (Marina, California) -			
Mesh Sieve Size	Sieve Size inches	Sieve Size mm	#0/30 (30x50)
3/8	0.3748	9.520	
3	0.2638	6.700	
1/4	0.2500	6.350	
4	0.1870	4.750	
6	0.1319	3.350	
8	0.0929	2.360	
10	0.0787	2.000	
16	0.0465	1.180	
20	0.0335	0.850	100
30	0.0236	0.6000	77
40	0.0167	0.4250	12
50	0.0118	0.3000	2
70	0.0083	0.212	0.5
100	0.0059	0.1500	
200	0.0030	0.0750	

CEMEX
TECHNICAL SERVICES

LAPIS LUSTRE SAND GRADING PARAMETERS
Cumulative percent passing US Sieves

Summary of Test Results

PRODUCT		Special Blend	Coarse Aquarium	Medium Aquarum	4 x 16 6 Mesh	8 Mesh	#3	#2/12
Nominal Sieve Size		3/8" x #6	4 x 12	6 x 16	4 x 16	8 x 16	8 x 20	12 x 20
US	mm							
3/8"	9.52	100 ± 0						
#3	6.70	77 ± 24						
1/4"	6.35	65 ± 33	100 ± 0	100 ± 0	100 ± 0			
#4	4.75	21 ± 20	97 ± 3	98 ± 2	99 ± 1			
#6	3.35	4 ± 4	78 ± 10	87 ± 14	79 ± 7	100 ± 0	100 ± 0	
#8	2.36	2 ± 1	31 ± 7	37 ± 18	39 ± 17	99 ± 1	99 ± 1	100 ± 0
#12	1.70		1 ± 1	9 ± 5	6 ± 5	40 ± 15	59 ± 12	96 ± 3
#16	1.18			2 ± 1	2 ± 2	4 ± 3	9 ± 5	20 ± 8
#20	0.850			1 ± 1	1 ± 1	2 ± 2	2 ± 1	1 ± 1
#30	0.600						1 ± 1	1 ± 1

PRODUCT		#2/16	#1C	#1/20	#0/30	30 Mesh	#60	All Purpose
Nominal Sieve Size		16 x 30	16 x 40	20 x 40	30 x 50	30 x 70	40 x 70	4 x 50
US	mm							
#4	4.75							100 ± 0
#8	2.36							99 ± 1
#12	1.70	100 ± 0	100 ± 0					
#16	1.18	94 ± 5	95 ± 3	100 ± 0				76 ± 21
#20	0.850	22 ± 16	55 ± 9	88 ± 8	100 ± 0	100 ± 0	100 ± 0	
#30	0.600	3 ± 3	10 ± 6	18 ± 11	77 ± 5	95 ± 5	99 ± 1	42 ± 25
#40	0.425		1 ± 1	1 ± 1	12 ± 6	73 ± 23	80 ± 12	
#50	0.300				2 ± 2	25 ± 11	30 ± 11	13 ± 7
#70	0.212				0.5 ± 0.5	3 ± 2	5 ± 4	
#100	0.150					1 ± 1	1 ± 1	1 ± 1

THESE ARE GENERAL GRADINGS ONLY. FOR CURRENT INDIVIDUAL GRADING DATA A CERTIFICATE OF COMPLIANCE IS AVAILABLE ON REQUEST FROM THE TECHNICAL SERVICES LABORATORY. FOR PRICING OR AVAILABILITY INFORMATION CONTACT THE INDUSTRIAL SAND SALES DESK AT 925-200-6207.

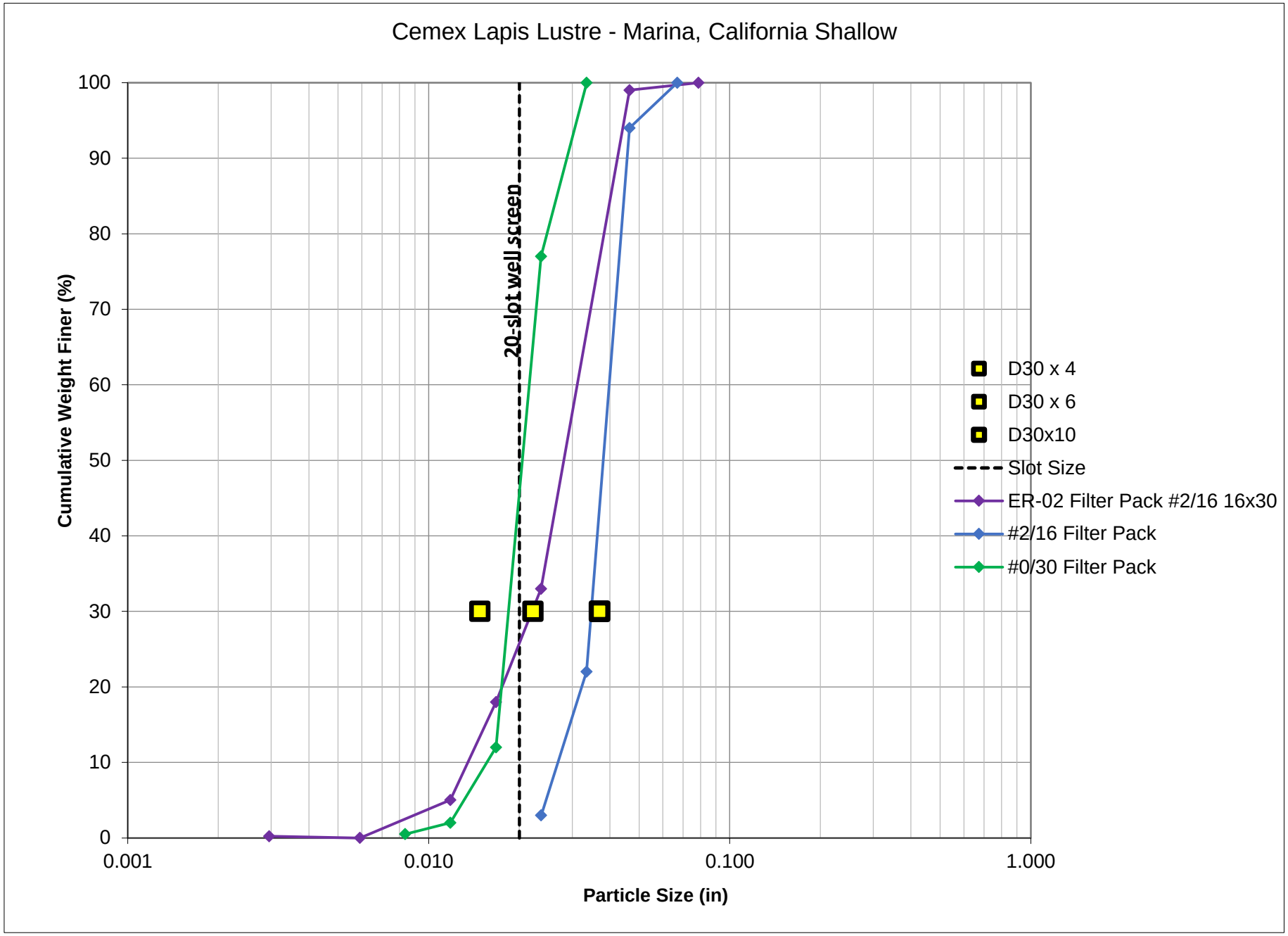
Aquifer Grain Size (finest Interval)

4*D30	0.015	in	6*D30	0.022	in	10*D30	0.037	in
30			30			30		

Selected Slot Size

0.0	0.0200
100	0.0200

Cemex Lapis Lustre Sand (Marina, California) - Submitted Aver			
Mesh Sieve Size	**Sieve Size inches**	**Sieve Size mm**	**#2/16 (16x30)**
3/8	0.3748	9.520	
3	0.2638	6.700	
1/4	0.2500	6.350	
4	0.1870	4.750	
6	0.1319	3.350	
8	0.0929	2.360	
12	0.0669	1.700	100
16	0.0465	1.180	94
20	0.0335	0.8500	22
30	0.0236	0.6000	3
40	0.0167	0.4250	
50	0.0118	0.3000	
70	0.0083	0.2120	
100	0.0059	0.1500	
140	0.0042	0.1060	
200	0.0030	0.0750	

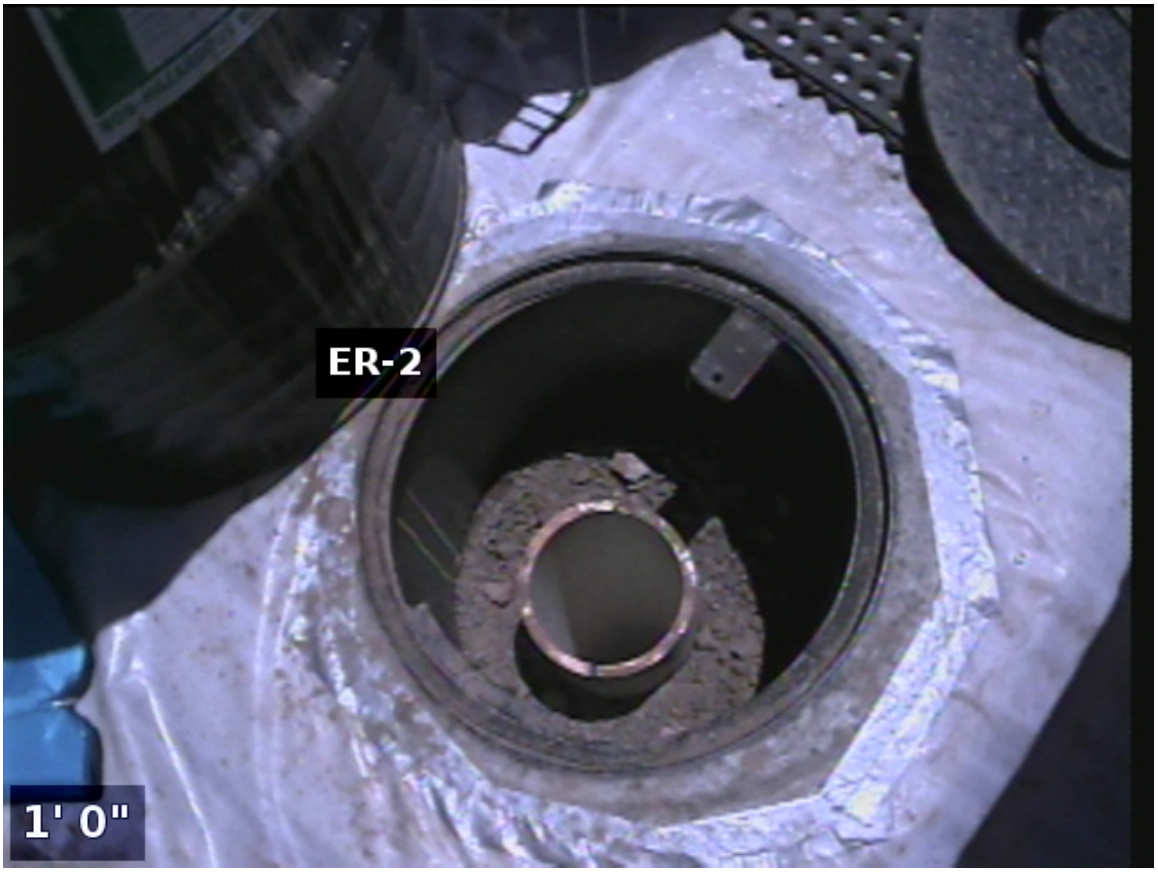

Cemex Lapis Lustre - Marina, California Shallow
Cumulative Weight Finer (%)
100
90
80
70
60
50
40
30
20
10
0
0.001
0.010
0.100
1.000
Particle Size (in)
20-slot well screen
D30 x 4
D30 x 6
D30x10
Slot Size
ER-02 Filter Pack #2/16 16x30
#2/16 Filter Pack
#0/30 Filter Pack

Attachment 9

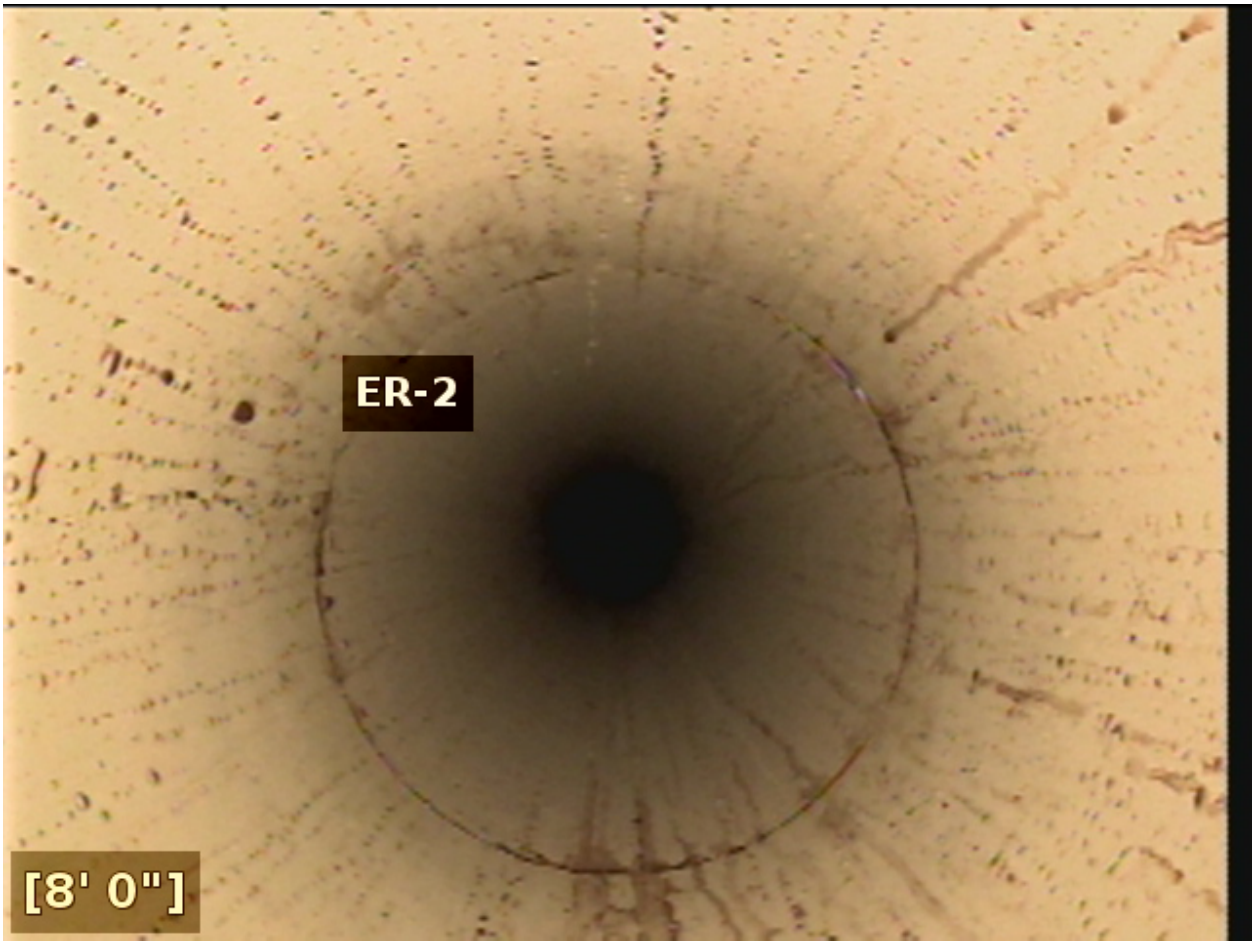
Video Survey Reports

Date/Time:	June 5th, 2022, 12:45
Well ID:	ER-02
Location:	Topock (Needles, CA)
Client:	PG&E, Arcadis
Casing Info:	6” Sch 80 PVC Riser with Stainless Wire Wrap Well Screen
Estimated Static:	56.5’
Est. Depth of Screen:	52.0’
Depth of Survey:	100’
Video Quality:	Poor due to turbidity

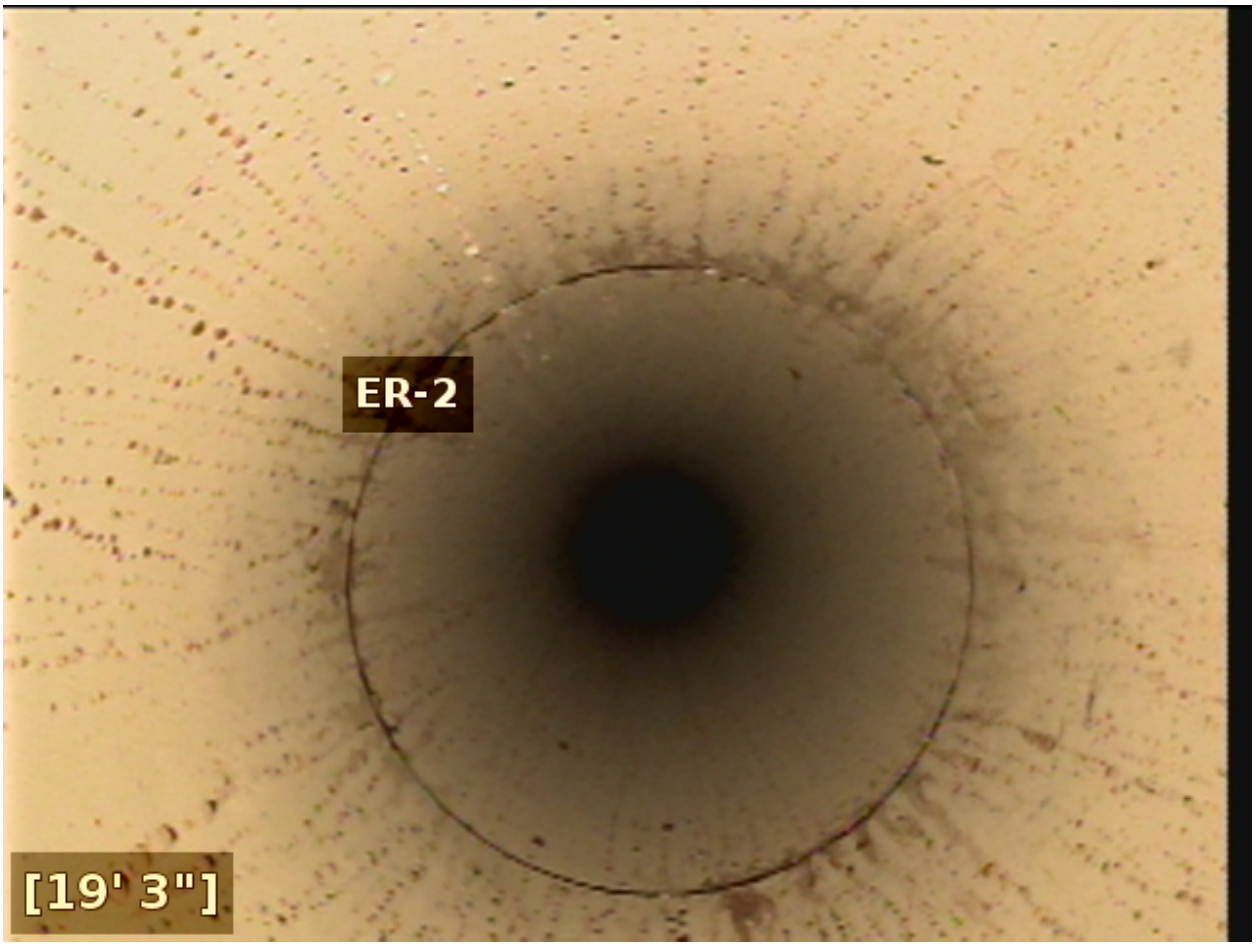
Summary:
PVC riser casing appeared to be in good condition, without damage or issues. The static water level was a few feet below the top of well screen. The well screen above the static water level appeared intact, without damage or separation. The water quality was very turbid making the video quality very poor with no visibility of the well screen or casing below the static water level. Note that water on camera after video was noticeably turbid, and slightly muddy.



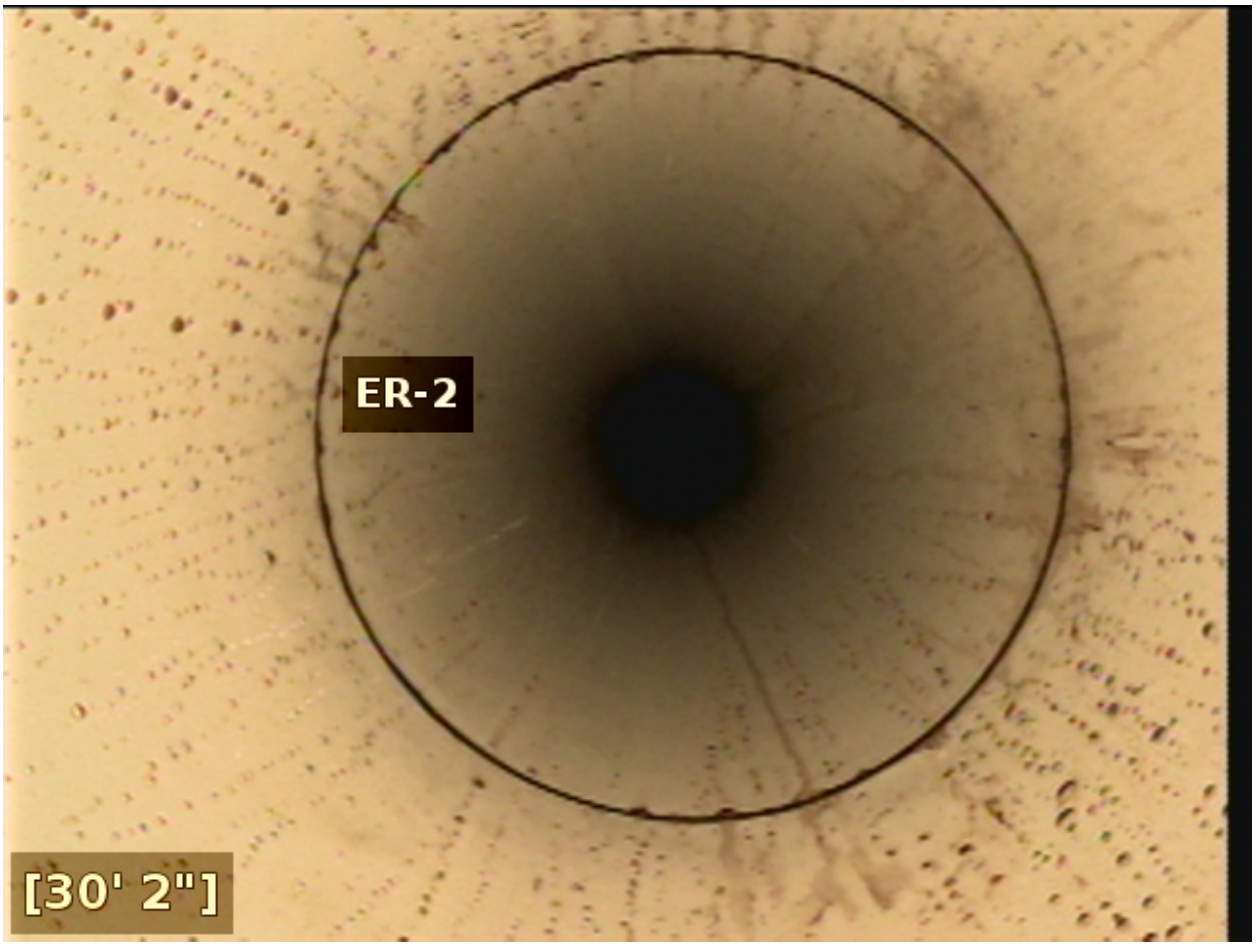
Well head and well box.



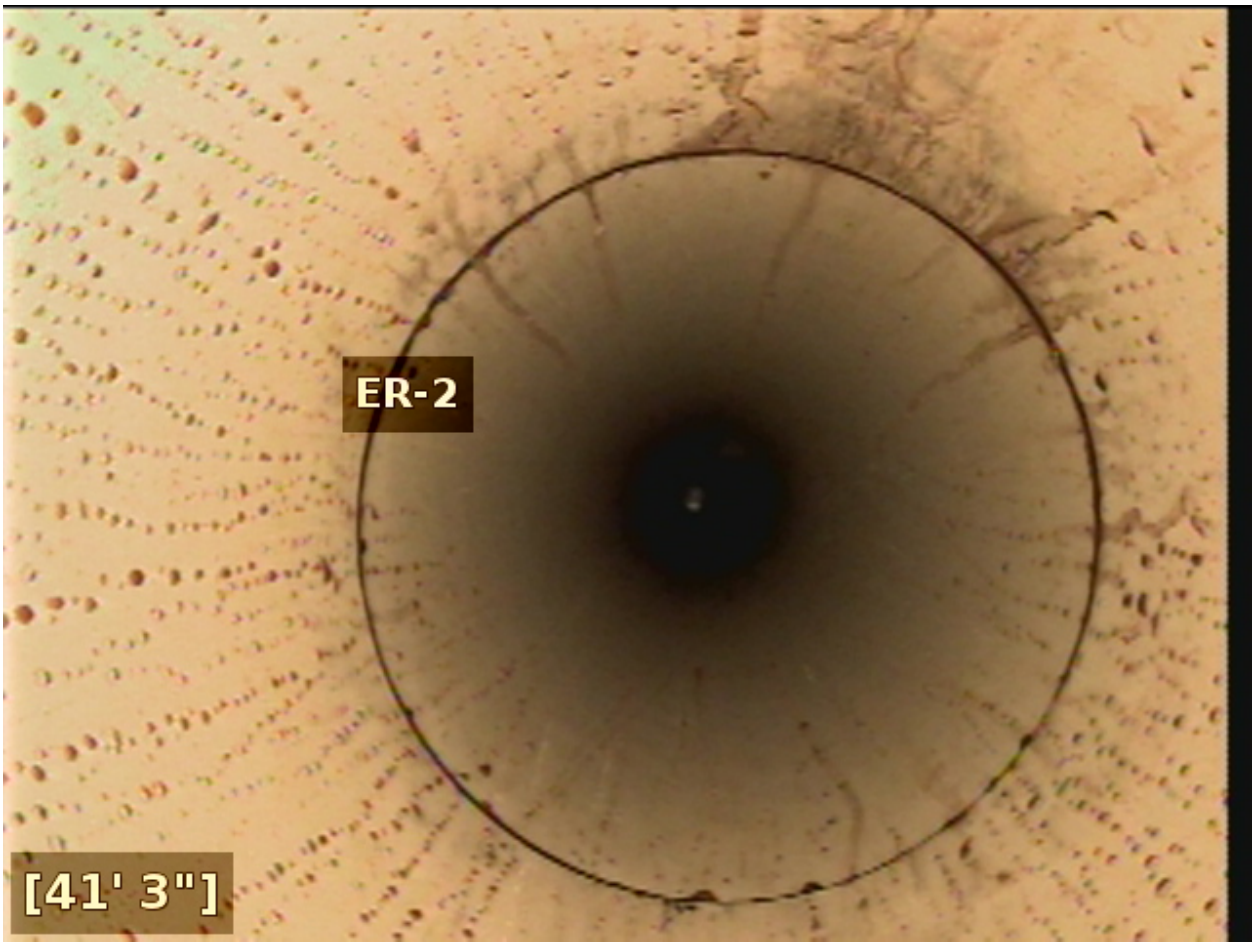
Well casing joint – no apparent issues. Noticeably muddy water on inside of casing for the entire riser well casing from surface to static.



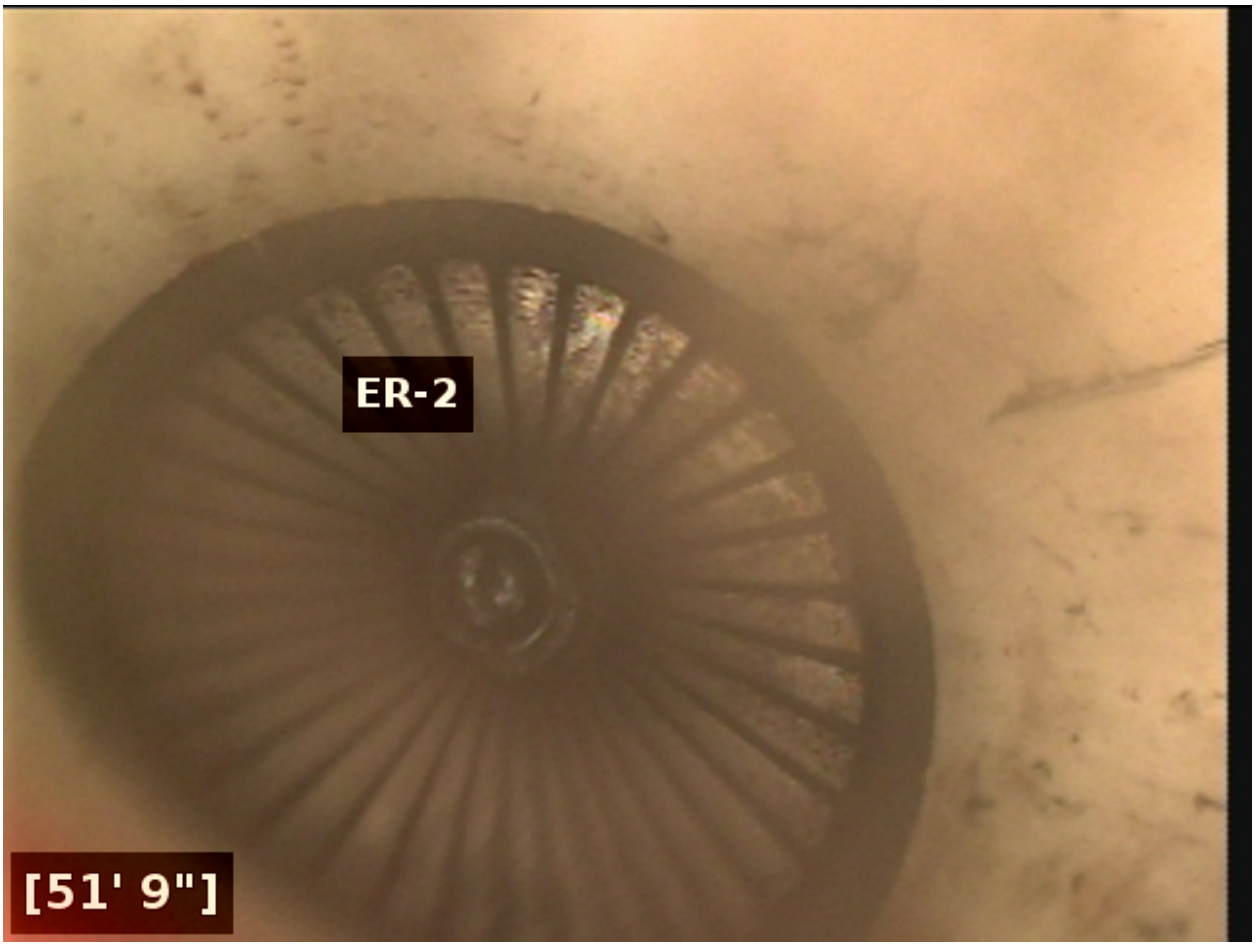
Well casing joint – no apparent issues.



Well casing joint – no apparent issues.



Well casing joint – no apparent issues. Notice static water reflection ~15ft below camera.



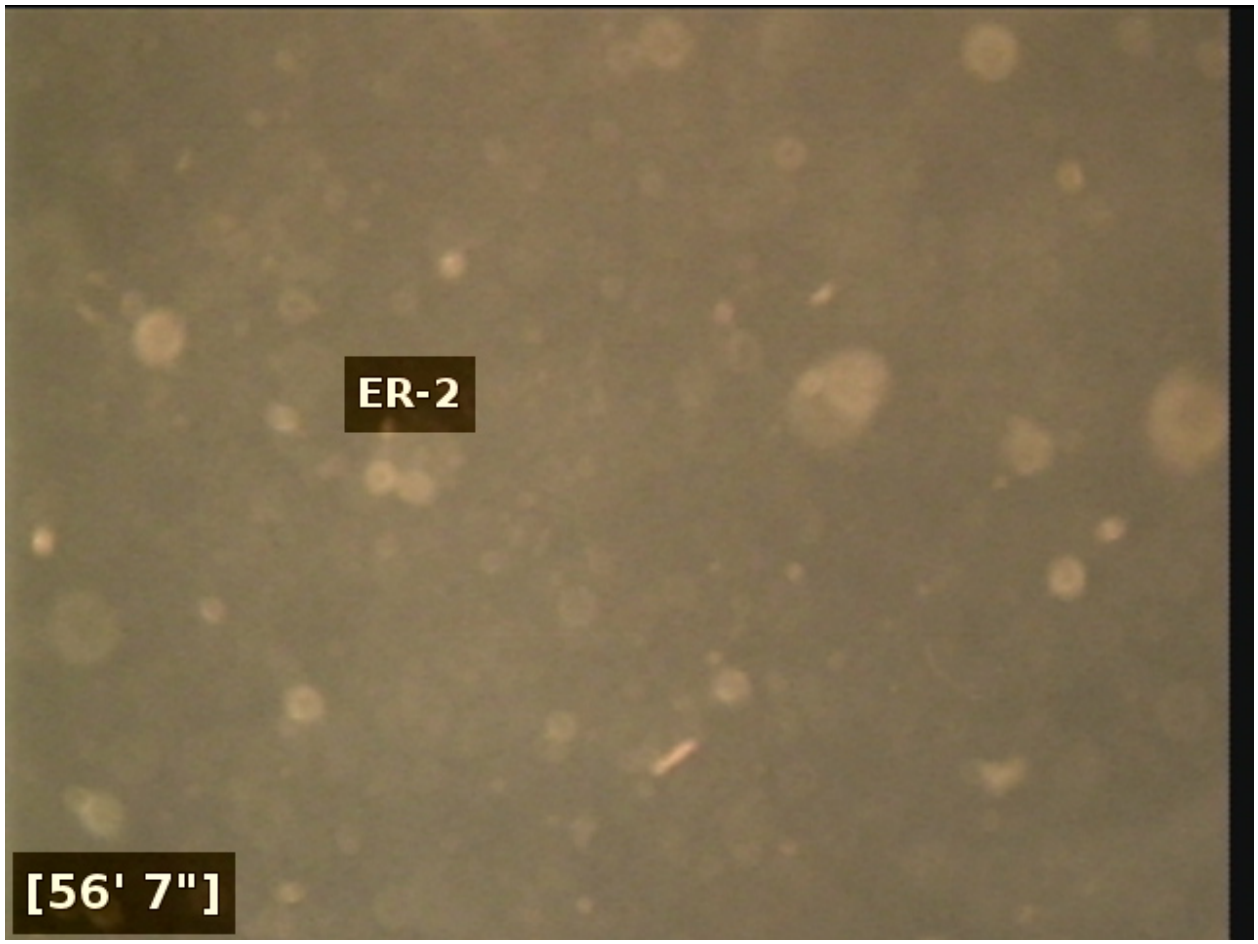
Top of well screen joint. Note that muddy water began to collect on the end of the lens. Therefore, the quality of this photo is not as good as it can be. The screen appears intact, and the joint appears also intact. The top of well screen is estimated at 52.0’.

CLIENT NAME: PG&E	WELL CONSTRUCTION PHOTO LOG	PROJECT NAME / LOCATION: Final Groundwater Remedy, PG&E Topock Compressor Station/Needles, CA
Arcadis PROJECT NO: 30126255		WELL ID: ER-02

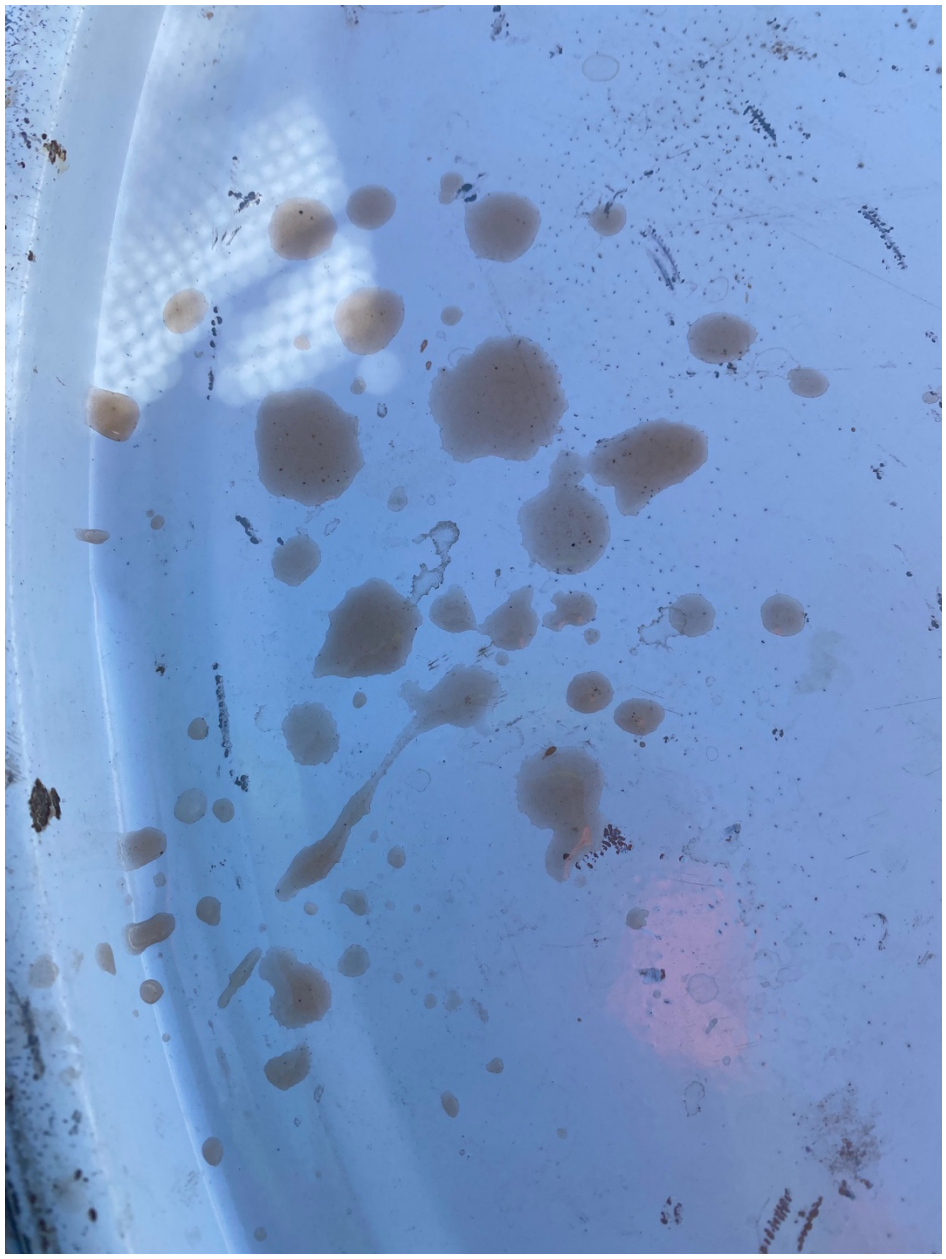
5/8/2020 – ER-02:
Cemex #0/30 (30 x 50) Lapis Lustre Sand for transition sand seal

5/8/2022 – ER-02:
Cemex #2/16 (16 x 30) Lapis Lustre Sand for filter pack

5/8/2020 – ER-02:
Enviroplug: Medium Bentonite Chips used for bentonite seal



Poor video quality due to high turbidity water. Video quality does not improve with depth. Video camera advancement ceased at 100’ to avoid camera potentially entering a portion of the well that may be damaged without knowing the camera is entering. The quality of the video did not improve from this depth to the end of the survey.



This is a photo taken with my phone of the water that dripped off the camera after the video was compete, onto the lid of the 55-gallon drum sitting by the well. Photo is included to demonstrate the turbidity of the groundwater.

Note that a series of 6-inch centralizers were used on the camera, so the camera moving advancing to 100’ and then being retrieved, will have likely disturbed the water enough to require restarting the clock on waiting for the water to become clearer for a potential future video.

Please call me if you wish to discuss any part of this report or video.
Thanks. Eli
505.999.7535

Pacific Surveys

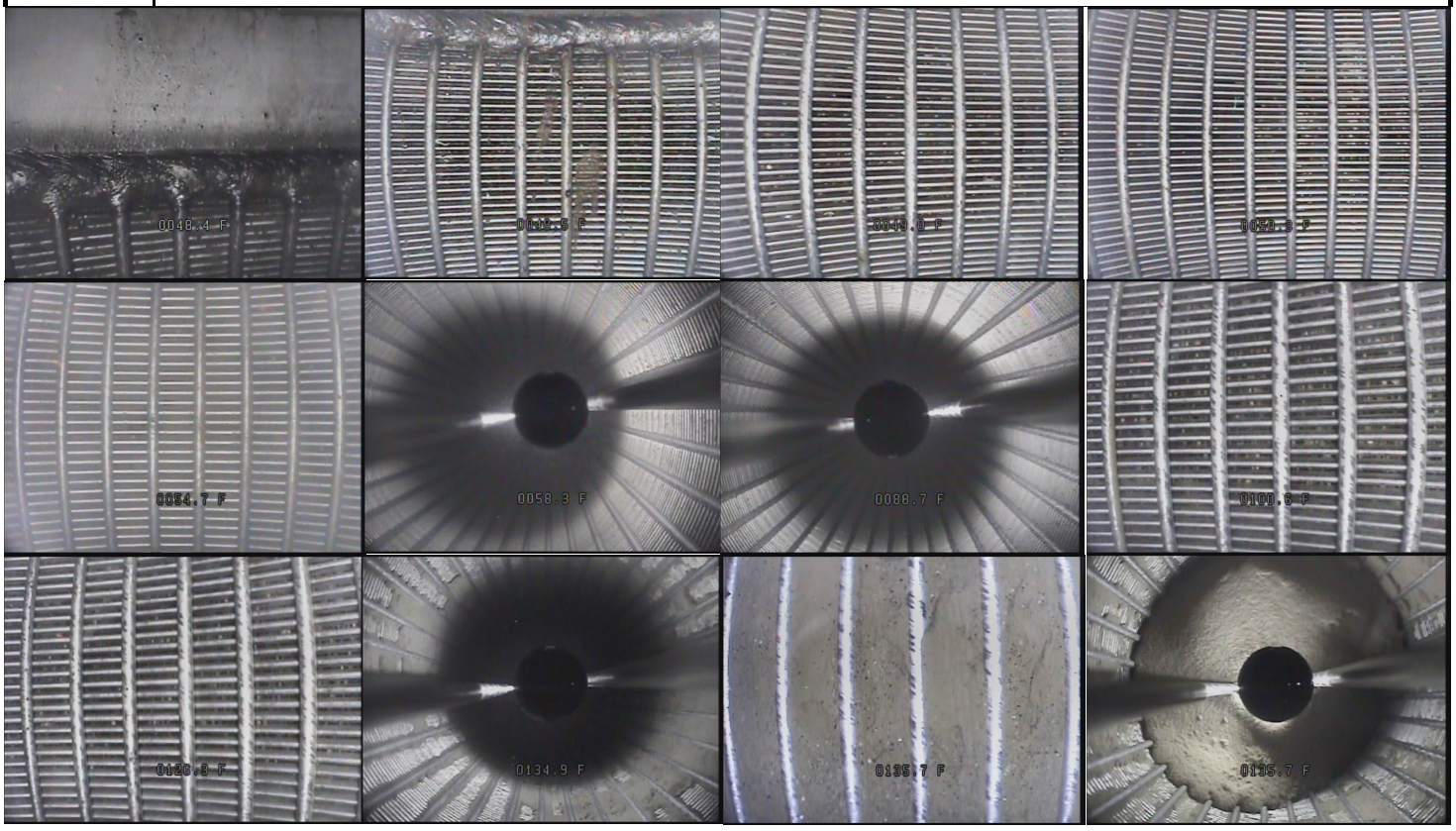
a full service geophysical well logging company

Video Survey Report

Company:	ABC Liovin Drilling, Inc.	**Date:**	30-Jun-22
Well:	ER-2	**Run No.**	One **Truck** PS-9
Field:	Topock	**Job Ticket:**	29875
State:	California	**Total Depth:**	136.7 ft
Location:	145453 National Trails HWY	**Water Level:**	51.0 ft SWL
		Oil on Water:	No **Amount:** N/A
GPS:	34.71505 -114.48875	**Operator:**	Afoh
Zero Datum:	Ground Level **Tool Zero:** Side-Scan		**Dead Space** 1.08 ft
Reason for Survey:	New Well Construction	**Guides Set**	5.5 inch

Depth	Observations
0.0 ft	Begin survey from ground level.
0.4 ft	Top of casing.
48.2 ft	Transition of casing from PVC to Stainless Steel Casing.
48.4 ft	Top of Screen: all are open with gravel pack visible behind the casing wall.
51.0 ft	SWL: Water is slightly cloudy. Visibility is fair.
100.0 ft	Water column clear up slightly.
134.3 ft	Wire-wrap screen are mostly plugged from 134.3 ft.
136.7 ft	Hard fill encountered, still in screen. End survey.

Well Details	
Perforation:	**As-Built**
Wire-Wrap	48 ft to 135.9 ft
Casing Size (in)	**As-Built**
OD / ID	
6.75 / 5.75	0 ft to 135.9 ft
Casing Material	PVC
Screen Material	Stainless Steel



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