



December 7, 2018

Mr. Aaron Yue
Project Manager
California Environmental Protection Agency,
Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, CA 90630

Subject: MW-23 pH Profiles, PG&E Topock Compressor Station

Dear Mr. Yue:

This letter presents the pH vs depth profiles for MW-23 that were requested by DTSC in addition to the specific conductivity (SC) vs. depth profiles for site-wide monitoring wells. The SC profile for MW-23 was submitted separately but is also attached here for convenience.

History

MW-23 is a bedrock monitoring well located at an outcrop of red fanglomerate east of the Topock Compressor Station. MW-23 was installed in 1998 with one screened interval from 60 to 80 feet below ground surface (bgs). In 2009, MW-23 was over-drilled and reconstructed in the same borehole as a dual completion monitoring well with two, 2-inch well casings and screens. The lower screened interval is from 75 to 80 feet bgs and the upper screened interval is from 50 to 60 feet bgs. Well construction diagrams for the original MW-23 installation and the 2009 reconstruction as MW-23-060 and MW-23-080 are enclosed as Attachment 1.

After reconstruction, MW-23-060 and MW-23-080 were each sampled approximately 20 times for the groundwater sampling program (GMP) using three-volume purge methods, removing at least 60 casing volumes of groundwater from each well, before low flow sampling for the GMP at this location began in 2014.

Chromium Concentrations

MW-23 had hexavalent chromium (Cr(VI)) concentrations ranging from non-detect (less than 0.2 micrograms per liter or $\mu\text{g/L}$) to 43.7 $\mu\text{g/L}$ (excluding one sample from 2006 with an anomalous value of 1,020 $\mu\text{g/L}$) in groundwater samples collected from 1998 to 2009. MW-23 field pH results ranged from 6.7 to 8.1 in groundwater samples collected from 2001 to 2009.

After reconstruction, the upper screen MW-23-060 had Cr(VI) concentrations ranging from 19.7 to 39 $\mu\text{g/L}$, in groundwater samples collected from 2009 to 2017. The highest concentrations of Cr(VI) were in more recent samples. MW-23-060 pH results ranged from 8.9 to 9.8 in groundwater samples collected from 2015 to 2017.

The lower screen MW-23-080 had Cr(VI) concentrations ranging from 1.2 to 34 $\mu\text{g/L}$ in groundwater samples collected from 2009 to 2017. The lowest concentrations of Cr(VI) were in more recent samples. MW-23-080 pH results ranged from 10.1 to 10.4 in groundwater samples collected from 2015 to 2017.

A plot of Cr(VI) concentration vs. time for MW-23 and its recompletion as MW-23-060 and MW-23-080 is enclosed as Attachment 2; the vertical scale is adjusted to exclude the anomalous result from 2006.

Historical pH Measurements

A plot of groundwater sampling pH measurements over time from MW-23, then from MW-23-060 and MW-23-080 after 2009 recompletion of the well, is enclosed as Attachment 3. pH values increased from measurements of pH 7 to 8 in MW-23 before the well was recompleted, up to pH 10 to 11 following recompletion, then began to decrease over time. The cause for the pH increase at well recompletion is not known.

SC and pH Profiles

Before the wells were purged for sampling with the 4Q 2017 GMP monitoring event, pH and SC profiles were measured in MW-23-060 and MW-23-080. The pH profiles are Attachment 3 and the SC profiles are Attachment 4. In the upper screen, pH ranges from 9 to 9.5, and in the lower screen, pH ranges from 9.6 to 10. SC is approximately 18,000 to 19,000 $\mu\text{S}/\text{cm}$ in the upper screen, and 20,000 to 21,000 $\mu\text{S}/\text{cm}$ in the lower screen.

Interpretation and Recommendation

After MW-23 was reconstructed, groundwater sampling field pH measurements increased in both the upper (-060) and lower (-080) screened intervals, compared to the original single screen monitoring results. Somewhat higher pH values of approximately 10 are measured in MW-23-080, with pH values of approximately 9.5 in MW-23-060.

Although Cr(VI) concentrations in MW-23-060 have increased recently, they are within the range observed in MW-23 (not counting the anomalous 2006 sample) and are higher than Cr(VI) concentrations in MW-23-080, which have decreased in more recent samples.

The pH range of 9 to 11 seen historically, and more recently pH 9 to 10, should not affect Cr(VI) concentrations or monitoring use of MW-23-060 and MW-23-080. No further actions are recommended at MW-23-060 and MW-23-080, other than continued GMP sampling.

Please contact me at 760-791-5884 if you have any questions about this information.

Sincerely,



Curt Russell
Topock Project Manager

Enclosures:

- Attachment 1: Well Construction Diagrams MW-23, MW-23-060, and MW-23-080
- Attachment 2: Hexavalent Chromium Cr(VI) Concentrations vs. Time at MW-23 Location
- Attachment 3: pH Measurements vs. Time at MW-23 Location
- Attachment 4: MW-23-060 and MW-23-080 pH vs. Depth Profiles
- Attachment 5: MW-23-060 and MW-23-080 SC vs. Depth Profiles

cc: Chris Guerre/DTSC
Karen Baker/DTSC
Pam Innis/DOI

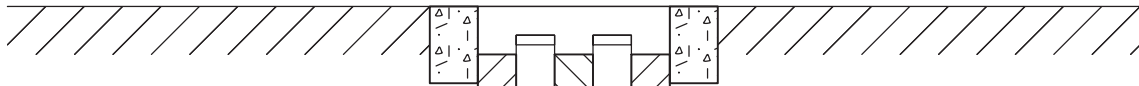
Attachment 1
Well Construction Diagrams
MW-23, MW-23-060, and MW-23-080

WELL COMPLETION DIAGRAM

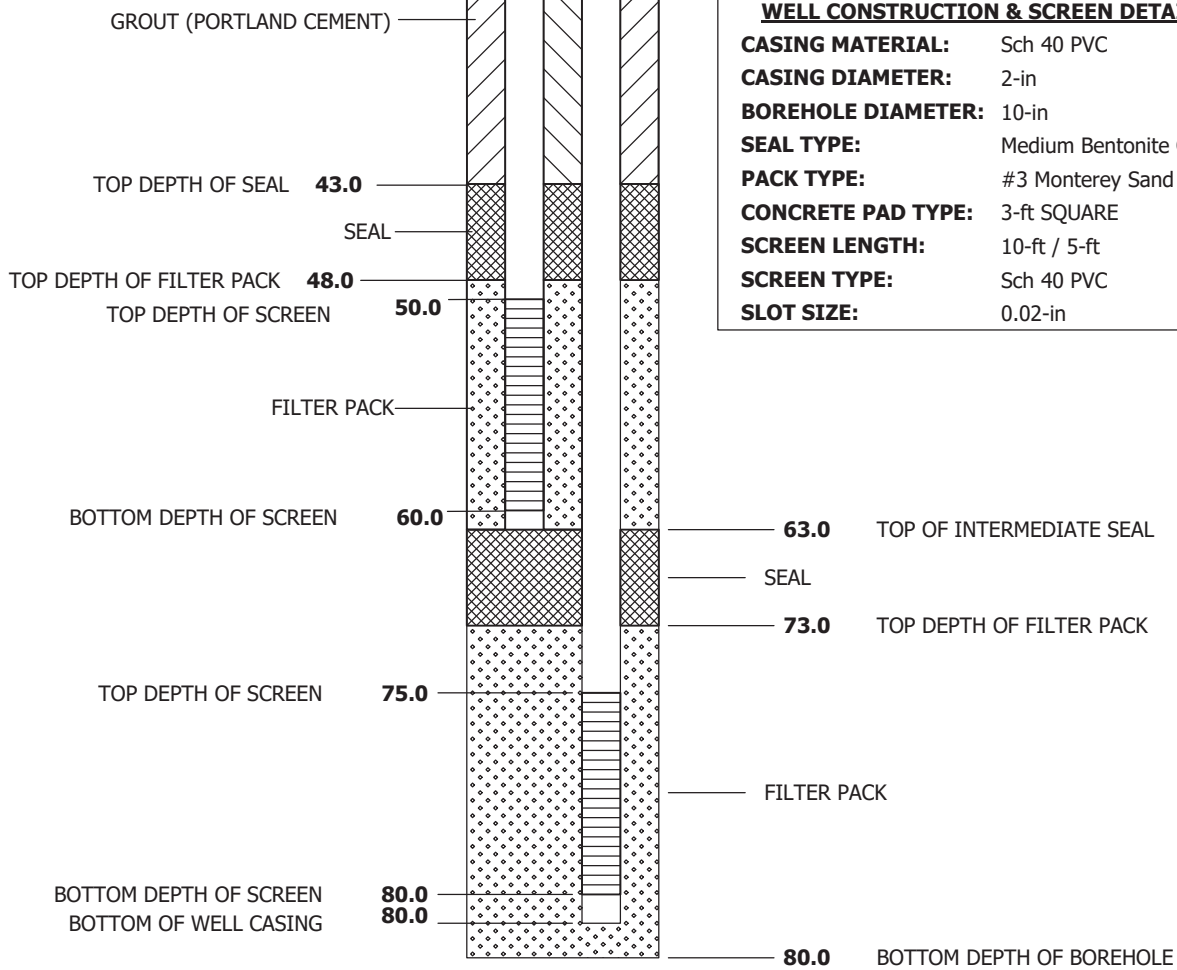
PROJECT NO: 382653.FP.04.FW	PROJECT: PG&E Topock - ERGI	WELL NO: <i>MW-23-060</i> <i>MW-23-080</i>
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LOCATION: Former MW-23	
DRILLING CONTRACTOR: Boart Longyear (D. Roberts)	DRILLING START: 4/30/2009
DRILLING METHOD: Rotosonic	DRILLING END: 5/2/2009
LOGGER: B. Pelletier (Northstar)	WELL COMPLETION DATE: 5/2/2009
GROUND SURFACE ELEVATION (NAVD 88): 504.6 ft AMSL	GENERAL REMARKS: Existing monitoring well MW-23 was over-drilled and reconstructed within the same borehole as two nested monitoring wells
NORTHING (CCS NAD 83 Z 5): 2101286.32	
EASTING (CCS NAD 83 Z 5): 7616448.50	

12-in DIAMETER WELL VAULT (FLUSH WITH GRADE)



NOTES:
1. All depths are reported as feet below ground surface



WELL CONSTRUCTION & SCREEN DETAILS	
CASING MATERIAL:	Sch 40 PVC
CASING DIAMETER:	2-in
BOREHOLE DIAMETER:	10-in
SEAL TYPE:	Medium Bentonite Chips
PACK TYPE:	#3 Monterey Sand
CONCRETE PAD TYPE:	3-ft SQUARE
SCREEN LENGTH:	10-ft / 5-ft
SCREEN TYPE:	Sch 40 PVC
SLOT SIZE:	0.02-in

WELL DIAGRAM IS NOT TO SCALE



ALISTO ENGINEERING GROUP
WALNUT CREEK, CALIFORNIA

LOG OF WELL MW-23

Page 1 of 2

SEE SITE PLAN

ALISTO PROJECT NO: 10-320-08

DATE DRILLED: 04/06/98

CLIENT: Pacific Gas and Electric Co.

LOCATION: Topock Compressor Station

DRILLING METHOD: Ingersol Rand STRATEX/Air rotary

DRILLING COMPANY: THF Drilling

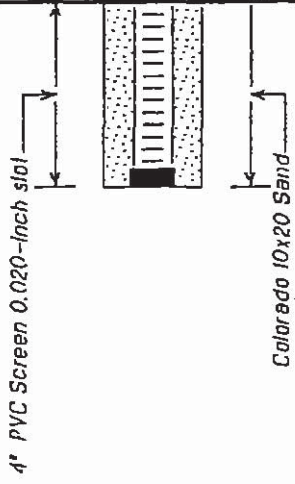
CASING ELEVATION:

LOGGED BY: Dan Selaices

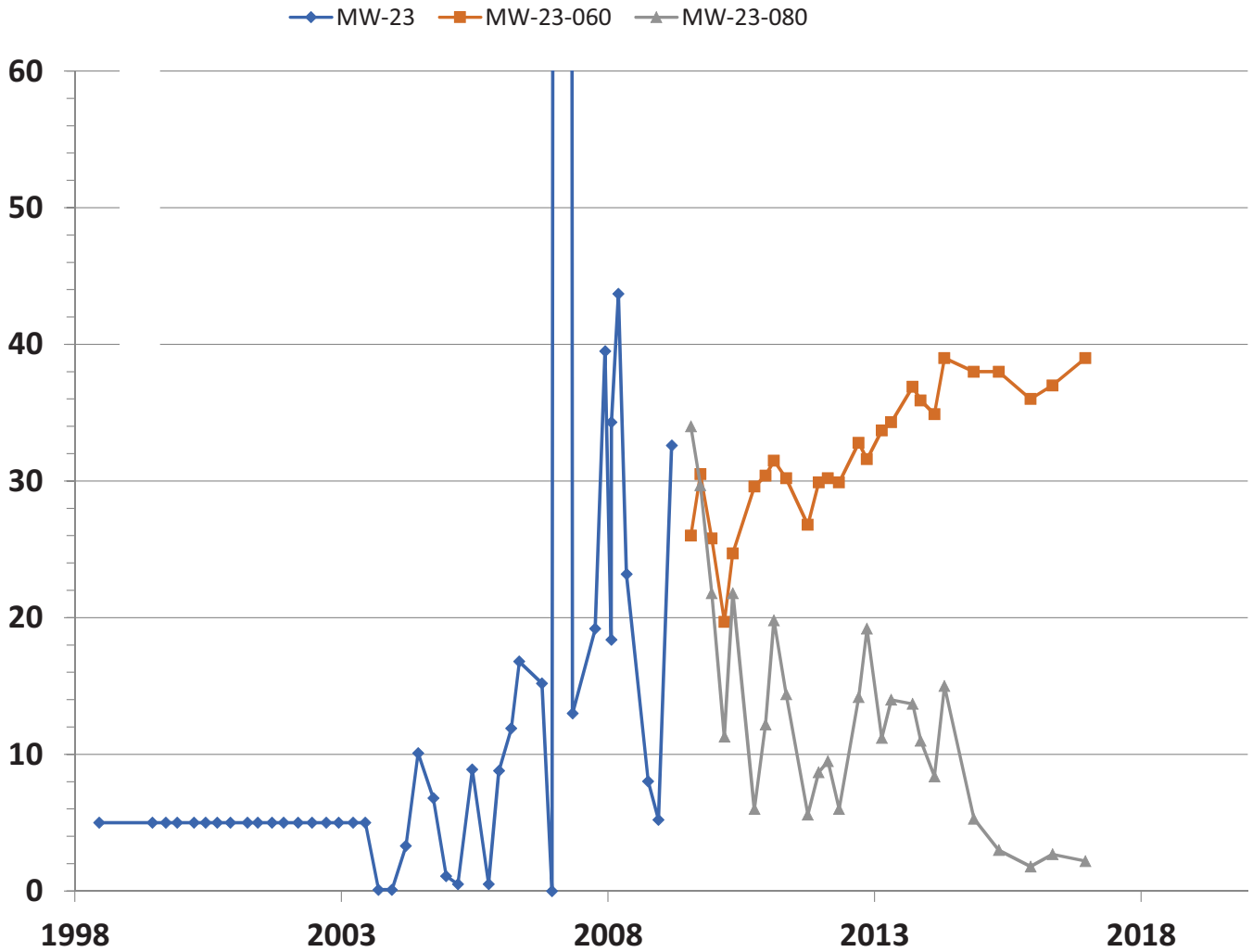
APPROVED BY: Dan Selaices

WELL DIAGRAM	DEPTH feet	SAMPLES	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
<p>4" PVC Screen 0.020-Inch slot</p> <p>4" Sch. 80 PVC Casing</p> <p>Cement/Bent Grout</p> <p>Colorado 10x20 Sand</p> <p>Bentonite</p>	<p>0</p> <p>10</p> <p>20</p> <p>30</p> <p>40</p> <p>50</p> <p>60</p>			<p>GP</p>	<p>sandy GRAVEL: light to medium gray; (till). RED FANGLOMERATE. appears to be a cemented sandy GRAVEL: pale reddish-brown to moderate reddish-brown; hard; dry.</p>



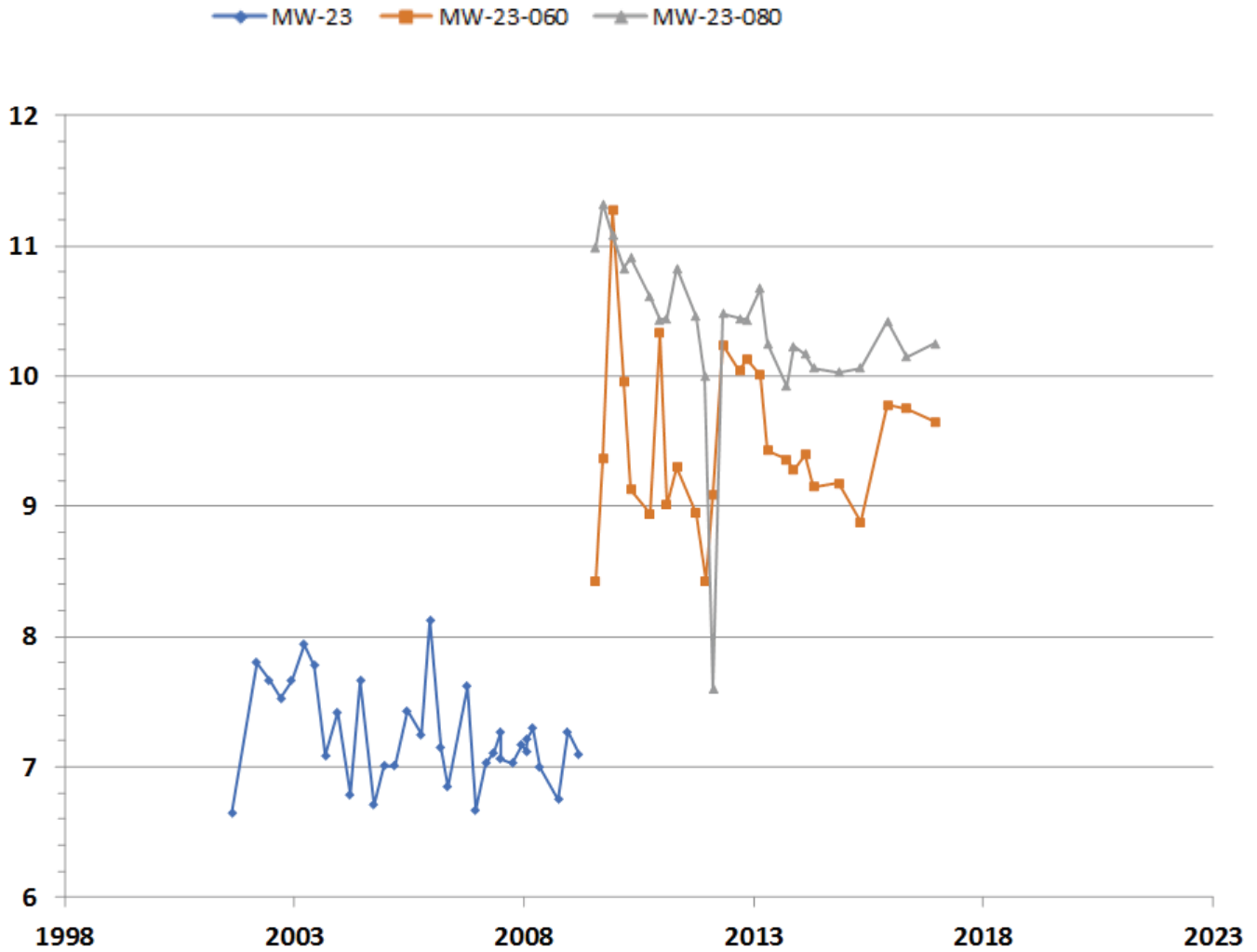
WELL DIAGRAM	DEPTH feet	SAMPLES	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
 <p>4" PVC Screen 0.020-inch slot</p> <p>Colorado 10x20 Sand</p>	80 90 100 110 120 130 140 150				RED FANGLOMERATE continued. Total depth of borehole is 80 feet.

Attachment 2
Hexavalent Chromium Cr(VI)
Concentrations vs. Time at MW-23 Location



Attachment 2. Hexavalent Chromium Cr(VI)
 Concentration vs. Time at MW-23 Location
 MW-23 pH Profiles
 PG&E Topock Compressor Station

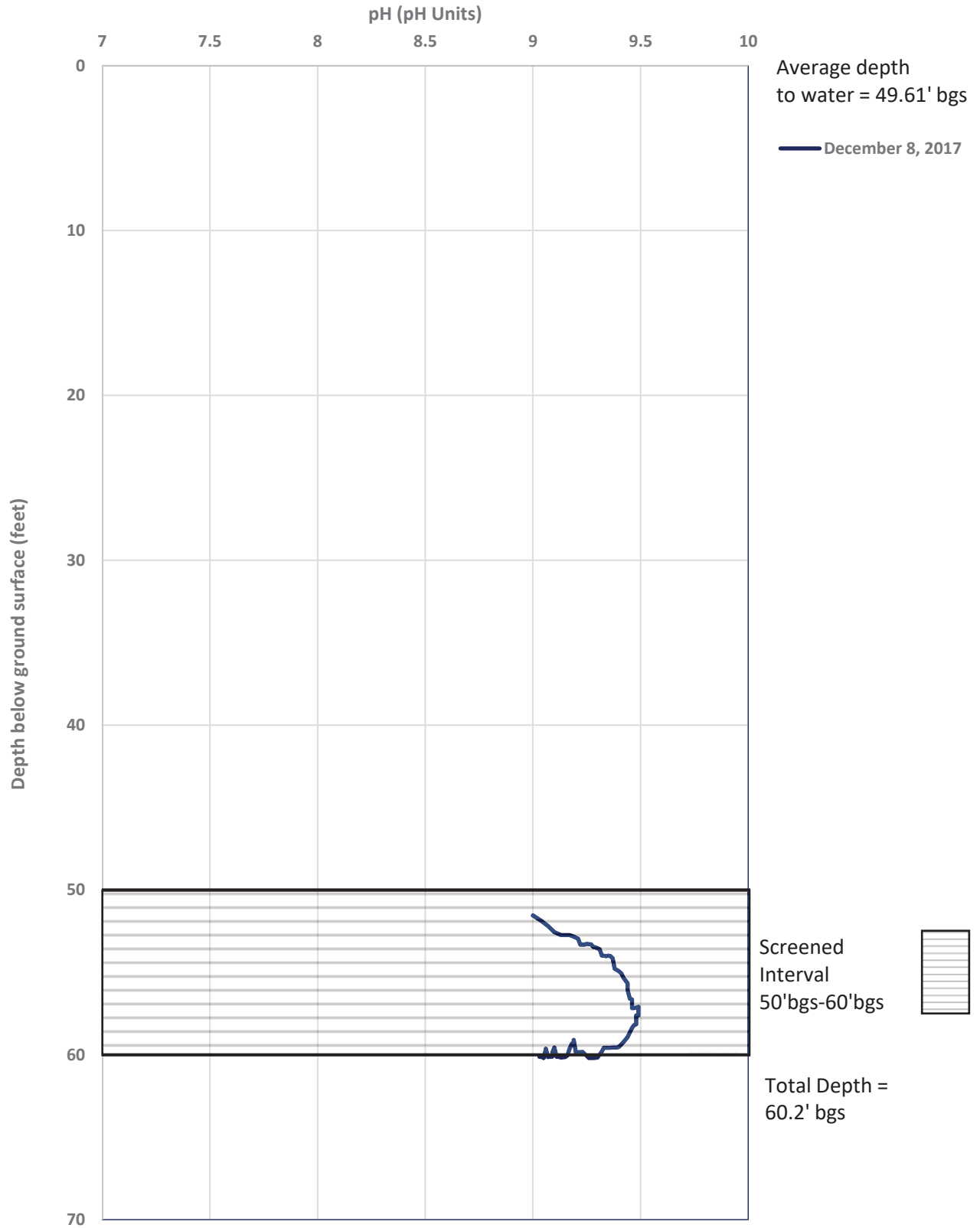
Attachment 3
pH Measurements vs. Time
at MW-23 Location



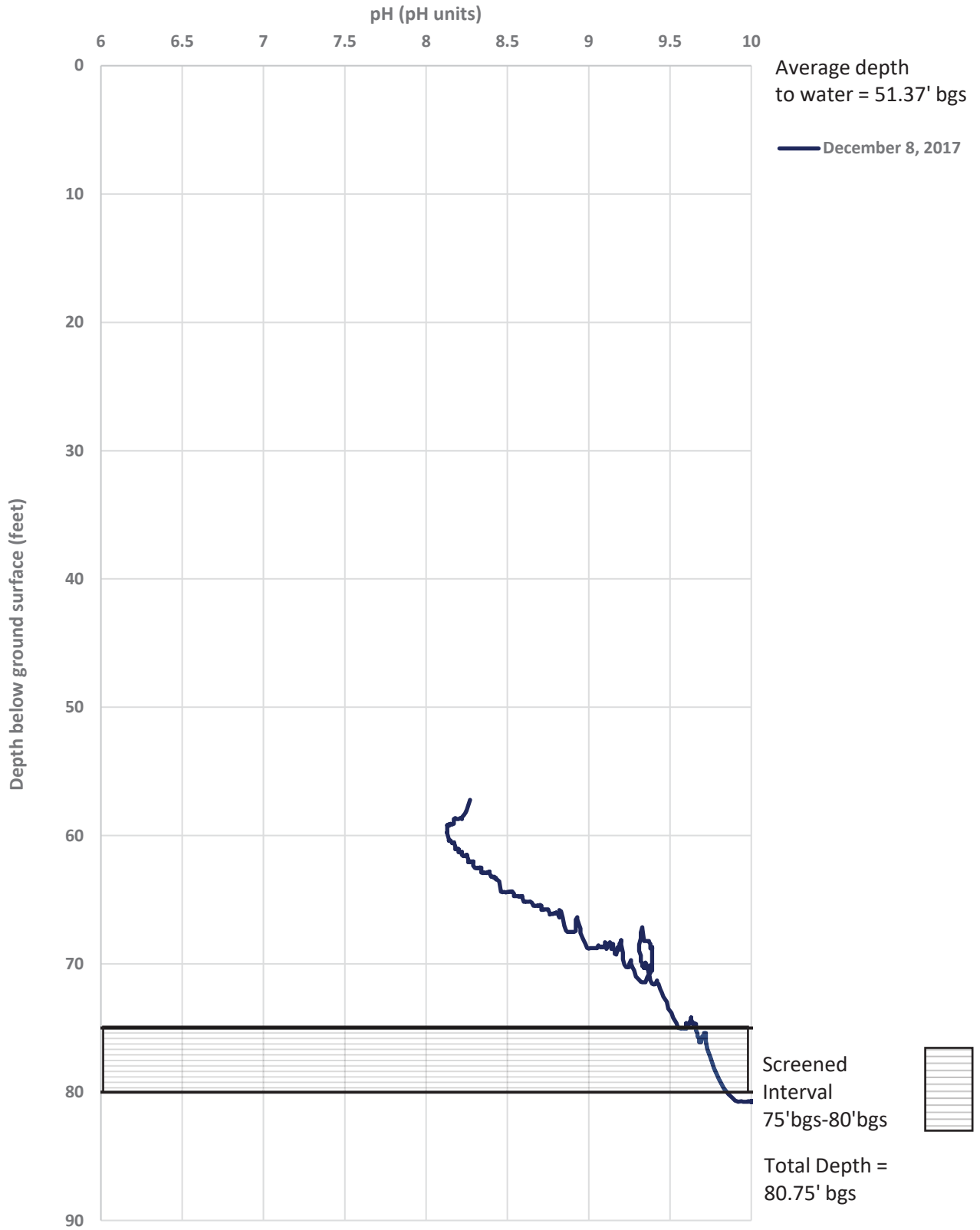
Attachment 3.
 pH Measurements vs. Time
 at MW-23 Location
 MW-23 pH Profiles
 PG&E Topock Compressor Station

Attachment 4
MW-23-060 and MW-23-080
pH vs. Depth Profiles

pH vs. Depth Below Ground Surface (bgs) for Well MW-23-060

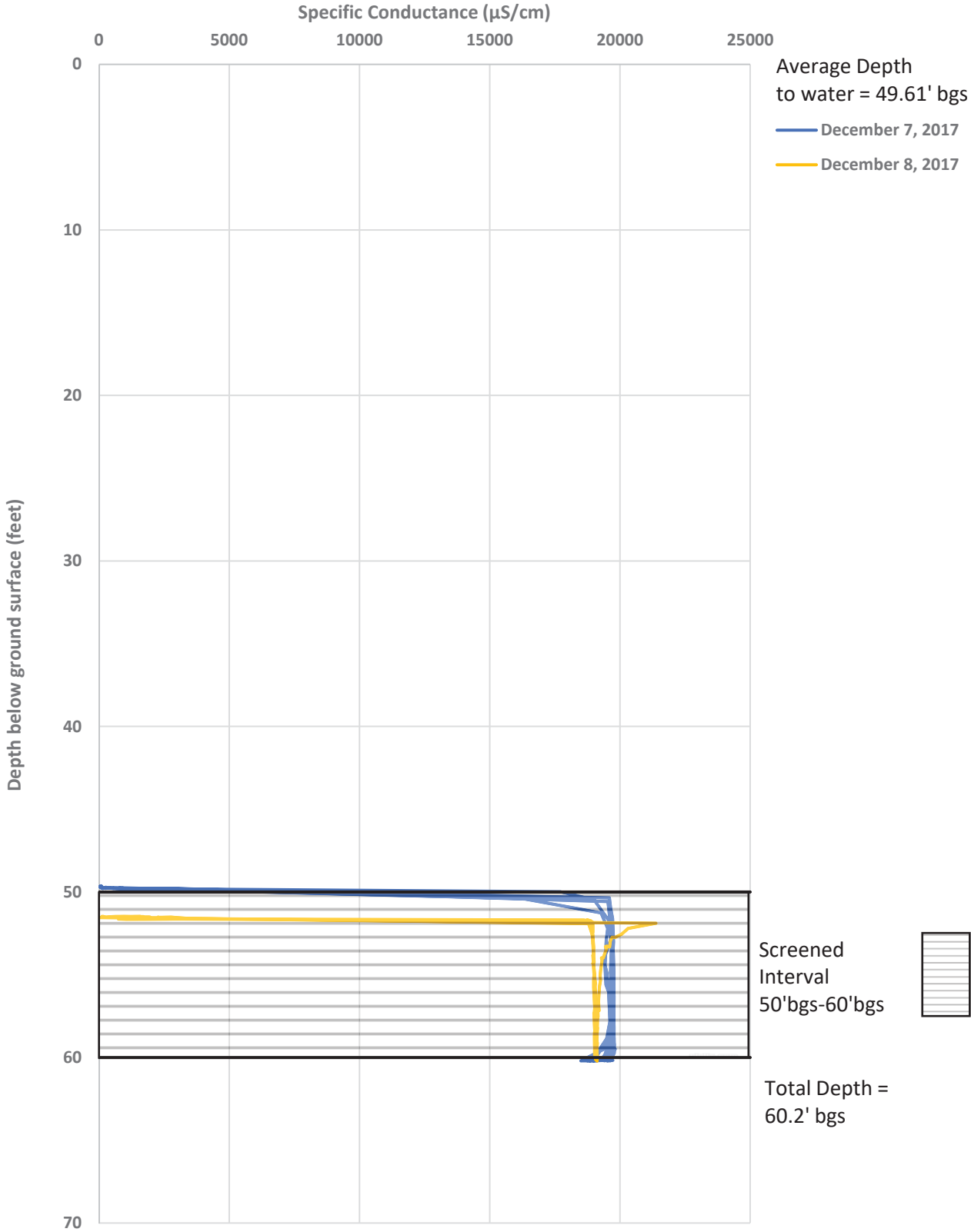


pH vs. Depth Below Ground Surface (bgs) for Well MW-23-080



Attachment 5
MW-23-060 and MW-23-080
SC vs. Depth Profiles

Specific Conductance vs. Depth below ground surface (bgs) for Well MW-23-060



Specific Conductance vs. Depth below ground surface (bgs) for Well MW-23-080

