

HGL Update
Fort Ord Operable Unit (OU) – 1 On-Post Groundwater Remediation
Marina, California
1:30 p.m., 7 August 2013

1. Groundwater Remediation System Update

The Northwest Treatment System (NWTS) operated continuously from 18 July 2013 through 6 August 2013. Extraction wells EW-OU1-60-A, EW-OU1-66-A, and MW-OU1-87-A operated continuously during this period with total pumping averaging 20.8 gallons per minute. Since system startup in 2006, the NWTS has pumped approximately 199 million gallons of groundwater and removed approximately 6.0 pounds (0.49 gallon) of total volatile organic compounds, primarily trichloroethene (TCE). An estimated 0.04 pound of TCE has been removed since the NWTS 27 March 2013 sampling event.

On 26 June 2013 HydroGeoLogic, Inc. (HGL) collected samples from the following extraction well and two monitoring wells:

MW-OU1-87-A

MW-OU1-61-A

MW-OU1-88-A

2. Long Term Monitoring Update

Unvalidated sampling results from the June 2013 sampling event are presented in attached Tables 1A and 1B for extraction well MW-OU1-87-A. Figure 2 shows the TCE concentration contours based on the unvalidated June 2013 data. The attached TCE concentration figure will be updated after the validated results from the 26 June 2013 sampling are received and reviewed.

As shown on the attached Figure 1, groundwater concentrations in the June 2013 samples exceeded the TCE Aquifer Cleanup Level (ACL) only in monitoring wells MW-OU1-61-A and MW-OU1-88-A (well identification highlighted in yellow). The latter well remains slightly above the ACL, decreasing from 6.8 micrograms per liter ($\mu\text{g/L}$) in March 2013 to 5.6 $\mu\text{g/L}$ in the June 2013 results. MW-OU1-61-A, the only well exceeding the ACL on the northwest boundary, decreased from 13 $\mu\text{g/L}$ in March 2013 to 7.4 $\mu\text{g/L}$ in the June 2013 results. The observed TCE concentration trend in wells MW-OU1-61-A and MW-OU1-88-A is shown on Figures 1a and 1b.

The TCE concentration in well MW-OU1-87-A, the only extraction well that exceeded the ACL in recent sampling results, dropped below the ACL in March 2013 for the first time since sampling began in 2006. The TCE concentration at this well in the June 2013 results further decreased to 4.4 $\mu\text{g/L}$ (see Table 1A).

The first quarter 2013 groundwater analytical results showed significant improvements in OU-1 groundwater quality. Consequently, the regulatory agencies (U.S. Environmental Protection Agency [EPA], California Department of Toxic Substances Control [DTSC], and Central Coast California Regional Water Quality Control Board [RWQCB]) agreed during the March 2013 Base Closure Team (BCT) meeting that the network of wells to be included in the September 2013 sampling event be determined after reviewing the June analytical results. Based on the continued decrease seen in TCE concentration and the fact that these concentrations are approaching the ACL, HGL recommends that the September sampling schedule be modified as shown in Table 3 and on Figure 2. The recommended September sampling includes the extraction wells along the northwest boundary and extraction wells MW-OU1-87-A and EW-OU1-71-A in the central Fort Ord Natural Reserve (FONR). Selected monitoring wells in the central FONR, MW-OU1-61-A on the northwest boundary, and the off-post wells are also recommended for sampling in September. The proposed sampling modifications will

provide additional data to confirm that the OU-1 groundwater ACLs have been met in the event that the September sampling results show that TCE decreases below 5 $\mu\text{g/L}$ in wells MW-OU1-61-A and MW-OU1-88-A.

3. Report Submittals

All scheduled submittals have been made for primary and secondary deliverables. The status of submitted and anticipated reports for 2012 and 2013 is summarized in Table 2. The groundwater sampling report for the 2013 first quarter monitoring report was distributed 1 July 2013. HGL is also updating the treatment system Operations and Maintenance Manual to describe changes made to system operation and equipment since 2010. The revised manual will be submitted to the Army in mid-August.

4. Discussion Agenda

(A) Weed Control

HGL renewed the agreement with the University of California Santa Cruz (UCSC) to perform weed control in selected portions of the FONR in 2013. The number of sites to be addressed is based on the results of previous monitoring and the habitat types observed during the Army/UCSC field inspection on 28 March 2013. Weed control activities began in April and are continuing.

(B) Rare Plant Survey

The 2013 rare plant survey was conducted from 12 April through 16 April 2013.

Action Items:

Ongoing:

- Submit draft minutes for previous BCT meeting(s) — draft June and July meeting minutes were submitted on 1 July and 31 July, respectively. To date, EPA and RWQCB stated that the draft minutes are approved as submitted.
- Submit final minutes for previous BCT meeting(s) (through May 2013) — awaiting DTSC comment or approval of draft minutes.
- Submit draft minutes for current BCT meeting.

**Fort Ord HTW BCT Meeting
Marina, California
07 August 2013**

ATTACHMENT 1

Reference Tables and Figures

Table 1A
TCE in OU-1 FONR Groundwater Remediation System – Performance Monitoring
BCT Meeting for Former Fort Ord – 7 August 2013

Began: Date	FONR Extraction Well (listed from south to north)					Boundary Extraction Well (from west to east)				NWTS							
	Nov-10	Oct-07				Jul-06				INFLUENT	MIDPOINT	EFFLUENT					
	IW-10	MW-87	EW-71	MW-85	MW-46AD	EW-63	EW-60	EW-66	EW-62								
TCE (µg/L)																	
11/9/07	Used as monitoring well until pump installed in October 2010. Pumping began 03 November 2010.	16	13	19	14	ND	ND	1.7	ND	11	ND	ND					
1/18/08		11	11	8.9	8.2	ND	ND	1.2	ND	6.0	ND	ND					
3/18/08		11	14	6.7	5.8	ND	0.29	1.5	ND	5.6	ND	ND					
5/27/08		9.7	18	2.5	6.1	ND	ND	1.8	ND	3.9	ND	ND					
7/21/08		9.1	14	4.4	3.4	ND	0.78	1.4	ND	3.6	ND	ND					
9/29/08		9.3	15	4.3	2.9	J	ND	0.90	J	1.7	J	ND	3.8	J	0.19	J	ND
12/1/08		5.8	11	2.6	1.6	ND	0.82	0.91	ND	2.7	0.35	J	ND				
1/26/09		5.9	10	2.2	1.2	ND	0.48	J	0.78	ND	2.4	ND	ND				
3/9/09		5.8	9.9	2.1	1.2	ND	0.95	0.86	ND	2.7	ND	ND					
6/11/09		6.9	11	2.4	1.5	ND	0.88	1.7	ND	2.6	0.14	J	ND				
9/15/09		6.8	9.4	1.7	0.78	ND	inactive	1.1	0.036	J	2.3	0.35	J	ND			
12/14/09		6.9	7.5	0.84	not sampled	not sampled	inactive	0.94	not sampled	2.3	0.65	J	ND				
3/22/10		7.2	8.5	0.62	0.55	inactive	ND	0.90	inactive	2.3	ND	ND					
6/21/10		7.4	6.5	0.90	0.40	J	inactive	0.86	0.58	inactive	2.1	ND	ND				
9/20/10		7.7	6.6	0.83	0.35	J	discontinued	0.63	0.49	J	inactive	2.3	not sampled	ND			
12/16/10		5.2	6.9	5.2	0.58	0.28	J	discontinued	0.72	0.42	J	inactive	2.6	0.18	J	ND	
3/7/11		5.1	6.0	4.6	0.55	0.60	discontinued	0.87	0.42	J	inactive	2.5	0.59	ND			
6/7/11		4.2	6.1	4.0	0.78	0.63	discontinued	0.76	0.36	J	inactive	2.6	1.0	ND			
9/20/11		4.5	6.2	4.2	1.10	0.38	J	discontinued	0.57	0.36	J	inactive	2.5	1.7	ND		
12/7/11		3.8	5.1	3.7	not sampled		discontinued	inactive	0.27	J	inactive	1.8	2.1	0.13	J		
3/15/12	3.7	5.5	3.8	0.70	0.23	J	discontinued	inactive	0.38	J	inactive	0.81	0.32	J	ND		
9/25/12	--	5.3	4.4	--	--	discontinued	inactive	0.19	J	inactive	1.8	0.72	J	ND			
1/8/13	--	5.4	--	--	--	discontinued	ND	0.19	J	inactive	1.54	--	ND				
3/27/13	--	4.8	--	--	--	discontinued	ND	0.23	J	inactive	1.48	--	ND				
6/26/13	--	4.4	--	--	--	discontinued	ND	--	J	inactive	--	--	ND				
		Italics (if used) indicate data not yet validated					Bold font indicates concentration > ACL										
Notes:																	
ACL - aquifer cleanup level	-- - Not sampled																
µg/L - micrograms per liter																	
J - Data qualified as estimated	Blue font indicates the concentration is calculated using the weighted average of the active pumping wells.																
ND - nondetect																	
TCE - trichloroethene																	
FONR - Fort Ord Natural Reserve																	
NWTS - Northwest Treatment System																	

Table 1B
cis-1,2-DCE in OU-1 FONR Groundwater Remediation System – Performance Monitoring
BCT Meeting for Former Fort Ord – 7 August 2013

Began:	FONR Extraction Well (listed from south to north)					Boundary Extraction Well (from west to east)				NWTS								
	Nov-10	Oct-07				Jul-06				INFLUENT	MIDPOINT	EFFLUENT						
Date	IW-10	MW-87	EW-71	MW-85	MW-46AD	EW-63	EW-60	EW-66	EW-62									
cis-1,2-DCE (µg/L)																		
11/09/07	Used as monitoring well until pump installed in October 2010. Pumping began 03 November 2010.	1.9	1.6	2.3	1.70	ND	ND	ND	ND	1.3	ND	ND						
01/18/08		1.20	1.40	1.00	1.20	ND	ND	0.11	ND	0.66	ND	ND						
03/18/08		1.20	1.50	0.74	0.63	ND	ND	ND	ND	0.59	0.11	ND						
05/27/08		0.88	2.10	0.26	0.74	ND	ND	ND	ND	0.36	0.21	ND						
07/21/08		0.80	1.50	0.52	0.37	ND	ND	ND	ND	0.41	0.34	ND						
09/29/08		0.99	1.60	0.54	0.30	ND	ND	0.13	ND	0.42	0.42	0.12						
12/01/08		0.67	1.30	0.33	0.21	J	ND	ND	ND	ND	0.27	J	0.37	J	0.19	J		
01/26/09		0.63	1.20	0.29	J	0.12	J	ND	ND	ND	ND	0.26	J	0.24	J	ND		
03/09/09		0.62	1.20	0.29	J	0.13	J	ND	ND	ND	ND	0.23	J	0.26	J	ND		
06/11/09		0.71	1.10	0.30	J	0.13	J	ND	ND	0.14	J	ND	0.24	J	0.28	J	ND	
09/15/09		0.80	1.00	0.22	J	0.08	J	ND	inactive	0.03	J	ND	0.22	J	0.37	J	0.03	J
12/14/09		0.67	0.65	0.10	J	not sampled		not sampled	inactive	ND	J	not sampled	0.21	J	0.30	J	0.11	J
03/22/10		0.67	0.79	ND		ND		inactive	ND	ND		inactive	0.20	J	0.11	J	0.13	J
06/21/10		0.67	0.53	0.14	J	ND		inactive	ND	ND		inactive	0.20	J	0.23	J	ND	
9/20/10		0.66	0.46	J	ND	ND		discontinued	ND	ND		inactive	0.23	J	not sampled		ND	
12/16/10		0.55	0.66	0.35	J	ND	J	ND	discontinued	ND	ND	inactive	0.27	J	0.28	J	ND	
3/7/11	0.37	J	0.52	0.28	J	0.11	J	ND	discontinued	ND	ND	inactive	0.23	J	0.30	J	ND	
6/7/11	0.35	J	0.55	0.29	J	ND		ND	discontinued	ND	ND	inactive	0.18	J	0.31	J	0.15	J
9/20/11	0.25	J	0.46	J	0.21	J	ND	ND	discontinued	ND	ND	inactive	0.17	J	0.19	J	0.30	J
12/7/11	0.27	J	0.48	J	0.19	J	not sampled		discontinued	inactive	ND	inactive	0.16	J	0.17	J	0.23	J
3/15/12	0.15	J	0.40	J	0.22	J	0.15	J	ND	discontinued	inactive	ND	inactive	ND	0.24	J	ND	
9/25/12	--		0.39	J	0.23	J	--		--	discontinued	inactive	ND	inactive	ND	0.24	J	ND	
1/8/13	--		0.35	J	--		--		--	discontinued	ND	ND	inactive	0.12	--		--	
3/27/13	--		0.34	J	--		--		--	discontinued	ND	ND	inactive	0.12	--		--	
6/26/13	--		0.31	J	--		--		--	discontinued	--	--	inactive	--	--		--	
Italics (if used) indicate data not yet validated					Bold font indicates concentration > ACL													
Notes:																		
ACL - aquifer cleanup level	--- Not sampled																	
µg/L - micrograms per liter																		
J - Data qualified as estimated	Blue font indicates the concentration is calculated using the weighted average of the active pumping wells.																	
ND - nondetect																		
DCE - dichloroethene																		
FONR - Fort Ord Natural Reserve																		
NWTS - Northwest Treatment System																		

Table 2
Current Deliverable Schedule
BCT Meeting for Former Fort Ord, Marina, California – 07 August 2013

Deliverable Title	Submittal Due	Review Comments Due	Status/Remarks
<i>Primary Deliverables</i>			
Draft 2013 Annual and 3rd Quarter Groundwater Monitoring Report			Samples to be collected in September
<i>Secondary Deliverables</i>			
None scheduled			
<i>Completed Recent Submittals</i>			
Final Memorandum for Record for Optimizing Remediation Pumping	March 2012	February 2012	Accepted as final during July 2012 BCT meeting.
Final IW-OU1-10-A Construction Report	March 2012	NA	Submitted 30 March 2012.
Final Operable Unit 1 Well Destruction Report	March 2012	NA	Submitted 30 March 2012.
Draft Five Year Review Report	March 2012	May 2012	Army submitted 30 March 2012.
Draft 2011 Annual and Third Quarter Groundwater Monitoring Report	May 2012	July 2012	Submitted 17 May 2012.
2012 First Quarter Groundwater Monitoring Report	May 2012	August 2012	Submitted 29 May 2012.
Draft 2007 Annual & Fourth Quarter Groundwater Monitoring Report	June 2012	August 2012	Submitted 13 June 2012.
Draft Final Five Year Review Report	July 2012	September 2012	Submitted to Army 26 June 2012.
Final 2011 Annual and Third Quarter Groundwater Monitoring Report	July 2012	NA	Submitted 25 July 2012. No agency comments.
IW-OU1-74-A Vandalism Report	July 2012	NA	Submitted 25 July 2012.
Final 2007 Annual and 4th Quarter Groundwater Monitoring Report	September 2012	NA	Submitted 26 September 2012. No comments.
Final Five Year Review Report	September 2012	NA	Text for final version sent to Army on 08 August 2012
Draft 2012 Annual and 3rd Quarter Groundwater Monitoring Report	December 2012	March 2013	Submitted 31 December 2012.
Final 2012 Annual and 3rd Quarter Groundwater Monitoring Report	March 2013	NA	Submitted 21 March 2013.
2013 First Quarter Groundwater Monitoring Report	June 2013	August 2013	Submitted 1 July 2013

Table 3
Proposed OU-1 Sampling Schedule for 2013

Sample Point	Location	Original March	Revised March	Revised June*	Current September	Recommended September
NWTS-Influent	Treatment Plant	x	---	---	TBD	--
NWTS-Midpoint	Treatment Plant	x	---	---	TBD	--
NWTS-Effluent	Treatment Plant	x	x	---	x	x
EW-OU1-60-A	NW Boundary	x	x	---	TBD	x
EW-OU1-66-A	NW Boundary	x	x	---	TBD	x
MW-OU1-87-A	Central FONR	---	x	x	x	x
EW-OU1-71-A	Central FONR	---	---	---	TBD	x
MW-OU1-70-A	NW Boundary	x	x	---	x	x
MW-OU1-69-A2	NW Boundary	x	x	---	x	x
MW-OU1-58-A	NW Boundary	x	x**	---	TBD	--
MW-OU1-57-A	NW Boundary	x	x**	---	TBD	--
MW-OU1-61-A	NW Boundary	x	x	x	x	x
EW-OU1-72-A	Central FONR	x	---	---	TBD	x
MW-OU1-86-A	Central FONR	x	---	---	TBD	Replace with MW-OU1-50-A
PZ-OU1-49-A1	Central FONR	x	---	---	TBD	x
MW-OU1-88-A	Central FONR	x	x	x	x	x
MW-OU1-26-A	Central FONR	---	---	---	x	x
PZ-OU1-10-A1	Central FONR	---	---	---	TBD	x
EW-OU1-52-A	Central FONR	---	---	---	TBD	x

* No sampling was originally scheduled for June 2013. This is an additional event.

** As agreed at January 2013 Base Closure Team Meeting, these samples were collected in January.

--- Not sampled
x Sample collected
TBD To be determined
FONR Fort Ord Natural Reserve
NW Northwest

Figure 1a: TCE Concentrations in MW-OU1-50-A & MW-OU1-61-A

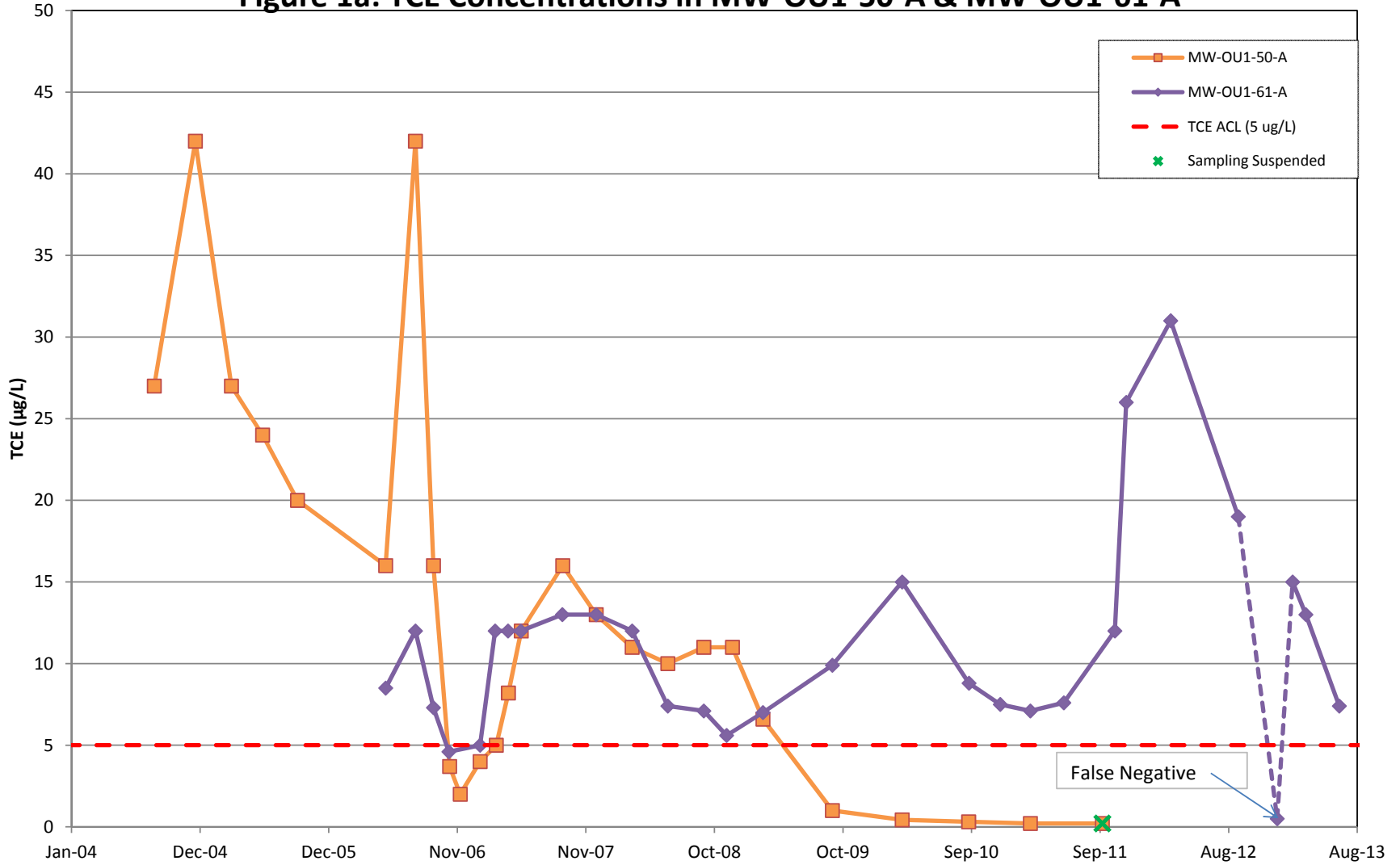


Figure 1b:TCE Concentrations in MW-OU1-88-A

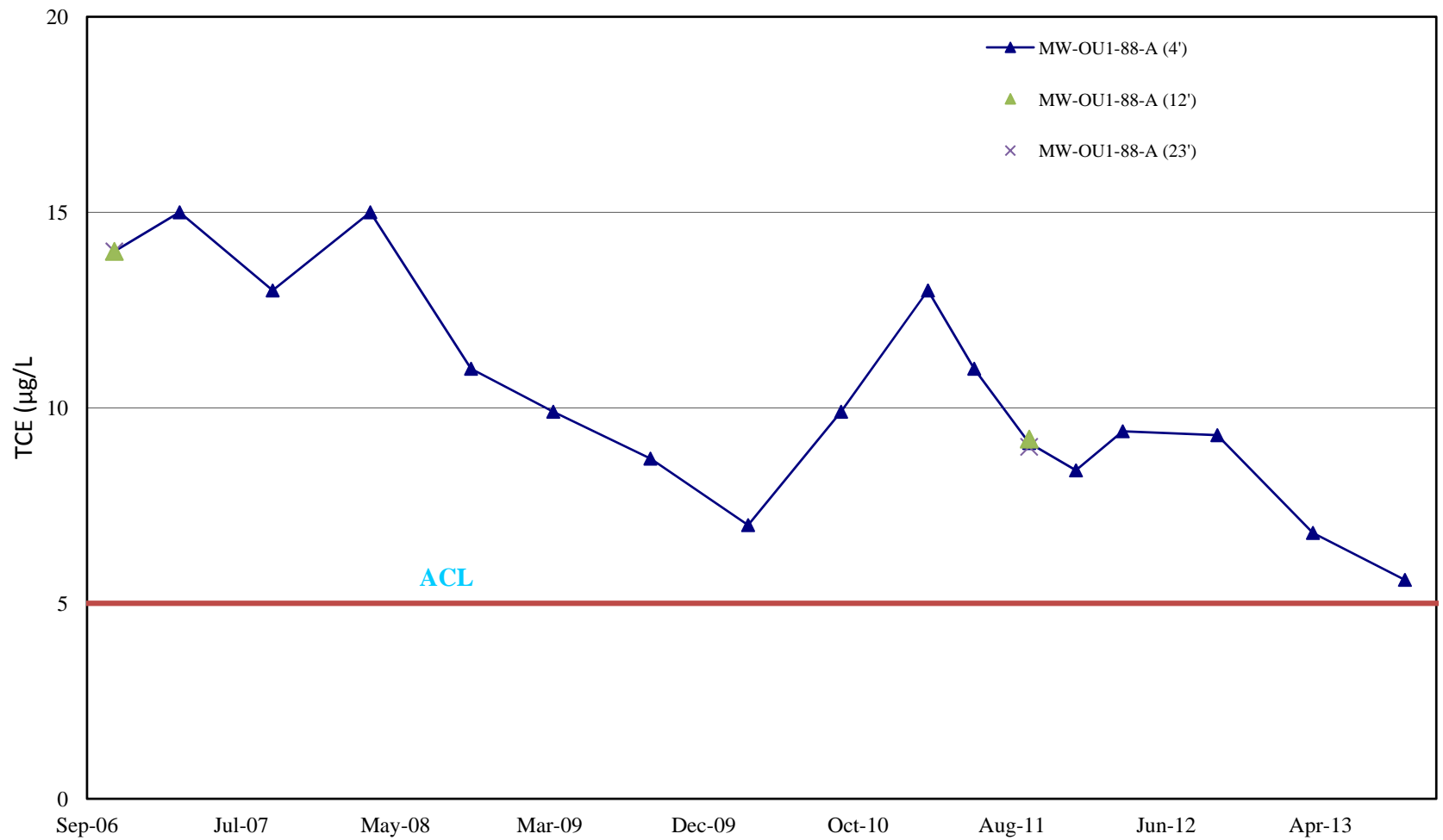
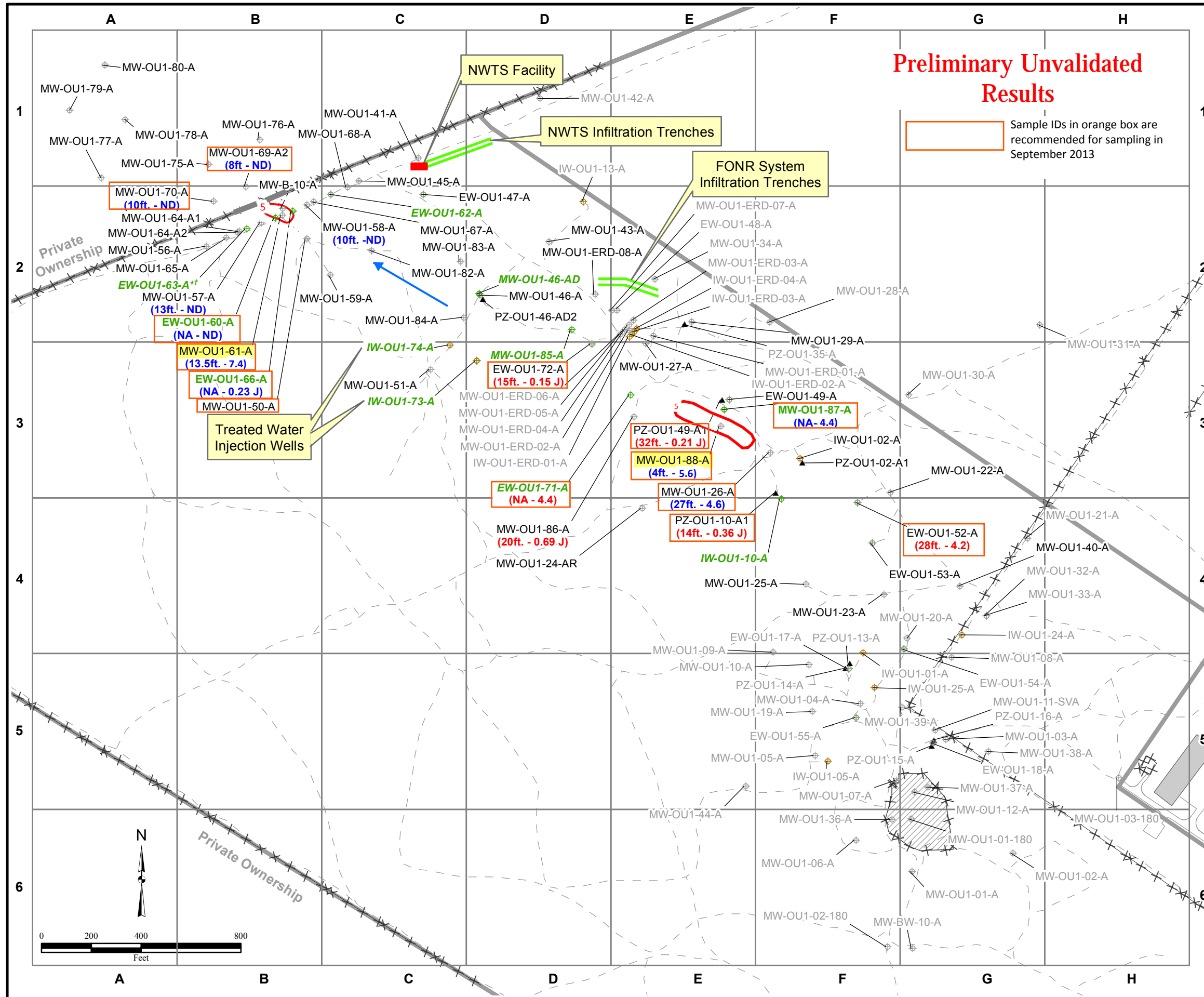


Figure 2
OU-1 FONR A-Aquifer
TCE Concentration in Groundwater
June 2013
Former Fort Ord, CA



Preliminary Unvalidated Results

Sample IDs in orange box are recommended for sampling in September 2013

Legend

- ⊕ Well
- ⊕ Extraction Well
- ⊕ Injection Well
- ▲ Piezometer or 2-Inch Well
- Groundwater Flow Direction
- ⊕ MW-OU1-21-A Well Destroyed
- MW-OU1-88-A Location with June 2013 TCE Concentrations at or above ACL (5 µg/L)
- MW-OU1-57-A Well ID
- (13ft. - ND) September 2012 TCE Result (µg/L)
- (13.5ft. - 13) Sample Elevation (feet above mean sea level)
- (13.5ft. - 13) 2013 TCE Result (µg/L)
- (13.5ft. - 13) Sample Elevation (feet above mean sea level)
- 5 TCE contour based on March 2013 Data
- - - Trail/Unimproved Road
- × Fence
- Treated Water Infiltration Trench
- Property Boundary
- Building
- ▨ Former Fire Drill Area

Notes:
 Units of TCE concentration are in micrograms per liter.
 FONR = Fort Ord Natural Reserve
 NWTS = Northwest Treatment System
 ACL = Aquifer Cleanup Level
 ND = nondetect
 NA = Depth is not applicable - sample is from pumping well
 µg/L = micrograms per liter
 Wells shown with an asterisk were not used to develop contour boundaries.
 Wells for which no data are posted were not sampled.
 J = Estimated value
 Green font indicates extraction or injection well.
 Italicized font shows pumping suspended.
 † = Disconnected extraction well. No longer operable.

\\Gst-srv-01\hglgis\F1_Ord_MSIW\GWMR_Quarterly_2013-Q1\08)TCE_2013-03.mxd
 6/3/2013 CNL
 Source: HGL

