

Former Fort Ord Operable Unit 2 Data and Status

HTW BCT, February 2, 2018

Table 1: OU2 GWTP Statistics as of January 26, 2018

Monthly Statistics	Volume Treated (gallons)	Average Flow (gallons per minute)	Percent of Time Online	COC Mass Removed (pounds)
January 2018	21,996,449	493	100	1.6
Total since October 1995	7.255 Billion			829

January 2018 Key Events for OU2

- EW-OU2-09-180 offline, variable frequency drive (VFD) replacement in progress.

February 2018 Key Events for OU2

- Replace VFD in EW-OU2-09-180
- Coordinate with JV for treated water use.
- Continue to prepare for GWTP decommissioning.
- Coordinate with Sea Haven developer for extraction well elevation adjustments: EW-OU2-08-A, EW-OU2-09-A, and EW-OU2-10-A.

Table 2: January 2018 – OU2 Analytical Results at TS-OU2-INJ

COC	Discharge Limit (µg/L)	Analytical Results (µg/L)
		Not Sampled
1,1-dichloroethane (1,1-DCA)	5.0*	NS
1,2-dichloroethane (1,2-DCA)	0.5	NS
1,2-dichloropropane (1,2-DCP)	0.5	NS
Benzene	0.5	NS
Carbon tetrachloride (CT)	0.5	NS
Chloroform	2.0*	NS
Cis-1,2-dichloroethene (cis-1,2-DCE)	6.0*	NS
Methylene Chloride	0.5	NS
Tetrachloroethene (PCE)	0.5	NS
Trichloroethene (TCE)	0.5	NS
Vinyl chloride (VC)	0.1	NS

Notes:

COC: chemical of concern

µg/L: micrograms per liter

ND: The analyte was not detected above the limit of detection (LOD).

NS: not sampled.

J: Estimated results below the limit of quantitation (LOQ).

TS-OU2-INJ: Injection point of compliance, the OU2 effluent pipeline.

*Discharge limits for low carbon affinity compounds were increased to the Aquifer Cleanup Level (ACL).

Results in **bold** and shaded are concentrations above the ACL

Results in *gray* are ND



Table 3. OU2 A-Aquifer Select Extraction/Monitoring Well Data

OU2 Hydraulic Zone ¹	Well Identification ²	Select COC Concentrations (µg/L)									
		3Q 2017					4Q 2017				
		TCE	PCE	1,1-DCA	1,2-DCA	VC	TCE	PCE	1,1-DCA	1,2-DCA	VC
ACL:		5.0	3.0	5.0	0.5	0.1	5.0	3.0	5.0	0.5	0.1
1	EW-OU2-16-A	3.0	2.9	7.3	2.2	0.73	4.1	3.0	9.0	3.3	1.1
1	MW-OU2-02-A	0.28 J	1.9	6.6	1.6	8.1	0.33 J	2.0	6.8	1.7	8.3
1	MW-OU2-73-A	ND (0.25)	0.48 J	6.3	1.1	11.4	ND (0.25)	0.87	8.5	1.5	11.6
1	MW-OU2-44-A	8.8	11.7	25.8	6.7	1.1	8.3	10.3	19.9	6.0	1.2
2	MW-OU2-27-A	0.12 J	4.3	0.28 J	ND (0.25)	ND (0.05)	ND (0.25)	2.8	0.23 J	ND (0.25)	ND (0.05)
3	EW-OU2-09-A	0.32 J	0.28 J	0.17 J	ND (0.25)	0.092	0.28 J	0.30 J	0.14 J	0.32 J	ND (0.05)
3	EW-OU2-10-A	2.1	1.0	1.1	1.1	0.10	2.2	1.2	0.92	0.96	ND (0.05)
3	EW-OU2-12-A	9.2	7.9	14.7	1.0	0.25	7.4	4.2	7.4	1.3	0.14
3	EW-OU2-13-A	8.6	2.3	2.5	4.3	ND (0.05)	7.9	2.5	2.1	4.0	ND (0.05)
3	MW-OU2-25-A	1.1	0.40 J	0.51	0.67	ND (0.05)	1.1	0.47 J	0.52	0.58	ND (0.05)
3	MW-OU2-75-A	1.9	3.1	4.1	ND (0.25)	ND (0.05)	2.7	4.8	5.1	ND (0.25)	ND (0.05)
3	MW-OU2-81-A	6.6	10.1	4.5	0.16 J	ND (0.05)	8.5	13.4	4.8	0.15 J	ND (0.05)
4	EW-OU2-02-A	0.40 J	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.05)	0.42 J	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.05)
4	EW-OU2-04-A	1.2	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.05)	1.6	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.05)
4	EW-OU2-05-A	4.0	0.18 J	0.26 J	ND (0.25)	ND (0.05)	4.6	0.24 J	0.25 J	ND (0.25)	ND (0.05)
4	EW-OU2-06-A	3.0	0.26 J	0.19 J	ND (0.25)	ND (0.05)	3.3	0.32 J	0.18 J	ND (0.25)	ND (0.05)
4	MW-OU2-04-A	4.4	0.80	0.35 J	0.15 J	ND (0.05)	4.2	0.70	0.34 J	0.13 J	ND (0.05)
4	MW-OU2-06-A	12.7	5.8	11.4	0.21 J	0.13	NS	NS	NS	NS	NS
4	MW-OU2-06AR	NS	NS	NS	NS	NS	1.6	0.46 J	0.15 J	0.18 J	ND (0.05)
4	MW-OU2-40-A	6.1	0.44 J	0.44 J	0.12 J	ND (0.05)	6.1	0.45 J	0.42 J	0.11 J	ND (0.05)
N/A	MW-OU2-08-A	5.0	5.4	21.5	0.84	0.36	7.2	6.3	24.6	0.59	0.41

Table 4. OU2 Upper 180-Foot Select Extraction/Monitoring Well Data

OU2 Hydraulic Zone ¹	Well Identification ²	TCE Concentration (µg/L)	
		3Q 2017	4Q 2017
		ACL:	
5	EW-OU2-01-180	8.5	11.3
5	MW-OU2-43-180	1.2	3.4
6	EW-OU2-03-180	8.9	9.8
6	MW-OU2-50-180	10.9	11.1
7	EW-OU2-06-180	6.7	6.5
7	MW-OU2-81-180	7.8	8.0
7	MW-OU2-44-180	17.2	18.5
9	MW-OU2-06-180R	2.8	NS
9	MW-OU2-06-180R2	NS	3.2

Notes:

ACL: Aquifer Cleanup Level
 COC: chemical of concern
 1,2-DCA: 1,2-dichloroethane
 TCE: trichloroethene
 PCE: tetrachloroethene
 1,1-DCA: 1,1-dichloroethane
 µg/L: micrograms per liter
 NS: not sampled
 ND: The analyte was not detected above the detection limit.
 J: Estimated result with a high (+) or low (-) bias.
¹ Hydraulic zones are identified in the Groundwater QAPP.
² Extraction wells not listed have met the QAPP decision rules to no longer operate.
 Results in **bold** and shaded are concentrations above the ACL
 Results in gray are ND



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City of Marina

SALINAS RIVER

RESERVATION RD

MAIN ST

MAIN PKWY

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 P:\8417190510_FortOrd\GIS\4Q17\OU2_GWTSR\Figure04_TCE1-COC_OU2-A_1704.mxd

EXPLANATION

- Monitoring Well with TCE Detection
- Extraction Well with TCE Detection
- Well ID - Bold When ACL Exceeded (* Indicates: Sample result not used for contouring)
- TCE Concentration (µg/L) and validation/lab qualifier. Bold when concentration exceeds the ACL.
- Monitoring Well with COC ACL Exceedance (not TCE)
- Extraction Well with COC ACL Exceedance (not TCE)
- Monitoring Well TCE Not Detected, and No Other COC ACL Exceedances
- Extraction Well TCE Not Detected, and No Other COC ACL Exceedances
- Monitoring Well Not Sampled This Quarter
- Extraction Well Not Sampled This Quarter

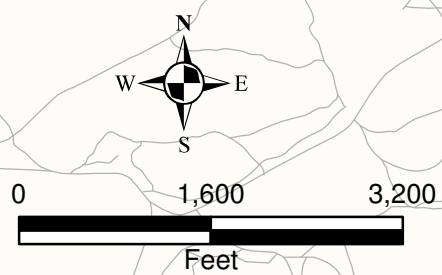
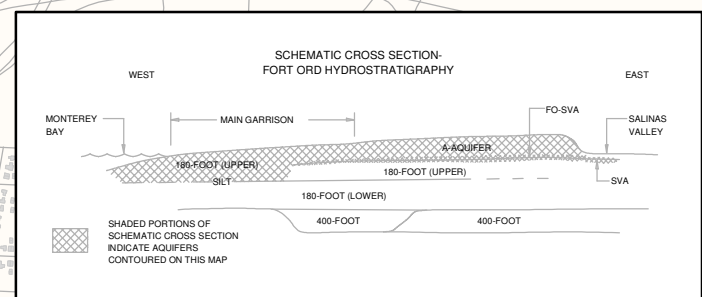
Chemical of Concern (COC) Aquifer Cleanup Level (ACL) Exceedance Contour in µg/L

- 5 Trichloroethene (TCE)
- 3 Tetrachloroethene (PCE)
- 5 1,1-Dichloroethane (1,1-DCA)
- 0.5 1,2-Dichloroethane (1,2-DCA)
- 0.1 Vinyl chloride (VC)

- Approximate Extent of Landfill Areas
- OU2 Landfill Areas B through F
 - Area A (clean closed)
 - Approximate Location of a Groundwater Divide
 - Roads
 - Facilities
 - Former Fort Ord Boundary

NOTES:

- (1) Samples were collected between December 4 and 7, 2017.
- (2) Contours are based on one interpretation of the data that were available at the time this report was prepared; other interpretations may be possible.
- (3) Contours based on highest value obtained from multiple bags where applicable.
- (4) Contours near wells not sampled this quarter are inferred from previous analytical data.



TCE CONCENTRATIONS AND OTHER COC ACL EXCEEDANCES
 A-AQUIFER
 Operable Unit 2
 Fourth Quarter 2017
 Groundwater Monitoring and Treatment System Report
 Former Fort Ord, California



Date: 1/2018 Project No. 8417190510

Figure 4

DRAFT

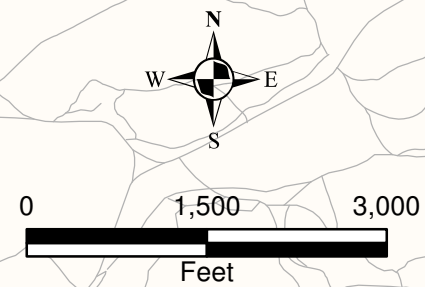
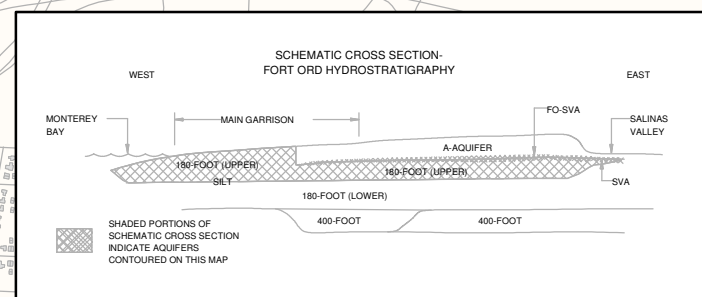
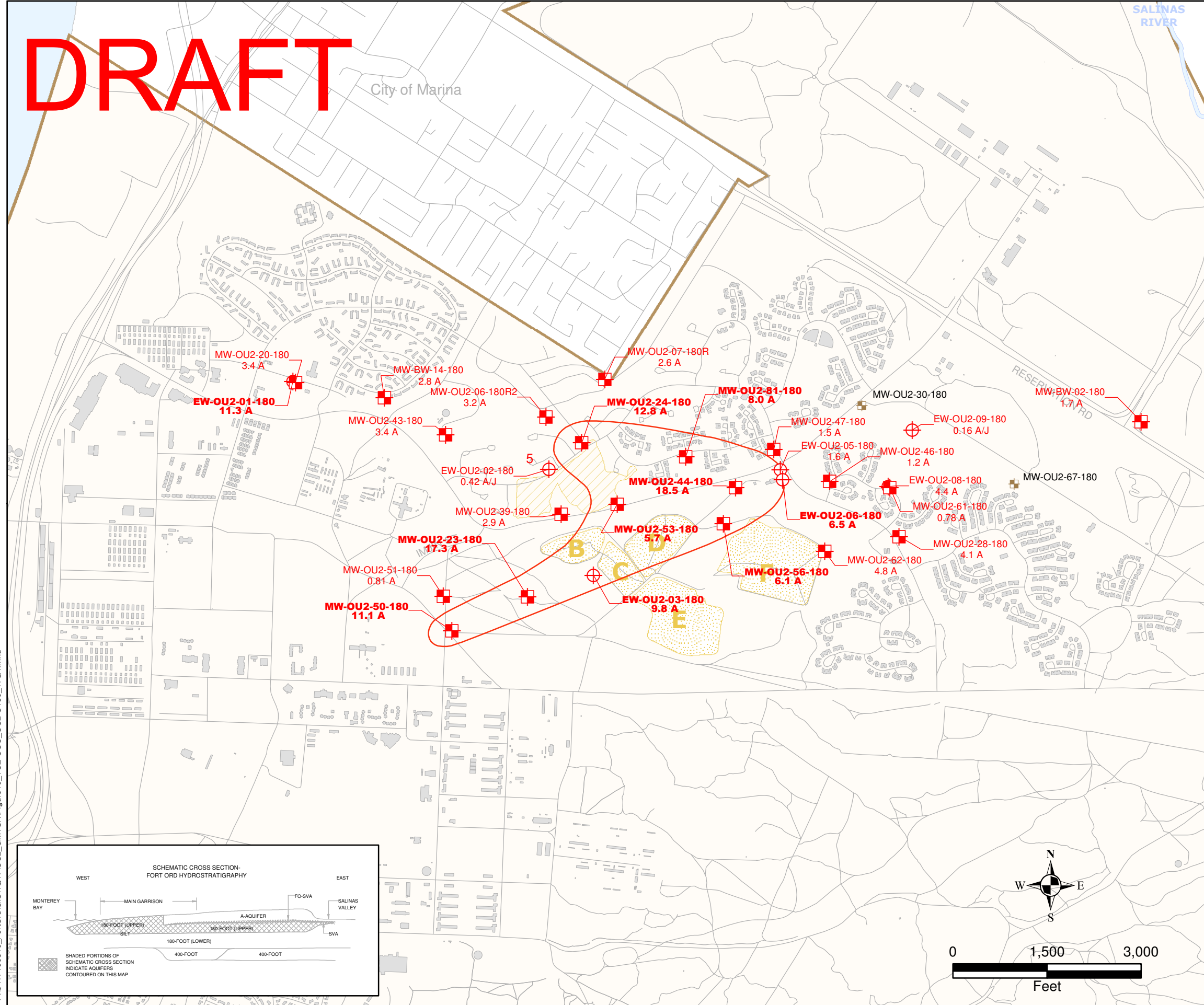
City of Marina

SALINAS RIVER

EXPLANATION	
	Monitoring Well with TCE Detection
	Extraction Well with TCE Detection
	Well ID - Bold When ACL Exceeded (* Indicates: Sample result not used for contouring)
	TCE concentration (µg/L) and validation/lab qualifier. Bold when concentration exceeds the ACL.
	Monitoring Well TCE Not Detected, and No Other COC ACL Exceedances
	Extraction Well TCE Not Detected, and No Other COC ACL Exceedances
	Monitoring Well Not Sampled This Quarter
	Extraction Well Not Sampled This Quarter

Chemical of Concern (COC) Aquifer Cleanup Level (ACL) Exceedance Contour in µg/L	
	5 Trichlorethene (TCE)
Approximate extent of Fort Ord Landfill Areas	
	OU2 Landfill Areas B through F
	Area A (clean closed)
	Roads
	Facilities
	Former Fort Ord Boundary

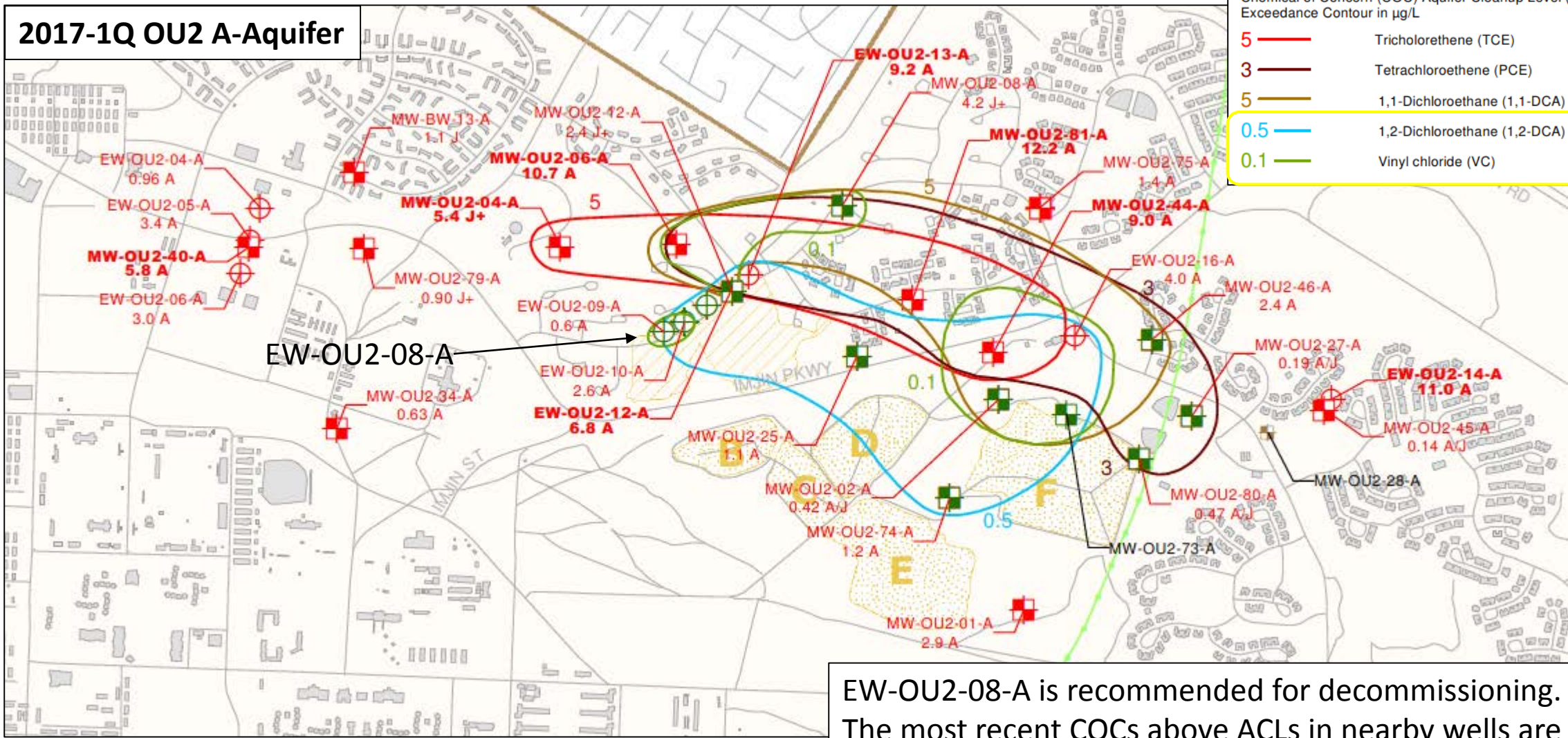
- NOTES:
- (1) Samples were collected between December 4 and 6, 2017.
 - (2) Contours are based on one interpretation of the data that were available at the time this report was prepared; other interpretations may be possible.
 - (3) Contours based on highest value obtained from multiple bags where applicable.
 - (4) Contours near wells not sampled this quarter are inferred from previous analytical data.



<p>TCE CONCENTRATIONS AND OTHER COC ACL EXCEEDANCES UPPER 180-FOOT AQUIFER Operable Unit 2 Fourth Quarter 2017 Groundwater Monitoring and Treatment System Report Former Fort Ord, California</p>		
Date: 1/2018	Project No. 8417190510	

Thursday, January 18, 2018 2:45:23 PM thomas.hunt P:\8417190510_FortOrd\GIS\17\OU2_GMTSR\Figure10_TCE-COC_OU2-U180_17Q4.mxd

2017-1Q OU2 A-Aquifer



EW-OU2-08-A

EW-OU2-08-A is recommended for decommissioning. The most recent COCs above ACLs in nearby wells are 1,2-DCA and VC in 2017-1Q. COC trends for EW-OU2-08-A and neighboring wells EW-OU2-07-A, MW-OU2-09-A, and EW-OU2-09-A are assessed in the next slides.

QAPP Decision Rule Excerpts*

- If concentrations of COCs in a well are less than or equal to their respective ACLs, and it can be demonstrated COC concentrations will continue to be less than or equal to ACLs in the future, then the attainment monitoring phase is complete under any of the following conditions:
 - If all COCs in the well are ND, the LOQ is below the ACL, or a combination of ND sampling results and all detected COC concentrations are below the ACLs for eight consecutive sampling events, then a **non-statistical or visual review** of the COC data will be sufficient to conclude the attainment monitoring phase is complete in the well.
 - If all COCs in the well are less than or equal to their respective ACLs for eight consecutive sampling events, and a **statistical analysis** (i.e., trend analysis) demonstrates COCs will remain less than or equal to ACLs in the future (the trend line has a statistically significant zero [steady state] or negative [decreasing] slope, and the 95% UCL value is less than or equal to the ACL), then the attainment monitoring phase is complete in the well.
 - **If the well is removed from the sampling program in accordance with the GWMP decision rules, then the attainment monitoring phase is complete in the well.**
- If a well has completed the attainment monitoring phase and it is not needed for groundwater elevation data, then it will be proposed for decommissioning.

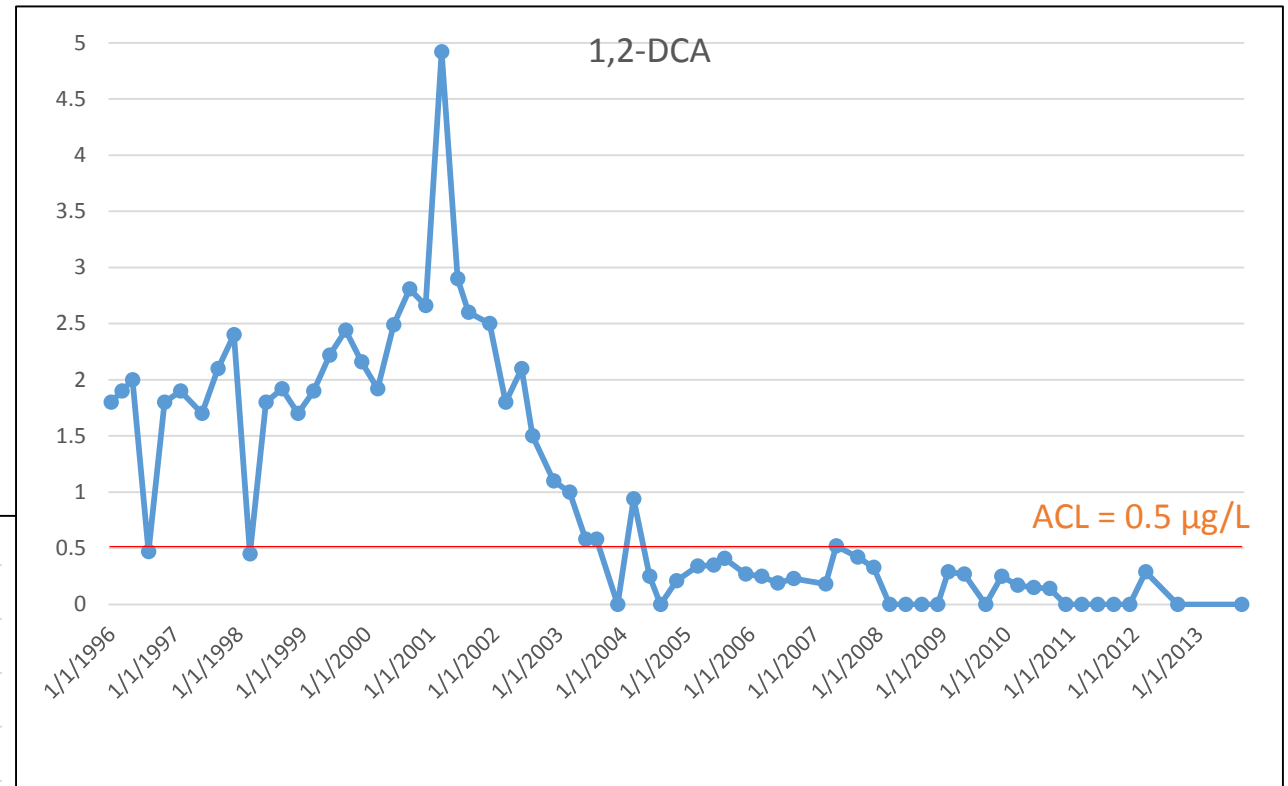
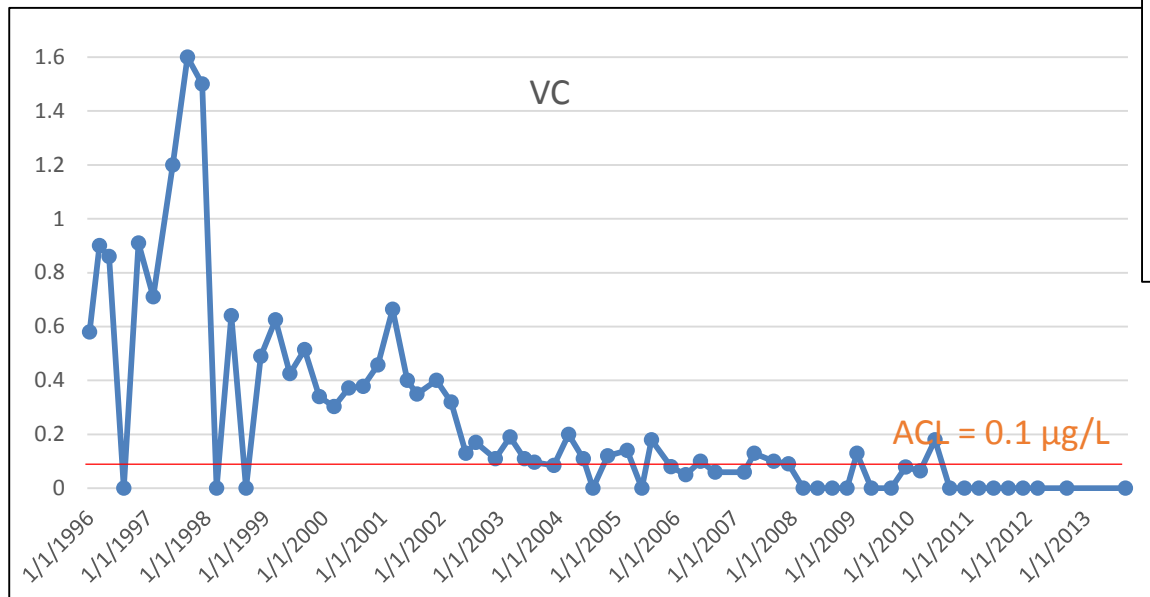
*Adapted from:

EPA, 2014a. *Groundwater Remedy Completion Strategy, Moving Forward with the End in Mind*. May. [OSWER 9200.2-144](#).

EPA, 2014b. *Recommended Approach for Evaluating Completion of Groundwater Restoration Remedial Actions at a Groundwater Monitoring Well*. August. [OSWER 9283.1-44](#).

EW-OU2-08-A Timeline

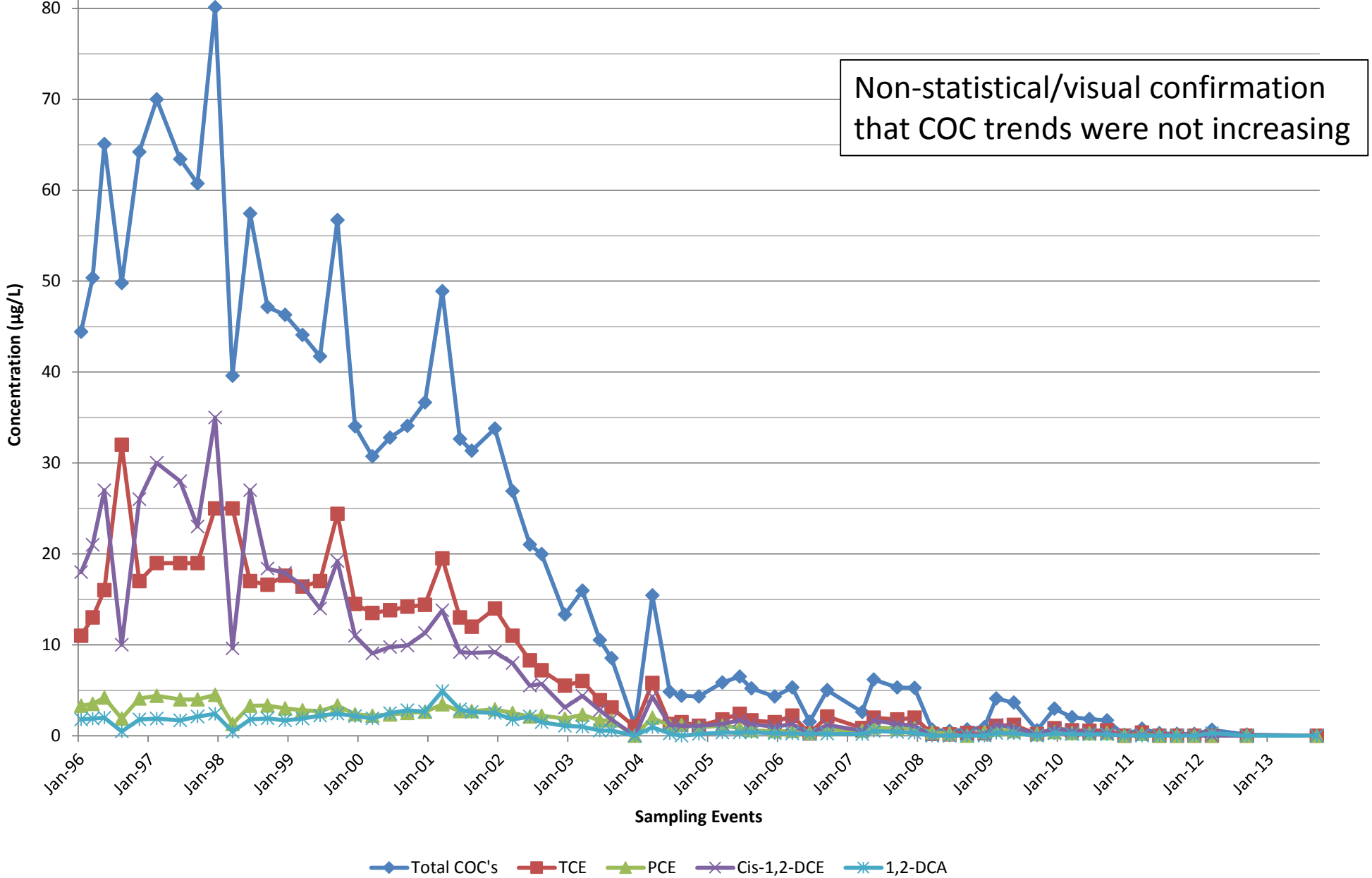
- Installed in 1995
- COCs below ACLs since 2010
 - Three COCs always below ACLs: 1,1-DCA; benzene; and CT
 - Methylene chloride below ACL since 1996
 - Chloroform below ACL since 1998
 - 1,2-DCPA and PCE below ACLs since 2001
 - Cis-1,2-DCE below ACL since 2002
 - TCE below ACL since 2004
 - 1,2-DCA below ACL since 2007
 - VC below ACL since 2010
- Last operated in 2011
- Last sampled in 2013: Last sample all COCs ND



Non-statistical/visual confirmation that 1,2-DCA and VC concentrations were not increasing

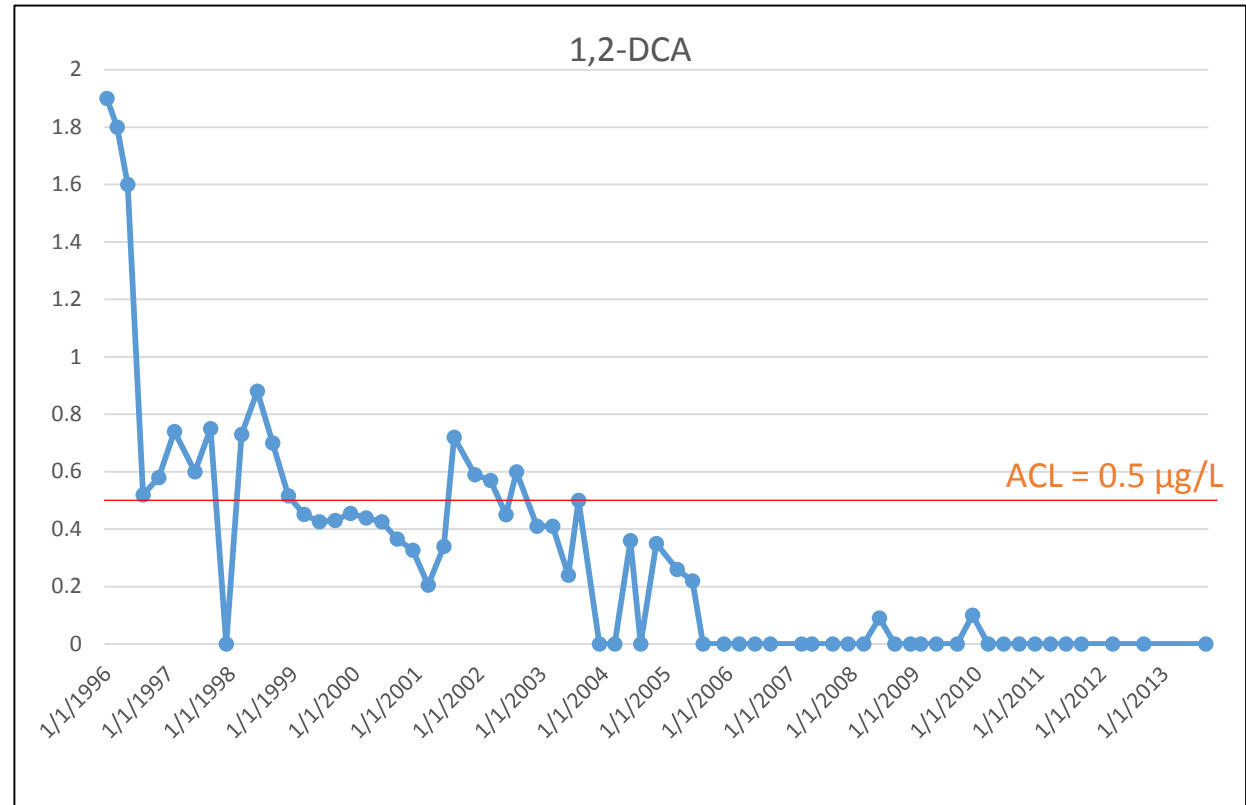
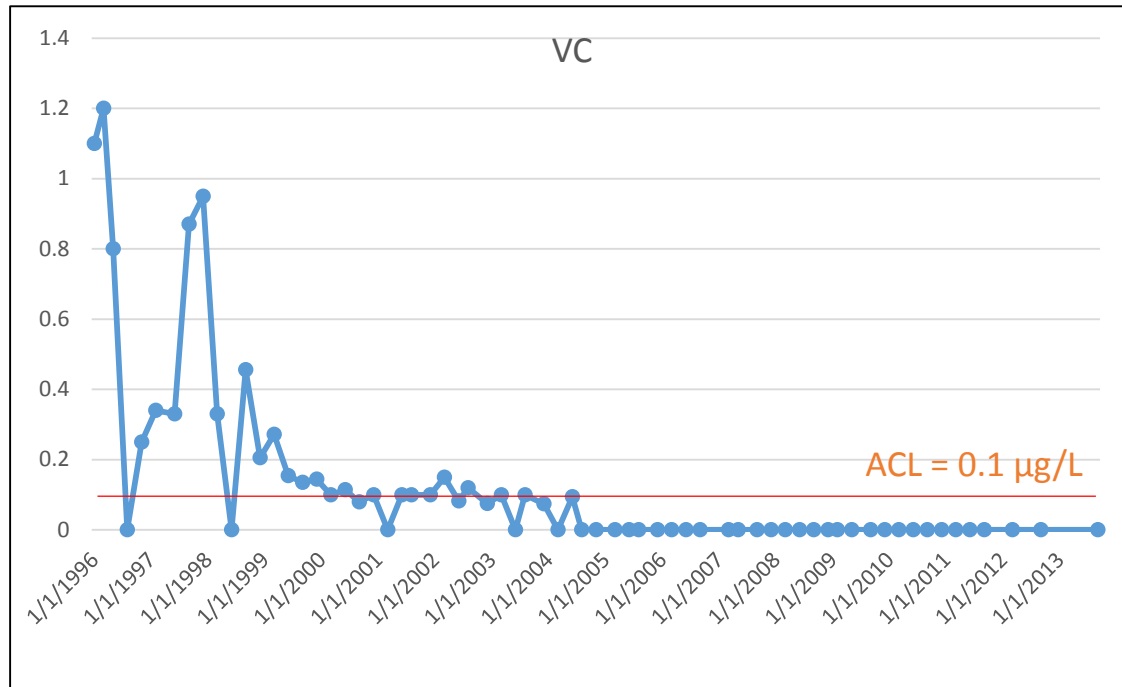
Attainment monitoring is complete.

EW-OU2-08-A



EW-OU2-07-A Timeline

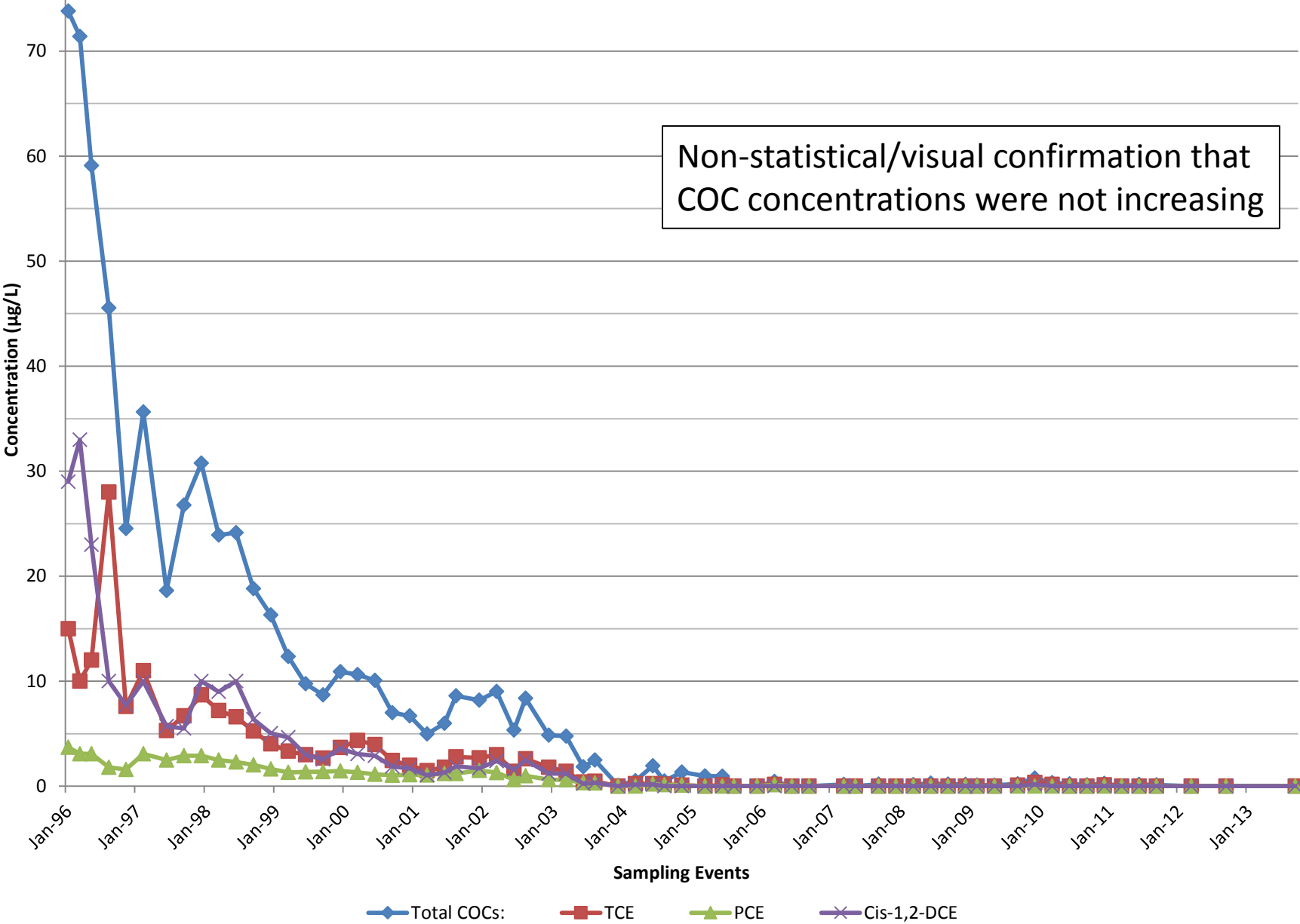
- Installed in 1995
- COCs below ACLs since 2002
 - CT always ND
 - 1,1-DCA always below ACL
 - Benzene, chloroform, and methylene chloride below ACLs since 1996
 - PCE below ACL since 1997
 - 1,2-DCPA; cis-1,2-DCE; and TCE below ACLs since 1998
 - 1,2-DCA and VC below ACLs since 2002
- Last operated in 2007
- Last sampled in 2013: Last three sample events all COCs ND



Non-statistical/visual confirmation that 1,2-DCA and VC concentrations were not increasing

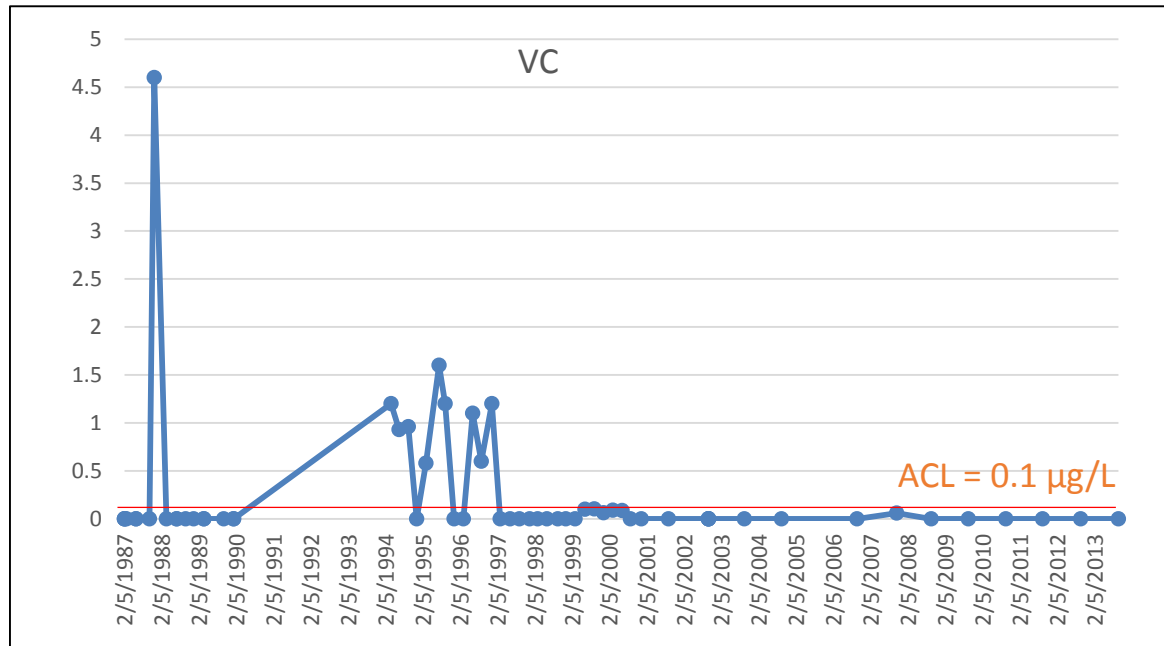
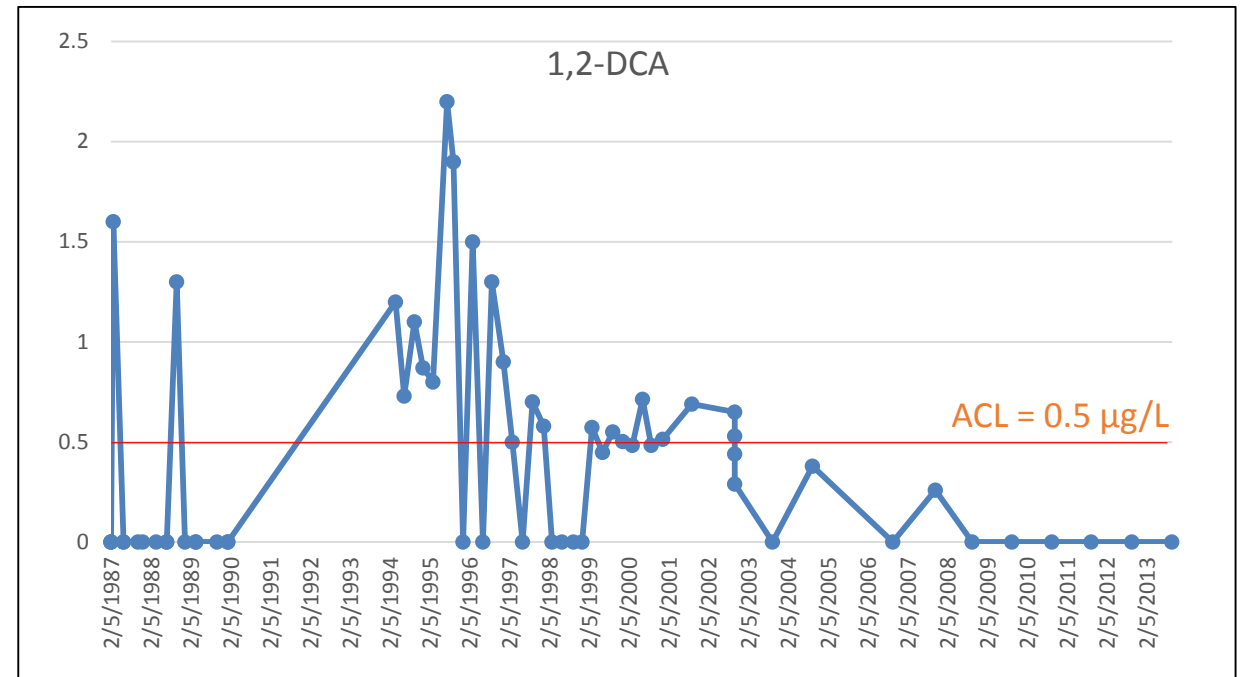
Attainment monitoring is complete.

EW-OU2-07-A



MW-OU2-09-A Timeline

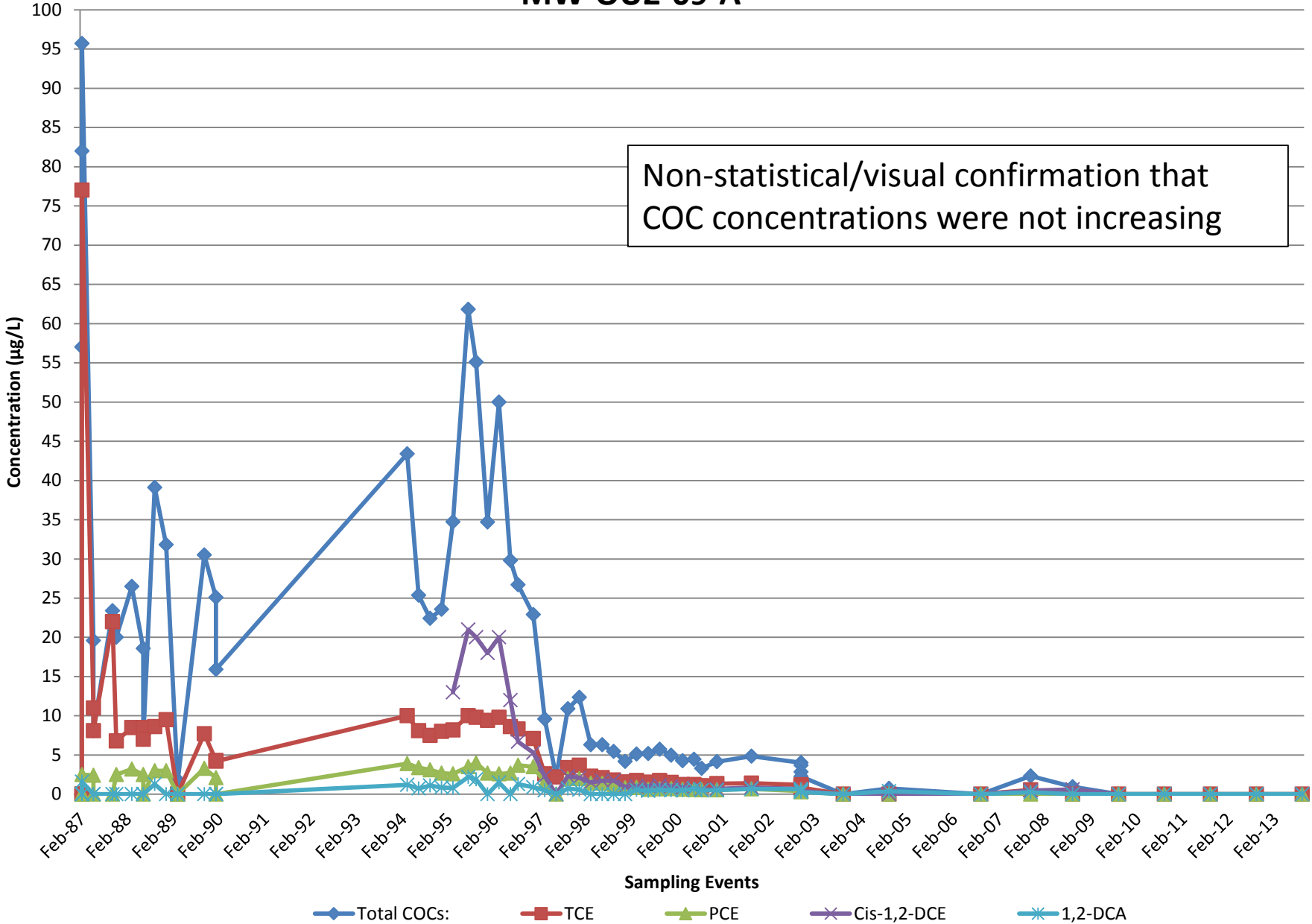
- Installed in 1987
- COCs below ACLs since 2002
 - 1,1-DCA always below ACL
 - CT below ACL since 1987
 - Benzene; chloroform; cis-1,2-DCE; and methylene chloride below ACLs since 1996
 - 1,2-DCPA; PCE; TCE; and VC below ACLs since 1997
 - 1,2-DCA below ACL since 2002
- Last sampled in 2013: Last 5 annual sample events all COCs ND



Non-statistical/visual confirmation that 1,2-DCA and VC concentrations were not increasing

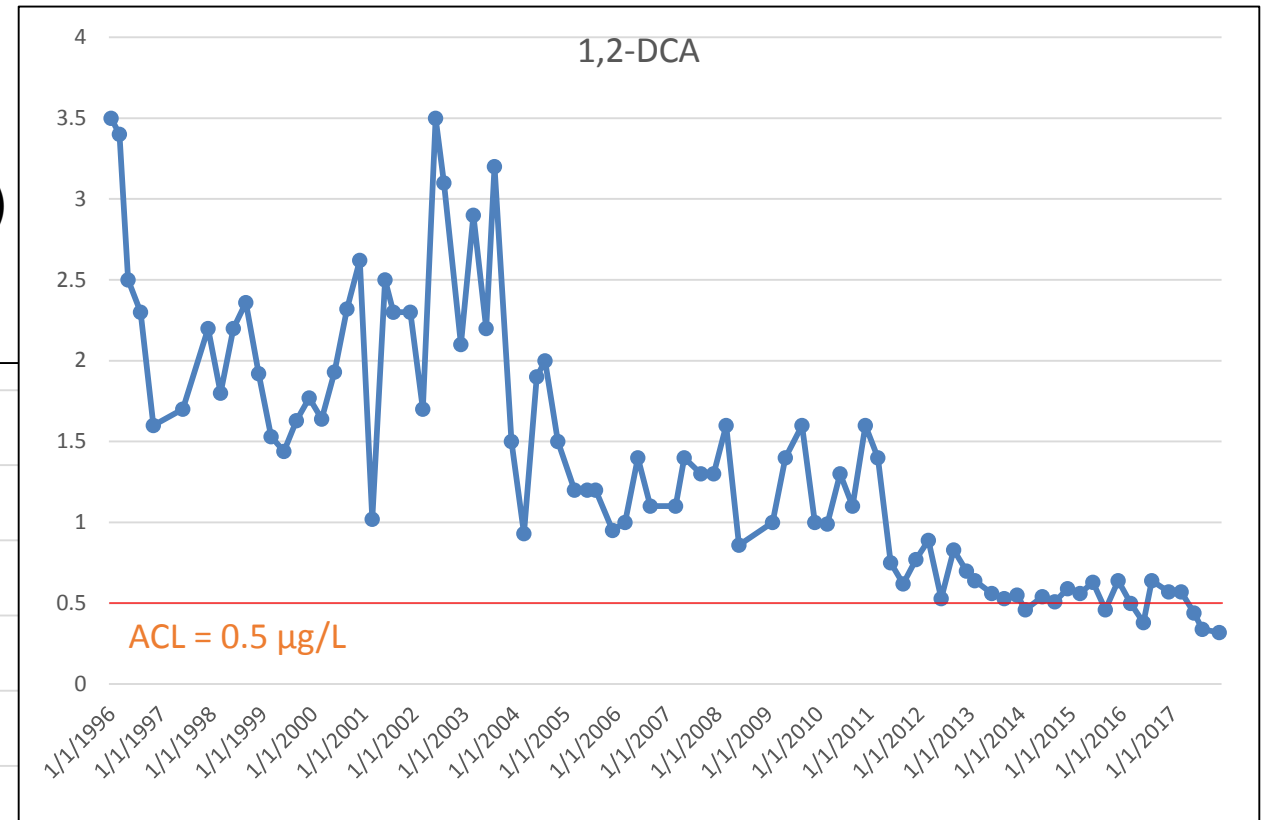
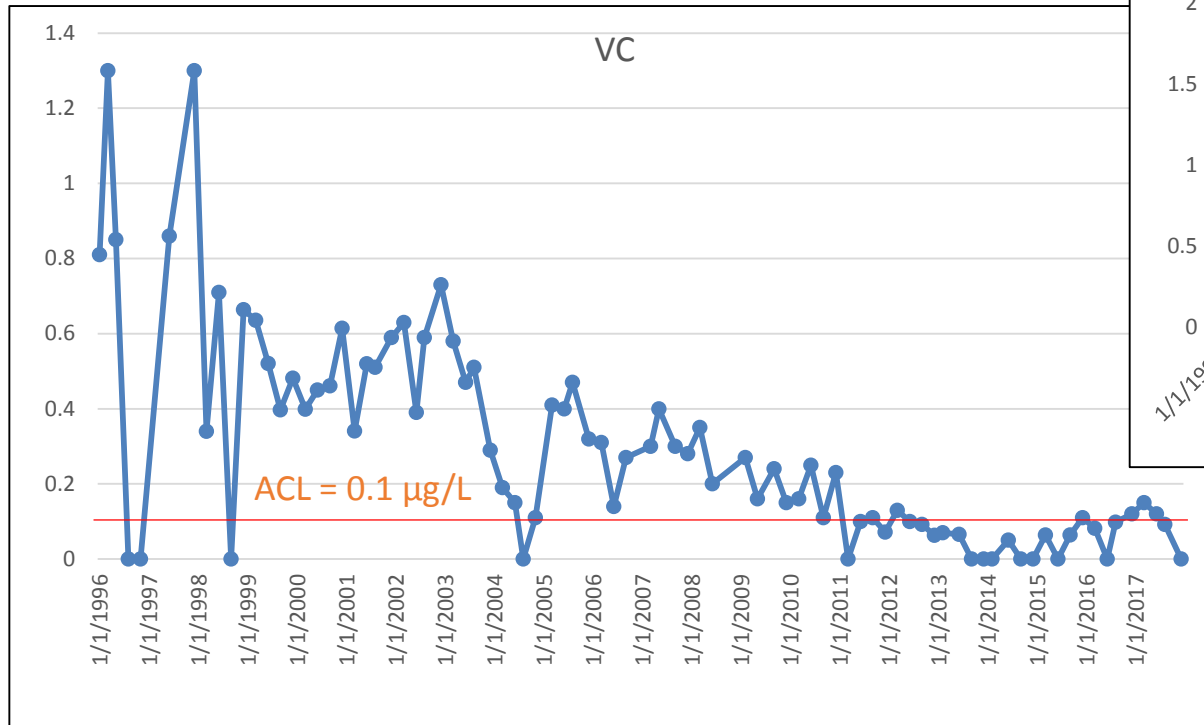
Attainment monitoring is complete.

MW-OU2-09-A



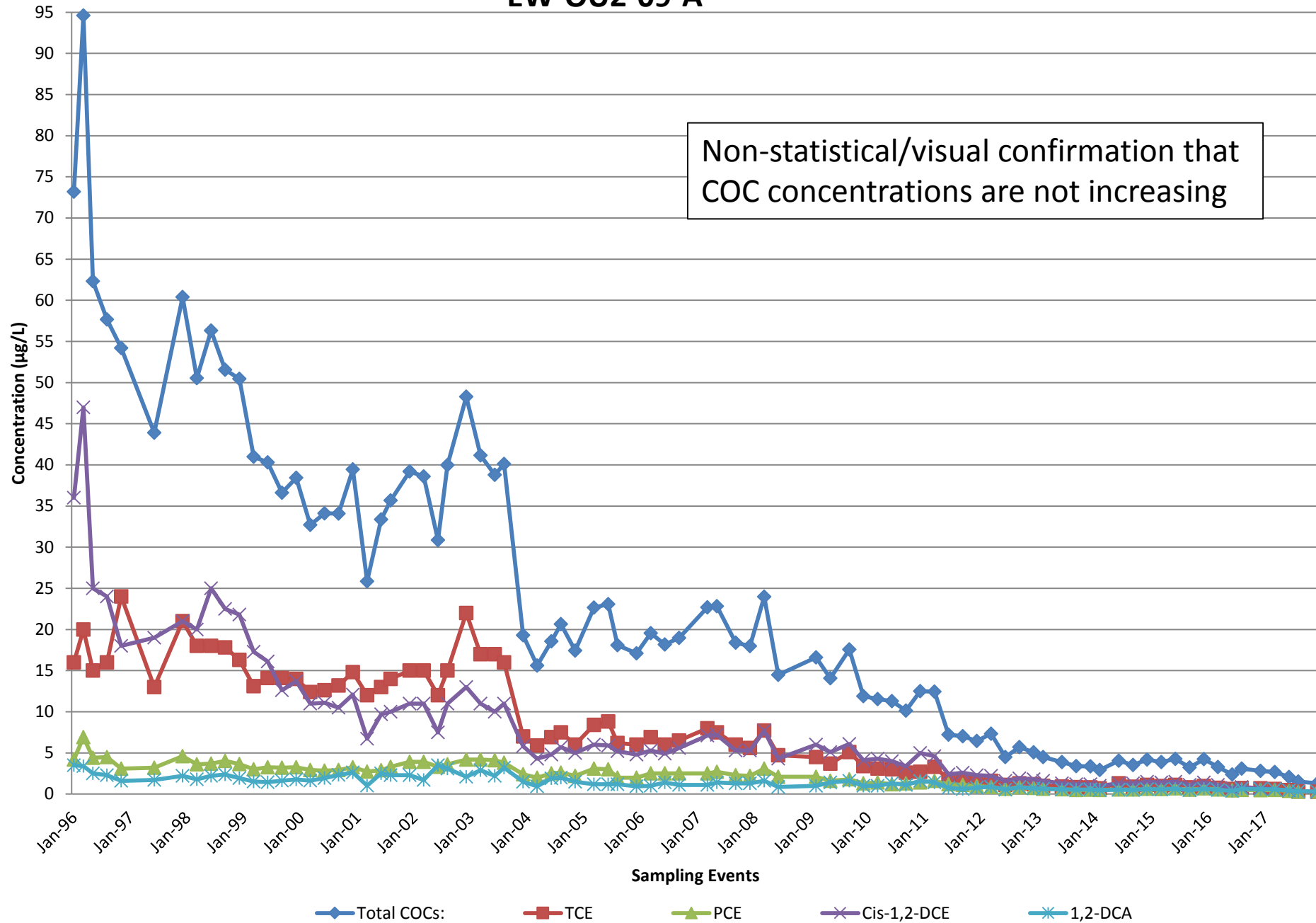
EW-OU2-09-A Timeline

- Installed in 1995
- COCs below ACLs since 2017
 - Four COCs always below ACLs: 1,1-DCA; benzene; CT; and methylene chloride
 - 1,2-DCPA below ACL since 2003
 - PCE below ACL since 2008
 - Cis-1,2-DCE and TCE below ACL since 2009
 - Chloroform below ACL since 2012
 - **1,2-DCA below ACL since 2017-2Q (M-K Stat: -2.0k)**
 - **VC below ACL since 2017-3Q (M-K Stat: -1.8k)**
- Operated and sampled

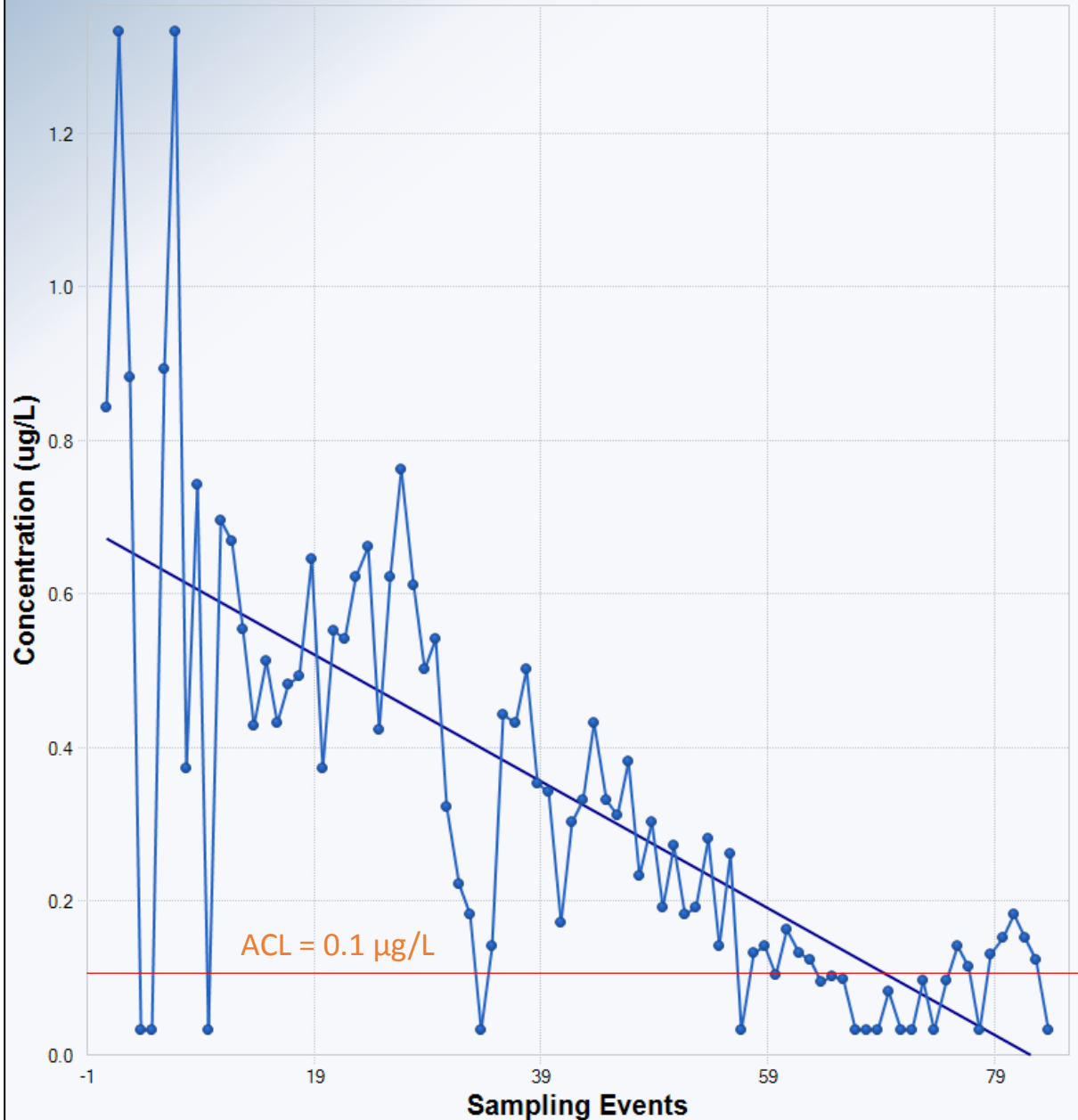


Non-statistical/visual confirmation and statistical analysis that VC and 1,2-DCA concentrations are not increasing

EW-OU2-09-A



EW-OU2-09-A VC



Mann-Kendall Trend Analysis

n	84
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	258.2938
Standardized Value of S	-7.8825
M-K Test Value (S)	-2.037
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0000

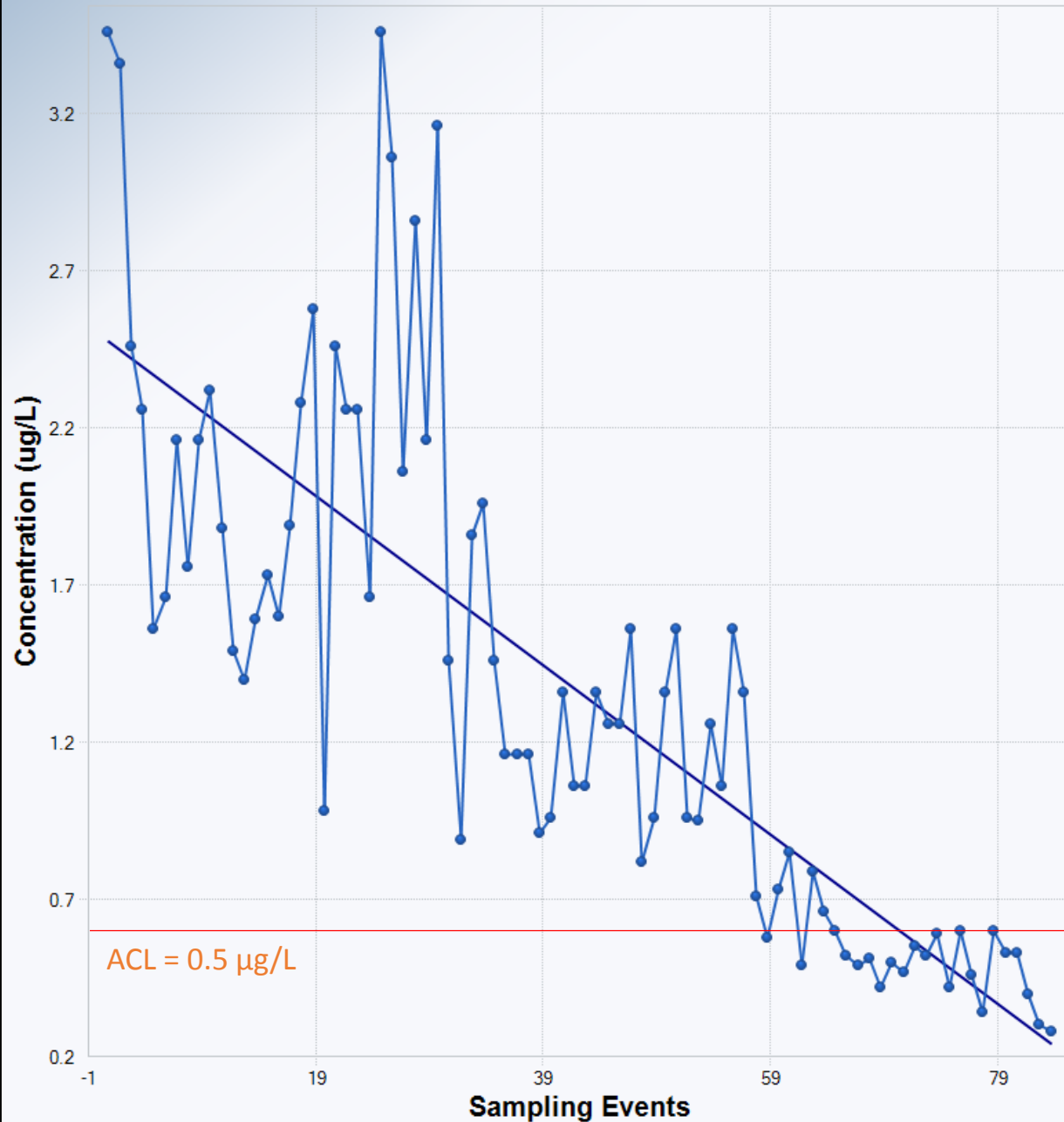
OLS Regression Line (Blue)

OLS Regression Slope	-0.0083
OLS Regression Intercept	0.6480

Statistically significant evidence of a decreasing trend at the specified level of significance.

VC concentration trend line has a statistically significant negative (decreasing) slope

EW-OU2-09-A 1,2-DCA



Mann-Kendall Trend Analysis

n	84
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	258.7618
Standardized Value of S	-9.1899
M-K Test Value (S)	-2.379
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0000

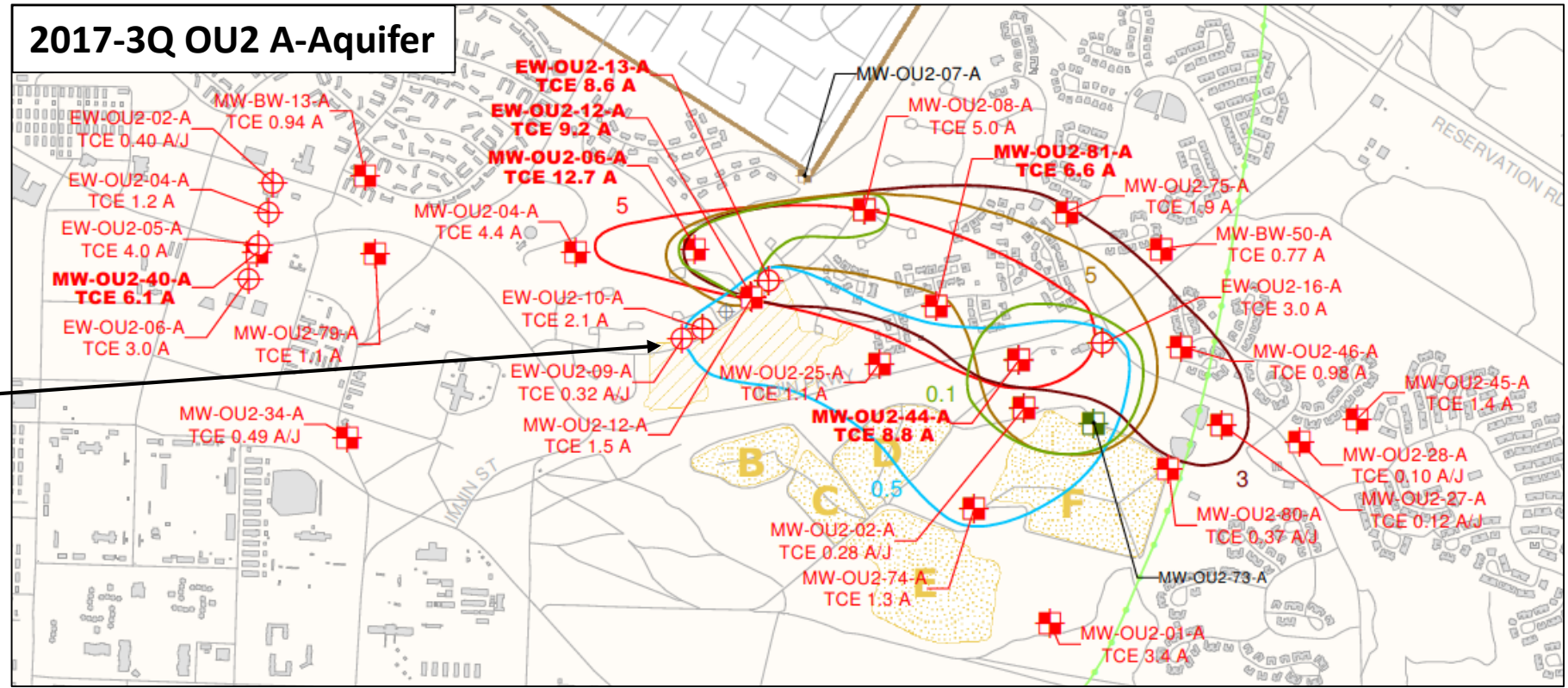
OLS Regression Line (Blue)

OLS Regression Slope	-0.0269
OLS Regression Intercept	2.5444

Statistically significant evidence of a decreasing trend at the specified level of significance.

1,2-DCA concentration trend line has a statistically significant negative (decreasing) slope

Based on visual and statistical review of COC analytical data, EW-OU2-08-A is recommended for decommissioning



DEPTH IN FEET	SAMPLE TYPE & NUMBER	WELL SUMMARY AND DRILLING REMARKS	USCS PROFILE
0		To Treatment System	
5		Very Easy Drilling, No Hammer	
10		Below Grade Valve 1" PVC Sand Tube 1 3/8" dia. Borehole Bentonite/Cement Grout	
15		Hammer Used at 17.0' (8-8" per blow)	
20			

BORING: EW-OU2-08-A	
COORDINATES N: 2136726.062	E: 5743718.828
FIELD GEOLOGIST: L. Carr	DATE BEGAN: 9/18/95
CHECKED BY: D. Landon	DATE FINISHED: 9/20/95
APPROVED BY: M. Miller	TOP OF ACCESS:
TOTAL DEPTH: 140 ft.	PORT ELEV: 182.96
DESCRIPTION	
0-3.0'	Poorly Graded SAND with SILT; dark yellowish brown; dry to damp; medium loose; fine to medium grained; subangular to subrounded sand; 75% quartz, 15% feldspar, 10% other; 10% organic silt; few organics.
3.0'-15.0'	Poorly Graded SAND; yellowish brown; dry to damp; loose; fine grained with some medium sized cobbles, subangular to subrounded; 75% quartz, 15% feldspar, 10% other.
15.0'-17.0'	Slight change in color to yellowish brown at 15.0'; few organics.
17.0'-20.0'	Slight increase in grain size at 20.0'.

Visual confirmation that 1,2-DCA and VC plumes decreasing in size in the area of EW-OU2-08-A
Current plumes are outside of capture area of EW-OU2-07-A and -08-A