ATTACHMENT 4: FIELD LOGS

This attachment contains the groundwater sample collection field logs for the relatively shallow standpipe monitoring wells (MW-1, MW-5 through MW-10, MW-13, MW-15, and MW-16), as well as the field data sheets for the Westbay™ multiport wells (MW-3, MW-4, MW-11, MW-12, MW-14, and MW-17 through MW-26). Groundwater sample collection for the 3rd Quarter 2012 sampling event was conducted by Blaine Tech Services, Inc.

Note: no samples were collected from MW-1 or MW-9 during the third quarter 2012 sampling event.

WELL MONITORING DATA SHEET

Project #: 120824 - AW1	Site: JPL Pasadena
Sampler: AWolff	Gauging Date: 9-7-12
Well I.D.: MW-5	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth (TD): 140	Depth to Water (DTW): 80.65
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	Flow Cell Type YSI Pro Plus
DTW with 80% Recharge [(Height of Water Column x 0.20) + DTW]: 92.52	

Purge Method:
- Disposable Bailer
- Positive Air Displacement
- Electric Submersible
- Waterra
- 2" Rediflo pump
- Extraction Pump
- Other Dedicated RFZ

Sampling Method:
- Disposable Bailer
- Extraction Port
- (Dedicated Tubing)
- Other:

Flow Rate= 3 gpm

Start Purge Date= 9-7-12 Pump @ 125'

38.6 (Gals.) X 3 = 115.8 Gals.
1 Case Volume Specified Volumes Calculated Volume

Well Diameter	Multiplier	Well Diameter	Multiplier
1"	0.04	4"	0.65
2"	0.16	6"	1.47
3"	0.37	Other	radius^2 * 0.163

Time	Temp (°C)	pH	Cond. (mS or (µS))	Turbidity (NTUs)	D.O. (mg/L)	ORP (mV)	Gals. Removed	DTW
1230	15.6	6.82	492	2.84	0.18	-19.4	21	80.88
1237	15.6	6.71	487	2.81	0.08	-50.4	42	80.88
1244	15.6	6.70	489	2.42	0.29	-73.6	63	80.88
1251	15.5	6.70	489	1.78	0.67	-101.6	84	80.88
1257	15.5	6.70	488	1.75	0.81	-110.4	102	80.88
1303	15.5	6.70	489	1.71	0.78	-115.9	120	80.88

Did well dewater? Yes (No) Gallons actually evacuated: 120

Sampling Date: 9-7-12 Sampling Time: 1305 Depth to Water: 80.88

Sample I.D.: MW-5 Laboratory: BC Labs

Analyzed for: See COC Other:

EB I.D. (if applicable): @ Time Duplicate I.D. (if applicable):

FB I.D. (if applicable): @ Time Analyzed for:

D.O. (if req'd):	Pre-purge:	mg/L	Post-purge:	mg/L
O.R.P. (if req'd):	Pre-purge:	mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 120824 AW-1	Site: JPL, Pasadena
Sampler: AWolff	Gauging Date: 9-7-12
Well I.D.: MW-6	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth (TD): 245	Depth to Water (DTW): 185.36
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	Flow Cell Type YSI Pro Plus
DTW with 80% Recharge [(Height of Water Column x 0.20) + DTW]: 197.28	

Purge Method:
- Disposable Bailer
- Positive Air Displacement
- Electric Submersible
- Waterra
- 2" Rediflo pump
- Extraction Pump
- Other Dedicated RFZ

Sampling Method:
- Disposable Bailer
- Extraction Port
- (Dedicated Tubing)
- Other:

Flow Rate= 3 gpm

Start Purge Date= ~~10/10~~ 9-7-12 Pump @ 230'

38.8 (Gals.) X 3 = 116.4 Gals.
1 Case Volume — Specified Volumes — Calculated Volume

Well Diameter	Multiplier	Well Diameter	Multiplier
1"	0.04	4"	0.65
2"	0.16	6"	1.47
3"	0.37	Other	radius^2 * 0.163

Time	Temp (°C)	pH	Cond. (mS or (µS))	Turbidity (NTUs)	D.O. (mg/L)	ORP (mV)	Gals. Removed	DTW
1049	20.9	6.45	1163	51.8	7.95	91.0	21	186.06
1056	20.9	6.45	1175	22.7	8.18	91.6	42	186.06
1103	20.9	6.45	1178	8.65	8.34	94.3	63	186.06
1110	20.9	6.46	1175	5.23	8.54	94.8	84	186.06
1117	20.9	6.46	1176	5.86	8.67	94.8	105	186.06
1122	20.9	6.46	1176	5.73	8.66	94.4	120	186.06

Did well dewater? Yes (No) Gallons actually evacuated: 120

Sampling Date: 9-7-12 Sampling Time: 1125 Depth to Water: 186.06

Sample I.D.: MW-6 Laboratory: BC Labs

Analyzed for: See C.O.C. Other:

EB I.D. (if applicable): @ Time Duplicate I.D. (if applicable):

FB I.D. (if applicable): @ Time Analyzed for:

D.O. (if req'd):	Pre-purge:	mg/L	Post-purge:	mg/L
O.R.P. (if req'd):	Pre-purge:	mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 120824-AW-1	Site: JPL, Pasadena
Sampler: AW	Gauging Date: 9-10-12
Well I.D.: MW-7	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth (TD): 275	Depth to Water (DTW): 218.15
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	Flow Cell Type YSI Pro Plus
DTW with 80% Recharge [(Height of Water Column x 0.20) + DTW]: 229.52	

Purge Method:
- Disposable Bailer
- Positive Air Displacement
- Electric Submersible
- Waterra
- 2" Rediflo pump
- Extraction Pump
- Other Dedicated RF2

Sampling Method:
- Disposable Bailer
- Extraction Port
- (Dedicated Tubing)
- Other:

Flow Rate= 3gpm

Start Purge Date= 9-10-12 Pump @ 265

37.0 (Gals.) X 3 = 111.0 Gals.
1 Case Volume — Specified Volumes — Calculated Volume

Well Diameter	Multiplier	Well Diameter	Multiplier
1"	0.04	4"	0.65
2"	0.16	6"	1.47
3"	0.37	Other	radius^2 * 0.163

Time	Temp (°C)	pH	Cond. (mS or (µS))	Turbidity (NTUs)	D.O. (mg/L)	ORP (mV)	Gals. Removed	DTW
1229	24.0	7.04	636	51.0	3.52	238.2	21	218.47
1235	24.1	6.99	632	14.7	3.33	241.7	39	218.47
1241	24.1	6.99	632	9.04	3.33	237.9	57	218.47
1247	24.1	6.99	633	7.37	3.36	233.1	73	218.47
1253	24.1	6.97	632	3.95	3.34	231.2	91	218.47
1259	24.1	6.96	632	3.49	3.34	230.7	111	218.47

Did well dewater? Yes (No) Gallons actually evacuated: 111

Sampling Date: 9-10-12 Sampling Time: 1300 Depth to Water: 218.47

Sample I.D.: MW-7 Laboratory: BC Labs

Analyzed for: See C.O.C. Other:

EB I.D. (if applicable): @ Time Duplicate I.D. (if applicable):

FB I.D. (if applicable): @ Time Analyzed for:

D.O. (if req'd):	Pre-purge:	mg/L	Post-purge:	mg/L
O.R.P. (if req'd):	Pre-purge:	mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: ~~120800~~ 120824AW-1	Site: JPL, Pasadena
Sampler: AWolff	Gauging Date: 9-10-12
Well I.D.: MW-8	Well Diameter: 2 3 (4) 6 8 ____
Total Well Depth (TD): 205	Depth to Water (DTW): 146.36
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	Flow Cell Type YSI Pro Plus
DTW with 80% Recharge [(Height of Water Column x 0.20) + DTW]: 150.08	

Purge Method:
- Disposable Bailer
- Positive Air Displacement
- Electric Submersible
- Waterra
- 2" Rediflo pump
- Extraction Pump
- Other Dedicated RF2

Sampling Method:
- Disposable Bailer
- Extraction Port
- (Dedicated Tubing)
- Other:

Flow Rate= 3 gpm

Start Purge Date= 9-10-12 Pump @ ~~205~~ 195'

38.2 (Gals.) X 3 = 114.6 Gals.
1 Case Volume Specified Volumes Calculated Volume

Well Diameter	Multiplier	Well Diameter	Multiplier
1"	0.04	4"	0.65
2"	0.16	6"	1.47
3"	0.37	Other	radius^2 * 0.163

Time	Temp (°C)	pH	Cond. (mS or (µS))	Turbidity (NTUs)	D.O. (mg/L)	ORP (mV)	Gals. Removed	DTW
1116	15.8	7.03	416	4.90	1.52	155.0	21	146.61
1123	15.6	6.98	414	4.41	1.47	172.2	42	146.61
1130	15.7	6.97	415	4.11	1.41	151.7	63	146.61
1136	15.7	6.97	414	4.02	1.41	140.6	81	146.61
1142	15.7	6.96	413	3.70	1.42	136.3	99	146.61
1148	15.7	6.95	413	3.52	1.41	134.2	117	146.61

Did well dewater? Yes (No) Gallons actually evacuated: 117

Sampling Date: 9-10-12 Sampling Time: 1150 Depth to Water: 146.61

Sample I.D.: MW-8 Laboratory: BC Labs

Analyzed for: See C.O.C. Other:

EB I.D. (if applicable): @ Time Duplicate I.D. (if applicable):

FB I.D. (if applicable): @ Time Analyzed for:

D.O. (if req'd):	Pre-purge:	mg/L	Post-purge:	mg/L
O.R.P. (if req'd):	Pre-purge:	mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 120824AW-1	Site: JPL, Pasadena
Sampler: AWolff	Gauging Date: 9-7-12
Well I.D.: MW-10	Well Diameter: 2 3 (4) 6 8 ____
Total Well Depth (TD): 155	Depth to Water (DTW): 95.36
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	Flow Cell Type YSI Pro Plus
DTW with 80% Recharge [(Height of Water Column x 0.20) + DTW]: 107.28	

Purge Method:
- Disposable Bailer
- Positive Air Displacement
- Electric Submersible
- Waterra
- (2" Rediflo pump)
- Extraction Pump
- Other_____

Sampling Method:
- Disposable Bailer
- Extraction Port
- Dedicated Tubing
- Other: New Tubing

Flow Rate= 2 gpm *3 gpm

Start Purge Date= 9-7-12 Pump @ 140'

38.8 (Gals.) X 3 = 116.4 Gals.
1 Case Volume — Specified Volumes — Calculated Volume

Well Diameter	Multiplier	Well Diameter	Multiplier
1"	0.04	4"	0.65
2"	0.16	6"	1.47
3"	0.37	Other	radius^2 * 0.163

Time	Temp (°C)	pH	Cond. (mS or (µS))	Turbidity (NTUs)	D.O. (mg/L)	ORP (mV)	Gals. Removed	DTW
0929	19.8	6.72	459	10.3	4.03	24.2	20	95.36
*0939	19.8	6.73	473	5.70	4.56	31.6	40	95.36
0946	19.8	6.76	475	3.95	4.17	39.4	61	95.40
0953	19.8	6.72	483	3.96	4.35	20.7	82	95.40
1000	19.8	6.72	483	4.03	4.48	19.6	103	95.40
1006	19.8	6.71	484	3.94	4.31	20.2	120	95.40

Did well dewater? Yes (No) Gallons actually evacuated: 120

Sampling Date: 9-7-12 Sampling Time: 1010 Depth to Water: 95.40

Sample I.D.: MW-10 Laboratory: BC Labs

Analyzed for: See COC. Other:

EB I.D. (if applicable): @ Time Duplicate I.D. (if applicable):

FB I.D. (if applicable): @ Time Analyzed for:

D.O. (if req'd):	Pre-purge:	mg/L	Post-purge:	mg/L
O.R.P. (if req'd):	Pre-purge:	mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 120824AW-1	Site: JPL, Pasadena
Sampler: AWolff	Gauging Date: 9-7-12
Well I.D.: MW-13	Well Diameter: 2 3 (4) 6 8 ____
Total Well Depth (TD): 235	Depth to Water (DTW): 189.55
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	Flow Cell Type YSI-Pro Plus
DTW with 80% Recharge [(Height of Water Column x 0.20) + DTW]: 207.64	

Purge Method:
- Disposable Bailer
- Positive Air Displacement
- Electric Submersible
- Waterra
- 2" Rediflo pump
- Extraction Pump
- Other Dedicated RFZ

Sampling Method:
- Disposable Bailer
- Extraction Port
- (Dedicated Tubing)
- Other: ____

Flow Rate= 3gpm

Start Purge Date= 9-7-12 Pump @ 220'

29.6 (Gals.) X 3 = 88.8 Gals.
1 Case Volume — Specified Volumes — Calculated Volume

Well Diameter	Multiplier	Well Diameter	Multiplier
1"	0.04	4"	0.65
2"	0.16	6"	1.47
3"	0.37	Other	radius^2 * 0.163

Time	Temp (°C)	pH	Cond. (mS or (µS))	Turbidity (NTUs)	D.O. (mg/L)	ORP (mV)	Gals. Removed	DTW
0725	22.2	6.59	615	9.01	5.28	115.6	15	189.63
0730	22.3	6.62	604	7.41	5.14	107.3	30	189.63
0735	22.3	6.65	603	5.35	5.08	100.6	45	189.63
0740	22.3	6.69	602	2.80	5.01	91.1	60	189.63
0745	22.3	6.70	601	2.16	4.96	86.3	75	189.63
0750	22.3	6.71	602	2.03	5.02	82.2	90	189.63

Did well dewater? Yes (No) Gallons actually evacuated: 90

Sampling Date: 9-7-12 Sampling Time: 0755 Depth to Water: 189.63

Sample I.D.: MW-13 Laboratory: BC Labs

Analyzed for: See COC. Other:

EB I.D. (if applicable): @ Time Duplicate I.D. (if applicable):

FB I.D. (if applicable): @ Time Analyzed for:

D.O. (if req'd):	Pre-purge:	mg/L	Post-purge:	mg/L
O.R.P. (if req'd):	Pre-purge:	mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 120824AW-1	Site: JPL, Pasadena
Sampler: AWolff	Gauging Date: 9-10-12
Well I.D.: MW-15	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth (TD): 74	Depth to Water (DTW): 34.06
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	Flow Cell Type YSI-Pro Plus
DTW with 80% Recharge [(Height of Water Column x 0.20) + DTW]: 42.04	

Purge Method:
- Disposable Bailer
- Positive Air Displacement
- Electric Submersible
- Waterra
- 2" Rediflo pump
- Extraction Pump
- Other Dedicated RF2

Sampling Method:
- Disposable Bailer
- Extraction Port
- (Dedicated Tubing)
- Other:

Flow Rate= 4gpm

Start Purge Date= 9-10-12 Pump @ 54'

26.0 (Gals.) X 3 = 78.0 Gals.
1 Case Volume — Specified Volumes — Calculated Volume

Well Diameter	Multiplier	Well Diameter	Multiplier
1"	0.04	4"	0.65
2"	0.16	6"	1.47
3"	0.37	Other	radius^2 * 0.163

Time	Temp (°C)	pH	Cond. (mS or (µS))	Turbidity (NTUs)	D.O. (mg/L)	ORP (mV)	Gals. Removed	DTW
1026	16.6	7.08	417	9.34	0.13	174.3	13	34.75
1030	16.6	7.07	418	8.51	0.15	174.0	26	34.75
1033	16.6	7.07	418	4.24	0.15	173.4	39	34.76
1036	16.6	7.08	417	4.32	0.15	172.2	52	34.77
1040	16.6	7.10	417	2.56	0.14	171.0	65	34.79
1043	16.6	7.07	415	2.53	0.15	170.2	78	34.81

Did well dewater? Yes (No) Gallons actually evacuated: 78

Sampling Date: 9-10-12 Sampling Time: 1045 Depth to Water: 34.81

Sample I.D.: MW-15 Laboratory: BC Labs

Analyzed for: See C.O.C. Other:

EB I.D. (if applicable): @ Time Duplicate I.D. (if applicable):

FB I.D. (if applicable): @ Time Analyzed for:

D.O. (if req'd):	Pre-purge:	mg/L	Post-purge:	mg/L
O.R.P. (if req'd):	Pre-purge:	mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: ~~12040~~ AW 120824AW-1	Site: JPL, Pasadena
Sampler: AWolff	Gauging Date: 9-10-12
Well I.D.: MW-16	Well Diameter: 2 3 (4") 6 8 ___
Total Well Depth (TD): 285	Depth to Water (DTW): 241.91
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	Flow Cell Type YSI Pro Plus
DTW with 80% Recharge [(Height of Water Column x 0.20) + DTW]: 250.52	

Purge Method:
- Disposable Bailer
- Positive Air Displacement
- Electric Submersible
- Waterra
- 2" Rediflo pump
- Extraction Pump
- Other Dedicated RFZ

Sampling Method:
- Disposable Bailer
- Extraction Port
- (Dedicated Tubing)
- Other:

Flow Rate= 1 gpm

Start Purge Date= 9-10-12 Pump @ 265'

28.1 (Gals.) X 3 = 84.3 Gals.
1 Case Volume Specified Volumes Calculated Volume

Well Diameter	Multiplier	Well Diameter	Multiplier
1"	0.04	4"	0.65
2"	0.16	6"	1.47
3"	0.37	Other	radius^2 * 0.163

Time	Temp (°C)	pH	Cond. (mS or (µS))	Turbidity (NTUs)	D.O. (mg/L)	ORP (mV)	Gals. Removed	DTW
0850	27.5	7.06	627	3.30	1.99	223.1	15	241.95
0904	26.5	6.98	627	3.00	1.75	218.7	29	242.02
0918	26.5	7.02	630	2.41	1.88	219.8	43	242.07
0932	26.4	6.98	627	1.98	1.77	217.4	57	242.01
0946	26.5	6.98	626	1.72	1.75	216.3	71	242.01
1000	26.5	6.98	623	1.70	1.74	215.9	85	242.01

Did well dewater? Yes (No) Gallons actually evacuated: 85

Sampling Date: 9-10-12 Sampling Time: 1005 Depth to Water: 242.01

Sample I.D.: MW-16 Laboratory: BC Labs

Analyzed for: See COC Other:

EB I.D. (if applicable): @ Time Duplicate I.D. (if applicable):

FB I.D. (if applicable): @ Time Analyzed for:

D.O. (if req'd):	Pre-purge:	mg/L	Post-purge:	mg/L
O.R.P. (if req'd):	Pre-purge:	mV	Post-purge:	mV

WESTBAY™ GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET

WELL ID: MW-3
SAMPLING DATE(S) 9-6-12
LOCATION: E. of site by settling ponds
WATER LEVEL INSIDE CASING: 161.41
ATM. PRESSURE (PSI): (Start) 14.07 (Finish) 14.10
25.65°C 21.81°C

PROBE TYPE Westbay
SERIAL NO. EMS2502
PROJECT: JPL Pasadena
OPERATOR(S) AWolff
WEATHER Clear

		Probe to Top Collar	Surface Function Tests / Position Sampler (probe in top of collar) / (lower probe to port)				Sample Collection Checks (probe at sampling port in MP casing)							Field Parameters						Sample	
Port Number	Run Number	Arm out / Land Probe	Shoe Out/ Close Valve/ Check Vacuum	Open Valve/ Apply Vacuum (5 psi)	Close Valve/ Shoe In/ Arm In	Locate Port/ Arm Out/ Land Probe	Pressure in MP Casing (psi)	Shoe Out	Port Pressure (psi)	Open Valve	Port Pressure (psi)	Close Valve/ Shoe In	Pressure in MP Casing (psi)	Sample Temp (°C)	SC (µS/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (ppm)	ORP (mV)	Sample Time	Sample ID
4	1	✓	✓	✓	✓	✓	186.35	✓	184.74	✓	184.73	✓	186.95	21.6	408.3	8.12	5.33	5.65	117	0830	MW-3-4
3	1	✓	✓	✓	✓	✓	93.43	✓	107.75	✓	107.75	✓	93.43	22.3	436.1	8.22	5.10	4.82	36	0930	MW-3-3
2	1	✓	✓	✓	✓	✓	52.51	✓	67.45	✓	67.45	✓	52.51	22.9	394.4	8.03	4.74	5.08	162	1000	MW-3-2

Comments:

WESTBAY™ GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET

WELL ID: MW-4
SAMPLING DATE(S) 9-4-12
LOCATION: East parking lot, JPL
WATER LEVEL INSIDE CASING: 203.98
ATM. PRESSURE (PSI): (Start) 14.12 (Finish) 14.12
29.66°C 20.16

PROBE TYPE Westbay
SERIAL NO. EM52504
PROJECT: JPL Pasadena
OPERATOR(S) AWolff
WEATHER Clear

Port Number	Run Number	Probe to Top Collar	Surface Function Tests / Position Sampler (probe in top of collar) / (lower probe to port)				Sample Collection Checks (probe at sampling port in MP casing)							Field Parameters						Sample	
		Arm out / Land Probe	Shoe Out/ Close Valve/ Check Vacuum	Open Valve/ Apply Vacuum (5 psi)	Close Valve/ Shoe In/ Arm In	Locate Port/ Arm Out/ Land Probe	Pressure in MP Casing (psi)	Shoe Out	Port Pressure (psi)	Open Valve	Port Pressure (psi)	Close Valve/ Shoe In	Pressure in MP Casing (psi)	Sample Temp (°C)	SC (µS/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (ppm) mg/l	ORP (mV)	Sample Time	Sample ID
3	1	✓	✓	✓	✓	✓	69.83	✓	108.05	✓	108.05	✓	69.83	24.5	474.0	8.34	4.03	5.59	146	1200	MW-4-3
2	1	✓	✓	✓	✓	✓	34.50	✓	73.44	✓	73.44	✓	34.50	23.6	683.8	8.05	40.8	5.11	107	1230	MW-4-2
1	1	✓	✓	✓	✓	✓	14.15	✓	39.75	✓	39.75	✓	14.15	24.6	430.3	8.27	8.03	4.61	166	1300	MW-4-1

Comments: Level IV Validation @ Port 2

WESTBAY™ GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET

WELL ID: MW-11
SAMPLING DATE(S) 8-31-12
LOCATION: Loading dock building 277, JPL
WATER LEVEL INSIDE CASING: 119.95
ATM. PRESSURE (PSI): (Start) 14.03 (Finish) 14.03
24.71°C 20.31°C

PROBE TYPE Westbay
SERIAL NO. EMS25021
PROJECT: JPL Pasadena
OPERATOR(S) A Wolff
WEATHER Clear

		Probe to Top Collar	Surface Function Tests / Position Sampler (probe in top of collar) / (lower probe to port)				Sample Collection Checks (probe at sampling port in MP casing)							Field Parameters						Sample	
Port Number	Run Number	Arm out / Land Probe	Shoe Out/ Close Valve/ Check Vacuum	Open Valve/ Apply Vacuum (5 psi)	Close Valve/ Shoe In/ Arm In	Locate Port/ Arm Out/ Land Probe	Pressure in MP Casing (psi)	Shoe Out	Port Pressure (psi)	Open Valve	Port Pressure (psi)	Close Valve/ Shoe In	Pressure in MP Casing (psi)	Sample Temp (°C)	SC (µS/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (ppm) mg/l	ORP (mV)	Sample Time	Sample ID
4	1	✓	✓	✓	✓	✓	193.40	✓	174.01	✓	174.01	✓	193.40	21.3	256.5	8.77	2.23	6.36	-167	0835	MW-11-4
3	1	✓	✓	✓	✓	✓	152.44	✓	132.19	✓	132.19	✓	152.44	22.6	357.0	8.56	4.70	6.82	51	0905	MW-11-3
	2	✓	✓	✓	✓	✓	152.44	✓	132.21	✓	132.21	✓	152.44					~~4.78~~			
2	1	✓	✓	✓	✓	✓	78.69	✓	62.49	✓	62.49	✓	78.69	24.7	461.1	8.40	8.02	4.78	29	1015	MW-11-2
1	1	✓	✓	✓	✓	✓	31.32	✓	28.97	✓	28.97	✓	31.32	26.5	518.7	8.39	3.08	5.37	-95	1045	MW-11-1

Comments: DUPE-3-3Q12 @ Port 3

WESTBAY™ GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET

WELL ID: MW-12
SAMPLING DATE(S) 9-5-12
LOCATION: North East parking lot, JPL
WATER LEVEL INSIDE CASING: 87.65
ATM. PRESSURE (PSI): (Start) 14.10 (Finish) 14.14
25.58°C 17.87°C

PROBE TYPE Westbay
SERIAL NO. EMS2502
PROJECT: JPL, Pasadena
OPERATOR(S) A. Wolff
WEATHER Overcast

		Probe to Top Collar	Surface Function Tests / Position Sampler (probe in top of collar) / (lower probe to port)				Sample Collection Checks (probe at sampling port in MP casing)							Field Parameters						Sample	
Port Number	Run Number	Arm out / Land Probe	Shoe Out/ Close Valve/ Check Vacuum	Open Valve/ Apply Vacuum (5 psi)	Close Valve/ Shoe In/ Arm In	Locate Port/ Arm Out/ Land Probe	Pressure in MP Casing (psi)	Shoe Out	Port Pressure (psi)	Open Valve	Port Pressure (psi)	Close Valve/ Shoe In	Pressure in MP Casing (psi)	Sample Temp (°C)	SC (µS/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (ppm)	ORP (mV)	Sample Time	Sample ID
5	1	✓	✓	✓	✓	✓	218.42	✓	182.03	✓	182.03	✓	218.42	20.1	461.4	8.24	3.43	5.81	-65	0800	MW-12-5
4	1	✓	✓	✓	✓	✓	169.66	✓	146.57	✓	146.57	✓	169.66	20.0	467.7	8.14	2.37	5.82	-108	0830	MW-12-4
3	1	✓	✓	✓	✓	✓	121.50	✓	100.07	✓	100.07	✓	121.50	20.8	430.3	8.31	3.01	6.22	-93	0900	MW-12-3
2	1	✓	✓	✓	✓	✓	86.59	✓	66.73	✓	66.73	✓	86.59	20.8	538.1	8.16	5.74	5.75	20	0930	MW-12-2
1	1	✓	✓	✓	✓	✓	41.69	✓	28.59	✓	28.59	✓	41.69	20.5	408.6	8.26	8.80	5.70	85	1000	MW-12-1
	2	✓	✓	✓	✓	✓	41.73	✓	28.54	✓	28.54	✓	41.73								

Comments: MS/MSD @ Port 3 DUPE-5-3012 @ Port 1

WESTBAY™ GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET

WELL ID: MW-14
SAMPLING DATE(S) 8-28-12
LOCATION: Annex Parking Lot, JPL Pasadena
WATER LEVEL INSIDE CASING: 150.17
ATM. PRESSURE (PSI): (Start) 14.03 (Finish) 14.02
35.43°C 21.00°C

PROBE TYPE Westbay
SERIAL NO. EMS2502
PROJECT: JPL Pasadena
OPERATOR(S) A. Wolff
WEATHER Clear

Port Number	Run Number	Probe to Top Collar	Surface Function Tests / Position Sampler (probe in top of collar) / (lower probe to port)				Sample Collection Checks (probe at sampling port in MP casing)							Field Parameters						Sample	
		Arm out / Land Probe	Shoe Out/ Close Valve/ Check Vacuum	Open Valve/ Apply Vacuum (5 psi)	Close Valve/ Shoe In/ Arm In	Locate Port/ Arm Out/ Land Probe	Pressure in MP Casing (psi)	Shoe Out	Port Pressure (psi)	Open Valve	Port Pressure (psi)	Close Valve/ Shoe In	Pressure in MP Casing (psi)	Sample Temp (°C)	SC (µS/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (ppm) mg/L	ORP (mV)	Sample Time	Sample ID
5	1	✓	✓	✓	✓	✓	188.16	✓	174.63	✓	174.63	✓	188.16	25.7	327.2	8.42	3.43	3.64	-91	1115	MW-14-5
4	1	✓	✓	✓	✓	✓	151.56	✓	138.71	✓	138.71	✓	151.56	25.4	757.9	8.11	2.29	3.96	40	1145	MW-14-4
3	1	✓	✓	✓	✓	✓	118.30	✓	106.69	✓	106.69	✓	118.30	25.0	1102	8.00	2.63	2.87	64	1215	MW-14-3
2	1	✓	✓	✓	✓	✓	72.51	✓	61.45	✓	61.45	✓	72.51	25.4	1181	7.75	2.28	2.97	63	1300	MW-14-2
1	1	✓	✓	✓	✓	✓	42.01	✓	32.34	✓	32.34	✓	42.01	26.5	1173	7.70	7.07	2.48	131	1345	MW-14-1

Comments: MS/MSD @ Port 2

WESTBAY™ GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET

WELL ID: MW-17
SAMPLING DATE(S) 8-29-12
LOCATION: 793 Harriet St, Altadena
WATER LEVEL INSIDE CASING: 205.85
ATM. PRESSURE (PSI): (Start) 14.01 (Finish) 13.98
30.48°C 19.59°C

PROBE TYPE Westbay
SERIAL NO. EMS 2502
PROJECT: JPL Pasadena
OPERATOR(S) AWolff
WEATHER Clear

		Probe to Top Collar	Surface Function Tests / Position Sampler (probe in top of collar) / (lower probe to port)				Sample Collection Checks (probe at sampling port in MP casing)							Field Parameters						Sample	
Port Number	Run Number	Arm out / Land Probe	Shoe Out/ Close Valve/ Check Vacuum	Open Valve/ Apply Vacuum (5 psi)	Close Valve/ Shoe In/ Arm In	Locate Port/ Arm Out/ Land Probe	Pressure in MP Casing (psi)	Shoe Out	Port Pressure (psi)	Open Valve	Port Pressure (psi)	Close Valve/ Shoe In	Pressure in MP Casing (psi)	Sample Temp (°C)	SC (µS/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (ppm) mg/L	ORP (mV)	Sample Time	Sample ID
4	1	✓	✓	✓	✓	✓	179.88	✓	156.82	✓	156.82	✓	179.88	25.8	370.6	8.62	2.49	7.10	90	1250	MW-17-4
3	1	✓	✓	✓	✓	✓	130.45	✓	117.21	✓	117.21	✓	130.45	24.9	564.2	8.27	3.67	7.60	100	1325	MW-17-3
2	1	✓	✓	✓	✓	✓	87.84	✓	78.24	✓	78.24	✓	87.84	25.5	450.5	8.35	6.61	5.62	-25	1400	MW-17-2

Comments:

WESTBAY™ GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET

WELL ID: MW-18
SAMPLING DATE(S) 8-29-12
LOCATION: 813 Altadena Dr, Altadena
WATER LEVEL INSIDE CASING: 338.32
ATM. PRESSURE (PSI): (Start) 13.97 (Finish) 13.97
31.12°C 19.12°C

PROBE TYPE Westbay
SERIAL NO. EMS2502
PROJECT: JPL Pasadena
OPERATOR(S) tWolff
WEATHER Clear

Port Number	Run Number	Probe to Top Collar	Surface Function Tests / Position Sampler (probe in top of collar) / (lower probe to port)				Sample Collection Checks (probe at sampling port in MP casing)							Field Parameters						Sample	
		Arm out / Land Probe	Shoe Out/ Close Valve/ Check Vacuum	Open Valve/ Apply Vacuum (5 psi)	Close Valve/ Shoe In/ Arm In	Locate Port/ Arm Out/ Land Probe	Pressure in MP Casing (psi)	Shoe Out	Port Pressure (psi)	Open Valve	Port Pressure (psi)	Close Valve/ Shoe In	Pressure in MP Casing (psi)	Sample Temp (°C)	SC (µS/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (ppm) mg/L	ORP (mV) -40	Sample Time	Sample ID
5	1	✓	✓	✓	✓	✓	165.21	✓	191.61	✓	191.61	✓	165.21	24.3	369.4	8.59	3.47	4.53	~~4.53~~	0915	MW-18-5
4	1	✓	✓	✓	✓	✓	113.48	✓	140.69	✓	140.69	✓	113.48	24.0	386.7	8.21	2.75	4.97	-87	0955	MW-18-4
3	1	✓	✓	✓	✓	✓	52.45	✓	86.51	✓	86.51	✓	52.45	24.9	498.2	8.23	4.42	5.31	-56	1030	MW-18-3
	2	✓	✓	✓	✓	✓	52.45	✓	86.51	✓	86.51	✓	52.45								
2	1	✓	✓	✓	✓	✓	14.12	✓	49.36	✓	49.36	✓	14.12	25.0	409.5	8.33	3.92	6.25	85	1130	MW-18-2

Comments: DUPE-1-30-12 collected @ port 3

WESTBAY™ GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET

WELL ID: MW-19
SAMPLING DATE(S) 8-27-12 / 8-28-12
LOCATION: 2696 Windsor Ave, Altadena
WATER LEVEL INSIDE CASING: 136.70
ATM. PRESSURE (PSI): (Start) 14.04 (Finish) 14.07
31.78°C 19.75°C

PROBE TYPE Westbay
SERIAL NO. EMS 2502
PROJECT: JPL Pasadena
OPERATOR(S) Kwolff
WEATHER Clear

		Probe to Top Collar	Surface Function Tests / Position Sampler (probe in top of collar) / (lower probe to port)				Sample Collection Checks (probe at sampling port in MP casing)							Field Parameters						Sample	
Port Number	Run Number	Arm out / Land Probe	Shoe Out/ Close Valve/ Check Vacuum	Open Valve/ Apply Vacuum (5 psi)	Close Valve/ Shoe In/ Arm In	Locate Port/ Arm Out/ Land Probe	Pressure in MP Casing (psi)	Shoe Out	Port Pressure (psi)	Open Valve	Port Pressure (psi)	Close Valve/ Shoe In	Pressure in MP Casing (psi)	Sample Temp (°C)	SC (µS/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (ppm) mg/L	ORP (mV)	Sample Time	Sample ID
5	1	✓	✓	✓	✓	✓	172.34	✓	150.48	✓	150.48	✓	172.34	25.9	676.8	8.09	2.18	3.10	25	1455	MW-19-5
4	1	✓	✓	✓	✓	✓	149.31	✓	117.96	✓	117.96	✓	149.31	20.1	677.0	8.21	1.75	4.66	79	0800	MW-19-4
3	1	✓	✓	✓	✓	✓	126.74	✓	108.91	✓	108.91	✓	126.74	19.9	596.1	8.11	2.74	4.07	178	0830	MW-19-3
2	1	✓	✓	✓	✓	✓	92.86	✓	76.35	✓	76.35	✓	92.86	19.8	894.5	7.87	28.5	3.91	151	0900	MW-19-2
1	1	✓	✓	✓	✓	✓	61.57	✓	48.77	✓	48.77	✓	61.57	20.2	469.6	8.29	7.66	3.64	143	0930	MW-19-1

Comments: MS/MSD @ Port 3 level IV Validation @ Ports 1+4

WESTBAY™ GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET

WELL ID: MW-20
SAMPLING DATE(S) 8-27-12
LOCATION: 2609 N. Lincoln Ave, Altadena (church parking lot)
WATER LEVEL INSIDE CASING: 192.65
ATM. PRESSURE (PSI): (Start) 14.10 (Finish) 14.04
21.32°C 23.29°C

PROBE TYPE Westbay
SERIAL NO. EMS2502
PROJECT: JPL Pasadena
OPERATOR(S) AWolff
WEATHER Clear

Port Number	Run Number	Probe to Top Collar	Surface Function Tests / Position Sampler (probe in top of collar) / (lower probe to port)				Sample Collection Checks (probe at sampling port in MP casing)							Field Parameters						Sample	
		Arm out / Land Probe	Shoe Out/ Close Valve/ Check Vacuum	Open Valve/ Apply Vacuum (5 psi)	Close Valve/ Shoe In/ Arm In	Locate Port/ Arm Out/ Land Probe	Pressure in MP Casing (psi)	Shoe Out	Port Pressure (psi)	Open Valve	Port Pressure (psi)	Close Valve/ Shoe In	Pressure in MP Casing (psi)	Sample Temp (°C)	SC (µS/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (ppm) mg/L	ORP (mV)	Sample Time	Sample ID
5	1	✓	✓	✓	✓	✓	322.62	✓	320.71	✓	320.71	✓	322.62	21.0	296.0	8.87	3.08	4.87	-175	1010	MW-20-5
4	1	✓	✓	✓	✓	✓	235.87	✓	225.21	✓	225.21	✓	235.87	22.0	309.1	8.96	2.40	3.65	-184	1125	MW-20-4
3	1	✓	✓	✓	✓	✓	176.06	✓	164.67	✓	164.67	✓	176.06	22.5	301.5	9.22	2.36	3.12	-198	1210	MW-20-3
2	1	✓	✓	✓	✓	✓	102.24	✓	98.68	✓	98.68	✓	102.24	22.5	586.2	8.26	1.84	2.61	-108	1255	MW-20-2
1	1	✓	✓	✓	✓	✓	31.87	✓	28.61	✓	28.61	✓	31.87	22.9	630.2	8.13	4.45	2.58	-127	1335	MW-20-1

Comments:

WESTBAY™ GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET

WELL ID: MW-21
SAMPLING DATE(S) 9-6-12
LOCATION: Hahamongna Park, by basket #5 (Disc Golf)
WATER LEVEL INSIDE CASING: 118.96
ATM. PRESSURE (PSI): (Start) 14.10 (Finish) 14.14
28.50°C 25.68°C

PROBE TYPE Westbay
SERIAL NO. EMS2502
PROJECT: JPL, Pasadena
OPERATOR(S) A. Wolff
WEATHER Clear

Port Number	Run Number	Probe to Top Collar	Surface Function Tests / Position Sampler (probe in top of collar) / (lower probe to port)				Sample Collection Checks (probe at sampling port in MP casing)							Field Parameters						Sample	
		Arm out / Land Probe	Shoe Out/ Close Valve/ Check Vacuum	Open Valve/ Apply Vacuum (5 psi)	Close Valve/ Shoe In/ Arm In	Locate Port/ Arm Out/ Land Probe	Pressure in MP Casing (psi)	Shoe Out	Port Pressure (psi)	Open Valve	Port Pressure (psi)	Close Valve/ Shoe In	Pressure in MP Casing (psi)	Sample Temp (°C)	SC (µS/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (ppm)	ORP (mV)	Sample Time	Sample ID
5	1	✓	✓	✓	✓	✓	129.22	✓	148.64	✓	148.64	✓	129.22	25.4	838.9	8.10	2.02	5.69	165	1105	MW-21-5
4	1	✓	✓	✓	✓	✓	102.29	✓	121.81	✓	121.81	✓	102.29	24.9	811.6	8.08	19.5	4.82	173	1135	MW-21-4
3	1	✓	✓	✓	✓	✓	72.11	✓	92.02	✓	92.02	✓	72.11	24.9	1074	8.06	3.70	4.78	194	1205	MW-21-3
	2	✓	✓	✓	✓	✓	72.15	✓	92.04	✓	92.04	✓	72.14								
2	1	✓	✓	✓	✓	✓	37.61	✓	58.05	✓	58.05	✓	37.61	25.1	1196	8.07	1.70	4.08	173	1245	MW-21-2
1	1	✓	✓	✓	✓	✓	14.12	✓	27.19	✓	27.15	✓	14.12	27.8	1212	7.84	7.58	4.65	210	1315	MW-21-1

Comments: Level IV validation @ Port 5 DUPE-7-3012 @ Port 3

WESTBAY™ GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET

WELL ID: MW-22
SAMPLING DATE(S) 8-30-12
LOCATION: Parking lot Building 180, JPL Pasadena
WATER LEVEL INSIDE CASING: 161.23
ATM. PRESSURE (PSI): (Start) 13.97 (Finish) 14.02
26.17°C 20.24°C

PROBE TYPE Westbay
SERIAL NO. EMS2502
PROJECT: JPL Pasadena
OPERATOR(S) Aewbiff
WEATHER Clear

Port Number	Run Number	Probe to Top Collar	Surface Function Tests / Position Sampler (probe in top of collar) / (lower probe to port)				Sample Collection Checks (probe at sampling port in MP casing)							Field Parameters						Sample	
		Arm out / Land Probe	Shoe Out/ Close Valve/ Check Vacuum	Open Valve/ Apply Vacuum (5 psi)	Close Valve/ Shoe In/ Arm In	Locate Port/ Arm Out/ Land Probe	Pressure in MP Casing (psi)	Shoe Out	Port Pressure (psi)	Open Valve	Port Pressure (psi)	Close Valve/ Shoe In	Pressure in MP Casing (psi)	Sample Temp (°C)	SC (µS/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (ppm) mg/l	ORP (mV)	Sample Time	Sample ID
3	1	✓	✓	✓	✓	✓	115.66	✓	104.12	✓	104.12	✓	115.66	21.6	669.1	8.27	2.28	8.60	104	0655	MW-22-3
2	1	✓	✓	✓	✓	✓	89.61	✓	78.01	✓	78.01	✓	89.61	21.7	740.2	8.24	2.63	7.07	147	0730	MW-22-2
1	1	✓	✓	✓	✓	✓	52.67	✓	42.91	✓	42.91	✓	52.67	21.6	1083	8.04	9.28	5.83	176	0805	MW-22-1

Comments:

WESTBAY™ GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET

WELL ID: MW-23
SAMPLING DATE(S) 9-4-12
LOCATION: Building 233 parking lot, JPL
WATER LEVEL INSIDE CASING: 106.96
ATM. PRESSURE (PSI): (Start) 14.10 (Finish) 14.12
25.09°C 21.44°C

PROBE TYPE Westbay
SERIAL NO. EMS2502
PROJECT: JPL Pasadena
OPERATOR(S) AWolff
WEATHER Clear

Port Number	Run Number	Probe to Top Collar	Surface Function Tests / Position Sampler (probe in top of collar) / (lower probe to port)				Sample Collection Checks (probe at sampling port in MP casing)							Field Parameters						Sample	
		Arm out / Land Probe	Shoe Out/ Close Valve/ Check Vacuum	Open Valve/ Apply Vacuum (5 psi)	Close Valve/ Shoe In/ Arm In	Locate Port/ Arm Out/ Land Probe	Pressure in MP Casing (psi)	Shoe Out	Port Pressure (psi)	Open Valve	Port Pressure (psi)	Close Valve/ Shoe In	Pressure in MP Casing (psi)	Sample Temp (°C)	SC (µS/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (ppm) mg/l	ORP (mV)	Sample Time	Sample ID
4	1	✓	✓	✓	✓	✓	163.02	✓	149.87	✓	149.87	✓	163.02	22.4	379.5	7.83	2.07	11.01	99	0900	MW-23-4
3	1	✓	✓	✓	✓	✓	108.43	✓	100.78	✓	100.78	✓	108.43	23.2	406.3	8.15	3.28	5.91	-17	0930	MW-23-3
2	1	✓	✓	✓	✓	✓	80.22	✓	72.82	✓	72.82	✓	80.22	23.1	1097	7.91	2.16	5.39	152	1000	MW-23-2
	2	✓	✓	✓	✓	✓	80.22	✓	72.83	✓	72.83	✓	80.22								
1	1	✓	✓	✓	✓	✓	45.46	✓	40.55	✓	40.55	✓	45.46	24.0	981.5	8.01	13.0	5.19	142	1100	MW-23-1

Comments: Level IV Validation @ Port 4 DUPE-4-3Q12 @ Port 2

WESTBAY™ GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET

WELL ID: MW-24
SAMPLING DATE(S) 9-5-12
LOCATION: Aeros Rd, E. of Building 79, JPL
WATER LEVEL INSIDE CASING: 175.35
ATM. PRESSURE (PSI): (Start) 14.09 (Finish) 14.05
22.48 21.97°C

PROBE TYPE Westbay
SERIAL NO. EMS2502
PROJECT: JPL, Pasadena
OPERATOR(S) A. Wolff
WEATHER Overcast, light rain

Port Number	Run Number	Probe to Top Collar	Surface Function Tests / Position Sampler (probe in top of collar) / (lower probe to port)				Sample Collection Checks (probe at sampling port in MP casing)							Field Parameters						Sample	
		Arm out / Land Probe	Shoe Out/ Close Valve/ Check Vacuum	Open Valve/ Apply Vacuum (5 psi)	Close Valve/ Shoe In/ Arm In	Locate Port/ Arm Out/ Land Probe	Pressure in MP Casing (psi)	Shoe Out	Port Pressure (psi)	Open Valve	Port Pressure (psi)	Close Valve/ Shoe In	Pressure in MP Casing (psi)	Sample Temp (°C)	SC (µS/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (ppm)	ORP (mV)	Sample Time	Sample ID
4	1	✓	✓	✓	✓	✓	180.24	✓	155.23	✓	155.23	✓	180.24	22.4	246.0	9.17	2.79	6.89	-18.3	1130	MW-24-4
3	1	✓	✓	✓	✓	✓	128.63	✓	109.46	✓	109.46	✓	128.63	22.5	417.6	8.47	3.36	5.92	-117	1200	MW-24-3
	2	✓	✓	✓	✓	✓	128.62	✓	109.44	✓	109.44	✓	128.62								
2	1	✓	✓	✓	✓	✓	101.75	✓	83.33	✓	83.33	✓	101.75	22.2	481.1	8.34	3.06	5.82	-50	1300	MW-24-2
1	1	✓	✓	✓	✓	✓	61.03	✓	45.80	✓	45.80	✓	61.03	23.3	578.3	8.09	3.42	5.63	-10	1330	MW-24-1

Comments: DUPE-C-3012 @ Port 3

WESTBAY™ GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET

WELL ID: MW-25
SAMPLING DATE(S) 8-30-12
LOCATION: Pasadena City Yard,
WATER LEVEL INSIDE CASING: 263.20
ATM. PRESSURE (PSI): (Start) 14.12 (Finish) 14.09
28.25°C 22.53°C

PROBE TYPE Westbay
SERIAL NO. EMS2502
PROJECT: JPL Pasadena
OPERATOR(S) AWolff
WEATHER Clear

Port Number	Run Number	Probe to Top Collar	Surface Function Tests / Position Sampler (probe in top of collar) / (lower probe to port)				Sample Collection Checks (probe at sampling port in MP casing)							Field Parameters						Sample	
		Arm out / Land Probe	Shoe Out/ Close Valve/ Check Vacuum	Open Valve/ Apply Vacuum (5 psi)	Close Valve/ Shoe In/ Arm In	Locate Port/ Arm Out/ Land Probe	Pressure in MP Casing (psi)	Shoe Out	Port Pressure (psi)	Open Valve	Port Pressure (psi)	Close Valve/ Shoe In	Pressure in MP Casing (psi)	Sample Temp (°C)	SC (µS/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (ppm) mg/l	ORP (mV)	Sample Time	Sample ID
5	1	✓	✓	✓	✓	✓	214.05	✓	211.19	✓	211.19	✓	214.05	26.0	430.3	8.88	2.55	7.11	-150	1120	MW-25-5
4	1	✓	✓	✓	✓	✓	179.41	✓	175.45	✓	175.45	✓	179.41	25.3	731.3	8.04	2.76	8.41	29	1150	MW-25-4
3	1	✓	✓	✓	✓	✓	123.24	✓	122.48	✓	122.48	✓	123.24	25.0	627.0	8.35	1.89	5.63	102	1220	MW-25-3
	2	✓	✓	✓	✓	✓	123.25	✓	122.48	✓	122.48	✓	123.25								
2	1	✓	✓	✓	✓	✓	88.39	✓	90.66	✓	90.66	✓	88.39	26.5	642.1	8.34	2.27	5.20	99	1320	MW-25-2
1	1	✓	✓	✓	✓	✓	60.04	✓	63.59	✓	63.59	✓	60.04	26.5	803.8	8.16	11.0	5.67	123	1350	MW-25-1

Comments: Level IV Validation @ Port 5 DUPE-2-30312 @ Port 3

WESTBAY™ GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET

WELL ID: MW-26
SAMPLING DATE(S) 8-30-12
LOCATION: Muir High Parking lot
WATER LEVEL INSIDE CASING: ∅ 84.37
ATM. PRESSURE (PSI): (Start) 13.99 (Finish) 14.05
25.00°C 20.32°C

PROBE TYPE Westbay
SERIAL NO. EMS2.502
PROJECT: JPL Pasadena
OPERATOR(S) AWolff
WEATHER Clear

Port Number	Run Number	Probe to Top Collar	Surface Function Tests / Position Sampler (probe in top of collar) / (lower probe to port)				Sample Collection Checks (probe at sampling port in MP casing)							Field Parameters						Sample	
		Arm out / Land Probe	Shoe Out/ Close Valve/ Check Vacuum	Open Valve/ Apply Vacuum (5 psi)	Close Valve/ Shoe In/ Arm In	Locate Port/ Arm Out/ Land Probe	Pressure in MP Casing (psi)	Shoe Out	Port Pressure (psi)	Open Valve	Port Pressure (psi)	Close Valve/ Shoe In	Pressure in MP Casing (psi)	Sample Temp (°C)	SC (µS/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (ppm) mg/l	ORP (mV)	Sample Time	Sample ID
2	1	✓	✓	✓	✓	✓	74.56	✓	70.61	✓	70.61	✓	74.56	24.9	685.8	8.36	4.62	6.20	141	0930	MW-26-2
1	1	✓	✓	✓	✓	✓	39.67	✓	35.64	✓	35.64	✓	39.67	25.7	864.5	8.13	3.09	7.57	154	1005	MW-26-1
	2	✓	✓	✓	✓	✓	37.69	✓	35.66	✓	35.66	✓	37.69								

Comments:

ATTACHMENT 5: WATER LEVEL MEASUREMENTS

This attachment contains water level measurements for the JPL relatively shallow standpipe monitoring wells (MW-1, MW-5 through MW-10, MW-13, MW-15, and MW-16) and the Westbay™ multiport wells (MW-3, MW-4, MW-11, MW-12, MW-14, and MW-17 through MW-26) obtained during the 3rd Quarter 2012. Water level measurements were recorded before the sampling event on August 24, 2012 for the relatively shallow standpipe monitoring wells and for the Westbay™ multiport wells. Water level measurements were recorded after the sampling event on September 11, 2012 for the relatively shallow standpipe monitoring wells and the Westbay™ multiport wells. Water levels for the shallow wells were measured using a Solinst™ water level meter. In the deep multiport wells, the hydraulic head at each sampling port was measured with a Westbay™ MOSDAX sampling probe. Water level measurements were conducted by Blaine Tech Services, Inc.

Note: no samples were collected from MW-1 or MW-9 during the third quarter 2012 sampling event; however water levels were obtained.

Battelle
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505 King Avenue
Columbus, OH 43201

Pre-Event Shallow Well Sounding Log

Project Name: JPL GW Monitoring 3Q12

WELL #	*DATE*	*TIME*	*DEPTH (FT)*
MW-1	8/24/2012	12:55	28.61
MW-5	8/24/2012	7:49	76.05
MW-6	8/24/2012	11:31	182.77
MW-7	8/24/2012	9:56	214.63
MW-8	8/24/2012	10:25	142.16
MW-9	8/24/2012	13:00	20.20
MW-10	8/24/2012	9:09	91.10
MW-13	8/24/2012	10:35	186.35
MW-15	8/24/2012	9:33	32.42
MW-16	8/24/2012	9:48	238.76

WESTBAY™ GROUNDWATER MONITORING WELL
WATER LEVEL MEASUREMENT LOG SHEET

WELL ID: MW-3
DATE: 8-24-12
LOCATION: JPL
ELEV. TOP OF WASTBAY CASING 1,100.34
WEATHER: Clear

PROBE TYPE Westbay
SERIAL NO. EMS2502
PROJECT JPL Pasadena
OPERATOR(S) AZWolff
ATM. PRESSURE (Patm): (start) 14.08 (finish) 14.10
21.64°C 18.67°C

Port No.	Depth to Meas. Port Valve (ft)		Pressure Readings (psi)				Pressure Head Outside Port (ft) P(ft)=(P2-Patm)*2.307 ft/psi)	Depth to Water Outside Port (ft) DTW = Dp-P(ft)	True Port Depth (Dp) (ft)	Time
	From Log (Dp)	From Cable	psi Inside Casing	kg/cm² Outside Casing P2	mH²O Inside Casing	Trans. Temp. (oC)				
5	653	648	230.41	237.07	230.41	22.91	514.44	138.56	653	1234
4	558	553	189.15	195.97	189.15	23.03	419.62	138.38	558	1237
3	346	342	96.98	111.25	96.98	22.33	224.17	121.83	346	1239
2	252	248	56.11	70.18	56.11	20.83	129.42	122.58	252	1240
1	172	169	21.31	39.41	21.31	19.74	58.44	113.56	172	1241

Comments: Collar detect is 2' above sample port

WESTBAY™ GROUNDWATER MONITORING WELL
WATER LEVEL MEASUREMENT LOG SHEET

WELL ID: MW-4

DATE: 8-24-12

LOCATION: JPL

ELEV. TOP OF WASTBAY CASING 1,082.84

WEATHER: Overcast

PROBE TYPE Westbay

SERIAL NO. EM525832

PROJECT JPL Pasadena

OPERATOR(S) A Wolff

ATM. PRESSURE (Patm): (start) 14.04 (finish) 14.07

23.42°C 19.78°C

Port No.	Depth to Meas. Port Valve (ft)		Pressure Readings (psi)				Pressure Head Outside Port (ft) P(ft)=(P2-Patm)*2.307 ft/psi)	Depth to Water Outside Port (ft) DTW = Dp-P(ft)	True Port Depth (Dp) (ft)	Time
	From Log (Dp)	From Cable	psi Inside Casing	kg/cm² Outside Casing P2	mH²O Inside Casing	Trans. Temp. (oC)				
5	513	510	149.21	195.59	149.21	22.73	418.84	94.16	513	0820
4	392	390	96.57	143.21	96.57	22.21	298.00	94.00	392	0823
3	322	320	66.10	112.88	66.10	21.82	228.02	93.98	322	0824
2	240	238	30.40	77.84	30.40	21.31	147.19	92.81	240	0825
1	150	148	14.15	41.22	14.15	20.72	62.70	87.30	150	0826

Comments: Collar detect is 2" ~~below~~ above sample port

WESTBAY™ GROUNDWATER MONITORING WELL
WATER LEVEL MEASUREMENT LOG SHEET

WELL ID: MW-11

DATE: 8-23-12

LOCATION: JPL

ELEV. TOP OF WASTBAY CASING 1,139.30

WEATHER: Clear

PROBE TYPE Westbay

SERIAL NO. EMS2502

PROJECT JPL Pasadena

OPERATOR(S) AWolff

ATM. PRESSURE (Patm): (start) 14.06 (finish) 14.07

25.07°C 19.70°C

Port No.	Depth to Meas. Port Valve (ft)		Pressure Readings (psi)				Pressure Head Outside Port (ft) P(ft)=(P2-Patm)*2.307 ft/psi)	Depth to Water Outside Port (ft) DTW = Dp-P(ft)	True Port Depth (Dp) (ft)	Time
	From Log (Dp)	From Cable	psi Inside Casing	kg/cm² Outside Casing P2	mH²O Inside Casing	Trans. Temp. (oC)				
5	639	636	239.01	212.43	239.01	22.91	457.64	181.36	639	1611
4	524	522	189.51	175.73	189.51	22.51	368.36	155.64	524	1613
3	429	427	148.66	134.67	148.66	21.13	278.25	150.75	429	1614
2	259	257	75.09	63.86	75.09	20.15	114.89	144.11	259	1616
1	149	149	27.76	29.30	27.76	19.21	35.16	113.84	149	1617

Comments: Collar detect is 6" above sample port

WESTBAY™ GROUNDWATER MONITORING WELL
WATER LEVEL MEASUREMENT LOG SHEET

WELL ID: MW-12

DATE: 8-24-12

LOCATION: JPL

ELEV. TOP OF WASTBAY CASING 1,102.14

WEATHER: Overcast

PROBE TYPE Westbay

SERIAL NO. EMS2502

PROJECT JPL Pasadena

OPERATOR(S) Atwoiff

ATM. PRESSURE (Patm): (start) 14.09 (finish) 14.10

20.84°C 18.13°C

Port No.	Depth to Meas. Port Valve (ft)		Pressure Readings (psi)				Pressure Head Outside Port (ft) P(ft)=(P2-Patm)*2.307 ft/psi)	Depth to Water Outside Port (ft) DTW = Dp-P(ft)	True Port Depth (Dp) (ft)	Time
	From Log (Dp)	From Cable	psi Inside Casing	kg/cm² Outside Casing P2	mH²O Inside Casing	Trans. Temp. (oC)				
5	548	547	215.61	193.41	215.61	20.45	413.69	134.31	548	0919
4	436	435	166.92	151.69	166.92	20.76	317.44	118.56	436	0921
3	323	323	117.80	105.45	117.80	20.18	210.77	112.23	323	0922
2	243	243	82.91	71.38	82.91	19.50	132.17	110.83	243	0924
1	140	140	38.05	30.02	38.05	18.83	36.75	103.25	140	0925

Comments: Collar detect is 6" above sample port

WESTBAY™ GROUNDWATER MONITORING WELL
WATER LEVEL MEASUREMENT LOG SHEET

WELL ID: MW-14

DATE: 8-23-12

LOCATION: JPL

ELEV. TOP OF WASTBAY CASING 1,173.47

WEATHER: Clear

PROBE TYPE Westbay

SERIAL NO. EMS2504

PROJECT JPL Pasadena

OPERATOR(S) tWolff

ATM. PRESSURE (Patm): (start) 14.02 (finish) 14.09

25.27°C 20.10°C

Port No.	Depth to Meas. Port Valve (ft)		Pressure Readings (psi)				Pressure Head Outside Port (ft) P(ft)=(P2-Patm)*2.307 ft/psi)	Depth to Water Outside Port (ft) DTW = Dp-P(ft)	True Port Depth (Dp) (ft)	Time
	From Log (Dp)	From Cable	psi Inside Casing	kg/cm² Outside Casing P2	mH²O Inside Casing	Trans. Temp. (oC)				
5	540	540	185.72	174.63	185.72	23.26	370.53	169.47	540	1105
4	456	455	148.39	139.26	148.39	21.84	288.93	167.07	456	1107
3	382	381	116.27	107.26	116.27	21.27	215.10	166.90	382	1108
2	277	276	70.48	61.94	70.48	20.65	110.55	166.45	277	1109
1	207	206	39.89	32.70	39.89	20.14	43.09	163.91	207	1110

Comments: Collar detect located 6" above sample port

WESTBAY™ GROUNDWATER MONITORING WELL
WATER LEVEL MEASUREMENT LOG SHEET

WELL ID: MW-17

DATE: 8-24-12

LOCATION: JPL

ELEV. TOP OF WASTBAY CASING 1,191.21

WEATHER: Clear

PROBE TYPE Westbay

SERIAL NO. EMS2502

PROJECT JPL Pasadena

OPERATOR(S) t Wolff

ATM. PRESSURE (Patm): (start) 14.04 (finish) 14.05

24.87° C 16.73° C

Port No.	Depth to Meas. Port Valve (ft)		Pressure Readings (psi)				Pressure Head Outside Port (ft) P(ft)=(P2-Patm)*2.307 ft/psi)	Depth to Water Outside Port (ft) DTW = Dp-P(ft)	True Port Depth (Dp) (ft)	Time
	From Log (Dp)	From Cable	psi Inside Casing	kg/cm² Outside Casing P2	mH²O Inside Casing	Trans. Temp. (oC)				
5	726	722	240.66	225.33	240.66	21.76	522.81	203.19	726	1317
4	582	578	178.31	164.50	178.31	20.72	378.97	203.03	582	1319
3	468	464	128.91	119.51	128.91	18.27	265.01	202.99	468	1323
2	370	366	86.39	79.77	86.39	17.62	166.91	203.09	370	1325
1	250	247	34.22	32.51	34.22	16.88	46.56	203.44	250	1326

Comments: Collar detect is located 6" above sample port

WESTBAY™ GROUNDWATER MONITORING WELL
WATER LEVEL MEASUREMENT LOG SHEET

WELL ID: MW-18

DATE: 8-23-12

LOCATION: JPL

ELEV. TOP OF WASTBAY CASING 1,225.41

WEATHER: Clear

PROBE TYPE Westbay

SERIAL NO. EMS2502

PROJECT JPL Pasadena

OPERATOR(S) tWolff

ATM. PRESSURE (Patm): (start) 14.02 (finish) 14.03

22.84°C 17.57°C

Port No.	Depth to Meas. Port Valve (ft)		Pressure Readings (psi)				Pressure Head Outside Port (ft) P(ft)=(P2-Patm)*2.307 ft/psi)	Depth to Water Outside Port (ft) DTW = Dp-P(ft)	True Port Depth (Dp) (ft)	Time
	From Log (Dp)	From Cable	psi Inside Casing	kg/cm² Outside Casing P2	mH²O Inside Casing	Trans. Temp. (oC)				
5	684	681	162.01	192.98	162.01	21.77	412.86	271.14	684	1344
4	564	561	109.87	145.26	109.87	21.33	302.77	261.23	564	1346
3	424	422	48.98	88.16	48.98	20.15	171.04	252.96	424	1347
2	330	229	14.21	50.09	14.21	18.98	83.21	246.79	330	1349
1	270	269	14.15	24.66	14.15	18.12	29.55	245.45	270	1350

Comments: Collar detect located 6" above sample port

WESTBAY™ GROUNDWATER MONITORING WELL
WATER LEVEL MEASUREMENT LOG SHEET

WELL ID: MW-19
DATE: 8-28-12
LOCATION: JPL
ELEV. TOP OF WASTBAY CASING 1,142.94
WEATHER: Clear

PROBE TYPE Westbay
SERIAL NO. EMS2502
PROJECT JPL Pasadena
OPERATOR(S) AW. Iff
ATM. PRESSURE (Patm): (start) 14.05 (finish) 14.09
25.61° C 17.77° C

Port No.	Depth to Meas. Port Valve (ft)		Pressure Readings (psi)				Pressure Head Outside Port (ft) P(ft)=(P2-Patm)*2.307 ft/psi)	Depth to Water Outside Port (ft) DTW = Dp-P(ft)	True Port Depth (Dp) (ft)	Time
	From Log (Dp)	From Cable	psi Inside Casing	kg/cm² Outside Casing P2	mH²O Inside Casing	Trans. Temp. (oC)				
5	498	495	172.19	150.56	172.19	19.56	314.93	183.07	498	1158
4	444	444	148.84	127.39	148.84	19.59	261.48	182.52	444	1200
3	392	389	125.44	112.42	125.44	19.53	226.94	165.06	392	1209
2	314	312	91.57	78.43	91.57	19.34	148.52	165.48	314	1211
1	242	240	60.31	49.59	60.31	18.73	81.99	160.01	242	1212

Comments: Collar detect is 6" above sample port

WESTBAY™ GROUNDWATER MONITORING WELL
WATER LEVEL MEASUREMENT LOG SHEET

WELL ID: MW-20
DATE: 8-23-12
LOCATION: JPL
ELEV. TOP OF WASTBAY CASING 1,165.05
WEATHER: Clear

PROBE TYPE Westbay
SERIAL NO. EMS2502
PROJECT JPL Pasadena
OPERATOR(S) Wolff
ATM. PRESSURE (Patm): (start) 14.02 (finish) 14.04
23.08°C 17.96°C

Port No.	Depth to Meas. Port Valve (ft)		Pressure Readings (psi)				Pressure Head Outside Port (ft) P(ft)=(P2-Patm)*2.307 ft/psi)	Depth to Water Outside Port (ft) DTW = Dp-P(ft)	True Port Depth (Dp) (ft)	Time
	From Log (Dp)	From Cable	psi Inside Casing	kg/cm² Outside Casing P2	mH²O Inside Casing	Trans. Temp. (oC)				
5	900	895	321.60	320.75	321.60	22.74	707.63	192.37	900	1416
4	700	696	234.95	225.14	234.95	22.77	487.05	212.95	700	1418
3	562	558	175.13	165.64	175.13	21.88	349.79	212.21	562	1420
2	392	389	101.42	98.50	101.42	20.31	194.90	197.10	392	1421
1	230	228	31.02	28.59	31.02	18.66	33.61	196.39	230	1422

Comments: Collar detect is located 6" above sample port

WESTBAY™ GROUNDWATER MONITORING WELL
WATER LEVEL MEASUREMENT LOG SHEET

WELL ID: MW-21

DATE: 8-24-12

LOCATION: JPL

ELEV. TOP OF WASTBAY CASING 1,059.10

WEATHER: Clear

PROBE TYPE Westbay

SERIAL NO. EMS2502

PROJECT JPL Pasadena

OPERATOR(S) L Wolff

ATM. PRESSURE (Patm): (start) 14.10 (finish) 14.10

25.30°C 20.51°C

Port No.	Depth to Meas. Port Valve (ft)		Pressure Readings (psi)				Pressure Head Outside Port (ft) P(ft)=(P2-Patm)*2.307 ft/psi)	Depth to Water Outside Port (ft) DTW = Dp-P(ft)	True Port Depth (Dp) (ft)	Time
	From Log (Dp)	From Cable	psi Inside Casing	kg/cm² Outside Casing P2	mH²O Inside Casing	Trans. Temp. (oC)				
5	372	371	125.37	149.68	125.37	21.94	312.78	59.22	372	1538
4	310	309	98.46	122.84	98.46	20.53	250.86	59.14	310	1541
3	240	240	68.44	93.04	68.44	20.13	182.11	57.89	240	1543
2	161	161	34.01	59.00	34.01	19.51	103.58	57.42	161	1544
1	90	89	14.15	28.04	14.15	19.29	32.16	57.84	90	1545

Comments: Collar detect is 2' above sample port

WESTBAY™ GROUNDWATER MONITORING WELL
WATER LEVEL MEASUREMENT LOG SHEET

WELL ID: MW-22

DATE: 8-30-12

LOCATION: Parking lot Building 183, JPL Pasadena

ELEV. TOP OF WASTBAY CASING 4,176.98

WEATHER: Clear

PROBE TYPE Westbay

SERIAL NO. EMS2502

PROJECT JPL Pasadena

OPERATOR(S) fWolff

ATM. PRESSURE (Patm): (start) 13.97 (finish) 14.02

26.17°C 20.24°C

Port No.	Depth to Meas. Port Valve (ft)		Pressure Readings (psi)				Pressure Head Outside Port (ft) P(ft)=(P2-Patm)*2.307 ft/psi)	Depth to Water Outside Port (ft) DTW = Dp-P(ft)	True Port Depth (Dp) (ft)	Time
	From Log (Dp)	From Cable	psi Inside Casing	kg/cm² Outside Casing P2	mH²O Inside Casing	Trans. Temp. (oC)				
5	588	585	202.04	182.25	202.04	22.57	388.22	199.78	588	0630
4	467	464	149.43	133.03	149.43	22.21	274.67	192.33	467	0633
3	389	387	115.66	104.12	115.66	21.78	207.98	181.02	389	0636
2	329	327	89.59	78.01	89.59	20.81	147.74	181.26	329	0646
1	245	243	52.66	42.93	52.66	20.36	66.81	178.19	245	0647

Comments: Collar detect located 1' above sample port

WESTBAY™ GROUNDWATER MONITORING WELL
WATER LEVEL MEASUREMENT LOG SHEET

WELL ID: MW-23

DATE: 8-24-12

LOCATION: JPL

ELEV. TOP OF WASTBAY CASING 1,108.84

WEATHER: Overcast

PROBE TYPE Westbay

SERIAL NO. EMS2502

PROJECT JPL Pasadena

OPERATOR(S) AWolff

ATM. PRESSURE (Patm): (start) 14.07 (finish) 14.13

20.81°C 20.26°C

Port No.	Depth to Meas. Port Valve (ft)		Pressure Readings (psi)				Pressure Head Outside Port (ft) P(ft)=(P2-Patm)*2.307 ft/psi)	Depth to Water Outside Port (ft) DTW = Dp-P(ft)	True Port Depth (Dp) (ft)	Time
	From Log (Dp)	From Cable	psi Inside Casing	kg/cm² Outside Casing P2	mH²O Inside Casing	Trans. Temp. (oC)				
5	542	540	203.43	193.74	203.43	21.21	414.50	127.50	542	0851
4	445	443	161.44	153.04	161.44	21.40	320.60	124.40	445	0853
3	319	317	106.87	103.60	106.87	21.23	206.55	112.45	319	0855
2	254	253	78.63	75.46	78.63	20.93	141.63	112.37	254	0856
1	174	173	43.93	41.63	43.93	20.54	63.58	110.42	174	0857

Comments: Collar detect is 1' above sample port

WESTBAY™ GROUNDWATER MONITORING WELL
WATER LEVEL MEASUREMENT LOG SHEET

WELL ID: MW-24

DATE: 8-24-12

LOCATION: JPL

ELEV. TOP OF WASTBAY CASING 1,200.94

WEATHER: Clear

PROBE TYPE Westbay

SERIAL NO. EMS 2502

PROJECT JPL Pasadena

OPERATOR(S) A Wolff

ATM. PRESSURE (Patm): (start) 14.05 (finish) 14.05

22.47°C 21.01°C

Port No.	Depth to Meas. Port Valve (ft)		Pressure Readings (psi)				Pressure Head Outside Port (ft) P(ft)=(P2-Patm)*2.307 ft/psi)	Depth to Water Outside Port (ft) DTW = Dp-P(ft)	True Port Depth (Dp) (ft)	Time
	From Log (Dp)	From Cable	psi Inside Casing	kg/cm² Outside Casing P2	mH²O Inside Casing	Trans. Temp. (oC)				
5	678	677	232.26	210.28	232.26	22.40	452.70	225.30	678	1009
4	554	554	178.68	159.56	178.68	22.37	335.69	218.31	554	1010
3	435	435	127.11	112.99	127.11	22.11	228.25	206.75	435	1011
2	373	374	100.19	86.43	100.19	21.97	166.98	206.02	373	1012
1	279	280	59.44	47.01	59.44	21.86	76.04	202.96	279	1013

Comments: Collar detect is 6" above sample port

WESTBAY™ GROUNDWATER MONITORING WELL
WATER LEVEL MEASUREMENT LOG SHEET

WELL ID: MW-25
DATE: 8-28-12
LOCATION: JPL
ELEV. TOP OF WASTBAY CASING 934.52
WEATHER: Clear

PROBE TYPE Westbay
SERIAL NO. EMS2502
PROJECT JPL Pasadena
OPERATOR(S) AWolff
ATM. PRESSURE (Patm): (start) 14.13 (finish) 14.17
24.71°C 20.38°C

Port No.	Depth to Meas. Port Valve (ft)		Pressure Readings (psi)				Pressure Head Outside Port (ft) P(ft)=(P2-Patm)*2.307 ft/psi)	Depth to Water Outside Port (ft) DTW = Dp-P(ft)	True Port Depth (Dp) (ft)	Time
	From Log (Dp)	From Cable	psi Inside Casing	kg/cm² Outside Casing P2	mH²O Inside Casing	Trans. Temp. (oC)				
5	713	711	210.26	211.33	210.26	23.14	454.94	258.06	713	1510
4	633	631	175.80	175.58	175.80	22.81	372.47	260.53	633	1512
3	503	501	119.48	122.57	119.48	22.19	250.17	252.83	503	1513
2	423	422	84.87	90.75	84.87	21.62	176.76	246.24	423	1514
1	358	357	56.57	63.66	56.57	20.81	114.27	243.73	358	1515

Comments: Collar detect is 2' below sample port

WESTBAY™ GROUNDWATER MONITORING WELL
WATER LEVEL MEASUREMENT LOG SHEET

WELL ID: MW-26

DATE: 8-23-12

LOCATION: JPL

ELEV. TOP OF WASTBAY CASING 1,059.08

WEATHER: Clear

PROBE TYPE Westbay

SERIAL NO. EMS 2502

PROJECT JPL Pasadena

OPERATOR(S) AWolff

ATM. PRESSURE (Patm): (start) 14.10 (finish) 14.10

24.45°C 19.99°C

Port No.	Depth to Meas. Port Valve (ft)		Pressure Readings (psi)				Pressure Head Outside Port (ft) P(ft)=(P2-Patm)*2.307 ft/psi)	Depth to Water Outside Port (ft) DTW = Dp-P(ft)	True Port Depth (Dp) (ft)	Time
	From Log (Dp)	From Cable	psi Inside Casing	kg/cm² Outside Casing P2	mH²O Inside Casing	Trans. Temp. (oC)				
2	215	212	71.06	71.48	71.06	21.57	132.38	82.62	215	1447
1	135	132	36.20	35.99	36.20	20.73	50.50	84.50	135	1449

Comments: Collar detect located 2' ~~above~~ below sample port

Battelle
The Business of Innovation

505 King Avenue
Columbus, OH 43201

Post-Event Shallow Well Sounding Log

Project Name: JPL GW Monitoring 3Q12

WELL #	*DATE*	*TIME*	*DEPTH (FT)*
MW-1	9/11/2012	8:29	29.40
MW-5	9/11/2012	7:08	81.50
MW-6	9/11/2012	10:07	185.21
MW-7	9/11/2012	9:32	219.41
MW-8	9/11/2012	13:01	146.65
MW-9	9/11/2012	8:33	20.75
MW-10	9/11/2012	7:02	95.05
MW-13	9/11/2012	5:40	190.18
MW-15	9/11/2012	8:00	34.06
MW-16	9/11/2012	9:24	242.61

WESTBAY™ GROUNDWATER MONITORING WELL
WATER LEVEL MEASUREMENT LOG SHEET

WELL ID: MW-3

DATE: 9/11/12

LOCATION: JPL

ELEV. TOP OF WASTBAY CASING 1,100.34

WEATHER: Partly Cloudy

PROBE TYPE Westbay

SERIAL NO. EMS 2502

PROJECT JPL Pasadena

OPERATOR(S) AWolff

ATM. PRESSURE (Patm): (start) 14.63 (finish) 14.10

21.27°C 19.11

Port No.	Depth to Meas. Port Valve (ft)		Pressure Readings (psi)				Pressure Head Outside Port (ft) P(ft)=(P2-Patm)*2.307 ft/psi)	Depth to Water Outside Port (ft) DTW = Dp-P(ft)	True Port Depth (Dp) (ft)	Time
	From Log (Dp)	From Cable	psi Inside Casing	kg/cm² Outside Casing P2	mH²O Inside Casing	Trans. Temp. (oC)				
5	653	651	223.30	225.33	223.30	22.06	487.47	165.53	653	0848
4	558	556	182.07	184.27	182.07	22.47	392.74	165.26	558	0849
3	346	345	89.87	107.30	89.87	21.92	215.17	130.83	346	0851
2	252	252	49.01	67.00	49.01	21.55	122.20	129.80	252	0852
1	172	172	14.20	36.99	14.20	19.96	52.97	119.03	172	0853

Comments:

WESTBAY™ GROUNDWATER MONITORING WELL
WATER LEVEL MEASUREMENT LOG SHEET

WELL ID: MW-4

DATE: 9/11/12

LOCATION: JPL

ELEV. TOP OF WASTBAY CASING 1082.84

WEATHER: Partly cloudy

PROBE TYPE Westbay

SERIAL NO. EMS2502

PROJECT JPL Pasadena

OPERATOR(S) AWolff

ATM. PRESSURE (Patm): (start) 14.12 (finish) 14.14

22.00°C 20.24

Port No.	Depth to Meas. Port Valve (ft)		Pressure Readings (psi)				Pressure Head Outside Port (ft) P(ft)=(P2-Patm)*2.307 ft/psi)	Depth to Water Outside Port (ft) DTW = Dp-P(ft)	True Port Depth (Dp) (ft)	Time
	From Log (Dp)	From Cable	psi Inside Casing	kg/cm² Outside Casing P2	mH²O Inside Casing	Trans. Temp. (oC)				
5	513	512	149.49	190.17	149.49	21.95	406.15	106.85	513	0718
4	392	391	96.81	137.78	96.81	22.07	285.28	106.72	392	0719
3	322	321	66.43	107.48	66.43	21.88	215.38	106.62	322	0719
2	240	240	30.68	72.84	30.68	21.58	135.47	104.53	240	0720
1	150	150	14.20	39.11	14.20	21.04	57.65	92.35	150	0721

Comments:

WESTBAY™ GROUNDWATER MONITORING WELL
WATER LEVEL MEASUREMENT LOG SHEET

WELL ID: MW-11

DATE: 9/11/12

LOCATION: JPL

ELEV. TOP OF WASTBAY CASING 1139.30

WEATHER: Partly Cloudy

PROBE TYPE Westbay

SERIAL NO. EMS 2502

PROJECT JPL, Pasadena

OPERATOR(S) AWolff

ATM. PRESSURE (Patm): (start) 14.10 (finish) 14.07

21.23°C 18.21

Port No.	Depth to Meas. Port Valve (ft)		Pressure Readings (psi)				Pressure Head Outside Port (ft) P(ft)=(P2-Patm)*2.307 ft/psi)	Depth to Water Outside Port (ft) DTW = Dp-P(ft)	True Port Depth (Dp) (ft)	Time
	From Log (Dp)	From Cable	psi Inside Casing	kg/cm² Outside Casing P2	mH²O Inside Casing	Trans. Temp. (oC)				
5	639	628	238.84	204.92	238.84	20.09	440.22	198.78	639	0748
4	524	523	189.34	173.04	189.34	20.67	366.67	157.33	524	0749
3	429	428	148.42	131.40	148.42	20.60	270.61	158.39	429	0750
2	259	259	75.05	61.72	75.05	20.10	109.86	149.14	259	0751
1	149	150	27.57	28.52	27.57	18.62	33.27	115.73	149	0753

Comments:

WESTBAY™ GROUNDWATER MONITORING WELL
WATER LEVEL MEASUREMENT LOG SHEET

WELL ID: MW-12

DATE: 9/11/12

LOCATION: JPL

ELEV. TOP OF WASTBAY CASING 1102.14

WEATHER: Partly Cloudy

PROBE TYPE Westbay

SERIAL NO. ~~SS~~ EMS2502

PROJECT JPL, Pasadena

OPERATOR(S) AWolff

ATM. PRESSURE (Patm): (start) 14.09 (finish) 14.11

20.13°C 18.36°C

Port No.	Depth to Meas. Port Valve (ft)		Pressure Readings (psi)				Pressure Head Outside Port (ft) P(ft)=(P2-Patm)*2.307 ft/psi)	Depth to Water Outside Port (ft) DTW = Dp-P(ft)	True Port Depth (Dp) (ft)	Time
	From Log (Dp)	From Cable	psi Inside Casing	kg/cm² Outside Casing P2	mH²O Inside Casing	Trans. Temp. (oC)				
5	548	548	215.35	181.66	215.35	20.98	386.58	161.42	548	0814
4	436	436	166.89	146.09	166.89	21.15	304.52	131.48	436	0815
3	323	323	117.55	99.58	117.55	20.70	197.23	125.77	323	0816
2	243	244	82.74	66.22	82.74	19.96	120.26	122.74	243	0817
1	140	141	37.89	27.98	37.89	19.26	32.04	107.96	140	0818

Comments:

WESTBAY™ GROUNDWATER MONITORING WELL
WATER LEVEL MEASUREMENT LOG SHEET

WELL ID: MW-14

DATE: 9/11/12

LOCATION: JPL

ELEV. TOP OF WASTBAY CASING 1173.47

WEATHER: Partly Cloudy

PROBE TYPE Westbay

SERIAL NO. EMS 2502

PROJECT JPL, Pasadena

OPERATOR(S) Awolff

ATM. PRESSURE (Patm): (start) 14.01 (finish) 14.07

24.35° C 19.39

Port No.	Depth to Meas. Port Valve (ft)		Pressure Readings (psi)				Pressure Head Outside Port (ft) P(ft)=(P2-Patm)*2.307 ft/psi)	Depth to Water Outside Port (ft) DTW = Dp-P(ft)	True Port Depth (Dp) (ft)	Time
	From Log (Dp)	From Cable	psi Inside Casing	kg/cm² Outside Casing P2	mH²O Inside Casing	Trans. Temp. (oC)				
5	540	539	184.78	173.75	184.78	22.56	368.52	171.48	540	0949
4	456	455	148.22	137.64	148.22	22.29	285.21	170.79	456	0950
3	382	382	116.13	105.63	116.13	20.27	211.37	170.63	382	0954
2	277	277	70.41	60.38	70.41	19.98	106.98	170.02	277	0955
1	207	207	39.92	31.28	39.92	19.67	39.84	167.16	207	0956

Comments:

WESTBAY™ GROUNDWATER MONITORING WELL
WATER LEVEL MEASUREMENT LOG SHEET

WELL ID: MW-17

DATE: 9/11/12

LOCATION: JPL

ELEV. TOP OF WASTBAY CASING 1191.21

WEATHER: Partly Cloudy

PROBE TYPE Westbay

SERIAL NO. EMS2502

PROJECT JPL, Pasadena

OPERATOR(S) tWolff

ATM. PRESSURE (Patm): (start) 14.00 (finish) 14.05

24.46°C 17.47

Port No.	Depth to Meas. Port Valve (ft)		Pressure Readings (psi)				Pressure Head Outside Port (ft) P(ft)=(P2-Patm)*2.307 ft/psi)	Depth to Water Outside Port (ft) DTW = Dp-P(ft)	True Port Depth (Dp) (ft)	Time
	From Log (Dp)	From Cable	psi Inside Casing	kg/cm² Outside Casing P2	mH²O Inside Casing	Trans. Temp. (oC)				
5	726	725	240.67	217.55	240.67	21.74	469.59	256.41	726	1031
4	582	581	178.36	155.22	178.36	20.75	325.79	256.21	582	1034
3	468	468	128.98	116.14	128.98	20.06	235.64	232.36	468	1035
2	370	370	86.41	77.21	86.41	19.30	145.83	224.17	370	1036
1	250	250	34.20	30.62	34.20	17.86	38.34	211.66	250	1037

Comments:

WESTBAY™ GROUNDWATER MONITORING WELL
WATER LEVEL MEASUREMENT LOG SHEET

WELL ID: MW-18

DATE: 9/11/12

LOCATION: JPL

ELEV. TOP OF WASTBAY CASING 1225.41

WEATHER: Partly Cloudy

PROBE TYPE Westbay

SERIAL NO. EMS2502

PROJECT JPL Pasadena

OPERATOR(S) tWolff

ATM. PRESSURE (Patm): (start) 14.00 (finish) 14.04

21.67° C 18.08

Port No.	Depth to Meas. Port Valve (ft)		Pressure Readings (psi)				Pressure Head Outside Port (ft) P(ft)=(P2-Patm)*2.307 ft/psi)	Depth to Water Outside Port (ft) DTW = Dp-P(ft)	True Port Depth (Dp) (ft)	Time
	From Log (Dp)	From Cable	psi Inside Casing	kg/cm² Outside Casing P2	mH²O Inside Casing	Trans. Temp. (oC)				
5	684	682	162.05	188.98	162.05	21.28	403.68	280.32	684	1053
4	564	562	109.95	139.09	109.95	21.17	288.58	275.42	564	1054
3	424	423	49.02	85.40	49.02	20.82	164.72	259.28	424	1055
2	330	330	14.22	48.17	14.22	19.78	78.83	251.17	330	1056
1	270	270	14.18	22.89	14.18	18.96	20.51	249.49	270	1057

Comments:

WESTBAY™ GROUNDWATER MONITORING WELL
WATER LEVEL MEASUREMENT LOG SHEET

WELL ID: MW-19

DATE: 9/11/12

LOCATION: JPL

ELEV. TOP OF WASTBAY CASING 1142.94

WEATHER: Partly Cloudy

PROBE TYPE Westbay

SERIAL NO. EMS2502

PROJECT JPL Pasadena

OPERATOR(S) Ambiff

ATM. PRESSURE (Patm): (start) 14.02 (finish) 14.07

21.26°C 18.10

Port No.	Depth to Meas. Port Valve (ft)		Pressure Readings (psi)				Pressure Head Outside Port (ft) P(ft)=(P2-Patm)*2.307 ft/psi)	Depth to Water Outside Port (ft) DTW = Dp-P(ft)	True Port Depth (Dp) (ft)	Time
	From Log (Dp)	From Cable	psi Inside Casing	kg/cm² Outside Casing P2	mH²O Inside Casing	Trans. Temp. (oC)				
5	498	497	171.41	138.06	171.41	20.33	286.21	211.79	498	1133
4	444	443	148.05	114.83	148.05	20.12	232.61	211.39	444	1133
3	392	391	125.44	107.54	125.44	19.95	215.80	176.20	392	1134
2	314	314	91.68	74.42	91.68	19.78	139.39	174.61	314	1135
1	242	242	60.28	47.26	60.28	19.48	76.73	165.27	242	1135

Comments:

WESTBAY™ GROUNDWATER MONITORING WELL
WATER LEVEL MEASUREMENT LOG SHEET

WELL ID: MW-20

DATE: 9/11/12

LOCATION: JPL

ELEV. TOP OF WASTBAY CASING 1165.05

WEATHER: Partly Cloudy

PROBE TYPE Westbay

SERIAL NO. EMS2502

PROJECT JPL, Pasadena

OPERATOR(S) tWolff

ATM. PRESSURE (Patm): (start) 14.03 (finish) 14.06

20.72°C 18.24

Port No.	Depth to Meas. Port Valve (ft)		Pressure Readings (psi)				Pressure Head Outside Port (ft) P(ft)=(P2-Patm)*2.307 ft/psi)	Depth to Water Outside Port (ft) DTW = Dp-P(ft)	True Port Depth (Dp) (ft)	Time
	From Log (Dp)	From Cable	psi Inside Casing	kg/cm² Outside Casing P2	mH²O Inside Casing	Trans. Temp. (oC)				
5	900	898	321.47	319.41	321.47	21.22	704.51	195.49	900	1113
4	700	699	234.70	223.28	234.70	22.15	482.74	217.26	700	1115
3	562	562	175.14	166.61	175.14	21.61	352.00	210.00	562	1116
2	392	392	101.47	97.53	101.47	20.80	192.63	199.37	392	1117
1	230	231	31.02	27.65	31.02	19.23	31.42	198.58	230	1118

Comments:

WESTBAY™ GROUNDWATER MONITORING WELL
WATER LEVEL MEASUREMENT LOG SHEET

WELL ID: MW-21

DATE: 9/11/12

LOCATION: JPL

ELEV. TOP OF WASTBAY CASING 1059.10

WEATHER: Partly Cloudy

PROBE TYPE Westbay

SERIAL NO. 2502

PROJECT JPL, Pasadena

OPERATOR(S) A. Wolff

ATM. PRESSURE (Patm): (start) 14.06 (finish) 14.10

24.45° C 19.24

Port No.	Depth to Meas. Port Valve (ft)		Pressure Readings (psi)				Pressure Head Outside Port (ft) P(ft)=(P2-Patm)*2.307 ft/psi)	Depth to Water Outside Port (ft) DTW = Dp-P(ft)	True Port Depth (Dp) (ft)	Time
	From Log (Dp)	From Cable	psi Inside Casing	kg/cm² Outside Casing P2	mH²O Inside Casing	Trans. Temp. (oC)				
5	372	372	125.48	148.11	125.48	23.23	309.25	62.75	372	1240
4	310	310	98.48	121.29	98.48	22.49	247.38	62.62	310	1241
3	240	241	68.47	91.51	68.47	21.41	178.68	61.32	240	1242
2	161	163	31.86	57.56	31.86	19.57	100.35	60.65	161	1245
1	90	91	14.16	26.84	14.16	19.32	29.48	60.52	90	1246

Comments:

WESTBAY™ GROUNDWATER MONITORING WELL
WATER LEVEL MEASUREMENT LOG SHEET

WELL ID: MW-22

DATE: 9-11-12

LOCATION: JPL

ELEV. TOP OF WASTBAY CASING 1176.98

WEATHER: Clear

PROBE TYPE Westbay

SERIAL NO. EMS2502

PROJECT JPL, Pasadena

OPERATOR(S) AWolff

ATM. PRESSURE (Patm): (start) 14.00 (finish) 14.04

26.23°C 21.00°C

Port No.	Depth to Meas. Port Valve (ft)		Pressure Readings (psi)				Pressure Head Outside Port (ft) P(ft)=(P2-Patm)*2.307 ft/psi)	Depth to Water Outside Port (ft) DTW = Dp-P(ft)	True Port Depth (Dp) (ft)	Time
	From Log (Dp)	From Cable	psi Inside Casing	kg/cm² Outside Casing P2	mH²O Inside Casing	Trans. Temp. (oC)				
5	588	588	200.23	181.33	200.23	23.65	386.03	201.97	588	0622
4	467	467	147.81	13222	147.81	23.30	272.73	194.27	467	0623
3	389	389	113.99	103.44	113.99	22.76	206.34	182.66	389	0623
2	329	329	88.08	77.32	88.08	22.36	146.08	182.92	329	0624
1	245	245	51.16	41.91	51.16	21.73	64.39	180.61	245	0625

Comments:

WESTBAY™ GROUNDWATER MONITORING WELL
WATER LEVEL MEASUREMENT LOG SHEET

WELL ID: MW-23

DATE: 9-11-12

LOCATION: JPL

ELEV. TOP OF WASTBAY CASING 1108.84

WEATHER: Clear

PROBE TYPE Westbay

SERIAL NO. EMS2502

PROJECT JPL, Pasadena

OPERATOR(S) AWolff

ATM. PRESSURE (Patm): (start) 14.09 (finish) 14.11

21.39°C 20.91

Port No.	Depth to Meas. Port Valve (ft)		Pressure Readings (psi)				Pressure Head Outside Port (ft) P(ft)=(P2-Patm)*2.307 ft/psi)	Depth to Water Outside Port (ft) DTW = Dp-P(ft)	True Port Depth (Dp) (ft)	Time
	From Log (Dp)	From Cable	psi Inside Casing	kg/cm² Outside Casing P2	mH²O Inside Casing	Trans. Temp. (oC)				
5	542	541	203.31	191.18	203.31	21.39	408.66	133.34	542	0645
4	445	444	161.44	149.28	161.44	21.53	312.00	133.00	445	0645
3	319	318	106.83	100.23	106.83	21.43	198.84	120.16	319	0646
2	254	254	78.64	72.23	78.64	21.17	134.24	119.76	254	0647
1	174	174	43.89	39.88	43.89	20.77	59.61	114.39	174	0648

Comments:

WESTBAY™ GROUNDWATER MONITORING WELL
WATER LEVEL MEASUREMENT LOG SHEET

WELL ID: MW-24

DATE: 9/11/12

LOCATION: JPL

ELEV. TOP OF WASTBAY CASING 1200.94

WEATHER: Partly Cloudy

PROBE TYPE Westbay

SERIAL NO. EMS2502

PROJECT JPL, Pasadena

OPERATOR(S) tWolff

ATM. PRESSURE (Patm): (start) 14.04 (finish) 14.04

21.75°C 21.75

Port No.	Depth to Meas. Port Valve (ft)		Pressure Readings (psi)				Pressure Head Outside Port (ft) P(ft)=(P2-Patm)*2.307 ft/psi)	Depth to Water Outside Port (ft) DTW = Dp-P(ft)	True Port Depth (Dp) (ft)	Time
	From Log (Dp)	From Cable	psi Inside Casing	kg/cm² Outside Casing P2	mH²O Inside Casing	Trans. Temp. (oC)				
5	678	676	232.28	202.84	232.28	22.07	435.56	242.44	678	0911
4	554	552	178.64	154.77	178.64	22.11	324.66	229.34	554	0912
3	435	434	127.07	108.96	127.07	21.93	218.98	216.02	435	0913
2	373	372	100.19	82.82	100.19	21.82	158.68	214.32	373	0914
1	279	279	59.44	45.23	59.44	21.74	71.96	207.04	279	0914

Comments:

WESTBAY™ GROUNDWATER MONITORING WELL
WATER LEVEL MEASUREMENT LOG SHEET

WELL ID: MW-25

DATE: 9/11/12

LOCATION: JPL

ELEV. TOP OF WASTBAY CASING 934.52

WEATHER: Partly Cloudy

PROBE TYPE Westbay

SERIAL NO. EMS2502

PROJECT JPL, Pasadena

OPERATOR(S) tWolff

ATM. PRESSURE (Patm): (start) 14.17 (finish) 14.16

23.79° C 20.50

Port No.	Depth to Meas. Port Valve (ft)		Pressure Readings (psi)				Pressure Head Outside Port (ft) P(ft)=(P2-Patm)*2.307 ft/psi)	Depth to Water Outside Port (ft) DTW = Dp-P(ft)	True Port Depth (Dp) (ft)	Time
	From Log (Dp)	From Cable	psi Inside Casing	kg/cm² Outside Casing P2	mH²O Inside Casing	Trans. Temp. (oC)				
5	713	711	210.34	211.05	210.34	22.73	454.20	258.80	713	1216
4	633	631	175.99	175.31	175.99	22.54	371.75	261.25	633	1217
3	503	501	119.69	122.33	119.69	22.13	249.53	253.47	503	1218
2	423	422	84.93	90.56	84.93	21.63	176.23	246.77	423	1219
1	358	357	56.71	63.46	56.71	21.22	113.71	244.29	358	1220

Comments:

WESTBAY™ GROUNDWATER MONITORING WELL
WATER LEVEL MEASUREMENT LOG SHEET

WELL ID: MW-26

DATE: 9-11-12

LOCATION: JPL

ELEV. TOP OF WASTBAY CASING ~~1094.~~ 1059.08

WEATHER: Partly Cloudy

PROBE TYPE Westbay

SERIAL NO. EMS2502

PROJECT JPL, Pasadena

OPERATOR(S) AWolff

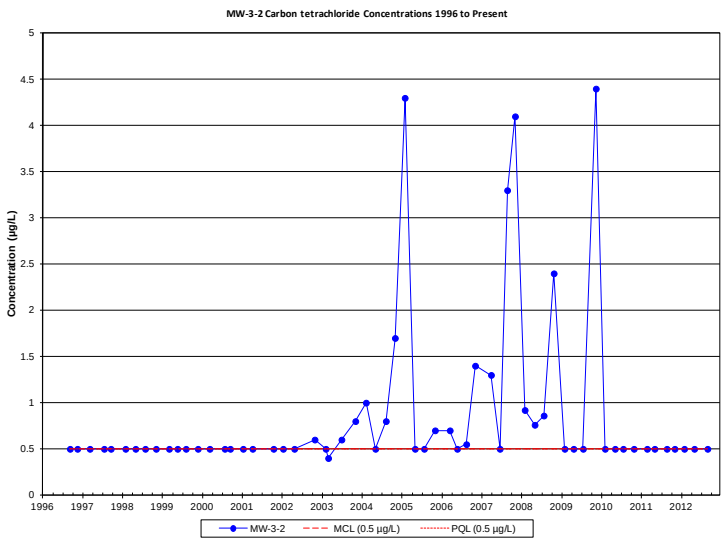
ATM. PRESSURE (Patm): (start) 14.10 (finish) 14.10

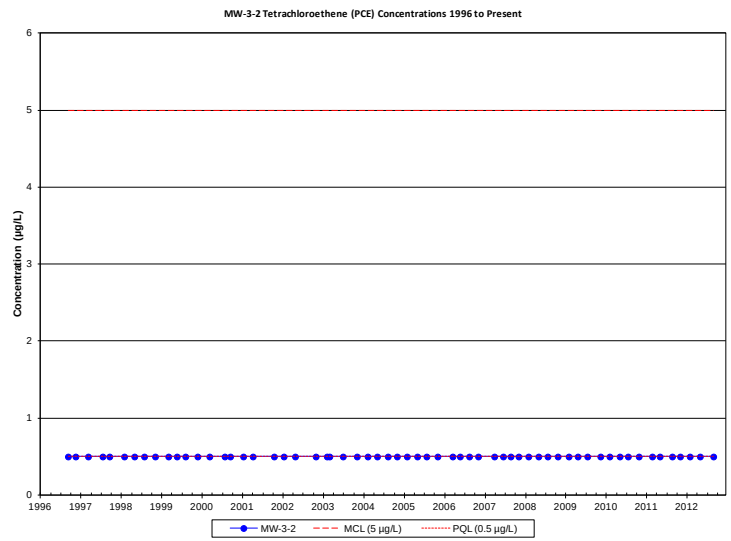
22.71°C 20.30°C

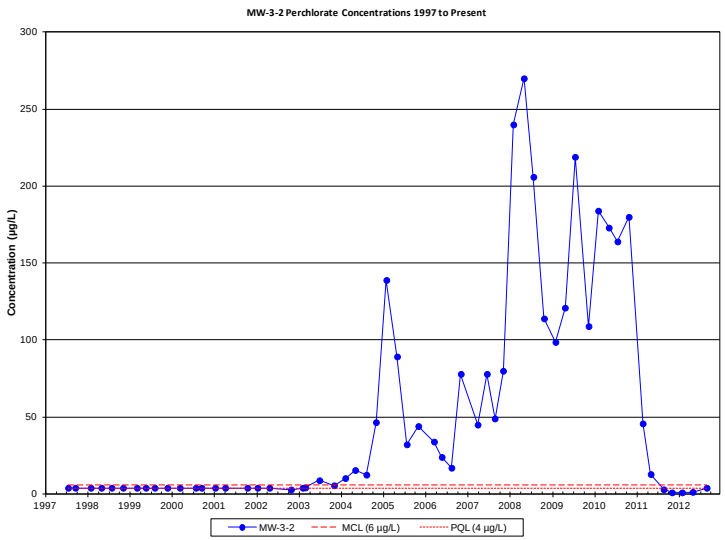
Port No.	Depth to Meas. Port Valve (ft)		Pressure Readings (psi)				Pressure Head Outside Port (ft) P(ft)=(P2-Patm)*2.307 ft/psi)	Depth to Water Outside Port (ft) DTW = Dp-P(ft)	True Port Depth (Dp) (ft)	Time
	From Log (Dp)	From Cable	psi Inside Casing	kg/cm² Outside Casing P2	mH²O Inside Casing	Trans. Temp. (oC)				
2	215	213	71.05	70.25	71.05	21.93	129.54	85.46	215	1156
1	135	133	36.19	35.02	36.19	21.34	48.26	86.74	135	1157

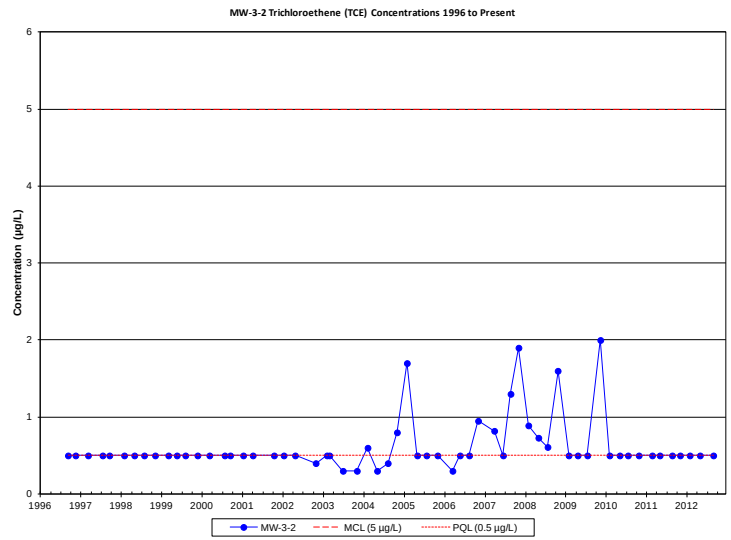
Comments:

ATTACHMENT 6: TIME SERIES PLOTS

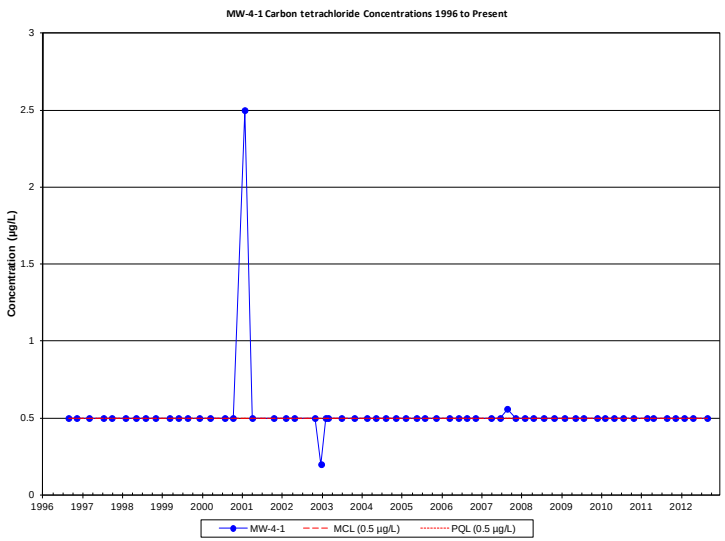


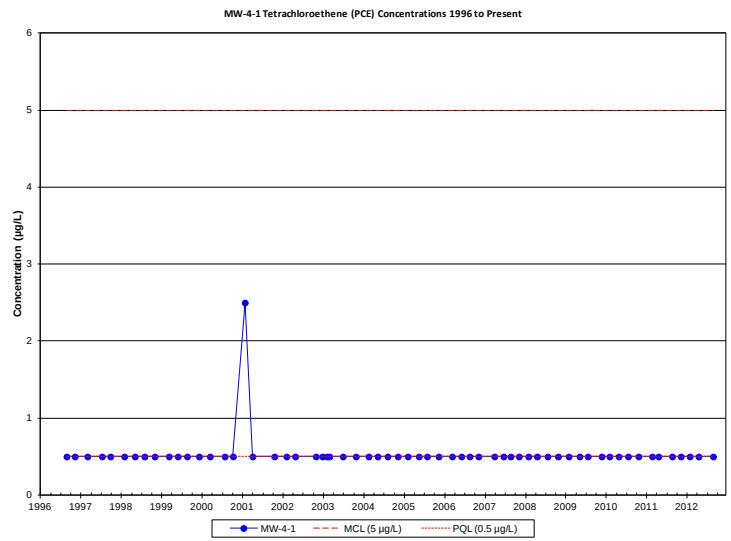


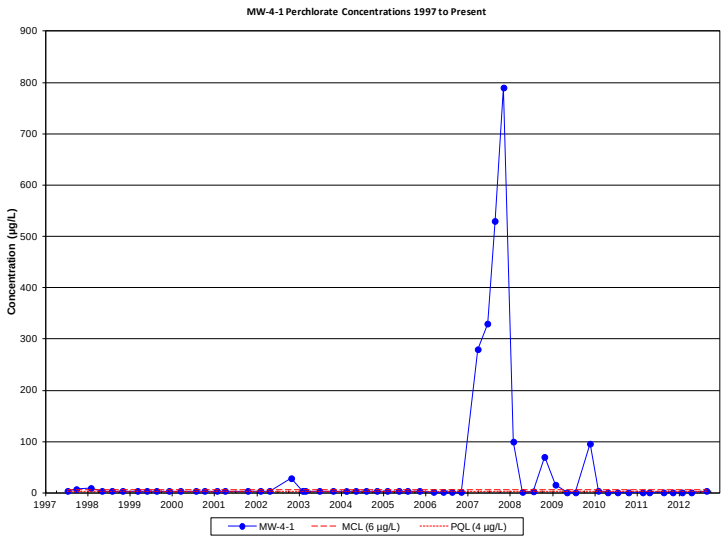


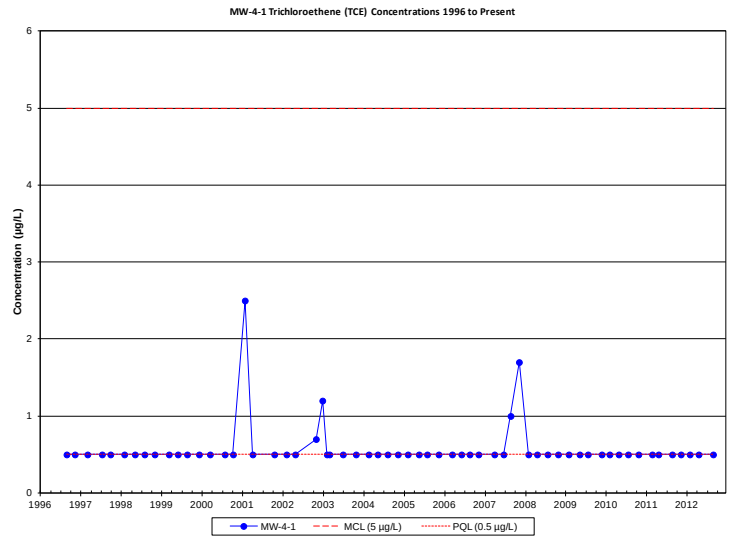


VOCs and Perchlorate Time Series Plots for MW-3-2

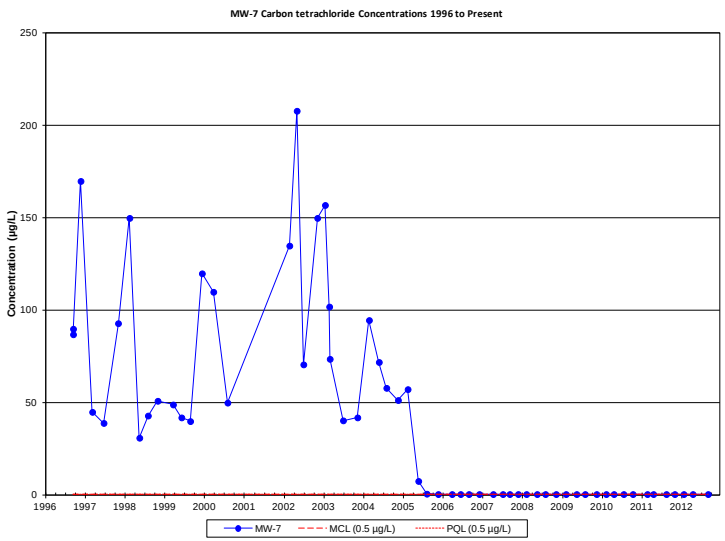


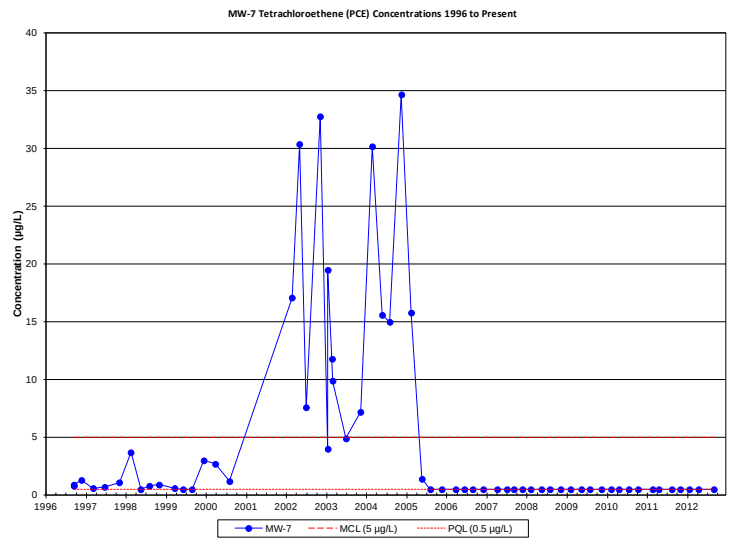


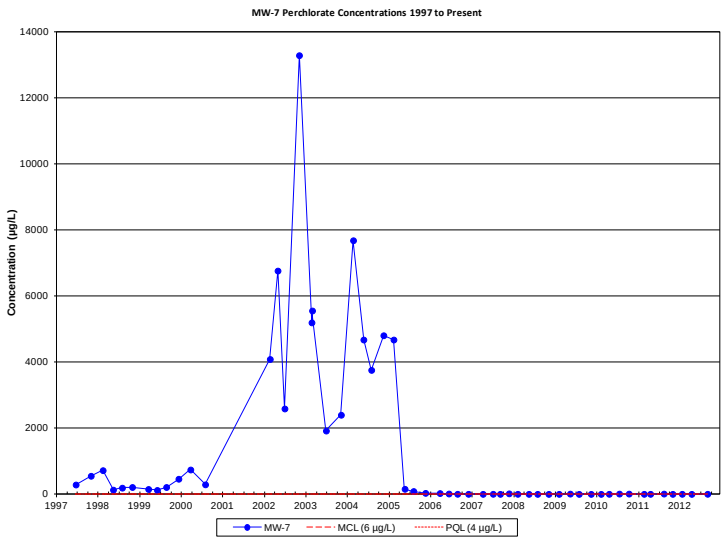


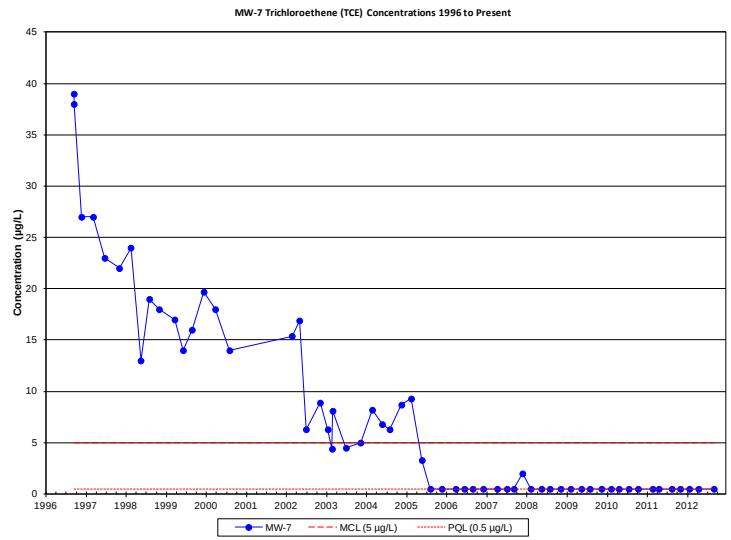


VOCs and Perchlorate Time Series Plots for MW-4-1

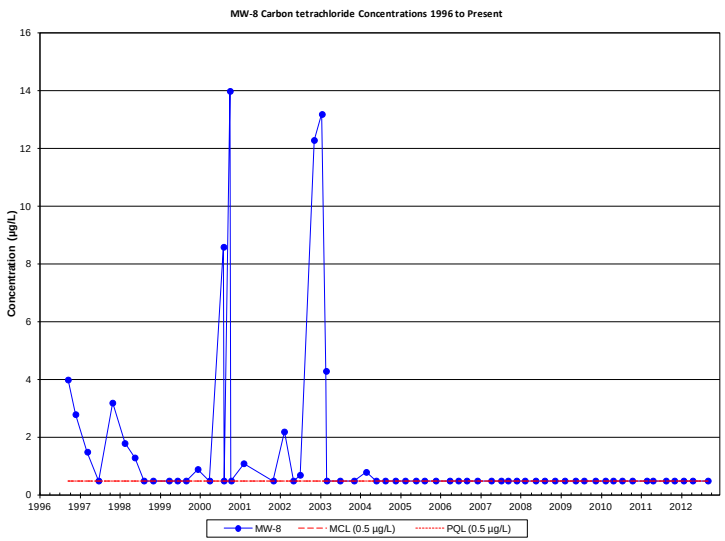


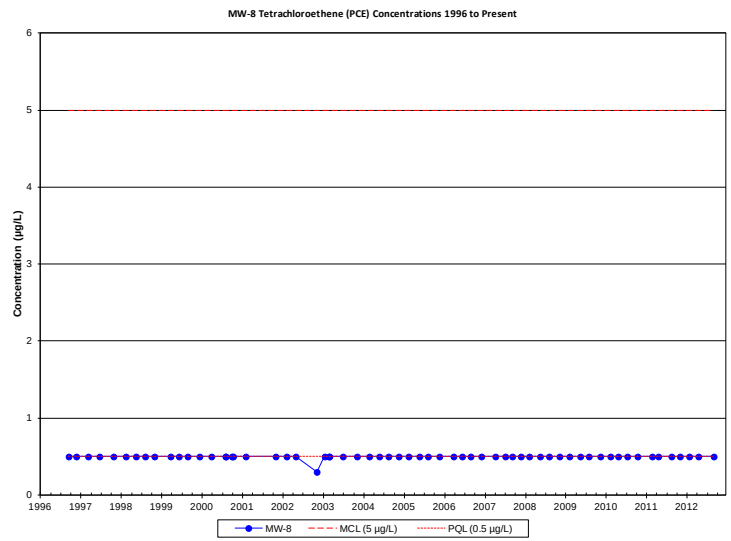


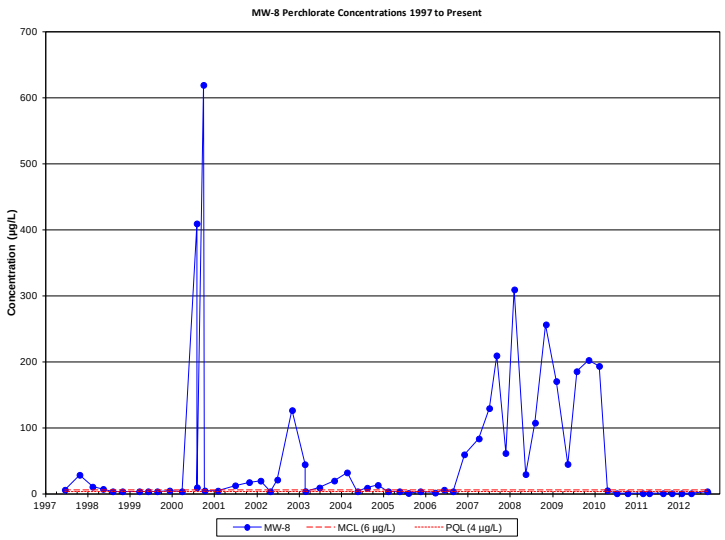


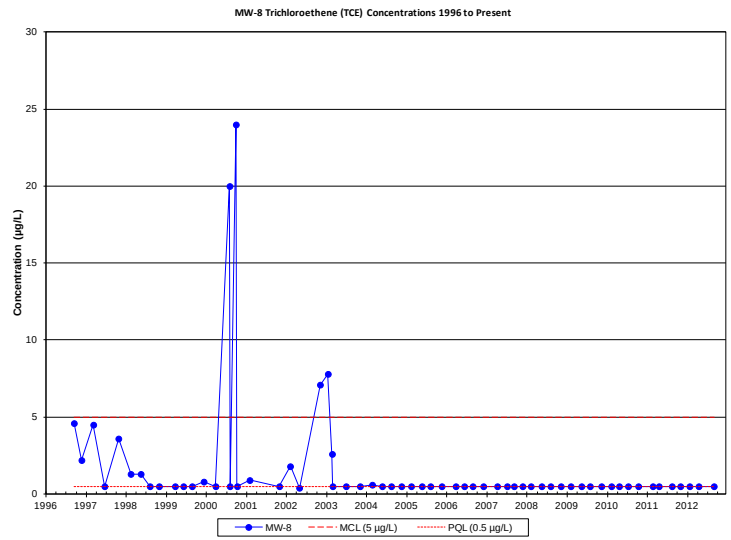


VOCs and Perchlorate Time Series Plots for MW-7

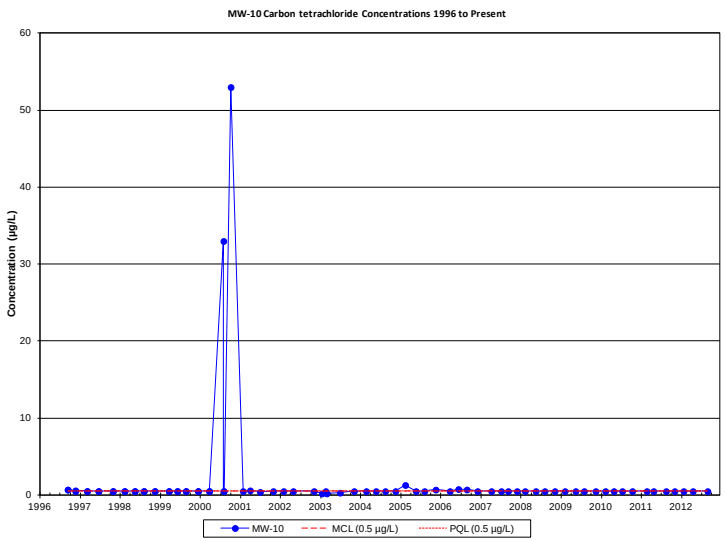


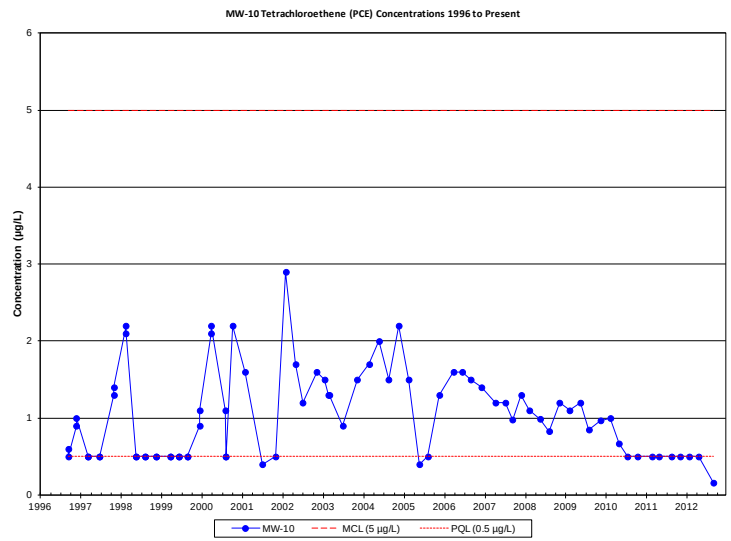


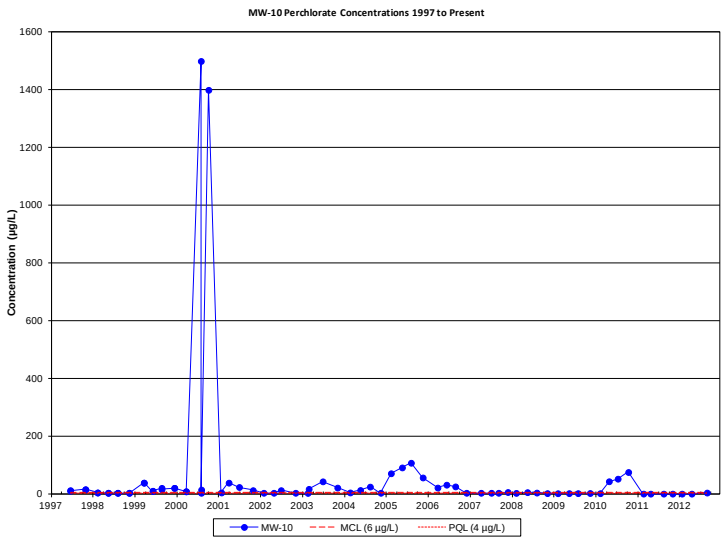


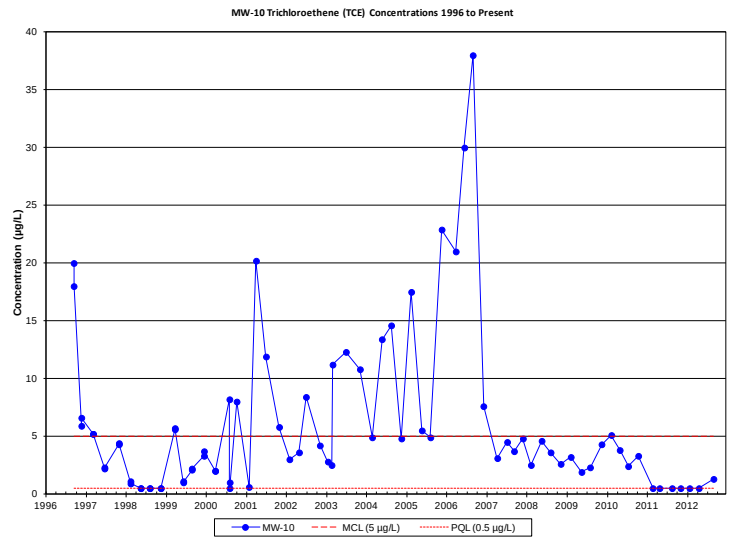


VOCs and Perchlorate Time Series Plots for MW-8

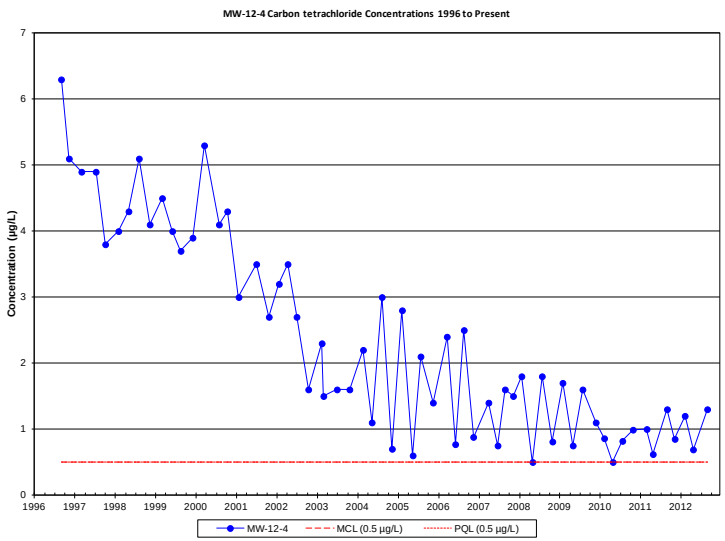


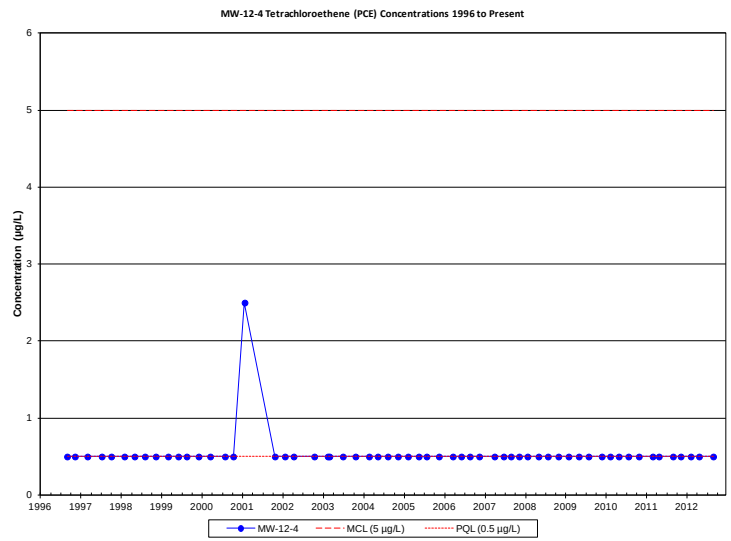


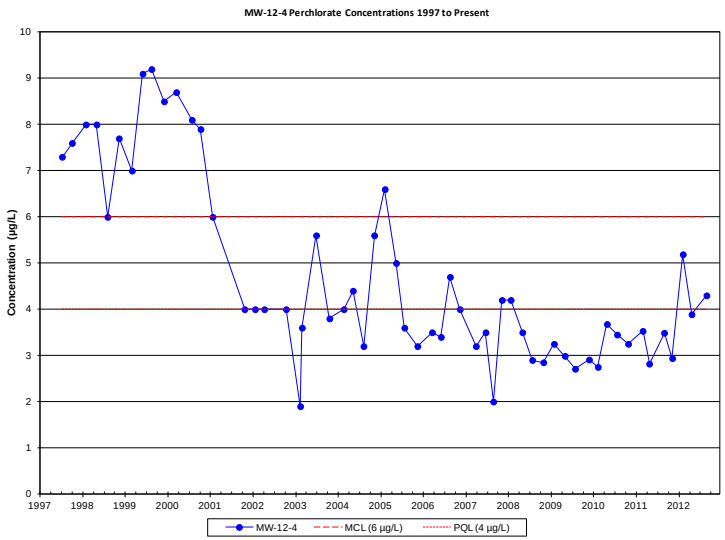


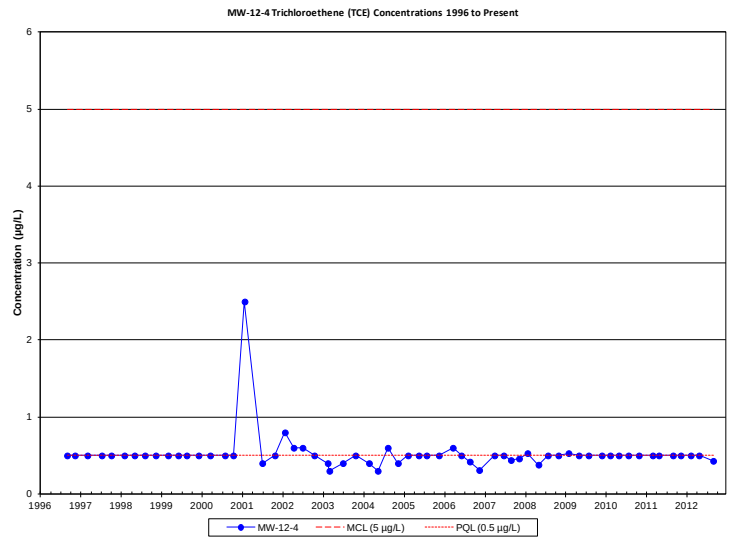


VOCs and Perchlorate Time Series Plots for MW-10

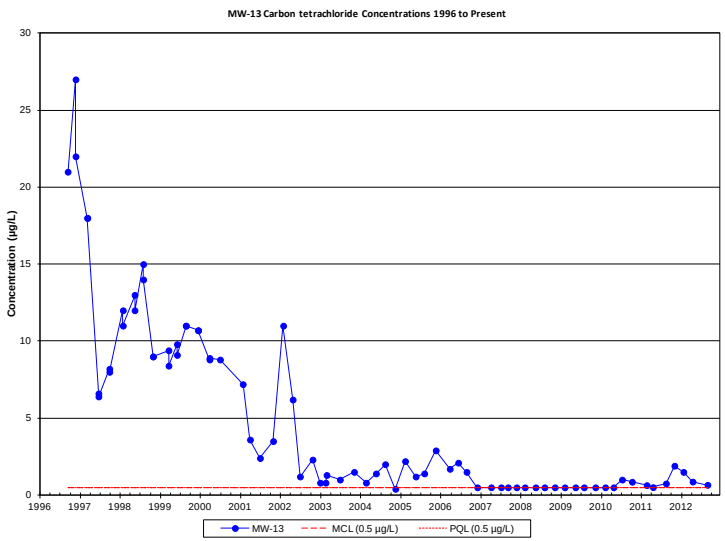


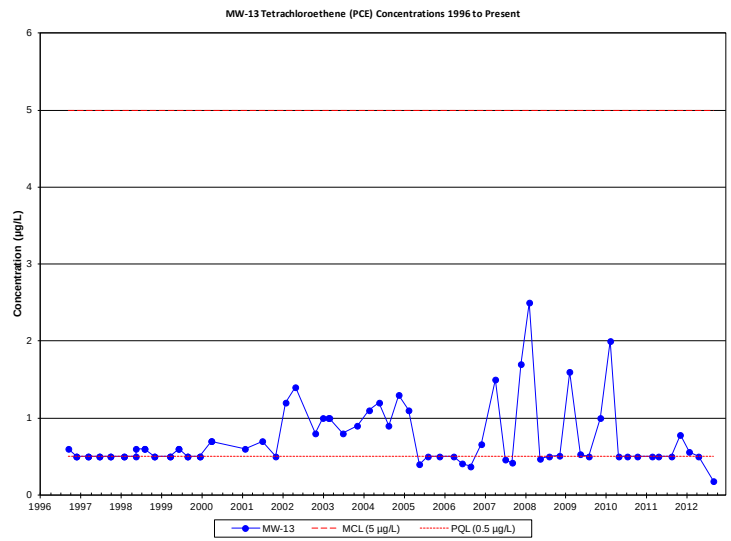


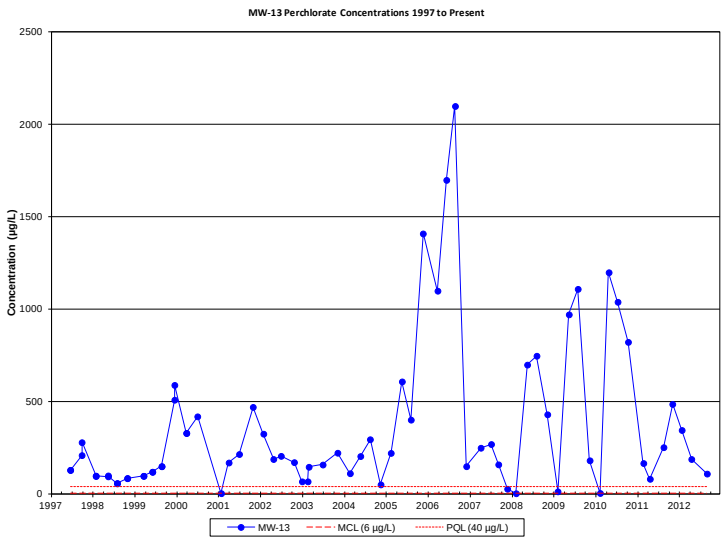


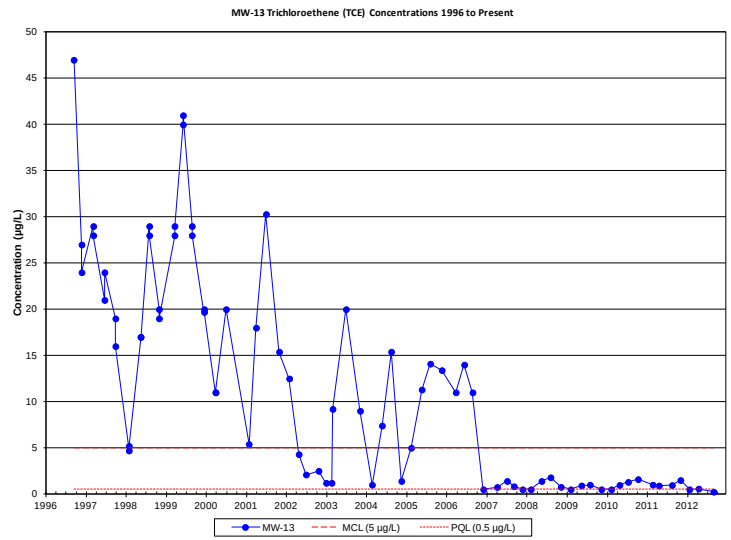


VOCs and Perchlorate Time Series Plots for MW-12-4

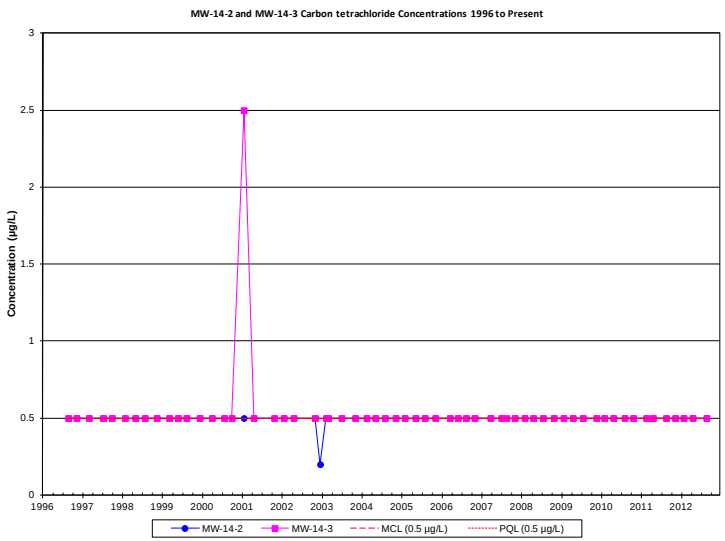


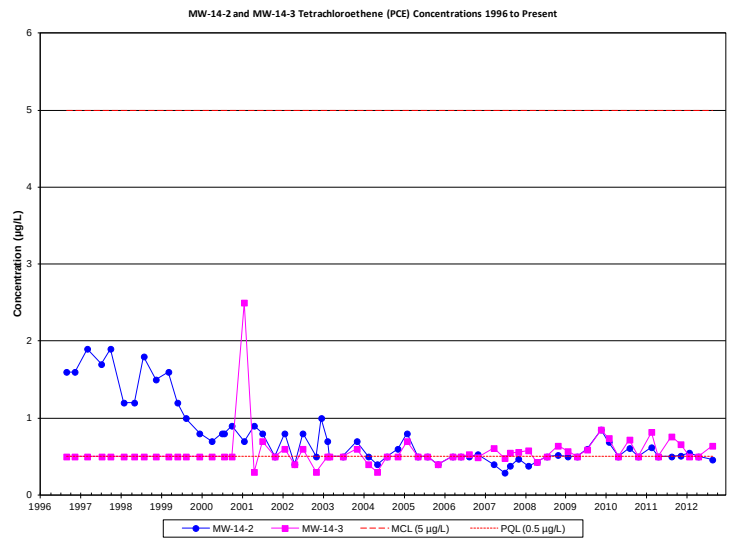


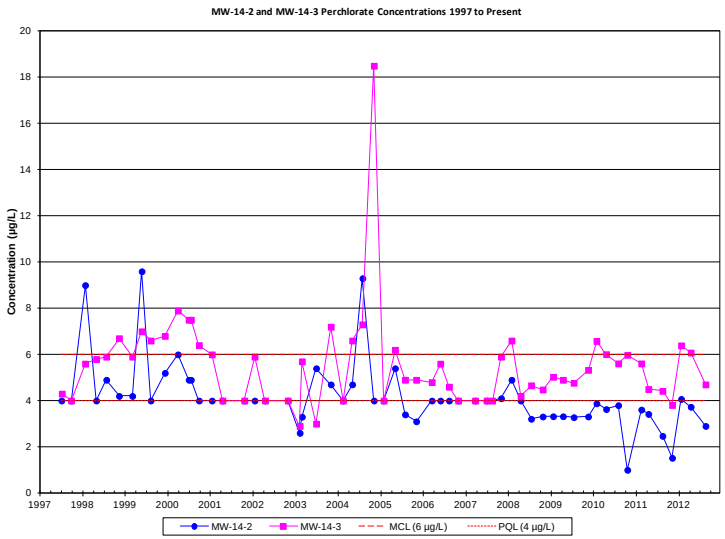


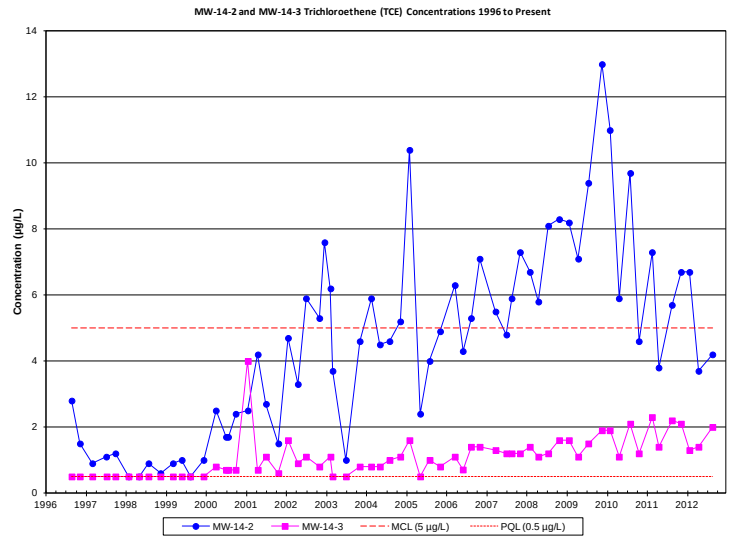


VOCs and Perchlorate Time Series Plots for MW-13

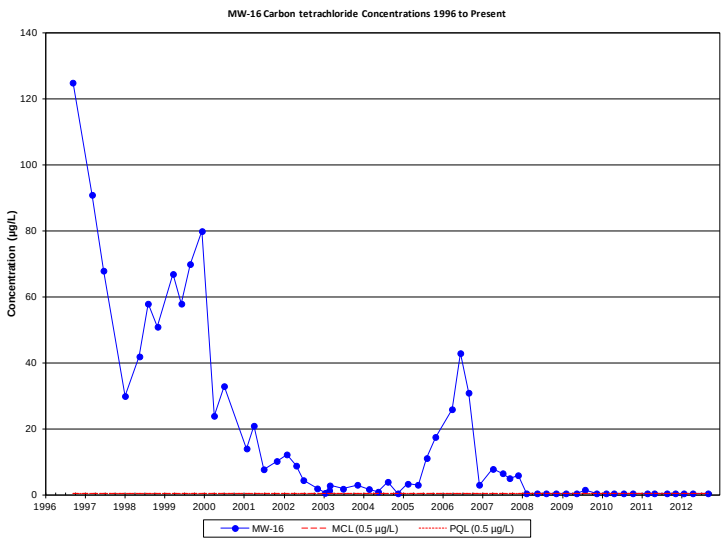


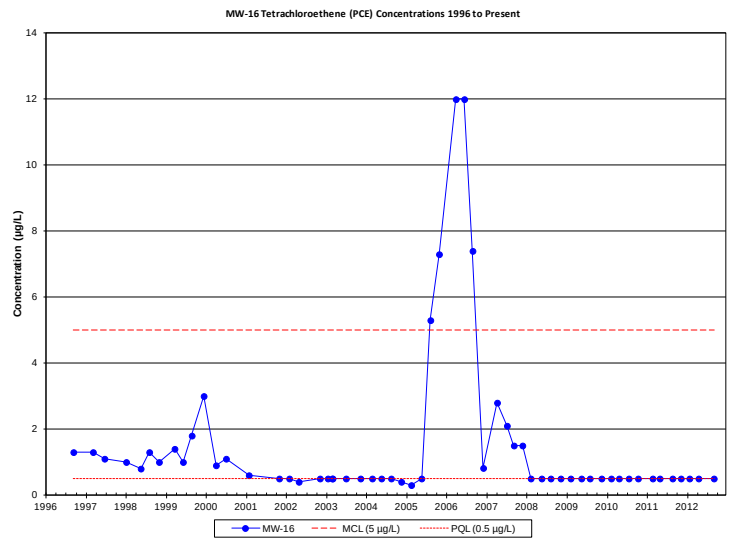


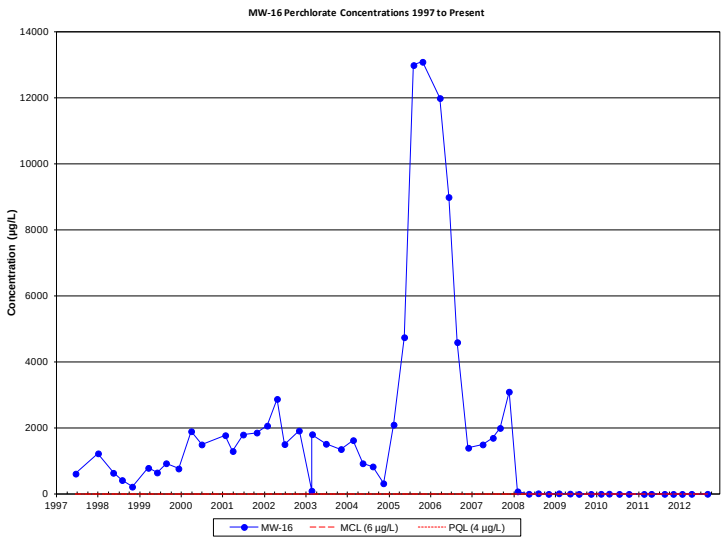


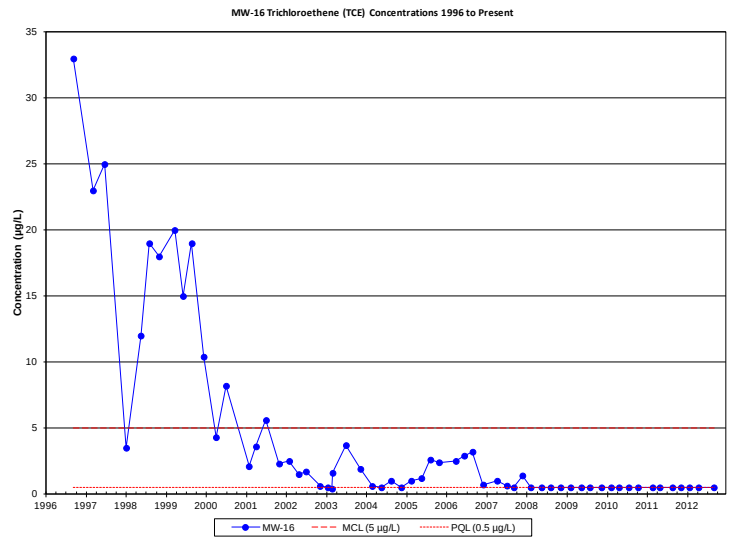


VOCs and Perchlorate Time Series Plots for MW-14-2 and MW-14-3

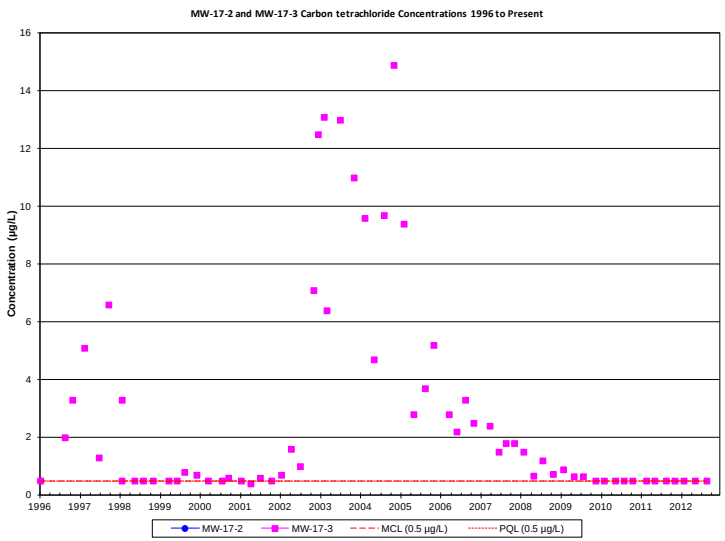


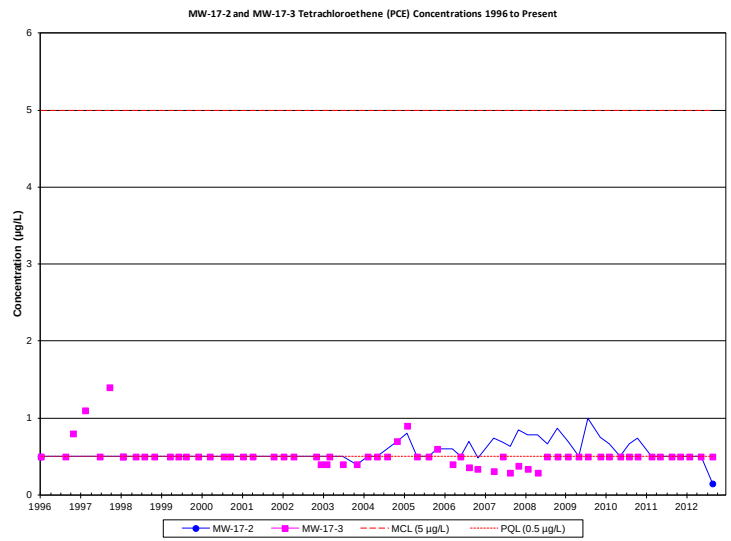


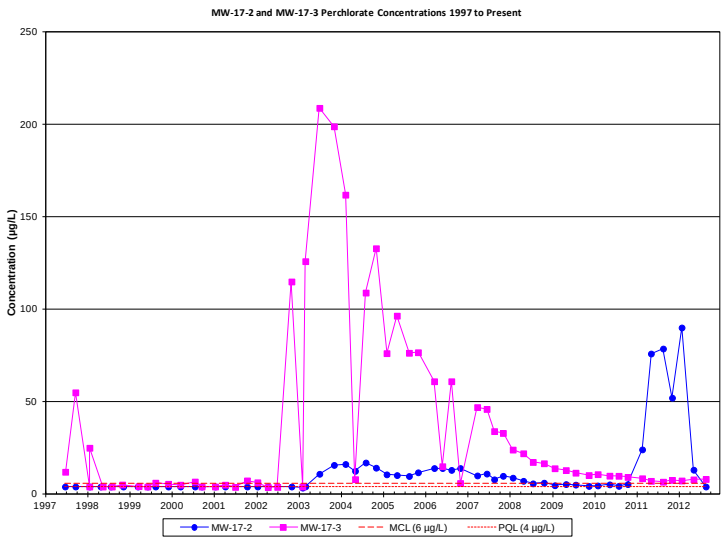


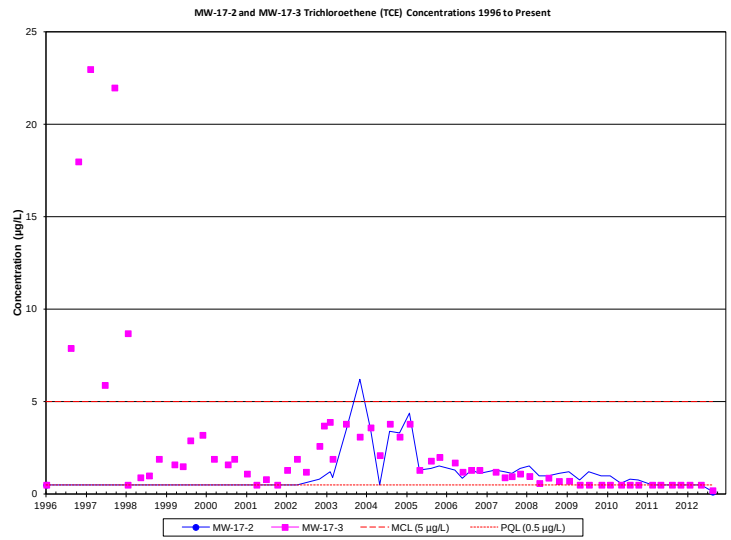


VOCs and Perchlorate Time Series Plots for MW-16

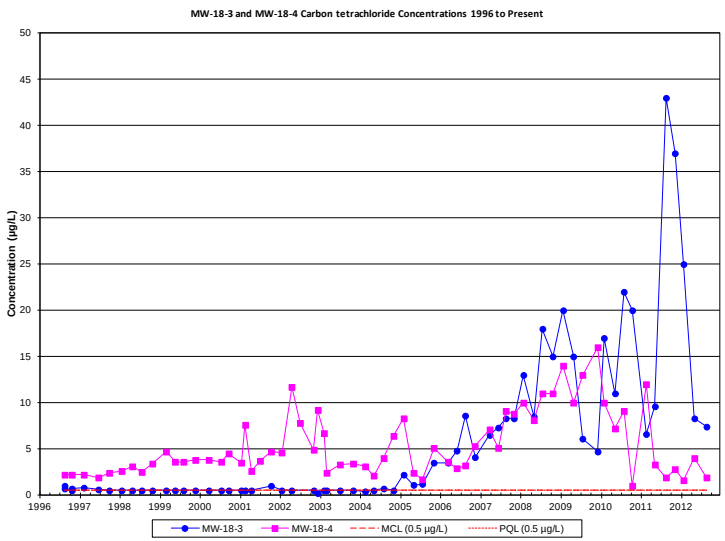


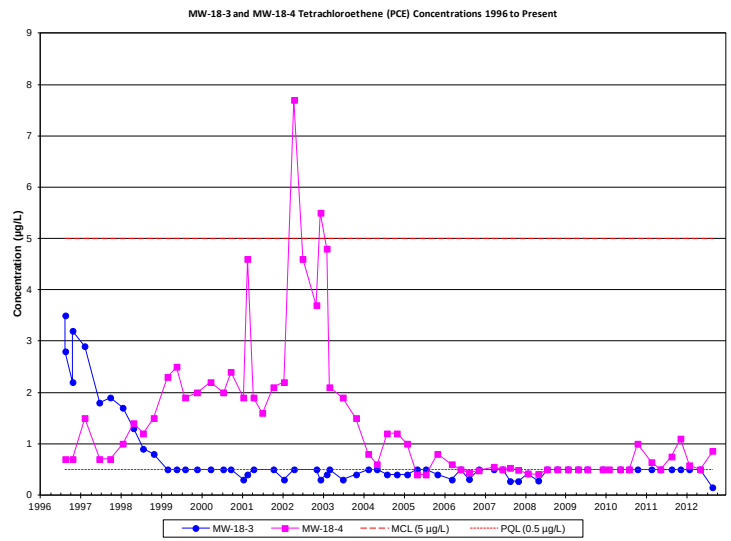


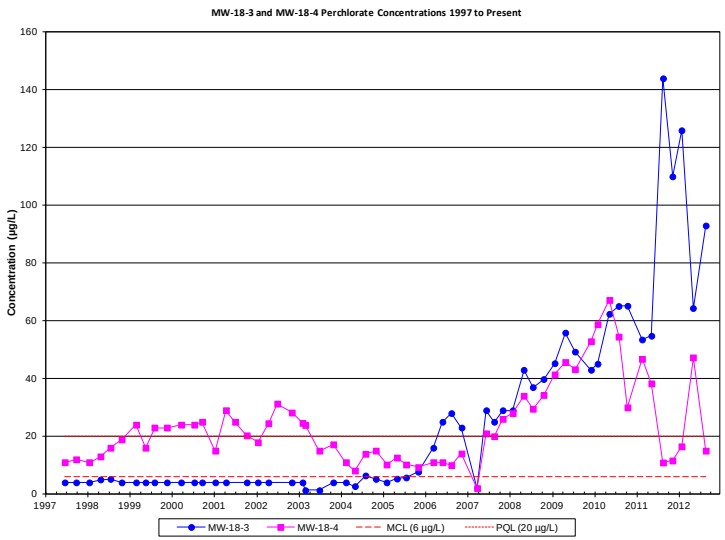


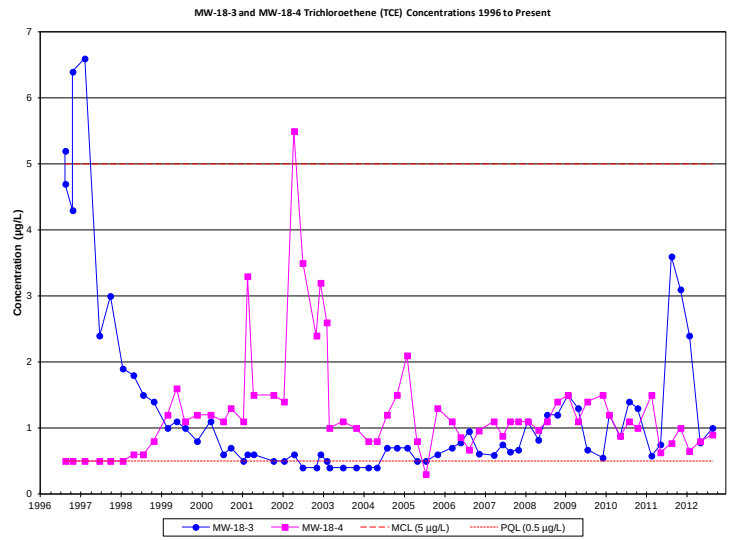


VOCs and Perchlorate Time Series Plots for MW-17-2 and MW-17-3

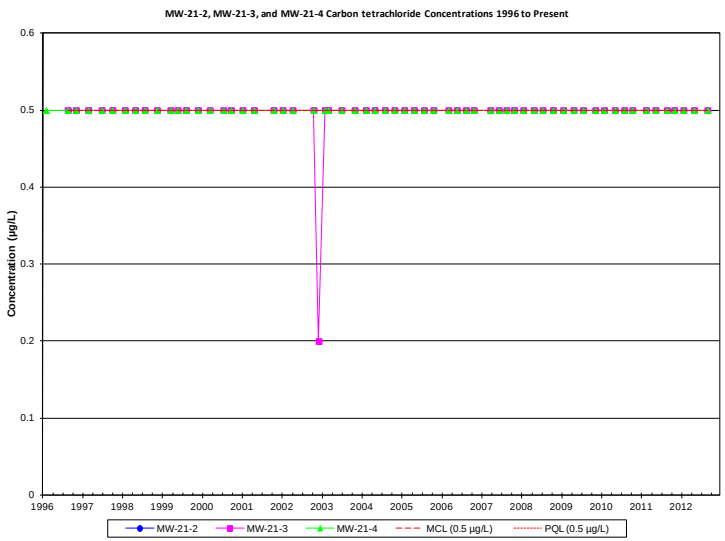


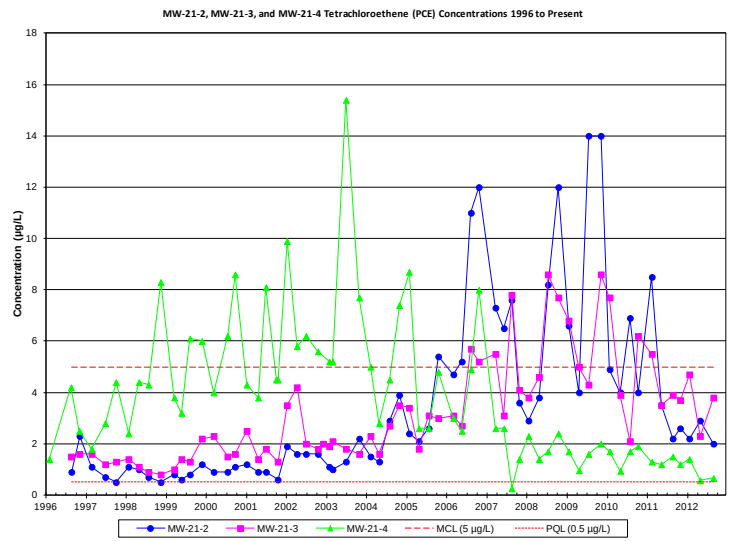


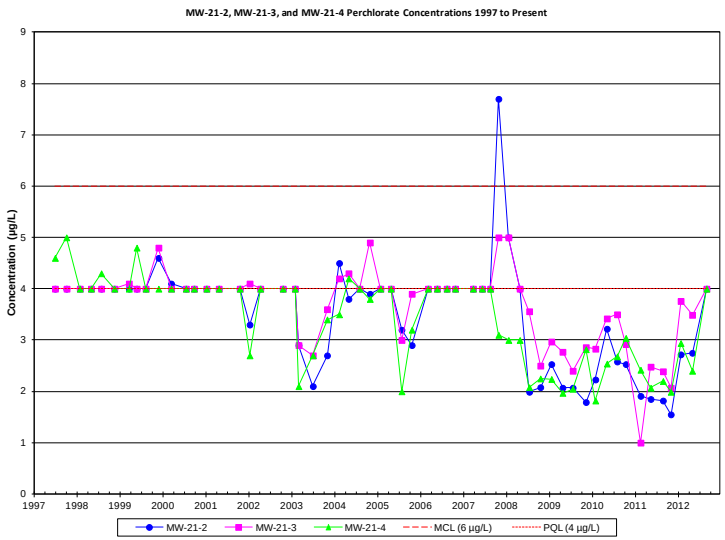


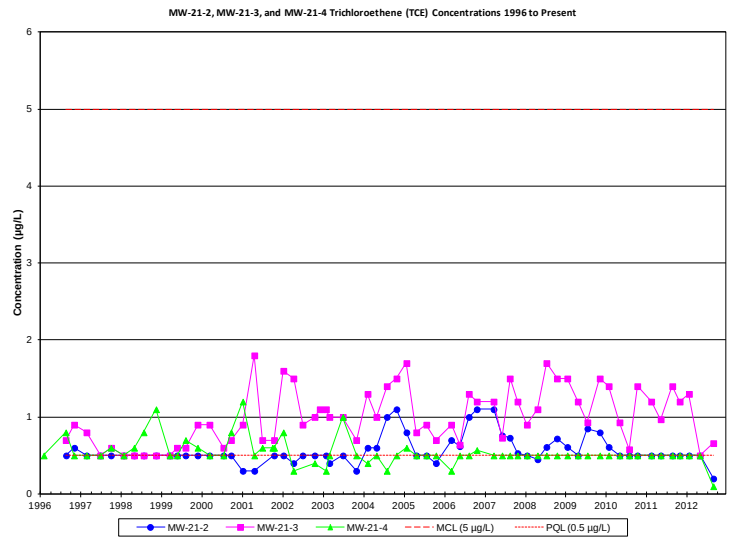


VOCs and Perchlorate Time Series Plots for MW-18-3 and MW-18-4

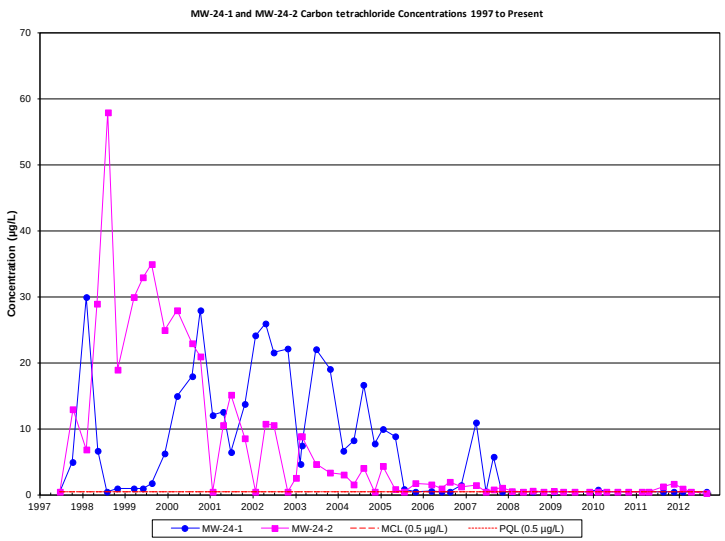


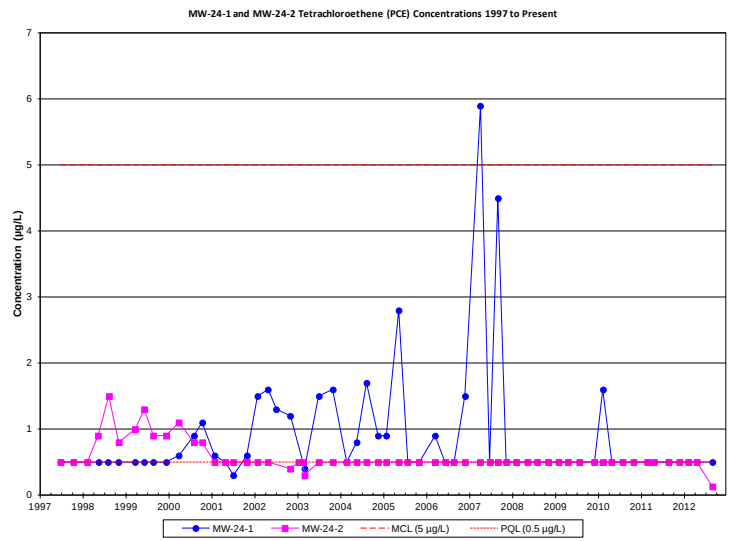


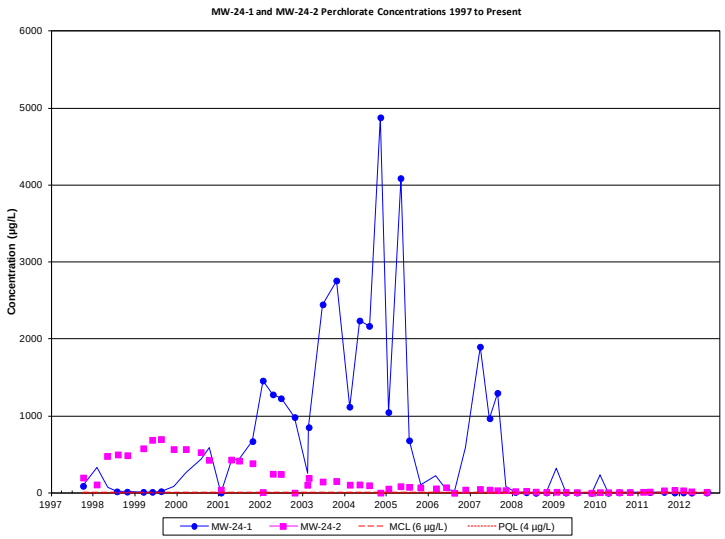


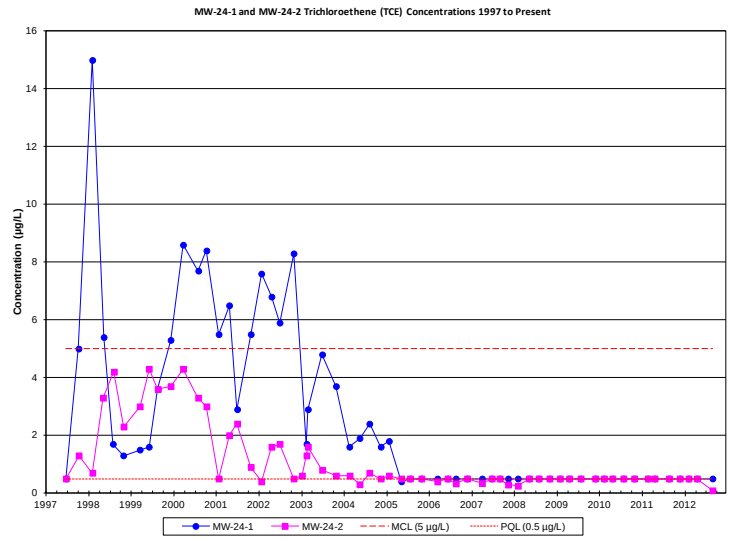


VOCs and Perchlorate Time Series Plots for MW-21-2 and MW-21-3 and MW-21-4









VOCs and Perchlorate Time Series Plots for MW-24-1 and MW-24-2