Final

Travis Air Force Base
Environmental Restoration Program
Remedial Program Manager's
Meeting Minutes

21 March 2012, 0930 Hours

Mr. Mark Smith, Travis Air Force Base (AFB), conducted the Remedial Program Manager's (RPM) meeting on 21 March 2012 at 0930 via teleconference, Travis AFB, California. Attendees included:

• Mark Smith	Travis AFB
• Glenn Anderson	Travis AFB
• Lonnie Duke	Travis AFB
• Gregory Parrott	Travis AFB
• Merrie Schilter-Lowe	Travis AFB
• Dezso Linbrunner	USACE-Omaha
• Alan Friedman	California Regional Water Quality Control Board (RWQCB)
• Jose Salcedo	California Department of Toxic Substances Control (DTSC)
• Nadia Hollan Burke	United States Environmental Protection Agency (USEPA)
• Mary Snow	Techlaw, Inc
• Rachel Hess	ITSI
• Mike Wray	CH2M HILL
• Loren Krook	CH2M HILL
• Tony Chakurian	CH2M HILL

Handouts distributed at the meeting and presentations included:

• Attachment 1	Meeting Agenda
• Attachment 2	Master Meeting and Document Schedule
• Attachment 3	SBBGWTP Monthly Data Sheet (February 2012)
• Attachment 4	CGWTP Monthly Data Sheet (February 2012)
• Attachment 5	NGWTP Monthly Data Sheet (February 2012)
• Attachment 6	Site ST018 Monthly Data Sheet (February 2012)
• Attachment 7	SS015 Performance Update
• Attachment 8	Presentation: Management Overview Briefing

1. ADMINISTRATIVE

A. Previous Meeting Minutes

The 22 February 2012 RPM meeting minutes were approved and finalized as written.

B. Action Item Review.

Action items from February were reviewed.

Action item one still open. No change.

Action item two still open. No change.

Master Meeting and Document Schedule Review (see Attachment 2)

The Travis AFB Master Meeting and Document Schedule (MMDS) was discussed during this meeting (see Attachment 2).

Travis AFB Annual Meeting and Teleconference Schedule

— The next RPM meeting will be held on 19 April 2012 at 1400 hours. The 20 June 2012 RPM meeting has been changed to 13 June 2012; Mr. Smith and Mr. Duke are scheduled to be in San Antonio on 20 June 2012.

Travis AFB Master Document Schedule

— Proposed Plan (PP): Draft to Agencies new date 04 April 2012. PP Public Meeting is tentatively scheduled for 18 July 2012. The rest of the dates have changed accordingly.

— Groundwater Record of Decision (ROD): Draft to Agencies date has been pushed back to 17 August 2012. The rest of the dates have changed accordingly.

— Potrero Hills Annex: (FS, PP, and ROD): No change. The site investigation draft report has been submitted to the RWQCB. Mr. Smith asked Mr. Friedman if he hears anything internally on the report review to let Travis know.

— Work plan for Assessment of Aerobic Chlorinated Cometabolism Enzymes at Travis AFB: Document is Final. Will be moved to history.

— Technical Memorandum for Assessment of Aerobic Chlorinated Cometabolism Enzymes: Predraft to AF/Service Center new date is 02 April 2012. The rest of the dates have changed accordingly.

- Work Plan for Remedial Process Optimization of Sites SS016 and SS029: No change.
- RPO Baseline Implementation Report: No change. Document is going final on 28 March.
- Technical and Economic Feasibility Analysis (TEFA): The Response to Comments Meeting date has been changed to 21 March 2012. Travis offered to schedule a teleconference with RWQCB to expedite finalizing the TEFA document in April. Ms. Burke requested a final date for the TEFA from RWQCB in order for her to schedule time for review of the PP.
- Site LF007C Data Gaps Investigation Technical Memorandum: Dates have been populated. Predraft to AF/Service Center 03 May 2012.
- FT005 Remedial Action Completion Report: Dates have been changed to TBD, to go back in the field to achieve residential cleanup levels by additional excavation. Ms. Burke requested to see a schedule as soon as possible. Ms. Hess will provide a schedule by 4 April 2012.
- Quarterly Newsletter (April 2012): No change. Mr. Anderson spoke briefly of how the April 2012 RAB meeting will conducted; it will be more of an open forum. Mr. Smith said typically the RAB meetings consist of what Travis AFB has completed, and this RAB will be focused on future cleanup work at Travis AFB.
- 2010/2011 GSAP: Response to Comments was changed to 27 February 2012. Travis is working on the agency comments. The final date was changed to TBD.
- 2011 Groundwater Treatment RPO Annual Report: Dates changed to TBD, a slight delay do to the priority of other documents. Mr. Duke said the dates will be populated by the next RPM meeting.
- 2011 CAMU Annual Report: New document. All dates are TBD; dates will be populated by the next RPM meeting.
- Old Skeet Range Engineering Evaluation/Cost Analysis: No change.

2. CURRENT PROJECTS

Treatment Plant Operation and Maintenance Update

Mr. Duke reported on the treatment plant status.

The South Base Boundary Groundwater Treatment Plant (SBBGWTP) performed at 100% uptime, and 5.1 million gallons of groundwater were extracted and treated during the month of February 2012. All of the treated water was discharged to Union Creek. The average flow rate for the SBBGWTP was 115 gallons per minute (gpm). Electrical power usage was 12,720 kWh and approximately 17,426 pounds of CO_2

were created (based on DOE calculation). Approximately 1.6 pounds of volatile organic compounds (VOCs) were removed in February. The total mass of VOCs removed since startup of the system is 416 pounds.

Optimization Activities: No optimization activities to report for the month of February.

Central Groundwater Treatment Plant (see Attachment 4)

The Central Groundwater Treatment Plant (CGWTP) performed at 100% uptime with approximately 1.7 million gallons of groundwater extracted and treated during the month of February 2012. All treated water was diverted to the storm drain. The average flow rate for the CGWTP was 37.5 gpm. Electrical power usage was 2,477 kWh for all equipment connected to the Central plant, and approximately 3,393 pounds of CO_2 were created. Approximately 5 pounds of VOCs were removed from groundwater in February. The total mass of VOCs removed since the startup of the system is 11,268 pounds.

Optimization Activities for WTTP: The WTTP remains off line since it was shut down in April 2010 for the ongoing rebound study. No additional optimization activities to report for the month of February.

Optimization Activities for CGWTP: The final quarterly performance monitoring event at Site SS015 was completed in February 2012. A presentation will be given with the detailed information during this meeting.

North Groundwater Treatment Plant (see Attachment 5)

The North Groundwater Treatment Plant (NGWTP) performed at 99.9% uptime with approximately 18,880 gallons of groundwater extracted and treated during the month of February 2012. The average flow rate of the NGWTP, while operating, was 0.42 gpm and electrical power use was 775 kWh for all the equipment connected to the North plant. Approximately 1,062 pounds of CO_2 was created. Approximately 0 pounds of VOCs were removed from the groundwater in February. The total mass of VOCs removed since the startup of the system is 174.3 pounds.

Optimization Activities: No optimization activities to report for the month of February.

Site ST018 Groundwater (MTBE) Treatment Plant (see attachment 6)

The Site ST018 (MTBE) Treatment Plant (S18GWTP) performed at 87.8% uptime with approximately 153 thousand gallons of groundwater extracted and treated during the month of February 2012. All treated water was diverted to the storm drain. The average flow rate for the ST018 GWTP was 3.92 gpm. Electrical power usage for the month was 106 kWh for all equipment connected to the ST018 GWTP plant, which equates to the creation of approximately 145 pounds of CO_2. Approximately 0.58 pounds of BTEX, MTBE and TPH were removed from groundwater in February. The

total BTEX, MTBE and TPH mass removed since the startup of the system is 8.1 pounds.

Note: electrical power use is for the alarm system and a pump that pushes water through the GAC. The other pumps in the system are all solar powered.

Optimization Activities: The operation of four extraction wells had faulty batteries that were still under warranty, they were observed to be physically bulging. They have since been replaced. No other optimization activities to report for the month of February.

3. Presentations

SS015 Performance Update (see Attachment 7)

Mr. Chakurian reported on the fourth quarter SS015 Performance Data Update. See Attachment 7 for details.

Highlights included:

- There have been significant reductions of greater than 99% of CVOCs compared to the baseline concentrations observed in the Site SS015 hot spot area.

- The analytical results from wells IW2128x15 and MW216x15, since the Emulsified Vegetable Oil (EVO) injection was conducted, have shown significant reductions in DCE, and vinyl chloride in the source area. In well MW216x15, TCE decreased from 504 µg/L to 0.2 J µg/L, Cis-1,2-DCE decreased from 8,800 µg/L to 8.3 µg/L, and vinyl chloride decreased from 5,140 µg/L to 6.8 µg/L.

- There is very little Cis-1,2-DCE remaining in IW2128x15 and MW216x15 and there is no significant vinyl chloride accumulation. High levels of ethane remain in the hot spot area providing conditions for complete destruction of the remaining low levels of vinyl chloride.

- Significant reductions of CVOCs have been observed in the wells surrounding the original TCE hot spot (MW2103x15, IW2126x15, IW2127x15, MW2129x15, and MW2132x15).

- MW2103x15 is not an injection well and is located seventy-five feet downgradient from the injection wells. MW2103x15 has shown a decrease in TCE and cis-1,2-DCE concentration by over ninety percent over the fifteen month treatment period.

- Fifteen months after the EVO injections, there is no indication of TCE rebound in the treatment area.

- Only three wells at Site SS015 (MW2124x15, MW2118x15, and MW625x15), containing CVOCs contamination have not been impacted by the EVO injection.

MW2124x15 is located approximately 100 feet downgradient of the EVO injection area, MW2118x15 is located approximately 175 feet downgradient of the EVO Injection area, and MW625x15 is located approximately 100 feet crossgradient of the EVO injection area.

- Dissolved TOC supply in the hot spot injection area remains high and is sustaining ERD. Six wells in the original CVOC hot spot area still contain TOC averaging 194 mg/L after fifteen months following the EVO injection. TOC should be sufficient to sustain ERD for another year or more. Mr. Wray said we are trying to maintain a TOC level of 20 mg/L.

- Geochemical data collected from the hot spot area supports ERD. High TOC, high methane, high dissolved iron and manganese, and significantly depleted sulfate are all positive geochemical signatures for anaerobic conditions favoring ERD.

- The SS015 performance monitoring is converting from quarterly sampling to annual sampling with the first annual event in November 2012. MW2124x15 and MW625x15 will be sampled for VOCs and TOC as part of the 2012 Annual GSAP sampling event second quarter 2012.

- MW624x15, MW2104x15, MW2119x15, and MW2125x15 will be removed from the SS015 performance monitoring well network due to the historical results and the location of these wells. The data collected from these wells has reported non-detect for CVOCs. Mr. Wray said the historical data from these wells has not changed since the EVO injection, and is not providing any useful data at the present time.

  Ms. Burke voiced concern about removing these wells from the performance monitoring network. Mr. Chakurian explained there are wells closer to the plume cross-gradient and downgradient that will be kept in the performance monitoring network, and these wells have been non-detect as well. Mr. Wray asked if it would help to provide a table with the initial monitoring network indicating where the wells are placed within or near the plume; cross-gradient, downgradient, depth, and why they are being removed from the performance monitoring program, and the wells that are kept that would serve as replacement. Ms. Burke said yes, that would be very helpful.

  Mr. Chakurian referred to a map of the TCE plume and a cross section with the baseline and subsequent quarterly TCE concentrations posted. See attachment 7 for details.

Program Update: Activities Completed, In Progress and Upcoming (see Attachment 8)

Mr. Wray reported on the status of field work and documents which are completed, in progress, and upcoming. See Attachment 8 for details.

Highlights included:

Completed Documents include the Work Plan for Assessment of Aerobic Chlorinated Cometabolism Enzymes.

Completed Fieldwork includes the sampling for assessment of aerobic chlorinated cometabolism enzymes.

Field Work In Progress: None.

Upcoming Documents includes addition of the 2011 CAMU Annual Report.

Upcoming Fieldwork includes SS029/SS016 System Optimization Analysis, and 2012 Annual GSAP sampling.

4. New Action Item Review

None.

5. PROGRAM/ISSUES/UPDATE

None.

6. Action Items

Item #	Responsible	Action Item Description	Due Date	Status
1.	Travis AFB	Petition to have the Lysimeter removed.	TBD	Open
2.	Travis AFB	Research beneficial reuse of treated water and give update.	TBD	Open
3.	CH2M HILL	Revise 21 March 2012 RPM Agenda, and MMDS to reflect that today's meeting was a teleconference.	19 April 2012	Open
4.	Mr. Friedman	Confirm if the start time of 1400 hours for RPM 19 April 2012 RPM meeting will work for him to attend.	28 March 2012	Open
5.	Travis AFB	Contact Ms. Gavlak for coordination for use of a local school to hold the PP Public Meeting that provides audio and visual technology.	TBD	Open

6.	ITSI	Provide best dates possible for FT005 Remedial Action Completion Report.	12 April 2012	Open
7.	CH2M HILL	Provide regulators with Site SS015 table explaining the strategy of the removal of wells from the performance monitoring network	28 March 2012	Open

TRAVIS AIR FORCE BASE
ENVIRONMENTAL RESTORATION PROGRAM
REMEDIAL PROGRAM MANAGER'S MEETING
BLDG 570, Main Conference Room
21 March 2012, 9:30 A.M.
AGENDA

1. ADMINISTRATIVE

   A. PREVIOUS MEETING MINUTES
   B. ACTION ITEM REVIEW
   C. MASTER MEETING AND DOCUMENT SCHEDULE REVIEW

2. CURRENT PROJECTS

   A. TREATMENT PLANT OPERATION AND MAINTENANCE UPDATE (LONNIE)

3. PRESENTATIONS

   A. SS015 PERFORMANCE UPDATE
   B. PROGRAM UPDATE: ACTIVITIES COMPLETED, IN PROGRESS AND UPCOMING

4. NEW ACTION ITEM REVIEW

5. PROGRAM/ISSUES/UPDATE

NOTE: WE HAVE ALSO SET ASIDE THE 12:30 TO 2:30 TIMEFRAME AFTER THE RPM MEETING TO DISCUSS THE TEFA AND THE DRAFT GSAP ANNUAL REPORT.

Travis AFB Master Meeting and Document Schedule

(2012)
Annual Meeting and Teleconference Schedule

Monthly RPM Meeting (Begins at 9:30 a.m.)	RPM Teleconference (Begins at 9:30 a.m.)	Restoration Advisory Board Meeting (Begins at 7:00 p.m.) (Poster Session at 6:30 p.m.)
01-18-12	—	—
02-22-12	—	—
03-21-12	—	—
04-19-12 (1:00 PM)	—	04-19-12
05-16-12	—	—
06-20-12*	—	—
07-18-12	—	—
08-15-12	—	—
09-19-12	—	—
10-18-12 (1:00 PM)	—	10-18-12
11-14-12	—	—
—	—	—

* Mark and Lonnie will not be able to attend this meeting. Consider cancelling if 6/13/2012 is not acceptable.

Travis AFB Master Meeting and Document Schedule

PRIMARY DOCUMENTS		
	Basewide Groundwater	
Life Cycle	Proposed Plan Travis, Glenn Anderson CH2M HILL, Loren Krook	Record of Decision Travis, Glenn Anderson CH2M HILL, Tony Jaegel
Scoping Meeting	**NA**	**01-24-07 (11-30-11)**
Predraft to AF/Service Center	10-06-11	06-04-12
AF/Service Center Comments Due	11-05-11	07-06-12
Draft to Agencies	04-04-12	08-17-12
Draft to RAB	04-04-12	08-17-12
Agency Comments Due	05-04-12	10-16-12
Response to Comments Meeting	**05-16-12**	**11-14-12**
Public Comment Period	07-09-12 to 08-07-12	NA
Public Meeting	**07-18-12**	**NA**
Response to Comments Due	05-30-12	11-28-12
Draft Final Due (CD)	05-30-12	11-28-12
Final Due	06-29-12	12-27-12

Travis AFB Master Meeting and Document Schedule

PRIMARY DOCUMENTS			
	Potrero Hills Annex Travis, Glenn Anderson		
Life Cycle	FS	**Proposed Plan**	**ROD**
Scoping Meeting	**180 days after Water Board Order Rescinded**	**+470 days**	**+735 days**
Predraft to AF/Service Center	+ 270 days	+530 days	+ 915 days
AF/Service Center Comments Due	+ 300 days	+560 days	+ 975 days
Draft to Agencies	+330 days	+590 days	+ 1035 days
Draft to RAB	+ 330 days	+590 days	+ 1035 days
Agency Comments Due	+390 days	+650 days	+ 1095 days
Response to Comments Meeting	**+ 405 days**	**+665 days**	**+ 1110 days**
Agency Concurrence with Remedy	NA	NA	+ 1130 days
Public Comment Period	NA	+735 to 765 days	NA
Public Meeting	**NA**	**+745 days**	**NA**
Response to Comments Due	+430 days	+695days	+ 1190 days
Draft Final Due	+430 days	+695 days	+ 1190 days
Final Due	+460 days	+725 days	+ 1250 days

Travis AFB Master Meeting and Document Schedule

SECONDARY DOCUMENTS			
Life Cycle	**Work Plan for Assessment of Aerobic Chlorinated Cometabolism Enzymes at Travis AFB** **Travis AFB, Glenn Anderson** **CH2M HILL, Leslie Royer**	**Technical Memorandum for Assessment of Aerobic Chlorinated Cometabolism Enzymes at Travis AFB** **Travis AFB, Glenn Anderson** **CH2M HILL, Leslie Royer**	**Work Plan for Remedial Process Optimization of Sites SS016 and SS029 at Travis AFB** **Travis AFB, Lonnie Duke** **Tri-Hydro, Glenn Leong**
Scoping Meeting	**NA**	**NA**	**NA**
Predraft to AF/Service Center	08-09-11	04-02-12	01-06-12
AF/Service Center Comments Due	08-19-11	04-09-12	01-20-12
Draft to Agencies	09-29-11	04-20-12	02-22-12
Draft to RAB	09-29-11	04-20-12	02-22-12
Agency Comments Due	11-14-11	05-21-12	04-02-12
Response to Comments Meeting	**11-30-11**	**06-20-12**	**04-19-12**
Response to Comments Due	11-17-11	07-10-12	04-26-12
Draft Final Due	NA	NA	NA
Final Due	02-24-12	07-10-12	04-26-12
Public Comment Period	NA	NA	NA
Public Meeting	**NA**	**NA**	**NA**

Travis AFB Master Meeting and Document Schedule

SECONDARY DOCUMENTS				
Life Cycle	**RPO Baseline Implementation Report** **Travis AFB, Lonnie Duke** **CH2M HILL, Tony Chakurian**	**Technical and Economic Feasibility Analysis** **Travis AFB, Glenn Anderson** **CH2M HILL, Loren Krook**	**Site LF007C Data Gaps Investigation Technical Memorandum** **Travis AFB, Lonnie Duke** **CH2M HILL, Tony Chakurian**	**FT005 Remedial Action Completion Report** **Travis AFB, Lonnie Duke** **ITSI, Rachel Hess**
Scoping Meeting	**NA**	**07-20-11**	**NA**	**NA**
Predraft to AF/Service Center	08-02-11	10-13-11	05-03-12	TBD
AF/Service Center Comments Due	08-16-11	10-31-11	05-17-12	TBD
Draft to Agencies	09-16-11	12-15-11	05-31-12	TBD
Draft to RAB	09-16-11	12-15-11	05-31-12	TBD
Agency Comments Due	10-31-11	01-30-12	07-02-12	TBD
Response to Comments Meeting	**02-22-12**	**03-21-12**	**07-18-12**	**TBD**
Response to Comments Due	03-28-12	04-04-12	08-01-12	TBD
Draft Final Due	NA	NA	NA	NA
Final Due	03-28-12	04-04-12	08-01-12	TBD
Public Comment Period	NA	NA	NA	NA
Public Meeting	**NA**	**NA**	**NA**	**NA**

Travis AFB Master Meeting and Document Schedule

INFORMATIONAL DOCUMENTS				
Life Cycle	**Quarterly Newsletters (April 2012) Travis, Glenn Anderson**	**2010/2011 GSAP Travis AFB, Lonnie Duke CH2M HILL, Leslie Royer**	**2011 Groundwater Treatment RPO Annual Report Travis AFB, Lonnie Duke CH2M HILL, Doug Berwick**	**2011 CAMU Annual Report Travis AFB, Lonnie Duke ITSI, Rachel Hess**
Scoping Meeting	**NA**	**NA**	**NA**	**NA**
Predraft to AF/Service Center	NA	10-20-11	02-22-12	TBD
AF/Service Center Comments Due	NA	10-30-11	03-05-12	TBD
Draft to Agencies	03-19-12	12-07-11	TBD	TBD
Draft to RAB	NA	12-07-11	TBD	TBD
Agency Comments Due	04-02-12	02-05-12	TBD	TBD
Response to Comments Meeting	**TBD**	**02-22-12**	**TBD**	**TBD**
Response to Comments Due	04-06-12	02-27-12	TBD	TBD
Draft Final Due	NA	NA	NA	NA
Final Due	04-09-12	TBD	TBD	TBD
Public Comment Period	NA	NA	NA	NA
Public Meeting	**NA**	**NA**	**NA**	**NA**

Travis AFB Master Meeting and Document Schedule

INFORMATIONAL DOCUMENTS	
Life Cycle	**Old Skeet Range Engineering Evaluation/Cost Analysis** **Travis AFB, Glenn Anderson** **Baywest, Steve Thornton**
Scoping Meeting	**NA**
Predraft to AF/Service Center	07-18-11
AF/Service Center Comments Due	08-03-11
Draft to Agencies	09-29-11
Draft to RAB	09-29-11
Agency Comments Due	10-31-11
Response to Comments Meeting	**TBD (Teleconference)**
Agency Concurrence with Remedy	NA
Public Comment Period	TBD
Public Meeting	**NA**
Response to Comments Due	TBD
Draft Final Due	TBD
Final Due	**TBD**

South Base Boundary Groundwater Treatment Plant Monthly Data Sheet

Report Number: 138 **Reporting Period: 31 Jan 2012 – 29 Feb 2012** **Date Submitted: 16 March 2012**

This monthly data sheet presents information regarding the South Base Boundary Groundwater Treatment Plant (SBBGWTP) and associated remedial process optimization (RPO) activities.

System Metrics

Table 1 presents operation data from the February 2012 reporting period.

Table 1 – Operations Summary – February 2012

Operating Time:	Percent Uptime:	Electrical Power Usage:
SBBGWTP: 740 hours	**SBBGWTP:** 100 %	**SBBGWTP:** 12,720 kWh (17,426 lbs CO_2 generated[a])

Gallons Treated: **5.1 million gallons**

Gallons Treated Since July 1998: **773 million gallons**

Volume Discharged to Union Creek: **5.1 million gallons**

VOC Mass Removed: **1.6 lbs**[b]

VOC Mass Removed Since July 1998: **416 lbs**

Rolling 12-Month Cost per Pound of Mass Removed: $6,098[c]

Monthly Cost per Pound of Mass Removed: $4,611

lbs = pounds

[a] Based on Department of Energy estimate that 1 kilowatt hour generated produces 1.37 pounds of GHG.

[b] Calculated using February 2012 EPA Method SW8260B analytical results.

[c] Costs include operations and maintenance, reporting, analytical laboratory, project management, and utility costs related to operation of the system.

Table 2 presents individual extraction well flow rates along with the average system flow during the monthly reporting period.

Table 2 – SBBGWTP Average Flow Rate (gpm)[a]

FT005[b]				SS029		SS030	
EW01x05	Offline	EW736x05	Offline	EW01x29	8.2	EW01x30	10.1
EW02x05	0.6	EW737x05	Offline	EW02x29	4.9	EW02x30	0.4
EW03x05	Offline	EW742x05	Offline	EW03x29	2.8	EW03x30	2.5
EW731x05	Offline	EW743x05	Offline	EW04x29	8.5	EW04x30	23.8
EW732x05	Offline	EW744x05	Offline	EW05x29	10.0	EW05x30	12.0
EW733x05	Offline	EW745x05	Offline	EW06x29	7.5	EW06x30	Dry
EW734x05	9.8	EW746x05	Offline	EW07x29	7.6	EW711x30	16.0
EW735x05	5.9						
FT005 Total:	**16.3**			**SS029 Total:**	**49.5**	**SS030 Total:**	**64.8**

SBBGWTP Average Monthly Flow[c]: 115 gpm

[a] Extraction well flow rates are based on end-of-month readings.
[b] Most extraction wells at FT005 were taken offline in accordance with the *2008 Annual Remedial Process Optimization Report for the Central Groundwater Treatment Plant, North Groundwater Treatment Plant, and South Base Boundary Groundwater Treatment Plant.*
[c] The average groundwater flow rate was calculated using the Union Creek Discharge Totalizer and dividing it by the operating time of the plant. Flow rates listed for each well are instantaneous flow rates and may differ from the average monthly flow due to well recharge.

gpm – gallons per minute
Recharge –not pumping while the well recharges.
SBBGWTP – South Base Boundary Groundwater Treatment Plant

Table 3 presents a summary of system shutdowns during the monthly reporting period.

Table 3 – Summary of System Shutdowns

Location	Shutdown		Restart		Cause
	Date	Time	Date	Time	
	None		NA		NA

SBBGWTP = South Base Boundary Groundwater Treatment Plant

Summary of O&M Activities

Monthly groundwater samples at the SBBGWTP were collected on 6 February 2012. Sample results are presented in Table 4. The total VOC concentration (38.6 µg/L) in the influent sample was nearly the same as the January 2012 sample (38.0 µg /L) . Figure 1 presents a plot of influent concentrations at the SBBGWTP over the past twelve (12) months.

Concentrations of 1,2-DCA, TCE and cis 1,2-DCE were detected at concentrations of 0.5, 36.1, and 2.0 µg/L at the influent sample location in February 2012. While TCE was not detected in samples collected at the midpoint sampling location, 1,2-DCA and cis 1,2-DCE were both detected at concentrations of 0.57 and 0.85 J µg/L. No contaminants were detected in the effluent process stream. Travis AFB will continue to monitor for evidence of breakthrough of the primary carbon vessel, though the SBBGWTP did recently undergo a carbon change out of one of the GAC vessels (6,000 pounds) in the treatment stream.

Optimization Activities

No optimization activities were performed in February 2012.

Sustainability

Travis AFB is committed to decreasing the amount of GHG produced directly (waste streams discharging GHG) or indirectly (GHG produced as related to electrical energy consumption) from all systems across Travis AFB. Travis AFB continues to optimize each treatment plant to reduce the amount of electrical energy consumed, and to implement sustainable treatment plant optimization programs, such as bioreactors and EVO injection well networks.

Figure 2 presents the historical GHG production from the SBBGWTP. The SBBGWTP produced approximately 17,426 pounds of GHG during February 2012. GHG production has increased (from 16,522 pounds) since January 2012 as a result of increased SBBGWTP operating time. The overall energy consumption levels remain consistent with the general decrease in energy demand since the air stripper was bypassed, and the GAC system was brought online.

TABLE 4
Summary of Groundwater Analytical Data for February 2012 – South Base Boundary Groundwater Treatment Plant

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	6 February 2012 (µg/L)		
				Influent	Midpoint	Effluent
Halogenated Volatile Organics						
Bromodichloromethane	5.0	0.15	0	ND	ND	ND
Carbon Tetrachloride	0.5	0.14	0	ND	ND	ND
Chloroform	5.0	0.16	0	ND	ND	ND
Dibromochloromethane	5.0	0.13	0	ND	ND	ND
1,1-Dichloroethane	5.0	0.15	0	ND	ND	ND
1,2-Dichloroethane	0.5	0.15	0	0.5	0.57	ND
1,1-Dichloroethene	5.0	0.19	0	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.19	0	2.0	0.85 J	ND
trans-1,2-Dichloroethene	5.0	0.33	0	ND	ND	ND
Methylene Chloride	5.0	0.66	0	ND	ND	ND
Tetrachloroethene	5.0	0.21	0	ND	ND	ND
1,1,1-Trichloroethane	5.0	0.14	0	ND	ND	ND
1,1,2-Trichloroethane	5.0	0.20	0	ND	ND	ND
Trichloroethene	5.0	0.19	0	36.1	ND	ND
Vinyl Chloride	0.5	0.18	0	ND	ND	ND
Non-Halogenated Volatile Organics						
Benzene	1.0	0.17	0	ND	ND	ND
Ethylbenzene	5.0	0.22	0	ND	ND	ND
Toluene	5.0	0.14	0	ND	ND	ND
Xylenes	5.0	0.23 – 0.5	0	ND	ND	ND
Other						
Total Petroleum Hydrocarbons – Gasoline	50	8.5	0	NM	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	50	0	NM	NM	ND
Total Suspended Solids (mg/L)	NE	1.0	0	35	NM	NM

* In accordance with Appendix B of the Travis AFB South Base Boundary Groundwater Treatment Plant Operations and Maintenance Manual (CH2M HILL, 2004).

Notes:

J = analyte concentration is considered an estimated value
mg/L = milligrams per liter
N/C = number of samples out of compliance with discharge limits
ND = not detected
NE = not established
NM = not measured
µg/L = micrograms per liter

Figure 1
SBBGWTP Total VOC Influent Concentrations - Twelve Month History
Travis Air Force Base, California

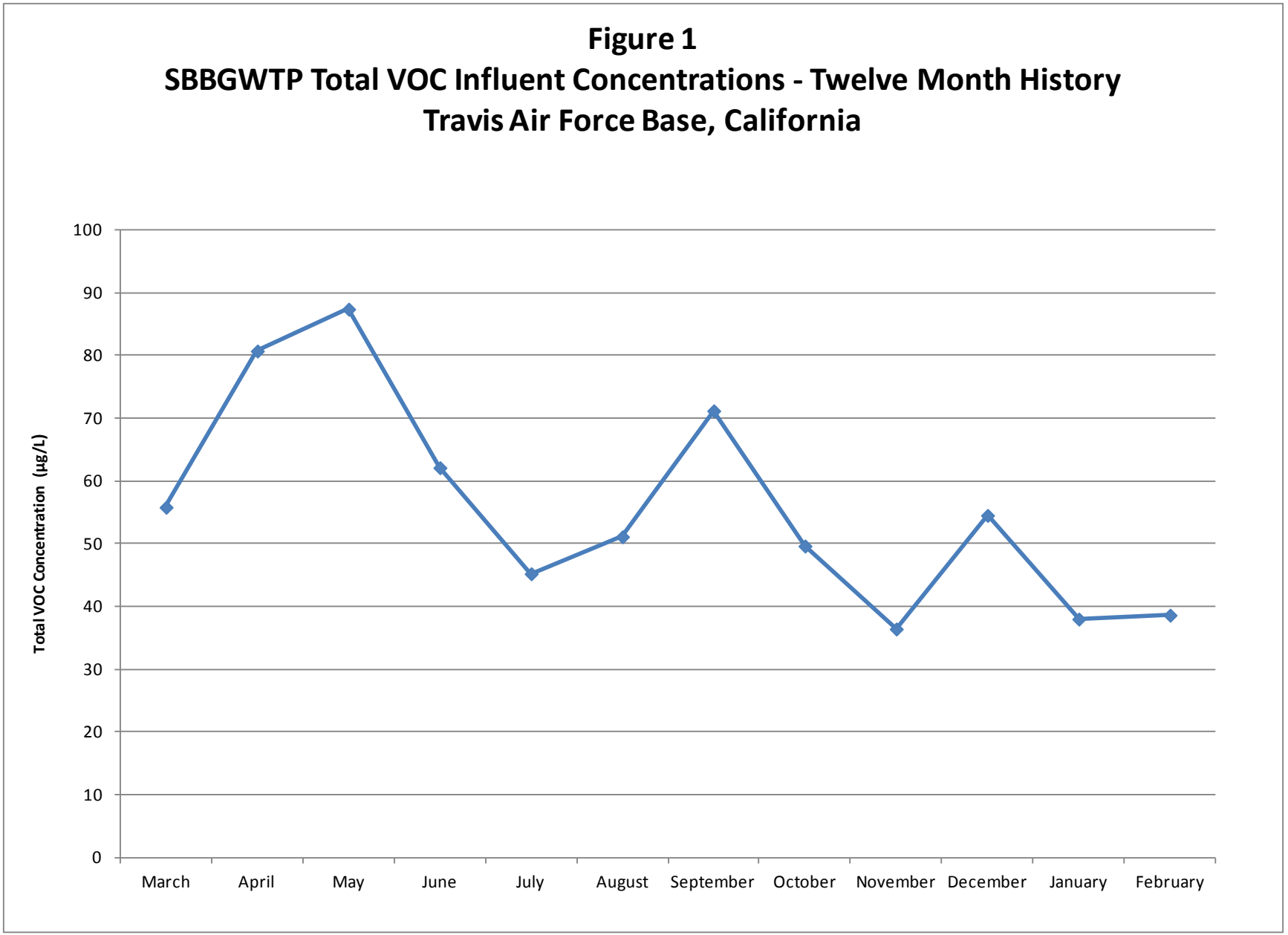
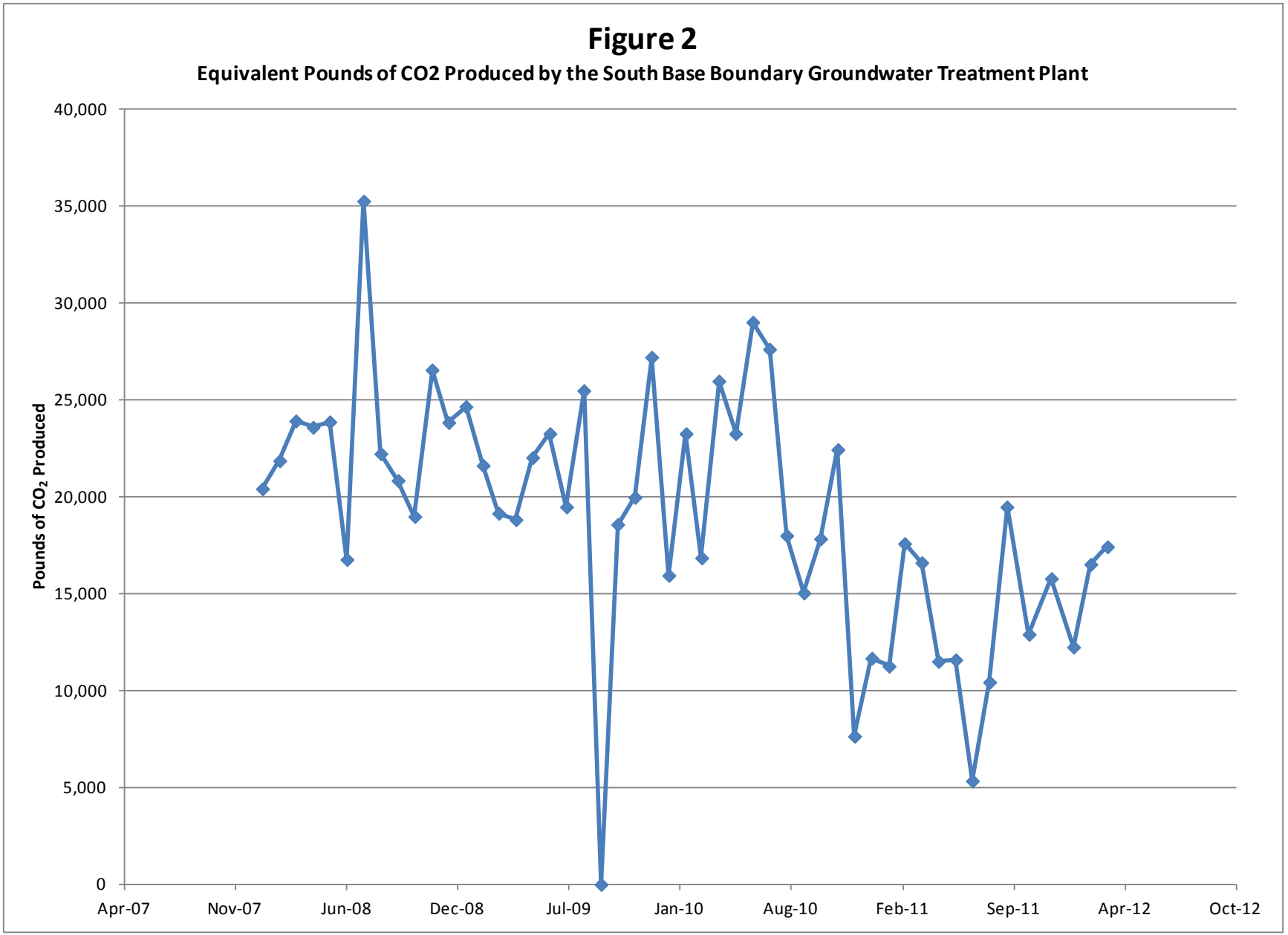


Figure 2

Equivalent Pounds of CO2 Produced by the South Base Boundary Groundwater Treatment Plant



Central Groundwater Treatment Plant Monthly Data Sheet

Report Number: 151 **Reporting Period: 31 Jan 2011 – 29 Feb 2012** **Date Submitted: 16 March 2012**

This monthly data sheet presents information regarding all systems and associated treatability demonstrations and remedial process optimization (RPO) activities to the Central Groundwater Treatment Plant (CGWTP). The activities related to the CGWTP network of treatment systems include various emulsified vegetable oil (EVO) injection sites, two (2) bioreactors, and various rebound studies.

Results from the fourth performance monitoring event at the Site SS015 EVO injection treatability demonstration are presented in this Data Sheet. This performance sampling event signifies the final quarterly performance sampling event. Performance monitoring events at Site SS015 will transition to an annual event, with the next one scheduled for November 2012. The performance monitoring event in November 2012 will coincide with the other annual performance monitoring events scheduled for Sites DP039, SD036, and SD037.

System Metrics

Table 1 presents operational data from the February 2012 reporting period.

Table 1 – Operations Summary – February 2012

Operating Time:		Percent Uptime:		Electrical Power Usage:	
CGWTP:	742 hours	**CGWTP:**	100%	**CGWTP:**	2,477 kWh (3,393 lbs CO_2 generated[a])
WTTP:	Water: 0 hours Vapor: 0 hours	**WTTP[b]:**	Water: 0% Vapor: 0%	**WTTP:**	0 kWh

Gallons Treated: **1.7 million gallons**

Gallons Treated Since January 1996: **458 million gallons**

VOC Mass Removed:

5.0 lbs[b] (groundwater only)

0 lbs (vapor only)

VOC Mass Removed Since January 1996:

2,582 lbs from groundwater

8,686 lbs from vapor

Rolling 12-Month Cost per Pound of Mass Removed: $1,594[c]

Monthly Cost per Pound of Mass Removed: $1,701

[a] Based on Department of Energy estimate that 1 kilowatt hour generated produces 1.37 pounds of GHG.

[b] Calculated using February 2012 EPA Method SW8260B analytical results.

[c] Costs include operations and maintenance, reporting, analytical laboratory, project management, and utility costs related to operation of the CGWTP.

Table 2 presents individual extraction well flow rates during the monthly reporting period. All WIOU extraction wells continue to remain off line for the WIOU rebound study.

Table 2 – CGWTP Average Flow Rates[a]

Location	Average Flow Rate	
	Groundwater (gpm)	Soil Vapor (scfm) [b]
EW01x16	19.8	Offline
EW02x16	7.3	Offline
EW03x16	1.5[c]	Offline
EW605x16	0.6	Offline
EW610x16	3.2	Offline
CGWTP	37.5	--
WTTP	Offline[b]	Offline

[a] All flow rates calculated by dividing total gallons processed by system operating time for the month.
[b] No vapor or groundwater was treated in February 2012.
[c] Water discharged to Site SS016 bioreactor – flow rate taken from wellhead Flow Totalizer divided by operating time during the month.
gpm = gallons per minute
-- = not applicable/not available
scfm = standard cubic feet per minute

Table 3 presents average a summary of shutdowns during the monthly reporting period.

Table 3 – Summary of System Shutdowns

Location	Shutdown		Restart		Cause
	Date	Time	Date	Time	
CGWTP (Groundwater)					
	None		NA		NA
WTTP					
	System down for rebound study		NA		NA

CGWTP = Central Groundwater Treatment Plant
WTTP = West Transfer Treatment Plant

Summary of O&M Activities

Monthly groundwater samples at the CGWTP were collected on 6 February 2012. Sample results are presented in Table 4. The total VOC concentration (360 µg/L) in the influent sample has increased slightly since the January 2012 sample (324 µg/L) was collected. Concentrations of cis 1,2-DCE (79.8 µg/L) and TCE (272 µg/L) were detected at the influent sampling location, but neither were detected between the primary and secondary vessels, or at the effluent sampling location.

Vinyl chloride was also detected at the influent sampling location, but was not detected at the system effluent sampling location. The primary GAC vessel reduced the vinyl chloride concentration from 0.76 µg/L to 0.65 µg/L, and the concentration decreased again through the secondary GAC vessel to 0.25 J µg/L, which is less than the instantaneous maximum effluent limit (0.5 µg/L). Vinyl chloride was not detected at the effluent sample location. Travis Air Force Base will continue to monitor vinyl chloride and other contaminant concentrations at CGWTP for breakthrough in the primary vessel. Figure 1 presents a plot of influent concentrations (total VOCs) at the CGWTP versus time for the past twelve (12) months.

The flow meter associated with extraction well EW605x16 was discovered as inoperable on 23 February 2012. The flow meter register was replaced on 27 February 2012.

On 7 and 8 February 2012, performance samples were collected from several monitoring wells at EVO injection Site SS015 as part of the fourth quarterly performance monitoring sampling event. Details are provided in the Optimization section of this Data Sheet.

The Site DP039 bioreactor has transitioned to a "pulsed mode" operation in order to improve the rate of remediation and to preserve the small amounts of total organic carbon being produced within the bioreactor. On 30 January 2012, the extraction pump at well EW782x39 (the Site DP039 bioreactor recirculation well) was brought back on line as part of the pulsed operation for a period of approximately three (3) weeks. The pump was taken off line on 20 February 2012, and will continue to be shut down into March 2012. Pulsed operation consists of operating the pump for approximately two (2) weeks, then taking it off line for approximately four (4) weeks.

Table 5 presents the Site DP039 bioreactor recirculation well pulsing dates.

Optimization Activities

The final quarterly performance monitoring event at Site SS015 was completed in February 2012. Figures 2 through 5 show concentration profiles through February 2012 for TCE, cis-1,2-DCE, vinyl chloride, and TOC. Figures 6A – 6D and 7A – 7D show these same contamination profiles as cross sections through Site SS015. These cross section lines are shown on Figure 2. Table 6 presents the analytical results for the final quarterly performance monitoring event at Site SS015. A summary of the data is provided below.

Contaminant Reductions The Site SS015 EVO injection area (target wells IW2128x15 and MW216X15) is showing total chlorinated volatile organic compound (CVOC) reductions of over 99 percent when compared to baseline concentrations. Figures 2 through 4 show the current contamination profiles, while the cross section figures (6A-C, 7A-C) identify all contaminant concentrations collected in the Site SS015 injection area since the baseline sampling event in November 2010. Very little cis-1,2 DCE remains in these wells (Figure 6B and 7B), and no significant vinyl chloride accumulation is evident (Figures 6C and 7C). High levels of methane remain in this area, which indicates that reducing conditions continue to persist in the treatment area.

There have also been significant contaminant reductions in wells surrounding the target well MW216x15 (IW2126x15, IW2127x15, MW2103X15, MW2129X15, and MW2132x15). Fifteen months after EVO injection, there is no indication of TCE rebound in the treatment area, as shown in Figures 6A and 7A. Well MW2103x15 is located approximately 75 feet downgradient of the EVO injection area and this well has seen both TCE and DCE decrease by over 90 percent over the 15-month treatment period. Monitoring wells MW2124x15, which is located approximately 100 feet downgradient of the EVO injection area, and MW625X15, which is 100 feet cross gradient of the injection area are not yet within the influence of injection activities.

TOC Supply: The dissolved total organic carbon (TOC) supply in the injection area remains high and is sustaining ERD. Six wells (IW2126x15, IW2127x15, IW2128x15, MW216x15, MW2129x15, and MW2132x15) in the injection area still contain TOC concentrations in excess of 20 mg/L, and averaging 194 mg/L approximately 15 months after EVO injection activities began. Figure 5 shows the current (February 2012) TOC concentration profile, and Figures 6D and 7D show TOC concentration cross sections from February 2012.

Geochemical Indicators: Geochemical data collected from the Site SS015 injection area supports ERD. High TOC, high methane, high dissolved iron and manganese, and significantly depleted sulfate are all positive geochemical signatures for anaerobic conditions favoring ERD. Sulfate levels in the CVOC source area remain low and are not inhibiting CVOC reduction.

Summary: Site SS015 provides a good example of ERD for TCE removal at Travis AFB. The EVO design (well spacing and injected volumes) at this site provide a good blueprint for EVO success at Travis AFB. Wells that

have been impacted by the EVO substrate (shown TOC increases) have responded with nearly complete TCE and cis-1,2-DCE reduction with minimal buildup or migration of vinyl chloride. In the first 15 months of treatment, injection area wells MW216x15 and IW2128x15 have experienced total TCE, cis-1,2-DCE, and vinyl chloride concentration reductions of over 99 percent with no evidence of rebound. TOC concentrations within the injection area average 194 mg/L and are sufficient to sustain ERD for an additional year or more.

Technology Demonstration Optimizations: Performance monitoring at Site SS015 will transition to an annual frequency and be synchronized with the other performance sampling events at Sites DP039, SD036, and SD037. This sampling frequency is sufficient based on historical monitoring data, the low levels of contaminant concentrations remaining in the target treatment area, and high remaining TOC levels. Monitoring wells MW625x15 and MW2124x15 are at the edge of influence from the EVO injection area and have yet to experience concentration profiles similar to those wells within the injection area (Figures 6A-D, 7A-D).

There are several wells at this site that are not providing useful information for evaluating the progress of the ERD technology demonstration due to their proximity to the treatment area, or depth of screened interval (too deep). Through several performance monitoring events, these wells have consistently shown no detectable contaminant concentrations and are not needed to define the plume boundary. As a result, monitoring wells MW624x15, MW2104x15, MW2119x15, and MW2125x15 will be removed from the performance monitoring well network.

Sustainability

Travis AFB is committed to decreasing the amount of GHG produced directly (waste streams discharging GHG) or indirectly (GHG produced as related to electrical energy consumption) from all systems across Travis AFB. Travis AFB continues to optimize each treatment plant to reduce the amount of electrical energy consumed, and to implement sustainable treatment plant optimization programs, such as bioreactors and EVO injection well networks.

Figure 8 presents the historical GHG production from the systems associated with the CGWTP. The CGWTP produced approximately 3,393 pounds of GHG during February 2012. This is a decrease from the amount produced in January 2012 (approximately 3,535 pounds). The decrease in GHG is likely attributed to the decrease in CGWTP monthly operating time and gallons treated.

TABLE 4
Summary of Groundwater Analytical Data for February 2012 – Central Groundwater Treatment Plant

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	6 February 2012 (µg/L)			
				Influent	After Carbon 1 Effluent	After Carbon 2 Effluent	System Effluent
Halogenated Volatile Organics							
Bromodichloromethane	5.0	0.15	0	ND	ND	ND	ND
Carbon Disulfide	1.0	0.19	0	ND	ND	ND	ND
Carbon Tetrachloride	0.5	0.14	0	ND	ND	ND	ND
Chloroform	5.0	0.16	0	ND	ND	ND	ND
MTBE	1.0	0.5	0	0.61 J	ND	ND	ND
1,2-Dichlorobenzene	5.0	0.25	0	0.41 J	ND	ND	ND
1.3-Dichlorobenzene	5.0	0.15	0	0.48 J	ND	ND	ND
1,4-Dichlorobenzene	5.0	0.15	0	0.25 J	ND	ND	ND
1,1-Dichloroethane	5.0	0.15	0	ND	ND	ND	ND
1,2-Dichloroethane	0.5	0.15	0	ND	ND	ND	ND
1,1-Dichloroethene	5.0	0.19	0	0.89	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.19	0	79.8	ND	ND	ND
trans-1,2-Dichloroethene	5.0	0.33	0	3.8	ND	ND	ND
Methylene Chloride	5.0	0.66	0	ND	ND	ND	ND
Tetrachloroethene	5.0	0.21	0	0.62	ND	ND	ND
1,1,1-Trichloroethane	5.0	0.14	0	ND	ND	ND	ND
1,1,2-Trichloroethane	5.0	0.2	0	ND	ND	ND	ND
Trichloroethene	5.0	0.19	0	272	ND	ND	ND
Vinyl Chloride	0.5	0.18	0	0.76	0.65	0.25 J	ND
Non-Halogenated Volatile Organics							
Benzene	1.0	0.17	0	ND	ND	ND	ND
Ethylbenzene	5.0	0.22	0	ND	ND	ND	ND
Toluene	5.0	0.14	0	ND	ND	ND	ND
Total Xylenes	5.0	0.5 – 0.23	0	ND	ND	ND	ND

* In accordance with Appendix G of the T*ravis AFB Central Groundwater Treatment Plant Operations and Maintenance Manual* (URS Group, Inc., 2002).

Notes:

J = analyte concentration is considered an estimated value
N/C = number of samples out of compliance with discharge limits
ND = not detected
µg/L = micrograms per liter

Table 5 – Summary of DP039 Bioreactor "Pulsed Mode" Operations

Location	Pulse On Start Date	Pulse Off Start Date
EW782x39	20 December 2011	30 December 2011
	30 January 2012	20 February 2012

CGWTP = Central Groundwater Treatment Plant
EW = Extraction Well

Table 6 – Site SS015 EVO Injection Performance Monitoring Analytical Results

Well ID	Date	TCE (ug/L)	cis-1,2-DCE (ug/L)	Vinyl Chloride (ug/L)	Ethene (ug/L)	Ethane (ug/L)	Methane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Dissolved Iron (mg/L)	Dissolved Manganese (mg/L)
MW104x15	11/4/2010	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	5/5/2011	0.39 J	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	9/6/2011	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	11/9/2011	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	2/6/2012	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
MW105x15	11/5/2010	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	5/4/2011	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	9/2/2011	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	11/9/2011	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	2/7/2012	0.68	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
MW216x15	11/4/2010	351	8,080	5,140	17	2.2	1,400 B	13.8	3,160	0.0233 J	0.799
	5/23/2011	24.8	598	70.6	3.3	6.7	150 B	1,310	<5.0	78.5	15.9
	9/6/2011	3.2	535	80.7	1.8	<1.2	2,900	645	<5.0	48.8	19.8
	11/9/2011	<0.5	6.0	5.2	7.9	<1.2	7,600	336	<5.0	38.4	17.7
	2/6/2012	<0.5	8.3	6.8	<1.0	<1.2	2,200	94.5	0.5 J	36.6	12.5
MW238x15	2/11/2011	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	11/9/2011	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	2/7/2012	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
MW306x15	11/4/2010	0.3 J	0.51 J	<0.5	NA	NA	NA	NA	NA	NA	NA
	5/24/2011	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	9/7/2011	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	11/9/2011	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	2/7/2012	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
MW624x15	11/5/2010	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	5/23/2011	<0.5	2.3	<0.5	NA	NA	NA	NA	NA	NA	NA
	9/2/2011	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA

Table 6 – Site SS015 EVO Injection Performance Monitoring Analytical Results

Well ID	Date	TCE (ug/L)	cis-1,2-DCE (ug/L)	Vinyl Chloride (ug/L)	Ethene (ug/L)	Ethane (ug/L)	Methane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Dissolved Iron (mg/L)	Dissolved Manganese (mg/L)
MW625x15	11/5/2010	5.5	41.2	<0.5	NA	NA	NA	NA	NA	NA	NA
	5/23/2011	15.9	131	2.5	NA	NA	NA	NA	NA	NA	NA
	9/2/2011	19.5	178	13.8	NA	NA	NA	NA	NA	NA	NA
	11/9/2011	28.4	250	33.2	NA	NA	NA	NA	NA	NA	NA
	2/8/2012	22.5	174	10.2	NA	NA	NA	NA	NA	NA	NA
MW2103x15	11/5/2010	31.7	41.3	1.2	NA	NA	NA	NA	NA	NA	NA
	5/23/2011	10.6	13.6	<0.5	NA	NA	NA	NA	NA	NA	NA
	9/2/2011	6.2	6.3	<0.5	NA	NA	NA	NA	NA	NA	NA
	11/9/2011	9.5	9.5	<0.5	NA	NA	NA	7.18	NA	NA	NA
	2/7/2012	2.9	2.2	<0.5	NA	NA	NA	NA	NA	NA	NA
MW2104x15	11/4/2010	<0.5	0.21 J	<0.5	NA	NA	NA	NA	NA	NA	NA
	5/24/2011	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	9/7/2011	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	11/9/2011	<0.5	<1.0	<0.5	NA	NA	NA	4.58	2,640	<0.05	0.656
MW2105x15	11/5/2010	5.4	0.33 J	<0.5	NA	NA	NA	NA	NA	NA	NA
	5/3/2011	7.2	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	11/16/2011	6.4	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	11/16/2011 (Dup)	7.1	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
MW2106x15	11/5/2010	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	5/23/2011	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	9/2/2011	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	11/9/2011	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	2/8/2012	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
MW2118x15	11/4/2010	26	45.5	5.8	NA	NA	NA	NA	NA	NA	NA
	5/2/2011	29.5	59.6	6.6	NA	NA	NA	NA	NA	NA	NA
	11/16/2011	25.2	41.4	4.2	NA	NA	NA	NA	NA	NA	NA

Table 6 – Site SS015 EVO Injection Performance Monitoring Analytical Results

Well ID	Date	TCE (ug/L)	cis-1,2-DCE (ug/L)	Vinyl Chloride (ug/L)	Ethene (ug/L)	Ethane (ug/L)	Methane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Dissolved Iron (mg/L)	Dissolved Manganese (mg/L)
MW2119x15	11/5/2010	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	5/2/2011	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	11/16/2011	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
MW2120x15	11/5/2010	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	5/2/2011	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	5/2/2011 (Dup)	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	11/16/2011	<0.5	0.2 J-	<0.5	NA	NA	NA	NA	NA	NA	NA
MW2124x15	11/11/2010	274	26.5	0.59	NA	NA	NA	NA	NA	NA	NA
	5/23/2011	226	37.8	0.19 J	NA	NA	NA	NA	NA	NA	NA
	9/2/2011	233	33.4	0.99	NA	NA	NA	NA	NA	NA	NA
	11/11/2011	268	39.4	2.0	NA	NA	NA	7.48	NA	NA	NA
	2/8/2012	255	37.2	1.2	NA	NA	NA	NA	NA	NA	NA
MW2125x15	11/5/2010	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	5/3/2011	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	11/16/2011	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
IW2126x15	11/4/2010	21.4	350	49.2	<1.0	<1.2	7 B	5.71	3,010	<0.05	0.724
	5/23/2011	0.42 J	39	0.84	<1.0	<1.2	3,600	113	<5.0	40.9	18
	9/6/2011	0.21 J	33.9	1.0	<1.0	<1.2	3,900	38.6	2.5 J	12	5.93
	11/9/2011	0.23 J	31.9	5.8	<1.0	<1.2	7,200	33.1	39.2	12.6	5.57
	2/6/2012	0.25 J	15.3	9.0	<1.0	<1.2	3,400	37.3	0.46 J	26	5.92
IW2127x15	11/4/2010	95.7	211	6.1	<1.0	<1.2	130 B	9.88	2,670	0.0948	11.3
	5/23/2011	1.7	27.9	4.7	1.3	<1.2	1,700	718	<5.0	53.3	9.97
	9/6/2011	0.38 J	4.9	1.8	<1.0	<1.2	1,900	148	<5.0	17.6	10.2
	11/9/2011	0.28 J	2.5	0.9	<1.0	<1.2	6,200	124	1.2 J	13.5	11.3
	2/7/2012	0.47 J	3.0	1.7	<1.0	<1.2	1,700	663	3.5 J	8.18	11.3

Table 6 – Site SS015 EVO Injection Performance Monitoring Analytical Results

Well ID	Date	TCE (ug/L)	cis-1,2-DCE (ug/L)	Vinyl Chloride (ug/L)	Ethene (ug/L)	Ethane (ug/L)	Methane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Dissolved Iron (mg/L)	Dissolved Manganese (mg/L)
IW2128x15	11/4/2010	504	598	17.5	<1.0	<1.2	15 B	5.56	2,780	0.0264 J	1.07
	5/24/2011	0.62	121	2.0	0.52 J	<1.2	4,600	900	0.76	57.7	25
	9/7/2011	0.26 J	119	10.4	<1.0	<1.2	3,800	77.8	0.6 J	46.8	14.9
	11/9/2011	0.26 J	6.4	3.6	0.54 J	<1.2	5,700	70.2	1.0 J	48.2	11.7
	2/6/2012	0.2 J	2.2	1.6	<1.0	<1.2	3,700	58.2	2.6 J	54.2	10.6
MW2129x15	11/4/2010	40.8	37.6	1.0	<1.0	<1.2	10 B	2.94	NA	<0.05	3.26
	11/4/2010 (Dup)	39.2	37.9	1.2	NA	NA	NA	2.86	NA	NA	NA
	5/31/2011	3.2	17.1	0.57	<1.0	<1.2	2,900	1,720	NA	NA	37.5
	5/31/2011 (Dup)	3.0	17.1	0.58	NA	NA	NA	1,820	NA	NA	NA
	9/6/2011	<5.0	8.9 J	<5.0	<1.0	<1.2	2,000	687	NA	NA	24.2
	9/6/2011 (Dup)	<5.0	10.2	<5.0	NA	NA	NA	657	NA	NA	NA
	11/9/2011	0.4 J	2.4	1.1	<1.0	<1.2	7,600	128	0.67 J	34.7	20.9
	11/9/2011 (Dup)	0.37 J	2.4	1.1	NA	NA	NA	120	NA	NA	NA
	2/7/2012	0.41 J	1.4	1.3	<1.0	<1.2	4,400	111	0.34 J	23.9	12.1
	2/7/2012 (Dup)	0.38 J	1.4	1.3	NA	NA	NA	120	NA	NA	NA
MW2130x15	11/5/2010	1.0	0.87 J	<0.5	NA	NA	NA	NA	NA	NA	NA
	5/2/2011	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	11/16/2011	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
MW2131x15	11/5/2010	0.28 J	0.2 J	<0.5	NA	NA	NA	NA	NA	NA	NA
	6/13/2011	0.7	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	9/2/2011	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	11/9/2011	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
	2/8/2012	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA
MW2132x15	11/4/2010	11.4	42.5	50.6	NA	NA	NA	NA	NA	NA	NA
	5/23/2011	0.84	2.3	<0.5	NA	NA	NA	NA	NA	NA	NA
	9/6/2011	<0.5	1.1	<0.5	NA	NA	NA	NA	NA	NA	NA
	11/9/2011	<0.5	0.76 J	<0.5	<1.0	<1.2	7,000	196	0.74 J	36.4	9.45
	2/8/2012	<0.5	1.0	0.55	<1.0	<1.2	2,500	197	5.6	38.9	7.14

Figure 1
CGWTP Total VOC Influent Concentrations - Twelve Month History
Travis Air Force Base, California

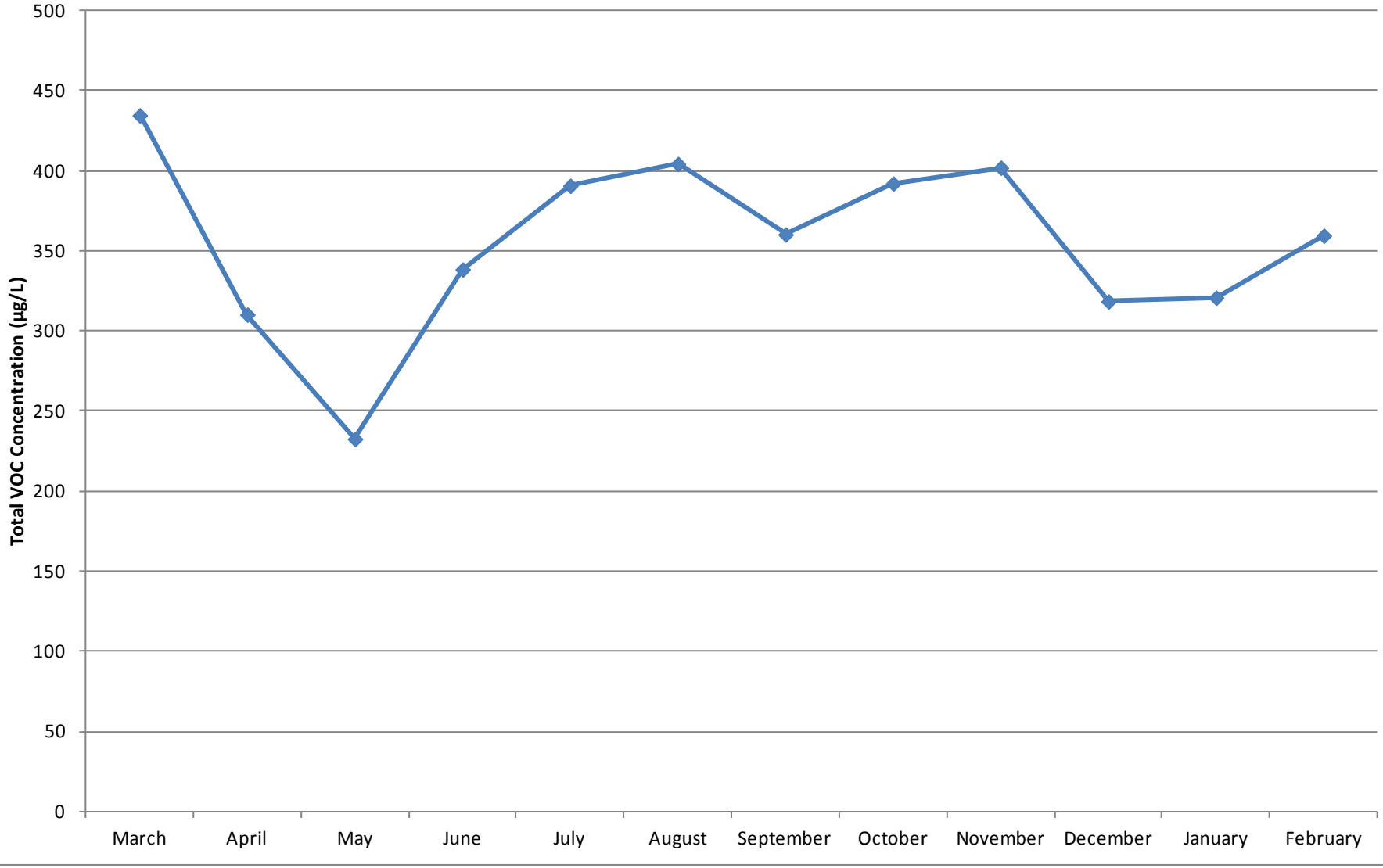
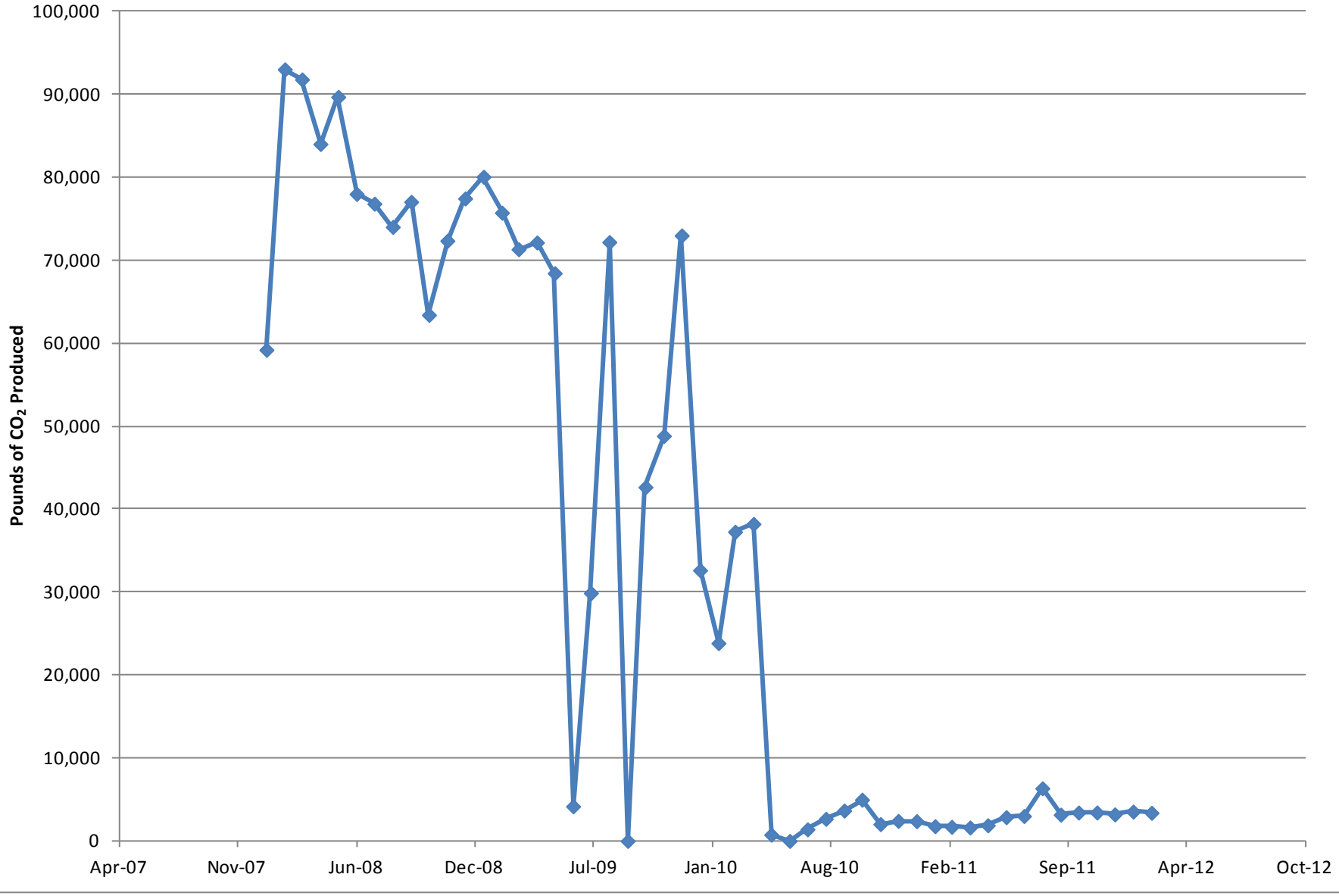


Figure 8

Equivalent Pounds of CO2 Produced by the Central Groundwater Treatment Plant



North Groundwater Treatment Plant Monthly Data Sheet

Report Number: 123 **Reporting Period: 31 Jan 2011 – 29 Feb 2012** **Date Submitted: 16 March 2012**

This monthly data sheet presents information regarding the North Groundwater Treatment Plant (NGWTP) and associated remedial process optimization (RPO) activities.

System Metrics

Table 1 presents operational data from the February 2012 reporting period:

Table 1 – Operations Summary – February 2012

Operating Time:	Percent Uptime:	Electrical Power Usage:
NGWTP: 745 hours	**NGWTP:** 99.9%	**NGWTP:** 775 kWh (1,062 lbs CO_2 generated[a])

Gallons Treated: **18,880 gallons**

Gallons Treated Since March 2000: **82.6 million gallons**

Volume Discharged to Duck Pond **18,880 gallons**

Volume Discharge to Storm Drain: **0 gallons**

VOC Mass Removed: **6.9×10^{-4} pounds**[b]

VOC Mass Removed Since March 2000: **174.3 pounds (Groundwater)**

Rolling 12-Month Cost per Pound of Mass Removed: **Not Measured**[c]

Monthly Cost per Pound of Mass Removed: **Not Measured**[d]

[a] Based on Department of Energy estimate that 1 kilowatt hour generated produces 1.37 pounds of GHG.
[b] VOCs from February 2012 influent sample detected by EPA Method SW8260B.
[c] Value not calculated since measurement does not accurately represent the cost effectiveness of the system.
[d] Value not calculated since measurement does not accurately represent the potential effectiveness of the system. O&M costs are low, but very little contaminant mass is being treated.

Table 2 presents individual extraction well flow rates during the monthly reporting period.

Table 2 – NGWTP Average and Total Flow Rates – February 2012

Location	Average Flow Rate (gpm) [a]	Total Gallons Processed (gallons)
EW614x15	0.23	10,410
EW615x15	0.21	9,170
NGWTP	0.42	18,880

[a] Average flow rate calculated by dividing the total gallons processed collected from wellhead totalizers by the reporting period operating time. The total gallons processed are determined by readings collected at wellhead and system influent totalizers. The discrepancy between the sum of both wells and the NGWTP influent can be attributed to the piping between the wells and the NGWTP, which has to be filled before flow registers at the NGWTP.

gpm = gallons per minute

Table 3 presents average a summary of shutdowns during the monthly reporting period.

Table 3 – Summary of System Shutdowns

Location	Shutdown		Restart		Cause
	Date	Time	Date	Time	
NGWTP	NONE		NA		NA

NGWTP = North Groundwater Treatment Plant
HDPE= High Density Polyethylene

Summary of O&M Activities

Analytical data from the 6 February 2012 sampling event are presented in Table 4. Concentrations of TCE (3.9 µg/L), vinyl chloride (0.19 J µg/L) and cis 1,2-DCE (0.37 J µg/L) were detected in the influent sample. TCE has been detected in the influent sample for six (6) consecutive months. This is the second consecutive month that cis 1,2-DCE has been detected in the influent sample. As with data collected in 2011, contaminant concentrations detected in the influent process stream are less than their respective effluent limits (5.0 µg/L for TCE and cis 1,2-DCE and 0.5 µg/L for vinyl chloride). Contaminant concentrations were not detected between the primary and secondary granular activated carbon (GAC) vessels or at the effluent sampling location.

Figure 1 presents a chart of influent concentrations (total VOCs) at the NGWTP versus time for the past twelve (12) months. As required by US Fish and Wildlife Service (USFWS), the NGWTP is taken off line ("System Shutdown") when vernal pools are present at Site LF007C. To date, the vernal pools at LF007C do not show ponded water which is due to the very low rainfall this year. Therefore the extraction system continues to operate.

Extracted groundwater volumes (total gallons processed) for each Site LF007C extraction well as well as for total flows at the NGWTP are collected from wellhead and treatment plant flow totalizers on a weekly basis. The monthly accumulation of these data are presented in Table 2.

Analytical data (Table 4) continue to indicate effective treatment of the influent process stream with only two (2) operating GAC drums online. A spare GAC drum is available if analytical data indicate a third GAC drum should be brought back on line.

Optimization Activities

No optimization activities occurred in February 2012.

Sustainability

Travis AFB is committed to decreasing the amount of GHG produced directly (waste streams discharging GHG) or indirectly (GHG produced as related to electrical energy consumption) from all systems across Travis AFB. Travis AFB continues to optimize each treatment plant to reduce the amount of electrical energy consumed, and to implement sustainable treatment plant optimization programs, such as the solar arrays employed to power the system.

Figure 2 presents the historical GHG production from the systems associated with the NGWTP. The NGWTP is off line ("System Shutdown") when vernal pools are present at Site LF007C. The NGWTP used 775 kWh which calculates to approximately 1,062 pounds of GHG generation during February 2012. This is an increase from January 2012 when the NGWTP used 441 kWh of electricity. The increase of electricity usage can be attributed to an increase in monthly operation time and gallons treated. The overall GHG generation remains considerably lower than traditional GWTPs since the system is predominantly powered by solar arrays.

TABLE 4
Summary of Groundwater Analytical Data for February 2012 – North Groundwater Treatment Plant

Constituent	Instantaneous Maximum* (μg/L)	Detection Limit (μg/L)	N/C	6 February 2012 (μg/L)		
				Influent	After Carbon 1	Effluent
Halogenated Volatile Organics						
Bromodichloromethane	5.0	0.15	0	ND	ND	ND
Bromoform	5.0	0.19	0	ND	ND	ND
Carbon Tetrachloride	0.5	0.14	0	ND	ND	ND
Chloroform	5.0	0.16	0	ND	ND	ND
Dibromochloromethane	5.0	0.13	0	ND	ND	ND
1,3-Dichlorobenzene	5.0	0.15	0	ND	ND	ND
1,4-Dichlorobenzene	5.0	0.15	0	ND	ND	ND
1,1-Dichloroethane	5.0	0.15	0	ND	ND	ND
1,2-Dichloroethane	0.5	0.15	0	ND	ND	ND
1,1-Dichloroethene	5.0	0.19	0	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.19	0	0.37 J	ND	ND
trans-1,2-Dichloroethene	5.0	0.33	0	ND	ND	ND
Methylene Chloride	5.0	0.66	0	ND	ND	ND
Tetrachloroethene	5.0	0.21	0	ND	ND	ND
1,1,1-Trichloroethane	5.0	0.14	0	ND	ND	ND
1,1,2-Trichloroethane	5.0	0.2	0	ND	ND	ND
Trichloroethene	5.0	0.19	0	3.9	ND	ND
Vinyl Chloride	0.5	0.18	0	0.19 J	ND	ND
Non-Halogenated Volatile Organics						
Benzene	1.0	0.17	0	ND	ND	ND
Ethylbenzene	5.0	0.22	0	ND	ND	ND
Toluene	5.0	0.14	0	ND	ND	ND
Xylenes	5.0	0.23 – 0.5	0	ND	ND	ND
Other						
Total Petroleum Hydrocarbons – Gasoline	50	8.5	0	NM	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	50	0	NM	NM	ND

* In accordance with Appendix G of the *Travis AFB North Groundwater Treatment Plant Operations and Maintenance Manual*, Sites FT004, SD031, and LF007 Area C (URS Group, Inc., 2005).

Notes:

N/C = number of samples out of compliance with discharge limits
ND = not detected
NM = not measured
μg/L = micrograms per liter

Figure 1
NGWTP Total VOC Influent Concentrations - Twelve Month History
Travis Air Force Base, California

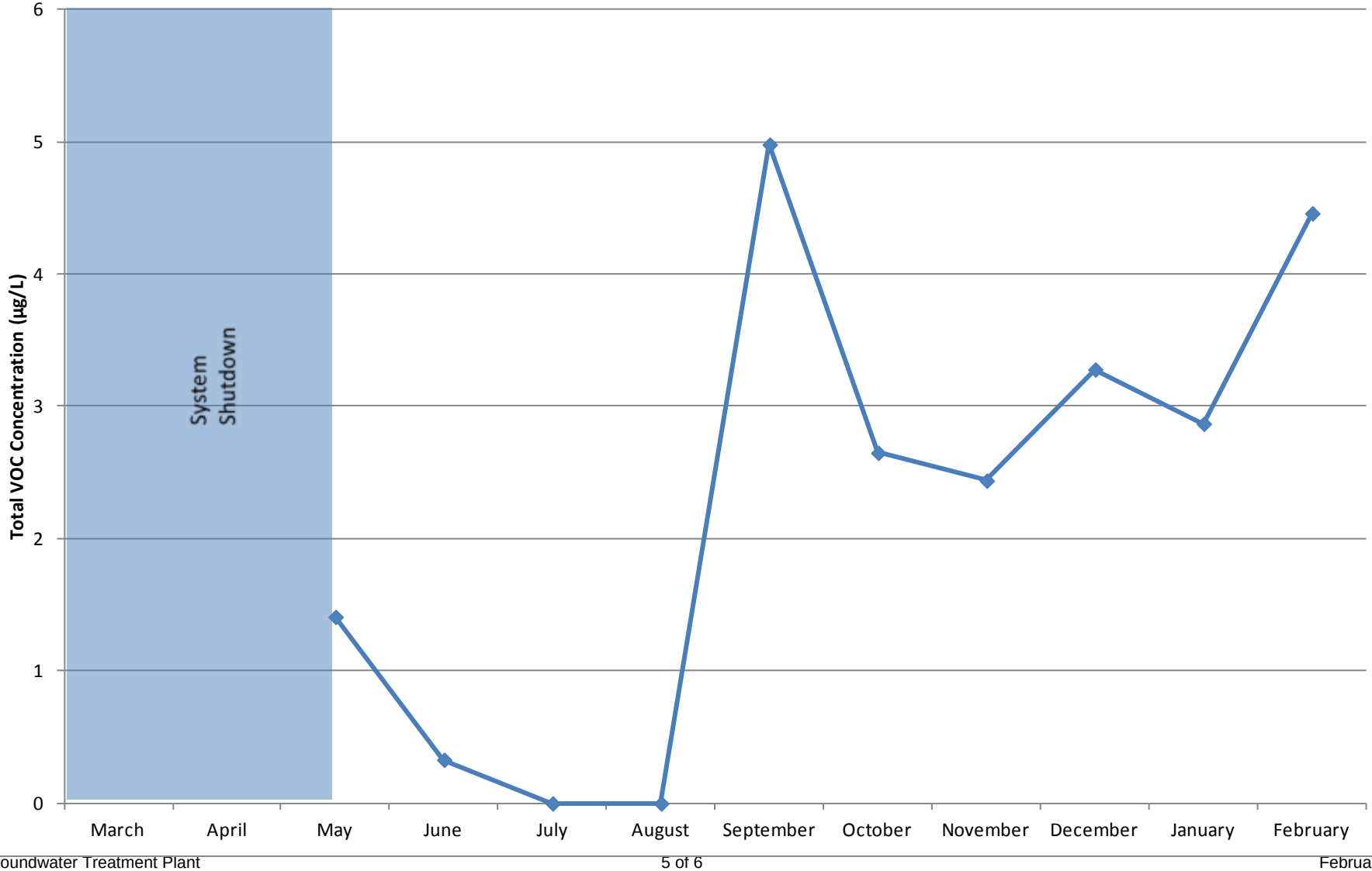
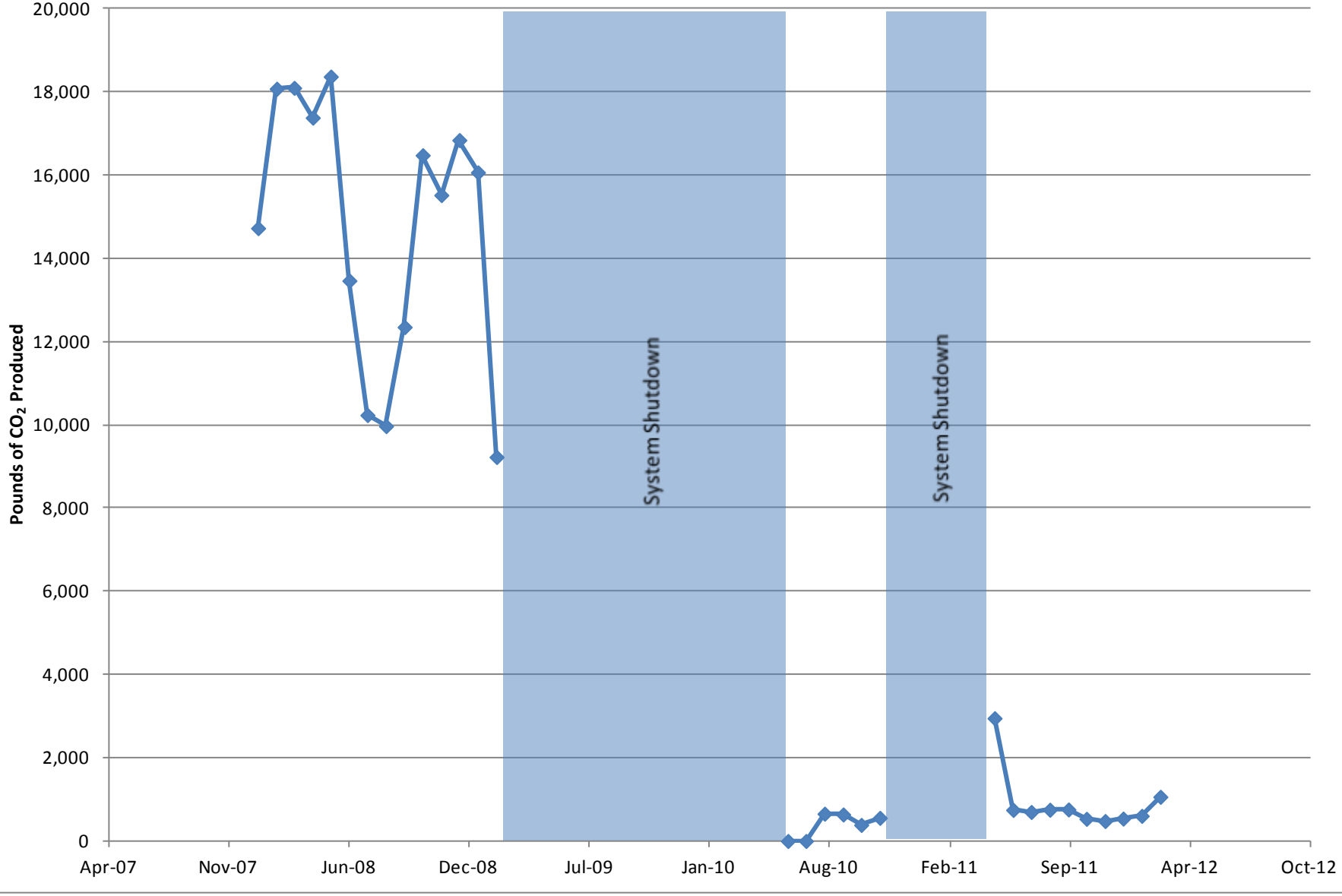


Figure 2

Equivalent Pounds of CO2 Produced by the North Groundwater Treatment Plant



Site ST018 Groundwater Treatment Plant Monthly Data Sheet

Report Number: 011 **Reporting Period: 1 Feb – 29 Feb 2012** **Date Submitted: 16 March 2012**

This monthly data sheet presents information regarding the Site ST018 Groundwater Treatment Plant (S18GWTP). The February operation period accounts for operation from 1 February through 29 February, 2012.

System Metrics

Table 1 presents operation data from the February 2012 reporting period.

Table 1 – Operations Summary – January 2012

Operating Time:		Percent Uptime:		Electrical Power Usage:	
S18GWTP:	650 hours	**S18GWTP:**	87.8%	**S18GWTP:**	106 kWh (145 lbs CO_2 generated[a])

Gallons Treated: **153 thousand gallons** Gallons Treated Since March 2011: **1.51 million gallons**

Volume Discharged to Union Creek: **153 thousand gallons**

BTEX, MTBE, TPH Mass Removed: **0.58 lbs**[b] BTEX, MTBE, TPH Mass Removed Since March 2011: **8.1 lbs**

Rolling 12-Month Cost per Total Pounds of Mass Removed: $9,340 [c]

Monthly Cost per Pound of Mass Removed: $25,902[d]

Lbs = pounds

[a] Based on Department of Energy estimate that 1 kilowatt hour generated produces 1.37 pounds of GHG.

[b] Calculated using January 2012 (influent) and February 2012 (effluent) EPA Method SW8260B analytical results. Influent samples are collected on a quarterly basis.

[c] Costs include operations and maintenance, reporting, analytical laboratory, project management, and utility costs related to operation of the system; however the system is only in its tenth month of operation.

[d] This increased monthly cost per pound of mass removed (compared with January 2012) is due to optimization efforts at wells EW2014x18 and EW2016x18.

Table 2 presents individual extraction well flow rates along with the average system flow during the monthly reporting period.

Table 2 – S18GWTP Average Flow Rates[a]

Location	Average Flow Rate Groundwater (gpm)
EW2014x18	1.55
EW2016x18	1.21
EW2019x18	1.22
Site ST018 GWTP	3.92

[a] All flow rates calculated by dividing total gallons processed by system operating time for the month.

gpm = gallons per minute
S18GWTP = Site ST018 Groundwater Treatment Plant

Table 3 presents a summary of system shutdowns during the monthly reporting period.

Table 3 – Summary of System Shutdowns

Location	Shutdown		Restart		Cause
	Date	Time	Date	Time	
S18GWTP	9 February	1000	13 February	17:00	Only wells EW2014x18 and EW2016x18 were taken off line. Batteries for each well were tested, with four (4) discovered bad. Batteries replaced and wells returned to service.
S18GWTP	16 February	1600	20 February	1000	Treatment system shut down for carbon change out activities on 17 February. New carbon soaked for approximately 3 days before restarting the system.

S18GWTP = Site ST018 Groundwater Treatment Plant

Summary of O&M Activities

Groundwater samples were collected at the S18GWTP on 24 January 2012. The January 2012 sampling event was the annual sampling event and included analysis of the influent, midpoint, and effluent samples. Sample results from the annual ST018 sampling event analytes (BTEX, MTBE, and TPHg/d/mo) were presented in the January 2012 Site ST018 Groundwater Treatment Plant Monthly Data Sheet. The full annual sampling event results (metals, SVOCs, PAH, etc.) will be presented in the upcoming NPDES quarterly report submitted to the Water Board. Sample results from the February sampling event are presented in Table 4.

No contaminant concentrations were detected in the effluent sample in February 2012. The total influent concentration (benzene, toluene, ethylbenzene, total xylenes, MTBE, TPH-gas, TPH-diesel, and TPH-motor oil) in the quarterly (1Q12) influent sample was 455 µg/L, which is a significant increase of the previous (4Q11) influent concentration of 179 µg/L. This increase is likely due to more consistent operation of extraction well EW2014x18, located immediately behind the Base Exchange Service Station. The Site ST018 GWTP was primarily installed to address MTBE contamination at Site ST018, so Figure 1 presents a plot of influent quarterly total VOC (TPHg, TPHd, MTBE, and BTEX) and MTBE concentrations at the S18GWTP versus time.

Due to the amount of heavier (TPH-diesel) hydrocarbons in the influent process stream, the primary GAC vessel was changed out from coconut-based carbon, which is primarily used to extract smaller compounds, such as MTBE, to coal-based carbon on 17 February 2012. Following change out activities, the new carbon was allowed to soak for approximately three (3) days before restarting the system on 20 February 2012. The final two GAC vessels in series will remain coconut-based for lighter VOC and BTEX contaminants, including MTBE.

The batteries in extraction wells EW2014x18 and EW2016x18 were tested for operational integrity on 9 February. Of the eight (8) batteries used to power these extraction wells, four (4) were observed to be physically bulging and were suspected as faulty. Integrity testing at a battery service center identified that these four (4) bulging batteries were faulty and would require replacement. Four (4) new batteries were installed in well EW2014x18, while the four (4) remaining "tested good" batteries were reinstalled at well EW2016x18. Both wells were returned to service on 13 February 2012.

Flow rates from wells EW2014x18 and EW2016x18 both increased in February 2012 when compared with flow rates from these wells in previous months. From August 2011 through January 2012, the average flow rates at wells EW2014x18 and EW2016x18 averaged approximately 0.77 gpm and 0.85, respectively. In February, the average flow rates for these wells were 1.55 (EW20114x18) and 1.21 (EW2016x18). These increased flow rates were realized in the total system flow, with the average system flow rate of 3.92 gpm in February 2012 being the highest flow rates since bringing the system on line in March 2011.

Extraction well EW2019x18 has continued to operate consistently since being brought on line in March 2011.

Travis AFB will continue to monitor and optimize flow rate production from this new pump, in addition to the other two (2) extraction well pumps at Site ST108.

Optimization Activities

The operation of extraction wells EW2014x18 and EW2016x18 were optimized in February 2012. These optimization activities are described in the previous section. No other optimization activities were completed in February 2012.

Sustainability

Travis AFB is committed to decreasing the amount of GHG produced directly (waste streams discharging GHG) or indirectly (GHG produced as related to electrical energy consumption) from all systems across Travis AFB. Travis AFB continues to optimize each treatment plant to reduce the amount of electrical energy consumed, and to implement sustainable treatment plant optimization programs, such as the solar arrays employed to power the system.

As a result of the solar arrays at S18GWTP, the system produced approximately 145 pounds of GHG during February 2012. This is an increase from January 2012 (111 pounds) which is primarily due to the increase in operation hours, and increased operation of extraction wells EW2014x18 and EW2016x18. The overall GHG generation remains considerably lower than traditional GWTPs since the system is predominantly powered by solar arrays.

TABLE 4
Summary of Groundwater Analytical Data for February 2012 – Site ST018 Groundwater Treatment Plant

Constituent	Instantaneous Maximum[a] (µg/L)	Detection Limit (µg/L)	N/C	06 February 2012 (µg/L)		
				Influent[b]	After Carbon 2	System Effluent
Fuel Related Constituents						
MTBE	5	0.5	0	189	ND	ND
Benzene	5	0.17	0	10.7	ND	ND
Ethylbenzene	5	0.22	0	6.7	ND	ND
Toluene	5	0.14	0	0.86	ND	ND
Total Xylenes	5	0.73	0	10.4	ND	ND
Total Petroleum Hydrocarbons – Gasoline	50	8.5	0	170	ND	ND
Total Petroleum Hydrocarbons – Diesel	50	50	0	67	ND	ND
Total Petroleum Hydrocarbons – Motor Oil	--	56	0	ND	ND	ND

[a] In accordance with the National Pollutant Discharge Elimination System (NPDES) Effluent Limitations

[b] Values taken from January 2012 (1Q12) sample data. Influent sampling is conducted on a quarterly basis.

Notes:

µg/L = micrograms per liter
ND = not detected above method detection limit
NM = not measured this month

Figure 1
S18GWTP Total VOC and MTBE Influent Concentrations (Benzene, Toluene, Ethylbenzene, Xylenes, MTBE, TPH)
Travis Air Force Base, California

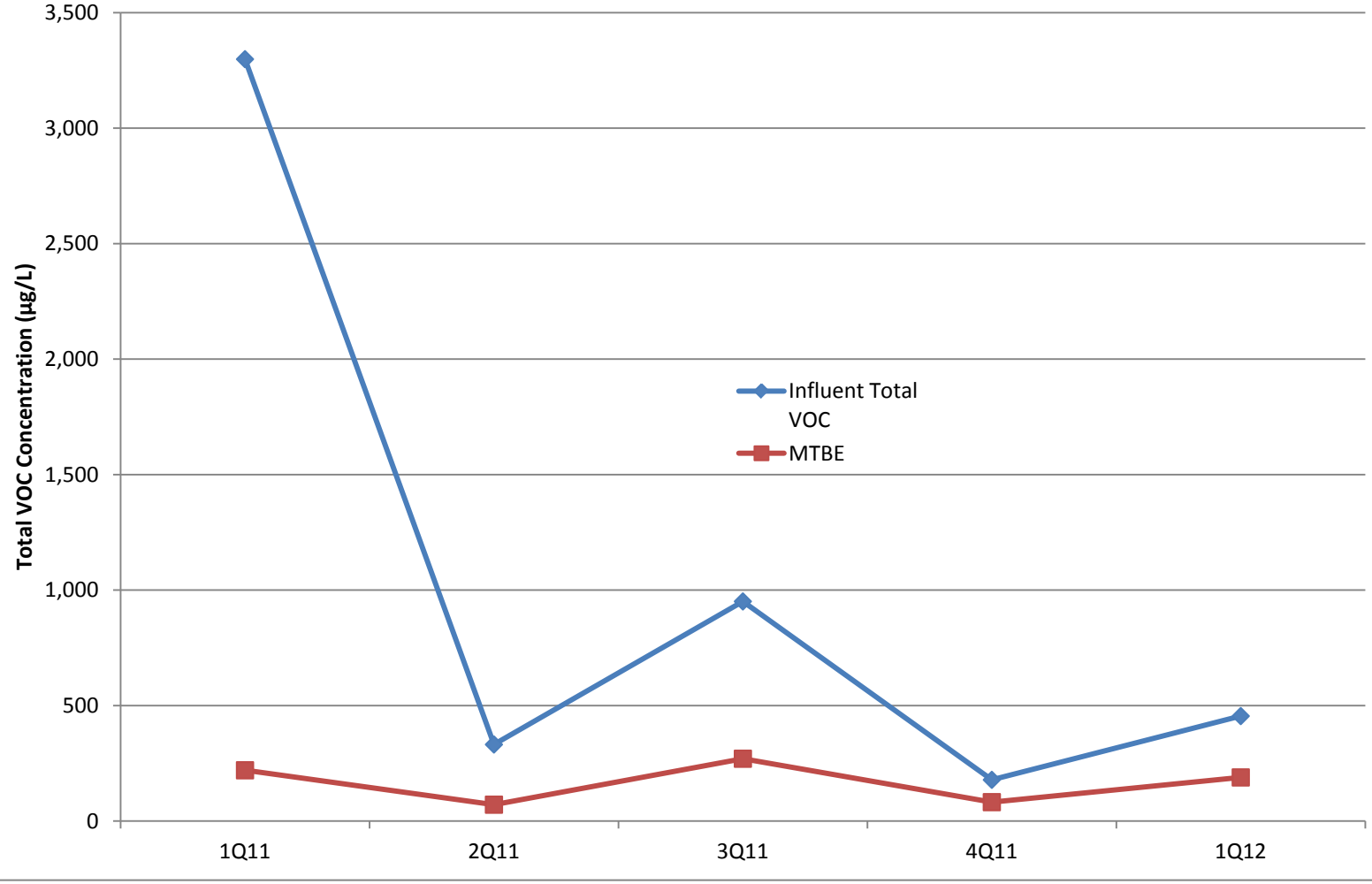


Figure 2

Equivalent Pounds of CO2 Produced by the Site ST018 Groundwater Treatment Plant

February 2012
Performance Monitoring Program
Quarterly Analytical Results
Travis AFB

RPM Meeting

March 21, 2012

Site SS015 EVO Injection (4th Quarter)

- Reductions of greater than 99% of CVOCs compared to baseline concentrations have been observed in the Site SS015 hot spot area (IW2128x15 and MW216x15).
  - TCE from 504 µg/L to 0.2 J µg/L
  - Cis-1,2-DCE from 8,080 µg/L to 8.3 µg/L.
  - Vinyl chloride from 5,140 µg/L to 6.8 µg/L.
- Very little cis-1,2-DCE remains in IW2128x15 and MW216x15 and there is no significant vinyl chloride accumulation.
- High levels of methane remain in the hot spot area providing conditions for complete destruction of the remaining low levels (6.8 µg/L) of vinyl chloride.
- Significant reductions of CVOCs have been observed in wells surrounding the original TCE hot spot (MW2103x15, IW2126x15, IW2127x15, MW2129x15, and MW2132x15).

Site SS015 EVO Injection (4th Quarter) Continued

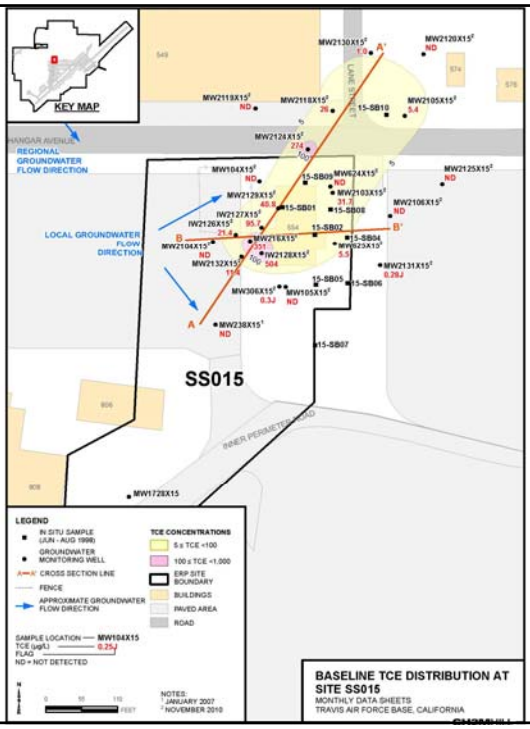
- 15 months after EVO injection, there is no indication of TCE rebound in the treatment area.
- Well MW2103x15 is located approximately 75 feet downgradient of the EVO injection area and has seen both TCE and cis-1,2-DCE concentrations decrease by over 90% over the 15-month treatment period.
- Only 2 wells at Site SS015 (MW2124x15 and MW625x15) containing CVOC contamination have not been impacted by the EVO injection yet.
  - MW2124x15 is located approximately 100 feet downgradient of the EVO injection area.
  - MW625x15 is located approximately 100 feet cross-gradient of the EVO injection area.
- MW2124x15 and MW625x15 appear to be at the edge of the zone of active ERD.

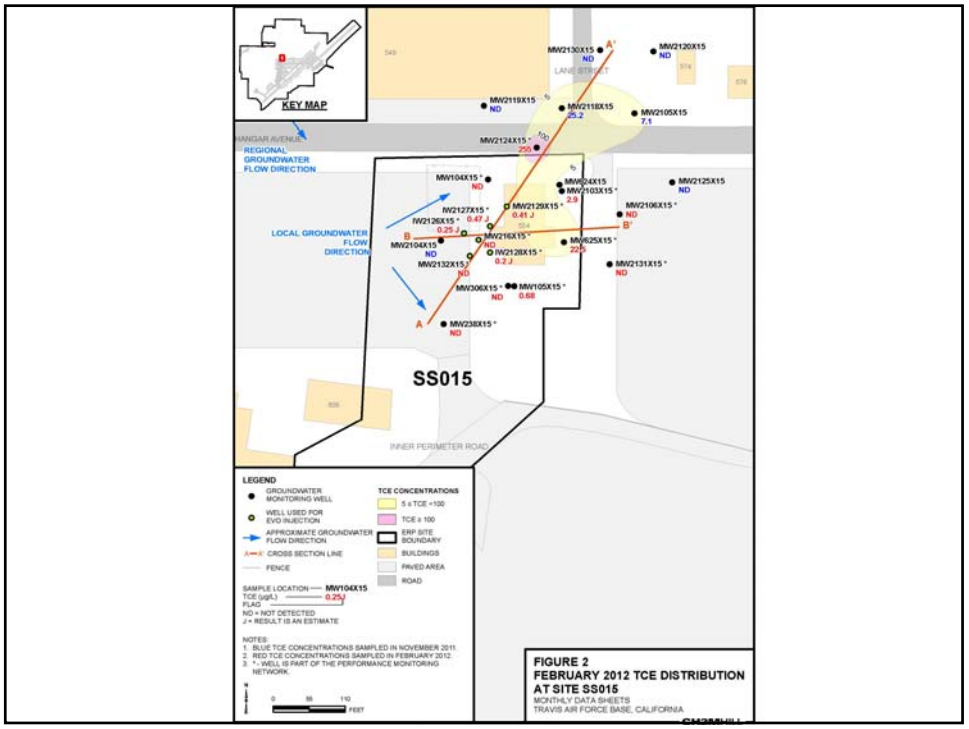
Site SS015 EVO Injection (4th Quarter) Continued

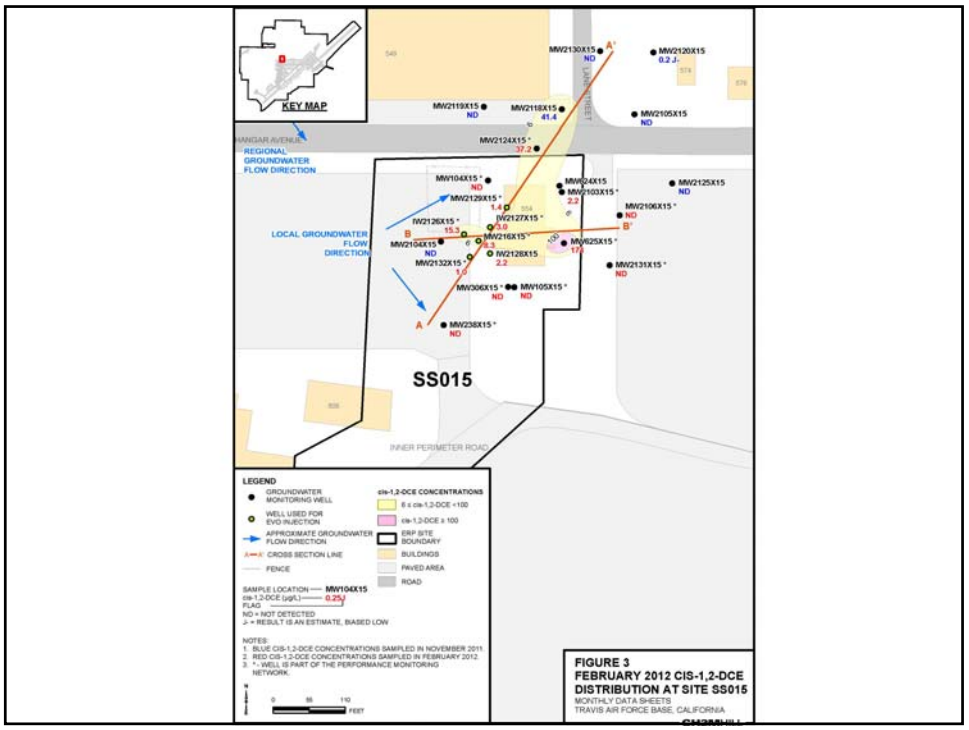
- Dissolved TOC supply in the hot spot injection area remains high and is sustaining ERD
  - Six wells in the original CVOC hot spot area still contain TOC averaging 194 mg/L at 15 months after EVO injection.
  - TOC should be sufficient to sustain ERD for an additional year or more.
- Background TOC levels of less than 5 mg/L were detected upgradient of the site in well MW2104x15 in November 2011.
- Geochemical data collected from the hot spot area supports ERD.
- High TOC, high methane, high dissolved iron and manganese, and significantly depleted sulfate are all positive geochemical signatures for anaerobic conditions favoring ERD.

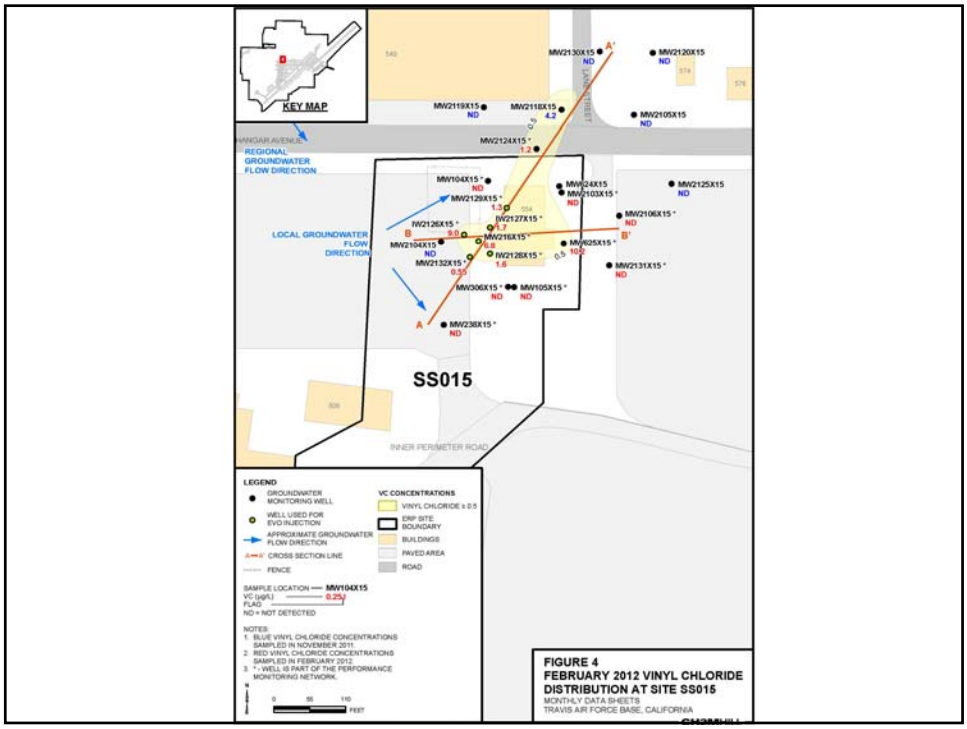
Site SS015 EVO Injection (4th Quarter) Continued

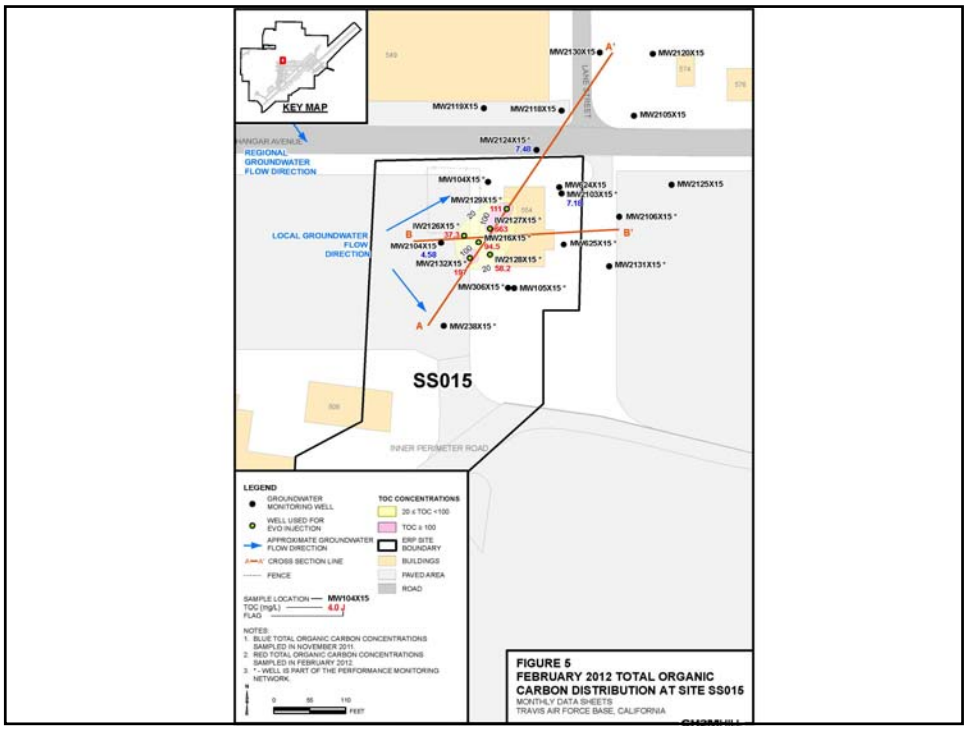
- Site SS015 performance monitoring is converting from quarterly sampling to annual sampling with the first annual event in November 2012.
- MW214x15 and MW625x15 will be sampled for VOCs and TOC as part of the 2012 Annual GSAP sampling event in 2nd Quarter 2012.
- MW624x15, MW2104x15, MW2119x15, and MW2125x15 will be removed for the Site SS015 performance monitoring well network due to the historical results and locations of the wells.
  - MW624x15 is screened deeper than where CVOCs have been detected.
  - MW2104x15 is located upgradient of the Site SS015 groundwater plume.
  - MW2119x15 and MW2125x15 are located cross-gradient of the Site SS015 groundwater plume and have historically not had CVOCs detected in them.

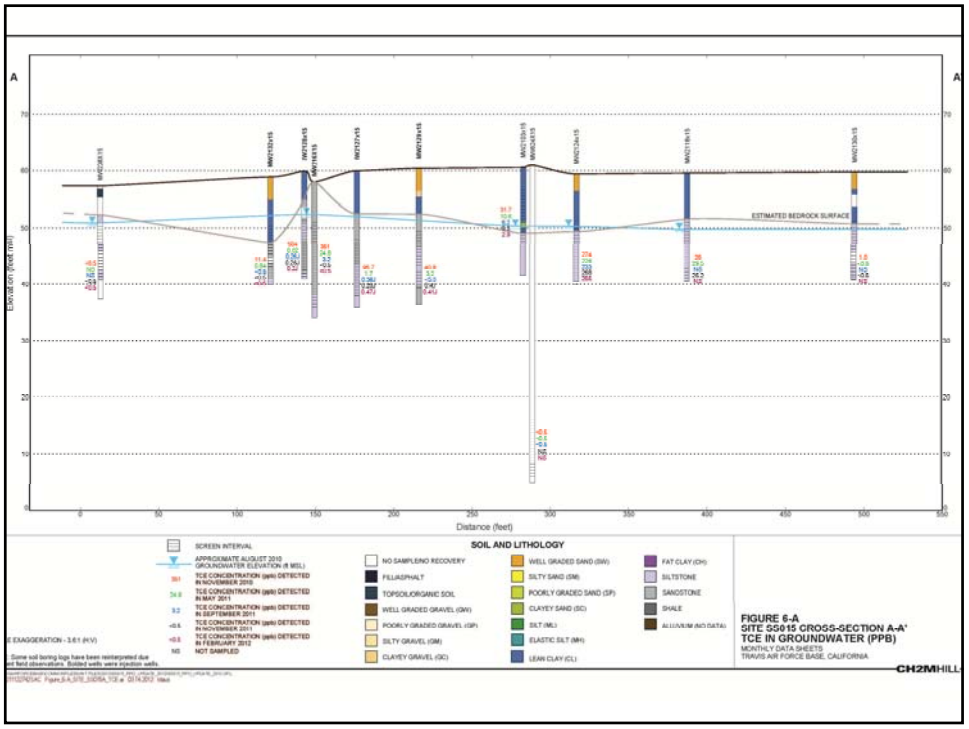


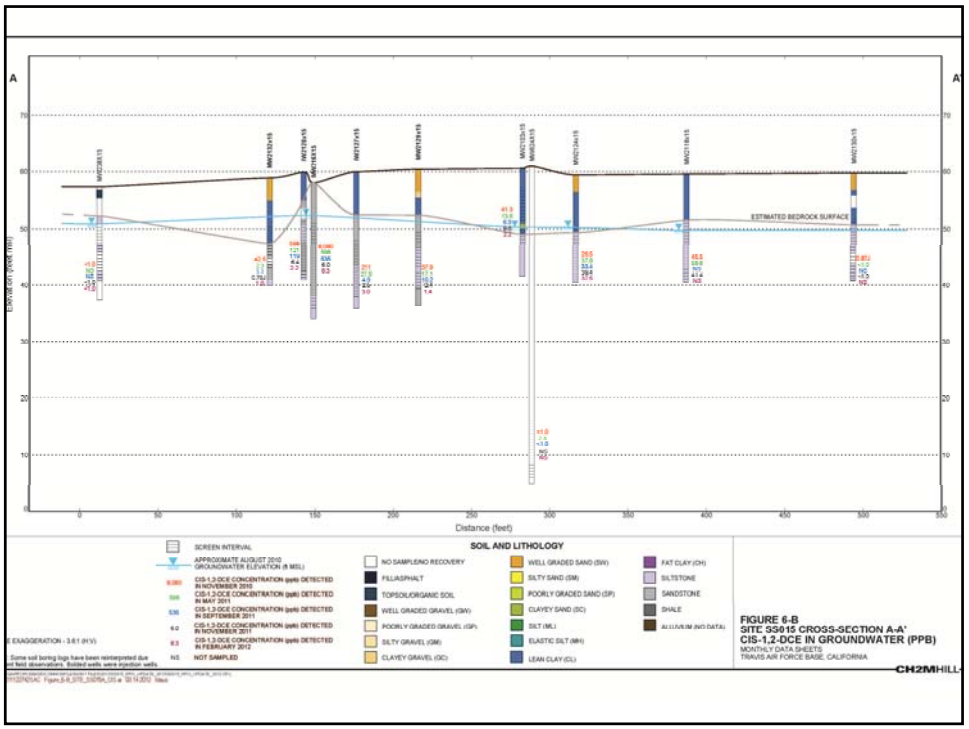

KEY MAP
HANGAR AVENUE
REGIONAL GROUNDWATER FLOW DIRECTION
LOCAL GROUNDWATER FLOW DIRECTION
LANE STREET
INNER PERIMETER ROAD
SS015
MW2130X15 ND
MW2120X15 ND
MW2119X15 ND
MW2118X15 25.2
MW2105X15 7.1
MW2124X15 225
MW104X15 ND
MW124X15 2.9
MW2103X15
MW2125X15 ND
MW2127X15 0.47 J
MW2129X15 0.45 J
MW2106X15 ND
IW2126X15 0.25 J
MW216X15 ND
MW625X15 22.5
MW2104X15 ND
IW2128X15 0.2 J
MW2131X15 ND
MW2132X15 ND
MW306X15 ND
MW105X15 0.68
MW238X15 ND
LEGEND
GROUNDWATER MONITORING WELL
WELL USED FOR EVO INJECTION
APPROXIMATE GROUNDWATER FLOW DIRECTION
CROSS SECTION LINE
FENCE
TCE CONCENTRATIONS
5 ≤ TCE <100
TCE ≥ 100
ERP SITE BOUNDARY
BUILDINGS
PAVED AREA
ROAD
SAMPLE LOCATION — MW104X15
TCE (ug/L) — 0.25J
FLAG
ND = NOT DETECTED
J = RESULT IS AN ESTIMATE
NOTES:
1. BLUE TCE CONCENTRATIONS SAMPLED IN NOVEMBER 2011.
2. RED TCE CONCENTRATIONS SAMPLED IN FEBRUARY 2012.
3. '-' WELL IS PART OF THE PERFORMANCE MONITORING NETWORK.
0 55 110
FEET
FIGURE 2
FEBRUARY 2012 TCE DISTRIBUTION AT SITE SS015
MONTHLY DATA SHEETS
TRAVIS AIR FORCE BASE, CALIFORNIA


KEY MAP
HANGAR AVENUE
REGIONAL GROUNDWATER FLOW DIRECTION
LOCAL GROUNDWATER FLOW DIRECTION
LANE STREET
INNER PERIMETER ROAD
SS015
MW2130X15 ND
MW2120X15 0.2 J-
MW2119X15 ND
MW2118X15 41.4
MW2105X15 ND
MW2124X15 37.2
MW104X15 ND
MW124X15 2.2
MW2103X15
MW2125X15 ND
MW2129X15 1.4
MW2106X15 ND
IW2126X15 15.3
IW2127X15 3.0
MW216X15 28.3
MW625X15 17.7
MW2104X15 ND
IW2128X15 2.2
MW2131X15 ND
MW2132X15 1.0
MW306X15 ND
MW105X15 ND
MW238X15 ND
LEGEND
GROUNDWATER MONITORING WELL
WELL USED FOR EVO INJECTION
APPROXIMATE GROUNDWATER FLOW DIRECTION
CROSS SECTION LINE
FENCE
cis-1,2-DCE CONCENTRATIONS
6 ≤ cis-1,2-DCE <100
cis-1,2-DCE ≥ 100
ERP SITE BOUNDARY
BUILDINGS
PAVED AREA
ROAD
SAMPLE LOCATION — MW104X15
cis-1,2-DCE (ug/L) — 0.25J
FLAG
ND = NOT DETECTED
J = RESULT IS AN ESTIMATE, BIASED LOW
NOTES:
1. BLUE CIS-1,2-DCE CONCENTRATIONS SAMPLED IN NOVEMBER 2011.
2. RED CIS-1,2-DCE CONCENTRATIONS SAMPLED IN FEBRUARY 2012.
3. '-' WELL IS PART OF THE PERFORMANCE MONITORING NETWORK.
0 55 110
FEET
FIGURE 3
FEBRUARY 2012 CIS-1,2-DCE DISTRIBUTION AT SITE SS015
MONTHLY DATA SHEETS
TRAVIS AIR FORCE BASE, CALIFORNIA


KEY MAP
HANGAR AVENUE
REGIONAL GROUNDWATER FLOW DIRECTION
LOCAL GROUNDWATER FLOW DIRECTION
LANE STREET
INNER PERIMETER ROAD
SS015
MW2130X15 ND
MW2120X15 ND
MW2119X15 ND
MW2118X15 4.2
MW2105X15 ND
MW2124X15 1.2
MW104X15 ND
MW2129X15 1.3
MW2124X15 ND
MW2103X15 ND
MW2125X15 ND
MW2106X15 ND
IW2126X15 9.6
IW2127X15 4.7
MW216X15 6.8
MW2104X15 ND
MW2132X15 0.55
IW2128X15 1.6
MW625X15 10.2
MW2131X15 ND
MW306X15 ND
MW105X15 ND
MW238X15 ND
LEGEND
GROUNDWATER MONITORING WELL
WELL USED FOR EVO INJECTION
APPROXIMATE GROUNDWATER FLOW DIRECTION
CROSS SECTION LINE
FENCE
SAMPLE LOCATION — MW104X15
VC (µg/L) — 0.25J
FLAG
ND = NOT DETECTED
VC CONCENTRATIONS
VINYL CHLORIDE ≥ 0.5
ERP SITE BOUNDARY
BUILDINGS
PAVED AREA
ROAD
NOTES:
1. BLUE VINYL CHLORIDE CONCENTRATIONS SAMPLED IN NOVEMBER 2011.
2. RED VINYL CHLORIDE CONCENTRATIONS SAMPLED IN FEBRUARY 2012.
3. * - WELL IS PART OF THE PERFORMANCE MONITORING NETWORK.
0 55 110
FEET
FIGURE 4
FEBRUARY 2012 VINYL CHLORIDE DISTRIBUTION AT SITE SS015
MONTHLY DATA SHEETS
TRAVIS AIR FORCE BASE, CALIFORNIA


KEY MAP
HANGAR AVENUE
REGIONAL GROUNDWATER FLOW DIRECTION
LOCAL GROUNDWATER FLOW DIRECTION
LANE STREET
INNER PERIMETER ROAD
SS015
MW2130X15
MW2120X15
MW2119X15
MW2118X15
MW2105X15
MW2124X15 7.40
MW104X15
MW2129X15 111
MW2124X15
MW2103X15 7.15
MW2125X15
MW2106X15
IW2126X15 37.1
IW2127X15 963
MW216X15 94.5
MW2104X15 4.58
MW2132X15 19
IW2128X15 58.2
MW625X15
MW2131X15
MW306X15
MW105X15
MW238X15
LEGEND
GROUNDWATER MONITORING WELL
WELL USED FOR EVO INJECTION
APPROXIMATE GROUNDWATER FLOW DIRECTION
CROSS SECTION LINE
FENCE
SAMPLE LOCATION — MW104X15
TOC (mg/L) — 4.0 J
FLAG
TOC CONCENTRATIONS
20 ≤ TOC <100
TOC ≥ 100
ERP SITE BOUNDARY
BUILDINGS
PAVED AREA
ROAD
NOTES:
1. BLUE TOTAL ORGANIC CARBON CONCENTRATIONS SAMPLED IN NOVEMBER 2011.
2. RED TOTAL ORGANIC CARBON CONCENTRATIONS SAMPLED IN FEBRUARY 2012.
3. * - WELL IS PART OF THE PERFORMANCE MONITORING NETWORK.
0 55 110
FEET
FIGURE 5
FEBRUARY 2012 TOTAL ORGANIC CARBON DISTRIBUTION AT SITE SS015
MONTHLY DATA SHEETS
TRAVIS AIR FORCE BASE, CALIFORNIA


A
A'
Elevation (feet msl)
Distance (feet)
ESTIMATED BEDROCK SURFACE
SOIL AND LITHOLOGY
SCREEN INTERVAL
APPROXIMATE AUGUST 2010 GROUNDWATER ELEVATION (ft MSL)
TCE CONCENTRATION (ppb) DETECTED IN NOVEMBER 2010
TCE CONCENTRATION (ppb) DETECTED IN MAY 2011
TCE CONCENTRATION (ppb) DETECTED IN SEPTEMBER 2011
TCE CONCENTRATION (ppb) DETECTED IN NOVEMBER 2011
TCE CONCENTRATION (ppb) DETECTED IN FEBRUARY 2012
NS NOT SAMPLED
NO SAMPLE/NO RECOVERY
FILL/ASPHALT
TOPSOIL/ORGANIC SOIL
WELL GRADED GRAVEL (GW)
POORLY GRADED GRAVEL (GP)
SILTY GRAVEL (GM)
CLAYEY GRAVEL (GC)
WELL GRADED SAND (SW)
SILTY SAND (SM)
POORLY GRADED SAND (SP)
CLAYEY SAND (SC)
SILT (ML)
ELASTIC SILT (MH)
LEAN CLAY (CL)
FAT CLAY (CH)
SILTSTONE
SANDSTONE
SHALE
ALLUVIUM (NO DATA)
E EXAGGERATION - 3.6:1 (H:V)
Some soil boring logs have been reinterpreted due to field observations. Bolded wells were injection wells.
FIGURE 6-A
SITE SS015 CROSS-SECTION A-A'
TCE IN GROUNDWATER (PPB)
MONTHLY DATA SHEETS
TRAVIS AIR FORCE BASE, CALIFORNIA
CH2MHILL


A
A'
Elevation (feet msl)
Distance (feet)
ESTIMATED BEDROCK SURFACE
SOIL AND LITHOLOGY
SCREEN INTERVAL
APPROXIMATE AUGUST 2010 GROUNDWATER ELEVATION (ft MSL)
CIS-1,2-DCE CONCENTRATION (ppb) DETECTED IN NOVEMBER 2010
CIS-1,2-DCE CONCENTRATION (ppb) DETECTED IN MAY 2011
CIS-1,2-DCE CONCENTRATION (ppb) DETECTED IN SEPTEMBER 2011
CIS-1,2-DCE CONCENTRATION (ppb) DETECTED IN NOVEMBER 2011
CIS-1,2-DCE CONCENTRATION (ppb) DETECTED IN FEBRUARY 2012
NS NOT SAMPLED
NO SAMPLE/NO RECOVERY
FILL/ASPHALT
TOPSOIL/ORGANIC SOIL
WELL GRADED GRAVEL (GW)
POORLY GRADED GRAVEL (GP)
SILTY GRAVEL (GM)
CLAYEY GRAVEL (GC)
WELL GRADED SAND (SW)
SILTY SAND (SM)
POORLY GRADED SAND (SP)
CLAYEY SAND (SC)
SILT (ML)
ELASTIC SILT (MH)
LEAN CLAY (CL)
FAT CLAY (CH)
SILTSTONE
SANDSTONE
SHALE
ALLUVIUM (NO DATA)
E EXAGGERATION - 3.6:1 (H:V)
Some soil boring logs have been reinterpreted due to field observations. Bolded wells were injection wells.
FIGURE 6-B
SITE SS015 CROSS-SECTION A-A'
CIS-1,2-DCE IN GROUNDWATER (PPB)
MONTHLY DATA SHEETS
TRAVIS AIR FORCE BASE, CALIFORNIA
CH2MHILL

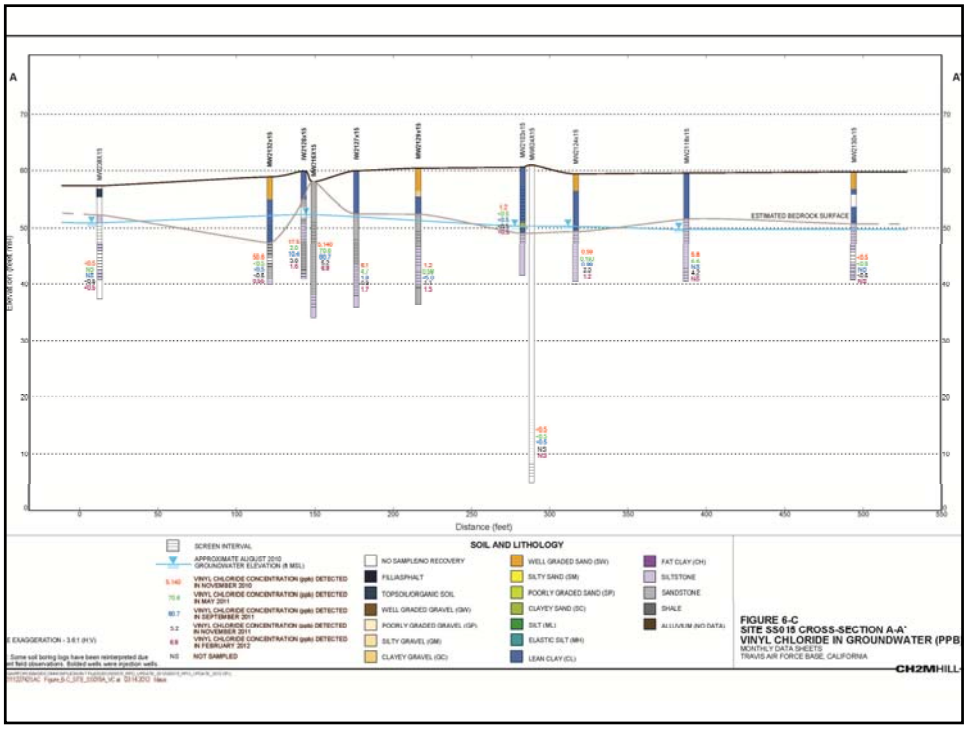


FIGURE 6-C
SITE SS015 CROSS-SECTION A-A'
VINYL CHLORIDE IN GROUNDWATER (PPB)
MONTHLY DATA SHEETS
TRAVIS AIR FORCE BASE, CALIFORNIA

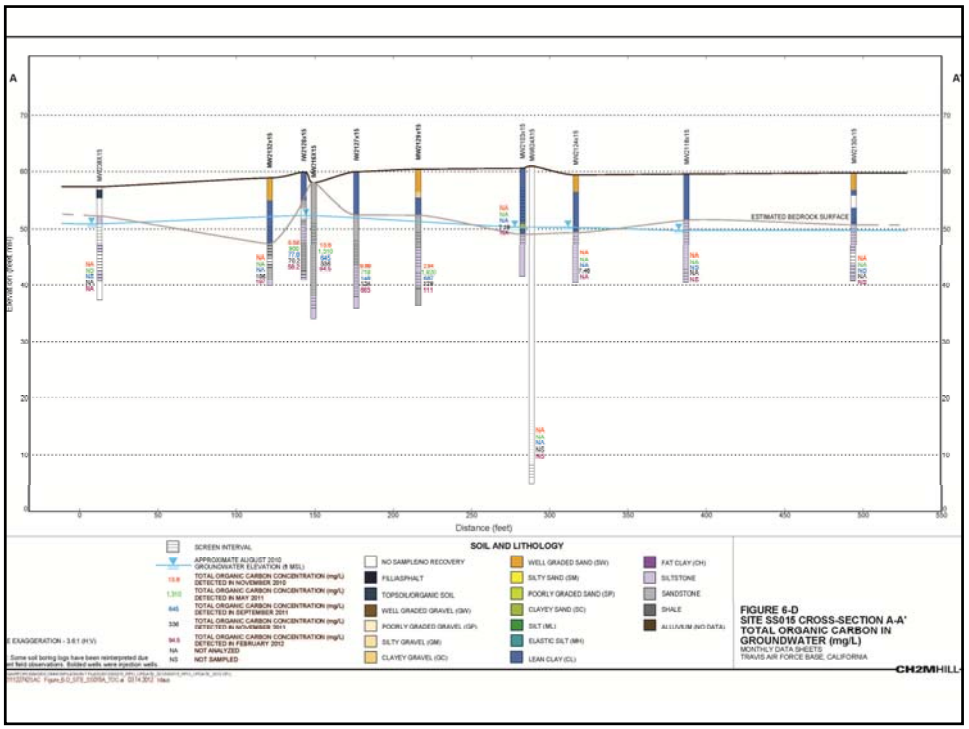


FIGURE 6-D
SITE SS015 CROSS-SECTION A-A'
TOTAL ORGANIC CARBON IN GROUNDWATER (mg/L)
MONTHLY DATA SHEETS
TRAVIS AIR FORCE BASE, CALIFORNIA

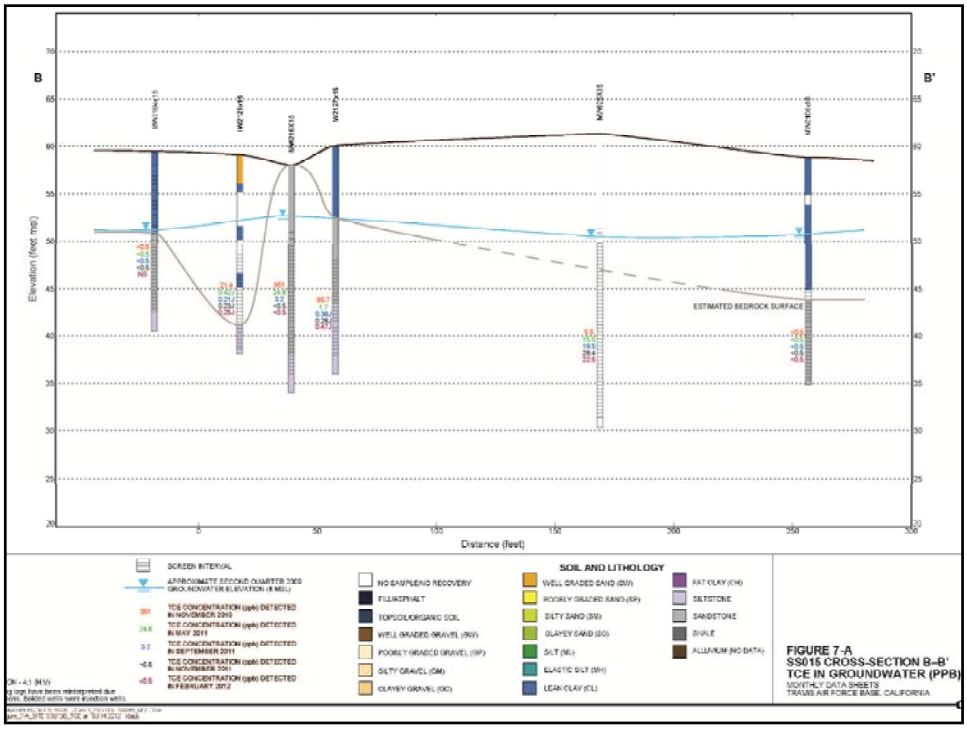


FIGURE 7-A
SS015 CROSS-SECTION B–B'
TCE IN GROUNDWATER (PPB)
MONTHLY DATA SHEETS
TRAVIS AIR FORCE BASE, CALIFORNIA

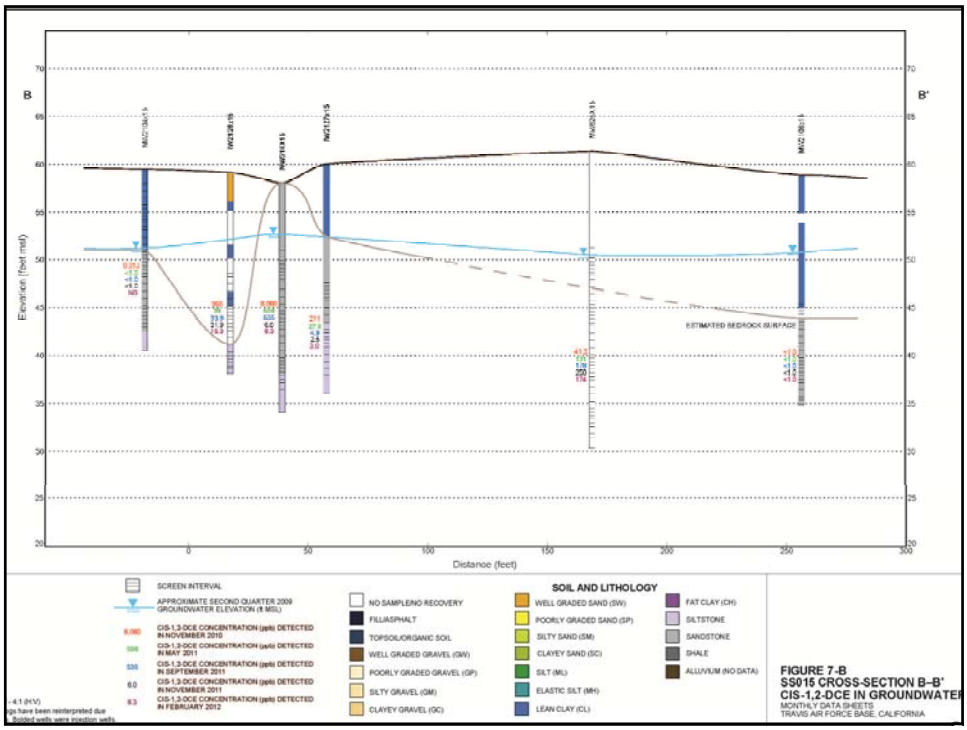


FIGURE 7-B
SS015 CROSS-SECTION B–B'
CIS-1,2-DCE IN GROUNDWATER
MONTHLY DATA SHEETS
TRAVIS AIR FORCE BASE, CALIFORNIA

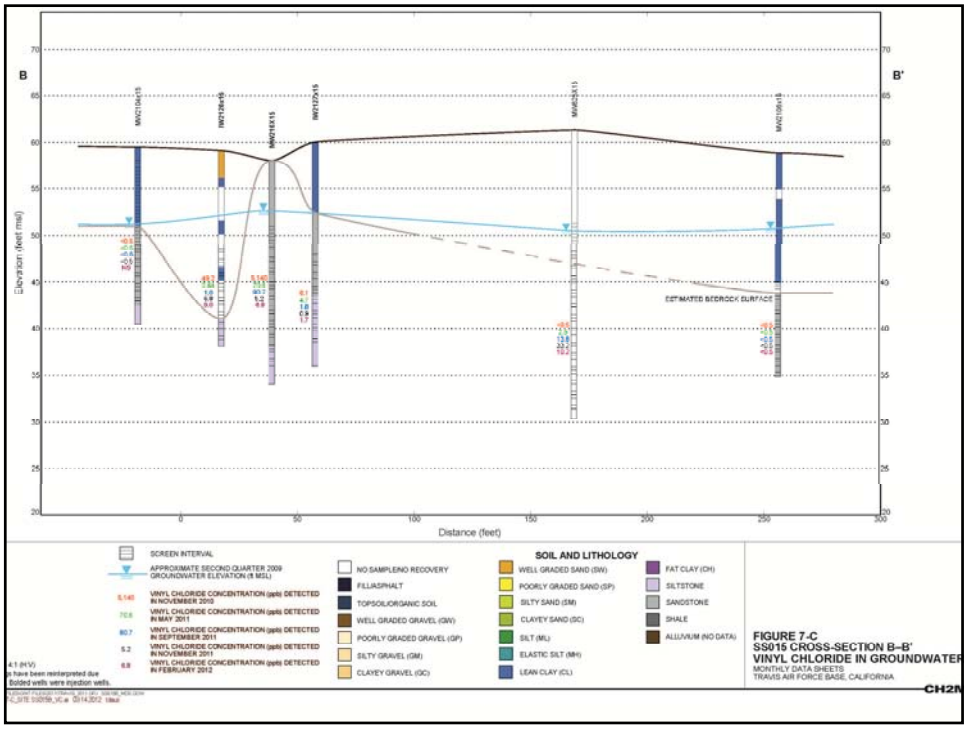


FIGURE 7-C
SS015 CROSS-SECTION B–B'
VINYL CHLORIDE IN GROUNDWATER
MONTHLY DATA SHEETS
TRAVIS AIR FORCE BASE, CALIFORNIA

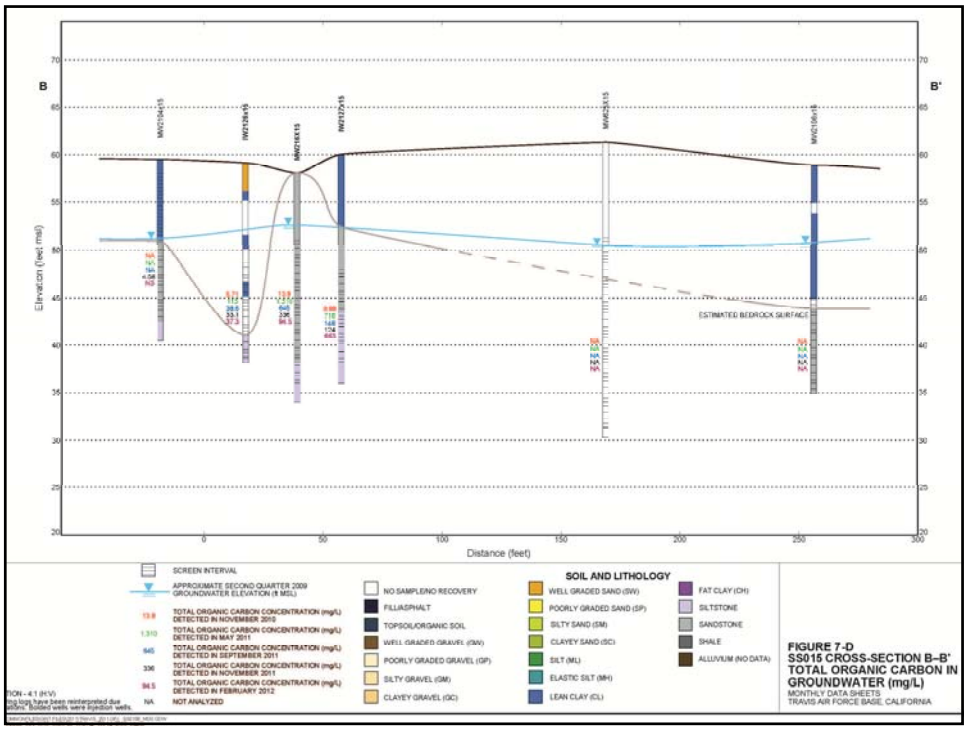


FIGURE 7-D
SS015 CROSS-SECTION B–B'
TOTAL ORGANIC CARBON IN GROUNDWATER (mg/L)
MONTHLY DATA SHEETS
TRAVIS AIR FORCE BASE, CALIFORNIA

Travis AFB
Restoration Program

Program Overview

RPM Meeting

March 21, 2012

Completed Documents

- Basewide Health & Safety Plan (HSP)
- Action Plan
- 2007/2008 GSAP Annual Report
- LF007C RPO Work Plan
- LF008 Rebound Study Work Plan
- SS014 Tier 1 POCO Evaluation Work Plan
- ST027B Site Characterization Work Plan
- SS030 RPO Work Plan
- ST032 POCO Technical Memo
- DP039 Bioreactor Work Plan
- 2008 Annual GWTP RPO Report
- Passive Diffusion Bag (PDB) Technical Memo
- RD/RA QAPP Update
- ST032 Tier 1 POCO Evaluation Work Plan
- Phytostabilization Demonstration Technical Memo
- Model QAPP
- LF008 Rebound Test Technical Memo
- Comprehensive Site Evaluation Phase II Work Plan
- Field Sampling Plan (FSP)
- SS016 RPO Work Plan
- ST018 POCO RA Work Plan
- Vapor Intrusion Assessment Report
- GSAP 2008/2009 Annual Report
- FT005 Data Gap Work Plan
- First, Second , & Third Site DP039 Sustainable Bioreactor Demonstration Progress Reports
- DP039 RPO Work Plan
- SD036/SD037 RPO Work Plan

Completed Documents (cont'd)

- ST027B Site Characterization Report
- 2009 GWTP RPO Annual Report Natural Attenuation Assessment Report (NAAR)
- Union Creek Sites SD001 & SD033 Remedial Action Report
- CAMU 2008-2009 Monitoring Annual Report
- Phytostabilization Study Report
- 2009/2010 Annual GSAP Report
- SS015 Remedy Optimization Field Implementation Plan
- Sites SS014 and ST032 Tier 1 POCO Evaluation Report
- SD036 Remedy Optimization Field Implementation Plan
- 2010 Annual CAMU Inspection Report
- Site ST018 POCO Baseline Implementation Report
- FT005 Data Gaps Investigation Report
- Comprehensive Site Evaluation Phase II Report
- 2010 Groundwater RPO Annual Report
- Focused Feasibility Study (FFS)
- Site ST027-Area B Human Health Risk Assessment
- Site ST027-Area B Ecological Risk Assessment
- ***Work Plan for Assessment of Aerobic Chlorinated Cometabolism Enzymes***

Completed Field Work

- ST027B Gore Sorber Survey – Phase 1
- ST027B Field Sampling – Phase 2
- GSAP 2008 Semi-annual Event
- ST027B Installation of Wells – Phase 3
- SS014 Site Characterization
- LF008 Rebound Study
- GSAP Annual Sampling Event - 2009
- SS030 Site Characterization – Phase 1
- ST027 Site Characterization - Phase 3
- ST014 Monitor Well Install - Subsite 3
- SD001/SD033 Sediment RA
- SS016 Site Characterization (OSA source area)
- ST018 Site Characterization
- SS030 Site Characterization (Off-base VOC Plume)
- DP039 Site Characterization (for Biobarrier Placement)
- SS014 & ST032 Q1 2010 MNA Sampling (2nd of 4 quarterly events)
- SD036 Additional Site Characterization (north & east)
- Therm/Ox System Removal
- SS016 Monitoring Well Installation
- SD037 EVO Injection Well Installation
- DP039 Monitoring Well & Injection Well Installation
- DP039 EVO Injection
- SD037 Monitoring Well Installation
- GSAP 2010 Annual Sampling Event
- SD037 EVO Injection

Completed Field Work (cont'd)

- SS015 Site Characterization
- South Plant GAC Change-out
- FT005 Data Gap Investigation
- SS016 Position Survey of EW03
- SS016 Bioreactor Installation
- SS016 Bioreactor Baseline Sampling
- DP039 Biobarrier Quarterly Performance Sampling
- DP039 Bioreactor Quarterly Performance Sampling
- SD037 EVO Quarterly Performance Sampling
- SS015 EVO Baseline Sampling
- SD036 EVO Baseline Sampling
- SS016 Bioreactor Startup
- SD036 Injection Wells Installation
- SS015 Injection Wells Installation
- ST018 GETS Installation
- SD036 EVO Injection
- 2010 Semiannual GSAP
- SS015 EVO Injection
- Quarterly RPO Performance Monitoring (Feb 2011)
- ST018 GETS Startup
- Quarterly RPO Performance Monitoring (May 2011)
- 2011 Annual GSAP Sampling
- SS029 GET Shutdown Test (System Optimization analysis)
- Quarterly RPO Performance Monitoring (Aug 2011)
- Quarterly RPO Performance Monitoring (Nov 2011)
- 2011 Semiannual GSAP Sampling
- LF007C Site Characterization (Wetlands)
- FT005 Soil Remedial Action
- Performance Monitoring SS015 (4th Quarterly event)
- ***Sampling for Assessment of Aerobic Chlorinated Cometabolism Enzymes (Feb 21-22)***

In-Progress Documents & Field Work

Documents

- Baseline Implementation Report – BIR (Sites SS015, SS016, SD036, SD037, and DP039)
- Technical and Economic Feasibility Analysis (TEFA)
- 2010/2011 Annual GSAP Report
- Old Skeet Range Engineering Evaluation/Cost Analysis
- Work Plan for RPO of Sites SS016 and SS029

Field Work

- None

Upcoming Documents

• Proposed Plan (PP)	March
• 2011 Groundwater Treatment RPO Annual Report	March
• FT005 Remedial Action Completion Report	TBD
• Site LF007C Data Gaps Investigation Technical Memorandum	TBD
• Technical Memorandum for Assessment of Aerobic Chlorinated Cometabolism Enzymes	TBD
• ***2011 CAMU Annual Report***	***TBD***

Upcoming Field Work

- SS029/SS016 System Optimization Analysis — Summer 2012
- 2012 Annual GSAP Sampling — April

Note: Travis will try to notify regulatory agencies via email approximately one week in advance of planned field work