Final

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

20 February 2013, 0930 Hours

Mr. Mark Smith, Travis Air Force Base (AFB), conducted the Remedial Program Manager's (RPM) meeting on 20 February 2013 at 0930 hours, at Travis AFB, California. Attendees included:

• Mark Smith	Travis AFB
• Glenn Anderson	Travis AFB
• Lonnie Duke	Travis AFB
• Gregory Parrott	Travis AFB
• Dezso Linbrunner	United States Army Corp of Engineers (USACE) Omaha District
• Adriana Constantinescu	California Regional Water Quality Control Board (RWQCB)
• Jose Salcedo	California Department of Toxic Substances Control (DTSC)
• Nadia Hollan Burke (via phone)	United States Environmental Protection Agency (USEPA)
• Sharon Halper (via phone)	Techlaw, Inc
• Mike Wray	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 (January 2013)
• Attachment 4	CGWTP Monthly Data Sheet (January 2013)
• Attachment 5	Presentation: 2012 Travis AFB Technology Demonstrations Performance Monitoring Update
• Attachment 6	Presentation: Program Update: Activities Completed, In Progress and Upcoming

1. ADMINISTRATIVE

A. Previous Meeting Minutes

The 16 January 2013 RPM meeting minutes were approved and finalized as written.

B. Action Item Review.

Action items from January were reviewed.

Action item 1 still open: Travis AFB to research beneficial reuse of treated water. AFCEE is in agreement with treated water reuse using Defense Environmental Restoration Account (DERA) funds under the authority of a "net-zero policy" for the Air Force. Update, 16 January 2013: Mr. Duke said that an Air Force energy reduction contractor is looking into the cost of installing a pipe to convey treated water from the central plant to the duck pond.

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 20 March 2013 at 0930 hours.

Travis AFB Master Document Schedule

— Groundwater Record of Decision (ROD): No change to the schedule. Mr. Anderson asked the agencies if their review was going in accordance with the schedule. Ms. Constantinescu said RWQCB comments will be submitted according to the schedule. Mr. Salcedo/DTSC and Ms. Burke/EPA said they might need an additional week or two. Mr. Anderson requested DTSC and EPA to notify Travis AFB in writing if they expect more than a one week delay.

— 3rd Five-Year Review: No change to the schedule. Mr. Anderson said the draft submittal for agency review may be delayed depending on the number of comments from the agencies on the draft ROD. The primary focus will be getting the ROD finalized. Mr. Smith said the draft submittal might be pushed back one month to April. Ms. Burke cautioned to be careful of the statutory deadline requirements for the Five-year review. Mr. Smith stated that the previous Five-year review was issued in September.

— Potrero Hills Annex: (FS, PP, and ROD): No new information and no change to the schedule.

— Old Skeet Range Action Memorandum: The TBD dates have been populated. Draft to Agencies will to go out this afternoon, after RPM meeting. Mr. Anderson announced document review priority: ROD, 5-year review, then the Old Skeet Range Action Memorandum. If the agencies need an extension for their review of the Action Memorandum, that would be acceptable.

— Vapor Intrusion Update Technical Memorandum: The final due date has been changed to 15 February 2013 to reflect the actual date the document went final.

— Quarterly Newsletter (January 2013): No change to the schedule. Mr. Anderson will follow up with paper copies.

— Groundwater Remediation Implementation Status Report: No change to schedule.

— Kinder Morgan LF044 Land Use Control Report: New Document. Dates are TBD. Mr. Anderson said Kinder Morgan will be submitting a CD to Travis AFB that documents their fuel tank farm construction. Travis AFB will use some of the information documented to prepare the draft report for the Land Use Control Report.

— 2012 Groundwater Sampling and Analysis Program Technical Memorandum: Moved to history.

2. CURRENT PROJECTS

Treatment Plant Operation and Maintenance Update

Mr. Duke reported on the treatment plant status.

South Base Boundary Groundwater Treatment Plant (see Attachment 3)

The South Base Boundary Groundwater Treatment Plant (SBBGWTP) performed at 98.6% uptime, and 1.7 million gallons of groundwater were extracted and treated during the month of January 2013. All of the treated water was discharged to Union Creek. The average flow rate for the SBBGWTP was 43.6 gallons per minute (gpm). Electrical power usage was 2,520 kWh and approximately 3,452 pounds of CO_2 were created (based on DOE calculation). Approximately 1.52 pounds of volatile organic compounds (VOCs) were removed in January. The total mass of VOCs removed since startup of the system is 435 pounds.

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

Central Groundwater Treatment Plant (see Attachment 4)

The Central Groundwater Treatment Plant (CGWTP) performed at 89.6% uptime with approximately 1.3 million gallons of groundwater extracted and treated during the month of January 2013. All treated water was diverted to the storm drain. The average flow rate for the CGWTP was 31.0 gpm. Electrical power usage was 2,104 kWh for all equipment connected to the Central plant, and approximately 2,882 pounds of CO_2 were generated. Approximately 4.40 pounds of VOCs were removed from groundwater by the treatment plant in January. The total mass of VOCs removed since the startup of the system is 11,313 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 January.

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

Site ST018 Groundwater (MTBE) Treatment Plant (attachment not available)

The Site ST018 (MTBE) Treatment Plant (ST018 GWTP) report was not available for this meeting. The laboratory is in the process of validating the sample data.

3. Presentations

2012 Travis AFB Technology Demonstrations Performance Monitoring Update (see Attachment 5)

Mr. Chakurian reported on the 2012 Travis AFB Technology Demonstrations Performance Monitoring Update. See attachment 5 for maps and graphs details. Highlights included:

Performance Monitoring Results Summary for sites: SS015 Emulsified Vegetable Oil (EVO) Injection, SS016 Bioreactor, SD036 EVO Injection, SD037 EVO Injection, DP039 Bioreactor and DP039 Biobarrier.

EVO Site SS015: Over the two-year demonstration period, the data collected in the injection area wells are showing total Chlorinated Volatile Organic Compounds (CVOC) reductions of 99%, and cis-1,2-DCE continues to degrade without significant vinyl chloride accumulation. A monitoring well located 75 feet downgradient of the Emulsified Vegetable Oil (EVO) injection area has seen a combined TCE and cis-1,2-DCE decrease of 90%; the design radius of influence for EVO was 20 feet, so we are seeing greater EVO migration. At one cross gradient well, concentrations of cis-1,2-DCE and vinyl chloride are increasing; daughter products are increasing, additional monitoring is needed to evaluate the success of the Enhanced Reductive Dechlorination (ERD) treatment for that particular area. Total Organic Carbon (TOC) remains in excess of 100 µg/L in the injection wells and is sustaining ERD. Ms. Burke asked the average depth of the wells. Mr. Chakurian answered about 20 to 25 feet.

Bioreactor Site SS016: After a two-year period of operating the bioreactor, we are seeing removal of over 99% of the total CVOCs entering the bioreactor. Concentrations of TCE and cis-1,2-DCE in the horizontal ‘feeder’ extraction well have increased; could be a result of the

groundwater exiting the bioreactor and into the highly contaminated bedrock. CVOCs, including vinyl chloride, analyzed in the monitoring well located at the bottom of the bioreactor, are almost completely remediated. TCE concentrations in a well located 20 feet downgradient from the bioreactor decreased significantly from November 2011 to November 2012: decrease from 47,800 µg/L to 104 µg/L. There has been an increase in TOC, cis-1,2-DCE, vinyl chloride and methane. A well located upgradient of the bioreactor is showing an increase in TOC, cis-1,2-DCE, and vinyl chloride, indicating some mounding around the bioreactor.

Ms. Halper asked how Travis AFB plans to deal with the cis-1,2-DCE. Mr. Anderson replied once the ROD is signed and the new PBC contract is awarded, there will be designs to modify and/or enhance the demonstration performance monitoring remedies. Mr. Anderson gave one example of optimizing a demonstration project; the first bioreactor located at DP039 utilized immature mulch which was not as effective as it could be. Lesson learned: apply older mature mulch which is a better source of carbon. Mr. Smith added that site SS016 is flowing toward the runway so there is no human health risk, and only one structure, used for storage, that is in its path. Ms. Burke asked if the first GRISR report will focus on the initial demonstration goals, or do you see the report supporting optimization efforts. Mr. Duke said the report will show the data already collected as of December 2012. Mr. Wray said it is important to note that ERD and Bioreactor projects are designed to address TCE, cis-1,2-DCE and vinyl chloride and the data shows dramatic decreases in all three and, moreover, no stalling.

EVO Site SD036: Over the two-year demonstration period, we have seen significant reductions of TCE in the injection area and an increase in cis-1,2-DCE. TOC supply in the injection area remains high enough to sustain ERD. Little vinyl chloride has accumulated and ethene is being detected. The average TOC concentration decreased from 460 mg/kg to 83 mg/kg in the injection wells from November 2011 to November 2012. An influx of sulfate is likely responsible for the TOC consumption. This indicates sulfate is starting to compete and signifies another round of EVO injections may be necessary in the future. Mr. Wray said this is another example that demonstrates the success of the EVO injections. When more injections are needed, the existing injection wells will be used (as appropriate), and new injection wells will also be added as needed.

EVO Site SD037: After two years the TCE in the EVO injection area is showing significant reductions. Increases in cis-1,2-DCE and vinyl chloride are apparent in target wells. A total reduction of over 99% of CVOCs recorded in one well, and 76% of CVOCs in another well. High levels of methane indicate reducing conditions are sufficient for complete de-chlorination in the injection area. TOC supply in the injection area remains high enough to sustain ERD. The average TOC remaining in the seven injection wells is 276 mg/L.

Mr. Chakurian pointed out at DP039 the three different technology demonstration remedies at this site (slide 7). The Bioreactor is located in the northwestern ‘source area’, the biobarrier is located in the southeast end of the site, and the phytoremediation zone is located in the central area.

Bioreactor Site DP039: Over the four year demonstration period TCE and total CVOC reductions of over 99% within 30 feet of the source area have been observed. The most contaminated well in the source area recorded a reduction in TCE concentrations from 8,000

µg/L in December 2008 to 51 µg/L in December 2012. Similar CVOC reductions have been observed in other wells. Minimal vinyl chloride has been detected outside of the bioreactor; the maximum current concentration is 7.7 µg/L. There was an unexpected TOC increase generated within the bioreactor as observed in December 2012. TOC increased from 14.7 mg/L to 134 mg/L. The solar powered pump was removed from one extraction well and installed into a more distant monitoring well in September 2012 to expand the recirculation of groundwater further downgradient of the bioreactor. Influent TCE concentration to the bioreactor from the converted well was 878 µg/L in December 2012. TCE concentrations at the bottom of the bioreactor is <0.5 µg/L. The bioreactor continues to remove over 99% total CVOCs from the influent.

Biobarrier Site DP039: Over the two years since the EVO injection, the data collected shows almost total TCE destruction, minor cis-1,2-DCE accumulation and very little vinyl chloride accumulation along the biobarrier line of injection wells. There is sufficient TOC in the biobarrier injection wells to support ERD of TCE, cis-1,2-DCE and vinyl chloride that passes through the barrier. The average TOC levels measured in the 12 injection wells was over 260 mg/L. Downgradient, about 20 feet from the injection wells, a monitoring well is showing a significant increase in methane and TOC. No impact has been observed from the biobarrier of TCE concentrations in the downgradient wells located 80 to 120 feet from the injection wells. Mr. Wray said to accurately monitor the effectiveness of the biobarrier, additional monitoring wells need to be installed closer to the biobarrier.

Mr. Wray added the well pairs are shallow/deep collection points and the data used in contouring the plume on the map is the highest concentration, which could be either from the shallow or deep screened interval.

Program Update: Activities Completed, In Progress and Upcoming (see Attachment 6)

Mr. Wray reported on the status of field work and documents which are completed, in progress, and upcoming. Updates from the briefing this month included:

Completed Documents: Vapor Intrusion Assessment Update Technical Memorandum.

Completed Field Work: Replace electrical wiring for well field at Site SS030.

In-Progress Documents: Groundwater Record of Decision.

In-Progress Field Work: Replace battery banks at ST018 Groundwater Treatment Plant.

Upcoming Documents: Old Skeet Range Action Memorandum, 3rd Five-Year Review, 2012 Annual Groundwater Remediation Implementation Status Report, Kinder Morgan LF044 Land Use Control Report.

Upcoming Fieldwork: Annual Groundwater Remediation Implementation Program (GRIP) Sampling Event (April).

4. New Action Item Review

None.

5. PROGRAM/ISSUES/UPDATE

Mr. Smith announced the Air Force Civil Engineering Center (AFCEC) is looking at closing as many sites administratively by combining them into one operable unit, i.e., FT005 groundwater could be merged with SS029 groundwater and administratively close FT005. AFCEC has asked Travis AFB to present this information to the agencies and to gather feedback. Note: the ROD does not take this concept into account. Mr. Salcedo said that it would be complicated for DTSC because when a site is reported closed they are required to report how many acres are freed up for reuse, etc. Mr. Smith said he will follow up with an email giving more detail to the agencies.

6. Action Items

Item #	Responsible	Action Item Description	Due Date	Status
1.	Travis AFB	Research beneficial reuse of treated water and give update. Update (13 June 2012): AFCEE is in agreement with treated water reuse using Defense Environmental Restoration Account (DERA) funds under the authority of a "net-zero policy" for the Air Force. Update (15 August 2012): Mr. Duke reported that irrigation lines were destroyed by a communications contractor and not repaired because the system was inactive. Travis AFB will get the system design information to determine if the trunk line is still intact and repairs can be made to get the system running. Update, 16 January 2013: Mr. Duke said that an Air Force energy reduction contractor will look into the cost of installing a pipe to convey treated water from the	February 2013	Open

		central plant to the duck pond.		

TRAVIS AIR FORCE BASE
ENVIRONMENTAL RESTORATION PROGRAM
REMEDIAL PROGRAM MANAGER'S MEETING
BLDG 570, Main Conference Room
20 February 2013, 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. PRESENTATION

   A. 2012 TRAVIS AFB TECHNOLOGY DEMONSTRATIONS PERFORMANCE MONITORING UPDATE
   B. PROGRAM UPDATE: ACTIVITIES COMPLETED, IN PROGRESS AND UPCOMING

4. NEW ACTION ITEM REVIEW

5. PROGRAM/ISSUES/UPDATE

NOTES:

Travis AFB Master Meeting and Document Schedule

(2013)
Annual Meeting and Teleconference Schedule

Monthly RPM Meeting[1] (Begins at 9:30 a.m.)	RPM Teleconference (Begins at 10:00 a.m.)	Restoration Advisory Board Meeting (Begins at 7:00 p.m.) (Poster Session at 6:30 p.m.)
01-16-13	—	—
02-20-13	—	—
03-20-13[2]	—	—
04-18-13 (Thur 2:00 PM)	—	04-18-13
05-22-13	—	—
06-19-13	—	—
07-17-13	—	—
08-21-13	—	—
09-18-13	—	—
10-17-13 (Thur 2:00 PM)	—	10-17-13
11-20-13	—	—
—	—	—

[1] Note: Meetings will be held the third Wednesday of each month unless otherwise noted.

[2] Note: Meetings will alternate between face to face and teleconferences after the GW ROD is final.

Travis AFB Master Meeting and Document Schedule

PRIMARY DOCUMENTS		
Life Cycle	**Groundwater Record of Decision** **Travis, Glenn Anderson** **CH2M HILL, Leah Waller**	**3rd Five-Year Review** **Travis AFB, Glenn Anderson** **J.C. Palomar, Chris Bason**
Scoping Meeting	**01-24-07 (11-30-11)**	**10-31-12**
Predraft to AF/Service Center	11-28-12	02-18-13
AF/Service Center Comments Due	12-12-12	03-04-13
Draft to Agencies	01-02-13	03-18-13
Draft to RAB	01-02-13	03-18-13
Agency Comments Due	03-03-13	04-15-13
Response to Comments Meeting	**03-20-13**	**04-29-13**
Public Comment Period	NA	NA
Public Meeting	**NA**	**NA**
Response to Comments Due	04-01-13	05-13-13
Draft Final Due	04-01-13	06-03-13
Final Due	05-01-13	07-03-13

Travis AFB Master Meeting and Document Schedule

PRIMARY DOCUMENTS			
Life Cycle	**Potrero Hills Annex Travis, Glenn Anderson**		
	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	**MMRP** **Old Skeet Range Action Memorandum** **Travis AFB, Glenn Anderson** **Baywest, Steve Thornton**	**Vapor Intrusion Update Technical Memorandum** **Travis AFB, Glenn Anderson** **CH2M HILL, Leslie Royer**
Scoping Meeting	NA	**NA**
Predraft to AF/Service Center	01-10-13	08-14-12
AF/Service Center Comments Due	01-28-13	08-28-12
Draft to Agencies	02-20-13	9-20-12
Draft to RAB	02-20-13	9-20-12
Agency Comments Due	03-22-13	10-20-12 (12-14-12)
Response to Comments Meeting	**04-18-13**	**TBD**
Response to Comments Due	04-30-13	02-15-13
Draft Final Due	**NA**	**NA**
Final Due	04-30-13	02-15-13
Public Comment Period	NA	NA
Public Meeting	NA	**NA**

Travis AFB Master Meeting and Document Schedule

Life Cycle	Quarterly Newsletters (January 2013) Travis, Glenn Anderson	Groundwater Remediation Implementation Status Report Travis AFB, Lonnie Duke CH2M HILL, Royer/Berwick	Kinder Morgan LF044 Land Use Control Report Travis AFB, Glenn Anderson Kinder Morgan, Heidi Sickler
Scoping Meeting	**NA**	**NA**	**NA**
Predraft to AF/Service Center	NA	03-28-13	TBD
AF/Service Center Comments Due	NA	04-11-13	TBD
Draft to Agencies	01-09-13	04-27-13	TBD
Draft to RAB	NA	04-27-13	TBD
Agency Comments Due	01-23-13	05-27-13	TBD
Response to Comments Meeting	**TBD**	**06-19-13**	**TBD**
Response to Comments Due	01-30-13	06-27-13	TBD
Draft Final Due	NA	NA	NA
Final Due	01-30-13	06-27-13	TBD
Public Comment Period	NA	NA	NA
Public Meeting	**NA**	**NA**	**NA**

Travis AFB Master Meeting and Document Schedule

HISTORICAL	
Life Cycle	**2012 Groundwater Sampling and Analysis Program Technical Memorandum** **Travis AFB, Lonnie Duke** **CH2M HILL, Leslie Royer**
Scoping Meeting	**NA**
Predraft to AF/Service Center	09-20-2012
AF/Service Center Comments Due	09-25-2012
Draft to Agencies	09-26-2012
Draft to RAB	09-26-2012
Agency Comments Due	11-14-12
Response to Comments Meeting	**11-28-2012**
Response to Comments Due	12-18-12
Draft Final Due	NA
Final Due	12-18-12
Public Comment Period	NA
Public Meeting	**NA**

South Base Boundary Groundwater Treatment Plant Monthly Data Sheet

Report Number: 149 **Reporting Period: 31 December 2012 – 31 January 2013** **Date Submitted: 6 February 2013**

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 January 2013 reporting period.

Table 1 – Operations Summary – January 2013

Operating Time:	Percent Uptime:	Electrical Power Usage:
SBBGWTP: 758 hours	**SBBGWTP:** 98.6 %	**SBBGWTP:** 2,520 kWh (3,452 lbs CO_2 generated[a])

Gallons Treated: **1.7 million gallons**

Gallons Treated Since July 1998: **812 million gallons**

Volume Discharged to Union Creek: **1.7 million gallons**

VOC Mass Removed: **1.52 lbs**[b]

VOC Mass Removed Since July 1998: **435 lbs**

Rolling 12-Month Cost per Pound of Mass Removed: $3,992[c]

Monthly Cost per Pound of Mass Removed: $4,621

lbs = pounds

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

[b] Calculated using January 2013 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	1.3	EW01x30	Offline
EW02x05	2.2	EW737x05	Offline	EW02x29	Offline	EW02x30	Offline
EW03x05	Offline	EW742x05	Offline	EW03x29	3.5	EW03x30	Offline
EW731x05	Offline	EW743x05	Offline	EW04x29	Offline	EW04x30	Offline
EW732x05	Offline	EW744x05	Offline	EW05x29	7.8	EW05x30	Offline
EW733x05	Offline	EW745x05	Offline	EW06x29	17.4	EW06x30	Offline
EW734x05	Offline	EW746x05	Offline	EW07x29	Offline	EW711x30	Offline
EW735x05	Offline						
FT005 Total:	**2.2**			**SS029 Total:**	**30.0**	**SS030 Total:**	**Offline**

SBBGWTP Average Monthly Flow[c]: 43.6 gpm

[a] Extraction well flow rates are based on 1 February 2013 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. Additional volume from rainfall was passed through the system in January 2013.

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	
SBBGWTP	1/4/2013	22:00	1/7/2013	09:00	Treatment plant shutdown due to high containment level alarm. Restarted after priming sump pump to resume operation.

SBBGWTP = South Base Boundary Groundwater Treatment Plant

Summary of O&M Activities

Monthly groundwater samples at the SBBGWTP were collected on 8 January 2013. Sample results are presented in Table 4. The total VOC concentration (108 µg/L) in the influent sample has decreased since the December 2012 sample (176 µg /L) was collected. Figure 1 presents a plot of influent concentrations at the SBBGWTP over the past twelve (12) months.

Concentrations of 1,2-Dichloroethane (0.26 J µg/L), cis-1,2-DCE (6.3 µg/L), and TCE (88.2 µg/L) were detected at the influent sample location in January 2013. No contaminants were detected at the midpoint and effluent sampling locations.

On 14 January 2013 work began to replace the extraction well network power wiring at Site SS030. All of the existing wiring was replaced in January 2013. The process of reconnecting the extraction wells is currently in progress and it is expected that the well network will resume operation in early February 2013.

Optimization Activities

No optimization activities were performed in January 2013.

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 3,452 pounds of GHG during January 2013. GHG production has decreased (from 5,425 pounds) since December 2012 due to decreased extraction well operations. 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 January 2013 – South Base Boundary Groundwater Treatment Plant

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	8 January 2013 (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	0.50	0	ND	ND	ND
1,2-Dichloroethane	0.5	0.15	0	0.26 J	ND	ND
1,1-Dichloroethene	5.0	0.19	0	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.19	0	6.3	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	0.20	0	ND	ND	ND
Trichloroethene	5.0	0.19	0	88.2	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	13 J	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 and Average Flowrate
Twelve Month History
Travis Air Force Base, California

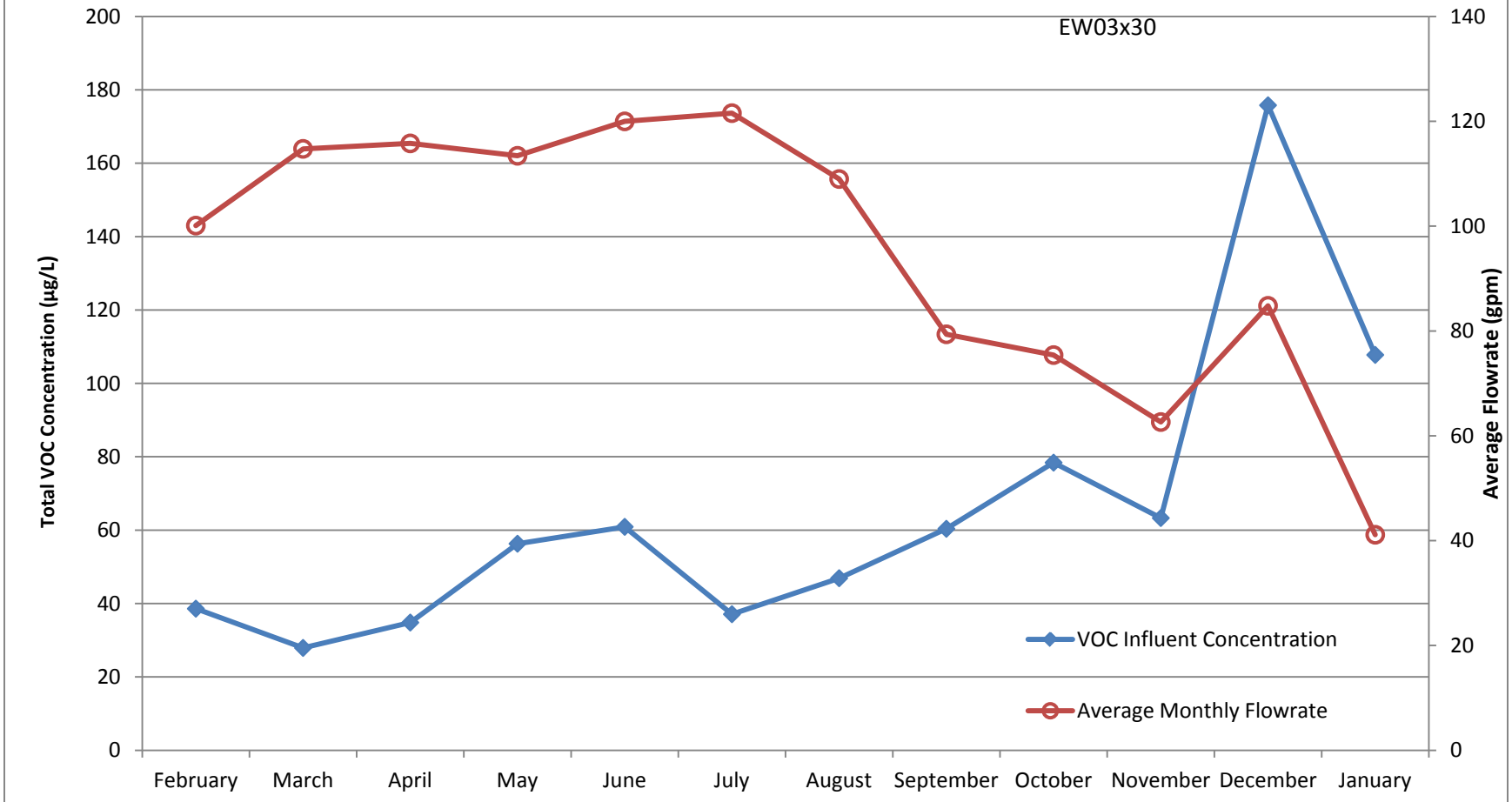
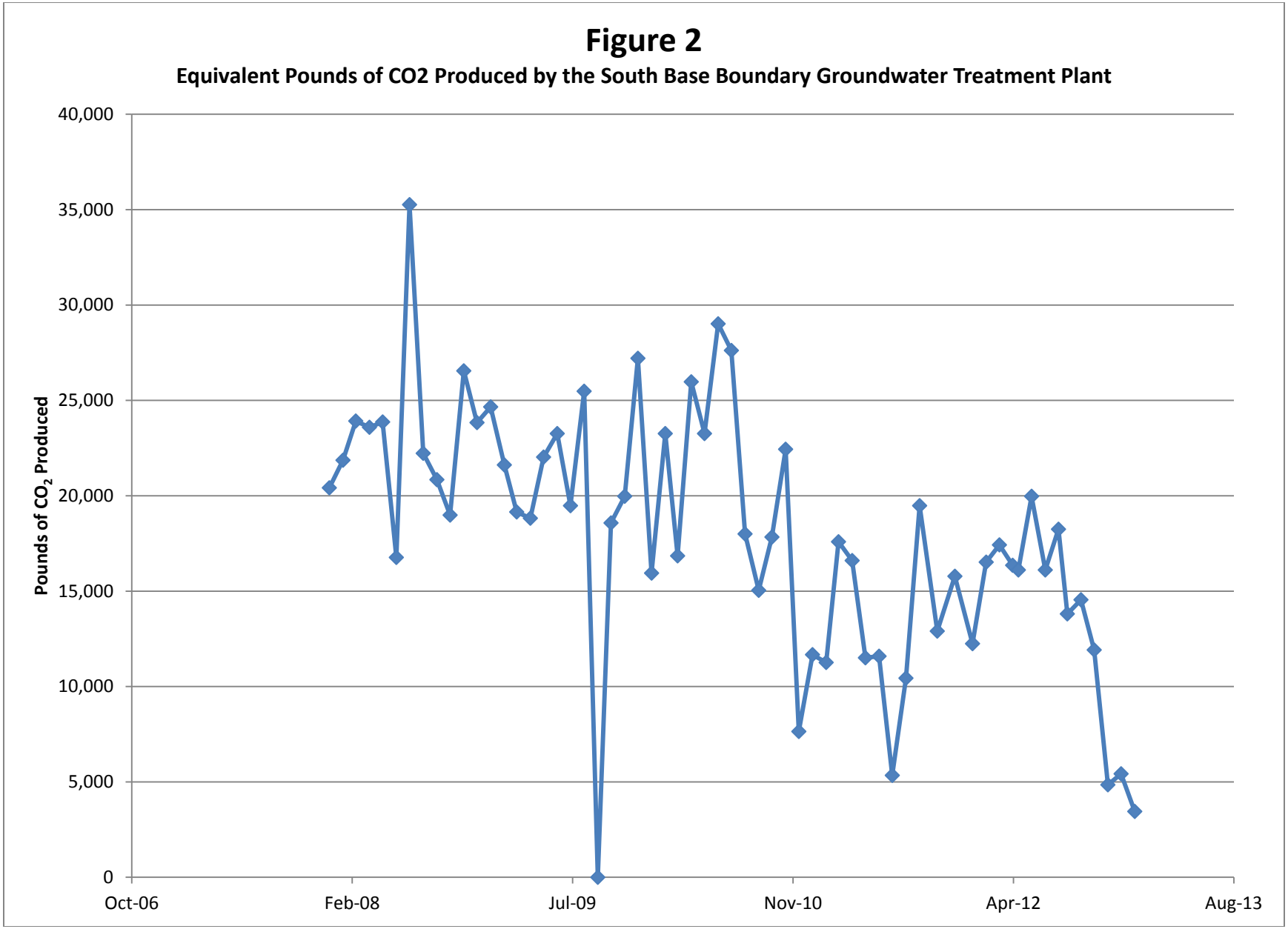


Figure 2

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



Central Groundwater Treatment Plant Monthly Data Sheet

Report Number: 162 **Reporting Period: 31 December 2012 – 31 January 2013** **Date Submitted: 6 February 2013**

This monthly data sheet presents information regarding the Central Groundwater Treatment Plant (CGWTP) and its associated technology demonstrations. The ongoing technology demonstrations related to the CGWTP include various emulsified vegetable oil (EVO) injections, two (2) bioreactor treatability studies, and various rebound studies.

System Metrics

Table 1 presents operational data from the January 2013 reporting period.

Table 1 – Operations Summary – January 2013

Operating Time:		Percent Uptime:		Electrical Power Usage:	
CGWTP:	686 hours	**CGWTP:**	89.6%	**CGWTP:**	2,104 kWh (2,882 lbs CO_2 generated[a])
WTTP:	Water: 0 hours Vapor: 0 hours	**WTTP:**	Water: 0% Vapor: 0%	**WTTP:**	0 kWh

Gallons Treated: **1.3 million gallons**

Gallons Treated Since January 1996: **474 million gallons**

VOC Mass Removed:

4.40 lbs[b] (groundwater only)

0 lbs (vapor only)

VOC Mass Removed Since January 1996:

2,627 lbs from groundwater

8,686 lbs from vapor

Rolling 12-Month Cost per Pound of Mass Removed: $1,441[c]

Monthly Cost per Pound of Mass Removed: $963

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

[b] Calculated using January 2013 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	19.1	Offline
EW02x16	6.3	Offline
EW03x16	0.2[c]	Offline
EW605x16	6.1	Offline
EW610x16	2.7	Offline
CGWTP	31.0	--
WTTP	--[b]	Offline

[a] Flow rates calculated by dividing total gallons processed by system operating time for the month.
[b] No vapor or groundwater was treated in January 2013.
[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)					
	1/12/2013	16:00	1/14/2013	07:30	The treatment plant shut down as a result of a high level alarm in the influent tank (T-301).
	1/14/2013	07:30	1/18/2013	12:45	SCADA system reset, likely due to power failure. Treatment operations resumed after system power cycle.
WTTP					
	None	NA			

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

Summary of O&M Activities

Monthly groundwater samples were collected at the CGWTP on 8 January 2013. Sample results are presented in Table 4. The total VOC concentration (415 µg/L) in the influent sample has decreased since the December 2012 sample (490 µg/L) was collected. Concentrations of 1,1-Dichloroethene (0.93 µg/L), cis-1,2-DCE (73 µg/L), trans-1,2-Dichloroethene (3.8 µg/L), Tetrachloroethene (0.62 µg/L), and TCE (336 µg/L) were detected at the influent sampling location.

Vinyl chloride was detected at the influent sampling location this month (0.42 J µg/L), but was not detected after the first carbon vessel. No contaminants were detected at the effluent sampling location. Travis Air Force Base will continue to monitor vinyl chloride and other contaminant concentrations at CGWTP for breakthrough in the primary vessel, as vinyl chloride is frequently detected in the influent sample.

Figure 1 presents a plot of influent concentrations (total VOCs) at the CGWTP versus time for the past twelve (12) months.

The Site DP039 bioreactor has transitioned to a "pulsed mode" operation in order to improve the rate of remediation and to preserve the amount of total organic carbon being produced within the bioreactor. The "pulsed mode" operation continued on a two (2) week transition schedule in January 2013.

Optimization Activities

No optimization activities occurred at CGWTP in January 2013.

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 systems associated with the CGWTP. The CGWTP produced approximately 2,882 pounds of GHG during January 2013. This is a decrease from the amount produced in December 2012 (approximately 3,551 pounds) and can be attributed to decreased operation time.

TABLE 4
Summary of Groundwater Analytical Data for January 2013 – Central Groundwater Treatment Plant

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	8 January 2013 (µg/L) Influent	After Carbon 1 Effluent	After Carbon 2 Effluent	System Effluent
Halogenated Volatile Organics							
1,2-Dibromoethane	5.0	0.11	0	ND	ND	ND	ND
2-Hexanone	5.0	0.48	0	ND	ND	ND	ND
4-Methyl-2-Pentanone	5.0	1.0	0	ND	ND	ND	ND
Bromoform	5.0	0.19	0	ND	ND	ND	ND
MTBE	1.0	0.5	0	ND	ND	ND	ND
Bromobenzene	5.0	0.21	0	ND	ND	ND	ND
1,3-Dichlorobenzene	5.0	0.15	0	ND	ND	ND	ND
1,4-Dichlorobenzene	5.0	0.16	0	ND	ND	ND	ND
Chloroethane	5.0	0.72	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	0.93	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.19	0	73	ND	ND	ND
trans-1,2-Dichloroethene	5.0	0.33	0	3.8	ND	ND	ND
Bromomethane	5.0	0.43	0	ND	ND	ND	ND
Tetrachloroethene	5.0	0.21	0	0.62	ND	ND	ND
trans-1,3-Dichloropropene	5.0	0.3	0	ND	ND	ND	ND
1,1,2-Trichloroethane	5.0	0.2	0	ND	ND	ND	ND
Trichloroethene	5.0	0.19	0	336	ND	ND	ND
Vinyl Chloride	0.5	0.18	0	0.42 J	ND	ND	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	0.23 – 0.5	0	ND	ND	ND	ND
Other							
Total Dissolved Solids (mg/L)	NA	10	0	NM	NM	NM	NM

* 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
mg/L = milligrams per liter

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

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
	20 March 2012	13 April 2012
	27 April 2012	11 May 2012
	11 June 2012	25 June 2012
	20 July 2012	3 August 2012
MW750x39	5 September 2012	16 September 2012
	28 September 2012	13 October 2012
	29 October 2012	9 November 2012
	21 November 2012	7 December 2012
	21 December 2012	4 January 2013
	18 January 2013	4 February 2013

CGWTP = Central Groundwater Treatment Plant
EW = Extraction Well

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

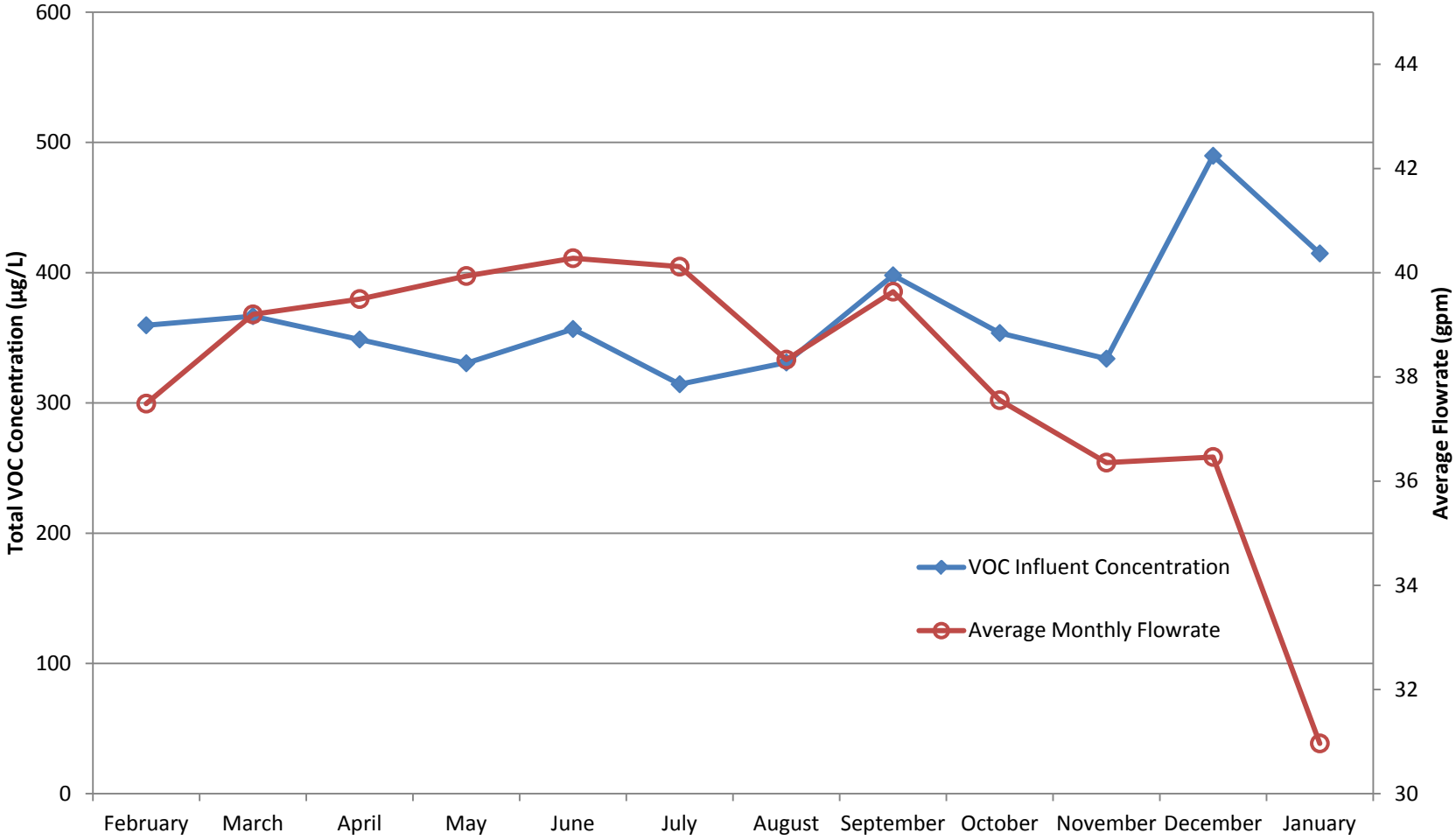
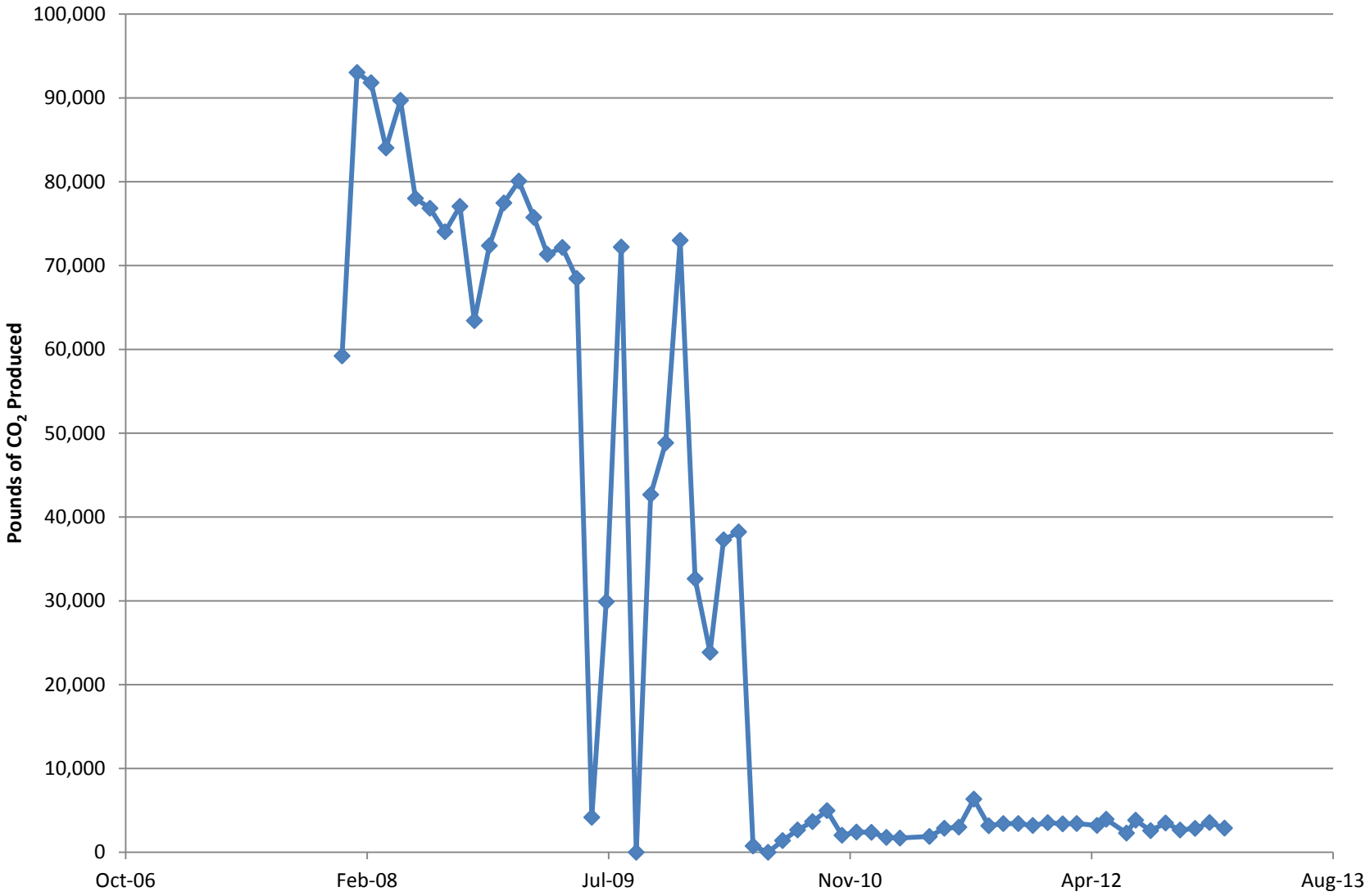


Figure 2

Equivalent Pounds of CO2 Produced by the Central Groundwater Treatment Plant



2012 Travis AFB Technology Demonstrations Performance Monitoring Update

RPM Meeting

February 20, 2013

Agenda

- Performance Monitoring Results Summary
- Site SS015 EVO Injection
- Site SS016 Bioreactor
- Site SD036 EVO Injection
- Site SD037 EVO Injection
- Site DP039 Bioreactor
- Site DP039 Biobarrier

Performance Monitoring Results

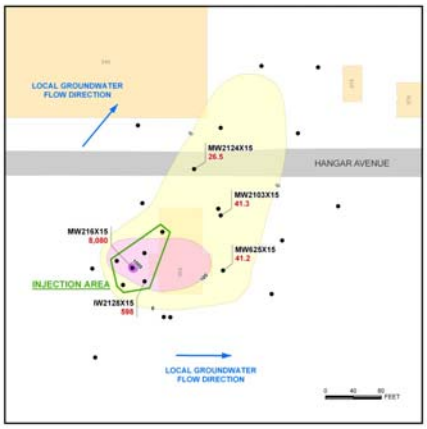
- ERD is proceeding at a high rate of CVOC removal efficiency in the SS016 and DP039 bioreactors.
  - Both bioreactors are removing more than 99% of the total CVOCs in the bioreactor influent streams.
  - Downgradient TCE reduction has been observed up to 30 feet from the bioreactors.
  - Cis-1,2-DCE and vinyl chloride accumulation has been minor.
- Monitoring wells in the injection areas at Sites SS015, SD036, SD037, and the DP039 biobarrier generally have responded with:
  - Elevated TOC levels,
  - Decreasing TCE levels, and
  - Decreasing total CVOC levels.

Performance Monitoring Results (Continued)

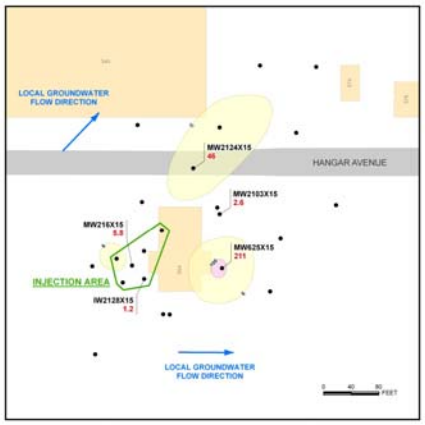
- Distribution of EVO and resultant TOC has been evident within a 25 ft radius of most injection wells.
- There is significant TCE, DCE, and vinyl chloride degradation occurring in the treatment zone surrounding the DP039 biobarrier (line of injection wells).
- Geochemical data collected from each bioreactor and EVO injection site supports the conditions for ERD.
  - High CH_4, dissolved Fe, and dissolved Mn.
  - Lower to depleted concentrations of SO_4.

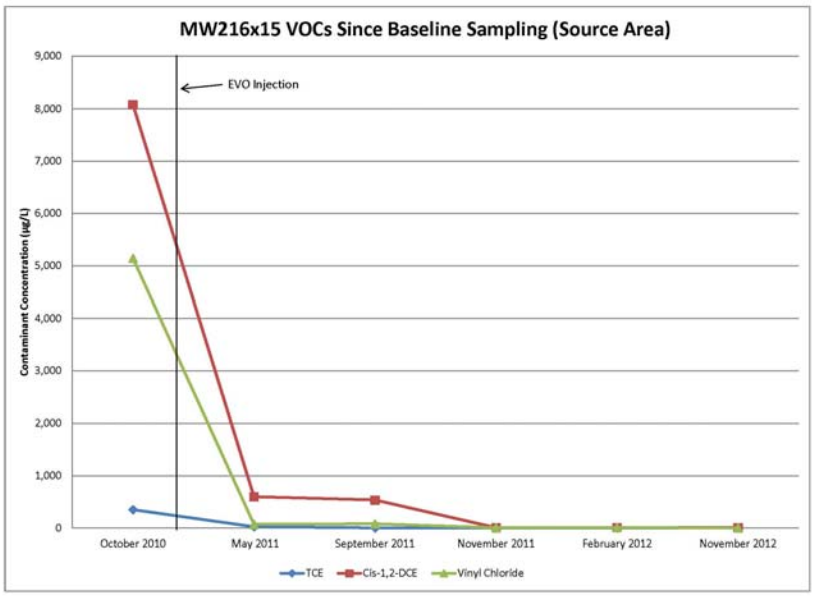
SS015 Cis-1,2-DCE Plume

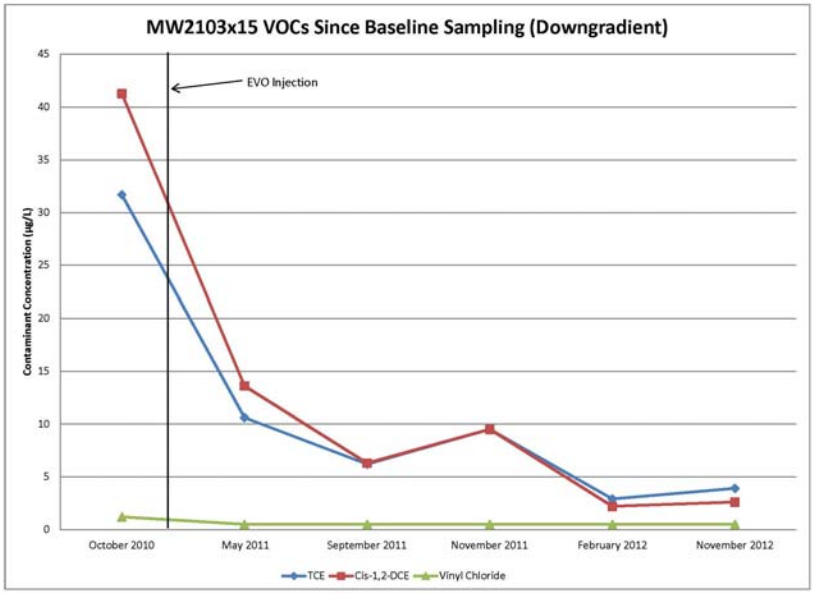
Baseline (2010)



2012

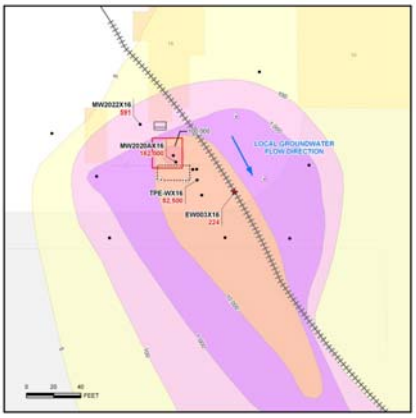




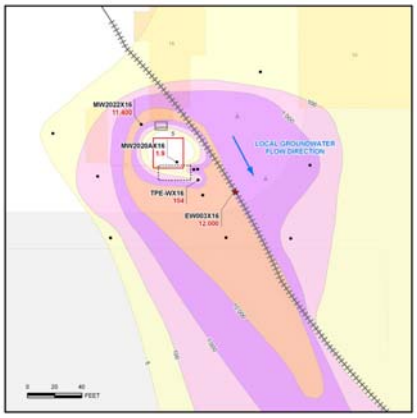


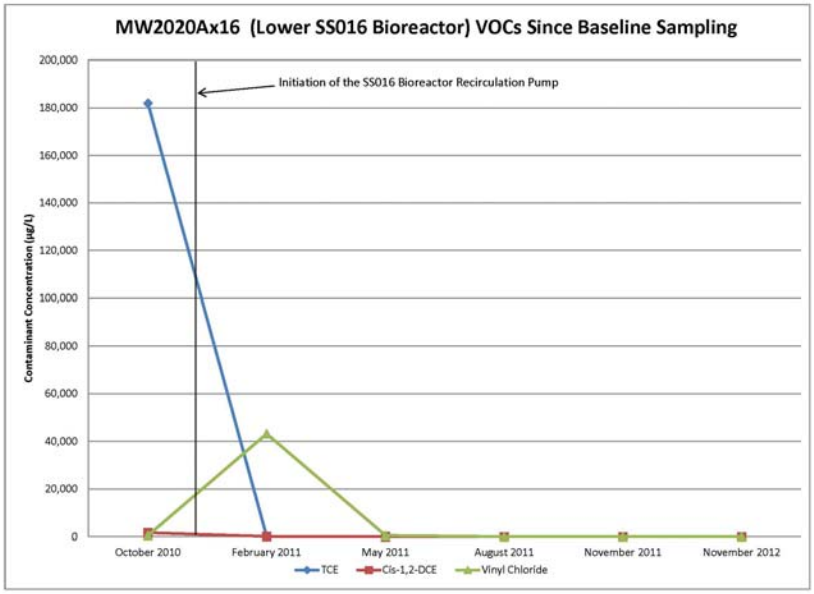
Site SS016 TCE Plume

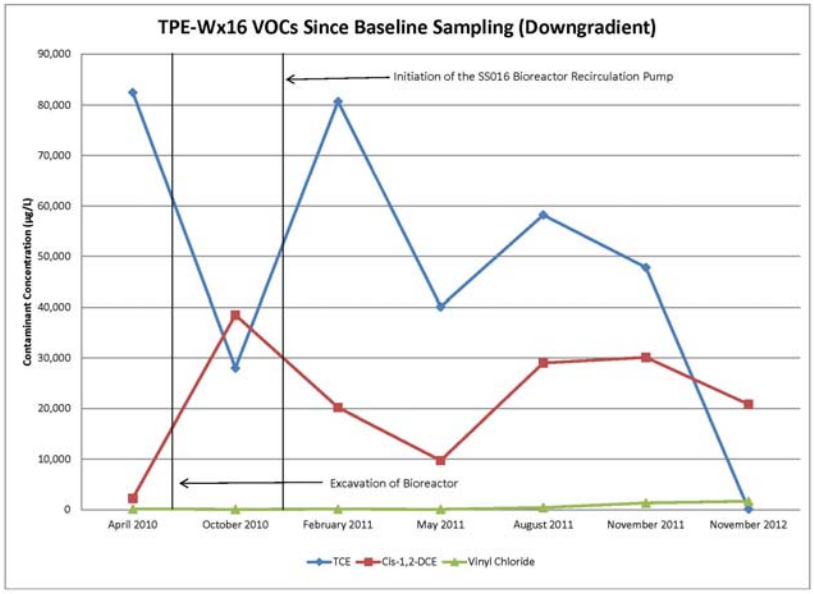
Baseline (2010)



2012

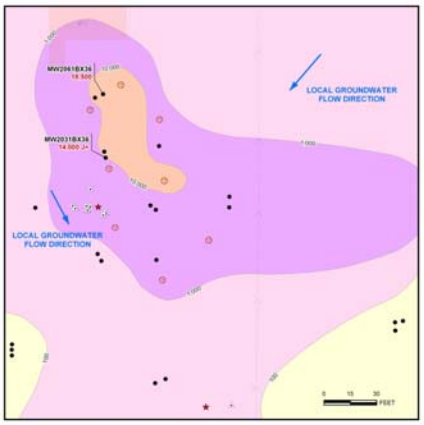



MW2020Ax16 (Lower SS016 Bioreactor) VOCs Since Baseline Sampling
Initiation of the SS016 Bioreactor Recirculation Pump
Contaminant Concentration (µg/L)
200,000
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
October 2010
February 2011
May 2011
August 2011
November 2011
November 2012
TCE
Cis-1,2-DCE
Vinyl Chloride

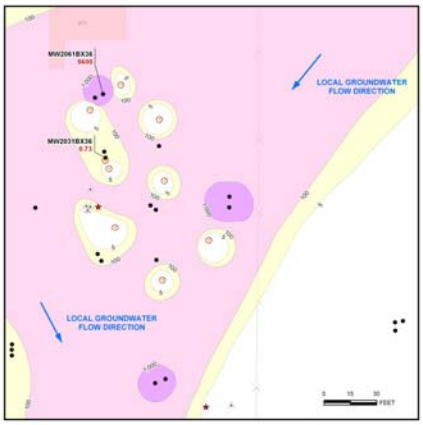

TPE-Wx16 VOCs Since Baseline Sampling (Downgradient)
Initiation of the SS016 Bioreactor Recirculation Pump
Excavation of Bioreactor
Contaminant Concentration (µg/L)
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
April 2010
October 2010
February 2011
May 2011
August 2011
November 2011
November 2012
TCE
Cis-1,2-DCE
Vinyl Chloride

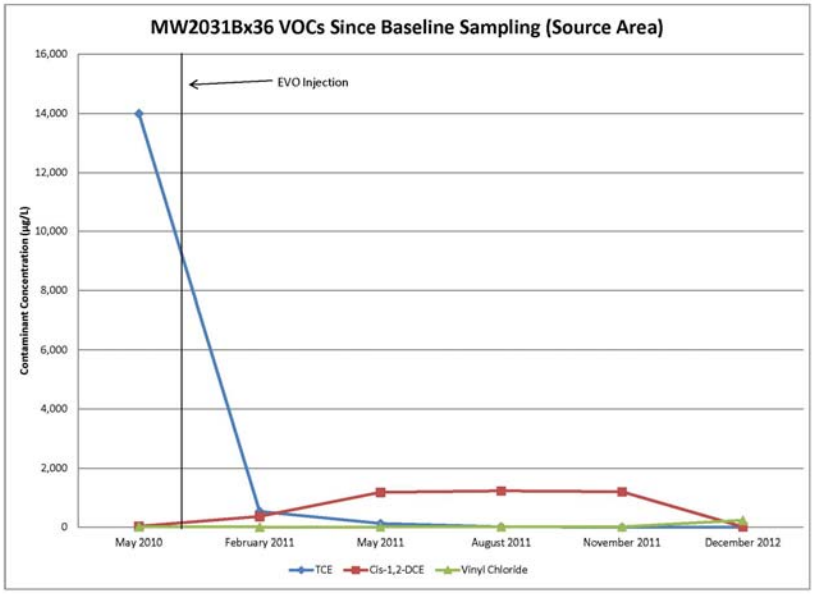
Site SD036 TCE Plume

Baseline (2010)



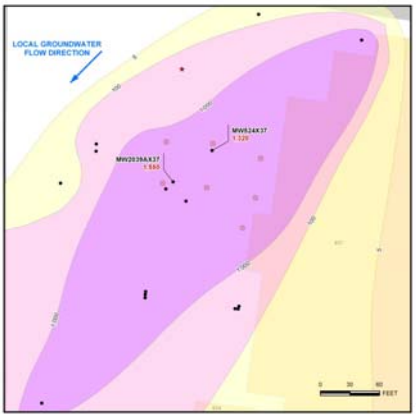
2012



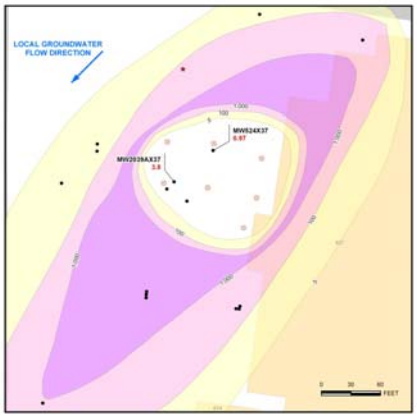


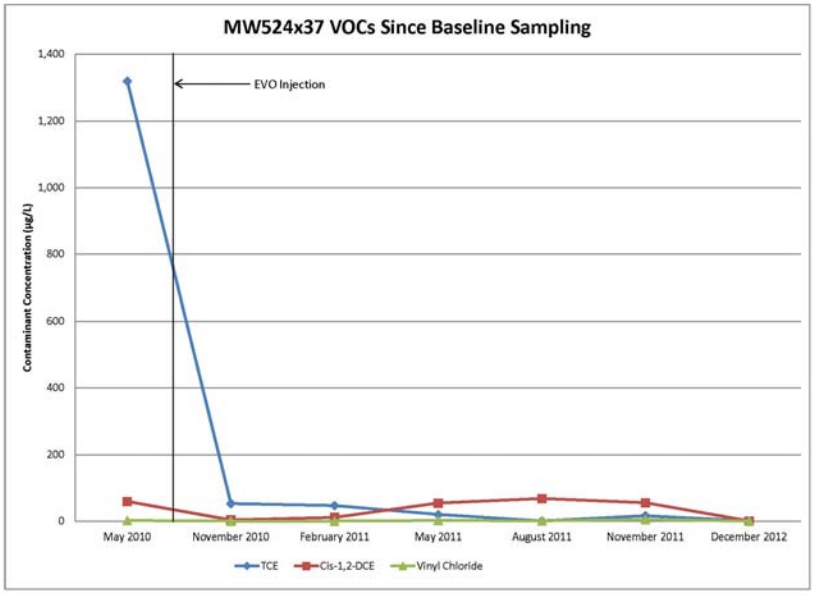
Site SD037 TCE Plume

Baseline (2010)

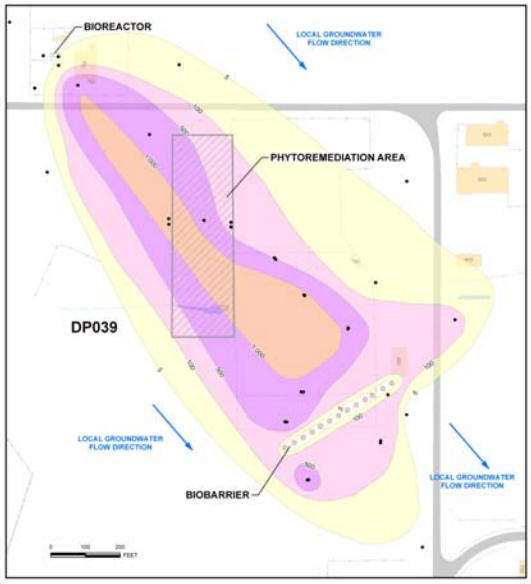


2012



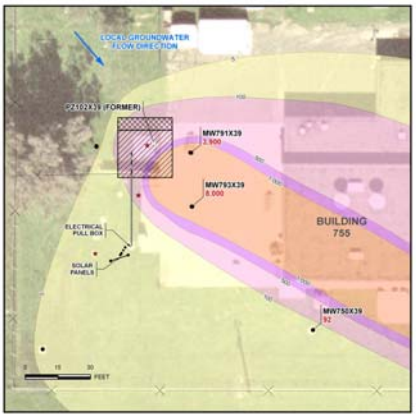


Site DP039 TCE Plume

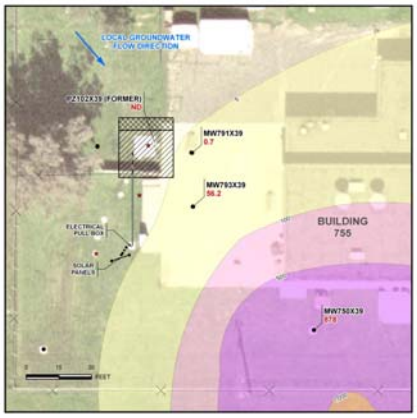


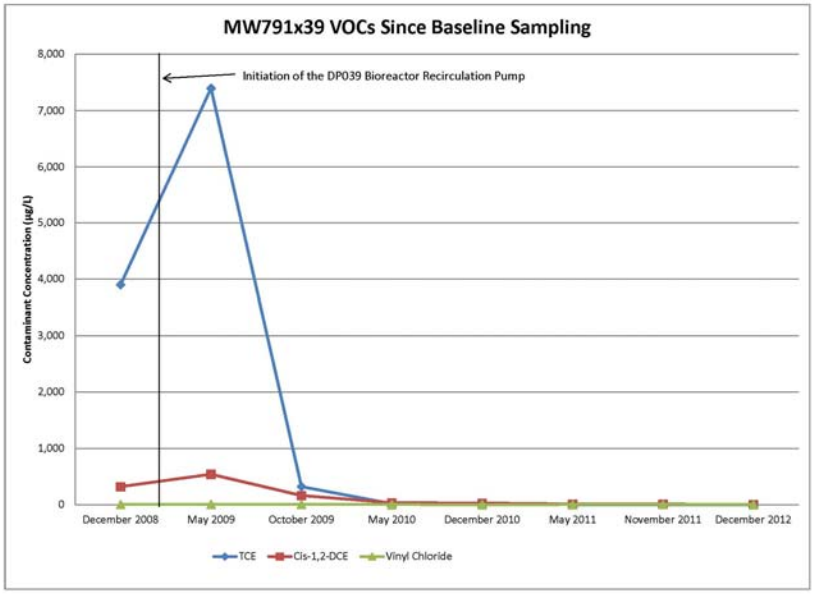
Site DP039 TCE Plume in the Source Area

Baseline (2008)



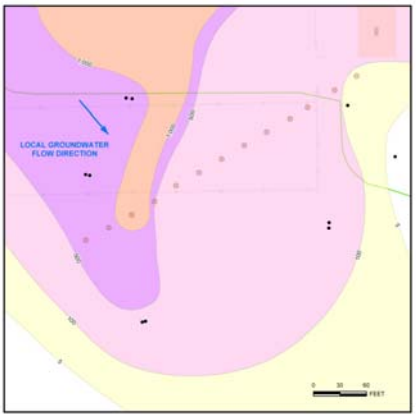
2012



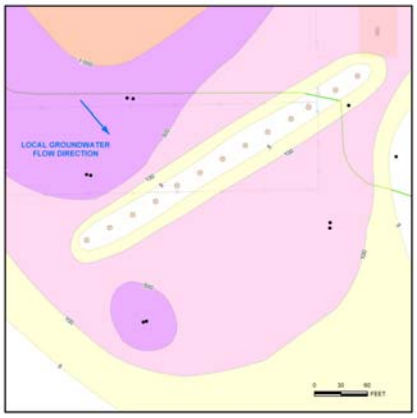


Site DP039 TCE Plume at the Biobarrier

Baseline (2010)



2012



Travis AFB
Restoration Program

Program Overview

RPM Meeting

February 20, 2013

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
- 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

Completed Documents (cont'd)

- 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
- 2010/2011 Annual GSAP Report
- Baseline Implementation Report (Sites SS015, SS016, SD036, SD037, and DP039)
- 2011 CAMU Annual Report
- Technical and Economic Feasibility Analysis (TEFA)
- Work Plan for RPO of Sites SS016 and SS029
- Site LF007C Data Gaps Investigation Technical Memorandum
- Technical Memorandum for Assessment of Aerobic Chlorinated Cometabolism Enzymes
- Old Skeet Range Engineering Evaluation/Cost Analysis
- 2011 Groundwater Treatment RPO Annual Report
- Groundwater Proposed Plan (PP)
- FT005 Remedial Action Completion Report
- 2012 GSAP Technical Memorandum

Completed Documents (cont'd)

- ***Vapor Intrusion Assessment Update Technical Memorandum***

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
- 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

Completed Field Work (cont'd)

- 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 (4^{th} Quarterly event)
- Sampling for Assessment of Aerobic Chlorinated Cometabolism Enzymes (Feb 21-22)
- 2012 Annual GSAP Sampling
- CAMU Lysimeter Removal
- LF007C GET System Optimization
- SS029/SS016 System Optimization Analysis
- GSAP Semiannual Sampling Event
- ***Replace electrical wiring for well field at Site SS030***

In-Progress Documents & Field Work

Documents

- Groundwater Record of Decision

Field Work

- Replace battery banks at ST018 Groundwater Treatment Plant

Upcoming Documents & Field Work

Documents

- Old Skeet Range Action Memorandum — Feb
- 3rd Five-Year Review — Mar
- 2012 Annual Groundwater Remediation Implementation Status Report (GRISR) — Apr
- Kinder Morgan LF044 Land Use Control Report — TBD

Field Work

- Annual Groundwater Remediation Implementation Program (GRIP) Sampling event — Apr

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