Final

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

17 August 2011, 0930 Hours

Mr. Mark Smith, Travis Air Force Base (AFB), conducted the Remedial Program Manager's (RPM) meeting on 17 August 2011 at 0930 in the Main Conference Room, Building 570, 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
• Dave Leeson	AFCEE/ERC
• Dezso Linbrunner	USACE-Omaha
• 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 (July 2011)
• Attachment 4	CGWTP Monthly Data Sheet (July 2011)
• Attachment 5	NGWTP Monthly Data Sheet (July 2011)
• Attachment 6	Site ST018 Monthly Data Sheet (July 2011)
• Attachment 7	Presentation: May 2011 Remedial Process Optimization (RPO) Analytical Results at Travis AFB
• Attachment 8	Presentation: Management Overview Briefing

- Attachment 9 Presentation: 2011 Field Schedule Update

1. ADMINISTRATIVE

A. Previous Meeting Minutes

The 20 July 2011 RPM meeting minutes were approved and finalized as written, with the following exception. Ms. Burke requested a revision on page six and on page eight. Change "Dr. John Wilson agrees" to "it is our understanding that Dr. John Wilson agrees" on page six, paragraph two, first sentence, and on page eight, first paragraph, last sentence.

B. Action Item Review.

Action items from July were reviewed.

Action item one still open. No change.

Action item two still open. No change.

Action item three still open. No change.

Action item four is closed.

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 21 September 2011.

Travis AFB Master Document Schedule

— Focused Feasibility Study (FFS): The response to comments (RTC) meeting date has been changed to 17 August 2011, the rest of the dates will be changed accordingly.

— Proposed Plan (PP): The "TBD" has been changed to specific dates in order to have the document ready for the Public Meeting that coincides with the October 2011 RAB meeting. Travis is requesting assistance from the Agencies in regards to the review time on the Draft Proposed Plan (PP) due to the time spent on the FFS discussions. In lieu of the normal thirty day document review time, Travis is requesting a twenty-one day document review time. Ms. Burke voiced concern about the schedule, she was not sure if it is permissible to review the Draft PP until after the Final FFS is done. She also questioned if it was acceptable for the Agencies and Public to receive the Draft PP on the same date, adding that EPA Headquarters (HQ) needs to review the document as well, and they normally take sixty days. Ms. Burke will consult with her management regarding her concerns, and advise of her

findings. Ms. Snow asked Ms. Burke if EPA HQ needs to review the Focused Feasibility Study (FFS). Ms. Burke said no, EPA signs the Record of Decision (ROD) not the FFS, EPA just needs to approve the FFS.

— Mr. Anderson asked Mr. Salcedo if he has any concerns about the proposed review schedule. Mr. Salcedo said that DTSC will work with Travis and he did not see any issues with reviewing the Draft PP prior to submittal of the Final FFS. Mr. Anderson asked if Mr. Marcus Simpson would be involved in the Draft PP review. Mr. Salcedo said it would probably be a low priority for Mr. Simpson and he would most likely defer to Mr. David Cooper.

  Mr. Smith said there are two reasons the Draft PP schedule needs to stay "as is": 1) The Public Meeting coinciding with the RAB meeting is scheduled for October and has been posted for over a year, and 2) It is also a contractual issue with the PBC contract. Mr. Smith added that the FFS discussion took a long time, that Travis has pushed back the Draft PP dates several times, and additional help from the Agencies is needed to avoid slipping the date for the Draft PP.

— Groundwater Record of Decision (ROD): No change.

— Comprehensive Site Evaluation Phase II: This document went Final today, and will be moved to the historical file. Mr. Anderson said that Travis had a Public Affairs requirement to present the prioritization tables that came with the report to the public for their review. Ms. Schilter-Lowe said she revised the wording in the public notice that advertised the 30-day comment period for these tables in two categories and also how Travis was rated. Mr. Anderson explained this process is an MMRP requirement. Ms. Burke requested that in the future EPA be informed of any news worthy media events pertaining to Travis AFB.

— Site ST027-Area B Human Health Risk Assessment: New document.

— Site ST027-Area B Ecological Risk Assessment: New document.

— Potrero Hills Annex: (FS, PP, and ROD): No change. Ms. Burke inquired about the Work Plan (WP). Mr. Anderson said he will check into it.

— In Situ Chemical Oxidation (ISCO)/Enhanced Reductive Dechlorination (ERD) Technical Memorandum: This document will be removed from the MMDS. The FFS contains all the information in this tech memo and it was collectively decided to discontinue this document.

— Site FT005 Data Gaps Investigation Report: Final. Move to history.

— Work plan for Assessment of Aerobic Chlorinated Cometabolism Enzymes at Travis AFB: No change.

— 2010 GWTP RPO Annual Report: No change. Travis will be submitting the last few RTCs to EPA in a couple of days.

— RPO Baseline Implementation Report: The Predraft was submitted to the Air Force and US Corps of Engineers on 02 August 2011. The subsequent due dates have been changed accordingly. It was noted that soil oxygen demand data will be included in this document.

— Technical and Economic Feasibility Analysis (TEFA): Predraft is scheduled for submittal on 06 October 2011. The subsequent due dates have been changed accordingly. Ms. Burke asked if the TEFA needs to be completed before the ROD is signed. Mr. Anderson answered "yes." Mr. Anderson said the PP is a summary document and it will not be listing all the ARARs or how they will be complied with.

— Quarterly Newsletter (July 2011): Submittal of the Final is late, and it will be emailed to the Agencies when completed.

— 2010 CAMU Annual Report: The Response To Comments (RTC) due date was changed. The document will now be moved to the history file.

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 100% uptime, and 3.6 million gallons of groundwater were extracted and treated during the month of July 2011. All of the treated water was discharged to Union Creek. The average flow rate for the SBBGWTP was 86.5 gallons per minute (gpm), and electrical power usage was 3,900 kWh. Approximately 5,343 pounds of CO_2 were created (based on DOE calculation); approximately 1.36 pounds of volatile organic compounds (VOCs) were removed in July. The total mass of VOCs removed since the startup of the system is 405 pounds.

Mr. Duke said the extraction wells for SS029 were shut down on Friday to conduct water level measurements to collect data for the biobarrier design analysis. The extraction wells were turned back on the following Tuesday. Ms. Burke said that she was not notified and requested that she be notified prior to the extraction wells being shut down in the future. Mr. Smith apologized to Ms. Burke and stated that future notifications would be more timely.

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

Central Groundwater Treatment Plant (see Attachment 4)

The Central Groundwater Treatment Plant (CGWTP) performed at 86.2% uptime with approximately 1.4 million gallons of groundwater extracted and treated during the month of July 2011. All treated water was diverted to the storm drain. The average flow rate for the CGWTP was 4.42 gpm, and electrical power usage was 2,192 kWh for all equipment connected to the Central plant; approximately 3,003 pounds of CO_2 were created. Approximately 4.42 pounds of VOCs were removed from groundwater in July. The total mass of VOCs removed since the startup of the system is 11,233 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 July.

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

North Groundwater Treatment Plant (see Attachment 5)

The North Groundwater Treatment Plant (NGWTP) performed at 100% uptime with approximately 4,336 gallons of groundwater extracted and treated during the month of July 2011. The average flow rate of the NGWTP, while operating, was 0.1 gpm and electrical power use was 509 kWh for all the equipment connected to the North plant; approximately 697 pounds of CO_2 was created. Approximately 0 VOCs were removed from the groundwater in July. 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 July.

Mr. Duke said Travis has received approval from US Fish and Wildlife Service to start the site characterization work at LF007C with a few minor exceptions regarding conservation measures. Ms. Burke asked if there is a WP for this work. Mr. Smith answered yes, and that it has already been approved.

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

The Site ST018 (MTBE) Treatment Plant (S18GWTP) performed at 86% uptime with approximately 132 thousand gallons of groundwater extracted and treated during the month of July 2011. All treated water was diverted to the storm drain. The average flow rate for the S18GWTP was 3.69 gpm. Electrical power usage for the month was 97 kWh for all equipment connected to the S18GWTP plant, which equates to the creation of approximately 133 pounds of CO_2. Approximately 1.02 pounds of BTEX, MTBE and TPH were removed from groundwater in July. The total BTEX, MTBE and TPH mass removed since the startup of the system is 4.2 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: No optimization activities to report for the month of July.

3. Presentations

May 2011 Remedial Process Optimization (RPO) Analytical Results at Travis AFB (see attachment 7)

Mr. Wray gave a brief introduction on the performance monitoring data on the sites that have had significant optimization upgrades. Each site will show three slides: a summary of key points, a map of the TCE plume, and the cross sections. These figures will include the historical TCE concentration progression from the baseline measurements through the current performance monitoring data. The sample collection program for these sites starts with a baseline, followed by four quarterly sampling events, and then onto an annual sampling schedule. The quarterly sample collections for all optimized sites are on the same quarterly calendar schedule, although the sites are not all at the same point in their sampling schedule. For this presentation only the TCE data will be shown on the cross sections. The CD that was handed out during the meeting will have the Chemicals of Concern (COC) included in the cross sections. Mr. Duke said this data will also be included in the future Annual RPO Reports.

Mr. Chakurian reported on the Remedial Optimization (RPO) Analytical Results. See Attachment 7 for details.

<u>Site SS015 EVO Injection, baseline and first quarterly performance sampling results:</u>

- The hotspot focus for the EVO injection was on monitoring well MW216x15. Since the EVO injection, there have been significant reductions in TCE, DCE, and vinyl chloride. (Cis-1,2-DCE a decrease of 8,800 µg/l to 598 µg/L, and vinyl chloride decreased from 5,140 µg/L to 70.6 µg/L).

- The detections of ethane and ethene in MW216x15, confirms the complete destruction of vinyl chloride. There have also been significant reductions of TCE, DCE, and vinyl chloride in the wells surrounding MW216x15.

- The Dissolved Total Organic Carbon (TOC) supply in the hot spot injection area remains very high and is sustaining a rapid rate of Enhanced Reductive Dechlorination (ERD). TOC concentration in MW216x15 increased from a baseline concentration of 13.8 mg/L to 1,310 mg/L over the four months after the EVO injection. The EPA recommendation is 20 mg/L for ERD, and we are well above that.

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

Mr. Salcedo asked if the analytical results are available for ethane and ethene. Mr. Chakurian said it is not available in the cross sections but the analytical results are in the table on the CD. Mr. Salcedo asked if a mass balance was conducted. Mr. Anderson said it is hard to get a mass balance for ethane and ethene because they are extremely volatile compounds, and an accurate

mass balance calculation would be very challenging. Ms. Burke asked if chlorine is tested for because when all these chemicals become converted and if you see an increase in chlorine that reduces the pH levels in the long term. Mr. Chakurian said that it was not. Mr. Anderson said that you cannot put a lot of faith in the chlorine concentrations, plus chlorine is naturally occurring; ethane and ethene are not.

Mr. Chakurian referred to a map of the TCE plume and a cross section with the TCE historic concentration. See attachment 7 for details.

Site SS016 Bioreactor - Baseline, First, and Second Quarterly Performance Sampling Results:

- In November 2010, the in situ bioreactor began operation in the SS016 OSA source area.
- Based on the first two quarters of performance data, the bioreactor is providing high rates of TCE, DCE, and vinyl chloride removal.
- Based on the May 2011 analytical data the bioreactor is removing over 99% of the TCE and nearly 93% of the total molar chlorinated VOCs entering the bioreactor.
- The unfortunate part about this site is that the bedrock is shallow and the saturated interval surrounding the bioreactor is in bedrock. So the downgradient distribution of total organic carbon (TOC) is slow, and ERD is slow to develop in the downgradient direction. Monitoring well MW2112Ax16 which is located approximately 10 feet downgradient of the bioreactor is just beginning to show evidence of ERD. DCE and vinyl chloride concentrations are beginning to rise in the well, and TOC has increased from a baseline of 4.2 mg/L to 20.1 mg/L.
- The dissolved TOC supply inside the bioreactor has ranged from 714 to 866 mg/L over the first six months and is sustaining a rapid rate of ERD inside the bioreactor.
- Geochemical data collected from the bioreactor supports ERD. High methane, high dissolved iron and manganese, and totally depleted sulfate are all positive geochemical signatures of anaerobic conditions favoring ERD.

Mr. Salcedo asked if the site SS016 bioreactor is more efficient than the DP039 Bioreactor because SS016 used the older more mature mulch. Mr. Duke said yes, the old dark mulch is a better source of carbon. Mr. Chakurian added that bioreactors are much more efficient with higher concentrations of TCE, and site SS016 has a much higher TCE concentration level than the DP039 bioreactor.

Mr. Chakurian pointed out that in one well in particular, MW2020Ax16, the TCE concentration went from the baseline result of 182,000 µg/L down to 1.7µg/L. Mr. Salcedo suggested that could be due to most of the highly contaminated source area soils being excavated. Mr. Wray pointed out that there is an existing horizontal well EW03x16 which is tied into the bioreactor for recirculation of untreated groundwater. Mr. Chakurian said that in well TPE-Wx16 the TCE concentration for the baseline was 82,500 µg/L, and dropped in the first quarter to 28,000 µg/L,

followed by the second quarter result of 80,700 µg/L. This indicates that the contaminated groundwater is getting recirculated.

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

Site SD036 EVO Injection, Baseline, First and Second Quarterly Performance Sampling Results:

- The TCE hot spot area targeted for the EVO injection at Site SD036 focused on three wells MW2031Bx36, MW2061Bx36, and PZ550Cx36. The area surrounding these wells is showing significant reductions in TCE and increases in DCE when compared to the baseline concentrations. Very little vinyl chloride is being generated.

- Ethane and Ethene are being detected, indicating that complete dechlorination of the DCE and vinyl chloride seems to be in progress.

- The quantities of DCE being generated are less than expected if the DCE was simply accumulating from TCE degradation. A total molar reduction of 88% has occurred in well MW2031Bx36 in the first six months of ERD treatment.

- Well MW2033Ax36 showed an increase in TCE when compared to the baseline results. This may be caused by the emulsified oil which acts as a co-solvent and increases the solubility of TCE in the aquifer matrix, and moves it out of the soil and into groundwater. Or the increase may be due to localized lateral displacement from the initial high volume of injection fluids.

- The DCE levels at MW2031Bx36 increased from 22 µg/L to 1,290 µg/L, which confirms that the area is undergoing ERD treatment.

- There is a general increase in DCE concentrations in the monitoring wells around the hot spot treatment area.

- The dissolved TOC supply in the hot spot area remains high and is sustaining a rapid rate of ERD. TOC in MW2031Bx36 has increased from a baseline concentration of <1 mg/L to 2,410 mg/L six months after the injection.

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

- Sulfate reduction is competing with TCE reduction. A continuing influx of sulfate will deplete the TOC supply and slow TCE and DCE removal.

Mr. Salcedo asked if basically it goes from TCE to DCE then to vinyl chloride for a very short period of time and then turns into ethane. Mr. Chakurian said that is correct. Mr. Salcedo said that is great because it usually stalls at vinyl chloride.

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

Site SD037 EVO Injection, Baseline, First, Second, and Third Quarterly Performance Sampling Results:

- The TCE hot spot area targeted for the EVO injection includes the area of monitoring wells MW524x37 and MW2039Ax37, which is showing significant reductions in TCE. Increases in DCE are significant in MW2039Ax37 but not apparent at MW524x37. The very high TOC concentrations in MW524x37 are likely creating conditions for total destruction of TCE, DCE and vinyl chloride. Trace levels of vinyl chloride are being observed.

- The ethane and ethene detected indicates that complete dechlorination of the DCE and vinyl chloride appears to be in progress.

- At MW524x37 a total molar reduction of 93% has occurred in the first six months of ERD treatment. The other wells that are being monitored at this site are over 50 feet from the injections wells and are not showing evidence of ERD.

- The dissolved TOC supply in the hot spot injection area remains high and is sustaining a rapid rate of ERD. The TOC concentration in the target well MW524x37 has increased from a baseline concentration of 1.16 mg/L to 2,155 mg/L in one month after the EVO injections, and down to 1,440 mg/L six months after the injection. Well MW2039Ax37 has not experienced an increase in the TOC levels, but TCE levels have decreased and DCE levels have increased. Well MW2039Ax37 may be located at the edge of the TOC influence, and we are not seeing much of the organic carbon yet.

- The geochemical data collected from the hot spot area supports ERD. The high methane, high dissolved iron and manganese, and significantly lower sulfate levels are all positive geochemical signatures for anaerobic conditions favoring ERD. Sulfate levels are in excess of 200 mg/L at this site, and the sulfate reduction is competing with TCE reduction. The influx of sulfate will continue to decrease the TOC supply and eventually slow TCE and DCE removal.

Mr. Smith asked if the organic carbon is used in part to reduce sulfate. Mr. Chakurian said the first pathway breaks down the sulfate which takes it away from the process of breaking down the TCE and DCE. Eventually more injections of total organic carbon may be needed to address the sulfate issue.

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

Site DP039 Permeable Reactive Barrier (Bio-barrier) EVO Injection, Baseline, First, Second, and Third Quarterly Performance Sampling Results:

- There have been significant TCE reductions, minor DCE accumulation, and no vinyl chloride accumulation along the line of the DP039 biobarrier injection wells.

- In the injection wells there are high levels of TOC that have degraded most of the TCE, DCE, and vinyl chloride.

- The TOC supply along the line of injections wells is still adequate for ERD; the range has increased from 128 to 3,080 mg/L, and are well above the EPA recommended level for ERD of 20 mg/L.

- The TOC is dropping in two of the three injection wells that were samples. These wells will be monitored for TOC depletion to better estimate the recharge frequency for this site.

- The downgradient wells are 80 to 150 feet from the line of injections, and there is minimal impact observed so far based on the data.

- The geochemical data collected from the line of injection wells supports ERD. The high methane, high dissolved iron and manganese, and depressed sulfate are all positive geochemical signs for anaerobic conditions favoring ERD.

Ms. Burke wanted to confirm, on the map, that the higher concentrations are on the bottom of the plume. Mr. Chakurian said there are two sets of hot spots; on the map they are defined by the orange color. Ms. Burke asked about injection well IW2081x39 showing a high TCE concentration. Mr. Chakurian said that is because that well is located in a bedrock high area.

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

<u>Site DP039 Bioreactor, Operating for Thirty Months, Performance Sampling Results:</u>

- During the past 30 months of operation, a reduction of 99% of TCE and 95% of total molar VOCs have occurred in the aquifer up to 30 feet away of the bioreactor.

- The most contaminated well in the source area is monitoring well MW793x39 which had a baseline TCE concentration of 8,000 µg/L. TCE concentrations in this well have been reduced to 5.3 µg/L, as indicated in the May 2011 sampling data.

- The bioreactor could now continue to operate with very limited monitoring on an annual basis.

- Bioreactors are most efficient with treatment of higher TCE levels in the recirculated water. With the significantly reduced contaminants in the DP039 bioreactor, an intermittent or pulsed operation such as one week on and four weeks off may be more effective to conserve the small quantities of TOC being generated in the bioreactor.

- Previous attempts to increase the TOC being generated from the bioreactor into the surrounding aquifer have not been very successful.

- It appears that the daily recirculation of sulfate-rich groundwater through the bioreactor is rapidly decreasing the TOC that was added to the bioreactor as vegetable oil in October 2010.

Mr. Chakurian said that the TCE plume first is treated through the bioreactor. The plume then passes through the phytostabilizaton area, followed by the biobarrier. Mr. Anderson said that this site was a great design. He also indicated that where the biobarrier and bioreactor are located, you can't plant trees because of the asphalt and concrete pavement. When you look at this site, the design was tailored to its condition.

Ms. Burke said she appreciated the presentation and that the results are very promising, and looks forward to seeing more data.

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

Program Update: Management Overview Briefing (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: FT005 Data Gaps Investigation Report, and The Comprehensive Site Evaluation Phase II Report.

New Documents added: Site ST027 Area B Human Health Risk Assessment, and Site ST027 Area B Ecological Risk Assessment.

Field Work: FT005 Soil Remedial Action, Quarterly RPO Performance Monitoring, and SS029 GET Shutdown Test (system optimization analysis).

Upcoming Documents: Baseline Implementation Report, Work Plan for Assessment of Aerobic Chlorinated Cometabolism Enzymes, Proposed Plan (PP), Technical and Economic Feasibility Analysis (TEFA), and Work Plan for Site SS029 System Optimization Analysis.

Field Schedule (see Attachment 9)

Mr. Wray reported on the 2011 field schedule. See Attachment 9 for details.

Highlights included: LF007C Remedy Optimization Investigation (recently received USFWS approval to sample the vernal pool area), Sampling for Assessment of Aerobic Chlorinated

Cometabolism Enzymes, 2011 Semiannual GSAP Sampling, and Site SS029 System Optimization Analysis Investigation.

4. New Action Item Review

Ms. Burke is to inquire with EPA HQ if the Draft PP can be issued for review (with a truncated review time) before the Final FFS is submitted, and if the Draft PP can be sent to Agencies and public simultaneously for review. Travis AFB is to advise Regulatory Agencies when remedial actions/fieldwork are scheduled at Travis AFB so a site visit can be planned.

5. PROGRAM/ISSUES/UPDATE

None.

General Discussion

None.

7. 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.	Travis AFB and EPA	Review past site closure completion reports to determine if future site closure reports are necessary.	TBD	Open
4.	EPA	Ms. Burke is to inquire with EPA HQ if the Draft PP can be issued for review (with a truncated review time) before the Final FFS due, and if the Draft PP can be sent to Agencies and public simultaneously for review.	TBD	Open

5.	Travis AFB	Travis AFB is to advise Regulatory Agencies when remedial actions/fieldwork are scheduled at Travis AFB so a site visit can be planned.	TBD	Open

TRAVIS AIR FORCE BASE
ENVIRONMENTAL RESTORATION PROGRAM
REMEDIAL PROGRAM MANAGER'S MEETING
BLDG 570, Main Conference Room
17 August 2011, 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. Program Update: Activities Completed, In Progress and Upcoming
   B. 2011 Field Schedule

4. New Action Item Review

5. PROGRAM/ISSUES/UPDATE

NOTE: Following the RPM Meeting, we will visit FT005 to observe the ongoing soil remedial action. We have also set aside the 12:30 to 4 o'clock timeframe to discuss the remaining responses to EPA comments on the draft Focused Feasibility Study report.

Travis AFB Master Meeting and Document Schedule

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.)
01-26-11	—	—
02-16-11	—	—
03-16-11	—	—
04-21-11 (1:00 PM)	—	04-21-11
05-26-11	—	—
06-15-11	—	—
07-20-11	—	—
08-17-11	—	—
09-21-11	—	—
10-20-11 (1:00 PM)	—	10-20-11
11-30-11	—	—
—	—	—

Travis AFB Master Meeting and Document Schedule

PRIMARY DOCUMENTS			
Life Cycle	**Basewide Groundwater**		
	Focused Feasibility Study Travis, Glenn Anderson CH2M Hill, Loren Krook	**Proposed Plan Travis, Glenn Anderson CH2M HILL, Loren Krook**	**Record of Decision Travis, Glenn Anderson CH2M HILL, Tony Jaegel**
Scoping Meeting	**03-30-10**	**NA**	**01-24-07 (11-30-11)**
Predraft to AF/Service Center	12-30-10	08-26-11	12-08-11
AF/Service Center Comments Due	01-13-11	09-02-11	01-11-12
Draft to Agencies	01-27-11	09-09-11	01-25-12
Draft to RAB	01-27-11	09-09-11	01-25-12
Agency Comments Due	03-31-11	09-30-11	03-28-12
Response to Comments Meeting	**08-17-11**	**10-05-11**	**04-18-12**
Agency Concurrence with Remedy	NA	NA	05-09-12
Public Comment Period	NA	10-17-11 to 11-18-11	NA
Public Meeting	**NA**	***10-20-11**	**NA**
Response to Comments Due	09-13-11	10-12-11	05-29-12
Draft Final Due (CD)	09-13-11	10-12-11	05-29-12
Final Due	10-13-11	10-17-11	06-27-12

*Public meeting to coincide with RAB meeting.

Travis AFB Master Meeting and Document Schedule

PRIMARY DOCUMENTS			
	Comprehensive Site Evaluation Phase II **Travis AFB, Glenn Anderson** **Sky Research, Ian Roberts**	**Site ST027-Area B Human Health Risk Assessment** **Travis AFB, Glenn Anderson** **CH2M HILL, Gavan Heinrich** ***Formerly included as Appendix G in the draft FFS**	**Site ST027-Area B Ecological Risk Assessment** **Travis AFB, Glenn Anderson** **CH2M HILL, Gavan Heinrich** ***Formerly included as Appendix G in the draft FFS**
Life Cycle	**Report**	**Report**	**Report**
Scoping Meeting	**NA**	**03-30-10**	**03-30-10**
Predraft to AF/Service Center	04-23-10	12-30-10	12-30-10
AF/Service Center Comments Due	05-04-10	01-13-11	01-13-11
Draft to Agencies	10-14-10	01-27-11 *	01-27-11 *
Draft to RAB	10-14-10	01-27-11	01-27-11
Agency Comments Due	11-24-10	03-31-11	03-31-11
Response to Comments Meeting	**06-13-11 (teleconference)**	**08-17-11**	**08-17-11**
Agency Concurrence with Remedy	NA	NA	NA
Public Comment Period	NA	NA	NA
Public Meeting	**NA**	**NA**	**NA**
Response to Comments Due	07-18-11	09-16-11	09-16-11
Draft Final Due	07-18-11	09-16-11 (CD)	09-16-11 (CD)
Final Due	08-17-11	10-17-11	10-17-11

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	**ISCO/ERD Technical Memorandum Travis AFB, Glenn Anderson CH2M HILL, Loren Krook**	**Site FT005 Data Gaps Investigation Report Travis AFB, Lonnie Duke ITSI, Rachel Hess**	**Work Plan for Assessment of Aerobic Chlorinated Cometabolism Enzymes at Travis AFB Travis AFB, Glenn Anderson CH2M HILL, Leslie Royer**
Scoping Meeting	**NA**	**NA**	**NA**
Predraft to AF/Service Center	08-25-10	04-15-11	08-09-11
AF/Service Center Comments Due	09-08-10 (09-10-10)	04-29-11	08-19-11
Draft to Agencies	10-06-10	05-13-11 (06-03-11)	09-02-11
Draft to RAB	10-06-10	05-13-11 (06-03-11)	09-02-11
Agency Comments Due	11-05-10	06-13-11 (07-05-11)	10-03-11
Response to Comments Meeting	**05-26-11**	**06-15-11 (07-20-11)**	**10-11-11**
Response to Comments Due	04-27-11	07-07-11 (07-22-11)	10-14-11
Draft Final Due	NA	NA	NA
Final Due	NA	07-07-11(08-05-11)	10-14-11
Public Comment Period	NA	NA	NA
Public Meeting	**NA**	**NA**	**NA**

Travis AFB Master Meeting and Document Schedule

SECONDARY DOCUMENTS			
Life Cycle	**2010 Groundwater RPO Annual Report** **Travis AFB, Lonnie Duke** **CH2M HILL, Doug Berwick**	**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**
Scoping Meeting	**NA**	**NA**	**07-20-11**
Predraft to AF/Service Center	04-05-11	08-02-11	10-06-11
AF/Service Center Comments Due	04-19-11	08-16-11	10-16-11
Draft to Agencies	05-18-11	08-30-11	10-28-11
Draft to RAB	05-18-11	08-30-11	10-28-11
Agency Comments Due	06-18-11	09-29-11	11-28-11
Response to Comments Meeting	**07-20-11(08-17-11)**	**10-20-11**	**11-30-11**
Response to Comments Due	09-20-11	11-03-11	12-20-11
Draft Final Due	NA	NA	NA
Final Due	09-20-11	11-03-11	12-20-11
Public Comment Period	NA	NA	NA
Public Meeting	**NA**	**NA**	**NA**

Travis AFB Master Meeting and Document Schedule

INFORMATIONAL DOCUMENTS		
Life Cycle	**Quarterly Newsletters (July 2011) Travis, Glenn Anderson**	**2010 CAMU Annual Report Travis AFB, Lonnie Duke ITSI, Rachel Hess**
Scoping Meeting	**NA**	**NA**
Predraft to AF/Service Center	NA	01-18-11
AF/Service Center Comments Due	NA	01-31-11
Draft to Agencies	07-18-11	03-01-11
Draft to RAB	NA	03-01-11
Agency Comments Due	08-01-11	04-01-11 (05-03-11)
Response to Comments Meeting	**TBD**	**(07-20-11)**
Response to Comments Due	08-03-11	(07-22-11)
Draft Final Due	NA	NA
Final Due	08-09-11	(07-22-11)
Public Comment Period	NA	NA
Public Meeting	**NA**	**NA**

Travis AFB Master Meeting and Document Schedule

Historical	
Life Cycle	**Baseline Implementation Report POCO Site ST018 Travis AFB, Lonnie Duke CH2M HILL, Gavan Heinrich**
Scoping Meeting	**NA**
Predraft to AF/Service Center	04-18-11
AF/Service Center Comments Due	05-02-11
Draft to Agencies	05-20-11
Draft to RAB	05-20-11
Agency Comments Due	06-19-11 (06-16-11)
Response to Comments Meeting	**07-20-11 (06-16-11)**
Response to Comments Due	08-02-11 (06-22-11)
Draft Final Due	NA
Final Due	08-02-11 (06-22-11)
Public Comment Period	NA
Public Meeting	**NA**

South Base Boundary Groundwater Treatment Plant Monthly Data Sheet

Report Number: 131 **Reporting Period: 30 Jun – 31 Jul 2011** **Date Submitted: 16 August 2011**

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 July 2011 reporting period.

Table 1 – Operations Summary – July 2011

Operating Time:	Percent Uptime:	Electrical Power Usage:
SBBGWTP: 696 hours	**SBBGWTP:** 100%	**SBBGWTP:** 3,900 kWh (5,343 lbs CO_2 generated[a])

Gallons Treated: **3.6 million gallons**

Gallons Treated Since July 1998: **745 million gallons**

Volume Discharged to Union Creek: **3.6 million gallons**

VOC Mass Removed: **1.36 lbs**[b]

VOC Mass Removed Since July 1998: **405 lbs**

Rolling 12-Month Cost per Pound of Mass Removed: $4,426[c]

Monthly Cost per Pound of Mass Removed: $12,619

Lbs = pounds

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

[b] Calculated using July 2011 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	Off line	EW736x05	Off line	EW01x29	0.5	EW01x30	10.1
EW02x05	0.5	EW737x05	Off line	EW02x29	0.2	EW02x30	0.7
EW03x05	Off line	EW742x05	Off line	EW03x29	Off line[d]	EW03x30	3.6
EW731x05	Off line	EW743x05	Off line	EW04x29	5.5	EW04x30	25.0
EW732x05	Off line	EW744x05	Off line	EW05x29	9.4	EW05x30	11.0
EW733x05	Off line	EW745x05	Off line	EW06x29	12.7	EW06x30	Dry
EW734x05	Off line[c]	EW746x05	Off line	EW07x29	Recharge	EW711x30	18.3
EW735x05	0.1						
FT005 Total:		**0.6**		**SS029 Total:**	**28.3**	**SS030 Total:**	**68.7**
SBBGWTP Average Monthly Flow[e]: 86.5 gpm							

[a] Extraction well flow rates are based on the monthly readings.
[b] Most extraction wells at FT005 were taken off line 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] EW734x05 off line during July 2011 due to inoperable pump.
[d] EW03x29 off line due to low VOC concentrations but will be brought back on line in August 2011.
[e] The average groundwater flow rate was calculated using the Union Creek Discharge Totalizer and dividing it by the operating time of the plant

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	None				

SBBGWTP = South Base Boundary Groundwater Treatment Plant

Summary of O&M Activities

Monthly groundwater samples at the SBBGWTP were collected on 15 July 2011. Sample results are presented in Table 4. The total VOC concentration (45.2 µg/L) in the influent sample has decreased since the June 2011 sample (62.1µg/L) was collected. TCE and cis-1,2-DCE were detected (0.57 µg/L and 0.24 J µg/L) in the effluent process stream. However, these reported concentrations are much less than the NPDES permit effluent limitations for each constituent (5 µg/L).

Troubleshooting resumed at FT005 wells EW734x05 and EW735x05 to determine why flow rates or water levels were not reported. Sections of signal wire between the well vault and control panel were replaced for both wells. The faulty signal wire was replace with new signal wire and signal integrity was verified. EW735x05 was brought back on line, but with limited flow rate. Adjustments to maximize flow from EW735x05 will be made in August 2011.

After the signal wire was replaced at EW734x05, it was discovered that the pump faulted. The pump will be serviced in August 2011 and brought back on line.

Replacement parts for EW03x29 were ordered in July 2011 and expected to be delivered in August 2011. Following receipt of these items, EW03x29 is expected to be brought back on line in late August or early September 2011.

Optimization Activities

No optimization activities occurred at the SBBGWTP in July 2011.

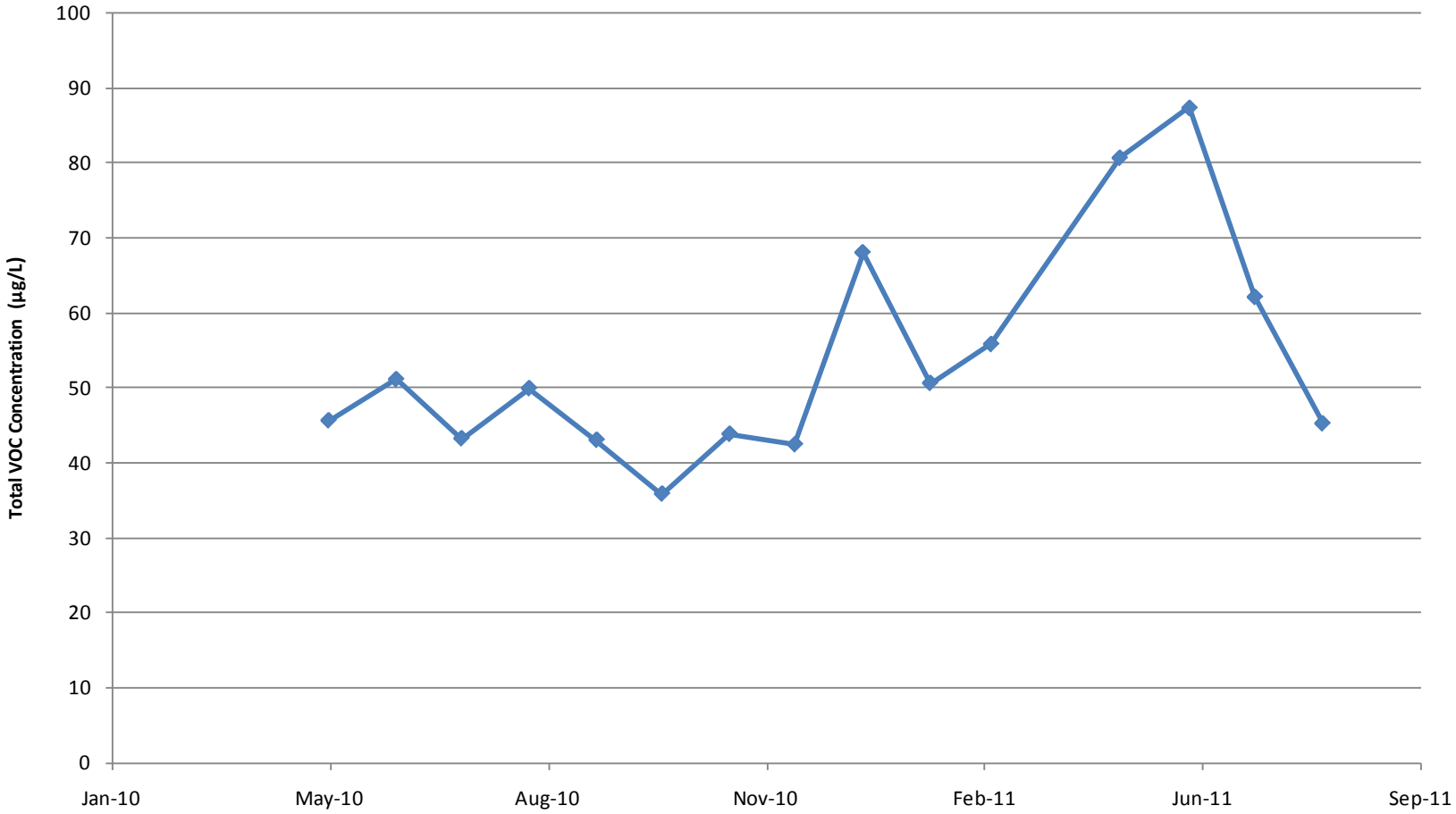
Table 4
Summary of Groundwater Analytical Data for July 2011 – South Base Boundary Groundwater Treatment Plant

Constituent	Instantaneous Maximum[a] (µg/L)	Detection Limit (µg/L)	N/C	15 July 2011 (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	0.23 J	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	ND	ND	ND
1,1-Dichloroethene	5.0	0.19	0	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.19	0	2.6	2.4	0.24 J
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	42.6	ND	0.57
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	24	NM	NM

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

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
Travis Air Force Base, California



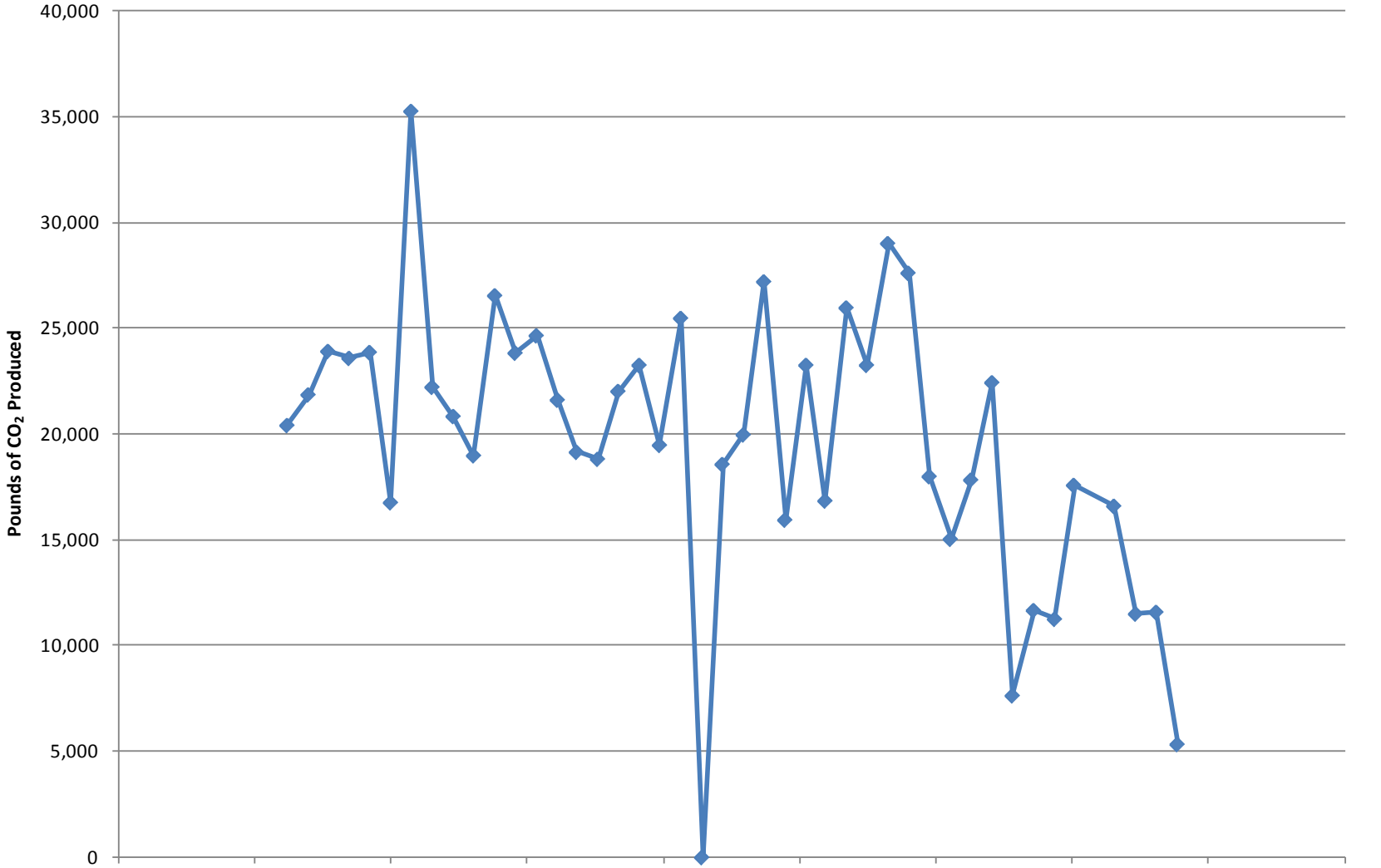
Sustainability

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 5,343 pounds of GHG during July 2011. This is a decrease from June 2011. The overall energy consumption levels remain consistent with the general decrease in energy demand since the air stripper was bypassed, and the granular activated carbon (GAC) system was brought on line.

Figure 2

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



Central Groundwater Treatment Plant Monthly Data Sheet

Report Number: 144 **Reporting Period: 30 June – 29 July 2011** **Date Submitted: 16 August 2011**

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

System Metrics

Table 1 presents operational data from the July 2011 reporting period.

Table 1 – Operations Summary – July 2011

Operating Time:		Percent Uptime:		Electrical Power Usage:	
CGWTP:	600 hours*	**CGWTP:**	86.2%	**CGWTP:**	2,192 kWh (3,003 lbs CO_2 generated[a])
WTTP:	Water: 0 hours	**WTTP:**	Water: 0%	**WTTP:**	0 kWh
	Vapor: 0 hours		Vapor: 0%		

Gallons Treated: **1.4 million gallons**

Gallons Treated Since January 1996: **446 million gallons**

VOC Mass Removed:

4.42 lbs[b] (groundwater only)

0 lbs (vapor only)

VOC Mass Removed Since January 1996:

2,547 lbs from groundwater

8,686 lbs from vapor

Rolling 12-Month Cost per Pound of Mass Removed: $1,778[c]

Monthly Cost per Pound of Mass Removed: $3,861[d]

* Operating hours corrected for accuracy due to transfer pump clogging in July 2011.

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

[b] Calculated using July 2011 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.

[d] Increased cost in July 2011 due to maintenance activities at WTTP and CGWTP.

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

Table 2 – CGWTP Average Flow Rates[a]

Location	Average Flow Rate	
	Groundwater (gpm)	Soil Vapor (scfm) [b]
EW01x16	17.3	Off line
EW02x16	6.4	Off line
EW03x16	2.4[c] (97,149 gallons in July 2011)	Off line
EW605x16	5.8	Off line
EW610x16	4.1	Off line
CGWTP	34.0	--
WTTP	Off line	Off line

[a] Measured by the effluent discharge to the storm drain divided by the operating time during the month
[b] No vapor was treated in July 2011.
[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 flow rate values from the West Industrial Operable Unit (WIOU) extraction wells.

Table 3 – Average Flow Rate from the WIOU Extraction Wells[a] (gpm)

SD037/ SD043				SD033/SD034		SD036	
EW599x37	Off line	EW705x37	Off line	EW501x33	Off line	EW593x36	Off line
EW700x37	Off line	EW706x37	Off line	EW503x33	Off line	EW594x36	Off line
EW701x37	Off line	EW707x37	Off line	EW01x34	Off line	EW595x36	Off line
EW702x37	Off line	EW510x37	Off line	EW03x34	Off line		
EW703x37	Off line	EW511x37	Off line				
EW704x37	Off line	EW555x43	Off line				

[a] Extraction wells are offline due to the ongoing rebound study in the WIOU.

gpm—gallons per minute
NA – not available / not recorded

Table 4 presents average a summary of shutdowns during the monthly reporting period.

Table 4 – Summary of System Shutdowns

Location	Shutdown		Restart		Cause
	Date	Time	Date	Time	
CGWTP (Groundwater)					
CGWTP	11 July 2011	13:00	15 July 2011	13:00	System running, but trash clogging transfer pump. Extraction wells off line, high level in influent tank. Trash removed, system restarted.
CGWTP	28 July 2011	09:15	29 July 2011	12:00	Main system breaker off line / tripped. Breaker reset, system back on line.
WTTP					
WTTP (Vapor)	24 August 2009				System shutdown for rebound study
WTTP (Water)	27 April 2010				System shutdown for rebound study

CGWTP = Central Groundwater Treatment Plant

WTTP = West Transfer Treatment Plant

Summary of O&M Activities

Monthly groundwater samples at the CGWTP were collected on 15 July 2011. Sample results are presented in Table 5. The total VOC concentration (391 µg/L) in the influent sample has increased slightly since the June 2011 sample (338 µg/L) was collected. The increase was likely caused by resumed pumping from wells EW605x16 and EW610x16, which had both been off line while undergoing electrical repair. Contaminant concentrations were not detected in the effluent process stream.

During the Site visit on 15 July 2011, the CGWTP was found to be operational, but no extraction wells (EW001x16, EW002x16, EW605x16, EW610x16) were on line. The CGWTP transfer pump was operating at full capacity, but no water was being processed through the system. The transfer pump was taken off line and inspected, at which time trash was discovered within the impeller. This trash was removed, and the CGWTP was brought back on line. This outage resulted in approximately four (4) days of system downtime, even though the transfer pump continued to operate. This downtime was recorded and is reflected in the July 2011 uptime percentage.

The WTTP underwent system maintenance in July 2011 so that rebound vapor samples could be collected, also in July 2011. One system issue discovered during this maintenance was that a flow meter, the influent tank/eductor supply tank level meter, and differential bag filter pressure readings were all missing (blank readings) at the WTTP SCADA interface. All of these inputs were traced back to a single module of the PLC. This module was ultimately replaced, and the WTTP was readied for startup. As a result of this extended maintenance, the WTTP was not restarted in July 2011. The WTTP will be restarted during August 2011 at which time rebound vapor samples will be collected. Following sample collection, the WTTP will be taken off line pending analytical results.

Optimization Activities

The WTTP remained off line since being shut down in April 2010 for the ongoing rebound study. The WTTP will be brought back on line briefly in August 2011 during the soil vapor sample collection event.

No additional optimization activities occurred at the CGWTP in June 2011.

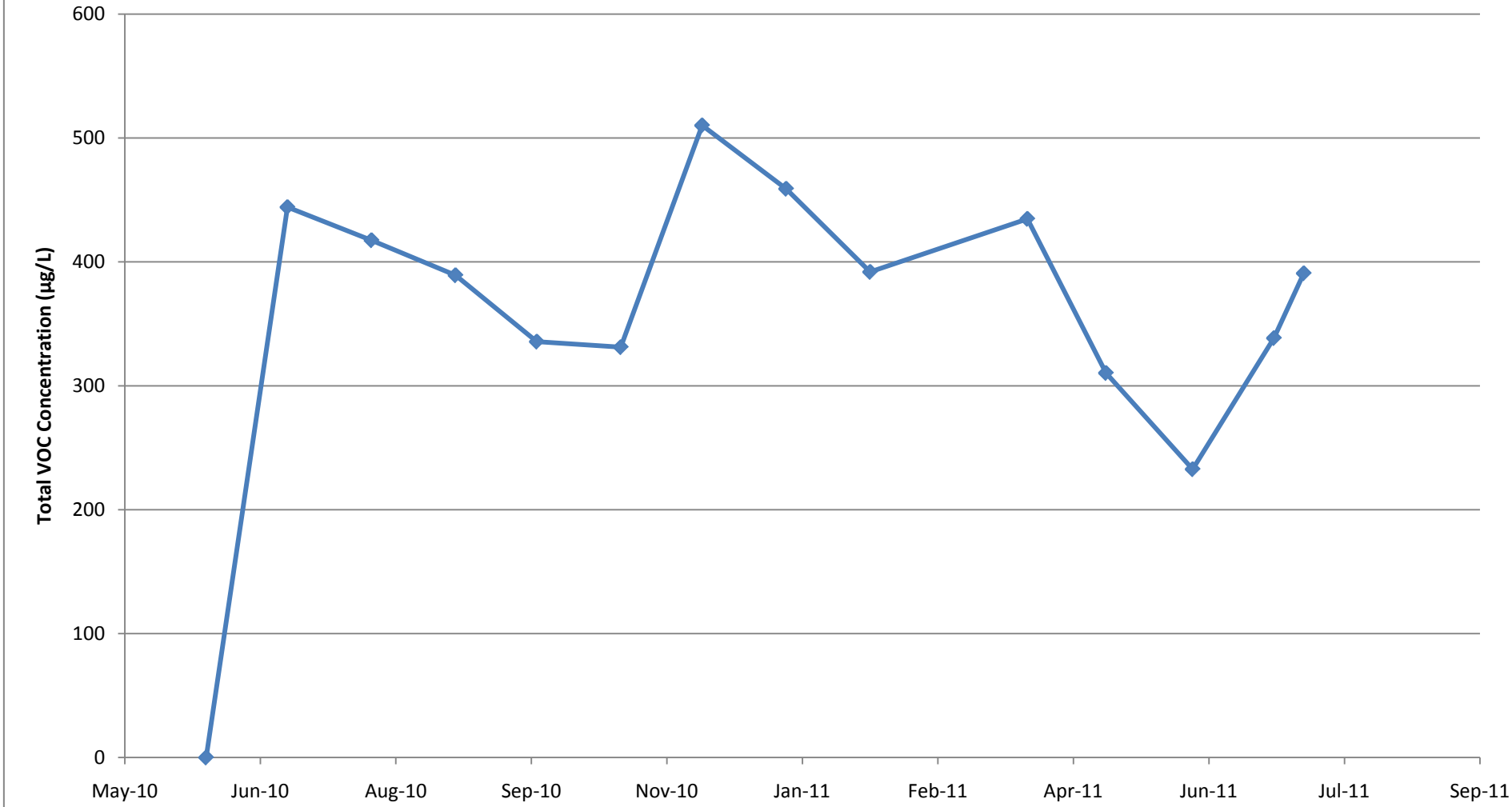
Table 5
Summary of Groundwater Analytical Data for July 2011 – Central Groundwater Treatment Plant

Constituent	Instantaneous Maximum[a] (µg/L)	Detection Limit (µg/L)	15 July 2011 (µg/L) N/C	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	ND	ND	ND	ND
1,2-Dichlorobenzene	5.0	0.25	0	0.35 J	ND	ND	ND
1.3-Dichlorobenzene	5.0	0.15	0	ND	ND	ND	ND
1,4-Dichlorobenzene	5.0	0.15	0	ND	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	0.81	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.19	0	72.1	ND	ND	ND
trans-1,2-Dichloroethene	5.0	0.33	0	3.4	ND	ND	ND
Methylene Chloride	5.0	0.66	0	ND	ND	ND	ND
Tetrachloroethene	5.0	0.21	0	0.59	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	313	ND	ND	ND
Vinyl Chloride	0.5	0.18	0	0.52	0.68	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	0.5 – 0.23	0	ND	ND	ND	ND

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

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

Figure 1
CGWTP Total VOC Influent Concentrations
Travis Air Force Base, California



Performance Monitoring Results

Performance monitoring sampling results are presented in these monthly data sheets as data are collected throughout the year. Currently, performance monitoring is taking place at Sites within Travis AFB that have undergone remedial process optimization activities in the forms of bioreactors or EVO injections:

- Site SS015 EVO injection – area treatment approach
- Site SS016 bioreactor
- Site SD036 EVO injection – area treatment approach
- Site SD037 EVO injection – area treatment approach
- Site DP039 EVO injection – permeable reactive biobarrier
- Site DP039 bioreactor

Performance monitoring at each Site serves to track the progress and effectiveness of each optimization effort, and data are typically collected on a quarterly basis for the first year of operation, and annually thereafter.

The performance data are presented in the form of graphical attachments (cross sections, attached to this data sheet) and a technical analysis of the results. These data will also be presented in the annual Remedial Process Optimization Report along with analysis of each optimization for the preceding year. Performance data cross sections and maps are presented as an attachment to this monthly data sheet and are presented as follows:

- Site SS015 – Figures 1A-D, 2A-D
- Site SS016 – Figures 3A-D, 4A-D
- Site SD036 – Figures 5A-D, 6A-D, 7A-D
- Site SD037 – Figures 8A-D, 9A-D
- Site DP039 permeable reactive biobarrier – Figures 10A-D, 11A-D, 12A-D, 13A-D
- Site DP039 bioreactor – Figures 14A-D

Bioreactors

Travis AFB has two bioreactors installed on base: one (1) at Site DP039, and the other at Site SS016. The following sections provide analytical data obtained during the latest performance monitoring event in May 2011.

Site DP039 Bioreactor

The Site DP039 bioreactor is located near former building 755 in the WIOU, and was installed in October 2008. The bioreactor is approximately 25 feet square, and approximately 20 feet deep.

Analytical data were collected as part of performance monitoring activities during May 2011. The next performance sampling event is scheduled for November 2011.

During the past 30 months of operation, TCE reductions of over 99 percent and total molar reductions of over 95% have occurred in the aquifer within 30 feet of the source area bioreactor. The most contaminated well in the source area, MW793X39, had a baseline (December 2008) concentration of 8,000 ug/L, but has decreased to 5.3 ug/L (May 2011). The bioreactor is most efficient in treating the higher levels of TCE in the recirculated groundwater.

Attempts to increase the total organic carbon (TOC) being generated from the bioreactor into the surrounding aquifer have only been marginally successful. It is likely that daily recirculation of sulfate-rich groundwater through the bioreactor is rapidly decreasing the TOC added to the bioreactor (as vegetable oil) in October 2010. Sulfate reduction is consuming most of the TOC, leaving a depleted supply of TOC for reducing the dilute levels of TCE and DCE remaining at the site.

An intermittent or pulsed operation (e.g. one week on and four weeks off) may lead to more effective operation and to conservation of the small quantities of TOC being generated in the bioreactor.

The bioreactor has been monitored quarterly for the past two years. The data set is now sufficient to allow for performance monitoring to be scaled back to an annual sampling event.

Site SS016 Bioreactor

The Site SS016 bioreactor is located directly south of Building 18 in the OSA, and was installed in September 2010. The bioreactor is approximately 25 feet square, and approximately 25 feet deep.

Performance data were collected in May 2011 as part of the Site SS016 bioreactor performance monitoring schedule. These data represent the second performance monitoring sampling event following the baseline event in October 2010. The next scheduled performance monitoring sampling event for the Site SS016 bioreactor is in August 2011.

Based on the first two quarters of performance data, the bioreactor is providing high rates of TCE, DCE and vinyl chloride removal. Nearly 125,000 gallons of groundwater has been pumped from horizontal well EW003X16, directed to the top of the bioreactor, and allowed to filter down through the mulch/gravel media. Well MW2020AX16 is screened in the bottom of the bioreactor to measure CVOC treatment within the bioreactor. Based on the latest May 2011 data, the bioreactor is removing over 99% of the TCE and nearly 93% of the total molar CVOCs entering the bioreactor. Significant levels of ethene in MW2020AX16 also confirm that destruction of vinyl chloride is underway in the bioreactor.

Because the saturated interval surrounding the bioreactor is in bedrock, the downgradient distribution of TOC has been slow and ERD slow to develop downgradient. Well MW2112AX16 is located approximately 10 feet downgradient of the bioreactor and is beginning to show evidence of ERD. DCE and vinyl chloride are beginning to increase at this well, and TOC has increased from a baseline of 4.2 mg/L to 20.1 mg/L.

The dissolved TOC supply inside the bioreactor has ranged from 714 to 866 mg/L over the first six months and is sustaining a rapid rate of ERD inside the bioreactor.

Geochemical data collected from the bioreactor supports ERD. High methane, high dissolved iron and manganese, and totally depleted sulfate are all positive geochemical signatures for anaerobic conditions favoring ERD.

Emulsified Vegetable Oil Injections

Four Sites at Travis AFB (Sites DP039, SD036, SD037, and SS015) underwent various implementations of an EVO injection program during 2010. The following sections provide analytical data pertaining to performance monitoring at these Sites obtained during the monthly reporting period.

Site DP039

The EVO injection program at Site DP039 consists of thirteen (13) injection wells arranged in a linear or wall-like fashion perpendicular to the groundwater gradient. The purpose of this arrangement is to form a biobarrier that treats contaminated groundwater as it flows downgradient through the injection well network.

Performance monitoring data were collected in May 2011 as part of the performance monitoring sampling event. Data collected in May 2011 represent the third performance monitoring event for this Site. The next performance monitoring event is scheduled for August 2011.

Performance monitoring data show significant reductions in TCE concentrations, minor DCE accumulation, and no vinyl chloride accumulation along the biobarrier line of injection wells. The high TOC in this treatment zone has likely degraded most of the TCE, DCE, and vinyl chloride. The biobarrier appears to be degrading CVOCs in the vicinity of the injection wells.

TOC supply along the line of injection wells is still adequate for ERD (range 128-3080 mg/L) and is well above the EPA recommended 20 mg/L. TOC is dropping in two of the three injections wells that were sampled. The rate of TOC depletion will be closely monitored to better estimate the recharge frequency for the biobarrier.

The impact of the biobarrier in monitoring wells 80 to 150 feet downgradient of the injection is minimal and shows no signs of injection influence yet, with the possible exception of MW2093, which may be seeing some TOC impact.

Geochemical data collected from the line of injection wells supports ERD. High methane, high dissolved iron and manganese, and depressed sulfate are all positive geochemical signatures for anaerobic conditions favoring ERD.

Site SD036

The EVO injection program at Site SD036 consists of eight (8) injection wells arranged throughout the Site SD036 "hot spot." This configuration is known as an area approach, since the EVO is injected over a broad area instead of in a wall-like barrier as was done at Site DP039.

Performance monitoring data were collected in May 2011 as part of the performance monitoring sampling event, and represent the second performance sampling event for this Site.

The TCE hot spot area targeted for the EVO injection (target wells MW2031BX36, MW2061BX36, PZ550CX36) are showing significant reductions in TCE and increases in DCE when compared to baseline concentrations. Some vinyl chloride is being formed. Ethane and ethene are being detected at the Site, which indicates that complete dechlorination of the DCE and vinyl chloride seems to be in progress. The quantities of DCE being generated are less than expected if DCE was simply accumulating from TCE degradation. For example, at MW2031BX36, a total molar reduction of 88% has occurred in the first six months of ERD treatment.

Well MW2033AX36 showed an increase in TCE when compared to its baseline TCE concentration. This is not uncommon during the early months after injection and may be caused by the emulsified oil, which acts as a co-solvent and increases the solubility of TCE in the aquifer matrix. Localized lateral displacement of TCE is also possible during injection. The increase in DCE levels at MW2031BX36 from 22 µg/L to 1,290 µg/L confirms that this area is undergoing ERD. There is a general increase in DCE concentrations in monitoring wells in and around the hot spot treatment area.

The dissolved TOC supply in the hot spot injection area remains high and is sustaining a rapid rate of ERD. TOC concentrations in the target well MW2031BX36 increased from a baseline concentration of < 1 mg/L to 2,410 mg/L six months after EVO injection. TOC levels have increased significantly from baseline concentrations in most monitoring wells in the target injection area. There is a good correlation between decreasing TCE concentrations and increasing TOC concentrations indicating TOC is the driving factor in the ERD process at this site.

Geochemical data collected from the hot spot area supports ERD. High methane, high dissolved iron and manganese, and significantly lower sulfate levels are all positive geochemical signatures for anaerobic conditions favoring ERD. However, it is also apparent that sulfate reduction is competing with TCE reduction and that a continuing influx of sulfate will deplete the TOC supply and slow TCE and DCE removal.

Site SD037

The EVO injection program at Site SD037 consists of seven (7) injection wells arranged throughout the Site SD037 "hot spot." This configuration is known as an area approach, since the EVO is injected over a broad area instead of in a wall-like barrier as was done at Site DP039.

Performance monitoring data were collected in May 2011 as part of the performance monitoring sampling event, which represents the third set of performance monitoring data for this Site. The next performance monitoring event is scheduled for August 2011.

The TCE hot spot area targeted for the EVO injection (target wells MW524X37 and MW2039AX37) are showing significant reductions in TCE. Increases in DCE are significant in MW2039X37, but not apparent in MW524X37. The very high TOC levels in MW524X37 are likely creating conditions for total destruction of TCE and DCE. Trace levels of vinyl chloride are being formed. Ethane and ethene are being detected, likely indicating that complete dechlorination of the DCE and VC seems to be in progress. At MW524X37, a total molar reduction of 93% has occurred in the first six months of ERD treatment. Other wells being monitored at this site are all over 50 feet from injection wells and do not show evidence of ERD yet.

The dissolved TOC supply in the hot spot injection area remains high and is sustaining a rapid rate of ERD. TOC concentrations in the target well MW524X37 increased from a baseline concentration of 1.16 mg/L to 2,155 mg/L one month after EVO injection and are down to 1,440 mg/L six months after injection. Hot spot well MW2039AX37 has not experienced a rise in TOC levels, yet TCE levels are down and DCE levels are up. This well may be located at the edge of the TOC influence and is receiving water that has passed through aquifer that contains higher TOC. There is no evidence of TOC influence beyond 10 feet of injection wells, but a lack of wells in the 20 to 50 feet radius of any injection well has made it difficult to estimate TOC influence at this site.

Geochemical data collected from the hot spot area supports ERD. High methane, high dissolved iron and manganese, and significantly lower sulfate levels are all positive geochemical signatures for anaerobic conditions favoring ERD. However, it is also apparent that sulfate levels in excess of 200 mg/L are present at the site and sulfate reduction will be competing with TCE reduction. A continuing influx of sulfate will deplete the TOC supply and eventually slow TCE and DCE removal.

Site SS015

The EVO injection program at Site SS015 consists of three (3) injection and three (3) monitoring wells arranged throughout the Site SS015 source area. This configuration is known as an area approach, since the EVO is injected over a broad area instead of in a wall-like barrier as was done at Site DP039.

Data were collected as part of performance monitoring activities during May 2011, which represents the first quarter of performance monitoring data at this Site. The next performance sampling event is scheduled for August 2011.

The hot spot area targeted for the EVO injection (target well MW216X15) is showing significant reductions in TCE, DCE and vinyl chloride compared to baseline concentrations. Most encouraging is the decrease in cis-1,2 DCE from 8,800 µg/L to 598 µg/L, and the decrease in vinyl chloride from 5,140 µg/L to 70.6 µg/L. Detections of ethane and ethene in this well also confirm the complete destruction of vinyl chloride. As expected, the three EVO injection wells surrounding MW216X15 also show significant CVOC reductions compared to their pre-injection concentrations. There were also significant CVOC reductions in wells at the perimeter of the treated hot spot area. Wells MW2127X15, MW2129X15, and MW2132x15 all exhibited reductions in TCE, DCE and VC. The initial CVOC concentrations in these wells were generally one or two orders of magnitude lower than hot spot well MW216X15.

The dissolved TOC supply in the hot spot injection area remains very high and is sustaining a rapid rate of ERD. TOC concentrations in the target well MW216X15 increased from a baseline concentration of 13.8 mg/L

to 1,310 mg/L four months after EVO injection. Although TOC data is not available from perimeter wells, it appears that ERD is occurring based on CVOC reductions in several wells.

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

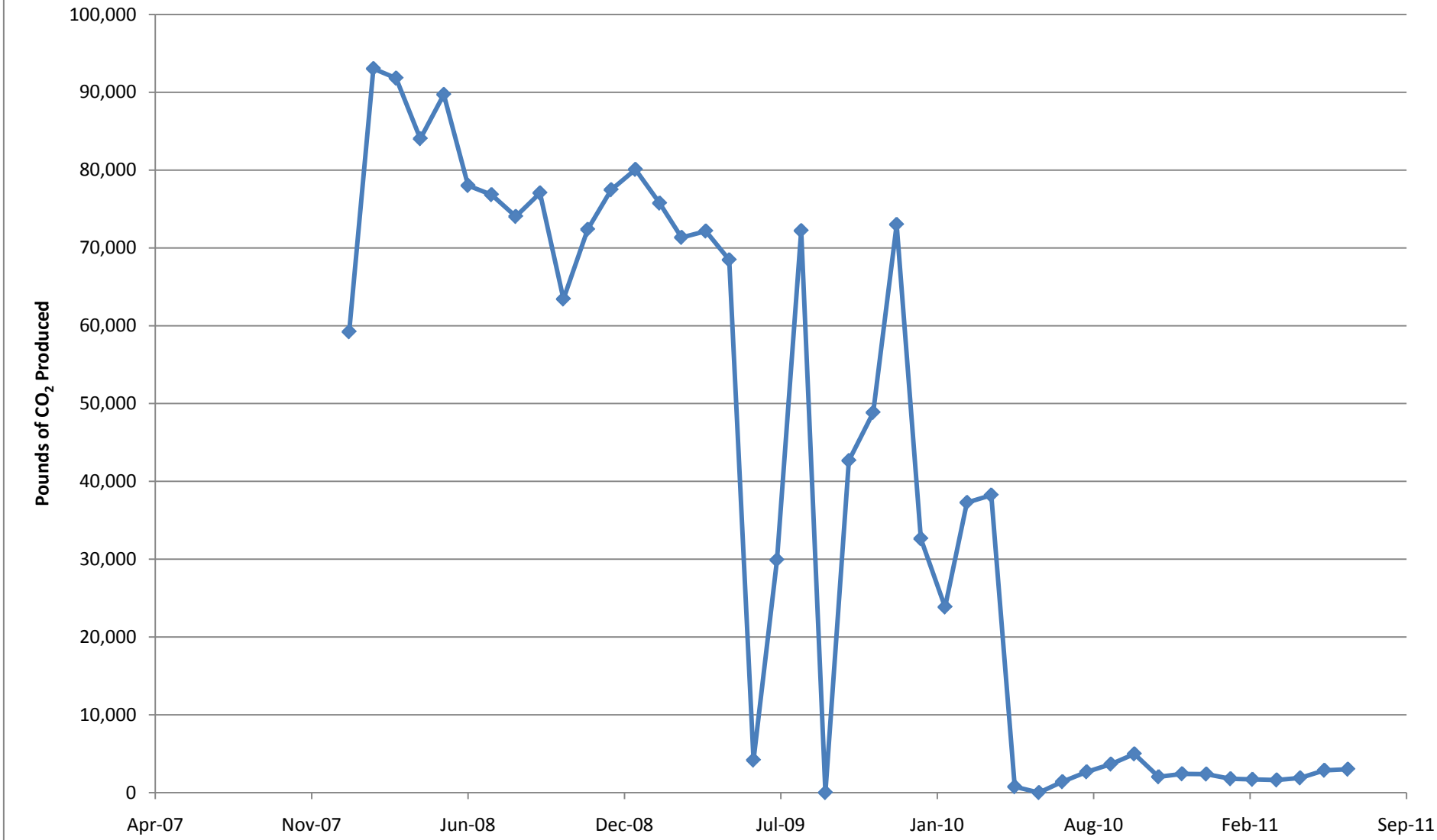
Sustainability

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 WTTP and ThOx system are tied into the CGWTP. Much of the groundwater extraction system that feeds the CGWTP (except for the Site SS016 system) is currently off line for a rebound study. The CGWTP produced approximately 3,003 pounds of GHG during July 2011. This is an increase from the amount produced in June 2011 (approximately 2,866 pounds). The increase in GHG is attributed to the two extraction wells (EW605x16 and EW610x16) which were brought back into operation following repairs to the pumps and electrical system.

Figure 2

Equivalent Pounds of CO2 Produced by the Central Groundwater Treatment Plant



North Groundwater Treatment Plant Monthly Data Sheet

Report Number: 116 **Reporting Period: 30 Jun – 31 Jul 2011** **Date Submitted: 16 August 2011**

This monthly data sheet presents information regarding the North Groundwater Treatment Plant (NGWTP) and associated remedial process optimization (RPO) activities. NGWTP resumed operation in May after the wet season which required system shutdown from December 2010 to May 2011. July 2011 system operation denotes the second full month of system operation since shutdown.

System Metrics

Table 1 presents operational data from the July 2011 reporting period:

Table 1 – Operations Summary – July 2011

Operating Time:	Percent Uptime:	Electrical Power Usage:
NGWTP: 696 hours	**NGWTP:** 100%	**NGWTP:** 509 kWh (697 lbs CO_2 generated[a])

Gallons Treated: **4,336 gallons**

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

Volume Discharged to Duck Pond: **4,336 gallons**

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

VOC Mass Removed: **0 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] No VOCs detected from July 2011 influent sample.
[c] Value not calculated since measurement does not accurately represent the cost effectiveness of the system. The system was not removing mass from December 2010 to May 2011, but operating costs were incurred.
[d] Value not calculated since measurement does not accurately represent the potential effectiveness of the system.

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

Table 2 – NGWTP Average Flow Rates

Location	Average Flow Rate (gpm)
EW614x07	NA[a]
EW615x07	0.1[b]
NGWTP	0.1

[a] Extraction well not operational. New pump ordered and will be replaced in August 2011.
[b] Average flow rate calculated by dividing the system discharge volume into the duck pond by the operating time since EW615x07 is the only pump in operation.

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 = North Groundwater Treatment Plant

Summary of O&M Activities

Analytical data from the 15 July 2011 sampling event are presented in Table 4. Contaminant concentrations were not detected in the influent or the effluent process stream.

Currently, one of the two FL007C extraction wells (EW614x07) remains off line due to pump failure. A new pump is in the process of being ordered and is scheduled to be brought back on line in August 2011.

Optimization Activities

No optimization activities occurred at the NGWTP in July 2011.

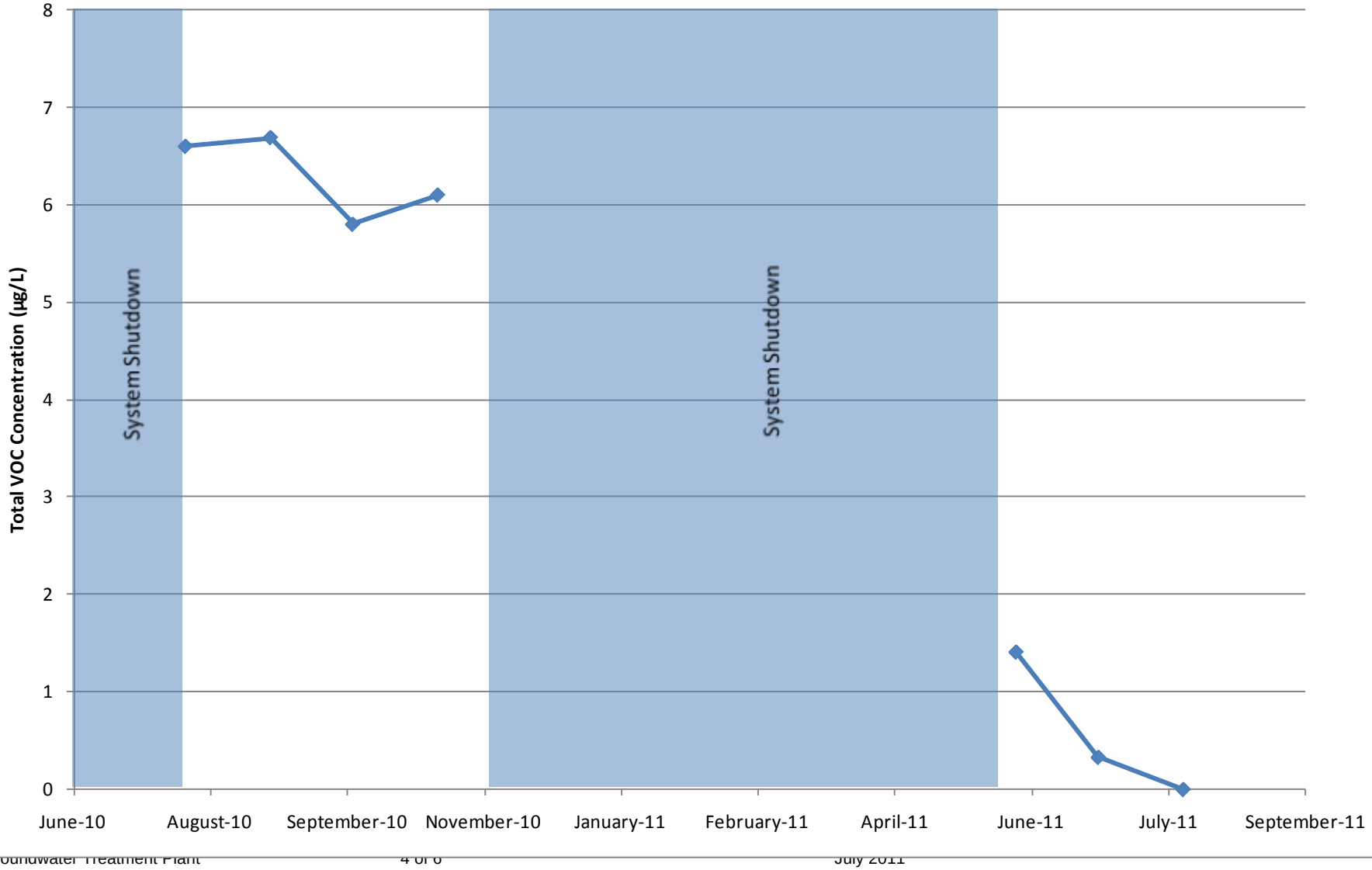
Table 4
Summary of Groundwater Analytical Data for July 2011 – North Groundwater Treatment Plant

Constituent	Instantaneous Maximum[a] (µg/L)	Detection Limit (µg/L)	N/C	15 July 2011 (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	ND	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	ND	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

[a] 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).

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
Travis Air Force Base, California



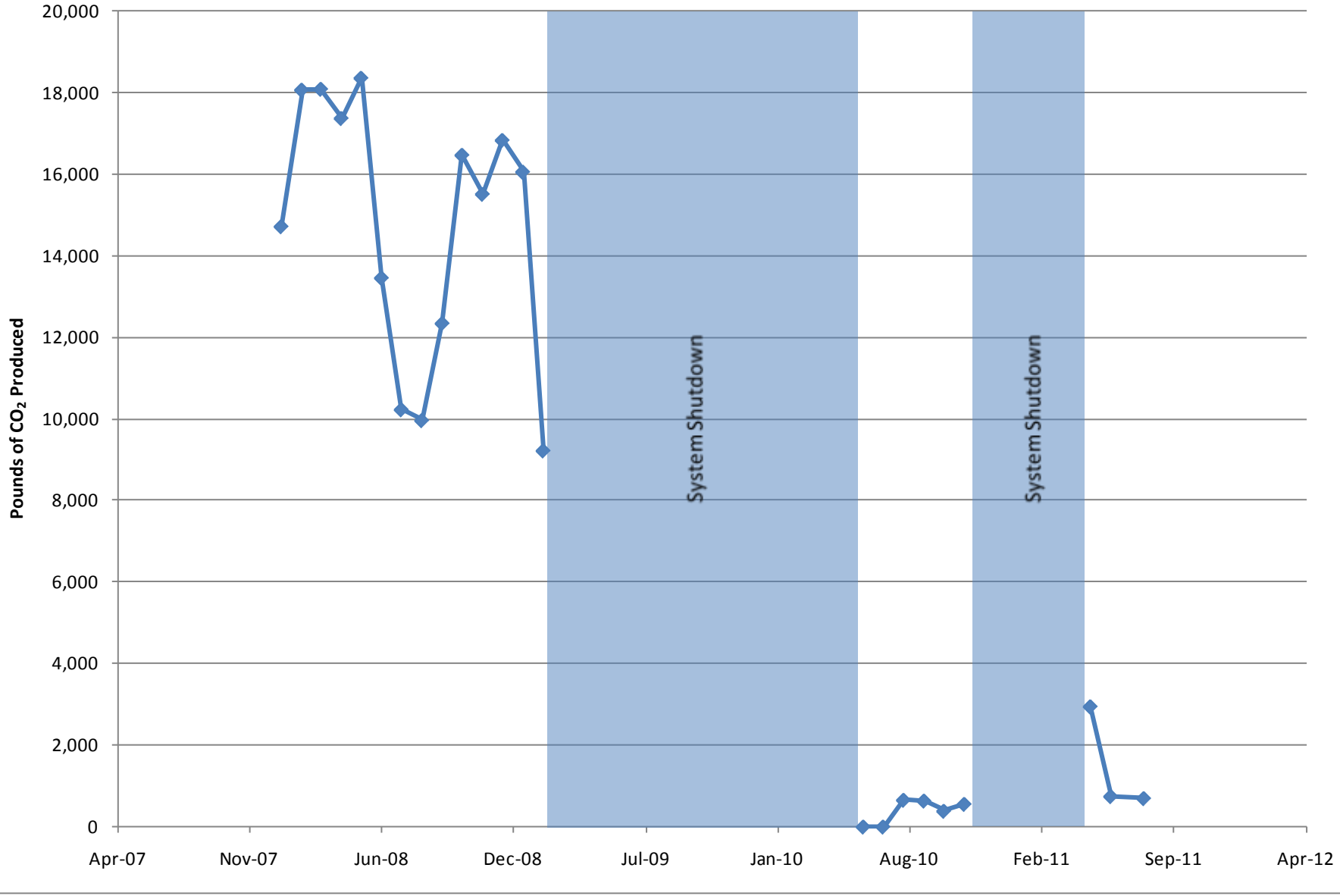
Sustainability

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 used 509 kWh which produced approximately 697 pounds of GHG during July 2011. The overall GHG generation remains considerably lower than traditional GWTPs since the system is predominantly powered by solar arrays.

Figure 2

Equivalent Pounds of CO2 Produced by the North Groundwater Treatment Plant



Site ST018 Groundwater Treatment Plant Monthly Data Sheet

Report Number: 005 **Reporting Period: 30 Jun – 31 Jul 2011** **Date Submitted: 16 August 2011**

This monthly data sheet presents information regarding the Site ST018 Groundwater Treatment Plant (S18GWTP). One extraction well (EW2019x18) is currently off line due to pump faulting at the control box.

System Metrics

Table 1 presents operation data from the July 2011 reporting period.

Table 1 – Operations Summary – July 2011

Operating Time:		Percent Uptime:		Electrical Power Usage:	
S18GWTP:	599 hours	**S18GWTP:**	86.0%	**S18GWTP:**	97 kWh (133 lbs CO_2 generated[a])

Gallons Treated: **132 thousand gallons**

Gallons Treated Since March 2011: **609 thousand gallons**

Volume Discharged to Union Creek: **132 thousand gallons**

BTEX, MTBE, TPH Mass Removed: **1.02 lbs**[b]

BTEX, MTBE, TPH Mass Removed Since March 2011: **4.2 lbs**

Rolling 12-Month Cost per Total Pounds of Mass Removed: $10,222[c]

Monthly Cost per Pound of Mass Removed: $4,158

Lbs = pounds

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

[b] Calculated using July 2011 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; however the system is only in its fourth month of operation.

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	1.45
EW2016x18	1.20
EW2019x18	0.93
Site ST018 GWTP	3.69

[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	July 15, 2011	09:00	July 19, 2011	10:00	System mistakenly left off line following monthly sampling event.

S18GWTP = Site ST018 Groundwater Treatment Plant

Summary of O&M Activities

Monthly groundwater samples at the S18GWTP were collected on 15 June 2011. The samples included the quarterly influent sample. Sample results are presented in Table 4. No contaminant concentrations from the effluent sample exceeded trigger or effluent limitation values. The total VOC concentration reported in the influent sample is 951 µg/L. The increase in VOC concentration from April 2011 (332 µg/L) is likely the result of continuous operation of extraction well (EW2014x18) during July 2011.

Additional samples were collected from the influent and effluent locations at ST018GWTP in July 2011 as part of a quality check on the current analytical laboratory. The duplicate samples were sent to a different laboratory and analyzed for TPHg and TPHd. The duplicate sample results are included in Table 4. The laboratory analyzing the field duplicate samples was not selected as the primary laboratory for Site ST018 due to its inability to meet detection limit requirements outlined in the Site ST018 NPDES permit. As such, the duplicate samples were collected to provide an "order of magnitude" comparison to the field original samples.

The field duplicate samples for TPHg were similar to the field original samples, but results for TPHd varied between the field original and field duplicate samples. The field original samples from the influent and effluent locations identified quantities of TPHd (170 µg/L and 29 J µg/L, respectively) while the field duplicate samples did not detect any TPHd.

Well vault EW2016x18 continues to experience frequent shut downs due to flooding. The flooding is likely a result of landscape maintenance (watering the lawn) surrounding the well vault. When discovered, the well vault is pumped out and the pump is brought back on line. If frequent flooding continues to occur during summer months, the float switch may be adjusted to a higher elevation within the well vault to promote longer pump operation.

The pump in EW2019x18 was discovered as being off line on 29 July, 2011 due to an error indicating no electrical contact between the pump motor and the motor controller. Troubleshooting is currently underway and the well is expected to resume operation in August 2011.

Optimization Activities

No optimization activities occurred at the S18GWTP in July 2011.

Table 4
Summary of Groundwater Analytical Data for July 2011 – Site ST018 Groundwater Treatment Plant

Constituent	Instantaneous Maximum[a] (µg/L)	Detection Limit (µg/L)	N/C	15 July, 2011 (µg/L)				
				Influent[b]	Influent Field Duplicate	After Carbon 2	System Effluent	System Effluent Field Duplicate
Fuel Related Constituents								
MTBE	5	0.1[c]	0	270	--	ND	ND	--
Benzene	5	0.1	0	16	--	ND	ND	--
Ethylbenzene	5	0.1	0	24	--	ND	ND	--
Toluene	5	0.1	0	2.3	--	ND	ND	--
Total Xylenes	5	0.1	0	38.7	--	ND	ND	--
Total Petroleum Hydrocarbons – Gasoline	50	10	0	430	520	ND	ND	ND
Total Petroleum Hydrocarbons – Diesel	50	16	0	170	ND	35 J	29 J	ND
Total Petroleum Hydrocarbons – Motor Oil	--	74	0	ND	--	ND	ND	--

[a] In accordance with the National Pollutant Discharge Elimination System (NPDES) Effluent Limitations
[b] Values taken from July 2011 sample data. Influent sampling is conducted on a quarterly basis.
[c] Influent sample detection limit report at 0.5 µg/L

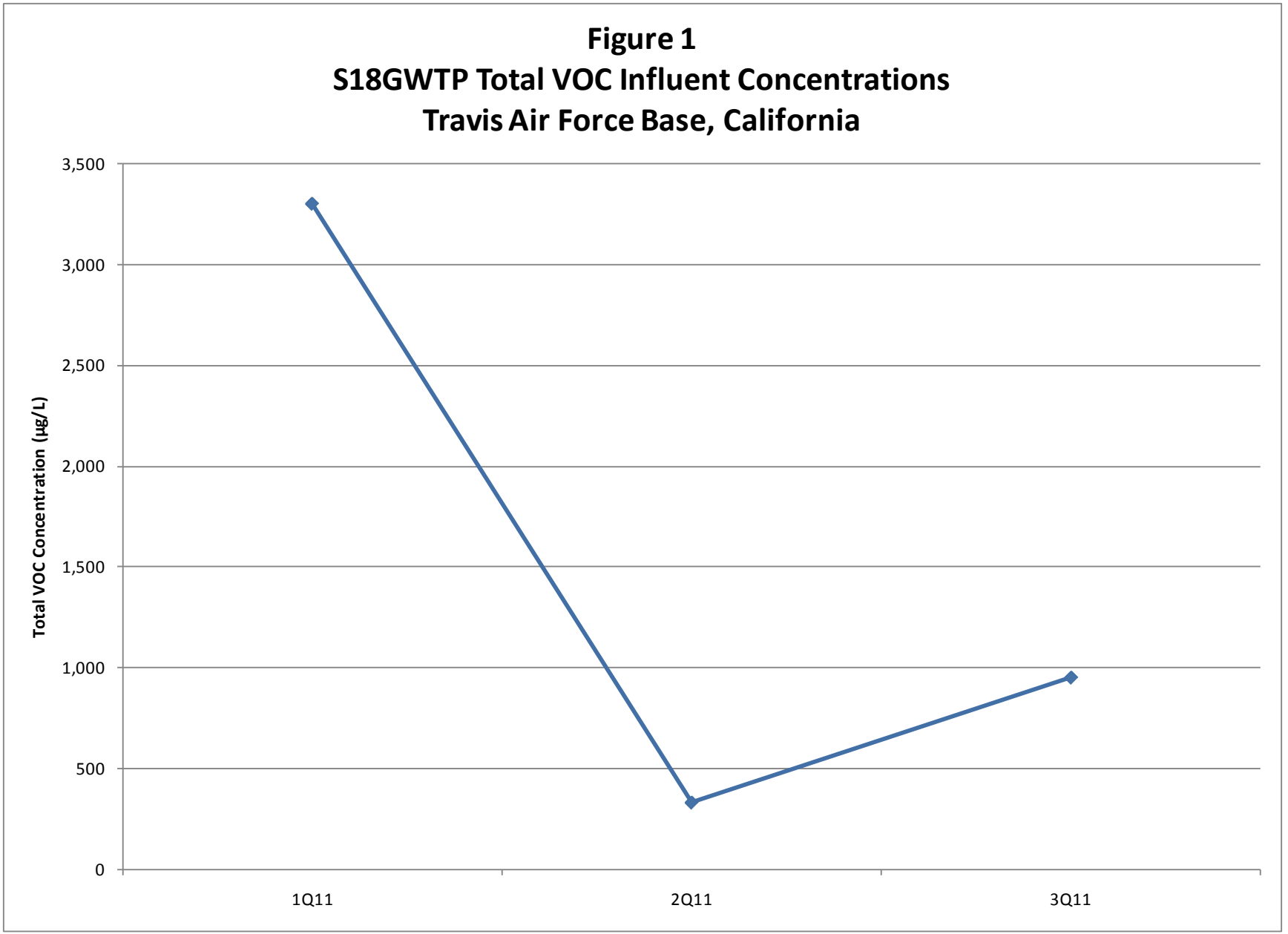
J = analyte concentration is considered an estimated value

N/C = number of samples out of compliance with discharge limits

ND = not detected above method detection limit

µg/L = micrograms per liter

Figure 1
S18GWTP Total VOC Influent Concentrations
Travis Air Force Base, California



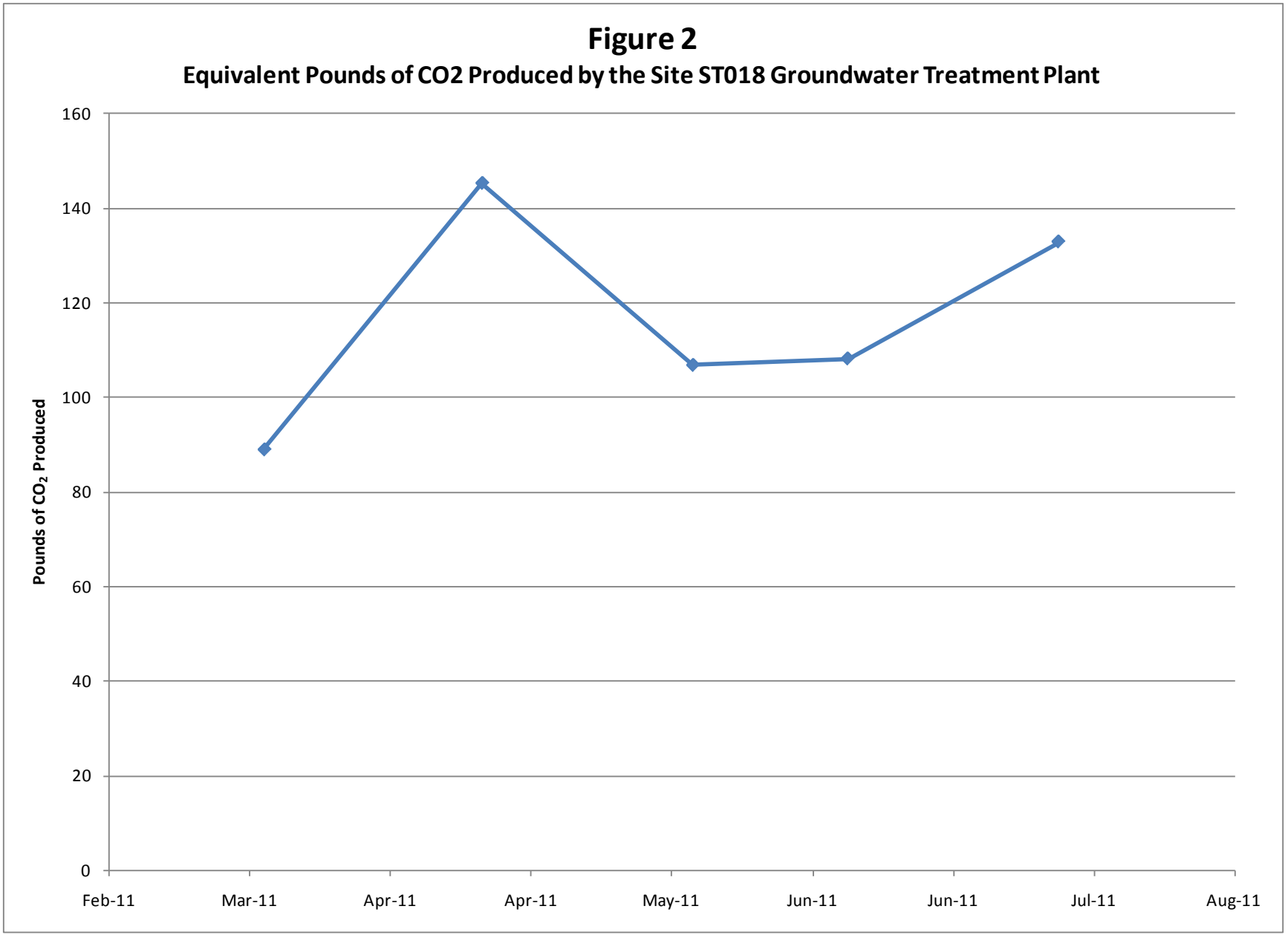
Sustainability

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 133 pounds of GHG during July 2011. This is a slight increase (108 pounds) from June 2011 which is like due to the increase in gallons treated. However, the overall GHG generation remains considerably lower than traditional GWTPs since the system is predominantly powered by solar arrays.

Figure 2

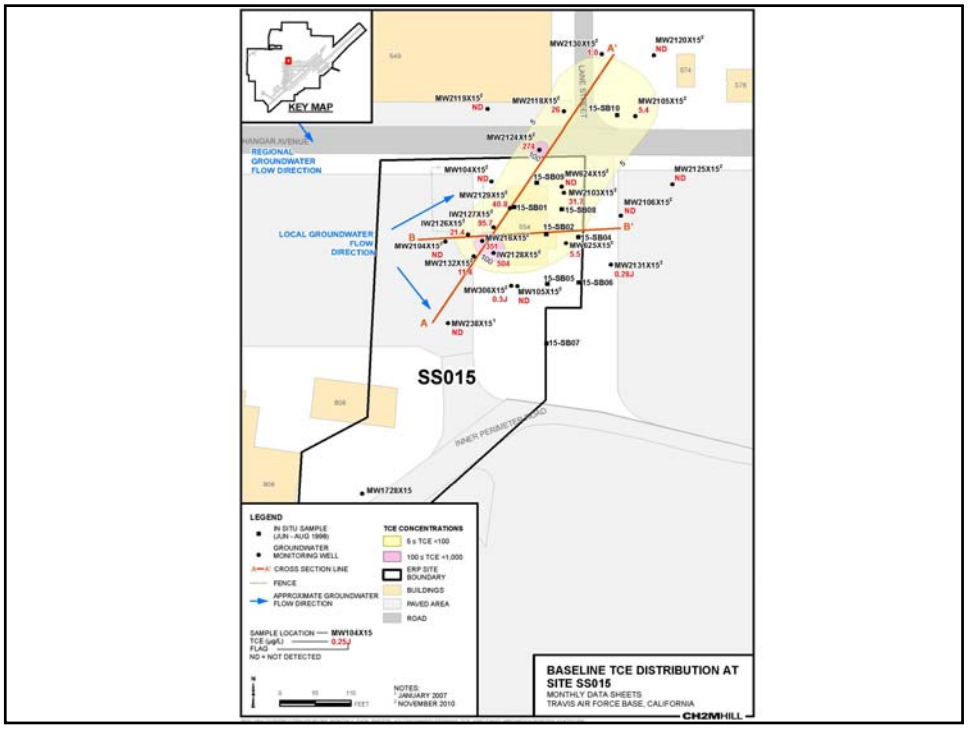
Equivalent Pounds of CO2 Produced by the Site ST018 Groundwater Treatment Plant

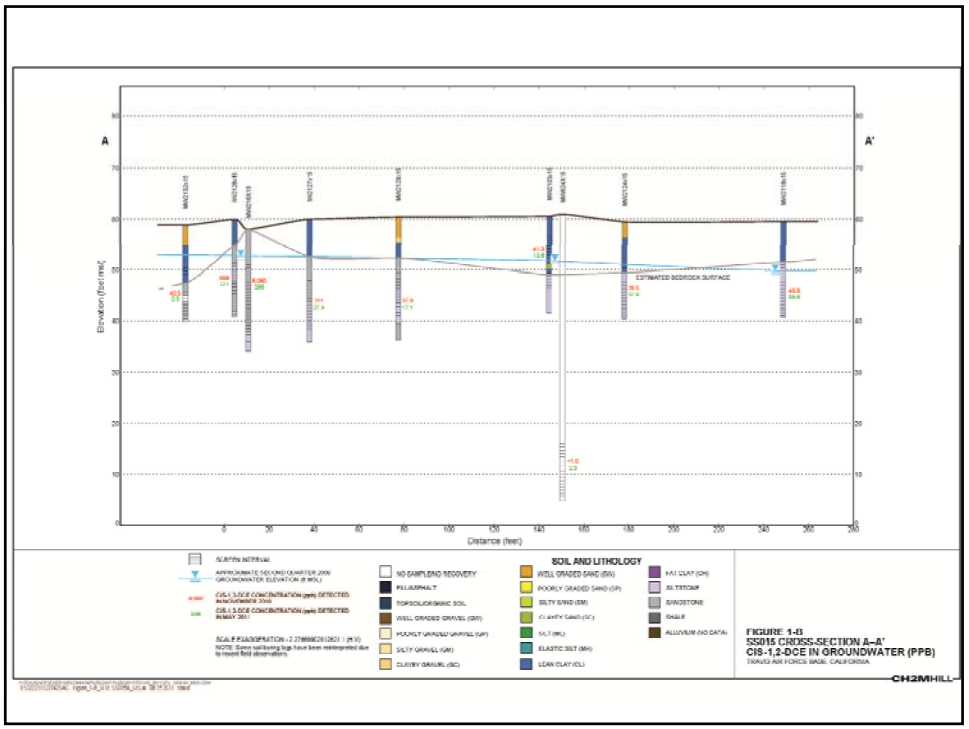


May 2011 Remedial Process Optimization Analytical Results at Travis AFB

Site SS015 EVO Injection

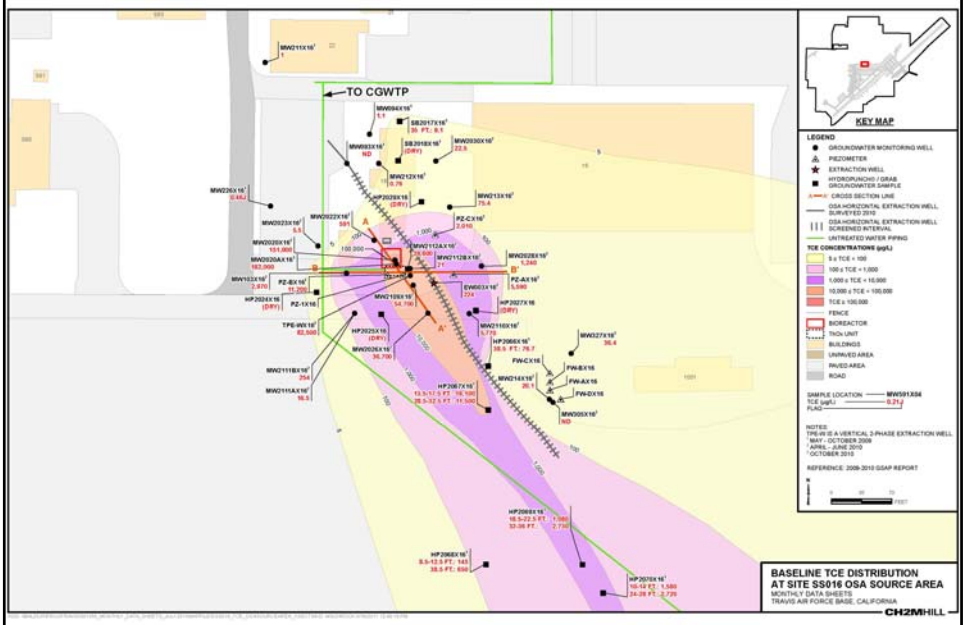
- Significant reductions in the hot spot area (MW216x15) in TCE, DCE, and vinyl chloride.
  - Cis-1,2-DCE from 8,800 µg/L to 598 µg/L.
  - Vinyl chloride from 5,140 µg/L to 70.6 µg/L.
- Detections of ethane and ethene in MW216x15 confirm the complete destruction of vinyl chloride.
- Significant reductions of TCE, DCE, and vinyl chloride observed IW2127x15, MW2129x15, and MW2132x15.
- Dissolved TOC supply in the hot spot injection area remains very high and is sustaining a rapid rate of ERD.
  - TOC concentration in MW216x15 increased from baseline concentration of 13.8 mg/L to 1,310 mg/L four months after EVO injection.
- Geochemical data collected from the hot spot area supports ERD. High methane, high dissolved iron and manganese, and significantly depleted sulfate are all positive geochemical signatures for anaerobic conditions favoring ERD.

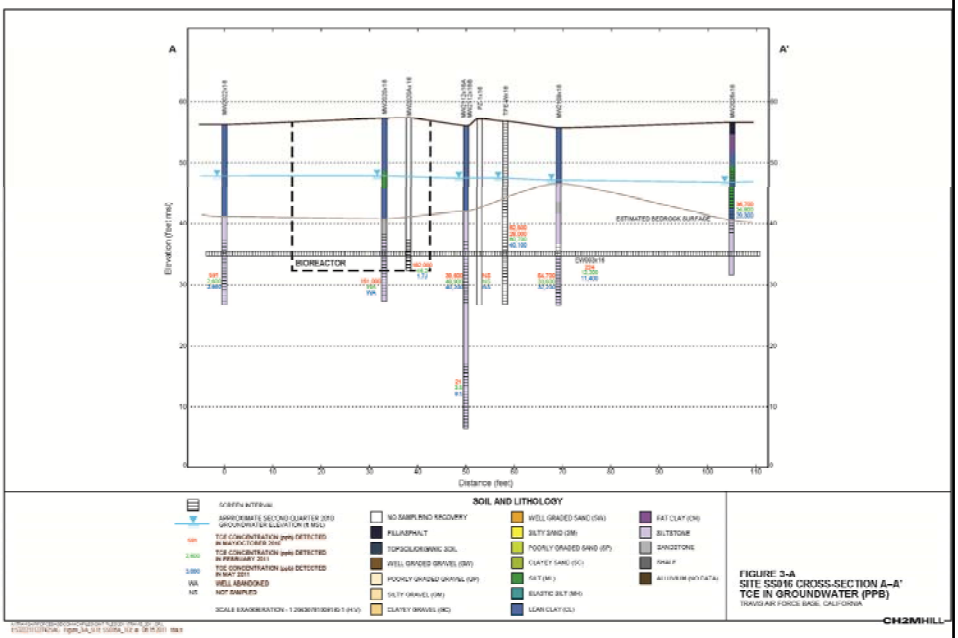

KEY MAP
REGIONAL GROUNDWATER FLOW DIRECTION
LOCAL GROUNDWATER FLOW DIRECTION
SS015
INNER PERIMETER ROAD
LEGEND
IN SITU SAMPLE (JUN - AUG 1998)
GROUNDWATER MONITORING WELL
CROSS SECTION LINE
FENCE
APPROXIMATE GROUNDWATER FLOW DIRECTION
SAMPLE LOCATION
TCE (µg/L)
FLAG
ND = NOT DETECTED
TCE CONCENTRATIONS
5 ≤ TCE <100
100 ≤ TCE <1,000
ERP SITE BOUNDARY
BUILDINGS
PAVED AREA
ROAD
NOTES:
1 JANUARY 2007
2 NOVEMBER 2010
BASELINE TCE DISTRIBUTION AT SITE SS015
MONTHLY DATA SHEETS
TRAVIS AIR FORCE BASE, CALIFORNIA
CH2MHILL


A
A'
Elevation (feet msl)
Distance (feet)
ESTIMATED BEDROCK SURFACE
SOIL AND LITHOLOGY
NO SAMPLE/NO RECOVERY
ASPHALT
TOPSOIL/ORGANIC SOIL
WELL GRADED GRAVEL (GW)
POORLY GRADED GRAVEL (GP)
SILTY GRAVEL (GM)
CLAYEY GRAVEL (GC)
WELL GRADED SAND (SW)
POORLY GRADED SAND (SP)
SILTY SAND (SM)
SILT (ML)
ELASTIC SILT (MH)
LEAN CLAY (CL)
FAT CLAY (CH)
SANDSTONE
ALLUVIUM (NO DATA)
FIGURE 1-13
SS015 CROSS-SECTION A–A'
CIS-1,2-DCE IN GROUNDWATER (PPB)
TRAVIS AIR FORCE BASE, CALIFORNIA
CH2MHILL

Site SS016 Bioreactor

- In November 2010, the in situ bioreactor began operation in the SS016 OSA Source Area.
- Based on the first two quarters of performance data, the bioreactor is providing high rates of TCE, DCE, and vinyl chloride removal.
- Based on the May 2011 data, the bioreactor is removing over 99% of the TCE and nearly 93% of the total molar chlorinated VOCs entering the bioreactor.
- Due to the saturated interval surrounding the bioreactor is in bedrock, the downgradient distribution of TOC has been slow and ERD slow to develop downgradient.
  - MW2112Ax16 is located approximately 10 feet downgradient of the bioreactor and is beginning to show evidence of ERD. DCE and vinyl chloride are beginning to rise in the well and TOC has increased from a baseline of 4.2 mg/L to 20.1 mg/L.
- The dissolved TOC supply inside the bioreactor has ranged from 714 to 866 mg/L over the first 6 months and is sustaining a rapid rate of ERD inside the bioreactor.
- Geochemical data collected from the bioreactor supports ERD. High methane, high dissolved iron and manganese, and totally depleted sulfate are all positive geochemical signatures for anaerobic conditions favoring ERD.



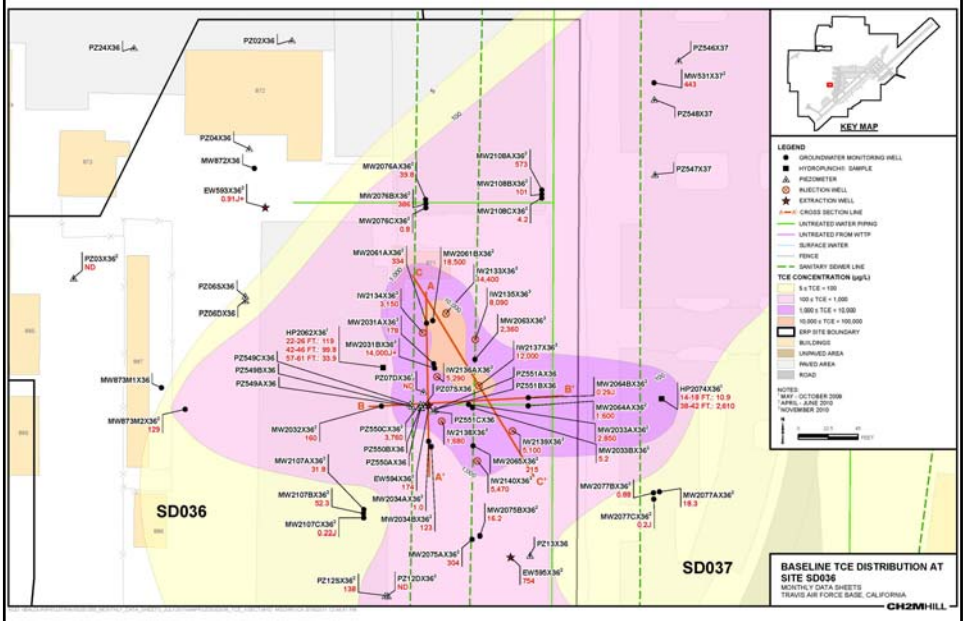


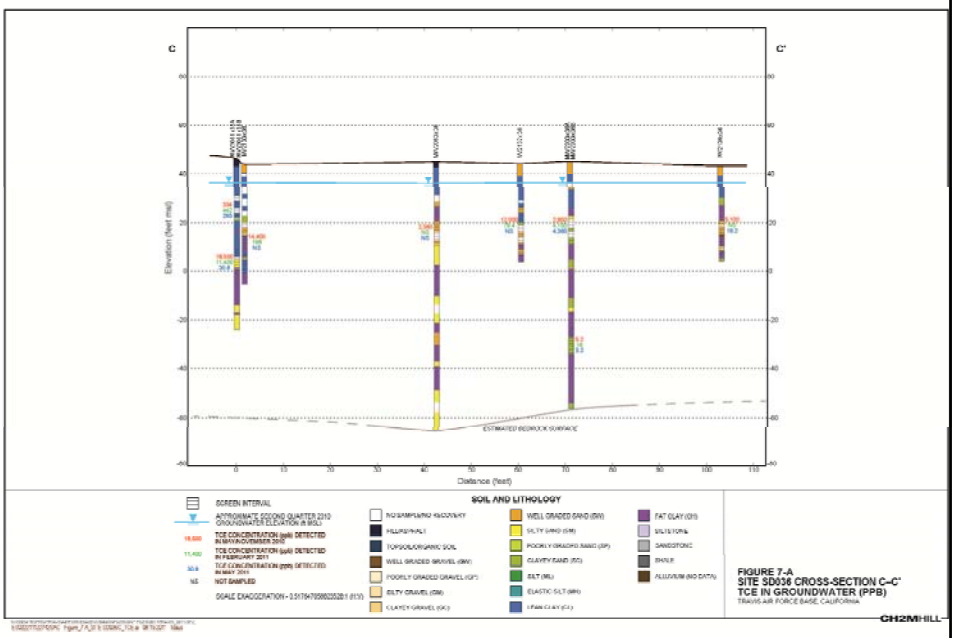
SD036 EVO Injection

- The TCE hot spot area targeted for the EVO injection (MW2031Bx36, MW2061Bx36, and PZ550Cx36) are showing significant reductions in TCE and increases in DCE when compared to baseline concentrations. Little vinyl chloride is being generated.
- Ethane and ethene are being detected indicating that complete dechlorination of the DCE and vinyl chloride seems to be in progress.
- The quantities of DCE being generated are less than expected if the DCE was simply accumulating from TCE degradation.
  - A total molar reduction of 88% has occurred at MW2031Bx36 in the first 6 months of ERD treatment.
- MW2033Ax36 showed an increase in TCE when compared to baseline.
  - May be caused by the emulsified oil which acts as a co-solvent and increases the solubility of TCE in the aquifer matrix.
  - May be due to localized lateral displacement.
- Increase in DCE levels at MW2031Bx36 from 22 µg/L to 1,290 µg/L confirms that the area is undergoing ERD treatment.
- There is a general increase in DCE concentrations in the monitoring wells around the hot spot treatment area.

SD036 EVO Injection

- The dissolved TOC supply in the hot spot area remains high and is sustaining a rapid rate of ERD.
  - TOC in MW2031Bx36 increase from a baseline concentration of <1 mg/L to 2,410 mg/L six months after injection.
- Geochemical data collected for the hot spot area supports ERD. High methane, high dissolved iron and manganese, and significantly lower sulfate levels are all positive geochemical signatures favoring ERD.
- Sulfate reduction is competing with TCE reduction.
  - Continuing influx of sulfate will deplete the TOC supply and slow TCE and DCE removal.



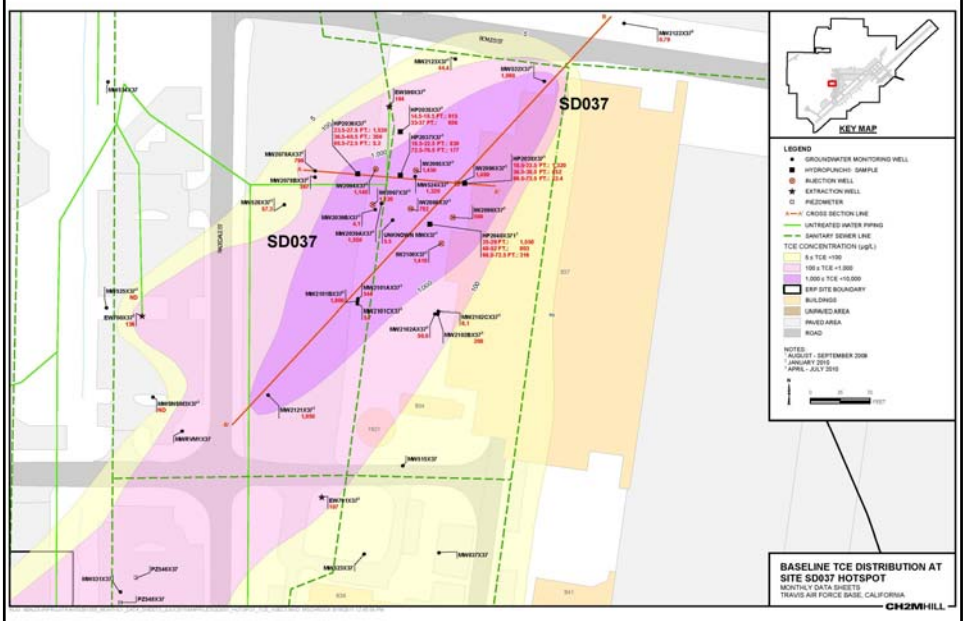


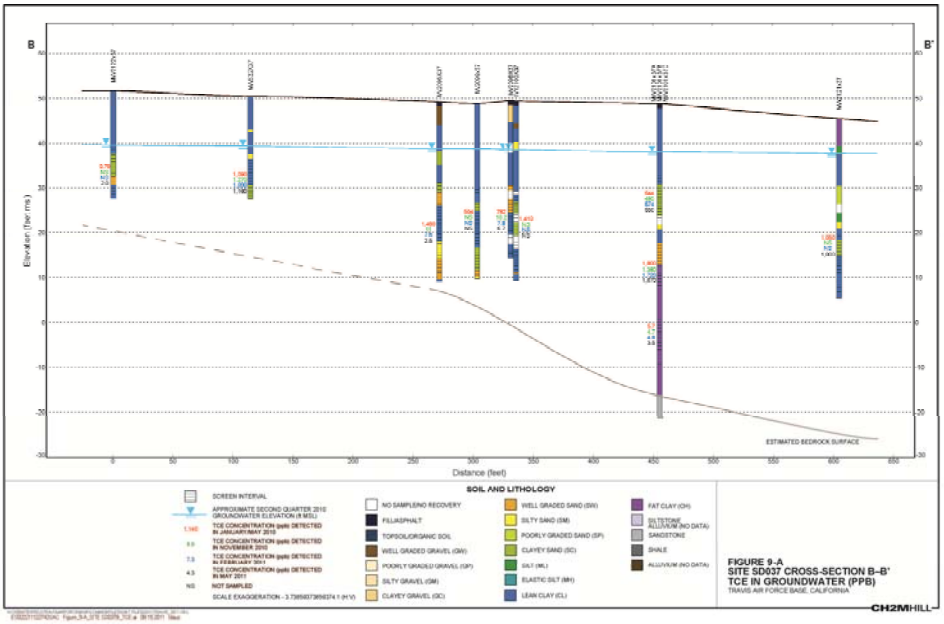
SD037 EVO Injection

- The TCE hot spot area targeted for the EVO injection (MW524x37 and MW2039Ax37) are showing significant reductions in TCE. Increases in DCE are significant in MW2039Ax37 but not apparent in MW524x37.
  - Very high TOC concentrations in MW524x37 are likely creating conditions for total destruction of TCE and DCE.
- Trace levels of vinyl chloride are being generated.
- Ethane and ethene are being detected indicating that complete dechlorination of the DCE and vinyl chloride seems to be in progress.
- At MW524x37, a total molar reduction of 93% has occurred in the first six months of ERD treatment.
- The other wells being monitored at Site SD037 are all over 50 feet from injection wells and are not showing evident of ERD.
- The dissolved TOC supply in the hot spot injection area remains high and is sustaining a rapid rate of ERD.
  - TOC concentrations in the target well MW524x37 increased from a baseline concentration of 1.16 mg/L to 2,155 mg/L one month after EVO injections and are down to 1,440 mg/L six months after injection.
  - MW2039Ax37 has not experienced a rise in TOC levels, yet TCE levels are down and DCE levels are up. MW2039Ax37 may be located at the edge of the TOC influence.

SD037 EVO Injection

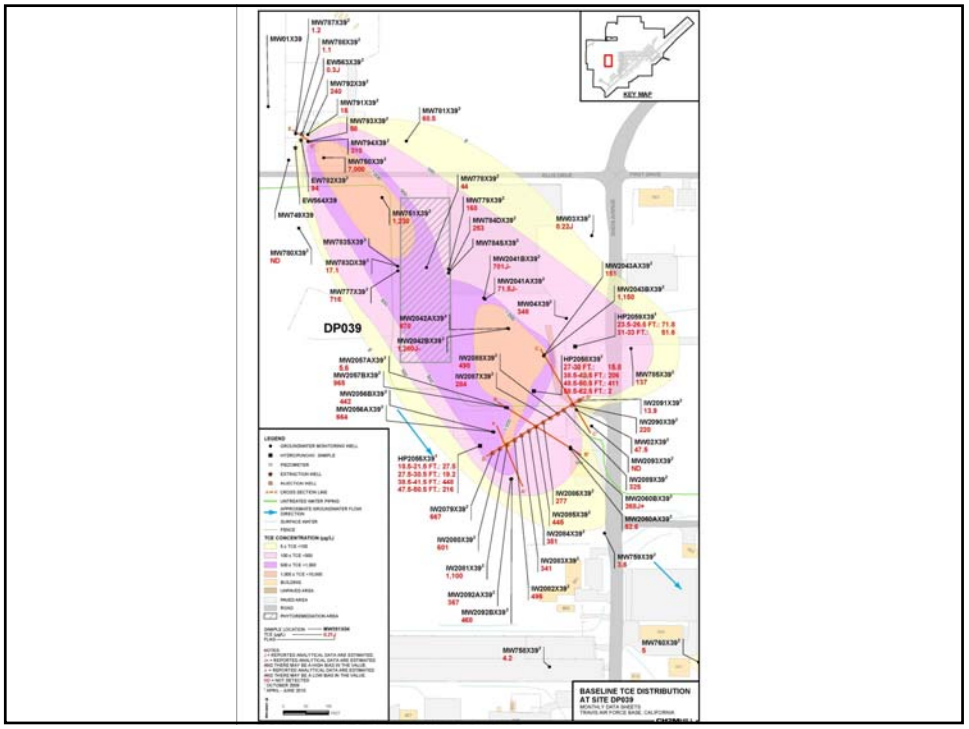
- Geochemical data collected from the hot spot area supports ERD. High methane, high dissolved iron and manganese, and significantly lower sulfate levels are all positive geochemical signatures for anaerobic conditions favoring ERD.
  - Sulfate levels are in excess of 200 mg/L at Site SD037 and sulfate reduction will be competing with TCE reduction.
  - A continuing influx of sulfate will deplete the TOC supply and eventually slow TCE and DCE removal.

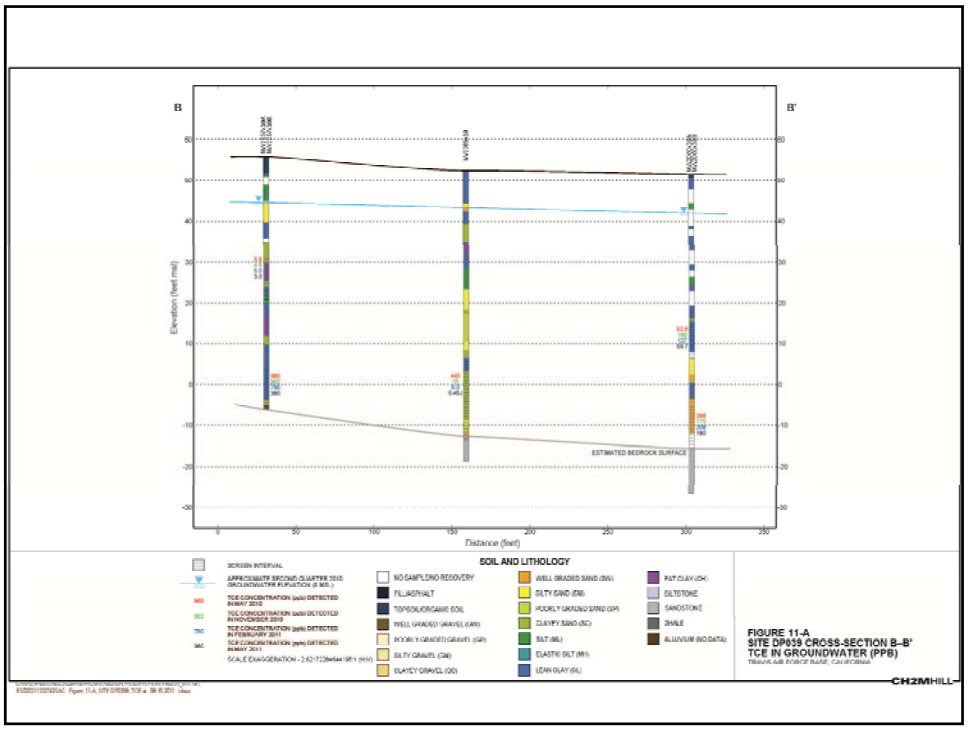




Site DP039 Permeable Reactive Barrier EVO Injection

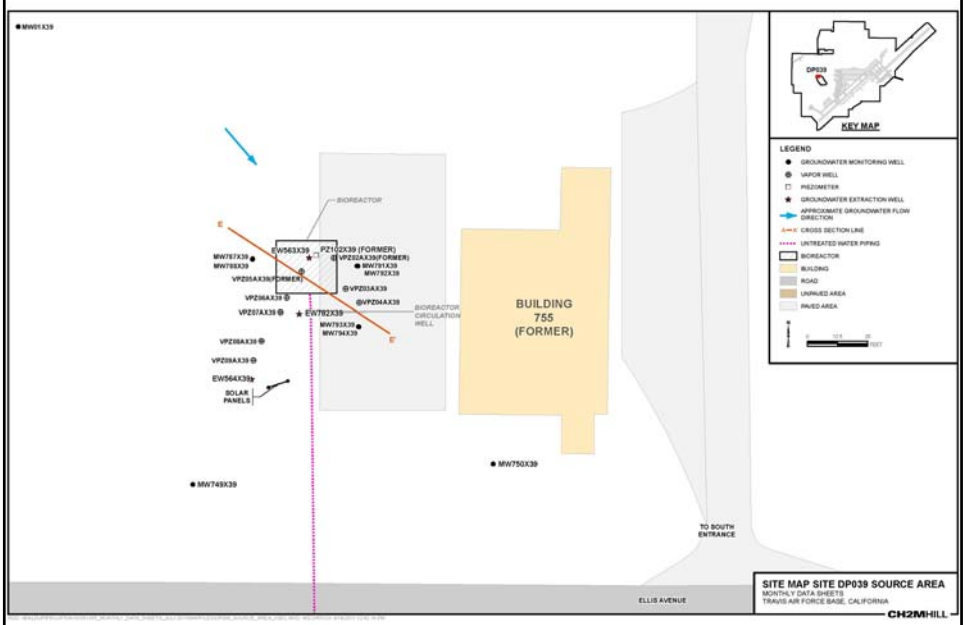
- Significant TCE reductions, minor DCE accumulation, and no vinyl chloride accumulation along the PRB line of injection wells.
- High TOC in the PRB treatment zone has degraded most the TCE, DCE, and vinyl chloride.
- TOC supply along the line of injection wells is still adequate for ERD (range 128 to 3,080 mg/L) and is well above EPA recommended 20 mg/L.
- TOC is dropping in two of the three injection wells that were sampled.
  - We will watch the rate of TOC depletion to better estimate the recharge frequency for the PRB.
- Downgradient impact of injection is minimal based on sampling wells that are 80 to 150 feet downgradient of the injection wall.
- Geochemical data collected from the line of injection wells supports ERD. High methane, high dissolved iron and manganese, and depressed sulfate are all positive geochemical signatures for anaerobic conditions favoring ERD.

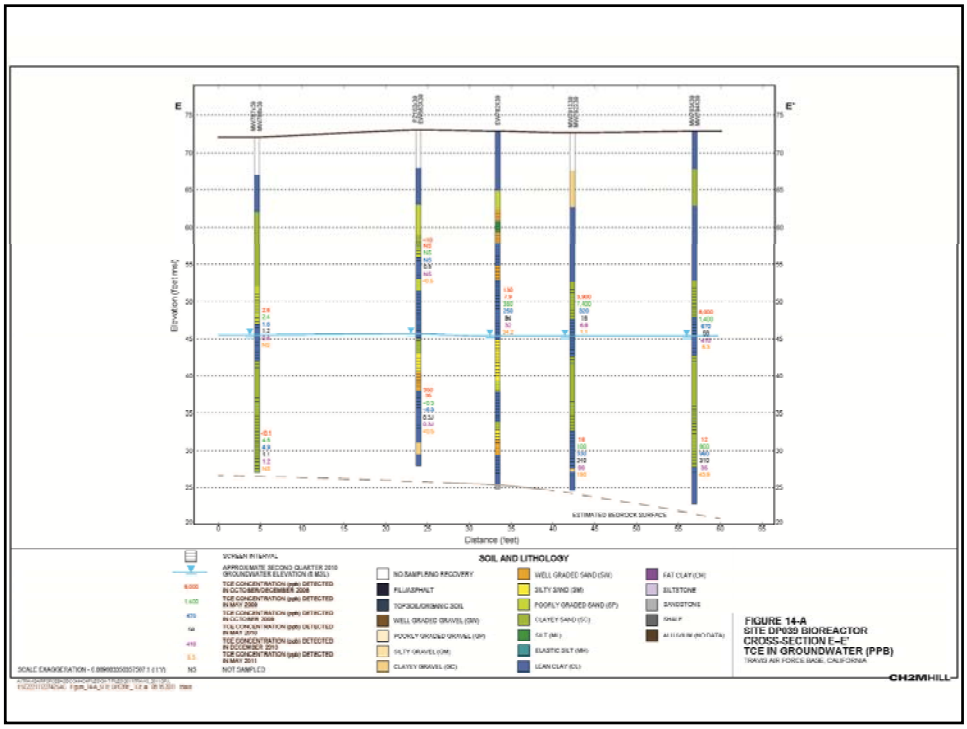

DP039
BASELINE TCE DISTRIBUTION AT SITE DP039


B
B'
Elevation (feet msl)
Distance (feet)
ESTIMATED BEDROCK SURFACE
SOIL AND LITHOLOGY
FIGURE 11-A
SITE DP039 CROSS-SECTION B-B'
TCE IN GROUNDWATER (PPB)
CH2MHILL

Site DP039 Bioreactor

- During the past 30 months of operation, TCE reductions of over 99% and total molar reductions of over 95% have occurred in the aquifer within 30 feet of the source are bioreactor.
- The most contaminated well in the source area (MW793x39) had a baseline concentration of 8,000 µg/L, which has been reduced to 5.3 µg/L in the May 2011 sampling event.
- The bioreactor could continue to operate with very limited monitoring on an annual basis.
- The bioreactor is most efficient with higher levels of TCE to treat in the recirculated water.
- An intermittent or pulsed operation such as one week on and four weeks off may be more effective and conserve the small quantities of TOC being generated in the bioreactor.
- Previous attempts to increase the TOC being generated from the bioreactor into the surrounding aquifer have not been successful.
- It appears that daily recirculation of sulfate rich groundwater through the bioreactor is rapidly decreasing the TOC that was added to the bioreactor as vegetable oil in October 2010.




E
E'
Elevation (feet msl)
Distance (feet)
SOIL AND LITHOLOGY
NO SAMPLING 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
NOT SAMPLED
FIGURE 14-A
SITE DP039 BIOREACTOR
CROSS-SECTION E–E'
TCE IN GROUNDWATER (PPB)
CH2MHILL

Travis AFB
Restoration Program

Management Overview Briefing

RPM Meeting

August 17, 2011

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 WP
- ST027B Site Characterization WP
- 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 WP
- Phytostabilization Demonstration Tech Memo
- Model QAPP
- LF008 Rebound Test Tech 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
- 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***

2

Completed Field Work

- ST027B Gore Sorber Survey – Ph 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 – Ph 1
- ST027 Site Characterization -Ph 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
- DP039 Bioreactor Quarterly Performance Sampling
- SD037 EVO Quarterly Performance Sampling
- SS015 EVO Baseline Sampling
- SD036 EVO Baseline Sampling
- SS016 Bioreactor Startup
- SD036 Injection Well Installation (8)
- SS015 Injection Well Installation (5)
- ST018 GETS Installation
- SD036 EVO Injection
- Semiannual GSAP
- SS015 EVO Injection
- Quarterly RPO Performance Monitoring (Feb 2011)
- ST018 GETS Startup
- Quarterly RPO Performance Monitoring (May 2011)
- 2011 Annual GSAP Sampling

3

In-Progress Documents & Field Work

Documents

- Focused Feasibility Study (FFS)
- 2010 Groundwater RPO Annual Report
- ***Site ST027-Area B Human Health Risk Assessment***
- ***Site ST027-Area B Ecological Risk Assessment***

Field Work

- FT005 Soil Remedial Action — Aug(+)
- Quarterly RPO Performance Monitoring — Aug
  - SS015 EVO Second Quarterly Performance Sampling
  - SS016 Bioreactor Third Quarterly Performance Sampling
  - SD036 EVO Third Quarterly Performance Sampling
  - SD037 EVO Fourth Quarterly Performance Sampling
  - DP039 Biobarrier Fourth Quarterly Performance Sampling
- SS029 GET Shutdown Test (System Optimization analysis) — Aug

4

Upcoming Documents

• Baseline Implementation Report (Sites SS015, SS016, SD036, SD037, and DP039)	Aug
• Work Plan for Assessment of Aerobic Chlorinated Cometabolism Enzymes	Sep
• Proposed Plan (PP)	Sep
• Technical and Economic Feasibility Analysis (TEFA)	Oct
• Work Plan for Site SS029 System Optimization Analysis	TBD

5

Upcoming Field Work

• Sampling for Assessment of Aerobic Chlorinated Cometabolism Enzymes	Oct
• LF007C Site Characterization (Wetlands)	Oct
• SS029 System Optimization Analysis	TBD

6

Travis AFB
Field Schedule - 2011

RPM Meeting

August 17, 2011

2011 Field Schedule

- FT005 Soil Remedial Action — Aug
- Quarterly RPO Performance Monitoring — Aug

  (sites SS015 EVO injection, SS016 bioreactor, SD036 EVO injection, SD037 EVO injection, & DP039 EVO biobarrier)
- ***SS029 Extraction System Shutdown Test*** — ***Aug***
- ***LF007C Remedy Optimization Investigation*** — ***Oct***

  Recently received USFWS approval to sample from vernal pool area
- Sampling for Assessment of Aerobic Chlorinated Cometabolism Enzymes — Oct
- Quarterly RPO Performance Monitoring — Nov

  (sites SS015 EVO injection, SS016 bioreactor, SD036 EVO injection, SD037 EVO injection, DP039 bioreactor, & DP039 EVO biobarrier)
- 2011 Semiannual GSAP Sampling — Nov – Dec
- Site SS029 System Optimization Analysis Investigation — TBD