

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

23 July 2014, 0930 Hours

Mr. Mark Smith, of the Air Force Civil Engineer Center (AFCEC) Restoration Support Team, conducted the Restoration Program Manager's (RPM) meeting in Building 248, on 23 July 2014 at 0930 hours, at Travis AFB, California. Attendees included:

- Mark Smith AFCEC/CZOW
- Glenn Anderson AFCEC/CZOW
- Lonnie Duke AFCEC/CZOW
- Erin Hernandez Travis AFB 60 AMW/JA
- Dave Leeson AFCEC/CZRW
- Shannon Garcia AFCEC/CZRW
- Dezso Linbrunner USACE-Omaha
- Nadia Hollan Burke United States Environmental Protection Agency (USEPA)
- Indira Balkissoon Techlaw, Inc
- Adriana Constantinescu California Regional Water Quality Control Board (RWQCB)
- John Hart (via telephone) California Department of Toxic Substances Control (DTSC)
- Mike Wray CH2M HILL
- Leslie Royer 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 (June 2014)
- Attachment 4 CGWTP Monthly Data Sheet (June 2014)
- Attachment 5 NGWTP Monthly Data Sheet (June 2014)
- Attachment 6 ST018 Monthly Data Sheet (June 2014)
- Attachment 7 Site FT004 Technology Demonstration Work Plan
- Attachment 8 Presentation: Program Update: Activities Completed, In Progress and Upcoming

1. ADMINISTRATIVE

A. Previous Meeting Minutes

The 18 June 2014 RPM meeting minutes were approved and finalized as written.

B. Action Item Review.

Action items from June were reviewed.

Action item 1 will remain open: AFCEC's Travis Restoration Team and Travis AFB will continue to pursue opportunities for the beneficial reuse of treated water. AFCEC is in agreement with using Defense Environmental Restoration Account (DERA) funds under the authority of a "net-zero energy policy" for the Air Force for the beneficial reuse of treated groundwater. Current possibilities include: Rerouting treated water from the central plant to the duck pond or as irrigation as an energy reduction project with the intent of reducing on-base water usage. Due date will remain TBD to ensure this action item remains visible. 23 July 2014: No update.

Master Meeting and Document Schedule Review (see Attachment 2)

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

Travis AFB Annual Meeting and Teleconference Schedule

The next RPM meeting will be held on 20 August 2014. The September and November RPM meetings are scheduled as teleconferences subject to change to a face to face meeting if presentations are scheduled. Mr. Smith announced the post-ROD celebration for the Restoration Advisory Board (RAB), scheduled this Friday, 25 July 2014 at 1300 hours, with the C17 flight simulator experience to follow.

Travis AFB Master Document Schedule

- Groundwater Record of Decision (ROD): Final Due date was changed to 26 June 2014 to reflect the actual date the ROD went final.
- Travis Air Force Base Uniform Federal Policy-Quality Assurance Project Plan (UFP-QAPP): Draft to agencies date was changed to 22 July 2014 to reflect the actual date the document went out. The remaining due dates were changed accordingly.

- Site SD037 GW Remedial Design/Remedial Action Work Plan: TBD was populated with actual dates. The scheduled delivery dates for the work plans (WPs) are staggered so as to not inundate the agencies with overlapping review periods.
- Site SD036 Remedial Design/Remedial Action Work Plan: TBD was populated with schedule dates.

Ms. Burke asked if Travis AFB was planning on a Remedial Design/Remedial Action Work Plan (RD/RA WP) for all 19 sites. Mr. Anderson said that it is not necessary, for example the GETS infustructures are in place and will not need a RD/RA WP for some sites. The RD/RA WPs are for the active remedies that were selected in the ROD and need implementation. Ms. Burke said it would be easier to track if there was a roadmap/description for each of documents to come for each site.

Ms. Constantinescu asked about the upcoming primary documents; where will they be filed, and under what naming convention, in the Defense State Memoranda of Agreement (DSMOA) database. Mr. Smith said that the documents are not listed in the DSMOA Joint Execution Program on a site specific basis. They are listed by phase, such as groundwater remediation, sampling report, etc. Mr. Smith said he would work with the RWQCB if site specific information is needed. Ms. Constantinescu said she will let Travis AFB know if additional site specific information becomes necessary.

- Site SS016 GW Remedial Design/Remedial Action Work Plan: TBD was populated with schedule dates.
- Site SS015 GW Remedial Design/Remedial Action Work Plan: TBD was populated with schedule dates.
- Potrero Hills Annex: (FS, PP, and ROD): No change to the schedule.
- Site CG508 POCO Work Plan: The Final Due date was changed to 1 July 2014 to reflect the actual date the WP went final.
- Site FT004 Treatment Demonstration Work Plan: Draft to Agencies date was changed to 28 June 2014, and the remaining due dates were changed accordingly. A presentation will be given later during this RPM meeting.
- Site DP039 Lead Excavation Technical Memorandum: Draft to Agencies date was changed to 1 July 2014 to reflect the actual date the document went out, and the rest of the dates were changed accordingly. This technical memorandum addresses the soil Land Use Controls (LUC) at the site. The groundwater LUCs will remain in place and are being addressed separately. This technical memorandum will document how the soil was excavated and transported to an off-base repository, and will include laboratory reports.
- Explanation of Significant Differences (ESD) to the NEWIOU Soil, Sediment, and Surface Water Record of Decision (ROD): Draft to Agencies date was changed to 1 August 2014, and the remaining due dates were changed

accordingly. Ms. Burke questioned if this document should be moved to the primary document section of the MMDS according to the Federal Facilities Agreement (FFA). Mr. Anderson said that if it turns out the ESD should be in the primary document category then both ESD documents will be transferred. Mr. Smith said that Travis AFB will consult with Ms. Hernandez to find out where these documents should be listed.

- Site TA500 Investigation Work Plan: TBD was populated with schedule dates. This WP addresses an annex that is just north of the base. The chemical of concern is fluoride in groundwater. There has been a lot of upgrading of the infrastructure within the site that is unrelated to any environmental work. The source of the fluoride originated from a release of hydrofluorosilicic acid that was used to treat potable water. In theory, the fluoride should attenuate, but a data gap investigation needs to be conducted to see if attenuation took place or if additional remedial work is needed.
- Site SD031 Technology Demonstration Work Plan: New document. All new dates. This groundwater plume consists mostly of 1,1-DCE. This will be the first attempt at Travis AFB to horizontally distribute emulsified vegetable oil (EVO) within a plume.
- Explanation of Significant Differences to the Soil Record of Decision for the WABOU: Draft to Agencies date was changed to 16 December 2014, the remaining due dates were changed accordingly.
- Site SS014 Technology Demonstration Work Plan: TBD was populated with schedule dates.
- Quarterly Newsletter (July 2014): The quarterly edition of the newsletter was mailed on 18 July 2014. The Guardian advertised the ROD going final. The ROD notice of availability was advertised in three local newspapers, and it was also sent to AFCEC to have it distributed in their Center Pieces newsletter. Mr. Smith said they are hopeful the advertisements will generate interest in RAB participation.

Ms. Constantinescu commented on low attendance of the RAB members and citizens, and mentioned that other bases have attracted new RAB members by sending out fact sheets with public participation and also advertised at local libraries and other public places. Mr. Smith said that originally Travis AFB didn't have any problems getting RAB member interest, but as the base is cleaned up and fewer decision documents are being generated, community concern or interest has been waning. Mr. Smith is planning on having a future conversation with the RAB members about disbanding the RAB in a couple of years. Mr. Smith added that he has started the process of updating the community involvement plan and will add it to the schedule soon. Ms. Balkissoon suggested perhaps going to other public community events/meetings and "report out" to get the public interested, stating this has worked at other locations. Mr. Smith said he would take these suggestions into consideration.

- 2013 Annual Groundwater Remediation Implementation Status Report (GRISR): The final due date was changed to 16 July 2014 to reflect the actual date. Ms. Balkissoon/Techlaw said that she only needs one CD and a hard copy of the large figure/plate. Mr. Smith acknowledged and thanked Ms. Royer/CH2M HILL for developing this report, adding that it is an excellent source for groundwater information as almost everything you ever wanted to know about Travis AFB groundwater is in this document.
- Kinder Morgan LF044 Land Use Control Report: The Final Due date was changed to TBD.

2. CURRENT PROJECTS

Treatment Plant Operation and Maintenance Update

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 June 2014. All of the treated water was discharged to Union Creek. The average flow rate for the SBBGWTP was 78.7 gallons per minute (gpm). Electrical power usage was 10,080 kWh, and approximately 13,810 pounds of CO₂ were created (based on DOE calculation). Approximately 1.49 pounds of volatile organic compounds (VOCs) were removed in June. The total mass of VOCs removed since startup of the system is 449 pounds.

Optimization Activities: No optimization activities are reported for the month of June.

Ms. Balkissoon asked if Travis AFB has looked at doing a carbon offset project at the California Climate Registry. Mr. Smith said that he hadn't, and that was something to consider.

Central Groundwater Treatment Plant (see Attachment 4)

The Central Groundwater Treatment Plant (CGWTP) performed at 45.7% uptime with approximately 0.70 million gallons of groundwater extracted and treated during the month of June 2014. All treated water was discharged to the storm drain. The average flow rate for the CGWTP was 33.3 gpm. Electrical power usage was 1,753 kWh for all equipment connected to the Central Plant, and approximately 2,402 pounds of CO₂ were generated. Approximately 1.93 pounds of VOCs were removed from groundwater by the treatment plant in June. The total mass of VOCs removed since the startup of the system is 11,372 pounds.

Optimization Activities for WTTP: The WTTP remains off line since it was shut down in April 2010 for the ongoing rebound study. The rebound study was concluded

with the signing of the Groundwater ROD in June. No additional optimization activities to report for the month of June.

Optimization Activities for CGWTP: No optimization activities are reported for the month of June.

North Groundwater Treatment Plant (see Attachment 5)

The North Groundwater Treatment Plant (NGWTP) performed at 98% uptime with approximately 160,935 gallons of groundwater extracted and treated during the month of June 2014. The average flow rate at the NGWTP was 3.7 gpm, and electrical power use was 0 kWh for all the equipment connected to the North plant; and 0 pounds of CO₂ was generated; this system is 100 percent off of the power grid. Approximately 7.60×10^{-3} pounds of VOCs were removed from the groundwater in June. The total mass of VOCs removed since the startup of the system is 174.3 pounds.

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

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

The Site ST018 (MTBE) Treatment Plant (ST018 GWTP) performed at 97% uptime with approximately 168,400 gallons of groundwater extracted and treated during the month of June 2014. All treated water was diverted to the storm drain. The average flow rate for the ST018 GWTP was 3.91gpm. Electrical power usage for the month was 107 kWh for all equipment connected to the ST018 GWTP plant, which equates to the creation of approximately 147 pounds of CO₂. Approximately 1.42 pounds of BTEX, MTBE and TPH were removed from groundwater in June from the treatment plant. The total BTEX, MTBE and TPH mass removed since the startup of the system is 30.3 pounds.

Note: Electrical power use at the ST018 GWTP is only for the alarm system and a pump that pushes water through the GAC vessels for treatment. The extraction pumps in the system are solar powered.

Optimization Activities for ST018: No optimization activities to report for the month of June.

Presentations:

Site FT004 Technology Demonstration Work Plan (see Attachment 7)

Leslie Royer reported on Site FT004 Technology Demonstration Work Plan.

Mr. Anderson gave a brief introduction about the history and perspective of Site FT004 and the Technology Demonstration.

Travis AFB has conducted past demonstration projects in support of the remedy selection process for the Groundwater Record of Decision (ROD). In approximately 2007/2008, Travis AFB began to explore different alternatives to pumping and treating. “We were getting less contamination from every gallon of groundwater pumped.” The cost for treatment was increasing and the amount of contamination removed was going down. Plus Travis AFB wanted to explore green and sustainable technologies to achieve cleanup levels.

Travis AFB consulted with the regulatory agencies to receive input and approval of the technology demonstration projects. In this case, it was biology-based type of remedies (i.e., EVO injections) used to try and induce reductive dechlorination. They are called demonstration projects, because they were never designed to actually clean up the entire groundwater contamination. The purpose was to provide proof of concept that the technologies work. Travis AFB installed a bunch of new wells (injection and monitoring) at four different sites with high TCE concentration levels in order to get a large volume of EVO injected. The thought was if the EVO works to effectively reduce the highest levels of contamination, then EVO will also work with lower concentrations. The demonstration projects that were conducted in these sites proved to be successful.

By conducting this type of post-ROD demonstration project, using an already approved effective technology, the base hopes to optimize the performance of the injections by recirculating the EVO and utilizing existing wells/infrastructure; we would then get more “bang for the buck”. Alternatively, Travis AFB would need to install a bunch of new wells to inject EVO, which is very cost prohibitive, and any new well installed at some point will have to be decommissioned.

Mr. Anderson gave Ms. Balkissoon a brief background on the aerobic study that was conducted by Idaho National Laboratories (referenced in the ROD). Ms. Royer added that Travis AFB is naturally aerobic, because the groundwater is so shallow. The only places where it has gone anaerobic are at the injections sites, which were forced into an anaerobic state by the injections.

Ms. Burke expressed concern with this demonstration project, in particular the implementation of the MNA remedy that was selected in the ROD for this site. Mr. Anderson said this second demonstration project has to be conducted in a location where EVO injections have not been performed before, because we would not be able to determine if results were achieved from the first set or second set of injections. The sole focus of this demonstration is learning how to get EVO from point A to point B in the subsurface. Mr. Anderson added that the base needs to document in separate correspondence the implementation of MNA as described in the ROD.

Ms. Royer began the Site FT004 Technology Demonstration Work Plan slide presentation (see attachment 7 for detail). Highlights of the presentation included:

Background:

- Site FT004 was used for fire training exercises from 1953 to 1962. A TCE plume with concentrations as high as 5,200 µg/L resulted from the training exercises.
- A groundwater extraction and treatment system (GETS) was used at the site from 2000 to 2009 as an interim remedial action which significantly reduced TCE concentrations to below 500 µg/L. The GETS split the plume into two smaller plumes (north and south plumes).
- In 2009 the GETS was shut down for a rebound study. The study determined that the plume was stable, and in 2014 monitored natural attenuation (MNA) was selected as the final remedy in the ROD for Site FT004.
- Emulsified vegetable oil (EVO) has not been previously used at Site FT004.

Slide 7 is a map of FT004 showing its current infrastructure, monitoring wells, extraction wells, and TCE concentrations associated with each well (note: the data is from 2013 GRISR). There are two separate plumes, a larger plume to the south, and the smaller plume to the north. The original plume shrank and separated into two plumes when the GETS was in operation.

Objectives:

- Evaluate the effectiveness of subsurface distribution of EVO using a combination of injection wells, bioreactor trenches and the existing extraction system to create a recirculation cell to promote distribution through the aquifer.
- Site FT004 was selected for the technology demonstration, because EVO has never been used at this site, it has an existing extraction system, and it presents a good opportunity to see how effective different methods of subsurface EVO distributions are. The technology demonstration will be performed over a period of three to five years.
- Two different types of enhanced reductive dechlorination (ERD) technologies will be compared. At the south plume we will use a combination of infiltration bioreactor trenches, EVO injection, and recirculation. At the north plume we will use EVO injection with groundwater extraction, there will be no recirculation in this part of the plume.
- Results from this demonstration will be used to optimize the performance of the groundwater remedial actions that use an injected carbon source to promote ERD. The hope is to apply what we learn at this site to assist with other EVO injection sites.

Conceptual Design – South TCE Plume:

- At the south TCE plume we will create groundwater TOC recirculation cells using extraction wells, injection wells, and infiltration bioreactor trenches. The existing extraction wells currently have eductor pumps, which will be

replaced with electric submersible pumps. Initially EVO will be injected into the subsurface in approximately 26 injection wells that will be located along the presumed axis of the TCE plume, targeting where TCE exceed 20 µg/L.

- An existing extraction well system that is predominantly located along the northeastern portion of the TCE plume will be used to redistribute the EVO to the northeast (upgradient) toward the extraction wells. The EVO and groundwater captured by the extraction wells will be re-injected into up to four infiltration bioreactor trenches.
- The infiltration bioreactor trenches are expected to be installed along the western and southern portion of the south TCE plume. The infiltration bioreactor trenches will provide a source of TOC for the shallow portion of the aquifer and injection wells will provide a source of TOC for the deeper portion of the aquifer. A map was presented to show the installation.

Conceptual Design – North TCE Plume:

- The design for the north TCE plume is to inject EVO in approximately seven injection wells and to use groundwater extraction to promote TOC distribution within the 20 µg/L TCE groundwater plume.
- Groundwater will be extracted from two existing extraction wells that are located on the south side of the north TCE plume.

Data Gap Investigation:

- Prior to conducting the technology demonstration, a data gap investigation will be conducted.
- Six injection wells in the south TCE plume and one injection well in the north TCE plume to be used initially as monitoring wells. Groundwater samples from these wells will be used to re-evaluate where the TCE concentrations in the south and north plumes exceed 20 µg/L, and to refine the target areas.
- The final design of the technology demonstration will be based on the refined target areas.

Monitoring/Injection Wells:

- Approximately 26 monitoring/injection wells will be installed in the south TCE plume area.
- Approximately 7 monitoring/injection wells will be installed in the north TCE plume area.
- The wells will be drilled to bedrock, approximately 35 to 50 feet below ground surface (bgs).

Infiltration Bioreactor Trenches:

- Up to four infiltration bioreactor trenches will be installed in the south TCE plume area. The bioreactor trenches will be up to 100 feet long and up to 5 feet wide.
- The bottom of the trench will be covered with a layer of iron pyrite sands to promote abiotic reduction of volatile organic compounds (VOCs). A mixture of gravel and mulch will be placed on top of the pyrite sands, and two PVC groundwater distribution manifolds (one will be used as backup) for distributing the groundwater into the bioreactor infiltration trench from the extraction well network will be placed on top of the fill materials.

EVO Injection:

- It is anticipated that approximately 47,000 pounds of EVO will be injected into the south TCE plume area and approximately 13,000 pounds will be injected into the north TCE plume area.

Groundwater Monitoring:

- Baseline groundwater sampling will be conducted prior to injection of the EVO to establish the TOC and contaminant conditions.
- Post injection monitoring will be conducted in six to eight performance monitoring/extraction wells.
- Post injection monitoring will be conducted semiannually for one year and annually thereafter for up to three years.

Reporting:

- Results of the data gap investigation and implementation of the technology demonstration will be reported in a technology demonstration completion report (TDCR). Analytical results of post injection monitoring and lessons learned from the technology demonstration will be presented in the annual groundwater remediation implementation status report (GRISR).

Ms. Balkissoon asked where she can find the capture zone data. Ms. Royer said that capture zone is in the 2008 annual GSAP report.

Ms. Royer ended by stating that this is just a conceptual design and that the design will be modified based on the actual data that will be collected, using the triad-like approach.

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

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

Newly Completed Documents: Groundwater Record of Decision (ROD), CG508 POCO Work Plan, 2013 Annual GRISR.

Newly Completed Field Work: None.

In-Progress Documents: Travis AFB UFP-QAPP, DP039 Lead Excavation Technical Memo, FT004 Technology Demonstration Work Plan, Kinder Morgan LF044 Land Use Control Report,

In-Progress Field Work: Site CG508 Site Investigation.

Upcoming Documents: ESD to WABOU Soil ROD, ESD to NEWIOU Soil, Sediment, & Surface Water ROD, SD031 Treatment Demonstration Work Plan, SD037 GW RD/RA Work Plan, TA500 Investigation Work Plan, SD036 RD/RA Work Plan, SS014 Technology Demonstration Work Plan, SS016 GW RD/RA Work Plan, SS015 GW RD/RA Work Plan, Travis AFB UFP-QAPP.

Upcoming Field Work: Old Skeet Range Characterization Sampling, SD031 Technology Demonstration, 2Q Semiannual GRIP Sampling Event.

4. New Action Item Review

Travis AFB to provide a site-specific roadmap for the nineteen sites listed in the ROD due by the next RPM meeting, 20 August 2014.

5. PROGRAM/ISSUES/UPDATE

Mr. Linbrunner commended Mr. Hall's efforts in obtaining accelerated funding for the PBC-13 project. On 2 June 2014, an additional \$9.8 million was awarded outside the normal funding which brings the total to \$16.2 million. There is another \$4.2 million that may become available at the end of this fiscal year that Mr. Hall is aware of. He has a project priority list provided by Travis AFB and CH2M HILL.

Mr. Linbrunner also mentioned a Defense Logistics Agency (DLA) project that USACE manages, and Mr. Duke oversees. The Lawler Ranch project is a Solano County project, and is managed by the Certified Unified Program Agency (CUPA). This project involves a jet fuel pipeline leak that occurred in 2009.

Mr. Linbrunner said he has invited CH2M HILL's leadership team, from Atlanta and Kansas City, to visit Travis AFB on 19 August 2014 for a site visit and to give them a visual on everything that was accomplished in the FY08 contract. He also wants to show them sites scheduled to be worked on in the PBC-13 contract. They are also scheduled to attend the early part of the 20 August 2014 RPM meeting.

6. Action Items

Item #	Responsible	Action Item Description	Due Date	Status
1.	Travis AFB	AFCEC's Travis Restoration Team and Travis AFB will continue to pursue opportunities for the beneficial reuse of treated water. AFCEC is in agreement with using Defense Environmental Restoration Account (DERA) funds under the authority of a "net-zero energy policy" for the Air Force for the beneficial reuse of treated groundwater. Current possibilities include: Rerouting treated water from the central plant to the duck pond or as irrigation as an energy reduction project with the intent of reducing on-base water usage. Due date will remain TBD to ensure this action item remains visible.	TBD	Open
2.	Travis AFB	Travis AFB to provide a site specific roadmap for the nineteen sites listed in the ROD.	20 August 2014	Open

TRAVIS AIR FORCE BASE
ENVIRONMENTAL RESTORATION PROGRAM
RESTORATION PROGRAM MANAGER'S MEETING
BLDG 248 Conference Room
23 July 2014, 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

3. DISCUSSION

- A. SITE FT004 TECHNOLOGY DEMONSTRATION WORK PLAN

4. PRESENTATION

- A. PROGRAM UPDATE: ACTIVITIES COMPLETED, IN PROGRESS AND UPCOMING

5. NEW ACTION ITEM REVIEW

6. PROGRAM/ISSUES/UPDATE

- A. RAB POST-ROD BASE VISIT

(2014)
Annual Meeting and Teleconference Schedule

Monthly RPM Meeting ¹ (Begins at 9:30 a.m.)	RPM Teleconference (Begins at 10:00 a.m.)	Restoration Advisory Board Meeting (Begins at 7:00 p.m.) (Poster Session at 6:30 p.m.)
01-22-14	—	—
02-19-14	—	—
03-19-14	—	—
04-16-14	—	04-17-14 ²
05-14-14	—	—
06-18-14	—	—
07-23-14	—	—
08-20-14	—	—
—	09-17-14	—
10-23-14 (Thur 2:00 PM)	—	10-23-14
—	11-19-14	—
—	—	—

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

² Note: Replaced with post-ROD base visit on 25 July 2014

Travis AFB Master Meeting and Document Schedule

PRIMARY DOCUMENTS			
Life Cycle	Groundwater Record of Decision Travis, Glenn Anderson CH2M HILL, Leah Waller	Travis Air Force Base Uniform Federal Policy-Quality Assurance Project Plan Travis, Glenn Anderson CH2M HILL, Bernice Kidd	Site SD037 GW Remedial Design/Remedial Action Work Plan Travis AFB, Glenn Anderson CH2M HILL, Tony Chakurian
Scoping Meeting	01-24-07 (11-30-11)	NA	NA
Predraft to AF/Service Center	11-28-12	05-30-14	04-25-14
AF/Service Center Comments Due	12-12-12	06-13-14	05-08-14
Draft to Agencies	01-02-13 ¹	07-22-14	08-16-14
Draft to RAB	01-02-13 ¹	07-22-14	08-16-14
Agency Comments Due	03-03-13 (04-05-13)	08-20-14	09-14-14
Response to Comments Meeting	11-20-13	09-11-14	09-17-14
Public Comment Period	NA	NA	NA
Public Meeting	NA	NA	NA
Response to Comments Due	02-19-14	09-22-14	10-31-14
Draft Final Due	02-19-14	09-22-14	10-13-14
Final Due	06-26-14	10-22-14	11-12-14

¹Sent Appendix A to agencies for review on 07-31-13

Travis AFB Master Meeting and Document Schedule

PRIMARY DOCUMENTS			
Life Cycle	Site SD036 Remedial Design/Remedial Action Work Plan Travis AFB, Glenn Anderson CH2M HILL, Tony Chakurian	Site SS016 GW Remedial Design/Remedial Action Work Plan Travis AFB, Glenn Anderson CH2M HILL, Tony Chakurian	Site SS015 GW Remedial Design/Remedial Action Work Plan Travis AFB, Glenn Anderson CH2M HILL, Tony Chakurian
Scoping Meeting	NA	NA	NA
Predraft to AF/Service Center	08-23-14	10-24-14	02-18-15
AF/Service Center Comments Due	09-05-14	11-06-14	03-03-15
Draft to Agencies	10-04-14	12-05-14	04-01-15
Draft to RAB	10-04-14	12-05-14	04-01-15
Agency Comments Due	11-02-14	01-03-15	05-01-15
Response to Comments Meeting	11-19-14	01-21-15	05-20-15
Public Comment Period	NA	NA	NA
Public Meeting	NA	NA	NA
Response to Comments Due	12-01-14	02-02-15	06-01-15
Draft Final Due	12-01-14	02-02-15	06-01-15
Final Due	01-20-15	03-04-15	07-01-15

Travis AFB Master Meeting and Document Schedule

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

Travis AFB Master Meeting and Document Schedule

SECONDARY DOCUMENTS			
Life Cycle	Site CG508 POCO Work Plan Travis AFB, Glenn Anderson CH2M HILL, Tony Chakurian	Site FT004 Technology Demonstration Work Plan Travis AFB, Glenn Anderson CH2M HILL, Tony Chakurian	Site DP039 Lead Excavation Technical Memorandum Travis AFB, Glenn Anderson CH2M HILL, Loren Krook
Scoping Meeting	NA	NA	NA
Predraft to AF/Service Center	02-25-14	04-21-14	06-02-14
AF/Service Center Comments Due	03-11-14	05-21-14	06-16-14
Draft to Agencies	03-26-14	06-28-14	07-01-14
Draft to RAB	03-26-14	06-28-14	07-01-14
Agency Comments Due	04-27-14	7-28-14	07-31-14
Response to Comments Meeting	05-14-14	08-11-14	08-14-14
Response to Comments Due	06-25-14	08-27-14	08-29-14
Draft Final Due	NA	NA	NA
Final Due	07-01-14	08-27-14	08-29-14
Public Comment Period	NA	NA	NA
Public Meeting	NA	NA	NA

Travis AFB Master Meeting and Document Schedule

SECONDARY DOCUMENTS			
Life Cycle	Explanation of Significant Differences to the NEWIOU Soil, Sediment, and Surface Water Record of Decision Travis AFB, Glenn Anderson CH2M HILL, Loren Krook	Site TA500 Data Gap Investigation Work Plan Travis AFB, Glenn Anderson CH2M HILL, Tony Chakurian	Site SD031 Technology Demonstration Work Plan Travis AFB, Glenn Anderson CH2M HILL, Tony Chakurian
Scoping Meeting	NA	NA	NA
Predraft to AF/Service Center	04-23-14	07-23-14	07-11-14
AF/Service Center Comments Due	05-07-14	08-05-14	07-25-14
Draft to Agencies	08-01-14	08-19-14	08-25-14
Draft to RAB	08-01-14	08-19-14	08-25-14
Agency Comments Due	09-01-14	09-18-14	09-24-14
Response to Comments Meeting	09-17-14	10-02-14	10-08-14
Response to Comments Due	10-01-14	10-20-14	10-24-14
Draft Final Due	NA	NA	NA
Final Due	10-01-14	10-20-14	10-24-14
Public Comment Period	NA	NA	NA
Public Meeting	NA	NA	NA

Travis AFB Master Meeting and Document Schedule

SECONDARY DOCUMENTS		
Life Cycle	Explanation of Significant Differences to the Soil Record of Decision for the WABOU Travis AFB, Glenn Anderson CH2M HILL, Loren Krook	Site SS014 Technology Demonstration Work Plan Travis AFB, Glenn Anderson CH2M HILL, Tony Chakurian
Scoping Meeting	NA	NA
Predraft to AF/Service Center	04-23-14	11-06-14
AF/Service Center Comments Due	05-07-14	11-19-14
Draft to Agencies	12-16-14	12-18-14
Draft to RAB	12-16-14	12-18-14
Agency Comments Due	01-14-15	01-23-15
Response to Comments Meeting	01-21-15	01-30-15
Response to Comments Due	01-28-15	02-23-15
Draft Final Due	NA	NA
Final Due	01-28-15	02-23-15
Public Comment Period	NA	NA
Public Meeting	NA	NA

Travis AFB Master Meeting and Document Schedule

INFORMATIONAL DOCUMENTS			
Life Cycle	Quarterly Newsletters (July 2014) Travis, Glenn Anderson	2013 Annual Groundwater Remediation Implementation Status Report Travis AFB, Lonnie Duke CH2M HILL, Royer/Berwick	Kinder Morgan Site LF044 Land Use Control Report Travis AFB, Glenn Anderson AMEC, Nick Ricono
Scoping Meeting	NA	NA	NA
Predraft to AF/Service Center	NA	03-24-14	NA
AF/Service Center Comments Due	NA	04-10-14	NA
Draft to Agencies	06-25-14	04-25-14	09-18-13
Draft to RAB	NA	04-25-14	09-18-13
Agency Comments Due	07-09-14	05-26-14	10-18-13
Response to Comments Meeting	TBD	06-18-14	06-18-14
Response to Comments Due	07-18-14	06-26-14	06-25-14
Draft Final Due	NA	NA	NA
Final Due	07-18-14	07-16-14	TBD
Public Comment Period	NA	NA	NA
Public Meeting	NA	NA	NA

South Base Boundary Groundwater Treatment Plant Monthly Data Sheet

Report Number: 166

Reporting Period: 29 May 2014 – 30 June 2014

Date Submitted: 18 July 2014

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 operational data from the June 2014 reporting period.

Table 1 – Operations Summary – June 2014				
Initial Data Collection:		5/29/2014 17:30	Final Data Collection:	6/30/2014 15:30
Operating Time:		Percent Uptime:	Electrical Power Usage:	
SBBGWTP:	766 hours	SBBGWTP:	100%	SBBGWTP: 10,080 kWh (13,810 lbs CO ₂ generated ^a)
Gallons Treated: 3.6 million gallons			Gallons Treated Since July 1998: 861 million gallons	
Volume Discharged to Union Creek: 3.6 million gallons				
VOC Mass Removed: 1.49 lbs ^b			VOC Mass Removed Since July 1998: 449 lbs	
Rolling 12-Month Cost per Pound of Mass Removed: \$9,660 ^c				
Monthly Cost per Pound of Mass Removed: \$2,458				
lbs = pounds				
^a Based on Department of Energy estimate that 1 kilowatt hour generated produces 1.37 pounds of GHG.				
^b Calculated using June 2014 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,b}							
FT005 ^c				SS029		SS030	
EW01x05	2.4	EW736x05	Offline	EW01x29	0.3	EW01x30	5.9
EW02x05	1.6	EW737x05	Offline	EW02x29	5.4	EW02x30	0.2
EW03x05	Offline	EW742x05	Offline	EW03x29	1.8	EW03x30	8.0
EW731x05	Offline	EW743x05	Offline	EW04x29	8.4	EW04x30	35.8
EW732x05	Offline	EW744x05	Offline	EW05x29	11.3	EW05x30	6.6
EW733x05	Offline	EW745x05	Offline	EW06x29	3.9	EW06x30	Dry
EW734x05	1.8	EW746x05	Offline	EW07x29	2.3	EW711x30	4.0
EW735x05	1.2						
FT005 Total: 7.0				SS029 Total: 33.4		SS030 Total: 70.5	
SBBGWTP Average Monthly Flow ^c : 78.7 gpm							
^a Extraction well flow rates are based on instantaneous weekly readings collected at the end of the month.							
^b The average SBBGWTP groundwater flow rate was calculated using the Union Creek Discharge Totalizer and dividing it by the total time in the reporting period.							
^c Most extraction wells at FT005 were taken offline in accordance with the 2008 Annual Remedial Process Optimization Report for the Central Groundwater Treatment Plant, North Groundwater Treatment Plant, and South Base Boundary Groundwater Treatment Plant.							
gpm – gallons per minute							
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	NA			
SBBGWTP = South Base Boundary Groundwater Treatment Plant					

Summary of O&M Activities

Monthly groundwater samples were collected at the SBBGWTP on 5 June 2014. Sample results are presented in Table 4. The total VOC concentration (49.28 µg/L) in the influent sample has increased since the May sample (27 µg/L) was collected. Chloroform (0.18 µg/L), cis-1,2-DCE (3 µg/L), and TCE (46.1 µg/L) were detected at the influent sampling location. Cis-1,2-DCE (0.22 µg/L) and TCE (0.27 µg/L) were also detected at the effluent sampling location at a concentration well below the effluent limitations of 5 µg/L. The carbon was recently changed out in the primary vessel, so it is unlikely that the vessels are experiencing breakthrough at this time. No contaminant concentrations were detected at the midpoint sampling location. Effluent concentrations will continue to be monitored for breakthrough conditions.

Figure 1 presents a plot of influent concentrations and average flow at the SBBGWTP over the past twelve (12) months. The average flow rate at the SBBGWTP increased in June 2014 to 78.7 gpm from 61.9 gpm in May.

A faulty pump at extraction well EW05x29 was replaced on 25 June 2014. All of the extraction wells planned for operation are now online. The bag filters at the SBBGWTP were replaced on 30 June 2014.

Optimization Activities

No optimization activities were performed in June 2014.

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 taking extraction pumps off line that are no longer necessary for contaminant plume capture.

Figure 2 presents the historical GHG production from the SBBGWTP. The SBBGWTP produced approximately 13,810 pounds of GHG during June 2014. This is a decrease from usage during May 2014. GHG production at the SBBGWTP during June 2014 is consistent with expected monthly usage at the SBBGWTP.

TABLE 4
Summary of Groundwater Analytical Data for June 2014 – South Base Boundary Groundwater Treatment Plant

Constituent	Instantaneous Maximum ^a (µg/L)	Detection Limit (µg/L)	N/C	5 June 2014 (µg/L)		
				Influent	Midpoint	Effluent
Halogenated Volatile Organics						
Carbon Tetrachloride	0.5	0.14	0	ND	ND	ND
Chloroform	5.0	0.16	0	0.18 J	ND	ND
1,1-Dichloroethane	5.0	0.50	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	3	ND	0.22 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	46.1	ND	0.27 J
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	33	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).

Notes:

J = analyte concentration is considered an estimated value due to a detected concentration value between the reporting limit and method detection limit for the contaminant

mg/L = milligrams per liter

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

ND = not detected

NE = not established

NM = not measured

µg/L = micrograms per liter

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

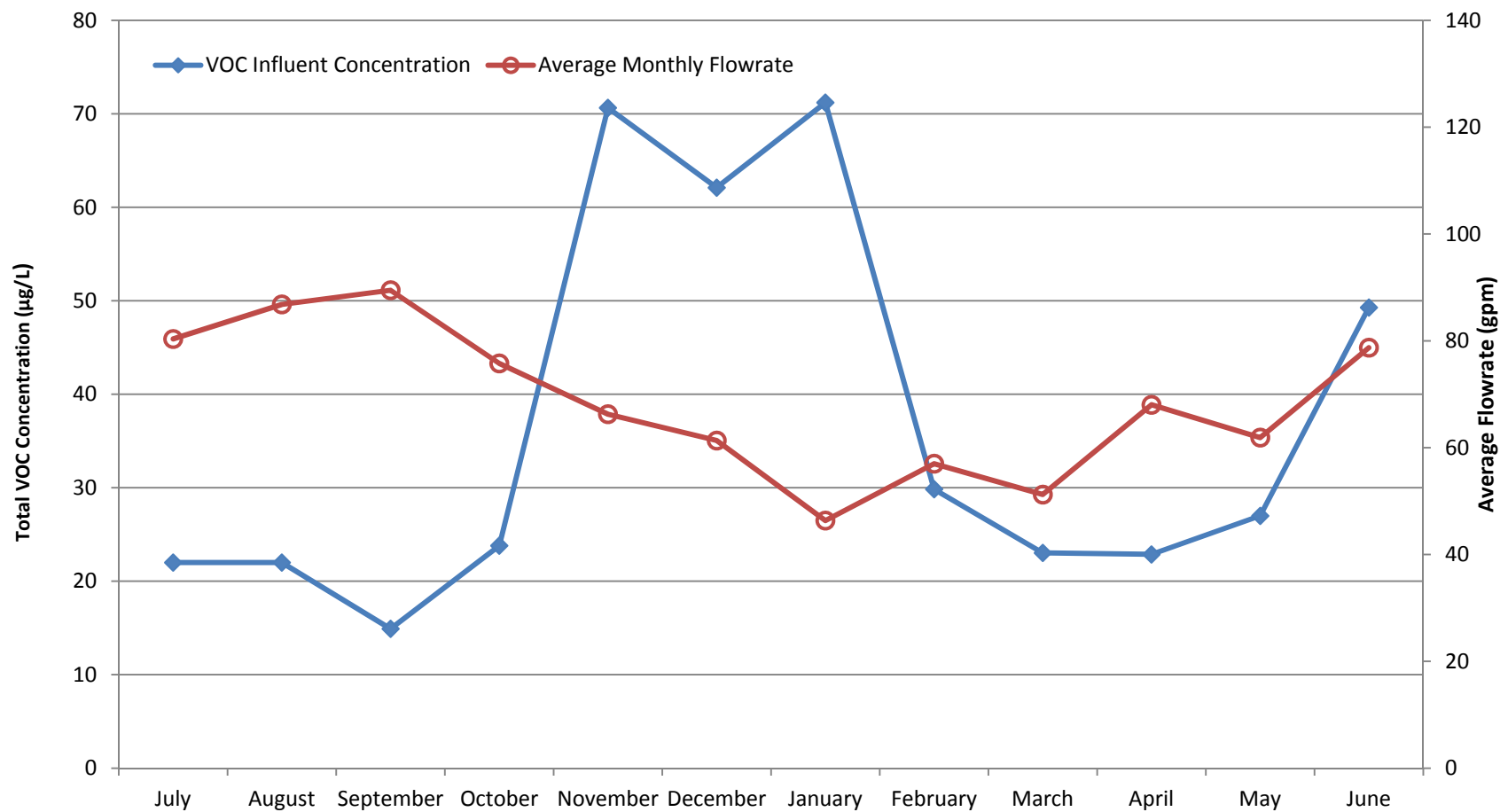
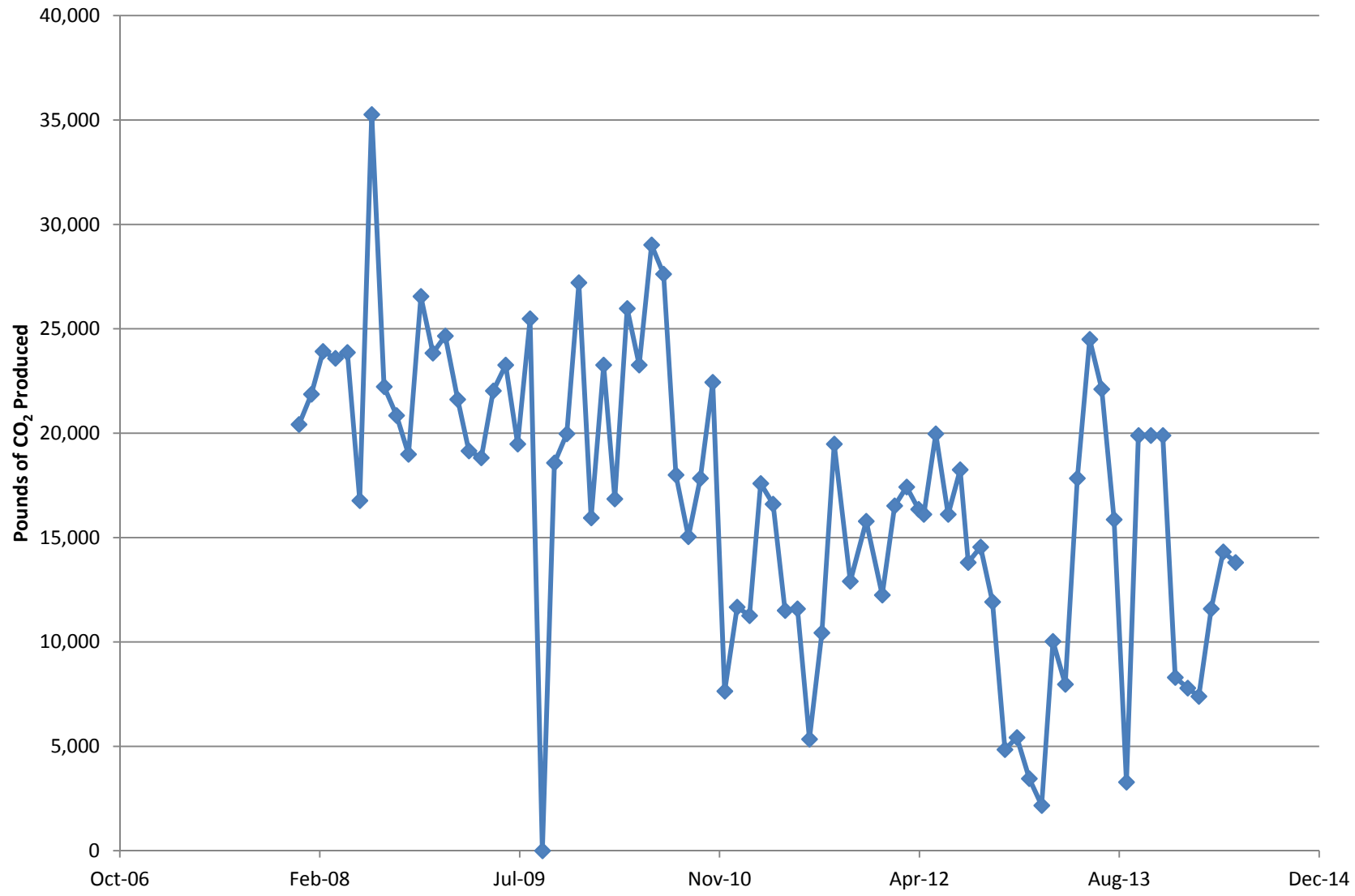


Figure 2

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



Central Groundwater Treatment Plant Monthly Data Sheet

Report Number: 179

Reporting Period: 29 May 2014 – 30 June 2014

Date Submitted: 18 July 2014

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

System Metrics

Table 1 presents operational data from the June 2014 reporting period.

Table 1 – Operations Summary – June 2014					
Initial Data Collection:		5/29/2014 16:30	Final Data Collection:	6/30/2014 15:00	
Operating Time:		Percent Uptime:	Electrical Power Usage:		
CGWTP:	350.5 hours	CGWTP:	45.7%	CGWTP:	1,753 kWh (2,402 lbs CO ₂ generated ^a)
WTTP:	Water: 0 hours Vapor: 0 hours	WTTP:	Water: 0% Vapor: 0%	WTTP:	0 kWh
Gallons Treated: 0.70 million gallons		Gallons Treated Since January 1996: 497 million gallons			
VOC Mass Removed:		VOC Mass Removed Since January 1996:			
1.93 lbs ^b (groundwater only)		2,686 lbs from groundwater			
0 lbs (vapor only)		8,686 lbs from vapor			
Rolling 12-Month Cost per Pound of Mass Removed: \$2,374 ^c					
Monthly Cost per Pound of Mass Removed: \$1,262					
^a Based on Department of Energy estimate that 1 kilowatt hour generated produces 1.37 pounds of GHG.					
^b Calculated using June 2014 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 and are reported based on the calendar month.					

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	20.1 ^c	Offline
EW02x16	7.2 ^c	Offline
EW03x16	0.1	Offline
EW605x16	6.8	Offline
EW610x16	3.5	Offline
CGWTP	33.3	--
WTTP	-- ^b	Offline
^a Flow rates calculated by dividing total gallons processed by system operating time for the month. ^b No soil vapor was treated in June 2014. ^c Flow rate based on instantaneous, end of the month reading for June 2014. gpm = gallons per minute -- = not applicable/not available scfm = standard cubic feet per minute		

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

Table 3 – Summary of System Shutdowns					
Location	Shutdown		Restart		Cause
	Date	Time	Date	Time	
CGWTP (Groundwater)					
CGWTP	6/8/2014	14:00	6/20/2014	17:00	System shut down due to high level alarm. SCADA system troubleshooting resulted in delayed restart.
WTTP					
	None	NA			
CGWTP = Central Groundwater Treatment Plant WTTP = West Transfer Treatment Plant					

Summary of O&M Activities

Monthly groundwater samples were collected at the CGWTP on 5 June 2014. Sample results are presented in Table 4. The total VOC concentration (331.26 µg/L) in the influent sample has increased since the May 2014 sample (117.74 µg/L) was collected.

Concentrations of 1,1-DCE (0.66 µg/L), 1,2-Dichlorobenzene (DCB) (0.61 µg/L), 1,3-DCB (0.31 µg/L), 1,4-DCB (0.46 µg/L), cis-1,2-DCE (67.3 µg/L), tetrachloroethene (0.6 µg/L), trans-1,2-Dichloroethene (3 µg/L), TCE (258 µg/L), and vinyl chloride (0.32 µg/L) were detected at the influent sampling location. Vinyl chloride was also detected at the midpoint sampling location after Carbon 1 (0.56 µg/L) and after Carbon 2 (0.31 µg/L).

No contaminants were detected at the effluent sampling location. Travis Air Force Base will continue to monitor contaminant concentrations at the CGWTP for breakthrough in the primary vessel.

Figure 1 presents a plot of influent concentrations (total VOCs) and the influent flow rate at the CGWTP versus time for the past twelve (12) months. The average flow rate through the treatment plant in June 2014 increased from the flow rate measured in May 2014.

On 6 June 2014 a high level influent tank alarm resulted in a system shutdown. The initial attempt to restart the system on 6 June failed due to logic code failure within the SCADA and PLC programs. The CGWTP was restarted on 20 June 2014 after I&C troubleshooting efforts had identified problematic sections of code.

Additional revisions to the SCADA logic code will continue into July 2014 to help prevent further problems.

The Site DP039 bioreactor continues to operate in a “pulsed mode” in order to improve the rate of remediation and to preserve the amount of total organic carbon being produced within the bioreactor. The “pulsed mode” operation continued on a two (2) week transition schedule in June 2014.

Optimization Activities

No optimization activities occurred at CGWTP in June 2014.

Sustainability

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

Figure 2 presents the historical GHG production from the systems associated with the CGWTP. The CGWTP produced approximately 2,402 pounds of GHG during June 2014. This is a decrease from the amount produced in May 2014 (approximately 2,402 pounds) and is the result of the system shutdown that occurred in June.

TABLE 4
Summary of Groundwater Analytical Data for June 2014 – Central Groundwater Treatment Plant

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	5 June 2014 (µg/L)			
				Influent	After Carbon 1 Effluent	After Carbon 2 Effluent	System Effluent
Halogenated Volatile Organics							
Carbon Tetrachloride	0.5	0.14	0	ND	ND	ND	ND
Chloroform	5.0	0.16	0	ND	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.19	0	67.3	ND	ND	ND
1,1-Dichloroethane	5.0	0.5	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	0.66	ND	ND	ND
Methylene Chloride	5.0	0.66	0	ND	ND	ND	ND
MTBE	1.0	0.5	0	ND	ND	ND	ND
Tetrachloroethene	5.0	0.21	0	0.6	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	258	ND	ND	ND
trans-1,2-Dichloroethene	5.0	0.33	0	3	ND	ND	ND
Vinyl Chloride	0.5	0.18	0	0.32 J	0.56	0.31 J	ND
Non-Halogenated Volatile Organics							
Benzene	1.0	0.17	0	ND	ND	ND	ND
Ethylbenzene	5.0	0.22	0	ND	ND	ND	ND
Toluene	5.0	0.14	0	ND	ND	ND	ND
Total Xylenes	5.0	0.23 – 0.5	0	ND	ND	ND	ND
Other							
Total Dissolved Solids (mg/L)	NA	10	0	NM	NM	852	NM

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

Notes:

J = analyte concentration is considered an estimated value due to a detected concentration value between the reporting limit and method detection limit for the contaminant

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

ND = not detected

µg/L = micrograms per liter

mg/L = milligrams per liter

Table 5 presents a twelve month summary of the Site DP039 bioreactor recirculation well pulsing dates.

Table 5 – Summary of DP039 Bioreactor “Pulsed Mode” Operations		
Location	Pulse On Start Date	Pulse Off Start Date
MW750x39	15 July 2013	26 July 2013
	8 August 2013	16 August 2013
	30 August 2013	13 September 2013
	27 September 2013	11 October 2013
	25 October 2013	8 November 2013
	22 November 2013	5 December 2013
	20 December 2013	3 January 2014
	17 January 2014	31 January 2014
	18 February 2014	28 February 2014
	14 March 2014	28 March 2014
	22 April 2014	28 April 2014
	12 May 2014	12 May 2014
	6 June 2014	20 June 2014
CGWTP = Central Groundwater Treatment Plant EW = Extraction Well		

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

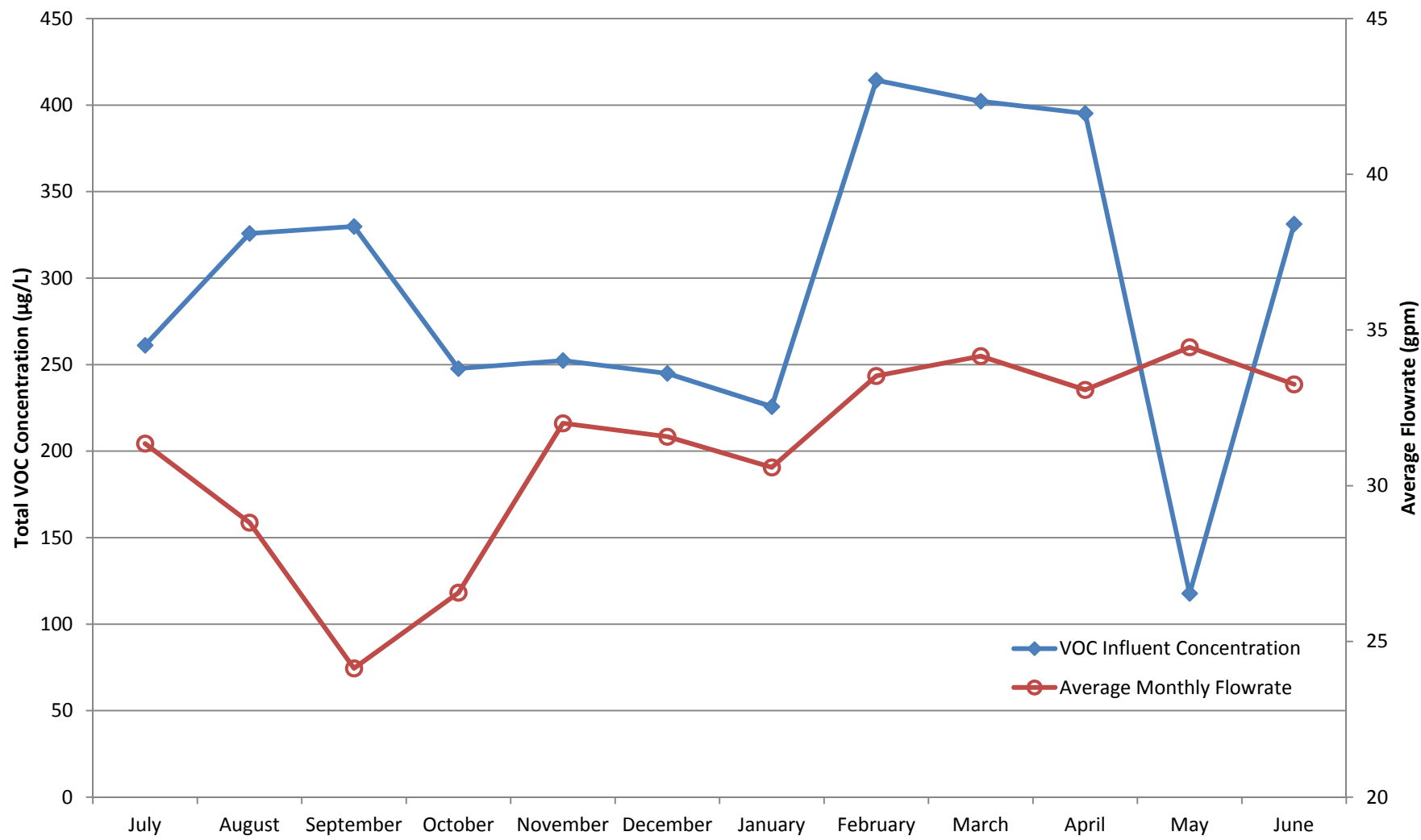
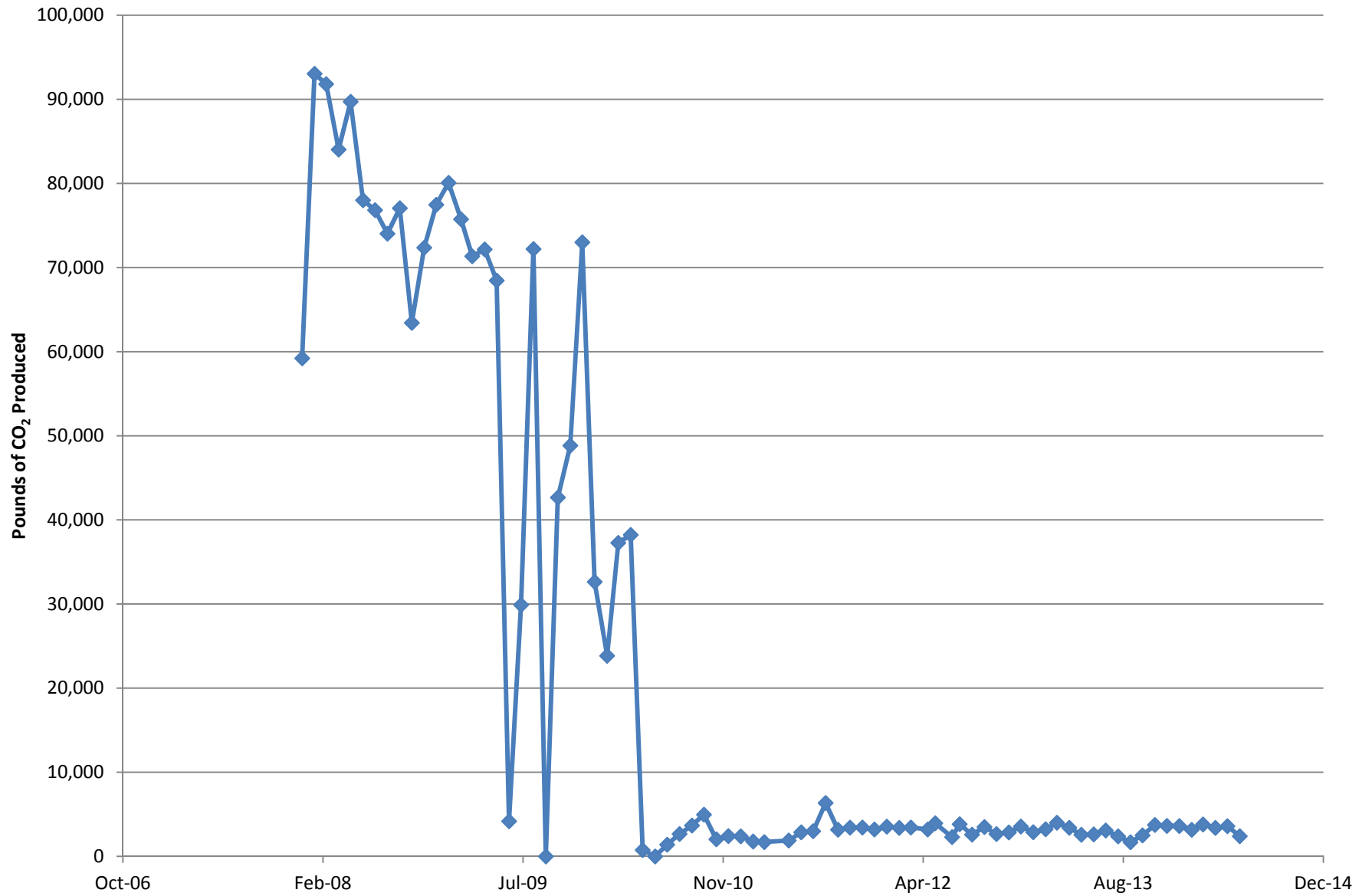


Figure 2

Equivalent Pounds of CO₂ Produced by the Central Groundwater Treatment Plant



North Groundwater Treatment Plant Monthly Data Sheet

Report Number: 139

Reporting Period: 30 May 2014 – 30 June 2014

Date Submitted: 18 July 2014

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

System Metrics

Table 1 presents operational data from the June 2014 reporting period:

Table 1 – Operations Summary – June 2014			
Initial Data Collection:		5/30/2014 17:00	
Final Data Collection:		6/30/2014 12:30	
Operating Time:		Percent Uptime:	
Electrical Power Usage ^a :			
NGWTP:	723 hours	NGWTP:	98%
NGWTP:		NGWTP:	0 kWh
Gallons Treated: 160,935 gallons		Gallons Treated Since March 2000: 83.3 million gallons	
Volume Discharged to Duck Pond: 160,935 gallons		Volume Discharge to Storm Drain: 0 gallons	
VOC Mass Removed: 7.60 x 10 ⁻³ 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 ^c			
^a The NGWTP operates on solar power only.			
^b VOCs from June 2014 influent sample detected by EPA Method SW8260B.			
^c Value not calculated since measurement does not accurately represent the cost effectiveness of the system.			

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

Table 2 – NGWTP Average and Total Flow Rates – June 2014		
Location	Average Flow Rate (gpm)^a	Total Gallons Processed (gallons)^b
EW614x07	3.2	139,620
EW615x07	0.08	3,605
NGWTP	3.7	160,935
^a Average flow rate calculated by dividing the total gallons processed collected from wellhead totalizers by the hours recorded by the system hour meter. ^b A discrepancy in totalizer values was recorded in June and troubleshooting of the meters will occur in July. 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	
	None	NA			
NGWTP = North Groundwater Treatment Plant					

Summary of O&M Activities

Analytical data from the 5 June 2014 sampling event are presented in Table 4. Cis-1,2-dichloroethene (0.37 J µg/L) and TCE (5.3 µg/L) were detected at the influent sample location. Cis-1,2-dichloroethene (0.32 J µg/L) and TCE (5.1 µg/L) were also detected at the midpoint sample location. No contaminant concentrations were measured at the effluent sample location. Carbon is scheduled for changeout in July due to evidence of breakthrough at the midpoint sample location.

Figure 1 presents a chart of influent concentrations (total VOCs) at the NGWTP versus time for the past twelve (12) months. Analytical data (Table 4) continue to indicate effective treatment of the influent process stream with only two (2) operating GAC drums online.

The average flow rate through the NGWTP in June 2014 (3.71 gpm) decreased from the average flow rate in May 2014 (7.8 gpm). However, even with this decrease the average flow rate remains nearly ten times greater than the 0.5 gpm flow rate commonly seen at this location prior to the system optimization completed in January 2014. A discrepancy was observed in June between the total gallons processed by the effluent totalizer and the extraction well totalizers. A brief test will be conducted in July consisting of four sets of readings collected over a period of two days to determine the source of the difference in gallons treated by the system.

Optimization Activities

No optimization activities were performed during June 2014.

Sustainability

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

Figure 2 presents the historical GHG production from the systems associated with the NGWTP. The NGWTP is taken off line when vernal pools are present at Site LF007C. The NGWTP is now a solar-only operated treatment system.

TABLE 4
Summary of Groundwater Analytical Data for June 2014 – North Groundwater Treatment Plant

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	5 June 2014 (µg/L)		
				Influent	After Carbon 1	Effluent
Halogenated Volatile Organics						
Bromodichloromethane	5.0	0.15	0	ND	ND	ND
Bromoform	5.0	0.19	0	ND	ND	ND
Carbon Tetrachloride	0.5	0.14	0	ND	ND	ND
Chloroform	5.0	0.16	0	ND	ND	ND
Dibromochloromethane	5.0	0.13	0	ND	ND	ND
1,3-Dichlorobenzene	5.0	0.15	0	ND	ND	ND
1,4-Dichlorobenzene	5.0	0.15	0	ND	ND	ND
1,1-Dichloroethane	5.0	0.15	0	ND	ND	ND
1,2-Dichloroethane	0.5	0.15	0	ND	ND	ND
1,1-Dichloroethene	5.0	0.19	0	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.19	0	0.37 J	0.32 J	ND
trans-1,2-Dichloroethene	5.0	0.33	0	ND	ND	ND
Methylene Chloride	5.0	0.66	0	ND	ND	ND
Tetrachloroethene	5.0	0.21	0	ND	ND	ND
1,1,1-Trichloroethane	5.0	0.14	0	ND	ND	ND
1,1,2-Trichloroethane	5.0	0.2	0	ND	ND	ND
Trichloroethene	5.0	0.19	0	5.3	5.1	ND
Vinyl Chloride	0.5	0.18	0	ND	ND	ND
Non-Halogenated Volatile Organics						
Benzene	1.0	0.17	0	ND	ND	ND
Ethylbenzene	5.0	0.22	0	ND	ND	ND
Toluene	5.0	0.14	0	ND	ND	ND
Xylenes	5.0	0.23 – 0.5	0	ND	ND	ND
Other						
Total Petroleum Hydrocarbons – Gasoline	50	8.5	0	NM	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	50	0	NM	NM	ND
Total Dissolved Solids (mg/L)	NA	10	0	NM	NM	2730

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

Notes:

J = analyte concentration is considered an estimated value due to a detected concentration value between the reporting limit and method detection limit for the contaminant

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

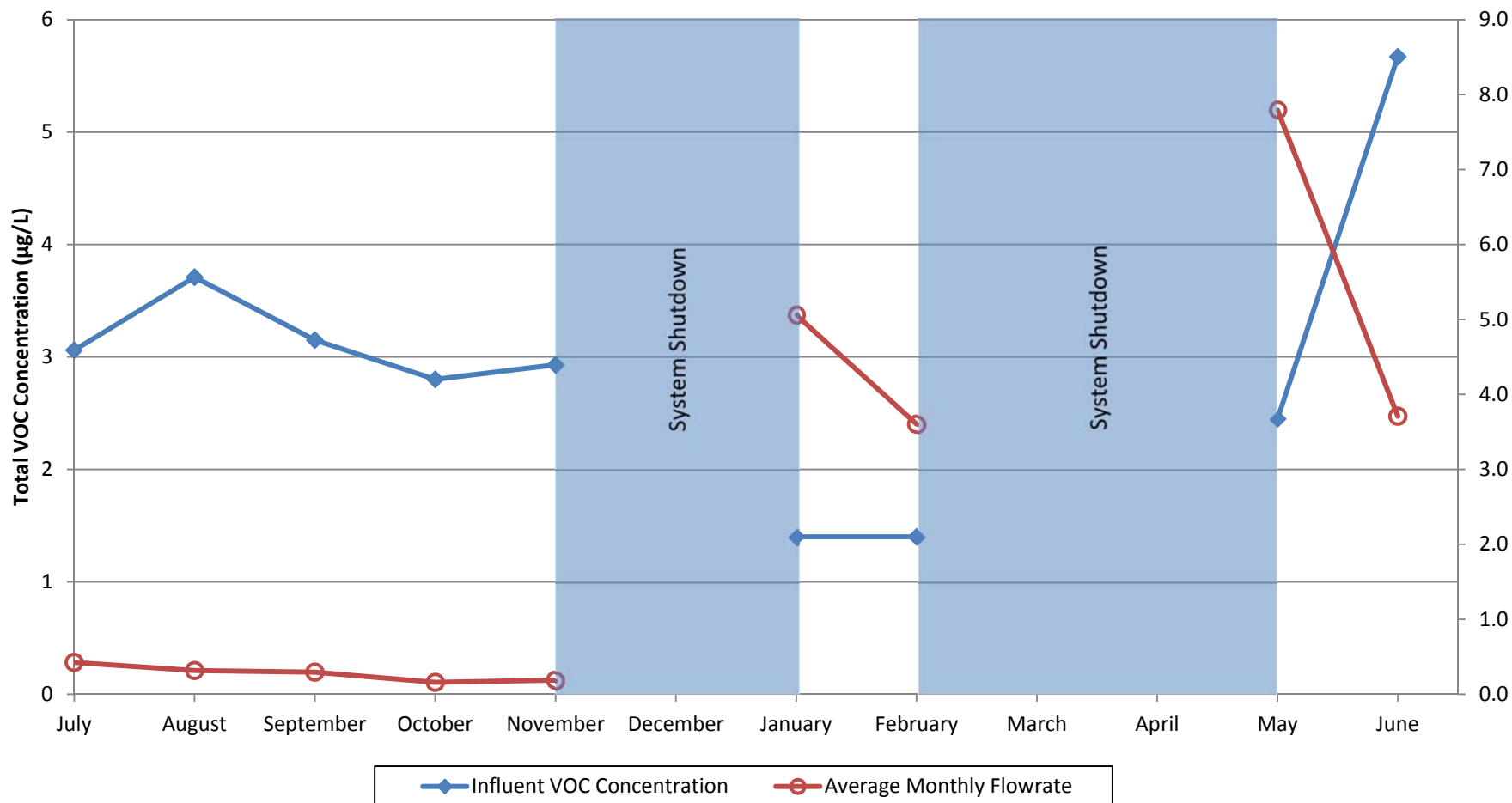
ND = not detected

NM = not measured

µg/L = micrograms per liter

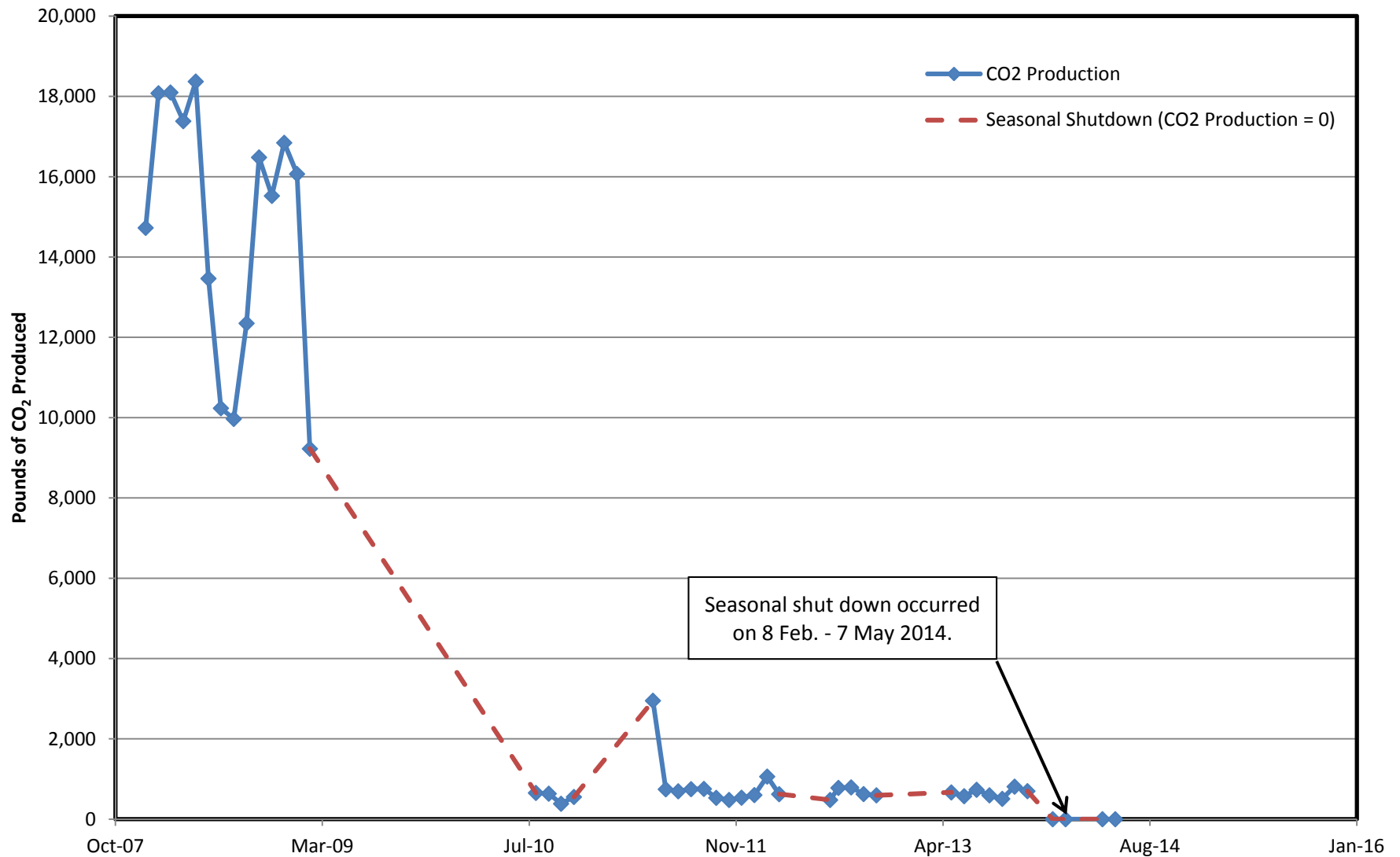
mg/L = milligrams per liter

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



*20 January 2014 sample results are shown as an estimation of February influent concentrations due to seasonal shutdown prior to the February monthly sampling event.

Figure 2
Equivalent Pounds of CO₂ Produced by the North Groundwater Treatment Plant



Note: Dashed line represents seasonal shutdowns due to the presence of vernal pools at Site LF007C during which no CO₂ production occurred.

Site ST018 Groundwater Treatment Plant Monthly Data Sheet

Report Number: 040

Reporting Period: 30 May 2014 – 30 June 2014

Date Submitted: 18 July 2014

This monthly data sheet presents information regarding the Site ST018 Groundwater Treatment Plant (ST018GWTP).

System Metrics

Table 1 presents operation data from the June 2014 reporting period.

Table 1 – Operations Summary – June 2014				
Initial Data Collection:		5/30/2014 16:00	Final Data Collection:	6/30/2014 9:45
Operating Time:		Percent Uptime:	Electrical Power Usage:	
ST018GWTP: 718 hours		ST018GWTP: 97%	ST018GWTP: 107 kWh (147 lbs CO ₂ generated ^a)	
Gallons Treated: 168.4 thousand gallons		Gallons Treated Since March 2011: 5.99 million gallons		
Volume Discharged to Union Creek: 168.4 thousand gallons				
BTEX, MTBE, TPH Mass Removed: 1.42 lbs ^b		BTEX, MTBE, TPH Mass Removed Since March 2011: 30.3 lbs		
MTBE (Only) Removed: 0.07 lbs ^b		MTBE (Only) Mass Removed Since March 2011: 6.3 lbs		
Rolling 12-Month Cost per Total Pounds of Mass Removed: \$14,219 ^c				
Monthly Cost per Pound of Mass Removed: \$2,080				
^a Based on Department of Energy estimate that 1 kilowatt hour generated produces 1.37 pounds of GHG.				
^b Calculated using June 2014 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.				
lbs = pounds				

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

Table 2 – ST018GWTP Average Flow Rates		
Location	Average Flow Rate Groundwater (gpm) ^a	Hours of Operation
EW2014x18	2.07	718
EW2016x18	1.35	719
EW2019x18	1.32	718 (738 ^b)
Site ST018 GWTP	3.91	718
^a Flow rates calculated by dividing total gallons processed by the hours of operation, from the totalizer and hour meter at each location. ^b The hour meter at EW2019x18 continued to record hours while the treatment system and pumps were shutdown. gpm = gallons per minute ST018GWTP = Site ST018 Groundwater Treatment Plant		

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

Table 3 – Summary of System Shutdowns					
Location	Shutdown		Restart		Cause
	Date	Time	Date	Time	
ST018GWTP	29 June 2014	14:00	30 June 2014	10:00	The treatment system shut down as the result of high pressure. The filters were replaced before bringing the system back on line.
ST018GWTP = Site ST018 Groundwater Treatment Plant					

Summary of O&M Activities

Groundwater samples were collected at the ST018GWTP on 6 June 2014. Sample results from the June sampling event are presented in Table 4. The total influent concentration (benzene, toluene, ethylbenzene, total xylenes, MTBE, TPH-gas, TPH-diesel, and TPH-motor oil) in the June 2014 influent sample was 1,012 µg/L, which is a decrease from the previous (May 2014) influent concentration of 1,042.3 µg/L. The influent concentration for MTBE during June 2014 was 50 µg/L. This is also a decrease from the May 2014 influent concentration for MTBE of 66.2 µg/L. TPH was detected in the influent sample for the first time in several months during the quarterly (1 April 2014) sampling event and is reflected in the June influent concentration. Influent TPH samples are collected on a quarterly basis in accordance with the National Pollutant Discharge Elimination System (NPDES) permit.

Figure 1 presents plots of flow rate and influent total VOC (TPH_g, TPH_d, MTBE, and BTEX) and MTBE concentrations at the ST018GWTP versus time. No contaminants were detected at the midpoint or effluent sampling locations in June 2014.

As shown on Figure 1, the average flow rate through the ST018GWTP has decreased slightly since the average flow rate peaked at 4.97 gallons per minute in April 2014. Downtime occurred at the ST018GWTP from 29 June through 30 June due to high pressure and the filters replaced on 30 June 2014 before the treatment system was restarted.

Optimization Activities

No optimization activities were performed in June 2014.

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 ST018GWTP system.

The ST018GWTP produced approximately 147 pounds of GHG during June 2014. This is a decrease from May 2014 (171 pounds) and is likely the result of fewer gallons having been treated in June from the previous month. Figure 2 presents the historical GHG production from the ST018GWTP. The overall GHG generation remains considerably lower than traditional GWTPs since the system is predominantly powered by solar arrays.

TABLE 4

Summary of Groundwater Analytical Data for June 2014 – Site ST018 Groundwater Treatment Plant

Summary of Groundwater Analytical Data for June 2014 - Site ST-10 Groundwater Treatment Plant							
Constituent	Instantaneous Maximum ^a (µg/L)	Detection Limit (µg/L)	N/C	6 June 2014 (µg/L)			
				Influent	After Carbon 1	After Carbon 2	System Effluent
Fuel Related Constituents							
MTBE	5	0.5	0	50	NM	ND	ND
Benzene	5	0.17	0	ND	NM	ND	ND
Ethylbenzene	5	0.22	0	ND	NM	ND	ND
Toluene	5	0.14	0	ND	NM	ND	ND
Total Xylenes	5	0.23 – 0.5	0	ND	NM	ND	ND
Total Petroleum Hydrocarbons – Gasoline	50	8.5	0	740 ^b	ND	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	50	0	52 J ^b	ND	NM	ND
Total Petroleum Hydrocarbons – Motor Oil	--	160	--	170 J ^b	ND	NM	ND

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

µg/L = micrograms per liter

^b Influent TPH samples are collected on a quarterly basis. Results presented from 1 April 2014.

J = analyte concentration is considered an estimated value due to a detected concentration value between the reporting limit and method detection limit for the contaminant

ND = not detected above method detection limit

NM = not measured this month

Figure 1
S18GWTP Total VOC and MTBE Influent Concentrations
Twelve Month History
Travis Air Force Base, California

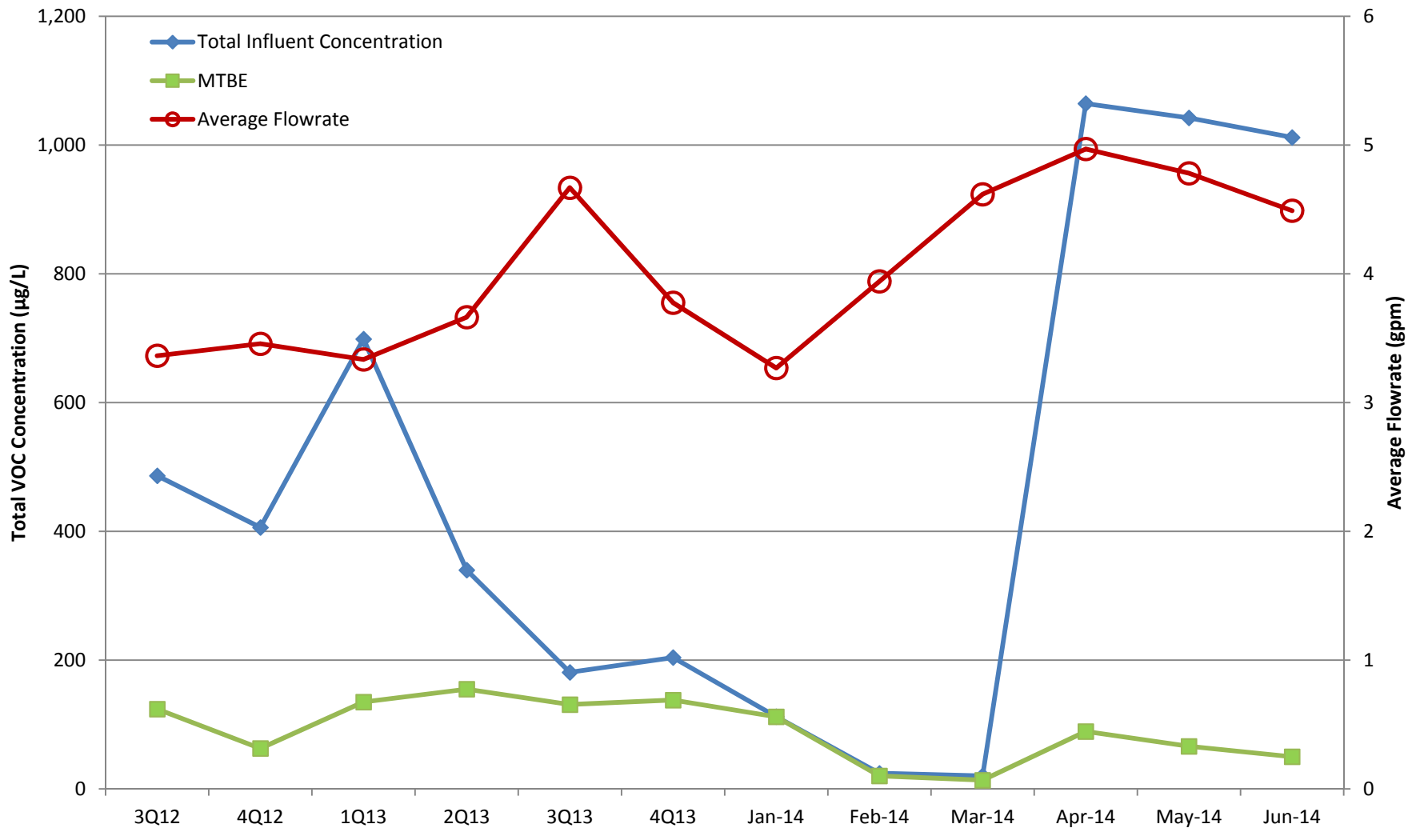
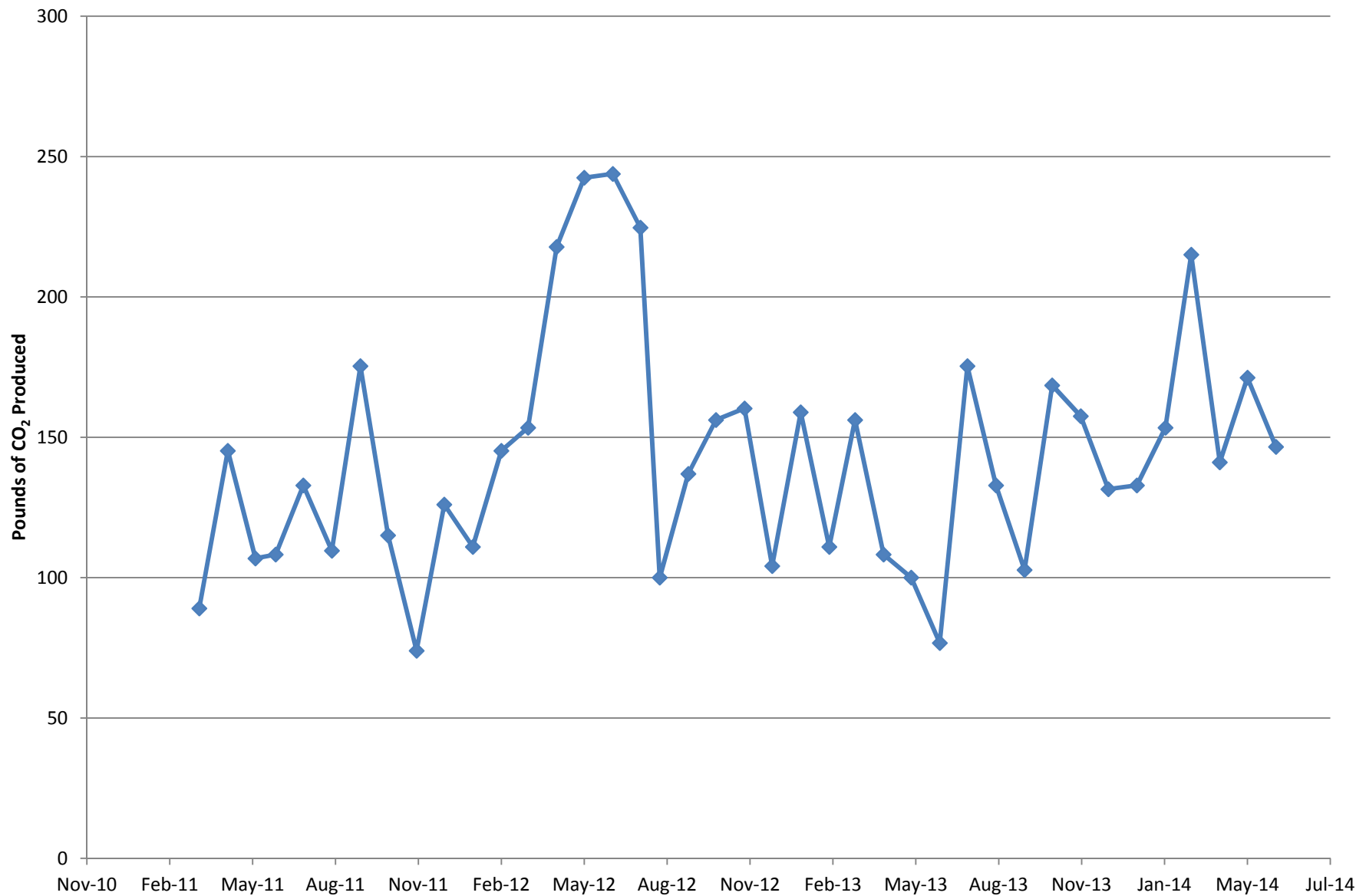


Figure 2
Equivalent Pounds of CO₂ Produced by the Site ST018 Groundwater Treatment Plant



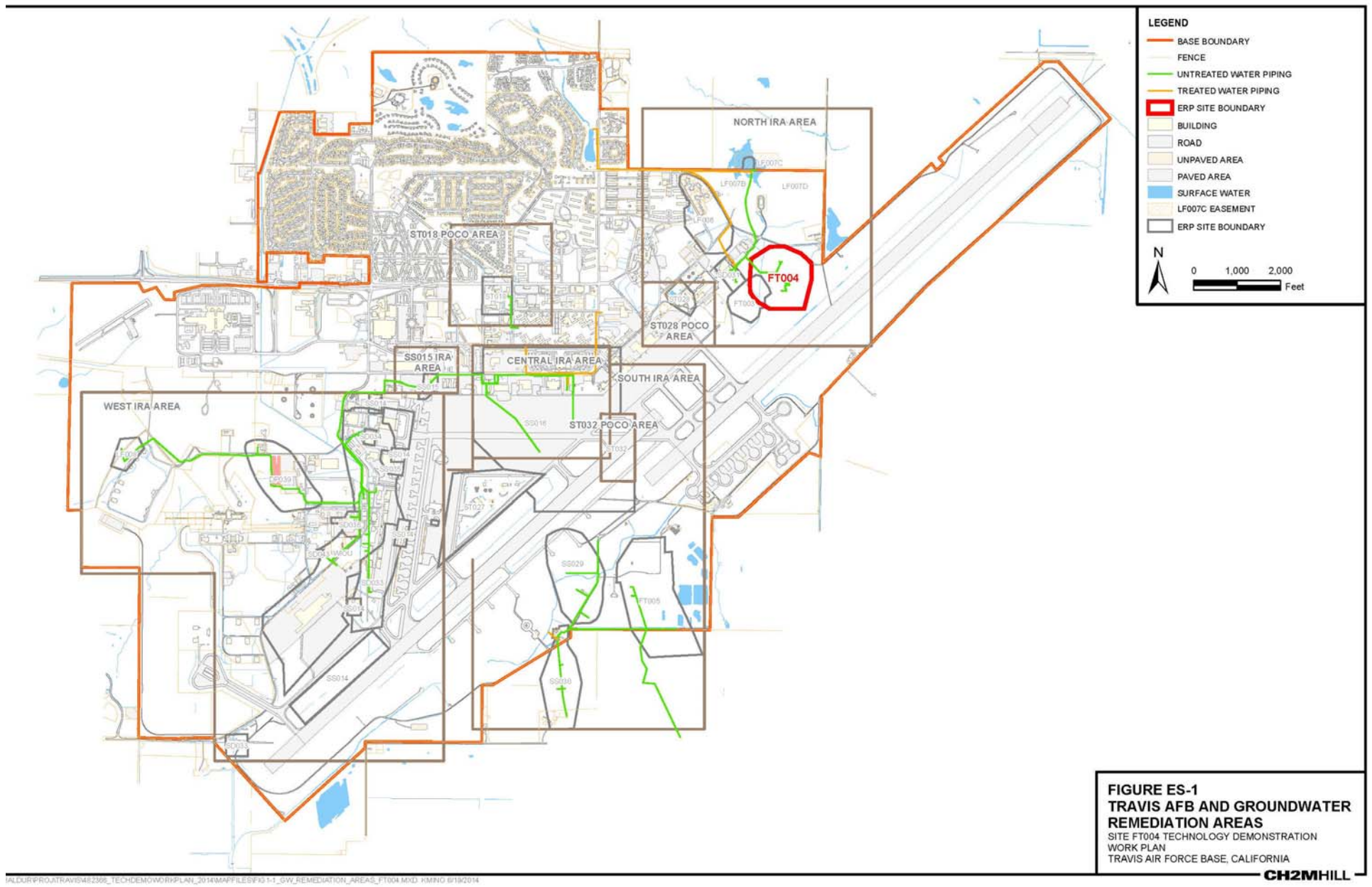
Site FT004 Technology Demonstration Work Plan

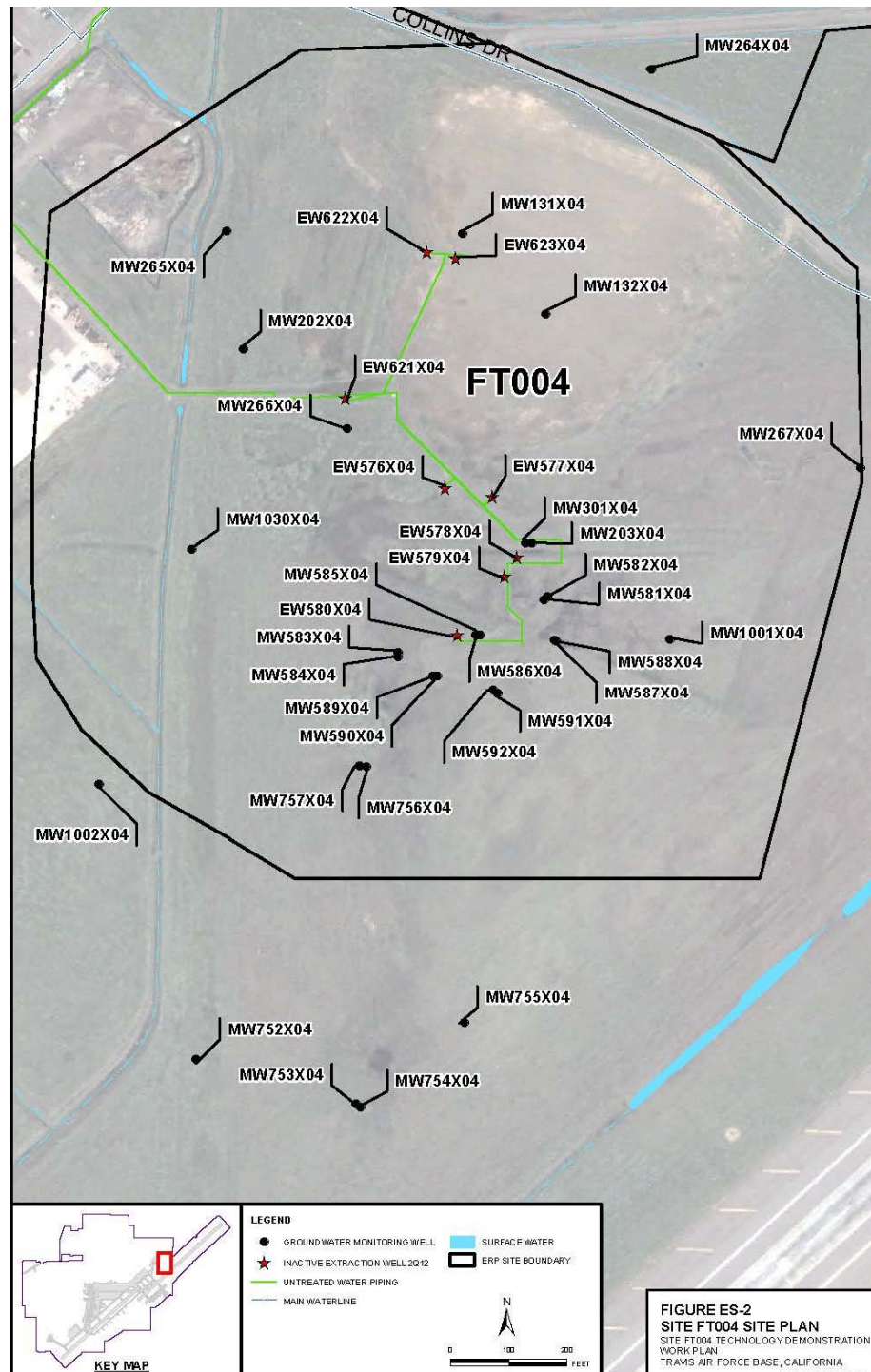
RPM Meeting

July 23, 2014

Agenda

- Background
- Objectives
- Conceptual Design
- Data Gap Investigation
- Monitoring/Injection Wells
- Extraction Wells
- Infiltration Bioreactor Trenches
- EVO Injection
- Groundwater Monitoring
- Reporting



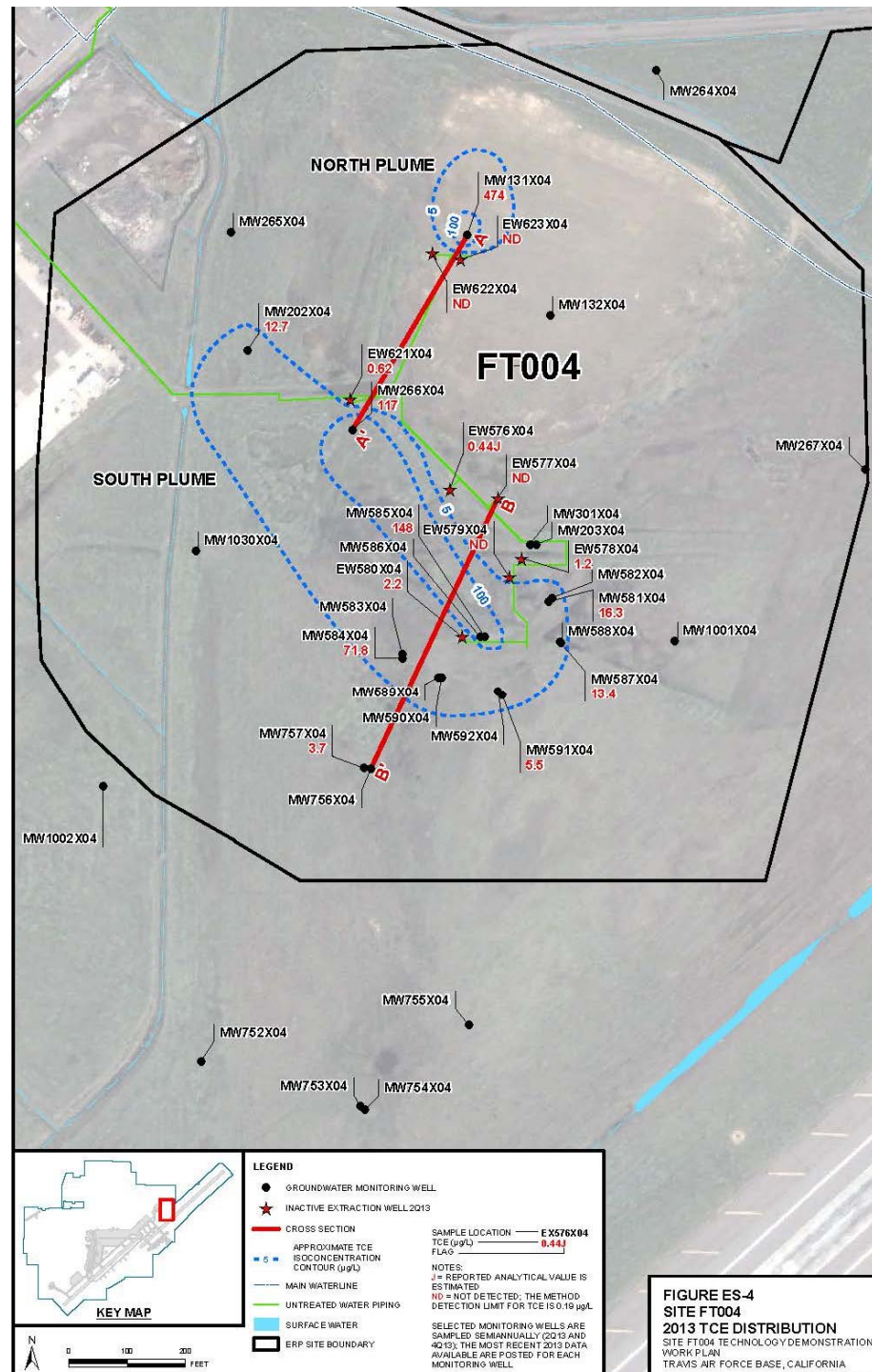


Background

- Site FT004 was used as Fire Training Area #3 for fire training exercises from 1953-1962.
- A TCE plume with concentrations as high 5,200 µg/L resulted from the fire training exercises.
- A Groundwater Extraction and Treatment System (GETS) was used at the site from 2000 to 2009 as an Interim Remedial Action, significantly reducing TCE concentrations to below 500 µg/L and splitting the plume into two smaller plumes (north and south plume).

Background

- The Site FT004 plume has been in a rebound study since 2009.
- No significant rebound of TCE concentrations has been observed.
- In 2014 Monitored Natural Attenuation (MNA) was selected as the final remedy for Site FT004.
- Emulsified vegetable oil (EVO) has not been previously used at Site FT004.



Objectives

- Evaluate the effectiveness of subsurface distribution of emulsified vegetable oil (EVO) at Site FT004 using a combination of injection wells and bioreactor trenches.
 - Injection of EVO has been previously established as an effective remedial technology at Travis AFB using an area and biobarrier treatment approach
 - Are there more effective means for spreading TOC over larger areas?

Objectives

- Site FT004 was selected for the technology demonstration because EVO had never been used at the site before, has an existing extraction system, and presents a good opportunity to see how effective different methods of subsurface EVO distribution are.
- The technology demonstration will be performed over a period of 3 to 4 years.

Objectives

- Two different types of enhanced reductive dechlorination (ERD) technologies will be compared:
 - Combination of infiltration bioreactor trenches, EVO injection, and recirculation (south TCE plume).
 - EVO injection with groundwater extraction to promote TOC distribution (north TCE plume).

Objectives

- Results from this demonstration will be used to optimize the performance of groundwater remedial actions that use an injected carbon source to promote ERD.

Conceptual Design – South TCE Plume

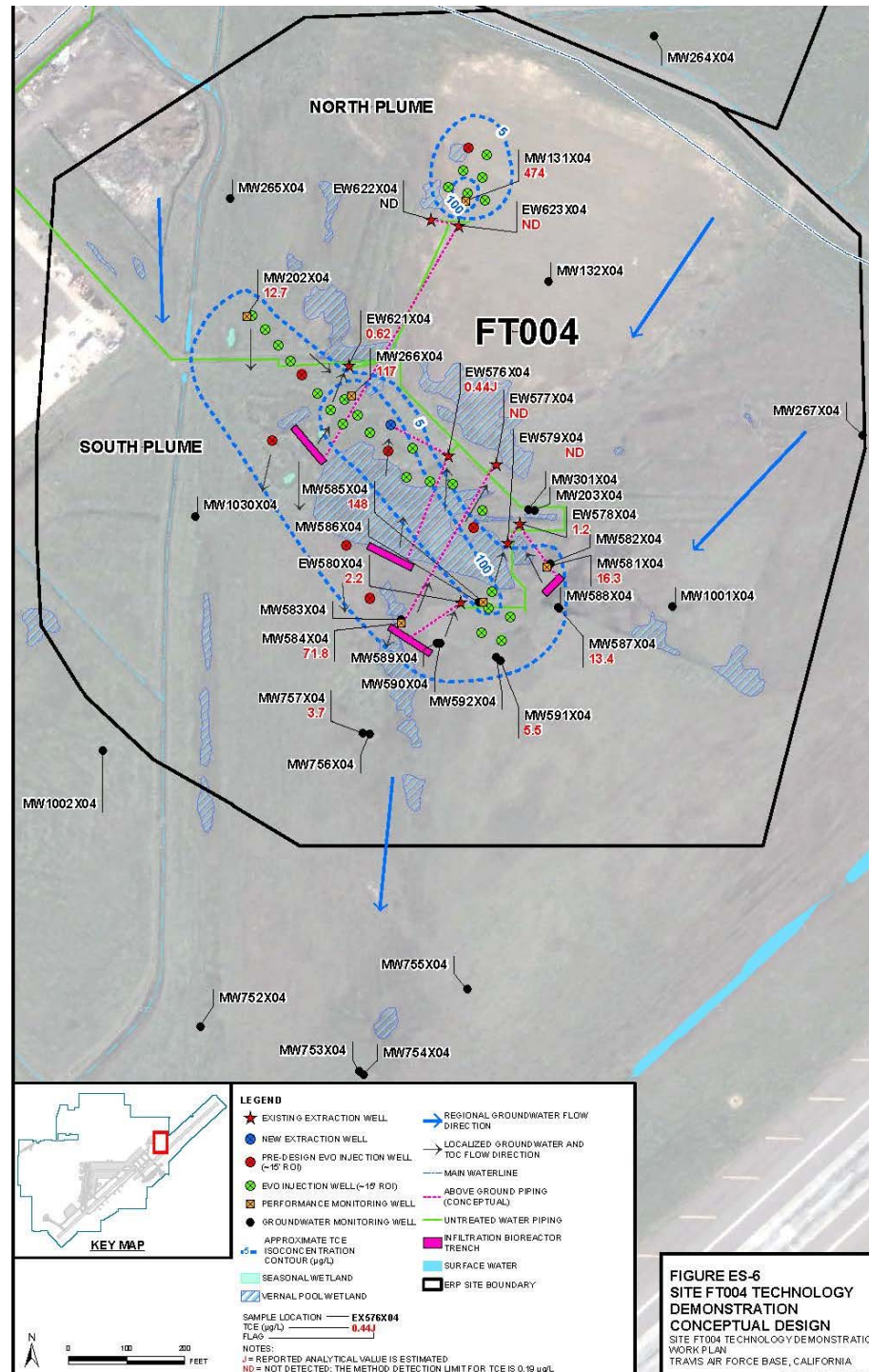
- The conceptual design for the south TCE plume is to create groundwater total organic carbon (TOC) recirculation cells using extraction wells and infiltration bioreactor trenches.

Conceptual Design – South TCE Plume

- Initially EVO will be injected into the subsurface in up to 26 injection wells that will be located along the presumed access of the TCE plume. Portion of plume where TCE exceeds 20 $\mu\text{g/L}$ will be targeted.
- An existing extraction well system that is predominantly located along the northeastern portion of the TCE plume will be used to redistribute the EVO to the northeast (upgradient) toward the extraction wells.

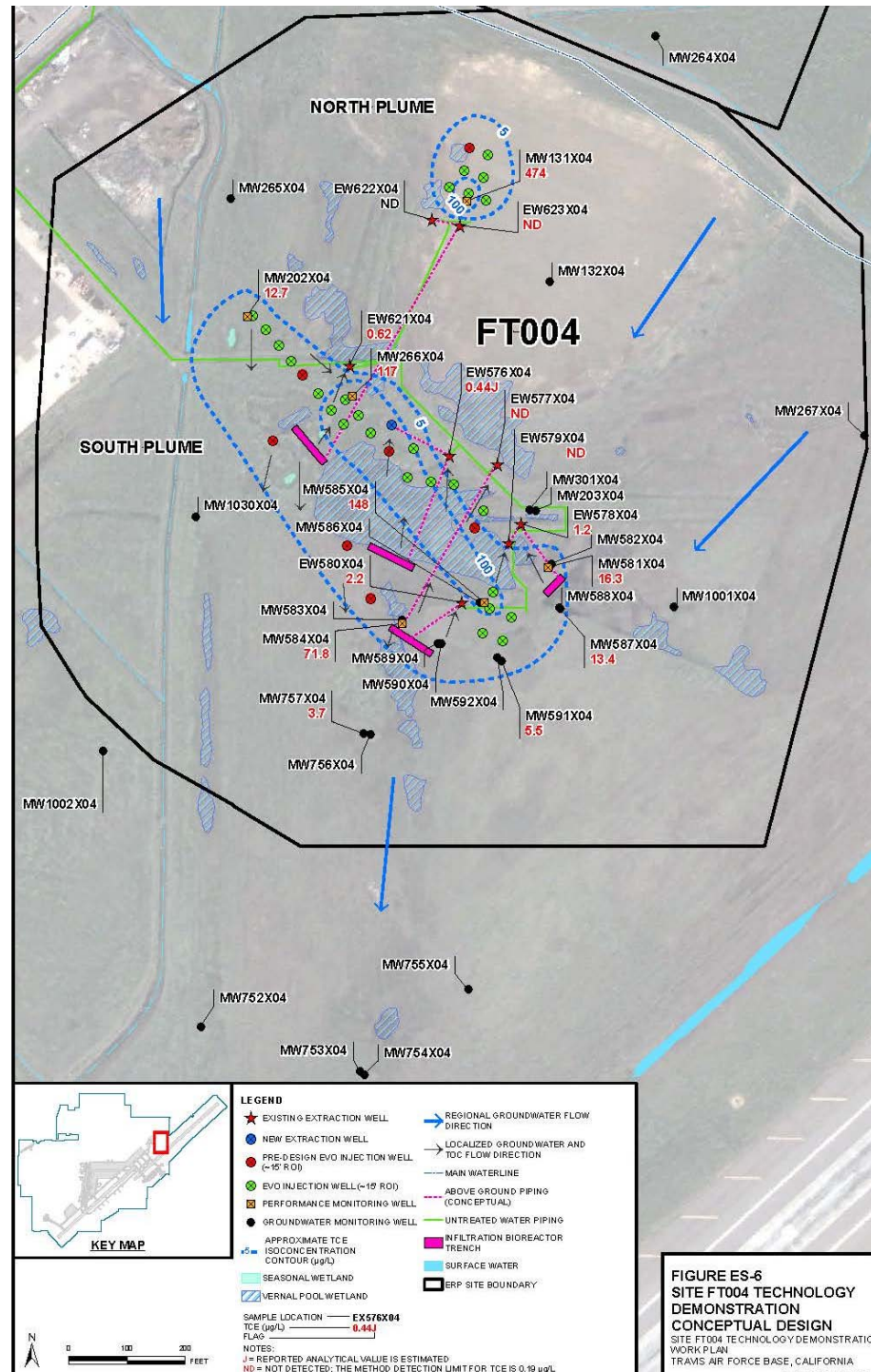
Conceptual Design – South TCE Plume

- EVO and groundwater captured by the extraction wells will be reinjected into up to four infiltration bioreactor trenches.
- The infiltration bioreactor trenches are expected to be located along the western and southern portion of the south TCE plume.
- The infiltration bioreactor trenches will provide the source of TOC for the shallow portion of the aquifer and injection wells will provide the source of TOC for the deeper portion of the aquifer.



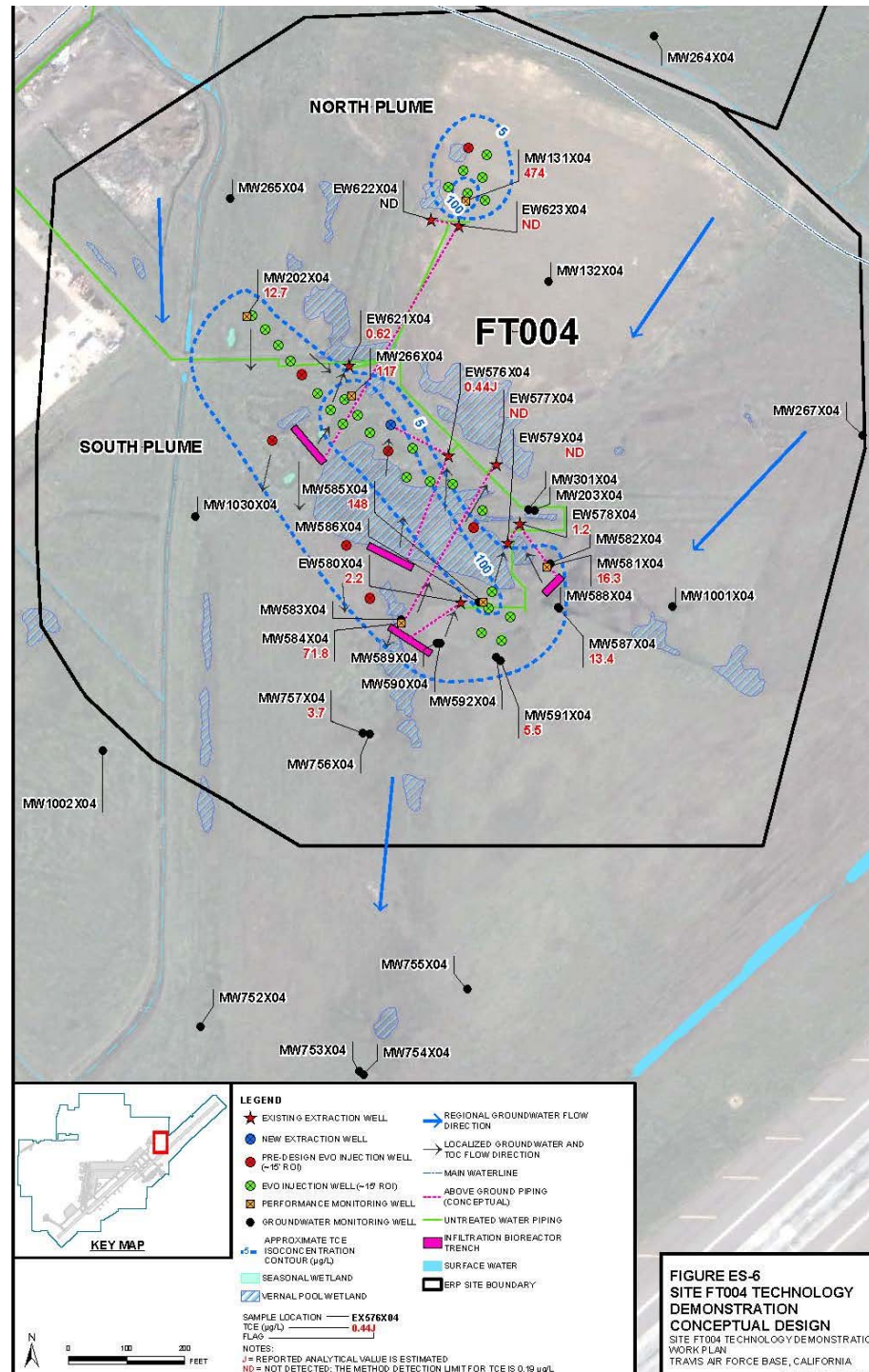
Conceptual Design – North TCE Plume

- The conceptual design for the north TCE plume is to inject EVO in up to seven injection wells and to use groundwater extraction to promote TOC distribution within the 20 µg/L TCE groundwater plume.
- Groundwater will be extracted from two existing extraction wells that are located adjacent to the south of the north TCE plume.



Data Gap Investigation

- Prior to conducting the technology demonstration a data gap investigation will be conducted.
- Six injection wells in the south TCE plume and one injection well in the north TCE plume will be installed in the north TCE plume as monitoring wells.
- Groundwater samples from these wells will be used to reevaluate where TCE concentrations in the south and north plumes exceed 20 µg/L and refine the target areas.
- The final design of the technology demonstration will be based on the refined target areas.



Monitoring/Injection Wells

- Up to 26 monitoring/injection wells will be installed in the south TCE plume area.
- Up to seven monitoring/injection wells will be installed in the north TCE plume area.
- The wells will be drilled to bedrock (approximately 35 to 50 feet below ground surface [bgs]).

Monitoring/Injection Wells

- Each well will be a 2-inch diameter PVC well and will consist of 20 feet of 0.020-inch prefabricated slot screen.
- The wells will be screened across the lowest portion of the aquifer where permeable zones are encountered.

Extraction Well

- One extraction well will be installed in the south TCE plume area.
- The well will be drilled to bedrock.
- The extraction well will be a 6-inch diameter PVC well and will consist of 0.020-inch wire-wrap screen across the entire saturated interval of the alluvium.

Infiltration Bioreactor Trenches

- Up to four infiltration bioreactor trenches will be installed in the south TCE plume area.
- The infiltration bioreactor trenches will be elongated trenches up to 100 feet long and up to 5 feet wide.
- The trenches will be excavated up to 5 feet below groundwater, which is expected to be encountered at 13 feet bgs.
- The infiltration bioreactor trenches will be backfilled with a 50/50 mixture of gravel and tree mulch.

Infiltration Bioreactor Trenches

- At the bottom of the trench will be a layer of iron pyrite sands to promote an abiotic reduction of volatile organic compounds (VOCs).
- Above the mixture of gravel and mulch will be two PVC groundwater distribution manifolds (one backup) for distributing the groundwater into the bioreactor infiltration trench from the extraction well network.

EVO Injection

- It is anticipated that approximately 47,000 pounds of EVO will be injected into the south TCE plume area and 13,000 pounds into the north TCE plume area.
- A Dositron DI520 (or equivalent) proportional feed system will be used to dilute the concentrated EVO to the approximately 3.5 percent design injection concentration.

Groundwater Monitoring

- Baseline groundwater sampling will be conducted prior to the injection of EVO to establish the initial TOC and contaminant conditions.
- Post-injection monitoring will be conducted in six to eight injection wells and six performance monitoring wells.
 - Performance monitoring wells include MW131x04, MW202x04, MW266x04, MW581x04, MW584x04, and MW585x04.
- Post-injection monitoring will be conducted semi-annually for 1 year and annually thereafter, for up to 3 years.

Reporting

- Results of the Data Gap Investigation and the implementation of the technology demonstration will be reported in a Technology Demonstration Completion Report (TDCR).
- Analytical results of post-injection monitoring and lessons learned from the technology demonstration at Site FT004 will be presented in the annual Groundwater Remediation Implementation Status Report (GRISR).

Questions

Travis AFB Restoration Program

Program Overview

RPM Meeting

July 23, 2014

Completed Documents

- Vapor Intrusion Assessment Update Technical Memorandum
- 2012 CAMU Annual Report
- Old Skeet Range Action Memorandum
- 3rd Five-Year Review
- 2012 Annual Groundwater Remediation Implementation Status Report (GRISR)
- Subarea LF007C and Site SS030 Remedial Process Optimization Work Plan
- Pre-Design Site Characterization of SS029 Report
- Old Skeet Range Removal Action Work Plan
- 2013 CAMU Inspection Annual Report
- ***Groundwater Record of Decision (ROD)***
- ***CG508 POCO Work Plan***
- ***2013 Annual GRISR***

Completed Field Work

- Replace battery banks at ST018 Groundwater Treatment Plant
- Annual Groundwater Remediation Implementation Program (GRIP) Sampling event
- Well Decommissioning (9 Wells)
- Electrical repairs to FT005 extraction system (well EW01x05)
- Electrical repairs to Site SS029 extraction system
- Site ST018 carbon vessels upgrade
- 2014 GRIP Semiannual Sampling Event
- Pump repairs to Site SS016 well (EW610x16)
- Subsite LF007C optimization upgrades
- 2014 Annual GRIP Sampling Event
- Biological Resource Assessment

Documents & Field Work In-Progress

Documents

- ***Travis AFB UFP-QAPP***
- ***DP039 Lead Excavation Technical Memo***
- ***FT004 Technology Demonstration Work Plan***
- Kinder Morgan LF044 Land Use Control Report

Field Work

- ***Site CG508 Site Investigation***

Documents Planned

- | | |
|---|---------|
| • ESD to WABOU Soil ROD | TBD |
| • ESD to NEWIOU Soil, Sediment, & Surface Water ROD | Aug |
| • SD031 Technology Demonstration Work Plan | Aug |
| • SD037 GW RD/RA Work Plan | Aug |
| • TA500 Investigation Work Plan | Aug |
| • SD036 RD/RA Work Plan | Oct |
| • SS014 Technology Demonstration Work Plan | Dec |
| • SS016 GW RD/RA Work Plan | Dec |
| • SS015 GW RD/RA Work Plan | Apr '15 |

Field Work Planned

- Old Skeet Range Characterization Sampling **Aug**
- ***SD031 Technology Demonstration*** **Oct**
- ***2Q Semiannual GRIP Sampling Event*** **Oct**

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

Completed Documents (Historical1)

- Basewide Health & Safety Plan (HSP)
- Action Plan
- 2007/2008 GSAP Annual Report
- LF007C RPO Work Plan
- LF008 Rebound Study Work Plan
- SS014 Tier 1 POCO Evaluation Work Plan
- ST027B Site Characterization Work Plan
- SS030 RPO Work Plan
- ST032 POCO Technical Memo
- DP039 Bioreactor Work Plan
- 2008 Annual GWTP RPO Report
- Passive Diffusion Bag (PDB) Technical Memo
- RD/RA QAPP Update
- ST032 Tier 1 POCO Evaluation Work Plan
- Phytostabilization Demonstration Technical Memo
- Model QAPP
- LF008 Rebound Test Technical Memo
- Comprehensive Site Evaluation Phase II Work Plan
- Field Sampling Plan (FSP)
- SS016 RPO Work Plan
- ST018 POCO RA Work Plan
- Vapor Intrusion Assessment Report
- GSAP 2008/2009 Annual Report
- FT005 Data Gap Work Plan
- First, Second, & Third Site DP039 Sustainable Bioreactor Demonstration Progress Reports
- DP039 RPO Work Plan
- SD036/SD037 RPO Work Plan
- ST027B Site Characterization Report
- 2009 GWTP RPO Annual Report
- Natural Attenuation Assessment Report (NAAR)
- Union Creek Sites SD001 & SD033 Remedial Action Report
- CAMU 2008-2009 Monitoring Annual Report

Completed Documents (Historical 2)

- Phytostabilization Study Report
- 2009/2010 Annual GSAP Report
- SS015 Remedy Optimization Field Implementation Plan
- Sites SS014 and ST032 Tier 1 POCO Evaluation Report
- SD036 Remedy Optimization Field Implementation Plan
- 2010 Annual CAMU Inspection Report
- Site ST018 POCO Baseline Implementation Report
- FT005 Data Gaps Investigation Report
- Comprehensive Site Evaluation Phase II Report
- 2010 Groundwater RPO Annual Report
- Focused Feasibility Study (FFS)
- Site ST027-Area B Human Health Risk Assessment
- Site ST027-Area B Ecological Risk Assessment
- Work Plan for Assessment of Aerobic Chlorinated Cometabolism Enzymes
- 2010/2011 Annual GSAP Report
- Baseline Implementation Report (Sites SS015, SS016, SD036, SD037, and DP039)
- 2011 CAMU Annual Report
- Technical and Economic Feasibility Analysis (TEFA)
- Work Plan for RPO of Sites SS016 and SS029
- Site LF007C Data Gaps Investigation Technical Memorandum
- Technical Memorandum for Assessment of Aerobic Chlorinated Cometabolism Enzymes
- Old Skeet Range Engineering Evaluation/Cost Analysis
- 2011 Groundwater Treatment RPO Annual Report
- Groundwater Proposed Plan (PP)
- FT005 Remedial Action Completion Report
- 2012 GSAP Technical Memorandum 8

Completed Field Work (Historical1)

- ST027B Gore Sorber Survey–Phase 1
- ST027B Field Sampling – Phase 2
- GSAP 2008 Semi-annual Event
- ST027B Installation of Wells – Phase 3
- SS014 Site Characterization
- LF008 Rebound Study
- GSAP Annual Sampling Event - 2009
- SS030 Site Characterization–Phase 1
- ST027 Site Characterization -Phase 3
- ST014 Monitor Well Install - Subsite 3
- SD001/SD033 Sediment RA
- SS016 Site Characterization (OSA source area)
- ST018 Site Characterization
- SS030 Site Characterization (Off-base VOC Plume)
- DP039 Site Characterization (for Biobarrier Placement)
- SS014 & ST032 Q1 2010 MNA Sampling (2nd of 4 quarterly events)
- SD036 Additional Site Characterization (north & east)
- Therm/Ox System Removal
- SS016 Monitoring Well Installation
- SD037 EVO Injection Well Installation
- DP039 Monitoring Well & Injection Well Installation
- DP039 EVO Injection
- SD037 Monitoring Well Installation
- GSAP 2010 Annual Sampling Event
- SD037 EVO Injection
- SS015 Site Characterization
- South Plant GAC Change-out
- FT005 Data Gap Investigation
- SS016 Position Survey of EW03
- SS016 Bioreactor Installation
- SS016 Bioreactor Baseline Sampling
- DP039 Biobarrier Quarterly Performance Sampling

Completed Field Work (Historical 2)

- DP039 Bioreactor Quarterly Performance Sampling
- SD037 EVO Quarterly Performance Sampling
- SS015 EVO Baseline Sampling
- SD036 EVO Baseline Sampling
- SS016 Bioreactor Startup
- SD036 Injection Wells Installation
- SS015 Injection Wells Installation
- ST018 GETS Installation
- SD036 EVO Injection
- 2010 Semiannual GSAP
- SS015 EVO Injection
- Quarterly RPO Performance Monitoring (Feb 2011)
- ST018 GETS Startup
- Quarterly RPO Performance Monitoring (May 2011)
- 2011 Annual GSAP Sampling
- SS029 GET Shutdown Test (System Optimization analysis)
- Quarterly RPO Performance Monitoring (Aug 2011)
- Quarterly RPO Performance Monitoring (Nov 2011)
- 2011 Semiannual GSAP Sampling
- LF007C Site Characterization (Wetlands)
- FT005 Soil Remedial Action
- Performance Monitoring SS015 (4th Quarterly event)
- Sampling for Assessment of Aerobic Chlorinated Cometabolism Enzymes (Feb 21-22)
- 2012 Annual GSAP Sampling
- CAMU Lysimeter Removal
- LF007C GET System Optimization
- SS029/SS016 System Optimization Analysis
- GSAP Semiannual Sampling Event
- Replace electrical wiring for well field at Site SS030