Final

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

21 January 2015, 0930 Hours

Mr. Mark Smith, of the Air Force Civil Engineer Center (AFCEC) Restoration Installation Support Team (IST), conducted the Restoration Program Manager's (RPM) meeting, on 21 January 2015 at 0930 hours, in Building 248 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
• William Hall	AFCEC/CZRW
• Dezso Linbrunner	USACE-Omaha
• Adriana Constantinescu	California Regional Water Quality Control Board (RWQCB)
• Ben Fries	California Department of Toxic Substances Control (DTSC)
• Nadia Hollan Burke	United States Environmental Protection Agency (USEPA)
• Karen Scheuermann (via telephone)	United States Environmental Protection Agency (USEPA)
• Indira Balkissoon	Techlaw, Inc
• Mike Wray	CH2M HILL
• Jeff Gamlin	CH2M HILL
• Tony Chakurian	CH2M HILL

.

Handouts distributed at the meeting, discussions and presentations included:

• Attachment 1	Meeting Agenda
• Attachment 2	Master Meeting and Document Schedule
• Attachment 3	SBBGWTP Monthly Data Sheet (November/December 2014)
• Attachment 4	CGWTP Monthly Data Sheet (November/December 2014)
• Attachment 5	NGWTP Monthly Data Sheet (November 2014)
• Attachment 6	ST018 Monthly Data Sheet (November/December 2014)
• Attachment 7	Presentation: CG508 POCO Investigation Conclusions

- Attachment 8 Presentation: SD036 RD/RA Work Plan
- Attachment 9 Presentation: SS015 RD/RA Work Plan
- Attachment 10 Presentation: Program Update: Activities Completed, In Progress and Upcoming

1. ADMINISTRATIVE

A. Previous Meeting Minutes

The 19 November 2014 RPM teleconference meeting minutes were approved as modified with one correction provided by Ms. Constantinescu to page 3 of 8 regarding the Notice of Violation (NOV) for Potrero Hills Annex. No other comments were provided.

B. Action Item Review.

Action items from November were reviewed.

Action item 1 will remain open: AFCEC's Travis Restoration Support 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. 21 January 2015: Mr. Smith spoke with Mr. Miller, the Deputy Base civil engineer, and reminded him that treated water is available for Base use. No further updates.

Action item 2 is now closed: Mr. Smith to provide a status update on programming efforts for soil characterization at Site SD031. 21 January 2015: Action item 2 is now closed with Mr. Smith providing the following comment: A project has been added to the FY2016 Program Requirements Development (PRD) for the remedial investigation and feasibility study (RI/FS) and follow-on phases to progress the site as close as possible to site closeout under the current contract.

Mr. Smith announced upcoming funding for site characterization efforts at Site SD031 in FY2016. For FY2016, AFCEC has approved the addition of a project to perform a RI/FS of the soil at site SD031 to characterize contamination encountered during implementation of the site SD031 technology demonstration for groundwater. An attempt will be made to accelerate the funding to FY2015 to expedite the effort.

Ms. Constantinescu expressed concern about the impact soil contamination at the site could have on the in-progress installation of the groundwater technology demonstration and asked how the effort would be modified to avoid the soil contamination.

Mr. Smith stated that the location of the chimneys and other infrastructure were installed in such a way that they will avoid the soil contamination. Travis will not be pulling vegetable oil through the contaminated soil.

Mr. Wray added that the soil contamination encountered at site SD031 is very shallow at 2 to 14 feet below ground surface (bgs) and the groundwater level is at 14 feet bgs and they have been able to perform the work without restrictions due to the soil contamination. He also shared that the injection well installations were being performed with continuous cores to allow for visual observations of the soil and measurement of headspace concentrations with a PID providing a matrix of data for the site. A limited number of soil samples have also been collected.

Mr. Smith then shared the history of the site including the no further action determination made in the NEWIOU Soil Record of Decision (ROD), which he anticipates will result in a ROD amendment to be completed in FY2017 after the investigation is completed under the new project.

Mr. Linbrunner included that he has spoken with the Contracting Officer about the change in site conditions resulting from the discovery of soil contamination in addition to groundwater contamination at site SD031. Mr. Linbrunner informed the Contracting Officer that the existing Performance Based Contract (PBC) could be modified to include the soil investigation to continue progress toward site closure of groundwater with the current contractor and prevent impeding their ability to meet that goal. The contract modification is therefore currently being developed.

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 a face to face meeting held on 18 February 2015 at 9:30. A consensus was reached for scheduled meeting times going forward. In person RPM meetings will continue to start at 9:30. Beginning with the 18 March 2015 meeting, teleconferences will start at 9:00. The next Restoration Advisory Board meeting is scheduled for 23 April 2015.

Travis AFB Master Document Schedule

— Travis Air Force Base Uniform Federal Policy-Quality Assurance Project Plan (UFP-QAPP): The final due date was updated to 29 January 2015. No other changes were made to the schedule. Mr. Anderson explained that the delay in finalizing the document is due to the issue of cleanup levels that are below detection levels and the need to address that in the UFP-QAPP rather than continuously address it in the site-specific work plans.

— Site SD037 GW Remedial Design/Remedial Action Work Plan: The response to comments (RTC) due date was changed to 9 January 2015, the rest of the dates were changed accordingly. EPA is reviewing Travis AFB responses to their comments. Mr. Anderson said that Travis AFB has scheduled the document go final on 9 February 2015.

— Site SD036 Remedial Design/Remedial Action Work Plan: The draft to agencies date was changed to 16 January 2015; the remaining dates were changed accordingly. The dates were pushed back to incorporate any changes that were made to the SD037 RD/RA work plan since the SD036 RD/RA work plan is very similar.

— Site SS016 GW Remedial Design/Remedial Action Work Plan: The draft to agencies, draft to RAB, and agency comments due dates were updated to reflect the actual dates. No other changes were made to the schedule.

— Site SS015 GW Remedial Design/Remedial Action Work Plan: The draft to agencies and draft to RAB dates were updated to reflect the actual dates. The agency comments due date was updated to 20 February 2015 to accommodate the date specified in the cover letter. No other changes were made to the schedule.

— Community Involvement Plan: The draft to agencies date was changed to 20 February 2015, the rest of the dates were changed accordingly. Mr. Smith gave an update on his efforts to update the document. No additional comments were made.

— Site DP039 Remedial Design/Remedial Action Work Plan: Predraft to AF/Service Center date was updated to 15 January 2015 to reflect the actual date, the rest of the dates were changed accordingly.

— Proposed Plan for the Amendment to the NEWIOU Soil, Sediment, and Surface Water Record of Decision (ROD): No changes to the schedule.

— Amendment to the NEWIOU Soil, Sediment, and Surface Water Record of Decision: No changes to the schedule. Mr. Hall took on the task to determine the time requirements and signature process for getting the AFCEC signature on the upcoming ROD Amendments.

— Proposed Plan for the Amendment to the Soil Record of Decision for the WABOU: No changes to the schedule.

— Amendment to the Soil Record of Decision for the WABOU: No changes to the schedule.

— Potrero Hills Annex (FS, PP, and ROD): No change to the schedule. Mr. Anderson said a revised work plan has been prepared. Ms. Constantinescu said that the RWQCB is reviewing the addendum to the work plan and that additional work has been proposed. Travis AFB was not copied on the comments and Ms. Constantinescu clarified that she is not involved with the project, but did relay that the RWQCB is still unhappy with the proposed work, because it does not provide enough coverage to delineate the groundwater contamination. Ms. Constantinescu also shared that a technical memorandum was submitted to the RWQCB in December 2014 more than a year after installation of an agricultural well on the downgradient property in October 2013. Ms. Constantinescu shared that the RWQCB is unhappy about the delay in receiving notification about the installation of the well and that it is close to the property line and contains both perchlorate and VOCs. The RWQCB will be working to produce a revised

site cleanup order. Mr. Smith asked about the status of the Notice of Violation (NOV). Ms. Constantinescu replied that it is still in place. Mr. Smith asked what approach Travis AFB should take going forward. Ms. Constantinescu concurred that Travis AFB should continue to wait for the current situation to be resolved. Ms. Constantinescu shared that a site visit will take place and said that she will relay the message that Travis AFB would like to attend since they are a party on the cleanup order. Ms. Hernandez asked Ms. Constantinescu whether the RWQCB had any additional expectations of Travis AFB other than the wait and see posture. Ms. Constantinescu said she would take the question to management and get back to her. Mr. Smith elaborated on the current posture of Travis AFB to provide technical guidance, and document review, to help the other responsible party achieve the objectives in the Water Board Order.

— Site DP039 Lead Excavation Technical Memorandum: The RTC date and final due was changed to TBD. Travis AFB received EPA's comments and is working on responses. Mr. Anderson shared with EPA that Travis AFB is currently working on a plan of action to complete the document.

— Site ST018 POCO Work Plan Addendum: The RTC and final dates were changed to 13 January 2015 to reflect the actual dates.

— Site SD034 Data Gap Investigation: The RTC date was changed to 17 February 2015, the rest of the dates were change accordingly. Mr. Smith noted that the RTC meeting date needs to be updated as well.

— Site SS014 POCO Technology Demonstration Work Plan: The Predraft to AF/Service Center date was updated to reflect the actual date; all other dates were updated accordingly.

— POCO Investigation Work Plan for Oil Water Separators: New document, all new dates.

— Old Skeet Range PAH Delineation Report: New document, all new dates. Mr. Linbrunner stated that this will be a mostly informational document, because the previous contractor did not have enough funding to complete their work. The Contracting Office determined that, due to the site having PAHs and lead, a mod could not be awarded for the PAH portion of the contract. The work will go out for bid again due to contractual obligations, and it will become an FY2016 project. Ms. Burke stated that the EPA database will need to be updated to reflect the incomplete status of the non-time sensitive removal action and insert a new completion date. She then asked if it should still be considered a removal action or if the status should be changed and how EPA should treat the site. Mr. Smith said the site will be changed to an actual project to be awarded late in FY2015 with the goal of site closeout in the June of 2018 time frame.

— Site FT005 Technology Demonstration Work Plan: New document, all new dates. Mr. Anderson gave a brief overview of the intent of the technology demonstration. The question driving the technology demonstration is the maximum distance that emulsified vegetable oil (EVO) can flow in the subsurface, and Travis AFB will answer that question by measuring the distance that EVO can be drawn through the subsurface at Site FT005.

— POCO Site ST032 Soil Excavation Work Plan: New document, all new dates.

— Quarterly Newsletter (January 2015): No changes to the schedule.

— 2014 Annual CAMU Monitoring Report: New document, all new dates.

— 2014 Annual GRISR: New document, all new dates. Mr. Duke shared that the GRISR would be getting larger mainly due to the inclusion of the monitored natural attenuation (MNA) implementation plan. Discussion of copies required by each agency: EPA one hardcopy and electronic copy, Ms. Balkissoon receiving an electronic copy with hardcopy maps, RWQCB one hardcopy and electronic copy, and DTSC one electronic copy.

— Site TA500 Data Gap Investigation Work Plan: Moved to History.

— Site SD031 Technology Demonstration Work Plan: Moved to History.

Discussions:

Green Sustainable Remediation (GSR) Discussion with Karen Scheuermann, USEPA (via telephone):

Ms. Burke introduced Ms. Scheuermann of the USEPA, who joined the meeting via telephone, to discuss Green Sustainable Remediation (GSR) and the new ASTM E2893 Standard Guide for Greener Cleanups.

Ms. Scheuermann gave an overview of the USEPA goals for GSR and introduced ASTM E2893:

- The USEPA is looking for ways to begin tracking the GSR practices of superfund sites using different metrics and aiming to establish a level playing field.
- The USEPA is encouraging those with ongoing remediation work to set goals for achieving GSR and to find ways to gauge their performance.
- The ASTM E2893 standard provides a process for looking at resource use (ex. water, energy, carbon footprint) and includes best management practices (BMPs).
- The standard includes two steps: 1) a checklist of BMPs that can be implemented to support GSR, 2) a self-certification process for those who use GSR BMPs to publicly state that they are employing GSR practices in their cleanup projects.
- The USEPA is encouraging projects they oversee to review the standard and consider self-certification.
- The USEPA is currently working on consolidated metrics to track the projects they oversee.

Mr. Gamlin shared some of the BMPs for GSR that are being employed at Travis AFB such as shipping EVO to the base via rail.

Mr. Duke stated that he would review the standard to see which BMPs have already been employed and what new approaches could be taken to increase GSR at Travis AFB.

Mr. Hall said he would review the ASTM E2893 Standard Guide for Greener Cleanups and what historically has been done along the lines of GSR.

Thermal Oxidation Unit (ThOX) Removal from Site SS016:

Mr. Duke stated that, with agency concurrence, the thermal oxidation unit (ThOX) would be removed from the base and not be brought back into service. The ThOX had remained available while the NEWIOU Groundwater Interim Record of Decision (ROD) was in place, but is no longer used nor a component of the Groundwater ROD. The USEPA, RWQCB, and DTSC concurred that it is appropriate to have the ThOX unit removed from the Base, because it is not a component of the final remedy for Site SS016.

2. CURRENT PROJECTS

Treatment Plant Operation and Maintenance Update

South Base Boundary Groundwater Treatment Plant, November 2014 (see Attachment 3)

The South Base Boundary Groundwater Treatment Plant (SBBGWTP) performed at 47% uptime, and 2.0 million gallons of groundwater were extracted and treated during the month of November 2014. All of the treated water was discharged to Union Creek. The average flow rate for the SBBGWTP was 64.8 gallons per minute (gpm). Electrical power usage was 3,480 kWh, and approximately 4,768 pounds of CO_2 were created (based on DOE calculation). Approximately 0.70 pounds of volatile organic compounds (VOCs) were removed in November. The total mass of VOCs removed since startup of the system is 454 pounds.

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

South Base Boundary Groundwater Treatment Plant, December 2014 (See Attachment 3)

The South Base Boundary Groundwater Treatment Plant (SBBGWTP) performed at 100% uptime, and 2.8 million gallons of groundwater were extracted and treated during the month of December 2014. All of the treated water was discharged to Union Creek. The average flow rate for the SBBGWTP was 66.70 gallons per minute (gpm). Electrical power usage was 7,800 kWh, and approximately 10,686 pounds of CO_2 were created (based on DOE calculation). Approximately 0.89 pounds of volatile organic compounds (VOCs) were removed in December. The total mass of VOCs removed since startup of the system is 455 pounds.

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

Central Groundwater Treatment Plant, November 2014 (see Attachment 4)

The Central Groundwater Treatment Plant (CGWTP) performed at 100% uptime with approximately 1.3 million gallons of groundwater extracted and treated during the month of November 2014. All treated water was discharged to the storm drain. The average flow rate for the CGWTP was 30.8 gpm. Electrical power usage was 2,587 kWh for all equipment connected to the Central Plant, and approximately 3,544 pounds of CO_2 were generated. Approximately 2.92 pounds of VOCs were removed from groundwater by the treatment plant in November. The total mass of VOCs removed since the startup of the system is 11,387 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 August. No additional optimization activities to report for the month of November.

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

Central Groundwater Treatment Plant, December 2014 (See Attachment 4)

The Central Groundwater Treatment Plant (CGWTP) performed at 100% uptime with approximately 1.13 million gallons of groundwater extracted and treated during the month of December 2014. All treated water was discharged to the storm drain. The average flow rate for the CGWTP was 28.9 gpm. Electrical power usage was 2,114 kWh for all equipment connected to the Central Plant, and approximately 2,896 pounds of CO_2 were generated. Approximately 2.91 pounds of VOCs were removed from groundwater by the treatment plant in December. The total mass of VOCs removed since the startup of the system is 11,390 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 August. No additional optimization activities to report for the month of December.

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

North/LF007 Groundwater Treatment Plant, November 2014 (see Attachment 5)

The North/LF007 Groundwater Treatment Plant (NGWTP) performed at 37% uptime with approximately 54,860 gallons of groundwater extracted and treated during the month of November 2014. The average flow rate at the NGWTP was 2.7 gpm, and electrical power use was 0 kWh for all the equipment connected to the North plant; and 0 pounds of CO_2 was generated; this system is 100 percent off of the power grid.

Approximately $2.84x10^{-3}$ pounds of VOCs were removed from the groundwater in November. The total mass of VOCs removed since the startup of the system is 174.31 pounds.

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

North/LF007 Groundwater Treatment Plant, December 2014

The North/LF007 Groundwater Treatment Plant is offline as of 2 December 2014, in accordance with the US Fish and Wildlife Service, due to the presence of standing water in the vernal pools. As such, a monthly report was not prepared.

Site ST018 Groundwater (MTBE) Treatment Plant, November 2014 (see Attachment 6)

The Site ST018 (MTBE) Treatment Plant (ST018 GWTP) performed at 0.7% uptime with approximately 2,255 gallons of groundwater extracted and treated during the month of November 2014. All treated water was diverted to the storm drain. An average flow rate for the ST018 GWTP for the month of November is not available due to very low uptime for the month. Electrical power usage for the month was 0 kWh for all equipment connected to the ST018 GWTP, which equates to the creation of approximately 5 pounds of CO_2. Approximately 0.0013 pounds of BTEX, MTBE and TPH were removed from groundwater in November from the treatment plant. Approximately 0.0013 pounds of MTBE were removed from groundwater. The total BTEX, MTBE and TPH mass removed since the startup of the system is 30.9 pounds. And the total MTBE mass removed since startup of the system is 6.6 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 all solar powered.

The ST018 GWTP effluent was rerouted to the sanitary sewer in November. Monitoring requirements for the ST018 GWTP are no longer determined by the National Pollutant Discharge Elimination System (NPDES) permit and influent sampling will now be performed monthly to comply with sewer district guidelines.

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

Site ST018 Groundwater (MTBE) Treatment Plant, December 2014 (See Attachment 6)

The Site ST018 (MTBE) Treatment Plant (ST018 GWTP) performed at 100% uptime with approximately 125,060 gallons of groundwater extracted and treated during the month of December 2014. All treated water was diverted to the sanitary sewer. The average flow rate for the ST018 GWTP was 3.11 gpm. Electrical power usage for the

month was 65 kWh for all equipment connected to the ST018 GWTP, which equates to the creation of approximately 89 pounds of CO_2. Approximately 0.07 pounds of BTEX, MTBE and TPH were removed from groundwater in December from the treatment plant. Approximately 0.07 pounds of MTBE were removed from groundwater. The total BTEX, MTBE and TPH mass removed since the startup of the system is 30.9 pounds. And the total MTBE mass removed since startup of the system is 6.7 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 all solar powered.

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

Presentations:

Presentation: CG508 POCO Investigation Conclusions (see Attachment 7)

Mr. Gamlin reported on the conclusions of the site investigation at CG508.

- Results of groundwater sampling were not indicative of petroleum contamination.
- A sewer release is suspected due to the similarities between the chromatograms and the locations of detections only along the sewer line.

Ms. Constantinescu agreed with the evidence presented by Mr. Gamlin and said that in order to close the site, a No Further Action request should be made under the low-threat closure policy. The 9 criteria in the policy should be followed in the request. Ms. Constantinescu will provide the RWQCB site closure summary form to be filled out and used as a guide for structuring the closure repot.

Presentation: SD036 RD/RA Work Plan (see Attachment 8)

Mr. Chakurian reported on the plans for accelerating cleanup at SD036. He stated that additional injection wells will be installed at SD036 in the areas of high Trichloroethene (TCE) concentrations as presented on multiple site maps. Baseline sampling will be presented in the Remedial Action Construction Completion Report (RACCR) and performance monitoring will be presented in the GRISR.

Ms. Burke expressed some concern over the terminology enhanced attenuation (EA) versus monitored natural attenuation (MNA) and whether select areal treatment would need to occur across the site in order to consider the remedy for the site fully implemented.

Mr. Wray said further clarification of the MNA approach for Travis AFB would appear in the upcoming GRISR in the MNA Implementation Plan portion of the report. Additionally, the EA

remedy is described in the Groundwater ROD (June 2014), and is the selected remedy for many sites at Travis AFB.

Presentation: SS015 RD/RA Work Plan (see Attachment 9)

Mr. Chakurian reported on the plans for accelerating cleanup at SS015. He stated that additional injection and monitoring wells will be installed at SS015 in the areas of high TCE concentrations as presented on multiple site maps. Baseline sampling will be presented in the RACCR and performance monitoring will be presented in the GRISR.

Program Update: Activities Completed, In Progress and Upcoming (see Attachment 10)

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: ST018 POCO Work Plan Addendum.

Newly Completed Field Work: No changes.

In-Progress Documents: SD037 RD/RA Work Plan, Travis AFB UFP-QAPP, DP039 Lead Excavation Technical Memorandum, SD034 Data Gap Investigation Work Plan, SD036 RD/RA Work Plan, SS016 GW RD/RA Work Plan, SS015 GW RD/RA Work Plan, Proposed Plan for the Amendment to WABOU Soil ROD, Proposed Plan for the Amendment to NEWIOU Soil, Sediment, & Surface Water ROD.

In-Progress Field Work: SD031 Technology Demonstration.

Upcoming Documents (CERCLA): Community Involvement Plan, DP039 RD/RA Work Plan, FT005 Technology Demonstration Work Plan, Annual CAMU Monitoring Report, 2014 GRISR.

Upcoming Documents (POCO): SS014 POCO Technology Demonstration Work Plan, Oil-Water Separators POCO Evaluation Work Plan, ST032 POCO Soil Excavation Work Plan, and the Old Skeet Range PAH Delineation Report.

Field Work Planned: SD031 Well/Trench Installation (February), SD031 EVO Injection (February), SD036 Well Installation (March), SD037 Well Installation (March), SD034 Site Investigation (April), SD036 EVO Injection (April), SD037 EVO Injection (April), SS016 Well Installation (April), ST018 Well/Trench Installation (April), and SS014 Site Investigation (April), GRIP Sampling (April).

4. New Action Item Review

Mr. Hall to determine the time requirements and signature process for getting the AFCEC signature on the upcoming ROD Amendments.

Mr. Hall to review the ASTM E2893 Standard Guide for Greener Cleanups and what historically has been done along the lines of GSR.

Mr. Hall to ask if we can use DERA funds for the beneficial reuse of treated groundwater under AFCEC's "net-zero energy policy".

Ms. Constantinescu to provide the RWQCB site closure summary form to Mr. Smith for distribution.

Mr. Smith to provide updates on PFOS and PFOA efforts as he becomes aware of them.

Ms. Constantinescu to ask for guidance from her management to see if any action is required from Travis AFB regarding the cleanup order.

5. PROGRAM/ISSUES/UPDATE

Travis AFB had their performance requirements development process planning for FY2016 that included SD031, previously discussed, and the MMRP Old Skeet Range. More information to follow.

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.	Mark Smith	Mr. Smith to provide a status update on programming efforts for soil characterization at site SD031. Update 21 January 2015: Mr. Smith provided a status update for the site SD031 soil efforts during the action item review.	21 Jan 2015	Closed
3.	William Hall	Mr. Hall to determine the time requirements and signature process for getting the AFCEC signature on the upcoming ROD Amendments.	18 Feb 2015	New
4.	William Hall	Mr. Hall to review the ASTM E2893 Standard Guide for Greener Cleanups and what historically has been done along the lines of GSR.	18 Feb 2015	New
5.	William Hall	Mr. Hall to ask if we can use DERA funds for the beneficial reuse of treated groundwater under AFCEC's "net-zero energy policy".	18 Feb 2015	New
6.	Adrianna Constantinescu	Ms. Constantinescu to provide the RWQCB site closure summary form to Mr. Smith for distribution.	18 Feb 2015	New
7.	Mark Smith	Mr. Smith to provide updates on PFOS and PFOA as he becomes aware of them.	18 Feb 2015	New
8.	Adrianna Constantinescu	Ms. Constantinescu to ask for guidance from her management to see if any action is required from Travis AFB regarding the cleanup order.	18 Feb 2015	New

TRAVIS AIR FORCE BASE
ENVIRONMENTAL RESTORATION PROGRAM
RESTORATION PROGRAM MANAGER'S MEETING
BLDG 248 Conference Room
21 January 2015, 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. PRESENTATIONS

   A. CG508 POCO INVESTIGATION
   B. SD036 RD/RA WORK PLAN
   C. SS015 RD/RA WORK PLAN
   D. PROGRAM UPDATE: ACTIVITIES COMPLETED, IN PROGRESS AND UPCOMING

4. NEW ACTION ITEM REVIEW

5. PROGRAM/ISSUES/UPDATE

NOTES: AFTER THE RPM MEETING WE WILL HOLD A SEPARATE RTC MEETING ON THE SS016 GW RD/RA WORK PLAN AND DISCUSS OUR WAY AHEAD FOR THE PROPOSED PLANS. ALL PARTICIPANTS ARE WELCOME TO ATTEND.

(2015)
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.)
01-21-15	—	—
02-18-15	—	—
—	03-18-15	—
04-23-15 (Thursday 2:00 PM)	—	04-23-15
—	05-27-15	—
06-17-15	—	—
—	07-15-15	—
08-19-15	—	—
—	09-16-15	—
10-22-15 (Thursday 2:00 PM)	—	10-22-15
—	11-18-15	—
—	—	—

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

As of: 01-22-2015

Travis AFB Master Meeting and Document Schedule

PRIMARY DOCUMENTS			
Life Cycle	**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, Leslie Royer**	**Site SD036 Remedial Design/Remedial Action Work Plan** **Travis AFB, Glenn Anderson** **CH2M HILL, Leslie Royer**
Scoping Meeting	**NA**	**NA**	NA
Predraft to AF/Service Center	**05-30-14**	04-25-14	08-23-14
AF/Service Center Comments Due	06-13-14	**05-08-14**	09-05-14
Draft to Agencies	07-22-14	08-13-14	01-16-15
Draft to RAB	07-22-14	08-13-14	01-16-15
Agency Comments Due	08-20-14	09-12-14	02-16-15
Response to Comments Meeting	**10-23-14**	**09-17-14**	**02-18-15**
Agency Concurrence with Remedy	NA	NA	NA
Public Comment Period	NA	**NA**	NA
Public Meeting	**NA**	**NA**	**NA**
Response to Comments Due	11-14-14	01-09-15	03-04-15
Draft Final Due	11-14-14	01-09-15	03-04-15
Final Due	01-29-15	02-09-15	04-06-15

Travis AFB Master Meeting and Document Schedule

PRIMARY DOCUMENTS				
Life Cycle	**Site SS016 GW Remedial Design/Remedial Action Work Plan** **Travis AFB, Glenn Anderson** **CH2M HILL, Leslie Royer**	**Site SS015 GW Remedial Design/Remedial Action Work Plan** **Travis AFB, Glenn Anderson** **CH2M HILL, Leslie Royer**	**Community Involvement Plan** **Travis AFB, Mark Smith** **CH2M HILL, Tricia Carter**	**Site DP039 Remedial Design/Remedial Action Work Plan** **Travis AFB, Glenn Anderson** **CH2M HILL, Leslie Royer**
Scoping Meeting	**NA**	**NA**	**NA**	**NA**
Predraft to AF/Service Center	10-31-14	11-20-14	NA	01-15-14
AF/Service Center Comments Due	11-17-14	12-08-14	NA	01-29-15
Draft to Agencies	12-03-14	01-20-15	02-20-15	02-12-15
Draft to RAB	12-03-14	01-20-15	02-20-15	02-12-15
Agency Comments Due	01-08-15	02-19-15	03-23-15	03-16-15
Response to Comments Meeting	**01-21-15**	**02-18-15**	**04-23-15**	**03-18-15**
Agency Concurrence with Remedy	NA	NA	NA	NA
Public Comment Period	NA	NA	NA	NA
Public Meeting	**NA**	**NA**	**NA**	**NA**
Response to Comments Due	02-02-15	03-04-15	05-07-15	04-01-15
Draft Final Due	02-02-15	03-04-15	05-25-15	04-01-15
Final Due	03-04-15	04-03-15	06-25-15	05-01-15

Travis AFB Master Meeting and Document Schedule

PRIMARY DOCUMENTS				
Life Cycle	**Proposed Plan for the Record of Decision Amendment to the NEWIOU Soil, Sediment, and Surface Water Record of Decision Travis AFB, Glenn Anderson CH2M HILL, Tricia Carter**	**Record of Decision Amendment to the NEWIOU Soil, Sediment, and Surface Water Record of Decision Travis AFB, Glenn Anderson CH2M HILL, Loren Krook**	**Proposed Plan for the Record of Decision Amendment to the Soil Record of Decision for the WABOU Travis AFB, Glenn Anderson CH2M HILL, Tricia Carter**	**Record of Decision Amendment to the Soil Record of Decision for the WABOU Travis AFB, Glenn Anderson CH2M HILL, Loren Krook**
Scoping Meeting	**NA**	**TBD**	**NA**	**TBD**
Predraft to AF/Service Center	11-05-14	05-25-15	11-05-14	05-25-15
AF/Service Center Comments Due	11-26-14	06-24-15	11-26-14	06-24-15
Draft to Agencies	12-19-14	07-08-15	12-19-14	07-08-15
Draft to RAB	12-19-14	07-08-15	12-19-14	07-08-15
Agency Comments Due	01-19-15	08-07-15	01-19-15	08-07-15
Response to Comments Meeting	**01-21-15**	**08-19-15**	**01-21-15**	**08-19-15**
Agency Concurrence with Remedy	NA	10-02-15	NA	10-02-15
Public Comment Period	4-15-15 to 5-15-15	NA	4-15-15 to 5-15-15	NA
Public Meeting	**4-23-15**	**NA**	**4-23-15**	**NA**
Response to Comments Due	02-17-15	09-02-15	02-17-15	09-02-15
Draft Final Due	02-28-15	09-02-15	02-28-15	09-02-15
Final Due	03-30-15	10-02-15	03-30-15	10-02-15

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	**Site DP039 Lead Excavation Technical Memorandum Travis AFB, Glenn Anderson CH2M HILL, Loren Krook**	**Site ST018 POCO Work Plan Addendum Travis AFB, Lonnie Duke CH2M HILL, Leslie Royer**	**Site SD034 Data Gap Investigation Work Plan Travis AFB, Lonnie Duke CH2M HILL, Leslie Royer**	**Site SS014 POCO Technology Demonstration Work Plan Travis AFB, Lonnie Duke CH2M HILL, Leslie Royer**
Scoping Meeting	**NA**	**NA**	**NA**	**NA**
Predraft to AF/Service Center	06-02-14	09-09-14	10-01-14	12-05-14
AF/Service Center Comments Due	06-16-14	09-23-14	10-15-14	12-19-14
Draft to Agencies	07-01-14	10-16-14	11-06-14	02-04-15
Draft to RAB	07-01-14	10-16-14	11-06-14	02-04-15
Agency Comments Due	07-31-14	11-14-14	12-05-14	03-06-15
Response to Comments Meeting	**10-23-14**	**11-19-14**	**12-19-14**	**03-18-15**
Response to Comments Due	TBD	01-13-15	02-17-15	04-01-15
Draft Final Due	NA	NA	NA	NA
Final Due	TBD	01-13-15	02-17-15	04-01-15
Public Comment Period	NA	NA	NA	NA
Public Meeting	**NA**	**NA**	**NA**	**NA**

Travis AFB Master Meeting and Document Schedule

SECONDARY DOCUMENTS				
Life Cycle	POCO Investigation Work Plan for Oil Water Separators Travis AFB, Lonnie Duke CH2M HILL, Ashley Shaddy	Old Skeet Range PAH Delineation Report Travis AFB, Glenn Anderson Bay West, Steve Thornton	Site FT005 Technology Demonstration Work Plan Travis AFB, Glenn Anderson CH2M HILL, Leslie Royer	POCO Site ST032 Soil Excavation Work Plan Travis AFB, Lonnie Duke CH2M HILL, Doug Berwick
Scoping Meeting	**NA**	**NA**	**NA**	**NA**
Predraft to AF/Service Center	01-05-15	11-24-14	02-11-15	02-13-15
AF/Service Center Comments Due	01-19-15	12-02-14	02-25-15	02-27-15
Draft to Agencies	02-02-15	01-13-15	03-11-15	03-13-15
Draft to RAB	02-02-15	01-13-15	03-11-15	03-13-15
Agency Comments Due	03-04-15	02-12-15	04-10-15	04-13-15
Response to Comments Meeting	**03-18-15**	**02-18-15**	**04-23-15**	**04-23-15**
Response to Comments Due	04-01-15	03-04-15	05-07-15	05-07-15
Draft Final Due	NA	NA	NA	NA
Final Due	04-01-15	03-04-15	05-07-15	05-07-15
Public Comment Period	NA	NA	NA	NA
Public Meeting	**NA**	**NA**	**NA**	**NA**

Travis AFB Master Meeting and Document Schedule

INFORMATIONAL DOCUMENTS			
Life Cycle	**Quarterly Newsletters (January 2015)** **Travis, Glenn Anderson**	**2014 Annual CAMU Monitoring Report** **Travis AFB, Lonnie Duke** **CH2M HILL, Ashley Shaddy**	**2014 Annual GRISR** **Travis AFB, Lonnie Duke** **CH2M HILL, Leslie Royer**
Scoping Meeting	**NA**	**NA**	**NA**
Predraft to AF/Service Center	NA	02-26-15	03-30-15
AF/Service Center Comments Due	NA	03-12-15	04-13-15
Draft to Agencies	12-23-14	03-26-15	04-27-15
Draft to RAB	NA	03-26-15	04-27-15
Agency Comments Due	01-13-15	04-27-15	05-27-15
Response to Comments Meeting	**TBD**	**05-27-15**	**05-27-15**
Response to Comments Due	01-16-15	06-08-15	06-10-15
Draft Final Due	NA	NA	NA
Final Due	01-20-15	06-08-15	06-10-15
Public Comment Period	NA	NA	NA
Public Meeting	**NA**	**NA**	**NA**

Travis AFB Master Meeting and Document Schedule

HISTORY		
Life Cycle	**Site TA500 Data Gap Investigation Work Plan Travis AFB, Glenn Anderson CH2M HILL, Leslie Royer**	**Site SD031 Technology Demonstration Work Plan Travis AFB, Glenn Anderson CH2M HILL, Leslie Royer**
Scoping Meeting	**NA**	**NA**
Predraft to AF/Service Center	07-23-14	07-11-14
AF/Service Center Comments Due	08-05-14	07-25-14
Draft to Agencies	08-20-14	09-02-14
Draft to RAB	08-20-14	09-02-14
Agency Comments Due	09-19-14	10-02-14
Response to Comments Meeting	**10-02-14**	**10-23-14**
Response to Comments Due	11-17-14	11-17-14
Draft Final Due	NA	NA
Final Due	11-17-14	11-17-14
Public Comment Period	NA	NA
Public Meeting	**NA**	**NA**

South Base Boundary Groundwater Treatment Plant Monthly Data Sheet

Report Number: 171 **Reporting Period: 27 October – 5 December 2014** **Date Submitted: 16 January 2015**

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 November 2014 reporting period.

Table 1 – Operations Summary – November 2014

Initial Data Collection: 10/27/2014 15:45	**Final Data Collection:** 12/5/2014 12:00
Operating Time: **SBBGWTP:** 441 hours	Percent Uptime: **SBBGWTP:** 47%
Electrical Power Usage: **SBBGWTP:** 3,480 kWh (4,768 lbs CO_2 generated[a])	
Gallons Treated: **2.0 million gallons**	Gallons Treated Since July 1998: **875 million gallons**
Volume Discharged to Union Creek: **2.0 million gallons**	
VOC Mass Removed: **0.70 lbs**[b]	VOC Mass Removed Since July 1998: **454 lbs**
Rolling 12-Month Cost per Pound of Mass Removed: $5,716[c]	
Monthly Cost per Pound of Mass Removed: $3,072	

lbs = pounds

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

[b] Calculated using November 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	1.6	EW736x05	Offline	EW01x29	2.3	EW01x30	5.6
EW02x05	1.7	EW737x05	Offline	EW02x29	1.6	EW02x30	0.2
EW03x05	Offline	EW742x05	Offline	EW03x29	2.4	EW03x30	2.7
EW731x05	Offline	EW743x05	Offline	EW04x29	8.6	EW04x30	33.3[d]
EW732x05	Offline	EW744x05	Offline	EW05x29	11.9	EW05x30	1.5
EW733x05	Offline	EW745x05	Offline	EW06x29	4.9	EW06x30	Dry
EW734x05	Offline	EW746x05	Offline	EW07x29	2.4	EW711x30	7.9
EW735x05	1.3						
FT005 Total:	**4.6**			**SS029 Total:**	**34.1**	**SS030 Total:**	**51.2**

SBBGWTP Average Monthly Flow[c]: 64.08 gpm

[a] Extraction well flow rates are based on instantaneous weekly readings collected at the end of the month.
[b] Most extraction wells at FT005 were taken offline in accordance with the *2008 Annual Remedial Process Optimization Report for the Central Groundwater Treatment Plant, North Groundwater Treatment Plant, and South Base Boundary Groundwater Treatment Plant.*
[c] The average SBBGWTP groundwater flow rate was calculated using the Union Creek Discharge Totalizer and dividing it by the total time in the reporting period.
[d] Extraction well flow rates are based on instantaneous weekly readings collected at the beginning of the month, since well was offline at the end of the month.
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[a]		Restart[a]		Cause
	Date	Time	Date	Time	
SBBGWTP	27 October 2014	16:30	5 November 2014	9:29	Shut down for effluent confirmation sampling of TPH.
SBBGWTP	5 November 2014	15:45	12 November 2014	10:00	Shut down for effluent confirmation sampling of TPH.
SBBGWTP	13 November 2014	--	18 November 2014	17:15	System offline for filter housing replacement.

-- = Time not recorded
[a] Shutdown and restart times estimated based on field notes.
SBBGWTP = South Base Boundary Groundwater Treatment Plant

Summary of O&M Activities

Analytical data from the November 2014 sampling event are presented in Table 4; the November samples were taken on 27 October 2014. The total VOC concentration (41.9 µg/L) in the influent sample increased from the October sample results (36.5 µg/L). Cis-1,2-DCE (2.5 µg/L), TCE (39.4 µg/L), and total dissolved solids (TDS) (12 J mg/L) were detected at the influent sampling location. Cis-1,2-DCE (1.1 µg/L) was detected at the midpoint sampling location; no other contaminants were detected in the midpoint sample. TPH-d (110 J µg/L) and arsenic (9.78 J µg/L) were detected at the effluent sample location; no other contaminants were detected at the effluent sample.

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 decreased in November 2014 to 75.63 gpm from the October flow rate of 86.04 gpm.

A trigger study began in October 2014 in response to arsenic exceeding its respective inorganics effluent limitation of 3 grams per day (g/day) during the August 2014 sampling event. Trigger studies for the SBBGWTP are mandated by the Plant O&M Manual (CH2M HILL, 2004), which follows the Interim Record of Decision (IROD) (Travis AFB, 1997) and NPDES permit No. CAG912003. The IROD has since been superseded by the ROD (CH2M HILL, 2014), so effluent limitations based on the IROD are no longer valid. Instead, the sampling schedule and discharge limitations are based on the current NPDES permit No. CAG912002, Order No. R2-2012-0012 (March 2012). The inorganic effluent limitation concentration for arsenic in this current NPDES permit for arsenic is 10 µg/L. Arsenic was detected in both the October 2014 (12.2 µg/L) and November 2014 (9.78 µg/L) effluent samples, exceeding the inorganic effluent limitation in October 2014 and thus continuing the trigger study. The November 2014 sample is considered the first sample of three that will be taken following the exceedance of the inorganic effluent limitation of 10 µg/L, in order to satisfy the requirements of the arsenic trigger study. Arsenic samples will be collected at the effluent location in December 2014 and January 2015.

The October 2014 sample results also showed detections of TPH-d in the effluent sample (92 J µg/L). Confirmation resamples were collected on 27 October 2014 with a 24-hour turnaround laboratory processing time. These confirmation samples also showed detections of TPH-d, with a detection also in the receiving water samples, which are collected upstream (R-1) and downstream (R-2) of the SBBGWTP Union Creek outfall location. An additional set of confirmation samples was collected on 5 November 2014 with split effluent samples sent to an additional laboratory for processing. The SBBGWTP system was shut down on 27 October pending sampling results. It was restarted at 9:29 on 5 November for confirmation sampling, then taken offline again at 15:45 pending sampling results. The system was brought back online on 12 November 2014 after the 5 November 2014 sample results were all non-detect.

Site SS030 well EW01x30 was not functioning correctly in October 2014 and as a result, the submersible pump/motor for this well was replaced on 7 November 2014. Additionally, a portion of the EW01x30 wellhead piping was replaced due to severe rusting. The bag filter housings at the treatment plant were replaced between 13 November 2014 and 18 November 2013, and a section of discharge piping from the treatment system sump pump was replaced on 24 November 2014.

Optimization Activities

No optimization activities were performed in November 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 4,768 pounds of GHG during November 2014. This is a large decrease from the usage measured during October 2014 (13,481 pounds), and is due in part to the decrease in system uptime (441 hours in November 2014 versus 647 hours uptime in October 2014). GHG production at the SBBGWTP during November 2014 is consistent with expected monthly usage based on historical variability at the SBBGWTP.

TABLE 4
Summary of Groundwater Analytical Data For November 2014 – South Base Boundary Groundwater Treatment Plant

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	27 October 2014 (µg/L)			5 November 2014[a] (µg/L)		
				Influent	Midpoint	Effluent	Influent	Midpoint	Effluent
Halogenated Volatile Organics									
Carbon Tetrachloride	0.5	0.14	0	ND	ND	ND	NM	NM	NM
Chloroform	5.0	0.16	0	ND	ND	ND	NM	NM	NM
1,1-Dichloroethane	5.0	0.50	0	ND	ND	ND	NM	NM	NM
1,2-Dichloroethane	0.5	0.15	0	ND	ND	ND	NM	NM	NM
1,1-Dichloroethene	5.0	0.19	0	ND	ND	ND	NM	NM	NM
cis-1,2-Dichloroethene	5.0	0.19	0	2.5	1.1	ND	NM	NM	NM
trans-1,2-Dichloroethene	5.0	0.33	0	ND	ND	ND	NM	NM	NM
Methylene Chloride	5.0	0.66	0	ND	ND	ND	NM	NM	NM
Tetrachloroethene	5.0	0.21	0	ND	ND	ND	NM	NM	NM
1,1,1-Trichloroethane	5.0	0.14	0	ND	ND	ND	NM	NM	NM
1,1,2-Trichloroethane	5.0	0.20	0	ND	ND	ND	NM	NM	NM
Trichloroethene	5.0	0.19	0	39.4	ND	ND	NM	NM	NM
Vinyl Chloride	0.5	0.18	0	ND	ND	ND	NM	NM	NM
Non-Halogenated Volatile Organics									
Benzene	1.0	0.17	0	ND	ND	ND	NM	NM	NM
Ethylbenzene	5.0	0.22	0	ND	ND	ND	NM	NM	NM
Toluene	5.0	0.14	0	ND	ND	ND	NM	NM	NM
Xylenes	5.0	0.23 – 0.5	0	ND	ND	ND	NM	NM	NM
Other									
Total Petroleum Hydrocarbons – Gasoline	50	8.5	0	NM	NM	ND	NM	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	50	0	NM	NM	110 J	ND	ND	ND
Total Suspended Solids (mg/L)	NE	1.0	0	12 J	NM	NM	NM	NM	NM

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

[a] Confirmation sampling results from 5 November 2014.

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

Table 5

Summary of 2014 Arsenic Analytical Data in the Effluent Sample - SBBGWTP

Constituent	Trigger Limit[a] (µg/L)	August 2014 (µg/L)	October 2014 (µg/L)	November 2014 (µg/L)
Arsenic	10	9.9 J	12.2	9.78 J

[a] Effluent limitation provided as concentration limit (µg/L) based on current NPDES permit No. CAG912002, Order No. R2-2012-0012 (March 2012).
Notes:
µg/L = micrograms per liter
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

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

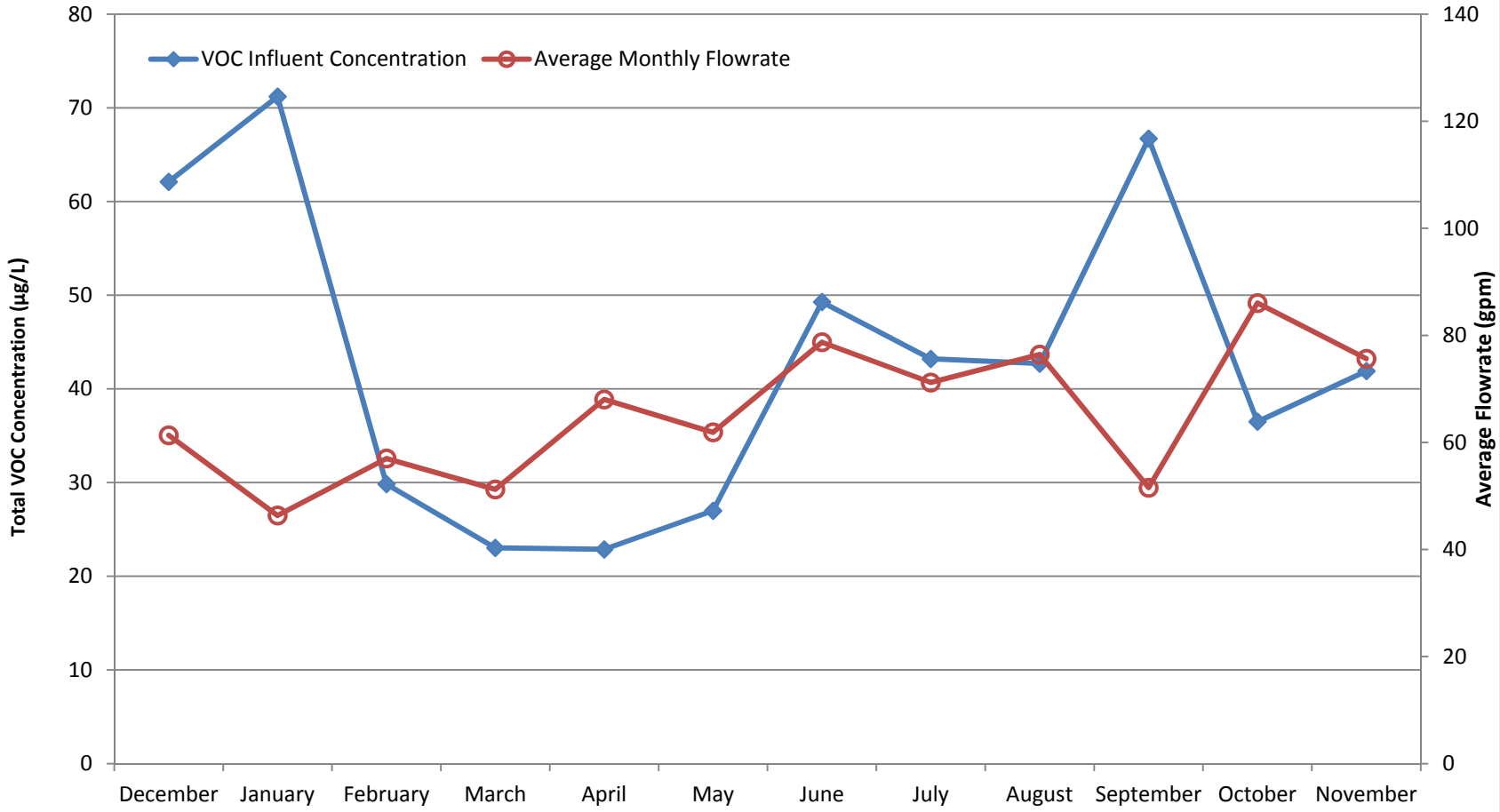
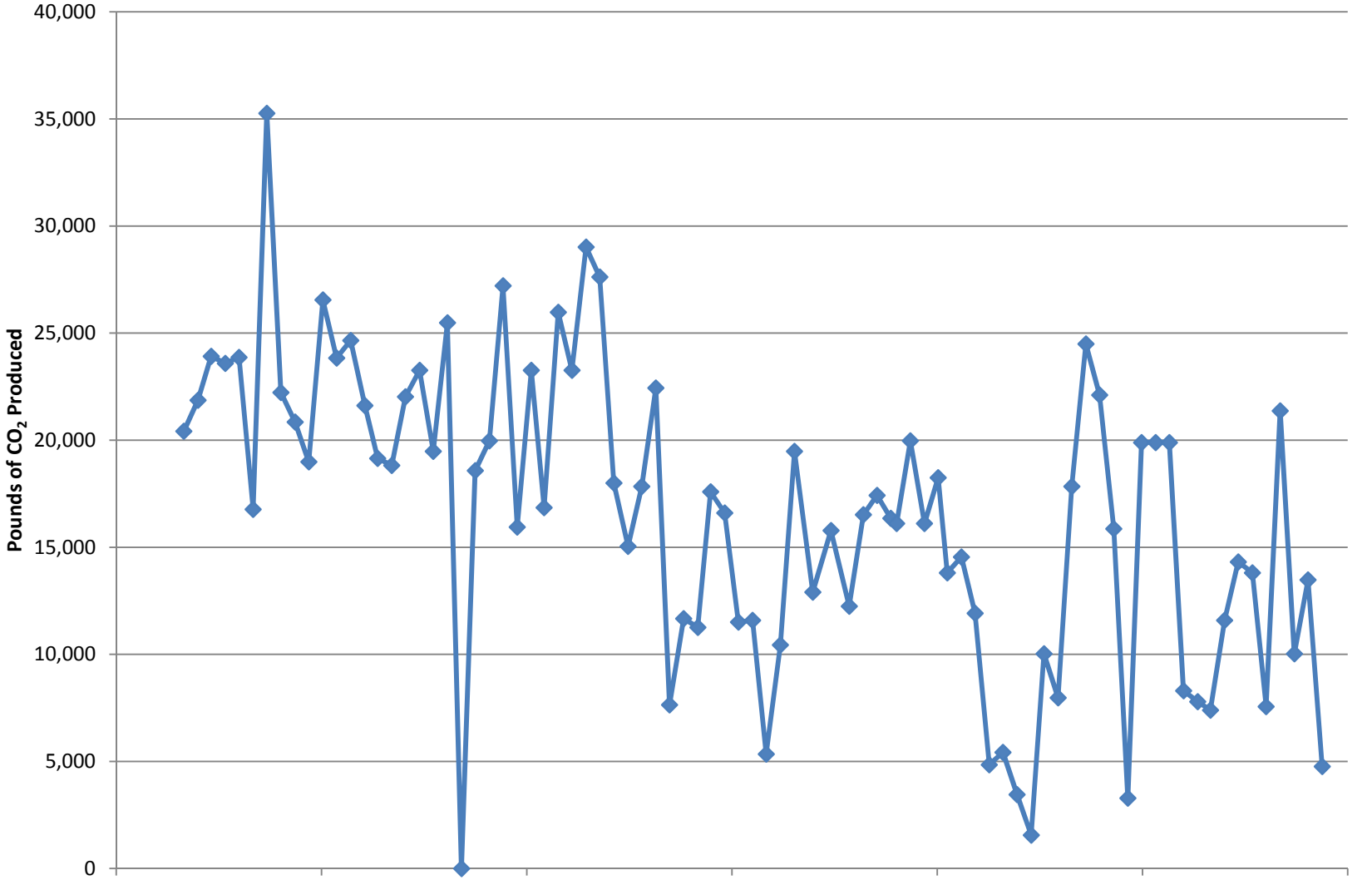


Figure 2

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



South Base Boundary Groundwater Treatment Plant Monthly Data Sheet

Report Number: 172 **Reporting Period: 5 December – 30 December 2014** **Date Submitted: 16 January 2015**

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 December 2014 reporting period.

Table 1 – Operations Summary – December 2014

Initial Data Collection: 12/5/2014 12:00	**Final Data Collection:** 12/30/2014 13:30
Operating Time: **SBBGWTP:** 602 hours	Percent Uptime: **SBBGWTP:** 100%
Electrical Power Usage: **SBBGWTP:** 7,800 kWh (10,686 lbs CO_2 generated[a])	
Gallons Treated: **2.8 million gallons**	Gallons Treated Since July 1998: **878 million gallons**
Volume Discharged to Union Creek: **2.8 million gallons**	
VOC Mass Removed: **0.89 lbs**[b]	VOC Mass Removed Since July 1998: **455 lbs**
Rolling 12-Month Cost per Pound of Mass Removed: $5,518[c]	
Monthly Cost per Pound of Mass Removed: $2,563	

lbs = pounds

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

[b] Calculated using December 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[b]				SS029		SS030	
EW01x05	1.9	EW736x05	Offline	EW01x29	2.2	EW01x30	6.6
EW02x05	1.9	EW737x05	Offline	EW02x29	1.6[d]	EW02x30	4.2
EW03x05	Offline	EW742x05	Offline	EW03x29	2.3	EW03x30	2.3
EW731x05	Offline	EW743x05	Offline	EW04x29	8.4	EW04x30	Offline[e]
EW732x05	Offline	EW744x05	Offline	EW05x29	12.0	EW05x30	1.5
EW733x05	Offline	EW745x05	Offline	EW06x29	4.8	EW06x30	Dry
EW734x05	Offline	EW746x05	Offline	EW07x29	4.7	EW711x30	2.3
EW735x05	1.3						
FT005 Total:	**5.1**			**SS029 Total:**	**36.0**	**SS030 Total:**	**16.9**

SBBGWTP Average Monthly Flow[c]: 66.70 gpm

[a] Extraction well flow rates are based on instantaneous weekly readings collected at the end of the month.
[b] Most extraction wells at FT005 were taken offline in accordance with the *2008 Annual Remedial Process Optimization Report for the Central Groundwater Treatment Plant, North Groundwater Treatment Plant, and South Base Boundary Groundwater Treatment Plant.*
[c] The average SBBGWTP groundwater flow rate was calculated using the Union Creek Discharge Totalizer and dividing it by the total time in the reporting period.
[d] Extraction well flow rates are based on instantaneous weekly readings collected at the beginning of the month, since well was offline at the end of the month.
[e] Extraction well EW04x30 was offline during December 2014 due to a failure of the well pump.
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[a]		Restart[a]		Cause
	Date	Time	Date	Time	
SBBGWTP	None	NA	None	NA	

-- = Time not recorded
[a] Shutdown and restart times estimated based on field notes.
NA = not applicable
SBBGWTP = South Base Boundary Groundwater Treatment Plant

Summary of O&M Activities

Analytical data from the December 2014 sampling event are presented in Table 4. The total VOC concentration (38.7 µg/L) in the influent sample decreased from the November sample results (41.9 µg/L). Cis-1,2-DCE (2.2 µg/L), TCE (36.5 µg/L), and total dissolved solids (TDS) (3 J mg/L) were detected at the influent sampling location. 1,1-DCA (0.58 µg/L) and cis-1,2-DCE (0.91 µg/L) were detected at the midpoint sampling location; no other contaminants were detected in the midpoint sample. The concentration of cis-1,2-DCE has decreased at the midpoint location since the November 2014 sampling event (from 1.1 µg/L), but will be monitored for breakthrough conditions. Arsenic (5.73 J µg/L) was detected at the effluent sample location; no other contaminants were detected at the effluent sample.

Because the October 2014 sample results showed detections of TPH-d in the effluent sample, confirmation samples were collected on 27 October 2014. These confirmation samples also showed detections of TPH-d, with a detection also in the receiving water samples, which are collected upstream (R-1) and downstream (R-2) of the SBBGWTP Union Creek outfall location. An additional set of confirmation samples was collected on 5 November 2014 with split effluent samples sent to an additional laboratory for processing. Both the November 2014 sample results and the split sample results yielded no detections of TPH-d in the effluent sample. No detections of TPH-d were found in the December 2014 effluent sample results.

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 December 2014 to 76.40 gpm from the November 2014 flowrate of 75.63 gpm.

Arsenic was detected in the October 2014 (12.2 µg/L) effluent sample, exceeding the inorganic effluent limitation of 10 µg/L, thus starting an arsenic trigger study. Arsenic was detected in the effluent sample in December 2014 at a concentration of 5.73 J µg/L, which is below the inorganic effluent limit. One final arsenic sample will be collected at the effluent location in January 2015 in order to complete the trigger study. Results of the arsenic trigger study are presented in Table 5.

Optimization Activities

No optimization activities were performed in December 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 10,686 pounds of GHG during December 2014. This amount is typical for the SBBGWTP with uptime at or around 100 percent; the uptime in November 2014 was just above 47 percent which produced 4,768 pounds of GHG.

TABLE 4
Summary of Groundwater Analytical Data For December 2014 – South Base Boundary Groundwater Treatment Plant

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	8 December 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	ND	ND	ND
1,1-Dichloroethane	5.0	0.50	0	ND	ND	ND
1,2-Dichloroethane	0.5	0.15	0	ND	0.58	ND
1,1-Dichloroethene	5.0	0.19	0	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.19	0	2.2	0.91	ND
trans-1,2-Dichloroethene	5.0	0.33	0	ND	ND	ND
Methylene Chloride	5.0	0.66	0	ND	ND	ND
Tetrachloroethene	5.0	0.21	0	ND	ND	ND
1,1,1-Trichloroethane	5.0	0.14	0	ND	ND	ND
1,1,2-Trichloroethane	5.0	0.20	0	ND	ND	ND
Trichloroethene	5.0	0.19	0	36.5	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	ND	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	50	0	ND	NM	ND
Total Suspended Solids (mg/L)	NE	1.0	0	3 J	NM	NM

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

Notes:

J = analyte concentration is considered an estimated value 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

Table 5
Summary of 2014 Arsenic Analytical Data in the Effluent Sample - SBBGWTP

Constituent	Trigger Limit[a] (µg/L)	October 2014 (µg/L)	November 2014 (µg/L)	December 2014 (µg/L)
Arsenic	10	12.2	9.78 J	5.73 J

[a] Effluent limitation provided as concentration limit (µg/L) based on most recent general NPDES permit No. CAG912002, Order No. R2-2012-0012 (March 2012).
Notes:
µg/L = micrograms per liter
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

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

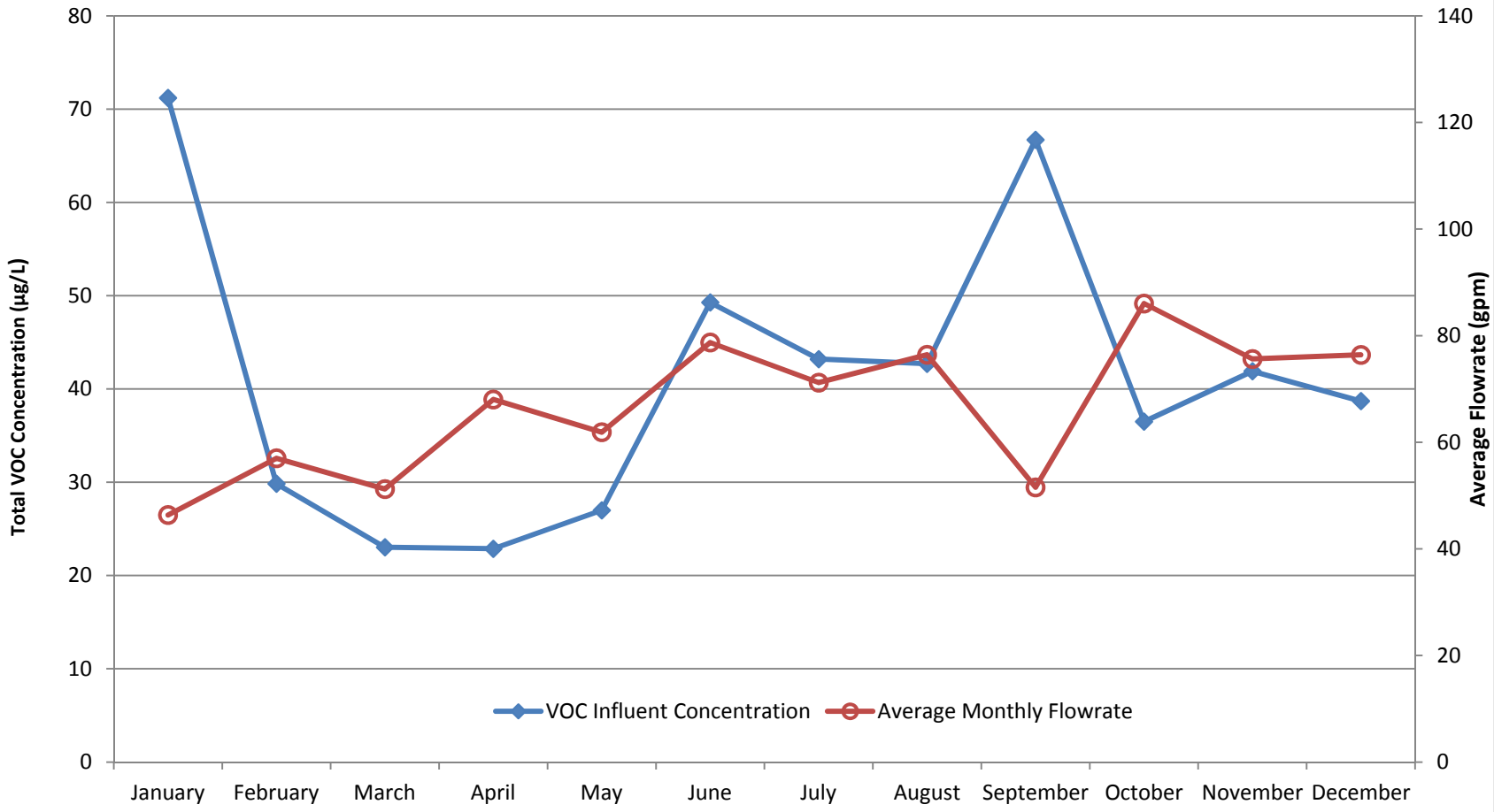
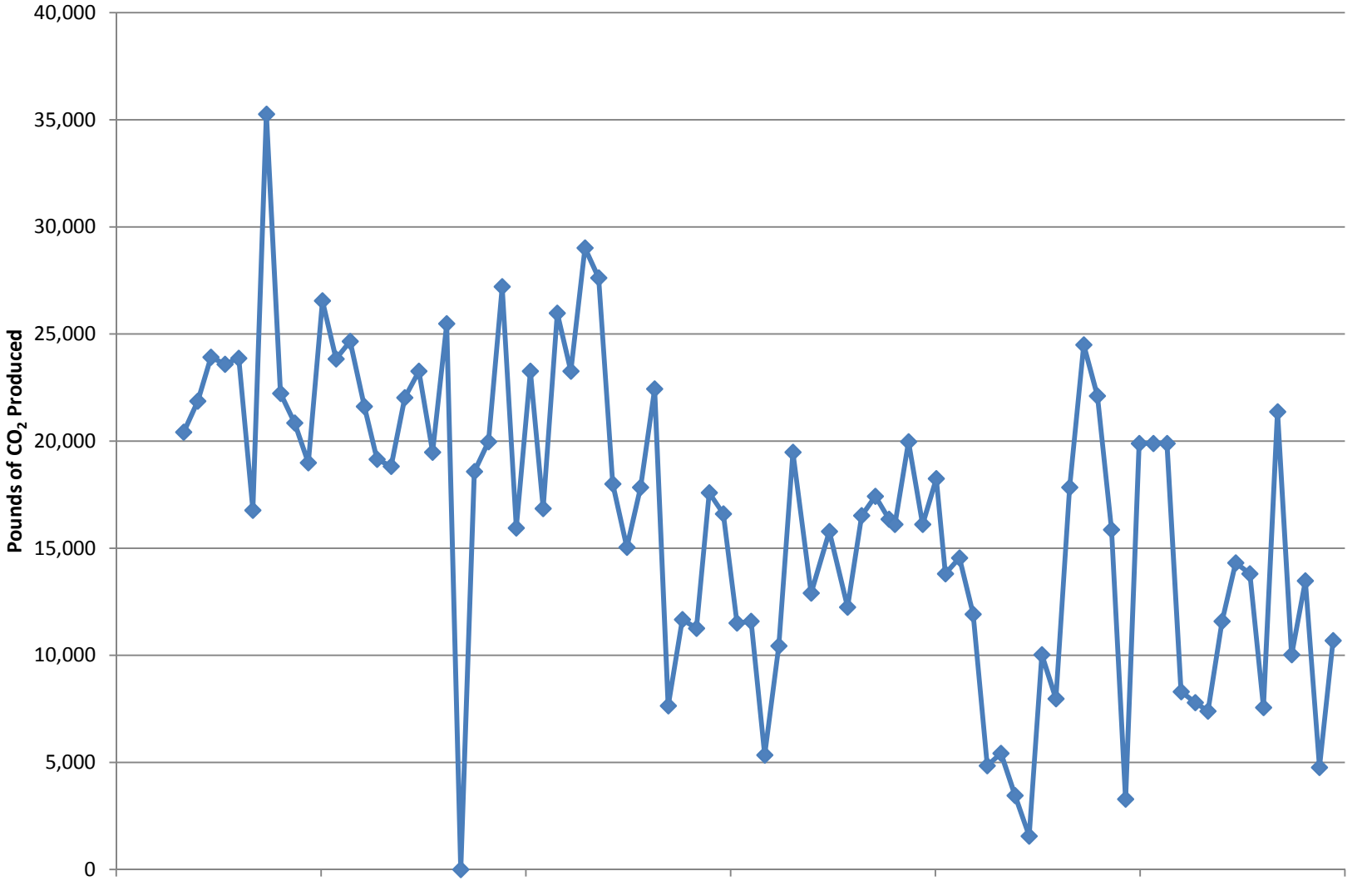


Figure 2

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



Central Groundwater Treatment Plant Monthly Data Sheet

Report Number: 184 **Reporting Period: 3 November – 3 December 2014** **Date Submitted: 5 January 2015**

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 and two (2) bioreactor treatability studies.

System Metrics

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

Table 1 – Operations Summary – November 2014

Initial Data Collection:	11/3/2014 16:15	**Final Data Collection:**	12/3/2014 13:00		
Operating Time:		Percent Uptime:		Electrical Power Usage:	
CGWTP:	717 hours	**CGWTP:**	100%	**CGWTP:**	2,587 kWh (3,544 lbs CO_2 generated[a])
WTTP:	Water: 0 hours Vapor: 0 hours	**WTTP:**	Water: 0% Vapor: 0%	**WTTP:**	0 kWh

Gallons Treated: **1.3 million gallons**

Gallons Treated Since January 1996: **504 million gallons**

VOC Mass Removed:

2.92 lbs[b] (groundwater only)

0 lbs (vapor only)

VOC Mass Removed Since January 1996:

2,701 lbs from groundwater

8,686 lbs from vapor

Rolling 12-Month Cost per Pound of Mass Removed: $1,509[c]

Monthly Cost per Pound of Mass Removed: $715

[a] Based on Department of Energy estimate that 1 kilowatt hour generated produces 1.37 pounds of GHG.
[b] Calculated using November 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	17.8[c]	Offline
EW02x16	7.0[c]	Offline
EW03x16	2.0[c]	Offline
EW605x16	6.8[c]	Offline
EW610x16	2.8[c]	Offline
CGWTP	30.8	--
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 November 2014.
[c] Flow rate based on instantaneous, end of the month reading for November 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)					
	None	NA			
WTTP					
	None	NA			

-- = Time not recorded
[a] Shutdown and restart times estimated based on field notes
CGWTP = Central Groundwater Treatment Plant
NA = not applicable
WTTP = West Transfer Treatment Plant

Summary of O&M Activities

Monthly groundwater samples were collected at the CGWTP on 10 November 2014. Sample results are presented in Table 4. The total VOC concentration (264.97µg/L) in the November 2014 influent sample has increased since the October 2014 sample (228.82 µg/L) was collected. Concentrations of 1,1-DCE (0.57 J+ µg/L), cis-1,2-DCE (60.8 J+ µg/L), PCE (0.6 J+ µg/L), trans-1,2-DCE (3 J+ µg/L), and TCE (200 µg/L) were detected at the influent sampling location. None of these constituents were detected at the midpoint or effluent sampling locations, except TCE, which was detected at the effluent location (0.24 J µg/L). This detection of TCE was below the maximum daily effluent limitation of 5 µg/L. A 'J+' flagged result is considered a J-flagged value that is above the reporting limit for the contaminant (a high estimate).

Vinyl chloride was detected after the first carbon vessel (0.39 J µg/L) and after the second carbon vessel (0.45 J µg/L). Vinyl chloride was not detected in either the system influent or effluent sample locations. 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 decreased in November 2014 from the flow rate measured in October 2014 (from 34.31 gpm to 30.8 gpm).

The battery for the uninterruptible power supply (UPS) was replaced on 12 November 2014, which did not affect CGWTP uptime because the UPS was bypassed during system operation. There were no additional issues with the UPS in November.

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 November 2014, and was put back on line on 21 November 2014.

Optimization Activities

No optimization activities occurred at the CGWTP in November 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 3,544 pounds of GHG during November 2014. This is a decrease from the amount produced in October 2014 (approximately 4,068 pounds) which is the result of less system runtime and fewer gallons treated in November than in the previous month.

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

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	10 November 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	60.8 J+	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	0.57 J+	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 J+	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	200	ND	ND	0.24 J
trans-1,2-Dichloroethene	5.0	0.33	0	3 J+	ND	ND	ND
Vinyl Chloride	0.5	0.18	0	ND	0.39 J	0.45 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	NM	NM

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

Notes:

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

J+ = is considered a J-flagged value that is above the reporting limit for the contaminant (a high estimate)

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

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	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
	3 July 2014	24 July 2014
	01 August 2014	15 August 2014
	01 September 2014	12 September 2014
	26 September 2014	30 September 2014[a]
	24 October 2014	7 November 2014
	21 November 2014	--

[a] = DP039 Bioreactor turned off on 30 September 2014 to replace hose.
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

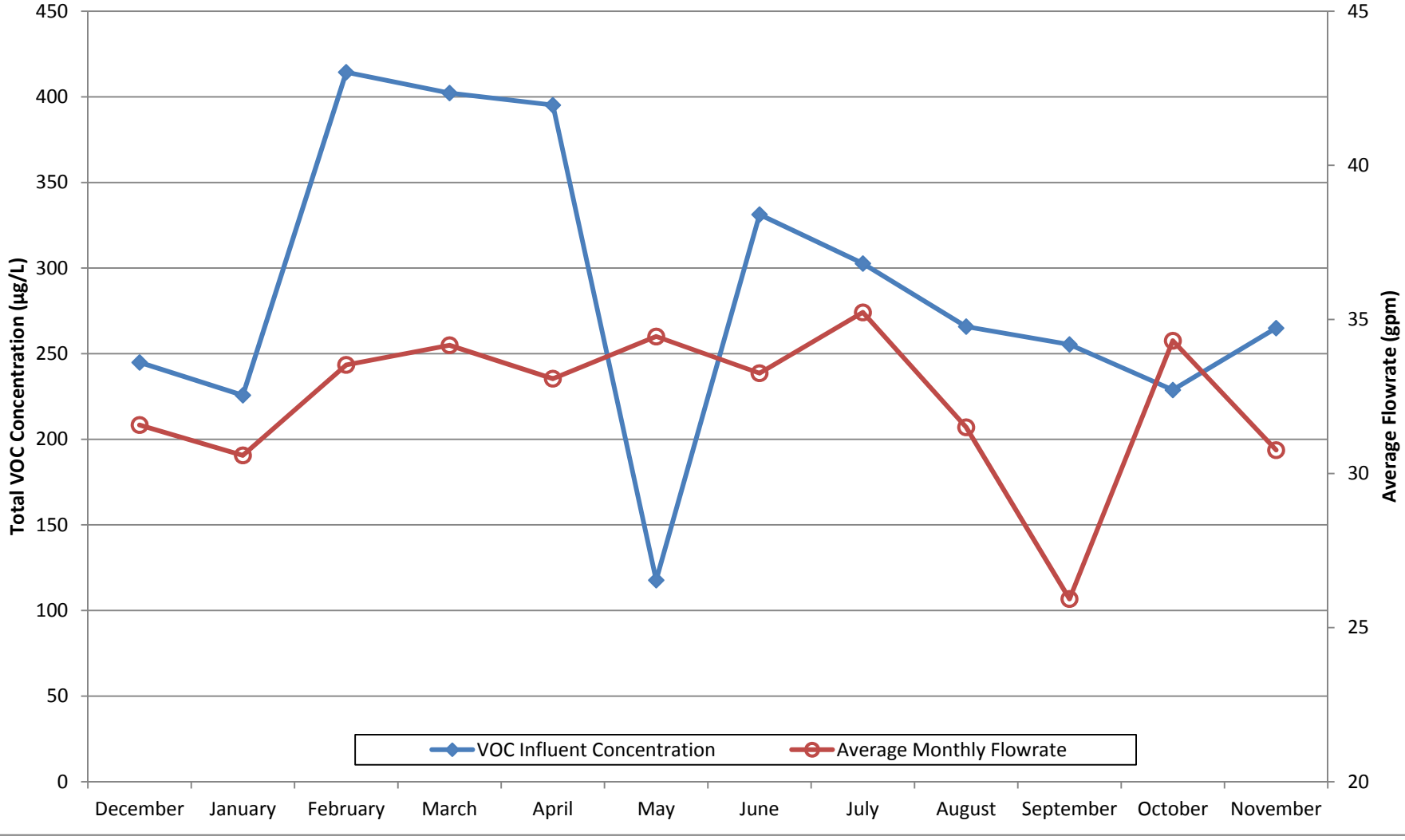
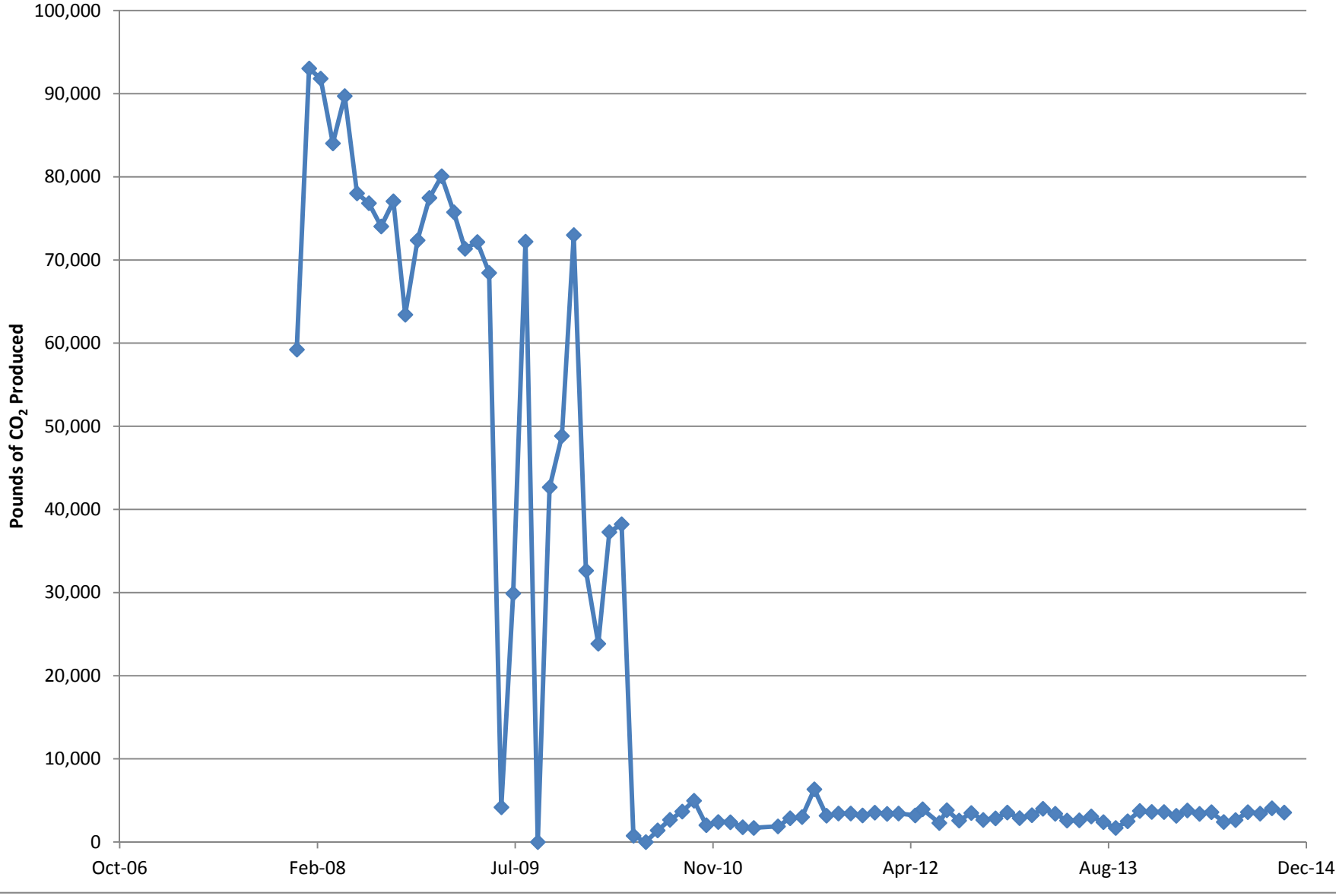


Figure 2

Equivalent Pounds of CO2 Produced by the Central Groundwater Treatment Plant



Central Groundwater Treatment Plant Monthly Data Sheet

Report Number: 185 **Reporting Period: 3 December – 30 December 2014** **Date Submitted: 14 January 2015**

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 and two (2) bioreactor treatability studies.

System Metrics

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

Table 1 – Operations Summary – December 2014

Initial Data Collection:	12/3/2014 13:00	**Final Data Collection:**	12/30/2014 14:00		
Operating Time:		Percent Uptime:		Electrical Power Usage:	
CGWTP:	649 hours	**CGWTP:**	100%	**CGWTP:**	2,114 kWh (2,896 lbs CO_2 generated[a])
WTTP:	Water: 0 hours Vapor: 0 hours	**WTTP:**	Water: 0% Vapor: 0%	**WTTP:**	0 kWh

Gallons Treated: **1.13 million gallons**

Gallons Treated Since January 1996: **505 million gallons**

VOC Mass Removed:

2.91 lbs[b] (groundwater only)

0 lbs (vapor only)

VOC Mass Removed Since January 1996:

2,704 lbs from groundwater

8,686 lbs from vapor

Rolling 12-Month Cost per Pound of Mass Removed: $1,389[c]

Monthly Cost per Pound of Mass Removed: $646

[a] Based on Department of Energy estimate that 1 kilowatt hour generated produces 1.37 pounds of GHG.
[b] Calculated using December 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	17.8[c]	Offline
EW02x16	7.0[c]	Offline
EW03x16	2.0[c]	Offline
EW605x16	6.8[c]	Offline
EW610x16	2.8[c]	Offline
CGWTP	28.9	--
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 December 2014.
[c] Flow rate based on instantaneous, end of the month reading for December 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)					
	None	NA			
WTTP					
	None	NA			

-- = Time not recorded
[a] Shutdown and restart times estimated based on field notes
CGWTP = Central Groundwater Treatment Plant
NA = not applicable
WTTP = West Transfer Treatment Plant

Summary of O&M Activities

Monthly groundwater samples were collected at the CGWTP on 8 December 2014. Sample results are presented in Table 4. The total VOC concentration (310.62µg/L) in the December 2014 influent sample has increased since the November 2014 sample (264.97 µg/L) was collected. Concentrations of 1,1-DCE (0.52 µg/L), 1,2- dichlorobenzene (0.35 J µg/L), cis-1,2-DCE (51.6 µg/L), PCE (0.55 µg/L), trans-1,2-DCE (2.6 µg/L), and TCE (255 µg/L) were detected at the influent sampling location. None of these constituents were detected at the midpoint or effluent sampling locations.

Vinyl chloride was detected after the first carbon vessel (0.19 J µg/L), which was a decrease since the November sampling event, where it was detected at this location at a concentration of 0.39 J µg/L. Vinyl chloride was not detected in the system influent or effluent sample locations, or after the second carbon vessel. 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 decreased in December 2014 from the flow rate measured in November 2014 (from 30.8 gpm to 28.9 gpm).

Site SS016 extraction wells EW605x16 and EW610x16 were shut down at 16:00 on 11 December 2014 for six days, due to flooding in the sample port vault as a result from heavy rains. Heavy rains also caused flooding in the containment sump at the WTTP, which was pumped out on 2 December and 22 December 2014. The flooding at the WTTP had no effect on the CGWTP operation.

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 December 2014, and was brought back on line on 19 December 2014.

Optimization Activities

No optimization activities occurred at the CGWTP in December 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 2,896 pounds of GHG during December 2014. This is a decrease from the amount produced in November 2014 (approximately 3,544 pounds) which is the result of less system runtime and fewer gallons treated in December than in the previous month.

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

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	8 December 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	51.6	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	0.52	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	0.55	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	255	ND	ND	ND
trans-1,2-Dichloroethene	5.0	0.33	0	2.6	ND	ND	ND
Vinyl Chloride	0.5	0.18	0	ND	0.19 J	ND	ND
Non-Halogenated Volatile Organics							
Benzene	1.0	0.17	0	ND	ND	ND	ND
Ethylbenzene	5.0	0.22	0	ND	ND	ND	ND
Toluene	5.0	0.14	0	ND	ND	ND	ND
Total Xylenes	5.0	0.23 – 0.5	0	ND	ND	ND	ND
Other							
Total Dissolved Solids (mg/L)	NA	10	0	NM	NM	809	NM

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

Notes:

J = analyte concentration is considered an estimated value 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

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	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
	3 July 2014	24 July 2014
	01 August 2014	15 August 2014
	01 September 2014	12 September 2014
	26 September 2014	30 September 2014[a]
	24 October 2014	7 November 2014
	21 November 2014	4 December 2014
	19 December 2014	--

[a] = DP039 Bioreactor turned off on 30 September 2014 to replace hose.
CGWTP = Central Groundwater Treatment Plant
MW = Monitoring Well

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

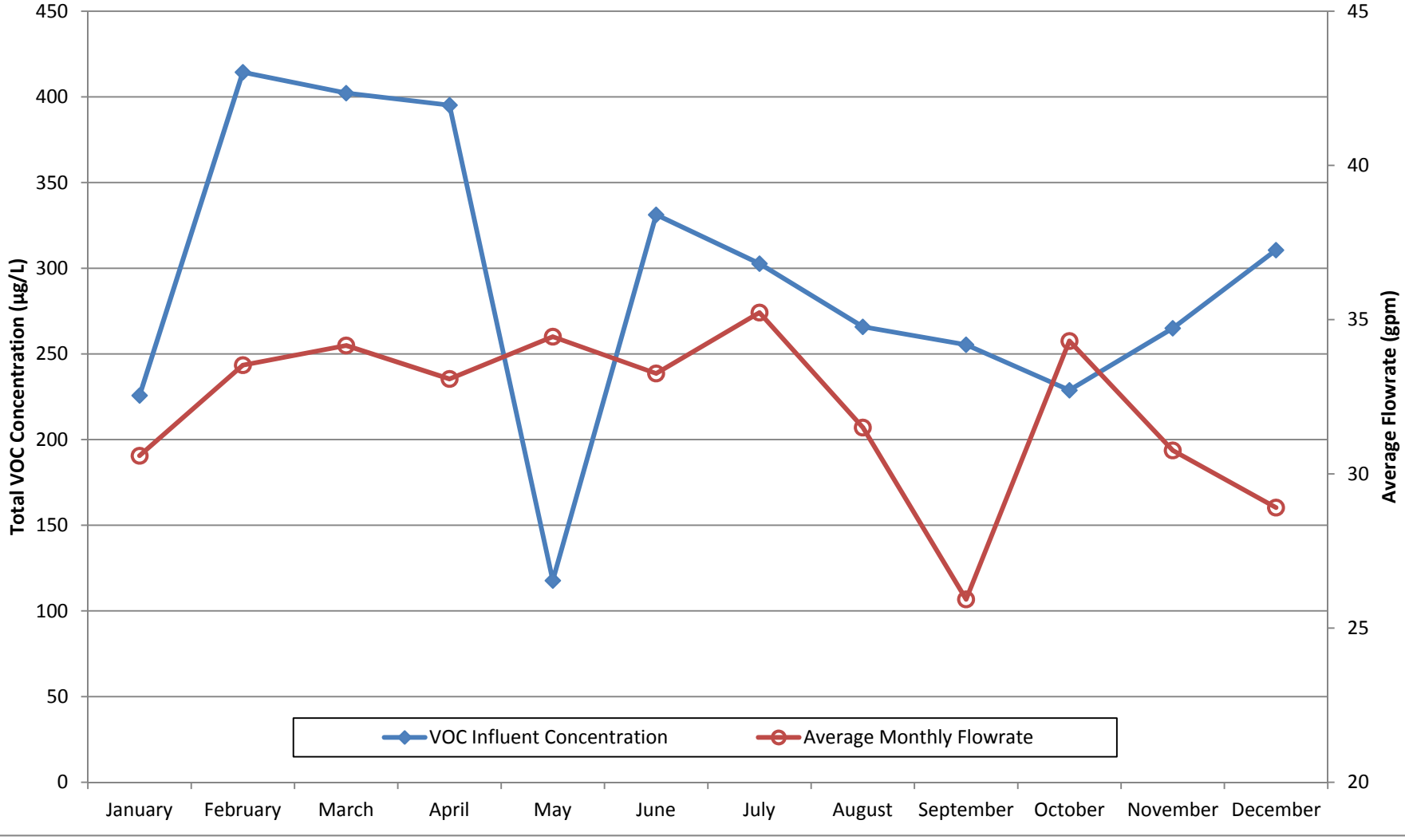
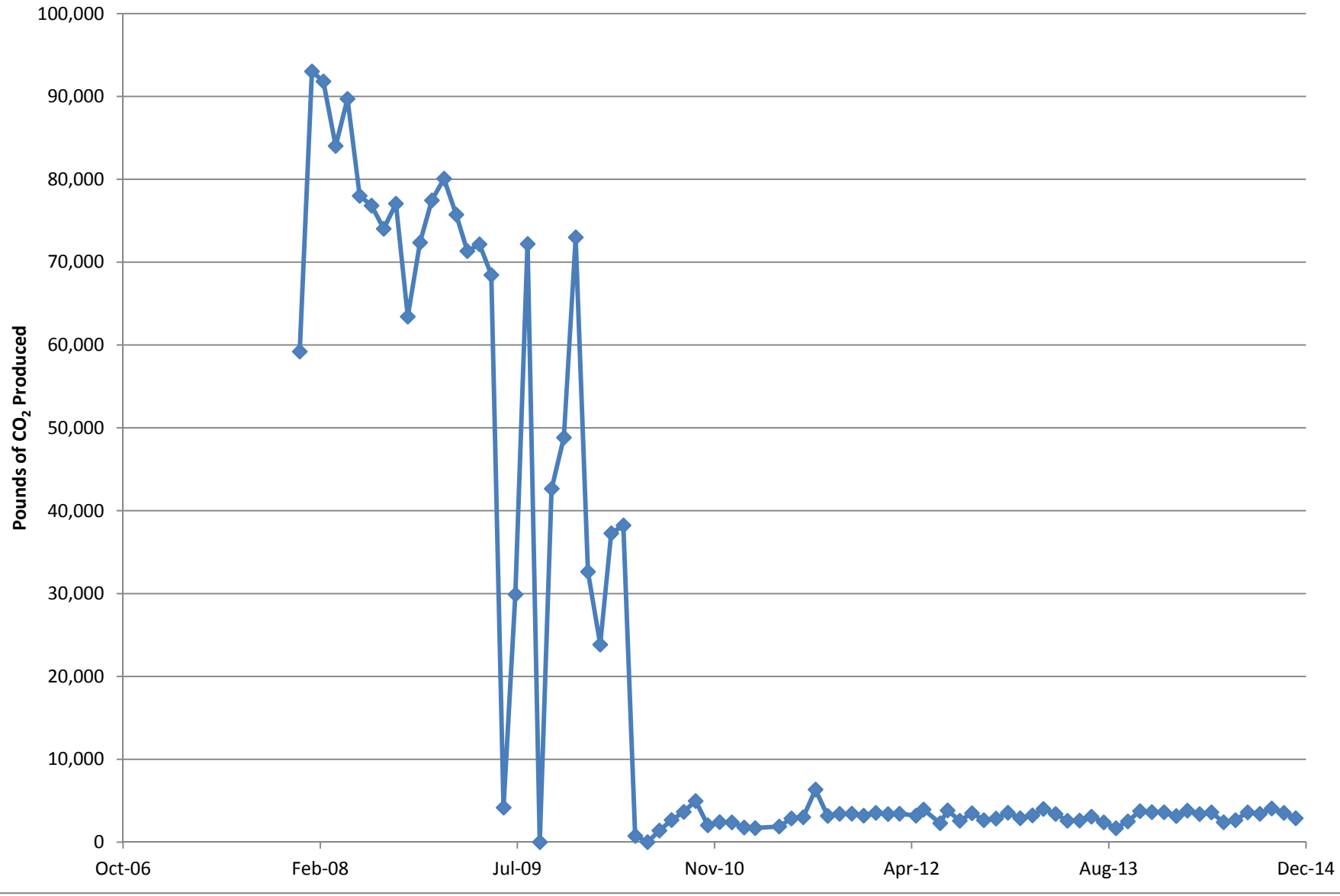


Figure 2

Equivalent Pounds of CO2 Produced by the Central Groundwater Treatment Plant



North Groundwater Treatment Plant Monthly Data Sheet

Report Number: 144 **Reporting Period: 27 October – 5 December 2014** **Date Submitted: 5 January 2015**

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 November 2014 reporting period:

Table 1 – Operations Summary – November 2014

Initial Data Collection:	10/27/2014 10:15	**Final Data Collection:**	12/5/2014 14:00
Operating Time:		Percent Uptime:	
NGWTP:	345 hours	**NGWTP:**	37%
Electrical Power Usage[a]:			
NGWTP:	0 kWh		
Gallons Treated: **54,860 gallons**		Gallons Treated Since March 2000: **84.1 million gallons**	
Volume Discharged to Duck Pond: **54,860 gallons**		Volume Discharge to Storm Drain: **0 gallons**	
VOC Mass Removed: **2.84×10^{-3} pounds**[b]		VOC Mass Removed Since March 2000: **174.31 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 November 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 – November 2014

Location	Average Flow Rate (gpm)[a]	Total Gallons Processed (gallons)
EW614x07	2.7	54,860
EW615x07[b]	0	0
NGWTP	**2.7**	**54,860**

[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] Extraction well currently offline due to insufficient battery power.
gpm = gallons per minute

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

Table 3 – Summary of System Shutdowns

Location	Shutdown[a]		Restart[a]		Cause
	Date	Time	Date	Time	
NGWTP	27 October 2014	15:15	5 November 2014	8:41	Shut down for effluent confirmation sampling of TPH.
NGWTP	5 November 2014	13:45	12 November 2014	11:00	Shut down for effluent confirmation sampling of TPH.
NGWTP	19 November 2014	11:15	21 November 2014	13:45	System found offline due to rain water in sump.

-- = Time not recorded
[a] Shutdown and restart times estimated based on field notes
NGWTP = North Groundwater Treatment Plant

Summary of O&M Activities

Analytical data from the November 2014 sampling event are presented in Table 4; the November samples were taken on 27 October 2014. Cis-1,2-DCE (0.41 J µg/L) and TCE (5.8 µg/L) were detected at the influent sample location for a total influent contaminant concentration of 6.21 µg/L. 2-Butanone (39.1 µg/L) and Acetone (21.6 µg/L) were detected in the midpoint sample only; although these analytes are common laboratory contaminants, the laboratory blank and trip blank samples had no detections of either analyte. Both contaminants are commonly found in PVC glue, and therefore, the detections may be associated with the installation of new carbon vessels or rearranging of system piping.

The 27 October 2014 sample results showed detections of TPH-d in the effluent sample (82 J µg/L). Additional confirmation samples were collected on 5 November 2014 from the influent, midpoint, and effluent sample locations with a 24-hour turnaround laboratory processing time. The confirmation resamples showed no detections of TPH-d at any NGWTP sampling locations. Split effluent samples were collected at that time and sent to another lab for analysis, which yielded similar results (no detections). The NGWTP was shut down on 27 October pending confirmation sampling results, was brought back online in order to collect the 5 November 2014 confirmation samples, and then taken offline again pending those sampling results. The system was

restarted on 12 November 2014, but was found to be offline again on 19 November 2014 due to rain water in the sump. The water was bailed from the sump, but there was no access to the panel, and therefore could not be restarted until 21 November 2014 (the panel is located remotely out at the extraction well, and was temporarily inaccessible due to heavy rains).

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

Beginning in August 2014, troubleshooting was performed to identify the source of the discrepancy between totalizer readings at the extraction wells and the effluent. The NGWTP effluent totalizer has routinely measured greater flow and total gallons than the combined extraction well totalizers, but did not do so during November 2014. The total flows through both the NGWTP and EW614x07 were measured to be 54,860 gallons, which indicates that past troubleshooting measures were successful (see the September 2014 Monthly Data Sheet, which describes the steps taken to eliminate cascading groundwater in the extraction well). Totalizer readings will continue to be monitored for discrepancies in December.

The average flow rate through the NGWTP in November 2014 (2.7 gpm) decreased from the average flow rate measured in October 2014 (4.8 gpm), which may be due to a recirculation line on the pump sensor that was installed. The recirculation line may be shutting the pump off, but not the hour meter, which would cause an incorrect calculation of the flow rate. Possible remedies for this problem will be looked at in the upcoming months. Low bag filter pressures were observed in November 2014 (5 pounds per square inch [psi]) compared to pressures observed since January 2014 (an average of 12.8 psi), due to an air release valve that was installed on the bag filter vessel in September 2014.

Optimization Activities

No optimization activities were performed during November 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 now a solar-only operated treatment system and no longer generates GHG.

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

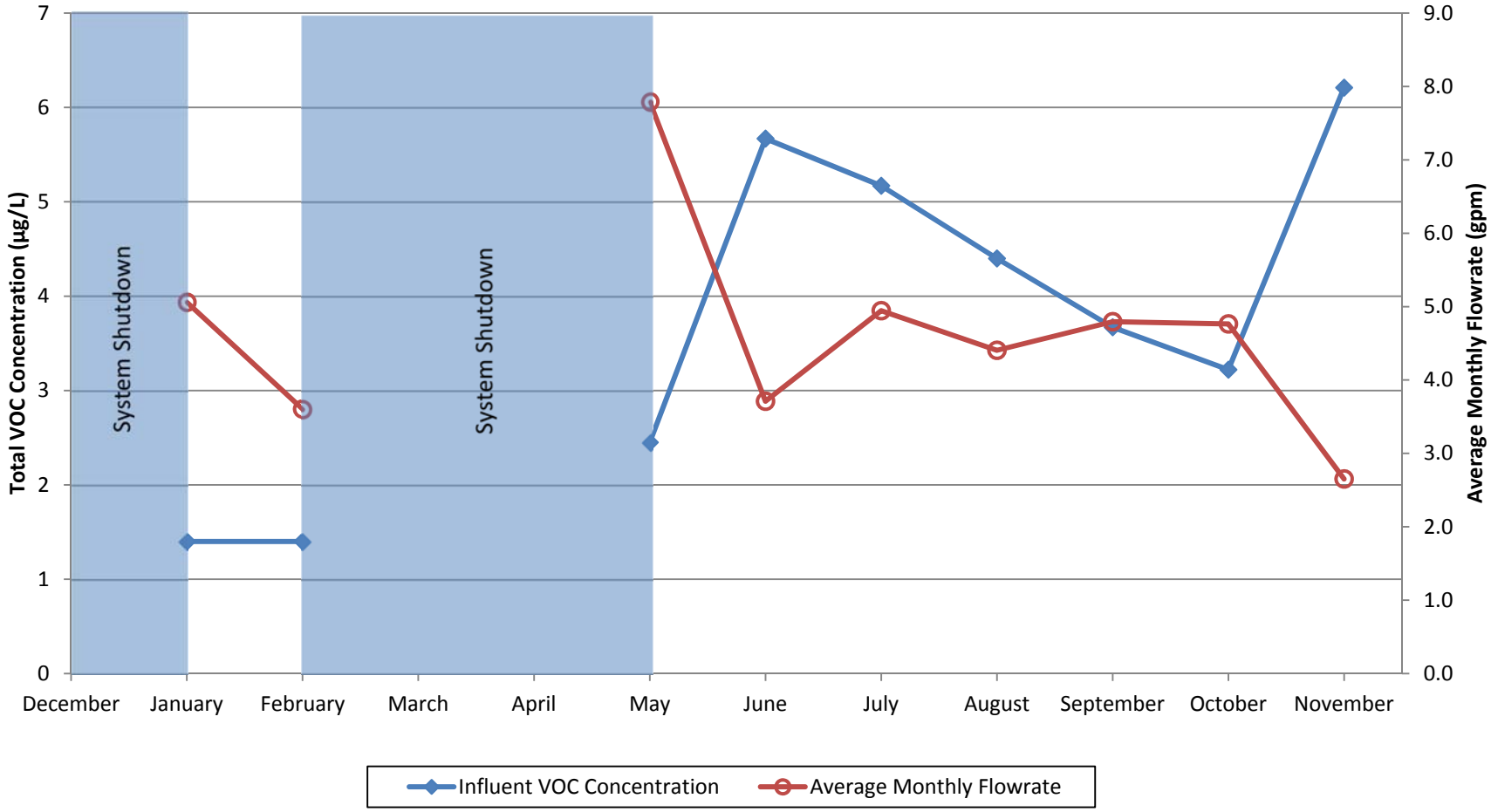
Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	27 October 2014 (µg/L)			5 November 2014[a] (µg/L)
				Influent	After Carbon 1	Effluent	Effluent
Halogenated Volatile Organics							
Bromodichloromethane	5.0	0.15	0	ND	ND	ND	NM
Bromoform	5.0	0.19	0	ND	ND	ND	NM
Carbon Tetrachloride	0.5	0.14	0	ND	ND	ND	NM
Chloroform	5.0	0.16	0	ND	ND	ND	NM
Dibromochloromethane	5.0	0.13	0	ND	ND	ND	NM
1,3-Dichlorobenzene	5.0	0.15	0	ND	ND	ND	NM
1,4-Dichlorobenzene	5.0	0.15	0	ND	ND	ND	NM
1,1-Dichloroethane	5.0	0.15	0	ND	ND	ND	NM
1,2-Dichloroethane	0.5	0.15	0	ND	ND	ND	NM
1,1-Dichloroethene	5.0	0.19	0	ND	ND	ND	NM
cis-1,2-Dichloroethene	5.0	0.19	0	0.41 J	ND	ND	NM
trans-1,2-Dichloroethene	5.0	0.33	0	ND	ND	ND	NM
Methylene Chloride	5.0	0.66	0	ND	ND	ND	NM
Tetrachloroethene	5.0	0.21	0	ND	ND	ND	NM
1,1,1-Trichloroethane	5.0	0.14	0	ND	ND	ND	NM
1,1,2-Trichloroethane	5.0	0.2	0	ND	ND	ND	NM
Trichloroethene	5.0	0.19	0	5.8	ND	ND	NM
Vinyl Chloride	0.5	0.18	0	ND	ND	ND	NM
Non-Halogenated Volatile Organics							
Benzene	1.0	0.17	0	ND	ND	ND	NM
Ethylbenzene	5.0	0.22	0	ND	ND	ND	NM
Toluene	5.0	0.14	0	ND	ND	ND	NM
Xylenes	5.0	0.23 – 0.5	0	ND	ND	ND	NM
Other							
Total Petroleum Hydrocarbons – Gasoline	50	8.5	0	NM	NM	ND	ND
Total Petroleum Hydrocarbons – Diesel	50	50	0	NM	NM	82 J	ND
Total Dissolved Solids (mg/L)	NA	10	0	NM	NM	NM	NM

* 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).

[a] Confirmation sampling results from 5 November 2014.

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

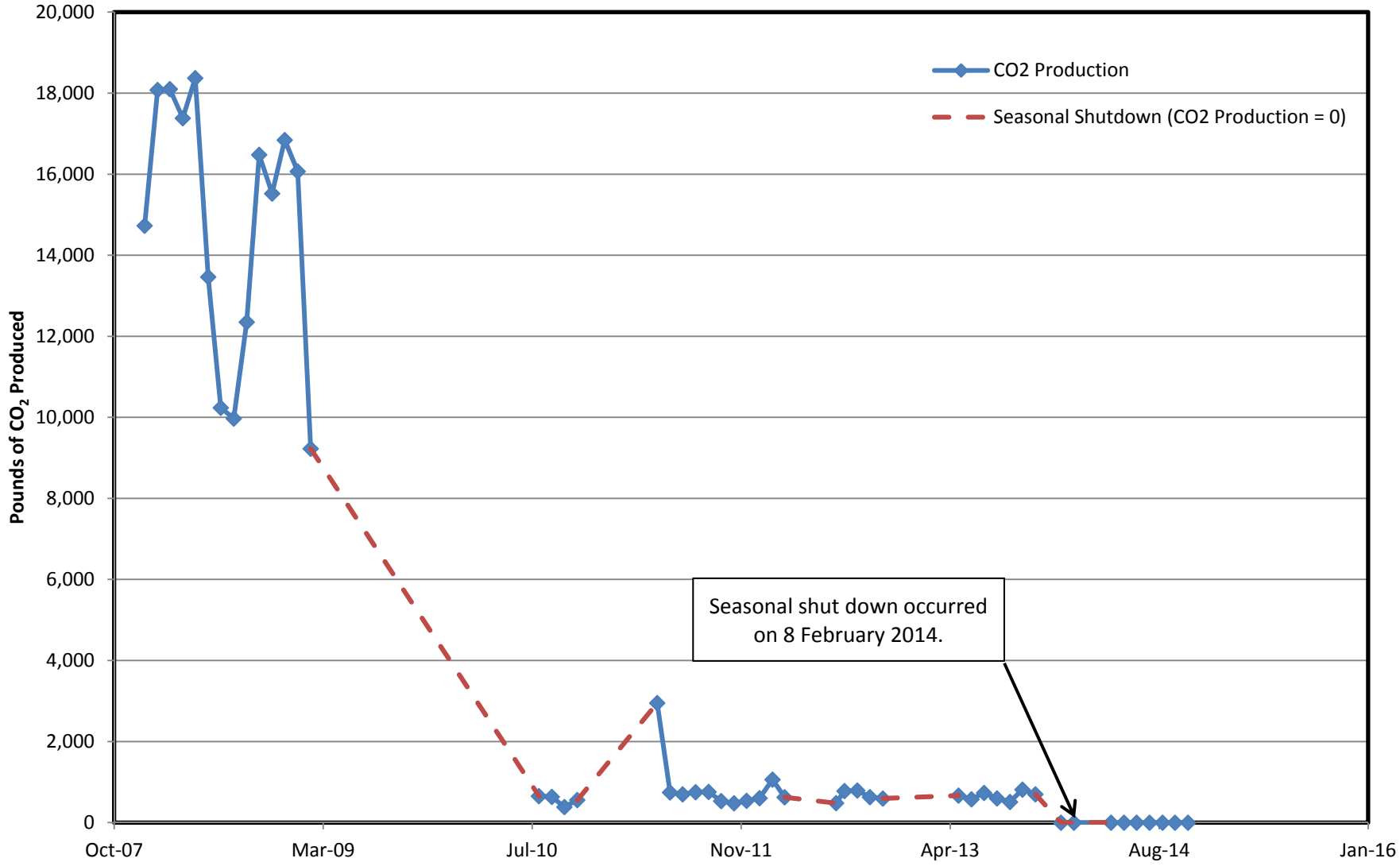
Figure 1
NGWTP Total VOC Influent Concentrations and Average Flowrate
Twelve Month History
Travis Air Force Base, California



*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: 045 **Reporting Period: 31 October – 2 December 2014** **Date Submitted: 5 January 2015**

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

System Metrics

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

Table 1 – Operations Summary – November 2014

Initial Data Collection:	10/31/2014 17:00	**Final Data Collection:**	12/2/2014 10:15
Operating Time:		Percent Uptime:	Electrical Power Usage:
ST018GWTP:	5.3 hours	**ST018GWTP:** 0.7%	**ST018GWTP:** 0 kWh (5 lbs CO_2 generated[a])
Gallons Treated: **2,255 gallons**		Gallons Treated Since March 2011: **6.50 million gallons**	
Volume Discharged to Union Creek: **2,255 gallons**		Final Totalizer Reading: **2,441,660 gallons**	
BTEX, MTBE, TPH Mass Removed: **0.0013 lbs**[b]		BTEX, MTBE, TPH Mass Removed Since March 2011: **30.9 lbs**	
MTBE (Only) Removed: **0.0013 lbs**[b]		MTBE (Only) Mass Removed Since March 2011: **6.6 lbs**	
Rolling 12-Month Cost per Total Pounds of Mass Removed: $12,618[c]			
Monthly Cost per Pound of Mass Removed: N/A[d]			

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

[b] Calculated using November 2014 effluent 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.

[d] Value inflated due to small influent concentration in the denominator when determining the cost per pound of mass removed.

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	--	5.2
EW2016x18	--	5.3
EW2019x18	--	0[b]
Site ST018 GWTP	--	5.3

[a] Flow rates not read for November 2014, due to plant being offline
[b] EW2019x18 was not restarted with the rest of the system on 2 December 2014
-- = flow rates not taken due to plant being offline
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[a]		Restart[a]		Cause
	Date	Time	Date	Time	
ST018GWTP	15 October 2014	17:00	3 November 2014	--	System off for effluent being re-routed from storm drain to sanitary sewer (SS). Accuracy of system flow/totalizer was checked by running 30 gallons through meter on 3 November.
ST018GWTP	3 November 2014	--	24 November 2014	8:45	System restarted for sample collection.
ST018GWTP	24 November 204	14:00	2 December 2014	10:15	System offline awaiting restart sampling results.

-- = Time not recorded
[a] Shutdown and restart times estimated based on field notes
ST018GWTP = Site ST018 Groundwater Treatment Plant

Summary of O&M Activities

On 15 October 2014, the ST018GWTP system was taken offline in order to reroute the treatment plant discharge line from the storm drain to the sanitary sewer. The system was not turned back on until early December. Influent samples were previously collected on a quarterly basis in accordance with the National Pollutant Discharge Elimination System (NPDES) permit. Because the ST018GWTP now discharges to the sanitary sewer (SS), the NPDES permit no longer applies. Monitoring requirements are now based on sewer district guidelines, which call for monthly sampling. The ST018GWTP was restarted on 24 November 2014 after discharge piping was installed from the treatment plant to the discharge point within the sanitary sewer manhole, in order to collect system restart samples. The system was then turned off at 14:00 on 24 November pending sampling results; the system was restarted on 2 December 2014.

Monthly groundwater treatment samples were collected at the ST018GWTP on 24 November 2014 with a 24-hour turnaround laboratory processing time. Results are presented in Table 4. The influent concentration for MTBE during the 24 November 2014 sampling was 68.7 µg/L, which is an increase from the October 2014

sample (51.5 µg/L). Benzene was also detected in the influent sample, at a concentration of 1.2 µg/L. No other contaminants were detected at any sample locations during the sampling event.

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 November 2014.

As shown on Figure 1, the average flow rate through the ST018GWTP has been seasonally variable with a slight increasing trend since the battery upgrade in 2013. TPH-g, TPH-d and TPH-mo were not detected in the influent sample for 4Q14. The 4Q14 sample event had the lowest influent concentrations for the past two years, as shown on Figure 1.

Optimization Activities

No optimization activities were performed in November 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 five pounds GHG during November 2014 because the plant was only in operation for just over five hours and therefore, the minimal production of GHG is not indicative of a continued trend. The amount of GHG produced in October 2014 (71 pounds) is more representative of typical values observed during normal system operation. Figure 2 presents the historical GHG production from the ST018GWTP. The overall GHG generation has been decreasing since a 2014 peak in March, and remains considerably lower than traditional GWTPs since the system is predominantly powered by solar arrays. The previous increasing GHG production reflected an inverse relationship between solar exposure in the fall and winter relative to GHG production.

TABLE 4
Summary of Groundwater Analytical Data for November 2014 – Site ST018 Groundwater Treatment Plant

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	24 November 2014 (µg/L)			
				Influent	After Carbon 1	After Carbon 2	System Effluent
Fuel Related Constituents							
MTBE	5	0.5	0	68.7	NM	ND	ND
Benzene	5	0.17	0	1.2	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	ND	ND	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	50	0	ND	ND	NM	ND
Total Petroleum Hydrocarbons – Motor Oil	--	160	--	ND	ND	NM	ND

* In accordance with the National Pollutant Discharge Elimination System (NPDES) Effluent Limitations
µg/L = micrograms per liter
ND = not detected above method detection limit
NM = not measured this month

Figure 1
ST18GWTP Total VOC and MTBE Influent Concentrations
Quarterly History
Travis Air Force Base, California

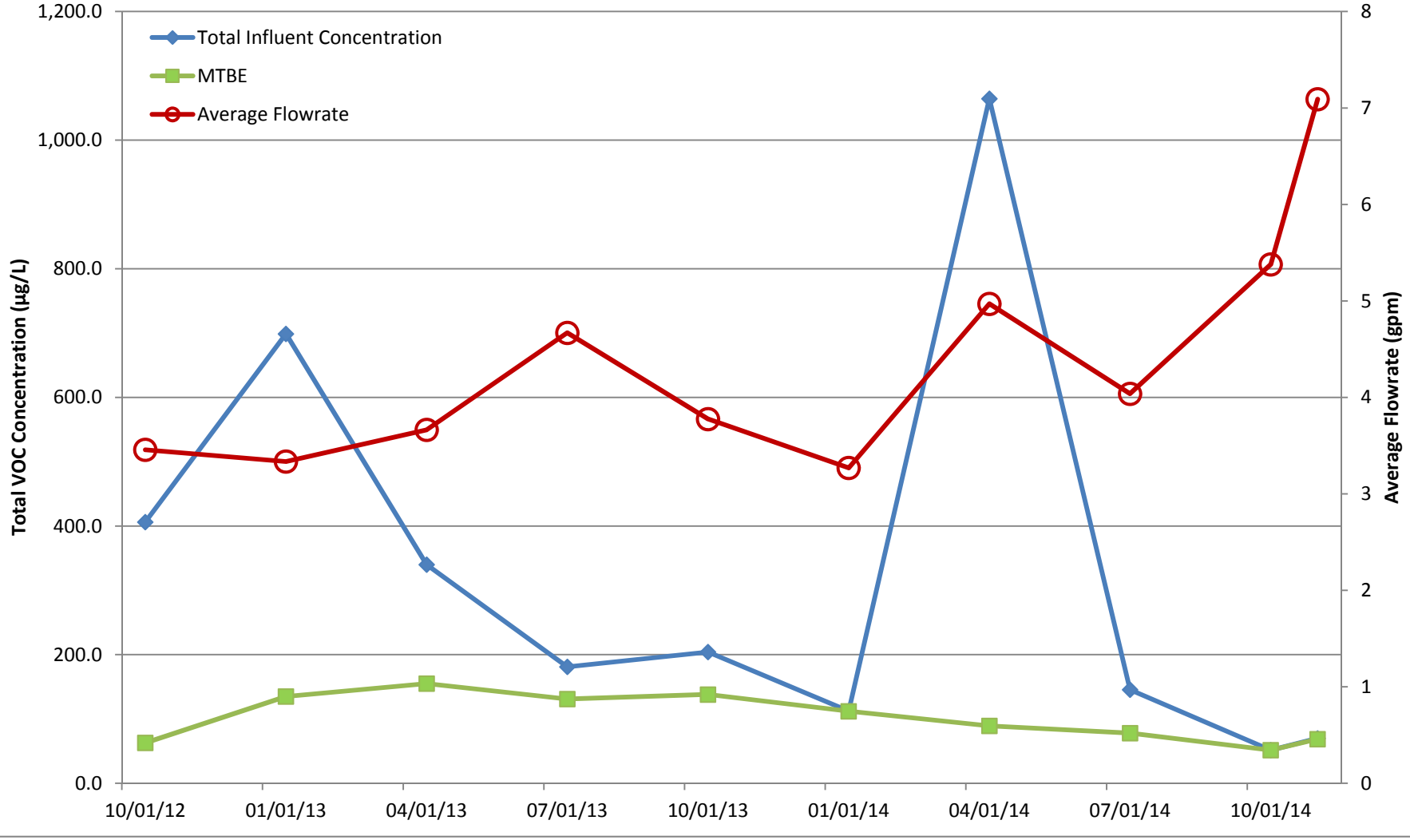
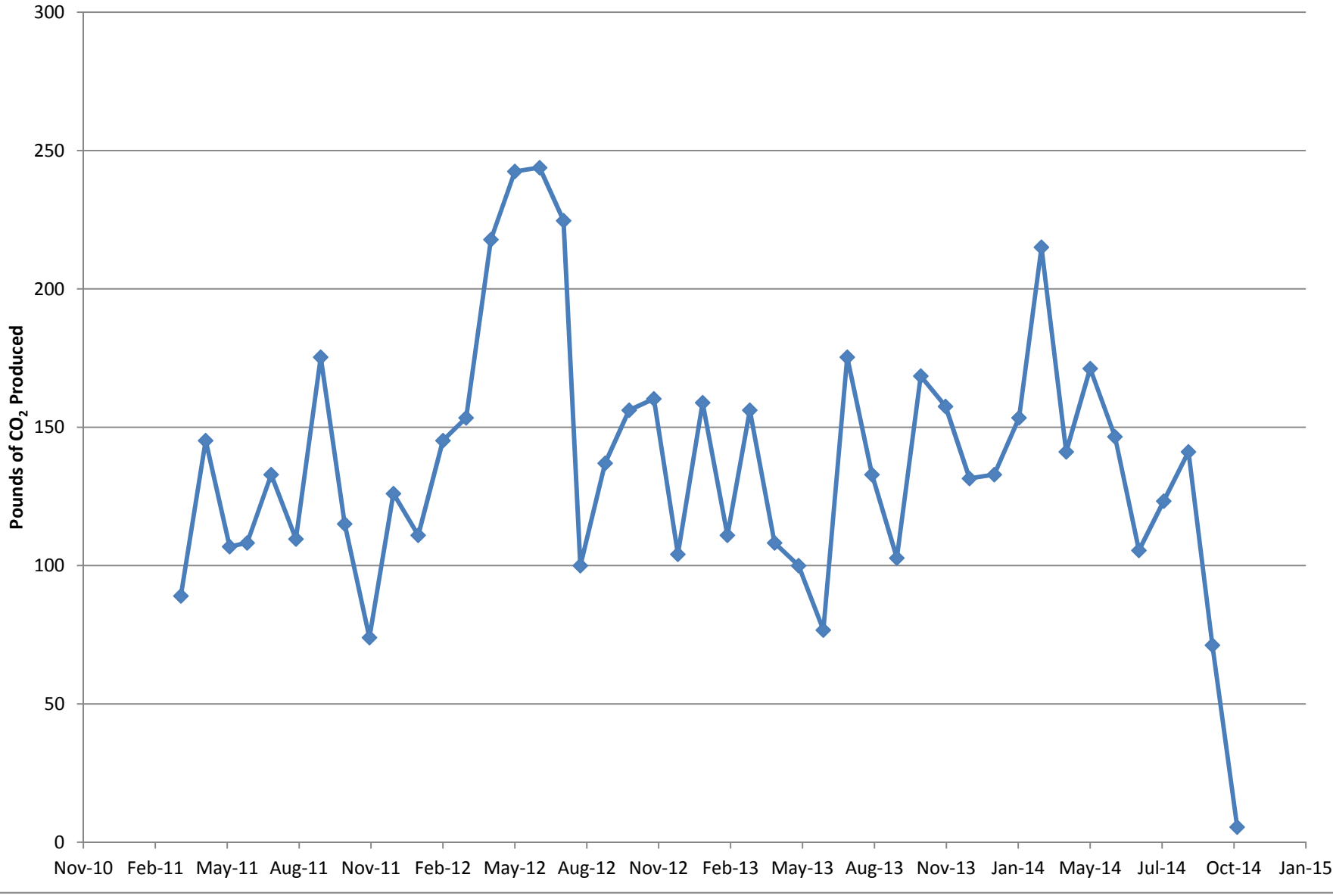


Figure 2

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



Site ST018 Groundwater Treatment Plant Monthly Data Sheet

Report Number: 046 **Reporting Period: 2 December – 30 December 2014** **Date Submitted: 14 January 2015**

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

System Metrics

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

Table 1 – Operations Summary – December 2014

Initial Data Collection:	12/2/2014 10:15	**Final Data Collection:**	12/30/2014 15:00
Operating Time:		Percent Uptime:	Electrical Power Usage:
ST018GWTP: 677 hours		**ST018GWTP:** 100%	**ST018GWTP:** 65 kWh (89 lbs CO_2 generated[a])
Gallons Treated: **125,060 gallons**		Gallons Treated Since March 2011: **6.62 million gallons**	
Volume Discharged to Union Creek: **125,060 gallons**		Final Totalizer Reading: **2,478,700 gallons**	
BTEX, MTBE, TPH Mass Removed: **0.07 lbs**[b]		BTEX, MTBE, TPH Mass Removed Since March 2011: **30.9 lbs**	
MTBE (Only) Removed: **0.07 lbs**[b]		MTBE (Only) Mass Removed Since March 2011: **6.7 lbs**	
Rolling 12-Month Cost per Total Pounds of Mass Removed: $12,210[c]			
Monthly Cost per Pound of Mass Removed: $23,857[d]			

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

[b] Calculated using 24 November 2014 effluent 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.

[d] Value slightly inflated due to small influent concentration in the denominator when determining the cost per pound of mass removed.

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	2.4	677
EW2016x18	2.6	677
EW2019x18	2.6	677
Site ST018 GWTP	3.11	677

[a] Flow rates calculated by dividing total gallons processed by the hours of operation, from the totalizer and hour meter at each location.
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[a]		Restart[a]		Cause
	Date	Time	Date	Time	
ST018GWTP	24 November 2014	11:00	2 December 2014	10:15	System was offline awaiting restart sampling results.

[a] Shutdown and restart times estimated based on field notes
ST018GWTP = Site ST018 Groundwater Treatment Plant

Summary of O&M Activities

In October 2014, the ST018GWTP system was taken offline in order to reroute the treatment plant discharge line from the storm drain to the sanitary sewer (SS). The system was not turned back on until 2 December 2014, after restart samples taken on 24 November 2014 indicated that the system would operate within discharge limits. Influent samples that were previously collected on a quarterly basis in accordance with the National Pollutant Discharge Elimination System (NPDES) permit are now taken on a monthly basis, since monitoring requirements are now based on sewer district guidelines, and the NPDES permit no longer applies.

Monthly groundwater treatment samples were collected at the ST018GWTP on 24 November 2014, and will serve as the December 2014 sampling event. Results are presented in Table 4. The influent concentration for MTBE during the 24 November 2014 sampling was 68.7 µg/L, which is an increase from the October 2014 sample (51.5 µg/L). Benzene was also detected in the influent sample, at a concentration of 1.2 µg/L. No other contaminants were detected at any sample locations during the sampling event.

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 during 24 November 2014 sampling.

As shown on Figure 1, the average flow rate through the ST018GWTP has been seasonally variable with a slight increasing trend since the battery upgrade in 2013. TPH-g, TPH-d and TPH-mo were not detected in the 24 November 2014 influent sample. The last few sample events of 2014 had the lowest influent concentrations for the past two years, as shown on Figure 1.

Optimization Activities

No optimization activities were performed in December 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 89 pounds of GHG during December 2014, which is representative of typical values observed during normal operation. The amount of GHG produced in November 2014 (5 pounds) was unusually low, due to only 4 hours of operating time during that month. Figure 2 presents the historical GHG production from the ST018GWTP. The overall GHG generation has been decreasing since a 2014 peak in March, and remains considerably lower than traditional GWTPs since the system is predominantly powered by solar arrays. The previous increasing GHG production reflected an inverse relationship between solar exposure in the fall and winter relative to GHG production.

TABLE 4
Summary of Groundwater Analytical Data for December 2014 – Site ST018 Groundwater Treatment Plant

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	24 November 2014 (µg/L)			
				Influent	After Carbon 1	After Carbon 2	System Effluent
Fuel Related Constituents							
MTBE	5	0.5	0	68.7	NM	ND	ND
Benzene	5	0.17	0	1.2	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	ND	ND	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	50	0	ND	ND	NM	ND
Total Petroleum Hydrocarbons – Motor Oil	--	160	--	ND	ND	NM	ND

* In accordance with the National Pollutant Discharge Elimination System (NPDES) Effluent Limitations
µg/L = micrograms per liter
ND = not detected above method detection limit
NM = not measured this month

Figure 1
ST18GWTP Total VOC and MTBE Influent Concentrations
Quarterly History
Travis Air Force Base, California

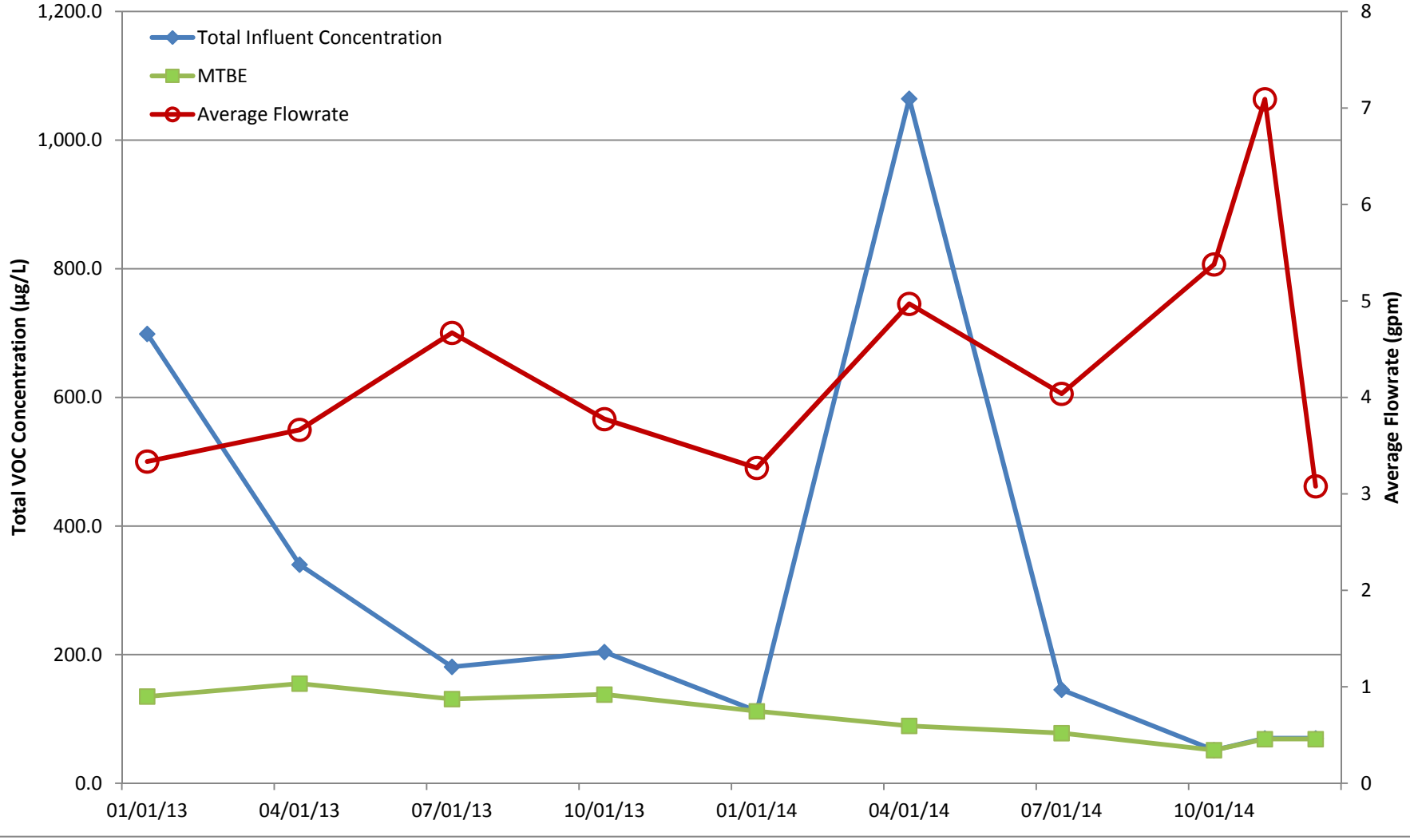
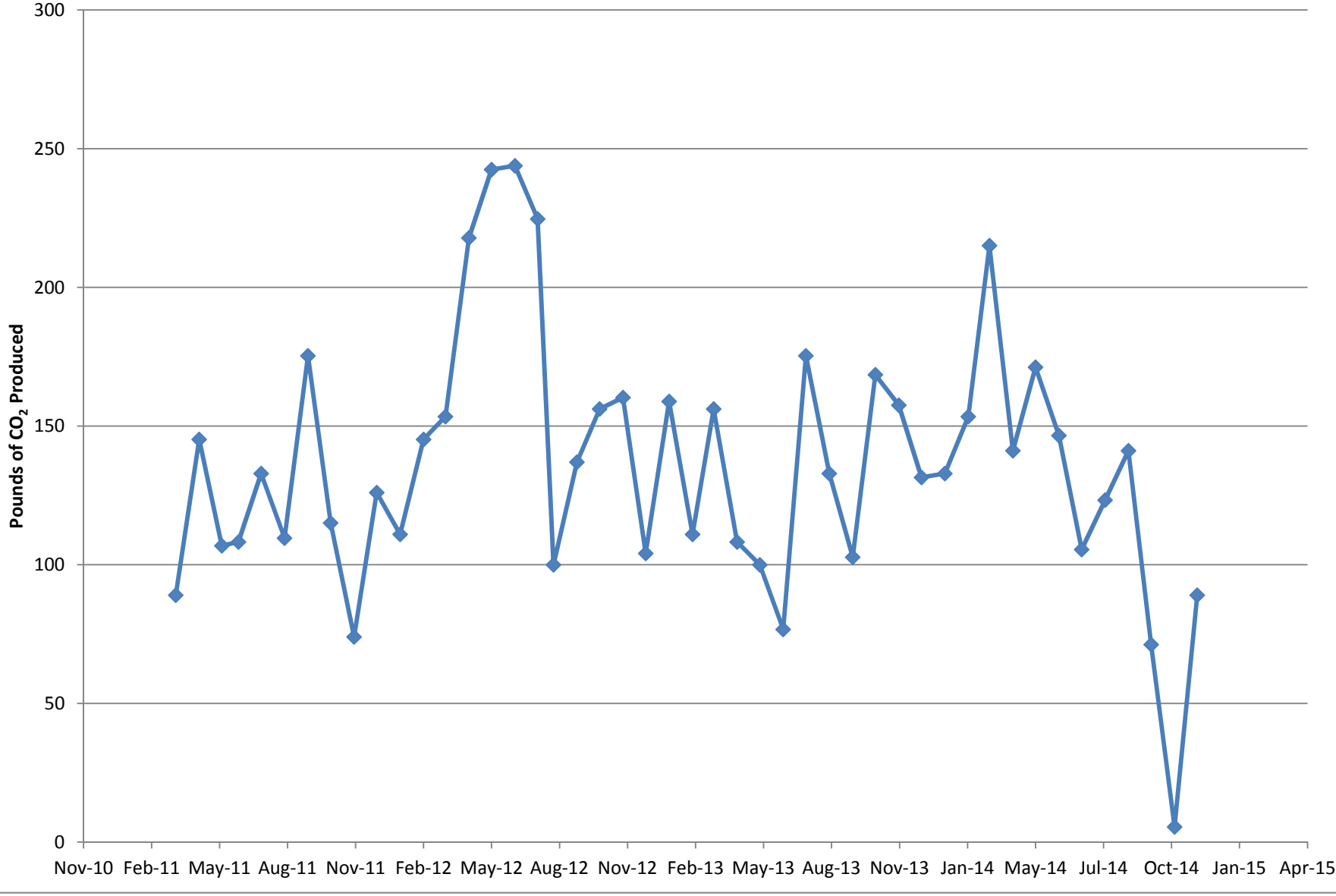


Figure 2

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



CG508 - POCO Investigation Conclusions
Travis AFB, California

January 21, 2015

Review of Site Background
Presented during the October 2014 RPM

2

CG508 Background

- POL site with a groundwater plume (primarily TPH-MRO) of previously unknown size and unknown source
- Site discovered in 2002 during removal of UST 1947
  - UST 1947 was known as ERP Site RW012 and was associated with Building 903, which was used for nuclear weapons maintenance from 1953 to 1962
  - Previous investigations indicated UST 1947 was never used for storage of fuels or other TPH products
  - NFA Consensus Statement for Site RW012 (Travis AFB, 1996) was issued by Travis AFB and signed by the U.S. Air Force, the EPA, the Water Board, and the DTSC on April 24, 1996, for the closure of Site RW012 with regard to radioactive materials

3

CG508 Background (continued)

- Soil sample results from the UST 1947 excavation confirmed that the source of the TPH-impacted groundwater was not UST 1947
  - Non-detectable concentrations of TPH-MRO and concentrations of TPH-DRO only as high as 1.2 mg/kg
- Solano County Department of Resource Management, Environmental Health Division (SCDRMEHD - the regulatory agent for the Water Board) issued an NFA for UST 1947 (SCDRMEHD, 2013) on March 27, 2013
  - UST was closed for TPH and other compounds
- The source of the TPH-impacted groundwater associated with Site CG508 had not been investigated following closure of UST 1947
  - TPH-MRO in groundwater near UST was as high as 1,000 µg/L

4

As presented during the October 2014 RPM …

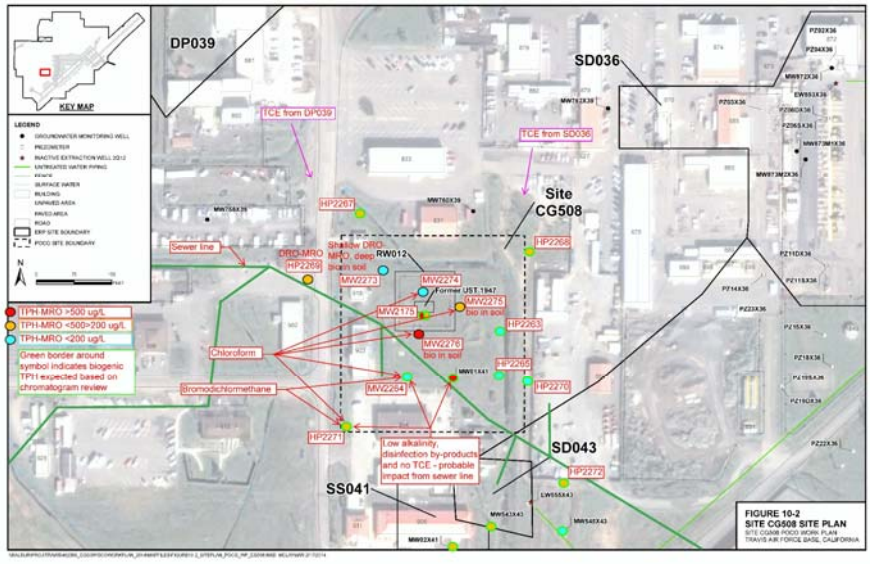
- We conducted a phased soil and groundwater investigation looking for the potential TPH source area
- No soil source of contamination was identified, no BTEX detections, and TPH detections in groundwater above the 100 µg/L ESL were expected to be biased by biogenic sources (from a historical sewer line leak)
- Remaining Data Gap: Are PAHs present in groundwater?
  - If PAH results are non-detect or very low then:
    - Provides further evidence that TPH results are not caused by a “petroleum” release
    - Will demonstrate a lack of risk
    - We expect to recommended this be considered a “non-site”
  - If PAH results indicate motor oil is present then:
    - We expect to recommend this site be considered for “low-threat closure”

5

Summary of Site Data

6

CG508 Groundwater Summary



7

Soil Detections

All soil detections were below ESL of 100 mg/kg

- MW2273x508
  - 0-0.5 ft bgs = 12.1 mg/kg TPH-MO
  - 14.5-15 ft bgs = 29.1 mg/kg TPH-MO, 8.8 mg/kg TPH-D
- MW2274x508
  - 0-0.5 ft bgs = 13 mg/kg TPH-MO
- MW2276x508
  - 9.5-10 ft bgs = 8.2 J mg/kg TPH-MO
- MW2264x508
  - 0-0.5 ft bgs = 19.7 mg/kg TPH-MO
- Soil from 2014 was analyzed using silica gel cleanup; however, no petroleum soil staining or petroleum odors were detected during drilling
- Soil samples collected during the removal of UST 1947 in 2005 did not use silica gel cleanup and were also below 100 mg/kg (non-detectable concentrations of TPH-MRO and concentrations of TPH-DRO only as high as 1.2 mg/kg)

8

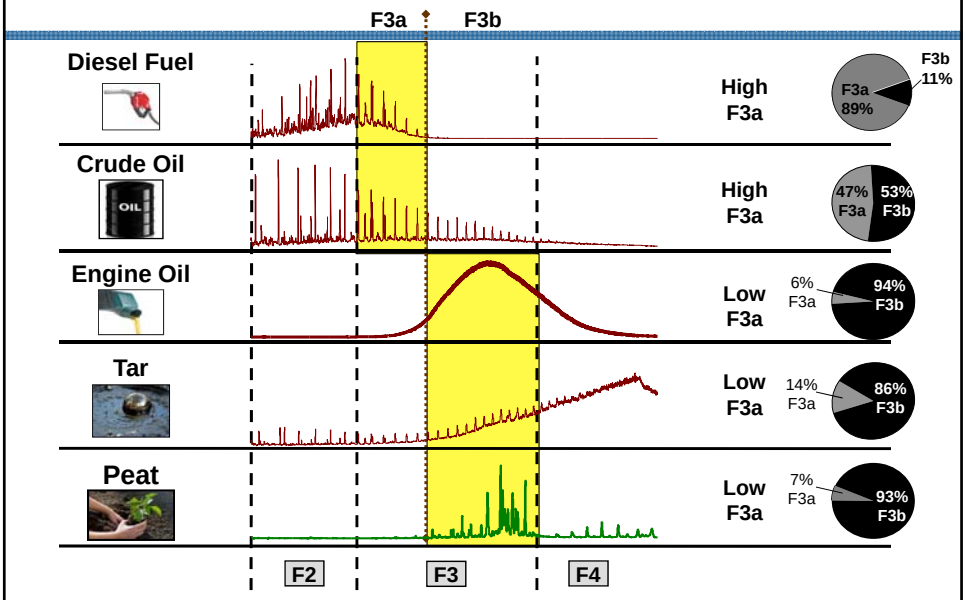
Maximum Groundwater Detections

- MW2175x508
  - TPH-D = 880 ug/L and TPH-MRO = 1,100 ug/L
  - Fluoranthene = 0.011 J ug/L and Phenanthrene 0.018 J ug/L
- MW01x508
  - TPH-DRO = 700 ug/L and TPH-MRO = 2,300 ug/L
  - Acenaphthylene = 0.019 J ug/L, Fluoranthene = 0.011 J ug/L, and Phenanthrene = 0.018 J ug/L
- BTEX and MTBE were non-detect at all wells
- These wells had indications of potential biogenic hydrocarbons (chromatogram review)

9

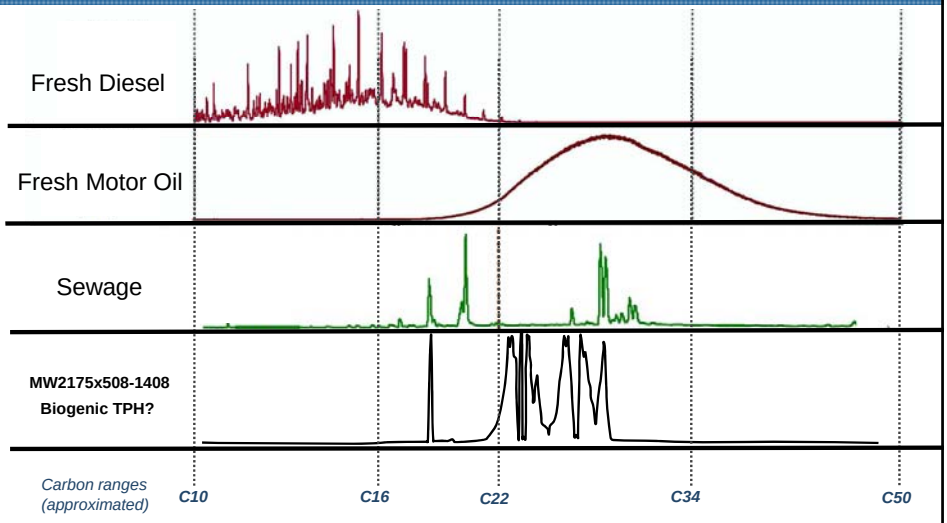
Limitations of F2:F3b Ratio and BOC-adjusted PHC Calculation

Light PHCs have high %F3a; Heavy PHCs have low %F3a



From: Francine Kelly-Hooper, PhD

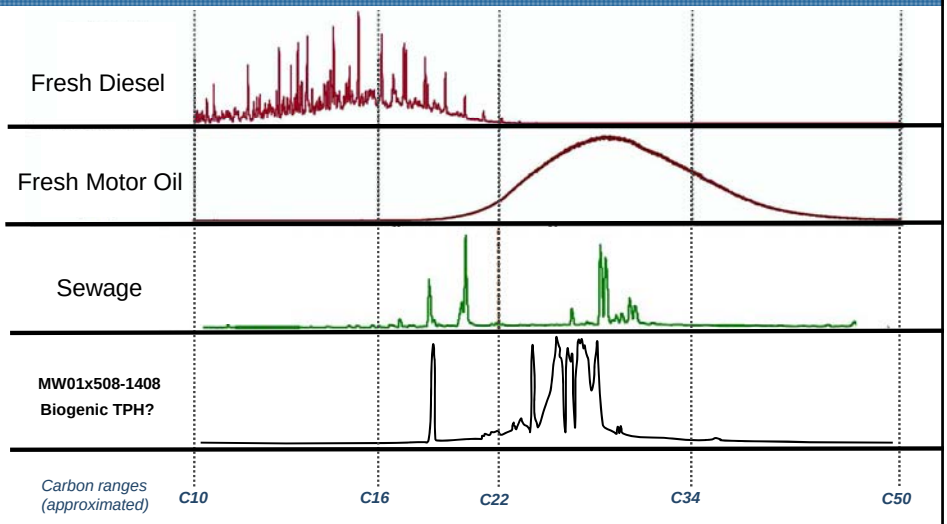
Chromatogram Review of MW2175x508



NOT TO SCALE

Chromatogram examples from:
Francine Kelly-Hooper, PhD

Chromatogram Review of MW2175x508



NOT TO SCALE

Chromatogram examples from:
Francine Kelly-Hooper, PhD

Multiple Lines of Evidence Evaluation

13

Line of Evidence #1: Expected Contaminants for a Petroleum Release

The expected contaminants for a diesel/motor oil release include:

- BTEX and PAHs (Joy and VanCantfort, 1999)
  - *Joy, T. and C. VanCantfort. 1999. User Guide for Risk Assessment of Petroleum Releases. Version 1.0. November.*
  - Water Board's LUFT Manual also focuses on BTEX and PAHs as indicators of risk
- The TPH-DRO and TPH-MRO detections in groundwater are questionable since:
  - No soil source was identified
  - Chromatograms indicate the potential for biogenic hydrocarbons within the TPH-DRO and TPH-MRO range
  - The area with the highest detections is near a former sewer line break

14

Line of Evidence #2: Evaluation of Risk

- Water Board (2013) ESL of 100 ug/L is based on a taste and odor ceiling value
- The Water Board's health risk-based value, based on long-term residential exposure scenario for TPH-MRO (motor or lube oil) in groundwater is 2,700 ug/L and 150 ug/L for TPH-DRO
  - None of the groundwater samples have TPH-MRO greater than 2,300 ug/L. Therefore, even if we assume that TPH-MRO is due to an unexpected site release, the risks from potential exposure to TPH-MRO would be within acceptable limits (i.e., less than the target non-cancer hazard index of 1)
  - TPH-DRO was detected as high as 880 ug/L. However, the most toxic components of TPH-DRO are the PAHs. Since PAH detections were low/non-detect, this supports the conclusion that the TPH-DRO detections are not from a diesel release and do not pose a human health risk

15

Line of Evidence #2: Evaluation of Risk (continued)

PAH detections were several orders of magnitude below risk-based concentrations

- Acenaphthylene (0.019 J ug/L)
  - ESL of 940 ug/L (acenaphthene as surrogate)
- Fluoranthene (0.011 J ug/L)
  - ESL of 630 ug/L
- Phenanthrene (0.018 J ug/L)
  - No risk-based ESL for this compound, but ceiling value is 410 ug/L

16

Conclusions

Summary of Results

- BTEX and PAH data are low/non-detect and therefore not indicative of a petroleum release
- TPH detections above the ESL presumed to be biased by biogenic hydrocarbons due to historical sewer line leak within the TPH “hot spot”
- Even if TPH detections were from an unexpected petroleum release, the weight-of-evidence show they are below health risk-based criteria

Conclusions

- No COCs have been positively identified at POCO Site CG508
- Based on multiple lines of evidence we believe POCO Site CG508 should be classified as a “non-site” and closed

17

Discussion

18

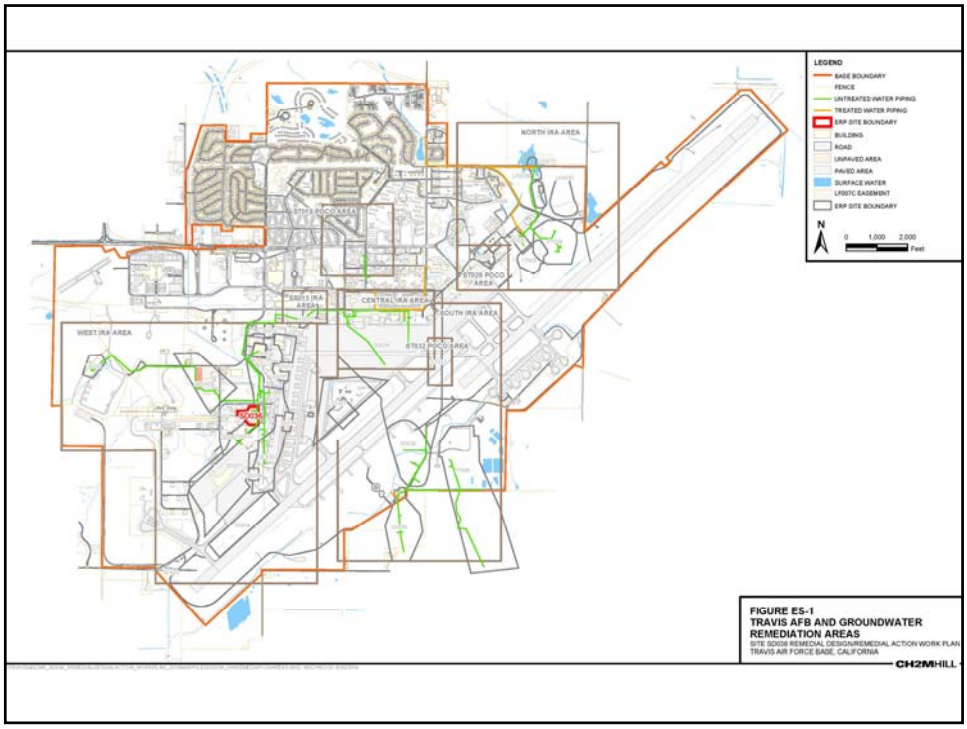
Site SD036 Remedial Design/Remedial Action Work Plan

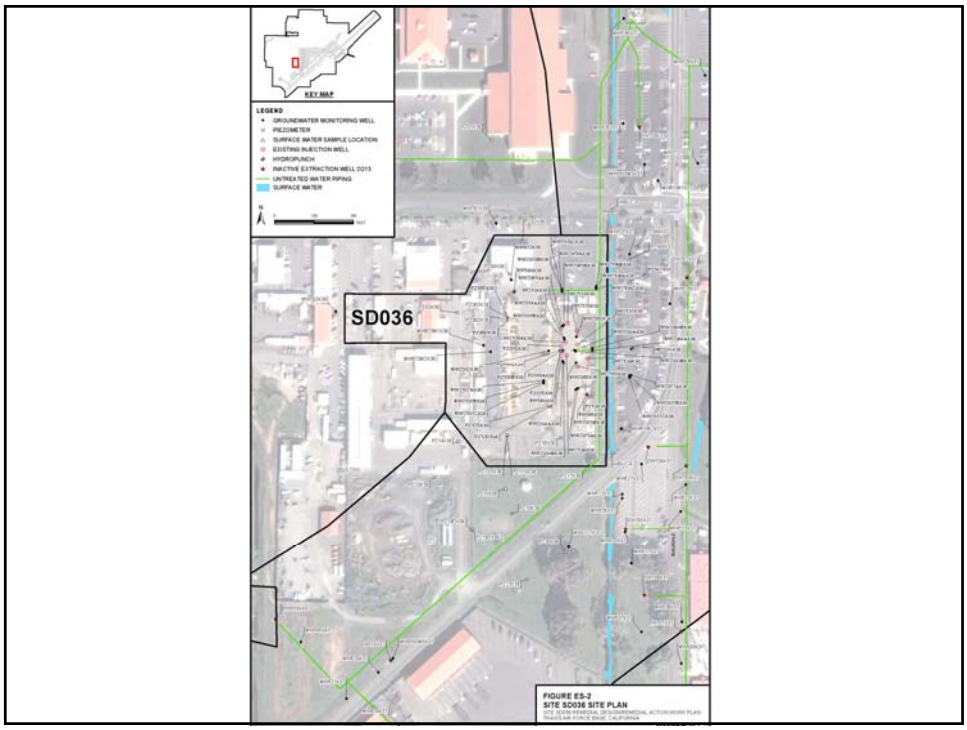
RPM Meeting

January 21, 2014

Agenda

- Background
- Objectives
- Conceptual Design
- Monitoring Wells
- Injection Wells
- EVO Injection
- Groundwater Monitoring
- Reporting


LEGEND
BASE BOUNDARY
FENCE
UNTREATED WATER PIPING
TREATED WATER PIPING
ERP SITE BOUNDARY
BUILDING
ROAD
UNPAVED AREA
PAVED AREA
SURFACE WATER
LFSDTC EASEMENT
ERP SITE BOUNDARY
N
0 1,000 2,000
Feet
NORTH IRA AREA
ST035 POCO AREA
SS003 IRA AREA
CENTRAL IRA AREA
SOUTH IRA AREA
WEST IRA AREA
ST032 POCO AREA
SD036
FIGURE ES-1
TRAVIS AFB AND GROUNDWATER REMEDIATION AREAS
SITE SD036 REMEDIAL DESIGN/REMEDIAL ACTION WORK PLAN
TRAVIS AIR FORCE BASE, CALIFORNIA
CH2MHILL


KEY MAP
LEGEND
GROUNDWATER MONITORING WELL
PIEZOMETER
SURFACE WATER SAMPLE LOCATION
EXISTING INJECTION WELL
HYDROPUNCH
INACTIVE EXTRACTION WELL 2013
UNTREATED WATER PIPING
SURFACE WATER
SD036
FIGURE ES-2
SITE SD036 SITE PLAN

Background

- Site SD036 is a 6-acre area in the West Industrial Operable Unit (WIOU) that is used by Civil Engineering and consists of multiple-use shops, a wash rack, and oil/water-separator.
- Historical practices resulted in groundwater contamination with CVOCs, some SVOCs, and petroleum hydrocarbons.
- Historically, liquid wastes containing TCE from facilities in the WIOU were likely flushed into the sanitary sewer system.
- A portion of the waste stream may have been released into the groundwater at Site SD036 from a damaged segment of the sanitary sewer.

Background

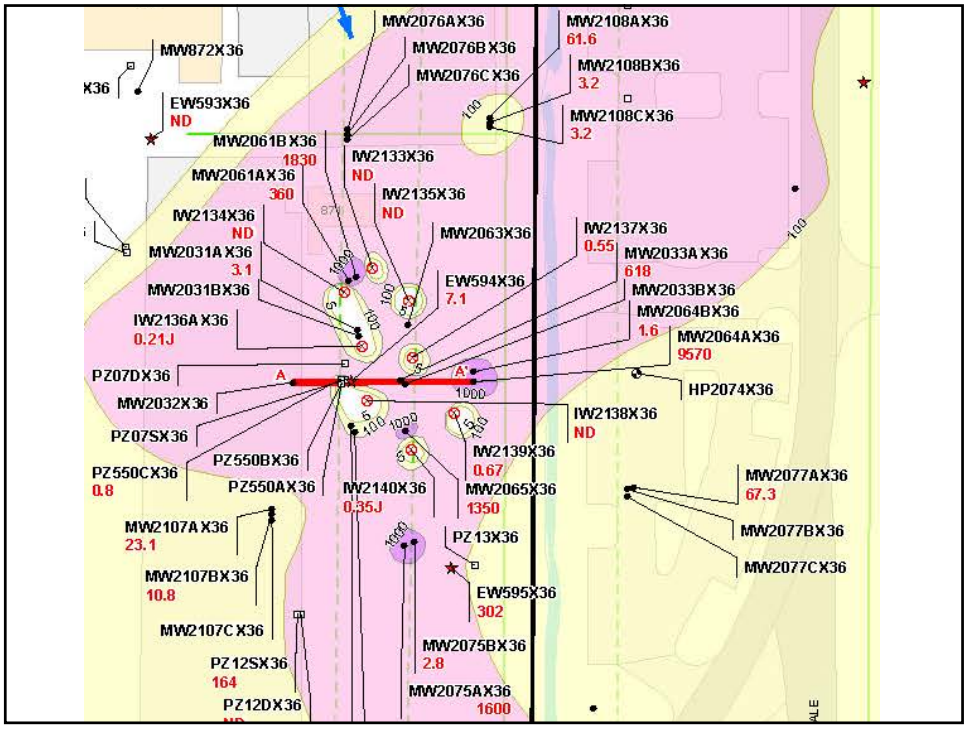
- A Groundwater Extraction and Treatment System (GETS) was used at the site from 2000 to 2010 as an Interim Remedial Action.
- Although GETS was successful for migration control and contaminant reduction, TCE concentrations continued to exceed 1,000 µg/L.
- A 2009 data gap investigation identified a hotspot of the TCE plume with concentrations as high as 18,500 µg/L over the sanitary sewer.
- Results of the data gap investigation indicated that the source of the remaining CVOC contamination at Site SD036 was likely the result of a break in one of the sanitary sewer lines that traverse the site.

Background

- In 2010 a Technology Demonstration consisting of EVO Injections was conducted at Site SD036.
- Eight (8) injection wells and sixteen (16) monitoring wells were installed at Site SD036 hotspot.
- Results of performance monitoring indicated that CVOCs were being effectively degraded and in situ enhanced reductive dechlorination (ERD) processes were achieving a high rate of CVOC treatment efficiency.
- The results of the Technology Demonstration successfully demonstrated the viability of in situ ERD treatment processes as a component of groundwater remediation at the site.
- In 2014 the Travis AFB Groundwater Record of Decision (ROD) selected EVO injection and enhanced attenuation as the final remedy to clean up Site SD036.

Background

- Also during the 2009 data gap investigation HydroPunch samples from boring HP2074x36, which was located across the West Branch of Union Creek from Site SD036, identified TCE concentrations ranging from 2,550 to 2,960 µg/L.
- No monitoring wells were installed at HP2074x36. These TCE concentrations still need to be confirmed.

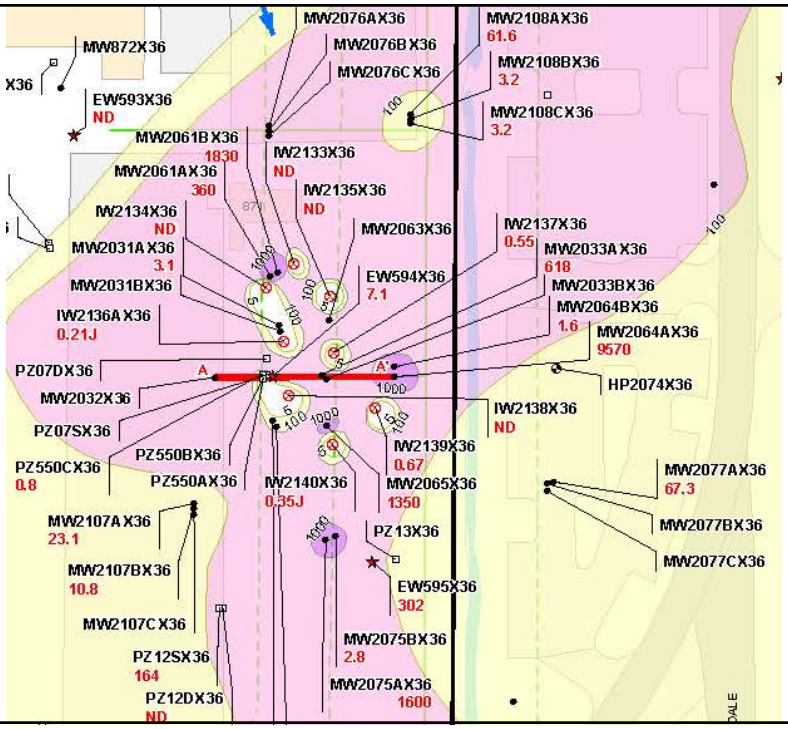


Objectives

- Carry out the selected groundwater remedy to Site SD036 to accelerate the reduction of contaminant mass within the target treatment area.
- Confirm the presence/absence of TCE concentrations greater than 1,000 µg/L at HP2074x36.

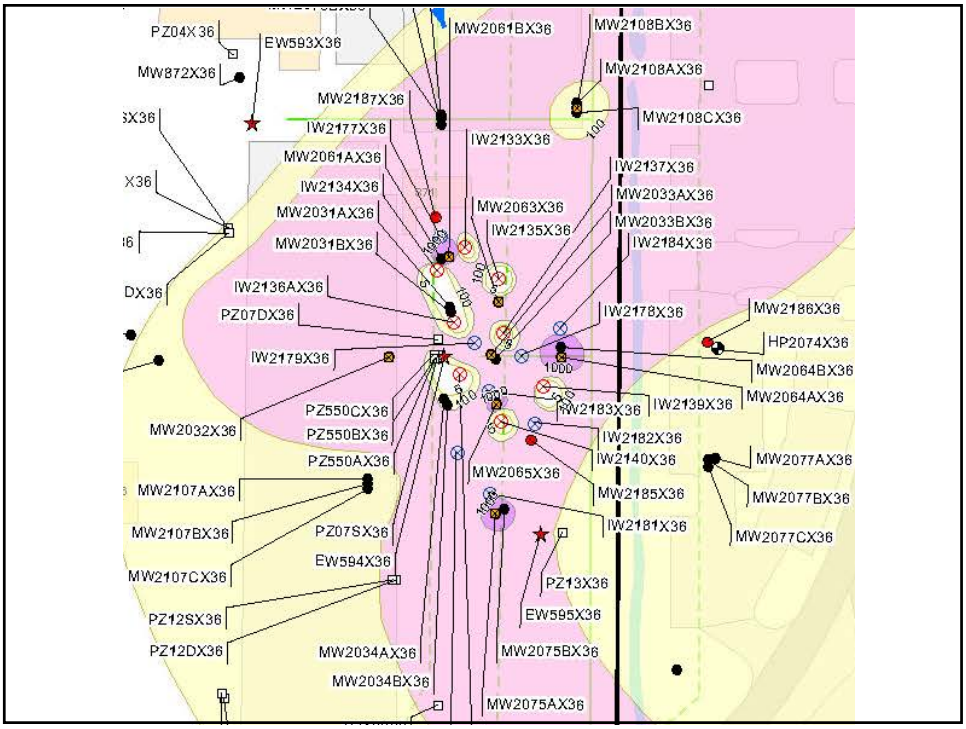
Conceptual Design

- The conceptual design for ERD treatment at Site SD036 is to inject EVO into the subsurface at targeted locations where TCE concentrations exceed 1,000 µg/L.



Injection/Monitoring Wells

- Eight (8) injection wells will be installed within the plume where TCE concentrations are greater than 1,000 µg/L.
- Three (3) monitoring wells will be installed within the TCE plume to refine the plume definition.
- One (1) of the monitoring wells will be installed near HydroPunch HP2074x36. Should concentrations of TCE in this monitoring well be greater than 1,000 µg/L an additional injection well will be installed near HP2074x36.
- The injection wells will be drilled to a depth of approximately 45 feet below ground surface (bgs).
- The monitoring wells will be drilled to a depth of approximately 60 feet bgs.



Injection/Monitoring Wells

- Each injection well will be 2-inch diameter PVC and will consist of 20 feet of 0.020-inch prefabricated slot screen.
- The injection wells will be screened across the lowest permeable zones to the depth of approximately 45 feet bgs.
- Each monitoring well will be 2-inch diameter PVC and will consist of 10 feet of 0.010-inch prefabricated slot screen.
- The monitoring wells will be screened across the lowest permeable zones to the depth of approximately 60 feet bgs.

EVO Injection

- It is anticipated that approximately 14,800 pounds of EVO will be injected into the SD036 plume.
- A Dositron DI520 (or equivalent) proportional feed system will be used to dilute the concentrated EVO to the approximately 3.6 percent design injection concentration.

Groundwater Monitoring

- Baseline groundwater sampling will be conducted prior to the injection of EVO to establish the initial CVOC concentrations.
- Post-injection monitoring will be conducted in eight (8) performance monitoring wells.
  - Performance monitoring wells include MW2032x36, MW2033x36, MW2061Bx36, MW2063x36, MW2064Ax36, MW2065x36, MW2075Ax36, and MW2108Bx36.
- Post-injection monitoring will be conducted semi-annually for 1 year and annually thereafter.

Reporting

- Results of the implementation of the Remedial Action/Remedial Design (RD/RA) Work Plan and the baseline sampling will be reported in a Remedial Action Construction Completion Report (RACCR).
- Analytical results of post-injection monitoring at Site SD036 will be presented in the annual Groundwater Remediation Implementation Status Reports (GRISR).

Questions

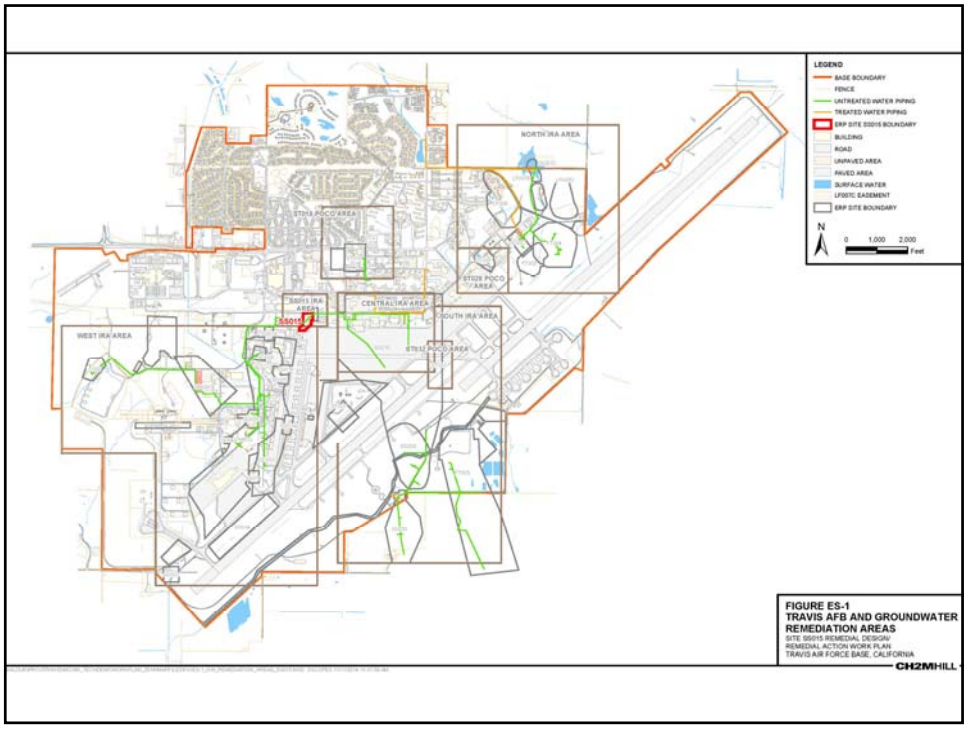
Site SS015 Remedial Design/Remedial Action Work Plan

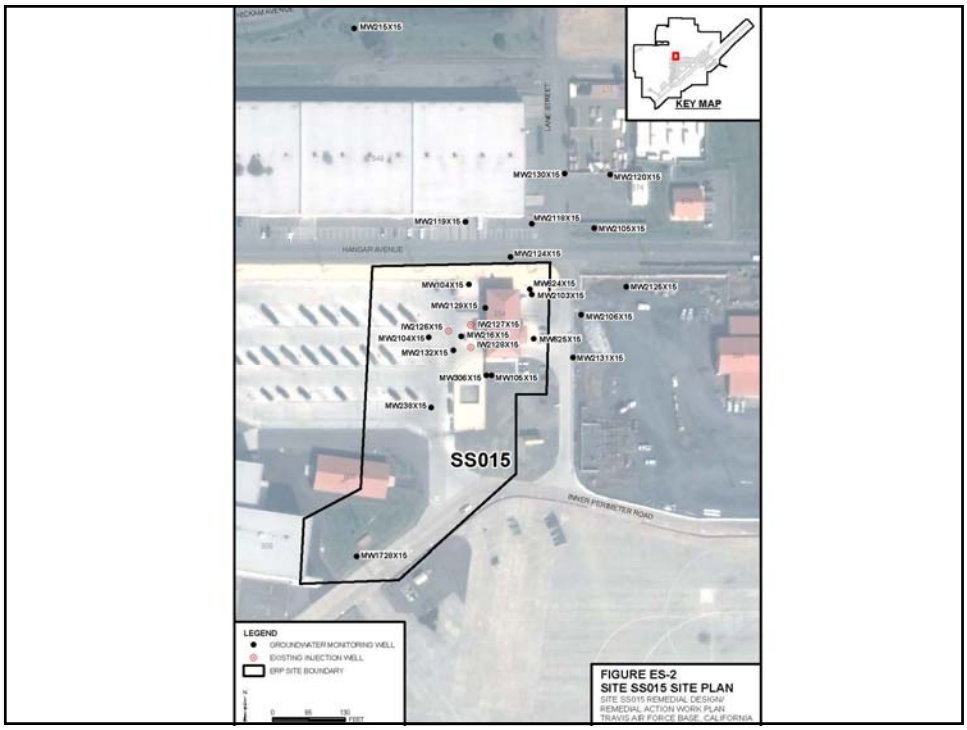
RPM Meeting

January 21, 2014

Agenda

- Background
- Objectives
- Conceptual Design
- Injection Wells
- EVO Injection
- Groundwater Monitoring
- Reporting


LEGEND
BASE BOUNDARY
FENCE
UNTREATED WATER PIPING
TREATED WATER PIPING
ERP SITE SS015 BOUNDARY
BUILDING
ROAD
UNPAVED AREA
PAVED AREA
SURFACE WATER
LFGTC EASEMENT
ERP SITE BOUNDARY
N
0 1,000 2,000
Feet
NORTH IRA AREA
ST026 PISCO AREA
ST026 PISCO AREA
SS015 IRA AREA
SS015
CENTRAL IRA AREA
SOUTH IRA AREA
WEST IRA AREA
ST032 PISCO AREA
FIGURE ES-1
TRAVIS AFB AND GROUNDWATER REMEDIATION AREAS
SITE SS015 REMEDIAL DESIGN/ REMEDIAL ACTION WORK PLAN
TRAVIS AIR FORCE BASE, CALIFORNIA
CH2MHILL


KEY MAP
MW215X15
MW213X15
MW212X15
MW211X15
MW210X15
MW124X15
MW104X15
MW224X15
MW103X15
MW212X15
MW129X15
MW106X15
MW127X15
MW126X15
MW216X15
MW104X15
MW125X15
MW128X15
MW132X15
MW131X15
MW306X15
MW105X15
MW239X15
SS015
MW172X15
LEGEND
GROUNDWATER MONITORING WELL
EXISTING INJECTION WELL
ERP SITE BOUNDARY
FIGURE ES-2
SITE SS015 SITE PLAN
SITE SS015 REMEDIAL DESIGN/ REMEDIAL ACTION WORK PLAN
TRAVIS AIR FORCE BASE, CALIFORNIA

Background

- Site SS015 is a 3.5-acre area of groundwater contamination in western-central portion of Travis AFB, within the East Industrial Operable Unit (EIOU), that consisted of former Facility 550, former Facility 552 (including the area of Facility 1832), and the Solvent Spill Area (SSA) east of former Facility 550.
  - Former Facility 550 was constructed in 1952 and housed a corrosion control shop, a metals processing shop and a fiberglass shop.
  - Former Facility 552 was used as a hazardous waste collection area. Wastes from Facility 550 were stored at Facility 552.
  - The SSA was an area where paint was stripped from aircraft. Accidental releases included an estimated 100 to 150 gallons per month of methyl ethyl ketone, toluene, or tetraethylene glycol dimethyl ether (tetraglyme).

Background

- Currently Site SS015 consists of Facility 554, which is a petroleum, oil, and lubricants (POL) military compound and includes an office building, a fuel truck maintenance facility, and a large concrete parking area for fuel trucks.
- Site SS015 was initially selected for a monitoring natural attenuation (MNA) assessment as the interim remedial action as part of the Groundwater Interim Record of Decision (IROD).
- The MNA assessment was delayed as Site SS015 was selected for a treatability study of enhanced attenuation (EA) using vegetable oil injection.

Background

- The limited treatability study was conducted in 2000-2001.
  - Approximately 227 pounds of soybean oil was injected into three (3) injection points in two (2) phases (June and December 2000).
- The treatability study was terminated early because of the military project to construct Facility 554. Building 554 was constructed over a portion of the vegetable oil injection area.
- Although concluded prematurely, the initial results of the vegetable oil treatability study were promising and demonstrated that suitable bacteria populations were present and reductive dechlorination was occurring at the site.

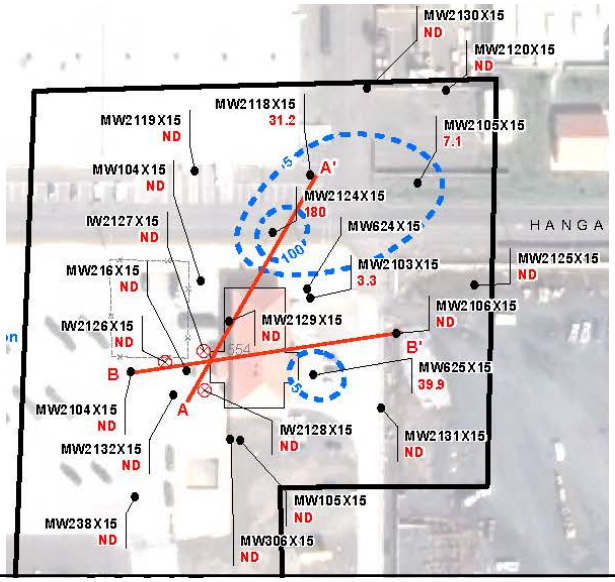
Background

- In 2009 a natural attenuation assessment was performed at Site SS015 and concluded that MNA alone may not be a sufficient remedy at the site because of recent increasing contaminant trends in some monitoring wells.
- In 2010 a data gap investigation was performed at Site SS015 to further delineate the vertical and horizontal extent of CVOC contamination in groundwater.
- Results of the data gap investigation indicated the presence of 1,1-DCE and vinyl chloride at concentrations of 8,080 µg/L and 5,140 µg/L, respectively, in source area well (MW216x15).

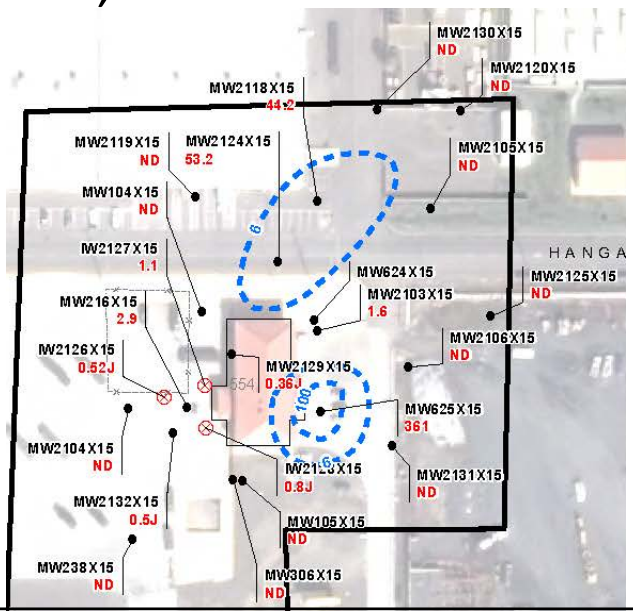
Background

- Based on the results of the data gap investigation a technology demonstration was performed in 2010-2011 where 5,097 pounds of emulsified vegetable oil (EVO) was injected into six (6) injection wells within the source area.
- Performance monitoring results of the technology demonstration indicated the CVOC concentrations in the source area were significantly reduced to where the concentrations of the CVOCs are near their respective maximum contaminant limits (MCLs).
- In 2014 the Travis AFB Groundwater Record of Decision (ROD) selected EVO injection and EA as the final remedy to clean up Site SS015.

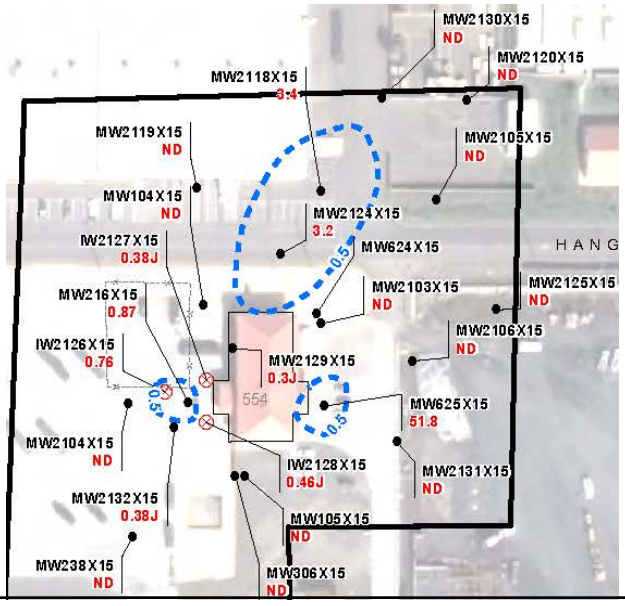
TCE Concentrations



cis-1,2-DCE Concentrations



Vinyl Chloride Concentrations



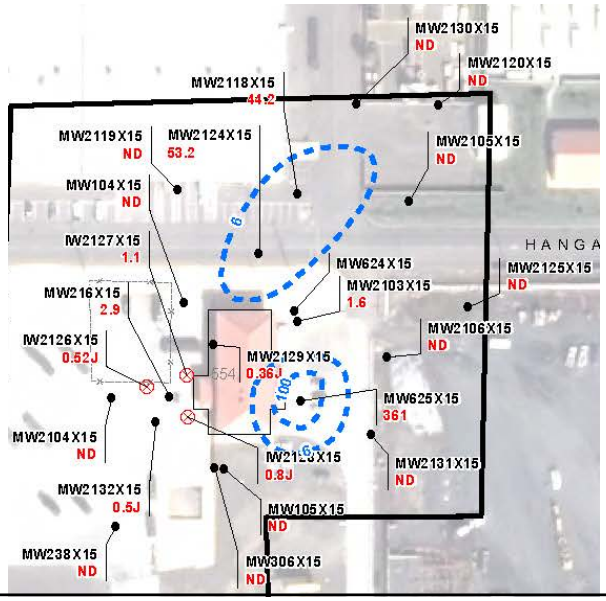
Objective

- Carry out the selected groundwater remedy at Site SS015 and initiate the reduction of contaminant mass within the northern and southern portion of the CVOC plume.

Conceptual Design

- The conceptual design for ERD treatment at Site SS015 is to inject EVO into the subsurface in the areas of the plume where chemicals of concern (COC) concentrations exceed 20 µg/L.

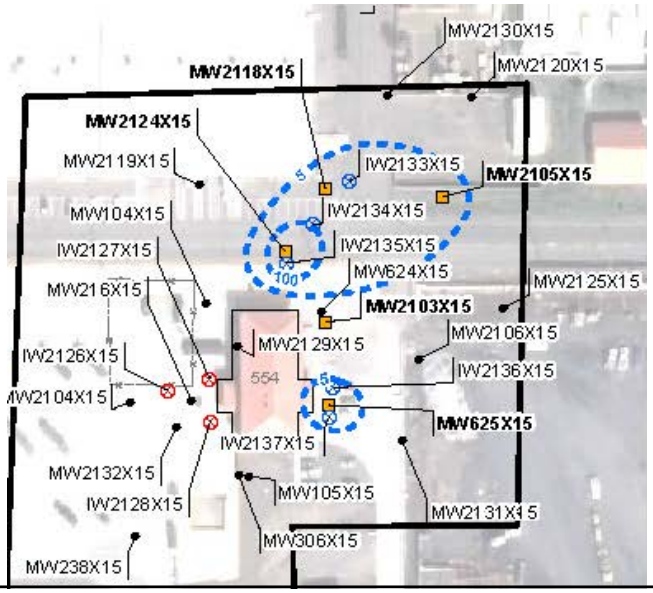
cis-1,2-DCE Concentrations



Injection Wells

- Five (5) injection wells will be installed within the plume where COC concentrations are greater than 20 µg/L.
- The injection wells will be drilled to a depth of approximately 25 feet below ground surface (bgs).
- Each injection well will be 2-inch diameter PVC and will consist of 10 feet of 0.020-inch prefabricated slot screen.
- The injection wells will be screened across the more permeable zones encountered at each boring location.

Injection Design



EVO Injection

- It is anticipated that approximately 5,400 pounds of EVO will be injected into the SS015 plume.
- A Dositron DI520 (or equivalent) proportional feed system will be used to dilute the concentrated EVO to the approximately 3.1 percent design injection concentration.

Groundwater Monitoring

- Baseline groundwater sampling will be conducted prior to the injection of EVO to establish the initial COC concentrations and geochemical parameters before treatment begins.
- Post-injection monitoring will be conducted in five (5) performance monitoring wells.
  - Performance monitoring wells include MW625x15, MW2103x15, MW2105x15, MW2118x15, and MW2124x15.
- Post-injection monitoring will be conducted semi-annually for 1 year and annually thereafter.

Reporting

- Results of the implementation of the Remedial Action/Remedial Design (RD/RA) Work Plan and the baseline sampling will be reported in a Remedial Action Construction Completion Report (RACCR).
- Analytical results of post-injection monitoring at Site SS015 will be presented in the annual Groundwater Remediation Implementation Status Reports (GRISR).

Questions

Travis AFB
Restoration Program

Program Overview

RPM Meeting
January 21, 2015

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
- FT004 Technology Demonstration Work Plan
- Kinder Morgan LF044 Land Use Control Report
- SD031 Technology Demonstration Work Plan
- TA500 Data Gap Investigation Work Plan
- ***ST018 POCO Work Plan Addendum***

2

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
- Site CG508 Site Investigation
- Old Skeet Range Characterization Sampling
- ***4Q Semiannual GRIP Sampling Event***

3

Documents & Field Work In-Progress

Documents

- SD037 GW RD/RA Work Plan
- Travis AFB UFP-QAPP
- DP039 Lead Excavation Technical Memo
- SD034 Data Gap Investigation Work Plan
- ***SD036 RD/RA Work Plan***
- ***SS016 GW RD/RA Work Plan***
- ***SS015 GW RD/RA Work Plan***
- ***Proposed Plan for ROD Amendment to WABOU Soil ROD***
- ***Proposed Plan for ROD Amendment to NEWIOU Soil, Sediment, & Surface Water ROD***

Field Work

- ***SD031 Technology Demonstration***

4

Documents Planned

CERCLA

• DP039 RD/RA Work Plan	Feb
• Community Involvement Plan	***Feb***
• FT005 Technology Demonstration Work Plan	***Mar***
• ***2014 Annual CAMU Monitoring Report***	***Mar***
• ***2014 Annual GRISR***	***Apr***

POCO

• SS014 POCO Technology Demonstration Work Plan	***Feb***
• Oil-Water Separators POCO Evaluation Work Plan	Feb
• ***ST032 POCO Soil Excavation Work Plan***	***Mar***

MMRP

• **TS060 Old Skeet Range PAH Delineation Report**	**Jan**

5

Field Work Planned

• SD031 Well/Trench Installation	Jan
• SD031 EVO Injection	Feb
• SD036 Well Installation	Mar
• SD037 Well Installation	Mar
• SD034 Site Investigation	Apr
• SD036 EVO Injection	Apr
• SD037 EVO Injection	Apr
• SS016 Well Installation	Apr
• ST018 Well/Trench Installation	Apr
• SS014 Site Investigation	Apr
• ***GRIP Sampling (annual)***	***Apr***

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

6

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

7

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

9

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

10