

**Travis Air Force Base
Environmental Restoration Program
Restoration Program Manager's
Meeting Minutes
15 February 2017, 0930 Hours**

Mr. Lonnie Duke of the Air Force Civil Engineer Center (AFCEC) Restoration Installation Support Team (IST) conducted the Restoration Program Manager's (RPM) face-to-face meeting on 15 February 2017 at 0930 hours in Building 248 at Travis AFB, California. Attendees included:

Lonnie Duke	AFCEC/CZOW
Glenn Anderson	AFCEC/CZOW
Angel Santiago Jr.	AFCEC/CZOW
Milton 'Gene' Clare	AFCEC/CZOW
Monika O'Sullivan	AFCEC/CZOW
William Hall	AFCEC/CZR
Merrie Schilter-Lowe	Travis AFB 60 AMW/PA
Dezso Linbrunner	USACE-Omaha
Adriana Constantinescu	RWQCB
Ben Fries	DTSC
Nadia Hollan Burke	USEPA
Indira Balkissoon	Techlaw, Inc.
Renee Caird	CH2M
Steve Offner	CH2M
Tom O'Hara	CH2M
Mike Wray	CH2M

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 (January 2017)
Attachment 4	CGWTP Monthly Data Sheet (January 2017)
Attachment 5	ST018 Monthly Data Sheet (January 2017)
Attachment 6	Presentation: Multisite Technical Demonstration Construction Completion Report
Attachment 7	Presentation: Program Update

1. ADMINISTRATIVE

A. Previous Meeting Minutes

The 18 January 2017 RPM meeting minutes were approved and finalized as written with the following exception. Ms. Constantinescu requested, on second page, first paragraph, last sentence; change “In additional” to “In addition”.

The revision noted above was made to the 18 January 2017 RPM meeting minutes.

B. Action Item Review.

Action items from January 2017 were reviewed.

Action item 1 is ongoing: Ms. O’Sullivan to provide updates on perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA). 15 February 2017: No updates.

Action item 2: Mr. Wray will investigate 1) Why Acetone is not listed in table 4 of this South Base Boundary GWTP, but it is listed in the GRISR. 2) Why is total dissolved solids (TDS) measured when there aren’t any discharge limitations. 3) The uptime calculation for December’s LF007C GWTP Monthly Data Sheet, and the restart date were missing from table 1. 15 February 2017 update: Mr. Wray provided updates. 1) Acetone is not listed on table 4 when there isn’t a detection. 2) TDS will be removed from the treatment plant sampling matrix, because there are no sampling requirements or discharge limits according to the NPDES permit. 3) Although the treatment plant report was correct, updates were made to provide clarity.

C. 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 teleconference meeting, which will be held on Wednesday, 15 March 2017, at 0930 hours.

Travis AFB Master Document Schedule

- Community Involvement Plan (CIP): All dates were changed to TBD. Mr. Anderson said it was decided to change the dates to TDB after the teleconference held with EPA and

Techlaw. We are looking into expanding the Public Environmental website to develop a separate page to cover community involvement activities. Once the website is created in draft format, Mr. Anderson will send an email with a website link to request comments from the regulators and RAB members. The intention is to make the CIP more of a “living document”. There will be a paper document that will reference specific links to the website, the parts that get modified, and the “living” part of the document. Mr. Fries said that he remembered seeing a Travis AFB “Mission Statement” somewhere and suggested incorporating it into the CIP. Mr. Duke said that there is an older one and that he will take on the action item of locating it.

- Potrero Hills Annex (FS, PP, and ROD): No change to the schedule. Mr. Anderson said the Water Board (WB) provided Travis AFB with a draft version of a very detailed administrative order which requires actions/deliverables out to the year 2020. Travis AFB as well as the responsible parties (RPs) had an opportunity to review the document and make comments. The administrative order will go out for a thirty day public review period. Ms. Constantinescu said the RPs and their attorneys brought to the WB attention a concern regarding cleanup levels of perchlorate and VOCs according to the state standards, the uncertainties of CERCLA’s required cleanup levels, and the associated costs. The RPs would like for this 25-acre parcel to be carved out of the National Priorities List (NPL) so that the cleanup will be under the state’s standards. Mr. Duke said it is the RPs contamination and they signed a lease that required the leasing party to return the property to its original condition when it was first leased to them. Ms. Constantinescu said the WB cleanup order takes into account the current land use of the Annex and right now it is industrial land use. She asked that, in the future, would the Air Force require the land to be cleaned up to residential levels? Mr. Duke said yes; unrestricted use and unlimited exposure (UU/UE).
- Site TS060 Removal Action Work Plan: No change to the schedule. Travis AFB is working on EPA RTCs.
- Site LF044 Investigation Work Plan: No change was made to the schedule. Travis AFB is working on EPA RTCs.
- Site SS016, SD033, SD043, and SS046 Risk Assessment Technical Memorandum: No change to the schedule. The risk assessment documents were rolled into one.
- Site FT004 POCO Soil Data Gap Investigation Work Plan: No change to the schedule.
- Quarterly Newsletters (April 2017): Draft to Agencies date updated to 28 March 2017 to reflect the second quarter 2017 newsletter, the rest of the dates were changed accordingly.
- 2016 Annual GRISR: New document, populated with all new dates.
- Site DP039 Remedial Action Construction Completion Report: No change to the schedule.
- Multi-Site Technology Demonstration Construction Completion Report: No change to the schedule.
- 2016 Annual CAMU Monitoring Report: Predraft to AF/Service Center date was changed to 9 February 2017, the rest of the dates were changed accordingly.

- Site SD034 Technology Demonstration Construction Completion Report: No change was made to the schedule.
- POCO Evaluation/Closure Report for DERA-funded Oil/Water Separators OW051, OW053, and OW054: No change was made to the schedule. Ms. Constantinescu mentioned that her comments might be a little late; they should be ready by the end of February.
- Site ST028 POCO Well Decommissioning and Site Closeout Technical Memorandum: No change was made to the schedule. Ms. Constantinescu said that she is working on a no further action (NFA) closure package in draft format that will be submitted to Travis AFB for review. Ms. Constantinescu asked if Travis AFB is looking now for the final draft package, adding that two years ago she sent the CG508 draft NFA package to Travis AFB at their attorney's request. Mr. Duke said that he didn't recall receiving it, but would see if he could locate a copy.
- POCO Evaluation/Closure Report for DERA-funded Oil/Water Separators OW040, OW047, OW048, OW049, OW052, OW055, and OW057. Predraft to AF/Service Center date was changed to 1 February 2017, the rest of the dates were changed accordingly.
- Site SS014 POCO Technology Demonstration Construction Completion Report: No change was made to the schedule.

2. CURRENT PROJECTS

Treatment Plant Operation and Maintenance Update

South Base Boundary Groundwater Treatment Plant, January 2017 (see Attachment 3)

The South Base Boundary Groundwater Treatment Plant (SBBGWTP) performed at 100% uptime, and 3.9 million gallons of groundwater were extracted and treated during the month of January 2017. All of the treated water was discharged to Union Creek. The average flow rate for the SBBGWTP was 97.6 gallons per minute (gpm). Electrical power usage was 13,409 kWh, and approximately 10,723 pounds of CO₂ were created (based on DOE calculation). Approximately 1.01 pound of volatile organic compounds (VOCs) was removed in January. The total mass of VOCs removed since startup of the system is 483.4 pounds.

Optimization Activities for SBBGWTP: No optimization activities are reported for the month of January 2017.

Central Groundwater Treatment Plant, January 2017 (see Attachment 4)

The Central Groundwater Treatment Plant (CGWTP) performed at 89.2% uptime with approximately 1,269,550 gallons of groundwater extracted and treated during the month of January 2017. All treated water was discharged to the storm sewer. The

average flow rate for the CGWTP was 35.2 gpm. Electrical power usage was 2,212 kWh for all equipment connected to the Central Plant, and approximately 2,525 pounds of CO₂ were generated. Approximately 2.80 pounds of VOCs were removed from groundwater by the treatment plant in January. The total mass of VOCs removed since the startup of the system is 11,455 pounds.

Optimization Activities for CGWTP: No optimization activities are reported for the month of January 2017.

Note: The Site DP039 bioreactor is currently undergoing an optimization effort to determine the most effective pulse mode duration to optimize distribution of TOC in the subsurface.

LF007C Groundwater Treatment Plant

The LF007C Groundwater Treatment Plant was taken offline as of 16 December 2016, in accordance with the US Fish and Wildlife Service requirements, due to the presence of standing water in the vernal pools.

ST018 Groundwater (MTBE) Treatment Plant, January 2017 (see Attachment 5)

Site ST018 (MTBE) Treatment Plant (ST018 GWTP) performed at 99.9% uptime with approximately 132,240 gallons of groundwater extracted and treated during the month of January 2017. All treated water was discharged to the sanitary sewer. The average flow rate for the ST018 GWTP was 3.4 gpm. Electrical power usage for the month was 79 kWh for all equipment connected to the ST018 GWTP. The total CO₂ equivalent, including an estimate for the carbon change-out, equates to approximately 58 pounds. Approximately 0.13 pound of BTEX, MTBE and TPH was removed in January by the treatment plant and approximately 0.01 pound of MTBE was removed from groundwater. The total BTEX, MTBE and TPH mass removed since the startup of the system is 40.2 pounds, and the total MTBE mass removed since startup of the system is 9.8 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 four groundwater extraction pumps in the system are all solar powered.

Optimization Activities for ST018GWTP: No optimization activities to report for the month of January 2017.

Mr. Wray said that Travis AFB will be working with the Fairfield Sanitary Sewer District (FSSD) for removing the carbon from the system. FSSD effluent limitations are very high compared to the detections that have been observed over the years that the system has been operating. The carbon vessels were originally installed, because the system operated under a NPDES permit.

Presentation:

Multi-site Bioaugmentation Technology Demonstration Construction Completion Report (see Attachment 6)

Ms. Caird reported on the Multi-site Bioaugmentation Technology Demonstration Construction Completion Report. See attachment 6 for details. Highlights included:

The purpose of this technology demonstration (TD) is to compare the first-order degradation rates of chlorinated VOCs when we amend the aquifer with a bioaugmentation culture versus not using the bioaugmentation culture. This report documents completion of construction activities for this TD at Sites ST027B and SD036.

Site ST027B Background:

- Site ST027B is a 35-acre area located in the middle of Travis AFB (TAFB) flightline, historically used for fuel storage, aircraft, and jet engine testing.
- Site ST027 was historically a POCO site, however investigations in 2007 and 2008 discovered a small, previously unknown TCE plume in the southwest portion of Site ST027 (now called Site ST027B), which is an ERP site.
- Monitored natural attenuation (MNA) was selected as the final remedy for Site ST027B in the Groundwater ROD; the technical demonstration should not interfere with MNA.

Site SD036 Background:

- Site SD036 covers six (6) acres in the WIOU. The site is in a highly industrial area and consists of multiple use shops, including a wash rack and oil/water separator.
- Enhanced reductive dechlorination (ERD) and enhanced attenuation (EA) were selected as the final remedy in the GW ROD.

Technology Demonstration (TD) Approach:

- Evaluate the potential for future remedy optimizations at appropriate sites.
- TD is being performed in two (2) study areas at each of the sites: 1) Emulsified vegetable oil (EVO)-only study area. 2) An EVO amended with bioaugmentation culture study area.

Sites ST027B and SD036 TD Approach:

- Evaluate the potential for future remedy optimizations at appropriate sites.
- A study area with EVO and bioaugmentation amends the aquifer with additional bacteria that are known to support ERD. The bioaugmentation substrate selected is KB01 Plus, which consists of Dehalococcoides and Dehalobacter microorganisms.

Site SD027B TD Approach:

- The TD design included the installation of two (2) new injection wells in each study area and the installation of one (1) new performance monitoring well in the EVO-only study area.
- The installation of a new performance monitoring well downgradient of the two (2) study areas to confirm the TD does not negatively affect the MNA remedy.

Site SD036 TD Approach:

- The EVO-only study area is comprised of an existing injection well and an existing monitoring well.
- The bioaugmentation study area is comprised of three (3) existing injection wells and one (1) existing monitoring well.
- The existing injection wells previously received EVO injections as part of the Site SD036 remedial action (RA) conducted in 2015.

TD Implementation:

- Construction activities for the TD included well installation, development, and baseline sampling at Site ST027B, and EVO/bioaugmentation injection activities at Sites ST027B and SD036. All construction work at Site ST027B was completed while the runway was closed during a military construction project.

Site ST027B TD Construction Activities:

- Installed monitoring and injection wells. Bedrock was encountered between 10 and 18.5 ft bgs. The injection wells were screened from 13 to 33 ft bgs.
- The EVO-only study area monitoring well was screened from 9 to 19 ft bgs. The downgradient well was screened from 13 to 23 ft bgs.
- Crystalline gypsum was encountered as disseminations or fracture filling in most of the borings starting from between 7 and 10 ft bgs.

Site ST027B Baseline Groundwater Sampling:

- Maximum TCE concentration was 1,200 µg/L. Total organic carbon (TOC) ranged from 2.1 mg/L to 5.4 mg/L.
- Baseline groundwater samples for Dehalococcoides and Dehalobacter bacterial cultures were collected at performance monitoring wells in each study area. Dehalococcoides concentrations ranged from 2.6 to 8.8 cells per milliliter (cells/mL). Dehalobacter concentration ranged from 175 to 860 cells/mL.

Site SD036 Baseline Groundwater Sampling:

- Maximum TCE concentration was 2,000 µg/L. Total organic carbon (TOC) ranged from 0.89 mg/L to 700 mg/L.
- Baseline groundwater samples for Dehalococcoides and Dehalobacter bacterial cultures were collected at performance monitoring wells in each study area. Dehalococcoides concentrations ranged from 77.7 to 22,600 cells/mL. Dehalobacter concentration ranged from 3,510 to 249,000 cells/mL.

Sites ST027B and SD036 Emulsified Vegetable Oil Injection:

- At site ST027B a total of 15,408 gallons of EVO solution was injected into the four (4) newly installed injection wells. EVO Injection were followed by 5,765 gallons of chase water. During the drilling, bedrock was encountered between 10 and 18.5 ft bgs, 10 ft bgs in the north and 18.5 further south. The bedrock at these depths were highly weathered, the alluvium package is relatively thin; the majority of the groundwater flow is in the bedrock. As the bedrock becomes more competent, it becomes a barrier.
- At site SD036 EVO injections were previously completed in 2015 as part of the remedial action (RA), therefore no additional EVO injection was required.

Sites ST027B Bioaugmentation Injection:

- Bioaugmentation injections were completed after 20 percent of total EVO solution had been injected and anaerobic aquifer conditions were observed.
- Each injection well in the bioaugmentation study area received 3 liters of KB-1 Plus bioaugmentation culture, followed by 125 gallons of deoxygenated chase water.

Sites SD036 Bioaugmentation Injection:

- Bioaugmentation injections were completed.
- EVO injections were previously completed in May 2015 and anaerobic conditions were observed, prior to bioaugmentation injections.
- Each injection well in the bioaugmentation study area received three (3) liters of KB-1 Plus bioaugmentation culture, followed by deoxygenated chase water.

Performance monitoring:

- The multi-site TD will be monitored for three (3) years. Semiannually for the first year and annually for two (2) years.
- Performance monitoring will be conducted at Sites ST027 and SD036 to evaluate the first order degradation rates of targeted CVOCs when treated with EVO alone verses EVO amended with bioaugmentation culture.
- The results of the performance monitoring will be reported in the annual GRISRs.

Program Update: Activities Completed, In Progress, and Upcoming (see Attachment 7)

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

Newly Completed Documents: Site DP039 Remedial Action Construction Completion Report.

Newly Completed Fieldwork: None.

In-Progress Documents (CERCLA): Community Involvement Plan; Site TS060 Removal Action Work Plan; Site LF044 Investigation Work Plan; Multisite Technology Demonstration Construction Completion Report.

In-Progress Documents (POCO): Site FT004 POCO Soil Data Gap Investigation Work Plan; ST028 POCO Well Decommissioning/Site Closeout Technical Memorandum; POCO Evaluation/Closeout Report for DERA-funded oil/water separators OW051, OW053, and OW054.

In-Progress Fieldwork (CERCLA): None.

In-Progress Fieldwork (POCO): None.

Planned Documents (CERCLA): 2016 Annual CAMU Monitoring Report (March); SD034 Technology Demonstration Construction Completion Report (April); SS016, SD033, SD043, SS046 Risk Assessment Tech Memo (April); 2016 Annual GRISR (June); SD031 Background Soil Study Work Plan (TBD).

Planned Documents (POCO): Site SS014 POCO Technology Demonstration Construction Completion Report (March); POCO Evaluation/Closure Report for DERA-funded Oil/Water Separators OW040, OW047, OW048, OW049, OW052, OW055, and OW057 (March).

Fieldwork Planned (CERCLA): Q2 2017 GRIP Sampling Event (April); Site LF044 Sediment Sampling (2017); Site TS060 Removal Action (2017); DP039 Installation of Down-gradient Monitoring Wells (2017); SD031 Background Soil Sampling (2017).

Fieldwork Planned (POCO): Site FT004 POCO Soil Data Gap Investigation (2017); OW055 Sidewalk Repairs (2017); OW056 Site Excavation/Closure (2017).

Technology Demonstration Projects:

- SS014: Recycled Drywall Subgrade Biochemical Reactor “SBGR”.
 - Evaluate the effectiveness of sulfate (gypsum from crushed drywall) to enhance anaerobic biodegradation of petroleum in groundwater.
 - Installation to be completed November 2016.
 - Too early to evaluate performance data.

- Multisite Bioaugmentation: EVO and KB-1 Plus.
 - Evaluate if addition of bioaugmentation substrate to an EVO injection will increase the rate of CVOC degradation.
 - Injections not complete yet (Nov 2016).
 - Too early to evaluate performance data.
- SD034: Washboard SBGR.
 - Evaluate the effectiveness of an oxygen-enhanced aerobic SBGR on reducing TPH as diesel (TPH-D) in groundwater.
 - Installation to be completed November 2016.
 - Installed six (6) SBGR trenches, In process of evaluating need/constructability of installing the 7th trench.
 - Too early to evaluate performance data.
- FT005: Distribution of EVO and KB-1 Plus.
 - Evaluate total organic carbon (TOC) dispersion distances and rates for optimizing the remediation of 1,2-dichloroethane (DCA) in groundwater.
 - Installation completed May 2016.
 - Too early to evaluate performance data.
- FT004: Distribution of EVO via SBGR and/or Groundwater Extraction.
 - Determine effectiveness of TOC distribution through two different enhanced reductive dechlorination (ERD) approaches: (1) groundwater TOC recirculation using a combination EVO injection, infiltration SBGR trenches, and groundwater extraction; and (2) EVO injection with groundwater extraction.
 - Installation completed April 2016.
 - Too early to evaluate performance data.
- SD031: EVO distribution via Gravel Chimneys.
 - Determine if EVO injection and recirculation of groundwater through gravel chimneys can effectively distribute TOC horizontally in the subsurface to support ERD of 1,1-dichloroethene (DCE).
 - Installation completed in April 2015.
 - Early indications:
 - Reducing conditions have initiated as expected throughout the TD area and are supporting anaerobic degradation.
 - TOC concentrations are increasing at several wells.
 - 1,1-DCE (primary COC) concentrations have reduced by 57% (sum of key wells within TD area).
 - Total Molar concentration (sum of CVOCs) has reduced by 49% (sum of key wells within TD area).
 - Recirculation through chimneys has been successful relative to our design assumptions.

4. New Action Item Review

- Mr. Duke to locate the Travis ERP mission statement to see if it fits in the CIP.
- Mr. Duke to locate Water Board's NFA draft package issued for CG508 in 2015.

— Mr. Wray to send the DP039 pulsed bioreactor optimization study plan to the USEPA.

5. PROGRAM/ISSUES/UPDATE

Mr. Duke began the meeting by showing a picture of a protected species, the California Tiger Salamander, that was spotted on the runway on Travis AFB at 1:30 am after a rain event.

6. Action Items

Item #	Responsible	Action Item Description	Due Date	Status
1.	Monika O'Sullivan	Ms. O'Sullivan to provide updates on PFOS and PFOA as she becomes aware of them.	Ongoing	Open
2.	Lonnie Duke	Find ERP mission statement to see if it fits in the CIP.	15 March 2017	Open
3.	Lonnie Duke	Locate Water Board NFA draft package issued for CG508 in 2015.	15 March 2017	Open
4.	Mike Wray	Send the DP039 pulsed optimization study plan to the USEPA.	15 March 2017	Open

TRAVIS AIR FORCE BASE
ENVIRONMENTAL RESTORATION PROGRAM
RESTORATION PROGRAM MANAGER'S MEETING

The RPM face-to-face is scheduled for 9:30 AM PST on 15 February, 2017.

AGENDA

1. ADMINISTRATIVE

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

2. CURRENT PROJECTS

- A. TREATMENT PLANT OPERATION AND MAINTENANCE UPDATE

3. PRESENTATIONS

- A. MULTISITE TECH DEMO CONSTRUCTION COMPLETION REPORT
- B. PROGRAM UPDATE:
DOCUMENTS & ACTIVITIES COMPLETED, IN PROGRESS AND PLANNED

4. NEW ACTION ITEM REVIEW

5. PROGRAM/ISSUES/UPDATE

- A. MEETING SCHEDULE

NOTES: AFTER THE RPM MEETING, BASED ON THE DISCUSSION DURING THE REVIEW OF THE MASTER MEETING AND DOCUMENT SCHEDULE, WE ALLOW TIME TO HOLD A SEPARATE SPLINTER MEETING TO DISCUSS RESPONSES TO AGENCY COMMENTS ON THOSE DOCUMENTS THAT ARE IN PROGRESS, OR OTHER ISSUES IF NEEDED. ALL PARTICIPANTS ARE WELCOME TO PARTICIPATE.

(2017)
Annual Meeting and Teleconference Schedule

Monthly RPM Meeting¹ (Begins at time noted)	RPM Teleconference (Begins at time noted)	Restoration Advisory Board Meeting (Begins at 7:00 p.m.) (Poster Session at 6:30 p.m.)
—	01-18-17	—
02-15-17	—	—
—	03-15-17	—
04-20-17 (Thursday 2:00 PM)	—	04-20-17
—	05-17-17	—
06-21-17	—	—
—	07-19-17	—
08-16-17	—	—
—	09-20-17	—
10-19-17 (Thursday 2:00 PM)	—	10-19-17 ²
—	11-15-17	—
—	—	—

¹ Note: Meetings and teleconferences will be held at 09:30 AM on the third Wednesday of each month unless otherwise noted.

² Note: Tentative RAB tour date in lieu of RAB meeting.

Travis AFB Master Meeting and Document Schedule

PRIMARY DOCUMENTS	
Life Cycle	Community Involvement Plan Travis AFB, Glenn Anderson CH2M HILL, Jill Dunphy
Scoping Meeting	NA
Predraft to AF/Service Center	08-23-16
AF/Service Center Comments Due	09-07-16
Draft to Agencies	09-28-16
Draft to RAB	09-28-16
Agency Comments Due	10-28-16 (11-28-16)
Response to Comments Meeting	TBD
Agency Concurrence with Remedy	NA
Public Comment Period	NA
Public Meeting	NA
Response to Comments Due	TBD
Draft Final Due	TBD
Final Due	TBD

Travis AFB Master Meeting and Document Schedule

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

Travis AFB Master Meeting and Document Schedule

SECONDARY DOCUMENTS			
Life Cycle	Site TS060 Removal Action Work Plan Travis AFB, Glenn Anderson CH2M HILL, Doug Berwick CAPE, Meg Greenwald	Site LF044 Investigation Work Plan Travis AFB, Glenn Anderson CH2M HILL, Doug Berwick CAPE, Meg Greenwald	Sites SS016, SD033, SD043, and SS046 Risk Assessment Technical Memorandum Travis AFB, Glenn Anderson CH2M HILL, Tony Chakurian
Scoping Meeting	NA	NA	NA
Predraft to AF/Service Center	04-14-16	04-26-16	03-30-17
AF/Service Center Comments Due	04-28-16	05-10-16	04-13-17
Draft to Agencies	06-20-16	06-27-16	04-28-17
Draft to RAB	06-20-16	06-27-16	04-28-17
Agency Comments Due	07-27-16	07-28-16	05-30-17
Response to Comments Meeting	08-17-16	08-17-16	06-21-17
Response to Comments Due	08-31-16 (02-23-17)	08-31-16 (02-22-17)	07-10-17
Draft Final Due	NA	NA	NA
Final Due	08-31-16 (02-23-17)	08-31-16 (02-22-17)	07-10-17
Public Comment Period	NA	NA	NA
Public Meeting	NA	NA	NA

Travis AFB Master Meeting and Document Schedule

SECONDARY POCO DOCUMENTS	
Life Cycle	Site FT004 POCO Soil Data Gap Investigation Work Plan Travis AFB, Glenn Anderson CH2M HILL, Doug Berwick CAPE, Meg Greenwald
Scoping Meeting	NA
Predraft to AF/Service Center	06-03-16
AF/Service Center Comments Due	06-17-16
Draft to Agencies	07-19-16
Draft to RAB	07-19-16
Agency Comments Due	08-19-16
Response to Comments Meeting	09-21-16
Response to Comments Due	10-06-16 (02-28-17)
Draft Final Due	NA
Final Due	10-06-16 (02-28-17)
Public Comment Period	NA
Public Meeting	NA

Travis AFB Master Meeting and Document Schedule

INFORMATIONAL DOCUMENTS		
Life Cycle	Quarterly Newsletters (April 2017) Travis, Glenn Anderson	2016 Annual GRISR Travis AFB, Glenn Anderson CH2M HILL, Leslie Royer
Scoping Meeting	NA	NA
Predraft to AF/Service Center	NA	04-21-17
AF/Service Center Comments Due	NA	05-22-17
Draft to Agencies	03-28-17	06-07-17
Draft to RAB	NA	06-07-17
Agency Comments Due	04-11-17	07-10-17
Response to Comments Meeting	TBD	07-19-17
Response to Comments Due	04-12-17	08-02-17
Draft Final Due	NA	NA
Final Due	04-13-17	08-02-17
Public Comment Period	NA	NA
Public Meeting	NA	NA

Travis AFB Master Meeting and Document Schedule

INFORMATIONAL DOCUMENTS				
Life Cycle	Site DP039 Remedial Action Construction Completion Report Travis AFB, Glenn Anderson CH2M HILL, Levi Pratt	Multi-Site Technology Demonstration Construction Completion Report Travis AFB, Glenn Anderson CH2M HILL, Levi Pratt	2016 Annual CAMU Monitoring Report Travis AFB, Glenn Anderson CH2M HILL, Levi Pratt	Site SD034 Technology Demonstration Construction Completion Report Travis AFB, Glenn Anderson CH2M HILL, Levi Pratt
Scoping Meeting	NA	NA	NA	NA
Predraft to AF/Service Center	08-05-16	12-15-16	02-09-17	03-17-17
AF/Service Center Comments Due	08-19-16	01-13-17	02-24-17	03-31-17
Draft to Agencies	09-30-16	01-27-17	03-10-17	04-14-17
Draft to RAB	09-30-16	01-27-17	03-10-17	04-14-17
Agency Comments Due	10-31-16	02-27-17	04-10-17	05-15-17
Response to Comments Meeting	11-16-16	03-15-17	04-20-17	05-17-17
Response to Comments Due	01-27-17	03-29-17	05-05-17	06-02-17
Draft Final Due	NA	TBD	NA	NA
Final Due	01-27-17	03-29-17	05-05-17	06-02-17
Public Comment Period	NA	NA	NA	NA
Public Meeting	NA	NA	NA	

Travis AFB Master Meeting and Document Schedule

INFORMATIONAL POCO DOCUMENTS				
Life Cycle	POCO Evaluation/Closure Report for DERA-funded Oil/Water Separators OW051, OW053, and OW054 Travis AFB, Glenn Anderson CH2M HILL, Doug Berwick	Site ST028 POCO Well Decommissioning and Site Closeout Technical Memorandum Travis AFB, Glenn Anderson CH2M HILL, Doug Berwick	POCO Evaluation/Closure Report for DERA-funded Oil/Water Separators OW040, OW047, OW048, OW049, OW052, OW055, and OW057 Travis AFB, Glenn Anderson CH2M HILL, Doug Berwick	Site SS014 POCO Technology Demonstration Construction Completion Report Travis AFB, Glenn Anderson CH2M HILL, Levi Pratt
Scoping Meeting	NA	NA	NA	NA
Predraft to AF/Service Center	11-07-16	11-11-16	02-01-17	02-24-17
AF/Service Center Comments Due	11-21-16	11-28-16	02-15-17	03-10-17
Draft to Agencies	01-19-17	01-13-17	03-15-17	03-28-17
Draft to RAB	01-19-17	01-13-17	03-15-17	03-28-17
Agency Comments Due	02-21-17	02-13-17	04-14-17	04-27-17
Response to Comments Meeting	03-15-17	02-15-17	04-20-17	05-17-17
Response to Comments Due	04-04-17	03-01-17	05-04-17	05-31-17
Draft Final Due	NA	NA	NA	NA
Final Due	04-04-17	03-01-17	05-04-17	05-31-17
Public Comment Period	NA	NA	NA	NA
Public Meeting	NA	NA	NA	NA

South Base Boundary Groundwater Treatment Plant

Monthly Data Sheet

Report Number: 195

Reporting Period: 4 January 2017 – 1 February 2017

Date Submitted: 9 February 2017

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 January 2017 reporting period.

Table 1 – Operations Summary – January 2017			
Initial Data Collection:		1/4/2017 12:00	Final Data Collection: 2/1/2017 9:45
Operating Time:		Percent Uptime:	Electrical Power Usage:
SBBGWTP:	670 hours	SBBGWTP:	100%
Gallons Treated: 3.9 million gallons		Gallons Treated Since July 1998: 958 million gallons	
Volume Discharged to Union Creek: 3.9 million gallons		Gallons Treat From Other Sources: 0 gallons	
VOC Mass Removed: 1.01 lbs ^b		VOC Mass Removed Since July 1998: 483.4 lbs	
Rolling 12-Month Cost per Pound of Mass Removed: \$9,459 ^c			
Monthly Cost per Pound of Mass Removed: \$17,785 ^c			
lbs = pounds			
^a SiteWise™ estimate that 1 kilowatt hour generated produces 0.74 pounds of GHG. Value also includes approximately 800 pounds of GHG from GAC change out.			
^b Calculated using January 2017 EPA Method SW8260C 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 – January 2017							
FT005 ^b				SS029		SS030	
EW01x05	Offline	EW736x05	Offline	EW01x29	1.9	EW01x30	6.2
EW02x05	Offline	EW737x05	Offline	EW02x29	4.1	EW02x30	0.2
EW03x05	Offline	EW742x05	Offline	EW03x29	4.1	EW03x30	4.6
EW731x05	5.5	EW743x05	5.7	EW04x29	6.9	EW04x30	19.5
EW732x05	Offline	EW744x05	4.6	EW05x29	10.5	EW05x30	0.7
EW733x05	Offline	EW745x05	14.0	EW06x29	0.5	EW2174x30	10.8
EW734x05	Offline	EW746x05	Offline	EW07x29	12.7	EW711x30	Offline
EW735x05	1.0	EW2291x05	3.3				
FT005 Total: 34.1				SS029 Total: 40.7		SS030 Total: 42.0	
SBBGWTP Average Monthly Flow ^c : 97.6 gpm							
^a Flow rates presented are instantaneous measurements taken at the end of the reporting period.							
^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 the system was operational.							
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	24 January 2017	--	24 January 2017	--	System off line for approximately 1 hour to perform routine maintenance.
-- = 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 4 January 2017 sampling event are presented in Table 4. The total VOC concentration (31.01 µg/L) in the influent sample has decreased from the December 2016 sample results (33.07 µg/L). TCE (28.7 J+ µg/L), cis-1,2-DCE (1.96 J+ µg/L), chloroform (0.20 J+ µg/L), and 1,2-DCA (0.15 J µg/L) were detected at the influent sampling location. No VOCs, except acetone, were detected at the midpoint and effluent sampling locations. The acetone detections are likely a result of laboratory contamination as acetone was not detected in the influent. Beginning in March 2017, the effluent sample will no longer be sampled for total dissolved solids (TDS) because there are no sampling requirements or discharge limits for TDS according to the NPDES permit.

On 24 January, the SBBGWTP was shut down for less than 1 hour to repair power connections within the motor control center.

In December 2016, EW01x29 at Site SS029 was found to be fouled with manganese oxide. In early January 2017, EW01x29 was cleaned, re-assembled, and restarted without issue.

In January, troubleshooting was performed on several Site SS030 extraction wells, as follows:

- EW01x30 and EW04x30 – The auxiliary contacts on the starter were broken. The contacts were replaced. Wells are operational.
- EW711x30 - Pump was not functioning properly because of pump corrosion; however, this issue was resolved in January. Upon restart, additional issues with the flow and water level signals were discovered. Additional troubleshooting is required. Well is off line.

As part of the Site FT005 technology demonstration, troubleshooting was performed on several Site FT005 wells, as follows:

- EW734x05 – Pump was removed and new pump will be installed. Well is off line.
- EW743x05 – Electrical wires were reversed to decrease the flow to approximately 5 – 7 gallons per minute. Well is operational.
- EW744x05 – Electrical wires need to be replaced. Well is off line.
- EW745x05 – Replaced electrical wires and flow meter. Well is operational.
- On 19 January, all the FT005 wells were temporarily shut down to repair the SCADA system and reset the uninterruptible power supply.

In addition to the maintenance on the extraction wells, the individual extraction well flow rates were evaluated to ensure that the SCADA system was properly reporting them. Several issues were identified and are currently being resolved. However, the total volume and flow through the SBBGWTP are correct as readings are collected directly from the totalizer and flow meter.

Figure 1 presents a plot of influent concentrations and average flow at the SBBGWTP over the past twelve (12) months. An overall decrease in the VOC influent concentration has been observed in the past twelve months; however, the flow rate has remained relatively steady.

Optimization Activities

No optimization activities occurred at the SBBGWTP in January 2017.

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. In January 2017, the SBBGWTP produced approximately 10,723 pounds of GHG, which includes approximately 800 pounds of GHG generated from changing out the GAC.

TABLE 4

Summary of Groundwater Analytical Data For January 2017 – South Base Boundary Groundwater Treatment Plant

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	4 January 2017 (µg/L)		
				Influent	Midpoint	Effluent
Halogenated Volatile Organics						
Acetone	NA	1.0	0	ND	2.80 J	2.84 J
Bromodichloromethane	NA	0.15	0	ND	ND	ND
Carbon Tetrachloride	0.5	0.15	0	ND	ND	ND
Chloroform	5.0	0.15	0	0.20 J+	ND	ND
Chloromethane	NA	0.15	0	ND	ND	ND
1,1-Dichloroethane	5.0	0.15	0	ND	ND	ND
1,2-Dichloroethane	0.5	0.15	0	0.15 J+	ND	ND
1,1-Dichloroethene	5.0	0.15	0	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.15	0	1.96 J+	ND	ND
trans-1,2-Dichloroethene	5.0	0.15	0	ND	ND	ND
Methylene Chloride	5.0	0.15	0	ND	ND	ND
Tetrachloroethene	5.0	0.15	0	ND	ND	ND
1,1,1-Trichloroethane	5.0	0.15	0	ND	ND	ND
1,1,2-Trichloroethane	5.0	0.15	0	ND	ND	ND
Trichloroethene	5.0	0.15	0	28.7 J+	ND	ND
Vinyl Chloride	0.5	0.15	0	ND	ND	ND
Non-Halogenated Volatile Organics						
Benzene	1.0	0.15	0	ND	ND	ND
Ethylbenzene	5.0	0.15	0	ND	ND	ND
Toluene	5.0	0.15	0	ND	ND	ND
Xylenes	5.0	0.15 – 0.30	0	ND	ND	ND
Other						
Total Suspended Solids (mg/L)	NA	0.6	0	1.6 J	NM	NM
Total Petroleum	50	35	0	NM	NM	ND
Hydrocarbons – Gasoline						
Total Petroleum	50	24	0	NM	NM	ND
Hydrocarbons – Diesel						

* 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

J+ = analyte concentration is considered an estimated value with a high bias

mg/L = milligrams per liter

NA = not applicable

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

ND = not detected

NM = not measured

µg/L = micrograms per liter

Figure 1

SBBGWTP Total VOC Influent Concentrations and Average Flowrate Twelve Month History

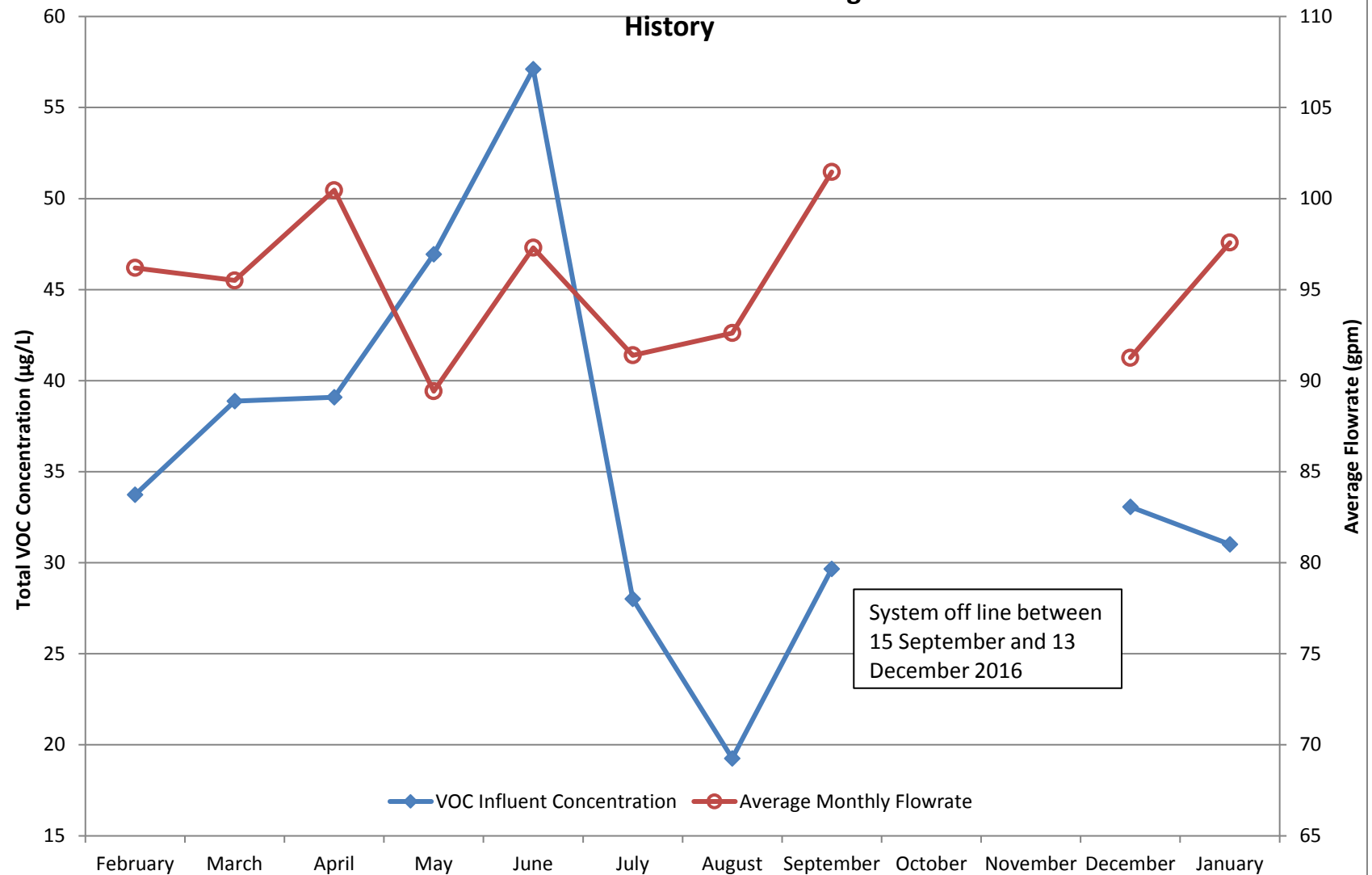
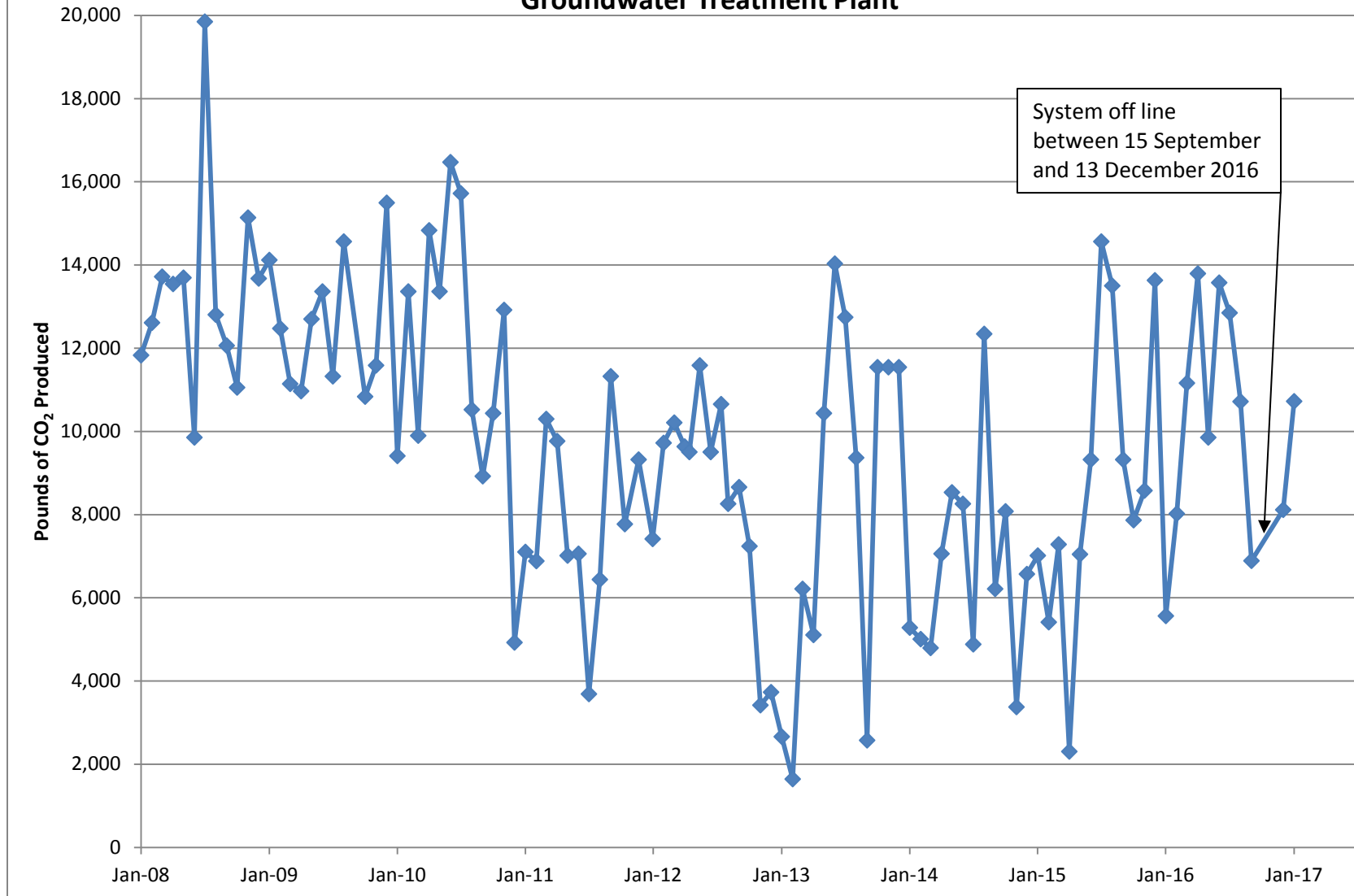


Figure 2

**Equivalent Pounds of Carbon Dioxide Produced by the South Base Boundary
Groundwater Treatment Plant**



Central Groundwater Treatment Plant Monthly Data Sheet

Report Number: 210

Reporting Period: 3 January 2017 – 31 January 2017

Date Submitted: 9 February 2017

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 January 2017 reporting period.

Table 1 – Operations Summary – January 2017			
Initial Data Collection:		Final Data Collection:	
1/3/2017 11:00		1/31/2017 12:10	
Operating Time:		Electrical Power Usage:	
Percent Uptime:			
CGWTP:	601 hours	CGWTP:	89.2%
		CGWTP:	2,212 kWh (2,525 lbs CO ₂ generated ^a)
Gallons Treated (discharge to storm sewer):		Gallons Treated Since January 1996: 536.4 million gallons	
1,269,550 gallons			
VOC Mass Removed from groundwater:		VOC Mass Removed Since January 1996:	
2.80 lbs ^b		2,769 lbs from groundwater	
		8,686 lbs from vapor	
Rolling 12-Month Cost per Pound of Mass Removed: \$2,447 ^c			
Monthly Cost per Pound of Mass Removed: \$2,765 ^c			
^a SiteWise™ estimate that 1 kilowatt hour generated produces 0.74 pounds of GHG. Value also includes approximately 888 pounds of GHG from GAC change out.			
^b Calculated using January 2017 EPA Method SW8260C 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 during the monthly reporting period.

Table 2 – CGWTP Average Flow Rates ^a – January 2017	
Location	Average Flow Rate Groundwater (gpm)
EW001x16	14.9
EW002x16	11.2
EW003x16	0.2
EW605x16	6.7
EW610x16	2.4
CGWTP	35.2
^a Flow rates calculated by dividing total gallons processed by system operating time for the month or the average of the instantaneous readings. 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		Cause
	Date	Time	Date	Time	
CGWTP	18 January 2017	17:00	20 January 2017	12:00	Influent pump P-301 motor malfunctioned.
CGWTP	22 January 2017	05:58	23 January 2017	11:30	Influent pump P-301 malfunctioned.
^a Shutdown and restart times estimated based on field notes CGWTP = Central Groundwater Treatment Plant					

Summary of O&M Activities

Monthly groundwater samples were collected at the CGWTP on 4 January 2017. Sample results are presented in Table 4. The total VOC concentration (264.88 µg/L) in the January 2017 influent sample has increased from the December 2016 sample (247.75 µg/L). TCE was the primary VOC detected in the influent sample at a concentration of 218 µg/L. Cis-1,2-DCE (3.92 µg/L) was detected in the sample collected after the first carbon vessel. No VOC constituents were detected in the samples collected after the second carbon vessel and in the system effluent. Acetone was detected in all the samples; however, the detections are likely because of laboratory contamination. Travis AFB will continue to monitor influent, midpoint, and effluent concentrations at the CGWTP for carbon breakthrough, though the carbon treatment remained effective in January 2017. Beginning in March 2017, the effluent sample will no longer be sampled for total dissolved solids (TDS) because there are no sampling requirements or discharge limits for TDS according to the NPDES permit.

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 influent concentration has displayed a slightly decreasing trend over the past year. However, the overall flow rate through the treatment plant has increased over the past 12 months.

The Site DP039 subgrade biogeochemical reactor (SBGR), also known as a bioreactor, continued to operate in a “pulsed mode” in an effort to optimize distribution of total organic carbon (TOC). During this optimization effort, the pulsed mode operation will consist of three (3) different time scales: one week, two week, and three week pulsed modes. Samples will be collected after each round of pulsed mode operation. This will help determine which duration of each pulsed mode cycle of the bioreactor is most effective.

On January 10, the bioreactor at Site DP039 was taken off line as it concluded the two-week pulse mode operation. Groundwater samples were collected from several groundwater monitoring wells at Site DP039. The bioreactor will begin the three-week operational cycle for nine (9) weeks (three weeks on, three weeks off, three weeks on) in February 2017.

Optimization Activities

No optimization activities occurred at the CGWTP in January 2017. As discussed above, the Site DP039 bioreactor is currently undergoing an optimization effort to determine the most effective pulse mode duration to optimize distribution of TOC in the subsurface.

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 2,525 pounds of GHG during January 2017. This is a decrease from the December 2016 amount of 2,902 pounds.

TABLE 4

Summary of Groundwater Analytical Data for January 2017 – Central Groundwater Treatment Plant

				4 January 2017 (µg/L)			
Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	Influent	After Carbon 1 Effluent	After Carbon 2 Effluent	System Effluent
Halogenated Volatile Organics							
Acetone	NA	1.0	0	3.40 J	4.18 J	3.85 J	3.06 J
Carbon Tetrachloride	0.5	0.15	0	ND	ND	ND	ND
Chloroform	5.0	0.15	0	ND	ND	ND	ND
Chloromethane	NA	0.15	0	ND	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.15	0	42.4	3.92	ND	ND
1,2-Dichlorobenzene	5.0	0.15	0	0.39 J	ND	ND	ND
1,3-Dichlorobenzene	5.0	0.15	0	0.47 J	ND	ND	ND
1,4-Dichlorobenzene	5.0	0.15	0	0.22 J	ND	ND	ND
1,1-Dichloroethane	5.0	0.15	0	ND	ND	ND	ND
1,2-Dichloroethane	0.5	0.15	0	ND	ND	ND	ND
1,1-Dichloroethene	5.0	0.15	0	0.53	ND	ND	ND
Methylene Chloride	5.0	0.15	0	ND	ND	ND	ND
Methyl tert-Butyl Ether	1.0	0.15	0	ND	ND	ND	ND
Tetrachloroethene	5.0	0.15	0	0.50	ND	ND	ND
1,1,1-Trichloroethane	5.0	0.15	0	ND	ND	ND	ND
1,1,2-Trichloroethane	5.0	0.15	0	ND	ND	ND	ND
trans-1,2-Dichloroethene	5.0	0.15	0	2.21	ND	ND	ND
Trichloroethene	5.0	0.15 – 1.5	0	218	ND	ND	ND
Vinyl Chloride	0.5	0.15	0	0.16 J	ND	ND	ND
Non-Halogenated Volatile Organics							
Benzene	1.0	0.15	0	ND	ND	ND	ND
Ethylbenzene	5.0	0.15	0	ND	ND	ND	ND
Toluene	5.0	0.15	0	ND	ND	ND	ND
Total Xylenes	5.0	0.15 – 0.30	0	ND	ND	ND	ND
Other							
Total Suspended Solids (mg/L)	NA	0.6	0	0.60 J	NM	NM	NM
Total Petroleum Hydrocarbons – Gasoline	50	35	0	NM	NM	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	24.1	0	NM	NM	NM	ND
Total Petroleum Hydrocarbons – Motor Oil	50 (trigger)	24.1	0	NM	NM	NM	ND

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

Notes:

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

NA = not applicable

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 Date	Pulse-off Date
MW750x39	21 December 2015	31 December 2015
	15 January 2016	1 February 2016
	12 February 2016	26 February 2016
	11 March 2016	28 March 2016
	8 April 2016	22 April 2016
	4 May 2016	13 May 2016
	27 May 2016	17 June 2016
	1 July 2016	19 July 2016
	2 August 2016	12 August 2016
	26 August 2016	8 September 2016
	10 October 2016	17 October 2016
	25 October 2016	2 November 2016
	29 November 2016	13 December 2016
	27 December 2016	10 January 2017
MW = Monitoring Well		

Figure 1

CGWTP Total VOC Influent Concentrations and Average Flowrate Twelve Month History

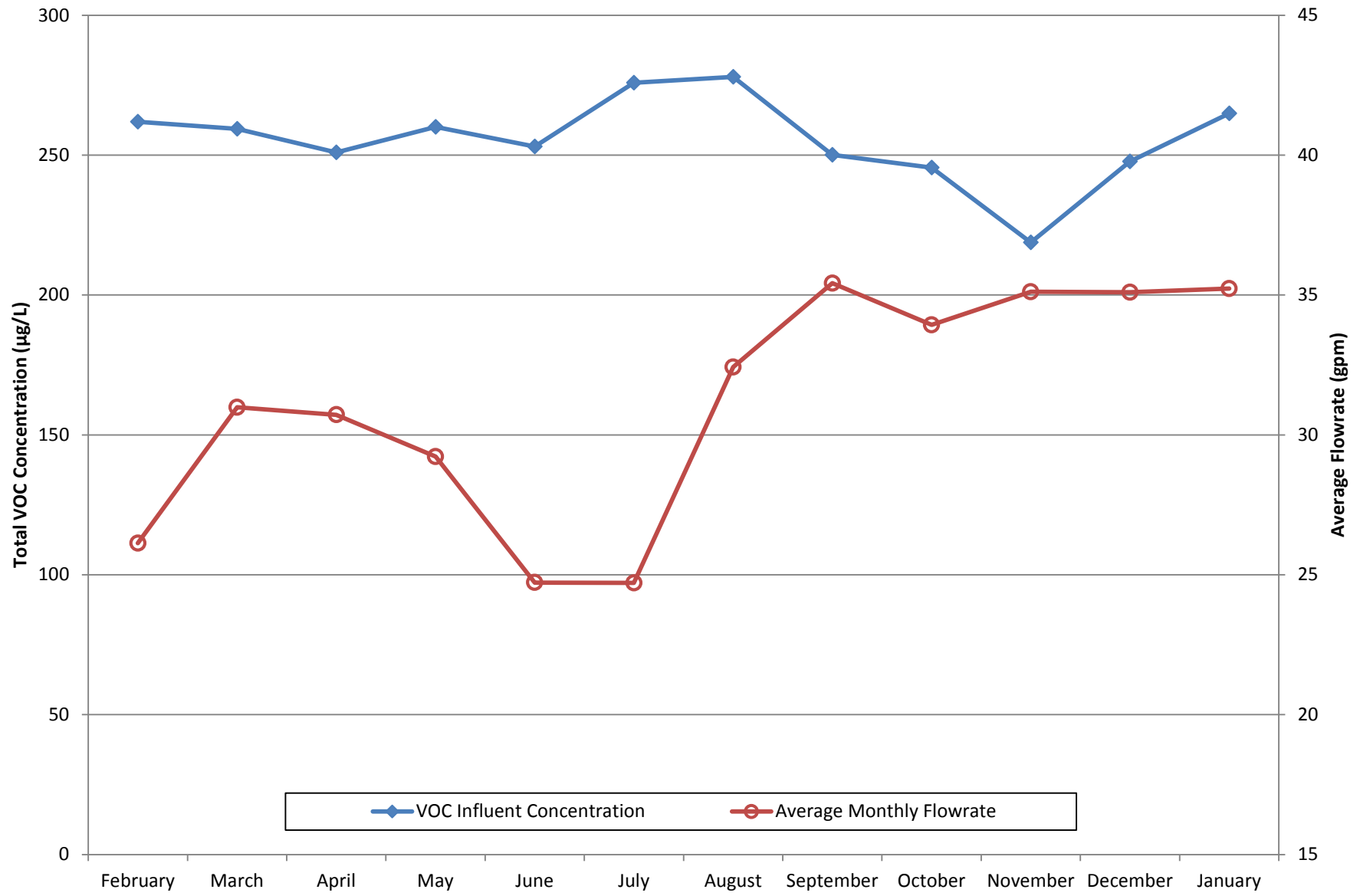
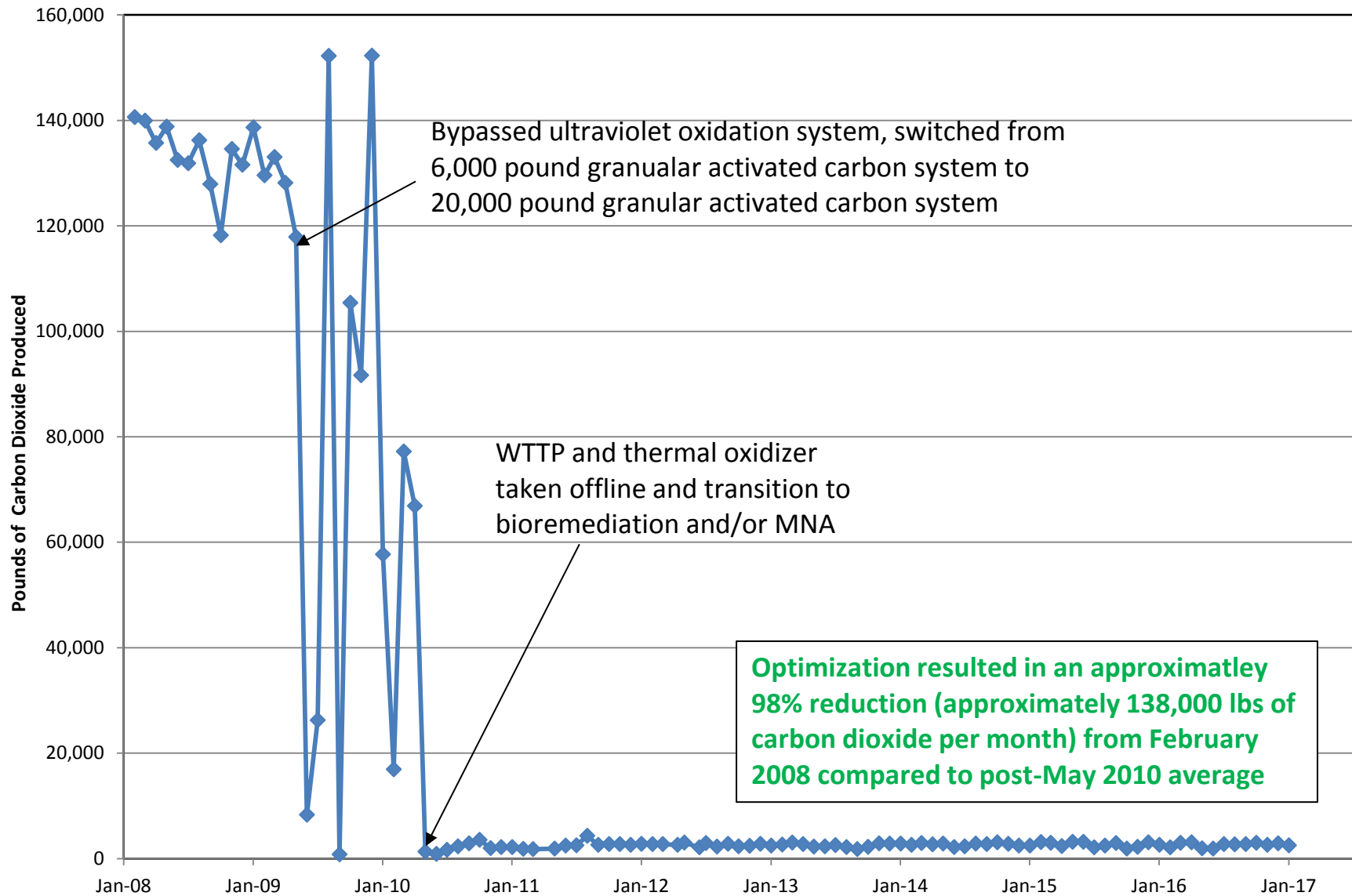


Figure 2

Equivalent Pounds of Carbon Dioxide Produced by the Central Groundwater Treatment Plant



Site ST018 Groundwater Treatment Plant

Monthly Data Sheet

Report Number: 071

Reporting Period: 4 January 2017 – 31 January 2017

Date Submitted: 9 February 2017

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

System Metrics

Table 1 presents operation data from the January 2017 reporting period.

Table 1 – Operations Summary – January 2017			
Initial Data Collection:	1/4/2017 13:30	Final Data Collection:	1/31/2017 13:40
Operating Time:		Percent Uptime:	Electrical Power Usage:
ST018GWTP: 648 hours		ST018GWTP: 99.9%	ST018GWTP: 79 kWh (58 lbs CO ₂ generated ^a)
Gallons Treated: 132,240 gallons		Gallons Treated Since March 2011: 11.6 million gallons	
Volume Discharged to Sanitary Sewer: 132,240 gallons		Final Totalizer Reading: 11,594,219 gallons	
Cumulative Volume Discharged to Sanitary Sewer since 1 November 2014: 5,098,045 gallons			
MTBE, BTEX, VOC, TPH Mass Removed: 0.13 lbs^b		MTBE, BTEX, VOC, TPH Mass Removed Since March 2011: 40.2 lbs	
MTBE (Only) Removed: 0.01 lbs^b		MTBE (Only) Mass Removed Since March 2011: 9.8 lbs	
Rolling 12-Month Cost per Total Pounds of Mass Removed: \$13,722 ^{bc}			
Monthly Cost per Pound of Mass Removed: \$56,438 ^{bc}			
^a SiteWise™ estimate that 1 kilowatt hour generated produces 0.74 pounds of GHG.			
^b Calculated using January 2017 EPA Method SW8260C and SW8015B analytical results.			
^c Costs include operations and maintenance, reporting, analytical laboratory, project management, and utility costs related to operation of the system.			
kWh = kilowatt hour			
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 – January 2017		
Location	Average Flow Rate Groundwater (gpm)^a	Hours of Operation
EW2014x18	0.5	648
EW2016x18	0.9	642
EW2019x18	0.6	647
EW2333x18	2.0	239
Site ST018 GWTP	3.4	648
^a Flow rates calculated by dividing total gallons processed by amount of operating time of the pump/system. 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	26 January 2017	--	26 January 2017	--	System was off line for approximately 1 hour to perform routine maintenance.
-- = Time not recorded ^a Shutdown and restart times estimated based on field notes ST018GWTP = Site ST018 Groundwater Treatment Plant					

Summary of O&M Activities

Monthly groundwater treatment samples were collected at the ST018GWTP on 4 January 2017. Results are presented in Table 4. The complete January 2017 laboratory data report is available upon request. The influent concentration for MTBE during the January 2017 sampling event was 6.47 µg/L, which is a significant decrease from the December 2016 sample result of 30.1 µg/L. During the time of the sampling, both EW2016x18 and EW233x18 were off line. TPH-g (68.6 J µg/L), TPH-d (45.0 J µg/L), benzene (0.307 µg/L), ethylbenzene (0.47 J µg/L), and m,p-xylene (0.31 J µg/L) were also detected in the influent sample. TPH-g (40.7 J µg/L) was detected after the first carbon vessel sampling location. MTBE was detected after the second carbon vessel sampling location and in the system effluent sampling location at concentrations of 0.46 J µg/L and 1.75 µg/L, respectively. All detected concentrations of TPH are well below the Fairfield-Suisun Sewer District effluent limitation of 50,000 µg/L, or 100,000 µg/L for TPH-mo. Additionally, the Fairfield-Suisun Sewer District does not currently have a local limit for MTBE, but a limit of 6,400 µg/L is advised based on worker health and safety. Travis AFB will continue to monitor effluent contaminant concentrations.

Figure 1 presents plots of the average flow rate and influent total contaminant (MTBE, TPH-g, TPH-d, TPH-mo, BTEX, and VOCs) and MTBE concentrations at the ST018GWTP over the past twelve (12) months. The average flow rate through the ST018GWTP has been steadily decreasing since April 2016. The total influent concentrations peaked in March 2016, which was large because of the TPH-g concentration. Since

March 2016, however, the total concentrations have been slowly decreasing. The MTBE concentration in the system influent has generally been decreasing slightly over the past 12 months.

In January 2017, several extraction wells were temporarily off line because of faults or maintenance. On 4 January, EW2016x18 shutdown for approximately 6 hours because of a tripped circuit breaker. The breaker was reset and the pump restarted without issue. On 25 January, EW2019x18 was shut down for approximately 1 hour to replace a corroded electrical connector. EW2333x18 was off line intermittently between 4 and 23 January because of a recurring pump fault. The pump was replaced along with its electrical power connector. The pump was restarted on 23 January without issue.

On 26 January 2017, the ST018GWTP was shut down for less than 1 hour to change the bag filter. The system was restarted without issue.

Optimization Activities

No optimization activities occurred at the ST018GWTP in January 2017.

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.

Figure 2 presents the historical GHG production from the ST018GWTP. The ST018GWTP produced 58 pounds of GHG during January 2017 and treated 132,240 gallons of water, which was a decrease from December 2016 (71 pounds, treating 162,380 gallons). The GHG levels had been peaked in April 2016, which was due to the addition of a new extraction well into the groundwater extraction and treatment system. Since May 2016, GHG levels have continued to decrease to levels observed historically.

TABLE 4

Summary Of Groundwater Analytical Data for January 2017– Site ST018 Groundwater Treatment Plant

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	4 January 2017 (µg/L)			
				Influent	After Carbon 1	After Carbon 2	System Effluent
Fuel Related Constituents							
Methyl tert-Butyl Ether	6,400	0.15	0	6.47	NM	0.46 J	1.75
Benzene	25,000 ^a	0.15	0	3.07	NM	ND	ND
Ethylbenzene	25,000 ^a	0.15	0	0.47 J	NM	ND	ND
Toluene	25,000 ^a	0.15	0	ND	NM	ND	ND
Total Xylenes	25,000 ^a	0.15 – 0.30	0	0.31 J	NM	ND	ND
Total Petroleum Hydrocarbons – Gasoline	50,000 ^b	35	0	68.6 J	ND	NM	ND
Total Petroleum Hydrocarbons – Diesel	50,000 ^b	23.8 – 24.5	0	45.0 J	40.7 J	NM	ND
Total Petroleum Hydrocarbons – Motor Oil	100,000	23.8 – 24.5	0	ND	ND	NM	ND
Other							
Chloromethane	NA	0.15	0	ND	NM	ND	ND
1,2-Dichloroethane	20	0.15	0	ND	NM	ND	ND

* In accordance with the Fairfield-Suisun Sewer District Effluent Limitations

Laboratory data available on request.

a – The limit of 25,000 µg/L is a combined limit for BTEX.

b – The limit of 50,000 µg/L is a combined limit for TPH-g and TPH-d

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

NA = not applicable

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

ND = not detected above method detection limit

NM = not measured this month

Figure 1
ST018GWTP Total VOC and MTBE Influent Concentrations
and Average Flowrate Twelve Month History

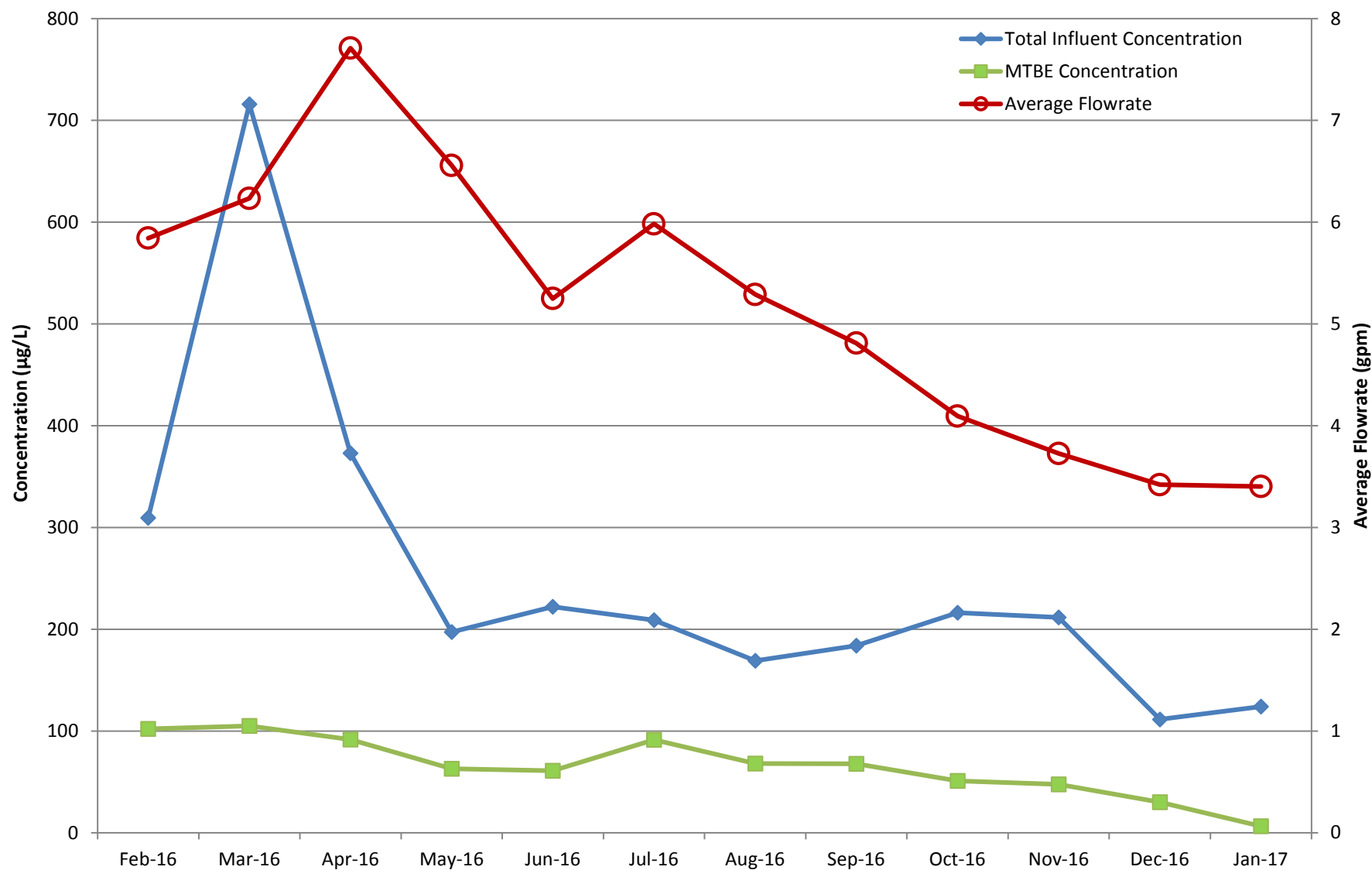
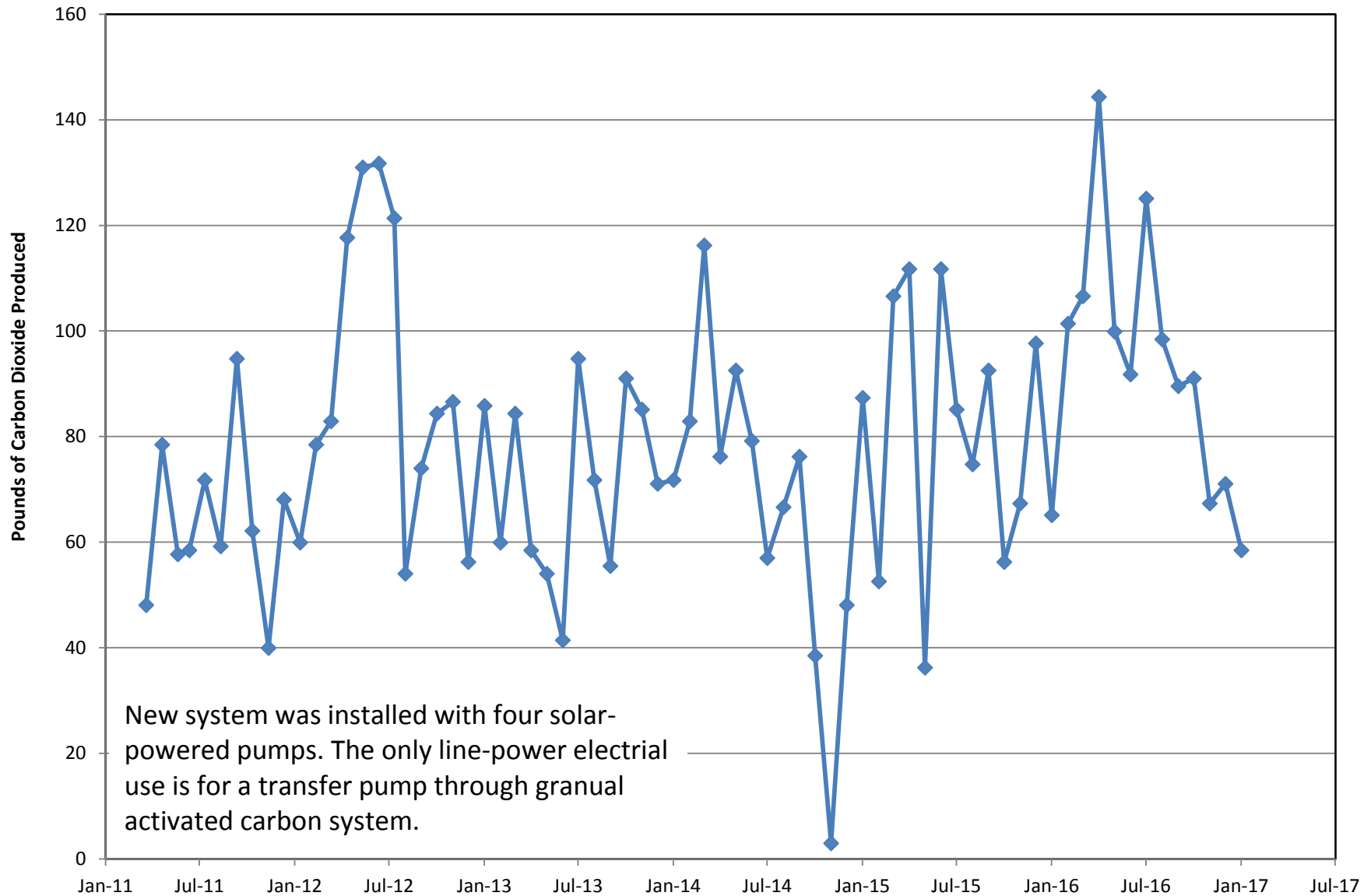


Figure 2

Equivalent Pounds of Carbon Dioxide Produced by the Site ST018 Groundwater Treatment Plant

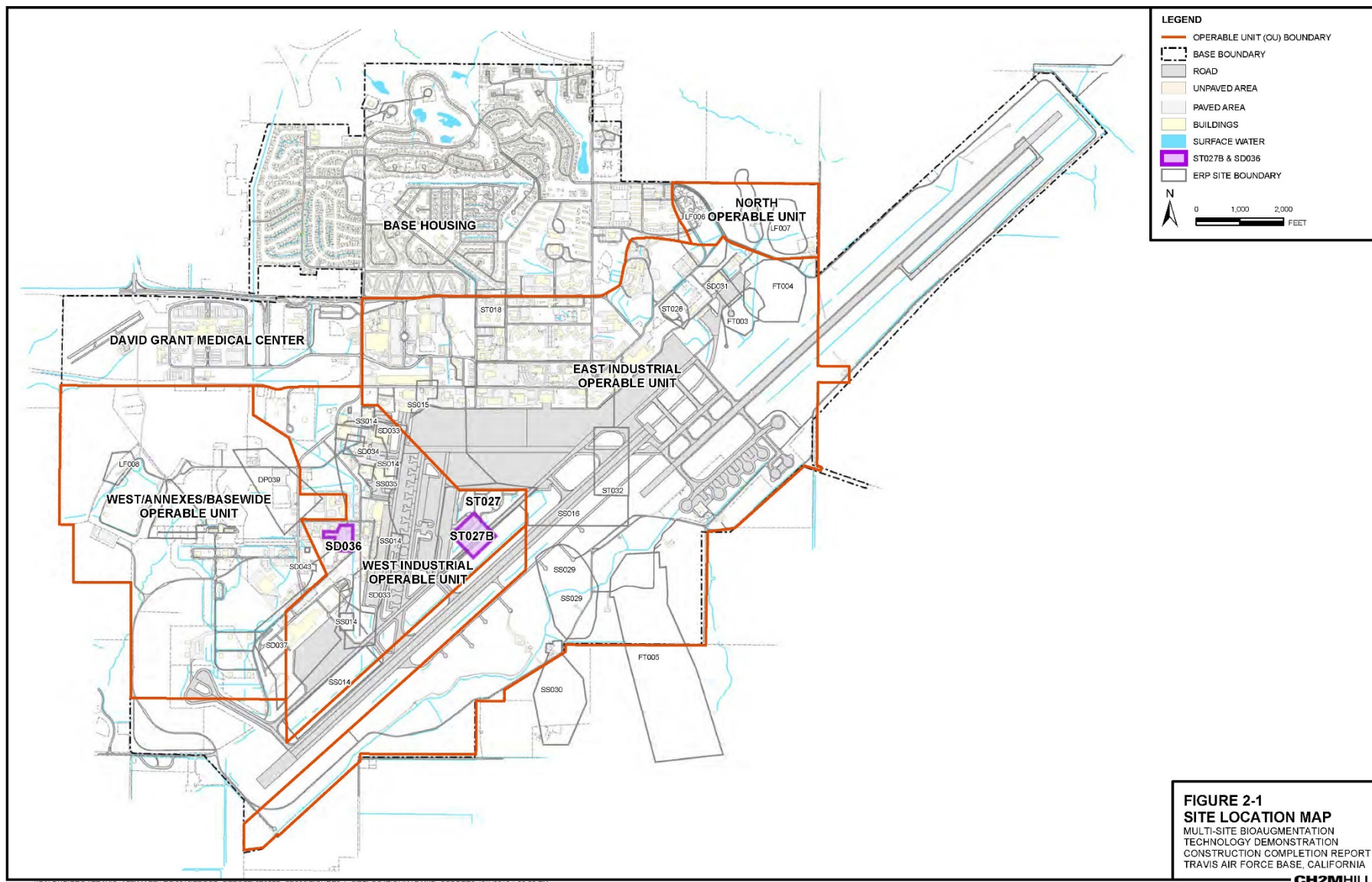


Multi-site Bioaugmentation Technology Demonstration Construction Completion Report

RPM Meeting
February 15, 2017

Purpose of Technology Demonstration (TD) Construction Completion Report (CCR)

- Purpose: to compare the first-order degradation rates of chlorinated VOCs.
- This report documents completion of construction activities for this TD at Sites SD036 and ST027B.



\\BALDUR\PROJ\TRAVIS_AF\BMAPFILES\2016\DOCCR_REPORT\ST027B_SD036\FIGURE2_1_SITELOCATIONMAP.MXD SSCOPE5 12/12/2016 1:22:28 PM

Site ST027B Background

- Site ST027B is a 35-acre area located in the middle of Travis AFB (TAFB) flightline, historically used for fuel storage and aircraft and jet engine testing.
- Site ST027 was historically a POCO site, however investigations in 2007 and 2008 discovered a small, previously unknown TCE plume in the southwest portion of Site ST027 (now called Site ST027B), which an ERP site.
- Monitored natural attenuation (MNA) was selected as the final remedy for Site ST027B in the Groundwater ROD.

Site SD036 Background

- Site SD036 covers 6 acres in the WIOU. The site consists of multiple-use shops, including a wash rack and oil/water separator.
- The groundwater contains CVOCs, SVOCs, and petroleum fuel hydrocarbons.
- Enhanced reductive dechlorination (ERD) and enhanced attenuation (EA) selected as the final remedy in the GW ROD.

TD Approach

- Evaluate the potential for future remedy optimizations at appropriate sites.
- TD is being performed in two (2) study areas at each site (Sites ST027B and SD036):
 1. An emulsified vegetable oil (EVO)-only study area
 2. An EVO amended with bioaugmentation study area

TD Approach

Site ST027B

- TD design included the installation of:
 - Two (2) new injection wells in each study area.
 - The installation of one (1) new performance monitoring well in the EVO-only study area.
 - The installation of a new performance monitoring well downgradient of the two (2) study areas to confirm the TD does not negatively affect the MNA remedy.

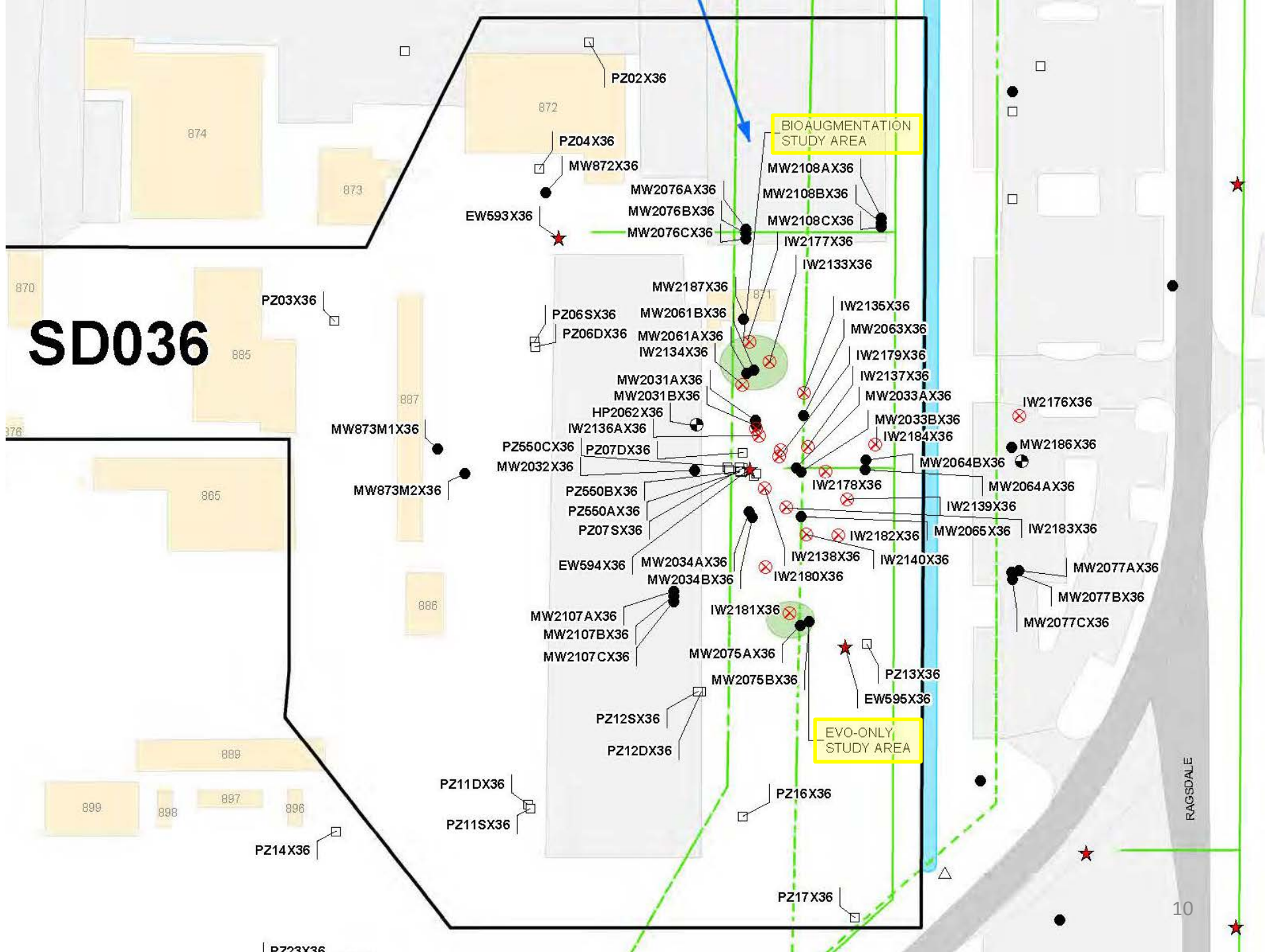


TD Approach

Site SD036

- TD design utilizes existing injection and performance monitoring wells:
 - The EVO-only study area is comprised of an existing injection well and an existing monitoring well.
 - The bioaugmentation study area is comprised of three (3) existing injection wells and one existing monitoring well.
 - Existing injection wells previously received EVO injections as part of the Site SD036 RA conducted in 2015.

SD036



TD Implementation

- Construction activities for the TD included well installation, development, and baseline sampling at Site ST027B, and EVO/bioaugmentation injection activities at Sites ST027B and SD036.
- All construction work at Site ST027B was completed while the runway was closed during a military construction project.

TD Construction Activities

ST027B

- Drilled, installed, and developed monitoring and injection wells.
- During drilling, bedrock was encountered between 10 and 18.5 ft bgs.
- Borings were initially dry when drilled, with the exception of one (1) boring MW2258x27, where GW was encountered at 13 ft bgs.
- Crystalline gypsum was encountered as disseminations or fracture filling in most of the borings starting from between 7 and 10 ft bgs.

TD Construction Activities

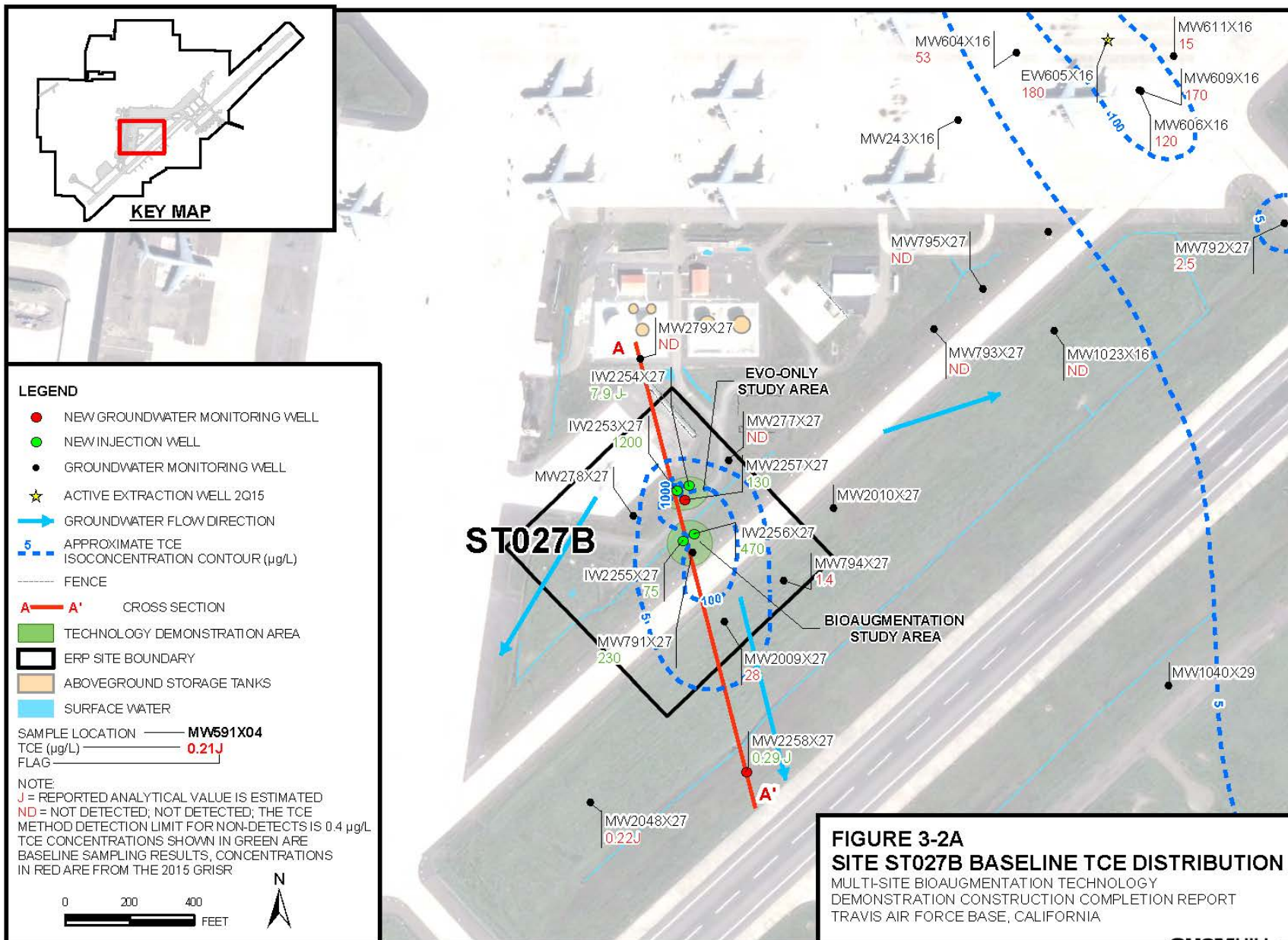
ST027B

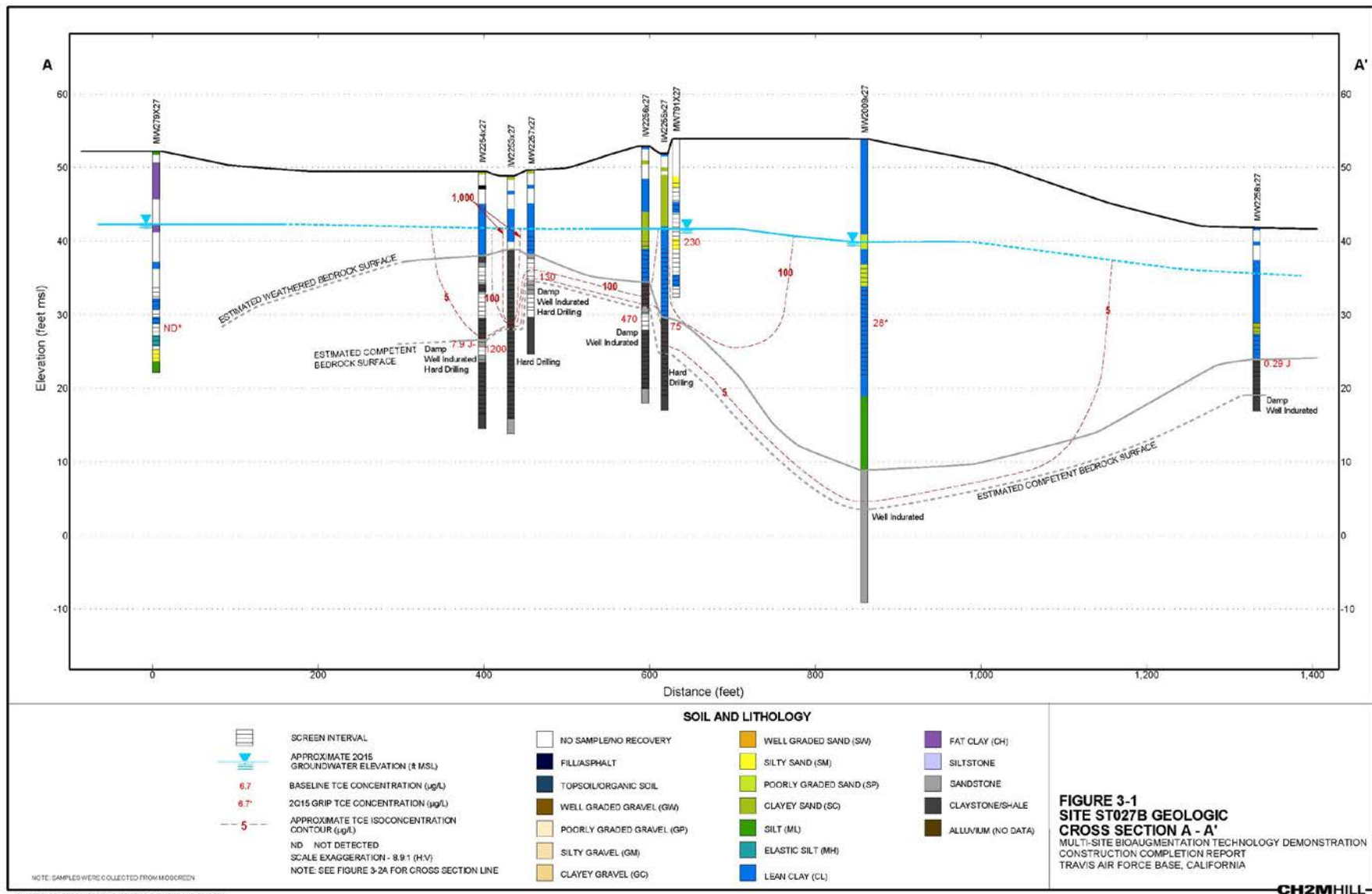
- Injection wells were all screened from 13 to 33 ft bgs.
- To ensure that potential areas for groundwater flow were covered, the filter pack for each injection well was extended to either 9 or 10 ft bgs.
- The EVO-only study area monitoring well was screened from 9 to 19 ft bgs.
- The downgradient monitoring well was screened 13 to 23 ft bgs.

Baseline Groundwater Sampling

Site ST027B

- Maximum TCE concentration was 1,200 µg/L.
- Total organic carbon (TOC) ranged from 2.1 mg/L to 5.4 mg/L.
- Baseline groundwater samples for *Dehalococcoides* and *Dehalobacter* bacterial cultures were collected at performance monitoring wells in each study area.
 - *Dehalococcoides* concentrations ranged from 2.6 to 8.8 cells per milliliter (cells/mL).
 - *Dehalobacter* concentrations ranged from 175 to 860 cells/mL.



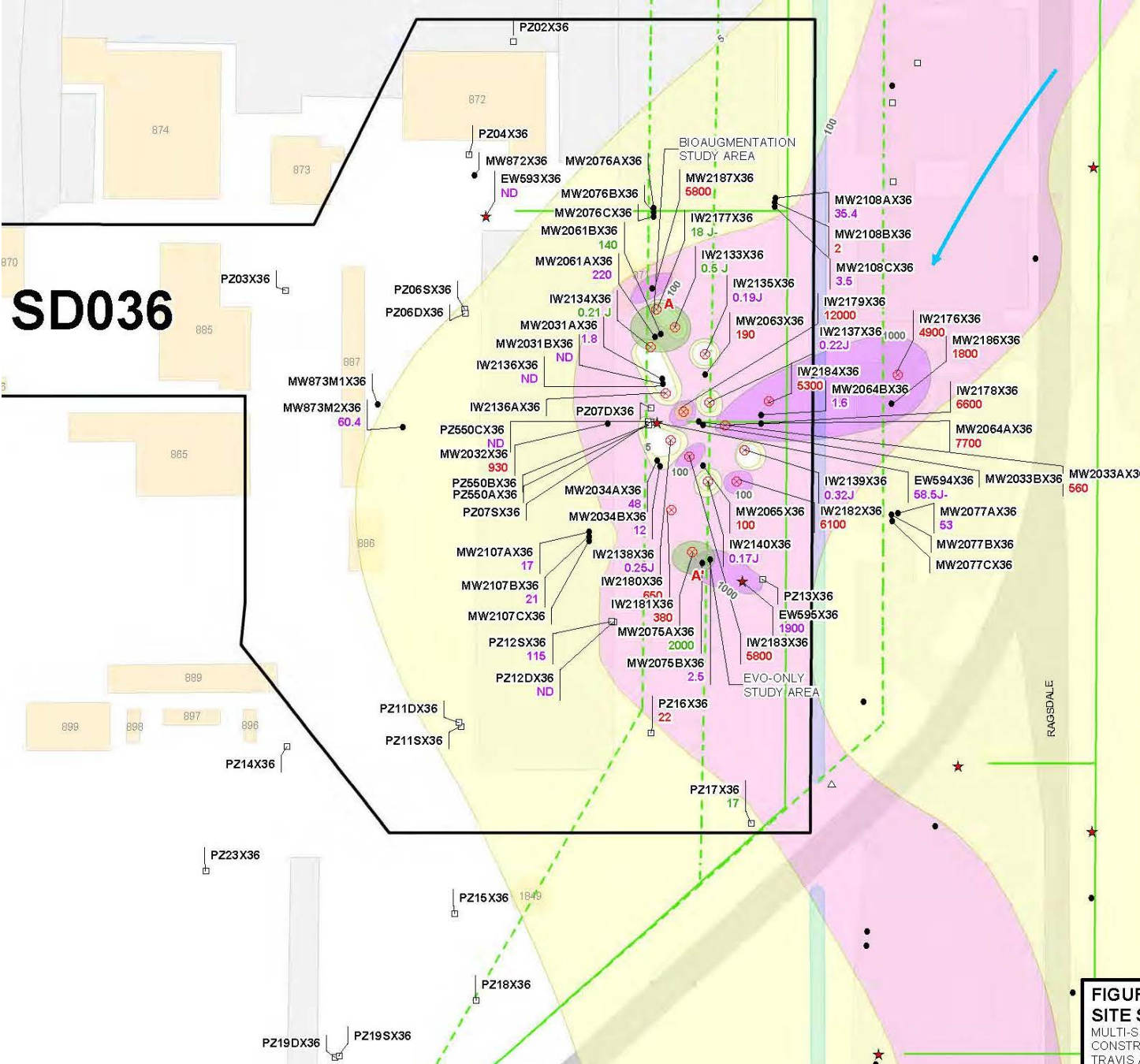


Baseline Groundwater Sampling

Site SD036

- Maximum TCE concentration was 2,000 µg/L.
- TOC ranged from 0.89 J mg/L to 700 mg/L.
- Baseline groundwater samples for *Dehalococcoides* and *Dehalobacter* bacterial cultures were collected at performance monitoring wells in each study area.
 - *Dehalococcoides* concentrations ranged from 77.7 to 22,600 cells/mL.
 - *Dehalobacter* concentrations ranged from 3,510 to 249,000 cells/mL.

SD036



Emulsified Vegetable Oil Injection

Site ST027B

- 15,408 gallons of EVO solution were injected into the four (4) newly installed injection wells.
- EVO injections were followed by 5,765 gallons of chase water.

Site SD036

- EVO injections were previously completed at Site SD036 during 2015 as part of the RA, therefore no additional EVO injection was required.

Bioaugmentation Injection

Site ST027B

- Bioaugmentation injections were completed after 20 percent of total EVO solution had been injected and anaerobic aquifer conditions were observed.
- Each injection well in the bioaugmentation study area received 3 liters of KB-1 Plus bioaugmentation culture followed by 125 gallons of deoxygenated chase water.
- EVO injections resumed on October 10, 2016

Bioaugmentation Injection

Site SD036

- Bioaugmentation injections were completed.
- EVO injections were previously completed in May 2015 and anaerobic conditions were observed, prior to bioaugmentation injections.
- Each injection well in the bioaugmentation study area received 3 liters of KB-1 Plus bioaugmentation culture followed by deoxygenated chase water.

Performance Monitoring

- Multi-site TD will be monitored for three (3) years.
- Performance monitoring will be conducted at Sites ST027B and SD036 to evaluate the first-order degradation rates of targeted CVOCs when treated with EVO alone versus EVO amended with bioaugmentation culture.
- Performance sampling will be performed semiannually for the first year and annually for two (2) years.
- The results of performance monitoring will be reported in the annual GRISRs.

Evaluation of Performance Monitoring Data

- **VOC** data will be used to support calculation of first-order degradation rates of CVOCs.
- **TOC** analysis will provide direct data on TOC concentrations within the two (2) study areas.
- **Dissolved gas data** particularly methane, propane, butane, and acetylene will provide further evidence of whether ERD has become established.
- **Geochemical parameters** will support evaluation of geochemical changes in the aquifer favorable to ERD.
- ***Dehalococcoides*** and ***Dehalobacter*** bacterial population densities will provide evaluation of potential biodegradation of CVOCs resulting from populations present.

Reporting

- Annual operations and performance monitoring results for Sites ST027B and SD036 of the Multi-site TD will be included in the annual GRISRs to document the impact of the TD.

Questions?

Existing Well Construction Details

Well Location	Screen Interval (feet bgs)	Filter Pack Interval (feet bgs)	Borehole Depth (feet bgs)	Well Casing Diameter (inches)	Top of Casing Elevation (feet amsl)
ST027B Existing Well					
MW791x27	6 to 21	5.5 to 21.5	21.5	2	53.77
SD036 Existing Wells					
IW2133x36	25.5 to 45.5	22.5 to 50	50	4	44.87
IW2134x36	25 to 45	22 to 46	50	4	45.81
IW2177x36	26.5 to 46.5	24.5 to 48	48	2	45.62
IW2181x36	14 to 44	12 to 45.5	50	2	45.11
MW2061Bx36	37 to 47	34 to 47.5	60	2	45.32
MW2075Ax36	13 to 23	11 to 23.5	23.5	2	44.83

Newly Installed Wells Construction Details

Well Location	Screen Interval (feet bgs)	Filter Pack Interval (feet bgs)	Borehole Depth (feet bgs)	Well Casing Diameter (inches)	Top of Casing Elevation (feet amsl)
Injection Wells					
IW2253x27	13 to 33	10 to 35	35	2	49.08
IW2254x27	13 to 33	10 to 35	35	2	49.70
IW2255x27	13 to 33	9 to 35	35	2	52.28
IW2256x27	13 to 33	9 to 35	35	2	52.95
Monitoring Wells					
MW2257x27	9 to 19	7 to 21	25	2	49.80
MW2258x27	13 to 23	11 to 25	25	2	42.05

Travis AFB Restoration Program

Program Update

RPM Meeting
February 15, 2017

Completed Documents (1)

- 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
- SD037 GW RD/RA Work Plan
- Travis AFB UFP-QAPP
- DP039 Lead Excavation Technical Memo

Completed Documents (2)

- Proposed Plan for ROD Amendment to WABOU Soil ROD
- Proposed Plan for ROD Amendment to NEWIOU Soil, Sediment, & Surface Water ROD
- SD034 Data Gap Investigation Work Plan
- POCO Investigation Work Plan for Oil-Water Separators
- ST032 POCO Soil Excavation Work Plan
- SD036 GW RD/RA Work Plan
- SS016 GW RD/RA Work Plan
- SS015 GW RD/RA Work Plan
- FT005 Technology Demonstration Work Plan
- 2014 Annual CAMU Monitoring Report
- Old Skeet Range PAH Delineation Report
- ST028 POCO Work Plan
- SS014 POCO TD Work Plan
- CG508 Site Investigation/Site Closure Request Report
- 2014 Annual CAMU Monitoring Report
- DP039 GW RD/RA Work Plan
- SD031 TDCCR
- ST018 POCO CCR
- Site SS030 Groundwater RA CCR
- Sites SD036 and SD037 Groundwater RACCR
- Site SS016 Groundwater RACCR
- Site SS015 Groundwater RACCR
- 2014 Annual GRISR
- Site CG508 Well Decommissioning Work Plan

Completed Documents (3)

- Data Gap Investigation TM for Soil Sites SD033, SD043, & SS046
- Site FT004 Technology Demonstration Construction Completion Report
- Site SD031 Soil Remedial Investigation Work Plan
- Corrective Action Plan for DERA-Funded Oil Water Separators
- Site ST032 POCO Completion Report
- Site ST028 POCO Completion Report
- 2015 Annual CAMU Monitoring Report
- Site SD031 Remedial Investigation Work Plan
- Site SD034 Technology Demonstration Work Plan
- Site SS016 Soil Data Gaps Investigation Work Plan
- Multi-Site Bioaugmentation Technology Demonstration Work Plan
- Sites ST028 and ST032 POCO Well Decommissioning Work Plan
- Site TS060 Action Memorandum
- 2015 Annual GRISR
- FT005 Technology Demonstration Construction Completion Report
- Site CG508 POCO Well Decommissioning and Site Closeout Technical Memorandum
- ***Site DP039 Remedial Action Construction Completion Report***

Completed Field Work (1)

- 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
- SD031 Technology Demonstration Well Installation
- SD037 Well Installation
- SD031 Trench/Conveyance/Power Installation
- SD031 EVO Injection
- ST018 Well Installation
- SS015 Well Installation
- SS016 Well Installation
- Well Development (SD036, SD037)
- ST018 Trench/Conveyance/Power Installation
- SD036 EVO Injection
- Well Development (SS015, SS016)
- Baseline Sampling (SS015, SS016)
- SS014 Data Gap Investigation
- SS016 EVO Injection
- TA500 Data Gaps Investigation

Completed Field Work (2)

- 2015 Annual GRIP Sampling
- SD037 EVO Injection
- SD034 Data Gaps Investigation
- SS015 EVO Injection
- FT005 Injection Well Installation
- OWS 47, 48, 49 Site Investigations
- SS030 Trench/Conveyance/Power Installation
- FT005 Trench Installation
- FT005 Well Development
- FT004 Well Installation, Well Development, Baseline Sampling
- FT005 Baseline Sampling
- DP039 Well Installation, Well Development, Baseline Sampling
- FT004 EVO Injection
- FT004 Trench/Conveyance/Power Installation
- DP039 Infiltration Trench Installation
- TA500 Groundwater Sampling
- FT005 EVO Injection
- 2016 Q2 GRIP Sampling
- Data Gap Inv. for Soil Sites (SD043, SS046)
- SD031 Remedial Investigation Step-out Sampling (2nd round)
- DP039 EVO Injection
- CG508 Well Decommissioning
- SD033 Soil Sampling
- Multi-site Bioaugmentation Well Installation
- SD034 Technology Demonstration Well Installation
- SS014 Bioreactor Installation
- ST028 & ST032 Well Decommissioning

Completed Field Work (3)

- SS016 Soil Data Gaps Investigation
- SD031 Remedial Investigation Soil Sampling (3rd round)
- Oil Water Separators Step-out Drilling
- OW055 Close-in-place
- Q4 2016 GRIP Sampling
- OW040 Soil Excavation/Surface Restoration
- OW057 Soil Excavation/Surface Restoration
- Multi-site Bioaugmentation & EVO Injection
- SD034 Technology Demonstration Bioreactor Installation

Documents In-Progress

CERCLA

- Community Involvement Plan
- Site TS060 Removal Action Work Plan
- Site LF044 Investigation Work Plan
- ***Multisite Technology Demonstration Construction Completion Report***

Documents In-Progress

POCO

- Site FT004 POCO Soil Data Gap Investigation Work Plan
- ST028 POCO Well Decommissioning/Site Closeout
Technical Memorandum
- ***POCO Evaluation/Closeout Report for DERA-funded oil/water
separators OW051, OW053, and OW054***

Field Work In-Progress

CERCLA

- None

POCO

- None

Documents Planned

CERCLA

- 2016 Annual CAMU Monitoring Report Mar
- SD034 Technology Demonstration Construction Completion Report Apr
- SS016, SD033, SD043, SS046 Risk Assessment Tech Memo Apr
- 2016 Annual GRISR Jun
- SD031 Background Soil Study Work Plan TBD

Documents Planned

POCO

- SS014 POCO Technology Demonstration Construction Completion Report Mar
- POCO Evaluation/Closure Report for DERA-funded Oil/Water Separators OW040, OW047, OW048, OW049, OW052, OW055, and OW057 Mar

Field Work Planned

CERCLA

- Q2 2017 GRIP Sampling Event Apr
- LF044 Sediment Sampling 2017
- TS060 Removal Action 2017
- DP039 Installation of Down-gradient Monitoring Wells 2017
- SD031 Background Soil Sampling 2017

Note: Contact Lonnie Duke if you
would like to observe planned field
work events

Field Work Planned

POCO

- FT004 POCO Soil Data Gaps Investigation 2017
- OW055 Sidewalk Repairs 2017
- OW056 Site Excavation/Closure 2017

Note: Contact Lonnie Duke if you
would like to observe planned field
work events

Technology Demonstration Projects (1)

- SS014: Recycled Drywall SBGR
 - Evaluate the effectiveness of sulfate (gypsum from crushed drywall) to enhance anaerobic biodegradation of petroleum in groundwater
 - Installation was completed November 2016
 - Too early to evaluate performance data
- Multisite Bioaugmentation: EVO and KB-1 Plus
 - Evaluate if addition of bioaugmentation substrate to an EVO injection will increase the rate of CVOC degradation
 - Injections were completed (Nov 2016)
 - Too early to evaluate performance data
- SD034: Washboard SBGR
 - Evaluate the effectiveness of an oxygen-enhanced aerobic SBGR on reducing TPH as diesel (TPH-D) in groundwater
 - Installation was completed November 2016
 - Installed six (6) SBGR trenches. In process of evaluating need/constructability of installing the 7th trench
 - Too early to evaluate performance data

Technology Demonstration Projects (2)

- FT005: Distribution of EVO and KB-1 Plus
 - Evaluate total organic carbon (TOC) dispersion distances and rates for optimizing the remediation of 1,2-dichloroethane (DCA) in groundwater
 - Installation completed May 2016
 - Too early to evaluate performance data
- FT004: Distribution of EVO via SBGR and/or Groundwater Extraction
 - Determine effectiveness of TOC distribution through two different enhanced reductive dechlorination (ERD) approaches: (1) groundwater TOC recirculation using a combination EVO injection, infiltration SBGR trenches, and groundwater extraction; and (2) EVO injection with groundwater extraction
 - Installation completed April 2016
 - Too early to evaluate performance data

Technology Demonstration Projects (3)

- SD031: EVO distribution via Gravel Chimneys
 - Determine if EVO injection and recirculation of groundwater through gravel chimneys can effectively distribute TOC horizontally in the subsurface to support ERD of 1,1-dichloroethene (DCE)
 - Installation completed in April 2015
 - Early indications:
 - Reducing conditions have initiated as expected throughout the TD area and are supporting anaerobic degradation
 - TOC concentrations are increasing at several wells
 - 1,1-DCE (primary COC) concentrations have reduced by 57% (sum of key wells within TD area)
 - Total Molar concentration (sum of CVOCs) has reduced by 49% (sum of key wells within TD area)
 - Recirculation through chimneys has been successful relative to our design assumptions

Completed Documents (Historical1)

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

Completed Documents (Historical 2)

- Phytostabilization Study Report
- 2009/2010 Annual GSAP Report
- SS015 Remedy Optimization Field Implementation Plan
- Sites SS014 and ST032 Tier 1 POCO Evaluation Report
- SD036 Remedy Optimization Field Implementation Plan
- 2010 Annual CAMU Inspection Report
- Site ST018 POCO Baseline Implementation Report
- FT005 Data Gaps Investigation Report
- Comprehensive Site Evaluation Phase II Report
- 2010 Groundwater RPO Annual Report
- Focused Feasibility Study (FFS)
- Site ST027-Area B Human Health Risk Assessment
- Site ST027-Area B Ecological Risk Assessment
- Work Plan for Assessment of Aerobic Chlorinated Cometabolism Enzymes
- 2010/2011 Annual GSAP Report
- Baseline Implementation Report (Sites SS015, SS016, SD036, SD037, and DP039)
- 2011 CAMU Annual Report
- Technical and Economic Feasibility Analysis (TEFA)
- Work Plan for RPO of Sites SS016 and SS029
- Site LF007C Data Gaps Investigation Technical Memorandum
- Technical Memorandum for Assessment of Aerobic Chlorinated Cometabolism Enzymes
- Old Skeet Range Engineering Evaluation/Cost Analysis
- 2011 Groundwater Treatment RPO Annual Report
- Groundwater Proposed Plan (PP)
- FT005 Remedial Action Completion Report
- 2012 GSAP Technical Memorandum¹⁹

Completed Field Work (Historical1)

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

Completed Field Work (Historical 2)

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