

**Travis Air Force Base  
Environmental Restoration Program  
Restoration Program Manager's  
Meeting Minutes  
21 March 2018, 0930 Hours**

Mr. Lonnie Duke of the Air Force Civil Engineer Center (AFCEC) Restoration Installation Support Section (ISS) conducted the Restoration Program Manager's (RPM) meeting on 21 March at 0930 hours in Building 248 at Travis AFB, California. Attendees included:

Lonnie Duke	AFCEC/CZOW
Glenn Anderson	AFCEC/CZOW
Milton 'Gene' Clare	AFCEC/CZOW
Angel Santiago Jr.	AFCEC/CZOW
Monika O'Sullivan	AFCEC/CZOW
Greg Capra	AFCEC/CZOW
Haekyung Kim (via telephone)	AFCEC/CZRW
Dezso Linbrunner	USACE-Omaha
Merrie Schilter-Lowe	Travis AFB/PAO
Sarah Miller	USACE-Omaha
Mike Riggle	USACE-Omaha
Paul Gedbaw	USACE-Omaha
Adriana Constantinescu (via telephone)	RWQCB
Ben Fries (via telephone)	DTSC
Nadia Hollan Burke (via telephone)	USEPA
Tony Chakurian	CH2M JACOBS
Mike Wray	CH2M JACOBS

Handouts distributed prior to or at the meeting, discussions, and presentations included:

Attachment 1	Meeting Agenda
Attachment 2	Master Meeting and Document Schedule
Attachment 3	SBBGWTP Monthly Data Sheet (February 2018)
Attachment 4	CGWTP Monthly Data Sheet (February 2018)
Attachment 5	LF007C GWTP Monthly Data Sheet (February 2018)
Attachment 6	ST018 Monthly Data Sheet (February 2018)
Attachment 7	Presentation: Aquifer Testing Tech Memo

Attachment 8	Triad Discussion: KC-46 Hangar Update
Attachment 9	Presentation: Program Update (March 2018)

## 1. **ADMINISTRATIVE**

### **A. Previous Meeting Minutes**

Ms. Burke provided the following comments on the 21 February 2018 RPM Teleconference minutes:

Action Item Review; specify that the Draft PFOS/PFOA SI will be available for internal Air Force review in late February.

Travis AFB Master Document Schedule – Community Relations Plan Update: Specify that the EPA requested Responses to Comments for the CRP, which the Air Force agreed to provide while the website and CRP are being updated.

Travis AFB Master Document Schedule – Quarterly Newsletter (April 2018): add that the EPA may have to track the TS060 Proposed Plan as a different type of document, “such as a no further action “Action Memorandum.”

Program Issues/Update: specify that CH2M staff could record and prepare the TS060 Public Meeting summary transcript rather than the use of a “court reporter.”

### **B. Action Item Review**

Action items from February 2018 were reviewed.

Action item 1 is ongoing: Ms. O’Sullivan to provide updates on perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA). 21 February 2018 update: The Draft SI Report was received late, which will delay the internal Air Force review due date. Findings will still be ready by, and presented at, the April 2018 RAB meeting.

Action Item 2: Ms. Constantinescu to obtain the citation for the Water Board health and safety code, to ensure that the language regarding health and safety requirements in the oil/water separator site management plans is consistent with the language in the LUCIP. 21 March Update: Ms. Constantinescu emailed the safety code reference on 19 March 2018; this action item is closed.

**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 held on Thursday 19 April 2018, at 1400 hours. The Annual RAB Meeting will be held that evening.

Reminder: The annual RAB tour (which historically has been held in October) will not be formally scheduled and will instead be individual tours given when an interested party would like to see field work. As a result, all agencies agreed to move the October RPM meeting from Thursday, October 18, to Wednesday, October 17, at 0930.

**Travis AFB Master Document Schedule**

- Community Relations Plan Update (CRP): The Draft to Agencies date was changed to 22 March 2018 to reflect actual submittal date. The rest of the schedule was changed accordingly.
- Amendment to the WABOU Soil ROD for Travis AFB ERP Sites DP039, SD043, and SS046: The RTC due date was changed to 27 April 2018 to allow time to prepare RTCs to additional comments from EPA Headquarters; the remainder of the schedule was changed accordingly.
- Amendment to the NEWIOU Soil ROD for the Travis AFB ERP Sites SS016 and SD033: No changes were made to the schedule.
- Site SD031 Soil Remedial Investigation/Feasibility Study: The submittal date of the pre-draft version was changed to 9 April 2018; the rest of the schedule was changed accordingly.
- Site SD043 Remedial Design/Remedial Action Work Plan: No changes were made to the schedule.
- Site SS046 Remedial Design/Remedial Action Work Plan: No changes were made to the schedule.
- Site SS016 Remedial Design/Remedial Action Work Plan: This is a new document; the intent is to expedite the field work upon finalization of the NEWIOU ROD-amendment. The schedule should be in place by the 19 April 2018 RPM meeting.
- Potrero Hills Annex (FS, PP, and ROD): No change was made to the schedule. The Water Board indicated that Mr. Anderson would be copied on Water Board comments to the Report of Findings.

- Data Gap Investigation Results Technical Memorandum for Soil Site SS016: Response to comments due date changed to 4 April 2018. The EPA and Water Board are still reviewing responses to comments.
- Site SS015 Soil Sampling Plan: This is a new document.
- Quarterly Newsletters (April 2018): The Agency Comments Due date was changed to 7 March 2018 to reflect the date comments were received. Mr. Anderson noted his appreciation for the expedited regulatory review.
- 2017 Annual GRISR: No change was made to the schedule.
- Site TS060 Removal Action Completion Report: No change was made to the schedule. This document is complete and will be moved to the History page for the April RPM meeting.
- Site SS035 Site Closure Report: No change was made to the schedule. This document is complete and will be moved to the History page for the April RPM meeting.
- Monitoring Well Installation Technical Memorandum for Site DP039, Addendum to the Site DP039 Remedial Action Construction Completion Report: No changes were made to the schedule.
- Sites LF006, SS030, and SD031 Aquifer Test Activities Technical Memorandum: Agency Comments Due date was changed to 23 April 2018 due to concurrent timing with the RAB and public meetings; the rest of the schedule was changed accordingly.
- Site FT005 Extraction System Optimization Report: No changes were made to the schedule.
- 2017 Annual CAMU Monitoring Report: No changes were made to the schedule. The Air Force responsible party was changed to Gene Clare.
- Emulsified Vegetable Oil Sites FT004, SS015, SD031, and SD036 Optimization Injections Report: No changes were made to the schedule.
- Site LF044 Sediment Sampling Report. The Predraft to the Air Force/Service Center date was changed to 3 April due to other documents having higher priority. The rest of the schedule was changed accordingly.
- POCO Evaluation/Closure Report for DERA-funded Oil/Water Separators OW040, OW047, OW048, OW049, OW052, OW050, OW052, OW055, OW056, and OW057: The Response to Comment due date was changed to 17 April 2018; the rest of the schedule was changed accordingly.
- Area of Concern TA500 Data Gap Investigation and Closure Report: The Agency Comments Due date was changed to 16 March 2018 by request; the rest of the schedule was changed accordingly.
- The following document was moved to History:

## **2. CURRENT PROJECTS**

### **Treatment Plant Operation and Maintenance Update**

#### **South Base Boundary Groundwater Treatment Plant, February 2018 (see Attachment 3)**

The South Base Boundary Groundwater Treatment Plant (SBBGWTP) performed at 100% uptime, and 6.4 million gallons of groundwater were extracted and treated in February 2018. All treated water was discharged to Union Creek. The average flow rate for the SBBGWTP was 159.8 gallons per minute (gpm). Electrical power usage was 18,576 kWh, and approximately 14,546 pounds of CO<sub>2</sub> were created (based on DOE calculation). Approximately 0.81 pound of volatile organic compounds (VOCs) was removed in February. The total mass of VOCs removed since startup of the system is 498.2 pounds.

No optimization activities are reported for the month of February 2018.

#### **Central Groundwater Treatment Plant, February 2018 (see Attachment 4)**

The Central Groundwater Treatment Plant (CGWTP) performed at 100% uptime with approximately 1,174,787 gallons of groundwater extracted and treated in February 2018. All treated water was discharged to the storm sewer system which discharges to Union Creek. The average flow rate for the CGWTP was 29.3 gpm. Electrical power usage was 1,919 kWh for all equipment connected to the Central Plant, and approximately 2,308 pounds of CO<sub>2</sub> were generated. Approximately 2.02 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 11,484 pounds.

Optimization Activities for CGWTP: The DP039 bioreactor continues to operate in a four-week “pulsed mode.” No other optimization activities are reported for the month of February 2018. A carbon change on the lead GAC is being coordinated.

Ms. Burke commented on the TPH-G detected in the influent. Mr. Duke responded that these detections are observed sporadically, but will follow up on historical TPH-G data for this GWTP.

### **LF007C Groundwater Treatment Plant, February 2018 (see Attachment 5)**

The Subarea LF007C Groundwater Treatment Plant (LF007C GWTP) performed at 100% uptime with approximately 182,500 gallons of groundwater extracted and treated in February 2018. All treated water was discharged to the Duck Pond for beneficial reuse. The average flow rate was 4.5 gpm. Approximately  $1.54 \times 10^{-3}$  pound of VOCs was removed from groundwater by the treatment plant in February. The total mass of VOCs removed since the startup of the system is 174.38 pounds. There was no electrical power usage statistics as this plant operates on solar power only.

Per agreement between the Air Force and agencies during the February RPM meeting, due to ongoing issues related to the recent TPH results for this treatment plant, the March 2018 sampling event for this treatment plant has been modified as follows:

- SVOCs will be analyzed for influent and effluent samples
- Samples taken from extraction wells 614, 615, and monitoring well 210, and will be analyzed for TPH-D, TPH-G, TPH-MO, VOCs and SVOCs
- All TPH-D and TPH-MO samples are being split between two laboratories for analysis for comparison purposes, to assist with determination of the source of the TPH recently noted in the effluent.

These results will help determine an appropriate sampling plan for this site going forward.

No optimization activities are reported for the month of February 2018.

Note: The sump in the LF007C treatment compound is open to the atmosphere. Accumulated rain water must be pumped out by hand. This is done as part of the post-rain event inspections. An automatic pump has been installed to minimize down-time in the future.

### **ST018 Groundwater (MTBE) Treatment Plant, February 2018 (see Attachment 6)**

Site ST018 (MTBE) Treatment Plant (ST018 GWTP) performed at 100% uptime with approximately 223,590 gallons of groundwater extracted and treated in February 2018. All treated water was discharged to the Fairfield – Suisun Sewer District. The average flow rate for the ST018 GWTP was 6.0 gpm. Electrical power usage for the month was 125 kWh for all equipment connected to the ST018 GWTP. The total CO<sub>2</sub> equivalent, including an estimate for the carbon change-out, equates to approximately 93 pounds. Approximately 0.49 pound of BTEX, VOCs, and TPH was removed in January by the treatment plant, and approximately 0.02 pound of MTBE was removed from groundwater. The total BTEX, MTBE and TPH mass removed since the startup of the system is 43.4 pounds, and the total MTBE mass removed since startup of the system is 10.6 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 four groundwater extraction pumps in the system are all solar powered.

No optimization activities are reported for the month of February 2018.

Mr. Linbrunner, Mr. Duke, and Mr. Anderson noted that all plants operated at 100% uptime in February 2018, and acknowledged the efforts of Doug Berwick and Lorenzo Lujan. This puts the total amount of water treated at the South Base Boundary GWTS at over 1 billion gallons, and likely puts the total amount of water treated overall at over 2 billion gallons.

### **3. Presentations:**

#### **A) Aquifer Testing Tech Memo (Attachment 7)**

Mr. Tony Chakurian provided an update on the technical memorandum for Sites LF006, SS030, and SD031 aquifer test activities. Please refer to Attachment 7 for details. Highlights of the presentation include:

- Aquifer tests were conducted at AOC TA500 and Sites FT005, LF006, SS030, and SD031.
- The tests occurred during the summer of 2017.
- The activities for Site FT005 will be documented in the upcoming Site FT005 Extraction System Optimization Technical Memorandum.
- The activities for AOC TA500 have been documented in the Draft Area of Concern TA500 Data Gap Investigation and Closure Report.
- Each test consisted of pumping groundwater for 3 days at a nearly constant rate. The only time the pumping rate changed was during the refueling of the generator.
- A groundwater elevation survey was conducted prior to the aquifer testing, and water levels in select observation wells were monitored during pumping.
- Data were evaluated using the software package AQTESOLV Version 4.5 Professional. This groundwater modeling software is used within CH2M for almost all groundwater modeling efforts. Ms. Constantinescu commented that the equations used by the software must be included in the tech memo.
- At site LF006, a splay of the Vaca Fault represents a no-flow boundary. Ms. Burke noted that the figure does not show this fault and added that the figure should be updated to include this in the final tech memo.
- Ms. Burke also noted that the red box and pink circles on the SD031 figure should be labeled in the legend in the final tech memo.
- Ms. Burke asked what information and recommendations will come out of this effort, and where will they be documented. Mr. Wray replied that the Air Force will use information

about contaminant behavior and aquifer properties to plan the path forward at the various sites with the hope of closing them, to assess if anything additional must be done at these sites, and to see if a ROD amendment is necessary.

## **B) KC-46 Hangar Update (Attachment 8)**

Mr. Duke provided an update on the plans for the KC-46 hangar construction. Site plans are provided in Attachment 8. Highlights of the presentation include:

- Five buildings are being demolished to accommodate the new 3-bay hangar. The outline of the proposed hangar is shown in Attachment 8.
- This will be a high-profile project with congressional interest.
- The bioreactor will be left in place, but other infrastructure will need to be moved, including monitoring wells and the horizontal well that is beneath the proposed footprint.
- Representatives from the Navy and Air Force, as well as the design engineers and consultants from CH2M recently attended a call to discuss the construction plans, logistics of infrastructure relocation and abandonment, and issues they might discover during construction
- A passive venting system will be included in the office buildings, but is not needed under the hangar bays since they are open to the atmosphere when occupied.
- The 65% design is anticipated this week.
- The construction contract should be awarded in 2018.
- Mr. Duke will continue to keep RPM stakeholders updated throughout the process and can also relay any concerns or questions to the team coordinating the construction.
- Ms. Burke inquired about the decommissioning schedule. Mr. Duke responded that it will be included as part of the design, so should be expected in early 2019. He added that this decommissioning work is not part of the PBR contract for environmental work; it will be part of the hangar construction contract. Mr. Wray added that CH2M will not be performing the decommissioning tasks or providing a decommissioning work plan. Ms. Burke noted that the RPM stakeholders need to be included in the decommissioning discussions, since that represents a significant change in the operation and maintenance.
- Ms. Constantinescu added that the RPM stakeholders may need to see the design for the passive venting system, since it involves the protection of human health.
- Mr. Fries inquired if asbestos is expected and what kind of measures will be put into place to ensure protection of the workers. Mr. Duke and Mr. Linbrunner responded that there are specific requirements for the various phases of design and construction, including abatement of lead and asbestos if encountered. Asbestos and lead abatement, if encountered, will be done as part of the demolition. The contractor specifications will be written concisely to include lead and asbestos abatement and worker protection measures, including atmospheric monitoring.
- Mr. Duke stressed that all of the team's collective input to all phases of construction, beginning with design, must be gathered and provided before the construction contract is



awarded, noting that it will be very difficult to make changes after the contract is awarded.

- Mr. Duke will continue to send additional information and provide updates regarding the design to facilitate collection of concerns and input from the RPM team.

### **C) Program Update: Activities Completed, In Progress, and Upcoming (see Attachment 9)**

Mr. Wray reported on the status of fieldwork and documents which are completed, in progress, and upcoming. Please refer to Attachment 9 for the full briefing.

#### **4. New Action Item Review**

Mr. Santiago and Mr. Duke will check past TPH-G data for the CGWTP influent samples.

Mr. Duke will follow up on 1,4-dioxane detections in the Subarea LF007C GWTP effluent.

Ongoing: Mr. Duke will continue to provide design and construction information for the KC-46 Hangar for agency input ahead of the Air Force/Civil Engineering awarding the construction contract.

#### **5. PROGRAM/ISSUES/UPDATE**

Ms. Burke informed the team that, according to the 2016 EPA Community Involvement Handbook, a transcript of the TS060 Public Meeting will be required. Use of a court reporter/stenographer is suggested, but not required. She noted the high quality of CH2M RPM meeting summaries, and is comfortable with CH2M staff following the same process (recording the audio and using that to provide a meeting summary) rather than a court reporter, for the TS060 public meeting summary.

#### **6. Action Items**

Item #	Responsible	Action Item Description	Due Date	Status
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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	Mr. Duke will continue to provide design and construction information for the KC-46 Hangar for agency input ahead of the Air Force/Civil Engineering awarding the construction contract.	Ongoing	Open
3.	Angel Santiago and Lonnie Duke	Mr. Santiago and Mr. Duke will check past TPH-G data for the CGWTP influent samples	April 19, 2018	Open
4.	Lonnie Duke	Mr. Duke will follow up on 1,4-dioxane detections in the Subarea LF007C GWTP effluent, noted during February 2018 routine sampling.	April 19, 2018	Open

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

The RPM Teleconference is scheduled for 9:30 AM PST on 21 March 2018. **The call-in number is 1-866-203-7023. Enter the Participation code 5978-75-9736 then enter #.**

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. AQUIFER TESTING TECH MEMO
- B. TRIAD DISCUSSION:
  - KC-46 HANGAR UPDATE
- C. 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 TELECONFERENCE, 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.

**(2018)**  
**Annual Meeting and Teleconference Schedule**

Monthly RPM Meeting <sup>1</sup> (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.)
—	01-17-18	—
02-21-18	—	—
—	03-21-18	—
04-19-18 (Thursday 2:00 PM)	—	04-19-18
—	05-16-18	—
06-20-18	—	—
—	07-18-18	—
08-15-18	—	—
—	09-19-18	—
10-17-18	—	May through October <sup>2</sup>
—	11-21-18	—
—	—	—

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

<sup>2</sup> Note: Tentative RAB tour(s) during construction season.

## Travis AFB Master Meeting and Document Schedule

PRIMARY DOCUMENTS				
Life Cycle	Community Relations Plan Update Travis AFB, Glenn Anderson CH2M, Jill Dunphy	Amendment to the WABOU Soil ROD for the Travis AFB ERP Sites DP039, SD043, and SS046 Travis AFB, Glenn Anderson CH2M, Latonya Coleman	Amendment to the NEWIOU Soil ROD for the Travis AFB ERP Sites SS016 and SD033 Travis AFB, Glenn Anderson CH2M, Latonya Coleman	Site SD031 Soil Remedial Investigation/Feasibility Study Travis AFB, Glenn Anderson CH2M, Nikki Carlton
<b>Scoping Meeting</b>	NA	NA	NA	NA
Predraft to AF/Service Center	08-23-16	10-09-17	02-28-18	04-09-18
AF/Service Center Comments Due	09-07-16	11-08-17	03-30-18	05-09-18
Draft to Agencies	09-28-16 (03-22-18)	11-30-17	04-16-18	05-24-18
Draft to RAB	09-28-16 (03-22-18)	11-30-17	04-16-18	05-24-18
Agency Comments Due	10-28-16 (04-27-18)	01-31-18	06-15-18	07-24-18
<b>Response to Comments Meeting</b>	05-16-18	02-21-18	06-20-18	08-15-18
Agency Concurrence with Remedy	NA	NA	NA	NA
Public Comment Period	NA	NA	NA	NA
<b>Public Meeting</b>	NA	NA	NA	NA
Response to Comments Due	06-07-18	04-27-18	07-12-18	08-31-18
Draft Final Due	06-07-18	04-27-18	07-12-18	08-31-18
Final Due	07-10-18	06-01-18	08-13-18	10-01-18

## Travis AFB Master Meeting and Document Schedule

PRIMARY DOCUMENTS			
Life Cycle	Site SD043 Remedial Design/Remedial Action Work Plan Travis AFB, Glenn Anderson CH2M, Levi Pratt	Site SS046 Remedial Design/Remedial Action Work Plan Travis AFB, Glenn Anderson CH2M, Doug Berwick CAPE, Meg Greenwald	Site SS016 Remedial Design/Remedial Action Work Plan Travis AFB, Glenn Anderson CH2M, Doug Berwick CAPE, Meg Greenwald
<b>Scoping Meeting</b>	NA	NA	NA
Predraft to AF/Service Center	02-22-18	03-02-18	TBD
AF/Service Center Comments Due	03-08-18	03-16-18	TBD
Draft to Agencies	03-26-18	04-02-18	TBD
Draft to RAB	03-26-18	04-02-18	TBD
Agency Comments Due	04-25-18	05-02-18	TBD
<b>Response to Comments Meeting</b>	<b>05-16-18</b>	<b>05-16-18</b>	<b>TBD</b>
Agency Concurrence with Remedy	NA	NA	NA
Public Comment Period	NA	NA	NA
<b>Public Meeting</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
Response to Comments Due	05-31-18	06-01-18	TBD
Draft Final Due	05-31-18	06-01-18	TBD
Final Due	07-02-18	07-03-18	TBD

## Travis AFB Master Meeting and Document Schedule

PRIMARY DOCUMENTS			
Life Cycle	Potrero Hills Annex Travis, Glenn Anderson		
	FS	Proposed Plan	ROD
<b>Scoping Meeting</b>	<b>180 days after Water Board Order Rescinded</b>	<b>+470 days</b>	<b>+735 days</b>
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
<b>Response to Comments Meeting</b>	<b>+ 405 days</b>	<b>+665 days</b>	<b>+ 1110 days</b>
Agency Concurrence with Remedy	NA	NA	+ 1130 days
Public Comment Period	NA	+735 to 765 days	NA
<b>Public Meeting</b>	<b>NA</b>	<b>+745 days</b>	<b>NA</b>
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	Data Gap Investigation Results Technical Memorandum for Soil Site SS016 Travis AFB, Glenn Anderson CH2M, Doug Berwick CAPE, Meg Greenwald	Site SS015 Soil Sampling Plan Travis AFB, Glenn Anderson CH2M, Levi Pratt
<b>Scoping Meeting</b>	NA	NA
Predraft to AF/Service Center	10-04-17	03-13-18
AF/Service Center Comments Due	10-18-17	03-27-18
Draft to Agencies	11-30-17	04-12-18
Draft to RAB	11-30-17	04-12-18
Agency Comments Due	01-02-18	05-14-18
<b>Response to Comments Meeting</b>	01-17-18	05-16-18
Response to Comments Due	03-21-18 (04-04-18)	05-29-18
Draft Final Due	NA	NA
Final Due	03-21-18 (04-04-18)	05-29-18
Public Comment Period	NA	NA
<b>Public Meeting</b>	NA	NA



## Travis AFB Master Meeting and Document Schedule

INFORMATIONAL DOCUMENTS			
Life Cycle	Quarterly Newsletter (Site TS060 Proposed Plan) (April 2018) Travis, Glenn Anderson	2017 Annual GRISR Travis AFB, Glenn Anderson CH2M, Leslie Royer	Site TS060 Removal Action Completion Report Travis AFB, Glenn Anderson CH2M, Doug Berwick CAPE, Meg Greenwald
<b>Scoping Meeting</b>	NA	NA	NA
Predraft to AF/Service Center	01-31-18	04-23-18	11-08-17
AF/Service Center Comments Due	NA	05-23-18	11-22-17
Draft to Agencies	02-28-18	06-15-18	12-11-17
Draft to RAB	NA	06-15-18	12-11-17
Agency Comments Due	03-28-18 (03-07-18)	07-16-18	01-15-18
<b>Response to Comments Meeting</b>	<b>04-03-18 (03-21-18)</b>	<b>08-15-18</b>	<b>01-17-18</b>
Response to Comments Due	04-04-18	08-29-18	03-05-18
Draft Final Due	NA	NA	NA
Final Due	04-04-18	08-29-18	03-05-18
Public Comment Period	NA	NA	NA
<b>Public Meeting</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>

## Travis AFB Master Meeting and Document Schedule

INFORMATIONAL DOCUMENTS			
Life Cycle	Site SS035 Site Closure Report Travis AFB, Glenn Anderson CH2M, Leslie Royer	Monitoring Well Installation Technical Memorandum for Site DP039, Addendum to the Site DP039 Remedial Action Construction Completion Report Travis AFB, Glenn Anderson CH2M, Levi Pratt	Sites LF006, SS030 and SD031 Aquifer Test Activities Technical Memorandum Travis AFB, Glenn Anderson CH2M, Renee Caird
<b>Scoping Meeting</b>	NA	NA	NA
Predraft to AF/Service Center	11-07-17	02-26-18	02-15-18
AF/Service Center Comments Due	11-21-17	03-14-18	03-02-18
Draft to Agencies	12-21-17	03-29-18	03-21-18
Draft to RAB	12-21-17	03-29-18	03-21-18
Agency Comments Due	01-25-18	04-30-18	04-23-18
<b>Response to Comments Meeting</b>	<b>02-21-18</b>	<b>05-16-18</b>	<b>05-16-18</b>
Response to Comments Due	03-14-18	06-08-18	06-04-18
Draft Final Due	NA	NA	NA
Final Due	03-14-18	06-08-18	06-04-18
Public Comment Period	NA	NA	NA
<b>Public Meeting</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>

## Travis AFB Master Meeting and Document Schedule

INFORMATIONAL DOCUMENTS				
Life Cycle	Site FT005 Extraction System Optimization Technical Memorandum Travis AFB, Glenn Anderson CH2M, Levi Pratt	2017 Annual CAMU Monitoring Report Travis AFB, Gene Clare CH2M HILL, Levi Pratt	Emulsified Vegetable Oil Sites FT004, SS015, SD031, and SD036 Optimization Injections Technical Memorandum Travis AFB, Glenn Anderson CH2M, Levi Pratt	Site LF044 Sediment Sampling Technical Memorandum Travis AFB, Glenn Anderson CH2M, Doug Berwick CAPE, Meg Greenwald
<b>Scoping Meeting</b>	NA	NA	NA	NA
Predraft to AF/Service Center	03-08-18	04-19-18	05-22-18	04-03-18
AF/Service Center Comments Due	03-22-18	05-03-18	06-06-18	04-17-08
Draft to Agencies	04-06-18	05-18-18	06-25-18	05-02-18
Draft to RAB	04-06-18	05-18-18	06-25-18	05-02-18
Agency Comments Due	05-07-18	06-18-18	07-26-18	06-04-18
<b>Response to Comments Meeting</b>	<b>05-16-18</b>	<b>07-11-18</b>	<b>08-15-18</b>	<b>06-20-18</b>
Response to Comments Due	06-05-18	07-25-18	08-31-18	07-13-18
Draft Final Due	NA	NA	NA	NA
Final Due	06-05-18	07-25-18	08-31-18	07-13-18
Public Comment Period	NA	NA	NA	NA
<b>Public Meeting</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>

## Travis AFB Master Meeting and Document Schedule

INFORMATIONAL POCO DOCUMENTS		
Life Cycle	POCO Evaluation/Closure Report for DERA-funded Oil/Water Separators OW040, OW047, OW048, OW049, OW050, OW052, OW055, OW056, and OW057  Travis AFB, Glenn Anderson CH2M, Doug Berwick	Area of Concern TA500 Data Gap Investigation and Closure Report  Travis AFB, Glenn Anderson CH2M, Renee Caird
<b>Scoping Meeting</b>	NA	NA
Predraft to AF/Service Center	02-01-17	12-21-17
AF/Service Center Comments Due	02-15-17	01-08-18
Draft to Agencies	12-19-17	01-23-18
Draft to RAB	12-19-17	01-23-18
Agency Comments Due	01-30-18	02-23-18 (03-16-18)
<b>Response to Comments Meeting</b>	<b>02-21-18</b>	<b>03-09-18</b>
Response to Comments Due	03-07-18 (04-17-18)	03-27-18
Draft Final Due	NA	NA
Final Due	03-07-18 (04-17-18)	03-27-18
Public Comment Period	NA	NA
<b>Public Meeting</b>	<b>NA</b>	<b>NA</b>

## Travis AFB Master Meeting and Document Schedule

HISTORY	
Life Cycle	Data Gap Investigation Results Technical Memorandum for Soil Sites SD033, SD043, and SS046  Travis AFB, Glenn Anderson CH2M, Leslie Royer
<b>Scoping Meeting</b>	NA
Predraft to AF/Service Center	07-26-17
AF/Service Center Comments Due	08-09-17
Draft to Agencies	09-19-17
Draft to RAB	09-19-17
Agency Comments Due	10-19-17 (11-20-17)
<b>Response to Comments Meeting</b>	<b>(11-15-17) 01-17-18</b>
Response to Comments Due	(12-05-17) 02-01-18
Draft Final Due	NA
Final Due	(12-05-17) 02-01-18
Public Comment Period	NA
<b>Public Meeting</b>	<b>NA</b>

# South Base Boundary Groundwater Treatment Plant

## Monthly Data Sheet

Report Number: 208

Reporting Period: 31 January 2018 – 28 February 2018

Date Submitted: 13 March 2018

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 February 2018 reporting period.

Table 1 – Operations Summary – February 2018			
Initial Data Collection:		1/31/2018 12:00	Final Data Collection: 2/28/2018 14:20
Operating Time:		Percent Uptime:	Electrical Power Usage:
SBBGWTP:	672 hours	SBBGWTP:	100%
SBBGWTP:		18,576 kWh (14,546 lbs CO <sub>2</sub> generated <sup>a</sup> )	
Gallons Treated: 6.4 million gallons		Gallons Treated Since July 1998: 1,022 million gallons	
Volume Discharged to Union Creek: 6.4 million gallons		Gallons Treated From Other Sources: 0 gallons	
VOC Mass Removed: 0.81 lbs <sup>b</sup>		VOC Mass Removed Since July 1998: 498.2 lbs	
Rolling 12-Month Cost per Pound of Mass Removed: \$9,339 <sup>c</sup>			
Monthly Cost per Pound of Mass Removed: \$17,783 <sup>c</sup>			
lbs = pounds			
<sup>a</sup> 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 services averaged to a per month basis.			
<sup>b</sup> Calculated using February 2018 EPA Method SW8260C analytical results.			
<sup>c</sup> 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) <sup>a</sup> – February 2018							
FT005 <sup>b</sup>				SS029		SS030	
EW01x05	Offline	EW743x05	Offline	EW01x29	Offline <sup>c</sup>	EW01x30	9.0
EW02x05	Offline	EW744x05	3.3	EW02x29	Offline <sup>c</sup>	EW02x30	0.0
EW03x05	Offline	EW745x05	11.3	EW03x29	2.6	EW03x30	7.1
EW731x05	5.9	EW746x05	Offline	EW04x29	5.5	EW04x30	21.8
EW732x05	Offline	EW2291x05	6.5	EW05x29	5.0	EW05x30	18.6
EW733x05	Offline	EW2782x05	4.9	EW06x29	6.3	EW2174x30	8.0
EW734x05	4.4	EW2783x05	8.1	EW07x29	10.2	EW711x30	8.0
EW735x05	11.4	EW2784x05	7.7				
EW736x05	Offline	EW2785x05	4.3				
EW737x05	Offline	EW2786x05	11.4				
EW742x05	Offline						
FT005 Total: 79.2				SS029 Total: 29.6		SS030 Total: 72.5	
SBBGWTP Average Monthly Flow <sup>d</sup> : 159.8 gpm							
<sup>a</sup> Flow rates presented are instantaneous measurements taken at the end of the reporting period.							
<sup>b</sup> 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.							
<sup>c</sup> Extraction wells taken off line because of persistent fouling of the well pumps and associated discharge piping.							
<sup>d</sup> 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 <sup>a</sup>		Restart <sup>a</sup>		Cause
	Date	Time	Date	Time	
SBBGWTP	None.	--		--	None.
-- = Time not recorded <sup>a</sup> Shutdown and restart times estimated based on field notes SBBGWTP = South Base Boundary Groundwater Treatment Plant					

## Summary of O&M Activities

Monthly groundwater treatment samples were collected at the SBBGWTP on 1 February 2018. Sample results are presented in Table 4. The total VOC concentration (15.13 µg/L) in the influent sample has decreased from the January 2018 sample results (26.96 µg/L). TCE was the primary VOC detected in the influent sample at a concentration of 13.4 µg/L. Several VOCs were detected in the midpoint sampling location, including 1,2-DCA, cis-1,2-DCE, and chloroform. No VOCs were detected at the effluent sampling location. The decrease in the total VOC influent concentration is a result of the five (5) new Site FT005 extraction wells pumping groundwater with lower TCE concentrations but higher 1,2-DCA concentrations.

Between 1 and 14 February, the backwash system was serviced as follows:

- Primary backwash tank (T-BW-1) – Replaced water level transmitter
- Secondary (settling) backwash tank (T-BW-2) – Replaced cracked check valve
- Tertiary (wet well) backwash tank (T-BW-3) – Replaced transfer pump and water level transmitter

Figure 1 presents a plot of influent concentrations and average flow at the SBBGWTP over the past twelve (12) months. The VOC influent concentrations have generally been fluctuating over the past 12 months with an overall flat trend. However, an overall increasing flow rate trend was observed in the past 12 months with the addition of the new extraction wells.

## Optimization Activities

No optimization activities occurred at the SBBGWTP in February 2018.

## 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 February 2018, the SBBGWTP produced approximately 14,546 pounds of GHG, which includes approximately 800 pounds of GHG generated from GAC change out services averaged to a per month basis.



TABLE 4

Summary of Groundwater Analytical Data for February 2018 – South Base Boundary Groundwater Treatment Plant

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	1 February 2018 (µg/L)		
				Influent	Midpoint	Effluent
Halogenated Volatile Organics						
Acetone	NA	1.0	0	ND	ND	ND
Bromodichloromethane	NA	0.15	0	ND	ND	ND
Carbon Tetrachloride	0.5	0.15	0	ND	ND	ND
Chloroform	5.0	0.15	0	0.16 J	0.19 J	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	0.64	0.23 J	ND
1,1-Dichloroethene	5.0	0.15	0	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.15	0	0.93	0.26 J	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	13.4	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 Petroleum Hydrocarbons – Gasoline	50	35	0	ND	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	24	0	ND	NM	ND
Total Petroleum Hydrocarbons – Motor Oil	50 (trigger)	24	0	ND	NM	ND
1,4-Dioxane	NA	0.19	0	NM	NM	ND

\* 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

NA = not applicable

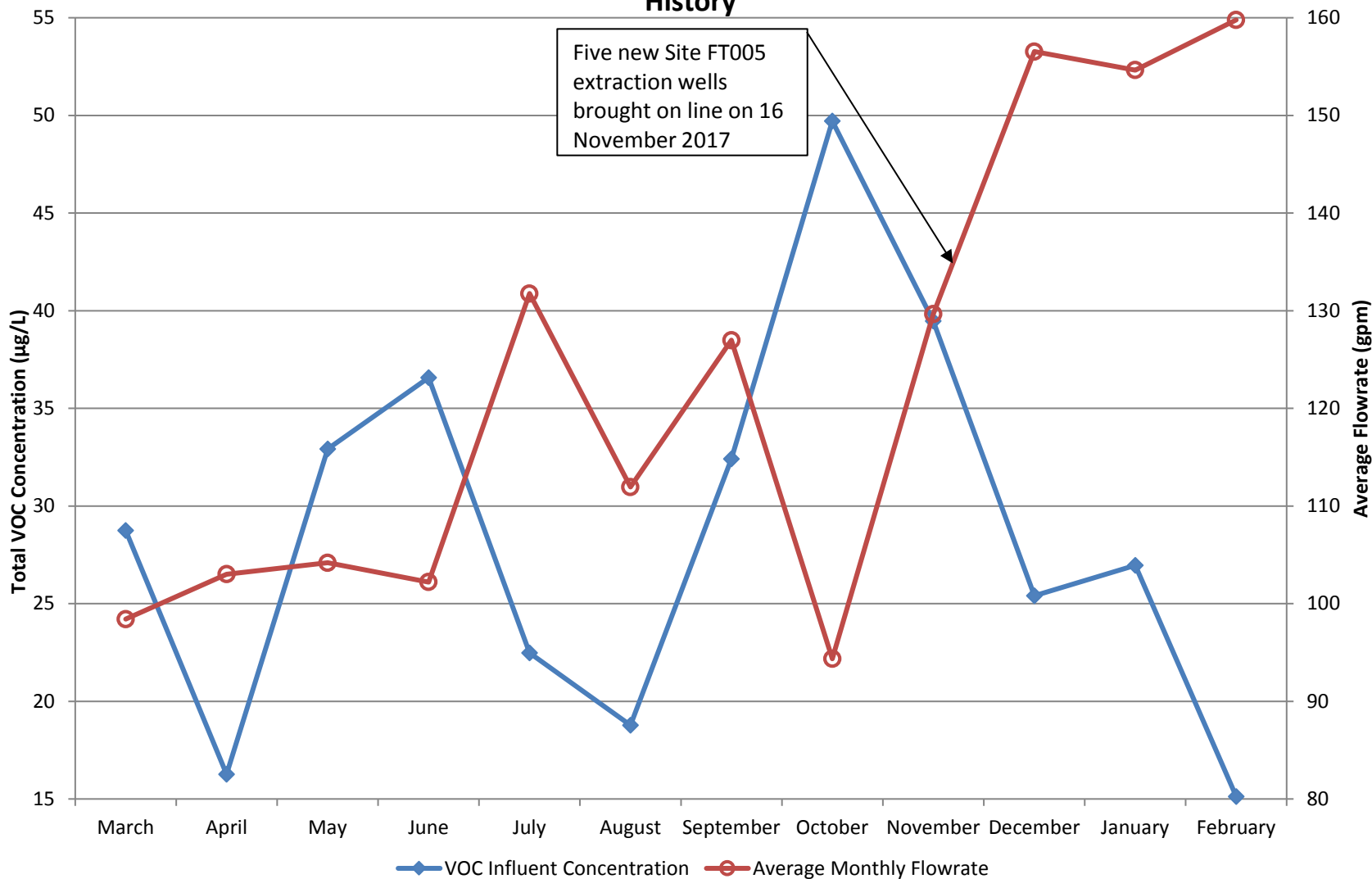
N/C = number of samples out of compliance with discharge limits

ND = not detected

NM = not measured

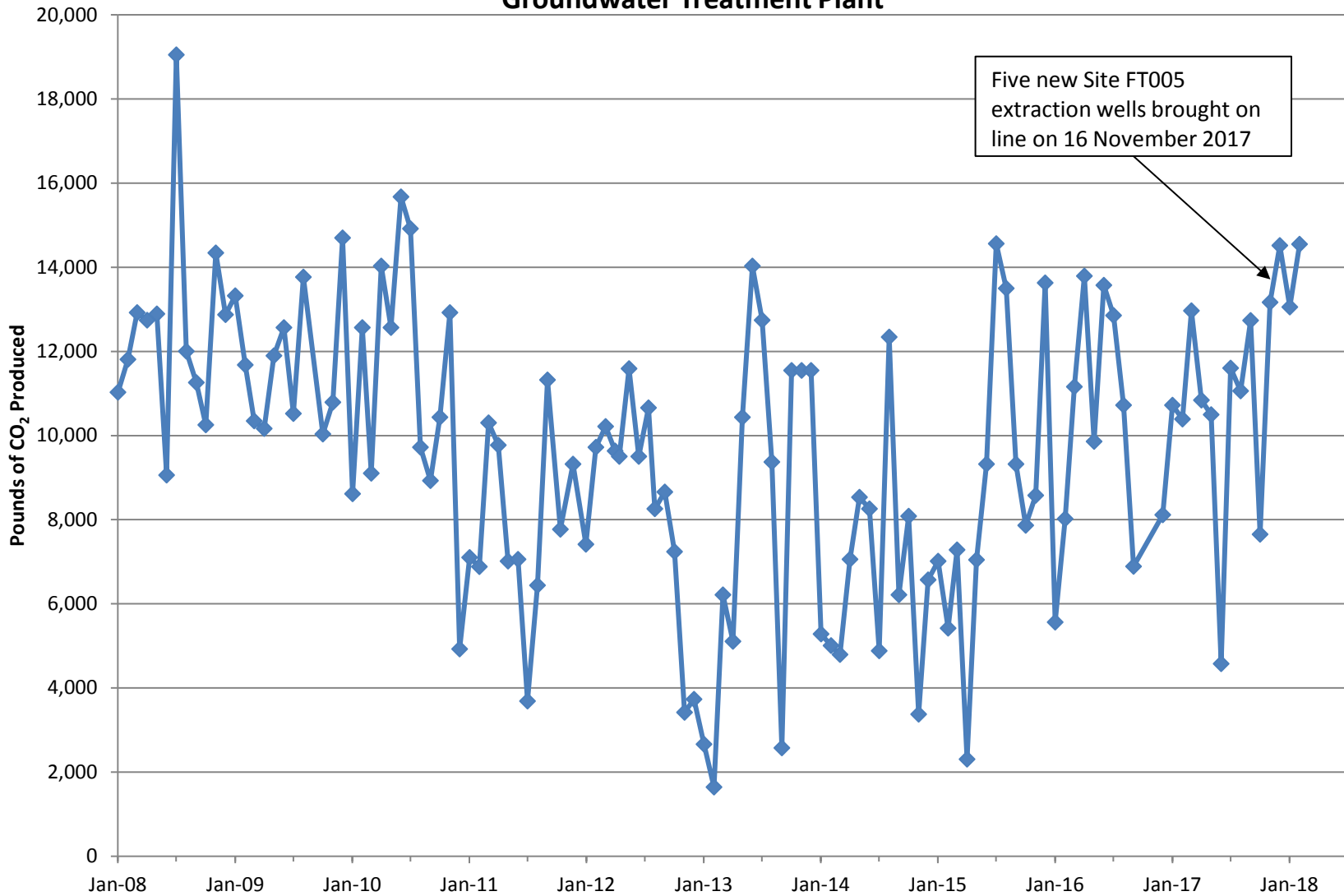
µg/L = micrograms per liter

**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: 223

Reporting Period: 30 January 2018 – 27 February 2018

Date Submitted: 13 March 2018

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 February 2018 reporting period.

Table 1 – Operations Summary – February 2018					
Initial Data Collection:		1/30/2018 15:10	Final Data Collection:	2/27/2018 12:10	
Operating Time:		Percent Uptime:	Electrical Power Usage:		
CGWTP:	669 hours	CGWTP:	100%	CGWTP:	1,919 kWh (2,308 lbs CO <sub>2</sub> generated <sup>a</sup> )
Gallons Treated (discharge to storm sewer):		Gallons Treated Since January 1996: <b>550.6 million gallons</b>			
<b>1,174,787 gallons</b>					
VOC Mass Removed from groundwater:		VOC Mass Removed Since January 1996:			
<b>2.02 lbs<sup>b</sup></b>		<b>2,798 lbs from groundwater</b>			
		<b>8,686 lbs from vapor</b>			
Rolling 12-Month Cost per Pound of Mass Removed: \$2,202 <sup>c</sup>					
Monthly Cost per Pound of Mass Removed: \$3,329 <sup>c</sup>					
<sup>a</sup> 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 services averaged to a per month basis.					
<sup>b</sup> Calculated using February 2018 EPA Method SW8260C analytical results.					
<sup>c</sup> 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 <sup>a</sup> – February 2018	
Location	Average Flow Rate Groundwater (gpm)
EW001x16	13.2
EW002x16	11.1
EW003x16	0.3
EW605x16	6.0
EW610x16	2.4
CGWTP	29.3
<sup>a</sup> 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.

<b>Table 3 – Summary of System Shutdowns</b>					
<b>Location</b>	<b>Shutdown<sup>a</sup></b>		<b>Restart</b>		<b>Cause</b>
	<b>Date</b>	<b>Time</b>	<b>Date</b>	<b>Time</b>	
CGWTP	None.	--		--	None.
-- = Date/Time not recorded <sup>a</sup> Shutdown and restart times estimated based on field notes CGWTP = Central Groundwater Treatment Plant					

Table 4 presents a twelve-month summary of the Site DP039 bioreactor recirculation well pulsing dates.

<b>Table 4 – Summary of DP039 Bioreactor “Pulsed Mode” Operations</b>		
<b>Location</b>	<b>Pulse-on Date</b>	<b>Pulse-off Date</b>
MW750x39	7 February 2017	7 March 2017
	5 April 2017	7 August 2017
	7 September 2017	2 October 2017
	6 November 2017	27 November 2017
	26 December 2017	22 January 2018
	19 February 2018	
MW = Monitoring Well		

## Summary of O&M Activities

Monthly groundwater treatment samples were collected at the CGWTP on 1 February 2018. Sample results are presented in Table 5. The total VOC concentration (205.91 µg/L) in the February 2018 influent sample has decreased from the January 2018 sample (222.02 µg/L). TCE was the primary VOC detected in the influent sample at a concentration of 163 µg/L. Cis-1,2-DCE (15.7 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 effluent. Travis AFB will continue to monitor influent, midpoint, and effluent concentrations at the CGWTP for carbon breakthrough, though the carbon treatment remained effective in February 2018. A carbon change out on the lead GAC vessel is being coordinated.

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 concentrations show a decreasing trend over the past 12 months along with an overall decreasing trend for the flow rate through the treatment plant. The reduction in flow rate is likely a seasonal fluctuation.

The Site DP039 subgrade biogeochemical reactor (SBGR), also known as a bioreactor, continued to operate in a four-week “pulsed mode” to optimize distribution of total organic carbon (TOC). The bioreactor was brought back on line on 19 February as planned.

## Optimization Activities

No optimization activities occurred at the CGWTP in February 2018.

## 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 2,308 pounds of GHG during February 2018.

TABLE 5

Summary of Groundwater Analytical Data for February 2018 – Central Groundwater Treatment Plant

				1 February 2018 (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	ND	ND	ND	ND
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	38.0	15.7	ND	ND
1,2-Dichlorobenzene	5.0	0.15	0	0.40 J	ND	ND	ND
1,3-Dichlorobenzene	5.0	0.15	0	0.50	ND	ND	ND
1,4-Dichlorobenzene	5.0	0.15	0	0.29 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	0.48 J	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	0.48 J	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	2.52	ND	ND	ND
Trichloroethene	5.0	0.15 – 1.5	0	163	ND	ND	ND
Vinyl Chloride	0.5	0.15	0	0.24 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 Petroleum Hydrocarbons – Gasoline	50	35	0	102	NM	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	24	0	ND	NM	NM	ND
Total Petroleum Hydrocarbons – Motor Oil	50 (trigger)	24	0	ND	NM	NM	ND
1,4-Dioxane	NA	0.19	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

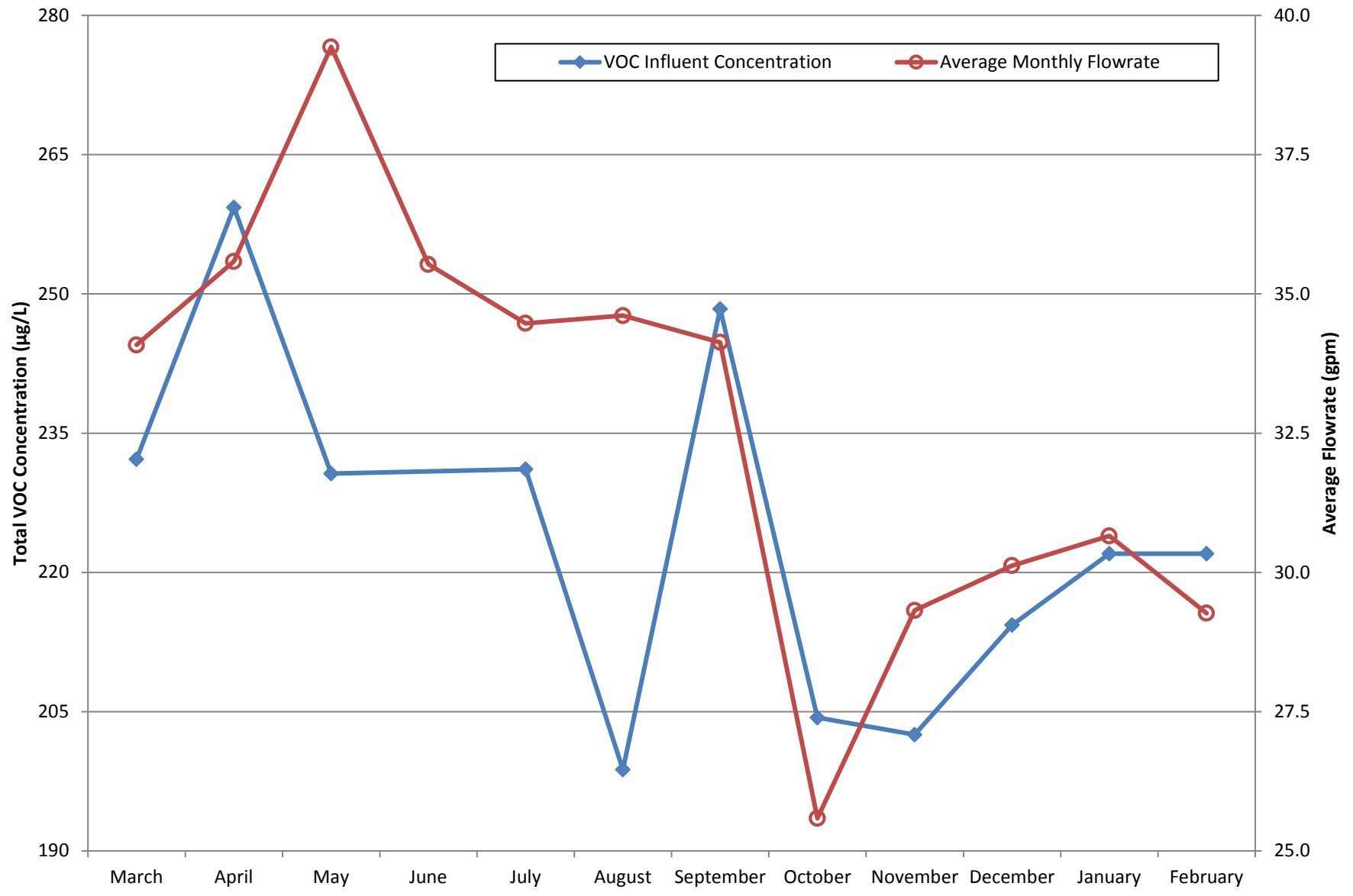
NM = not measured

µg/L = micrograms per liter

mg/L = milligrams per liter

**Figure 1**

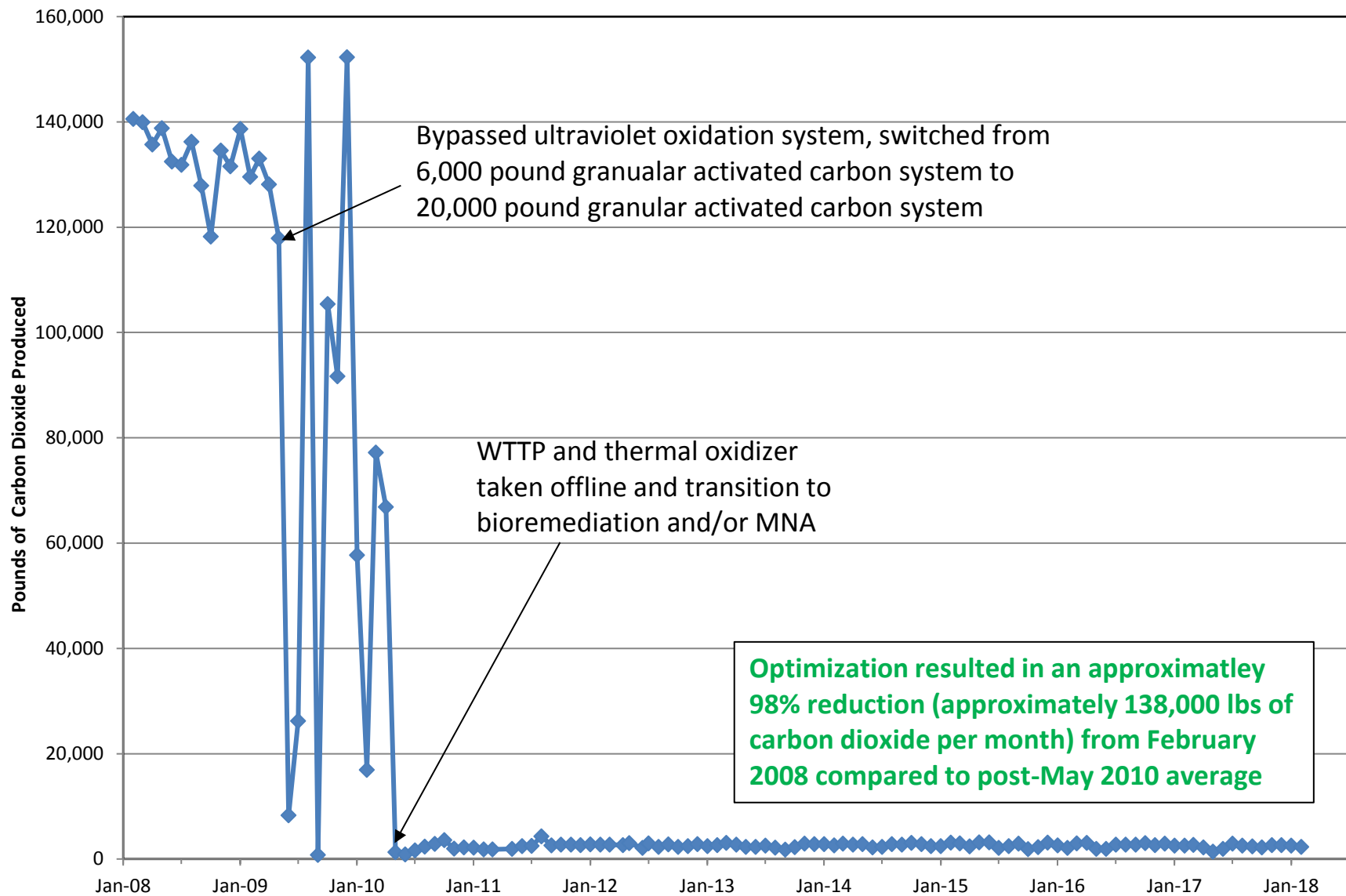
**CGWTP Total VOC Influent Concentrations and Average Flowrate Twelve Month History**





**Figure 2**

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



# Subarea LF007C Groundwater Treatment Plant

## Monthly Data Sheet

Report Number: 167

Reporting Period: 31 January 2018 – 28 February 2018

Date Submitted: 13 March 2018

This monthly data sheet presents information regarding the Subarea LF007C Groundwater Treatment Plant (LF007C GWTP) and associated remedial process optimization (RPO) activities.

### System Metrics

Table 1 presents operational data from the February 2018 reporting period:

Table 1 – Operations Summary – February 2018			
Initial Data Collection:		1/31/2018 10:45	Final Data Collection: 2/28/2018 14:00
Operating Time:		Percent Uptime:	Electrical Power Usage <sup>a</sup> :
LF007C GWTP:	675 hours	LF007C GWTP	100% LF007C GWTP: 0 kWh
Gallons Treated: 182,500 gallons		Gallons Treated Since March 2000: 87.2 million gallons	
Volume Discharged to Duck Pond: 182,500 gallons		VOC Mass Removed Since March 2000: 174.38 pounds (Groundwater)	
VOC Mass Removed: 1.54 x 10 <sup>-3</sup> pounds <sup>b</sup>			
Rolling 12-Month Cost per Pound of Mass Removed: Not Measured <sup>c</sup>			
Monthly Cost per Pound of Mass Removed: Not Measured <sup>c</sup>			
<sup>a</sup> The LF007C GWTP operates on solar power only.			
<sup>b</sup> VOCs from February 2018 influent sample detected by EPA Method SW8260C.			
<sup>c</sup> 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 – LF007C GWTP Average and Total Flow Rates – February 2018		
Location	Average Flow Rate (gpm) <sup>a</sup>	Total Gallons Processed (gallons)
EW614x07	3.9	159,010
EW615x07	0.9	20,830
LF007C GWTP	4.5	182,500
<sup>a</sup> 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 <sup>a</sup>		Restart <sup>a</sup>		Cause
	Date	Time	Date	Time	
LF007C GWTP	None.	--		--	None.
-- = Time not recorded <sup>a</sup> Shutdown and restart times estimated based on field notes LF007C GWTP = Subarea LF007C Groundwater Treatment Plant					

## Summary of O&M Activities

Monthly groundwater samples were collected at the LF007C GWTP on 1 February 2018. Sample results are presented in Table 4. TCE (1.01 µg/L) was detected at the influent sample location. In addition, TPH-d (120 µg/L) and TPH-mo (145 µg/L) were detected at the influent sample location. No VOC contaminants were detected at the midpoint and effluent sampling locations. However, the effluent sample identified TPH-d at a concentration (96.2 J µg/L) in excess of the effluent limitation of 50 µg/L. TPH-mo was also detected in the effluent sample, but at a concentration (46.7 J µg/L) below the effluent limitation of 50 µg/L. In addition, 1,4-dioxane was detected in the effluent sample at a concentration of 0.38 J µg/L. There are no established effluent limits for 1,4-dioxane when discharging to non-drinking water receiving waters according to the current VOC and fuel general NPDES permit.

Concentrations of TPH-d and TPH-mo continue to be detected in effluent samples collected from the Subarea LF007C GWTP. Following Triad discussions with the EPA, Water Board, and DTSC in February 2018, the March 2018 monthly sampling event at the LF007C GWTP will be modified to include the following:

- Include SVOC analysis on the influent and effluent samples.
- Sample extraction wells EW614x07 and EW615x07 along with cross-gradient well MW210x06. Analyze these samples for TPH-d, TPH-mo, VOCs, and SVOCs.
- Have all TPH-d and TPH-mo samples (influent, effluent, EW614x07, EW615x07, and MW210x06) split and sent to separate laboratories for analysis.

The March 2018 sample results will be analyzed to help determine an appropriate monthly sampling plan for the LF007C GWTP.

Figure 1 presents a chart of influent concentrations (total VOCs) at the LF007C GWTP versus time for the past twelve (12) months. VOC concentrations, primarily TCE, have been seasonally variable; however, over the last 12 months the trend has been slightly decreasing. The average flow rate through the LF007C GWTP has decreased over the last 12 months.

## Optimization Activities

No optimization activities occurred at the LF007C GWTP in February 2018.

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## 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 and LF007C GWTP. The LF007C GWTP is now a solar-only operated treatment system and no longer generates GHG, with exception of a small amount of GHG generated from changing out the GAC averaged to a per month basis.

TABLE 4

Summary of Groundwater Analytical Data for February 2018 – Subarea LF007C Groundwater Treatment Plant

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	1 February 2018 (µg/L)		
				Influent	After Carbon 1	Effluent
Halogenated Volatile Organics						
Acetone	NA	0.50	0	ND	ND	ND
Bromodichloromethane	5.0	0.15	0	ND	ND	ND
Bromoform	5.0	0.15	0	ND	ND	ND
2-Butanone	5.0	2.0	0	ND	ND	ND
Carbon Tetrachloride	0.5	0.15	0	ND	ND	ND
Chloroform	5.0	0.15	0	ND	ND	ND
Dibromochloromethane	5.0	0.15	0	ND	ND	ND
1,3-Dichlorobenzene	5.0	0.15	0	ND	ND	ND
1,4-Dichlorobenzene	5.0	0.15	0	ND	ND	ND
1,1-Dichloroethane	5.0	0.15	0	ND	ND	ND
1,2-Dichloroethane	0.5	0.15	0	ND	ND	ND
1,1-Dichloroethene	5.0	0.15	0	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.15	0	ND	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	1.01	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 Petroleum Hydrocarbons – Gasoline	50	35	0	ND	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	24	1	120	NM	96.2 J
Total Petroleum Hydrocarbons – Motor Oil	50	24	0	145	NM	46.7 J
1,4-Dioxane	NA	0.19	0	NM	NM	0.38 J

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

## Notes:

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

NA = not applicable

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

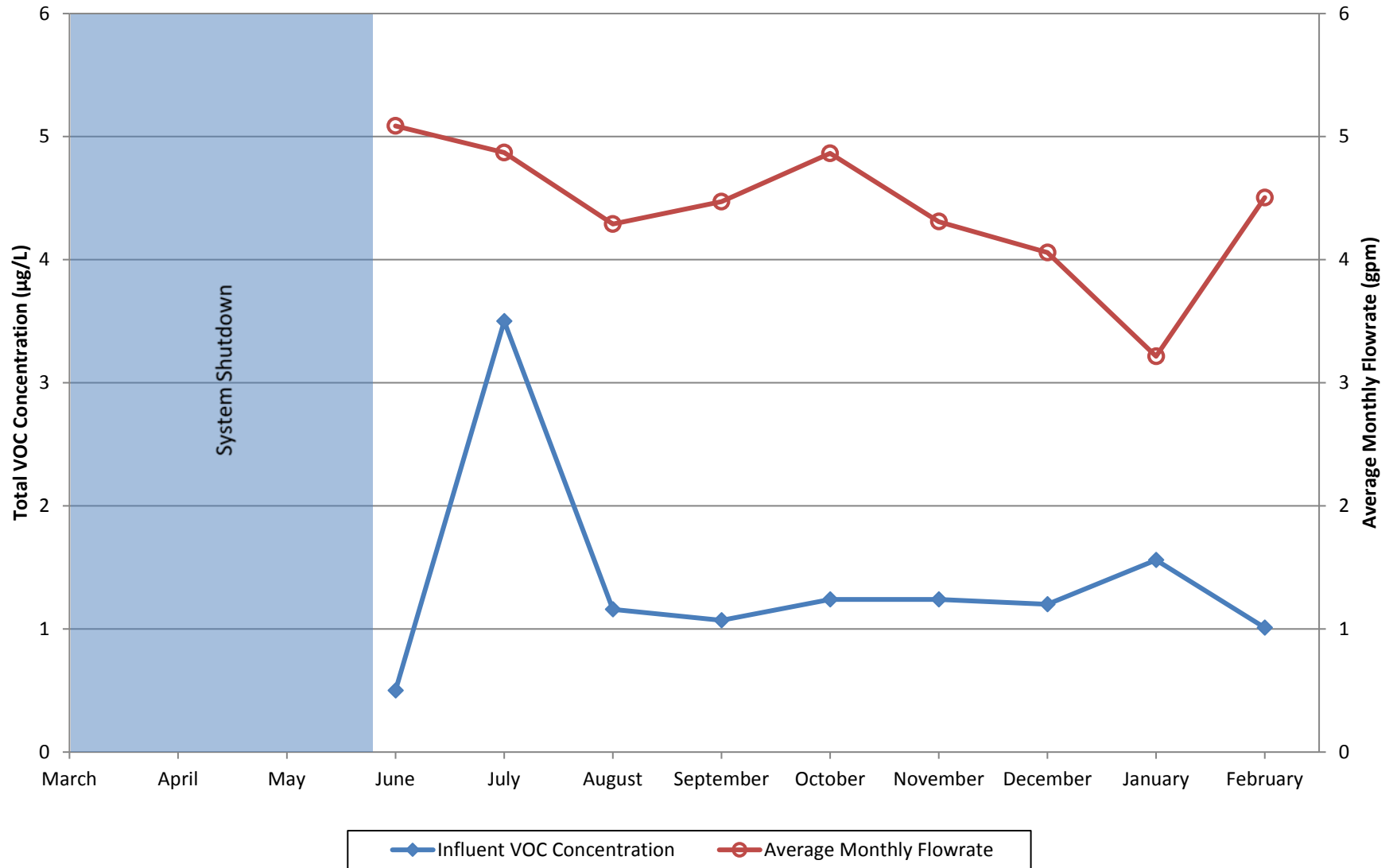
ND = not detected

NM = not measured

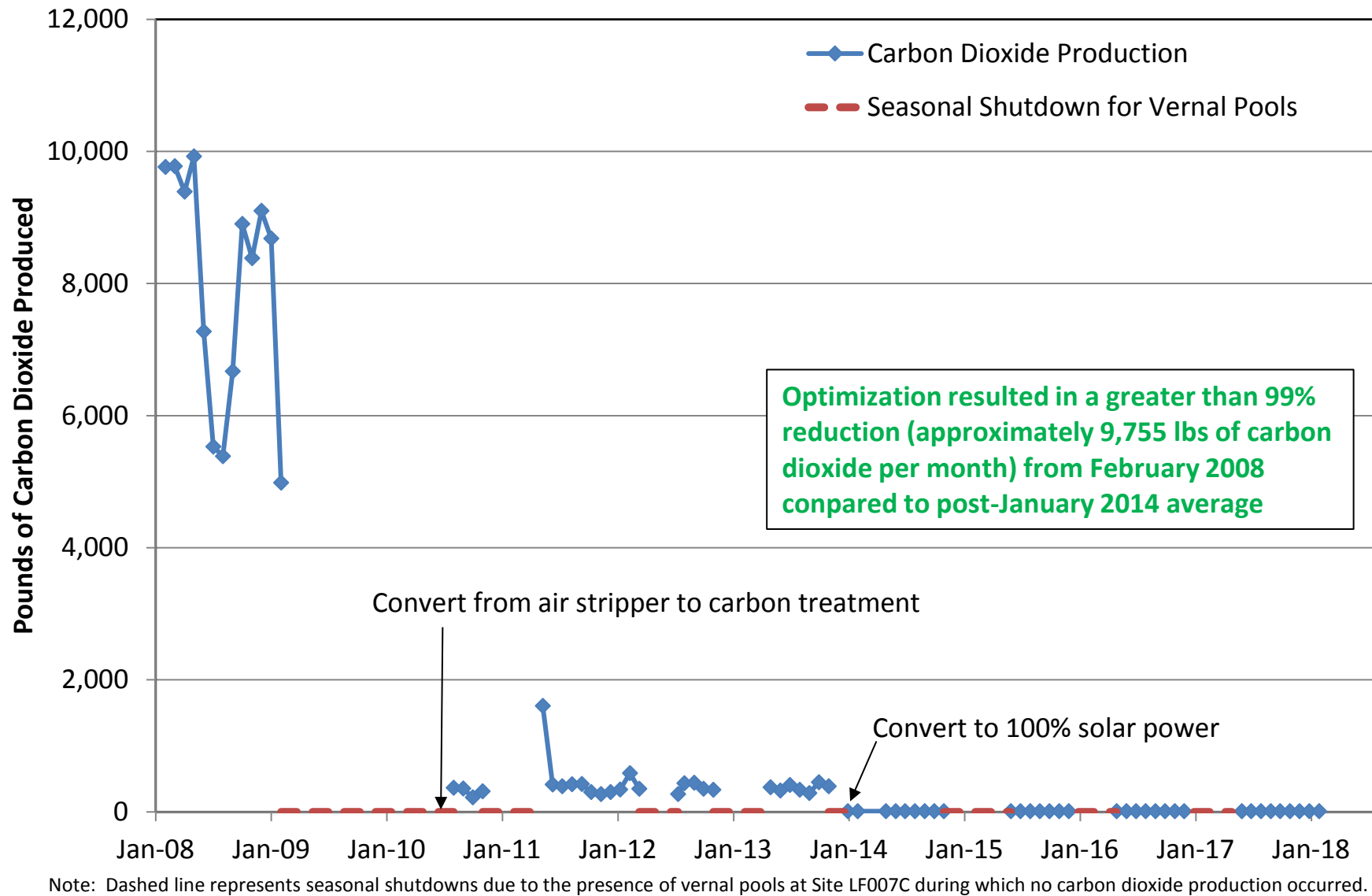
µg/L = micrograms per liter

**Figure 1**

**LF007CGWTP Total VOC Influent Concentrations and Average Flowrate Twelve Month History**



**Figure 2**  
**Equivalent Pounds of Carbon Dioxide Produced by the NGWTP/LF007C GWTP**



# Site ST018 Groundwater Treatment Plant

## Monthly Data Sheet

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Report Number: 084

Reporting Period: 2 February 2018 – 28 February 2018

Date Submitted: 13 March 2018

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

### System Metrics

Table 1 presents operation data from the February 2018 reporting period.

Table 1 – Operations Summary – February 2018			
Initial Data Collection:	2/2/2018 11:15	Final Data Collection:	2/28/2018 12:35
Operating Time:		Percent Uptime:	Electrical Power Usage:
ST018GWTP: 625 hours		ST018GWTP: 100%	ST018GWTP: 125 kWh (93 lbs CO <sub>2</sub> generated <sup>a</sup> )
Gallons Treated: <b>223,590 gallons</b>		Gallons Treated Since March 2011: <b>14.3 million gallons</b>	
Volume Discharged to Sanitary Sewer: <b>223,590 gallons</b>		Final Totalizer Reading: <b>14,298,489 gallons</b>	
Cumulative Volume Discharged to Sanitary Sewer since 1 November 2014: <b>7,802,315 gallons</b>			
MTBE, BTEX, VOC, TPH Mass Removed: <b>0.49 lbs<sup>b</sup></b>		MTBE, BTEX, VOC, TPH Mass Removed Since March 2011: <b>43.4 lbs</b>	
MTBE (Only) Removed: <b>0.02 lbs<sup>b</sup></b>		MTBE (Only) Mass Removed Since March 2011: <b>10.6 lbs</b>	
Rolling 12-Month Cost per Total Pounds of Mass Removed: \$12,285 <sup>bc</sup>			
Monthly Cost per Pound of Mass Removed: \$8,441 <sup>bc</sup>			
<sup>a</sup> SiteWise™ estimate that 1 kilowatt hour generated produces 0.74 pounds of GHG.			
<sup>b</sup> Calculated using February 2018 EPA Method SW8260C and SW8015B analytical results.			
<sup>c</sup> 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.

<b>Table 2 – ST018GWTP Average Flow Rates – February 2018</b>		
<b>Location</b>	<b>Average Flow Rate Groundwater (gpm)<sup>a</sup></b>	<b>Hours of Operation</b>
EW2014x18	1.4	625
EW2016x18	1.3	625
EW2019x18	1.0	625
EW2333x18	1.8	625
ST018GWTP	6.0	625
<sup>a</sup> 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.

<b>Table 3 – Summary of System Shutdowns</b>					
<b>Location</b>	<b>Shutdown<sup>a</sup></b>		<b>Restart<sup>a</sup></b>		<b>Cause</b>
	<b>Date</b>	<b>Time</b>	<b>Date</b>	<b>Time</b>	
ST018GWTP	None.	--		--	None.
-- = Time not recorded <sup>a</sup> 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 1 February 2018. The treatment samples were collected approximately 2.5 hours after extraction wells EW2014x18, EW2016x18, and EW2333x18 were restarted and following the conclusion of the pulse-mode operation. Results are presented in Table 4. The complete February 2018 laboratory data report is available upon request. The influent concentration for MTBE during the February 2018 sampling event was 57.4 µg/L, which is a significant increase from the January 2018 sample result of 0.51 µg/L. TPH-d, TPH-g, and BTEX components were also detected in the influent sample. MTBE was detected in the system effluent sampling location at a concentration less than the effluent limitation.

All concentrations of TPH are well below the Fairfield-Suisun Sewer District effluent limitation of 50,000 µg/L for TPH-g and TPH-d, 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 influent and effluent contaminant concentrations to maintain compliance with the Fairfield-Suisun Sewer District discharge permit.

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 cyclical with flow rates decreasing following the wet rainy season (summer and fall) and increasing during the rainy season (winter and spring). The overall

average flow rates in the past 12 months show a decreasing trend because of the “pulse-mode” operations. The MTBE concentration and total influent concentrations have generally been fluctuating over the past 12 months with an overall slight decreasing trend.

## Optimization Activities

No optimization activities occurred at the ST018GWTP in February 2018.

## 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 93 pounds of GHG during February 2018 and treated 223,590 gallons of water. The amount of GHG produced is directly attributed to the amount of water treated through the system because the only line-power electrical use is for a transfer pump through the GAC system.

TABLE 4

Summary of Groundwater Analytical Data for February 2018– Site ST018 Groundwater Treatment Plant

Summary of Groundwater Monitoring Data for Period: 2016 - On-Site Groundwater Monitoring Plan					
Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	1 February 2018** (µg/L)	
				Influent	System Effluent
<b>Fuel Related Constituents</b>					
Methyl tert-Butyl Ether	6,400	0.15	0	<b>57.4</b>	<b>1.42</b>
Benzene	25,000 <sup>a</sup>	0.15	0	<b>3.23</b>	ND
Ethylbenzene	25,000 <sup>a</sup>	0.15	0	<b>1.85</b>	ND
Toluene	25,000 <sup>a</sup>	0.15	0	ND	ND
Total Xylenes	25,000 <sup>a</sup>	0.15 – 0.30	0	<b>0.32 J</b>	ND
Total Petroleum Hydrocarbons – Gasoline	50,000 <sup>b</sup>	35	0	<b>126</b>	ND
Total Petroleum Hydrocarbons – Diesel	50,000 <sup>b</sup>	24	0	<b>73.7 J</b>	ND
Total Petroleum Hydrocarbons – Motor Oil	100,000	24	0	ND	ND
<b>Other</b>					
Acetone	NA	1.0	0	ND	ND
1,2-Dichloroethane	20	0.15	0	<b>0.77</b>	ND

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

\*\* During the sampling event, only EW2019x18 was operational

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

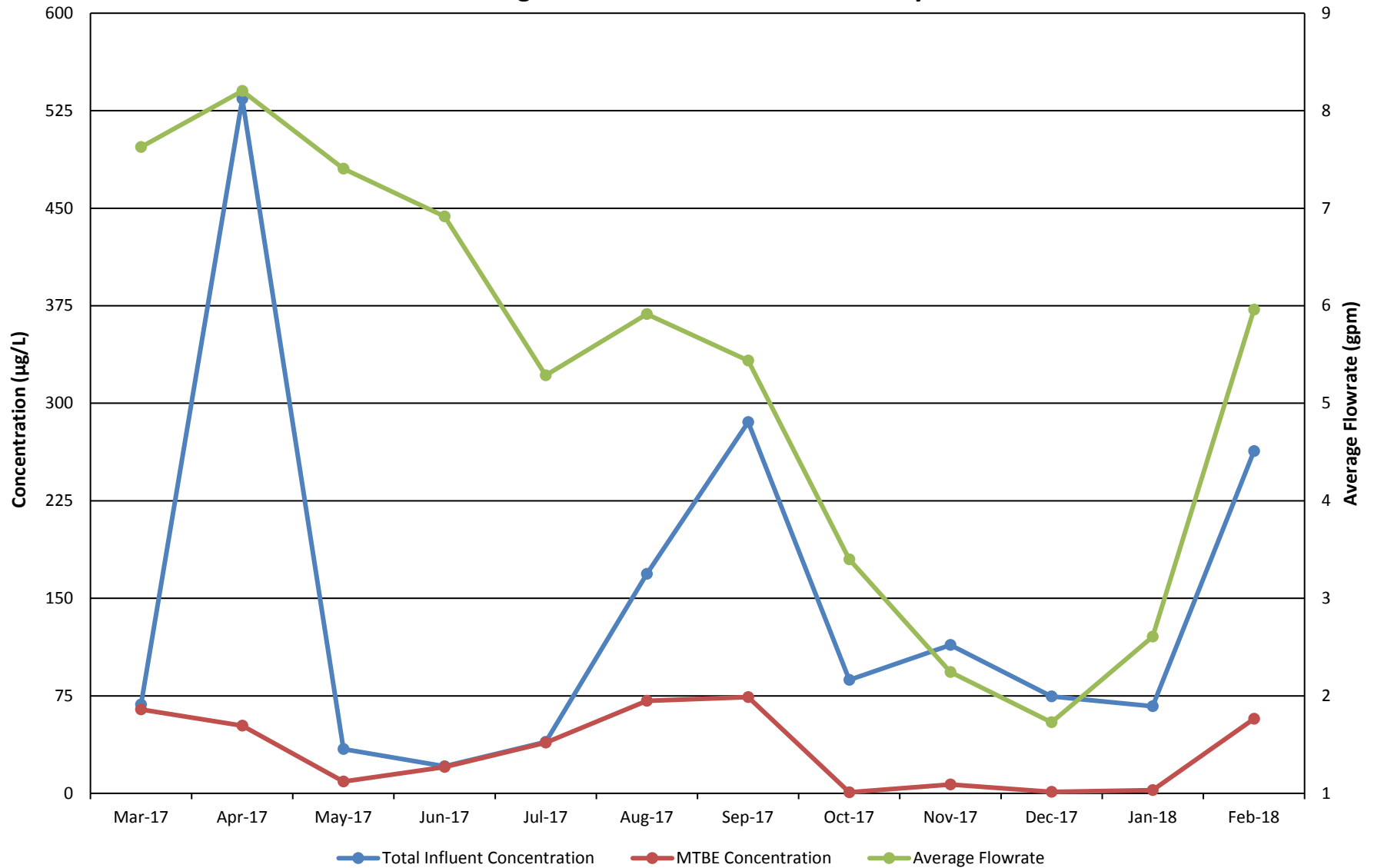
J = analyte concentration is considered an estimated value due to a detected concentration value between the reporting limit and method detection limit for the contaminant

NA = not applicable

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

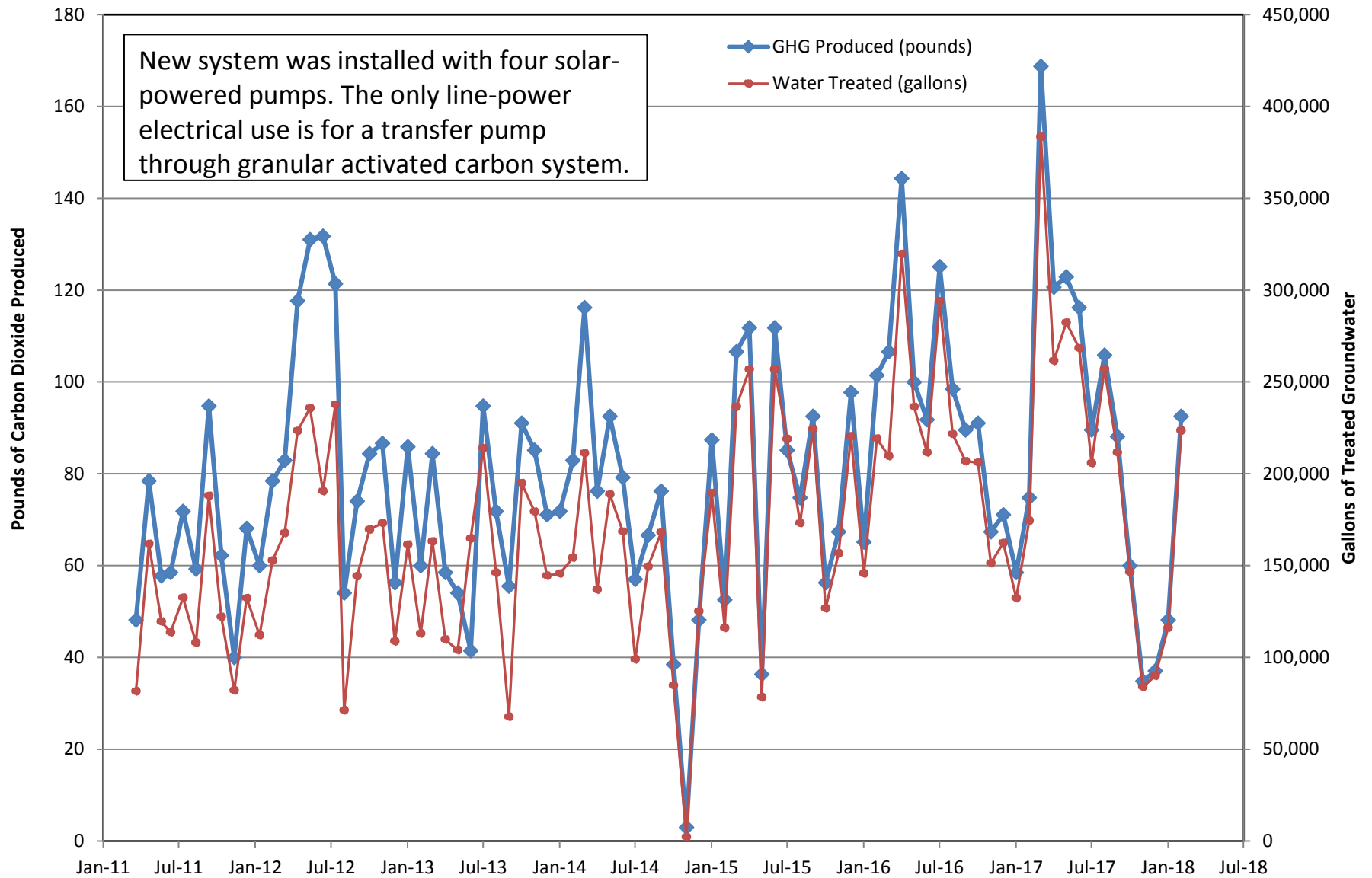
ND = not detected above method detection limit

**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**



# Sites LF006, SS030, and SD031 Aquifer Test Activities Technical Memorandum

RPM Meeting  
March 21, 2018

# Introduction

- Aquifer tests were conducted at Sites FT005, LF006, SS030, and SD031 and Area of Concern (AOC) TA500 during the summer of 2017.
- The tests were conducted to refine the site-specific CSM in plume areas where contaminant concentrations remain slightly elevated above cleanup levels.
- The aquifer test activities for Site FT005 will be documented in the upcoming Site FT005 Extraction System Optimization Technical Memorandum.
- The aquifer test activities for AOC TA500 have been documented in the Draft Area of Concern TA500 Data Gap Investigation and Closure Report.

# Introduction

- Grab groundwater samples were collected throughout the test and analyzed for volatile organic compounds (VOCs) to better understand contaminant transport under pumping conditions within the aquifer.





# Field Activities

- Each of the aquifer test consisted of pumping groundwater for three (3) days (72 hours) at a nearly constant rate.
- The water levels in selected observation wells were monitored during pumping.
- Prior to performing the aquifer test at each site, a groundwater elevation survey was performed at the pumping and observation wells to provide static groundwater elevation data.

# Field Activities

- During each test, water levels were manually measured at the pumping and observation wells at the following frequency.
  - 15 minutes from 0 to two (2) hours.
  - 30 minutes from two (2) to eight (8) hours.
  - 60 minutes from eight (8) to 72 hours.
- Flow rates were recorded during each aquifer test from the totalizer installed as part of the pumping well manifold.

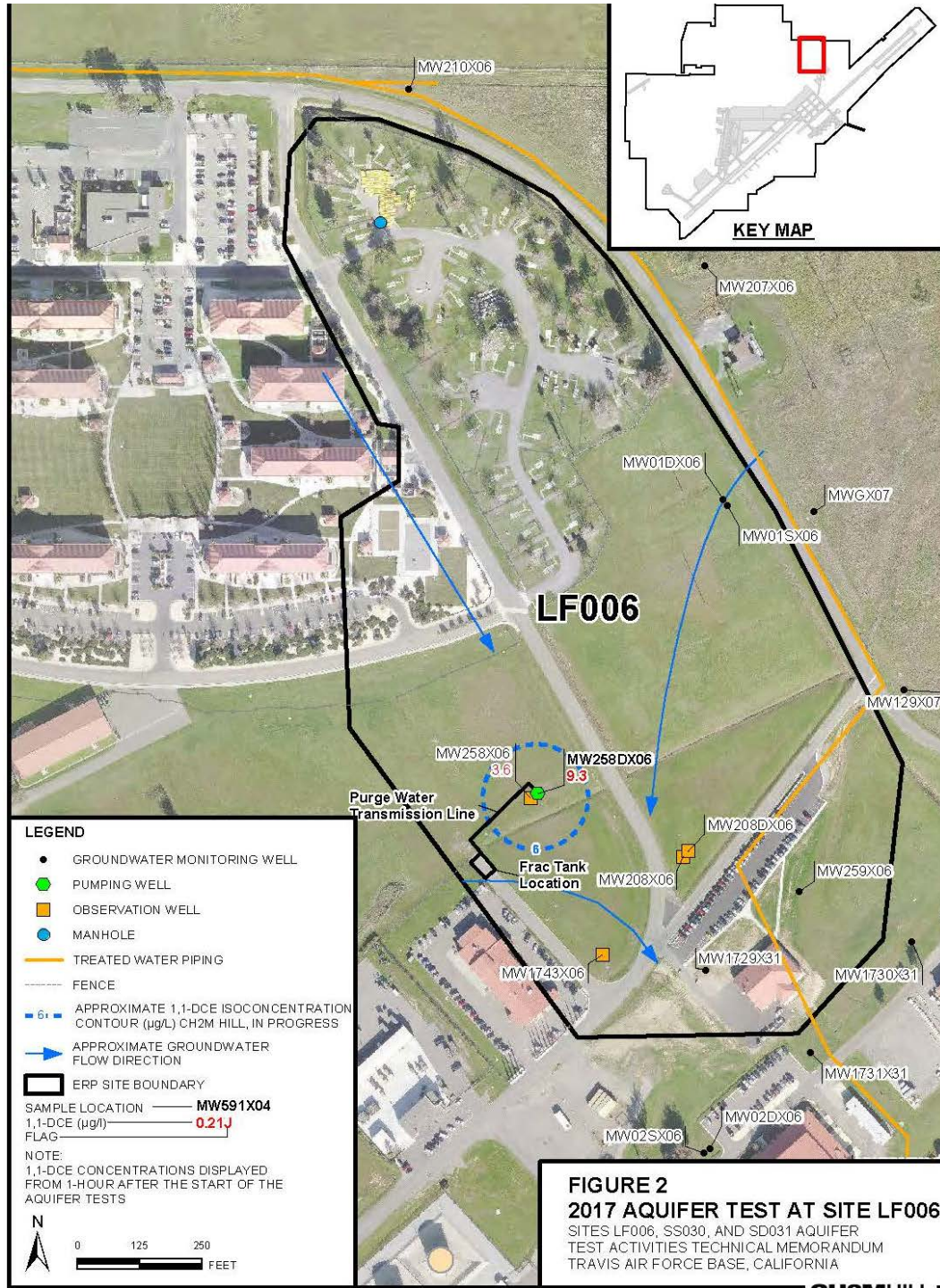
# Aquifer Test Analysis

- Aquifer parameter values were calculated from the constant-rate discharge tests using data from the available observation wells.
- The data were evaluated using the software package AQTESOLV Version 4.50 Professional (AQTESOLV).
- Based on the collected data, values for transmissivity, hydraulic conductivity, and storativity were estimated for each monitoring well.

# Site LF006 Aquifer Test

- The aquifer test for Site LF006 was performed from May 1<sup>st</sup> through May 4<sup>th</sup>, 2017.
- MW258Dx06 was used as the pumping well.
- Four observation wells were used in the test.
- The pumping rate averaged 1.6 gallons per minute (gpm) during the aquifer test.
- Approximately 8,160 gallons of water were generated during the aquifer test.





# Site LF006 Analytical Results

- The main groundwater COCs at Site LF006 are trichloroethene (TCE) and 1,1-dichloroethene (DCE).
- During the aquifer test at LF006, only 1,1-DCE was detected in exceedance of the cleanup level (6 µg/L) at the pumping well.
- The 1,1-DCE concentration ranged from 9.1 to 9.6 µg/L.
- TCE concentrations (0.27 J to 0.38 J µg/L) were below the cleanup level (5 µg/L) over the course of the aquifer test.

# Site LF006 Aquifer Test Analysis Results

- Evaluation of available hydrogeologic data indicates that the Neuman (1974) unconfined aquifer solution fits well with the Site LF006 aquifer test data.
- Transmissivity values ranged from 342 to 490 square feet per day (ft<sup>2</sup>/day).
- Hydraulic conductivity values ranged from approximately 15.5 to 22.3 feet per day (ft/day).
- Storativity values were consistently at approximately 0.00017.
- The increasing trend observed in the derivative data for all monitoring wells indicates a no-flow boundary consistent with known faults in this area.



# Site LF006 Aquifer Test Results

- It is expected that a splay of the Vaca Fault oriented on a line between the approximate coordinates (X: 1862070 feet and Y: 6583290 feet; X: 1861755 feet and Y: 6583385 feet) represents the no-flow boundary.
- This no flow boundary was input into AQTESOLV, which resulted in a better fit of the Neuman solution with the observed data.

# Site SS030 South Aquifer Test

- The aquifer test for the south area of Site SS030 was performed from June 26<sup>th</sup> through June 29<sup>th</sup>, 2017.
- MW05x30 was used as the pumping well.
- Three observation wells were used in the test.
- The pumping rate averaged 6.3 gpm during the aquifer test.
- Approximately 28,651 gallons of water were generated during the aquifer test.







# Site SS030 South Analytical Results

- The main groundwater COC at Site SS030 is TCE.
- During the aquifer test at the south area of Site SS030 the concentrations of TCE (4.5 to 4.9  $\mu\text{g/L}$ ) were below cleanup levels at pumping well MW05x30.

# Site SS030 South Aquifer Test Analysis

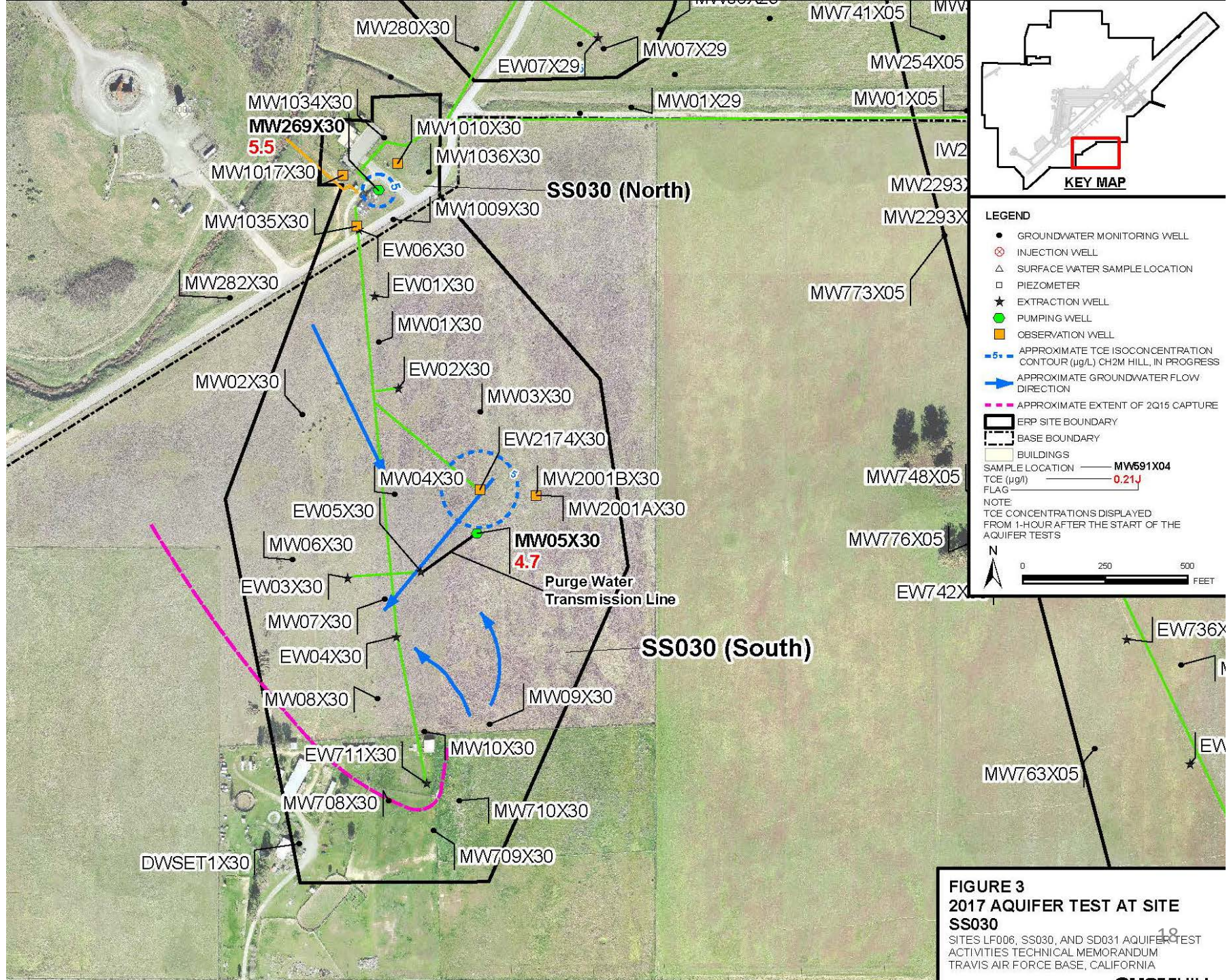
## Results

- Based on available hydrogeologic data collected during the aquifer test at the south area of Site SS030, the observation wells were beyond the influence of the pumping well during the period tested and therefore did not yield appropriate data for analysis.
- The pumping well data was used for the transmissivity, hydraulic conductivity, and storativity values.
- Transmissivity was 758 ft<sup>2</sup>/day.
- Hydraulic conductivity was 25.3 ft/day.
- Storativity was 0.0000028.

# Site SS030 North Aquifer Test

- The aquifer test for the north area of Site SS030 was performed from August 14<sup>th</sup> through August 17<sup>th</sup>, 2017.
- MW269x30 was used as the pumping well.
- Three observation wells were used in the test.
- The pumping rate averaged 0.5 gpm during the aquifer test.
- Approximately 2,018 gallons of water were generated during the aquifer test.







# Site SS030 North Analytical Results

- The main groundwater COC at Site SS030 is TCE.
- During the aquifer test at the north area of Site SS030, only the initial sample (5.5 µg/L) collected at one (1) hour after the start of the aquifer test exceeded the cleanup level for TCE at the pumping well.
- The TCE concentrations for the 24, 48, and 72 hours groundwater samples ranged from 2.2 to 3.6 µg/L.



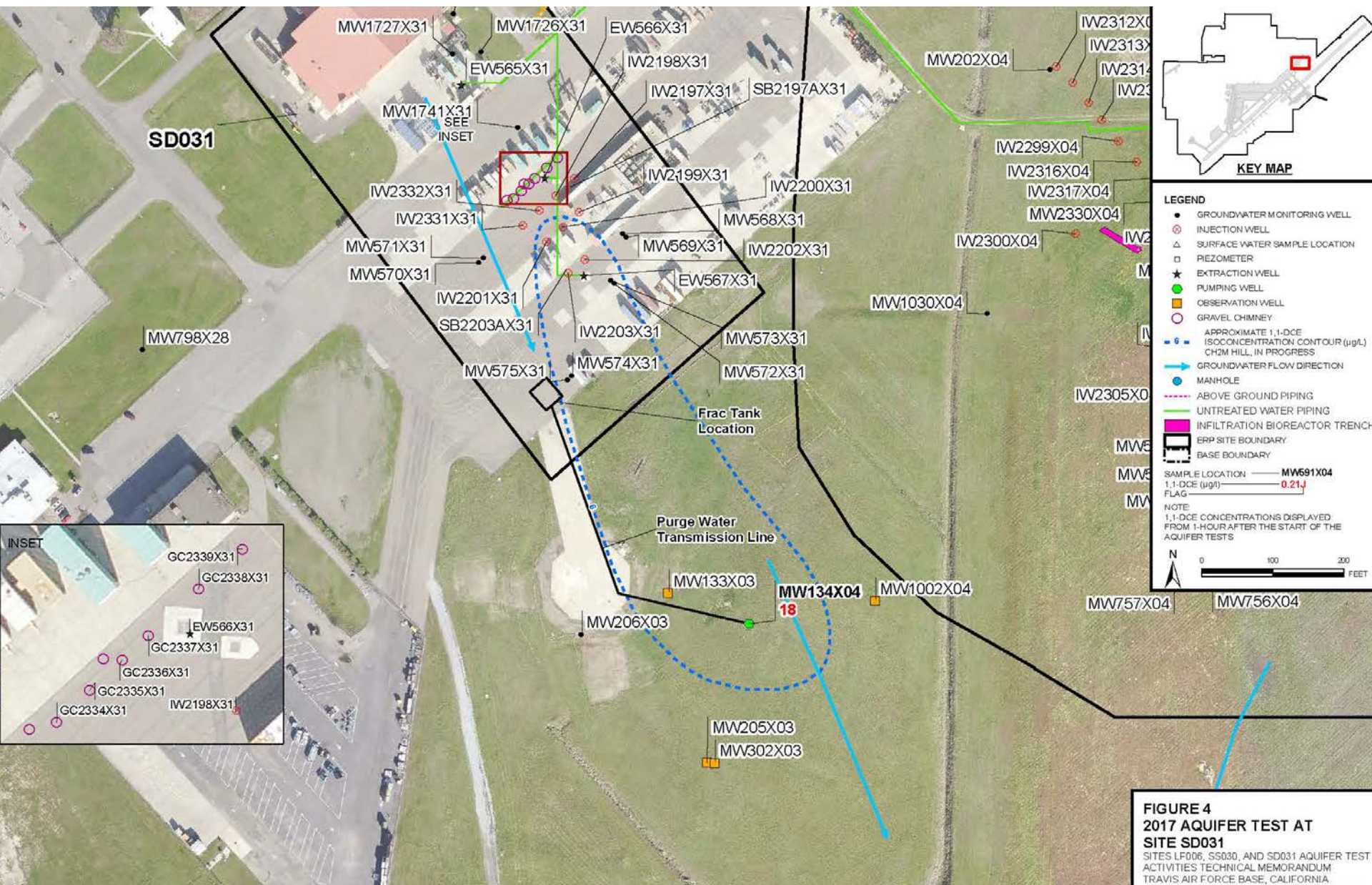
# Site SS030 North Aquifer Test Analysis

## Results

- Because MW269x30 had a maximum flow rate of 0.5 gpm, the distance between the pumping well and the observation wells were beyond the influence of the pumping well during the tested period.
- The pumping well data was used for the transmissivity, hydraulic conductivity, and storativity values.
- Transmissivity was 62 ft<sup>2</sup>/day.
- Hydraulic conductivity was 9 ft/day.
- Storativity was 0.00012.

# Site SD031 Aquifer Test

- The aquifer test for Site SD031 was performed from August 21<sup>st</sup> through August 24<sup>th</sup>, 2017.
- MW134x04 was used as the pumping well.
- Four observation wells were used for the test.
- The pumping rate averaged 3.9 gpm during the aquifer test.
- Approximately 11,275 gallons of water were generated during the aquifer test.



# Site SD031 Analytical Results

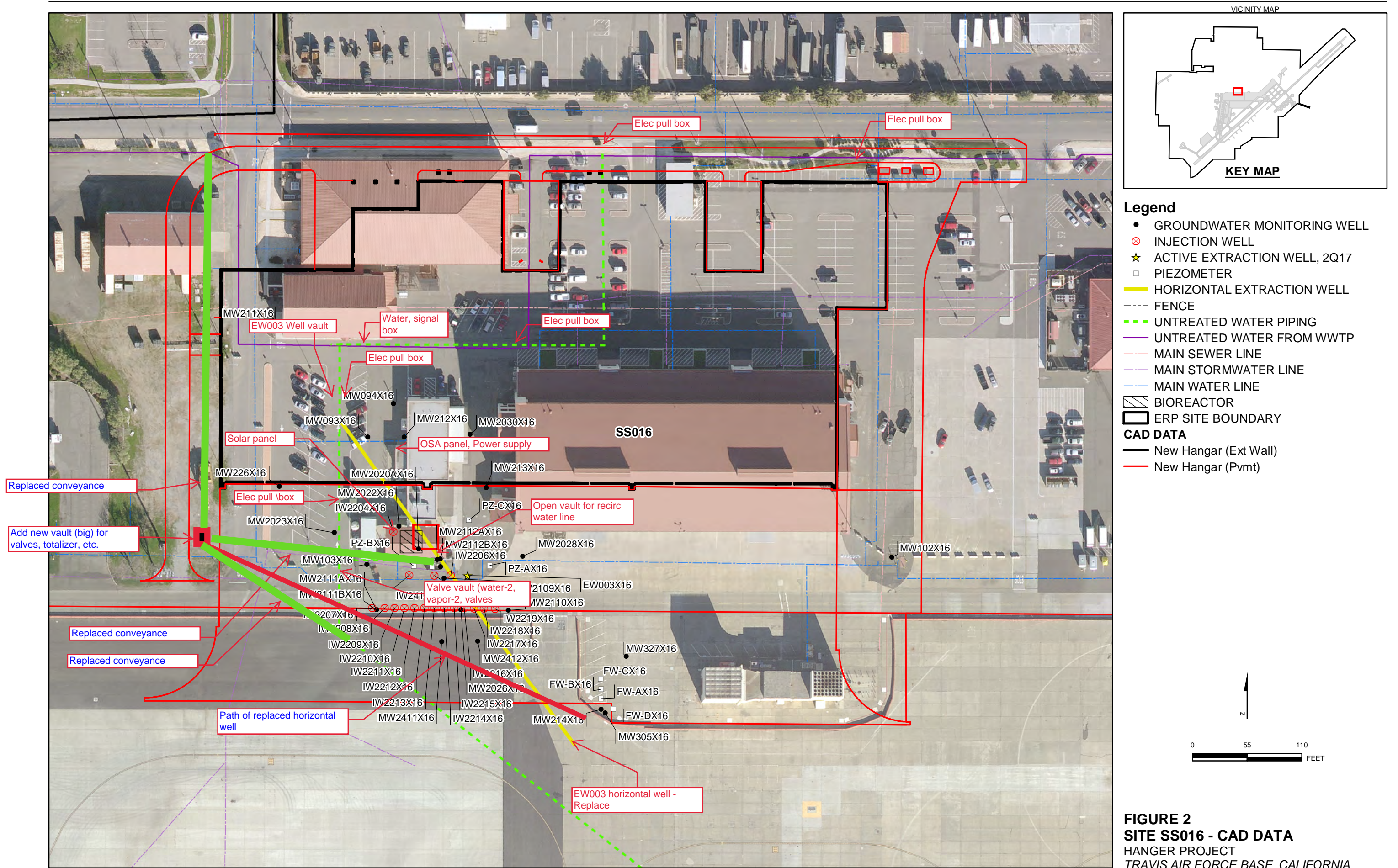
- The main groundwater COCs at Site SD031 are 1,1-DCE and TCE.
- 1,1-DCE concentrations in the pumping well exceeded the cleanup level throughout the aquifer test.
- The 1,1-DCE concentration decreased from 18  $\mu\text{g/L}$  after one (1) hour of pumping to 13  $\mu\text{g/L}$  at the end of the aquifer test (72 hours sample).
- TCE concentrations (1.0 to 1.7  $\mu\text{g/L}$ ) were below the cleanup level over the course of the aquifer test.

# Site SD031 Aquifer Test Analysis Results

- Evaluation of available hydrogeologic data indicates that the Neuman (1974) unconfined aquifer solution fits well with the Site SD031 aquifer test data.
- Transmissivity values ranged from 364 to 789 ft<sup>2</sup>/day.
- Hydraulic conductivity values ranged from approximately 8.7 to 19 ft/day.
- Storativity values ranged from approximately 0.005 to 0.02.

# Questions





**FIGURE 2**  
**SITE SS016 - CAD DATA**  
 HANGER PROJECT  
 TRAVIS AIR FORCE BASE, CALIFORNIA



# Travis AFB Restoration Program

## Program Update

*RPM Meeting*  
*March 21, 2018*



# Completed Documents (1)

- Vapor Intrusion Assessment Update Technical Memorandum
- 2012 CAMU Annual Report
- Old Skeet Range Action Memorandum
- 3<sup>rd</sup> 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
- ST028 POCO Well Decommissioning/Site Closeout Technical Memorandum
- Site TS060 Removal Action Work Plan

# Completed Documents (4)

- Multisite Technology Demonstration Construction Completion Report
- SS014 POCO Technology Demonstration Construction Completion Report
- Site LF044 Investigation Work Plan
- Site FT004 POCO Soil Data Gap Investigation Work Plan
- SD034 Technology Demonstration Construction Completion Report
- POCO Evaluation/Closeout Report for DERA-funded oil/water separators OW051, OW053, and OW054
- ST032 POCO Well Decommissioning and Site Closeout Technical Memorandum
- 2016 Annual CAMU Monitoring Report
- Work Plan for Fourth Five-year Review
- 2016 Annual GRISR
- Data Gap Investigation Results, Technical Memorandum for Soil, Sites SD033, SD043, SS046
- ***TS060 Removal Action Completion Report***
- ***SS035 Site Closure 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 (2<sup>nd</sup> 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 (3<sup>rd</sup> 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
- OW050 Soil Sampling at Former Location of OWS
- OW055 Sidewalk Repairs
- SD031 Finish Soil Delineation (NE portion of site)
- Q2 2017 GRIP Sampling Event
- SS015 Optimization: Injection Well Installation
- DP039 Down-gradient Monitoring Well Installation (1<sup>st</sup> round)
- SD036 Optimization: Injection Well Installation
- SD031 Optimization: Injection Well Installation
- OW056 Site Excavation/Closure
- Well Re-development
- TS060 Removal Action

# Completed Field Work (4)

- FT004 POCO Soil Data Gaps Investigation
- LF044 Sediment Sampling
- FT004 EVO Optimization
- DP039 Install downgradient monitoring wells (2<sup>nd</sup> round)
- FT005 – Install Extraction Wells
- DP039 Repair SBGR distribution headers
- Q4 2017 GRIP Sampling
- SD036 EVO Optimization
- SS015 EVO Optimization
- SD031 EVO Optimization
- FT005 Installation of Pumps and Controls in 5 New Extraction Wells
- Q1 2018 GRIP Sampling
- ***SD037 EVO reinjection***



# Documents In-Progress

## CERCLA

- Data Gap Investigation Results, Technical Memorandum for Site SS016
- Amendment to the WABOU Soil ROD for sites DP039, SD043, and SS046
- ***LF006, SS030, SD031 Aquifer Test Activities Tech Memo***
- ***Site TS060 No Further Action Proposed Plan***

## POCO

- POCO Evaluation/Closure Report for DERA-funded Oil/Water Separators OW040, OW047, OW048, OW049, OW050, OW052, OW055, OW056, and OW057
- AOC TA500 Data Gaps Investigation and Closure Report

# Field Work In-Progress

CERCLA

- None

POCO

- None

# Documents Planned

## CERCLA

- |   |                   |
|---|-------------------|
| • Monitoring Well Installation Tech Memo for Site DP039,<br>Addendum to the RACCR | Mar               |
| • SD043 RD/RA Work Plan   | Mar               |
| • <b><i>Community Relations Plan (revised draft)</i></b>                          | <b><i>Mar</i></b> |
| • Amendment to the NEWIOU Soil ROD for Sites<br>SS016 and SD033                   | Apr               |
| • SS046 RD/RA Work Plan   | Apr               |
| • FT005 Extraction System Optimization Tech Memo                                  | Apr               |
| • SS015 Soil Sampling Plan  | Apr               |
| • 2017 Annual CAMU Monitoring Report  | May               |
| • SD031 Soil RI/FS  | May               |
| • LF044 Sediment Sampling Report  | May               |
| • EVO Sites FT004, SS015, SD031, & SD036 Optimization<br>Injections Tech Memo     | Jun               |
| • 2017 Annual GRISR   | Jun               |
| • SS016 RD/RA Work Plan   | TBD               |

# Documents Planned

POCO

- None

# Field Work Planned

## CERCLA

- Q2 2018 GRIP Sampling Apr
- SD034 Install barricade around SBGR May
- SD034 Repair collar around EW2450x34 May
- SD043 Soil excavation Jun
- SS046 Soil excavation Jun
- SS015 Soil sampling Jun
- SS016 Soil excavation Aug
- FT005 EVO injection Summer

## POCO

- FT004 POCO Soil Investigation Jun

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

# Petroleum 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
  - **Results through first 9 months**
    - **TPH-G: 99% reduction in source area (1,900 to 15 J  $\mu\text{g/L}$ ), 34% for remaining 6 site wells (was 18% after 3 months)**
    - **TPH-D: 98% reduction in source area (5,500 to 130 J  $\mu\text{g/L}$ ), 61% for remaining 6 site wells (was 33% after 3 months)**
    - **Benzene: 98% reduction (22 to 0.24 J  $\mu\text{g/L}$ ), 61% for remaining 6 site wells (was 49% after 3 months)**
- SD034: Washboard SBGR
  - Evaluate the effectiveness of an oxygen-enhanced aerobic SBGR on reducing TPH as diesel (TPH-D) in groundwater
  - Installed six (6) SBGR trenches in November 2016
  - **Below SBGR trench (MW811x34/PZSSAx34) through first 9 months**
    - **TPH-DRO baseline 9,600 ug/L reduced to 160 ug/L (98% reduction)**
    - **TPH-MRO baseline 2,300 ug/L reduced to 210 ug/L (91% reduction)**
  - **Plume hot spot monitoring well (MW02x34) through first 9 months**
    - **TPH-DRO baseline 8,300 ug/L reduced to 1,100 ug/L (87% reduction)**
    - **TPH-MRO baseline 1,500 ug/L reduced to 420 ug/L (72% reduction)**

\* SBGR = Subgrade Biogeochemical Reactor

**Updates in Green Font**

## CVOC Technology Demonstration Projects (2)

- Multisite Bioaugmentation: EVO and KB-1 Plus
  - Evaluate if addition of bioaugmentation substrate to an EVO injection will increase the rate of CVOC degradation
  - Initial injections were completed (Nov 2016)
  - Limited TOC dispersal at SD036, so installed additional injection wells and reinjected with nanoEVO in 2017
  - Too early to evaluate degradation rates; **however:**
    - ~50-70% TCE reduction at ST027B bioaugmentation area and low/fluctuating reductions at EVO only area
    - TCE fluctuations at SD036 bioaugmentation area (but 62% DCE decrease) and 99% decrease at EVO only area
- 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
  - Slightly elevated TOC and reduced COC concentrations in the north, **TOC increase has not yet been observed in the central test area yet (distance may be too far for TOC dispersal using EVO)**
  - Optimized the GETs in southern portion of site in 2017, which may help accelerate TOC dispersal to support this TD

**Updates in Green Font**

# CVOC Technology Demonstration Projects (3)

- 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
  - COC concentrations declined through year 1
    - ~50% total molar reduction plume-wide through first year
    - Max monitoring well TCE concentration reduced from 560 to 140 µg/L
  - Limited TOC dispersal, additional EVO injection conducted with nanoEVO in 2017 to determine if this can enhance TOC dispersal (**too early to evaluate results of reinjection**)
    - **Concentrations rebounded in 4Q17, but 2017 reinjection should support further reductions**

**Updates in Green Font**



# CVOC Technology Demonstration Projects (4)

- 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
    - Recirculation through chimneys has been successful relative to our design assumptions
    - 1,1-DCE (primary COC) concentrations have reduced by **96% (was 93%)** (sum of key wells within TD area, excluding 2 wells to SW that increased)
    - Total Molar concentration (sum of CVOCs) has reduced by **93% (was 84%)** (sum of key wells within TD area, excluding 2 wells to SW that increased)
    - Four (4) new EVO wells installed to SW to enhance TOC in problem areas (plume being pulled back towards extraction well causing increasing concentrations in this area), conducted reinjection of EVO in 2017
    - **Too early to evaluate effect of reinjection on cross-gradient area**

**Updates in Green Font**

# 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 Memorandum20

# 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 (2<sup>nd</sup> 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 (4<sup>th</sup> 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