

**Travis Air Force Base
Environmental Restoration Program
Restoration Program Manager's
Meeting Minutes
15 August 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 15 August 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
Sarah Miller	USACE/OMAHA
Ben Fries (via telephone)	DTSC
Nadia Hollan Burke	USEPA
Adriana Constantinescu	RWQCB
Mike Wray	CH2M/JACOBS
Jeff Gamlin (via telephone)	CH2M/JACOBS
Tony Chakurian	CH2M/JACOBS
Leslie Royer	CH2M/JACOBS
Jill Dunphy	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 (July 2018)
Attachment 4	CGWTP Monthly Data Sheet (July 2018)
Attachment 5	LF007C Monthly Data Sheet (July 2018)
Attachment 6	ST018 Monthly Data Sheet (July 2018)
Attachment 7	Presentation: LF006 Technology Demonstration Work Plan
Attachment 8	Presentation: Program Update

1. ADMINISTRATIVE

A. Previous Meeting Minutes

The July meeting minutes were approved by all agencies as written.

B. Action Item Review

Action items from June 2018 were reviewed.

Action item 1 is ongoing: Ms. O'Sullivan to provide updates on perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA). August 2018 update: Mr. Duke conveyed that Ms. O'Sullivan had no updates; however, on behalf of Ms. O'Sullivan, Mr. Duke informed the team that the State of California is considering lowering the advisory limits beyond those in place at the federal level.

Action Item 2 is ongoing: Mr. Duke will continue to provide design and construction information for the new KC-46 Hangar construction project for agency input ahead of the Air Force/Civil Engineering awarding the construction contract. August 2018 update: The Contractor is working on finishing their design package to submit to potential bidders. Soil vapor samples will be collected next week as planned. The deeper samples will be collected at approximately 9 feet below ground surface (bgs) in order to stay above the expected groundwater table, based on site conditions. For indoor air sampling, they will core through the floor first then install the probes. Soil vapor probes will be allowed to equilibrate for 48 hours before sampling. Mr. Chakurian will be present when the soil vapor sampling is conducted to help with the observations and boring logs. Ms. Constantinescu inquired about a potential teleconference with the contractors; Mr. Duke said that the contractors have done this type of work before and are communicating often with Jacobs for additional site-specific expertise.

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, held on Wednesday 19 September 2018, at 0930 hours.

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 this summer. As a result, since there will not be a formal RAB meeting, all agencies agreed to move the October RPM meeting from Thursday, 18 October, to Wednesday, 17 October, at 0930.

Travis AFB Master Document Schedule

- Community Relations Plan Update (CRP): There was no change to the schedule.
- Amendment to the WABOU Soil ROD for Travis AFB ERP Sites DP039, SD043, and SS046: The Draft Final will be submitted on 17 August 2018. Mr. Anderson noted that the purpose of the Draft Final version is for the regulators to ensure that their comments on the Draft were adequately incorporated, and that a redline version will be submitted to assist with that task. The team will determine if each agency will have a separate signature page, or if there will be one page for all signatures. Ms. Constantinescu advised the Air Force that her agency will not likely sign until the Air Force signs, as lead agency, according to the Federal Facility Agreement. Mr. Anderson and Mr. Duke replied that in the past the Air Force wouldn't sign until the agencies signed. This issue affects all forthcoming RODs and Mr. Duke indicated that he will elevate this to his management for direction, as well as discuss it during the Air Force quarterly meeting to be held in two weeks. **This is a super critical document.**
- Amendment to the NEWIOU Soil ROD for the Travis AFB ERP Sites SS016 and SD033: The agency comment due date was shifted to 22 August. The EPA has provided one set of comments, and Ms. Burke indicated that the second set is currently with legal review, but they may not be ready by the due date. The Water Board will provide comments by 22 August. Mr. Duke said he would contact DTSC to see if they will be providing comments since Mr. Fries is out of the office. Mr. Anderson emphasized the importance to submit comments by the due date. **This is a super critical document** due to site work supporting planned KC-46 hangar construction. The field work at Site SS016 must be completed by December 2018.
- Site TS060 No Further Action Record of Decision for Old Skeet Range: There was no change to the schedule. **This is an important but not critical document.**
- Site SD043 Remedial Design/Remedial Action Work Plan: No change was made to the schedule.
- Site SS046 Remedial Design/Remedial Action Work Plan: The Response to Comments date has been changed to 21 August 2018. The rest of the schedule was changed accordingly.
- Site SS016 Remedial Design/Remedial Action Work Plan: The Draft to Agencies date was changed to 31 July, the rest of the dates were changed accordingly. The Response to Comments Due, Draft Final Due and Final Due dates were changed to TBD to ensure the work plan supports any changes in the NEWIOU ROD amendment. This excavation project is located within the footprint of the future new KC-46 hangar, so **this document is critical.**
- Site SD031 Soil Remedial Investigation/Feasibility Study: The Predraft to Air Force/Service Center has been changed to 28 August 2018. The due dates for items related to the Predraft and Draft versions changed accordingly. No change was

made to the schedule for the Final version, because any follow-on work will come under the next contract. **This document is important but not critical.**

- Fourth Five-Year Review Report for Multiple Groundwater, Soil, and Sediment Sites: No change was made to the schedule. Comments are being received and sent to Air Force Legal as appropriate. Mr. Duke indicated that the Air Force may not have responses ready by 23 September. Ms. Burke indicated that the EPA needs to issue a protectiveness statement by that date, and Mr. Duke agreed to work with the EPA on timing of responses. Ms. Constantinescu noted that the state agencies are expected to issue new guidance regarding vapor intrusion numbers that may affect the EPA's determination of protectiveness. Ms. Constantinescu said that if there is a concern regarding vapor intrusion, the Water Board will consider multiple lines of evidence, but may request indoor air sampling. Ms. Royer replied that we have collected data and developed site specific attenuation factors without use of the J&E model for vapor intrusion, so although new generic numbers will be included in the forthcoming guidance, hopefully this will be considered in the protectiveness evaluation. She noted that TCE is the most widespread contaminant, and the current data are what were used to develop the LUC boundaries. Ms. Burke added that the primary change will be for perchloroethylene, which likely won't affect LUC boundaries based on TCE concentrations. **This document is very important but not critical.**
- Potrero Hills Annex (FS, PP, and ROD): No change was made to the schedule. The Water Board sent comments on the risk assessment work plan; responses are being prepared by the Potrero Hills contractor.
- Site LF006 Technology Demonstration Work Plan: The Draft to Agencies date has been changed to 20 August 2018. The remainder of the schedule has been changed accordingly. Ms. Royer noted that the Draft version may be submitted earlier than that date. Mr. Wray requested the agencies review at their earliest convenience so that the field work can occur on 4 September as scheduled, noting that this is the only date that the drillers are available. A presentation is scheduled for later in the meeting in order to facilitate discussion and expedite approval. The agencies concurred that drilling can commence as scheduled.
- Quarterly Newsletters (July 2018): No change was made to the schedule; however, Mr. Anderson noted that the newsletter has been delayed indefinitely, until the KC-46 mission has been officially approved and announced for Travis AFB.
- 2017 Annual GRISR: There was no change to the schedule. This document is not as critical as some others, and comments are not expected until November 2018. Mr. Anderson requested that, if the agencies have comments on the 4Q2018 sampling plan, to please let Ms. Royer know so that changes to the monitoring event could be incorporated if possible. If not, proposed changes will be incorporated into the 2Q2019 sampling event.
- Monitoring Well Installation Technical Memorandum for Site DP039, Addendum to the Site DP039 Remedial Action Construction Completion Report: The

Response to Comment and Final dates were changed to 26 July 2018 to reflect actual submittal date.

- Site FT005 Extraction System Optimization Report: The Response to Comments Due and Final Due dates were changed to 23 August 2018.
- Site LF044 Sediment Sampling Report: The Response to Comments Due and Final Due dates were changed to 28 August 2018.
- 2017 Annual CAMU Monitoring Report: The Response to Comments Due and Final Due dates were changed to 7 September 2018.
- Emulsified Vegetable Oil Sites FT004, SS015, SD031, and SD036 Optimization Injections Report: The Draft to Agencies date was changed to 31 August 2018. The remainder of the dates were changed accordingly. This is a lower priority document.
- Site SS015 Soil Sampling Plan: Moved to History.

2. CURRENT PROJECTS

Treatment Plant Operation and Maintenance Update

South Base Boundary Groundwater Treatment Plant, July 2018 (see Attachment 3)

The South Base Boundary Groundwater Treatment Plant (SBBGWTP) performed at 96.1% uptime, and 7.3 million gallons of groundwater were extracted and treated in July 2018. All treated water was discharged to Union Creek. The average flow rate for the SBBGWTP was 154.3 gallons per minute (gpm). Electrical power usage was 19,404 kWh, and approximately 15,159 pounds of CO₂ were created (based on DOE calculation). Approximately 1.2 pounds of volatile organic compounds (VOCs) were removed in July. The total mass of VOCs removed since startup of the system is 502.9 pounds.

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

In July 2018, troubleshooting was performed on several extraction wells, and several maintenance activities were performed on the treatment system. Details can be found in Attachment 3.

Central Groundwater Treatment Plant, July 2018 (see Attachment 4)

The Central Groundwater Treatment Plant (CGWTP) performed at 97.1% uptime with approximately 1,325,442 gallons of groundwater extracted and treated in July 2018. All treated water was discharged to the storm sewer system which discharges to Union Creek. The average flow rate for the CGWTP was 27.9 gpm. Electrical power usage

was 3.089 kWh for all equipment connected to the Central Plant, and approximately 3,174 pounds of CO₂ were generated. Approximately 2.8 pounds of VOCs were removed from groundwater by the treatment plant in July. The total mass of VOCs removed since the startup of the system is 11,498 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 July 2018.

A carbon changeout of the lead GAC vessel was performed on 17 July.

LF007C Groundwater Treatment Plant, July 2018 (See Attachment 5)

The Subarea LF007C Groundwater Treatment Plant (LF007C GWTP) performed at 93% uptime with approximately 188,262 gallons of groundwater extracted and treated in July 2018. All treated water was discharged to the Duck Pond for beneficial reuse. The average flow rate was 4.2 gpm. Approximately 1.2×10^{-3} pound of VOCs was removed from groundwater by the treatment plant in June. The total mass of VOCs removed since the startup of the system is 174.4 pounds. There was no electrical power usage statistics, because this plant operates on solar power only.

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

ST018 Groundwater (MTBE) Treatment Plant, July 2018 (see Attachment 6)

Site ST018 (MTBE) Treatment Plant (ST018 GWTP) performed at 99.9% uptime with approximately 223,640 gallons of groundwater extracted and treated in July 2018. All treated water was discharged to the Fairfield – Suisun Sewer District. The average flow rate for the ST018 GWTP was 4.6 gpm. Electrical power usage for the month was 126 kWh for all equipment connected to the ST018 GWTP. The total CO₂ equivalent, including an estimate for the carbon change-out, equates to approximately 93 pounds. Approximately 0.16 pound of MTBE, BTEX, VOCs, and TPH was removed in July 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 45.7 pounds, and the total MTBE mass removed since startup of the system is 11.1 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 July 2018: Because influent concentrations are significantly less than Fairfield-Suisun Sewer District (FSSD) effluent limitations, and because the system began experiencing increased high-pressure shutdowns, the GAC vessels and bag filters will be bypassed on 1 August (as approved by the FSSD). Extracted

groundwater from Site ST018 is discharged directly to the sanitary sewer. FSSD currently does not have a local limit for MTBE, but a limit of 6,4000 µg/L is advised based on worker health and safety. On 3 July, the ST018 GWTP was shut down for approximately 1 hour to break up the top foot of GAC in the lead vessel to help decrease system pressure. After the system was restarted, the pressure only decreased slightly; therefore, the screens at the bottom of the tank may be clogged.

3. Presentations:

A) Site LF006 Technology Demonstration Work Plan (see Attachment 7)

Mr. Chakurian presented the technology demonstration planned for Site LF006. Please refer to Attachment 7 for the full briefing. Highlights from the discussion following the presentation are as follows:

- Mr. Gamlin noted that an aquifer test was performed at this site; concentrations of 1,1-DCE declined during the test but then increased later due to slight back-diffusion out of clays.
- Mr. Gamlin has been coordinating with several in the academic world to provide soil cores from drilling activities for future research purposes.
- Lactoil is lactate plus emulsified vegetable oil (EVO), and may be more efficient than EVO-only and help a solvent site reach site closure faster.
- Ms. Burke asked if all planned injections will utilize Lactoil with the sulfidated iron; Mr. Chakurian replied that only the three upgradient wells will. The amendment will be pulled downgradient, and better groundwater flow was observed in the deeper wells during the aquifer test.
- The agencies unanimously agreed for the team to install the injection wells as scheduled on 4 September 2018.

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

Mr. Wray reported on the status of fieldwork and documents which are completed, in progress, and upcoming. Please refer to Attachment 8 for the full briefing.

- Mr. Duke noted that the offbase property owners near Site FT005 have changed, but the new owners signed a cattle grazing lease with the same people as the previous owners; therefore, there is no change to the plan for this site.

4. New Action Item Review

No new action items were identified during this meeting.

5. PROGRAM/ISSUES/UPDATE

1) Ms. Constantinescu, Ms. Burke, Mr. Duke, and Mr. Anderson discussed the signature process for Records of Decision and other decision documents. Per the FFA, the agencies cannot sign until the lead agency signs; but since the centralization of AFCEC, the Air Force as lead agency cannot sign until they know the regulating agencies agree with the document as written. Mr. Duke said that he would elevate this issue to his management, and potentially discuss during the Air Force quarterly meeting with the regulators, to be held at the end of the month.

2) Ms. Burke noted that the funding for EPA's contract with TechLaw, Inc. is running out as the end of the fiscal year approaches. As a result, EPA may not review and provide comments on lower priority secondary documents. She noted a risk that the reviewer contract may not be renewed in the next fiscal year.

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	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

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

The RPM face-to-face meeting is scheduled for 09:30 AM PST on 15 August, 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

TREATMENT PLANT OPERATION AND MAINTENANCE UPDATE

3. PRESENTATIONS

- A LF006 TECH DEMO WORK PLAN
- B PROGRAM UPDATE:
DOCUMENTS & ACTIVITIES COMPLETED, IN PROGRESS AND PLANNED

4. NEW ACTION ITEM REVIEW

5. PROGRAM/ISSUES/UPDATE

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.

(2018)
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.)
—	01-17-18	—
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 ²
—	11-21-18	—
—	—	—

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(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	No Further Action ROD for Old Skeet Range (TS060 MRA) Travis AFB, Glenn Anderson
Scoping Meeting	NA	NA	NA	NA
Predraft to AF/Service Center	08-23-16	10-09-17	02-28-18	05-18-18
AF/Service Center Comments Due	09-07-16	11-08-17	03-30-18	06-01-18
Draft to Agencies	09-28-16 (03-22-18)	11-30-17	06-22-18	6-25-18
Draft to RAB	09-28-16 (03-22-18)	11-30-17	06-22-18	6-25-18
Agency Comments Due	10-28-16 (04-27-18)	01-31-18	08-22-18	9-24-18
Response to Comments Meeting	TBD	02-21-18	09-06-18	10-17-18
Agency Concurrence with Remedy	NA	NA	NA	NA
Public Comment Period	NA	NA	NA	NA
Public Meeting	NA	NA	NA	NA
Response to Comments Due	TBD	08-17-18	09-21-18	10-24-18
Draft Final Due	TBD	08-17-18	09-21-18	10-24-18
Final Due	TBD	09-17-18	10-22-18	11-26-18

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
Scoping Meeting	NA	NA	NA
Predraft to AF/Service Center	02-22-18	03-02-18	06-04-18
AF/Service Center Comments Due	03-08-18	03-16-18	06-18-18
Draft to Agencies	04-10-18	04-12-18	07-31-18
Draft to RAB	04-10-18	04-12-18	07-31-18
Agency Comments Due	05-10-18	05-14-18	08-30-18
Response to Comments Meeting	05-16-18	05-16-18	09-19-18
Agency Concurrence with Remedy	NA	NA	NA
Public Comment Period	NA	NA	NA
Public Meeting	NA	NA	NA
Response to Comments Due	06-06-18	08-21-18	TBD
Draft Final Due	06-06-18	08-21-18	TBD
Final Due	TBD	TBD	TBD

Travis AFB Master Meeting and Document Schedule

PRIMARY DOCUMENTS		
Life Cycle	Site SD031 Soil Remedial Investigation/Feasibility Study Travis AFB, Glenn Anderson CH2M, Nikki Carlton	Fourth Five-Year Review Report for Multiple Groundwater, Soil, and Sediment Sites Travis AFB, Glenn Anderson Tetra Tech, Joachim Eberharter
Scoping Meeting	NA	NA
Predraft to AF/Service Center	08-28-18	03-14-18
AF/Service Center Comments Due	09-28-18	05-22-18
Draft to Agencies	10-15-18	6-5-18
Draft to RAB	10-15-18	6-5-18
Agency Comments Due	12-17-18	7-20-18
Response to Comments Meeting	01-16-19	TBD
Agency Concurrence with Remedy	NA	NA
Public Comment Period	NA	NA
Public Meeting	NA	NA
Response to Comments Due	02-07-19	TBD
Draft Final Due	02-07-19	TBD
Final Due	03-12-19	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 LF006 Technology Demonstration Work Plan Travis AFB, Glenn Anderson CH2M, Levi Pratt
Scoping Meeting	NA
Predraft to AF/Service Center	07-03-18
AF/Service Center Comments Due	07-18-18
Draft to Agencies	08-20-18
Draft to RAB	08-20-18
Agency Comments Due	09-20-18
Response to Comments Meeting	10-04-18
Response to Comments Due	10-18-18
Draft Final Due	NA
Final Due	10-18-18
Public Comment Period	NA
Public Meeting	NA

Travis AFB Master Meeting and Document Schedule

INFORMATIONAL DOCUMENTS		
Life Cycle	Quarterly Newsletter (July 2018) Travis, Glenn Anderson	2017 Annual GRISR Travis AFB, Glenn Anderson CH2M, Leslie Royer
Scoping Meeting	NA	NA
Predraft to AF/Service Center	06-26-18	05-09-18
AF/Service Center Comments Due	NA	06-11-18
Draft to Agencies	07-05-18	07-19-18
Draft to RAB	NA	07-19-18
Agency Comments Due	07-19-18	11-19-18
Response to Comments Meeting	07-20-18	01-16-19
Response to Comments Due	07-25-18	01-30-19
Draft Final Due	NA	NA
Final Due	07-25-18	01-30-19
Public Comment Period	NA	NA
Public Meeting	NA	NA

Travis AFB Master Meeting and Document Schedule

INFORMATIONAL DOCUMENTS			
Life Cycle	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	Site FT005 Extraction System Optimization Technical Memorandum Travis AFB, Gene Clare CH2M, Levi Pratt	Site LF044 Sediment Sampling Technical Memorandum Travis AFB, Glenn Anderson CH2M, Doug Berwick CAPE, Meg Greenwald
Scoping Meeting	NA	NA	NA
Predraft to AF/Service Center	02-26-18	03-08-18	04-12-18
AF/Service Center Comments Due	03-14-18	03-22-18	04-26-08
Draft to Agencies	04-19-18	05-01-18	05-17-18
Draft to RAB	04-19-18	05-01-18	05-17-18
Agency Comments Due	05-21-18	06-01-18	06-18-18
Response to Comments Meeting	06-20-18	06-20-18	06-20-18
Response to Comments Due	07-27-18 (07-26-18)	08-23-18	08-28-18
Draft Final Due	NA	NA	NA
Final Due	07-27-18 (07-26-18)	08-23-18	08-28-18
Public Comment Period	NA	NA	NA
Public Meeting	NA	NA	NA

Travis AFB Master Meeting and Document Schedule

INFORMATIONAL DOCUMENTS		
Life Cycle	2017 Annual CAMU Monitoring Report Travis AFB, Gene Clare CH2M HILL, Levi Pratt	Emulsified Vegetable Oil Sites FT004, SS015, SD031, and SD036 Injections Technical Memorandum Travis AFB, Glenn Anderson CH2M, Levi Pratt
Scoping Meeting	NA	NA
Predraft to AF/Service Center	04-19-18	06-12-18
AF/Service Center Comments Due	05-03-18	06-26-18
Draft to Agencies	05-15-18	08-31-18
Draft to RAB	05-15-18	08-31-18
Agency Comments Due	06-15-18	10-01-18
Response to Comments Meeting	06-20-18	10-18-18
Response to Comments Due	09-07-18	11-01-18
Draft Final Due	NA	NA
Final Due	09-07-18	11-01-18
Public Comment Period	NA	NA
Public Meeting	NA	NA

Travis AFB Master Meeting and Document Schedule

HISTORY	
Life Cycle	Site SS015 Soil Sampling Plan Travis AFB, Glenn Anderson CH2M, Levi Pratt
Scoping Meeting	NA
Predraft to AF/Service Center	03-13-18
AF/Service Center Comments Due	03-27-18
Draft to Agencies	04-30-18
Draft to RAB	04-30-18
Agency Comments Due	05-31-18
Response to Comments Meeting	06-20-18
Response to Comments Due	07-13-18
Draft Final Due	NA
Final Due	07-13-18
Public Comment Period	NA
Public Meeting	NA

South Base Boundary Groundwater Treatment Plant

Monthly Data Sheet

Report Number: 213

Reporting Period: 28 June 2018 – 1 August 2018

Date Submitted: 9 August 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 July 2018 reporting period.

Table 1 – Operations Summary – July 2018				
Initial Data Collection:		6/28/2018 10:30	Final Data Collection:	8/1/2018 14:00
Operating Time:		Percent Uptime:		Electrical Power Usage:
SBBGWTP:	788 hours	SBBGWTP:	96.1%	SBBGWTP: 19,404 kWh (15,159 lbs CO ₂ generated ^a)
Gallons Treated: 7.3 million gallons		Gallons Treated Since July 1998: 1,054 million gallons		
Volume Discharged to Union Creek: 7.3 million gallons		Gallons Treated from Other Sources: 0 gallons		
VOC Mass Removed: 1.2 lbs ^b		VOC Mass Removed Since July 1998: 502.9 lbs		
Rolling 12-Month Cost per Pound of Mass Removed: \$9,975 ^c				
Monthly Cost per Pound of Mass Removed: \$11,391 ^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 services averaged to a per month basis.				
^b Calculated using July 2018 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 – July 2018							
FT005 ^b				SS029		SS030	
EW01x05	Offline	EW743x05	Offline	EW01x29	Offline ^c	EW01x30	16.4
EW02x05	Offline	EW744x05	3.6	EW02x29	Offline ^c	EW02x30	7.6
EW03x05	Offline	EW745x05	11.1	EW03x29	3.0	EW03x30	16.2
EW731x05	6.8	EW746x05	Offline	EW04x29	11.4	EW04x30	24.5
EW732x05	Offline	EW2291x05	5.6	EW05x29	7.4	EW05x30	8.5
EW733x05	Offline	EW2782x05	6.8	EW06x29	8.3	EW2174x30	7.2
EW734x05	2.0	EW2783x05	4.0	EW07x29	13.3	EW711x30	9.3
EW735x05	11.0	EW2784x05	5.8			MW269x30	0.5
EW736x05	Offline	EW2785x05	4.0				
EW737x05	Offline	EW2786x05	17.1				
EW742x05	Offline						
FT005 Total: 77.8				SS029 Total: 43.4		SS030 Total: 90.2	
SBBGWTP Average Monthly Flow ^d : 154.3 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 Extraction wells taken off line because of persistent fouling of the well pumps and associated discharge piping.							
^d 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	10 July 2018	09:15	10 July 2018	11:00	Backwash carbon vessels
SBBGWTP	27 July 2018	09:00	27 July 2018	14:00	Clean out effluent holding tank and install new fitting for backwash tank
SBBGWTP	30 July 2018	12:00	31 July 2018	13:00	Seal leak on new fitting for backwash tank
-- = 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

Monthly groundwater treatment samples were collected at the SBBGWTP on 5 July 2018. Sample results are presented in Table 4. The total VOC concentration (19.20 µg/L) in the influent sample increased slightly from the June 2018 sample results (18.20 µg/L). TCE was the primary VOC detected in the influent sample at a concentration of 18 µg/L. Several VOCs were detected in the midpoint sampling location, including TCE, cis-1,2-DCE, and chloroform. No VOCs were detected in the final effluent sample. However, TPH-d was detected at a concentration of 30 J- µg/L, which was less than the effluent limitation. A carbon change out is scheduled for the lead GAC vessel at the SBBGWTP in August 2018.

In July 2018, troubleshooting was performed on several extraction wells. The following list presents the maintenance activities and status of several extraction wells:

- EW04x29 - Replaced the pump end and cleaned the flow meter paddlewheel. Well is currently operating.
- EW05x30 - Cleaned the flow meter paddlewheel. Well is currently operating.
- EW711x30 - Installed new control wires. Well is currently operating.
- EW2174x30 - Replaced the transducer. Well is currently operating.
- EW2783x05 - Replaced the transducer. Well is currently operating.

In addition, several maintenance activities were performed on the treatment system.

- On 10 July, the system was shut down to backwash the GAC vessels because of high pressures.
- On 27 July, the system was shut down to clean out the algae buildup within the effluent holding tank. While the effluent tank was empty, a new fitting was installed for the backwash pump. After the system was restarted, a small leak was observed at the newly installed fitting.
- On 30 July, the system was shut down again to seal around the fitting. The sealant was allowed to dry overnight. On 31 July, the system was restarted without any leaks.

Figure 1 presents the 1,2-DCA and TCE concentrations since January 2017. Figure 2 presents a plot of influent concentrations and average flow at the SBBGWTP over the past twelve (12) months. The VOC influent concentrations have an overall decreasing trend over the past 12 months with a slight increasing trend since February 2018. However, an overall increasing flow rate trend was observed in the past 12 months with the addition of the new extraction wells at Site FT005 in November 2017.

Optimization Activities

No optimization activities occurred at the SBBGWTP in July 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 3 presents the historical GHG production from the SBBGWTP. In July 2018, the SBBGWTP produced approximately 15,159 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 July 2018 – South Base Boundary Groundwater Treatment Plant

				5 July 2018 (µg/L)		
Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	Influent	Midpoint	Effluent
Halogenated Volatile Organics						
Acetone	NA	1.9	0	ND	ND	ND
Bromodichloromethane	NA	0.17	0	ND	ND	ND
Carbon Tetrachloride	0.5	0.19	0	ND	ND	ND
Chloroform	5.0	0.16	0	ND	0.17 J	ND
Chloromethane	NA	0.30	0	ND	ND	ND
1,1-Dichloroethane	5.0	0.16	0	ND	ND	ND
1,2-Dichloroethane	0.5	0.13	0	ND	ND	ND
1,1-Dichloroethene	5.0	0.14	0	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.15	0	1.2 J	1.6	ND
trans-1,2-Dichloroethene	5.0	0.15	0	ND	ND	ND
Methylene Chloride	5.0	0.32	0	ND	ND	ND
Tetrachloroethene	5.0	0.20	0	ND	ND	ND
1,1,1-Trichloroethane	5.0	0.16	0	ND	ND	ND
1,1,2-Trichloroethane	5.0	0.32	0	ND	ND	ND
Trichloroethene	5.0	0.16	0	18	1.1	ND
Vinyl Chloride	0.5	0.10	0	ND	ND	ND
Non-Halogenated Volatile Organics						
Benzene	1.0	0.16	0	ND	ND	ND
Ethylbenzene	5.0	0.16	0	ND	ND	ND
Toluene	5.0	0.17	0	ND	ND	ND
Xylenes	5.0	0.19 – 0.34	0	ND	ND	ND
Other						
Total Petroleum Hydrocarbons – Gasoline	50	10	0	NM	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	15	0	NM	NM	30 J-
Total Petroleum Hydrocarbons – Motor Oil	50	160	0	NM	NM	ND
1,4-Dioxane	NA	0.08	0	ND	NM	ND

* In accordance with current National Pollutant Discharge Elimination System permit – January 2018.

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, biased low

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 Influent 1,2-DCA and TCE Concentrations Since January 2017

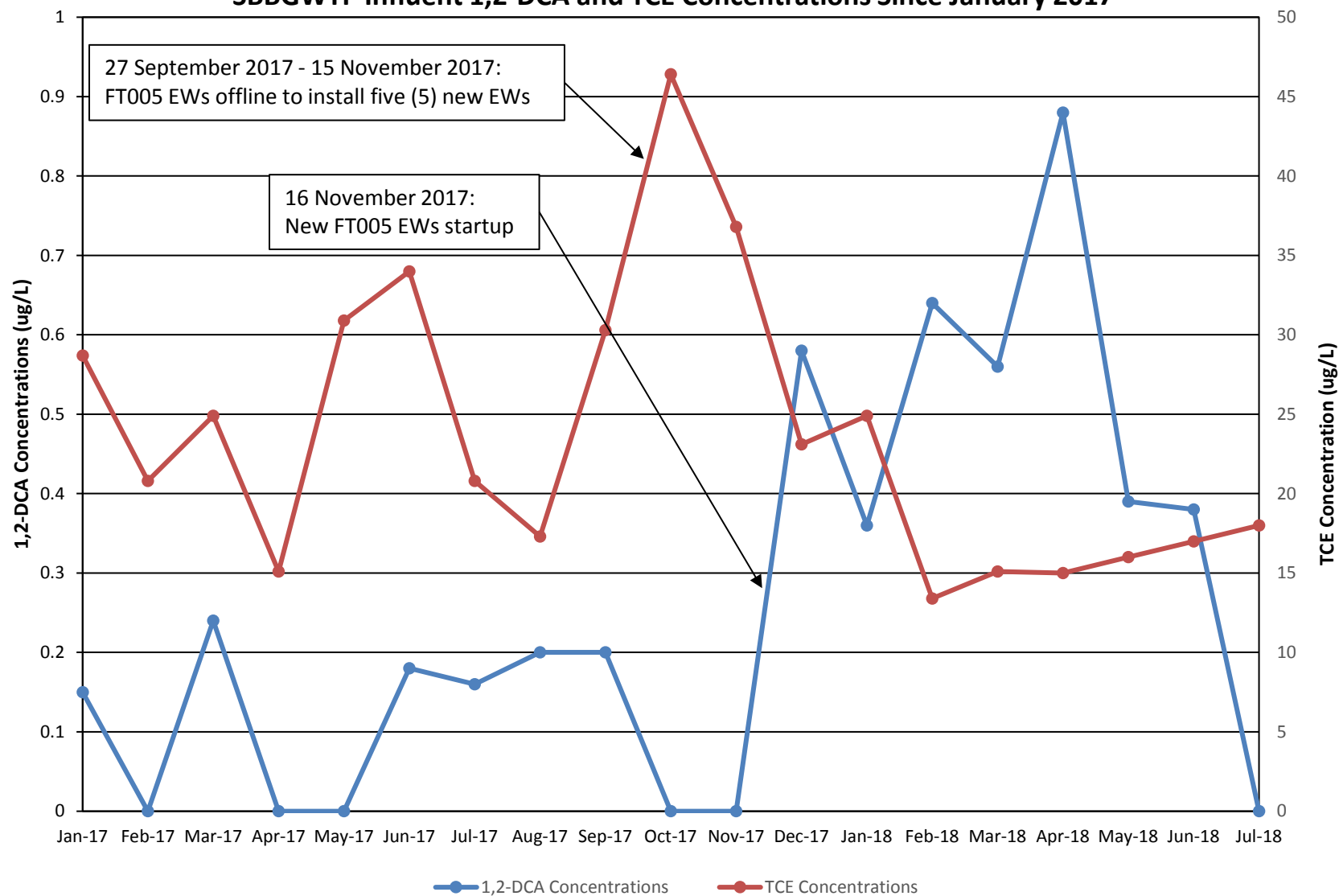


Figure 2
SBBGWTP Total VOC Influent Concentrations and Average Flowrate Twelve Month History

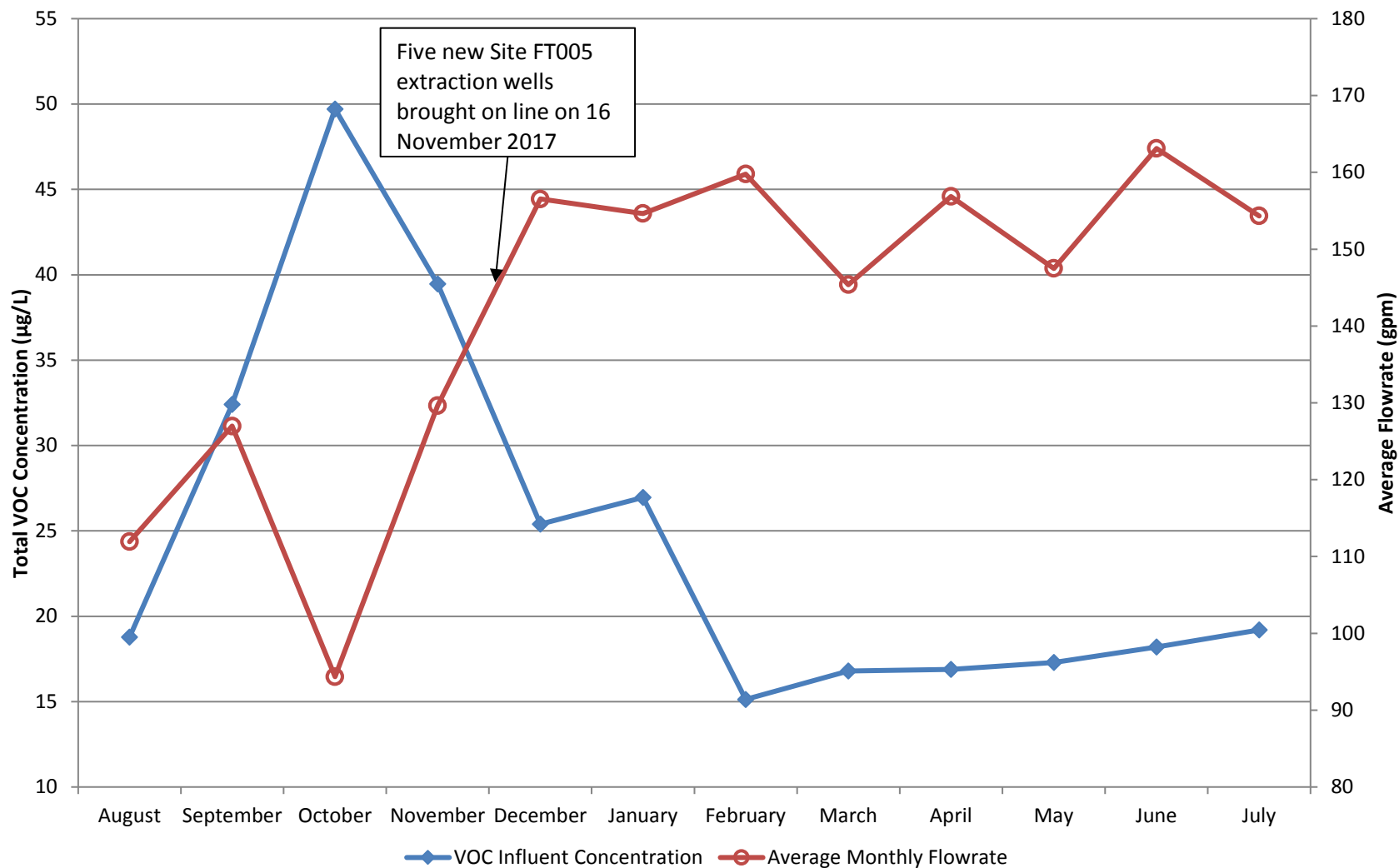
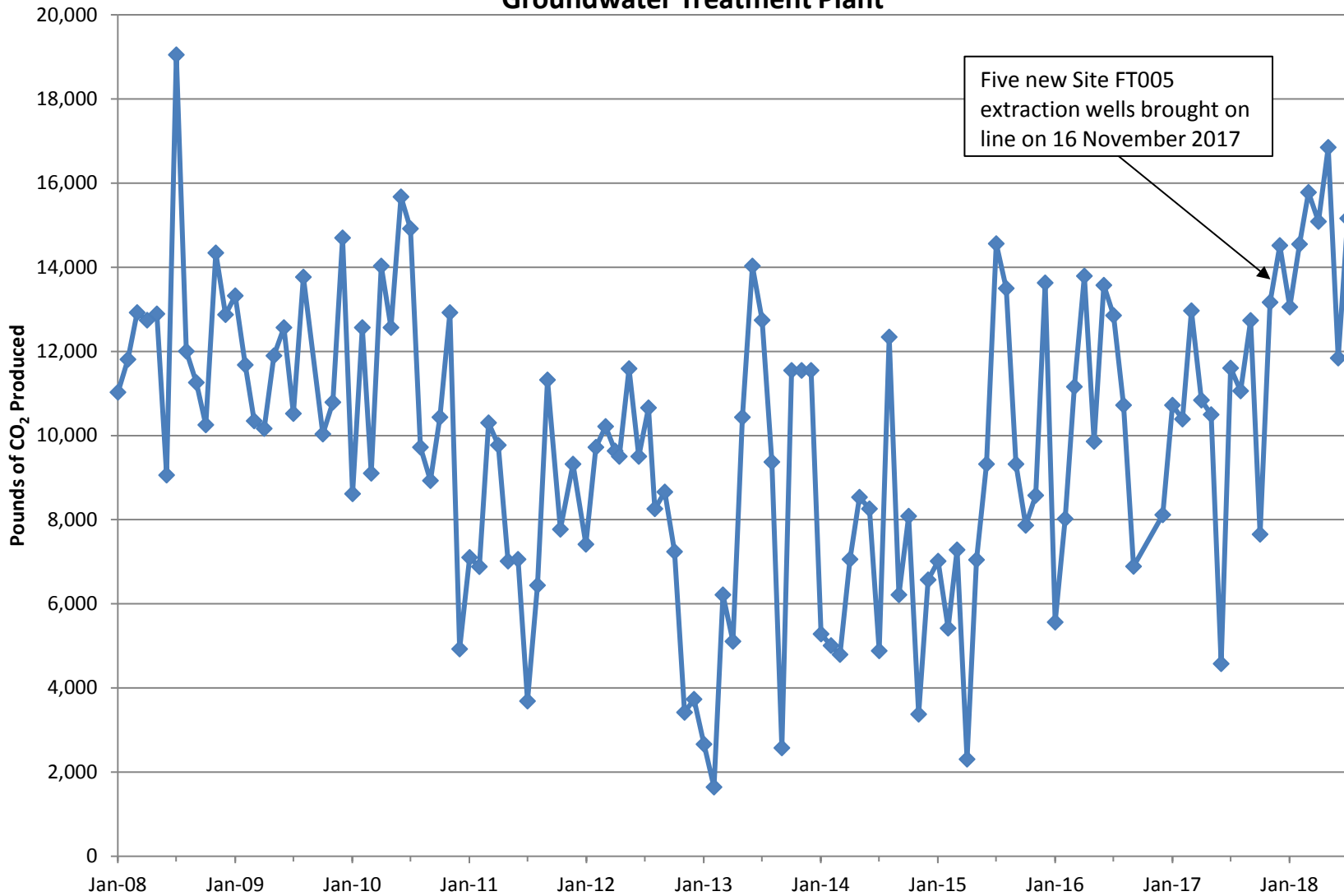


Figure 3

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



Central Groundwater Treatment Plant Monthly Data Sheet

Report Number: 228

Reporting Period: 28 June 2018 – 1 August 2018

Date Submitted: 9 August 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 July 2018 reporting period.

Table 1 – Operations Summary – July 2018				
Initial Data Collection:		6/28/2018 14:00	Final Data Collection:	8/1/2018 12:50
Operating Time:		Percent Uptime:	Electrical Power Usage:	
CGWTP:	791 hours	CGWTP:	97.1%	CGWTP: 3,089 kWh (3,174 lbs CO ₂ generated ^a)
Gallons Treated (discharge to storm sewer): 1,325,442 gallons		Gallons Treated Since January 1996: 558.0 million gallons		
VOC Mass Removed from groundwater: 2.8 lbs ^b		VOC Mass Removed Since January 1996: 2,812 lbs from groundwater 8,686 lbs from vapor		
Rolling 12-Month Cost per Pound of Mass Removed: \$2,070 ^c				
Monthly Cost per Pound of Mass Removed: \$2,182 ^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 services averaged to a per month basis.				
^b Calculated using July 2018 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 – July 2018	
Location	Average Flow Rate Groundwater (gpm)
EW001x16	13.0
EW002x16	7.4
EW003x16	0.1
EW605x16	5.9
EW610x16	2.5
CGWTP	27.9
^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	17 July 2018	8:55	18 July 2018	08:30	Perform carbon change out on lead GAC vessel.
-- = Date/Time not recorded					
^a 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.

Table 4 – Summary of DP039 Bioreactor “Pulsed Mode” Operations		
Location	Pulse-on Date	Pulse-off Date
MW750x39	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	21 March 2018
	16 April 2018	14 May 2018
	12 June 2018	9 July 2018
MW = Monitoring Well		

Summary of O&M Activities

Monthly groundwater treatment samples were collected at the CGWTP on 5 July 2018. Sample results are presented in Table 5. The total VOC concentration (256.59 µg/L) in the July 2018 influent sample has increased slightly from the June 2018 sample (251.24 µg/L). TCE was the primary VOC detected in the influent sample at a concentration of 210 µg/L. Cis-1,2-DCE (30 µg/L), chloroform (0.16 J µg/L), and vinyl chloride (0.27 J µg/L) were detected in the sample collected after the first carbon vessel. Vinyl chloride was detected in the sample collected after the second carbon vessel and the effluent sample at trace concentrations. In addition, TPH-d (16 J- µg/L) was also detected in the effluent sample. All detections in the effluent sample were less than the NPDES permit effluent limits. Travis AFB will continue to monitor influent, midpoint, and effluent concentrations at the CGWTP for carbon breakthrough, though the carbon treatment remained effective in July 2018.

On 17 July, a carbon change out was performed on the lead GAC vessel. The system remained off line until 18 July when the lead GAC vessel was backwashed to remove the fines. The backwash water was stored in the construction/backwash tanks to be treated through the system at a later date. While the lead GAC vessel was being backwashed, the system totalizer was temporarily removed and rebuilt.

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 an increasing trend over the past 12 months along with an overall decreasing trend for the flow rate through the treatment plant.

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 taken off line on 9 July 2018 as planned.

Optimization Activities

No optimization activities occurred at the CGWTP in July 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 3,174 pounds of GHG during July 2018.

TABLE 5
Summary of Groundwater Analytical Data for July 2018 – Central Groundwater Treatment Plant

				5 July 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							
Carbon Tetrachloride	0.5	0.19	0	ND	ND	ND	ND
Chloroform	5.0	0.16	0	ND	0.16 J	ND	ND
Chloromethane	NA	0.30	0	ND	ND	ND	ND
1,2-Dichlorobenzene	5.0	0.13	0	0.32 J	ND	ND	ND
1,3-Dichlorobenzene	5.0	0.16	0	0.37 J	ND	ND	ND
1,4-Dichlorobenzene	5.0	0.16	0	0.16 J	ND	ND	ND
1,1-Dichloroethane	5.0	0.16	0	ND	ND	ND	ND
1,2-Dichloroethane	0.5	0.13	0	ND	ND	ND	ND
1,1-Dichloroethene	5.0	0.14	0	0.56 J	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.15	0	42	30	ND	ND
trans-1,2-Dichloroethene	5.0	0.15	0	2.4	ND	ND	ND
Methylene Chloride	5.0	0.32	0	ND	ND	ND	ND
Tetrachloroethene	5.0	0.20	0	0.45 J	ND	ND	ND
1,1,1-Trichloroethane	5.0	0.16	0	ND	ND	ND	ND
1,1,2-Trichloroethane	5.0	0.32	0	ND	ND	ND	ND
Trichloroethene	5.0	0.16 – 1.6	0	210	ND	ND	ND
Vinyl Chloride	0.5	0.10	0	0.33 J	0.27 J	0.23 J	0.13 J
Non-Halogenated Volatile Organics							
Benzene	1.0	0.16	0	ND	ND	ND	ND
Ethylbenzene	5.0	0.16	0	ND	ND	ND	ND
Toluene	5.0	0.17	0	ND	ND	ND	ND
Total Xylenes	5.0	0.19 – 0.34	0	ND	ND	ND	ND
Other							
Total Petroleum Hydrocarbons – Gasoline (C6 – C10)	50	10	0	NM	NM	NM	ND
Total Petroleum Hydrocarbons – Diesel (C10 – C28)	50	15	0	NM	NM	NM	16 J-
Total Petroleum Hydrocarbons – Motor Oil (C28 – C40)	50 (trigger)	160	0	NM	NM	NM	ND
1,4-Dioxane	NA	0.08	0	ND	NM	NM	ND

* In accordance with current National Pollutant Discharge Elimination System permit – January 2018.

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, biased low

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

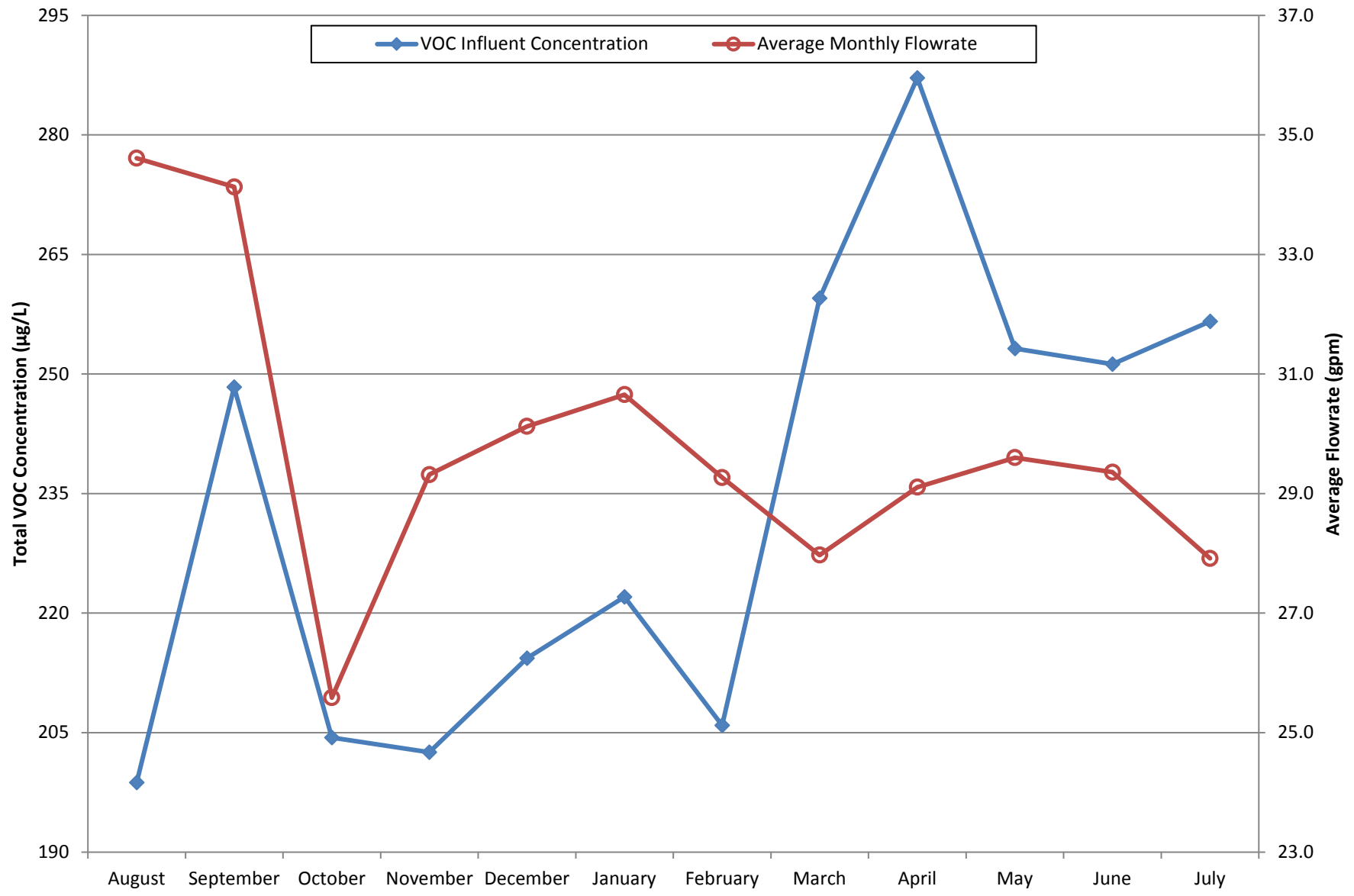
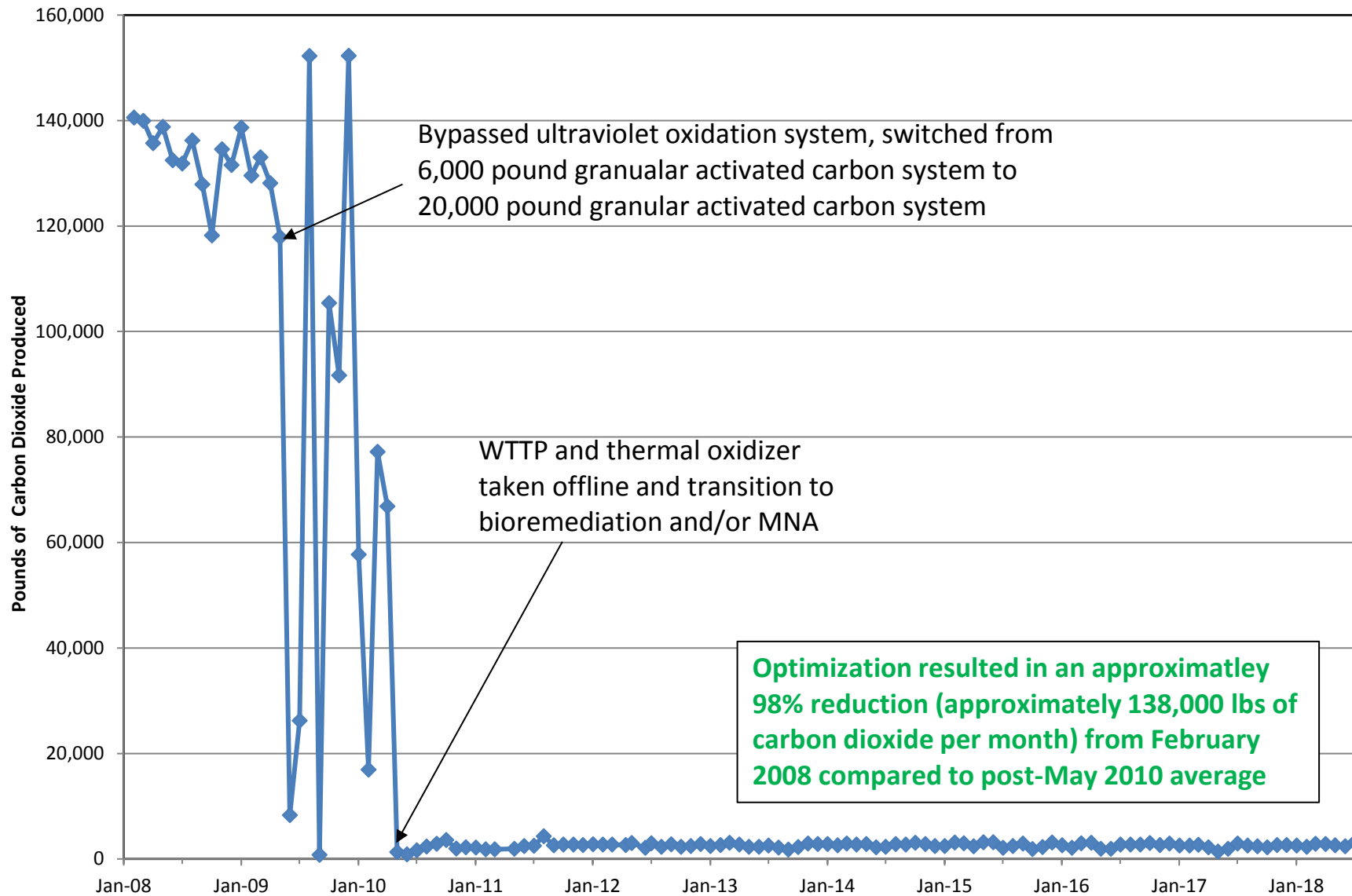


Figure 2

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



Subarea LF007C Groundwater Treatment Plant

Monthly Data Sheet

Report Number: 171

Reporting Period: 28 June 2018 – 1 August 2018

Date Submitted: 9 August 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 July 2018 reporting period:

Table 1 – Operations Summary – July 2018				
Initial Data Collection:		6/28/2018 16:30	Final Data Collection:	8/1/2018 13:15
Operating Time:		Percent Uptime:		Electrical Power Usage ^a :
LF007C GWTP:	756 hours	LF007C GWTP	93%	LF007C GWTP: 0 kWh
Gallons Treated: 188,262 gallons		Gallons Treated Since March 2000: 87.8 million gallons		
Volume Discharged to Duck Pond: 188,262 gallons		VOC Mass Removed Since March 2000: 174.4 pounds (Groundwater)		
VOC Mass Removed: 1.2 x 10 ⁻³ pounds ^b				
Rolling 12-Month Cost per Pound of Mass Removed: Not Measured ^c				
Monthly Cost per Pound of Mass Removed: Not Measured ^c				
^a The LF007C GWTP operates on solar power only.				
^b VOCs from July 2018 influent sample detected by EPA Method SW8260C.				
^c Value not calculated since measurement does not accurately represent the cost effectiveness of the system.				

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

Table 2 – LF007C GWTP Average and Total Flow Rates – July 2018		
Location	Average Flow Rate (gpm) ^a	Total Gallons Processed (gallons)
EW614x07	3.7	165,735
EW615x07	0.4	19,513
LF007C GWTP	4.2	188,262
^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 ^a		Cause
	Date	Time	Date	Time	
LF007C GWTP	July 25, 2018	--	August 1, 2018	--	Unknown system outages occurred between 25 July and 1 August 2018 resulting in approximately 58 hours of system downtime. In each case, the system was automatically restarted and returned to service.
-- = Time not recorded ^a 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 5 July 2018. Sample results are presented in Table 4. TCE (0.79 J µg/L) and 1,4-dioxane (1.5 J- µg/L) were detected at the influent sample location. Cis-1,2-DCE (0.19 J µg/L) was detected in the midpoint sampling location. TPH-d was detected in the effluent sample at a concentration (58 J- µg/L) in excess of the effluent limitation of 50 µg/L. The false-positive TPH issue is being studied, which will result in a technical memorandum discussing this issue. 1,4-dioxane was detected in the effluent sample at a concentration of 1.0 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 Permit.

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 slightly increased over the last 12 months.

Optimization Activities

No optimization activities occurred at the LF007C GWTP in July 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 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 July 2018 – Subarea LF007C Groundwater Treatment Plant

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	5 July 2018 (µg/L)		
				Influent	After Carbon 1	Effluent
Halogenated Volatile Organics						
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	0.19 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	0.79 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 Petroleum Hydrocarbons – Gasoline	50	35	0	NM	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	24	1	NM	NM	58 J-
Total Petroleum Hydrocarbons – Motor Oil	50	24	0	NM	NM	ND
1,4-Dioxane	NA	0.19	0	1.5 J-	NM	1.0 J-

* In accordance with current National Pollutant Discharge Elimination System permit – January 2018.

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, biased low

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

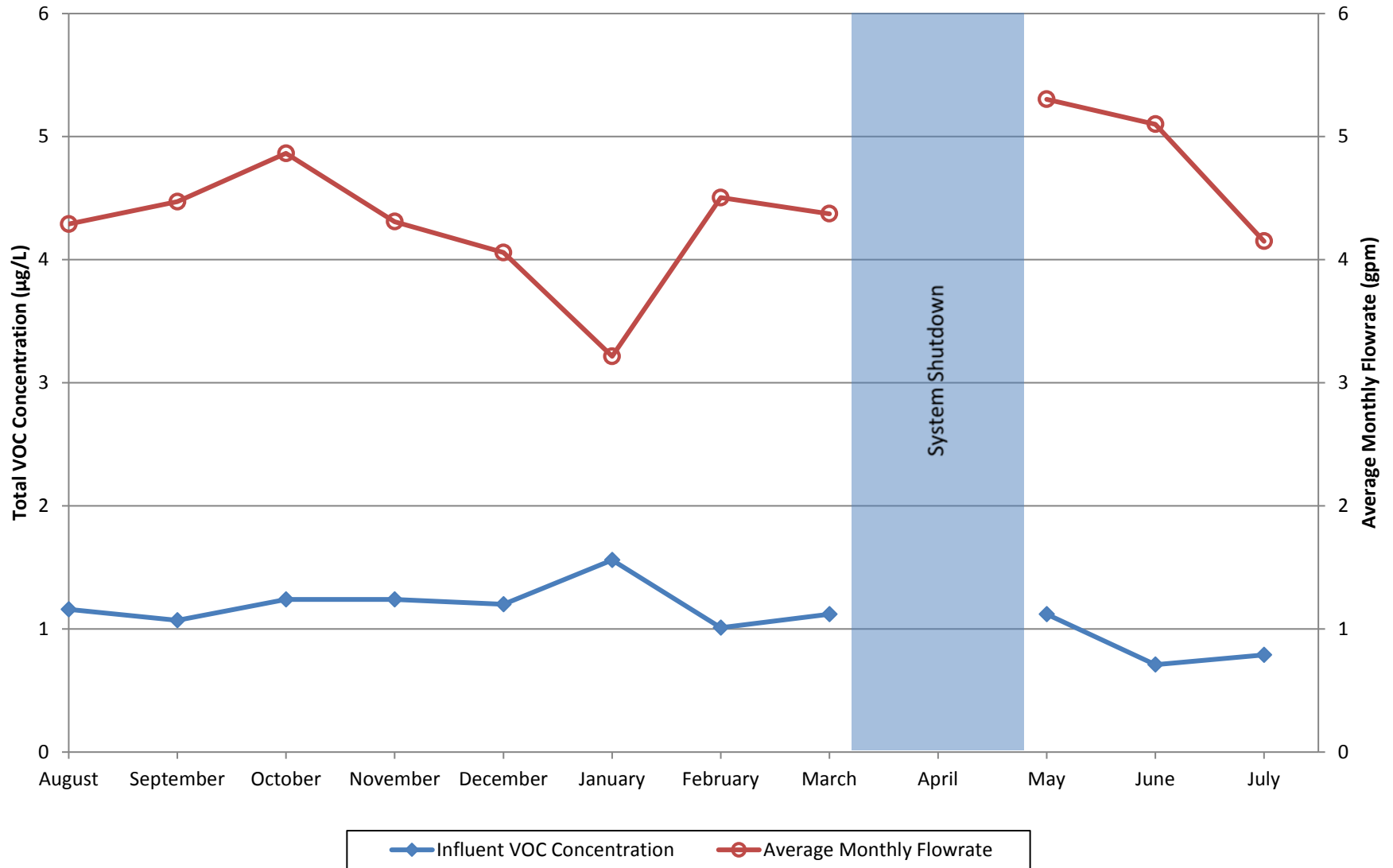
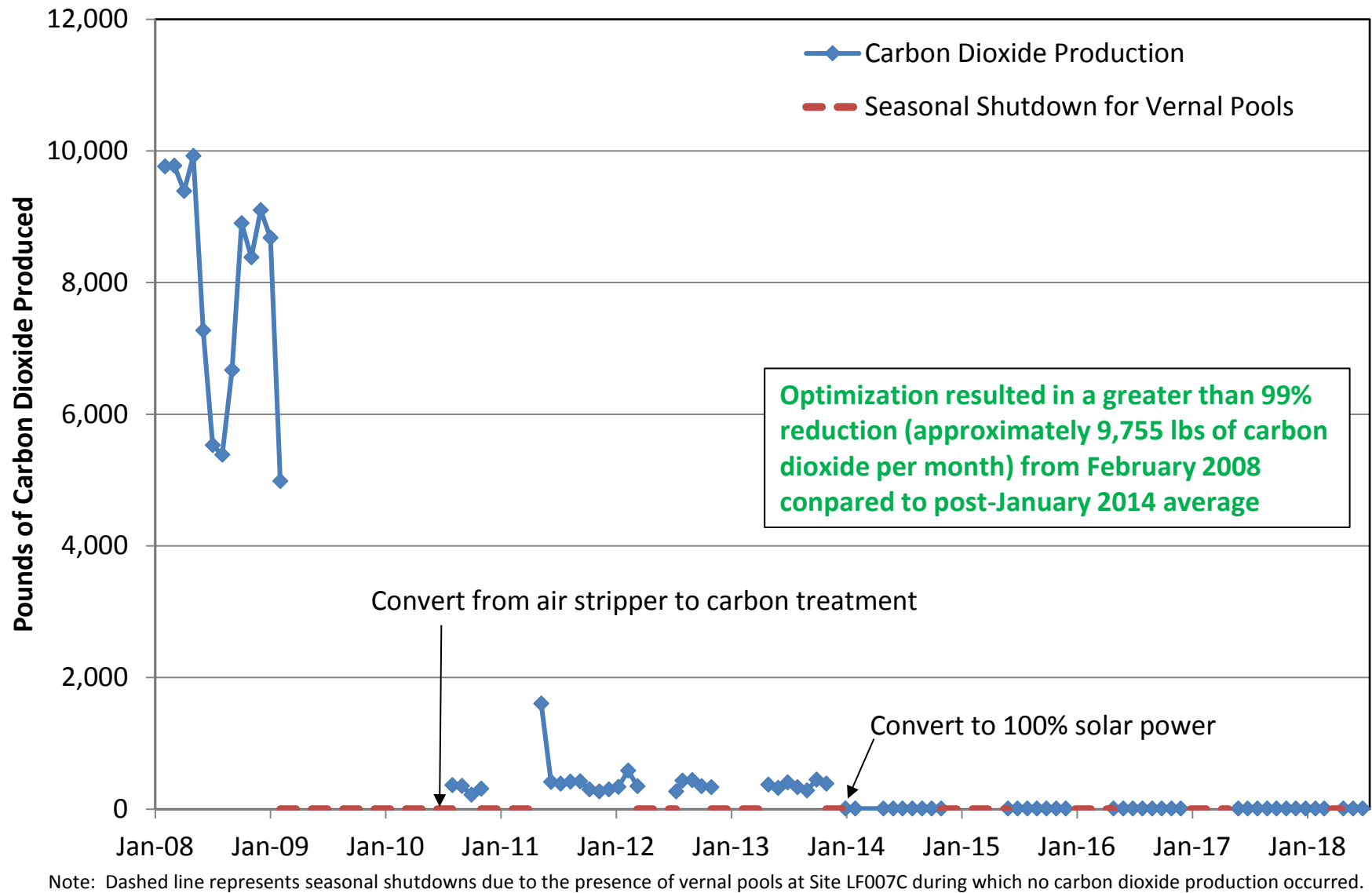


Figure 2
Equivalent Pounds of Carbon Dioxide Produced by the NGWTP/LF007C GWTP



Site ST018 Groundwater Treatment Plant

Monthly Data Sheet

Report Number: 089

Reporting Period: 28 June 2018 – 1 August 2018

Date Submitted: 9 August 2018

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

System Metrics

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

Table 1 – Operations Summary – July 2018			
Initial Data Collection: 6/28/2018 16:00		Final Data Collection: 8/1/2018 12:00	
Operating Time:		Percent Uptime:	
ST018GWTP: 811 hours		ST018GWTP: 99.9%	
		ST018GWTP: 126 kWh (93 lbs CO ₂ generated ^a)	
Gallons Treated: 223,640 gallons		Gallons Treated Since March 2011: 15.4 million gallons	
Volume Discharged to Sanitary Sewer: 223,640 gallons		Final Totalizer Reading: 15,426,789 gallons	
Cumulative Volume Discharged to Sanitary Sewer since 1 November 2014: 8,930,615 gallons			
MTBE, BTEX, VOC, TPH Mass Removed: 0.16 lbs^b		MTBE, BTEX, VOC, TPH Mass Removed Since March 2011: 45.7 lbs	
MTBE (Only) Removed: 0.02 lbs^b		MTBE (Only) Mass Removed Since March 2011: 11.1 lbs	
Rolling 12-Month Cost per Total Pounds of Mass Removed: \$9,860 ^{bc}			
Monthly Cost per Pound of Mass Removed: \$28,650 ^{bc}			
^a SiteWise™ estimate that 1 kilowatt hour generated produces 0.74 pounds of GHG.			
^b Calculated using July 2018 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 – July 2018		
Location	Average Flow Rate Groundwater (gpm)^a	Hours of Operation
EW2014x18	1.7	811
EW2016x18	0.9	120
EW2019x18	1.3	811
EW2333x18	1.1	811
ST018GWTP	4.6	811
^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	3 July 2018	13:00	3 July 2018	14:00	Break up top foot of carbon in the lead GAC vessel to decrease pressure.
-- = 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 5 July 2018. Results are presented in Table 4. The complete July 2018 laboratory data report is available upon request. The influent concentration for MTBE during the July 2018 sampling event was 12 µg/L, which is a decrease from the June 2018 sample result of 29 J- µg/L. TPH-g and TPH-d were also detected in the influent sample. MTBE and TPH-d were detected in the system effluent sampling location at concentrations less than their respective effluent limitations.

On 3 July, the ST018GWTP was shut down for approximately 1 hour to break up the top foot of GAC in the lead vessel to help decrease system pressure. After the system was restarted, the pressure only decreased slightly; therefore, the screens at the bottom of the tank may be clogged.

Influent concentrations at the Site ST018 GWTP have consistently been two (2) or three (3) orders of magnitude below effluent limitation to the Fairfield-Suisun Sewer District sanitary sewer discharge. Because of increased system shutdowns due to GAC vessel clogging, Travis AFB worked with the Base Water Program Manager and the Fairfield-Suisun Sewer District in July 2018 to coordinate the bypass of the bag filters and GAC vessels at the Site ST018 GWTP. On 1 August 2018, the three (3) GAC vessels and bag filters were bypassed. Extracted groundwater from Site ST018 is currently discharged directly to the sewer. Two (2) GAC vessels will be

removed from the ST018 GWTP at a later date, with a single vessel remaining in the event that treatment becomes necessary.

The detected concentrations of TPH in the July 2018 effluent sample 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 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 during the dry 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 slightly increasing trend. The MTBE concentrations and total influent concentrations have generally been fluctuating over the past 12 months with a flat trend and a decreasing trend, respectively.

Optimization Activities

Because influent concentrations are significantly less than Fairfield-Suisun Sewer District effluent limitations, and because the system began experiencing increased high-pressure shutdowns, the GAC vessels and bag filters were bypassed on 1 August. Extracted groundwater from Site ST018 is discharged directly to the sewer.

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 July 2018 and treated 223,640 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 system.

Because the GAC vessels were bypassed on 1 August, future GHG production at ST018GWTP will significantly decrease due to a lack of carbon changes.

TABLE 4

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

Summary of Groundwater Monitoring Data for July 2018 Site C-1010 Groundwater Treatment Plant					
Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	5 July 2018 (µg/L)	
				Influent	System Effluent
Fuel Related Constituents					
Methyl tert-Butyl Ether	6,400	0.25	0	12	3.2 J
Benzene	25,000 ^a	0.16	0	ND	ND
Ethylbenzene	25,000 ^a	0.16	0	ND	ND
Toluene	25,000 ^a	0.17	0	ND	ND
Total Xylenes	25,000 ^a	0.19 – 0.34	0	ND	ND
Total Petroleum Hydrocarbons – Gasoline	50,000 ^b	10	0	31	ND
Total Petroleum Hydrocarbons – Diesel	50,000 ^b	16	0	41 J-	15 J-
Total Petroleum Hydrocarbons – Motor Oil	100,000	160 – 170	0	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

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

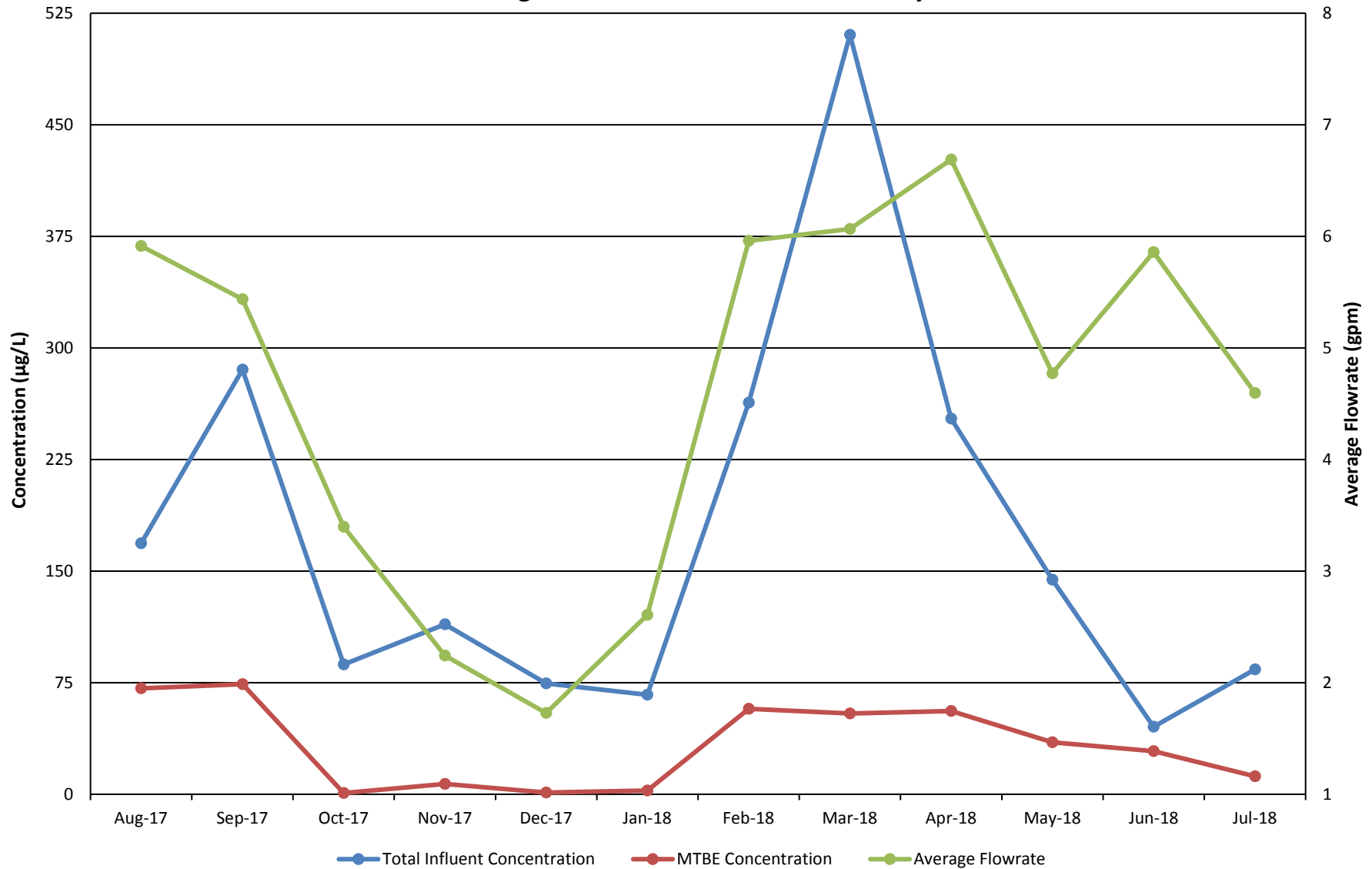
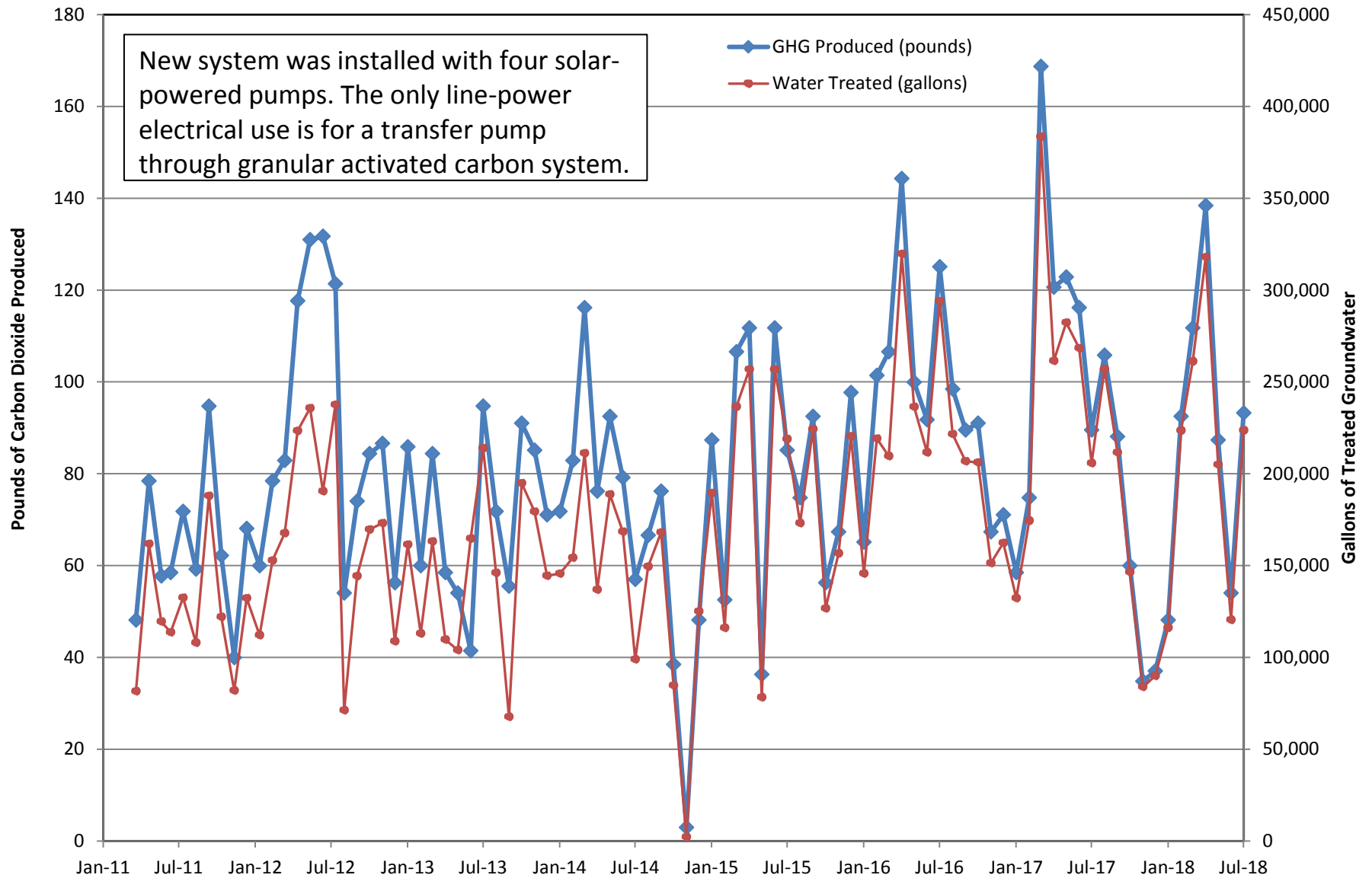


Figure 2

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



Site LF006 Technology Demonstration Work Plan

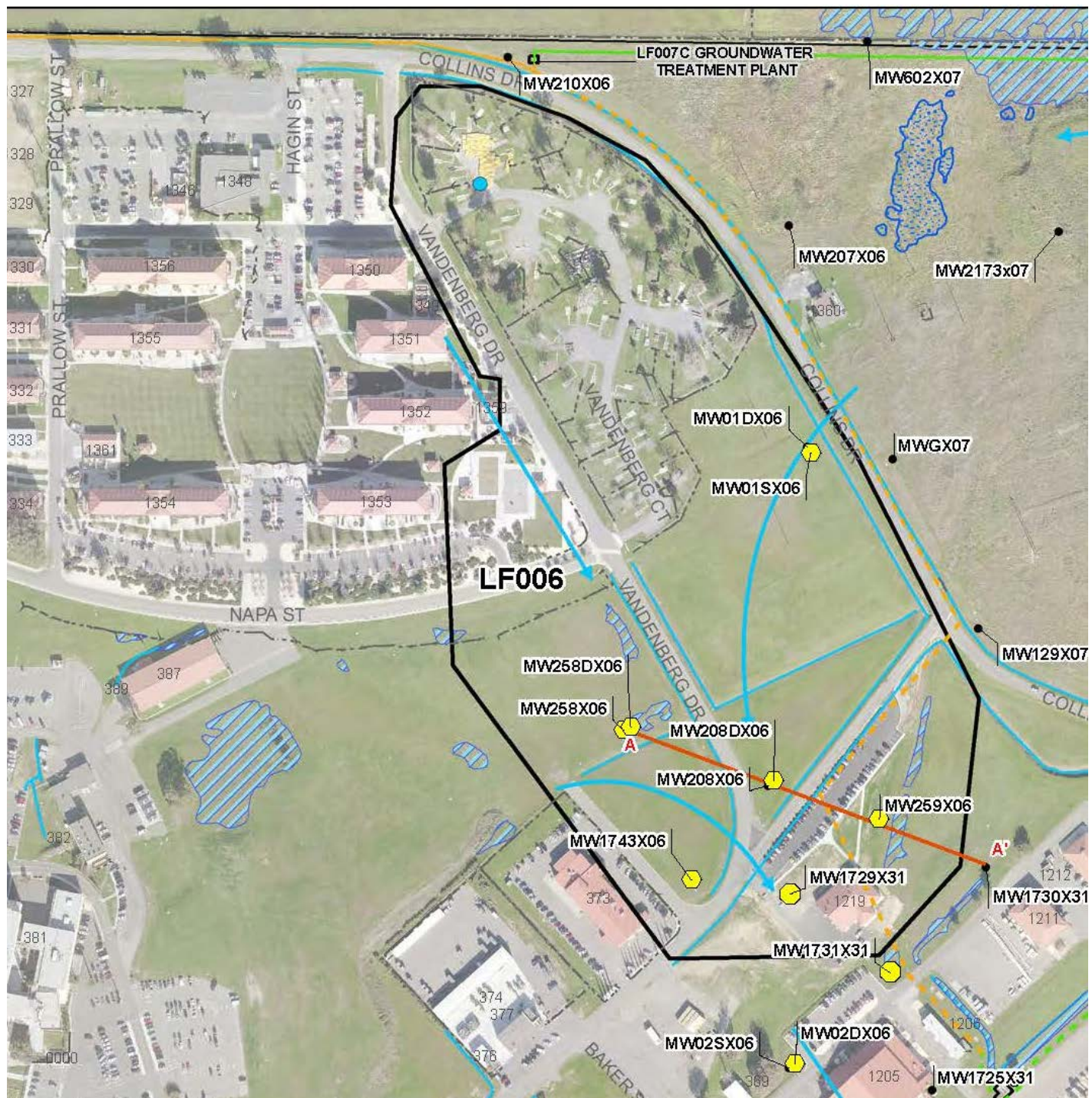
RPM Meeting
August 15, 2018

Agenda

- Background
- Objectives
- Conceptual Design
- Results Comparison
- Rationale for Using Site LF006
- Monitoring/Injection Wells
- Lactoil Injection
- Groundwater Monitoring
- Reporting

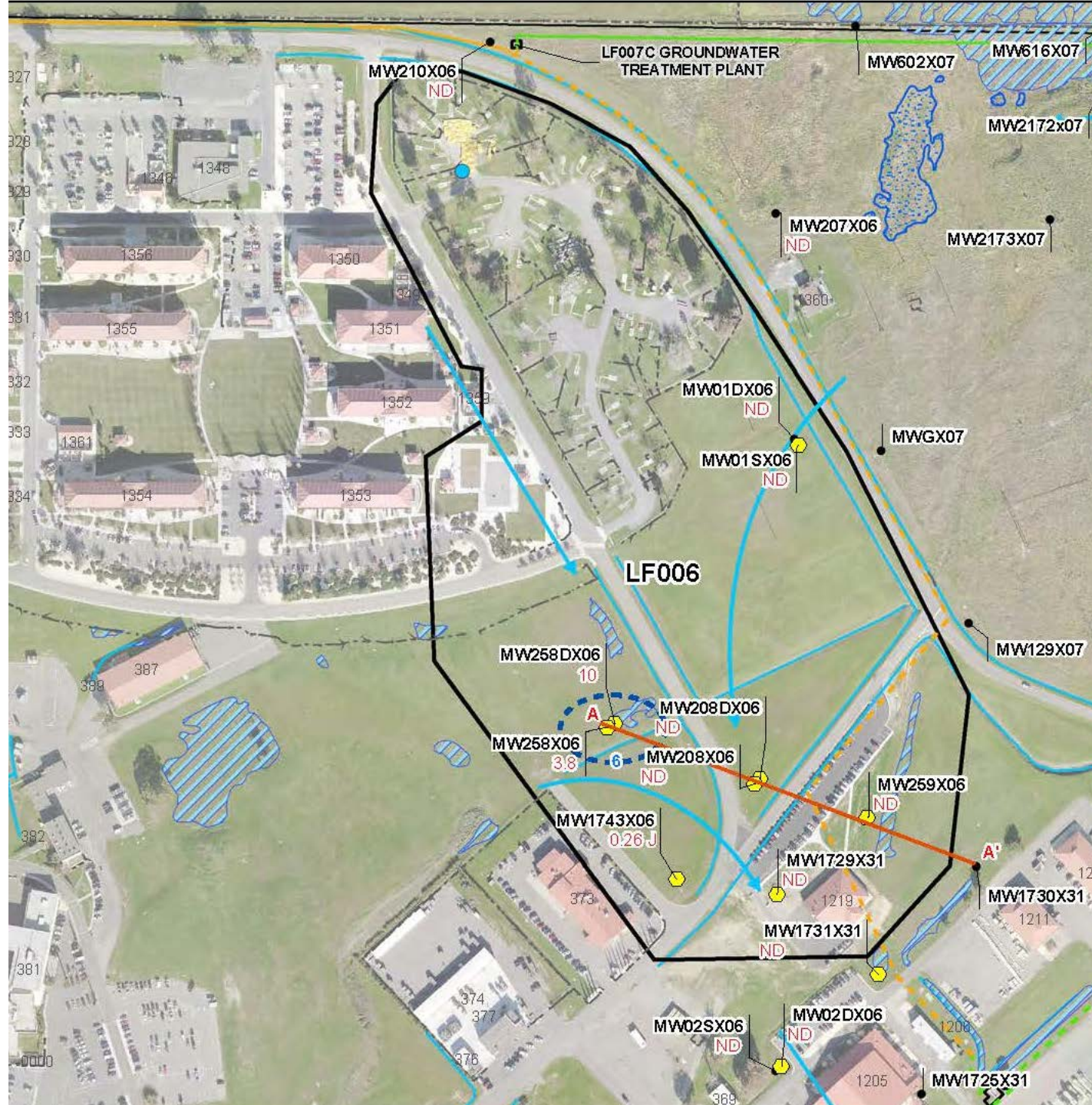
Background

- Site LF006 is a former burn-and-fill landfill that encompasses approximately 17 acres in the northeastern corner of Travis AFB.
- Site LF006 operated between 1943 and the early 1950s.
- Materials disposed of and burned at Site LF006 consisted primarily of wood, paper, glass, residential debris, industrial wastes, and construction debris.
- Leaching from the buried waste appears to have been the source of groundwater contamination.



Background

- In 2014, the Groundwater Record of Decision (ROD) selected MNA as the final remedy for Site LF006.
- In 2Q17, all site-related chemicals of concern (COC) concentrations were below cleanup levels.
- In 4Q17, the groundwater monitoring was expanded at the site to include all Site LF006 monitoring wells to assess whether cleanup levels have been met sitewide.
- In 2017, an aquifer test was performed at well MW258Dx06 to evaluate hydrogeologic and contaminant properties of the aquifer in the area, where 1,1-dichloroethene (DCE) concentrations have recently been detected at concentrations exceeding the cleanup level.
- This testing indicated minimal remaining contamination is left in the aquifer, and there is minimal potential for plume migration.



Objectives

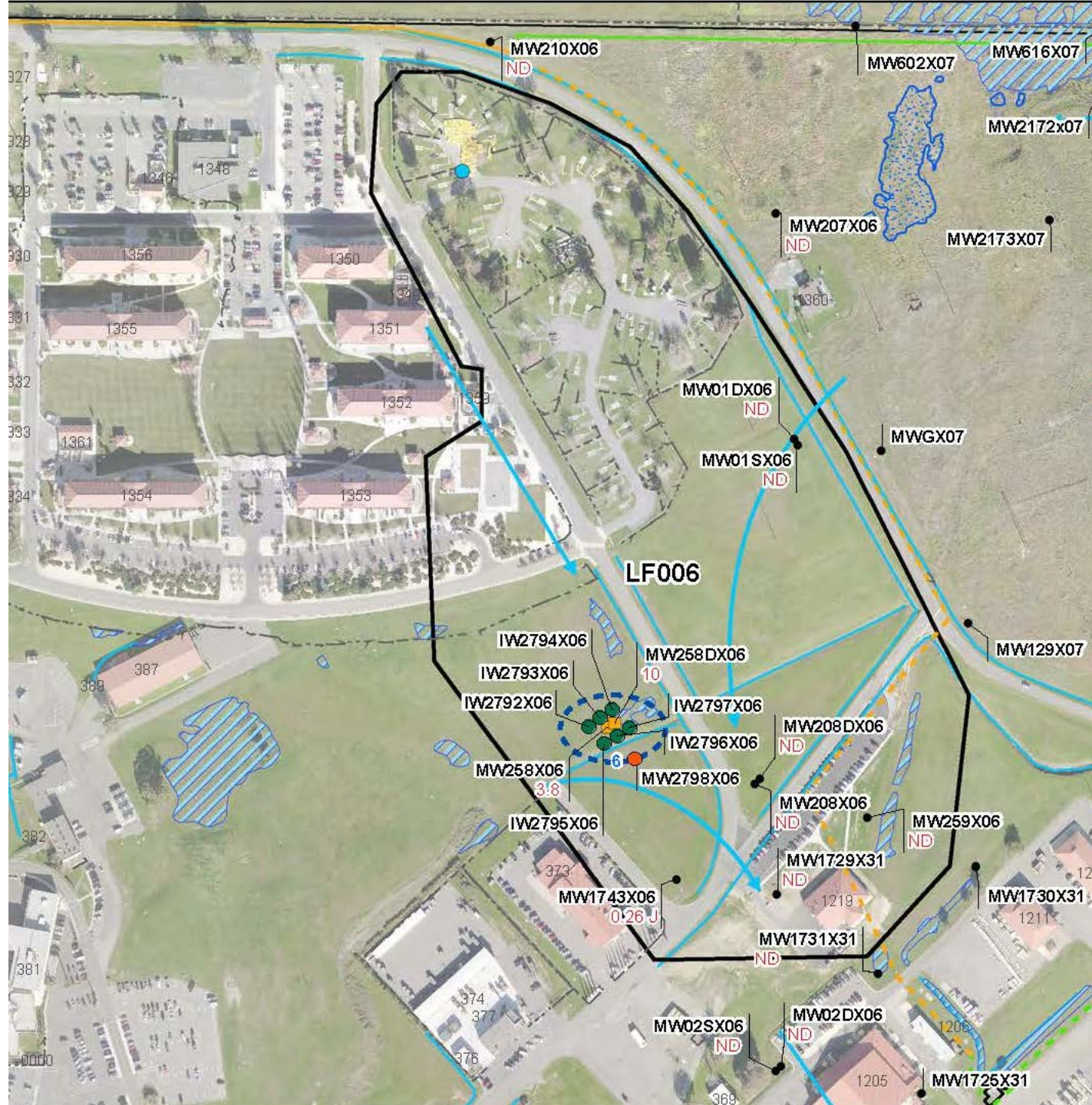
- The Air Force has implemented innovative technologies in the past to promote the reductive dechlorination of chlorinated volatile organic compounds (CVOCs) in groundwater.
- The results of technology demonstrations supported the selection of groundwater remedies in the Groundwater ROD.
- The Air Force continues to evaluate the potential for future remedy optimization at appropriate sites.
- The TD at Site LF006 will assess the effectiveness of using Lactoil and Lactoil amended with sulfidated iron, as a potential alternative to emulsified vegetable oil (EVO) if it is shown to be more effective.

Objectives

- This TD will also evaluate the feasibility of injecting sulfidated iron along with Lactoil within an injection well.
- Iron amendments are typically injected under high pressure using direct push methods.
- However, this new sulfidated iron product is designed to be injected at low pressure within injection wells.

Conceptual Design

- The conceptual design is to inject Lactoil rather than EVO into six (6) new injection wells around monitoring well pair MW258x06/MW258Dx06.
- Three (3) injection wells will be installed upgradient of the well pair.
- Three (3) injection wells will be installed downgradient of well pair MW258x06/MW258Dx06.
- Additionally, the Lactoil injection in the three (3) upgradient wells will be amended with sulfidated iron to promote abiotic degradation.
- Also, a new monitoring well will be installed downgradient of the injection wells to monitor the parameters and impact of the TD.



Results Comparison

- Since 1,1-DCE is the target COC at Sites LF006 and Site SD031, and the TD designs are similar, results from the two (2) sites will be used for comparative analysis.
 - Sites LF006 and SD031 both use an electron donor and sulfidated iron to control total organic carbon (TOC) delivery and consumption.
 - Site LF006 will be injected with Lactoil and Lactoil amended with sulfidated iron.
 - Site SD031 utilizes EVO injection combined with gravel chimney bioreactors containing iron sulfide (pyrite) gravel and sand and groundwater recirculation.

Results Comparison

- Because these two (2) TDs are similar in approach, but apply different designs, the Air Force intends to utilize the results of the two (2) TDs to evaluate the preferred substrate and technology for TOC delivery to address 1,1-DCE in groundwater at Travis AFB.
- The results from the Site LF006 TD will be compared with the results of the Site SD031 TD in order to evaluate first-order degradation rates resulting from Lactoil injection amended with sulfidated iron (LF006) against EVO injection combined with gravel chimney bioreactors containing iron pyrite and groundwater recirculation (SD031).

Results Comparison

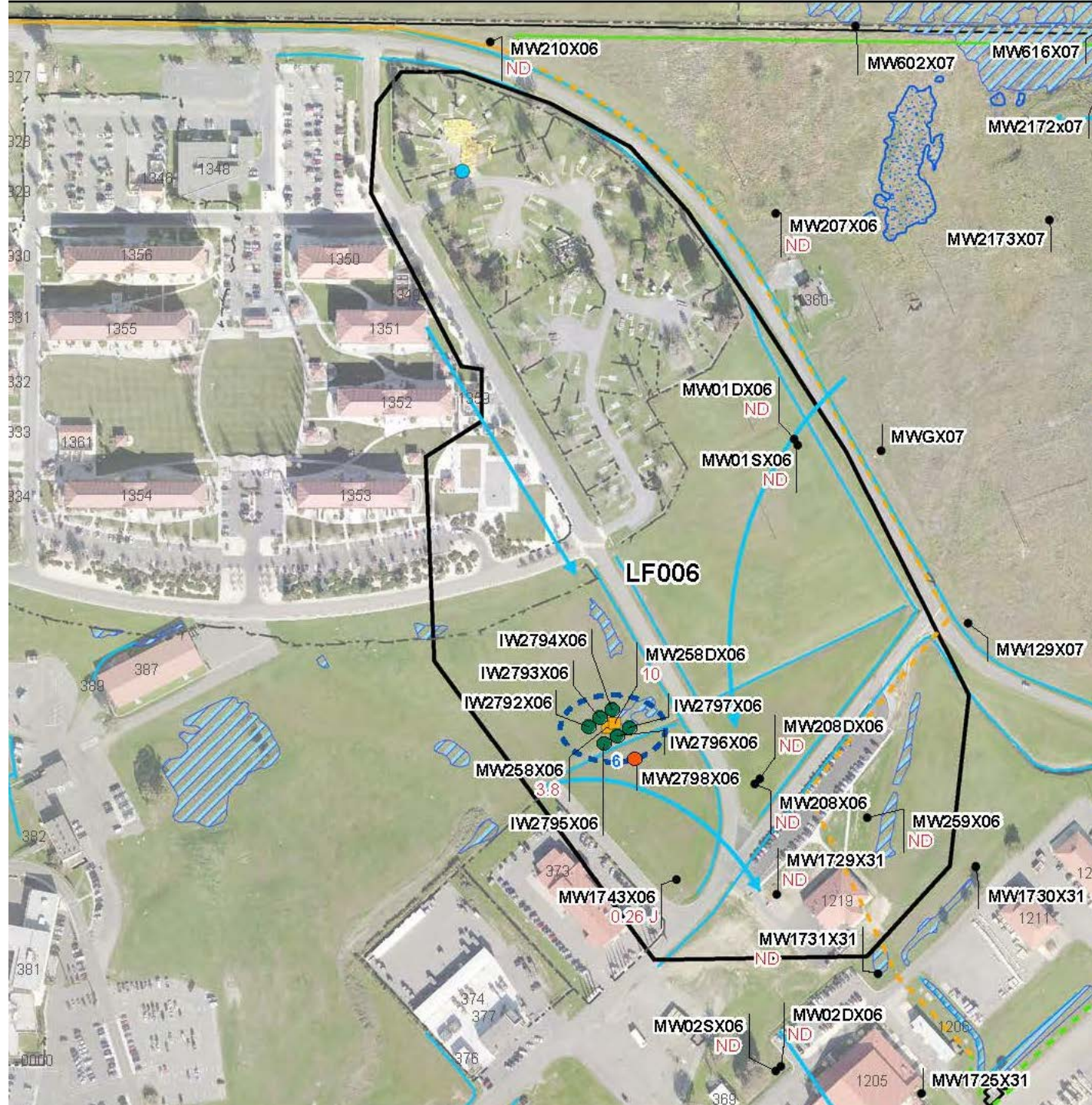
- This comparative evaluation will allow the Air Force to select potential optimization methods for individual sites where enhanced reductive dechlorination (ERD) was selected as part of the final remedy.
- If successful, the results of this TD could be used to implement more cost effective, green, and sustainable remediation technologies at other Air Force sites.

Rationale for Using Site LF006

- Site LF006 is a good candidate for this TD for the following reasons:
 - A historical natural attenuation data set exists and can be used as a point of comparison.
 - Electron donor amendments have not previously been introduced to the subsurface at the site.
 - Site LF006 has not previously been part of a demonstration project.

Monitoring/Injection Wells

- Six (6) injection wells will be installed.
 - Three (3) wells (IW2792x06 through IW2794x06) will be installed approximately 50 feet upgradient from existing well pair MW258x06/MW258Dx06.
 - Three (3) wells (IW2795x06 through IW2797x06) will be installed approximately 50 feet downgradient from well pair MW258x06/MW258Dx06.
- One (1) monitoring well (MW2798x06) will be installed approximately 100 feet downgradient from existing well pair MW258x06/MW258Dx06.
- The wells will be drilled to 35 feet below ground surface (bgs) or consolidated bedrock, whichever is encountered first.



Monitoring/Injection Wells

- Each injection well will be 2-inch diameter PVC wells and will consist of 15 feet of 0.020-inch prefabricated slot screen.
- Because the 1,1-DCE plume appears to dive below the shallow wells screened between 5 and 15 feet bgs, the wells will be screened across the highest permeability zones encountered below 15 feet bgs.
- The monitoring well will also be constructed as a 2-inch diameter PVC well and will consist of 10 feet of 0.020-inch prefabricated slot screen.
- The design of the new monitoring well will mirror the screen interval (22 to 32 feet bgs) of MW258Dx06, where the highest concentrations of 1,1-DCE are observed.

Lactoil Injections

- Approximately 14,844 gallons of amendment solution, including approximately 800 gallons of Lactoil will be injected into six (6) injection wells.
- Additionally, a 0.1 percent mixture (approximately 8 gallons) of a sulfidated iron suspension will be injected into the three (3) upgradient injection wells.
- Also, approximately 6,384 gallons of potable chase water will be injected into the wells.
- A Dositron DI520 (or equivalent) proportional feed system will be used to dilute the concentrated Lactoil to the approximately 4.3 percent design injection concentration.

Groundwater Monitoring

- Baseline groundwater sampling will be conducted in all new injection wells, the new monitoring well, and wells MW258 and 258Dx06, prior to the injection to establish the initial geochemical conditions, and VOC and TOC concentrations.
- Post-injection monitoring will be conducted in three (3) performance monitoring wells.
 - Performance monitoring wells include MW258x06, MW258Dx06, and MW2798x06 (new well).
- Post-injection monitoring will be conducted quarterly for one (1) year for VOCs and TOC, followed by one (1) year of semiannual, and one (1) year of annual sampling for VOCs, TOC, dissolved gases (ethene, ethane, and methane), chloride, nitrate, sulfate, sulfide, and dissolved iron.

Reporting

- Results of the implementation of the technology demonstration will be reported in a Technology Demonstration Construction Completion Report (TDCCR).
- Analytical results of post-injection monitoring and lessons learned from the technology demonstration at Site LF006 will be presented in the annual Groundwater Remediation Implementation Status Report (GRISR).

Questions

Travis AFB Restoration Program

Program Update

RPM Meeting
August 15, 2018

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
- 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
- AOC TA500 Data Gaps Investigation and Closure Report
- Site TS060 No Further Action Proposed Plan
- POCO Evaluation/Closure Report for DERA-funded Oil/Water Separators OW040, OW047, OW048, OW049, OW050, OW052, OW055, OW056, and OW057

Completed Documents (5)

- Data Gap Investigation Results, Technical Memorandum for Soil Site SS016
- LF006, SS030, SD031 Aquifer Test Activities Technical Memorandum
- SS015 Soil Sampling Plan
- ***Monitoring Well Installation Tech Memo for Site DP039, Addendum to the RACCR***

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
- 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 (1st 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 (2nd 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
- Q2 2018 GRIP Sampling
- SS015 Soil sampling
- ***TA500 Well Decommissioning***
- ***FT005 EVO injection***
- ***FT004 POCO Soil Investigation***

Documents In-Progress

CERCLA

- Amendment to the WABOU Soil ROD for sites DP039, SD043, and SS046
- Amendment to the NEWIOU Soil ROD for Sites SS016 and SD033
- SD043 RD/RA Work Plan
- SS046 RD/RA Work Plan
- FT005 Extraction System Optimization Tech Memo
- 2017 Annual CAMU Monitoring Report
- LF044 Sediment Sampling Report
- Community Relations Plan Update (revised draft)
- 4th Five Year Review Report for Multiple Groundwater, Soil, and Sediment Sites
- ***SS016 RD/RA Work Plan***
- ***2017 Annual GRISR***

Documents In-Progress

MMRP

- NFA ROD for Old Skeet Range (TS060 MRA)

POCO

- None

Field Work In-Progress

CERCLA

- ***3Q GRIP Sampling***

POCO

- None

Documents Planned

CERCLA

- EVO Sites FT004, SS015, SD031, & SD036 Optimization Injections Tech Memo
- LF006 Technology Demonstration Work Plan
- SD031 Soil RI/FS

Aug

Aug

Oct

MMRP

- None

POCO

- None

Field Work Planned

CERCLA

- | | |
|---|-----|
| • LF006 Well Installations and Injections | Sep |
| • SD043 Soil excavation | Oct |
| • SS046 Soil excavation | Oct |
| • SS016 Soil excavation | Nov |

POCO

- None

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 15 months
 - TPH-G: 99% reduction in source area (1,900 to 15 J $\mu\text{g/L}$), 51% for remaining 6 site wells (was 34% after 9 months and 18% after 3 months)
 - TPH-D: 98% reduction in source area (5,500 to 92 $\mu\text{g/L}$), 38% for remaining 6 site wells (was 61% after 9 months and 33% after 3 months)
 - Benzene: 98% reduction in source area (22 to <0.4 $\mu\text{g/L}$), 87% for remaining 6 site wells (was 61% after 9 months and 49% after 3 months)

* SBGR = Subgrade Biogeochemical Reactor

Petroleum Technology Demonstration Projects (2)

- 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 15 months
 - TPH-D baseline 9,600 ug/L reduced to 40 J ug/L (99.6% reduction – was 98% after 9 months)
 - TPH-MO baseline 2,300 ug/L reduced to 89 J ug/L (96% reduction – was 91% after 9 months)
 - Plume hot spot monitoring well (MW02x34) through first 15 months
 - TPH-D baseline 8,300 ug/L reduced to 6,800 ug/L (18% reduction – was 87% after 9 months, seeing some fluctuations)
 - TPH-MO baseline 1,500 ug/L reduced to 660 J ug/L (56% reduction – was 72% after 9 months, seeing some fluctuations)

* SBGR = Subgrade Biogeochemical Reactor

Updates in Green Font

CVOC Technology Demonstration Projects (3)

- 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
 - Waiting on 4Q18 data to evaluate progress
- 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
 - FT005 north area: Slightly elevated TOC and reduced COC concentrations (below MCLs);
 - FT005 central area: TOC increase has only been observed at EW02x05, near injection area. Injected EVO may be adsorbed to sediments or being consumed faster than spread can be observed. “Natural” TOC increase (3.5 to 14 mg/L) observed in central plume near MW766x05, away from injections (from infiltration of natural organics/cattle?). Reinjecting this area in 2018.
 - FT005 south area: Optimized the GETs in 2017, which may help accelerate TOC dispersal to support this TD

Updates in Green Font

CVOC Technology Demonstration Projects (4)

- 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
 - **Waiting on 4Q18 data to evaluate progress**

Updates in Green Font

CVOC Technology Demonstration Projects (5)

- 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:
 - Recirculation through chimneys has been successful relative to our design assumptions, TOC increased to >10 mg/L within majority of target area and COCs decreased to below MCLs (most wells ND, max 1,1-DCE reduced from 390 ug/L to ND)
 - 1,1-DCE (primary COC) concentrations have reduced by 99% (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 99% (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 cross-gradient area), conducted reinjection of EVO in 2017
 - Waiting on 4Q18 data to evaluate effects of 2017 injections

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 Memorandum²²

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