

**Travis Air Force Base  
Environmental Restoration Program  
Restoration Program Manager's  
Meeting Minutes  
17 July 2019, 0930 Hours**

Ms. Monika O'Sullivan of the Air Force Civil Engineer Center (AFCEC) Restoration Installation Support Section (ISS) conducted the Restoration Program Manager's (RPM) teleconference on 17 July 2019 at 0930 hours in Building 248 at Travis AFB, California. Attendees included:

Glenn Anderson	AFCEC/CZOW
Angel Santiago	AFCEC/CZOW
Gene Clare	AFCEC/CZOW
Monika O'Sullivan	AFCEC/CZOW
Merrie Schilter-Lowe	Travis AFB/PA
Sarah Miller (via telephone)	USACE-Omaha
Paul Gedbaw (via telephone)	USACE-Omaha
Dominique Forrester (via telephone)	DTSC
Adriana Constantinescu (via telephone)	RWQCB
Alison Mathews (via telephone)	RWQCB
Nadia Hollan Burke (via telephone)	EPA
Indira Balkissoon (via telephone)	TechLaw, Inc.
Mike Wray	CH2M/Jacobs
Jill Dunphy (via telephone)	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 (June 2019)
Attachment 4	CGWTP Monthly Data Sheet (June 2019)

Attachment 5	LF007C Monthly Data Sheet (June 2019)
Attachment 6	ST018 Monthly Data Sheet (June 2019)
Attachment 7	Program Update

**1. ADMINISTRATIVE**

**A. Previous Meeting Minutes**

Ms. Burke asked that Action Item 3 of the June 2019 Meeting Minutes be revised to state that the EPA suggested the draft final version of documents that is submitted with responses to comments show redline strikeout text.

The Water Board and DTSC had no comments on the June 2019 Meeting Minutes.

**B. Action Item Review**

Action items from June 2019 were reviewed.

Action Item 1 is ongoing: Ms. O’Sullivan to provide updates on perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA). July 2019 update: Ms. O’Sullivan informed the team that another kickoff call with Aerostar, the contractor who has been awarded the expanded site inspection, has been scheduled for 22 July 2019 at 1300 hours. A schedule that includes work plan submittal and field work/sampling dates will be developed during the call.

Action Item 2 is ongoing: Mr. Duke will continue to provide design and construction information for the new KC-46 Hangar construction project. July 2019 update: Mr. Anderson noted that there are no updates. Ms. Burke asked when the KC-46 airplanes will arrive at Travis AFB; Mr. Anderson replied that they will not arrive until the appropriate infrastructure is in place.

Action Item 3: The PMs for all agencies will elevate to their management any suggestions for keeping document reviews on schedule going forward. July 2019 update: Mr. Anderson noted that any updates to this item will be discussed on a document by document basis in the MMDS review. Ms. Miller noted that DTSC has still not yet provided their comments on the 2018 GRISR; Mr. Forrester replied that they will likely be submitted by the end of the week.

Action Item 4: Ms. Royer will follow up on the TPH motor oil detection limits at the Central Groundwater Treatment Plant with the project chemist. July 2019 update: The project team has identified a laboratory that can meet the detection

limit matching the discharge limit. Mr. Santiago noted that this will be reflected starting in the July 2019 GWTP discussion. This item is now closed.

Action Item 5: Mr. Duke to contact Air Force Real Property Address regarding easement access at Site LF007C. July 2019 update: Mr. Anderson noted that this action item remains open until Mr. Duke returns from vacation. Ms. Constantinescu noted that the Water Board can contact the property owner if necessary.

### **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 meeting held on Wednesday, 21 August 2019, at 0930.

The 2020 Meeting Schedule has been provided so that attendees can start planning ahead for next year.

#### **Travis AFB Master Document Schedule**

- Community Relations Plan Update (CRP): There was no change to the schedule. This document will be finished as soon as the other higher-priority documents are completed, but not likely in 2019.
- Amendment to the NEWIOU Soil ROD for the Travis AFB ERP Sites SS016 and SD033: There was no change to the schedule. DTSC is awaiting proposed language from the AFLOA attorney to replace language proposed by DTSC attorney. Mr. Forrester noted that he sent the language proposed by DTSC's attorney to Mr. Duke several weeks ago but would forward to Mr. Anderson and Ms. O'Sullivan. **This is a super-critical document** due to site work supporting planned KC-46 hangar construction, and it has been **delayed for almost a year**.
- No Further Action ROD for Old Skeet Range (TS060 and TS060A MRA): Final due date was changed to 21 August 2019. Signatures from state agencies have been received. The signature page continues to make its way through the Air Force. Mr. Anderson has provided the transcript from the public meeting to EPA. Ms. Burke said she forwarded the responsiveness summary back to her legal department, with a note that while there were questions asked and answered during the informal discussion, no verbal public comments were made during the formal comment period following the presentation and discussion. She hopes that they will find a reference to the meeting transcript in the responsiveness summary sufficient to cover this. She added that web link to the public meeting transcript should be included in the ROD document before it goes final. Otherwise, it is still moving through EPA's legal department. **This is becoming a critical document, because it affects two site closures, and MUST be finalized by the end of the fiscal year.**

- Site SS016 Remedial Design/Remedial Action Work Plan: There was no change in the schedule. This document can't go final until the final Amendment to the NEWIOU Soil, Sediment and Surface Water ROD is published. There is a chance that this document may need to be revised prior to finalizing, if the new toxicity criteria language for Travis AFB generate lower cleanup levels that warrant resampling. This excavation project is located within the footprint of the future new KC-46 hangar, so **this document is critical and is delayed due to excessive delays on the Amendment to the NEWIOU Soil, Sediment and Surface Water ROD.**
- Site SD031 Soil Remedial Investigation/Feasibility Study: The Draft to Agencies date was changed to 14 August 2019; the rest of the schedule was changed accordingly. The Proposed Plan and Record of Decision for this site will be included in the Optimized Remediation Contract (ORC, 2021). **This document is important and although not time-critical, must be completed during the current contract.**
- Fourth Five-Year Review Report for Multiple Groundwater, Soil, and Sediment Sites: No change was made to the schedule; the RTC, Draft Final, and Final due dates remain TBD. DTSC had a conference call with Mr. Duke to discuss responses to comments. EPA continues to work with Mr. Stralka and TechLaw on specifics of the proposed responses to comments in order to discuss with the Air Force; however, TechLaw may not be available for a teleconference until early August. **This document is very important but not critical.**
- Addendum to the Site SS016 Groundwater Remedial Design/Remedial Action Work Plan: The Final due date was changed to 2 August 2019. Ms. Constantinescu noted that the Water Board will check to see that the responses to comments were incorporated into the document adequately and will let the Air Force know by the end of the week. Mr. Anderson noted that once all agencies accept the Air Force's responses to their comments, the Final document can be submitted and sent to MILCON for budgeting with a note that this is changing the remedy infrastructure for the site.
- Potrero Hills Annex (FS, PP, and ROD): No change was made to the schedule; Mr. Anderson noted that the contractor has issued a proposal to close the groundwater component of the site using the Water Board Low-Threat Closure Policy. The Water Board has not provided a response to the proposal.
- Quarterly Newsletters (July 2019): No change was made to the schedule. Mr. Anderson expressed appreciation for constructive comments received from Ms. Schilter-Lowe and Ms. Burke.
- 2018 Annual GRISR: No change was made to the schedule. Water Board and EPA comments have been received; Mr. Forrester noted that DTSC would provide comments by the end of the week. The Final document must be submitted by the end of the fiscal year (September 2019).
- Site SD043 Remedial Action Completion Report: The Response to Comments due date and Final due date were changed to 24 July 2019. The EPA is reviewing the

Air Force's responses to comments. Ms. Burke said she would try to complete her review and provide comments this week; noting that due to internal approvals necessary, review of RTCs generally takes 2 weeks, and reviewing the final takes an additional two weeks. Ms. Burke indicated that this is a situation where a redline document would help expedite their review.

- Site SS046 Remedial Action Completion Report and Well Decommissioning Work Plan: The Response to Comments and Final due dates were changed to TBD. DTSC is aware that their comments are overdue; however, they have been focusing on other documents that are also priorities. Mr. Forrester will check to see if they can provide comments by the end of the week. Mr. Wray noted that this document is tied to expiring funds, so the Final needs to be submitted as scheduled. Ms. Miller stated that she has been emphasizing the need for this document to remain on schedule since March, and that she and her management have serious concerns about this document being submitted on time, noting that her team expedited their reviews in order to provide the agencies with ample review time. Her management at US Army Corps of Engineers and the Air Force are closely monitoring the progress of this document and she receives daily emails regarding expiring funds.
- 2018 Annual Site LF007 Corrective Action Management Unit Inspection, Monitoring, and Maintenance Report: The Draft to Agencies due date was changed to 1 August 2019; the rest of the schedule was changed accordingly.
- Site SD043 Site Closure Report: The Draft to Agencies due date was changed to 26 July 2019; the rest of the schedule was changed accordingly. This document will follow the SD043 RACR; all infrastructure must be removed from the site before the Air Force can claim that the site is closed.
- Site LF008 Remedial Action Completion Report: The Predraft to AF/Service Center due date was changed to 10 July 2019; the rest of the schedule was changed accordingly. Ms. Burke noted that if the Air Force is proposing discontinuation of an aspect of the remedy (in this case, discontinuation of monitoring when monitored natural attenuation was the selected remedy), a remedy change report or optimization report is necessary; not a RACR. Mr. Anderson and Mr. Wray agreed to discuss this further after the meeting. The MMDS may change based on the outcome of the discussion.
- Site SS046 Site Closure Report: This is a new document; all dates are TBD. Doug Berwick will be the task manager responsible for this document. This report will include removal of infrastructure and decommissioning of piezometers and will justify that no media of concern remain at the site.
- Site SS014 POCO Subsites 2, 4, and 5 Closure Report: The Response to Comments and Final due dates were changed to TBD. Ms. Constantinescu said that the Water Board will respond later this week regarding the Air Force responses to their comments. This document will not close the entire SS014 site, but will provide the information necessary when the site is ready for closure of the various subsites.

MOVED TO HISTORY:

## 2. CURRENT PROJECTS

### Treatment Plant Operation and Maintenance Update

#### **South Base Boundary Groundwater Treatment Plant, June 2019 (see Attachment 3)**

The South Base Boundary Groundwater Treatment Plant (SBBGWTP) performed at 78.5% uptime, and 6.6 million gallons of groundwater were extracted and treated in June 2019. All treated water was discharged to Union Creek. The average flow rate for the SBBGWTP was 171.8 gallons per minute (gpm). Electrical power usage was 16,451 kilowatt hours (kWh), and approximately 13,774 pounds of CO<sub>2</sub> were created (based on DOE calculation). Approximately 0.9 pound of volatile organic compounds (VOCs) was removed in June. The total mass of volatile organic compounds (VOCs) removed since startup of the system is 517.4 pounds.

In June 2019, troubleshooting was performed on three Site SS030 extraction wells and one Site FT005 extraction well. Details can be found in Attachment 3.

Optimization activities conducted in June 2019 include:

- Removal of several components including the oil/water separator, air stripper, construction water tank, and empty metal cabinet
- A new influent holding tank was installed with a new replacement effluent holding tank.
- The existing effluent tank was replaced with a new closed top tank
- The new effluent tank was plumbed into the existing system.

#### **Central Groundwater Treatment Plant, June 2019 (see Attachment 4)**

The Central Groundwater Treatment Plant (CGWTP) performed at 100% uptime with approximately 1,271,280 gallons of groundwater extracted and treated in June 2019. All treated water was discharged to the storm sewer system which discharges to Union Creek. The average flow rate for the CGWTP was 26.0 gpm. Electrical power usage was 2,383 kWh for all equipment connected to the Central Plant, and approximately 2,651 pounds of CO<sub>2</sub> were generated. Approximately 2.8 pounds of VOCs were removed from groundwater by the treatment plant in June. The total mass of VOCs removed since the startup of the system is 11,523 pounds.

Because the current laboratory analyzing the treatment plant samples cannot meet a detection limit at least as low as the discharge limit of 100 ug/L, the samples will be sent to a new laboratory starting in July 2019.

Optimization Activities for CGWTP: The DP039 bioreactor continues to operate in a four-week “pulsed mode.” However, the pulsing will be discontinued next month. No other optimization activities are reported for the month of June 2019.

### **LF007C Groundwater Treatment Plant, June 2019 (Attachment 5)**

The Subarea LF007C Groundwater Treatment Plant (LF007C GWTP) performed at 100% uptime with approximately 28,113 gallons of groundwater extracted and treated in June 2018. All treated water was discharged to the Duck Pond for beneficial reuse. The average flow rate was 6.3 gpm. Approximately  $8.9 \times 10^{-5}$  pound of VOCs was removed from groundwater by the treatment plant in November 2018. 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.

The system was shut down on 7 January 2019 due to formation of vernal pools at the site. The vernal pools dried up and the system was temporarily restarted on 4 June to collect monthly groundwater samples, then shut down again.

Starting in July, the treatment plant samples will be sent to a different laboratory that can meet the detection limit for TPH-MO that is as least as low as the discharge limit.

No optimization activities are reported for the month of June 2019.

### **ST018 Groundwater (MTBE) Treatment Plant, June 2019 (see Attachment 6)**

Site ST018 (MTBE) Treatment Plant (ST018 GWTP) performed at 100% uptime with approximately 251,530 gallons of groundwater extracted in June 2019. All groundwater was discharged to the Fairfield – Suisun Sewer District. The average flow rate for the ST018 GWTP was 5.1 gpm. Electrical power usage for the month was 140 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 104 pounds. Approximately 0.78 pound of MTBE, BTEX, VOCs, and TPH was removed in June by the treatment plant, and approximately 0.14 pound of MTBE-only was removed from groundwater. The total BTEX, MTBE and TPH mass removed since the startup of the system is 48.2 pounds, and the total MTBE mass removed since startup of the system is 11.7 pounds.

Note: Electrical power use at the ST018 GWTP is only for the alarm system and a pump that pushes influent tank water to the Fairfield-Suisun Sanitary Sewer line. The four groundwater extraction pumps in the system are all solar powered.

Spent carbon from the GAC vessels was removed on 29 May. Extraction well EW2014x18 is currently offline for maintenance and will be brought back online in July 2019. Details can be found in Attachment 6.

No optimization activities are reported for the month of June 2019.

**3. Presentations:**

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

Mr. Wray reported on the status of fieldwork and documents that have been completed, are in progress, or upcoming. Please refer to Attachment 7 for the full briefing,

**4. New Action Item Review**

1. Air Force or Jacobs to send Outlook invitations to the regulators for future meetings.
2. Air Force to determine appropriate path forward for Site LF008 Remedial Action Completion Report proposing discontinuation of the monitoring aspect of the monitored natural attenuation remedy.
3. Ms. O’Sullivan to request a base pass for Mr. Forrester.

**5. PROGRAM ISSUES/UPDATE**

None

**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



3.	All	All PMs for all agencies will elevate to their management any suggestions for keeping document reviews on schedule going forward.	Ongoing	Open
4.	Mr. Wray/Ms. Dunphy	Air Force or Jacobs to send Outlook invitations to the regulators for future meetings.	21 August 2019	Open
5.	Mr. Duke/Mr. Anderson/Mr. Wray	Air Force to determine appropriate path forward for Site LF008 Remedial Action Completion Report proposing discontinuation of the monitoring aspect of the monitored natural attenuation remedy.	21 August 2019	Open
6.	Ms. O'Sullivan	Ms. O'Sullivan to request a base pass for Mr. Forrester.	21 August 2019	Open

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

The RPM Teleconference is scheduled for 9:30 AM PST on 17 July 2019. **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. PROGRAM UPDATE:  
DOCUMENTS & ACTIVITIES COMPLETED, IN PROGRESS AND PLANNED

4. NEW ACTION ITEM REVIEW

**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.

**(2019)**  
**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.)
—	01-16-19	—
02-13-19	—	—
—	03-20-19	—
04-18-19 (Thursday 2:00 PM)	—	04-18-19
—	05-15-19	—
06-19-19	—	—
—	07-17-19	—
08-21-19	—	—
—	09-18-19	—
10-16-19	—	May through October <sup>2</sup>
—	11-20-19	—
—	—	—

<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.

**(2020)**  
**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.)
—	01-15-20	—
02-19-20	—	—
—	03-18-20	—
04-16-20 (Thursday 2:00 PM)	—	04-16-20
—	05-20-20	—
06-17-20	—	—
—	07-15-20	—
08-19-20	—	—
—	09-16-20	—
10-21-20	—	May through October <sup>2</sup>
—	11-18-20	—
—	—	—

<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

<b>PRIMARY DOCUMENTS</b>			
<b>Life Cycle</b>	<b>Community Relations Plan Update Travis AFB, Glenn Anderson CH2M, Jill Dunphy</b>	<b>Amendment to the NEWIOU Soil ROD for the Travis AFB ERP Sites SS016 and SD033 Travis AFB, Glenn Anderson CH2M, Latonya Coleman</b>	<b>No Further Action Soil ROD for Old Skeet Range (TS060 MRA) Travis AFB, Glenn Anderson</b>
<b>Scoping Meeting</b>	NA	NA	NA
Predraft to AF/Service Center	08-23-16	02-28-18	05-18-18
AF/Service Center Comments Due	09-07-16	03-30-18	06-01-18
Draft to Agencies	09-28-16 (03-22-18)	06-22-18	6-25-18
Draft to RAB	09-28-16 (03-22-18)	06-22-18	6-25-18
Agency Comments Due	10-28-16 (04-27-18)	08-22-18	11-30-18
<b>Response to Comments Meeting</b>	<b>TBD</b>	<b>09-06-18</b>	<b>01-16-19</b>
Agency Concurrence with Remedy	NA	NA	NA
Public Comment Period	NA	NA	NA
<b>Public Meeting</b>	NA	NA	NA
Response to Comments Due	TBD	TBD	06-13-19
Draft Final Due	TBD	TBD	06-13-19
Final Due	TBD	TBD	<b>08-21-19</b>

## Travis AFB Master Meeting and Document Schedule

<b>PRIMARY DOCUMENTS</b>		
<b>Life Cycle</b>	<b>Site SS016 Remedial Design/Remedial Action Work Plan</b> Travis AFB, Glenn Anderson CH2M, Doug Berwick CAPE, Meg Greenwald	<b>Site SD031 Soil Remedial Investigation/Feasibility Study</b> Travis AFB, Glenn Anderson CH2M, Rick Sturm
<b>Scoping Meeting</b>	NA	NA
Predraft to AF/Service Center	06-04-18	05-24-19
AF/Service Center Comments Due	06-18-18	06-10-19
Draft to Agencies	07-31-18	08-14-19
Draft to RAB	07-31-18	08-14-19
Agency Comments Due	08-30-18	10-15-19
<b>Response to Comments Meeting</b>	<b>09-19-18</b>	<b>10-23-19</b>
Agency Concurrence with Remedy	NA	NA
Public Comment Period	NA	NA
<b>Public Meeting</b>	<b>NA</b>	<b>NA</b>
Response to Comments Due	10-24-18	11-06-19
Draft Final Due	10-24-18	11-06-19
Final Due	TBD	12-09-19

## Travis AFB Master Meeting and Document Schedule

<b>PRIMARY DOCUMENTS</b>		
<b>Life Cycle</b>	<b>Fourth Five-Year Review Report for Multiple Groundwater, Soil, and Sediment Sites Travis AFB, Glenn Anderson Tetra Tech, Joachim Eberharter</b>	<b>Addendum to the Site SS016 Groundwater Remedial Design/Remedial Action Work Plan Travis AFB, Lonnie Duke CH2M, Levi Pratt</b>
<b>Scoping Meeting</b>	<b>NA</b>	<b>NA</b>
Predraft to AF/Service Center	03-14-18	12-12-18
AF/Service Center Comments Due	05-22-18	01-02-19
Draft to Agencies	06-05-18	02-22-19
Draft to RAB	06-05-18	02-22-19
Agency Comments Due	07-20-18	03-25-19
<b>Response to Comments Meeting</b>	<b>TBD</b>	<b>04-18-19</b>
Agency Concurrence with Remedy	NA	NA
Public Comment Period	NA	NA
<b>Public Meeting</b>	<b>NA</b>	<b>NA</b>
Response to Comments Due	TBD	06-12-19 (07-02-19)
Draft Final Due	TBD	06-12-19 (07-02-19)
Final Due	TBD	07-17-19 (08-02-19)

## Travis AFB Master Meeting and Document Schedule

<b>PRIMARY DOCUMENTS</b>			
<b>Life Cycle</b>	<b>Potrero Hills Annex Travis, Glenn Anderson</b>		
	<b>FS</b>	<b>Proposed Plan</b>	<b>ROD</b>
<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

<b>INFORMATIONAL DOCUMENTS</b>		
<b>Life Cycle</b>	<b>Quarterly Newsletter (July 2019) Travis, Glenn Anderson</b>	<b>2018 Annual GRISR Travis AFB, Glenn Anderson CH2M, Leslie Royer</b>
<b>Scoping Meeting</b>	NA	NA
Predraft to AF/Service Center	06-18-19	05-06-19
AF/Service Center Comments Due	NA	05-20-19
Draft to Agencies	06-25-19	06-05-19
Draft to RAB	NA	06-05-19
Agency Comments Due	07-10-19	07-08-19
<b>Response to Comments Meeting</b>	<b>07-17-19</b>	07-17-19
Response to Comments Due	07-17-19	08-14-19
Draft Final Due	NA	NA
Final Due	07-18-19	08-14-19
Public Comment Period	NA	NA
<b>Public Meeting</b>	<b>NA</b>	<b>NA</b>

## Travis AFB Master Meeting and Document Schedule

<b>INFORMATIONAL DOCUMENTS</b>			
<b>Life Cycle</b>	<b>Site SD043 Remedial Action Completion Report Travis AFB, Glenn Anderson CH2M, Levi Pratt</b>	<b>Site SS046 Remedial Action Completion Report and Well Decommissioning Work Plan Travis AFB, Glenn Anderson CH2M, Doug Berwick CAPE, Meg Greenwald</b>	<b>2018 Annual Site LF007 Corrective Action Management Unit Inspection, Monitoring, and Maintenance Report Travis AFB, Milton Clare CH2M, Levi Pratt</b>
<b>Scoping Meeting</b>	NA	NA	NA
Predraft to AF/Service Center	03-29-19	04-15-19	05-31-19
AF/Service Center Comments Due	04-12-19	04-22-19	06-14-19
Draft to Agencies	05-08-19	05-09-19	08-01-19
Draft to RAB	05-08-19	05-09-19	08-01-19
Agency Comments Due	06-07-19	06-10-19	09-03-19
<b>Response to Comments Meeting</b>	<b>06-19-19</b>	<b>06-19-19</b>	<b>09-18-19</b>
Response to Comments Due	07-24-19	07-12-19 (TBD)	10-07-19
Draft Final Due	NA	NA	NA
Final Due	07-24-19	07-12-19 (TBD)	10-07-19
Public Comment Period	NA	NA	NA
<b>Public Meeting</b>	NA	NA	NA

## Travis AFB Master Meeting and Document Schedule

<b>INFORMATIONAL DOCUMENTS</b>			
<b>Life Cycle</b>	<b>Site SD043 Site Closure Report Travis AFB, Glenn Anderson CH2M, Levi Pratt</b>	<b>Site LF008 Remedial Action Completion Report Travis AFB, Glenn Anderson CH2M, Latonya Coleman</b>	<b>Site SS046 Site Closure Report Travis AFB, Glenn Anderson CH2M, Doug Berwick CAPE, Meg Greenwald</b>
<b>Scoping Meeting</b>	NA	NA	NA
Predraft to AF/Service Center	06-12-19	07-10-19	TBD
AF/Service Center Comments Due	06-28-19	07-24-19	TBD
Draft to Agencies	07-26-19	08-08-19	TBD
Draft to RAB	07-26-19	08-08-19	TBD
Agency Comments Due	08-26-19	09-09-19	TBD
<b>Response to Comments Meeting</b>	<b>09-18-19</b>	<b>09-18-19</b>	<b>TBD</b>
Response to Comments Due	10-02-19	10-04-19	TBD
Draft Final Due	NA	NA	NA
Final Due	10-02-19	10-04-19	TBD
Public Comment Period	NA	NA	NA
<b>Public Meeting</b>	NA	NA	NA

## Travis AFB Master Meeting and Document Schedule

<b>INFORMATIONAL DOCUMENTS</b>	
<b>Life Cycle</b>	<b>Site SS014 Subsites 2, 4, and 5 POCO Site Closure Evaluation Report Travis AFB, Glenn Anderson CH2M, Tony Chakurian</b>
<b>Scoping Meeting</b>	<b>NA</b>
Predraft to AF/Service Center	04-10-19
AF/Service Center Comments Due	04-24-19
Draft to Agencies	05-02-19
Draft to RAB	05-02-19
Agency Comments Due	06-03-19
<b>Response to Comments Meeting</b>	<b>06-19-19</b>
Response to Comments Due	07-11-19 (TBD)
Draft Final Due	NA
Final Due	07-11-19 (TBD)
Public Comment Period	NA
<b>Public Meeting</b>	<b>NA</b>

## Travis AFB Master Meeting and Document Schedule

<b>HISTORY</b>	
<b>Life Cycle</b>	<b>2017 Annual GRISR Travis AFB, Glenn Anderson CH2M, Leslie Royer</b>
<b>Scoping Meeting</b>	NA
Predraft to AF/Service Center	05-09-18
AF/Service Center Comments Due	06-11-18
Draft to Agencies	07-19-18
Draft to RAB	07-19-18
Agency Comments Due	11-19-18 (01-31-19) (02-08-19)
<b>Response to Comments Meeting</b>	<b>01-16-19 (02-13-19)</b>
Response to Comments Due	05-20-19
Draft Final Due	NA
Final Due	05-20-19
Public Comment Period	NA
<b>Public Meeting</b>	NA

# South Base Boundary Groundwater Treatment Plant Monthly Data Sheet

Report Number: 224

Reporting Period: 28 May 2019 – 1 July 2019

Date Submitted: 12 July 2019

This monthly data sheet presents information regarding the South Base Boundary Groundwater Treatment Plant (SBBGWTP) and associated remedial process optimization (RPO) activities.

## System Metrics

Table 1 presents operational data from the June 2019 reporting period.

<b>Table 1 – Operations Summary – June 2019</b>			
<b>Initial Data Collection:</b>	5/28/2019 10:45	<b>Final Data Collection:</b>	7/1/2019 11:00
Operating Time:	Percent Uptime:	Electrical Power Usage:	
<b>SBBGWTP: 641 hours</b>	<b>SBBGWTP: 78.5%</b>	<b>SBBGWTP: 16,451 kWh (13,774 lbs CO<sub>2</sub> generated<sup>a</sup>)</b>	
Gallons Treated: <b>6.6 million gallons</b>		Gallons Treated Since July 1998: <b>1,122 million gallons</b>	
Volume Discharged to Union Creek: <b>6.6 million gallons</b>		Gallons Treated from Other Sources: <b>0 gallons</b>	
VOC Mass Removed: <b>0.9 lbs<sup>b</sup></b>		VOC Mass Removed Since July 1998: <b>517.4 lbs</b>	
Rolling 12-Month Cost per Pound of Mass Removed: <b>\$13,990<sup>c</sup></b>			
Monthly Cost per Pound of Mass Removed: <b>\$16,179<sup>c</sup></b>			
lbs = pounds <sup>a</sup> SiteWise™ estimate that 1 kilowatt hour generated produces 0.74 pounds of GHG. Value also includes approximately 1,600 pounds of GHG from GAC change out services averaged to a per month basis. <sup>b</sup> Calculated using June 2019 EPA Method SW8260C analytical results. <sup>c</sup> Costs include operations and maintenance, carbon change out, 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.

<b>Table 2 – SBBGWTP Average Flow Rate (gpm)<sup>a</sup> – June 2019</b>							
<b>FT005<sup>b</sup></b>				<b>SS029</b>		<b>SS030</b>	
EW01x05	Offline	EW743x05	Offline	EW01x29	Offline <sup>c</sup>	EW01x30	16.6
EW02x05	Offline	EW744x05	0.0 <sup>d</sup>	EW02x29	Offline <sup>c</sup>	EW02x30	3.2
EW03x05	Offline	EW745x05	13.3	EW03x29	Offline <sup>e</sup>	EW03x30	9.7
EW731x05	7.0	EW746x05	Offline	EW04x29	Offline <sup>e</sup>	EW04x30	24.4
EW732x05	Offline	EW2291x05	4.4	EW05x29	7.9	EW05x30	19.2
EW733x05	Offline	EW2782x05	6.1	EW06x29	7.2	EW2174x30	7.8
EW734x05	Offline <sup>e</sup>	EW2783x05	0.0 <sup>d</sup>	EW07x29	13.1	EW711x30	9.0
EW735x05	Offline <sup>e</sup>	EW2784x05	0.0 <sup>d</sup>			MW269x30	0.5
EW736x05	Offline	EW2785x05	7.6				
EW737x05	Offline	EW2786x05	18.4				
EW742x05	Offline						
<b>FT005 Total: 56.8</b>				<b>SS029 Total: 28.2</b>		<b>SS030 Total: 90.4</b>	
<b>SBBGWTP Average Monthly Flow<sup>e</sup>: 171.8 gpm</b>							
<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> Extraction wells are operational; however, well was recharging. <sup>e</sup> Extraction well were off line for redevelopment. <sup>e</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.

<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>	
SBBGWTP	18 June 2019	9:30	24 June 2019	17:00	SBBGWTP off line to install new influent and effluent holding tanks.
<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 4 June 2019. Sample results are presented in Table 4. Samples collected in June 2019 were also analyzed for metals but the laboratory got backed up and could not report the metals results in time for this report. Results from the metals analysis will be presented in the July 2019 Monthly Data Sheet.

The total VOC concentration (17.16 µg/L) in the influent sample decreased from the May 2019 sample results (18.17 µg/L). TCE was the primary VOC detected in the influent sample at a concentration of 16 µg/L. TCE, cis-1,2-DCE, and chloroform were detected in the midpoint sampling location at low concentrations. No VOCs or TPH were detected in the effluent sample.

Starting in July, the treatment plant samples will be sent to a different laboratory that can meet the detection limit for TPH-MO that is at least as low as the discharge limit. The current lab cannot meet the discharge limit of 100 µg/L.

In June 2019, optimization activities continued at SBBGWTP. Several additional components were removed, including the air stripper, oil/water separator, construction water tank, and an empty metal cabinet. On 20 June 2019, a new 10,100-gallon influent holding tank was installed along with a new replacement effluent holding tank. The existing 13,000-gallon effluent tank was replaced with a closed-top 8,300-gallon tank. The new effluent holding tank was plumbed in with the existing system, and the SBBGWTP was restarted on 24 June 2019. The expansion activities, including plumbing into new influent holding tank, will continue through July 2019.

In June 2019, troubleshooting was performed on several extraction wells. The following list presents the maintenance activities and status of those extraction wells:

- EW2785x05 – Replaced the effluent hose and cleaned out corroded flow meter. Well is currently on line.
- EW03x30 – Replaced paddlewheel, pump, and transducer. Well is currently on line.
- EW711x30 – Rewired connection from transducer, which had corroded. Well is currently on line.
- MW269x30 – Replaced pump. Well is currently on line.
- EW2783x05, EW2784x05, EW03x29, and EW04x29 – Pumps were removed to redevelop wells. Wells are currently off line and will be brought back on line in July 2019.

Figure 1 presents the influent 1,2-DCA and TCE concentrations since January 2017. The 1,2-DCA and TCE concentrations have been sporadic and appear to be dependent on seasonal variation and which wells are actively being extracted during the time of sampling. TCE concentrations have generally been increasing since March 2018, and 1,2-DCA concentrations were elevated between December 2017 and June 2018 and mostly non-detect from July through November 2018. 1,2-DCA concentrations were sporadic between December 2018 and June 2019 with no detections present in the most recent two months.

Figure 2 presents a plot of influent VOC concentrations and average flow at the SBBGWTP over the past twelve (12) months. An overall increasing trend was observed for the VOC influent concentrations in the past 12 months, though the past three months have seen successive decreases in influent concentrations. An overall increasing flow rate trend was observed in the past 12 months, which continued through June 2019.

## Optimization Activities

Optimization activities at the SBBGWTP in June 2019 are described above.



## 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 June 2019, the SBBGWTP produced approximately 13,774 pounds of GHG, which includes approximately 1,600 pounds of GHG generated from GAC change out services averaged to a per month basis.

TABLE 4

Summary of Groundwater Analytical Data for June 2019 – South Base Boundary Groundwater Treatment Plant

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	4 June 2019 (µg/L)		
				Influent	Midpoint	Effluent
<b>Halogenated Volatile Organics</b>						
Bromodichloromethane	NA	0.29	0	ND	ND	ND
Chloroform	1.9	0.12	0	<b>0.18 J</b>	<b>0.28 J</b>	ND
1,1-Dichloroethane	0.50	0.15	0	ND	ND	ND
1,2-Dichloroethane	0.50	0.22	0	ND	ND	ND
1,1-Dichloroethene	0.50	0.14	0	ND	ND	ND
cis-1,2-Dichloroethene	0.50	0.15	0	<b>0.98 J</b>	<b>1.7</b>	ND
trans-1,2-Dichloroethene	0.50	0.11	0	ND	ND	ND
Tetrachloroethene	0.50	0.15	0	ND	ND	ND
1,1,1-Trichloroethane	0.50	0.19	0	ND	ND	ND
1,1,2-Trichloroethane	0.50	0.31	0	ND	ND	ND
Trichloroethene	0.65	0.13	0	<b>16</b>	<b>1.4</b>	ND
Vinyl Chloride	0.90	0.22	0	ND	ND	ND
<b>Non-Halogenated Volatile Organics</b>						
Benzene	0.50	0.13	0	ND	ND	ND
Ethylbenzene	0.50	0.15	0	ND	ND	ND
Toluene	0.50	0.25	0	ND	ND	ND
Xylenes	0.50	0.10 – 0.18	0	ND	ND	ND
Methyl Tert Butyl Alcohol	0.50	0.17	0	ND	ND	ND
<b>Other</b>						
Total Petroleum	50	10	0	NM	NM	ND
Hydrocarbons – Gasoline						
Total Petroleum	50	16	0	NM	NM	ND
Hydrocarbons – Diesel						
Total Petroleum Hydrocarbons – Motor Oil	100	160	0	NM	NM	ND

\* In accordance with current National Pollutant Discharge Elimination System permit number CAG912002, Order number R2-2017-0048.

## 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.

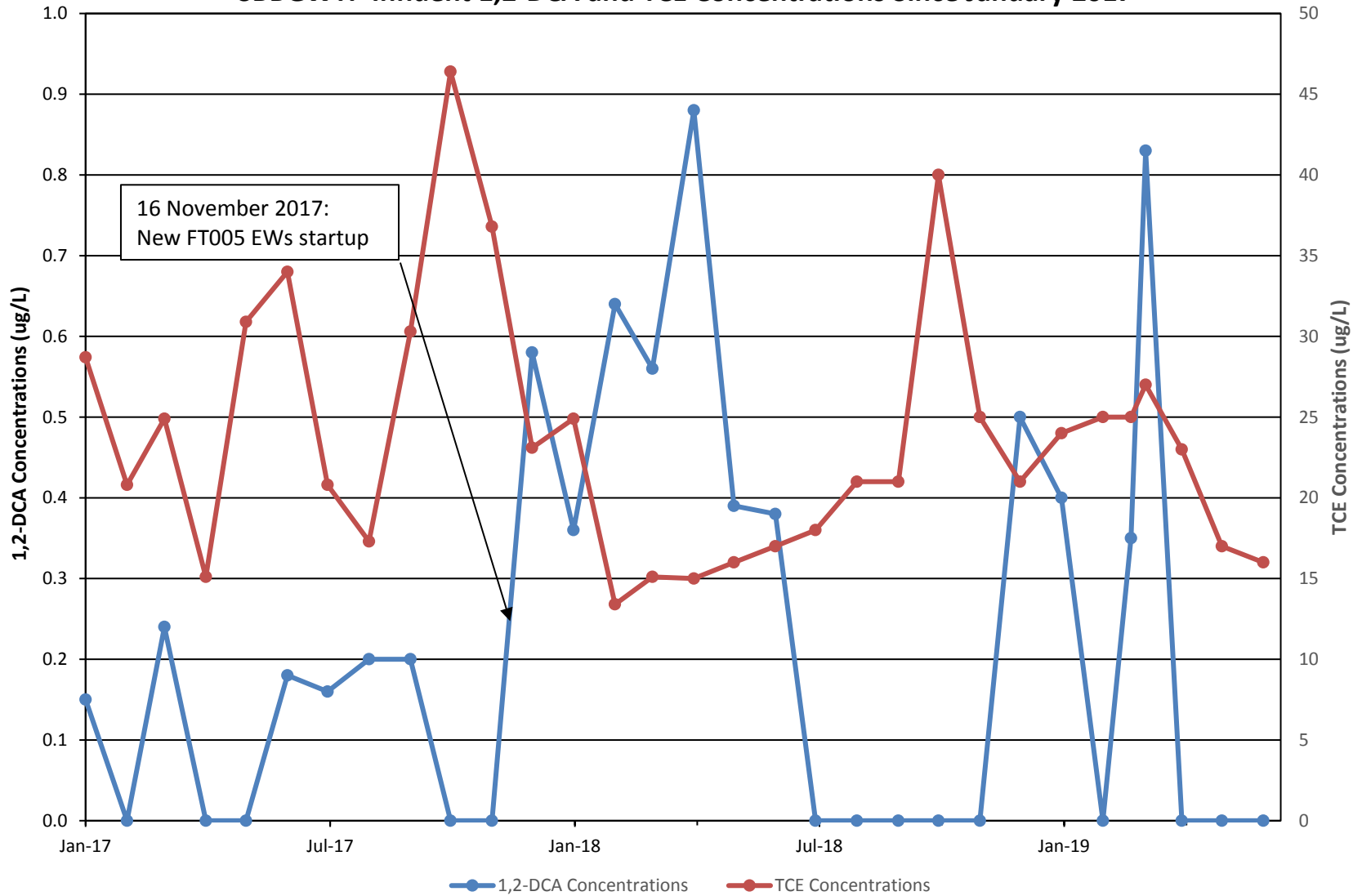
ND = not detected

NM = not measured

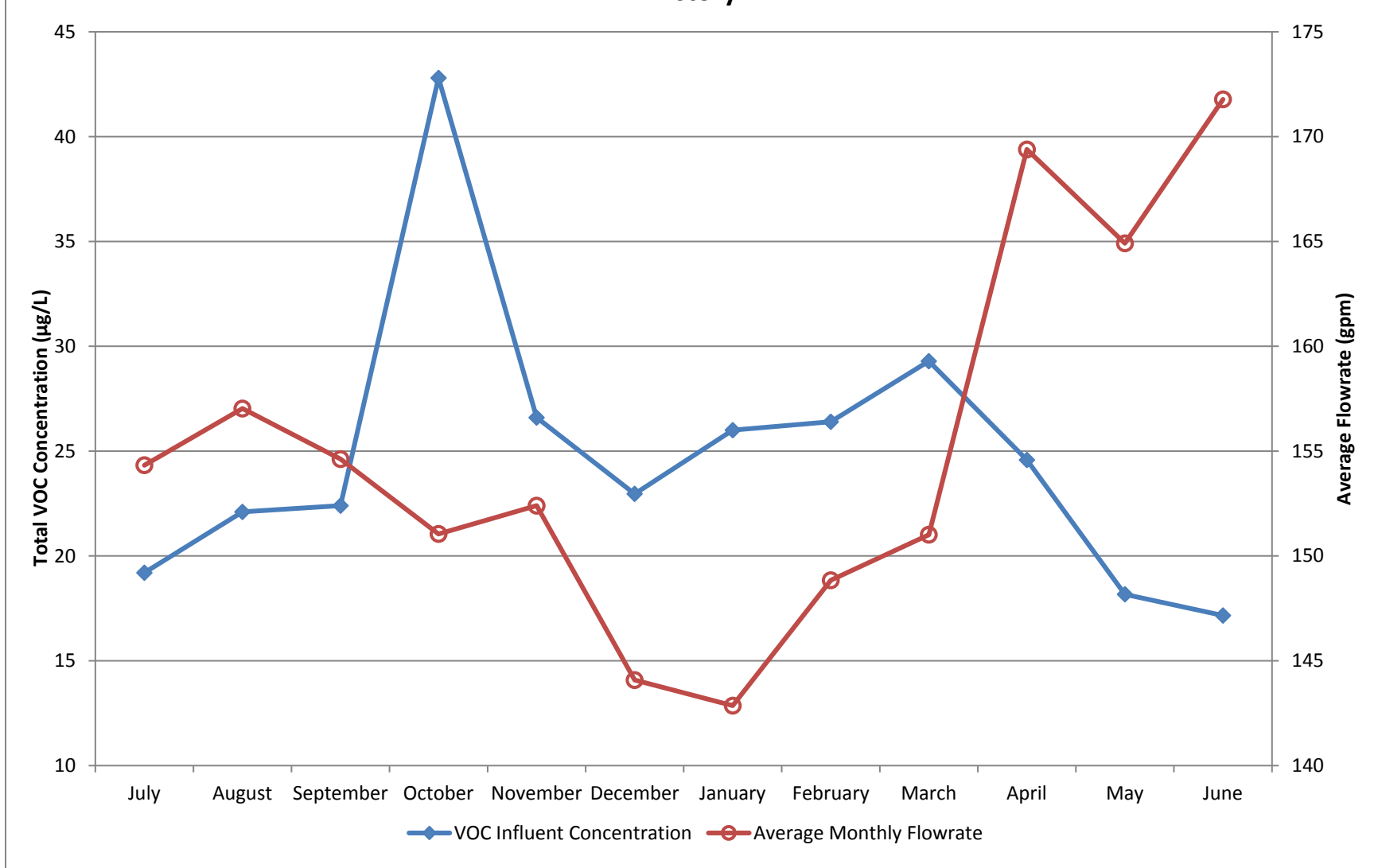
µg/L = micrograms per liter

# Figure 1

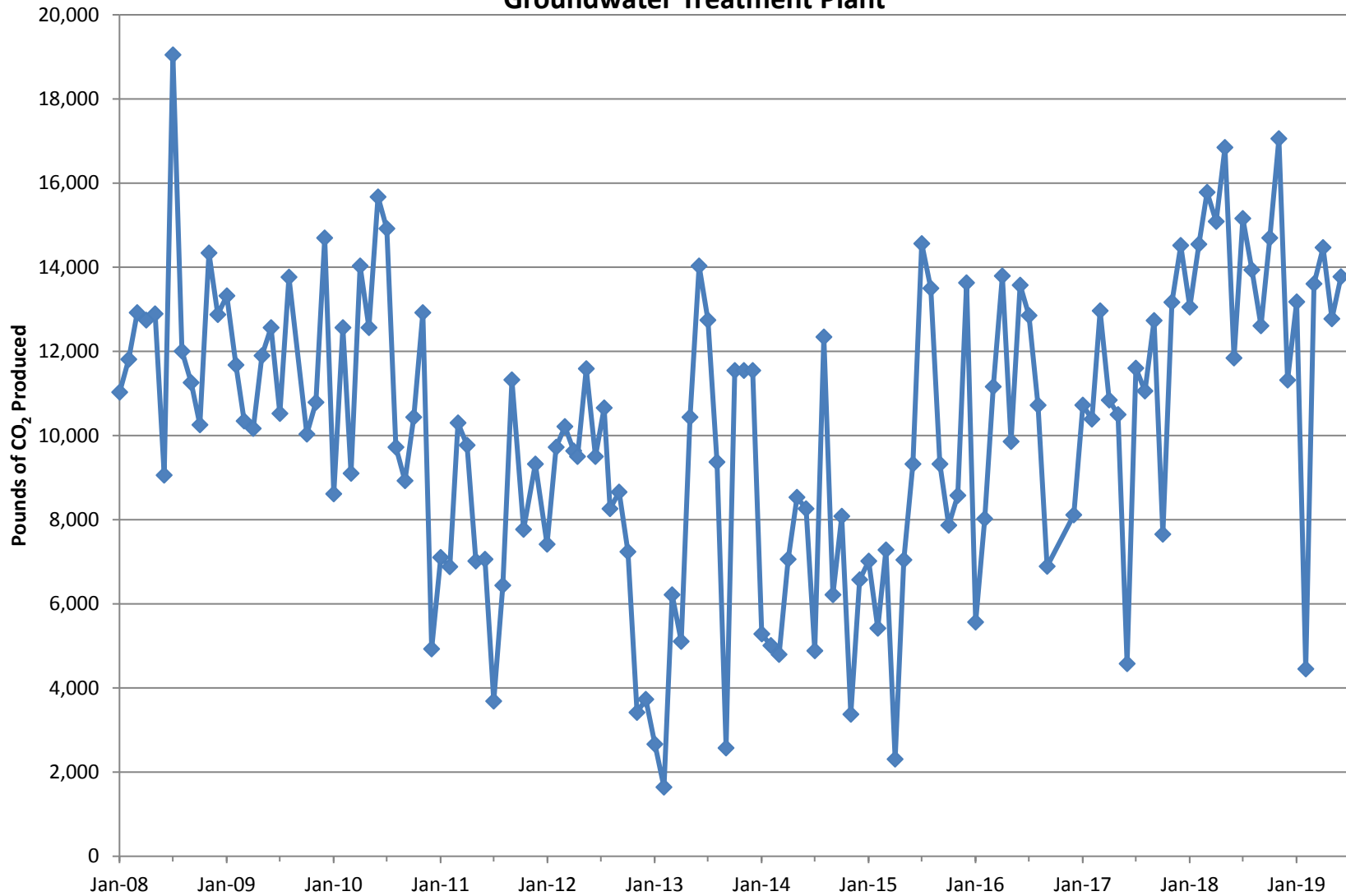
## SBBGWTP Influent 1,2-DCA and TCE Concentrations Since January 2017



**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: 239

Reporting Period: 28 May 2019 – 1 July 2019

Date Submitted: 12 July 2019

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 June 2019 reporting period.

<b>Table 1 – Operations Summary – June 2019</b>			
<b>Initial Data Collection:</b>	5/28/2019 11:25	<b>Final Data Collection:</b>	7/1/2019 9:15
Operating Time:	Percent Uptime:	Electrical Power Usage:	
<b>CGWTP:</b> 814 hours	<b>CGWTP:</b> 100%	<b>CGWTP:</b>	2,383 kWh (2,651 lbs CO <sub>2</sub> generated <sup>a</sup> )
Gallons Treated (discharge to storm sewer): <b>1,271,280 gallons</b>	Gallons Treated Since January 1996: <b>570.9 million gallons</b>		
VOC Mass Removed from groundwater: <b>2.8 lbs<sup>b</sup></b>	VOC Mass Removed Since January 1996: <b>2,837 lbs from groundwater</b> <b>8,686 lbs from vapor</b>		
Rolling 12-Month Cost per Pound of Mass Removed: \$4,489 <sup>c</sup>			
Monthly Cost per Pound of Mass Removed: \$1,586 <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 June 2019 EPA Method SW8260C analytical results.			
<sup>c</sup> Costs include operations and maintenance, carbon change out, 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.

<b>Table 2 – CGWTP Average Flow Rates<sup>a</sup> – June 2019</b>	
<b>Location</b>	<b>Average Flow Rate Groundwater (gpm)</b>
EW001x16	12.4
EW002x16	7.3
EW003x16	0.1
EW605x16	4.4
EW610x16	1.8
CGWTP	26.0
<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.	--		--	
-- = 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	12 June 2018	9 July 2018
	7 August 2018	6 September 2018
	1 October 2018	30 October 2018
	27 November 2018	24 December 2018
	23 January 2019	26 February 2019
	18 March 2019	15 April 2019
	13 May 2019	10 June 2019
	11 June 2019	
MW = Monitoring Well		

## Summary of O&M Activities

Monthly groundwater treatment samples were collected at the CGWTP on 4 June 2019. Sample results are presented in Table 5. Samples collected in June 2019 were also analyzed for metals but the laboratory got backed up and could not report the metals results in time for this report. Results from the metals analysis will be presented in the July 2019 Monthly Data Sheet.

The total VOC concentration (262.1 µg/L) in the June 2019 influent sample has decreased from the May 2019 sample (315.7 µg/L). TCE was the primary VOC detected in the influent sample at a concentration of 220 µg/L. Vinyl chloride (0.31 µg/L) was detected in the sample after the first carbon vessel. No VOCs were detected in the sample collected after the second carbon vessel or in the effluent sample. Travis AFB will continue to monitor influent, midpoint, and effluent concentrations at the CGWTP for carbon breakthrough, though the carbon treatment remained effective in June 2019.

Starting in July, the treatment plant samples will be sent to a different laboratory that can meet the detection limit for TPH-MO that is at least as low as the discharge limit. The current lab cannot meet the discharge limit of 100 µg/L.

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 a decreasing trend for the flow rate through the treatment plant.

The Site DP039 subgrade biogeochemical reactor (SBGR), also known as a bioreactor, ceased the four-week “pulsed mode” operations on 11 June 2019. In March and April 2019, the conveyance line between the bioreactor and the infiltration trench was modified to include additional groundwater extracted from DP039 extraction wells EW2382x38 and EW2383x39. Therefore, it was decided during the May RPM meeting to continuously operate the DP039 extraction wells and cease pulsing operation.

## Optimization Activities

No optimization activities occurred at the CGWTP in June 2019.

## 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 2,651 pounds of GHG during June 2019.



TABLE 5

Summary of Groundwater Analytical Data for June 2019 – Central Groundwater Treatment Plant

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	4 June 2019 (µg/L)			
				Influent	After Carbon 1 Effluent	After Carbon 2 Effluent	System Effluent
<b>Halogenated Volatile Organics</b>							
Acetone	NA	1.9 – 3.8	0	ND	ND	ND	ND
Bromomethane	NA	0.21 – 0.42	0	ND	ND	ND	ND
Chloroform	1.9	0.16 – 0.32	0	ND	ND	ND	ND
1,2-Dichlorobenzene	NA	0.15 – 0.30	0	ND	ND	ND	ND
1,3-Dichlorobenzene	NA	0.13 – 0.26	0	<b>0.28 J</b>	ND	ND	ND
1,4-Dichlorobenzene	NA	0.16 – 0.32	0	ND	ND	ND	ND
Bromodichloromethane	NA	0.17 – 0.34	0	ND	ND	ND	ND
1,1-Dichloroethane	0.50	0.22 – 0.44	0	ND	ND	ND	ND
1,2-Dichloroethane	0.50	0.13 – 0.26	0	ND	ND	ND	ND
1,1-Dichloroethene	0.50	0.23 – 0.46	0	<b>0.61 J</b>	ND	ND	ND
cis-1,2-Dichloroethene	0.50	0.15 – 0.30	0	<b>38</b>	ND	ND	ND
trans-1,2-Dichloroethene	0.50	0.15 – 0.30	0	<b>2.4</b>	ND	ND	ND
Tetrachloroethene	0.50	0.20 – 0.40	0	<b>0.38 J</b>	ND	ND	ND
1,1,1-Trichloroethane	0.50	0.16 – 0.32	0	ND	ND	ND	ND
1,1,2-Trichloroethane	0.50	0.27 – 0.54	0	ND	ND	ND	ND
Trichloroethene	0.65	0.16 – 0.32	0	<b>220</b>	ND	ND	ND
Vinyl Chloride	0.90	0.10 – 0.20	0	<b>0.17 J</b>	<b>0.31 J</b>	ND	ND
<b>Non-Halogenated Volatile Organics</b>							
Benzene	0.50	0.16 – 0.32	0	ND	ND	ND	ND
Ethylbenzene	0.50	0.16 – 0.32	0	ND	ND	ND	ND
Toluene	0.50	0.17 – 0.34	0	ND	ND	ND	ND
Total Xylenes	0.50	0.15 – 0.38	0	ND	ND	ND	ND
Methyl Tertiary Butyl Ether	0.50	0.25 – 0.50	0	ND	ND	ND	ND
<b>Other</b>							
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	ND
Total Petroleum Hydrocarbons – Motor Oil (C28 – C40)	100	160	0	NM	NM	NM	ND

\* In accordance with current National Pollutant Discharge Elimination System permit number CAG912002, Order number R2-2017-0048.

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.

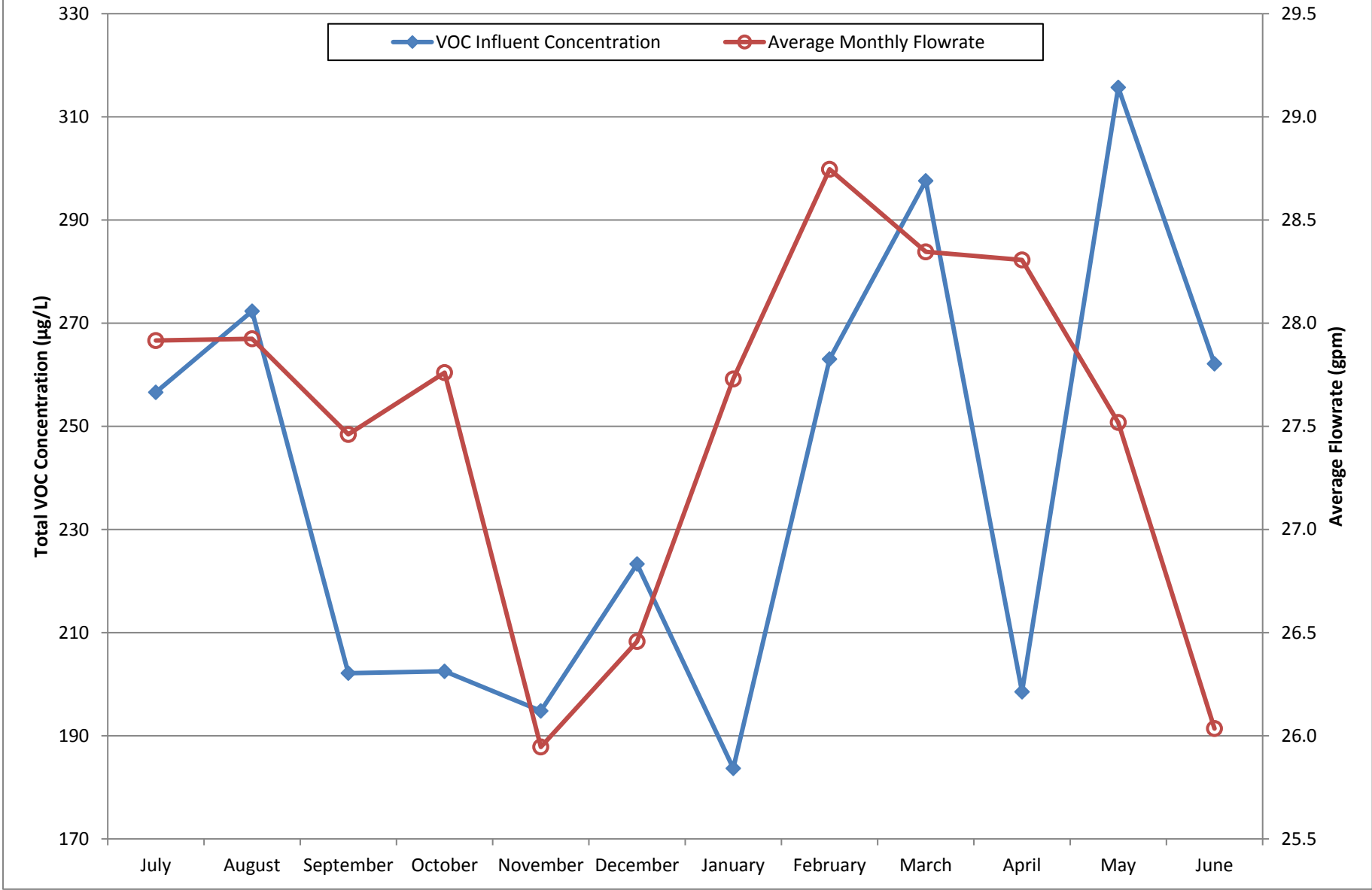
ND = not detected

NM = not measured

µg/L = micrograms per liter

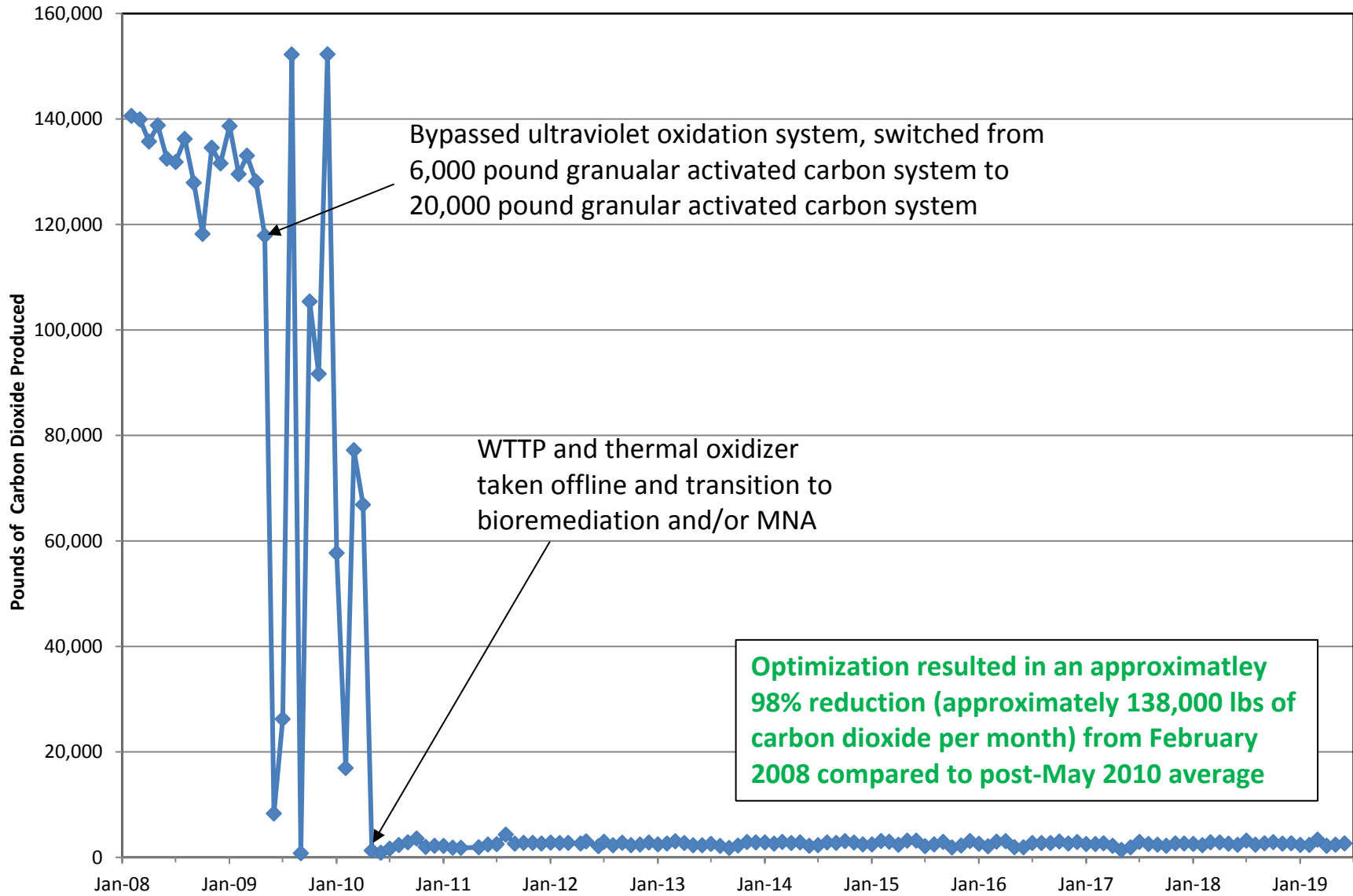
mg/L = milligrams per liter

**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: 178

Reporting Period: 4 June 2019 – 1 July 2019

Date Submitted: 12 July 2019

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 June 2019 reporting period:

<b>Table 1 – Operations Summary – June 2019</b>			
<b>Initial Data Collection:</b>	6/4/2019 9:00	<b>Final Data Collection:</b>	7/1/2019 14:15
Operating Time:	Percent Uptime:	Electrical Power Usage <sup>a</sup> :	
<b>LF007C GWTP:</b> 75 hours	<b>LF007C GWTP</b> 100% <sup>b</sup>	<b>LF007C GWTP:</b> 0 kWh	
Gallons Treated: <b>28,113 gallons</b>		Gallons Treated Since March 2000: <b>88.7 million gallons</b>	
Volume Discharged to Duck Pond: <b>28,113 gallons</b>			
VOC Mass Removed: <b>8.9 x 10<sup>-5</sup> pounds<sup>c</sup></b>		VOC Mass Removed Since March 2000: <b>174.4 pounds (Groundwater)</b>	
Rolling 12-Month Cost per Pound of Mass Removed: <b>Not Measured<sup>d</sup></b>			
Monthly Cost per Pound of Mass Removed: <b>Not Measured<sup>d</sup></b>			
<sup>a</sup> The LF007C GWTP operates on solar power only. <sup>b</sup> The system was temporarily restarted on 4 June to collect a sample prior to restarting the system. The system was operational 100% of the available time between 28 June and 1 July 2019 (when the system was brought back on line). <sup>c</sup> VOCs from June 2019 influent sample detected by EPA Method SW8260C. <sup>d</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.

<b>Table 2 – LF007C GWTP Average and Total Flow Rates – June 2019</b>		
<b>Location</b>	<b>Average Flow Rate (gpm)<sup>a</sup></b>	<b>Total Gallons Processed (gallons)</b>
EW614x07	5.6	25,221
EW615x07	0.6	2,803
<b>LF007C GWTP</b>	<b>6.3</b>	<b>28,113</b>
<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	7 January 2019	12:00	4 June 2019	9:00	The system had been shut down due to vernal pools. Restarted to collect sample when vernal pools were dry.
LF007C GWTP	4 June 2019	13:00	28 June 2019	16:00	Shut down following sample collection. Restarted after sample results confirmed effective treatment.
-- = 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

The LF007C GWTP was shut down on 7 January 2019 when vernal pools formed at Subarea LF007C. After the vernal pools dried up, the LF007C GWTP was temporarily restarted on 4 June 2019 to collect the monthly groundwater samples. After letting the system run for approximately 4 hours, the groundwater samples were collected and the system was shut down again. Sample results are presented in Table 4. Samples collected in June 2019 were also analyzed for metals but the laboratory got backed up and could not report the metals results in time for this report. Results from the metals analysis will be presented in the July 2019 Monthly Data Sheet.

TCE (0.38 J µg/L) was the only analyte detected at the influent sample location. No VOCs or TPH were detected in the samples collected between carbon vessels or at the effluent sample location. Therefore, on 28 June 2019, the LF007C GWTP resumed operation.

Starting next month (July), the treatment plant samples will be sent to a different laboratory that can meet the detection limit for TPH-MO that is at least as low as the discharge limit. The current lab cannot meet the discharge limit of 100 µg/L.

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 also slightly decreased over the last 12 months.

## Optimization Activities

No optimization activities occurred at the LF007C GWTP in June 2019.

# 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 a solar-only operated treatment system and does not generate 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 June 2019 – Subarea LF007C Groundwater Treatment Plant

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	4 June 2019 (µg/L)		
				Influent	After Carbon 1	Effluent
<b>Halogenated Volatile Organics</b>						
Acetone	NA	2.1	0	ND	ND	ND
Bromodichloromethane	5.0	0.29	0	ND	ND	ND
Bromoform	5.0	0.10	0	ND	ND	ND
2-Butanone	5.0	0.35	0	ND	ND	ND
Carbon Tetrachloride	0.5	0.15	0	ND	ND	ND
Chloroform	5.0	0.12	0	ND	ND	ND
Dibromochloromethane	5.0	0.13	0	ND	ND	ND
1,3-Dichlorobenzene	5.0	0.11	0	ND	ND	ND
1,4-Dichlorobenzene	5.0	0.13	0	ND	ND	ND
1,1-Dichloroethane	5.0	0.15	0	ND	ND	ND
1,2-Dichloroethane	0.5	0.22	0	ND	ND	ND
1,1-Dichloroethene	5.0	0.14	0	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.10	0	ND	ND	ND
trans-1,2-Dichloroethene	5.0	0.11	0	ND	ND	ND
Methylene Chloride	5.0	0.35	0	ND	ND	ND
Tetrachloroethene	5.0	0.15	0	ND	ND	ND
1,1,1-Trichloroethane	5.0	0.19	0	ND	ND	ND
1,1,2-Trichloroethane	5.0	0.31	0	ND	ND	ND
Trichloroethene	5.0	0.13	0	<b>0.38 J</b>	ND	ND
Vinyl Chloride	0.5	0.22	0	ND	ND	ND
<b>Non-Halogenated Volatile Organics</b>						
Benzene	1.0	0.13	0	ND	ND	ND
Ethylbenzene	5.0	0.15	0	ND	ND	ND
Toluene	5.0	0.25	0	ND	ND	ND
Xylenes	5.0	0.10 – 0.18	0	ND	ND	ND
<b>Other</b>						

Total Petroleum Hydrocarbons – Gasoline	50	10	0	NM	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	15	0	NM	NM	ND
Total Petroleum Hydrocarbons – Motor Oil	50	160	0	NM	NM	ND

\* In accordance with current National Pollutant Discharge Elimination System permit number CAG912002, Order number R2-2017-0048.

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 high.

NA = not applicable

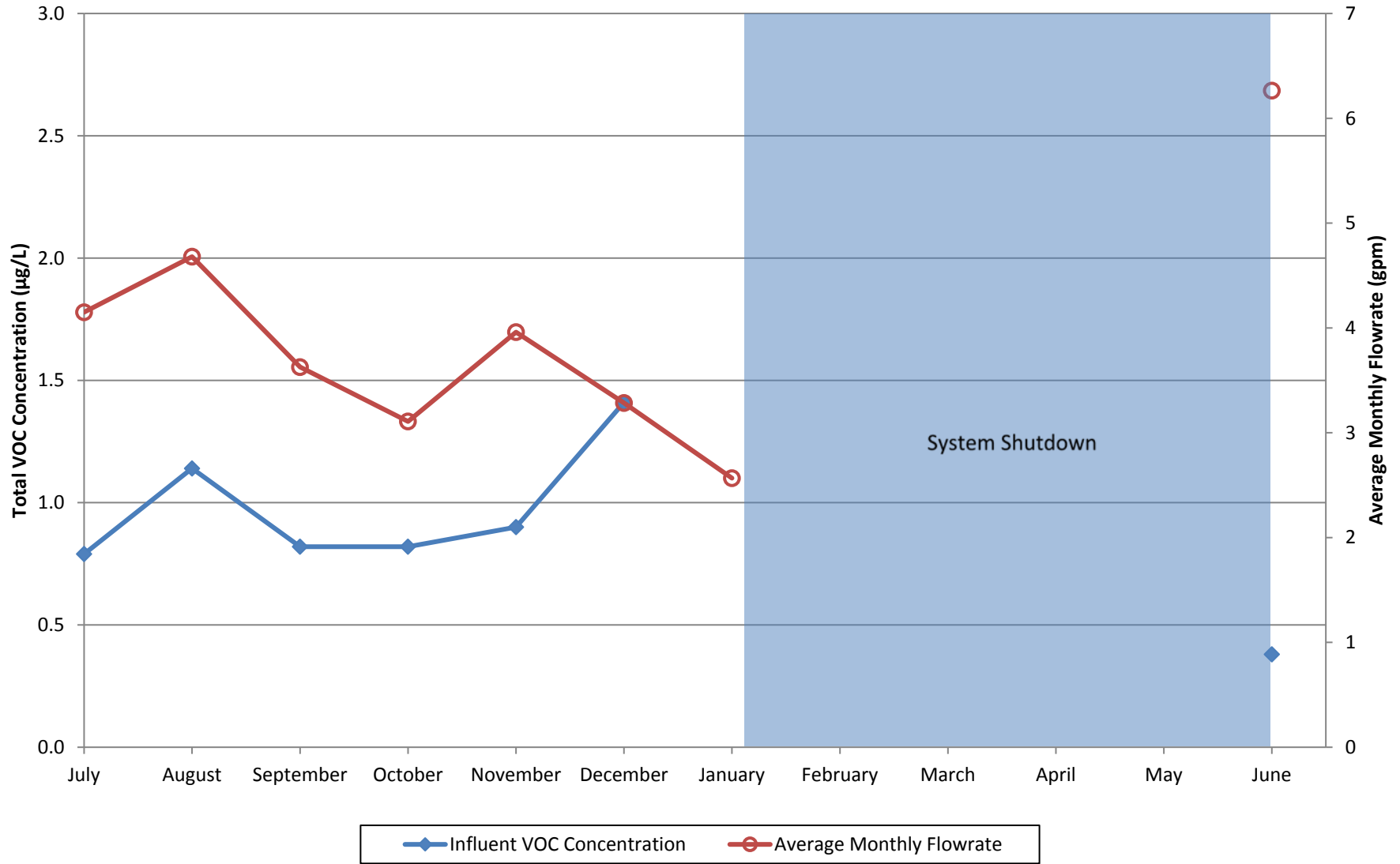
N/C = number of samples out of compliance with discharge limits.

ND = not detected

NM = not measured

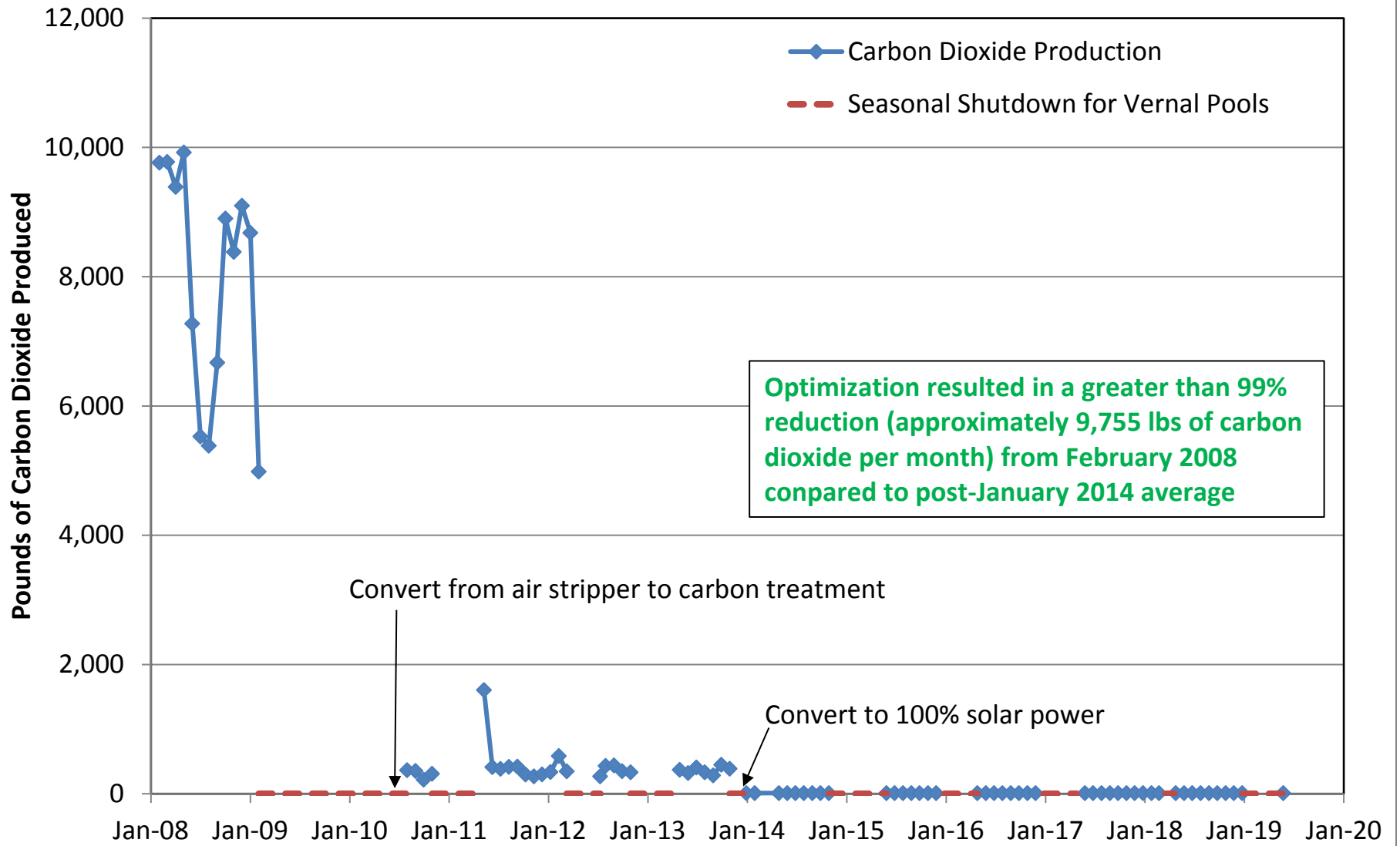
µg/L = micrograms per liter

**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**



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

# Site ST018 Groundwater Treatment Plant Monthly Data Sheet

Report Number: 100

Reporting Period: 28 May 2019 – 1 July 2019

Date Submitted: 12 July 2019

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

## System Metrics

Table 1 presents operation data from the June 2019 reporting period.

Table 1 – Operations Summary – June 2019		
<b>Initial Data Collection:</b> 5/28/2019 9:20	<b>Final Data Collection:</b> 7/1/2019 12:50	
Operating Time: <b>ST018GWTP: 819 hours</b>	Percent Uptime: <b>ST018GWTP: 100%</b>	Electrical Power Usage: <b>ST018GWTP: 140 kWh (104 lbs CO<sub>2</sub> generated<sup>a</sup>)</b>
Gallons Extracted: <b>251,530 gallons</b>	Gallons Extracted Since March 2011: <b>17.5 million gallons</b>	
Volume Discharged to Sanitary Sewer: <b>251,530 gallons</b>	Final Totalizer Reading: <b>17,526,119 gallons</b>	
Cumulative Volume Discharged to Sanitary Sewer since 1 November 2014: <b>11,029,945 gallons</b>		
MTBE, BTEX, VOC, TPH Mass Removed: <b>0.78 lbs<sup>b</sup></b>	MTBE, BTEX, VOC, TPH Mass Removed Since March 2011: <b>48.2 lbs</b>	
MTBE (Only) Removed: <b>0.14 lbs<sup>b</sup></b>	MTBE (Only) Mass Removed Since March 2011: <b>11.7 lbs</b>	
Rolling 12-Month Cost per Total Pounds of Mass Removed: \$14,379 <sup>bc</sup>		
Monthly Cost per Pound of Mass Removed: \$5,454 <sup>bc</sup>		
<sup>a</sup> SiteWise™ estimate that 1 kilowatt hour generated produces 0.74 pounds of GHG. <sup>b</sup> Calculated using June 2019 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 – June 2019</b>		
<b>Location</b>	<b>Average Flow Rate Groundwater (gpm)<sup>a</sup></b>	<b>Hours of Operation</b>
EW2014x18	1.2	671
EW2016x18	0.8	810
EW2019x18	1.4	652
EW2333x18	1.5	811
ST018GWTP	5.1	819

<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.	--		--	

-- = 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 discharge samples were collected at the ST018GWTP on 4 June 2019. Because the extracted groundwater is no longer treated with carbon prior to discharge to the sanitary sewer, only discharge samples are now collected, rather than influent and effluent samples. Results are presented in Table 4. The complete June 2019 laboratory data report is available upon request. The MTBE discharge concentration during the June 2019 sampling event was 65 µg/L, which is an increase from the May 2019 sample result of 35 µg/L. Several other VOCs, TPH-g, and TPH-d were detected in the system discharge sample.

The Fairfield-Suisun Sewer District does not currently have a discharge 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 discharge contaminant concentrations to maintain compliance with the Fairfield-Suisun Sewer District discharge permit.

On 29 May 2019, the spent carbon from the old GAC vessels was removed. On 5 June 2019, the spent GAC was picked up and disposed of off Base.

The totalizer on EW2014x18 was malfunctioning and not properly recording the volume extracted. On 6 June, the totalizer was removed, cleaned out, rebuilt, and reinstalled. In addition, some sediment was removed from the conveyance piping. On 25 June, EW2014x18 was shutdown and the pump was removed so that the well could be redeveloped in early July 2019. EW2014x18 is currently off line but will be brought back on line in July 2019.

The other extraction wells were off line at various times in June 2019 for maintenance activities. All pumps were placed back on line following the maintenance activities.

Figure 1 presents plots of the average flow rate and total extracted contaminant (MTBE, TPH-g, TPH-d, TPH-mo, BTEX, and VOCs) and extracted 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 an increasing trend with a fairly steadily increasing trend since December 2018. The extracted MTBE concentrations and extracted total concentrations have generally been fluctuating over the past 12 months with an overall increasing trend.

## Optimization Activities

No optimization activities occurred at the ST018GWTP in June 2019.

## 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 104 pounds of GHG during June 2019 and removed 251,530 gallons of water. The amount of GHG produced is directly attributed to the amount of water removed through the system because the only line-power electrical use is for a transfer pump to push the water from the system to the sanitary sewer.

TABLE 4

Summary of Groundwater Analytical Data for June 2019– Site ST018 Groundwater Treatment Plant

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	4 June 2019 (µg/L)
				System Discharge
<b>Fuel Related Constituents</b>				
Methyl tert-Butyl Ether	6,400	0.25	0	<b>65</b>
Benzene	25,000 <sup>a</sup>	0.16	0	<b>9.0</b>
Ethylbenzene	25,000 <sup>a</sup>	0.16	0	<b>5.5</b>
Toluene	25,000 <sup>a</sup>	0.17	0	<b>0.28 J</b>
Total Xylenes	25,000 <sup>a</sup>	0.19 – 0.34	0	<b>1.6 J</b>
Total Petroleum Hydrocarbons – Gasoline	50,000 <sup>b</sup>	10	0	<b>170 J+</b>
Total Petroleum Hydrocarbons – Diesel	50,000 <sup>b</sup>	15	0	<b>110</b>
Total Petroleum Hydrocarbons – Motor Oil	100,000	160	0	ND
<b>Other</b>				
1,2-Dichloroethane	20	0.13	0	ND
Isopropylbenzene	NA	0.19	0	<b>0.71 J</b>
Naphthalene	NA	0.22	0	<b>3.8</b>
n-Butylbenzene	NA	0.14	0	<b>0.26 J</b>
N-Propylbenzene	NA	0.16	0	<b>1.8</b>
1,2,4-Trimethylbenzene	NA	0.15	0	<b>2.5</b>
1,3,5-Trimethylbenzene	NA	0.16	0	<b>1.1</b>

\* In accordance with the Fairfield-Suisun Sewer District Discharge 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

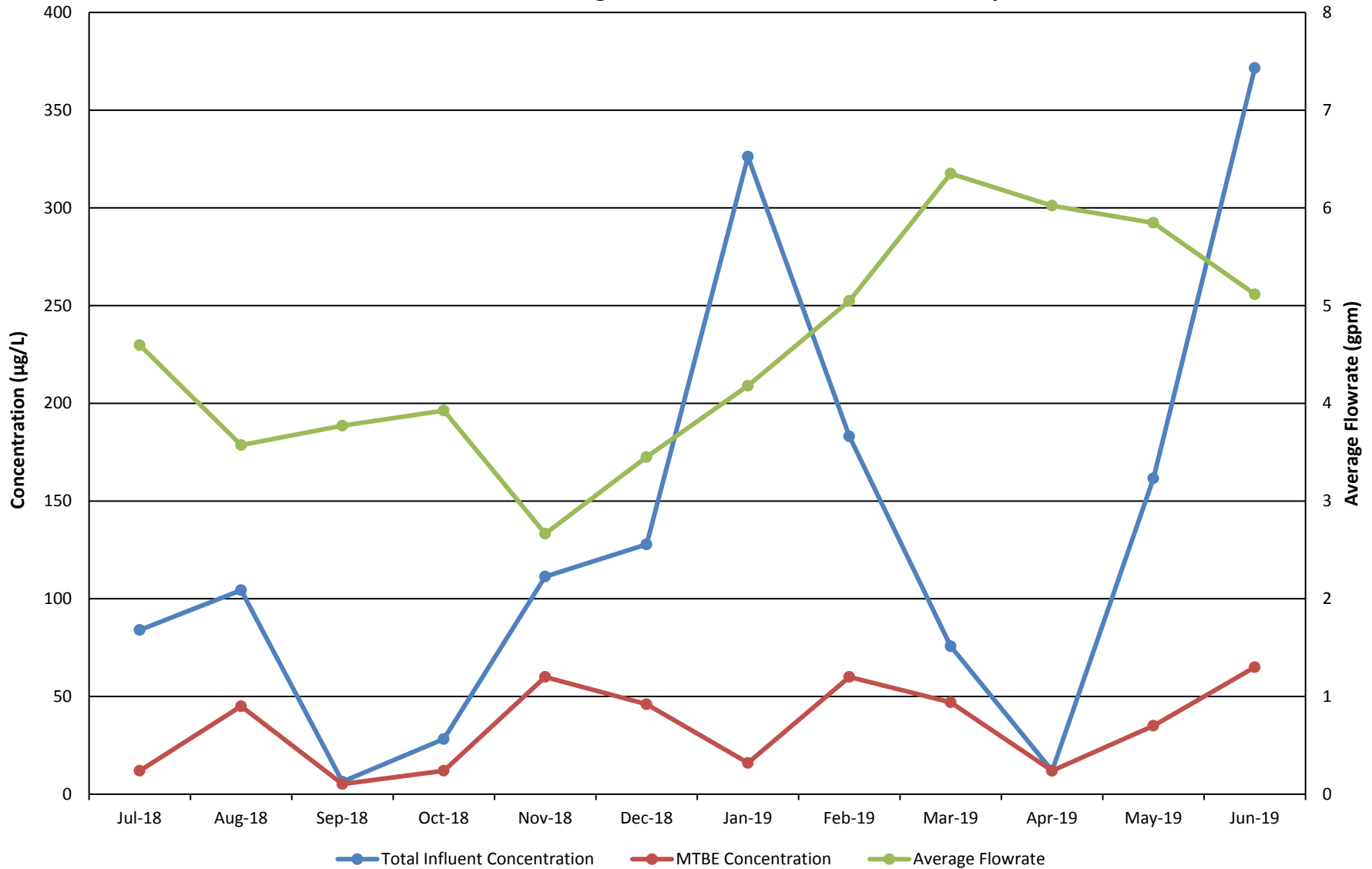
J = analyte concentration is considered an estimated value due to a detected concentration value between the reporting limit and method detection limit for the contaminant.

NA = not applicable

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

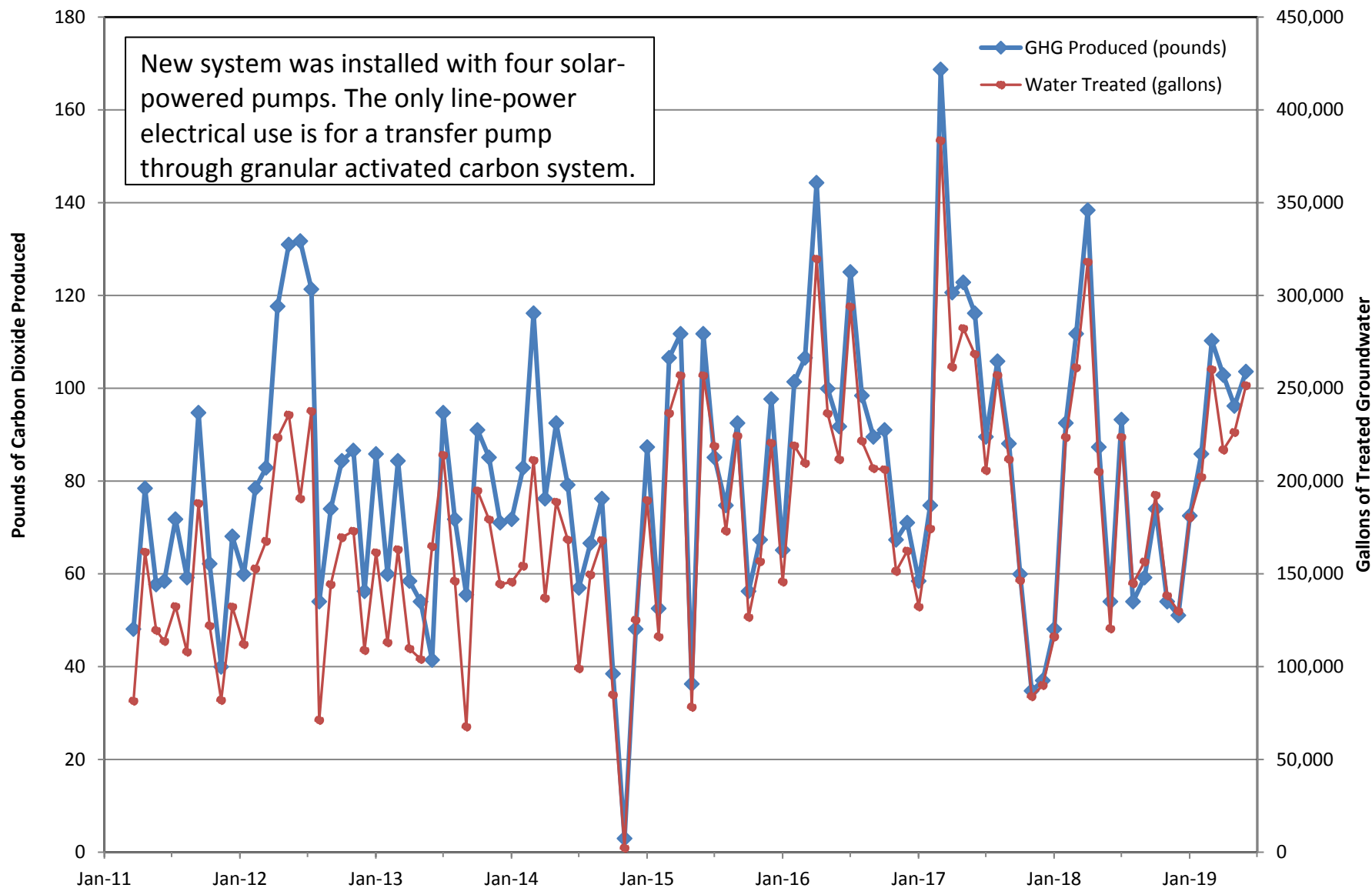
ND = not detected above method detection limit.

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



### Figure 2

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



# Travis AFB Restoration Program

## Program Update

*RPM Meeting*

*July 17, 2019*



# 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
- 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
- FT005 Extraction System Optimization Tech Memo
- 2017 Annual CAMU Monitoring Report
- LF044 Sediment Sampling Report
- SD043 RD/RA Work Plan
- SS046 RD/RA Work Plan
- Amendment to the WABOU Soil ROD for sites DP039, SD043, and SS046
- EVO Sites FT004, SS015, SD031, & SD036 Optimization Injections Tech Memo
- LF006 Technology Demonstration Work Plan
- AOC TA500 Well Decommissioning and Site Closeout Tech Memo
- SS015 Soil Sampling Results Tech Memo
- LF006 Technology Demonstration Construction Completion Report
- Subarea LF007C TPH Chromatogram Review TM
- 2017 Annual GRISR

# 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
- Q2 2018 GRIP Sampling
- SS015 Soil sampling
- TA500 Well Decommissioning
- FT005 EVO injection
- FT004 POCO Soil Investigation
- 3Q 2018 GRIP Sampling
- LF006 Well Installations and Injections
- 4Q 2018 GRIP Sampling
- SD043 Soil excavation
- 1Q 2019 GRIP Sampling
- 2019 Annual LUC Inspections
- SS046 Soil excavation
- 2Q 2019 GRIP Sampling Event
- ***Well Re-development (13 wells)***

# Documents In-Progress

## CERCLA

- Amendment to the NEWIOU Soil ROD for Sites SS016 and SD033
- Community Relations Plan Update (revised draft)
- 4<sup>th</sup> Five Year Review Report for Multiple Groundwater, Soil, and Sediment Sites
- SS016 RD/RA Work Plan
- Addendum to the Site SS016 Groundwater RD/RA Work Plan
- SD043 Remedial Action Completion Report
- SS046 Remedial Action Completion Report
- 2018 Annual GRISR

# Documents In-Progress

## MMRP

- NFA ROD for Old Skeet Range (TS060/TS060A MRA)

## POCO

- SS014 POCO Subsites 2, 4, and 5 Closure Evaluation Report

# Field Work In-Progress

CERCLA

- SD034 O<sub>2</sub> Enhancement

POCO

- None

# Documents Planned

## CERCLA

- SD043 Site Closure Report Jul
- SD031 Soil RI/FS Aug
- 2018 LF007 CAMU Inspection, Monitoring,  
and Maintenance Report Aug
- LF008 Remedial Action Completion Report Aug
- ***SS046 Site Closure Report*** ***TBD***

## POCO

- None

# Field Work Planned

## CERCLA

- SD037 Injection Well Installation Jul
- SS046 Well Decommissioning Jul
- SS016 SBGR Repairs Aug
- 3<sup>rd</sup> Quarter GRIP Sampling Aug
- SS016 Soil excavation (waiting on ROD amendment) TBD
- SD037 EVO Re-injection (MW 2121x37) TBD

## POCO

- None

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

# Petroleum Technology Demonstration Projects (1)

- SS014: Recycled Drywall Subgrade Biogeochemical Reactor (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 ~2.5 years
    - TPH-G: 99% reduction in source area (1,900 to <25 mg/L [non-detect])
    - TPH-D: 99% reduction in source area (5,500 to 76 mg/L)
    - Benzene: 99% reduction in source area (90 to <0.4 mg/L [non-detect])
    - Plume as a whole continues to shrink, so this TD has been quite successful

SBGR = Subgrade Biogeochemical Reactor

**Updates in Green Font**

# Petroleum Technology Demonstration Projects (2)

- SD034: Aerobic “Washboard” Subgrade Biogeochemical Reactor (SBGR)
  - Installed six (6) SBGR trenches in November 2016 to evaluate the effectiveness of an oxygen-enhanced aerobic SBGR on reducing TPH as diesel (TPH-D) in groundwater
  - Below SBGR trench (MW811x34/PZSSAx34) through first 2 years
    - TPH-D baseline 9,600 ug/L was reduced to 40 J ug/L after 15 months, with increase to 890 ug/L at 20 months, then decreased to 100 ug/L at 2 years (decreased to 90 ug/L at 2.5 years). Concentration fluctuations are to be expected as higher concentration areas are flushed as part of the washboard effect. We are evaluating enhancements to the SBGR trenches to maintain treatment efficiency.)
    - TPH-MO baseline 2,300 ug/L was reduced to 89 J ug/L after 15 months, with increase to 760 ug/L at 20 months, then decreased to non-detect at 2 years (remained non-detect at 2.5 years)
  - Plume hot spot monitoring well (MW02x34) through first 2 years
    - TPH-D baseline 8,300 ug/L was reduced to 6,800 ug/L after 15 months, with increase to 13,000 ug/L at 20 months, then decreased to 6,700 ug/L at 2 years and further decreased to 5,500 ug/L at 2.5 years (Concentration fluctuations are to be expected as higher concentration areas are flushed as part of the washboard effect. We are evaluating enhancements to the extraction network to help reductions in this area.)
    - TPH-MO baseline 1,500 ug/L was reduced to 660 J ug/L after 15 months, with non-detect at elevated detection limit at 20 months, then 1,100 ug/L at 2 years and remained 1,100 J ug/L at 2.5 years (Was 72% reduction after 9 months, seeing some fluctuations)
- Aerobic treatment process for this TD has been successful, but additional enhancements are warranted to maintain treatment efficiency (optimization activities are in progress)

Updates in Green Font



# CVOC Technology Demonstration Projects (3)

- **Multisite Bioaugmentation: EVO and KB-1 Plus (No new information)**
  - 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 reductions at ST027B, but still too early to evaluate if bioaugmentation was beneficial
    - TCE fluctuations at SD036 bioaugmentation area and 99% decrease in the EVO-only area, reinjections and additional injection wells have supported significant reductions to the east of the site (in MW2064Ax36, TCE reduced from 6,400 to 11 ug/L), northeast (in MW2063x36, TCE reduced from 1,000 to 1.8 J ug/L), and to the north (in MW2187x36, TCE reduced from 1,400 to 84 ug/L). Still too early to evaluate if bioaugmentation was beneficial
- **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. TD installation completed May 2016. Optimized the GETs in 2017
    - FT005 north area: Slightly elevated TOC and reduced COC concentrations (below MCLs);
    - FT005 central area: Limited TOC increase observed to date in most areas, as injected EVO may be adsorbed to sediments or being consumed faster than spread can be observed. However, MW2292x05 (south of Base boundary) had TOC increase from 1.2 to 20 mg/L between May and October 2018, likely the result of the newly installed extraction wells and the 2018 reinjection in this area.
    - FT005 south area: No TOC increase observed in this control area: Newly installed extraction wells are effectively capturing the remaining 1,2-DCA hot spots, with concentrations now beginning to decrease in these areas
    - New extraction wells are decreasing 1,2-DCA (e.g., 3.6 to 0.91 J; 1.4 to 0.54 J; 5.9 to 3.3; 3.0 to 1.9 ug/L)
    - We don't think distribution of TOC through the aquifer via extraction will be viable, although it is still expected to have had a benefit to remediation as a whole

# 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 baseline monitoring well TCE concentration reduced from 560 to 140 µg/L (now decreased to 63 ug/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)
    - Slight TOC increase (3.5 to 5.4 mg/L) and TCE decrease (previous max well rebounded from 140 to 330 ug/L, and then decreased to 63 ug/L following reinjection)
    - Variable TOC increase and TCE decrease in main plume area monitoring wells
    - In some extraction wells, TCE concentrations are increasing. This indicates additional TCE mass below the vernal pools that is now being pulled to the extraction wells (recirculation is working, but we are fighting additional TCE mass below the vernal pools, so it will take additional time to see concentration reductions)
    - MW2330x04 maxed out at 640 ug/L in April 2018 and now 49 ug/L in May 2019

**Updates in Green Font**

# CVOC Technology Demonstration Projects (5)

- SD031: EVO distribution via Gravel Chimneys (No new information)
  - 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
      - 1,1-DCE in SW area where we reinjected: MW568x31 decreased from max of 48 ug/L to ND, MW572x31 decreased from max of 200 to 13 ug/L, and MW574x31 decreased from max of 33 to 8.9 ug/L

**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 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 (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