Final

Travis Air Force Base
Environmental Restoration Program
Restoration Program Manager's
Meeting Minutes
15 January, 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) teleconference on 15 January 2020 at 0930 hours in Building 248 at Travis AFB, California. Attendees included:

Lonnie Duke	AFCEC/CZOW
Glenn Anderson	AFCEC/CZOW
Monika O'Sullivan	AFCEC/CZOW
Angel Santiago	AFCEC/CZOW
Milton 'Gene' Clare	ÁFCEC/CZOW
Lt Rachel Brinegar (via telephone)	Travis AFB/PAO
Sarah Miller (via telephone)	USACE-Omaha
Brian Boccellato (via telephone)	USACE-Omaha
Nadia Hollan Burke (via telephone)	EPA
Amanda Rohrbaugh (via telephone)	TechLaw, Inc.
Adriana Constantinescu (via telephone)	RWQCB
Dominique Forrester (via telephone)	DTSC
Mike Wray	CH2M/Jacobs
Leslie Royer	CH2M/Jacobs
Tony Chakurian	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 (November 2019)
Attachment 4	CGWTP Monthly Data Sheet (November 2019)
Attachment 5	LF007C Monthly Data Sheet (November 2019)
Attachment 6	ST018 Monthly Data Sheet (November 2019)
Attachment 7	SBBGWTP Monthly Data Sheet (December 2019)
Attachment 8	CGWTP Monthly Data Sheet (December 2019)
Attachment 9	LF007C Monthly Data Sheet (December 2019)
Attachment 10	ST018 Monthly Data Sheet (December 2019)
Attachment 11	Presentation: Passive Vent System Sampling
Attachment 12	Program Update

1. ADMINISTRATIVE

A. Previous Meeting Minutes

November 2019 Draft Meeting Minutes were accepted as Final with no changes.

B. Action Item Review

Action items from November 2019 were reviewed.

Action Item 1 is ongoing: Ms. O'Sullivan to provide updates on perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA). January 2020 update: Ms. O'Sullivan stated that all comments on the QAPP were received before the holidays. The contractor is working on responses, and the Air Force hopes to send them to the regulators by the end of the month. A quick turnaround on the review of the RTCs is requested; in order to get the field work started as soon as possible, the Air Force asked everyone to continue to prioritize this document.

Mr. Duke added that the Air Force attorneys are being included in the preparation of the responses. He reinforced the importance of getting into the field to collect the necessary data but noted that the Air Force wants to ensure everyone agrees that the data are appropriate and acceptable.

Ms. Burke said that the EPA and state agencies had a call regarding the laboratory analysis methods suggested, and they agreed more information from the lab is

necessary, particularly if anything deviates from what is in the EPA guidance. Ms. O'Sullivan took the action to ensure the EPA and Air Force chemists are in communication over this topic. Ms. Constantinescu stated that the EPA and state agencies will have another call after the responses to comments are received.

Action Item 2 is ongoing: Mr. Duke will continue to provide design and construction information for the new KC-46 Hangar construction project. January 2020 update: Mr. Duke stated that the excavation had been completed in some areas, but that some confirmation samples still showed exceedances of contaminants. Additional excavation will be completed on January 27, and the areas will be resampled. If all results are acceptable, the land use controls will be lifted.

He added that the contractor for hangar construction was awarded to WALSH, who built Terminal B at the Sacramento International Airport. The kickoff meeting will be held in the next few weeks.

Action Item 3 is ongoing: Include the progress of the optimized Emulsified Vegetable Oil (EVO) delivery via solar-powered organic carbon (SPOC) injection system pilot test at Site SS015 during future monthly program updates. January 2020 update: Startup of the pilot test is on-schedule and anticipated to begin in early February. The necessary parts have been ordered. Updates will be provided during the Program Update when warranted.

Action Item 4: Ms. Constantinescu to send letter to Air Force requesting Air Force and CH2M HILL reports related to the Potrero Hills Annex; Mr. Anderson to provide requested reports. January 2020 update: Mr. Anderson provided the requested reports to the Water Board. This action item is now closed.

Action Item 5: Air Force to add rows to the Master Meeting and Document Schedule for dates agency comments are received by the Air Force, and dates that responses to comments are sent to the agencies. January 2020 update: The rows have been added to, and populated in, this month's MMDS. Ms. Burke and Mr. Forrester both expressed the need for additional information when comments are expected from several divisions within an agency, and also when multiple rounds of comments and responses are produced. The Air Force proposed that the dates shown reflect that comments from all divisions within an agency have been received, and in the case of multiple rounds of RTCS, including dates for only the initial and most recent round, because the MMDS is not meant to be an RTC tracking sheet. Ms. Burke had additional concerns and volunteered to provide a markup to Mr. Duke and Mr. Anderson.

Action Item 6: Air Force to compare last few months of uptime at the Site ST018 GWTP with how much MTBE has been removed. January 2020 update: Mr. Santiago investigated the correlation and sent the information to the Water Board. This action item is now closed.

Action Item 7: Air Force will bold only concentrations exceeding discharge limits on future monthly groundwater treatment plant reports. A note explaining that bolded values indicated exceedances of discharge limits will be included in the

table for future reports. January 2020 update: This change has been made and will be pointed out during the GWTP update later in the meeting. This action item is now closed.

C. Master Meeting and Document Schedule Review (see Attachment 2)

The Travis AFB Master Meeting and Document Schedule (MMDS) was discussed during this meeting (see Attachment 2).

Travis AFB Annual Meeting and Teleconference Schedule

The next RPM meeting will be an in-person meeting to be held 19 February 2020 at 0930.

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.
- Site SD031 Soil Remedial Investigation/Feasibility Study (RI/FS): There was no change to the schedule. DTSC comments have been received. A complete set of EPA comments are still outstanding, Ms. Constantinescu said the Water Board would provide comment before 17 January 2020.
- Potrero Hills Annex (FS, PP, and ROD): No change was made to the schedule; Ms. Constantinescu said that the Water Board did not concur with the request for closure per the state low threat closure policy.
- Quarterly Newsletter (April 2020): No change was made to the schedule. This newsletter will announce the Restoration Advisory Board meeting. The newsletter will convert to a semi-annual schedule in 2020 due to a ramping down of project activities. The newsletter may return to a quarterly schedule when the follow-on ORC is in place (FY2022).
- Fourth Five-Year Review Report for Multiple Groundwater, Soil, and Sediment Sites: There was no change to the schedule. The path forward for remaining concerns was addressed in a cover letter, and the passive vent sampling will be covered in a presentation later in the meeting.
- Site LF008 Remedial Action Completion Report: Comments have been received from all agencies, Mr. Anderson will populate the table with the dates the Air Force provided responses. The response to comments meeting date was changed to 19 February 2020. The rest of the schedule was updated accordingly.

— Site SD043 Site Closure Report: The Response to Comments and Final due dates were changed to 9 December 2019 to reflect actual submittal dates. This document will be moved to the History section next month.

— Site SS046 Well Decommissioning and Site Closeout Tech Memo: The response to comment and final due dates were changed to 22 January 2020 to reflect actual submittal dates.

— Initial Passive Vent Systems Evaluation Work Plan Tech Memo: The Predraft to Air Force Service Center due date was changed to 16 December 2019 to reflect actual submittal date; the rest of the schedule was updated accordingly. This document partially addresses comments on the Fourth Five Year Review, and will be discussed in a presentation during today's meeting.

— Optimization Activities Technical Memorandum for Sites SD034 and SD037: This is a new document; the Air Force document lead will be Glenn Anderson, and the CH2M HILL document lead will be Levi Pratt. The Predraft to AF/Service Center was assigned a due date of 20 January 2020; all other dates were assigned accordingly.

— Site SD043 Well Decommissioning and Site Closeout Technical Memorandum: This is a new document; the Air Force document lead will be Glenn Anderson, and the CH2M HILL document lead will be Levi Pratt. The Predraft to AF/Service Center was assigned a due date of 29 January 2020; all other dates were assigned accordingly.

— Site SD031B POCO Additional Site Work Plan: The Predraft to Air Force Service Center was changed to 18 December 2019. The rest of the schedule was updated accordingly.

— Site FT004 POCO Excavation Work Plan Tech Memo: This is a new document. Mr. Anderson, Mr. Berwick from CH2M, and Ms. Greenwald from CAPE will be the document leads. All dates are TBD and a schedule will be assigned in the February 2020 MMDS.

— MOVED TO HISTORY:

— Amendment to the NEWIOU Soil, Sediment, and Surface Water Record of Decision for the Travis AFB ERP Sites SS016 and SD033

— Site SS016 Remedial Design/Remedial Action Work Plan

2. CURRENT PROJECTS

Treatment Plant Operation and Maintenance Update

South Base Boundary Groundwater Treatment Plant, November 2019 (see Attachment 3)

The South Base Boundary Groundwater Treatment Plant (SBBGWTP) performed at 97.3% uptime, and 7.0 million gallons of groundwater were extracted and treated in November 2019. All treated water was discharged to Union Creek. The average flow rate for the SBBGWTP was 155.6 gallons per minute (gpm). Electrical power usage was 19,851 kilowatt hours (kWh), and approximately 16,290 pounds of CO_2 were created (based on DOE calculation). Approximately 0.87 of a pound of volatile organic compounds (VOCs) was removed in November. The total mass of VOCs removed since startup of the system is 522.2 pounds.

The annual freshwater toxicity test, required by the State of California, was conducted in November 2019. No adverse effects on the rainbow trout were noted, and the survival rate was 100 percent. Ms. Constantinescu stated that the Water Board is notified in the event of any exceedances. Ms. Royer added that a streamlined discussion of the results is included in the annual Groundwater Remediation Implementation Status Report (GRISR).

No optimization activities were conducted in November 2019.

Central Groundwater Treatment Plant, November 2019 (see Attachment 4)

The Central Groundwater Treatment Plant (CGWTP) performed at 82% uptime with approximately 1,010,710 gallons of groundwater extracted and treated in November 2019. All treated water was discharged to the storm sewer system which discharges to Union Creek. The average flow rate for the CGWTP was 26.8 gpm. Electrical power usage was 2,160 kWh for all equipment connected to the Central Plant, and approximately 2,486 pounds of CO_2 were generated. Approximately 1.9 pounds of VOCs were removed from groundwater by the treatment plant in November. The total mass of VOCs removed since the startup of the system is 11,535 pounds.

The annual freshwater toxicity test was conducted in November 2019, with no adverse effects noted for rainbow trout, and the survival rate was 100 percent.

The system is currently offline due to a damaged programmable logic controller resulting from a basewide power outage. The new part will be installed in December 2019.

No optimization activities occurred at the CGWTP in November 2019.

LF007C Groundwater Treatment Plant, November 2019 (Attachment 5)

The Subarea LF007C Groundwater Treatment Plant (LF007C GWTP) performed at 98.1% uptime with approximately 160,186 gallons of groundwater extracted and treated in November 2019. All treated water was discharged to the Duck Pond for beneficial reuse. The average flow rate was 3.6 gpm. Approximately 9.7 x 10^{-4} of a pound of VOCs was removed from groundwater by the treatment plant in November 2019. 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 annual freshwater toxicity test was conducted in November 2019, with no adverse effects noted for rainbow trout, and the survival rate was 100 percent.

A new air release valve and support were installed on 12 November, requiring approximately 4 hours of down time. On 1 December, the system was shut down briefly due to a stuck float switch on the sump pump. The system was restarted both times without issue.

This GWTP will continue to operate until ponded water develops over the groundwater plume. Once the vernal pools develop, the system will be shut off in accordance with USFWS requirements.

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

NOTE: While the LF007C GWTP and extraction systems are still accessible for O&M, the monitoring wells located offbase are not currently accessible, because the Air Force's LF007C easement has expired. The Air Force is working on getting a new easement, which has been complicated by a change of land ownership. Ms. Burke and Ms. Constantinescu offered regulatory agency support for getting access to the sites for sampling and groundwater elevation measurements if the Air Force continues to encounter difficulties in obtaining an access agreement.

ST018 Groundwater (MTBE) Treatment Plant, November 2019 (see Attachment 6)

Site ST018 (MTBE) Treatment Plant (ST018 GWTP) performed at 84.4% uptime with approximately 161,830 gallons of groundwater extracted in November 2019. All groundwater was discharged to the Fairfield – Suisun Sewer District. The average flow rate for the ST018 GWTP was 4.2 gpm. Electrical power usage for the month was 89 kWh for all equipment connected to the ST018 GWTP. The total CO_2 discharge equivalent equates to approximately 66 pounds. Approximately 0.06 of a pound of MTBE, BTEX, VOCs, and TPH was removed in November by the treatment plant, and approximately 0.03 of a pound of MTBE-only was removed from groundwater. The

total BTEX, MTBE and TPH mass removed since the startup of the system is 48.7 pounds, and the total MTBE mass removed since startup of the system is 11.9 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.

The annual freshwater toxicity test was conducted in November 2019, with no adverse effects noted for rainbow trout, and the survival rate was 100 percent.

Extraction well EW2019x18 was taken offline on 25 November due to low MTBE concentrations, with regulatory approval.

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

South Base Boundary Groundwater Treatment Plant, December 2019 (see Attachment 7)

The South Base Boundary Groundwater Treatment Plant (SBBGWTP) performed at 100% uptime, and 6.2 million gallons of groundwater were extracted and treated in December 2019. All treated water was discharged to Union Creek. The average flow rate for the SBBGWTP was 154.2 gallons per minute (gpm). Electrical power usage was 17,417 kilowatt hours (kWh), and approximately 14,489 pounds of CO_2 were created (based on DOE calculation). Approximately 0.75 of a pound of volatile organic compounds (VOCs) was removed in December. The total mass of VOCs removed since startup of the system is 522.9 pounds.

Troubleshooting was performed on two wells during December 2019, and the Site SS030 extraction wells were taken offline to install new signal wires for water level and flow rate instrumentation. All wells were restarted without issue for each activity.

No optimization activities were conducted in December 2019.

Central Groundwater Treatment Plant, December 2019 (see Attachment 8)

The Central Groundwater Treatment Plant (CGWTP) performed at 64.2% uptime with approximately 694,230 gallons of groundwater extracted and treated in December 2019. All treated water was discharged to the storm sewer system which discharges to Union Creek. The average flow rate for the CGWTP was 26.8 gpm. Electrical power usage was 1,575 kWh for all equipment connected to the Central Plant, and approximately 2,054 pounds of CO_2 were generated. Approximately 1.5 pounds of VOCs were removed from groundwater by the treatment plant in December. The total mass of VOCs removed since the startup of the system is 11,536 pounds.

The system had been shut off since 26 November due to a damaged programmable logic controller (PLC) resulting from a basewide power outage. A new PLC was installed on 12 December and the system was restarted without issue.

No optimization activities occurred at the CGWTP in December 2019.

LF007C Groundwater Treatment Plant, December 2019 (Attachment 9)

The Subarea LF007C Groundwater Treatment Plant (LF007C GWTP) performed at 82.0% uptime with approximately 83,407 gallons of groundwater extracted and treated in December 2019. All treated water was discharged to the Duck Pond for beneficial reuse. The average flow rate was 2.5 gpm. Approximately 7.6×10^{-4} of a pound of VOCs was removed from groundwater by the treatment plant in December 2019. 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.

This GWTP will continue to operate until ponded water develops over the groundwater plume. Once the vernal pools develop, the system will be shut off in accordance with USFWS requirements.

TPH-d was detected in the effluent sample location at a concentration exceeding the effluent limitation. A confirmation sample was collected from the effluent sampling location in January. The LF007C GWTP was taken off line following sample collection in January, and will remain off line until confirmation sample results are received. If TPH-d concentrations do not exceed effluent limitations in the confirmation sample, the system will be restarted. If concentrations are again in excess of effluent limitations, additional samples may be collected to help determine the cause of the detection. Ms. Constantinescu requested that the Air Force request the chromatograms in the event of another exceedance to help them determine if the TPH-d is naturally-occurring.

The system was shut down briefly in late December due to the sump filling with rainwater. The rainwater was drained, and the system restarted with no issue.

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

NOTE: While the LF007C GWTP and extraction systems are still accessible for O&M, the monitoring wells located offbase are not currently accessible, because the Air Force's LF007C easement has expired. The Air Force is working on getting a new easement, which has been complicated by a change of land ownership. Ms. Burke and Ms. Constantinescu offered regulatory agency support for getting access to the sites for sampling and groundwater elevation measurements if the Air Force continues to encounter difficulties in obtaining an access agreement.

ST018 Groundwater (MTBE) Treatment Plant, December 2019 (see Attachment 10)

Site ST018 (MTBE) Treatment Plant (ST018 GWTP) performed at 57.2% uptime with approximately 51,770 gallons of groundwater extracted in December 2019. All groundwater was discharged to the Fairfield – Suisun Sewer District. The average flow rate for the ST018 GWTP was 2.2 gpm. Electrical power usage for the month was 33 kWh for all equipment connected to the ST018 GWTP. The total CO_2 discharge equivalent equates to approximately 24 pounds. Approximately 0.10 of a pound of MTBE, BTEX, VOCs, and TPH was removed in December by the treatment plant, and approximately 0.03 of a pound of MTBE-only was removed from groundwater. The total BTEX, MTBE and TPH mass removed since the startup of the system is 48.8 pounds, and the total MTBE mass removed since startup of the system is 12.0 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.

The system was shut down for approximately 12 days due to the influent tank high level alarm. The system was restarted without issue.

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

3. Presentations:

A) Presentation: Passive Vent System Sampling at Buildings 38, 554, and 837 (see Attachment 11)

Ms. Royer reported on the proposed passive vent system sampling at Buildings 38, 554, and 837. The full briefing is included as Attachment 11; highlights of the discussion are as follows:

- This proposed sampling is in response to comments received on the Fourth Five-Year Review Report.
- Travis AFB applies a site-specific attenuation factor to the passive vent system sample results to derive the subslab to indoor air pathway risk
- The Air Force wants to collect the winter sample by the end of March since it's cold outside and the buildings are closed. Summer samples will be collected in July or August when it is hot outside.
- Ms. Burke noted that the potential areas of disagreement would be the screening levels and the decision-making process, but agreed that the collection of the data at the right times of the year is necessary and the discussion regarding screening levels can be an ongoing discussion. She noted that the detection limits being proposed are low enough that results will meet whatever screening level EPA requires, and

reiterated the importance of collecting the data. Ms. Constantinescu agreed about the importance of collecting the data at the right time.
- Ms. Royer noted that the DTSC 2019 Note 3 screening levels are used in the document.

B) Program Update: Activities Completed, In Progress, and Upcoming (see Attachment 12)

Mr. Wray reported on the status of fieldwork and documents that have been completed, are in progress, or upcoming. Please refer to Attachment 12 for the full briefing.

4. New Action Item Review

1. Action Item 1: Ongoing, new action: Ms. O'Sullivan to facilitate communication between the EPA and Air Force chemists, and update the Air Force chemist regarding yesterday's call and the outcome.

2. Air Force to request chromatogram from LF007C GWTP TPH-d confirmation sampling if results exceed effluent limitations.

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. New subaction: Ms. O'Sullivan to facilitate communication between the EPA and Air Force chemists, and update the Air Force chemist regarding yesterday's call and the outcome.	Ongoing	Open
2.	Lonnie Duke	Mr. Duke will continue to provide design and construction information for the KC-46 Hangar for agency input	Ongoing	Open

		ahead of the Air Force/Civil Engineering awarding the construction contract.		
3.	Mr. Wray and Ms. Royer	Mr. Wray or Ms. Royer to include the progress of the optimized EVO delivery via solar-powered organic carbon injection system pilot test at Site SS015 during future monthly program updates.	Ongoing	Open
4.	Lonnie Duke and Glenn Anderson	Air Force to request chromatogram from LF007C GWTP TPH-d confirmation sampling if results exceed effluent limitations.	21 February 2020	Open

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

The RPM Teleconference is scheduled for 9:30 AM PST on 15 January 2020. **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. PASSIVE VENT SYSTEM SAMPLING
   B. PROGRAM UPDATE:
      DOCUMENTS & ACTIVITIES COMPLETED, IN PROGRESS & 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 WILL 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.

(2020)

Annual Meeting and Teleconference Schedule

Monthly RPM Meeting[1] (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[2]
—	11-18-20	—
—	—	—

[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**	**Site SD031 Soil Remedial Investigation/Feasibility Study Travis AFB, Glenn Anderson CH2M, Rick Sturm**
Scoping Meeting	**NA**	**NA**
Predraft to AF/Service Center	08-23-16	05-24-19
AF/Service Center Comments Due	09-07-16	06-10-19
Draft to Agencies / RAB	09-28-16 (03-22-18)	09-12-19
Agency Comments Due	10-28-16 (04-27-18)	11-12-19 (01-14-20)
Agency Comments Received	EPA: 11-22-16 (04-11-18) WB: NC DTSC: 04-12-18	EPA: WB: DTSC: 12-31-19
Responses Sent to Agencies	EPA: 03-22-18 (TBD) WB: NA DTSC: TBD	EPA: WB: DTSC:
Agency Concurrence with Remedy	NA	NA
Public Comment Period	NA	NA
Public Meeting	**NA**	NA
Response to Comments Due	TBD	03-11-20
Draft Final Due	TBD	03-11-20
Final Due	TBD	04-11-20

NA = not applicable
NC = no comments

Travis AFB Master Meeting and Document Schedule

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

NA = not applicable
NC = no comments

Travis AFB Master Meeting and Document Schedule

INFORMATIONAL DOCUMENTS			
Life Cycle	**Quarterly Newsletter (April 2020)** **Travis, Glenn Anderson**	**Fourth Five-Year Review Report for Multiple Groundwater, Soil, and Sediment Sites** **Travis AFB, Glenn Anderson** **Tetra Tech, Joachim Eberharter**	**Site LF008 Remedial Action Evaluation Report** **Travis AFB, Glenn Anderson** **CH2M, Latonya Coleman**
Scoping Meeting	**NA**	**NA**	**NA**
Predraft to AF/Service Center	03-05-20	03-14-18	07-10-19
AF/Service Center Comments Due	NA	05-22-18	07-24-19
Draft to Agencies / RAB	03-12-20	06-05-18	10-07-19
Agency Comments Due	03-26-20	07-20-18	11-06-19
Agency Comments Received	EPA: WB: DTSC:	EPA: WB: DTSC:	EPA: 11-07-19 WB: 11-04-19 DTSC: 11-20-19
Responses Sent to Agencies	EPA: WB: DTSC:	EPA: WB: DTSC:	EPA: WB: DTSC:
Response to Comments Meeting	**03-27-20**	**TBD**	**02-19-20**
Response to Comments Due	04-01-20	11-30-19	03-06-20
Draft Final Due	NA	NA	NA
Final Due	04-01-20	11-30-19	03-06-20
Public Comment Period	NA	NA	NA
Public Meeting	**NA**	**NA**	**NA**

NA = not applicable
NC = no comments

Travis AFB Master Meeting and Document Schedule

INFORMATIONAL DOCUMENTS			
Life Cycle	**Site SD043 Site Closure Report Travis AFB, Glenn Anderson CH2M, Levi Pratt**	**Site SS046 Well Decommissioning and Site Closeout Tech Memo Travis AFB, Glenn Anderson CH2M, Doug Berwick CAPE, Meg Greenwald**	**Initial Passive Vent Systems Sampling Work Plan Tech Memo Travis AFB, Glenn Anderson CH2M, Leslie Royer**
Scoping Meeting	**NA**	**NA**	**NA**
Predraft to AF/Service Center	06-12-19	09-04-19	12-16-19
AF/Service Center Comments Due	06-28-19	09-18-19	12-31-19
Draft to Agencies / RAB	08-06-19	10-15-19	01-09-20
Agency Comments Due	10-07-19	11-15-19	02-10-20
Agency Comments Received	EPA: 10-04-19 WB: 08-27-19 DTSC: 08-28-19	EPA: 11-04-19 WB: NC DTSC: NC	EPA: WB: DTSC:
Responses Sent to Agencies	EPA: 11-05-19 WB: 10-23-19 DTSC: 10-23-19	EPA: 12-27-19 WB: NA DTSC: NA	EPA: WB: DTSC:
Response to Comments Meeting	**11-20-19**	**11-20-19**	02-19-20
Response to Comments Due	12-09-19	12-06-19 (01-22-20)	03-04-20
Draft Final Due	NA	NA	NA
Final Due	12-09-19	12-06-19 (01-22-20)	03-04-20
Public Comment Period	NA	NA	NA
Public Meeting	**NA**	**NA**	**NA**

NA = not applicable
NC = no comments

Travis AFB Master Meeting and Document Schedule

INFORMATIONAL DOCUMENTS		
Life Cycle	**Optimization Activities Technical Memorandum for Sites SD034 and SD037 Travis AFB, Glenn Anderson CH2M, Levi Pratt**	**Site SD043 Well Decommissioning and Site Closeout Technical Memorandum Travis AFB, Glenn Anderson CH2M, Levi Pratt**
Scoping Meeting	**NA**	**NA**
Predraft to AF/Service Center	01-20-20	01-29-20
AF/Service Center Comments Due	02-20-20	03-02-20
Draft to Agencies / RAB	03-09-20	03-17-20
Agency Comments Due	04-08-20	04-17-20
Agency Comments Received	EPA: WB: DTSC:	EPA: WB: DTSC:
Responses Sent to Agencies	EPA: WB: DTSC:	EPA: WB: DTSC:
Response to Comments Meeting	04-16-20	05-20-20
Response to Comments Due	05-01-20	06-03-20
Draft Final Due	NA	NA
Final Due	05-01-20	06-03-20
Public Comment Period	NA	NA
Public Meeting	**NA**	**NA**

NA = not applicable
NC = no comments

Travis AFB Master Meeting and Document Schedule

INFORMATIONAL DOCUMENTS		
Life Cycle	**Site SD031B POCO Additional Site Investigation Work Plan** **Travis, Glenn Anderson** **CH2M, Tony Chakurian**	**Site FT004 POCO Excavation Work Plan Tech Memo** **Travis AFB, Glenn Anderson** **CH2M, Doug Berwick** **CAPE, Meg Greenwald**
Scoping Meeting	**NA**	**NA**
Predraft to AF/Service Center	12-18-19	TBD
AF/Service Center Comments Due	01-20-20	TBD
Draft to Agencies / RAB	02-04-20	TBD
Agency Comments Due	03-06-20	TBD
Agency Comments Received	EPA: WB: DTSC:	EPA: WB: DTSC:
Responses Sent to Agencies	EPA: WB: DTSC:	EPA: WB: DTSC:
Response to Comments Meeting	**03-18-20**	TBD
Response to Comments Due	04-01-20	TBD
Draft Final Due	NA	NA
Final Due	04-01-20	TBD
Public Comment Period	NA	NA
Public Meeting	**NA**	**NA**

NA = not applicable
NC = no comments

Travis AFB Master Meeting and Document Schedule

HISTORY - PRIMARY DOCUMENTS		
Life Cycle	Amendment to the NEWIOU Soil ROD for the Travis AFB ERP Sites SS016 and SD033 Travis AFB, Glenn Anderson CH2M, Latonya Coleman	Site SS016 Remedial Design/Remedial Action Work Plan Travis AFB, Glenn Anderson CH2M, Doug Berwick CAPE, Meg Greenwald
Scoping Meeting	**NA**	**NA**
Predraft to AF/Service Center	02-28-18	06-04-18
AF/Service Center Comments Due	03-30-18	06-18-18
Draft to Agencies	06-22-18	07-31-18
Draft to RAB	06-22-18	07-31-18
Agency Comments Due	08-22-18	08-30-18
Response to Comments Meeting	**09-06-18**	**09-19-18**
Agency Concurrence with Remedy	NA	NA
Public Comment Period	NA	NA
Public Meeting	**NA**	**NA**
Response to Comments Due	08-29-19 (09-16-19)	10-24-18
Draft Final Due	08-29-19 (10-07-19)	10-24-18
Final Due	09-30-19 (11-13-19)	11-15-19

NA = not applicable
NC = no comments

South Base Boundary Groundwater Treatment Plant Monthly Data Sheet

Report Number: 229 **Reporting Period: 31 October 2019 – 2 December 2019** **Date Submitted: 12 December 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 November 2019 reporting period.

Table 1 – Operations Summary – November 2019

Initial Data Collection:	10/31/2019 10:15	**Final Data Collection:**	12/2/2019 12:30
Operating Time:		Percent Uptime:	
SBBGWTP:	750 hours	**SBBGWTP:**	97.3%
Electrical Power Usage:			
SBBGWTP:	19,851 kWh (16,290 lbs CO_2 generated[a])		
Gallons Treated: **7.0 million gallons**		Gallons Treated Since July 1998: **1,158 million gallons**	
Volume Discharged to Union Creek: **7.0 million gallons**		Gallons Treated from Other Sources: **0 gallons**	
VOC Mass Removed: **0.87 lbs**[b]		VOC Mass Removed Since July 1998: **522.2 lbs**	
Rolling 12-Month Cost per Pound of Mass Removed: **$19,864**[c]			
Monthly Cost per Pound of Mass Removed: **$19,073**[c]			

lbs = pounds
[a] 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.
[b] Calculated using November 2019 EPA Method SW8260C analytical results.
[c] 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.

Table 2 – SBBGWTP Average Flow Rate (gpm)[a] – November 2019

FT005[b]				SS029		SS030	
EW01x05	Offline	EW743x05	Offline	EW01x29	Offline[c]	EW01x30	8.0
EW02x05	Offline	EW744x05	Offline[c]	EW02x29	Offline[c]	EW02x30	Offline[d]
EW03x05	Offline	EW745x05	10.0	EW03x29	Offline[d]	EW03x30	12.2
EW731x05	6.9	EW746x05	Offline	EW04x29	4.2	EW04x30	25.3
EW732x05	Offline	EW2291x05	2.0	EW05x29	8.2	EW05x30	6.4
EW733x05	Offline	EW2782x05	5.5	EW06x29	7.8	EW2174x30	8.0
EW734x05	3.2	EW2783x05	Offline[d]	EW07x29	13.2	EW711x30	3.6
EW735x05	8.7	EW2784x05	Offline[d]			MW269x30	0.5
EW736x05	Offline	EW2785x05	7.8				
EW737x05	Offline	EW2786x05	17.6				
EW742x05	Offline						
FT005 Total: 61.7				**SS029 Total: 33.4**		**SS030 Total: 64.0**	

SBBGWTP Average Monthly Flow[e]: 155.6 gpm

[a] Flow rates presented are instantaneous measurements taken at the end of the reporting period.
[b] Most extraction wells at FT005 were taken offline in accordance with the *2008 Annual Remedial Process Optimization Report for the Central Groundwater Treatment Plant, North Groundwater Treatment Plant, and South Base Boundary Groundwater Treatment Plant.*
[c] Extraction wells taken off line because of persistent fouling of the well pumps and associated discharge piping.
[d] Extraction wells were operational; however, well was recharging.
[e] 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	26 November 2019	17:30	27 November 2019	14:00	Basewide power outage.

[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 4 November 2019. Sample results are presented in Table 4. The total VOC concentration (14.89 µg/L) in the influent sample remained steady from the October 2019 sample results (14.90 µg/L). TCE was the primary VOC detected in the influent sample at a concentration of 14 µg/L. Three VOCs, including TCE, were detected in the midpoint sampling location. No VOCs or TPH were detected in the effluent sample.

In November 2019, a freshwater toxicity test was performed on the SBBGWTP system effluent. No observed adverse effects were reported on the rainbow trout, and there was a 100 percent survival rate.

On 4 November 2019, the pump motor was replaced at MW269x30. The well is currently on line.

On 18 November 2019, the totalizer was replaced at EW735x05. The well is currently on line.

On 26 November 2019, the system was shut down because of a base-wide power outage. The system was restarted on 27 November without issue.

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. Since 2017, TCE concentrations have generally been decreasing, and 1,2-DCA concentrations were mostly sporadic with a slight increasing trend.

Figure 2 presents a plot of influent VOC concentrations and average flow at the SBBGWTP over the past twelve (12) months. An overall decreasing trend was observed for the VOC influent concentrations in the past 12 months. An overall increasing flow rate trend was observed in the past 12 months; however, flow rates have generally been decreasing since September 2019.

Optimization Activities

No optimization activities occurred at the SBBGWTP in November 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 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 November 2019, the SBBGWTP produced approximately 16,290 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 November 2019 – South Base Boundary Groundwater Treatment Plant

Constituent	Instantaneous Maximum[a] (µg/L)	Detection Limit (µg/L)	N/C	4 November 2019 (µg/L)		
				Influent	Midpoint	Effluent[b]
Halogenated Volatile Organics						
Bromodichloromethane	NA	0.17	0	ND	ND	ND
Chloroform	1.9	0.16	0	ND	0.27 J	ND
Chloromethane	NA	0.30	0	ND	ND	ND
1,1-Dichloroethane	0.50	0.22	0	ND	ND	ND
1,2-Dichloroethane	0.50	0.13	0	ND	ND	ND
1,1-Dichloroethene	0.50	0.23	0	ND	ND	ND
cis-1,2-Dichloroethene	0.50	0.15	0	0.89 J	1.5	ND
trans-1,2-Dichloroethene	0.50	0.11	0	ND	ND	ND
Dichlorodifluoromethane	NA	0.31	0	ND	ND	ND
Tetrachloroethene	0.50	0.20	0	ND	ND	ND
1,1,1-Trichloroethane	0.50	0.16	0	ND	ND	ND
1,1,2-Trichloroethane	0.50	0.27	0	ND	ND	ND
Trichloroethene	0.65	0.16	0	14	0.18 J	ND
Vinyl Chloride	0.90	0.10	0	ND	ND	ND
Non-Halogenated Volatile Organics						
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
Other						
Total Petroleum Hydrocarbons – Gasoline	50	10	0	NM	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	5.5	0	NM	NM	ND
Total Petroleum Hydrocarbons – Motor Oil	100	32	0	NM	NM	ND

[a] In accordance with current National Pollutant Discharge Elimination System permit number CAG912002, Order number R2-2017-0048.

[b] Concentrations in **bold** exceeded discharge limits.

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

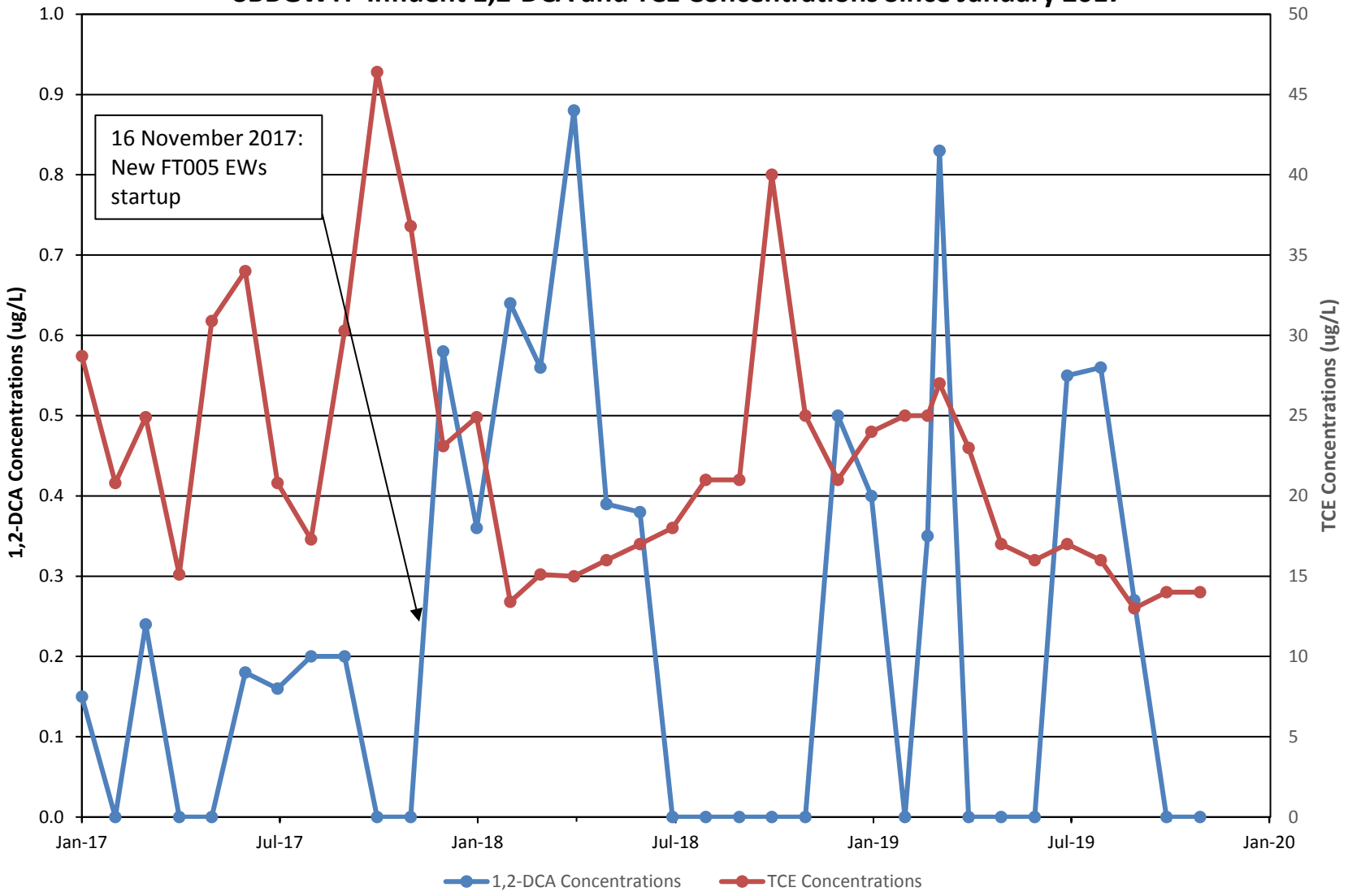


Figure 2

SBBGWTP Total VOC Influent Concentrations and Average Flowrate Twelve Month History

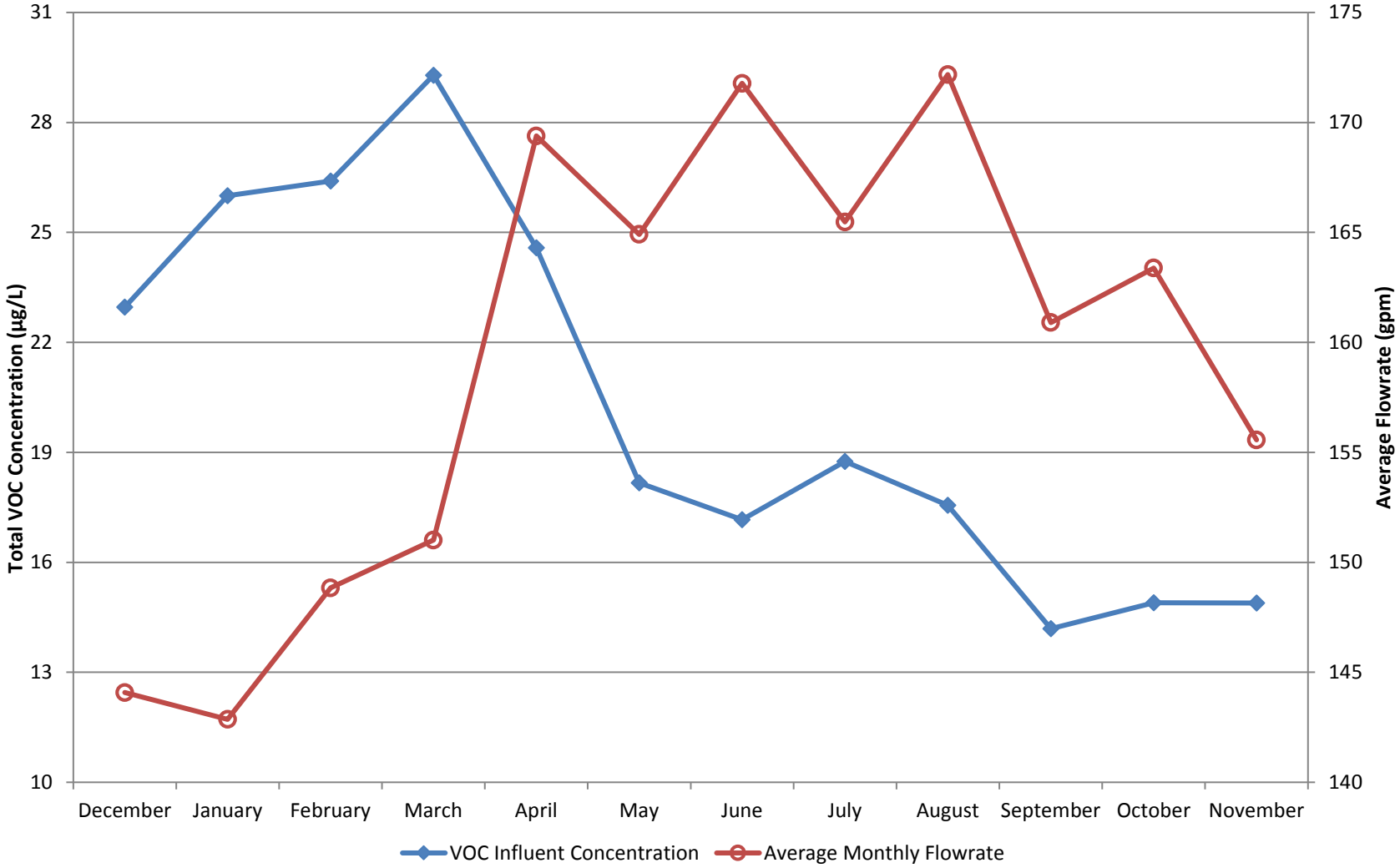
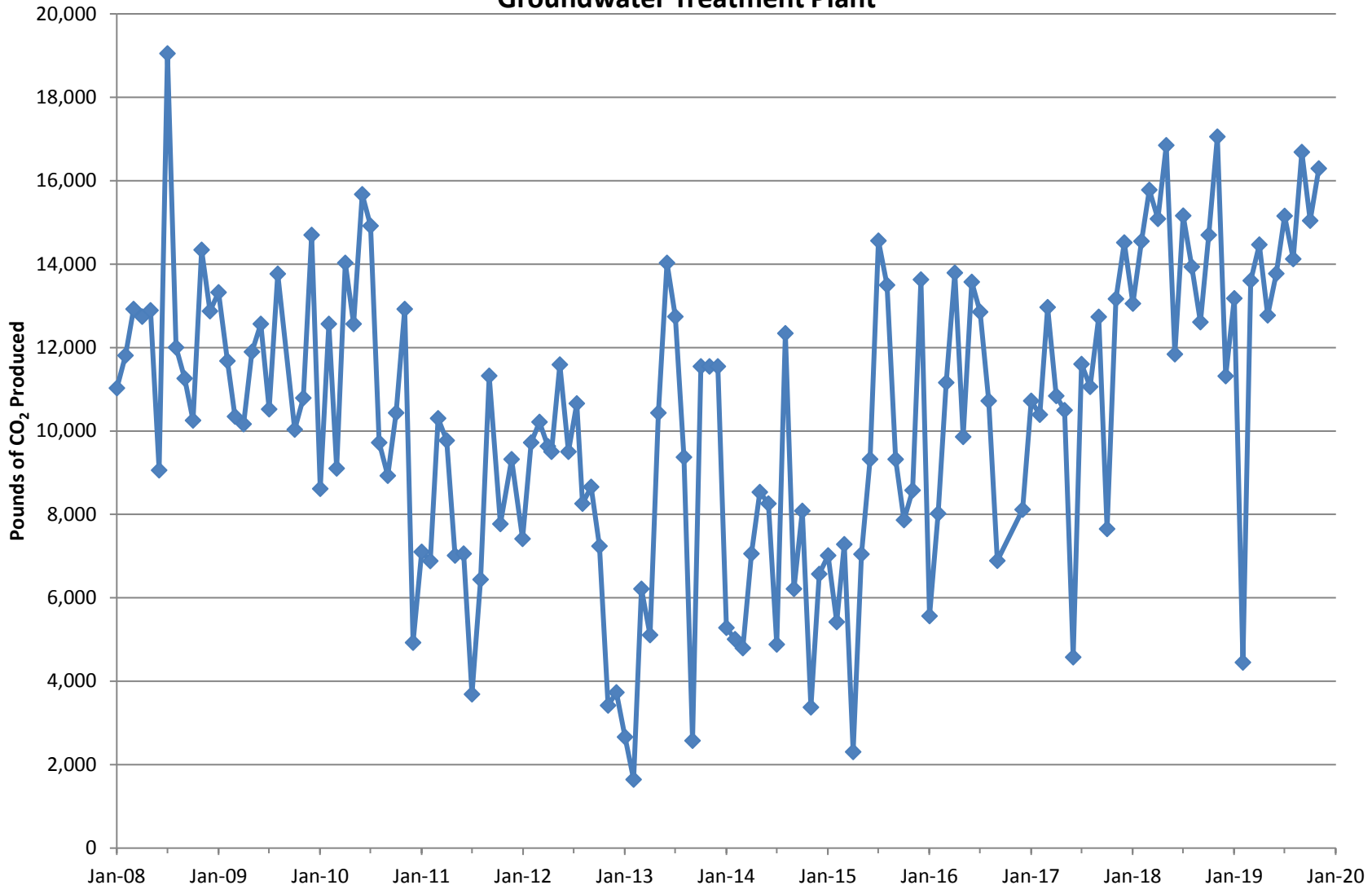


Figure 3

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



Central Groundwater Treatment Plant Monthly Data Sheet

Report Number: 244 **Reporting Period: 31 October 2019 – 2 December 2019** **Date Submitted: 12 December 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 November 2019 reporting period.

Table 1 – Operations Summary – November 2019

Initial Data Collection:	10/31/2019 12:10	**Final Data Collection:**	12/2/2019 10:00		
Operating Time:		Percent Uptime:		Electrical Power Usage:	
CGWTP:	628 hours	**CGWTP:**	82.0%	**CGWTP:**	2,160 kWh (2,486 lbs CO_2 generated[a])
Gallons Treated (discharge to storm sewer): **1,010,710 gallons**		Gallons Treated Since January 1996: **576.7 million gallons**			
VOC Mass Removed from groundwater:		VOC Mass Removed Since January 1996:			
1.9 lbs[b]		**2,849 lbs from groundwater**			
		8,686 lbs from vapor			
Rolling 12-Month Cost per Pound of Mass Removed: $3,262[c]					
Monthly Cost per Pound of Mass Removed: $2,459[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 November 2019 EPA Method SW8260C analytical results.
[c] 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.

Table 2 – CGWTP Average Flow Rates[a] – November 2019

Location	Average Flow Rate Groundwater (gpm)
EW001x16	12.3
EW002x16	7.2
EW003x16[b]	0.4
EW605x16	5.6
EW610x16	2.0
CGWTP	26.8

[a] Flow rates calculated by dividing total gallons processed by system operating time for the month or the average of the instantaneous readings.
[b] Extracted groundwater from EW003x16 is treated in Site SS016 bioreactor.
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	26 November 2019	17:10			System PLC malfunctioned. New PLC was ordered.

-- = Date/Time not recorded
[a] Shutdown and restart times estimated based on field notes
CGWTP = Central Groundwater Treatment Plant

Summary of O&M Activities

Monthly groundwater treatment samples were collected at the CGWTP on 4 November 2019. Sample results are presented in Table 4. The total VOC concentration (227.1 µg/L) in the November 2019 influent sample has decreased from the October 2019 sample (243.3 µg/L). TCE was the primary VOC detected in the influent sample at a concentration of 180 µg/L. Vinyl chloride (0.35 J µg/L) was detected in the sample collected after the first carbon vessel. Chloromethane was detected at trace concentrations in the samples collected after the first and second carbon vessels. No VOCs were detected 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 November 2019.

In November 2019, a freshwater toxicity test was performed on the CGWTP system effluent. No observed adverse effects were reported on the rainbow trout, and the survival rate was 100 percent.

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.

On 26 November 2019, the CGWTP shut down because of a base-wide power outage. The programmable logic controller (PLC) that controls operation of the CGWTP was damaged during the power outage and was not able to be brought back on line. A new PLC was ordered and will be installed in December 2019. The CGWTP is currently off line.

The Site SS016 subgrade biogeochemical reactor (SBGR), also known as the bioreactor and the Site DP039 bioreactor continued operating in November 2019.

Optimization Activities

No optimization activities occurred at the CGWTP in November 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 2,486 pounds of GHG during November 2019.

TABLE 4
Summary of Groundwater Analytical Data for November 2019 – Central Groundwater Treatment Plant

Constituent	Instantaneous Maximum[a] (µg/L)	Detection Limit (µg/L)	N/C	4 November 2019 (µg/L) Influent	After Carbon 1 Effluent	After Carbon 2 Effluent	System Effluent[b]
Halogenated Volatile Organics							
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
Chloromethane	NA	0.30 – 0.60	0	ND	0.5 J	0.31 J	ND
1,2-Dichlorobenzene	NA	0.15 – 0.30	0	0.48 J	ND	ND	ND
1,3-Dichlorobenzene	NA	0.13 – 0.26	0	0.77 J	ND	ND	ND
1,4-Dichlorobenzene	NA	0.16 – 0.32	0	0.37 J	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	0.63 J	ND	ND	ND
cis-1,2-Dichloroethene	0.50	0.15 – 0.30	0	41	ND	ND	ND
trans-1,2-Dichloroethene	0.50	0.15 – 0.30	0	2.9	ND	ND	ND
Tetrachloroethene	0.50	0.20 – 0.40	0	0.44 J	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	180	ND	ND	ND
Vinyl Chloride	0.90	0.10 – 0.20	0	0.51 J	0.35 J	ND	ND
Non-Halogenated Volatile Organics							
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
Other							
Total Petroleum Hydrocarbons – Gasoline (C6 – C10)	50	10	0	NM	NM	NM	ND
Total Petroleum Hydrocarbons – Diesel (C10 – C28)	50	5.5	0	NM	NM	NM	ND
Total Petroleum Hydrocarbons – Motor Oil (C28 – C40)	100	32	0	NM	NM	NM	ND

[a] In accordance with current National Pollutant Discharge Elimination System permit number CAG912002, Order number R2-2017-0048.

[b] Concentrations in **bold** exceeded discharge limits

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

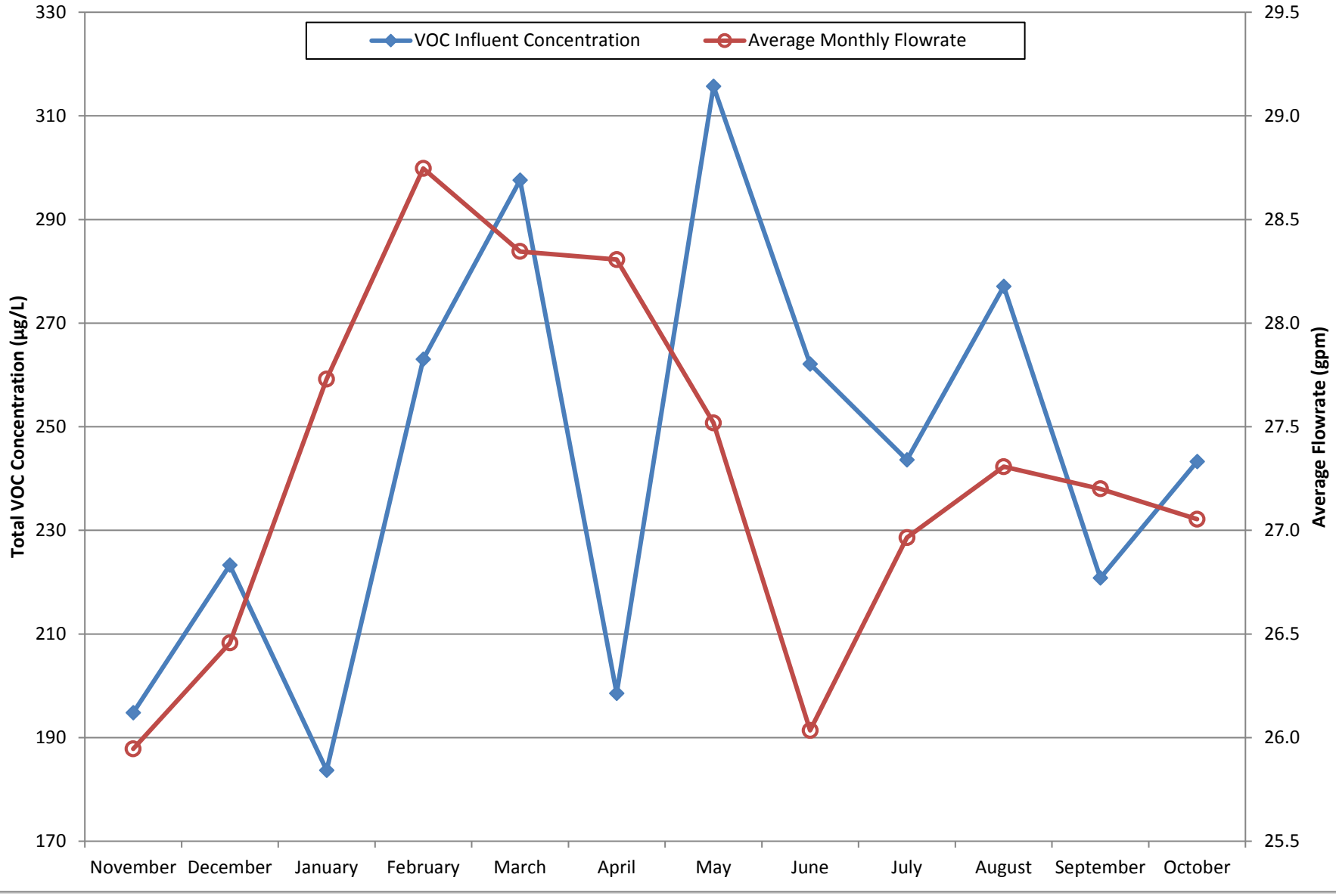
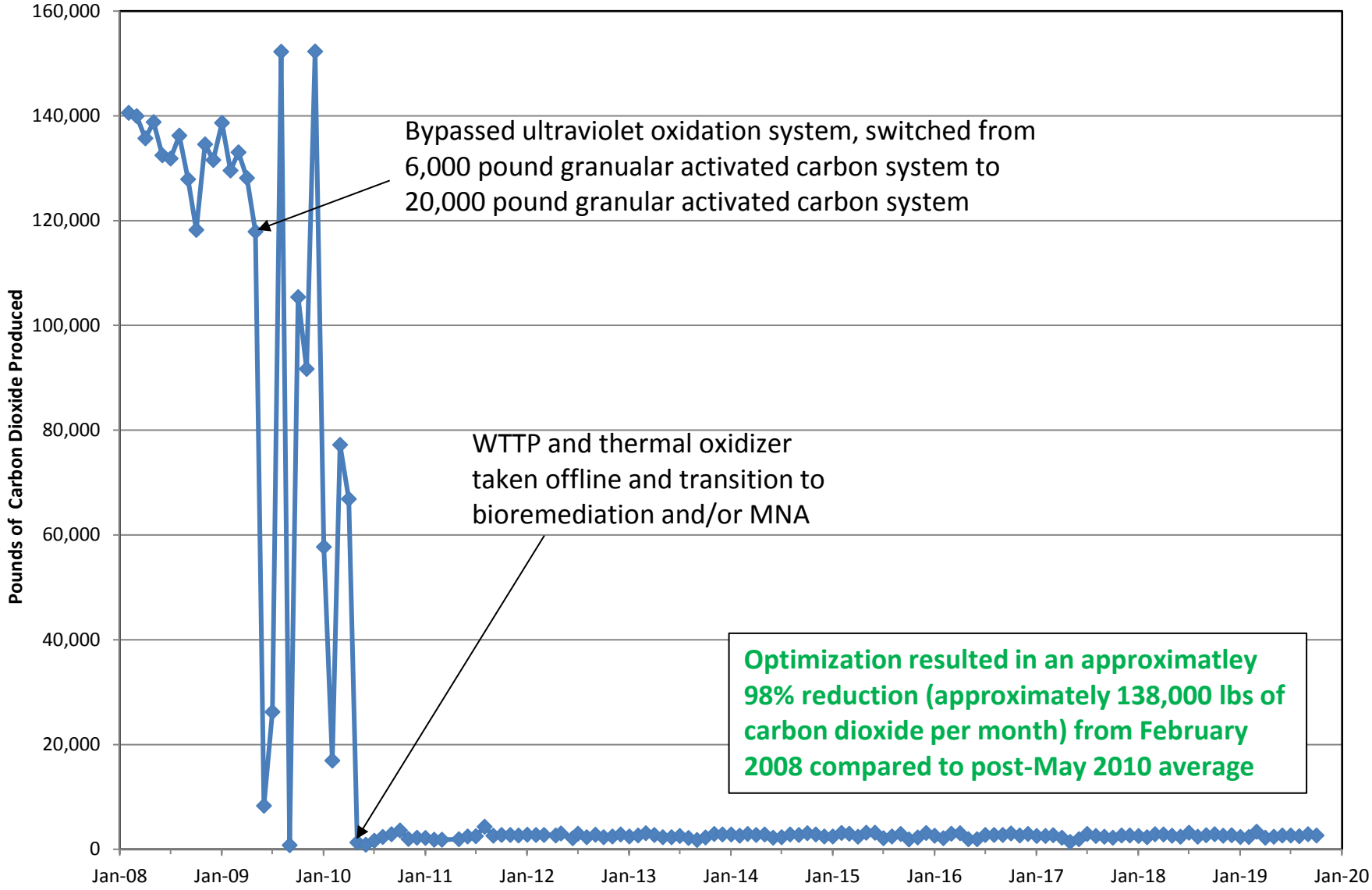


Figure 2

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



Subarea LF007C Groundwater Treatment Plant Monthly Data Sheet

Report Number: 183 **Reporting Period: 31 October 2019 – 2 December 2019** **Date Submitted: 12 December 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 November 2019 reporting period:

Table 1 – Operations Summary – November 2019

Initial Data Collection:	10/31/2019 11:00		**Final Data Collection:**	12/2/2019 9:15	
Operating Time:		Percent Uptime:		Electrical Power Usage[a]:	
LF007C GWTP:	751 hours	**LF007C GWTP**	98.1%	**LF007C GWTP:**	0 kWh
Gallons Treated: **160,186 gallons**				Gallons Treated Since March 2000: **89.6 million gallons**	
Volume Discharged to Duck Pond: **160,186 gallons**					
VOC Mass Removed: **9.7×10^{-4} pounds**[b]				VOC Mass Removed Since March 2000: **174.4 pounds (Groundwater)**	
Rolling 12-Month Cost per Pound of Mass Removed: **Not Measured**[c]					
Monthly Cost per Pound of Mass Removed: **Not Measured**[c]					

[a] The LF007C GWTP operates on solar power only.
[b] VOCs from November 2019 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 – November 2019

Location	Average Flow Rate (gpm)[a]	Total Gallons Processed (gallons)
EW614x07	3.6	161,348[b]
EW615x07	0.3	13,151
LF007C GWTP	**3.6**	**160,186**

[a] Flow rates calculated by dividing total gallons processed by system operating time for the month or the average of the instantaneous readings.
[b] The extraction pump takes in air from the subsurface, which alters the flow and totalizer. An air-release valve was installed on 12 November 2019 to help minimize the effects on the system.
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	12 November 2019	10:00	12 November 2019	14:00	Install new air relief valve.
LF007C GWTP	1 December 2019	22:00	2 December 2019	9:00	System shut down due to rainwater in the sump. Adjusted the sump float valve to get system back on line.

-- = 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 4 November 2019. Sample results are presented in Table 4. The total VOC concentration in the November 2019 influent sample was 0.73 µg/L, not including the detection of acetone, which is a common lab contaminant. TCE was detected at the influent sample location. No VOCs were detected in the midpoint and effluent sample locations. However, TPH-d was detected in the effluent sample location at a concentration of 8.9 J µg/L, which is less than the effluent limitation.

In November 2019, a freshwater toxicity test was performed on the LF007C GWTP system effluent. No observed adverse effects were reported on the rainbow trout, and there was a 100 percent survival rate.

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 increasing. The average flow rate through the LF007C GWTP has increased over the last 12 months; however, flow rates have been decreasing since the system startup in June 2019.

On 12 November, a new air release valve and support were installed in the process train upstream of the carbon vessels. The system was off line for approximately 4 hours during the installation. On 1 December 2019, the system was shut down due to a stuck float switch on the sump pump. The LF007C GWTP was restarted on 2 December 2019 without issue.

Optimization Activities

No optimization activities occurred at the LF007C GWTP in November 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 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 November 2019 – Subarea LF007C Groundwater Treatment Plant

Constituent	Instantaneous Maximum[a] (µg/L)	Detection Limit (µg/L)	N/C	4 November 2019 (µg/L)		
				Influent	After Carbon 1	Effluent[b]
Halogenated Volatile Organics						
Acetone	NA	2.1	0	3.7 J	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
Chloromethane	NA	0.30	0	ND	ND	ND
Dibromochloromethane	5.0	0.13	0	ND	ND	ND
Dichlorodifluoromethane	NA	0.31	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	0.73 J	ND	ND
Vinyl Chloride	0.5	0.22	0	ND	ND	ND
Non-Halogenated Volatile Organics						
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
Other						
Total Petroleum Hydrocarbons – Gasoline	50	10	0	NM	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	5.5	0	NM	NM	8.9 J
Total Petroleum Hydrocarbons – Motor Oil	100	32	0	NM	NM	ND

[a] In accordance with current National Pollutant Discharge Elimination System permit number CAG912002, Order number R2-2017-0048.

[b] Concentrations in **bold** exceeded discharge limits

Notes:
J = analyte concentration is considered an estimated value due to a detected concentration value between the reporting limit and method detection limit for the contaminant.
NA = not applicable
N/C = number of samples out of compliance with discharge limits.
ND = not detected
NM = not measured
µg/L = micrograms per liter

Figure 1

LF007CGWTP Total VOC Influent Concentrations and Average Flowrate Twelve Month History

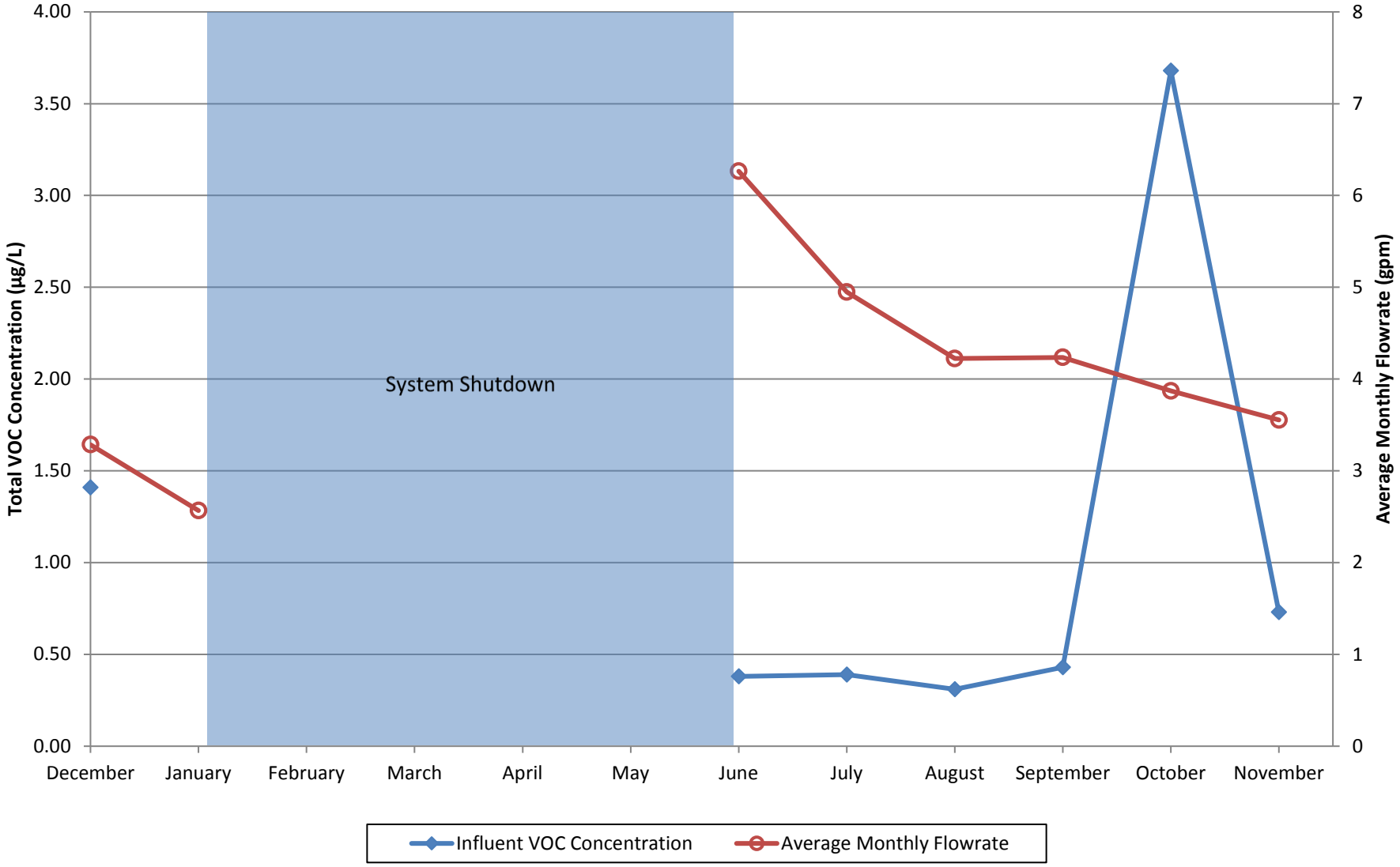
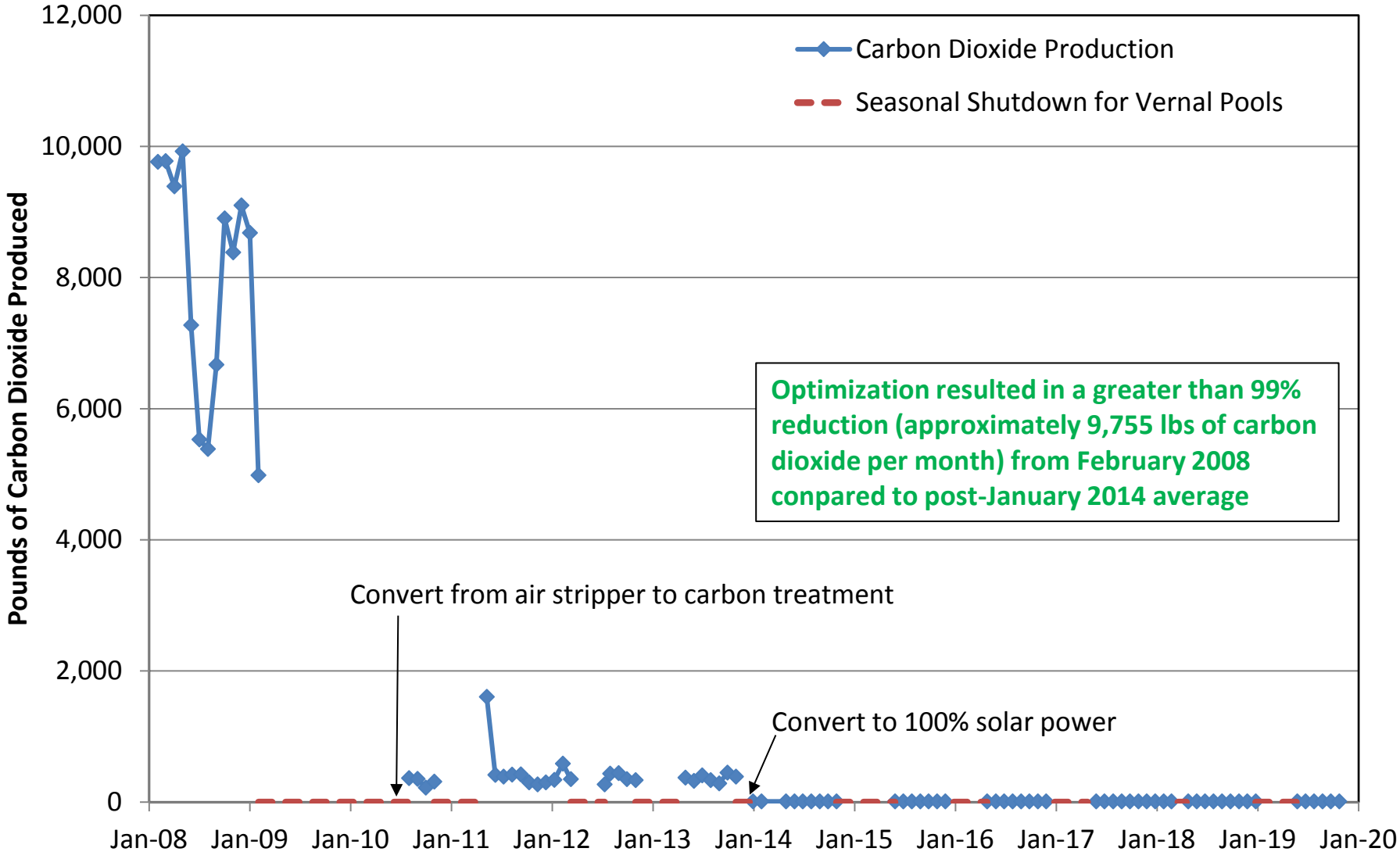


Figure 2

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



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: 105 **Reporting Period: 31 October 2019 – 2 December 2019** **Date Submitted: 12 December 2019**

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

System Metrics

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

Table 1 – Operations Summary – November 2019

Initial Data Collection:	10/31/2019 10:20	**Final Data Collection:**	12/2/2019 9:45
Operating Time:		Percent Uptime:	Electrical Power Usage:
ST018GWTP: 648 hours		**ST018GWTP: 84.4**%	**ST018GWTP:** 89 kWh (66 lbs CO_2 generated[a])
Gallons Extracted: **161,830 gallons**		Gallons Extracted Since March 2011: **18.4 million gallons**	
Volume Discharged to Sanitary Sewer: **161,830 gallons**		Final Totalizer Reading: **18,387,419 gallons**	
Cumulative Volume Discharged to Sanitary Sewer since 1 November 2014: **11,891,245 gallons**			
MTBE, BTEX, VOC, TPH Mass Removed: **0.06 lbs**[b]		MTBE, BTEX, VOC, TPH Mass Removed Since March 2011: **48.7 lbs**	
MTBE (Only) Removed: **0.03 lbs**[b]		MTBE (Only) Mass Removed Since March 2011: **11.9 lbs**	
Rolling 12-Month Cost per Total Pounds of Mass Removed: $19,621[bc]			
Monthly Cost per Pound of Mass Removed: $74,150[bc]			

[a] SiteWise™ estimate that 1 kilowatt hour generated produces 0.74 pounds of GHG.
[b] Calculated using November 2019 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 – November 2019

Location	Average Flow Rate Groundwater (gpm)[a]	Hours of Operation
EW2014x18	2.1	648
EW2016x18	0.5	648
EW2019x18	0.9	605[b]
EW2333x18	1.4	648
ST018GWTP	4.2	648

[a] Flow rates calculated by dividing total gallons processed by amount of operating time of the pump/system.
[b] Extraction well was turned off because of low MTBE concentrations with regulatory approval on 25 November 2019.

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	27 November 2019	9:00	2 December 2019	8:00	Reset system after power outage.

-- = 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 discharge samples were collected at the ST018GWTP on 4 November 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 November 2019 laboratory data report is available upon request. The MTBE discharge concentration during the November 2019 sampling event was 24 µg/L, which is a decrease from the October 2019 sample result of 57 µg/L. Benzene, 1,2-DCA, and TPH-g were also 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 25 November, extraction well EW2019x18 was taken off line because of low MTBE concentrations. Regulatory approval was received prior to turning off the well.

On 27 November, the system shut down because of Base-wide power outage. The system was restarted on 2 December 2019 without issue.

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 a decreasing trend. The extracted MTBE concentrations and extracted total concentrations have generally been fluctuating over the past 12 months with an overall decreasing trend.

Optimization Activities

No optimization activities occurred at the ST018GWTP in November 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 a majority of the ST018GWTP system.

Figure 2 presents the historical GHG production from the ST018GWTP. The ST018GWTP produced 66 pounds of GHG during November 2019 and removed 161,830 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 November 2019– Site ST018 Groundwater Treatment Plant

Constituent	Instantaneous Maximum[a] (µg/L)	Detection Limit (µg/L)	N/C	4 November 2019 (µg/L)
				System Discharge[b]
Fuel Related Constituents				
Methyl tert-Butyl Ether	6,400	0.25	0	24
Benzene	25,000[c]	0.16	0	1.1
Ethylbenzene	25,000[c]	0.16	0	ND
Toluene	25,000[c]	0.17	0	ND
Total Xylenes	25,000[c]	0.19 – 0.34	0	ND
Total Petroleum Hydrocarbons – Gasoline	50,000[d]	10	0	20 J
Total Petroleum Hydrocarbons – Diesel	50,000[d]	15	0	ND
Total Petroleum Hydrocarbons – Motor Oil	100,000	160	0	ND
Other				
1,2-Dichloroethane	20	0.13	0	0.48 J

[a] In accordance with the Fairfield-Suisun Sewer District Discharge Limitations

[b] Concentrations in **bold** exceeded discharge limits

Laboratory data available on request.

[c] The limit of 25,000 µg/L is a combined limit for BTEX.

[d] 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

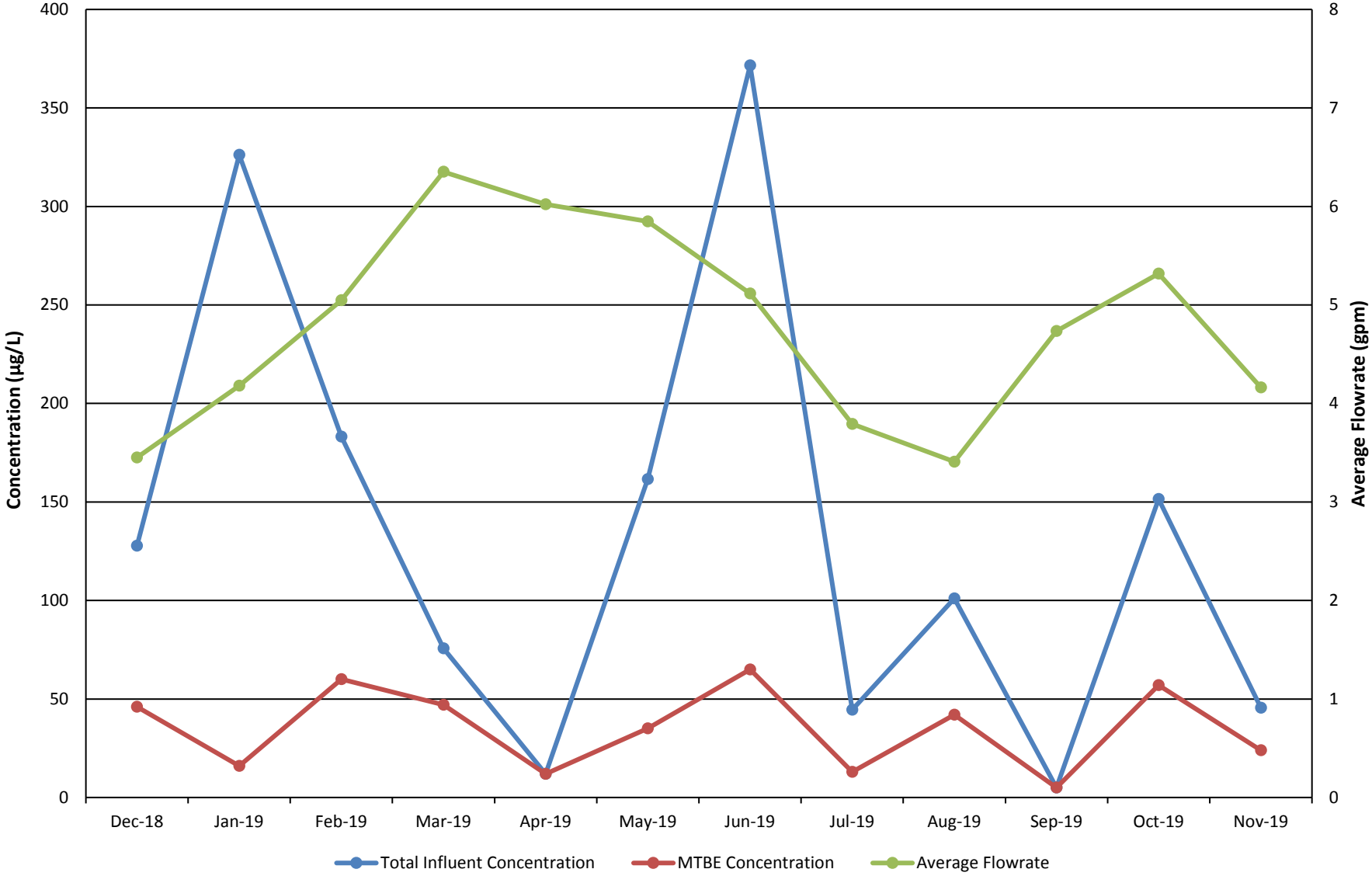
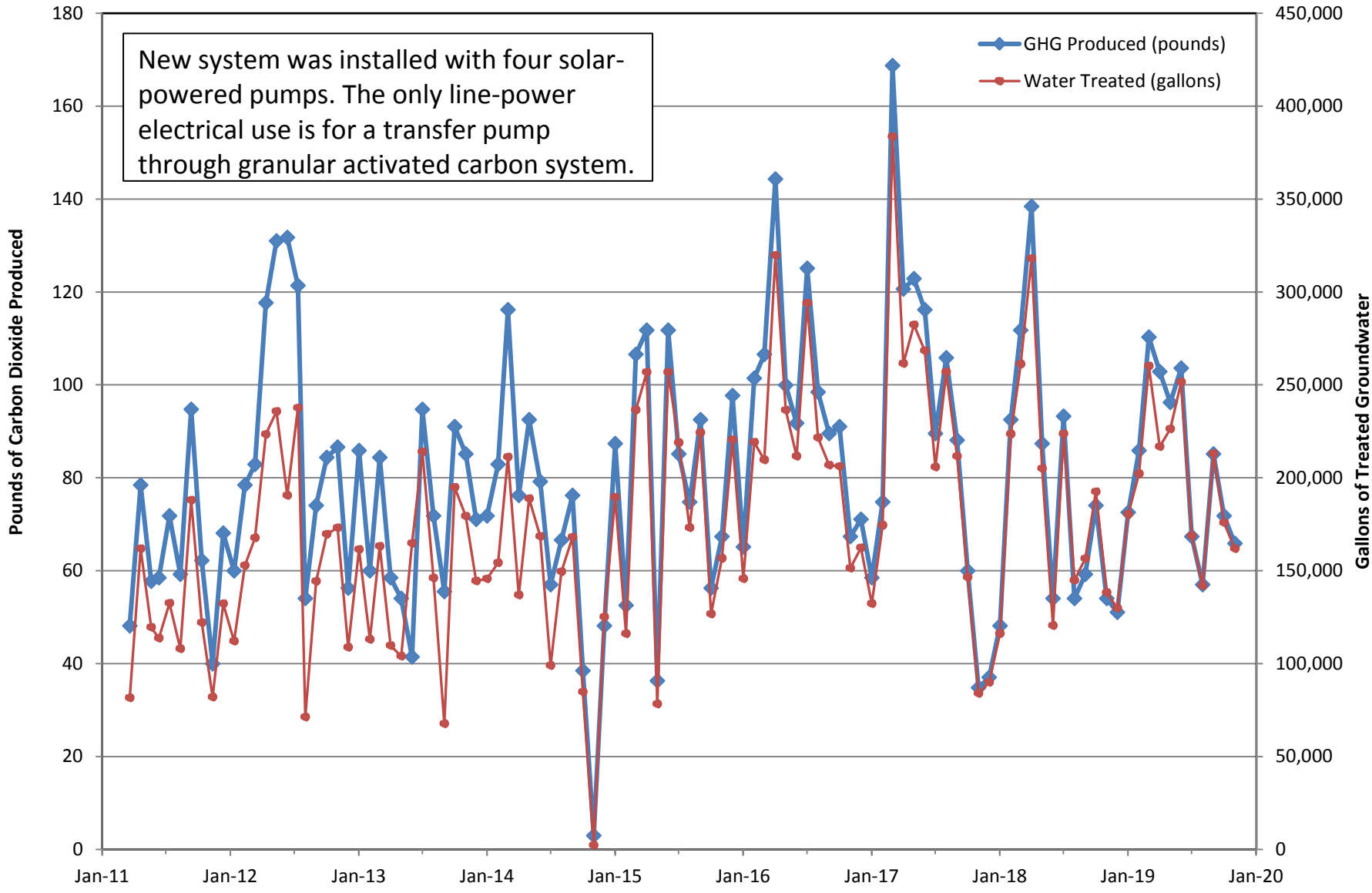


Figure 2

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



South Base Boundary Groundwater Treatment Plant Monthly Data Sheet

Report Number: 230 **Reporting Period: 2 December 2019 – 30 December 2019** **Date Submitted: 9 January 2020**

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

System Metrics

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

Table 1 – Operations Summary – December 2019

Initial Data Collection:	12/2/2019 12:30	**Final Data Collection:**	12/30/2019 9:30
Operating Time:	Percent Uptime:	Electrical Power Usage:	
SBBGWTP: 669 hours	**SBBGWTP:** 100%	**SBBGWTP:**	17,417 kWh (14,489 lbs CO_2 generated[a])
Gallons Treated: **6.2 million gallons**		Gallons Treated Since July 1998: **1,164 million gallons**	
Volume Discharged to Union Creek: **6.2 million gallons**		Gallons Treated from Other Sources: **0 gallons**	
VOC Mass Removed: **0.75 lbs**[b]		VOC Mass Removed Since July 1998: **522.9 lbs**	
Rolling 12-Month Cost per Pound of Mass Removed: **$20,443**[c]			
Monthly Cost per Pound of Mass Removed: **$19,834**[c]			

lbs = pounds
[a] 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.
[b] Calculated using December 2019 EPA Method SW8260C analytical results.
[c] 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.

Table 2 – SBBGWTP Average Flow Rate (gpm)[a] – December 2019

FT005[b]				SS029		SS030	
EW01x05	Offline	EW743x05	Offline	EW01x29	Offline[c]	EW01x30	14.1
EW02x05	Offline	EW744x05	3.1	EW02x29	Offline[c]	EW02x30	3.9
EW03x05	Offline	EW745x05	10.3	EW03x29	3.0	EW03x30	12.2
EW731x05	6.9	EW746x05	Offline	EW04x29	5.9	EW04x30	24.0
EW732x05	Offline	EW2291x05	4.7	EW05x29	8.3	EW05x30	6.6
EW733x05	Offline	EW2782x05	5.2	EW06x29	7.6	EW2174x30	7.8
EW734x05	5.0	EW2783x05	4.8	EW07x29	13.3	EW711x30	3.8
EW735x05	7.2	EW2784x05	10.2			MW269x30	0.5
EW736x05	Offline	EW2785x05	7.0				
EW737x05	Offline	EW2786x05	12.0				
EW742x05	Offline						
FT005 Total: 76.4				**SS029 Total: 38.1**		**SS030 Total: 72.9**	
SBBGWTP Average Monthly Flow[d]: 154.2 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	None.	--		--	

[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 2 December 2019. Sample results are presented in Table 4. The total VOC concentration (14.48 µg/L) in the influent sample decreased from the November 2019 sample results (14.89 µg/L). TCE was the primary VOC detected in the influent sample at a concentration of 13 µg/L. Three VOCs, including TCE, were detected in the midpoint sampling location. With exception of acetone, a common laboratory contaminant, no VOCs or TPH were detected in the effluent sample.

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

- EW734x05 – Replaced pump and totalizer. Well is currently on line.
- EW735x05 – Replaced totalizer. Well is currently on line.

On 23 December, the Site SS030 extraction wells were taken off line to install new signal wires for water level and flow rate instrumentation. Installation was completed on 26 December, and all the wells were restarted without issue.

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. Since 2017, TCE concentrations have generally been decreasing, and 1,2-DCA concentrations were mostly sporadic with a slight increasing trend.

Figure 2 presents a plot of influent VOC concentrations and average flow at the SBBGWTP over the past twelve (12) months. An overall decreasing trend was observed for the VOC influent concentrations in the past 12 months. An overall increasing flow rate trend was observed in the past 12 months; however, flow rates have generally been decreasing since September 2019.

Optimization Activities

No optimization activities occurred at the SBBGWTP in December 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 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 December 2019, the SBBGWTP produced approximately 14,489 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 December 2019 – South Base Boundary Groundwater Treatment Plant

Constituent	Instantaneous Maximum[a] (µg/L)	Detection Limit (µg/L)	N/C	2 December 2019 (µg/L)		
				Influent	Midpoint	Effluent[b]
Halogenated Volatile Organics						
Acetone	NA	1.9	0	ND	ND	3.2 J
Bromodichloromethane	NA	0.17	0	ND	ND	ND
Chloroform	1.9	0.16	0	ND	0.24 J	ND
Chloromethane	NA	0.30	0	0.52 J	ND	ND
1,1-Dichloroethane	0.50	0.22	0	ND	ND	ND
1,2-Dichloroethane	0.50	0.13	0	ND	ND	ND
1,1-Dichloroethene	0.50	0.23	0	ND	ND	ND
cis-1,2-Dichloroethene	0.50	0.15	0	0.96 J	1.9	ND
trans-1,2-Dichloroethene	0.50	0.11	0	ND	ND	ND
Dichlorodifluoromethane	NA	0.31	0	ND	ND	ND
Tetrachloroethene	0.50	0.20	0	ND	ND	ND
1,1,1-Trichloroethane	0.50	0.16	0	ND	ND	ND
1,1,2-Trichloroethane	0.50	0.27	0	ND	ND	ND
Trichloroethene	0.65	0.16	0	13	0.61 J	ND
Vinyl Chloride	0.90	0.10	0	ND	ND	ND
Non-Halogenated Volatile Organics						
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
Other						
Total Petroleum Hydrocarbons – Gasoline	50	10	0	ND	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	5.5	0	7.5 J-	NM	ND
Total Petroleum Hydrocarbons – Motor Oil	100	32	0	ND	NM	ND

[a] In accordance with current National Pollutant Discharge Elimination System permit number CAG912002, Order number R2-2017-0048.

[b] Concentrations in **bold** exceeded discharge limits.

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 due to a detected concentration value between the reporting limit and method detection limit for the contaminant, 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

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

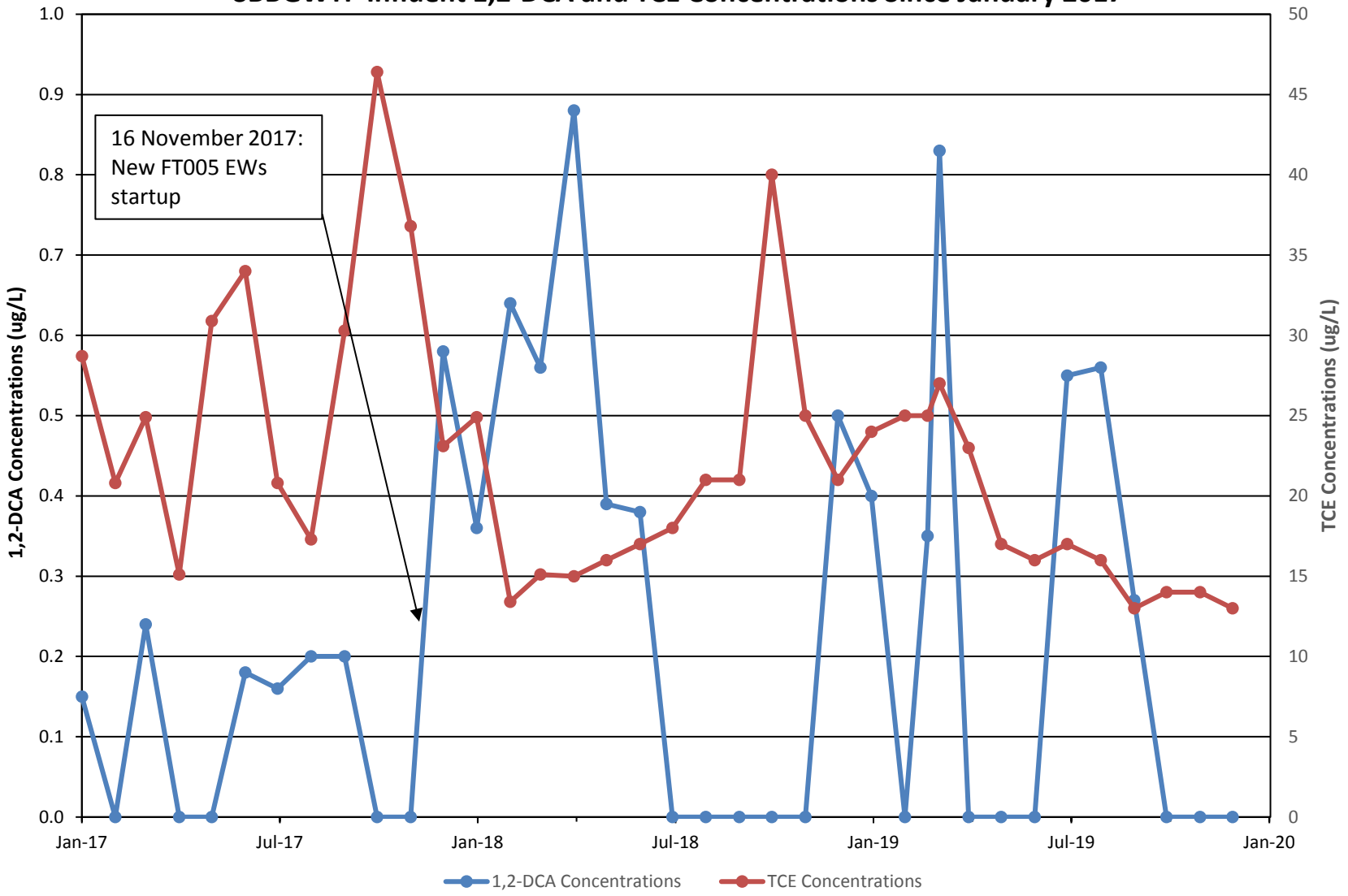


Figure 2

SBBGWTP Total VOC Influent Concentrations and Average Flowrate Twelve Month History

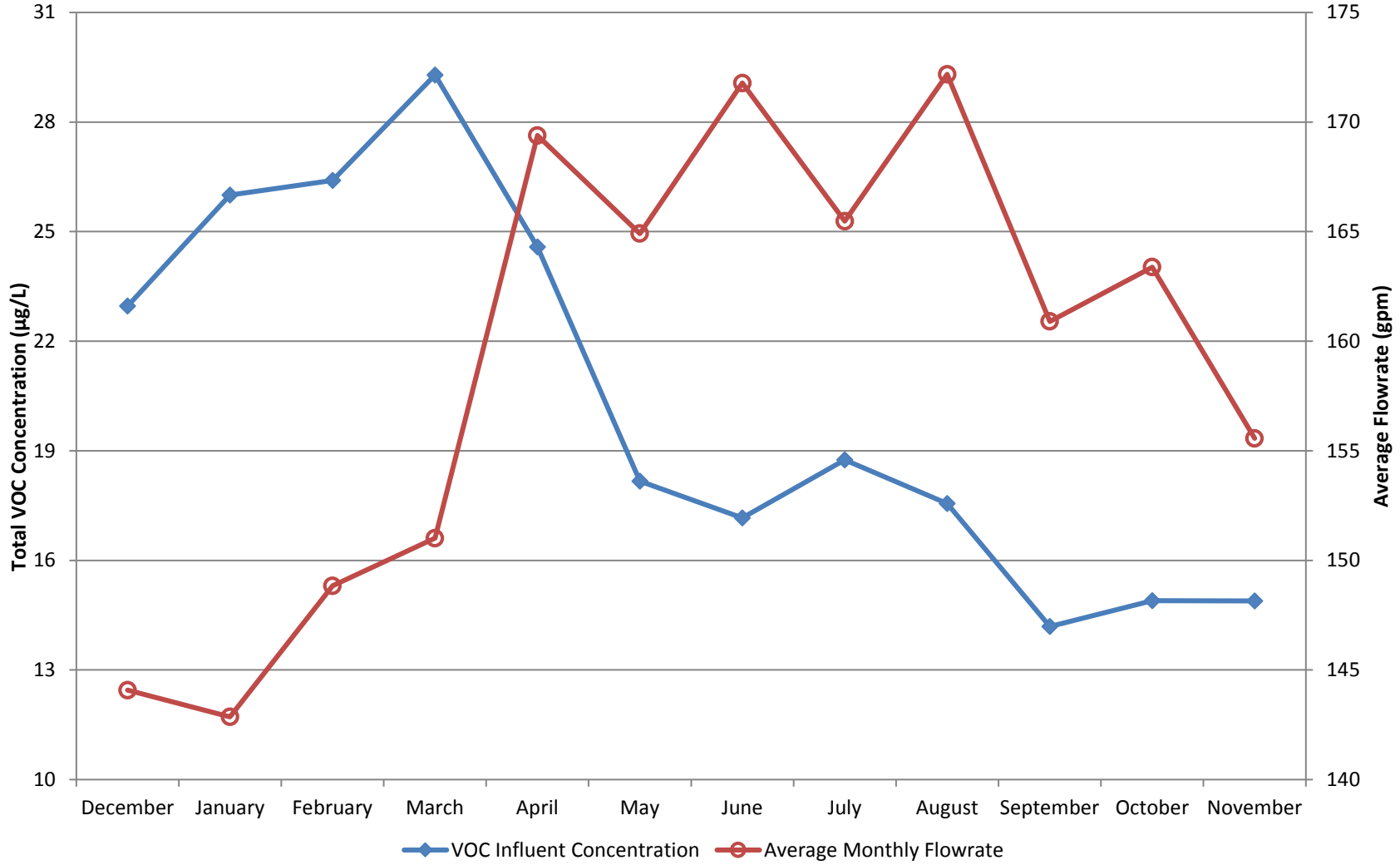
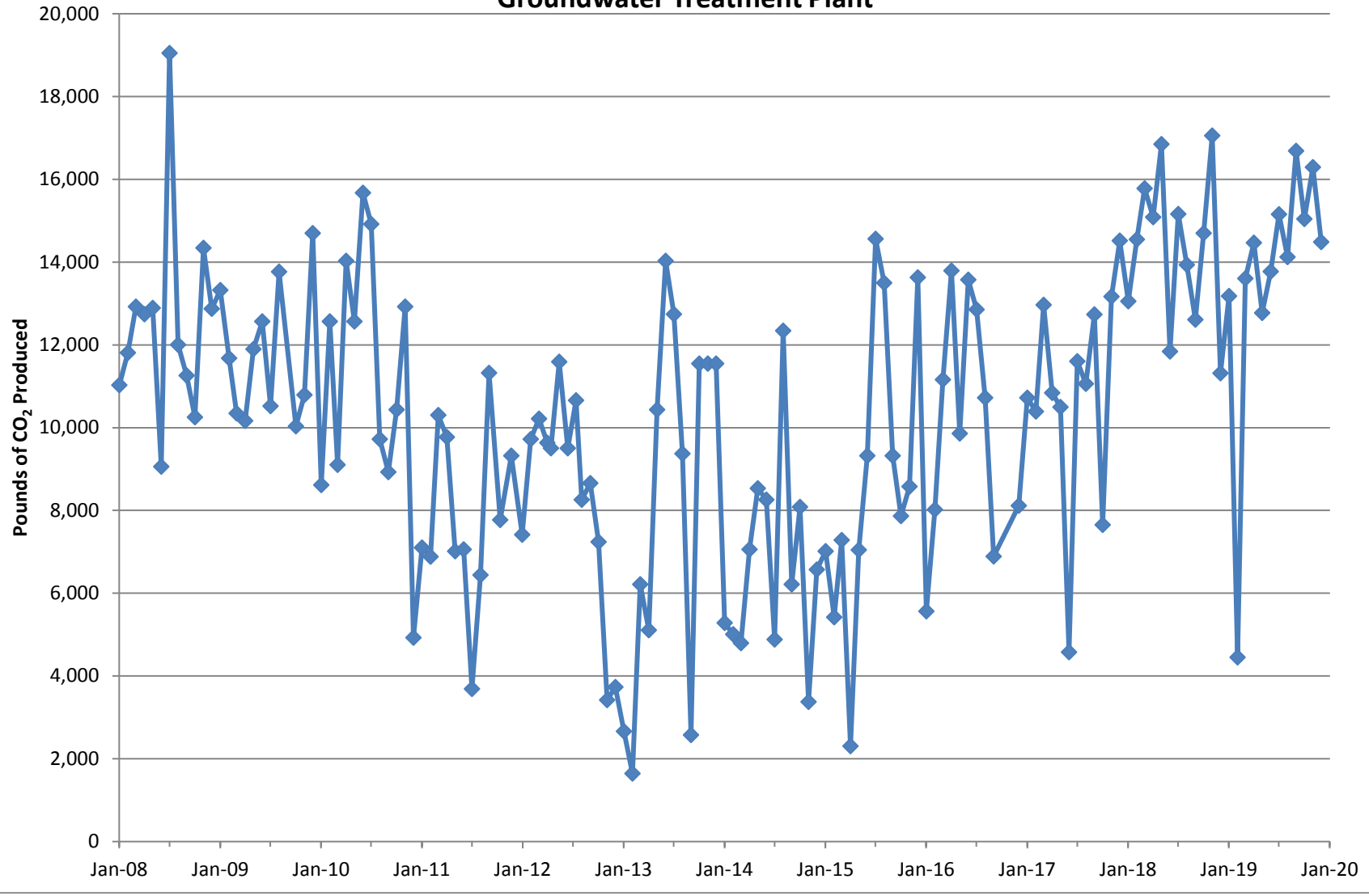


Figure 3

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



Central Groundwater Treatment Plant Monthly Data Sheet

Report Number: 245 **Reporting Period: 2 December 2019 – 30 December 2019** **Date Submitted: 9 January 2020**

This monthly data sheet presents information regarding the Central Groundwater Treatment Plant (CGWTP) and its associated technology demonstrations. The ongoing technology demonstrations related to the CGWTP include various emulsified vegetable oil (EVO) injections and two (2) bioreactor treatability studies.

System Metrics

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

Table 1 – Operations Summary – December 2019

Initial Data Collection:	12/2/2019 10:00	**Final Data Collection:**	12/30/2019 11:55		
Operating Time:		Percent Uptime:		Electrical Power Usage:	
CGWTP:	432 hours	**CGWTP:**	64.2%	**CGWTP:**	1,575 kWh (2,054 lbs CO_2 generated[a])
Gallons Treated (discharge to storm sewer): **694,230 gallons**		Gallons Treated Since January 1996: **577.4 million gallons**			
VOC Mass Removed from groundwater:		VOC Mass Removed Since January 1996:			
1.5 lbs[b]		**2,850 lbs from groundwater**			
		8,686 lbs from vapor			
Rolling 12-Month Cost per Pound of Mass Removed: $3,206[c]					
Monthly Cost per Pound of Mass Removed: $2,757[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 December 2019 EPA Method SW8260C analytical results.
[c] 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.

Table 2 – CGWTP Average Flow Rates[a] – December 2019

Location	Average Flow Rate Groundwater (gpm)
EW001x16	12.2
EW002x16	7.1
EW003x16[b]	0.3
EW605x16	5.5
EW610x16	1.9
CGWTP	26.8

[a] Flow rates calculated by dividing total gallons processed by system operating time for the month or the average of the instantaneous readings.
[b] Extracted groundwater from EW003x16 is treated in Site SS016 bioreactor.
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	26 November 2019	17:10	12 December 2019	14:30	System PLC malfunctioned. New PLC was installed.

-- = Date/Time not recorded
[a] Shutdown and restart times estimated based on field notes
CGWTP = Central Groundwater Treatment Plant

Summary of O&M Activities

Monthly groundwater treatment samples were collected at the CGWTP on 17 December 2019. Sample results are presented in Table 4. The total VOC concentration (262.64 µg/L) in the December 2019 influent sample has increased from the November 2019 sample (227.10 µg/L). TCE was the primary VOC detected in the influent sample at a concentration of 220 µg/L. Vinyl chloride (0.48 J µg/L) was detected in the sample collected after the first carbon vessel. Acetone (1.9 µg/L), which is a common lab contaminant, was detected in the sample collected after the second carbon vessel. No VOCs were detected 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 December 2019.

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.

On 26 November 2019, the CGWTP shut down because of a base-wide power outage. The programmable logic controller (PLC) that controls operation of the CGWTP was damaged during the power outage and was not brought back on line. A new PLC was ordered and installed on 12 December 2019. The CGWTP was restarted without issue.

The Site SS016 subgrade biogeochemical reactor (SBGR), also known as the bioreactor and the Site DP039 bioreactor continued operating in December 2019.

Optimization Activities

No optimization activities occurred at the CGWTP in December 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 2,054 pounds of GHG during December 2019.

TABLE 4
Summary of Groundwater Analytical Data for December 2019 – Central Groundwater Treatment Plant

Constituent	Instantaneous Maximum[a] (µg/L)	Detection Limit (µg/L)	N/C	17 December 2019 (µg/L)			
				Influent	After Carbon 1 Effluent	After Carbon 2 Effluent	System Effluent[b]
Halogenated Volatile Organics							
Acetone	NA	1.9 – 3.8	0	ND	ND	1.9 J	ND
Bromomethane	NA	0.21 – 0.42	0	ND	ND	ND	ND
Chloroform	1.9	0.16 – 0.32	0	ND	ND	ND	ND
Chloromethane	NA	0.30 – 0.60	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	ND	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	0.67 J	ND	ND	ND
cis-1,2-Dichloroethene	0.50	0.15 – 0.30	0	39	ND	ND	ND
trans-1,2-Dichloroethene	0.50	0.15 – 0.30	0	2.5	ND	ND	ND
Tetrachloroethene	0.50	0.20 – 0.40	0	0.47 J	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	220	ND	ND	ND
Vinyl Chloride	0.90	0.10 – 0.20	0	ND	0.48 J	ND	ND
Non-Halogenated Volatile Organics							
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
Other							
Total Petroleum Hydrocarbons – Gasoline (C6 – C10)	50	10	0	ND	NM	NM	ND
Total Petroleum Hydrocarbons – Diesel (C10 – C28)	50	5.5	0	17 J+	NM	NM	ND
Total Petroleum Hydrocarbons – Motor Oil (C28 – C40)	100	32	0	ND	NM	NM	ND

[a] In accordance with current National Pollutant Discharge Elimination System permit number CAG912002, Order number R2-2017-0048.

[b] Concentrations in **bold** exceeded discharge limits

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 due to a detected concentration value between the reporting limit and method detection limit for the contaminant, biased high.

NA = not applicable

NM = not measured

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

µg/L = micrograms per liter

ND = not detected

Figure 1

CGWTP Total VOC Influent Concentrations and Average Flowrate Twelve Month History

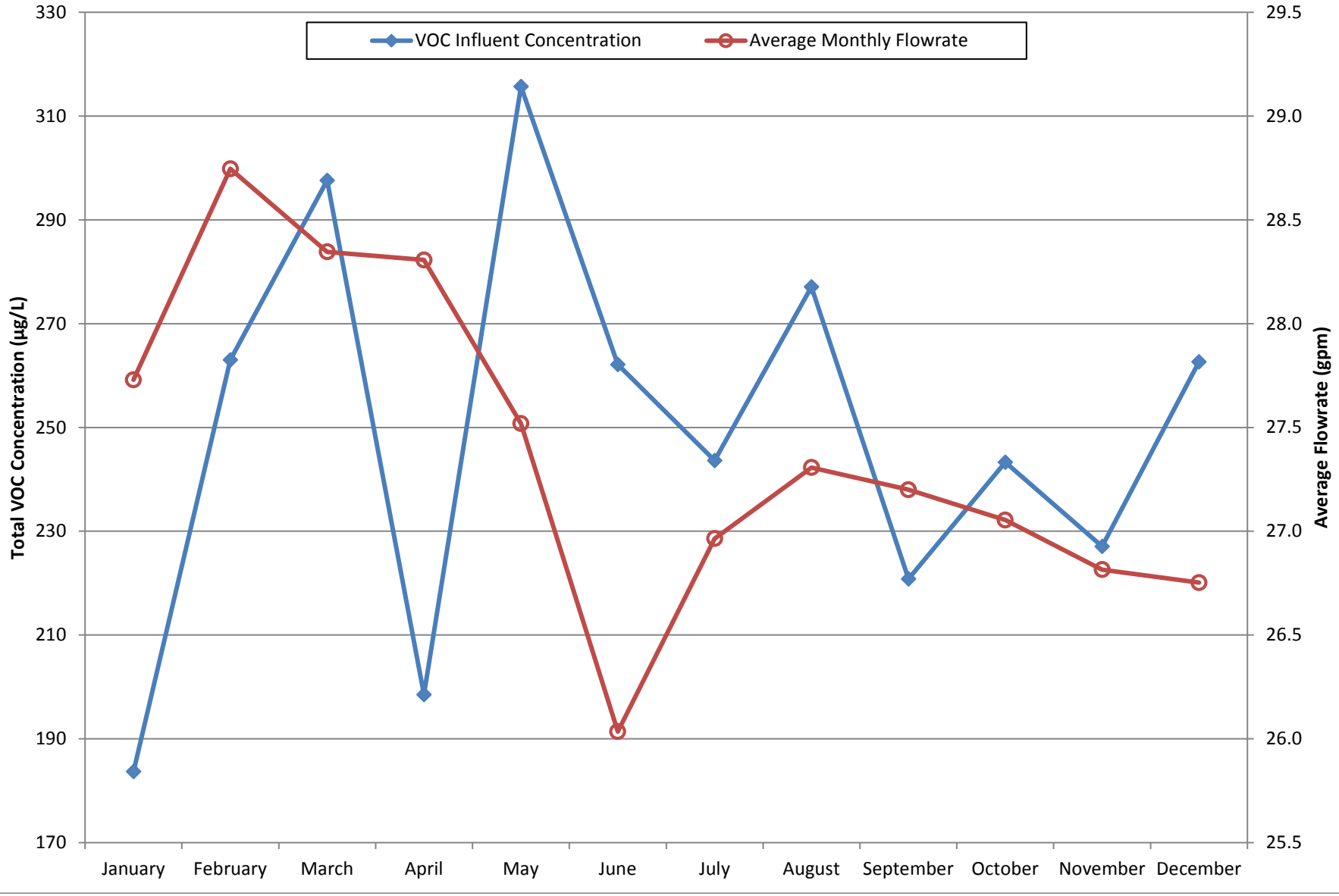
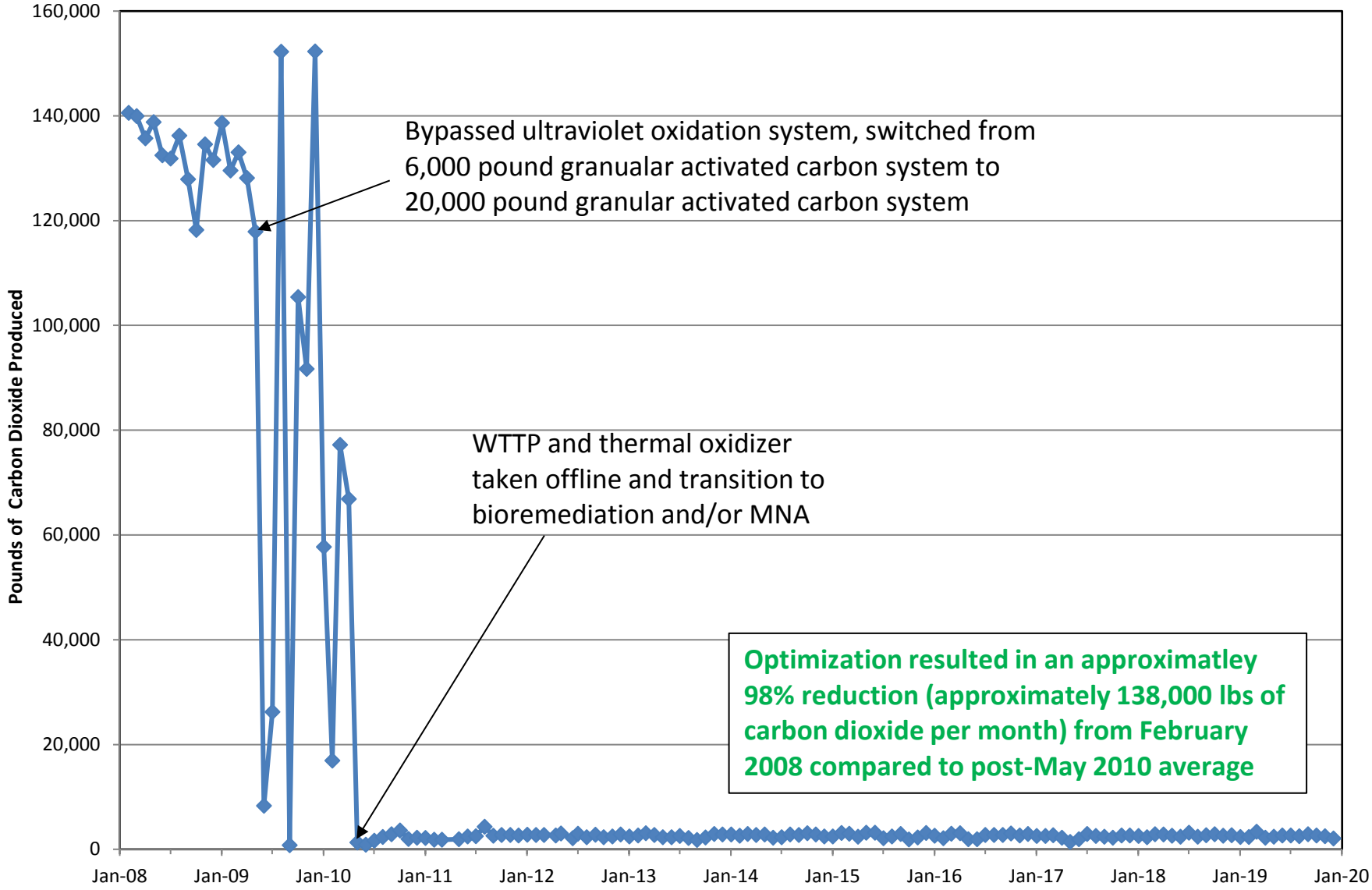


Figure 2

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



Subarea LF007C Groundwater Treatment Plant Monthly Data Sheet

Report Number: 184 **Reporting Period: 2 December 2019 – 30 December 2019** **Date Submitted: 9 January 2020**

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 December 2019 reporting period:

Table 1 – Operations Summary – December 2019

Initial Data Collection:	12/2/2019 9:15		**Final Data Collection:**	12/30/2019 11:30	
Operating Time:		Percent Uptime:		Electrical Power Usage[a]:	
LF007C GWTP:	553 hours	**LF007C GWTP**	82.0%	**LF007C GWTP:**	0 kWh
Gallons Treated: **83,407 gallons**				Gallons Treated Since March 2000: **89.6 million gallons**	
Volume Discharged to Duck Pond: **83,407 gallons**					
VOC Mass Removed: **7.6×10^{-4} pounds**[b]				VOC Mass Removed Since March 2000: **174.4 pounds (Groundwater)**	
Rolling 12-Month Cost per Pound of Mass Removed: **Not Measured**[c]					
Monthly Cost per Pound of Mass Removed: **Not Measured**[c]					

[a] The LF007C GWTP operates on solar power only.
[b] VOCs from December 2019 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 – December 2019

Location	Average Flow Rate (gpm)[a]	Total Gallons Processed (gallons)
EW614x07	2.4	80,122[b]
EW615x07	0.1	4,769
LF007C GWTP	**2.5**	**83,407**

[a] Flow rates calculated by dividing total gallons processed by system operating time for the month or the average of the instantaneous readings.
[b] The extraction pump takes in air from the subsurface, which alters the flow and totalizer. An air-release valve was installed on 12 November 2019 to help minimize the effects on the system.
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	25 December 2019	6:30	30 December 2019	11:30	System shut down due to rainwater in the sump.

-- = 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 2 December 2019. Sample results are presented in Table 4. The total VOC concentration in the December 2019 influent sample was 1.1 µg/L, not including the detection of acetone, which is a common lab contaminant. TCE was detected at the influent sample location. Except for acetone, no other VOCs were detected in the midpoint and effluent sample locations.

TPH-d and TPH-g were detected in the influent sample. TPH-d was also detected in the effluent sample location at a concentration of 170 J- µg/L, which exceeded the effluent limitation. Because of this effluent exceedance, a confirmation sample was collected on 8 January 2020 from the effluent sampling location. The LF007C GWTP was taken off line following sample collection and will remain off line until confirmation sample results are received. If TPH-d concentrations do not exceed effluent limitations in the confirmation sample, the system will be restarted. If concentrations are again in excess of effluent limitations, additional samples may be collected to help determine the cause of the detections.

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 increasing. The average flow rate through the LF007C GWTP has decreased over the last 12 months.

On 25 December 2019, the system was shut down because the sump filled with rainwater. The sump was drained and the LF007C GWTP was restarted on 30 December 2019 without issue.

Optimization Activities

No optimization activities occurred at the LF007C GWTP in December 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 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 December 2019 – Subarea LF007C Groundwater Treatment Plant

Constituent	Instantaneous Maximum[a] (µg/L)	Detection Limit (µg/L)	N/C	2 December 2019 (µg/L)		
				Influent	After Carbon 1	Effluent[b]
Halogenated Volatile Organics						
Acetone	NA	2.1	0	3.4 J	6.7 J	2.5 J
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
Chloromethane	NA	0.30	0	ND	ND	ND
Dibromochloromethane	5.0	0.13	0	ND	ND	ND
Dichlorodifluoromethane	NA	0.31	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	1.1	ND	ND
Vinyl Chloride	0.5	0.22	0	ND	ND	ND
Non-Halogenated Volatile Organics						
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
Other						
Total Petroleum Hydrocarbons – Gasoline	50	10	0	ND	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	5.5	1	63 J-	NM	**170 J-**
Total Petroleum Hydrocarbons – Motor Oil	100	32	0	57 J-	NM	ND

[a] In accordance with current National Pollutant Discharge Elimination System permit number CAG912002, Order number R2-2017-0048.
[b] Concentrations in **bold** exceeded discharge limits

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 due to a detected concentration value between the reporting limit and method detection limit for the contaminant, 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

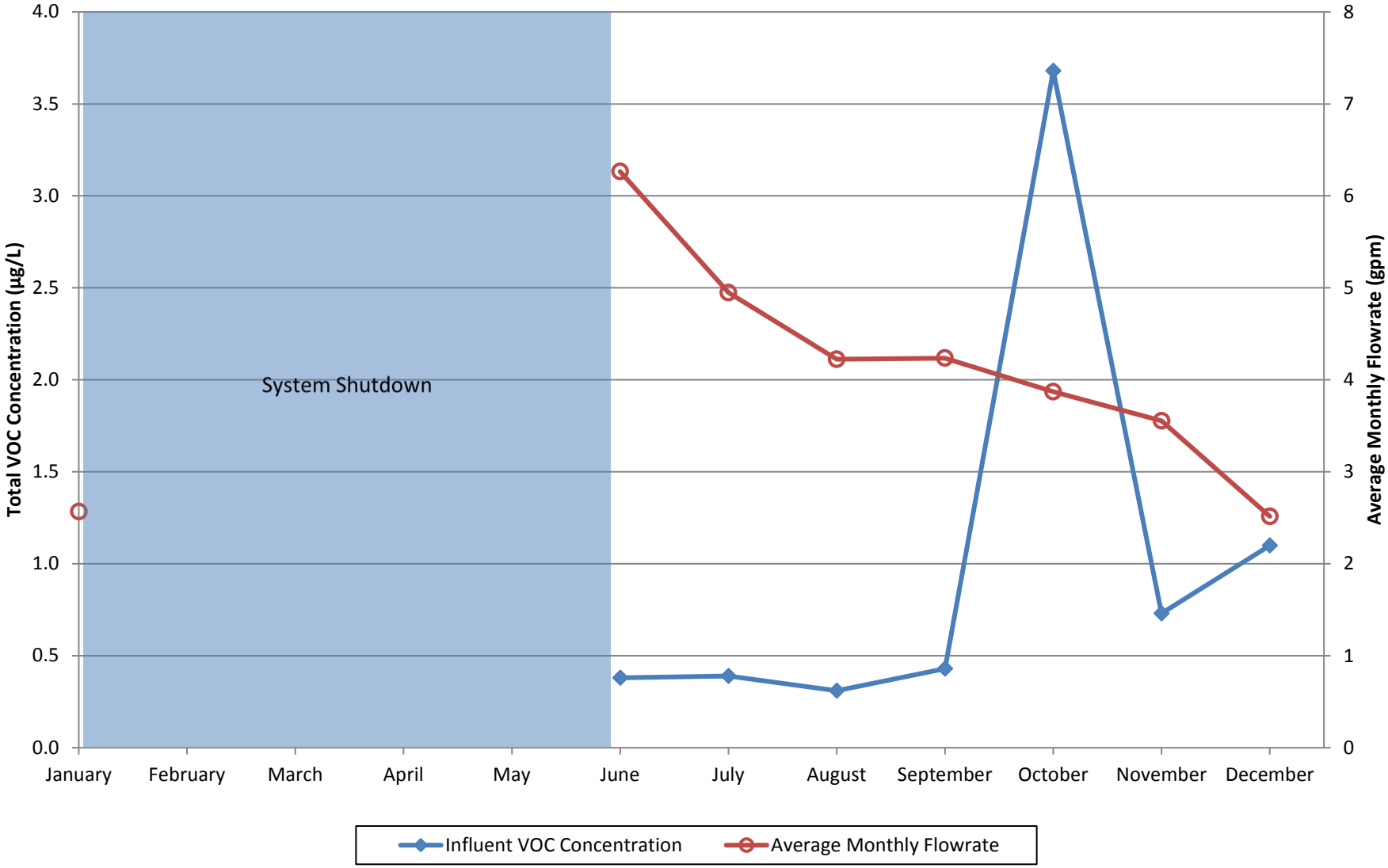
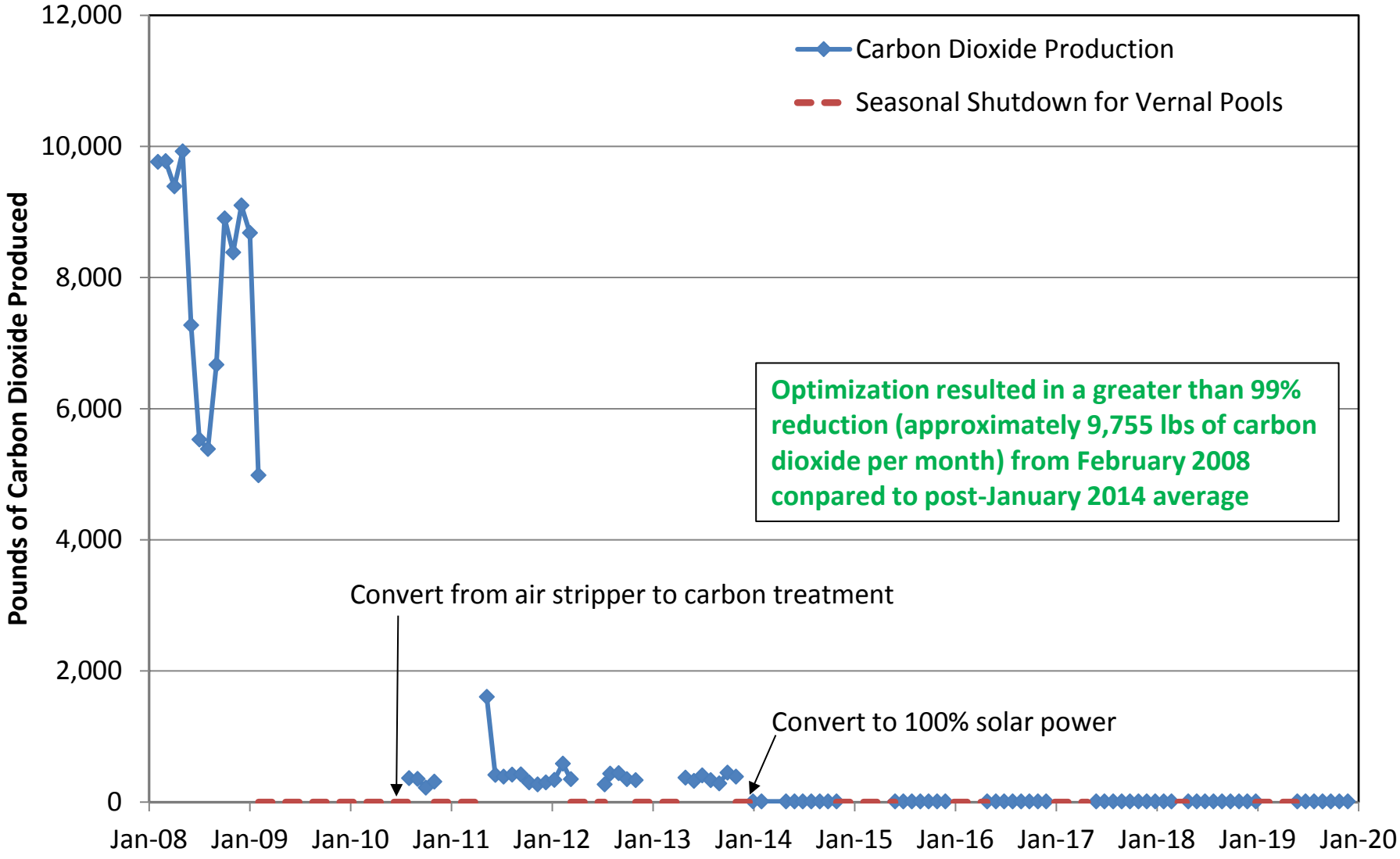


Figure 2

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



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: 106 **Reporting Period: 2 December 2019 – 30 December 2019** **Date Submitted: 9 January 2020**

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

System Metrics

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

Table 1 – Operations Summary – December 2019

Initial Data Collection: 12/2/2019 9:45	**Final Data Collection:** 12/30/2019 10:50	
Operating Time:	Percent Uptime:	Electrical Power Usage:
ST018GWTP: 385 hours	**ST018GWTP: 57.2**%	**ST018GWTP:** 33 kWh (24 lbs CO_2 generated[a])
Gallons Extracted: **51,770 gallons**	Gallons Extracted Since March 2011: **18.4 million gallons**	
Volume Discharged to Sanitary Sewer: **51,770 gallons**	Final Totalizer Reading: **18,439,189 gallons**	
Cumulative Volume Discharged to Sanitary Sewer since 1 November 2014: **11,943,015 gallons**		
MTBE, BTEX, VOC, TPH Mass Removed: **0.10 lbs**[b]	MTBE, BTEX, VOC, TPH Mass Removed Since March 2011: **48.8 lbs**	
MTBE (Only) Removed: **0.03 lbs**[b]	MTBE (Only) Mass Removed Since March 2011: **12.0 lbs**	
Rolling 12-Month Cost per Total Pounds of Mass Removed: $21,997[bc]		
Monthly Cost per Pound of Mass Removed: $78,614[bc]		

[a] SiteWise™ estimate that 1 kilowatt hour generated produces 0.74 pounds of GHG.
[b] Calculated using December 2019 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 – December 2019

Location	Average Flow Rate Groundwater (gpm)[a]	Hours of Operation
EW2014x18	1.0	385
EW2016x18	0.5	385
EW2019x18	0.0	Offline[b]
EW2333x18	1.0	385
ST018GWTP	2.2	385

[a] Flow rates calculated by dividing total gallons processed by amount of operating time of the pump/system.
[b] Extraction well was turned off because of low MTBE concentrations with regulatory approval on 25 November 2019.

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	18 December 2019	10:30	30 December 2019	10:50	Influent tank high level alarm.

-- = 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 discharge samples were collected at the ST018GWTP on 2 December 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 December 2019 laboratory data report is available upon request. The MTBE discharge concentration during the December 2019 sampling event was 77 µg/L, which is an increase from the November 2019 sample result of 24 µg/L. Benzene, 1,2-DCA, n-propylbenzene, and TPH-g were also 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 18 December, the system shut down because of the influent tank high level alarm. The system was restarted on 30 December 2019 without issue.

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). In December, the

system flow rate decreased, largely due to turning EW2019x18 off in November. However, the MTBE concentration in the system discharge sample increased with this shutdown. The overall average flow rates in the past 12 months show a decreasing trend. The extracted MTBE concentrations and extracted total concentrations have generally been fluctuating over the past 12 months with an overall increasing trend and decreasing trend, respectively.

Optimization Activities

No optimization activities occurred at the ST018GWTP in December 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 a majority of the ST018GWTP system.

Figure 2 presents the historical GHG production from the ST018GWTP. The ST018GWTP produced 24 pounds of GHG during December 2019 and removed 51,770 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 December 2019– Site ST018 Groundwater Treatment Plant

Constituent	Instantaneous Maximum[a] (µg/L)	Detection Limit (µg/L)	N/C	2 December 2019 (µg/L)
				System Discharge[b]
Fuel Related Constituents				
Methyl tert-Butyl Ether	6,400	0.25	0	77
Benzene	25,000[c]	0.16	0	2.5
Ethylbenzene	25,000[c]	0.16	0	ND
Toluene	25,000[c]	0.17	0	ND
Total Xylenes	25,000[c]	0.19 – 0.34	0	ND
Total Petroleum Hydrocarbons – Gasoline	50,000[d]	10	0	140 J+
Total Petroleum Hydrocarbons – Diesel	50,000[d]	15	0	ND
Total Petroleum Hydrocarbons – Motor Oil	100,000	160	0	ND
Other				
1,2-Dichloroethane	20	0.13	0	0.96 J
N-Propylbenzene	NA	0.16	0	0.19 J

[a] In accordance with the Fairfield-Suisun Sewer District Discharge Limitations

[b] Concentrations in **bold** exceeded discharge limits

Laboratory data available on request.

[c] The limit of 25,000 µg/L is a combined limit for BTEX.

[d] 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.
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, biased high.
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

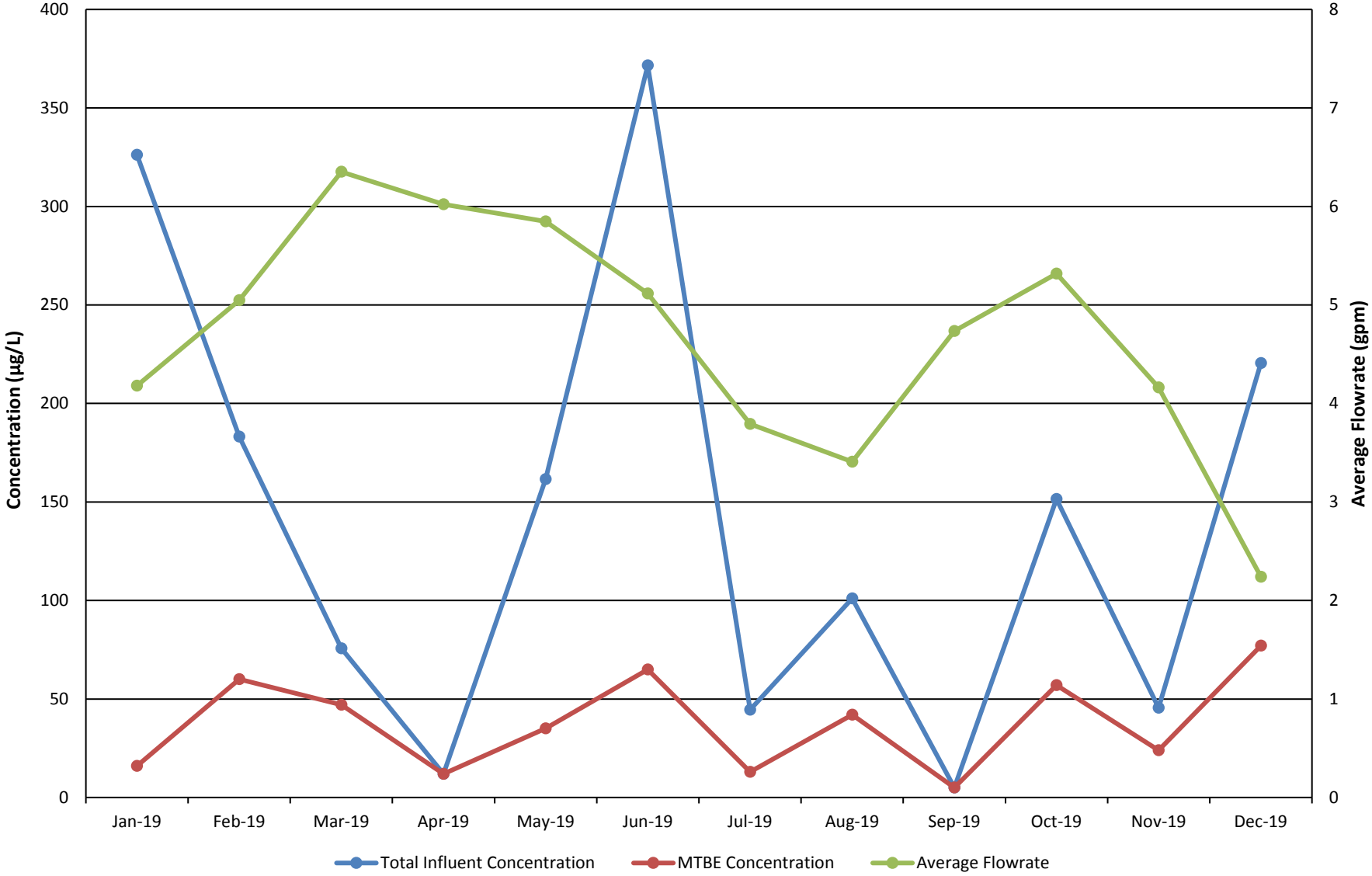
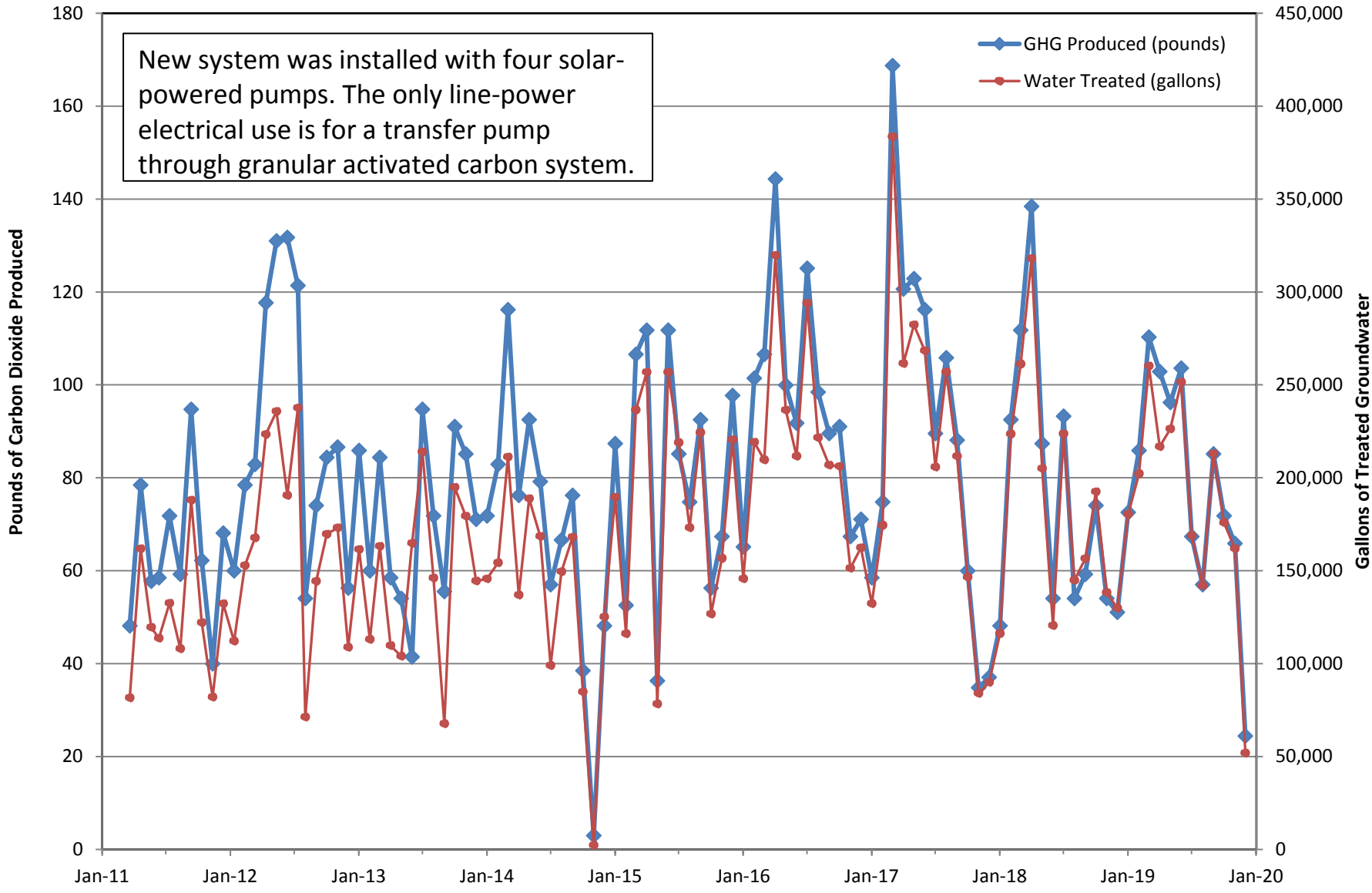


Figure 2

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



Passive Vent System Sampling at Buildings 38, 554, 837

RPM Teleconference

January 15, 2020

Introduction

- Present the purpose and planned approach for collecting soil vapor from passive vents and outdoor air samples to fill data gaps identified in the fourth 5-Year Review
- Soil vapor and outdoor air samples will be collected at three buildings identified in the 5-Year Review: 38, 554, 837
- These three buildings overlie or are adjacent to volatile organic compound (VOC) plumes and were constructed with passive vent systems as a precautionary measure

Purpose of Sampling

- Evaluate the soil gas source strength beneath Buildings 38, 554, and 837
- If sampling results indicate sufficient source strength is present to result in indoor air impacts due to vapor intrusion above risk-based target levels, additional evaluation of the passive vent systems may be conducted under a separate contract

Building 38 Location

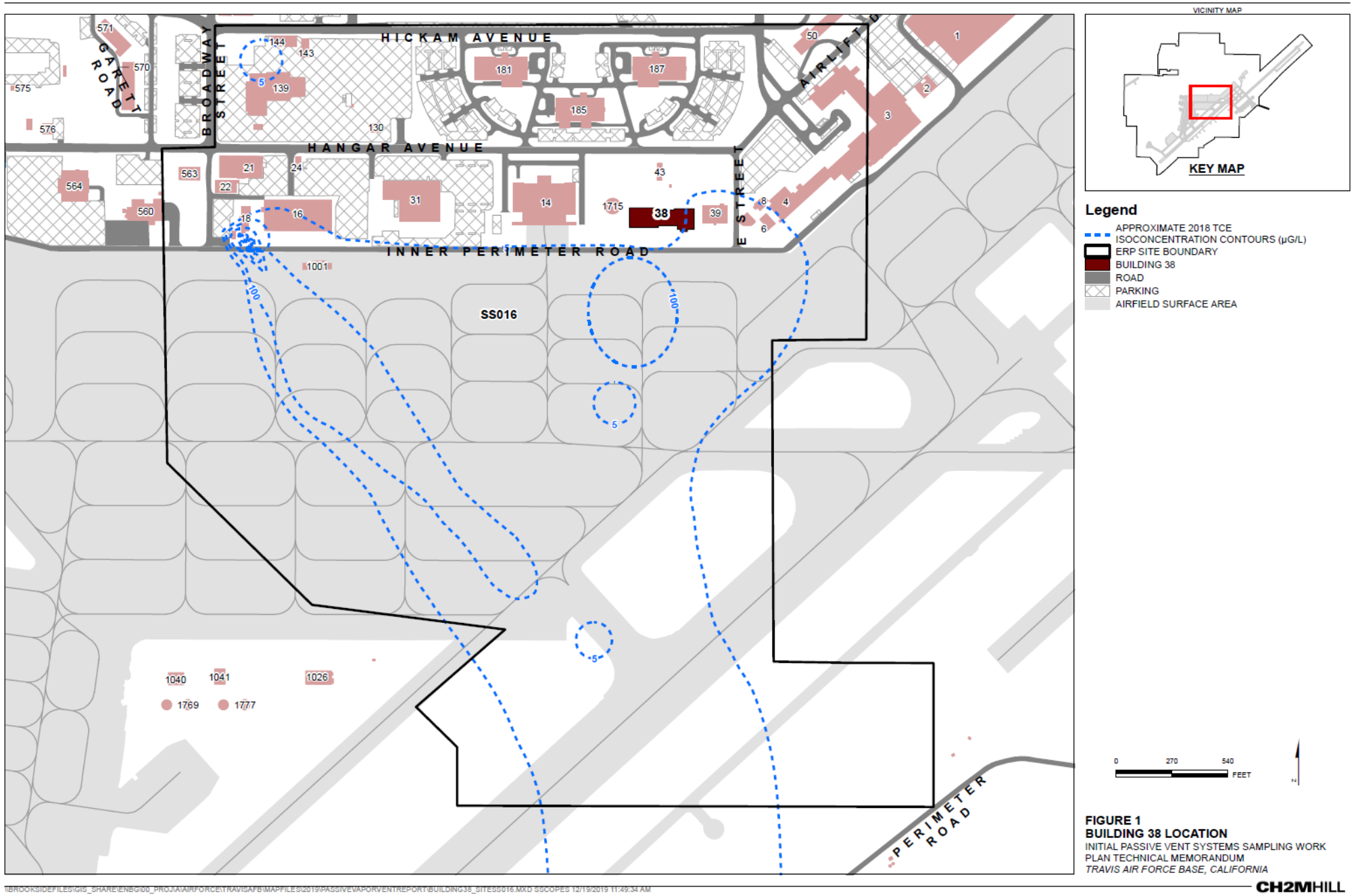


FIGURE 1
BUILDING 38 LOCATION
INITIAL PASSIVE VENT SYSTEMS SAMPLING WORK PLAN TECHNICAL MEMORANDUM
TRAVIS AIR FORCE BASE, CALIFORNIA

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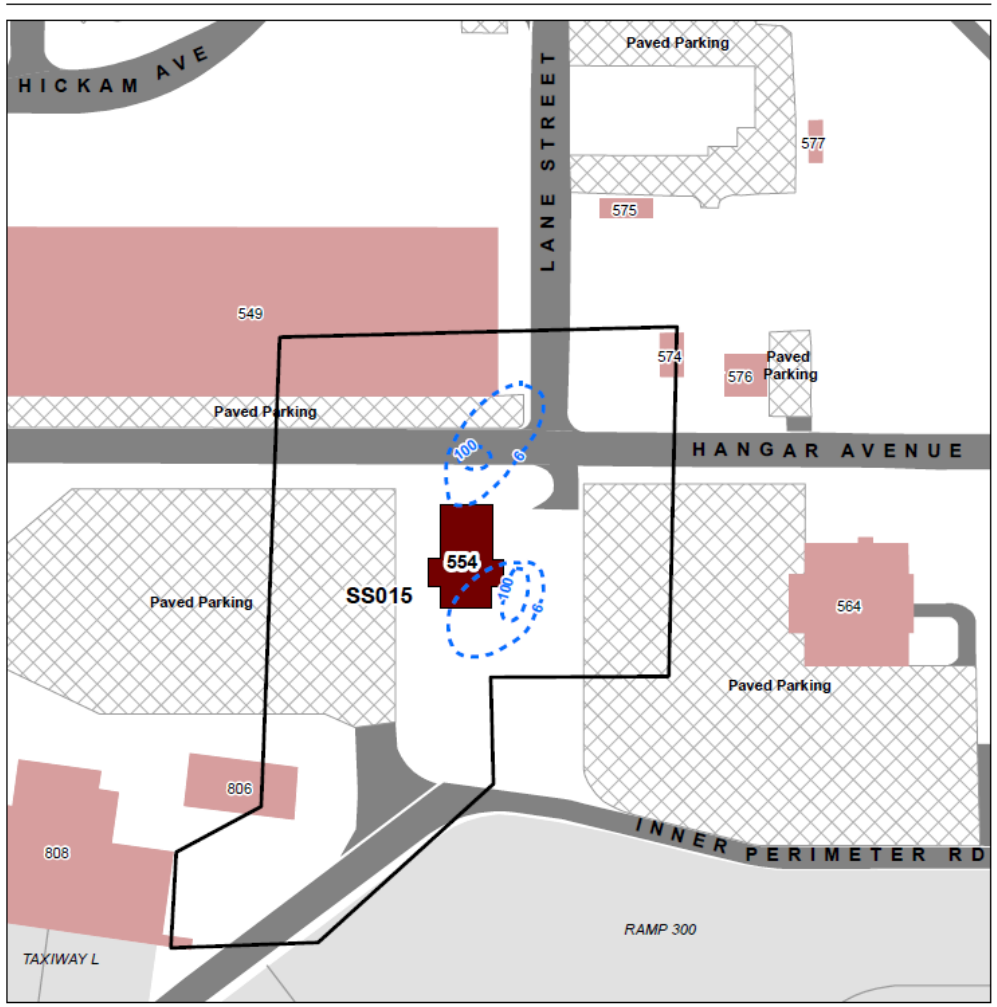
Building 554 Location



LEGEND

- APPROXIMATE 2018 CIS-1,2-DCE ISOCONCENTRATION CONTOURS (µG/L)
- ERP SITE BOUNDARY
- BUILDING 554
- EXISTING STRUCTURE
- ROAD
- PARKING
- AIRFIELD SURFACE AREA

N

0 70 140 FEET

VICINITY MAP

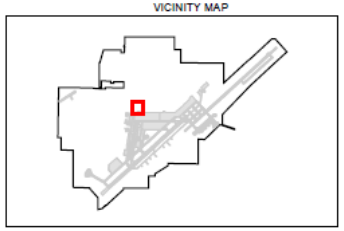


FIGURE 3
BUILDING 554 LOCATION
INITIAL PASSIVE VENT SYSTEMS SAMPLING WORK PLAN TECHNICAL MEMORANDUM
TRAVIS AIR FORCE BASE, FAIRFIELD, CALIFORNIA

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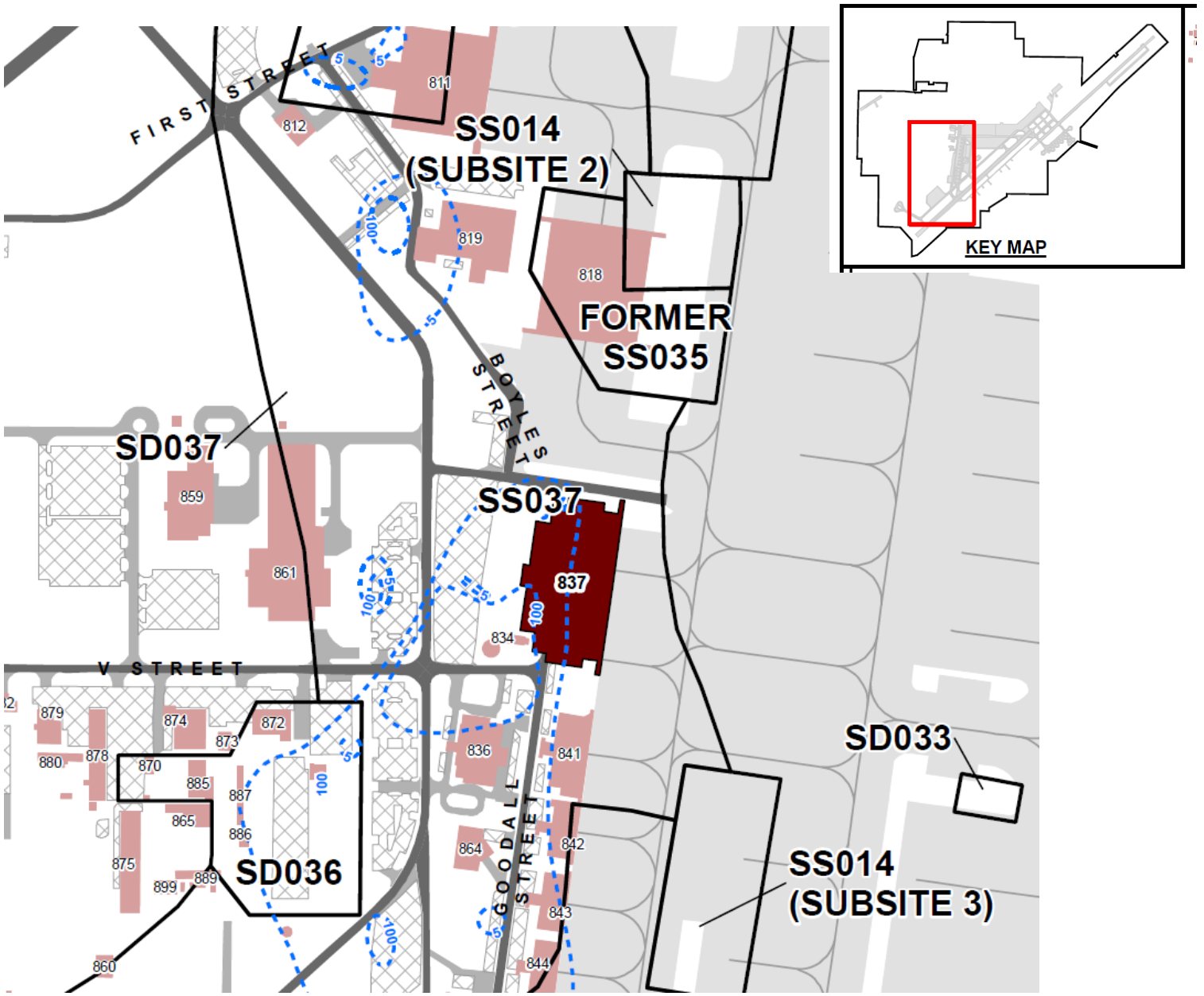
Building 837 Location



Passive Vent System Description

- Purpose of the passive vents is to mitigate the potential for vapor entry into the building from a subsurface source
- Use vent pipes and surrounding environmental conditions (wind effects and barometric pressure) to remove potentially impacted air from beneath the building
- The vent pipes intersect a gravel layer beneath the buildings, facilitating removal of air
- The portion of the vent pipe in contact with the gravel layer is perforated to allow movement of air into the pipes

Passive Vent System Description, Cont.

- The passive vent systems also include an impermeable geomembrane (vapor barrier) to block migration of vapors across the building slab interface
- At Buildings 38 and 554, the vapor barrier underlies the gravel layer
- At Building 837, the vapor barrier overlies the gravel layer. The vent system is constructed only beneath the office area and not beneath the open hangar (cannot support the weight of aircraft)

Building 38 Vent Exit Locations

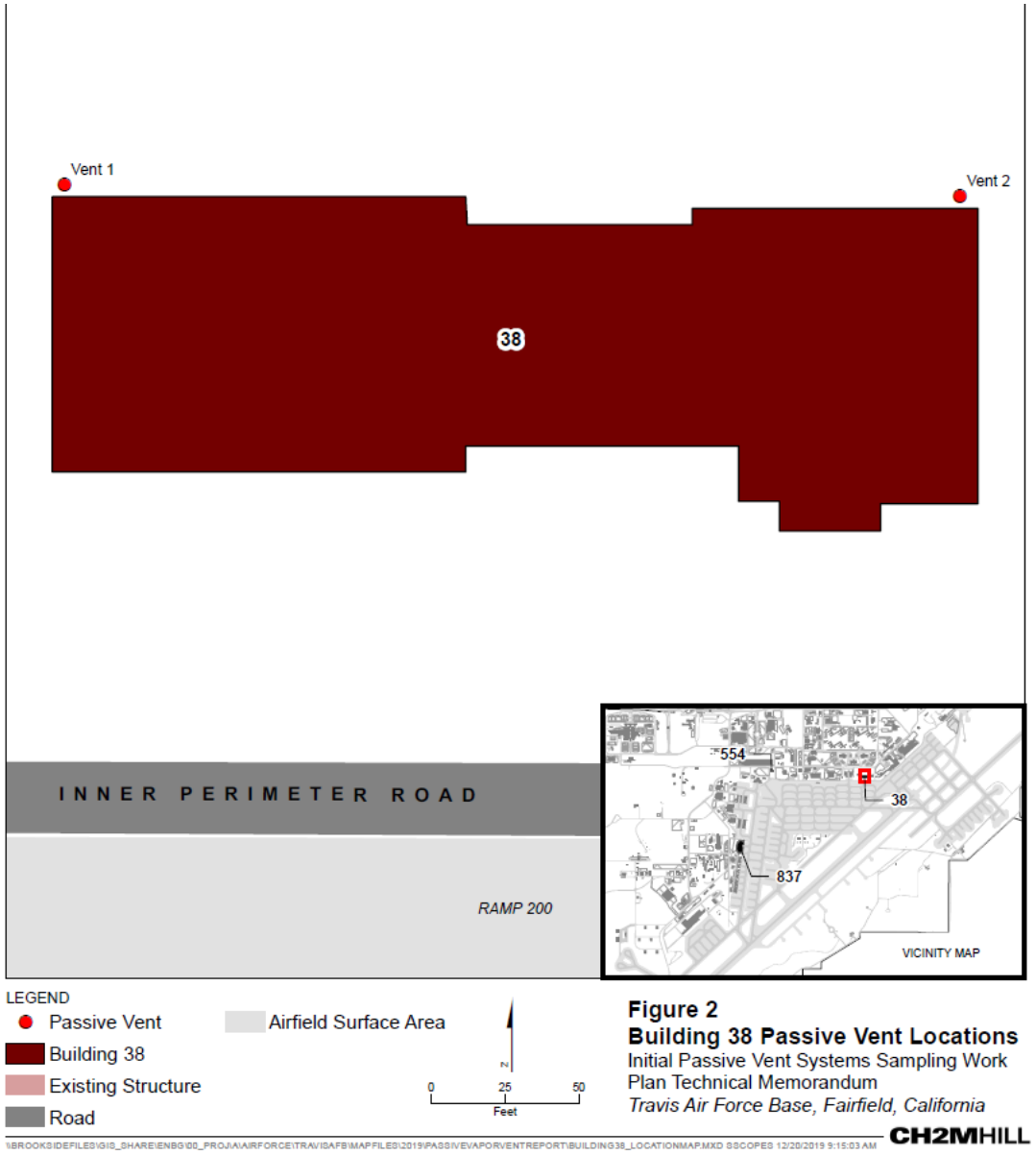


Figure 2
Building 38 Passive Vent Locations
Initial Passive Vent Systems Sampling Work Plan Technical Memorandum
Travis Air Force Base, Fairfield, California

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Building 554 Vent Exit Locations

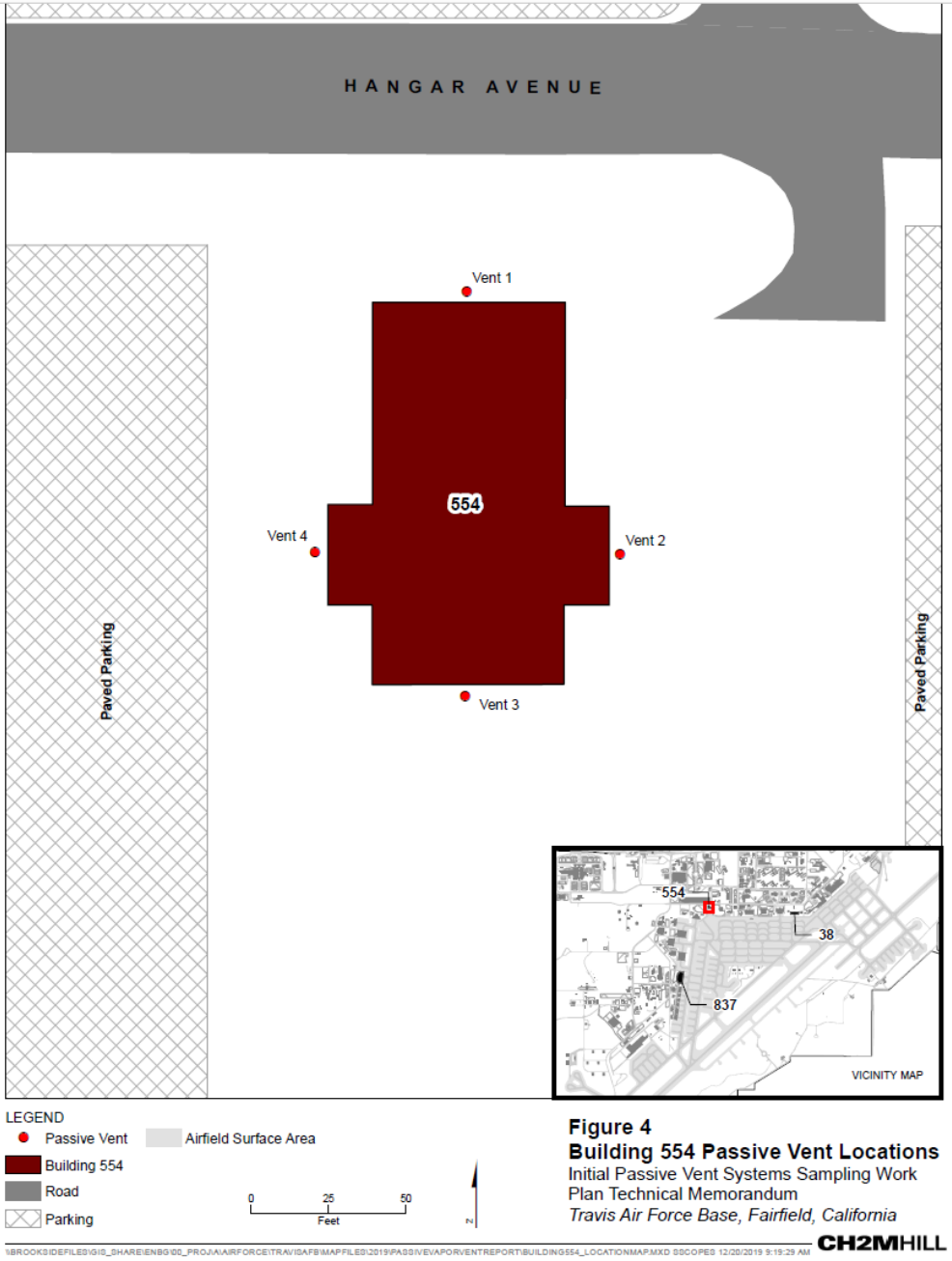

Figure 4
Building 554 Passive Vent Locations
Initial Passive Vent Systems Sampling Work Plan Technical Memorandum
Travis Air Force Base, Fairfield, California

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Building 837 Vent Exit Locations

Figure 6
Building 837 Passive Vent Locations
Initial Passive Vent Systems Sampling Work Plan Technical Memorandum
Travis Air Force Base, Fairfield, California

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Sampling Plan

- Collect subslab samples from all of the passive vents at each building
- Collect a concurrent outdoor air sample upgradient of each building
- Samples will be analyzed by EPA method TO-15 for the volatile groundwater site COCs at each building:

Building	Site	Volatile Groundwater COCs
38	SS016	1,1-DCE, 1,2-DCA, 1,4-DCB, benzene, bromodichloromethane, chloroform, cis-1,2-DCE, TCE, vinyl chloride, and PCE
554	SS015	1,2-DCA, cis-1,2-DCE, TCE, PCE, and vinyl chloride
837	SD037	1,1-DCE, 1,2-DCA, benzene, bromodichloromethane, carbon tetrachloride, chloromethane, cis-1,2-DCE, TCE, PCE, vinyl chloride, and naphthalene

Sampling Plan, Cont.

- Samples will be collected in winter and summer 2020 at Buildings 554 and 837 (5-Year Review recommended two sampling events)
- Samples will be collected in winter 2020 at Building 38 (5-Year Review recommended one sampling event)

Sampling Method

- Prior to vent sample collection, all the vent pipes at a building will be sealed with expandable plugs or PVC caps sealed with silicon tape (prevent outdoor air bias)
- Each vent at the building will be purged of 3 times the riser (non-perforated section of pipe) volume
- To allow for equilibration, a minimum of 2 hours will pass before vent samples are collected
- Vent samples will be collected in 1.4 Liter Summa canisters at a rate of approximately 200 ml/min

Sampling Method, Cont

- Concurrent with the passive vent system sampling, an outdoor air sample will be collected adjacent to each building
- The outdoor air sample will be collected near a building vent, on the upwind side of the building (to be determined on day of sampling)
- The outdoor air sample will be collected in a 6 liter summa canister over an 8-hour period on the same day the building vent system is sampled

Data Evaluation and Reporting

- Subslab sample results will be compared to:
  - outdoor air, to determine if there is a significant difference
  - Travis AFB industrial subslab soil-vapor-to-indoor-air risk-based concentrations (RBCs)
- If sampling results indicate that sufficient source strength is present to result in indoor air impacts due to vapor intrusion above risk-based target levels, additional evaluation of the passive vent system may be conducted under a separate contract

Travis AFB Industrial Subslab Soil-Vapor-to-Indoor-Air RBCs

Groundwater COC	Travis AFB Industrial Subslab Soil-Vapor-to-Indoor-Air RBC (µg/m³)	2019 Industrial Indoor-Air RBC (µg/m³)	Industrial Indoor-Air RBC Source
1,1-DCE	15,500	310	DTSC RSL
1,2-DCA	23.5	0.47	EPA RSL
1,4-DCB	55	1.1	EPA RSL
Benzene	21	0.42	DTSC RSL
Bromodichloromethane	16.5	0.33	DTSC RSL
Carbon tetrachloride	100	2	DTSC RSL
Chloroform	26.5	0.53	EPA RSL
Chloromethane	19,500	390	EPA RSL
cis-1,2-DCE	4,000	80	DTSC RSL
Naphthalene	18	0.36	EPA RSL
PCE	100	2	DTSC RSL
TCE	150	3	EPA RSL
Vinyl chloride	8	0.16	DTSC RSL

Schedule

- Fieldwork planned for winter (February) and summer (July) 2020
- Draft TM with results anticipated for September 2020

Travis AFB
Restoration Program

Program Update

RPM Teleconference

January 15, 2020

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
- 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
- SS014 POCO Subsites 2, 4, and 5 Closure Evaluation Report
- Addendum to the Site SS016 Groundwater RD/RA Work Plan

Completed Documents (6)

- SD043 Remedial Action Completion Report
- NFA ROD for Old Skeet Range (TS060/TS060A MRA)
- 2018 Annual GRISR
- SS046 Remedial Action Completion Report and Well Decommissioning Work Plan
- 2018 LF007 CAMU Inspection, Monitoring, and Maintenance Report
- Amendment to the NEWIOU Soil ROD for Sites SS016 and SD033
- SS016 RD/RA Work Plan
- ***4th Five Year Review Report for Multiple Groundwater, Soil, and Sediment Sites***
- ***SD043 Site Closure Report***

Completed Field Work (1)

- Replace battery banks at ST018 Groundwater Treatment Plant
- Annual Groundwater Remediation Implementation Program (GRIP) Sampling event
- Well Decommissioning (9 Wells)
- Electrical repairs to FT005 extraction system (well EW01x05)
- Electrical repairs to Site SS029 extraction system
- Site ST018 carbon vessels upgrade
- 2014 GRIP Semiannual Sampling Event
- Pump repairs to Site SS016 well (EW610x16)
- Subsite LF007C optimization upgrades
- 2014 Annual GRIP Sampling Event
- Biological Resource Assessment
- Site CG508 Site Investigation
- Old Skeet Range Characterization Sampling
- 4Q Semiannual GRIP Sampling Event
- SD031 Technology Demonstration Well Installation
- SD037 Well Installation
- SD031 Trench/Conveyance/Power Installation
- SD031 EVO Injection
- ST018 Well Installation
- SS015 Well Installation
- SS016 Well Installation
- Well Development (SD036, SD037)
- ST018 Trench/Conveyance/Power Installation
- SD036 EVO Injection
- Well Development (SS015, SS016)
- Baseline Sampling (SS015, SS016)
- SS014 Data Gap Investigation
- SS016 EVO Injection
- TA500 Data Gaps Investigation

Completed Field Work (2)

- 2015 Annual GRIP Sampling
- SD037 EVO Injection
- SD034 Data Gaps Investigation
- SS015 EVO Injection
- FT005 Injection Well Installation
- OWS 47, 48, 49 Site Investigations
- SS030 Trench/Conveyance/Power Installation
- FT005 Trench Installation
- FT005 Well Development
- FT004 Well Installation, Well Development, Baseline Sampling
- FT005 Baseline Sampling
- DP039 Well Installation, Well Development, Baseline Sampling
- FT004 EVO Injection
- FT004 Trench/Conveyance/Power Installation
- DP039 Infiltration Trench Installation
- TA500 Groundwater Sampling
- FT005 EVO Injection
- 2016 Q2 GRIP Sampling
- Data Gap Inv. for Soil Sites (SD043, SS046)
- SD031 Remedial Investigation Step-out Sampling (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
- 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 (11 wells)
- SD037 Injection Well Installation
- SS046 Well Decommissioning

Completed Field Work (5)

- 3rd Quarter 2019 GRIP Sampling
- SD034 O_2 Enhancement
- SS016 SBGR Repairs
- SD037 EVO Re-injection
- 4th Quarter 2019 GRIP Sampling
- ***SD043 Well and GETS Decommissioning***

Documents In-Progress

CERCLA

- Community Relations Plan Update (revised draft)
- SD031 Soil RI/FS
- *LF008 Remedial Action Evaluation Report*
- *SS046 Well Decommissioning and Site Closeout Tech Memo*

POCO

- None

Field Work In-Progress

CERCLA

- ***SS016 Soil excavation***

POCO

- SD031B POCO Additional Investigation

Documents Planned

CERCLA

- Initial Passive Vent Systems Evaluation Tech Memo — Jan
- ***SD043 Well Decommissioning and Site Closeout Tec Memo*** — ***Mar***
- ***Optimization Activities Tech Memo for SD034 and SD037*** — ***Mar***

POCO

- SD031B POCO Additional Site Investigation Work Plan — Feb
- ***FT004 POCO Excavation Work Plan Tech Memo*** — ***TBD***

Field Work Planned

CERCLA

- ***2Q20 GRIP Sampling*** ***Apr***
- ***SPOC Installation at SS015*** ***Feb***
- ***Passive Vent Systems Sampling*** ***Feb***

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

No new data since the last update

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)
    - **TPH-D baseline of 9,600 ug/L decreased to 90 ug/L at 2.5 years in May 2019 and 77 ug/L by October 2019**). Concentration fluctuations are to be expected as higher concentration areas are flushed as part of the washboard effect. Recently completed enhancements to the SBGR trenches to maintain treatment efficiency.)
    - **TPH-MO baseline of 2,300 ug/L decreased to non-detect at 2 years and remained non-detect at through latest sampling event in October 2019**
  - Plume hot spot monitoring well (MW02x34)
    - **TPH-D baseline of 8,300 ug/L decreased to 5,500 ug/L at 2.5 years in May 2019, 430 ug/L in August 2019, and 4,300 ug/L in October 2019** (Concentration fluctuations are to be expected as higher concentration areas are flushed as part of the washboard effect. Recently completed enhancements to the extraction network to help reductions in this area.)
    - **TPH-MO baseline of 1,500 ug/L decreased to 1,100 J ug/L at 2.5 years in May 2019, 210 J ug/L in August 2019, and 520 ug/L in October 2019**
- **Aerobic treatment process for this TD has been successful, but additional enhancements were recently completed to maintain treatment efficiency (replacement extraction well, new extraction well, and biosparging inside the SBGR trenches)**

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)
  - Summary:
    - **It is inconclusive if bioaugmentation provided a noticeable increase in degradation rates compared to EVO only for Site ST027B.**
    - 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). **Inconclusive if bioaugmentation was beneficial, ultimately performance was dictated by the additional injection wells installed to treat upgradient source mass.**
- 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 0.81 J**; **1.4 to <0.4**; **5.9 to 4.2**; **3.0 to 1.8** ug/L)
    - **Distribution of TOC through the aquifer via extraction was not able to be demonstrated via sampling data, although it is still expected to have had a benefit to remediation as a whole**

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
  - **Max monitoring well TCE concentration of 560 μg/L (baseline) was reduced to 63 ug/L in October 2018 and 94 ug/L in October 2019**
  - Limited TOC dispersal, additional EVO injection conducted with nanoEVO in 2017 to determine if this can enhance TOC dispersal
    - 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 present below the vernal pools, so it will take additional time to see concentration reductions)
    - **MW2330x04 maxed out at 640 ug/L in April 2018, decreased to 49 ug/L in May 2019, and rebounded to 600 ug/L in October 2019. Need to further evaluate what is causing these fluctuations**

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
  - Summary:
    - TD 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% (sum of key wells within TD area, excluding 2 wells to SW that increased expected to be caused by previously unknown downgradient mass)
    - Total molar concentration (sum of CVOCs) has reduced by 99% (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

No new data since the last update

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 Memorandum

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 (4^{th} 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