Final

Travis Air Force Base
Environmental Restoration Program
Restoration Program Manager's
Meeting Minutes
17 October 2018, 0930 Hours

Mr. Lonnie Duke of the Air Force Civil Engineer Center (AFCEC) Restoration Installation Support Section (ISS) conducted the Restoration Program Manager's (RPM) meeting on 17 October 2018 at 0930 hours in Building 248 at Travis AFB, California. Attendees included:

Lonnie Duke	AFCEC/CZOW
Glenn Anderson	AFCEC/CZOW
Gene Clare	AFCEC/CZOW
Monika O'Sullivan	AFCEC/CZOW
Merrie Schilter-Lowe	Travis AFB/PA
Kurt Grunawalt	Travis AFB/JA
Greg Capra	AFCEC/CZOW
Mike Riggle	USACE
Ben Fries	DTSC
Indira Balkissoon	TechLaw, Inc.
Nadia Hollan Burke	USEPA
Adriana Constantinescu	RWQCB
Leslie Royer	CH2M/JACOBS
Jill Dunphy	CH2M/JACOBS

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

Attachment 1	Meeting Agenda
Attachment 2	Master Meeting and Document Schedule
Attachment 3	SBBGWTP Monthly Data Sheet (September 2018)
Attachment 4	CGWTP Monthly Data Sheet (September 2018)
Attachment 5	LF007C Monthly Data Sheet (September 2018)
Attachment 6	ST018 Monthly Data Sheet (September 2018)
Attachment 7	Presentation: 4Q2018 GRIP Event
Attachment 8	Presentation: Program Update

1. ADMINISTRATIVE

A. Previous Meeting Minutes

Ms. Constantinescu requested the following changes to the September 2018 RPM Meeting Minutes:

Action Item Review, Item 2, second to last line: change “air samples” to “soil vapor samples”

MMDS, 2017 Annual GRISR discussion, second to last line: add “and concerns” after “agency comments”

B. Action Item Review

Action items from September 2018 were reviewed.

Action item 1 is ongoing: Ms. O’Sullivan to provide updates on perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA). October 2018 update: Ms. O’Sullivan had no updates. Ms. Constantinescu noted that the Water Board is reviewing submitted documents and will provide comments on each.

Action Item 2 is ongoing: Mr. Duke will continue to provide design and construction information for the new KC-46 Hangar construction project for agency input ahead of the Air Force/Civil Engineering awarding the construction contract. October 2018 update: The soil vapor sample that was previously collected beneath Building 21 was rejected because there was evidence that air leakage compromised the sample. The Building 21 location was subsequently resampled. The data have not been received yet.

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

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

Travis AFB Annual Meeting and Teleconference Schedule

The next RPM meeting will be a teleconference. Due to conflict with the Thanksgiving holiday, it will be held on Wednesday, 28 November at 0930.

Travis AFB Master Document Schedule

- Community Relations Plan Update (CRP): There was no change to the schedule.
- Amendment to the WABOU Soil ROD for Travis AFB ERP Sites DP039, SD043, and SS046: The Final due date has changed to 30 November 2018. Mr. Anderson noted that the document is out for Air Force signature and thanked everyone for

working together to get to this point. No field work can be conducted until the document is fully signed. Mr. Anderson will contact the PAO at that time to provide a schedule for the field work and notify the RAB that the work will commence. **This is a super critical document**.

— Amendment to the NEWIOU Soil ROD for the Travis AFB ERP Sites SS016 and SD033: The Response to Comments due date changed to 30 October 2018. Ms. Burke requested on behalf of the EPA that ARAR Table C-2 be revised according to approved responses to comments on the WABOU ROD-A. Ms. Constantinescu supported this request, adding that the Water Board would also like to see these revisions made. Ms. Burke noted that the EPA legal team has not yet sent their comments to her. **This is a super critical document** due to site work supporting planned KC-46 hangar construction.

— Site TS060 No Further Action Record of Decision for Old Skeet Range: The Agency Comments Due date was changed to 30 November 2018. **This is an important but not critical document**.

— Site SD043 Remedial Design/Remedial Action Work Plan: The Final due date was changed to 10 October 2018. Field work can start once the Air Force signature is obtained on the WABOU ROD Amendment.

— Site SS046 Remedial Design/Remedial Action Work Plan: The Final due date was changed to 12 October 2018. Field work can start once the Air Force signature is obtained on the WABOU ROD Amendment.

— Site SS016 Remedial Design/Remedial Action Work Plan: The Response to Comments due date was changed to 23 October 2018, the rest of the dates were changed accordingly. The EPA has approved the RTCs. This excavation project is located within the footprint of the future new KC-46 hangar, so **this document is critical**.

— Site SD031 Soil Remedial Investigation/Feasibility Study: All dates were changed to TBD, because revisions to the FS were needed and the document is not time-critical (any follow-on work will come under the next contract). **This document is important but not time-critical**.

— Addendum to the Site SS016 Groundwater Remedial Design/Remedial Action Work Plan: The title was changed from Site SS016 Horizontal Well Replacement Work Plan Technical Memorandum, and the document has been reclassified as a Primary Document. The Predraft to AF Service Center date has been changed to 26 November 2018, the rest of the schedule has been updated accordingly.

— Fourth Five-Year Review Report for Multiple Groundwater, Soil, and Sediment Sites: No change was made to the schedule. Mr. Anderson noted that will take time to finalize all Air Force responses and have all parties accept them due to potential for impact on the restoration program. This document will likely not be finalized until early to mid-2019. **This document is very important but not critical**.

— Potrero Hills Annex (FS, PP, and ROD): No change was made to the schedule. Ms. Constantinescu noted that the Water Board is reviewing two documents, and that they are adhering to the schedule from the Site Cleanup Order.

— Site LF006 Technology Demonstration Work Plan: The Agency Comment Due date was changed to 4 October 2018. The EPA and Water Board did not have any comments. The remainder of the schedule was updated accordingly.

— Quarterly Newsletters (July 2018): No change was made to the schedule. Mr. Duke reminded the team that anyone can submit an article for the "Viewpoint" feature and reiterated that comments on this feature are generally not expected or responded to since it is an opinion piece.

— 2017 Annual GRISR: There was no change to the schedule. A discussion of the 4Q2018 monitoring plan will be held later in the meeting to ensure that agency comments and concerns relating to the 4Q2018 sampling event are addressed ahead of the monitoring event.

— Site FT005 Extraction System Optimization Report: This document has been moved to the History section.

— Site LF044 Sediment Sampling Report: This document has been moved to the History section.

— 2017 Annual CAMU Monitoring Report: This document has been moved to the History section.

— Emulsified Vegetable Oil Sites FT004, SS015, SD031, and SD036 Optimization Injections Report: No changes were made to the schedule. This is a lower priority document.

— Site SS015 Soil Sampling Results Technical Memorandum. The schedule was populated with actual dates; the Predraft to AF Service Center date is 17 October 2018.

— Subarea LF007C Total Petroleum Hydrocarbon Chromatogram Review Technical Memorandum: No change was made to the schedule. Ms. Burke noted that the EPA did not receive a copy of this document, but the EPA provided comments on the GRISR related to this issue. Mr. Anderson noted that the TPH discussion in the GRISR differs from that provided in this tech memo, so the comments will be responded to along with the rest of the GRISR RTCs. Mr. Anderson agreed to send the LF007C Tech Memo to Ms. Burke for her files.

— AOC TA500 POCO Well Decommissioning and Site Closeout Technical Memorandum: The schedule was populated with actual dates. The Predraft to AF Service Center date is 15 October 2018.

2. CURRENT PROJECTS

Treatment Plant Operation and Maintenance Update

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

The South Base Boundary Groundwater Treatment Plant (SBBGWTP) performed at 99.9% uptime, and 6.2 million gallons of groundwater were extracted and treated in September 2018. All treated water was discharged to Union Creek. The average flow rate for the SBBGWTP was 154.6 gallons per minute (gpm). Electrical power usage was 15,957 kWh, and approximately 12,608 pounds of CO_2 were created (based on DOE calculation). Approximately 1.1 pounds of volatile organic compounds (VOCs) were removed in September. The total mass of VOCs removed since startup of the system is 505.3 pounds.

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

In August 2018, troubleshooting was performed on two extraction wells; including cleaning totalizer and piping near one wellhead, replacing communications wires that had been damaged by rodents, and replacing a totalizer and totalizer cable.

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

The Central Groundwater Treatment Plant (CGWTP) performed at 100% uptime with approximately 1,180,390 gallons of groundwater extracted and treated in September 2018. All treated water was discharged to the storm sewer system which discharges to Union Creek. The average flow rate for the CGWTP was 27.5 gpm. Electrical power usage was 2,394 kWh for all equipment connected to the Central Plant, and approximately 2,660 pounds of CO_2 were generated. Approximately 2.0 pounds of VOCs were removed from groundwater by the treatment plant in September. The total mass of VOCs removed since the startup of the system is 11,502 pounds.

Optimization Activities for CGWTP: The DP039 bioreactor continues to operate in a four-week “pulsed mode.” No other optimization activities are reported for the month of September 2018.

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

The Subarea LF007C Groundwater Treatment Plant (LF007C GWTP) performed at 100% uptime with approximately 138,410 gallons of groundwater extracted and treated in September 2018. All treated water was discharged to the Duck Pond for beneficial

reuse. The average flow rate was 3.6 gpm. Approximately 9.5 x 10^{-4} pound of VOCs was removed from groundwater by the treatment plant in September 2018. The total mass of VOCs removed since the startup of the system is 174.4 pounds. There was no electrical power usage statistics, because this plant operates on solar power only.

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

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

Site ST018 (MTBE) Treatment Plant (ST018 GWTP) performed at 96.9% uptime with approximately 156,510 gallons of groundwater extracted and treated in September 2018. All treated water was discharged to the Fairfield – Suisun Sewer District. The average flow rate for the ST018 GWTP was 3.8 gpm. Electrical power usage for the month was 80 kWh for all equipment connected to the ST018 GWTP. The total CO_2 equivalent, including an estimate for the carbon change-out, equates to approximately 59 pounds. Approximately 0.3 pound of MTBE, BTEX, VOCs, and TPH was removed in September by the treatment plant, and approximately 0.01 pound of MTBE-only was removed from groundwater. The total BTEX, MTBE and TPH mass removed since the startup of the system is 45.8 pounds, and the total MTBE mass removed since startup of the system is 11.1 pounds.

Note: Electrical power use at the ST018 GWTP is only for the alarm system and a pump that pushes water through the GAC vessels for treatment. The four groundwater extraction pumps in the system are all solar powered.

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

3. Presentations:

A) 4Q2018 GRIP Event: Changes from the 4Q2017 Event (see Attachment 7)

Ms. Royer presented an overview of the 4Q2018 GRIP event sampling, outlining similarities to and differences from the 4Q2017 event. Please refer to Attachment 7 for the full briefing. Highlights of the discussion include:

- EPA noted trends in several wells and requested that the Air Force check to see if they were already being sampled in the 4Q2018 event. The wells and trends are:
- EW576x04 (increasing TCE)
- EW580x04 (increasing TCE)
- EW621x04 (increasing TCE)
- MW266x04 (increasing 1,1-DCE)
- MW131x04 (increasing TCE)
- EW595x36 (increasing TCE)

- MW2063x36 (increasing TCE)
- MW2064Ax36 (increasing TCE)
- MW2065x36 (increasing TCE, cis-1,2-DCE, vinyl chloride)
- MW2186x36 (increasing TCE, cis-1,2-DCE, vinyl chloride)
- MW2187x36
- MW2077A (increasing cis-1,2-DCE)

Ms. Balkissoon noted that these trends were identified for a separate effort and had not been compared to the GRIP 4Q2018 sampling plan. Ms. Royer agreed to check on the monitoring frequency for these wells and if they will be sampled as part of the 4Q2018 event.

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

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

4. New Action Item Review

Mr. Duke will send the Subarea LF007C Total Petroleum Hydrocarbon Chromatogram Review Technical Memorandum to Ms. Burke.

5. PROGRAM ISSUES/UPDATE

No program issues or updates were reported.

6. Action Items

Item #	Responsible	Action Item Description	Due Date	Status
1.	Monika O'Sullivan	Ms. O'Sullivan to provide updates on PFOS and PFOA as she becomes aware of them.	Ongoing	Open
2.	Lonnie Duke	Mr. Duke will continue to provide design and construction information for the KC-46 Hangar for agency input ahead of the Air Force/Civil Engineering awarding the construction contract.	Ongoing	Open

3.	Lonnie Duke	Mr. Duke will send the Subarea LF007C Total Petroleum Hydrocarbon Chromatogram Review Technical Memorandum to Ms. Burke.	28 November 2018	Open

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

The RPM face-to-face meeting is scheduled for 09:30 AM PST on 17 October, 2018. **The call-in number is 1-866-203-7023. Enter the Participation code 5978-75-9736 then enter #.**

AGENDA

1. ADMINISTRATIVE

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

2. CURRENT PROJECTS

   TREATMENT PLANT OPERATION AND MAINTENANCE UPDATE

3. PRESENTATIONS

   A TRIAD DISCUSSION:
   4Q2018 Sampling Event
   B PROGRAM UPDATE:
   DOCUMENTS & ACTIVITIES COMPLETED, IN PROGRESS AND PLANNED

4. NEW ACTION ITEM REVIEW

5. PROGRAM/ISSUES/UPDATE

   MEETING SCHEDULE

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

(2018)
Annual Meeting and Teleconference Schedule

Monthly RPM 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.)
—	01-17-18	—
02-21-18	—	—
—	03-21-18	—
04-19-18 (Thursday 2:00 PM)	—	04-19-18
—	05-16-18	—
06-20-18	—	—
—	07-18-18	—
08-15-18	—	—
—	09-19-18	—
10-17-18	—	May through October[2]
—	11-28-18	—
—	—	—

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

[2] Note: Tentative RAB tour(s) during construction season.

(2019)

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.)
—	01-16-19	—
02-20-19	—	—
—	03-20-19	—
04-18-19 (Thursday 2:00 PM)	—	04-18-19
—	05-15-19	—
06-19-19	—	—
—	07-17-19	—
08-21-19	—	—
—	09-18-19	—
10-16-19	—	May through October[2]
—	11-20-19	—
—	—	—

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

[2] Note: Tentative RAB tour(s) during construction season.

Travis AFB Master Meeting and Document Schedule

PRIMARY DOCUMENTS				
Life Cycle	**Community Relations Plan Update** **Travis AFB, Glenn Anderson** **CH2M, Jill Dunphy**	**Amendment to the WABOU Soil ROD for the Travis AFB ERP Sites DP039, SD043, and SS046** **Travis AFB, Glenn Anderson** **CH2M, Latonya Coleman**	**Amendment to the NEWIOU Soil ROD for the Travis AFB ERP Sites SS016 and SD033** **Travis AFB, Glenn Anderson** **CH2M, Latonya Coleman**	**No Further Action ROD for Old Skeet Range (TS060 MRA)** **Travis AFB, Glenn Anderson**
Scoping Meeting	**NA**	**NA**	**NA**	**NA**
Predraft to AF/Service Center	08-23-16	10-09-17	02-28-18	05-18-18
AF/Service Center Comments Due	09-07-16	11-08-17	03-30-18	06-01-18
Draft to Agencies	09-28-16 (03-22-18)	11-30-17	06-22-18	6-25-18
Draft to RAB	09-28-16 (03-22-18)	11-30-17	06-22-18	6-25-18
Agency Comments Due	10-28-16 (04-27-18)	01-31-18	08-22-18	11-30-18
Response to Comments Meeting	**TBD**	**02-21-18**	**09-06-18**	**01-16-18**
Agency Concurrence with Remedy	NA	NA	NA	NA
Public Comment Period	NA	NA	NA	NA
Public Meeting	**NA**	**NA**	**NA**	**NA**
Response to Comments Due	TBD	08-17-18	10-30-18	01-30-19
Draft Final Due	TBD	08-17-18	10-30-18	01-30-19
Final Due	TBD	09-17-18 (11-30-18)	12-21-18	03-04-19

Travis AFB Master Meeting and Document Schedule

PRIMARY DOCUMENTS			
Life Cycle	**Site SD043 Remedial Design/Remedial Action Work Plan Travis AFB, Glenn Anderson CH2M, Levi Pratt**	**Site SS046 Remedial Design/Remedial Action Work Plan Travis AFB, Glenn Anderson CH2M, Doug Berwick CAPE, Meg Greenwald**	**Site SS016 Remedial Design/Remedial Action Work Plan Travis AFB, Glenn Anderson CH2M, Doug Berwick CAPE, Meg Greenwald**
Scoping Meeting	**NA**	**NA**	**NA**
Predraft to AF/Service Center	02-22-18	03-02-18	06-04-18
AF/Service Center Comments Due	03-08-18	03-16-18	06-18-18
Draft to Agencies	04-10-18	04-12-18	07-31-18
Draft to RAB	04-10-18	04-12-18	07-31-18
Agency Comments Due	05-10-18	05-14-18	08-30-18
Response to Comments Meeting	**05-16-18**	**05-16-18**	**09-19-18**
Agency Concurrence with Remedy	NA	NA	NA
Public Comment Period	NA	NA	NA
Public Meeting	**NA**	**NA**	**NA**
Response to Comments Due	06-06-18	08-21-18	10-23-18
Draft Final Due	06-06-18	08-21-18	10-23-18
Final Due	10-10-18	10-12-18	TBD

Travis AFB Master Meeting and Document Schedule

PRIMARY DOCUMENTS			
Life Cycle	**Site SD031 Soil Remedial Investigation/Feasibility Study** **Travis AFB, Glenn Anderson** **CH2M, Nikki Carlton**	**Addendum to the Site SS016 Groundwater Remedial Design/Remedial Action Work Plan** **Travis AFB, Lonnie Duke** **CH2M, Levi Pratt**	**Fourth Five-Year Review Report for Multiple Groundwater, Soil, and Sediment Sites** **Travis AFB, Glenn Anderson** **Tetra Tech, Joachim Eberharter**
Scoping Meeting	**NA**	**NA**	**NA**
Predraft to AF/Service Center	TBD	11-26-18	03-14-18
AF/Service Center Comments Due	TBD	12-04-18	05-22-18
Draft to Agencies	TBD	12-18-18	06-05-18
Draft to RAB	TBD	12-18-18	06-05-18
Agency Comments Due	TBD	01-22-19	07-20-18
Response to Comments Meeting	**TBD**	**02-20-19**	**TBD**
Agency Concurrence with Remedy	NA	NA	NA
Public Comment Period	NA	NA	NA
Public Meeting	**NA**	**NA**	**NA**
Response to Comments Due	TBD	03-06-19	TBD
Draft Final Due	TBD	03-06-19	TBD
Final Due	TBD	04-05-19	TBD

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

Travis AFB Master Meeting and Document Schedule

SECONDARY DOCUMENTS	
Life Cycle	**Site LF006 Technology Demonstration Work Plan Travis AFB, Glenn Anderson CH2M, Levi Pratt**
Scoping Meeting	**NA**
Predraft to AF/Service Center	07-03-18
AF/Service Center Comments Due	07-18-18
Draft to Agencies	08-20-18
Draft to RAB	08-20-18
Agency Comments Due	09-20-18 (10-04-18)
Response to Comments Meeting	**10-17-18**
Response to Comments Due	10-31-18
Draft Final Due	NA
Final Due	10-31-18
Public Comment Period	NA
Public Meeting	**NA**

Travis AFB Master Meeting and Document Schedule

INFORMATIONAL DOCUMENTS		
Life Cycle	**Quarterly Newsletter (October 2018) Travis, Glenn Anderson**	**2017 Annual GRISR Travis AFB, Glenn Anderson CH2M, Leslie Royer**
Scoping Meeting	**NA**	**NA**
Predraft to AF/Service Center	09-26-18	05-09-18
AF/Service Center Comments Due	NA	06-11-18
Draft to Agencies	10-05-18	07-19-18
Draft to RAB	NA	07-19-18
Agency Comments Due	10-19-18	11-19-18
Response to Comments Meeting	**10-20-18**	**01-16-19**
Response to Comments Due	10-25-18	01-30-19
Draft Final Due	NA	NA
Final Due	10-25-18	01-30-19
Public Comment Period	NA	NA
Public Meeting	**NA**	**NA**

Travis AFB Master Meeting and Document Schedule

INFORMATIONAL DOCUMENTS		
Life Cycle	**Emulsified Vegetable Oil Sites FT004, SS015, SD031, and SD036 Injections Technical Memorandum** **Travis AFB, Gene Clare** **CH2M, Levi Pratt**	**Site SS015 Soil Sampling Results Technical Memorandum** **Travis AFB, Glenn Anderson** **CH2M HILL, Levi Pratt**
Scoping Meeting	**NA**	**NA**
Predraft to AF/Service Center	06-12-18	10-17-18
AF/Service Center Comments Due	06-26-18	10-31-18
Draft to Agencies	08-31-18	11-15-18
Draft to RAB	08-31-18	11-15-18
Agency Comments Due	10-01-18	12-19-18
Response to Comments Meeting	**10-18-18**	01-16-19
Response to Comments Due	11-01-18	02-05-19
Draft Final Due	NA	NA
Final Due	11-01-18	02-05-19
Public Comment Period	NA	NA
Public Meeting	**NA**	**NA**

Travis AFB Master Meeting and Document Schedule

INFORMATIONAL DOCUMENTS		
Life Cycle	**Subarea LF007C Total Petroleum Hydrocarbon Chromatogram Review Technical Memorandum** **Travis AFB, Glenn Anderson** **CH2M HILL, Leslie Royer**	**AOC TA500 Well Decommissioning and Site Closeout Technical Memorandum** **Travis AFB, Glenn Anderson** **CH2M HILL, Tony Chakurian**
Scoping Meeting	**NA**	**NA**
Predraft to AF/Service Center	09-05-18	10-15-18
AF/Service Center Comments Due	09-19-18	10-29-18
Draft to Agencies	09-24-18	11-13-18
Draft to RAB	09-24-18	11-13-18
Agency Comments Due	10-24-18	12-17-18
Response to Comments Meeting	11-21-18	**01-16-19**
Response to Comments Due	12-07-18	02-01-19
Draft Final Due	NA	NA
Final Due	12-07-18	02-01-19
Public Comment Period	NA	NA
Public Meeting	**NA**	**NA**

Travis AFB Master Meeting and Document Schedule

HISTORY			
Life Cycle	**Site FT005 Extraction System Optimization Technical Memorandum** **Travis AFB, Gene Clare** **CH2M, Levi Pratt**	**Site LF044 Sediment Sampling Technical Memorandum** **Travis AFB, Glenn Anderson** **CH2M, Doug Berwick** **CAPE, Meg Greenwald**	**2017 Annual CAMU Monitoring Report** **Travis AFB, Gene Clare** **CH2M HILL, Levi Pratt**
Scoping Meeting	**NA**	**NA**	**NA**
Predraft to AF/Service Center	03-08-18	04-12-18	04-19-18
AF/Service Center Comments Due	03-22-18	04-26-08	05-03-18
Draft to Agencies	05-01-18	05-17-18	05-15-18
Draft to RAB	05-01-18	05-17-18	05-15-18
Agency Comments Due	06-01-18	06-18-18	06-15-18
Response to Comments Meeting	**06-20-18**	**06-20-18**	**06-20-18**
Response to Comments Due	08-23-18	08-28-18 (08-24-18)	09-18-18
Draft Final Due	NA	NA	NA
Final Due	08-23-18	08-28-18 (08-24-18)	09-18-18
Public Comment Period	NA	NA	NA
Public Meeting	**NA**	**NA**	**NA**

South Base Boundary Groundwater Treatment Plant Monthly Data Sheet

Report Number: 215 **Reporting Period: 31 August 2018 – 28 September 2018** **Date Submitted: 9 October 2018**

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

System Metrics

Table 1 presents operational data from the September 2018 reporting period.

Table 1 – Operations Summary – September 2018

Initial Data Collection:	8/31/2018 13:55	**Final Data Collection:**	9/28/2018 6:50
Operating Time:	Percent Uptime:	Electrical Power Usage:	
SBBGWTP: 664 hours	**SBBGWTP:** 99.9%	**SBBGWTP:**	15,957 kWh (12,608 lbs CO_2 generated[a])
Gallons Treated: **6.2 million gallons**		Gallons Treated Since July 1998: **1,067 million gallons**	
Volume Discharged to Union Creek: **6.2 million gallons**		Gallons Treated from Other Sources: **0 gallons**	
VOC Mass Removed: **1.1 lbs**[b]		VOC Mass Removed Since July 1998: **505.3 lbs**	
Rolling 12-Month Cost per Pound of Mass Removed: $10,931[c]			
Monthly Cost per Pound of Mass Removed: $7,506[c]			

lbs = pounds

[a] SiteWise™ estimate that 1 kilowatt hour generated produces 0.74 pounds of GHG. Value also includes approximately 800 pounds of GHG from GAC change out services averaged to a per month basis.

[b] Calculated using September 2018 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] – September 2018

FT005[b]				SS029		SS030	
EW01x05	Offline	EW743x05	Offline	EW01x29	Offline[c]	EW01x30	15.9
EW02x05	Offline	EW744x05	3.3	EW02x29	Offline[c]	EW02x30	7.5
EW03x05	Offline	EW745x05	9.5	EW03x29	2.8	EW03x30	15.8
EW731x05	6.7	EW746x05	Offline	EW04x29	8.6	EW04x30	24.0
EW732x05	Offline	EW2291x05	5.3	EW05x29	7.5	EW05x30	14.6
EW733x05	Offline	EW2782x05	5.5	EW06x29	8.3	EW2174x30	6.6
EW734x05	4.3	EW2783x05	3.1	EW07x29	13.2	EW711x30	10.1
EW735x05	11.9	EW2784x05	5.4			MW269x30	0.0[d]
EW736x05	Offline	EW2785x05	4.6				
EW737x05	Offline	EW2786x05	13.5				
EW742x05	Offline						
FT005 Total: 73.1				**SS029 Total: 40.4**		**SS030 Total: 94.5**	

SBBGWTP Average Monthly Flow[e]: 154.6 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 well was operational, but water levels were recharging when field readings were collected.
[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	17 September 2018	10:30	17 September 2018	11:30	Backwash on lead GAC vessel.

-- = Time not recorded
[a] Shutdown and restart times estimated based on field notes
SBBGWTP = South Base Boundary Groundwater Treatment Plant

Summary of O&M Activities

Monthly groundwater treatment samples were collected at the SBBGWTP on 5 September 2018. Sample results are presented in Table 4. The total VOC concentration (22.4 µg/L) in the influent sample increased from the August 2018 sample results (22.1 µg/L). TCE was the primary VOC detected in the influent sample at a concentration of 21 µg/L. Cis-1,2-DCE, chloroform, and 1,2-DCA were detected in the midpoint sampling location at low concentrations. No VOCs were detected in the final effluent sample.

On 17 September, the SBBGWTP was shut down for approximately 1 hour to backwash the lead GAC vessel to decrease the pressure through it.

In September 2018, troubleshooting was performed on a couple Sites FT005 extraction wells, as follows:

- EW734x05 - Cleaned the totalizer and piping near the wellhead. Replaced the communication wires that were damaged by rodents. Well is currently operating.
- EW2785x05 – Replaced the totalizer and totalizer cable. Well is currently operating.

Figure 1 presents the influent 1,2-DCA and TCE concentrations since January 2017. Since July 2018, TCE influent concentrations have increased slightly, while the 1,2-DCA influent concentrations have decreased to non-detect.

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

Optimization Activities

No optimization activities occurred at the SBBGWTP in September 2018.

Sustainability

Travis AFB is committed to decreasing the amount of GHG produced directly (waste streams discharging GHG) or indirectly (GHG produced as related to electrical energy consumption) from all systems across Travis AFB. Travis AFB continues to optimize each treatment plant to reduce the amount of electrical energy consumed, and to implement sustainable treatment plant optimization programs, such as taking extraction pumps off line that are no longer necessary for contaminant plume capture.

Figure 3 presents the historical GHG production from the SBBGWTP. In September 2018, the SBBGWTP produced approximately 12,608 pounds of GHG, which includes approximately 800 pounds of GHG generated from GAC change out services averaged to a per month basis.

TABLE 4
Summary of Groundwater Analytical Data for September 2018 – South Base Boundary Groundwater Treatment Plant

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	5 September 2018 (µg/L)		
				Influent	Midpoint	Effluent
Halogenated Volatile Organics						
Acetone	NA	1.9	0	ND	ND	ND
Bromodichloromethane	NA	0.17	0	ND	ND	ND
Carbon Tetrachloride	0.5	0.19	0	ND	ND	ND
Chloroform	5.0	0.16	0	ND	**0.23 J**	ND
Chloromethane	NA	0.30	0	ND	ND	ND
1,1-Dichloroethane	5.0	0.16	0	ND	ND	ND
1,2-Dichloroethane	0.5	0.13	0	ND	**0.69 J**	ND
1,1-Dichloroethene	5.0	0.14	0	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.15	0	**1.4**	**0.58 J**	ND
trans-1,2-Dichloroethene	5.0	0.15	0	ND	ND	ND
Methylene Chloride	5.0	0.32	0	ND	ND	ND
Tetrachloroethene	5.0	0.20	0	ND	ND	ND
1,1,1-Trichloroethane	5.0	0.16	0	ND	ND	ND
1,1,2-Trichloroethane	5.0	0.32	0	ND	ND	ND
Trichloroethene	5.0	0.16	0	**21**	ND	ND
Vinyl Chloride	0.5	0.10	0	ND	ND	ND
Non-Halogenated Volatile Organics						
Benzene	1.0	0.16	0	ND	ND	ND
Ethylbenzene	5.0	0.16	0	ND	ND	ND
Toluene	5.0	0.17	0	ND	ND	ND
Xylenes	5.0	0.19 – 0.34	0	ND	ND	ND
Other						
Total Petroleum Hydrocarbons – Gasoline	50	10	0	ND	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	15	0	ND	NM	ND
Total Petroleum Hydrocarbons – Motor Oil	50	160	0	ND	NM	ND

* In accordance with current National Pollutant Discharge Elimination System permit – Interim, effective January 2019.

Notes:

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

Figure 1

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

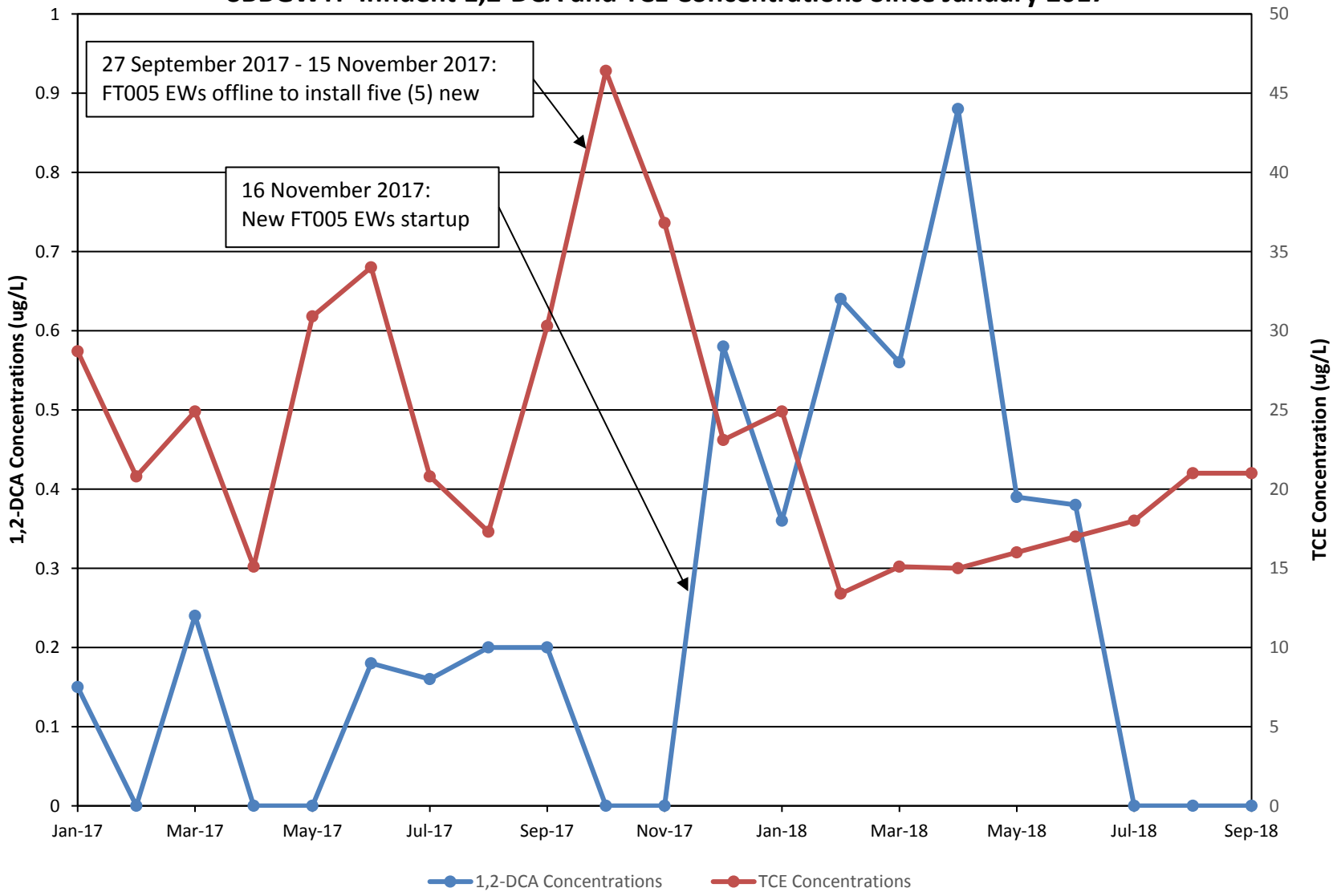


Figure 2

SBBGWTP Total VOC Influent Concentrations and Average Flowrate Twelve Month History

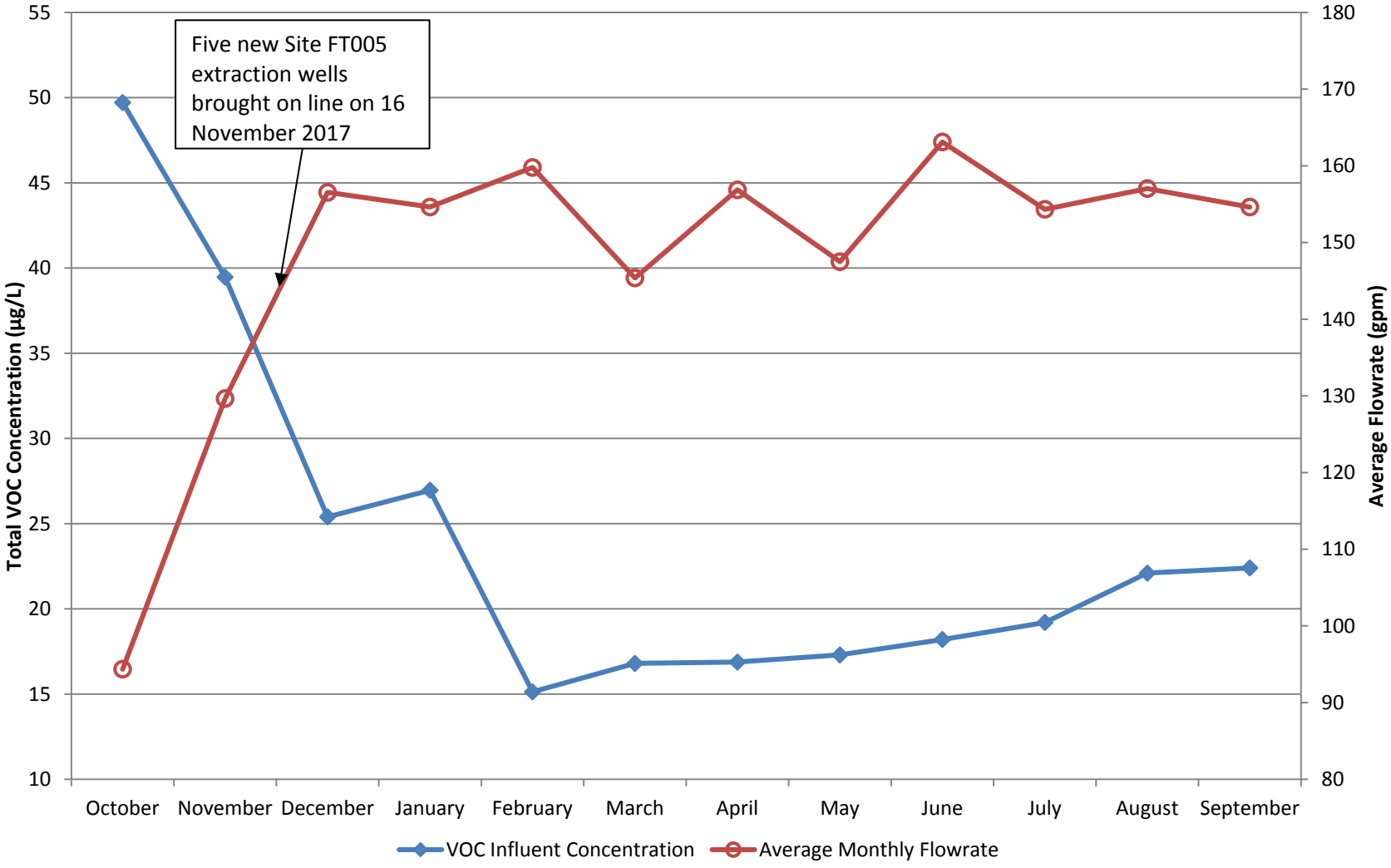
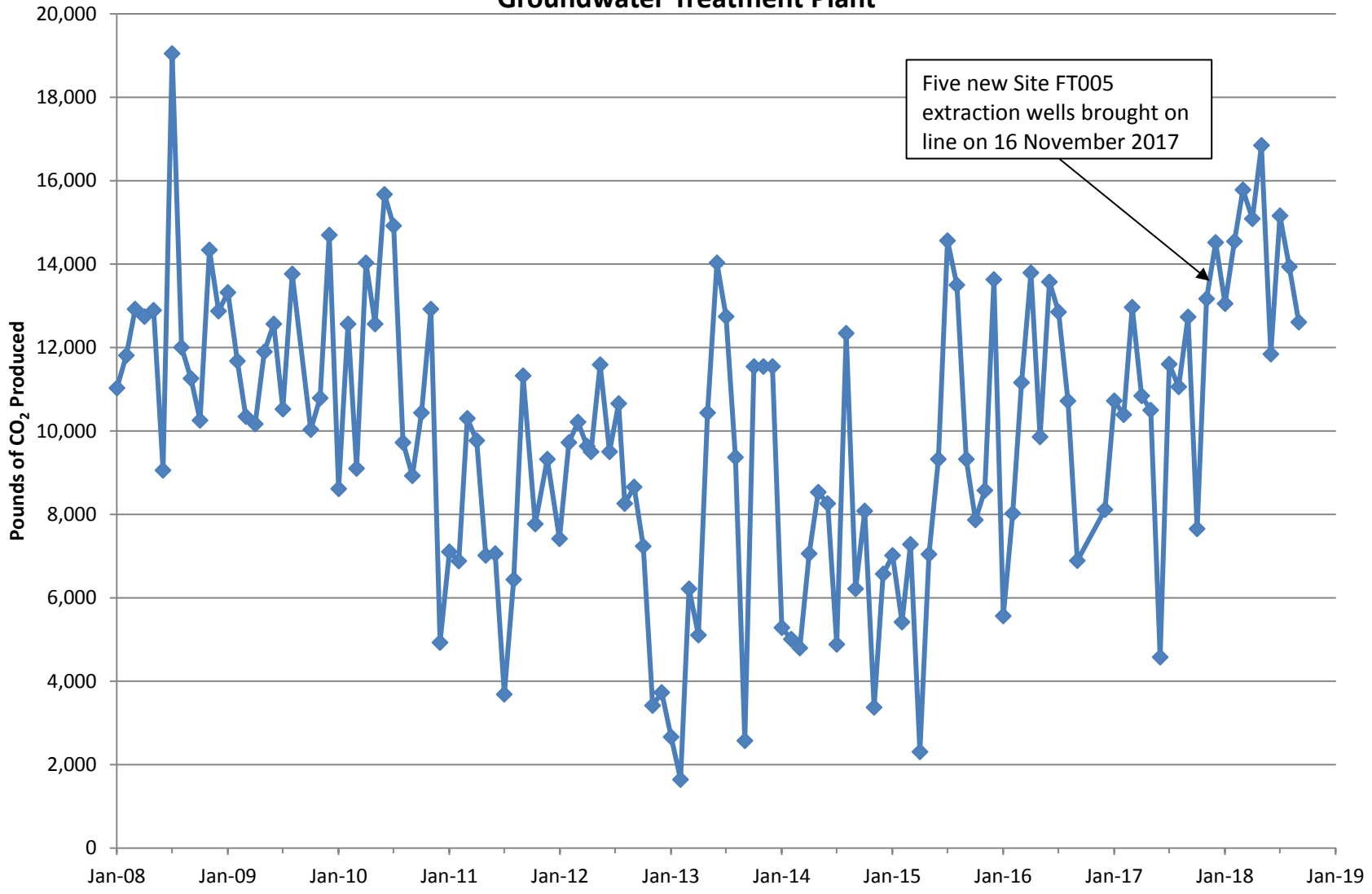


Figure 3

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



Central Groundwater Treatment Plant Monthly Data Sheet

Report Number: 230 **Reporting Period: 29 August 2018 – 28 September 2018** **Date Submitted: 9 October 2018**

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

System Metrics

Table 1 presents operational data from the September 2018 reporting period.

Table 1 – Operations Summary – September 2018

Initial Data Collection:	8/29/2018 16:15	**Final Data Collection:**	9/28/2018 12:40		
Operating Time:		Percent Uptime:		Electrical Power Usage:	
CGWTP:	716 hours	**CGWTP:**	100%	**CGWTP:**	2,394 kWh (2,660 lbs CO_2 generated[a])
Gallons Treated (discharge to storm sewer): **1,180,390 gallons**		Gallons Treated Since January 1996: **560.3 million gallons**			
VOC Mass Removed from groundwater:		VOC Mass Removed Since January 1996:			
2.0 lbs[b]		**2,816 lbs from groundwater**			
		8,686 lbs from vapor			
Rolling 12-Month Cost per Pound of Mass Removed: $3,166[c]					
Monthly Cost per Pound of Mass Removed: $2,184[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 September 2018 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] – September 2018

Location	Average Flow Rate Groundwater (gpm)
EW001x16	13.1
EW002x16	8.8
EW003x16	0.1
EW605x16	5.9
EW610x16	2.6
CGWTP	27.5

[a] Flow rates calculated by dividing total gallons processed by system operating time for the month or the average of the instantaneous readings.
gpm = gallons per minute

Table 3 presents a summary of shutdowns during the monthly reporting period.

Table 3 – Summary of System Shutdowns

Location	Shutdown[a]		Restart		Cause
	Date	Time	Date	Time	
CGWTP	None.	--		--	

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

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

Table 4 – Summary of DP039 Bioreactor "Pulsed Mode" Operations

Location	Pulse-on Date	Pulse-off Date
MW750x39	7 September 2017	2 October 2017
	6 November 2017	27 November 2017
	26 December 2017	22 January 2018
	19 February 2018	21 March 2018
	16 April 2018	14 May 2018
	12 June 2018	9 July 2018
	7 August 2018	6 September 2018

MW = Monitoring Well

Summary of O&M Activities

Monthly groundwater treatment samples were collected at the CGWTP on 5 September 2018. Sample results are presented in Table 5. The total VOC concentration (202.13 µg/L) in the September 2018 influent sample has decreased from the August 2018 sample (272.32 µg/L). TCE was the primary VOC detected in the influent sample at a concentration of 160 µg/L. Vinyl chloride (0.27 J µg/L) was detected at a trace concentration in the sample after the first carbon vessel. Toluene was detected at trace concentrations in the sample collected after the second carbon vessel and the effluent sample. Acetone, a common laboratory contaminant, was also detected in the effluent sample. The detection of toluene in the effluent sample was less than effluent limit of 0.5 µg/L. Travis AFB will continue to monitor influent, midpoint, and effluent concentrations at the CGWTP for carbon breakthrough, though the carbon treatment remained effective in September 2018.

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

The Site DP039 subgrade biogeochemical reactor (SBGR), also known as a bioreactor, continued to operate in a four-week "pulsed mode" to optimize distribution of total organic carbon (TOC). The bioreactor was taken off line on 6 September 2018.

Optimization Activities

No optimization activities occurred at the CGWTP in September 2018.

Sustainability

Travis AFB is committed to decreasing the amount of GHG produced directly (waste streams discharging GHG) or indirectly (GHG produced as related to electrical energy consumption) from all systems across Travis AFB. Travis AFB continues to optimize each treatment plant to reduce the amount of electrical energy consumed, and to implement sustainable treatment plant optimization programs, such as bioreactors and EVO injection well networks.

Figure 2 presents the historical GHG production from the systems associated with the CGWTP. The CGWTP produced approximately 2,660 pounds of GHG during September 2018.

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

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	5 September 2018 (µg/L) Influent	After Carbon 1 Effluent	After Carbon 2 Effluent	System Effluent
Halogenated Volatile Organics							
Acetone	NA	1.8	0	ND	ND	ND	**1.9 J**
Chloroform	5.0	0.16	0	ND	ND	ND	ND
Chloromethane	NA	0.30	0	ND	ND	ND	ND
1,2-Dichlorobenzene	5.0	0.13	0	**0.41 J**	ND	ND	ND
1,3-Dichlorobenzene	5.0	0.16	0	**0.58 J**	ND	ND	ND
1,4-Dichlorobenzene	5.0	0.16	0	**0.25 J**	ND	ND	ND
1,1-Dichloroethane	5.0	0.16	0	ND	ND	ND	ND
1,2-Dichloroethane	0.5	0.13	0	ND	ND	ND	ND
1,1-Dichloroethene	5.0	0.14	0	**0.46 J**	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.15	0	**37**	ND	ND	ND
trans-1,2-Dichloroethene	5.0	0.15	0	**2.5**	ND	ND	ND
Methylene Chloride	5.0	0.32	0	ND	ND	ND	ND
Tetrachloroethene	5.0	0.20	0	**0.54 J**	ND	ND	ND
1,2,3-Trichlorobenzene	5.0	0.18	0	ND	ND	ND	ND
1,1,1-Trichloroethane	5.0	0.16	0	ND	ND	ND	ND
1,1,2-Trichloroethane	5.0	0.32	0	ND	ND	ND	ND
Trichloroethene	5.0	0.16 – 1.6	0	**160**	ND	ND	ND
Vinyl Chloride	0.5	0.10	0	**0.39 J**	**0.27 J**	ND	ND
Non-Halogenated Volatile Organics							
Benzene	1.0	0.16	0	ND	ND	ND	ND
Ethylbenzene	5.0	0.16	0	ND	ND	ND	ND
Toluene	5.0	0.17	0	ND	ND	**0.38 J**	**0.39 J**
Total Xylenes	5.0	0.19 – 0.34	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	15	0	ND	NM	NM	ND
Total Petroleum Hydrocarbons – Motor Oil (C28 – C40)	50 (trigger)	160	0	ND	NM	NM	ND

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

Notes:

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

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

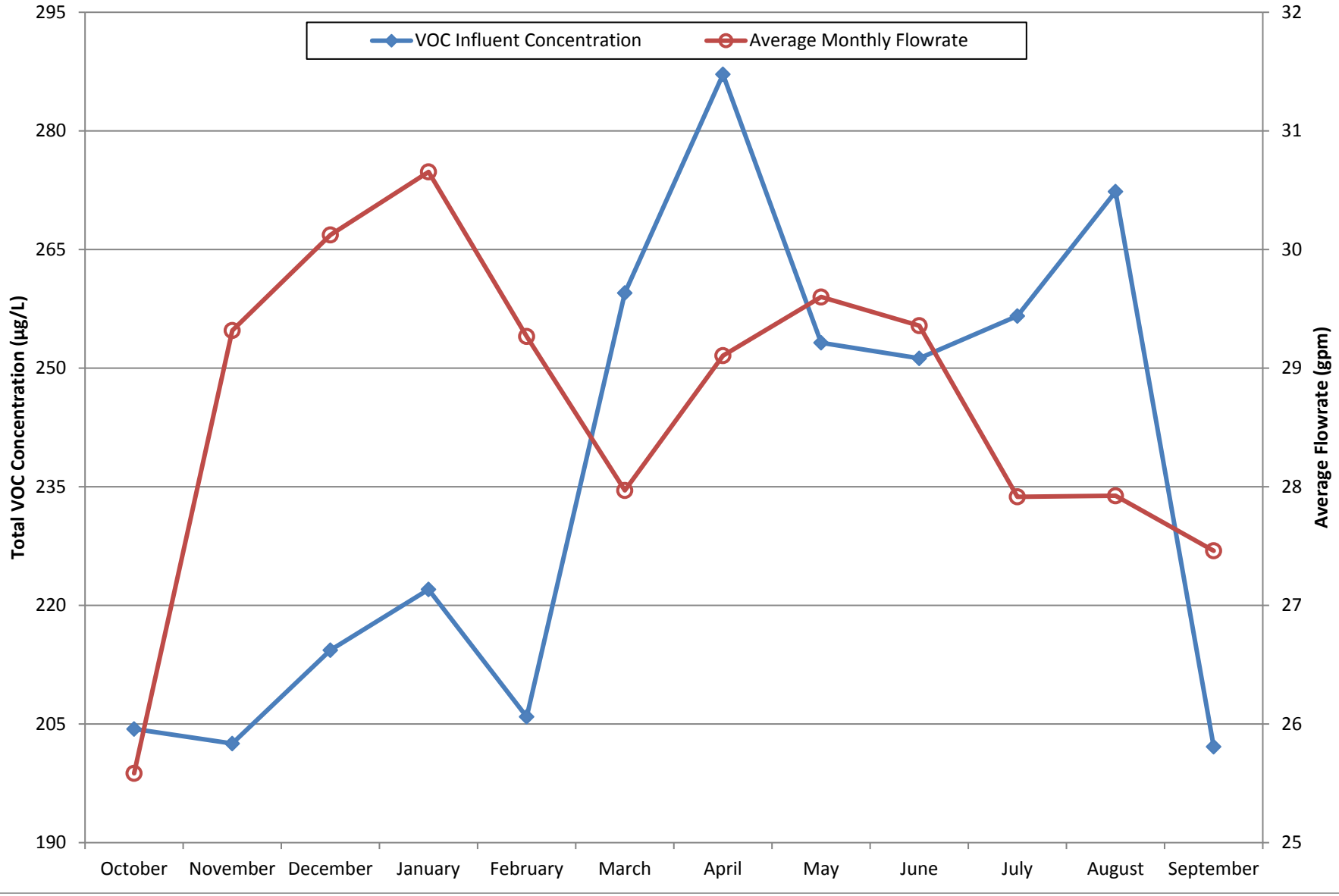
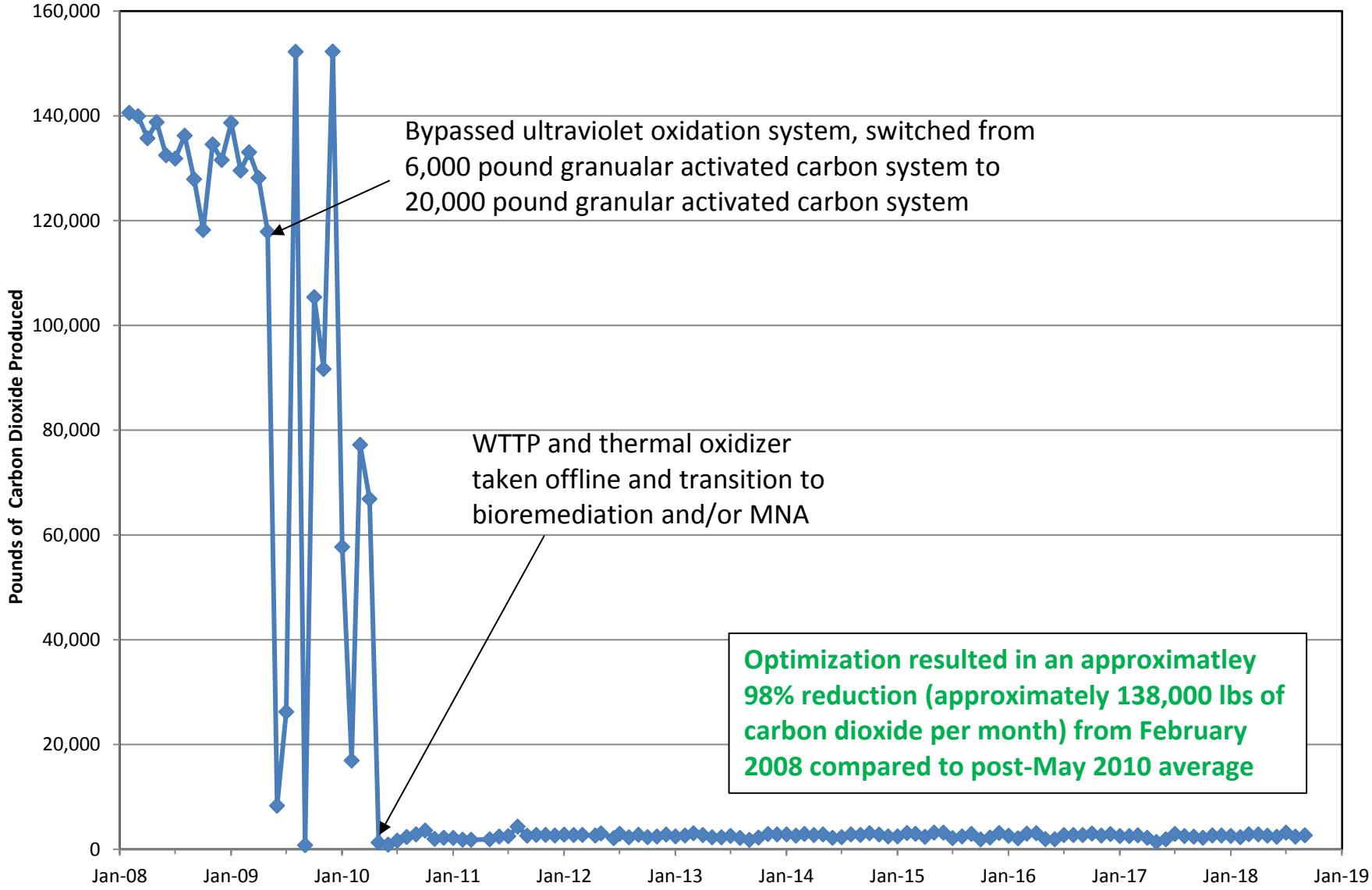


Figure 2

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



Subarea LF007C Groundwater Treatment Plant Monthly Data Sheet

Report Number: 173 **Reporting Period: 31 August 2018 – 28 September 2018** **Date Submitted: 9 October 2018**

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

System Metrics

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

Table 1 – Operations Summary – September 2018

Initial Data Collection:	8/31/2018 13:35		**Final Data Collection:**	9/28/2018 11:30	
Operating Time:		Percent Uptime:		Electrical Power Usage[a]:	
LF007C GWTP:	636 hours	**LF007C GWTP**	100	**LF007C GWTP:**	0 kWh
Gallons Treated: **138,410 gallons**				Gallons Treated Since March 2000: **88.2 million gallons**	
Volume Discharged to Duck Pond: **138,410 gallons**					
VOC Mass Removed: **9.5×10^{-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 September 2018 influent sample detected by EPA Method SW8260C.
[c] Value not calculated since measurement does not accurately represent the cost effectiveness of the system.

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

Table 2 – LF007C GWTP Average and Total Flow Rates – September 2018

Location	Average Flow Rate (gpm)[a]	Total Gallons Processed (gallons)
EW614x07	3.1	117,830
EW615x07	0.5	18,550
LF007C GWTP	**3.6**	**138,410**

[a] Flow rates calculated by dividing total gallons processed by system operating time for the month or the average of the instantaneous readings.
gpm = gallons per minute

Table 3 presents a summary of shutdowns during the monthly reporting period.

Table 3 – Summary of System Shutdowns

Location	Shutdown[a]		Restart[a]		Cause
	Date	Time	Date	Time	
LF007C GWTP	None.	--		--	

-- = Time not recorded
[a] Shutdown and restart times estimated based on field notes
LF007C GWTP = Subarea LF007C Groundwater Treatment Plant

Summary of O&M Activities

Monthly groundwater samples were collected at the LF007C GWTP on 5 September 2018. Sample results are presented in Table 4. TCE (0.82 J µg/L) was detected at the influent sample location. Cis-1,2-DCE (0.18 J µg/L) and toluene (0.22 J µg/L) were detected in the midpoint sample location. No VOCs were detected in the effluent sample location.

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

Optimization Activities

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

Sustainability

Travis AFB is committed to decreasing the amount of GHG produced directly (waste streams discharging GHG) or indirectly (GHG produced as related to electrical energy consumption) from all systems across Travis AFB. Travis AFB continues to optimize each treatment plant to reduce the amount of electrical energy consumed, and to implement sustainable treatment plant optimization programs, such as the solar arrays employed to power the system.

Figure 2 presents the historical GHG production from the systems associated with the NGWTP and LF007C GWTP. The LF007C GWTP is now a solar-only operated treatment system and no longer generates GHG, with exception of a small amount of GHG generated from changing out the GAC averaged to a per month basis.

TABLE 4
Summary of Groundwater Analytical Data for September 2018 – Subarea LF007C Groundwater Treatment Plant

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	5 September 2018 (µg/L)		
				Influent	After Carbon 1	Effluent
Halogenated Volatile Organics						
Acetone	NA	1.9	0	ND	ND	ND
Bromodichloromethane	5.0	0.15	0	ND	ND	ND
Bromoform	5.0	0.15	0	ND	ND	ND
2-Butanone	5.0	2.0	0	ND	ND	ND
Carbon Tetrachloride	0.5	0.15	0	ND	ND	ND
Chloroform	5.0	0.15	0	ND	ND	ND
Dibromochloromethane	5.0	0.15	0	ND	ND	ND
1,3-Dichlorobenzene	5.0	0.15	0	ND	ND	ND
1,4-Dichlorobenzene	5.0	0.15	0	ND	ND	ND
1,1-Dichloroethane	5.0	0.15	0	ND	ND	ND
1,2-Dichloroethane	0.5	0.15	0	ND	ND	ND
1,1-Dichloroethene	5.0	0.15	0	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.15	0	ND	**0.18 J**	ND
trans-1,2-Dichloroethene	5.0	0.15	0	ND	ND	ND
Methylene Chloride	5.0	0.15	0	ND	ND	ND
Tetrachloroethene	5.0	0.15	0	ND	ND	ND
1,1,1-Trichloroethane	5.0	0.15	0	ND	ND	ND
1,1,2-Trichloroethane	5.0	0.15	0	ND	ND	ND
Trichloroethene	5.0	0.15	0	**0.82 J**	ND	ND
Vinyl Chloride	0.5	0.15	0	ND	ND	ND
Non-Halogenated Volatile Organics						
Benzene	1.0	0.15	0	ND	ND	ND
Ethylbenzene	5.0	0.15	0	ND	ND	ND
Toluene	5.0	0.15	0	ND	**0.22 J**	ND
Xylenes	5.0	0.15 – 0.30	0	ND	ND	ND
Other						
Total Petroleum Hydrocarbons – Gasoline	50	35	0	ND	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	24	0	ND	NM	ND
Total Petroleum Hydrocarbons – Motor Oil	50	24	0	ND	NM	ND

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

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

Figure 1

LF007CGWTP Total VOC Influent Concentrations and Average Flowrate Twelve Month History

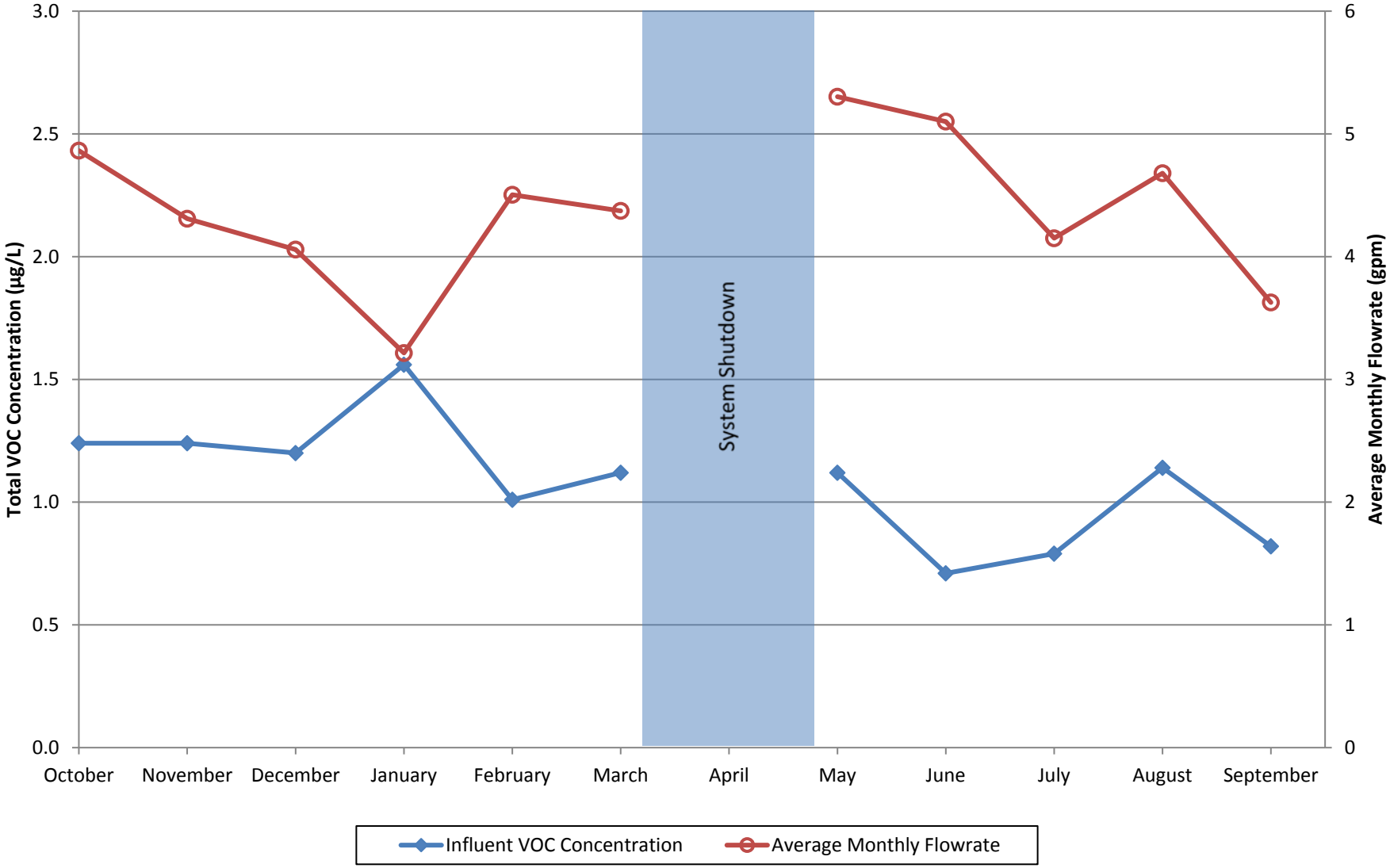
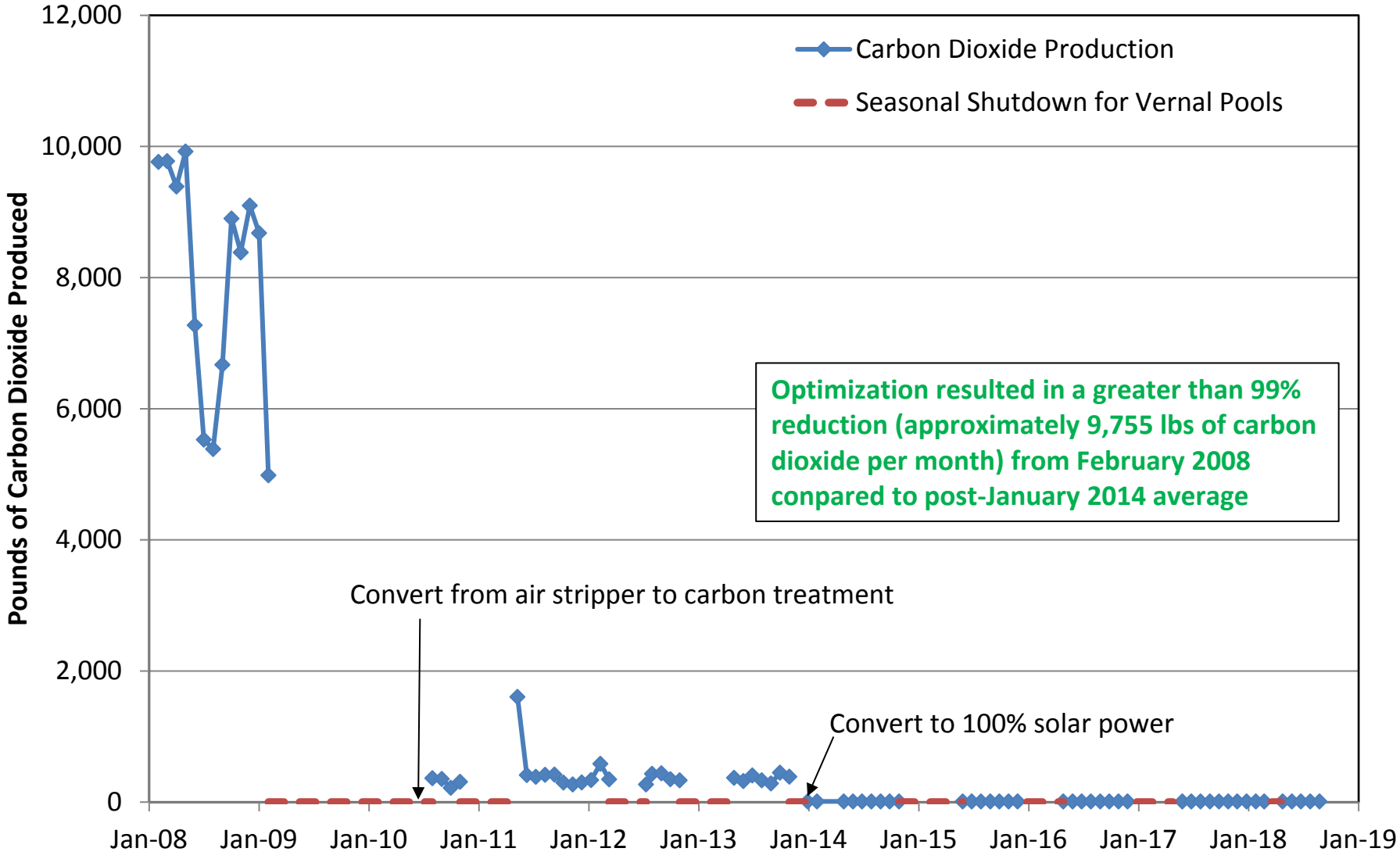


Figure 2

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



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: 091 **Reporting Period: 29 August 2018 – 28 September 2018** **Date Submitted: 9 October 2018**

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

System Metrics

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

Table 1 – Operations Summary – September 2018

Initial Data Collection:	8/29/2018 15:50	**Final Data Collection:**	9/28/2018 9:20
Operating Time:		Percent Uptime:	Electrical Power Usage:
ST018GWTP: 692 hours		**ST018GWTP: 96.9**%	**ST018GWTP:** 80 kWh (59 lbs CO_2 generated[a])
Gallons Extracted: **156,510 gallons**		Gallons Extracted Since March 2011: **15.7 million gallons**	
Volume Discharged to Sanitary Sewer: **156,510 gallons**		Final Totalizer Reading: **15,728,129 gallons**	
Cumulative Volume Discharged to Sanitary Sewer since 1 November 2014: **9,231,955 gallons**			
MTBE, BTEX, VOC, TPH Mass Removed: **0.01 lbs**[b]		MTBE, BTEX, VOC, TPH Mass Removed Since March 2011: **45.8 lbs**	
MTBE (Only) Removed: **0.01 lbs**[b]		MTBE (Only) Mass Removed Since March 2011: **11.1 lbs**	
Rolling 12-Month Cost per Total Pounds of Mass Removed: $10,891[bc]			
Monthly Cost per Pound of Mass Removed: $150,691[bc]			

[a] SiteWise™ estimate that 1 kilowatt hour generated produces 0.74 pounds of GHG.
[b] Calculated using September 2018 EPA Method SW8260C and SW8015B analytical results.
[c] Costs include operations and maintenance, reporting, analytical laboratory, project management, and utility costs related to operation of the system.
kWh = kilowatt hour
lbs = pounds

Table 2 presents individual extraction well flow rates along with the average system flow during the monthly reporting period.

Table 2 – ST018GWTP Average Flow Rates – September 2018

Location	Average Flow Rate Groundwater (gpm)[a]	Hours of Operation
EW2014x18	1.0	692
EW2016x18	0.5	0
EW2019x18	0.9	692
EW2333x18	1.0	692
ST018GWTP	3.8	692

[a] Flow rates calculated by dividing total gallons processed by amount of operating time of the pump/system.

gpm = gallons per minute
ST018GWTP = Site ST018 Groundwater Treatment Plant

Table 3 presents a summary of shutdowns during the monthly reporting period.

Table 3 – Summary of System Shutdowns

Location	Shutdown[a]		Restart[a]		Cause
	Date	Time	Date	Time	
ST018GWTP	5 September 2018	12:30	6 September 2018	10:15	High tank 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 5 September 2018. Because the extracted groundwater is no longer treated with carbon prior to discharge to the sewer, only discharge samples are now collected, rather than influent and effluent samples. Results are presented in Table 4. The complete September 2018 laboratory data report is available upon request. The MTBE discharge concentration during the September 2018 sampling event was 5.2 µg/L, which is a significant decrease from the July 2018 sample result of 45 J- µg/L. Benzene was also detected in the system discharge sample at a concentration of 1.2 µg/L.

The Fairfield-Suisun Sewer District does not currently have a local limit for MTBE, but a limit of 6,400 µg/L is advised based on worker health and safety. Travis AFB will continue to monitor discharge contaminant concentrations to maintain compliance with the Fairfield-Suisun Sewer District discharge permit.

Between 5 and 6 September, the ST018GWTP was shut down because of a high tank level alarm. The alarm was reset on 6 September, and the system restarted 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 an increasing trend. The extracted MTBE concentrations and

extracted total concentrations have generally been fluctuating over the past 12 months with a decreasing trend and a slightly increasing trend, respectively.

Optimization Activities

No optimization activities occurred at the ST018GWTP in September 2018.

Sustainability

Travis AFB is committed to decreasing the amount of GHG produced directly (waste streams discharging GHG) or indirectly (GHG produced as related to electrical energy consumption) from all systems across Travis AFB. Travis AFB continues to optimize each treatment plant to reduce the amount of electrical energy consumed, and to implement sustainable treatment plant optimization programs, such as the solar arrays employed to power the ST018GWTP system.

Figure 2 presents the historical GHG production from the ST018GWTP. The ST018GWTP produced 59 pounds of GHG during September 2018 and removed 156,510 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. Since the GAC vessels were removed, a slightly less amount of electricity will be required.

TABLE 4
Summary of Groundwater Analytical Data for September 2018– Site ST018 Groundwater Treatment Plant

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	5 September 2018 (µg/L)
				System Discharge
Fuel Related Constituents				
Methyl tert-Butyl Ether	6,400	0.25	0	**5.2**
Benzene	25,000[a]	0.16	0	**1.2**
Ethylbenzene	25,000[a]	0.16	0	ND
Toluene	25,000[a]	0.17	0	ND
Total Xylenes	25,000[a]	0.19 – 0.34	0	ND
Total Petroleum Hydrocarbons – Gasoline	50,000[b]	10	0	ND
Total Petroleum Hydrocarbons – Diesel	50,000[b]	16	0	ND
Total Petroleum Hydrocarbons – Motor Oil	100,000	160 – 170	0	ND
Other				
1,2-Dichloroethane	20	0.15	0	ND
Naphthalene	NA	0.22	0	ND
n-Propylbenzene	NA	0.16	0	ND

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

Laboratory data available on request.

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

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

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

Figure 1

ST018GWTP Total VOC and MTBE Concentrations and Average Flowrate Twelve Month History

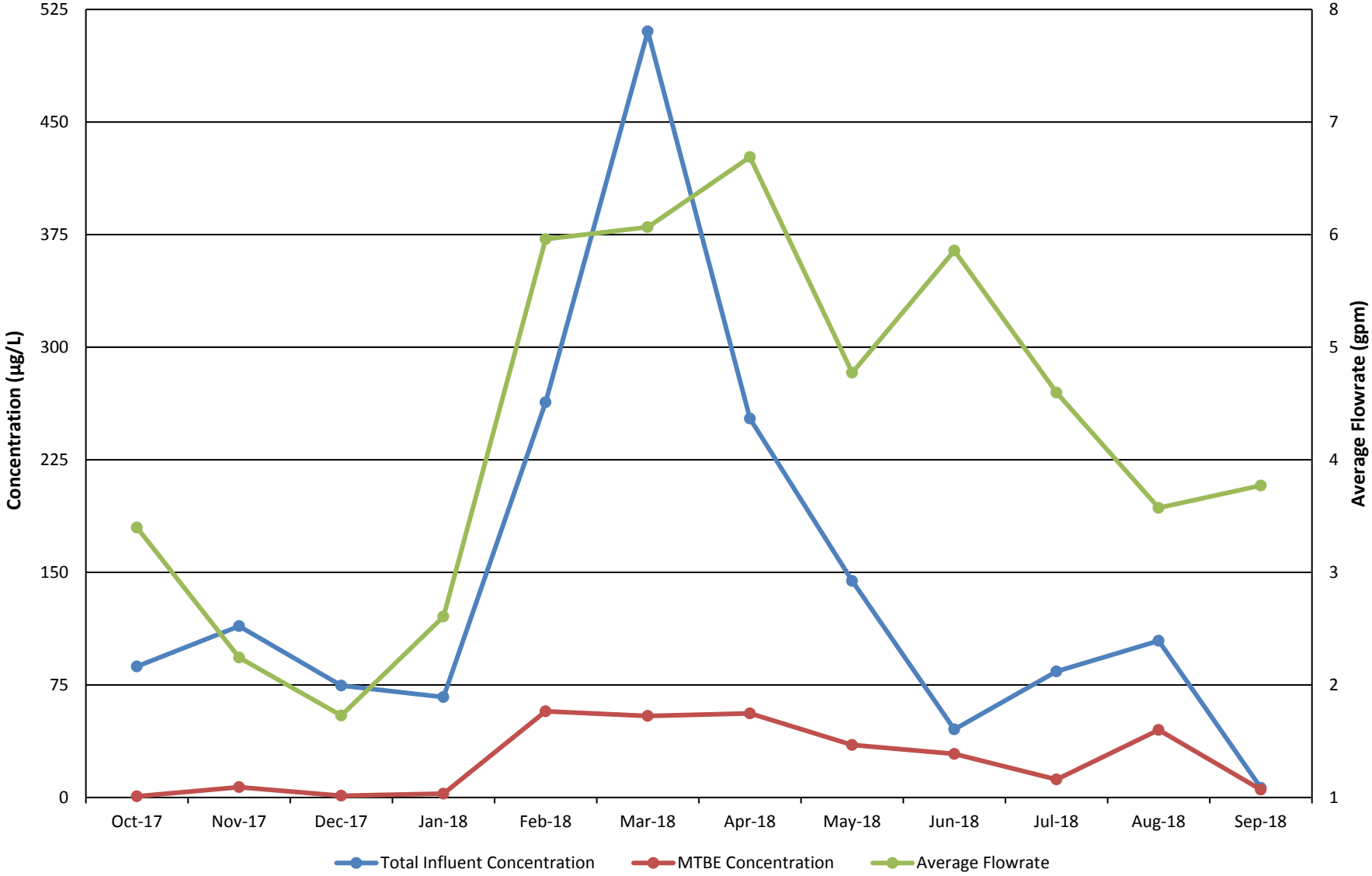
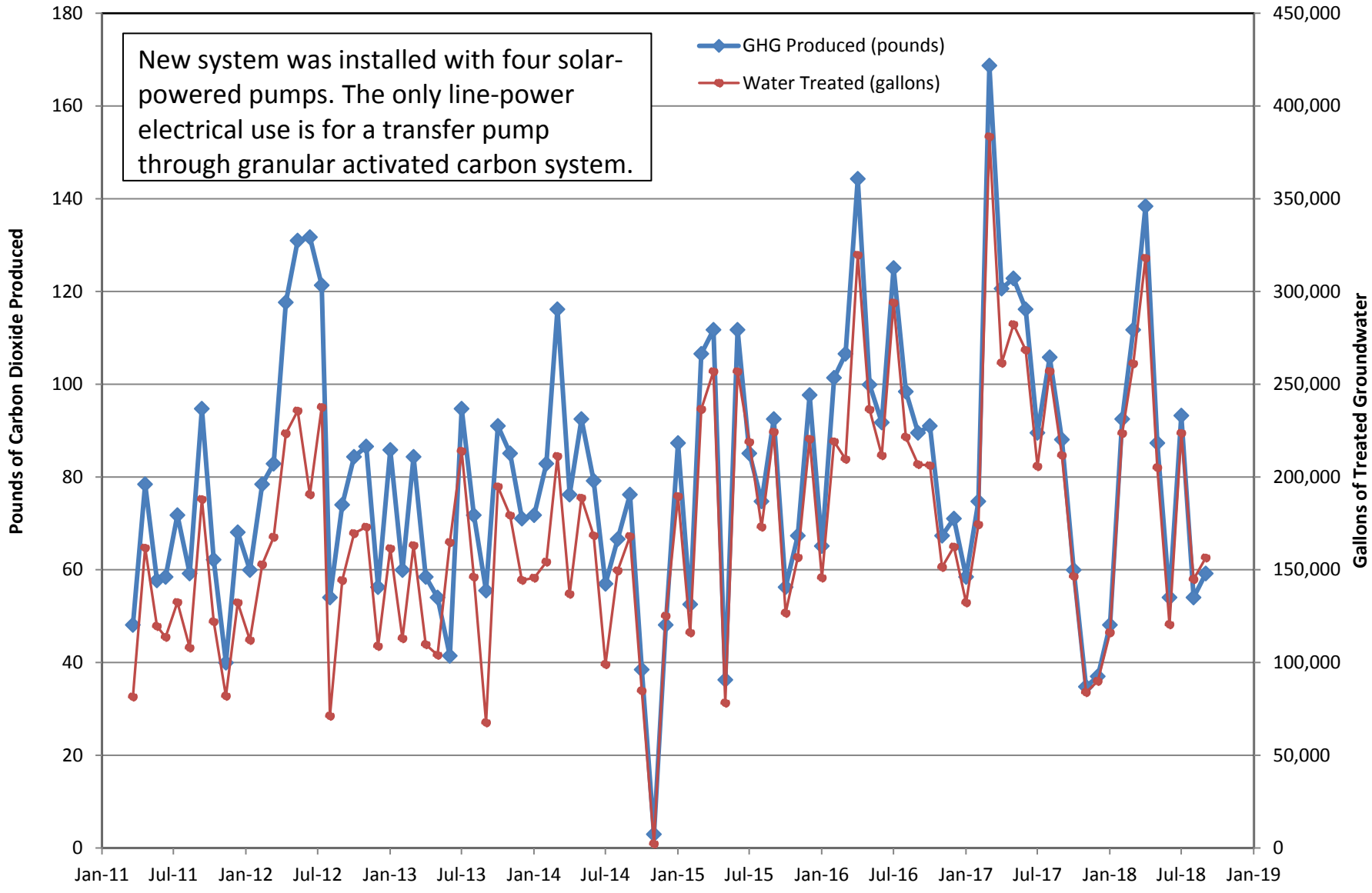


Figure 2

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



4Q18 GRIP Event

Changes from the 4Q17 GRIP Event

Sites Where 4Q18 Event is the Same as 4Q17 Event

- LF007
- SS014
- SS015
- ST018
- SS029
- ST027
- SS030

Sites Where 4Q18 Event is Different from 4Q17 Event

Site FT004 Monitoring Change:

- Increased sampling frequency at TD performance monitoring well MW2330x04 from annual to semiannual (added to 4Q18 event) to monitor recent increase in TCE concentrations

Site FT005 Monitoring Change:

- Added MW763x05 to 4Q18 event as a cross-gradient GET well, to define western extent of 1,2-DCA near EW735x05

4Q18 Vs 4Q17, Continued….

Site LF006 Monitoring Changes:

- In 2017, all site wells were added to 4Q17 event to determine whether cleanup levels had been met at all wells, but 4Q17 sample results demonstrated that they had not. Reverted back to MNA network for 2018.
- Increased sampling frequency at downgradient MNA well MW1729x31 from annual to semiannual (added to 4Q18 event) to evaluate recent increase in TCE concentrations (as requested in EPA comments). Otherwise, the 4Q18 event is the same as the 4Q16 event.

4Q18 Vs 4Q17, Continued….

Site SS016:

- Increased sampling frequency of downgradient GET well MW1712x16 from annual to semiannual (added to 4Q18) to monitor for rebound
- Decreased sampling frequency of plume GET well MW1714x16 from semiannual to annual (removed from 4Q18). COC concentrations decreased to below the cleanup level in 2017; resumed annual sampling frequency

Site SD031:

- Increased sampling frequency of plume MNA well MW575x31 from annual to semiannual (added to 4Q18 event) to monitor recent increase in 1,1-DCE concentrations

4Q18 Vs 4Q17, Continued….

WIOU:

- Decreased sampling frequency of plume EA well MW504x33 from semiannual to annual (removed from 4Q18 event) because it no longer has significant increasing COC trend
- Increased sampling frequency of treatment performance well MW2032x36 and plume EA well MW2077Ax36 from annual to semiannual (added to 4Q18 event) because both had increasing TCE concentration trends in 2017
- Increased sampling frequency of treatment performance well MW2064Ax36 from annual to semiannual (added to 4Q18 event) in 2018 to support TD study-bioaugmentation injection

Site LF008 Variation from 2017 GRISR

- The 2018 sampling plan presented in the 2017 GRISR for LF008 was a reduction from semiannual to annual sampling frequency.
- The 2Q18 event was a filtered vs nonfiltered sample study, which included all of the site wells to support an RC evaluation.
- However the laboratory did not meet the detection limits required by the project for several samples, therefore the study will be continued in the 4Q18 event. One set of filtered and one set of unfiltered samples will be collected from all the site wells in the 4Q18 event, and the data will be used to support an RC evaluation. The samples will be sent to a different lab for analysis.
- Consequently, the 4Q18 event will be the same as the 4Q17 event, except that both filtered and unfiltered samples will be collected from all the wells in 4Q18.

Travis AFB
Restoration Program

Program Update

RPM Meeting

October 17, 2018

Completed Documents (1)

- Vapor Intrusion Assessment Update Technical Memorandum
- 2012 CAMU Annual Report
- Old Skeet Range Action Memorandum
- 3rd Five-Year Review
- 2012 Annual Groundwater Remediation Implementation Status Report (GRISR)
- Subarea LF007C and Site SS030 Remedial Process Optimization Work Plan
- Pre-Design Site Characterization of SS029 Report
- Old Skeet Range Removal Action Work Plan
- 2013 CAMU Inspection Annual Report
- Groundwater Record of Decision (ROD)
- CG508 POCO Work Plan
- 2013 Annual GRISR
- FT004 Technology Demonstration Work Plan
- Kinder Morgan LF044 Land Use Control Report
- SD031 Technology Demonstration Work Plan
- TA500 Data Gap Investigation Work Plan
- ST018 POCO Work Plan Addendum
- SD037 GW RD/RA Work Plan
- Travis AFB UFP-QAPP
- DP039 Lead Excavation Technical Memo

Completed Documents (2)

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

Completed Documents (3)

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

Completed Documents (4)

- Multisite Technology Demonstration Construction Completion Report
- SS014 POCO Technology Demonstration Construction Completion Report
- Site LF044 Investigation Work Plan
- Site FT004 POCO Soil Data Gap Investigation Work Plan
- SD034 Technology Demonstration Construction Completion Report
- POCO Evaluation/Closeout Report for DERA-funded oil/water separators OW051, OW053, and OW054
- ST032 POCO Well Decommissioning and Site Closeout Technical Memorandum
- 2016 Annual CAMU Monitoring Report
- Work Plan for Fourth Five-year Review
- 2016 Annual GRISR
- Data Gap Investigation Results, Technical Memorandum for Soil, Sites SD033, SD043, SS046
- TS060 Removal Action Completion Report
- SS035 Site Closure Report
- AOC TA500 Data Gaps Investigation and Closure Report
- Site TS060 No Further Action Proposed Plan
- POCO Evaluation/Closure Report for DERA-funded Oil/Water Separators OW040, OW047, OW048, OW049, OW050, OW052, OW055, OW056, and OW057

Completed Documents (5)

- Data Gap Investigation Results, Technical Memorandum for Soil Site SS016
- LF006, SS030, SD031 Aquifer Test Activities Technical Memorandum
- SS015 Soil Sampling Plan
- Monitoring Well Installation Tech Memo for Site DP039, Addendum to the RACCR
- FT005 Extraction System Optimiz-ation Tech Memo
- 2017 Annual CAMU Monitoring Report
- LF044 Sediment Sampling Report
- ***SD043 RD/RA Work Plan***
- ***SS046 RD/RA Work Plan***

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

Documents In-Progress

CERCLA

- Amendment to the WABOU Soil ROD for sites DP039, SD043, and SS046
- Amendment to the NEWIOU Soil ROD for Sites SS016 and SD033
- Community Relations Plan Update (revised draft)
- 4th Five Year Review Report for Multiple Groundwater, Soil, and Sediment Sites
- SS016 RD/RA Work Plan
- 2017 Annual GRISR
- EVO Sites FT004, SS015, SD031, & SD036 Optimization Injections Tech Memo
- LF006 Technology Demonstration Work Plan

Documents In-Progress

MMRP

- NFA ROD for Old Skeet Range (TS060 MRA)

POCO

- ***Subarea LF007C TPH Chromatogram Review TM***

Field Work In-Progress

CERCLA

- LF006 Well Installations and Injections
- ***4Q18 GRIP***

POCO

- None

Documents Planned

CERCLA

- SD031 Soil RI/FS ***TBD***
- ***Addendum to the Site SS016 Groundwater RD/RA Work Plan*** ***Dec***
- SS015 Soil Sampling Results Tech Memo ***Nov***

MMRP

- None

POCO

- ***AOC TA500 Well Decommissioning and Site Closeout Tech Memo*** ***Nov***

Field Work Planned

CERCLA

- SD043 Soil excavation **Dec**
- SS046 Soil excavation **Dec**
- SS016 Soil excavation **Jan**

POCO

- None

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

Petroleum Technology Demonstration Projects (1)

- SS014: Recycled Drywall SBGR
  - Evaluate the effectiveness of sulfate (gypsum from crushed drywall) to enhance anaerobic biodegradation of petroleum in groundwater
  - Installation was completed November 2016
  - Results through first 15 months
    - TPH-G: 99% reduction in source area (1,900 to 15 J μg/L), 51% for remaining 6 site wells (was 34% after 9 months and 18% after 3 months)
    - TPH-D: 98% reduction in source area (5,500 to 92 μg/L), 38% for remaining 6 site wells (was 61% after 9 months and 33% after 3 months)
    - Benzene: 98% reduction in source area (22 to <0.4 μg/L), 87% for remaining 6 site wells (was 61% after 9 months and 49% after 3 months)

* SBGR = Subgrade Biogeochemical Reactor

Updates in Green Font

Petroleum Technology Demonstration Projects (2)

- Evaluate the effectiveness of an oxygen-enhanced aerobic SBGR on reducing TPH as diesel (TPH-D) in groundwater
- Installed six (6) SBGR trenches in November 2016
- Below SBGR trench (MW811x34/PZSSAx34) through first 20 months
  - TPH-D baseline 9,600 ug/L was reduced to 40 J ug/L after 15 months, with increase to 890 ug/L at 20 months (Was 98% reduction after 9 months. Concentration fluctuations are to be expected as higher concentration areas are flushed as part of the washboard effect)
  - TPH-MO baseline 2,300 ug/L was reduced to 89 J ug/L after 15 months, with increase to 760 ug/L at 20 months (Was 91% reduction after 9 months)
- Plume hot spot monitoring well (MW02x34) through first 20 months
  - TPH-D baseline 8,300 ug/L was reduced to 6,800 ug/L after 15 months, with increase to 13,000 ug/L at 20 months (Was 87% reduction after 9 months. Concentration fluctuations are to be expected as higher concentration areas are flushed as part of the washboard effect)
  - TPH-MO baseline 1,500 ug/L was reduced to 660 J ug/L after 15 months, with non-detect at elevated detection limit at 20 months (Was 72% reduction after 9 months, seeing some fluctuations)

* SBGR = Subgrade Biogeochemical Reactor

Updates in Green Font

CVOC Technology Demonstration Projects (3)

- Multisite Bioaugmentation: EVO and KB-1 Plus
  - Evaluate if addition of bioaugmentation substrate to an EVO injection will increase the rate of CVOC degradation
  - Initial injections were completed (Nov 2016)
  - Limited TOC dispersal at SD036, so installed additional injection wells and reinjected with nanoEVO in 2017
  - Too early to evaluate degradation rates; however:
    - ~50-70% TCE reduction at ST027B bioaugmentation area and low/fluctuating reductions at EVO only area
    - TCE fluctuations at SD036 bioaugmentation area (but 62% DCE decrease) and 99% decrease at EVO only area
  - Waiting on 4Q18 data to evaluate progress

- FT005: Distribution of EVO and KB-1 Plus
  - Evaluate total organic carbon (TOC) dispersion distances and rates for optimizing the remediation of 1,2-dichloroethane (DCA) in groundwater
  - Installation completed May 2016
  - FT005 north area: Slightly elevated TOC and reduced COC concentrations (below MCLs)**;**
  - FT005 central area: TOC increase has only been observed at EW02x05, near injection area. Injected EVO may be adsorbed to sediments or being consumed faster than spread can be observed. “Natural” TOC increase (3.5 to 14 mg/L) observed in central plume near MW766x05, away from injections (from infiltration of natural organics/cattle?). Reinjected this area in 2018.
  - FT005 south area: Optimized the GETs in 2017, which may help accelerate TOC dispersal to support this TD

Updates in Green Font

CVOC Technology Demonstration Projects (4)

- FT004: Distribution of EVO via SBGR and/or Groundwater Extraction
  - Determine effectiveness of TOC distribution through two different enhanced reductive dechlorination (ERD) approaches: (1) groundwater TOC recirculation using a combination EVO injection, infiltration SBGR trenches, and groundwater extraction; and (2) EVO injection with groundwater extraction
  - Installation completed April 2016
  - COC concentrations declined through year 1
    - ~50% total molar reduction plume-wide through first year
    - Max monitoring well TCE concentration reduced from 560 to 140 μg/L
  - Limited TOC dispersal, additional EVO injection conducted with nanoEVO in 2017 to determine if this can enhance TOC dispersal (too early to evaluate results of reinjection)
    - Concentrations rebounded in 4Q17, but 2017 reinjection should support further reductions
  - Waiting on 4Q18 data to evaluate progress

Updates in Green Font

CVOC Technology Demonstration Projects (5)

- SD031: EVO distribution via Gravel Chimneys
  - Determine if EVO injection and recirculation of groundwater through gravel chimneys can effectively distribute TOC horizontally in the subsurface to support ERD of 1,1-dichloroethene (DCE)
  - Installation completed in April 2015
  - Early indications:
    - Recirculation through chimneys has been successful relative to our design assumptions, TOC increased to >10 mg/L within majority of target area and COCs decreased to below MCLs (most wells ND, max 1,1-DCE reduced from 390 ug/L to ND)
    - 1,1-DCE (primary COC) concentrations have reduced by 99% (was 93%) (sum of key wells within TD area, excluding 2 wells to SW that increased)
    - Total molar concentration (sum of CVOCs) has reduced by 99% (was 84%) (sum of key wells within TD area, excluding 2 wells to SW that increased)
    - Four (4) new EVO wells installed to SW to enhance TOC in problem areas (plume being pulled back towards extraction well causing increasing concentrations in this cross-gradient area), conducted reinjection of EVO in 2017
    - Waiting on 4Q18 data to evaluate effects of 2017 injections

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 (4th Quarterly event)
- Sampling for Assessment of Aerobic Chlorinated Cometabolism Enzymes (Feb 21-22)
- 2012 Annual GSAP Sampling
- CAMU Lysimeter Removal
- LF007C GET System Optimization
- SS029/SS016 System Optimization Analysis
- GSAP Semiannual Sampling Event
- Replace electrical wiring for well field at Site SS030