

**Travis Air Force Base
Environmental Restoration Program
Restoration Program Manager's
Meeting Minutes
16 August 2017, 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 16 August 2017 at 0930 hours in Building 248 at Travis AFB, California. Attendees included:

Lonnie Duke	AFCEC/CZOW
Glenn Anderson	AFCEC/CZOW
Milton 'Gene' Clare	AFCEC/CZOW
Angel Santiago Jr.	AFCEC/CZOW
Merrie Schilter-Lowe	Travis AFB/PAO
Monika O'Sullivan	AFCEC/CZOW
William Hall (via telephone)	AFCEC/CZR
Dezso Linbrunner	USACE-Omaha
Adriana Constantinescu	RWQCB
Ben Fries	DTSC
Nadia Hollan Burke (via telephone)	USEPA
Indira Balkissoon	Techlaw, Inc.
Jeff Gamlin (via telephone)	CH2M
Tony Chakurian	CH2M
Mike Wray	CH2M

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

Attachment 1	Meeting Agenda
Attachment 2	Master Meeting and Document Schedule
Attachment 3	SBBGWTP Monthly Data Sheet (July 2017)
Attachment 4	CGWTP Monthly Data Sheet (July 2017)
Attachment 5	LF007C GWTP Monthly Data Sheet (July 2017)
Attachment 6	ST018 Monthly Data Sheet (July 2017)
Attachment 7	Presentation: Triad Discussion Site FT005

Attachment 8	Presentation: Historical Hexavalent Chromium Analyses at Travis AFB
Discussion	Presentation: Community Relations Plan (no attachment)
Attachment 9	Presentation: Program Update (August 2017)

1. ADMINISTRATIVE

A. Previous Meeting Minutes

The 19 July 2017 RPM meeting minutes were approved and finalized as written, with the following exception. Ms. Burke requested a minor revision. In Section 1A; Previous Meeting Minutes; last paragraph; replace the word “paragraph” with the word “sentence”.

B. Action Item Review.

Action items from August 2017 were reviewed.

Action item 1 is ongoing: Ms. O’Sullivan to provide updates on perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA). 16 August 2017 update: Ms. O’Sullivan stated Travis AFB replied to the agencies response to comments (RTCs) and asked if they would respond as soon as possible because the sample event is scheduled to start on 24 August 2017. Ms. O’Sullivan will email a copy of the drilling schedule to the regulators. She asked anyone interested in attending the field event to review the standard operation procedures (SOPs) and to avoid days when sampling in restricted areas (which are included in the schedule). Mr. Duke mentioned before the work can begin we need to confirm if the RTCs are adequate.

Action item 2 is closed: Mr. Wray to find out if groundwater at Site SD031 was ever sampled for hexavalent chromium, and report results if so. 16 August 2017 update: Data on historic hexavalent chromium will be presented on later during the meeting.

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

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

Travis AFB Annual Meeting and Teleconference Schedule

The next RPM meeting will be a teleconference held on Wednesday, 20 September 2017, at 0930 hours.

The 2018 Annual Meeting and Teleconference Schedule was presented at the meeting. Mr. Duke asked the regulatory agencies to inform him if any of the 2018 meeting/teleconference dates present a problem.

Travis AFB Master Document Schedule

- Community Relations Plan (CRP): No change was made to the schedule. Mr. Anderson discussed the anticipated path forward: 1. Ms. Dunphy (CH2M) is currently working on modifying the text part of the document, 2. Upon completion of the draft document, the review order will start with the Wing Public Affairs for their approval, then to the AFCEC Public Affairs for their review and comment, then to the regulatory agencies for their review and comment. Mr. Anderson will make a “real-life” web presentation later during this meeting.
- Work Plan for the Fourth Five-year Review: Predraft to AF/Service Center date was changed to 1 August 2017 to reflect the actual date the document went out. The rest of the dates were changed accordingly. Mr. Anderson indicated that ERP has completed their review and Tetrtech has responded to ERP’s comments. He asked Mr. Hall if he anticipated reviewing the content of this document? Mr. Hall said he did not need to review and to go ahead and move forward with the document.
- Amendment to the WABOU Soil ROD for Travis AFB ERP Sites DP039, SD043, and SS046: Title change: formerly Amendment to the Soil ROD for the WABOU Sites DP039, SD043, and SS046. New dates were added to the schedule, to replace the “TBDs”.
- Potrero Hills Annex (FS, PP, and ROD): No change was made to the schedule. Ms. Constantinescu said the additional remediation is on schedule. A Deed Restriction was drafted for the down-gradient property, and is awaiting approval. The document declares that the downgradient property cannot use groundwater as drinking water, and they cannot build structures due to sensitive receptors. Ms. Constantinescu will request electronic copies for the Travis AFB attorney to review.
- Data Gap Investigation Results Technical Memorandum for Soil Sites SD033, SD043, and SS046: No change has been made to the document schedule.
- Data Gap Investigation Results Technical Memorandum for Soil Site SS016: Predraft to Agency date changed to 16 August 2017; the rest of the dates were changed accordingly.
- Site FT004 POCO Soil Data Gap Investigation Work Plan: No change was made to the schedule. Document went final and will be moved to history.
- Quarterly Newsletters (October 2017): Populated with new dates to support the fourth quarter newsletter.

- 2016 Annual GRISR: The due date for agency comments was extended until 24 August 2017, based on a request by the agencies; the rest of the dates were changed accordingly.
- 2016 Annual CAMU Monitoring Report: No change was made to the schedule. Travis AFB received DTSC comments and is currently working on their reply. EPA indicated they will not be providing comments. Ms. Burke asked Mr. Duke to forward DTSC comments to EPA for their records.
- Site SD034 Technology Demonstration Construction Completion Report: The Response to Comment meeting and Final Due dates were changed to 11 August 2017 to reflect the actual date.
- POCO Evaluation/Closure Report for DERA-funded Oil/Water Separators OW051, OW053, and OW054: Response to Comments and Final Due dates were changed to 13 September 2017.
- POCO Evaluation/Closure Report for DERA-funded Oil/Water Separators OW040, OW047, OW048, OW049, OW052, OW050, OW052, OW055, OW056, and OW057. Draft to Agencies date changed to 29 September 2017; the rest of the dates were changed accordingly.
- Site ST032 POCO Well Decommissioning and Site Closeout Technical Memorandum: Draft to Agencies was changed to 8 September 2017; the rest of the dates were changed accordingly. Ms. Constantinescu said she is making this document her priority.

2. CURRENT PROJECTS

Treatment Plant Operation and Maintenance Update

South Base Boundary Groundwater Treatment Plant, July 2017 (see Attachment 3)

The South Base Boundary Groundwater Treatment Plant (SBBGWTP) performed at 85.4% uptime, and 5.5 million gallons of groundwater were extracted and treated during the month of July 2017. All of the treated water was discharged to Union Creek. The average flow rate for the SBBGWTP was 131.8 gallons per minute (gpm). Electrical power usage was 14,596 kWh, and approximately 11,601 pounds of CO₂ were created (based on DOE calculation). Approximately 1.03 pounds of volatile organic compounds (VOCs) was removed in July. The total mass of VOCs removed since startup of the system is 488.6 pounds.

Optimization Activities for SBBGWTP: No optimization activities are reported for the month of July 2017.

Note: Aquifer testing is being conducted at sites SS030 and FT005 to determine if optimization of the pump and treat system through installation of an additional

extraction well(s) will help to achieve closure at this site. If the decision is made to install an additional extraction well(s), the timing of installation will be determined, and documentation of the optimization will be included in the next GRISR.

Ms. Constantinescu asks when the regulators should expect the results of the aquifer test. Mr. Wray said they will be included as a tech memo in the 2017 GRISR. Mr. Wray added we are looking to update the hydraulic parameters for these sites, and optimize systems if applicable.

Central Groundwater Treatment Plant, July 2017 (see Attachment 4)

The Central Groundwater Treatment Plant (CGWTP) performed at 99.9% uptime with approximately 1,628,610 gallons of groundwater extracted and treated during the month of July 2017. All treated water was discharged to the storm sewer system. The average flow rate for the CGWTP was 34.5 gpm. Electrical power usage was 2,747 kWh for all equipment connected to the Central Plant, and approximately 2,912 pounds of CO₂ were generated. Approximately 3.14 pounds of VOCs were removed from groundwater by the treatment plant in July. The total mass of VOCs removed since the startup of the system is 11,468 pounds.

Optimization Activities for CGWTP: No optimization activities are reported for the month of July 2017.

Note: The Site DP039 bioreactor is currently undergoing repairs to replace the infiltration manifold due to accumulation of silt that has occurred over the 10 years it has been operating.

Mr. Anderson noted that the 10-year duration for operation of the first bioreactor in the country is newsworthy, and he'd like to write an article about it, as well as about the 20-year anniversary of the phytoremediation pilot test, in a future Guardian newsletter.

LF007C Groundwater Treatment Plant, July 2017 (See Attachment 5)

The Subarea LF007C Groundwater Treatment Plant (LF007C GWTP) performed at 60.3% uptime with approximately 139,199 gallons of groundwater extracted and treated during the month of July 2017. All treated water was discharged to the Duck Pond. The average flow rate for the CGWTP was 4.9 gpm. The plant operates on solar power only. Approximately 4.06×10^{-3} pounds of VOCs were removed from groundwater by the treatment plant in July. The total mass of VOCs removed since the startup of the system is 174.37 pounds.

Optimization Activities for LF007C GWTP: No optimization activities are reported for the month of July 2017.

ST018 Groundwater (MTBE) Treatment Plant, July 2017 (see Attachment 6)

Site ST018 (MTBE) Treatment Plant (ST018 GWTP) performed at 82.1% uptime with approximately 205,680 gallons of groundwater extracted and treated during the month of July 2017. All treated water was discharged to the sanitary sewer system. The average flow rate for the ST018 GWTP was 5.3 gpm. Electrical power usage for the month was 121 kWh for all equipment connected to the ST018 GWTP. The total CO₂ equivalent, including an estimate for the carbon change-out, equates to approximately 90 pounds. Approximately 0.06 pound of BTEX, MTBE and TPH was removed in July by the treatment plant, and approximately 0.06 pound of MTBE was removed from groundwater. The total BTEX, MTBE and TPH mass removed since the startup of the system is 41.8 pounds, and the total MTBE mass removed since startup of the system is 10.3 pounds.

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

Optimization Activities for ST018 GWTP: No optimization activities to report for the month of July 2017.

Ms. Constantinescu suggested to conduct a pulsed mode study, similar to the study conducted at DP039 bioreactor. She also suggested leaving the extraction well (EW) furthest downgradient to keep the plume from migrating. Mr. Wray will look into this suggestion.

3. Presentations:

A) Triad Discussion Site FT005 (See Attachment 7)

Mr. Gamlin reported on the FT005 Optimization RPM Triad Discussion. See Attachment 7 for details. Highlights of the presentation include:

FT005 Background: Selected remedy in the groundwater record of decision (GW ROD) is groundwater extraction and treatment (GET). The TCE concentrations have gone down, and are below the cleanup level. However, 1,2-DCA concentration continue to fluctuate above and below the MCL. We need to think of ways to complete the cleanup of the off-base portion of the plume. The easement agreement with the landowner expires in 2026. The two aquifer tests at Site FT005 were completed as part of the GET optimization.

Overview:

- Completed 72-hour aquifer tests and VOC sampling every ~ 24 hours at two well locations. Samples were collected at the start of the test and then every 24 hours to see if

concentrations would go up or down. If they go down it would be concluded that concentrations would attenuate over time. If concentrations go up then this tells us something else is going on and we would need to install more extraction wells.

- Results will be presented in a tech memo to be included as an appendix to the 2017 GRISR.
- Aquifer parameters are consistent with previous interpretations.
- Increasing 1,2-DCA concentrations during aquifer tests at Site FT005 indicate optimization of the extraction well network is appropriate to reduce cleanup timeframe. (see attached for aquifer test results)

Optimization Plan:

- Install five (5) new extraction wells. Three (3) hydropunches samples will be collected in the northern off-base area to determine the best placement of extraction wells in that area.
- Complete the work in a manner consistent with the 2000 Remedial design.
- Extraction wells may have longer screens to ensure all permeable zones are captured. This will be determined based on observed conditions during drilling activities

We will follow the existing work plan (WP) that documents how to install an extraction well and how to lay conveyance pipe. The documentation for the optimization work will be in the 2017 GRISR. The only deviation from the existing WP is the longer well screens to cover the entire saturated zone.

Mr. Fries asked how deep the extraction wells will be. Mr. Chakurian said roughly 65 ft. to the north and 80 ft. to the south. Ms. Burke expressed concern about the planned documentation. The regulators usually have an opportunity to review planned fieldwork before construction begins. She suggested having a TRIAD discussion to review the hydropunch results and select e-well locations.

Mr. Gamlin presented a diagram of the current hydraulic conditions. And a diagram of the hydraulic conditions after the optimized extraction network is installed.

Mr. Gamlin said we have a very compressed remaining field season to work with. As soon as we received the aquifer test data, we went to work to see how to best optimize this site. In order to get this work completed by 15 October and not have to wait another year, we must get in the field by 5 September.

Mr. Duke briefed everyone about the landowner and his involvement in the process. The landowner is holding off giving approval for the optimization work on his property until a list of requirements are met. Mr. Duke asked if the regulators would provide a letter stating the Travis AFB goes through an approval process with the agencies. Ms. Constantinescu said that RWQCB has a “comfort letter” for downgradient property owners, acknowledging the source of contamination was from the upgradient property, and gives a brief description of the remediation.

After some discussion with the regulators it was decided that Mr. Duke would email the property owner with details and copy the regulators. This might satisfy the landowner.

B) Historical Hexavalent Chromium Analyses at Travis AFB (See Attachment 8)

Mr. Chakurian presented the historical groundwater hexavalent chromium analyses at Travis AFB. See Attachment 8 for details. Highlights include:

Mr. Wray clarified that the action item was for just historical hexavalent chromium in groundwater at Site SD031, and that he misinterpreted it to mean gathering hexavalent chromium results for the entire base.

Mr. Chakurian provided a figure that shows the historical hexavalent chromium sample results and locations. He also provided a spreadsheet that has the concentrations by site/well ID and sample collection date.

Mr. Chakurian said that the change in analytical methods eliminated the interferences that resulted in false positives for hexavalent chromium. Method SW7196A in soil data at Site SD031 initially showed a disturbing amount of hexavalent chromium. But using method BAL4300 eliminated false positives. The historical groundwater samples were all analyzed using method SW7196, including the four (4) groundwater samples collected in the 1990's that were above the MCL.

Mr. Chakurian said that there isn't any historical reason for hexavalent chromium to be in the soil. We resampled our highest concentration area and requested that the laboratory run hexavalent chromium by method BAL4300. All samples came back non-detect.

Mr. Chakurian concluded that there doesn't appear to be a problem with hexavalent chromium in the soil or groundwater at Travis AFB.

Ms. Burke asked if the BAL4300 method is an approved method in the QAPP. Ms. Balkissoon said that their chemists prefer method BAL4300.

C) Presentation: Community Relations Plan (discussion)

Mr. Anderson navigated to the Travis AFB public website on a screen to show the online portion of the Community Relations Plan from an administrator viewpoint. The public website address is: <http://www.travis.af.mil/About-Us/Environment/>. Mr. Anderson's discussion demonstrates why it is important to have a "living and growing" component to the Community Relations Plan. An example of just some of the activities that show the need for the "living component" to keep events current for the involved community are listed below.

- Restoration Schedule
- Investigations

- Drinking Water Report
- Compatible Use Zone Study
- Current News
- RPM and RAB Meeting Minutes

Ms. Burke suggested linking this site to other social media sites. Mr. Anderson will look into adding links.

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

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

4. New Action Item Review

- 1) Ms. Constantinescu will try to locate an RWQCB environmental clearance letter for the FT005 landowner.
- 2) Mr. Wray will verify if Kettleman Landfill is an OSR-approved landfill.
- 3) Mr. Duke will send email to FT005 landowner and copy the regulators regarding upcoming fieldwork on his property.

5. PROGRAM/ISSUES/UPDATE

Mr. Hall announced his replacement, Dr. Haekyung Kim.

Ms. Constantinescu asked Mr. Fries if he is working on the Department of Defense - State Memorandum of Agreement (DSMOA), which needs to be completed by 28 September 2017. Mr. Fries will look into it.

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.	Ms. Constantinescu	Locate RWQCB environmental clearance letter for FT005 landowner	20 September 2017	Open
3.	Mr. Wray	Verify if Kettleman Hills Landfill is an OSR approved landfill lists	20 September 2017	Open
4.	Mr. Duke	Send email to FT005 landowner and copy the regulators regarding upcoming fieldwork on his property.	20 September 2017	Open

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

The RPM face-to-face meeting is scheduled for 9:30 PM PST on 16 August, 2017. **The call-in number is 1-866-203-7023. Enter the Participation code 5978-75-9736 then #.**

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. TRIAD DISCUSSION SITE FT005
- B. HISTORICAL HEXAVALENT CHROMIUM ANALYSES AT TRAVIS AFB
- C. COMMUNITY RELATIONS PLAN
- D. 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.

(2017)
Annual Meeting and Teleconference Schedule

Monthly RPM Meeting¹ (Begins at time noted)	RPM Teleconference (Begins at time noted)	Restoration Advisory Board Meeting (Begins at 7:00 p.m.) (Poster Session at 6:30 p.m.)
—	01-18-17	—
02-15-17	—	—
—	03-15-17	—
04-20-17 (Thursday 2:00 PM)	—	04-20-17
—	05-17-17	—
06-21-17	—	—
—	07-19-17	—
08-16-17	—	—
—	09-20-17	—
10-19-17 (Thursday 2:00 PM)	—	10-19-17 ²
—	11-15-17	—
—	—	—

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 date in lieu of RAB meeting.

(2018)
Annual Meeting and Teleconference Schedule

Monthly RPM Meeting¹ (Begins at time noted)	RPM Teleconference (Begins at time noted)	Restoration Advisory Board Meeting (Begins at 7:00 p.m.) (Poster Session at 6:30 p.m.)
—	01-17-18	—
02-21-18	—	—
—	03-21-18	—
04-19-18 (Thursday 2:00 PM)	—	04-19-18
—	05-16-18	—
06-20-18	—	—
—	07-18-18	—
08-15-18	—	—
—	09-19-18	—
10-18-18 (Thursday 2:00 PM)	—	10-18-18 ²
—	11-21-18	—
—	—	—

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

² Note: Tentative RAB tour date in lieu of RAB meeting.

Travis AFB Master Meeting and Document Schedule

PRIMARY DOCUMENTS			
Life Cycle	Community Relations Plan Travis AFB, Glenn Anderson CH2M, Jill Dunphy	Work Plan for the Fourth Five-year Review Travis AFB, Glenn Anderson Tetrattech, Joachim Eberharter	Amendment to the WABOU Soil ROD for the Travis AFB ERP Sites DP039, SD043, and SS046 Travis AFB, Glenn Anderson CH2M, Latonya Coleman
Scoping Meeting	NA	06-02-17	NA
Predraft to AF/Service Center	08-23-16	08-01-17	08-25-17
AF/Service Center Comments Due	09-07-16	09-01-17	09-25-17
Draft to Agencies	09-28-16	09-19-17	10-31-17
Draft to RAB	09-28-16	09-19-17	10-31-17
Agency Comments Due	10-28-16 (11-28-16)	10-19-17	01-02-18
Response to Comments Meeting	TBD	10-26-17	01-17-18
Agency Concurrence with Remedy	NA	NA	NA
Public Comment Period	NA	NA	NA
Public Meeting	NA	NA	NA
Response to Comments Due	TBD	11-06-17	01-31-18
Draft Final Due	TBD	11-06-17	01-31-18
Final Due	TBD	12-06-17	03-05-18

Travis AFB Master Meeting and Document Schedule

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

Travis AFB Master Meeting and Document Schedule

SECONDARY DOCUMENTS		
Life Cycle	Data Gap Investigation Results Technical Memorandum for Soil Sites SD033, SD043, and SS046 Travis AFB, Glenn Anderson CH2M, Leslie Royer	Data Gap Investigation Results Technical Memorandum for Soil Site SS016 Travis AFB, Glenn Anderson CH2M, Doug Berwick CAPE, Meg Greenwald
Scoping Meeting	NA	NA
Predraft to AF/Service Center	07-26-17	08-16-17
AF/Service Center Comments Due	08-09-17	08-30-17
Draft to Agencies	08-24-17	09-15-17
Draft to RAB	08-24-17	09-15-17
Agency Comments Due	09-25-17	10-16-17
Response to Comments Meeting	10-19-17	10-19-17
Response to Comments Due	11-02-17	11-03-17
Draft Final Due	NA	NA
Final Due	11-02-17	11-03-17
Public Comment Period	NA	NA
Public Meeting	NA	NA

Travis AFB Master Meeting and Document Schedule

SECONDARY POCO DOCUMENTS	
Life Cycle	Site FT004 POCO Soil Data Gap Investigation Work Plan Travis AFB, Glenn Anderson CH2M, Doug Berwick CAPE, Meg Greenwald
Scoping Meeting	NA
Predraft to AF/Service Center	06-03-16
AF/Service Center Comments Due	06-17-16
Draft to Agencies	07-19-16
Draft to RAB	07-19-16
Agency Comments Due	08-19-16
Response to Comments Meeting	09-21-16
Response to Comments Due	10-06-16 (08-03-17)
Draft Final Due	NA
Final Due	10-06-16 (08-03-17)
Public Comment Period	NA
Public Meeting	NA

Travis AFB Master Meeting and Document Schedule

INFORMATIONAL DOCUMENTS		
Life Cycle	Quarterly Newsletters (October 2017) Travis, Glenn Anderson	2016 Annual GRISR Travis AFB, Glenn Anderson CH2M, Leslie Royer
Scoping Meeting	NA	NA
Predraft to AF/Service Center	NA	04-21-17
AF/Service Center Comments Due	NA	05-22-17
Draft to Agencies	09-22-17	06-07-17
Draft to RAB	NA	06-07-17
Agency Comments Due	10-06-17	08-10-17 (08-24-17)
Response to Comments Meeting	TBD	08-16-17 (09-20-17)
Response to Comments Due	10-10-17	09-01-17 (10-06-17)
Draft Final Due	NA	NA
Final Due	10-12-17	09-01-17 (10-06-17)
Public Comment Period	NA	NA
Public Meeting	NA	NA

Travis AFB Master Meeting and Document Schedule

INFORMATIONAL DOCUMENTS		
Life Cycle	2016 Annual CAMU Monitoring Report Travis AFB, Glenn Anderson CH2M, Levi Pratt	Site SD034 Technology Demonstration Construction Completion Report Travis AFB, Glenn Anderson CH2M, Levi Pratt
Scoping Meeting	NA	NA
Predraft to AF/Service Center	02-09-17	03-23-17
AF/Service Center Comments Due	02-24-17	04-06-17
Draft to Agencies	06-30-17	05-02-17
Draft to RAB	06-30-17	05-02-17
Agency Comments Due	07-31-17	06-02-17
Response to Comments Meeting	08-16-17	06-21-17 (07-19-17)
Response to Comments Due	08-30-17	07-06-17 (08-11-17)
Draft Final Due	NA	NA
Final Due	08-30-17	07-06-17 (08-11-17)
Public Comment Period	NA	NA
Public Meeting	NA	NA

Travis AFB Master Meeting and Document Schedule

INFORMATIONAL POCO DOCUMENTS			
Life Cycle	POCO Evaluation/Closure Report for DERA-funded Oil/Water Separators OW051, OW053, and OW054 Travis AFB, Glenn Anderson CH2M, Doug Berwick	POCO Evaluation/Closure Report for DERA-funded Oil/Water Separators OW040, OW047, OW048, OW049, OW050, OW052, OW055, OW056, and OW057 Travis AFB, Glenn Anderson CH2M, Doug Berwick	Site ST032 POCO Well Decommissioning and Site Closeout Technical Memorandum Travis AFB, Glenn Anderson CH2M, Doug Berwick
Scoping Meeting	NA	NA	NA
Predraft to AF/Service Center	11-07-16	02-01-17	04-25-17
AF/Service Center Comments Due	11-21-16	02-15-17	05-09-17
Draft to Agencies	01-19-17	09-29-17	09-08-17
Draft to RAB	01-19-17	09-29-17	09-08-17
Agency Comments Due	02-21-17	10-30-17	10-09-17
Response to Comments Meeting	03-15-17	11-15-17	10-19-17
Response to Comments Due	09-13-17	12-06-17	11-08-17
Draft Final Due	NA	NA	NA
Final Due	09-13-17	12-06-17	11-08-17
Public Comment Period	NA	NA	NA
Public Meeting	NA	NA	NA

South Base Boundary Groundwater Treatment Plant

Monthly Data Sheet

Report Number: 201

Reporting Period: 28 June 2017 – 1 August 2017

Date Submitted: 10 August 2017

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

System Metrics

Table 1 presents operational data from the July 2017 reporting period.

Table 1 – Operations Summary – July 2017				
Initial Data Collection:		6/28/2017 15:00	Final Data Collection:	8/1/2017 12:35
Operating Time:		Percent Uptime:	Electrical Power Usage:	
SBBGWTP:	695 hours	SBBGWTP:	85.4%	SBBGWTP: 14,596 kWh (11,601 lbs CO ₂ generated ^a)
Gallons Treated: 5.5 million gallons			Gallons Treated Since July 1998: 982 million gallons	
Volume Discharged to Union Creek: 5.5 million gallons			Gallons Treated From Other Sources: 0 gallons	
VOC Mass Removed: 1.03 lbs ^b			VOC Mass Removed Since July 1998: 488.6 lbs	
Rolling 12-Month Cost per Pound of Mass Removed: \$15,526 ^c				
Monthly Cost per Pound of Mass Removed: \$12,006 ^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.				
^b Calculated using July 2017 EPA Method SW8260C analytical results.				
^c Costs include operations and maintenance, reporting, analytical laboratory, project management, and utility costs related to operation of the system.				

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

Table 2 – SBBGWTP Average Flow Rate (gpm) ^a – July 2017							
FT005 ^b				SS029		SS030	
EW01x05	Offline	EW736x05	Offline	EW01x29	Offline ^c	EW01x30	15.4
EW02x05	Offline	EW737x05	Offline	EW02x29	1.1	EW02x30	0.0 ^d
EW03x05	Offline	EW742x05	Offline	EW03x29	3.5	EW03x30	15.8
EW731x05	5.3	EW743x05	5.7	EW04x29	Offline ^c	EW04x30	25.2
EW732x05	Offline	EW744x05	0.0 ^d	EW05x29	6.9	EW05x30	14.0
EW733x05	Offline	EW745x05	Offline ^c	EW06x29	0.5	EW2174x30	9.8
EW734x05	3.5	EW746x05	Offline	EW07x29	13.5	EW711x30	0.0 ^d
EW735x05	2.0	EW2291x05	8.9				
FT005 Total: 25.4				SS029 Total: 25.5		SS030 Total: 80.2	
SBBGWTP Average Monthly Flow ^e : 131.8 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 These extraction wells are offline due to pump or other malfunction.							
^d Well is in recharge while measurements were being taken.							
^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	12 June 2017	14:25	3 July 2017	13:30	System shut down for aquifer test at Sites FT005 and SS030.
-- = 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

Analytical data from the 5 July 2017 sampling event are presented in Table 4. The total VOC concentration (22.48 µg/L) in the influent sample has decreased from the June 2017 sample results (36.57 µg/L). TCE (20.8 µg/L), cis-1,2-DCE (1.32 µg/L), 1,2-DCA (0.16 µg/L), and chloroform (0.20 µg/L) were detected in the influent sampling location. Several VOCs were detected in the midpoint sampling location at trace concentrations, including cis-1,2-DCE, 1,2-DCA, and chloroform. No VOCs were detected at the effluent sampling location.

Figure 1 presents a plot of influent concentrations and average flow at the SBBGWTP over the past twelve (12) months. An overall increase in the VOC influent concentration has been observed in the past twelve months along with an increasing flow rate trend.

On 12 June, the SBBGWTP was shut down for the aquifer testing. Following the conclusion of the aquifer test, the system was restarted on 3 July.

In July 2017, troubleshooting was performed on several Site FT005, SS029, and SS030 extraction wells. The following list presents the maintenance activities and status of several extraction wells:

- EW731x05 – Extraction well is on line; however, the wiring for the transducer is faulty and will need to be replaced.
- EW734x05 – Pump was removed and cleaned. Extraction well was redeveloped. Pump was reinstalled. Well is currently operating.
- EW743x05 – Extraction well is on line; however, the wiring for the transducer is faulty and will need to be replaced.
- EW01x29 – Pump was removed and cleaned. Extraction well was redeveloped. Pump was reinstalled. Pump was initially operational; however, it is currently off line because of high pressures caused by a clogged conveyance line. Methods to clear the clog will continue to be evaluated.
- EW02x29 – Pump was removed and cleaned. Replaced leaking tubing. Extraction well was redeveloped. Pump was reinstalled. Well is currently operating; however, it is showing high pressures caused by a clogged conveyance line. Methods to clear the clog will continue to be evaluated.
- EW04x29 – Pump was removed, cleaned, and reinstalled; however, the variable-frequency drive (VFD) is malfunctioning. Well is currently off line, and the VFD will continue to be inspected and evaluated.
- EW07x29 – Replaced flow meter paddlewheel. Well is currently operating.
- EW04x30 – Replaced pressure transducer. Well is currently operating.
- EW711x30 – Replaced flow meter paddlewheel. Well is currently operating.

Optimization Activities

No optimization activities occurred at the SBBGWTP in July 2017.

Sustainability

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

Figure 2 presents the historical GHG production from the SBBGWTP. In July 2017, the SBBGWTP produced approximately 11,601 pounds of GHG, which includes approximately 800 pounds of GHG generated from changing out the GAC.

TABLE 4

Summary of Groundwater Analytical Data For July 2017 – South Base Boundary Groundwater Treatment Plant

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	5 July 2017 (µg/L)		
				Influent	Midpoint	Effluent
Halogenated Volatile Organics						
Acetone	NA	1.0	0	ND	ND	ND
Bromodichloromethane	NA	0.15	0	ND	ND	ND
Carbon Tetrachloride	0.5	0.15	0	ND	ND	ND
Chloroform	5.0	0.15	0	0.20 J	0.22 J	ND
Chloromethane	NA	0.15	0	ND	ND	ND
1,1-Dichloroethane	5.0	0.15	0	ND	ND	ND
1,2-Dichloroethane	0.5	0.15	0	0.16 J	0.15 J	ND
1,1-Dichloroethene	5.0	0.15	0	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.15	0	1.32	0.30 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	20.8	ND	ND
Vinyl Chloride	0.5	0.15	0	ND	ND	ND
Non-Halogenated Volatile Organics						
Benzene	1.0	0.15	0	ND	ND	ND
Ethylbenzene	5.0	0.15	0	ND	ND	ND
Toluene	5.0	0.15	0	ND	ND	ND
Xylenes	5.0	0.15 – 0.30	0	ND	ND	ND
Other						
Total Petroleum Hydrocarbons – Gasoline	50	35	0	NM	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	24	0	NM	NM	ND
Total Petroleum Hydrocarbons – Motor Oil	50 (trigger)	24	0	NM	NM	ND

* In accordance with Appendix B of the Travis AFB South Base Boundary Groundwater Treatment Plant Operations and Maintenance Manual (CH2M HILL, 2004).

Notes:

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

mg/L = milligrams per liter

NA = not applicable

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

ND = not detected

NM = not measured

µg/L = micrograms per liter

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

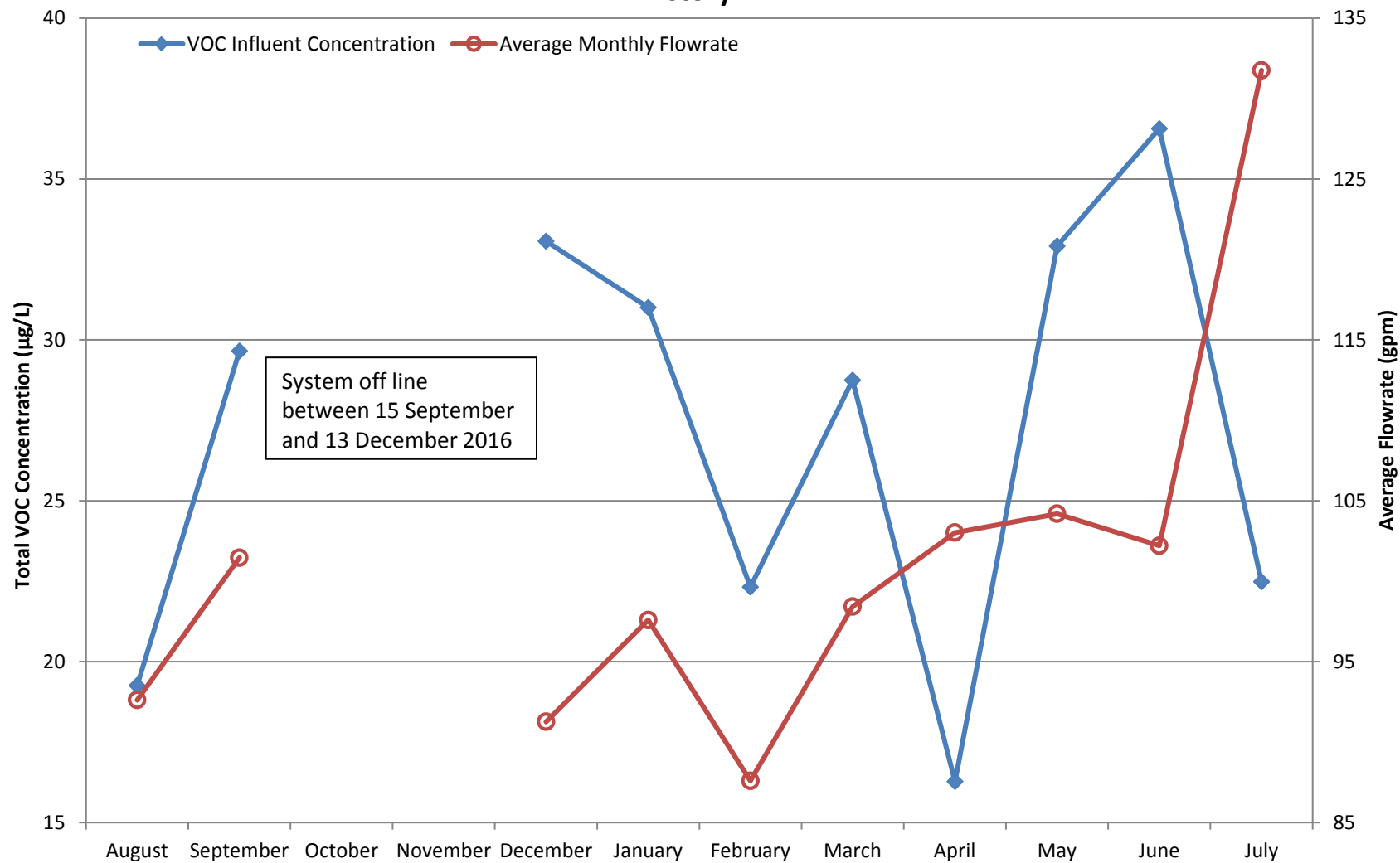
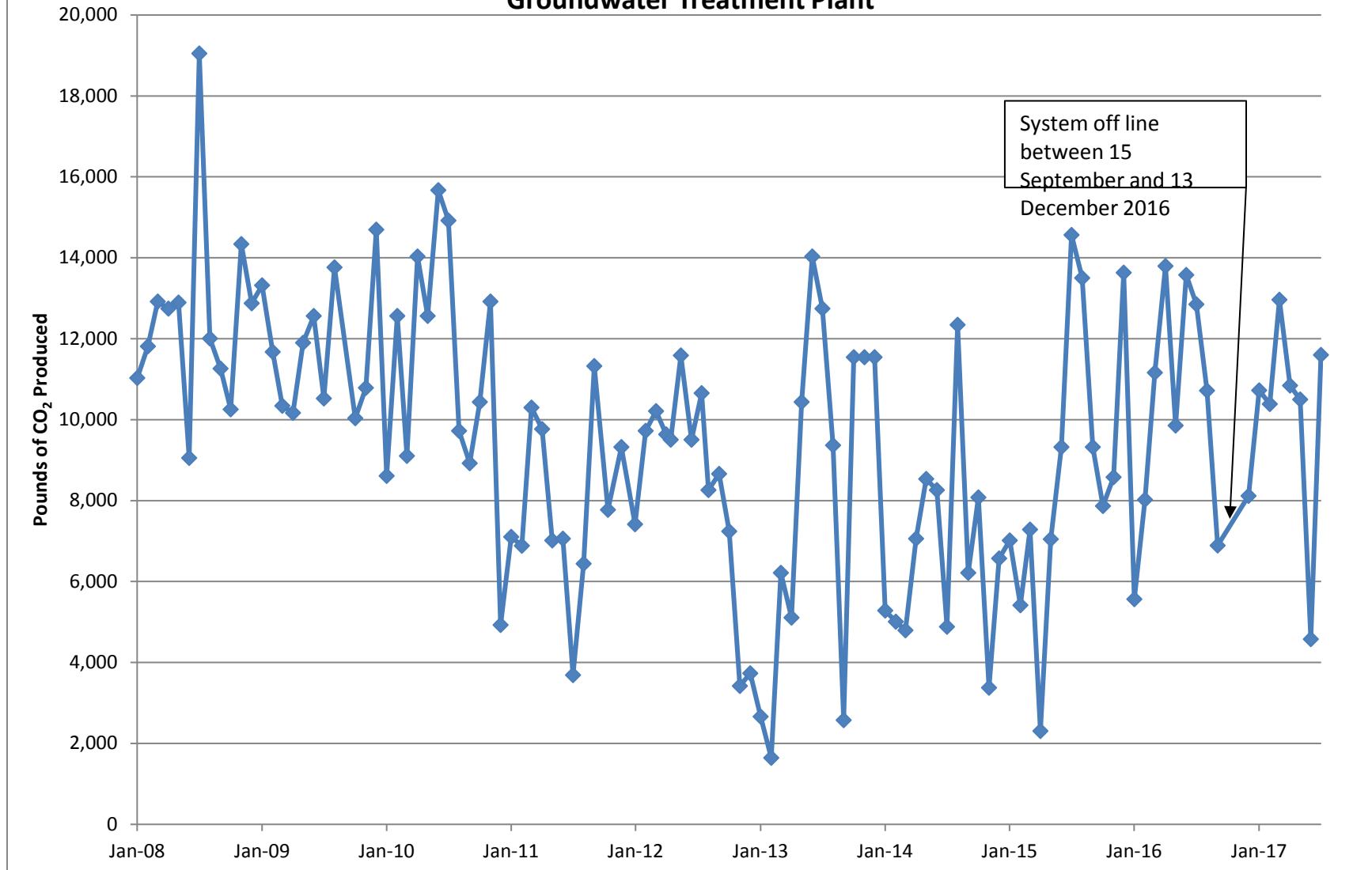


Figure 2

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



Central Groundwater Treatment Plant Monthly Data Sheet

Report Number: 216

Reporting Period: 29 June 2017 – 1 August 2017

Date Submitted: 10 August 2017

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

System Metrics

Table 1 presents operational data from the July 2017 reporting period.

Table 1 – Operations Summary – July 2017				
Initial Data Collection:		6/29/2017 11:30	Final Data Collection:	8/1/2017 08:00
Operating Time:		Percent Uptime:	Electrical Power Usage:	
CGWTP:	787 hours	CGWTP:	99.9%	CGWTP: 2,747 kWh (2,921 lbs CO ₂ generated ^a)
Gallons Treated (discharge to storm sewer):		Gallons Treated Since January 1996: 543.0 million gallons		
1,628,610 gallons				
VOC Mass Removed from groundwater:		VOC Mass Removed Since January 1996:		
3.14 lbs^b		2,782 lbs from groundwater		
		8,686 lbs from vapor		
Rolling 12-Month Cost per Pound of Mass Removed: \$2,149 ^c				
Monthly Cost per Pound of Mass Removed: \$1,869 ^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.				
^b Calculated using July 2017 EPA Method SW8260C analytical results.				
^c Costs include operations and maintenance, reporting, analytical laboratory, project management, and utility costs related to operation of the system.				

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

Table 2 – CGWTP Average Flow Rates ^a – July 2017	
Location	Average Flow Rate Groundwater (gpm)
EW001x16	14.5
EW002x16	11.3
EW003x16	Off line
EW605x16	6.5
EW610x16	3.0
CGWTP	34.5
^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	20 July 2017	13:07	20 July 2017	14:15	Conducted arc flash survey
-- = 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 samples were collected at the CGWTP on 5 July 2017. Sample results are presented in Table 4. The total VOC concentration (231.12 µg/L) in the July 2017 influent sample has increased slightly from the May 2017 sample (230.64 µg/L). TCE was the primary VOC detected in the influent sample at a concentration of 194 µg/L. Cis-1,2-DCE (11.0 µg/L) and vinyl chloride (0.18 J µg/L) were detected in the sample collected after the first carbon vessel, and only vinyl chloride (0.19 J µg/L) was detected in the sample collected after the second carbon vessel. No VOC constituents 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 July 2017.

Figure 1 presents a plot of influent concentrations (total VOCs) and the influent flow rate at the CGWTP versus time for the past twelve (12) months. The influent concentrations show a decreasing trend over the past 12 months. The overall flow rate through the treatment plant has increased slightly over the past 12 months.

Extraction well EW003x16 was off line in July because of low water level.

On 20 July 2017, the CGWTP was shut down for approximately 1 hour to perform an arc flash survey to comply with NFPA 70E. Upon completion of the survey, the system was restarted without issue.

The Site DP039 subgrade biogeochemical reactor (SBGR), also known as a bioreactor, continued to operate in a “pulsed mode” in an effort to optimize distribution of total organic carbon (TOC). Since the conclusion of the optimization effort, the bioreactor has remained in operation while the sample results were being reviewed. Based on the evaluation, the optimal pulse-mode frequency was for four weeks. Although the two-week pulsed mode had slightly higher TOC concentrations in the bioreactor, the four-week pulsed mode provided the highest TOC concentrations in monitoring wells MW782x39 and MW791x39. The four-week pulsed mode operation will begin in August 2017 with the bioreactor being turned off.

Optimization Activities

No optimization activities occurred at the CGWTP in July 2017. As discussed above, the optimal Site DP039 bioreactor pulsed-mode frequency of four weeks will be implemented in August 2017.

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 2,921 pounds of GHG during July 2017. This is an increase from the June 2017 amount of 1,912 pounds because of the increased operational uptime.

TABLE 4

Summary of Groundwater Analytical Data for July 2017 – Central Groundwater Treatment Plant

				5 July 2017 (µg/L)			
Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	Influent	After Carbon 1 Effluent	After Carbon 2 Effluent	System Effluent
Halogenated Volatile Organics							
Acetone	NA	1.0	0	ND	ND	ND	ND
Carbon Tetrachloride	0.5	0.15	0	ND	ND	ND	ND
Chloroform	5.0	0.15	0	ND	ND	ND	ND
Chloromethane	NA	0.15	0	ND	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.15	0	33.2	11.0	ND	ND
1,2-Dichlorobenzene	5.0	0.15	0	0.38 J	ND	ND	ND
1,3-Dichlorobenzene	5.0	0.15	0	0.31 J	ND	ND	ND
1,4-Dichlorobenzene	5.0	0.15	0	0.18 J	ND	ND	ND
1,1-Dichloroethane	5.0	0.15	0	ND	ND	ND	ND
1,2-Dichloroethane	0.5	0.15	0	ND	ND	ND	ND
1,1-Dichloroethene	5.0	0.15	0	0.50	ND	ND	ND
Methylene Chloride	5.0	0.15	0	ND	ND	ND	ND
Methyl tert-Butyl Ether	1.0	0.15	0	ND	ND	ND	ND
Tetrachloroethene	5.0	0.15	0	0.50	ND	ND	ND
1,1,1-Trichloroethane	5.0	0.15	0	ND	ND	ND	ND
1,1,2-Trichloroethane	5.0	0.15	0	ND	ND	ND	ND
trans-1,2-Dichloroethene	5.0	0.15	0	2.05	ND	ND	ND
Trichloroethene	5.0	0.15 – 1.5	0	194	ND	ND	ND
Vinyl Chloride	0.5	0.15	0	ND	0.18 J	0.19 J	ND
Non-Halogenated Volatile Organics							
Benzene	1.0	0.15	0	ND	ND	ND	ND
Ethylbenzene	5.0	0.15	0	ND	ND	ND	ND
Toluene	5.0	0.15	0	ND	ND	ND	ND
Total Xylenes	5.0	0.15 – 0.30	0	ND	ND	ND	ND
Other							
Total Petroleum Hydrocarbons – Gasoline	50	35	0	ND	NM	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	24	0	ND	NM	NM	ND
Total Petroleum Hydrocarbons – Motor Oil	50 (trigger)	24	0	ND	NM	NM	ND

* In accordance with Appendix G of the Travis AFB Central Groundwater Treatment Plant Operations and Maintenance Manual (URS Group, Inc., 2002).

Notes:

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

NA = not applicable

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

ND = not detected

NM = not measured

µg/L = micrograms per liter

mg/L = milligrams per liter

Table 5 presents a twelve month summary of the Site DP039 bioreactor recirculation well pulsing dates.

Table 5 – Summary of DP039 Bioreactor “Pulsed Mode” Operations		
Location	Pulse-on Date	Pulse-off Date
MW750x39	2 August 2016	12 August 2016
	26 August 2016	8 September 2016
	10 October 2016	17 October 2016
	25 October 2016	2 November 2016
	29 November 2016	13 December 2016
	27 December 2016	10 January 2017
	7 February 2017	7 March 2017
	5 April 2017	
MW = Monitoring Well		

Figure 1

CGWTP Total VOC Influent Concentrations and Average Flowrate Twelve Month History

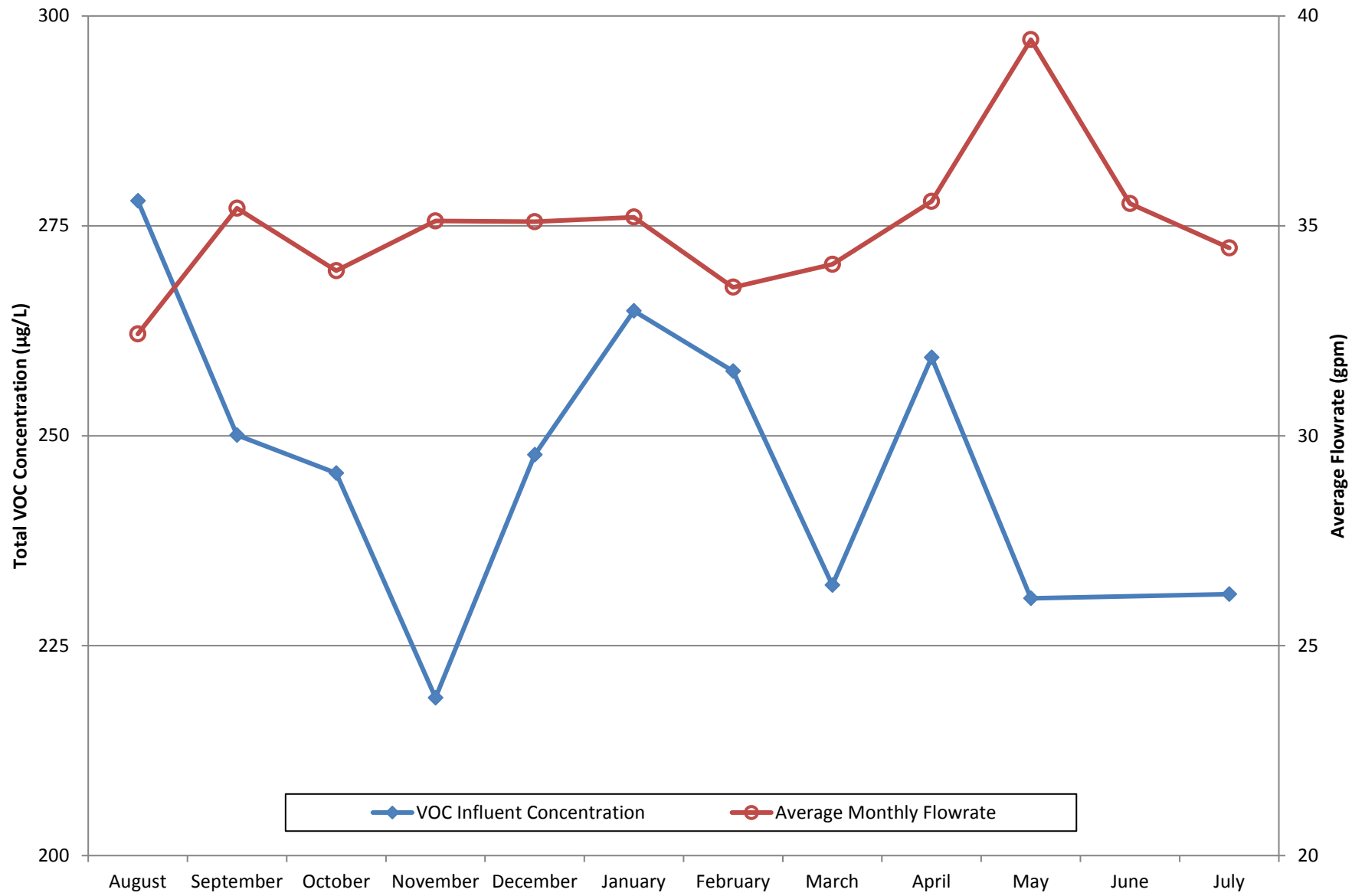
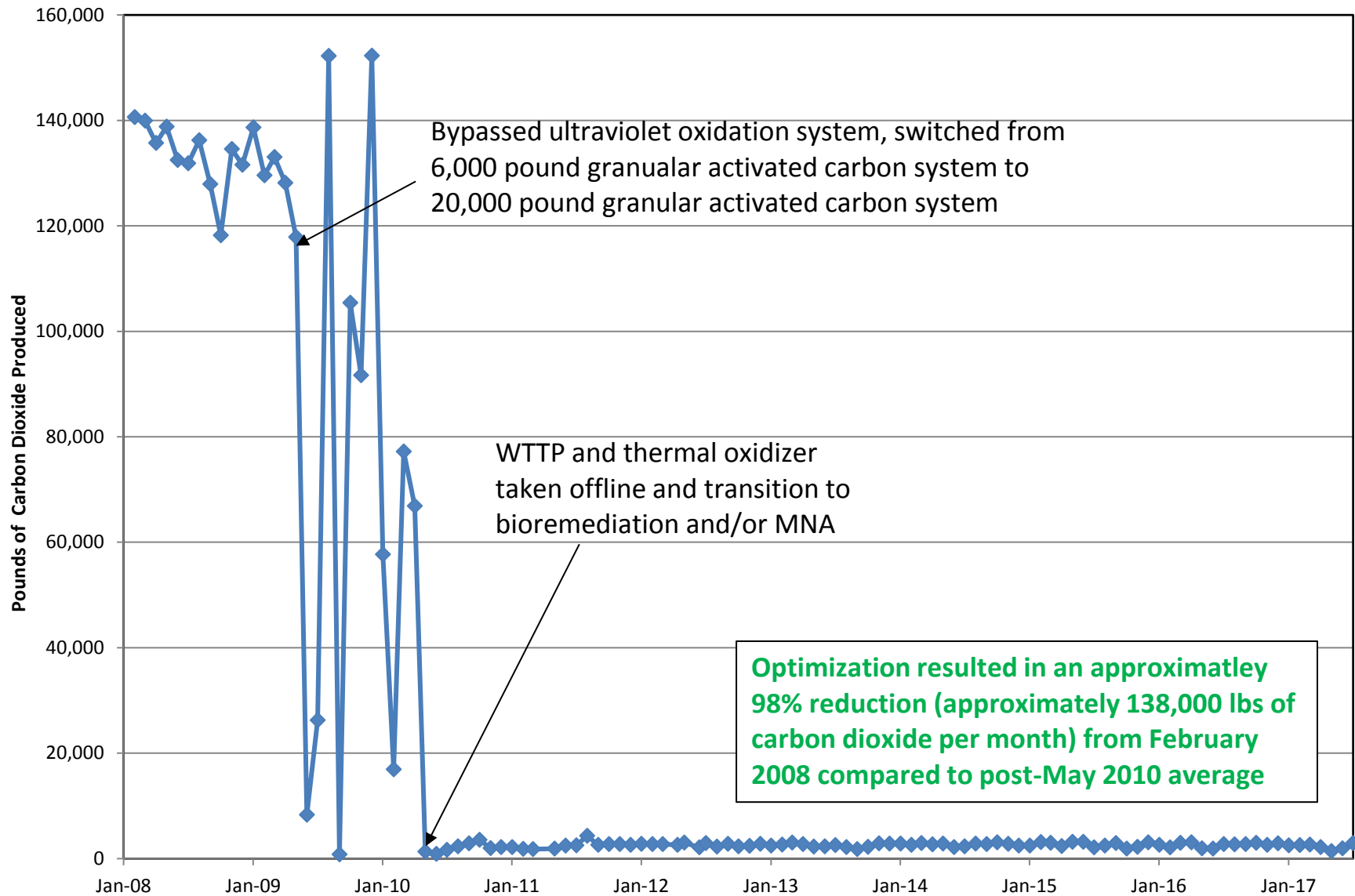


Figure 2

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



Subarea LF007C Groundwater Treatment Plant

Monthly Data Sheet

Report Number: 160

Reporting Period: 29 June 2017 – 1 August 2017

Date Submitted: 10 August 2017

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

System Metrics

Table 1 presents operational data from the July 2017 reporting period:

Table 1 – Operations Summary – July 2017				
Initial Data Collection:		6/29/2017 10:50	Final Data Collection:	8/1/2017 09:10
Operating Time:		Percent Uptime:		Electrical Power Usage ^a :
LF007C GWTP:	476 hours	LF007C GWTP	60.3%	LF007C GWTP: 0 kWh
Gallons Treated: 139,199 gallons			Gallons Treated Since March 2000: 86.2 million gallons	
Volume Discharged to Duck Pond: 139,199 gallons				
VOC Mass Removed: 4.06 x 10⁻³ pounds^b			VOC Mass Removed Since March 2000: 174.37 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 July 2017 influent sample detected by EPA Method SW8260C.				
^c Value not calculated since measurement does not accurately represent the cost effectiveness of the system.				

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

Table 2 – LF007C GWTP Average and Total Flow Rates – July 2017		
Location	Average Flow Rate (gpm) ^a	Total Gallons Processed (gallons)
EW614x07	4.1	117,900
EW615x07	0.7	20,230
LF007C GWTP	4.9	139,199
^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	3 July 2017	12:00	5 July 2017	11:45	High pressure fault.
LF007C GWTP	20 July 2017	10:00	31 July 2017	13:10	High pressure fault.
-- = 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

The July 2017 analytical data are presented in Table 4. TCE (1.32 µg/L) and 2-butanone (or methyl ethyl ketone) (2.18 µg/L) were detected at the influent sample location. Acetone, a common laboratory contaminant, was also detected in the influent sample location. No VOC contaminants were detected at the midpoint and effluent sampling locations. Analytical data continue to indicate effective treatment of the influent process stream.

Figure 1 presents a chart of influent concentrations (total VOCs) at the LF007C GWTP versus time for the past twelve months. VOC concentrations, primarily TCE, have been seasonally variable; however, over the last twelve months the trend has been increasing slightly. The average flow rate through the LF007C GWTP have increased since the low of 1.92 gpm in October 2016. The increase may be a result of the above average rainy season in 2016/2017.

On 3 July, the LF007C GWTP shut down because of a high pressure fault. On 5 July, the system was restarted without issue. Similarly, on 20 July, the LF007C GWTP shut down again because of a high pressure fault. The bag filters were replaced on 31 July, and the system was restarted without issue.

Optimization Activities

No optimization activities occurred at the LF007C GWTP in July 2017.

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.

TABLE 4

Summary of Groundwater Analytical Data For July 2017 – Subarea LF007C Groundwater Treatment Plant

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	5 July 2017 (µg/L)		
				Influent	After Carbon 1	Effluent
Halogenated Volatile Organics						
Acetone	NA	0.50	0	17.6 J+	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	2.18 J	ND	ND
Carbon Tetrachloride	0.5	0.15	0	ND	ND	ND
Chloroform	5.0	0.15	0	ND	ND	ND
Dibromochloromethane	5.0	0.15	0	ND	ND	ND
1,3-Dichlorobenzene	5.0	0.15	0	ND	ND	ND
1,4-Dichlorobenzene	5.0	0.15	0	ND	ND	ND
1,1-Dichloroethane	5.0	0.15	0	ND	ND	ND
1,2-Dichloroethane	0.5	0.15	0	ND	ND	ND
1,1-Dichloroethene	5.0	0.15	0	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.15	0	ND	ND	ND
trans-1,2-Dichloroethene	5.0	0.15	0	ND	ND	ND
Methylene Chloride	5.0	0.15	0	ND	ND	ND
Tetrachloroethene	5.0	0.15	0	ND	ND	ND
1,1,1-Trichloroethane	5.0	0.15	0	ND	ND	ND
1,1,2-Trichloroethane	5.0	0.15	0	ND	ND	ND
Trichloroethene	5.0	0.15	0	1.32	ND	ND
Vinyl Chloride	0.5	0.15	0	ND	ND	ND
Non-Halogenated Volatile Organics						
Benzene	1.0	0.15	0	ND	ND	ND
Ethylbenzene	5.0	0.15	0	ND	ND	ND
Toluene	5.0	0.15	0	ND	ND	ND
Xylenes	5.0	0.15 – 0.30	0	ND	ND	ND
Other						
Total Petroleum Hydrocarbons – Gasoline	50	35	0	NM	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	24	0	NM	NM	ND
Total Petroleum Hydrocarbons – Motor Oil	100	24	0	NM	NM	ND

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

Notes:

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

J+ = analyte concentration is considered an estimated value and biased high

NA = not applicable

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

ND = not detected

NM = not measured

µg/L = micrograms per liter

mg/L = milligrams per liter

Figure 1

LF007CGWTP Total VOC Influent Concentrations and Average Flowrate Twelve Month History

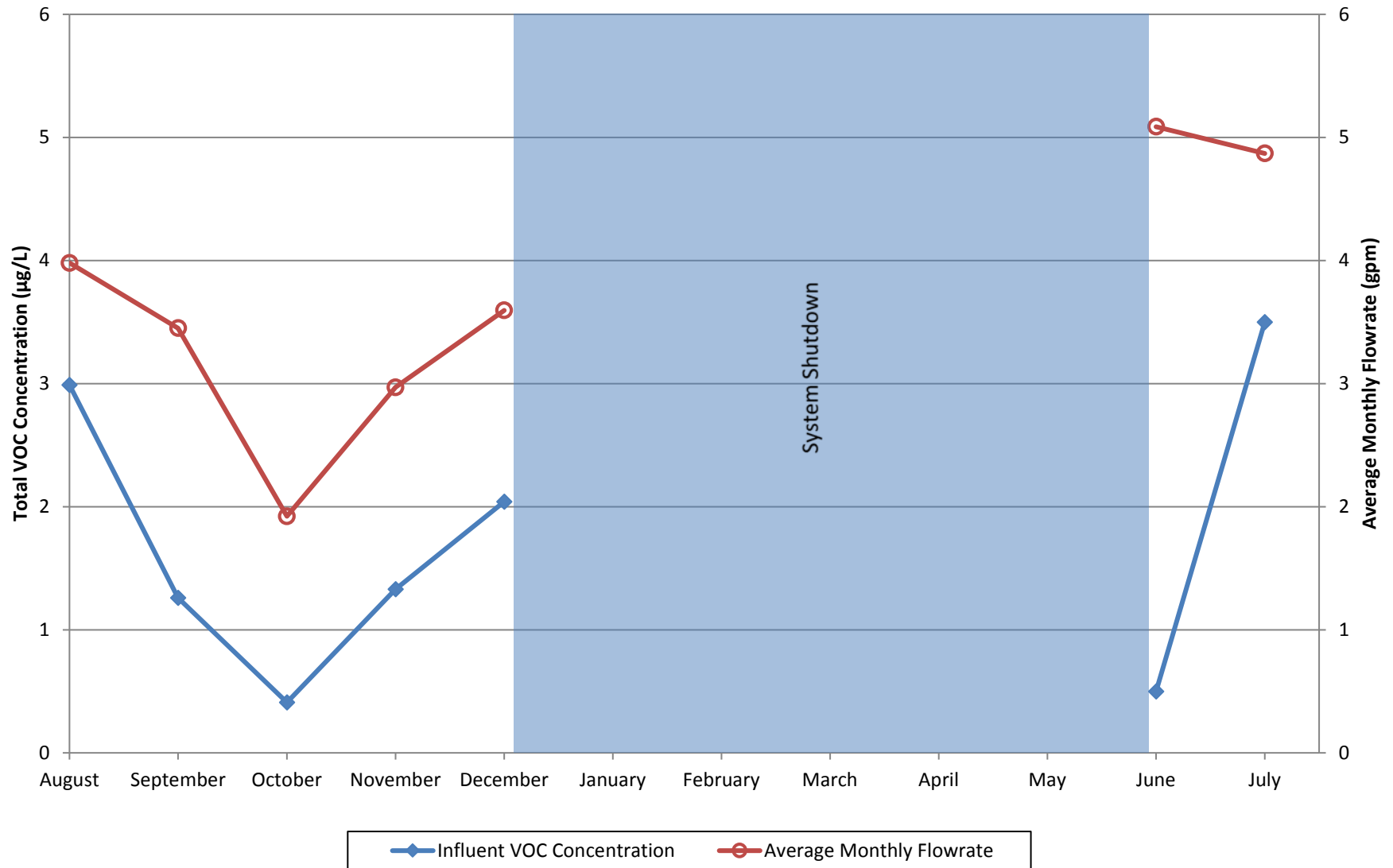
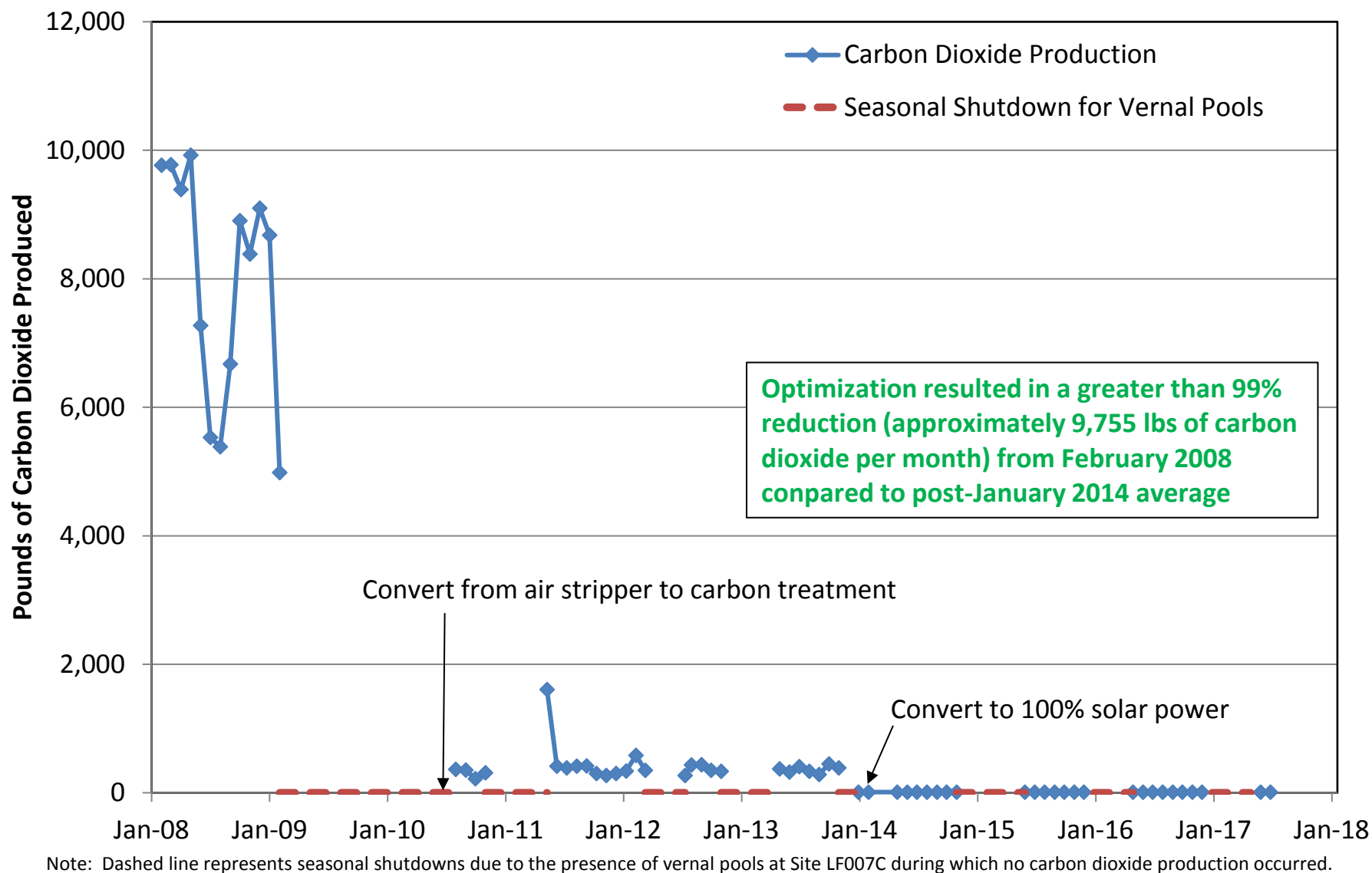


Figure 2
Equivalent Pounds of Carbon Dioxide Produced by the NGWTP/LF007C GWTP



Site ST018 Groundwater Treatment Plant

Monthly Data Sheet

Report Number: 077

Reporting Period: 29 June 2017 – 1 August 2017

Date Submitted: 10 August 2017

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

System Metrics

Table 1 presents operation data from the July 2017 reporting period.

Table 1 – Operations Summary – July 2017			
Initial Data Collection: 6/29/2017 12:00		Final Data Collection: 8/1/2017 10:00	
Operating Time:		Percent Uptime:	Electrical Power Usage:
ST018GWTP: 648 hours		ST018GWTP: 82.1%	ST018GWTP: 121 kWh (90 lbs CO ₂ generated ^a)
Gallons Treated: 205,680 gallons		Gallons Treated Since March 2011: 13.2 million gallons	
Volume Discharged to Sanitary Sewer: 205,680 gallons		Final Totalizer Reading: 13,169,869 gallons	
Cumulative Volume Discharged to Sanitary Sewer since 1 November 2014: 6,673,695 gallons			
MTBE, BTEX, VOC, TPH Mass Removed: 0.06 lbs^b		MTBE, BTEX, VOC, TPH Mass Removed Since March 2011: 41.8 lbs	
MTBE (Only) Removed: 0.06 lbs^b		MTBE (Only) Mass Removed Since March 2011: 10.3 lbs	
Rolling 12-Month Cost per Total Pounds of Mass Removed: \$19,361 ^{bc}			
Monthly Cost per Pound of Mass Removed: \$56,137 ^{bc}			
^a SiteWise™ estimate that 1 kilowatt hour generated produces 0.74 pounds of GHG.			
^b Calculated using July 2017 EPA Method SW8260C and SW8015B analytical results.			
^c Costs include operations and maintenance, reporting, analytical laboratory, project management, and utility costs related to operation of the system.			
kWh = kilowatt hour			
lbs = pounds			

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

Table 2 – ST018GWTP Average Flow Rates – July 2017		
Location	Average Flow Rate Groundwater (gpm)^a	Hours of Operation
EW2014x18	1.9	451
EW2016x18	1.1	648
EW2019x18	1.8	460
EW2333x18	1.8	648
Site ST018 GWTP	5.3	648
^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	16 July 2017	13:40	19 July 2017	11:15	Bag filter high pressure.
	21 July 2017	--	24 July 2017	--	Bag filter high pressure.
	26 July 2017	08:00	26 July 2017	--	Backwash lead GAC vessel
-- = Time not recorded ^a Shutdown and restart times estimated based on field notes ST018GWTP = Site ST018 Groundwater Treatment Plant					

Summary of O&M Activities

Monthly groundwater treatment samples were collected at the ST018GWTP on 5 July 2017. Results are presented in Table 4. The complete July 2017 laboratory data report is available upon request. The influent concentration for MTBE during the July 2017 sampling event was 38.9 µg/L, which is an increase from the June 2017 sample result of 20.3 µg/L. 1,2-DCA (0.63 µg/L) was also detected in the influent sample. MTBE was detected in the system effluent sampling location at a concentration of 2.63 µg/L.

All concentrations of TPH are well below the Fairfield-Suisun Sewer District effluent limitation of 50,000 µg/L for TPH-g and TPH-d, or 100,000 µg/L for TPH-mo. Additionally, the Fairfield-Suisun Sewer District does not currently have a local limit for MTBE, but a limit of 6,400 µg/L is advised based on worker health and safety. Travis AFB will continue to monitor influent and effluent contaminant concentrations to maintain compliance with the Fairfield-Suisun Sewer District discharge permit.

Figure 1 presents plots of the average flow rate and influent total contaminant (MTBE, TPH-g, TPH-d, TPH-mo, BTEX, and VOCs) and MTBE concentrations at the ST018GWTP over the past twelve (12) months. The average flow rate through the ST018GWTP has been cyclical with flow rates decreasing following the wet rainy season (summer and fall) and increasing during the rainy season (winter and spring). The overall

average flow rates show an increasing trend. The total influent concentrations have generally been decreasing over the past 12 months with the exception of April 2017. The overall decrease is largely due to the decrease in TPH-g concentrations. The influent MTBE concentration has also generally been decreasing over the past 12 months.

The ST018GWTP was shut down on three separate occasions in July 2017. On 16 July, the ST018GWTP was shut down because of high pressures in the bag filters, and on 19 July, the bag filters were replaced and the system was restarted. Similarly, on 21 July, the ST018GWTP was shut down again because of high pressures in the bag filters, and on 24 July, the bag filters were replaced and the system was restarted. On 26 July, the ST018GWTP was shut down for several hours to backwash the lead GAC vessel.

In addition to the system shutdowns, a couple extraction wells were also offline during the reporting period. On 11 July, the EW2014x18 pump was removed for cleaning. On 25 July, the pump was re-installed in EW2014x18 and restarted. On 25 July, EW2019x18 was shut down because of a non-specific alarm/fault, and it was restarted on 1 August without issue.

Optimization Activities

No optimization activities occurred at the ST018GWTP in July 2017.

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 90 pounds of GHG during July 2017 and treated 205,680 gallons of water, which was a decrease from June 2017 (116 pounds, treating 268,430 gallons). The amount of GHG produced is directly attributed to the amount of water treated through the system because the only line-power electrical use is for a transfer pump through the GAC system.

TABLE 4

Summary Of Groundwater Analytical Data for July 2017– Site ST018 Groundwater Treatment Plant

Summary of Groundwater Monitoring Data for July 2017: Site C-1010 Groundwater Treatment Plant					
Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	5 July 2017 (µg/L)	
				Influent	System Effluent
Fuel Related Constituents					
Methyl tert-Butyl Ether	6,400	0.15	0	38.9	2.63
Benzene	25,000 ^a	0.15	0	ND	ND
Ethylbenzene	25,000 ^a	0.15	0	ND	ND
Toluene	25,000 ^a	0.15	0	ND	ND
Total Xylenes	25,000 ^a	0.15 – 0.30	0	ND	ND
Total Petroleum Hydrocarbons – Gasoline	50,000 ^b	35	0	ND	ND
Total Petroleum Hydrocarbons – Diesel	50,000 ^b	24	0	ND	ND
Total Petroleum Hydrocarbons – Motor Oil	100,000	24	0	ND	ND
Other					
Acetone	NA	1.0	0	ND	ND
1,2-Dichloroethane	20	0.15	0	0.64	ND

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

Laboratory data available on request.

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

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

µg/L = micrograms per liter

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

NA = not applicable

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

ND = not detected above method detection limit

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

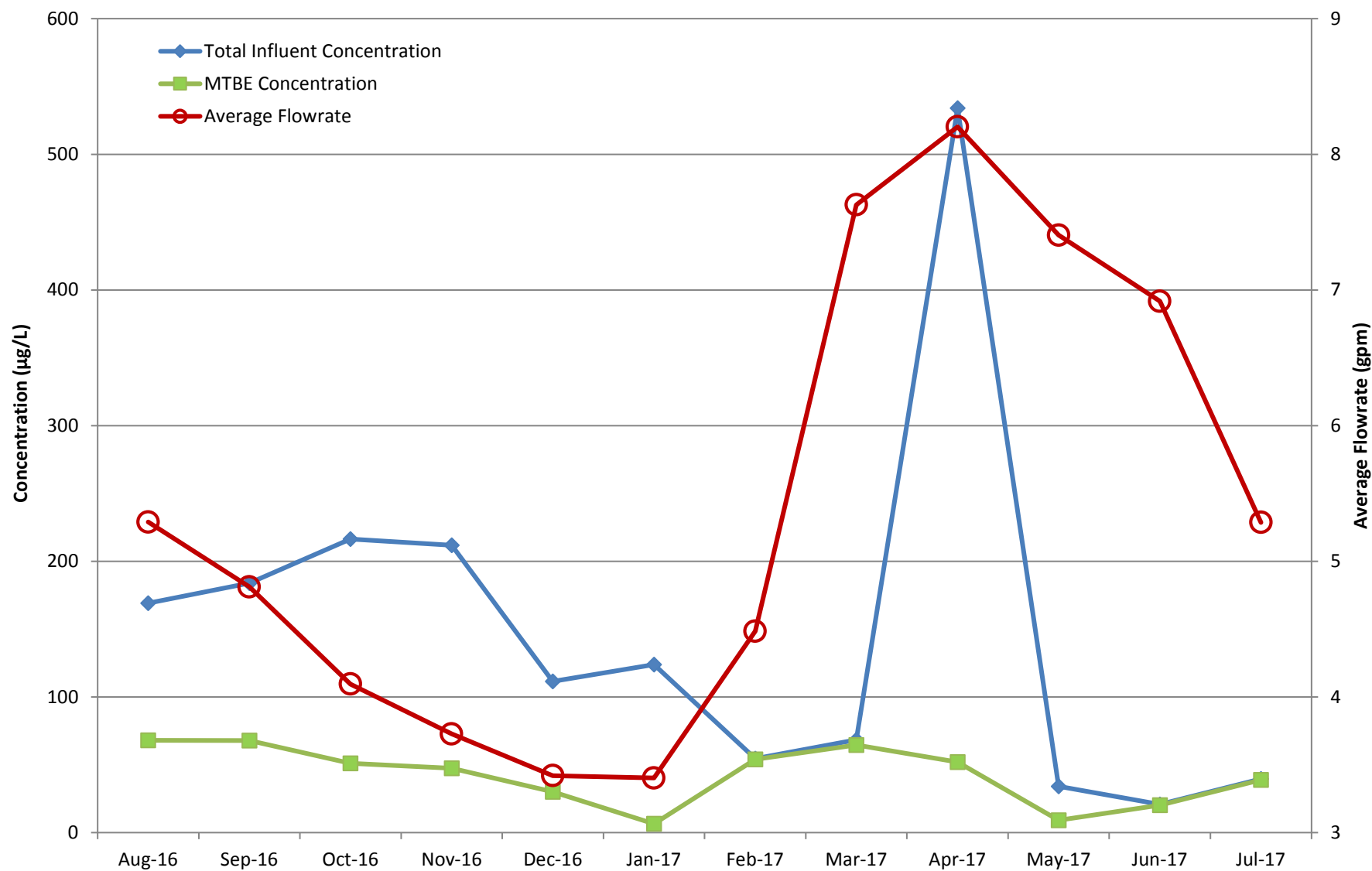
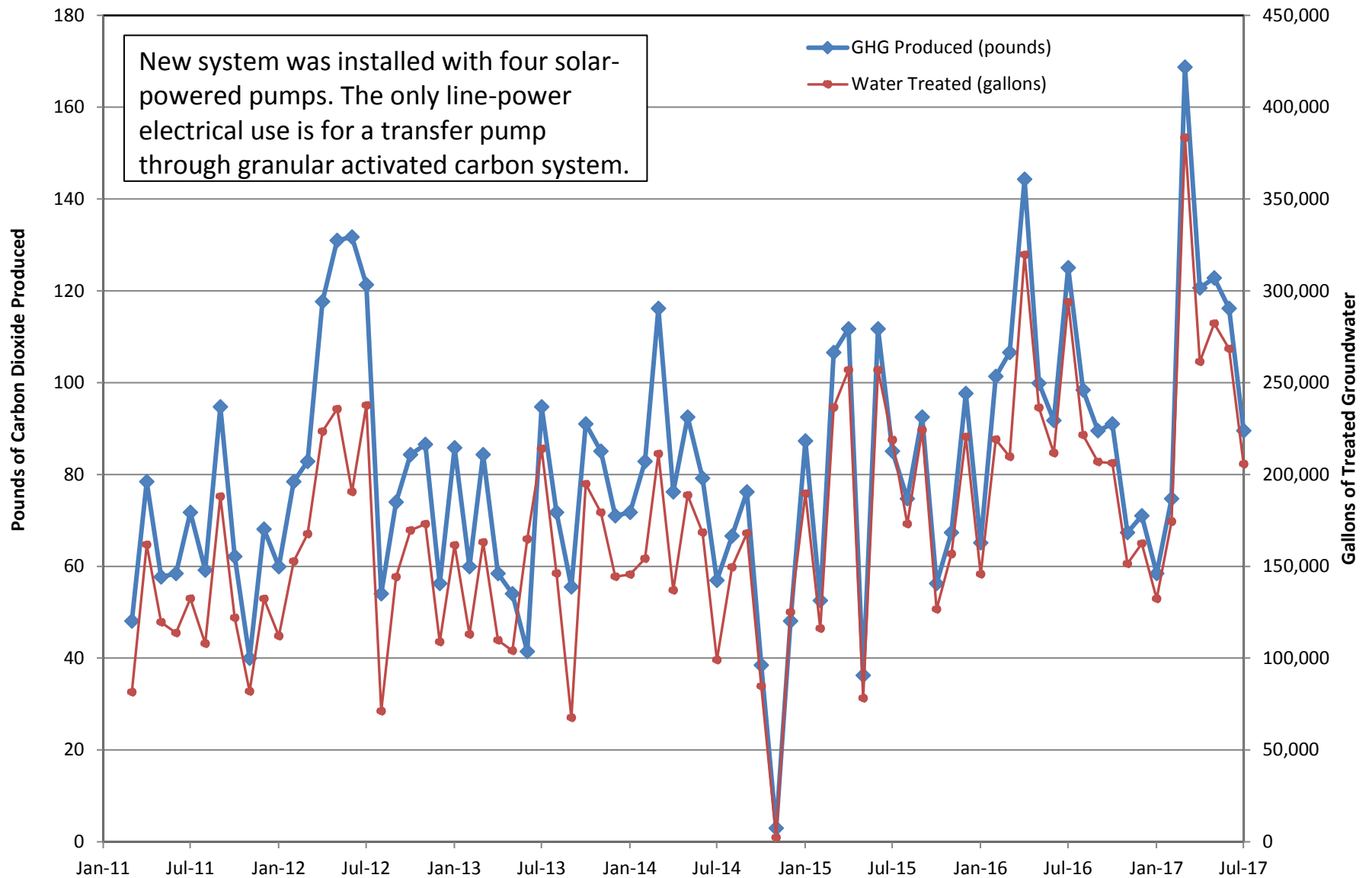


Figure 2

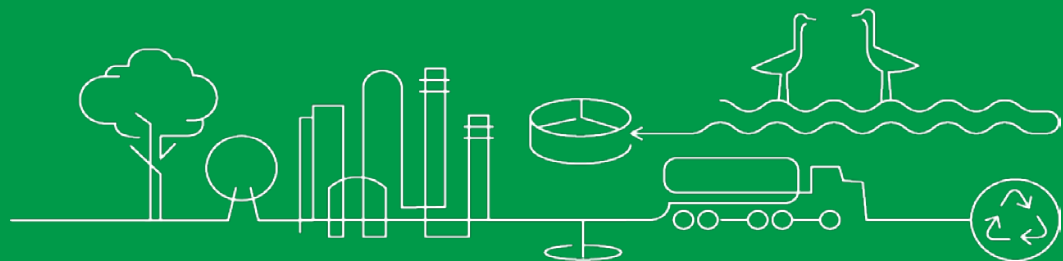
Equivalent Pounds of Carbon Dioxide Produced by the Site ST018 Groundwater Treatment Plant



FT005 Optimization - RPM Triad Discussion



Photo of new FT005 extraction well installation in 2015



Delivering Sustainable Solutions to Complex Local Challenges, Worldwide





FT005 Background

- Selected Remedy in the GW ROD is GET
- Continuing to see 1,2-DCA concentration fluctuations
 - Completed aquifer tests as part of GET O&M

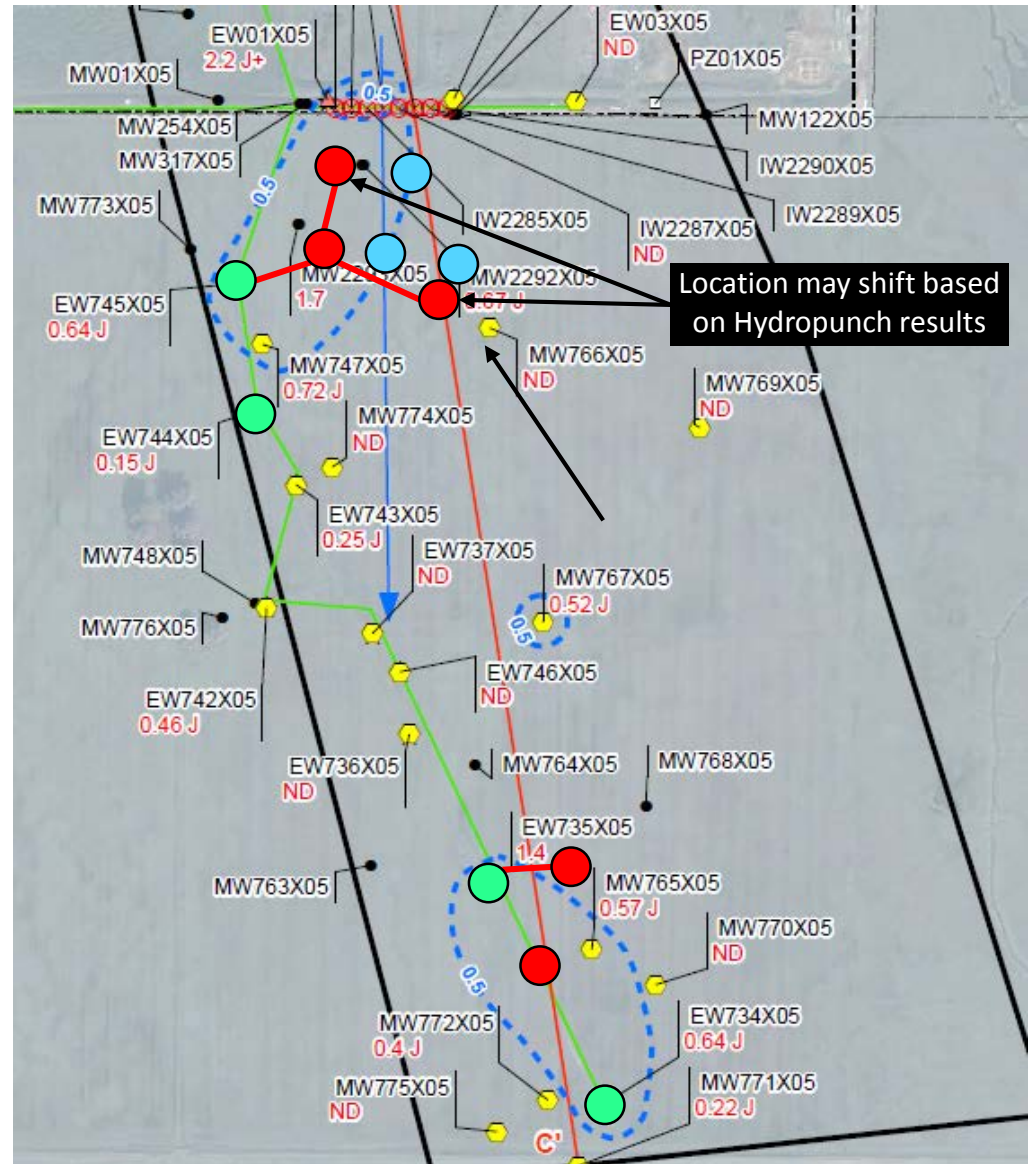
Aquifer Test Results

- Completed 72-hour aquifer tests and VOC sampling every ~24 hours at two well locations (map on next slide)
- Results will be presented in a Tech Memo to be included as appendix to 2017 GRISR
 - Aquifer parameters are consistent with previous interpretations
 - Increasing 1,2-DCA concentrations during aquifer tests indicate optimization of extraction well network is appropriate to reduce cleanup timeframe

Optimization Plan

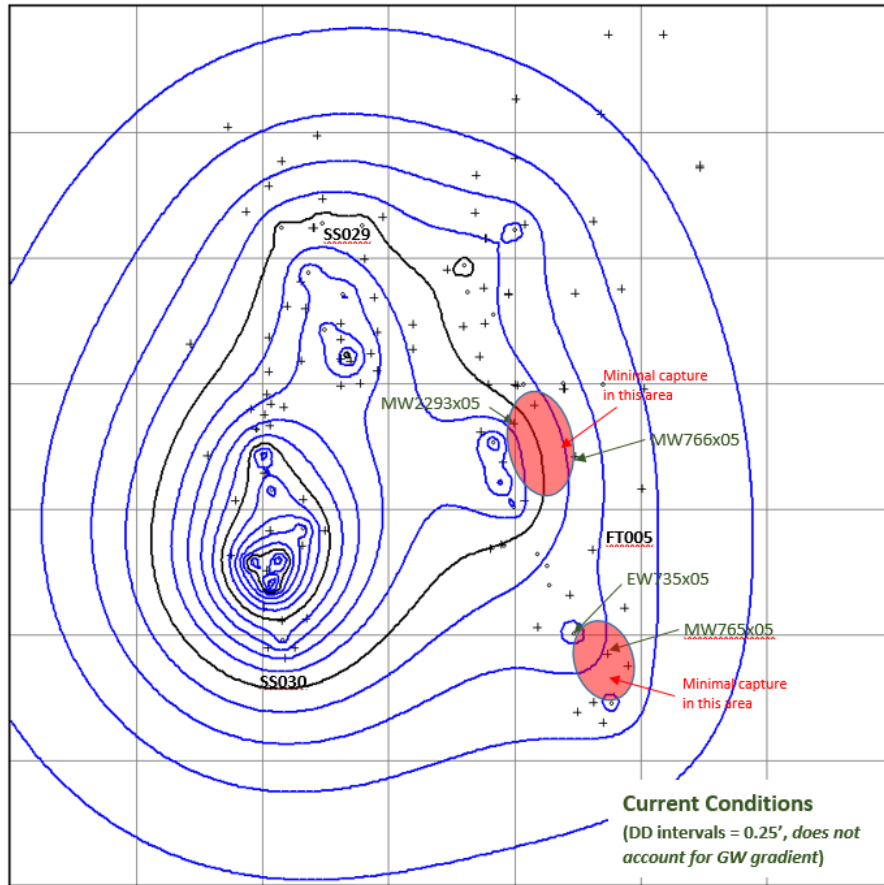
-  Existing Extraction Well
-  New Extraction Well
-  Hydropunch
-  New Pipeline

- Complete work in a manner consistent with 2000 Remedial Design
- Extraction wells may have longer screens to ensure all permeable zones are captured (to be determined based on observed conditions during drilling)

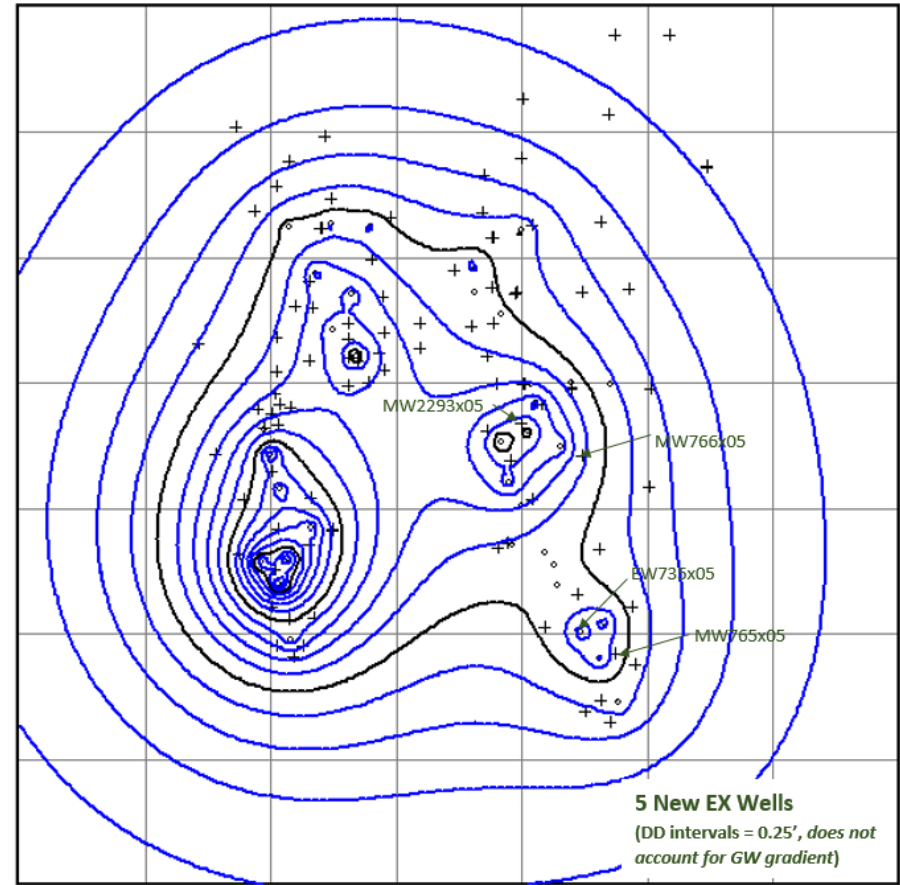


Optimized Hydraulic Conditions

Current Conditions



Optimized Extraction Network

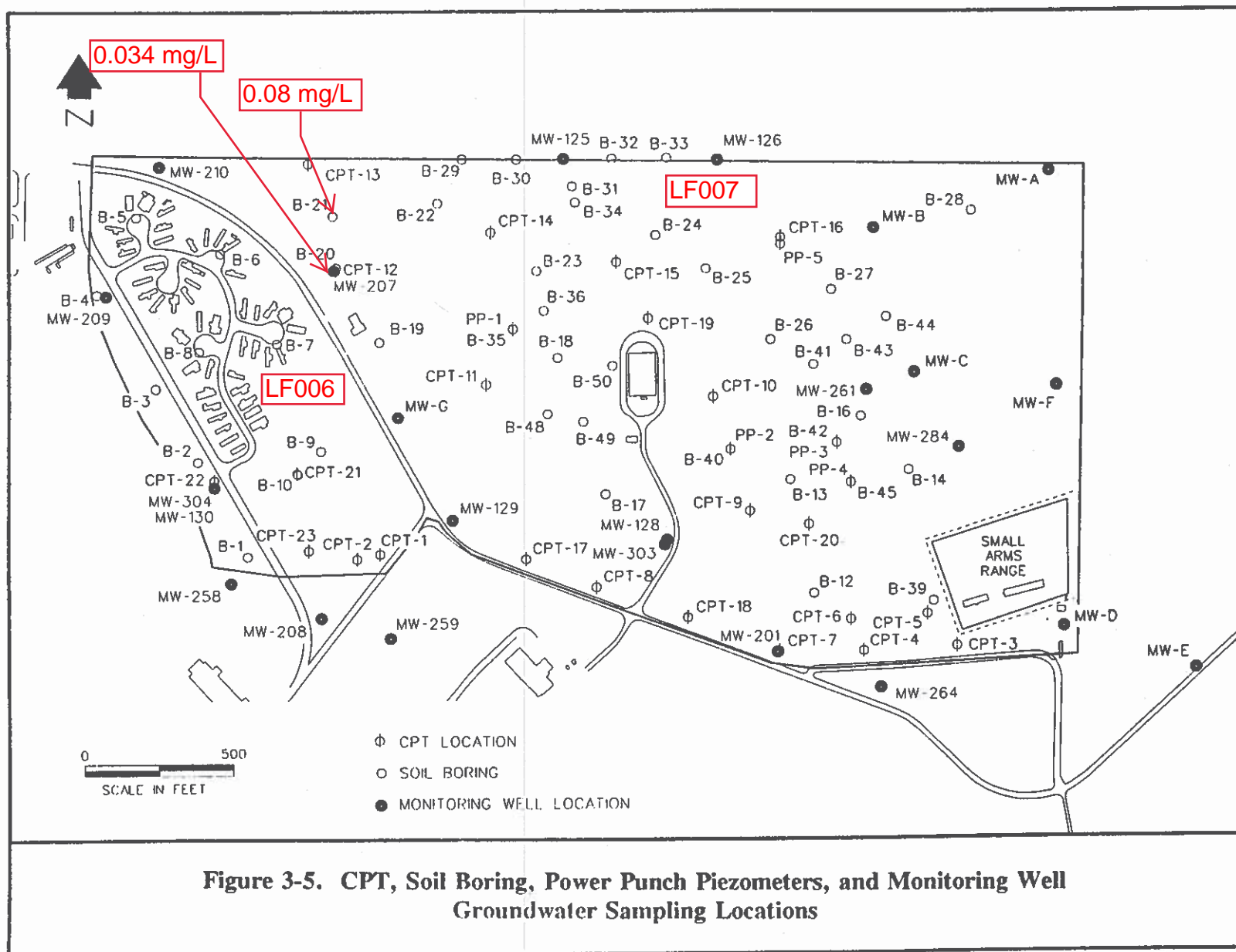


Schedule

- Need to complete construction by October 15 to make this year's field season
 - Begin drilling September 5, end construction October 10
- Document construction in Tech Memo to be included as appendix to 2017 GRISR
- Future RODA may consider additional EVO injection locations as a contingency to existing remedy (TBD)
 - Trying to complete cleanup prior to expiration of existing off-site access agreement with land owner

Landowner Issues

1. The FT005 easement (for off-base portion of site) expires on 31 July 2026.
2. Landowner requires updated set of plans and specifications.
3. Landowner requires comprehensive information on provisions for restoring disturbed soil and ground contours.
4. Calculate increased flow from site, from the new extraction wells.
5. Landowner requires “environmental clearance”.
6. What is provision for removing new wells and piping?



Travis AFB Restoration Program

Program Update

RPM Meeting
August 16, 2017

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***

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***

Documents In-Progress

CERCLA

- Community Relations Plan
- 2016 Annual GRISR
- 2016 Annual CAMU Monitoring Report

POCO

- POCO Evaluation/Closeout Report for DERA-funded oil/water separators OW051, OW053, and OW054

Field Work In-Progress

CERCLA

- FT004 EVO Optimization
- SS015 EVO Optimization
- TS060 Removal Action
- DP039 Install downgradient monitoring wells (2nd round)

POCO

- None

Documents Planned

CERCLA

- Data Gap Investigation Results, Technical Memorandum for Soil, Sites SD033, SD043, SS046 Aug
- Work Plan for Fourth Five-year Review Sep
- Data Gap Investigation Results, Technical Memorandum for Site SS016 Sep
- Amendment to the Soil ROD for WABOU sites DP039, SD043, and SS046 Oct

POCO

- POCO Evaluation/Closure Report for DERA-funded Oil/Water Separators OW040, OW047, OW048, OW049, OW050, OW052, OW055, OW056, and OW057 Sep
- ST032 POCO Well Decommissioning and Site Closeout Technical Memorandum Sep

Field Work Planned

CERCLA

- SD036 EVO Optimization Sep
- SD031 EVO Optimization Sep
- LF044 Sediment Sampling Sep
- FT005 – Install Extraction Wells Sep
- SD034 Install bollards around SBGR Oct
- DP039 Repair SBGR distribution headers Oct
- Q4 GRIP Sampling Oct

POCO

- FT004 POCO Soil Data Gaps Investigation Sep

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

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
 - First quarter performance results
 - TPH-G: 99% reduction in source area (1,900 to 14 J $\mu\text{g/L}$), 18% for remaining 7 site wells
 - TPH-D: 98% reduction in source area (5,500 to 130 J $\mu\text{g/L}$), 33% for remaining 7 site wells
 - Benzene: 98% reduction (22 to <0.4 $\mu\text{g/L}$), 49% for remaining 7 site wells
- Multisite Bioaugmentation: EVO and KB-1 Plus
 - Evaluate if addition of bioaugmentation substrate to an EVO injection will increase the rate of CVOC degradation
 - Injections were completed (Nov 2016)
 - Limited TOC dispersal at SD036, so install additional injection wells and reinject with nanoEVO in 2017
 - Too early to evaluate performance data

Technology Demonstration Projects (2)

- SD034: Washboard SBGR
 - Evaluate the effectiveness of an oxygen-enhanced aerobic SBGR on reducing TPH as diesel (TPH-D) in groundwater
 - Installation was completed November 2016
 - Installed six (6) SBGR trenches.
 - Too early to evaluate performance data
- FT005: Distribution of EVO and KB-1 Plus
 - Evaluate total organic carbon (TOC) dispersion distances and rates for optimizing the remediation of 1,2-dichloroethane (DCA) in groundwater
 - Installation completed May 2016
 - Slightly elevated TOC and reduced COC concentrations in the north, but too early to evaluate performance data
 - May evaluate optimization of GETs in southern portion of site

Technology Demonstration Projects (3)

- FT004: Distribution of EVO via SBGR and/or Groundwater Extraction
 - Determine effectiveness of TOC distribution through two different enhanced reductive dechlorination (ERD) approaches: (1) groundwater TOC recirculation using a combination EVO injection, infiltration SBGR trenches, and groundwater extraction; and (2) EVO injection with groundwater extraction
 - Installation completed April 2016
 - Limited TOC dispersal, additional EVO injection underway with nanoEVO to determine if this can enhance TOC dispersal
 - COC concentrations have declined
 - ~50% total molar reduction plume-wide through first year
 - Max monitoring well TCE concentration reduced from 560 to 140 µg/L

Technology Demonstration Projects (4)

- SD031: EVO distribution via Gravel Chimneys
 - Determine if EVO injection and recirculation of groundwater through gravel chimneys can effectively distribute TOC horizontally in the subsurface to support ERD of 1,1-dichloroethene (DCE)
 - Installation completed in April 2015
 - Early indications:
 - Reducing conditions have initiated as expected throughout the TD area and are supporting anaerobic degradation
 - TOC concentrations are increasing at several wells
 - Recirculation through chimneys has been successful relative to our design assumptions
 - 1,1-DCE (primary COC) concentrations have reduced by 93% (sum of key wells within TD area, excluding 2 wells to SW that increased)
 - Total Molar concentration (sum of CVOCs) has reduced by 84% (sum of key wells within TD area, excluding 2 wells to SW that increased)
 - Four (4) new EVO wells installed to SW to enhance TOC in problem areas (plume being pulled back towards extraction well causing increasing concentrations in this area)

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 Memorandum¹⁸

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