

**Travis Air Force Base
Environmental Restoration Program
Restoration Program Manager's
Meeting Minutes
15 July 2020, 0930 Hours**

Mr. Lonnie Duke of the Air Force Civil Engineer Center (AFCEC) Restoration Installation Support Section (ISS) conducted the Restoration Program Manager's (RPM) teleconference on 15 July 2020 at 0930 hours.

Effective 1 June 2020, the 60 AMW/CC at Travis AFB directed Health Protection Condition (HPCON) Bravo (changed from HPCON Charlie) in response to the evolving COVID-19 public health situation in the local area. The base has cancelled all on-base gatherings of more than 10 people, and continues to encourage teleworking and virtual meetings in place of in-person meetings.

All attendees participated via telephone or Microsoft TEAMS due to increased teleworking measures meant to reduce the number of employees on the base at one time. Attendees included:

| | |
|------------------------|------------------|
| Lonnie Duke | AFCEC/CZOW |
| Glenn Anderson | AFCEC/CZOW |
| Monika O'Sullivan | AFCEC/CZOW |
| Chet Storrs | AFCEC/CZOW |
| Angel Santiago | AFCEC/CZOW |
| Gene Clare | AFCEC/CZOW |
| Lt Rachel Brinegar | Travis AFB/PA |
| Lou Briscese | Travis AFB/PA |
| Kurt Grunawalt | Travis AFB/Legal |
| Haekyung Kim | AFCEC/CZRW |
| Sarah Miller | USACE-Omaha |
| Paul Gedbaw | USACE-Omaha |
| Brian Boccellato | USACE-Omaha |
| Nadia Hollan Burke | EPA |
| Adriana Constantinescu | RWQCB |
| Dominique Forrester | DTSC |
| Kimiye Touchi | DTSC |
| Randall Bleichner | DTSC/GSU |
| Mike Wray | CH2M/Jacobs |
| Leslie Royer | CH2M/Jacobs |
| Tony Chakurian | CH2M/Jacobs |
| Jeff Gamlin | CH2M/Jacobs |
| Jill Dunphy | CH2M/Jacobs |

Handouts distributed prior to the meeting included:

| | |
|--------------|---|
| Attachment 1 | Meeting Agenda |
| Attachment 2 | Master Meeting and Document Schedule |
| Attachment 3 | SBBGWTP Monthly Data Sheet (June 2020) |
| Attachment 4 | CGWTP Monthly Data Sheet (June 2020) |
| Attachment 5 | LF007C Monthly Data Sheet (June 2020) |
| Attachment 6 | ST018 Monthly Data Sheet (June 2020) |
| Attachment 7 | Presentation: Technology Demonstration Update |
| Attachment 8 | Presentation: Program Update |

1. ADMINISTRATIVE

A. Previous Meeting Minutes

EPA, DTSC, and the Water Board all approved the June 2020 Draft RPM Meeting Minutes with no changes or comments.

B. Action Item Review

Action items from June 2020 were reviewed.

Action Item 1 is ongoing: Ms. O’Sullivan to provide updates on perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA). July 2020 update: Ms. O’Sullivan stated that the Air Force conducted the sampling at 6 offbase properties on 30 June. Mr. Duke and Mr. Anderson were present for the sampling. Most properties had spigots close to the well. The water was run for a predetermined amount of time and typical field parameters were checked to ensure the water originated from the subsurface formation surrounding the well prior to sampling. The team has basic information about well depths; most wells are open with no screened interval. The team also has information about the number of residents at each property who consume the water. Preliminary results are expected within the week; Ms. O’Sullivan said that she will inform the team if there are any exceedances. Validation will take approximately 1.5 months, and final results will be presented in a report.

Action Item 2 is ongoing: Mr. Duke will continue to provide design and construction information for the new KC-46 Hangar construction project. July 2020

update: Mr. Duke stated that two OSA extraction wells had been taken offline as a precaution during installation of the fencing around the construction site. Well EW610x16 is operating fine, but a small wiring issue in Well EW605x16 is requiring the well to be operated in manual mode during the day. It recharges at night. Mr. Clare is overseeing extraction well operations.

Mr. Duke suggested that this action item be converted to an update in the Current Projects discussion, under a new subheading of “Land Use Control Sites”, and took the action to update the agenda for future meetings accordingly. This action item can now be closed.

Action Item 3 is ongoing: Include the progress of the optimized Emulsified Vegetable Oil (EVO) delivery via solar-powered organic carbon (SPOC) injection system pilot test at Site SS015 during future monthly program updates. July 2020 update: Ms. Royer said that the injection wells will be pumped to try to achieve a sustainable pumping rate, if this isn’t possible, the system may be moved to a different location where two wells are in closer proximity to hopefully produce enough water to test the system. Right now the system is pumping a little water then being allowed to drain (similar to the PICARD system at Site DP039), but the goal is a more automated approach using a larger volume of water.

Action Item 4: Ms. Constantinescu to confer with her SMEs on whether TPH-D detected in the LF007C groundwater extraction treatment system is naturally occurring rather than petroleum based. The decision will be made based on data collected by Jacobs in the July 2020 O&M sampling (total bacteria count, matrix spike/matrix spike duplicate, and current and historical chromatograms). Ms. Royer will provide this data to the Water Board when it is available. July 2020 update: Ms. Royer sent the chromatograms from last month’s discussion to Ms. Constantinescu, who indicated that the Water Board would also like to review the chromatograms from the influent samples. The results from the MS/MSD samples will be available for discussion during the August 2020 RPM meeting. Mr. Gamlin is preparing a comprehensive data package that will include historical influent and effluent data, precipitation, and temperature, among other parameters. He will try to correlate this information with the dates of the carbon changeouts. The data are showing increases in the bacteria count in the effluent samples but not the influent. This action item remains open.

Action Item 6: Ms. Royer will forward the 3 slides showing chromatograms at LF007C GWTP to Ms. Constantinescu. July 2020 update: Ms. Royer sent the requested information to Ms. Constantinescu; this action item is now closed.

Action Item 7: Mr. Duke and Mr. Anderson will move the Potrero Hills page to the end of the MMDS, and include the Geotracker link. July 2020 update: This page has been moved to the back of the MMDS as agreed. This action item is now closed.

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

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

Travis AFB Annual Meeting and Teleconference Schedule

Mr. Anderson reminded everyone that all upcoming meetings will be held as Microsoft TEAMS teleconferences until California meets the requirements for the “green phase” of COVID-19 reopening; however, the MMDS will remain the same. Teammates will be notified if we will resume in-person meetings; however, he anticipates that the remainder of meetings in 2020 will be held virtually. The next RPM meeting had been rescheduled for 26 August 2020, but the team agreed to move it back to the original date of 19 August 2020. The Restoration Advisory Board Meeting is scheduled for 22 October 2020; but may be held virtually due to COVID-19 restrictions.

Travis AFB Master Document Schedule

Mr. Anderson reminded the team that there is limited capability for producing document hard copies and CDs due to ongoing COVID-19 restrictions. For now, electronic versions of small documents will be emailed, and larger versions will be distributed via DOD SAFE. Hard copies and CDs cannot be made at the present time due to the CH2M/Jacobs offices being closed for COVID-19, with no access to reproduction equipment.

- Community Relations Plan Update (CRP): There was no change to the schedule. This document will be finished as soon as the other higher-priority documents are completed.
- Site SD031 Soil Remedial Investigation/Feasibility Study (RI/FS): There was no change to the schedule. Responses to agency comments were sent on 26 May 2020, and all agencies have responded. Legal responses to ARAR issues will be coordinated with AFLOA. Ms. Miller said that the document must be finalized and invoiced by August 1, 2020 (before the funds expire in September), and recommended a separate call to resolve outstanding issues regarding ARARs and DTSC toxicity criteria in order to expedite finalization of the document.
- Site FT004 POCO Corrective Action Plan: The Agency Comments due date was changed to 13 July 2020 to reflect actual date that comments were received. The rest of the schedule was updated accordingly.

- Quarterly Newsletter (October 2020): There was no change to the schedule. This issue will announce the October 2020 RAB meeting; Mr. Anderson and Ms. Dunphy are exploring options to host the RAB meeting virtually.
- Initial Passive Vent Systems Evaluation Work Plan Technical Memorandum: The Response to Comments and Final due dates were changed to 2 July 2020 based on actual submittals. This document will be moved to the History section in next month's MMDS.
- Optimization Activities Technical Memorandum for Sites SD034 and SD037: The Response to Comments and Final due dates were changed to 8 July 2020 based on actual submittals. This document will be moved to the History section in next month's MMDS.
- Site SD043 Well Decommissioning and Site Closeout Technical Memorandum: There was no change in the schedule. The Water Board and DTSC had no comments, responses to EPA comments have been submitted.
- 2019 Annual Groundwater Remediation Implementation Status Report (GRISR): The Draft to Agencies and RAB due date was changed to 25 June 2020. Mr. Duke and Mr. Anderson agreed to extend the Agency Comments due date to 7 August 2020.
- 2019 Annual Corrective Action Management Unit Monitoring Report: All dates are currently TBD. DTSC's geotechnical expert in their Engineering and Special Projects Office will review the document; EPA and Water Board will defer comments to DTSC.
- Site SS016 Soil Remedial Action Completion Report: There was no change to the schedule.
- Potrero Hills Annex (FS, PP, and ROD): This page was moved to the end of the MMDS and the Geotracker link was added.
- MOVED TO HISTORY:
Site SD031B POCO Additional Site Work Plan

2. CURRENT PROJECTS

Treatment Plant Operation and Maintenance Update

South Base Boundary Groundwater Treatment Plant, June 2020 (see Attachment 3)

The South Base Boundary Groundwater Treatment Plant (SBBGWTP) performed at 98.5% uptime, and 6.148 million gallons of groundwater were extracted and treated in June 2020. All treated water was discharged to Union Creek. The average flow rate for the SBBGWTP was 145.2 gallons per minute (gpm). Electrical power usage was 17,410 kilowatt hours (kWh), and approximately 14,483 pounds of CO₂ were created (based on DOE calculation). Approximately 0.63 of a pound of volatile organic compounds (VOCs) was removed in June. The total mass of VOCs removed since startup of the system is 527.7 pounds.

In June 2020, troubleshooting activities were performed on several extraction wells, and maintenance activities were conducted on several granulated activated carbon vessels. Details can be found in Attachment 3.

No optimization activities were conducted in June 2020.

Central Groundwater Treatment Plant, June 2020 (see Attachment 4)

The Central Groundwater Treatment Plant (CGWTP) performed at 100% uptime with approximately 1,009,430 gallons of groundwater extracted and treated in June 2020. All treated water was discharged to the storm sewer system which discharges to Union Creek. The average flow rate for the CGWTP was 23.4 gpm. Electrical power usage was 2,253kWh for all equipment connected to the Central Plant, and approximately 2,555 pounds of CO₂ were generated. Approximately 1.55 pounds of VOCs were removed from groundwater by the treatment plant in June. The total mass of VOCs removed since the startup of the system is 11,550 pounds.

Two extraction wells (EW605x16 and EW610x16) were shut off on 16 May 2020 as a precautionary measure during installation of construction fencing related to the KC-46 hangar construction. Both wells were restarted on 2 June 2020.

The Site SS016 subgrade biogeochemical reactor (SBGR), also known as a bioreactor, and the Site DP039 bioreactor, continued operating in June 2020.

No optimization activities occurred at the CGWTP in June 2020.

LF007C Groundwater Treatment Plant, June 2020 (Attachment 5)

The Subarea LF007C Groundwater Treatment Plant (LF007C GWTP) performed at 100% uptime with approximately 159,492 gallons of groundwater extracted and treated in June 2020. All treated water was discharged to the Duck Pond for beneficial reuse. The average flow rate was 3.7 gpm. Approximately 1.25×10^{-3} of a pound of VOCs was removed from groundwater by the treatment plant in June 2020. 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 June 2020.

NOTE: The new property owner signed a 5-year right of entry for the easement in June 2020. Samples were collected, and results will be available at the next RPM Meeting.

ST018 Groundwater (MTBE) Treatment Plant, June 2020 (see Attachment 6)

Site ST018 (MTBE) Treatment Plant (ST018 GWTP) performed at 87.2% uptime with approximately 106,280 gallons of groundwater extracted in June 2020. All groundwater was discharged to the Fairfield – Suisun Sewer District. The average flow rate for the ST018 GWTP was 2.8 gpm. Electrical power usage for the month was 58 kWh for all equipment connected to the ST018 GWTP. The total CO₂ discharge equivalent equates to approximately 43 pounds. Approximately 0.04 of a pound of MTBE, BTEX, VOCs, and TPH was removed in June by the treatment plant, and approximately 0.02 of a pound of MTBE-only was removed from groundwater. The total BTEX, MTBE and TPH mass removed since the startup of the system is 49.3 pounds, and the total MTBE mass removed since startup of the system is 12.1 pounds.

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

No optimization activities are reported for the month of June 2020.

3. Presentations:

A) Presentation: Technology Demonstration Update

Mr. Gamlin reported on the status of ongoing technology demonstrations at Travis AFB. Highlights of the discussion are presented below; please refer to Attachment 8 for the full briefing.

- The goal of the technology demonstrations (TDs) is to get sites cleaned up more quickly, using sustainable methods as much as possible, within the framework of the existing remedy, while also reducing costs for the government.
- The technology demonstrations in progress at Travis AFB are not quite complete; but there are enough data to present preliminary conclusions and paths forward. When they are complete, a technical memorandum will be produced that will summarize formal conclusions and paths forward.

- The TDs at Sites SS014 and SD034 compare enhanced anaerobic to enhanced aerobic biodegradation of petroleum in groundwater, as well as cost.
- The goal for emulsified vegetable oil (EVO) injections and bioreactors is to drive contaminated water – often from areas not previously known to be contaminated - to and through the treatment areas. If these areas are left to attenuate naturally, treatment would potentially take decades longer. It is important to realize that this is what is likely happening if contaminant concentrations increase after treatment has begun.
- Multiple lines of evidence, such as dispersal of amendments, geochemical parameters, and reduction in COC concentrations and/or plume extents, are used to show progress and improvement resulting from the technology demonstrations.
- When utilizing bioaugmentation such as KB1 in combination with emulsified vegetable oil, the proper organic carbon source sometimes has more of an effect than the bioaugmentation itself.
- Lactoil, a mixture of EVO plus lactate, and with sulfidated zero-valent iron added, doesn't last long but gets the bacterial population working quickly so that additional EVO can be more effective for treating low concentrations of VOCs.
- The labor for injections is often what drives the cost of injection remedies; automated systems like the SPOC will keep costs low.

Mr. Anderson concluded the presentation by thanking the regulators for approving technology demonstrations. The technology demonstrations allow a determination of which methods work at Travis AFB, and the continued research allows for improvements in treatment effectiveness and cost efficiency.

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

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

4. New Action Item Review

1. Mr. Duke will create a “Land Use Control Sites” subheading under “Current Projects” and move the KC-46 Hangar updates and discussions from the action items list.
2. The Air Force will update the August RPM Meeting date to 19 August 2020 on the next MMDS.

3. The Air Force will extend the agency review period and comment due date for the 2019 GRISR to 7 August 2020 on the next MMDS.

4. The Air Force will send the 2019 CAMU Monitoring Report to DTSC for review by their Engineering and Special Projects Office (ESPO), and will extend the agency review period and comment due date to 18 September 2020 on the next MMDS.

5. PROGRAM ISSUES/UPDATE

None

6. ACTION ITEMS

| Item # | Responsible | Action Item Description | Due Date | Status |
|--------|----------------------------------|--|-------------------|--------|
| 1. | Monika O'Sullivan | Ms. O'Sullivan to provide updates on PFOS and PFOA as she becomes aware of them. | Ongoing | Open |
| 2. | Mr. Wray and Ms. Royer | Mr. Wray or Ms. Royer to include the progress of the optimized EVO delivery via solar-powered organic carbon (SPOC) injection system pilot test at Site SS015 during future monthly program updates. | Ongoing | Open |
| 3. | Ms. Constantinescu and Ms. Royer | Ms. Constantinescu will confer with Water Board SMEs on whether the TPH samples on the system detections at the LF007C groundwater extraction treatment system are naturally occurring or represent petroleum contamination. The Water Board decision will be based on total bacteria sampling | 30 September 2020 | Open |

| | | | | |
|----|----------|---|----------------|------|
| | | data, matrix spike/matrix spike duplicate data, and current and historical chromatograms. Ms. Royer will provide this data to the Water Board when it is available. | | |
| 4. | Mr. Duke | Mr. Duke will create a “Land Use Control Sites” subheading under “Current Projects” and move the KC-46 Hangar updates and discussions there. | 19 August 2020 | Open |
| 5. | Mr. Duke | The Air Force will update the August RPM Meeting date to 19 August 2020 on the next MMDS. | 19 August 2020 | Open |
| 6. | Mr. Duke | The Air Force will extend the agency review period and comment due date for the 2019 GRISR to 7 August 2020 on the next MMDS. | 19 August 2020 | Open |
| 7. | Mr. Duke | The Air Force will send the 2019 CAMU Monitoring Report to DTSC for ESPO review, and will extend the agency review period and comment due date to 18 September 2020 on the next MMDS. | 19 August 2020 | Open |

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

The RPM Teleconference is scheduled for 9:30 AM PST on 15 July 2020. **The call-in number will be provided in the MS Teams meeting invite and also in the same email that the meeting materials are provided in. If you are able to participate via MS Teams meeting, you will see the shared documents that will be viewable by all participants.**

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. TECHNOLOGY DEMONSTRATION UPDATE
 - B. PROGRAM UPDATE:

DOCUMENTS & ACTIVITIES COMPLETED, IN PROGRESS & PLANNED
4. NEW ACTION ITEM REVIEW
5. PROGRAM/ISSUES/UPDATE

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

(2020)
Annual Meeting and Teleconference Schedule

| Monthly RPM 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.) |
|---|--|---|
| — | 01-15-20 | — |
| 02-19-20 | — | — |
| — | 03-18-20 | — |
| 04-16-20 (Thursday 1:00 PM) | — | 04-16-20 |
| — | 05-20-20 | — |
| 06-17-20 | — | — |
| — | 07-15-20 | — |
| 08-26-20 | — | — |
| — | 09-16-20 | — |
| 10-22-20 (Thursday 2:00 PM) | — | 10-22-20 |
| — | 11-18-20 | — |
| — | — | — |

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

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

Travis AFB Master Meeting and Document Schedule

| PRIMARY DOCUMENTS | | |
|-------------------------------------|--|---|
| Life Cycle | Community Relations Plan Update Travis AFB, Glenn Anderson CH2M, Jill Dunphy | Site SD031 Soil Remedial Investigation/Feasibility Study Travis AFB, Glenn Anderson CH2M, Rick Sturm |
| Scoping Meeting | NA | NA |
| Predraft to AF/Service Center | 08-23-16 | 05-24-19 |
| AF/Service Center Comments Due | 09-07-16 | 06-10-19 |
| Draft to Agencies / RAB | 09-28-16 (03-22-18) | 09-12-19 |
| Agency Comments Due | 10-28-16 (04-27-18) | 11-12-19 (01-14-20) |
| Response to Comments Meeting | TBD | TBD |
| Agency Concurrence with Remedy | NA | NA |
| Public Comment Period | NA | NA |
| Public Meeting | NA | NA |
| Response to Comments Due | TBD | TBD |
| Draft Final Due | TBD | TBD |
| Final Due | TBD | TBD |

Travis AFB Master Meeting and Document Schedule

| SECONDARY DOCUMENTS | |
|-------------------------------------|---|
| Life Cycle | Site FT004 POCO Corrective Action Plan Travis AFB, Glenn Anderson CH2M, Doug Berwick CAPE, Meg Greenwald |
| Scoping Meeting | NA |
| Predraft to AF/Service Center | 03-20-20 |
| AF/Service Center Comments Due | 04-20-20 |
| Draft to Agencies / RAB | 04-29-20 |
| Agency Comments Due | 05-29-20 (07-13-20) |
| Response to Comments Meeting | 06-17-20 (07-15-20) |
| Response to Comments Due | 07-01-20 (07-31-20) |
| Draft Final Due | NA |
| Final Due | 07-01-20 (07-31-20) |
| Public Comment Period | NA |
| Public Meeting | NA |

Travis AFB Master Meeting and Document Schedule

| INFORMATIONAL DOCUMENTS | | | |
|-------------------------------------|--|--|--|
| Life Cycle | Quarterly Newsletter (October 2020) Travis, Glenn Anderson | Initial Passive Vent Systems Sampling Work Plan Tech Memo Travis AFB, Glenn Anderson CH2M, Leslie Royer | Optimization Activities Technical Memorandum for Sites SD034 and SD037 Travis AFB, Glenn Anderson CH2M, Levi Pratt |
| Scoping Meeting | NA | NA | NA |
| Predraft to AF/Service Center | 09-08-20 | 12-16-19 | 01-20-20 |
| AF/Service Center Comments Due | NA | 12-31-19 | 02-20-20 |
| Draft to Agencies / RAB | 09-15-20 | 01-09-20 | 04-03-20 |
| Agency Comments Due | 09-29-20 | 02-10-20 | 05-04-20 |
| Response to Comments Meeting | 10-01-20 | 02-19-20 | 05-20-20 |
| Response to Comments Due | 10-06-20 | 03-04-20 (07-02-20) | 06-01-20 (07-08-20) |
| Draft Final Due | NA | NA | NA |
| Final Due | 10-08-20 | 03-04-20 (07-02-20) | 06-01-20 (07-08-20) |
| Public Comment Period | NA | NA | NA |
| Public Meeting | NA | NA | NA |

Travis AFB Master Meeting and Document Schedule

| INFORMATIONAL DOCUMENTS | | | | |
|-------------------------------------|---|---|--|---|
| Life Cycle | Site SD043 Well Decommissioning and Site Closeout Technical Memorandum Travis AFB, Glenn Anderson CH2M, Levi Pratt | 2019 Annual GRISR Travis AFB, Glenn Anderson CH2M, Levi Pratt | 2019 Annual CAMU Monitoring Report Travis AFB, Gene Clare CH2M HILL, Levi Pratt | Site SS016 Soil Remedial Action Completion Report Travis AFB, Glenn Anderson CH2M, Doug Berwick CAPE, Meg Greenwald |
| Scoping Meeting | NA | NA | NA | NA |
| Predraft to AF/Service Center | 04-06-20 | 05-04-20 | TBD | 06-17-20 |
| AF/Service Center Comments Due | 05-06-20 | 06-04-20 | TBD | 07-20-20 |
| Draft to Agencies / RAB | 05-27-20 | 06-25-20 | TBD | 08-04-20 |
| Agency Comments Due | 06-26-20 | 07-27-20 | TBD | 09-03-20 |
| Response to Comments Meeting | 07-15-20 | 08-05-20 | TBD | 09-16-20 |
| Response to Comments Due | 07-29-20 | 08-21-20 | TBD | 09-30-20 |
| Draft Final Due | NA | NA | NA | NA |
| Final Due | 07-29-20 | 08-21-20 | TBD | 09-30-20 |
| Public Comment Period | NA | NA | NA | NA |
| Public Meeting | NA | NA | NA | NA |

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 |

https://geotracker.waterboards.ca.gov/profile_report.asp?global_id=SL20299915

Travis AFB Master Meeting and Document Schedule

| HISTORY - INFORMATIONAL DOCUMENTS | |
|--|---|
| Life Cycle | Site SD031B POCO Additional Site Investigation Work Plan Travis, Glenn Anderson CH2M, Tony Chakurian |
| Scoping Meeting | NA |
| Predraft to AF/Service Center | 12-18-19 |
| AF/Service Center Comments Due | 01-20-20 |
| Draft to Agencies / RAB | 03-02-20 |
| Agency Comments Due | 04-01-20 |
| Response to Comments Meeting | 04-16-20 |
| Response to Comments Due | 06-10-20 |
| Draft Final Due | NA |
| Final Due | 06-10-20 |
| Public Comment Period | NA |
| Public Meeting | NA |

South Base Boundary Groundwater Treatment Plant

Monthly Data Sheet

Report Number: 236

Reporting Period: 1 June 2020 – 1 July 2020

Date Submitted: 10 July 2020

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

System Metrics

Table 1 presents operational data from the June 2020 reporting period.

| Table 1 – Operations Summary – June 2020 | | | |
|---|-----------|--|---|
| Initial Data Collection: | | 6/1/2020 13:10 | Final Data Collection: 7/1/2020 9:45 |
| Operating Time: | | Percent Uptime: | Electrical Power Usage: |
| SBBGWTP: | 706 hours | SBBGWTP: | 98.5% |
| | | SBBGWTP: | 17,410 kWh (14,483 lbs CO ₂ generated ^a) |
| Gallons Treated: 6.148 million gallons | | Gallons Treated Since July 1998: 1.202 billion gallons | |
| Volume Discharged to Union Creek: 6.148 million gallons | | Gallons Treated from Other Sources: 0 gallons | |
| VOC Mass Removed: 0.63 lbs ^b | | VOC Mass Removed Since July 1998: 527.7 lbs | |
| Rolling 12-Month Cost per Pound of Mass Removed: \$24,495 ^c | | | |
| Monthly Cost per Pound of Mass Removed: \$43,853 ^c | | | |
| lbs = pounds | | | |
| ^a SiteWise™ estimate that 1 kilowatt hour generated produces 0.74 pounds of GHG. Value also includes approximately 1,600 pounds of GHG from GAC change out services averaged to a per month basis. | | | |
| ^b Calculated using June 2020 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 – June 2020 | | | | | | | |
|---|---------|-----------|---------|-------------------|----------------------|-------------------|----------------------|
| FT005 ^b | | | | SS029 | | SS030 | |
| EW01x05 | Offline | EW743x05 | Offline | EW01x29 | Offline ^c | EW01x30 | 13.8 |
| EW02x05 | Offline | EW744x05 | 2.8 | EW02x29 | Offline ^c | EW02x30 | Offline ^d |
| EW03x05 | Offline | EW745x05 | 6.7 | EW03x29 | 2.9 | EW03x30 | 12.5 |
| EW731x05 | 6.8 | EW746x05 | Offline | EW04x29 | 7.5 | EW04x30 | 15.4 |
| EW732x05 | Offline | EW2291x05 | 5.9 | EW05x29 | 4.8 | EW05x30 | 6.5 |
| EW733x05 | Offline | EW2782x05 | 4.1 | EW06x29 | 10.7 | EW2174x30 | 8.0 |
| EW734x05 | 6.2 | EW2783x05 | 6.0 | EW07x29 | 10.8 | EW711x30 | 3.6 |
| EW735x05 | 6.9 | EW2784x05 | 9.1 | | | MW269x30 | 0.5 |
| EW736x05 | Offline | EW2785x05 | 6.5 | | | | |
| EW737x05 | Offline | EW2786x05 | 11.6 | | | | |
| EW742x05 | Offline | | | | | | |
| FT005 Total: 72.6 | | | | SS029 Total: 36.7 | | SS030 Total: 60.3 | |
| SBBGWTP Average Monthly Flow ^e : 145.2 gpm | | | | | | | |
| ^a Flow rates presented are instantaneous measurements taken at the end of the reporting period. | | | | | | | |
| ^b Most extraction wells at FT005 were taken offline in accordance with the 2008 Annual Remedial Process Optimization Report for the Central Groundwater Treatment Plant, North Groundwater Treatment Plant, and South Base Boundary Groundwater Treatment Plant. | | | | | | | |
| ^c Extraction wells taken off line because of persistent fouling of the well pumps and associated discharge piping. | | | | | | | |
| ^d Extraction wells were operational; however, well was recharging. | | | | | | | |
| ^e The average SBBGWTP groundwater flow rate was calculated using the Union Creek Discharge Totalizer and dividing it by the total time the system was operational. | | | | | | | |
| gpm – gallons per minute | | | | | | | |
| SBBGWTP – South Base Boundary Groundwater Treatment Plant | | | | | | | |

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

| Table 3 – Summary of System Shutdowns | | | | | |
|---|-----------------------|------|----------------------|-------|---|
| Location | Shutdown ^a | | Restart ^a | | Cause |
| | Date | Time | Date | Time | |
| SBBGWTP | 1 June 2020 | 8:40 | 1 June 2020 | 10:50 | Replace motor starter for EW02x30 |
| SBBGWTP | 30 June 2020 | 8:00 | 30 June 2020 | 17:00 | Carbon change out on lead 6,000-lb GAC vessel |
| ^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 1 June 2020. Sample results are presented in Table 4. Samples collected in June 2020 were also analyzed for total metals (in accordance with the NPDES permit) and the results are presented in Table 5.

The total VOC concentration (12.20 µg/L) in the influent sample decreased from the May 2020 sample results (18.10 µg/L). TCE was the primary VOC detected in the influent sample at a concentration of 11 µg/L. TCE, cis-1,2-DCE, and 1,2-DCA were detected in the midpoint sampling location. Cis-1,2-DCE was detected in the effluent sample at a concentration less than effluent limitation.

In addition, TPH-d was detected in the influent sample but not in the effluent sample.

From the June metals analysis, chromium, manganese, and zinc were detected in the influent sample. Chromium and zinc were detected in the system effluent sample, which were less than the daily maximum effluent limitations.

Figure 1 presents a plot of influent VOC concentrations and average flow at the SBBGWTP over the past twelve (12) months. An overall decreasing trend was observed for the VOC influent concentrations in the past 12 months. An overall decreasing flow rate trend was also observed in the past 12 months.

In June 2020 troubleshooting was performed on eight extraction wells. The following list presents the maintenance activities and status of those extraction wells:

- EW734x05 – The pump was replaced. Well is currently on line.
- EW744x05 – The totalizer was cleaned, and the transducer and communication wires were replaced. Well is currently on line.
- EW745x05 – The pump motor was replaced. Well is currently on line.
- EW2783x05 – The pump was replaced. Well is currently on line.
- EW05x29 – The galvanized steel piping was upgraded to Sch 80 PVC piping. Well is currently on line.
- EW06x29 – The pump was cleaned and rehabilitated. Well is currently on line.
- EW02x30 – The motor starter and overload were replaced. Well is currently on line.
- EW03x30 – The pump motor was replaced. Well is currently on line.

On 29 June, the 2,000-lb polish GAC vessels were bypassed. On 30 June 2020, a carbon change out was conducted on the lead 6,000-lb GAC vessel. The carbon was backwashed and soaked prior to restarting at the end of the day.

Optimization Activities

No optimization activities occurred at the SBBGWTP in June 2020.

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 June 2020, the SBBGWTP produced approximately 14,483 pounds of GHG, which includes approximately 1,600 pounds of GHG generated from GAC change out services averaged to a per month basis.

TABLE 4

Summary of Groundwater Analytical Data for June 2020 – South Base Boundary Groundwater Treatment Plant

| Summary of Groundwater Analytical Data for June 2020 – South Gate Boundary Groundwater Treatment Plant | | | | | | |
|--|---|------------------------------|-----|-----------------------|----------|-----------------------|
| Constituent | Instantaneous Maximum ^a (µg/L) | Detection Limit (µg/L) | N/C | 1 June 2020 (µg/L) | | |
| | | | | Influent | Midpoint | Effluent ^b |
| Halogenated Volatile Organics | | | | | | |
| Acetone | NA | 1.9 | 0 | ND | ND | ND |
| Bromodichloromethane | NA | 0.17 | 0 | ND | ND | ND |
| Chloroform | 1.9 | 0.16 | 0 | ND | ND | ND |
| Chloromethane | NA | 0.30 | 0 | ND | ND | ND |
| 1,1-Dichloroethane | 0.50 | 0.22 | 0 | ND | ND | ND |
| 1,2-Dichloroethane | 0.50 | 0.13 | 0 | 0.49 J | 0.73 J | ND |
| 1,1-Dichloroethene | 0.50 | 0.23 | 0 | ND | ND | ND |
| cis-1,2-Dichloroethene | 0.50 | 0.15 | 0 | 0.71 J | 1.7 | 0.35 J |
| trans-1,2-Dichloroethene | 0.50 | 0.11 | 0 | ND | ND | ND |
| Dichlorodifluoromethane | NA | 0.31 | 0 | ND | ND | ND |
| Tetrachloroethene | 0.50 | 0.20 | 0 | ND | ND | ND |
| 1,1,1-Trichloroethane | 0.50 | 0.16 | 0 | ND | ND | ND |
| 1,1,2-Trichloroethane | 0.50 | 0.27 | 0 | ND | ND | ND |
| Trichloroethene | 0.65 | 0.16 | 0 | 11 | 2.8 | ND |
| Vinyl Chloride | 0.90 | 0.10 | 0 | ND | ND | ND |
| Non-Halogenated Volatile Organics | | | | | | |
| Benzene | 0.50 | 0.13 | 0 | ND | ND | ND |
| Ethylbenzene | 0.50 | 0.15 | 0 | ND | ND | ND |
| Toluene | 0.50 | 0.25 | 0 | ND | ND | ND |
| Xylenes | 0.50 | 0.10 – 0.18 | 0 | ND | ND | ND |
| Other | | | | | | |
| Total Petroleum Hydrocarbons – Gasoline | 50 | 10 | 0 | ND | NM | ND |
| Total Petroleum Hydrocarbons – Diesel | 50 | 26 | 0 | 28 J | NM | ND |
| Total Petroleum Hydrocarbons – Motor Oil | 100 | 32 | 0 | ND | NM | ND |

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

^b Concentrations in **bold** exceeded discharge limits.

Notes:

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

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

TABLE 5

Summary of Metals Groundwater Analytical Data for June 2020 – South Base Boundary Groundwater Treatment Plant

| Constituent | Daily Maximum Effluent Limitation* (µg/L) | Detection Limit (µg/L) | 1 June 2020 (µg/L) | |
|-------------|---|---------------------------|-----------------------|------------------------------|
| | | | Influent | System Effluent ^b |
| Metals | | | | |
| Antimony | 8,600 | 5.2 | ND | ND |
| Arsenic | 59 | 4.4 | ND | ND |
| Beryllium | NA | 0.17 | ND | ND |
| Cadmium | 1.8 | 0.45 | ND | ND |
| Chromium | 340 | 0.66 | 5.8 J | 4.6 J |
| Copper | 5.8 | 4.2 | ND | ND |
| Lead | 5.2 | 2.7 | ND | ND |
| Manganese | NA | 1.9 | 13 | ND |
| Nickel | 14 | 2.6 | ND | ND |
| Selenium | 8.2 | 6.3 | ND | ND |
| Silver | 2.2 | 2.0 | ND | ND |
| Thallium | 13 | 4.9 | ND | ND |
| Zinc | 95 | 4.5 | 50 J | 4.5 J |

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

^b Concentrations in **bold** exceeded discharge limits

Notes:

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

NA = not applicable

µg/L = micrograms per liter

ND = not detected

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

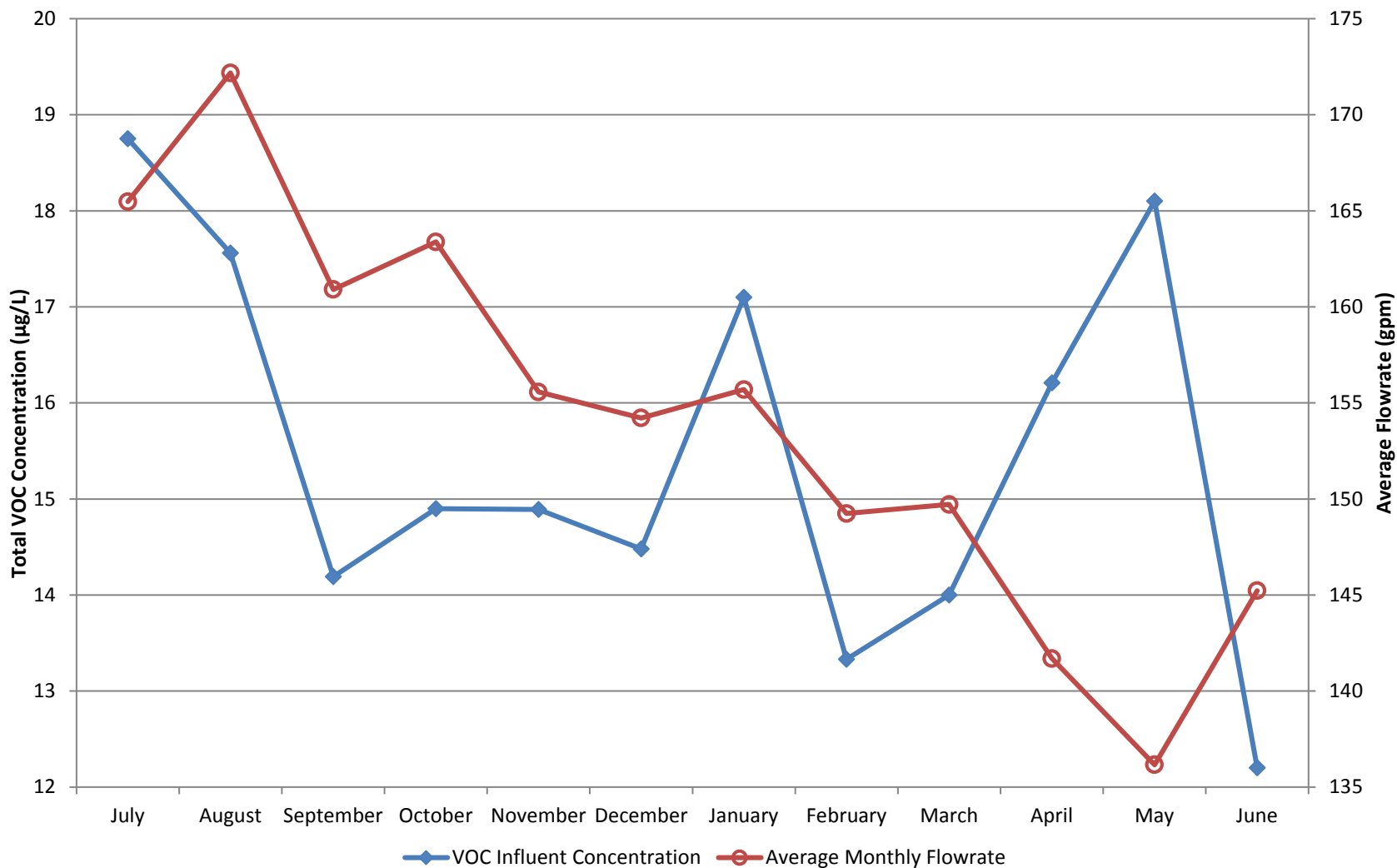
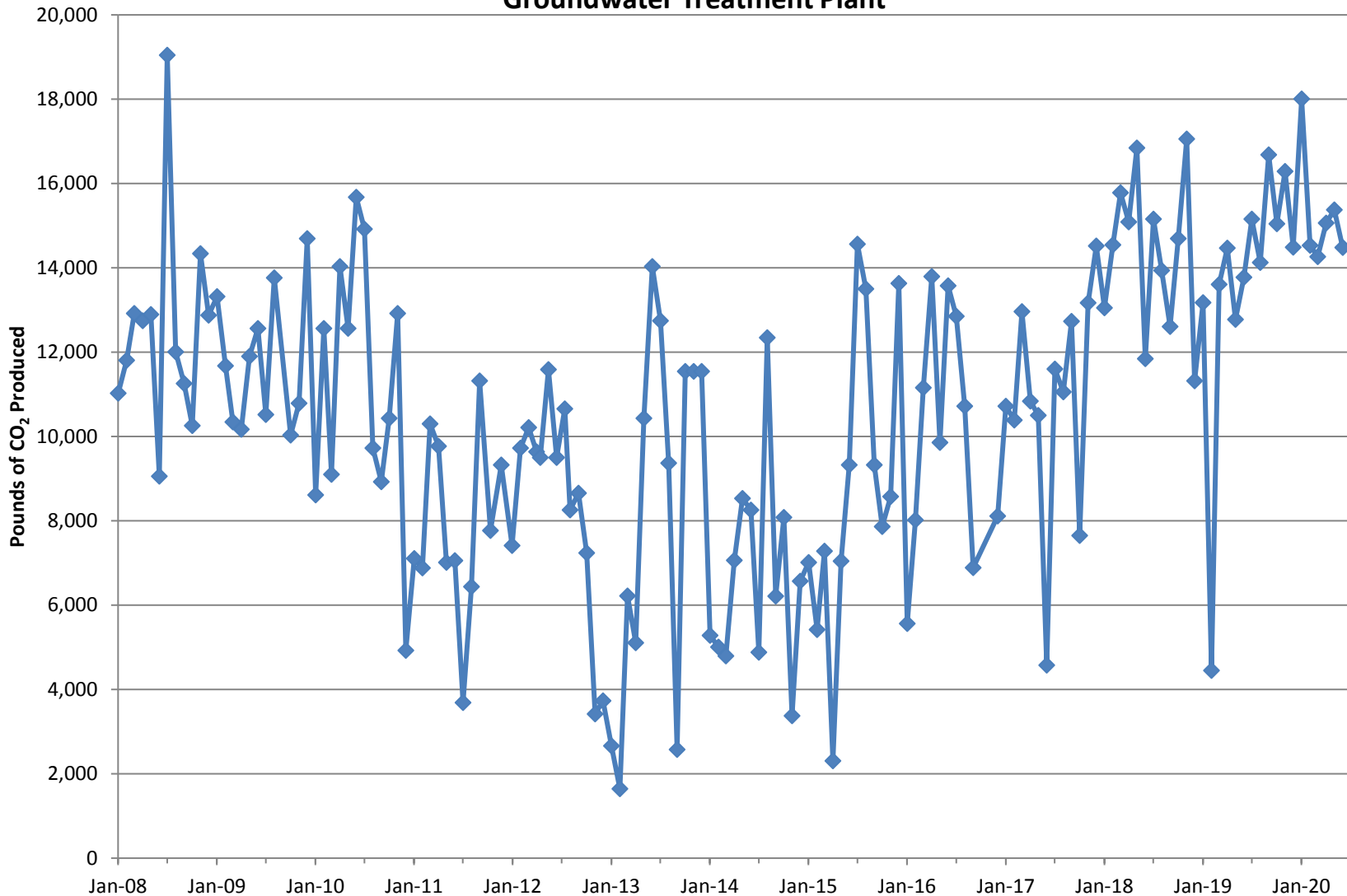


Figure 2

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



Central Groundwater Treatment Plant Monthly Data Sheet

Report Number: 251

Reporting Period: 1 June 2020 – 1 July 2020

Date Submitted: 10 July 2020

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

System Metrics

Table 1 presents operational data from the June 2020 reporting period.

| Table 1 – Operations Summary – June 2020 | | | | |
|---|-----------|--|-------------------------|--|
| Initial Data Collection: | | 6/1/2020 9:20 | Final Data Collection: | 7/1/2020 9:10 |
| Operating Time: | | Percent Uptime: | Electrical Power Usage: | |
| CGWTP: | 720 hours | CGWTP: | 100% | CGWTP: 2,253 kWh (2,555 lbs CO ₂ generated ^a) |
| Gallons Treated (discharge to storm sewer): 1,009,430 gallons | | Gallons Treated Since January 1996: 584.0 million gallons | | |
| VOC Mass Removed from groundwater: 1.55 lbs ^b | | VOC Mass Removed Since January 1996: 2,864 lbs from groundwater 8,686 lbs from vapor | | |
| Rolling 12-Month Cost per Pound of Mass Removed: \$2,507 ^c | | | | |
| Monthly Cost per Pound of Mass Removed: \$5,172 ^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 June 2020 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 – June 2020 | |
|---|-------------------------------------|
| Location | Average Flow Rate Groundwater (gpm) |
| EW001x16 | 11.4 |
| EW002x16 | 6.9 |
| EW003x16 ^b | 0.5 |
| EW605x16 | 7.1 ^c |
| EW610x16 | 2.0 ^c |
| CGWTP | 23.4 |
| ^a Flow rates calculated by dividing total gallons processed by system operating time for the month or the average of the instantaneous readings. | |
| ^b Extracted groundwater from EW003x16 is treated in Site SS016 bioreactor. | |
| ^c EW605x16 and EW610x16 were offline for construction in May 2020 and restarted on 2 June 2020. | |
| 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 | | | | | |

Summary of O&M Activities

Monthly groundwater treatment samples were collected at the CGWTP on 1 June 2020. Sample results are presented in Table 4. Samples collected in June 2020 were also analyzed for total metals (as required by the current General NPDES permit), and the results are presented in Table 5.

As is typical for this time of year (dry season), the total VOC concentration (184.24 µg/L) in the June 2020 influent sample has decreased significantly from the May 2020 sample (238.04 µg/L). During the June sampling event, EW605x16 and EW610x16 were off line as discussed below. TCE was the primary VOC detected in the influent sample at a concentration of 130 µg/L. No VOCs were detected in the samples collected after the first and second carbon vessels and in the effluent sample. The influent and effluent samples were also analyzed for TPH, and TPH-d was detected at concentrations of 30 J µg/L and 59 J µg/L, respectively. The TPH-d concentration in the effluent sample exceeded the effluent limitation of 50 µg/L. In accordance with discharge permit requirements, confirmation samples were collected in early July and the system continued to run while waiting for quick turnaround of the sample analysis. The confirmation data will be presented in the July monthly data sheet. Travis AFB will continue to monitor influent, midpoint, and effluent concentrations at the CGWTP for carbon breakthrough.

From the June metals analysis, chromium and manganese were detected in the influent sample. Manganese was detected in the system effluent sample, but at a concentration less than the effluent limitation.

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 along with a decreasing trend for the flow rate through the treatment plant. This pattern of decreasing well yield and VOC concentrations is typical for this time in the dry season.

EW605x16 and EW610x16 were both shut off on 16 May 2020 as a precautionary measure during installation of construction fencing around the KC-46 hangar project in the Oil Spill Area (OSA). Both wells were restarted on 2 June 2020.

The Site SS016 subgrade biogeochemical reactor (SBGR), also known as the bioreactor and the Site DP039 bioreactor, continued operating in June 2020. On 25 June, the DP039 extraction wells were shut down in preparation for the Site DP039 infiltration trench expansion scheduled for early July 2020.

Optimization Activities

No optimization activities occurred at the CGWTP in June 2020.

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 2,555 pounds of GHG during June 2020.

TABLE 4

Summary of Groundwater Analytical Data for June 2020 – Central Groundwater Treatment Plant

| | | | | 1 June 2020 (µg/L) | | | |
|---|---|------------------------------|-----|-----------------------|-------------------------------|-------------------------------|---------------------------------|
| Constituent | Instantaneous Maximum ^a (µg/L) | Detection Limit (µg/L) | N/C | Influent | After Carbon 1 Effluent | After Carbon 2 Effluent | System Effluent ^b |
| Halogenated Volatile Organics | | | | | | | |
| Acetone | NA | 1.9 – 3.8 | 0 | ND | ND | ND | ND |
| Bromomethane | NA | 0.21 – 0.42 | 0 | ND | ND | ND | ND |
| Carbon disulfide | NA | 0.17 | 0 | ND | ND | ND | ND |
| Chloroform | 1.9 | 0.16 – 0.32 | 0 | ND | ND | ND | ND |
| Chloromethane | NA | 0.30 – 0.60 | 0 | ND | ND | ND | ND |
| 1,2-Dichlorobenzene | NA | 0.15 – 0.30 | 0 | 0.31 J | ND | ND | ND |
| 1,3-Dichlorobenzene | NA | 0.13 – 0.26 | 0 | 0.34 J | ND | ND | ND |
| 1,4-Dichlorobenzene | NA | 0.16 – 0.32 | 0 | 0.18 J | ND | ND | ND |
| Bromodichloromethane | NA | 0.17 – 0.34 | 0 | ND | ND | ND | ND |
| 1,1-Dichloroethane | 0.50 | 0.22 – 0.44 | 0 | ND | ND | ND | ND |
| 1,2-Dichloroethane | 0.50 | 0.13 – 0.26 | 0 | ND | ND | ND | ND |
| 1,1-Dichloroethene | 0.50 | 0.23 – 0.46 | 0 | 0.53 J | ND | ND | ND |
| cis-1,2-Dichloroethene | 0.50 | 0.15 – 0.30 | 0 | 49 | ND | ND | ND |
| trans-1,2-Dichloroethene | 0.50 | 0.15 – 0.30 | 0 | 2.9 | ND | ND | ND |
| Tetrachloroethene | 0.50 | 0.20 – 0.40 | 0 | 0.49 J | ND | ND | ND |
| 1,1,1-Trichloroethane | 0.50 | 0.16 – 0.32 | 0 | ND | ND | ND | ND |
| 1,1,2-Trichloroethane | 0.50 | 0.27 – 0.54 | 0 | ND | ND | ND | ND |
| Trichloroethene | 0.65 | 0.16 – 0.32 | 0 | 130 | ND | ND | ND |
| Vinyl Chloride | 0.90 | 0.10 – 0.20 | 0 | 0.49 J | ND | ND | ND |
| Non-Halogenated Volatile Organics | | | | | | | |
| Benzene | 0.50 | 0.16 – 0.32 | 0 | ND | ND | ND | ND |
| Ethylbenzene | 0.50 | 0.16 – 0.32 | 0 | ND | ND | ND | ND |
| Toluene | 0.50 | 0.17 – 0.34 | 0 | ND | ND | ND | ND |
| Total Xylenes | 0.50 | 0.15 – 0.38 | 0 | ND | ND | ND | ND |
| Other | | | | | | | |
| Total Petroleum Hydrocarbons – Gasoline (C6 – C10) | 50 | 10 | 0 | ND | NM | NM | ND |
| Total Petroleum Hydrocarbons – Diesel (C10 – C28) | 50 | 25 | 1 | 30 J | NM | NM | 59 J |
| Total Petroleum Hydrocarbons – Motor Oil (C28 – C40) | 100 | 32 | 0 | ND | NM | NM | ND |

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

^b Concentrations in **bold** exceeded discharge limits

Notes:

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

J+ = analyte concentration is considered a biased high estimated value.

NA = not applicable

NM = not measured

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

µg/L = micrograms per liter

ND = not detected

TABLE 5

Summary of Metals Groundwater Analytical Data for June 2020 – Central Groundwater Treatment Plant

| Summary of Metals Groundwater Analytical Data for June 2020 - Central Groundwater Treatment Plant | | | | |
|---|---|------------------------|--------------------|------------------------------|
| Constituent | Daily Maximum Effluent Limitation* (µg/L) | Detection Limit (µg/L) | 1 June 2020 (µg/L) | |
| | | | Influent | System Effluent ^b |
| Metals | | | | |
| Antimony | 8,600 | 5.2 | ND | ND |
| Arsenic | 59 | 4.4 | ND | ND |
| Beryllium | NA | 0.17 | ND | ND |
| Cadmium | 1.8 | 0.45 | ND | ND |
| Chromium | 340 | 0.66 | 1.5 J | ND |
| Copper | 5.8 | 4.2 | ND | ND |
| Lead | 5.2 | 2.7 | ND | ND |
| Manganese | NA | 1.9 | 3.4 J | 2.7 J |
| Nickel | 14 | 2.6 | ND | ND |
| Selenium | 8.2 | 6.3 | ND | ND |
| Silver | 2.2 | 2.0 | ND | ND |
| Thallium | 13 | 4.9 | ND | ND |
| Zinc | 95 | 4.5 | ND | ND |

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

^b Concentrations in **bold** exceeded discharge limits

Notes:

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

NA = not applicable

µg/L = micrograms per liter

ND = not detected

Figure 1

CGWTP Total VOC Influent Concentrations and Average Flowrate Twelve Month History

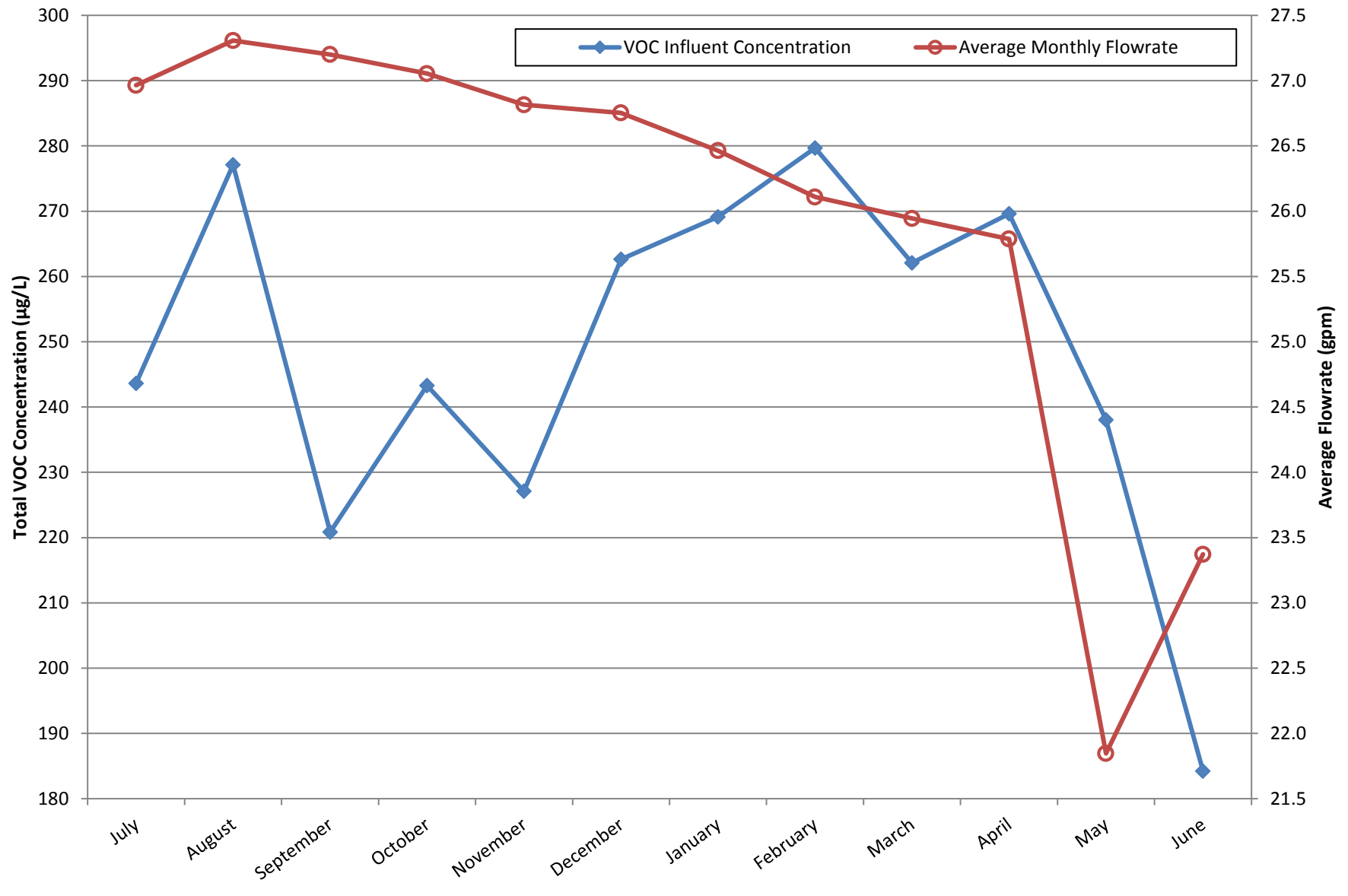
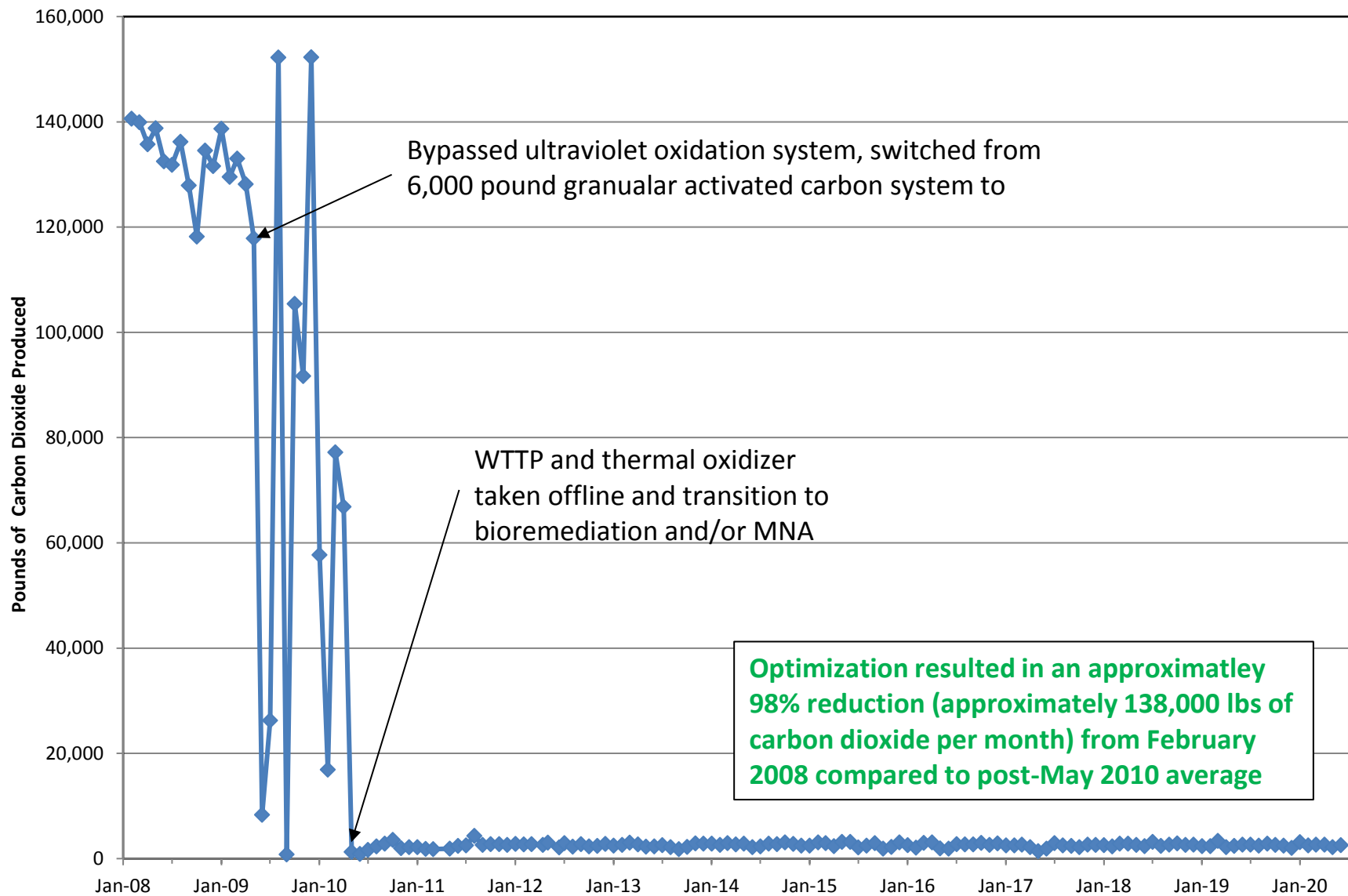


Figure 2

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



Subarea LF007C Groundwater Treatment Plant

Monthly Data Sheet

Report Number: 190

Reporting Period: 1 June 2020 – 1 July 2020

Date Submitted: 10 July 2020

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

System Metrics

Table 1 presents operational data from the June 2020 reporting period:

| Table 1 – Operations Summary – June 2020 | | | |
|---|-------------|---|------|
| Initial Data Collection: | | 6/1/2020 11:10 | |
| Final Data Collection: | | 7/1/2020 11:40 | |
| Operating Time: | | Percent Uptime: | |
| Electrical Power Usage ^a : | | | |
| LF007C GWTP: | 720.5 hours | LF007C GWTP | 100% |
| LF007C GWTP: | | 0 kWh | |
| Gallons Treated: 159,492 gallons | | Gallons Treated Since March 2000: 90.5 million gallons | |
| Volume Discharged to Duck Pond: 159,492 gallons | | | |
| VOC Mass Removed: 1.25 x 10 ⁻³ 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 June 2020 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 – June 2020 | | |
|--|--------------------------------------|-----------------------------------|
| Location | Average Flow Rate (gpm) ^a | Total Gallons Processed (gallons) |
| EW614x07 | 3.3 | 141,623 ^b |
| EW615x07 | 0.6 | 27,057 |
| LF007C GWTP | 3.7 | 159,492 |
| ^a Flow rates calculated by dividing total gallons processed by system operating time for the month or the average of the instantaneous readings. | | |
| ^b The extraction pump takes in air from the subsurface, which alters the flow and totalizer. An air-release valve was installed on 12 November 2019 to help minimize the effects on the system. | | |
| gpm = gallons per minute | | |

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

| Table 3 – Summary of System Shutdowns | | | | | |
|--|-----------------------------|-------------|----------------------------|-------------|--------------|
| Location | Shutdown^a | | Restart^a | | Cause |
| | Date | Time | Date | Time | |
| LF007C GWTP | 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 1 June 2020. Sample results are presented in Table 4. Samples collected in June 2020 were also analyzed for total metals (in accordance with the NPDES permit) and the results are presented in Table 5.

The total VOC concentration in the June 2020 influent sample was 0.94 µg/L. TCE and 1,2-DCA were the only VOCs detected at the influent sample location. No VOCs were detected in the midpoint and effluent sample locations. However, acetone, a common laboratory contaminant, was also detected in the influent and midpoint sampling locations.

The influent and effluent samples were also analyzed for TPH, and TPH-d was detected at concentrations of 49 J µg/L and 24 J µg/L, respectively, which are less than the effluent limitation of 50 µg/L.

From the June metals analysis, chromium, copper, manganese, nickel and zinc were detected in the influent sample, and chromium, lead, and zinc were detected in the system effluent sample. All reported concentrations in the effluent were less than the daily maximum effluent limitations, except for zinc. Confirmation samples for zinc were collected on 10 July 2020. Confirmation sample results will be presented in the July 2020 data sheet.

Figure 1 presents a chart of influent concentrations (total VOCs) at the LF007C GWTP versus time for the past twelve (12) months. VOC concentrations, primarily TCE, have been seasonally variable; however, over the last 12 months the trend has been flat. The average flow rate through the LF007C GWTP has decreased over the last 12 months.

Optimization Activities

No optimization activities occurred at the LF007C GWTP in June 2020.

Sustainability

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

Figure 2 presents the historical GHG production from the systems associated with the NGWTP and LF007C GWTP. The LF007C GWTP is a solar-only operated treatment system and does not generate GHG, with exception of a small amount of GHG generated from changing out the GAC averaged to a per month basis.

TABLE 4

Summary of Groundwater Analytical Data for June 2020 – Subarea LF007C Groundwater Treatment Plant

| Constituent | Instantaneous Maximum ^a (µg/L) | Detection Limit (µg/L) | N/C | 1 June 2020 (µg/L) | | |
|--|---|------------------------------|-----|-----------------------|----------------|-----------------------|
| | | | | Influent | After Carbon 1 | Effluent ^b |
| Halogenated Volatile Organics | | | | | | |
| Acetone | NA | 2.1 | 0 | 2.6 J | 2.5 J | ND |
| Bromodichloromethane | 5.0 | 0.29 | 0 | ND | ND | ND |
| Bromoform | 5.0 | 0.10 | 0 | ND | ND | ND |
| 2-Butanone | 5.0 | 0.35 | 0 | ND | ND | ND |
| Carbon Tetrachloride | 0.5 | 0.15 | 0 | ND | ND | ND |
| Chloroform | 5.0 | 0.12 | 0 | ND | ND | ND |
| Chloromethane | NA | 0.30 | 0 | ND | ND | ND |
| Dibromochloromethane | 5.0 | 0.13 | 0 | ND | ND | ND |
| Dichlorodifluoromethane | NA | 0.31 | 0 | ND | ND | ND |
| 1,3-Dichlorobenzene | 5.0 | 0.11 | 0 | ND | ND | ND |
| 1,4-Dichlorobenzene | 5.0 | 0.13 | 0 | ND | ND | ND |
| 1,1-Dichloroethane | 5.0 | 0.15 | 0 | ND | ND | ND |
| 1,2-Dichloroethane | 0.5 | 0.22 | 0 | 0.31 J | ND | ND |
| 1,1-Dichloroethene | 5.0 | 0.14 | 0 | ND | ND | ND |
| cis-1,2-Dichloroethene | 5.0 | 0.10 | 0 | ND | ND | ND |
| trans-1,2-Dichloroethene | 5.0 | 0.11 | 0 | ND | ND | ND |
| Methylene Chloride | 5.0 | 0.35 | 0 | ND | ND | ND |
| Tetrachloroethene | 5.0 | 0.15 | 0 | ND | ND | ND |
| 1,1,1-Trichloroethane | 5.0 | 0.19 | 0 | ND | ND | ND |
| 1,1,2-Trichloroethane | 5.0 | 0.31 | 0 | ND | ND | ND |
| Trichloroethene | 5.0 | 0.13 | 0 | 0.63 J | ND | ND |
| Vinyl Chloride | 0.5 | 0.22 | 0 | ND | ND | ND |
| Non-Halogenated Volatile Organics | | | | | | |
| Benzene | 1.0 | 0.13 | 0 | ND | ND | ND |
| Ethylbenzene | 5.0 | 0.15 | 0 | ND | ND | ND |
| Toluene | 5.0 | 0.25 | 0 | ND | ND | ND |
| Xylenes | 5.0 | 0.10 – 0.18 | 0 | ND | ND | ND |
| Other | | | | | | |
| Total Petroleum Hydrocarbons – Gasoline | 50 | 10 | 0 | ND | NM | ND |
| Total Petroleum Hydrocarbons – Diesel | 50 | 5.5 | 0 | 49 J | NM | 24 J |
| Total Petroleum Hydrocarbons – Motor Oil | 100 | 32 | 0 | ND | NM | ND |

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

Notes:

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

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

TABLE 5

Summary of Metals Groundwater Analytical Data for June 2020 – Subarea LF007C Groundwater Treatment Plant

| Constituent | Daily Maximum Effluent Limitation* (µg/L) | Detection Limit (µg/L) | 1 June 2020 (µg/L) | |
|-------------|---|---------------------------|-----------------------|------------------------------|
| | | | Influent | System Effluent ^b |
| Metals | | | | |
| Antimony | 8,600 | 5.2 | ND | ND |
| Arsenic | 59 | 4.4 | ND | ND |
| Beryllium | NA | 0.17 | ND | ND |
| Cadmium | 1.8 | 0.45 | ND | ND |
| Chromium | 340 | 0.66 | 1.2 J | 1.2 J |
| Copper | 5.8 | 4.2 | 5.9 J | ND |
| Lead | 5.2 | 2.7 | ND | 3.4 J |
| Manganese | NA | 1.9 | 4.5 J | ND |
| Nickel | 14 | 2.6 | 7.0 J | ND |
| Selenium | 8.2 | 6.3 | ND | ND |
| Silver | 2.2 | 2.0 | ND | ND |
| Thallium | 13 | 4.9 | ND | ND |
| Zinc | 95 | 4.5 | 130 J | 98 J |

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

^b Concentrations in **bold** exceeded discharge limits

Notes:

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

NA = not applicable

ND = not detected

µg/L = micrograms per liter

Figure 1

LF007CGWTP Total VOC Influent Concentrations and Average Flowrate Twelve Month History

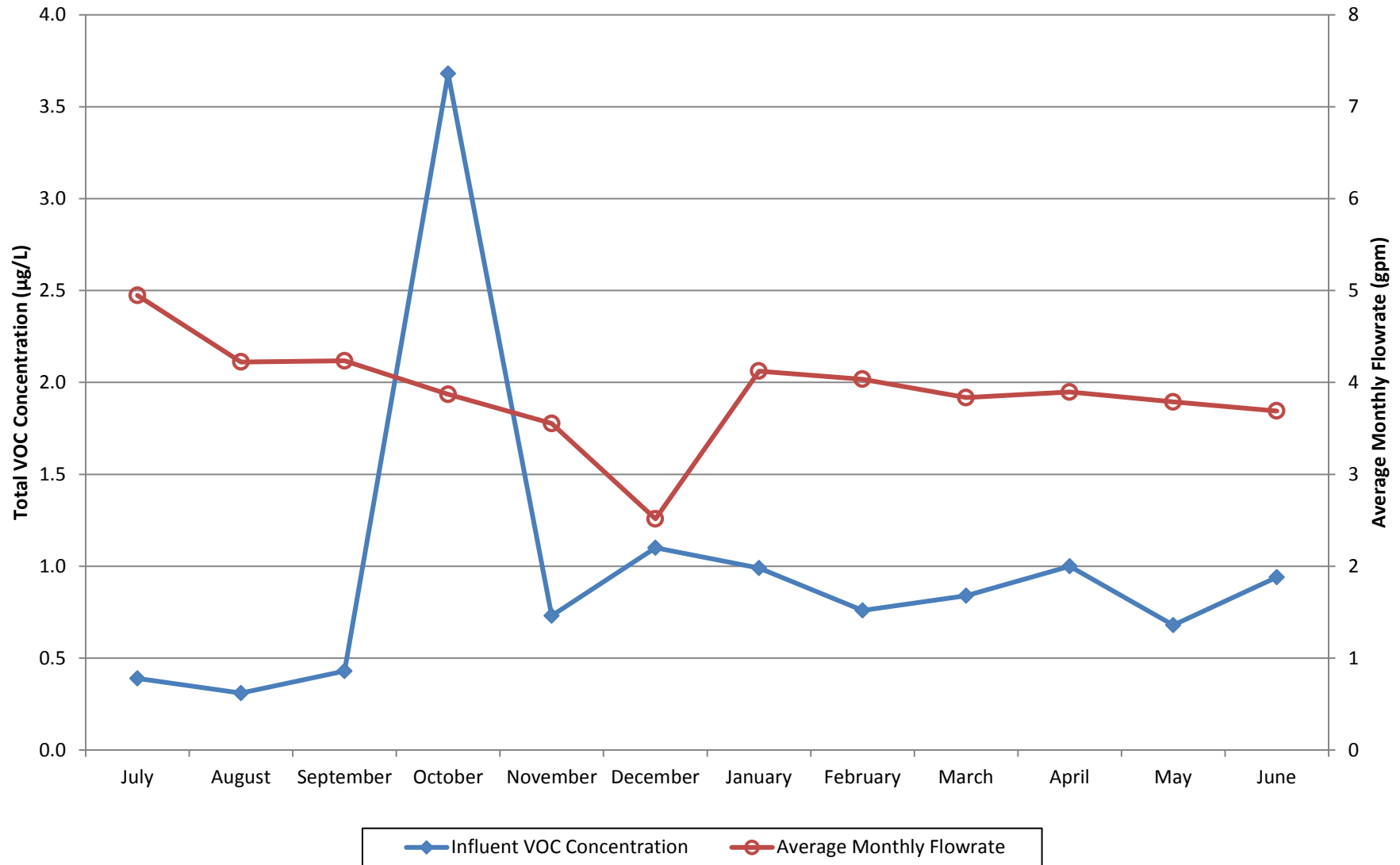
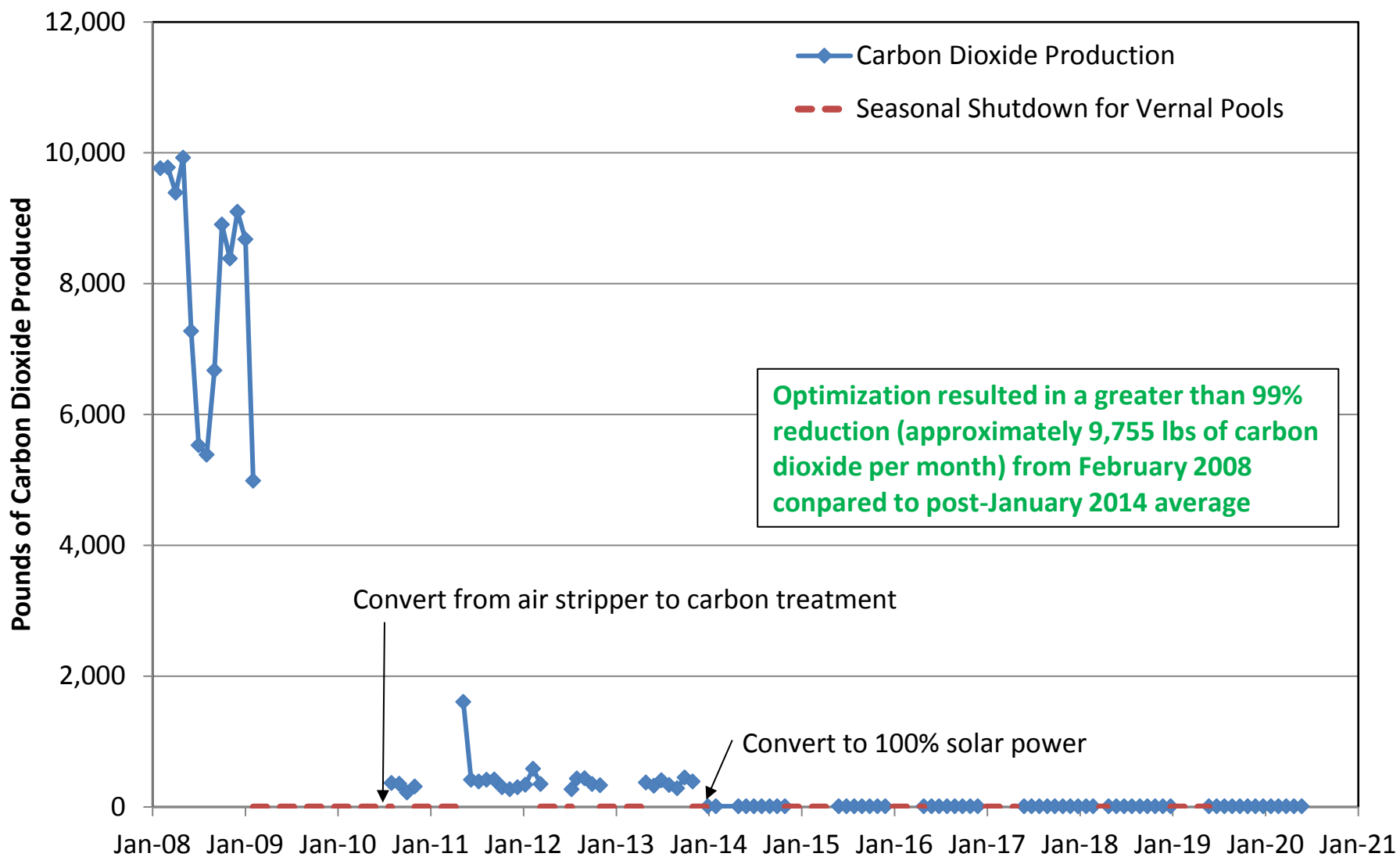


Figure 2
Equivalent Pounds of Carbon Dioxide Produced by the NGWTP/LF007C GWTP



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: 112

Reporting Period: 1 June 2020 – 1 July 2020

Date Submitted: 10 July 2020

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

System Metrics

Table 1 presents operation data from the June 2020 reporting period.

| Table 1 – Operations Summary – June 2020 | | | |
|--|--|---|---|
| Initial Data Collection: 6/1/2020 12:45 | | Final Data Collection: 7/1/2020 10:30 | |
| Operating Time: | | Percent Uptime: | Electrical Power Usage: |
| ST018GWTP: 627 hours | | ST018GWTP: 87.2% | ST018GWTP: 58 kWh (43 lbs CO ₂ generated ^a) |
| Gallons Extracted: 106,280 gallons | | Gallons Extracted Since March 2011: 19.3 million gallons | |
| Volume Discharged to Sanitary Sewer: 106,280 gallons | | Final Totalizer Reading: 19,284,789 gallons | |
| Cumulative Volume Discharged to Sanitary Sewer since 1 November 2014: 12.8 million gallons | | | |
| MTBE, BTEX, VOC, TPH Mass Removed: 0.04 lbs^b | | MTBE, BTEX, VOC, TPH Mass Removed Since March 2011: 49.3 lbs | |
| MTBE (Only) Removed: 0.02 lbs^b | | MTBE (Only) Mass Removed Since March 2011: 12.1 lbs | |
| Rolling 12-Month Cost per Total Pounds of Mass Removed: \$63,027 ^{bc} | | | |
| Monthly Cost per Pound of Mass Removed: \$189,543 ^{bc} | | | |
| ^a SiteWise™ estimate that 1 kilowatt hour generated produces 0.74 pounds of GHG. | | | |
| ^b Calculated using June 2020 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 – June 2020 | | |
|--|--|---------------------------|
| Location | Average Flow Rate Groundwater (gpm)^a | Hours of Operation |
| EW2014x18 | 2.0 | 625 |
| EW2016x18 | 0.6 | 601 |
| EW2019x18 | 0.0 | Offline ^b |
| EW2333x18 | 2.2 | 605 |
| ST018GWTP | 2.8 | 626 |
| ^a Flow rates calculated by dividing total gallons processed by amount of operating time of the pump/system. ^b Extraction well was turned off with regulatory approval on 25 November 2019 because of low MTBE concentrations. 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 | |
| ST018 | 18 June 2020 | 17:30 | 22 June 2020 | 13:30 | High pressure 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 1 June 2020. Because the extracted groundwater is no longer treated with carbon prior to discharge to the sanitary sewer, only discharge samples are now collected, rather than influent and effluent samples. Results are presented in Table 4. The complete June 2020 laboratory data report is available upon request. The MTBE discharge concentration during the June 2020 sampling event was 17 µg/L, which is a decrease from the May 2020 sample result of 18 µg/L. A number of other fuel-related constituents were also detected in the system discharge sample and are listed in Table 4.

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

Figure 1 presents plots of the average flow rate and total extracted contaminants (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 typical flow rates decreasing during the dry season (summer and fall) and increasing during the rainy season (winter and spring). The overall average flow rates in the past 12 months show a decreasing trend, which is partially attributed to the

shutdown of EW2019x18 in November 2019. The extracted MTBE concentrations and extracted total concentrations have generally been fluctuating over the past 12 months also with an overall decreasing trend.

On 18 June, the ST018GWTP was shut down because of a high-pressure alarm. Because the bag filters and GAC vessels have been removed, it is likely the pressure sensor malfunctioned. Since the pressure sensor no longer serves a purpose, the pressure switch will be bypassed to avoid future false high-pressure alarms. The ST018GWTP was restarted on 22 June without issue.

The totalizer for EW2014x18 was replaced on 24 June 2020. The well remains on line.

Optimization Activities

No optimization activities occurred at the ST018GWTP in June 2020.

Sustainability

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

Figure 2 presents the historical GHG production from the ST018GWTP. The ST018GWTP produced 43 pounds of GHG during June 2020 and removed 106,280 gallons of water. The amount of GHG produced is directly attributed to the amount of water removed through the system because the only line-power electrical use is for a transfer pump to push the water from the system to the sanitary sewer.

TABLE 4

Summary of Groundwater Analytical Data for June 2020 – Site ST018 Groundwater Treatment Plant

| Summary of Groundwater Analytical Data for June 2020 – Site C-1710 Groundwater Treatment Plant | | | | |
|--|---|---------------------------|-----|-------------------------------|
| Constituent | Instantaneous Maximum ^a (µg/L) | Detection Limit (µg/L) | N/C | 1 June 2020 (µg/L) |
| | | | | System Discharge ^b |
| Fuel Related Constituents | | | | |
| Methyl tert-Butyl Ether | 6,400 | 0.25 | 0 | 17 |
| Benzene | 25,000 ^c | 0.16 | 0 | 0.16 J |
| Ethylbenzene | 25,000 ^c | 0.16 | 0 | ND |
| Toluene | 25,000 ^c | 0.17 | 0 | ND |
| Total Xylenes | 25,000 ^c | 0.19 – 0.34 | 0 | ND |
| Total Petroleum Hydrocarbons – Gasoline | 50,000 ^d | 10 | 0 | ND |
| Total Petroleum Hydrocarbons – Diesel | 50,000 ^d | 15 | 0 | 29 J |
| Total Petroleum Hydrocarbons – Motor Oil | 100,000 | 160 | 0 | ND |
| Other | | | | |
| Acetone | NA | 1.9 | 0 | 3.2 J |
| 1,2-Dichloroethane | 20 | 0.13 | 0 | 0.66 J |
| Isopropylbenzene | NA | 0.19 | 0 | ND |
| Naphthalene | NA | 0.22 | 0 | ND |
| N-Propylbenzene | NA | 0.16 | 0 | ND |

^a In accordance with the Fairfield-Suisun Sewer District Discharge Limitations^b Concentrations in **bold** exceeded discharge limits^c The limit of 25,000 µg/L is a combined limit for BTEX.^d The limit of 50,000 µg/L is a combined limit for TPH-g and TPH-d.

µg/L = micrograms per liter

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

NA = not applicable

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

ND = not detected above method detection limit.

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

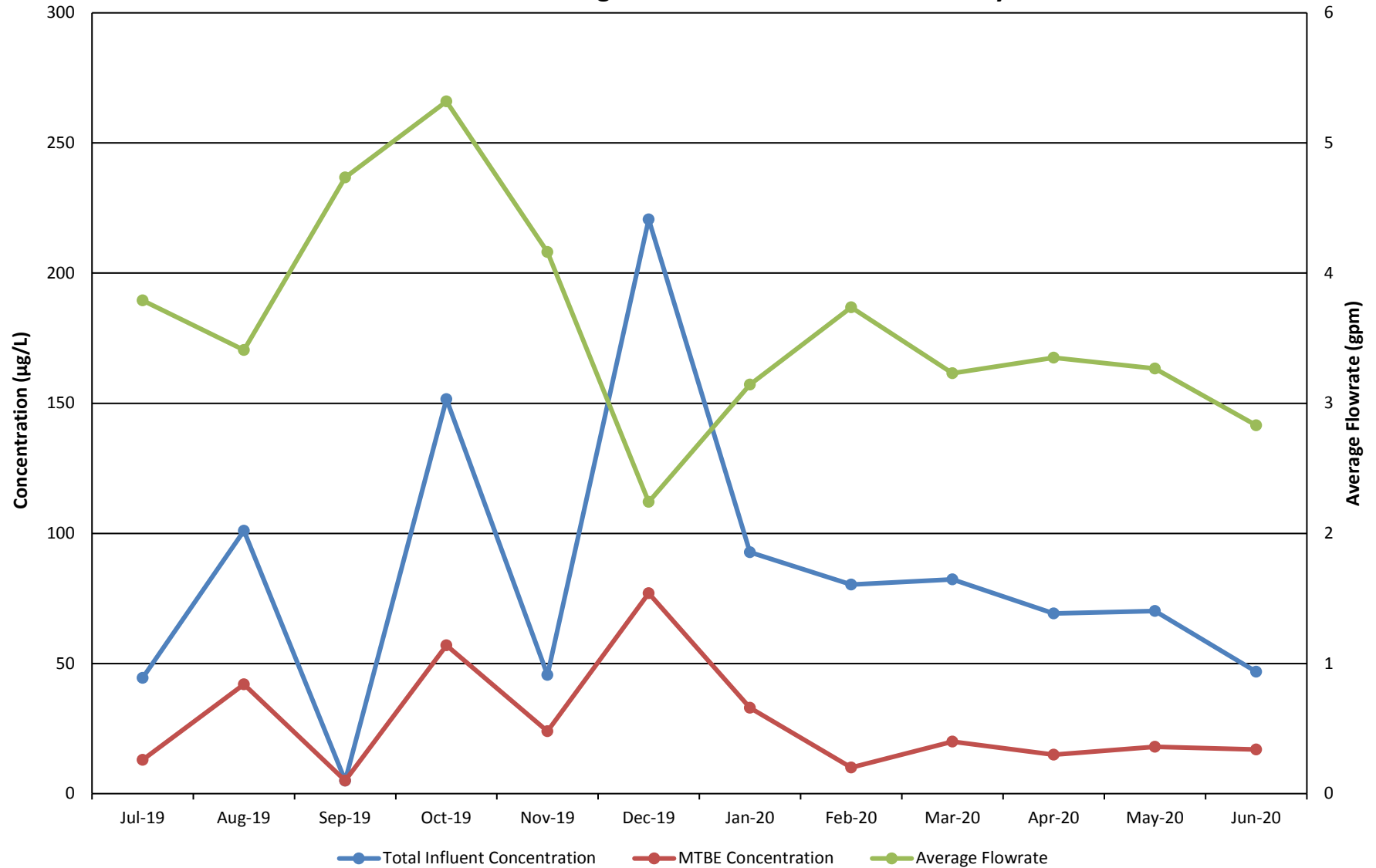
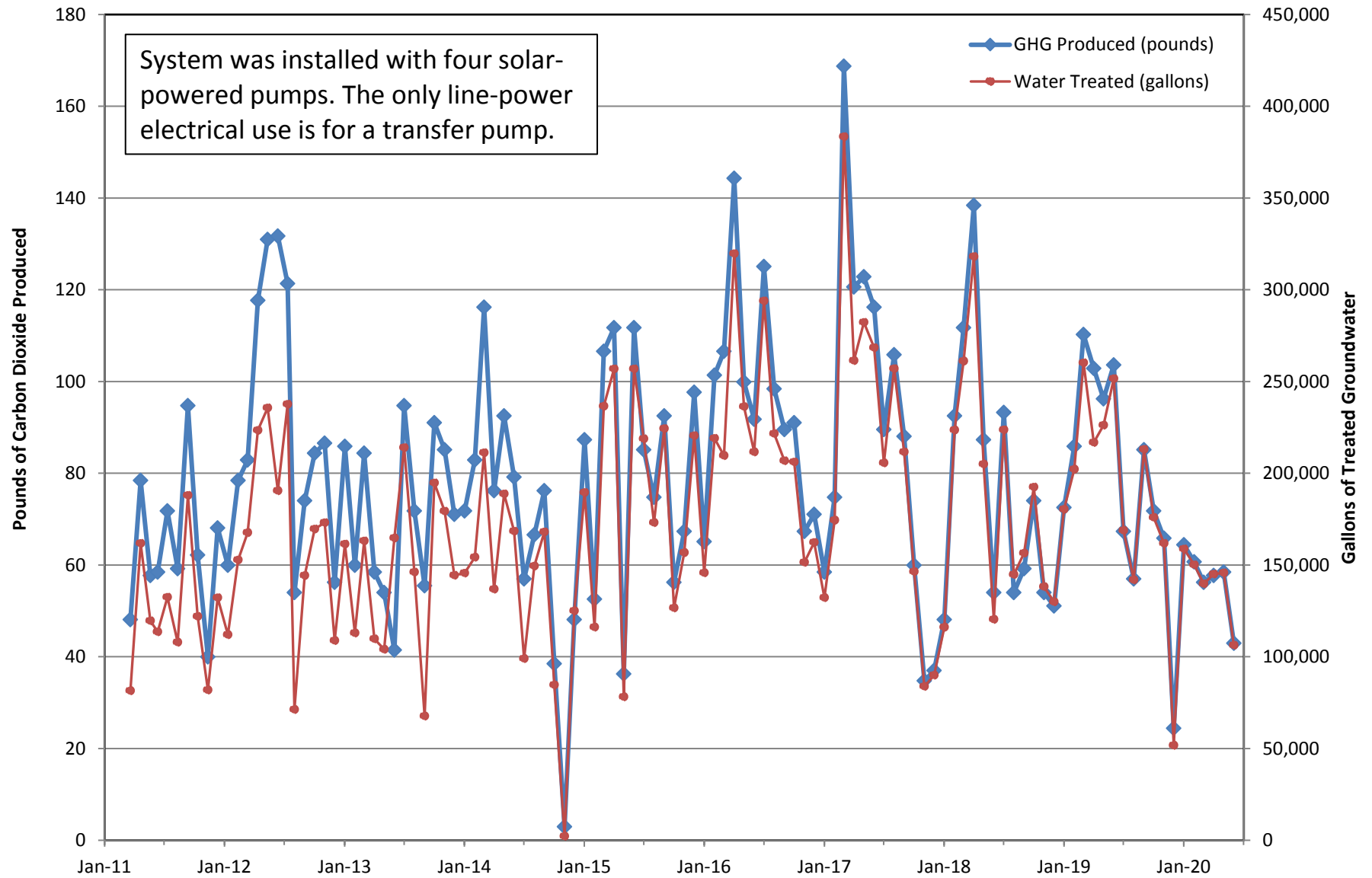


Figure 2

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



Technology Demonstration Update

July 15, 2020

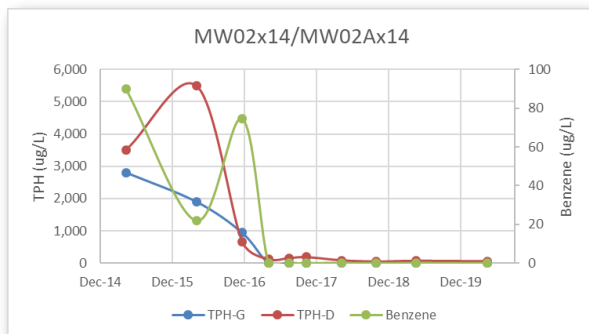
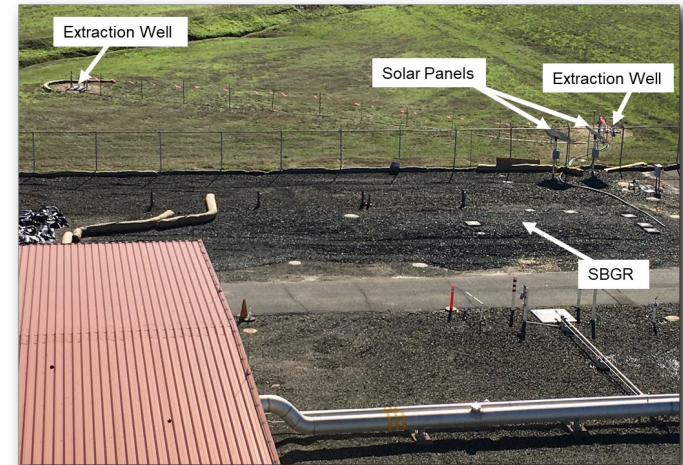
Overview

- Technology demonstrations (TDs) conducted at several Travis AFB sites are reaching the end of the performance evaluation period
- Presentation provides preliminary conclusions on TD performance based on data collected through 2Q20
- Broken into COC classes:
 - Petroleum TDs: SS014, SD034
 - Chlorinated volatile organic compounds (CVOC) TDs: SD031, FT004, FT005, multi-site (ST027 and SD036), and LF006

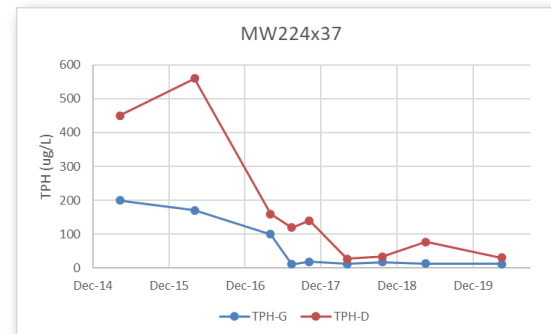
Petroleum Technology Demonstration Projects (1)

SS014: Recycled Drywall Subgrade Biogeochemical Reactor (SBGR)

- Evaluate the effectiveness of sulfate (gypsum from crushed drywall) to enhance anaerobic biodegradation of petroleum in groundwater
- Results after ~4 years:**
 - >99% reduction in source area concentrations (TPH-G, TPH-D, and Benzene)
 - >93% reduction in downgradient extraction well concentrations (TPH-G & TPH-D)
 - Cost: ~\$100 per pound of TPH treated
- Preliminary Conclusions:**
 - Plume continues to shrink and SBGR requires minimal O&M
 - TD was successful and technology should be considered for relevant Air Force sites
 - Cheaper overall cost and more sustainable than aerobic “washboard” SBGR (sister TD at site SD034, see next slide), but more cost per pound due to lower mass at SS014
 - Continue to operate SBGR and evaluate incorporating as part of the remedy



Source Area



Downgradient Extraction Well

Petroleum Technology Demonstration Projects (2a)

SD034: Aerobic “Washboard” Subgrade Biogeochemical Reactor (SBGR)

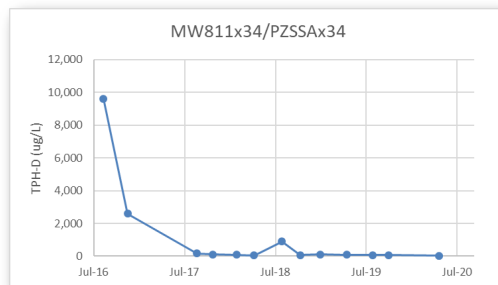
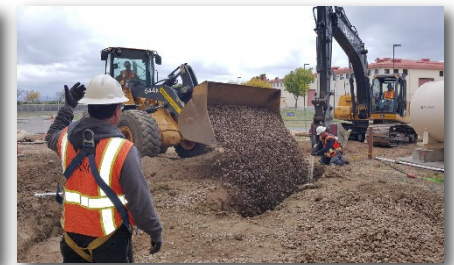
- Evaluate the effectiveness of an oxygen-enhancing SBGR to increase aerobic biodegradation of Stoddard solvent (measured as TPH as diesel [TPH-D]) in groundwater

- **Results after ~4 years:**

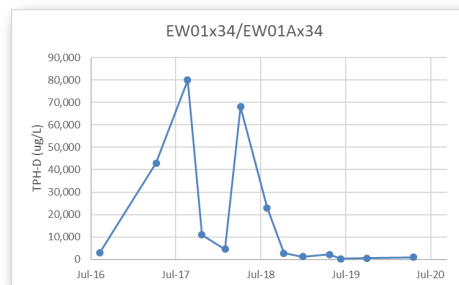
- Source area (MW811x34/PZSSAx34) concentration **reduced >99%** (9,600 to 23 J ug/L)
- Plume hot spots:
 - EW01x34 concentration **reduced ~99%** from max of 80,000 ug/L (2Q17) to 950 ug/L (2Q20 at EW01Ax34)
 - MW02x34 concentration **reduced ~86%** from max of 21,000 ug/L (3Q17) to 2,900 ug/L (2Q20)
- Cost: ~\$50 per pound of TPH treated

- **Preliminary Conclusions:**

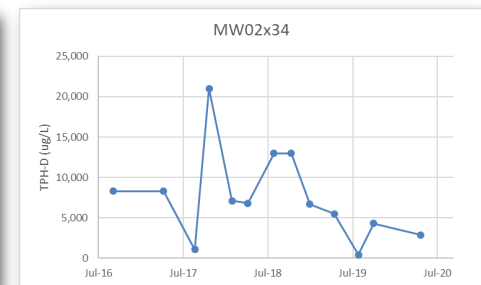
- Aerobic treatment process for this **TD was successful** and “washboard” has allowed solubilization/mobilization of residual LNAPL within the treatment area, which will reduce overall cleanup timeframe by decades. Consider for other relevant Air Force sites.
- Greater total cost than Drywall SBGR, but it was cheaper on a cost per pound basis based on the high mass required to be treated. Also, there is less concern with biogas near buildings, able to operate in a flexible manner, and easily upgrade/optimize
- Incorporate into remedy as part of future ROD Amendment



Source Area



Plume Hot Spots

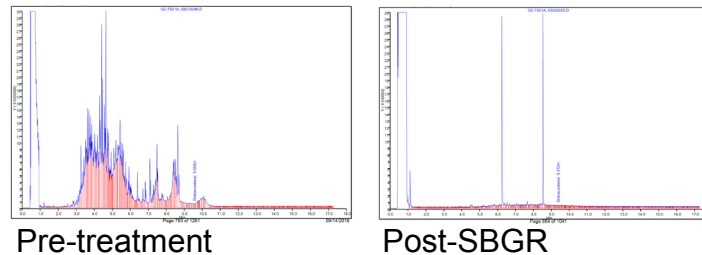


Petroleum Technology Demonstration Projects (2b)

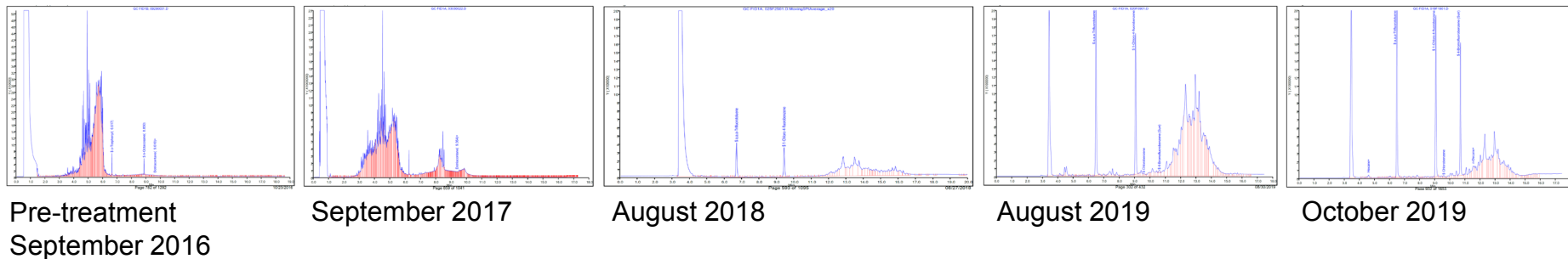
SD034: Aerobic “Washboard” Subgrade Biogeochemical Reactor (SBGR), continued

- Chromatogram review indicates we had two separate TPH sources
- Oil/water separator (OWS) source was known, but separate source under the building was unknown

OWS Source Area



MW02x34



Lighter-end TPH-D, similar to OWS source

Lighter TPH-D gone, heavier TPH-D/M arrives

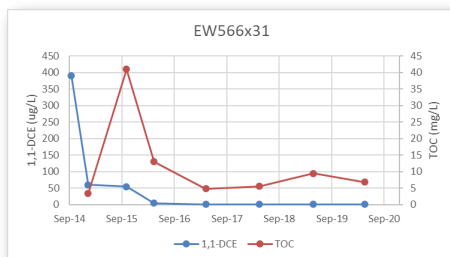
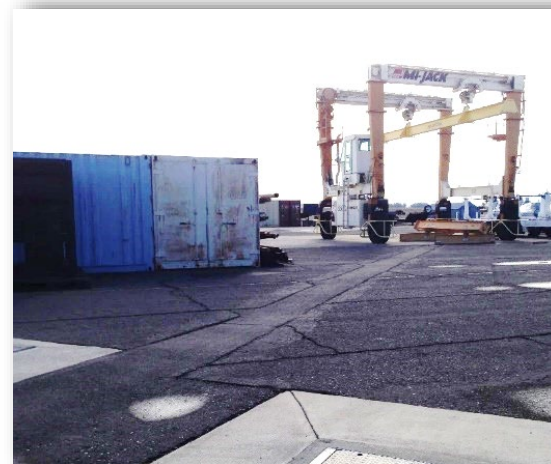
Peak of heavier TPH

Heavier TPH waning

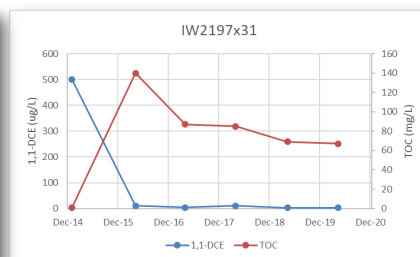
CVOC Technology Demonstration Projects (3)

SD031: EVO distribution via Gravel Chimneys

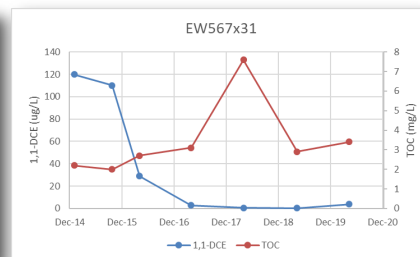
- Determine if EVO injection and recirculation of groundwater through gravel chimneys can effectively distribute TOC horizontally in the subsurface to support ERD of 1,1-DCE
- **Results after ~5 years:**
 - TOC concentrations increased (and remain elevated) compared to baseline
 - Previous max 1,1-DCE concentration of 390 ug/L (EW566x31) reduced to ND
 - Great results within recirculation zone, even though TPH soil contamination identified
 - Cross-gradient plume identified after recirc started, but concentrations are dropping
- **Preliminary Conclusions:**
 - Recirculation of EVO and corresponding 1,1-DCE reductions were achieved within the recirculation cell
 - Injection capacity of gravel chimneys reduced over time and may be a limitation for application at larger-scale sites
 - **TD was successful** and technology should be considered for relevant Air Force sites
 - Operation can cease because cleanup levels achieved for 1,1-DCE in target area, but Air Force may consider incorporation into remedy as part of future ROD Amendment depending on outcome of additional RI work related to newly identified soil contamination



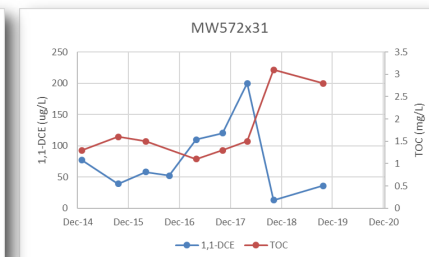
Source Area



Hot Spot



Down-gradient



Cross-gradient

CVOC Technology Demonstration Projects (4)

FT004: Distribution of EVO via SBGR and/or Groundwater Extraction

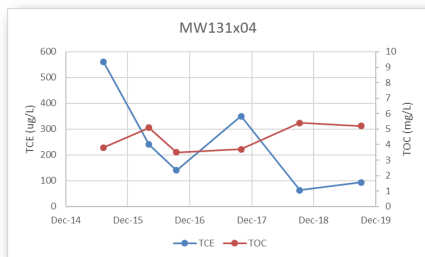
- Determine effectiveness of TOC distribution through two different enhanced reductive dechlorination (ERD) approaches: (1) groundwater TOC recirculation using a combination EVO injection, infiltration SBGR trenches, and groundwater extraction; and (2) EVO injection with groundwater extraction

Results after ~4 years:

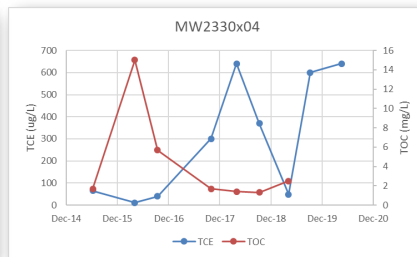
- Temporary TOC increases observed in some areas, but other lines of evidence show ERD increased over larger area
- Previous max TCE concentration of 560 ug/L (MW131x04) reduced to 94 ug/L (4Q19)
- 100 ug/L TCE plume extent reduced 90% and 5 ug/L TCE extent reduced 53%
- Able to successfully implement technology within endangered species habitat

Preliminary Conclusions:

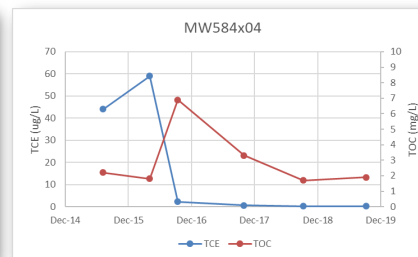
- Recirculation of EVO and corresponding TCE reductions were achieved
- We discovered previously unidentified contamination under vernal pools. This is a benefit of recirculation versus injection-only strategies because it allows us to find and treat previously unknown plume hot spots
- TD was successful** and technology should be considered for relevant Air Force sites
- Continue to operate and incorporate into remedy as part of future ROD Amendment



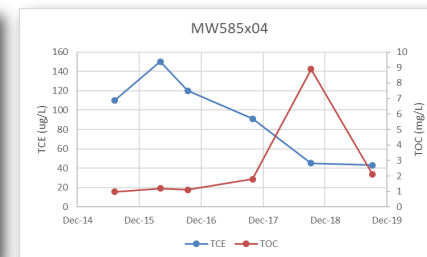
Northern Hot Spot



Vernal Pool Hot Spot



Down-gradient

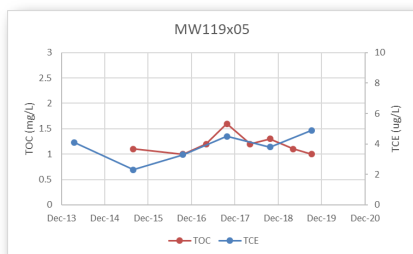


Cross-gradient

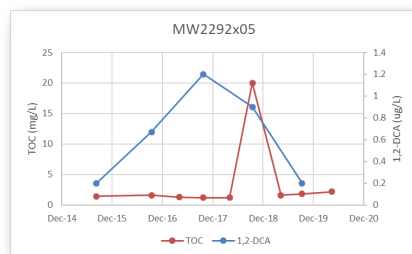
CVOC Technology Demonstration Projects (5)

FT005: Distribution of EVO and KB-1 Plus

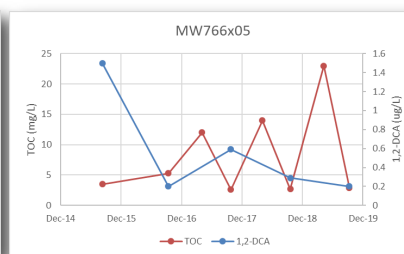
- Evaluate total organic carbon (TOC) dispersion distances and rates for optimizing the remediation of 1,2-dichloroethane (DCA) in groundwater
- **Results after ~4 years:**
 - FT005 north area: **No significant TOC increase** (although COCs are near or below MCLs)
 - FT005 central area: **Sporadic TOC increase observed**, but this may be due to natural organics. Increases seem to be tied to precipitation events. Newly installed extraction wells are effectively capturing the remaining 1,2-DCA plume and concentrations are decreasing
 - FT005 south area: No TOC increase observed in this control area: Newly installed extraction wells are effectively capturing the remaining 1,2-DCA hot spots and concentrations are decreasing
- **Preliminary Conclusions:**
 - Injected EVO may be adsorbed to sediments or being consumed faster than spread can be observed at downgradient wells as measured by TOC concentrations
 - **TD was NOT successful** based on the original goal of understanding how far TOC could be dispersed. However, the TD did help to reduce COC concentrations, even though we could not observe dissolved organic carbon changes at great distances from the injection locations
 - Continue to operate existing GET remedy as planned until residual COCs have reached cleanup levels (getting close)



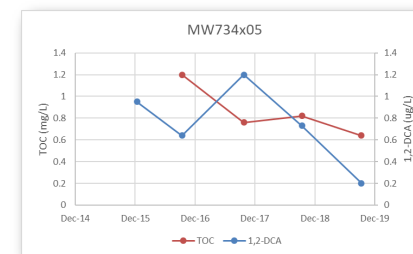
Northern Plume



140 feet from injection,
within central plume



Edge of central plume



Control Area

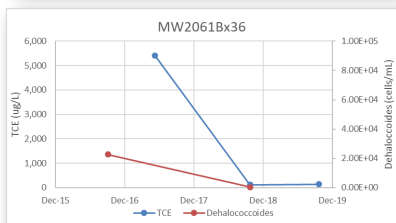
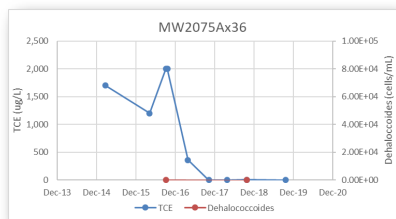
CVOC Technology Demonstration Projects (6)

Multisite Bioaugmentation: EVO and KB-1 Plus

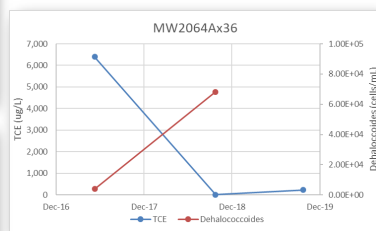
- Evaluate if addition of bioaugmentation substrate to an EVO injection will increase the rate of CVOC degradation
- **Results after ~3+ years:**
 - **SD036:** Significant TCE reductions in all areas of the site regardless of bioaugmentation. **Inconclusive if bioaugmentation was beneficial**, ultimately performance was dictated by the additional injection wells installed to treat upgradient source mass near MW064Ax36
 - **ST027:** Better performance at bioaugmentation area, but **test is inconclusive** because this may just be due to resulting treatment upgradient from the new injection wells because *Dehalococcoides* did not increase
- **Preliminary Conclusions:**
 - No significant difference in degradation rates based on the abundance of *Dehalococcoides* or as a result of bioaugmentation. This indicates other bacteria or abiotic processes may play a key role at ERD sites at Travis AFB.
 - **TD was successful** at determining that **bioaugmentation does not appear to provide a significant benefit at Travis AFB**
 - Continue to implement existing remedies at each site without any changes



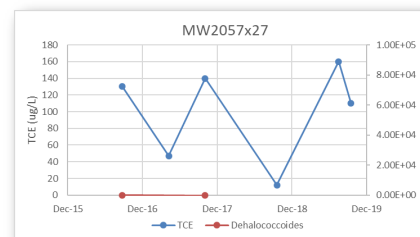
KB-1 Plus photo from SIREM
(www.siremlab.com)



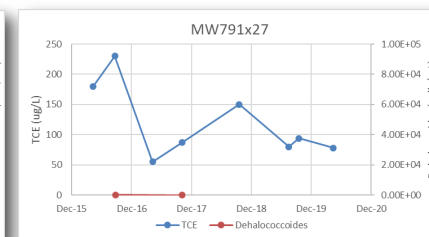
SD036 EVO Only



SD036 Bioaugmentation



ST027 EVO Only

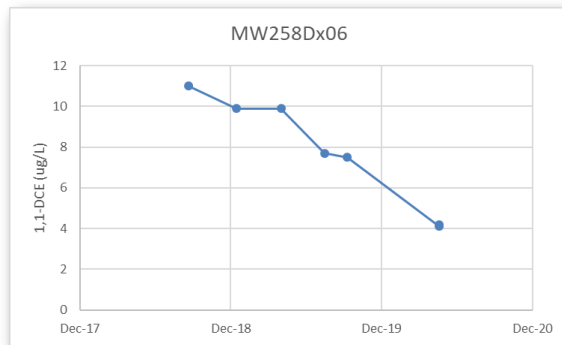
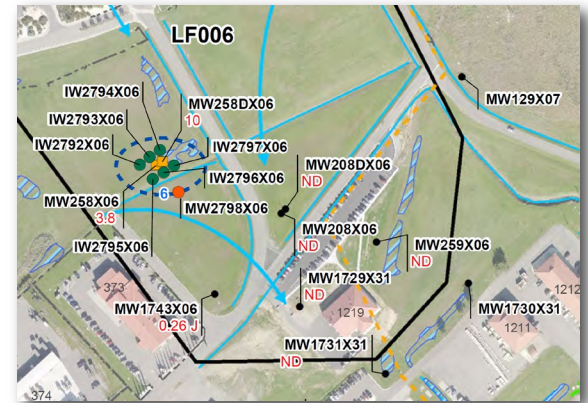


ST027 Bioaugmentation

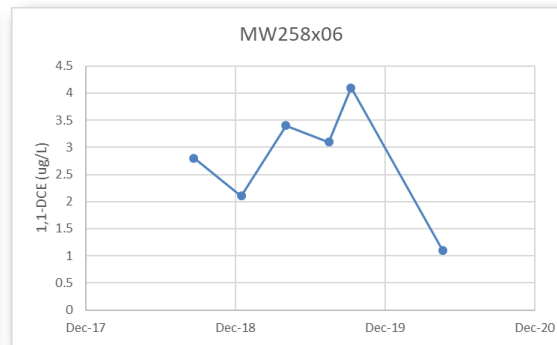
CVOC Technology Demonstration Projects (7)

LF006: Lactoil amended with sulfidated zero valent iron (ZVI)

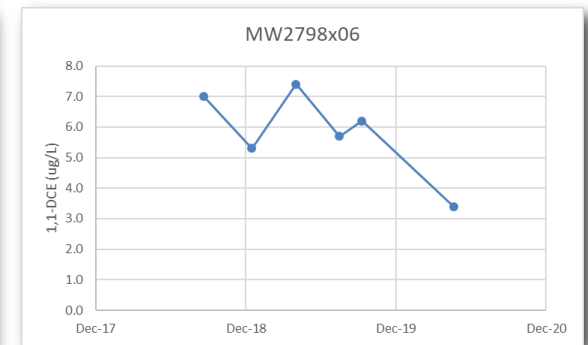
- Evaluate injection of Lactoil with sulfidated ZVI compared to EVO and iron pyrite chimney approach at SD031
- **Results after ~1.5 years:**
 - Plume hot spot and downgradient well have been **reduced to below 1,1-DCE cleanup level (6 ug/L)**
- **Preliminary Conclusions:**
 - Use of Lactoil with sulfidated ZVI appears to be a good strategy for treating low-level CVOC concentrations
 - Injection-only strategies may not be as successful over larger plume areas, when compared to recirculation strategies such as at SD031 because recirculation can overcome heterogeneity and accelerate amendment dispersal. Perhaps a hybrid of these two strategies would be most effective.
 - **TD was successful** at determining multiple ways to accelerate treatment of 1,1-DCE
 - Cleanup levels have been achieved, so evaluate Response Complete status as next step



Plume Hot Spot



Plume Hot Spot



Downgradient

Travis AFB Restoration Program

Program Update

RPM Meeting July 15, 2020

Completed Documents (1)

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

Completed Documents (2)

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

Completed Documents (3)

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

Completed Documents (4)

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

Completed Documents (5)

- Data Gap Investigation Results, Technical Memorandum for Soil Site SS016
- LF006, SS030, SD031 Aquifer Test Activities Technical Memorandum
- SS015 Soil Sampling Plan
- Monitoring Well Installation Tech Memo for Site DP039, Addendum to the RACCR
- FT005 Extraction System Optimization Tech Memo
- 2017 Annual CAMU Monitoring Report
- LF044 Sediment Sampling Report
- SD043 RD/RA Work Plan
- SS046 RD/RA Work Plan
- Amendment to the WABOU Soil ROD for sites DP039, SD043, and SS046
- EVO Sites FT004, SS015, SD031, & SD036 Optimization Injections Tech Memo
- LF006 Technology Demonstration Work Plan
- AOC TA500 Well Decommissioning and Site Closeout Tech Memo
- SS015 Soil Sampling Results Tech Memo
- LF006 Technology Demonstration Construction Completion Report
- Subarea LF007C TPH Chromatogram Review TM
- 2017 Annual GRISR
- SS014 POCO Subsites 2, 4, and 5 Closure Evaluation Report
- Addendum to the Site SS016 Groundwater RD/RA Work Plan

Completed Documents (6)

- SD043 Remedial Action Completion Report
- NFA ROD for Old Skeet Range (TS060/TS060A MRA)
- 2018 Annual GRISR
- SS046 Remedial Action Completion Report and Well Decommissioning Work Plan
- 2018 LF007 CAMU Inspection, Monitoring, and Maintenance Report
- Amendment to the NEWIOU Soil ROD for Sites SS016 and SD033
- SS016 RD/RA Work Plan
- 4th Five Year Review Report for Multiple Groundwater, Soil, and Sediment Sites
- SD043 Site Closure Report
- SS046 Well Decommissioning and Site Closeout Tech Memo
- LF008 Remedial Action Evaluation Report
- SD031B POCO Additional Site Investigation Work Plan
- ***Initial Passive Vent Systems Sampling Work Plan Tech Memo***
- ***Optimization Activities Tech Memo for SD034 and SD037***

Completed Field Work (1)

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

Completed Field Work (2)

- 2015 Annual GRIP Sampling
- SD037 EVO Injection
- SD034 Data Gaps Investigation
- SS015 EVO Injection
- FT005 Injection Well Installation
- OWS 47, 48, 49 Site Investigations
- SS030 Trench/Conveyance/Power Installation
- FT005 Trench Installation
- FT005 Well Development
- FT004 Well Installation, Well Development, Baseline Sampling
- FT005 Baseline Sampling
- DP039 Well Installation, Well Development, Baseline Sampling
- FT004 EVO Injection
- FT004 Trench/Conveyance/Power Installation
- DP039 Infiltration Trench Installation
- TA500 Groundwater Sampling
- FT005 EVO Injection
- 2016 Q2 GRIP Sampling
- Data Gap Inv. for Soil Sites (SD043, SS046)
- SD031 Remedial Investigation Step-out Sampling (2nd round)
- DP039 EVO Injection
- CG508 Well Decommissioning
- SD033 Soil Sampling
- Multi-site Bioaugmentation Well Installation
- SD034 Technology Demonstration Well Installation
- SS014 Bioreactor Installation
- ST028 & ST032 Well Decommissioning

Completed Field Work (3)

- SS016 Soil Data Gaps Investigation
- SD031 Remedial Investigation Soil Sampling (3rd round)
- Oil Water Separators Step-out Drilling
- OW055 Close-in-place
- Q4 2016 GRIP Sampling
- OW040 Soil Excavation/Surface Restoration
- OW057 Soil Excavation/Surface Restoration
- Multi-site Bioaugmentation & EVO Injection
- SD034 Technology Demonstration Bioreactor Installation
- OW050 Soil Sampling at Former Location of OWS
- OW055 Sidewalk Repairs
- SD031 Finish Soil Delineation (NE portion of site)
- Q2 2017 GRIP Sampling Event
- SS015 Optimization: Injection Well Installation
- DP039 Down-gradient Monitoring Well Installation (1st round)
- SD036 Optimization: Injection Well Installation
- SD031 Optimization: Injection Well Installation
- OW056 Site Excavation/Closure
- Well Re-development
- TS060 Removal Action

Completed Field Work (4)

- FT004 POCO Soil Data Gaps Investigation
- LF044 Sediment Sampling
- FT004 EVO Optimization
- DP039 Install downgradient monitoring wells (2nd round)
- FT005 – Install Extraction Wells
- DP039 Repair SBGR distribution headers
- Q4 2017 GRIP Sampling
- SD036 EVO Optimization
- SS015 EVO Optimization
- SD031 EVO Optimization
- FT005 Installation of Pumps and Controls in 5 New Extraction Wells
- Q1 2018 GRIP Sampling
- SD037 EVO reinjection
- Q2 2018 GRIP Sampling
- SS015 Soil sampling
- TA500 Well Decommissioning
- FT005 EVO injection
- FT004 POCO Soil Investigation
- 3Q 2018 GRIP Sampling
- LF006 Well Installations and Injections
- 4Q 2018 GRIP Sampling
- SD043 Soil excavation
- 1Q 2019 GRIP Sampling
- 2019 Annual LUC Inspections
- SS046 Soil excavation
- 2Q 2019 GRIP Sampling Event
- Well Re-development (11 wells)
- SD037 Injection Well Installation
- SS046 Well Decommissioning

Completed Field Work (5)

- 3rd Quarter 2019 GRIP Sampling
- SD034 O₂ Enhancement
- SS016 SBGR Repairs
- SD037 EVO Re-injection
- 4th Quarter 2019 GRIP Sampling
- SD031B POCO Additional Investigation (Gore Sorber Round 1)
- SD043 Well and GETS Decommissioning
- SS016 Soil excavation
- SS015 SPOC system installation
- SD031B POCO Additional Investigation (Gore Sorber Round 2)
- Annual CAMU Gas Monitoring
- SS015 SPOC Sampling
- 2Q20 GRIP Sampling
- ***DP039 Bioreactor Rejuvenation***
- ***SD031B Phase 2 Soil, Vapor, & Groundwater Sampling***
- ***DP039 Phytoremediation Trench extension***
- ***Sampling Offbase LF007C wells***

Documents In-Progress

CERCLA

- Community Relations Plan Update (revised draft)
- SD031 Soil RI/FS
- SD043 Well Decommissioning and Site Closeout Tech Memo
- **2019 GRISR**

POCO

- FT004 POCO Corrective Action Plan

Field Work In-Progress

CERCLA

None

POCO

None

Documents Planned

CERCLA

- | | |
|-------------------------------|-----|
| • SS016 Soil RACR | Aug |
| • 2019 CAMU Monitoring Report | TBD |

POCO

None

Field Work Planned

CERCLA

- LF008 Well Decommissioning Aug 4-7
- Passive Vent Systems Sampling Aug 3-7
- ***PFAS Pilot Test*** ***Aug***

POCO

- FT004 Soil Excavation Aug 17- Sep 12
- SD031B Phase 3 MW Installation & GW Sampling Aug 10- Sept 21

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

Completed Documents (Historical 1)

- 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 (Historical 1)

- 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