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

The RPM Teleconference is scheduled for 9:30 AM PST on 20 January 2021. 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

A. JACOBS PBR CONTRACT

- 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

PROGRAM UPDATE: DOCUMENTS & ACTIVITIES COMPLETED, IN PROGRESS & PLANNED

- 4. NEW ACTION ITEM REVIEW
- 5. PROGRAM/ISSUES/UPDATE

B. TRAVIS UPDATES

- 1. CURRENT PROJECTS
 - a. LUC SITES
 - b. PFOS / PFOA

C. SRS PFAS RI CONTRACT

- 1. ADMINISTRATIVE
 - a. INTRODUCTIONS
 - b. PREVIOUS MEETING MINUTES
 - c. ACTION ITEM REVIEW
 - d. MASTER MEETING AND DOCUMENT SCHEDULE REVIEW
- 2. CURRENT PROJECTS
- 3. PRESENTATIONS
 - a. PFAS REMEDIAL INVESTIGATION
 - b. ENVIRONMENTAL SEQUENCE STRATIGRAPHY
- 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.

Travis Air Force Base Environmental Restoration Program Restoration Program Manager's Meeting Minutes 20 January 2021, 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 20 January 2021 at 0930 hours.

Effective 16 December 2020, the 60 AMW/CC at Travis AFB directed Health Protection Condition (HPCON) Charlie (changed from HPCON Bravo) 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. Essential missions will continue, and visitors are permitted with an approved base pass.

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 |
|------------------------|----------------------|
| Chet Storrs | AFCEC/CZOW |
| Angel Santiago | AFCEC/CZOW |
| Gene Clare | AFCEC/CZOW |
| Kurt Grunawalt | Travis AFB 60 AMW/JA |
| Lou Briscese | Travis AFB 60 AMW/PA |
| Sarah Miller | USACE-Omaha |
| Brian Boccellato | USACE-Omaha |
| Paul Gedbaw | USACE-Omaha |
| Alan Soicher | USACE-ABQ |
| Nadia Hollan Burke | EPA |
| Adriana Constantinescu | RWQCB |
| Kimiye Touchi | DTSC |
| David Kremer | DTSC |
| Li Wang | DTSC |
| Jesse Negherbon | DTSC |
| Megan Duley | SRS |
| Diane Escobedo | SRS |
| James Griffin | SRS |
| David Parse | AECOM |
| Junaid Sadeque | AECOM |
| Mike Wray | CH2M/Jacobs |
| Leslie Royer | CH2M/Jacobs |

Jeff Gamlin Jill Dunphy CH2M/Jacobs 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 (November 2020) |
| Attachment 4 | CGWTP Monthly Data Sheet (November 2020) |
| Attachment 5 | LF007C GWTP Monthly Data Sheet (November 2020) |
| Attachment 6 | ST018 GWTP Monthly Data Sheet (November 2020) |
| Attachment 7 | SBBGWTP Monthly Data Sheet (December 2020) |
| Attachment 8 | CGWTP Monthly Data Sheet (December 2020) |
| Attachment 9 | LF007C GWTP Monthly Data Sheet (December 2020) |
| Attachment 10 | ST018 GWTP Monthly Data Sheet (December 2020) |
| Attachment 11 | Presentation: Program Update (January 2021) |
| Attachment 12 | Travis AFB LUC Sites Update (January 2021) |
| Attachment 13 | Travis AFB PFOS/PFOA Update (January 2021) |
| Attachment 14 | Presentation: SRS PFAS Remedial Investigation |
| Attachment 15 | Presentation: SRS Environmental Sequence Stratigraphy |

I. JACOBS PBR CONTRACT UPDATES

A. ADMINISTRATIVE

1. **Previous Meeting Minutes**

There were no agency comments on the November 2020 RPM Meeting Minutes; they will be finalized as written.

2. Action Item Review

Action items from November 2020 were reviewed.

Action Item 1 is ongoing: Include the progress of the optimized Emulsified Vegetable Oil (EVO) delivery via solar-powered organic carbon (SPOC) injection system pilot test at Site SS015 during future monthly program updates. January 2021 update: SPOC was moved to Site DP039, where lithology is more permeable. Samples were collected last week, and the data may be ready to share at the February 2021 RPM meeting. The system is successfully pumping groundwater at a low rate. This action item remains open.

Action Item 2: Ms. Royer will add the raw vapor intrusion data collected in August 2020 to the Addendum to the Initial Passive Vent System Sampling Work Plan as an appendix. January 2021 update: Ms. Royer has added the requested appendix information to the document. This action item is now closed.

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

The Travis AFB MMDS was discussed during this meeting (see Attachment 2).

Travis AFB Annual Meeting and Teleconference Schedule

NOTE: All upcoming meetings will be held as MS Teams teleconferences until California meets the requirements for the "green phase" of COVID-19 reopening. The MMDS will continue to list in-person meetings and teleconferences, and teammates will be notified when in-person meetings are safe to resume.

The annual Restoration Advisory Board (RAB) meeting is scheduled for 15 April 2021. Mr. Duke noted that it is unlikely this meeting can be held in person due to the ongoing COVID-19 situation, and suggested that the meeting be delayed until 21 October 2021. He added that there will be a better chance that the meeting can be held in-person, plus an update on summer field activities and the new Optimized Remediation Contract can be included in the agenda. Ms. Constantinescu agreed that postponing the RAB meeting would be beneficial however reminded the team that the community would likely be interested in an update on the PFAS investigation prior to October. Mr. Duke agreed and proposed the April 2021 Guardian Newsletter be used to update the community on the PFAS project. The team agreed to this approach. Mr. Duke will announce the RAB meeting schedule update in the April 2021 Guardian Newsletter and include information about the PFAS project.

The team then agreed to keep April's RPM meeting as scheduled, on 15 April 2021 from 1400 - 1700. The October 2021 RPM meeting will be moved to 21 October 2021 and will be held at 1330-1630.

The next RPM meeting is scheduled for 0930 on Wednesday, 17 February 2021, via MS Teams.

Travis AFB Master Document Schedule

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 (CRP) Update: There was no change to the schedule. Mr. Duke recommended that this document be moved to the end of the MMDS until the ORC is underway.
- Site FT004 POCO Soil Corrective Action Completion Report (CACR): The Draft to Agencies / RAB due date was changed to 07 January 2021. The Agency Comments due date was changed accordingly. Ms. Constantinescu indicated that she would continue to prioritize this document to meet the schedule.
- Quarterly Newsletter (April 2021): There were no changes to the schedule. Mr. Duke indicated that he is utilizing the template provided by Mr. Anderson, and that this newsletter will inform the RAB and public that the 2021 RAB meeting will be moved to 21 October.
- 2019 Annual Corrective Action Management Unit (CAMU) Monitoring Report: The Final due date was changed to 4 December 2020 to reflect actual submittal. This document will be moved to the History section next month.
- Site SS016 Soil Remedial Action Completion Report (RACR): The Response to Comments and Final due date were changed to 15 December 2020 to reflect actual submittal. This document will be moved to the History section next month.
- Site LF008 Remedial Infrastructure Decommissioning Technical Memorandum: The Draft to Agencies and RAB due date was changed to 11 December 2020; The Agency Comments due was changed to 15 January 2021.
- Addendum to the Initial Passive Vent Systems Sampling Work Plan Technical Memorandum: There were no changes to the schedule. Technology Demonstration Technical Memorandum: The PreDraft to AF/Service Center was changed to 13 January 2021; the rest of the dates were updated accordingly.
- Site SD031 and FT004 Groundwater Sampling Results Technical Memorandum: This is a new document, new dates.
- Site SD031B POCO Additional Site Investigation Report: The Predraft to AF/Service Center date was changed to 27 January 2021; the rest of the dates were updated accordingly. Ms. Constantinescu noted that

because it is a decision document, the Water Board requests a 60-day review period.

- Potrero Hills Annex (FS, PP, and ROD): The Water Board will issue NFA for the VOC plume in the main area. A copy of the NFA letter was sent to the Air Force by Ms. Hashimoto.
- MOVED TO HISTORY:
 - Site SD031 Soil Remedial Investigation/Feasibility Study

- 2019 Annual GRISR

B. CURRENT PROJECTS

1. Treatment Plant Operation and Maintenance Update

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

The South Base Boundary Groundwater Treatment Plant (SBBGWTP) performed at 100% uptime, and 5.284 million gallons of groundwater were extracted and treated in November 2020. All treated water was discharged to Union Creek. The average flow rate for the SBBGWTP was 126.4 gallons per minute (gpm). Electrical power usage was 15,795 kilowatt hours (kWh), and approximately 13,288 pounds of CO2 were created (based on DOE calculation). Approximately 0.47 pounds of volatile organic compounds (VOCs) were removed in November. The total mass of VOCs removed since startup of the system is 532.4 pounds.

Troubleshooting was performed on four extraction wells in November 2020; details can be found in Attachment 3. The SCADA system is scheduled for upgrade in the first quarter of 2021. VOCs were detected in the effluent in November, so a granulated activated carbon (GAC) change has been scheduled for mid-December. The last changeout was performed in the Spring; this system typically requires two changeouts per year.

The annual toxicity test was performed this month with a 100% survival rate.

No optimization activities were conducted in November 2020.

Central Groundwater Treatment Plant, November 2020 (Attachment 4)

The Central Groundwater Treatment Plant (CGWTP) performed at 100% uptime with approximately 753,535 gallons of groundwater extracted and treated in November 2020. All treated water was discharged to the storm sewer system which discharges to Union Creek. The average flow rate for

the CGWTP was 18.1 gpm. Electrical power usage was 1,020 kWh for all equipment connected to the Central Plant, and approximately 1,643 pounds of CO2 were generated. Approximately 1.43 pounds of VOCs were removed from groundwater by the treatment plant in November. The total mass of VOCs removed since the startup of the system is 11,558 pounds.

The Site SS016 subgrade biogeochemical reactor (SBGR) and the Site DP039 SBGR continued operating in November 2020.

Mr. Clare will send Ms. Touchi a map showing the location of EW2382x39, which is incorrectly referenced as EW2382x16 in this treatment plant report. The November treatment plant report will be corrected.

The annual toxicity test was performed this month with a 100% survival rate.

No optimization activities were conducted in November 2020.

LF007C Groundwater Treatment Plant, November 2020 (Attachment 5)

The Subarea LF007C Groundwater Treatment Plant (LF007C GWTP) performed at 85.2% uptime with approximately 78,513 gallons of groundwater extracted and treated in November 2020. All treated water was discharged to the Duck Pond for beneficial reuse. The average flow rate was 2.2 gpm. Approximately 5.69×10^{-4} of a pound of VOCs was removed from groundwater by the treatment plant in November 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.

The annual toxicity test was performed this month with a 100% survival rate.

No optimization activities were conducted in November 2020.

ST018 Groundwater (MTBE) Treatment Plant, November 2020 (Attachment 6)

Site ST018 (MTBE) Treatment Plant (ST018 GWTP) performed at 100% uptime with approximately 74,880 gallons of groundwater extracted in November 2020. All groundwater was discharged to the Fairfield – Suisun Sewer District. The average flow rate for the ST018 GWTP was 1.8 gpm. Electrical power usage for the month was 45 kWh for all equipment connected to the ST018 GWTP. The total CO2 discharge equivalent equates to approximately 33 pounds. Approximately 0.04 of a pound of

MTBE, BTEX, VOCs, and TPH was removed in November by the treatment plant, and 0.01 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 49.6 pounds, and the total MTBE mass removed since startup of the system is 12.2 pounds.

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

The total reported flow from the system was lower than the sum of the extraction wells in November 2020. Troubleshooting of the flow meters will continue in November.

The annual toxicity test was performed this month with a 100% survival rate.

No optimization activities were conducted in November 2020.

South Base Boundary Groundwater Treatment Plant, December 2020 (Attachment 7)

The South Base Boundary Groundwater Treatment Plant (SBBGWTP) performed at 83.1% uptime, and 4.413 million gallons of groundwater were extracted and treated in December 2020. All treated water was discharged to Union Creek. The average flow rate for the SBBGWTP was 131.31 gallons per minute (gpm). Electrical power usage was 13,503 kilowatt hours (kWh), and approximately 11,592 pounds of CO2 were created (based on DOE calculation). Approximately 0.51 pounds of volatile organic compounds (VOCs) were removed in December. The total mass of VOCs removed since startup of the system is 532.9 pounds.

The GAC changeout was successful. The SCADA system is scheduled for upgrade in the first quarter of 2021.

No optimization activities were conducted in December 2020.

Central Groundwater Treatment Plant, December 2020 (Attachment 8)

The Central Groundwater Treatment Plant (CGWTP) performed at 57.4% uptime with approximately 596,570 gallons of groundwater extracted and treated in December 2020. All treated water was discharged to the storm sewer system which discharges to Union Creek. The average flow rate for the CGWTP was 24.0 gpm. Electrical power usage was 780 kWh for all equipment connected to the Central Plant, and approximately 1,465 pounds of CO2 were generated. Approximately 1.56 pounds of VOCs

were removed from groundwater by the treatment plant in December. The total mass of VOCs removed since the startup of the system is 11,560 pounds.

The Site SS016 subgrade biogeochemical reactor (SBGR) and the Site DP039 SBGR continued operating in December 2020. Both wells that feed into the infiltration trench are now online. Flow rates are adjusted to avoid surfacing of groundwater.

Several issues such as a leaky system totalizer, defective power supplies, and power outages led to timing issues and resulted in several days of nonoperation. Extraction well EW2383x39, located inside a yard used for construction material and green waste, was damaged by heavy equipment used in the yard; installation of bollards around the well will be considered when the well is repaired.

No optimization activities were conducted in December 2020.

LF007C Groundwater Treatment Plant, December 2020 (Attachment 9)

The Subarea LF007C Groundwater Treatment Plant (LF007C GWTP) performed at 95.7% uptime with approximately 75,822 gallons of groundwater extracted and treated in December 2020. All treated water was discharged to the Duck Pond for beneficial reuse. The average flow rate was 2.0 gpm. Approximately 7.58×10^{-4} of a pound of VOCs was removed from groundwater by the treatment plant in December 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.

The pump switch has been malfunctioning recently. The cause of the issue is being investigated, and the team checks the switch several times each week to ensure it is working properly.

No optimization activities were conducted in December 2020.

ST018 Groundwater (MTBE) Treatment Plant, December 2020 (Attachment 10)

Site ST018 (MTBE) Treatment Plant (ST018 GWTP) performed at 92.2% uptime with approximately 54,770 gallons of groundwater extracted in December 2020. All groundwater was discharged to the Fairfield – Suisun Sewer District. The average flow rate for the ST018 GWTP was 1.5 gpm. Electrical power usage for the month was 33 kWh for all equipment connected to the ST018 GWTP. The total CO2 discharge equivalent equates to approximately 24 pounds. Approximately 0.03 of a pound of

MTBE, BTEX, VOCs, and TPH was removed in December by the treatment plant, and 0.01 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 49.6 pounds, and the total MTBE mass removed since startup of the system is 12.2 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 were conducted in December 2020.

C. PRESENTATIONS

1. Program Update: Activities Completed, In Progress, and Upcoming (see Attachment 11)

Ms. Royer reported on the status of fieldwork and documents that have been completed, are in progress, or are upcoming. Please refer to Attachment 11 for the full briefing. Highlights of the discussion are noted below.

Addendum to the Initial Passive Vent System Sampling Work Plan:

- Comments received by the agencies regarding actual execution of the field work have been responded to; Ms. Royer asked the agencies to review those responses as soon as is convenient, because work is anticipated to start on Monday, 25 January.
- Field equipment has been ordered and necessary access coordination with building occupants has been completed.
- Field work is anticipated to take approximately three weeks, and due to warming weather, it really can't be pushed out any further in order to obtain data representative of the winter season.
- The sampling event at Building 38 -the firehouse was delayed due to an outbreak of COVID. Other buildings will be sampled before the firehouse while the COVID issue resolves.
- Several changes have been made to the field sampling plan based on the comments received.
- Each location type will now be associated with at least one field duplicate.
- There will be no soil gas sampling until at least 7 days have passed after any rain event.

- The radon indoor air test kits originally planned for use were more for a three-day sample period, so the team switched the approach to use realtime radon meters which will collect data on an hourly basis to obtain results concurrent with VOC samples.
- One outdoor air location has been moved away from the building for a more ambient sample. Other considerations were taken into account regarding proximity to the flight line and predominant wind direction, proximity to potential preferential pathways, etc.
- The one comment that couldn't be addressed was the request for a summer field event to be included. This is due to limitations of the current PBR contract and when the report needs to be finalized. The report will include data from the August 2020 summer sampling event.
- Ms. Burke of EPA noted that they may have comments on the Air Force responses by the end of the week. She suggested getting started on the field work, understanding that coordination with occupants of the buildings is a consideration, and prioritizing which comments to work on first with the Air Force. Ms. Royer noted that most of the comments and responses are clarifying aspects of the sampling plan, rather than significant changes in execution.
- Ms. Constantinescu noted that the Water Board in general has no concerns with the Air Force responses, but will give a firm answer by the end of the week.

D. NEW ACTION ITEM REVIEW

- 1. The Air Force will update the MMDS to show the RAB meeting scheduled for 21 October 2021, and the October RPM meeting scheduled for 21 October 2021 at 1330-1430.
- 2. The Air Force will send Outlook invitations for the LUC Inspections to the regulatory agency representatives, once scheduled.
- **3.** The Air Force will send a map showing the location of EW2382x39, and will change references to EW2382x16 to EW2382x39 in the November Central Groundwater Treatment Plant Report.
- **4.** The Air Force will update the MMDS to reflect a 60-day regulatory review period for the Site SD031B POCO Additional Site Investigation Report.

E. PROGRAM ISSUES/UPDATE

Ms. Touchi of DTSC introduced Mr. David Kremer, who will take Mr. Randall Bleichner's place on the project team.

Mr. Wray of Jacobs announced that he has made the difficult decision to retire, effective 1 February 2021. This is the last RPM meeting of his career. He noted that he has enjoyed seeing the work accomplished at Travis AFB over the course of his career and that he is disappointed that he will not get to work on the upcoming ORC proposal. He said that this has been a really great group of people to work with.

F. ACTION ITEMS

| Item # | Responsible | Action Item Description | Due Date | Status |
|--------|-------------|---|------------------|--------|
| 1. | Ms. Royer | Ms. Royer to include the progress of the optimized EVO delivery via solar-powered organic carbon (SPOC) injection system pilot test during future monthly program updates. | Ongoing | Open |
| 2. | Mr. Duke | The Air Force will update the MMDS to show the RAB meeting scheduled for 21 October 2021, and the October RPM meeting scheduled for 21 October 2021 at 1330-1430. | 17 February 2021 | Open |
| 3. | Mr. Clare | The Air Force will send Outlook invitations for the LUC Inspections to the regulatory agency representatives, once scheduled. | 17 February 2021 | Open |
| 4. | Mr. Clare | The Air Force will send a map showing the location of EW2382x39, and will change references to EW2382x16 to EW2382x39 in the November Central Groundwater Treatment Plant Report. | 17 February 2021 | Open |
| 5. | Mr. Duke | The Air Force will update the MMDS to reflect a 60-day regulatory review period for the Site SD031B POCO Additional Site Investigation Report. | 17 February 2021 | Open |

II. TRAVIS AFB UPDATES

A. Land Use Control Sites, January 2021 (Attachment 12)

1. Inspections

The annual land use control (LUC) inspection is delayed until mid-February. The Air Force will send an invitation to the regulatory agency representatives once scheduled; for awareness and potential participation. Participation/attendance will be determined by the status of COVID restrictions at the time of the LUC inspections.

2. Site SS016 KC-46 Hangar

Mr. Duke reported on the status of the PFOS/PFOA Program at Travis AFB. Please refer to Attachment 12 for the full briefing.

B. PFOS/PFOA PROGRAM STATUS, JANUARY 2021 (Attachment 13)

Mr. Chet Storrs reported on the status of the PFOS/PFOA Program at Travis AFB. Please refer to Attachment 13 for the full briefing.

III. SRS PFOS/PFOA CONTRACT

A. ADMINISTRATIVE

1. Introductions

Ms. Megan Duley introduced Mr. James Griffin and Ms. Diane Escobedo to the team. Their contact information will be provided to update the POC form.

B. PRESENTATIONS

1. **PFAS Remedial Investigation (Attachment 14)**

Ms. Duley provided an overview of the tasks, objectives, and schedule for the Travis AFB Phase I PFAS Remedial Investigation project. Please refer to the briefing slides provided in the RPM meeting handout for full presentation content. Additional details discussed during the presentation are noted below.

- The Preliminary Draft Work Plan and Preliminary Draft UFP-QAPP have been submitted for USACE and AFCEC review. The current

schedule projects the Draft document submittal to the Agencies approximately 12 April 2021.

- The Phase I RI includes tasks for sampling groundwater, soil, sediment, surface water, and pore water as well as the installation of additional monitoring wells. An ESS evaluation, described further in additional slides presented by AECOM, is also included in the scope of work and will help refine the conceptual site model (CSM) and understand flow pathways and transport mechanisms. The RI will utilize the EPA RSLs developed for PFOS, PFOA, and PFBS for delineation. Ms. Duley noted that the Phase I RI does not include a formal risk assessment.

Through initial data mining and review of site data, regional information, and the current groundwater monitoring network, the Oneida Team has selected approximately 100 groundwater monitoring wells for an initial round of sampling. Groundwater data from an initial round of groundwater sampling at existing wells will help inform the CSM, provide valuable data for locations to install additional monitoring wells, and determine locations to perform sampling of other media (e.g. soil, surface water, etc.). This is in line with the data-driven nature of the planned RI activities to optimize data collection and evaluation. The Oneida Team also selected nested wells to help provide data to begin understanding vertical and horizontal extent of PFOS, PFOA, and PFBS. The group acknowledged the difference between the EPA RSLs and the California Notification Limits, which is a difference in DoD and State policy. Ms. Duley discussed the project schedule, noting that the Draft Work Plan and UFP-QAPP documents would be submitted for regulatory review in mid-April 2021. The Team discussed the idea of utilizing the previous SI UFP-QAPP in order to accelerate data collection with the initial groundwater sampling event. Given the current review periods, the Work Plan and UFP-QAPP will be finalized in mid-August 2021. DTSC stated that the previous UFP-QAPP would need to be reviewed for approval of usage. Nadia Hollan Burke noted that they do not believe the previous UFP-QAPP was approved and that there were previous comments that were not fully addressed. Ms. Burke further noted that the document would still require revisions of project planning and laboratory information that had since changed. Ms. Touchi noted it may be possible as long as the lab quantitation levels and detection limits are lower than the CA notification levels. Ms. Duley noted the project would use the USEPA 537 Modified, compliant with DoD QSM version 5.3, Table B-15 and that the laboratory limits are below the notification levels. Ms.

Constantinescu asked about the number of wells proposed for sampling under the previous UFP-QAPP and potential effect on data comparison or quality when compared to future data collected using the 2021 UFP-QAPP and Work Plan documents.

- The Team agreed to look at the previous UFP-QAPP and hold a meeting to discuss the ability to use it and associated pros/cons. Ms. Duley will correspond further with USACE and Travis ISS to coordinate a meeting with the Agencies and associated technical teams to discuss the previous document and associated comments as well as the proposed sampling tasks and recommended wells selected for initial sampling.
- Ms. Touchi noted that this type of technical meeting would be helpful during the project to discuss site information and potentially expedite document reviews. Ms. Duley agreed and noted the Oneida Team would be happy to support meetings to facilitate document reviews, discuss decision points, and support project progress.

2. Environmental Sequence Stratigraphy (Attachment 15)

Junaid Sadeque, AECOM Senior Stratigrapher, provided an overview of the ESS process and how it supports CSM development for the Travis AFB PFAS RI Project. Please refer to the briefing slides provided in the RPM meeting handout for full presentation content. Additional details discussed during the presentation are noted below.

- ESS provides an evaluation of subsurface geology and hydrogeology using depositional events and processes to help understand transport.
- The ESS methodology develops an understanding of the regional geology and larger scale depositional environments. The Oneida Team and AECOM reviewed availability and quality of site data and boring logs to select areas to develop cross sections as part of the evaluation.
- A total of 5 cross-sections are proposed; A-A', B-B', C-C', D-D', and E-E'. The proposed cross-sections cross paleo valleys and other key geologic features in various orientations to support understanding of deposition and stratigraphic features contributing to potential flow pathways.
- Data from the ESS will help in the development of the CSM and will be refined as an iterative process throughout the project

C. NEW ACTION ITEM REVIEW

1. Mr. Storrs will provide the link to the previous UFP-QAPP.

2. Ms. Duley will work with USACE and Travis ISS to coordinate a meeting time with the Agencies and technical staff to further discuss the use of the previous UFP-QAPP, comments, pros/cons, as well as the recommendations for the initial groundwater sampling task.

D. PROGRAM ISSUES/UPDATE

The Oneida Team will send access instructions to the project SharePoint website to the RPMs. Previous versions of the UFP-QAPP and project submittals will be posted on the site.

E. ACTION ITEMS

| Item # | Responsible | Action Item Description | Due Date | Status |
|--------|---------------------------|---|-----------------|----------|
| 1 | Ms. Duley/Ms. Escobedo | Provide SharePoint Access | 31 January 2021 | Complete |
| 2 | Mr. Storrs | Upload/provide previous UFP-QAPP for preliminary sampling | NA | Complete |
| 3 | Ms. Duley/Mr. Duke | Schedule meeting with the RPMs and technical teams to further discuss and evaluate using the previous UFP- QAPP for initial groundwater sampling event | 31 January 2021 | Open |
| 4 | Ms. Duley/Mr. Duke | Update POC contact information to include James Griffin and Diane Escobedo | N/A | Complete |

2021 Annual Meeting and Teleconference Schedule

| Monthly RPM Meeting ¹ | RPM Teleconference | Restoration Advisory Board Meeting (Begins at 7:00 p.m.) |
|----------------------------------|-----------------------------|---|
| (Begins at time noted) | (Begins at time noted) | (Poster Session at 6:30 p.m.) |
| _ | 01-20-21 | |
| _ | 02-17-21 | |
| _ | 03-17-21 | |
| | 04-15-21 (Thursday 2:00 PM) | <mark>04-15-20 (TBD)</mark> |
| | 05-19-21 | _ |
| 06-16-21 | _ | _ |
| | 07-21-21 | _ |
| 08-18-21 | _ | _ |
| _ | 09-15-21 | _ |
| 10-20-21 | — | May through October ² |
| _ | 11-17-21 | _ |
| _ | _ | |

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.

| PRIMARY DOCUMENTS | | |
|--------------------------------|--|--|
| Life Cycle | Community Relations Plan Update ¹ Travis AFB,TBD ORC Contractor TBD | |
| Scoping Meeting | NA | |
| Predraft to AF/Service Center | 08-23-16 | |
| AF/Service Center Comments Due | 09-07-16 | |
| Draft to Agencies / RAB | 09-28-16 (03-22-18) | |
| Agency Comments Due | 10-28-16 (04-27-18) | |
| Response to Comments Meeting | TBD | |
| Agency Concurrence with Remedy | NA | |
| Public Comment Period | NA | |
| Public Meeting | NA | |
| Response to Comments Due | TBD | |
| Draft Final Due | TBD | |
| Final Due | TBD | |

¹Note: The Community Relations Plan Update will be finalized in the first year of the ORC contract.

| PRIMARY DOCUMENTS | | |
|--------------------------------|---|--|
| | Site FT004 POCO Soil Corrective Action Completion Report | |
| | Travis AFB, <mark>Gene Clare</mark> | |
| | CH2M, Doug Berwick | |
| Life Cycle | CAPE, Meg Greenwald | |
| Scoping Meeting | NA | |
| Predraft to AF/Service Center | 11-16-20 | |
| AF/Service Center Comments Due | 12-17-20 | |
| Draft to Agencies / RAB | 01-07-21 | |
| Agency Comments Due | <mark>03-08-21</mark> | |
| Response to Comments Meeting | 03-17-21 | |
| Agency Concurrence with Remedy | NA | |
| Public Comment Period | NA | |
| Public Meeting | NA | |
| Response to Comments Due | 03-31-21 | |
| Draft Final Due | 03-31-21 | |
| Final Due | 04-30-21 | |

| INFORMATIONAL DOCUMENTS | | | |
|--------------------------------|--|--|--|
| Life Cycle | Quarterly Newsletter (April 2021) Travis, <mark>Lonnie Duke</mark> | 2019 Annual CAMU Monitoring Report Travis AFB, Gene Clare CH2M HILL, Levi Pratt | |
| Scoping Meeting | NA | NA | |
| Predraft to AF/Service Center | 02-24-21 | 07-22-20 | |
| AF/Service Center Comments Due | 02-26-21 | 08-21-20 | |
| Draft to Agencies / RAB | 03-01-21 | 09-09-20 | |
| Agency Comments Due | 03-15-21 | 10-09-20 | |
| Response to Comments Meeting | 03-17-21 | 10-22-20 | |
| Response to Comments Due | 04-02-21 | 11-05-20 | |
| Draft Final Due | NA | NA | |
| Final Due | 04-05-21 | 12-04-20 | |
| Public Comment Period | NA | NA | |
| Public Meeting | NA | NA | |

| INFORMATIONAL DOCUMENTS | | | |
|--------------------------------|---|--|--|
| Life Cycle | Site SS016 Soil Remedial Action Completion Report Travis AFB, Glenn Anderson CH2M, Doug Berwick CAPE, Meg Greenwald | Site LF008 Remedial Infrastructure Decommissioning Technical Memorandum Travis AFB, <mark>Chet Storrs</mark> CH2M, Mike Wray | Addendum to the Initial Passive Vent Systems Sampling Work Plan Technical Memorandum Travis AFB, <mark>Chet Storrs</mark> CH2M, Stephanie Curtis |
| Scoping Meeting | NA | NA | NA |
| Predraft to AF/Service Center | 06-17-20 | 10-02-20 | 10-30-20 |
| AF/Service Center Comments Due | 07-20-20 | 11-02-20 | 11-13-20 |
| Draft to Agencies / RAB | 08-14-20 | <mark>12-11-20</mark> | 11-25-20 |
| Agency Comments Due | 09-14-20 | <mark>01-15-21</mark> | 12-28-20 |
| Response to Comments Meeting | 10-22-20 | 01-20-21 | 01-11-21 |
| Response to Comments Due | 11-05-20 <mark>(12-15-20)</mark> | 02-03-21 | 01-26-21 |
| Draft Final Due | NA | NA | NA |
| Final Due | 11-05-20 (12-15-20) | 02-03-21 | 01-26-21 |
| Public Comment Period | NA | NA | NA |
| Public Meeting | NA | NA | NA |

| INFORMATIONAL DOCUMENTS | | | |
|--|-----------------------|-----------------------|--|
| Technology Demonstration Technical Memorandum Site SD031 and FT004 Ground Sampling Results Technic Memorandum Travis AFB, Lonnie Duke Memorandum CH2M, Tony Chakurian Travis AFB, Chet Storrs Life Cycle CH2M, Tony Chakurian | | | |
| Scoping Meeting | NA | NA | |
| Predraft to AF/Service Center | <mark>01-13-21</mark> | 01-22-21 | |
| AF/Service Center Comments Due | 03-02-21 | <mark>03-10-21</mark> | |
| Draft to Agencies / RAB | 03-16-21 | 03-24-21 | |
| Agency Comments Due | <mark>04-15-21</mark> | <mark>04-23-21</mark> | |
| Response to Comments Meeting | 05-06-21 | <mark>05-19-21</mark> | |
| Response to Comments Due | 05-20-21 | <mark>06-02-21</mark> | |
| Draft Final Due | NA | NA | |
| Final Due | <mark>05-20-21</mark> | <mark>06-02-21</mark> | |
| Public Comment Period | NA | NA | |
| Public Meeting | NA | NA | |

| INFORMATIONAL DOCUMENTS | | |
|--------------------------------|---|--|
| | SD031B POCO Additional Site Investigation Report | |
| | Travis AFB, Chet Storrs | |
| Life Cycle | CH2M, Levi Pratt | |
| Scoping Meeting | NA | |
| Predraft to AF/Service Center | 01-27-21 | |
| AF/Service Center Comments Due | 03-17-21 | |
| Draft to Agencies / RAB | 04-06-21 | |
| Agency Comments Due | 05-06-21 | |
| Response to Comments Meeting | <mark>05-19-21</mark> | |
| Response to Comments Due | 06-04-21 | |
| Draft Final Due | NA | |
| Final Due | 06-04-21 | |
| Public Comment Period | NA | |
| Public Meeting | NA | |

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

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

| HISTORY - PRIMARY DOCUMENTS | | | | | |
|--------------------------------|---|--|--|--|--|
| Life Cycle | Site SD031 Soil Remedial Investigation/Feasibility Study Travis AFB, Glenn Anderson CH2M, Rick Sturm | | | | |
| Scoping Meeting | NA | | | | |
| Predraft to AF/Service Center | 05-24-19 | | | | |
| AF/Service Center Comments Due | 06-10-19 | | | | |
| Draft to Agencies / RAB | 09-12-19 | | | | |
| Agency Comments Due | 11-12-19 (01-14-20) | | | | |
| Response to Comments Meeting | 08-19-20 | | | | |
| Agency Concurrence with Remedy | NA | | | | |
| Public Comment Period | NA | | | | |
| Public Meeting | NA | | | | |
| Response to Comments Due | 08-31-20 (09-01-20) | | | | |
| Draft Final Due | 08-31-20 (09-01-20) | | | | |
| Final Due | 09-30-20 (11-13-20) | | | | |

| HISTORY - INFORMATIONAL DOCUMENTS | | | | |
|-----------------------------------|---|--|--|--|
| | 2019 Annual GRISR Travis AFB, Glenn Anderson | | | |
| Life Cycle | CH2M, Levi Pratt | | | |
| Scoping Meeting | NA | | | |
| Predraft to AF/Service Center | 05-04-20 | | | |
| AF/Service Center Comments Due | 06-04-20 | | | |
| Draft to Agencies / RAB | 06-25-20 | | | |
| Agency Comments Due | 07-27-20 (08-07-20) | | | |
| Response to Comments Meeting | 08-05-20 (08-21-20) | | | |
| Response to Comments Due | 08-21-20 (10-22-20) | | | |
| Draft Final Due | NA | | | |
| Final Due | 08-21-20 (10-22-20) | | | |
| Public Comment Period | NA | | | |
| Public Meeting | NA | | | |

South Base Boundary Groundwater Treatment Plant Monthly Data Sheet

Report Number: 241 Reporting Period: 2 November 2020 – 1 December 2020 D

Date Submitted: 14 December 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 November 2020 reporting period.

| Table 1 – Operations Summary – November 2020 | | | | | | | |
|---|-----------|-----------------|--|----------------|-------------------------|---|--|
| Initial Data Collee | ction: | 11/2/2020 11:45 | | Final Data Col | llection: | 12/1/2020 12:35 | |
| Operating Time: | | Percent Uptime: | | | Electrical Power Usage: | | |
| SBBGWTP: | 697 hours | SBBGWTP: | 100% | SBBGWTP: | 15,795 kWh (| 13,288 lbs CO ₂ generated ^a) | |
| Gallons Treated: 5.284 million gallons | | | Gallons Treated Since July 1998: 1.232 billion gallons | | | | |
| Volume Discharged to Union Creek: 5.284 million gallons | | | Gallons Treated from Other Sources: 0 gallons | | | | |
| VOC Mass Removed: 0.47 Ibs ^b | | | VOC Mass Removed Since July 1998: 532.4 Ibs | | | | |
| Rolling 12-Month Cost per Pound of Mass Removed [:] \$22,223 ° | | | | | | | |
| Monthly Cost per Pound of Mass Removed: \$40,428 ° | | | | | | | |
| lbs = pounds ^a SiteWise[™] estimate that 1 kilowatt hour generated produces 0.74 pounds of GHG. Value also includes approximately 1,600 pounds of GHG from GAC change out services averaged to a per month basis. ^b Calculated using November 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. | | | | | | | |

South Base Boundary Groundwater Treatment Plant Monthly Data Sheet SBBGWTP_Nov2020.docx Table 2 presents individual extraction well flow rates along with the average system flow during the monthly reporting period.

| Table 2 – SBBGWTP Average Flow Rate (gpm) ^a – November 2020 | | | | | | | | |
|---|---|-----------|---------|---------|----------------------|-----------|----------------------|--|
| FT005 ^b | | | SSC |)29 | SSC |)30 | | |
| EW01x05 | Offline | EW743x05 | Offline | EW01x29 | Offline ^c | EW01x30 | 12.7 | |
| EW02x05 | Offline | EW744x05 | 2.3 | EW02x29 | Offline ^c | EW02x30 | 7.4 | |
| EW03x05 | Offline | EW745x05 | 7.7 | EW03x29 | 3.0 ^d | EW03x30 | 12.2 | |
| EW731x05 | 6.7 | EW746x05 | Offline | EW04x29 | 10.9 | EW04x30 | 17.1 | |
| EW732x05 | Offline | EW2291x05 | 2.5 | EW05x29 | 5.8 | EW05x30 | 6.5 | |
| EW733x05 | Offline | EW2782x05 | 6.0 | EW06x29 | 0.5 | EW2174x30 | 5.2 | |
| EW734x05 | 3.9 | EW2783x05 | 2.2 | EW07x29 | 12.1 | EW711x30 | 3.6 | |
| EW735x05 | 6.9 | EW2784x05 | 10.6 | | | MW269x30 | Offline ^e | |
| EW736x05 | Offline | EW2785x05 | 6.8 | | | | | |
| EW737x05 | Offline | EW2786x05 | 10.4 | | | | | |
| EW742x05 | Offline | | | | | | | |
| | FT005 Total: 66.0 SS029 Total: 32.3 SS030 Total: 64.7 | | | | | | | |
| SBBGWTP Ave | SBBGWTP Average Monthly Flow ^f : 126.4 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 Estimated based on historical performance of well. ^e Extraction wells were operational; however, well was recharging. ^f 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 | | | | | | | | |
|---|------|------|------|------|-------|--|--|--|
| Shutdown ^a Restart ^a | | | | | | | | |
| Location | Date | Time | Date | Time | Cause | | | |
| SBBGWTP | None | | | | | | | |
| Shutdown and restart times estimated based on field notes BBGWTP = South Base Boundary Groundwater Treatment Plant | | | | | | | | |

Summary of O&M Activities

Monthly groundwater treatment samples were collected at the SBBGWTP on 10 November 2020. Sample results are presented in Table 4. The total VOC concentration (10.68 μ g/L) in the influent sample decreased from the October 2020 sample results (21.2 μ g/L). TCE was the primary VOC detected in the influent sample at a concentration of 10 μ g/L. TCE and cis-1,2-DCE were detected in the midpoint sampling location. Cis-1,2-DCE was also detected in the effluent sample at a concentration of 0.51 J μ g/L, which slightly exceeds the effluent discharge limit of 0.50 μ g/L. The effluent sample was also analyzed for TPH-g, TPH-d, and TPH-mo, and TPH was not detected.

The December 2020 groundwater treatment samples were collected on 1 December 2020. The turnaround time for the effluent sample was expedited instead of collecting a separate confirmation sample. The results from the expedited effluent sample indicated a concentration of $0.80 \text{ J } \mu g/L$, which also exceeds the effluent discharge limit of $0.50 \ \mu g/L$. The Site SS029 extraction wells are the source of incoming cis-1,2-DCE to the treatment plant. As a result, four (4) of the five (5) Site SS029 extraction wells were taken off line on 10 December 2020. Extraction well EW07x29 was left on line to maintain hydraulic capture, as it is the furthest downgradient well in the Site SS029 extraction well field. The Site FT005 and SS030 extraction wells remained on line. A carbon change out for both GAC vessels is scheduled for 17 December 2020.

In November 2020, a freshwater toxicity test was performed on the SBBGWTP system effluent. No observed adverse effects were reported on the rainbow trout, and the survival rate was 100 percent.

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

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

- EW04x29 The pump was replaced. Well is currently on line.
- EW07x29 The power supply unit was repaired. Well is currently on line.

In addition, the SBBGWTP SCADA system is going to be upgraded in the first quarter of 2021. Preparations for this upgrade are currently being implemented. Significant upgrade work is likely to begin in January 2021.

Optimization Activities

No optimization activities occurred at the SBBGWTP in November 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 November 2020, the SBBGWTP produced approximately 13,288 pounds of GHG, which includes approximately 1,600 pounds of GHG generated from GAC change out services averaged to a per month basis.

TABLE 4

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

| | Instantaneous Maximum ^a | Detection | | 10 November 2020 (μg/L) | | | |
|---|---------------------------------------|-------------|-----|----------------------------|----------|-----------------------|--|
| Constituent | (μg/L) | (μg/L) | N/C | 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 | ND | ND | ND | |
| 1,1-Dichloroethene | 0.50 | 0.23 | 0 | ND | ND | ND | |
| cis-1,2-Dichloroethene | 0.50 | 0.15 | 1 | 0.68 J | 1.5 | 0.51 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 | 10 | 2.3 | ND | |
| Vinyl Chloride | 0.90 | 0.10 | 0 | ND | ND | ND | |
| Non-Halogenated Volatile Organ | nics | | | | | | |
| 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 | 50 | 10 | 0 | NM | NM | ND | |
| Hydrocarbons – Gasoline | | | | | | | |
| Total Petroleum Hydrocarbons – Diesel | 50 | 26 | 0 | NM | NM | ND | |
| Total Petroleum Hydrocarbons – Motor Oil | 100 | 32 | 0 | NM | NM | ND | |

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

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

Notes:

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

NA = not applicable

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

ND = not detected

NM = not measured

 μ g/L = micrograms per liter





Central Groundwater Treatment Plant Monthly Data Sheet

 Report Number: 256
 Reporting Period: 2 November 2020 – 1 December 2020
 Date Submitted: 14 December 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 November 2020 reporting period.

| Table 1 – Operations Summary – November 2020 | | | | | | |
|---|---|-----------------|--------|----------------|---|--|
| Initial Data Collect | tion: 11/2/2020 11:10 Final Data Collection: | | 12/1/2 | 2020 9:15 | | |
| Operating Time: | | Percent Uptime: | | Electrical Pow | ver Usage: | |
| CGWTP: | 694 hours | CGWTP: | 100% | CGWTP: | 1,020 kWh (1,643 lbs CO₂ generatedª) | |
| Gallons Treated (dis 753,535 gallons | lischarge to storm sewer): Gallons Treated Since January 1996: 588.4 million gallons | | | | | |
| VOC Mass Remove | VOC Mass Removed from groundwater: VOC Mass Removed Since January 1996: | | | | | |
| 1.43 lbs⁵ | 2,872 lbs from groundwater | | | | | |
| | 8,686 lbs from vapor | | | | | |
| Rolling 12-Month Cost per Pound of Mass Removed [:] \$2,705 [°] Monthly Cost per Pound of Mass Removed: \$3,817 [°] | | | | | | |
| ^a SiteWise[™] estimate that 1 kilowatt hour generated produces 0.74 pounds of GHG. Value also includes approximately 888 pounds of GHG from GAC change out services averaged to a per month basis. ^b Calculated using November 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 – November 2020 | | | | | |
|---|------|--|--|--|--|
| Location Average Flow Rate Groundwater (gpm) | | | | | |
| EW001x16 | 10.7 | | | | |
| EW002x16 | 7.0 | | | | |
| EW003x16 ^b | 0.0 | | | | |
| EW605x16 | 4.2 | | | | |
| EW610x16 | 1.9 | | | | |
| CGWTP | 18.1 | | | | |
| ^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. This well has experienced intermittent down time due to hangar construction activities in the OSA. gpm = gallons per minute | | | | | |

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

| Table 3 – Summary of System Shutdowns | | | | | | | |
|---------------------------------------|---|------|------|------|-------|--|--|
| Shutdown ^a Restart | | | | | | | |
| Location | Date | Time | Date | Time | Cause | | |
| CGWTP | None | | | | | | |
| = Date/Time not recorded | | | | | | | |
| ^a Shutdown CGWTP = 0 | ^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 10 November 2020. Sample results are presented in Table 4. The total VOC concentration (227.12 μ g/L) in the November 2020 influent sample has decreased from the October 2020 sample (251.80 μ g/L). TCE was the primary VOC detected in the influent sample at a concentration of 170 μ g/L. No VOCs were detected in the samples collected after the first and second carbon vessels nor in the effluent sample. The effluent sample was also analyzed for TPH-g, TPH-d, and TPH-mo, and TPH was not detected. Travis AFB will continue to monitor influent, midpoint, and effluent concentrations at the CGWTP for carbon breakthrough.

In November 2020, a freshwater toxicity test was performed on the CGWTP system effluent. No observed adverse effects were reported on the rainbow trout, and the survival rate was 100 percent.

In mid-November, the flow rate from EW002x16 had decreased significantly. After troubleshooting, the motor was found to have stripped splines. The pump motor will be replaced in early December 2020. The well is currently offline.

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. Between May and September 2020, the Oil Spill Area (OSA) extraction wells (EW605x16 and EW610x16) were periodically shut down as a precautionary measure during construction activities for the KC-46 hangar project. During these shutdowns, the overall flow rates and influent concentrations decreased. In addition, the flow rate decreased because of the EW002x16 pump motor issues in November.

The Site SS016 subgrade biogeochemical reactor (SBGR), also known as the bioreactor and the Site DP039 bioreactor, continued operating in November 2020. On 10 November, the ground near the trench was observed to be damp but the water had not overtopped the trench. On 11 November, the high-water alarm was triggered, so EW2382x39 was temporarily shut down to allow the water to drain. On 13 November, a recirculating line was installed in EW2382x39 to decrease the flow going to the bioreactor, and the well was restarted. When the recirculating line is fully open, the flow rate decreases by approximately 50 percent or 1.5 gpm. Travis AFB will continue to monitor the water level within the infiltration trench and adjust flow rates as necessary to avoid surfacing of groundwater.

A 3-bay aircraft hangar is being constructed over much of the OSA source area (former Buildings 16 and 18 area). This project is scheduled to be constructed over at least the next year or so. Every attempt will be made to keep all extraction wells and the Site SS016 bioreactor in operation. However, there may be times when extraction needs to be shutdown to avoid spills of extracted groundwater or to change out electrical

equipment. In addition, the horizontal well (EW003x16) is being replaced, which will necessitate significant down-time for this well.

Optimization Activities

No optimization activities occurred at the CGWTP in November 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 1,643 pounds of GHG during November 2020.
Summary of Groundwater Analytical Data for November 2020 – Central Groundwater Treatment Plant

| | | | | 10 November 2020 (μg/L) | | | |
|---|-------------------------------------|------------------------------|-----|----------------------------|-------------------------------|-------------------------------|---------------------|
| Constituent | Instantaneous Maximumª (μg/L) | Detection Limit (μg/L) | N/C | Influent | After Carbon 1 Effluent | After Carbon 2 Effluent | System Effluent⁵ |
| Halogenated Volatile Organics | | | | | | | |
| Acetone | NA | 1.9 – 3.8 | 0 | ND | ND | ND | ND |
| Bromomethane | 5.0 | 0.21 – 0.42 | 0 | ND | ND | ND | ND |
| Carbon disulfide | 5.0 | 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 | 5.0 | 0.15 – 0.30 | 0 | 0.34 J | ND | ND | ND |
| 1,3-Dichlorobenzene | 5.0 | 0.13 – 0.26 | 0 | 0.38 J | ND | ND | ND |
| 1,4-Dichlorobenzene | 5.0 | 0.16 – 0.32 | 0 | ND | ND | ND | ND |
| 1,1-Dichloroethane | 0.50 | 0.22 – 0.44 | 0 | ND | ND | ND | ND |
| 1,2-Dichloroethane | 0.50 | 0.13 – 0.26 | 0 | ND | ND | ND | ND |
| 1,1-Dichloroethene | 0.50 | 0.23 – 0.46 | 0 | 0.67 J | ND | ND | ND |
| cis-1,2-Dichloroethene | 0.50 | 0.15 – 0.30 | 0 | 52 | ND | ND | ND |
| trans-1,2-Dichloroethene | 0.50 | 0.15 – 0.30 | 0 | 3.2 | ND | ND | ND |
| Tetrachloroethene | 0.50 | 0.20 - 0.40 | 0 | 0.53 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 | 170 | ND | ND | ND |
| Vinyl Chloride | 0.90 | 0.10 - 0.20 | 0 | ND | ND | ND | ND |
| Non-Halogenated Volatile Orga | nics | | | | | | |
| 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 | NM | NM | NM | ND |
| Total Petroleum Hydrocarbons – Diesel (C10 – C28) | 50 | 25 | 0 | NM | NM | NM | ND |
| Total Petroleum Hydrocarbons – Motor Oil (C28 – C40) | 100 | 32 | 0 | NM | NM | NM | ND |

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

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

Notes:

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

NA = not applicable

N/C = number of samples out of compliance with discharge limits. ND = not detected NM = not measured μg/L = micrograms per liter





Subarea LF007C Groundwater Treatment Plant Monthly Data Sheet

Report Number: 195 Reporting Period: 2 November 2020 – 1 December 2020 Date Submitted: 14 December 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 November 2020 reporting period:

| Table 1 – Operations Summary – November 2020 | | | | | | |
|---|--|--|--|--|--|--|
| Initial Data Collection: 11/2/2020 10:30 | | Final Data Collection: 12/1/2020 10:50 | | | | |
| Operating Time: | Percent Uptime: | Electrical Power Usage ^a : | | | | |
| LF007C GWTP: 593.5 hours | LF007C GWTP 85.2% | LF007C GWTP: 0 kWh | | | | |
| Gallons Treated: 78,513 gallons | - 79 542 college | Gallons Treated Since March 2000: 91.2 million gallons | | | | |
| | . 78,513 gallons | VOO Maaa Damanad Olaas Marah 2020, 474 Amanada | | | | |
| VOC Mass Removed: 5.69 X 10- | pounds | (Groundwater) | | | | |
| Rolling 12-Month Cost per Pound | of Mass Removed: Not Measured ^c | | | | | |
| Monthly Cost per Pound of Mass Removed: Not Measured ^c | | | | | | |
| ^a The LF007C GWTP operates on solar power only. ^b VOCs from November 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 – November 2020 | | | | | | | |
|--|--|---|--|--|--|--|--|
| Location | Average Flow Rate (gpm) ^a | Total Gallons Processed (gallons) | | | | | |
| EW614x07 | 1.9 | 68,609 | | | | | |
| EW615x07 | 0.3 | 12,244 | | | | | |
| LF007C GWTP | 2.2 | 78,513 | | | | | |
| ^a Flow rates calculated by dividing total ga readings. gpm = gallons per minute | llons processed by system operating time for the r | nonth or the average of the instantaneous | | | | | |

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

| Table 3 – Summary of System Shutdowns | | | | | | | |
|--|-----------------------|------|----------------------|-------|----------------|--|--|
| | Shutdown ^a | | Restart ^a | | | | |
| Location | Date | Time | Date | Time | Cause | | |
| LF007C GWTP | November 20, 2020 | 7:25 | November 23, 2020 | 10:30 | Unknown reason | | |
| LF007C GWTP | November 30, 2020 | 7:15 | December 1, 2020 | 10:50 | Unknown reason | | |
| = 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 10 November 2020. Sample results are presented in Table 4. The total VOC concentration in the November 2020 influent sample was 0.87 J μ g/L. TCE was the only VOC detected at the influent sample location. No VOCs were detected in the midpoint or effluent sample locations.

In November 2020, a freshwater toxicity test was performed on the LF007C GWTP system effluent. No observed adverse effects were reported on the rainbow trout, and the survival rate was 100 percent.

In November, the LF007C GWTP shut down twice. The systems were restarted without issue. The cause of the shutdowns will be further investigated.

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 relatively flat. The average flow rate through the LF007C GWTP has gradually decreased over the last 12 months due to typical seasonal variation.

Optimization Activities

No optimization activities occurred at the LF007C GWTP in November 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.

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

| | Instantaneous Maximumª | Detection Limit | | 10 November 2020 (μg/L) | | |
|--------------------------------|---------------------------|--------------------|-----|----------------------------|----------------|-----------------------|
| Constituent | (μg/L) | (μg/L) | N/C | Influent | After Carbon 1 | Effluent ^b |
| Halogenated Volatile Organics | | | | | | |
| Acetone | NA | 2.1 | 0 | ND | ND | ND |
| Bromodichloromethane | 5.0 | 0.29 | 0 | ND | ND | ND |
| Bromoform | 5.0 | 0.10 | 0 | ND | ND | ND |
| 2-Butanone | 5.0 | 0.35 | 0 | ND | ND | ND |
| Carbon Tetrachloride | 0.5 | 0.15 | 0 | ND | ND | ND |
| Chloroform | 1.9 | 0.12 | 0 | ND | ND | ND |
| Chloromethane | NA | 0.30 | 0 | ND | ND | ND |
| Dibromochloromethane | 5.0 | 0.13 | 0 | ND | ND | ND |
| 1,3-Dichlorobenzene | 5.0 | 0.11 | 0 | ND | ND | ND |
| 1,4-Dichlorobenzene | 5.0 | 0.13 | 0 | ND | ND | ND |
| 1,1-Dichloroethane | 0.50 | 0.15 | 0 | ND | ND | ND |
| 1,2-Dichloroethane | 0.50 | 0.22 | 0 | ND | ND | ND |
| 1,1-Dichloroethene | 0.50 | 0.14 | 0 | ND | ND | ND |
| cis-1,2-Dichloroethene | 0.50 | 0.10 | 0 | ND | ND | ND |
| trans-1,2-Dichloroethene | 0.50 | 0.11 | 0 | ND | ND | ND |
| Methylene Chloride | 5.0 | 0.35 | 0 | ND | ND | ND |
| Tetrachloroethene | 0.50 | 0.15 | 0 | ND | ND | ND |
| 1,1,1-Trichloroethane | 0.50 | 0.19 | 0 | ND | ND | ND |
| 1,1,2-Trichloroethane | 0.50 | 0.31 | 0 | ND | ND | ND |
| Trichloroethene | 0.65 | 0.13 | 0 | 0.87 J | ND | ND |
| Vinyl Chloride | 0.90 | 0.22 | 0 | ND | ND | ND |
| Non-Halogenated Volatile Organ | ics | | | | | |
| 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 |

^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

 μ g/L = micrograms per liter





Site ST018 Groundwater Treatment Plant Monthly Data Sheet

Report Number: 117 Reporting Period: 2 November 2020 – 1 December 2020

Date Submitted: 14 December 2020

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

System Metrics

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

| Table 1 – Operations Summary – November 2020 | | | | | | | |
|---|---|---|--|--|--|--|--|
| Initial Data Collection: 11/2/2020 13:05 | Final Data Collection: | 12/1/2020 11:15 | | | | | |
| Operating Time: | Percent Uptime: | Electrical Power Usage: | | | | | |
| ST018GWTP: 694 hours | ST018GWTP: 100% | ST018GWTP: 45 kWh (33 lbs CO ₂ generated ^a) | | | | | |
| Gallons Extracted: 74,880 gallons | Gallons Extracted Since March 2011: 19.7 million gallons | | | | | | |
| Volume Discharged to Sanitary Sewer: 74,880 gallons | Final Totalizer Reading: 19,747,2: | 29 gallons | | | | | |
| Cumulative Volume Discharged to Sanitary Sewer since 1 November 2014: 13.3 million gallons | | | | | | | |
| MTBE, BTEX, VOC, TPH Mass Removed: 0.04 Ibs ^b | MTBE, BTEX, VOC, TPH Mass Removed Since March 2011: 49.6 lbs | | | | | | |
| MTBE (Only) Removed: 0.01 lbs ^b | MTBE (Only) Mass Removed Since March 2011: 12.2 lbs | | | | | | |
| Rolling 12-Month Cost per Total Pounds of Mass Removed | d: \$74,284 ^{bc} | | | | | | |
| Monthly Cost per Pound of Mass Removed: \$126,293 ^{bc} | | | | | | | |
| ^a SiteWise [™] estimate that 1 kilowatt hour generated produces ^b Calculated using November 2020 EPA Method SW8260C ar ^c Costs include operations and maintenance, reporting, analyt the system. | ^a SiteWise [™] estimate that 1 kilowatt hour generated produces 0.74 pounds of GHG. ^b Calculated using November 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 – November 2020 | | | | | | |
|---|---|----------------------|--|--|--|--|
| Location | Average Flow Rate Groundwater (gpm) ^a | Hours of Operation | | | | |
| EW2014x18 | 1.1 | 694 | | | | |
| EW2016x18 | 0.7 | 694 | | | | |
| EW2019x18 | 0.0 | Offline ^b | | | | |
| EW2333x18 | 1.6 | 694 | | | | |
| ST018GWTP | 1.8 | 694 | | | | |
| ^a Flow rates calculated by dividing total gallons processed by amount of operating time of the pump/system. The extraction pumps take in air from the subsurface, which alters the flow and totalizer. ^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 | | | | | | | |
|--|-----------------------|------|----------------------|------|-------|--|--|
| | Shutdown ^a | | Restart ^a | | | | |
| Location | Date | Time | Date | Time | Cause | | |
| ST018 | None | | | | | | |
| | | | | | | | |
| = 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 10 November 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 November 2020 laboratory data report is available upon request. The MTBE discharge concentration during the November 2020 sampling event was 16 μ g/L, which is a decrease from the October 2020 sample result of 17 J μ g/L. Two 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 μ g/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 as expected. The extracted MTBE concentrations and extracted total concentrations have exhibited overall decreasing trends over the past 12 months.

The total reported flow for the system was lower than the sum of the extraction wells in November 2020. On 10 November 2020, the effluent totalizer was calibrated by filling a graduated drum and comparing the volume of water that filled the drum with the volume of water shown to have passed through the totalizer. Three (3) trials were run and each time the amounts of water in both locations were within approximately 1 gallon of water.

Troubleshooting at the extraction wellheads indicated that there is likely air in the extraction well discharge lines that can slightly inflate the number of gallons shown on the totalizer in the extraction well vaults. Any trapped air is expelled when the process water enters the system influent tank. From there, the transfer pump discharges all water into the sanitary sewer, so the treatment plant system totalizer presents an accurate count of how much water is being processed at the Site ST018 GWTP (as opposed to adding individual extraction well totals).

Optimization Activities

No optimization activities occurred at the ST018GWTP in November 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 33 pounds of GHG during November 2020 and removed 74,880 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.

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

| | Instantaneous Maximum ^a | Detection Limit | | 10 November 2020 (μg/L) |
|---|---------------------------------------|-----------------|-----|-------------------------------|
| Constituent | (µg/L) | (μg/L) | N/C | System Discharge ^b |
| Fuel Related Constituents | | | | |
| Methyl tert-Butyl Ether | 6,400 | 0.25 | 0 | 16 |
| Benzene | 25,000 ^c | 0.16 | 0 | 0.21 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 | 52 |
| Total Petroleum Hydrocarbons – Motor Oil | 100,000 | 160 | 0 | ND |
| Other | | | | |
| Acetone | NA | 1.9 | 0 | ND |
| 2-Butanone (MEK) | NA | 2.0 | 0 | ND |
| 1,2-Dichloroethane | 20 | 0.13 | 0 | ND |
| 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

 $^{\rm c}$ The limit of 25,000 $\mu\text{g/L}$ is a combined limit for BTEX.

 $^{\rm d}$ The limit of 50,000 $\mu g/L$ 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.



Site ST018 Groundwater Treatment Plant Monthly Data Sheet ST018_Nov2020.Docx



South Base Boundary Groundwater Treatment Plant Monthly Data Sheet

Report Number: 242 Reporting Period: 1 December 2020 – 29 December 2020 Date Submitted: 14 January 2021

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

System Metrics

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

| Table 1 – Operations Summary – December 2020 | | | | | | | |
|--|------------------|--------------------------------|--|---|--|--|--|
| Initial Data Collection: 12/1/2020 12:35 | | Final Data Col | llection: | 12/29/2020 15:00 | | | |
| Operating Time: | | Percent Uptime: | | Electrical Power Usage: | | | |
| SBBGWTP: | 560 hours | SBBGWTP: | 83.1% | SBBGWTP: 13,503 kWh (11,592 lbs CO ₂ gener | | | |
| Gallons Treated: 4.413 million gallons | | | Gallons Treated Since July 1998: 1.237 billion gallons | | | | |
| Volume Discharged to Union Creek: 4.413 million gallons | | | lons | Gallons Treated from Other Sources: 0 gallons | | | |
| VOC Mass Removed: 0.51 Ibs ^b | | | | VOC Mass Removed Since July 1998: 532.9 lbs | | | |
| Rolling 12-Month | Cost per Pound c | f Mass Removed [:] \$ | 23,622 ^c | | | | |
| Monthly Cost per Pound of Mass Removed: \$46,051 ° | | | | | | | |
| Ibs = pounds ^a SiteWise [™] estimate that 1 kilowatt hour generated produces 0.74 pounds of GHG. Value also includes approximately 1,600 pounds of GHG from GAC change out services averaged to a per month basis. ^b Calculated using December 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. | | | | | | | |

South Base Boundary Groundwater Treatment Plant Monthly Data Sheet SBBGWTP_Dec2020.docx Table 2 presents individual extraction well flow rates along with the average system flow during the monthly reporting period.

| Table 2 – SBBGWTP Average Flow Rate (gpm) ^a – December 2020 | | | | | | | | |
|---|---|---|---|--|---|--|---|--|
| FT005 ^b | | | SS | SS029 | |)30 | | |
| EW01x05 | Offline | EW743x05 | Offline | EW01x29 | Offline ^c | EW01x30 | 13.1 | |
| EW02x05 | Offline | EW744x05 | 1.2 | EW02x29 | Offline ^c | EW02x30 | 7.5 | |
| EW03x05 | Offline | EW745x05 | 6.8 | EW03x29 | 5.0 | EW03x30 | 11.7 | |
| EW731x05 | 6.6 | EW746x05 | Offline | EW04x29 | 5.0 | EW04x30 | 16.6 | |
| EW732x05 | Offline | EW2291x05 | 1.6 | EW05x29 | 6.7 | EW05x30 | 6.4 | |
| EW733x05 | Offline | EW2782x05 | 6.1 | EW06x29 | 0.5 | EW2174x30 | 1.9 | |
| EW734x05 | 2.0 | EW2783x05 | 2.5 | EW07x29 | 12.6 | EW711x30 | 2.2 | |
| EW735x05 | 6.7 | EW2784x05 | 9.4 | | | MW269x30 | Offline ^e | |
| EW736x05 | Offline | EW2785x05 | 5.9 | | | | | |
| EW737x05 | Offline | EW2786x05 | 10.7 | | | | | |
| EW742x05 | Offline | | | | | | | |
| | FT005 Tr | otal: 59.5 | | SS029 Tot | al: 29.8 | SS030 Tota | al: 59.4 | |
| SBBGWTP Ave | erage Monthly F | low ^f : 131.31 gpm | 1 | | | | | |
| ^a Flow rates pres | sented are instant: | aneous measureme | ents taken at the e | end of the reporting | g period. | | | |
| ^b Most extraction | wells at FT005 w | /ere taken offline in | accordance with | the 2008 Annual F | Remedial Process | Optimization Repo | ort for the | |
| Central Groundw | Central Groundwater Treatment Plant, North Groundwater Treatment Plant, and South Base Boundary Groundwater Treatment Plant. | | | | | | | |
| ^c Extraction wells | s taken off line bec | cause of persistent | fouling of the wel | I pumps and assoc | ciated discharge p | biping. | | |
| ^a Estimated base | d on historical per | rformance of well. | | | | | | |
| ^e Extraction weils | 3 were operational | i; however, well was | s recnarging. | | Nachara Tatalian | بريالة ومناولاته المراج | 4h a 4 a 4 a 1 4 | |
| EW732x05 EW733x05 EW734x05 EW735x05 EW735x05 EW736x05 EW737x05 EW742x05 SBBGWTP Av ^a Flow rates pres ^b Most extractior <i>Central Groundv</i> ^c Extraction wells ^d Estimated base ^e Extraction wells ^f The average St | Offline Offline Offline Offline Offline Offline Offline Offline FT005 Te erage Monthly F sented are instant: wells at FT005 w water Treatment P s taken off line be- ed on historical pe s were operationa BBGWTP groundy | EW2291x05 EW2282x05 EW2783x05 EW2784x05 EW2785x05 EW2786x05 EW2786x05 ital: 59.5 ital: 59.5 ital: 59.5 ital: 131.31 gpm aneous measureme vere taken offline in <i>Plant, North Ground</i> cause of persistent erformance of well. It; however, well wa water flow rate was | 1.6 6.1 2.5 9.4 5.9 10.7 | EW05x29 EW06x29 EW07x29 SS029 Tota end of the reporting the 2008 Annual F Plant, and South E Il pumps and assouthe the Union Creek E | 6.7 0.5 12.6 al: 29.8 g period. Remedial Process Base Boundary Gr ciated discharge p Discharge Totalize | EW05x30 EW05x30 EW2174x30 EW711x30 MW269x30 SS030 Tota SOptimization Report oundwater Treatmon piping. | 6.4 1.9 2.2 Offline al: 59.4 Dort for the ent Plant. the total tim | |

the system was operational.

S

а S

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 | | | | | | | | |
|---|------------------|-------|----------------------|------|-------------------|--|--|--|
| | Shutdown | а | Restart ^a | | | | | |
| Location | Date | Time | Date | Time | Cause | | | |
| BBGWTP | 16 December 2020 | 14:00 | 21 December 2020 | 8:15 | Carbon change out | | | |
| Shutdown and restart times estimated based on field notes | | | | | | | | |

Summary of O&M Activities

Monthly groundwater treatment samples were collected at the SBBGWTP on 1 December 2020. Sample results are presented in Table 4. The total VOC concentration (13.87 μ g/L) in the influent sample increased from the November 2020 sample results (10.68 μ g/L). TCE was the primary VOC detected in the influent sample at a concentration of 13 μ g/L. TCE and cis-1,2-DCE were detected in the midpoint sampling location. Cis-1,2-DCE was also detected in the effluent sample at a concentration of 0.80 J μ g/L, which exceeds the effluent discharge limit of 0.50 μ g/L.

Four (4) of the five (5) operating Site SS029 extraction wells (EW03x29, EW04x29, EW05x29, and EW06x29) were taken offline on 10 December 2020 following the effluent exceedance. Extraction well EW07x29 was left online to maintain hydraulic capture as it is the furthest downgradient well in the Site SS029 extraction well field.

On 17 December, a carbon change out was performed for both 6,000-pound vessels. Both vessels were backwashed and allowed to soak over the weekend. On 21 December, the SBBGWTP was restarted and all extraction wells, including Site SS029 wells, were put back online. A confirmation effluent sample was collected on 21 December, and no VOCs, including cis-1,2-DCE, were detected (see Table 4).

While the Site SS029 wells were offline (as indicated above), the old galvanized pipe manifold at EW04x29 was replaced with Schedule 80 PVC pipe, fittings, and valves. The Site FT005 and SS030 extraction wells remained online.

The influent and effluent samples were also analyzed for TPH-g, TPH-d, and TPH-mo. TPH-d was detected in the influent (62 J μ g/L) and effluent (29 J μ g/L) samples; however, the effluent concentration was less than the discharge limit of 50 μ g/L.

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

The SBBGWTP SCADA system is going to be upgraded in the first quarter of 2021. Preparations for this upgrade are currently being implemented. Significant upgrade work is likely to begin in January 2021.

Optimization Activities

No optimization activities occurred at the SBBGWTP in December 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 December 2020, the SBBGWTP produced approximately 11,592 pounds of GHG, which includes approximately 1,600 pounds of GHG generated from GAC change out services averaged to a per month basis.

Summary of Groundwater Analytical Data for December 2020 - South Base Boundary Groundwater Treatment Plant

| | Instantaneous Maximum ^a | Detection | | 1 December 2020 (μg/L) | | 20 | 21 December 2020 (μg/L) |
|---|---------------------------------------|-------------|-----|---------------------------|----------|-----------------------|----------------------------|
| Constituent | (μg/L) | (μg/L) | N/C | Influent | Midpoint | Effluent ^b | Effluent |
| Halogenated Volatile Orga | anics | | | | | | |
| Acetone | NA | 1.9 | 0 | ND | ND | ND | ND |
| Bromodichloromethane | NA | 0.17 | 0 | ND | ND | ND | ND |
| Chloroform | 1.9 | 0.16 | 0 | ND | ND | ND | ND |
| Chloromethane | NA | 0.30 | 0 | ND | ND | ND | ND |
| 1,1-Dichloroethane | 0.50 | 0.22 | 0 | ND | ND | ND | ND |
| 1,2-Dichloroethane | 0.50 | 0.13 | 0 | ND | ND | ND | ND |
| 1,1-Dichloroethene | 0.50 | 0.23 | 0 | ND | ND | ND | ND |
| cis-1,2-Dichloroethene | 0.50 | 0.15 | 1 | 0.87 J | 1.5 | 0.80 J | ND |
| trans-1,2-Dichloroethene | 0.50 | 0.11 | 0 | ND | ND | ND | ND |
| Dichlorodifluoromethane | NA | 0.31 | 0 | ND | ND | ND | ND |
| Tetrachloroethene | 0.50 | 0.20 | 0 | ND | ND | ND | ND |
| 1,1,1-Trichloroethane | 0.50 | 0.16 | 0 | ND | ND | ND | ND |
| 1,1,2-Trichloroethane | 0.50 | 0.27 | 0 | ND | ND | ND | ND |
| Trichloroethene | 0.65 | 0.16 | 0 | 13 | 3.5 | ND | ND |
| Vinyl Chloride | 0.90 | 0.10 | 0 | ND | ND | ND | ND |
| Non-Halogenated Volatile | Organics | | | | | | |
| Benzene | 0.50 | 0.13 | 0 | ND | ND | ND | ND |
| Ethylbenzene | 0.50 | 0.15 | 0 | ND | ND | ND | ND |
| Toluene | 0.50 | 0.25 | 0 | ND | ND | ND | ND |
| Xylenes | 0.50 | 0.10 – 0.18 | 0 | ND | ND | ND | ND |
| Other | | | | | | | |
| Total Petroleum | 50 | 10 | 0 | ND | NM | ND | NM |
| Hydrocarbons – Gasoline | | | | | | | |
| Total Petroleum | 50 | 25 | 0 | 62 J | NM | 29 J | NM |
| Hydrocarbons – Diesel | | | | | | | |
| Total Petroleum Hydrocarbons – Motor Oil | 100 | 32 | 0 | ND | NM | ND | NM |

^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

 μ g/L = micrograms per liter





Report Number: 257 Reporting Period: 1 December 2020 – 31 December 2020 Date Submitted: 14 January 2021

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

System Metrics

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

| Table 1 – Operations Summary – December 2020 | | | | | |
|---|--|----------------------------|------------------------------|----------------------|--|
| Initial Data Collect | ion: 12/1/2020 9:15 | | Final Data Collection: | 12/31 | /2020 10:30 |
| Operating Time: | | Percent Up | time: | Electrical Pov | ver Usage: |
| CGWTP: | 414 hours | CGWTP: | 57.4% | CGWTP: | 780 kWh (1,465 lbs CO ₂ generated ^a) |
| Gallons Treated (dis 596,570 gallons | scharge to storm sewer): | G | allons Treated Since January | 1996: 589.0 m | illion gallons |
| VOC Mass Remove | d from groundwater: | V | OC Mass Removed Since Jan | uary 1996: | |
| 1.56 lbs⁵ | | 2,874 lbs from groundwater | | | |
| | | | 8,686 lbs from vapor | | |
| Rolling 12-Month Cost per Pound of Mass Removed [:] \$2,813° Monthly Cost per Pound of Mass Removed: \$4,373° | | | | | |
| ^a SiteWise [™] estimate from GAC change ou ^b Calculated using De ^c Costs include opera related to operation o | ^a SiteWise [™] estimate that 1 kilowatt hour generated produces 0.74 pounds of GHG. Value also includes approximately 888 pounds of GHG from GAC change out services averaged to a per month basis. ^b Calculated using December 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 – December 2020 | | | | | |
|---|--|--|--|--|--|
| Location | Average Flow Rate Groundwater (gpm) | | | | |
| EW001x16 | 11.0 | | | | |
| EW002x16 | 10.4 | | | | |
| EW003x16 ^b | 0.0 | | | | |
| EW605x16 | 5.6 | | | | |
| EW610x16 | 1.9 | | | | |
| CGWTP | 24.0 | | | | |
| ^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. This well has experienced intermittent down time | | | | | |
| due to hangar construction activities in the OSA. | | | | | |
| gpm = gallons per minute | | | | | |

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

| Table 3 – Summary of System Shutdowns | | | | | | | |
|---------------------------------------|---|-------|------------------|-------|--|--|--|
| | Shutdown ^a | | Restart | | | | |
| Location | Date | Time | Date | Time | Cause | | |
| CGWTP | 18 December 2020 | 15:00 | 31 December 2020 | 10:30 | Repair leak and defective PLC power supply | | |
| = Date/Time not recorded | | | | | | | |
| ^a Shutdown CGWTP = 0 | ^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 December 2020. Sample results are presented in Table 4. The total VOC concentration (313.6 μ g/L) in the December 2020 influent sample has increased from the November 2020 sample (227.12 μ g/L). TCE was the primary VOC detected in the influent sample at a concentration of 250 μ g/L. No VOCs were detected in the samples collected after the first and second carbon vessels nor in the effluent sample. The influent and effluent samples were also analyzed for TPH-g, TPH-d, and TPH-mo. TPH-d was detected in the influent sample; however, no TPH was detected in the effluent sample. Travis AFB will continue to monitor influent, midpoint, and effluent concentrations at the CGWTP for carbon breakthrough.

On 2 December 2020, the pump and motor were replaced at EW002x16. The well is currently online.

On 18 December 2020, a minor leak was observed at the system totalizer. The leak was contained within the treatment compound. Additionally, a base-wide power outage was scheduled for 19 December 2020. Due to the observed leak and upcoming power outage, the system was shut down on 18 December 2020 to repair the leak. The system was left offline until 21 December 2020 (after the scheduled power outage had been completed). The treatment system would not come back online, and after extensive troubleshooting, a defective PLC power supply was identified as the cause. A new power supply was installed on 31 December and the system was restarted without issue.

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. Between May and September 2020, the Oil Spill Area (OSA) extraction wells (EW605x16 and EW610x16) were periodically shut down as a precautionary measure during construction activities for the KC-46 hangar project. During these shutdowns, the overall flow rates and influent concentrations decreased. In addition, the flow rate decreased because of the EW002x16 pump motor issues in November.

The Site SS016 subgrade biogeochemical reactor (SBGR), also known as the bioreactor and the Site DP039 bioreactor, continued operating in December 2020. In December, the EW2383x39 extraction well vault was damaged accidentally by a piece of heavy equipment during a construction project. The extraction well was successfully restarted, but the well vault remains damaged. Travis AFB is currently coordinating with the Civil Engineer department to get the vault repaired.

A 3-bay aircraft hangar is being constructed over much of the OSA source area (former Buildings 16 and 18 area). This project is scheduled to be constructed over at least the next year or so. Every attempt will be made

to keep all extraction wells and the Site SS016 bioreactor in operation. However, there may be times when extraction needs to be shutdown to avoid spills of extracted groundwater or to change out electrical equipment. In addition, the horizontal well (EW003x16) is being replaced, which will necessitate significant down-time for this well.

Optimization Activities

No optimization activities occurred at the CGWTP in December 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 1,465 pounds of GHG during December 2020.

TABLE 4 Summary of Groundwater Analytical Data for December 2020 – Central Groundwater Treatment Plant

| | | | | 1 December 2020 (μq/L) | | | |
|---|-------------------------------------|------------------------------|-----|---------------------------|-------------------------------|-------------------------------|---------------------------------|
| Constituent | Instantaneous Maximumª (μg/L) | Detection Limit (μg/L) | N/C | Influent | After Carbon 1 Effluent | After Carbon 2 Effluent | System Effluent ^ь |
| Halogenated Volatile Organics | | | | | | | |
| Acetone | NA | 1.9 – 3.8 | 0 | ND | ND | ND | ND |
| Bromomethane | 5.0 | 0.21 – 0.42 | 0 | ND | ND | ND | ND |
| Carbon disulfide | 5.0 | 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 | 5.0 | 0.15 – 0.30 | 0 | ND | ND | ND | ND |
| 1,3-Dichlorobenzene | 5.0 | 0.13 – 0.26 | 0 | ND | ND | ND | ND |
| 1,4-Dichlorobenzene | 5.0 | 0.16 – 0.32 | 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 | ND | ND | ND | ND |
| cis-1,2-Dichloroethene | 0.50 | 0.15 – 0.30 | 0 | 61 | ND | ND | ND |
| trans-1,2-Dichloroethene | 0.50 | 0.15 – 0.30 | 0 | 2.6 | ND | ND | ND |
| Tetrachloroethene | 0.50 | 0.20 - 0.40 | 0 | ND | 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 | 250 | ND | ND | ND |
| Vinyl Chloride | 0.90 | 0.10 – 0.20 | 0 | ND | ND | ND | ND |
| Non-Halogenated Volatile Orga | nics | | | | | | |
| 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 | 24 – 27 | 0 | 35 J | NM | NM | ND |
| Total Petroleum Hydrocarbons – Motor Oil (C28 – C40) | 100 | 24 – 27 | 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.

NA = not applicable

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

NM = not measured µg/L = micrograms per liter





Subarea LF007C Groundwater Treatment Plant Monthly Data Sheet

Report Number: 196Reporting Period: 1 December 2020 – 29 December 2020Date Submitted: 14 January 2021

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

System Metrics

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

| Table 1 – Operations Summary – December 2020 | | | | | |
|---|--|---|--|--|--|
| Initial Data Collection: | 12/1/2020 10:50 | Final Data Collection: 12/29/2020 13:00 | | | |
| Operating Time: | Percent Uptime: | Electrical Power Usage ^a : | | | |
| LF007C GWTP: 645 hours | LF007C GWTP 95.7% | LF007C GWTP: 0 kWh | | | |
| Gallons Treated: 75,822 gallons | | Gallons Treated Since March 2000: 91.2 million gallons | | | |
| Volume Discharged to Duck Pond | 1: 75,822 gallons | | | | |
| VOC Mass Removed: 7.58 x 10 ⁻⁴ pounds ^b | | VOC Mass Removed Since March 2000: 174.4 pounds (Groundwater) | | | |
| Rolling 12-Month Cost per Pound | of Mass Removed: Not Measured ^c | | | | |
| Monthly Cost per Pound of Mass Removed: Not Measured ^c | | | | | |
| ^a The LF007C GWTP operates on solar power only. ^b VOCs from December 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 – December 2020 | | | | | |
|---|--------------------------------------|-----------------------------------|--|--|--|
| Location | Average Flow Rate (gpm) ^a | Total Gallons Processed (gallons) | | | |
| EW614x07 | 1.8 | 67,375 | | | |
| EW615x07 | 0.3 | 10,873 | | | |
| LF007C GWTP | 2.0 | 75,822 | | | |
| ^a Flow rates calculated by dividing total gallons processed by system operating time for the month or the average of the instantaneous readings. gpm = gallons per minute | | | | | |

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

| Table 3 – Summary of System Shutdowns | | | | | | | |
|---|-----------------------|--|------------------|-------|---------------------|--|--|
| | Shutdown ^a | Shutdown ^a Restart ^a | | | | | |
| Location | Date | Time | Date | Time | Cause | | |
| LF007C GWTP | 8 December 2020 | 12:00 | 8 December 2020 | 12:45 | Routine maintenance | | |
| LF007C GWTP | 20 December 2020 | 8:45 | 21 December 2020 | 13:00 | Rain water in sump | | |
| = Time not recorded ^a Shutdown and restart times estimated based on field notes LF007C GWTP = Subarea LF007C Groundwater Treatment Plant | | | | | | | |

Summary of O&M Activities

Monthly groundwater samples were collected at the LF007C GWTP on 1 December 2020. Sample results are presented in Table 4. The total VOC concentration in the December 2020 influent sample was 1.2 μ g/L. TCE was the only VOC detected at the influent sample location. No VOCs were detected in the midpoint or effluent sample locations.

On 8 December, the LF007C GWTP was shut down to clean the scale off the inlet screen. The system was restarted the same day without issue. On 20 December, the LF007C GWTP was shut down because of accumulated rain water in the sump. The system was restarted on 21 December without issue.

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 increased. The average flow rate through the LF007C GWTP has gradually decreased over the last 12 months due to typical seasonal variation.

Optimization Activities

No optimization activities occurred at the LF007C GWTP in December 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.

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

| | Instantaneous Maximumª | Detection Limit | _ | | 1 December 2020 (μg/L) | |
|--------------------------------|---------------------------|--------------------|-----|----------|---------------------------|-----------------------|
| Constituent | (μg/L) | (μg/L) | N/C | Influent | After Carbon 1 | Effluent ^b |
| Halogenated Volatile Organics | | | | | | |
| Acetone | NA | 1.9 | 0 | ND | ND | ND |
| Bromodichloromethane | 5.0 | 0.17 | 0 | ND | ND | ND |
| Bromoform | 5.0 | 0.46 | 0 | ND | ND | ND |
| 2-Butanone | 5.0 | 2.0 | 0 | ND | ND | ND |
| Carbon Tetrachloride | 0.5 | 0.19 | 0 | ND | ND | ND |
| Chloroform | 1.9 | 0.16 | 0 | ND | ND | ND |
| Chloromethane | NA | 0.30 | 0 | ND | ND | ND |
| Dibromochloromethane | 5.0 | 0.17 | 0 | ND | ND | ND |
| 1,3-Dichlorobenzene | 5.0 | 0.13 | 0 | ND | ND | ND |
| 1,4-Dichlorobenzene | 5.0 | 0.16 | 0 | ND | ND | ND |
| 1,1-Dichloroethane | 0.50 | 0.22 | 0 | ND | ND | ND |
| 1,2-Dichloroethane | 0.50 | 0.13 | 0 | ND | ND | ND |
| 1,1-Dichloroethene | 0.50 | 0.23 | 0 | ND | ND | ND |
| cis-1,2-Dichloroethene | 0.50 | 0.15 | 0 | ND | ND | ND |
| trans-1,2-Dichloroethene | 0.50 | 0.15 | 0 | ND | ND | ND |
| Methylene Chloride | 5.0 | 0.94 | 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 | 1.2 | ND | ND |
| Vinyl Chloride | 0.90 | 0.10 | 0 | ND | ND | ND |
| Non-Halogenated Volatile Organ | ics | | | | | |
| Benzene | 0.50 | 0.16 | 0 | ND | ND | ND |
| Ethylbenzene | 0.50 | 0.16 | 0 | ND | ND | ND |
| Toluene | 0.50 | 0.17 | 0 | ND | ND | ND |
| Xylenes | 0.50 | 0.15 – 0.19 | 0 | ND | ND | 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

 μ g/L = micrograms per liter





Site ST018 Groundwater Treatment Plant Monthly Data Sheet

Report Number: 118 Reporting Period: 1 December 2020 – 29 December 2020 D

Date Submitted: 14 January 2021

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

System Metrics

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

| Final Data Collection: | | | | |
|--|---|--|--|--|
| Final Data Conection. | 12/29/2020 14:15 | | | |
| Percent Uptime: | Electrical Power Usage: | | | |
| ST018GWTP: 92.2% | ST018GWTP: 33 kWh (24 lbs CO ₂ generated ^a) | | | |
| Gallons Extracted Since March 20 | 11: 19.8 million gallons | | | |
| Final Totalizer Reading: 19,801,999 gallons | | | | |
| Cumulative Volume Discharged to Sanitary Sewer since 1 November 2014: 13.3 million gallons | | | | |
| MTBE, BTEX, VOC, TPH Mass Removed Since March 2011: 49.6 lbs | | | | |
| MTBE (Only) Mass Removed Since March 2011: 12.2 lbs | | | | |
| l: \$79,624 ^{bc} | | | | |
| Monthly Cost per Pound of Mass Removed: \$247,603 ^{bc} | | | | |
| ^a SiteWise [™] estimate that 1 kilowatt hour generated produces 0.74 pounds of GHG. ^b Calculated using December 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 | | | | |
| | Final Data Collection: Percent Uptime: ST018GWTP: 92.2% Gallons Extracted Since March 20 Final Totalizer Reading: 19,801,99 MTBE, BTEX, VOC, TPH Mass Re MTBE (Only) Mass Removed Since I: \$79,624 ^{bc} 0.74 pounds of GHG. d SW8015B analytical results. cal laboratory, project management, | | | |

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

| Table 2 – ST018GWTP Average Flow Rates – December 2020 | | | | | |
|---|---|----------------------|--|--|--|
| Location | Average Flow Rate Groundwater (gpm) ^a | Hours of Operation | | | |
| EW2014x18 | 0.6 | 623 | | | |
| EW2016x18 | 0.7 | 623 | | | |
| EW2019x18 | 0.0 | Offline ^b | | | |
| EW2333x18 | 1.2 | 623 | | | |
| ST018GWTP | 1.5 | 623 | | | |
| ^a Flow rates calculated by dividing total gallons processed by amount of operating time of the pump/system. The extraction pumps take in air from the subsurface, which alters the flow and totalizer. ^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 | | | | | | | |
|--|--|------|------------------|-------|------------------------|--|--|
| | Shutdown ^a | · | | | | | |
| Location | Date | Time | Date Time | | Cause | | |
| ST018GWTP | 19 December 2020 | 8:00 | 21 December 2020 | 12:30 | Scheduled power outage | | |
| = Time not rec | = Time not recorded | | | | | | |
| ^a Shutdown and ST018GWTP = | ^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 December 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 December 2020 laboratory data report is available upon request. The MTBE discharge concentration during the December 2020 sampling event was 18 μ g/L, which is an increase from the November 2020 sample result of 16 J μ g/L. TPH-d, benzene, and 1,2-DCA 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 μ g/L is advised based on worker health and safety. Travis AFB will continue to monitor discharge contaminant concentrations to maintain compliance with the Fairfield-Suisun Sewer District discharge permit.

On 19 December, the ST018GWTP was shut down because of a schedule power outage. The system was restarted on 21 December without issue.

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 as expected. The extracted MTBE concentrations and extracted total concentrations have exhibited overall decreasing trends over the past 12 months.

Optimization Activities

No optimization activities occurred at the ST018GWTP in December 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 24 pounds of GHG during December 2020 and removed 54,770 gallons of water. The amount of GHG produced is directly attributed to the amount of water removed through the system because the only line-power electrical use is for a transfer pump to push the water from the system to the sanitary sewer.

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

| | Instantaneous Maximum ^a | Detection Limit | | 1 December 2020 (μg/L) |
|---|---------------------------------------|-----------------|-----|-------------------------------|
| Constituent | (µg/L) | (μg/L) | N/C | System Discharge ^ь |
| Fuel Related Constituents | | | | |
| Methyl tert-Butyl Ether | 6,400 | 0.25 | 0 | 18 |
| Benzene | 25,000 ^c | 0.16 | 0 | 0.26 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 | 41 J |
| Total Petroleum Hydrocarbons – Motor Oil | 100,000 | 160 | 0 | ND |
| Other | | | | |
| Acetone | NA | 1.9 | 0 | ND |
| 2-Butanone (MEK) | NA | 2.0 | 0 | ND |
| 1,2-Dichloroethane | 20 | 0.13 | 0 | 0.61 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

 $^{\rm c}$ The limit of 25,000 $\mu\text{g/L}$ is a combined limit for BTEX.

 $^{\rm d}$ The limit of 50,000 $\mu g/L$ 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.




Travis AFB Restoration Program

Program Update

RPM Meeting January 20, 2021

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
- SD043 Well Decommissioning and Site Closeout Tech Memo
- FT004 POCO Corrective Action Plan
- 2019 GRISR
- 2019 CAMU Monitoring Report
- SD031 Soil RI/FS

Completed Documents (7)

• SS016 Soil RACR

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 Stepout 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
- LF008 Well Decommissioning
- Passive Vent Systems Sampling
- FT004 Soil Excavation
- SD031B Phase 3 MW Installation & GW Sampling
- PFAS Pilot Test

Completed Field Work (6)

- 4Q20 GRIP
- CAMU Topographic Survey

Documents In-Progress

- Addendum to the Initial Passive Vent System Sampling Work Plan
- Site LF008 Remedial Infrastructure Decommissioning TM

POCO

• Site FT004 POCO Soil Corrective Action Completion Report

Field Work In-Progress

CERCLA

None

POCO

None

Documents Planned

CERCLA

- Technology Demonstration TM
- Site SD031 and FT004 Groundwater Sampling March Results TM

POCO

Site SD031B POCO Additional Site Investigation April
 Report

March

Field Work Planned

CERCLA

- SBBGWTP SCADA Upgrade
- Winter 2021 Vapor Intrusion Sampling Event

Jan-Feb Jan-Feb

POCO

None

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 Memorandum20

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

Travis AFB RPM Meeting 20 January 2021

Land Use Control Sites Status/Update



Travis Air Force Base Environmental Restoration Program

- Annual LUC Inspection Delayed Until Mid-February
- We Have a New LUC Map
- KC-46 Hangar Project
 - □ EW003AX16 Installation
 - □ Airfield Parking Ramp



Travis Air Force Base Environmental Restoration Program



Service Layer Credits:

KC-46 3-Bay Hangar

Horizontal well EW003AX16 has been installed, 300 feet of stainless steel screen, still cleaning up site and preparing area for vault and piping installation

Drilling mud day lighted at MW2411X16 during installation, will be redeveloped

Current untreated water conveyance piping may need realignment due to interference with new storm drain system

Underground utility work going slowly as there have been several unidentified utilities discovered, most had been abandoned in place

Slight changes to the parking ramp are needed which will require trenching to install new fuel piping and refueling vaults. All work will take place above the water table.



Travis Air Force Base Environmental Restoration Program



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PFOS / PFOA Updates



Travis Air Force Base Environmental Restoration Program

Site Inspection

Emergency Removal Action Memorandum (ERAM)

- Submitted to the regulatory agencies on 1 Dec 2020.
- The ERAM documents approval and decision by the AF to conduct an emergency removal action in response to the presence of PFOS/PFOA above the USEPA lifetime health advisory (LHA) levels of 70 ppt.
- The AF continues to supply bottled water to all five impacted residences and will install Point-of-Entry Treatment Systems (POETS) at the three impacted residential wells as an interim/long-term solution.

Off-Base Drinking Water Treatment Systems (two mile radius)

- On 12 Jan, the Travis RI Project Manager met with the AFCEC support contractor for job walks of three properties scheduled to receive point-of-entry ground water treatment systems.
- Two property owners were on-site and discussion of the treatment systems ensued.
- The contractor took measurements and photos to support the future installation.
- New concrete slabs will be placed prior to the installation, and the treatment systems will be housed in small shed-like structures.

Travis Air Force Base Environmental Restoration Program

Expanded Site Inspection

Drinking Water Production Well sampling (four mile radius)

- Letters requesting to sample GW production wells were sent to five property owners for six parcels with records of groundwater wells:
 - Two property owners did not respond after several attempts to reach by mail and telephone.
 - One property owner confirmed she has a well that is not used as a source of drinking water.
 - One property owner with two parcels provided consent to sample one well used for drinking water and confirmed the well on the second parcel was not used as a source of drinking water.
 - One property has three wells that may be used for as a source of drinking water and the owner provided consent to sample all three wells.
- On 5 Jan, the Expanded Site Inspection contractor sampled groundwater from the two properties.
- Preliminary lab data is expected in two-three weeks.



Expanded Site Inspection, cont.

Drinking Water Production Well sampling (four mile radius)

- If GW sample results are over EPA LHA of 70 ppt, the AF will:
 - Immediately provide bottled water for human consumption.
 - Notify regulatory agencies.
 - Arrange for confirmation sampling.

Remedial Investigation

• Updates provided in next section, a new addition to the RPM meeting.



Travis Air Force Base Environmental Restoration Program

PFOS / PFOA Updates

Additional questions?



Travis Air Force Base Environmental Restoration Program

Air Force Civil Engineer Center

Travis Air Force Base PFAS Remedial Investigation AFFF Sites



Presented by Megan Duley, PE

January 2021

Battle Ready...Built Right!

Remedial Investigation Project

- Awarded 29 July 2020
- Project Team:
 - AFCEC Travis AFB, AFCEC-CZTE, and AFCEC-CZR
 - RPM Lonnie Duke
 - Project Manager Chet Storrs
 - USACE-SPA Albuquerque District (Contract and Project Management)
 - Project Manager Alan Soicher
 - Sustainment and Restoration Services, LLC (SRS) Oneida Team
 - Project Manager Megan Duley
 - AECOM Environmental Sequence Stratigraphy (ESS) Group
 - Project Manager Dave Parse
 - USEPA, DTSC, and RWQCB
- Period of Performance through 28 July 2025 for completion of all RI tasks

Project Objectives

- Site characterization of the identified AFFF areas.
- Delineate the nature and extent of the per- and polyfluoroalkyl substances of PFOS, PFOA, and PFBS.
- Define the vertical and horizontal extent and interaction within environmental media: soil, groundwater, sediment, and surface water.
- Evaluate the source-strength of PFOS, PFOA, and PFBS impacted soils within potential vadose source zones.

*Delineation performed using USEPA RSLs for PFOS, PFOA, and PFBS.

PFAS = per- and polyfluoroalkyl substances PFOA = perfluorooctanoic acid (-octanoate) PFOS = perfluorooctane sulfonic acid (sulfonate) PFBS = perfluorobutane sulfonic acid (sulfonate)
Project Objectives

- Further develop the conceptual site model (CSM)
 - –Understand regional and site-specific geologic and hydrogeologic conditions and potential pathways.
 - -PFOS/PFOA/PFBS fate and transport.
 - -Migration and behavior in the surface and subsurface (vadose and saturated zones).
 - -Identify potential risk pathways.
- Support USACE and Travis AFB with planning and communication of Site and program information to regulatory agencies and stakeholders.
- Environmental Sequence Stratigraphy (ESS) is included in the project scope.

AFFF Investigation Areas

| AFFF / Remedial Investigation Area | Site Area Name | Possible Pathway |
|------------------------------------|--|---------------------------------------|
| AFFF Area 1 | Former Fire Training Area 4 | Discharge |
| AFFF Area 2 | Current Fire Training Area | Spill and Discharge |
| AFFF Area 3 | Hangar Building 811 | Effluent Discharge |
| AFFF Area 4 | Former Fire Station 1 (Bldg 175) | Storage, Effluent Discharge and Spill |
| AFFF Area 5 | Former Fire Station 2 (Bldg 560) | Storage, Effluent Discharge and Spill |
| AFFF Area 6 | Former Fire Station 4 (Bldg 895) | Effluent Discharge |
| AFFF Area 7 | 1982/1983 C-5 Crash | Direct Spray |
| AFFF Area 8 | 1986 C-141B Accident | Direct Spray |
| AFFF Area 9 | 1988 C-5 Fire | Direct Spray |
| AFFF Area 10 | Late 1980s C-141B Accident | Direct Spray |
| AFFF Area 11 | 2001 Aircraft Crash | Direct Spray |
| AFFF Area 12 | 2014 Boeing E75 Air Show Crash | Direct Spray |
| AFFF Area 13 | Nozzle Spray Test Area (900 Ramp) | Discharge |
| AFFF Area 14 | Former Sewage Treatment Plant and Sludge Disposal Area | Effluent Discharge |
| AFFF Area 15 | Union Creek Outfall # 1 | Sediment, Storm water runoff |
| AFFF Area 16 | Union Creek Outfall # 2 | Sediment, Storm water runoff |
| AFFF Area 17 | South Base Boundary Groundwater Treatment Plant | Discharge |
| Remedial Investigation Area 18 | Fire Station 3 (Bldg 1380) | Storage, Effluent Discharge and Spill |
| Remedial Investigation Area 19 | Fire Station 5 (Bldg 38) | Storage, Effluent Discharge and Spill |
| Remedial Investigation Area 20 | 1987 L-100 Crash | Direct Spray |
| Remedial Investigation Area 21 | 1993 C-141B Fire | Direct Spray |
| Remedial Investigation Area 22 | 1974 DC-8 Fire | Direct Spray |
| Private Wells | Within 4-mile Radius Downgradient | Migration |

AFFF Investigation Areas



Four Mile Radius



Primary Project Tasks

- Project Kick-off and Management
- Project Planning
 - Work Plan Regulatory Submittal in April 2021
 - UFP-QAPP Regulatory Submittal in April 2021
 - Accident Prevention Plan (APP)
 - Preliminary ESS Deliverables
- Project Reporting
 - Final ESS deliverables
 - RI report document
 - Data and ERPIMS / GIS deliverables

Primary Project Tasks

Field Activities

- Groundwater sampling (new and existing wells) *initial* sampling of existing GW monitoring wells
- Install and sample up to 100 GW monitoring wells
- Source Area sampling surface/subsurface soil
- Optional surface water sampling
- Sediment sampling
- Install lysimeters
- Monitor and sample lysimeters
- Surveying

Use of Existing ESI QAPP Discussion

- Project planning documents targeted for Regulatory submittal in April 2021. Standard review cycle shows field activities starting in September/October 2021.
- Data from the initial sampling at existing monitoring wells provides characterization data and supports a data-driven process to select monitoring well locations and additional media sampling.
- Given the current review period/approval timeframe for the planning documents, utilization of a previously approved UFP-QAPP would accelerate data collection and subsequent selection of sampling and monitoring well locations.

ESS Evaluation

OVERVIEW OF ENVIRONMENTAL SEQUENCE STRATIGRAPHY

Junaid Sadeque and Patrick Donahoe

1 Introduction

- 2 ESS Methodology
- 3 Regional Geology of Travis AFB
- 4 Going Forward

ESS Methodology



Location





Location of Travis AFB in the Western Sacramento Basin



Map of the Central Valley's four major regions.

5



Pleistocene-Holocene fill is continental, consisting of fine-grained, with volcanicderived sediments. Some relatively coarse-grained deposits occur along the river channels and/or toes of alluvial fans

https://ca.water.usgs.gov/pr ojects/central-valley/

AECOM

Stratigraphic Column for Travis

| Geologic Column - | Travis AFB | and Vicinity, | California |
|-------------------|------------|---------------|------------|
|-------------------|------------|---------------|------------|

| Million Years Before Present | Geologic Period | Geologic Epoch | Geologic Unit | Description | Environment of Deposition |
|---------------------------------|--------------------|-------------------|------------------------------------|--|------------------------------|
| 1.8 | Quaternary | Holocene | Alluvium (Q _{yal}) | Poorly-sorted stream and basin deposit clay to boulder size. | Continental |
| | | Pleistocene | Older Alluvium (Q _{oal}) | Dissected alluvial deposits. | Continental |
| 5 | Tertiary | Pliocene | Tehama Formation (Tt) | Sand, silt rocks. Volcaniclastic. | Continental |
| | | Miocene | Neroly Sandstone | Interbedded sandstone, siltstone, and shale. | Marine |
| | | Eocene | Markley Sandstone (Tmk) | Massive, brownish-gray, Feldspathic, Micaceous sandstone. | Marine |
| | | | Nortonville Shale (Tn) | Dark brown, silty shale, interbedded with sandstone. | Marine |
| | | | Domengine Sandstone (Td) | Quartzose sandstone, basal glauconite grit. | Marine |
| 55 | Cretaceous | | Guinda Formation (Kg) | Massive sandstone with calcareous concretions and interbedded shale. | Marine |

Example from Previous Cross-section



Application of ESS to Correlation



AECOM

Lithologic Data Selection Criteria





Saturation Thickness Map



Groundwater Contours



AECOM

Proposed Cross-sections



Going Forward with Travis AFB CSM

- Develop the 5 Stratigraphic cross-sections using the best lithologic data
- Input hydrogeological data on the sections
- Input chemical data on the sections
- Work with the team hydrogeologist to determine groundwater and contamination pathways
- Develop and deliver a CSM

Initial Monitoring Well Sampling

- Wells were selected based on the evaluation of existing groundwater and soil data from the SI, other plumes and site information for ERP sites, and preliminary information from the ESS evaluation
- Wells were chosen along likely migration pathways
- Nested wells were selected where possible
- All wells previously sampled for PFAS were included
- Wells at the base boundary were prioritized



Initial Monitoring Well Sampling



Project Communications

- Project Website: <u>https://workspaces.oescgroup.com/travisafb/pfasri/SitePages/Home.a</u> <u>spx</u>
- Team Calls Free Conference Calls, Teams, etc.

| Travis AFB PFAS RI > Home | | | Search this site P |
|--|---|----------------------------------|--------------------|
| Travis AFB Oneida ESC Group SharePoint | | | |
| BROWSE PAGE | | | 😲 SHARE 🏠 FOLLOW 🛛 |
| | | | |
| | Travis AF | B PFAS RI | |
| | Travis Air Force Base | U.S. Army Corps of Engineers | |
| | PFAS Remedial Investigation | Albuquerque District | |
| | Solano County, California | 4101 Jefferson Plaza, NE | |
| | Contract W912PP-20-C0014 | Albuquerque, NM 87109 | |
| | Pro | ect Lead | |
| | Megan Duley, PE Sustainment and Restoration Services, LLC (SRS) MDuley@srslc.com 651-775-7870 cell | | |
| | Documents and Regulator R AF and | USACE Review AECOM Data Transfer | |

