## Travis Air Force Base Environmental Restoration Program Restoration Program Manager's Meeting Minutes 17 February 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 17 February 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-SPA
Damian Simonini	USACE
Pie Zhang	USACE
Dan Stralka	USACE
Nadia Hollan Burke	EPA
Karla Brasaemle	TechLaw, Inc.
Richard Freitas	EPA
Adriana Constantinescu	RWQCB
Gabriel Daiess	RWQCB
Kimiye Touchi	DTSC
Li Wang	DTSC
David Kremer	DTSC
Jesse Negherbon	DTSC
Megan Duley	SRS

Diane Escobedo	SRS
James Griffin	SRS
Jacques Marcillac	SRS
David Parse	AECOM
Junaid Sadeque	AECOM
Dan Schultz	AECOM
Allison Martinelli	AECOM
Leslie Royer	CH2M/Jacobs
Doug Berwick	CH2M/Jacobs
Jill Dunphy	CH2M/Jacobs

Handouts distributed prior to the meeting included:

Attachment 1	Meeting Agenda
Attachment 2	Master Meeting and Document Schedule
Attachment 3	SBBGWTP Monthly Data Sheet (January 2021)
Attachment 4	CGWTP Monthly Data Sheet (January 2021)
Attachment 5	LF007C GWTP Monthly Data Sheet (January 2021)
Attachment 6	ST018 GWTP Monthly Data Sheet (January 2021)
Attachment 7	Presentation: South Base Boundary Groundwater Treatment Plant SCADA Upgrade
Attachment 8	Presentation: Program Update (February 2021)
Attachment 9	Travis AFB LUC Sites Update (February 2021)
Attachment 10	Travis AFB PFOS/PFOA Update (February 2021)
Attachment 11	Presentation: SRS PFAS Remedial Investigation
Attachment 12	Presentation: SRS Environmental Sequence Stratigraphy

### I. JACOBS PBR CONTRACT UPDATES

#### A. ADMINISTRATIVE

#### 1. **Previous Meeting Minutes**

There were no agency comments on the content of the January 2021 RPM Meeting Minutes. Ms. Burke of the EPA pointed out a typo on Page 6, Paragraph 3. The last sentence will be changed to "The November treatment plant ..." From "The November treatment plan ...".

#### 2. Action Item Review

Action items from January 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 during future monthly program updates. February 2021 update: A full update will be provided during the Program Update This action item remains open.

Action Item 2: 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. February 2021 update: The MMDS was updated as suggested. This action item is now closed.

Action Item 3: The Air Force will send Outlook invitations for the LUC Inspections to the regulatory agency representatives, once scheduled. February 2021 update: The LUC inspections were conducted sooner than anticipated due to personnel availability, and invitations were not sent out due to timing. The LUC inspections will be discussed during the Travis AFB LUC Sites part of the meeting. This action item is now closed.

Action Item 4: 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. February 2021 update: Mr. Clare sent the map with the well identified, and Jacobs changed the treatment plant report appropriately. This action item is now closed.

Action Item 5: The Air Force will update the MMDS to reflect a 60-day regulatory review period for the Site SD031B POCO Additional Site Investigation Report. February 2021 update: The MMDS was updated as suggested. 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 next RPM meeting is scheduled for 0930 on Wednesday, 17 March 2021, via MS Teams.

The April 2021 RAB meeting has been postponed to 21 October 2021. The October RPM meeting has been moved from 20 October to 21 October and will begin at 1400.

## **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.

- Travis AFB PFAS Remedial Investigation Work Plan: This is a new document and falls under the PFAS contract. The Travis AFB document lead will be Mr. Storrs. The SRS document lead will be Ms. Megan Duley. The Predraft to AF/Service Center was assigned a due date of 27 October 2020. The rest of the dates were assigned accordingly. Ms. Burke noted that the timeframe given from Draft Final to Final is only 2 weeks. Mr. Duke will change this to 30 days.
- Travis AFB PFAS Remedial Investigation Quality Assurance Program Plan (QAPP): This is a new document and falls under the PFAS contract. The Travis AFB document lead will be Mr. Storrs. The SRS document lead will be Ms. Megan Duley. The Predraft to AF/Service Center was assigned a due date of 27 October 2020. The rest of the dates were assigned accordingly. Ms. Burke noted that the timeframe given from Draft Final to Final is only 2 weeks. Mr. Duke will change this to 30 days.
- Site FT004 POCO Soil Corrective Action Completion Report (CACR): There were no changes to the schedule.
- Quarterly Newsletter (April 2021): There were no changes to the schedule.
- Site LF008 Remedial Infrastructure Decommissioning Technical Memorandum: The CH2M/Jacobs document lead was changed to Mr. Chakurian. The Response to Comments and Final due dates were changed to 26 February 2021.
- Addendum to the Initial Passive Vent Systems Sampling Work Plan Technical Memorandum: The Response to Comments and Final due dates were changed to 10 February 2021. This item will be moved to the History section next month.

- 2020 Annual Groundwater Remedy Implementation Status Report (GRISR): This is a new document. The Travis AFB document lead will be Mr. Storrs. The CH2M/Jacobs document lead will be Mr. Levi Pratt. The Predraft to AF/Service Center was assigned a due date of 27 April 2021. The rest of the dates were assigned accordingly.
- Technology Demonstration Technical Memorandum: There were no changes to the schedule.
- Site SD031 and FT004 Groundwater Sampling Results Technical Memorandum: There were no changes to the schedule.
- Site SD031B POCO Additional Site Investigation Report: The Predraft to AF/Service Center date was changed to 28 January 2021; the rest of the dates were updated accordingly.
- Potrero Hills Annex (FS, PP, and ROD): There were no updates to the schedule.
- Community Relations Plan (CRP) Update: There was no change to the schedule. This document will be updated as a priority in the upcoming Optimized Remediation Contract.

— MOVED TO HISTORY:

- 2019 Annual Corrective Action Management Unit (CAMU) Monitoring Report
- -Site SS016 Soil Remedial Action Completion Report (RACR)

### B. CURRENT PROJECTS

### 1. Treatment Plant Operation and Maintenance Update

# South Base Boundary Groundwater Treatment Plant, January 2021 (Attachment 3)

The South Base Boundary Groundwater Treatment Plant (SBBGWTP) performed at 75.5% uptime, and 4.506 million gallons of groundwater were extracted and treated in January 2021. All treated water was discharged to Union Creek. The average flow rate for the SBBGWTP was 121.9 gallons per minute (gpm). Electrical power usage was 12,553 kilowatt hours (kWh), and approximately 10,889 pounds of CO2 were created (based on DOE calculation). Approximately 0.54 pounds of volatile organic compounds (VOCs) were removed in January. The total mass of VOCs removed since startup of the system is 533.4 pounds.

Troubleshooting was performed on two extraction wells in January2021; details can be found in Attachment 3. A schedule power outage occurred

on 14 January 2021 and the system was shut down until 15 January, when it was restarted with no issue. The system was shut down again on 25 January to upgrade the SCADA system and remained offline for the rest of the reporting period.

Optimization: On 25 January 2021, the SBBGWTP was taken offline to begin updating the SCADA system. Preliminary information regarding the update will be provided in a presentation later in the meeting.

#### Central Groundwater Treatment Plant, January 2021 (Attachment 4)

The Central Groundwater Treatment Plant (CGWTP) performed at 97.7% uptime with approximately 1,083,105 gallons of groundwater extracted and treated in January 2021. 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 1,380 kWh for all equipment connected to the Central Plant, and approximately 1,909 pounds of CO2 were generated. Approximately 2.32 pounds of VOCs were removed from groundwater by the treatment plant in January. The total mass of VOCs removed since the startup of the system is 11,562 pounds.

The Site SS016 subgrade biogeochemical reactor (SBGR) and the Site DP039 SBGR continued operating in January 2021.

Heavy rainfall and stormy weather caused power trips and the system shut down on 26 January 2021. Accumulated rainwater was processed through the system and the system was restarted on 27 January 2021. The KC-46 hangar is being constructed in the area and expected to take approximately one year. Occasionally the extraction wells may need to be shut down during this time to avoid spills of extracted groundwater or protect equipment. The horizontal well EW003x16 is being replaced and will require significant down-time.

No optimization activities were conducted in January 2021.

# LF007C Groundwater Treatment Plant, January 2021 (Attachment 5)

The Subarea LF007C Groundwater Treatment Plant (LF007C GWTP) performed at 83.3% uptime with approximately 78,223 gallons of groundwater extracted and treated in January 2021. All treated water was discharged to the Duck Pond for beneficial reuse. The average flow rate was 1.9 gpm. Approximately  $7.17 \times 10^{-4}$  of a pound of VOCs was removed from groundwater by the treatment plant in January. 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.

On 26 January 2021, the float switch that activates the sump pump was impinged in the sump, which resulted in excessive rainwater accumulation in the treatment pad. The float was adjusted, and the system restarted on 1 February 2021.

No optimization activities were conducted in January 2021.

# ST018 Groundwater (MTBE) Treatment Plant, January 2021 (Attachment 6)

Site ST018 (MTBE) Treatment Plant (ST018 GWTP) performed at 100% uptime with approximately 77,440 gallons of groundwater extracted in January 2021. All groundwater was discharged to the Fairfield – Suisun Sewer District. The average flow rate for the ST018 GWTP was 1.6 gpm. Electrical power usage for the month was 48 kWh for all equipment connected to the ST018 GWTP. The total CO2 discharge equivalent equates to approximately 36 pounds. Approximately 0.16 of a pound of MTBE, BTEX, VOCs, and TPH was removed in January 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 49.7 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 January 2021.

#### C. PRESENTATIONS

#### 1. South Base Boundary Groundwater Treatment Plant SCADA Upgrade (see Attachment 7)

Mr. Berwick presented details of the SCADA system upgrade at the South Base Boundary Groundwater Treatment Plant. Please refer to Attachment 7 for the full briefing. Additional points of discussion are noted below:

- The system can be monitored remotely.
- An alarm can be set up to alert personnel of issues via text message or email.

- A very large amount of data accumulate over time. The team is still deciding on how long to keep data on the primary system vs. when to archive the data, how long to keep the archives.
- The data can be plotted to see how the system can be optimized. Start and stop times can be established based on water level and how long the system has been on. These parameters can be adjusted to allow the system to recharge longer. A minimum off time can be set up. Flow rates can be set up, but some wells are on/off only.
- There is a battery backup and the programs and data are backed up; however, individual pumps and motors are not backed up. There is no battery backup for the generators to keep all the pumps running so they must stop pumping in the event of a power outage.

## 2. Program Update – February 2021 (see Attachment 8)

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

## D. NEW ACTION ITEM REVIEW

None

## E. PROGRAM ISSUES/UPDATE

Mr. Duke informed the team that the Optimized Remediation Contract (ORC) Request for Proposals is expected this week. The Air Force anticipates that the ORC will be awarded in July 2021 and that there will be some overlap between the PBR and the ORC.

F. ACTION ITEMS
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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

## II. TRAVIS AFB UPDATES

## A. Land Use Control Sites, February 2021 (Attachment 9)

### 1. Inspections

The annual land use control (LUC) inspection occurred on 9 February 2021. No discrepancies were noted during the inspections. Mr. Clare and Mr. Storrs will take the lead on this document this year; then it will be part of the ORC. Expected timeframe for submission is early spring 2021.

## 2. Site SS016 KC-46 Hangar

Mr. Duke reported on the status of the KC-46 Hangar Project. Please refer to Attachment 9 for the full briefing.

## B. PFOS/PFOA PROGRAM STATUS, JANUARY 2021 (Attachment 10)

Mr. Storrs reported on the status of the PFOS/PFOA Program at Travis AFB. Please refer to Attachment 10 for the full briefing.

## III. SRS PFOS/PFOA CONTRACT

## A. ADMINISTRATIVE

### 1. Introductions

Ms. Duley introduced James Griffin and Jacques Marcillac to the team. Each of the RPMs and PMs introduced their team members that will provide support for the PFAS RI project.

## B. PRESENTATIONS

The Team requested a second presentation of the project overview to allow technical support contractors that were not present at the January 2021 RPM meeting to attend. Ms, Duley used an updated version of the January 2021 slides for the briefing and the AECOM Environmental Sequence Stratigraphy (ESS) team members present the ESS process and preliminary findings.

## 1. **PFAS Remedial Investigation (Attachment 11)**

Ms. Duley provided an overview of the tasks, objectives, and schedule for the Travis AFB Phase I PFAS RI project. Please refer to Attachment 11 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 use of the previous UFP-QAPP will no longer be considered. The UFP-QAPP generated for the initial groundwater sampling will be submitted for regulatory review. Subsequent sampling activities and monitoring well installation will be addressed in addendums to the UFP-QAPP as part of the data-driven process.
- 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) to understand flow pathways and transport mechanisms. The RI will utilize the EPA RSLs developed for PFOS, PFOA, and PFBS for delineation. The RSL for tapwater will be used to analyze groundwater and surface water samples The RSL for residential soil will be used to analyze soil and sediment samples. The Phase I RI will collect data to support site characterization and the future risk assessment, though a risk assessment will not be included in Phase I.

## 2. Environmental Sequence Stratigraphy (Attachment 12)

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 Attachment 12 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 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.
- Five cross-sections are proposed: A-A', B-B', C-C', D-D', and E-E'. The proposed cross-sections identify paleo valleys, the fault, and other key geologic features in various orientations to analyze the deposition and stratigraphic features to understand potential flow pathways and patterns.

- Data from the ESS will support development of the CSM and will be refined as an iterative process throughout the project for the project Team will use ESS as a tool to understand and communicate the CSM.

Following the ESS discussion, a number of questions were asked by the group. The questions and answers are summarized below.

- Mr. Kremer asked if the ESS evaluation had observed fractures or displacement in bedrock near the fault. Junaid indicated that bore hole logs were evaluated during the initial ESS development though significant fractures were not noted near the fault. Mr. Sadeque also noted that the bedrock is sedimentary.
- Ms. Constantinescu asked how the information from the ESS will be used in the RI. Ms. Duley indicated that the ESS will be developed in an iterative process that is ongoing and will be refined as the project activities produce data. Data will be incorporated into the ESS and used to help drive decision-making as the project proceeds (e.g. well location, screening interval, etc.). The final ESS deliverable will be a tech memo that may be included in the RI report.
- Ms. Constantinescu asked if geophysical methods will be used in the investigation. Mr. Sadeque indicated that geophysical data is useful and available data will be reviewed. Ms. Duley indicated that she would confirm, but that she did not think that geophysical logging or evaluation was included in the scope of the Phase I RI. Ms. Constantinescu noted that faults along the cross sections may influence groundwater flow.
- Ms. Constantinescu asked if existing hydrogeological data will be used or if new hydrogeological tests would be performed. Ms. Duley indicated that if hydrogeological data are available, they will be considered, however, the Phase I RI did not include specific tasks for pump tests or aquifer tests.
- Mr. Kremer asked if surface water samples will be collected. Ms.
  Duley indicated that surface water samples were included in the contract as an option but that given the outfall sample locations at Union Creek, she anticipated surface water sampling would be performed as part of the RI to determine if there are PFOS/A detections and to develop an understanding of groundwater-surface water interaction.

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- Ms. Touchi asked for clarification on what a channel point bar deposit is. Mr. Sadeque provided an explanation on point bar deposits and ESS techniques for estimating their width and depth.
- Ms. Touchi asked about the interpretation and use of the saturated alluvium thickness layer. Mr. Parse, AECOM PM, explained it is an indication of how much water there is present and helps in understanding where there are potential flow pathways, transmissive and non-transmissive zones, and mappable areas of lateral continuous units.

### 3. **PFAS Remedial Investigation – Conclusion**

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Through initial data mining and review of site data, regional information, and the current groundwater monitoring network, the Oneida Team has recommended approximately 100 groundwater monitoring wells for an initial round of sampling. Groundwater data from the initial round of groundwater sampling at existing wells will help inform the CSM, provide valuable data to select 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 Phase I RI activities to optimize data collection and evaluation. The Oneida Team also selected nested wells within the existing monitoring well network to provide data to understand the vertical and horizontal extent of PFOS, PFOA, and PFBS. 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.

Mr. Freitas noted that in the 1990s, there were cross-sections produced by Weston that may be useful to review. Mr. Parse indicated that AECOM will look for the information.

The group discussed that an in-depth discussion on the Draft UFP-QAPP and Draft Work Plan would not be possible during the 17 March RPM meeting since multiple Team members from Oneida, DTSC, and USEPA have a conflicting meeting for Edwards AFB. The group determined that a stand-alone document development meeting would be held on 25 March at 10:00 am PST. The objective of the meeting is to discuss the Draft Work Plan and UFP-QAPP documents and the logic for selection of recommended monitoring wells for initial groundwater sampling prior to submittal of the draft documents.

## C. NEW ACTION ITEM REVIEW

1. Ms. Duley and Ms. Escobedo to send meeting minutes to Travis AFB.

## D. PROGRAM ISSUES/UPDATE

None.

## E. ACTION ITEMS

Item #	Responsible	Action Item Description	Due Date	Status
1	Ms. Duley/Ms. Escobedo	Send meeting minutes to Travis AFB	24 February 2021	Complete

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

The RPM Teleconference is scheduled for 9:30 AM PST on 17 February 2021. After a break, the teleconference will reconvene at 1:30 PM for the PFAS discussion to allow regulatory agency support staff to participate at a set time. 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 for the first part of the teleconference. You will receive a separate MS Teams invite for the RI discussion. 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

SBBGWTP SCADA UPGRADE

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
- 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. 2021 Annual Meeting and Teleconference Schedule

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

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

PRIMARY DOCUMENTS		
Life Cycle	Travis AFB PFAS RI Work Plan Travis AFB, Chet Storrs SRS, Megan Duley	Travis AFB PFAS RI QAPP Travis AFB, Chet Storrs SRS, Megan Duley
Scoping Meeting	NA	NA
Predraft to AF/Service Center	10-27-20	10-27-20
AF/Service Center Comments Due	12-08-20	12-08-20
Draft to Agencies / RAB	04-12-21	04-12-21
Agency Comments Due	<mark>06-11-21</mark>	06-11-21
Response to Comments Meeting		
Agency Concurrence with Remedy	NA	NA
Public Comment Period	NA	NA
Public Meeting	NA	NA
Response to Comments Due	<mark>06-26-21</mark>	<mark>06-26-21</mark>
Draft Final Due	07-01-21	<mark>07-01-21</mark>
Final Due	07-16-21	07-16-21

PRIMARY DOCUMENTS		
	Site FT004 POCO Soil Corrective Action Completion Report	
	Travis AFB, Gene Clare	
	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	03-08-21	
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, Lonnie Duke	Site LF008 Remedial Infrastructure Decommissioning Technical Memorandum Travis AFB, Chet Storrs CH2M, Tony Chakurian
Scoping Meeting	NA	NA
Predraft to AF/Service Center	02-24-21	10-02-20
AF/Service Center Comments Due	02-26-21	11-02-20
Draft to Agencies / RAB	03-01-21	12-11-20
Agency Comments Due	03-15-21	01-15-21
Response to Comments Meeting	03-17-21	01-20-21
Response to Comments Due	04-02-21	02-26-21
Draft Final Due	NA	NA
Final Due	04-05-21	02-26-21
Public Comment Period	NA	NA
Public Meeting	NA	NA

INFORMATIONAL DOCUMENTS		
Life Cycle	Addendum to the Initial Passive Vent Systems Sampling Work Plan Technical Memorandum Travis AFB, Chet Storrs CH2M, Stephanie Curtis	2020 Annual GRISR Travis AFB, Chet Storrs CH2M, Levi Pratt
Scoping Meeting	NA	NA
Predraft to AF/Service Center	10-30-20	<mark>04-27-21</mark>
AF/Service Center Comments Due	11-13-20	05-27-21
Draft to Agencies / RAB	11-25-20	<mark>06-11-21</mark>
Agency Comments Due	12-28-20	07-12-21
Response to Comments Meeting	01-11-21	07-21-21
Response to Comments Due	02-10-21	<mark>08-06-21</mark>
Draft Final Due	NA	NA
Final Due	02-10-21	08-06-21
Public Comment Period	NA	NA
Public Meeting	NA	NA

INFORMATIONAL DOCUMENTS		
Life Cycle	Technology Demonstration Technical Memorandum Travis AFB, Lonnie Duke CH2M, Tony Chakurian	Site SD031 and FT004 Groundwater Sampling Results Technical Memorandum Travis AFB, Chet Storrs CH2M, Tony Chakurian
Scoping Meeting	NA	NA
Predraft to AF/Service Center	01-13-21	01-22-21
AF/Service Center Comments Due	03-02-21	03-10-21
Draft to Agencies / RAB	03-16-21	03-24-21
Agency Comments Due	04-15-21	04-23-21
Response to Comments Meeting	05-06-21	05-19-21
Response to Comments Due	05-20-21	06-02-21
Draft Final Due	NA	NA
Final Due	05-20-21	06-02-21
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	01-28-21				
AF/Service Center Comments Due	03-17-21				
Draft to Agencies / RAB	04-06-21				
Agency Comments Due	06-07-21				
Response to Comments Meeting	<mark>06-16-21</mark>				
Response to Comments Due	06-30-21				
Draft Final Due	NA				
Final Due	06-30-21				
Public Comment Period	NA				
Public Meeting	NA				

PRIMARY DOCUMENTS									
	Potrero Hills Annex Travis, Lonnie Duke								
Life Cycle	FS	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

PRIMARY DOCUMENTS					
Life Cycle	Community Relations Plan Update <sup>1</sup> 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				

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

HISTORY - INFORMATIONAL DOCUMENTS					
	2019 Annual CAMU Monitoring Report	Site SS016 Soil Remedial Action Completion Report			
	Travis AFB, Gene Clare	Travis AFB, Glenn Anderson			
	CH2M HILL, Levi Pratt	CH2M, Doug Berwick			
Life Cycle		CAPE, Meg Greenwald			
Scoping Meeting	NA	NA			
Predraft to AF/Service Center	07-22-20	06-17-20			
AF/Service Center Comments Due	08-21-20	07-20-20			
Draft to Agencies / RAB	09-09-20	08-14-20			
Agency Comments Due	10-09-20	09-14-20			
Response to Comments Meeting	10-22-20	10-22-20			
Response to Comments Due	11-05-20	11-05-20 (12-15-20)			
Draft Final Due	NA	NA			
Final Due	12-04-20	11-05-20 (12-15-20)			
Public Comment Period	NA	NA			
Public Meeting	NA	NA			

# South Base Boundary Groundwater Treatment Plant Monthly Data Sheet

#### Report Number: 243 Reporting Period: 29 December 2020 – 1 February 2021 Date Submitted: 11 February 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 January 2021 reporting period.

Table 1 – Operations Summary – January 2021								
Initial Data Collec	<b>nitial Data Collection:</b> 12/29/2020 15:00			Final Data Collection:2/1/2021 15:00				
Operating Time:		Percent Uptime:		Electrical Power Usage:				
SBBGWTP:	616 hours	SBBGWTP:	75.5%	SBBGWTP:	12,553 kWh (	10,889 lbs CO <sub>2</sub> generated <sup>a</sup> )		
Gallons Treated: 4	ons	Gallons Treated Since July 1998: 1.241 billion gallons						
Volume Discharged to Union Creek: 4.506 million gallons			Gallons Treated from Other Sources: 0 gallons					
VOC Mass Removed: 0.54 lbs <sup>b</sup>			VOC Mass Removed Since July 1998: 533.4 lbs					
Rolling 12-Month	Cost per Pound of	Mass Removed <sup>:</sup> \$	24,288°					
Monthly Cost per F	Pound of Mass Re	emoved: <b>\$36,823</b> °						
<ul> <li>Ibs = pounds</li> <li><sup>a</sup> SiteWise<sup>™</sup> 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.</li> <li><sup>b</sup> Calculated using January 2021 EPA Method SW8260C analytical results.</li> <li><sup>c</sup> Costs include operations and maintenance, carbon change out, reporting, analytical laboratory, project management, and utility costs related to operation of the system</li> </ul>								

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) <sup>a</sup> – January 2021								
FT005 <sup>b</sup>			SSI	029	SSC	)30		
EW01x05	Offline	EW743x05	Offline	EW01x29	Offline <sup>c</sup>	EW01x30	10.4	
EW02x05	Offline	EW744x05	1.1	EW02x29	Offline <sup>c</sup>	EW02x30	7.9	
EW03x05	Offline	EW745x05	7.5	EW03x29	8.0	EW03x30	12.8	
EW731x05	6.7	EW746x05	Offline	EW04x29	5.3	EW04x30	14.1	
EW732x05	Offline	EW2291x05	3.6	EW05x29	5.8	EW05x30	Offline <sup>d</sup>	
EW733x05	Offline	EW2782x05	6.0	EW06x29	0.5	EW2174x30	Offline	
EW734x05	7.6	EW2783x05	1.8	EW07x29	12.4	EW711x30	3.7	
EW735x05	8.2	EW2784x05	Offline <sup>d</sup>		1	MW269x30	Offline	
EW736x05	Offline	EW2785x05	6.8		I			
EW737x05	Offline	EW2786x05	10.1					
EW742x05	Offline				1			
	FT005 Total: 59.4 SS029 Total: 32.0 SS030 Total: 48.9							
SBBGWTP Ave	erage Monthly	Flow <sup>e</sup> : 121.9 gpm						
<sup>a</sup> Flow rates pres	sented are instan	taneous measurem/	ents taken on 12	January 2021 befo	re the system we	is shut down on 25	January 2021.	

<sup>a</sup> Flow rates presented are instantaneous measurements taken on 12 January 2021 before the system was shut down on 25 January 2021. <sup>b</sup> 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.

<sup>c</sup> Extraction wells taken off line because of persistent fouling of the well pumps and associated discharge piping.

<sup>d</sup> Extraction wells were operational; however, well was recharging.

<sup>e</sup> 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 <sup>a</sup> Restart <sup>a</sup>						
Location	Date	Time	Date	Time	Cause		
SBBGWTP	14 January 2021	7:00	15 January 2021	9:00	Scheduled power outage/ transformer maintenance		
SBBGWTP	25 January 2021	9:00			SCADA system upgrade		
<sup>a</sup> Shutdown and restart times estimated based on field notes SBBGWTP = South Base Boundary Groundwater Treatment Plant							

# Summary of O&M Activities

Monthly groundwater treatment samples were collected at the SBBGWTP on 4 January 2021. Sample results are presented in Table 4. The total VOC concentration (14.26  $\mu$ g/L) in the influent sample increased from the December 2020 sample results (13.87  $\mu$ g/L). TCE was the primary VOC detected in the influent sample at a concentration of 13  $\mu$ g/L. No VOCs were detected in the midpoint and effluent sampling locations.

The influent and effluent samples were also analyzed for TPH-g, TPH-d, and TPH-mo. TPH-g was detected in the effluent (12 J  $\mu$ g/L) sample; however, the concentration was less than the discharge limit of 50  $\mu$ g/L.

Figure 1 presents a plot of influent VOC concentrations and average flow at the SBBGWTP over the past twelve (12) months. VOC concentrations have been seasonally variable; however, over the last 12 months the trend has slightly increased. An overall decreasing flow rate trend was also observed in the past 12 months.

In January 2021 troubleshooting was performed on two extraction wells. The following list presents the maintenance activities and status of those extraction wells:

- EW734x05 The pump was cleaned and the flow meter was replaced.
- EW2174x30 The motor was replaced.

On 14 January 2021, the SBBGWTP was shut down because of a scheduled power outage. The system was restarted on 15 January without issue. On 25 January, the SBBGWTP was shut down to upgrade the SCADA system, and the SBBGWTP remained off line for the remainder of the reporting period.

## **Optimization Activities**

On 25 January 2021, the SBBGWTP was taken off line to begin updating the SCADA system. Details regarding the update will be provided in February 2021 after the update has been completed.

# 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 January 2021, the SBBGWTP produced approximately 10,889 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 January 2021 – South Base Boundary Groundwater Treatment Plant

	Instantaneous Maximum <sup>a</sup>	Detection			4 January 2021 (μg/L)	
Constituent	(μg/L)	(μg/L)	N/C	Influent	Midpoint	Effluent <sup>b</sup>
Halogenated Volatile Orga	anics					
Acetone	NA	1.9	0	ND	ND	ND
Bromodichloromethane	NA	0.17	0	ND	ND	ND
Chloroform	1.9	0.16	0	ND	ND	ND
Chloromethane	NA	0.30	0	ND	ND	ND
1,1-Dichloroethane	0.50	0.22	0	ND	ND	ND
1,2-Dichloroethane	0.50	0.13	0	0.38 J	ND	ND
1,1-Dichloroethene	0.50	0.23	0	ND	ND	ND
cis-1,2-Dichloroethene	0.50	0.15	0	0.88 J	ND	ND
trans-1,2-Dichloroethene	0.50	0.11	0	ND	ND	ND
Dichlorodifluoromethane	NA	0.31	0	ND	ND	ND
Tetrachloroethene	0.50	0.20	0	ND	ND	ND
1,1,1-Trichloroethane	0.50	0.16	0	ND	ND	ND
1,1,2-Trichloroethane	0.50	0.27	0	ND	ND	ND
Trichloroethene	0.65	0.16	0	13	ND	ND
Vinyl Chloride	0.90	0.10	0	ND	ND	ND
Non-Halogenated Volatile	Organics					
Benzene	0.50	0.13	0	ND	ND	ND
Ethylbenzene	0.50	0.15	0	ND	ND	ND
Toluene	0.50	0.25	0	ND	ND	ND
Xylenes	0.50	0.10 – 0.18	0	ND	ND	ND
Other						
Total Petroleum	50	10	0	ND	NM	12 J
Hydrocarbons – Gasoline						
Total Petroleum	50	25	0	ND	NM	ND
Hydrocarbons – Diesel						
Total Petroleum Hydrocarbons – Motor Oil	100	32	0	ND	NM	ND

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

<sup>b</sup> 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

 $\mu$ g/L = micrograms per liter





# Central Groundwater Treatment Plant Monthly Data Sheet

#### Report Number: 258 Reporting Period: 31 December 2020 – 1 February 2021

Date Submitted: 11 February 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 January 2021 reporting period.

Table 1 – Operations Summary – January 2021							
Initial Data Collection: 12/31/2020 10:		10:30	30 Final Data Collection:		021 12:00		
Operating Time:		Percent Upt	ime:	Electrical Pov	ver Usage:		
CGWTP:	752 hours	CGWTP:	97.7%	CGWTP:	1,380 kWh (1,909 lbs CO <sub>2</sub> generated <sup>a</sup> )		
Gallons Treated (discharge to storm sewer):Gallons Treated Since January 1996: 590.1 million gallons1,083,105 gallons					illion gallons		
VOC Mass Removed from groundwater: VOC Mass Removed Since January 1996:							
<b>2.32 lbs</b> <sup>b</sup>		2,876 lbs from groundwater					
		8,686 lbs from vapor					
Rolling 12-Month Cost per Pound of Mass Removed <sup>:</sup> \$2,800 <sup>c</sup> Monthly Cost per Pound of Mass Removed: \$2,483 <sup>c</sup>							
<ul> <li><sup>a</sup> SiteWise<sup>™</sup> 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.</li> <li><sup>b</sup> Calculated using January 2021 EPA Method SW8260C analytical results.</li> <li><sup>c</sup> Costs include operations and maintenance, carbon change out, reporting, analytical laboratory, project management, and utility costs related to operation of the system.</li> </ul>							

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

Table 2 – CGWTP Average Flow Rates <sup>a</sup> – January 2021						
Location	Average Flow Rate Groundwater (gpm)					
EW001x16	10.9					
EW002x16	5.8					
EW003x16 <sup>b</sup>	0.0					
EW605x16	5.6					
EW610x16	1.9					
CGWTP	24.0					
<ul> <li><sup>a</sup> Flow rates calculated by dividing total gallons processed by system operating time for the month or the average of the instantaneous readings.</li> <li><sup>b</sup> 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.</li> </ul>						
gpm = gallons per minute						

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

Table 3 – Summary of System Shutdowns							
	Shutdown <sup>a</sup>		Restart				
Location	Date	Time	Date	Time	Cause		
CGWTP	26 January 2021	14:00	27 January 2021	8:00	Excessive rain water and power interruptions. Accumulated rain water was processed through the system and the system was restarted without issue.		
= Date/Time not recorded a Shutdown and restart times estimated based on field notes CGWTP = Central Groundwater Treatment Plant							

# Summary of O&M Activities

Monthly groundwater treatment samples were collected at the CGWTP on 4 January 2021. Sample results are presented in Table 4. The total VOC concentration (254.51  $\mu$ g/L) in the January 2021 influent sample has decreased from the December 2020 sample (313.60  $\mu$ g/L). TCE was the primary VOC detected in the influent sample at a concentration of 200  $\mu$ 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, and no TPH was detected in either samples. Travis AFB will continue to monitor influent, midpoint, and effluent concentrations at the CGWTP for carbon breakthrough.

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 have been seasonally variable; however, over the last 12 months the trend has increased slightly.

On 26 January 2021, the CGWTP shut down because of heavy rainfall and stormy weather (power trips). Accumulated rain water was processed through the system and the system was restarted on 27 January without issue.

The Site SS016 subgrade biogeochemical reactor (SBGR), also known as the bioreactor and the Site DP039 bioreactor, continued operating in January 2021.

A 3-bay aircraft hangar is being constructed over much of the Oil Spill Area (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 January 2021.

# 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 1,909 pounds of GHG during January 2021.

TABLE 4

Summary of Groundwater Analytical Data for January 2021 – Central Groundwater Treatment Plant

					4 Janı (با	uary 2021 ug/L)	
Constituent	Instantaneous Maximum <sup>a</sup> (μg/L)	Detection Limit (µg/L)	N/C	Influent	After Carbon 1 Effluent	After Carbon 2 Effluent	System Effluent <sup>b</sup>
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	0.47 J	ND	ND	ND
1,3-Dichlorobenzene	5.0	0.13 – 0.26	0	0.69 J	ND	ND	ND
1,4-Dichlorobenzene	5.0	0.16 – 0.32	0	0.23 J	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	0.61 J	ND	ND	ND
cis-1,2-Dichloroethene	0.50	0.15 – 0.30	0	51	ND	ND	ND
trans-1,2-Dichloroethene	0.50	0.15 – 0.30	0	3.0	ND	ND	ND
Tetrachloroethene	0.50	0.20 - 0.40	0	0.51 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	200	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	ND	NM	NM	ND
Total Petroleum Hydrocarbons – Motor Oil (C28 – C40)	100	24 – 27	0	ND	NM	NM	ND

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

<sup>b</sup> 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: 197Reporting Period: 29 December 2020 – 1 February 2021Date Submitted: 11 February 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 January 2021 reporting period:

Table 1 – Operations Summary – January 2021						
Initial Data Collection:	12/29/2020 13:00	Final Data Collection:2/1/2021 10:30				
Operating Time:	Percent Uptime:	Electrical Power Usage <sup>a</sup> :				
LF007C GWTP: 677.5 hours	LF007C GWTP 83.3%	LF007C GWTP: 0 kWh				
Gallons Treated: <b>78,223 gallons</b> Volume Discharged to Duck Pond	: 78,223 gallons	Gallons Treated Since March 2000: 91.3 million gallons				
VOC Mass Removed: 7.17 x 10 <sup>-4</sup>	pounds <sup>b</sup>	VOC Mass Removed Since March 2000: <b>174.4 pounds</b> (Groundwater)				
Rolling 12-Month Cost per Pound of Mass Removed: <b>Not Measured</b> <sup>c</sup>						
Monthly Cost per Pound of Mass Removed: Not Measured <sup>c</sup>						
<ul> <li><sup>a</sup> The LF007C GWTP operates on solar power only.</li> <li><sup>b</sup> VOCs from January 2021 influent sample detected by EPA Method SW8260C.</li> <li><sup>c</sup> Value not calculated since measurement does not accurately represent the cost effectiveness of the system.</li> </ul>						

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) <sup>a</sup> Total Gallons Processed (gallons)							
EW614x07	1.7	68,828					
EW615x07	0.3	11,627					
LF007C GWTP	1.9	78,223					
<sup>a</sup> 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 <sup>a</sup> Restart <sup>a</sup>						
Location	Date	Time	Date	Time	Cause		
LF007C GWTP	26 January, 2021	18:00	1 February 2021	10:00	The float switch that activates the sump pump was impinged in the sump, which resulted in excessive rainwater accumulation in the treatment pad. The float was adjusted, and the system restarted.		
= Time not recorded <sup>a</sup> Shutdown and restart times estimated based on field notes LF007C GWTP = Subarea LF007C Groundwater Treatment Plant							

#### Summary of O&M Activities

Monthly groundwater samples were collected at the LF007C GWTP on 4 January 2021. Sample results are presented in Table 4. The total VOC concentration in the January 2021 influent sample was  $1.1 \mu g/L$ . TCE was the only VOC detected at the influent sample location. No VOCs were detected in the midpoint or effluent sample locations.

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.

On 26 January 2021, the float switch that activates the sump pump was impinged in the sump, which resulted in excessive rainwater accumulation in the treatment pad. The float was adjusted, and the system restarted on 1 February.

#### **Optimization Activities**

No optimization activities occurred at the LF007C GWTP in January 2021.

### Sustainability

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

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

#### TABLE 4

Summary of Groundwater Analytical Data for January 2021 – Subarea LF007C Groundwater Treatment Plant

	Instantaneous Maximum <sup>a</sup>	Detection Limit	_	4 January 2021 (μg/L)		
Constituent	(µg/L)	(μg/L)	N/C	Influent	After Carbon 1	Effluent <sup>b</sup>
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	1.1	ND	ND
Vinyl Chloride	0.90	0.10	0	ND	ND	ND
Non-Halogenated Volatile Organi	cs					
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

<sup>a</sup> In accordance with current National Pollutant Discharge Elimination System permit number CAG912002, Order number R2-2017-0048. <sup>b</sup> 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

 $\mu$ g/L = micrograms per liter





### Site ST018 Groundwater Treatment Plant Monthly Data Sheet

Report Number: 119 Reporting Period: 29 December 2020 – 1 February 2021 Date St

Date Submitted: 11 February 2021

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

#### **System Metrics**

Table 1 presents operation data from the January 2021 reporting period.

Table 1 – Operations Summary – January 2021						
Initial Data Collection: 12/29/2020 14:15	Final Data Collection:	2/1/2021 15:00				
Operating Time:	Percent Uptime:	Electrical Power Usage:				
ST018GWTP: 817 hours	ST018GWTP: 100%	ST018GWTP: 48 kWh (36 lbs CO <sub>2</sub> generated <sup>a</sup> )				
Gallons Extracted: 77,440 gallons	Gallons Extracted Since March 2011: 19.9 million gallons					
Volume Discharged to Sanitary Sewer: 77,440 gallons	Final Totalizer Reading: 19,879,439 gallons					
Cumulative Volume Discharged to Sanitary Sewer since 1 November 2014: <b>13.4 million gallons</b>						
MTBE, BTEX, VOC, TPH Mass Removed: 0.16 lbs <sup>b</sup>	MTBE, BTEX, VOC, TPH Mass Removed Since March 2011: 49.7 Ibs					
MTBE (Only) Removed: <b>0.01 lbs</b> <sup>b</sup>	MTBE (Only) Mass Removed Since March 2011: 12.2 lbs					
Rolling 12-Month Cost per Total Pounds of Mass Removed: \$73,578 <sup>bc</sup>						
Monthly Cost per Pound of Mass Removed: \$35,119 <sup>bc</sup>						
<ul> <li><sup>a</sup> SiteWise<sup>™</sup> estimate that 1 kilowatt hour generated produces 0.74 pounds of GHG.</li> <li><sup>b</sup> Calculated using January 2021 EPA Method SW8260C and SW8015B analytical results.</li> <li><sup>c</sup> Costs include operations and maintenance, reporting, analytical laboratory, project management, and utility costs related to operation of the system.</li> </ul>						
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 – January 2021							
Location	Average Flow Rate Groundwater (gpm) <sup>a</sup>	Hours of Operation					
EW2014x18 0.8 817							
EW2016x18 0.7 817							
EW2019x18	Offline <sup>b</sup>						
EW2333x18	817						
ST018GWTP 1.6 817							
<ul> <li><sup>a</sup> 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.</li> <li><sup>b</sup> Extraction well was turned off with regulatory approval on 25 November 2019 because of low MTBE concentrations.</li> </ul>							
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 <sup>a</sup> Restart <sup>a</sup>							
Location	Date	Time	Date Time		Cause			
ST018GWTP	ST018GWTP None							
= Time not recorded								
<sup>a</sup> Shutdown and restart times estimated based on field notes ST018GWTP = Site ST018 Groundwater Treatment Plant								

#### Summary of O&M Activities

Monthly groundwater discharge samples were collected at the ST018GWTP on 4 January 2021. 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 January 2021 laboratory data report is available upon request. The MTBE discharge concentration during the January 2021 sampling event was  $20 \ \mu g/L$ , which is an increase from the December 2020 sample result of 18 J  $\mu g/L$ . TPH-g, TPH-d, and benzene 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  $\mu$ 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 increasing trends over the past 12 months.

#### **Optimization Activities**

No optimization activities occurred at the ST018GWTP in January 2021.

#### 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 36 pounds of GHG during January 2021 and removed 77,440 gallons of water. The amount of GHG produced is directly attributed to the amount of water removed through the system because the only line-power electrical use is for a transfer pump to push the water from the system to the sanitary sewer.

#### TABLE 4 Summary of Groundwater Analytical Data for January 2021 – Site ST018 Groundwater Treatment Plant

	Instantaneous Maximum <sup>a</sup> Detection Limit Constituent (μg/L) (μg/L)			4 January 2021 (μg/L)
Constituent			N/C	System Discharge <sup>b</sup>
Fuel Related Constituents				
Methyl tert-Butyl Ether	6,400	0.25	0	20
Benzene	25,000 <sup>c</sup>	0.16	0	0.52 J
Ethylbenzene	25,000 <sup>c</sup>	0.16	0	ND
Toluene	25,000 <sup>c</sup>	0.17	0	ND
Total Xylenes	25,000 <sup>c</sup>	0.19 – 0.34	0	ND
Total Petroleum Hydrocarbons – Gasoline	50,000 <sup>d</sup>	10	0	39
Total Petroleum Hydrocarbons – Diesel	50,000 <sup>d</sup>	15	0	190 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	ND
Isopropylbenzene	NA	0.19	0	ND
Naphthalene	NA	0.22	0	ND
N-Propylbenzene	NA	0.16	0	ND

<sup>a</sup> In accordance with the Fairfield-Suisun Sewer District Discharge Limitations

<sup>b</sup> 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.

 $\mu$ g/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\_Jan2021.Docx



South Base Boundary Groundwater Treatment Plant SCADA Upgrade

February 2021

## What is "SCADA?"

- SCADA stands for Supervisory Control and Data Acquisition.
- The South Base Boundary Groundwater Treatment Plant (South Plant) treats extracted groundwater from three (3) separate wellfields.
- There are several sensors and controllers at each extraction well location, and many more within the treatment plant compound itself.
- All sensors and controllers must operate together for the treatment plant to operate correctly and efficiently.
- The SCADA system represents the computer system that interacts with all sensors and controllers, and presents those data to the operator.
- The "brain" of a SCADA system is often a programmable logic controller (PLC). This device manages all sensor inputs and reacts according to its program.

## SCADA operational examples

- When the water level gets low in an extraction well, the extraction well pump should shut off to let the well recharge.
- If the flow rate from the extraction well is too low, and the pump is running, something may be wrong (leak?). The extraction pump should shut off and alert the operator that something isn't right.
- If the influent tank is too full, the extraction wells should stop trying to pump into a full tank.
- Is the treatment plant operating currently? How much water is flowing through the system right now? Are all the extraction wells on line?

# Ongoing updates during 20 years of operation

- The South Plant began as a pilot study for the Site SS030 extraction wells.
- Site SS029 extraction wells were added to the system years later, along with three Site FT005 extraction wells.
- Additional Site FT005 extraction wells were added even later.
- The Site SS029 and FT005 extraction wellfields were added into an existing system. Even another Site SS030 extraction well was added at a later date.
- Each addition and tweak was done at a different time with a different methodology.

# Treatment plant additions, and an aging SCADA

- In 2009, the air stripper was taken off line and carbon filtration was used exclusively to treat incoming extraction well groundwater.
- In 2019, an influent tank was added to the system, along with a system transfer pump. This eased pressures at each extraction wellhead.
- Four (4) additional 2,000-pound carbon vessels were added to the system as a potential for additional treatment.
- By this time, the SCADA system was nearly 20 years old, which is a long time in the context of computers. Many controllers were obsolete and no longer supported.

## What's new?

- The old, obsolete controllers were replaced with current, supported modules.
- The old copper wiring was replaced with fiber optic cable, which offers faster, more reliable communication, with a lot less material.
- A more consistent user interface can now provide clear information and control of the treatment system.
- Remote management is now possible.
- Uninterruptable power supplies, server backups, data historian...

### What does the process look like? What's involved?

- The first step is to take the treatment plant off line. Removing the old SCADA means there won't be any control of the system until the new system is installed.
- Remove the old infrastructure. This includes controls no longer needed (air stripper) and lights/switches that serve no purpose.
- Install new, modern components.
- Add labels to everything!
- Test operation, verify that things work.
- Take pictures!



### Old Control Panel

• This photo represents years of additions, subtractions, tweaks, duct tape, etc.



# Same control panel, cleaned up!

• Organized wiring, and a battery backup installed.



### Another old control panel

• Cleaner panel, but filled with relays that have no function.



### This panel now houses the "brain."

- The fiber optic input is in the top left.
- The new PLC is smaller, and is in the middle of this cabinet.
- Local controls are conducted over CAT6 ethernet.
- Another battery backup is installed for the PLC.

### The old user interface



• This system overview includes images of the air stripper (gone)

### The old user interface (continued)



• These are extraction wells at Site SS030. Green represents a running pump.



### The new user interface





# New individual extraction well screen

- Real-time water level trend
- Total flow for the day, and current flow rate
- Current water level



### Out with the old...

6.



## Questions?

### Travis AFB Restoration Program

### **Program Update**

RPM Meeting February 17, 2021

# Completed Documents (1)

- Vapor Intrusion Assessment Update
   Technical Memorandum
- 2012 CAMU Annual Report
- Old Skeet Range Action Memorandum
- 3<sup>rd</sup> 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
- 4<sup>th</sup> 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
- Addendum to the Initial Passive Vent System Sampling Work Plan

# Completed Field Work (1)

- Replace battery banks at ST018
   Groundwater Treatment Plant
- Annual Groundwater Remediation Implementation Program (GRIP) Sampling event
- Well Decommissioning (9 Wells)
- Electrical repairs to FT005 extraction system (well EW01x05)
- Electrical repairs to Site SS029 extraction system
- Site ST018 carbon vessels upgrade
- 2014 GRIP Semiannual Sampling Event
- Pump repairs to Site SS016 well (EW610x16)
- Subsite LF007C optimization upgrades
- 2014 Annual GRIP Sampling Event
- Biological Resource Assessment
- Site CG508 Site Investigation
- Old Skeet Range Characterization Sampling

- 4Q Semiannual GRIP Sampling Event
- SD031 Technology Demonstration Well Installation
- SD037 Well Installation
- SD031 Trench/Conveyance/Power Installation
- SD031 EVO Injection
- ST018 Well Installation
- SS015 Well Installation
- SS016 Well Installation
- Well Development (SD036, SD037)
- ST018 Trench/Conveyance/Power Installation
- SD036 EVO Injection
- Well Development (SS015, SS016)
- Baseline Sampling (SS015, SS016)
- SS014 Data Gap Investigation
- SS016 EVO Injection
- TA500 Data Gaps Investigation

# Completed Field Work (2)

- 2015 Annual GRIP Sampling
- SD037 EVO Injection
- SD034 Data Gaps Investigation
- SS015 EVO Injection
- FT005 Injection Well Installation
- OWS 47, 48, 49 Site Investigations
- SS030 Trench/Conveyance/Power Installation
- FT005 Trench Installation
- FT005 Well Development
- FT004 Well Installation, Well Development, Baseline Sampling
- FT005 Baseline Sampling
- DP039 Well Installation, Well Development, Baseline Sampling
- FT004 EVO Injection
- FT004 Trench/Conveyance/Power Installation
- DP039 Infiltration Trench Installation

- TA500 Groundwater Sampling
- FT005 EVO Injection
- 2016 Q2 GRIP Sampling
- Data Gap Inv. for Soil Sites (SD043, SS046)
- SD031 Remedial Investigation Stepout Sampling (2<sup>nd</sup> 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 (3<sup>rd</sup> 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 (1<sup>st</sup> 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 (2<sup>nd</sup> 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)

- 3<sup>rd</sup> Quarter 2019 GRIP Sampling
- SD034 O<sub>2</sub> Enhancement
- SS016 SBGR Repairs
- SD037 EVO Re-injection
- 4<sup>th</sup> 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
- SBBGWTP SCADA Upgrade

### Documents In-Progress CERCLA

• Site LF008 Remedial Infrastructure Decommissioning TM

#### POCO

• Site FT004 POCO Soil Corrective Action Completion Report

## Field Work In-Progress

#### CERCLA

• Winter 2021 Vapor Intrusion Sampling Event

POCO

None

## **Documents Planned**

#### CERCLA

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

#### POCO

Site SD031B POCO Additional Site Investigation April
 Report

March

March

### Field Work Planned

CERCLA

None

POCO

None

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

# SPOC Update

- Currently located at well pair MW2060A/Bx39
- Baseline sampling 10/19/2020
- Progress sampling on 1/13/2021
- Approximately 950 gallons through system between sampling events
- Received VOC/TOC sample results (still waiting on bacteria results)



# **SPOC Sampling Results**

		10/19/2020 (Baseline) Concentration (µg/L)	1/13/2021 Concentration (µg/L)
MW2060Ax39	TCE	140	6.8
(receiving)	Cis-1,2-DCE	61	0.98 J
	VC	ND	ND
	TOC	6.5	9
MW2060Bx39	TCE	69	84
(pumping)	Cis-1,2-DCE	1	1.1
	VC	ND	ND
	TOC	1.1	0.6 J

# 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 Memorandum23

## 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 (2<sup>nd</sup> of 4 quarterly events)

- SD036 Additional Site Characterization (north & east)
- Therm/Ox System Removal
- SS016 Monitoring Well Installation
- SD037 EVO Injection Well Installation
- DP039 Monitoring Well & Injection Well Installation
- DP039 EVO Injection
- SD037 Monitoring Well Installation
- GSAP 2010 Annual Sampling Event
- SD037 EVO Injection
- SS015 Site Characterization
- South Plant GAC Change-out
- FT005 Data Gap Investigation
- SS016 Position Survey of EW03
- SS016 Bioreactor Installation
- SS016 Bioreactor Baseline Sampling
- DP039 Biobarrier Quarterly Performance Sampling

## Completed Field Work (Historical 2)

- DP039 Bioreactor Quarterly Performance Sampling
- SD037 EVO Quarterly Performance Sampling
- SS015 EVO Baseline Sampling
- SD036 EVO Baseline Sampling
- SS016 Bioreactor Startup
- SD036 Injection Wells Installation
- SS015 Injection Wells Installation
- ST018 GETS Installation
- SD036 EVO Injection
- 2010 Semiannual GSAP
- SS015 EVO Injection
- Quarterly RPO Performance Monitoring (Feb 2011)
- ST018 GETS Startup
- Quarterly RPO Performance Monitoring (May 2011)
- 2011 Annual GSAP Sampling
- SS029 GET Shutdown Test (System Optimization analysis)

- Quarterly RPO Performance Monitoring (Aug 2011)
- Quarterly RPO Performance Monitoring (Nov 2011)
- 2011 Semiannual GSAP Sampling
- LF007C Site Characterization (Wetlands)
- FT005 Soil Remedial Action
- Performance Monitoring SS015 (4<sup>th</sup> 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 17 February 2021

Land Use Control Sites Status/Update



Travis Air Force Base Environmental Restoration Program

## Land Use Control Sites

- Annual LUC Inspection Conducted 09 February
  - No discrepancies noted

• Annual Report to be completed in house, will transition to the ORC next year.



Travis Air Force Base Environmental Restoration Program

### Land Use Control Sites

- KC-46 Hangar Project
  - EW003AX16-restart delayed due to aircraft rated vault procurement
  - Underground utility work going slowly; several unidentified utilities discovered, most had been abandoned in place
  - MW226X16 to be decommissioned, discovered to be in footprint of hangar
  - Monoshield Vapor Barrier by Land Science, a division of REGENESIS to be installed.



Iravis Air Force Base Environmental Restoration Program

### Monoshield

https://landsciencetech.com/technologies/monoshield/

MonoShield is a chemically resistant and easy-to-apply barrier specifically designed as a preemptive solution for vapor intrusion at brownfield redevelopment sites. It is backed by unparalleled design support, standard industry warranty, and a network of certified applicators who can ensure quality installation.



Travis Air Force Base Environmental Restoration Program



Environmental Restoration Program

# PFOS / PFOA Updates



Travis Air Force Base Environmental Restoration Program

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

- The AFCEC contractor installing the POETS did not receive approval for easement access for the installation of a power drop.
- Secondary options are under discussion with the contractor, property owner and PG&E.

#### Expanded Site Inspection (four mile radius)

- TISS is expecting the AFCEC PFOS/PFOA team to release sampling data from 5 Jan additional well sampling on-or-about 23 Feb post validation process.
- TISS will subsequently notify property owners and Regulatory Stakeholders upon receiving the validated data.
- Contract mechanisms are in place to provide bottled water if the results are above the EPA LHA for PFOS/A.



Travis Air Force Base Environmental Restoration Program

# **Travis Air Force Base**

### PFAS Remedial Investigation of AFFF Sites



Presented by Megan Duley, PE

February 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 SFRWQCB
- 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 17	South Base Boundary Groundwater Treatment Plant	Discharge
Remedial Investigation Area 18	Fire Station 3 (Bldg 1380)	Storage, Effluent Discharge and Spill

**NOTE:** AFFF Areas 15 and 16 (Outfalls 1 and 2 respectively) were included within the Travis Site Inspection and the Relative Risk Site Evaluation (RRSE). The outfalls were non-detect for PFOS, PFOA and PFBS during the SI sampling. Furthermore outfalls are not considered as source areas so they will not explicitly be investigated under the RI. However the contract does allow for sampling of the outfalls in association with delineation of up gradient source areas.

### **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 targeted AUG/SEPT 2021
- Install up to 100 GW monitoring wells in clustered pairs.
- Source Area sampling surface/subsurface soil
- Optional surface water sampling
- Sediment sampling
- Install lysimeters
- Monitor and sample lysimeters
- Surveying

### Project WP and UFP-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.
- The WP and UFP-QAPP provide project information, lab and field strategy and procedures, and recommended locations for the initial round of groundwater sampling at 100 existing monitoring wells.
## OVERVIEW OF ENVIRONMENTAL SEQUENCE STRATIGRAPHY (ESS)

Junaid Sadeque and Patrick Donahoe

## **Initial Monitoring Well Sampling**



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## Initial Monitoring Well Sampling





alpha-chlordane, 0.1 µg/L

Legend

Notes

## **Initial Monitoring Well Sampling**

- 100 initial monitoring 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 at multiple locations to provide indication of presence/absence and vertical understanding.
- All wells previously sampled for PFAS were included.
- Wells at the base boundary were prioritized.
- Samples will also be collected at the influent and effluent of the South Base Boundary Groundwater Treatment Plant and analyzed for PFAS.

## **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			
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	Travis AF		
	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@srsllc.com 651-775-7870 cell		
	Documents and Regulator R AF and	USACE Review AECOM Data Transfer	





# Environmental Sequence Stratigraphy (ESS) in Developing CSM for Travis AFB



Junaid Sadeque and Patrick Donahoe PRISM<sup>™</sup> Team, Arlington, Virginia

January 2021

#### 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
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Million Years Before Present	Geologic Period	Geologic Epoch	Geologic Unit	Description	Environment of Deposition
1.8	Quaternary	Holocene	Alluvium (Q <sub>yal</sub> )	Poorly-sorted stream and basin deposit clay to boulder size.	Continental
		Pleistocene	Older Alluvium (Q <sub>oal</sub> )	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