

**Travis Air Force Base
Environmental Restoration Program
Restoration Program Manager's
Meeting Minutes
20 April 2017, 1400 Hours**

Mr. Lonnie Duke of the Air Force Civil Engineer Center (AFCEC) Restoration Installation Support Team (IST) conducted the Restoration Program Manager's (RPM) face-to-face meeting on 20 April 2017 at 1400 hours in Building 248 at Travis AFB, California. Attendees included:

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

Handouts distributed at the meeting, discussions and presentations included:

Attachment 1	Meeting Agenda
Attachment 2	Master Meeting and Document Schedule
Attachment 3	SBBGWTP Monthly Data Sheet (March 2017)
Attachment 4	CGWTP Monthly Data Sheet (March 2017)
Attachment 5	ST018 Monthly Data Sheet (March 2017)
Attachment 6	Presentation: Remedy Optimizations 2017
Attachment 7	Presentation: SS014 Subsite 1 POCO TDCCR
Attachment 8	Presentation: Program Update

1. ADMINISTRATIVE

A. Previous Meeting Minutes

The 15 March 2017 RPM meeting minutes were approved and finalized as written.

B. Action Item Review.

Action items from March 2017 were reviewed.

Action item 1 is ongoing: Ms. O’Sullivan to provide updates on perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA). 20 April 2017: Ms. O’Sullivan said that a Travis AFB site-specific QAPP has been drafted and is currently in internal review. It is scheduled to go out to the regulators for review in mid-May. Ms. O’Sullivan added in order to conduct the fieldwork this season she will be requesting a 30-day review period. Mr. Linbrunner asked if they are using the existing base-wide QAPP or at least utilizing parts of it where it makes sense. Mr. Duke said the QAPP needs to be specific to this type of fieldwork because PFOS/PFOA is so unique.

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

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

Travis AFB Annual Meeting and Teleconference Schedule

The next RPM meeting will be a teleconference meeting, which will be held on Wednesday, 17 May 2017, at 0930 hours.

Travis AFB Master Document Schedule

- Site TS060 Removal Action Work Plan: The Final Due date was changed to 31 March 2017 to reflect the actual date.
- Community Involvement Plan (CIP): No change was made to the schedule.
- Work Plan for the Fourth Five-year Review: Scoping Meeting and Predraft to AF/Service Center date was changed to to-be-determined (TBD).
- Potrero Hills Annex (FS, PP, and ROD): No change to the schedule. Ms. Constantinescu said that the Final Cleanup and Abatement Order has been signed and approved.

- Site LF044 Investigation Work Plan: Travis AFB is working on EPA responses to comments (RTCs).
- Site SS016, SD033, SD043, and SS046 Risk Assessment Technical Memorandum: No change to the schedule.
- Site FT004 POCO Soil Data Gap Investigation Work Plan: RTCs and Final Due dates were changed to 05 May 2017. Ms. Constantinescu will send comments on 28 April 2017. Mr. Wray mentioned that the field scheduled is starting in May. Ms. Constantinescu said that the issue can be discussed after the RPM meeting.
- Quarterly Newsletters (April 2017): No change was made to the schedule.
- 2016 Annual GRISR: The Agency Comments Due date changed from 10 July 2017. No other changes were made to the schedule.
- Multi-Site Technology Demonstration Construction Completion Report: Response to Comments Due and Final Due date changed to 22 March 2017 to reflect the actual dates.
- 2016 Annual CAMU Monitoring Report: Draft to Agencies date was changed to 3 May 2017, the rest of the dates were changed accordingly.
- Site SD034 Technology Demonstration Construction Completion Report: Predraft to AF/Service Center date was changed to 23 March 2017, the rest of the dates were changed accordingly.
- POCO Evaluation/Closure Report for DERA-funded Oil/Water Separators OW051, OW053, and OW054: No change was made to the schedule.
- POCO Evaluation/Closure Report for DERA-funded Oil/Water Separators OW040, OW047, OW048, OW049, OW052, OW055, and OW057. No change to the schedule.
- Site SS014 Subsite 1 POCO Technology Demonstration Construction Completion Report: Draft to Agencies date was changed to 12 April 2017 to reflect the actual date, and the rest of the dates were changed accordingly.
- Site ST032 POCO Well Decommissioning and Site Closeout Technical Memorandum: New document, populated with all new dates.
- Site ST028 POCO Well Decommissioning and Site Closeout Technical Memorandum: moved to history.

2. CURRENT PROJECTS

Treatment Plant Operation and Maintenance Update

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

The South Base Boundary Groundwater Treatment Plant (SBBGWTP) performed at 100% uptime, and 3.3 million gallons of groundwater were extracted and treated during the month of March 2017. All of the treated water was discharged to Union Creek. The average flow rate for the SBBGWTP was 98.4 gallons per minute (gpm). Electrical power usage was 16,439 kWh, and approximately 12,965 pounds of CO₂ were created (based on DOE calculation). Approximately 1.19 pound of volatile organic compounds (VOCs) was removed in March. The total mass of VOCs removed since startup of the system is 485.2 pounds.

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

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

The Central Groundwater Treatment Plant (CGWTP) performed at 83.8% uptime with approximately 1,431,500 gallons of groundwater extracted and treated during the month of March 2017. All treated water was discharged to the storm sewer system. The average flow rate for the CGWTP was 34.1 gpm. Electrical power usage was 2,410 kWh for all equipment connected to the Central Plant, and approximately 2,671 pounds of CO₂ were generated. Approximately 2.80 pounds of VOCs were removed from groundwater by the treatment plant in March. The total mass of VOCs removed since the startup of the system is 11,461 pounds.

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

Note: The Site DP039 bioreactor is currently undergoing an optimization effort to determine the most effective pulse mode duration to optimize distribution of TOC in the subsurface.

LF007C Groundwater Treatment Plant

The LF007C Groundwater Treatment Plant was taken offline as of 16 December 2016, in accordance with the US Fish and Wildlife Service requirements, due to the presence of standing water in the associated vernal pools.

ST018 Groundwater (MTBE) Treatment Plant, March 2017 (see Attachment 5)

Site ST018 (MTBE) Treatment Plant (ST018 GWTP) performed at 99.8% uptime with approximately 383,500 gallons of groundwater extracted and treated during the month of March 2017. All treated water was discharged to the sanitary sewer system. The average flow rate for the ST018 GWTP was 7.6 gpm. Electrical power usage for the month was 228 kWh for all equipment connected to the ST018 GWTP. The total CO₂ equivalent, including an estimate for the carbon change-out, equates to approximately

169 pounds. Approximately 0.21 pound of BTEX, MTBE and TPH was removed in March by the treatment plant, and approximately 0.20 pound of MTBE was removed from groundwater. The total BTEX, MTBE and TPH mass removed since the startup of the system is 40.5 pounds, and the total MTBE mass removed since startup of the system is 10.1 pounds.

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

Optimization Activities for ST018GWTP: No optimization activities to report for the month of March 2017.

Mr. Wray said that Travis AFB will be working with the Fairfield Sanitary Sewer District (FSSD) regarding bypassing the carbon vessels during treatment of the influent within the treatment system. FSSD effluent limitations are very high compared to the detections that have been observed over the years that the system has been operating. The carbon vessels were originally installed, because the system operated under a NPDES permit.

Presentation:

EVO Injection Optimization (see Attachment 6)

Mr. Gamlin reported on the EVO Injection Optimization. See attachment 6 for details. Highlights included:

This presentation is a high level overview of the optimization actions we are planning in 2017 based on analytical data received from the initial performance results at sites: SS015, SD036, SD031 and FT004.

Site SS015 Optimization:

- Groundwater ROD selected emulsified vegetable oil (EVO) injection and enhanced attenuation (EA).
- The 2015 EVO injections did not reduce the concentrations as quickly as desired. We are planning a more aggressive optimization by installing additional EVO injection wells, as well as using existing injection wells that were installed in 2015. The conditions at this site are very tight given the location and subsurface utilities. However, we believe we can install six (6) more injection wells to get a better EVO radius of influence. The TCE concentrations have gone down some, and it is the DCE concentration that is not reducing as quickly as planned.
- EVO with a smaller droplet size will be used, and this injection event will include bioaugmentation. The work will be completed in a manner consistent with the RD/RA Work Plan.

Ms. Burke asked if bioaugmentation is considered part of the remedy; do we call it optimization or a pilot study. Mr. Gamlin said he considers it an optimization; it is all an enhanced reductive dechlorination (ERD) process.

Site SD036 Optimization:

- The Groundwater ROD selected EVO injection and EA.
- The 2016 EVO injection was successful, except that the desired effect was not observed in two areas: MW2064Ax36 and MW2075Ax36 where the concentrations are increasing and TOC did not reach these wells or is insufficient.
- The plan is to install three (3) new injection wells. Injections will be completed consistent with goals of bioaugmentation technology demonstration (TD). We will keep the EVO injections to the technology demonstration (TD) area only at this site.
- EVO with the smaller droplet size will be used to complete work in a manner consistent with the RD/RA Work Plan.

Site SD031 Optimization:

- The gravel chimney subgrade biogeochemical reactor (SBGR) technology demonstration is in 1,1-DCE area greater than 20 µg/L.
- The TOC dispersal has been successful to date. The downgradient area at this site has increased above 20 µg/L.
- Install four (4) additional wells for EVO injection consistent with the TD Work Plan and reinject EVO, using the smaller droplet size, in the chimneys because TOC concentrations have decreased below 10 mg/L.

Ms. Balkissoon said this is an MNA remedy site and with the increased concentration how do you know the plume isn't stable? Mr. Gamlin said this is the only site where we had increased concentrations on the downgradient side. This is an MNA remedy site but we are still within the TD footprint. The pumping had just been turned back on after being off for a long time, and Mr. Gamlin thinks we are just moving the concentrations around locally.

Sites FT004 Optimization:

- SBGR recirculation trench technology demonstration in the TCE area greater than 20 µg/L.
- There has been limited TOC dispersal, but other indicators are favorable.
- Reinject EVO using the smaller droplet size in ~20 existing injection wells in the TCE areas above ~20 µg/L consistent with TD Work Plan.

Mr. Gamlin mentioned a recent publication featured in Wikipedia that CH2M was invited to write. The article features two SBGR's at Travis AFB. The link is provided below.

[http://www.environmentalrestoration.wiki/index.php?title=Subgrade Biogeochemical Reactor \(SBGR\)](http://www.environmentalrestoration.wiki/index.php?title=Subgrade_Biogeochemical_Reactor_(SBGR))

Site SS014 Drywall SBGR Installation (see Attachment 7)

Mr. Gamlin reported on Site SS014 Technology Demonstration. Highlights included (see attachment for photos):

The presentation will cover Travis AFB SS014 drywall SBGR installation.

Site SS014 technology demonstration:

- SBGR for remediation of fuel contamination. This design was based on internally-funded CH2M bench scale research. Drywall was used as a safe and sustainable source of sulfate.
- The SBGR is filled with gravel, scraps of drywall, wheat straw, and iron pyrite gravel to support enhanced biodegradation of fuel contamination. The iron pyrite is used to control hydrogen sulfide.
- Gypsum is a good source of sulfate. Dissolved sulfate is good for reducing bacteria that degrade petroleum contamination. Wheat straw is good growth substrate for the sulfate reducing bacteria. Iron pyrite gravel is used as a control method, as the sulfate reducing pathway will generate hydrogen sulfide and methane. And in the presence of iron, the hydrogen sulfide gas will turn into a solid and will precipitate out as iron sulfide.
- Before installation of the SBGR, baseline samples were collected: TPH/diesel was at 5,500 µg/L and TPH/gas 1,900 µg/L. We sampled again in the well that was installed just below the reactor and the analytes were both non-detect. The first performance samples will be collected in April 2017.
- This SBGR is powered by solar panels and is 100 percent off the grid.

Ms. Balkissoon asked if the drywall was sampled before the application. Mr. Gamlin said yes, confirmation samples were collected before installation and analyzed using TCLP and STLC methods for metals.

Ms. Constantinescu asked if we had groundwater quality data downgradient. Mr. Gamlin said yes, we collected baseline samples for the chemicals of concern (COC), and two wells were sampled for sulfate reducing bacteria. We will collect samples later to evaluate if those populations increase.

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

Mr. Wray reported on the status of fieldwork and documents which are completed, in progress, and upcoming. Updates from the briefing this month included:

Newly Completed Documents: Site TS060 Removal Action Work Plan, Multisite Technology Demonstration Construction Completion Report.

Newly Completed Fieldwork: None.

In-Progress Documents (CERCLA): Community Involvement Plan; Site TS060 Removal Action Work Plan; Site LF044 Investigation Work Plan; Multisite Technology Demonstration Construction Completion Report.

In-Progress Documents (POCO): Site FT004 POCO Soil Data Gap Investigation Work Plan; POCO Evaluation/Closeout Report for DERA-funded oil/water separators OW051, OW053, and OW054.

In-Progress Fieldwork (CERCLA): None.

In-Progress Fieldwork (POCO): None.

Planned Documents (CERCLA): 2016 Annual CAMU Monitoring Report (March); SD034 Technology Demonstration Construction Completion Report (April); 2016 Annual GRISR (June); SS016, SD033, SD043, SS046 Risk Assessment Tech Memo (TBD); Work Plan for Fourth Five-year Review (TBD).

Planned Documents (POCO): Site SS014 POCO Technology Demonstration Construction Completion Report (March); POCO Evaluation/Closure Report for DERA-funded Oil/Water Separators OW040, OW047, OW048, OW049, OW052, OW055, and OW057 (March); ST032 POCO Well Decommissioning and Site Closeout Technical Memorandum (April).

Fieldwork Planned (CERCLA): Q2 2017 GRIP Sampling Event (April); DP039 Installation of Down-gradient Monitoring Wells (May); SD031 Finish Soil Delineation (NE portion of site) (May); Site LF044 Sediment Sampling (2017); Site TS060 Removal Action (2017).

Fieldwork Planned (POCO): Site FT004 POCO Soil Data Gap Investigation (2017); OW055 Sidewalk Repairs (2017); OW056 Site Excavation/Closure (2017); OW050 Soil Sampling a Former Location of OWS (May).

Technology Demonstration Projects:

- SS014: Recycled Drywall Subgrade Biochemical Reactor “SBGR”.
 - Evaluate the effectiveness of sulfate (gypsum from crushed drywall) to enhance anaerobic biodegradation of petroleum in groundwater.

- Installation to be completed November 2016.
 - Too early to evaluate performance data.
- Multisite Bioaugmentation: EVO and KB-1 Plus.
 - Evaluate if addition of bioaugmentation substrate to an EVO injection will increase the rate of CVOC degradation.
 - Injections not complete yet (Nov 2016).
 - Too early to evaluate performance data.
- SD034: Washboard SBGR.
 - Evaluate the effectiveness of an oxygen-enhanced aerobic SBGR on reducing TPH as diesel (TPH-D) in groundwater.
 - Installation to be completed November 2016.
 - Installed six (6) SBGR trenches, In process of evaluating need/constructability of installing the 7th trench.
 - Too early to evaluate performance data.
- FT005: Distribution of EVO and KB-1 Plus.
 - Evaluate total organic carbon (TOC) dispersion distances and rates for optimizing the remediation of 1,2-dichloroethane (DCA) in groundwater.
 - Installation completed May 2016.
 - Too early to evaluate performance data.
- FT004: Distribution of EVO via SBGR and/or Groundwater Extraction.
 - Determine effectiveness of TOC distribution through two different enhanced reductive dechlorination (ERD) approaches: (1) groundwater TOC recirculation using a combination EVO injection, infiltration SBGR trenches, and groundwater extraction; and (2) EVO injection with groundwater extraction.
 - Installation completed April 2016.
 - Too early to evaluate performance data.
- SD031: EVO distribution via Gravel Chimneys.
 - Determine if EVO injection and recirculation of groundwater through gravel chimneys can effectively distribute TOC horizontally in the subsurface to support ERD of 1,1-dichloroethene (DCE).
 - Installation completed in April 2015.
 - Early indications:
 - Reducing conditions have initiated as expected throughout the TD area and are supporting anaerobic degradation.
 - TOC concentrations are increasing at several wells.
 - 1,1-DCE (primary COC) concentrations have reduced by 57% (sum of key wells within TD area).
 - Total Molar concentration (sum of CVOCs) has reduced by 49% (sum of key wells within TD area).
 - Recirculation through chimneys has been successful relative to our design assumptions.

4. New Action Item Review

None

5. PROGRAM/ISSUES/UPDATE

Mr. Duke announced that the Travis AFB Environmental Restoration Program won the General Thomas D. White Award. And... the crowd went wild!

6. Action Items

Item #	Responsible	Action Item Description	Due Date	Status
1.	Monika O'Sullivan	Ms. O'Sullivan to provide updates on PFOS and PFOA as she becomes aware of them.	Ongoing	Open