

**Travis Air Force Base
Environmental Restoration Program
Restoration Program Manager's
Meeting Minutes**

5 November 2015, 1400 Hours

Mr. Mark Smith, of the Air Force Civil Engineer Center (AFCEC) Restoration Installation Support Team (IST), conducted the Restoration Program Manager's (RPM) on 5 November 2015 at 1400 hours in Building 248 at Travis AFB, California. Attendees included:

- Mark Smith AFCEC/CZOW
- Glenn Anderson AFCEC/CZOW
- Lonnie Duke AFCEC/CZOW
- Captain Alexi Fong Travis AFB 60 AMW/JA
- Kurt Grunawalt Travis AFB 60 AMW/JA
- William Hall AFCEC/CZRW
- Dezso Linbrunner USACE-Omaha
- Adriana Constantinescu California Regional Water Quality Control Board (RWQCB)
- Ben Fries California Department of Toxic Substances Control (DTSC)
- Nadia Hollan Burke United States Environmental Protection Agency (USEPA)
- Indira Balkissoon Techlaw, Inc
(via telephone)
- Mike Wray CH2M
- Jeff Gamlin CH2M
(via telephone)
- Renee Delisle 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 (October 2015)
- Attachment 4 CGWTP Monthly Data Sheet (October 2015)
- Attachment 5 Subarea LF007C Monthly Data Sheet (October 2015)
- Attachment 6 ST018 Monthly Data Sheet (October 2015)

- Attachment 7 Presentation: Program Update: Activities Completed, In Progress and Upcoming
- Attachment 8 Presentation: Multi-Site Bioaugmentation Technology Demonstration

1. ADMINISTRATIVE

A. Previous Meeting Minutes

The 16 September 2015 RPM meeting minutes were approved and finalized as written.

B. Action Item Review.

Action items from September were reviewed.

Action item 1 will remain open: AFCEC's Travis Restoration Support Team and Travis AFB will continue to pursue opportunities for the beneficial reuse of treated water. Due date will remain TBD to ensure this action item remains visible. 05 November 2015: No update.

Action item 2 is ongoing: Mr. Smith to provide updates on PFOS and PFOA as he becomes aware of them. 05 November 2015: AFCEC is in the process of putting together a Performance Work Statement. The work statement will request a site inspection and assessment, which will include collecting some samples.

Action item 3 is closed: Ms. Constantinescu will schedule a site visit of the twelve (12) oil water separator sites (OWS) when she is available. 05 November 2015: closed.

Action item 4 is open: Travis AFB to provide Ms. Constantinescu/RWQCB one week notification via email before construction begins at Site SS014 Bioreactor Installation. 05 November 2015: The work is tentatively scheduled for December 2015, weather permitting.

Action item 5 is closed: Extend an invite to the RAB members for the Travis AFB site tour. 05 November 2015: closed.

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

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

Travis AFB Annual Meeting and Teleconference Schedule

The next RPM meetings will be face to face meetings, held on Wednesday, 20 January 2016 at 0930, and 17 February 2016 at 0930.

Travis AFB Master Document Schedule

- Community Involvement Plan: Draft to Agencies date was changed to 02 December 2015 the rest of the dates were changed accordingly. This will allow Mr. Smith time to discuss the community involvement plan with the new RAB members.
- Potrero Hills Annex (FS, PP, and ROD): No change to the schedule. Mr. Anderson said that Camp Dresser and McKee (CDM) is scheduled to submit their annual groundwater monitoring report next week. The report will include the groundwater sample results from this past summer's field activities. CDM will issue a "report of findings" next month which will include vegetation and soil sample results, as well as an exposure assessment. Ms. Constantinescu said she received confirmation that the report will be released to the RWQCB on 05 December 2015; after RWQCB reviews the report a decision by the RWQCB will be made if additional investigation work needs to be conducted. Adding that her section leader will be issuing a revised site cleanup order in 2016 to establish a regulatory frame, with very clear due dates, and if not met, enforcements will be place.
- Corrective Action Plan for DERA-Funded Oil Water Separators (POCO): No change to the schedule.
- Technical Memoranda for Soil Sample Collection to Support Risk Assessment, Sites SD033, SD043 and SS016: New documents, populated with all new dates.
- Site SD031 Remedial Investigation Work Plan: New document, all dates are to be determined (TBD).
- Site CG508 Well Abandonment Work Plan (POCO): New document, all dates are TBD.
- Site SD034 Technology Demonstration Work Plan: New document, all dates are TBD.
- Quarterly Newsletter (October 2015): No change to the schedule.
- 2014 Annual GRISR: No change to the schedule. Travis AFB is responding to EPA comments.
- Sites SD036 and SD037 Remedial Action Construction Completion Report: No change made to the schedule. Travis AFB received EPA's comments.
- Site ST018 POCO Construction Completion Report: Response to Comments Due date and Final Due Date were changed to 23 September 2015 to reflect the actual date.
- Site SS016 Groundwater Remedial Action Construction Completion Report: Response to Comments Due Date and Final Due Date were changed to 20 November 2015. DTSC and RWQCB indicated they will not have any comments on this document.
- Site SS015 Remedial Action Construction Completion Report: Draft to agencies date was changed to 25 September 2015 to reflect the actual date. The rest of the dates were

changed accordingly. DTSC and RWQCB indicated they will not have any comments on this document.

- Site SS030 Remedial Action Construction Completion Report: Predraft to AF/Service Center was changed to 09 October 2015, the rest of the dates were changed accordingly.
- Site FT004 Technology Demonstration Construction Completion Report: New document, populated with all new dates.
- Site FT005 Technology Demonstration Construction Completion Report: New document, all dates are TBD.
- Site SD031 Technology Demonstration Construction Completion Report: Moved to History.

2. CURRENT PROJECTS

Treatment Plant Operation and Maintenance Update

South Base Boundary Groundwater Treatment Plant, September 2015 (see Attachment 3)

The South Base Boundary Groundwater Treatment Plant (SBBGWTP) performed at 69.6% uptime, and 2.77 million gallons of groundwater were extracted and treated during the month of September 2015. All of the treated water was discharged to Union Creek. The average flow rate for the SBBGWTP was 80.06 gallons per minute (gpm). Electrical power usage was 11,520 kWh, and approximately 15,782 pounds of CO₂ were created (based on DOE calculation). Approximately 1.17 pounds of volatile organic compounds (VOCs) were removed in September. The total mass of VOCs removed since startup of the system is 466.1 pounds.

Optimization Activities for SBBGWTP: A new extraction well, EW2174x30, was installed and plumbed into the existing SBBGWTP during August and September 2015. On 10 September 2015, extraction well EW2174x30 was brought on line at a flow rate of approximately 11 gpm. This well continued to operate throughout the remainder of September 2015. EW2174x30 is expected to help capture lingering TCE contamination in the off-base portion of the Site SS030 plume.

Central Groundwater Treatment Plant, September 2015 (see Attachment 4)

The Central Groundwater Treatment Plant (CGWTP) performed at 100% uptime with approximately 1.24 million gallons of groundwater extracted and treated during the month of September 2015. All treated water was discharged to the storm drain. The average flow rate for the CGWTP was 26.0 gpm. Electrical power usage was 2,760 kWh for all equipment connected to the Central Plant, and approximately 3,781 pounds of CO₂ were generated. Approximately 2.72 pounds of VOCs were removed

from groundwater by the treatment plant in September. The total mass of VOCs removed since the startup of the system is 11,416 pounds.

Optimization Activities for CGWTP: No optimization activities are reported for the month of September 2015.

LF007C Groundwater Treatment Plant, September 2015 (see Attachment 5)

Subarea LF007C Treatment Plant (LF007CGWTP) performed at 100% uptime with approximately 174,627 gallons of groundwater extracted and treated during the month of September 2015. The average flow rate at the LF007CGWTP was 3.67 gpm, and electrical power use was 0 kWh for all the equipment connected to the plant; and 0 pounds of CO₂ was generated; this electrical system is 100 percent off of the power grid. Approximately 4.61×10^{-3} pounds of VOCs were removed from the groundwater in September. The total mass of VOCs removed by the North Groundwater Treatment Plant and LF007CGWTP combined is 174.35 pounds.

Optimization Activities for LF007CGWTP: No optimization activities to report for the month of September 2015.

ST018 Groundwater (MTBE) Treatment Plant, September 2015 (see Attachment 6)

The Site ST018 (MTBE) Treatment Plant (ST018 GWTP) performed at 100% uptime with approximately 224,319 gallons of groundwater extracted and treated during the month of September 2015. All treated water was diverted to the sanitary sewer. The average flow rate for the ST018 GWTP was 4.7 gpm. Electrical power usage for the month was 125 kWh for all equipment connected to the ST018 GWTP, which equates to approximately 171 pounds of CO₂. Approximately 0.52 pound of BTEX, MTBE and TPH was removed from groundwater in September by the treatment plant. Approximately 0.21 pound of MTBE was removed from groundwater. The total BTEX, MTBE and TPH mass removed since the startup of the system is 33.1 pounds, and the total MTBE mass removed since startup of the system is 8.0 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 extraction pumps in the system are all solar powered.

Optimization Activities for ST018GWTP: No optimization activities to report for the month of September 2015.

Program Update: Activities Completed, In Progress and Upcoming (see Attachment 7)

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

Newly Completed Documents: ST018 POCO Construction Completion Report.

Newly Completed Field Work: FT005 Baseline Sampling, DP039 Well Installation, Well Development, Baseline Sampling.

In-Progress Documents (CERCLA): 2014 Annual GRISR, Sites SD036 and SD037 Remedial Action Construction Completion Report, and Site SS016 Groundwater Remedial Action Construction Completion Report, Site SS015 Groundwater Remedial Action Construction Completion Report.

In-Progress Documents (POCO): None.

In-Progress Field Work: FT004 EVO Injection, SS014 Bioreactor Installation, FT004 Trench/Conveyance/Power Installation, DP039 Infiltration Trench Installation.

Upcoming Documents (CERCLA): Community Involvement Plan (December), Site SS030 Remedial Action Construction Completion Report (November), Site FT004 Technology Demonstration Construction Completion Report (December), Site FT005 Technology Demonstration Construction Completion Report (TBD), Tech Memo for Soil Sample Collection to Support Risk Assessment; Sites SD033, SD043, and SS016 (January), Site SD034 Technology Demonstration Work Plan (TBD), Site SD031 Soil Remedial Investigation Work Plan (TBD), Site CG508 Well Abandonment Work Plan (TBD).

Upcoming Documents (POCO): Corrective Action Plan for DERA-Funded Oil Water Separators.

Field Work Planned (CERCLA): FT005 EVO Injection (November), DP039 EVO Injection (November), SD031 Soil Remedial Investigation (TBD), TA500 Groundwater Sampling (TBD), SD034 Technology Demonstration Installation (TBD).

Field Work Planned (POCO): Oil Water Separators (12) Removal (TBD), CG508 Well Abandonment (TBD).

Presentations:

Presentation: Multi-Site Bioaugmentation Technology Demonstration (see Attachment 8)

Mr. Gamlin presented on the Multi-Site Bioaugmentation Technology Demonstration. For details see attachment 8.

Bioaugmentation technology demonstration rationale:

- Travis AFB is continually looking for ways to expedite treatment and to reduce life cycle costs. This demonstration is to see if there is value by adding bioaugmentation when doing the emulsified vegetable oil (EVO) injections.
- The cost of bioaugmentation is coming down significantly, and Travis AFB has more EVO injections scheduled.
- Bioaugmentation typically accounts for ~1-3% of total injection costs, based on that it is worth conducting a demonstration.

Demonstration Concept:

- Inject bioaugmentation culture, KB-1 Plus, in a portion of a site where EVO has been injected, and in a portion of a site where it is not. First look at the decay rates for the chemicals of concern (COC), primarily TCE, to see if the decay rates increase. Do we get improved rates of degradation in the TCE portion of the site where we injected the bioaugmentation culture? Can the data definitively show reduction in life cycle costs following the bioaugmentation to the magnitude where this is something we should be looking at for all EVO injection sites?
- Evaluate if first order decay rates increase to the point where we can definitively show a life cycle cost reduction following bioaugmentation.
- Evaluate bioaugmentation starting on a smaller scale, we chose two sites: one site with previous EVO injection (SD036) and a site without any previous EVO injections (ST027).

Demonstration Decision Logic:

- Does bioaugmentation reduce life cycle costs? If first order decay rates increase following bioaugmentation, we can do a cost benefit analysis to assess for future use.
- If first order decay rates do not increase then continue future injections with just EVO.

Mr. Gamlin provided a map of the plan for site SD036: We will monitor dehalococcoides (before and after treatment) at site SD036 at the proposed monitoring wells and injections wells shown on the map. For Site SD036:

- Monitor two monitoring wells with EVO only; conduct baseline sampling and collect samples again one year later for the dehalococcoides population.
- Inject KB-1 Plus in three injection wells; conduct baseline sampling and collect samples again one year later for dehalococcoides population.

Site ST027 is a small TCE plume with no history of EVO injections. This site is currently an MNA site. Conducting EVO injections does change the selected remedy so if we decide that this demonstration works and we want to apply this technology at this site, we would have to do a ROD amendment. (map also provided, see attachment 8). For Site ST027:

- Install two new upgradient injection wells and one new monitoring well, in which we would we would inject EVO only.
- Install two downgradient injection wells and use an existing monitoring well for the injecting the KB-1 Plus in conjunction with the EVO. The same data collection will apply here as with site SD036.

Ms. Constantinescu asked if there are any concern of cross migration, and if the two locations have the same subsurface conditions. Mr. Gamlin said that the EVO only study area is on the upgradient side of the site, so there is no concern for migration, and the subsurface is the same for both areas.

4. New Action Item Review

None.

5. PROGRAM/ISSUES/UPDATE

None.

6. Action Items

Item #	Responsible	Action Item Description	Due Date	Status
1.	Travis AFB	AFCEC's Travis Restoration Team and Travis AFB will continue to pursue opportunities for the beneficial reuse of treated water. Current possibilities include: Rerouting treated water from the central plant to the duck pond or as irrigation as an energy reduction project with the intent of reducing on-base water usage. Due date will remain TBD to ensure this action item remains visible. Update: Mr. Duke informed the group that Travis AFB is considering the use of treated water during EVO injection at Site FT005 as opposed to potable water. New Action Item 5 added as a	TBD	Open

		follow-up.		
2.	Mark Smith	Mr. Smith to provide updates on PFOS and PFOA as he becomes aware of them. Update: Mr. Smith stated that he has received the final preliminary assessment report from AFCEC. Direction from AFCEC for follow on steps has not yet been provided.	Ongoing	Open
3.	Adriana Constantinescu	Ms. Constantinescu will schedule a site visit of all the oil water separator sites (OWS), when she is available.	TBD	Closed
4.	Travis AFB	Provide Ms. Constantinescu/RWQCB one week notification via email before construction begins at Site SS014 Bioreactor Installation	TBD	Open
5.	Mr. Smith	Extend an invite to the RAB members for the Travis AFB site tour.	23 Oct 2015	Closed

TRAVIS AIR FORCE BASE
ENVIRONMENTAL RESTORATION PROGRAM
RESTORATION PROGRAM MANAGER'S MEETING
BLDG 248 Conference Room
5 November 2015, 2:00 P.M.
AGENDA

1. ADMINISTRATIVE

- A. PREVIOUS MEETING MINUTES
- B. ACTION ITEM REVIEW
- C. MASTER MEETING AND DOCUMENT SCHEDULE REVIEW

2. CURRENT PROJECTS

- A. TREATMENT PLANT OPERATION AND MAINTENANCE UPDATE

3. PRESENTATIONS

- A. MULTI-SITE PRESENTATION
- B. PROGRAM UPDATE:
DOCUMENTS & ACTIVITIES COMPLETED, IN PROGRESS AND UPCOMING

4. NEW ACTION ITEM REVIEW

5. PROGRAM/ISSUES/UPDATE

- A. MEETING SCHEDULE
- B. RAB MEETING – 5 NOV 2015, 7-9 PM, 3690 HILBORN ROAD, FF

NOTES: FOR THOSE OF YOU CALLING IN, PLEASE DIAL (707) 424-8872.

(2015)
Annual Meeting and Teleconference Schedule

Monthly RPM Meeting¹ (Begins at time noted)	RPM Teleconference (Begins at time noted)	Restoration Advisory Board Meeting (Begins at 7:00 p.m.) (Poster Session at 6:30 p.m.)
01-21-15	—	—
02-18-15	—	—
—	03-18-15	—
04-23-15 (Thursday 2:00 PM)	—	04-23-15
—	05-27-15	—
—	06-17-15 (start at 12:00)	—
—	07-15-15 (1:00 to 3:00)	—
08-19-15 (1:00 to 3:00)	—	—
—	09-16-15 (1:00 to 3:00)	—
11-05-15 (Thursday 2:00 PM)	—	11-05-15
—	11-18-15	—
—	—	—

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

(2016)
Annual Meeting and Teleconference Schedule

Monthly RPM Meeting¹ (Begins at time noted)	RPM Teleconference (Begins at time noted)	Restoration Advisory Board Meeting (Begins at 7:00 p.m.) (Poster Session at 6:30 p.m.)
01-13-16	—	—
02-17-16	—	—
—	03-16-16	—
04-21-16 (Thursday 2:00 PM)	—	04-21-16
—	05-18-16	—
06-15-16	—	—
—	07-20-16	—
08-17-16	—	—
—	09-21-16	—
10-20-16 (Thursday 2:00 PM)	—	10-20-16
—	11-16-16	—
—	—	—

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

Travis AFB Master Meeting and Document Schedule

PRIMARY DOCUMENTS	
Life Cycle	Community Involvement Plan Travis AFB, Mark Smith CH2M HILL, Tricia Carter
Scoping Meeting	NA
Predraft to AF/Service Center	NA
AF/Service Center Comments Due	NA
Draft to Agencies	12-02-15
Draft to RAB	12-02-15
Agency Comments Due	01-05-16
Response to Comments Meeting	01-13-16
Agency Concurrence with Remedy	NA
Public Comment Period	NA
Public Meeting	NA
Response to Comments Due	02-12-16
Draft Final Due	02-12-16
Final Due	03-14-16

Travis AFB Master Meeting and Document Schedule

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

Travis AFB Master Meeting and Document Schedule

SECONDARY DOCUMENTS			
Life Cycle	Corrective Action Plan for DERA-Funded Oil Water Separators Travis AFB, Lonnie Duke CH2M HILL, Doug Berwick	Technical Memorandum for Soil Sample Collection to Support Risk Assessment, Sites SD033, SD043, and SS016 Travis AFB, Glenn Anderson CH2M HILL, Leslie Royer	Site SD031 Remedial Investigation Work Plan Travis AFB, Lonnie Duke CH2M HILL, Tony Chakurian
Scoping Meeting	NA	NA	NA
Predraft to AF/Service Center	12-14-15	12-30-15	TBD
AF/Service Center Comments Due	12-29-15	01-14-16	TBD
Draft to Agencies	01-13-16	01-28-16	TBD
Draft to RAB	01-13-16	01-28-16	TBD
Agency Comments Due	02-12-16	02-29-16	TBD
Response to Comments Meeting	02-17-16	03-16-16	TBD
Response to Comments Due	03-02-16	03-30-16	TBD
Draft Final Due	NA	NA	NA
Final Due	03-02-16	03-30-16	TBD
Public Comment Period	NA	NA	NA
Public Meeting	NA	NA	NA

Travis AFB Master Meeting and Document Schedule

SECONDARY DOCUMENTS		
Life Cycle	Site CG508 Well Abandonment Work Plan Travis AFB, Lonnie Duke CH2M HILL, Tony Chakurian	Site SD034 Technology Demonstration Work Plan Travis AFB, Lonnie Duke CH2M HILL, Levi Pratt
Scoping Meeting	NA	NA
Predraft to AF/Service Center	TBD	TBD
AF/Service Center Comments Due	TBD	TBD
Draft to Agencies	TBD	TBD
Draft to RAB	TBD	TBD
Agency Comments Due	TBD	TBD
Response to Comments Meeting	TBD	TBD
Response to Comments Due	TBD	TBD
Draft Final Due	NA	NA
Final Due	TBD	TBD
Public Comment Period	NA	NA
Public Meeting	NA	NA

Travis AFB Master Meeting and Document Schedule

INFORMATIONAL DOCUMENTS			
Life Cycle	Quarterly Newsletters (October 2015) Travis, Glenn Anderson	2014 Annual GRISR Travis AFB, Lonnie Duke CH2M HILL, Leslie Royer	Sites SD036 and SD037 Remedial Action Construction Completion Report Travis AFB, Glenn Anderson CH2M HILL, Leslie Royer
Scoping Meeting	NA	NA	NA
Predraft to AF/Service Center	NA	04-24-15	06-24-15
AF/Service Center Comments Due	NA	05-22-15	07-08-15
Draft to Agencies	10-06-15	06-10-15	07-30-15
Draft to RAB	NA	06-10-15	07-30-15
Agency Comments Due	10-20-15	09-08-15	08-31-15
Response to Comments Meeting	TBD	09-16-15	09-16-15
Response to Comments Due	10-21-15	09-30-15	09-30-15
Draft Final Due	NA	NA	NA
Final Due	10-23-15	09-30-15	09-30-15
Public Comment Period	NA	NA	NA
Public Meeting	NA	NA	NA

Travis AFB Master Meeting and Document Schedule

INFORMATIONAL DOCUMENTS			
Life Cycle	Site ST018 POCO Construction Completion Report Travis AFB, Lonnie Duke CH2M HILL, Leslie Royer	Site SS016 Groundwater Remedial Action Construction Completion Report Travis AFB, Glenn Anderson CH2M HILL, Leslie Royer	Site SS015 Remedial Action Construction Completion Report Travis AFB, Glenn Anderson CH2M HILL, Leslie Royer
Scoping Meeting	NA	NA	NA
Predraft to AF/Service Center	07-10-15	07-24-15	09-02-15
AF/Service Center Comments Due	07-24-15	08-07-15	09-17-15
Draft to Agencies	08-05-15	08-21-15	09-25-15
Draft to RAB	08-05-15	08-21-15	09-25-15
Agency Comments Due	09-04-15	09-21-15	10-28-15
Response to Comments Meeting	09-16-15	10-22-15	11-05-15
Response to Comments Due	09-23-15	11-20-15	11-19-15
Draft Final Due	NA	NA	NA
Final Due	09-23-15	11-20-15	11-19-15
Public Comment Period	NA	NA	NA
Public Meeting	NA	NA	NA

Travis AFB Master Meeting and Document Schedule

INFORMATIONAL DOCUMENTS			
Life Cycle	Site SS030 Remedial Action Construction Completion Report Travis AFB, Lonnie Duke CH2M HILL, Leslie Royer	Site FT004 Technology Demonstration Construction Completion Report Travis AFB, Lonnie Duke CH2M HILL, Leslie Royer	Site FT005 Technology Demonstration Construction Completion Report Travis AFB, Lonnie Duke CH2M HILL, Leslie Royer
Scoping Meeting	NA	NA	NA
Predraft to AF/Service Center	10-09-15	01-06-16	TBD
AF/Service Center Comments Due	10-23-15	01-20-16	TBD
Draft to Agencies	11-06-15	02-03-16	TBD
Draft to RAB	11-06-15	02-03-16	TBD
Agency Comments Due	12-07-15	03-07-16	TBD
Response to Comments Meeting	01-20-16	03-16-16	TBD
Response to Comments Due	02-04-16	03-31-16	TBD
Draft Final Due	NA	NA	NA
Final Due	02-04-16	03-31-16	TBD
Public Comment Period	NA	NA	NA
Public Meeting	NA	NA	NA

Travis AFB Master Meeting and Document Schedule

HISTORY	
Life Cycle	Site SD031 Technology Demonstration Construction Completion Report Travis AFB, Lonnie Duke CH2M HILL, Leslie Royer
Scoping Meeting	NA
Predraft to AF/Service Center	04-23-15
AF/Service Center Comments Due	05-07-15
Draft to Agencies	05-21-15
Draft to RAB	05-21-15
Agency Comments Due	06-22-15
Response to Comments Meeting	07-15-15
Response to Comments Due	08-21-15
Draft Final Due	NA
Final Due	08-21-15
Public Comment Period	NA
Public Meeting	NA

South Base Boundary Groundwater Treatment Plant

Monthly Data Sheet

Report Number: 181

Reporting Period: 28 August 2015 – 30 September 2015

Date Submitted: 15 October 2015

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 September 2015 reporting period.

Table 1 – Operations Summary – September 2015				
Initial Data Collection:		08/28/2015 12:30	Final Data Collection:	09/30/2015 12:00
Operating Time:		Percent Uptime:	Electrical Power Usage:	
SBBGWTP:	551 hours	SBBGWTP:	69.6%	SBBGWTP: 11,520 kWh (15,782 lbs CO ₂ generated ^a)
Gallons Treated: 2.77 million gallons			Gallons Treated Since July 1998: 906 million gallons	
Volume Discharged to Union Creek: 2.77 million gallons			Gallons Treat From Other Sources: 0 gallons^b	
VOC Mass Removed: 1.17 lbs^c			VOC Mass Removed Since July 1998: 466.1 lbs	
Rolling 12-Month Cost per Pound of Mass Removed: \$2,727 ^d				
Monthly Cost per Pound of Mass Removed: \$3,257				
lbs = pounds				
^a Based on Department of Energy estimate that 1 kilowatt hour generated produces 1.37 pounds of GHG.				
^b Decontamination water from investigation activities, processed through the SBBGWTP from the external settling tank				
^c Calculated using September 2015 EPA Method SW8260B analytical results.				
^d Costs include operations and maintenance, reporting, analytical laboratory, project management, and utility costs related to operation of the system.				

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

Table 2 – SBBGWTP Average Flow Rate (gpm) ^{a,b} – August 2015							
FT005 ^b				SS029		SS030	
EW01x05	4.1	EW736x05	Offline	EW01x29	0.2	EW01x30	Offline ^c
EW02x05	0.3	EW737x05	Offline	EW02x29	3.4	EW02x30	1.7
EW03x05	Offline	EW742x05	Offline	EW03x29	2.0	EW03x30	2.0
EW731x05	Offline	EW743x05	Offline	EW04x29	6.7	EW04x30	23.3
EW732x05	Offline	EW744x05	Offline	EW05x29	5.9	EW05x30	1.5
EW733x05	Offline	EW745x05	Offline	EW06x29	2.3	EW2174x30 ^d	11.0
EW734x05	1.5	EW746x05	Offline	EW07x29	4.6	EW711x30	2.1
EW735x05	Offline ^c						
FT005 Total: 5.9				SS029 Total: 25.1		SS030 Total: 41.6	
SBBGWTP Average Monthly Flow ^e : 80.06 gpm							
^a Flow rates presented are instantaneous measurements taken at the end of the reporting period.							
^b Most extraction wells at FT005 were taken offline in accordance with the 2008 Annual Remedial Process Optimization Report for the Central Groundwater Treatment Plant, North Groundwater Treatment Plant, and South Base Boundary Groundwater Treatment Plant.							
^c These extraction wells are offline due to pump or other malfunction.							
^d Extraction well EW2174x30 was installed and brought online on September 10, 2015. Extraction well EW06x30 remains off line.							
^e The average SBBGWTP groundwater flow rate was calculated using the Union Creek Discharge Totalizer and dividing it by the total time in the reporting period.							
gpm – gallons per minute							
SBBGWTP – South Base Boundary Groundwater Treatment Plant							

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

Table 3 – Summary of System Shutdowns					
Location	Shutdown^a		Restart^a		Cause
	Date	Time	Date	Time	
SBBGWTP	31 August 2015	13:00	10 September 2015	15:00	The new extraction well EW2174x30 was installed beginning 31 August 2015, and was brought online on 10 September 2015 after construction activities had been completed. The SBBGWTP was offline during construction.
-- = Time not recorded ^a Shutdown and restart times estimated based on field notes. NA = not applicable SBBGWTP = South Base Boundary Groundwater Treatment Plant					

Summary of O&M Activities

Analytical data from the 17 September 2015 sampling event are presented in Table 4. The total VOC concentration (50.82 µg/L) in the influent sample increased slightly from the August 2015 sample results (43.19 µg/L). Cis-1,2-DCE (3.21 µg/L), TCE (47.4 µg/L), and 1,2-DCA (0.21 J µg/L) were detected at the influent sampling location. 1,2-DCA (0.62 µg/L), chloroform (0.23 J µg/L), cis-1,2-DCE (0.75 µg/L), and TCE (0.16 J µg/L) were detected at the midpoint location. No contaminants were detected at the effluent sampling location.

Figure 1 presents a plot of influent concentrations and average flow at the SBBGWTP over the past twelve (12) months. The average flow rate at the SBBGWTP increased in September 2015 to 83.7 gpm from the August 2015 flow rate of 80.1 gpm.

Troubleshooting activities on 29 September 2015 resulted in returning wells EW01x05, EW01x29, EW04x29, EW05x29 back online. EW01x05 was restarted after resetting its variable frequency drive and cycling power. EW01x29 was found clogged with caked silt. The intake screen was cleaned and the flow meter replaced before bringing this well back online. Wells EW04x29 and EW05x29 were adjusted according to their respective water levels to increase pumping rates.

EW01x30 was experiencing continuous shorts due to a faulty motor starter and overload. A new motor starter and overload was ordered and will be installed in October 2015. Extraction well EW05x30 shows no water level within the well, which results in the pump remaining non-operational. A new pressure transducer will be installed in early October 2015 to bring this well back online. Extraction well EW735x05 is not getting readings of either flow or water level. Troubleshooting this well will be accomplished in October 2015, and this well will be brought back online.

Optimization Activities

A new extraction well, EW2174x30, was installed and plumbed into the existing SBBGWTP during August and September 2015. On 10 September 2015, extraction well EW2174x30 was brought on line at a flow rate of approximately 11 gpm. This well continued to operate throughout the remainder of September 2015. This well is expected to help capture lingering TCE contamination in the off-base portion of the Site SS030 plume.

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. The SBBGWTP produced approximately 15,782 pounds of GHG during September 2015. This amount is lower than the August 2015 amount of 23,509 pounds of GHG, which is due to the decreased runtime.

TABLE 4

Summary of Groundwater Analytical Data For September 2015 – South Base Boundary Groundwater Treatment Plant

Summary of Groundwater Analytical Data For September 2015 – South Base Boundary Groundwater Treatment Plant						
Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	17 September 2015 (µg/L)		
				Influent	Midpoint	Effluent
Halogenated Volatile Organics						
Carbon Tetrachloride	0.5	0.14	0	ND	ND	ND
Chloroform	5.0	0.16	0	ND	0.23 J	ND
1,1-Dichloroethane	5.0	0.50	0	ND	ND	ND
1,2-Dichloroethane	0.5	0.15	0	0.21 J	0.62	ND
1,1-Dichloroethene	5.0	0.19	0	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.19	0	3.21	0.75	ND
trans-1,2-Dichloroethene	5.0	0.33	0	ND	ND	ND
Methylene Chloride	5.0	0.66	0	ND	ND	ND
Tetrachloroethene	5.0	0.21	0	ND	ND	ND
1,1,1-Trichloroethane	5.0	0.14	0	ND	ND	ND
1,1,2-Trichloroethane	5.0	0.20	0	ND	ND	ND
Trichloroethene	5.0	0.19	0	47.4	0.16 J	ND
Vinyl Chloride	0.5	0.18	0	ND	ND	ND
Non-Halogenated Volatile Organics						
Benzene	1.0	0.17	0	ND	ND	ND
Ethylbenzene	5.0	0.22	0	ND	ND	ND
Toluene	5.0	0.14	0	ND	ND	ND
Xylenes	5.0	0.23 – 0.5	0	ND	ND	ND
Other						
Total Petroleum	50	8.5	0	NM	NM	ND
Hydrocarbons – Gasoline						
Total Petroleum	50	50	0	NM	NM	ND
Hydrocarbons – Diesel						
Total Suspended Solids (mg/L)	NE	1.0	0	ND	NM	NM

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

Notes:

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

mg/L = milligrams per liter

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

ND = not detected

NE = not established

NM = not measured

µg/L = micrograms per liter

Figure 1
SBBGWTP Total VOC Influent Concentrations and Average Flowrate
Twelve Month History
Travis Air Force Base, California

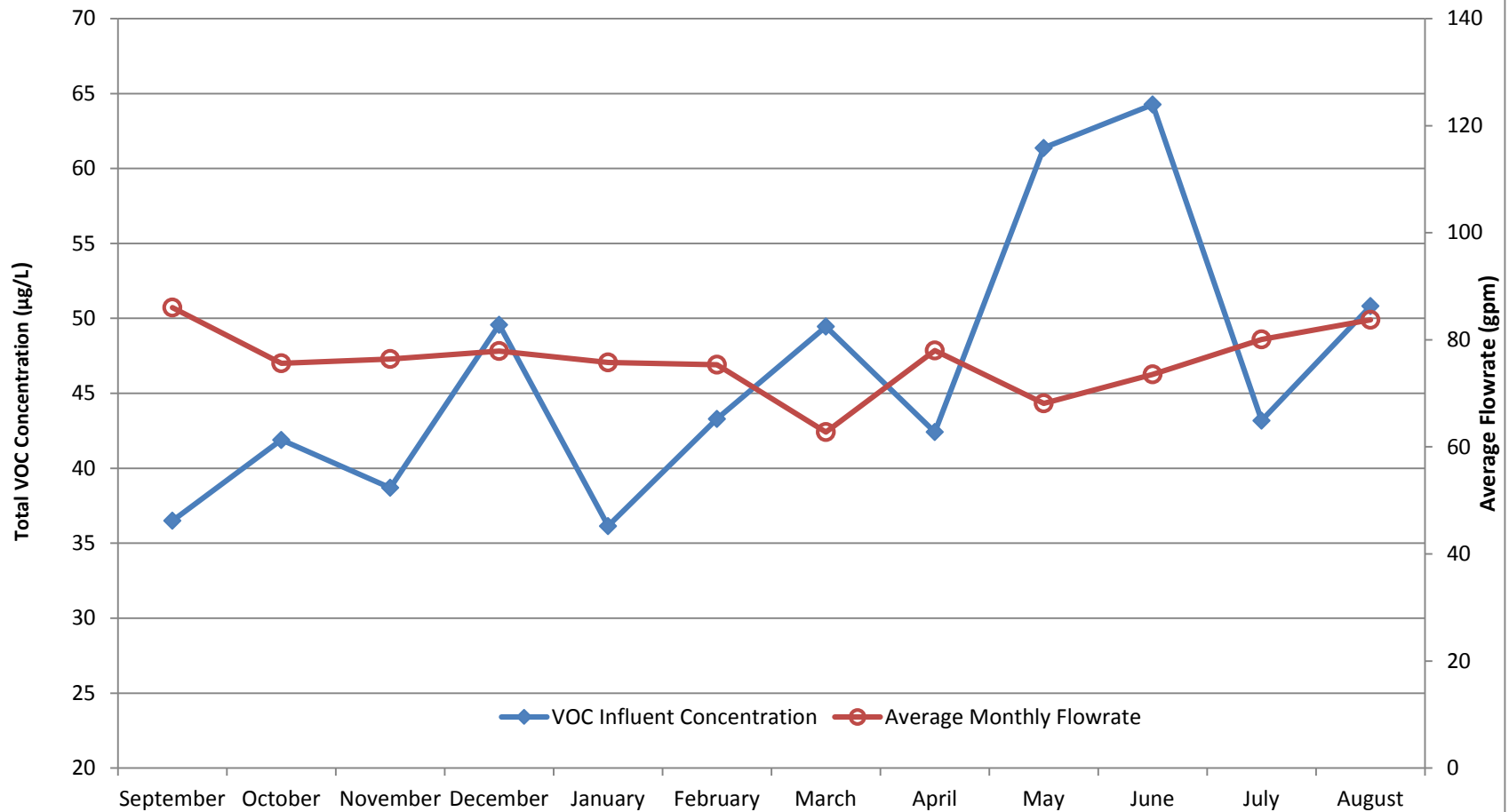
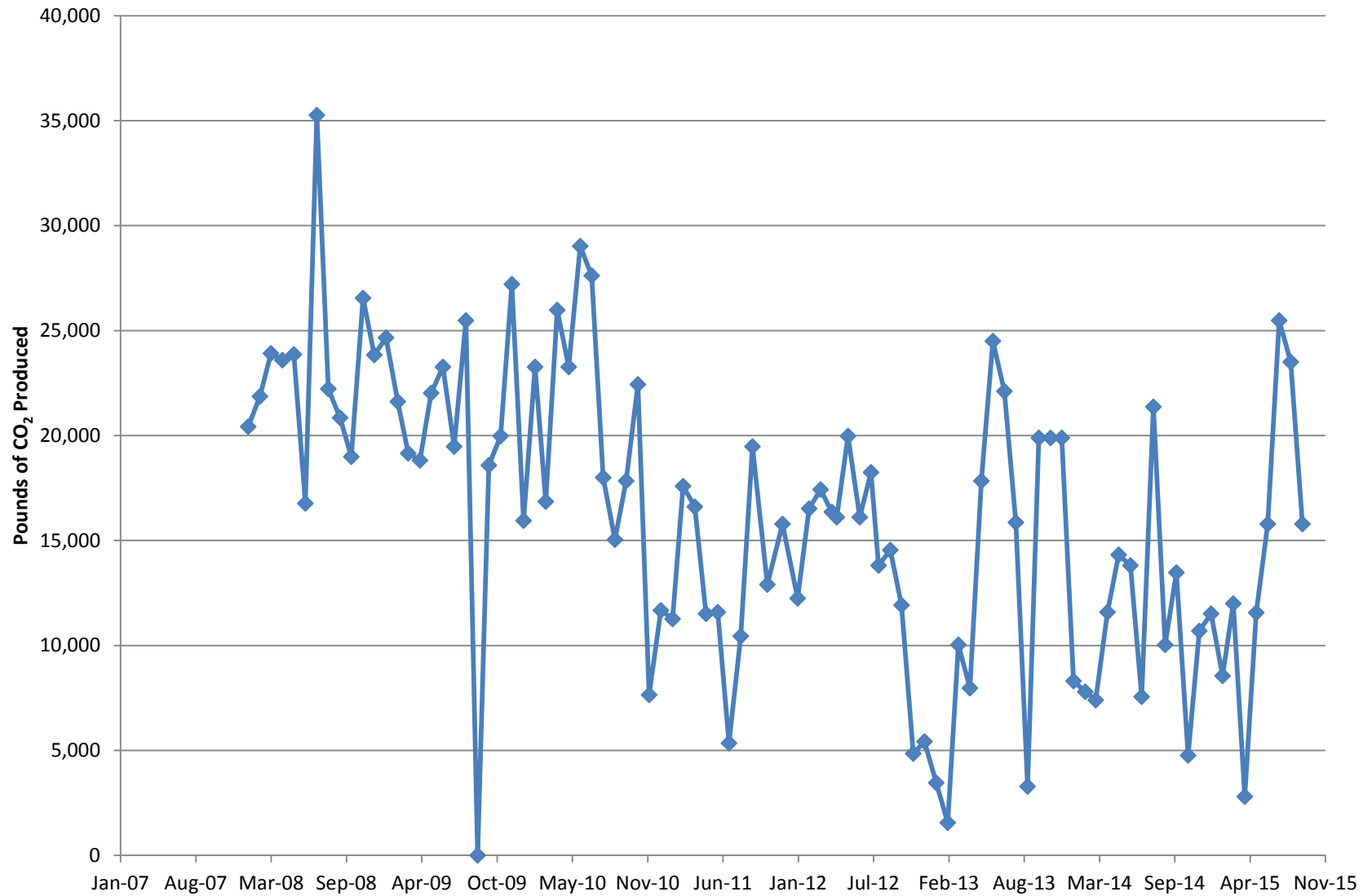


Figure 2

Equivalent Pounds of CO₂ Produced by the South Base Boundary Groundwater Treatment Plant



Central Groundwater Treatment Plant Monthly Data Sheet

Report Number: 194

Reporting Period: 28 August 2015 – 30 September 2015

Date Submitted: 15 October 2015

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 September 2015 reporting period.

Table 1 – Operations Summary – August 2015			
Initial Data Collection:	08/28/2015 09:45	Final Data Collection:	09/30/2015 12:00
Operating Time:		Percent Uptime:	Electrical Power Usage:
CGWTP: 794 hours		CGWTP: 100%	CGWTP: 2,760 kWh (3,781 lbs CO ₂ generated ^a)
Gallons Treated: 1,239,630 gallons		Gallons Treated Since January 1996: 516 million gallons	
VOC Mass Removed from groundwater:		VOC Mass Removed Since January 1996:	
2.72 lbs^b		2,730 lbs from groundwater	
		8,686 lbs from vapor	
Rolling 12-Month Cost per Pound of Mass Removed: \$902 ^c			
Monthly Cost per Pound of Mass Removed: \$1,180			
^a Based on Department of Energy estimate that 1 kilowatt hour generated produces 1.37 pounds of GHG.			
^b Calculated using September 2015 EPA Method SW8260B analytical results.			
^c Costs include operations and maintenance, reporting, analytical laboratory, project management, and utility costs related to operation of the CGWTP and are reported based on the calendar month.			

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

Table 2 – CGWTP Average Flow Rates^a – September 2015	
Location	Average Flow Rate Groundwater (gpm)
EW01x16	16.6
EW02x16	6.9
EW03x16	0.1
EW605x16	7.2
EW610x16	0.02 ^b
CGWTP	26.0
^a Flow rates calculated by dividing total gallons processed by system operating time for the month.	
^b Low flow at EW610x16 due to low water level shut off alarms within that well.	
gpm = gallons per minute	

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

Table 3 – Summary of System Shutdowns					
Location	Shutdown^a		Restart^a		Cause
	Date	Time	Date	Time	
CGTWP	NA	--			
-- = Time not recorded ^a Shutdown and restart times estimated based on field notes CGWTP = Central Groundwater Treatment Plant NA = not applicable					

Summary of O&M Activities

Monthly groundwater samples were collected at the CGWTP on 10 September 2015. Sample results are presented in Table 4. The total VOC concentration (263.02 µg/L) in the September 2015 influent sample has increased from the August 2015 sample (144.48 µg/L). Vinyl chloride was detected at a concentration of 0.19 J µg/L after the first carbon vessel, and at a concentration of 0.33 J µg/L after the second carbon vessel, but not in either the influent or effluent samples. Travis AFB will continue to monitor influent, midpoint, and effluent concentrations at the CGWTP for carbon breakthrough, though the carbon treatment remained effective in September 2015. No contaminants were found in samples taken from the effluent sampling location.

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 flow rate through the treatment plant remained consistent with the previous two months at approximately 26 gpm. The overall decrease in flow rate through the CGWTP (when compared to October 2014 through June 2015) can be directly attributed to the low level alarms in EW610x16 that caused the pump to go off line. A decreased water table due to long periods of dry conditions may have contributed to these alarms. EW610x16 will be investigated in October 2015 to determine if the low water level alarm can be adjusted to increase pump operation.

The Site DP039 bioreactor continues to operate in a “pulsed mode” in order to improve the rate of remediation and to preserve the amount of total organic carbon being produced within the bioreactor. The “pulsed mode” operation continued on a two (2) week transition schedule in September 2015. The bioreactor was taken off line

on 11 September 2015 and was brought back on line on 1 October 2015, just short of three weeks. The bioreactor is scheduled to resume a 2-week operating schedule in October 2015.

Optimization Activities

No optimization activities occurred at the CGWTP in September 2015.

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 3,781 pounds of GHG during September 2015. This is an increase from the August 2015 amount of 2,887 pounds, which is consistent with a longer uptime this month.

TABLE 4

Summary of Groundwater Analytical Data for September 2015 – Central Groundwater Treatment Plant

				10 September 2015 (µg/L)			
Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	Influent	After Carbon 1 Effluent	After Carbon 2 Effluent	System Effluent
Halogenated Volatile Organics							
Carbon Tetrachloride	0.5	0.14	0	ND	ND	ND	ND
Chloroform	5.0	0.16	0	ND	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.19	0	54.9	ND	ND	ND
1,1-Dichloroethane	5.0	0.5	0	ND	ND	ND	ND
1,2-Dichloroethane	0.5	0.15	0	ND	ND	ND	ND
1,1-Dichloroethene	5.0	0.19	0	0.45 J	ND	ND	ND
Methylene Chloride	5.0	0.66	0	ND	ND	ND	ND
MTBE	1.0	0.5	0	ND	ND	ND	ND
Tetrachloroethene	5.0	0.21	0	0.47 J	ND	ND	ND
1,1,1-Trichloroethane	5.0	0.14	0	ND	ND	ND	ND
1,1,2-Trichloroethane	5.0	0.2	0	ND	ND	ND	ND
Trichloroethene	5.0	0.19	0	130	ND	ND	ND
trans-1,2-Dichloroethene	5.0	0.33	0	2.63	ND	ND	ND
Vinyl Chloride	0.5	0.18	0	ND	0.19 J	0.33 J	ND
Non-Halogenated Volatile Organics							
Benzene	1.0	0.17	0	ND	ND	ND	ND
Ethylbenzene	5.0	0.22	0	ND	ND	ND	ND
Toluene	5.0	0.14	0	ND	ND	ND	ND
Total Xylenes	5.0	0.23 – 0.5	0	ND	ND	ND	ND
Other							
Total Dissolved Solids (mg/L)	NA	795	0	ND	NM	NM	NM
Total Petroleum Hydrocarbons – Gasoline	50	30		73.6	NM	NM	ND

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

Notes:

Trace amounts of 1,2-dichlorobenzene (0.37 J µg/L), 1,3-dichlorobenzene (0.41 J µg/L), and 1,4-dichlorobenzene (0.19 J µg/L) were detected in September 2015 and are not shown on Table 4 due to their infrequent detection.

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

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

ND = not detected

NM = not measured

µg/L = micrograms per liter

mg/L = milligrams per liter

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

Table 5 – Summary of DP039 Bioreactor “Pulsed Mode” Operations		
Location	Pulse On Start Date	Pulse Off Start Date
MW750x39	3 July 2014	24 July 2014
	01 August 2014	15 August 2014
	01 September 2014	12 September 2014
	26 September 2014	30 September 2014 ^a
	24 October 2014	7 November 2014
	21 November 2014	4 December 2014
	19 December 2014	January 2, 2015
	16 January 2015	29 January 2015
	13 February 2015	27 March 2015
	10 April 2015	24 April 2015
	8 May 2015	22 May 2015
	5 June 2015	19 June 2015
	3 July 2015	17 July 2015
	31 July 2015	14 August 2015
	28 August 2015	--
		--
^a = DP039 Bioreactor turned off on 30 September 2014 to replace hose. -- = Start/Off Date to be determined CGWTP = Central Groundwater Treatment Plant MW = Monitoring Well		

Figure 1
CGWTP Total VOC Influent Concentrations and Average Flowrate
Twelve Month History
Travis Air Force Base, California

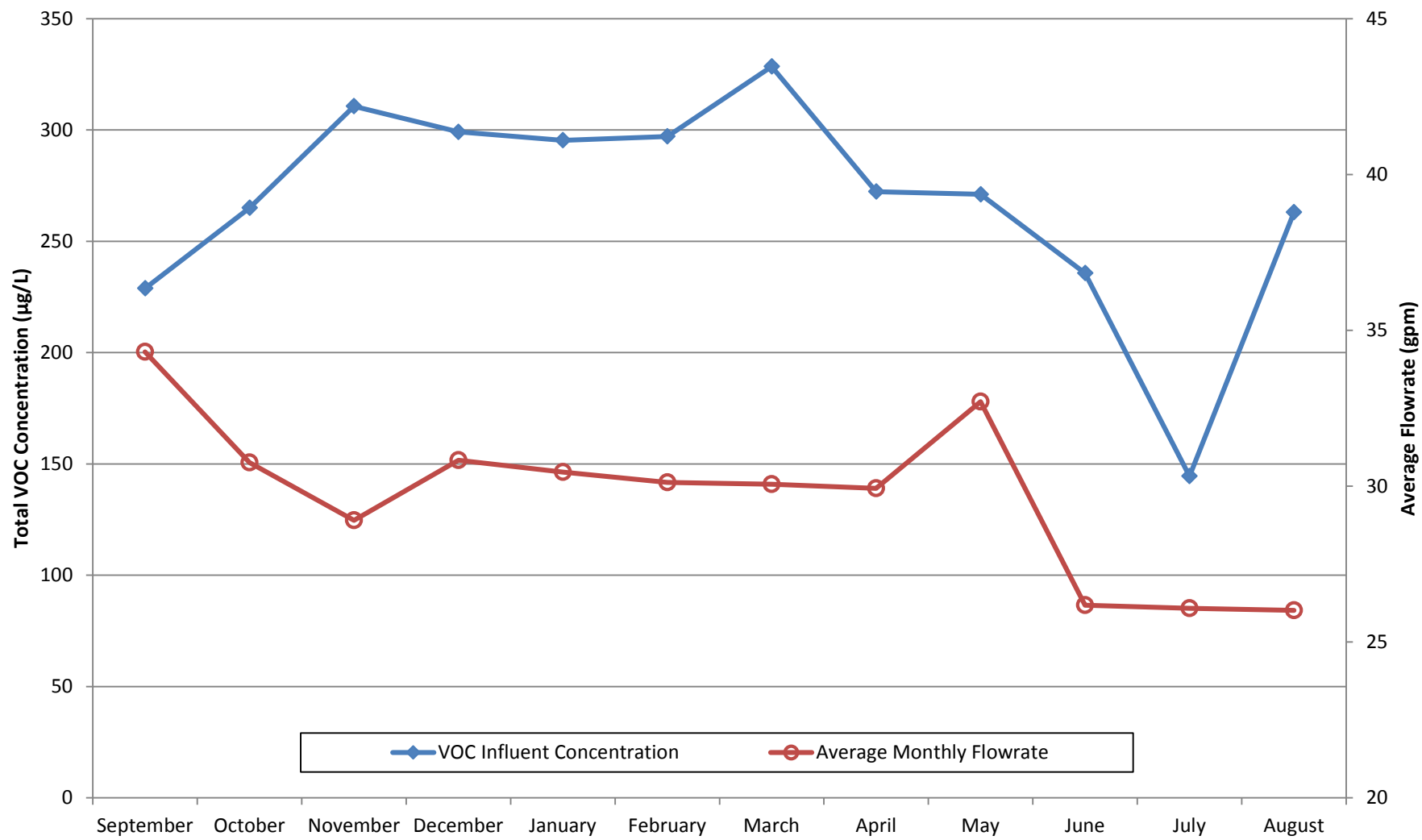
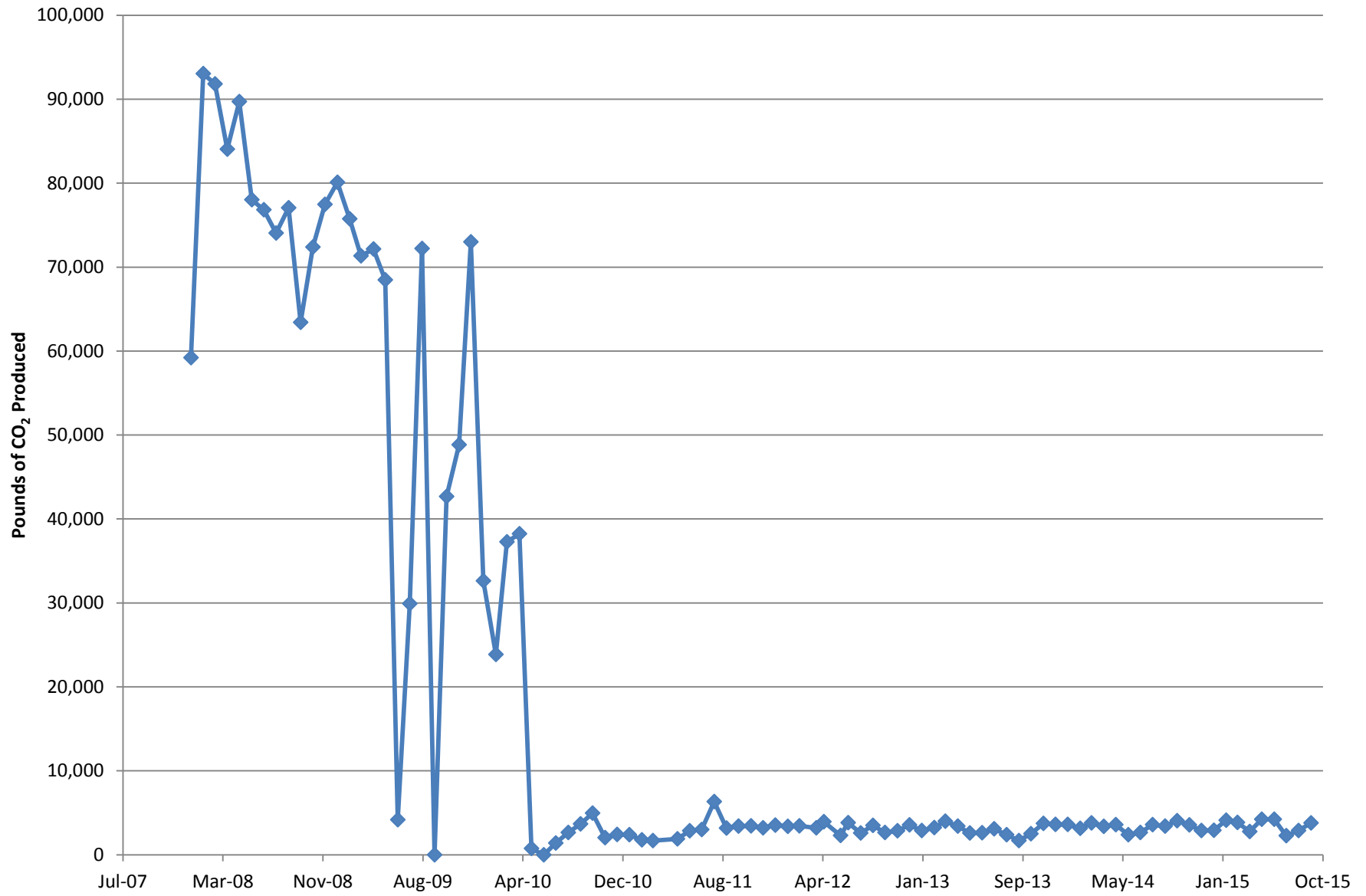


Figure 2

Equivalent Pounds of CO₂ Produced by the Central Groundwater Treatment Plant



Subarea LF007C Groundwater Treatment Plant Monthly Data Sheet

Report Number: 148

Reporting Period: 28 August 2015 – September 30, 2015

Date Submitted: 14 October 2015

This monthly data sheet presents information regarding the Subarea LF007C Groundwater Treatment Plant (LF007CGWTP) and associated remedial process optimization (RPO) activities.

System Metrics

Table 1 presents operational data from the September 2015 reporting period:

Table 1 – Operations Summary – August 2015				
Initial Data Collection:		08/28/2015 11:10	Final Data Collection:	09/30/2015 12:00
Operating Time:		Percent Uptime:		Electrical Power Usage ^a :
LF007CGWTP:	792 hours	LF007CGWTP	100%	LF007CGWTP: 0 kWh
Gallons Treated: 174,627 gallons		Gallons Treated Since March 2000: 84.6 million gallons		
Volume Discharged to Duck Pond: 174,627 gallons		Volume Discharge to Storm Drain: 0 gallons		
VOC Mass Removed: 4.61 x 10⁻³ pounds^b		VOC Mass Removed Since March 2000: 174.35 pounds (Groundwater)		
Rolling 12-Month Cost per Pound of Mass Removed: Not Measured^c				
Monthly Cost per Pound of Mass Removed: Not Measured^c				
^a The LF007CGWTP operates on solar power only.				
^b VOCs from September 2015 influent sample detected by EPA Method SW8260B.				
^c Value not calculated since measurement does not accurately represent the cost effectiveness of the system.				

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

Table 2 – LF007CGWTP Average and Total Flow Rates – August 2015		
Location	Average Flow Rate (gpm) ^a	Total Gallons Processed (gallons)
EW614x07	3.64	173,098
EW615x07 ^b	0	0
LF007CGWTP	3.67	174,627
^a Average flow rate calculated by dividing the total gallons processed collected from wellhead totalizers by the hours recorded by the system hour meter.		
^b Extraction well currently offline due to insufficient battery power.		
gpm = gallons per minute		

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

Table 3 – Summary of System Shutdowns					
Location	Shutdown ^a		Restart ^a		Cause
	Date	Time	Date	Time	
LF007CGWTP	None.	--		--	
-- = Time not recorded					
^a Shutdown and restart times estimated based on field notes					
LF007CGWTP = Subarea LF007C Groundwater Treatment Plant					

Summary of O&M Activities

Analytical data from the 10 September 2015 sampling event are presented in Table 4. Cis-1,2-DCE (0.24 J µg/L) and TCE (2.93 µg/L) were detected at the influent sample location. No contaminants were detected at the midpoint or effluent sampling location.

Figure 1 presents a chart of influent concentrations (total VOCs) at the LF007CGWTP versus time for the past twelve months. Analytical data (Table 4) continue to indicate effective treatment of the influent process stream.

The LF007CGWTP (formerly referred to as the North Groundwater Treatment Plant [NGWTP]) was brought back on line on 2 June 2015 after having been taken off line in December 2014 when vernal pools formed at Subarea LF007C.

The average flow rate through the LF007CGWTP in September 2015 (3.67 gpm) was slightly lower than the flow rate measured in August 2015 (4.10 gpm). Continued dry conditions may be affecting the amount of groundwater available for extraction at EW614x07.

Optimization Activities

No optimization activities were performed during September 2015.

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 LF007CGWTP. The LF007CGWTP is now a solar-only operated treatment system and no longer generates GHG.

TABLE 4

Summary of Groundwater Analytical Data For September 2015 – Subarea LF007C Groundwater Treatment Plant

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	10 September 2015 (µg/L)		
				Influent	After Carbon 1	Effluent
Halogenated Volatile Organics						
Bromodichloromethane	5.0	0.15	0	ND	ND	ND
Bromoform	5.0	0.19	0	ND	ND	ND
Carbon Tetrachloride	0.5	0.14	0	ND	ND	ND
Chloroform	5.0	0.16	0	ND	ND	ND
Dibromochloromethane	5.0	0.13	0	ND	ND	ND
1,3-Dichlorobenzene	5.0	0.15	0	ND	ND	ND
1,4-Dichlorobenzene	5.0	0.15	0	ND	ND	ND
1,1-Dichloroethane	5.0	0.15	0	ND	ND	ND
1,2-Dichloroethane	0.5	0.15	0	ND	ND	ND
1,1-Dichloroethene	5.0	0.19	0	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.19	0	0.24 J	ND	ND
trans-1,2-Dichloroethene	5.0	0.33	0	ND	ND	ND
Methylene Chloride	5.0	0.66	0	ND	ND	ND
Tetrachloroethene	5.0	0.21	0	ND	ND	ND
1,1,1-Trichloroethane	5.0	0.14	0	ND	ND	ND
1,1,2-Trichloroethane	5.0	0.2	0	ND	ND	ND
Trichloroethene	5.0	0.19	0	2.93	ND	ND
Vinyl Chloride	0.5	0.18	0	ND	ND	ND
Non-Halogenated Volatile Organics						
Benzene	1.0	0.17	0	ND	ND	ND
Ethylbenzene	5.0	0.22	0	ND	ND	ND
Toluene	5.0	0.14	0	ND	ND	ND
Xylenes	5.0	0.23 – 0.5	0	ND	ND	ND
Other						
Total Petroleum Hydrocarbons – Gasoline	50	8.5	0	NM	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	50	0	NM	NM	ND
Total Dissolved Solids (mg/L)	NA	10	0	NM	NM	2,460

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

Notes:

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

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

ND = not detected

NM = not measured

µg/L = micrograms per liter

mg/L = milligrams per liter

Figure 1
LF007CGWTP Total VOC Influent Concentrations and Average Flowrate
Twelve Month History
Travis Air Force Base, California

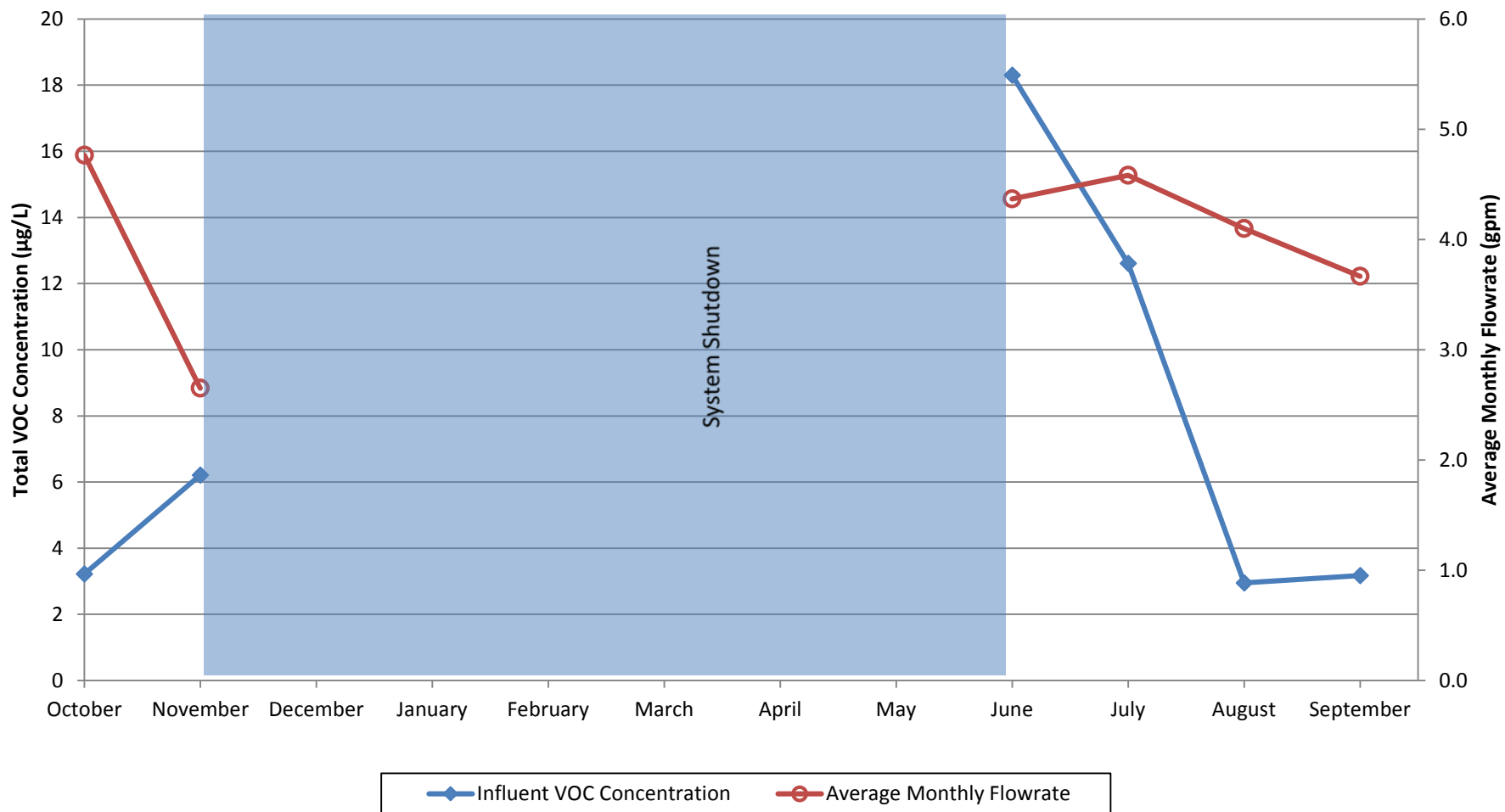
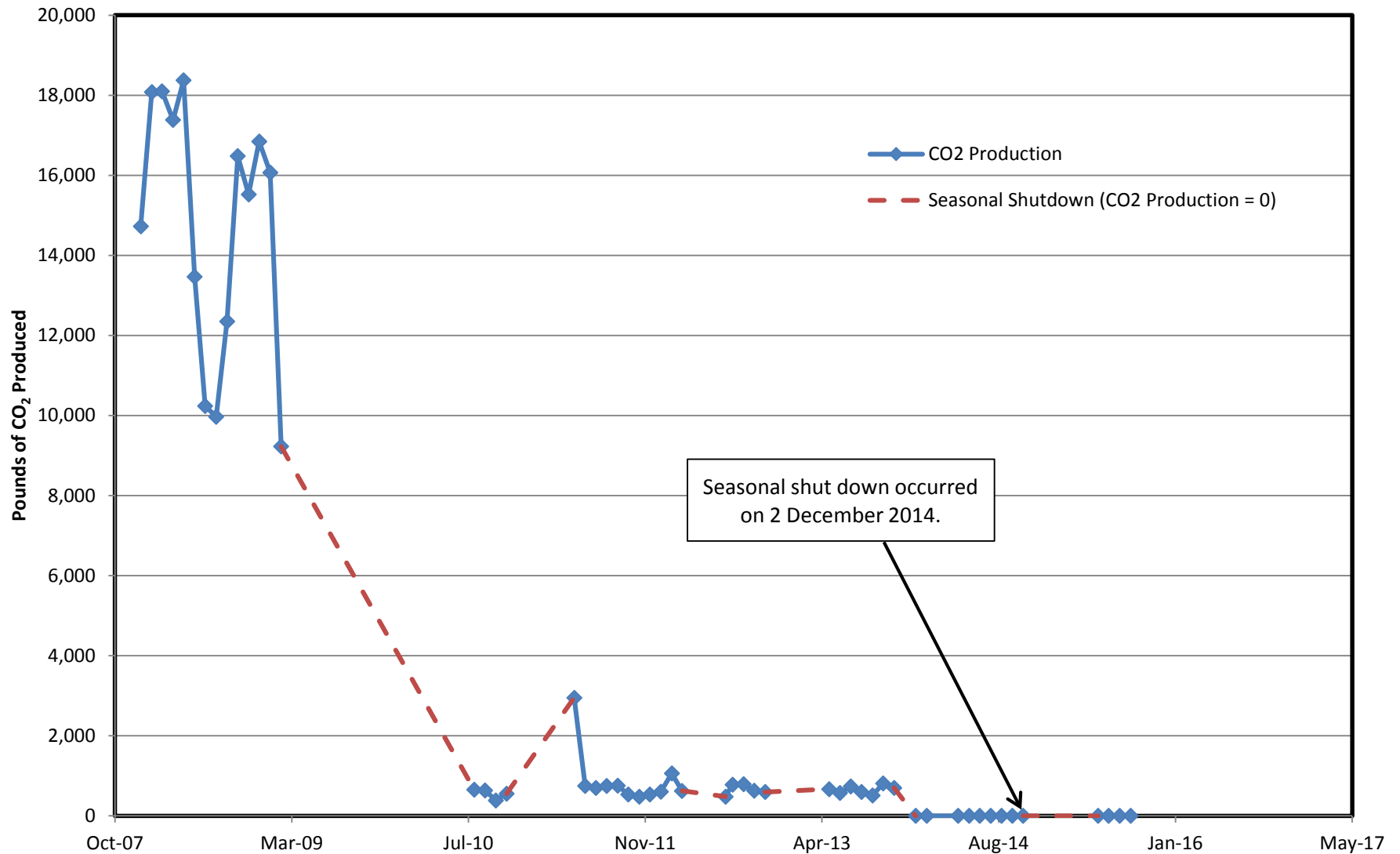


Figure 2

Equivalent Pounds of CO₂ Produced by the LF007C Groundwater Treatment Plant



Note: Dashed line represents seasonal shutdowns due to the presence of vernal pools at Site LF007C during which no CO₂ production occurred.

Site ST018 Groundwater Treatment Plant Monthly Data Sheet

Report Number: 055

Reporting Period: 28 August 2015 – 30 September 2015

Date Submitted: 15 October 2015

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

System Metrics

Table 1 presents operation data from the September 2015 reporting period.

Table 1 – Operations Summary – September 2015			
Initial Data Collection:	08/28/2015 09:40	Final Data Collection:	09/30/2015 12:00
Operating Time:		Percent Uptime:	Electrical Power Usage:
ST018GWTP: 792 hours		ST018GWTP: 100%	ST018GWTP: 125 kWh (171 lbs CO₂ generated^a)
Gallons Treated: 224,319 gallons		Gallons Treated Since March 2011: 8.37 million gallons	
Volume Discharged to Sanitary Sewer: 224,319 gallons		Final Totalizer Reading: 8,260,800 gallons	
Cumulative Volume Discharged to Sanitary Sewer since 1 November 2014: 1,877,715 gallons			
BTEX, MTBE, TPH Mass Removed: 0.52 lbs^b		BTEX, MTBE, TPH Mass Removed Since March 2011: 33.1 lbs	
MTBE (Only) Removed: 0.21 lbs^b		MTBE (Only) Mass Removed Since March 2011: 8.0 lbs	
Rolling 12-Month Cost per Total Pounds of Mass Removed: \$12,902 ^c			
Monthly Cost per Pound of Mass Removed: \$5,826			
^a Based on Department of Energy estimate that 1 kilowatt hour generated produces 1.37 pounds of GHG.			
^b Calculated using September 2015 effluent EPA Method SW8260B analytical results.			
^c Costs include operations and maintenance, reporting, analytical laboratory, project management, and utility costs related to operation of the system.			
kWh = kilowatt hour			
lbs = pounds			

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

Table 2 – ST018GWTP Average Flow Rates – August 2015		
Location	Average Flow Rate Groundwater (gpm)^a	Hours of Operation
EW2014x18	2.1	792
EW2016x18	1.0	792
EW2019x18	1.0	792
EW2333x18	1.3	792
Site ST018 GWTP	4.7	792
^a Flow rates calculated by dividing total gallons processed by amount of operating time of the pump/system. gpm = gallons per minute ST018GWTP = Site ST018 Groundwater Treatment Plant		

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

Table 3 – Summary of System Shutdowns					
Location	Shutdown^a		Restart^a		Cause
	Date	Time	Date	Time	
ST018GWTP	None.	--		--	
^a Shutdown and restart times estimated based on field notes -- = time not known ST018GWTP = Site ST018 Groundwater Treatment Plant					

Summary of O&M Activities

Monthly groundwater treatment samples were collected at the ST018GWTP on 10 September 2015. Results are presented in Table 4. The complete September 2015 laboratory data report is available upon request.

The influent concentration for MTBE during the September 2015 sampling event was 113 µg/L, which is a decrease from the August 2015 sample (182 µg/L). 1,2-DCA (1.85 µg/L) was also detected in the influent sample along with TPH-d (72.3 J µg/L), TPH-g (89.2 J µg/L), 1,2-dichloroethane (1.85 µg/L), and acetone (1.04 J µg/L). TPH-g was detected in the sample collected after the first carbon vessel at a concentration of 47.7 J µg/L, and MTBE was detected after the second carbon vessel at a concentration of 0.66 µg/L. No contaminant concentrations were detected at the effluent sampling location. All detected concentrations of TPH are well below the Fairfield-Suisun Sewer District effluent limitation for TPH of 50,000 µg/L. Travis AFB will continue to monitor effluent contaminant concentrations and evaluate the condition of the carbon filter beds.

Figure 1 presents plots of flow rate and influent total contaminant (TPH-g, TPH-d, MTBE, and BTEX) and MTBE concentrations at the ST018GWTP versus time. As shown on Figure 1, the average flow rate through the ST018GWTP has been seasonally variable with a slight increasing trend since the battery upgrade in 2013. September 2015 represents a decreased amount of groundwater treated and discharged by the ST018GWTP from the August 2015 amount, and may be a result of continued drought conditions.

Optimization Activities

No optimization activities occurred at the ST018GWTP in September 2015.

Sustainability

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

The ST018GWTP produced 171 pounds of GHG during September 2015 and treated 224,319 gallons of water, which was an increase from the amount of GHG produced during August 2015 (101 pounds, treating 173,081 gallons). Figure 2 presents the historical GHG production from the ST018GWTP. The overall GHG generation has been decreasing since a 2014 peak in March, and remains considerably lower than traditional GWTPs since the system is predominantly powered by solar arrays. The previous increasing GHG production reflected an inverse relationship between solar exposure in the fall and winter relative to GHG production.

TABLE 4

Summary Of Groundwater Analytical Data for September 2015 – Site ST018 Groundwater Treatment Plant

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	10 September 2015 (µg/L)			
				Influent	After Carbon 1	After Carbon 2	System Effluent
Fuel Related Constituents							
MTBE	6,400	0.5	0	113	NM	0.66	ND
Benzene	25,000 ^a	0.17	0	ND	NM	NM	ND
Ethylbenzene	25,000 ^a	0.22	0	ND	NM	NM	ND
Toluene	25,000 ^a	0.14	0	ND	NM	NM	ND
Total Xylenes	25,000 ^a	0.23 – 0.5	0	ND	NM	NM	ND
Total Petroleum Hydrocarbons – Gasoline	50,000 ^b	8.5	0	89.2 J	47.7 J	NM	ND
Total Petroleum Hydrocarbons – Diesel	50,000 ^b	50	0	72.3	ND	NM	ND
Total Petroleum Hydrocarbons – Motor Oil	100,000	160	0	ND	ND	NM	ND

* In accordance with the Fairfield-Suisun Sewer District Effluent Limitations
Laboratory data available on request.

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

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

µg/L = micrograms per liter

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

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

ND = not detected above method detection limit

NM = not measured this month

Figure 1
ST018GWTP Total VOC and MTBE Influent Concentrations
Travis Air Force Base, California

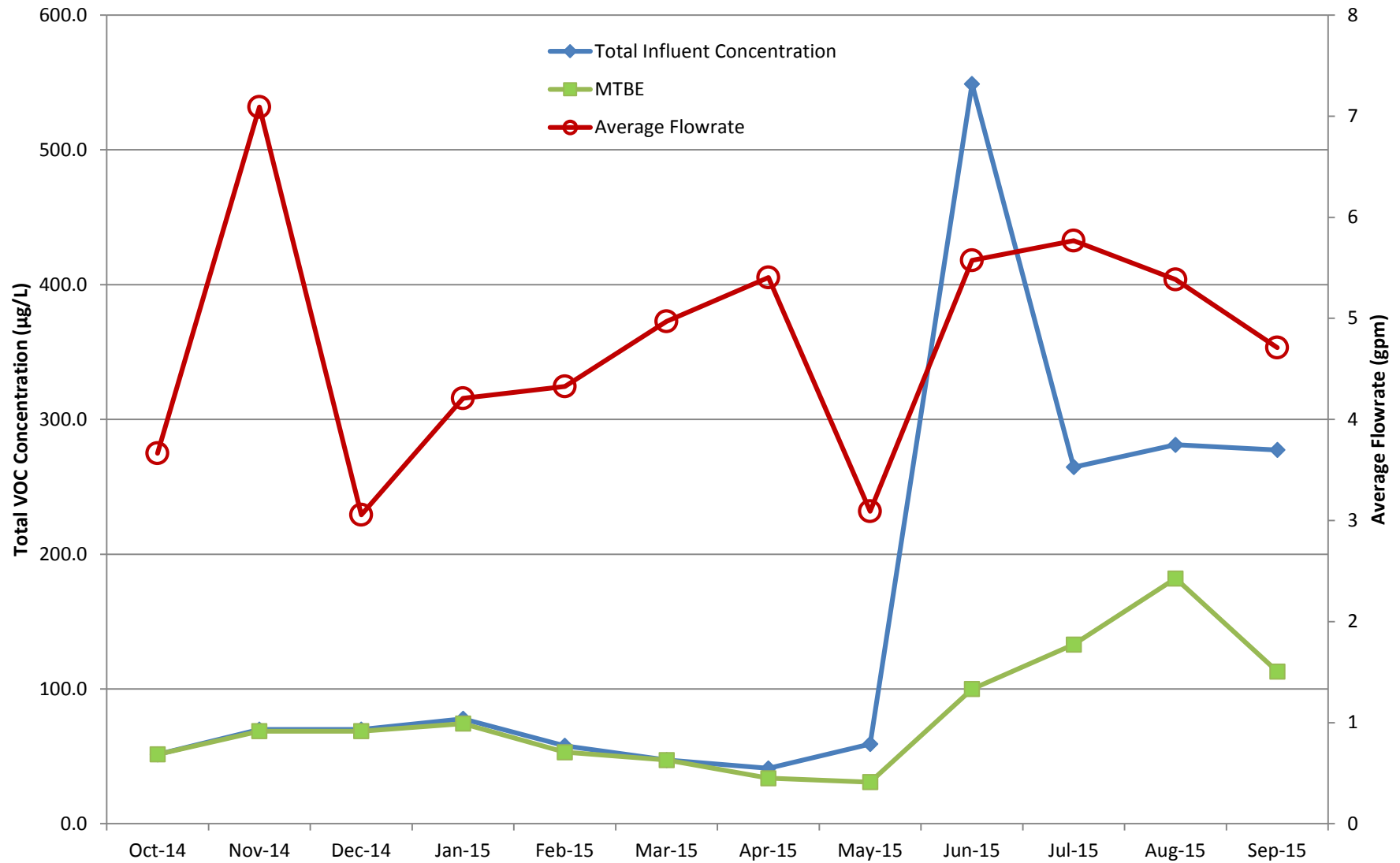
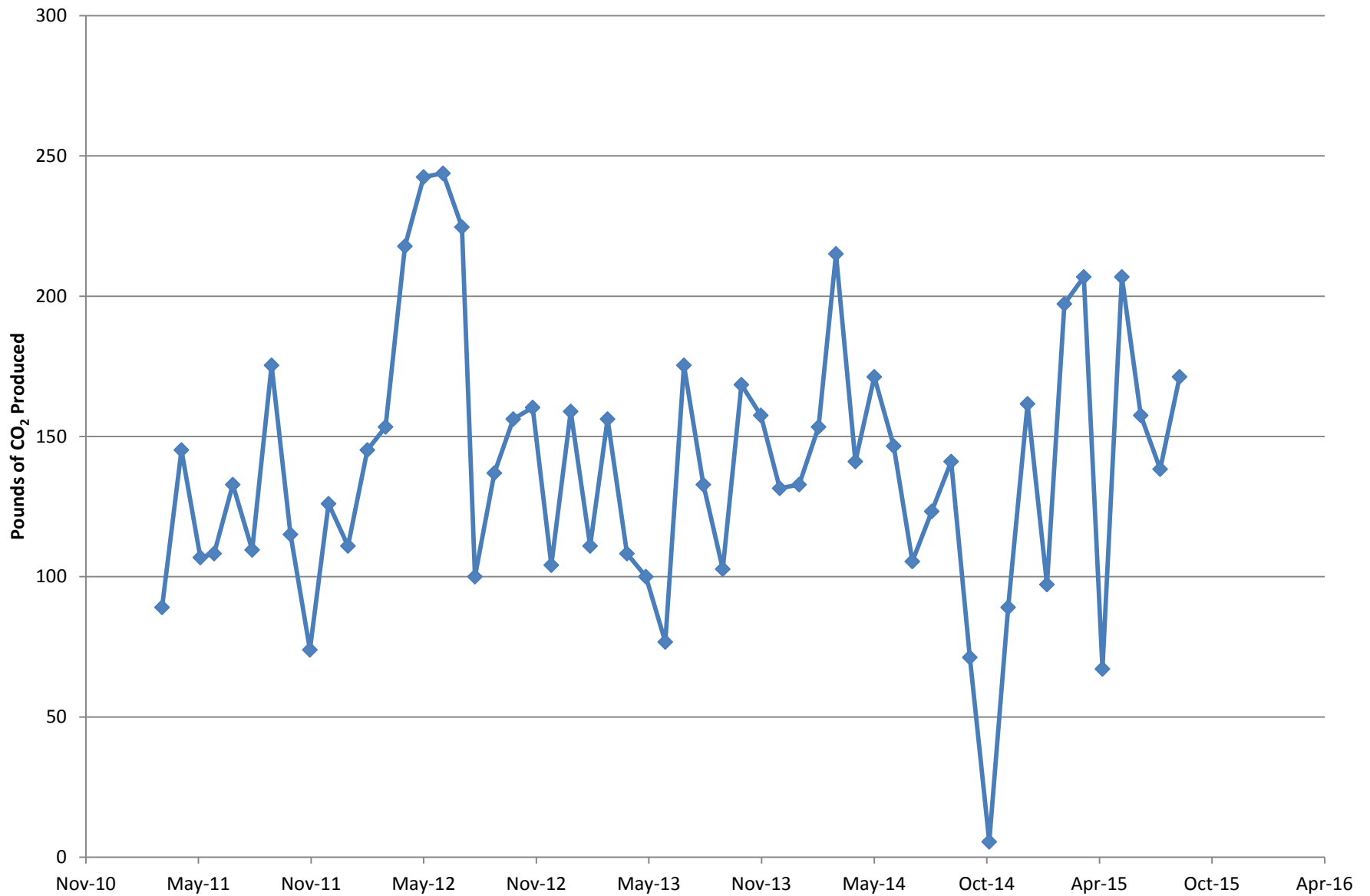


Figure 2
Equivalent Pounds of CO₂ Produced by the Site ST018 Groundwater Treatment Plant



Travis AFB Restoration Program

Program Overview

RPM Meeting
November 5, 2015

Completed Documents

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

Completed Documents (cont'd)

- 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 Technology Demonstration Work Plan
- CG508 Site Investigation/Site Closure Request Report
- 2014 Annual CAMU Monitoring Report
- DP039 GW RD/RA Work Plan
- SD031 Technology Demonstration Construction Completion Report
- ***ST018 POCO Construction Completion Report***

Completed Field Work

- 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

- 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***

Documents In-Progress

CERCLA

- 2014 Annual GRISR
- Sites SD036 and SD037 Remedial Action Construction Completion Report
- Site SS016 Groundwater Remedial Action Construction Completion Report
- ***Site SS015 Groundwater Remedial Action Construction Completion Report***

Documents In-Progress

POCO

- None

Field Work In-Progress

- FT004 EVO Injection
- ***SS014 Bioreactor Installation***
- ***FT004 Trench/Conveyance/Power Installation***
- ***DP039 Infiltration Trench Installation***

Documents Planned

CERCLA

- Community Involvement Plan Dec
- Site SS030 Remedial Action Construction Nov
Completion Report
- Site FT004 Technology Demonstration Construction Dec
Completion Report
- Site FT005 Technology Demonstration Construction TBD
Completion Report
- Tech Memo for Soil Sample Collection to Support
Risk Assessment, Sites SD033, SD043, and SS016 Jan
- Site SD034 Technology Demonstration Work Plan TBD
- **Site SD031 Soil Remedial Investigation Work Plan** **TBD**
- **Site CG508 Well Abandonment Work Plan** **TBD**

Documents Planned

POCO

- Corrective Action Plan for DERA-Funded Oil Water Separators

Jan

Field Work Planned

CERCLA

- | | |
|---|-------------------|
| • FT005 EVO Injection | Nov |
| • DP039 EVO Injection | Nov |
| • <i>SD031 Soil Remedial Investigation</i> | <i>TBD</i> |
| • <i>TA500 Groundwater Sampling</i> | <i>TBD</i> |
| • <i>SD034 Technology Demonstration Installation</i> | <i>TBD</i> |

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

Field Work Planned

POCO

- ***Oil Water Separators (12) Removal*** ***TBD***
- ***CG508 Well Abandonment*** ***TBD***

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

Completed Documents (Historical1)

- Basewide Health & Safety Plan (HSP)
- Action Plan
- 2007/2008 GSAP Annual Report
- LF007C RPO Work Plan
- LF008 Rebound Study Work Plan
- SS014 Tier 1 POCO Evaluation Work Plan
- ST027B Site Characterization Work Plan
- SS030 RPO Work Plan
- ST032 POCO Technical Memo
- DP039 Bioreactor Work Plan
- 2008 Annual GWTP RPO Report
- Passive Diffusion Bag (PDB) Technical Memo
- RD/RA QAPP Update
- ST032 Tier 1 POCO Evaluation Work Plan
- Phytostabilization Demonstration Technical Memo
- Model QAPP
- LF008 Rebound Test Technical Memo
- Comprehensive Site Evaluation Phase II Work Plan
- Field Sampling Plan (FSP)
- SS016 RPO Work Plan
- ST018 POCO RA Work Plan
- Vapor Intrusion Assessment Report
- GSAP 2008/2009 Annual Report
- FT005 Data Gap Work Plan
- First, Second, & Third Site DP039 Sustainable Bioreactor Demonstration Progress Reports
- DP039 RPO Work Plan
- SD036/SD037 RPO Work Plan
- ST027B Site Characterization Report
- 2009 GWTP RPO Annual Report
- Natural Attenuation Assessment Report (NAAR)
- Union Creek Sites SD001 & SD033 Remedial Action Report
- CAMU 2008-2009 Monitoring Annual Report

Completed Documents (Historical 2)

- Phytostabilization Study Report
- 2009/2010 Annual GSAP Report
- SS015 Remedy Optimization Field Implementation Plan
- Sites SS014 and ST032 Tier 1 POCO Evaluation Report
- SD036 Remedy Optimization Field Implementation Plan
- 2010 Annual CAMU Inspection Report
- Site ST018 POCO Baseline Implementation Report
- FT005 Data Gaps Investigation Report
- Comprehensive Site Evaluation Phase II Report
- 2010 Groundwater RPO Annual Report
- Focused Feasibility Study (FFS)
- Site ST027-Area B Human Health Risk Assessment
- Site ST027-Area B Ecological Risk Assessment
- Work Plan for Assessment of Aerobic Chlorinated Cometabolism Enzymes
- 2010/2011 Annual GSAP Report
- Baseline Implementation Report (Sites SS015, SS016, SD036, SD037, and DP039)
- 2011 CAMU Annual Report
- Technical and Economic Feasibility Analysis (TEFA)
- Work Plan for RPO of Sites SS016 and SS029
- Site LF007C Data Gaps Investigation Technical Memorandum
- Technical Memorandum for Assessment of Aerobic Chlorinated Cometabolism Enzymes
- Old Skeet Range Engineering Evaluation/Cost Analysis
- 2011 Groundwater Treatment RPO Annual Report
- Groundwater Proposed Plan (PP)
- FT005 Remedial Action Completion Report
- 2012 GSAP Technical Memorandum¹⁴

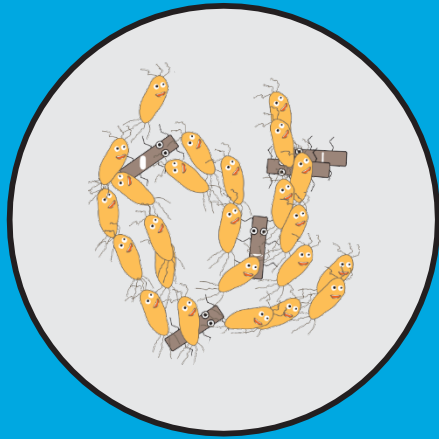
Completed Field Work (Historical1)

- ST027B Gore Sorber Survey–Phase 1
- ST027B Field Sampling – Phase 2
- GSAP 2008 Semi-annual Event
- ST027B Installation of Wells – Phase 3
- SS014 Site Characterization
- LF008 Rebound Study
- GSAP Annual Sampling Event - 2009
- SS030 Site Characterization–Phase 1
- ST027 Site Characterization -Phase 3
- ST014 Monitor Well Install - Subsite 3
- SD001/SD033 Sediment RA
- SS016 Site Characterization (OSA source area)
- ST018 Site Characterization
- SS030 Site Characterization (Off-base VOC Plume)
- DP039 Site Characterization (for Biobarrier Placement)
- SS014 & ST032 Q1 2010 MNA Sampling (2nd of 4 quarterly events)
- SD036 Additional Site Characterization (north & east)
- Therm/Ox System Removal
- SS016 Monitoring Well Installation
- SD037 EVO Injection Well Installation
- DP039 Monitoring Well & Injection Well Installation
- DP039 EVO Injection
- SD037 Monitoring Well Installation
- GSAP 2010 Annual Sampling Event
- SD037 EVO Injection
- SS015 Site Characterization
- South Plant GAC Change-out
- FT005 Data Gap Investigation
- SS016 Position Survey of EW03
- SS016 Bioreactor Installation
- SS016 Bioreactor Baseline Sampling
- DP039 Biobarrier Quarterly Performance Sampling

Completed Field Work (Historical 2)

- DP039 Bioreactor Quarterly Performance Sampling
- SD037 EVO Quarterly Performance Sampling
- SS015 EVO Baseline Sampling
- SD036 EVO Baseline Sampling
- SS016 Bioreactor Startup
- SD036 Injection Wells Installation
- SS015 Injection Wells Installation
- ST018 GETS Installation
- SD036 EVO Injection
- 2010 Semiannual GSAP
- SS015 EVO Injection
- Quarterly RPO Performance Monitoring (Feb 2011)
- ST018 GETS Startup
- Quarterly RPO Performance Monitoring (May 2011)
- 2011 Annual GSAP Sampling
- SS029 GET Shutdown Test (System Optimization analysis)
- Quarterly RPO Performance Monitoring (Aug 2011)
- Quarterly RPO Performance Monitoring (Nov 2011)
- 2011 Semiannual GSAP Sampling
- LF007C Site Characterization (Wetlands)
- FT005 Soil Remedial Action
- Performance Monitoring SS015 (4th Quarterly event)
- Sampling for Assessment of Aerobic Chlorinated Cometabolism Enzymes (Feb 21-22)
- 2012 Annual GSAP Sampling
- CAMU Lysimeter Removal
- LF007C GET System Optimization
- SS029/SS016 System Optimization Analysis
- GSAP Semiannual Sampling Event
- Replace electrical wiring for well field at Site SS030

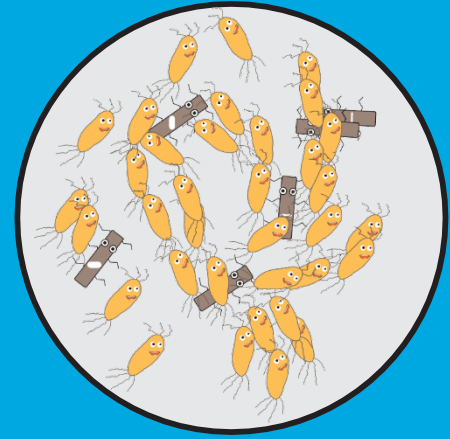
Multi-site Bioaugmentation Technology Demonstration for Travis AFB, California



We love TCE!



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



We REALLY love TCE!

October 22, 2015

Bioaugmentation Technology

Demonstration Rationale

- EVO has been selected as a remedial component for many Travis AFB groundwater sites
 - Travis AFB is continually looking for ways to expedite treatment and reduce life-cycle costs
 - The cost of bioaugmentation has come down significantly over the past several years
 - Bioaugmentation typically accounts for ~1-3% of total injection costs, so it warrants further evaluation

Bioaugmentation Technology Demonstration Concept

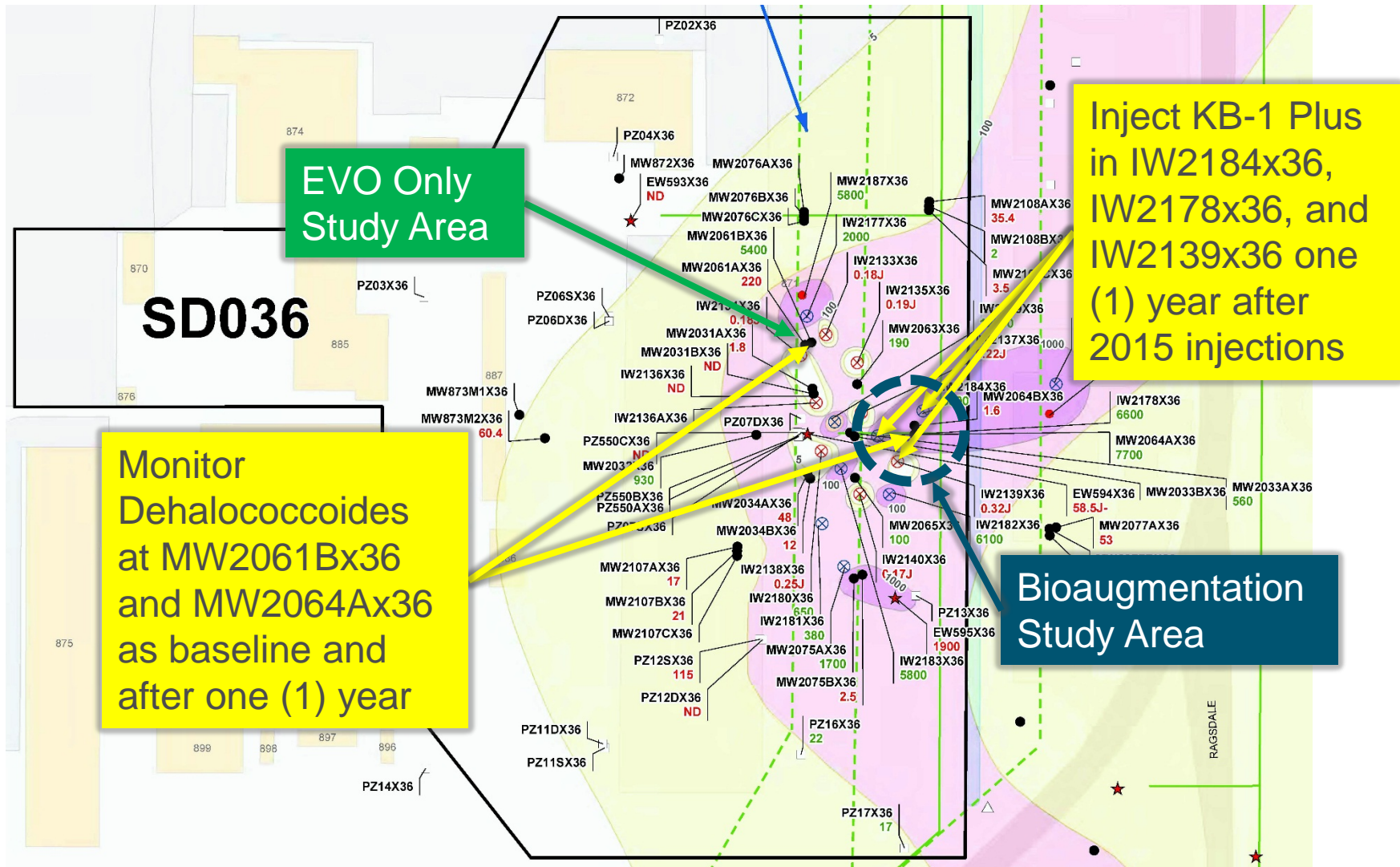
- Inject bioaugmentation culture at one portion of a site and compare to “EVO only” at other portion of site
 - Evaluate if first-order decay rates increase to the point where we can definitively show a life-cycle cost reduction following bioaugmentation
- Evaluate bioaugmentation at two types of sites
 - Site with previous EVO injection (SD036)
 - Site without previous EVO injection (ST027)

Bioaugmentation Technology

Demonstration Decision Logic

- Does bioaugmentation reduce life-cycle costs?
 - If first-order decay rates increase following bioaugmentation, complete cost-benefit analysis to assess benefit for future use
 - If first-order decay rates do not increase then continue future injections with EVO only

SD036 Site Plan - Bioaugmentation



ST027 Site Plan - Bioaugmentation

