

**Travis Air Force Base
Environmental Restoration Program
Restoration Program Manager's
Meeting Minutes
20 June 2018, 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) meeting on 20 June at 0930 hours in Building 248 at Travis AFB, California. Attendees included:

Lonnie Duke	AFCEC/CZOW
Glenn Anderson	AFCEC/CZOW
Milton 'Gene' Clare	AFCEC/CZOW
Angel Santiago Jr.	AFCEC/CZOW
Monika O'Sullivan	AFCEC/CZOW
Haekyung Kim (via telephone)	AFCEC/CZRW
Kurt Grunawalt	Travis AFB Legal (60 AMW/JA)
Merrie Schilter-Lowe	Travis AFB/PA
Dezso Linbrunner	USACE-Omaha
Sarah Miller	USACE-Omaha
Paul Gedbaw	USACE-Omaha
Adriana Constantinescu	RWQCB
Ben Fries (via telephone)	DTSC
Nadia Hollan-Burke	USEPA
Paul Townley	CH2M/JACOBS
Jeff Gamlin	CH2M/JACOBS
Leslie Royer	CH2M/JACOBS
Tony Chakurian	CH2M/JACOBS
Jeannette Cumberland	CH2M/JACOBS
Mike Wray	CH2M/JACOBS

Handouts distributed prior to or at the meeting, discussions, and presentations included:

Attachment 1	Meeting Agenda
Attachment 2	Master Meeting and Document Schedule
Attachment 3	SBBGWTP Monthly Data Sheet (May 2018)
Attachment 4	CGWTP Monthly Data Sheet (May 2018)

Attachment 5	LF007C Monthly Data Sheet (May 2018)
Attachment 6	ST018 Monthly Data Sheet (May 2018)
Attachment 7	Presentation: Site SS016 Remedial Design/Remedial Action Work Plan
Attachment 8	Presentation: LF007C Chromatogram Review
Attachment 9	Presentation: Program Update

1. ADMINISTRATIVE

A. Previous Meeting Minutes

Mr. Fries requested that the May Minutes be updated per the following:

Ms. Constantinescu's Comments on Draft April Meeting Minutes: Define TCE and VI the first time they are used in the minutes; "trichloroethylene (TCE) vapor intrusion (VI)". Please clarify that this is in reference to the KC-46 hangar proposed for construction.

Action Item Review, Action Item 2: the terms "soil gas" and "soil vapor" are incorrectly used interchangeably - text should read "soil vapor;" if the VI issue pertains to TCE rather than other contaminants, the text should so indicate.

These changes were incorporated as requested into the Final May 2018 RPM minutes, sent on 28 June 2018.

B. Action Item Review

Action items from May 2018 were reviewed.

Action item 1 is ongoing: Ms. O'Sullivan to provide updates on perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA). June 2018 update: Ms. O'Sullivan said that the Site Inspection (SI) report should be going out to the regulatory agencies in late June.

Action Item 2 is ongoing: Mr. Duke will continue to provide design and construction information for the new KC-46 Hangar construction project for agency input ahead of the Air Force/Civil Engineering awarding the construction contract. June 2018 update: Mr. Duke noted that the design engineering firm confirmed that piping for routine subslab soil vapor sampling will be placed below the geomembrane that will underlie the proposed KC-46 hangar footprint. The piping for the passive-to-active venting system will also be below this geomembrane.

Mr. Duke also showed a figure of seven subslab soil vapor sampling locations recommended by the Water Board. Ms. Constantinescu clarified that the Water Board would like to see samples from two depths at each location; one at 5 feet bgs and one from between 10 and 12 feet bgs. Ms. Constantinescu referenced the 2011

DTSC vapor intrusion guidance as justification for collecting soil vapor samples from multiple depths. She noted that this request has been documented in several emails and past RPM meeting minutes and is consistent with the Air Force's vapor intrusion investigative approach. She added that the information from the initial soil vapor sampling round will determine future monitoring needs, and should the initial round be below the risk screening levels, no additional soil vapor monitoring will be necessary or required.

Ms. Royer noted that groundwater at this location is very shallow and that the field team will likely be unable to collect a soil vapor sample at the 10-12 ft bgs interval. She recommended that samples be collected at 5 feet bgs and just above the water table, and completing a boring first to know where the water table is, or setting a soil gas probe.

Ms. Burke noted that the USEPA would like two groundwater samples collected from the vicinity of Building 16; one near SG-6, and one outside of the building to the south. Soils should also be logged in anticipation of a new extraction well.

Mr. Duke added that since the Air Force environmental restoration contractors will not be performing the sampling, our team needs to provide clear instruction regarding sample collection to the environmental subcontractor that the design engineers are hiring.

Ms. Constantinescu suggested a teleconference with the environmental subcontractors and the Air Force; all agreed.

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 held on Wednesday 18 July 2018, at 0930 hours.

Reminder: The annual RAB tour (which historically has been held in October) will not be formally scheduled and will instead be individual tours given when an interested party would like to see field work this summer. As a result, since there will not be a formal RAB meeting, all agencies agreed to move the October RPM meeting from Thursday, 18 October, to Wednesday, 17 October, at 0930.

Travis AFB Master Document Schedule

— Community Relations Plan Update (CRP): There was no change to the schedule.

- Amendment to the WABOU Soil ROD for Travis AFB ERP Sites DP039, SD043, and SS046: The Response to Comments date was changed to TBD to allow for a teleconference with the Water Board to discuss State Applicable or Relevant and Appropriate Requirements (ARARs) table. The rest of the schedule was changed accordingly. **This is a super critical document.**
- Amendment to the NEWIOU Soil ROD for the Travis AFB ERP Sites SS016 and SD033: The Draft to agencies date was changed to 22 June 2018 to reflect actual submittal date. The rest of the schedule was changed accordingly. **This is a super critical document** due to site work supporting planned KC-46 hangar construction, and that site work must be completed by December 2018.
- Site TS060 No Further Action Record of Decision: Predraft to AF/Services Center was changed to 18 May 2018 to reflect actual submittal date. Comments were due on 1 June 2018. The remainder of the schedule was left as TBD. **This is an important but not critical document.**
- Site SD043 Remedial Design/Remedial Action Work Plan: The Response to Comment due date was changed to 6 June 2018 to reflect actual submittal date. The rest of the schedule was changed accordingly.
- Site SS046 Remedial Design/Remedial Action Work Plan: The Response to Comment due date was changed to 29 June 2018 based on the projected submittal date. The rest of the schedule was changed accordingly.
- Site SS016 Remedial Design/Remedial Action Work Plan: The Predraft to AF/Service Center date was changed to 4 June 2018 to reflect projected submittal date. The rest of the schedule was changed accordingly. The Draft will be submitted early in an effort to conduct field work this year. This excavation project is located within the footprint of the future new KC-46 hangar, so **this document is critical.**
- Site SD031 Soil Remedial Investigation/Feasibility Study: The submittal date of the Predraft to AF/Service Center was changed to 16 August 2018; the rest of the schedule was changed accordingly. **This document is important but not critical.**
- Fourth Five-Year Review Report for Multiple Groundwater, Soil, and Sediment Sites: The Predraft to AF/Service Center date was changed to 14 March 2018 to reflect actual submittal date. A Draft has been submitted to the agencies, and comments are due on 20 July 2018. The rest of the schedule remains TBD in anticipation of a greater quantity of comments than for other documents. USEPA needs to issue the letter indicating sufficiency of protectiveness, even if the Final version of the document (expected 30 September 2018) has not yet been submitted. **This document is very important but not critical.**
- Potrero Hills Annex (FS, PP, and ROD): No change was made to the schedule. The Draft DGI Report has been submitted, the Water Board returned significant comments. The responsible parties are complying with the schedule set forth in the Administrative Order.

- Data Gap Investigation Results Technical Memorandum for Soil Site SS016: The Response to Comment date has been changed to 5 June 2018 to reflect actual submittal date. The remainder of the schedule has been changed accordingly.
- Site SS015 Soil Sampling Plan: No change was made to the schedule. USEPA submitted one comment noting a minor edit on 11 June 2018.
- Site LF006 Technology Demonstration Work Plan: The Predraft to AF/Services Center date has been changed to 27 June 2018 because additional time is required. The remainder of the schedule has been changed accordingly.
- Quarterly Newsletters (June 2018): No changes have been made to the schedule for the July 2018 issue.
- 2017 Annual GRISR: The Draft to Agencies date was changed to 26 July 2018. The rest of the schedule was changed accordingly. This document is not as critical as some others, and comments are not expected until November 2018. Mr. Anderson noted that, if during review, someone feels that a well not planned for 4Q2018 sampling should be sampled, to please let Ms. Royer know by late October if possible.
- Sites LF006, SS030, and SD031 Aquifer Test Activities Technical Memorandum: The Response to Comments and Final Due dates were changed to 23 May 2018 to reflect actual submittal dates.
- Monitoring Well Installation Technical Memorandum for Site DP039, Addendum to the Site DP039 Remedial Action Construction Completion Report: No change was made to the schedule.
- Site FT005 Extraction System Optimization Report: No change was made to the schedule. USEPA and DTSC comments have been received; the Water Board will not review this document.
- Site LF044 Sediment Sampling Report: No change was made to the schedule. The Water Board will provide comment by 22 June 2018.
- 2017 Annual CAMU Monitoring Report: No change was made to the schedule. DTSC and Water Board comments have been received; USEPA deferred comment to the Water Board and DTSC.
- Emulsified Vegetable Oil Sites FT004, SS015, SD031, and SD036 Optimization Injections Report: The Predraft to AF/Service Center was changed to 12 June 2018 to reflect actual submittal date. The rest of the schedule was changed accordingly.

2. CURRENT PROJECTS

Treatment Plant Operation and Maintenance Update

South Base Boundary Groundwater Treatment Plant, May 2018 (see Attachment 3)

The South Base Boundary Groundwater Treatment Plant (SBBGWTP) performed at 82.2% uptime, and 5.6 million gallons of groundwater were extracted and treated in May 2018. All treated water was discharged to Union Creek. The average flow rate for the SBBGWTP was 147.5 gallons per minute (gpm). Electrical power usage was 21,686 kWh, and approximately 16,848 pounds of CO₂ were created (based on DOE calculation). Approximately 0.80 pound of volatile organic compounds (VOCs) was removed in May. The total mass of VOCs removed since startup of the system is 500.9 pounds.

No optimization activities are reported for the month of May 2018.

Central Groundwater Treatment Plant, May 2018 (see Attachment 4)

The Central Groundwater Treatment Plant (CGWTP) performed at 99.4% uptime with approximately 1,231,220 gallons of groundwater extracted and treated in May 2018. All treated water was discharged to the storm sewer system which discharges to Union Creek. The average flow rate for the CGWTP was 29.6 gpm. Electrical power usage was 2,323 kWh for all equipment connected to the Central Plant, and approximately 2,607 pounds of CO₂ were generated. Approximately 2.6 pounds of VOCs were removed from groundwater by the treatment plant in May. The total mass of VOCs removed since the startup of the system is 11,492 pounds.

Optimization Activities for CGWTP: The DP039 bioreactor continues to operate in a four-week “pulsed mode.” No other optimization activities are reported for the month of May 2018.

LF007C Groundwater Treatment Plant, May 2018 (See Attachment 5)

The Subarea LF007C Groundwater Treatment Plant (LF007C GWTP) performed at 100% uptime with approximately 127,402 gallons of groundwater extracted and treated in May 2018. All treated water was discharged to the Duck Pond for beneficial reuse. The average flow rate was 5.3 gpm. Approximately 1.19×10^{-3} pound of VOCs was removed from groundwater by the treatment plant in May. The total mass of VOCs removed since the startup of the system is 174.39 pounds. There was no electrical power usage statistics because this plant operates on solar power only.

Per agreement between the Air Force and agencies during the March RPM meeting, due to ongoing issues related to the recent TPH results for this treatment plant, the May 2018 sampling event for this treatment plant has been modified as follows:

- SVOCs were analyzed for influent and effluent samples.
- Samples taken from extraction wells EW614x07, EW615x07, and monitoring well MW210x06, and were analyzed for TPH-D, TPH-G, TPH-MO, VOCs and SVOCs.
- All TPH-D and TPH-MO samples were split between two laboratories for analysis for comparison purposes, to assist with determination of the source of the TPH recently noted in the effluent.

These results will help determine an appropriate sampling plan for this site going forward.

No optimization activities are reported for the month of May 2018.

ST018 Groundwater (MTBE) Treatment Plant, May 2018 (see Attachment 6)

Site ST018 (MTBE) Treatment Plant (ST018 GWTP) performed at 100% uptime with approximately 204,960 gallons of groundwater extracted and treated in May 2018. All treated water was discharged to the Fairfield – Suisun Sewer District. The average flow rate for the ST018 GWTP was 4.8 gpm. Electrical power usage for the month was 118 kWh for all equipment connected to the ST018 GWTP. The total CO₂ equivalent, including an estimate for the carbon change-out, equates to approximately 87 pounds. Approximately 0.25 pound of MTBE, BTEX, VOCs, and TPH was removed in May by the treatment plant, and approximately 0.06 pound of MTBE was removed from groundwater. The total BTEX, MTBE and TPH mass removed since the startup of the system is 45.5 pounds, and the total MTBE mass removed since startup of the system is 11.0 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 four groundwater extraction pumps in the system are all solar powered.

No optimization activities are reported for the month of May 2018.

3. Presentations:

A) Remedial Design/Remedial Action Work Plan for Soil Site SS016 (See Attachment 7)

Mr. Tony Chakurian provided an overview of the Remedial Design/Remedial Action Work Plan for Soil Site SS016. Please refer to Attachment 7 for details.

B) Site LF007C TPH Chromatogram Review Conclusions (See Attachment 8)

Mr. Gamlin provided a summary of the TPH chromatogram review conclusions at Site LF007C. Please refer to Attachment 8 for the full briefing. Highlights include:

- There is an ongoing issue with unexpected TPH at the LF007C GET. TPH is not a site COC.
- Samples have been analyzed for petroleum related VOCs and SVOCs; not detected and do not indicate a petroleum related release.
- A review of the TPH chromatograms was conducted for understanding of a potential source. A biological source is suspected due to proximity of vernal pools that provide natural organic material, especially during rainy weather like that experienced in 2016/2017.
- The Water Board published a Petroleum Metabolite Framework indicating emerging risk associated with petroleum-related polar compounds remaining and presenting risk after silica gel cleanup (SGC). SGC is therefore no longer permitted when investigating petroleum sites. It is still permitted when investigating natural biogenic organic compounds (BOCs). Per the guidance recommendations, this project will continue to utilize SGC to help determine if the source of TPH at this site is biological in nature.
- Lighter compounds such as diesel show up earlier in a chromatogram, heavier compounds like motor oil show up later. They both exhibit a characteristic hump. BOCs show up as individual peaks. The peaks from the LF007C chromatograms don't align with any one specific hump or peak.
- In samples from the background well, the same 'hump' is shown with and without SGC. It doesn't strongly resemble the diesel or motor oil hump.
- In samples from extraction wells, SGC typically removes these humps and peaks from our samples; when one remains, its signature exhibits characteristics of peat and bears a slight resemblance to the motor oil hump, indicating that the source is likely biological.
- In samples from the GET effluent, we see the same peak location as in the background sample, and the SGC removes the natural organics.
- The September influent sample indicates a heavier peat or natural origin, it is not quite motor oil. The SGC cleaned some but not all of the material.

- The September effluent sample doesn't show these heavier compounds, since the GAC removed it. What remains is natural, polar organic compounds.
- Similar patterns were observed in additional sampling results.
- Conclusions indicate that the same pattern from background samples is also seen in the extraction well, influent, and effluent samples. SGC removes polar, natural organic compounds due to proximity to organic-rich soils due to heavy rain in recent years. TPH at this site is therefore not a concern since the detections are of natural origin.
- Going forward, it is recommended to sample for petroleum-related VOCs and SVOCs rather than TPH, and to use TPH data with caution, accept its variations, and consider multiple lines of evidence when evaluating the site.
- Mr. Gamlin will prepare a technological memorandum summarizing the TPH chromatogram review and conclusions, including a recommended sampling plan, to the Water Board.
- Ms. Constantinescu will review the tech memo with respect to the statewide General Permit.
- Ms. Constantinescu inquired about a large, four-volume Air Force-funded study on the toxicity of polar compounds in TPH. She will provide the title to Mr. Duke and Mr. Anderson.

C) Program Update: Activities Completed, In Progress, and Upcoming (see Attachment 9)

Mr. Wray reported on the status of fieldwork and documents which are completed, in progress, and upcoming. Please refer to Attachment 8 for the full briefing.

4. New Action Item Review

Mr. Gamlin will prepare a technological memorandum summarizing the TPH chromatogram review and conclusions, including a recommended sampling plan, to the Water Board.

5. PROGRAM/ISSUES/UPDATE

This is Mr. Linbrunner's last RPM meeting. He thanked the entire team for their hard work and dedication over the years, resulting in several clean and closed sites and advancement of new

technologies in the field, as well as receipt of the Secretary of Defense environmental award in 2017. Mr. Linbrunner noted that he has put together a good team to take over for him upon his retirement; he has been training Ms. Sarah Miller as PM for several months and getting her up to speed on the project, and Mr. Paul Gedbaw will serve as the project chemist. He is confident that he is leaving the team in capable hands, and is looking forward to staying in touch and hearing how the project progresses.

6. Action Items

Item #	Responsible	Action Item Description	Due Date	Status
1.	Monika O’Sullivan	Ms. O’Sullivan to provide updates on PFOS and PFOA as she becomes aware of them.	Ongoing	Open
2.	Lonnie Duke	Mr. Duke will continue to provide design and construction information for the KC-46 Hangar for agency input ahead of the Air Force/Civil Engineering awarding the construction contract.	Ongoing	Open
3.	Jeff Gamlin	Mr. Gamlin will prepare and submit a technical memorandum regarding TPH chromatogram reviews and conclusions at Site LF007C to the Water Board and EPA.	19 July 2018	Open

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

The RPM face-to-face meeting is scheduled for 09:30 PM PST on 20 June, 2018.
The call-in number is 1-866-203-7023. Enter the Participation code 5978-75-9736 then enter #.

AGENDA

1. ADMINISTRATIVE

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

2. CURRENT PROJECTS

TREATMENT PLANT OPERATION AND MAINTENANCE UPDATE

3. PRESENTATIONS

- A SS016 RD/RA WORK PLAN
- B TPH AT LF007C
- C PROGRAM UPDATE:
DOCUMENTS & ACTIVITIES COMPLETED, IN PROGRESS AND PLANNED

4. NEW ACTION ITEM REVIEW

5. PROGRAM/ISSUES/UPDATE

MEETING SCHEDULE

NOTES: AFTER THE RPM MEETING, BASED ON THE DISCUSSION DURING THE REVIEW OF THE MASTER MEETING AND DOCUMENT SCHEDULE, WE 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.

(2018)
Annual Meeting and Teleconference Schedule

Monthly RPM Meeting ¹ (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.)
—	01-17-18	—
02-21-18	—	—
—	03-21-18	—
04-19-18 (Thursday 2:00 PM)	—	04-19-18
—	05-16-18	—
06-20-18	—	—
—	07-18-18	—
08-15-18	—	—
—	09-19-18	—
10-17-18	—	May through October ²
—	11-21-18	—
—	—	—

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

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

Travis AFB Master Meeting and Document Schedule

PRIMARY DOCUMENTS				
Life Cycle	Community Relations Plan Update Travis AFB, Glenn Anderson CH2M, Jill Dunphy	Amendment to the WABOU Soil ROD for the Travis AFB ERP Sites DP039, SD043, and SS046 Travis AFB, Glenn Anderson CH2M, Latonya Coleman	Amendment to the NEWIOU Soil ROD for the Travis AFB ERP Sites SS016 and SD033 Travis AFB, Glenn Anderson CH2M, Latonya Coleman	No Further Action ROD for Old Skeet Range (TS060 MRA) Travis AFB, Glenn Anderson
Scoping Meeting	NA	NA	NA	NA
Predraft to AF/Service Center	08-23-16	10-09-17	02-28-18	05-18-18
AF/Service Center Comments Due	09-07-16	11-08-17	03-30-18	06-01-18
Draft to Agencies	09-28-16 (03-22-18)	11-30-17	06-22-18	TBD
Draft to RAB	09-28-16 (03-22-18)	11-30-17	06-22-18	TBD
Agency Comments Due	10-28-16 (04-27-18)	01-31-18	08-07-18	TBD
Response to Comments Meeting	TBD	02-21-18	08-21-18	TBD
Agency Concurrence with Remedy	NA	NA	NA	NA
Public Comment Period	NA	NA	NA	NA
Public Meeting	NA	NA	NA	NA
Response to Comments Due	TBD	TBD	09-06-18	TBD
Draft Final Due	TBD	TBD	09-06-18	TBD
Final Due	TBD	TBD	10-08-18	TBD

Travis AFB Master Meeting and Document Schedule

PRIMARY DOCUMENTS			
Life Cycle	Site SD043 Remedial Design/Remedial Action Work Plan Travis AFB, Glenn Anderson CH2M, Levi Pratt	Site SS046 Remedial Design/Remedial Action Work Plan Travis AFB, Glenn Anderson CH2M, Doug Berwick CAPE, Meg Greenwald	Site SS016 Remedial Design/Remedial Action Work Plan Travis AFB, Glenn Anderson CH2M, Doug Berwick CAPE, Meg Greenwald
Scoping Meeting	NA	NA	NA
Predraft to AF/Service Center	02-22-18	03-02-18	06-04-18
AF/Service Center Comments Due	03-08-18	03-16-18	06-18-18
Draft to Agencies	04-10-18	04-12-18	07-02-18
Draft to RAB	04-10-18	04-12-18	07-02-18
Agency Comments Due	05-10-18	05-14-18	08-02-18
Response to Comments Meeting	05-16-18	05-16-18	08-15-18
Agency Concurrence with Remedy	NA	NA	NA
Public Comment Period	NA	NA	NA
Public Meeting	NA	NA	NA
Response to Comments Due	06-06-18	06-29-18	08-28-18
Draft Final Due	06-06-18	06-29-18	08-28-18
Final Due	07-09-18	07-30-18	09-28-18

Travis AFB Master Meeting and Document Schedule

PRIMARY DOCUMENTS		
Life Cycle	Site SD031 Soil Remedial Investigation/Feasibility Study Travis AFB, Glenn Anderson CH2M, Nikki Carlton	Fourth Five-Year Review Report for Multiple Groundwater, Soil, and Sediment Sites Travis AFB, Glenn Anderson Tetra Tech, Joachim Eberharter
Scoping Meeting	NA	NA
Predraft to AF/Service Center	08-16-18	03-14-18
AF/Service Center Comments Due	09-17-18	05-22-18
Draft to Agencies	10-02-18	6-5-18
Draft to RAB	10-02-18	6-5-18
Agency Comments Due	12-11-18	7-20-18
Response to Comments Meeting	01-16-19	TBD
Agency Concurrence with Remedy	NA	NA
Public Comment Period	NA	NA
Public Meeting	NA	NA
Response to Comments Due	02-07-19	TBD
Draft Final Due	02-07-19	TBD
Final Due	03-12-19	TBD

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	Data Gap Investigation Results Technical Memorandum for Soil Site SS016 Travis AFB, Glenn Anderson CH2M, Doug Berwick CAPE, Meg Greenwald	Site SS015 Soil Sampling Plan Travis AFB, Glenn Anderson CH2M, Levi Pratt	Site LF006 Technology Demonstration Work Plan Travis AFB, Glenn Anderson CH2M, Levi Pratt
Scoping Meeting	NA	NA	NA
Predraft to AF/Service Center	10-04-17	03-13-18	06-27-18
AF/Service Center Comments Due	10-18-17	03-27-18	07-12-18
Draft to Agencies	11-30-17	04-30-18	07-27-18
Draft to RAB	11-30-17	04-30-18	07-27-18
Agency Comments Due	01-02-18	05-31-18	08-27-18
Response to Comments Meeting	01-17-18	06-20-18	09-05-18
Response to Comments Due	03-21-18 (06-05-18)	07-16-18	09-19-18
Draft Final Due	NA	NA	NA
Final Due	03-21-18 (06-05-18)	07-16-18	09-19-18
Public Comment Period	NA	NA	NA
Public Meeting	NA	NA	NA

Travis AFB Master Meeting and Document Schedule

INFORMATIONAL DOCUMENTS		
Life Cycle	Quarterly Newsletter (July 2018) Travis, Glenn Anderson	2017 Annual GRISR Travis AFB, Glenn Anderson CH2M, Leslie Royer
Scoping Meeting	NA	NA
Predraft to AF/Service Center	06-26-18	05-09-18
AF/Service Center Comments Due	NA	06-11-18
Draft to Agencies	07-03-18	07-26-18
Draft to RAB	NA	07-26-18
Agency Comments Due	07-17-18	11-19-18
Response to Comments Meeting	07-18-18	01-16-19
Response to Comments Due	07-19-18	01-30-18
Draft Final Due	NA	NA
Final Due	07-19-18	01-30-18
Public Comment Period	NA	NA
Public Meeting	NA	NA

Travis AFB Master Meeting and Document Schedule

INFORMATIONAL DOCUMENTS			
Life Cycle	Sites LF006, SS030 and SD031 Aquifer Test Activities Technical Memorandum Travis AFB, Glenn Anderson CH2M, Renee Caird	Monitoring Well Installation Technical Memorandum for Site DP039, Addendum to the Site DP039 Remedial Action Construction Completion Report Travis AFB, Glenn Anderson CH2M, Levi Pratt	Site FT005 Extraction System Optimization Technical Memorandum Travis AFB, Gene Clare CH2M, Levi Pratt
Scoping Meeting	NA	NA	NA
Predraft to AF/Service Center	02-15-18	02-26-18	03-08-18
AF/Service Center Comments Due	03-02-18	03-14-18	03-22-18
Draft to Agencies	03-21-18	04-19-18	05-01-18
Draft to RAB	03-21-18	04-19-18	05-01-18
Agency Comments Due	04-23-18	05-21-18	06-01-18
Response to Comments Meeting	05-16-18	06-20-18	06-20-18
Response to Comments Due	06-04-18 (05-23-18)	07-27-18	07-18-18
Draft Final Due	NA	NA	NA
Final Due	06-04-18 (05-23-18)	07-27-18	07-18-18
Public Comment Period	NA	NA	NA
Public Meeting	NA	NA	NA

Travis AFB Master Meeting and Document Schedule

INFORMATIONAL DOCUMENTS			
Life Cycle	Site LF044 Sediment Sampling Technical Memorandum Travis AFB, Glenn Anderson CH2M, Doug Berwick CAPE, Meg Greenwald	2017 Annual CAMU Monitoring Report Travis AFB, Gene Clare CH2M HILL, Levi Pratt	Emulsified Vegetable Oil Sites FT004, SS015, SD031, and SD036 Injections Technical Memorandum Travis AFB, Glenn Anderson CH2M, Levi Pratt
Scoping Meeting	NA	NA	NA
Predraft to AF/Service Center	04-12-18	04-19-18	06-12-18
AF/Service Center Comments Due	04-26-08	05-03-18	06-26-18
Draft to Agencies	05-17-18	05-15-18	07-12-18
Draft to RAB	05-17-18	05-15-18	07-12-18
Agency Comments Due	06-18-18	06-15-18	08-13-18
Response to Comments Meeting	06-20-18	06-20-18	08-15-18
Response to Comments Due	07-13-18	07-10-18	08-31-18
Draft Final Due	NA	NA	NA
Final Due	07-13-18	07-10-18	08-31-18
Public Comment Period	NA	NA	NA
Public Meeting	NA	NA	NA

South Base Boundary Groundwater Treatment Plant Monthly Data Sheet

Report Number: 211

Reporting Period: 2 May 2018 – 3 June 2018

Date Submitted: 14 June 2018

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 May 2018 reporting period.

Table 1 – Operations Summary – May 2018			
Initial Data Collection:	5/2/2018 12:30	Final Data Collection:	6/3/2018 11:30
Operating Time:	Percent Uptime:	Electrical Power Usage:	
SBBGWTP: 630 hours	SBBGWTP: 82.2%	SBBGWTP: 21,686 kWh (16,848 lbs CO₂ generated^a)	
Gallons Treated: 5.6 million gallons		Gallons Treated Since July 1998: 1,041 million gallons	
Volume Discharged to Union Creek: 5.6 million gallons		Gallons Treated From Other Sources: 0 gallons	
VOC Mass Removed: 0.80 lbs^b		VOC Mass Removed Since July 1998: 500.9 lbs	
Rolling 12-Month Cost per Pound of Mass Removed: \$10,219 ^c			
Monthly Cost per Pound of Mass Removed: \$15,162 ^c			
lbs = pounds			
^a SiteWise™ estimate that 1 kilowatt hour generated produces 0.74 pounds of GHG. Value also includes approximately 800 pounds of GHG from GAC change out services averaged to a per month basis.			
^b Calculated using May 2018 EPA Method SW8260C analytical results.			
^c 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 – May 2018							
FT005^b				SS029		SS030	
EW01x05	Offline	EW743x05	Offline	EW01x29	Offline ^c	EW01x30	16.0
EW02x05	Offline	EW744x05	4.0	EW02x29	Offline ^c	EW02x30	0.0 ^d
EW03x05	Offline	EW745x05	11.7	EW03x29	3.3	EW03x30	7.2
EW731x05	6.9	EW746x05	Offline	EW04x29	2.4	EW04x30	24.8
EW732x05	Offline	EW2291x05	6.4	EW05x29	7.4	EW05x30	7.9
EW733x05	Offline	EW2782x05	7.0	EW06x29	8.2	EW2174x30	9.4
EW734x05	Offline ^e	EW2783x05	10.1	EW07x29	13.5	EW711x30	8.3
EW735x05	11.9	EW2784x05	11.4			MW269x30	0.5
EW736x05	Offline	EW2785x05	7.1				
EW737x05	Offline	EW2786x05	16.7				
EW742x05	Offline						
FT005 Total: 93.2				SS029 Total: 34.8		SS030 Total: 74.1	
SBBGWTP Average Monthly Flow^f: 147.5 gpm							
^a Flow rates presented are instantaneous measurements taken at the end of the reporting period. ^b Most extraction wells at FT005 were taken offline in accordance with the 2008 Annual Remedial Process Optimization Report for the Central Groundwater Treatment Plant, North Groundwater Treatment Plant, and South Base Boundary Groundwater Treatment Plant. ^c Extraction wells taken off line because of persistent fouling of the well pumps and associated discharge piping. ^d Extraction well was operational but water levels were recharging when field readings were collected. ^e Extraction well was off line for repair. ^f The average SBBGWTP groundwater flow rate was calculated using the Union Creek Discharge Totalizer and dividing it by the total time the system was operational. gpm – gallons per minute SBBGWTP – South Base Boundary Groundwater Treatment Plant							

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

Table 3 – Summary of System Shutdowns					
Location	Shutdown^a		Restart^a		Cause
	Date	Time	Date	Time	
SBBGWTP	7 May 2018	08:00	9 May 2018	13:00	Replaced 4-inch pipe leading to effluent tank, which was fouled with calcium carbonate.
SBBGWTP	21 May 2018	10:00	22 May 2018	12:30	Cracked pipe on effluent tank.
SBBGWTP	23 May 2018	9:00	23 May 2018	14:40	Resealed small leak on effluent tank.
SBBGWTP	31 May 2018	10:00	2 June 2018	14:30	Installed two additional bag filter housings.
-- = Time not recorded					
^a Shutdown and restart times estimated based on field notes SBBGWTP = South Base Boundary Groundwater Treatment Plant					

Summary of O&M Activities

Monthly groundwater treatment samples were collected at the SBBGWTP on 2 May 2018. Sample results are presented in Table 4. The total VOC concentration (17.30 µg/L) in the influent sample increased slightly from the April 2018 sample results (16.88 µg/L). TCE was the primary VOC detected in the influent sample at a concentration of 16 µg/L. Several VOCs were detected in the midpoint sampling location, including TCE, 1,2-DCA, cis-1,2-DCE, and chloroform. No VOCs were detected at the effluent sampling location.

The SBBGWTP was shut down several times in May 2018 as presented in Table 3. Between 7 and 9 May, the system was off line to replace a 4-inch pipe leading to the effluent tank that was significantly fouled with calcium carbonate. The buildup in the pipe was from when the air stripper was operational. After replacing the pipe, the pressures through the SBBGWTP decreased significantly. On 21 May, the system was shut down because a 6-inch pipe on the effluent tank cracked. The cracked pipe, which was no longer in use, was removed, and the pipe opening was sealed with several layers of quick curing epoxy sealant. While the system was off line, some of the algae buildup inside the effluent tank was removed. After the system restarted, there was a small leak from the seal. Therefore, on 23 May, the system was shut down for approximately 6 hours to re-apply another layer of epoxy sealant. Between 31 May and 2 June, the SBBGWTP was shut down to install two (2) additional bag filter housings. There were several additional minor maintenance activities were performed at the SBBGWTP in May 2018, including cleaning the backwash pumps (P-BW-2 and P-BW-3) and filters and repairing a small leak on an 8-inch flange within the treatment plant.

In May 2018, troubleshooting was performed on several extraction wells. The following list presents the maintenance activities and status of several extraction wells:

- EW01x30 – Replaced auxillary switch on the starter. Well is currently operating.
- EW04x30 – Replaced the communication wire for the transducer. Well is currently operating.
- EW711x30 – Communication wire for the transducer will need to be replaced. Well is currently operating.
- EW734x05 – Replaced the pump end; however, the motor will need to be replaced. Well is currently off line.

Figure 1 presents the 1,2-DCA and TCE concentrations since January 2017. Figure 2 presents a plot of influent concentrations and average flow at the SBBGWTP over the past twelve (12) months. The VOC influent concentrations have generally been fluctuating over the past 12 months with an overall decreasing trend. However, an overall increasing flow rate trend was observed in the past 12 months with the addition of the new extraction wells at Site FT005 in November 2017.

Optimization Activities

No optimization activities occurred at the SBBGWTP in May 2018.

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 3 presents the historical GHG production from the SBBGWTP. In May 2018, the SBBGWTP produced approximately 16,848 pounds of GHG, which includes approximately 800 pounds of GHG generated from GAC change out services averaged to a per month basis.

TABLE 4

Summary of Groundwater Analytical Data for May 2018 – South Base Boundary Groundwater Treatment Plant

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	2 May 2018 (µg/L)		
				Influent	Midpoint	Effluent
Halogenated Volatile Organics						
Acetone	NA	1.9	0	ND	ND	ND
Bromodichloromethane	NA	0.17	0	ND	ND	ND
Carbon Tetrachloride	0.5	0.19	0	ND	ND	ND
Chloroform	5.0	0.16	0	ND	0.24 J	ND
Chloromethane	NA	0.30	0	ND	ND	ND
1,1-Dichloroethane	5.0	0.16	0	ND	ND	ND
1,2-Dichloroethane	0.5	0.13	0	0.39 J	0.65 J	ND
1,1-Dichloroethene	5.0	0.14	0	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.15	0	0.91 J	1.4	ND
trans-1,2-Dichloroethene	5.0	0.15	0	ND	ND	ND
Methylene Chloride	5.0	0.32	0	ND	ND	ND
Tetrachloroethene	5.0	0.20	0	ND	ND	ND
1,1,1-Trichloroethane	5.0	0.16	0	ND	ND	ND
1,1,2-Trichloroethane	5.0	0.32	0	ND	ND	ND
Trichloroethene	5.0	0.16	0	16	0.18 J	ND
Vinyl Chloride	0.5	0.10	0	ND	ND	ND
Non-Halogenated Volatile Organics						
Benzene	1.0	0.16	0	ND	ND	ND
Ethylbenzene	5.0	0.16	0	ND	ND	ND
Toluene	5.0	0.17	0	ND	ND	ND
Xylenes	5.0	0.19 – 0.34	0	ND	ND	ND
Other						
Total Petroleum Hydrocarbons – Gasoline	50	10	0	NM	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	15	0	NM	NM	ND
Total Petroleum Hydrocarbons – Motor Oil	50	160	0	NM	NM	ND
1,4-Dioxane	NA	0.08	0	NM	NM	ND

* 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

NA = not applicable

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

ND = not detected

NM = not measured

µg/L = micrograms per liter

Figure 1

SBBGWTP Influent 1,2-DCA and TCE Concentrations Since January 2017

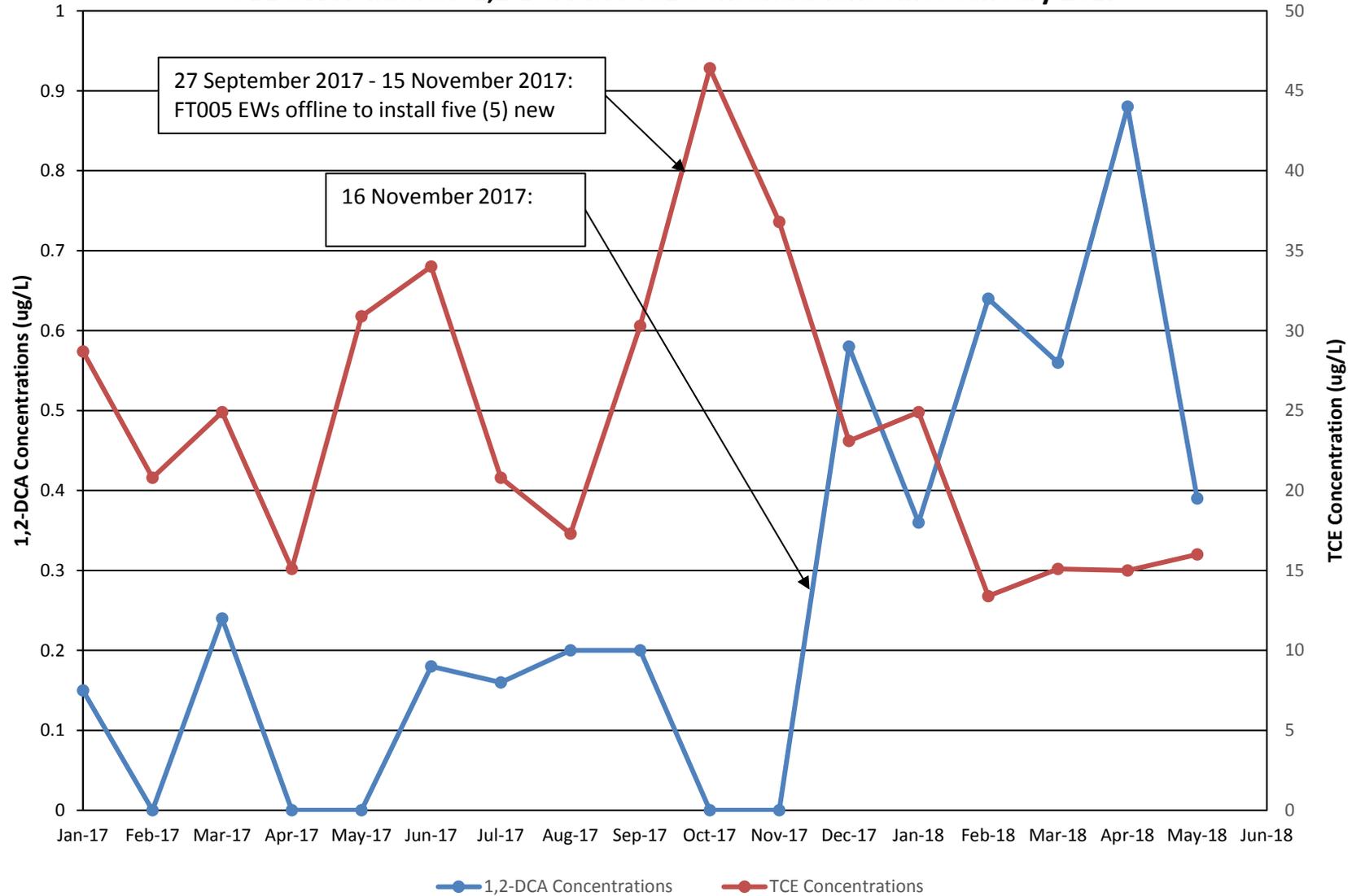


Figure 2
SBBGWTP Total VOC Influent Concentrations and Average Flowrate Twelve Month History

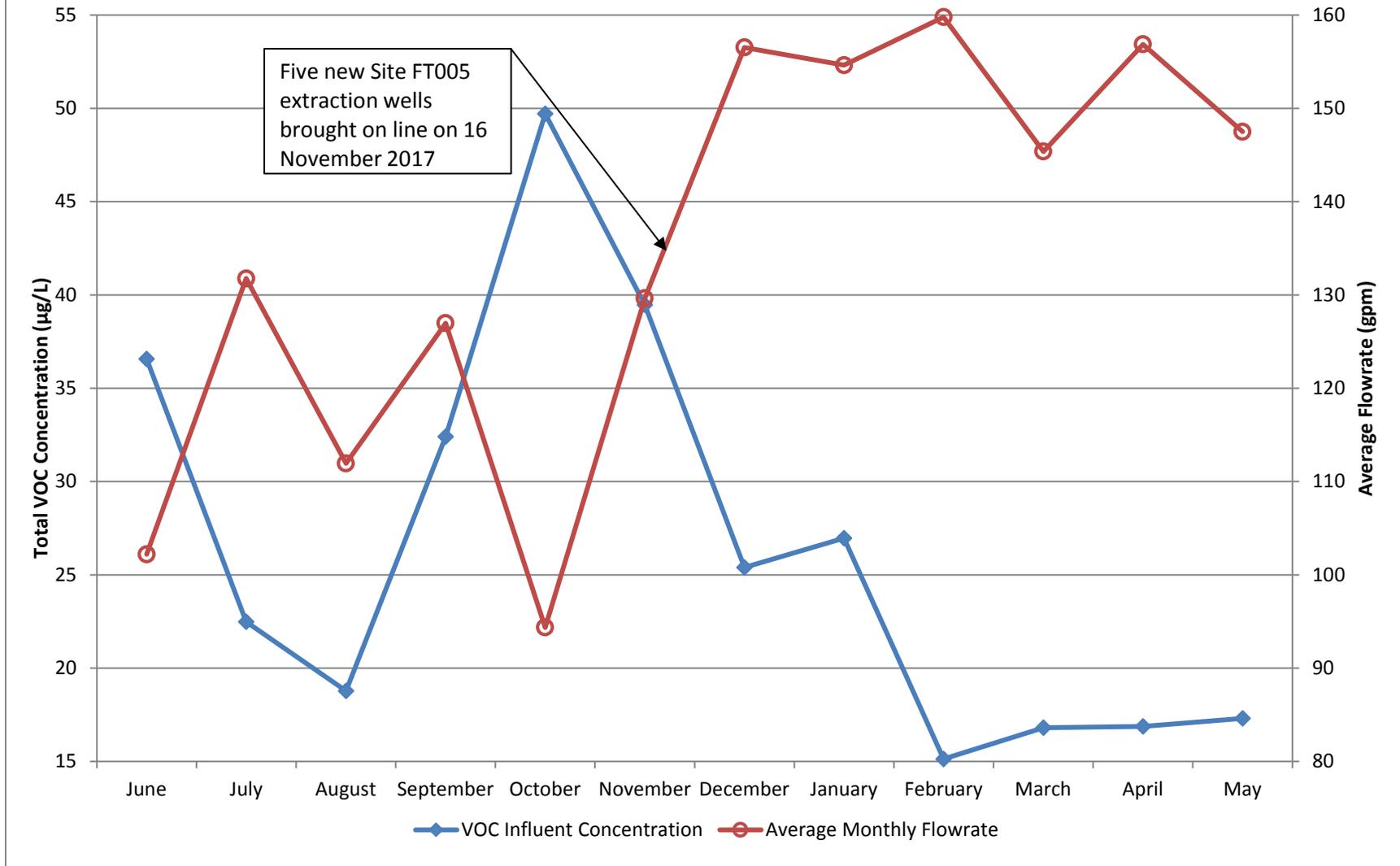
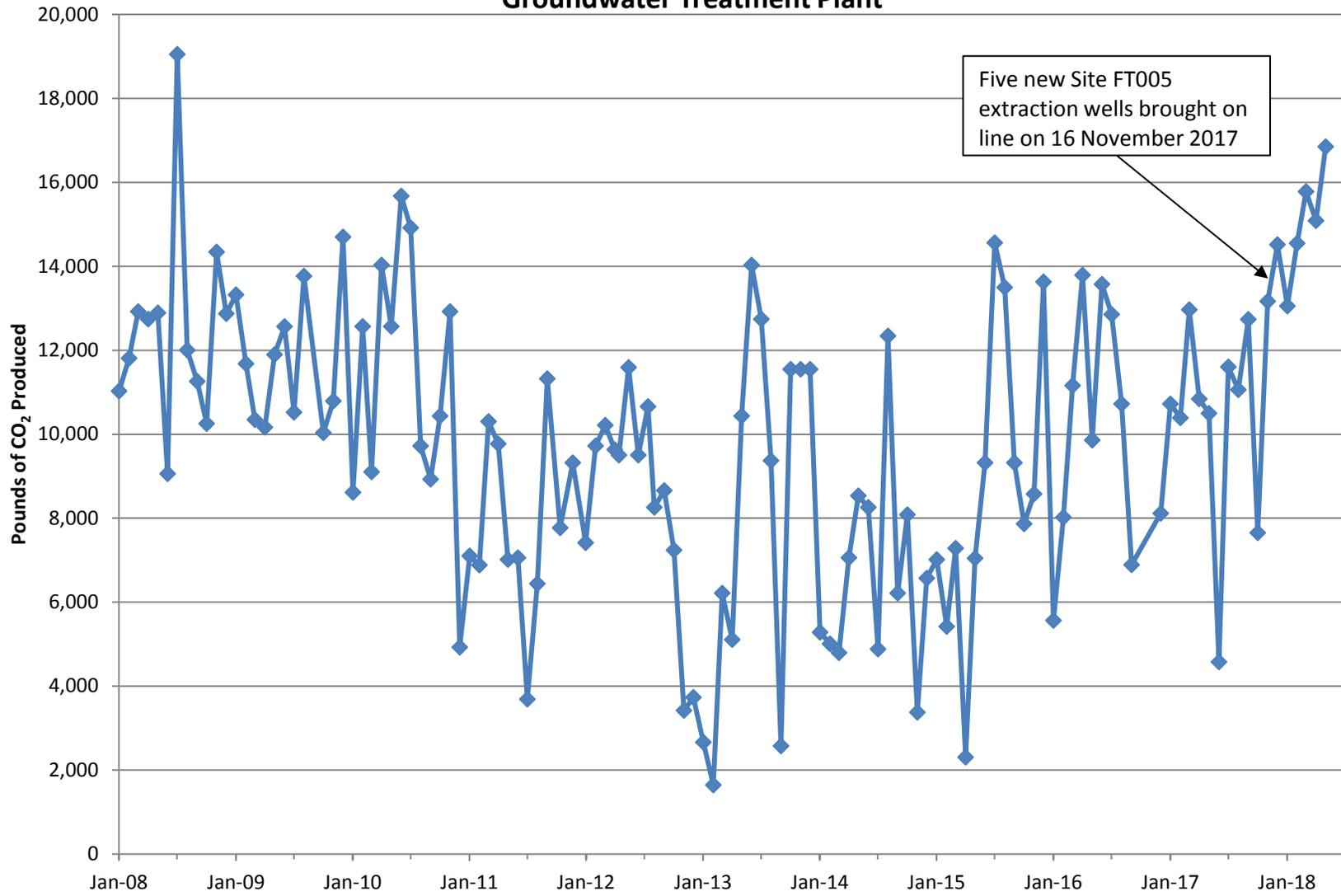


Figure 3
Equivalent Pounds of Carbon Dioxide Produced by the South Base Boundary
Groundwater Treatment Plant



Central Groundwater Treatment Plant Monthly Data Sheet

Report Number: 226

Reporting Period: 3 May 2018 – 1 June 2018

Date Submitted: 14 June 2018

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 May 2018 reporting period.

Table 1 – Operations Summary – May 2018			
Initial Data Collection:	5/3/2018 12:05	Final Data Collection:	6/1/2018 13:20
Operating Time:		Percent Uptime:	Electrical Power Usage:
CGWTP:	693 hours	CGWTP:	99.4%
		CGWTP:	2,323 kWh (2,607 lbs CO ₂ generated ^a)
Gallons Treated (discharge to storm sewer):		Gallons Treated Since January 1996:	555.5 million gallons
1,231,220 gallons			
VOC Mass Removed from groundwater:		VOC Mass Removed Since January 1996:	
2.60 lbs^b		2,806 lbs from groundwater	
		8,686 lbs from vapor	
Rolling 12-Month Cost per Pound of Mass Removed: \$2,209 ^c			
Monthly Cost per Pound of Mass Removed: \$2,117 ^c			
^a SiteWise™ estimate that 1 kilowatt hour generated produces 0.74 pounds of GHG. Value also includes approximately 888 pounds of GHG from GAC change out services averaged to a per month basis.			
^b Calculated using May 2018 EPA Method SW8260C analytical results.			
^c 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 during the monthly reporting period.

Table 2 – CGWTP Average Flow Rates^a – May 2018	
Location	Average Flow Rate Groundwater (gpm)
EW001x16	13.2
EW002x16	11.0
EW003x16	0.2
EW605x16	6.0
EW610x16	1.8
CGWTP	29.6
^a Flow rates calculated by dividing total gallons processed by system operating time for the month or the average of the instantaneous readings.	
gpm = gallons per minute	

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

Table 3 – Summary of System Shutdowns					
Location	Shutdown^a		Restart		Cause
	Date	Time	Date	Time	
CGWTP	16 May 2018	11:30	16 May 2018	15:30	Removed the old valves that connected to the old GAC vessels.
-- = Date/Time not recorded					
^a Shutdown and restart times estimated based on field notes					
CGWTP = Central Groundwater Treatment Plant					

Table 4 presents a twelve-month summary of the Site DP039 bioreactor recirculation well pulsing dates.

Table 4 – Summary of DP039 Bioreactor “Pulsed Mode” Operations		
Location	Pulse-on Date	Pulse-off Date
MW750x39	5 April 2017	7 August 2017
	7 September 2017	2 October 2017
	6 November 2017	27 November 2017
	26 December 2017	22 January 2018
	19 February 2018	21 March 2018
	16 April 2018	14 May 2018
MW = Monitoring Well		

Summary of O&M Activities

Monthly groundwater treatment samples were collected at the CGWTP on 2 May 2018. Sample results are presented in Table 5. The total VOC concentration (253.21 µg/L) in the May 2018 influent sample has decreased from the April 2018 sample (287.15 µg/L). TCE was the primary VOC detected in the influent sample at a concentration of 210 µg/L. Cis-1,2-DCE (26 µg/L) and vinyl chloride (0.22 J µg/L) were detected in the sample collected after the first carbon vessel, and vinyl chloride (0.18 J µg/L) was detected in the sample collected after the second carbon vessel. No VOC constituents were detected in the effluent sample. Travis AFB will continue to monitor influent, midpoint, and effluent concentrations at the CGWTP for carbon breakthrough, though the carbon treatment remained effective in May 2018. A carbon change out on the lead GAC vessel is being coordinated.

On the old GAC vessels, there were two (2) PVC manifolds connected to the vessels with three (3) valves each. Since these manifolds are no longer needed, it was decided to remove them to eliminate a tripping hazard. On 16 May, the CGWTP was shut down for approximately four hours to remove the PVC manifolds along with the six (6) old PVC valves, and new valves were installed at the end of the PVC pipes.

Throughout May, the totalizer for EW610x16 was malfunction. On 29 May, the totalizer was rebuilt and repaired.

Figure 1 presents a plot of influent concentrations (total VOCs) and the influent flow rate at the CGWTP versus time for the past twelve (12) months. The influent concentrations show an increasing trend over the past 12 months along with an overall decreasing trend for the flow rate through the treatment plant.

The Site DP039 subgrade biogeochemical reactor (SBGR), also known as a bioreactor, continued to operate in a four-week “pulsed mode” to optimize distribution of total organic carbon (TOC). The bioreactor was taken off line on 14 May 2018 as planned.

Optimization Activities

No optimization activities occurred at the CGWTP in May 2018.

Sustainability

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

Figure 2 presents the historical GHG production from the systems associated with the CGWTP. The CGWTP produced approximately 2,607 pounds of GHG during May 2018.

TABLE 5

Summary of Groundwater Analytical Data for May 2018 – Central Groundwater Treatment Plant

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	2 May 2018 (µg/L)			
				Influent	After Carbon 1 Effluent	After Carbon 2 Effluent	System Effluent
Halogenated Volatile Organics							
Acetone	NA	1.9	0	ND	ND	ND	ND
Carbon Tetrachloride	0.5	0.19	0	ND	ND	ND	ND
Chloroform	5.0	0.16	0	ND	ND	ND	ND
Chloromethane	NA	0.30	0	ND	ND	ND	ND
1,2-Dichlorobenzene	5.0	0.13	0	0.30 J	ND	ND	ND
1,3-Dichlorobenzene	5.0	0.16	0	0.33 J	ND	ND	ND
1,4-Dichlorobenzene	5.0	0.16	0	0.16 J	ND	ND	ND
1,1-Dichloroethane	5.0	0.16	0	ND	ND	ND	ND
1,2-Dichloroethane	0.5	0.13	0	ND	ND	ND	ND
1,1-Dichloroethene	5.0	0.14	0	0.47 J	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.15	0	39	26	ND	ND
trans-1,2-Dichloroethene	5.0	0.15	0	2.3	ND	ND	ND
Methylene Chloride	5.0	0.32	0	ND	ND	ND	ND
Tetrachloroethene	5.0	0.20	0	0.43 J	ND	ND	ND
1,1,1-Trichloroethane	5.0	0.16	0	ND	ND	ND	ND
1,1,2-Trichloroethane	5.0	0.32	0	ND	ND	ND	ND
Trichloroethene	5.0	0.16 – 1.6	0	210	ND	ND	ND
Vinyl Chloride	0.5	0.10	0	0.22 J	0.22 J	0.18 J	ND
Non-Halogenated Volatile Organics							
Benzene	1.0	0.16	0	ND	ND	ND	ND
Ethylbenzene	5.0	0.16	0	ND	ND	ND	ND
Toluene	5.0	0.17	0	ND	ND	ND	ND
Total Xylenes	5.0	0.19 – 0.34	0	ND	ND	ND	ND
Other							
Total Petroleum Hydrocarbons – Gasoline (C6 – C10)	50	10	0	NM	NM	NM	ND
Total Petroleum Hydrocarbons – Diesel (C10 – C28)	50	15	0	NM	NM	NM	ND
Total Petroleum Hydrocarbons – Motor Oil (C28 – C40)	50 (trigger)	160	0	NM	NM	NM	ND
1,4-Dioxane	NA	0.08	0	NM	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:

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

NA = not applicable

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

ND = not detected

NM = not measured

µg/L = micrograms per liter

mg/L = milligrams per liter

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

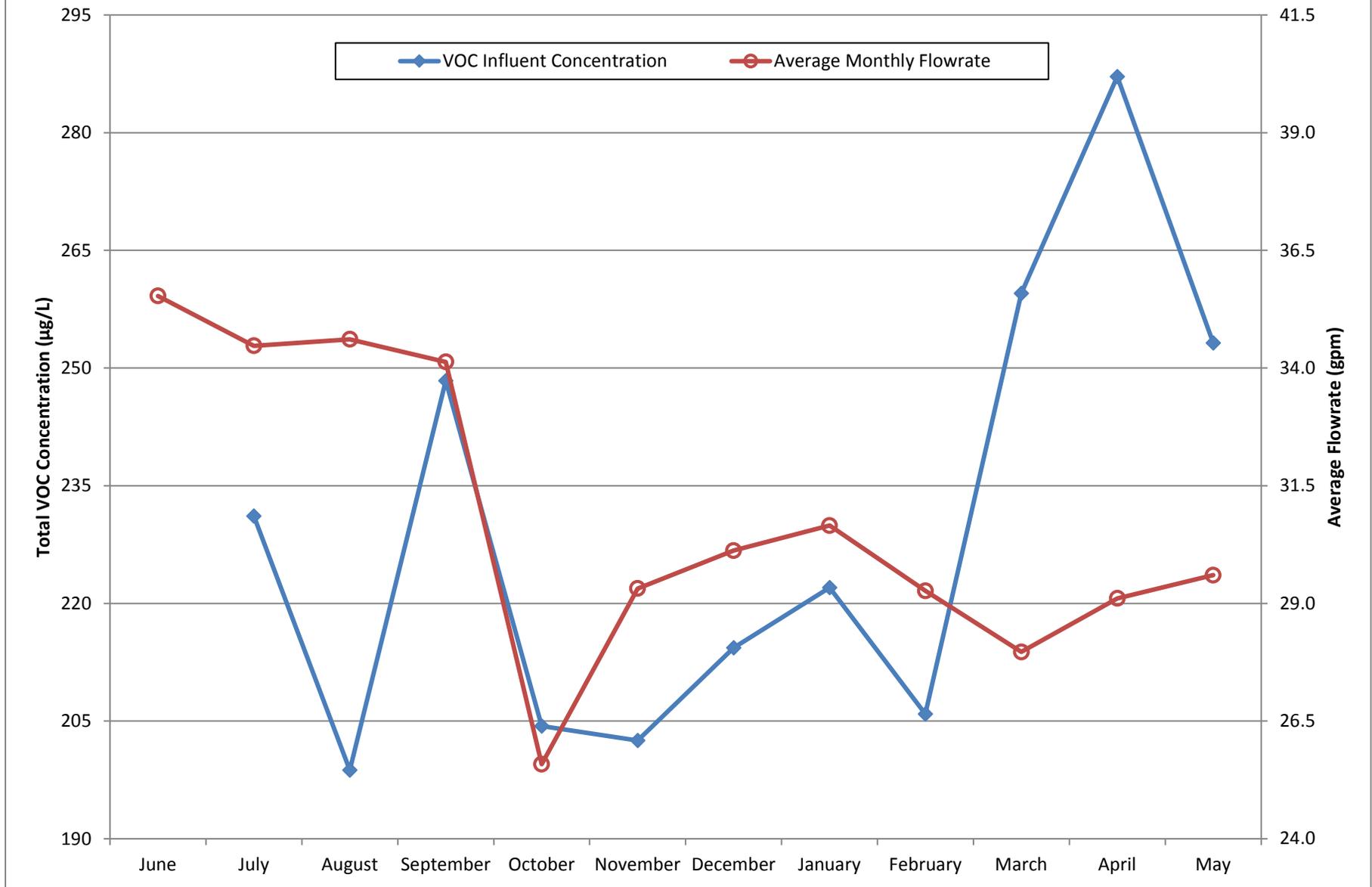
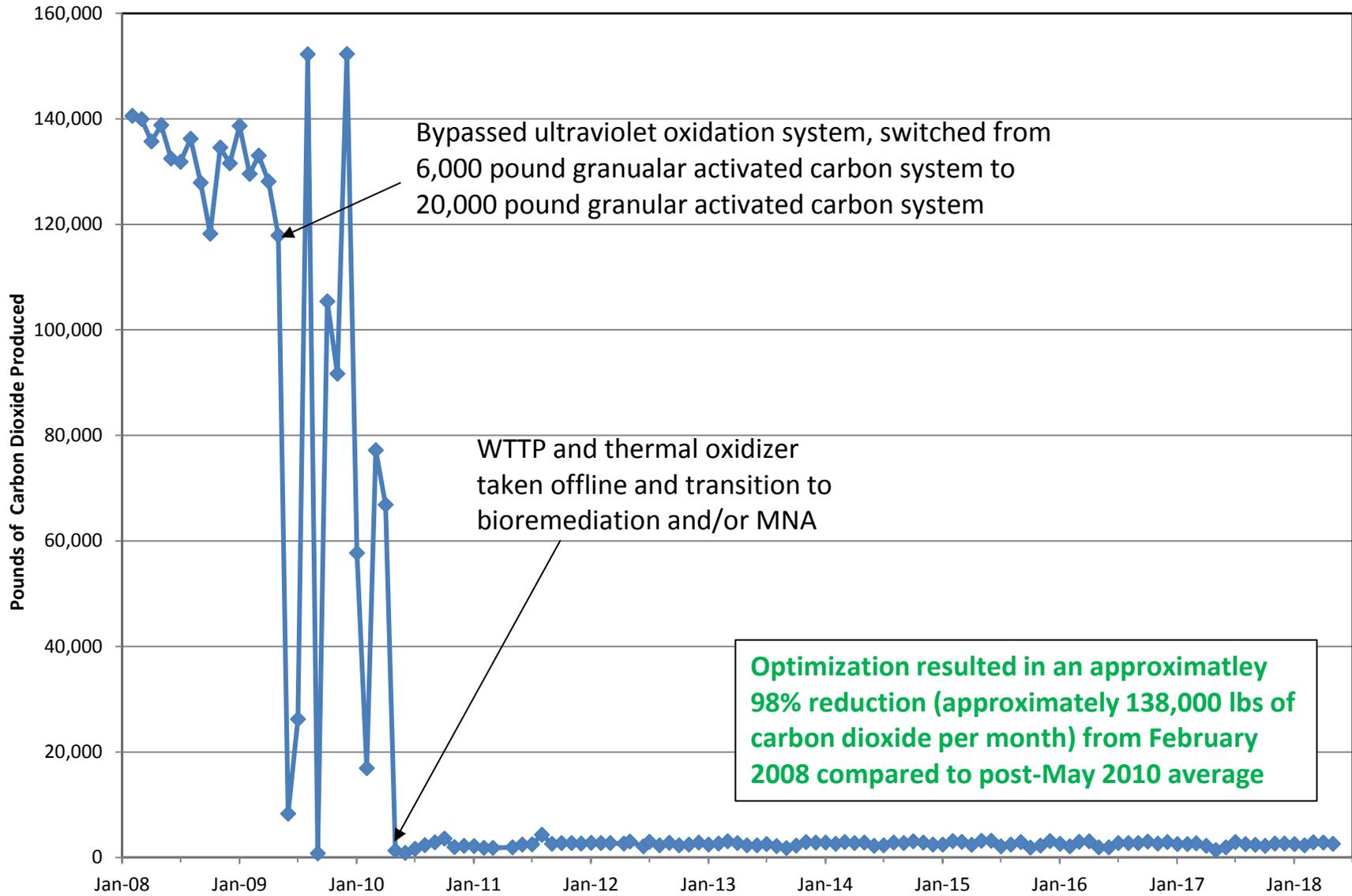


Figure 2

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



Subarea LF007C Groundwater Treatment Plant Monthly Data Sheet

Report Number: 169

Reporting Period: 15 May 2018 – 1 June 2018

Date Submitted: 14 June 2018

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 May 2018 reporting period:

Table 1 – Operations Summary – May 2018			
Initial Data Collection:	5/15/2018 16:00	Final Data Collection:	6/1/2018 8:20
Operating Time:	Percent Uptime:	Electrical Power Usage ^a :	
LF007C GWTP: 400 hours	LF007C GWTP 100% ^b	LF007C GWTP: 0 kWh	
Gallons Treated: 127,402 gallons		Gallons Treated Since March 2000: 87.4 million gallons	
Volume Discharged to Duck Pond: 127,402 gallons			
VOC Mass Removed: 1.19 x 10⁻³ pounds^c		VOC Mass Removed Since March 2000: 174.39 pounds (Groundwater)	
Rolling 12-Month Cost per Pound of Mass Removed: Not Measured^d			
Monthly Cost per Pound of Mass Removed: Not Measured^d			
^a The LF007C GWTP operates on solar power only. ^b The system was operational 100% of the available time between 15 May (when the system was restarted after vernal pool dried up) and 1 June. ^c VOCs from March 2018 influent sample detected by EPA Method SW8260C. ^d Value not calculated since measurement does not accurately represent the cost effectiveness of the system.			

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

Table 2 – LF007C GWTP Average and Total Flow Rates – May 2018		
Location	Average Flow Rate (gpm) ^a	Total Gallons Processed (gallons)
EW614x07	4.6	109,827
EW615x07	0.7	16,430
LF007C GWTP	5.3	127,402
^a Flow rates calculated by dividing total gallons processed by system operating time for the month or the average of the instantaneous readings. gpm = gallons per minute		

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

Table 3 – Summary of System Shutdowns					
Location	Shutdown^a		Restart^a		Cause
	Date	Time	Date	Time	
LF007C GWTP	16 March 2018	09:30	15 May 2018	16:00	Shut down due to vernal pools. Restarted when dry.
-- = Time not recorded					
^a Shutdown and restart times estimated based on field notes					
LF007C GWTP = Subarea LF007C Groundwater Treatment Plant					

Summary of O&M Activities

The LF007C GWTP was shut down, in accordance with US Fish and Wildlife Service requirements, on 16 March 2018 when vernal pools formed above the groundwater VOC plume at Subarea LF007C. After the vernal pools had dried up, the LF007C GWTP was restarted on 15 May 2018. Monthly groundwater samples were not collected at the LF007C GWTP in May due to startup late in the month. Monthly compliance samples will be collected in early June.

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

Optimization Activities

No optimization activities occurred at the LF007C GWTP in May 2018.

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 now a solar-only operated treatment system and no longer generates GHG, with exception of a small amount of GHG generated from changing out the GAC averaged to a per month basis.

Figure 1
LF007CGWTP Total VOC Influent Concentrations and Average Flowrate Twelve Month History

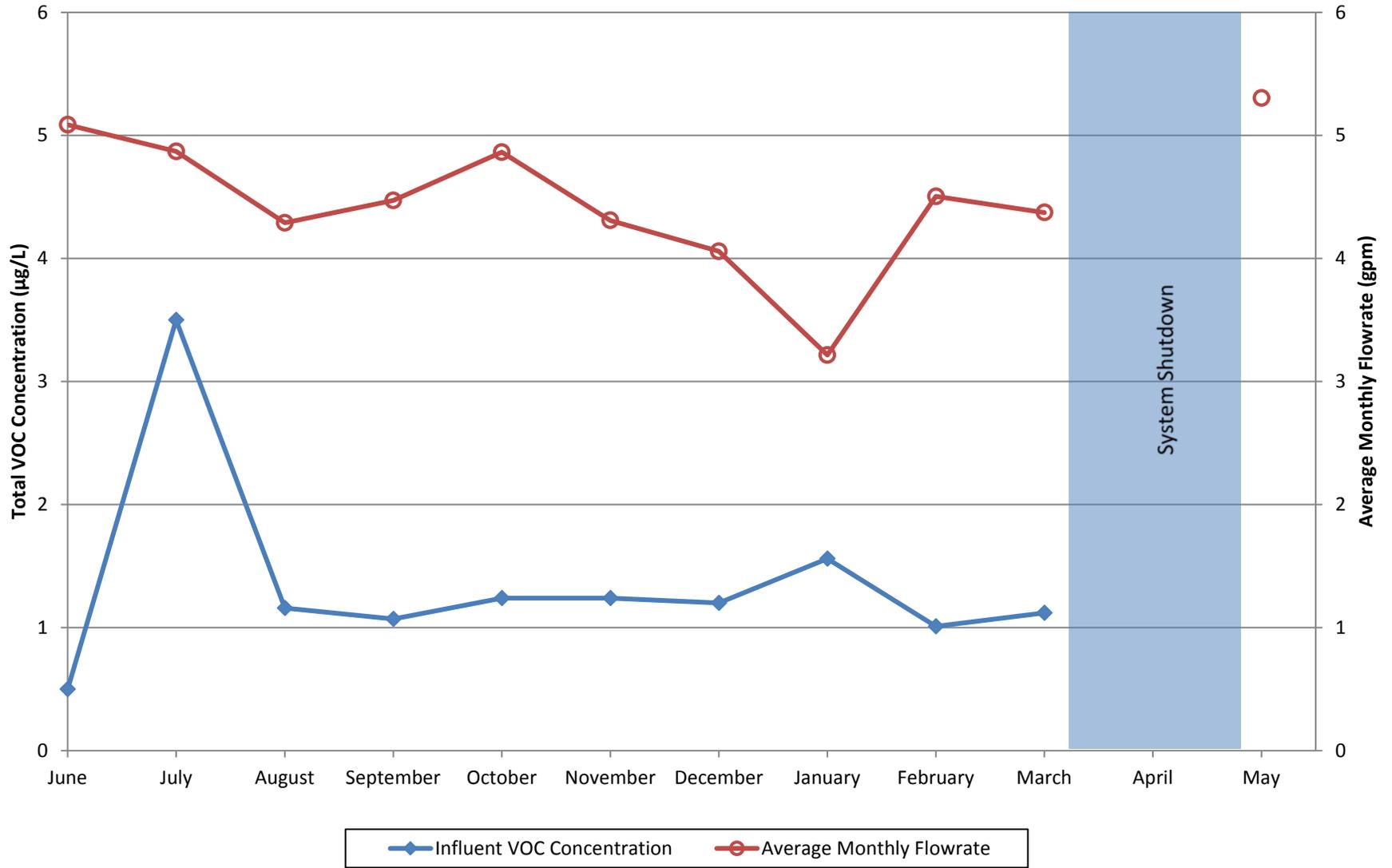
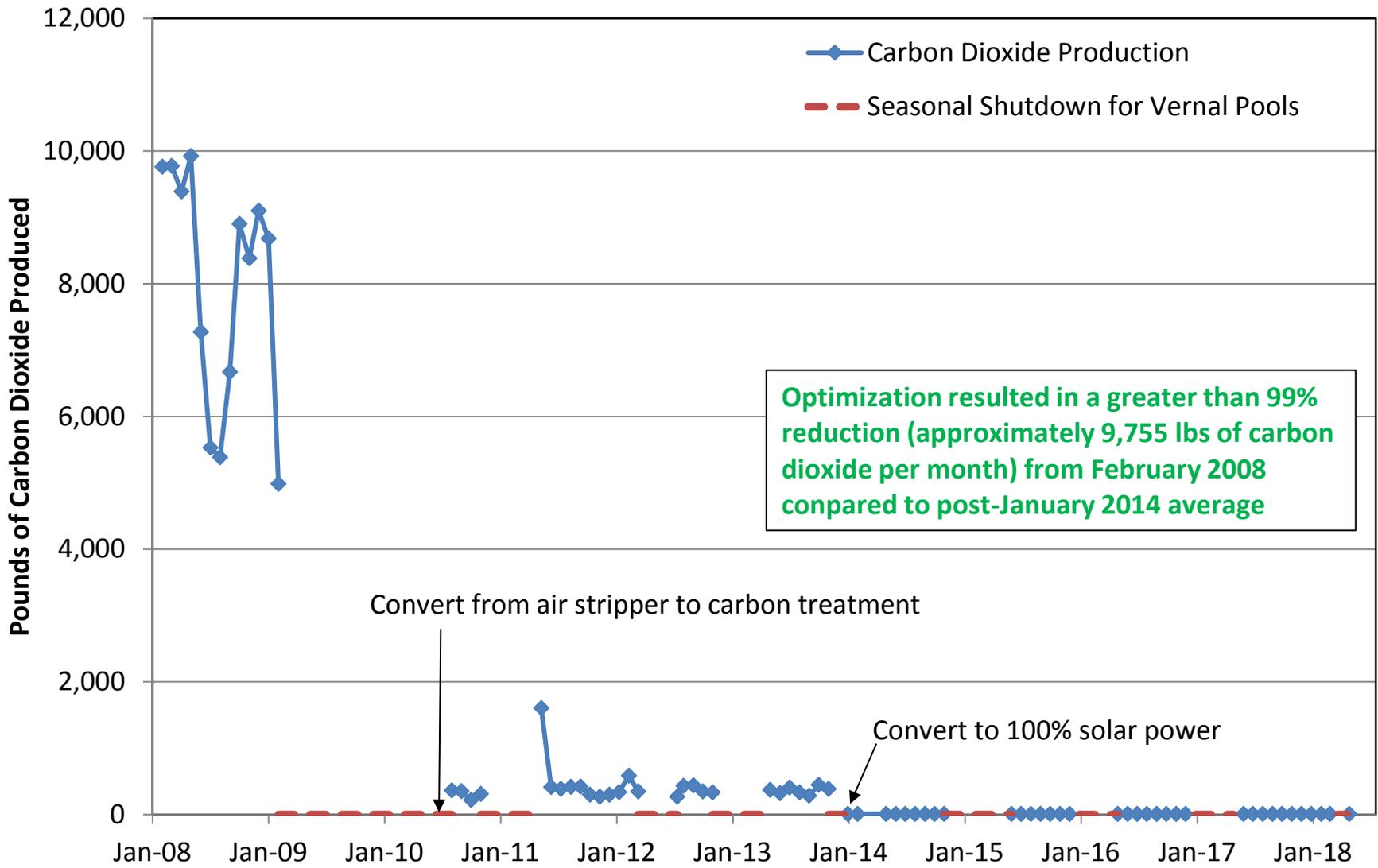


Figure 2
Equivalent Pounds of Carbon Dioxide Produced by the NGWTP/LF007C GWTP



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

Site ST018 Groundwater Treatment Plant Monthly Data Sheet

Report Number: 087

Reporting Period: 2 May 2018 – 1 June 2018

Date Submitted: 14 June 2018

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

System Metrics

Table 1 presents operation data from the May 2018 reporting period.

Table 1 – Operations Summary – May 2018			
Initial Data Collection:	5/2/2018 13:35	Final Data Collection:	6/1/2018 9:20
Operating Time:		Percent Uptime:	Electrical Power Usage:
	ST018GWTP: 716 hours	ST018GWTP: 100%	ST018GWTP: 118 kWh (87 lbs CO₂ generated^a)
Gallons Treated:	204,960 gallons	Gallons Treated Since March 2011:	15.1 million gallons
Volume Discharged to Sanitary Sewer:	204,960 gallons	Final Totalizer Reading:	15,082,709 gallons
Cumulative Volume Discharged to Sanitary Sewer since 1 November 2014:	8,586,535 gallons		
MTBE, BTEX, VOC, TPH Mass Removed:	0.25 lbs^b	MTBE, BTEX, VOC, TPH Mass Removed Since March 2011:	45.5 lbs
MTBE (Only) Removed:	0.06 lbs^b	MTBE (Only) Mass Removed Since March 2011:	11.0 lbs
Rolling 12-Month Cost per Total Pounds of Mass Removed:	\$9,950 ^{bc}		
Monthly Cost per Pound of Mass Removed:	\$16,281 ^{bc}		
^a SiteWise™ estimate that 1 kilowatt hour generated produces 0.74 pounds of GHG. ^b Calculated using May 2018 EPA Method SW8260C and SW8015B analytical results. ^c Costs include operations and maintenance, reporting, analytical laboratory, project management, and utility costs related to operation of the system. kWh = kilowatt hour lbs = pounds			

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

Table 2 – ST018GWTP Average Flow Rates – May 2018		
Location	Average Flow Rate Groundwater (gpm)^a	Hours of Operation
EW2014x18	1.3	716
EW2016x18	1.0	716
EW2019x18	1.4	695
EW2333x18	0.9	715
ST018GWTP	4.8	716

^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.	--		--	

-- = Time not recorded
^a Shutdown and restart times estimated based on field notes
ST018GWTP = Site ST018 Groundwater Treatment Plant

Summary of O&M Activities

Monthly groundwater treatment samples were collected at the ST018GWTP on 2 May 2018. Results are presented in Table 4. The complete May 2018 laboratory data report is available upon request. The influent concentration for MTBE during the May 2018 sampling event was 35 µg/L, which is a decrease from the April 2018 sample result of 56 µg/L. TPH-d, TPH-g, BTEX components, and several other fuels-related VOCs were also detected in the influent sample. MTBE was detected in the system effluent sampling location at a concentration less than the effluent limitations.

All concentrations of TPH are well below the Fairfield-Suisun Sewer District effluent limitation of 50,000 µg/L for TPH-g and TPH-d, or 100,000 µg/L for TPH-mo. Additionally, the Fairfield-Suisun Sewer District does not currently have a local limit for MTBE, but a limit of 6,400 µg/L is advised based on worker health and safety. Travis AFB will continue to monitor influent and effluent contaminant concentrations to maintain compliance with the Fairfield-Suisun Sewer District discharge permit.

On 11 May, EW2333x18 was shut down for less than 1 hour to replace the leaking sample port. On 31 May and 1 June, EW2019x18 was off line for approximately 21 hours because of a pump fault, and it was restarted without issue.

Figure 1 presents plots of the average flow rate and influent total contaminant (MTBE, TPH-g, TPH-d, TPH-mo, BTEX, and VOCs) and MTBE concentrations at the ST018GWTP over the past twelve (12) months. The average flow rate through the ST018GWTP has been cyclical with 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 slightly decreasing trend because of the “pulse-mode” operations that were evaluated between October 2017 and January 2018. The MTBE concentrations and total influent concentrations have generally been fluctuating over the past 12 months with a flat trend and an increasing trend, respectively.

Optimization Activities

No optimization activities occurred at the ST018GWTP in May 2018.

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.

Figure 2 presents the historical GHG production from the ST018GWTP. The ST018GWTP produced 87 pounds of GHG during May 2018 and treated 204,960 gallons of water. The amount of GHG produced is directly attributed to the amount of water treated through the system because the only line-power electrical use is for a transfer pump through the GAC system.

TABLE 4

Summary of Groundwater Analytical Data for May 2018– Site ST018 Groundwater Treatment Plant

Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	2 May 2018 (µg/L)	
				Influent	System Effluent
Fuel Related Constituents					
Methyl tert-Butyl Ether	6,400	0.25	0	35	2.6 J
Benzene	25,000 ^a	0.16	0	5.2	ND
Ethylbenzene	25,000 ^a	0.16	0	4.9	ND
Toluene	25,000 ^a	0.17	0	0.21 J	ND
Total Xylenes	25,000 ^a	0.19 – 0.34	0	2.0	ND
Total Petroleum Hydrocarbons – Gasoline	50,000 ^b	10	0	84	ND
Total Petroleum Hydrocarbons – Diesel	50,000 ^b	16	0	ND	ND
Total Petroleum Hydrocarbons – Motor Oil	100,000	160 – 170	0	ND	ND
Other					
Acetone	NA	1.0	0	ND	ND
n-Butylbenzene	NA	0.32	0	0.79 J	ND
1,2-Dichloroethane	20	0.15	0	0.70 J	ND
Isopropylbenzene	NA	0.19	0	0.35 J	ND
Naphthalene	NA	0.22	0	3.1	ND
n-Propylbenzene	NA	0.16	0	1.1	ND
1,2,4-Trimethylbenzene	NA	0.14	0	5.3	ND
1,3,5-Trimethylbenzene	NA	0.14	0	1.6	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

NA = not applicable

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

ND = not detected above method detection limit

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

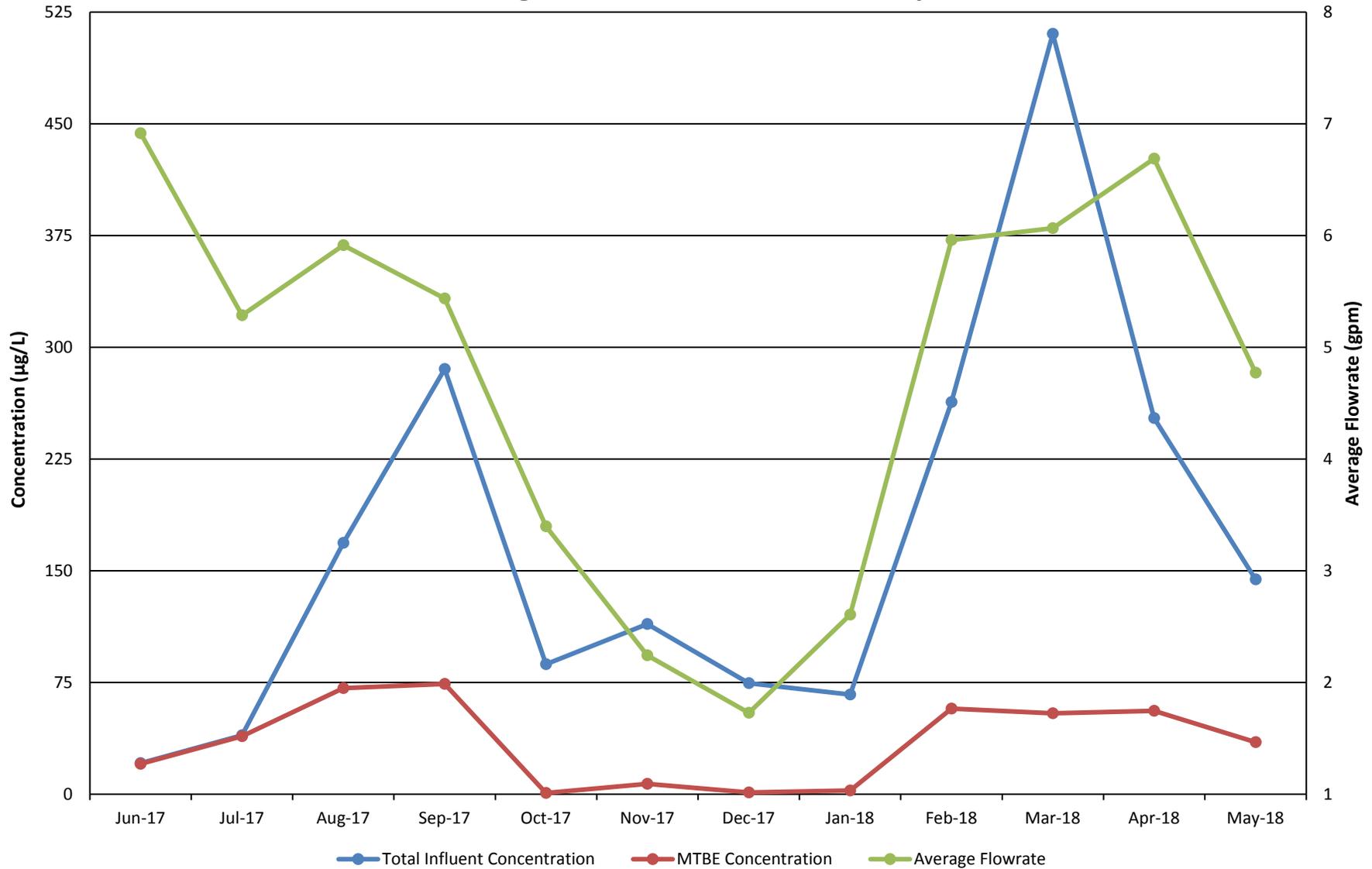
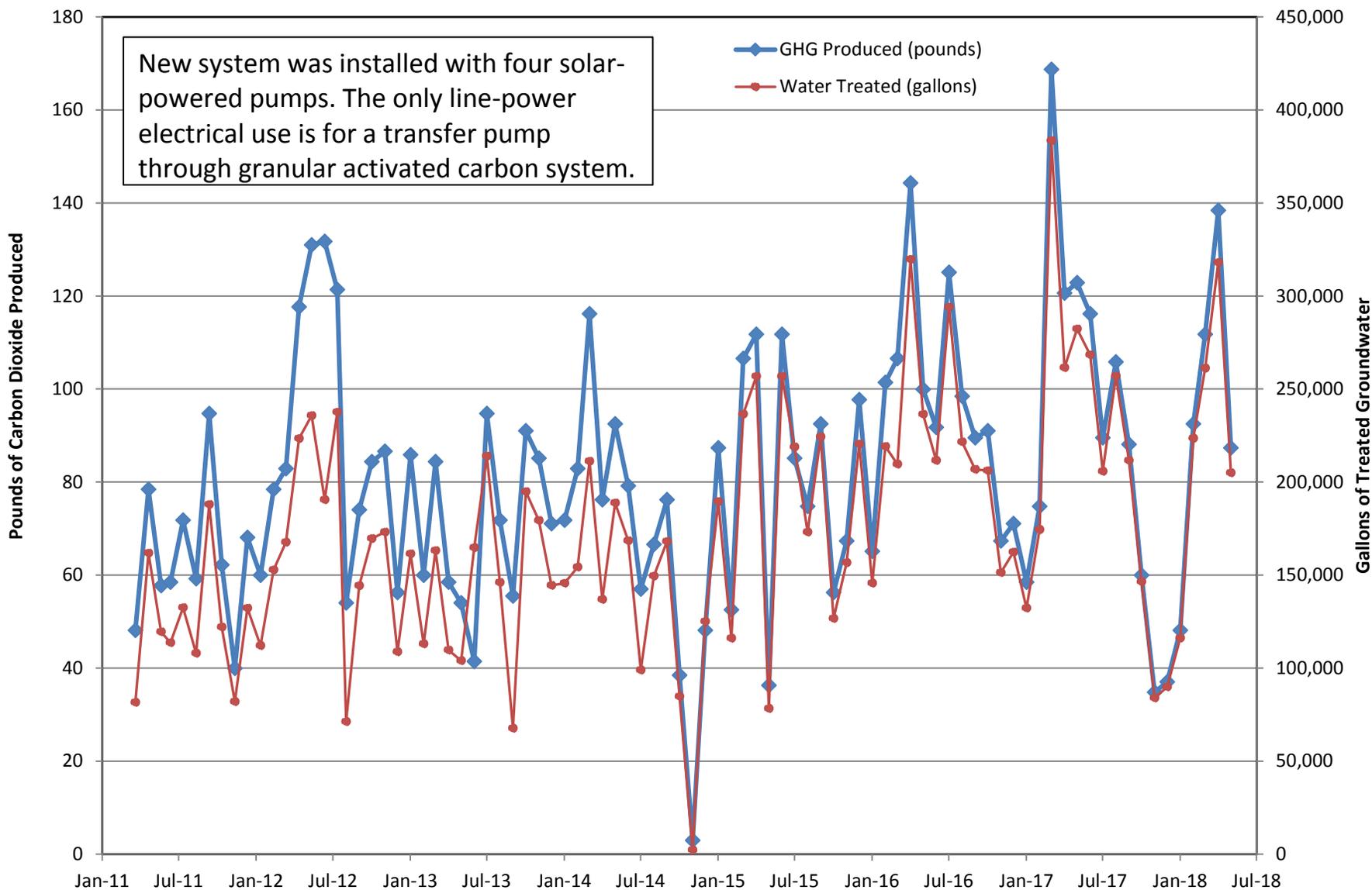


Figure 2

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



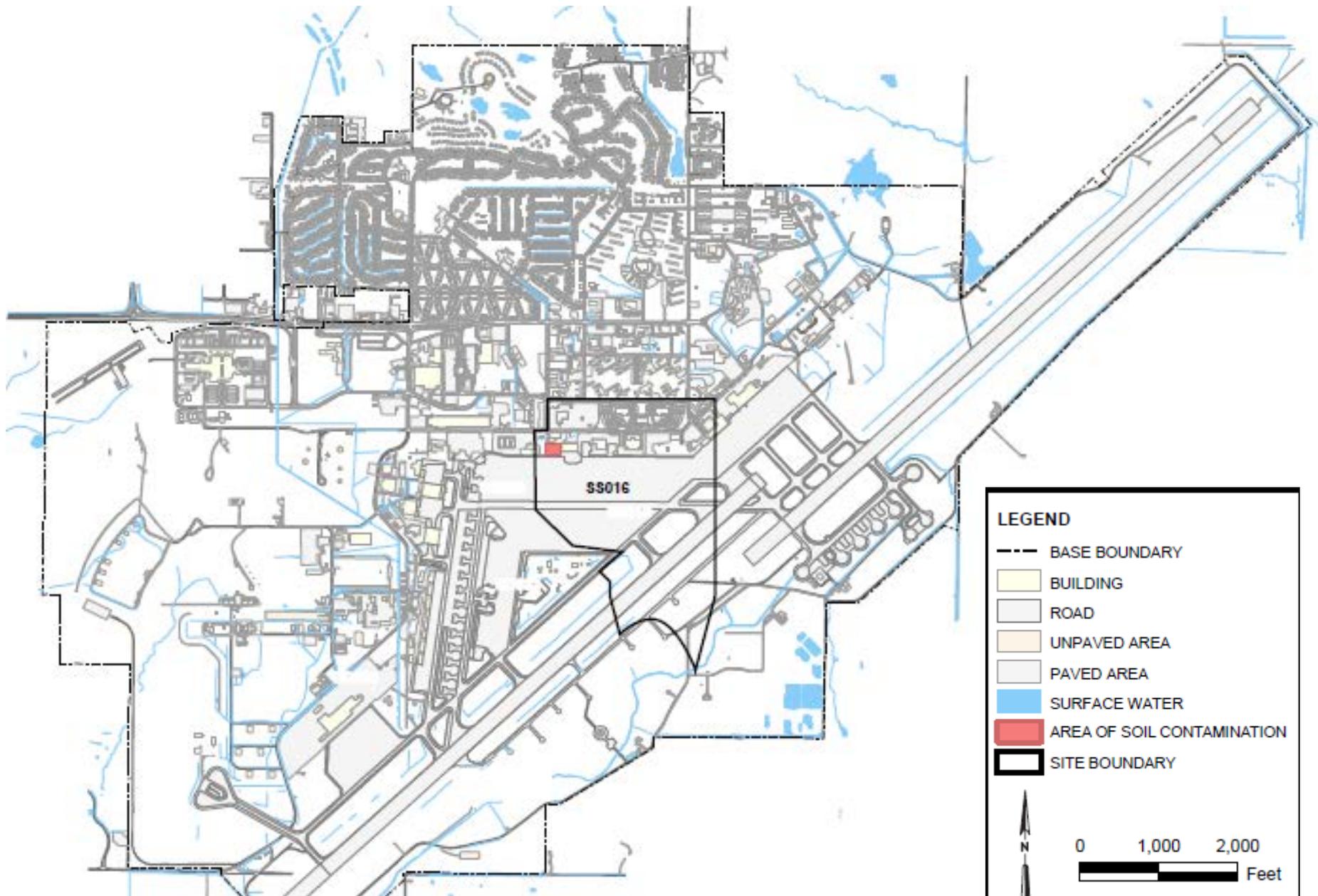
Remedial Design / Remedial Action Work Plan for Soil Site SS016

RPM Meeting

June 20, 2018

Agenda

- Site Background
- Remedial Action Objectives
- Nature and Extent of Contamination
- Project Tasks
- Data Quality Objectives
- Reporting



LEGEND

- BASE BOUNDARY
- BUILDING
- ROAD
- UNPAVED AREA
- PAVED AREA
- SURFACE WATER
- AREA OF SOIL CONTAMINATION
- SITE BOUNDARY

N

0 1,000 2,000 Feet

Site Background

- Site SS016 is comprised of the Oil Spill Area (OSA); Facilities 11, 13/14, 18, 20, and 42/1941; and portions of the Storm Sewer System
- Within an active area of Travis AFB with ongoing maintenance activities and an aircraft parking apron
- Cleaning and degreasing operations historically occurred at Facility 18 (OSA), which included a wash rack, an oil-water separator (OWS), and a subsurface open-top cement tank.
- Most of the area is now paved, some areas of exposed soil still remain.
- Similar historical practices likely resulted in the contamination of surface soil in an exposed soil area and adjacent paved area located to the west of Facility 18 (south of Facility 563).
- Based on results of the Remedial Investigation (1995), LUCs for soil were implemented as part of the NEWIOU SSSW ROD (2006).

Remedial Action Objectives

1. Prevent potential future residents or current Base workers from ingestion, inhalation or direct dermal contact with PAHs above acceptable exposure levels (NEWIOU Soil, Sediment, and Surface Water ROD Amendment, 2018)
2. Restore contaminated site to achieve residential soil cleanup levels which will allow for unlimited use of and unrestricted exposure to soil while minimizing interference with Base military mission (NEWIOU Soil, Sediment, and Surface Water ROD Amendment, 2018)

Nature and Extent of Soil Contamination

- 2016 Data Gap Investigation – analyze soil for PAHs and PCBs
 - Re-sample locations of previous exceedances and non-detections (analytical limits used in the EIOU RI exceeded current residential screening levels)
 - New sample locations – reevaluate extent of soil contamination and potential spread of contaminants during grading activities south of Facility 563
 - Data used to update Human Health Risk Assessment (HHRA)
- PAHs in surface soil exceed 2017 EPA residential screening levels at four (4) sample locations
 - **Site COCs:** Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, Napthalene, total Benzo(a)pyrene equivalents
- Total petroleum hydrocarbon (TPH) contamination identified at Site SS016
 - No Further Action was determined to be necessary for soil TPH contamination based on risk calculations presented in the updated HHRA (CH2M HILL, 2018)

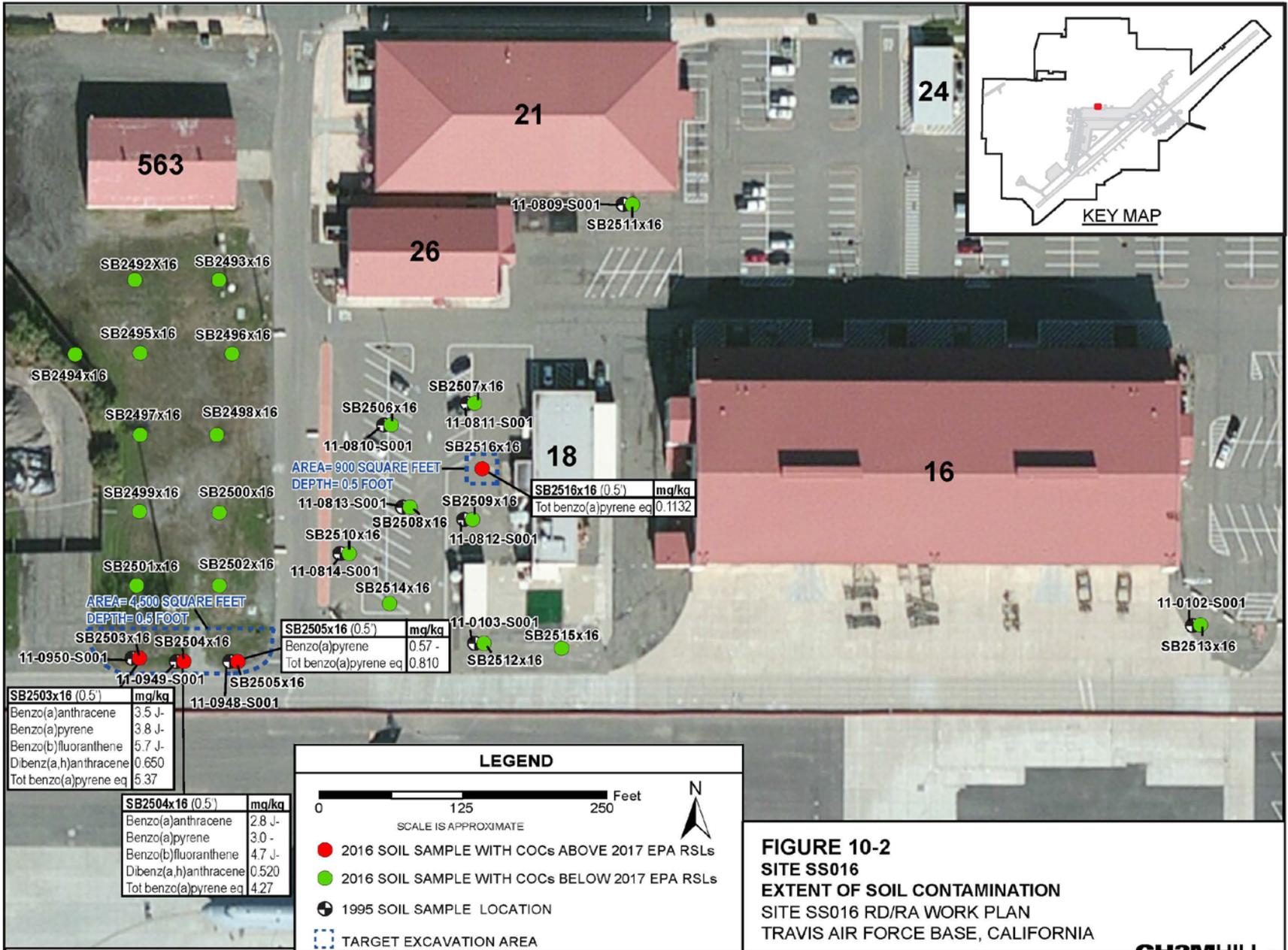
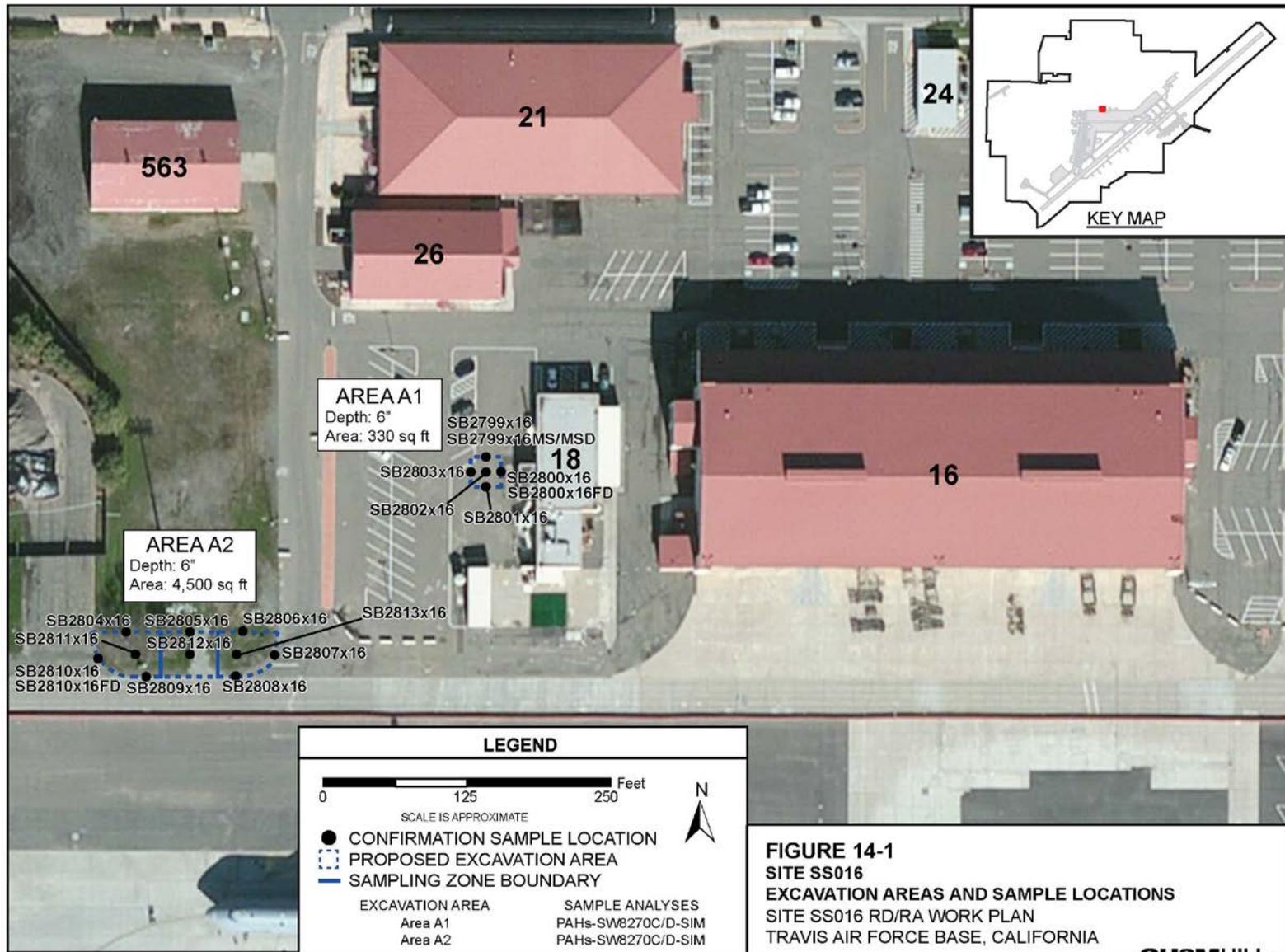


FIGURE 10-2
SITE SS016
EXTENT OF SOIL CONTAMINATION
 SITE SS016 RD/RA WORK PLAN
 TRAVIS AIR FORCE BASE, CALIFORNIA

Project Tasks

- **Start Date:** Pending regulatory approval of ROD Amendment (2018)
- **Excavation:** will require hand digging in grassy area south of Facility 563 in order to protect numerous buried utilities. Paved areas will require saw cutting and removal of asphalt/pavement
- **Confirmation Sampling:** Soil samples will be analyzed for site COCs to confirm complete removal of contaminated soil
- **Waste Management:** Excess soil, asphalt, and decontamination fluids will be stockpiled on-site in roll-off bins/drums. Waste characterization samples will be collected to determine proper disposal method
- **Waste Disposal:** Transportation and off-site disposal will be documented using signed manifests and disposal receipts
- **Cleanup:** Site restoration will be achieved using certified clean backfill

Excavation Areas & Confirmation Sample Locations



Data Quality Objectives

- Cleanup Levels based on EPA RSLs (November, 2017)

TABLE 15-1

Confirmation Sample Analyses – Comparison of Laboratory MDLs, LODs, and LOQs for TestAmerica, Denver

Site SS016 Remedial Design/Remedial Action Work Plan, Travis Air Force Base, California

Method	Analyte	CAS No.	Units	MDL	LOD	LOQ	Cleanup Level	Cleanup Level Source*	MDL Exceeds Cleanup Level?	LOD Exceeds Cleanup Level?	LOQ Exceeds Cleanup Level?
8270C/D-SIM	Benzo(a)pyrene	50-32-8	µg/kg	0.740	2.50	5.00	110	a	No	No	No
	Benzo(b)fluoranthene	205-99-2	µg/kg	1.20	2.50	5.00	1,100	b	No	No	No
	Benzo(k)fluoranthene	207-08-9	µg/kg	1.00	2.50	5.00	11,000	b	No	No	No
	Benzo(a)anthracene	56-55-3	µg/kg	0.900	2.50	5.00	1,100	b	No	No	No
	Chrysene	218-01-9	µg/kg	1.00	2.50	5.00	110,000	a	No	No	No
	Dibenz(a,h)anthracene	53-70-3	µg/kg	1.30	2.50	5.00	110	a	No	No	No
	Indeno(1,2,3-cd)pyrene	193-39-5	µg/kg	1.10	2.50	5.00	1,100	a	No	No	No
	Naphthalene	91-20-3	µg/kg	0.326	0.667	5.00	3,800	a	No	No	No
	Benzo(a)pyrene (equivalent)	NA	µg/kg	NA	NA	NA	110	b	NA	NA	NA

* Sources:

a. Soil cleanup level based on a residential exposure scenario cancer risk = 1×10^{-6} . Source: EPA RSL Table (Residential Soil), November 2017 (EPA, 2017).

b. As a result of updating risk assessment calculations, benzo(a)pyrene equivalent concentrations were calculated for each of the soil samples. These equivalent concentrations were then compared to the benzo(a)pyrene RSL (residential) of 0.11 mg/kg, instead of the individual PAH RSLs. Benzo(a)pyrene equivalent concentrations were not calculated as part of the NEWIOU SSSW ROD (Travis AFB, 2006). Source: *Data Gap Investigation Results Technical Memorandum for Soil Site SS016* (CH2M HILL, 2018).

Notes:

µg/kg = microgram(s) per kilogram

CAS = Chemical Abstracts Service

LOD = limit of detection

MDL = method detection limit

mg/kg = milligram(s) per kilogram

NA = not applicable

Reporting

- **Reporting:** Following project completion, a Removal Action Completion Report (RACR) will be prepared and will provide the following:
 - Methods used to carry out the excavation
 - Soil sampling results and analysis
 - Final extent of excavation
 - Impacts of environmental concern (if any occurred)
 - Documentation of the achievement of the Remedial Action Objectives
 - Support for the removal of LUCs at Site SS016

Questions?

LF007C Chromatogram Review Conclusions

June 20, 2018



JACOBS[®]

LF007C Background

- Solar-powered GET with GAC for CVOC plume
- TPH is not a COC, but was recently detected
 - Petroleum related VOCs/SVOCs not found
- We completed a chromatogram review to better understand the unexpected TPH detections
 - VOC/SVOC data presented in previous RPM presentation did not indicate petroleum release

Water Board's Petroleum Metabolite Framework

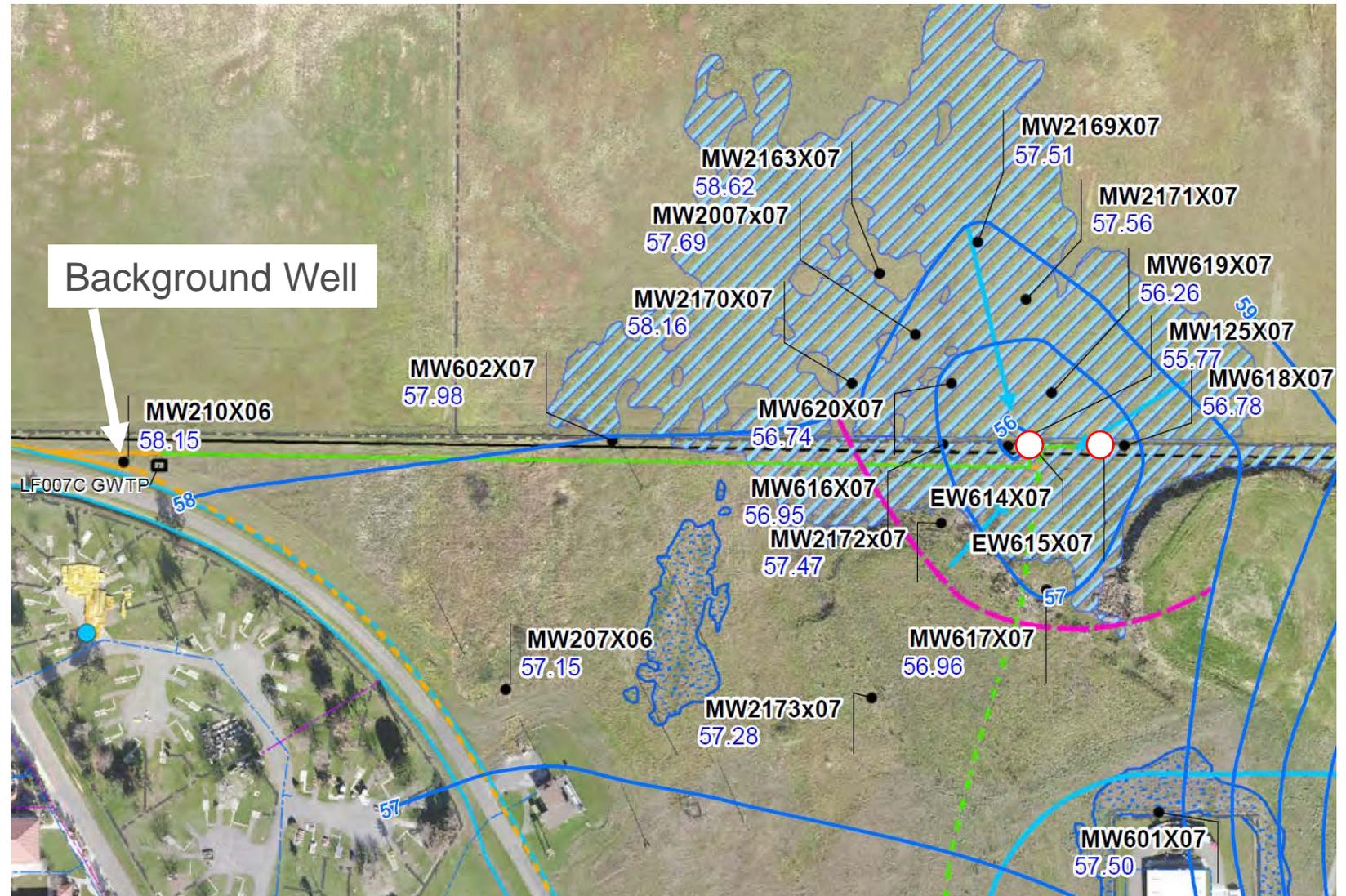
- Published June 27, 2016
- Risk associated petroleum-related polar compounds is emerging, which is why silica gel cleanup (SGC) to remove polar compounds at petroleum sites is no longer allowed
- However, restrictions on using SGC only apply if evaluating a “petroleum” release (versus evaluating if “TPH” is from natural biogenic organic compounds [BOCs])

Petroleum Metabolite Framework – Key Points

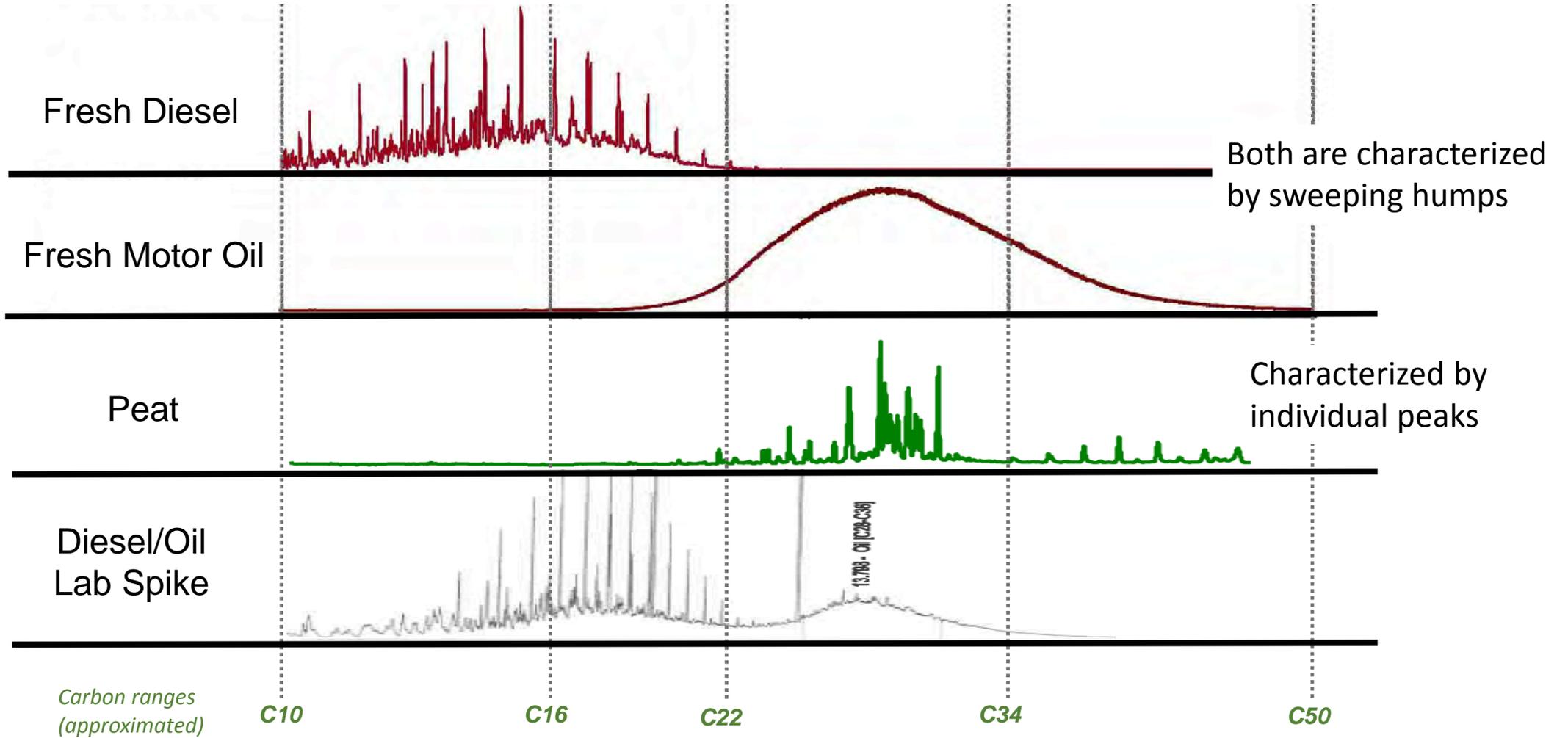
- The TPH analytical method will extract similar, but unrelated chemicals, including BOCs
 - SGC can be useful in assessing BOCs
- BOCs have chemical structures similar to petroleum compounds
 - BOCs may not be fully removed during SGC
- At heavily vegetated sites with organic rich soils, TPH may be overestimated due to BOCs
- Guidance recommends sampling with and without SGC to evaluate BOCs

Evaluation of LF007C Background Conditions

- Natural organic compounds are expected in LF007C area
 - Vernal pools and livestock
- Heavy rain in 2016/2017 likely drove natural organics through the soil column



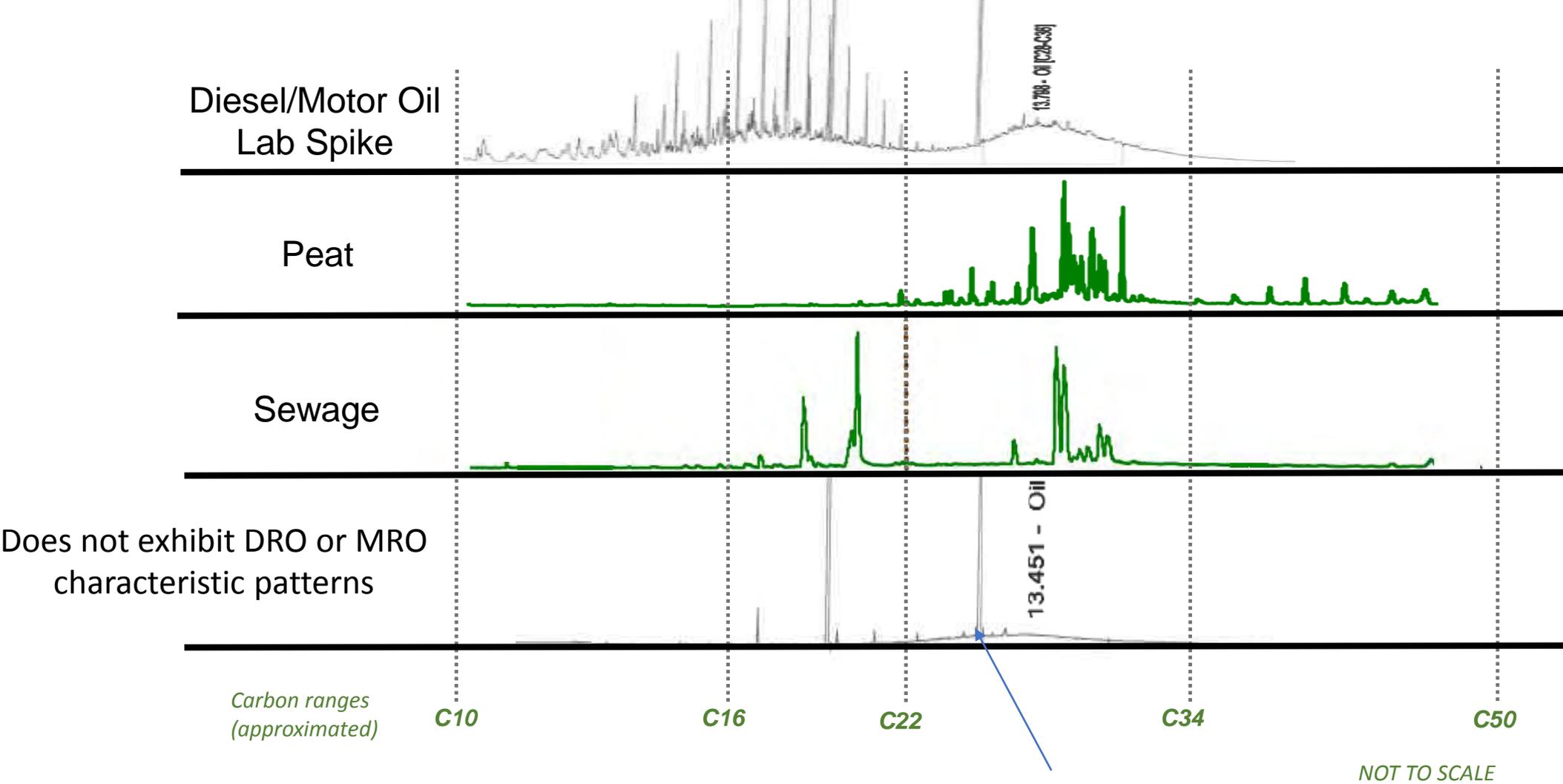
Chromatogram Review of Lab Spike



NOT TO SCALE

Chromatogram examples from:
Francine Kelly-Hooper, PhD

Chromatogram Review of Background Well



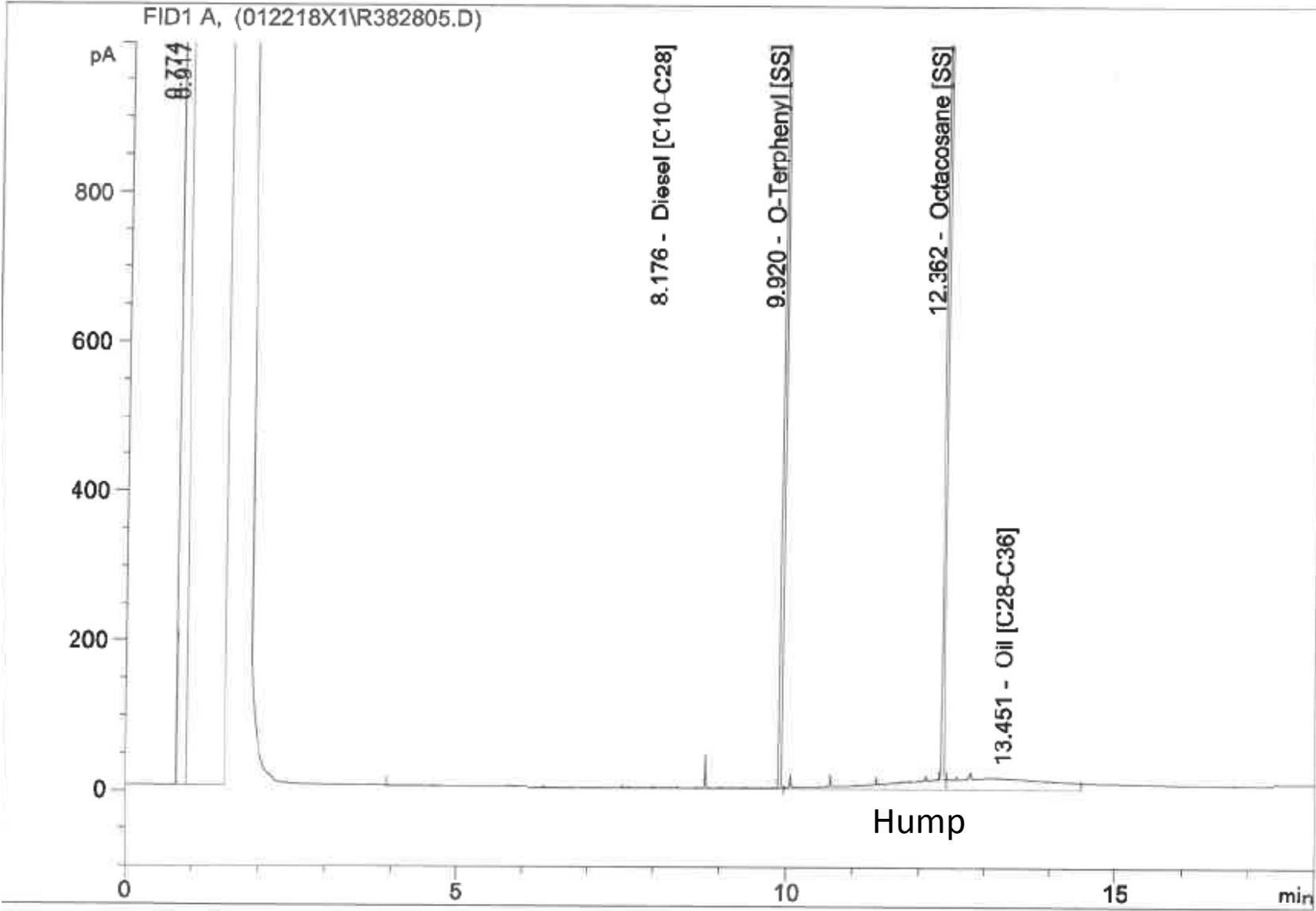
Does not exhibit DRO or MRO characteristic patterns

Hump does not align with DRO/MRO

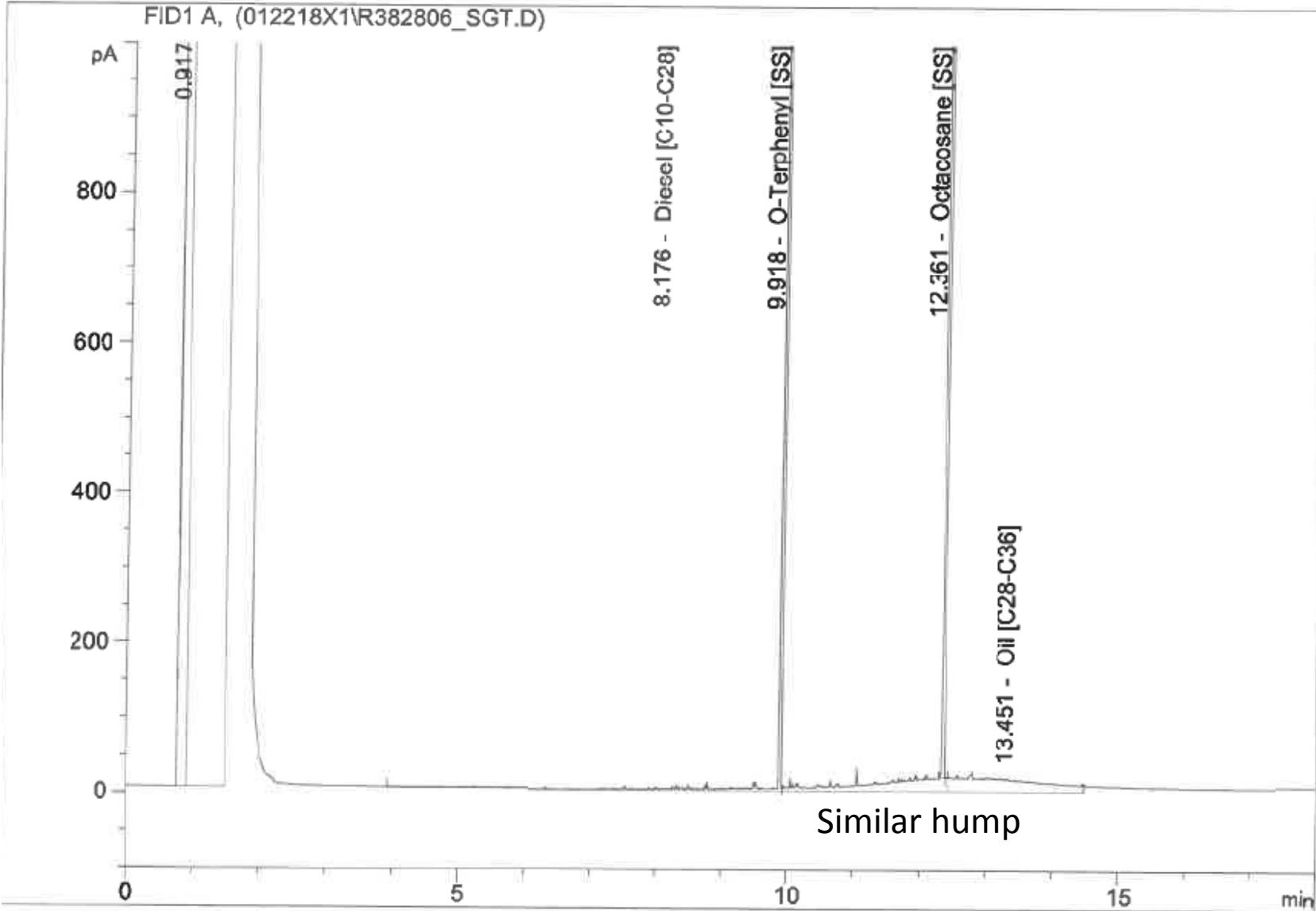
NOT TO SCALE

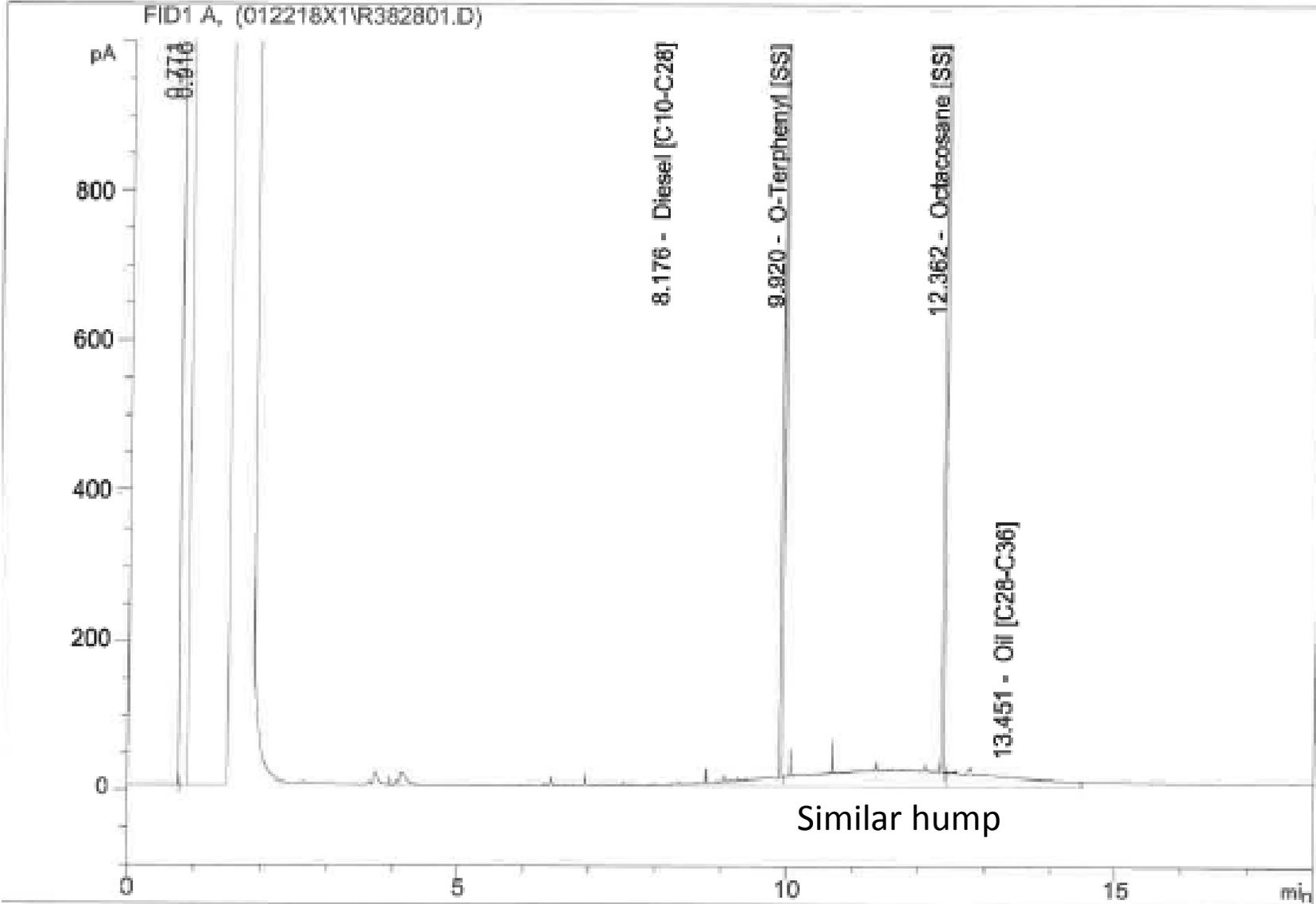
Chromatogram examples from:
Francine Kelly-Hooper, PhD

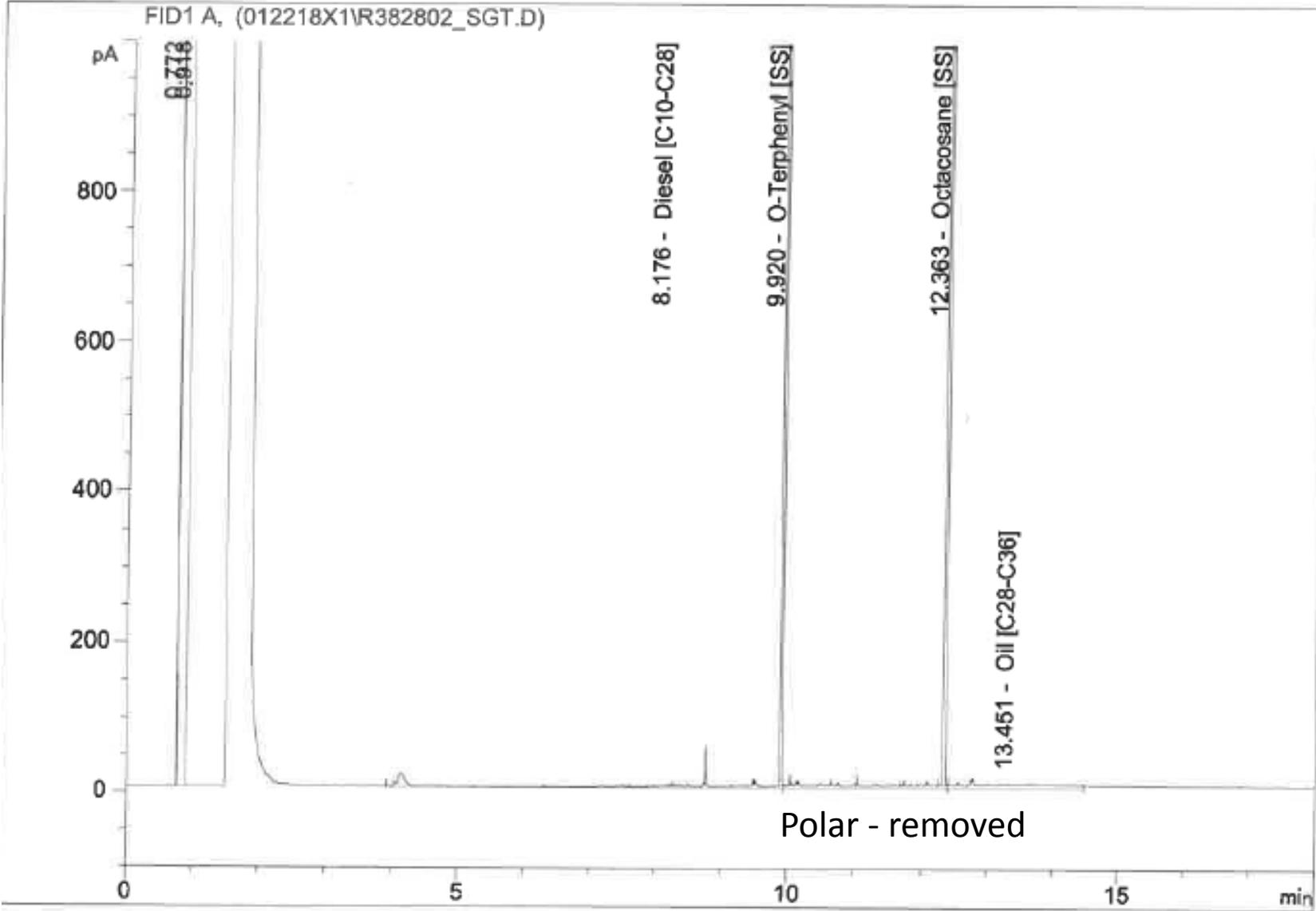
MW210x07 (background location)



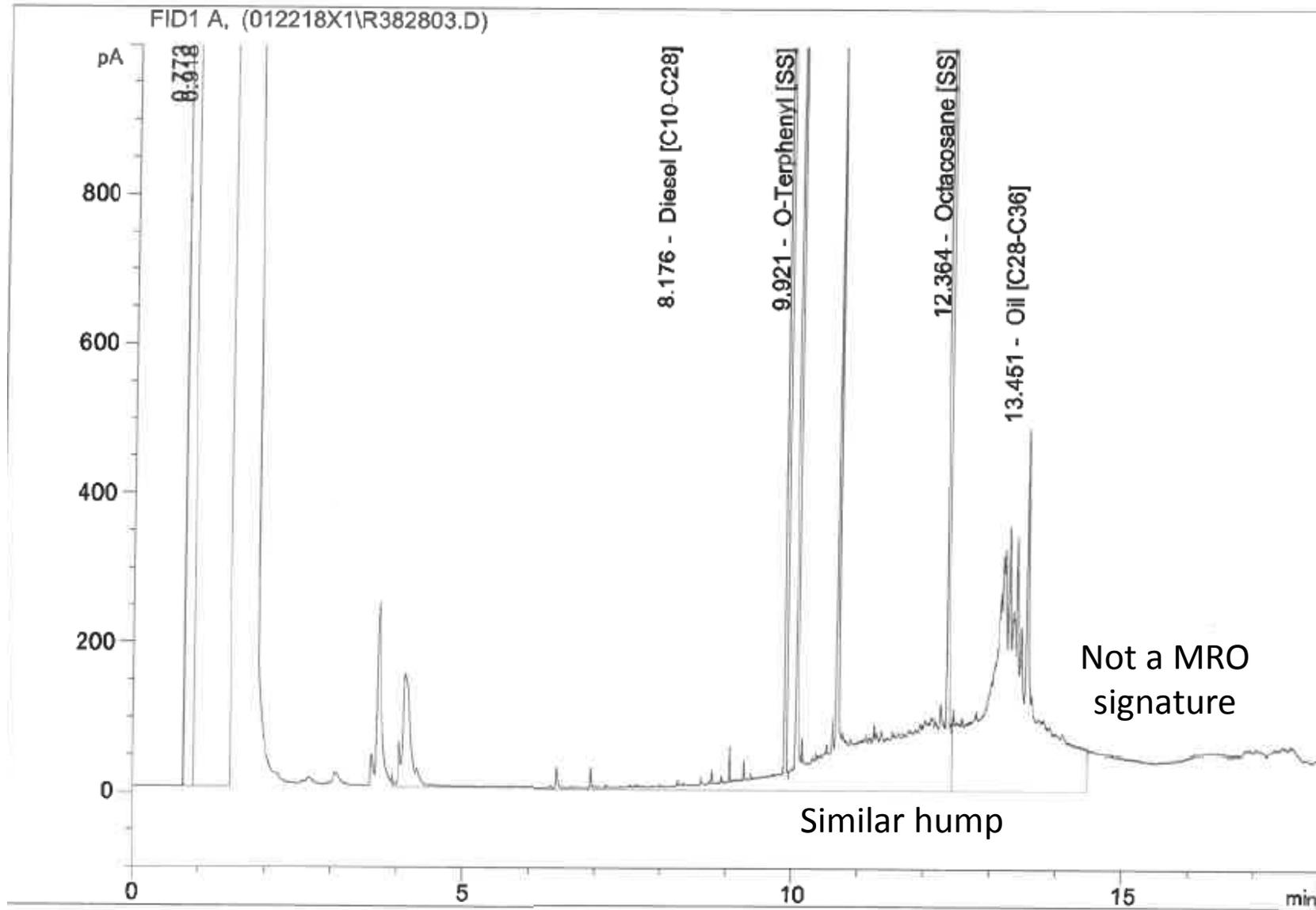
MW210x07 w/ SGC (background location)



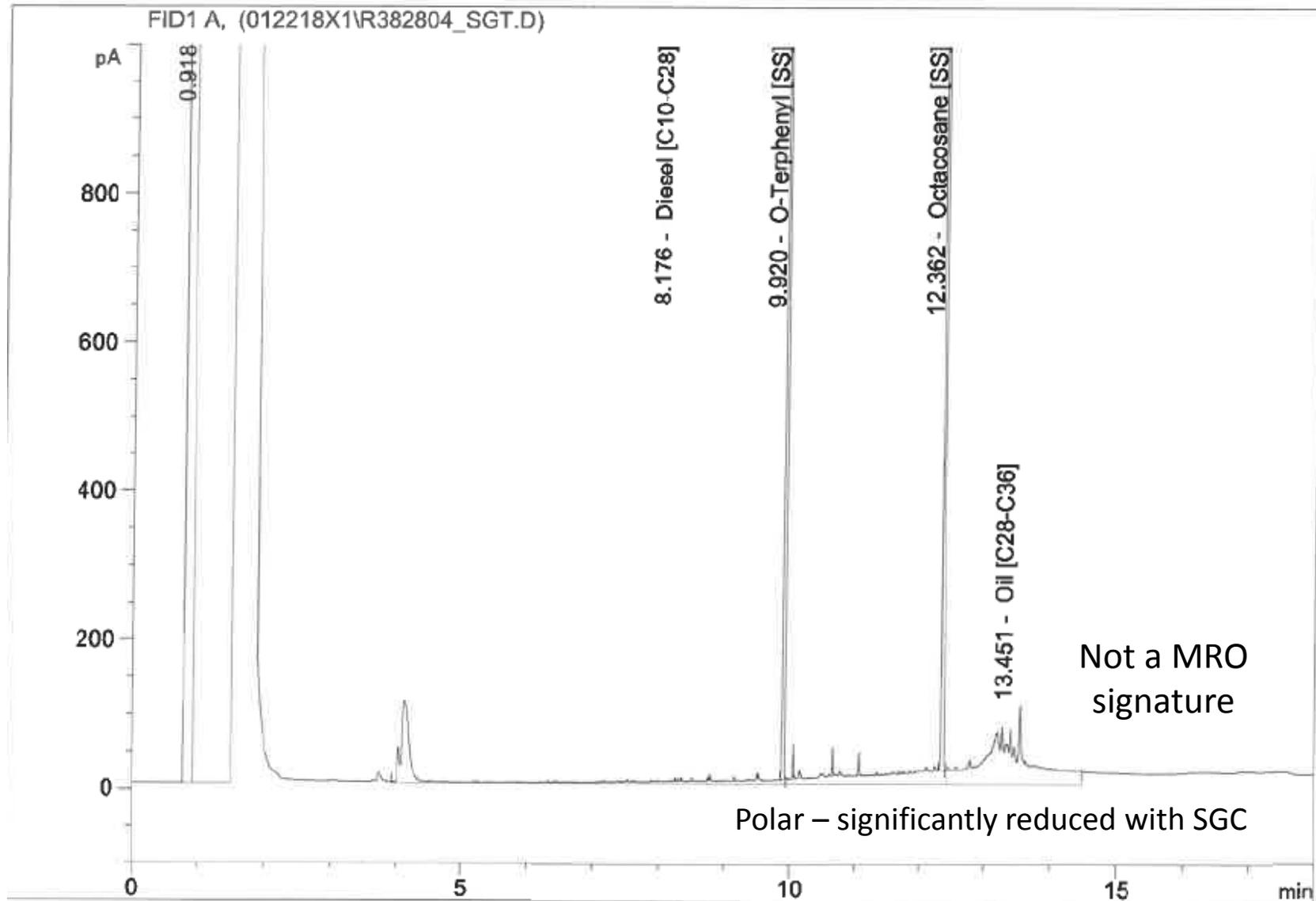




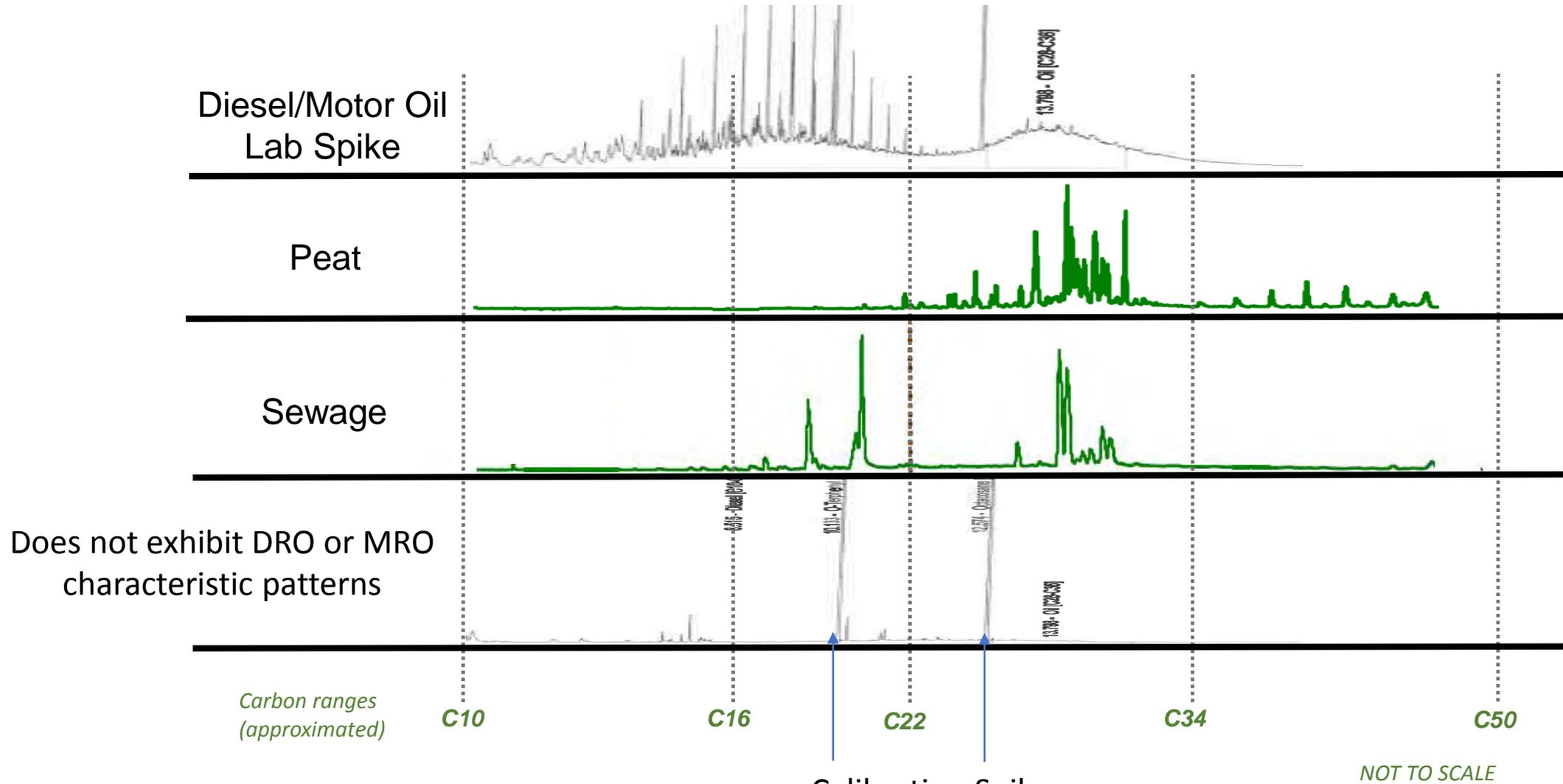
EW615x07



EW615x07 w/ SGC

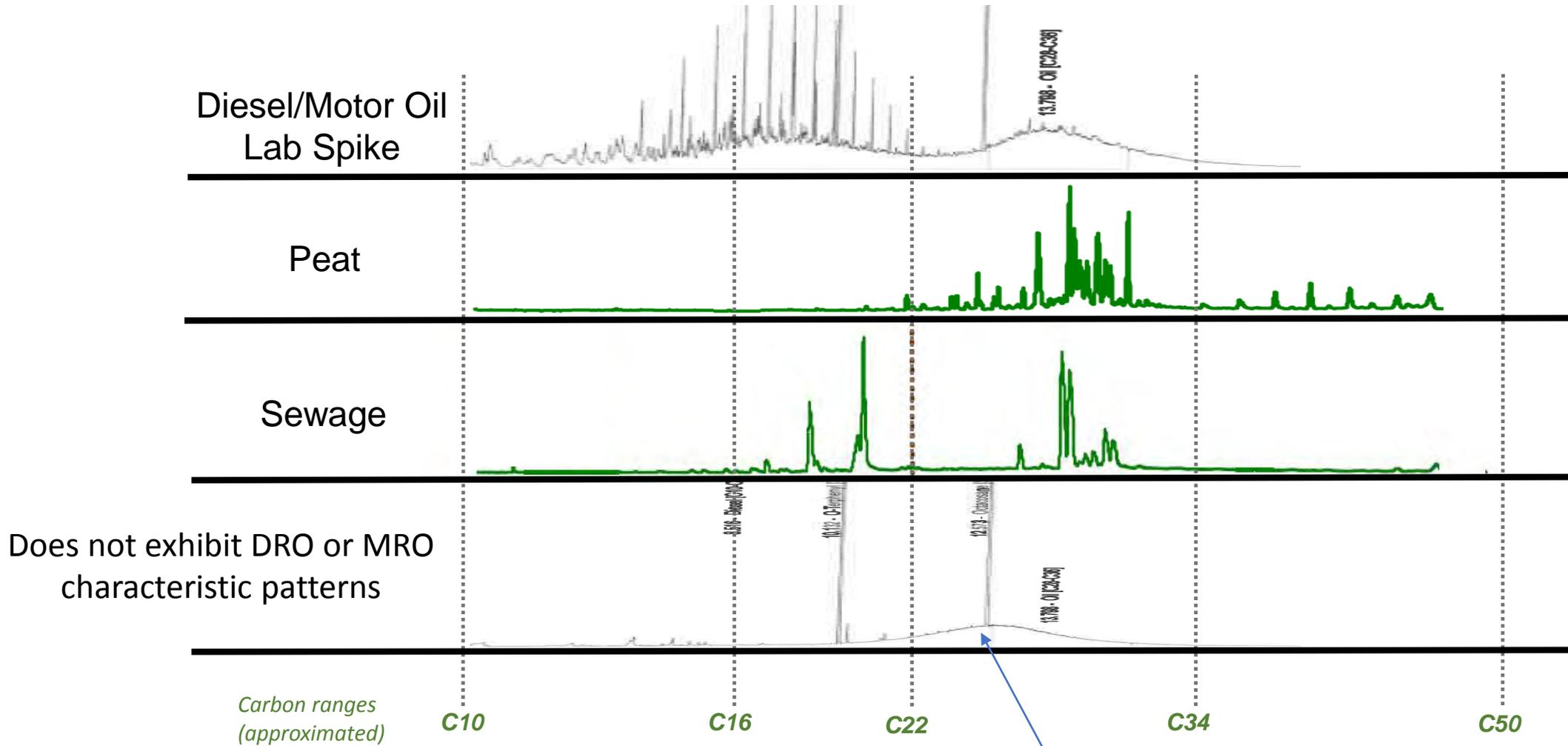


Chromatogram Review of August Effluent



Chromatogram examples from:
Francine Kelly-Hooper, PhD

Chromatogram Review of August Effluent (Resample)

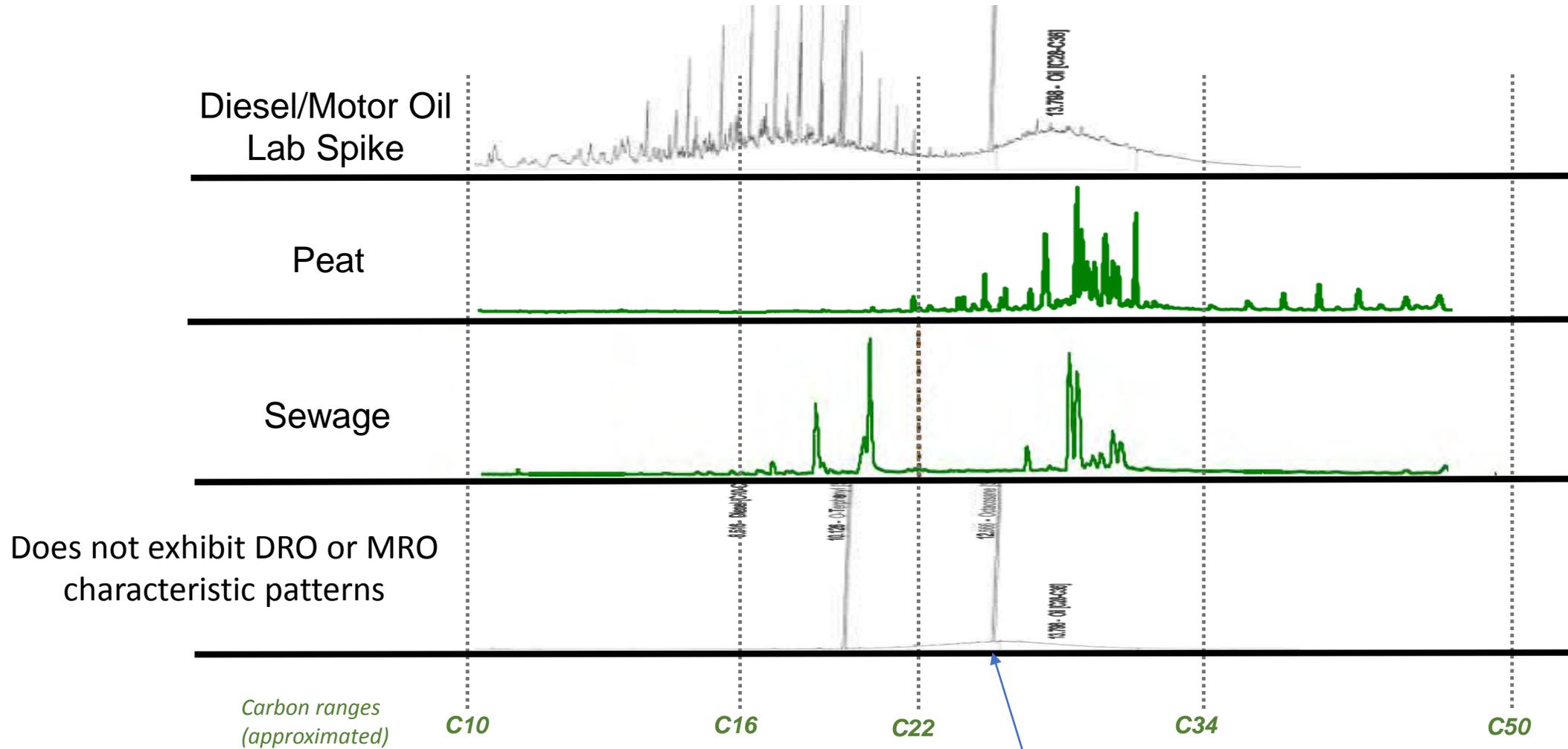


Does not exhibit DRO or MRO characteristic patterns

Hump does not align with DRO/MRO

Chromatogram examples from:
Francine Kelly-Hooper, PhD

Chromatogram Review of August Effluent (Resample w/ SGC)

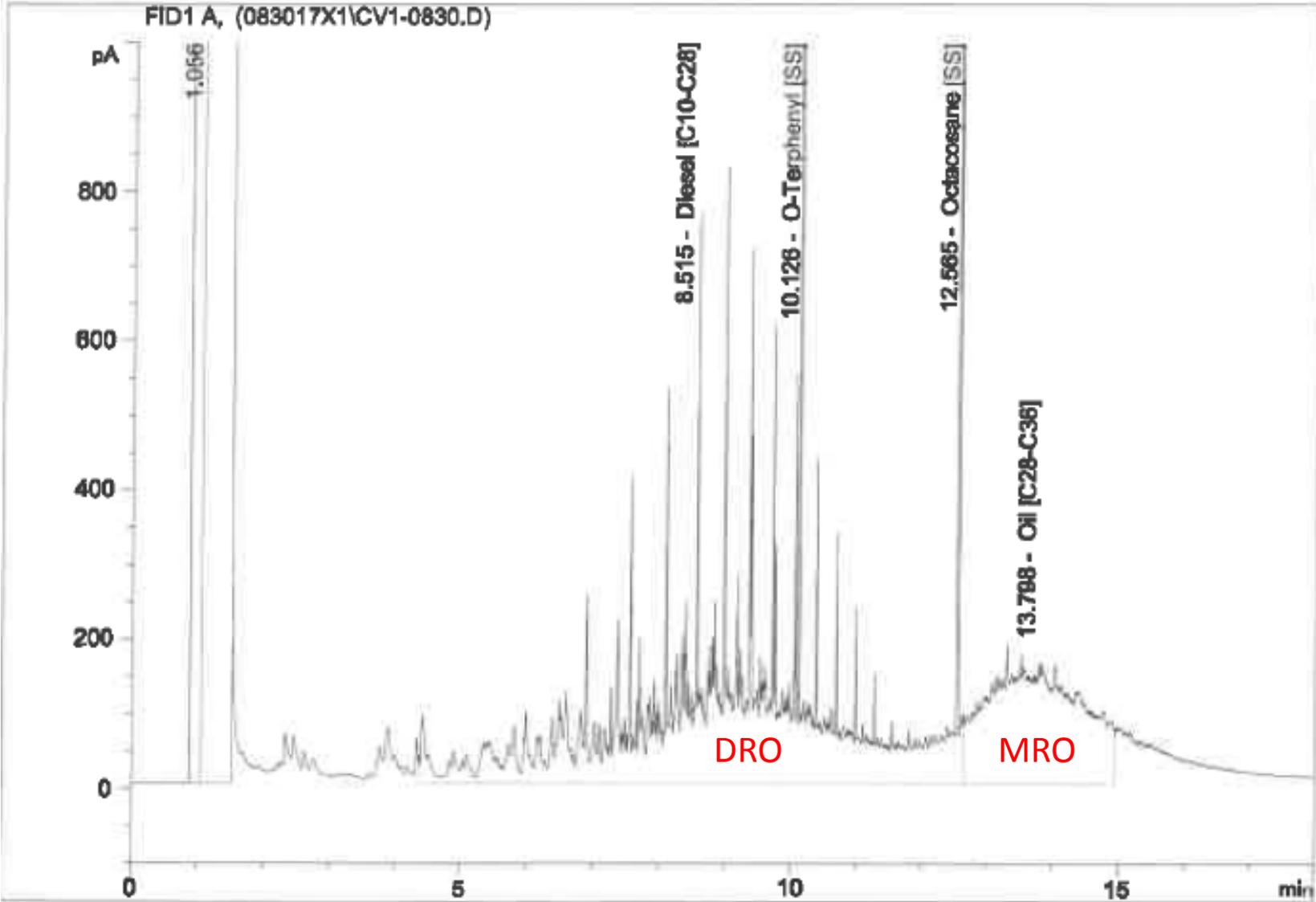


Hump decreases with SGC (biogenic compounds)

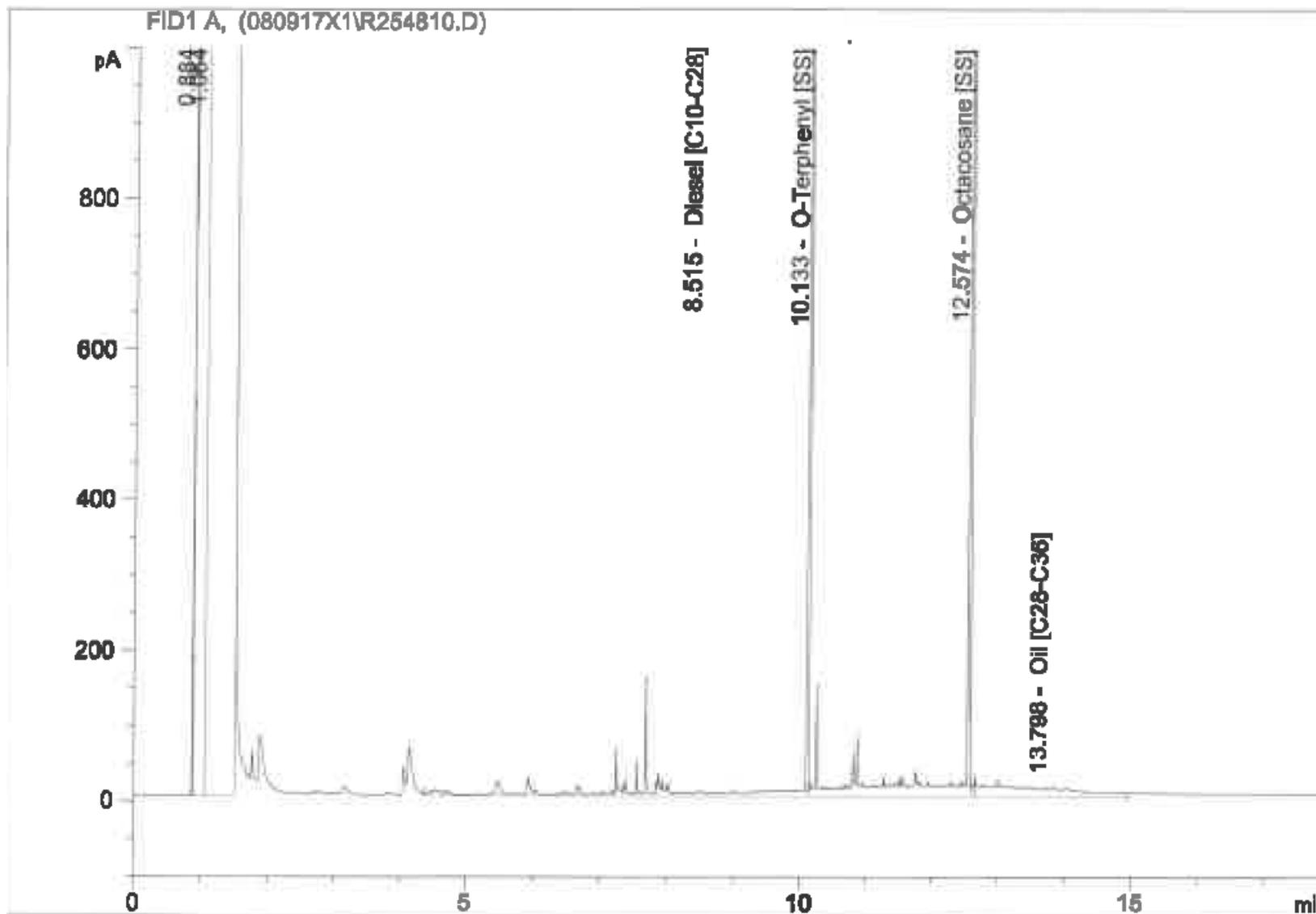
NOT TO SCALE

Chromatogram examples from:
Francine Kelly-Hooper, PhD

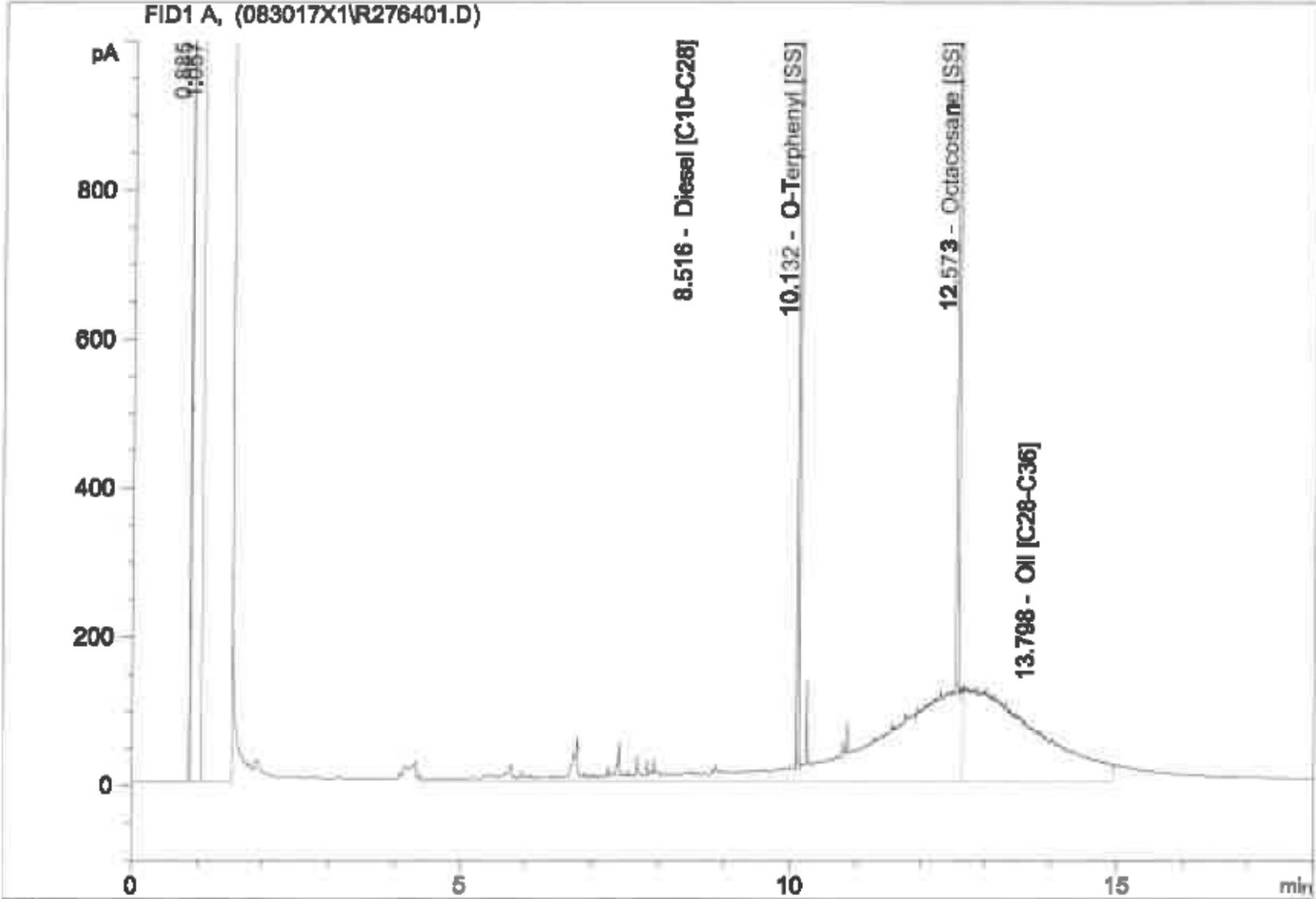
Diesel and Motor Oil Spike



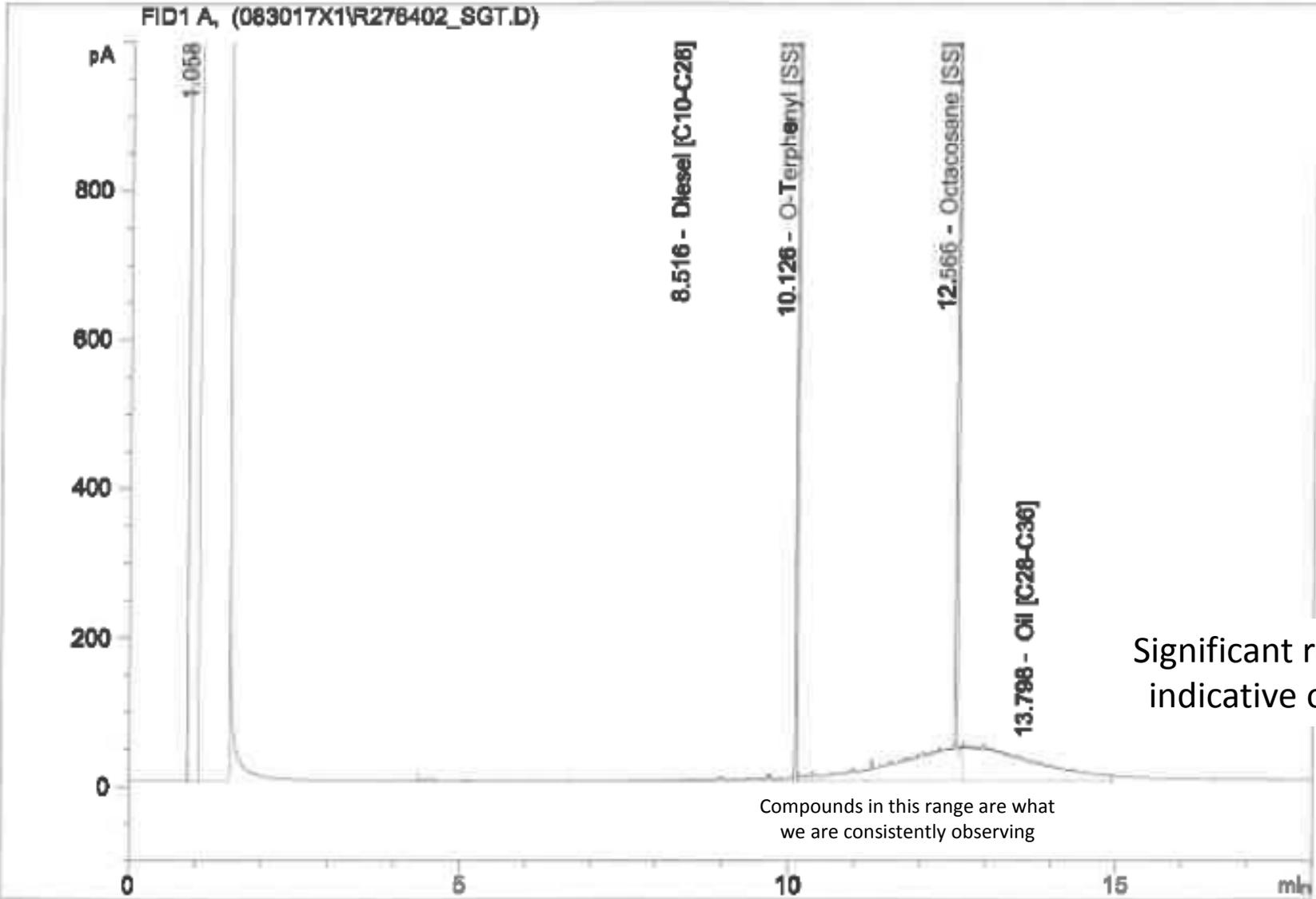
August Effluent



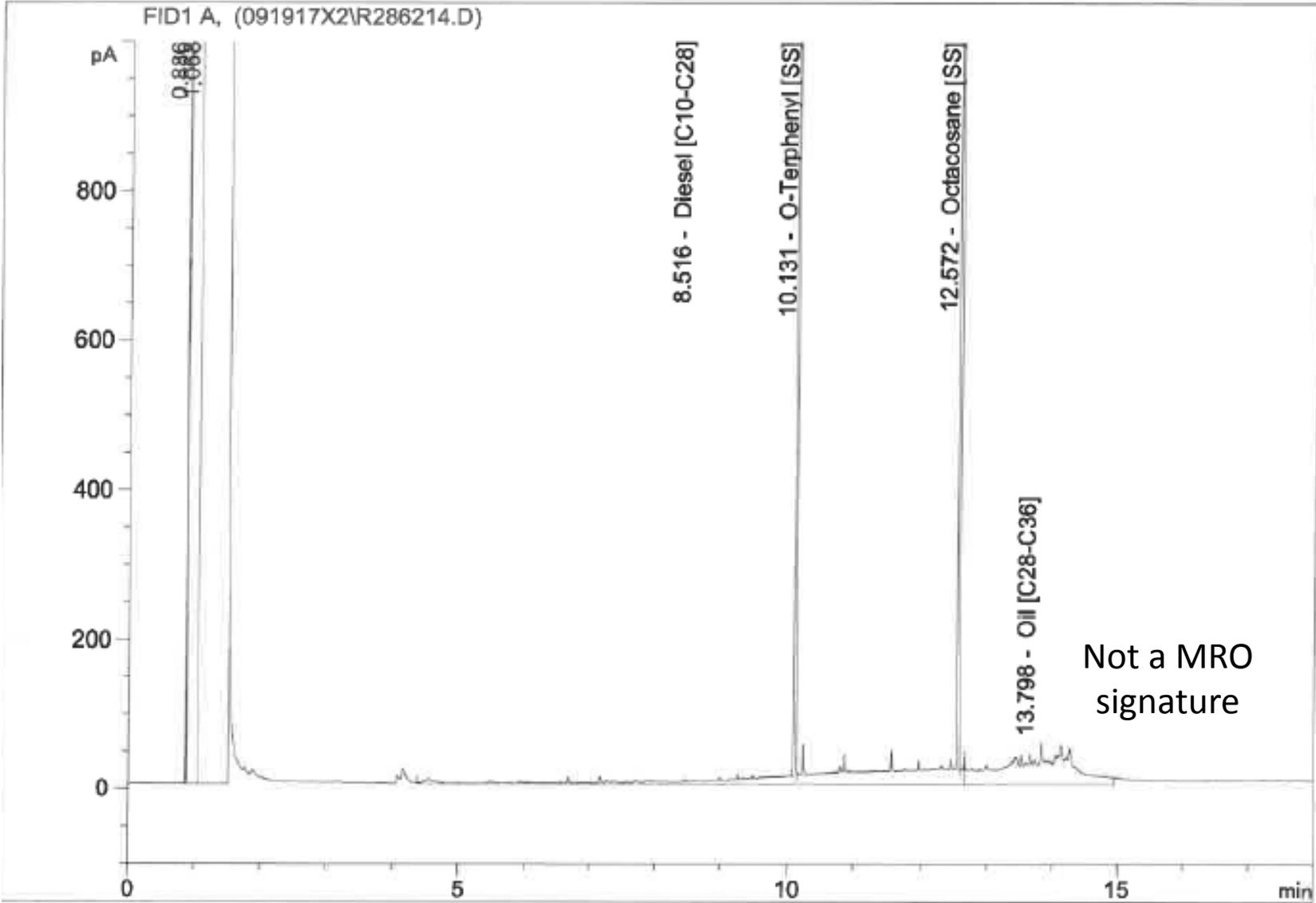
August Effluent Resample



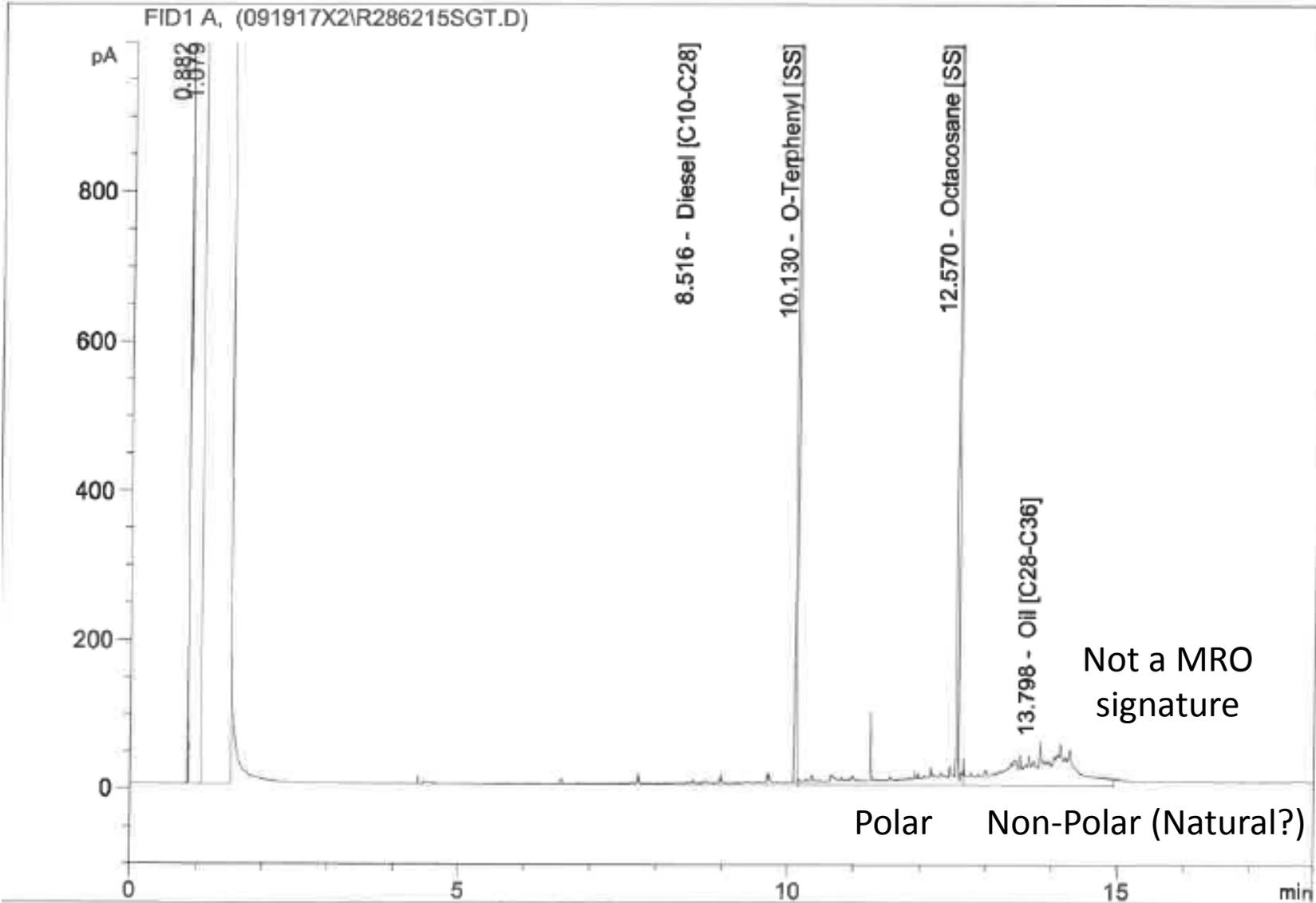
August Effluent Resample w/ SGC



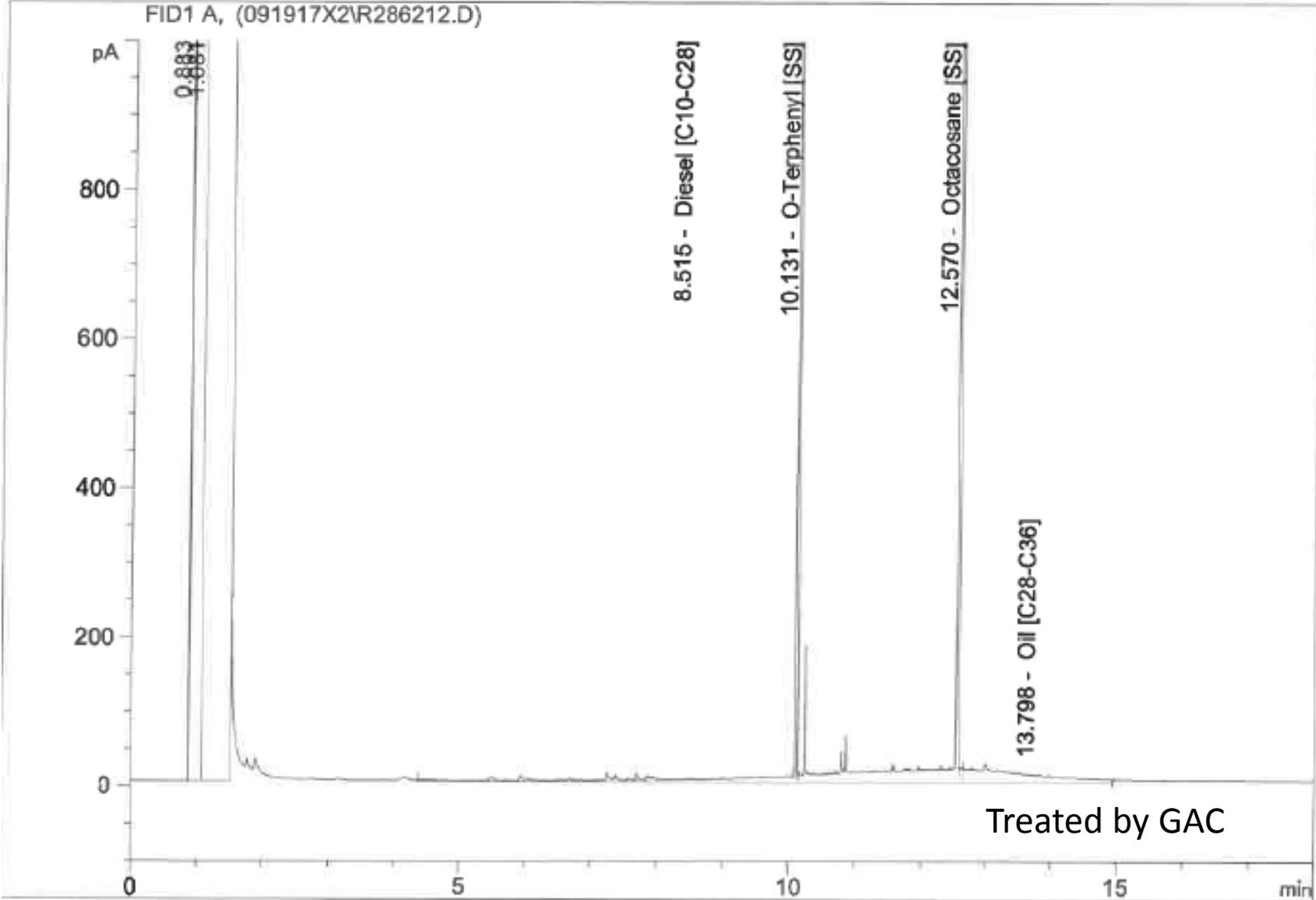
September Influent



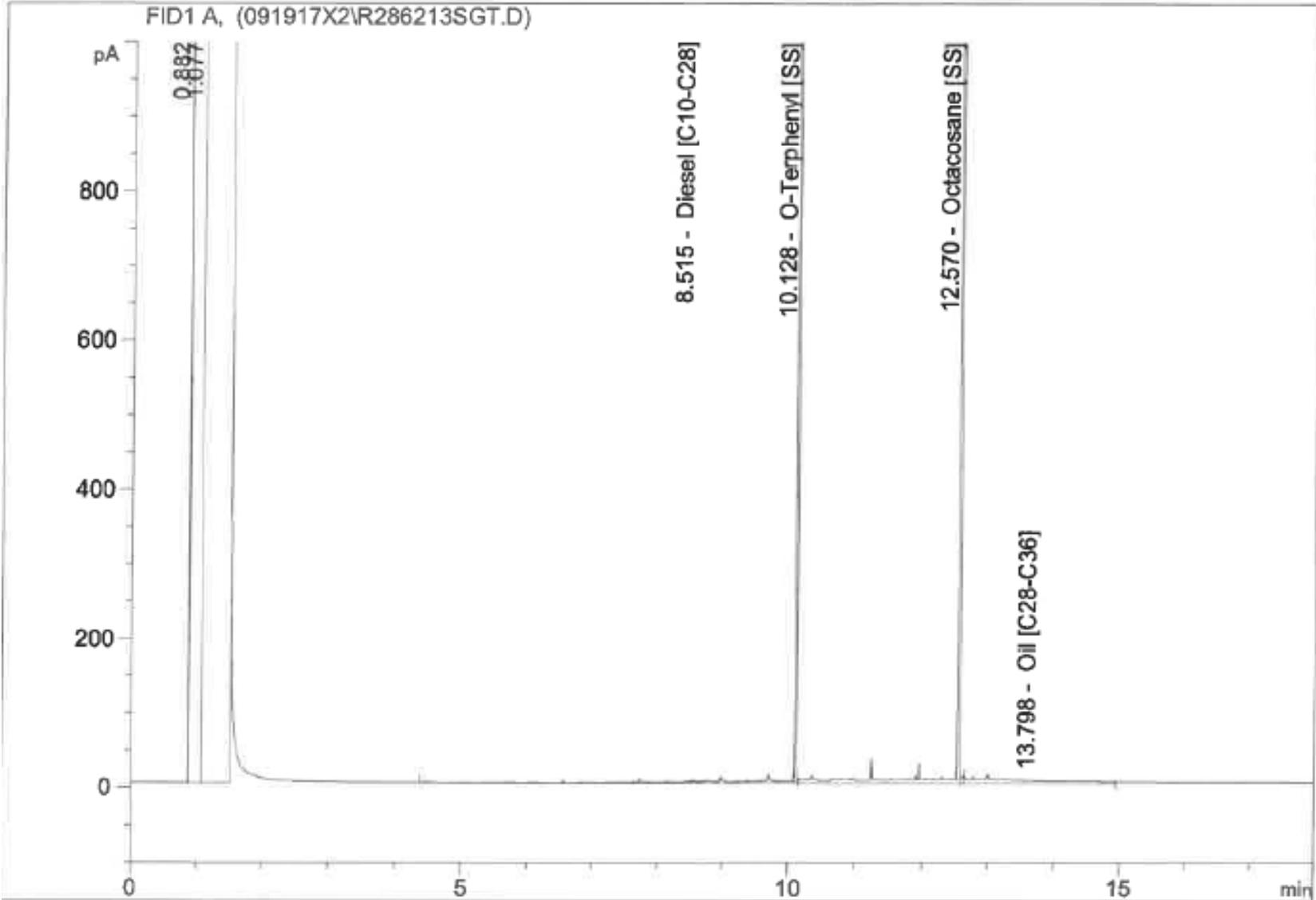
September Influent w/ SGC



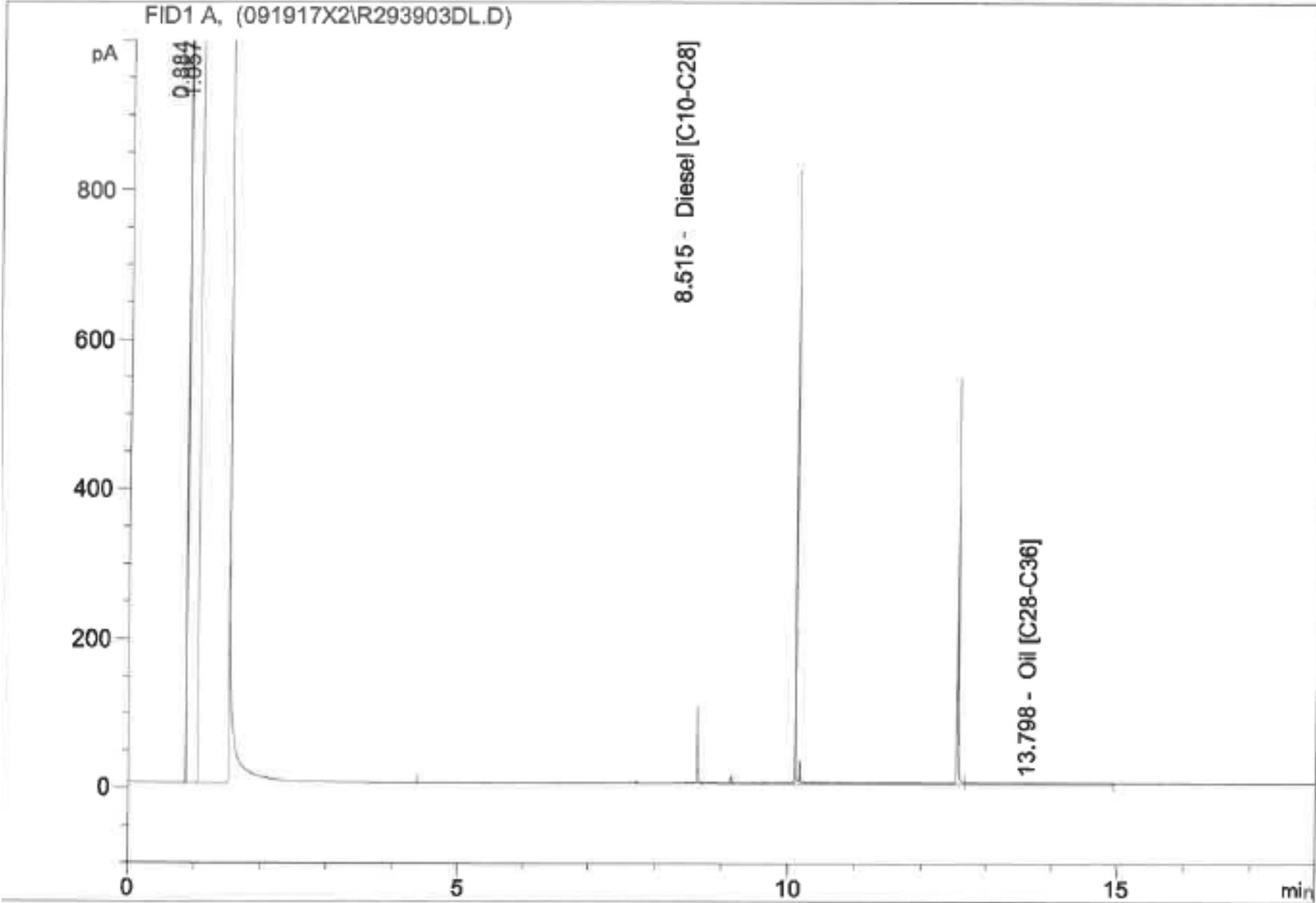
September Effluent



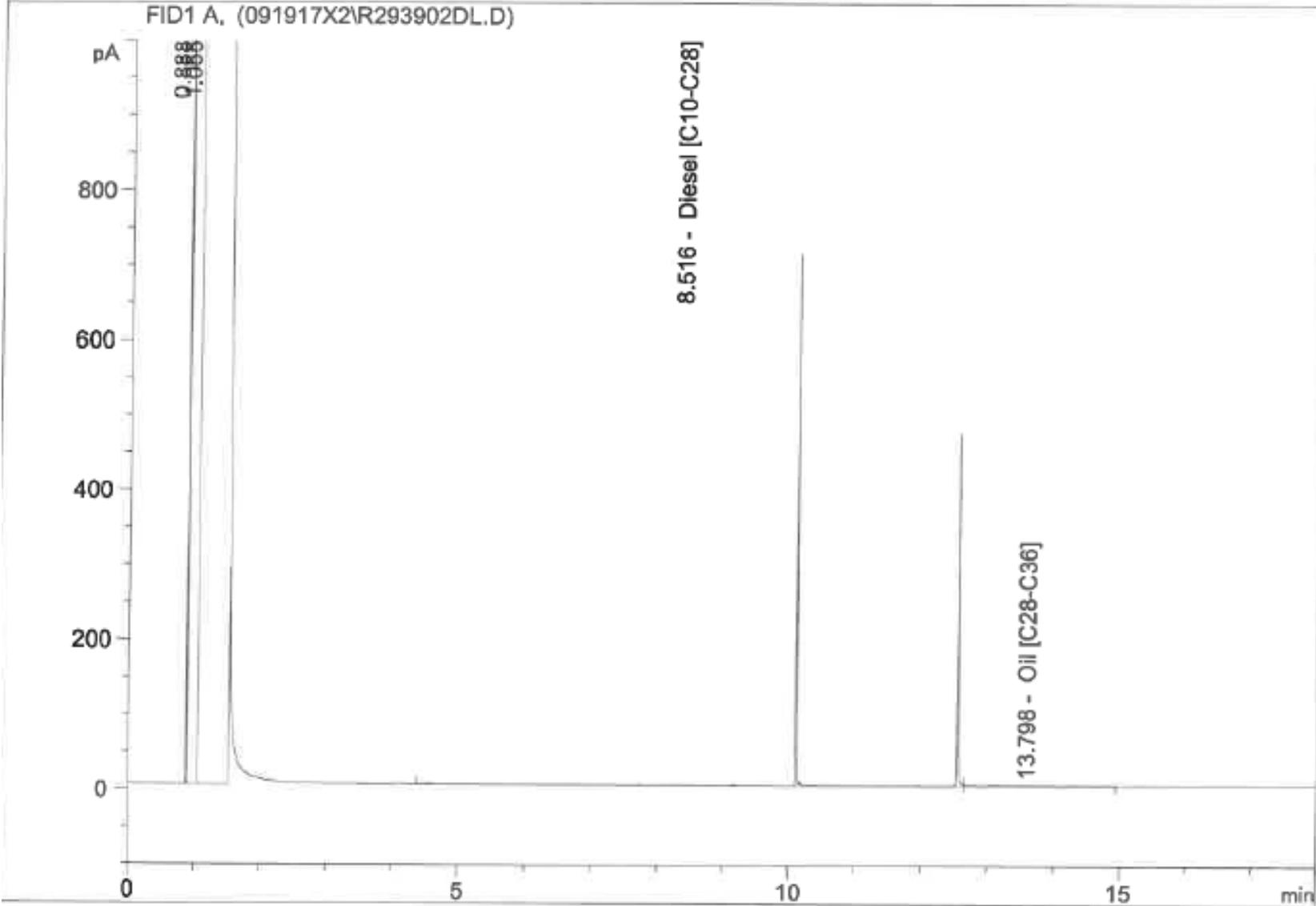
September Effluent w/ SGC



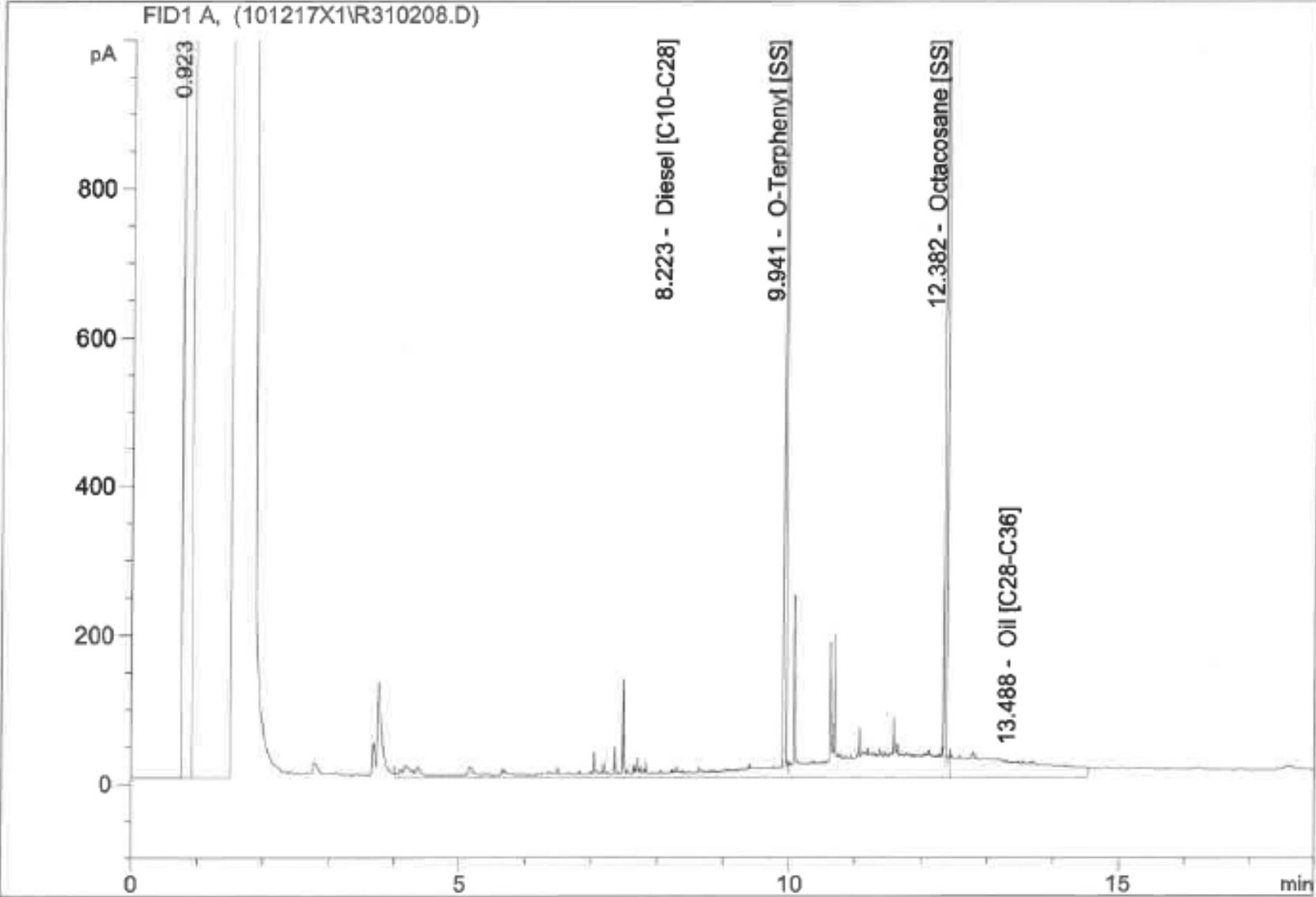
September Influent Resample



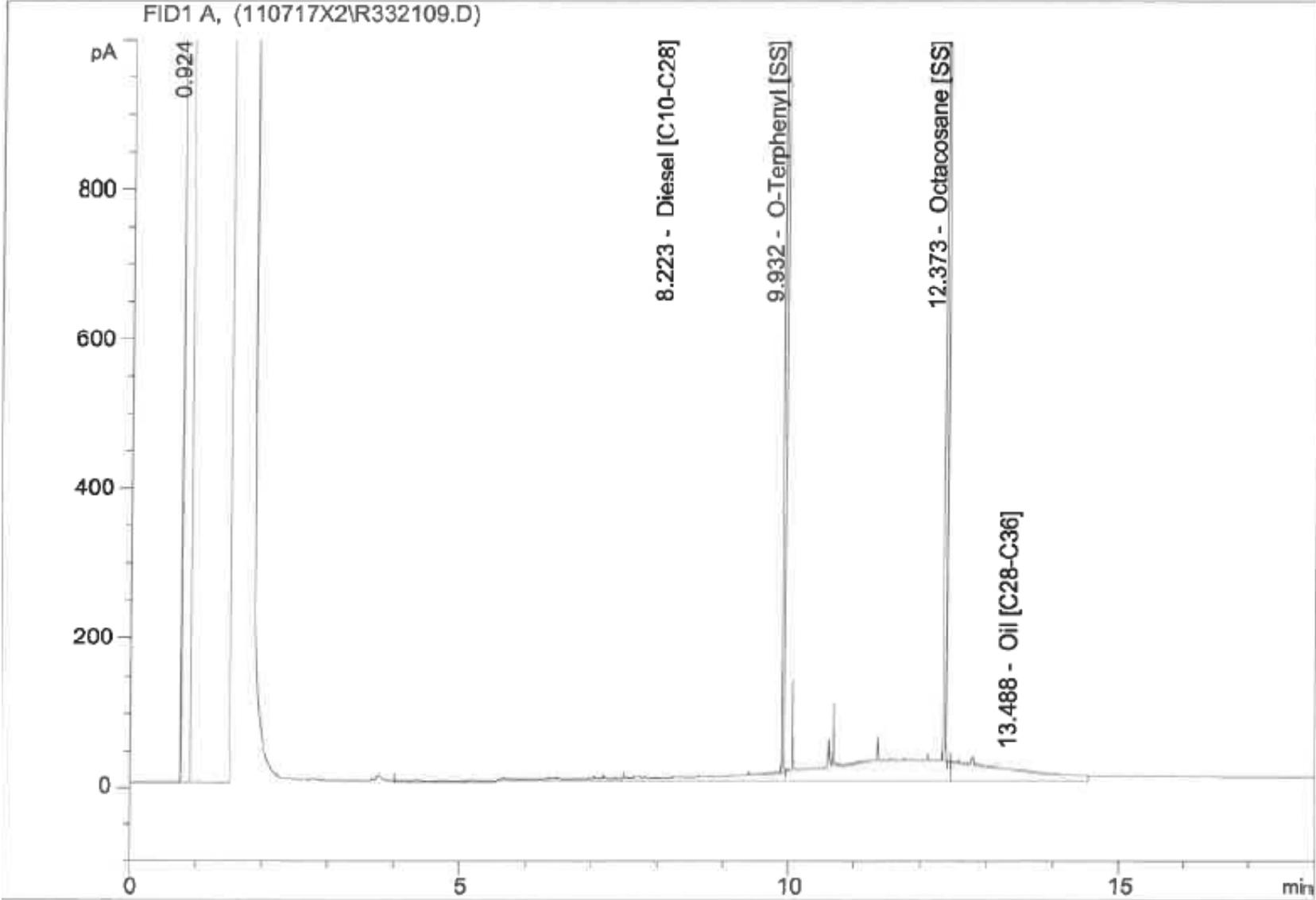
September Effluent Resample



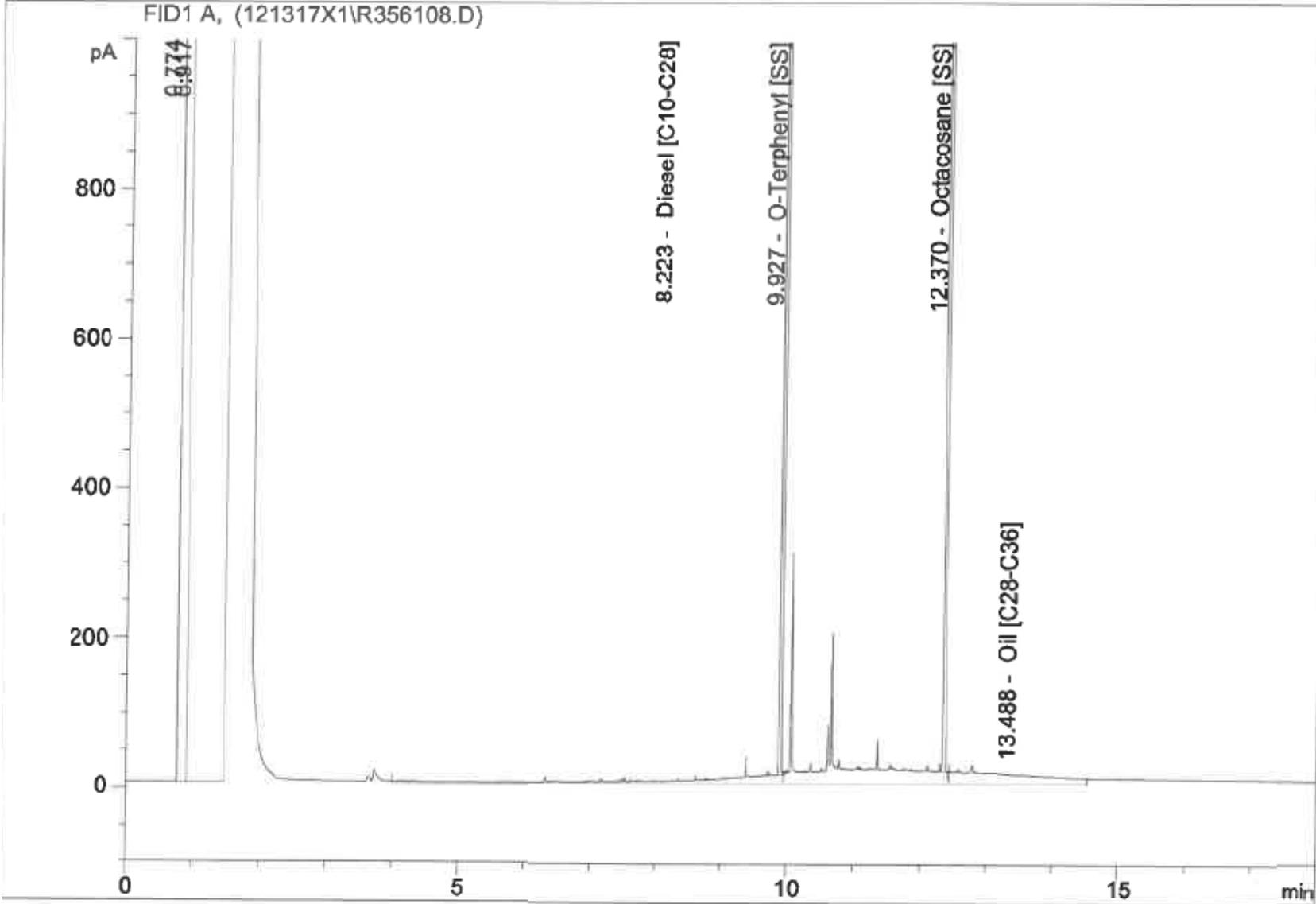
October Effluent



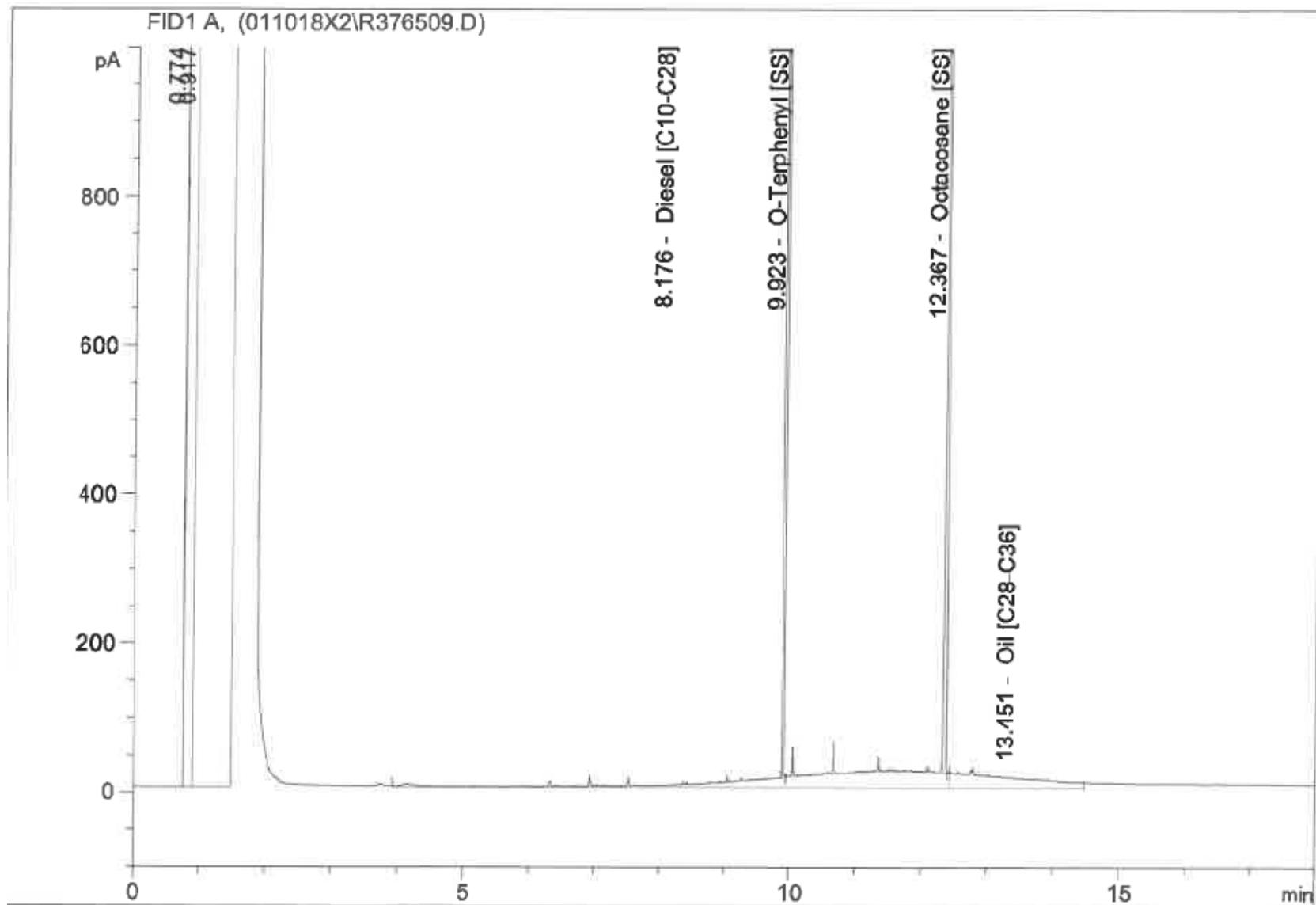
November Effluent



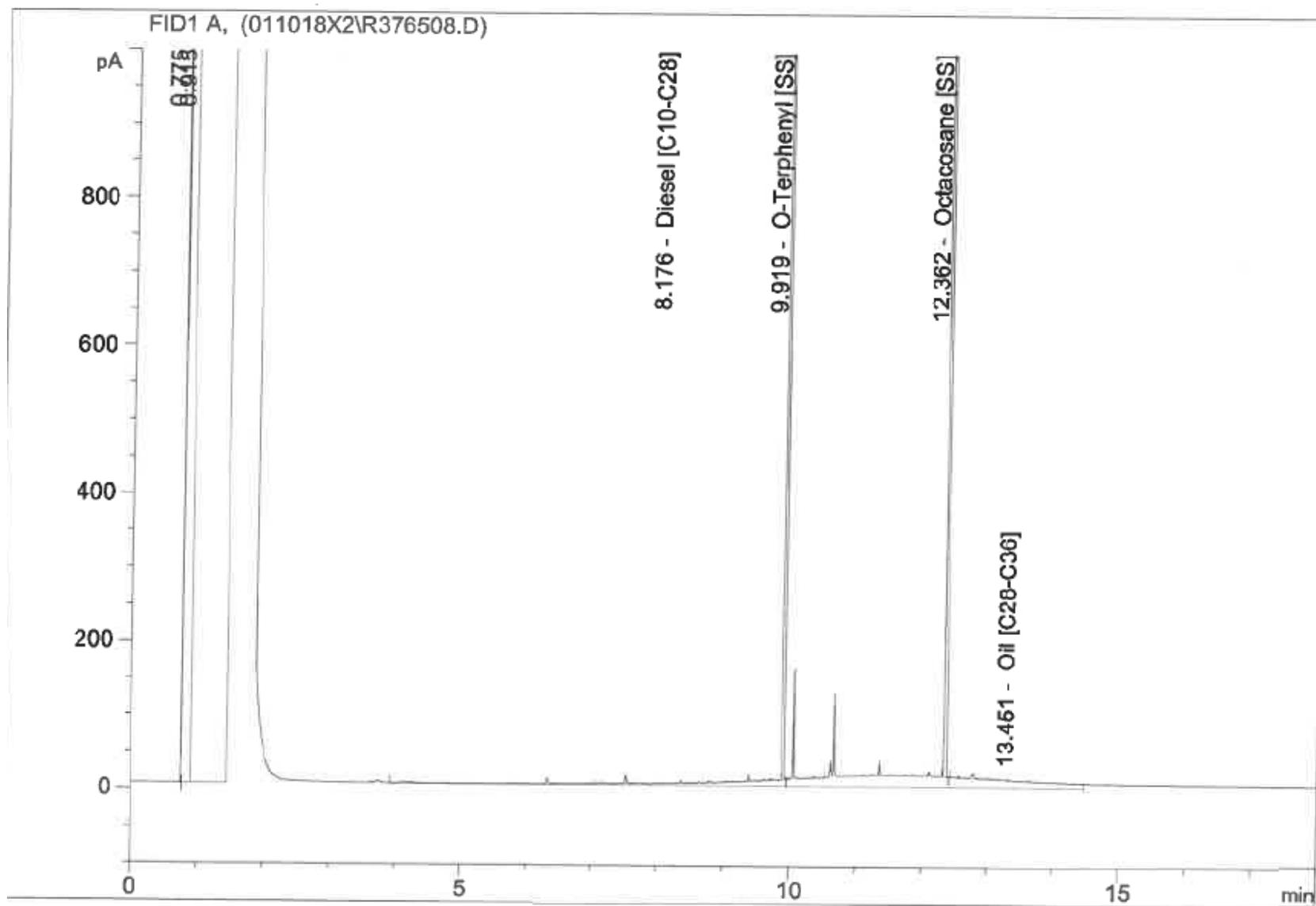
December Effluent



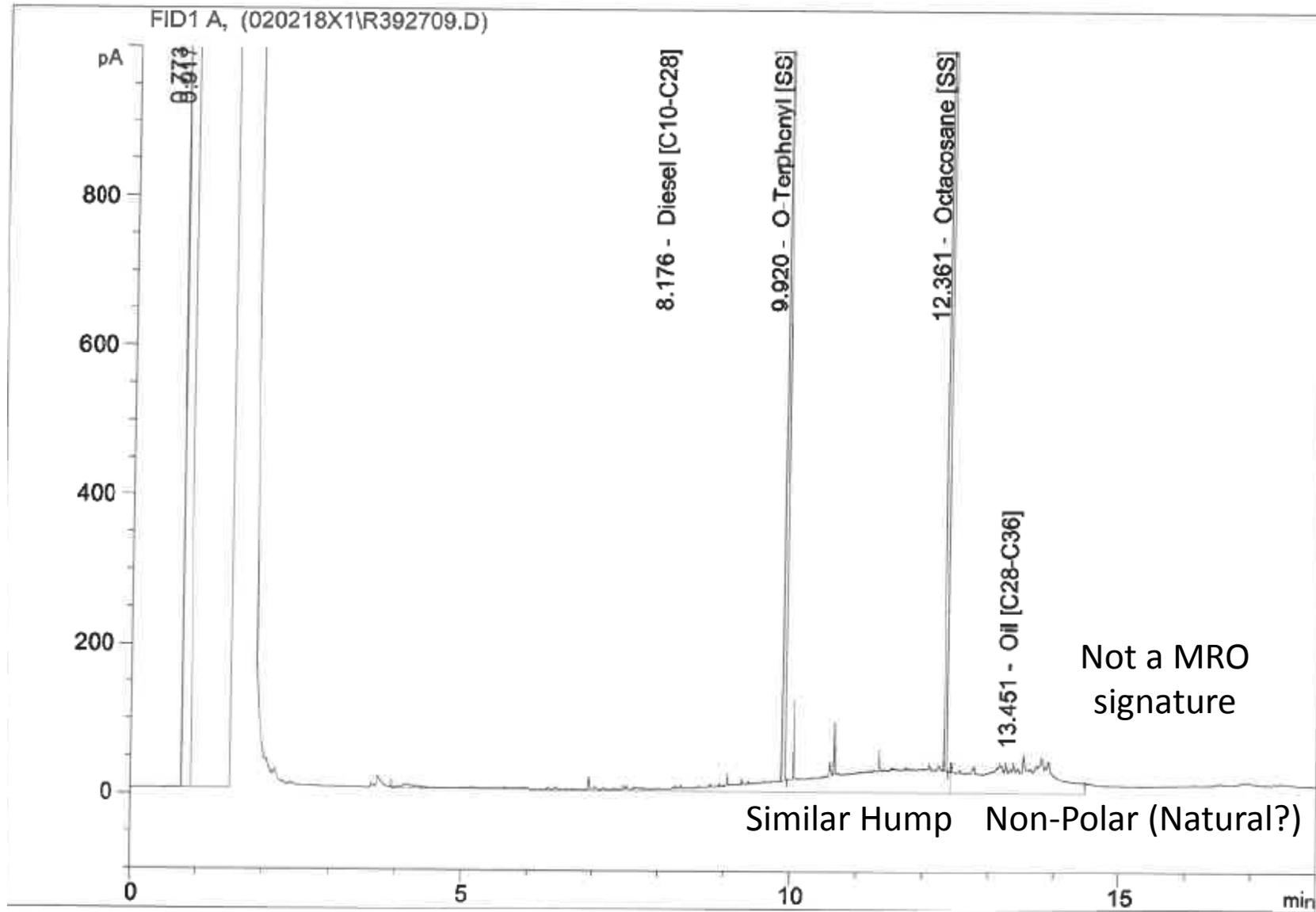
January Influent



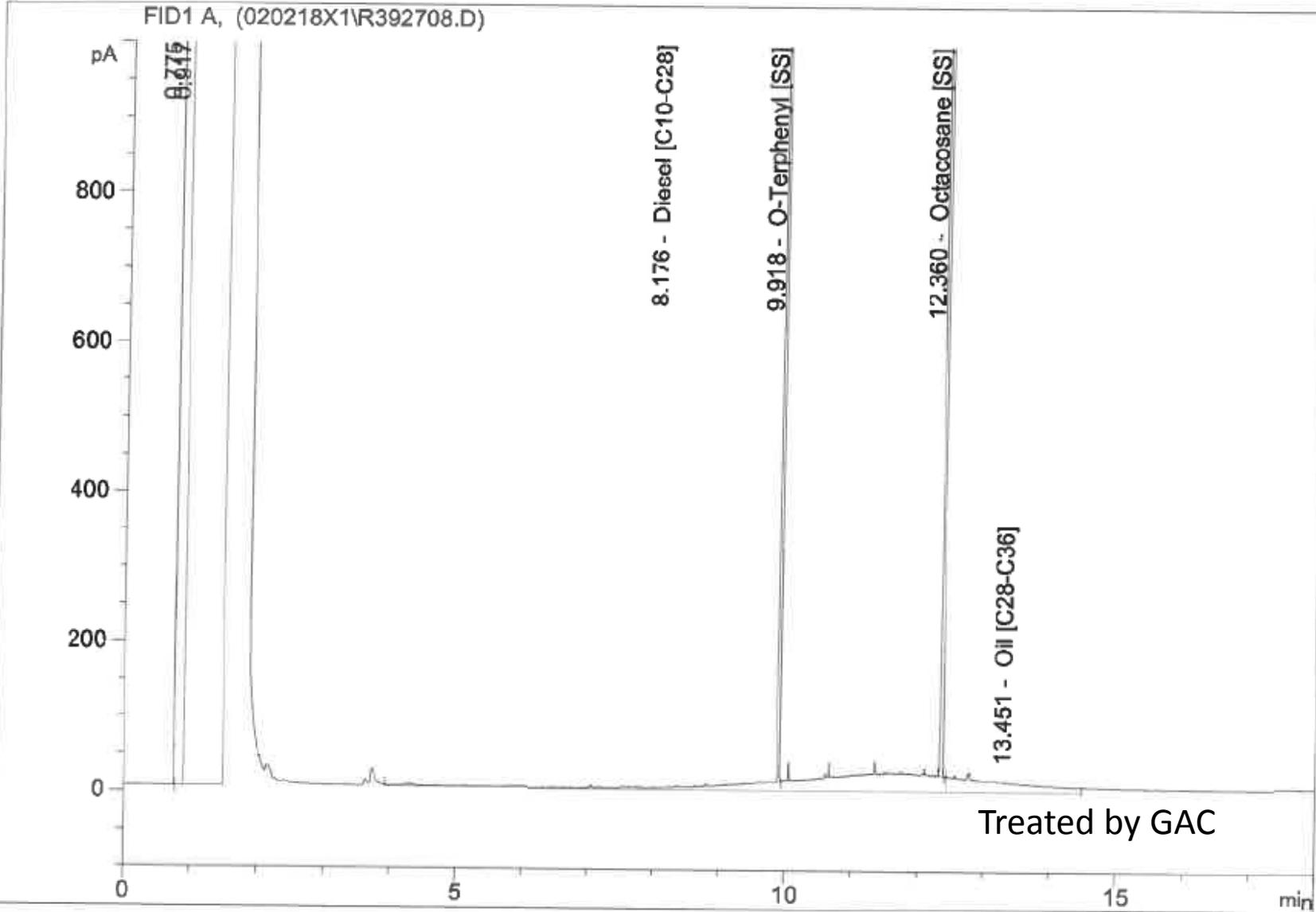
January Effluent



February Influent



February Effluent



Conclusions

- Consistent chromatogram patterns, which are not indicative of petroleum
- Recent TPH detections are expected to be a result of natural organics being driven through soil column due to recent rain
- TPH data at this site is not reliable, recommend adjusting sampling program to add SVOCs (in addition to VOCs) and remove TPH analysis

Travis AFB Restoration Program

Program Update

RPM Meeting
June 20, 2018

Completed Documents (1)

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

Completed Documents (2)

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

Completed Documents (3)

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

Completed Documents (4)

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

Completed Documents (5)

- *Data Gap Investigation Results, Technical Memorandum for Soil Site SS016*
- *LF006, SS030, SD031 Aquifer Test Activities Technical Memorandum*

Completed Field Work (1)

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

Completed Field Work (2)

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

Completed Field Work (3)

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

Completed Field Work (4)

- FT004 POCO Soil Data Gaps Investigation
- LF044 Sediment Sampling
- FT004 EVO Optimization
- DP039 Install downgradient monitoring wells (2nd round)
- FT005 – Install Extraction Wells
- DP039 Repair SBGR distribution headers
- Q4 2017 GRIP Sampling
- SD036 EVO Optimization
- SS015 EVO Optimization
- SD031 EVO Optimization
- FT005 Installation of Pumps and Controls in 5 New Extraction Wells
- Q1 2018 GRIP Sampling
- SD037 EVO reinjection
- **Q2 2018 GRIP Sampling**

Documents In-Progress

CERCLA

- Amendment to the WABOU Soil ROD for sites DP039, SD043, and SS046
- Monitoring Well Installation Tech Memo for Site DP039, Addendum to the RACCR
- SD043 RD/RA Work Plan
- Community Relations Plan Update (revised draft)
- SS046 RD/RA Work Plan
- SS015 Soil Sampling Plan
- FT005 Extraction System Optimization Tech Memo
- 2017 Annual CAMU Monitoring Report
- ***LF044 Sediment Sampling Report***
- ***4th Five Year Review Report for Multiple Groundwater, Soil, and Sediment Sites***

Documents In-Progress

POCO

- None

Field Work In-Progress

CERCLA

- FT005 EVO injection

POCO

- None

Documents Planned

CERCLA

- Amendment to the NEWIOU Soil ROD for Sites SS016 and SD033 Jun
- EVO Sites FT004, SS015, SD031, & SD036 Optimization Injections Tech Memo Jul
- SS016 RD/RA Work Plan Jul
- 2017 Annual GRISR Jul
- LF006 Technology Demonstration Work Plan Jul
- SD031 Soil RI/FS Oct

MMRP

- NFA ROD for Old Skeet Range (TS060 MRA) TBD

Documents Planned

POCO

- None

Field Work Planned

CERCLA

- SS015 Soil sampling Jun
- SD043 Soil excavation TBD
- SS046 Soil excavation TBD
- SS016 Soil excavation TBD

POCO

- FT004 POCO Soil Investigation Jul
- ***TA500 Well Decommissioning*** ***Jul***

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

Petroleum Technology Demonstration Projects (1)

- SS014: Recycled Drywall SBGR
 - Evaluate the effectiveness of sulfate (gypsum from crushed drywall) to enhance anaerobic biodegradation of petroleum in groundwater
 - Installation was completed November 2016
 - Results through first 9 months
 - TPH-G: 99% reduction in source area (1,900 to 15 J $\mu\text{g/L}$), 34% for remaining 6 site wells (was 18% after 3 months)
 - TPH-D: 98% reduction in source area (5,500 to 130 J $\mu\text{g/L}$), 61% for remaining 6 site wells (was 33% after 3 months)
 - Benzene: 98% reduction (22 to 0.24 J $\mu\text{g/L}$), 61% for remaining 6 site wells (was 49% after 3 months)
- SD034: Washboard SBGR
 - Evaluate the effectiveness of an oxygen-enhanced aerobic SBGR on reducing TPH as diesel (TPH-D) in groundwater
 - Installed six (6) SBGR trenches in November 2016
 - Below SBGR trench (MW811x34/PZSSAx34) through first 9 months
 - TPH-DRO baseline 9,600 $\mu\text{g/L}$ reduced to 160 $\mu\text{g/L}$ (98% reduction)
 - TPH-MRO baseline 2,300 $\mu\text{g/L}$ reduced to 210 $\mu\text{g/L}$ (91% reduction)
 - Plume hot spot monitoring well (MW02x34) through first 9 months
 - TPH-DRO baseline 8,300 $\mu\text{g/L}$ reduced to 1,100 $\mu\text{g/L}$ (87% reduction)
 - TPH-MRO baseline 1,500 $\mu\text{g/L}$ reduced to 420 $\mu\text{g/L}$ (72% reduction)

* SBGR = Subgrade Biogeochemical Reactor

Updates in Green Font

CVOC Technology Demonstration Projects (2)

- Multisite Bioaugmentation: EVO and KB-1 Plus
 - Evaluate if addition of bioaugmentation substrate to an EVO injection will increase the rate of CVOC degradation
 - Initial injections were completed (Nov 2016)
 - Limited TOC dispersal at SD036, so installed additional injection wells and reinjected with nanoEVO in 2017
 - Too early to evaluate degradation rates; however:
 - ~50-70% TCE reduction at ST027B bioaugmentation area and low/fluctuating reductions at EVO only area
 - TCE fluctuations at SD036 bioaugmentation area (but 62% DCE decrease) and 99% decrease at EVO only area
- 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
 - Slightly elevated TOC and reduced COC concentrations in the north, TOC increase has not yet been observed in the central test area yet (distance may be too far for TOC dispersal using EVO)
 - Optimized the GETs in southern portion of site in 2017, which may help accelerate TOC dispersal to support this TD

Updates in Green Font

CVOC Technology Demonstration Projects (3)

- 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
 - COC concentrations declined through year 1
 - ~50% total molar reduction plume-wide through first year
 - Max monitoring well TCE concentration reduced from 560 to 140 µg/L
 - Limited TOC dispersal, additional EVO injection conducted with nanoEVO in 2017 to determine if this can enhance TOC dispersal (too early to evaluate results of reinjection)
 - Concentrations rebounded in 4Q17, but 2017 reinjection should support further reductions

Updates in Green Font

CVOC Technology Demonstration Projects (4)

- 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
 - Recirculation through chimneys has been successful relative to our design assumptions
 - 1,1-DCE (primary COC) concentrations have reduced by 96% (was 93%) (sum of key wells within TD area, excluding 2 wells to SW that increased)
 - Total Molar concentration (sum of CVOCs) has reduced by 93% (was 84%) (sum of key wells within TD area, excluding 2 wells to SW that increased)
 - Four (4) new EVO wells installed to SW to enhance TOC in problem areas (plume being pulled back towards extraction well causing increasing concentrations in this area), conducted reinjection of EVO in 2017
 - Too early to evaluate effect of reinjection on cross-gradient area

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 Memorandum22

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