



DEPARTMENT OF THE NAVY

COMMANDER  
NAVY REGION HAWAII  
850 TICONDEROGA ST STE 110  
JBPHH, HAWAII 96860-5101

NOV 22 2019

5090  
N45  
November 18, 2019

**CERTIFIED NO: 7016 0910 0001 0892 0024**

Mr. Richard Takaba  
Hawaii State Department of Health  
Environmental Management Division  
Solid and Hazardous Waste Branch  
Underground Storage Tank Section  
2827 Waimano Home Road Suite 100  
Pearl City, HI 96782

Dear Mr. Takaba:

SUBJECT: RED HILL TANK COMPLEX  
SOIL VAPOR SAMPLING RESULTS FOR SEPTEMBER 2019  
DOH FACILITY ID NO. 9-102271  
DOH RELEASE ID NO. 990051, 010011, 020028, AND 140010

Soil vapor samples were collected from beneath all active and accessible Red Hill tanks on September 20, 2019.

Soil vapor VOC concentrations were measured in the field using a photo-ionization detector. The soil vapor sampling results are being submitted as Enclosure 1.

A conservative approach is to assess the integrity of the associated tank system if VOC concentrations exceed 280,000 ppbv in soil vapor monitoring points (SVMPs) beneath tanks containing JP-5 or JP-8, or 14,000 ppbv in SVMPs beneath tanks containing marine diesel fuel. These values are 50 percent of the calculated vapor concentration from fuel-saturated water.

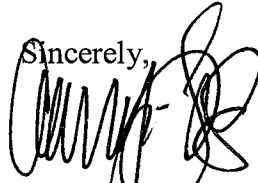
At Tank 5, sampling was not conducted due to work being performed on tank. Tank 5 was emptied in January 2014 and has not contained fuel since that time. VOC concentrations in all down-gradient soil vapor monitors were below 340 ppbv.

All other VOC concentrations measured in September were about 56 to 1,986 times below the action levels, with no consistent trends observed. NAVSUP FLC Pearl Harbor Causative Research Report is submitted as Enclosure 2. Possible reasons for the results are speculative and may include, but not be limited to, ongoing projects in the tunnel, groundwater level fluctuations, rainfall (or lack thereof), bi-product of biodegradation, and fuel movement in the tanks and piping.

5090  
N45  
November 18, 2019

Soil vapor VOC concentration trends will continue to be monitored. The next soil vapor sampling event is scheduled for October 2019, and will include collecting samples from soil vapor monitoring probes beneath all active and accessible tanks.

If there are any questions regarding this matter, or if more information is needed, please contact Mr. Melvin Muraoka at (808) 471-3869.

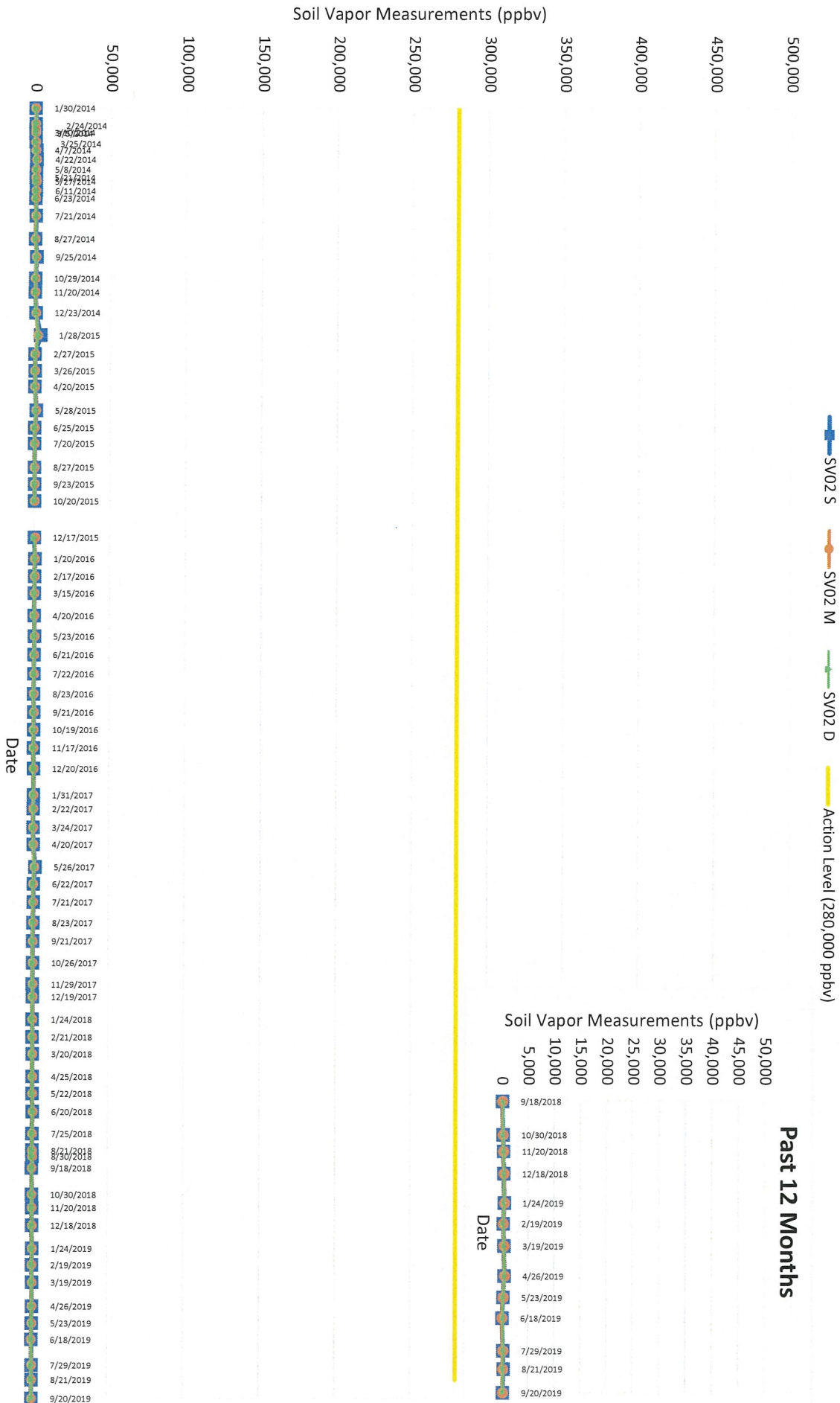
Sincerely,  


AARON Y. POENTIS  
Director  
Regional Environmental Department  
By direction of the  
Commander

- Enclosure: 1. Summary of Soil Vapor Sampling Results for Tanks 2 through 18 and 20 through September 2019 (18 pages)  
2. NAVSUP FLC Pearl Harbor Causative Research Report IRT Red Hill Soil Vapor Monitoring Report for September 2019

Copy to: Mr. Omer Shalev, U.S. EPA Region 9, Underground Storage Tank Program Office  
Mr. John Floyd, NAVSUP FLC Pearl Harbor  
Mr. Ralph Wells, DLA Energy Pacific

**Figure 1**  
**Soil Vapor Measurements - SV02 (F-24)**

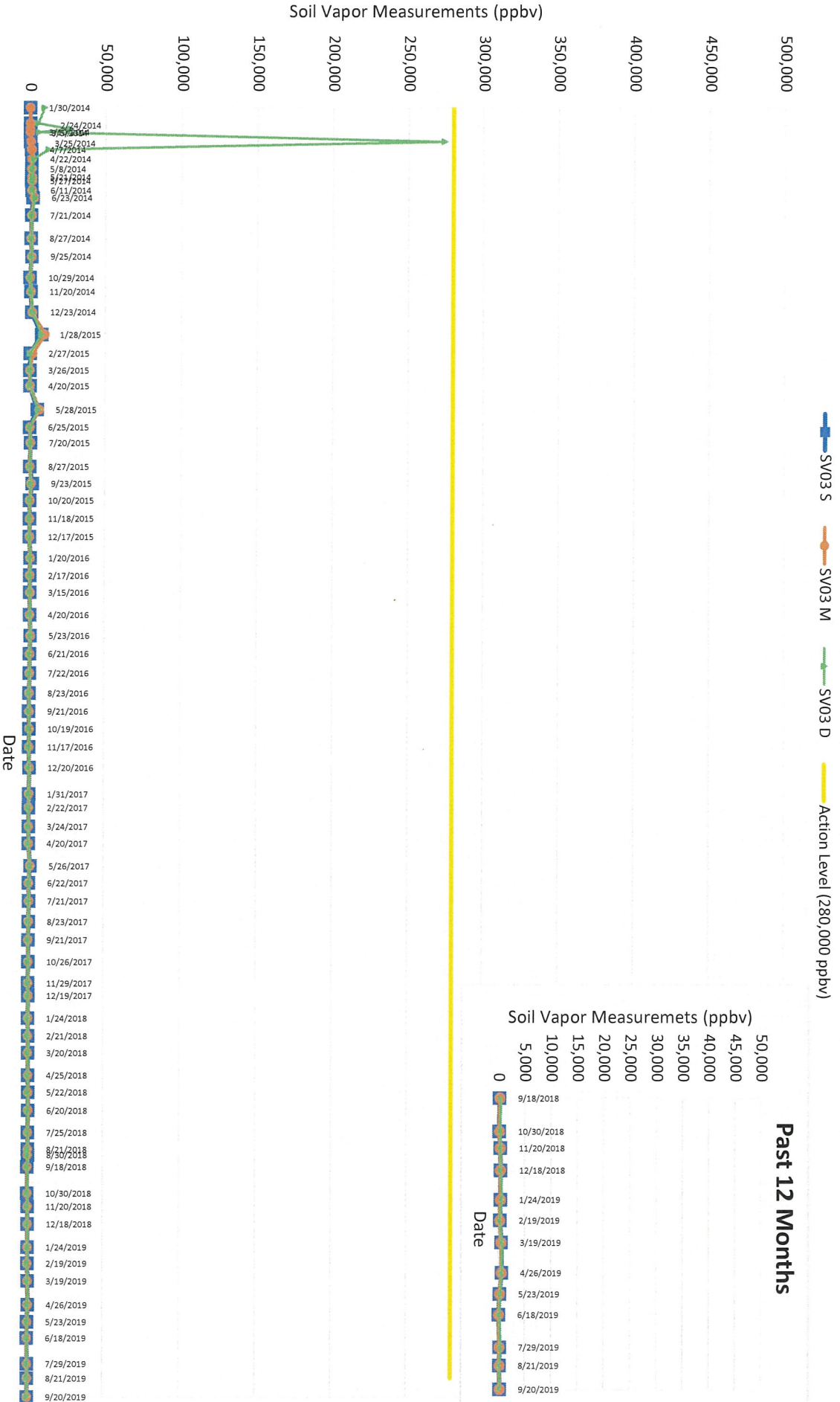


**ENCLOSURE ( 1 )**

Notes:  
 ppbv: Parts Per Billion by Volume  
 F-24: Jet Fuel, Fuel Number 24

JP-5: Jet Fuel, Propellant Number 5  
 F-76: Marine Diesel, Fuel Number 76

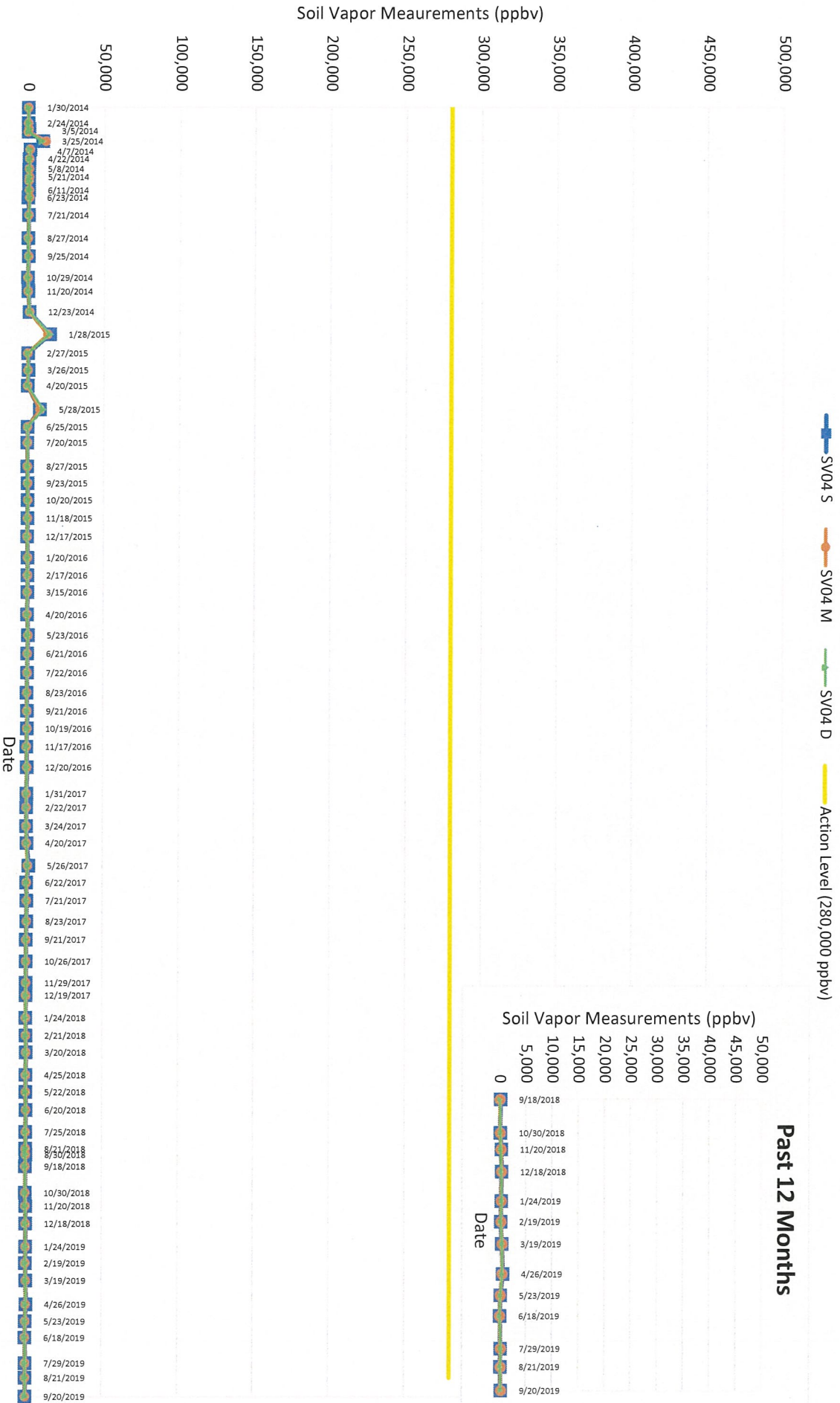
**Figure 2**  
**Soil Vapor Measurements - SV03 (F-24)**



Notes:  
 ppbv: Parts Per Billion by Volume  
 F-24: Jet Fuel, Fuel Number 24

JP-5: Jet Fuel, Propellant Number 5  
 F-76: Marine Diesel, Fuel Number 76

**Figure 3**  
**Soil Vapor Measurements - SV04 (F-24)**

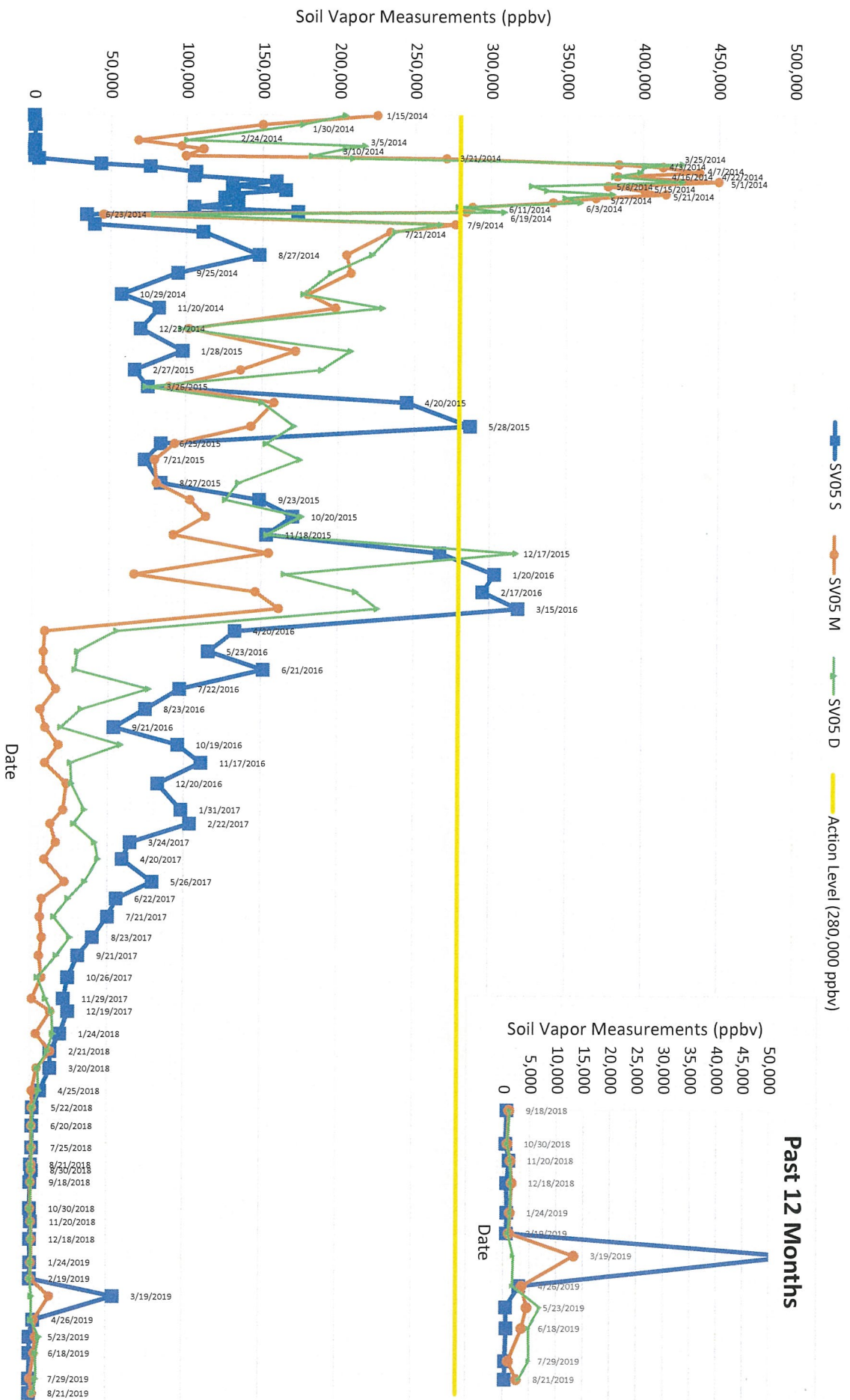


Notes:  
 ppbv: Parts Per Billion by Volume  
 F-24: Jet Fuel, Fuel Number 24

JP-5: Jet Fuel, Propellant Number 5  
 F-76: Marine Diesel, Fuel Number 76



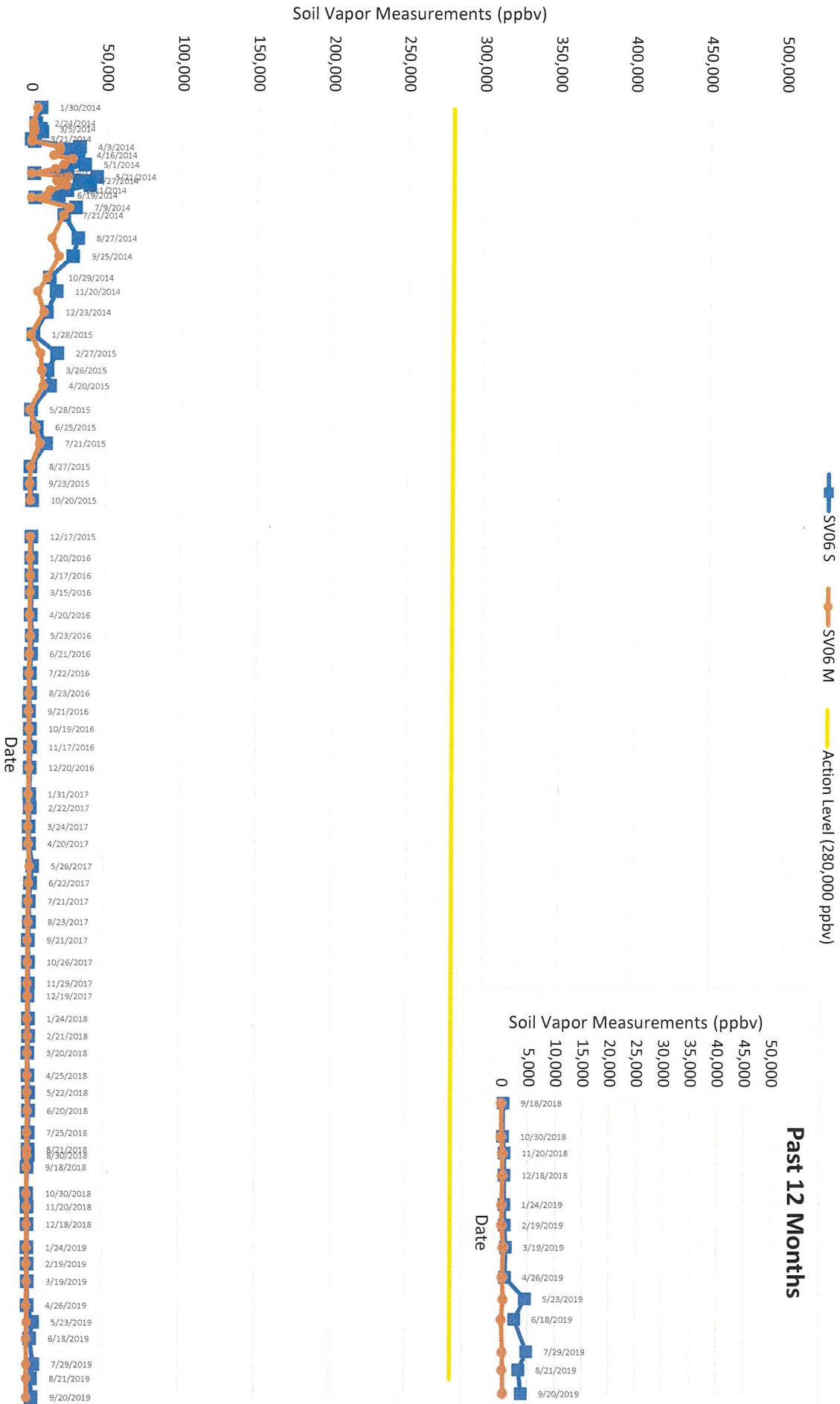
**Figure 4**  
**Soil Vapor Measurements - SV05 (F-24)**



Notes:  
 ppbv: Parts Per Billion by Volume  
 F-24: Jet Fuel, Fuel Number 24

JP-5: Jet Fuel, Propellant Number 5  
 F-76: Marine Diesel, Fuel Number 76

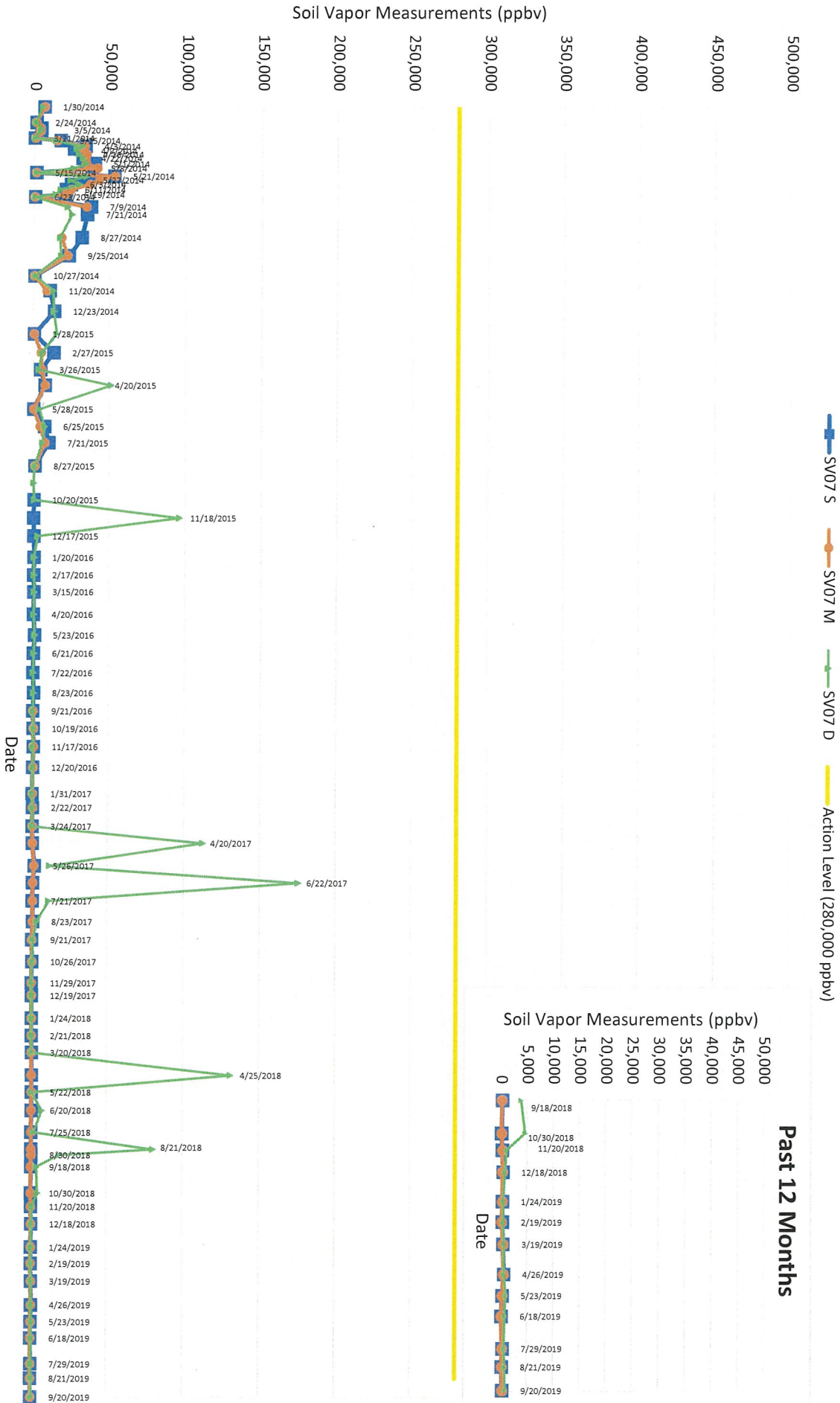
**Figure 5**  
**Soil Vapor Measurements - SV06 (F-24)**



Notes:  
 ppbv: Parts Per Billion by Volume  
 F-24: Jet Fuel, Fuel Number 24

JP-5: Jet Fuel, Propellant Number 5  
 F-76: Marine Diesel, Fuel Number 76

**Figure 6**  
**Soil Vapor Measurements - SV07 (JP-5)**

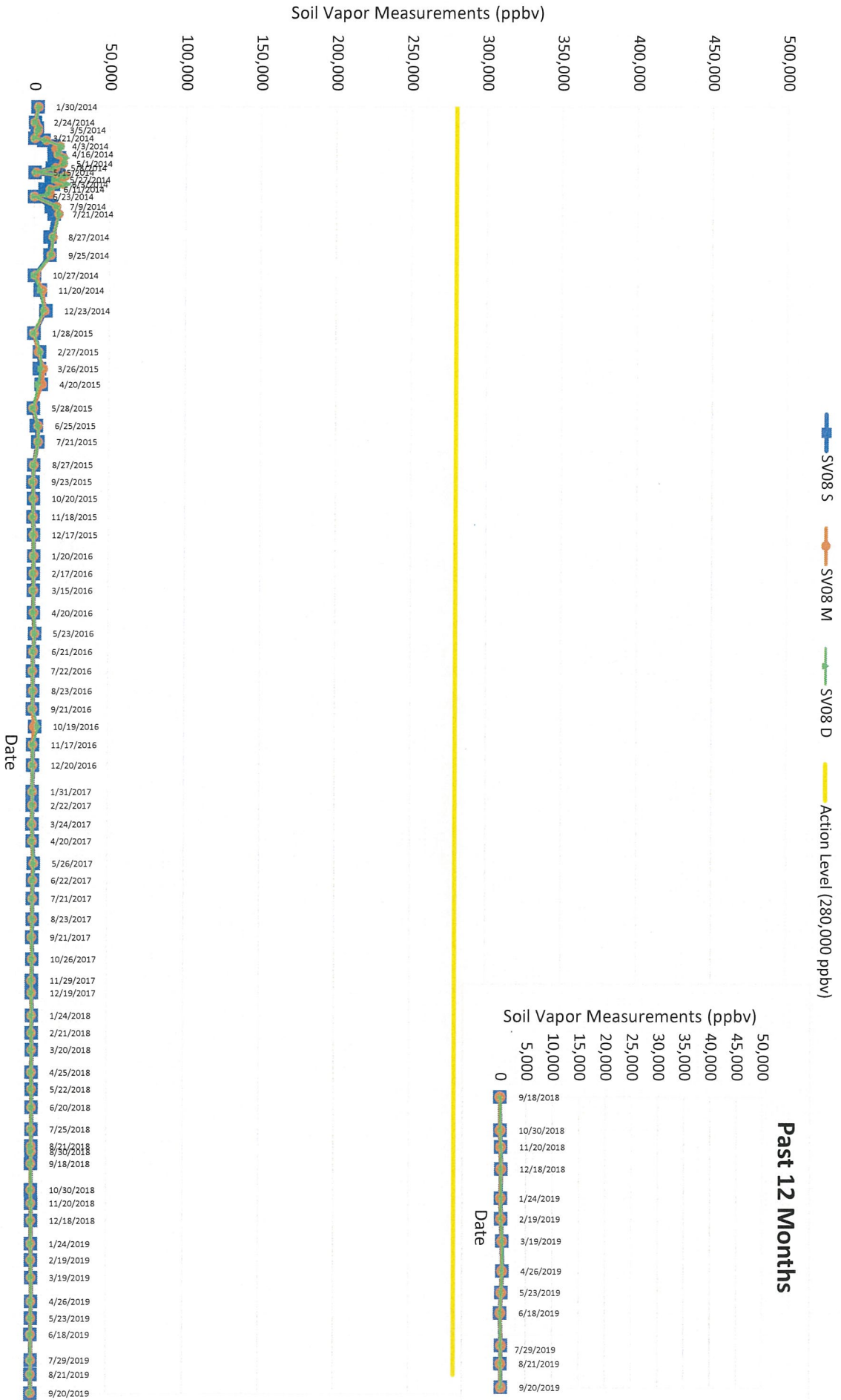


Notes:  
 ppbv: Parts Per Billion by Volume  
 F-24: Jet Fuel, Fuel Number 24

JP-5: Jet Fuel, Propellant Number 5  
 F-76: Marine Diesel, Fuel Number 76



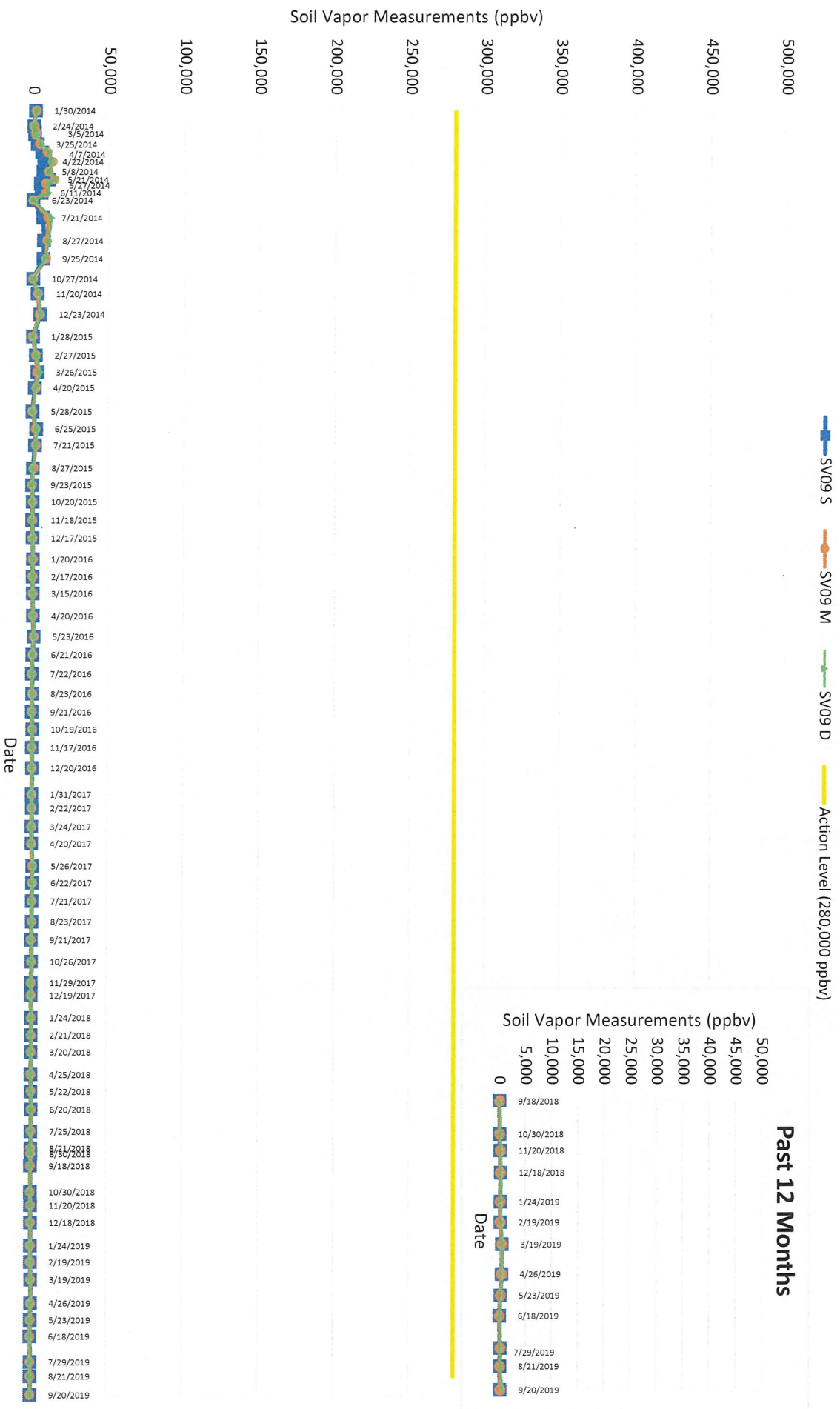
**Figure 7**  
**Soil Vapor Measurements - SV08 (JP-5)**



Notes:  
 ppbv: Parts Per Billion by Volume  
 F-24: Jet Fuel, Fuel Number 24

JP-5: Jet Fuel, Propellant Number 5  
 F-76: Marine Diesel, Fuel Number 76

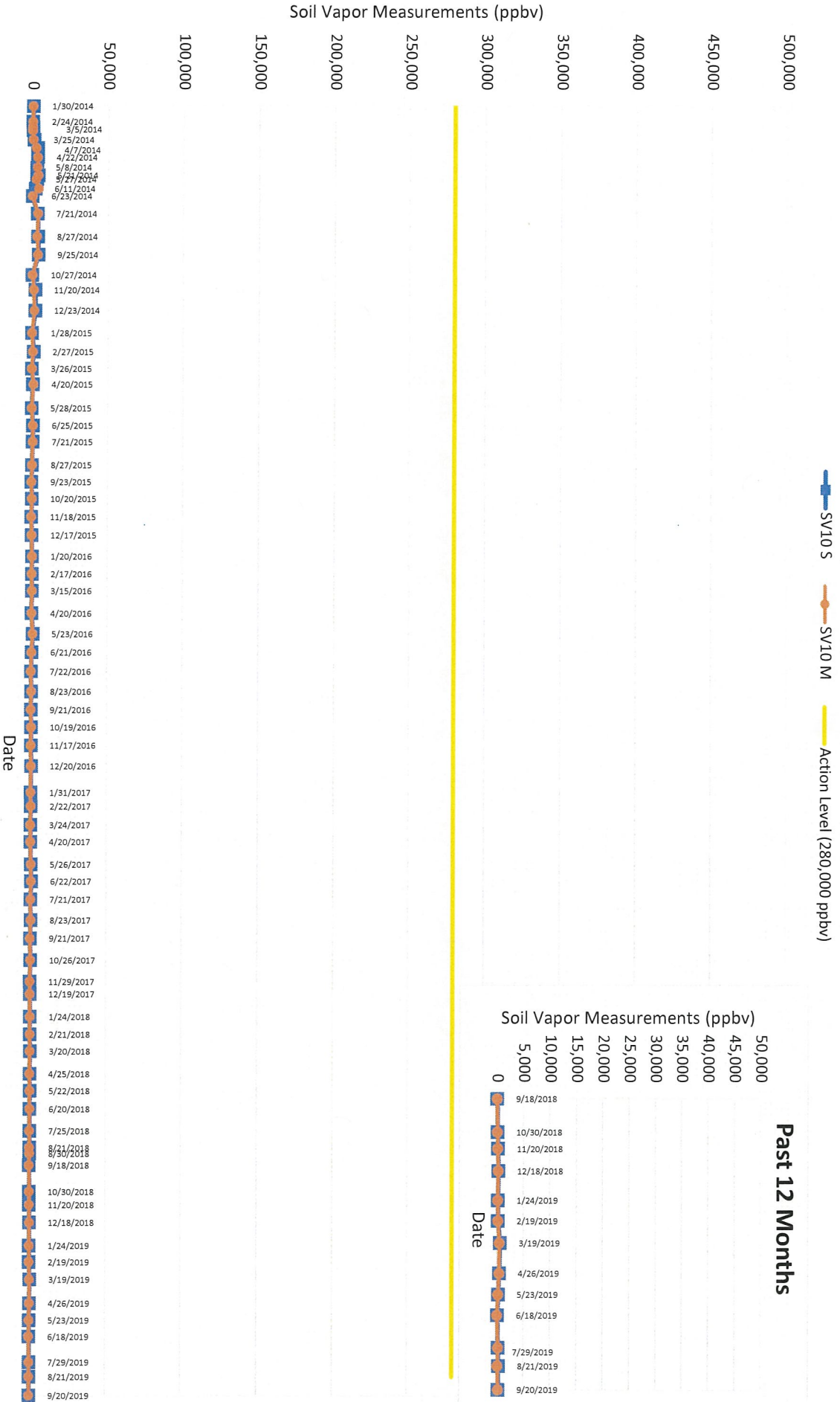
**Figure 8**  
**Soil Vapor Measurements - SV09 (JP-5)**



Notes:  
 ppbv: Parts Per Billion by Volume  
 F-24: Jet Fuel, Fuel Number 24

JP-5: Jet Fuel, Propellant Number 5  
 F-76: Marine Diesel, Fuel Number 76

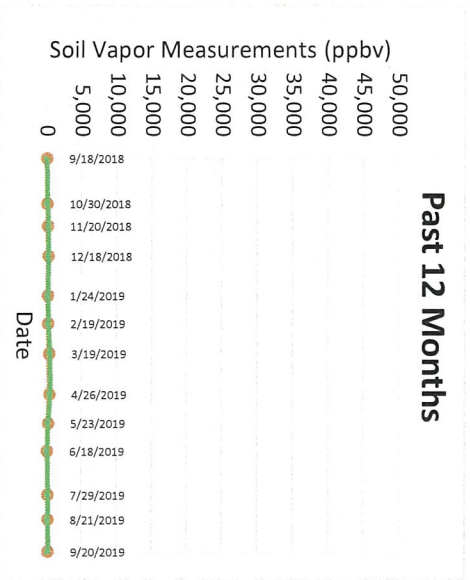
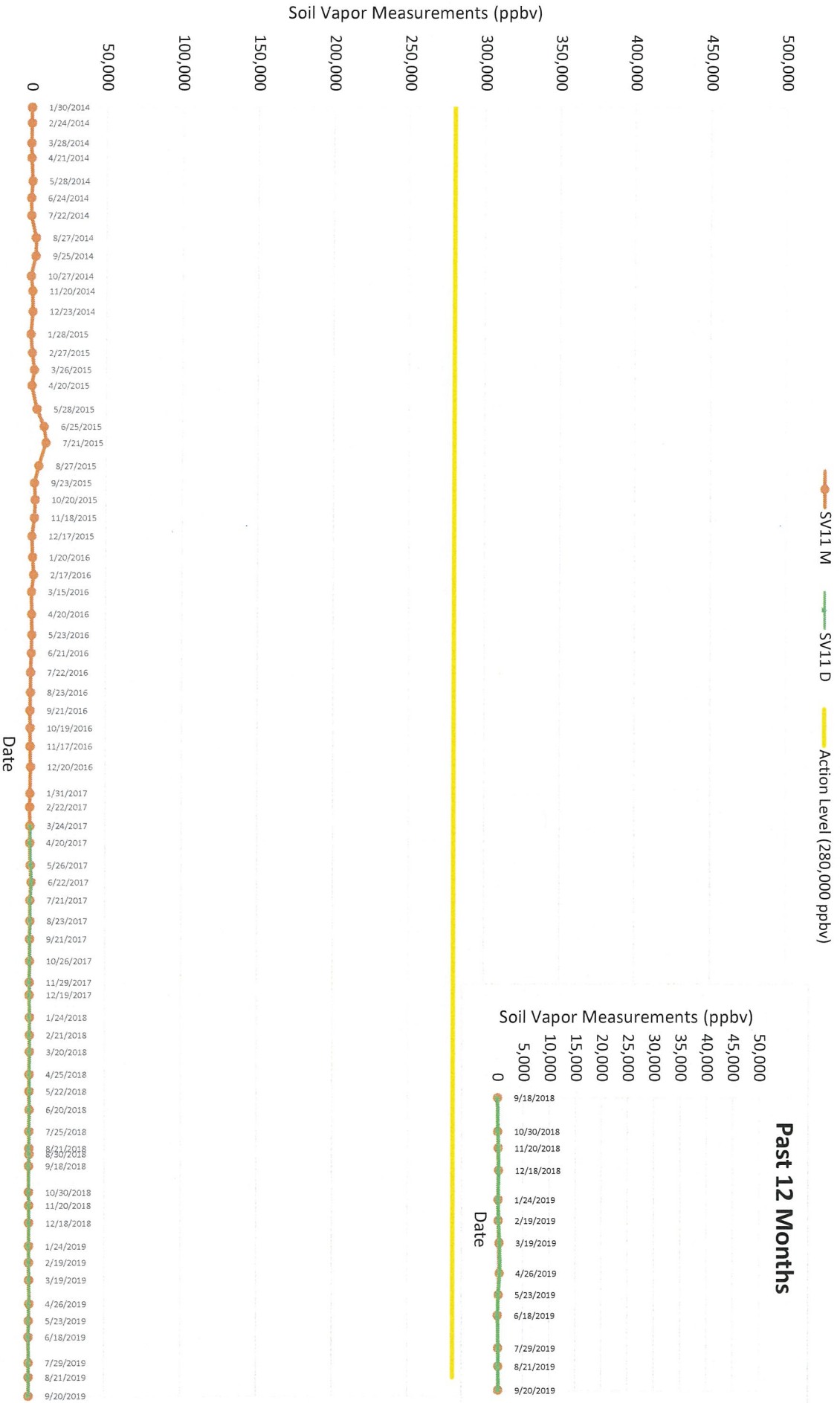
**Figure 9**  
**Soil Vapor Measurements - SV10 (JP-5)**



Notes:  
 ppbv: Parts Per Billion by Volume  
 F-24: Jet Fuel, Fuel Number 24

JP-5: Jet Fuel, Propellant Number 5  
 F-76: Marine Diesel, Fuel Number 76

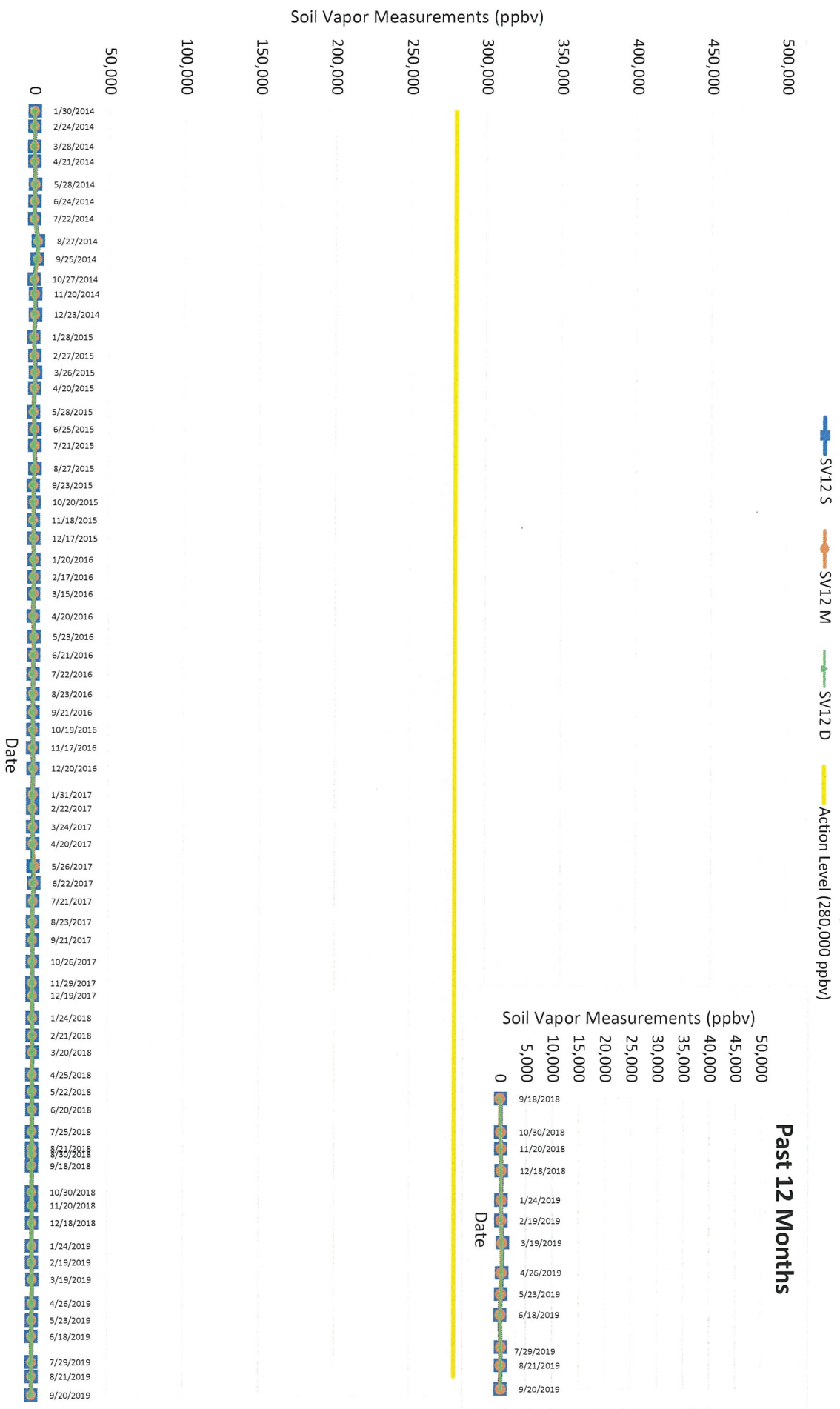
**Figure 10**  
**Soil Vapor Measurements - SV11 (JP-5)**



Notes:  
 ppbv: Parts Per Billion by Volume  
 F-24: Jet Fuel, Fuel Number 24

JP-5: Jet Fuel, Propellant Number 5  
 F-76: Marine Diesel, Fuel Number 76

**Figure 11**  
**Soil Vapor Measurements - SV12 (JP-5)**

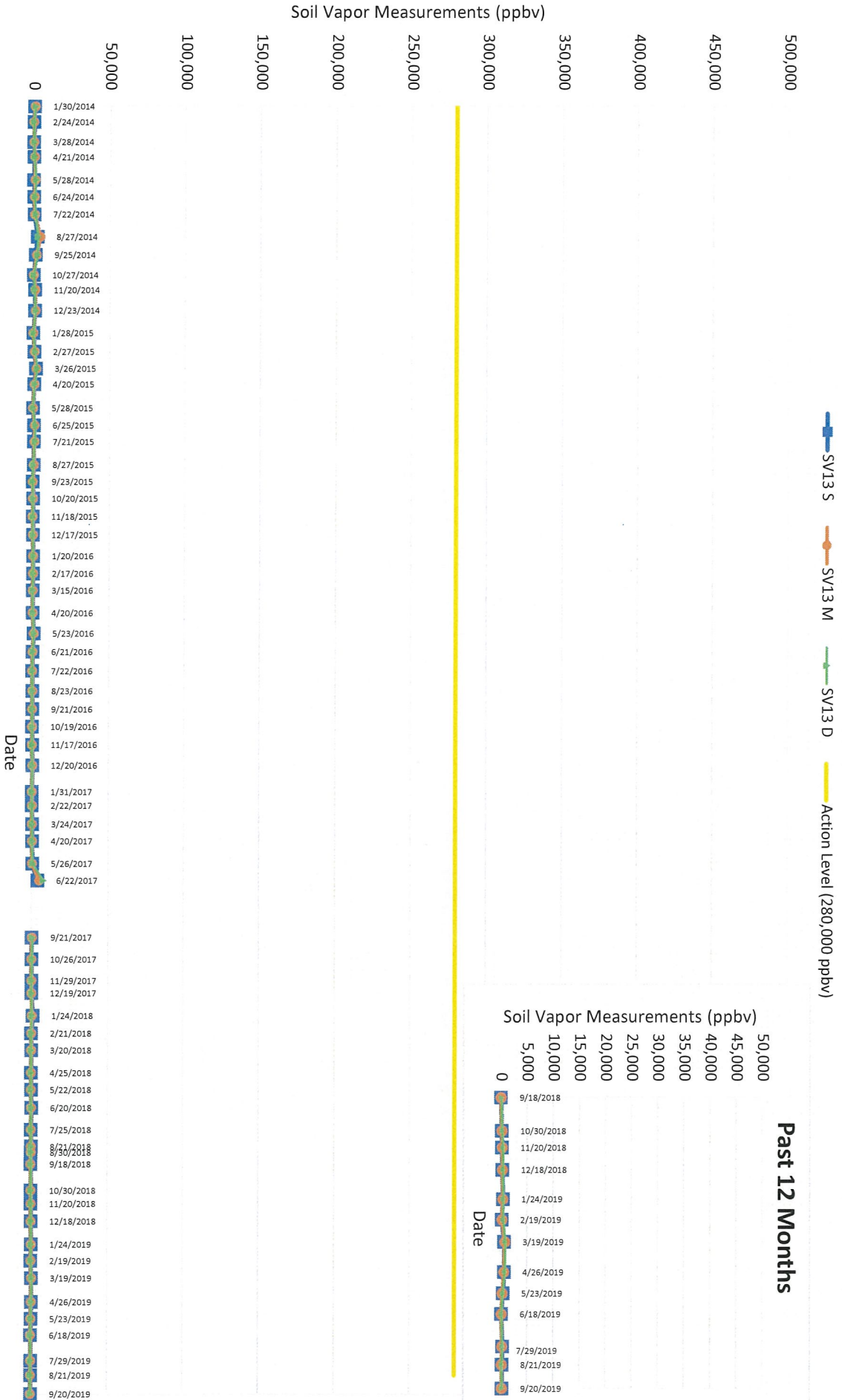


Notes:  
 ppbv: Parts Per Billion by Volume  
 F-24: Jet Fuel, Fuel Number 24

JP-5: Jet Fuel, Propellant Number 5  
 F-76: Marine Diesel, Fuel Number 76



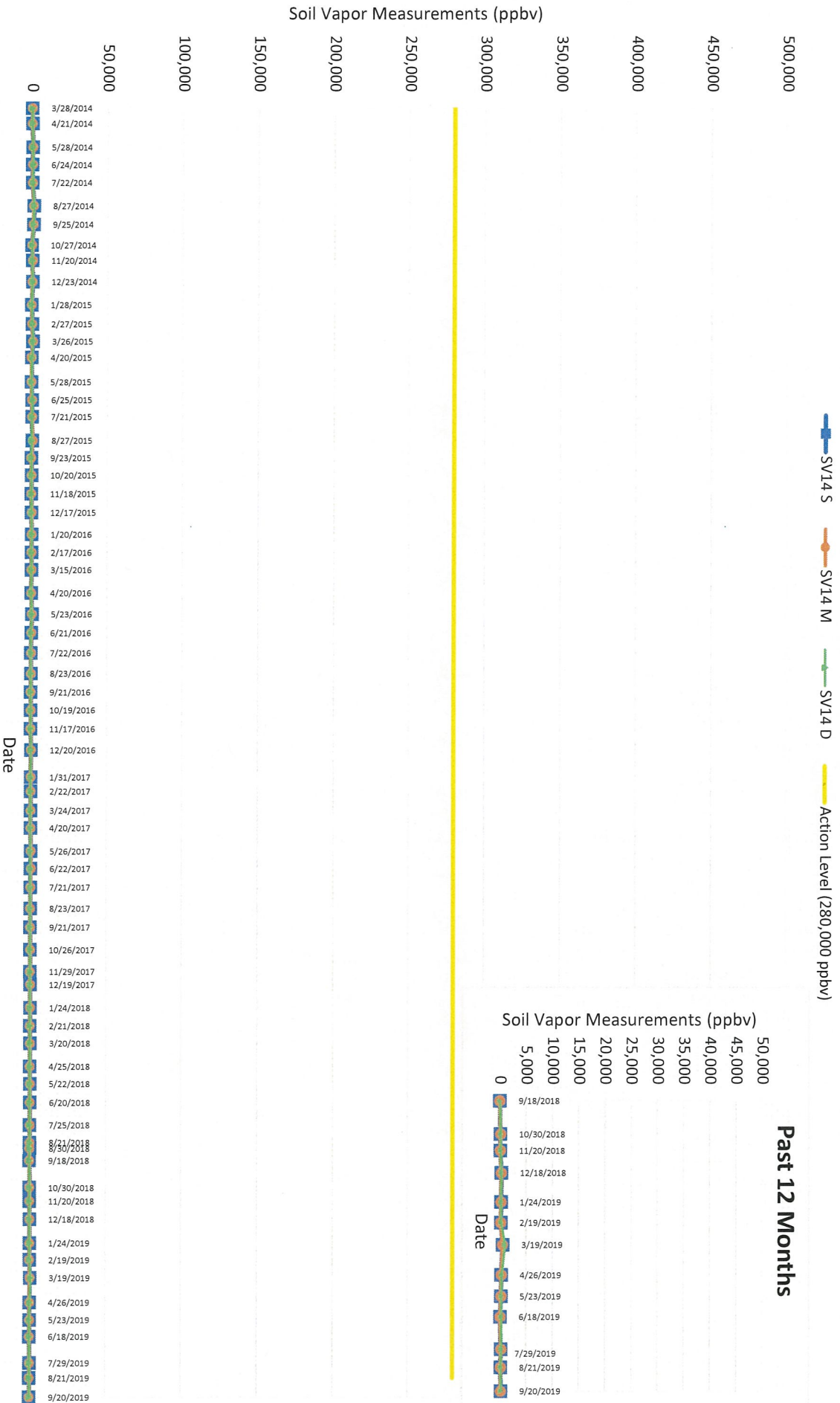
**Figure 12**  
**Soil Vapor Measurements - SV13 (JP-5)**



Notes:  
 ppbv: Parts Per Billion by Volume  
 F-24: Jet Fuel, Fuel Number 24

JP-5: Jet Fuel, Propellant Number 5  
 F-76: Marine Diesel, Fuel Number 76

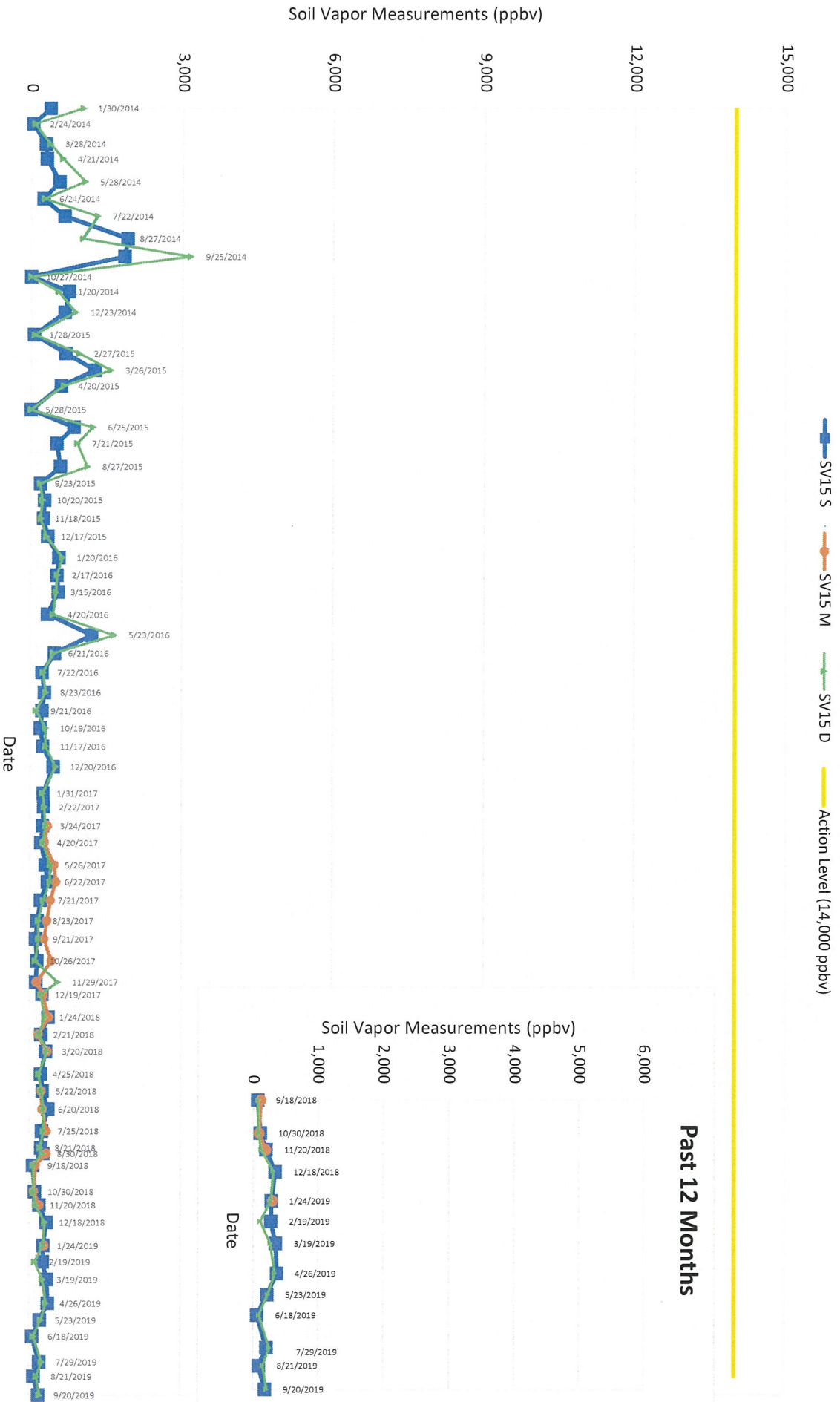
**Figure 13**  
**Soil Vapor Measurements - SV14 (JP-5)**



Notes:  
 ppbv: Parts Per Billion by Volume  
 F-24: Jet Fuel, Fuel Number 24

JP-5: Jet Fuel, Propellant Number 5  
 F-76: Marine Diesel, Fuel Number 76

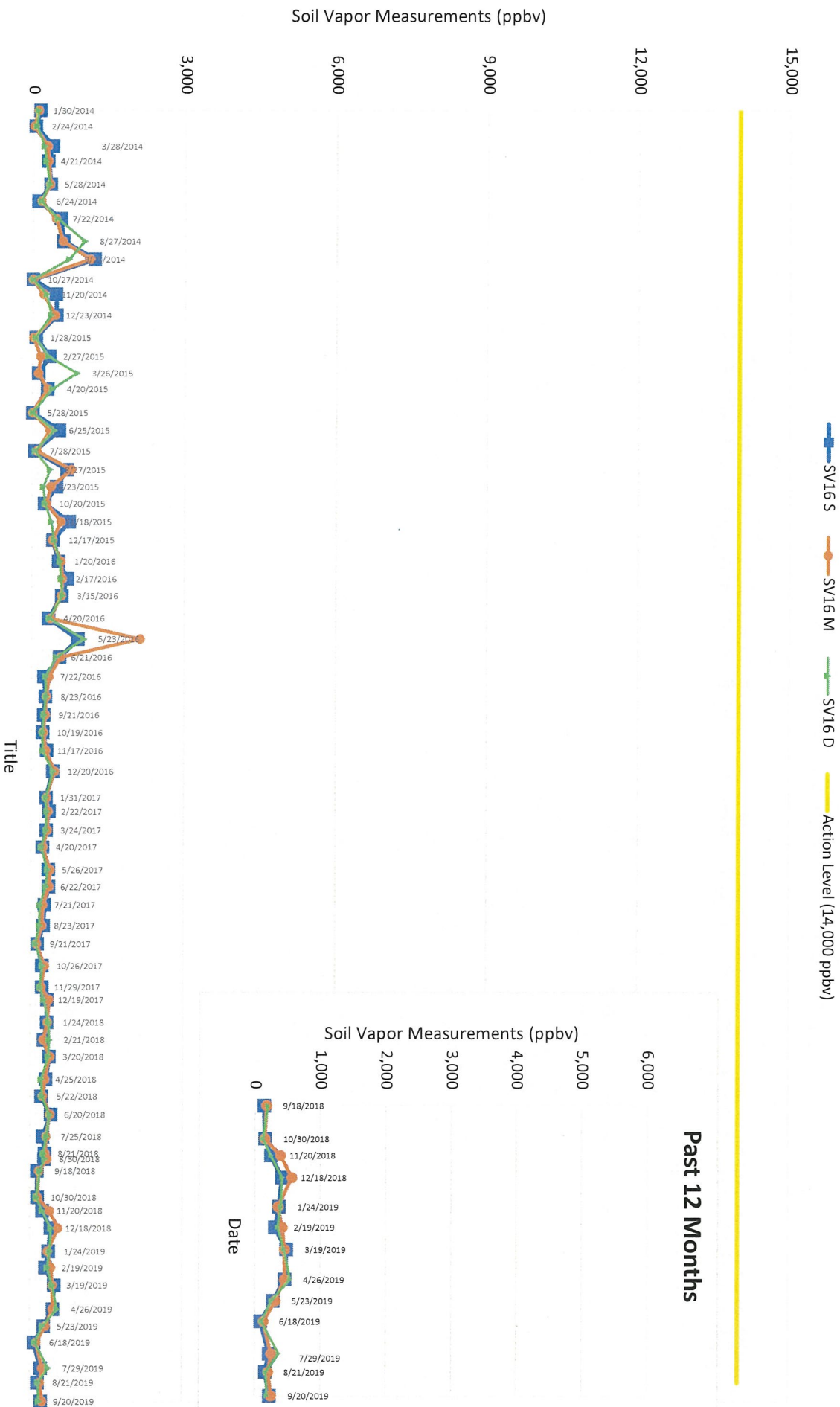
**Figure 14**  
**Soil Vapor Measurements - SV15 (F-76)**



Notes:  
 ppbv: Parts Per Billion by Volume  
 F-24: Jet Fuel, Fuel Number 24

JP-5: Jet Fuel, Propellant Number 5  
 F-76: Marine Diesel, Fuel Number 76

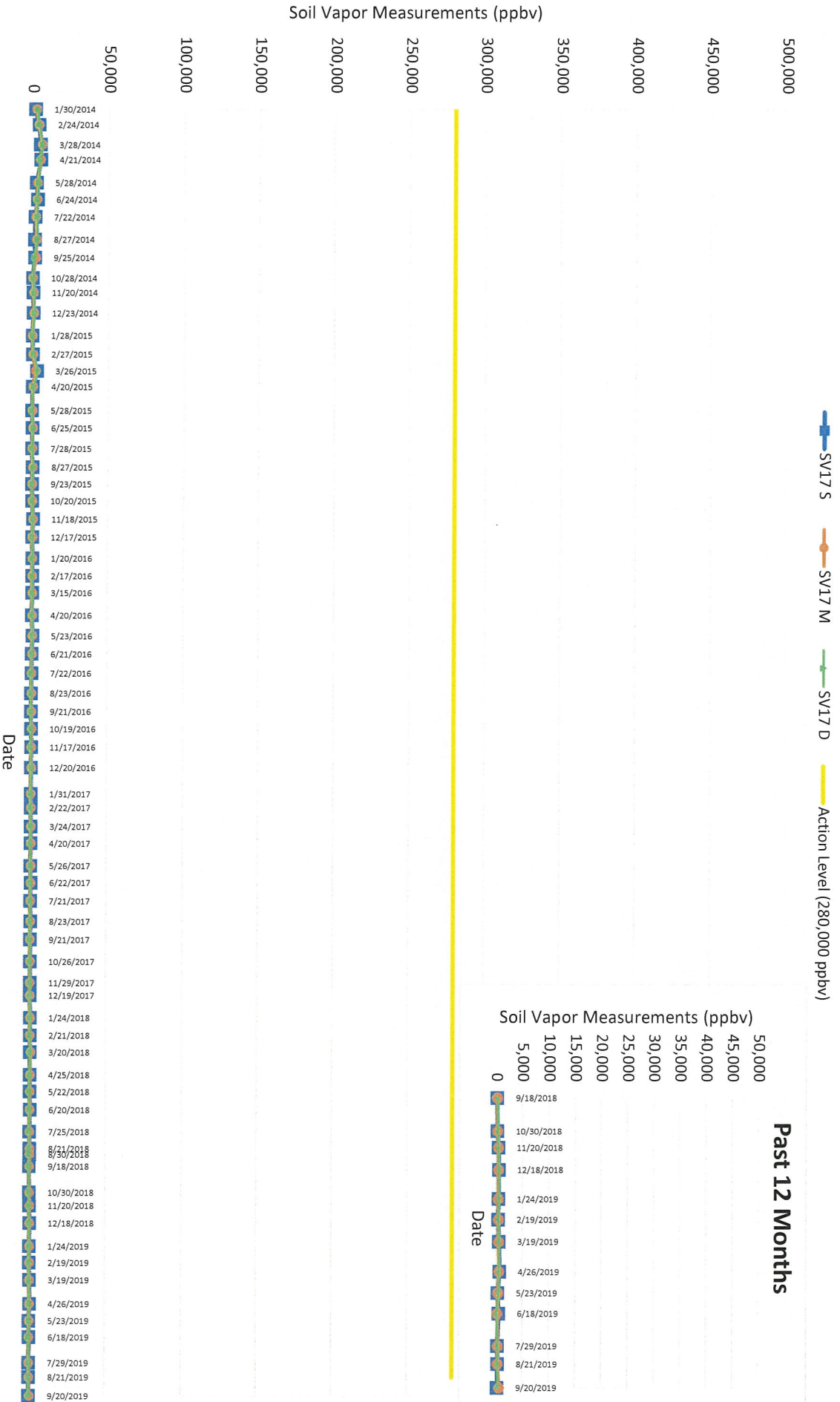
**Figure 15**  
**Soil Vapor Measurements - SV16 (F-76)**



Notes:  
 ppbv: Parts Per Billion by Volume  
 F-24: Jet Fuel, Fuel Number 24

JP-5: Jet Fuel, Propellant Number 5  
 F-76: Marine Diesel, Fuel Number 76

**Figure 16**  
**Soil Vapor Measurements - SV17 (JP-5)**



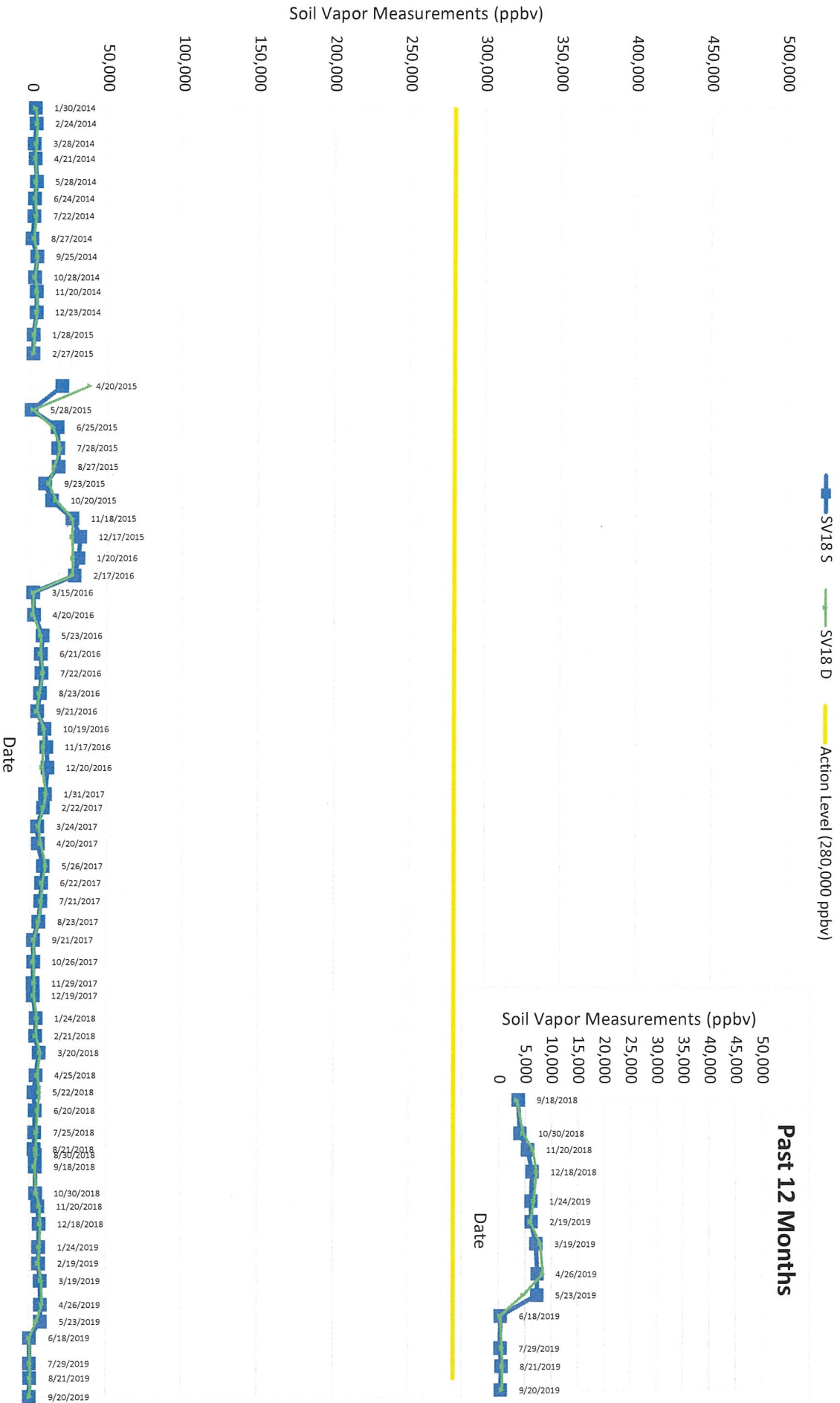
**Notes:**

ppbv: Parts Per Billion by Volume  
 F-24: Jet Fuel, Fuel Number 24

JP-5: Jet Fuel, Propellant Number 5  
 F-76: Marine Diesel, Fuel Number 76



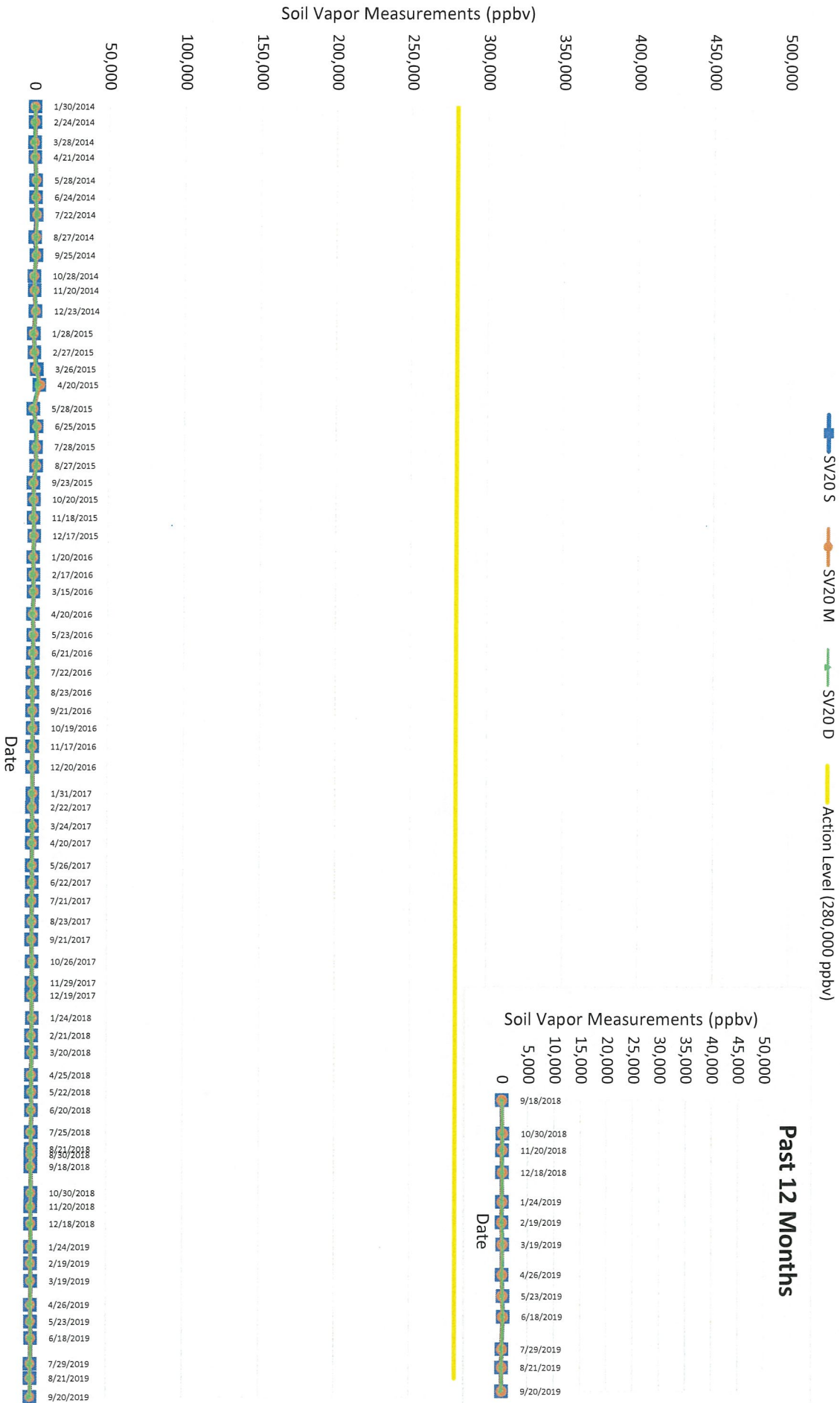
**Figure 17**  
**Soil Vapor Measurements - SV18 (JP-5)**



Notes:  
 ppbv: Parts Per Billion by Volume  
 F-24: Jet Fuel, Fuel Number 24

JP-5: Jet Fuel, Propellant Number 5  
 F-76: Marine Diesel, Fuel Number 76

**Figure 18**  
**Soil Vapor Measurements - SV20 (JP-5)**



Notes:  
 ppbv: Parts Per Billion by Volume  
 F-24: Jet Fuel, Fuel Number 24

JP-5: Jet Fuel, Propellant Number 5  
 F-76: Marine Diesel, Fuel Number 76

12 November 2019

From: Environmental Protection Specialist, NAVSUP FLC Pearl Harbor, HI  
To: Environmental Department, NAVFAC Pearl Harbor, HI

Subj: NAVSUP FLC PEARL HARBOR CAUSATIVE RESEARCH REPORT IRT RED HILL  
SOIL VAPOR MONITORING REPORT FOR SEPTEMBER 2019

Ref: (a) Red Hill Bulk Fuel Storage Facility Groundwater Protection Plan  
(b) Red Hill Soil Vapor Monitoring Report for Round 138, dated 27 September 2019

1. Ref (a) requires NAVSUP FLCPH investigate possible fuel leaks. Refs (b) reported the following soil vapor monitoring results at the Red Hill Fuel Storage Facility:

- Slight increase trends at tank 2-4, 7-13, 16 and 18.

2. FLCPH causative research and findings:

a. Reviewed all AFHE Unscheduled Fuel Movement (UFM) Alarm Summaries and UFM Reports. The following UFM's were recorded between sampling events 137 and 138 during the period of 22 Aug 2019- 20 Sep 2019:

30 Aug – RH16: A low UFM alarm occurred. Dispatched Rover to tank and conditions were normal. Tank was top gauged and inventory had not changed since last report. Investigative actions confirmed no release of fuel from the tank occurred. Opened Trouble Ticket # 4294391 to update set points.

01 Sep - RH 20: A high UFM alarm occurred while tank was idle. Dispatched Rover to tank and conditions were normal. Tank was top gauged and inventory had not changed since last report. Investigative actions confirmed no release of fuel from the tank occurred. Opened Trouble Ticket # 4294413 to determine cause of erroneous alarms.

06 Sep - RH 20: A high UFM alarm occurred while tank was idle. Dispatched Rover to tank and conditions were normal. Tank was top gauged and inventory had not changed since last report. Investigative actions confirmed no release of fuel from the tank occurred. We are using opened Trouble Ticket # 4294413 from 1 Sep 19 to determine cause of erroneous alarms.

10 Sep - RH 09: A high UFM alarm occurred while tank was idle. Dispatched Rover to tank and conditions were normal. Tank was top gauged and inventory had not changed since last report. Investigative actions confirmed no release of fuel from the tank occurred. Opened Trouble Ticket #4409303 to determine cause of erroneous alarms

17 Sep – TK301: A High UFM Alarm occurred. A UFM occurred due to the evolution not being started in a sufficient amount of time by the operator. Operator Error, confirmed no release of fuel from the tank occurred.

**ENCLOSURE(2)**

Subj: NAVSUP FLC PEARL HARBOR CAUSATIVE RESEARCH REPORT IRT RED HILL  
SOIL VAPOR MONITORING REPORT FOR SEPTEMBER 2019

17 Sep – RH15: A low UFM alarm occurred while completing evolution. Dispatched Rover to tank and conditions were normal. Tank was top gauged and inventory had not changed since last report. Maintenance verified that the system set points were not updating. Investigative actions confirmed no release of fuel from the tank occurred. Opened Trouble Ticket # 4347151 to update set points.

19 Sep – RH05: A low UFM alarm occurred. This tank is currently empty and under KTR repair work for the tank CIR process. The UFM occurred due to bringing the tank back on-line to AFHE to relieve history data for planning purposes. No Trouble Ticket required as tank is out of service and empty.

20 Sep – TK301: A High UFM Alarm occurred. A UFM occurred due to an erroneous input for the destination Tank. The destination was inputted, “pseudo” instead of Tank 301, which caused the UFM. Confirmed no release of fuel from the tank occurred. No Trouble Ticket required.

Reviewed Red Hill Inventory Trend Analysis Reports for September 2019; reports did not reveal evidence of a loss of fuel in any Red Hill tank.

- b. Red Hill maintenance and repair contractors did not report any factors that could have influenced increase in trends.
  - c. Inspection of the area surrounding all Red Hill tanks did not show evidence of a fuel leak or evidence that any fuel had spilled in the area.
  - d. All active tanks have passed tank tightness testing within the required periodicity.
3. There are no evidence of a leaking tank in the Red Hill Complex or evidence of a spill that may have contributed to elevated soil vapor VOC levels in the area of elevated VOC concentrations.

Richard Santos