



DEPARTMENT OF THE NAVY

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

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Ser N45/143

December 17, 2021

**CERTIFIED NO: 9489 0090 0027 6232 9775 50**

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

Dear Mr. Takaba:

SUBJECT: SOIL VAPOR SAMPLING RESULTS FOR NOVEMBER 2021  
RED HILL TANK COMPLEX  
DOH FACILITY ID NO. 9-102271  
DOH RELEASE ID NO. 990051, 010011, 020028, 140010, AND 210012

Monthly soil vapor samples were collected on November 19, 2021 from beneath all accessible Red Hill tanks, with the exception of Tanks 1 and 19, which are inactive and not included in the sampling network. The 18 tanks in the sampling network have two or three soil vapor monitoring points (SVMPs) screened within designated areas beneath the tanks. These SVMPs are each designated as shallow (S), middle (M), deep (D), or M/D.

To assess the integrity of the associated tank system, an action threshold or level was established as 50 percent of the calculated vapor concentration from fuel-saturated water. This conservative approach generated action thresholds of 280,000 ppbv for SVMPs beneath tanks containing jet fuels (F-24 or JP-5) and 14,000 ppbv for SVMPs beneath tanks containing marine diesel fuel (F-76).

Soil vapor VOC concentrations measured with a photo-ionization detector (PID) in the field are presented with the appropriate action level graphically in Enclosure 1. At Tank 5, the concentrations of VOCs detected in the SVMPs were 648 (SV05S), 413 (SV05M), and 417 (SV05D) ppbv, respectively. VOC concentrations measured in all down-gradient tank SVMPs were between 162 and 411 ppbv.

The Navy performed a causative investigation of fuel operations conducted during this time period due to increase in trends at SV07D, SV20S, SV20M, and SV20D. NAVSUP FLC Pearl Harbor Causative Research Report is submitted as Enclosure 2. This report documents causative research and findings to conclude there was no evidence of a leaking tank or spill at the time of sampling at the Red Hill Complex that may have contributed to elevated soil vapor VOC concentrations.

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All VOC concentrations measured in November were below the action levels, with no consistent trends observed over time. Additional monitoring in accordance with the DOH Transition Plan of June 10, 2021 in response to the May 6, 2021 pipeline breach is ongoing. These results are reported under separate cover. Regular monthly soil vapor VOC concentrations will continue to be sampled and reported with the next event scheduled for the week of December 13, 2021.

If there are any questions regarding the November soil vapor sampling results, or if more information is needed, please contact Ms. Susan Lohr at (808) 471-4619 or Ms. Dayna Fujimoto at (808) 471-4805.

Sincerely,



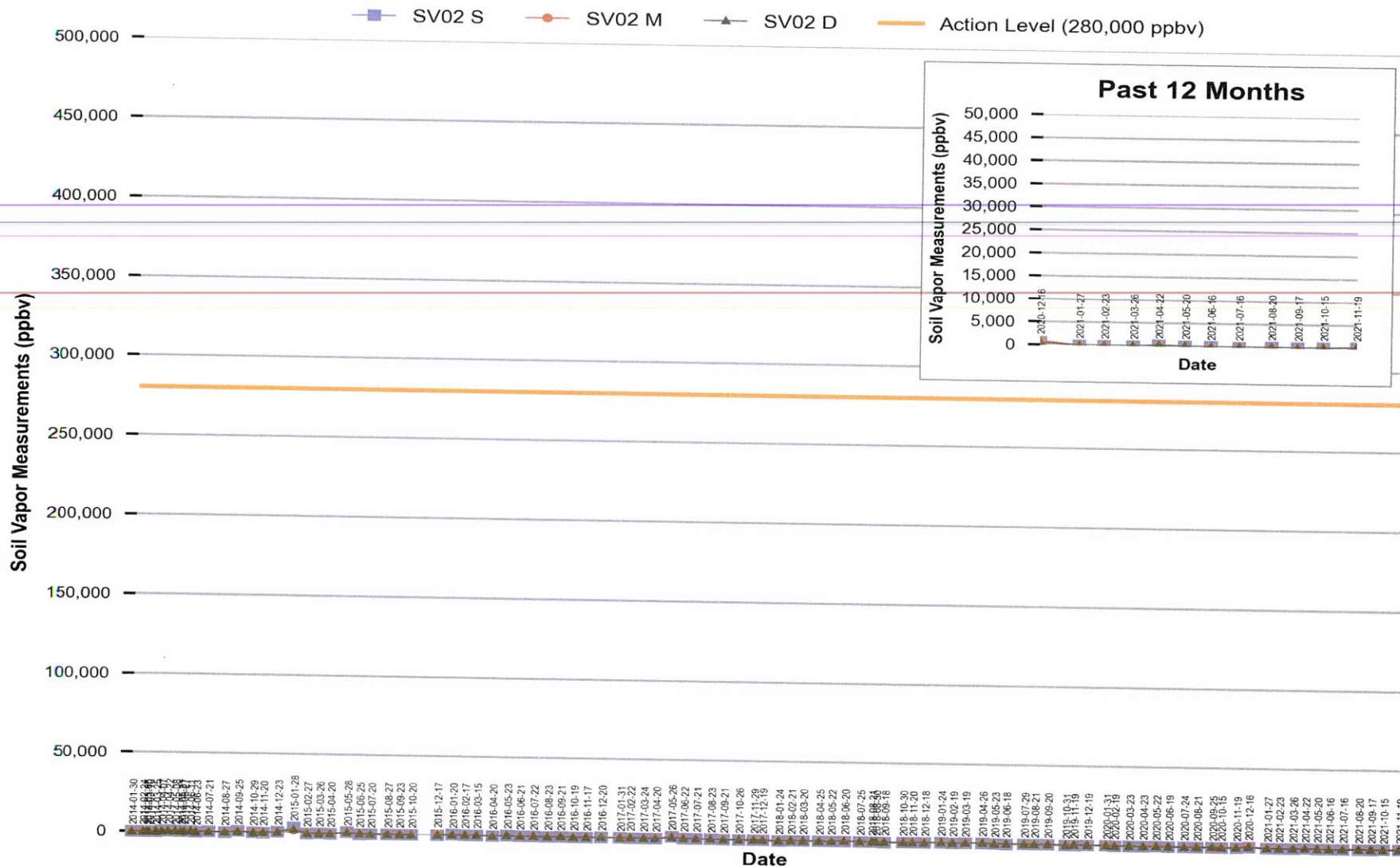
SHERRIL R. ENG  
Director  
Regional Environmental Department  
By direction of the  
Commander

- Enclosures: 1. Graphical Summary of Soil Vapor Sampling Results for Tanks 2 - 18 and 20  
Data represented through November 2021 (18 pages)  
2. NAVSUP FLC Pearl Harbor Causative Research Report IRT Red Hill Soil  
Vapor Monitoring Report for November 2021

Copy to: Mr. John Floyd, NAVSUP FLC Pearl Harbor

Electronic Copies to: Ms. Gabriela Carvalho, U.S. EPA Region 9, Red Hill Program Coordinator  
Mr. John Reed, DLA Energy Pacific  
Mr. William Potter, DLA Energy - Engineering, Environmental, Property  
Directorate

**Figure 1**  
**Red Hill - Tank 02 (F-24)**  
**Soil Vapor Measurements (Jan 2014 Through Nov 2021)**



Notes (where applicable):

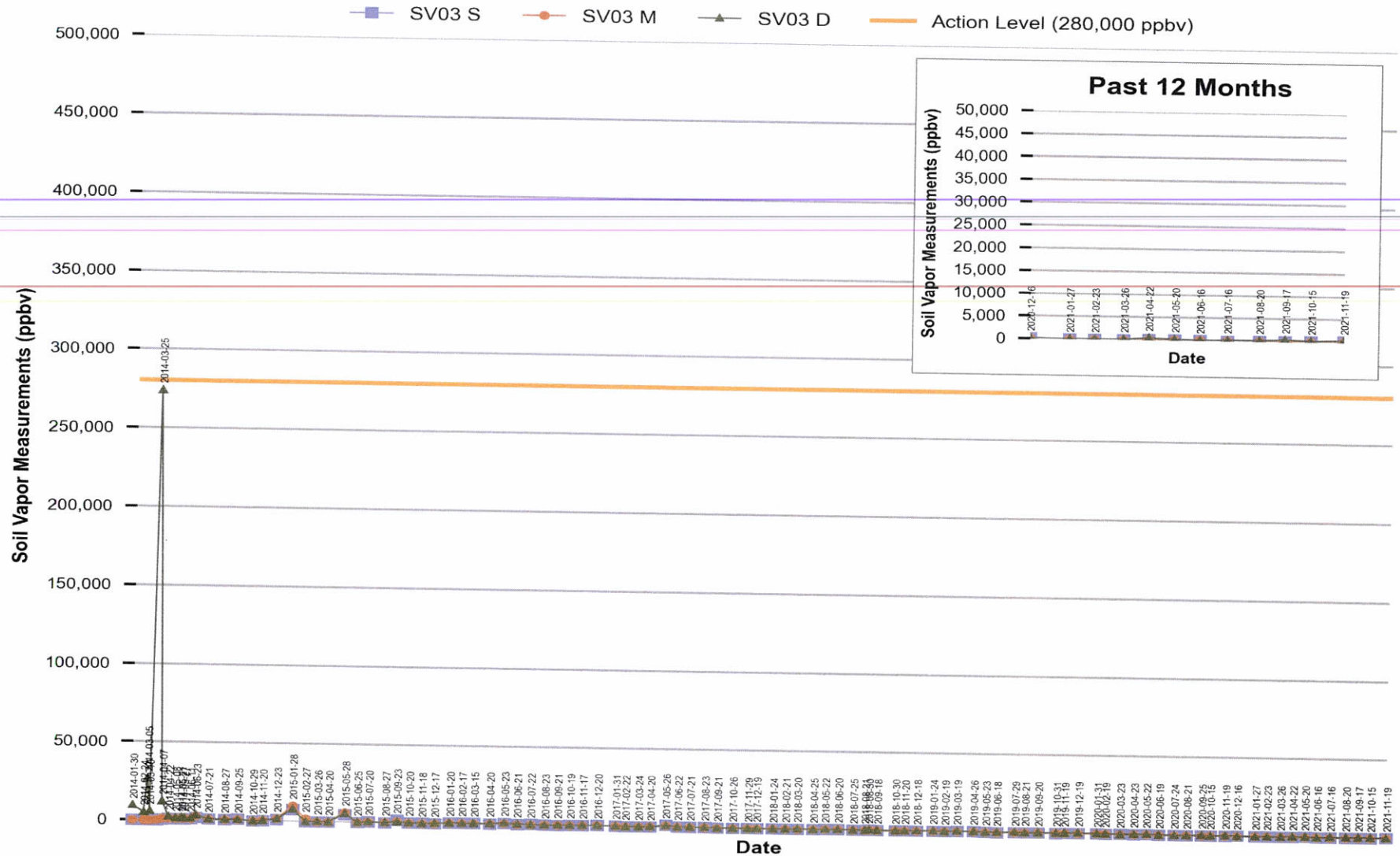
\* "M/D" monitoring points were constructed to screen both middle & deep depth intervals along the respective underground storage tank.

F-24: Jet Fuel, Fuel Number 24  
 F-76: Marine Diesel, Fuel Number 76

JP-5: Jet Fuel, Propellant Number 5  
 ppbv: Parts Per Billion by Volume



**Figure 2**  
**Red Hill - Tank 03 (F-24)**  
**Soil Vapor Measurements (Jan 2014 Through Nov 2021)**



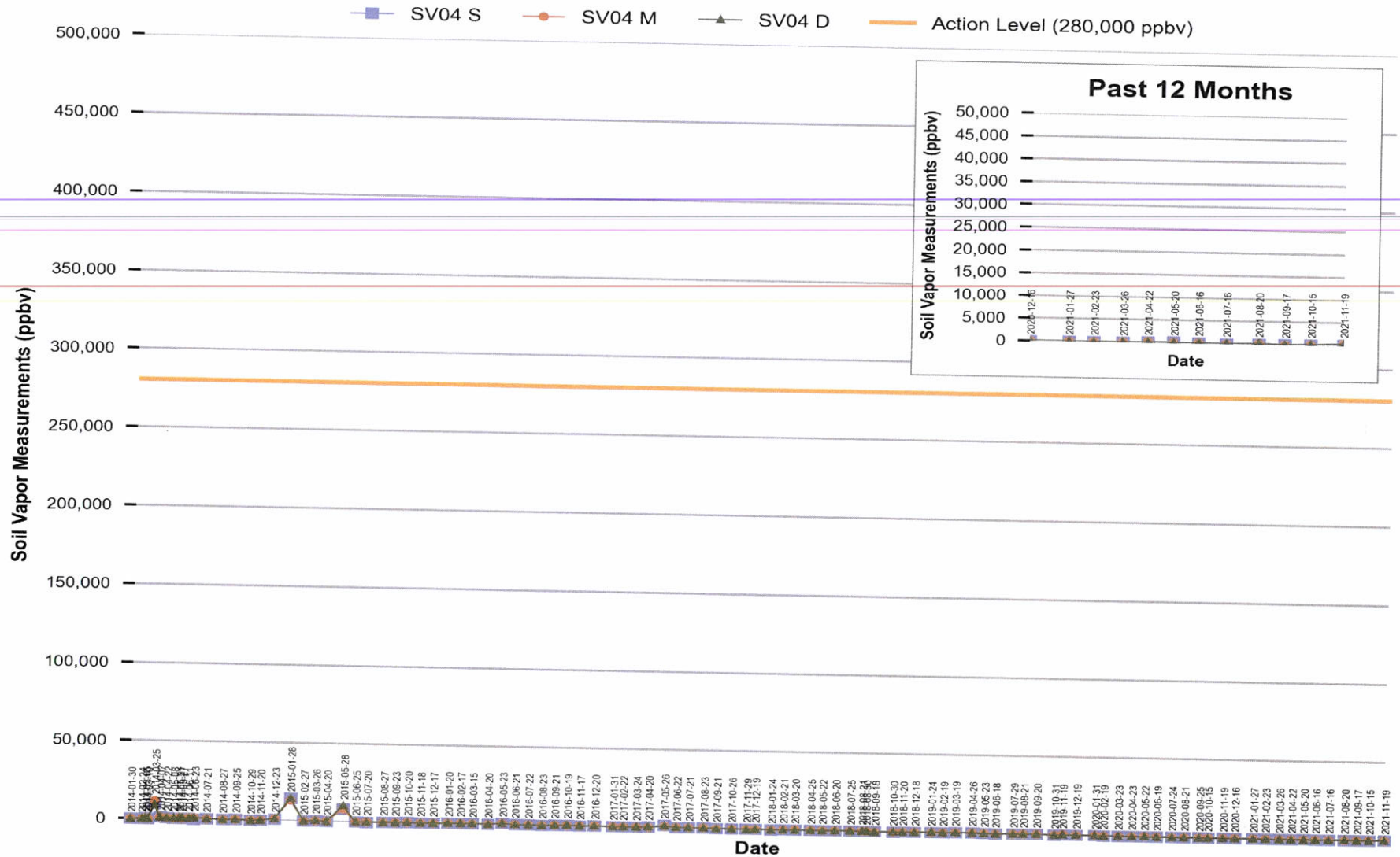
Notes (where applicable):

\* "M/D" monitoring points were constructed to screen both middle & deep depth intervals along the respective underground storage tank.

F-24: Jet Fuel, Fuel Number 24  
 F-76: Marine Diesel, Fuel Number 76

JP-5: Jet Fuel, Propellant Number 5  
 ppbv: Parts Per Billion by Volume

**Figure 3**  
**Red Hill - Tank 04 (F-24)**  
**Soil Vapor Measurements (Jan 2014 Through Nov 2021)**



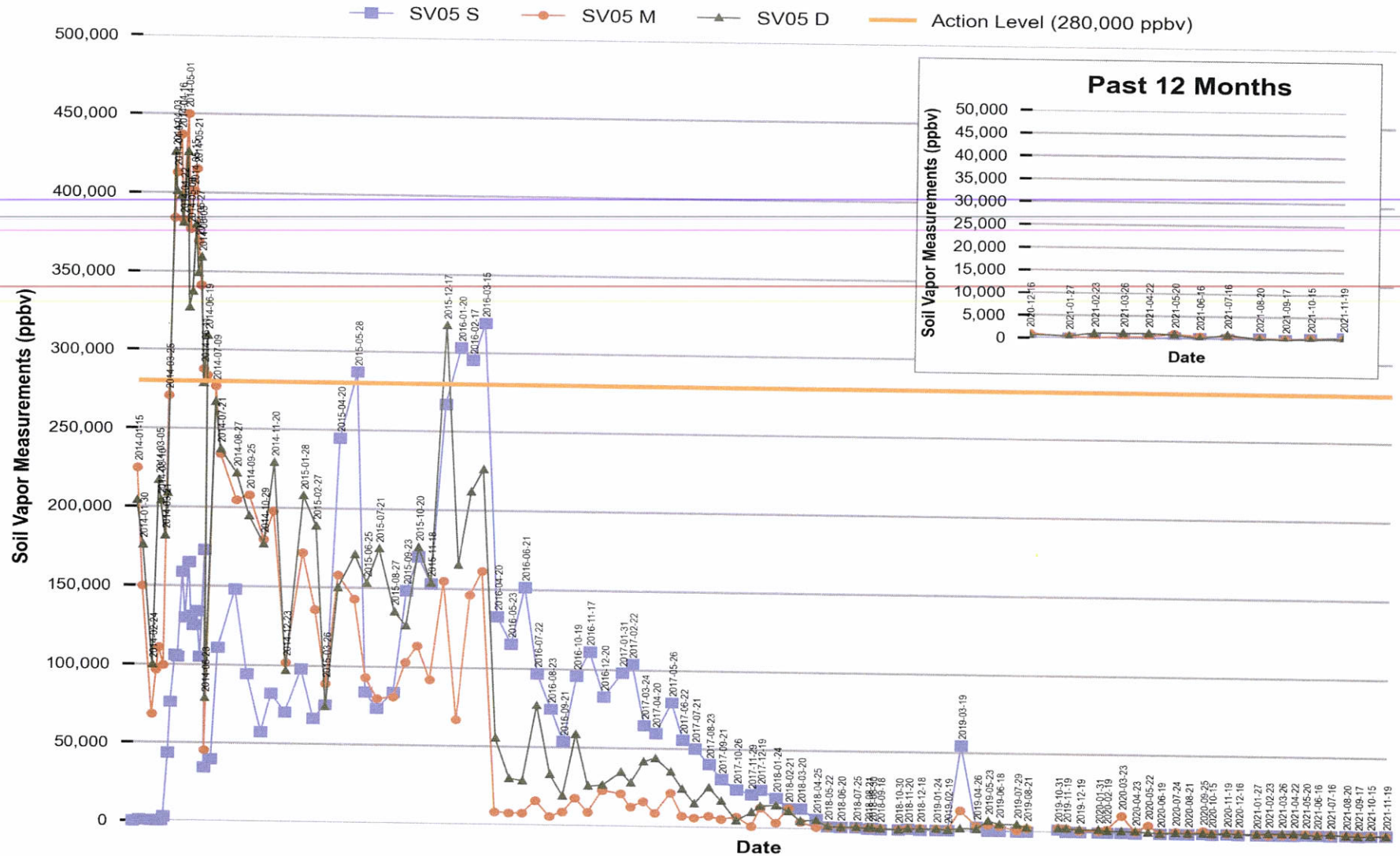
Notes (where applicable):

\* "M/D" monitoring points were constructed to screen both middle & deep depth intervals along the respective underground storage tank.

F-24: Jet Fuel, Fuel Number 24  
 F-76: Marine Diesel, Fuel Number 76

JP-5: Jet Fuel, Propellant Number 5  
 ppbv: Parts Per Billion by Volume

**Figure 4**  
**Red Hill - Tank 05 (F-24)**  
**Soil Vapor Measurements (Jan 2014 Through Nov 2021)**



Notes (where applicable):

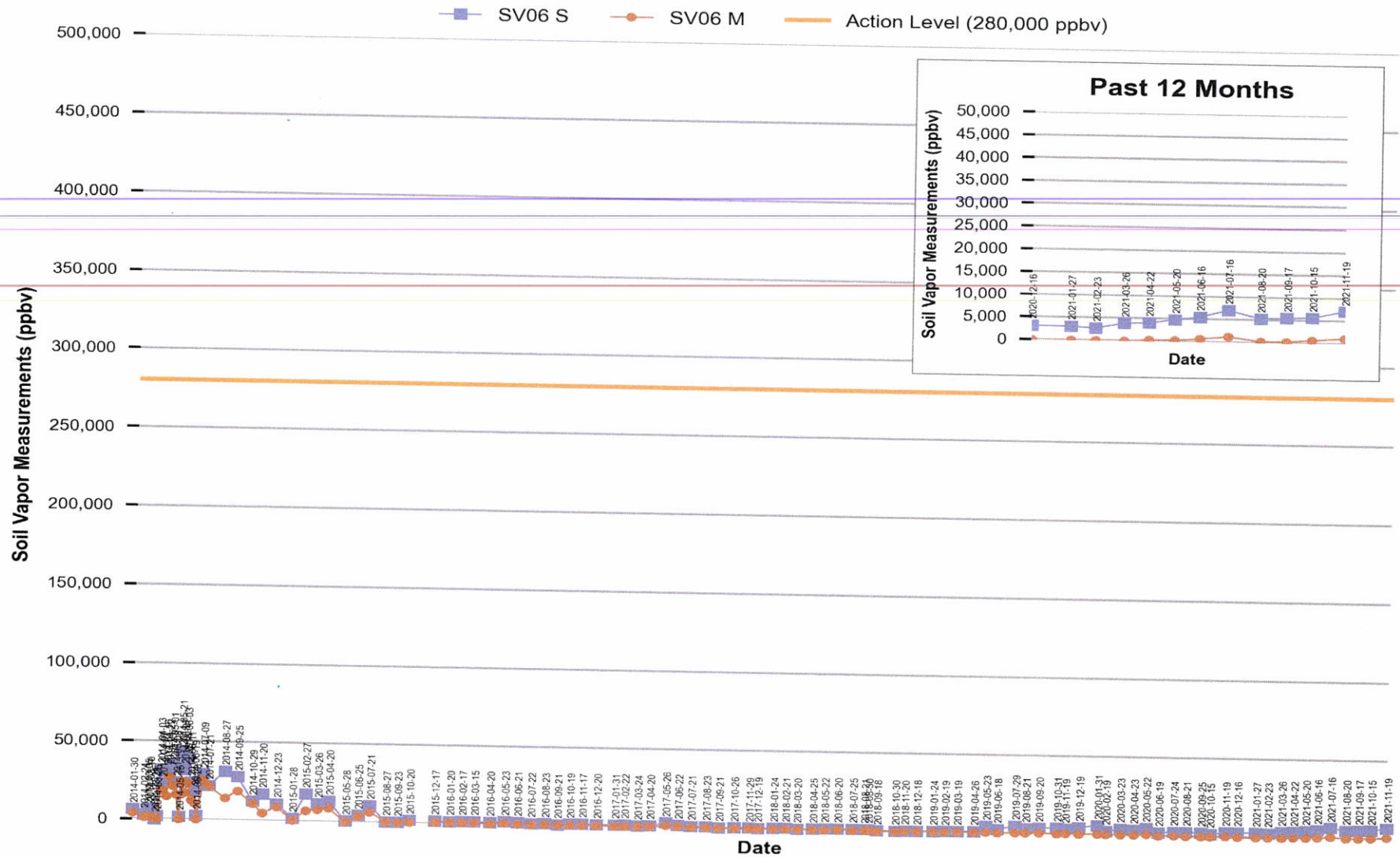
\* "M/D" monitoring points were constructed to screen both middle & deep depth intervals along the respective underground storage tank.

F-24: Jet Fuel, Fuel Number 24  
 F-76: Marine Diesel, Fuel Number 76

JP-5: Jet Fuel, Propellant Number 5  
 ppbv: Parts Per Billion by Volume



**Figure 5**  
**Red Hill - Tank 06 (F-24)**  
**Soil Vapor Measurements (Jan 2014 Through Nov 2021)**



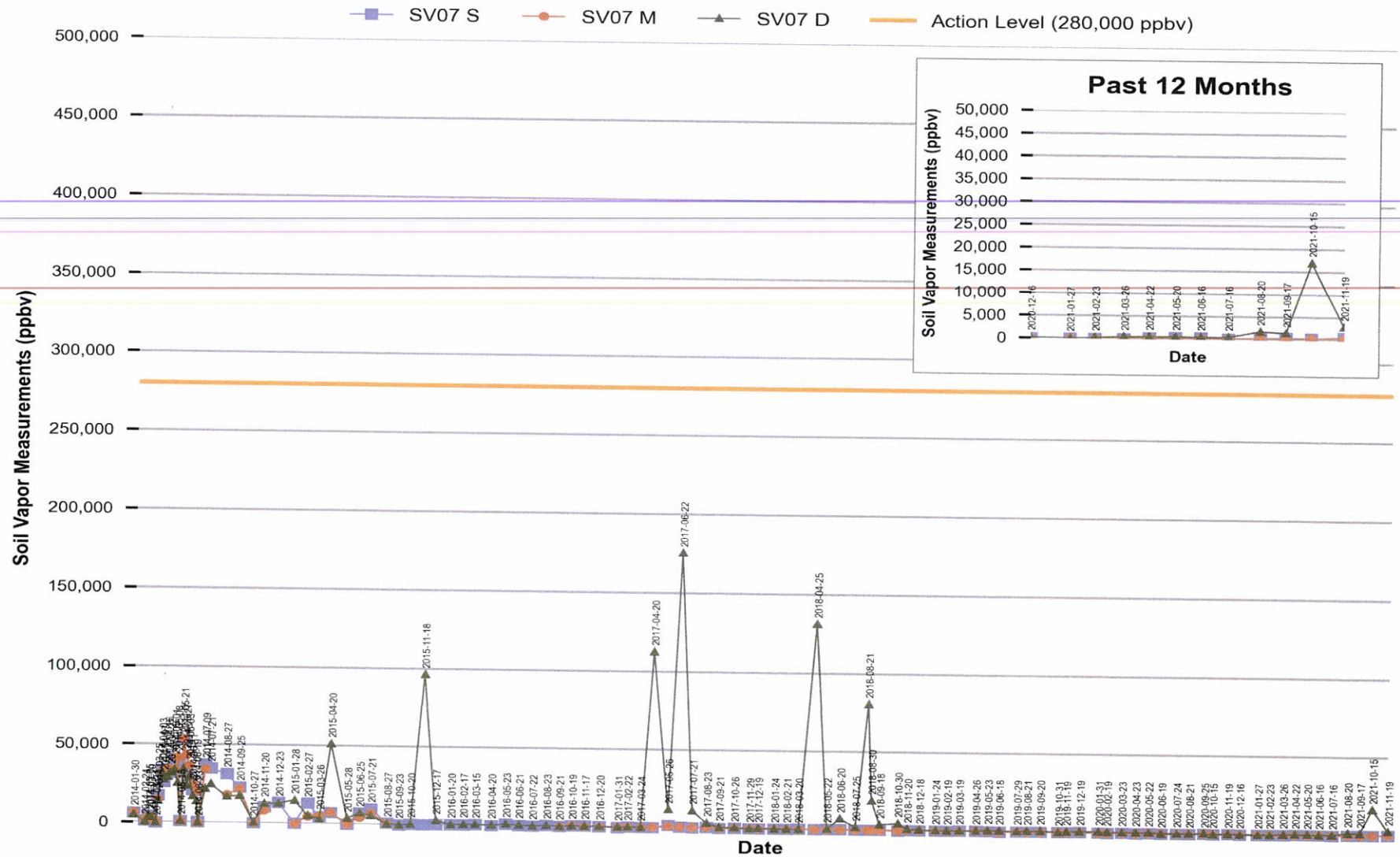
Notes (where applicable):

\* "M/D" monitoring points were constructed to screen both middle & deep depth intervals along the respective underground storage tank.

F-24: Jet Fuel, Fuel Number 24  
 F-76: Marine Diesel, Fuel Number 76

JP-5: Jet Fuel, Propellant Number 5  
 ppbv: Parts Per Billion by Volume

**Figure 6**  
**Red Hill - Tank 07 (JP-5)**  
**Soil Vapor Measurements (Jan 2014 Through Nov 2021)**



Notes (where applicable):

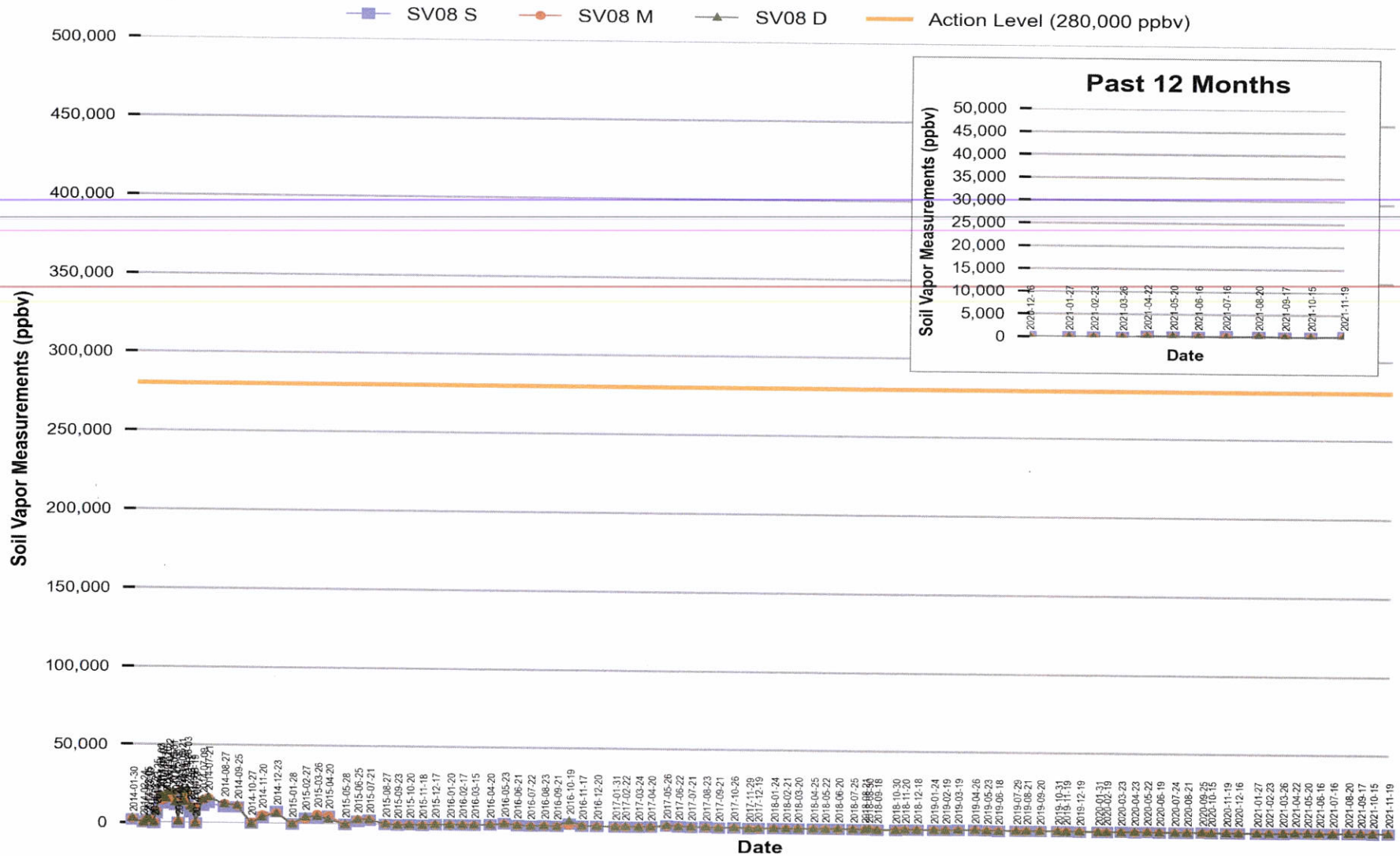
\* "M/D" monitoring points were constructed to screen both middle & deep depth intervals along the respective underground storage tank.

F-24: Jet Fuel, Fuel Number 24  
 F-76: Marine Diesel, Fuel Number 76

JP-5: Jet Fuel, Propellant Number 5  
 ppbv: Parts Per Billion by Volume



**Figure 7**  
**Red Hill - Tank 08 (JP-5)**  
**Soil Vapor Measurements (Jan 2014 Through Nov 2021)**



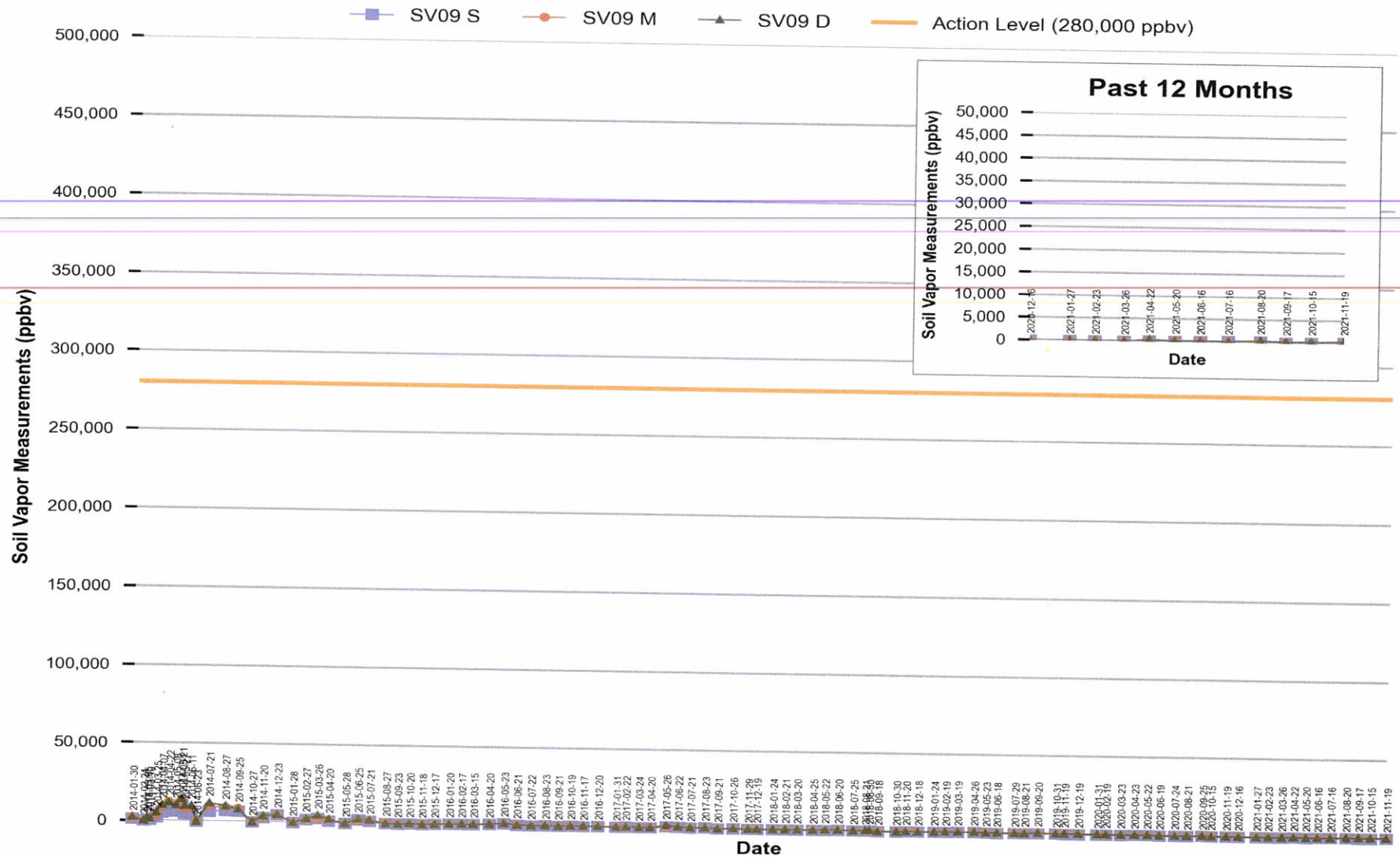
Notes (where applicable):

\* "M/D" monitoring points were constructed to screen both middle & deep depth intervals along the respective underground storage tank.

F-24: Jet Fuel, Fuel Number 24  
 F-76: Marine Diesel, Fuel Number 76

JP-5: Jet Fuel, Propellant Number 5  
 ppbv: Parts Per Billion by Volume

**Figure 8**  
**Red Hill - Tank 09 (JP-5)**  
**Soil Vapor Measurements (Jan 2014 Through Nov 2021)**



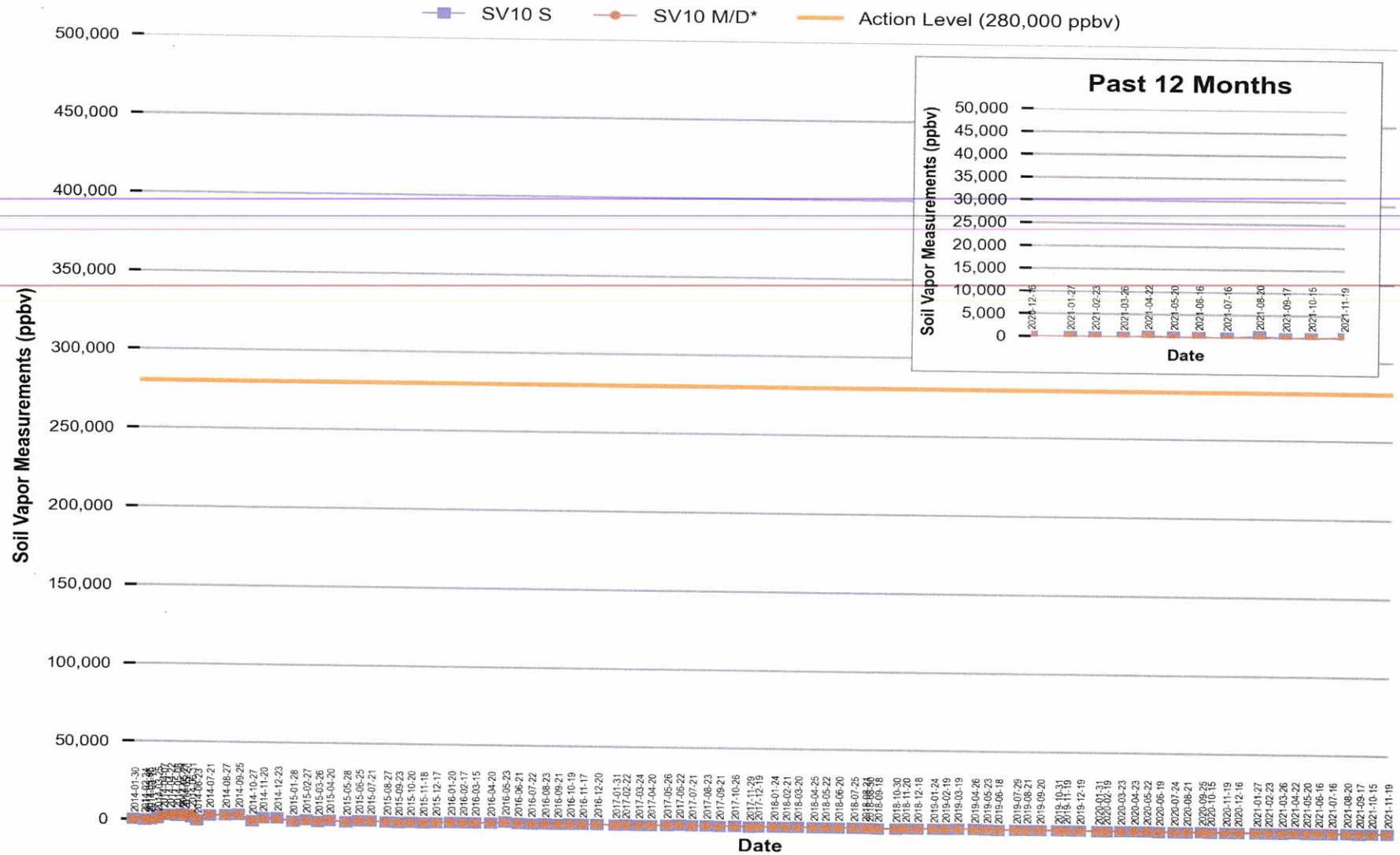
Notes (where applicable):

\* "M/D" monitoring points were constructed to screen both middle & deep depth intervals along the respective underground storage tank.

F-24: Jet Fuel, Fuel Number 24  
 F-76: Marine Diesel, Fuel Number 76

JP-5: Jet Fuel, Propellant Number 5  
 ppbv: Parts Per Billion by Volume

**Figure 9**  
**Red Hill - Tank 10 (JP-5)**  
**Soil Vapor Measurements (Jan 2014 Through Nov 2021)**



Notes (where applicable):

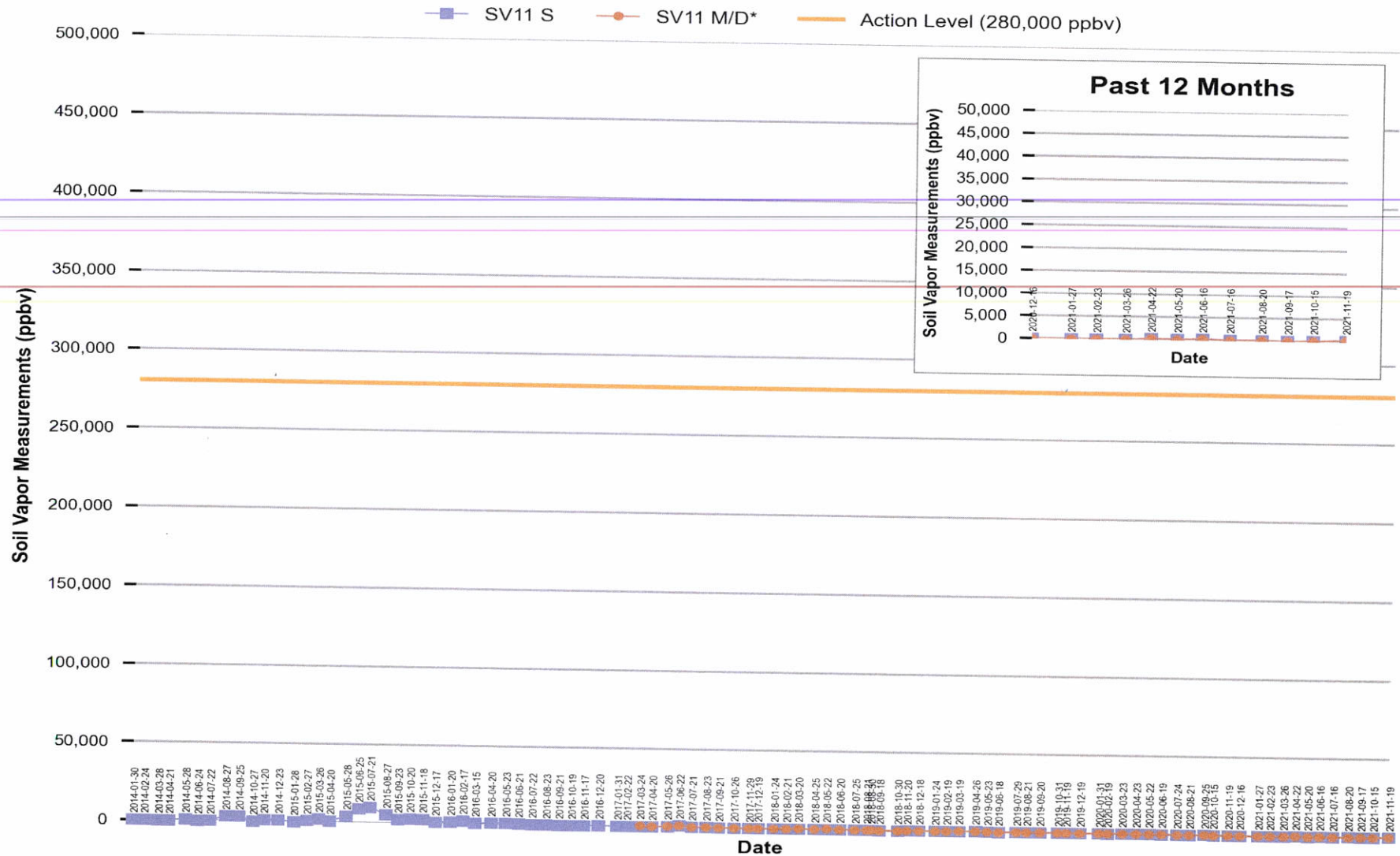
\* "M/D" monitoring points were constructed to screen both middle & deep depth intervals along the respective underground storage tank.

F-24: Jet Fuel, Fuel Number 24  
 F-76: Marine Diesel, Fuel Number 76

JP-5: Jet Fuel, Propellant Number 5  
 ppbv: Parts Per Billion by Volume



**Figure 10**  
**Red Hill - Tank 11 (JP-5)**  
**Soil Vapor Measurements (Jan 2014 Through Nov 2021)**



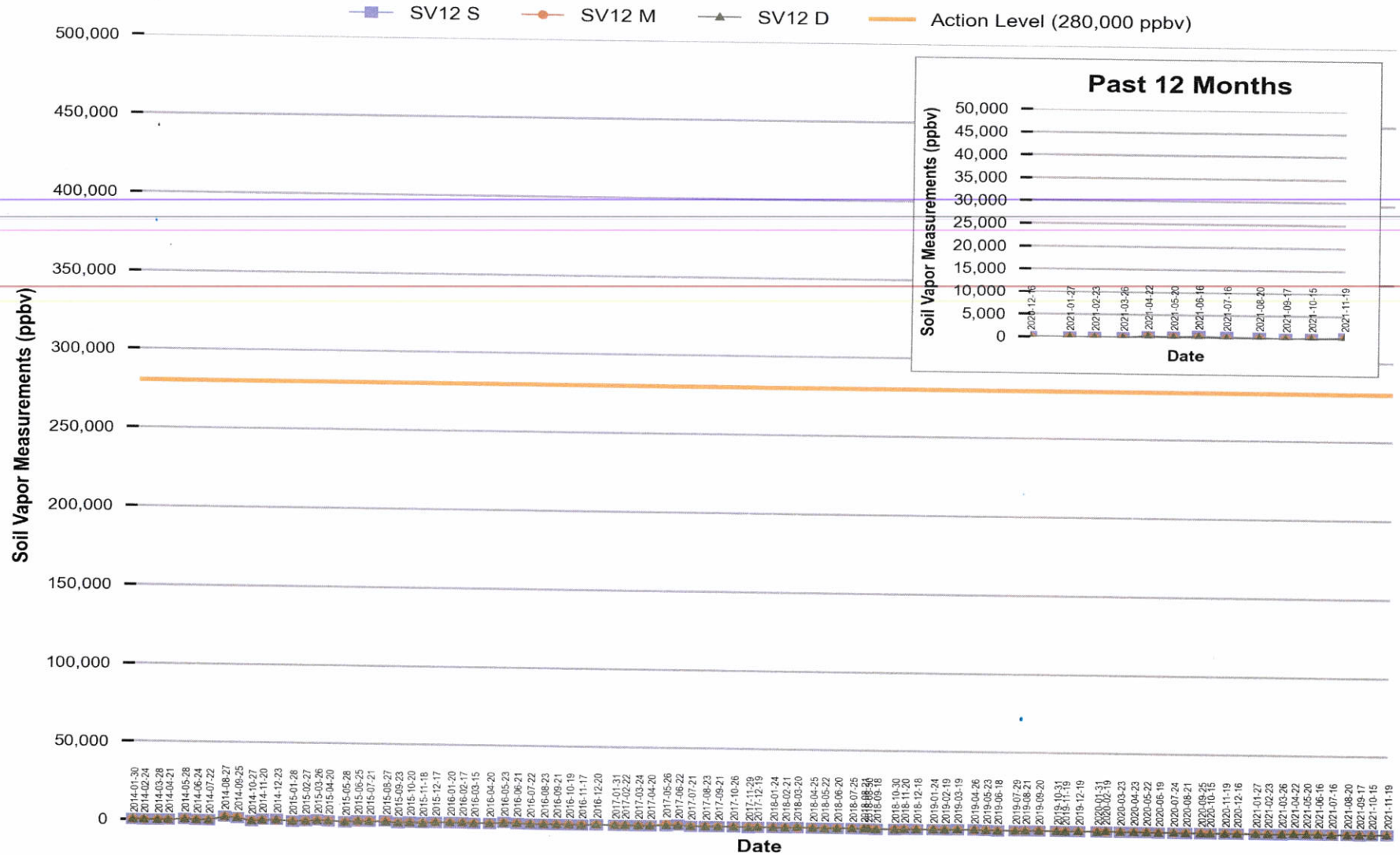
Notes (where applicable):

\* "M/D" monitoring points were constructed to screen both middle & deep depth intervals along the respective underground storage tank.

F-24: Jet Fuel, Fuel Number 24  
 F-76: Marine Diesel, Fuel Number 76

JP-5: Jet Fuel, Propellant Number 5  
 ppbv: Parts Per Billion by Volume

**Figure 11**  
**Red Hill - Tank 12 (JP-5)**  
**Soil Vapor Measurements (Jan 2014 Through Nov 2021)**



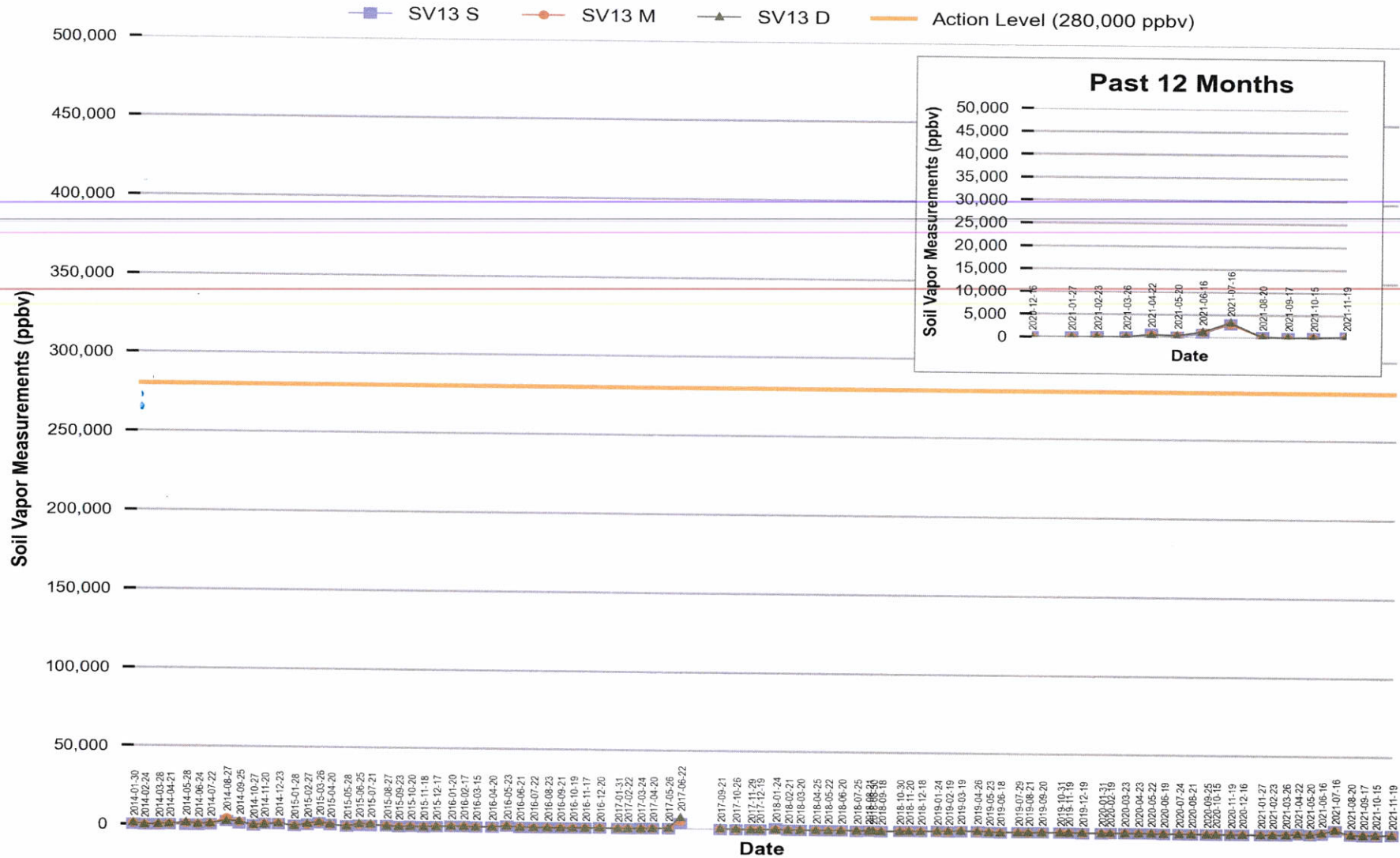
Notes (where applicable):

\* "M/D" monitoring points were constructed to screen both middle & deep depth intervals along the respective underground storage tank.

F-24: Jet Fuel, Fuel Number 24  
 F-76: Marine Diesel, Fuel Number 76

JP-5: Jet Fuel, Propellant Number 5  
 ppbv: Parts Per Billion by Volume

**Figure 12**  
**Red Hill - Tank 13 (JP-5)**  
**Soil Vapor Measurements (Jan 2014 Through Nov 2021)**



Notes (where applicable):

\* "M/D" monitoring points were constructed to screen both middle & deep depth intervals along the respective underground storage tank.

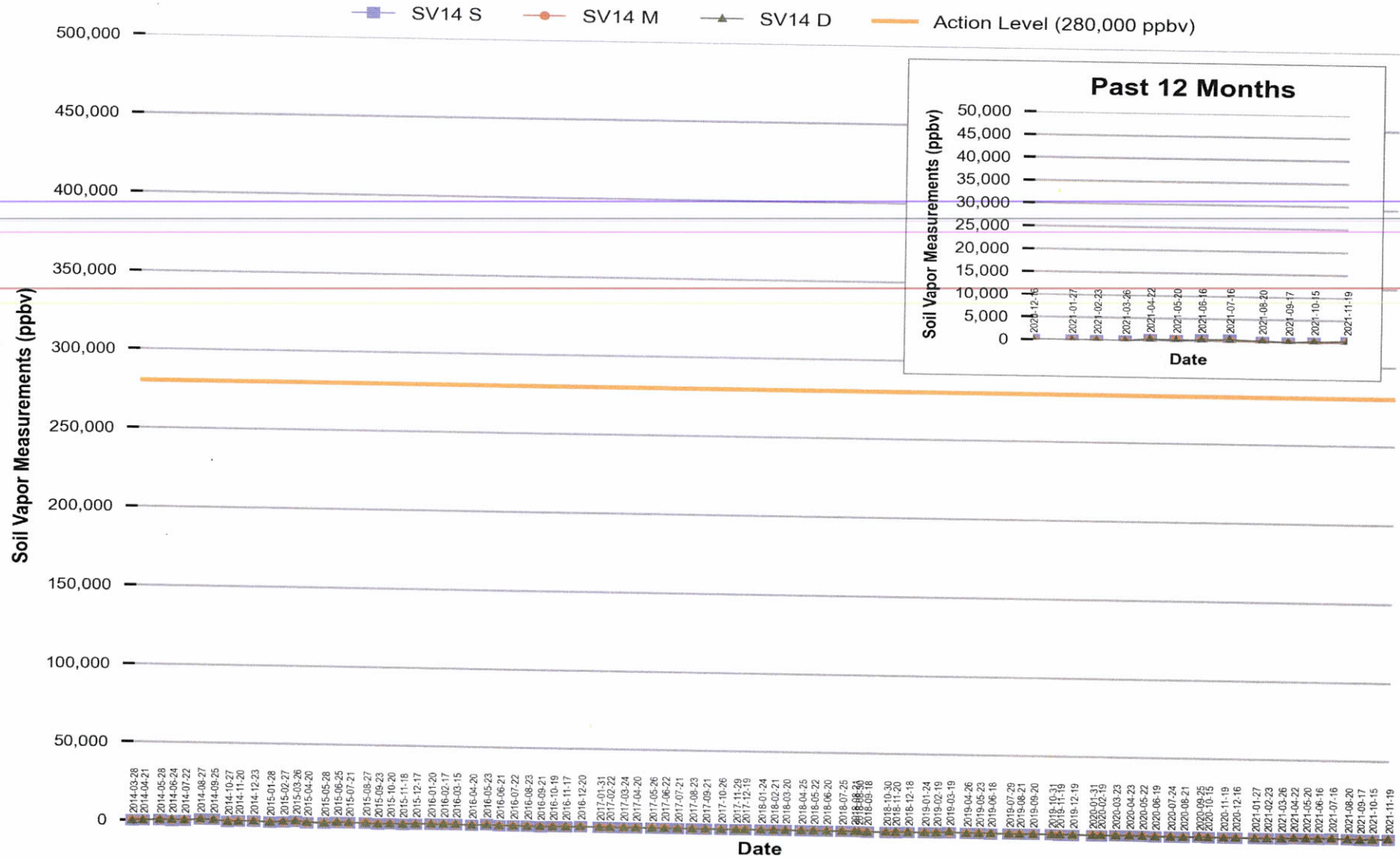
F-24: Jet Fuel, Fuel Number 24  
 F-76: Marine Diesel, Fuel Number 76

JP-5: Jet Fuel, Propellant Number 5  
 ppbv: Parts Per Billion by Volume

Tank 13 is empty and inactive, undergoing clean, inspect & repair (CIR), but remains accessible for soil vapor monitoring events.



**Figure 13**  
**Red Hill - Tank 14 (JP-5)**  
**Soil Vapor Measurements (Mar 2014 Through Nov 2021)**



Notes (where applicable):

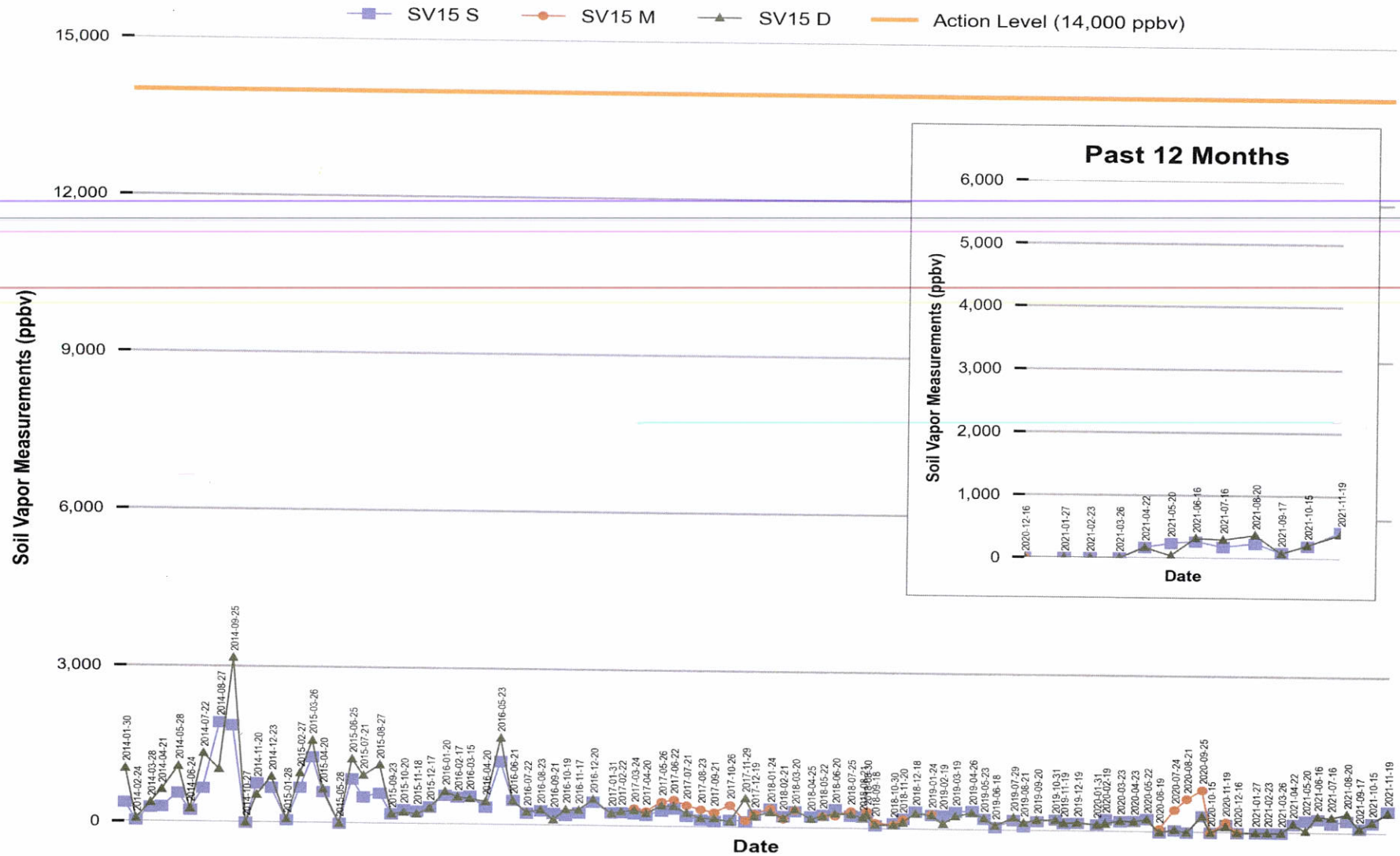
\* "M/D" monitoring points were constructed to screen both middle & deep depth intervals along the respective underground storage tank.

F-24: Jet Fuel, Fuel Number 24  
 F-76: Marine Diesel, Fuel Number 76

JP-5: Jet Fuel, Propellant Number 5  
 ppbv: Parts Per Billion by Volume

Tank 14 is empty and inactive, undergoing clean, inspect & repair (CIR), but remains accessible for soil vapor monitoring events.

**Figure 14**  
**Red Hill - Tank 15 (F-76)**  
**Soil Vapor Measurements (Jan 2014 Through Nov 2021)**



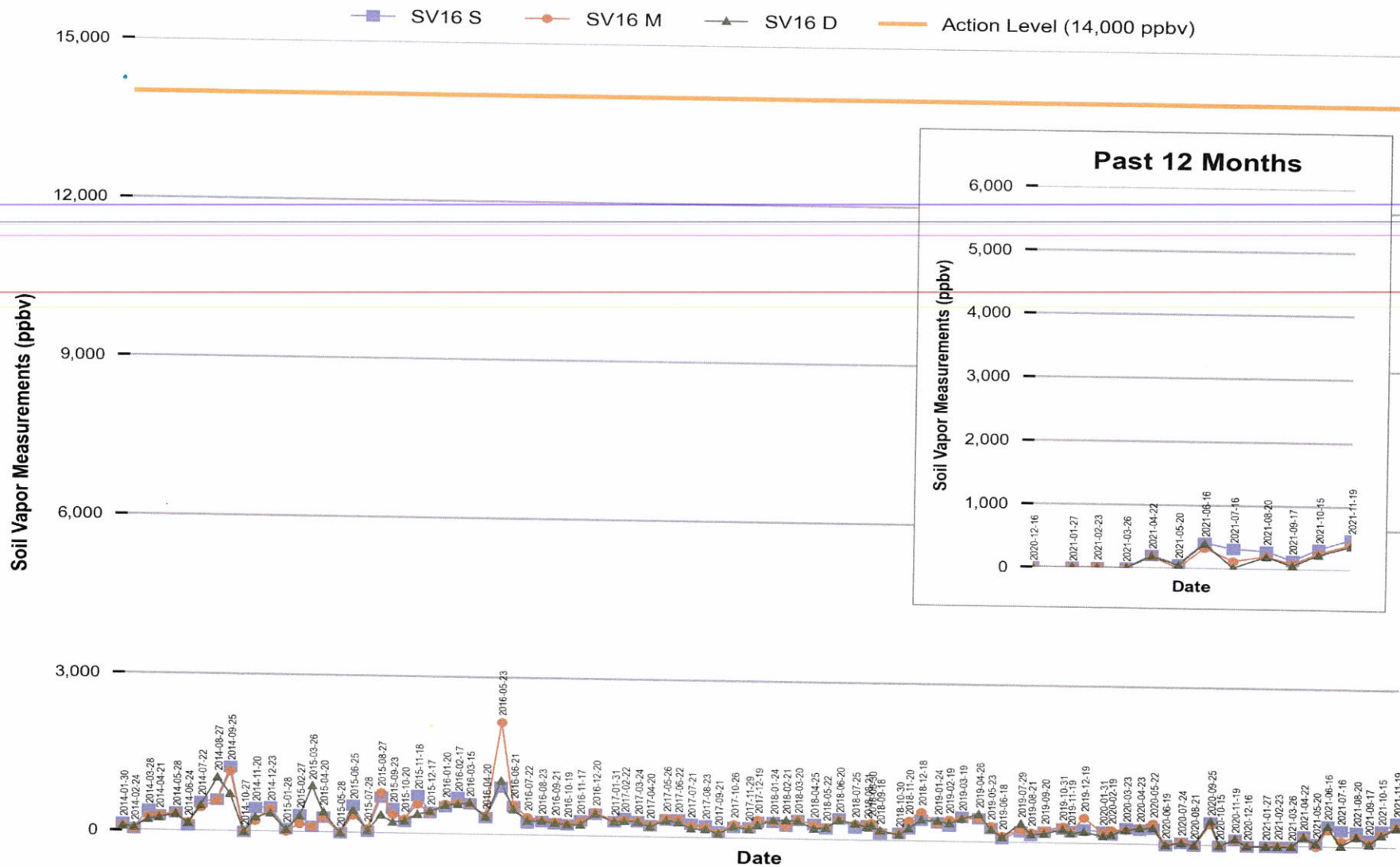
Notes (where applicable):

\* "M/D" monitoring points were constructed to screen both middle & deep depth intervals along the respective underground storage tank.

F-24: Jet Fuel, Fuel Number 24  
 F-76: Marine Diesel, Fuel Number 76

JP-5: Jet Fuel, Propellant Number 5  
 ppbv: Parts Per Billion by Volume

**Figure 15**  
**Red Hill - Tank 16 (F-76)**  
**Soil Vapor Measurements (Jan 2014 Through Nov 2021)**



Notes (where applicable):

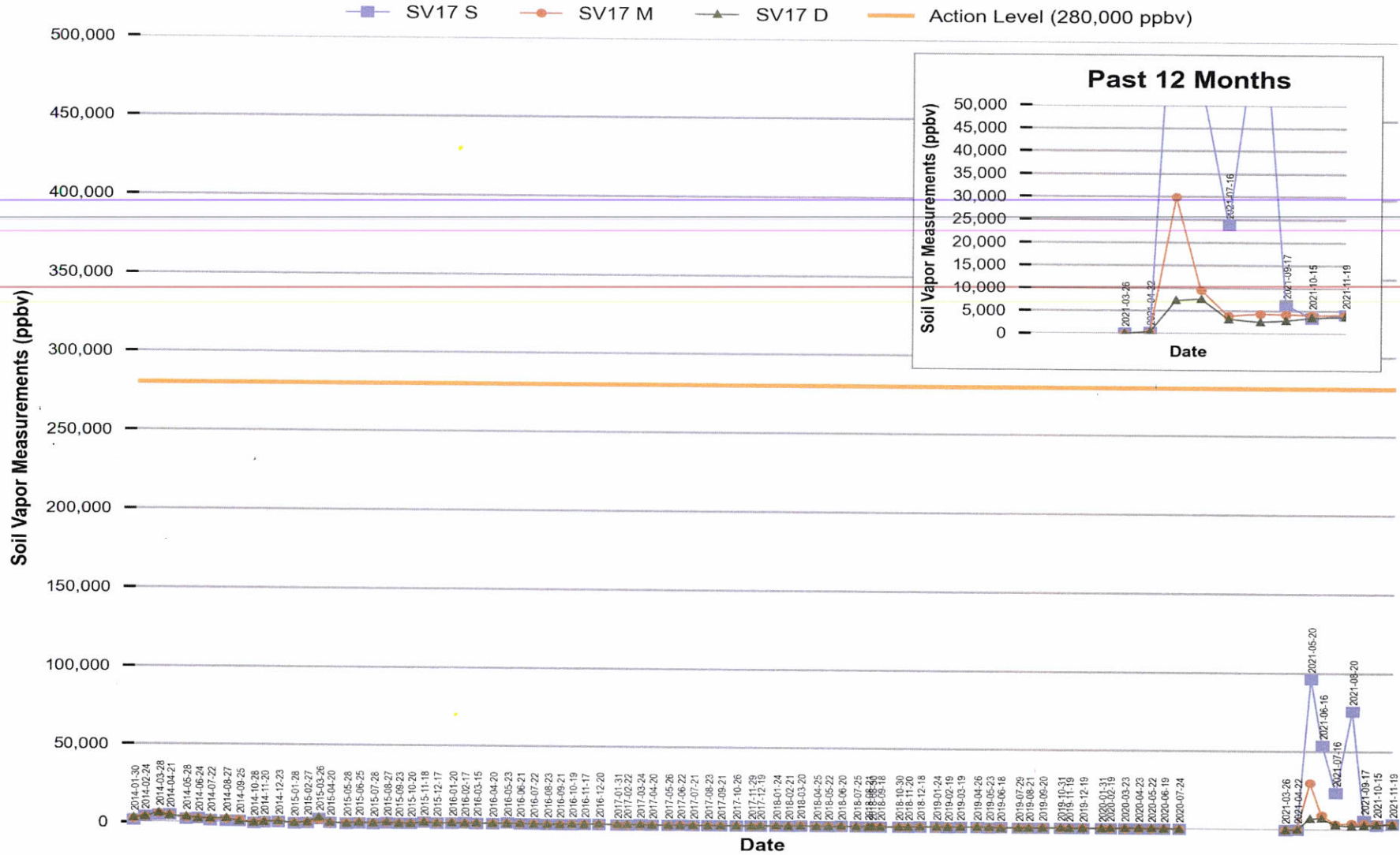
\* "M/D" monitoring points were constructed to screen both middle & deep depth intervals along the respective underground storage tank.

F-24: Jet Fuel, Fuel Number 24  
 F-76: Marine Diesel, Fuel Number 76

JP-5: Jet Fuel, Propellant Number 5  
 ppbv: Parts Per Billion by Volume



**Figure 16**  
**Red Hill - Tank 17 (JP-5)**  
**Soil Vapor Measurements (Jan 2014 Through Nov 2021)**



Notes (where applicable):

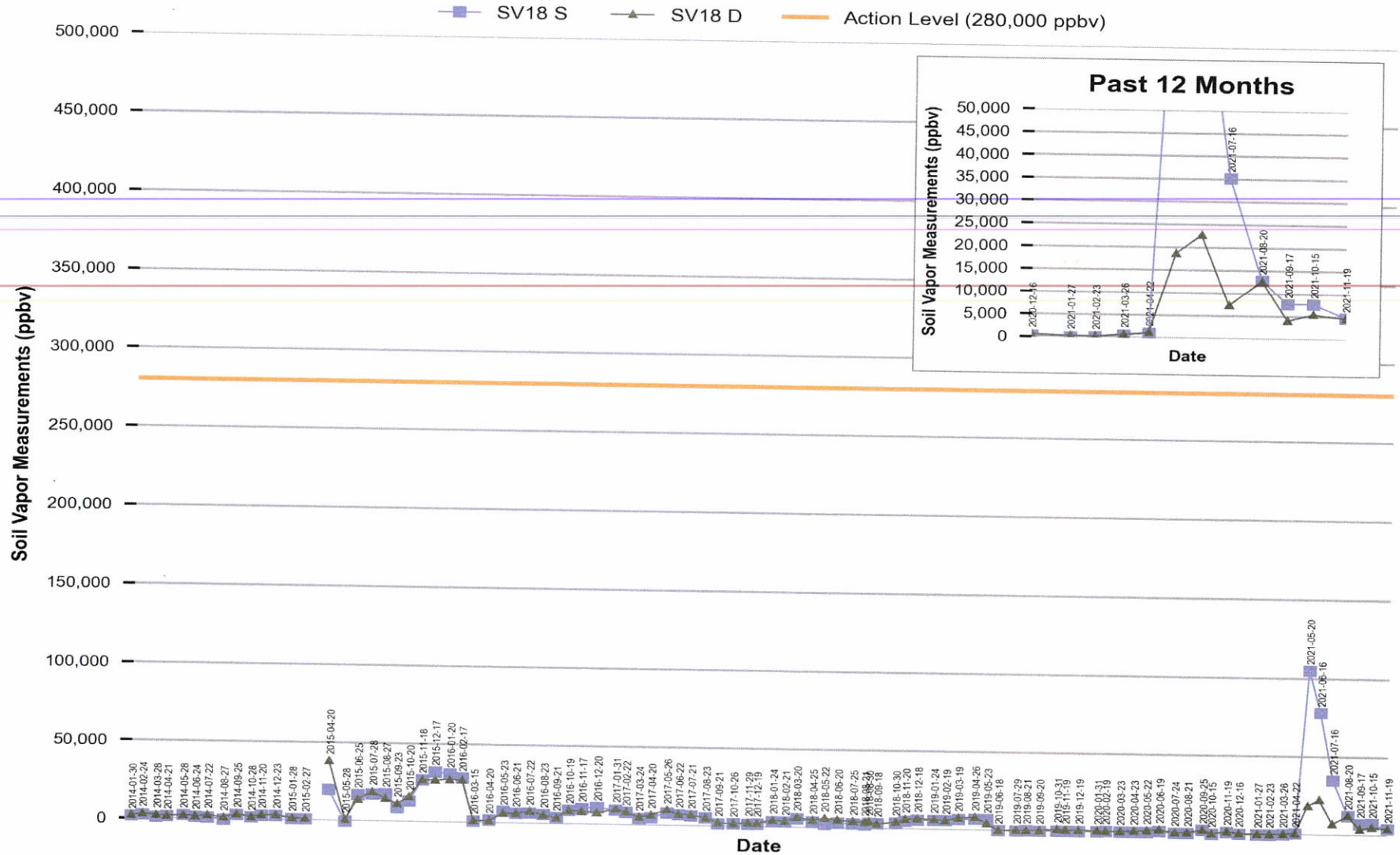
\* "M/D" monitoring points were constructed to screen both middle & deep depth intervals along the respective underground storage tank.

F-24: Jet Fuel, Fuel Number 24  
 F-76: Marine Diesel, Fuel Number 76

JP-5: Jet Fuel, Propellant Number 5  
 ppbv: Parts Per Billion by Volume

Tank 17 is empty and inactive, undergoing clean, inspect & repair (CIR), but remains accessible for soil vapor monitoring events.

**Figure 17**  
**Red Hill - Tank 18 (JP-5)**  
**Soil Vapor Measurements (Jan 2014 Through Nov 2021)**



Notes (where applicable):

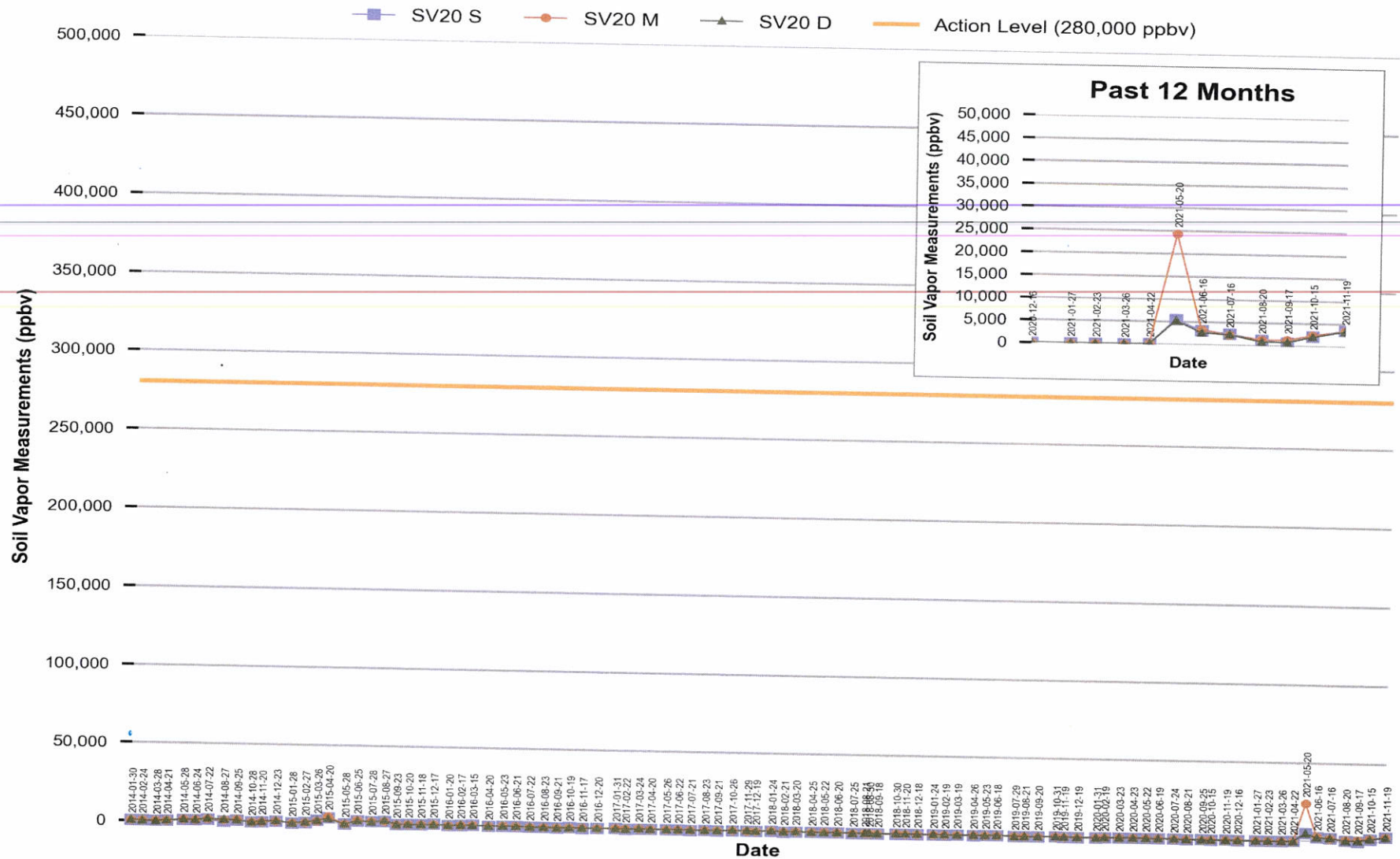
\* "M/D" monitoring points were constructed to screen both middle & deep depth intervals along the respective underground storage tank.

F-24: Jet Fuel, Fuel Number 24  
 F-76: Marine Diesel, Fuel Number 76

JP-5: Jet Fuel, Propellant Number 5  
 ppbv: Parts Per Billion by Volume

Tank 18 is empty and inactive, undergoing clean, inspect & repair (CIR), but remains accessible for soil vapor monitoring events.

**Figure 18**  
**Red Hill - Tank 20 (JP-5)**  
**Soil Vapor Measurements (Jan 2014 Through Nov 2021)**



Notes (where applicable):

\* "M/D" monitoring points were constructed to screen both middle & deep depth intervals along the respective underground storage tank.

F-24: Jet Fuel, Fuel Number 24  
 F-76: Marine Diesel, Fuel Number 76

JP-5: Jet Fuel, Propellant Number 5  
 ppbv: Parts Per Billion by Volume



09 December 2021

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 NOVEMBER 2021

Ref: (a) Red Hill Bulk Fuel Storage Facility Groundwater Protection Plan  
(b) Red Hill Soil Vapor Monitoring Report dated 24 November 2021

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:

- Strong increase trend in VOC concentrations at Tank 20 all ports.
- Strong increase trend in VOC concentrations at Tank 7 deep port.

2. FLCPH causative research and findings:

- a. The following Red Hill Fuel Storage Facility Underground Storage Tanks (USTs) are Out of Service: Tanks 1, 13, 14, 17, 18 and 19.
- b. Reviewed all AFHE Unscheduled Fuel Movement (UFM) Alarm Summaries and UFM Reports. There were UFM's recorded on 10/16/2021 on tanks 3-12, 15, 16, and 20. AFHE refresh on the system was performed by the contractor. All alarms were cleared by the contractor IT technician. Another UFM alarm happened on 11/2/20 at tank 15. The UFM was caused by the Control Room Operator (CRO) not having the evolution set with the new issue tank. The issue tank was originally set with RH 16. However, it was changed to RH 15 prior to the start of evolution.
- c. Red Hill maintenance and repair contractors did not report any factors that could have influenced increase in trends.
- d. There were no fuel samples collected on the day of sampling 19 November 21 that could have potentially increased the SVM sample result.
- e. 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 that would have affected sampling on 19 November 21.
- f. All active tanks have passed tank tightness testing within the required time period. Tank 7 passed the tank tightness testing on 11 OCT 21 and tank 20 passed on 19 OCT 21, which are the tanks with current strong increasing trend.

ENCLOSURE(2)

- g. There is 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 on the day of sample collection.

HAYASAKA.SHAUN.SA  
DAO.1251574762

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