

- Quarterly Release Response Report enclosed with NRH letter dated July 7, 2020
- Quarterly Release Response Report enclosed with NRH letter dated September 30, 2020
- Quarterly Release Response Report enclosed with NRH letter dated January 4, 2021
- Quarterly Release Response Report enclosed with NRH letter dated March 19, 2021
- Quarterly Release Response Report enclosed with NRH letter dated June 25, 2021
- Quarterly Release Response Report enclosed with NRH letter dated September 22, 2021
- Quarterly Release Response Report enclosed with NRH letter dated December 15, 2021

2.0 Background

The following sections provide a description of the site and information on the Facility.

2.1 Site Description

The Facility is located on federal government land (zoned a mix of F1- Military and Federal and P-1 Restricted Preservation districts) in south-central Oahu, approximately 2.5 miles northeast of Pearl Harbor. It is located on a low ridge on the western edge of the Ko'olau Mountain Range that divides Hālawā Valley from Moanalua Valley. The Facility occupies 144 acres of land and the majority of the ground surface of the site lies at an elevation of approximately 200 to 500 feet above mean sea level (msl) (AECOM Technical Services, Inc., 2018).

The Facility is bordered on the southwest by residential neighborhoods and the United States (U.S.) Coast Guard reservation, on the southeast by residential neighborhoods in Moanalua Valley, and on the northeast by preservation land. The Facility is bordered on the north by Hālawā Correctional Facility and Hālawā Industrial Park, which includes private businesses and a former bus facility. A quarry is located less than a quarter mile away to the northwest.

2.2 Facility Information

The Facility contains fourteen (14) active and six (6) inactive bulk fuel field-constructed underground storage tanks (USTs), which are operated by Naval Supply Systems Command (NAVSUP) Fleet Logistics Center (FLC) Pearl Harbor (formerly Fleet and Industrial Supply Center). The Facility was constructed by the U.S. Government in the early 1940s. Twenty (20) USTs and a series of tunnels were constructed to supply fuel to the United States Navy (Navy). Each UST has a capacity of approximately 12.5 million gallons. The Facility is located approximately 100 feet above the basal aquifer. The USTs currently contain Jet Fuel Propellant No. 5 (JP-5), North Atlantic Treaty Organization (NATO)-grade F-24 jet fuel (F-24) or Marine Diesel Fuel (F-76). At the time of the release, Tank 5 stored Jet Fuel Propellant No. 8 (JP-8) and now stores F-24.

Five (5) groundwater monitoring wells (wells RHMW01, RHMW01R, RHMW02, RHMW03, and RHMW05) are located within the lower access tunnel, and one (1) sampling point (RHMW2254-01) is located at Red Hill Shaft. Sampling point RHMW2254-01 is located inside the infiltration gallery of the Department of the Navy (Navy) Supply Well 2254-01.

Seventeen (17) groundwater monitoring wells (RHMW04, RHMW06, RHMW07, RHMW08, RHMW09, RHMW10, RHMW11, RHMW12, RHMW12A, RHMW13, RHMW14, RHMW15, RHMW16, RHMW16A, RHMW19, OWDFMW01, and HDMW2253-03) are located outside of the Facility tunnel system. Well OWDFMW01 is located at the former Oily Waste Disposal Facility, near Adit 3, and wells RHMW11, RHMW12, RHMW12A, RHMW14, and HDMW2253-03 are located at the Hālawā Correctional Facility (outside the Red Hill Facility boundary).

3.0 Groundwater and Soil Vapor Monitoring

The following sections describe activities that were performed to monitor the groundwater and soil vapor beneath Tank 5 from December 11, 2021 through March 11, 2022.

3.1 Oil/Water Interface Measurements

The water level was gauged and measured for the presence of light non-aqueous phase liquids (LNAPLs) using an interface meter. The interface meter was lowered into the groundwater monitoring wells located within the lower access tunnel to determine the depth of water to the nearest 0.01 foot, and the existence of any immiscible layers (LNAPL).

Oil/water interface measurements were taken at groundwater monitoring wells RHMW01R, RHMW02, RHMW03, and RHMW05 in December 2021, January and February 2022. No LNAPL was observed.

Additional supplemental monitoring is ongoing in response to the May 6, 2021 pipeline breach that occurred in the tunnel, and the November 20 release from a fire suppression drain line, and will continue to be monitored and reported separately through the supplemental monitoring program.

A summary of interface measurements through February 2022 is presented in Appendix A.

3.2 Soil Vapor Monitoring

Monthly soil vapor samples were collected and analyzed in the field for volatile organic compound (VOC) concentrations using a photo-ionization detector (PID). Soil vapor monitoring points (SVMPs) were given a SV prefix, followed by the associated tank number, and then the location under the tank: “S” for shallow or front of the UST, “M” for mid depth or middle of the UST, and “D” for deep or outer edge of the UST.

One of the methods that the Navy uses to assess the integrity of the associated tank system is to measure if VOC concentrations exceed a specific VOC concentration. Currently the concentration criteria are 280,000 parts per billion by volume (ppbv) in soil vapor monitoring probes beneath tanks containing jet fuels (JP-5 or F-24), or 14,000 ppbv in soil vapor monitoring probes beneath tanks containing marine diesel fuel (F-76) (TEC, 2010). These values are 50 percent of the calculated vapor concentration from fuel-saturated water.

Soil vapor monitoring was performed at all active and accessible tanks in December 2021, January and February 2022. Soil vapor VOC concentrations at Tank 5 were below the concentration criterion of 280,000 ppbv during all three monitoring events. During the same monitoring events, soil vapor VOC concentrations at all other active and accessible tanks were below the concentration criteria, with no consistent positive trend.

Additional supplemental monitoring is ongoing in response to the May 6, 2021 pipeline breach that occurred in the tunnel, and the November 20 release from a fire suppression drain line. SVMPs at Tanks 17 through 20 are believed to have been impacted by clean-up activities related to the May 6, 2021 incident, resulting in increased soil vapor VOC concentrations observed since the May 2021 monthly monitoring event. Soil vapor VOC concentrations at Tanks 17 through 20 were below the 280,000 ppbv concentration criterion and will continue to be monitored and reported separately through the supplemental monitoring program.

Monthly soil vapor sampling results from January 2014 through February 2022 are presented graphically in Appendix B.

3.3 Groundwater Sampling and Analysis

Groundwater samples were collected from 22 monitoring locations within the Red Hill groundwater monitoring network in December 2021. Groundwater samples were collected from sampling point RHMW2254-01 located at Red Hill Shaft, 15 single-screen monitoring wells within the Facility boundary (wells RHMW01 through RHMW10, RHMW01R, RHMW16, RHMW16A, RHMW19, and OWDFMW01), the Hālawā Deep Monitor Well (HDMW2253-03) and RHMW12A at the Hālawā Correctional Facility, 2 multilevel monitoring wells (RHMW11 and RHMW14) located at the Hālawā Correctional Facility, and 2 multilevel monitoring wells (RHMW13 and RHMW15) located within the Facility boundary.

Additional supplemental groundwater monitoring was requested by the DOH and is ongoing in response to both the May 6, 2021 pipeline breach that occurred in the tunnel and the November 20 release from a fire suppression drain line. The data from these sampling events will continue to be monitored and reported separately through the supplemental monitoring program.

The Fourth Quarter 2021 - Quarterly Groundwater Monitoring Report, which summarizes sampling activities and laboratory analytical results, will be submitted under separate cover.

3.4 Drinking Water Sampling

The November 20, 2021, release of JP-5 from a fire suppression line contaminated drinking water in the Red Hill Shaft. The Red Hill Shaft has been isolated and offline since November 28, 2021. Routine drinking water sampling at the Facility has been discontinued and replaced by recovery efforts described in the Red Hill Shaft Recovery and Monitoring Plan and the Drinking Water Distribution System Recovery Plan. These recovery plans were developed jointly by representatives of DOH, the State of Hawaii Department of Land and Natural Resources, the United States Environmental Protection Agency (EPA), the Navy, and a team of technical and subject matter experts. Both documents are available to the public at <https://www.cpf.navy.mil/JBPHH-Water-Updates/>.

Drinking water sampling results conducted as part of the recovery plans are compiled and published on a website designed to provide timely and accurate information regarding the status of flushing in all zones as well as validated data on sampling as it becomes available. Laboratory results are available at JBPHH-SAFEWATERS.ORG.

4.0 Continued Groundwater and Soil Vapor Monitoring

As release response actions for the January 2014 Tank 5 fuel release, the Navy will continue monitoring of the groundwater and soil vapor as follows:

- Oil/water interface measurements – monthly
- Soil vapor sampling – monthly
- Groundwater sampling and analysis – quarterly

Due to the presence of transducers in some of the groundwater monitoring wells, which made the wells unavailable for sampling, and the priority to perform supplemental groundwater sampling in response to the May 6 and November 20, 2021 releases, DOH and EPA concurred quarterly groundwater sampling and analysis could be skipped for the first quarter of 2022. The next quarterly groundwater sampling and analysis event is tentatively scheduled for April 2022.

Monitoring results will be submitted to DOH for each sampling event.

5.0 Continued Drinking Water Sampling

Drinking water sampling will continue to be executed per the Red Hill Shaft Recovery and Monitoring Plan and the Drinking Water Distribution System Recovery Plan.

6.0 Planned Future Release Response Actions

The Navy and DLA negotiated with the EPA and DOH (the “Regulatory Agencies”) release response actions that will be pursued. Future release response actions include determining the feasibility of alternatives for investigating and remediating releases from the Facility and continuing efforts to monitor and characterize the flow of groundwater around the Facility. A revised Work Plan/Scope of Work that describes the future release response actions was submitted

pursuant to the Red Hill AOC to the Regulatory Agencies in November 2016. Conditional approval was received from the Regulatory Agencies in December 2016.

The following documents were submitted for regulatory review:

- Monitoring Well Installation Work Plan Addendum No. 2 in August 2017
- Groundwater Flow Model Progress Report 02 in August 2017
- Groundwater Flow Model Progress Report 03 in December 2017
- Sentinel Well Network Development Plan in December 2017
- Risk Based Decision Criteria Development Plan in December 2017
- Technical Memorandum, Testing and Verification of Packer Integrity at RHMW11 in February 2018
- Seismic Profiling to Map Hydrostratigraphy in the Red Hill Area in March 2018
- Groundwater Flow Model Progress Report 04 in April 2018
- Conceptual Site Model Report and Groundwater Protection and Evaluation Considerations Report in July 2018
- Groundwater Flow Model Progress Report 05 in August 2018
- Groundwater Flow Model Progress Report 06 in December 2018
- Groundwater Flow Model Progress Report 07 in April 2019
- Conceptual Site Model Report Revision 01 in June 2019
- Groundwater Flow Model Progress Report 08 in August 2019
- Groundwater Flow Model Progress Report 09 in December 2019
- Groundwater Flow Model Progress Report 10 in March 2020
- Groundwater Flow Model Report in March 2020
- Investigation and Remediation of Releases Report in March 2020
- Errata for Conceptual Site Model Report, Revision 01, of June 2019 in April 2020
- Technical Memorandum, Evaluation of Chromatograms for Understanding TPH Detections in Monitoring Wells in September 2020

Approval by the Regulatory Agencies of these documents will guide future release response actions.

Ongoing actions in response to both the May 6, 2021 pipeline breach that occurred in the tunnel and the November 20 release from a fire suppression drain line are reported separately through the supplemental monitoring program and release response reporting.

7.0 Public Notifications

No press releases were issued by the Navy during this reporting period in response to the January 2014 Tank 5 release.

8.0 Conclusions and Recommendations

Results of groundwater sampling and analysis and drinking water sampling and analysis indicate the release of JP-8 from Tank 5 has not impacted the Red Hill Shaft.

Additional release response actions have been negotiated with the EPA and DOH to protect the drinking water sources near the Facility.

The next Tank 5 quarterly release response report will be submitted in June 2022 and will cover release response actions pertaining to the January 2014 release completed between March and June 2022.

9.0 References

AECOM Technical Services, Inc., 2018, *Final First Quarter 2018 – Quarterly Groundwater Monitoring Report, Red Hill Bulk Fuel Storage Facility*, Prepared for Department of the Navy, Naval Facilities Engineering Command, Hawaii, JBPHH, Hawaii, July 2018.

DOH, 2000, *Technical Guidance Manual for Underground Storage Tank Closure and Release Response*, Environmental Management Division, Solid and Hazardous Waste Branch, Underground Storage Tank Section, March 2000.

DOH, 2013, *Technical Guidance Manual for the Implementation of the Hawaii State Contingency Plan*, Office of Hazard Evaluation and Emergency Response, Interim Final, March 2013.

DOH, 2017, *Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater*, Environmental Management Division, Fall 2017.

DOH, 2020, *Red Hill Shaft Drinking Water Sample Results and Analysis, Joint Base Pearl Harbor-Hickam (JBPHH) Public Water System (PWS 360)*. Letter from: Keith E. Kawaoka, Deputy Director for Environmental Health, to: Captain Marc R. Delao, Regional Engineer, Navy Region Hawaii, attention: CDR Darrel E. Frame. June 16.

DOH, 2021, *Hawaii Administrative Rules, Title 11, Chapter 11-280.1, Underground Storage Tanks*, July 2021.

DOH, 2021, *Request to revise water quality monitoring at Red Hill Shaft Source (Pre- and Post-Chlorination), Joint Base Pearl Harbor-Hickam Water System (PWS 360)*. Letter from: Joanna L. Sato, Acting Chief, Safe Drinking Water Branch, to: Captain James G. Meyer, Regional Engineer, Navy Region Hawaii, attention: Sherri R. Eng. September 1.

TEC, 2007, *Final Technical Report, Red Hill Bulk Fuel Storage Facility*, Prepared for Department of the Navy, Commander Naval Facilities Engineering Command, Pacific, Pearl Harbor, Hawaii, August 2007.

TEC, 2008, *Final Groundwater Protection Plan, Red Hill Fuel Storage Facility*, prepared for Navy Region Hawaii, Pearl Harbor, Hawaii, January 2008, revised December 2009 and August 2014.

TEC, 2010, Final Soil Vapor Sampling Monitoring Analysis Letter Report, February 1, 2010. This page intentionally left blank

***Appendix A
Oil/Water Interface Measurements
January 2014 through February 2022***

This page intentionally left blank

Red Hill Oil/Water Interface Measurements January 2014 to Present

Date	RHMW01			RHMW01R			RHMW02			RHMW03			RHMW05		
	Elevation = 101.9955 ft ¹			Elevation = 101.7570 ft			Elevation = 104.5970 ft ¹			Elevation = 120.8980 ft ¹			Elevation = 101.3102 ft ¹		
	DTW (TOC)	SWL	LNAPL	DTW (TOC)	SWL	LNAPL	DTW (TOC)	SWL	LNAPL	DTW (TOC)	SWL	LNAPL	DTW (TOC)	SWL	LNAPL
15-Jan-14	83.94	18.06	0				86.62	17.98	0	NT	NT	NT	NT	NT	NT
16-Jan-14	NT	NT	NT				NT	NT	NT	NT	NT	NT	83.09	18.22	0
22-Jan-14	83.53	18.47	0				86.20	18.40	0	NT	NT	NT	82.87	18.44	0
23-Jan-14	83.58	18.42	0				86.24	18.36	0	NT	NT	NT	82.94	18.37	0
24-Jan-14	83.57	18.43	0				86.23	18.37	0	NT	NT	NT	82.93	18.38	0
27-Jan-14	83.55	18.45	0				86.23	18.37	0	NT	NT	NT	82.93	18.38	0
28-Jan-14	83.56	18.44	0				86.25	18.35	0	102.52	18.38	0	82.94	18.37	0
29-Jan-14	83.56	18.44	0				86.22	18.38	0	NT	NT	NT	82.94	18.37	0
30-Jan-14	83.53	18.47	0				86.21	18.39	0	NT	NT	NT	82.93	18.38	0
31-Jan-14	83.53	18.47	0				86.19	18.41	0	NT	NT	NT	82.88	18.43	0
3-Feb-14	83.54	18.46	0				86.20	18.40	0	NT	NT	NT	82.91	18.40	0
4-Feb-14	83.54	18.46	0				86.20	18.40	0	NT	NT	NT	82.89	18.42	0
10-Feb-14	84.49	17.51	0				86.16	18.44	0	102.47	18.43	0	82.83	18.48	0
24-Feb-14	83.54	18.46	0				86.24	18.36	0	102.47	18.43	0	82.97	18.34	0
4-Mar-14*	NT	NT	NT				NT	NT	NT	NT	NT	NT	NT	NT	NT
13-Mar-14*	NT	NT	NT				NT	NT	NT	NT	NT	NT	NT	NT	NT
28-Mar-14	83.76	18.24	0				86.42	18.18	0	102.65	18.25	0	83.18	18.13	0
7-Apr-14*	83.42	18.58	0				86.43	18.17	0	NT	NT	NT	83.21	18.10	0
21-Apr-14	83.93	18.07	0				86.58	18.02	0	102.80	18.10	0	83.27	18.04	0
8-May-14*	84.03	17.97	0				86.68	17.92	0	NT	NT	NT	83.46	17.85	0
22-May-14*	83.81	18.19	0				86.47	18.13	0	NT	NT	NT	83.15	18.16	0
27-May-14	83.91	18.09	0				86.60	18.00	0	102.85	18.05	0	83.31	18.00	0
10-Jun-14*	83.93	18.07	0				86.55	18.05	0	NT	NT	NT	83.34	17.97	0
23-Jun-14	84.06	17.94	0				86.72	17.88	0	103.99	16.91	0	83.54	17.77	0
21-Jul-14	84.13	17.87	0				86.80	17.80	0	102.98	17.92	0	83.49	17.82	0
27-Aug-14	84.01	17.99	0				86.65	17.95	0	102.87	18.03	0	83.04	18.27	0
25-Sep-14	84.64	17.36	0				87.27	17.33	0	103.51	17.39	0	84.10	17.21	0
28-Oct-14	83.79	18.21	0				86.51	18.09	0	102.78	18.12	0	83.21	18.10	0
20-Nov-14	83.87	18.13	0				86.56	18.04	0	102.78	18.12	0	83.35	17.96	0
23-Dec-14	83.67	18.33	0				86.37	18.23	0	102.64	18.26	0	83.05	18.26	0
28-Jan-15	83.63	18.37	0				86.35	18.25	0	102.63	18.27	0	83.03	18.28	0
27-Feb-15	83.68	18.32	0				86.28	18.32	0	102.52	18.38	0	83.06	18.25	0
26-Mar-15	83.83	18.17	0				86.04	18.56	0	102.79	18.11	0	83.24	18.07	0
21-Apr-15	84.33	17.67	0				86.97	17.63	0	103.18	17.72	0	83.72	17.59	0
28-May-15	84.29	17.71	0				86.97	17.63	0	103.24	17.66	0	83.95	17.36	0
25-Jun-15	84.58	17.42	0				87.28	17.32	0	103.57	17.33	0	83.75	17.56	0

Red Hill Oil/Water Interface Measurements January 2014 to Present

Date	RHMW01			RHMW01R			RHMW02			RHMW03			RHMW05		
	Elevation = 101.9955 ft ¹			Elevation = 101.7570 ft			Elevation = 104.5970 ft ¹			Elevation = 120.8980 ft ¹			Elevation = 101.3102 ft ¹		
	DTW (TOC)	SWL	LNAPL	DTW (TOC)	SWL	LNAPL	DTW (TOC)	SWL	LNAPL	DTW (TOC)	SWL	LNAPL	DTW (TOC)	SWL	LNAPL
21-Jul-15	84.58	17.42	0				87.24	17.36	0	103.44	17.46	0	83.76	17.55	0
27-Aug-15	84.44	17.56	0				87.13	17.47	0	103.41	17.49	0	83.69	17.62	0
23-Sep-15	84.26	17.74	0				86.91	17.69	0	103.21	17.69	0	83.63	17.68	0
20-Oct-15	84.00	18.00	0				86.38	18.22	0	103.38	17.52	0	Obstructed	NT	NT
18-Nov-15	84.25	17.75	0				86.93	17.67	0	103.24	17.66	0	84.62 ²	16.69	0
17-Dec-15	83.76	18.24	0				86.36	18.24	0	102.56	18.34	0	83.18	18.13	0
20-Jan-16	83.31	18.69	0				85.97	18.63	0	102.21	18.69	0	Obstructed	NT	NT
17-Feb-16	83.17	18.83	0				85.81	18.79	0	102.10	18.80	0	Obstructed	NT	NT
15-Mar-16	82.89	19.11	0				85.60	19.00	0	101.82	19.08	0	82.26	19.05	0
20-Apr-16	82.97	19.03	0				85.63	18.97	0	101.91	18.99	0	82.31	19.00	0
23-May-16	83.14	18.86	0				85.81	18.79	0	102.03	18.87	0	82.50	18.81	0
21-Jun-16	83.16	18.84	0				85.77	18.83	0	10.03	110.87	0	82.54	18.77	0
20-Jul-16	83.32	18.68	0				85.99	18.61	0	102.31	18.59	0	82.63	18.68	0
23-Aug-16	83.27	18.73	0				85.96	18.64	0	102.20	18.70	0	82.63	18.68	0
21-Sep-16	83.13	18.87	0				85.74	18.86	0	102.06	18.84	0	82.44	18.87	0
19-Oct-16	83.01	18.99	0				85.69	18.91	0	101.95	18.95	0	82.39	18.92	0
17-Nov-16	82.92	19.08	0				85.56	19.04	0	101.82	19.08	0	82.24	19.07	0
20-Dec-16	82.67	19.33	0				85.36	19.24	0	101.61	19.29	0	82.01	19.30	0
31-Jan-17	82.45	19.55	0				85.13	19.47	0	101.46	19.44	0	82.04	19.27	0
22-Feb-17	82.37	19.63	0				85.01	19.59	0	101.31	19.59	0	81.72	19.59	0
24-Mar-17	82.49	19.51	0				85.19	19.41	0	101.45	19.45	0	81.84	19.47	0
20-Apr-17	82.59	19.41	0				85.25	19.35	0	101.5	19.40	0	81.94	19.37	0
26-May-17	82.45	19.55	0				85.13	19.47	0	101.39	19.51	0	81.80	19.51	0
22-Jun-17	82.94	19.06	0				85.59	19.01	0	101.89	19.01	0	82.30	19.01	0
21-Jul-17	83.43	18.57	0				86.5	18.10	0	Transducer Installed	NT	NT	82.81	18.50	0
20-Mar-18	83.56	18.44	0				86.24	18.36	0	102.55	18.35	0	82.89	18.42	0
25-Apr-18	83.47	18.53	0				86.14	18.46	0	102.38	18.52	0	82.86	18.45	0
22-May-18	83.61	18.39	0				86.28	18.32	0	102.56	18.34	0	82.86	18.45	0
20-Jun-18	83.63	18.37	0				86.28	18.32	0	102.57	18.33	0	82.99	18.32	0
25-Jul-18	83.55	18.45	0				86.33	18.27	0	102.58	18.32	0	82.90	18.41	0
21-Aug-18	Transducer Installed	NT	NT				86.32	18.28	0	102.58	18.32	0	Transducer Installed	NT	NT
30-Oct-18	82.64	19.36	0				85.34	19.26	0	101.58	19.32	0	81.99	19.32	0
24-Jan-19	82.30	19.70	0				84.96	19.64	0	101.22	19.68	0	81.66	19.65	0
26-Apr-19	82.45	19.55	0				85.18	19.42	0	104.41	16.49	0	81.88	19.43	0

Red Hill Oil/Water Interface Measurements January 2014 to Present

Date	RHMW01			RHMW01R			RHMW02			RHMW03			RHMW05		
	Elevation = 101.9955 ft ¹			Elevation = 101.7570 ft			Elevation = 104.5970 ft ¹			Elevation = 120.8980 ft ¹			Elevation = 101.3102 ft ¹		
	DTW (TOC)	SWL	LNAPL	DTW (TOC)	SWL	LNAPL	DTW (TOC)	SWL	LNAPL	DTW (TOC)	SWL	LNAPL	DTW (TOC)	SWL	LNAPL
29-Jul-19	82.67	19.33	0				85.34	19.26	0	101.57	19.33	0	82.06	19.25	0
29-Oct-19	83.15	18.85	0				85.84	18.76	0	102.19	18.71	0	82.09	19.22	0
31-Jan-20	Obstructed	NT	0				85.88	18.72	0	102.17	18.73	0	82.52	18.79	0
23-Apr-20	82.93	19.07	0				85.68	18.92	0	101.82	19.08	0	82.27	19.04	0
24-Jul-20	83.28	18.72	0				85.94	18.66	0	102.13	18.77	0	82.63	18.68	0
15-Oct-20	83.69	18.31	0				86.39	18.21	0	102.56	18.34	0	83.12	18.19	0
27-Jan-21	83.53	18.47	0				86.23	18.37	0	102.46	18.44	0	82.87	18.44	0
22-Apr-21	83.85	18.15	0				86.53	18.07	0	102.72	18.18	0	83.26	18.05	0
20-May-21	83.85	18.15	0				Obstructed	NT	NT	Obstructed	NT	NT	83.42	17.89	0
16-Jun-21	84.10	17.90	0				86.79	17.81	0	102.99	17.91	0	83.53	17.78	0
16-Jul-21	84.14	17.86	0				86.89	17.71	0	103.11	17.79	0	83.62	17.69	0
20-Aug-21				84.06	17.70	0	85.96	18.64	0	103.17	17.73	0	83.67	17.64	0
17-Sep-21				84.14	17.62	0	87.02	17.58	0	103.22	17.68	0	83.79	17.52	0
15-Oct-21				84.17	17.59	0	87.06	17.54	0	103.26	17.64	0	83.80	17.51	0
19-Nov-21				84.26	17.50	0	87.12	17.48	0	103.32	17.58	0	83.89	17.42	0
17-Dec-21				83.31	18.45	0	86.22	18.38	0	102.45	18.45	0	82.94	18.37	0
14-Jan-22				82.90	18.86	0	85.78	18.82	0	102.01	18.89	0	82.49	18.82	0
18-Feb-22				83.23	18.53	0	86.11	18.49	0	102.32	18.58	0	82.85	18.46	0

Notes:

1 - Elevations were updated based on the Well Elevation Survey Report, Red Hill Bulk Fuel Storage Facility (DON 2018).

2 - Dedicated groundwater pump was obstructing the path of the interface meter probe. Depth measured was based on the elevation of water when pump was removed from the monitoring well (RHMW05).

Measurements recorded by Environmental Science International from January 2014 to August 2015, unless otherwise noted.

Measurements recorded by Element Environmental, LLC from September 2015.

* - Measurements recorded by NAVFAC HI.

All units in feet (ft).

DTW (TOC) - depth to water from top of well casing

LNAPL - light non-aqueous phase liquid

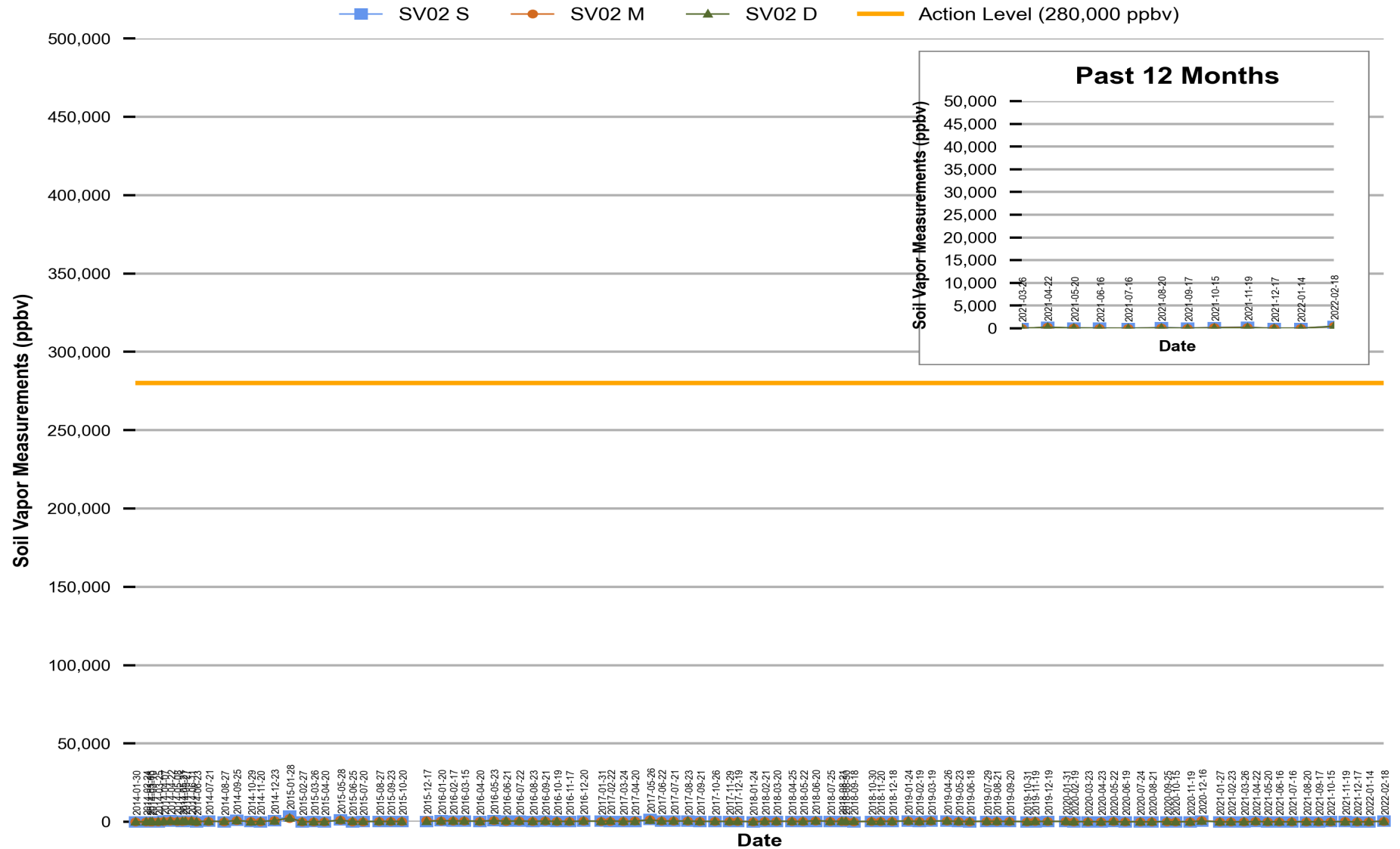
NT - measurement not taken

SWL - static water level

Appendix B
Soil Vapor Sampling Results through February 2022

This page intentionally left blank

Figure 1
Red Hill - Tank 02 (F-24)
Soil Vapor Measurements (Jan 2014 Through Feb 2022)



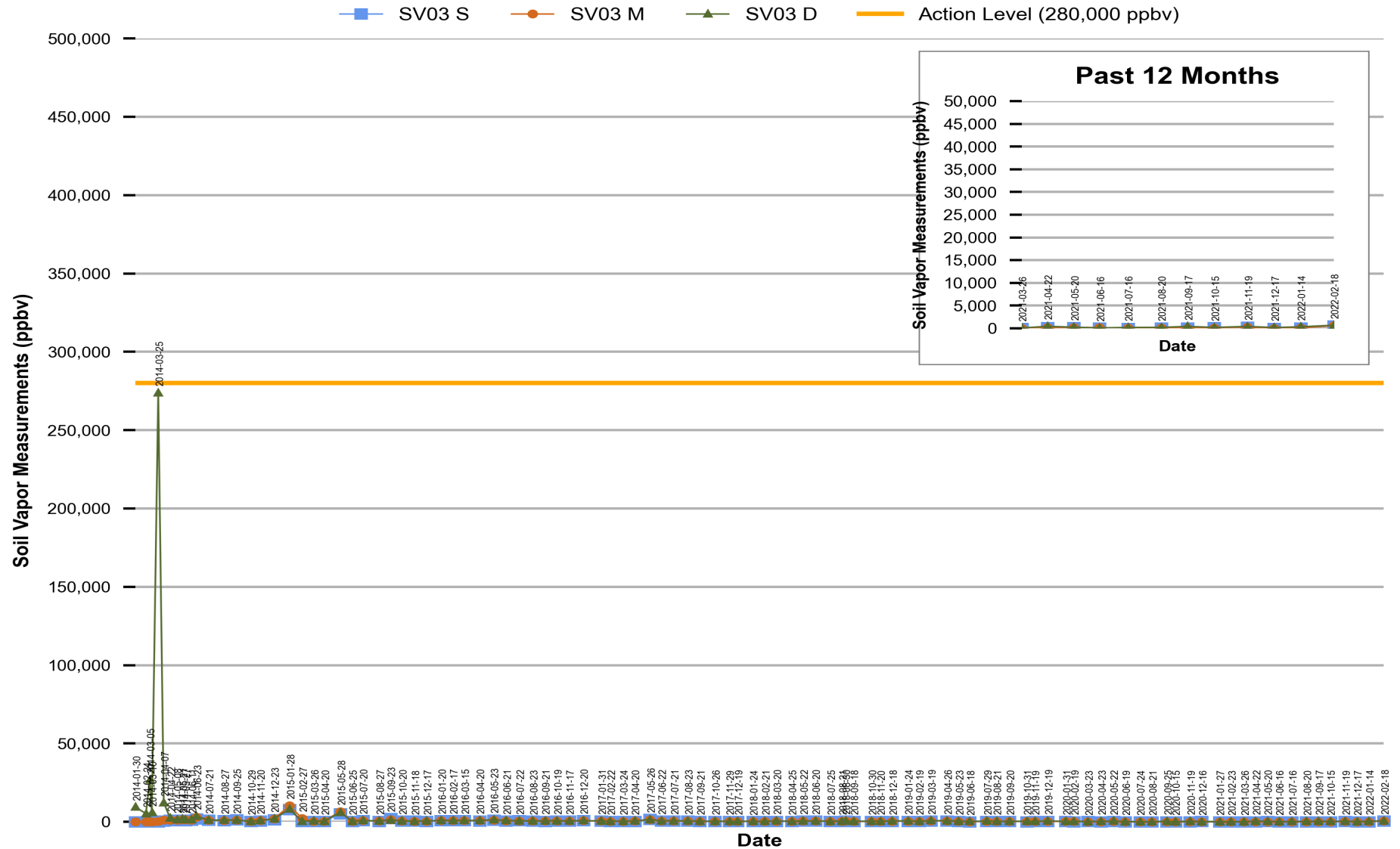
Notes (where applicable):

* "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 Feb 2022)



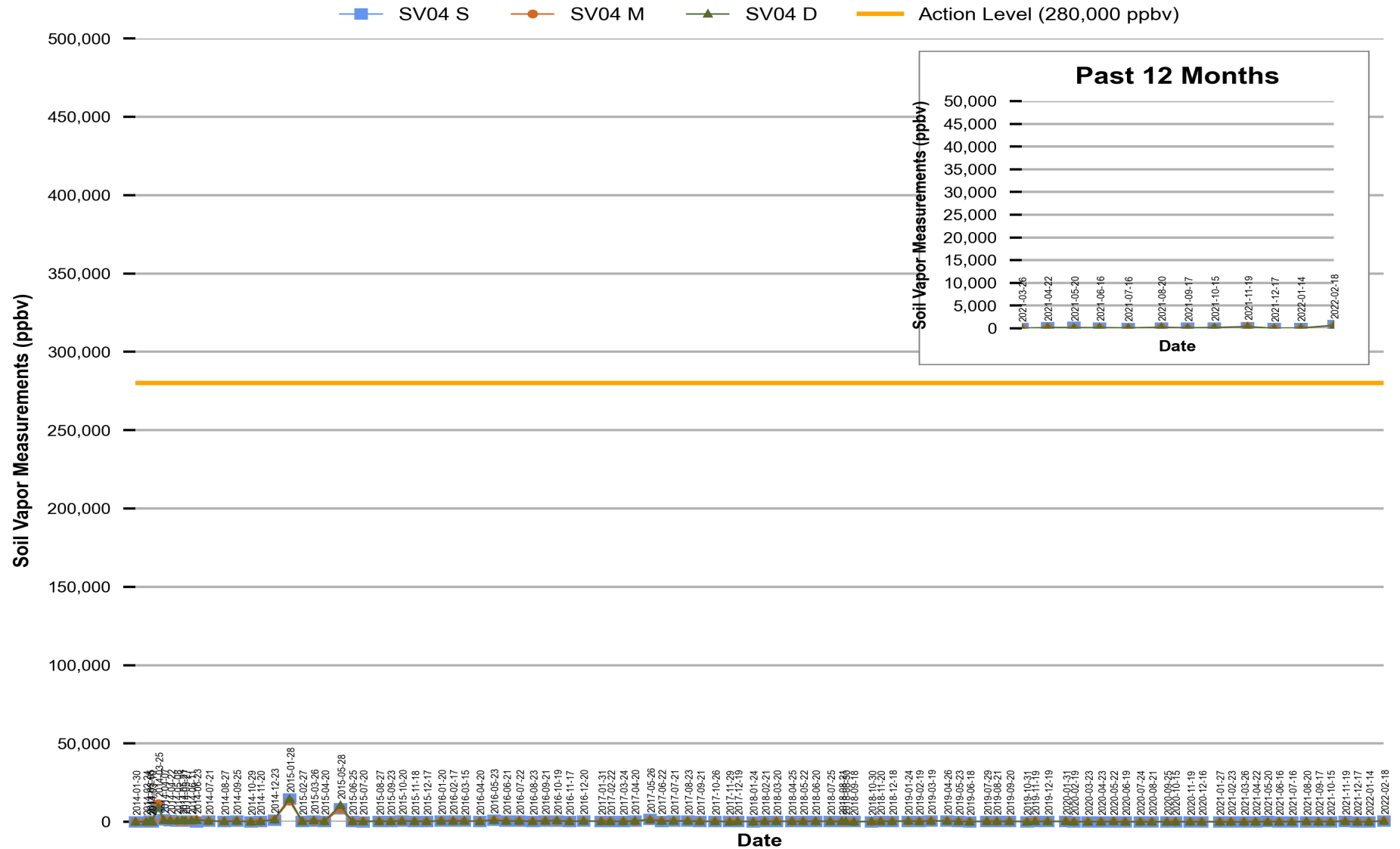
Notes (where applicable):

* "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 Feb 2022)



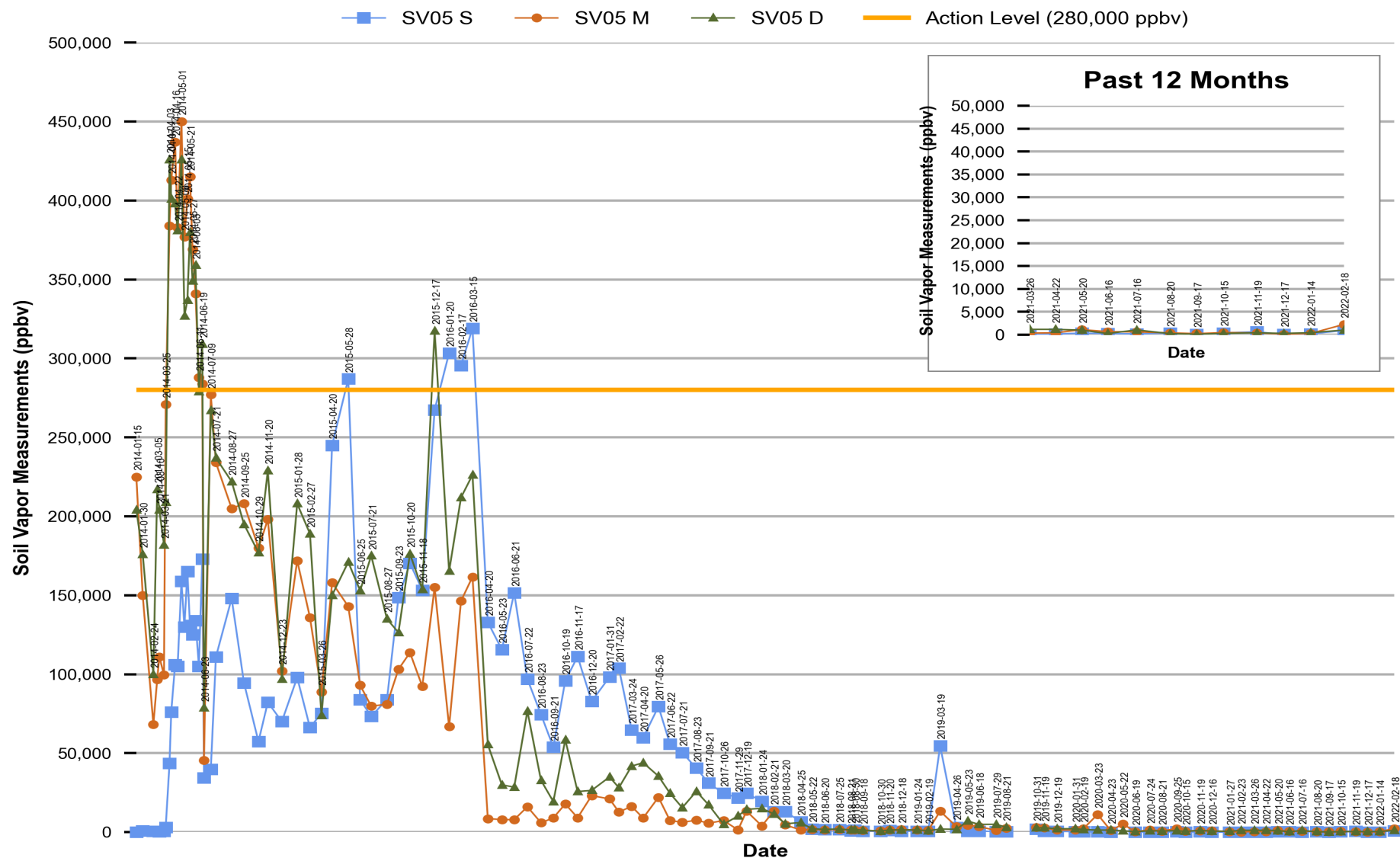
Notes (where applicable):

* "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 Feb 2022)



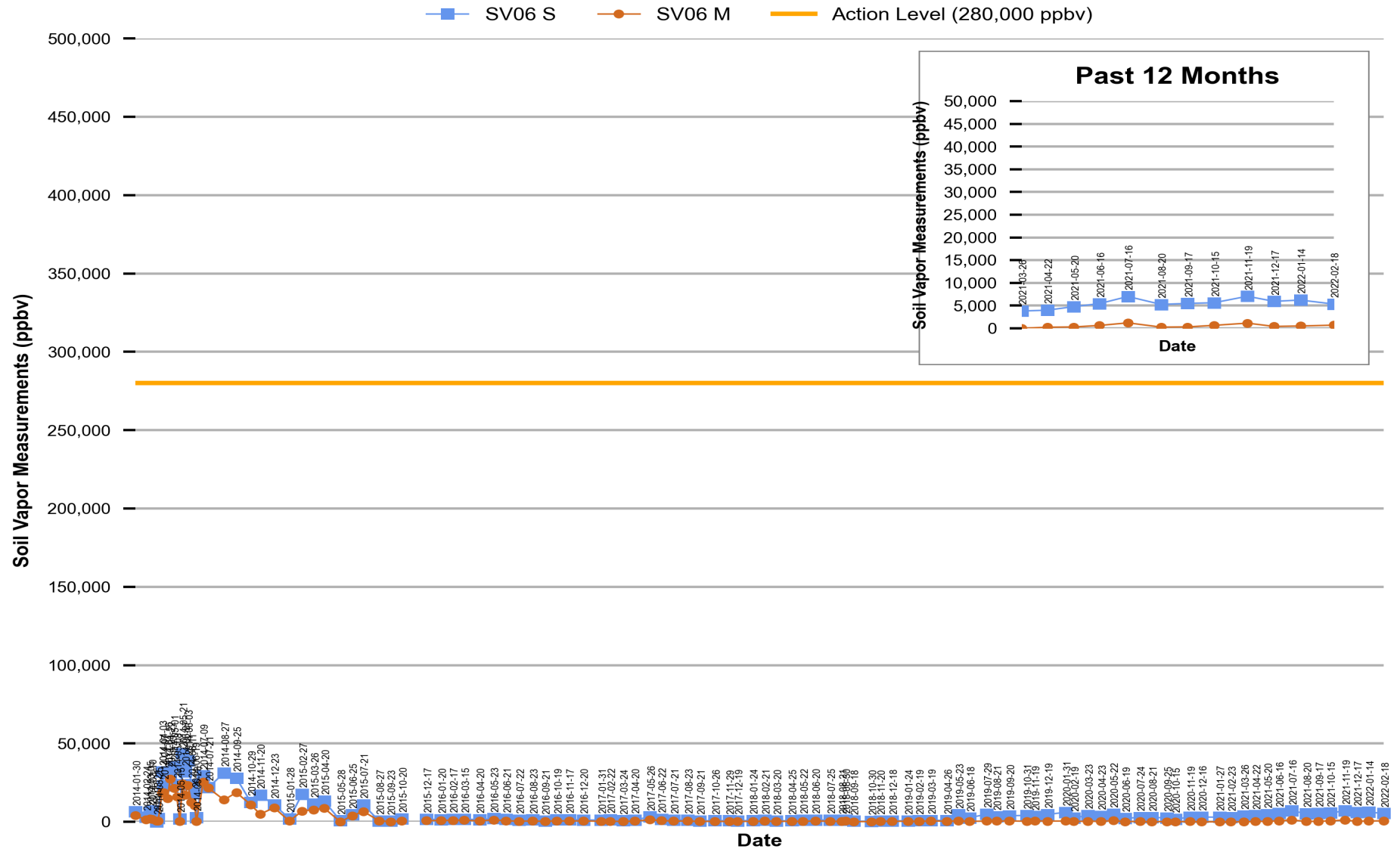
Notes (where applicable):

* "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 Feb 2022)



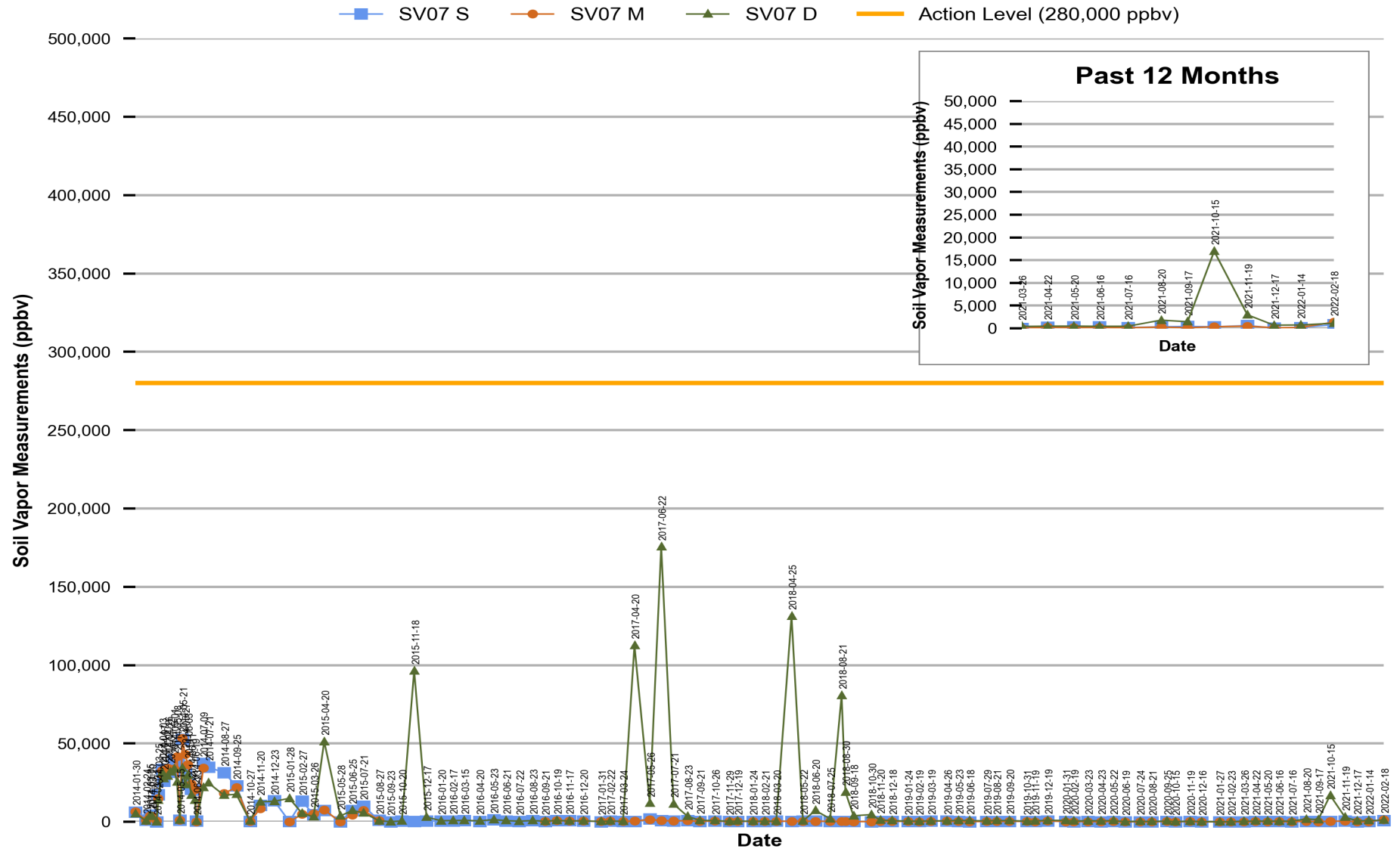
Notes (where applicable):

* "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 Feb 2022)



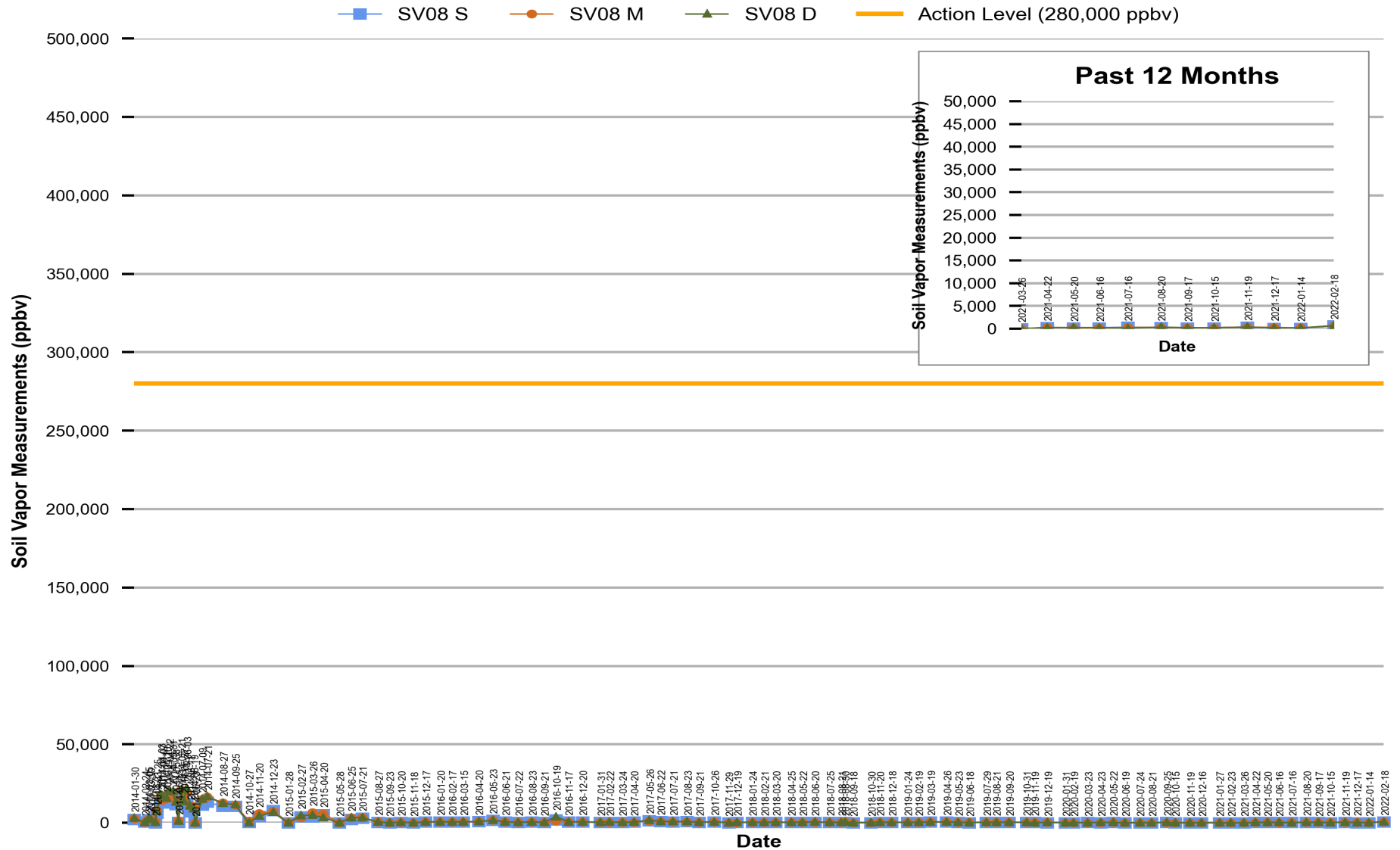
Notes (where applicable):

* "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 Feb 2022)



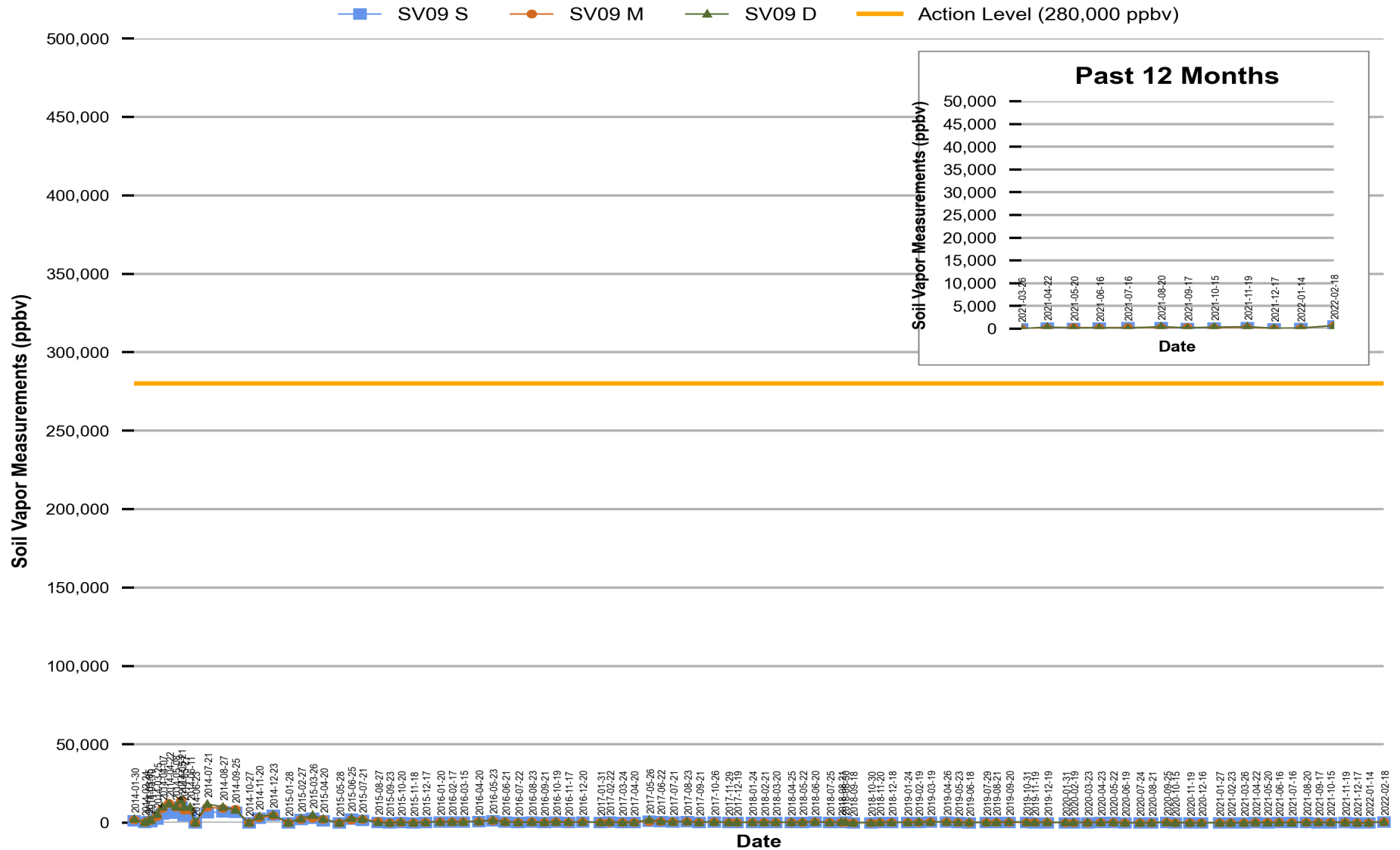
Notes (where applicable):

* "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 Feb 2022)



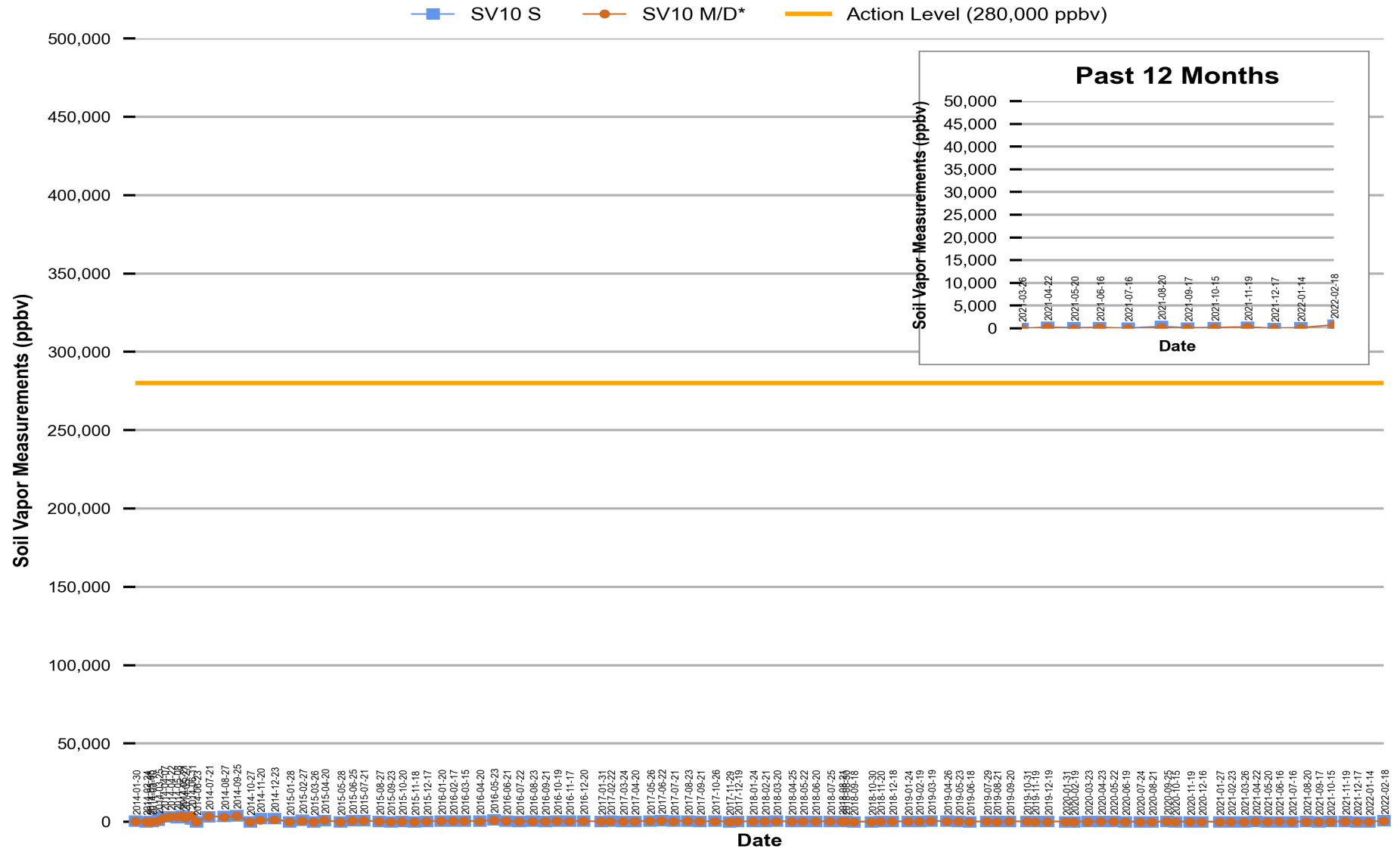
Notes (where applicable):

* "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 Feb 2022)



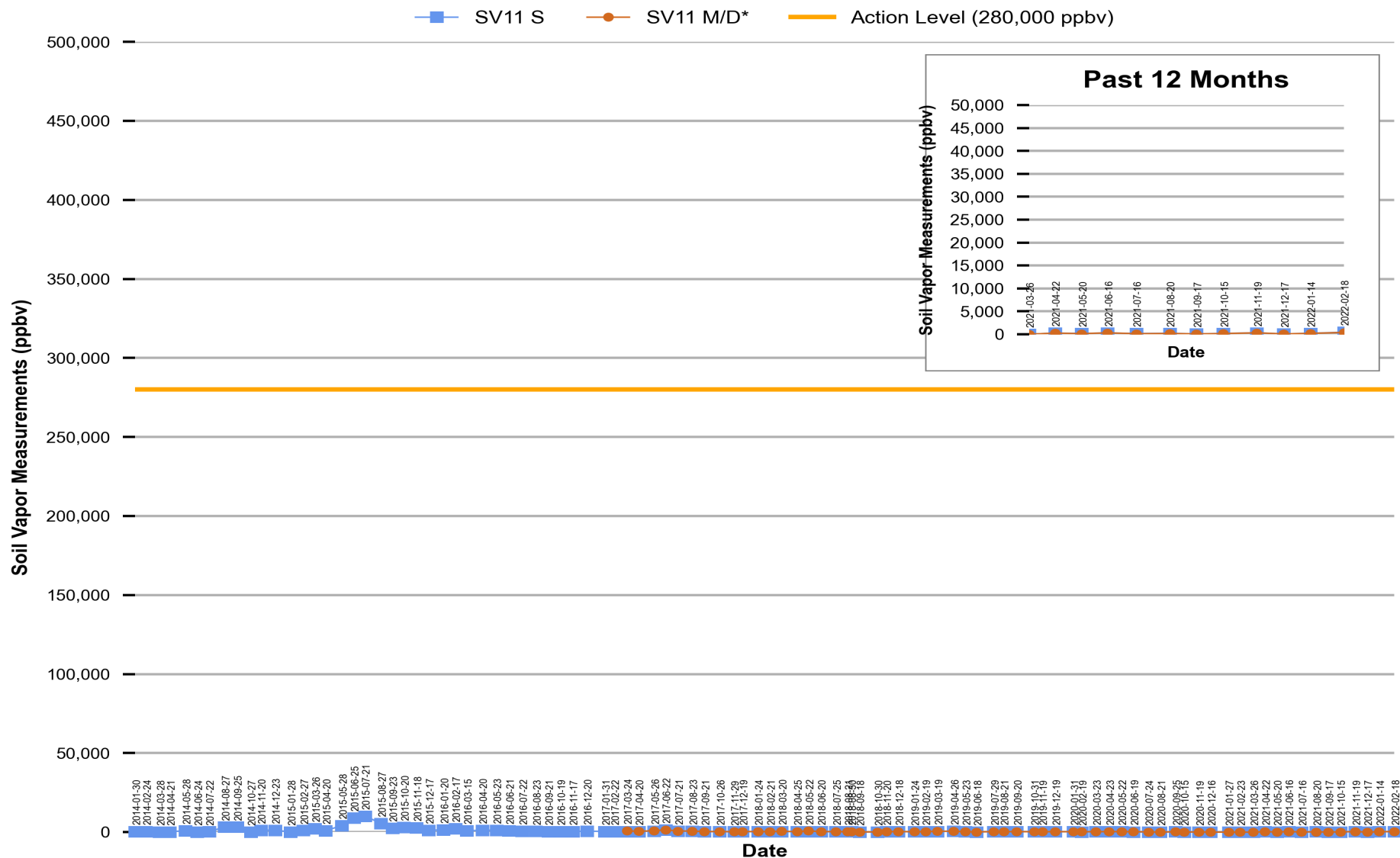
Notes (where applicable):

* "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 Feb 2022)



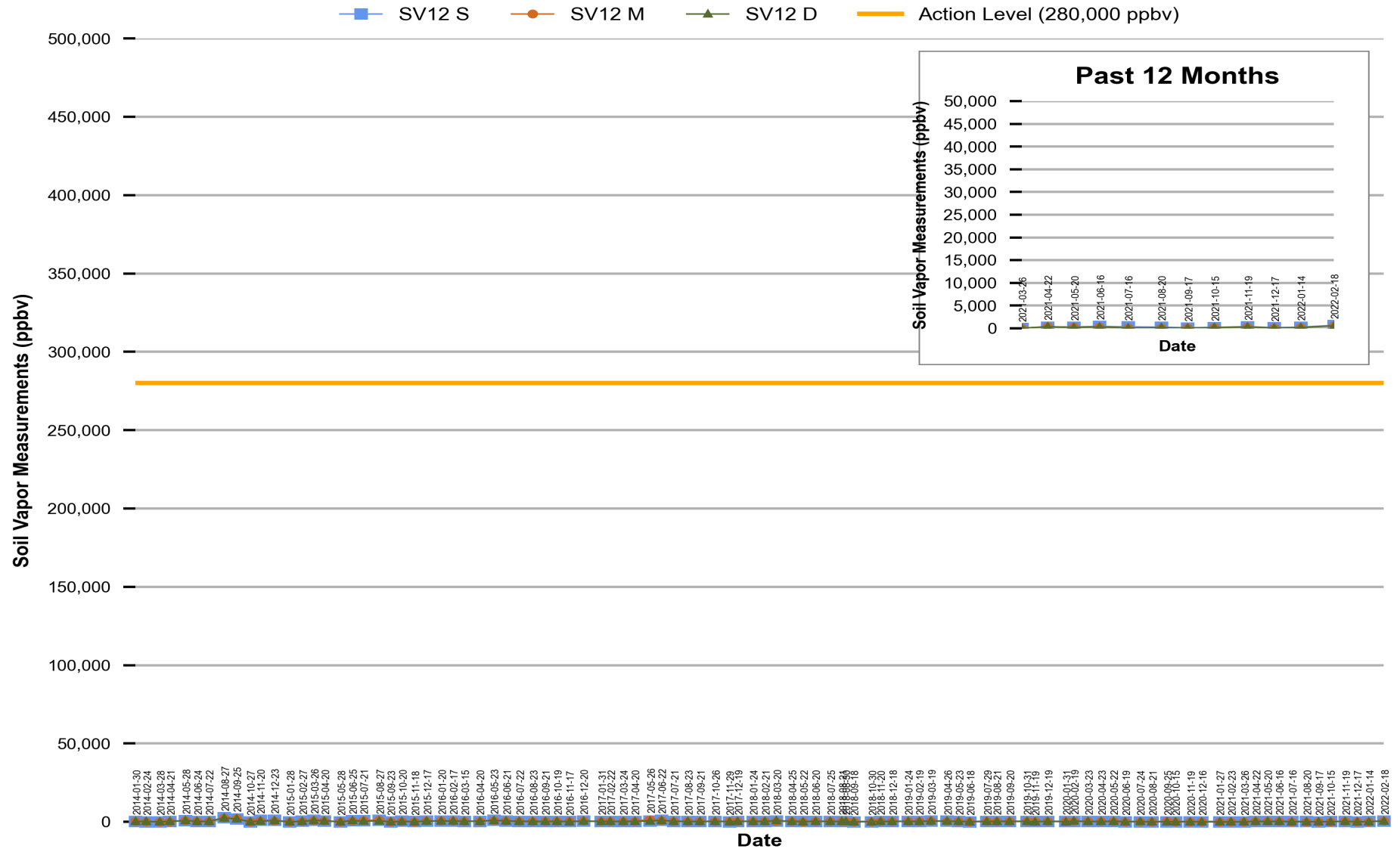
Notes (where applicable):

* "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 Feb 2022)



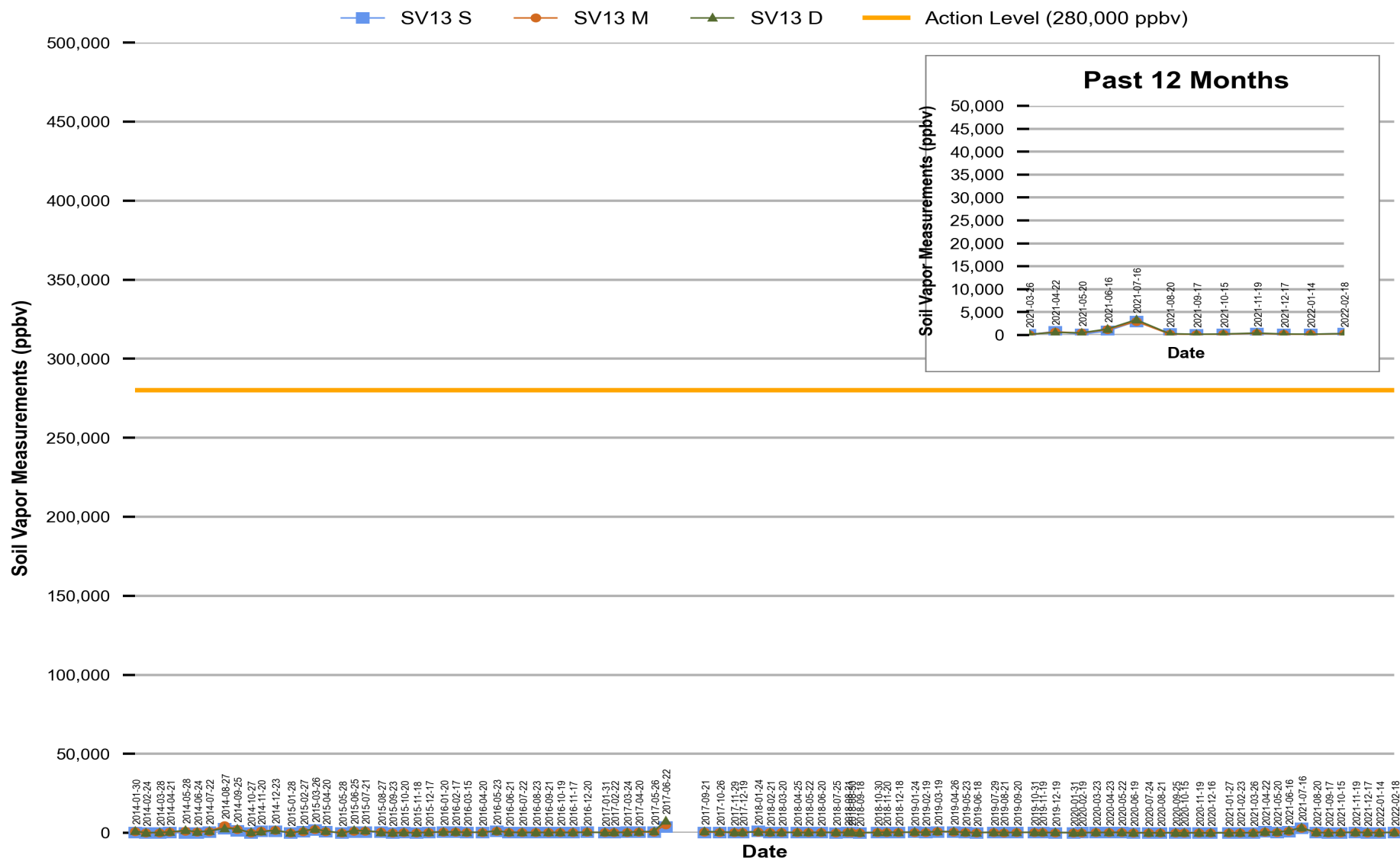
Notes (where applicable):

* "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 Feb 2022)



Notes (where applicable):

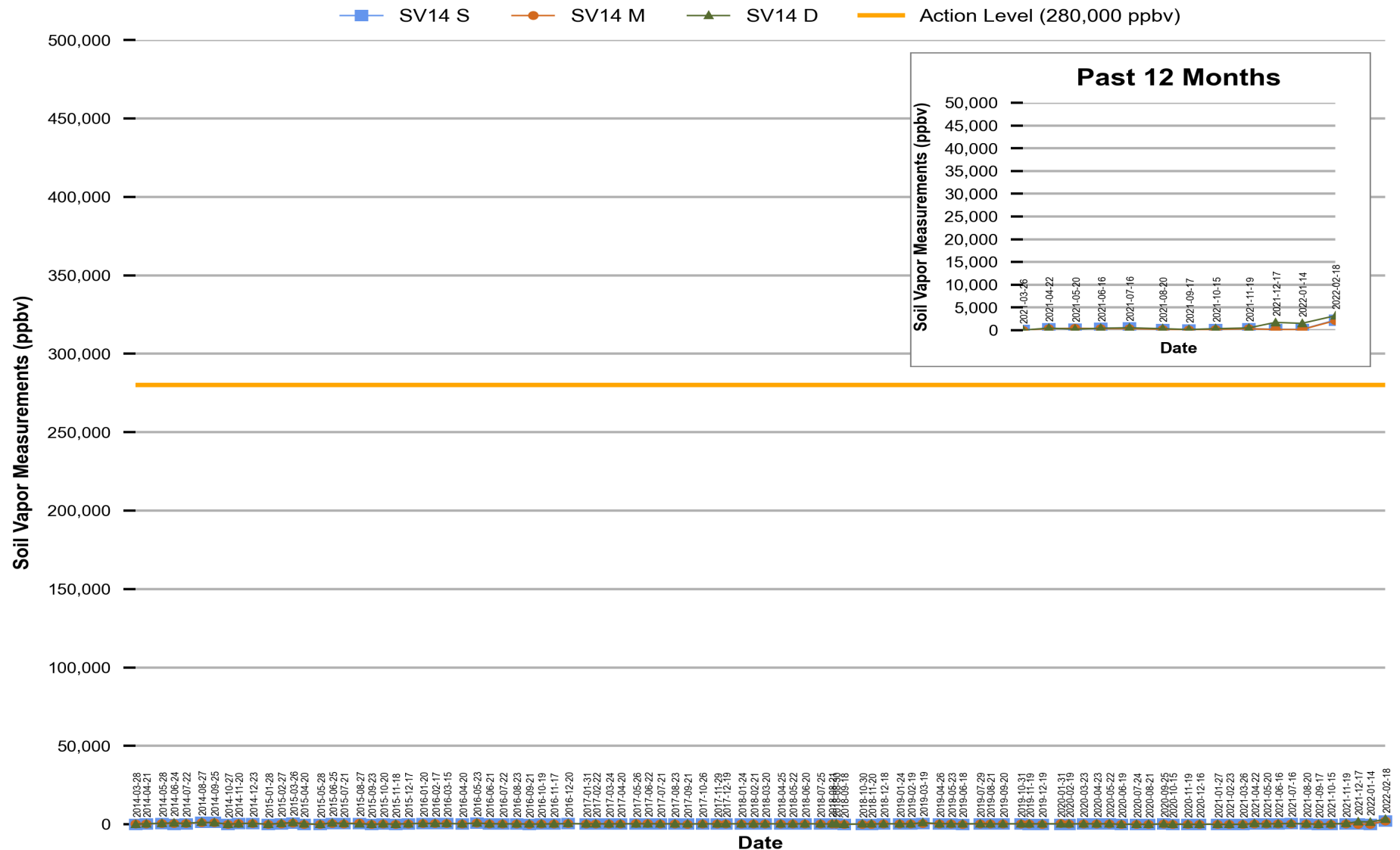
* "M/D" monitoring points were constructed to screen both middle & deep depth intervals along the respective underground storage tank.

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 Feb 2022)



Notes (where applicable):

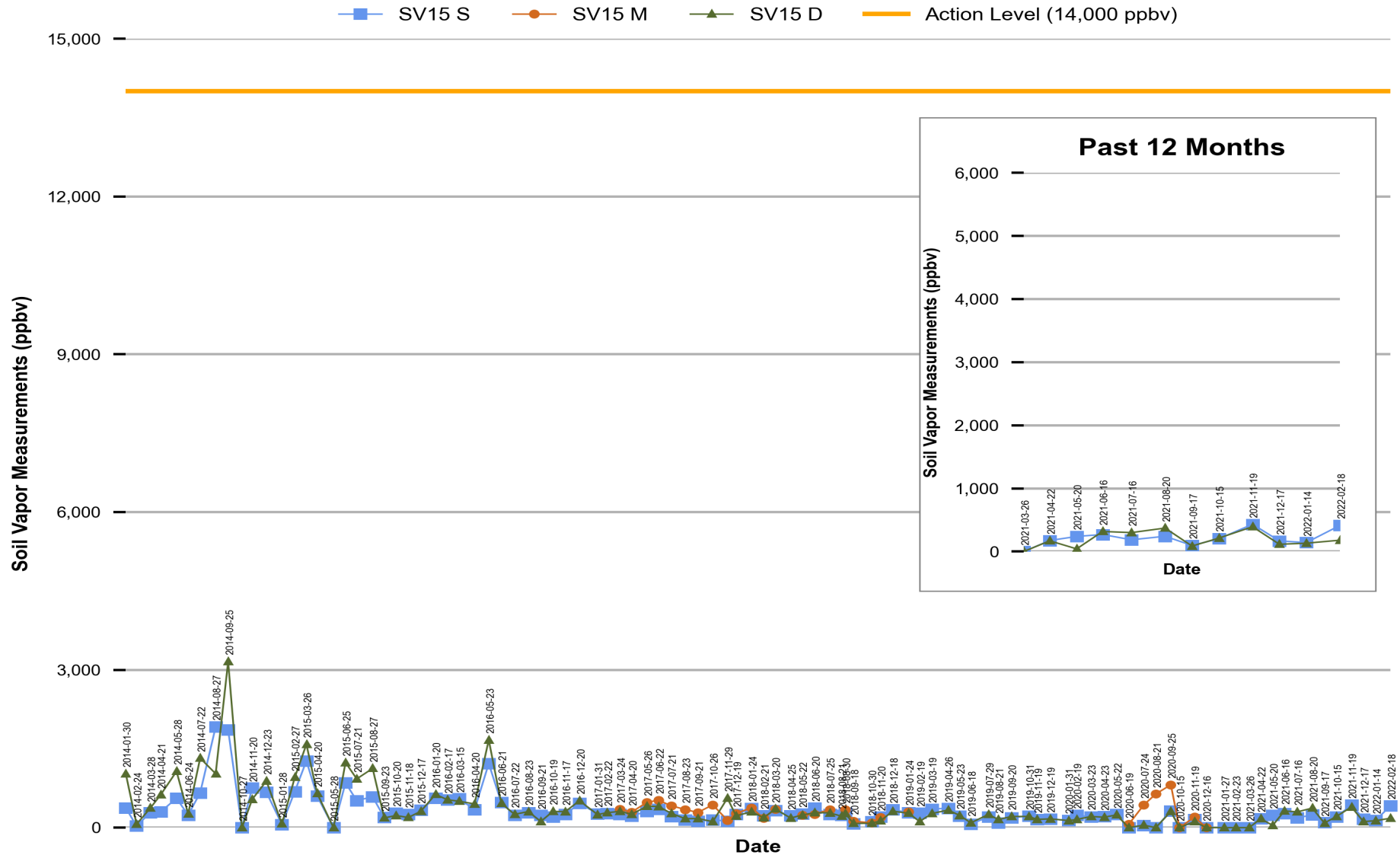
* "M/D" monitoring points were constructed to screen both middle & deep depth intervals along the respective underground storage tank.

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 Feb 2022)



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)



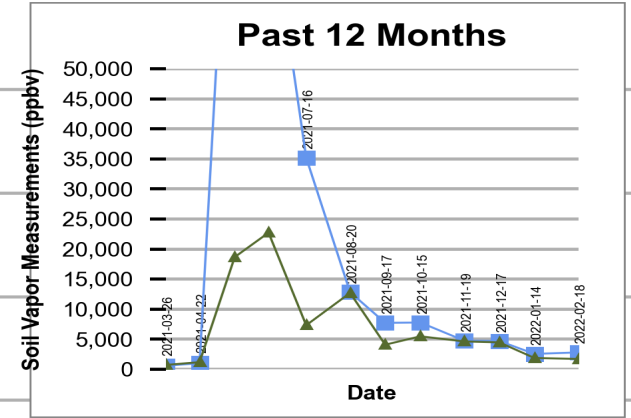
* "M/D" monitoring points were constructed to screen both middle & deep depth intervals along the respective underground storage tank.

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

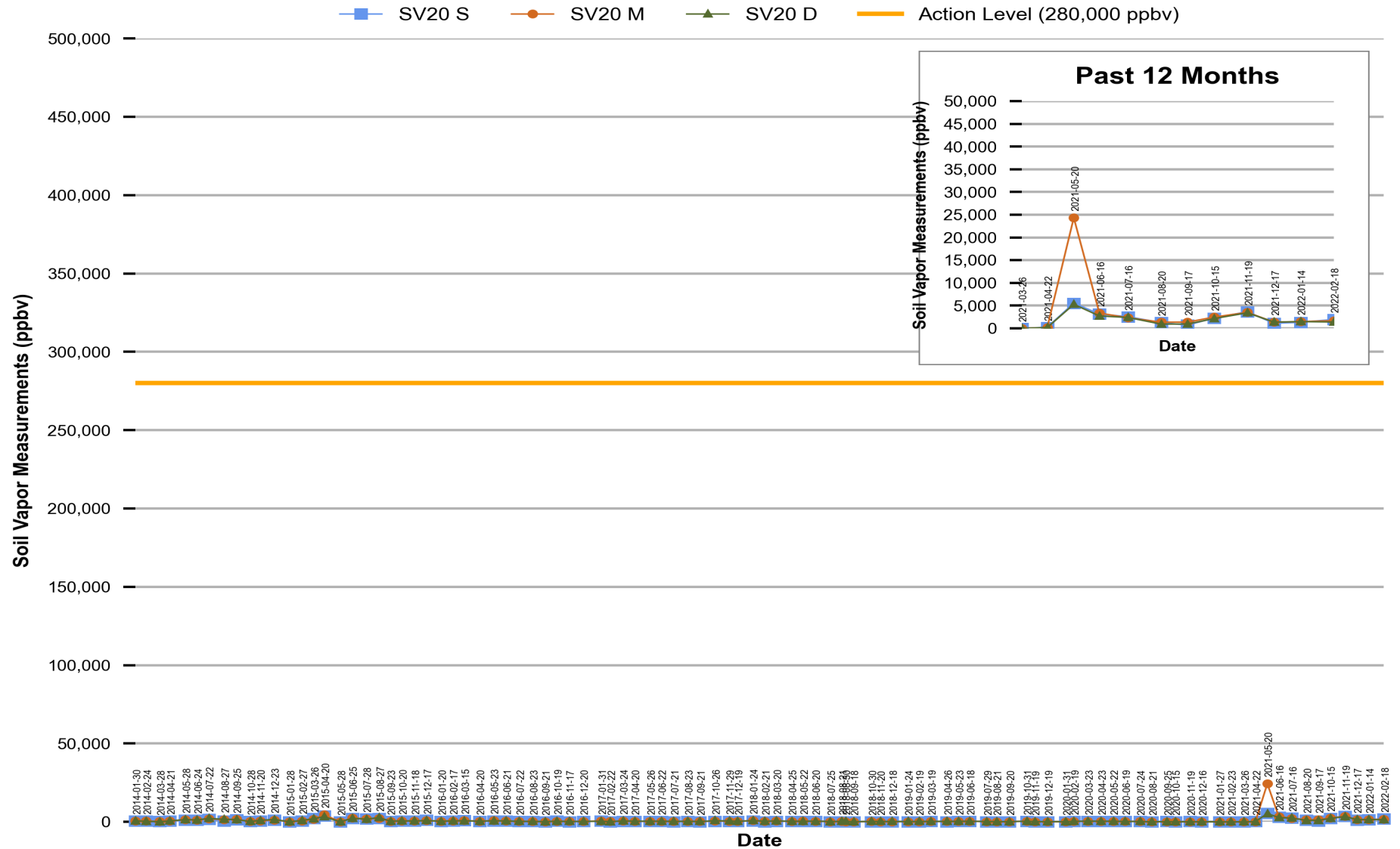
Tank 17 is empty and inactive, undergoing clean, inspect & repair (CIR), but remains accessible for soil vapor monitoring events.

—■— SV18 S —▲— SV18 D — Action Level (280,000 ppbv)



Page 17 of 18

Figure 18
Red Hill - Tank 20 (JP-5)
Soil Vapor Measurements (Jan 2014 Through Feb 2022)



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