

Tank 5 Quarterly Release Response Report Red Hill Bulk Fuel Storage Facility JBPHH, Oahu, Hawaii

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Prepared by:



Commander
Navy Region Hawaii
Environmental Department, Code N45
850 Ticonderoga Street, Suite 110
JBPHH, Hawaii 96860-5101

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Executive Summary

Navy Region Hawaii (NRH) prepared this Quarterly Release Response Report in accordance with the State of Hawaii Department of Health (DOH) Underground Storage Tank (UST) Technical Guidance Manual (DOH, 2000) and in response to the DOH release response letters dated February 12, 2014 and February 26, 2014 for the Red Hill Bulk Fuel Storage Facility (Facility). The objective of this report is to describe the actions taken by the Navy between April and June 2018 in response to the fuel reportedly released from Tank 5 in January 2014.

Soil vapor and groundwater samples continue to be collected from locations inside the Red Hill tunnel system. Groundwater samples are also collected from locations outside the Red Hill tunnel system. Laboratory analytical results continue to indicate the drinking water at Red Hill is in compliance with all Federal and State regulations and safe for human consumption.

The Navy continues to perform work to ensure the drinking water around the Facility remains safe. 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.

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1.0 Introduction

As required by Hawaii Administrative Rules 11-281-80.1, Release Response Reporting, this Quarterly Release Response Report presents the following information:

- 1) All release response actions taken pursuant to subchapter 7 after the last reported date;
- 2) A plan for future release response actions to be taken; and
- 3) Information required pursuant to section 11-281-78.1.

This report presents a summary of the release response activities performed from April 1 through June 30, 2018 at the Red Hill Bulk Fuel Storage Facility (hereinafter referred to as “the Facility”) located at Joint Base Pearl Harbor-Hickam (JBPHH), Oahu, Hawaii.

1.1 Statement of Purpose

Release response actions were performed to address a fuel release observed in Tank 5.

1.2 Previous Reports

The following documents were previously submitted to DOH:

- Release confirmation information for Tank 5 as Navy Region Hawaii (NRH) letter 5090 Ser N45/044 dated January 23, 2014
- Initial Release Response Report, enclosed with NRH letter 5090 Ser N45/320 dated April 24, 2014
- Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/563 dated July 22, 2014
- Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/929 dated November 10, 2014
- Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/121 dated January 21, 2015
- Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/322 dated April 20, 2015
- Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/573 dated July 17, 2015
- Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/812 dated October 16, 2015
- Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/0411 dated January 13, 2016
- Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/0508 dated April 13, 2016

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- Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/0583 dated July 28, 2016
 - Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/0658 dated October 24, 2016
 - Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/0422 dated January 27, 2017
 - Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/0489 dated April 24, 2017
 - Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/0552 dated July 24, 2017
 - Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/0627 dated October 23, 2017
 - Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/0410 dated January 19, 2018
 - Quarterly Release Response Report enclosed with NRH letter 5090 Ser N45/0492 dated April 19, 2018

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 Koolau Mountain Range that divides Halawa 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 Halawa Correctional Facility and Halawa 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 eighteen (18) active and two (2) 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 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, or Marine Diesel Fuel (F-76). Tank 5 was used to store Jet Fuel Propellant No. 8 (JP-8).

Four (4) groundwater monitoring wells (wells RHMW01, 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.

Nine (9) groundwater monitoring wells (RHMW04, RHMW06, RHMW07, RHMW08, RHMW09, RHMW10, RHMW11, 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 and HDMW2253-03 are located at the Halawa Correctional Facility (outside the Red Hill Facility).

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 April 1 through June 30, 2018.

3.1 Oil/Water Interface Measurements

Oil/water interface measurements were taken at groundwater monitoring wells RHMW01, RHMW02, RHMW03, and RHMW05 in April, May, and June 2018. 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 to determine the depth of water to the nearest 0.01 foot, and the existence of any immiscible layers (LNAPL). No LNAPL was observed.

A summary of interface measurements from January 2014 through June 2018 is presented in Appendix A.

3.2 Soil Vapor Monitoring

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.

A conservative approach to assess the integrity of the associated tank system is to measure if VOC concentrations exceed 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 April, May, and June 2018. Soil vapor VOC concentrations at Tank 5 were below the action level 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 action levels, with no consistent trending.

Soil vapor sampling results from January 2014 through June 2018 are presented in Appendix B.

3.3 Groundwater Sampling and Analysis

Groundwater samples were collected from sampling point RHMW2254-01 and monitoring wells located inside and outside the Red Hill tunnel system in April 2018.

Groundwater samples were collected from one (1) sampling point (RHMW2254-01) located at Red Hill Shaft, four (4) groundwater monitoring wells (wells RHMW01, RHMW02, RHMW03, and RHMW05) located within the lower access tunnel, and nine (9) groundwater monitoring wells (RHMW04, RHMW06, RHMW07, RHMW08, RHMW09, RHMW10, RHMW11, OWDFMW01, and HDMW2253-03) located outside of the Facility tunnel system.

A groundwater monitoring report, which summarizes sampling activities and laboratory analytical results, will be submitted under separate cover.

3.4 Drinking Water Sampling

Drinking water samples were collected from the Red Hill Shaft post-treatment regulatory compliance sampling point (360-011, Tap Outside Chlorine Building) on June 19, 2018. Samples were analyzed for Lead, JP-8/F-24, and contaminants listed in the Transition Plan.

U.S. Environmental Protection Agency (EPA) Methods 524.2 (VOCs), 525.2 (SVOCs), 8015B (JP-8/F-24 and TPH-o), and 200.8 (Lead) were used and all analyses were conducted by labs certified by the DOH State Laboratories Division.

Sample test results were below detectable levels. The test results indicate the water is acceptable for distribution. A summary of the drinking water sampling is provided in Table 1.

**RED HILL DRINKING WATER SHAFT SAMPLING
TRANSITION PLAN FOR TANK 5 RED HILL RELEASE FROM EMERGENCY RESPONSE TO REMEDIATION AS AMENDED ON FEBRUARY 13, 2014**

Date	JP-8	Lead	Benzene	Carbon tetrachloride	Chlorobenzene	1,2-Dichlorobenzene (o-Dichlorobenzene)	1,4-Dichlorobenzene (para-Dichlorobenzene)	1,2-Dichloroethane	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane (Methylene Chloride)	1,2-Dichloropropane	Ethylbenzene	Napthalene (unregulated)	Styrene	Tetrachloroethylene	Toluene	1,2,4-Trichlorobenzene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethylene	Vinyl chloride	Xylenes, Total	Acenaphthene (unregulated)	Acenaphthylene (unregulated)	Anthracene (unregulated)	Benzo(a)pyrene	Di(2-ethylhexyl)phthalate	Di(2-ethylhexyl)phthalate	Fluoranthene (unregulated)	Phenanthrene (unregulated)	Pyrene (unregulated)				
MCL (ug/L) ¹	-	15 (action level)	5	5	100	600	75	5	7	70	100	5	5	700	-	100	5	1,000	70	200	5	5	2	10000	-	-	-	0.2	400	6	-	-	-				
DW Toxicity (ug/L) ²	190	15	5	5	100	600	75	0.15	7	70	100	4.8	5	700	17	100	5	1,000	70	200	5	5	2	10000	370	240	1800	0.2		6	1500	240	180				
Final Grdwater AL (ug/L) ²	100	5.6	5	5	25	10	5	0.15	7	70	100	4.8	5	30	17	10	5	40	25	62	5	5	2	20	20	30	0.73	0.014		6	8	4.6	2				
MRL ³	100	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.2	0.5	0.1	0.1	0.1	0.02	0.6	0.6	0.1	0.1	0.1				
360-011, Tap Outside Chlorine Building (After Treatment)																																					
1/14/2014	ND	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
1/16/2014	ND	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
1/21/2014	ND	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
1/28/2014	ND	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
2/11/2014	ND	5.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
2/28/2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
3/11/2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
4/8/2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
5/13/2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
6/10/2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
7/8/2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
10/7/2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
1/21/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
4/7/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
6/16/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
9/15/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
12/15/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
12/21/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
3/22/2016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
6/21/2016	ND	1.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
9/20/2016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
11/15/2016 ⁷	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
12/13/2016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1/17/2017 ⁷	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
2/21/2017 ⁷	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
3/21/2017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
4/18/2017 ⁷	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
6/20/2017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
9/19/2017	ND	1.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
12/19/2017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
3/20/2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
6/19/2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
360-001, Pumphead																																					
1/16/2014	ND	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
2/11/2014	ND	3.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
2/28/2014	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
3/11/2014	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
4/8/2014	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Method	8015B	200.8																								524.2					525.2						

NOTES:

- MCLs are drinking water maximum contaminant levels per 40 CFR 141 and HAR 11-20.
- Action levels from "Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater, Hawaii Edition", Fall 2011 (revised January 2012), Hawaii Department of Health Hazard Evaluation and Emergency Response
- MRL is the Minimum Reporting Level
- One time sample to analyze for TPH-o. Detection levels less than or equal to MRLs
- ND - not detected at the minimum reporting level (MRL)
- Method 8260B, MRL=0.25 ug/L
- Voluntary sample. Not required by Transition Plan.

HISTORICAL DRINKING WATER RESULTS AT RED HILL SHAFT:

- Lead, VOCs and SVOCs regulated by HAR 11-20 and are monitored every 3 years. All petroleum-related contaminants were ND since 2000 (monitoring data not available prior to 2000).
- UEM conducted additional monitoring for benzene, toluene, and xylene quarterly and benzo(a)pyrene twice a year from mid 1990's - 2013. Results not available prior to 2002. All results from 2002 were ND.
- UEM also conducted additional quarterly monitoring for lead from mid 2012 - 2013. Lead was detected on:
 - 8/17/12 6 ppb
 - 11/27/12 1 ppb
 - 8/22/13 1.9 ppb
 - 11/19/13 1.8 ppb

4.0 Continued Groundwater and Soil Vapor Monitoring

Based on discussions with DOH and EPA, continued monitoring of the groundwater and soil vapor will be conducted as follows:

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

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

5.0 Continued Drinking Water Sampling

Drinking water sampling will continue on a quarterly schedule in accordance with the approved Transition Plan. Samples will be taken at the entry point to the distribution system (360-011 Tap Outside Chlorine Building) and analyzed using the following analytical methods:

- VOCs – EPA 524.2
- SVOCs – EPA 525.2
- Gas Chromatography for JP-8/F-24 – EPA 8015
- Lead – EPA 200.8

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 Administrative Order on Consent 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. 1 in January 2017
- Sampling and Analysis Plan in January 2017
- Existing Data Summary and Evaluation Report in March 2017
- Groundwater Flow Model Progress Report 01 in April 2017
- Sampling and Analysis Plan, Revision 01 in April 2017
- Data Gap Analysis Report in April 2017
- 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

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- 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 No. 4 in April 2018

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

7.0 Public Notifications

The Navy provided notifications to the public through the following document:

- Press Release “Red Hill Update: ‘Coupon’ Plate Testing Starts” of June 25, 2018

A copy of this document is included in Appendix C.

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 quarterly release response report will be submitted in October 2018 and will cover the release response actions completed between July and September 2018.

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

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.

Hawaii Administrative Rules, Title 11, Chapter 281, Underground Storage Tanks, August 2013.

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.

Appendix A
Oil/Water Interface Measurements
January 2014 through June 2018

Red Hill Oil/Water Interface Measurements January 2014 through June 2018

Date	RHMW01			RHMW02			RHMW03			RHMW05		
	Elevation = 102.27 ft ¹			Elevation = 104.76 ft ¹			Elevation = 121.06 ft ¹			Elevation = 101.55 ft ¹		
	DTW (TOC)	SWL	LNAPL	DTW (TOC)	SWL	LNAPL	DTW (TOC)	SWL	LNAPL	DTW (TOC)	SWL	LNAPL
15-Jan-14	83.94	18.33	0	86.62	18.14	0	NT	NT	NT	NT	NT	NT
16-Jan-14	NT	NT	NT	NT	NT	NT	NT	NT	NT	83.09	18.46	0
22-Jan-14	83.53	18.74	0	86.20	18.56	0	NT	NT	NT	82.87	18.68	0
23-Jan-14	83.58	18.69	0	86.24	18.52	0	NT	NT	NT	82.94	18.61	0
24-Jan-14	83.57	18.70	0	86.23	18.53	0	NT	NT	NT	82.93	18.62	0
27-Jan-14	83.55	18.72	0	86.23	18.53	0	NT	NT	NT	82.93	18.62	0
28-Jan-14	83.56	18.71	0	86.25	18.54	0	102.52	18.54	0	82.94	18.61	0
29-Jan-14	83.56	18.71	0	86.22	18.54	0	NT	NT	NT	82.94	18.61	0
30-Jan-14	83.53	18.74	0	86.21	18.55	0	NT	NT	NT	82.93	18.62	0
31-Jan-14	83.53	18.74	0	86.19	18.57	0	NT	NT	NT	82.88	18.67	0
3-Feb-14	83.54	18.73	0	86.20	18.56	0	NT	NT	NT	82.91	18.64	0
4-Feb-14	83.54	18.73	0	86.20	18.56	0	NT	NT	NT	82.89	18.66	0
10-Feb-14	84.49	17.78	0	86.16	18.60	0	102.47	18.59	0	82.83	18.72	0
24-Feb-14	83.54	18.73	0	86.24	18.52	0	102.47	18.59	0	82.97	18.58	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	18.51	0	86.42	18.34	0	102.65	18.41	0	83.18	18.37	0
7-Apr-14*	83.42	18.85	0	86.43	18.33	0	NT	NT	NT	83.21	18.34	0
21-Apr-14	83.93	18.34	0	86.58	18.18	0	102.80	18.26	0	83.27	18.28	0
8-May-14*	84.03	18.24	0	86.68	18.08	0	NT	NT	NT	83.46	18.09	0
22-May-14*	83.81	18.46	0	86.47	18.29	0	NT	NT	NT	83.15	18.40	0
27-May-14	83.91	18.36	0	86.60	18.16	0	102.85	18.21	0	83.31	18.24	0
10-Jun-14*	83.93	18.34	0	86.55	18.21	0	NT	NT	NT	83.34	18.21	0
23-Jun-14	84.06	18.21	0	86.72	18.04	0	103.99	17.07	0	83.54	18.01	0
21-Jul-14	84.13	18.14	0	86.80	17.96	0	102.98	18.08	0	83.49	18.06	0
27-Aug-14	84.01	18.26	0	86.65	18.11	0	102.87	18.19	0	83.04	18.51	0
25-Sep-14	84.64	17.63	0	87.27	17.49	0	103.51	17.55	0	84.10	17.45	0
28-Oct-14	83.79	18.48	0	86.51	18.25	0	102.78	18.28	0	83.21	18.34	0
20-Nov-14	83.87	18.40	0	86.56	18.20	0	102.78	18.28	0	83.35	18.20	0
23-Dec-14	83.67	18.60	0	86.37	18.39	0	102.64	18.42	0	83.05	18.50	0
28-Jan-15	83.63	18.64	0	86.35	18.41	0	102.63	18.43	0	83.03	18.52	0
27-Feb-15	83.68	18.59	0	86.28	18.48	0	102.52	18.54	0	83.06	18.49	0
26-Mar-15	83.83	18.44	0	86.04	18.72	0	102.79	18.27	0	83.24	18.31	0
21-Apr-15	84.33	17.94	0	86.97	17.79	0	103.18	17.88	0	83.72	17.83	0
28-May-15	84.29	17.98	0	86.97	17.79	0	103.24	17.82	0	83.95	17.60	0
25-Jun-15	84.58	17.69	0	87.28	17.48	0	103.57	17.49	0	83.75	17.80	0
21-Jul-15	84.58	17.69	0	87.24	17.52	0	103.44	17.62	0	83.76	17.79	0
27-Aug-15	84.44	17.83	0	87.13	17.63	0	103.41	17.65	0	83.69	17.86	0
23-Sep-15	84.26	18.01	0	86.91	17.85	0	103.21	17.85	0	83.63	17.92	0
20-Oct-15	84.00	18.27	0	86.38	18.38	0	103.38	17.68	0	Obstructed	NT	NT
18-Nov-15	84.25	18.02	0	86.93	17.83	0	103.24	17.82	0	84.62 ²	16.93	0
17-Dec-15	83.76	18.51	0	86.36	18.40	0	102.56	18.50	0	83.18	18.37	0
20-Jan-16	83.31	18.96	0	85.97	18.79	0	102.21	18.85	0	Obstructed	NT	NT
17-Feb-16	83.17	19.10	0	85.81	18.95	0	102.10	18.96	0	Obstructed	NT	NT
15-Mar-16	82.89	19.38	0	85.60	19.16	0	101.82	19.24	0	82.26	19.29	0
20-Apr-16	82.97	19.30	0	85.63	19.13	0	101.91	19.15	0	82.31	19.24	0
23-May-16	83.14	19.13	0	85.81	18.95	0	102.03	19.03	0	82.50	19.05	0
21-Jun-16	83.16	19.11	0	85.77	18.99	0	10.03	111.03	0	82.54	19.01	0
20-Jul-16	83.32	18.95	0	85.99	18.77	0	102.31	18.75	0	82.63	18.92	0
23-Aug-16	83.27	19.00	0	85.96	18.80	0	102.20	18.86	0	82.63	18.92	0
21-Sep-16	83.13	19.14	0	85.74	19.02	0	102.06	19.00	0	82.44	19.11	0
19-Oct-16	83.01	19.26	0	85.69	19.07	0	101.95	19.11	0	82.39	19.16	0
17-Nov-16	82.92	19.35	0	85.56	19.20	0	101.82	19.24	0	82.24	19.31	0
20-Dec-16	82.67	19.60	0	85.36	19.40	0	101.61	19.45	0	82.01	19.54	0
31-Jan-17	82.45	19.82	0	85.13	19.63	0	101.46	19.60	0	82.04	19.51	0
22-Feb-17	82.37	19.90	0	85.01	19.75	0	101.31	19.75	0	81.72	19.83	0
24-Mar-17	82.49	19.78	0	85.19	19.57	0	101.45	19.61	0	81.84	19.71	0
20-Apr-17	82.59	19.68	0	85.25	19.51	0	101.5	19.56	0	81.94	19.61	0
26-May-17	82.45	19.82	0	85.13	19.63	0	101.39	19.67	0	81.80	19.75	0
22-Jun-17	82.94	19.33	0	85.59	19.17	0	101.89	16.17	0	82.30	19.25	0
21-Jul-17	83.43	18.84	0	86.5	18.26	0	Transducer Installed	NT	NT	82.81	18.74	0
20-Mar-18	83.56	18.71	0	86.24	18.52	0	102.55	18.51	0	82.89	18.66	0
25-Apr-18	83.47	18.8	0	86.14	18.62	0	102.38	15.68	0	82.86	18.69	0
22-May-18	83.61	18.66	0	86.28	18.47	0	102.56	15.68	0	82.86	18.69	0
20-Jun-18	83.63	15.64	0	86.34	18.42	0	102.57	18.49	0	82.99	18.56	0

Notes:

1 - Elevations were updated based on the Groundwater Flow Direction/Gradient and Tier 3 Risk Assessment Re-evaluation Letter Report, Red Hill Bulk Fuel Storage Facility, Pearl Harbor, Hawaii, Contract No. N47408-04-D-8514, Task Order 54, dated April 15, 2010.

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 June 2018

Figure 1
Soil Vapor Measurements
SV02

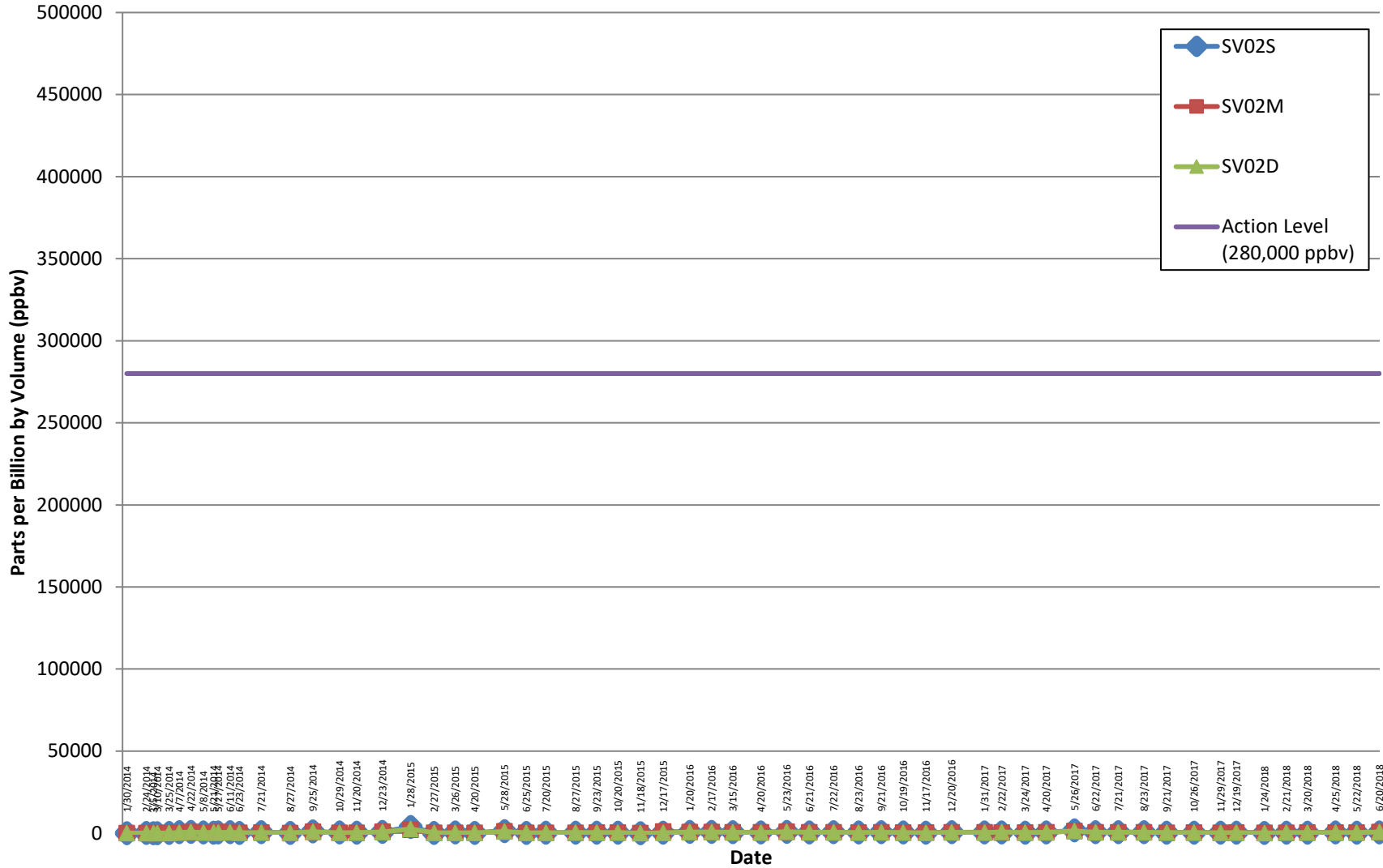


Table 1
Soil Vapor Results for SV02 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV02S	SV02M	SV02D
1/30/2014	11	11	8
2/24/2014	135	51	82
3/5/2014	1	0	0
3/10/2014	1	11	1
3/25/2014	146	19	47
4/7/2014	575	342	308
4/22/2014	739	610	662
5/8/2014	481	308	333
5/21/2014	344	280	278
5/27/2014	481	697	413
6/11/2014	527	475	468
6/23/2014	170	183	169
7/21/2014	527	392	426
8/27/2014	180	105	199
9/25/2014	1028	827	830
10/29/2014	409	227	164
11/20/2014	194	167	309
12/23/2014	810	811	715
1/28/2015	3808	2150	2530
2/27/2015	129	160	133
3/26/2015	360	115	176
4/20/2015	157	123	164
5/28/2015	1285	1146	1011
6/25/2015	159	172	248
7/20/2015	238	187	243
8/27/2015	196	199	270
9/23/2015	341	305	311
10/20/2015	276	314	323
11/18/2015	NC ₁	NC ₁	NC ₁
12/17/2015	320	904	226
1/20/2016	739	616	731
2/17/2016	671	664	662
3/15/2016	550	565	512
4/20/2016	454	445	393
5/23/2016	802	856	782
6/21/2016	466	464	473
7/22/2016	516	489	519
8/23/2016	396	390	390
9/21/2016	516	467	500
10/19/2016	426	332	345
11/17/2016	289	272	252
12/20/2016	543	533	469
1/31/2017	477	443	388
2/22/2017	387	291	679
3/24/2017	323	321	301
4/20/2017	461	472	436
5/26/2017	1646	1321	1223
6/22/2017	624	502	556
7/21/2017	604	510	502

ppbv: parts per billion by volume
NC₁: Not collected due to maintenance work

Table 1
Soil Vapor Results for SV02 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV02S	SV02M	SV02D
8/23/2017	519	508	503
9/21/2017	296	269	296
10/26/2017	297	289	292
11/29/2017	248	269	241
12/19/2017	310	294	292
1/24/2018	157	158	90
2/21/2018	264	254	410
3/20/2018	285	285	412
4/25/2018	356	324	353
5/22/2018	340	292	271
6/20/2018	418	659	707

ppbv: parts per billion by volume
NC₁: Not collected due to maintenance work

Figure 2
Soil Vapor Measurements
SV03

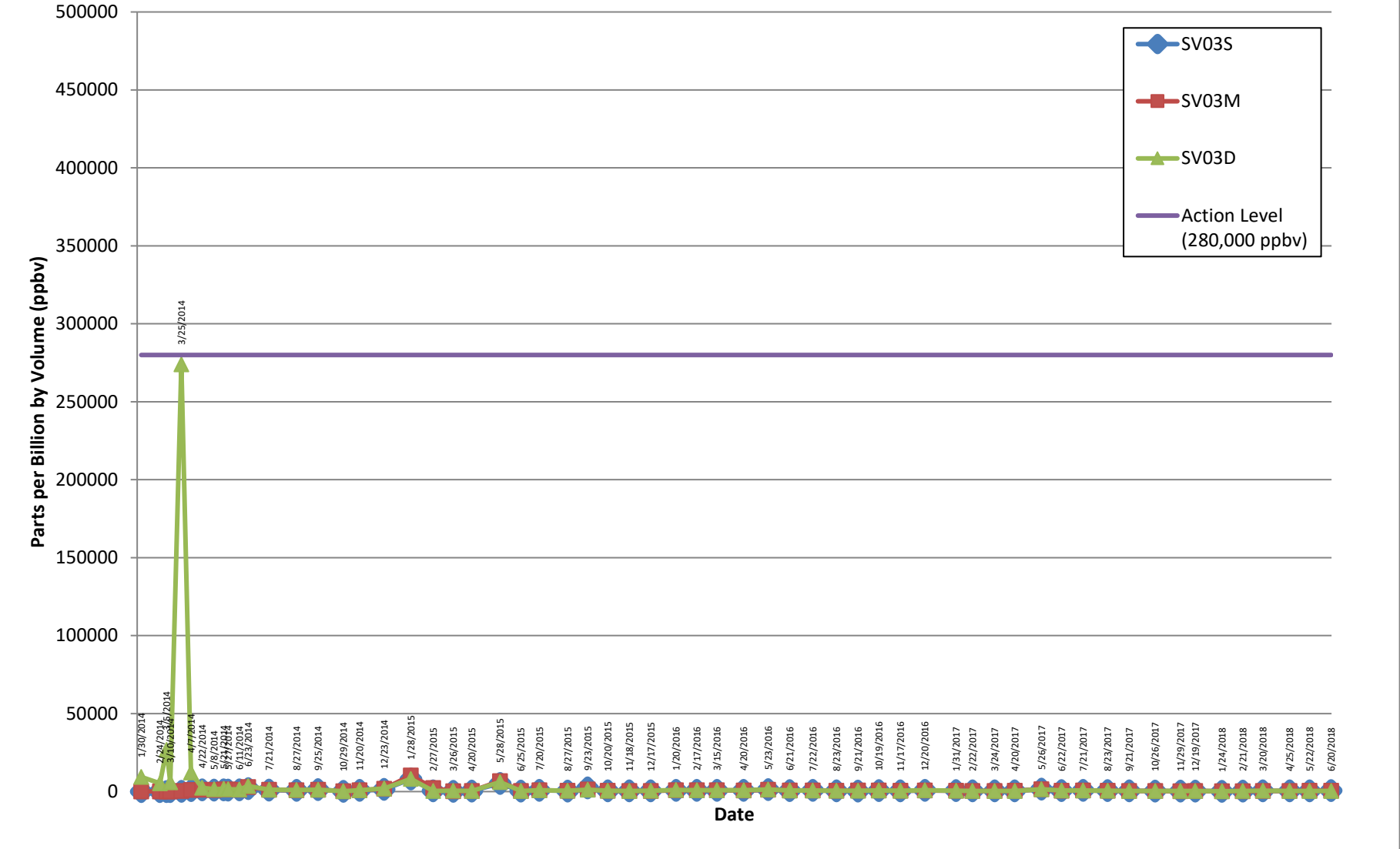


Table 2
Soil Vapor Results for SV03 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV03S	SV03M	SV03D
1/30/2014	41	46	9444
2/24/2014	70	162	5290
3/5/2014	20	17	26800
3/10/2014	8	27	5922
3/25/2014	87	385	274000
4/7/2014	676	1054	12300
4/22/2014	1056	1266	2442
5/8/2014	877	1096	1525
5/21/2014	1085	1378	1864
5/27/2014	915	1278	1536
6/11/2014	1148	1138	1424
6/23/2014	1970	2931	3530
7/21/2014	1021	1133	1215
8/27/2014	749	885	1050
9/25/2014	1298	1214	1187
10/29/2014	199	222	254
11/20/2014	731	919	856
12/23/2014	1403	1860	2004
1/28/2015	8037	10300	8075
2/27/2015	422	2231	435
3/26/2015	210	236	554
4/20/2015	363	422	436
5/28/2015	5289	6657	6075
6/25/2015	287	435	386
7/20/2015	849	880	880
8/27/2015	381	496	576
9/23/2015	2316	1334	1223
10/20/2015	488	552	619
11/18/2015	469	451	435
12/17/2015	418	434	506
1/20/2016	844	908	963
2/17/2016	761	801	888
3/15/2016	747	832	841
4/20/2016	732	784	855
5/23/2016	1194	1217	1382
6/21/2016	703	692	763
7/22/2016	740	736	710
8/23/2016	518	516	518
9/21/2016	348	646	602
10/19/2016	652	662	727
11/17/2016	469	512	540
12/20/2016	748	757	802
1/31/2017	589	618	560
2/22/2017	452	454	438
3/24/2017	449	417	458
4/20/2017	458	480	479
5/26/2017	1628	1447	1474
6/22/2017	654	583	699
7/21/2017	731	702	667

ppbv: parts per billion by volume

Table 2
Soil Vapor Results for SV03 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV03S	SV03M	SV03D
8/23/2017	582	576	608
9/21/2017	412	332	394
10/26/2017	370	373	373
11/29/2017	281	292	345
12/19/2017	373	363	410
1/24/2018	226	242	241
2/21/2018	361	302	341
3/20/2018	421	351	540
4/25/2018	456	436	357
5/22/2018	531	558	475
6/20/2018	559	621	466

ppbv: parts per billion by volume

Figure 3 Soil Vapor Measurements SV04

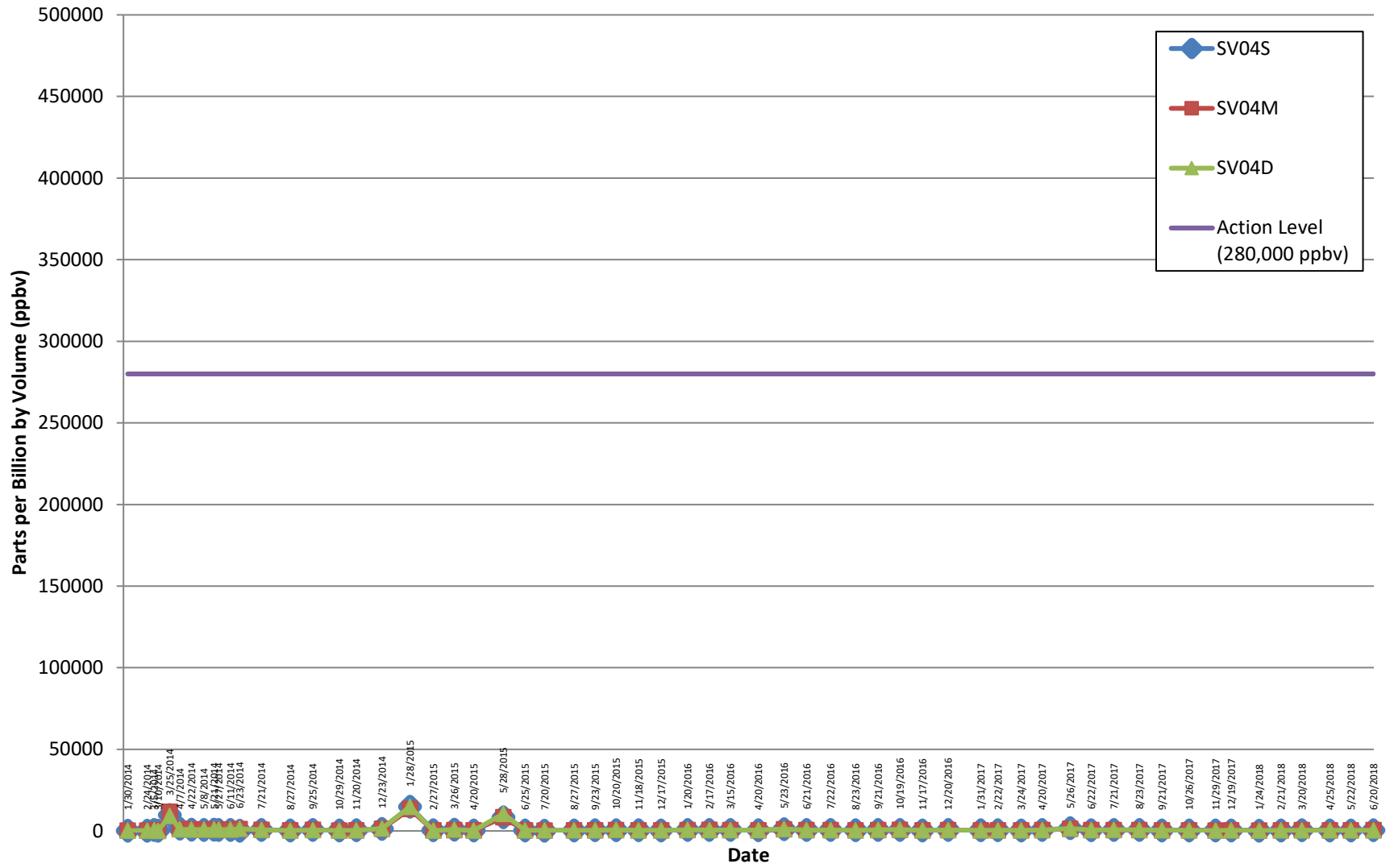


Table 3
Soil Vapor Results for SV04 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV04S	SV04M	SV04D
1/30/2014	132	165	135
2/24/2014	163	149	138
3/5/2014	536	493	520
3/10/2014	116	51	72
3/25/2014	9682	11800	9134
4/7/2014	1382	1217	1035
4/22/2014	769	948	870
5/8/2014	658	721	748
5/21/2014	666	861	944
5/27/2014	540	670	817
6/11/2014	657	762	754
6/23/2014	98	1075	1233
7/21/2014	557	625	735
8/27/2014	245	296	210
9/25/2014	614	612	512
10/29/2014	194	136	139
11/20/2014	409	315	373
12/23/2014	1265	1311	1483
1/28/2015	14800	13400	14800
2/27/2015	370	343	217
3/26/2015	682	488	814
4/20/2015	339	336	268
5/28/2015	8401	8427	10500
6/25/2015	233	276	295
7/20/2015	179	241	385
8/27/2015	209	357	406
9/23/2015	460	376	304
10/20/2015	489	541	627
11/18/2015	425	395	405
12/17/2015	323	310	320
1/20/2016	543	557	602
2/17/2016	617	594	585
3/15/2016	520	515	501
4/20/2016	419	407	428
5/23/2016	1054	1023	1093
6/21/2016	622	567	552
7/22/2016	575	526	538
8/23/2016	360	387	381
9/21/2016	660	506	630
10/19/2016	532	605	751
11/17/2016	306	279	297
12/20/2016	520	543	552
1/31/2017	407	352	349
2/22/2017	351	332	332
3/24/2017	343	285	320
4/20/2017	529	465	496
5/26/2017	1746	1259	1390
6/22/2017	451	568	503
7/21/2017	539	560	637

ppbv: parts per billion by volume

Table 3
Soil Vapor Results for SV04 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV04S	SV04M	SV04D
8/23/2017	550	533	596
9/21/2017	315	276	279
10/26/2017	318	271	301
11/29/2017	281	218	195
12/19/2017	323	300	315
1/24/2018	158	156	146
2/21/2018	279	306	339
3/20/2018	397	443	307
4/25/2018	302	276	284
5/22/2018	299	307	271
6/20/2018	443	443	414

ppbv: parts per billion by volume

Figure 4 Soil Vapor Measurements SV05

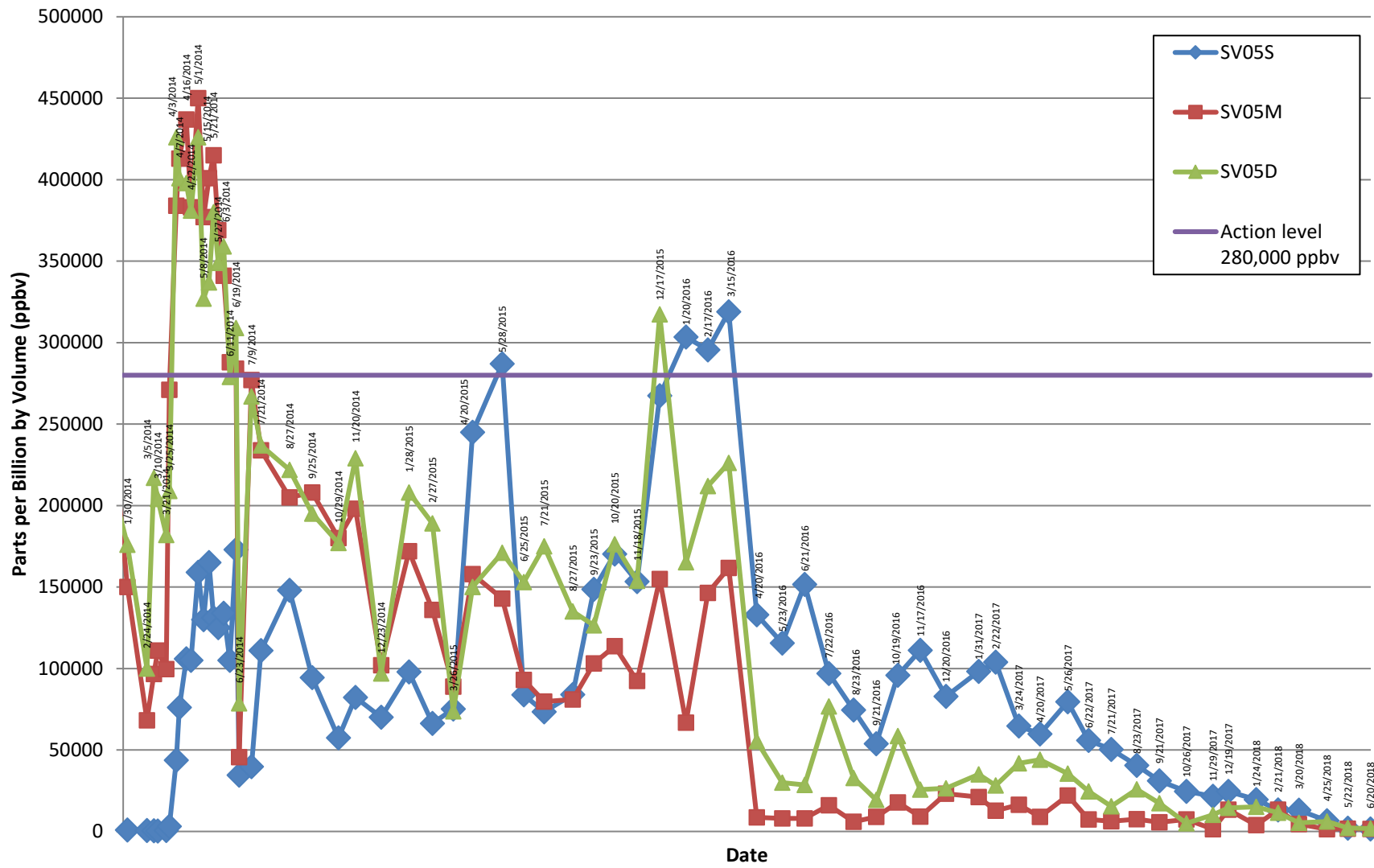


Table 4
Soil Vapor Results for SV05 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV05S	SV05M	SV05D
1/15/2014	96	225000	204000
1/30/2014	818	150000	176000
2/24/2014	597	68200	100000
3/5/2014	492	96600	217000
3/10/2014	308	111000	204000
3/21/2014	593	99600	182000
3/25/2014	3144	271000	209000
4/3/2014	43700	384000	426000
4/7/2014	76100	413000	401000
4/16/2014	106000	437000	398000
4/22/2014	105000	383000	381000
5/1/2014	159000	450000	426000
5/8/2014	130000	377000	327000
5/15/2014	165000	401000	337000
5/21/2014	131000	415000	380000
5/27/2014	125000	369000	349000
6/3/2014	134000	341000	359000
6/11/2014	105000	288000	279000
6/19/2014	173000	284000	309000
6/23/2014	34500	45600	78700
7/9/2014	39700	277000	267000
7/21/2014	111000	234000	237000
8/27/2014	148000	205000	222000
9/25/2014	94500	208000	195000
10/29/2014	57400	180000	177000
11/20/2014	82200	198000	229000
12/23/2014	70100	102000	97000
1/28/2015	97900	172000	208000
2/27/2015	66300	136000	189000
3/26/2015	75200	88900	73800
4/20/2015	245000	158000	150000
5/28/2015	287000	143000	171000
6/25/2015	83800	93000	153000
7/21/2015	73400	79800	175000
8/27/2015	84000	81000	135000
9/23/2015	148667	103123	126433
10/20/2015	170300	113700	176267
11/18/2015	153333	92350	153867
12/17/2015	267467	155000	317400
1/20/2016	303367	66763	165267
2/17/2016	295600	146400	211900
3/15/2016	319000	161667	226233
4/20/2016	133033	8558	55437
5/23/2016	115567	7928	29933
6/21/2016	151600	7927	28517
7/22/2016	96967	16083	76673
8/23/2016	74483	5934	32787
9/21/2016	53800	9014	19333
10/19/2016	95847	17870	58557

ppbv: parts per billion by volume

Table 4
Soil Vapor Results for SV05 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV05S	SV05M	SV05D
11/17/2016	111200	9117	25713
12/20/2016	82860	23123	26447
1/31/2017	98227	21063	34947
2/22/2017	103867	12767	28187
3/24/2017	64780	16317	41823
4/20/2017	59747	8923	43980
5/26/2017	79537	22097	35480
6/22/2017	55877	7411	24643
7/21/2017	50333	6207	15490
8/23/2017	40520	7577	25833
9/21/2017	31050	5682	17273
10/26/2017	24613	7342	4987
11/29/2017	21623	1424	10240
12/19/2017	24653	13310	14453
1/24/2018	19520	3957	15060
2/21/2018	13157	13307	11527
3/20/2018	13113	4562	5305
4/25/2018	6616	1439	6069
5/22/2018	2013	1632	2149
6/20/2018	1604	1533	1772

ppbv: parts per billion by volume

Figure 5
Soil Vapor Measurements
SV06

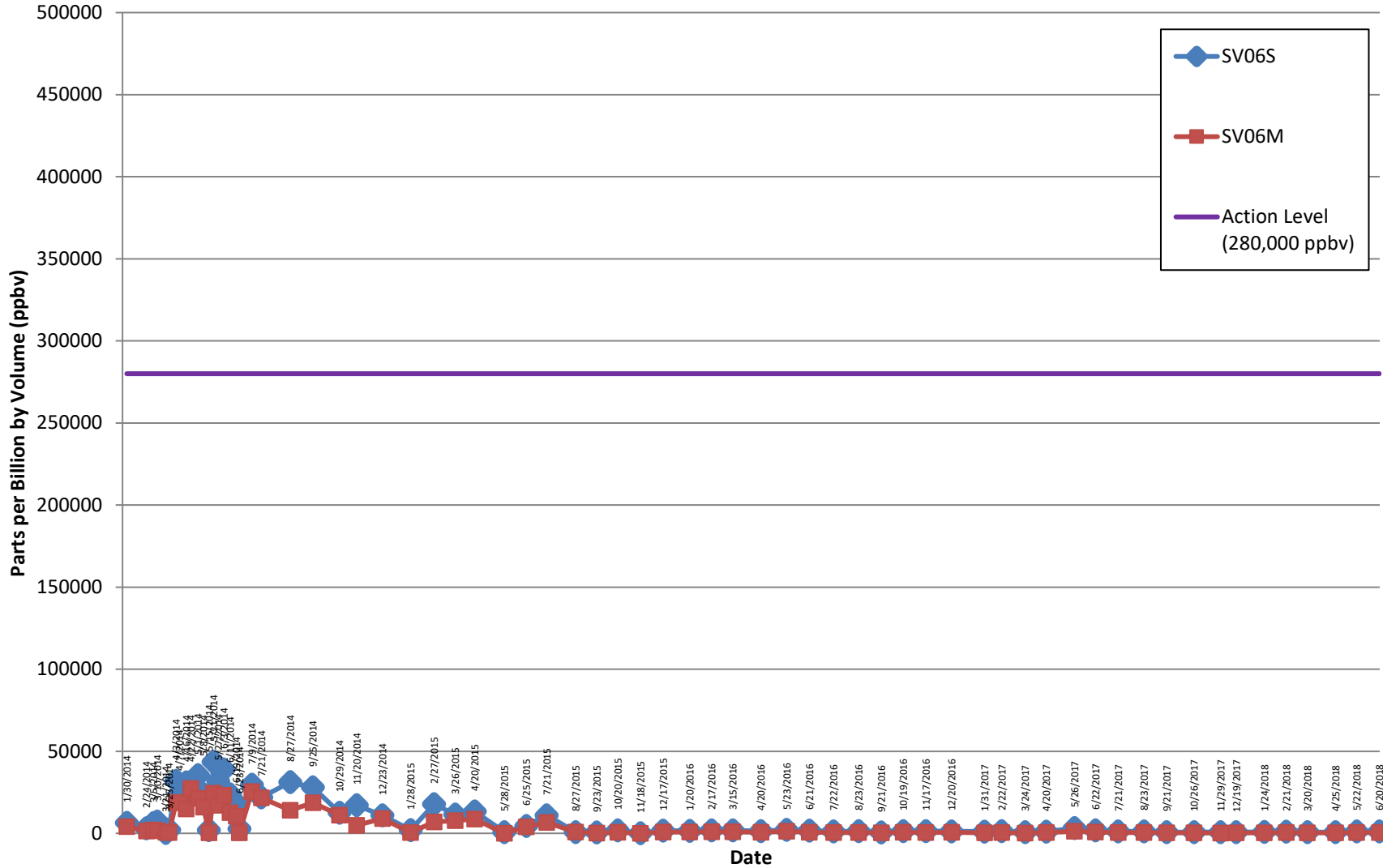


Table 5
Soil Vapor Results for SV06 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV06S	SV06M
1/30/2014	6424	4097
2/24/2014	3046	1457
3/5/2014	6165	2033
3/10/2014	7204	1644
3/21/2014	195	605
3/25/2014	2169	551
4/3/2014	32000	18600
4/7/2014	23100	18800
4/16/2014	31000	14900
4/22/2014	31100	27300
5/1/2014	35500	21400
5/8/2014	23900	15900
5/15/2014	1948	365
5/21/2014	43600	24500
5/27/2014	31900	17000
6/3/2014	38900	23300
6/11/2014	23800	12600
6/19/2014	18100	10400
6/23/2014	2747	314
7/9/2014	29600	25400
7/21/2014	21900	21600
8/27/2014	31200	14000
9/25/2014	28000	18700
10/29/2014	12600	11000
11/20/2014	17100	4886
12/23/2014	10900	9042
1/28/2015	2051	482
2/27/2015	17700	6909
3/26/2015	11500	7734
4/20/2015	13300	8747
5/28/2015	763	33
6/25/2015	4536	3873
7/21/2015	11000	6679
8/27/2015	718	731
9/23/2015	486	130
10/20/2015	1881	586
11/18/2015	NC ₁	NC ₁
12/17/2015	1620	739
1/20/2016	1548	846
2/17/2016	1763	966
3/15/2016	1797	1025
4/20/2016	1347	574
5/23/2016	2122	1277
6/21/2016	1668	690
7/22/2016	1176	437
8/23/2016	1312	526
9/21/2016	621	335
10/19/2016	1322	654
11/17/2016	1379	494

ppbv: parts per billion by volume
NC₁: Not collected due to maintenance work

Table 5
Soil Vapor Results for SV06 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV06S	SV06M
12/20/2016	1234	637
1/31/2017	1091	302
2/22/2017	1350	438
3/24/2017	781	219
4/20/2017	1074	494
5/26/2017	3201	1291
6/22/2017	1815	830
7/21/2017	1135	487
8/23/2017	1187	521
9/21/2017	662	253
10/26/2017	746	336
11/29/2017	747	220
12/19/2017	685	340
1/24/2018	912	247
2/21/2018	1037	481
3/20/2018	701	343
4/25/2018	757	305
5/22/2018	1190	398
6/20/2018	1259	547

ppbv: parts per billion by volume
 NC₁: Not collected due to maintenance work

Figure 6
Soil Vapor Measurements
SV07

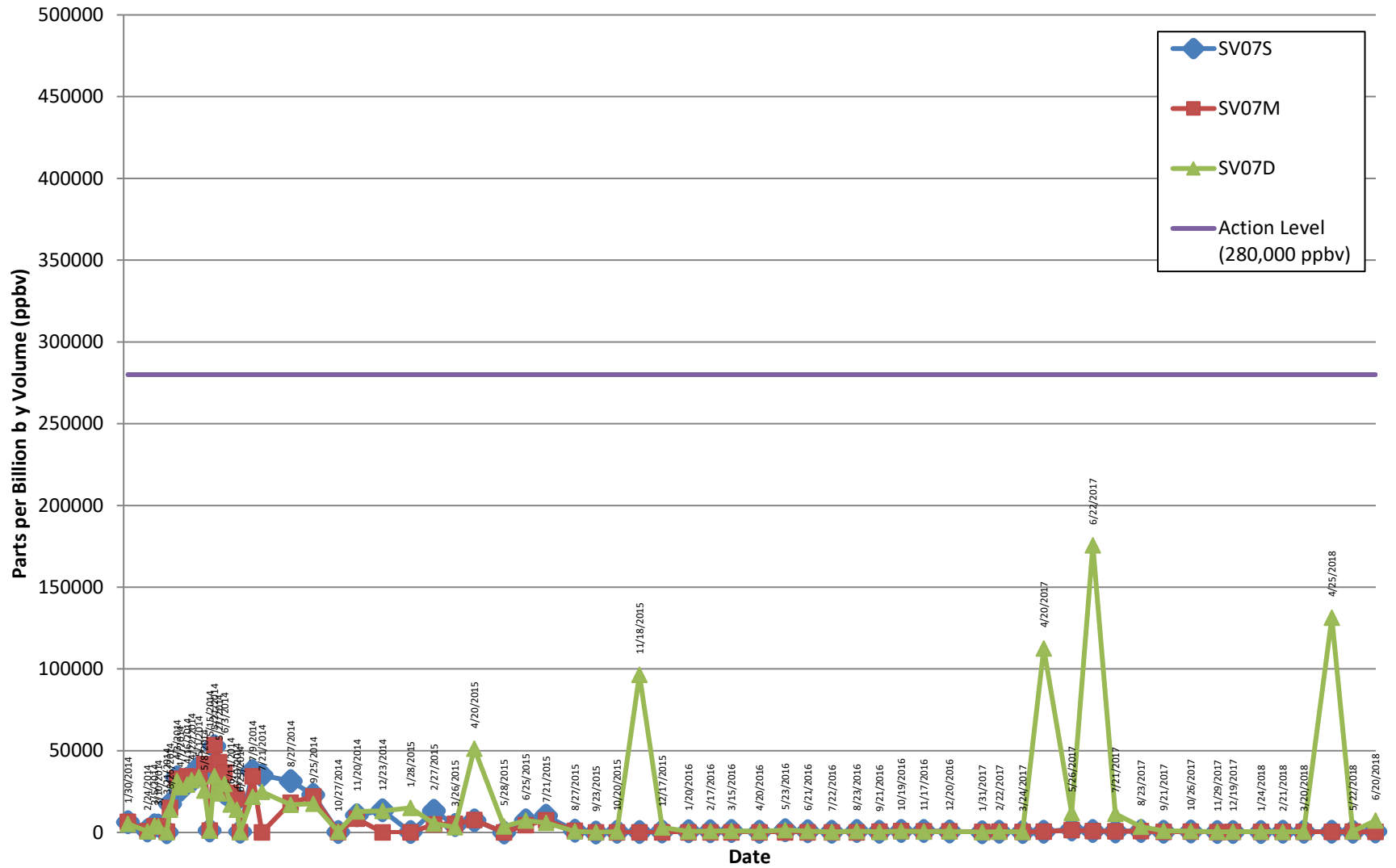


Table 6
Soil Vapor Results for SV07 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV07S	SV07M	SV07D
1/30/2014	6350	6539	5180
2/24/2014	1187	849	690
3/5/2014	4406	3890	4119
3/10/2014	4287	3687	3654
3/21/2014	102	512	170
3/25/2014	17300	15000	13900
4/3/2014	33700	32900	31700
4/7/2014	26100	29400	27700
4/16/2014	32900	34400	29200
4/22/2014	31700	33500	31900
5/1/2014	39700	34000	33800
5/8/2014	38000	41800	25600
5/15/2014	1209	1063	1188
5/21/2014	52800	53400	34500
5/27/2014	32900	43000	23900
6/3/2014	24100	36700	29800
6/11/2014	20900	24200	17100
6/19/2014	20300	20500	13900
6/23/2014	495	193	198
7/9/2014	37500	34400	21900
7/21/2014	34900	NC ₂	24900
8/27/2014	31400	18200	17000
9/25/2014	23000	22000	17600
10/27/2014	310	209	540
11/20/2014	10500	8478	12800
12/23/2014	13500	NC ₂	13100
1/28/2015	208	108	15000
2/27/2015	13200	4855	5347
3/26/2015	4567	5280	3260
4/20/2015	7434	7660	51300
5/28/2015	8	0	3740
6/25/2015	7341	4485	7246
7/21/2015	10200	7399	5863
8/27/2015	1025	957	726
9/23/2015	0	0	113
10/20/2015	474	NC ₂	569
11/18/2015	328	NC ₂	96503
12/17/2015	596	NC ₂	3086
1/20/2016	719	NC ₂	714
2/17/2016	699	NC ₂	832
3/15/2016	849	NC ₂	956
4/20/2016	465	NC ₂	626
5/23/2016	1349	NC ₂	1403
6/21/2016	665	NC ₂	796
7/22/2016	377	NC ₂	427
8/23/2016	889	NC ₂	826
9/21/2016	360	428	389
10/19/2016	844	783	900
11/17/2016	904	722	554

ppbv: parts per billion by volume
NC₂: Not collected due to an obstruction in the vapor line.

Table 6
Soil Vapor Results for SV07 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV07S	SV07M	SV07D
12/20/2016	539	599	657
1/31/2017	168	329	233
2/22/2017	484	536	557
3/24/2017	286	299	320
4/20/2017	441	494	112600
5/26/2017	1928	1526	11877
6/22/2017	833	747	175533
7/21/2017	633	634	11383
8/23/2017	924	759	3551
9/21/2017	396	343	966
10/26/2017	516	486	772
11/29/2017	224	247	395
12/19/2017	283	332	469
1/24/2018	297	303	436
2/21/2018	410	314	421
3/20/2018	470	381	437
4/25/2018	423	387	131367
5/22/2018	492	454	593
6/20/2018	559	386	7277

ppbv: parts per billion by volume
 NC₂: Not collected due to an obstruction in the vapor line.

Figure 7
Soil Vapor Measurements
SV08

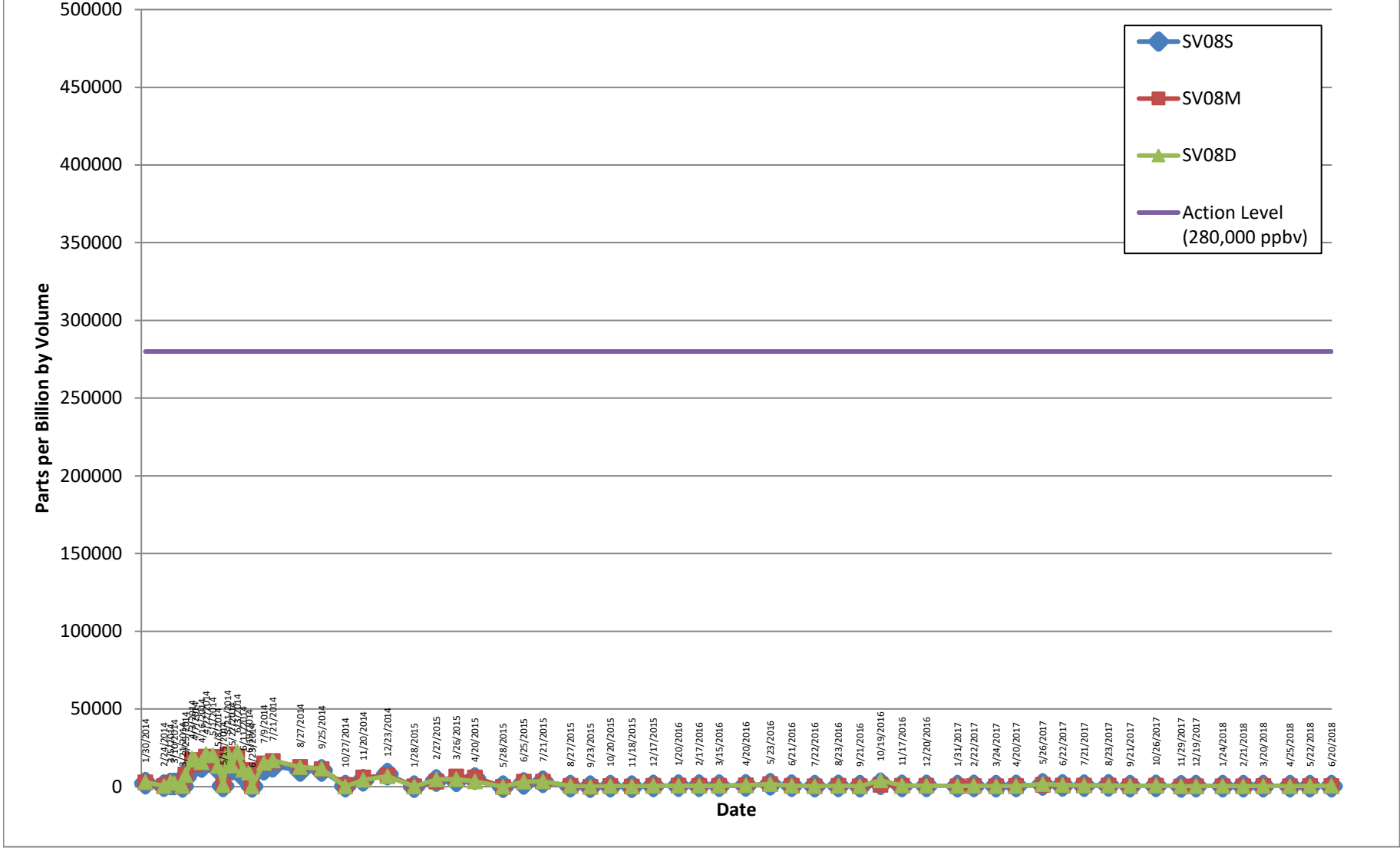


Table 7
Soil Vapor Results for SV08 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV08S	SV08M	SV08D
1/30/2014	2170	2698	2952
2/24/2014	601	423	428
3/5/2014	1814	2492	3097
3/10/2014	1819	2348	2274
3/21/2014	102	469	354
3/25/2014	6152	7880	7474
4/3/2014	12800	17100	18100
4/7/2014	13500	14300	17300
4/16/2014	12900	15600	15800
4/22/2014	16600	19300	21000
5/1/2014	15600	19200	20100
5/8/2014	11800	14100	13300
5/15/2014	419	1315	1073
5/21/2014	16500	20900	21200
5/27/2014	11200	15100	13500
6/3/2014	12600	19300	22300
6/11/2014	7109	10600	10800
6/19/2014	8307	10700	9120
6/23/2014	133	22	54
7/9/2014	11300	14900	15300
7/21/2014	13200	16500	16800
8/27/2014	10500	12700	12500
9/25/2014	10500	11300	11600
10/27/2014	248	1196	129
11/20/2014	4113	5894	4398
12/23/2014	7996	7265	6710
1/28/2015	74	237	50
2/27/2015	3916	3201	4689
3/26/2015	3867	6634	4870
4/20/2015	5268	5860	3343
5/28/2015	0	0	0
6/25/2015	2124	3323	3232
7/21/2015	3163	3223	3430
8/27/2015	401	549	475
9/23/2015	0	0	0
10/20/2015	339	412	373
11/18/2015	87	93	69
12/17/2015	486	538	494
1/20/2016	642	644	635
2/17/2016	611	633	608
3/15/2016	581	596	599
4/20/2016	763	805	810
5/23/2016	1557	1597	1691
6/21/2016	590	590	632
7/22/2016	287	293	309
8/23/2016	533	553	629
9/21/2016	293	278	276
10/19/2016	1955	1240	3981
11/17/2016	480	617	671

ppbv: parts per billion by volume

Table 7
Soil Vapor Results for SV08 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV08S	SV08M	SV08D
12/20/2016	542	543	602
1/31/2017	353	320	390
2/22/2017	428	405	485
3/24/2017	304	257	281
4/20/2017	509	462	467
5/26/2017	1360	1246	1645
6/22/2017	795	782	966
7/21/2017	715	661	770
8/23/2017	761	684	775
9/21/2017	319	315	355
10/26/2017	485	574	664
11/29/2017	195	143	180
12/19/2017	258	193	238
1/24/2018	331	297	362
2/21/2018	299	242	276
3/20/2018	366	339	387
4/25/2018	282	258	251
5/22/2018	378	346	406
6/20/2018	402	428	512

ppbv: parts per billion by volume

Figure 8
Soil Vapor Measurements
SV09

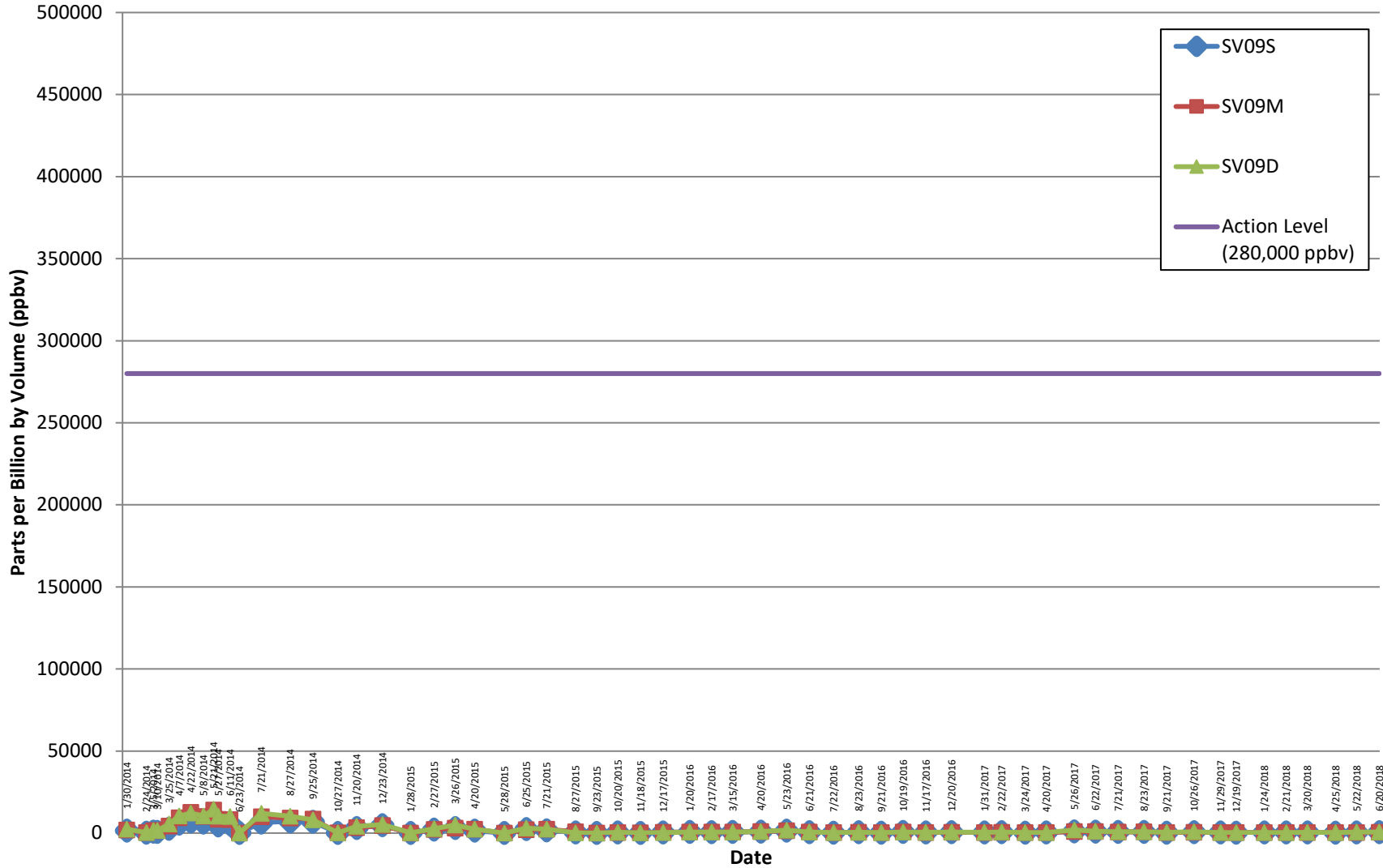


Table 8
Soil Vapor Results for SV09 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV09S	SV09M	SV09D
1/30/2014	1488	1963	2408
2/24/2014	307	330	319
3/5/2014	915	1474	1614
3/10/2014	777	1569	1656
3/25/2014	2629	4246	5465
4/7/2014	5750	9329	10400
4/22/2014	7038	12600	12200
5/8/2014	6407	10100	10400
5/21/2014	10300	14100	14500
5/27/2014	4725	8296	10200
6/11/2014	5415	8278	10100
6/23/2014	10	7	22
7/21/2014	6459	9981	12000
8/27/2014	7069	9198	10200
9/25/2014	6795	8583	8125
10/27/2014	95	127	185
11/20/2014	3016	3303	4102
12/23/2014	4832	4555	5213
1/28/2015	41	43	87
2/27/2015	2106	2286	2689
3/26/2015	3101	2997	4885
4/20/2015	1456	2342	2410
5/28/2015	0	0	2
6/25/2015	2527	2039	3074
7/21/2015	1734	2331	2383
8/27/2015	360	859	224
9/23/2015	5	11	44
10/20/2015	388	357	476
11/18/2015	103	89	97
12/17/2015	399	420	390
1/20/2016	647	703	693
2/17/2016	590	591	567
3/15/2016	635	633	662
4/20/2016	893	923	951
5/23/2016	1437	1466	1797
6/21/2016	604	680	701
7/22/2016	292	298	347
8/23/2016	477	490	526
9/21/2016	312	262	379
10/19/2016	641	586	698
11/17/2016	390	343	469
12/20/2016	520	470	579
1/31/2017	365	347	434
2/22/2017	483	437	554
3/24/2017	289	266	342
4/20/2017	353	317	388
5/26/2017	1026	934	1840
6/22/2017	911	941	1078
7/21/2017	733	646	723

ppbv: parts per billion by volume

Table 8
Soil Vapor Results for SV09 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV09S	SV09M	SV09D
8/23/2017	742	755	862
9/21/2017	295	317	410
10/26/2017	536	521	712
11/29/2017	365	284	283
12/19/2017	233	280	310
1/24/2018	326	340	383
2/21/2018	324	331	377
3/20/2018	375	375	444
4/25/2018	266	276	324
5/22/2018	323	359	573
6/20/2018	501	522	619

ppbv: parts per billion by volume

Figure 9
Soil Vapor Measurements
SV10

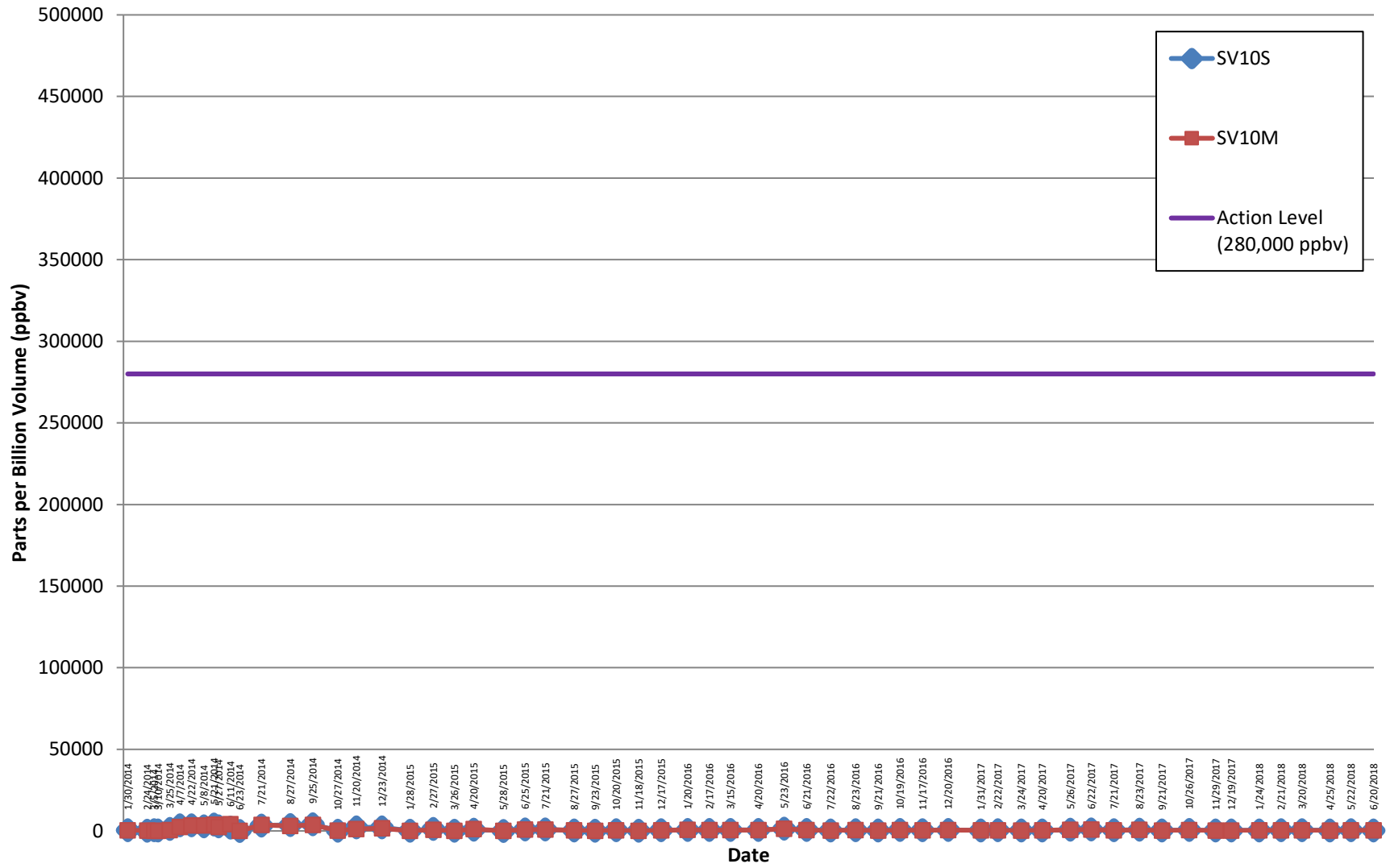


Table 9
Soil Vapor Results for SV10 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV10S	SV10M
1/30/2014	483	358
2/24/2014	165	147
3/5/2014	365	45
3/10/2014	280	73
3/25/2014	1148	493
4/7/2014	3364	2393
4/22/2014	3381	3335
5/8/2014	2876	3278
5/21/2014	3836	3776
5/27/2014	2850	2424
6/11/2014	2037	4089
6/23/2014	10	7
7/21/2014	3334	3640
8/27/2014	3650	3073
9/25/2014	4093	3720
10/27/2014	62	117
11/20/2014	2124	1069
12/23/2014	2225	1543
1/28/2015	46	74
2/27/2015	1187	598
3/26/2015	104	97
4/20/2015	741	1175
5/28/2015	0	0
6/25/2015	959	839
7/21/2015	823	822
8/27/2015	292	363
9/23/2015	71	3
10/20/2015	380	318
11/18/2015	103	77
12/17/2015	403	403
1/20/2016	608	667
2/17/2016	574	541
3/15/2016	608	570
4/20/2016	535	450
5/23/2016	1342	1273
6/21/2016	595	549
7/22/2016	298	253
8/23/2016	479	459
9/21/2016	295	239
10/19/2016	567	478
11/17/2016	485	393
12/20/2016	576	479
1/31/2017	333	281
2/22/2017	495	418
3/24/2017	290	235
4/20/2017	322	284
5/26/2017	682	650
6/22/2017	973	831
7/21/2017	500	418

ppbv: parts per billion by volume

Table 9
Soil Vapor Results for SV10 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV10S	SV10M
8/23/2017	708	653
9/21/2017	283	242
10/26/2017	558	462
11/29/2017	193	186
12/19/2017	280	256
1/24/2018	341	290
2/21/2018	391	327
3/20/2018	482	306
4/25/2018	321	255
5/22/2018	426	367
6/20/2018	338	342

ppbv: parts per billion by volume

Figure 10
Soil Vapor Measurements
SV11

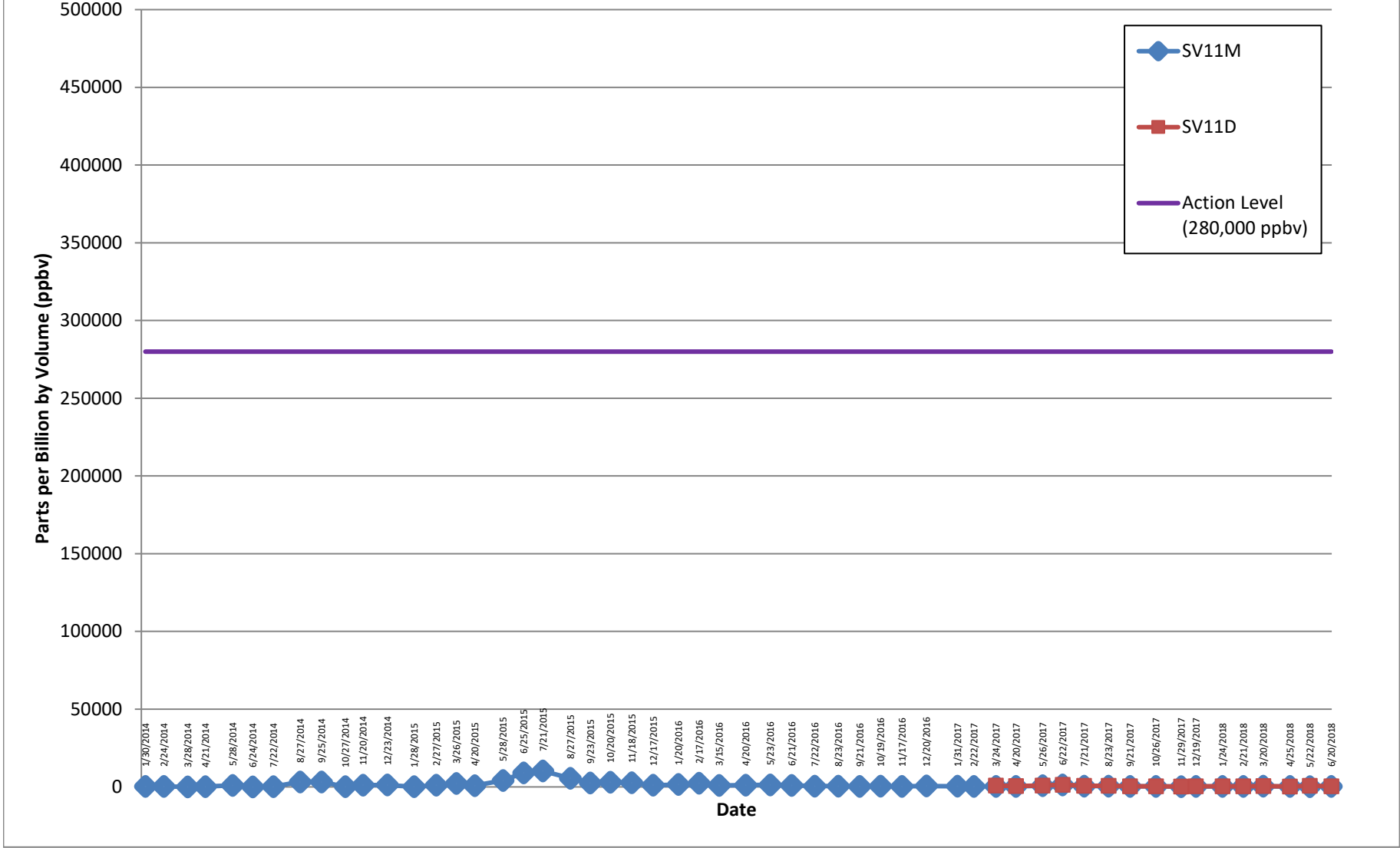


Table 10
Soil Vapor Results for SV11 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV11M	SV11D
1/30/2014	374	NC ₂
2/24/2014	307	NC ₂
3/28/2014	53	NC ₂
4/21/2014	167	NC ₂
5/28/2014	959	NC ₂
6/24/2014	17	NC ₂
7/22/2014	240	NC ₂
8/27/2014	3218	NC ₂
9/25/2014	3185	NC ₂
10/27/2014	154	NC ₂
11/20/2014	1182	NC ₂
12/23/2014	1261	NC ₂
1/28/2015	99	NC ₂
2/27/2015	1056	NC ₂
3/26/2015	2294	NC ₂
4/20/2015	835	NC ₂
5/28/2015	4184	NC ₂
6/25/2015	9065	NC ₂
7/21/2015	10200	NC ₂
8/27/2015	5595	NC ₂
9/23/2015	2584	NC ₂
10/20/2015	3045	NC ₂
11/18/2015	2714	NC ₂
12/17/2015	1071	NC ₂
1/20/2016	1534	NC ₂
2/17/2016	2316	NC ₂
3/15/2016	947	NC ₂
4/20/2016	1133	NC ₂
5/23/2016	1271	NC ₂
6/21/2016	968	NC ₂
7/22/2016	522	NC ₂
8/23/2016	498	NC ₂
9/21/2016	273	NC ₂
10/19/2016	409	NC ₂
11/17/2016	353	NC ₂
12/20/2016	630	NC ₂
1/31/2017	411	NC ₂
2/22/2017	302	NC ₂
3/24/2017	365	827
4/20/2017	347	491
5/26/2017	723	918
6/22/2017	1301	1415
7/21/2017	548	731
8/23/2017	554	692
9/21/2017	327	354
10/26/2017	365	399
11/29/2017	198	226
12/19/2017	306	346
1/24/2018	390	358

ppbv: parts per billion by volume
 NC₂: Not collected due to an obstruction in the vapor line.

Table 10
Soil Vapor Results for SV11 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV11M	SV11D
2/21/2018	308	356
3/20/2018	457	535
4/25/2018	285	308
5/22/2018	225	758
6/20/2018	349	348

ppbv: parts per billion by volume
NC₂: Not collected due to an obstruction in the vapor line.

Figure 11
Soil Vapor Measurements
SV12

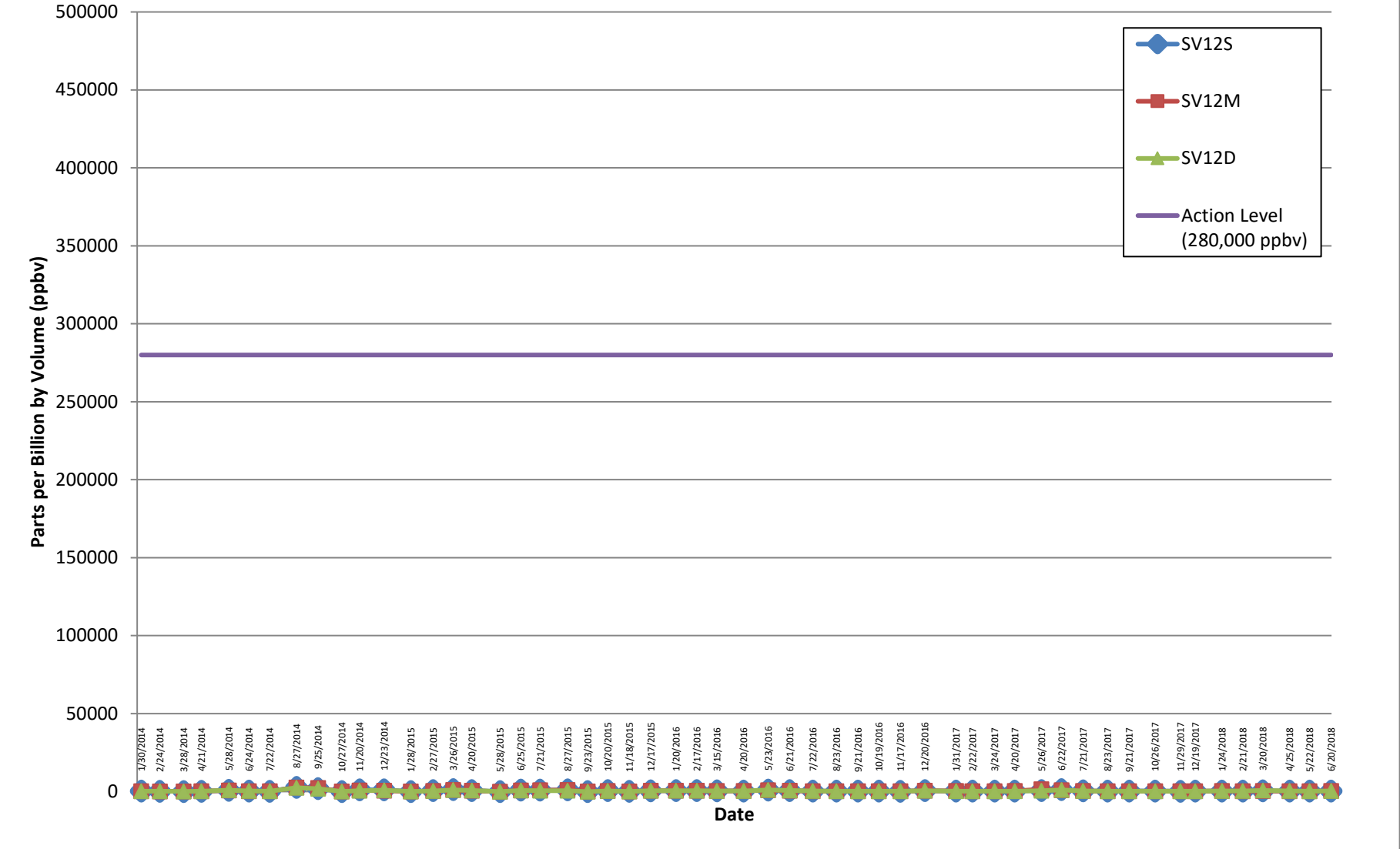


Table 11
Soil Vapor Results for SV12 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV12S	SV12M	SV12D
1/30/2014	270	200	264
2/24/2014	135	148	215
3/28/2014	45	42	66
4/21/2014	237	166	290
5/28/2014	743	774	810
6/24/2014	374	244	326
7/22/2014	232	217	290
8/27/2014	2769	2607	2469
9/25/2014	1979	2338	1877
10/27/2014	77	144	81
11/20/2014	1147	721	512
12/23/2014	1075	632	834
1/28/2015	15	46	63
2/27/2015	609	396	331
3/26/2015	1203	964	992
4/20/2015	681	595	728
5/28/2015	0	0	0
6/25/2015	897	673	792
7/21/2015	940	875	490
8/27/2015	1047	1016	601
9/23/2015	64	8	1
10/20/2015	584	371	334
11/18/2015	207	101	99
12/17/2015	541	510	514
1/20/2016	618	630	573
2/17/2016	616	530	543
3/15/2016	465	421	381
4/20/2016	391	410	456
5/23/2016	1008	847	971
6/21/2016	623	539	675
7/22/2016	342	286	346
8/23/2016	312	278	275
9/21/2016	321	231	235
10/19/2016	293	270	293
11/17/2016	235	227	175
12/20/2016	568	525	484
1/31/2017	272	333	296
2/22/2017	338	249	262
3/24/2017	318	288	288
4/20/2017	353	361	318
5/26/2017	696	1541	596
6/22/2017	1213	867	965
7/21/2017	422	461	403
8/23/2017	297	285	262
9/21/2017	324	241	214
10/26/2017	369	306	304
11/29/2017	195	196	177
12/19/2017	278	252	290
1/24/2018	325	323	357

ppbv: parts per billion by volume

Table 11
Soil Vapor Results for SV12 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV12S	SV12M	SV12D
2/21/2018	341	278	323
3/20/2018	482	344	779
4/25/2018	254	259	357
5/22/2018	329	165	192
6/20/2018	392	383	382

Figure 12
Soil Vapor Measurements
SV13

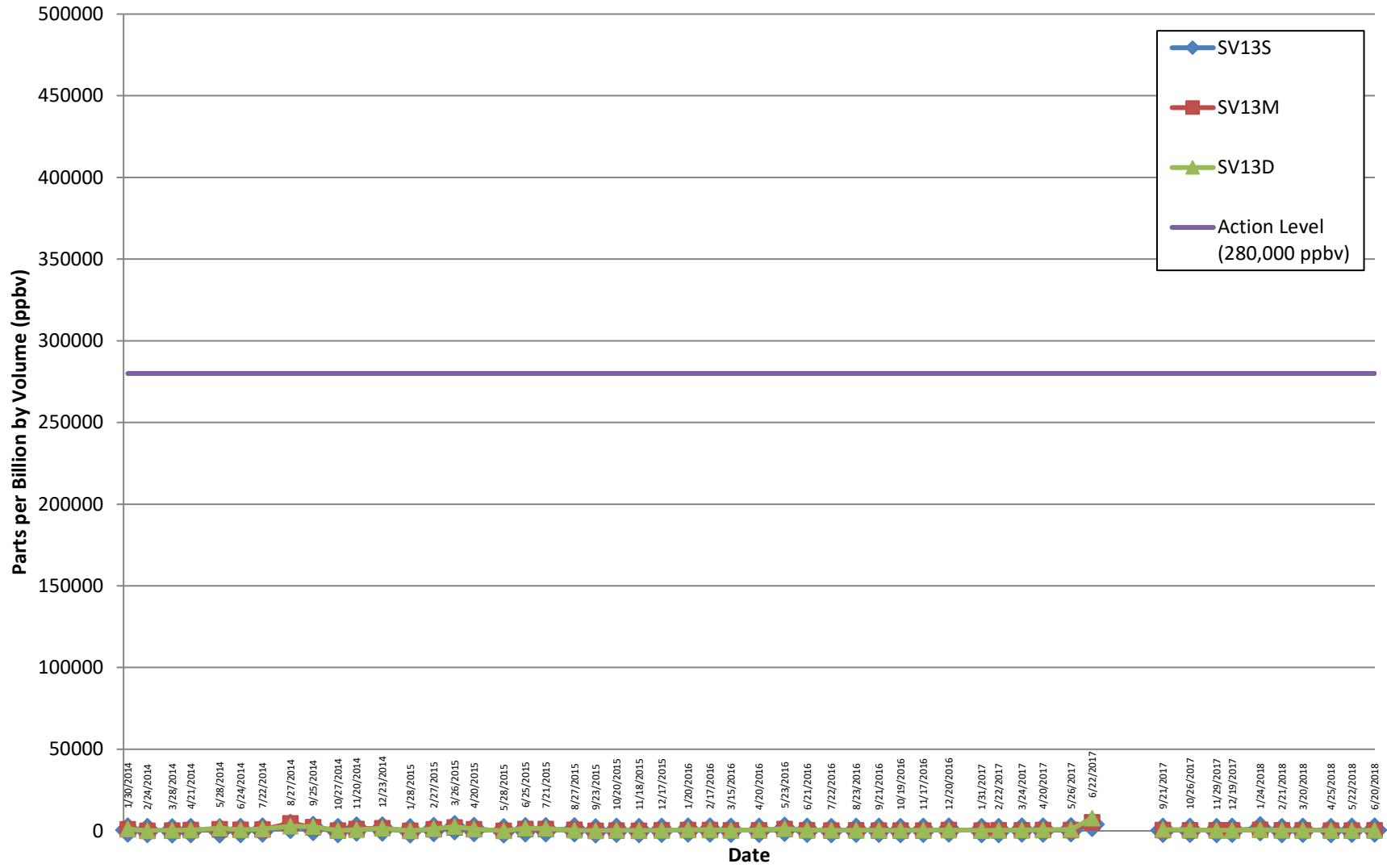


Table 12
Soil Vapor Results for SV13 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV13S	SV13M	SV13D
1/30/2014	440	929	1109
2/24/2014	116	98	99
3/28/2014	90	151	332
4/21/2014	198	575	560
5/28/2014	89	1031	1615
6/24/2014	161	616	727
7/22/2014	495	815	1191
8/27/2014	2657	4638	2877
9/25/2014	1414	2193	2562
10/27/2014	149	145	205
11/20/2014	1093	1208	738
12/23/2014	1148	1610	1621
1/28/2015	85	66	75
2/27/2015	822	973	1309
3/26/2015	1889	2160	2562
4/20/2015	774	939	1145
5/28/2015	0	0	0
6/25/2015	640	1178	1594
7/21/2015	682	1079	1431
8/27/2015	654	659	412
9/23/2015	37	10	59
10/20/2015	270	242	286
11/18/2015	115	98	125
12/17/2015	393	382	350
1/20/2016	502	530	707
2/17/2016	567	542	615
3/15/2016	373	379	407
4/20/2016	344	378	451
5/23/2016	1044	1075	1233
6/21/2016	285	364	436
7/22/2016	222	224	292
8/23/2016	392	272	306
9/21/2016	270	259	295
10/19/2016	206	227	316
11/17/2016	282	199	307
12/20/2016	474	473	471
1/31/2017	231	219	215
2/22/2017	255	273	299
3/24/2017	511	399	457
4/20/2017	521	561	720
5/26/2017	592	501	846
6/22/2017	3958	5239	7761
7/21/2017	NC ₁	NC ₁	NC ₁
8/23/2017	NC ₁	NC ₁	NC ₁
9/21/2017	395	580	796
10/26/2017	372	382	695
11/29/2017	268	298	323
12/19/2017	319	295	327
1/24/2018	1261	620	674

ppbv: parts per billion by volume
 NC₁: Not collected due to maintenance work.

Table 12
Soil Vapor Results for SV13 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV13S	SV13M	SV13D
2/21/2018	253	306	375
3/20/2018	290	365	373
4/25/2018	258	218	260
5/22/2018	273	252	266
6/20/2018	458	333	367

ppbv: parts per billion by volume
NC₁: Not collected due to maintenance work.

Figure 13
Soil Vapor Measurements
SV14

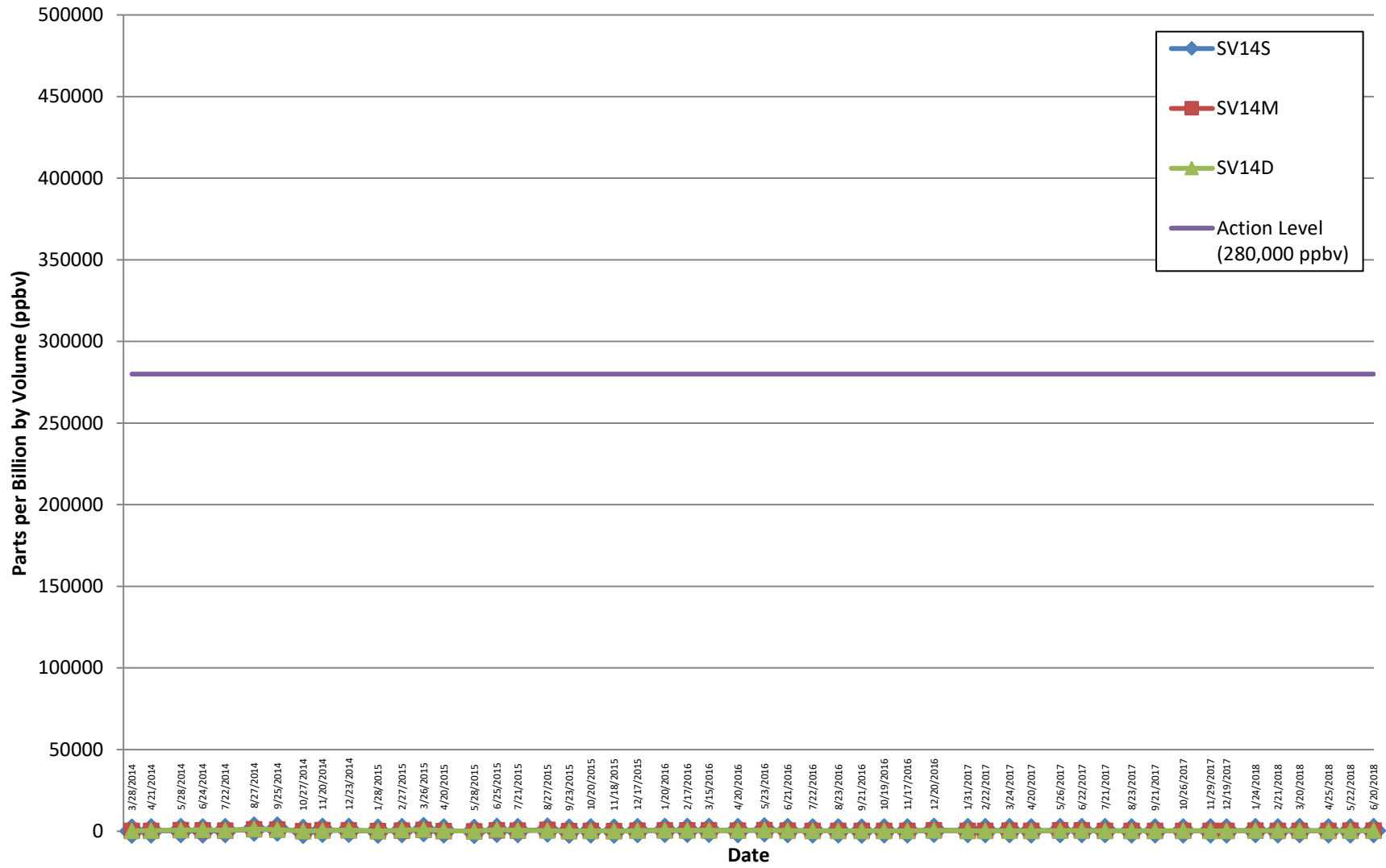


Table 13
Soil Vapor Results for SV14 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV14S	SV14M	SV14D
3/28/2014	82	261	170
4/21/2014	282	253	349
5/28/2014	471	640	697
6/24/2014	175	523	824
7/22/2014	323	474	634
8/27/2014	1376	1248	1327
9/25/2014	1295	1023	1067
10/27/2014	0	123	127
11/20/2014	564	678	422
12/23/2014	582	548	654
1/28/2015	44	24	85
2/27/2015	430	371	648
3/26/2015	996	937	1088
4/20/2015	191	111	434
5/28/2015	0	0	0
6/25/2015	560	550	986
7/21/2015	469	454	500
8/27/2015	711	892	344
9/23/2015	148	66	62
10/20/2015	295	320	303
11/18/2015	118	123	161
12/17/2015	406	418	415
1/20/2016	546	543	589
2/17/2016	539	520	543
3/15/2016	523	532	501
4/20/2016	368	371	366
5/23/2016	877	777	778
6/21/2016	427	441	415
7/22/2016	264	287	296
8/23/2016	314	319	289
9/21/2016	157	166	196
10/19/2016	215	238	235
11/17/2016	225	232	277
12/20/2016	522	500	485
1/31/2017	340	302	287
2/22/2017	335	301	315
3/24/2017	336	355	304
4/20/2017	295	303	319
5/26/2017	461	492	337
6/22/2017	365	615	372
7/21/2017	324	294	304
8/23/2017	276	242	313
9/21/2017	227	168	203
10/26/2017	243	293	335
11/29/2017	264	207	286
12/19/2017	278	270	303
1/24/2018	362	325	383
2/21/2018	253	246	347
3/20/2018	414	316	326

ppbv: parts per billion by volume

Table 13
Soil Vapor Results for SV14 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV14S	SV14M	SV14D
4/25/2018	244	253	314
5/22/2018	309	343	264
6/20/2018	360	394	361

Figure 14
Soil Vapor Measurements
SV15

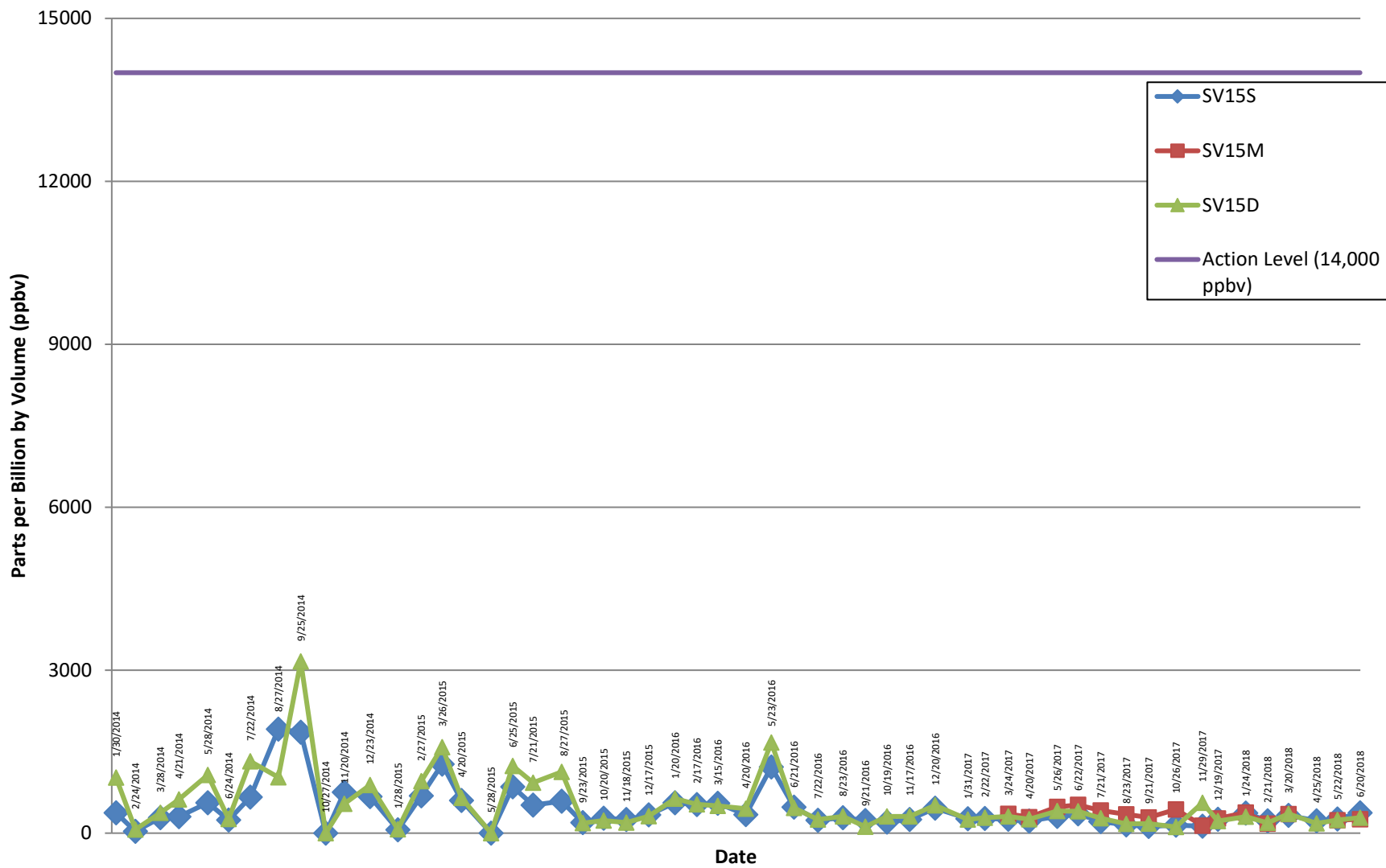


Table 14
Soil Vapor Results for SV15 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV15S	SV15M	SV15D
1/30/2014	376	NC ₂	1025
2/24/2014	32	NC ₂	65
3/28/2014	285	NC ₂	372
4/21/2014	302	NC ₂	623
5/28/2014	558	NC ₂	1071
6/24/2014	240	NC ₂	260
7/22/2014	663	NC ₂	1321
8/27/2014	1916	NC ₂	1026
9/25/2014	1857	NC ₂	3159
10/27/2014	0	NC ₂	0
11/20/2014	754	NC ₂	539
12/23/2014	673	NC ₂	886
1/28/2015	62	NC ₂	71
2/27/2015	687	NC ₂	956
3/26/2015	1270	NC ₂	1585
4/20/2015	600	NC ₂	651
5/28/2015	0	NC ₂	0
6/25/2015	851	NC ₂	1239
7/21/2015	515	NC ₂	927
8/27/2015	586	NC ₂	1126
9/23/2015	193	NC ₂	185
10/20/2015	277	NC ₂	230
11/18/2015	253	NC ₂	194
12/17/2015	338	NC ₂	311
1/20/2016	560	NC ₂	633
2/17/2016	527	NC ₂	530
3/15/2016	551	NC ₂	502
4/20/2016	341	NC ₂	451
5/23/2016	1220	NC ₂	1668
6/21/2016	479	NC ₂	463
7/22/2016	236	NC ₂	253
8/23/2016	284	NC ₂	306
9/21/2016	234	NC ₂	117
10/19/2016	205	NC ₂	308
11/17/2016	253	NC ₂	306
12/20/2016	461	NC ₂	511
1/31/2017	263	NC ₂	249
2/22/2017	272	NC ₂	284
3/24/2017	255	353	310
4/20/2017	221	293	256
5/26/2017	310	484	407
6/22/2017	354	519	403
7/21/2017	215	418	273
8/23/2017	151	344	170
9/21/2017	123	289	174
10/26/2017	147	434	114
11/29/2017	126	139	561
12/19/2017	255	271	224
1/24/2018	370	379	304

ppbv: parts per billion by volume
NC₂: Not collected due to an obstruction in the vapor line.

Table 14
Soil Vapor Results for SV15 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV15S	SV15M	SV15D
2/21/2018	229	177	188
3/20/2018	327	352	355
4/25/2018	226	NC ₂	182
5/22/2018	262	236	241
6/20/2018	373	257	285

ppbv: parts per billion by volume
NC₂: Not collected due to an obstruction in the vapor line.

Figure 15
Soil Vapor Measurements
SV16

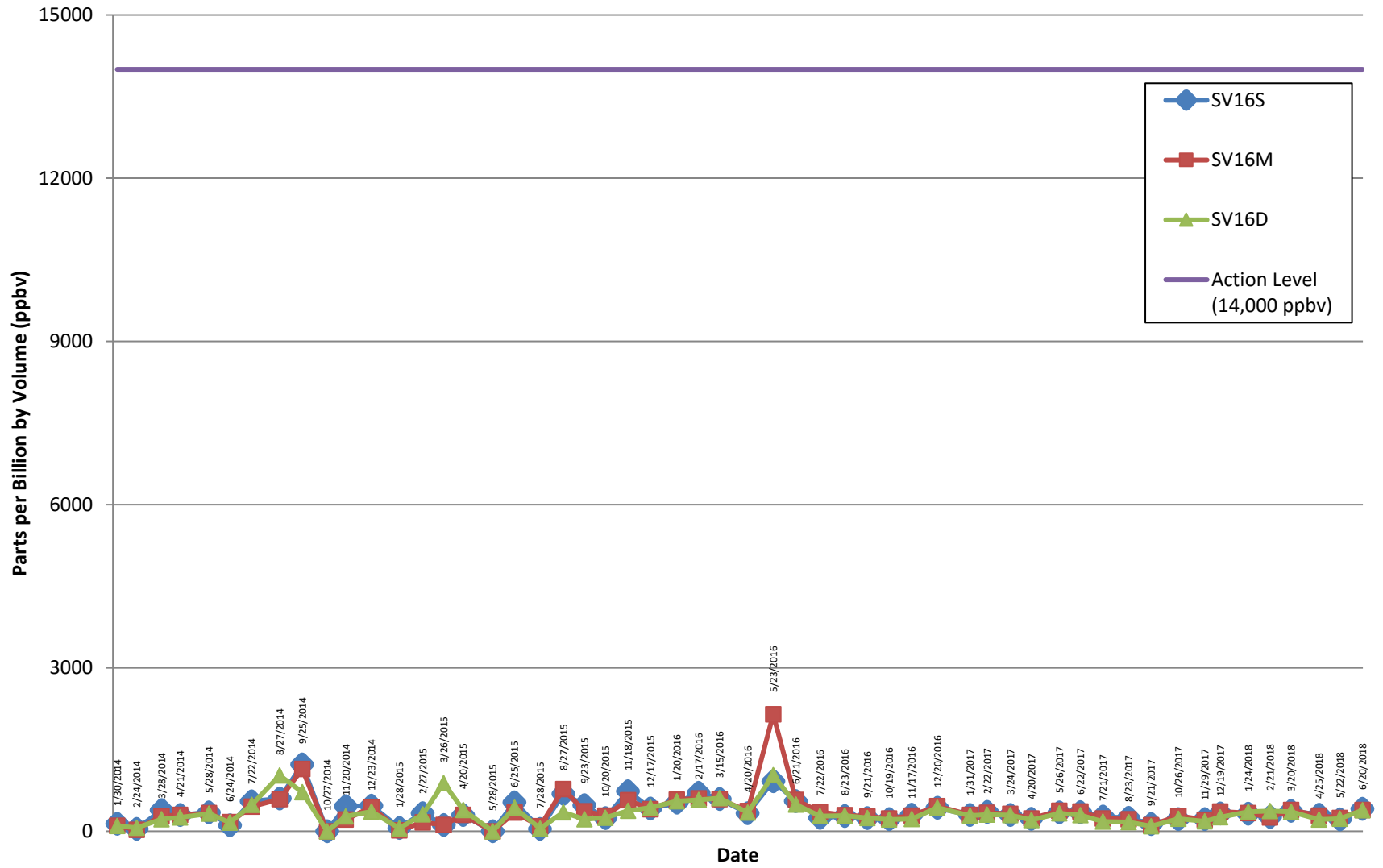


Table 15
Soil Vapor Results for SV16 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV16S	SV16M	SV16D
1/30/2014	139	102	95
2/24/2014	44	24	65
3/28/2014	388	281	220
4/21/2014	298	302	253
5/28/2014	348	334	327
6/24/2014	107	169	158
7/22/2014	552	455	488
8/27/2014	602	590	1026
9/25/2014	1226	1143	719
10/27/2014	0	0	0
11/20/2014	458	216	274
12/23/2014	470	442	363
1/28/2015	63	19	54
2/27/2015	333	162	310
3/26/2015	113	116	884
4/20/2015	297	303	393
5/28/2015	0	0	0
6/25/2015	531	346	432
7/28/2015	44	93	50
8/27/2015	689	777	349
9/23/2015	477	367	220
10/20/2015	240	289	249
11/18/2015	735	573	376
12/17/2015	416	406	432
1/20/2016	526	580	552
2/17/2016	705	603	578
3/15/2016	591	589	607
4/20/2016	332	371	344
5/23/2016	920	2147	1031
6/21/2016	555	576	490
7/22/2016	246	353	279
8/23/2016	280	298	287
9/21/2016	240	273	244
10/19/2016	223	236	218
11/17/2016	304	288	223
12/20/2016	430	463	432
1/31/2017	297	299	286
2/22/2017	356	338	306
3/24/2017	301	322	294
4/20/2017	229	235	206
5/26/2017	346	376	329
6/22/2017	352	362	296
7/21/2017	268	236	178
8/23/2017	245	219	169
9/21/2017	134	113	92
10/26/2017	223	280	228
11/29/2017	222	212	183
12/19/2017	329	365	258
1/24/2018	323	335	360

ppbv: parts per billion by volume

Table 15
Soil Vapor Results for SV16 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV16S	SV16M	SV16D
2/21/2018	261	256	371
3/20/2018	374	389	356
4/25/2018	305	286	215
5/22/2018	218	245	232
6/20/2018	412	390	387

Figure 16
Soil Vapor Measurements
SV17

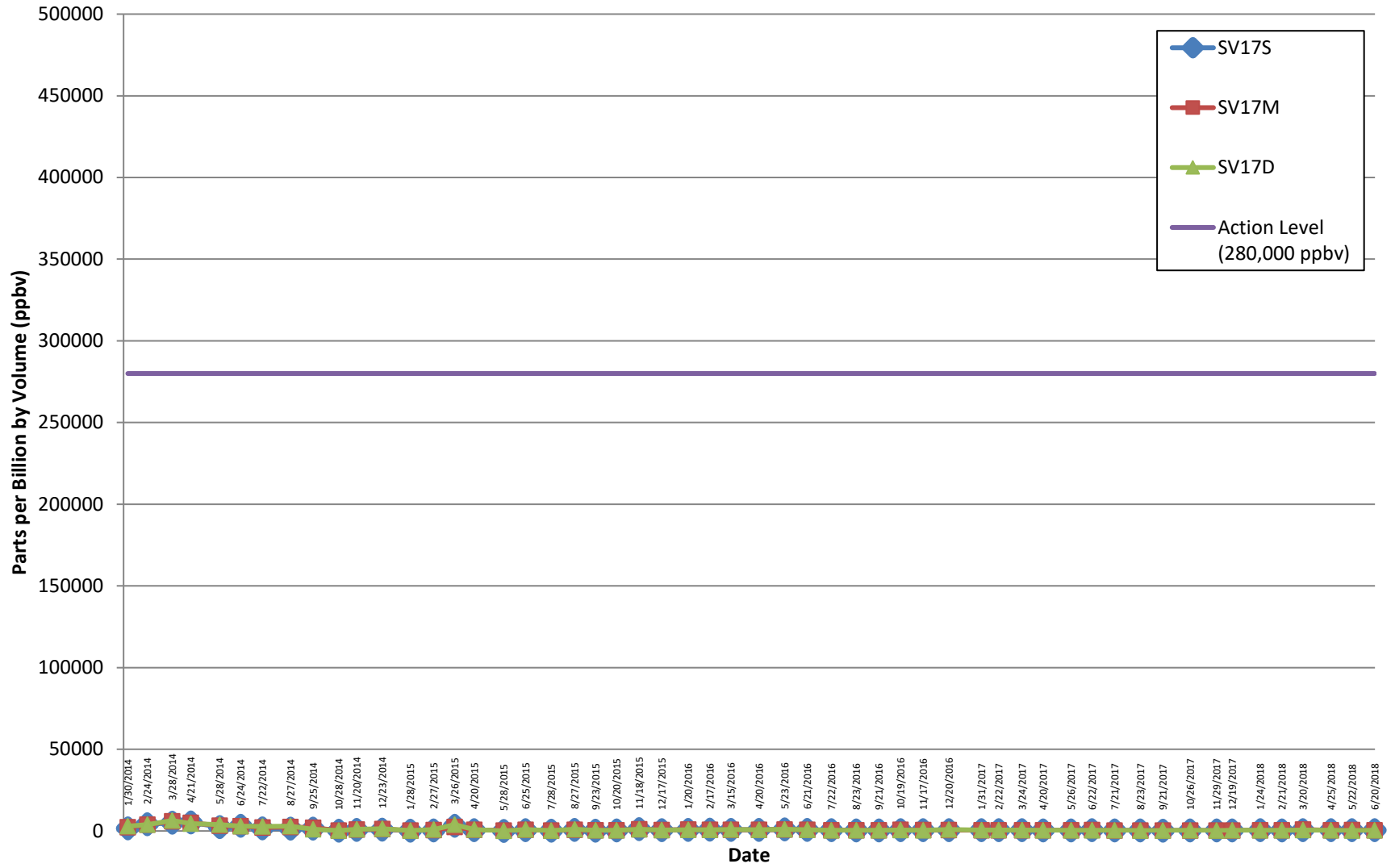


Table 16
Soil Vapor Results for SV17 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV17S	SV17M	SV17D
1/30/2014	1598	2378	2980
2/24/2014	4069	3944	3884
3/28/2014	5033	5987	6391
4/21/2014	5221	4941	4541
5/28/2014	2452	3239	3827
6/24/2014	3138	2865	2892
7/22/2014	1578	2156	2804
8/27/2014	1419	2492	2954
9/25/2014	1468	2056	1043
10/28/2014	190	205	257
11/20/2014	618	849	998
12/23/2014	805	1126	1319
1/28/2015	170	202	282
2/27/2015	366	530	877
3/26/2015	3095	2472	3938
4/20/2015	510	734	952
5/28/2015	36	268	11
6/25/2015	462	755	955
7/28/2015	117	243	275
8/27/2015	647	779	1045
9/23/2015	237	334	358
10/20/2015	372	439	424
11/18/2015	1082	1010	1078
12/17/2015	561	612	593
1/20/2016	699	810	759
2/17/2016	765	647	714
3/15/2016	701	736	818
4/20/2016	658	726	704
5/23/2016	1033	928	990
6/21/2016	660	720	766
7/22/2016	520	469	436
8/23/2016	346	404	417
9/21/2016	327	368	375
10/19/2016	412	730	640
11/17/2016	536	506	361
12/20/2016	512	586	838
1/31/2017	462	335	507
2/22/2017	442	455	492
3/24/2017	485	420	534
4/20/2017	365	398	331
5/26/2017	354	431	446
6/22/2017	519	495	401
7/21/2017	310	324	343
8/23/2017	404	300	318
9/21/2017	238	203	207
10/26/2017	281	229	348
11/29/2017	276	188	228
12/19/2017	249	208	357
1/24/2018	438	435	480

ppbv: parts per billion by volume

Table 16
Soil Vapor Results for SV17 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV17S	SV17M	SV17D
2/21/2018	367	355	372
3/20/2018	469	820	563
4/25/2018	450	444	406
5/22/2018	429	487	273
6/20/2018	519	449	480

Figure 17
Soil Vapor Measurements
SV18

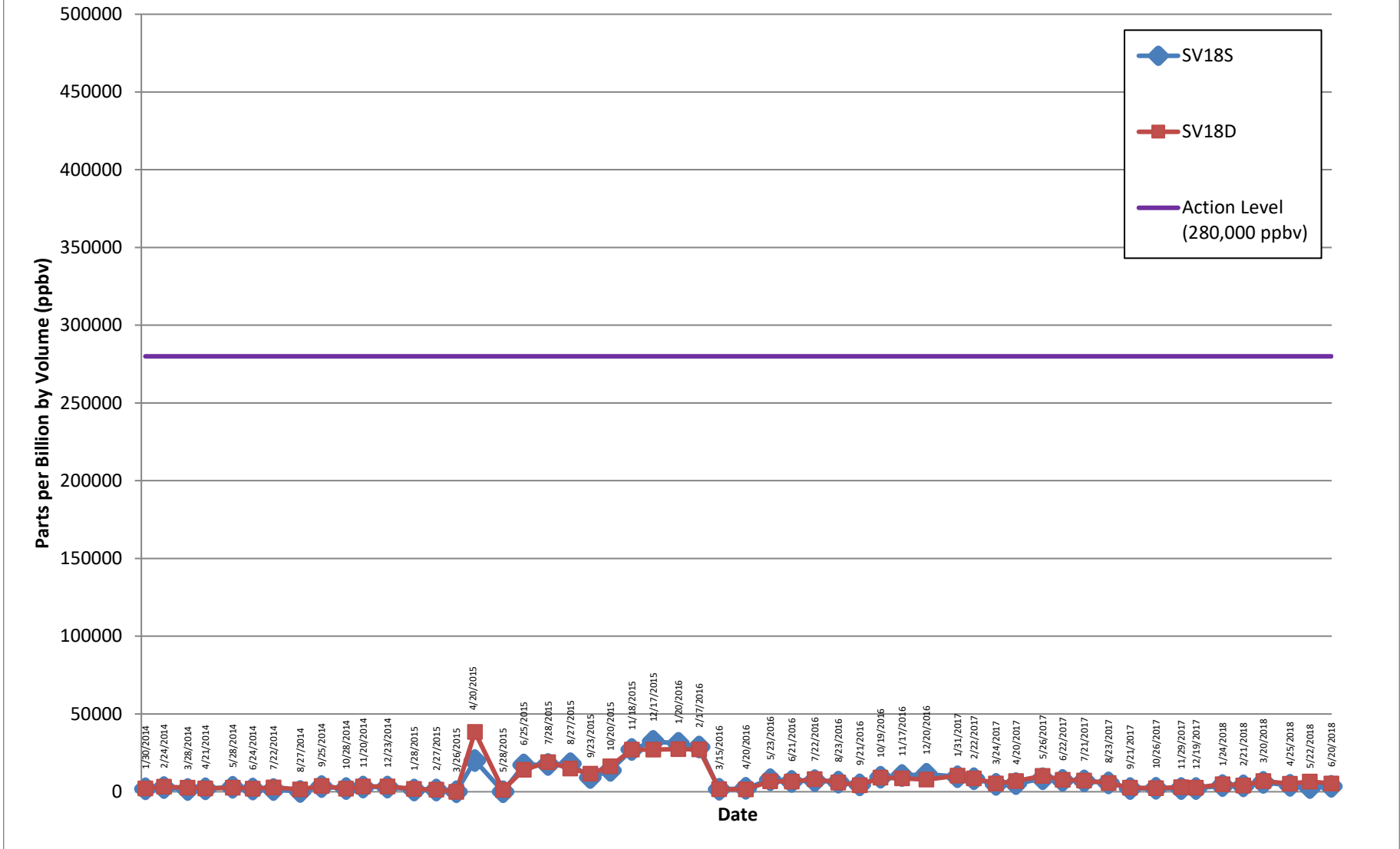


Table 17
Soil Vapor Results for SV18 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV18S	SV18D
1/30/2014	1949	2116
2/24/2014	2674	3241
3/28/2014	1392	2545
4/21/2014	1973	2082
5/28/2014	2856	2607
6/24/2014	1727	2050
7/22/2014	1474	2823
8/27/2014	137	1478
9/25/2014	3361	3679
10/28/2014	2001	2008
11/20/2014	3033	3404
12/23/2014	3026	3421
1/28/2015	1179	1762
2/27/2015	1154	1398
3/26/2015	NC ₁	NC ₁
4/20/2015	20100	38400
5/28/2015	47	1191
6/25/2015	17200	14200
7/28/2015	17600	19100
8/27/2015	18000	15000
9/23/2015	9188	11625
10/20/2015	13670	16280
11/18/2015	27097	27153
12/17/2015	32387	27093
1/20/2016	31047	27463
2/17/2016	28737	27267
3/15/2016	1533	1699
4/20/2016	2154	1550
5/23/2016	7787	6740
6/21/2016	6715	6537
7/22/2016	7143	8082
8/23/2016	6230	5871
9/21/2016	4441	4140
10/19/2016	9297	9030
11/17/2016	10427	8562
12/20/2016	11247	7833
1/31/2017	9716	10312
2/22/2017	8352	8613
3/24/2017	4756	5366
4/20/2017	5147	6817
5/26/2017	8442	10253
6/22/2017	7333	7718
7/21/2017	6925	7241
8/23/2017	5694	5599
9/21/2017	2089	2567
10/26/2017	2238	2304
11/29/2017	2004	2849
12/19/2017	2096	2585
1/24/2018	3909	4773

ppbv: parts per billion by volume
NC₁: Not collected due to maintenance work

Table 17
Soil Vapor Results for SV18 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV18S	SV18D
2/21/2018	3742	3994
3/20/2018	6065	6908
4/25/2018	4046	5112
5/22/2018	2722	6588
6/20/2018	3527	5366

ppbv: parts per billion by volume
NC₁: Not collected due to maintenance work

Figure 18
Soil Vapor Measurements
SV20

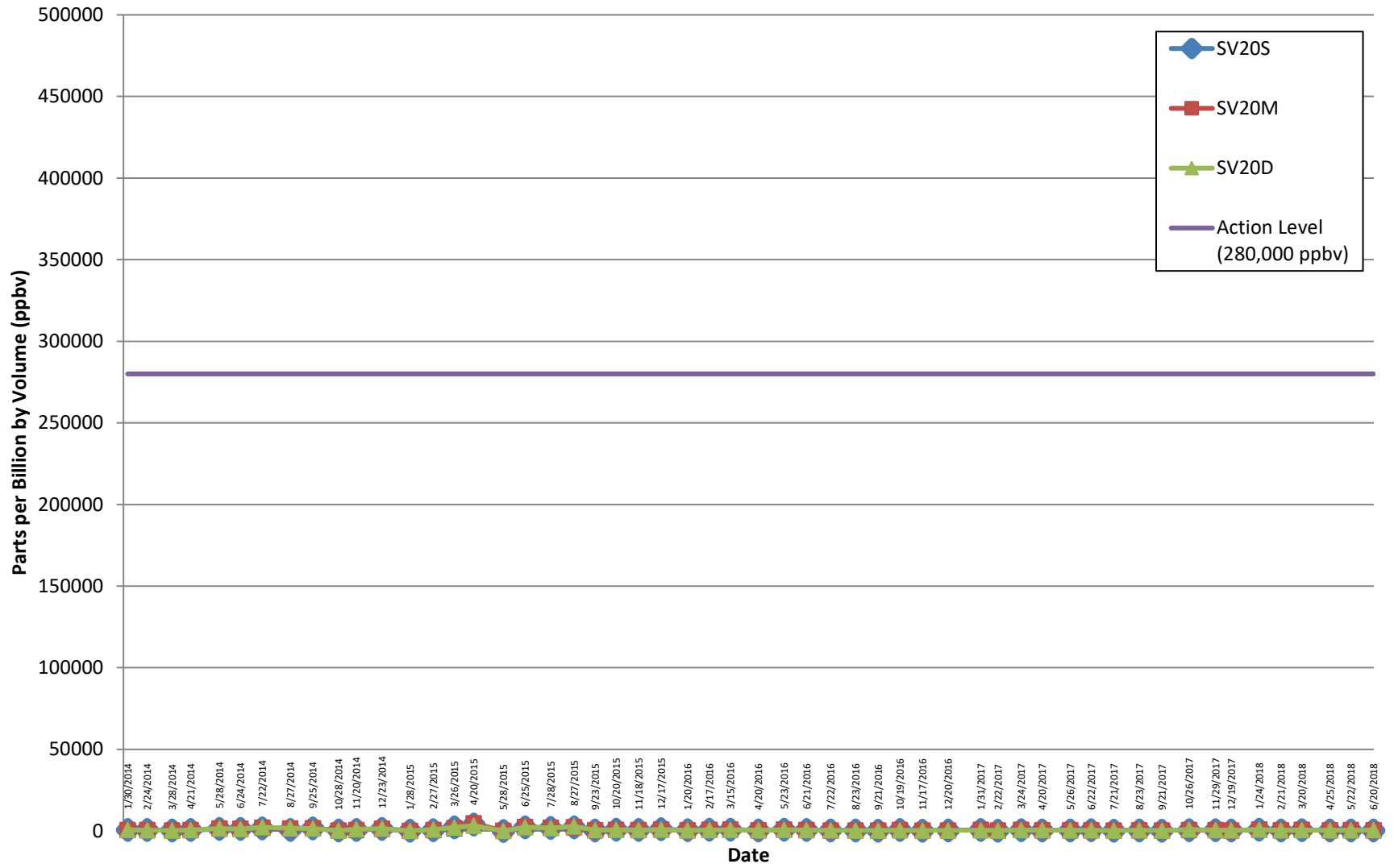


Table 18
Soil Vapor Results for SV20 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV20S	SV20M	SV20D
1/30/2014	560	584	697
2/24/2014	571	505	293
3/28/2014	214	242	118
4/21/2014	526	561	545
5/28/2014	1139	1451	1438
6/24/2014	1160	1271	1143
7/22/2014	1587	1877	2213
8/27/2014	630	1526	1618
9/25/2014	1531	1561	1472
10/28/2014	283	208	211
11/20/2014	620	566	983
12/23/2014	1227	1273	1516
1/28/2015	101	72	80
2/27/2015	495	575	898
3/26/2015	2211	1593	2041
4/20/2015	3939	4586	3207
5/28/2015	3	29	11
6/25/2015	2169	2456	2209
7/28/2015	1840	1994	1724
8/27/2015	2117	2222	2673
9/23/2015	259	379	455
10/20/2015	697	608	595
11/18/2015	523	556	549
12/17/2015	1010	820	813
1/20/2016	355	427	385
2/17/2016	692	724	567
3/15/2016	737	840	733
4/20/2016	327	344	343
5/23/2016	724	813	730
6/21/2016	572	584	542
7/22/2016	306	244	322
8/23/2016	220	251	252
9/21/2016	122	178	175
10/19/2016	539	447	350
11/17/2016	190	259	197
12/20/2016	212	248	262
1/31/2017	518	646	365
2/22/2017	186	211	170
3/24/2017	451	626	562
4/20/2017	197	423	434
5/26/2017	255	350	411
6/22/2017	358	388	422
7/21/2017	180	213	262
8/23/2017	297	358	323
9/21/2017	140	200	196
10/26/2017	400	550	745
11/29/2017	418	436	545
12/19/2017	241	247	306
1/24/2018	698	896	807

ppbv: parts per billion by volume

Table 18
Soil Vapor Results for SV20 (ppbv)
Historical Soil Vapor Monitoring Results - January 2014 Through Present Event
Red Hill Bulk Fuel Storage Facility

Date	SV20S	SV20M	SV20D
2/21/2018	195	296	403
3/20/2018	391	602	534
4/25/2018	240	289	388
5/22/2018	227	553	333
6/20/2018	346	401	436

Appendix C
Public Notifications



COMMANDER, NAVY REGION HAWAII
PUBLIC AFFAIRS OFFICE
850 TICONDEROGA STREET, SUITE 110
PEARL HARBOR, HAWAII 96860
PHONE: 808-473-2888 FAX: 808-473-2876
www.cnic.navy.mil/hawaii



For Immediate Release

CNRH Public Affairs: 808-371-5189

JUNE 25, 2018

Release # 18-026

Red Hill update: 'coupon' plate testing starts

PHOTO (public domain): 180625-N-EV910-019 PEARL HARBOR (June 25, 2018) Ten steel plates from a Red Hill Bulk Fuel Storage Facility tank are viewed by members of the Environmental Protection Agency, Hawaii Department of Health, Board of Water Supply and U.S. Navy. (U.S. Navy photo by Shannon R. Haney/RELEASED)

By Navy Region Hawaii Public Affairs

(JOINT BASE PEARL HARBOR-HICKAM) As part of the continuing Administrative Order on Consent (AOC) process, the Navy and Defense Logistics Agency invited regulators from the Environmental Protection Agency, Hawaii Department of Health, and other stakeholders to an initial viewing today of steel plates called "coupons" removed from a Red Hill Bulk Fuel Storage Facility tank.

Ten separate coupons – each about 12-inches square – were cut from a tank to be assessed and tested, including for corrosion. Each selected plate had a single hole drilled through it and was inspected to ensure it was safe for removal.

This removal was among the first steps to validate that non-destructive scanning during the current tank Clean, Inspect, & Repair Process is as accurate as possible. The coupons were selected as part of collaborative AOC-driven discussion between the Navy and the regulators.

“All of the pieces were chosen based irregularities we noted in the scanning process,” said Lt. Cmdr. Blake Whittle, Fuels Director at Fleet Logistics Command Pearl Harbor. “We look forward to an in-depth study of the samples in coming weeks as part of a final report.”

An independent third-party lab will compare the physical specifications of the removed coupons against measurements provided by several different scanning

mechanisms, and a final report will be provided to the Navy and regulators.