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

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Executive Summary

Commander Navy Region Hawaii (CNRH) 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. The objective of this report is to describe the actions taken by the Navy between April and July 2015 in response to the fuel reportedly released from Tank 5 in January 2014.

Soil vapor and groundwater samples continue to be collected from locations adjacent to Tank 5. Groundwater samples are also collected from locations outside the Red Hill tunnel system. Laboratory analytical results continue to indicate the concentrations of petroleum constituents in the groundwater directly beneath the tanks are within historical ranges.

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.

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 11, through July 10, 2015 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 Commander Navy Region Hawaii (CNRH) letter 5090 Ser N45/044 dated January 23, 2014
- Initial Release Response Report, enclosed with CNRH letter 5090 Ser N45/320 dated April 24, 2014
- Quarterly Release Response Report enclosed with CNRH letter 5090 Ser N45/563 dated July 22, 2014
- Quarterly Release Response Report enclosed with CNRH letter 5090 Ser N45/929 dated November 10, 2014
- Quarterly Release Response Report enclosed with CNRH letter 5090 Ser N45/121 dated January 21, 2015
- Quarterly Release Response Report enclosed with CNRH letter 5090 Ser N45/322 dated April 20, 2015

Weekly progress reports have been provided to DOH and U.S. Environmental Protection Agency (EPA) every Tuesday by e-mail, followed by hard copy, beginning on March 4, 2014.

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 F1- Military and Federal), located in Halawa Heights, approximately 2.5 miles northeast of Pearl Harbor (Appendix A, Figure 1). 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 site is at an elevation of approximately 200 to 500 feet above mean sea level (msl) (Environmental Science International, Inc., 2014).

The Facility is bordered on the west by the United States (U.S.) Coast Guard reservation, on the south by residential neighborhoods, and on the east by Moanalua Valley. 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.

Area wells and aquifers are shown in Appendix A, Figure 2. A site layout of groundwater monitoring wells and soil vapor monitoring points are shown in Appendix A, Figure 3.

2.2 Facility Information

The Facility contains 18 active and 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 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 contain jet fuel propellant-5 (JP-5), JP-8, and marine diesel fuel (F-76). Tank 5 is used to store JP-8.

Four groundwater monitoring wells (wells RHMW01, RHMW02, RHMW03, and RHMW05) are located within the lower access tunnel, and one 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) Well 2254-01. Navy Well 2254-01 is located approximately 3,000 feet down-gradient of the USTs and provides potable water to the JBPHH Water System, which serves approximately 65,200 military customers. Naval Facilities Engineering Command (NAVFAC) Public Works Department operates the infiltration gallery and Navy Well 2254-01.

Five groundwater monitoring wells (RHMW04, RHMW06, RHMW07, HDMW2253-03, and OWDFMW01) are located outside of the Facility tunnel system (Appendix A, Figure 3). Monitoring well RHMW04 is located by the Navy firing range. Well HDMW2253-03 is located at the Halawa Correctional Facility (outside the Facility) and well OWDFMW01 is located at the former Oily Waste Disposal Facility, near Adit 3.

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 11, 2015 through July 10, 2015.

3.1 Oil/Water Interface Measurements

The water level at each well 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 wells and sampling point 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 monitoring wells RHMW01, RHMW02, RHMW03, and RHMW05 in April, May, and June 2015. No LNAPL was detected.

3.2 Soil Vapor Sampling

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 or 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 JP-5 or JP-8, or 14,000 ppbv in soil vapor monitoring probes beneath tanks containing marine diesel fuel (TEC, 2010). These values are 50 percent of the calculated vapor concentration from fuel-saturated water.

Soil vapor sampling was performed at all active and accessible tanks in April, May, and June 2015. In April 2015, soil vapor VOC concentrations at Tank 5 were below the action level of 280,000 ppbv. In May 2015, soil vapor VOC concentrations in SV05S were above the action level of 280,000 ppbv. Soil vapor VOC concentrations in SV05M and SV05D were within the range of historical fluctuations. As Tank 5 is still empty for inspection, there are no suspected fuel releases. There have been no known fuel related activities at or near Tank 5 that may have caused an increase in VOC concentrations.

In June 2015, soil vapor VOC concentrations at Tank 5 were below the action level of 280,000 ppbv. All other VOC concentrations measured in June were about 10 to 1,000 times below the action levels, with no consistent trending.

Soil vapor sampling results from March 2008 through June 2015 are presented in Appendix B.

3.3 Groundwater Sampling and Analysis

Groundwater samples were collected from wells located inside and outside the Red Hill lower access tunnel from April 20 through 23, 2015. All groundwater samples were analyzed for petroleum constituents. Groundwater samples collected from sampling point RHMW2254-01 were also analyzed for total lead.

Analytical results were compared to site specific risk based levels (SSRBLs) for total petroleum hydrocarbons as diesel fuel (TPH-d) and benzene (TEC, 2008). Analytical results were also compared to DOH Environmental Action Levels (EALs) for sites where groundwater is a current or potential drinking water source (DOH, 2011).

3.3.1 Inside Tunnel Wells

Groundwater samples were collected from four groundwater monitoring wells (wells RHMW01, RHMW02, RHMW03, and RHMW05) located within the lower access tunnel, and one sampling point (RHMW2254-01) located at Red Hill Shaft. A summary of sampling activities and laboratory analytical results will be provided in a separate groundwater monitoring report.

3.3.2 Outside Tunnel Wells

Groundwater samples were collected from five groundwater monitoring wells (RHMW04, RHMW06, RHMW07, HDMW2253-03, and OWDFMW01) located outside of the Facility tunnel system. A summary of sampling activities and laboratory analytical results will be provided in a separate groundwater monitoring report.

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 Cl_2 Building) on April 7, 2015 and analyzed for VOCs, SVOCs, Lead, and JP-8.

EPA Methods 524.2 (VOCs), 525.2 (SVOCs), 8015B (JP-8), and 200.8 (Lead) were used and all analyses were conducted by labs certified by the DOH State Laboratories Division.

All sample test results were below detectable levels and acceptable for distribution.

A summary of the drinking water sampling is provided in Table 1.

4.0 Continued Groundwater and Soil Vapor Monitoring

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

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

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

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

	360-011, Tap Outside CL2 Bldg			Pumphead, 360-001			
Sample Date	**524.2; 525.2**	**8015B**	**200.8**	**524.2; 525.2**	**8015B**	**200.8**	**Detections and Comments**
1/14/2014	ND	ND	-	-	-	-	8015B analysis originally conducted with high MRL (10 mg/l), follow up with lower MRL outside of 14-day hold time
1/16/2014	Bromoform	ND	-	ND	ND	-	8015B analysis originally conducted with high MRL (10 mg/l), follow up with lower MRL outside of 14-day hold time. Bromoform detected in the 524.2 analysis for the 360-011 sample.
1/21/2014	Bromoform, Dibromochloromethane	ND	-	-	-	-	Bromoform, Dibromochloromethane detected
1/28/2014	Bromoform, Bromodichloromethane, Dibromochloromethane	ND	-	-	-	-	Bromoform, Bromodichloromethane, Dibromochloromethane were detected.
2/11/2014	Bromoform, Dibromochloromethane	ND	5.2 ppb	-	-	3.7 ppb	Bromoform, Dibromochloromethane, and Lead were detected. Result for lead at old post-chlorination sampling point was ND.
2/28/2014	N/A	-	ND	-	-	ND	Not required by UC Monitoring plan, not submitted to DOH. Result for lead at old post-chlorination sampling point was 10 ppb.
3/11/2014	Bromoform	ND	ND	-	-	ND	Bromoform was detected. Result for lead at old post-chlorination sampling point was ND.
4/8/2014	ND	ND	ND	-	-	ND	No contaminants detected.
5/13/2014	-	-	ND	-	-	-	Sampled for lead at 360-011 only. Lead not detected.
6/10/2014	-	-	ND	-	-	-	Sampled for Lead at 360-011 only. Lead not detected
7/8/2014	ND	ND	ND	-	-	-	Sampled for 524.2, 525.2, 8015B, Lead at 360-011. No contaminants detected.
10/7/2014*	ND	ND	ND	-	-	-	Sampled for 524.2, 525.2, 8015B, Lead at 360-011. No contaminants detected.
1/21/2015	Bromoform, Dibromochloromethane	ND	ND	-	-	-	Sampled for 524.2, 525.2, 8015B, Lead at 360-011. Detected bromoform, dibromochloromethane.
4/7/2015	ND	ND	ND	-	-	-	Sampled for 524.2, 525.2, 8015B, Lead at 360-011. No contaminants detected.
6/16/2015				-	-	-	
9/15/2015				-	-	-	

EPA Method 524.2 for volatile organic compounds (VOCs)
EPA Method 525.2 for semi-volatile organic compounds
EPA Method 8015 for JP8 (C8-C18) gas chromatograph
EPA Method 200.8 for lead

* Received DOH approval to change sample date from 10/14/14 to 10/7/14

VOCs tested (EPA Method 524.2)

Benzene	trans-1,2-Dichloroethylene	1,2,4-Trichlorobenzene
Carbon tetrachloride	Dichloromethane	1,1,1-Trichloroethane
Chlorobenzene	1,2-Dichloropropane	1,1,2-Trichloroethane
1,2-Dichlorobenzene	Ethylbenzene	Trichloroethylene
1,4-Dichlorobenzene	Napththalene (unregulated)	Vinyl chloride
1,2-Dichloroethane	Styrene	Xylenes, Total
1,1-Dichloroethylene	Tetrachloroethylene	
cis-1,2-Dichloroethylene	Toluene	

SVOCs tested (EPA Method 525.2)

Benzo(a)pyrene
Di(2-ethylhexyl)adipate
Di(2-ethylhexyl)phthalate
Acenaphthene (unregulated)
Acenaphthylene (unregulated)
Anthracene (unregulated)
Phenanthrene (unregulated)
Fluoranthene (unregulated)
Pyrene (unregulated)

5.0 Continued Drinking Water Sampling

In accordance with the approved Transition Plan, drinking water sampling will continue on a quarterly schedule at the entry point to the distribution system (360-011 Tap Outside Cl_2 Building). Samples will be analyzed using the following analytical methods:

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

6.0 Planned Future Release Response Actions

The Navy and DLA are negotiating with the EPA and DOH 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.

7.0 Public Notification

The Navy provided notification and updates to the public through a press release on June 10, 2015. A copy of the press release is included as Appendix C.

8.0 Conclusions and Recommendations

Results of oil/water interface measurements, 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 are being negotiated with the EPA and DOH to protect the drinking water sources located down-gradient of the Facility.

The next quarterly release response report will be submitted in October 2015 and will cover the release response actions completed between July and October 2015.

9.0 References

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, 2011, Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater, Environmental Management Division, Fall 2011, revised January 2012.

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.

Environmental Science International, Inc., 2014, Final Third Quarter 2014 – Quarterly Groundwater Monitoring Report, Inside Tunnel Wells, Red Hill Bulk Fuel Storage Facility, Prepared for Department of the Navy, Naval Facilities Engineering Command, Hawaii, JBPHH, Hawaii, September 2014.

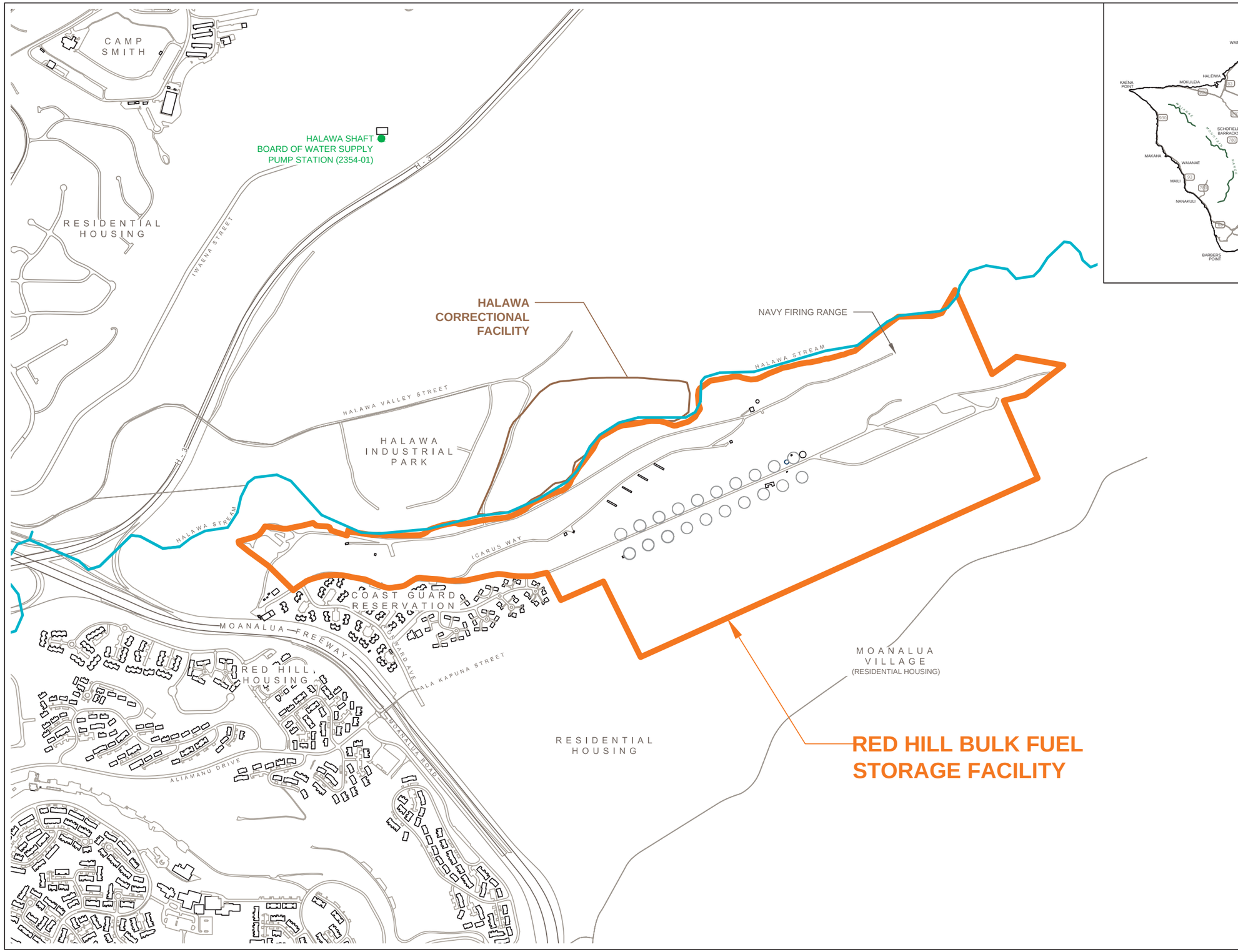
Hawaii Administrative Rules, Title 11, Chapter 281, Underground Storage Tanks, August 2013.

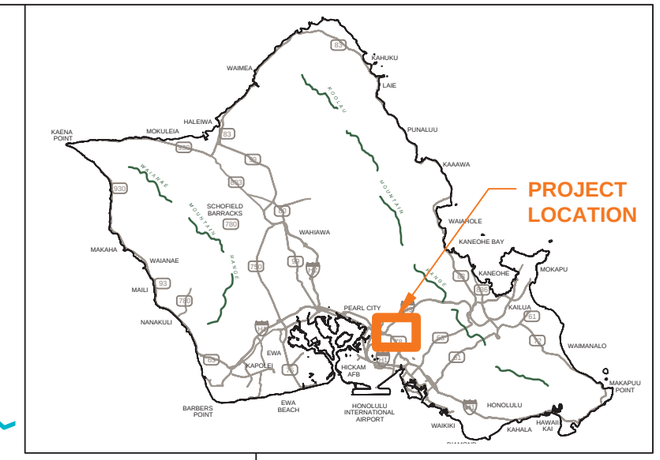
TEC, 2007, Final Technical Report, Red Hill Bulk Fuel Storage Facility, Prepared for Department of the Navy, Commander Naval Facilities Engineering Command, Pacific, Pearl Harbor, Hawaii, August 2007.

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
Figures





NOTES

The accuracy of this document is limited to the quality and scale of the source information. This document is not a legal representation of an engineered survey.

SOURCES

Pearl Harbor Base Map

Navy GIS files

NORTH

GRAPHIC SCALE

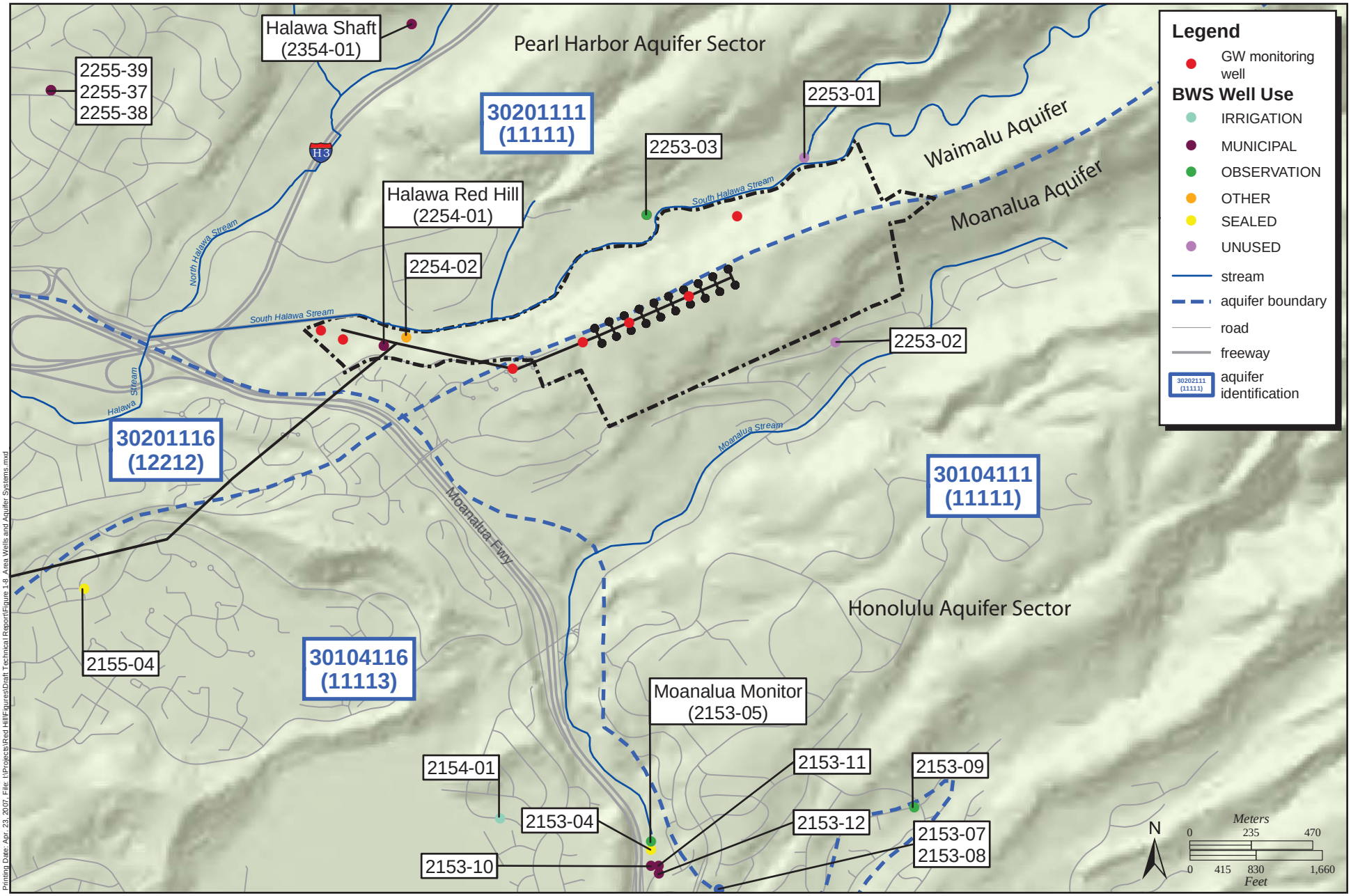
900 0 900

Scale in Feet

FIGURE 1

SITE LOCATION

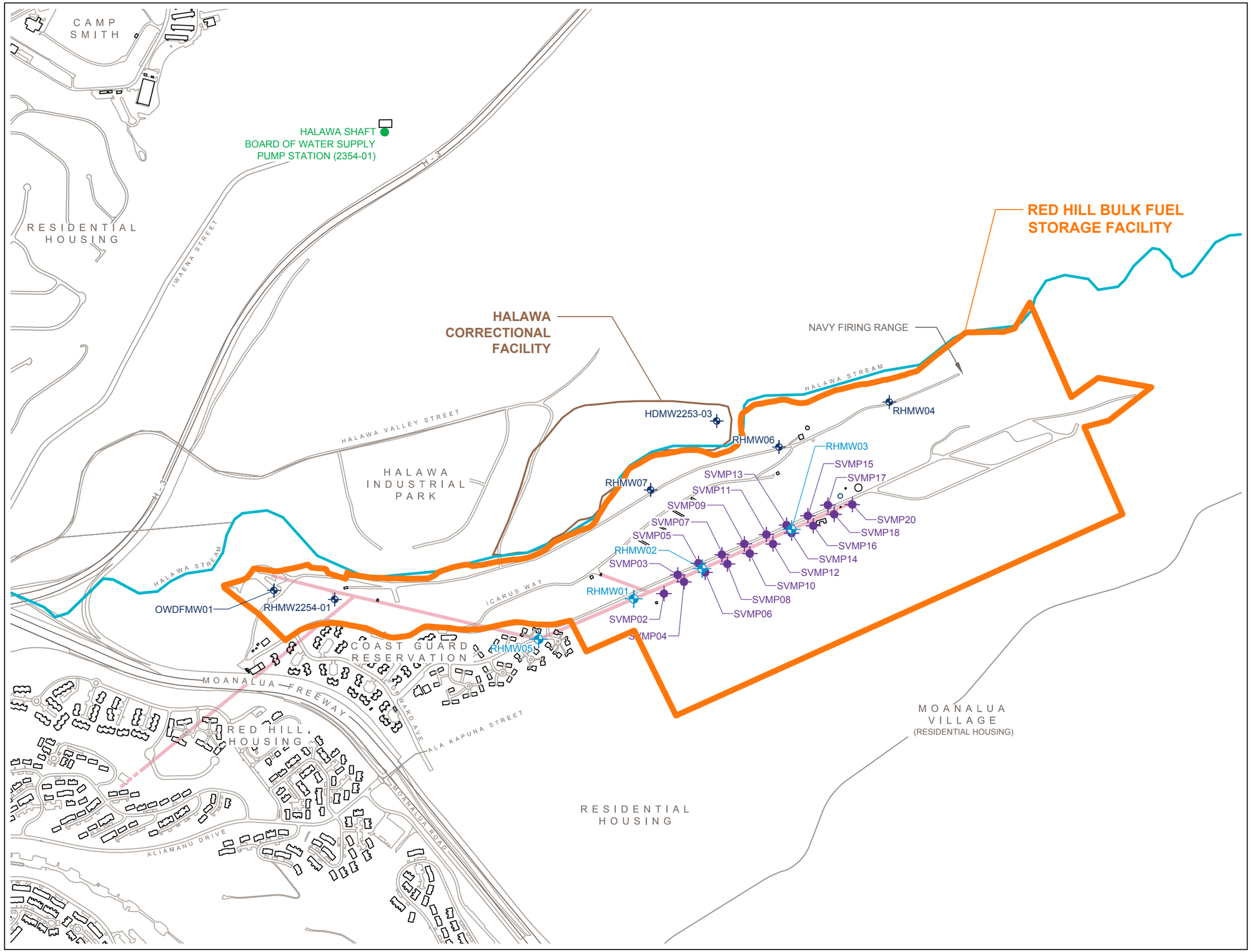
RED HILL BULK FUEL STORAGE FACILITY
NAVAL SUPPLY SYSTEM COMMAND (NAVSUP)
FLEET LOGISTICS CENTER
JBPHH, OAHU, HAWAII



Printing Date: Apr. 23, 2007. File: I:\Projects\Red Hill\Figures\Draft Technical Report\Figure 1-8 Area Wells and Aquifer Systems.mxd

Figure 2
Area Wells and Aquifer Systems
Red Hill Bulk Fuel Storage Facility
Oahu, Hawaii

Source Data:
City & County of Honolulu,
GIS base layers
DLNR Board of Water Supply,
2005 water supply well IDs



LEGEND

- RED HILL BULK FUEL STORAGE FACILITY
- HALAWA CORRECTIONAL FACILITY
- HALAWA STREAM
- BUILDING
- ROAD
- ABOVEGROUND STORAGE TANK
- WATER TANK
- SOIL VAPOR MONITORING POINT
- GROUNDWATER MONITORING WELL LOCATED INSIDE TUNNEL
- GROUNDWATER MONITORING WELL LOCATED OUTSIDE TUNNEL
- BOARD OF WATER SUPPLY PUMP STATION
- TUNNEL

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SOURCES

Pearl Harbor Base Map

Navy GIS files

NORTH

GRAPHIC SCALE

800 0 800

Scale in Feet

FIGURE 3

SITE LAYOUT

GROUNDWATER MONITORING
RED HILL BULK FUEL STORAGE FACILITY
NAVAL SUPPLY SYSTEM COMMAND (NAVSUP)
FLEET LOGISTICS CENTER
JBPHH, OAHU, HAWAII

Appendix B
Soil Vapor Sampling Results through June 2015

Table 1
Soil Vapor Results for SV02
Soil Vapor Monitoring Letter Report
Red Hill Bulk Fuel Storage Facility

Date	SV02S	SV02M	SV02D
3/24/2008	NC	NC	NC
5/6/2008	129	252	157
5/29/2008	1785	1217	657
7/3/2008	1090	984	525
7/31/2008	728	677	437
9/2/2008	754	693	434
9/29/2008	520	553	456
10/23/2008	493	555	413
11/25/2008	3396	1762	2792
1/14/2009	89	329	312
2/5/2009	188	264	202
2/26/2009	1912	348	184
4/1/2009	169	195	102
4/20/2009	704	557	504
5/27/2009	1473	835	799
6/29/2009	2141	659	511
7/20/2009	1360	628	544
8/28/2009	564	318	258
9/24/2009	488	294	241
10/29/2009	999	425	533
11/19/2009	305	283	241
12/16/2009	356	284	238
1/28/2010	684	283	299
2/22/2010	364	159	135
3/25/2010	394	340	277
4/28/2010	385	282	209
5/26/2010	374	252	294
6/28/2010	400	253	223
7/28/2010	332	232	205
9/29/2010	224	217	207
10/18/2010	525	577	565
11/16/2010	303	424	338
12/14/2010	313	416	330
1/14/2011	494	357	651
2/15/2011	280	298	283
3/15/2011	221	208	217
4/18/2011	327	270	305
5/18/2011	980	562	755
6/22/2011	184	205	162
7/27/2011	101	83	86
9/22/2011	318	268	313
10/27/2011	270	241	211
11/22/2011	235	226	183
12/16/2011	408	333	397
1/20/2012	103	111	239

Date	SV02S	SV02M	SV02D
2/23/2012	132	167	161
3/13/2012	222	155	58
4/16/2012	115	92	149
5/15/2012	146	145	131
6/19/2012	292	276	230
7/10/2012	206	184	194
8/14/2012	389	362	348
10/24/2012	166	139	144
11/26/2012	101	72	110
12/18/2012	106	83	97
1/31/2013	546	914	966
2/28/2013	47	26	18
3/28/2013	12	12	5
4/25/2013	13	15	18
5/30/2013	204	153	176
6/27/2013	13	15	15
7/25/2013	258	252	316
8/29/2013	165	28	11
9/26/2013	304	263	306
10/24/2013	281	271	285
11/21/2013	186	172	140
12/23/2013	21	33	61
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

ppbv: parts per billion by volume
NC: Not collected

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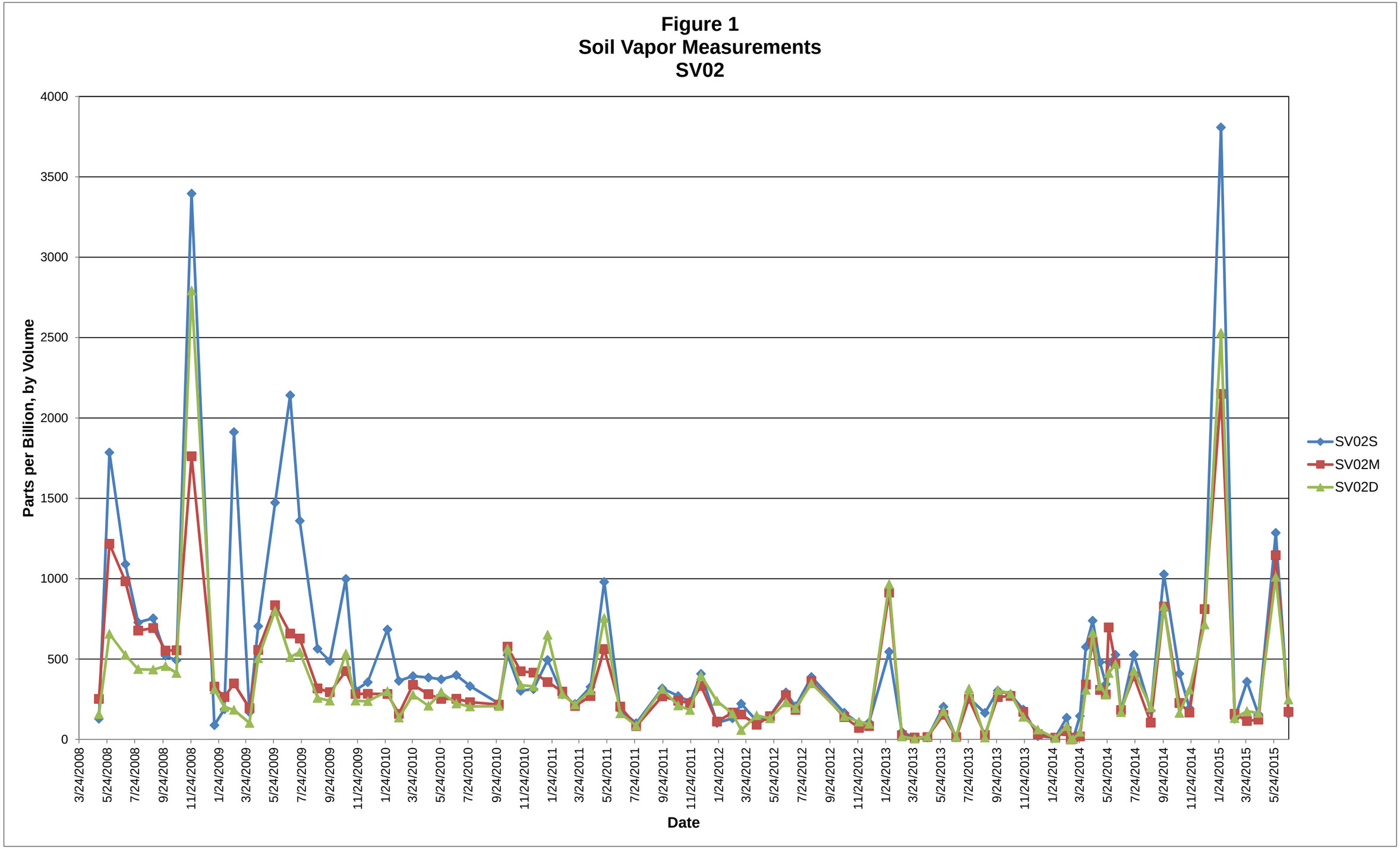

The recommended SVMP action level for JP-5 and JP-8 tanks is 280,000 ppbv.

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Table 2
Soil Vapor Results for SV03
Soil Vapor Monitoring Letter Report
Red Hill Bulk Fuel Storage Facility

Date	SV03S	SV03M	SV03D
3/24/2008	458	248	579
5/6/2008	668	521	328
5/29/2008	652	685	458
7/3/2008	1504	1044	1024
7/31/2008	1313	1245	951
9/2/2008	1645	1458	1237
9/29/2008	4425	3982	1804
10/23/2008	1423	1261	1058
11/25/2008	1060	1417	742
1/14/2009	4658	1593	1635
2/5/2009	710	1756	1470
2/26/2009	2616	1486	822
4/1/2009	407	611	571
4/20/2009	419	573	546
5/27/2009	568	528	481
6/29/2009	592	665	662
7/20/2009	1000	971	1272
8/28/2009	615	703	587
9/24/2009	658	838	860
10/29/2009	782	816	902
11/19/2009	697	707	740
12/16/2009	553	800	632
1/28/2010	531	569	575
2/22/2010	469	641	457
3/25/2010	410	919	750
4/28/2010	478	733	642
5/26/2010	467	470	621
6/28/2010	540	645	582
6/28/2010	540	645	582
7/28/2010	504	528	520
9/29/2010	242	257	259
10/18/2010	876	691	863
11/16/2010	492	367	581
12/14/2010	178	463	732
1/14/2011	436	555	627
2/15/2011	438	474	542
3/15/2011	272	300	350
4/18/2011	354	316	401
5/18/2011	565	672	840
6/22/2011	386	268	328
7/27/2011	126	115	127
8/26/2011	108	94	146
9/22/2011	318	309	346
10/27/2011	246	294	269
11/22/2011	265	265	338
12/16/2011	274	218	161

Date	SV03S	SV03M	SV03D
1/20/2012	223	101	151
2/23/2012	150	174	190
3/13/2012	173	341	104
4/16/2012	230	100	131
5/15/2012	166	162	196
6/19/2012	329	422	402
7/10/2012	245	246	265
8/14/2012	356	365	410
10/24/2012	246	178	168
11/26/2012	108	136	139
12/18/2012	109	79	78
1/31/2013	17	12	54
2/28/2013	215	104	127
3/28/2013	52	15	42
4/25/2013	27	34	39
5/30/2013	145	160	141
6/27/2013	25	35	35
7/25/2013	179	146	145
8/29/2013	8	2	13
9/26/2013	49	27	35
10/24/2013	277	277	277
11/21/2013	128	150	129
12/23/2013	8	6	17
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

ppbv: parts per billion by volume

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Figure 2
Soil Vapor Measurements
SV03

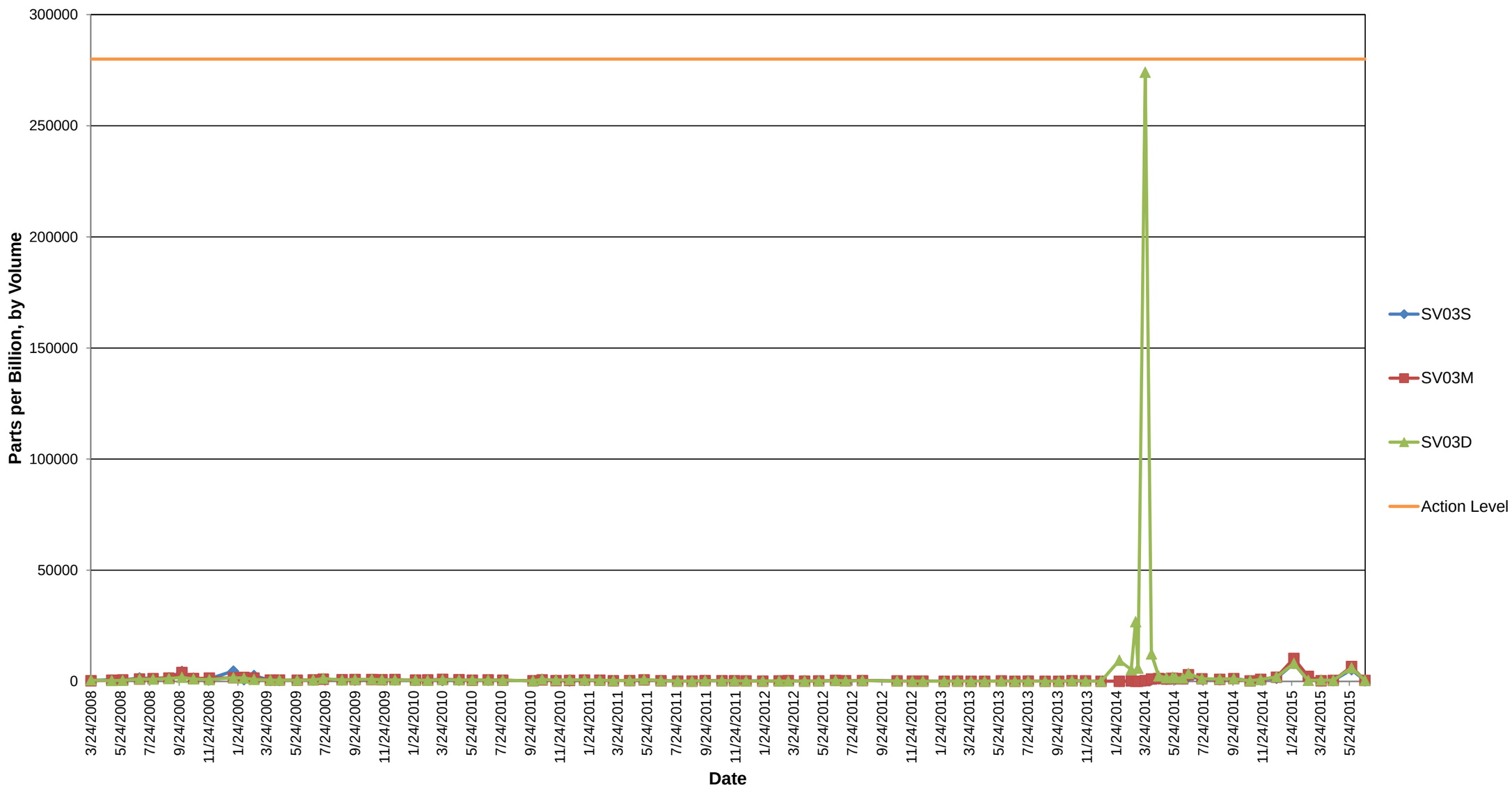

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Table 3
Soil Vapor Results for SV04
Soil Vapor Monitoring Letter Report
Red Hill Bulk Fuel Storage Facility

Date	SV04S	SV04M	SV04D
3/24/2008	468	641	827
5/6/2008	1076	1235	1228
5/29/2008	613	634	681
7/3/2008	696	898	806
7/31/2008	836	1009	1144
9/2/2008	972	1270	1233
9/29/2008	941	1454	1436
10/23/2008	802	1192	1321
11/25/2008	460	799	893
1/14/2009	72	1081	1138
2/5/2009	136	561	746
2/26/2009	1920	1147	847
4/1/2009	365	586	608
4/20/2009	465	662	695
5/27/2009	489	627	740
6/29/2009	526	714	796
7/20/2009	603	1354	1010
8/28/2009	511	647	751
9/24/2009	609	734	846
10/29/2009	682	931	881
11/19/2009	569	739	788
12/16/2009	464	655	726
1/28/2010	448	592	616
2/22/2010	381	555	713
3/25/2010	539	761	656
4/28/2010	505	627	683
5/26/2010	463	618	600
6/28/2010	460	582	626
7/28/2010	449	566	588
9/29/2010	297	306	318
10/18/2010	715	843	788
11/16/2010	422	644	440
12/14/2010	335	306	270
1/14/2011	568	555	633
2/15/2011	501	609	609
3/15/2011	292	375	471
4/18/2011	394	475	394
5/18/2011	652	983	978
6/22/2011	356	339	317
7/27/2011	102	187	162
8/26/2011	137	205	162
9/22/2011	359	373	363
10/27/2011	236	281	238
11/22/2011	337	356	345
12/16/2011	709	799	652
1/20/2012	104	121	141

Date	SV04S	SV04M	SV04D
2/23/2012	175	209	436
3/13/2012	146	139	114
4/16/2012	241	141	116
5/15/2012	224	228	253
6/19/2012	360	464	404
7/10/2012	276	287	289
8/14/2012	340	351	358
10/24/2012	221	162	155
11/26/2012	138	187	159
12/18/2012	85	99	66
1/31/2013	38	54	423
2/28/2013	87	79	51
3/28/2013	12	24	24
4/25/2013	28	39	36
5/30/2013	117	131	135
6/27/2013	16	23	26
7/25/2013	115	130	123
8/29/2013	121	192	190
9/26/2013	5	18	11
10/24/2013	295	285	254
11/21/2013	98	129	159
12/23/2013	4	14	11
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
11/202014	409	315	373
12/232014	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

ppbv: parts per billion by volume

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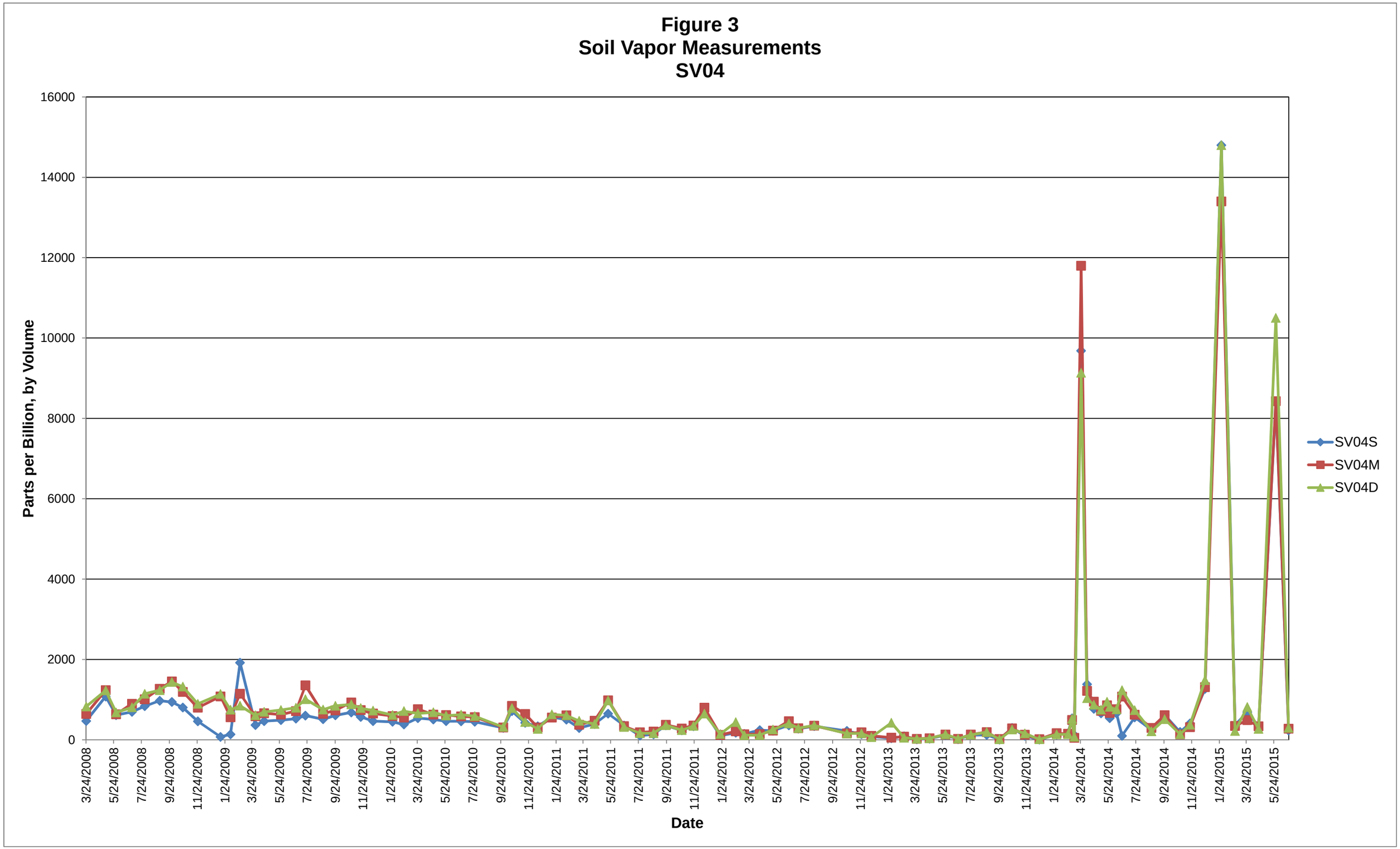

The recommended SVMP action level for JP-5 and JP-8 tanks is 280,000 ppbv.

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Table 4
Soil Vapor Results for SV05
Soil Vapor Monitoring Letter Report
Red Hill Bulk Fuel Storage Facility

Date	SV05S	SV05M	SV05D
3/24/2008	1295	716	697
5/6/2008	5441	4214	4012
5/29/2008	6523	4636	3984
7/3/2008	5195	4218	3957
7/31/2008	5190	3785	2894
9/2/2008	6905	5581	3681
9/29/2008	7149	6405	3960
10/23/2008	3497	3690	2518
11/25/2008	3750	5221	3741
1/14/2009	9519	20567	12473
2/5/2009	1744	1824	1638
2/26/2009	7015	2820	1616
4/1/2009	1178	996	1179
4/20/2009	1209	1146	1326
5/27/2009	1120	1054	1123
6/29/2009	1055	1061	1131
7/20/2009	1237	1296	1582
8/28/2009	1776	1314	1457
9/24/2009	1901	1722	1906
10/29/2009	1430	1507	1724
11/19/2009	780	2100	2715
12/16/2009	210	2068	3418
1/28/2010	818	976	1227
2/22/2010	487	1453	2234
3/25/2010	1028	1473	1484
4/28/2010	398	1417	1532
5/26/2010	1002	980	1147
6/28/2010	64900	42100	25600
7/28/2010	38167	46633	59433
9/29/2010	NC_1	NC_1	NC_1
10/18/2010	NC_1	NC_1	NC_1
11/16/2010	NC_1	NC_1	NC_1
12/14/2010	NC_1	NC_1	NC_1
1/13/2011	NC_1	NC_1	NC_1
2/15/2011	NC1	NC1	NC1
3/15/2011	NC_1	NC_1	NC_1
4/18/2011	NC_1	NC_1	NC_1
5/18/2011	NC_1	NC_1	NC_1
6/22/2011	NC_1	NC_1	NC_1
7/27/2011	NC_1	NC_1	NC_1
8/26/2011	NC_1	NC_1	NC_1
9/22/2011	NC_1	NC_1	NC_1
10/27/2011	NC_1	NC_1	NC_1
11/22/2011	NC_1	NC_1	NC_1
12/16/2011	NC_1	NC_1	NC_1
1/20/2012	NC_1	NC_1	NC_1
2/23/2012	NC_1	NC_1	NC_1
3/13/2012	NC_1	NC_1	NC_1
4/16/2012	NC_1	NC_1	NC_1
5/15/2012	NC_1	NC_1	NC_1

Date	SV05S	SV05M	SV05D
6/19/2012	NC_1	NC_1	NC_1
7/10/2012	NC_1	NC_1	NC_1
8/14/2012	NC_1	NC_1	NC_1
10/24/2012	NC_1	NC_1	NC_1
11/26/2012	NC_1	NC_1	NC_1
12/18/2012	NC_1	NC_1	NC_1
1/31/2013	NC_1	NC_1	NC_1
2/28/2013	NC_1	NC_1	NC_1
3/28/2013	NC_1	NC_1	NC_1
4/25/2013	NC_1	NC_1	NC_1
5/30/2013	215	221	184
6/27/2013	115	233	232
7/25/2013	208	218	322
8/29/2013	63	68	161
9/26/2013	14	29	114
10/24/2013	229	250	201
11/21/2013	94	120	109
12/23/2013	50	622	794
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
12/232014	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

ppbv: parts per billion by volume
NC_1: Not collected due to maintenance work

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Figure 4
Soil Vapor Measurements
SV05

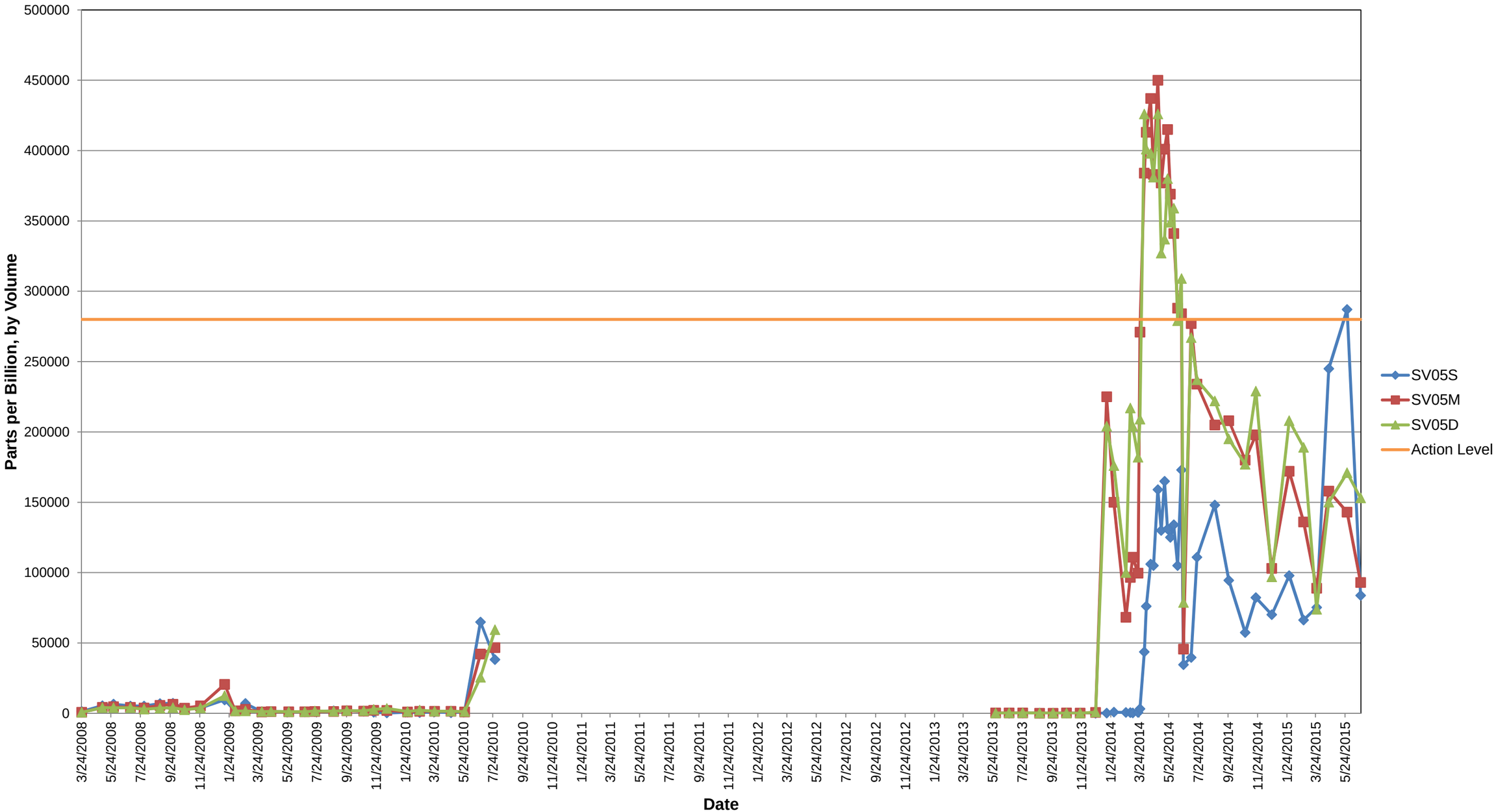

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Table 5
Soil Vapor Results for SV06
Soil Vapor Monitoring Letter Report
Red Hill Bulk Fuel Storage Facility

Date	SV06S	SV06M
3/24/2008	18567	8861
5/6/2008	13733	9828
5/29/2008	13333	6932
7/3/2008	10560	5075
7/31/2008	10502	3373
9/2/2008	11416	3030
9/29/2008	10456	2772
10/23/2008	8337	2255
11/25/2008	10683	2143
1/14/2009	32867	13533
2/5/2009	7624	1128
2/26/2009	7936	1160
4/1/2009	6857	688
4/20/2009	6872	692
5/27/2009	6940	535
6/29/2009	6161	584
7/20/2009	7120	860
8/28/2009	5901	1075
9/24/2009	6917	1417
10/29/2009	5430	1027
11/19/2009	6129	2937
12/16/2009	5549	2673
1/28/2010	5721	559
2/22/2010	4841	2775
3/25/2010	5709	1043
4/28/2010	5905	1997
5/26/2010	4483	1261
6/28/2010	4800	1539
7/28/2010	4347	1693
9/29/2010	1090	457
10/18/2010	675	1084
11/16/2010	1142	413
12/14/2010	2043	646
1/14/2011	566	1282
2/15/2011	2245	352
3/15/2011	2542	173
4/18/2011	2412	484
5/18/2011	2343	613
6/22/2011	221	1558
7/27/2011	100	909
8/26/2011	210	924
9/22/2011	380	1385
10/27/2011	189	1155
11/22/2011	200	1098
12/16/2011	621	651
1/20/2012	342	537
2/23/2012	943	348
3/13/2012	330	816
4/16/2012	357	756
5/15/2012	699	462

Date	SV06S	SV06M
6/19/2012	384	498
7/10/2012	305	373
8/14/2012	476	417
10/24/2012	225	474
11/26/2012	NC_1	NC_1
12/18/2012	NC_1	NC_1
1/31/2013	NC_1	NC_1
2/28/2013	NC_1	NC_1
3/28/2013	NC_1	NC_1
4/25/2013	NC_1	NC_1
5/30/2013	NC_1	NC_1
6/27/2013	143	378
7/25/2013	280	742
8/29/2013	131	1066
9/26/2013	9	566
10/24/2013	1291	1485
11/21/2013	160	322
12/23/2013	3	39
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

ppbv: parts per billion by volume
NC_1: Not collected due to maintenance work

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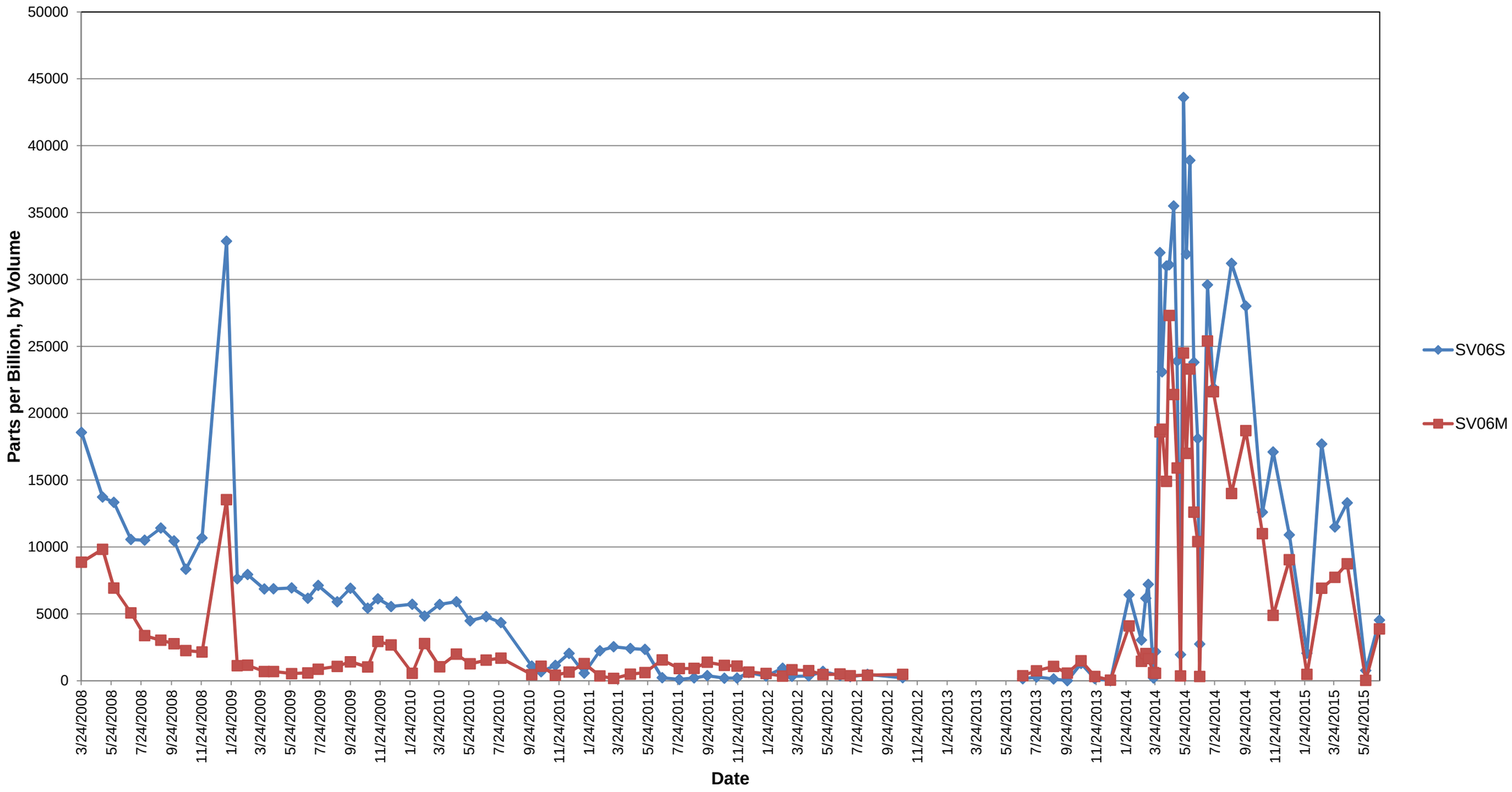
Figure 5
Soil Vapor Measurements
SV06



The recommended SVMP action level for JP-5 and JP-8 tanks is 280,000 ppbv.

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Table 6
Soil Vapor Results for SV07
Soil Vapor Monitoring Letter Report
Red Hill Bulk Fuel Storage Facility

Date	SV07S	SV07M	SV07D
3/24/2008	981	1966	21667
5/6/2008	5331	9047	12433
5/29/2008	NC	8698	12867
7/3/2008	6074	8759	16000
7/31/2008	4572	6737	20367
9/2/2008	4852	7576	21067
9/29/2008	4786	8620	22100
10/23/2008	3224	5459	21733
11/25/2008	1894	4069	12867
1/14/2009	2707	2567	10667
2/5/2009	1208	1780	7718
2/26/2009	7846	3623	9532
4/1/2009	1227	1268	12033
4/20/2009	1334	1434	12700
5/27/2009	1144	1353	18233
6/29/2009	1107	1184	9743
7/20/2009	1660	1595	11667
8/28/2009	1550	1207	3078
9/24/2009	1716	1481	2213
10/29/2009	1042	1214	6121
11/19/2009	657	1210	5342
12/16/2009	599	875	12633
1/28/2010	1032	872	4079
2/22/2010	444	728	3519
3/25/2010	762	886	16200
4/28/2010	288	689	2365
5/26/2010	782	731	3244
6/28/2010	629	628	1786
7/28/2010	703	801	6775
9/29/2010	344	363	372
10/18/2010	839	685	712
11/16/2010	701	288	356
12/14/2010	369	335	323
1/13/2011	210	283	451
2/15/2011	550	351	364
3/15/2011	267	255	296
4/18/2011	321	326	333
5/18/2011	851	871	900
6/22/2011	279	475	274
7/27/2011	137	342	166
8/26/2011	96	132	135
9/22/2011	298	443	361
10/27/2011	310	537	351
11/22/2011	249	431	311
12/16/2011	424	157	114
1/20/2012	96	356	133
2/23/2012	153	213	148
3/13/2012	68	782	144
4/16/2012	258	708	385
5/15/2012	148	1877	394

Date	SV07S	SV07M	SV07D
6/19/2012	421	686	483
7/10/2012	288	638	388
8/14/2012	348	680	477
10/24/2012	232	552	278
11/26/2012	88	87	100
12/18/2012	NC_1	NC_1	NC_1
1/31/2013	NC_1	NC_1	NC_1
2/28/2013	NC_1	NC_1	NC_1
3/28/2013	NC_1	NC_1	NC_1
4/25/2013	NC_1	NC_1	NC_1
5/30/2013	NC_1	NC_1	NC_1
6/27/2013	234	676	273
7/25/2013	164	583	232
8/29/2013	173	104	38
9/26/2013	7	253	7
10/24/2013	281	396	228
11/21/2013	122	122	191
12/23/2013	2	8	5
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

ppbv: parts per billion by volume
NC_1 : Not collected due to maintenance work
NC_2 : Not collected due to an obstruction in the vapor line

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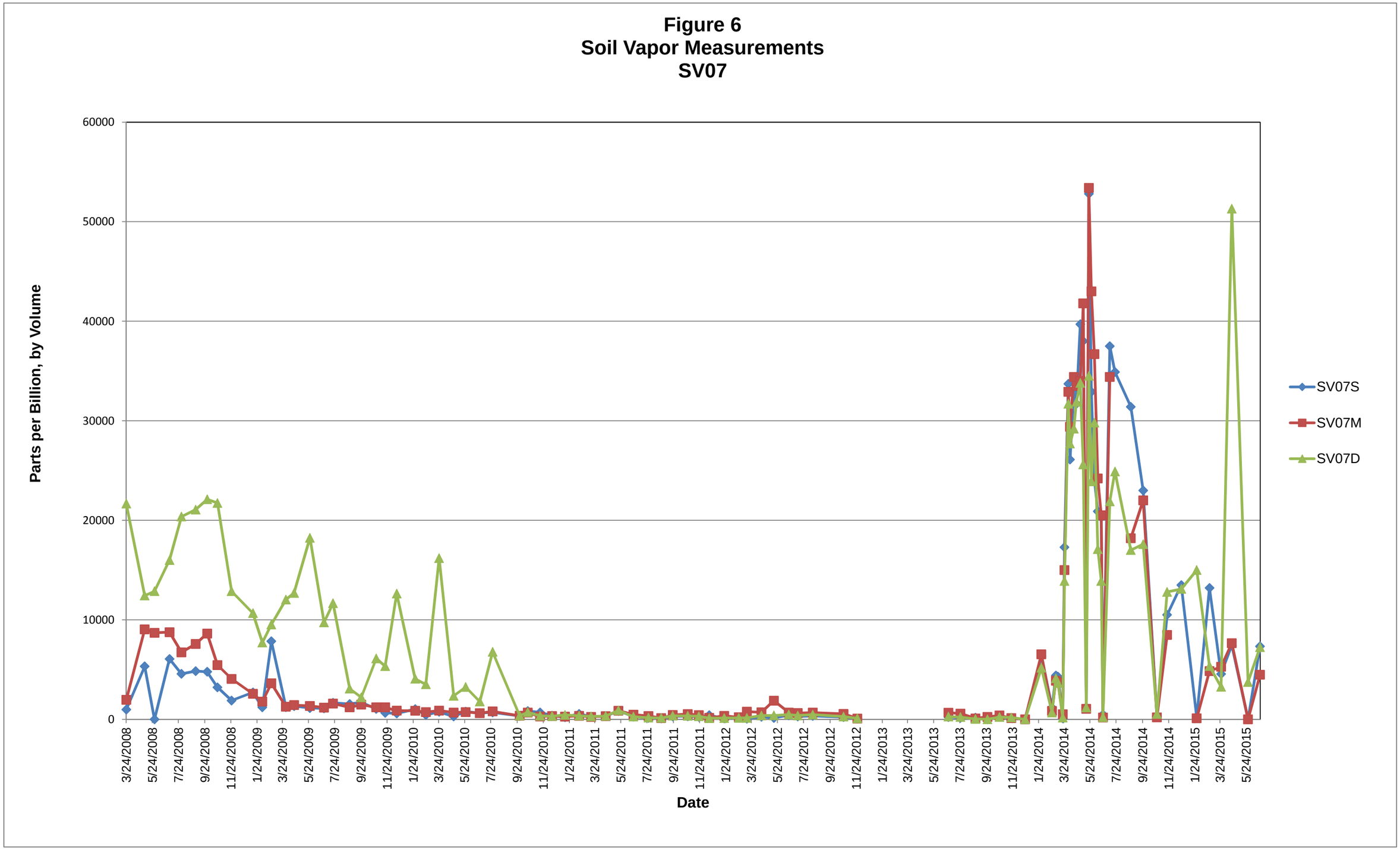

The recommended SVMP action level for JP-5 and JP-8 tanks is 280,000 ppbv.

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Table 7
Soil Vapor Results for SV08
Soil Vapor Monitoring Letter Report
Red Hill Bulk Fuel Storage Facility

Date	SV08S	SV08M	SV08D
3/24/2008	324	353	428
5/6/2008	4266	3274	2286
5/29/2008	541	607	482
7/3/2008	1764	1730	1397
7/31/2008	602	804	684
9/2/2008	1463	1605	1051
9/29/2008	2397	1859	1152
10/23/2008	1358	1119	866
11/25/2008	2780	2166	1393
1/14/2009	7153	6517	4762
2/5/2009	1211	1263	797
2/26/2009	1289	1019	669
4/1/2009	310	416	367
4/20/2009	400	484	454
5/27/2009	258	367	358
6/29/2009	464	491	474
7/20/2009	612	690	727
8/28/2009	450	546	563
9/24/2009	627	726	752
10/29/2009	617	697	762
11/19/2009	779	860	877
12/16/2009	1157	1247	1382
1/28/2010	508	579	621
2/22/2010	690	727	840
3/25/2010	555	573	612
4/28/2010	688	742	756
5/26/2010	477	560	553
6/28/2010	525	607	609
7/28/2010	515	539	610
9/29/2010	295	345	352
10/18/2010	582	1221	988
11/16/2010	629	612	740
12/14/2010	488	657	471
1/13/2011	556	796	862
2/15/2011	431	485	541
3/15/2011	169	284	304
4/18/2011	364	456	489
5/18/2011	909	1222	1263
6/22/2011	172	412	266
7/27/2011	99	139	320
8/26/2011	84	157	180
9/22/2011	277	301	309
10/27/2011	250	338	309
11/22/2011	177	268	355
12/16/2011	67	211	162
1/20/2012	169	105	340
2/23/2012	222	222	129
3/13/2012	85	134	391
4/16/2012	485	204	377
5/15/2012	106	157	153

Date	SV08S	SV08M	SV08D
6/19/2012	428	466	418
7/10/2012	291	325	290
8/14/2012	296	285	285
10/24/2012	214	216	400
11/26/2012	53	76	51
12/18/2012	NC_1	NC_1	NC_1
1/31/2013	NC_1	NC_1	NC_1
2/28/2013	NC_1	NC_1	NC_1
3/28/2013	NC_1	NC_1	NC_1
4/25/2013	NC_1	NC_1	NC_1
5/30/2013	NC_1	NC_1	NC_1
6/27/2013	224	235	402
7/25/2013	133	176	132
8/29/2013	16	28	19
9/26/2013	15	2	2
10/24/2013	207	2013	197
11/21/2013	76	73	88
12/23/2013	4	2	6
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

ppbv: parts per billion by volume
NC_1 : Not collected due to maintenance work

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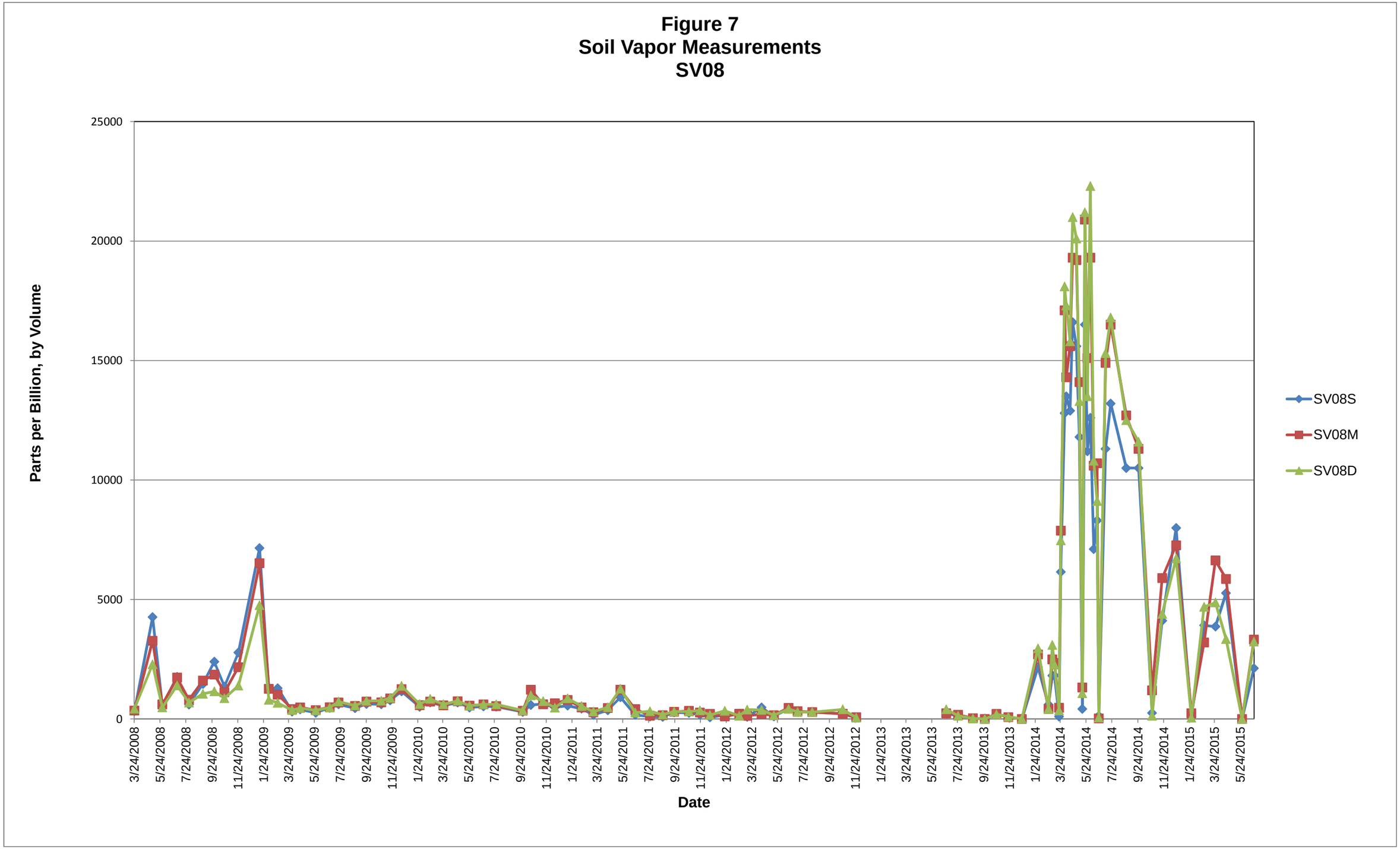

The recommended SVMP action level for JP-5 and JP-8 tanks is 280,000 ppbv.

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Table 8
Soil Vapor Results for SV09
Soil Vapor Monitoring Letter Report
Red Hill Bulk Fuel Storage Facility

Date	SV09S	SV09M	SV09D
3/24/2008	309	405	NC
5/6/2008	6462	7644	654
5/29/2008	878	825	451
7/3/2008	4190	4238	2301
7/31/2008	1024	961	646
9/2/2008	1949	1616	1047
9/29/2008	2714	2058	1232
10/23/2008	1458	1114	673
11/25/2008	2142	1855	1134
1/14/2009	4851	3250	NC
2/5/2009	786	457	NC
2/26/2009	930	503	NC
4/1/2009	241	233	NC
4/20/2009	329	361	NC
5/27/2009	234	326	183
6/29/2009	400	425	342
7/20/2009	566	645	704
8/28/2009	434	515	512
9/24/2009	663	708	630
10/29/2009	689	710	709
11/19/2009	861	898	928
12/16/2009	1084	1176	1410
1/28/2010	421	473	510
2/22/2010	659	716	877
3/25/2010	555	625	670
4/28/2010	575	743	858
5/26/2010	461	519	543
6/28/2010	531	590	627
7/28/2010	455	549	630
9/29/2010	304	357	377
10/18/2010	592	700	923
11/16/2010	488	567	607
12/14/2010	437	495	633
1/13/2011	574	572	668
2/15/2011	407	405	586
3/15/2011	261	312	NC_2
4/18/2011	320	365	NC_2
5/18/2011	918	1102	NC_2
6/22/2011	223	141	NC_2
7/27/2011	181	158	NC_2
8/26/2011	122	100	NC_2
9/22/2011	302	296	NC_2
10/27/2011	270	271	NC_2
11/22/2011	180	243	NC_2
12/16/2011	170	80	379
1/20/2012	80	148	NC_2

Date	SV09S	SV09M	SV09D
2/23/2012	130	135	110
3/13/2012	73	360	NC_2
4/16/2012	344	1212	NC_2
5/15/2012	137	122	NC_2
6/19/2012	626	518	NC_2
7/10/2012	325	298	NC_2
8/14/2012	339	350	NC_2
10/24/2012	204	335	208
11/26/2012	72	60	78
12/18/2012	63	83	87
1/31/2013	16	13	66
2/28/2013	58	20	133
3/28/2013	47	37	14
4/25/2013	42	42	59
5/30/2013	226	189	184
6/27/2013	38	39	47
7/25/2013	110	119	184
8/29/2013	8	39	23
9/26/2013	0	3	2
10/24/2013	200	170	167
11/21/2013	89	127	133
12/23/2013	13	8	2
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

ppbv: parts per billion by volume
NC: Not collected
NC_2: Not collected due to an obstruction in the vapor line

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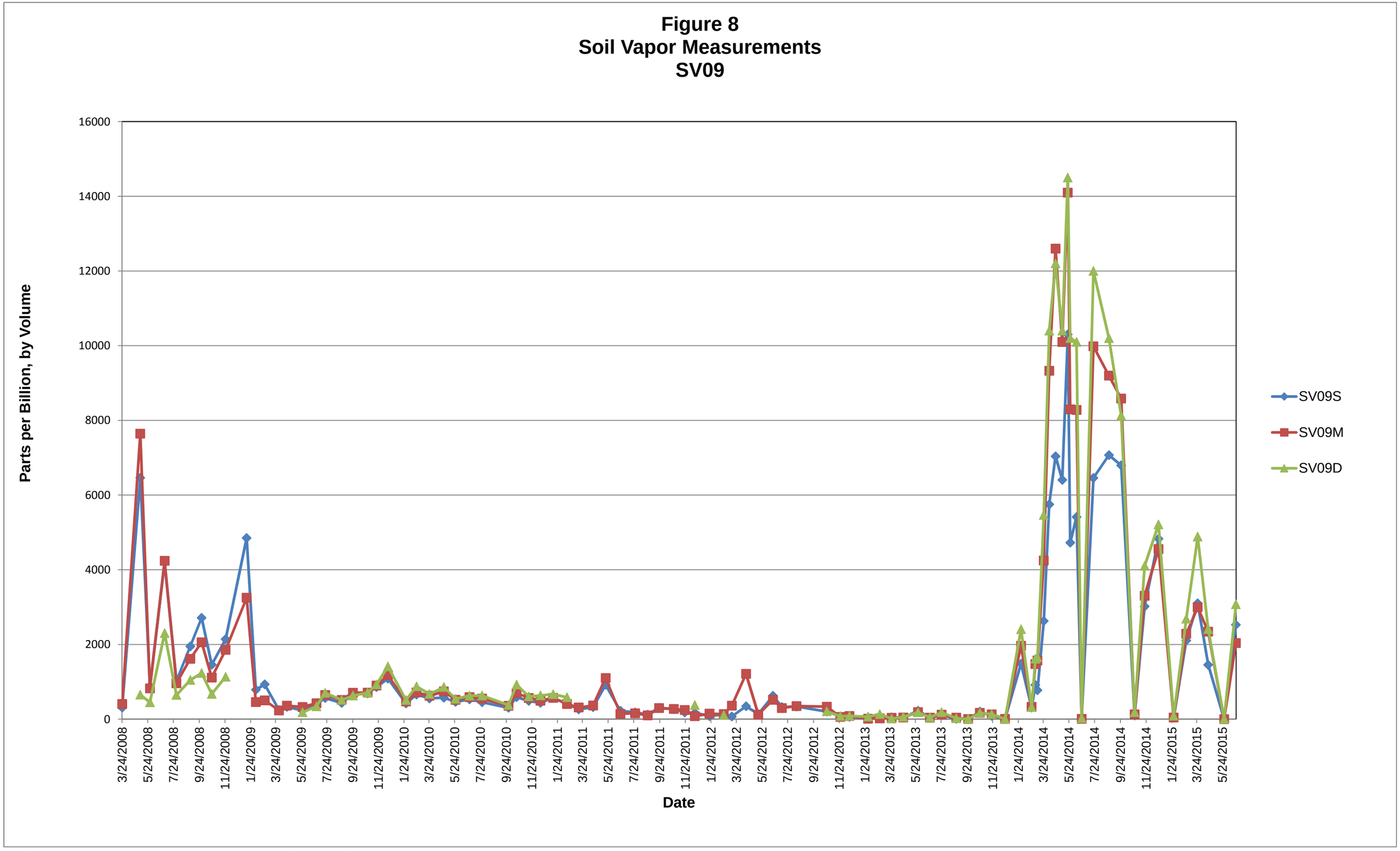

The recommended SVMP action level for JP-5 and JP-8 tanks is 280,000 ppbv.

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Table 9
Soil Vapor Results for SV10
Soil Vapor Monitoring Letter Report
Red Hill Bulk Fuel Storage Facility

Date	SV10S	SV10D
3/24/2008	246	158
5/6/2008	5368	3713
5/29/2008	521	316
7/3/2008	3212	1677
7/31/2008	855	443
9/2/2008	1410	848
9/29/2008	2266	1205
10/23/2008	1043	646
11/25/2008	1825	860
1/14/2009	5568	2867
2/5/2009	957	423
2/26/2009	798	270
4/1/2009	194	135
4/20/2009	241	174
5/27/2009	194	110
6/29/2009	312	258
7/20/2009	340	424
8/28/2009	352	302
9/24/2009	539	479
10/29/2009	546	496
11/19/2009	751	604
12/16/2009	1093	1141
1/28/2010	356	333
2/22/2010	711	708
3/25/2010	521	815
4/28/2010	662	695
5/26/2010	420	337
6/28/2010	440	402
7/28/2010	417	994
9/29/2010	288	273
10/18/2010	639	686
11/16/2010	454	625
12/14/2010	385	335
1/13/2011	467	501
2/15/2011	310	302
3/15/2011	222	246
4/18/2011	288	297
5/18/2011	979	1077
6/22/2011	103	216
7/27/2011	82	88
8/26/2011	64	97
9/22/2011	260	301
10/27/2011	245	204
11/22/2011	189	195
12/16/2011	141	92
1/20/2012	224	196

Date	SV10S	SV10D
2/23/2012	139	112
3/13/2012	387	283
4/16/2012	323	201
5/15/2012	75	87
6/19/2012	319	306
7/10/2012	288	353
8/14/2012	220	225
10/24/2012	164	130
11/26/2012	51	41
12/18/2012	16	36
1/31/2013	11	2
2/28/2013	91	83
3/28/2013	23	20
4/25/2013	31	40
5/30/2013	91	301
6/27/2013	137	301
7/25/2013	100	61
8/29/2013	529	1621
9/26/2013	0	3
10/24/2013	191	167
11/21/2013	69	76
12/23/2013	7	12
1/30/2014	483	358
2/24/2014	165	147
3/5/2014	365	45
3/10/2014	280	73
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

ppbv: parts per billion by volume

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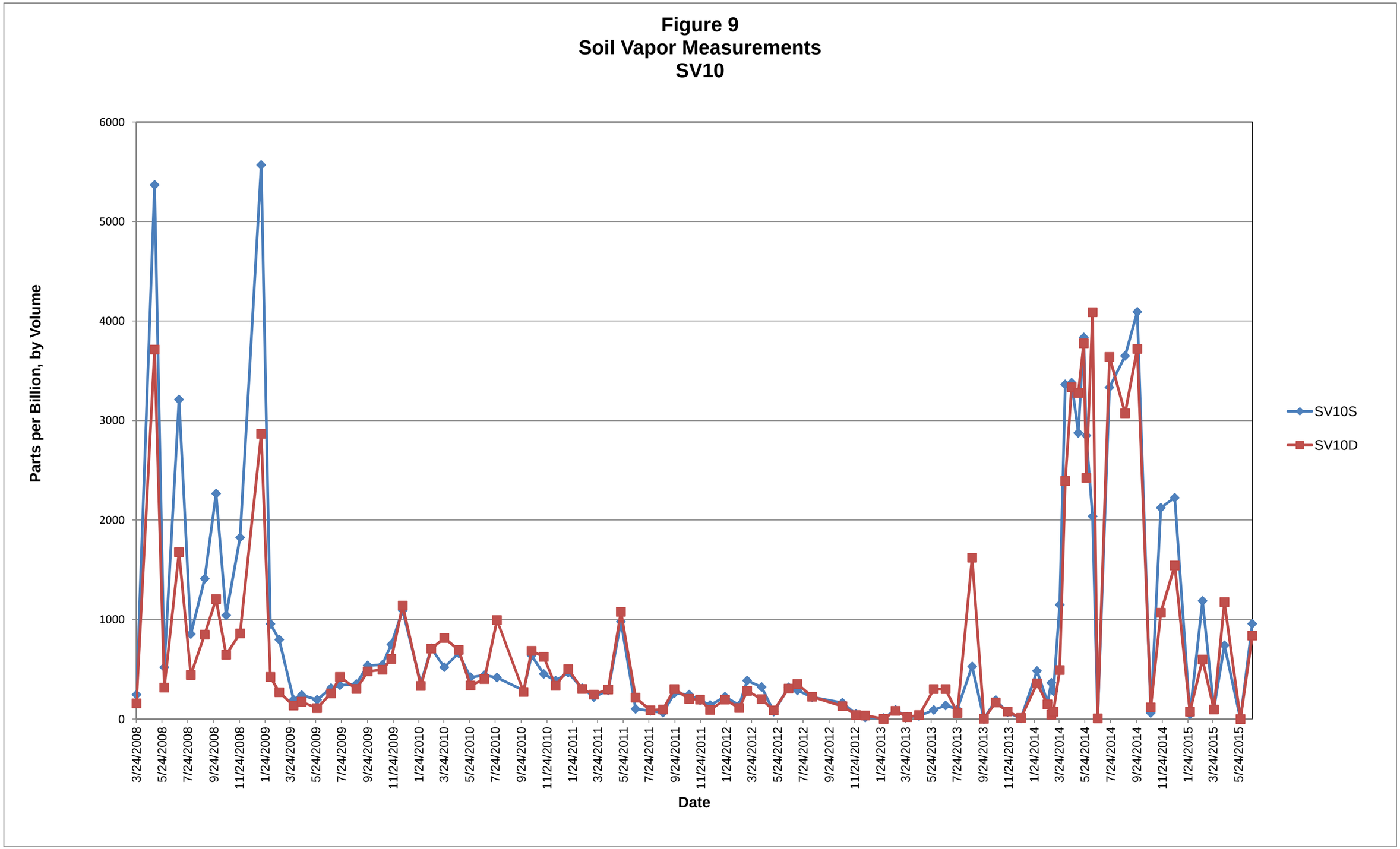

The recommended SVMP action level for JP-5 and JP-8 tanks is 280,000 ppbv.

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Table 10
Soil Vapor Results for SV11
Soil Vapor Monitoring Letter Report
Red Hill Bulk Fuel Storage Facility

Date	SV11M	SV11D
3/24/2008	304	419
5/6/2008	2770	NC_2
5/29/2008	1507	NC_2
7/3/2008	2318	NC_2
7/31/2008	1409	NC_2
9/2/2008	3459	NC_2
9/29/2008	3157	NC_2
10/23/2008	1234	NC_2
11/25/2008	1238	NC_2
1/14/2009	2123	NC_2
2/5/2009	425	NC_2
2/26/2009	298	NC_2
4/1/2009	117	NC_2
4/20/2009	333	NC_2
5/27/2009	210	NC_2
6/29/2009	364	NC_2
7/20/2009	462	NC_2
8/28/2009	403	NC_2
9/24/2009	763	NC_2
10/29/2009	734	NC_2
11/19/2009	744	NC_2
12/16/2009	1142	NC_2
1/28/2010	396	NC_2
2/22/2010	619	NC_2
3/25/2010	847	NC_2
4/28/2010	738	NC_2
5/26/2010	880	NC_2
6/28/2010	444	NC_2
7/28/2010	440	NC_2
9/29/2010	321	NC_2
10/18/2010	720	NC_2
11/16/2010	326	NC_2
12/14/2010	198	NC_2
1/13/2011	418	NC_2
2/15/2011	343	NC_2
3/15/2011	224	NC_2
4/18/2011	260	NC_2
5/18/2011	920	NC_2
6/22/2011	183	NC_2
7/27/2011	145	NC_2
8/26/2011	86	NC_2
9/22/2011	333	NC_2
10/27/2011	290	NC_2

Date	SV11M	SV11D
11/22/2011	183	NC_2
12/16/2011	75	NC_2
1/20/2012	272	NC_2
2/23/2012	135	NC_2
3/13/2012	144	NC_2
4/16/2012	157	NC_2
5/15/2012	66	NC_2
6/19/2012	347	NC_2
7/10/2012	252	NC_2
8/14/2012	342	NC_2
10/24/2012	163	303
11/26/2012	121	45
12/18/2012	31	35
1/31/2013	0	10
2/28/2013	9	100
3/28/2013	14	NC_2
4/25/2013	44	NC_2
5/30/2013	122	158
6/27/2013	27	NC_2
7/25/2013	138	NC_2
8/29/2013	784	448
9/26/2013	52	NC_2
10/24/2013	321	NC_2
11/21/2013	471	NC_2
12/23/2013	14	NC_2
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

ppbv: parts per billion by volume
NC_2 : Not collected due to an obstruction in the vapor line

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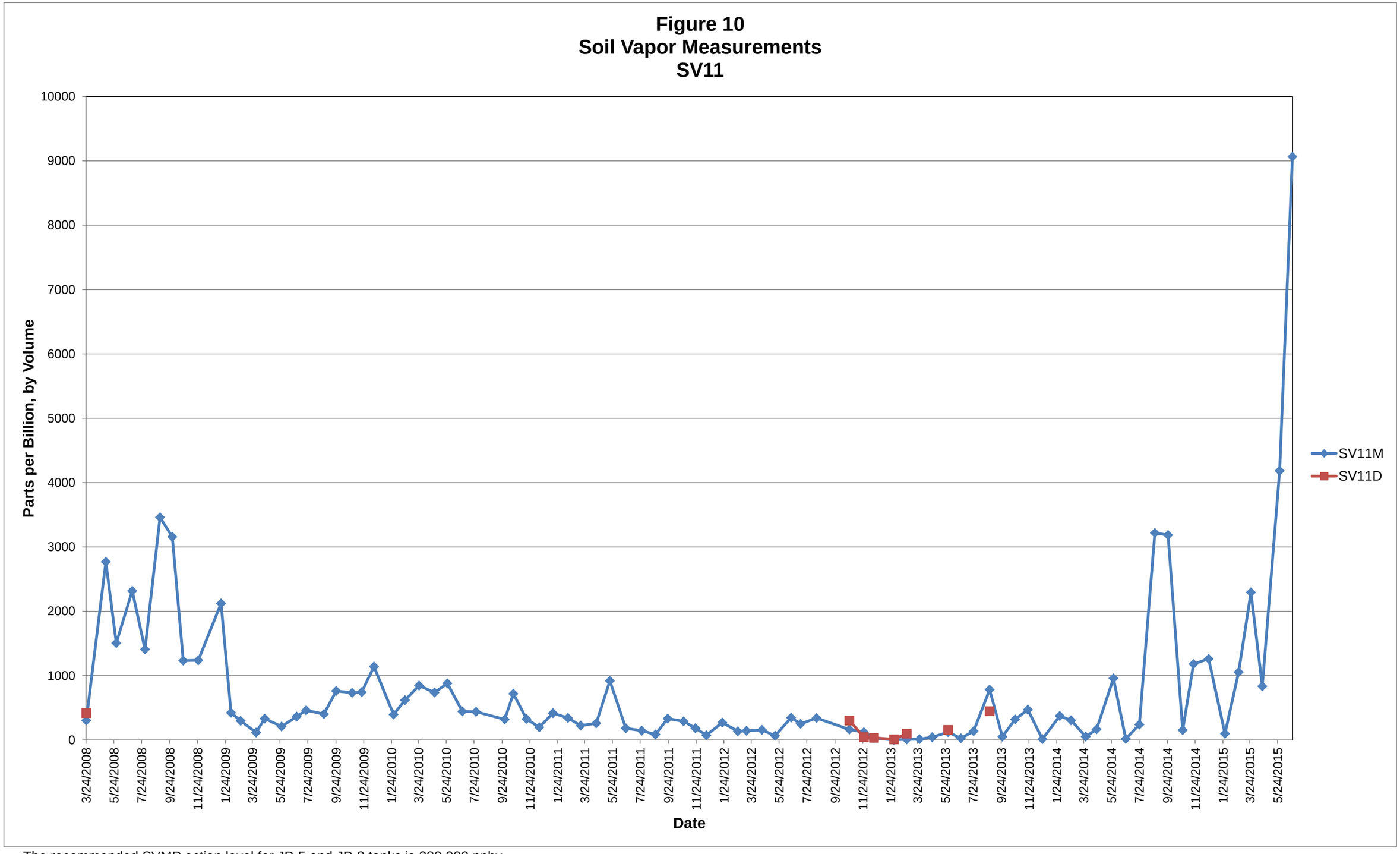

The recommended SVMP action level for JP-5 and JP-8 tanks is 280,000 ppbv.

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Table 11
Soil Vapor Results for SV12
Soil Vapor Monitoring Letter Report
Red Hill Bulk Fuel Storage Facility

Date	SV12S	SV12M	SV12D
3/24/2008	231	183	191
5/6/2008	6055	5542	3161
5/29/2008	3915	2840	1461
7/3/2008	5374	3809	2209
7/31/2008	4420	4202	989
9/2/2008	5132	5948	2929
9/29/2008	5794	5435	2544
10/23/2008	2237	2067	471
11/25/2008	1376	2066	532
1/14/2009	-1	-1	11
2/5/2009	46	210	226
2/26/2009	463	257	266
4/1/2009	122	120	149
4/20/2009	245	229	244
5/27/2009	162	95	113
6/29/2009	274	245	257
7/20/2009	402	354	510
8/28/2009	360	304	326
9/24/2009	680	621	542
10/29/2009	675	651	597
11/19/2009	1058	273	280
12/16/2009	311	43	50
1/28/2010	279	281	336
2/22/2010	12	14	104
3/25/2010	265	569	467
4/28/2010	175	401	444
5/26/2010	439	403	319
6/28/2010	341	351	383
7/28/2010	397	280	346
9/29/2010	276	247	283
10/18/2010	722	668	560
11/16/2010	12	146	252
12/14/2010	251	242	272
1/13/2011	333	195	221
2/15/2011	357	331	312
3/15/2011	317	339	228
4/18/2011	278	269	285
5/18/2011	943	988	1005
6/22/2011	274	278	228
7/27/2011	78	84	132
8/26/2011	134	111	80
9/22/2011	279	347	1631
10/27/2011	237	256	243

Date	SV12S	SV12M	SV12D
11/22/2011	303	280	244
12/16/2011	69	185	154
1/20/2012	103	200	297
2/23/2012	145	148	104
3/13/2012	231	190	423
4/16/2012	116	95	123
5/15/2012	115	98	130
6/19/2012	303	309	315
7/10/2012	337	288	345
8/14/2012	285	258	228
10/24/2012	153	140	135
11/26/2012	21	29	34
12/15/2012	12	23	17
1/31/2013	6	8	7
2/28/2013	98	54	14
3/28/2013	10	16	9
4/25/2013	31	62	35
5/30/2013	73	46	39
6/27/2013	39	32	44
7/25/2013	70	101	66
8/29/2013	75	8	270
9/26/2013	8	8	4
10/24/2013	192	221	198
11/21/2013	140	124	110
12/23/2013	11	4	2
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

ppbv: parts per billion by volume

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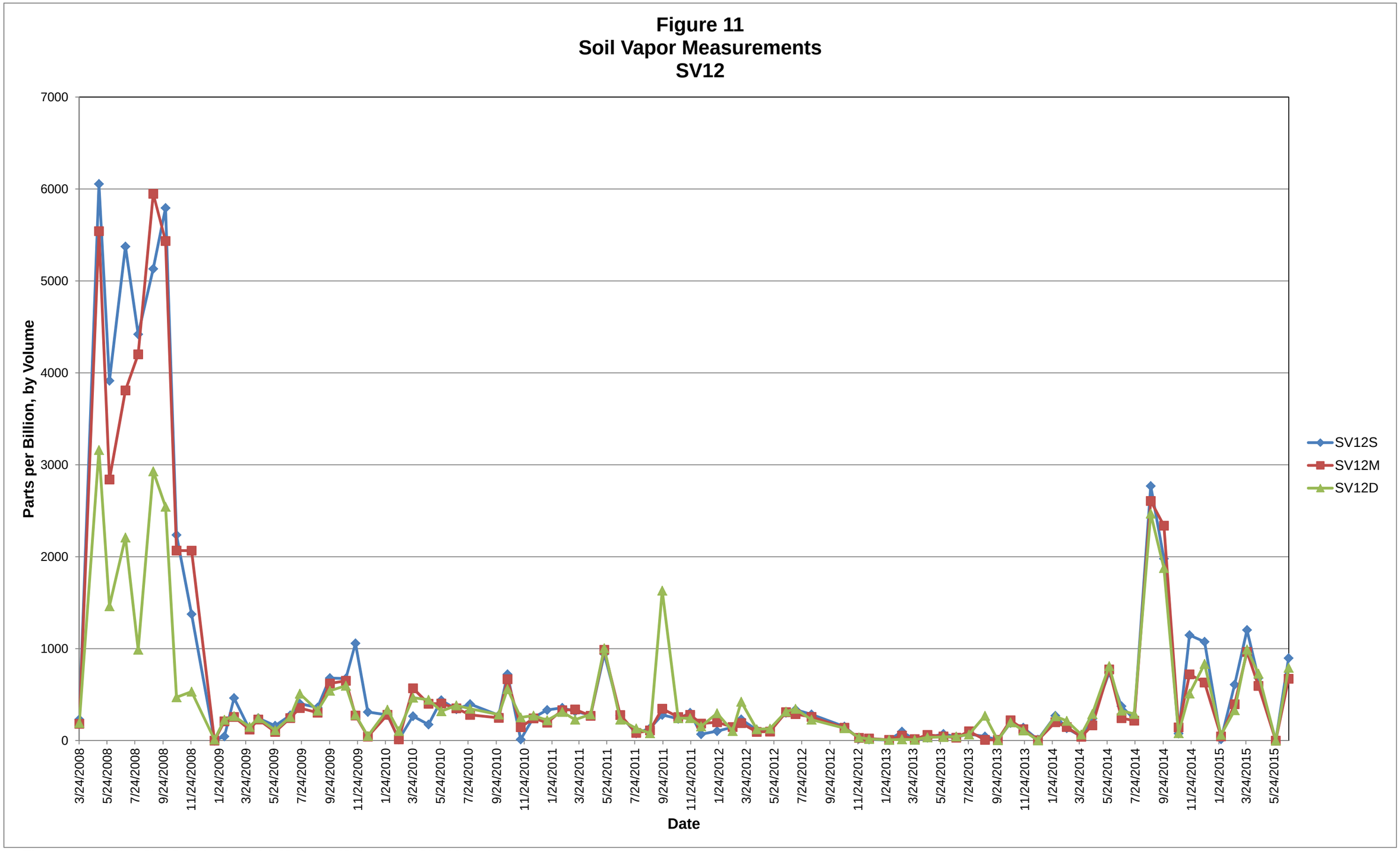

The recommended SVMP action level for JP-5 and JP-8 tanks is 280,000 ppbv.

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Table 12
Soil Vapor Results for SV13
Soil Vapor Monitoring Letter Report
Red Hill Bulk Fuel Storage Facility

Date	SV13S	SV13M	SV13D
3/24/2008	283	385	1195
5/6/2008	177	258	640
5/29/2008	3108	2384	1792
7/3/2008	3464	2566	1880
7/31/2008	3469	2529	1421
9/2/2008	5475	4141	2931
9/29/2008	4872	3471	1978
10/23/2008	1504	1148	838
11/25/2008	2961	2176	1256
1/14/2009	2832	4390	8757
2/5/2009	250	453	815
2/26/2009	713	596	604
4/1/2009	154	230	362
4/20/2009	294	340	492
5/27/2009	202	280	452
6/29/2009	353	387	516
7/20/2009	402	493	667
8/28/2009	360	464	622
9/24/2009	554	648	791
10/29/2009	674	800	1016
11/19/2009	774	904	1622
12/16/2009	507	729	2026
1/28/2010	334	410	542
2/22/2010	254	315	792
3/25/2010	414	483	863
4/28/2010	3406	4463	1736
5/26/2010	438	513	600
6/28/2010	418	503	637
7/28/2010	417	508	661
9/29/2010	258	306	382
10/18/2010	585	632	737
11/16/2010	386	500	626
12/14/2010	422	562	572
1/13/2011	577	825	878
2/15/2011	513	429	565
3/15/2011	255	306	434
4/18/2011	318	364	501
5/18/2011	1374	1557	1915
6/22/2011	290	253	370
7/27/2011	159	132	150
8/26/2011	154	151	207
9/22/2011	283	352	390
10/27/2011	206	217	361

Date	SV13S	SV13M	SV13D
11/22/2011	177	264	394
12/16/2011	860	125	107
1/20/2012	69	229	170
2/23/2012	115	116	201
3/13/2012	82	83	282
4/16/2012	122	85	161
5/15/2012	152	103	233
6/19/2012	266	373	382
7/10/2012	252	256	369
8/14/2012	121	287	334
10/24/2012	152	138	195
11/26/2012	59	43	20
12/18/2012	42	2	9
1/31/2013	3	0	2
2/28/2013	25	44	38
3/28/2013	32	7	4
4/25/2013	18	25	43
5/30/2013	39	40	39
6/27/2013	36	35	44
7/25/2013	77	81	148
8/29/2013	0	205	255
9/26/2013	0	3	0
10/24/2013	206	183	186
11/21/2013	83	66	68
12/23/2013	9	6	11
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

ppbv: parts per billion by volume

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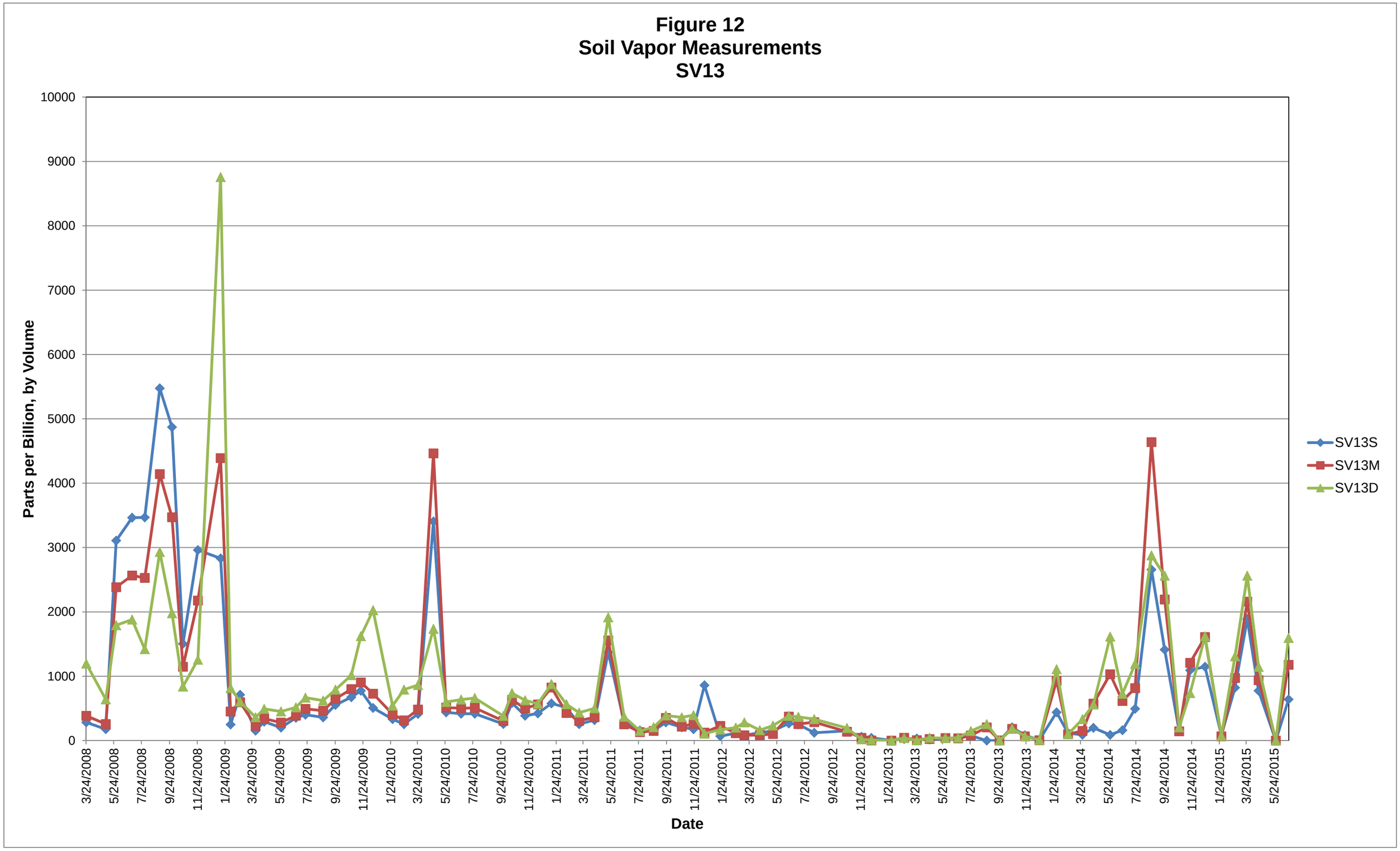

The recommended SVMP action level for F-76 tanks is 14,000 ppbv.

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Table 13
Soil Vapor Results for SV14
Soil Vapor Monitoring Letter Report
Red Hill Bulk Fuel Storage Facility

Date	SV14S	SV14M	SV14D
3/24/2008	NC	NC	347
5/6/2008	761	2302	438
5/29/2008	728	2056	619
7/3/2008	1898	2816	620
7/31/2008	698	2204	871
9/2/2008	868	2325	960
9/29/2008	480	2101	1359
10/23/2008	106	2477	663
11/25/2008	86	2666	705
1/14/2009	0	2977	4798
2/5/2009	27	3042	596
2/26/2009	8	3080	746
4/1/2009	225	3971	468
4/20/2009	267	3385	506
5/27/2009	154	3392	477
6/29/2009	184	2912	588
7/20/2009	408	3312	692
8/28/2009	617	3080	674
9/24/2009	646	3903	858
10/29/2009	378	3199	795
11/19/2009	63	3249	756
12/16/2009	0	3417	854
1/28/2010	349	3550	589
2/22/2010	72	2795	481
3/25/2010	312	4006	676
4/28/2010	83	3617	666
5/26/2010	405	4383	751
6/28/2010	387	5258	789
7/28/2010	375	5447	753
9/29/2010	280	334	255
10/18/2010	567	597	498
11/16/2010	152	438	431
12/14/2010	248	176	452
1/13/2011	539	604	473
2/15/2011	359	525	522
3/15/2011	228	217	311
4/18/2011	128	460	550
5/18/2011	1049	1481	1767
6/22/2011	242	266	306
7/27/2011	67	109	158
8/26/2011	89	169	254
9/22/2011	88	58	112
10/27/2011	142	148	236

Date	SV14S	SV14M	SV14D
11/22/2011	162	189	257
12/16/2011	61	156	72
1/20/2012	48	105	71
2/23/2012	127	133	180
3/13/2012	140	514	89
4/16/2012	222	68	77
5/15/2012	72	190	124
6/19/2012	356	352	406
7/10/2012	238	241	292
8/14/2012	179	234	237
10/24/2012	123	157	128
11/26/2012	7	13	11
12/18/2012	2	2	5
1/31/2013	0	4	6
2/28/2013	5	518	84
3/28/2013	12	16	5
4/25/2013	14	29	20
5/30/2013	25	112	47
6/27/2013	29	280	39
7/25/2013	58	124	87
8/29/2013	426	53	862
9/26/2013	8	12	4
10/24/2013	170	170	160
11/21/2013	75	70	69
12/23/2013	NC_1	NC_1	NC_1
1/30/2014	NC_1	NC_1	NC_1
2/24/2014	NC_1	NC_1	NC_1
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

ppbv: parts per billion by volume
NC: Not collected
NC_1 : Not collected due to maintenance work

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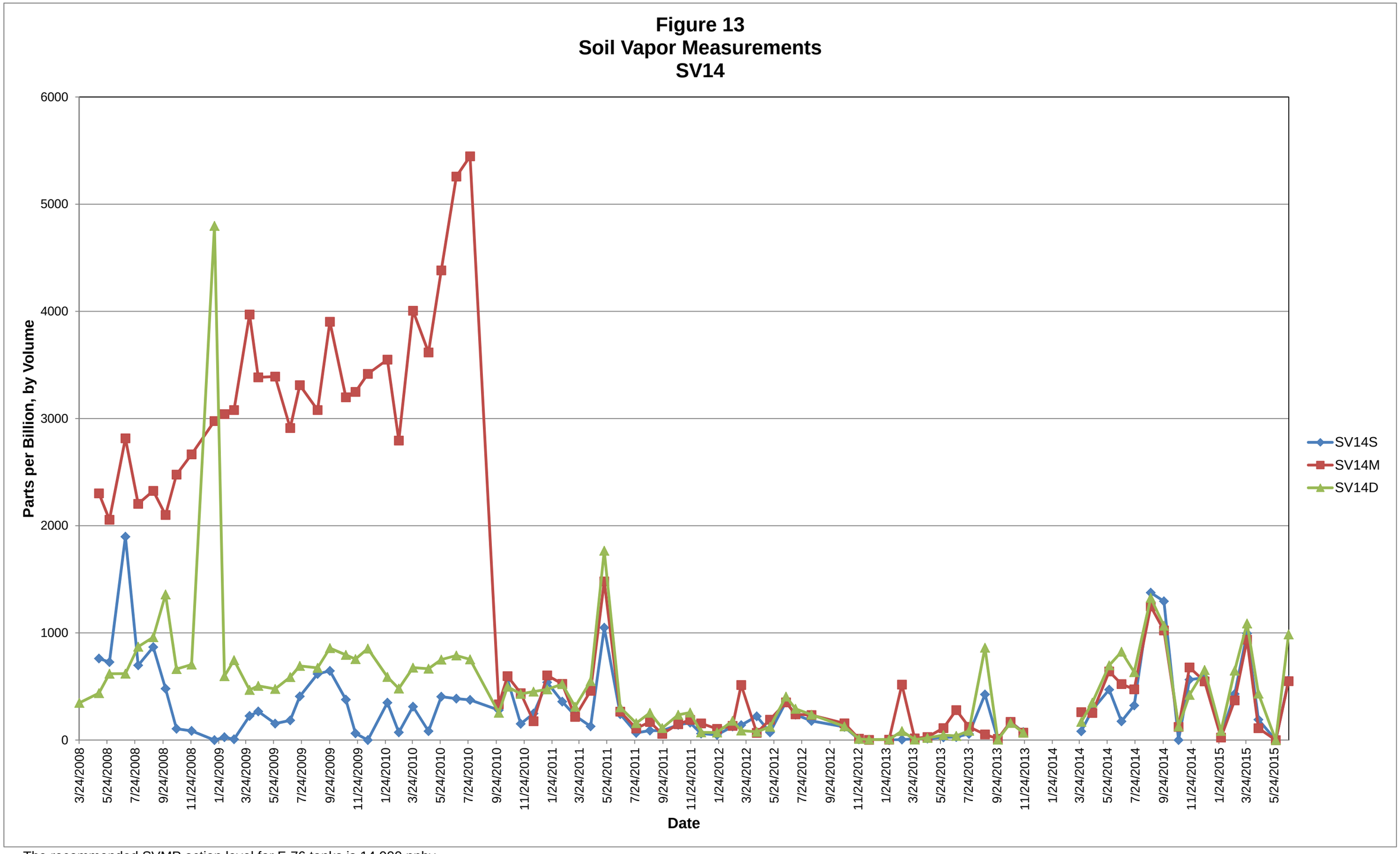

The recommended SVMP action level for F-76 tanks is 14,000 ppbv.

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Table 14
Soil Vapor Results for SV15
Soil Vapor Monitoring Letter Report
Red Hill Bulk Fuel Storage Facility

Date	SV15S	SV15M	SV15D
3/24/2008	318	600	415
5/6/2008	831	709	478
5/29/2008	763	2082	1135
7/3/2008	1541	1073	649
7/31/2008	2349	2076	1540
9/2/2008	2585	2087	1510
9/29/2008	4746	3991	2496
10/23/2008	1905	1711	1116
11/25/2008	2886	2483	1045
1/14/2009	7650	6457	4743
2/5/2009	1892	1182	904
2/26/2009	605	448	324
4/1/2009	175	249	247
4/20/2009	288	343	351
5/27/2009	194	251	216
6/29/2009	367	417	882
7/20/2009	383	457	977
8/28/2009	328	388	711
9/24/2009	475	569	759
10/29/2009	472	571	708
11/19/2009	442	483	673
12/16/2009	182	200	541
1/28/2010	346	779	527
2/22/2010	204	NC_2	442
3/25/2010	806	NC_2	542
4/28/2010	451	NC_2	599
5/26/2010	407	NC_2	608
6/28/2010	378	NC_2	592
7/28/2010	353	NC_2	623
9/29/2010	264	NC_2	328
10/18/2010	552	NC_2	677
11/16/2010	550	NC_2	605
12/14/2010	556	NC_2	544
1/13/2011	539	NC_2	625
2/15/2011	439	NC_2	552
3/15/2011	289	NC_2	367
4/18/2011	264	NC_2	368
5/18/2011	2031	NC_2	2864
6/22/2011	285	NC_2	314
7/27/2011	164	NC_2	193
8/26/2011	131	NC_2	192
9/22/2011	112	NC_2	136
10/27/2011	199	NC_2	196

Date	SV15S	SV15M	SV15D
11/22/2011	150	NC_2	230
12/16/2011	85	NC_2	94
1/20/2012	101	NC_2	36
2/23/2012	271	NC_2	130
3/13/2012	117	NC_2	86
4/16/2012	832	NC_2	398
5/15/2012	142	NC_2	153
6/19/2012	561	NC_2	570
7/10/2012	361	NC_2	454
8/14/2012	303	NC_2	59
10/24/2012	145	69	146
11/26/2012	15	19	12
12/18/2012	10	7	9
1/31/2013	4	2	2
2/28/2013	38	NC_2	85
3/28/2013	11	NC_2	13
4/25/2013	18	NC_2	25
5/30/2013	NC_1	NC_1	NC_1
6/27/2013	59	NC_2	24
7/25/2013	68	NC_2	90
8/29/2013	266	573	710
9/26/2013	14	NC_2	7
10/24/2013	181	NC_2	170
11/21/2013	46	NC_2	43
12/23/2013	18	NC_2	13
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

ppbv: parts per billion by volume
NC_1 : Not collected due to maintenance work
NC_2 : Not collected due to an obstruction in the vapor line

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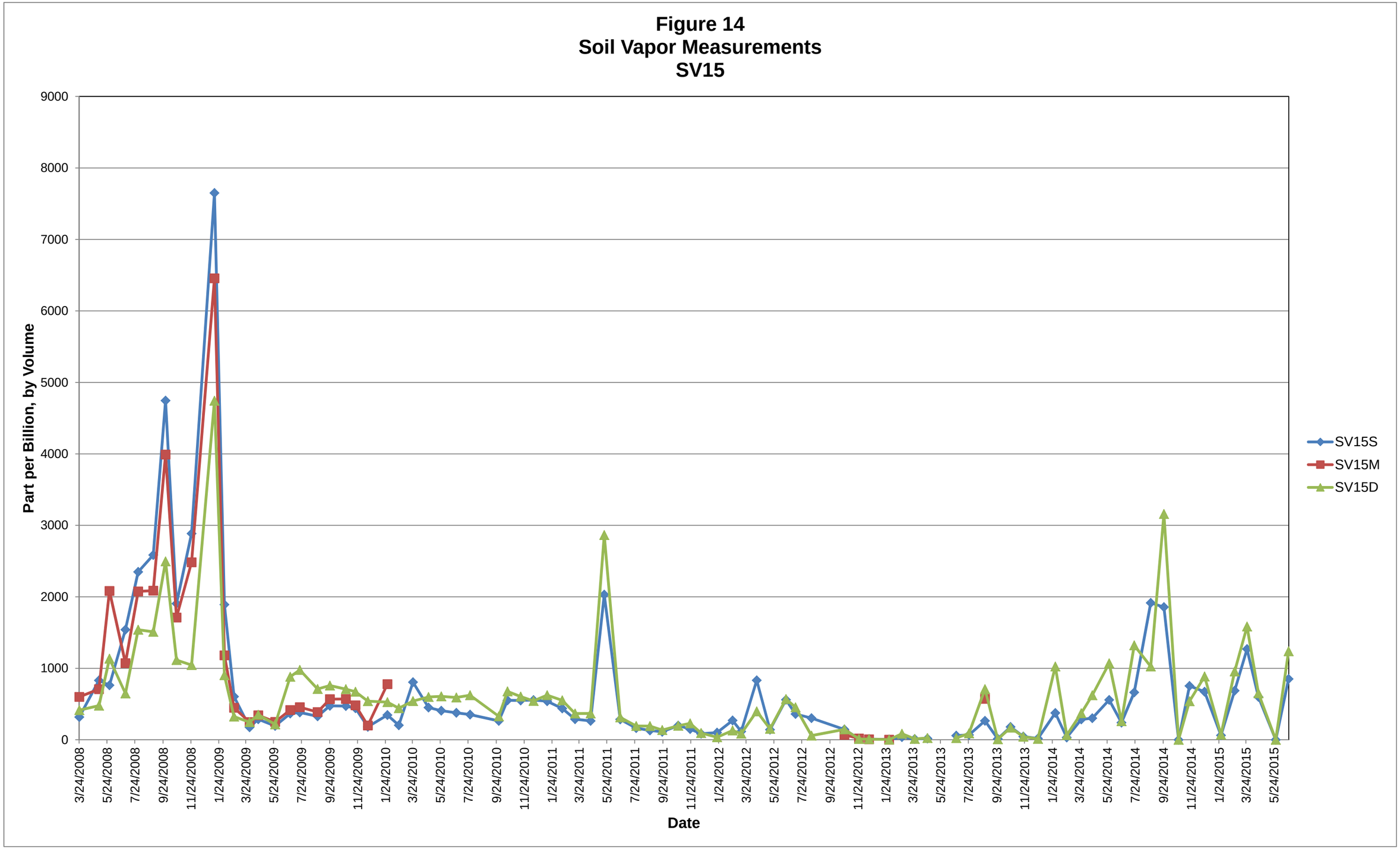

The recommended SVMP action level for F-76 tanks is 14,000 ppbv.

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Table 15
Soil Vapor Results for SV16
Soil Vapor Monitoring Letter Report
Red Hill Bulk Fuel Storage Facility

Date	SV16S	SV16M	SV16D
3/24/2008	73	81	195
5/6/2008	1521	561	445
5/29/2008	1576	636	359
7/3/2008	2395	1108	1022
7/31/2008	936	528	448
9/2/2008	1300	347	383
9/29/2008	1461	580	808
10/23/2008	788	143	356
11/25/2008	2594	106	293
1/14/2009	0	91	361
2/5/2009	1738	655	294
2/26/2009	70	39	176
4/1/2009	24	32	87
4/20/2009	198	182	238
5/27/2009	25	0	86
6/29/2009	181	154	256
7/20/2009	238	140	245
8/28/2009	178	157	269
9/24/2009	346	284	356
10/29/2009	248	215	326
11/19/2009	216	192	327
12/16/2009	238	116	301
1/28/2010	175	167	288
2/22/2010	106	80	209
3/25/2010	581	214	707
4/28/2010	217	184	447
5/26/2010	1633	211	489
6/28/2010	1144	210	307
7/28/2010	1112	199	300
9/29/2010	302	359	297
10/18/2010	576	562	535
11/16/2010	461	435	467
12/14/2010	198	225	327
1/13/2011	923	492	256
2/15/2011	1348	386	470
3/15/2011	331	235	240
4/18/2011	230	106	190
5/18/2011	2334	2654	2985
6/22/2011	305	330	227
7/27/2011	113	470	98
8/26/2011	765	257	157
9/22/2011	151	219	121
10/27/2011	214	180	155

Date	SV16S	SV16M	SV16D
11/22/2011	183	239	245
12/16/2011	93	121	77
1/20/2012	198	134	95
2/23/2012	195	66	111
3/13/2012	172	154	282
4/16/2012	1280	226	780
5/15/2012	247	159	116
6/19/2012	89	67	570
7/10/2012	199	152	340
8/14/2012	155	131	344
10/24/2012	166	91	81
11/26/2012	92	79	11
12/18/2012	4	28	3
1/31/2013	13	5	4
2/28/2013	77	12	51
3/28/2013	21	7	10
4/25/2013	27	28	36
5/30/2013	56	27	28
6/27/2013	51	28	24
7/25/2013	76	62	63
8/29/2013	0	0	0
9/26/2013	2	18	20
10/24/2013	173	145	172
11/21/2013	74	163	67
12/23/2013	5	2	6
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

ppbv: parts per billion by volume

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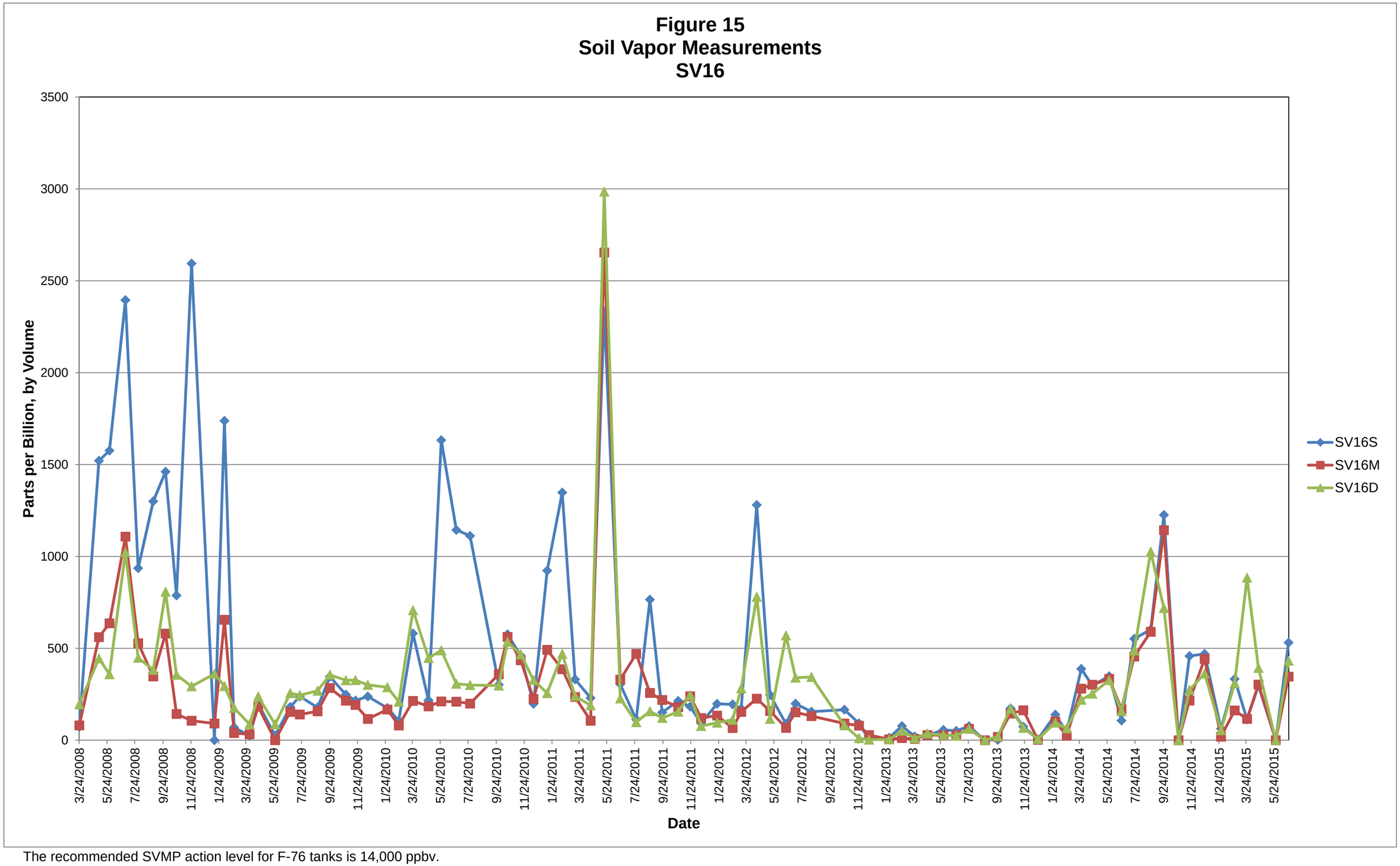

The recommended SVMP action level for F-76 tanks is 14,000 ppbv.

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Table 16
Soil Vapor Results for SV17
Soil Vapor Monitoring Letter Report
Red Hill Bulk Fuel Storage Facility

Date	SV17S	SV17M	SV17D
3/24/2008	NC	NC	NC
5/6/2008	NC	NC	NC
5/29/2008	NC	NC	NC
7/3/2008	NC	NC	NC
7/31/2008	NC	NC	NC
9/2/2008	NC	NC	NC
9/29/2008	NC	NC	NC
10/23/2008	NC	NC	NC
11/25/2008	967	980	896
1/14/2009	9419	11433	13567
2/5/2009	10594	12100	12933
2/26/2009	8678	11367	15567
4/1/2009	8397	11867	15633
4/20/2009	9344	10967	11000
5/27/2009	7656	9032	10567
6/29/2009	6046	7697	8982
7/20/2009	6489	7536	9093
8/28/2009	5075	5971	6506
9/24/2009	4882	5345	5290
10/29/2009	5158	5709	8051
11/19/2009	4031	4441	5115
12/16/2009	2550	2564	2840
1/28/2010	1866	2367	2497
2/22/2010	2304	2793	2846
3/25/2010	1488	1853	1865
4/28/2010	1442	1797	2072
5/26/2010	1240	1445	1637
6/28/2010	1405	1483	1773
7/28/2010	2035	2238	3745
9/29/2010	NC_1	NC_1	NC_1
10/18/2010	NC_1	NC_1	NC_1
11/16/2010	NC_1	NC_1	NC_1
12/14/2010	NC_1	NC_1	NC_1
1/13/2011	NC_1	NC_1	NC_1
2/15/2011	NC_1	NC_1	NC_1
3/15/2011	NC_1	NC_1	NC_1
4/18/2011	NC_1	NC_1	NC_1
5/18/2011	NC_1	NC_1	NC_1
6/22/2011	NC_1	NC_1	NC_1
7/27/2011	NC_1	NC_1	NC_1
8/26/2011	NC_1	NC_1	NC_1
9/22/2011	NC_1	NC_1	NC_1
10/27/2011	NC_1	NC_1	NC_1

Date	SV17S	SV17M	SV17D
11/22/2011	NC_1	NC_1	NC_1
12/16/2011	NC_1	NC_1	NC_1
1/20/2012	NC_1	NC_1	NC_1
2/23/2012	NC_1	NC_1	NC_1
3/13/2012	NC_1	NC_1	NC_1
4/16/2012	NC_1	NC_1	NC_1
5/15/2012	NC_1	NC_1	NC_1
6/19/2012	NC_1	NC_1	NC_1
7/10/2012	NC_1	NC_1	NC_1
8/14/2012	NC_1	NC_1	NC_1
10/24/2012	NC_1	NC_1	NC_1
11/26/2012	NC_1	NC_1	NC_1
12/18/2012	NC_1	NC_1	NC_1
1/31/2013	NC_1	NC_1	NC_1
2/28/2013	NC_1	NC_1	NC_1
3/28/2013	NC_1	NC_1	NC_1
4/25/2013	NC_1	NC_1	NC_1
5/30/2013	NC_1	NC_1	NC_1
6/27/2013	274	NC_3	NC_3
7/25/2013	672	837	876
8/29/2013	2162	2884	3069
9/26/2013	1716	945	1209
10/24/2013	601	638	648
11/21/2013	3065	3349	3218
12/23/2013	1243	2496	3023
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

ppbv: parts per billion by volume
NC : Not collected
NC_1 : Not collected due to maintenance work
NC_3 : Not collected due to insufficient tedlar bags

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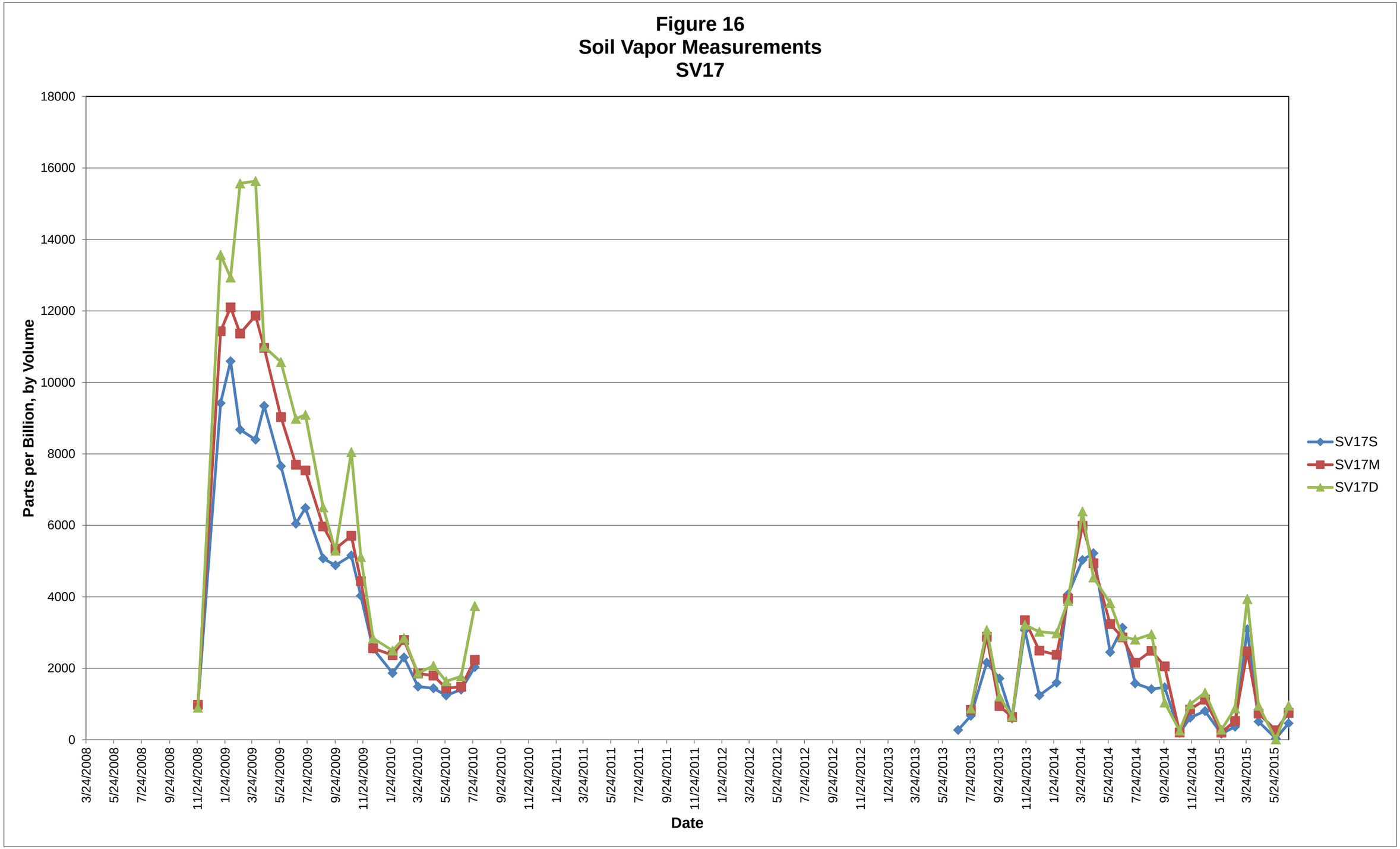

The recommended SVMP action level for JP-5 and JP-8 tanks is 280,000 ppbv.

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Table 17
Soil Vapor Results for SV18
Soil Vapor Monitoring Letter Report
Red Hill Bulk Fuel Storage Facility

Date	SV18S	SV18D
3/24/2008	385	662
5/6/2008	1162	1033
5/29/2008	1127	1224
7/3/2008	1844	1287
7/31/2008	1679	1380
9/2/2008	1724	1792
9/29/2008	2515	2509
10/23/2008	1377	1481
11/25/2008	1130	1262
1/14/2009	364	996
2/5/2009	2099	1861
2/26/2009	454	915
4/1/2009	681	820
4/20/2009	772	963
5/27/2009	931	1146
6/29/2009	900	1122
7/20/2009	1180	1597
8/28/2009	1447	2156
9/24/2009	1362	1549
10/29/2009	1341	1888
11/19/2009	1817	2209
12/16/2009	534	776
1/28/2010	693	888
2/22/2010	1327	1631
3/25/2010	1072	1222
4/28/2010	991	1575
5/26/2010	845	1190
6/28/2010	939	1299
7/28/2010	1131	1485
9/29/2010	422	580
10/18/2010	595	839
11/16/2010	577	778
12/14/2010	212	725
1/13/2011	390	512
2/15/2011	400	662
3/15/2011	450	515
4/18/2011	449	518
5/18/2011	460	742
6/22/2011	405	551
7/27/2011	250	380
8/26/2011	216	382
9/22/2011	241	367
10/27/2011	269	358

Date	SV18S	SV18D
11/22/2011	286	403
12/16/2011	237	327
1/20/2012	107	233
2/23/2012	283	326
3/13/2012	190	373
4/16/2012	248	402
5/15/2012	399	594
6/19/2012	684	875
7/10/2012	1425	992
8/14/2012	824	853
10/24/2012	752	584
11/26/2012	215	185
12/18/2012	171	142
1/31/2013	1423	1275
2/28/2013	913	654
3/28/2013	460	572
4/25/2013	266	293
5/30/2013	307	239
6/27/2013	244	264
7/25/2013	1037	1197
8/29/2013	5225	5326
9/26/2013	3190	3132
10/24/2013	2333	2309
11/21/2013	5227	3157
12/23/2013	8679	8606
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

ppbv: parts per billion by volume
NC_1 : Not collected due to maintenance work being performed on the tank

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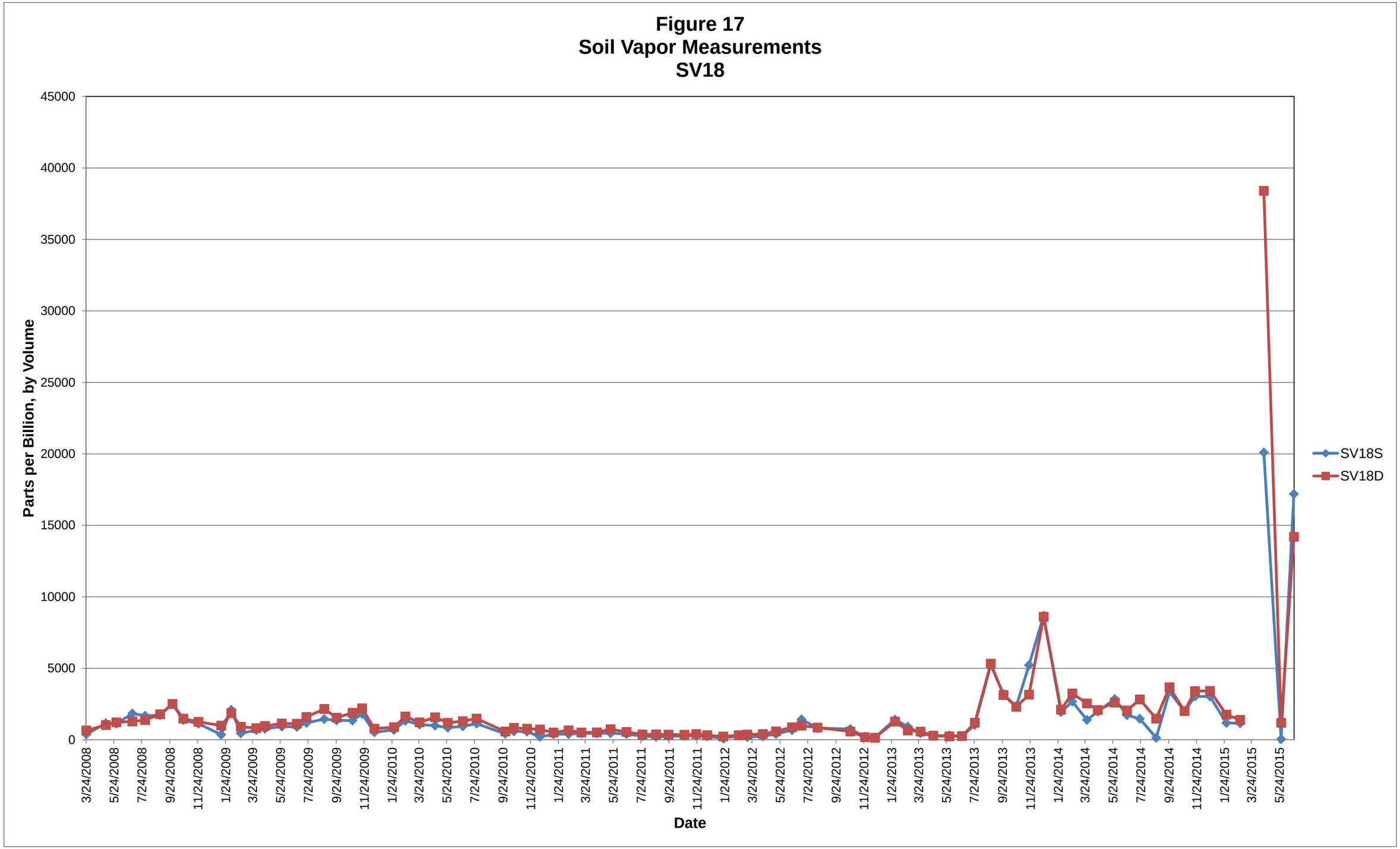

The recommended SVMP action level for JP-5 and JP-8 tanks is 280,000 ppbv.

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Table 18
Soil Vapor Results for SV20
Soil Vapor Monitoring Letter Report
Red Hill Bulk Fuel Storage Facility

Date	SV20S	SV20M	SV20D
3/24/2008	963	507	1133
5/6/2008	2045	1700	1390
5/29/2008	11633	14833	22667
7/3/2008	4892	3425	6976
7/31/2008	2963	2758	4201
9/2/2008	2709	1954	2556
9/29/2008	2796	1996	1874
10/23/2008	1399	1401	1609
11/25/2008	1091	1005	1208
1/14/2009	570	672	714
2/5/2009	2553	1920	1170
2/26/2009	515	622	674
4/1/2009	604	645	595
4/20/2009	798	604	600
5/27/2009	594	627	574
6/29/2009	651	663	631
7/20/2009	691	680	729
8/28/2009	403	431	473
9/24/2009	732	762	662
10/29/2009	1280	2259	788
11/19/2009	2013	2070	2789
12/16/2009	2112	2863	3545
1/28/2010	451	485	666
2/22/2010	1648	1825	2599
3/25/2010	1019	1004	1625
4/28/2010	815	1183	1597
5/26/2010	668	693	746
6/28/2010	726	866	898
7/28/2010	689	922	1191
9/29/2010	220	255	284
10/18/2010	567	593	602
11/16/2010	365	322	293
12/14/2010	398	484	390
1/13/2011	113	271	306
2/15/2011	239	361	302
3/15/2011	283	368	352
4/18/2011	540	378	396
5/18/2011	549	722	752
6/22/2011	282	347	339
7/27/2011	256	305	248
8/26/2011	252	220	251
9/22/2011	147	240	164
10/27/2011	223	263	245

Date	SV20S	SV20M	SV20D
11/22/2011	212	334	316
12/16/2011	119	149	361
1/20/2012	59	88	57
2/23/2012	254	393	312
3/13/2012	162	236	203
4/16/2012	424	201	135
5/15/2012	155	160	176
6/19/2012	383	350	354
7/10/2012	509	514	563
8/14/2012	494	443	384
10/24/2012	131	150	264
11/26/2012	95	80	106
12/18/2012	39	22	32
1/31/2013	223	204	159
2/28/2013	274	296	286
3/28/2013	209	263	246
4/25/2013	150	182	163
5/30/2013	80	95	80
6/27/2013	137	65	66
7/25/2013	250	282	332
8/29/2013	581	459	360
9/26/2013	214	64	323
10/24/2013	454	405	311
11/21/2013	350	317	215
12/23/2013	787	704	777
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

ppbv: parts per billion by volume

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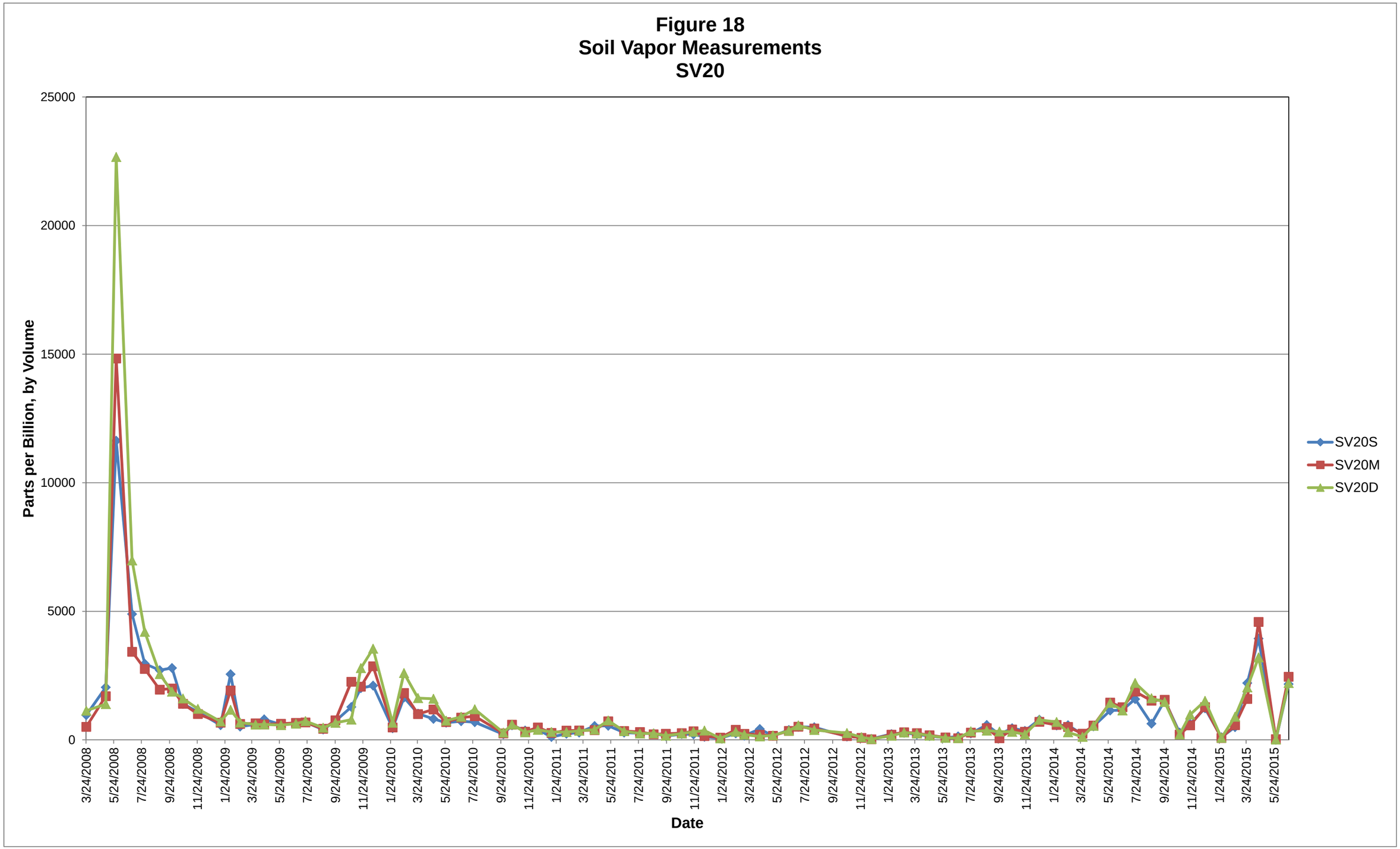

The recommended SVMP action level for JP-5 and JP-8 tanks is 280,000 ppbv.

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Appendix C
Fact Sheet

COMMANDER, NAVY REGION HAWAII &
NAVAL SURFACE GROUP
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Drinking Water Remains Safe in Red Hill vicinity

Laboratory test results continue to indicate no fuel or fuel constituents in drinking water

PEARL HARBOR - Results of recent laboratory tests indicate that Navy drinking water sources continue to meet federal regulatory Safe Drinking Water and State of Hawaii standards, and the water is safe to drink.

Test results of samples drawn from the Red Hill Shaft drinking water well that serves Joint Base Pearl Harbor-Hickam in the vicinity of Red Hill were provided to the State Department of Health on June 9. The results from an independent certified laboratory are "non-detect" for all parameters tested, indicating there is no fuel contamination in the drinking water source.

Laboratory tests have been conducted at least quarterly on water samples taken from various wells in the area since a fuel release of 27,000 gallons was reported on Jan. 13, 2014 by operators at the Red Hill Bulk Fuel Storage Facility.

Tests on drinking water samples taken since the release have consistently been well within federal and state guidelines, most often as non-detect, or no presence of fuel contamination in drinking water wells.

The Red Hill facility is a national strategic asset that provides secure fuel storage for ships and aircraft of U.S. Pacific Fleet and other military branches. "While the facility's value to our nation remains vital as America rebalances its forces to the Indo-Asia-Pacific, the Navy considers the availability of safe drinking water on Oahu to be a non-negotiable requirement," said Capt. Dean Tufts, Regional Engineer for Navy Region Hawaii.

"Drinking water in the communities surrounding Red Hill remains safe," Tufts added. "And the Navy has maintained a state-approved groundwater protection plan since 2008, updated three times (in 2009, 2010, and 2014), and we continue to coordinate routine updates with the State Department of Health."

The Navy is committed to ensuring the Red Hill fuel storage facility is maintained with the best available, practicable technology, complies with all regulations, and is operated safely. Since 2006, the Department of Defense has invested over $150 million improving operations, modernizing facilities, and conducting environmental monitoring. There are more than $60 million in current and planned projects. This is in addition to projects and upgrades that will be developed through the Administrative Order on Consent announced by the Environmental Protection Agency and the DOH on June 1.

"The AOC provides an engineering-based roadmap for the operation of Red Hill. The Navy and Defense Logistics Agency are ready to move forward within the framework of this consent order" Tufts said. "With the AOC, we can improve the protection of drinking water, while preserving an important strategic asset."

The Navy is also preparing to announce their latest annual water quality reports. "Naval Facilities Engineering Command (NAVFAC) Hawaii is the Navy's water purveyor in Hawaii and its personnel operate six water systems," said Environmental Business Line Director Aaron Poentis. "Providing safe drinking water to customers is a mission-critical responsibility we take very seriously."

As with all other drinking water providers throughout the country, NAVFAC Hawaii is required by the U.S. Environmental Protection Agency (EPA) to report test results on water that has been delivered over the past year. The report for 2014 will show that all Navy water sampling/testing met federal and state drinking water standards and that the results were provided to state regulators as required for review and analysis.

The Water Quality Reports are mailed or hand-delivered to NAVFAC Hawaii's customers in June.

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