

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

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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 July and September 2017 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 July 1 through September 30, 2017 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

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) in Halawa Heights, 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 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 southwest by the United States (U.S.) Coast Guard reservation, on the south by residential neighborhoods, and on the east by residential neighborhoods in 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.

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) Well 2254-01.

Eight (8) groundwater monitoring wells (RHMW04, RHMW06, RHMW07, RHMW08, RHMW09, RHMW10, 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 well HDMW2253-03 is located at the Halawa Correctional Facility (outside the 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 July 1 through September 30, 2017.

3.1 Oil/Water Interface Measurements

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

Oil/water interface measurements were taken at monitoring wells RHMW01, RHMW02, and RHMW05 in July 2017. No LNAPL was detected. No measurements were taken at monitoring well RHMW03 due to the presence of a transducer that was installed for a synoptic water level study.

Following the oil/water interface measurements in July 2017, transducers were installed in monitoring wells RHMW01, RHMW02, RHMW03, and RHMW05 for the synoptic water level survey. No oil/water interface measurements were taken at any of the monitoring wells in August and September. The synoptic water level survey is scheduled to end in October. The next oil/water interface measurement is tentatively scheduled for November 2017.

A summary of interface measurements from January 2014 through July 2017 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 July, August, and September 2017. During the July and August 2017 sampling events, the SVMPs at Tank 13 were secured with red tape due to a health and safety concern, and vapor samples were not collected.

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 September 2017 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 lower access tunnel in July 2017.

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 seven (7) groundwater monitoring wells (RHMW04, RHMW06, RHMW07, RHMW08, RHMW09, RHMW10, and OWDFMW01) located outside of the Facility tunnel system. Monitoring well HDMW2253-03 was not sampled due to ongoing testing of an experimental transition-zone monitoring device by the State of Hawaii Department of Land and Natural Resources (DLNR) Commission on Water Resource Management (CWRM) and the University of Hawaii.

All groundwater samples were analyzed for petroleum constituents. Analytical results for wells RHMW01, RHMW02, and RHMW03 were compared to site specific risk based levels (SSRBLs) for total petroleum hydrocarbons as diesel fuel (TPH-d) and benzene (TEC, 2008). Groundwater 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).

A groundwater monitoring report, which summarizes sampling activities and laboratory analytical results for samples that were collected in May, June, and July, is presented as Appendix C.

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 September 19, 2017. 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 with the exception of lead, which was detected at 1.3 µg/L. The Action Level for lead is 15 µg/L. The test results indicate the water is 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 and EPA, continued monitoring of the groundwater and soil vapor will be conducted as follows:

- Oil/water interface measurements – monthly, following the end of the synoptic water level study
- 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.

**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	1,1,1-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			
MRL³	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	ND	
2/28/2014	-	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	ND
5/13/2014	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
6/10/2014	-	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	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	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	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	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	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	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
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	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	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	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	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	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
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	-	3.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
2/28/2014	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
3/11/2014	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
4/8/2014	-	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

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

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 documents:

- Press Release “New Video Available on Red Hill Fuel Facility” of July 26, 2017
- Press Release “Navy Provides Latest Update on Red Hill” of October 10, 2017
- Red Hill Update Stakeholder Letter of October 10, 2017

Copies of these documents are included as Appendix D.

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 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 January 2018 and will cover the release response actions completed between October and December 2017.

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.

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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.

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TEC, 2010, Final Soil Vapor Sampling Monitoring Analysis Letter Report, February 1, 2010.

Appendix A
Oil/Water Interface Measurements
January 2014 through July 2017

Red Hill Oil/Water Interface Measurements January 2014 through July 2017

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	18.51	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

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 September 2017

Figure 1
Soil Vapor Measurements
SV02

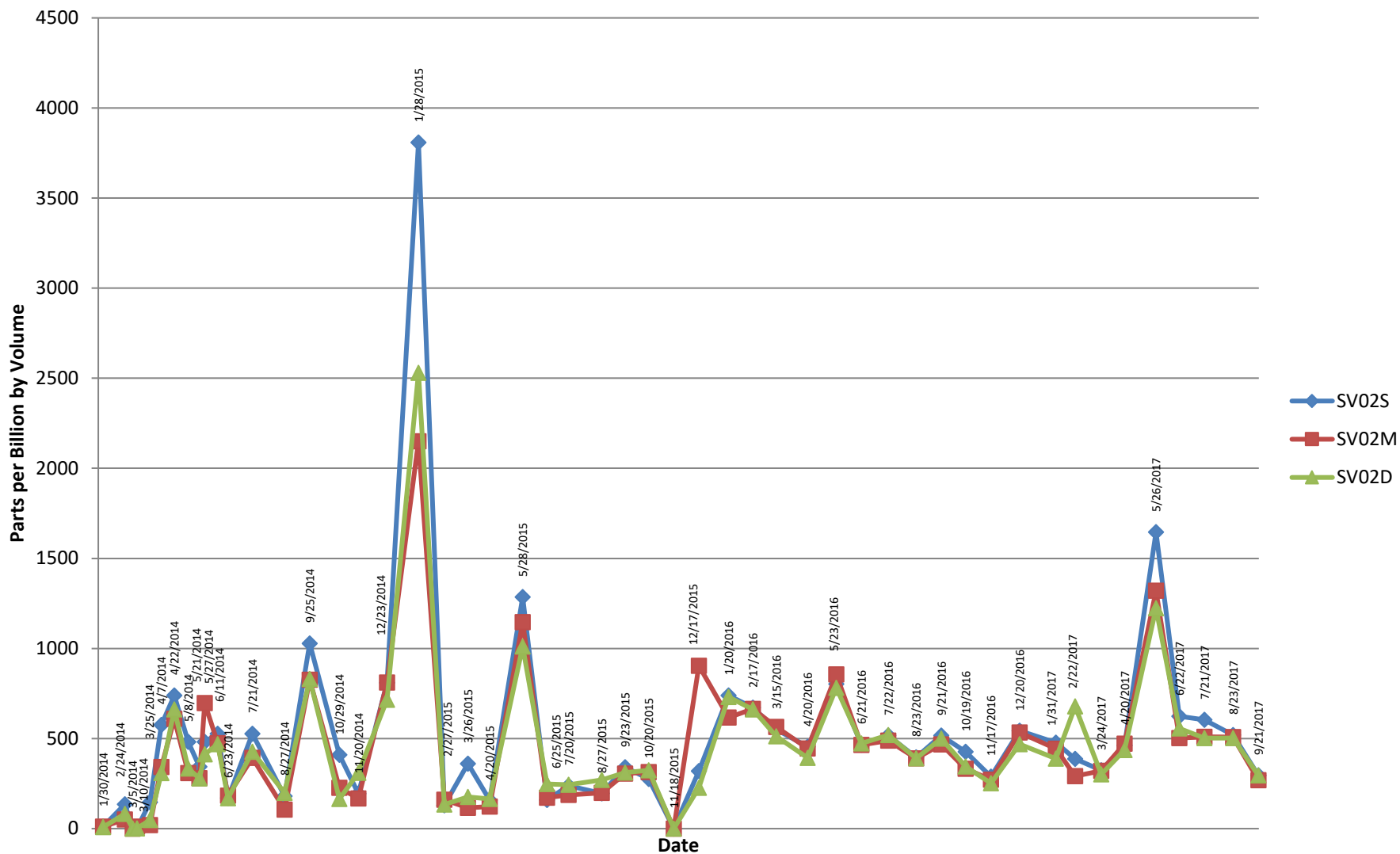


Figure 2
Soil Vapor Measurements
SV03

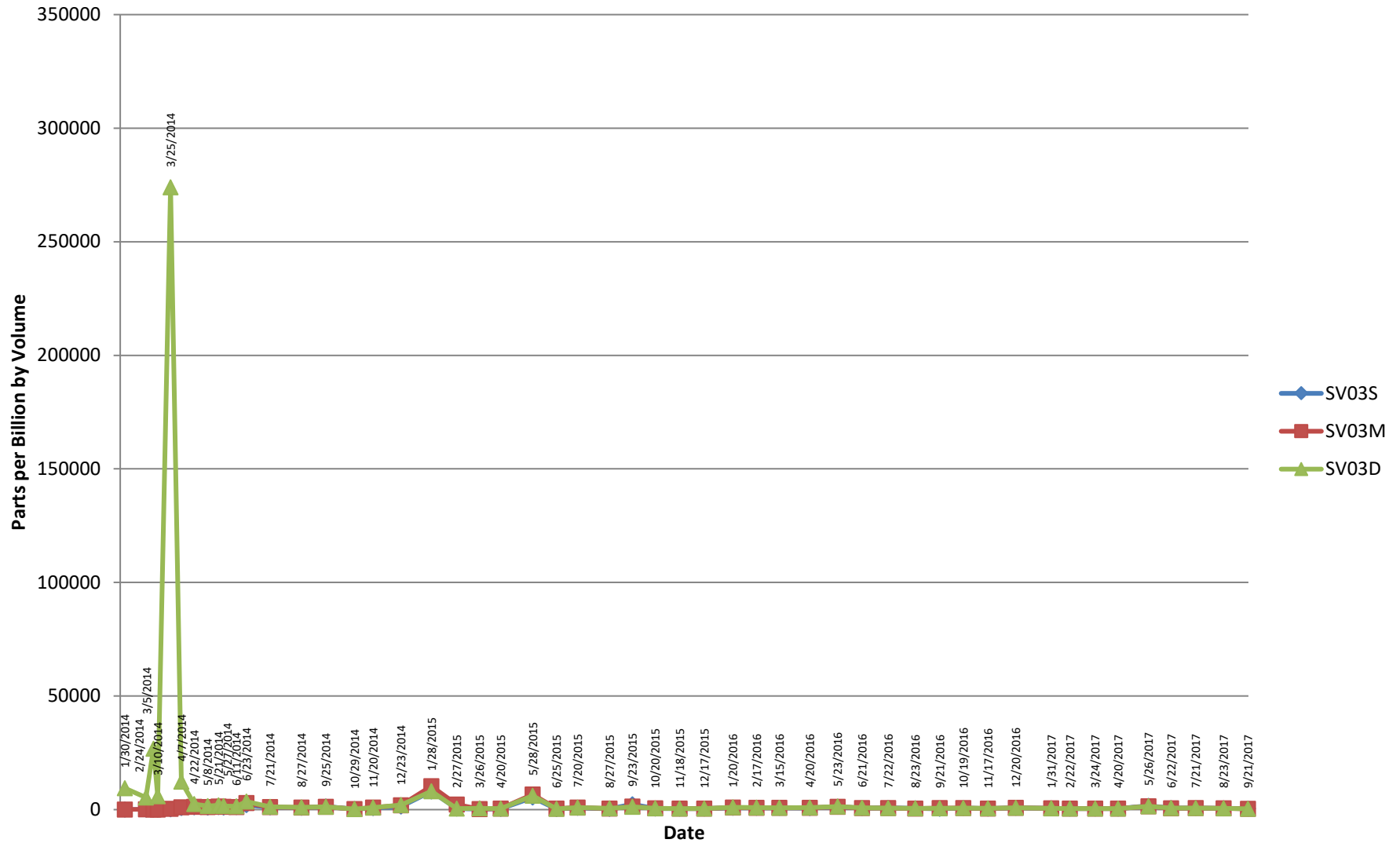


Figure 3
Soil Vapor Measurements
SV04

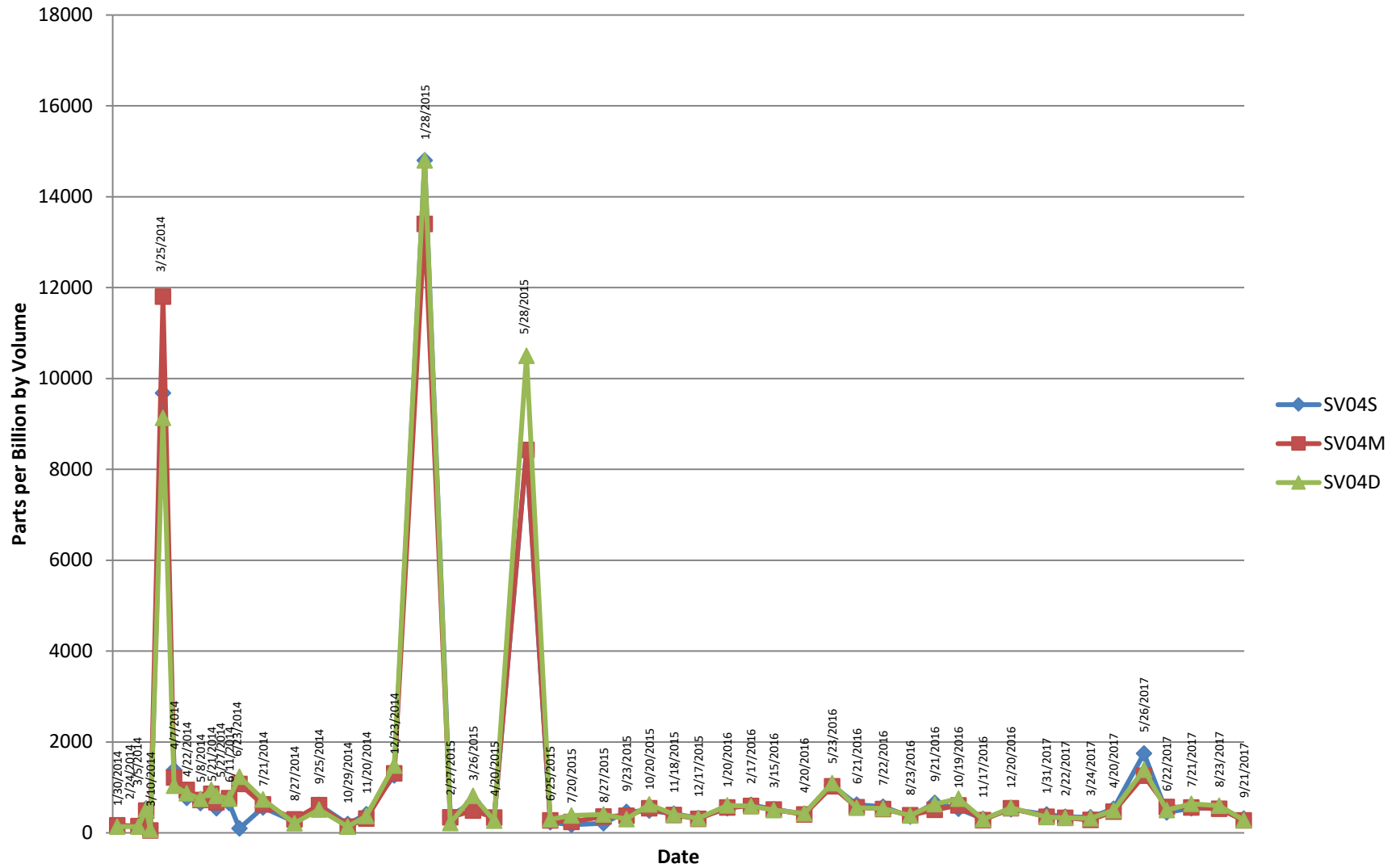


Figure 4 Soil Vapor Measurements SV05

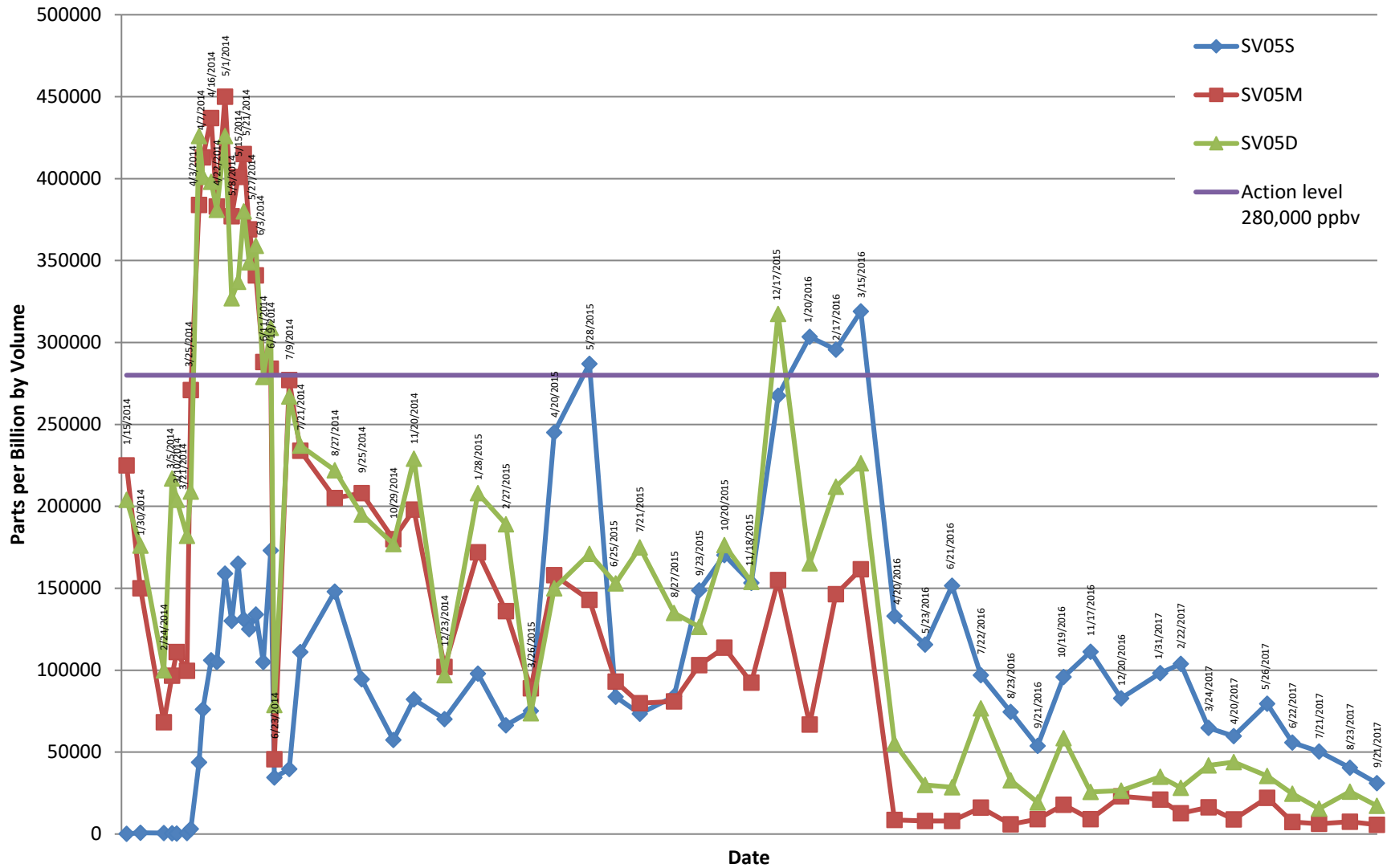


Figure 5 Soil Vapor Measurements SV06

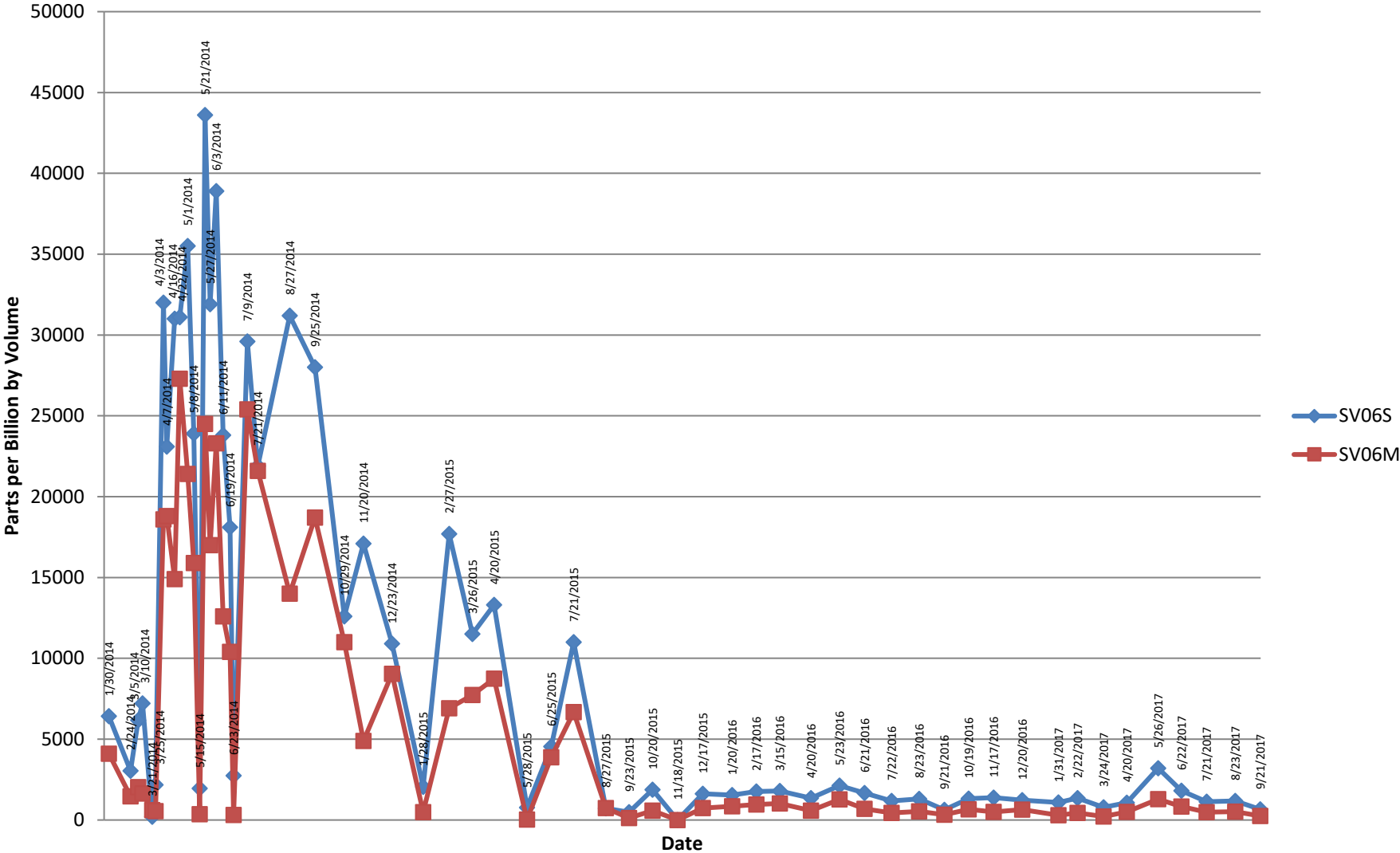


Figure 6
Soil Vapor Measurements
SV07

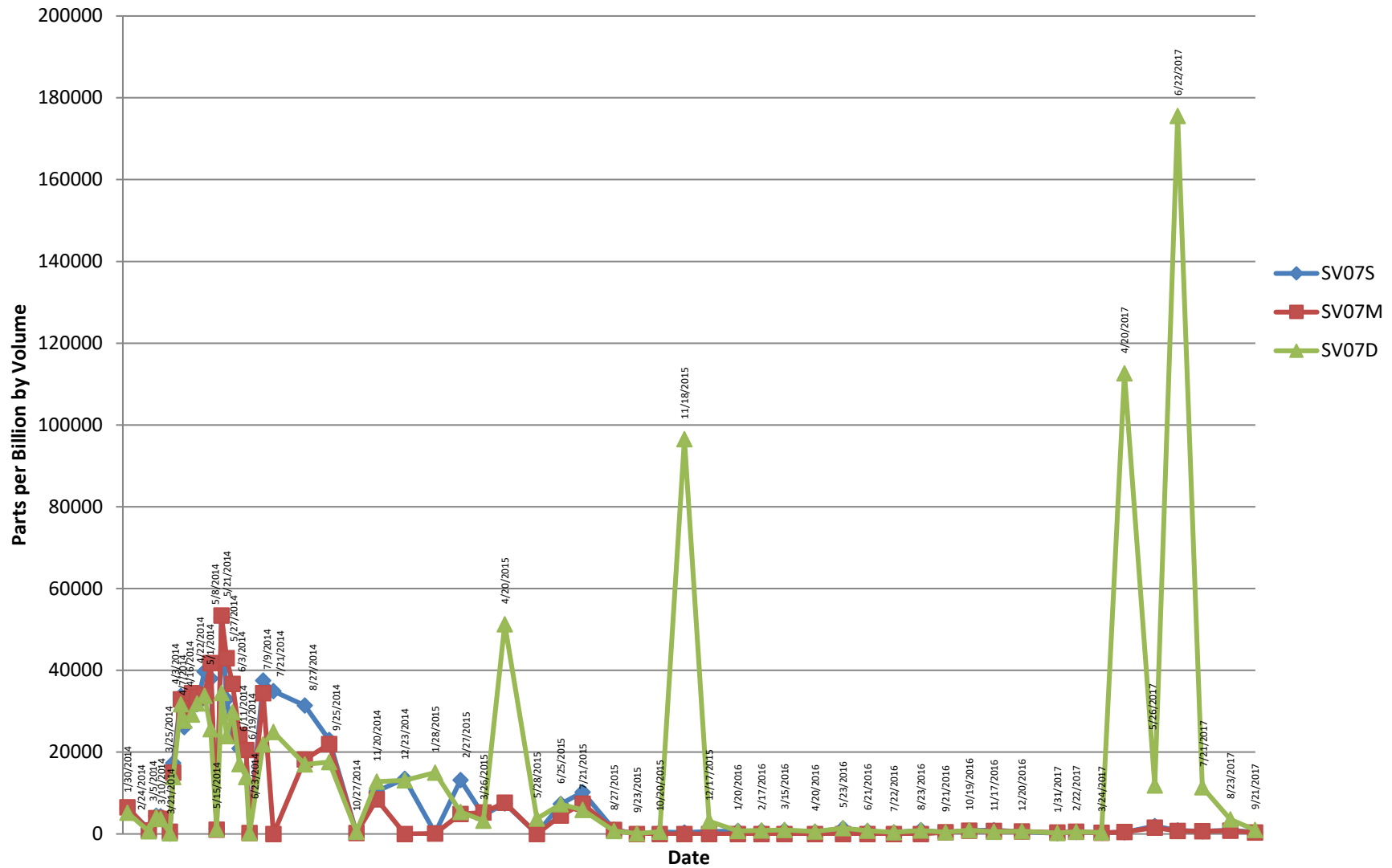


Figure 7 Soil Vapor Measurements SV08

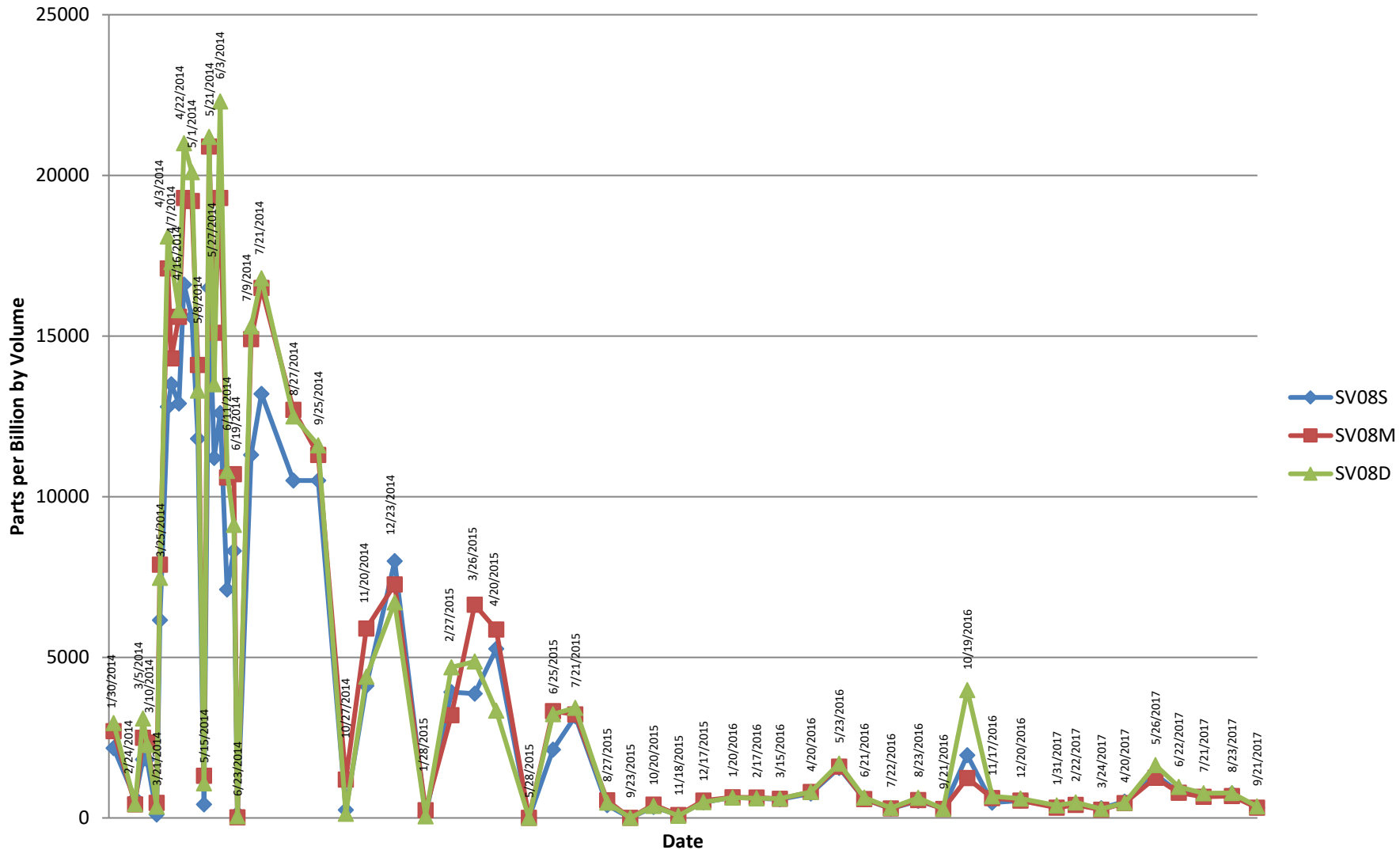


Figure 8
Soil Vapor Measurements
SV09

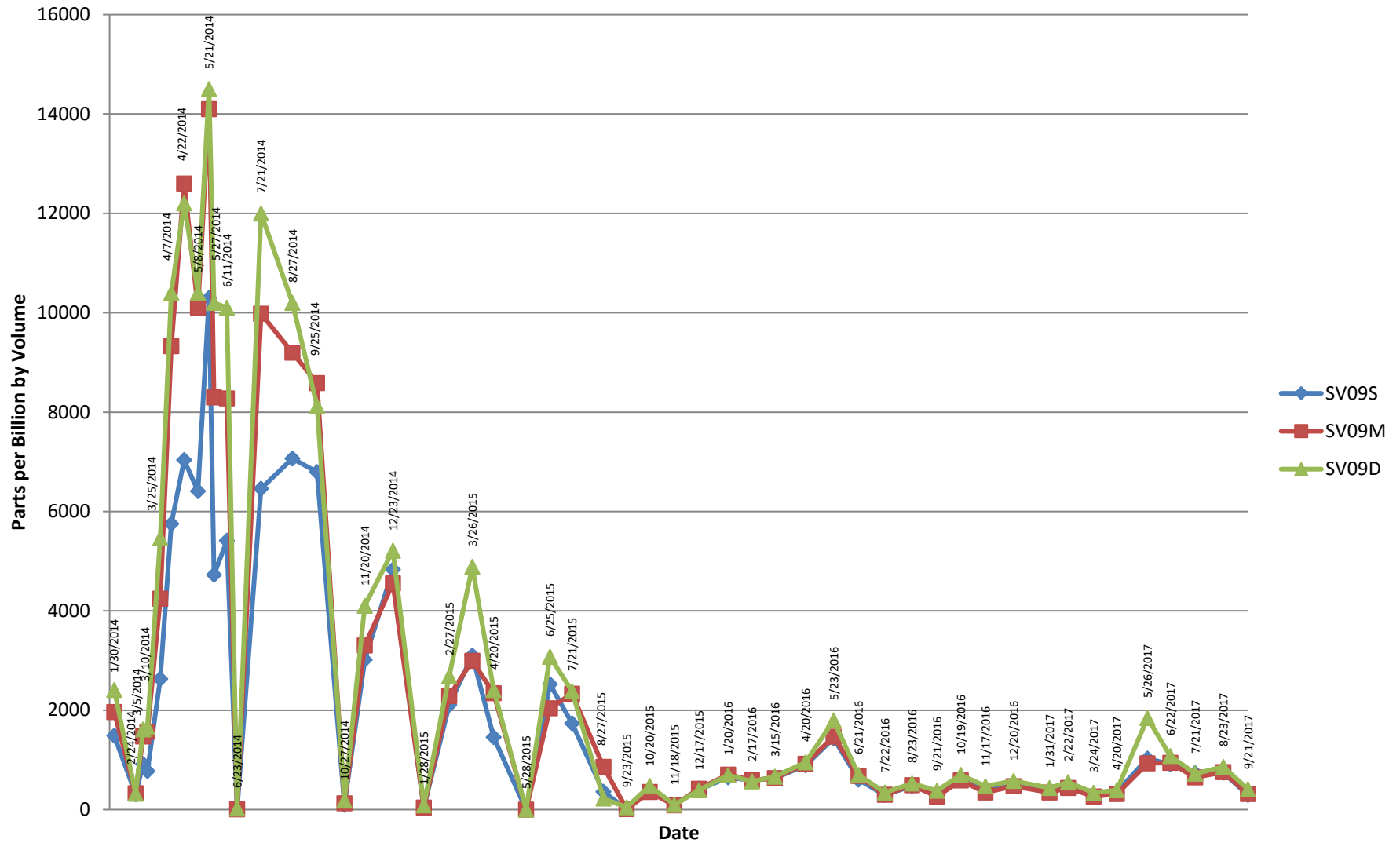


Figure 9 Soil Vapor Measurements SV10

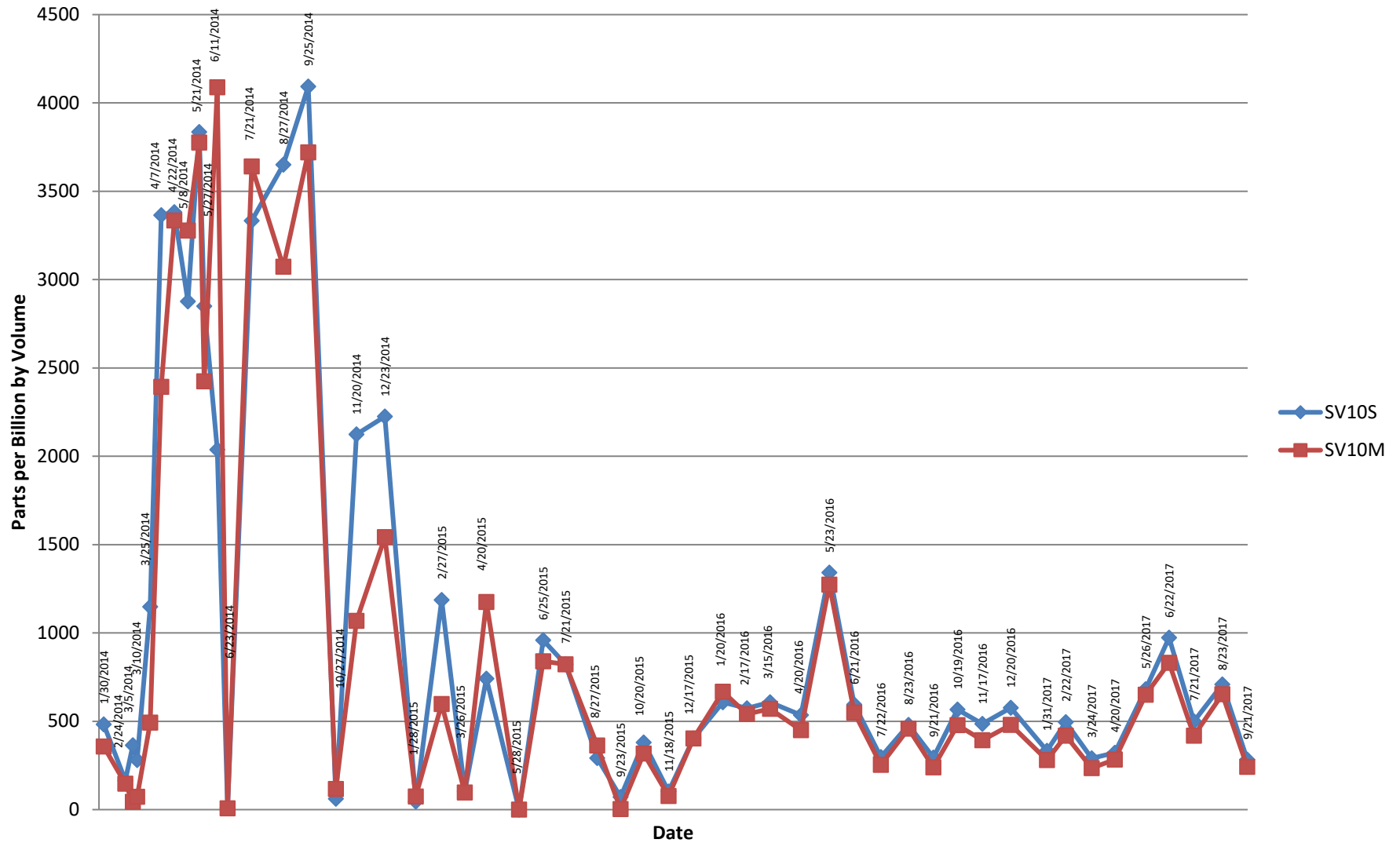


Figure 10
Soil Vapor Measurements
SV11

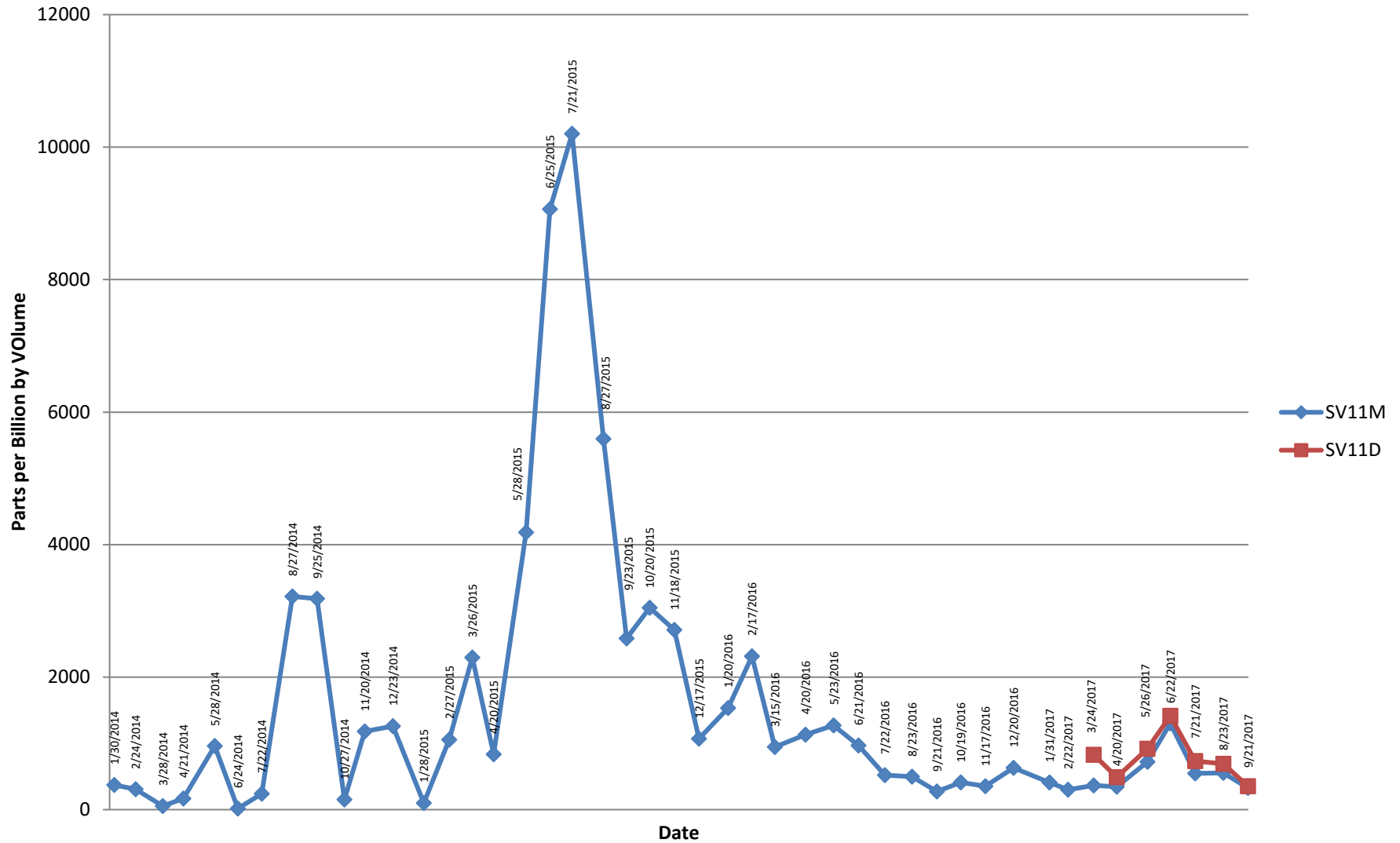


Figure 11
Soil Vapor Measurements
SV12

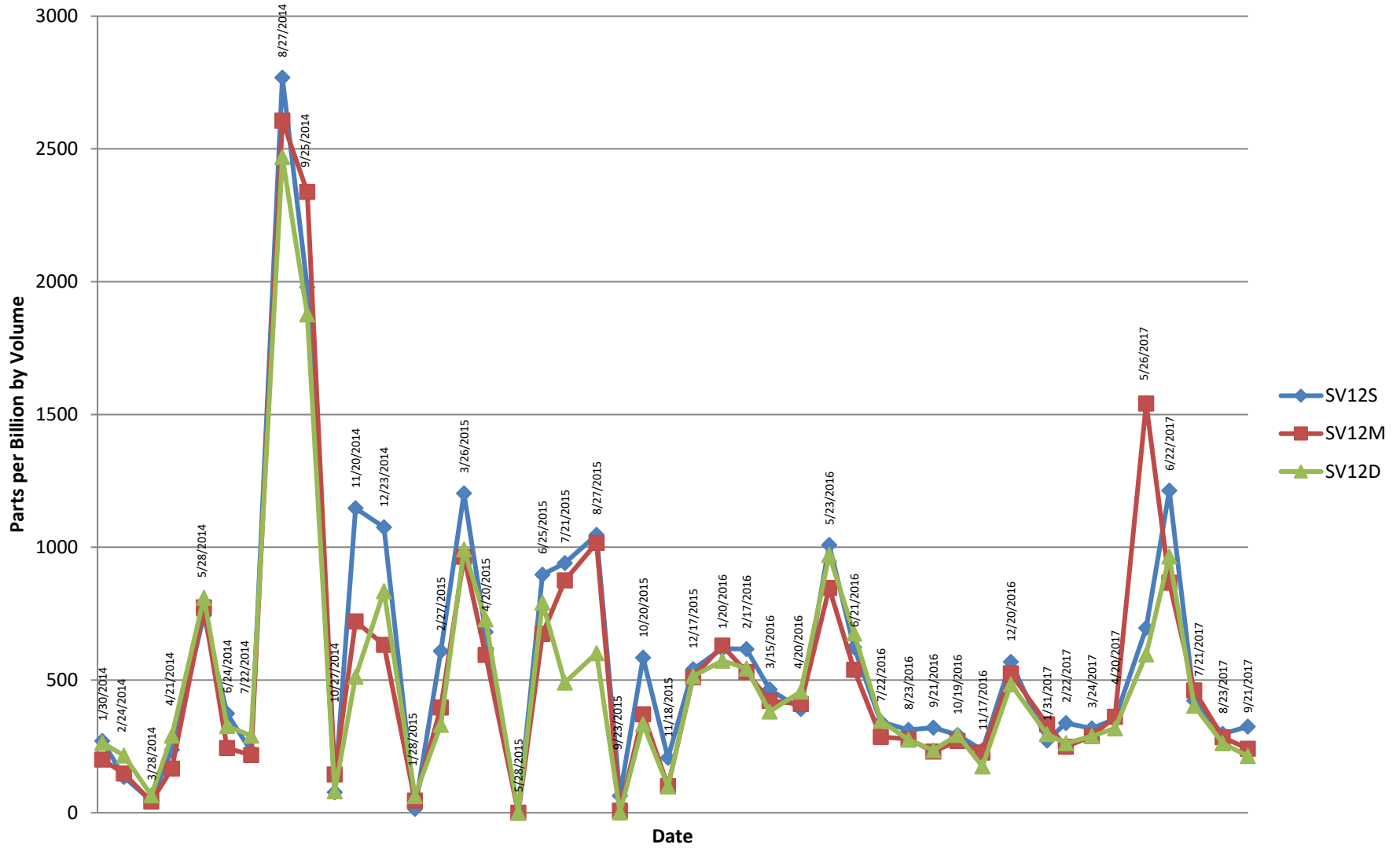


Figure 12
Soil Vapor Measurements
SV13

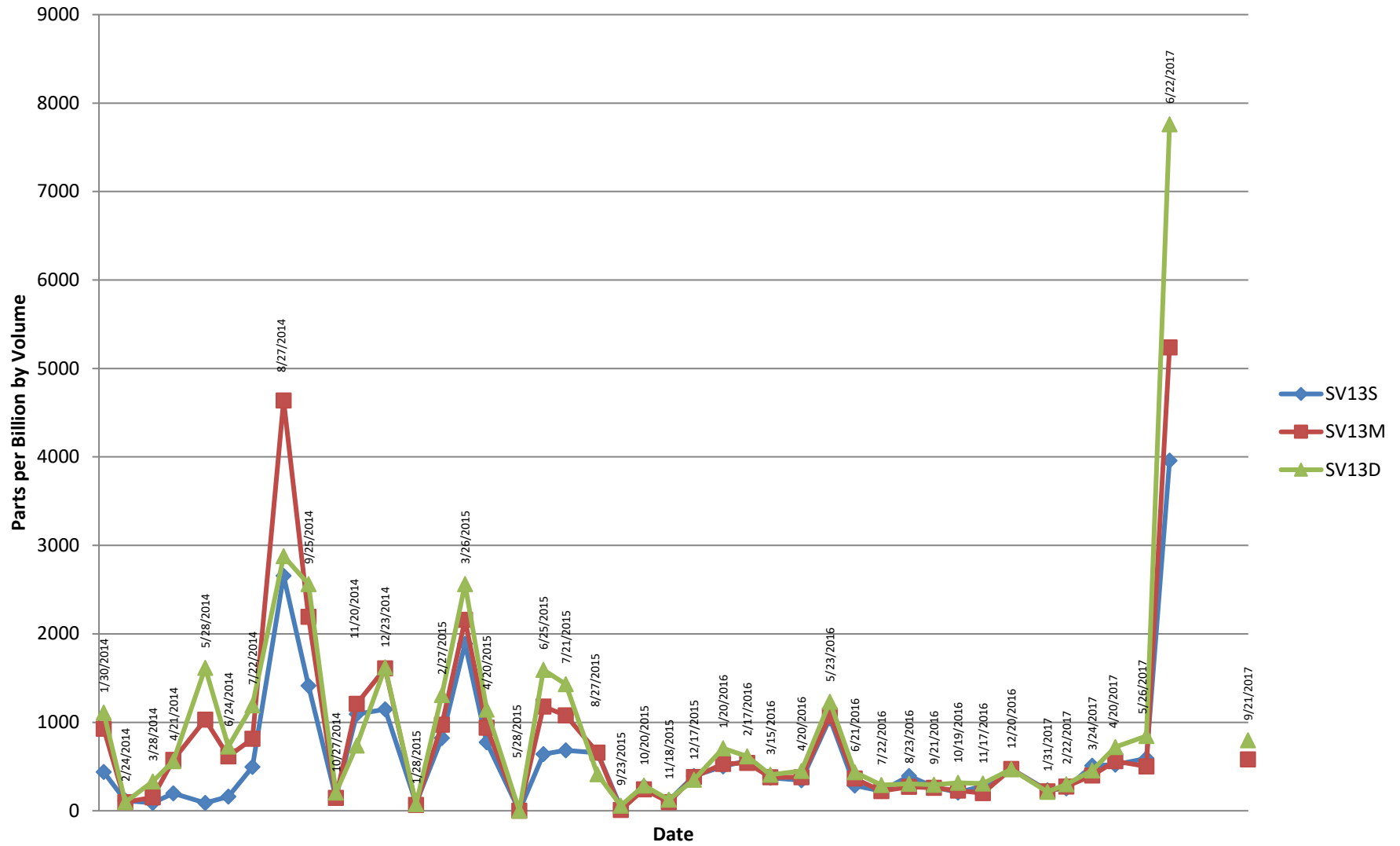


Figure 13
Soil Vapor Measurements
SV14

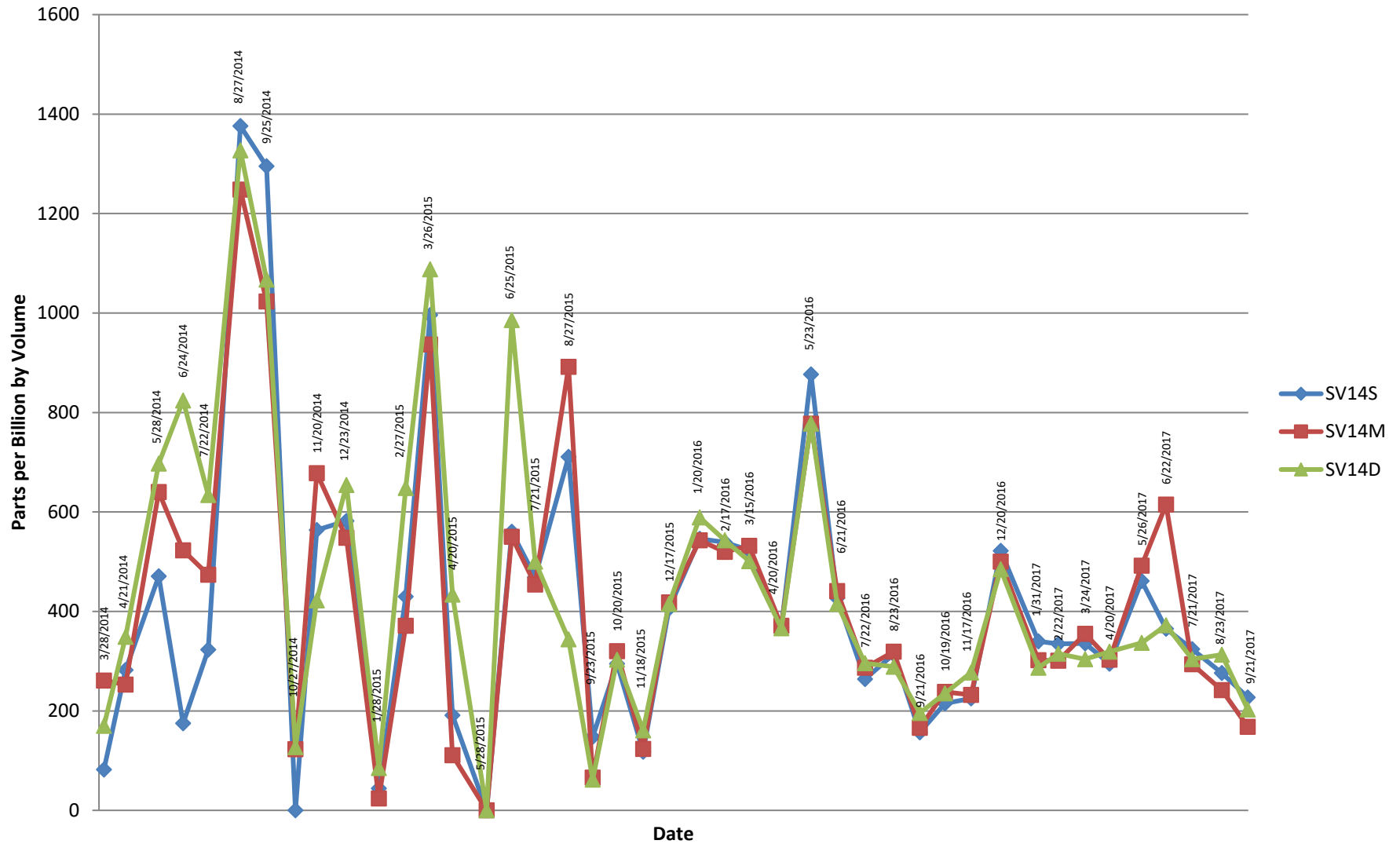


Figure 14
Soil Vapor Measurements
SV15

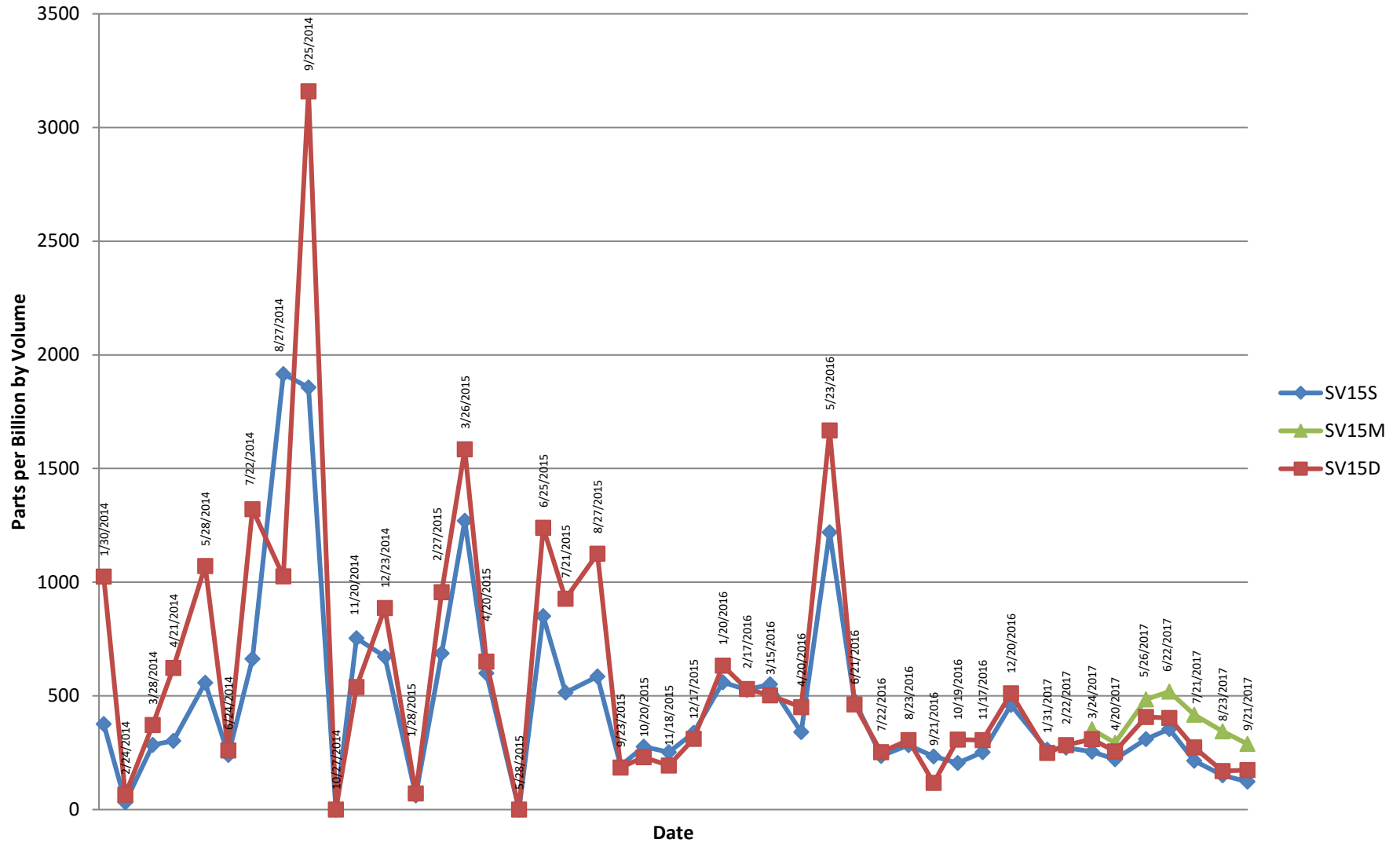


Figure 15
Soil Vapor Measurements
SV16

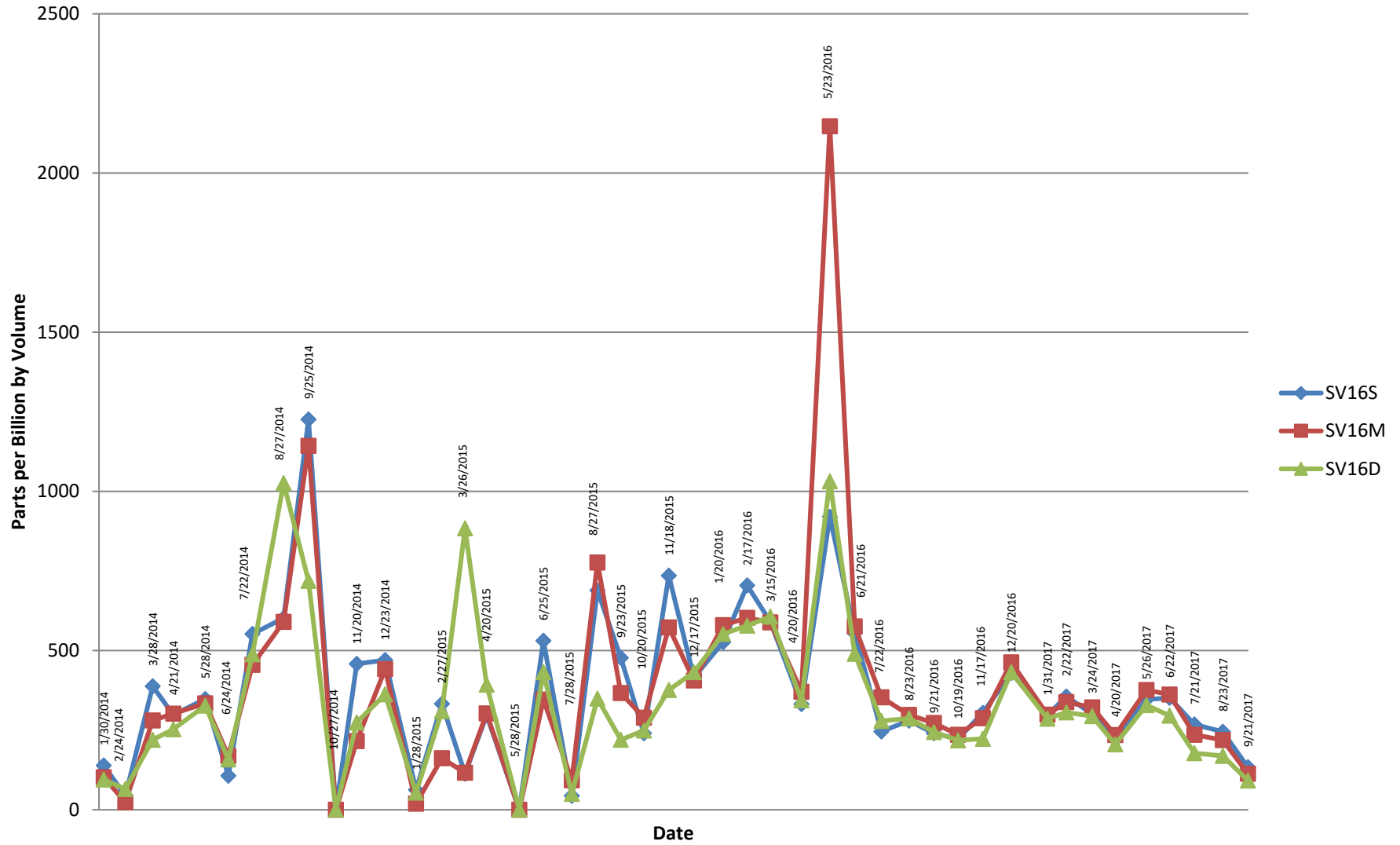


Figure 16
Soil Vapor Measurements
SV17

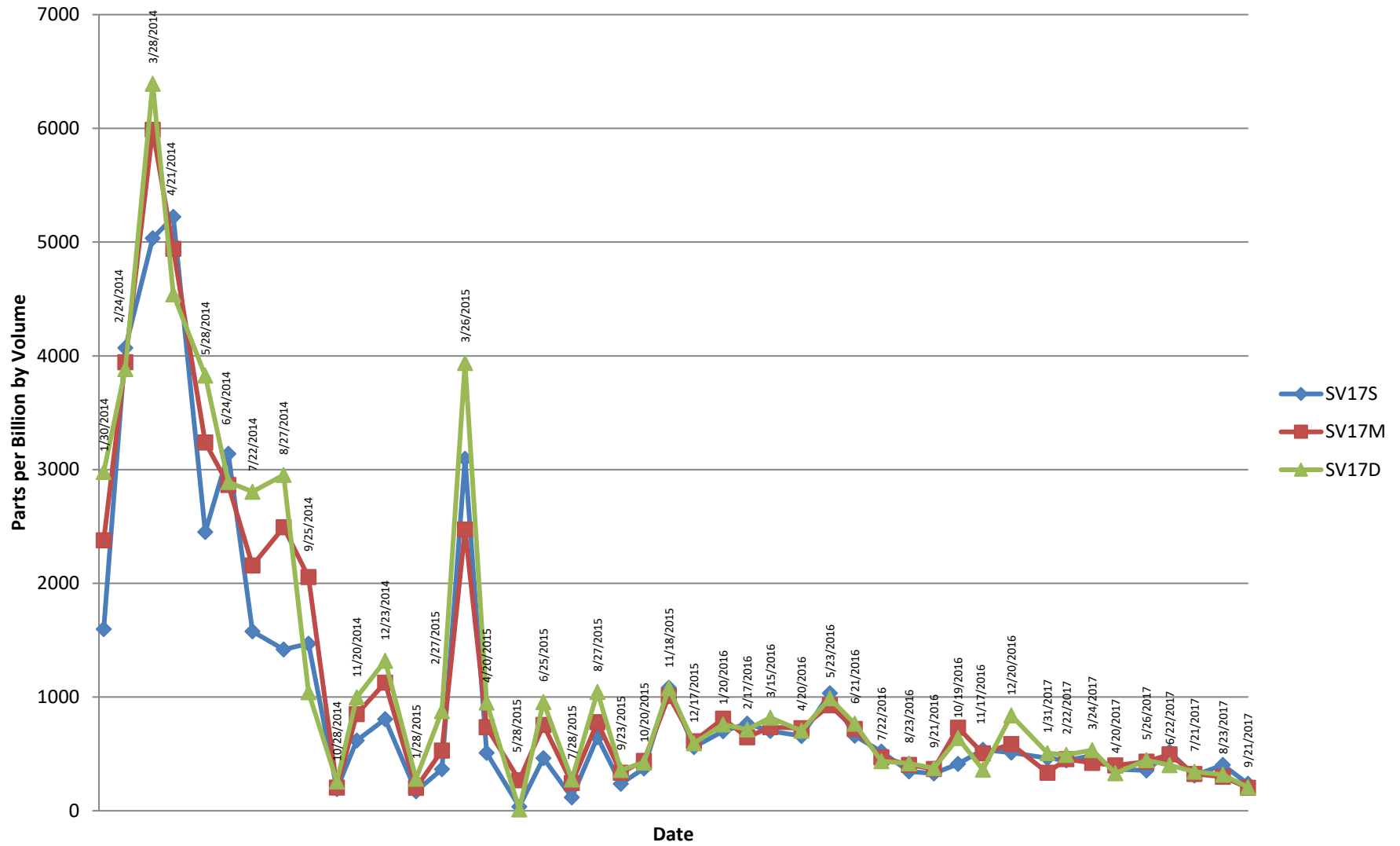


Figure 17
Soil Vapor Measurements
SV18

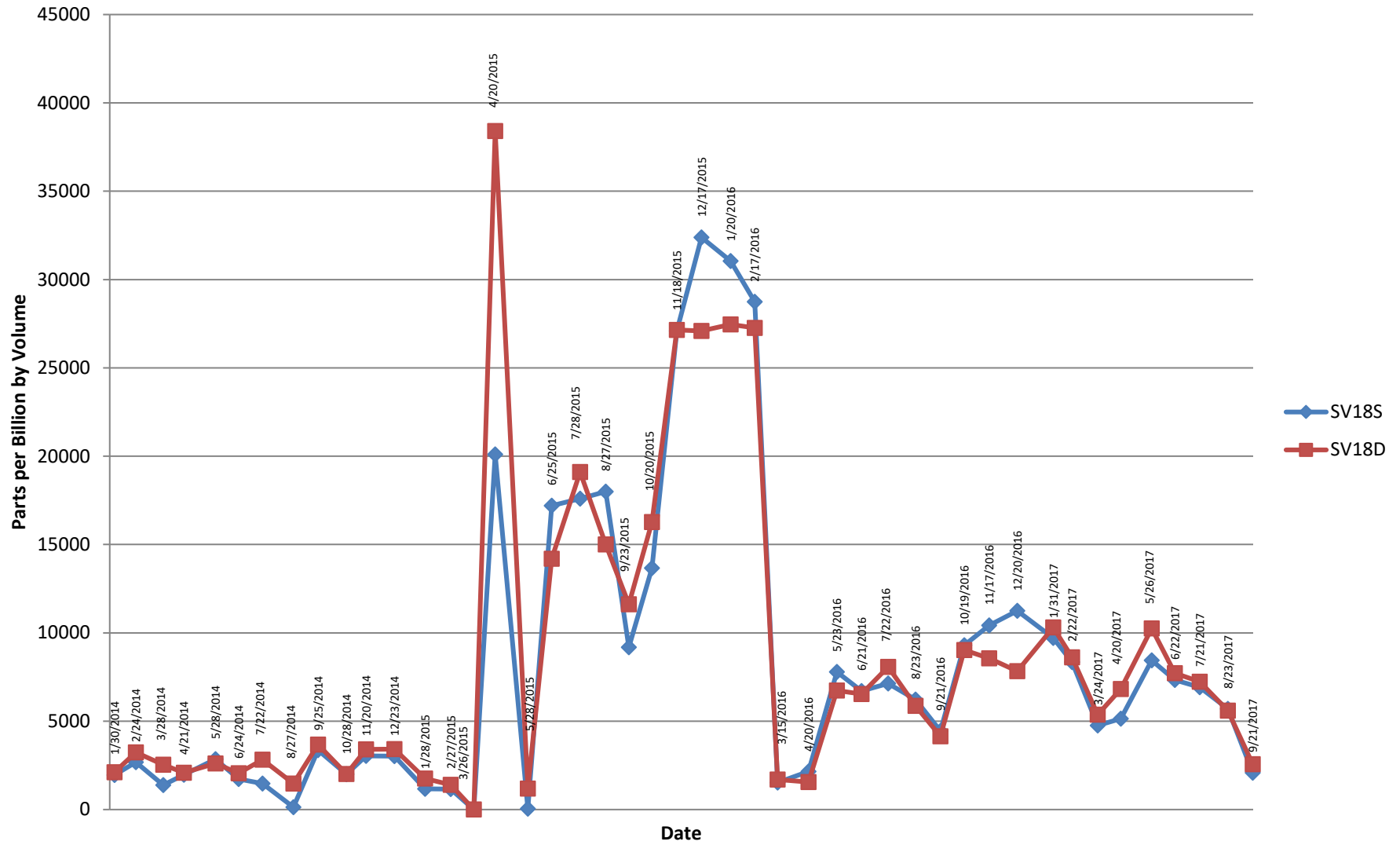
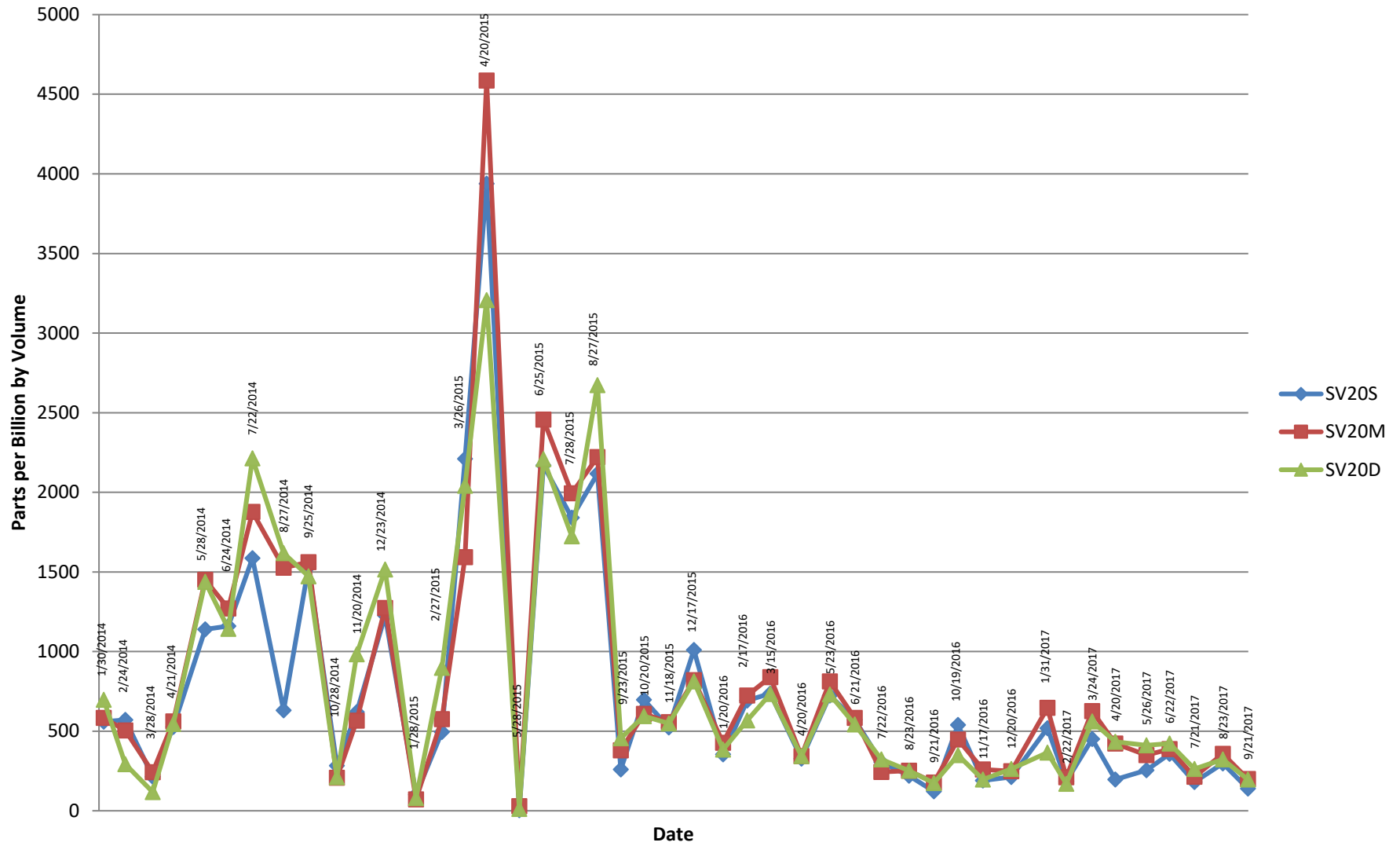


Figure 18
Soil Vapor Measurements
SV20



Appendix C
Third Quarter 2017 – Quarterly Groundwater Monitoring Report

(under separate cover)

Appendix D
Public Notifications



COMMANDER, NAVY REGION HAWAII
PUBLIC AFFAIRS OFFICE
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PEARL HARBOR, HAWAII 96860
PHONE: 808-473-2888 FAX: 808-473-2876
www.cnrc.navy.mil/hawaii



For Immediate Release

Release # 17-027
July 26, 2017

ATTN: Kathy Isobe, Environmental Public Affairs Officer
808-473-0662; Duty PAO phone: 808-371-5189

Red Hill AOC Update:

New Informational Video Available Online

By Navy Region Hawaii Public Affairs

(JOINT BASE PEARL HARBOR-HICKAM) – Navy Region Hawaii published a new Red Hill Bulk Fuel Storage Facility feature video, now available online at <https://www.youtube.com/watch?v=NTj9VgcZTII>

The new video explains how the release in 2014 occurred and how the Navy is keeping drinking water safe. Public records confirm the drinking water near Red Hill remains safe, and the Navy is committed to keeping it safe.

The video explains the Administrative Order on Consent (AOC), an enforceable agreement with the U.S. Navy and the Defense Logistics Agency (DLA), and regulators -- the Hawaii Department of Health (DOH) and the U.S. Environmental Protection Agency (EPA).

The AOC was signed and approved on Sept. 28, 2015 and serves as both a legally enforceable roadmap for continually modernizing Red Hill and a directed timetable toward completion. The AOC ensures the DOH and EPA provide the Navy regulatory oversight and expert resources in order to make step-by-step evidence-based decisions and not rush to potential failure.

It requires the Navy and DLA to take actions – subject to regulatory approval – to address fuel releases and implement infrastructure improvements to protect human health and the environment.

The video is part of an ongoing Navy commitment to keep communication lines open and the public informed. The video, as well as other information can be found on the Navy's website on Red Hill at www.cnrc.navy.mil/redhill. Information is also available on the EPA's website at www.epa.gov/region9/waste/ust/redhill/index.html.



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October 10, 2017
Release # 17-034

"I am pleased to report that after nearly four years, the tanks at Red Hill have not and are not leaking, and our drinking water continues to remain safe to drink." – Rear Adm. Brian Fort

Navy Provides Latest Update on Red Hill

(JOINT BASE PEARL HARBOR-HICKAM) – Rear Adm. Brian Fort, Commander, Navy Region Hawaii and Naval Surface Group Middle Pacific (MIDPAC), issued his first Red Hill letter to stakeholders and updated the community this week about the Navy's success in continually modernizing the fuel facility and keeping drinking water safe to drink.

Fort, who became regional commander Aug. 9, pledged continuity, noting the efforts of his predecessor, Rear Adm. John Fuller.

"Each of us is committed to improve public trust, ensure safe drinking water, prevent fuel leaks, and demonstrate the strategic importance of fuel to the fleet," Fort said.

"As the Navy Region and MIDPAC Commander, I have a responsibility to ensure our Sailors are always ready to sail into harm's way while also always being ready to provide humanitarian assistance and disaster relief across the entire Pacific. Maintaining a strategic and secure fuel reserve is absolutely essential for Hawaii, our nation and our Navy," Fort said.

Since the January 2014 fuel release, the Navy has ensured operational fuel tanks do not leak by conducting inspections and monitoring tank levels, and increased groundwater monitoring wells from eight to 13 with an additional 11 planned. These monitoring wells show no contamination threat to drinking water. The Joint Base Red Hill drinking well is the closest drinking well to the fuel facility, with the closest Board of Water Supply (BWS) well nearly a mile away. BWS and Navy drinking samples continue to show the water is safe to drink.

"This is the same drinking water my family and I drink," Fort said.

In his letter, Fort described his recent tour of the Red Hill Facility, explained how tanks are inspected and monitored, and discussed progress in meeting obligations under the Administrative

Order on Consent (AOC).

“Those who know me well know that I never make promises I cannot keep. That’s not how you maintain public trust. What I will promise, to earn and maintain your trust, is to keep the lines of communication open, listen to your questions and concerns, and share the latest information we have about our national strategic asset at Red Hill,” Fort said.

“I am pleased to report that after nearly four years, the tanks at Red Hill have not and are not leaking, and our drinking water continues to remain safe to drink.”

This was Navy Region Hawaii’s eighth stakeholder letter. Previous correspondence, press releases, photos and other information are available at www.cnic.navy.mil/redhill. The EPA also has a Red Hill information page, along with a posting of the AOC, at <https://www.epa.gov/red-hill>. The Navy also has an information video on YouTube to explain the AOC process. <https://www.youtube.com/watch?v=NTj9VgcZTII>. The animation video explains the AOC process and how it came about.

-USN-

Photos:

<https://www.dvidshub.net/image/3334572/red-hill-bulk-fuel-storage-facility>

170421-N-ON468-027 PEARL HARBOR (April 21, 2017) Capt. Richard Hayes, commanding officer of NAVFAC Hawaii, speaks to Hawaii 1st District Congresswoman Colleen Hanabusa during a visit at Joint Base Pearl Harbor-Hickam. The Congresswoman and other guests visited the modernized Red Hill Bulk Fuel Storage Facility, where subject matter experts showed how the Navy maintains the facility as a national strategic asset. Red Hill provides fuel to operate overseas while ensuring drinking water in the area remains safe. (U.S. Navy photo by Mass Communication Specialist 2nd Class Jeff Troutman)

<https://www.dvidshub.net/image/2437387/red-hill-visit>

160219-N-PA426-028 PEARL HARBOR (Feb. 19, 2016) Board of Water Supply members visit an empty fuel tank at the Red Hill Underground Fuel Storage Facility near Pearl Harbor. The group visited the modernized Red Hill Bulk Fuel Storage Facility, where subject matter experts showed how the Navy maintains the facility as a national strategic asset.

<https://www.dvidshub.net/image/2177582/officials-tour-red-hill-underground-fuel-storage-facility>

150915-N-GI544-139 PEARL HARBOR (Sept. 15, 2015) Capt. Ken Epps, commanding officer of NAVSUP Fleet Logistics Center Pearl Harbor, left, briefs members of the Honolulu Board of Water Supply, Moanalua Valley Community Association and Pearl City Neighborhood Board No. 21 during a visit to one of the empty fuel tanks at the Red Hill Underground Fuel Storage Facility near Pearl Harbor.



DEPARTMENT OF THE NAVY

COMMANDER
NAVY REGION HAWAII
850 TICONDEROGA ST STE 110
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10 Oct 17

Aloha, Stakeholder,

Thank you for the warm “welcome home” over the past two months since assuming command at Navy Region Hawaii and Naval Surface Group Middle Pacific (MIDPAC). Earlier in my Navy career I had the privilege of serving aboard three Hawaii homeported ships: USS INGERSOLL, USS LAKE ERIE and, right after 9/11, as executive officer of USS PORT ROYAL. It took 14 years for my family and me to return to the islands, but it was well worth the wait. We love Hawaii: the nature, the weather, and most of all the people and the feeling of aloha. If we haven’t met you personally yet, we look forward to talking story with you soon.

Rear Admiral Fuller and I had only a very brief time together during our transition. We didn’t have the opportunity to discuss many of the issues affecting the Navy in Hawaii, but one topic we discussed in depth was the Red Hill Bulk Fuel Facility. Each of us is committed to improving public trust, ensuring safe drinking water, preventing fuel leaks, and demonstrating the strategic importance of fuel to the fleet. As the Navy Region and MIDPAC Commander, I have a responsibility to ensure our Sailors are always ready to sail into harm’s way while also always being ready to provide humanitarian assistance and disaster relief across the entire Pacific. Maintaining a strategic and secure fuel reserve is absolutely essential for Hawaii, our nation and our Navy.

Those who know me well know that I never make promises I cannot keep; that’s not how you maintain public trust. What I will promise, to earn and maintain your trust, is to keep the lines of communication open, listen to your questions and concerns, and share the latest information we have about our national strategic asset at Red Hill. Like my predecessor, I am pleased to report that after nearly four years, the tanks at Red Hill have not and are not leaking, and our drinking water continues to remain safe to drink.

One week after assuming command, I personally toured the Red Hill Facility. Driving on the narrow road, through the industrial areas and along the ridge, I began to understand the challenges miners and engineers faced 75 years ago. Walking through the double doors, barely big enough for a car, I was surprised at the length and complexity of the tunnels leading to the fuel tanks. My team and I entered an empty, off-service tank and I got an appreciation of its massive size. Each steel tank is built into solid rock, surrounded by thick concrete and gunite. Judging by the great condition of the tank, it wasn’t clear how one could leak. An engineer explained how Tank 5 leaked in January of 2014: “The Navy contracts a company to inspect the tank to ensure the highest standards are maintained. Tank 5 was emptied for such an inspection. A new contractor began a two-year, hand-over-hand inspection of the tank wall. During that inspection, the contractor drilled 17 holes in the tank wall as part of an inspection but didn’t properly repair those holes. When the tank inspection was complete and the Navy placed the tank back in service it leaked from those holes.” The reality I saw on my tour is that the facility is well maintained, modernized and monitored 24 hours per day, each and every day. The tanks do not leak, and they are not in jeopardy of leaking.

One way the Navy ensures operational fuel tanks do not leak is by conducting inspections and monitoring tank levels. The most detailed inspection, which requires months to accomplish, scans every square inch of the tank wall using electromagnetic, ultrasonic analysis, and visual verification. Control room operators, using the automated fuel handling equipment system, continually monitor fuel level of every tank as well as check tank levels manually. Another measure the Navy takes to ensure tanks do not leak is our annual tank tightness test, which has undergone a third-party review by the National Working Group on Leak Detection Evaluations. This month, we began this test again on all operational tanks in Red Hill. Since 2014, the military spent over \$25.4 million on Administrative Order on Consent (AOC)-related issues in support of our efforts to monitor and upgrade the facility, and since 2006 we invested more than \$240 million on other Red Hill projects. We have also not let up on tank maintenance. We awarded two contracts worth \$39 million dollars to clean, inspect and repair five tanks, employing lessons learned from the 2014 release. Two of those tanks are currently in the inspection phase of the contract. We are always looking to improve the sensitivity and accuracy of our release detection systems as outlined in Section 4 of the AOC. We are currently developing test procedures to evaluate the performance of three state of the art release detection systems at Red Hill. The tests will be run early next year with the plan to install the top performer's system in all Red Hill tanks.

Since Rear Admiral Fuller's last stakeholder letter, we held an open house public meeting at Moanalua Middle School, co-hosted with the Defense Logistics Agency, Environmental Protection Agency (EPA) and State of Hawaii Department of Health (DOH). Turnout was higher than at previous meetings, and attendees expressed their appreciation at being able to speak one-on-one directly with subject matter experts. By the way, also since our last stakeholder letter, we posted an information video on YouTube to explain the AOC process. I hope you'll take a look: <https://www.youtube.com/watch?v=NTj9VgcZTII> . The animation video is a clear and concise way to explain the AOC process and how it came about.

We continue to make significant progress in meeting our obligations under the AOC. For example, EPA and DOH regulators approved our Tank Inspection, Repair, and Maintenance Decision Document/Implementation Plan (Section 2 of the AOC) in early September, and we are already successfully implementing the improvements on four tanks currently undergoing maintenance. Late last month, we participated in face-to-face meetings with experts and stakeholders in San Francisco hosted by EPA and DOH. We discussed several items including progress on Section 3's Tank Upgrade Alternative (TUA) report, which is on track for completion December 8, 2017.

Since the January 2014 fuel release, the Navy increased groundwater monitoring wells from eight to 13 with an additional 11 planned. These monitoring wells show no threat of contamination to our drinking water. The Joint Base Red Hill drinking well is the closest drinking well to the fuel facility, with the closest Board of Water Supply (BWS) well nearly a mile away. One aspect of the AOC is to evaluate if groundwater beneath Red Hill flows in the direction of Halawa or Moanalua. To meet this analysis requirement, we are collaborating with outside agencies and experts on our groundwater modeling, including the BWS. The Navy's analysis should be completed early next year. Meanwhile, it bears repeating: BWS and Navy drinking samples continue to show the water is safe to drink. This is the same drinking water my family and I drink.

Since this is my first stakeholder letter I've tried to keep it somewhat brief and general. However, if you or your constituents would like more technical details, please consider contacting my Red Hill Program Project Director/Project Coordinator, Mark Manfredi, at 808-473-4148. Mark and his team can arrange detailed briefings about TUA, Quantitative Risk and Vulnerability Assessment, and groundwater monitoring effects, etc., to interested groups, including neighborhood boards. We will consider sending out a more technical update in our next stakeholder letter in December. Until then, you can find our previous correspondence, press releases, photos and other information at www.cnic.navy.mil/redhill. The EPA also has a Red Hill information page, along with the AOC, at <https://www.epa.gov/red-hill>. My team and I look forward to hearing from you and answering any of your questions.

Very Respectfully,

A handwritten signature in black ink, appearing to read "B. P. FORT", is written over a solid horizontal line.

B. P. FORT
Rear Admiral, U. S. Navy