



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

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5090  
Ser N45/0627  
September 8, 2016

CERTIFIED NO: 7015 0640 0002 4679 3479

Mr. Richard Takaba  
Hawaii State Department of Health  
Environmental Management Division  
Solid and Hazardous Waste Branch  
Underground Storage Tank Section  
919 Ala Moana Boulevard, Room 212  
Honolulu, HI 96814

Dear Mr. Takaba:

SUBJECT: RED HILL TANK COMPLEX  
SOIL VAPOR SAMPLING RESULTS FOR AUGUST 2016  
DOH FACILITY ID NO. 9-102271  
DOH RELEASE ID NO. 990051, 010011, 020028, AND 140010

Soil vapor samples were collected from beneath all active and accessible Red Hill tanks on August 23, 2016.

Soil vapor VOC concentrations were measured in the field using a photo-ionization detector. The soil vapor sampling results are being submitted as Enclosure 1.

A conservative approach is to assess the integrity of the associated tank system if VOC concentrations exceed 280,000 ppbv in soil vapor monitoring points (SVMPs) beneath tanks containing JP-5 or JP-8, or 14,000 ppbv in SVMPs beneath tanks containing marine diesel fuel. These values are 50 percent of the calculated vapor concentration from fuel-saturated water.

At Tank 5, the concentrations of VOCs detected in the front, middle, and outer edge soil vapor monitoring probes were 74,483 ppbv, 5,934 ppbv, and 32,787 ppbv, respectively. Tank 5 was emptied in January 2014 and has not contained fuel since that time. No fuel level discrepancies were observed in the other tanks, and VOC concentrations in all down-gradient soil vapor monitors were below 1,000 ppbv.

All other VOC concentrations measured in August were about 40 to 1,000 times below the action levels, with no consistent trends observed. Possible reasons for the results are



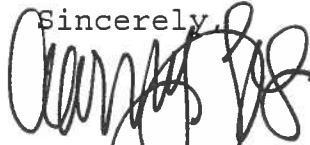
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Ser N45/0627  
September 8, 2016

speculative and may include, but not be limited to, ongoing projects in the tunnel, groundwater level fluctuations, rainfall (or lack thereof), and fuel movement in the tanks and piping.

Soil vapor VOC concentration trends will continue to be monitored. The next soil vapor sampling event is scheduled for September 2016, and will include collecting samples from soil vapor monitoring probes beneath all active and accessible tanks.

If there are any questions regarding this matter, or if more information is needed, please contact Mr. Melvin Muraoka at (808) 471-3869.

Sincerely,



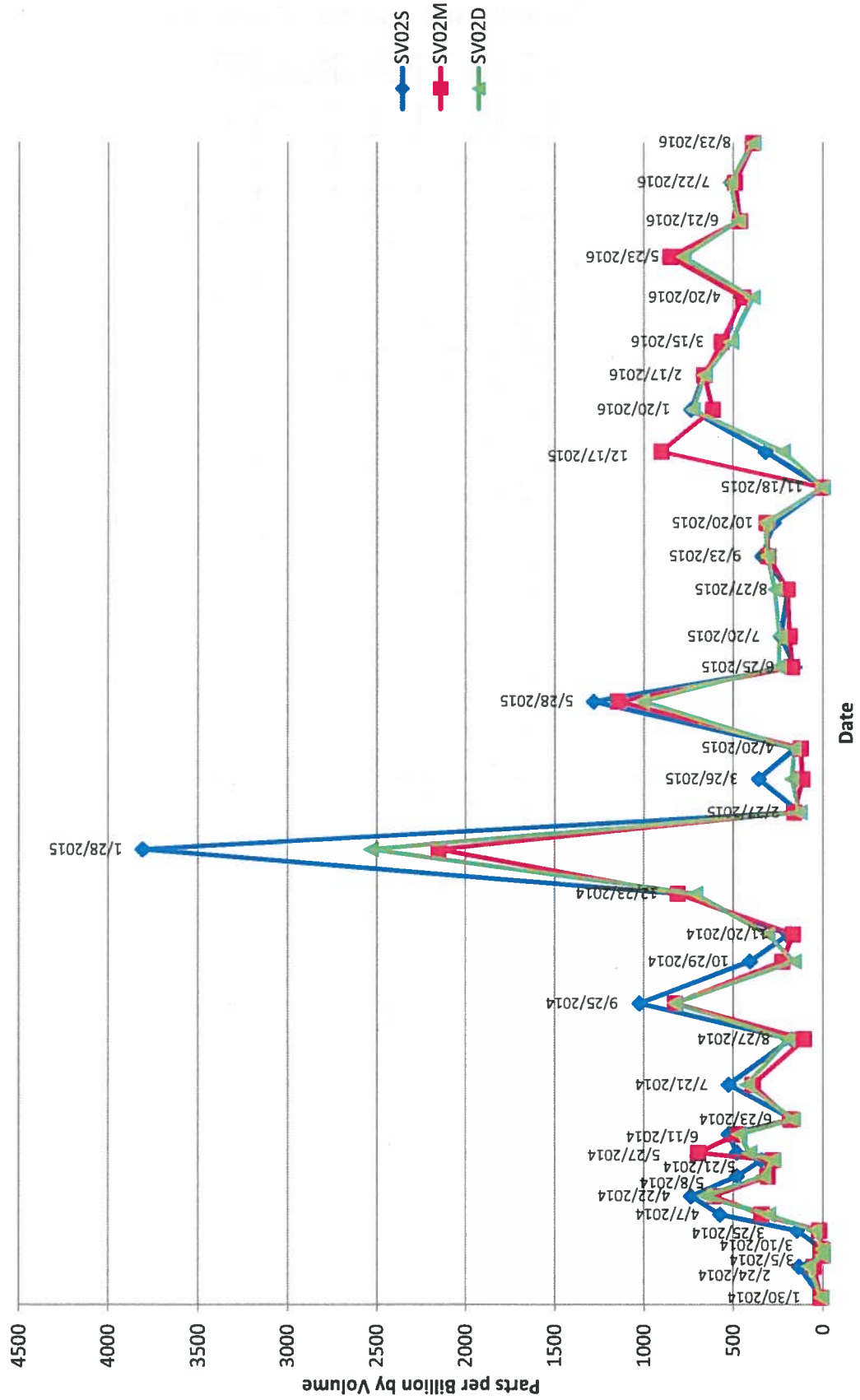
AARON V. POENTIS  
Director  
Regional Environmental Department  
By direction of the  
Commander

Enclosure: 1. Summary of Soil Vapor Sampling Results for Tanks 2 through 18 and 20 through August 2016 (18 pages)

Copy to: Mr. Bob Pallarino, U.S. EPA Region 9, Underground Storage Tank Program Office  
LCDR Andrew Lovgren, NAVSUP FLC Pearl Harbor  
Mr. Rockne Krill, DLA Energy Pacific



**Figure 1**  
**Soil Vapor Measurements**  
**SV02**

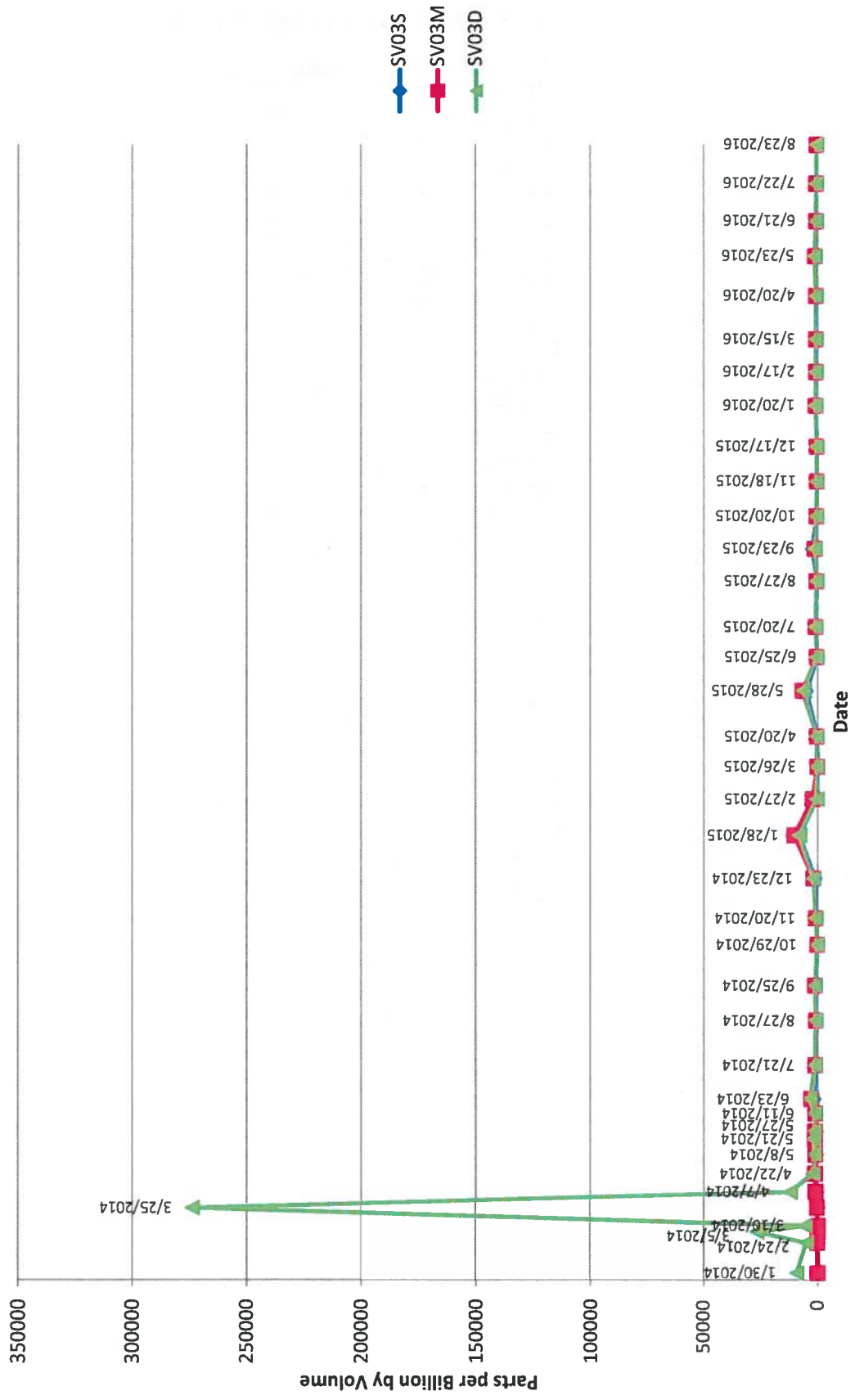


**Table 1**  
**Soil Vapor Results for SV02 (ppbv)**  
**Historical Soil Vapor Monitoring Results - January 2014 Through Present Event**  
**Red Hill Bulk Fuel Storage Facility**

Date	SV02S	SV02M	SV02D
1/30/2014	11	11	8
2/24/2014	135	51	82
3/5/2014	1	0	0
3/10/2014	1	11	1
3/25/2014	146	19	47
4/7/2014	575	342	308
4/22/2014	739	610	662
5/8/2014	481	308	333
5/21/2014	344	280	278
5/27/2014	481	697	413
6/11/2014	527	475	468
6/23/2014	170	183	169
7/21/2014	527	392	426
8/27/2014	180	105	199
9/25/2014	1028	827	830
10/29/2014	409	227	164
11/20/2014	194	167	309
12/23/2014	810	811	715
1/28/2015	3808	2150	2530
2/27/2015	129	160	133
3/26/2015	360	115	176
4/20/2015	157	123	164
5/28/2015	1285	1146	1011
6/25/2015	159	172	248
7/20/2015	238	187	243
8/27/2015	196	199	270
9/23/2015	341	305	311
10/20/2015	276	314	323
11/18/2015	NC <sub>1</sub>	NC <sub>1</sub>	NC <sub>1</sub>
12/17/2015	320	904	226
1/20/2016	739	616	731
2/17/2016	671	664	662
3/15/2016	550	565	512
4/20/2016	454	445	393
5/23/2016	802	856	782
6/21/2016	466	464	473
7/22/2016	516	489	519
8/23/2016	396	390	390

ppbv: parts per billion by volume  
 NC<sub>1</sub>: Not collected due to maintenance work

**Figure 2**  
**Soil Vapor Measurements**  
**SV03**



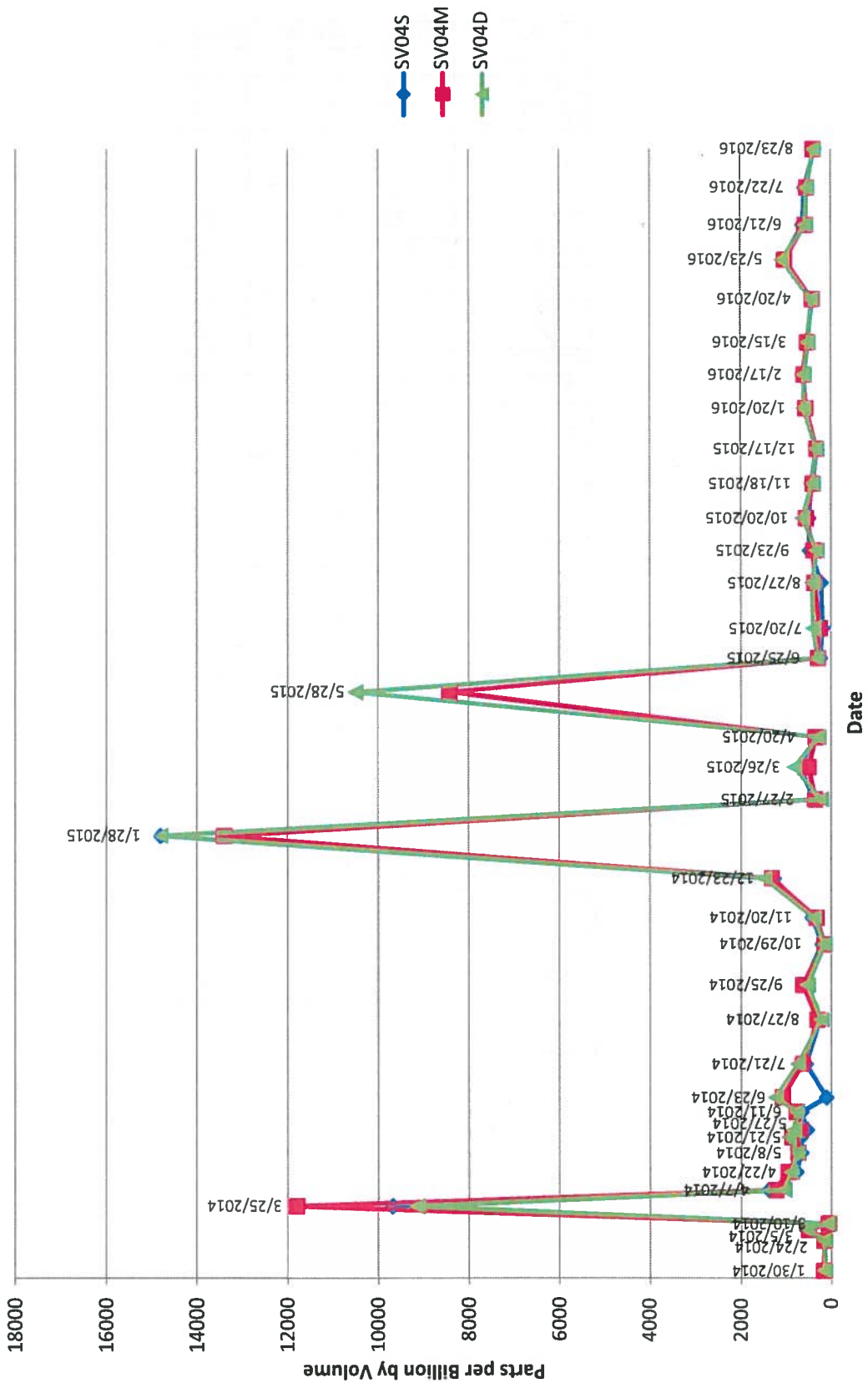
**Table 2**  
**Soil Vapor Results for SV03 (ppbv)**  
**Historical Soil Vapor Monitoring Results - January 2014 Through Present Event**  
**Red Hill Bulk Fuel Storage Facility**

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

ppbv: parts per billion by volume



**Figure 3**  
**Soil Vapor Measurements**  
**SV04**

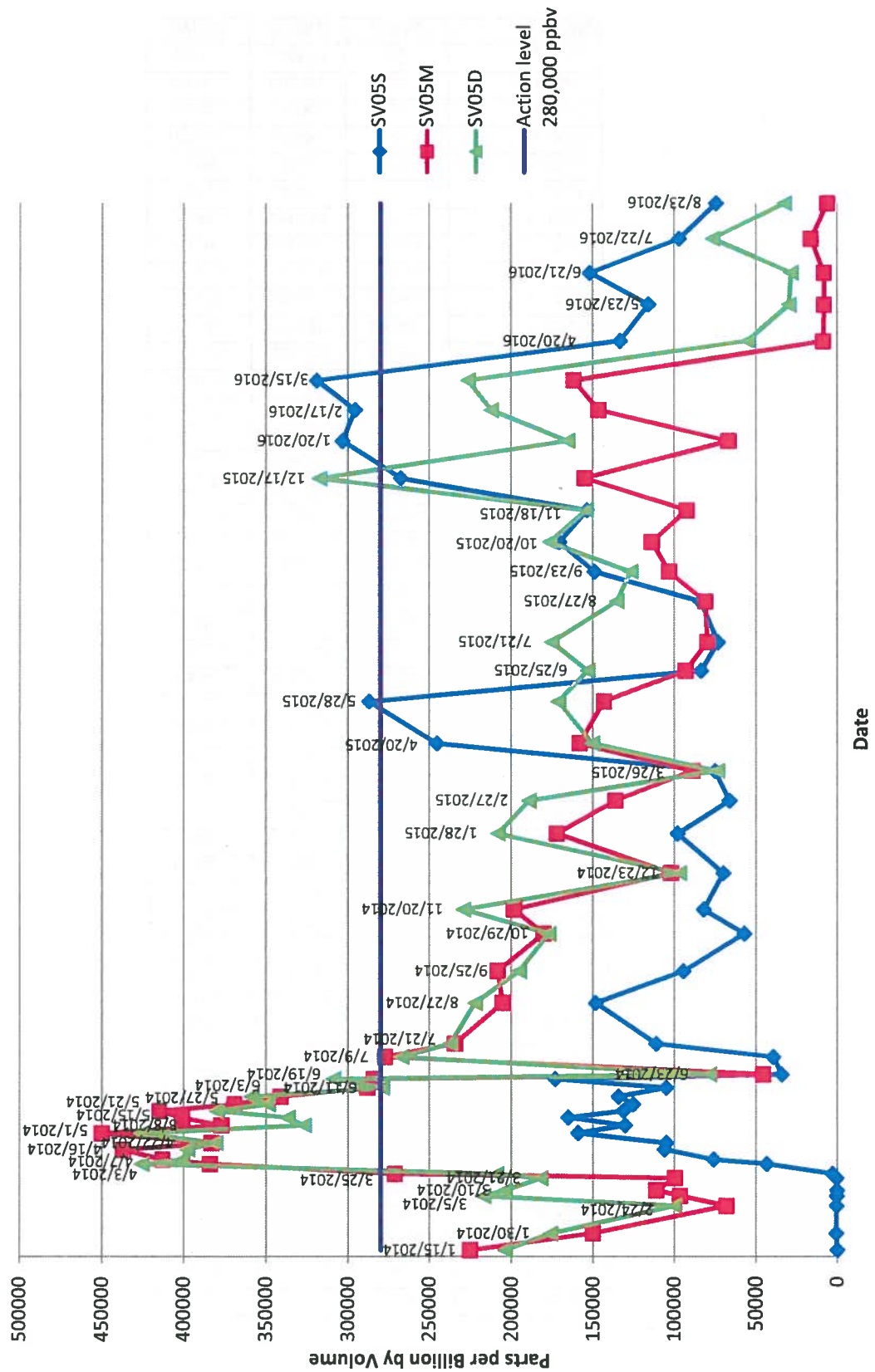


**Table 3**  
**Soil Vapor Results for SV04 (ppbv)**  
**Historical Soil Vapor Monitoring Results - January 2014 Through Present Event**  
**Red Hill Bulk Fuel Storage Facility**

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

ppbv: parts per billion by volume

**Figure 4**  
**Soil Vapor Measurements**  
**SV05**

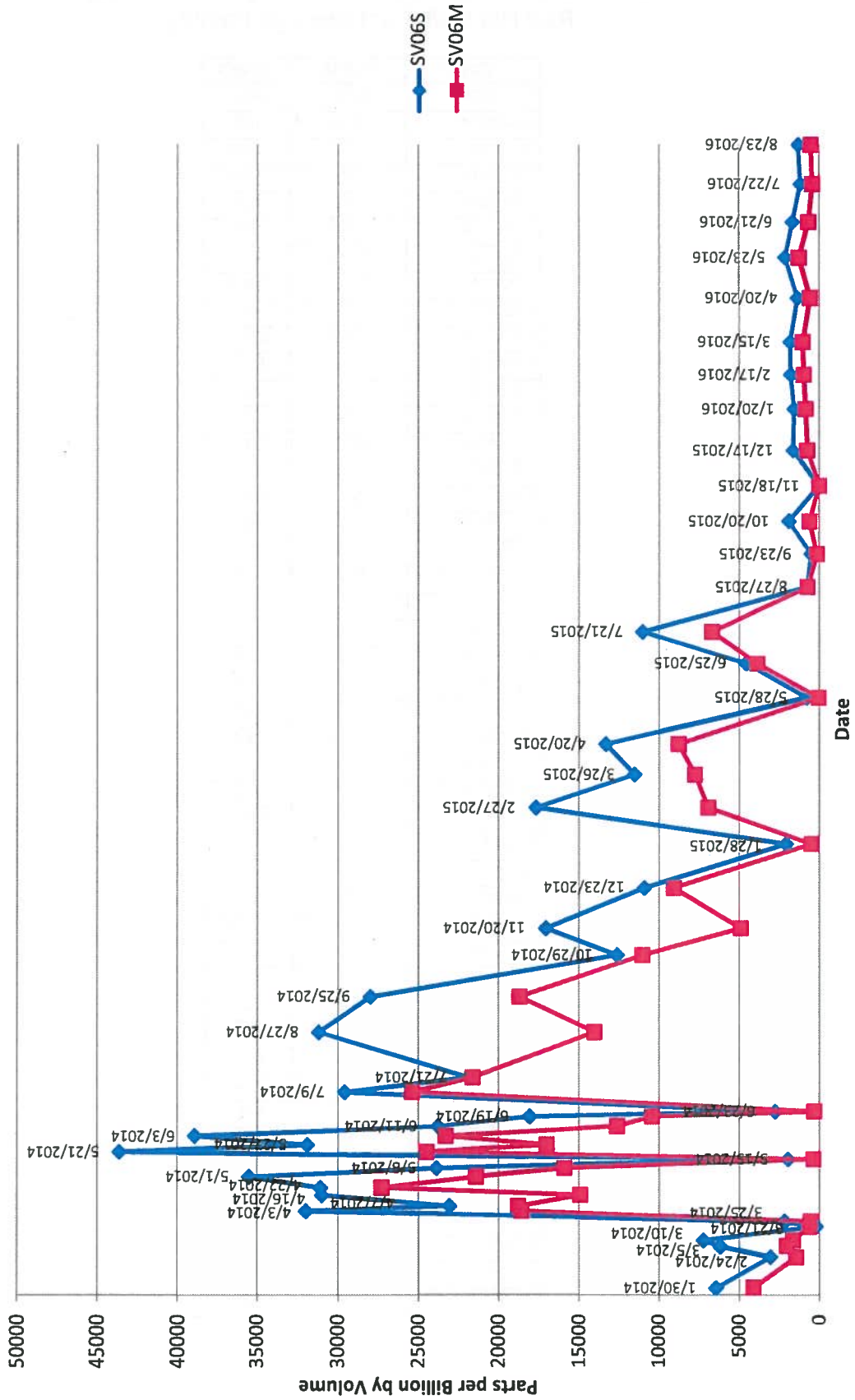


**Table 4**  
**Soil Vapor Results for SV05 (ppbv)**  
**Historical Soil Vapor Monitoring Results - January 2014 Through Present Event**  
**Red Hill Bulk Fuel Storage Facility**

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

ppbv: parts per billion by volume

Figure 5  
Soil Vapor Measurements  
SV06



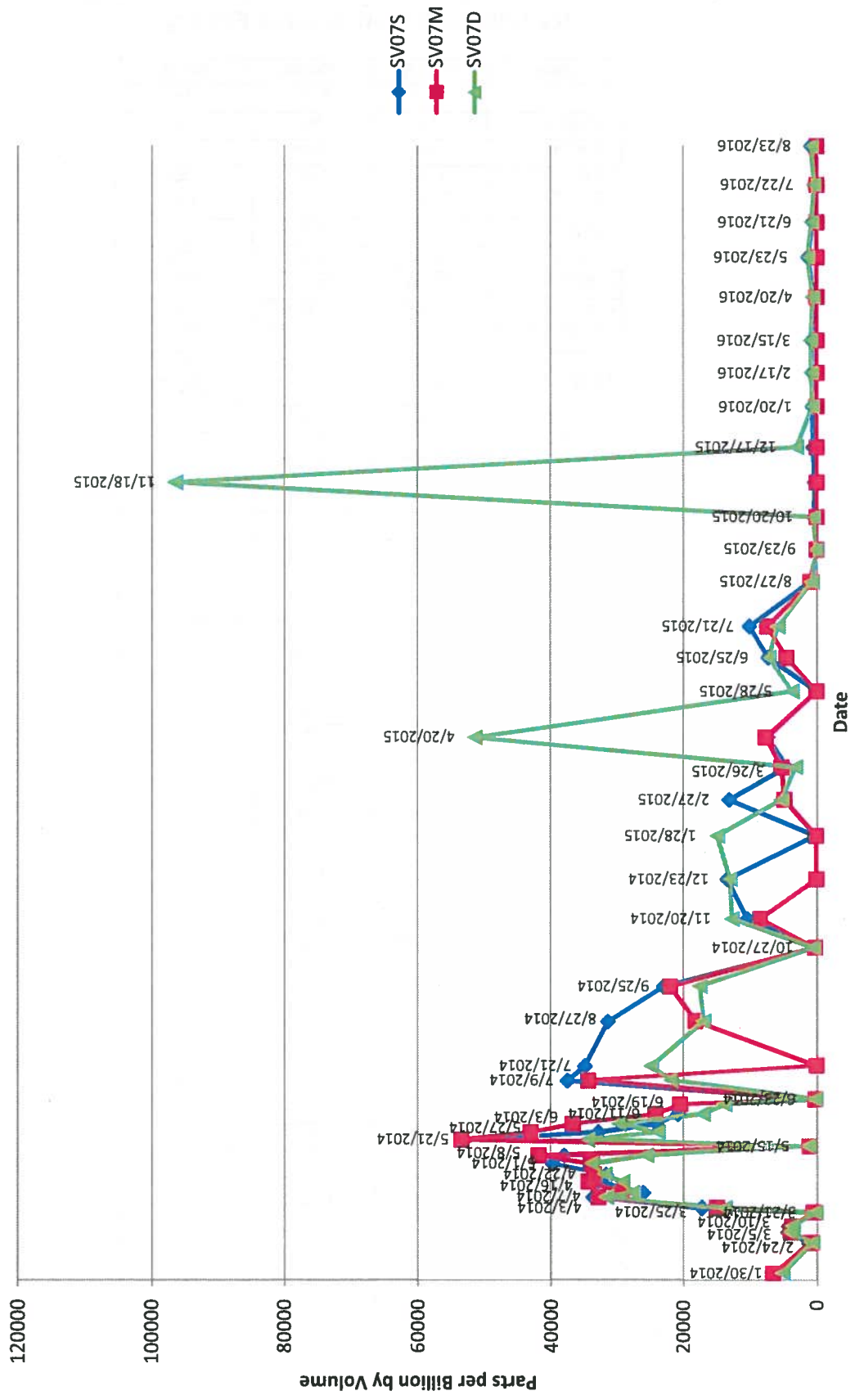
**Table 5**  
**Soil Vapor Results for SV06 (ppbv)**  
**Historical Soil Vapor Monitoring Results - January 2014 Through Present Event**  
**Red Hill Bulk Fuel Storage Facility**

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

ppbv: parts per billion by volume

NC<sub>1</sub>: Not collected due to maintenance work

**Figure 6**  
**Soil Vapor Measurements**  
**SV07**



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

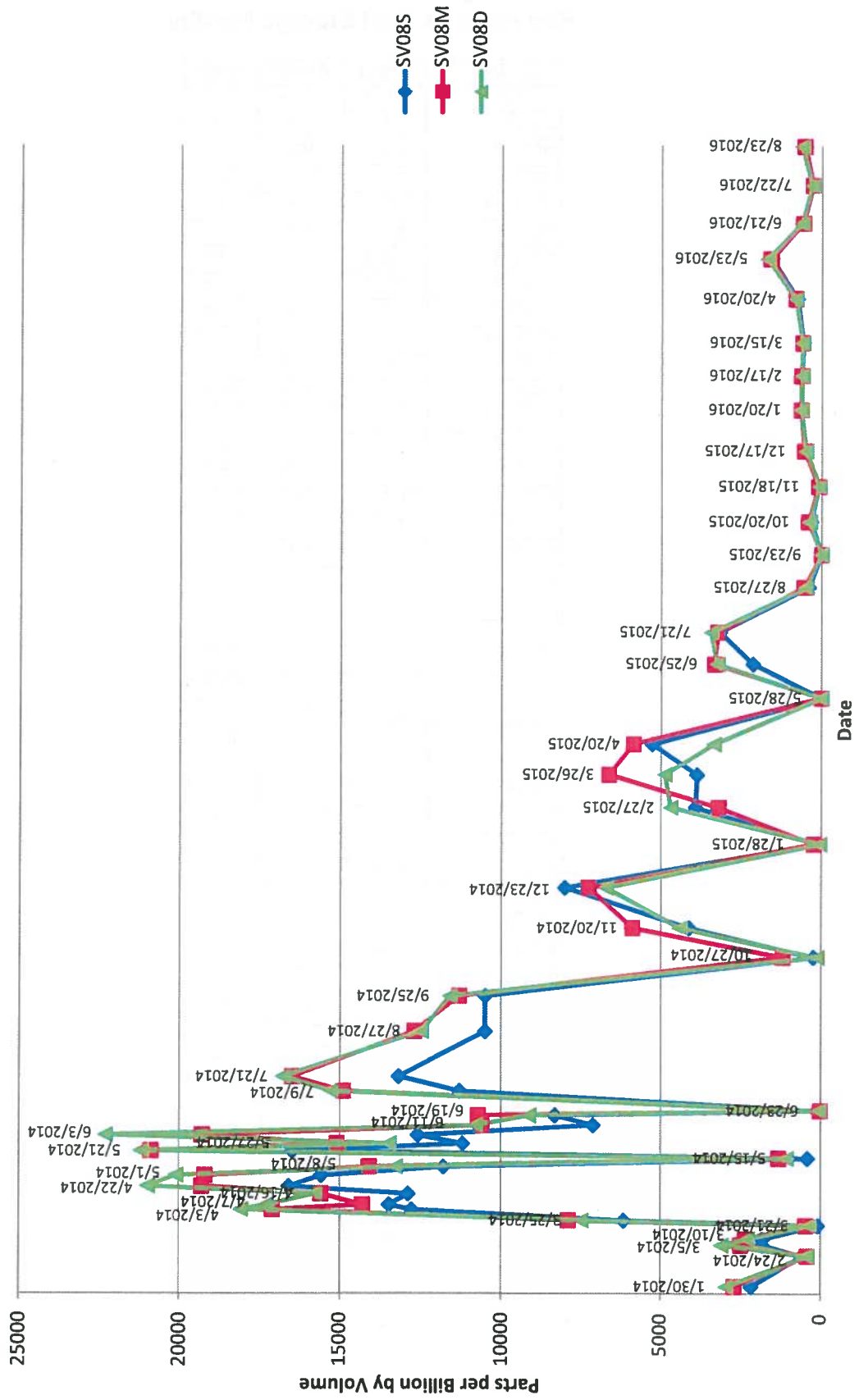
Date	SV07S	SV07M	SV07D
1/30/2014	6350	6539	5180
2/24/2014	1187	849	690
3/5/2014	4406	3890	4119
3/10/2014	4287	3687	3654
3/21/2014	102	512	170
3/25/2014	17300	15000	13900
4/3/2014	33700	32900	31700
4/7/2014	26100	29400	27700
4/16/2014	32900	34400	29200
4/22/2014	31700	33500	31900
5/1/2014	39700	34000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

ppbv: parts per billion by volume

NC<sub>2</sub>: Not collected due to an obstruction in the vapor line.



**Figure 7**  
**Soil Vapor Measurements**  
**SV08**

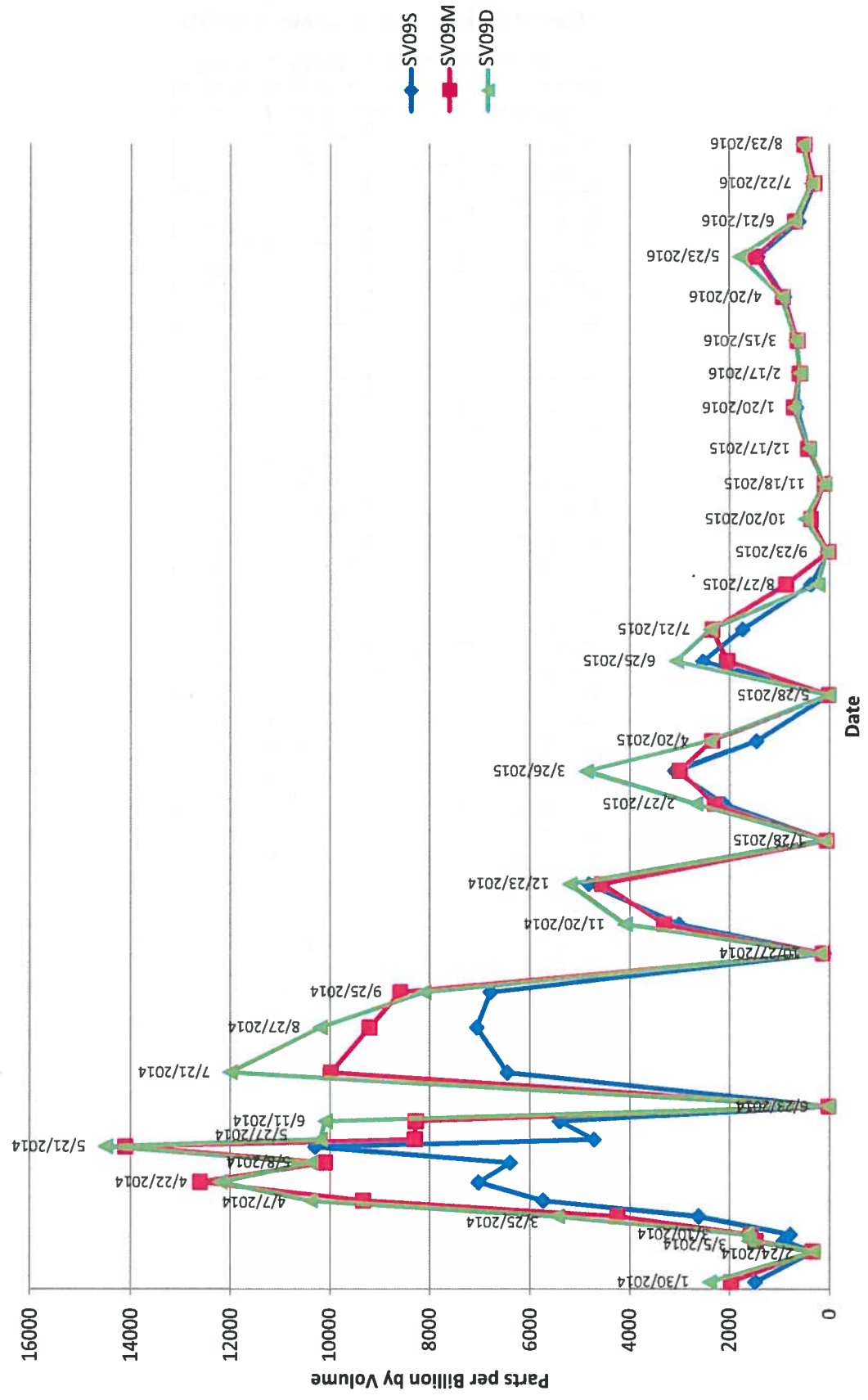


**Table 7**  
**Soil Vapor Results for SV08 (ppbv)**  
**Historical Soil Vapor Monitoring Results - January 2014 Through Present Event**  
**Red Hill Bulk Fuel Storage Facility**

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

ppbv: parts per billion by volume

**Figure 8**  
**Soil Vapor Measurements**  
**SV09**

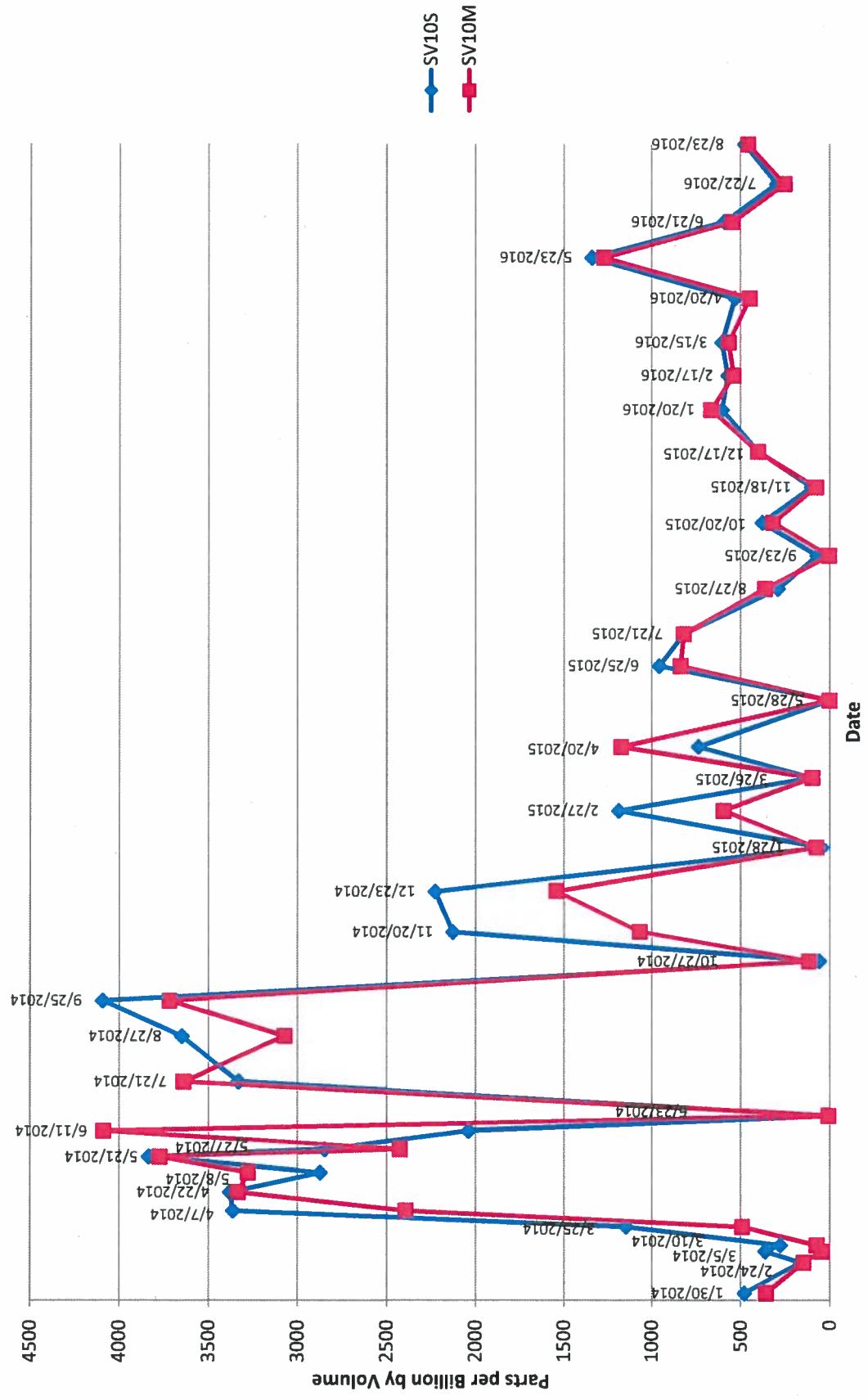


**Table 8**  
**Soil Vapor Results for SV09 (ppbv)**  
**Historical Soil Vapor Monitoring Results - January 2014 Through Present Event**  
**Red Hill Bulk Fuel Storage Facility**

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

ppbv: parts per billion by volume

**Figure 9**  
**Soil Vapor Measurements**  
**SV10**

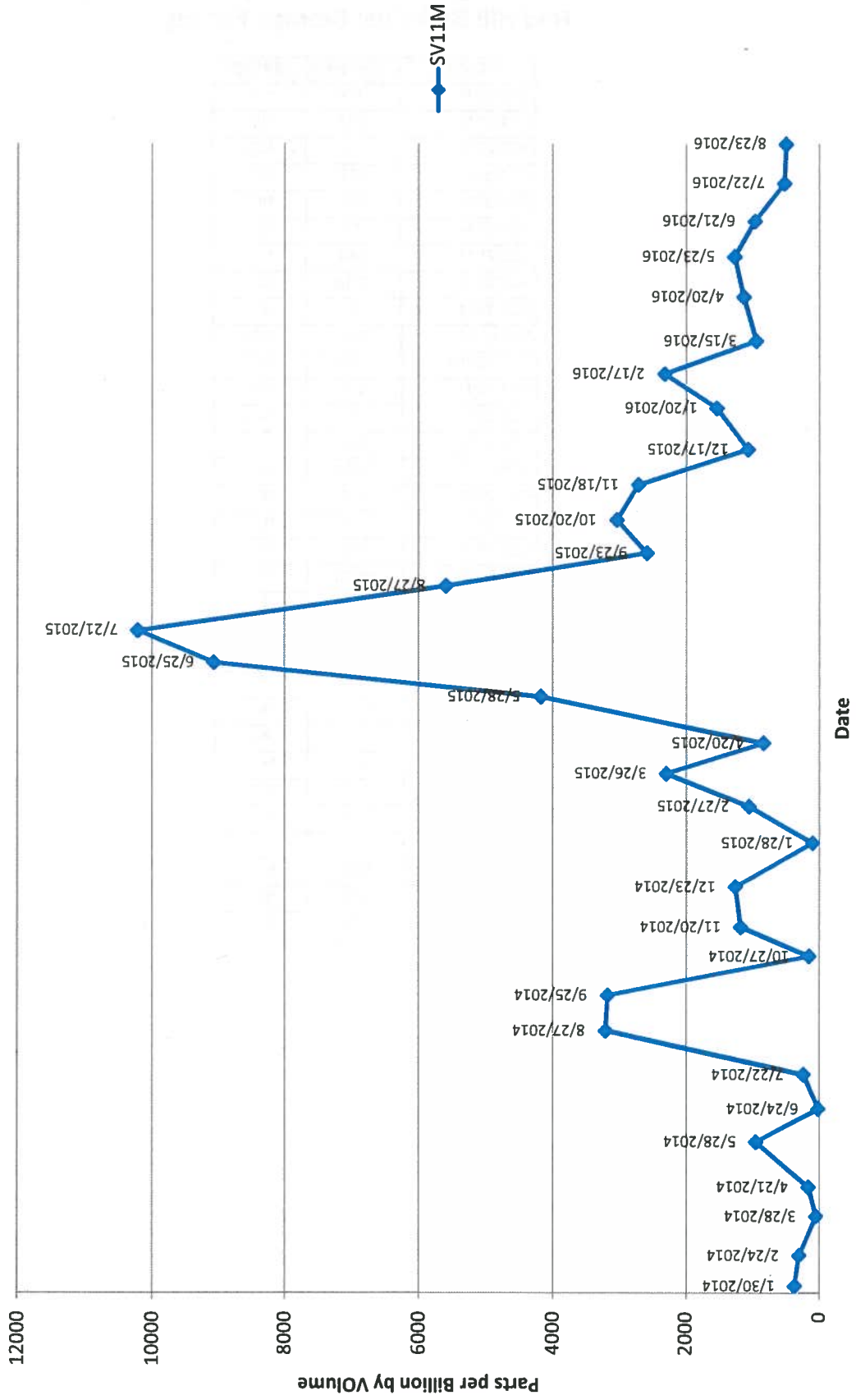


**Table 9**  
**Soil Vapor Results for SV10 (ppbv)**  
**Historical Soil Vapor Monitoring Results - January 2014 Through Present Event**  
**Red Hill Bulk Fuel Storage Facility**

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

ppbv: parts per billion by volume

**Figure 10**  
**Soil Vapor Measurements**  
**SV11**



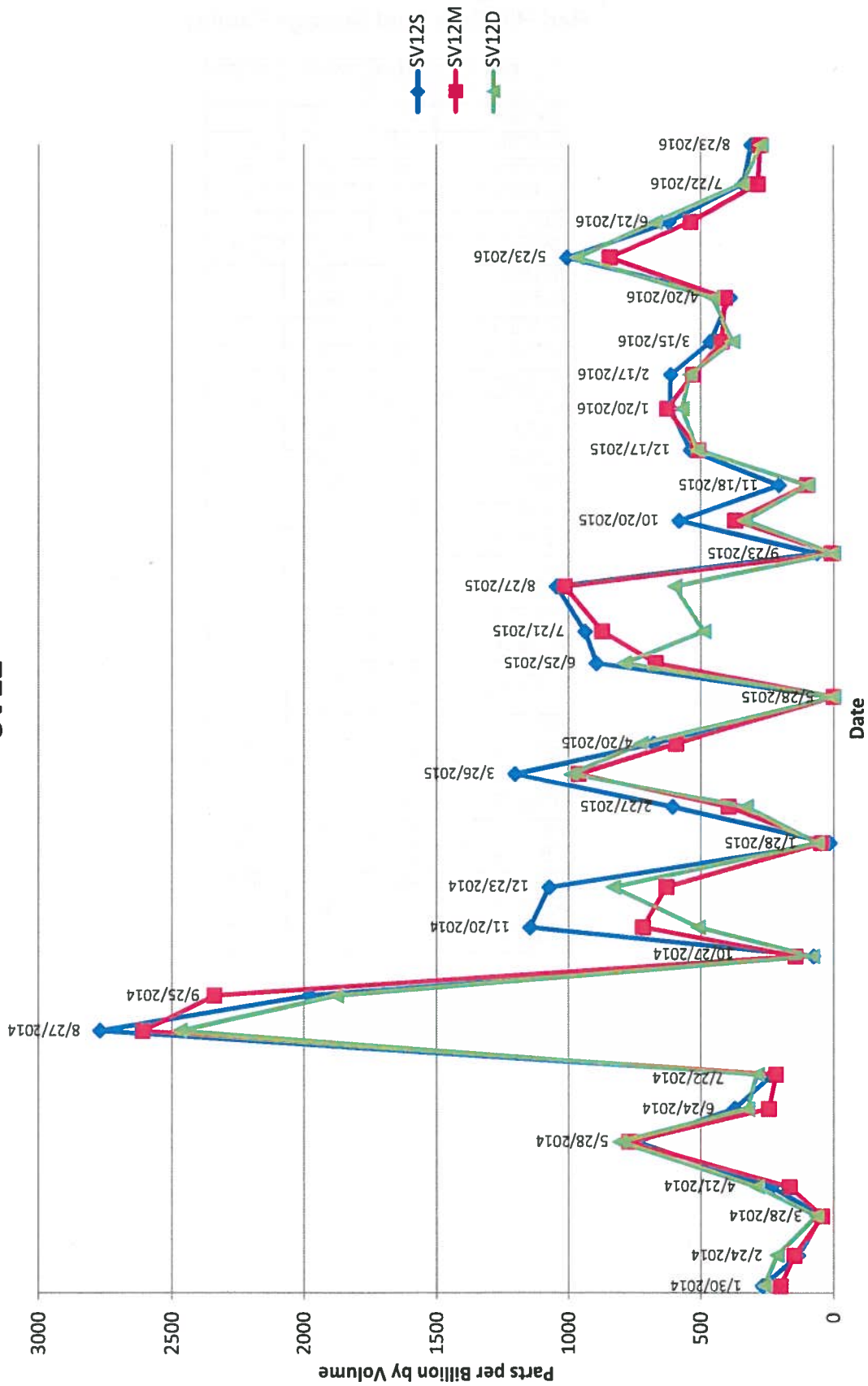
**Table 10**  
**Soil Vapor Results for SV11 (ppbv)**  
**Historical Soil Vapor Monitoring Results - January 2014 Through Present Event**  
**Red Hill Bulk Fuel Storage Facility**

Date	SV11M	SV11D
1/30/2014	374	NC <sub>2</sub>
2/24/2014	307	NC <sub>2</sub>
3/28/2014	53	NC <sub>2</sub>
4/21/2014	167	NC <sub>2</sub>
5/28/2014	959	NC <sub>2</sub>
6/24/2014	17	NC <sub>2</sub>
7/22/2014	240	NC <sub>2</sub>
8/27/2014	3218	NC <sub>2</sub>
9/25/2014	3185	NC <sub>2</sub>
10/27/2014	154	NC <sub>2</sub>
11/20/2014	1182	NC <sub>2</sub>
12/23/2014	1261	NC <sub>2</sub>
1/28/2015	99	NC <sub>2</sub>
2/27/2015	1056	NC <sub>2</sub>
3/26/2015	2294	NC <sub>2</sub>
4/20/2015	835	NC <sub>2</sub>
5/28/2015	4184	NC <sub>2</sub>
6/25/2015	9065	NC <sub>2</sub>
7/21/2015	10200	NC <sub>2</sub>
8/27/2015	5595	NC <sub>2</sub>
9/23/2015	2584	NC <sub>2</sub>
10/20/2015	3045	NC <sub>2</sub>
11/18/2015	2714	NC <sub>2</sub>
12/17/2015	1071	NC <sub>2</sub>
1/20/2016	1534	NC <sub>2</sub>
2/17/2016	2316	NC <sub>2</sub>
3/15/2016	947	NC <sub>2</sub>
4/20/2016	1133	NC <sub>2</sub>
5/23/2016	1271	NC <sub>2</sub>
6/21/2016	968	NC <sub>2</sub>
7/22/2016	522	NC <sub>2</sub>
8/23/2016	498	NC <sub>2</sub>

ppbv: parts per billion by volume  
NC<sub>2</sub>: Not collected due to an obstruction in the vapor line



**Figure 11**  
**Soil Vapor Measurements**  
**SV12**

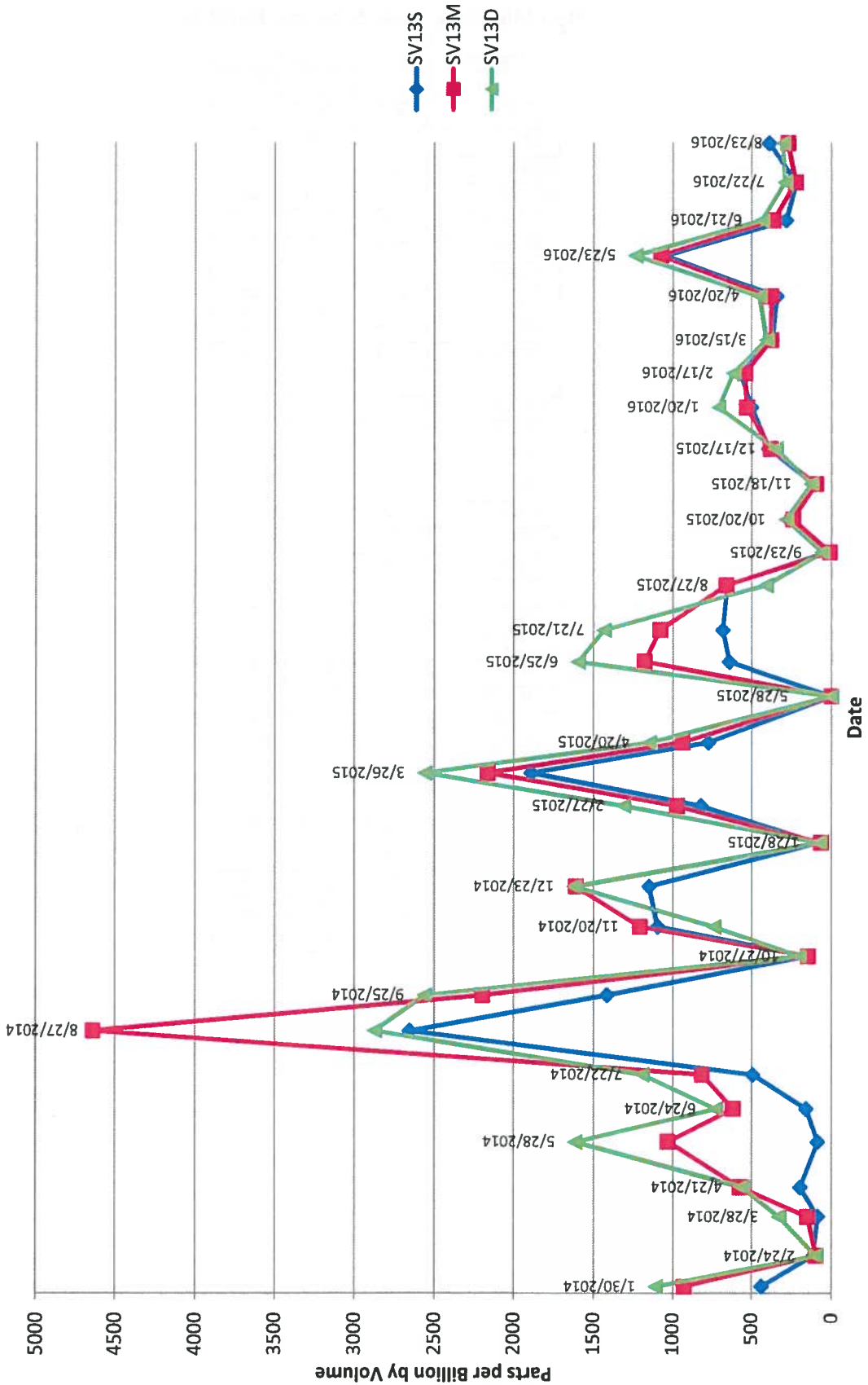


**Table 11**  
**Soil Vapor Results for SV12 (ppbv)**  
**Historical Soil Vapor Monitoring Results - January 2014 Through Present Event**  
**Red Hill Bulk Fuel Storage Facility**

Date	SV12S	SV12M	SV12D
1/30/2014	270	200	264
2/24/2014	135	148	215
3/28/2014	45	42	66
4/21/2014	237	166	290
5/28/2014	743	774	810
6/24/2014	374	244	326
7/22/2014	232	217	290
8/27/2014	2769	2607	2469
9/25/2014	1979	2338	1877
10/27/2014	77	144	81
11/20/2014	1147	721	512
12/23/2014	1075	632	834
1/28/2015	15	46	63
2/27/2015	609	396	331
3/26/2015	1203	964	992
4/20/2015	681	595	728
5/28/2015	0	0	0
6/25/2015	897	673	792
7/21/2015	940	875	490
8/27/2015	1047	1016	601
9/23/2015	64	8	1
10/20/2015	584	371	334
11/18/2015	207	101	99
12/17/2015	541	510	514
1/20/2016	618	630	573
2/17/2016	616	530	543
3/15/2016	465	421	381
4/20/2016	391	410	456
5/23/2016	1008	847	971
6/21/2016	623	539	675
7/22/2016	342	286	346
8/23/2016	312	278	275

ppbv: parts per billion by volume

**Figure 12**  
**Soil Vapor Measurements**  
**SV13**



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

Date	SV13S	SV13M	SV13D
1/30/2014	440	929	1109
2/24/2014	116	98	99
3/28/2014	90	151	332
4/21/2014	198	575	560
5/28/2014	89	1031	1615
6/24/2014	161	616	727
7/22/2014	495	815	1191
8/27/2014	2657	4638	2877
9/25/2014	1414	2193	2562
10/27/2014	149	145	205
11/20/2014	1093	1208	738
12/23/2014	1148	1610	1621
1/28/2015	85	66	75
2/27/2015	822	973	1309
3/26/2015	1889	2160	2562
4/20/2015	774	939	1145
5/28/2015	0	0	0
6/25/2015	640	1178	1594
7/21/2015	682	1079	1431
8/27/2015	654	659	412
9/23/2015	37	10	59
10/20/2015	270	242	286
11/18/2015	115	98	125
12/17/2015	393	382	350
1/20/2016	502	530	707
2/17/2016	567	542	615
3/15/2016	373	379	407
4/20/2016	344	378	451
5/23/2016	1044	1075	1233
6/21/2016	285	364	436
7/22/2016	222	224	292
8/23/2016	392	272	306

ppbv: parts per billion by volume

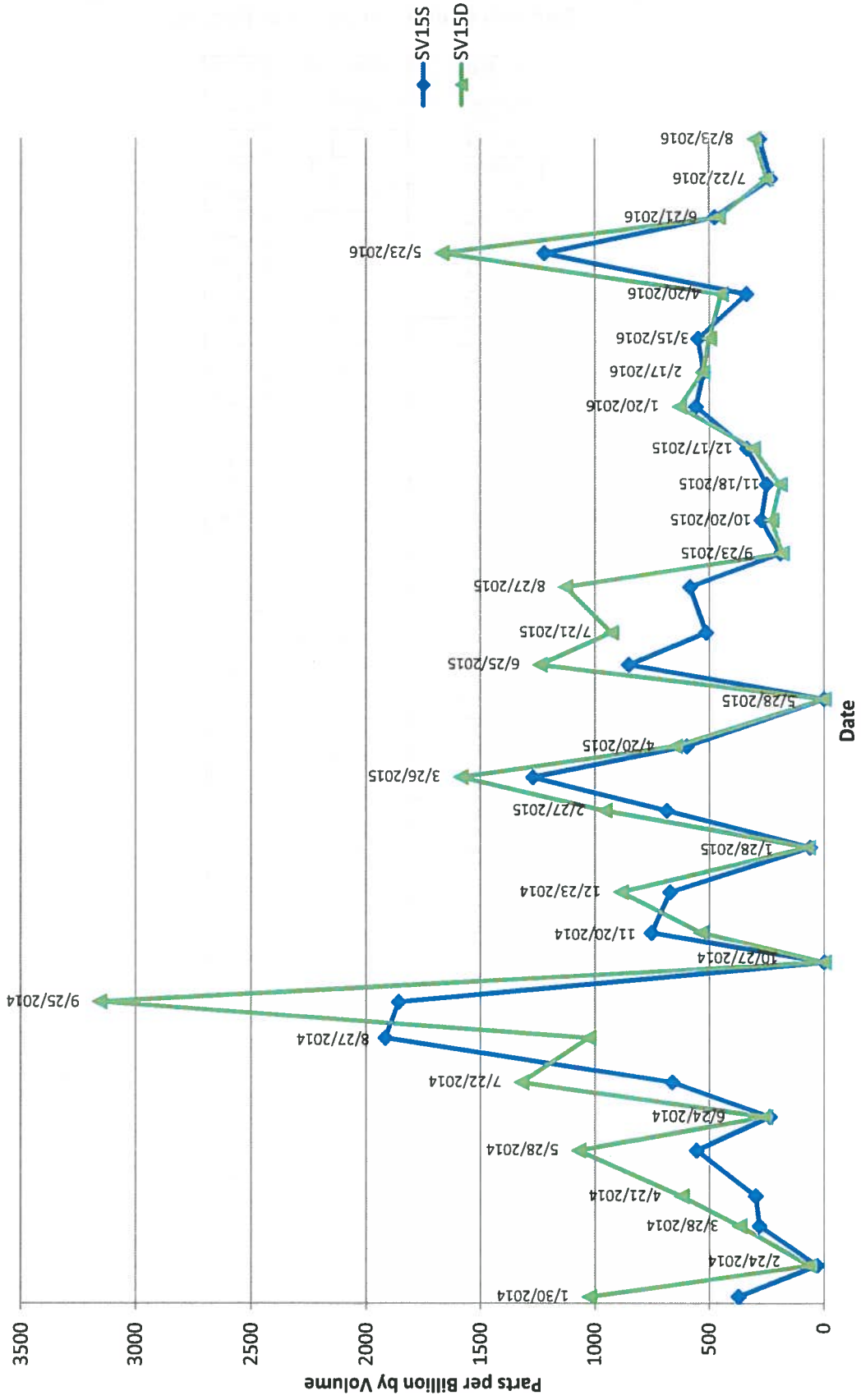


**Table 13**  
**Soil Vapor Results for SV14 (ppbv)**  
**Historical Soil Vapor Monitoring Results - January 2014 Through Present Event**  
**Red Hill Bulk Fuel Storage Facility**

Date	SV14S	SV14M	SV14D
3/28/2014	82	261	170
4/21/2014	282	253	349
5/28/2014	471	640	697
6/24/2014	175	523	824
7/22/2014	323	474	634
8/27/2014	1376	1248	1327
9/25/2014	1295	1023	1067
10/27/2014	0	123	127
11/20/2014	564	678	422
12/23/2014	582	548	654
1/28/2015	44	24	85
2/27/2015	430	371	648
3/26/2015	996	937	1088
4/20/2015	191	111	434
5/28/2015	0	0	0
6/25/2015	560	550	986
7/21/2015	469	454	500
8/27/2015	711	892	344
9/23/2015	148	66	62
10/20/2015	295	320	303
11/18/2015	118	123	161
12/17/2015	406	418	415
1/20/2016	546	543	589
2/17/2016	539	520	543
3/15/2016	523	532	501
4/20/2016	368	371	366
5/23/2016	877	777	778
6/21/2016	427	441	415
7/22/2016	264	287	296
8/23/2016	314	319	289

ppbv: parts per billion by volume

**Figure 14**  
**Soil Vapor Measurements**  
**SV15**



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

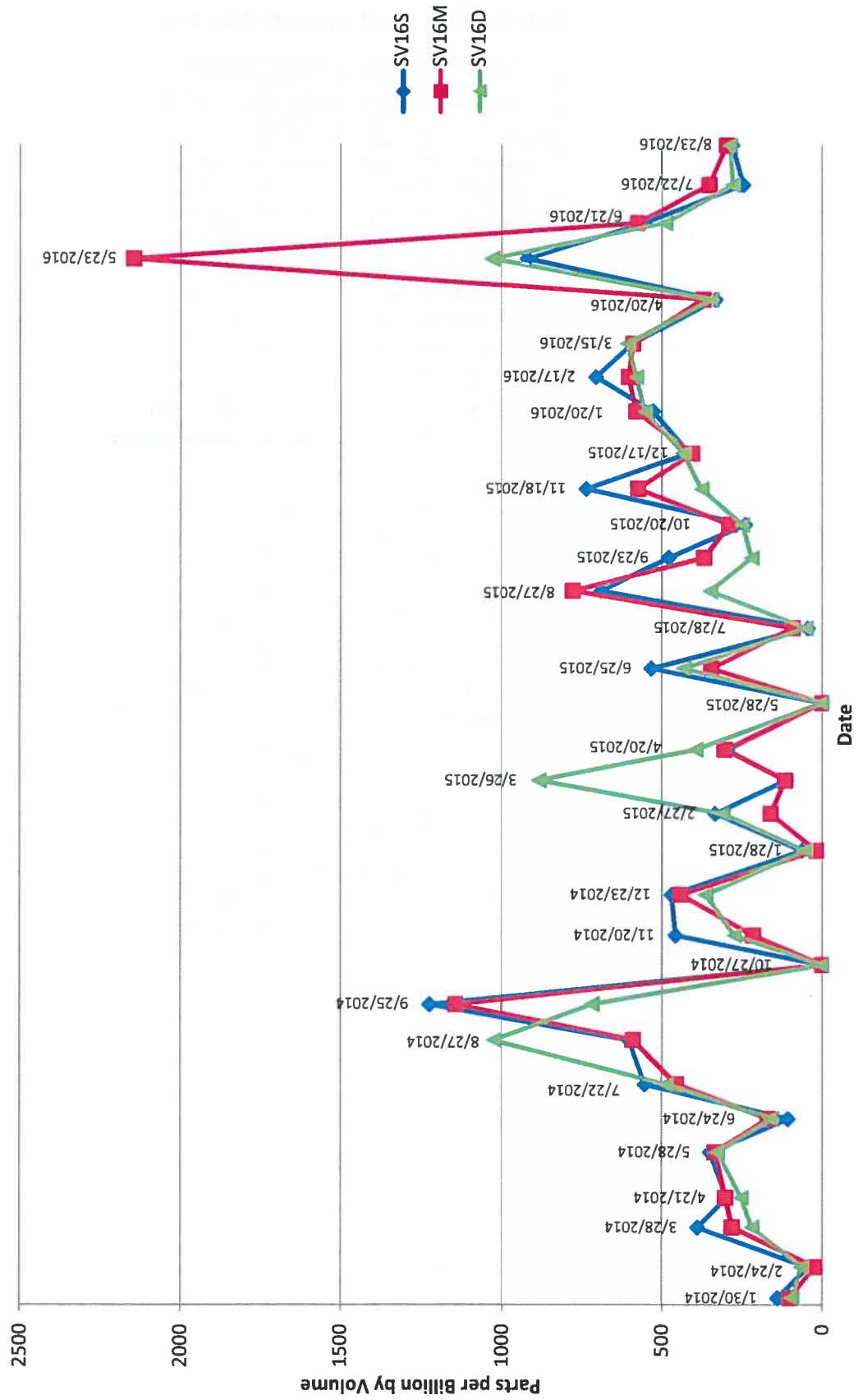
Date	SV15S	SV15M	SV15D
1/30/2014	376	NC <sub>2</sub>	1025
2/24/2014	32	NC <sub>2</sub>	65
3/28/2014	285	NC <sub>2</sub>	372
4/21/2014	302	NC <sub>2</sub>	623
5/28/2014	558	NC <sub>2</sub>	1071
6/24/2014	240	NC <sub>2</sub>	260
7/22/2014	663	NC <sub>2</sub>	1321
8/27/2014	1916	NC <sub>2</sub>	1026
9/25/2014	1857	NC <sub>2</sub>	3159
10/27/2014	0	NC <sub>2</sub>	0
11/20/2014	754	NC <sub>2</sub>	539
12/23/2014	673	NC <sub>2</sub>	886
1/28/2015	62	NC <sub>2</sub>	71
2/27/2015	687	NC <sub>2</sub>	956
3/26/2015	1270	NC <sub>2</sub>	1585
4/20/2015	600	NC <sub>2</sub>	651
5/28/2015	0	NC <sub>2</sub>	0
6/25/2015	851	NC <sub>2</sub>	1239
7/21/2015	515	NC <sub>2</sub>	927
8/27/2015	586	NC <sub>2</sub>	1126
9/23/2015	193	NC <sub>2</sub>	185
10/20/2015	277	NC <sub>2</sub>	230
11/18/2015	253	NC <sub>2</sub>	194
12/17/2015	338	NC <sub>2</sub>	311
1/20/2016	560	NC <sub>2</sub>	633
2/17/2016	527	NC <sub>2</sub>	530
3/15/2016	551	NC <sub>2</sub>	502
4/20/2016	341	NC <sub>2</sub>	451
5/23/2016	1220	NC <sub>2</sub>	1668
6/21/2016	479	NC <sub>2</sub>	463
7/22/2016	236	NC <sub>2</sub>	253
8/23/2016	284	NC <sub>2</sub>	306

ppbv: parts per billion by volume

NC<sub>2</sub>: Not collected due to an obstruction in the vapor line



**Figure 15**  
**Soil Vapor Measurements**  
**SV16**

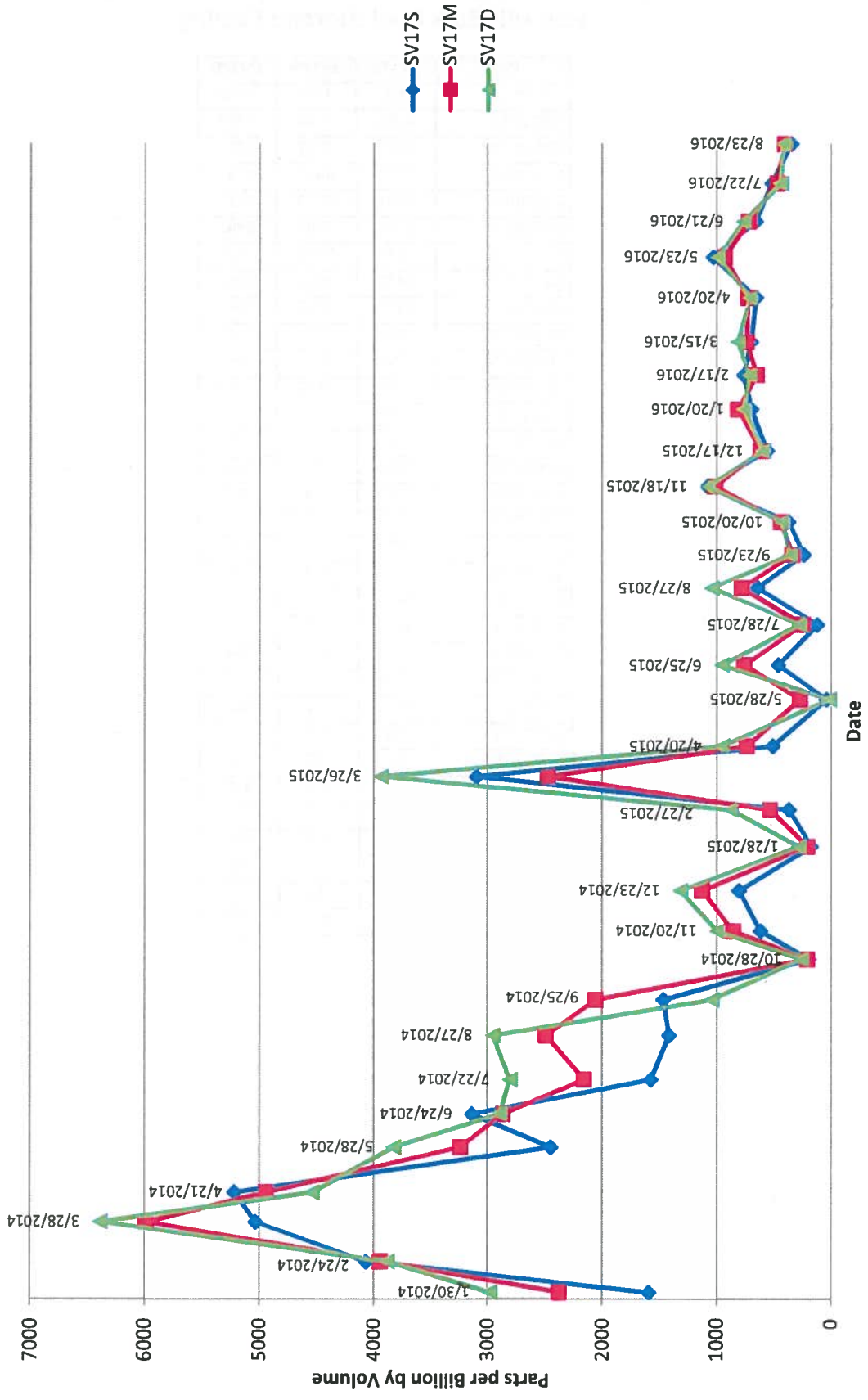


**Table 15**  
**Soil Vapor Results for SV16 (ppbv)**  
**Historical Soil Vapor Monitoring Results - January 2014 Through Present Event**  
**Red Hill Bulk Fuel Storage Facility**

Date	SV16S	SV16M	SV16D
1/30/2014	139	102	95
2/24/2014	44	24	65
3/28/2014	388	281	220
4/21/2014	298	302	253
5/28/2014	348	334	327
6/24/2014	107	169	158
7/22/2014	552	455	488
8/27/2014	602	590	1026
9/25/2014	1226	1143	719
10/27/2014	0	0	0
11/20/2014	458	216	274
12/23/2014	470	442	363
1/28/2015	63	19	54
2/27/2015	333	162	310
3/26/2015	113	116	884
4/20/2015	297	303	393
5/28/2015	0	0	0
6/25/2015	531	346	432
7/28/2015	44	93	50
8/27/2015	689	777	349
9/23/2015	477	367	220
10/20/2015	240	289	249
11/18/2015	735	573	376
12/17/2015	416	406	432
1/20/2016	526	580	552
2/17/2016	705	603	578
3/15/2016	591	589	607
4/20/2016	332	371	344
5/23/2016	920	2147	1031
6/21/2016	555	576	490
7/22/2016	246	353	279
8/23/2016	280	298	287

ppbv: parts per billion by volume

**Figure 16**  
**Soil Vapor Measurements**  
**SV17**

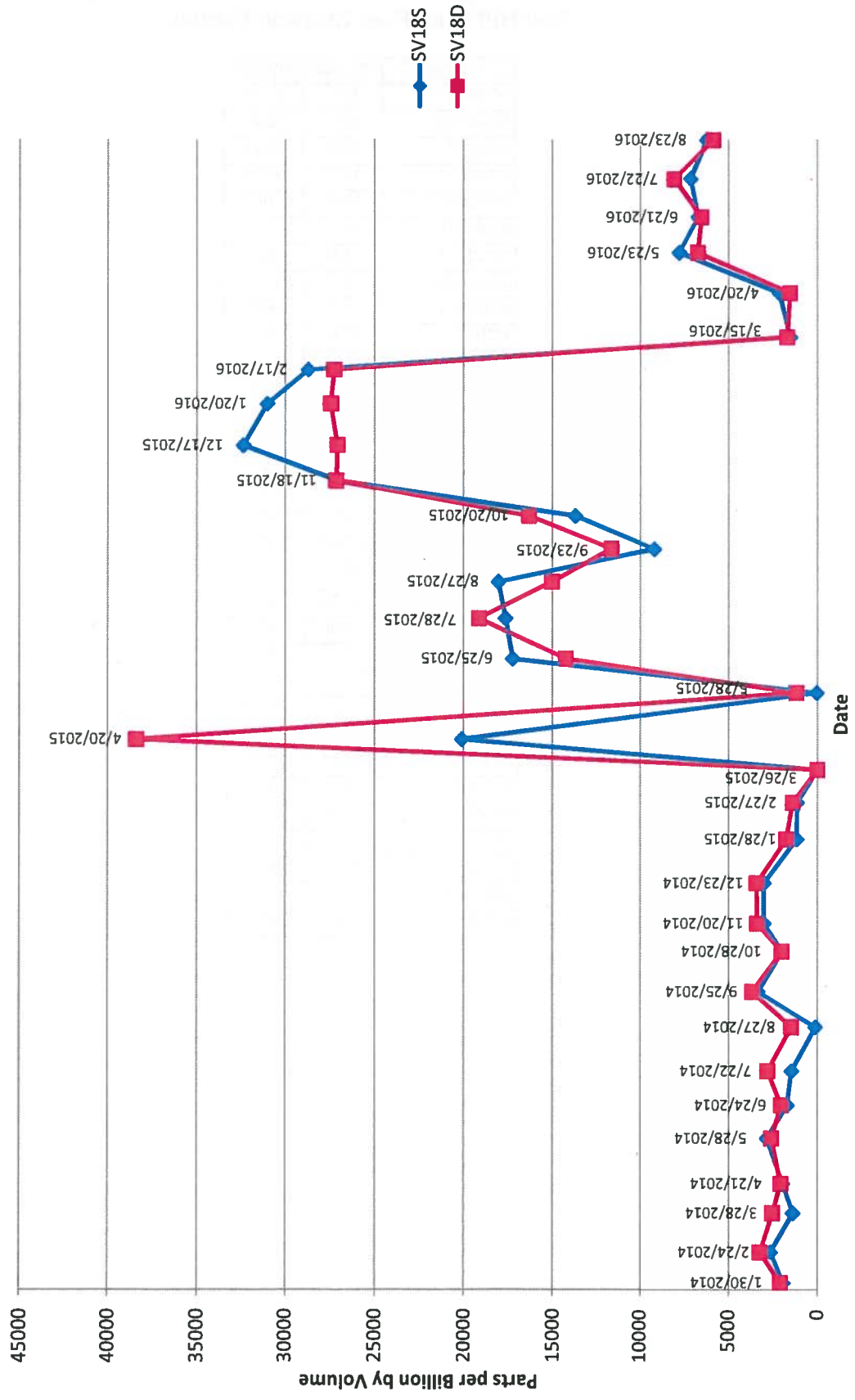


**Table 16**  
**Soil Vapor Results for SV17 (ppbv)**  
**Historical Soil Vapor Monitoring Results - January 2014 Through Present Event**  
**Red Hill Bulk Fuel Storage Facility**

Date	SV17S	SV17M	SV17D
1/30/2014	1598	2378	2980
2/24/2014	4069	3944	3884
3/28/2014	5033	5987	6391
4/21/2014	5221	4941	4541
5/28/2014	2452	3239	3827
6/24/2014	3138	2865	2892
7/22/2014	1578	2156	2804
8/27/2014	1419	2492	2954
9/25/2014	1468	2056	1043
10/28/2014	190	205	257
11/20/2014	618	849	998
12/23/2014	805	1126	1319
1/28/2015	170	202	282
2/27/2015	366	530	877
3/26/2015	3095	2472	3938
4/20/2015	510	734	952
5/28/2015	36	268	11
6/25/2015	462	755	955
7/28/2015	117	243	275
8/27/2015	647	779	1045
9/23/2015	237	334	358
10/20/2015	372	439	424
11/18/2015	1082	1010	1078
12/17/2015	561	612	593
1/20/2016	699	810	759
2/17/2016	765	647	714
3/15/2016	701	736	818
4/20/2016	658	726	704
5/23/2016	1033	928	990
6/21/2016	660	720	766
7/22/2016	520	469	436
8/23/2016	346	404	417

ppbv: parts per billion by volume

**Figure 17**  
**Soil Vapor Measurements**  
**SV18**



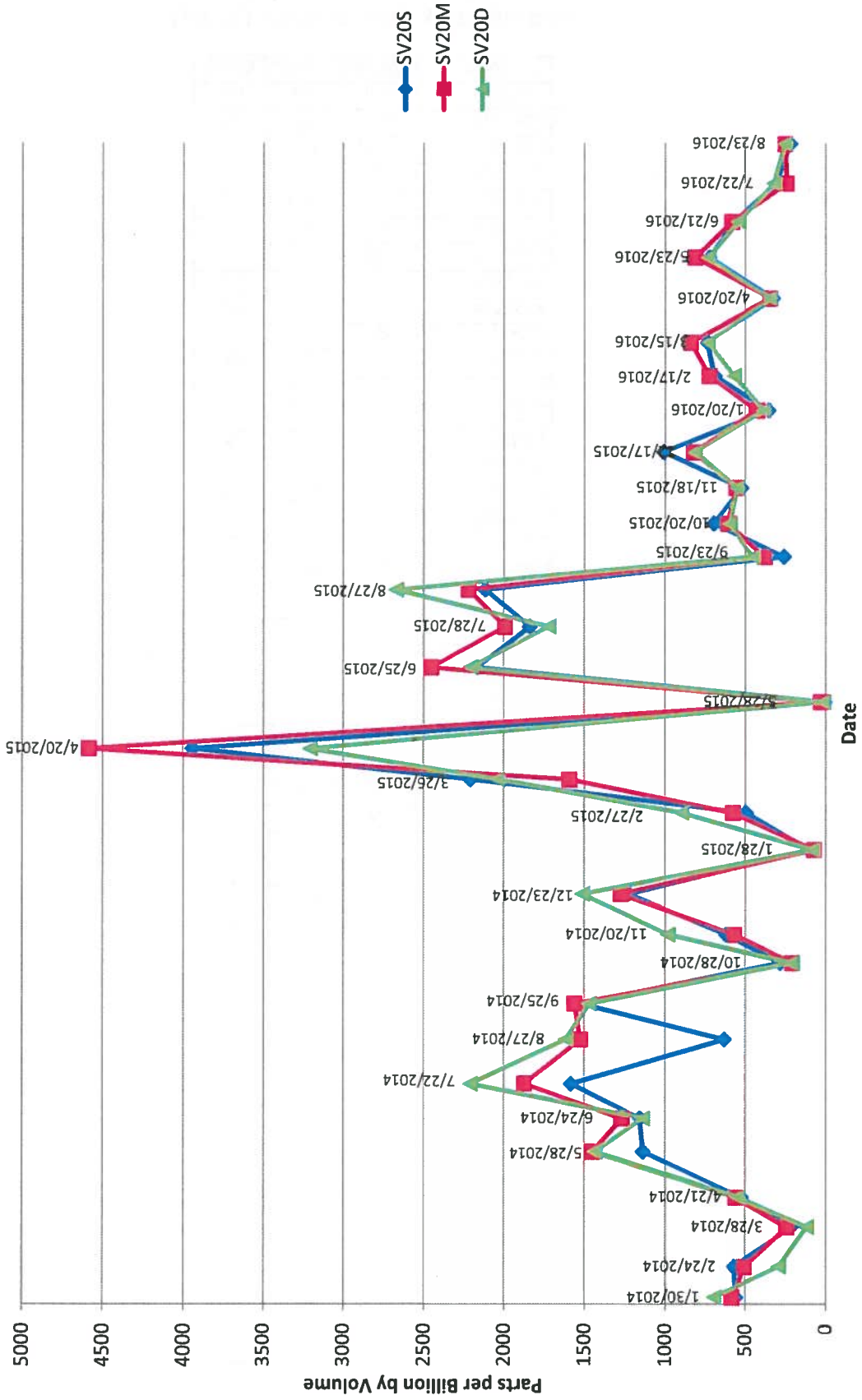
**Table 17**  
**Soil Vapor Results for SV18 (ppbv)**  
**Historical Soil Vapor Monitoring Results - January 2014 Through Present Event**  
**Red Hill Bulk Fuel Storage Facility**

Date	SV18S	SV18D
1/30/2014	1949	2116
2/24/2014	2674	3241
3/28/2014	1392	2545
4/21/2014	1973	2082
5/28/2014	2856	2607
6/24/2014	1727	2050
7/22/2014	1474	2823
8/27/2014	137	1478
9/25/2014	3361	3679
10/28/2014	2001	2008
11/20/2014	3033	3404
12/23/2014	3026	3421
1/28/2015	1179	1762
2/27/2015	1154	1398
3/26/2015	NC <sub>1</sub>	NC <sub>1</sub>
4/20/2015	20100	38400
5/28/2015	47	1191
6/25/2015	17200	14200
7/28/2015	17600	19100
8/27/2015	18000	15000
9/23/2015	9188	11625
10/20/2015	13670	16280
11/18/2015	27097	27153
12/17/2015	32387	27093
1/20/2016	31047	27463
2/17/2016	28737	27267
3/15/2016	1533	1699
4/20/2016	2154	1550
5/23/2016	7787	6740
6/21/2016	6715	6537
7/22/2016	7143	8082
8/23/2016	6230	5871

ppbv: parts per billion by volume  
 NC<sub>1</sub>: Not collected due to maintenance work

**Figure 18**  
**Soil Vapor Measurements**

SV20



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

Date	SV20S	SV20M	SV20D
1/30/2014	560	584	697
2/24/2014	571	505	293
3/28/2014	214	242	118
4/21/2014	526	561	545
5/28/2014	1139	1451	1438
6/24/2014	1160	1271	1143
7/22/2014	1587	1877	2213
8/27/2014	630	1526	1618
9/25/2014	1531	1561	1472
10/28/2014	283	208	211
11/20/2014	620	566	983
12/23/2014	1227	1273	1516
1/28/2015	101	72	80
2/27/2015	495	575	898
3/26/2015	2211	1593	2041
4/20/2015	3939	4586	3207
5/28/2015	3	29	11
6/25/2015	2169	2456	2209
7/28/2015	1840	1994	1724
8/27/2015	2117	2222	2673
9/23/2015	259	379	455
10/20/2015	697	608	595
11/18/2015	523	556	549
12/17/2015	1010	820	813
1/20/2016	355	427	385
2/17/2016	692	724	567
3/15/2016	737	840	733
4/20/2016	327	344	343
5/23/2016	724	813	730
6/21/2016	572	584	542
7/22/2016	306	244	322
8/23/2016	220	251	252

ppbv: parts per billion by volume