JAN 28 2014

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

5090
Ser N45/055
January 27, 2014

CERTIFIED MAIL NO. 7011 0110 0002 1802 1232

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 REPORT FOR TANK 5
DOH FACILITY ID NO. 9-102271
DOH RELEASE ID NO. 99051, 010011 AND 020028

As part of the release response actions for the suspected JP-8 fuel release from Tank 5 verbally reported to the DOH on January 13, 2014, and verbally confirmed on January 16, 2014, soil vapor samples were collected on January 15, 2014.

Soil vapor samples were analyzed in the field for VOC concentrations using a photo-ionization detector. The Soil Vapor Sampling Report is being submitted as Enclosure 1.

VOC concentrations in the soil vapor increased in the middle and deep vapor probes since the last sampling event, which was conducted on December 23, 2013.

The next monthly soil vapor sampling event is tentatively scheduled for January 30, 2014.

If there are any questions regarding this matter, or if more information is needed, please contact Ms. Raelynn Kishaba at (808) 471-1171, extension 233.

Sincerely,

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

5090
Ser N45/055
January 27, 2014

Enclosure: 1. Contract Number N62742-12-D-1853, Contract Task Order 0002, Soil Vapor Sampling Report for Additional Sampling in January 2014 prepared by Environmental Science International, dated January 23, 2014

Environmental Science International
354 Uluniu Street, Suite 304, Kailua, Hawaii 96734
(808) 261-0740 phone / (808) 261-0749 fax

112066

January 23, 2014

Naval Facilities Engineering Command, Hawaii
400 Marshall Road
JBPHH HI 96860-3139

Attention: Mr. Darren Uchima

Subject: Contract Number N62742-12-D-1853, Contract Task Order 0002, Soil Vapor Sampling Report for Additional Sampling in January 2014.

Dear Mr. Uchima,

Environmental Science International [ESI] has prepared this letter report documenting the additional sampling of soil vapor monitoring point SVMP05 conducted at the Red Hill Bulk Fuel Storage Facility [RHSF], Joint Base Pearl Harbor-Hickam [JBPHH], Hawaii. The soil vapor monitoring was conducted on January 15, 2014, under Contract Number N62742-12-D-1853, Contract Task Order 0002, Mod 01. Sampling of soil vapor monitoring point SV05 was conducted in response to the suspected leak at Tank 5.

Soil vapor samples were collected in Tedlar® bags and analyzed in the field for volatile organic compound [VOC] concentrations using a RAE Systems® ppbRAE Plus photo-ionization detector [PID]. Soil vapor monitoring points [SVMPs] were given a SV prefix, followed by the associated tank number, and then the depth identifier ("S" for shallow or front of the underground storage tank [UST], "M" for mid depth or middle of the UST, and "D" for deep or outer edge of the UST). Soil vapor monitoring was conducting in accordance with the standard operating procedures [SOP] included in Attachment A.

Soil Vapor Monitoring Activities

Prior to soil vapor sample collection at SV05, the PID was calibrated outside the tunnel. Soil vapor samples were collected and measured from three SV05 monitoring points located under Tank 05. The SVMP is located inside the RHSF lower access tunnel. A total of three samples were collected. For each sample, a PID reading from the Tedlar® bag was recorded every 10 seconds for 30 seconds. The three recorded values and the maximum peak over the 30 seconds were averaged, and that value was recorded in the field log book.

Monitoring Results

Recorded VOC concentrations ranged from 96 parts per billion by volume [ppbv] in SV05S to 225,000 ppbv in SV05M. An analysis of VOC concentrations collected from each SVMP was performed using

linear trend lines generated from the last four sampling events. The slopes of the linear trend lines were used to evaluate the near-term trends. Negative slope trends indicate decreasing concentrations of VOCs, while positive slopes trends indicate increasing concentrations of VOCs.

If the change in VOC concentrations was less than 10 ppbv per day, the trend was termed as slight. If the change in VOCs was between 10 and 20 ppbv per day, the trend was termed as moderate. If the change in VOCs was greater than 20 ppbv per day, the trend was termed as strong. All slope trends were rounded to the nearest tenth.

Based on the slope trends, the VOC concentrations decreased slightly in SVMP SV05S and increased strongly in SV05M and SV05D. A summary of the slope trends are included in Table 1. Soil vapor monitoring results and graphs for SV05 are included in Attachment B.

Table 1
Summary of Soil Vapor Monitoring Results
Soil Vapor Monitoring Letter Report, January 2014
Red Hill Bulk Fuel Storage Facility

Facility Tank	Fuel Type in Tank	Sampling Location	Slope Trend (ppbv per day)	Description of Trend
Tank 05	JP-8	SV05S	-1.6	Slight Decrease
		SV05M	2,284.9	Strong Increase
		SV05D	2,072.9	Strong Increase

JP-8 Jet Fuel Propellant Number 8

Conclusions and Recommendations

On January 15, 2014, ESI personnel collected 3 soil vapor samples, in accordance with the SOP, from soil vapor monitoring point SV05 at the RHSF. Soil vapor concentrations detected during the soil vapor monitoring event in SV05M and SV05D (225,000and 204,000 ppbv, respectively) significantly increased since the last sampling event conducted on December 23, 2013 (622 and 794 ppbv, respectively). The concentrations detected in SV05M and SV05D are slightly below the project action level [PAL] of 280,000 ppbv.

As stated in the project *Work Plan* (ESI, 2012), if VOC concentrations exceeding 280,000 ppbv (i.e., one-half of the calculated concentration expected above water with dissolved JP-8 at the solubility limit) are detected in SVMPs beneath tanks containing jet fuels (i.e., JP-8), it is recommended that aggressive and proactive actions be taken to assess the integrity of the associated tank system and mitigate, as needed, for potential fuel releases. If, after an inspection of the tank system, it is uncertain whether a leak exists, it is recommended that soil vapor samples be taken for laboratory analysis.

Although VOCs vapors were not detected at concentrations above the PAL of 280,000 ppbv, there has been a significant increase in VOC vapor concentrations in SV05M and SV05D since the last sampling event. Based on the results of the soil vapor monitoring, we recommend increasing the frequency of soil vapor monitoring at SV05 and adjacent SVMPs (specifically SV03, SV04, SV06,

SV07, and SV08). If you have any questions, please call me at either (808) 261-0740 (office) or (808) 479-5217 (cell).

Mahalo,

Robert Chong
Project Manager

Attachments:

Attachment A: Standard Operating Procedures for Soil Vapor Monitoring
Attachment B: Soil Vapor Monitoring Results for SV05

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Attachment A

Standard Operating Procedures for Soil Vapor Monitoring

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Standard Operating Procedures for Soil Vapor Monitoring

Red Hill Bulk Fuel Storage Facility
Naval Supply System Command (NAVSUP) Fleet Logistics Center,
Joint Base Pearl Harbor-Hickam

I. Monitoring Equipment
   a. ppbRAE Plus gas monitor (photo-ionization detector (PID))
   b. Sample pump
   c. 10 ppm isobutylene calibration gas
   d. VOC zeroing tube
   e. Vacuum chamber
   f. Dedicated field notebook
   g. Field forms
   h. Box of nitrile gloves
   i. Flashlight
   j. 15/16 socket and ratchet drive

II. Set up Procedures
   a. Calibrate ppbRAE Plus
      i. Zero calibrate the ppbRAE Plus outside of the tunnel by attaching the glass VOC zeroing tube and the tube adaptor directly onto the ppbRAE probe. The VOC zeroing tube is single use (THROW AWAY AFTER SINGLE USE).
      ii. Span calibrate with 10 ppm isobutylene calibration gas.
      iii. DO NOT attach the plastic filter until after the PID has been calibrated.
      iv. Check the difference in readings after attaching the plastic filter. If the filter is used it may raise the ambient readings significantly. If so, change the filter to a new one.
   b. Place all equipment next to the well being tested.
   c. Open the well cover with the 15/16 socket and ratchet drive (place the cover and bolts at a convenient location out of the way).
   d. Identify the deep, medium, and shallow probes using the reflective tags attached, or the color coded tape (white=deep; blue=mid; orange/yellow=shallow).

III. Sampling Procedures
   a. Purging
      i. Connect the first probe purge tube to the intake nozzle on the pump.
      ii. Open the probe purge valve by making it parallel to the rest of the apparatus.
      iii. Turn on the pump and purge at a rate of less than 200 milliliters per minute (record purge time).
   b. While Purging

i. Place the tedlar bag inside the vacuum chamber. Each probe should have a dedicated tedlar bag with color coded tape (stored in a Ziploc® bag inside the well).
ii. Connect the tygon tube to the tedlar bag inside the vacuum chamber, then open the bag's valve. Connect the other end of the tygon tube to the vacuum chamber's inside "sample inlet port".
iii. Close the vacuum chamber to create an air tight seal.
iv. Attach a ¼-inch tygon tube to the vacuum chamber's outside "vacuum outlet port". The other end of this tygon tube will connect to the sample pump after purging is completed.

c. Collecting Samples and VOC Measurements
i. Once purging is complete, turn off the pump then detach the probe purge tube from the pump.
ii. Attach the ¼ inch tygon tube, which is attached to the vacuum chamber's "vacuum outlet port," to the pump.
iii. Using another tygon tube (and attachments, if necessary), connect the probe purge tube to the "sample inlet port" on the vacuum chamber.
iv. Be sure the tedlar bag valve and probe purge valves are open.
v. Start the pump and cover the compression hole (on the vacuum chamber) to fill the tedlar bag. (Note: When activated, the pump evacuates air from inside the chamber. The sample bag inflates as a result of the interior pressure drop. The air from the probe is sampled directly into the bag without passing through the pump.)
vi. Observe the bag to prevent overfilling.
vii. Once the bag is full, open the vacuum chamber, close the bag's valve, then turn off the pump (if air is escaping from the bag when the lid is opened, then try again, however, only partially cover the compression hole to relieve the pressure in the chamber while vapors are slowly collected in the tedlar bag).
viii. Detach the tedlar bag and reattach it to the PID.
ix. Be sure the PID is on survey mode, open the bag valve and begin testing.
x. **Once numbers begin to appear** on the PID screen take readings every 10 seconds for 30 seconds.
xi. Once the 30 seconds is up, press "MODE" then "Y" to stop.
xii. Take the average value of the 3 recorded values and the peak value over 30 seconds.
xiii. Place the PID back on survey mode.

d. Close the probe purge valve and begin purging the next probe.
e. While purging
i. Deflate the tedlar bag and begin preparations for the next sample with the appropriate dedicated tygon tubing.
ii. Continue this process until all points at the location have been tested.

IV. Tear Down Procedures
a. Close all soil vapor monitoring probe purge valves.
b. Return the dedicated tedlar bags to the Ziploc® bag and place back in the well, then secure the well cover.

c. Be sure to test the PID in the main tunnel between each location, record background levels (if it reads more than typical background for the day, change the plastic filter).

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Attachment B

Soil Vapor Monitoring Results for SV05

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Table 1
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	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
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	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	225,000	204,000

ppbv: parts per billion by volume

NC_1: Not collected due to maintenance work

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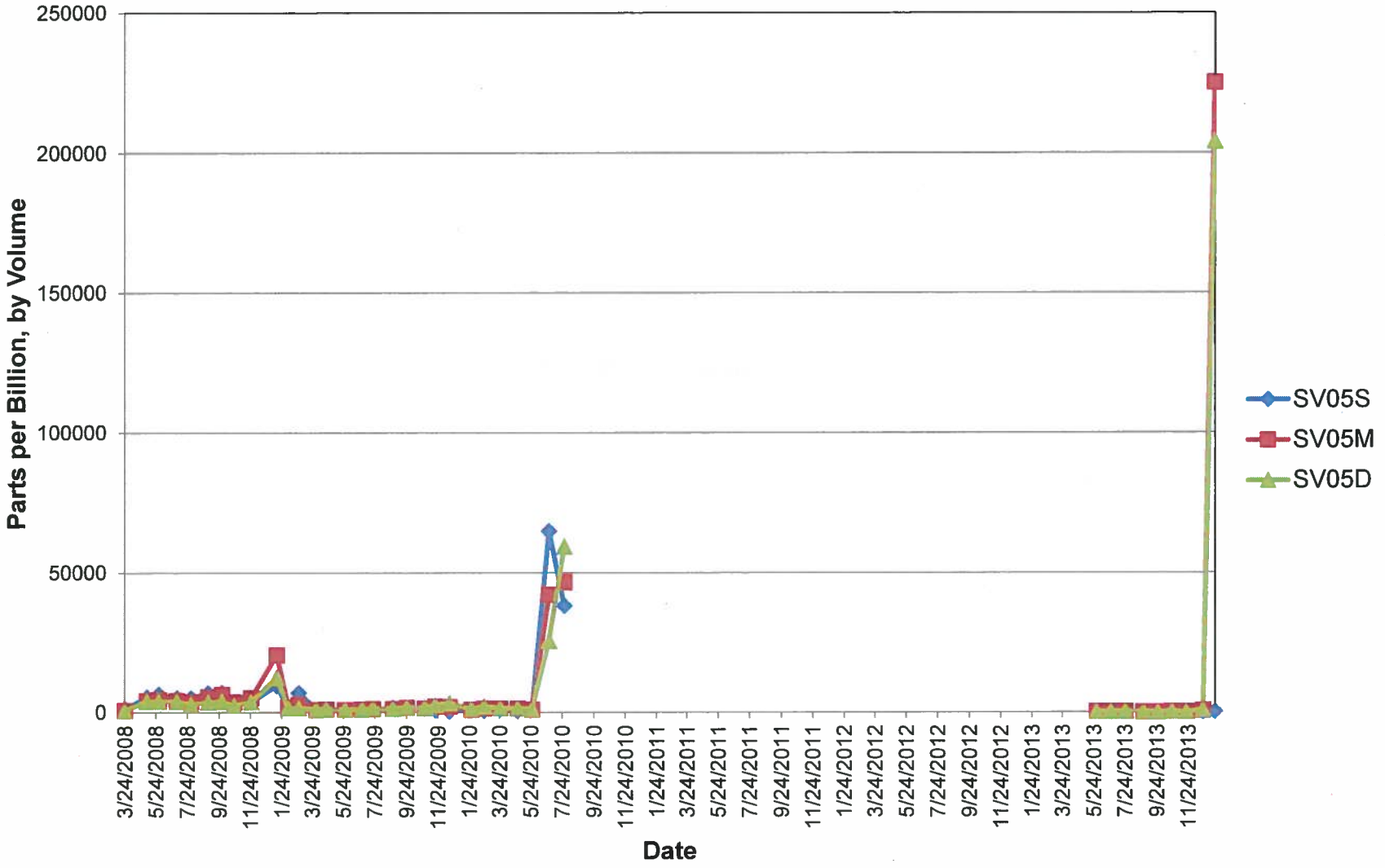
Figure 1
Soil Vapor Measurements
SV05



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