

EVENT INVESTIGATION REPORT

AW02E AOP-015 Event on 11/20/2014

Event Investigation Report Number: EIR-2014-046

Event Investigation Team Lead

12-10-14

Date

PER Responsible Manager

12/10/14

Date

PER No. WRPS-PER-2015-2205

AW02E AOP-015 Event on 11/20/2014

Investigation Summary

On Thursday, November 20, 2014, a Nuclear Chemical Operator (NCO) was performing surveillance activities in AW farm looking for heater configuration in various established warming tents. When the NCO entered the tent at AW 02E, the NCO encountered an odor described as “strong onions” and exited the tent. The odor was reported to management and AOP-015 was entered.

The NCO stepped within the warming tent at AW 02E and inhaled. The NCO immediately encountered the “strong onion” smell and immediately exited. The NCO described feeling “light headed”. The NCO stated that after taking about two breaths of fresh air outside the tent, the NCO “felt fine”. The NCO notified his management. The NCO’s manager sent an escort to the NCO to take him to Occupational Medical Services (HPMC) who arrived within minutes of the call. The NCO filled out an Odor Response Card. The NCO was evaluated at HPMC and returned to work without restriction.

Subsequent Industrial Hygiene samples were analyzed and data collected with no analyzed chemical above action levels. Operations initiated a “Red Arrow” logbook entry which states “Entry into DST (double shell tank) valve pit tent enclosures required IHT (Industrial Hygiene Technician) coverage or SCBA.”

Tank ventilation was running. There was no appreciable change in tank level or pressure and the wind was calm.

A Fact Finding meeting was not held. A personnel interview was conducted, odor response card was reviewed and data gathered.

Event Timeline

November 20, 2014

1345 NCO entered tent AW-02E and encountered odor of “strong onions”.

1346 NCO reported events to management.

1348 Escort arrives to take NCO to HPMC.

1350 AOP-015 entered.

1358 Industrial Hygiene support arrives at Central Shift Office.

1359 Event Investigation Initiated.

1405 NCO arrives at HPMC.

1425 NCO blood sample is drawn

1431 IHTs enter AW farm and perform monitoring and sample collection.

AW02E AOP-015 Event on 11/20/2014

1500 IHTs exit AW farm and return to laboratory to analyze samples and perform HAPSITE analysis.

1539 Initiated Event Investigation

1831 HAPSITE analysis complete.

1930 Samples analyzed with no results above action levels. HAPSITE analysis did indicate a total VOC of .036 ppm (exposure limit of 2ppm). AOP-015 for AW farm exited.

1943 AW farm downposted from AOP-015 conditions. AOP-015 exited.

11/21/2014

1546 Central Shift Operations initiated a "Red Arrow" logbook entry stating "Entry into DST valve pit tent enclosures required IHT coverage or SCBA."

11/24/2014

0945 Central Shift Operations Revised "Red Arrow" entry from 1/21/2014 1546 to "The enclosures set up over the top of DST pits will be considered Low Threshold Vapor (LTV) areas and the LTV requirements will be applied."

Compensatory Measures

1. Entered AOP-015
2. Restricted access to AW farm
3. IH planned and executed IH sample plan.
4. Initiated "Red Arrow" logbook entries requiring treatment of the enclosures as Low Threshold Vapor areas.

Preliminary Extent of Condition Review

If the tent is a contributor to retaining the odor, there are three total warming tents in AW farm and more may be present in other locations.

Discussion of Potential Causes

Cause is indeterminate from the information available.

Discussion of Barriers That Could Have Impacted the Cause

Indeterminate

AW02E AOP-015 Event on 11/20/2014

Recommendations/Proposed Corrective Actions

1. Consideration should be given to incorporating the “Red Arrow” requirements into the General Hazards Analysis.
2. Consideration should be given to evaluating the source of an “onion-like” odor that has been reported in several events at AW Farm. Prior events included workers detecting similar odors upon opening cathodic protection systems remote from the valve pit for this event.
3. Consider reviewing the enclosure configuration with the elephant trunk type ducting to determine if there is any effect on the air quality, movement, exchanges within the enclosure not accounted for.

Lessons Learned

To be addressed, if required, by the causal analysis via a corrective action under WRPS-PER-2014- 2205.

Attachments (as they apply):

1. List of personnel contacted
2. Log Book Entries
3. Weather Information
4. Stack Flow
5. Ventilation Flow
6. Odor Response Card
7. Industrial Hygiene Report

**Words in italics for explanatory purposes only, delete upon completion of report.*

AW02E AOP-015 Event on 11/20/2014

Attachment 1
List of Personnel Contacted

1. AW farm NCO
2. EV Farm Area Dayshift Manager

AW02E AOP-015 Event on 11/20/2014

Attachment 2
Log Book Entries

152

11/20/14

D-SHIFT

1215 - DECONTAMINATE THE HANDLING AND/OR CLEANING OF USED RESPIRATORY EQUIPMENT, OTHER THAN YOUR OWN UNLESS YOU HAVE RECEIVED THE TFC SUSCEPTIBLE PATHOGEN TRAINING (351545 AND 351526)

1117 - UPDATE TO 1015 ENTRY. THE POC'S ARE AND THE RESPONSIBILITIES FOR LIFTING THE RED PROGRAM WILL BE A CHANGE TO TABLE 1 OF TFC-ESHQ-S-SID-24 LOWER RIGHT BOX TO READ "HANDLING AND/OR CLEANING" MAKE POWER PROCESSOR CHANGE TO EVALUATE CHANGE MONDAY MORNING. SOEN SENT AND, AND NOTIFIED. PER 22 1/20/14.

1243 - UPDATE TO 0900 ENTRY. RETURNED TO WORK WITH OUT RESPIRATOR. SOEN SENT, RANCIOLA AND NOTIFIED.

1245 - A NUC SAFETY SUB CONTRACTOR WAS TAKEN TO HPMC AND TRANSPORTED VIA AMBULANCE TO HADJICE FOR AN INJURY SUSPECTED OFF SITE OF A PERSONAL NATURE. FELL AT HOME AND BECAME LIZZY AT WORK. NOTIFIED HIS CONTACT WEIRICH CONSULTING SERVICES. SOEN SENT,

NOTIFIED.

1267 - NOTIFIED BY ENGR THAT THE EMERGENCY HUT IS ON TEMP POWER AND SHOULD BE RESTORED TO SOURCE POWER IN 8 HRS. SHOULD NOT ATTEMPT TO RUN SERVICE.

1310 - AY-2 PGM IS BACK IN SERVICE.

1360 - ENTERED AOP-015 FOR OILY OILS IN AWC02E FDR TEST SAMPLED BY CAUSING HRM DEBRIDES. HE IS BEING TRANSPORTED TO HPMC FOR EVALUATION. ALL CALL MADE, SOEN SENT, NOTIFIED. LHM'S ARE PROGRAM SURVEYS PER AOP-015 FOR TANK OILS.

1431 - RECOVERY PLAN # 80-RP-14-06 ISSUED FOR SY VTP B FROM LEO SLA.2.2.

AW02E AOP-015 Event on 11/20/2014

11/20/14

D-SHIFT

1539 - EVENT INVESTIGATION 2014-246 WAS INITIATED FOR THE AW02E AOP 015 ENTRY. POC

1602 - C- RETRIEVAL PROCESS IS BACK IN SERVICE.

1721 - EXTENDING TIME MONITORING FOR AN VTP SIMPLY RETURNED TO SERVICE ON 11/20/14 AS INDICATED IN AN TEAM LOG BOOK AN-002 PAGE 251 AND COMPLETION ~~START~~ SR 3.1.3A AND SR 3.1.3B, SOEN SENT AND

1753 - RELIEVED AS CSM BY

1753 - ASSUMED DUTY AS CSM.

1932 - Sample analysis for the AW Farm AOP-015 event are complete and the results are at or below ~~action limits~~ ^{background levels} ~~emissions~~. Dispatched NEO to downpost AW Farm. SOEN sent, radio announcement complete. AOP-015 exited.

1943 - AW Farm has been downposted, routine access restricted.

1944 - Not. back (Sr. Manager) and left comments for end (DUE)

2315 - GR-2 reports an AP Farm H./Lo temp annunciator cabinet 904 alarm. Alarm will not clear, verified heater is operating, doors closed, and ladders closed per ARP.

11/21/14

G-SHIFT

0039 - GR-2 increased AN VTP fan speed to 2000 RPM to bring tank pressure back within normal range.

0044 - Relieved as CSM by

0044 - Relieved as CSM.

010 - Supply truck into AP Farm per route map and spotters. Vehicle sticker verified correct.

0154 - Supply truck out of AP Farm.

0202 - FORD3 exhaust secured for maintenance.

11/21/14

AW02E AOP-015 Event on 11/20/2014

Attachment 3 Weather Information

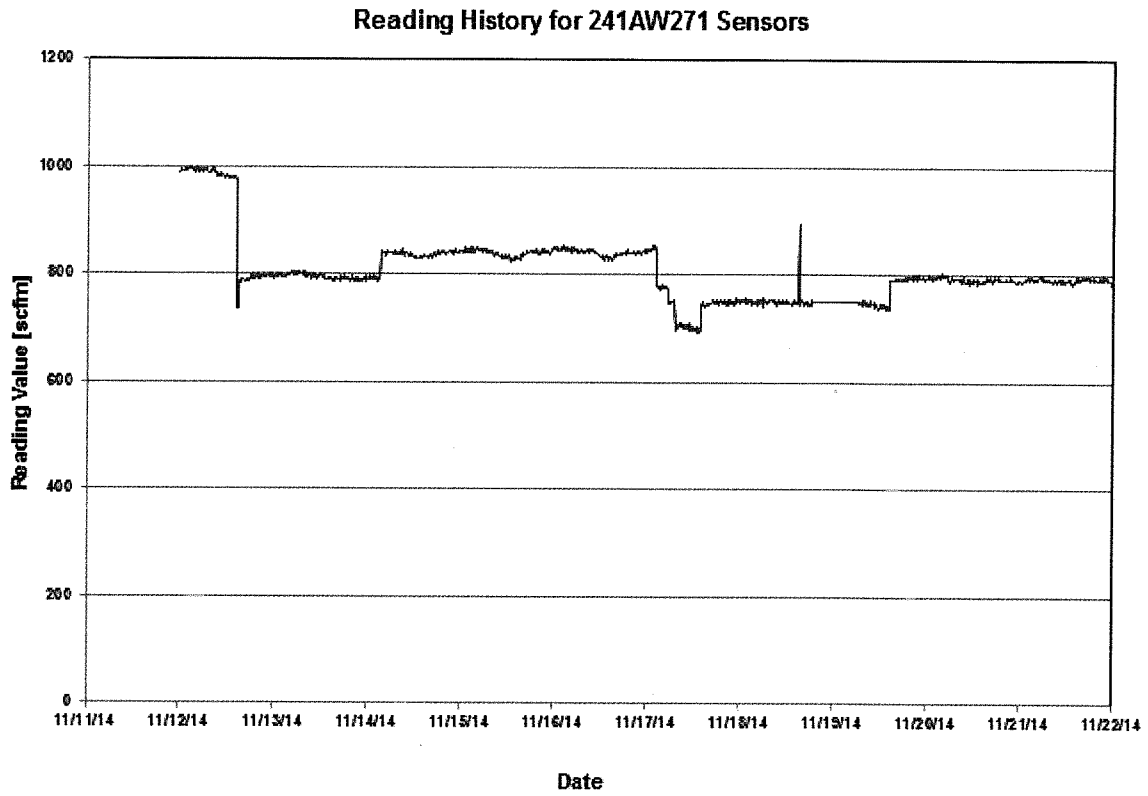
Tower Information				Fri Nov 21		00:02:21 PST 2014					
yr	mo	day	hr	Solar	Prevailing Wind			Peak Gust		Time	Stab
					Degrees	Speed	Direction	Degrees	Speed		
14	11	20	1	0.00	20.0	3.4	NNE	15.4	4.495	00:15	E
14	11	20	2	0.00	40.0	2.9	NE	33.9	4.706	01:11	D
14	11	20	3	0.00	340.0	2.4	NNW	354.3	4.495	02:47	D
14	11	20	4	0.00	320.0	3.5	NW	324.2	5.336	03:36	D
14	11	20	5	0.00	350.0	3.5	NNW	332.5	5.126	04:13	D
14	11	20	6	0.00	340.0	3.4	NNW	357.1	5.757	05:05	D
14	11	20	7	0.00	330.0	3.5	NW	345.9	4.916	06:17	D
14	11	20	8	0.01	280.0	3.6	W	306.1	7.019	07:43	D
14	11	20	9	0.11	280.0	5.1	W	276.1	8.280	08:49	D
14	11	20	10	0.25	330.0	4.9	NNW	358.7	8.491	09:44	D
14	11	20	11	0.16	330.0	3.9	NNW	335.5	7.019	10:14	D
14	11	20	12	0.15	320.0	3.7	NW	326.7	8.070	11:20	D
14	11	20	13	0.20	310.0	4.4	NW	290.0	7.860	12:58	D
14	11	20	14	0.13	330.0	4.3	NNW	323.6	7.860	13:06	D
14	11	20	15	0.09	320.0	3.8	NW	319.8	6.808	14:48	C
14	11	20	16	0.03	310.0	4.7	NW	317.0	6.598	15:18	D
14	11	20	17	0.00	300.0	4.4	WNW	308.9	6.388	16:23	D
14	11	20	18	0.00	280.0	4.9	W	289.2	7.439	17:45	D
14	11	20	19	0.00	270.0	4.6	W	278.4	7.650	18:19	D
14	11	20	20	0.00	290.0	4.0	WNW	288.0	5.757	19:15	D
14	11	20	21	0.00	270.0	4.2	W	263.3	6.808	20:55	E
14	11	20	22	0.00	230.0	4.6	SW	215.1	6.388	21:20	E
14	11	20	23	0.00	200.0	2.1	SSW	212.4	3.444	22:05	E
14	11	20	24	0.00	220.0	2.6	SW	225.0	5.547	23:41	E

14112024 332 398-999 237 298 302 307 303 306 303 297 9922 39931 39933 523 66

Delta T1 = T200 - T3 =	6.6	Pasquill Category =	E
Delta T2 = T250 - T50 =	0.4	200 ft Winds =	31.3
Delta T3 = T200 - T30 =	0.5 (NRC)	Least Dilution =	99.9 ALOFT

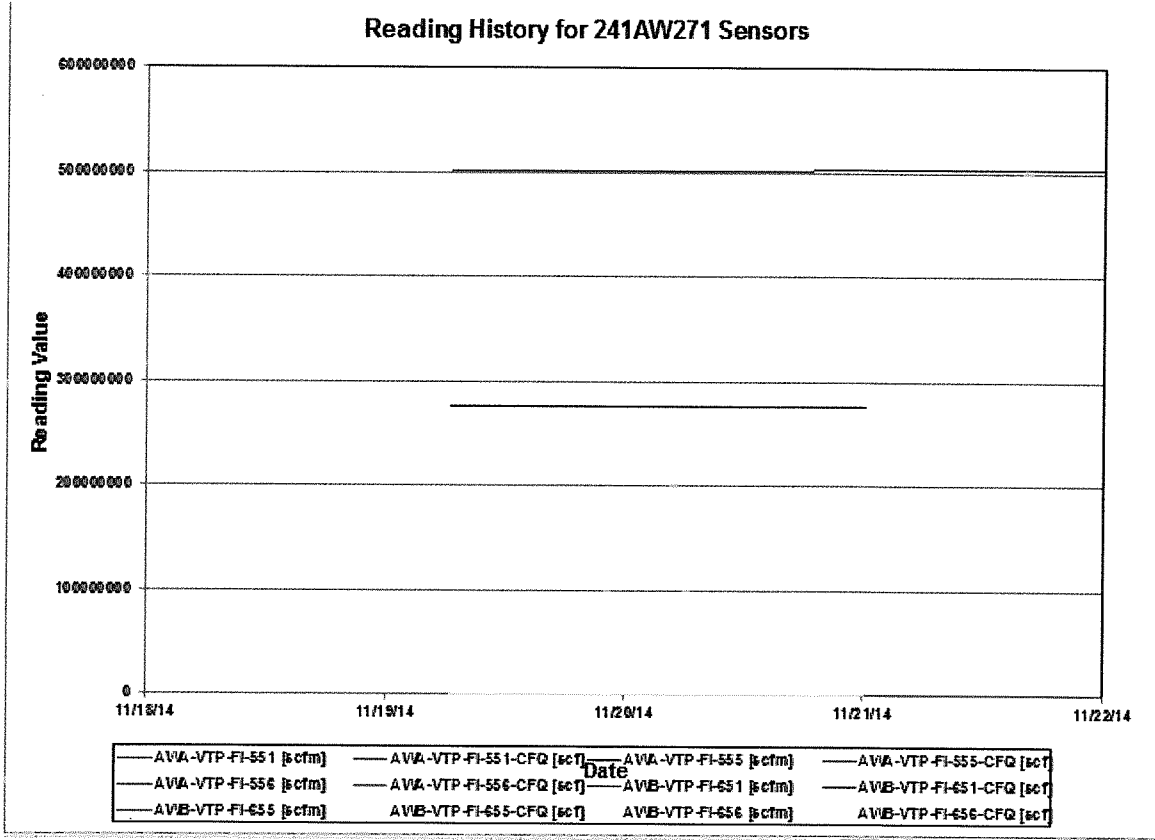
AW02E AOP-015 Event on 11/20/2014

Attachment 4
Stack Flow



AW02E AOP-015 Event on 11/20/2014

Attachment 5
Ventilation Flow



AW02E AOP-015 Event on 11/20/2014

Attachment 6
Odor Response Card
Odor Response Card

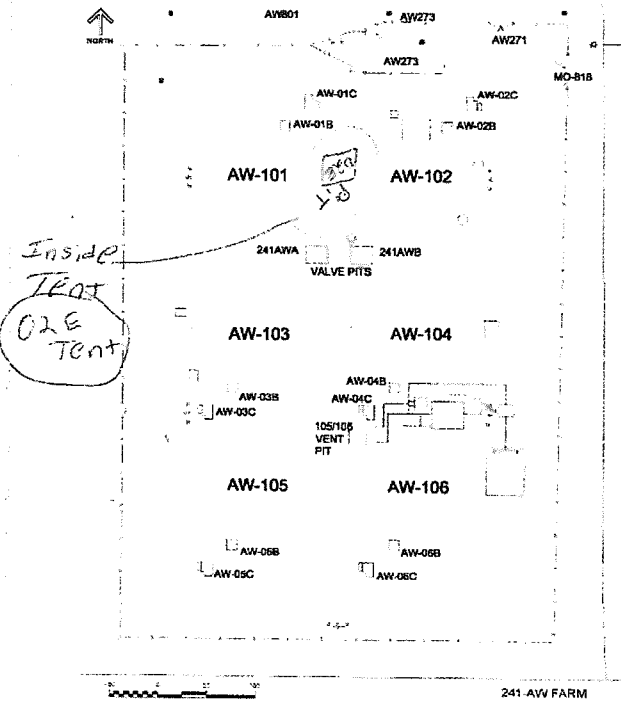
1. Contact CSM, [redacted] complete below bulleted information and map.

- Your name and the work you were performing checking Temp & heaters
- Your symptoms (if any) Dizzy - immediately -
- Time odor was noticed 1345 - 11/20/14
- Location of odors (mark area on map and wind direction) NO Wind (O2E Pit)
- Describe the odor onions - strong
- Name of others in or near the affected area NONE
- Was an IHT present? NO
- Possible source Pit COVER cracks

2. Send this card to the Central Shift Office.

Odor Response Card

1. Notify Immediate Supervisor.
2. Contact Central Shift Manager, [redacted] Provide below bulleted information.
3. Complete map, return to Central Shift Office as soon as practicable.
4. Notify Immediate Supervisor.
5. Contact CSM, [redacted] complete below bulleted information and map.
- Your name and the work you were performing
 - Your symptoms (if any)
 - Time odor was noticed
 - Location of odors (mark area on map and wind direction)
 - Describe the odor
 - Name of others in or near the affected area
 - Was an IHT present?
 - Possible source
6. Provide information on the back of card.
7. Send this card to the Central Shift Office.



AW02E AOP-015 Event on 11/20/2014

Attachment 7 Industrial Hygiene Report

Washington River Protection Solutions TF-AOP-015 INDUSTRIAL HYGIENE INVESTIGATION REPORT	PER Number:																																								
Time/Date & Event location: 1345/Nov 20 th , 2014, AOP-15 AW-02E Pit Tent																																									
<p>1. <u>Event Summary (including number of workers involved and activity in progress):</u> 1 operator inside AW farm was performing routine surveillances checking pit and tent temperatures. No valve or system manipulation was taking place.</p> <ul style="list-style-type: none"> • Was an IHT Present? [] Yes [X] No • Was Respiratory Protection Being Worn by Affected Worker(s)? [] Yes [X] No <p>2. <u>Summary of Employee Reported Information (e.g., symptoms):</u></p> <ul style="list-style-type: none"> • Attach Completed Odor Response Card <p>3. <u>Identification of Source of the Concern:</u> [] Yes [] No</p> <p>4. <u>Time Line of the Event:</u></p> <p>1345 Employee experienced odor 1355 SOEN: "Entering AOP-015 for odors in AW Farm. CSM" 1358 2 IH, 2 IHT, HSM, IHTS arrive at CSO 1359 2 IH, 2 IHT, HSM, IHTS briefed by CSO: Employee smelled onion odor and experienced dizziness in AW02E Pit tent. Odor response card not yet completed. RBA in tent. Affected employee on route to SOMC in 200W 1401 IHT's briefed on odor response by HSM with IH concurrence and leave CSO to mask station to acquire SCBA 1405 CSM confirmed that no personnel were currently in the farm. 1408 IH informed that odor response card was being completed by affected employee while in route to SOMC in 200W 1412 IHTs leave CSO to report to AW change trailer 1415 IHs and CSM briefed by AW IH that the system contained by the tent is part of the transfer system and is a potential leak point when transfers are taking place. 1416 CSO notified by phone that affected employee was checking pit and tent temperatures. No valve or system manipulation was taking place. 1431 IHT's enter farm to perform monitoring and collect bags for analysis. 1500 IHT's exit farm, return to lab to start processing field data and HAPSITE analysis. 1813 HAPSITE analysis complete.</p> <p>5. <u>Summary of IH Monitoring and Sampling Data:</u></p> <p>a. <u>Monitoring.</u> IHT's collected two bags for analysis inside O2E tent, also swept farm before exiting. Field readings are reported below. DRI-14-07643.</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>AGENT</th> <th>@ODOR</th> <th>@SOURCE</th> <th>EXPOSURE LIMIT</th> <th>REPORTING LIMIT</th> </tr> </thead> <tbody> <tr> <td>Ammonia</td> <td>0ppm</td> <td>ppm</td> <td>25 ppm OEL/35ppm STEL</td> <td>>0 ppm</td> </tr> <tr> <td>Total VOCs</td> <td>0ppm</td> <td>0.36ppm</td> <td>2 ppm AL</td> <td>>0 ppm</td> </tr> <tr> <td>Mercury</td> <td>0.000047mg/m</td> <td>mg/m</td> <td>0.025 mg/m³ OEL</td> <td>0.000016 mg/m³</td> </tr> <tr> <td>Nitrous Oxide</td> <td>0ppm</td> <td>ppm</td> <td>25 ppm AL</td> <td>>0 ppm</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> <p>b. <u>GCMS Sample Results.</u> The bag brought from AW farm contained trace amounts of solvents and background. The amount of VOC's found by the Hapsite was ~36 ppb. The identity of the small peaks in the 3 to 8 minute range indicates use of solvents. No compounds with a known "onion" odor were identified</p>		AGENT	@ODOR	@SOURCE	EXPOSURE LIMIT	REPORTING LIMIT	Ammonia	0ppm	ppm	25 ppm OEL/35ppm STEL	>0 ppm	Total VOCs	0ppm	0.36ppm	2 ppm AL	>0 ppm	Mercury	0.000047mg/m	mg/m	0.025 mg/m ³ OEL	0.000016 mg/m ³	Nitrous Oxide	0ppm	ppm	25 ppm AL	>0 ppm															
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AW02E AOP-015 Event on 11/20/2014

Washington River Protection Solutions TF-AOP-015 INDUSTRIAL HYGIENE INVESTIGATION REPORT		PER Number: _____
Time/Date & Event location: 1345/Nov 20 th , 2014, ACE-15 AW-02E Pit Tent.		
c. <u>Sampling:</u> <ul style="list-style-type: none"> • <u>Source</u> [] Yes [x] No • <u>Area</u> [] Yes [x] No • <u>Personal</u> [] Yes [x] No 		
6. <u>Weather Conditions at Time of Event:</u> <ul style="list-style-type: none"> • <u>Wind Direction & Speed</u> NW 3mph • <u>Barometric Pressure (steady/rising/falling)</u> 29.33 at 1300, 29.32 at 1400, 29.32 at 1500 • <u>Temperature (°F)</u> 30 degrees 		
7. <u>Recommendations/Conclusions:</u> Analysis of the field data and HAPSITE show no significant readings that would correlate to strong onion smell. This tent is accessed frequently to check heaters, monitor temperatures, etc.		
8. <u>Other:</u> N/A		
9. <u>IH Monitoring/ Sample Survey Reports:</u> DRI-14-07643 can be accessed for field/HAPSITE analysis data.		
IH Author	(Print) _____ (Sign) _____	_____ Phone _____ Date
S&H Program Mgmt.	(Print) _____ (Sign) _____	_____ Phone _____ Date