

**EVENT INVESTIGATION REPORT**

**EIR-2015-035**

**Health Physics Technician (HPT) Experienced Metallic Taste**

\_\_\_\_\_  
Event Investigation Team Lead

11/18/2015  
\_\_\_\_\_  
Date

\_\_\_\_\_  
PER Responsible Manager

11/18/2015  
\_\_\_\_\_  
Date

PER No. WRPS-PER-2015-2080

## Health Physics Technician (HPT) Experienced Metallic Taste Investigation

### Summary

WRPS-PER-0215-2080 documents the following:

*On Monday, September 28, 2015, at ~0950 a Health Physics Technician (HPT) experienced a metallic taste in her mouth while walking to the restrooms outside of the C Farm fence. The HPT returned to the C Farm change tent and began feeling very light-headed, disoriented, and shaky. The employee reported her condition to her manager. The Central Shift Office was contacted and the employee taken to HPMC for further evaluation. At approximately, 1010 AOP-015 was entered. Once at HPMC, the HPT reported that her shakiness subsided, however the HPT still felt light-headed and disoriented.*

Supplemental information was provided by an employee statement:

*While walking to the restroom around the outside of the fence at C farm I experienced a metallic taste in my mouth. I then returned to the change tent and began feeling very lightheaded and shaky. At that time I reported it to my manager and went to HPMC where the shakiness subsided quite a bit but I did still feel light headed and disoriented. After some time I began to feel better. I was given a medical exam and had urine and blood samples taken. I am currently awaiting the results for those tests.”*

Interviews provided some additional clarification. The worker did continue to the restroom before returning to contact her manager. The employee’s manager indicated the employee had not eaten breakfast and had eaten an apple prior to going to HPMC Occupational Medical Services (HPMC). The taste sensation occurred on the way to the restroom and the shakiness occurred on the way back to the work area. Upon receiving advice from co-workers, the HPT texted the HPT supervisor to inform him of the event.

An initial set of interviews conducted with the affected parties determined that no readily identifiable cause for the metallic taste nor other symptoms could be determined.

Figure One below shows the meteorological data. Based on this data, the worker was not downwind of any existing work activities.

Figure 1. Meteorological Data

Date	Wind direction	Wind Speed (MPH)	Temperature (deg F)	Pres (in Hg)	Rel Humidity
09/28/15@1000	NNW	3	61	29.39	34%
09/28/15@1100	N	6	64	29.38	30%
09/28/15@1200	NNE	7	66	29.38	27%

## Event Timeline

The following event timeline was drawn from interviews, Production Operations Central Shift Office (CS) logs, cell phone logs, and Shift Office Event Notification (SOEN) messages.

Time	Source	What Happened
0950	Interview	Employee experiences symptoms.
0957	Phone Logs	HPT texts supervisor, informing him of symptoms.
1000	Phone Logs	Unsuccessfully attempts to contact Retrieval and Closure Industrial Hygiene (IH).
1005	Phone Logs	HPT supervisor calls CSO. See 1008 entry below. Is directed to take employee to HPMC.
1007	Phone Logs	HPT supervisor calls HPT, requests she obtain a ride to 2704HV.
1008	Shift Log	HPT supervisor reports HPT was walking the east fence line of C Farm (outside) and experienced a metallic taste in her mouth. No odors present. Central Shift Manager (CSM) determined no AOP entry.  NOTE: The employee was actually at the southwest corner of C Farm.
1010	Shift Log	DOE notified by CSM.
1015	Shift Log	CSM corrected 1008 entry to reflect that AOP-015 is applicable. Re-sent SOEN, re-notified DOE, notified senior management.
1027	IH Investigation Report	CSM contacts AY/AZ IH about TF-AOP-015 outside of C Farm.
1029	IH Investigation Report	AY/AZ IH arrives at CSO.
1030	IH Investigation Report	CSM and IH briefly discuss the odor, location of the event, and possible solutions.

Time	Source	What Happened
1030	Estimated from Interviews	HPT arrives at 2704HV and, with radiological control (RadCon) supervisor, completes the exposure card.
1031	IH Investigation Report	AY/AZ IH talks with Retrieval IH to discuss who to contact for the TF-AOP-015.
1035:	IH Investigation Report	C Farm IH contacts AY/AZ IH and discusses how to respond to the TF-AOP-015. Discussion concluded with the standard protocol for pulling 2 bags in the area of concern along with the direct-reading instrumentation (DRI).
1040	IH Investigation Report	CSM contacts affected employee's supervisor to see where the odor response card is.
1040	Estimated from Interviews	Supervisor and HPT sent exposure card to the CSO with another RadCon supervisor and leave for HPMC.
1051	Phone Log	HPT supervisor informs CSO that he and the HPT have arrived at HPMC. Report ID OHM019. Encounter #94178303.
1052	Shift Log	HPT supervisor and HPT at HPMC. Safety notified. DOE notified. SOEN sent.
1057	IH Investigation Report	Odor response card arrives at CSO.
1100	IH Investigation Report	AY/AZ IH gives two responding IH technicians (IHT) direction on where to take bag samples, along with actions for response.  NOTE: The odor response card was not correctly annotated; see figures 2 and 3. However, the error resulted in the samples being taken upwind of the event location.
1104	IH Investigation Report	CSM contacts operator to issue self-contained breathing apparatus for responding IHTs since mask station attendant is at lunch.
1108	IH Investigation Report	IHTs leave SO to get SCBA.

Time	Source	What Happened
1130	IHT Field Notes	IHT's arrive at middle C change trailer  Note, IH Investigative Report puts this time at 1135. Decided to use IHT Field Notes.
1140	IHT Field Notes	IHTs monitor outside of change trailer and just outside of fencing area to the entrance of middle C.  Estimated 50-yard-long run of area. DRI readings while pulling bag samples was 0 parts per million ammonia (NH <sub>3</sub> ) and 0 parts per billion volatile organic chemicals (VOC).  See Site Wide Industrial Hygiene Database Survey #15-07689. Note, IH Investigative Report puts this time at 1138. Decided to use IHT Field Notes.
1144	IHT Field Notes	Samples for NH <sub>3</sub> , VOC, and mercury all zero; no units reported in field notes. Later documented on #15-07689.
1147	IHT Field Notes	Samples for NH <sub>3</sub> , VOC, and Hg all zero, no units reported in field notes. Later documented on #15-07689.
1250	Shift Log	HPT released to work without restriction. SOEN sent.
1819	IH Investigation Report	18:19: E-mail communication with _____ in regard to the chromatograms of the bag samples.
1850	IH Investigation Report	18:50: SOEN: "Sample analysis for TF-AOP-015 event at SY-Farm has been completed and the results are at or below background levels. Exiting TF-AOP-015. CSM"

### Compensatory Measures

There were no compensatory measures beyond those noted in the timeline and none are recommended as a result of the event investigation.

### Preliminary Extent of Condition Review

There is no cause condition or factor for which to extend any determinations from.

## **Discussion of Potential Causes**

The work area was walked down. Potential sources of materials that might cause a physiological response were noted, but almost all carry an odor that was distinctly missing.

- The worker was upwind, within 10 feet of a parking area that likely contained several vehicles; however, the exact number and types of vehicles cannot be determined.
- The worker was approximately 60 feet from an operating diesel generator.
- The worker was approximately 75 feet from a vented septic field.
- The worker was immediately adjacent to a heavily creosoted power line post.
- The worker was approximately 200 feet away from any specific work activity in a tank farm.

None of these sources provide an explanation of the symptoms exhibited, but no data revealed a basis for excluding work-related causation.

There were no waste-disturbing activities under way at the 241-C tank farm.

The TF-AOP-015 Industrial Hygiene Investigation Report noted that the results of the DRI monitoring and Hapsite analysis were such that IH could not identify any occupational stressors that would cause the metallic taste in the mouth. IH further recommended that the employee continue to follow HPMC recommendations.

Based on the above information, there is no conclusive determination of cause nor a basis for excluding any factors from causation.

## **Discussion of Barriers That Could Have Impacted the Cause**

No barriers were identified that could have impacted this event.

## **Recommendations/Proposed Corrective Actions**

No corrective actions are proposed/recommended as a result of this event investigation directly related to the event.

While not related to the event itself, the following recommendations were identified and have been entered into the PER system for evaluation.

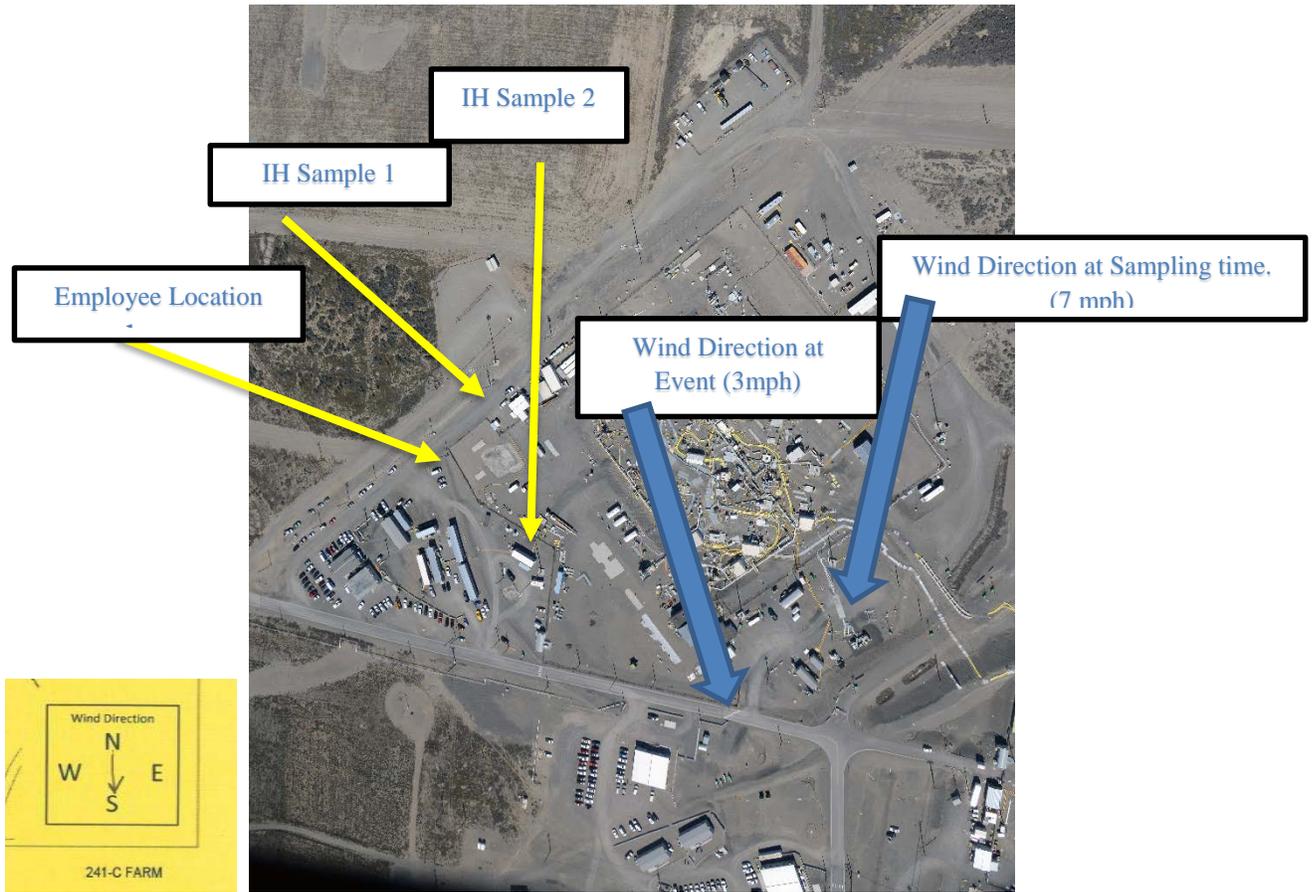
1. The automatic initiation of an event investigation for APO-015 entries appears to be a duplication of efforts given the Industrial Hygiene Investigation Report. Recommend considering a hot-wash for events that looks for opportunities for improvement in the response. [WRPS-PER-2015-2341](#).
2. The Industrial Hygiene Investigation Report could benefit from a better review process by affected parties. In this instance, the report contained errors in location, date, and wind

direction which might be avoided if independently reviewed by persons familiar with the event. WRPS-PER-2015-2342.

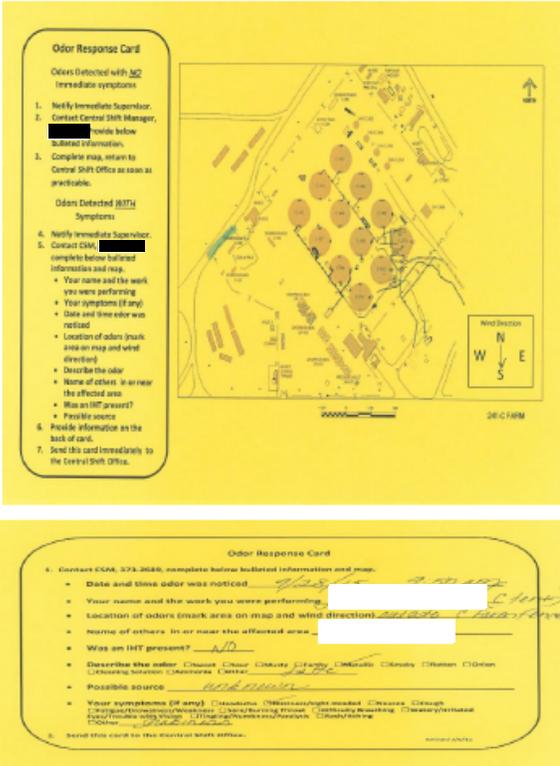
3. The C-Farm Odor Response Card graphics could be improved. WRPS-PER-2015-2316.

**Persons Contacted**

# Overhead View of Affected Area



Attachment A: Industrial Hygiene Investigation Report

<b>Washington River Protection Solutions</b> <b>TF-AOP-015 INDUSTRIAL HYGIENE INVESTIGATION REPORT</b>	<b>PER Number:</b> N/A
<b>Time/Date &amp; Event location:</b> 10:27/9-28-2015, Middle C Change Trailer	
1. <u>Event Summary (including number of workers involved and activity in progress):</u> <ul style="list-style-type: none"> <li>• Was an IHT Present? [ ] Yes [X] No</li> <li>• Was Respiratory Protection Being Worn by Affected Worker(s)? [ ] Yes [X] No</li> </ul>	
2. <u>Summary of Employee Reported Information (e.g., symptoms):</u> <ul style="list-style-type: none"> <li>• Odor area highlighted by blue highlighter.</li> </ul>	
	
Employee statement as provided by the supervisor in the event report:	
<p>"While walking to the restroom around the outside of the fence at C farm I experienced a metallic taste in my mouth. I then returned to the change tent and began feeling very lightheaded and shaky. At that time I reported it to my manager and went to HPMC where the shakiness subsided quiet a bit but I did still feel light headed and disoriented. After some time I began to feel better. I was given a medical exam and had urine and blood samples taken. I am currently awiating the results for those tests."</p>	
3. <u>Identification of Source of the Concern:</u> [ ] Yes [X] No	
4. <u>Time Line of the Event:</u>	
09:50: employee experiences metallic taste.	

Washington River Protection Solutions  
**TF-AOP-015 INDUSTRIAL HYGIENE INVESTIGATION REPORT**

PER Number:  
 N/A

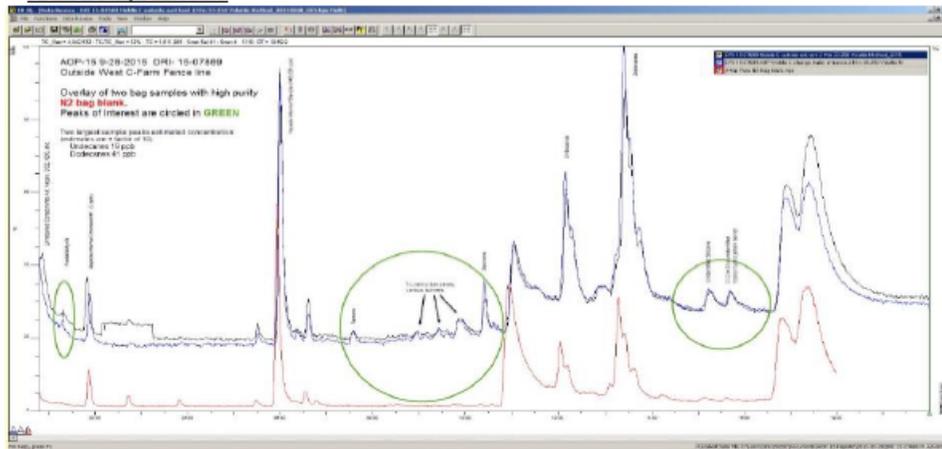
**Time/Date & Event location:**  
 10:27/9-28-2015, Middle C Change Trailer

1027: Central shift manager (CSM) contacts AY/AZ IH about AOP-015 outside of C-farm  
 1029: AY/AZ IH arrives at shift office  
 1030: Central shift manager discusses briefly the odor and location of the event  
 1031: AY/AZ IH talks with Retrieval IH to discuss who to contact for the AOP-015.  
 1032: Discuss response with CSM and possible sources  
 1035: C-farm IH contacts AY/AZ IH and discuss how to respond to the AOP-015. Discussion concluded with the standard protocol for pulling 2 bags in the area of concern along with the Direct Reading Instrumentation.  
 1040: CSM contacts affected employee supervisor to see where the odor response card is.  
 1057: Odor response card arrives at shift office.  
 1100: AY/AZ IH gives two responding IHT's direction on where to take bag samples along with actions for response.  
 1104: CSM contacts operator to issue SCBA for responding IHT's since mask station is at lunch.  
 1108: IHT's leave SO to get SCBA.  
 1135: IHT's arrive at middle C change trailer  
 1138: IHT's take monitor outside of change trailer and just outside of fencing area to the entrance of middle C. estimated 50 yard long run of area. DRI readings while pulling bag samples was 0 ppm NH3 and 0 ppb VOC. Winds were 7 mph moving from the south to the north. See SWIHD Survey #15-07689.  
 18:19: E-mail communication with regards to the chromatograms of the bag samples.  
 18:50: SOEN: "Sample analysis for TF-AOP-015 event at SY-Farm has been completed and the results are at or below background levels. Exiting TF-AOP-015. CSM"

5. Summary of IH Monitoring and Sampling Data:  
 a. Monitoring

AGENT	@ODOR	@SOURCE	EXPOSURE LIMIT	REPORTING LIMIT
Ammonia	0 ppm	0 ppm	25 ppm OEL/35ppm STEL	>0 ppm
Total VOCs	0 ppm	0 ppm	2 ppm AL	>0 ppm
Mercury	0 mg/m <sup>3</sup>	0 mg/m <sup>3</sup>	0.025 mg/m <sup>3</sup> OEL	0.000016 mg/m <sup>3</sup>
Nitrous Oxide	0 ppm	0 ppm	25 ppm AL	>0 ppm

b. GCMS Sample Results:



<b>Washington River Protection Solutions</b> <b>TF-AOP-015 INDUSTRIAL HYGIENE INVESTIGATION REPORT</b>	<b>PER Number:</b> N/A				
<b>Time/Date &amp; Event location:</b> 10:27/9-28-2015, Middle C Change Trailer					
<p>These samples are shown on the same scale with a bag blank to emphasize the peaks of interest.          The event was assigned DRI 15-07689          DRI readings were zero for VOC's, NH3, N2O, and Hg.</p> <p>Hapsite analysis identified trace amounts of acetaldehyde –a sweet fruity odor, several tri-methyl substituted Benzene (common name Mesitylene) materials at sub ppb concentrations that also have a sweet aromatic odor. These compounds are produced by alkylation of Xylenes which are ubiquitous throughout the tank farms. Odor threshold from literature indicates as low as 6 ppb, to as much as 2.4 ppm depending upon person. (US National Library of Medicine)          AIHA literature (1989) indicates 41 ppb to 280 ppb as odor threshold.</p> <p>Several alkanes were observed, which have basically no observable odor at the indicated concentrations, and a silicone material found throughout tank farms.          While the silicone is unidentified, it is thought to be a degradation product of anti-foam.</p> <p>c. <u>Sampling:</u></p> <ul style="list-style-type: none"> <li>• <u>Source</u> [ ] Yes [X] No</li> <li>• <u>Area</u> [ ] Yes [X] No</li> <li>• <u>Personal</u> [ ] Yes [X] No</li> </ul> <p>6. <u>Weather Conditions at Time of Event:</u> (11:30 7/13/2015 at Station 6#)</p> <ul style="list-style-type: none"> <li>• <u>Wind Direction &amp; Speed:</u> From the South to the North at 7 mph.</li> <li>• <u>Barometric Pressure (steady/rising/falling):</u> 29.3 in/Hg</li> <li>• <u>Temperature (°F):</u> 66°F</li> </ul> <p>7. <u>Recommendations/Conclusions:</u> Based upon the employee statement that there was no odor and the results of the DRI monitoring and Hapsite analysis IH cannot identify any occupational stressors that would cause the metallic taste in the mouth. IH recommends that the employee continue to follow HPMC recommendations.</p> <p>8. <u>Other:</u> Employee is currently awaiting results of tests performed by HPMC to be returned to work. Is performing non-field related work activities, and will return to normal activities once released by HPMC.</p> <p>9. <u>IH Monitoring/ Sample Survey Reports:</u> Survey identification form is 15-07689</p> <table style="width: 100%; margin-top: 20px;"> <tr> <td style="width: 60%;">           IH Author (Print)            (Signature)         </td> <td style="width: 40%; text-align: right;"> <u>9/29/2015</u>            Date         </td> </tr> <tr> <td>           S&amp;H Program Mgmt. (Print)            (Signature)         </td> <td style="text-align: right;"> <u>9/29/15</u>            Date         </td> </tr> </table>		IH Author (Print) (Signature)	<u>9/29/2015</u> Date	S&H Program Mgmt. (Print) (Signature)	<u>9/29/15</u> Date
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