

AOP-015 Event Investigation Reports (Redacted) EIR-2019-049 12022019

(Settlement Agreement Deliverable)

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Contractor for the U.S. Department of Energy
Office of River Protection under Contract DE-AC27-08RV14800



**P.O. Box 850
Richland, Washington 99352**

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S. A. Edinger

Washington River Protection Solutions

Date Published

January 2020

WRPS

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APPROVED

By Janis D. Aardal at 1:05 pm, Jan 20, 2020

Release Approval

Date

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COMBINED EVENT INVESTIGATION/CAUSE ANALYSIS REPORT

“TF-AOP-015 Event at AX Farm”

EIR-2019-049

WRPS-PER-2019-2370



Cause Analysis Type..... Apparent
Approving Manager..... [REDACTED]
Lead Event Investigator/Cause Analyst..... [REDACTED]
Event Investigator in Training/Cause Analyst..... [REDACTED]
ORP Facility Representative..... [REDACTED]
PER Discovery Date..... December 2, 2019
Significance Categorization..... PER with Resolution

Washington River Protection Solutions, LLC

Date Published
January 16, 2020

Approved for Public Release;
Further Dissemination Unlimited



Contract No. DE-AC27-08RV14800

Approval Page

[Redacted Signature]

Event Investigation Team Lead

1/16/20
Date

[Redacted Signature]

Event Investigator in Training

1/16/20
Date

[Redacted Signature]

PER Responsible Manager

1/16/2020
Date

Problem Statement

On December 2, 2019 workers smelled a burning odor near tank 241-AX-103. Six of the eighteen workers on the job reported smelling the odor. Three of the six workers were evaluated at HPMC. All three workers were released back to work without restrictions.

Executive Summary

On December 2, 2019 approximately eighteen (18) workers were removing Gripholyn plastic and rubber matting from scaffolding in the AX Tank Farm for the 241-AX-103 03A and 03D pits. At approximately 0920 hours, six (6) of the workers reported smelling an odor they described as “burning,” “burning plastic,” “smoky,” and “musty.” The workers warned others in the work area and with Health Physics Technician (HPT) concurrence exited AX Farm.

During the investigation of the cause of the odor, a heated KNAACK job box located near where the odor was smelled was disassembled and it was discovered that the end cap on the heating assembly located inside of the job box was discolored. The crew removed the heating assembly for further inspection and it was discovered that the outer protective covering on the power supply cord had melted. The apparent cause of the odor was due to poor assembly of the heating assembly piece which caused the power supply outer cord protective covering to come into contact with a metal covering that was emitting 300F. This contact partially melted the covering causing the “burning” odor.

TF-AOP-015 Summary

Date/Time of Event	December 2, 2019 at ~0920 hours
Locations	Five (5) people reported smelling an odor while standing next to tank 241-AX-103 (one of the individuals specified 241-AX-103, A Pit) One (1) person reported smelling odors while standing next to an Instrument Enclosure by AX-801A.
Personnel Affected	Six (6) personnel reported smelling odors. Three (3) workers were evaluated at the onsite medical provider, HPMC.
Odor	Personnel described odors as: <ul style="list-style-type: none"> • Burning/smoky/musty • Burning plastic.
Symptoms	<ul style="list-style-type: none"> • Three (3) individuals reported a symptom of a headache • Three (3) individuals reported no symptoms.
Direct Read Instrumentation (DRI) Monitoring (Survey # 190-11066)	On 12/2/19 multiple readings were taken at compass points around 241-AX-103. Direct reading instrument (DRI) readings resulted in: Ammonia (NH ₃) < Detectable Level Volatile Organic Compounds (VOC): < Detectable Level

Sampling	Two (2) bag samples were collected on 12/2/19. One (1) bag sample was taken in the southwest (SW) corner and one (1) was taken downwind of the AX Tank Farm. Nothing was detected above background concentrations.																								
Potential Source	The heated KNAACK job box, a fogco heat trace located on the AX-801A concrete slab, and 241-AX-103 Riser-3A.																								
Weather conditions on 12/2/19 Between 0915 and 0945 hours (data from weather station 6)	<table border="1"> <thead> <tr> <th>Time</th> <th>Wind Direction (From)</th> <th>Wind Speed</th> <th>Avg Temp</th> <th>Avg Bar Press</th> <th>Avg Relative Humidity</th> </tr> </thead> <tbody> <tr> <td>0915</td> <td>312</td> <td>4.72 mph</td> <td>25.1F</td> <td>29.51 inHg</td> <td>93.5%</td> </tr> <tr> <td>0930</td> <td>314</td> <td>4.72 mph</td> <td>25.5F</td> <td>29.51 inHg</td> <td>93.7%</td> </tr> <tr> <td>0945</td> <td>313</td> <td>4.26 mph</td> <td>25.8F</td> <td>29.52 inHg</td> <td>93.8%</td> </tr> </tbody> </table>	Time	Wind Direction (From)	Wind Speed	Avg Temp	Avg Bar Press	Avg Relative Humidity	0915	312	4.72 mph	25.1F	29.51 inHg	93.5%	0930	314	4.72 mph	25.5F	29.51 inHg	93.7%	0945	313	4.26 mph	25.8F	29.52 inHg	93.8%
Time	Wind Direction (From)	Wind Speed	Avg Temp	Avg Bar Press	Avg Relative Humidity																				
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0945	313	4.26 mph	25.8F	29.52 inHg	93.8%																				
Waste Disturbing or Tank Work in Adjacent Area	There was no waste disturbing work in the area. Yes, there was tank work being conducted in the area.																								
Other Work in Adjacent Area	Yes, there was other work being performed in Tank Farms AX, A, AN, AY, and AX during the morning of 12/2/19. There were no other reports of odors smelled.																								

TF-AOP-015 Odor Response and Event Timeline

DATE	TIME	DESCRIPTION	SOURCE
12/2/19	~0920	Workers smelled a "burning, "smoky," "musty" smell.	Odor Repose Cards
	~0920	Workers notified the Field Work Supervisor (FWS).	FWS
	~0930	FWS notified Central Shift Manager (CSM), Industrial Hygiene (IH), American Electric Inc (AEI) Safety & Management, AZ Farm Area Day Shift Manager (ADM), WRPS Safety & Construction Management.	FWS
	0932	CSM notified DOE Representative.	CSM
	0944 - 0945	Production Operations (PO) IH Subject Matter Expert (SME), IH Manager, PO Shift IH Supervisor, and AN Team Field IH professional arrive at Central Shift Office.	IH Timeline
	0947	CSM entered TF-AOP-015 for odors near 241-AX-103 and restricted access to AX Farm.	CSM

DATE	TIME	DESCRIPTION	SOURCE
	0953	R/C (Retrieval/Closure) contacts IH Programs SME about industrial hygiene reading acquired at time of event: 5ppm (parts per million) on the ToxiRAE worn by Health Physics Technician (HPT).	IH Timeline
	0955	Safety took workers to HPMC for evaluation.	Tank Farm Event Report
	0958	PO IH Supervisor contacts IH Program Industrial Hygiene Technician (IHT) Supervisor to ensure NUCON HAPSITE portable GC/MS is initiated.	IH Timeline
	1005	PO Shift IH SME makes contacts to get ToxiRAEs downloaded.	IH Timeline
	1007	Odor Response Cards arrive at the Central Shift Office (CSO).	IH Timeline
	1102	R/C IHTs enter 241-AX to perform response actions.	IH Timeline
	1115	R/C IHTs notify R/C IH Professional that initial readings indicate: Ammonia (NH ₃) < DL Volatile Organic Compounds (VOC): < DL	IH Timeline
	1109	CSM initiated event investigation (EIR-2019-046).	CSM
	1119	R/C IH Manager contacts R/C IH Professional to inquire about status of affected respirator cartridges.	IH Timeline
	1215	Workers were released to return to work by HPMC.	Tank Farm Event Report/CSO
	1251	CSM is notified by IH that field readings were consistent with background and that field instrumentation had passed post-use-function-test.	IH Timeline
	1332	Response actions for TF-AOP-015 completed.	CSM
	Afternoon	R/C IH visibly inspected the respiratory protection equipment worn by the six (6) workers and didn't identify any defects or improper configuration.	IH
	~ 1500-1630	It was identified that an HPT had smelled a "burning plastic" smell near a heated KNAACK job box located between Tanks 241-AX-103 and 241-AX-101 on the AX-	Interview

DATE	TIME	DESCRIPTION	SOURCE
		801A concrete slab. An action was taken to unplug the job box.	
	Morning	A work crew entered AX farm on self-contained breathing apparatus (SCBA) to investigate the possible source of the odor. The crew looked at the heated KNAACK job box, a fogco heat trace located on the AX-801A concrete slab, and 241-AX-103 Riser-3A.	Investigation
	Morning	The work crew opened the KNAACK job box and observed that the end cap on the heating assembly was discolored. The crew removed the heating assembly for further inspection. Upon inspection it was discovered that the outer protective covering on the power supply cord had melted.	Investigation
12/3/19		WRPS work areas were walked down to determine if there were any additional KNAACK heated job boxes, model 89-H. A second KNAACK heated job box model 89-H was identified. Both job boxes were pulled out of service.	WRPS Maintenance & Construction Subcontractors
12/4/19	0953	The vendor was contacted and made aware of the defective part.	Investigation
12/5/19	Afternoon	It was confirmed the heating element was UL Listed.	Investigation
12/10/19	1044	Hanford Operating Experience "Just-In-Time" report was issued.	

Investigation Summary

On December 2, 2019 approximately eighteen (18) workers were removing Grippolyn plastic and rubber matting from scaffolding in the AX Tank Farm for the 241-AX-103 03A and 03D pits (Work Order number 538187, "241-A/AX Retrieval Construction Mechanical Skill of the Craft Work- Repetitive)." At approximately 0920 hours, six (6) of the workers reported smelling an odor they described as "burning," "burning plastic," "smoky," and "musty." The workers warned others in the work area and with Health Physics Technician (HPT) concurrence exited AX Farm. The Field Work Supervisor (FWS) was notified and notifications were made starting at 0930 hours to the Central Shift Manager (CSM), WRPS Industrial Hygiene (IH), AEI Safety and Management, and WRPS Safety and Management. At the time the odors were reported, the workers were not working in an area that required use of supplied-air respiratory protection. The workers were wearing MSA Ultra Elite Full-Faced Air Purifying

Respirators (FFAPRs) and chemical cartridges, a full set of protective clothing, and surgeon gloves. The crew was working in a Contamination Area (CA)/Radiation Area (RA).

IHTs responded to the area and took Direct Read Instrument (DRI) readings (DRI Survey # 19-11066). DRI instrument readings were below background levels. The Direct Read Instrument monitoring reading didn't detect any VOC or ammonia (NH₃) readings above detectable levels. The HAPSITE GCMS laboratory results didn't detect any compounds that were above background concentrations. The ToxiRAEs readings were below response levels.

IH personnel visibly inspected the MSA Ultra Elite FFAPRs and chemical cartridges. No apparent defects or improper configuration was observed. It was noted that two (2) of the six (6) respirators had been cleared by Radiological Control and released prior to IH personnel inspection, therefore only four (4) remained in the configuration as worn by the individuals. At the time the odor was smelled by the workers, they were wearing MSA Ultra Elite Full Face Air Purifying Respirators (FFAPR) and chemical cartridges. Per WRPS Industrial Hygiene, odors may be detected when FFAPR and chemical cartridges are in use because they don't eliminate all potential sources of odor. In other words, it was possible for the workers to smell odors while wearing FFAPRs. The cartridges cannot eliminate all potential sources of odor.

A work crew investigated three (3) potential causes for the odors on December 3, 2019; a heated KNAACK job box, a fogco heat trace located on the AX-801A concrete slab, and 241-AX-103 Riser-3A. The work crew didn't identify any issues with the fogco heat trace or Riser-3A or at Riser-3A. The work crew disassembled the heated KNAACK job box and removed the internal heating element. The workers observed that the end cap on the heating assembly was discolored. The crew removed the heating assembly for further inspection. Upon inspection it was discovered that the outer protective covering on the power supply cord had melted. The heated job box was pulled out of service and the cord to the heating element was cut to ensure it could no longer be used.

It was confirmed on December 5, 2019 that the heating element located inside of the heated KNAACK job box was UL listed.

Weather

Data collected from the Hanford site Meteorological station for the morning of 12/2/19 (Station 6/200E) before, during and right after the time the odor was reported as being smelled, showed the wind was coming from the northwest at approximately 4.72 mph.

Location

The figure below is map of 241-AX Farm that shows the locations of where the six individuals reported smelling the odor [numbers 1 through 6 on the map]. The map also shows the direction the wind was blowing during the time the odor was smelled by the individuals

Remedial Actions

- A work crew entered AX Farm on SCBA on December 3, 2019 to investigate potential sources of odors. The work crew investigated the heated KNAACK job box, a fogco heat trace located on the AX-801A concrete slab, and 241-AX-103 Riser-3A. The work crew didn't identify any issues with the fogco heat trace or Riser-3A. The work crew removed the heating assembly from the KNAACK job box and discovered a melted outer insulation jacket around the power supply cord and the end cap of the heating assembly was discolored. The heating assembly was removed. Below is a photograph of the heating assembly after removal from the KNAACK job box.

Figure 1: Partially Melted Outer Cord Covering



Compensatory Actions

- On December 3, 2019 and December 4, 2019, WRPS Maintenance and WRPS Construction Subcontractors performed an extent of condition walk-down to identify if there were any other heated KNAACK job boxes (model 89-H) in service. It was identified that American Electric Inc (AEI) had a second heated KNAACK job box (model 89-H). The second KNAACK heated job box was also taken out of service.

Figure 2: Heated KNAACK Job Box



Facility Impact

There was not impact to a facility. Two (2) heated KNAACK job boxes were temporarily removed from service. Once the heating elements were removed, the job boxes were returned to service and remained in the tank farm.

Historical Review

The historical review is bound to past occurrences during a three year period of incidents where electrical components were discovered melted or burned. One similar event was identified that was discovered on February 7, 2019. Burnt out breakers were discovered at breaker panel MO733-EDS-DP-001 of the MO733 office trailer. It was discovered the breakers were emitting higher than normal

temperatures. WRPS electricians investigated and when they removed the breakers they discovered them to be burnt out. Had the condition of the breakers not been discovered when it had, the result could have been the MO733 facility catching fire (WRPS-PER-2019-0229).

Extent of Condition

WRPS work areas were walked down by WRPS and Subcontractor personnel to determine if there were any additional heated KNAACK job boxes model 89-H in service. A second KNAACK heated job box model 89-H was identified. The job box was pulled out of service.

During the IH visual inspection of the MSA Ultra Elite Full Face Air Purifying Respirators (FFAPRs) and chemical cartridges it was identified that the cartridges on two (2) of the respirators had been removed. Per IH when a worker detects an odor while wearing FFAPR, they should only doff the FFAPR and they should not remove the cartridges. An action to address this issue has been developed in this PER.

Discussion of Positive Aspects of the Event

- Observant workers smelled a “burning” odor and reported it. This initiated an investigation and identified the source of the odor to be the heating assembly inside of the KNAACK job box. This potentially prevented the KNAACK job box from catching fire.
- Rapid response from the IH staff to conduct the industrial hygiene investigation.
- Identification of the source of the odor.
- Timely identification of the second KNAACK job box and removal of it from service.

Human Performance Error Precursors

None were identified.

Cause Analysis

See Attachment 1, Change Analysis.

Cause

The cause of the odor on December 2, 2019 was due to equipment failure. The heating assembly inside of a heated KNAACK job box located near the workers was defective. Poor assembly of the heating assembly piece caused the power supply outer cord protective covering to come into contact with a metal covering that was emitting 300F. This contact partially melted the covering causing the “burning” odor.

Cause Codes

A2B6C01, Defective or failed part: A part/instrument that lacked something essential to perform its intended function. The degraded performance of a part or a component contributed to the failure of the component, equipment, or system.

Cause to Corrective Action Table

Cause	Corrective Action
<p>AC01: Power supply outer cord protective covering contacting a terminal. (Cause Codes: A2B6C01)</p>	<p>WRPS-PER-2019-2370.1: Issue a "Just in Time" Lessons Learned about the event and to notify other Department of Energy (DOE) contractors to identify any KNAACK job boxes model 89-H that may be in service. Actionee: ██████████ Due Date: 2/1/20 Deliverable: Issued "Just in Time" Lessons Learned.</p>
<p>AC01: Power supply outer cord protective covering contacting a terminal. (Cause Codes: A2B6C01)</p>	<p>WRPS-PER-2019-2370.2: Identify any KNAACK job boxes used within the Tank Farms, including WRPS subcontractors, and temporarily remove from service. Remove the internal heating assembly. Actionee: ██████████ Due Date: 2/1/20 Deliverable: Closure statement in ESTARS documenting the action has been completed.</p>
Other (Not Related or Extraneous to Cause)	Action
<p>Removal of FFAPR cartridges prior to IH inspection.</p>	<p>WRPS-PER-2019-2370.3: Issue a communication in the Safety Start-up to communicate to workers that during a response to odors, they should only doff their FFAPR and they should not remove the cartridges. Actionee: ██████████ Due Date: 2/1/20 Deliverable: A copy of the safety start-up slide.</p>

Attachments:

Attachment 1: Change Analysis

Attachment 2: Pictures of Damaged Heating Assembly

Attachment 3: Odor Response Cards

Attachment 4: TF-AOP-015 Industrial Hygiene Investigation Report

Attachment 5: Sample HAPSITE GC-MS Analysis

Attachment 6: Communication Template

Attachment 7: Follow-up Event Summary

Attachment 8: Personnel Contacted

Attachment 1 – WRPS-PER-2019-2370/EIR-2019-049 Change Analysis

Problem Statement: On December 2, 2019 workers smelled a burning odor near tank 241-AX-103. Six of the eighteen workers on the job reported smelling the odor. Three of the six workers were evaluated at HPMC. All three workers were released back to work without restrictions.

What did (or did not) happen	What should have happened	Difference	Analysis
The heated KNAACK job box should not have been emitting a “burning” or “smoky” odor.	No odor should have been emitted from the equipment.	There was a “burning” or “smoky” odor emitted from the heated KNAACK job box.	The odor being emitted from the heated KNAACK job box caused further investigation of the internal components of the equipment.
The end cap of the heating assembly was discolored.	The end cap of the heating assembly shouldn’t have been discolored.	The discolored end cap.	The discolored end cap of the heating assembly was an indication something may be failing inside of the heating assembly.
The insulation covering the power supply cord to the heating assembly’s plug-in partially melted.	The insulation should have been intact and not melted.	The insulation partially melted.	When the heating assembly was opened up, it was discovered that the power supply cord outer protective covering was partially melted. (Direct Cause)
When the heating assembly was assembled, the power supply outer cord protective covering was pushed up against a metal	When the part was assembled, the power supply cords should have been configured so that they were not making contact with the metal covering.	The outer protective covering around the power supply cord came into contact with the metal covering.	Due to poor assembly of the heating assembly piece, the power supply outer cord protective covering came into contact with a metal covering

What did (or did not) happen	What should have happened	Difference	Analysis
covering that was emitting 300F of heat.			that was emitting 300F. This contact caused the outer cord protective covering to partially melt. (Apparent Cause)

Attachment 2: Pictures of Damaged Heating Assembly

Figure 3: Heating Assembly Located Inside of KNAACK Job Box



Figure 4: Discolored End Cap



Figure 5: Discolored End Cap and Partially Melted Outer Cord Covering



Figure 6: Inside of Discolored End Cap



Attachment 3: TF-AOP-015 Odor Response Cards

Odor Response Card

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

- Date and time odor was noticed 12/2/19 @ 09:00 0925
- Your name and the work you were performing [REDACTED] HPT Surveys
- Location of odors (mark area on map and wind direction) Station 101, Enclosure AX-851A
- Name of others in or near the affected area [REDACTED]
- Was an IHT present? No
- Describe the odor Sweet Sour Musty Earthy Metallic Smoky Rotten Onion
 Cleaning Solution Ammonia Other Burning plastic
- Possible source 3A riser
- Your symptoms (if any) Headache Dizziness/Light-Headed Nausea Cough
 Fatigue/Drowsiness/Weakness Sore/Burning Throat Difficulty Breathing Watery/Irritated Eyes/Trouble with Vision Tingling/Numbness/Paralysis Rash/itching
 Other No Symptoms

2. Send this card to the Central Shift Office.

Revised 2/9/15

Odor Response Card

Odors Detected with NO Immediate symptoms

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.

Odors Detected WITH Symptoms

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)
 - Date and 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 immediately to the Central Shift Office.

241-AX FARM (FEET)

Wind Direction

N
W → E
S

Odor Response Card

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

- Date and time odor was noticed December 2nd, 2019 9:20am
- Your name and the work you were performing [redacted] AX-103 scaffolding Demobe
- Location of odors (mark area on map and wind direction) AX-103
- Name of others in or near the affected area [redacted]
- Was an IHT present? No
- Describe the odor Sweet Sour Musty Earthy Metallic Smoky Rotten Onion
 Cleaning Solution Ammonia Other _____
- Possible source Riser 3A
- Your symptoms (if any) Headache Dizziness/Light-Headed Nausea Cough
 Fatigue/Drowsiness/Weakness Sore/Burning Throat Difficulty Breathing Watery/Irritated
Eyes/Trouble with Vision Tingling/Numbness/Paralysis Rash/Itching
 Other _____

2. Send this card to the Central Shift Office.

Revised 2/9/15

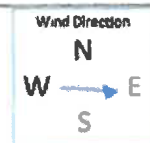
Odor Response Card

**Odors Detected with NO2
Immediate symptoms**

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.

**Odors Detected WITH
Symptoms**

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)
 - Date and 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 immediately to the Central Shift Office.



Odor Response Card

- Contact CSM, [redacted] complete below bulleted information and map. 9:20 am
 - Date and time odor was noticed Dec. 2, 2019 9:30 am
 - Your name and the work you were performing [redacted] Scaffolding
 - Location of odors (mark area on map and wind direction) AX 103
 - Name of others in or near the affected area [redacted]
 - Was an IHT present? NO
 - Describe the odor Sweet Sour Musty Earthy Metallic Smoky Rotten Onion Cleaning Solution Ammonia Other Burning Smell
 - Possible source 3A Riser
 - Your symptoms (if any) Headache Dizziness/Light-Headed Nausea Cough Fatigue/Drowsiness/Weakness Sore/Burning Throat Difficulty Breathing Watery/Irritated Eyes/Trouble with Vision Tingling/Numbness/Paralysis Rash/Itching Other _____

2. Send this card to the Central Shift Office.

Revised 2/9/15

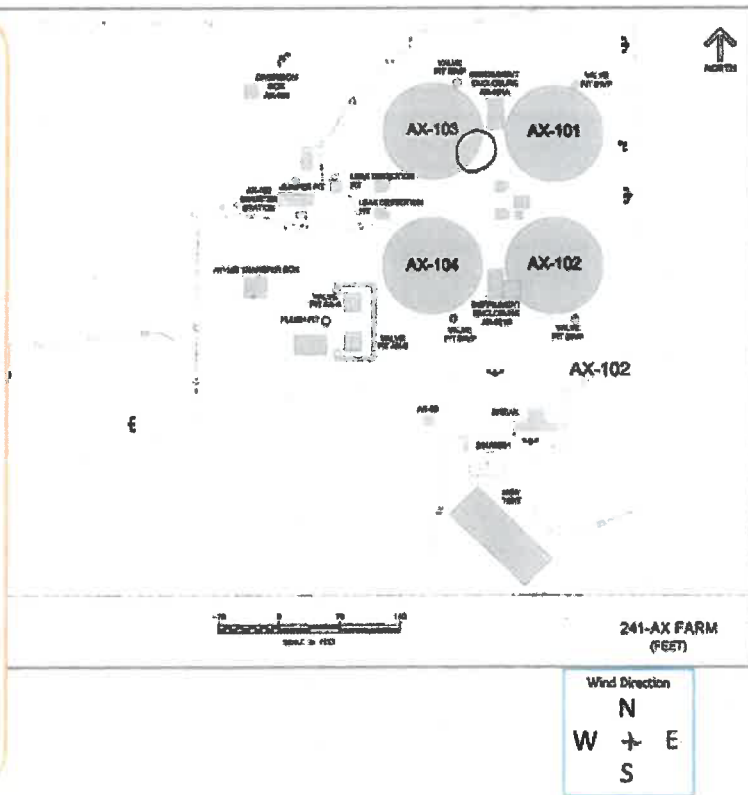
Odor Response Card

Odors Detected with NO Immediate symptoms

- Notify Immediate Supervisor.
- Contact Central Shift Manager, [redacted] Provide below bulleted information.
- Complete map, return to Central Shift Office as soon as practicable.

Odors Detected WITH Symptoms

- Notify Immediate Supervisor.
- Contact CSM, [redacted] complete below bulleted information and map.
 - Your name and the work you were performing
 - Your symptoms (if any)
 - Date and 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
- Provide information on the back of card.
- Send this card immediately to the Central Shift Office.



Attachment 4: TF-AOP-015 Industrial Hygiene Investigation Report

Washington River Protection Solutions TF-AOP-015 INDUSTRIAL HYGIENE INVESTIGATION REPORT		PER Number: WRPS-PER-2019-2370										
Time/Date & Event location: 0925 12/02/2019 241-AX 103		EIR Number: EIR-2019-049										
<p>1. Event Summary (including number of workers involved and activity in progress):</p> <p>At approximately 0925 six (6) workers smelled a "burning" odor. 3 workers reported experiencing headaches.</p> <ul style="list-style-type: none"> • <u>Was an IHT Present during initiating event?</u> () Yes [X] No <p><u>IH Monitoring/ Sample Survey Reports:</u></p> <p>Event response: 10-11066 "AOP-015 Response at AX-103"</p> <p><u>Weather Conditions at Time of Event:</u></p> <p>Ambient outside conditions:</p> <table style="width: 100%;"> <tr> <td style="width: 50%;">• Weather station:</td> <td>Station 6 @ 0900</td> </tr> <tr> <td>• Wind Direction and Speed:</td> <td>NW @ 4 mph</td> </tr> <tr> <td>• Barometric Pressure (steady/rising/falling):</td> <td>29.5"Hg and rising</td> </tr> <tr> <td>• Temperature (F°):</td> <td>26</td> </tr> <tr> <td>• Humidity:</td> <td>96%</td> </tr> </table>			• Weather station:	Station 6 @ 0900	• Wind Direction and Speed:	NW @ 4 mph	• Barometric Pressure (steady/rising/falling):	29.5"Hg and rising	• Temperature (F°):	26	• Humidity:	96%
• Weather station:	Station 6 @ 0900											
• Wind Direction and Speed:	NW @ 4 mph											
• Barometric Pressure (steady/rising/falling):	29.5"Hg and rising											
• Temperature (F°):	26											
• Humidity:	96%											

Washington River Protection Solutions TF-AOP-015 INDUSTRIAL HYGIENE INVESTIGATION REPORT		PER Number: WRPS-PER-2019-2370
Time/Date & Event location: 0925 12/02/2019 241-AX 103		EIR Number: EIR-2019-049
<p>Field Response Timeline:</p> <p>0944: Production Operations Specialist Industrial Hygiene Subject Matter Expert (POS IH SME) arrives at Central Shift Office (CSO)</p> <p>0945: PO IH Manager, PO Shift Industrial Hygiene Technician Supervisor (PO SIHTS), and AN Team Field Industrial Hygiene Professional (AN FIHP) arrive at CSO</p> <p>0947: SOEN: "Entering TF-AOP-015 for odors at the AX-103. Access is restricted to AX Farm. CSM"</p> <p>0950: Retrieval/Closure (R/C) IH Manager contacts PO IH Manager about Job scope: Removing rubber matting</p> <p>0951: POS IH SME contacts R/C IHT Supervisor about job scope: Removing rubber matting</p> <p>0952: R/C IH Supervisor contacts POS IH SME about job scope: Removing rubber matting</p> <p>0953: R/C IHT Supervisor contacts POS IH SME about IHT reading acquired at time of event: 5ppm on ToxiRAE worn by Health Physics Technician (HPT)</p> <p>0958: PO SIHT Supervisor contacts IH Programs IHT Supervisor to ensure NUCON HAPSITE® portable GC/MS is initiated</p> <p>1002: AN FIHP confirms with CSM that TF-AOP-015 3.1.11 is implemented</p> <p>1002: Field Work Supervisor (FWS) contacts CSO: 6 workers smelled "burning" odor, 3 workers reported symptoms (headache), removing plastic and rubber matting from work deck on AX-103 A pit and AX-103 D pit.</p> <p>1004: R/C IHT Lead arrives at CSO with ToxiRAE(s).</p> <p>1005: POS IH SME makes appropriate contacts to get ToxiRAEs downloaded</p> <p>1007: Odor Response Cards (ORCs) arrive at CSO</p> <p>1010: R/C IHP arrives at CSO</p> <p>1015: AY/AZ Team Field IH arrives at CSO with Respiratory Protection Form (RPF) and Industrial Hygiene Sample Plan (IHSP) for response actions</p> <p>1015: R/C IHTs arrive at CSO</p> <p>1019: AN FIHP briefs R/C IHTs on response actions:</p> <ul style="list-style-type: none"> • Respiratory Protection Equipment (RPE) will be worn in accordance with RPF TF-AOP-015 task 1 • Monitoring will be performed as per Industrial Hygiene Sampling Plan IHP-09001 • Ammonia (NH₃), Volatile Organic Compound (VOC) monitoring will be performed in area of concern • Two (2) grab samples will be collected: <ul style="list-style-type: none"> ○ One (1) grab sample from general area ○ One (1) grab sample from source if identified, or from general area if no source is identified) • Perform monitoring of grab samples for Nitrous Oxide (N₂O), elemental mercury (Hg) at Production Operations Temporary IHT Lab (MO511), transport grab samples to 2704 HV Industrial Hygiene Programs IHT Lab for analysis by NUCON HAPSITE® portable GC/MS. <p>1020: PO SIHT Supervisor ensures MIRAN SaphiRe and Ohio LUMEX are initiated</p> <p>1027: R/C IHTs leave CSO to perform response actions</p> <p>1031: R/C IHP confirms responding R/C IHTS are egressing through AY-2 change trailer to coordinate HPT support.</p> <p>1102: R/C IHTs enter 241-AX to perform response actions</p> <p>1115: R/C IHTs notify R/C IHP that initial readings indicate:</p> <ul style="list-style-type: none"> • NH₃: <DL • VOC: <DL <p>1119: R/C IH Manager contacts R/C IHP to inquire about status of affected respirator cartridges</p> <p>1123: R/C IHT contacts R/C IHP to notify AreaRAE near event location has a peak reading 0.3ppm NH₃</p> <p>1154: CSM contacts AN FIHP to enquire if exit criteria had been confirmed</p> <p>1237: AN FIHP Contacts R/C IHP to inquire on status of IHT response actions</p> <p>1249: AN FIHP contacts R/C IHT to confirm instrumentation passed post-use-function-test</p> <p>1251: AN FIHP notifies CSM that field readings were consistent with background and that field instrumentation had passed post-use-function-test</p> <p>1332: SOEN: "Response actions for the AOP-015 event have been completed and the results are at or below background levels. Exiting AOP-015. CSM"</p>		

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<u>Glossary:</u>		
AOP	Abnormal Operating Procedure	
ANFIHP	AN Team Field Industrial Hygiene Professional	
AYAZFIHP	AY/AZ Team Field Industrial Hygiene Professional	
ASAP	As Soon As Possible	
COMs	Central Operations and Maintenance	
COMsFIHP	Central Operations and Maintenance Field Industrial Hygiene Professional	
CSM	Central Shift Manager	
CSO	Central Shift Office (274AW Room 5)	
CVST	Chemical Vapors Solutions Team	
DL	Detection Limit	
EIR	Event Investigation Report	
ESH&Q	Environmental Safety Health and Quality	
ETF	Effluent Treatment Facility	
ETFIHT	Effluent Treatment Facility Industrial Hygiene Technician	
EV	Evaporator	
EVFIHP	EV Team Field Industrial Hygiene Professional	
FEI	Fugitive Emissions Investigation	
FEST	Fugitive Emissions Sub-Team	
H ₂ S	Hydrogen Sulfide	
Hg	Mercury	
HPT	Health Physics Technician	
HPMC	Hollie P. Mooers Corporation	
IH	Industrial Hygiene	
IHP	Industrial Hygiene Program (Sample Plan)	
IHPIHTL	Industrial Hygiene Programs Industrial Hygiene Technician Lead	
IHT	Industrial Hygiene Technician	
MO	Mobile Office	
N ₂ O	Nitrous Oxide	
NH ₃	Ammonia	
OE	Operating Engineer	
ORC	Odor Response Card	
PNNL	Pacific Northwest National Laboratories	
PO	Production Operations	
POIHT	Production Operations Industrial Hygiene Technician	
POIHTL	Production Operations Industrial Hygiene Technician Lead	
POIHTS	Production Operations Industrial Hygiene Technician Supervisor	
POS IH SME	Production Operations Specialist Industrial Hygiene Subject Matter Expert	
POSIHT	Production Operations Shift Industrial Hygiene Technician	
POSIHTS	Production Operations Shift Industrial Hygiene Technician Supervisor	
POWASHM	Production Operations West Area Safety and Health Manager	
R/C	Retrieval and Closure	
R/C IHP	Retrieval and Closure Industrial Hygiene Professional	
RPE	Respiratory Protection Equipment	
RPF	Respiratory Protection Form	
SM	Shift Manager	
SME	Subject Matter Expert	

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Glossary (cont.):

TF	Tank Farms
TGET	Terra Graphics Engineering Technician
TGIHRV	Terra Graphics Industrial Hygiene Response Van
TVA2020	Toxic Vapor Analyzer 2020
UTNCOL	Ultrasonic Testing Nuclear Control Operator Lead
VOC	Volatile Organic Compounds

Field IH Author:



12/03/2019
Date

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Time/Date & Event location: 0825 12/02/2018 241-AX 103		EIR Number: EIR-2019-049
<p>2. GCMS Sample Results:</p> <p>See Attachment A for HAPSITE (GCMS) results.</p> <p>3. Additional Information:</p> <ul style="list-style-type: none">• Odor Response Cards received: <p>See Next Page</p>		

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Time/Date & Event location: 0925 12/02/2019 241-AX 103		EIR Number: EIR-2019-049				
<p>• Summary of IH Monitoring and Sampling Data:</p> <p>a. Monitoring:</p> <p style="padding-left: 40px;">Event Response: 19-11085 "AOP-015 Response at AX-103"</p> <p style="padding-left: 40px;">DRI field readings:</p> <table style="margin-left: 80px;"><tr><td>VOC:</td><td><DL</td></tr><tr><td>NH₃:</td><td><DL</td></tr></table> <p>b. Sampling: N/A</p> <p>4. Summary of Employee Reported Information (e.g., symptoms): <u>6 Workers reported burning odor (like melting wires). 3 of these reported symptoms (Headache), and went to HPMC. All 3 were released to work without restriction.</u></p> <p>5. Recommendations/Conclusions: Identification of Source of the Concern: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Source of odor determined to electrical in nature. A warning device in a near-by tool box was malfunctioning and over heated</p> <p>6. Other:</p> <p>S&H Program Management:</p> <div style="border: 1px solid black; width: 300px; height: 40px; margin-left: 20px; position: relative;"><div style="position: absolute; top: -15px; left: 50px; font-size: 20px;">↻</div><div style="position: absolute; bottom: -15px; left: 50px; font-size: 20px;">↻</div><div style="position: absolute; top: 5px; right: 5px; width: 50px; height: 20px; background-color: black; color: white; text-align: center; font-size: 10px;">Phone No.</div><div style="position: absolute; top: 5px; right: 5px; text-align: right; font-size: 12px;">12/2/19 Date</div></div>			VOC:	<DL	NH ₃ :	<DL
VOC:	<DL					
NH ₃ :	<DL					

Attachment 5: Sample HAPSITE GC-MS Analysis

HAPSITE GC-MS Bag Sample Results Survey 19-11066, AX Tank Farm: (EIR-2019-049).

Two bag samples were collected in response to an odor reported at AX Tank Farm. One sample was taken in the southwest corner and one was taken downwind of the AX Tank Farm. These samples were collected on December 2, 2019 and analyzed that day using an Inficon HAPSITE GC-MS. Sample data was interpreted on December 9, 2019, and reported the same day. The sample collection bag matrix typically contains methyl methacrylate, toluene, xylenes, D-limonene, silicone compounds, and C9 - C15 alkane hydrocarbons. Results for the System and Bag Blank Samples were satisfactory.

Traces of compounds typical of the sample bag matrix were detected in both samples, but no other compounds were detected above background concentrations.



Attachment 6: Communication Template

Response to Reported Odors or Unexpected Changes to Vapor Conditions

Attachment 2 - Communication Template

The following is example of detail to provide in the electronic form of Communication Template.

Six Hanford workers were taken to HPMC or have declined precautionary medical evaluation after reporting odors at AX-103. Three of the workers reported symptoms and were taken to HPMC.

The employees were removing rubber matting from the AX103 work deck and were not in an area that requires use of a supplied air respirator.

Workers were instructed to leave the area, and access to the area has been restricted.

NOTE - This communication template is to be completed as soon as enough information is available.

Central Shift Manager:

[Redacted Signature]

[Redacted Print Name]

12-2-19

Signature

Print (First and Last)

Date

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Attachment 7: Follow-up Event Summary

Response to Reported Odors or Unexpected Changes to Vapor Conditions

Attachment 3 - Follow-Up Event Summary

The following is example of detail to provide in the electronic form of Follow-Up Event Summary.

TF-AOP-015 Initial Report	
Date: 12/02/2019	Time: 1347 hours
Location: AX Farm	
Number of Workers Involved: 6	Sampling Results #: Below background DRI Survey # 19-11066
Event Summary	
<p>At approximately 0932 hours 6 workers were removing plastic and rubber matting from AX-103 work deck. 3 workers had symptoms/headache and were transported to HPMC.</p> <p>At the time odors were reported, the individuals were not working in an area requiring use of supplied-air respiratory protection. All workers were instructed to leave the area. Access to the area was restricted.</p> <p>IHTs responded to the area and took DRI readings and a bag sample. DRI instrument readings were below background levels. Analytical results for bag samples are being analyzed and will be posted upon receipt.</p> <p>An event investigation 2019-049 has been initiated.</p>	
Return to Work Status	
Number of workers returned to work without restriction	3
Number of workers returned to work with restriction	N/A
Number of workers referred for further evaluation	N/A
<p>NOTE - Complete once event is stabilized and all details are known. - To learn more about chemical exposure evaluations see http://hsnfordvapors.com/wp-content/uploads/2016/09/2a-HPMC-procedure.pdf</p>	
Central Shift Manager: [REDACTED]	/ [REDACTED]
Signature	Print (First and Last)
	/ 12-2-19
	Date

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Attachment 8: Personnel Contacted

NAME	COMPANY	ORGANIZATION
[REDACTED]	WRPS	R&C CONSTRUCTION
[REDACTED]	AEI	CONSTRUCTION
[REDACTED]	WRPS	IH PROGRAM SME'S
[REDACTED]	AEI	CONSTRUCTION
[REDACTED]	AEI	CONSTRUCTION
[REDACTED]	AEI	CONSTRUCTION
[REDACTED]	WRPS	ELECTRICAL ENGINEERING
[REDACTED]	WRPS	PROD OPS SFTY & HEALTH-EAST
[REDACTED]	WRPS	SST R/C IH STAFF
[REDACTED]	WRPS	R&C CONSTRUCTION
[REDACTED]	WRPS	SST R&C SFTY & HEALTH
[REDACTED]	WRPS	R&C CONSTRUCTION
[REDACTED]	AEI	CONSTRUCTION
[REDACTED]	WRPS	R&C CONSTRUCTION
[REDACTED]	WRPS	R&C CONSTRUCTION
[REDACTED]	WRPS	R&C CONSTRUCTION
[REDACTED]	WRPS	SST R/C IH STAFF
[REDACTED]	Fowler	R&C CONSTRUCTION
[REDACTED]	WRPS	SST R/C IH STAFF
[REDACTED]	WRPS	INDUSTRIAL HYGIENE
[REDACTED]	WRPS	PROD OPS SFTY & HEALTH-EAST
[REDACTED]	AEI	CONSTRUCTION