

<b>Title: "TF-AOP-015 Entry for ToxiRAE Alarm at AX-103"</b> <b>EIR-2021-039/WRPS-CR-2021-3206</b>					
<b>Date:</b> 05/18/2021		<b>Time:</b> 0820 hours		<b>Location:</b> 200E/241-AX-Farm/241-AX-103/POR508	
<b>Number of Workers Involved:</b> 7		<b>Odor Response Card filled out:</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> How many? 7			
<b>Symptoms:</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		<b>Sampling Results #:</b> 21-05527			
<b>Medical Evaluation Offered:</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		<b>Medical Evaluation Declined:</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Annotate as appropriate (7 of 7)			
<b>Return to Work Status</b>					
Number of workers returned to work without restriction			N/A		
Number of workers returned to work with restriction			N/A		
Number of workers referred for further evaluation			N/A		
<b>Transported to Site Occupational Medical Services (HPMC)</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		<b>Odor Description:</b> None. No odors were smelled.			
<b>HMIS Activities:</b> None Biological/Herbicide <input type="checkbox"/> Septic Service <input type="checkbox"/> Other:		<b>Waste disturbing activities or Tank work in adjacent area:</b> Yes <input checked="" type="checkbox"/> Activity or work released: WOs 816431, 608121 No <input type="checkbox"/>			
<b>Meteorological Data:</b>					
<b>Time:</b>	<b>Weather Station #:</b>	<b>Speed: (MPH)</b>	<b>Direction: (N/S/E/W)</b>	<b>Temperature: F/C</b>	<b>Barometric Pressure (steady/rising/falling):</b>
0830	6 (200E)	24 MPH	From the W/SW	57° F	29.35" steady
<b>Event Summary &amp; Timeline</b>					
<p>On 5/18/21 at approximately 0820 hours a worker's Personal Ammonia Monitor (ToxiRAE) alarmed and indicated greater than 6 (six) parts per million (ppm) ammonia but less than 12 (twelve) parts per million ammonia inside 241-AX Farm AX-103 area while performing Construction Acceptance Testing (CAT) on POR508 and POR420 [Work Order (WO) number 632414, AX-103 Perform Construction Acceptance Tests (CAT) for the AX-103 Retrieval System]. The worker was opening an electrical panel (POR508) near tank 241-AX-103 when the ToxiRAE alarmed. The work crew placed their work in a safe configuration and exited the farm. The workers were wearing Full-Face Air-Purifying Respirators (FFAPRs). Seven (7) Retrieval/Closure Laborers were present at the time of the ToxiRAE alarm. No other worker's ToxiRAE alarmed. No odors were reported. Medical Surveillance was offered and declined.</p> <p>The Central Shift Manager (CSM) declared TF-AOP-015, "Response to Personal Ammonia Monitor Alarm," and restricted access to the area around tank 241-AX-103. All the ToxiRAE units from the work crew were quarantined and their data logs were downloaded.</p> <p>At the time of the event the workers were wearing Respiratory Protection Equipment in accordance with the Management Directed Respiratory Protection Form, "MDRPF-PLN-173," Task 1: Full Face Air Purifying Respirator (FFAPR) with gas/vapor cartridges.</p> <p>Industrial Hygiene Technicians (IHTs) responded to the area and took Direct Reading Instrument (DRI) readings. DRI instrument readings were below action levels.</p> <p>An Event Investigation Meeting wasn't held. Odor Response Cards, logbook entries, interviews, and document reviews provided sufficient information about the event.</p>					

**Event Timeline:**

~0820 – The event initiating ToxiRAE (003392) alarmed at six (6) parts per million (ppm).

0830 – The Field Work Supervisor (FWS) notified the CSM of the ToxiRAE alarm.

0835 – The CSM entered TF-AOP-015, "Response to Personal Ammonia Monitor Alarm," and restricted access to the area around 241-AX-103.

~0833 – The CSM notified the on-call Department of Energy (DOE) Facility Representative of the TF-AOP-015, "Response to Personal Ammonia Monitor Alarm."

0839 – The Production Operations (PO) Industrial Hygienist (IH) arrives at the Central Shift Office.

0839 – The PO IH contacts the Level two (2) Industrial Hygiene Manager and briefs him on the available information. Industrial Hygiene Investigation Report is initiated (IHIR-00018).

0840 – The PO Shift Industrial Hygiene Supervisor arrives at the Central Shift Office to support the response actions.

0841 – The PO IH contacts the Hanford On-Duty Weather Forecaster to obtain weather data.

0843 – The PO IH checks the Data Fusion and Advisor System (DFAS) application, powered by SmartSite™ for current conditions.

0845- The PO IH contacts the Retrieval and Closure Industrial Hygiene Technician Supervisor about acquisition of affected ToxiRAEs and work activity related Industrial Hygiene sampling and monitoring equipment.

0846 – The PO IH contacts the Retrieval and Closure Safety and Health Manager about supporting response actions.

0848 – The Retrieval and Closure Safety and Health Manager contacts the PO IH to notify them that the responsible Retrieval and Closure IH is in route to support response actions.

0850 – The FWS contacts the CSM:

- Affected workers was offered medical surveillance and declined
- All ToxiRAEs have been collected.

0851 – The CSM contacts the FWS regarding:

- Transport of all ToxiRAEs to the Central Shift Office.
- All affected personnel report to the Central Shift Office to populate Odor/Vapor Response Cards.

0852 – The PO IH contacts the Retrieval and Closure IH to coordinate response actions:

- The Retrieval Closure IH is in route.
- They will acquire Respiratory Protection Equipment.
- They will report to Central Shift Office.

0903- The affected workers arrive at Central Shift Office:

- All workers are requested to complete Odor/Vapor Response Cards.

- The worker whose ToxiRAE alarmed was opening an electrical panel on POR508.
- Personal Ammonia Monitor sensor was not blocked.
- No other unusual conditions were noted.

0909 – The workers submit Odor/Vapor Response Cards to the PO IH.

0913- The PO Shift Industrial Hygiene Technician (IHT) arrives at the Central Shift Office to support response actions.

0915- The PO IH briefs the PO Shift IH Supervisor on response actions:

- Monitor per Industrial Hygiene Plan IHP-09001
- Respiratory Protection Form "TF-AOP-015" Task 4 (Voluntary Use)
- If not voluntarily using, then use respiratory protection per MDRPF-PLN-173, Task 1.

0918 – The ToxiRAEs arrive at the Central Shift Office:

- A peak reading at six (6) ppm is confirmed for the event initiating ToxiRAE (003392).
- It was observed that the ToxiRAE that alarmed had a cracked cover and the sensor surface was dirty and rusted.

0922 – The PO Shift IHT departed the Central Shift Office to acquire respiratory protection equipment to perform monitoring.

0924 – The Retrieval and Closure IH arrived at the Central Shift Office and is briefed on the response actions.

0925 – The PO Shift IHT Supervisor departed the Central Shift Office to download the data-logs from ToxiRAE and to perform post-use-function-testing.

0926 – The PO Shift IHT and Retrieval and Closure IH depart the Central Shift Office to perform field response actions.

0941- The PO Shift IHT Supervisor contacts the PO IH with ToxiRAE in-service dates.

0954 – The Retrieval and Closure IH contacts the PO IH regarding:

- Ammonia - Less than detectable (less than one 1 ppm)
- The affected area is very windy
- No notable possible source of fugitive tank vapor emission.

1013 - The CSM exited TF-AOP-015 and the access restriction to 241-AX-103 was lifted.

1029 – Event investigation EIR-2021-039 was initiated.

**Immediate Actions Taken:**

- The workers exited the farm after placing work in a safe configuration. Access to the area around 241-AX-103 was restricted.
- The workers submitted Odor Response cards. No workers reported any odors. No workers reported any symptoms. All workers declined precautionary medical evaluation.
- All worker ToxiRAEs were submitted to the Central Shift Office.
- Industrial Hygiene Technicians (IHTs) responded to the area and took Direct Reading Instrument (DRI) readings. DRI instrument readings were below action levels.

- The ToxiRAE instrument's (003392) post-use function test was satisfactory.
- Event Investigation EIR-2021-039 was initiated.
- The CSM exited TF-AOP-015 and the access restriction to 241-AX-103 was lifted.

**Compensatory Measures:**

None.

**Facility Impact:**

No impact to the facility occurred.

**Discussion of Positive Aspects of the Event:**

The IH field response was quickly initiated and implemented.

**Readings from Sampling and/or Monitoring:**

Field Response area readings Site Wide Industrial Hygiene Database (SWHID) survey# 21-05527, "TF-AOP-015 Response at 241-AX-103, POR-508":

- Ammonia: Less than Detectable [less than 1 ppm]

ToxiRAE 003392 (event initiating ToxiRAE):

- Ammonia: Reported alarm of 6 ppm
- Ammonia: Display peak alarm of 6 ppm
- Ammonia: Data log peak alarm of 2 ppm.

Additional information on ToxiRAE 003392:

The ToxiRAE response time (t90), the time needed for the ToxiRAE to read 90% full-scale of the true concentration of ammonia, is 60 seconds. It was observed that there was an accumulation of debris on the sensor itself, although the amount of debris present on the alarming ToxiRAE doesn't indicate that this was the potential cause of the alarm.

All other ToxiRAEs associated with event either had a peak reading of 0 or 1 ppm ammonia.

Area air concentration surveillance/monitoring using an AreaRAE and located between POR126 and POR127:

- Ammonia: Less than Detectable [less than 1 ppm].

Source air concentration peak reading utilizing a MultiRAE located at POR126 and POR127:

- Ammonia: Less than Detectable [less than 1 ppm].

The Data Fusion and Advisor System (DFAS) application, powered by SmartSite™ current conditions were reported as:

- 20 miles per hour out of West/Southwest - 246 degrees
- The conditions at 0545 (the last DFAS update):
  - o Mixing Height: 1400 feet
  - o Stability Class E (stable)
  - o Wind at 9 miles per hour from the North West - 305 degrees

- o POR127 Vapor Monitoring Detection System Ammonia Reading - 2.71 ppm.

**Site Wide Industrial Hygiene Database (SWHID) References:**

Field Response SWHID survey:

21-05527, "TF-AOP-015 Response at 241-AX-103, POR-508"

Area air concentration surveillance/monitoring reported in SWHID:

21-05483, "A Complex Hotel Load AreaRAEs"

Source air concentration stack monitoring reported in SWHID:

21-05494, "AX/702-AZ-Farm Stack Readings"

21-05501, "A-Farm Hotel Load Stack Readings"

**Listing of IH Program(s) to Consider:**

Data Fusion and Advisor System (DFAS) application, powered by SmartSite™

**Discussion of Potential Source(s):**

Per the Industrial Hygiene Event Investigation Report (IHIR-00018), during the time of the ToxiRAE alarm, the Vapor Monitoring Detection System (VMDS) for Portable Exhauster POR126 was not operational. The VMDS for POR127 was operational and had a peak ammonia reading of 3.04 ppm between 0730 and 0900 hours. Both POR126 and POR127 were operational and were maintaining a negative pressure for all four tanks in 241-AX-Farm at the time of the alarm. The peak ammonia reading for the area air monitoring associated with the 241-AX-Farm was less than detectable (less than 1ppm). This was recorded from an AreaRAE that was placed in between POR126 and POR127.

When evaluating potential sources of the ToxiRAE Alarm, 241-A-Farm source air concentration monitoring performed at POR518 and POR519 was evaluated due to the wind direction reported from Weather Station 6. 241-A-Farm source air concentration monitoring performed at POR518 and POR519 had a peak reading of 4.0 ppm.

Therefore, there was very low potential for ground level exposure from the 241-AX-Farm and 241-A-Farm exhausters.

**Conclusions:**

The exact cause of the ToxiRAE alarm is unknown. The investigation didn't identify any sources and based on stack concentrations and meteorological conditions it is unlikely due to tank vapors.

**Recommendation:**

Industrial Hygiene to evaluate sensor usage and age to determine if that could be a contributing factor to spontaneous alarms [WRPS-CR-2021-3206-01].

**Attachments (as they apply):**

1. Redacted Odor Response Cards (14 pages)
2. WRPS TF-AOP-015 Industrial Hygiene Investigation Report, IHIR-00018 (4 pages)
3. Industrial Hygiene Sample Plan (IHP-09001 R7) for TF-AOP-015 (1 page)
4. TF-AOP-015 Rev H-2, pages 13 & 14 (2 pages)
5. Redacted CSM Logbook Entries (1 page).

**Personnel Contacted:**

- ██████████ – American Electric
- ██████████ – WRPS Single Shell Tank Retrieval & Closure IH Staff
- ██████████ – Industrial Hygiene
- ██████████ – WRPS PO Safety and Health - East

Responsible Manager:	██████████	██████████	6/30/21
	Print (First and Last)	Signature	Date
Event Investigator	██████████	██████████	6/29/21
	Print (First and Last)	Signature	Date

### ODOR/VAPOR RESPONSE CARD - 241-AX FARM

**1. Contact CSM, Complete below bulleted information and map.**

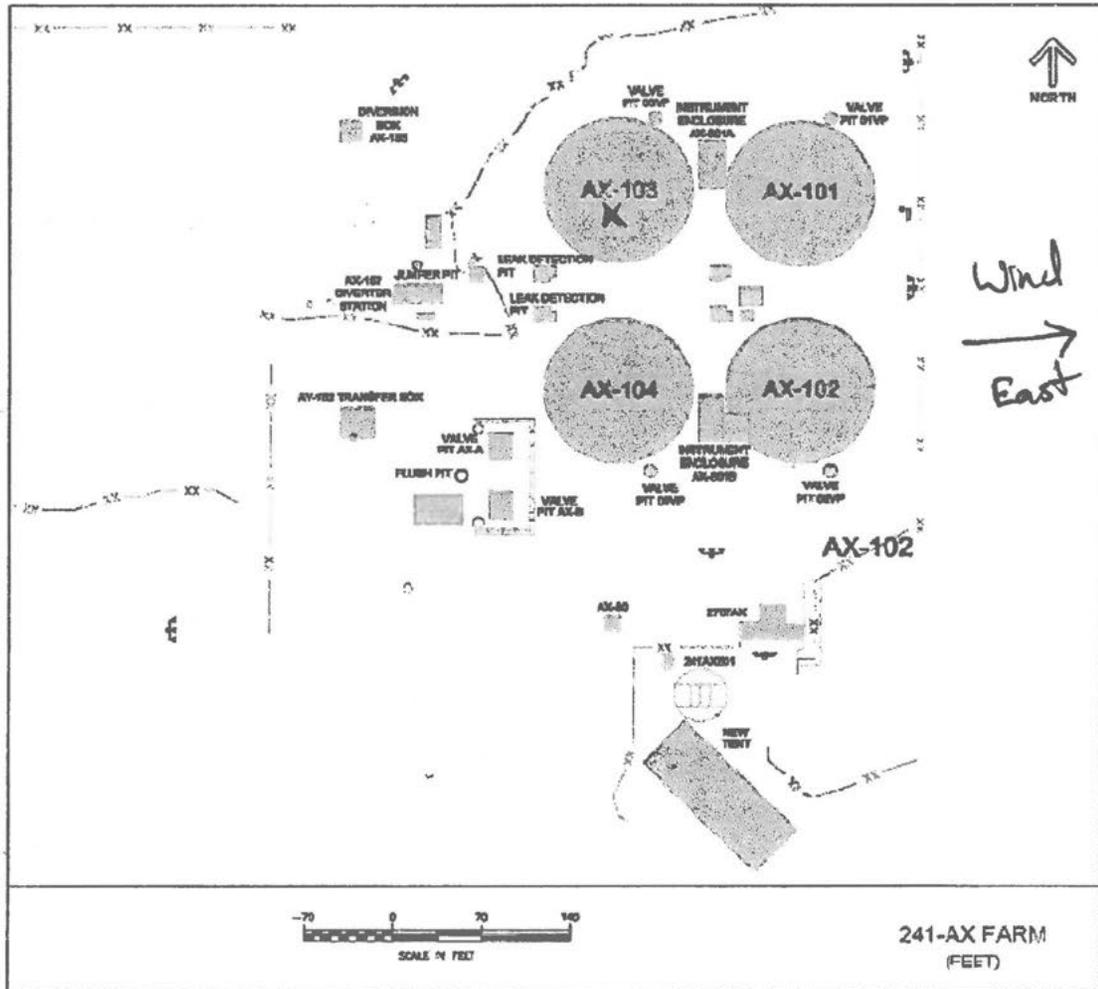
- Date and time of event: 05/18/21 8:30 am
- Check Applicable:  Odor  Alarm 6 ppm  Alarm 12 ppm  Alarm Other: \_\_\_\_\_
- Your name and the work your were performing: [REDACTED] on POR420
- Location of event (mark area on map and wind direction): Wind due East AK103 POR508
- Name(s) of others in or near the affected area: \_\_\_\_\_
- Was an IHT present? NO
- Describe the Odor:  Sweet  Sour  Musty  Earthy  Metallic  Smoky  Rotten  Onion  
 Septic  Ammonia  Cleaning Solution  Other: \_\_\_\_\_
- Possible Source: Panel POR 508 ? not really sure.
- 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, didn't smell anything.

**2. Send this card to the Central Shift Office.**

# ODOR/VAPOR RESPONSE CARD - 241-AX FARM

## ODOR OR VAPOR ALARM EVENT

1. Notify Immediate Supervisor.
2. Contact Central Shift Manager (CSM), [REDACTED] complete below bulleted information and map.
  - Your name and the work you were performing
  - Your symptoms (if any)
  - Date and time of event
  - Location of event (mark area on map and the wind direction)
  - Describe the odor, if applicable
  - Name of others in or near the affected area
  - Was an IHT present?
  - Possible source
3. Complete map.
4. Complete the back of card.
5. Send this card immediately to the Central Shift Office.

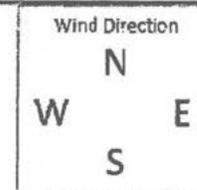
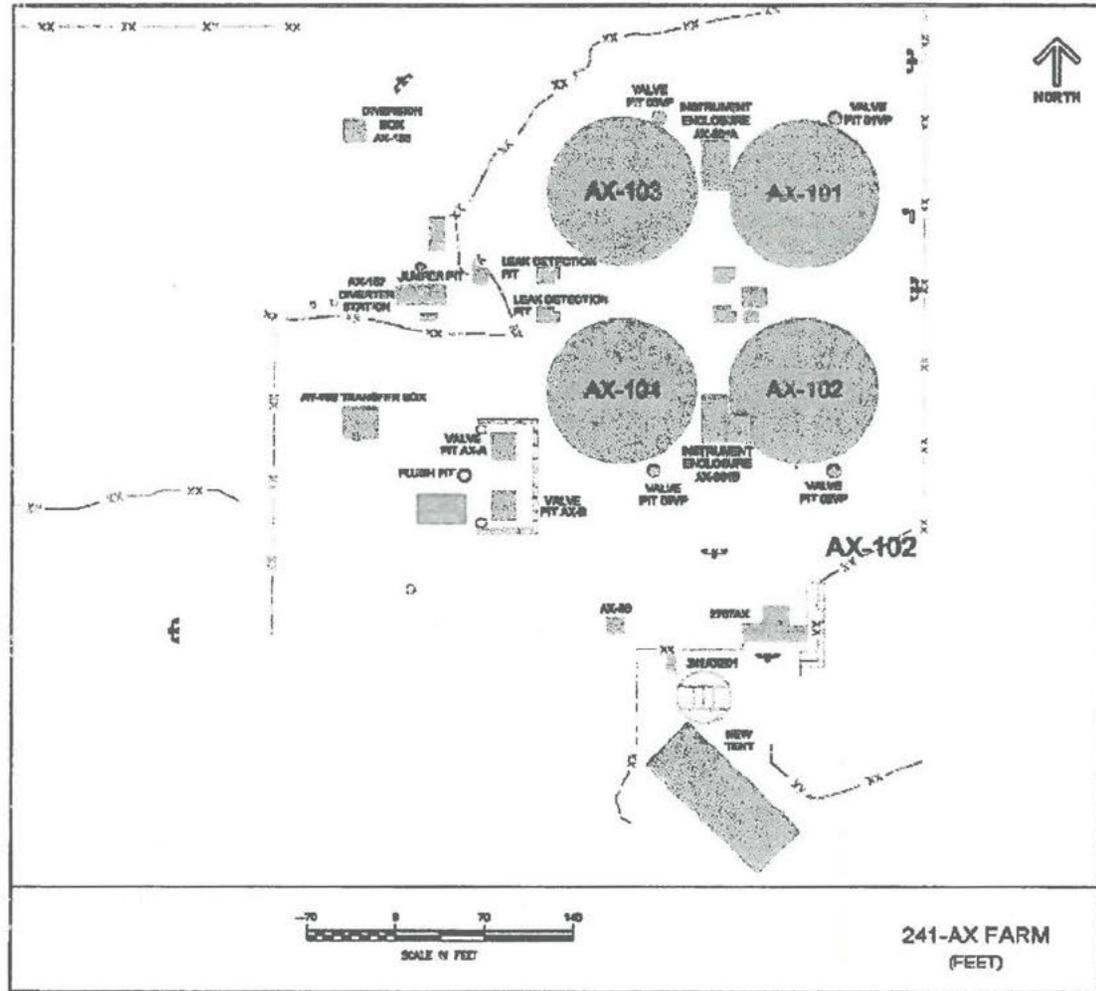


Wind Direction	
N	E
W	S

## ODOR/VAPOR RESPONSE CARD - 241-AX FARM

### ODOR OR VAPOR ALARM EVENT

1. Notify Immediate Supervisor.
2. Contact Central Shift Manager (CSM), XXXXXXXXXX complete below bulleted information and map.
  - Your name and the work you were performing
  - Your symptoms (if any)
  - Date and time of event
  - Location of event (mark area on map and the wind direction)
  - Describe the odor, if applicable
  - Name of others in or near the affected area
  - Was an IHT present?
  - Possible source
3. Complete map.
4. Complete the back of card.
5. Send this card immediately to the Central Shift Office.



ODOR/VAPOR RESPONSE CARD - 241-AX FARM

1. Contact CSM, Complete below bulleted information and map.

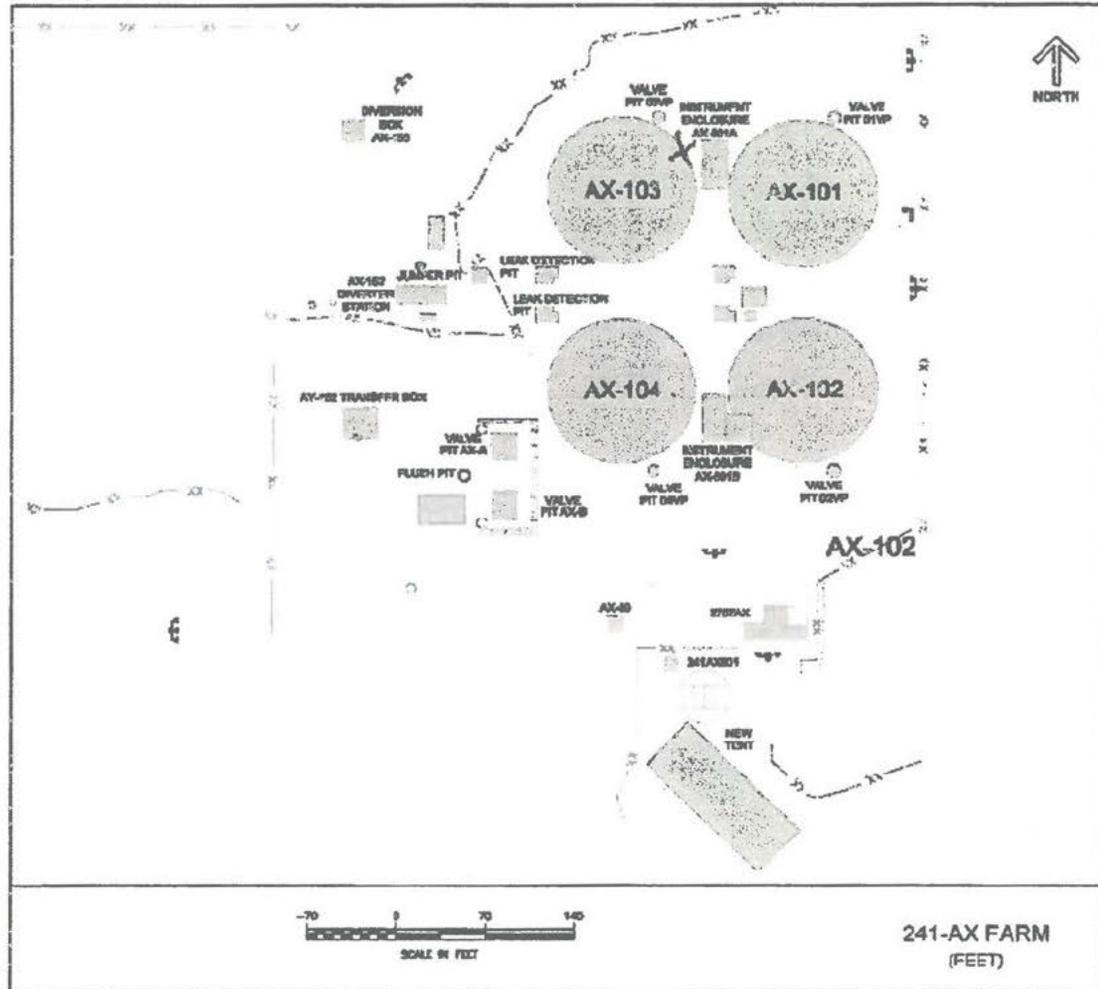
- Date and time of event: 5/18/21 8:34
- Check Applicable:  Odor  Alarm 6 ppm  Alarm 12 ppm  Alarm Other: \_\_\_\_\_  
*None*
- Your name and the work your were performing: \_\_\_\_\_ Breaker lineup
- Location of event (mark area on map and wind direction): ROR 420
- Name(s) of others in or near the affected area: \_\_\_\_\_
- Was an IHT present? No
- Describe the Odor:  Sweet  Sour  Musty  Earthy  Metallic  Smoky  Rotten  Onion  
*None*  Septic  Ammonia  Cleaning Solution  Other: \_\_\_\_\_
- Possible Source: Unknown
- Your Symptoms (if any):  Headache  Dizziness/Light-Headed  Nausea  Cough  
*None*  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.

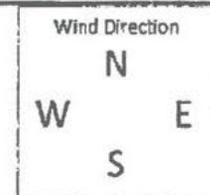
## ODOR/VAPOR RESPONSE CARD - 241-AX FARM

### ODOR OR VAPOR ALARM EVENT

1. Notify Immediate Supervisor.
2. Contact Central Shift Manager (CSM), ██████████ complete below bulleted information and map.
  - Your name and the work you were performing
  - Your symptoms (if any)
  - Date and time of event
  - Location of event (mark area on map and the wind direction)
  - Describe the odor, if applicable
  - Name of others in or near the affected area
  - Was an IHT present?
  - Possible source
3. Complete map.
4. Complete the back of card.
5. Send this card immediately to the Central Shift Office.



West to east



**Washington River Protection Solutions  
INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT**

<b>Event Title:</b>  <p style="text-align: center;">TF-AOP-015 Entry at 241-AX Farm; AX-103 area POR-508</p>	<b>PER Number:</b>  <p style="text-align: center;">N/A</p>
<b>IHIR Number:</b>  <p style="text-align: center;">IHIR-00018</p>	

<b>Date:</b> 05/18/2021	<b>Time:</b> 0820	<b>Location:</b> 241-AX Farm; 241-AX-103 area, POR-508
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**Event Summary and Timeline:**

**Event Summary:**

At approximately 0820, a personal ammonia monitor (PAM) alarmed at 6 ppm in an Electrician's breathing zone. The work crew was removing the access cover to POR-508 electrical distribution panel located near 241-AX-103. The crew consisted of seven AEI employees including three Electricians, two Laborers, one Quality Assurance Engineer and 1 FWS. The PAM's for the remaining six workers had a reading of 0 or 1 ppm ammonia. FWS notified Central Shift Office (CSO) and TF-AOP-015 was entered. When affected work crew arrived at CSO, Odor/Vapor response cards and PAMs were filled out and turned in. No odors were observed at the time of the event.

Production Operations (PO) Shift Industrial Hygiene Technician (IHT) and Retrieval/Closure (R/C) Industrial Hygienist (IH) were briefed on the appropriate response per TF-AOP-015 and were deployed into 241-AX Farm to perform further investigation and to complete the response sweep utilizing a MultiRAE PRO that was monitoring for both ammonia and VOCs. Workers donned anti-Cs and appropriate respiratory protection equipment (RPE) which included full-faced air purifying respirators with MSA GME Chemical Vapor cartridges and entered 241-AX Farm through the AX ingress/egress tent. When traversing to the primary point of concern (POR-508), there were no abnormal conditions observed. All ammonia and VOC readings were less than detectable at and around POR-508 during the investigation. The PO IHT and R/C IH then exited and the PO IHT returned to the lab and performed the post use function test for the MultiRAE PRO. The MultiRAE PRO was within tolerance for its post use function test and the TF-AOP-015 was exited.

During the time of the PAM alarm, Vapor Monitoring Detection System (VMDS) was not operational for Portable Exhauster (POR) 126, but VMDS for POR127 was operational and had a peak ammonia reading of 3.04 ppm between 0730 and 0900. Both POR126 and POR127 were operational and maintaining a negative for all four tanks in AX-Farm during the time of the alarm. The peak ammonia reading for the area air monitoring associated with 241-AX Farm was less than detectable (less than 1 ppm). This was recorded from an AreaRAE that was placed in between POR126 and POR127.

**Field Response Timeline:**

- 0820 Approximate time of the event - PAM alarm
- 0830 CSO notified of PAM alarm at 6 ppm
- 0836 SOEN: "Entered TF-AOP-015 Response to Personal Ammonia Monitor Alarm with reading 6 ppm ammonia. Access to area around AX103 is restricted. CSM"
- 0839 PO IH arrives at CSO
- 0839 PO IH contacts Level 2 Industrial Hygiene Manger
  - Briefed on available information
  - Industrial Hygiene Investigation Report Initiated (IHIR)
- 0840 Production Operations Shift Industrial Hygiene Supervisor arrives at Central Shift Office to support response actions
- 0841 Production Operations Industrial Hygienist contacts Hanford On-Duty Weather Forecaster:
  - Station 6 on 05/18/2021 @ 0830
  - Wind Speed: 24 miles per hour (mph) with gusts up to 34 mph
  - Wind Direction: Out of West South West
  - Temperature: 57 degrees Fahrenheit
  - Relative Humidity: 31%
  - Pressure: 29.35 inches of Mercury and steady
- 0843 PO IH checks Data Fusion Advisory System (DFAS) Smart Site current conditions:
  - 20 mph out of West South West 246 degrees

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**INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT(Continued)**

**Event Summary and Timeline:**

- Conditions at 0545 (last DFAS Smart Site update):
  - o Mixing Height: 1400 feet
  - o Stability Class E
  - o Wind at 9 mph from the North West at three-hundred-five (305) degrees
  - o POR-127 VMDS Ammonia Reading - 3.04 ppm
- 0845 PO IH contacts Retrieval Closure IHT Supervisor about acquisition of affected Personal Ammonia Monitors and work activity related Industrial Hygiene sampling and monitoring equipment
- 0846 PO IH contacts Retrieval Closure Safety and Health Manager about supporting response actions
- 0848 Retrieval Closure Safety and Health Manager contacts Production Operations Industrial Hygienist to notify that Responsible R/C IH is in route to support response actions
- 0850 FWS contacts central shift manager:
  - Affected worker was offered medical surveillance and declined
  - All personal ammonia monitors have been collected
- 0851 Central Shift Manager contacts FWS:
  - Transport all personal ammonia monitors to CSO
  - All affected personnel report to CSO to populate Odor/Vapor Response Cards
- 0852 PO IH contacts Responsible R/C IH to coordinate response actions:
  - R/C IH in route to office (2704HV)
  - Will acquire Respiratory Protection Equipment
  - Will report to CSO
- 0903 Affected workers arrive at CSO
  - Odor/Vapor Response Cards populated
  - Worker was opening electrical panel on POR-508
  - Personal Ammonia Monitor sensor was not blocked
  - No other unusual conditions were noted
- 0909 Affected workers submit Odor/Vapor Response Cards to PO IH
- 0913 PO Shift IHT arrives at Central Shift Office to support response actions
- 0915 PO IH briefs Production Operations Shift IHT Supervisor on response actions:
  - Monitor per IHP-09001
  - Respiratory Protection Form "TF-AOP-015" Task 4 (Voluntary Use)
  - IF not voluntarily using, THEN "MDRPF-PLN-173" Task 1
  - Awaiting arrival of Personal Ammonia Monitor to confirm peak reading at six (6) parts-per-million
- 0918 Affected PAM arrives at CSO
  - Confirmed peak reading at 6 ppm
  - Alarmed instrument had a cracked cover and the sensor surface is dirty and rusted
- 0921 PO IH contacts Responsible R/C IH about estimated time of arrival at CSO to support response actions
- 0922 PO Shift IHT departs CSO to acquire Respiratory Protection Equipment
- 0924 Responsible R/C IH arrives at CSO and is briefed on response actions
- 0925 PO Shift IHT Supervisor departs CSO to download data-logs from personal ammonia monitors and perform post-use-function-testing
- 0926 PO Shift IHT and Responsible R/C IH depart CSO to perform field response actions
- 0941 PO Shift IHT Supervisor contacts PO IH with Personal Ammonia Monitor in-service dates
- 0954 Responsible R/C IH contacts PO IH:
  - Ammonia - Less than detectable (less than one 1 ppm)
  - Affected area is very windy
  - No notable possible source of fugitive tank vapor emission
- 1009 PO Shift IHT contacts PO IH: MultiRAE Pro utilized in TF-AOP-015 response passed post use function test.
- 1013 SOEN: "Response actions for the TF-AOP-015 event have been completed and the results are below personal ammonia monitor response level. Exiting TF-AOP-015. Normal access to AX103 is restored. CSM"

**Sampling/Monitoring Results:**

**Field Response area readings:**

- Ammonia: Less than Detectable (less than 1 ppm)

**ToxiRAE 003392(event initiating ToxiRAE):**

- Ammonia: Reported alarm of 6 ppm
- Ammonia: Display peak alarm of 6 ppm

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**INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT(Continued)**

**Sampling/Monitoring Results:**

- Ammonia: Data log peak alarm of 2 ppm

All other ToxiRAEs associated with event either had a peak reading of 0 or 1 ppm ammonia.

Area air concentration surveillance/monitoring using an AreaRAE and located between POR126 and POR127:

- Ammonia - less than detectable (less than 1 ppm)

Source air concentration peak reading utilizing a MultiRAE located at POR126 and POR127:

- Ammonia - less than detectable (less than 1 ppm)

**SWIHD References:**

Field Response Site Wide Industrial Hygiene Data Base survey:

21-05527 "TF-AOP-015 Response at 241-AX-103, POR-508"

Area air concentration surveillance/monitoring reported in the Site Wide Industrial Hygiene Data Base (SWIHD):

21-05483 "A Complex Hotel Load AreaRAEs"

Source air concentration stack monitoring reported in SWIHD:

21-05494 "AX/702-AZ-farm Stack Readings"

21-05501 "A-farm hotel load stack readings"

**Additional Information:**

At the time of the initiating event the seven AEI employees were wearing Respiratory Protection Equipment in accordance with the Management Directed Respiratory Protection Form "MDRPF-PLN-173" Task 1: Full Face Air Purifying Respirator (FF-APR) with Gas/Vapor cartridges (MSA GME Chemical Vapor).

Additional Information on the Personal Ammonia Monitors (ToxiRAEs):

The ToxiRAE response time (t90), the time needed for the ToxiRAE to read 90% full-scale of the true concentration of ammonia, is sixty (60) seconds. It was observed that there was accumulation of debris on the sensor itself, although the amount of debris present on the alarming PAM does not indicate that this was the potential cause of the alarm.

ToxiRAE 003392 (event initiating ToxiRAE):

- Put into service on 03/28/2019
- Unit Name: ToxiRAE Pro (PGM-1860)
- Unit Serial Number (SN): G024010706
- User ID: TOXI3392
- Measure Type: Real
- Datalog Mode: Continuous
- Datalog Type: Auto
- Sample Period: 60 seconds
- Calibration Time: 3/10/2021 0019
- Passed bump test 05/18/2021

Atmospheric conditions outside of affected area during event provided by On-Duty Forecaster:

Weather Station 6 0830 05/18/2021:

- Temperature: 57 degrees Fahrenheit
- Wind speed and direction: Out of West, South West at 24 mph, gusts up to 19 mph
- Relative Humidity: 31%
- Barometric Pressure: 29.35 inches of Mercury and falling

Review of the DFAS application, powered by SmartSite™, Weather Details dashboard for the reported time of the Event indicate the cause of the Personal Ammonia Monitor alarm is unlikely to be from POR126 or POR127 Exhauster emissions based on:

- Stability Class E
- Atmospheric Mixing Height: 1400 feet above grade
- Wind Direction out of Northwest
  - o 241-AX-103 is located West of POR126 and POR127 Exhausters
- Wind Speed: Approximately 9 miles per hour from the North West
- POR-127 VMDS Ammonia Reading - 3.04 ppm

Washington River Protection Solutions  
**INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT(Continued)**

**Additional Information:**

**Related information:**

When evaluating potential sources of the PAM alarm, A-Farm source air concentration monitoring performed at POR518 and POR519 was evaluated due to the wind direction reported from Weather Station 6. A-Farm source air concentration monitoring performed at POR518 and POR519 had a peak reading of 4.0 ppm ammonia.

Therefore, there was a very low potential for ground level exposure from 241-AX Farm Exhausters and 241-A Farm Exhausters.

**Recommendations/Conclusions:**

**Recommendations:**

Evaluate sensor usage and age to determine if that could be a contributing factor to spontaneous alarms.

**Conclusion:**

The exact cause of the alarm is unknown, there were no identified sources and based on the stack concentrations and meteorological conditions it is unlikely due to tank vapors.

**Other:**

All Affected Personnel were offered voluntary medical surveillance, but declined.  
EIR(Event Investigation Report)# 2021-039.

**Industrial Hygienist:**

[Redacted Name]

*Print First and Last Name*

[Redacted Signature/Date]

*Signature / Date*

**Industrial Hygiene Level 2 Manager:**

[Redacted Name]

*Print First and Last Name*

[Redacted Signature/Date]

*Signature / Date*

**POR508-WT-DP-001**



<b>INDUSTRIAL HYGIENE SAMPLE PLAN</b>	Contractor: <b>Washington River Protection Solutions</b>	IHSP Number IHP-09001 R7
Exposure Assessment: <input checked="" type="checkbox"/> Job Specific: <input type="checkbox"/>		

**Brief Job Description and Type of Area:**  
Response to ammonia monitor alarm.

**INSTRUCTIONS**

**1. Action Limits**

Action Limit (Direct Reading Instrument)

- Ammonia: 12 ppm

**2. Monitoring**

- Source: Monitor possible source(s) to detect if there may be a noticeable increase in intensity or positive reading
- Area: General area where employees/ammonia monitor identified the source

If source is readily apparent, e.g. vehicle exhaust, septic systems, animal odors, inform shift office that source has been identified and await direction.

**3. Sampling**

N/A

**4. Pre-Job Briefing Information**

N/A

**5. Other**

- An ammonia monitor that has alarmed will be documented in the appropriate database, detailing the alarmed event.
- Industrial Hygiene Technician to monitor their way in using handheld direct reading instrument, moving from an upwind location if possible.
- Additional direction for access control may be provided by the Shift Manager based upon monitoring results
- An exclusion zone may be established or farm access restricted if air monitoring levels reach and remain above an action level.
- This sample plan may be modified or increased based on direction from the Industrial Hygienist.

Did IHT Lead Review?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	If Yes, Lead IHT INITIAL	& DATE:
IH Author	Print: [Redacted]	Sign: [Redacted]	Phone: [Redacted]	Date: [Redacted]
N/A <input type="checkbox"/> IH Peer Review	Print: [Redacted]	Sign: [Redacted]	Phone: [Redacted]	Date: [Redacted]
N/A <input checked="" type="checkbox"/> IH Mgmt.	Print: [Redacted]	Sign: [Redacted]	Phone: [Redacted]	Date: [Redacted]

## Response to Personal Ammonia Monitor Alarm

### Attachment 1 – Initial Communication Template

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

7 Hanford workers have declined precautionary medical evaluation after reporting unexpected changes to vapor conditions at AX103. 0 workers reported symptoms.

The employees were performing CAT testing on POR420 and verifying breakers at panel POR508 at the time of reported personal ammonia monitor alarm and were in an area that requires use of respiratory protection.

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.

\_\_\_\_\_  
Signature  
Central Shift Manager

\_\_\_\_\_  
Print (First & Last)

\_\_\_\_\_  
Date  
05-18-21

Type	Document No	Rev/Mod	Release Date	Page
REFERENCE	TF-AOP-015	H-2	05/17/2021	13 of 14

## Response to Personal Ammonia Monitor Alarm

### Attachment 2 - 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: 05/18/2021	Time: 1015 hours	Location: AX103
Number of Workers Involved: 7	Sampling Results #: 21-05527	
Event Summary		
<p>At approximately 0830 hours 1 worker's personal ammonia monitor alarmed with reading 6 ppm after opening an electrical panel near POR508 near AX103. Initially no workers reported symptoms and all declined medical evaluations.</p> <p>At the time the change in vapor condition was reported, the individuals were working in an area requiring use of 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. DRI instrument readings were below action levels.</p> <p>An event investigation has not been initiated.</p>		
Return to Work Status		
Number of workers returned to work without restriction	7	
Number of workers returned to work with restriction	0	
Number of workers referred for further evaluation	0	
<p>NOTE - Form is to be completed once event is stabilized and all details are known.                      - To learn more about chemical exposure evaluations see <a href="http://hanfordvapors.com/wp-content/uploads/2016/09/2a-HPMC-procedure.pdf">http://hanfordvapors.com/wp-content/uploads/2016/09/2a-HPMC-procedure.pdf</a></p>		
 Signature Central Shift Manager	 Print (First & Last)	/ 05-18-21 Date

RE: TF-AOP-015 5/18/21 Logbook Entry

 [Redacted]

[Reply](#) [Reply All](#) [Forward](#) [...](#)  
Tue 5/19/2021 4:25 PM

 You replied to this message on 5/19/2021 7:59 AM.

[Redacted]

- 05/18/2021 - 08:33 Entered TF-AOP-015 Response to Personal Ammonia Monitor Alarm. Notified by [Redacted] list while verifying breakers near AX103, an electrician's personal ammonia monitor alarmed with a reading of 6 ppm. There was not an IHT covering the work in the farm at this time. None of the other worker's monitors alarmed. Total of 7 workers in the work area as employee left the area. All personnel directed to exit the area with access restriction around AX103. Directed FWS to collect ToxiRAEs and odor response cards. Offered all workers medical surveillance. All declined coverage. SCEN sent. Radio announcement complete. Notified ORP FF.
- 05/18/2021 - 09:19 Odor/Vapor response cards indicate that the workers were supporting CAT testing of POR420 and the ToxiRAE alarmed for Electrician [Redacted] he opened POR508 electrical panel. None of the workers report odors or symptoms. The ToxiRAE in question has a cracked cover and appears dirty (rust). None of the other ToxiRAEs reported any elevated readings. Directed IHT to implement IHP-09001 "Response to Ammonia Monitor Alarm" utilizing TF-AOP-015 RPF.
- 05/18/2021 - 09:27 TF-AOP-015 Initial Communication sent to distribution list.
- 05/18/2021 - 10:13 Exited TF-AOP-015 Response to Personal Ammonia Monitor Alarm. Response actions for the TF-AOP-015 event have been completed and the results are below personal ammonia monitor response levels. Exiting TF-AOP-015. Normal access to AX-103 is restored. SCEN sent. Radio announcement complete. Notified ORP FF.