

Event Investigation Report EIR-2021-021
Investigation of TF-AOP-015 for ToxiRAE Alarm at A-104
WRPS-CR-2021-2912



P.O. Box 850
 Richland, Washington 99352

Responsible Manager: _____	/ _____	5/12/2021
	Signature	Date
Event Investigator: _____	/ Digitally signed by _____	
_____ Event Investigation Team Lead	Date: 2021.05.12 11:45:22 -07'00'	
	Signature	Date
Event Investigator: _____	/ Digitally signed by _____	
_____ Event Investigation Team (under instruction)	Date: 2021.05.12 11:50:06 -07'00'	
	Signature	Date

Executive Summary:

On March 31, 2021 at approximately 0930, a work crew (two [2] ITs and one [1] HPT) was performing A-104-LIT ENRAF calibration (WO#632842) when one of the IT's ToxiRAE Personal Ammonia Monitor alarmed. Workers reported a peak reading of nine (9) parts per million Ammonia (NH₃). (WRPS established response level is six [6] parts per million Ammonia and the established action level is twelve [12] parts per million Ammonia.) The workers were within one to two feet of each other at the time of the alarm, and the HPT confirmed that they were with the ITs during the entire work evolution. Therefore, personal sampling collected is representative of the entire evolution, including the initiating event. None of the workers encountered odors or experienced any symptoms and all declined medical evaluation. This investigation was performed in accordance with TF-AOP-015, "*Response to Personal Ammonia Monitor Alarm*" and TFC-OPS-OPER-C-14, "*Event Investigation Process*."

At the time the ToxiRAE Personal Ammonia Monitor alarmed, the three (3) individuals were wearing Full Face Air Purifying Respirators (FF-APR) with Gas/Vapor cartridges and ToxiRAE personal ammonia monitors. In response to the ToxiRAE alarm, the workers immediately exited the area, and notified the Field Work Supervisor (FWS). Notifications were made to the Central Shift Office (CSO), WRPS Safety and Health Manager and Industrial Hygiene Manager. Meteorological data collected at the time from Weather Station #6 indicates light winds from the WNW at 2mph, 46° F, and a steady barometric pressure.

At approximately 0955, the Central Shift Manager (CSM) entered TF-AOP-015 for response to ToxiRAE alarm and notifications were made as required by TFC-OPS-OPER- C-57, "Event Notification." Access to the area was restricted and affected workers arrived at CSO to complete Odor Response Cards.

IHTs responded to the area and took direct readings (Survey #21-03571) for Ammonia (NH₃) in the immediate and surrounding areas per IHP-09001, "Response to Ammonia Monitor Alarm." The monitoring that was conducted as per the Response Plan occurred in and immediately adjacent to the affected area (A-104 ENRAF area). Monitoring was also performed at and around all above ground structures associated with A-104, the excavation area immediately North of 241-A-104 ENRAF area, the nearby ventilation piping and footing, and the nearby service buildings. Monitoring instrumentation and personal ammonia monitors worn by the response team ran continuously from the ingress trailer to the affected area and to the egress trailer and did not indicate any chemical concentrations of concern, or alarm. The closest possible Ammonia source would be the 241-A-104 Radial Breather Filter and Inlet Ports which are immediately adjacent to the ENRAF which was being calibrated at the time of the event. However, there is no indication that there was a loss of vacuum pressure or ventilation at the time of the event. Flow into the inlet port was very audible during the investigation. DRI results were less than detectable (less than one [1] parts per million) and supported restoring access to restricted area. After confirming the required actions were completed, the CSM exited TF-AOP-015 and access was restored.

Washington River Protection Solutions (WRPS) Industrial Hygiene Department has established a conservative, reasonable, and data-derived response level (RL) of six (6) parts per million for Personal Ammonia Monitor concentrations associated with tank waste gases/vapors in the Hanford Tank Farms. The intent of this response level is to enhance the safety of Hanford Tank Farm workers by establishing a conservative and timely indicator of potential changing conditions in Tank Farm gas/vapor conditions, at which prudent and protective investigative measures may be taken.

When WRPS personnel experienced a ToxiRAE Personal Ammonia Monitor alarm, they took immediate action, followed established safety response procedures, reducing risk of further exposure. In order to thoroughly investigate all potential sources, IH tested the ToxiRAE under various common working conditions in the field to determine the potential effects on ToxiRAE readings. (See attached Industrial Hygiene Event Investigation Report for test results)

Upon extensive review and analysis of Data Fusion Advisor System (DFAS) application, meteorological conditions, plausible sources, Industrial Hygiene monitoring, and evaluation/testing of ToxiRAE Personal Ammonia Monitors no readily identifiable cause of the ToxiRAE alarm could be determined.

The investigation was conducted via personnel interviews in an effort to maintain COVID controls in lieu of an Event Investigation Meeting based on the limited number of individuals involved.

Background:

On March 31, 2021 at approximately 0930, a work crew (two [2] ITs and one [1] HPT) was performing A-104-LIT ENRAF calibration (WO#632842) when one of the IT's ToxiRAE Personal Ammonia Monitor alarmed. Workers reported a peak reading of nine (9) parts per million Ammonia (NH₃). (WRPS established response level is six [6] parts per million Ammonia and the established action level is twelve [12] parts per million Ammonia.) The workers were within one to two feet of each other at the time of the alarm, and the HPT confirmed that they were with the ITs during the entire work evolution.

Event Timeline:

March 31, 2021

0930 Three (3) workers report that one (1) IT's ToxiRAE Personal Ammonia Monitor alarms at nine (9) ppm ammonia; the workers exit area and contact management. Neither of the other two (2) workers present within one to two feet of the alarming instrument experienced a ToxiRAE alarm. NOTE: The investigation found through review of the data log, the initiating instrument peaked at six (6) parts per million Ammonia. The workers misread the display at the time of the alarm.

0949 Affected work crew notifies Production Operations Industrial Hygiene Technician assigned to the job for personal sampling, who in turn, notifies Production Operations Industrial Hygienists of Personal Ammonia Monitor alarm

0952 Production Operations Production Operations Industrial Hygienists arrive at Central Shift Office

0952 Central Shift Manager receives briefing from AZ Team ITs and HPT

- Workers report ToxiRAE alarmed at nine (9) ppm
- Performing ENRAF calibrations for A-104

0955 Central Shift Manager and Production Operations Industrial Hygienists discuss TF-AOP-015 Entry Conditions

0956 Central Shift Manager initiates TF-AOP-015 Entry and event response actions

0957 Production Operations Industrial Hygienist contacts Hanford Weather Station to acquire record of atmospheric conditions outside of affected area during event: (See Investigation section for further discussion of DFAS)

- At Weather Station six (6) 0945 03/31/2021
- Temperature: forty-three (43) degrees Fahrenheit
- Wind speed and direction: Out of West North West at two (2) Miles Per Hour
- Relative Humidity: forty-one (41) Percent
- Barometric Pressure: twenty-nine-point-seven-three (29.73) inches of Mercury and steady

0958 Production Operations Industrial Hygienist contacts Production Operations Shift Industrial Hygiene Technician Supervisor to request Industrial Hygiene Technician support for response

1001 Production Operations Shift Relief Manager arrives at Central Shift Office

1004 Central Shift Manager requests Affected Personnel fill out Odor/Vapor Response Cards (Odor/Vapor Response Card - 241-A Farm A-6006-922)

- Field Work Supervisor informs Central Shift Manager Affected Personnel en route to Central Shift Office

1004 Production Operations Shift Industrial Hygiene Technician Supervisor and Production Operations Shift Industrial Hygiene Technicians arrive at Central Shift Office

1005 Production Operations Industrial Hygienist gives initial briefing on response actions to Production Operations Shift Industrial Hygiene Technicians

- Monitor affected area as per IHP-09001 "Response to ammonia monitor alarm"
- Respiratory Protective Equipment may be worn as per Respiratory Protection Form "TF-AOP-015" "Task 4: Voluntary Upgrade"
 - If not Voluntarily Upgrading, then Respiratory Protective Equipment is to be worn per "MDRPF-PLN-173" Task 1

1007 Production Operations Shift Relief Manager request Operators to establish restricted access boundary around affected area

- 1008** Affected Personnel arrive at Central Shift Office and populate Odor/Vapor Response Cards (Odor/Vapor Response Card - 241-A Farm A-6006-922)
- 1008** Shift Office Event Notification (SOEN): "Entering TF-AOP-015 for ToxiRAE alarm at A-104. Stay clear of area around A-104. CSM"
- 1009** Production Operations Shift Relief Manager offers Affected Personnel medical surveillance
- All Affected Personnel decline medical surveillance
- 1013** Event Responding Production Operations Industrial Hygienist and Production Operations Shift Industrial Hygiene Technicians depart Central Shift Office to retrieve Respiratory Protective Equipment per "MDRPF-PLN-173" Task 1
- 1017** Affected Personnel submit Odor/Vapor Response Cards (Odor/Vapor Response Card - 241-A Farm A-6006-922) for Production Operations Industrial Hygienist review
- 1018** Production Operations Industrial Hygienist informs Event Responding Production Operations Industrial Hygienist Odor/Vapor Response Cards (Odor/Vapor Response Card - 241-A Farm A-6006-922) with map of Affected Area location has been completed
- 1019** Event Responding Production Operations Industrial Hygienist and Production Operations Shift Industrial Hygiene Technicians return to Central Shift Office to acquire Odor/Vapor Response Cards (Odor/Vapor Response Card - 241-A Farm A-6006-922) with map of Affected Area location
- In addition to monitoring affected area, Production Operations Industrial Hygienist directs Production Operations Shift Industrial Hygiene Technicians to monitor "Dig" area, as indicated on Odor/Vapor Response Cards
- 1019** Event Responding Production Operations Industrial Hygienist and Production Operations Shift Industrial Hygiene Technicians depart Central Shift Office to acquire Industrial Hygiene Technician supplies
- 1021** Production Operations Industrial Hygienist contacts Hanford Weather Station to acquire record of atmospheric conditions outside of affected area during event:
- At Weather Station six (6) 0930 03/31/2021
 - Temperature: forty-two (42) degrees Fahrenheit
 - Wind speed and direction: Out of West at three (3) Miles Per Hour
 - Relative Humidity: forty-four (44) Percent
 - Barometric Pressure: twenty-nine-point-seven-two (29.72) inches of Mercury and steady
- 1032** Event Responding Production Operations Industrial Hygienist and Production Operations Shift Industrial Hygiene Technicians en route to 241-A Change Trailer (MO2249)
- 1042** Event Responding Production Operations Industrial Hygienist requests Health Physics Technician support for exit survey
- 1045** Central Shift Manager attempts to contact Car 11 via radio to request Health Physics Technician support at MO2249
- 1046** Production Operations Shift Industrial Hygiene Technician Supervisor collects Affected Personnel's ToxiRAE to download Data Log
- 1049** Central Shift Manager requests Health Physics Technician via phone support at MO2249
- 1109** Event Responding Production Operations Industrial Hygienist contacts Production Operations Industrial Hygienist:
- Direct Reading Instrumentation indicates ammonia concentrations present at affected area are less than detectable
- 1112** Event Investigation Department contacts Central Shift Office to designate Event Investigation
- 1122** Event Responding Production Operations Shift Industrial Hygiene Technicians contact Production Operations Industrial Hygienist to report event response Direct Reading Instrumentation has passed post-use-function-tests
- 1128** Production Operations Industrial Hygienists update Affected Personnel of Response Actions completed and results are at or below background levels. Exiting TF-AOP-015. CSM"

Investigation:

At the time the ToxiRAE Personal Ammonia Monitor alarmed, the individuals were wearing Full Face Air Purifying Respirators (FF-APR) with Gas/Vapor cartridges and ToxiRAE personal ammonia monitors. In response to the ToxiRAE alarm, the workers immediately exited the area, and notified the Field Work Supervisor (FWS). Notifications were made to the Central Shift Office (CSO), WRPS Safety and Health Manager and Industrial Hygiene Manager. The DFAS MET Data for 0930 gives a wind speed of 4.6 mph with a wind direction of 318 (out of North West). The mixing height was at 140 feet. The A-Farm exhauster is not monitored on the DFAS.

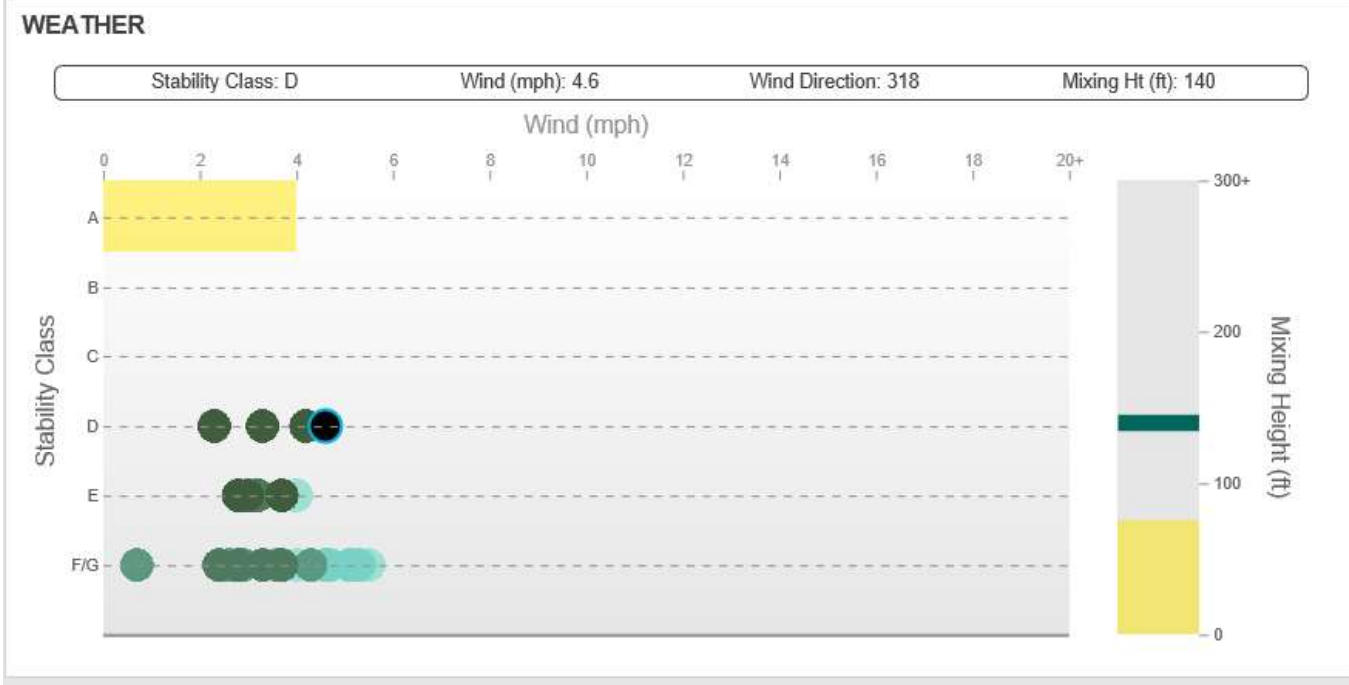


Figure 1: This Figure shows Data Fusion and Advisor System (DFAS) application, powered by SmartSite™, Weather Details dashboard at the time of the event.

The ammonia concentration going through the AN-Farm stack was between seven (7) and eight (8) ppm, as expected, is shown in the figure below.

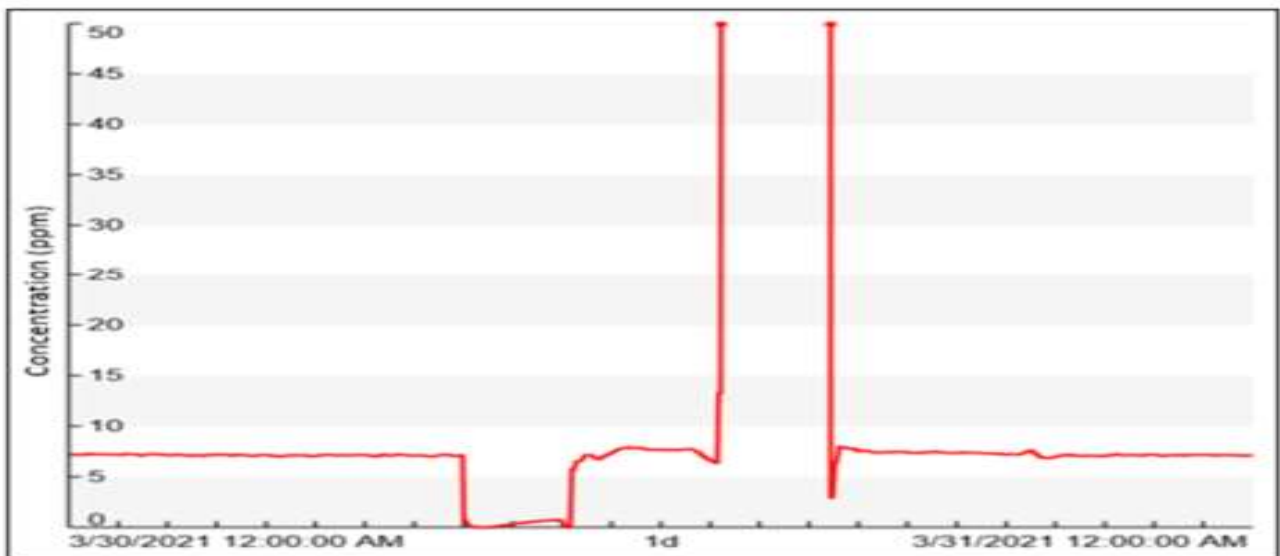


Figure 2: This Figure shows Ammonia concentration in AN-Farm Stack at time of the event.

These values are well below the stack alarm set points. 241-A Farm does not have Vapor Monitoring and Detection System (VMDS) fully implemented; however, IHT's performed stack monitoring that day.

- Survey # 21-03558 "Hotel Load 'A' Farm Stack Readings"
 - 03/31/2021 @ 0743 POR518 Source Ammonia Reading: four (4) parts per million
 - 03/31/2021 @ 0748 POR519 Source Ammonia Reading: two (2) parts per million
 - 03/31/2021 @ 1201 POR518 Source Ammonia Reading: five (5) parts per million
 - 03/31/2021 @ 1205 POR519 Source Ammonia Reading: four (4) parts per million

At approximately 0955, the Central Shift Manager (CSM) entered TF-AOP-015 for response to ToxiRAE alarm and notifications were made as required by TFC-OPS-OPER- C-57, "Event Notification." Access to the area was restricted and affected workers arrived at CSO to complete Odor Response Cards.

IHT's responded to the area and took direct readings (Survey #21-03571) for Ammonia (NH₃) in the immediate and surrounding areas per IHP-09001, "Response to Ammonia Monitor Alarm." The monitoring that was conducted as per the Response Plan occurred in and immediately adjacent to the affected area (A-104 ENRAF area). Monitoring was also performed at and around all above ground structures associated with A-104, the excavation area immediately North of 241-A-104 ENRAF area, the nearby ventilation piping and footing, and the nearby service buildings. Monitoring instrumentation and personal ammonia monitors worn by the response team ran continuously from the ingress trailer to the affected area and to the egress trailer and did not indicate any chemical concentrations of concern, or alarm. The closest possible Ammonia source would be the 241-A-104 Radial Breather Filter and Inlet Ports which are immediately adjacent to the ENRAF which was being calibrated at the time of the event. However, there is no indication that there was a loss of vacuum pressure or ventilation at the time of the event. Flow into the inlet port was very audible during the investigation. DRI results were below action levels and supported restoring access to restricted area. After confirming the required actions were completed, the CSM exited TF-AOP-015 and access was restored.

When WRPS personnel experienced a ToxiRAE Personal Ammonia Monitor alarm, they took immediate action, followed established safety response procedures, reducing risk of further exposure. In order to thoroughly investigate all potential sources, IH tested the ToxiRAE under various common working conditions in the field to determine the potential effects on ToxiRAE readings. (See attached Industrial Hygiene Event Investigation Report for test results)

In response to the event, all three Personal Ammonia Monitors were taken into custody by IH for evaluation and the data was downloaded from each instrument. (See comparisons below)

ToxiRAE Data Log Readings

ToxiRAE 003254 (event initiating ToxiRAE):

- Ammonia: Worker reported alarm of nine (9) parts per million
- Ammonia: Display & Data Log Peak Reading of six (6) parts per million (Data Log Line 785)
- Ammonia: In the fifteen (15) minutes prior to the Peak Reading Event, Readings fluctuated between zero (0) parts per million and three (3) parts per million (Data Log Lines 769-784)
- Ammonia: In the twenty (20) minutes following the Peak Reading Event, Readings fluctuated between zero (0) parts per million and four (4) parts per million(Data Log Lines 786-806)

ToxiRAE 002689 (present at initiating event):

- Ammonia: Peak of two (2) parts per million (Data Log Line 897 on 03/31/2021 @ 11:30:47)
- Ammonia: Peak reading in the fifteen (15) minutes prior to reported time of Initiating Event:
 - Ammonia: one (1) parts per million (Data Log Lines 761-776)

- Ammonia: Peak reading at the reported time of Initiating Event:
 - o Ammonia: zero (0) parts per million (Data Log Line 777)
- Ammonia: Peak reading in the twenty (20) minutes following the reported time of Initiating Event:
 - o Ammonia: one (1) parts per million (Data Log Lines 778-798)

ToxiRAE 003977 (present within 241-A Farm during initiating event):

- Ammonia: Peak of one (1) parts per million (Data Log Line 881 on 03/31/2021 @ 09:59:09)
- Ammonia: Peak reading in the fifteen (15) minutes prior to reported time of Initiating Event:
 - o Ammonia: zero (0) parts per million (Data Log Lines 837)
- Ammonia: Peak reading at the reported time of Initiating Event:
 - o Ammonia: zero (0) parts per million (Data Log Line 852)
- Ammonia: Peak reading in the twenty (20) minutes following the reported time of Initiating Event:
 - o Ammonia: zero (0) parts per million (Data Log Lines 853-873)

The initiating Personal Ammonia Monitor (ToxiRAE 003254) was tested under common working conditions in the field to determine the potential effects on ToxiRAE readings. (See Attached IHIR for test results) The instrument was determined to operate normally and within specifications (passed bump test) after the initiating event. While the Event Initiating Personal Ammonia Monitor (ToxiRAE 003254) fluctuated prior to and following the Peak Reading Event, RPP-RPT-61096 (Wearable Ammonia Detector Field Trial) stated that false positive concentration readings (positive bias) can be expected up to four (4) parts per million with the ToxiRAE Pro. Therefore, it does not appear the alarm was resultant from instrument malfunction.

Various working conditions have the potential to affect a ToxiRAE while worn in the field. On April 1, 2021, Production Operations Industrial Hygienist discussed the TF-AOP-015 event with the work crew. The Production Operations FWS and the Production Operations HPT that were on the job confirmed that there were no markers, Sharpies or any other potential vapor/odor source that could have interfered with the ToxiRAE Personal Ammonia Monitor. On April 13, 2021, Production Operations Performance Assurance held follow up interviews with affected personnel, establishing that some conditions known to cause spurious alarms were not present at the time the ToxiRAE Personal Ammonia Monitor alarmed. Workers confirmed that no clothing/PPE was blocking the inlet filter; the IT was not breathing into the inlet filter or bending down possibly restricting airflow into the ToxiRAE Personal Ammonia Monitor when it alarmed.

It could not be concluded any of these working conditions contributed to the Personal Ammonia Monitor alarm. Review of the Data Fusion and Advisor System (DFAS) application, powered by SmartSite™, Weather Details dashboard for the reported time of the Event, and the Exhauster source Direct Reading Instrument readings obtained the morning of 03/31/2021, indicate the cause of the Personal Ammonia Monitor alarm is unlikely to be from POR518 or POR519 Exhauster emissions based on:

- Stability Class D (Neutral Stability)
- Atmospheric Mixing Height (one hundred forty [140] feet above grade)
- Wind Direction (three hundred eighteen [318°]degrees out of North West)
 - o 241-AX-104 is located South West of PO518 and POR519 Exhausters
- Wind Speed (four point six [4.6] Miles Per Hour)

In addition, no on-going work around the A-Complex identified during the Industrial Hygiene Event Investigation that may cause the Personal Ammonia Monitor alarm. (See Attachment 1)

Discussion / Conclusion:

Washington River Protection Solutions (WRPS) follows a comprehensive strategy for reducing exposure to workplace hazards as much as reasonably possible with regard to occupational exposure limits (OEL) in the Tank Farms. The term occupational exposure limit is used to represent: (1) the concentration or intensity of an airborne agent that is allowable, (2) the time period over which workplace concentrations are averaged to compare with the allowable exposure, and (3) the allowable concentration of a biological exposure index (BEI) in a biological sample. Occupational exposure limits are considered the maximum concentrations to which a person can be exposed without suffering adverse health effects.

The Occupational Safety and Health Administration has established the Ammonia eight (8) hour time weighted average (TWA) permissible exposure limit (PEL) at fifty (50) parts per million. The American Conference of Governmental Industrial Hygienists (ACGIH) has established the Ammonia eight (8) hour time weighted average (TWA) threshold limit value (TLV) at twenty-five (25) parts per million. The American Conference of Governmental Industrial Hygienists (ACGIH) has also established the Ammonia fifteen (15) minute short-term exposure limit (STEL) threshold limit value (TLV) at thirty-five (35) parts per million. Per the Department of Energy Worker Safety and Health Program (10 CFR 851), Washington River Protection Solutions (WRPS) is to use the lower (more protective) occupational exposure limit.

As control measure to reduce the potential for an unacceptable worker exposure, Washington River Protection Solutions (WRPS) utilizes action levels (AL). If not prescribed by regulation, action levels (AL) are typically established at 50% of the OEL. An action level (AL) is a concentration (when reached) at which a specific action is taken. The Ammonia action level (AL) utilizing direct reading instrumentation is conservatively rounded down for instrument resolution and set at twelve (12) parts per million.

Additionally, Washington River Protection Solutions (WRPS) Industrial Hygiene Department has established a conservative, reasonable, and data-derived response level (RL) of six (6) parts per million for Personal Ammonia Monitor concentrations associated with tank waste gases/vapors in the Hanford Tank Farms. The intent of this response level is to enhance the safety of Hanford Tank Farm workers by establishing a conservative and timely indicator of potential changing conditions in Tank Farm gas/vapor conditions, at which prudent and protective investigative measures may be taken.

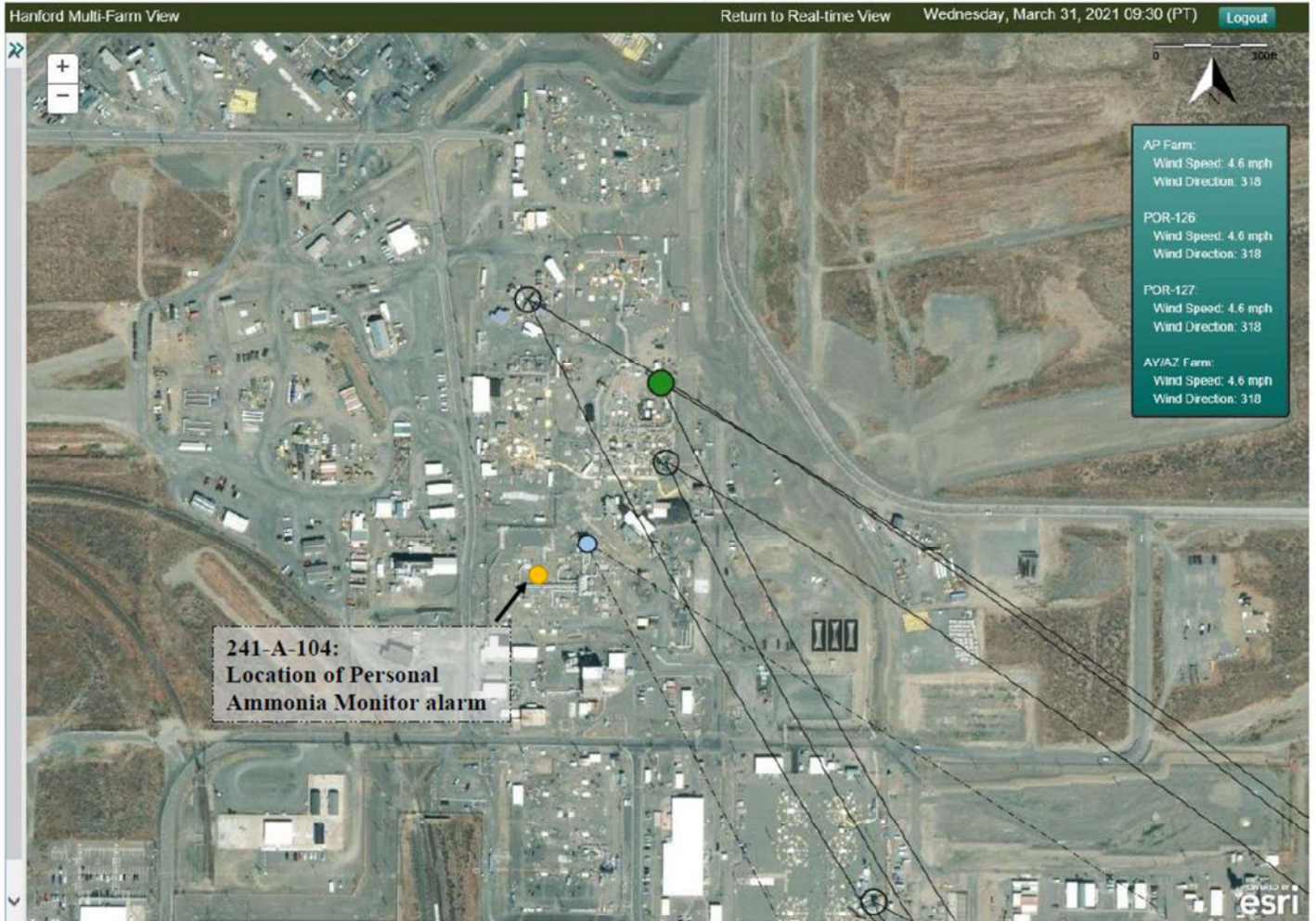
In conclusion, the work team's response to the observed personal ammonia monitor (ToxiRAE) alert was in full compliance with established procedures and would be expected to mitigate any potential for significant exposure to tank farm gases/vapors, should they be present.

The investigation revealed the primary engineering control (ventilation) maintaining the tank headspace negative to the environment was functional, and any tank sourced gases/vapors would be released through the A-Farm stack. A-Farm stack emission concentrations were 2-5 ppm ammonia and under worst case environmental conditions (capping inversion) the modelled stack dilution ratio exceeds 65:1 eliminating the A-Farm stack from consideration as a cause of the alarm. While the cause of the 6 ppm alert was not determined, it was transient and very localized, not observed/recorded by other collocated instrumentation, and the quick response by the work team mitigated any potential for significant exposure, regardless of the actual source.

Attachments: (See page 9)

1. Map 241-A Farm Data Fusion and Advisor System (DFAS) application powered by SmartSite™ with exhaustor plume.
2. List of Personnel Contacted (Redacted)
3. Redacted Odor Response Cards
4. Industrial Hygiene Investigation Report (6 pages)
5. Logbook Entries

Attachment 1: Map 241-A Farm Data Fusion and Advisor System (DFAS) application powered by SmartSite™ with exhauster plume.



241-A Farm POR518 & POR519 are not connected to the DFAS; however, an approximate exhauster plume was added based on other modeled plumes.

Attachment 2: List of Personnel Contacted

█ [REDACTED]
█ [REDACTED]
█ [REDACTED]
█ [REDACTED]
█ [REDACTED]
█ [REDACTED]
█ [REDACTED]
█ [REDACTED]

Attachment 3: Redacted Odor Response Cards

ODOR/VAPOR RESPONSE CARD - 241-A FARM	
1. Contact CSM, Complete below bulleted information and map.	
• Date and time of event:	<u>03/31/24</u>
• Check Applicable:	<input type="checkbox"/> Odor <input checked="" type="checkbox"/> Alarm 6 ppm <input type="checkbox"/> Alarm 12 ppm <input type="checkbox"/> Alarm Other: _____
• Your name and the work you were performing:	██████████ <u>CALIBRATING A104 ENRAF</u>
• Location of event (mark area on map and wind direction):	<u>A FARM A104 ENRAF</u>
• Name(s) of others in or near the affected area:	██████████
• Was an IHT present?	<u>NO</u>
• Describe the Odor:	<input type="checkbox"/> Sweet <input type="checkbox"/> Sour <input type="checkbox"/> Musty <input type="checkbox"/> Earthy <input type="checkbox"/> Metallic <input type="checkbox"/> Smoky <input type="checkbox"/> Rotten <input type="checkbox"/> Onion <input type="checkbox"/> Septic <input type="checkbox"/> Ammonia <input type="checkbox"/> Cleaning Solution <input type="checkbox"/> Other: <u>N/A</u>
• Possible Source:	<u>DO NOT KNOW</u>
• Your Symptoms (if any):	<input type="checkbox"/> Headache <input type="checkbox"/> Dizziness/Light-Headed <input type="checkbox"/> Nausea <input type="checkbox"/> Cough <input type="checkbox"/> Fatigue/Drowsiness/Weakness <input type="checkbox"/> Sore/Burning Throat <input type="checkbox"/> Difficulty Breathing <input type="checkbox"/> Watery/Irritated Eyes/Trouble with Vision <input type="checkbox"/> Tingling/Numbness/Paralysis <input type="checkbox"/> Rash/Itching <input type="checkbox"/> Other: <u>NONE</u>
2. Send this card to the Central Shift Office.	

Attachment 3: Redacted Odor Response Cards

ODOR/VAPOR RESPONSE CARD - 241-A 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	
W		E
	S	

241-A FARM

Attachment 3: Redacted Odor Response Cards

ODOR/VAPOR RESPONSE CARD - 241-A FARM	
1. Contact CSM, Complete below bulleted information and map.	
• Date and time of event:	<u>3-31-21</u>
• Check Applicable:	<input type="checkbox"/> Odor <input checked="" type="checkbox"/> Alarm 6 ppm <input type="checkbox"/> Alarm 12 ppm <input checked="" type="checkbox"/> Alarm Other: <u>9 ppm</u>
• Your name and the work you were performing:	<u>creat calibrations</u> [REDACTED]
• Location of event (mark area on map and wind direction):	[REDACTED]
• Name(s) of others in or near the affected area:	[REDACTED]
• Was an IHT present?	<u>no</u>
• Describe the Odor:	<input type="checkbox"/> Sweet <input type="checkbox"/> Sour <input type="checkbox"/> Musty <input type="checkbox"/> Earthy <input type="checkbox"/> Metallic <input type="checkbox"/> Smoky <input type="checkbox"/> Rotten <input type="checkbox"/> Onion <input type="checkbox"/> Septic <input type="checkbox"/> Ammonia <input type="checkbox"/> Cleaning Solution <input type="checkbox"/> Other: <u>N/A</u>
• Possible Source:	<u>diagnose</u>
• Your Symptoms (if any):	<input type="checkbox"/> Headache <input type="checkbox"/> Dizziness/Light-Headed <input type="checkbox"/> Nausea <input type="checkbox"/> Cough <input type="checkbox"/> Fatigue/Drowsiness/Weakness <input type="checkbox"/> Sore/Burning Throat <input type="checkbox"/> Difficulty Breathing <input type="checkbox"/> Watery/Irritated Eyes/Trouble with Vision <input type="checkbox"/> Tingling/Numbness/Paralysis <input type="checkbox"/> Rash/Itching <input type="checkbox"/> Other: <u>N/A</u>
2. Send this card to the Central Shift Office.	

Attachment 3: Redacted Odor Response Cards

ODOR/VAPOR RESPONSE CARD - 241-A 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
W E
S

NORTH ↑

241-A FARM

Scale: 1" = 50'

Attachment 3: Redacted Odor Response Cards

ODOR/VAPOR RESPONSE CARD - 241-A FARM	
1. Contact CSM, Complete below bulleted information and map.	
• Date and time of event: 3-31-21 @ 0930	
• Check Applicable: <input type="checkbox"/> Odor <input checked="" type="checkbox"/> Alarm 6 ppm <input type="checkbox"/> Alarm 12 ppm <input checked="" type="checkbox"/> Alarm Other: it was beeping @ 9	
• Your name and the work you were performing: [REDACTED] RCT, A-104 Enraf Cal	
• Location of event (mark area on map and wind direction): on A-104	
• Name(s) of others in or near the affected area: [REDACTED]	
• Was an IHT present? no	
• Describe the Odor: <input type="checkbox"/> Sweet <input type="checkbox"/> Sour <input type="checkbox"/> Musty <input type="checkbox"/> Earthy <input type="checkbox"/> Metallic <input type="checkbox"/> Smoky <input type="checkbox"/> Rotten <input type="checkbox"/> Onion <input type="checkbox"/> Septic <input type="checkbox"/> Ammonia <input type="checkbox"/> Cleaning Solution <input type="checkbox"/> Other: _____	
• Possible Source: dig adjacent to us?	
• Your Symptoms (if any): <input type="checkbox"/> Headache <input type="checkbox"/> Dizziness/Light-Headed <input type="checkbox"/> Nausea <input type="checkbox"/> Cough <input type="checkbox"/> Fatigue/Drowsiness/Weakness <input type="checkbox"/> Sore/Burning Throat <input type="checkbox"/> Difficulty Breathing <input type="checkbox"/> Watery/Irritated Eyes/Trouble with Vision <input type="checkbox"/> Tingling/Numbness/Paralysis <input type="checkbox"/> Rash/Itching <input type="checkbox"/> Other: _____	
2. Send this card to the Central Shift Office.	

Attachment 3: Redacted Odor Response Cards

ODOR/VAPOR RESPONSE CARD - 241-A 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	
W		E
	S	

↑ NORTH

241-A FARM

Attachment 4: Industrial Hygiene Event Investigation Report

Washington River Protection Solutions INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT			
Event Title:		PER Number:	
TF-AOP-015 Entry at 241-A Farm, A-104 area		N/A	
		IHIR Number:	
		IHIR-00008	
Date:	Time:	Location:	
03/31/2021	0930	241-A-104 area	
Event Summary and Timeline:			
Event Summary:			
<p>A personal Ammonia Monitor alarmed and indicated greater than 6 (six) parts per million ammonia but less than 12 (twelve) parts per million ammonia in the area around 241-A-104. Three workers, two Production Operations Instrument Technicians and one Production Operations Health Physics Technician, were present at the time of personal ammonia monitor alarm. Workers immediately exited the area. Workers were performing 241-A-104 ENRAF calibration. All workers were wearing Personal Ammonia Monitors.</p>			
Field Response Timeline:			
0930 Approximate Time of Event - Personal Ammonia Monitor alarm			
0949 Production Operations Industrial Hygiene Technician notifies Production Operations Industrial Hygienists of Personal Ammonia Monitor alarm			
0952 Production Operations Production Operations Industrial Hygienists arrive at Central Shift Office			
0952 Central Shift Manager receives briefing from AZ Team			
<ul style="list-style-type: none"> - ToxiRAE alarmed at nine (9) parts per million - Performing ENRAF calibrations for A-104 or A-105 			
0955 Central Shift Manager and Production Operations Industrial Hygienists discuss TF-AOP-015 Entry Conditions			
0956 Central Shift Manager initiates TF-AOP-015 Entry and event response actions			
0957 Production Operations Industrial Hygienist contacts Hanford Weather Station to acquire record of atmospheric conditions outside of affected area during event:			
<ul style="list-style-type: none"> - At Weather Station six (6) 0945 03/31/2021 - Temperature: forty-three (43) degrees Fahrenheit - Wind speed and direction: Out of West North West at two (2) miles per hour - Relative Humidity: forty-one (41) percent - Barometric Pressure: twenty-nine-point-seven-three (29.73) inches of Mercury and steady 			
0958 Production Operations Industrial Hygienist contacts Production Operations Shift Industrial Hygiene Technician Supervisor to request Industrial Hygiene Technician support for response			
1000 Production Operations Industrial Hygienist contacts Production Operation Safety & Health Manager to have Production Operations Safety & Health Manager contact the Level 2 (two) Industrial Hygiene Manager			
1001 Production Operations Shift Relief Manager arrives at Central Shift Office			
1004 Central Shift Manager requests Affected Personnel fill out Odor/Vapor Response Cards (Odor/Vapor Response Card - 241-A Farm A-6006-922)			
<ul style="list-style-type: none"> - Field Work Supervisor informs Central Shift Manager Affected Personnel en route to Central Shift Office 			
1004 Production Operations Shift Industrial Hygiene Technician Supervisor and Production Operations Shift Industrial Hygiene Technicians arrive at Central Shift Office			
1005 Production Operations Industrial Hygienist gives initial briefing on response actions to Production Operations Shift Industrial Hygiene Technicians			
<ul style="list-style-type: none"> - Monitor affected area as per IHP-09001 "Response to ammonia monitor alarm" - Respiratory Protective Equipment may be worn as per Respiratory Protection Form "TF-AOP-015" "Task 4: Voluntary Upgrade" <ul style="list-style-type: none"> o If not Voluntarily Upgrading, then Respiratory Protective Equipment is to be worn per "MDRPF-FLN-173" Task 1 - Awaiting Odor/Vapor Response Cards (Odor/Vapor Response Card - 241-A Farm A-6006-922) for map of Affected Area location 			
1005 Central Shift Manager inquires about the location of alarm from Field Work Supervisor			
<ul style="list-style-type: none"> - Field Work Supervisor states A-104 			
Field Response Timeline continued on next page			

Attachment 4: Industrial Hygiene Event Investigation Report

Washington River Protection Solutions INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT(Continued)	
Event Summary and Timeline:	
Field Response Timeline (continued):	
1006	Production Operations Industrial Hygienist attempts to contact the Level 2 (two) Industrial Hygiene Manager
1007	Production Operations Shift Relief Manager request Operators to establish restricted access boundary around affected area
1008	Affected Personnel arrive at Central Shift Office with their Personal Ammonia Monitors
1008	Affected Personnel populate Odor/Vapor Response Cards (Odor/Vapor Response Card - 241-A Farm A-6006-922)
1008	Shift Office Event Notification (SOEN): "Entering TF-AOP-015 for ToxiRAE alarm at A-104. Stay clear of area around A-104. CSM"
1009	Production Operations Shift Relief Manager offers Affected Personnel medical surveillance <ul style="list-style-type: none">- All Affected Personnel decline medical surveillance
1013	Event Responding Production Operations Industrial Hygienist and Production Operations Shift Industrial Hygiene Technicians depart Central Shift Office to retrieve Respiratory Protective Equipment per "MDRPF-PLN-173" Task 1
1017	Affected Personnel submit Odor/Vapor Response Cards (Odor/Vapor Response Card - 241-A Farm A-6006-922) for Production Operations Industrial Hygienist review
1018	Production Operations Industrial Hygienist informs Event Responding Production Operations Industrial Hygienist Odor/Vapor Response Cards (Odor/Vapor Response Card - 241-A Farm A-6006-922) with map of Affected Area's location has been completed
1019	Event Responding Production Operations Industrial Hygienist and Production Operations Shift Industrial Hygiene Technicians return to Central Shift Office to acquire Odor/Vapor Response Cards (Odor/Vapor Response Card - 241-A Farm A-6006-922) with map of Affected Area's location <ul style="list-style-type: none">- In addition to monitoring affected area, Production Operations Industrial Hygienist directs Production Operations Shift Industrial Hygiene Technicians to monitor "Dig" area, as indicated on Odor/Vapor Response Cards
1019	Event Responding Production Operations Industrial Hygienist and Production Operations Shift Industrial Hygiene Technicians depart Central Shift Office to acquire Industrial Hygiene Technician supplies
1021	Production Operations Industrial Hygienist contacts Hanford Weather Station to acquire record of atmospheric conditions outside of affected area during event: <ul style="list-style-type: none">- At Weather Station six (6) 0930 03/31/2021- Temperature: forty-two (42) degrees Fahrenheit- Wind speed and direction: Out of West at three (3) miles per hour- Relative Humidity: forty-four (44) percent- Barometric Pressure: twenty-nine-point-seven-two (29.72) inches of Mercury and steady
1032	Event Responding Production Operations Industrial Hygienist and Production Operations Shift Industrial Hygiene Technicians en route to 241-A Change Trailer (MO2249)
1042	Operators arrive at Central Shift Office to inquire about restricted access posting requirements
1042	Event Responding Production Operations Industrial Hygienist requests Health Physics Technician support for exit survey
1045	Central Shift Manager attempts to contact Car 11 via radio to request Health Physics Technician support at MO2249
1046	Production Operations Shift Industrial Hygiene Technician Supervisor collects Affected Personnel's ToxiRAE to download Data Log
1049	Central Shift Manager requests Health Physics Technician via phone support at MO2249
1109	Event Responding Production Operations Industrial Hygienist contacts Production Operations Industrial Hygienist: <ul style="list-style-type: none">- Direct Reading Instrumentation indicates ammonia concentrations present at affected area are less than detectable
1112	Event Investigation Department contacts Central Shift Office to designate Event Investigation Report Number (EIR# 2021-021) and Event Investigation Point of Contact
1122	Event Responding Production Operations Shift Industrial Hygiene Technicians contact Production Operations Industrial Hygienist to report event response Direct Reading Instrumentation has passed post-use-function-tests
1128	Production Operations Industrial Hygienists update Affected Personnel of Response Actions
1128	Shift Office Event Notification (SOEN): "Response actions for the TF-AOP-015 event have been completed and the results are at or below background levels. Exiting TF-AOP-015. CSM"

Attachment 4: Industrial Hygiene Event Investigation Report

Washington River Protection Solutions INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT(Continued)
<p>Sampling/Monitoring Results:</p> <p>Field Response area readings:</p> <ul style="list-style-type: none">• Ammonia: Less than Detectable [less than one (1) parts per million] <p>ToxiRAE 003254 (event initiating ToxiRAE):</p> <ul style="list-style-type: none">• Ammonia: Reported alarm of nine (9) parts per million• Ammonia: Display & Data Log Peak Reading of six (6) parts per million (Data Log Line 785)• Ammonia: In the fifteen (15) minutes prior to the Peak Reading Event, Readings fluctuated between zero (0) parts per million and three (3) parts per million (Data Log Lines 769-784)• Ammonia: In the twenty (20) minutes following the Peak Reading Event, Readings fluctuated between zero (0) parts per million and four (4) parts per million(Data Log Lines 786-806) <p>ToxiRAE 002689 (present at initiating event):</p> <ul style="list-style-type: none">• Ammonia: Peak of two (2) parts per million (Data Log Line 897 on 03/31/2021 @ 11:30:47)• Ammonia: Peak reading in the fifteen (15) minutes prior to reported time of Initiating Event:<ul style="list-style-type: none">◦ Ammonia: one (1) parts per million (Data Log Lines 761-776)• Ammonia: Peak reading at the reported time of Initiating Event:<ul style="list-style-type: none">◦ Ammonia: zero (0) parts per million (Data Log Line 777)• Ammonia: Peak reading in the twenty (20) minutes following the reported time of Initiating Event:<ul style="list-style-type: none">◦ Ammonia: one (1) parts per million (Data Log Lines 778-798) <p>ToxiRAE 003977 (present within 241-A Farm during initiating event):</p> <ul style="list-style-type: none">• Ammonia: Peak of one (1) parts per million (Data Log Line 881 on 03/31/2021 @ 09:59:09)• Ammonia: Peak reading in the fifteen (15) minutes prior to reported time of Initiating Event:<ul style="list-style-type: none">◦ Ammonia: zero (0) parts per million (Data Log Lines 837)• Ammonia: Peak reading at the reported time of Initiating Event:<ul style="list-style-type: none">◦ Ammonia: zero (0) parts per million(Data Log Line 852)• Ammonia: Peak reading in the twenty (20) minutes following the reported time of Initiating Event:<ul style="list-style-type: none">◦ Ammonia: zero (0) parts per million (Data Log Lines 853-873)
<p>SWIHD References:</p> <ul style="list-style-type: none">• Event Response Site Wide Industrial Hygiene Database (SWIHD) Direct Reading Instrument (DRI) Survey # 21-03571 "241-A Farm AOP-15 Response"• Work Activity Site Wide Industrial Hygiene Database (SWIHD) Air Survey # 21-02716 "241-A 104, 105 ENRAF CALIBRATION"<ul style="list-style-type: none">◦ Worn by Production Operations Health Physics Technician present at initiating event• Management Directed TFC-PLN-173 Site Wide Industrial Hygiene Database (SWIHD) Air Survey # 21-03432 "A Farm Hotel Load Pump Set #1"• Management Directed TFC-PLN-173 Site Wide Industrial Hygiene Database (SWIHD) Direct Reading Instrument (DRI) Survey # 21-03550 "A Complex Hotel Load AreaRAEs"• Management Directed TFC-PLN-173 Site Wide Industrial Hygiene Database (SWIHD) Direct Reading Instrument (DRI) Survey # 21-03536 "Hotel Load "A" Farm Stack Readings"
<p>Additional Information:</p> <p>Production Operations Industrial Hygienist discussed the TF-AOP-015 event with the work crew on 04/01/2021. The Production Operations Field Work Supervisor (FWS) and the Production Operations Health Physics Technician (HPT) that were on the job confirmed there were no markers/sharps or anything other potential odor or vapor source that could have interfered with the ToxiRAE. The Production Operations Health Physics Technician (HPT) also confirmed they were with the two Production Operations Instrument Techs throughout the entire evolution. Therefore, the personal sampling collected is representative of the entire evolution, including the initiating event.</p> <p>Production Operations Industrial Hygienist followed up with the A2 Area Day Shift Manager on 04/01/2021 to ensure work released yesterday (03/31/2021) would not have affected the affected area. The 241-A Farm had a pressure watch called out for upcoming 241-A-101 Saltwell screen removal package (saltwell screen already removed) at 0939 (after the reported time of the initiating event). The Production Operations Industrial Hygienist was not able to confirm the portion of the 241-A-101 Saltwell screen removal package being performed, or why it required a pressure watch. The 241-A-101 pit and the 241-A-104 ENRAF are separated by approximately fifty (50) feet. The 204AR and 244AR facilities did not have any ongoing work. These facilities are located across the street from the 241-A Farm. The three (3) Affected Workers also reported a vehicle that drove by them a few minutes prior to the Personal Ammonia Monitor alarm. The vehicle was never closer than approximately thirty (30) feet.</p> <p style="text-align: right;">Additional Information continued on next page</p>

Attachment 4: Industrial Hygiene Event Investigation Report

Washington River Protection Solutions INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (Continued)
<p>Additional Information:</p> <p>Production Operations Industrial Hygienist noted that both Production Operations Instrument Technicians that were part of the Affected Workers were not on site on 04/01/2021 (either training or PTB). All follow-up communications were with the Production Operations Field Work Supervisor (FWS) and the Production Operations Health Physics Technician (HPT) that were associated with the work.</p> <p>At the time of the initiating event the Affected 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 (FF-APR) with Gas/Vapor cartridges (MSA GME Chemical Vapor).</p> <p>Additional Information on the Personal Ammonia Monitors (ToxiRAEs):</p> <p>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. Blocking the gas inlet of the ToxiRAE, high humidity, and/or water droplets can disturb diffusion into the sensor, leading to false readings.</p> <p>ToxiRAE 003254 (event initiating ToxiRAE):</p> <ul style="list-style-type: none">• Put into service on 03/22/2019• Unit Name: ToxiRAE Pro (PGM-1860)• Unit Serial Number (SN): G024010696• User ID: TOXI3254• Measure Type: Max• Datalog Mode: Continuous• Datalog Type: Auto• Sample Period: sixty (60) seconds• Calibration Time: 01/01/2000 @ 01:37• NOTE: Instrument was reset to factory time/date when it was bump tested (pre-use function test)• Checked out by user: 02/21/2021 @ 08:42:49• Checked in by Production Operation Shift Industrial Hygiene Technician Supervisor: 03/31/2021 @ 11:32:06• Passed bump test 04/01/2021 @ 1101 <p>ToxiRAE 002689 (present at initiating event):</p> <ul style="list-style-type: none">• Put into service on 08/07/2018• Calibration Time: 03/29/2021 @ 20:45• Checked out by user: 03/31/2021 @ 09:02:17• Checked in by Production Operation Shift Industrial Hygiene Technician Supervisor: 03/31/2021 @ 11:32:15 <p>ToxiRAE 003977 (present within 241-A Farm during initiating event):</p> <ul style="list-style-type: none">• Put into service on 01/27/2020• Calibration Time: 03/30/2021 @ 19:49• Checked out by user: 03/31/2021 @ 08:42:59• Checked in by Production Operation Shift Industrial Hygiene Technician Supervisor: 03/31/2021 @ 11:32:27 <p>At 03/31/2021 @ 1150 the Performance Assurance Manager directs Industrial Hygiene "provide a signed INIR indicating the cause of the alarming instrument" "[i]n order to support closure of the investigation process per C-14".</p> <p>Production Operations Industrial Hygienists tested various working conditions that could occur to a ToxiRAE while worn in the field to determine their potential effects on ToxiRAE readings. Refer to Table on next page for peak Ammonia readings observed during testing.</p> <p>Additional Information continued on next page</p>

Attachment 4: Industrial Hygiene Event Investigation Report

Washington River Protection Solutions INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT(Continued)			
Functionality Test	ToxiRAE (003254)	Peak Reading Control ToxiRAE	Experimental ToxiRAE
Blocking Gas Inlet:			
• Nitrile Gloves	2 ppm	2 ppm	2 ppm
• Skin Contact	5 ppm	7 ppm	7 ppm
• Cloth (cotton) Material	2 ppm	2 ppm	2 ppm
Respirator Proximity:			
• FF-APR with MSA GME Chemical	2 ppm	2 ppm	N/A
Durability:			
• Kinetic	0 ppm	N/A	0 ppm
Chemical Interferences:			
• Sharpie	2 ppm	N/A	2 ppm
• Expo White Board Marker	1 ppm	N/A	1 ppm
• Hand Sanitiser	3 ppm	N/A	3 ppm
• Ball Point Pen	0 ppm	N/A	0 ppm
• Water	6 ppm	N/A	6 ppm
All instruments exhibited similar instrument response, response times, and returned to zero (cleared) in similar times for the functionality tests listed above.			
Atmospheric conditions outside of affected area during event provided by On-Duty Forecaster:			
Weather Station six (6) 0930 03/31/2021:			
• Temperature: forty-two (42) degrees Fahrenheit			
• Wind speed and direction: Out of West at three (3) Miles Per Hour			
• Relative Humidity: forty-four (44) Percent			
• Barometric Pressure: twenty-nine-point-seven-two (29.72) inches of Mercury and steady			
Review of preliminary (field information verified but awaiting responsible Industrial Hygienist approval) Management Directed TFC-PLN-173 Site Wide Industrial Hygiene Database (SWIHD) Direct Reading Instrument(DRI) survey readings:			
• Survey # 21-03558 "Hotel Load 'A' Farm Stack Readings":			
o 03/31/2021 @ 0743 POR518 Source Ammonia Reading: four (4) parts per million			
o 03/31/2021 @ 0748 POR519 Source Ammonia Reading: two (2) parts per million			
o 03/31/2021 @ 1201 POR518 Source Ammonia Reading: five (5) parts per million			
o 03/31/2021 @ 1205 POR519 Source Ammonia Reading: four (4) parts per million			
Review of the Data Fusion and Advisor System (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 POR518 or POR519 Exhauster emissions based on:			
• Stability Class [D (Neutral Stability)]			
• Atmospheric Mixing Height [one-hundred-forty (140) feet above grade]			
• Wind Direction [three-hundred-eighteen degrees (318°) (Out of North West)]			
o 241-AX-104 is located South West of POR518 and POR519 Exhausters			
• Wind Speed [four point six (4.6) Miles Per Hour]			
Therefore, there was a very low potential for ground level exposure from 241-A Farm Exhausters.			
Recommendations/Conclusions:			
Recommendations:			
Communicate results of the Industrial Hygiene Event Investigation to the Affected Workers.			
• The results of the personal sampling worn by the Production Operations Health Physics Technician (Air Survey # 21-02716) will be communicated to all Affected Workers, as both Production Operations Instrument Technicians are listed as Representative Personnel in the Site Wide Industrial Hygiene Database (SWIHD) survey. Subsequently, all Affected Workers will receive a Notification Letter following receipt of all results from the Analytical Laboratories.			
Recommendations/Conclusions continued on next page			

Attachment 4: Industrial Hygiene Event Investigation Report

Washington River Protection Solutions INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT(Continued)	
Recommendations/Conclusions: Conclusions: <p>The Event Initiating Personal Ammonia Monitor (ToxiRAE 003254) continued to operate normally and within specifications (passed bump test) after the initiating event. While the Event Initiating Personal Ammonia Monitor (ToxiRAE 003254) fluctuated prior to and following the Peak Reading Event, RPP-RPT-61096 (Wearable Ammonia Detector Field Trial) stated that false positive concentration readings (positive bias) can be expected up to four (4) parts per million with the ToxiRAE Pro. Therefore, it does not appear the alarm was resultant from instrument malfunction. Various working conditions have the potential to affect a ToxiRAE while worn in the field; however, it cannot be concluded any of these contributed to the Personal Ammonia Monitor alarm. Review of the Data Fusion and Advisor System (DFAS) application, powered by SmartSite™, Weather Details dashboard for the reported time of the Event, and the Exhauster source Direct Reading Instrument readings obtained the morning of 03/31/2021, indicate the cause of the Personal Ammonia Monitor alarm is unlikely to be from POR518 or POR519 Exhauster emissions. Additionally, no on-going work around the A-Complex identified during the Industrial Hygiene Event Investigation that may cause the Personal Ammonia Monitor alarm.</p>	
Other: <p>All Affected Personnel were offered voluntary medical examination, but declined. EIR(Event Investigation Report)# 2021-021.</p>	
Industrial Hygienist: [Redacted] _____ <i>Print First and Last Name</i>	 [Redacted] _____ <i>Signature / Date</i> <small>Digitally signed by [Redacted] Date: 2021.04.01 12:59:59 -0700'</small>
Industrial Hygiene Level 2 Manager: [Redacted] _____ <i>Print First and Last Name</i>	 [Redacted] _____ <i>Signature / Date</i> <small>Digitally signed by [Redacted] Date: 2021.04.01 14:03:08 -0700'</small>

Attachment 5: Logbook Entries

- [03/31/2021 -- 12:14](#) [Item of Interest](#) Initiated event investigation EIR-2021-021 "TF-AOP-015 Entry for ToxiRAE Alarm at A-104." POC: [REDACTED] Notified: FacRep [REDACTED] SOEN sent. Initiated event investigation EIR-2021-021 "TF-AOP-015 Entry for ToxiRAE Alarm at A-104." POC: [REDACTED]
- [03/31/2021 -- 11:28](#) [AOP](#) Entry 03/31/21 @ 1023 - Exiting TF-AOP-015 Response actions for the TF-AOP-015 event at A-104 have been completed and the results are at or below background levels.
- [03/31/2021 -- 10:23](#) [AOP](#) Entered TF-AOP-015 Response to Reported Odors or Unexpected Changes to Vapor Conditions. Three workers reported a ToxiRAE alarmed at 9ppm while working on A-104 ENRAF. Area around A-104 restricted. All workers declined medical and none reported symptoms. Odor response cards completed. IHT dispatched to monitor area.