

Washington River Protection Solutions  
**EVENT SUMMARY**

Check PART 1 box to hide that section of the form. Check PART 2 box it will show that section.

**PART 1 (hide)\***       **PART 2 (show)\***

**NOTE:** This form provides timely notification to management and documents preliminary information of an event that may require a more formal investigation. Details may change upon further examination and analysis. The following is a current status of available information:

**Project:** AP Farm Stadium Light Replacement/Maintenance      **Date:** May 1, 2021

**Area/Building/Location:** Northwest Interior of AP Farm      **Approximate Time of Event:** 09:08

**AR Number:** WRPS-AR-2021-3128      **Responsible Manager:** [REDACTED]

**EIR Number:** EIR-2021-033      **Event Investigator:** [REDACTED]

**EVENT SUMMARY PART I**

**Activity in Progress** (What activity was under way, include procedures and work order numbers, as applicable):

AP Farm Stadium Light Replacement/Maintenance

**Personnel Involved** (Job positions, number of personnel, identify any support organizations or subcontractors directly involved):

Electricians - 2

**What Happened** (Provide a short discussion of what happened):

At approximately 0908 hours, while two employees were working to replace the stadium lighting in AP Farm, one worker's personal ammonia monitor alarmed at 7ppm. The other worker's personal ammonia monitor did not alarm. Both workers were wearing respiratory protection and were working on the ground level. The workers stopped work, made sure the workspace was in a safe configuration and immediately left the area.

**Where Did It Happen** (Description of work area and working conditions. Include information on weather conditions, PPE, Postings, etc.):

Northwest interior corner of AP Farm

**Impact to Facility** (Caused by the event or a description of known consequences):

No impact to the facility. Work was delayed for the TF-AOP-015 response actions

**Immediate Actions Taken** (List immediate actions taken to stabilize the scene or respond to the event):

5/1/21:

- Both workers exited the farm after placing work in a safe configuration. Access to AP Farm was restricted.
- Workers completed odor response cards. Neither worker reported smelling any odors and both workers declined precautionary medical evaluation.
- Industrial Hygiene Technicians (IHTs) responded to the area and took direct reading instrument (DRI) readings. DRI readings were below action levels. The CSM exited TF-AOP-015 and access to the area is no longer restricted.

**Notifications Already Made** (Time and personnel notified):

09:04 - Notified Central Shift Office of ToxiRae Alarm  
09:10 - Entered TF-AOP-015: SOEN  
09:15 - AP Farm Posted Restricted Access  
09:43 - Facility Representative, Briefed on AOP-015 Entry  
10:52 - Facility Representative, Briefed on AOP-015 Exit, EIR 2021-033 Initiated  
12:43 - Exited AOP-015

This event does not merit an Event Investigation meeting

This event merits an Event Investigation meeting

**Basis for Determination:**

Washington River Protection Solutions  
**EVENT SUMMARY (Continued)**

Project: AP Farm Stadium Light Replacement/Maintenance Date: May 1, 2021

Area/Building/Location: Northwest Interior of AP Farm Approximate Time of Event: 09:08

AR Number: WRPS-AR-2021-3128 Responsible Manager: [REDACTED]

EIR Number: EIR-2021-033 Event Investigator: [REDACTED]

**Basis for Determination:**

Due to the limited personnel involved (two workers) the event investigation can be documented by review of the odor response cards, personnel interviews and IH instrument evaluation.

**Responsible Manager:**

[REDACTED] [REDACTED] [REDACTED]  
Print First and Last Name Signature / Date

**CAS Manager:**

[REDACTED] [REDACTED] [REDACTED]  
Print First and Last Name Signature / Date

**EVENT SUMMARY PART II**

**Key Elements of the Investigation (Key investigation points):**

At approximately 0908 hours, while two employees were working to replace the stadium lighting in AP Farm, one worker's personal ammonia monitor alarmed at 7ppm. The other worker's personal ammonia monitor did not alarm. Both workers were wearing respiratory protection and were working on the ground level. The workers stopped work, made sure the workspace was in a safe configuration and immediately left the area.

Industrial Hygiene Event Investigation Report (IHIR) number IHIR-00015 reported the following key data about the event:

Field Response area readings:

Ammonia: Less than detectable [less than one (1) part per million]

Hotel Load AreaRAE readings:

Ammonia: Less than detectable [less than one (1) part per million]

Volatile Organic Compounds: Thirty (30) parts per billion

Hotel Load exhauster stack readings (closest reading to initiating event was acquired at 0920 on 05/01/2021):

Ammonia: Eleven (11) parts per million

Volatile Organic Compounds: Two-point-three-four (2.34) parts per million

Affected ToxiRAE #003017 (instrument that alarmed) additional information:

- Passed a post-use-function-test.
  - Was placed into service on 01/22/2019
- Both ToxiRae instruments passed the post use function test.

The worker that was wearing the Personal Air Monitor that alarmed stated that his posture when bending over caused the front of his Full Face Air Purifying Respirator (FF-APR) hood to move away from his chest and allow the FF-APR's exhaust to reach the inlet of the PAM. Because the temperature was higher on May 1st, around 77 degrees Fahrenheit, the worker was only wearing a t-shirt to perform work. This left the worker with only their lanyard to attach their Personal Air Monitor inlet to. The worker stated that as soon as the alarm went off they were almost certain that the alarm was a result of the moisture in their breath reaching the Personal Air Monitor. Although this theory of false alarm is unproven, it is worth noting what the worker relayed. The ToxiRAE response time (t90), the time needed for the ToxiRAE to read ninety (90) percent 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.

**Washington River Protection Solutions**  
**EVENT SUMMARY (Continued)**

**Project:** AP Farm Stadium Light Replacement/Maintenance **Date:** May 1, 2021

**Area/Building/Location:** Northwest Interior of AP Farm **Approximate Time of Event:** 09:08

**AR Number:** WRPS-AR-2021-3128 **Responsible Manager:** [REDACTED]

**EIR Number:** EIR-2021-033 **Event Investigator:** [REDACTED]

**Key Elements of the Investigation (Key investigation points):**

At the time of the issuance of part two of this report the Industrial Hygiene Investigation Report (IHIR) had yet to be completed. When the IHIR is released, all pertinent IH information will be included in this report through revision.

\*\*\*\*\*

REVISION 1: This revision has been completed to include information from the related IHIR.

Additional ToxiRAE instruments present in 241-AP Farm at the time of the initiating event:

ToxiRAE #:	In-Service Date:
003358	03/27/2019
003210	03/22/2019
003025	01/22/2019
003062	03/04/2019
003576	08/14/2019
002905	09/27/2018
003836	01/20/2020
003704	08/29/2019
002933	10/01/2018
003971	01/27/2020
003139	03/13/2019
003654	08/14/2019
002544	08/02/2018
003634	08/14/2019

**ToxiRAE stress testing information:**

Production Operations Industrial Hygienists tested various working conditions on 04/01/2021 that could occur to a ToxiRAE while worn in the field to determine their potential effects on ToxiRAE readings. Refer to Table below for peak Ammonia readings observed during testing.

(Note: Occurred previous to initiating event, related to previous TF-AOP-015 entry - see IHIR-00008 "TF-AOP-015 entry at 241-A-104 on 03/31/2021 for more information)

Functionality Test	ToxiRAE (003254)	Peak Reading	
		Control ToxiRAE	Experimental ToxiRAE
<b>Blocking Gas Inlet:</b>			
• 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
<b>Respirator Proximity:</b>			
• FF-APR with MSA GME Chemical	2 ppm	2 ppm	N/A
<b>Durability:</b>			
• Kinetic	0 ppm	N/A	0 ppm
<b>Chemical Interferences:</b>			
• Sharpie	2 ppm	N/A	2 ppm
• Expo White Board Marker	1 ppm	N/A	1 ppm
• Hand Sanitizer	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.

Washington River Protection Solutions  
**EVENT SUMMARY (Continued)**

Project: AP Farm Stadium Light Replacement/Maintenance Date: May 1, 2021

Area/Building/Location: Northwest Interior of AP Farm Approximate Time of Event: 09:08

AR Number: WRPS-AR-2021-3128 Responsible Manager: [REDACTED]

EIR Number: EIR-2021-033 Event Investigator: [REDACTED]

Exhauster related additional information:

- Initiating event occurred approximately four-hundred-and-thirty (430) feet from the 241-AP-VTP (primary exhauster), which was the closest tank vapor emission point
- Initiating event occurred almost directly upwind from the 241-AP-VTP (primary exhauster)
- Based on review of Dara Fusion Advisory System Smart Site plume modeling the most plausible plume source with overlap of the affected area was 702AZ which is approximately one-thousand-four-hundred-fourty (1440) feet from the affected area. The next most likely source would be the 241-AX Farm primary exhauster system POR-126, although the plume modeled by the Data Fusion Advisory System did not intersect the affected area, passing to the North by around 100 ft. The 241-AX Farm exhauster POR-126 is approximately eight-hundred-seventy (870) feet from the affected area.  
(Note: the Data Fusion Advisory System plume modeling indicated that any ground-plume interaction was unlikely based on stability class and mixing height)
- Although the plume is not modeled by the Data Fusion Advisory System it can be inferred from other modeled plumes that the plume from the 241-A Farm Primary Exhauster would have plausibly been upwind from the affected location at a distance of six-hundred-eighty (680) ft.
- On 05/01/2019 work was not being performed in 241-A, 241-AX, or 241-AY/AZ; therefore, stack readings were not being acquired. At the time of the event VMDS data shows the following Ammonia Concentrations:
  - \* 241-AX Farm exhauster (POR-126/POR-127) - one (1) parts per million
  - \* 241-AY/AZ Farm exhauster (702-AZ)- fifteen (15) part per million

The Event Initiating Personal Ammonia Monitor (ToxiRAE 003017) continued to operate normally and within specifications (passed bump test) after the initiating event. While the Event Initiating Personal Ammonia Monitor (ToxiRAE 003017) 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. Based on previous ToxiRAE testing (04/01/2021 test, see "additional information" above) it is unlikely that the alarm was caused by interference based on proximity to the exhalation valve of Respiratory Protective Equipment, by the sensor being covered with clothing, or the instrument being agitated kinetically. While the approximate exhauster plumes, based on a review of the Data Fusion and Advisor System (DFAS) application, powered by SmartSite™, for the 241-AY/AZ Farm exhauster (702-AZ) included the location of the initiating event, atmospheric neutral stability combined with high atmospheric mixing height, indicate there was a very low potential for ground level exposure from Tank Farm Exhausters (refer to IHIR-00015 Attachment 1). Similarly, inferred exhauster plumes extrapolated from Data Fusion Advisory System for the 241-A Farm Exhausters (POR518 & POR519) included the location of the initiating event, atmospheric neutral stability combined with high atmospheric mixing height, indicate there was a very low potential for ground level exposure from Tank Farm Exhauster. Additionally, no on-going work around the A-Complex identified during the Industrial Hygiene Event Investigation that may cause the Personal Ammonia Monitor alarm.

The ToxiRAE response time (t90), the time needed for the ToxiRAE to read ninety (90) percent 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. The communication of preventing an impingement has been relayed to the workers.

Note: The Industrial Hygiene Event Investigation Report (IHIR) IHIR-00015 was approved and signed on 5/18/21. The approved and issued IHIR didn't change the content of the issued Event Summary Form. This Event Summary form was reissued as REVISION 1.

Washington River Protection Solutions  
**EVENT SUMMARY** (Continued)

Project: AP Farm Stadium Light Replacement/Maintenance Date: May 1, 2021

Area/Building/Location: Northwest Interior of AP Farm Approximate Time of Event: 09:08

AR Number: WRPS-AR-2021-3128 Responsible Manager: [REDACTED]

EIR Number: EIR-2021-033 Event Investigator: [REDACTED]

**Additional Compensatory/Remedial Measures** (any additional measures taken if different from immediate actions):

None.

**Lessons Learned or Information That the Work Force Needs Immediately:**

N/A

- An Event Investigation will be completed per [TFC-OPS-OPER-C-14](#)
- This event will be managed by another process, i.e., Operability Evaluation, Engineering Technical Evaluation, etc.
- This event does not require continuation of the Event Investigation process

**Basis for Determination:**

Considering the Industrial Hygiene Investigation Report is not complete at the time of issuance, the Event Investigation process will continue in accordance with TFC-OPS-OPER-C-14, which could include a complete EIR report, or a revision to this document.

\*\*\*\*\*

REVISION 1:

The investigation continued with the initiated TF-AOP-015 response plan and concluded that all readings obtained were below action limits, with none of the affected workers experiencing symptoms.

Given the Data Fusion and Advisor System (DFAS) data, the time of the event and the field response survey readings, it's unlikely the ToxiRAE alarm was caused by a tank vapor associated event. No fugitive source points were identified. It appears the most likely cause was attributed to a blocking of the gas inlet of the ToxiRAE, high humidity and/or water droplets can disturb diffusion into the sensor, causing an impingement of the passive ammonia sensor, leading to a false reading. The communication of preventing an impingement has been relayed to the workers.

**Responsible Manager:**

[REDACTED]  
Print First and Last Name

[REDACTED]  
Digitally signed by [REDACTED]  
Date: 2021.07.21 12:48:57 -07'00'  
Signature / Date

**CAS Manager:**

[REDACTED]  
Print First and Last Name

[REDACTED]  
Digitally signed by [REDACTED]  
Date: 2021.07.21 13:50:31 -07'00'  
Signature / Date

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

Event Title:  TF-AOP-015 Entry at 241-AP Farm	PER Number:  N/A
	IHIR Number:  IHIR-00015

Date: 05/01/2021	Time: 0845	Location: 241-AP Farm
---------------------	---------------	--------------------------

**Event Summary and Timeline:**

Event Summary:  
 A Personal Ammonia Monitor alarmed and indicated greater than 6 (six) parts per million ammonia but less than 12 (twelve) parts per million ammonia inside 241-AP Farm at the lay-down area (Northwest corner of farm). Two (2) workers were present at the time of Personal Ammonia Monitor alarm. No odors were reported. Medical Surveillance was declined.

Field Response Timeline:

0845 Approximate time of the Event

0909 Shift Office Event Notification (SOEN): "Entering TF-AOP-015 Response to Personal Ammonia Monitor Alarm for ToxiRAE alarm in Farm. Make an orderly exit of AP Farm. Access to AP Farm is restricted. CSM"

0912 Production Operations Industrial Hygienist contacts Production Operations Safety & Health Manager to arrange response support

0916 Production Operations Shift Industrial Hygiene Technician Supervisor contacts Production Operations Safety & Health Manager about resources to support response actions

0919 Production Operations Industrial Hygienist contacts Central Shift Office for information about event and to brief IHT for response actions:

- 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

0920 Production Operations Shift Industrial Hygiene Technician Supervisor contacts Production Operations Shift Industrial Hygiene Technicians to confirm briefing information on response actions

0925 Production Operations Shift Industrial Hygiene Technician Supervisor directs Production Operations Shift Industrial Hygiene Technicians to collect and segregate all Personal Ammonia Monitors, verify peak readings, and start downloading data-logs

0931 Production Operations Industrial Hygienist contacts Level two (2) Industrial Hygiene Manager

1933 Production Operations Industrial Hygienists check Data Fusion Advisory System Smart Site

- Stability Class "D"
- Mixing Height one-thousand (1000) feet
- Wind seventeen-point-three (17.3) miles per hour out of West (three-hundred-ten [310°] degrees)

0943 Production Operations Industrial Hygienist emails Data Fusion Advisory System information to Central Shift Manager

0944 Production Operations Industrial Hygienist updates level two (2) Industrial Hygiene Manager with Data Fusion Advisory System information

0947 Production Operations Industrial Hygienist contacts Central Shift Manager to inquire about Odor/Vapor Response Cards

0954 Production Operations Safety & Health Manager notifies Production Operations Industrial Hygienist that Production Operations Shift Industrial Hygiene Technicians will download data-logs from affected Personal Ammonia Monitors

1010 Central Shift Manager contacts Production Operations Industrial Hygienist with update:

- Industrial Hygiene Technicians have completed field response actions and are exiting farm
- Ammonia readings are less than detectable [less than one (1) part per million]

1014 Production Operations Industrial Hygienist contacts Production Operations Safety & Health Manager with update

1023 Shift Office Event Notification (SOEN): "Exiting TF-AOP-015 "Response to Personal Ammonia Monitor Alarm", IHT surveys indicate no readings above background. Access restored to AP Farm. CSM"

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

**Sampling/Monitoring Results:**

Field Response area readings:

Ammonia: Less than detectable [less than one (1) part per million]

Hotel Load AreaRAE readings:

Ammonia: Less than detectable [less than one (1) part per million]

Volatile Organic Compounds: Thirty (30) parts per billion

Hotel Load exhauster stack readings (closest reading to initiating event was acquired at 0920 on 05/01/2021):

Ammonia: Eleven (11) parts per million

Volatile Organic Compounds: Two-point-three-four (2.34) parts per million

**SWIHD References:**

Event Response Site Wide Industrial Hygiene Database Direct Reading Instrument (DRI) Survey #21-04798 "AOP-15 AP farm NW area"

Hotel Load Site Wide Industrial Hygiene Database Direct Reading Instrument (DRI) Survey #21-04793 "241-AP FFAPR TFC-PLN-173 (AreaRAE)"

Stack Monitoring Site Wide Industrial Hygiene Database Direct Reading Instrument (DRI) Survey #21-04795 "AP-Farm Stack Monitoring, TFC-PLN-173 FFAPR"

**Additional Information:**

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).

Additional Information on the Personal Ammonia Monitors (ToxiRAEs):

The ToxiRAE response time (t90), the time needed for the ToxiRAE to read ninety (90) percent 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.

Affected ToxiRAE #003017 (instrument that alarmed) additional information:

- Passed a post-use bump.
- Was placed into service on 01/22/2019
- Data-Log shows alarm occurred at 0857 05/01/2021

Affected ToxiRAE #003373 (instrument did not alarm, but was present at initiating event):

- Passed a post-use bump.
- Was placed into service on 03/28/2019

Additional ToxiRAE instruments present in 241-AP Farm at the time of the initiating event:

ToxiRAE #:	In-Service Date:
003358	03/27/2019
003210	03/22/2019
003025	01/22/2019
003062	03/04/2019
003576	08/14/2019
002905	09/27/2018
003836	01/20/2020
003704	08/29/2019
002933	10/01/2018
003971	01/27/2020
003139	03/13/2019
003654	08/14/2019
002544	08/02/2018
003634	08/14/2019

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

**Additional Information:**

ToxiRAE stress testing information:

Production Operations Industrial Hygienists tested various working conditions on 04/01/2021 that could occur to a ToxiRAE while worn in the field to determine their potential effects on ToxiRAE readings. Refer to Table below for peak Ammonia readings observed during testing.

(Note: Occurred previous to initiating event, related to previous TF-AOP-015 entry - see IHIR-00008 "TF-AOP-015 entry at 241-A-104 on 03/31/2021 for more information)

Functionality Test	ToxiRAE (003254)	Peak Reading	
		Control ToxiRAE	Experimental ToxiRAE
<b>Blocking Gas Inlet:</b>			
• 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
<b>Respirator Proximity:</b>			
• FF-APR with MSA GME Chemical	2 ppm	2 ppm	N/A
<b>Durability:</b>			
• Kinetic	0 ppm	N/A	0 ppm
<b>Chemical Interferences:</b>			
• Sharpie	2 ppm	N/A	2 ppm
• Expo White Board Marker	1 ppm	N/A	1 ppm
• Hand Sanitizer	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.

Data Fusion Advisory System Smart Site weather information (0900 05/01/2021)

- Stability Class "D" (neutral conditions)
- Mixing Height one-thousand (1000) feet
- Wind seventeen-point-three (17.3) miles per hour out of the West (three-hundred-ten [310°] degrees)

Exhauster related additional information:

- Initiating event occurred approximately four-hundred-and-thirty (430) feet from the 241-AP-VTP (primary exhauster), which was the closest tank vapor emission point
- Initiating event occurred almost directly upwind from the 241-AP-VTP (primary exhauster)
- Based on review of Data Fusion Advisory System Smart Site plume modeling the most plausible plume source with overlap of the affected area was 702AZ which is approximately one-thousand-four-hundred-fourty (1440) feet from the affected area. The next most likely source would be the 241-AX Farm primary exhauster system POR-126, although the plume modeled by the Data Fusion Advisory System did not intersect the affected area, passing to the North by around 100 ft. The 241-AX Farm exhauster POR-126 is approximately eight-hundred-seventy (870) feet from the affected area.

(Note: the Data Fusion Advisory System plume modeling indicated that any ground-plume interaction was unlikely based on stability class and mixing height)

- Although the plume is not modeled by the Data Fusion Advisory System it can be inferred from other modeled plumes that the plume from the 241-A Farm Primary Exhauster would have plausibly been upwind from the affected location at a distance of six-hundred-eighty (680) ft.
- On 05/01/2019 work was not being performed in 241-A, 241-AX, or 241-AY/AZ; therefore, stack readings were not being acquired. At the time of the event VMDS data shows the following Ammonia Concentrations:
  - \* 241-AX Farm exhauster (POR-126/POR-127) - one (1) parts per million
  - \* 241-AY/AZ Farm exhauster (702-AZ)- fifteen (15) part per million



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

**Recommendations/Conclusions:**

Recommendations:

- Industrial Hygiene Programs Direct Reading Instrumentation Subject Matter Expert will document instrument failure for the purpose of tracking and trending Personnel Ammonia Monitor issues (continuous improvement/lessons learned, Integrated Safety Management
- Recommend to Data Fusion Advisory System Smart Site software owner to add all Tank Farm primary exhausters to the Data Fusion Advisory System to increase usability for decision making during response actions. (ISMS Strategy step five (5) "Feedback").

Conclusions:

The Event Initiating Personal Ammonia Monitor (ToxiRAE 003017) continued to operate normally and within specifications (passed bump test) after the initiating event. While the Event Initiating Personal Ammonia Monitor (ToxiRAE 003017) 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. Based on previous ToxiRAE testing (04/01/2021 test, see "additional information" above) it is unlikely that the alarm was caused by interference based on proximity to the exhalation valve of Respiratory Protective Equipment, by the sensor being covered with clothing, or the instrument being agitated kinetically. While the approximate exhauster plumes, based on a review of the Data Fusion and Advisor System (DFAS) application, powered by SmartSite™, for the 241-AY/AZ Farm exhauster (702-AZ) included the location of the initiating event, atmospheric neutral stability combined with high atmospheric mixing height, indicate there was a very low potential for ground level exposure from Tank Farm Exhausters (refer to IHIR-00015 Attachment 1). Similarly, inferred exhauster plumes extrapolated from Data Fusion Advisory System for the 241-A Farm Exhausters (POR518 & POR519) included the location of the initiating event, atmospheric neutral stability combined with high atmospheric mixing height, indicate there was a very low potential for ground level exposure from Tank Farm Exhauster. Additionally, no on-going work around the A-Complex identified during the Industrial Hygiene Event Investigation that may cause the Personal Ammonia Monitor alarm.

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

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

**Recommendations/Conclusions:**

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.

While the event initiating Personal Ammonia Monitor recorded a peak reading of seven (7) parts per million, and was above the response level (RL), all Personal Ammonia Monitor readings were below the Ammonia action level (AL) and were well below all established occupational exposure limits (OEL). Therefore, Ammonia exposures are well below the workplace concentrations to which a person can be exposed without suffering adverse health effects.

**Other:**

N/A

**Industrial Hygienist:**

\_\_\_\_\_

*Print First and Last Name*

\_\_\_\_\_

*Signature / Date*

*Digitally signed by \_\_\_\_\_  
Date: 2021.05.18 15:50:20 -0700'*

**Industrial Hygiene Level 2 Manager:**

\_\_\_\_\_

*Print First and Last Name*

\_\_\_\_\_

*Signature / Date*

*Digitally signed by \_\_\_\_\_  
Date: 2021.05.18 16:07:28 -07'00'*

**ODOR/VAPOR RESPONSE CARD - 241-AP FARM**

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

- Date and time of event: 5/1/21 08:45
- Check Applicable:  Odor  Alarm 6 ppm  Alarm 12 ppm  Alarm Other: CO-Worker Alarm
- Your name and the work you were performing: [REDACTED] stadium lights
- Location of event (mark area on map and wind direction): NW corner AP farm
- Name(s) of others in or near the affected area: [REDACTED]
- Was an IHT present? N/A
- Describe the Odor:  Sweet  Sour  Musty  Earthy  Metallic  Smoky  Rotten  Onion  
 Septic  Ammonia  Cleaning Solution  Other: Nothing
- Possible Source: \_\_\_\_\_
- 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.**

## ODOR/VAPOR RESPONSE CARD - 241-AP 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.

