

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: Tank Farm Projects/Construction      Date: 4/7/2022

Area/Building/Location: 200E / AP Farm      Approximate Time of Event: 1405 Hours

AR Number: WRPS-AR-2022-1292      Responsible Manager: [REDACTED]

EIR Number: EIR-2022-031      Event Investigator: [REDACTED]

**EVENT SUMMARY PART I**

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

The work crew was installing and tying rebar in support of Work Order (WO) #793944, "AP Farm Pilot VMDS Demolition/Removal."

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

Laborers (American Electric): 6  
Carpenters (American Electric): 2  
Iron Workers (American Electric): 2  
Health Physics Technicians (Washington River Protection Solutions): 2  
Industrial Hygiene Technician (Washington River Protection Solutions): 2

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

On 4/7/22 at 1405 hours a Personal Ammonia Monitor (ToxiRAE) alarm occurred while workers were performing excavation work activities in support of the VMDS pilot demolition/removal inside of tank farm 241-AP-Farm. A second alarm occurred at 1410 hours. Both workers (laborers) were located on the east side of the tank farm near the fence line.

The first ToxiRAE alarm occurred while a laborer was tying rebar. All the other ToxiRAEs in the area were reading 0 Parts Per Million (PPM). When the Industrial Hygiene Technician (IHT) met the worker outside of the farm, the worker's ToxiRAE was still in alarm. The IHT removed the filter from the ToxiRAE and it stopped alarming.

Approximately 5 minutes later a second Personal Ammonia Monitor (ToxiRAE) alarmed while a laborer was bending over to perform work. Once the laborer stood up, the ToxiRAE alarm cleared.

The individuals were working in an area that required the use of respiratory protection.

The Field Work Supervisor (FWS) notified the Central Shift Manager (CSM). The CSM entered TF-AOP-015 "Response to Personal Ammonia Monitor Alarm."

Industrial Hygiene Technicians responded to the area and took Direct Reading Instrument (DRI) readings. DRI monitoring results were less than detectable.

The CSM exited TF-AOP-015 and the access restriction to the work area was lifted.

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

The TF-AOP-15, Response to Personal Ammonia Monitor Alarm, event occurred in the 200 East area inside of the 241-AP-Farm (east side of farm along fence line).

The Hanford Site Meteorological Station number 6 (200E) weather data reported at 1500 Hours:

Temperature - 65 degrees Fahrenheit  
Winds - 4 mph out of the North  
Relative Humidity - 17%  
Pressure - 29.6" steady

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

Entering in to TF-AOP-15 resulted in restricting access to the 241-AP-Farm.

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

Project: Tank Farm Projects/Construction Date: 4/7/2022

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AR Number: WRPS-AR-2022-1292 Responsible Manager: [REDACTED]

EIR Number: EIR-2022-031 Event Investigator: [REDACTED]

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

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

4/7/2022:

- All workers placed work area in to safe configuration and immediately exited the farm. (1505 Hours)
- The Field Work Supervisor (FWS) notified the Central Shift Manager (CSM) of the ToxiRAE alarm. The CSM entered TF-AOP-015 "Response to Personal Ammonia Monitor Alarm." (~1405 Hours)
- The workers with the alarming ToxiRAE completed an Odor Response Card. The workers were offered medical surveillance and declined. The workers did not smell any odor and reported no symptoms.
- IHTs responded to the area and took Direct Reading Instrument (DRI) readings. DRI monitoring results were less than detectable.
- The CSM exited TF-AOP-015 and the access restriction to the work area was lifted (1555 Hours).
- Initiated Event Investigation EIR-2022-031, "TF-AOP-015 Event at AP Farm." (1923 Hours)

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

- The FWS reports the initial ToxiRAE alarm to the CSM (1505 Hours)
- DOE Facility Representative notified of TF-AOP-15 by CSM (1505 Hours)
- DOE Facility Representative notified of TF-AOP-15 exited by CSM (1555 Hours)

- This event does not merit an Event Investigation meeting  
 This event merits an Event Investigation meeting

**Basis for Determination:**

Logbook entries, interviews, and documents reviews were used to provide initial information on the event.

**Responsible Manager:**

[REDACTED]

Print First and Last Name

[REDACTED]

Signature / Date

**CAS Manager:**

[REDACTED]

Print First and Last Name

[REDACTED]

Signature / Date

**EVENT SUMMARY PART II**

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

Note: The approximate time of the event as reported in the Event Summary Part I has been corrected to 1405 hours.

Industrial Hygiene Event Investigation Report, IHIR-00036, reports the following:

On 4/7/22, TF-AOP-015, Response to Personal Ammonia Monitor Alarm, was initiated following two Personal Ammonia Monitor (ToxiRAE) response alarms occurring in 241-AP-Farm. The work crew was involved in installing and tying rebar for a concrete slab in support of WO 793944 "AP-Farm Pilot VMDS Demolition/Removal" project. The monitoring devices were at least 10 feet apart and the alarms staggered in time by approximately 5 minutes. At approximately 1405 hours, the first worker's ToxiRAE alarmed, and the worker exited the farm when the alarm occurred. The alarm did not clear upon exiting the farm. Upon inspection by an Industrial Hygiene Technician (IHT), the instrument cleared when the dust filter was backed off slightly.

The second worker's ToxiRAE alarm occurred approximately 5 minutes later, while the worker was

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

Project: Tank Farm Projects/Construction Date: 4/7/2022

Area/Building/Location: 200E / AP Farm Approximate Time of Event: 1405 Hours

AR Number: WRPS-AR-2022-1292 Responsible Manager: [REDACTED]

EIR Number: EIR-2022-031 Event Investigator: [REDACTED]

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

bending over gathering tools. The alarm immediately cleared after a change in body position. No other alarms occurred.

Sampling/monitoring results:

ToxiRAE 004412 (Initial Alarming ToxiRAE):

Ammonia: Peak of 8 ppm on instrument display

Ammonia: Peak of 8 ppm on data log from 1409-1410 hours with variation between 0-2 ppm in the hours leading up.

ToxiRAE 003411(Second Alarming ToxiRAE):

Ammonia: Peak of 0 ppm on instrument display

Ammonia: Peak of 5 ppm on data log from 1327 hours with variation between 0-2 in the hours leading up.

The data log from ToxiRAE 004412, involved in the initial alarm, began reading steadily at 1-2 ppm from 1254 until 1333 hours, increasing to 2-3 ppm from 1334 until 1403 hours, then increased rapidly to 8 ppm (with variance of 5-7 ppm between 1404 to 1410 hours). Once the IHT released the dust filter on the ToxiRAE, the alarm immediately diminished to 0 ppm at 1414 hours. The continuance of the alarm after the worker exited the farm and the immediacy of the diminishing alarm upon releasing the filter would suggest that the source of the alarm was from a blockage on the filter rather than as a result of tank farm chemical vapor. Further evidence of this anomaly would be the adjacent ToxiRAEs worn by workers in the area all giving 0 ppm readings. Also, none of the workers outside 241-AP-Farm without Respiratory Protection Equipment donned made reports of Ammonia odors, which would have been prevalent at levels of 8 ppm.

The data log from ToxiRAE 003411, involved in the second alarm, had a peak reading of 5 ppm (below the action limit and alarm threshold) at 1327 hours and variance of 0-2 ppm during the alarm event. This infers that the alarm was a result of a flow fault rather than an action limit alarm.

The Industrial Hygiene Technician (IHT) responded to 241-AP-Farm per direction from the responding Project Industrial Hygienist. Direct Reading Instrument (DRI) monitoring results for Ammonia and Volatile Organic Compounds (VOCs) were 0 ppm. No odors were detected.

Ammonia (NH3): 0 ppm

Volatile Organic Compounds (VOCs): 0 ppm

Additional information:

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. Blocking the gas inlet of the ToxiRAE, high humidity, and/or water droplets can disturb diffusion into the sensor, leading to false readings. The Wearable Ammonia Detector Field Trial report (RPP-RPT-61096) stated that false positive concentration readings (positive bias) can be expected up to 4 ppm with the ToxiRAE Pro.

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

None.

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

None.

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

Project: Tank Farm Projects/Construction Date: 4/7/2022

Area/Building/Location: 200E / AP Farm Approximate Time of Event: 1405 Hours

AR Number: WRPS-AR-2022-1292 Responsible Manager: [REDACTED]

EIR Number: EIR-2022-031 Event Investigator: [REDACTED]

- 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:**

IHIR-000036 concluded that DRI monitoring in the vicinity confirmed less than detectable results for Ammonia and VOCs. The resulting ToxiRAE data logs suggest that a physical impingement is the most likely cause for the first alarm given the instrument response when filter adjustment was made, and body positioning as the most likely cause for the second alarm given the immediate clearance of the alarm once repositioned.

It's recommended that the results of the investigation and the causes of the alarms are communicated to the worker's whose Personal Ammonia Monitors (ToxiRAEs) alarmed.

The event investigation process will be exited.

**Responsible Manager:**

[REDACTED] \_\_\_\_\_ *Print First and Last Name*  
[REDACTED] \_\_\_\_\_ *Signature / Date*  
Digitally signed by [REDACTED]  
Date: 2022.04.20 19:27:44 -07'00'

**CAS Manager:**

[REDACTED] \_\_\_\_\_ *Print First and Last Name*  
[REDACTED] \_\_\_\_\_ *Signature / Date*  
Digitally signed by [REDACTED]  
Date: 2022.04.20 19:28:08 -07'00'

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**INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT**

<b>Event Title:</b>  <p style="text-align: center;">AOP-015 Personal Ammonia Monitor Response Alarms in AP Farm</p>	<b>PER Number:</b>  <hr/> <b>IHIR Number:</b> <p style="text-align: center;">IHIR-00036</p>
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<b>Date:</b> 4/7/2022	<b>Time:</b> 1505	<b>Location:</b> 241-AP Farm
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**Event Summary and Timeline:**

**Event Summary:**  
On April 7th, 2022, AOP-015 was initiated following two personal ammonia monitor response alarms occurring in AP farm. The work crew was involved in installing and tying rebar for a concrete slab in support of WO 793944 "AP-Farm Pilot VMDS Demolition/Removal" project. The monitoring devices were at least 10 feet apart and staggered in time by approximately 5 minutes. At approximately 1405, the first worker's ToxiRAE alarmed, and the worker exited the farm when the alarm occurred. The alarm did not clear upon exiting the farm. Upon inspection by IHT, the instrument cleared when the dust filter was backed off slightly. The second worker's ToxiRAE alarm occurred approximately 5 minutes later, while the worker was bending over gathering tools, and the alarm immediately cleared after a change in body position. No other alarms occurred. Central Shift Office (CSO) was alerted, TF-AOP-015 was entered, and all personnel exited 241-AP Farm.

**Field Response Timeline:**  
1405 Worker's personal Ammonia monitor alarmed while performing work in support of the AP-Farm pilot VMDS demolition and removal project. The worker exited the farm when the alarm occurred. Alarm did not clear after leaving. Upon inspection by Industrial Hygiene Technician (IHT), the instrument cleared when the dust filter was backed off slightly. Results immediately dropped back to 0 ppm. No other alarms occurred at this time.

1409 IHT notified Project IH, and Field Work Supervisor (FWS) notified the Central Shift Manager (CSM) of alarming Personal Ammonia Monitor.

1410 While workers made efforts to put work into a safe condition, a second worker alarm occurred while bending over gathering tools. Alarm cleared immediately after a change in body position. No other alarms occurred.

1420 Field Work Supervisor (FWS) attempted to notify the Central Shift Manager (CSM) of second alarming Personal Ammonia Monitor, but due to a response to C-67 Odor report at the same time notification was delayed.

1430 FWS, IHT, and Projects IH arrived at Central Shift Office (CSO) to make notifications to the CSM of the two alarming Personal Ammonia Monitors.

1511 CSM entered TF-AOP-015 "Response to Personal Ammonia Monitor Alarm." Access to 241-AP Farm restricted unless authorized by Shift Manager (SM).

1526 Shift IHT were deployed from Central Shift Office to perform DRI monitoring at AP farm.

1558 After a sweep of 241-AP Farm and the excavation area, shift IHT reported less than detectable monitoring results in AP farm for both Ammonia and VOCs.

1602 CSM exited TF-AOP-015 "Due to Personal Ammonia Fault."

**Sampling/Monitoring Results:**

ToxiRAE 004412 (Initial Alarming ToxiRAE):  
Ammonia: Peak of 8 ppm on instrument display  
Ammonia: Peak of 8 ppm on data log from 14:09-14:10 with variation between 0-2 ppm in the hours leading up

ToxiRAE 003411(Second Alarming ToxiRAE):  
Ammonia: Peak of 0 ppm on instrument display

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

**Sampling/Monitoring Results:**

Ammonia: Peak of 5 ppm on data log from 13:27 with variation between 0-2 in the hours leading up

The data log from ToxiRAE 004412, involved in the initial alarm, began reading steadily at 1-2 ppm from 12:54 until 13:33, increasing to 2-3 ppm from 13:34 until 14:03, then increased rapidly to 8 ppm (with variance of 5-7 ppm between 14:04 to 14:10). Once the IHT released the dust filter on the ToxiRAE, the alarm immediately diminished to 0 ppm at 14:14. The continuance of the alarm after the worker exited the farm and the immediacy of the diminishing alarm upon releasing the filter would suggest that the source of the alarm was from a blockage on the filter rather than as a result of tank farm chemical vapor. Further evidence of this anomaly would be the adjacent ToxiRAEs worn by workers in the area all giving 0 ppm readings. Also, none of the workers outside AP-Farm without Respiratory Protection Equipment donned made reports of Ammonia odors, which would have been prevalent at levels of 8 ppm.

The data log from ToxiRAE 003411, involved in the second alarm, had a peak reading of 5 ppm (below the action limit and alarm threshold) at 13:27 and variance of 0-2 ppm during the alarm event. This infers that the alarm was a result of a flow fault rather than an action limit alarm.

The Industrial Hygiene Technician (IHT) responded to 241-AP Farm per direction from the responding Project IH. DRI monitoring results for Ammonia and VOC's were 0 ppm. No odors were detected.

Ammonia (NH<sub>3</sub>):0 ppm

Volatile Organic Compounds (VOCs): 0 ppm

**SWIHD References:**

Event Response Site Wide Industrial Hygiene Database (SWIHD) Direct Reading Instrument (DRI) Survey #22-02390

**Additional Information:**

The ToxiRAE response time (t<sub>90</sub>), the time needed for the ToxiRAE to read 90% full-scale of the true concentration of ammonia, is 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 Wearable Ammonia Detector Field Trial report (RPP-RPT-61096) stated that false positive concentration readings (positive bias) can be expected up to 4 ppm with the ToxiRAE Pro.

Weather conditions reported at 1500 hours on 04/07/2022, obtained from the Hanford Meteorological Station #6 (200E) indicated the following:

- Temperature: 65 degrees Fahrenheit
- Relative Humidity: 17%
- Wind Direction: out of the North
- Wind Speed: 4 miles per hour
- Pressure: 29.6" steady

**Recommendations/Conclusions:**

**Conclusions:**

DRI monitoring in the vicinity confirmed less than detectable results for Ammonia and VOCs. The resulting ToxiRAE data logs suggest that a physical impingement is the most likely cause for the first alarm given the instrument response when filter adjustment was made, and body positioning as the most likely cause for the second alarm given the immediate clearance of the alarm once repositioned.

No recommendations at this time.

**Other:**

All Affected Personnel were offered voluntary medical examination, but declined.  
EIR(Event Investigation Report)# 2022-031.

**Industrial Hygienist:**

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

<p>_____</p> <p><i>Print First and Last Name</i></p>	<p>_____</p> <p><i>Signature / Date</i></p> <p><small>Digitally signed by _____ Date: 2022.04.20 09:35:38 -07'00'</small></p>
<p><b>Industrial Hygiene Level 2 Manager:</b></p> <p>_____</p> <p><i>Print First and Last Name</i></p>	<p>_____</p> <p><i>Signature / Date</i></p> <p><small>Digitally signed by _____ Date: 2022.04.20 16:07:51 -07'00'</small></p>