

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: Production Operations Date: Jun 24, 2022

Area/Building/Location: 200W/T-Farm Approximate Time of Event: 0815

AR Number: WRPS-AR-2022-1970 Responsible Manager: [REDACTED]

EIR Number: EIR-2022-054 Event Investigator: [REDACTED]

EVENT SUMMARY PART II

Key Elements of the Investigation (Key investigation points):

Additions to the Event Summary Part 1 information includes the following:

ACTIVITY IN PROGRESS:

Workers were performing routine radiological surveillances in accordance with Radiological Control Scheduled Radiation Survey Task Description Task Numbers: BOS-M008 Rev. 13, BOS-M010 Rev. 11, and BOS-M022 Rev. 27.

WHERE DID IT HAPPEN:

Workers were performing radiological surveys within the southwest corner T-Farm, near the 241-T-201 tank, at the time of the Ventis Pro personal ammonia monitor alarm. Workers were not performing radiological surveys within an exclusion zone established around the tank breather filters.

Workers were wearing FF-APR respiratory protection with chemical vapor cartridges as required by the MDRPF-STD-07 Respiratory Protection Form and Standing Order SO-OPS-17-003 "Use of Respiratory Protection in Tank Farms".

Workers were wearing Level D PPE and performing activities within a posted Radiation Area (RA) and Radiological Buffer Area (RBA). Anti-contamination clothing was not being worn, nor required, as workers were not performing activities within a posted radiological Contamination Area (CA).

The Data Fusion and Advisory System (DFAS) application, powered by SmartSite™, was utilized for outdoor weather details at the time of the Ventis Pro personal ammonia monitor alarm. Although, it is noted the DFAS application does not display information from T-Farm, and currently only reports information for the AP, AY/AZ, A, and AX actively ventilated tank farms. The DFAS dashboard indicated the following weather conditions at 0815 on 06/24/2022:

- Wind Speed: 5.4 miles per hour (mph)
- Wind Direction: 327° (out of North/Northwest)
- Mixing Height: 800 feet above grade (note: mixing height inconsequential for T-Farm because it is not an actively ventilated tank farm/equipped with an exhauster stack)
- Stability Class: D (neutral conditions)

IMMEDIATE ACTIONS TAKEN

- CSM reviewed the DFAS data and determined mixing height was >100 ft., therefore, no additional access restrictions were required.
- CSM offered precautionary medical surveillance to workers. Workers declined medical surveillance.
- CSM made required TF-AOP-015 notifications.
- Production Operations shift Industrial Hygiene Technician (IHT) initiated TF-AOP-015 response actions and monitoring per IHP-09001. Direct reading instrument (DRI) area readings inside T-Farm indicated a less than detectable (< 1 ppm) ammonia concentration, which is below background levels.

NOTIFICATION ALREADY MADE

(0852)- CSM initiated TF-AOP-015, restricted access to T-Farm, provided a radio announcement, and issued Shift Office Event Notification (SOEN) "Entering TF-AOP-015 for a personal ammonia monitor alarm at 15 ppm in T-Farm. Access is restricted to T-Farm, personnel stay clear of T-Farm".

(0930)- CSM notified the DOE Facility Representative of TF-AOP-015 entry.

(1041)- CSM issued SOEN that Event investigation EIR-2022-054 "TF-AOP-015 Event in T-Farm" was initiated. CSM notified DOE Facility Representative of event investigation initiation.

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EVENT SUMMARY (Continued)

Project: Production Operations

Date: Jun 24, 2022

Area/Building/Location: 200W/T-Farm

Approximate Time of Event: 0815

AR Number: WRPS-AR-2022-1970

Responsible Manager: [REDACTED]

EIR Number: EIR-2022-054

Event Investigator: [REDACTED]

Key Elements of the Investigation (Key investigation points):

(1117)- CSM restored access to T-Farm, provided radio announcement, and issued SOEN "Exiting TF-AOP-015 for T-Farm. Response actions for the TF-AOP-015 event have been completed and the results are at or below background levels". CSM contacted the on-call DOE Facility Representative to inform them TF-AOP-015 had been exited.

EVENT SUMMARY PART 2 KEY ELEMENTS OF THE INVESTIGATION:

To summarize the conclusions of IHIR-00042 "TF-AOP-015 for a personal monitor alarm at 15ppm in T-Farm", the Ventis Pro personnel ammonia monitor alarm was likely resultant of a faulty electrochemical ammonia sensor and/or instrument electronics and was not indicative of an employee chemical exposure event or changing Tank Farm conditions related to Tank Farm vapors.

The following considerations support the IHIR-00042 conclusion:

(1) Ammonia is used as a sentinel tank waste chemical vapor for chemicals of potential concern (COPC), therefore, direct reading instruments (DRIs) equipped with an ammonia sensor are utilized at a minimum when monitoring for tank waste chemical vapors/COPCs. Field response DRI monitoring, following initiation of TF-AOP-015, indicated area readings of less than detectable concentrations (<1 ppm) ammonia within T Farm.

(2) Another HPT was in the immediate work area and directly next to the individual when the Ventis Pro (005679) personal ammonia monitor "Action Level" alarm initiated. The co-located HPT's Ventis Pro personal ammonia monitor did not alarm and indicated ammonia concentrations of 0 ppm. If ammonia resultant from a tank vapor emission were present, it would be expected that both Ventis Pro personal ammonia monitors would have alarmed and indicated ammonia concentrations due to the close proximity of the workers.

(3) The workers reported to the Central Shift Office after they had exited T-farm. While in the shift office, the event initiating Ventis Pro (005679) started alarming at the "Response Level" and displayed ammonia concentration of 6 ppm although there was no ammonia source present. The other HPT's Ventis Pro PAM did not alarm and indicated an ammonia concentration of 0 ppm concurrently to the Ventis Pro (005679) instrument alarming and displaying an ammonia concentration of 6 ppm.

(4) IH review of the Ventis Pro (005679) personal ammonia monitor datalog showed uncharacteristic concentration fluctuations at the time of the instrument alarm, observed bouncing between rapid peaks and declines (ranging from -5 ppm to 17 ppm) during a 30 second interval. With typical ammonia concentration detection, the device datalog will show a gradual increase from 0 ppm to the peak ammonia concentration due to the Ventis Pro sensor response time taking 60 seconds to detect 90% of the true concentration of ammonia in the atmosphere. Therefore, rapid peaks and declines over a 30 second interval (with oscillations of 24 ppm occurring) would not be anticipated with normal sensor performance. Therefore, it was concluded the Ventis Pro (005679) likely contains a faulty electrochemical ammonia sensor and/or instrument electronics, resulting in false ammonia concentrations.

Event Investigation took the following additional consideration into account:

Discussions with the IH organization indicated review of the Ventis Pro (005679) personal ammonia monitor datalog showed uncharacteristic concentration fluctuations starting to occur on or around 06/13/2022. Thus, further supporting the conclusion the Ventis Pro (005679) likely contains a faulty electrochemical ammonia sensor and/or instrument electronics.

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

The event initiating Ventis Pro (005679) was removed from service as a result of uncharacteristic concentration fluctuations observed on the Ventis Pro datalog. Ventis Pro (005679) is being sent back to the manufacturer for further testing.

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EVENT SUMMARY (Continued)

Project: Production Operations Date: Jun 24, 2022

Area/Building/Location: 200W/T-Farm Approximate Time of Event: 0815

AR Number: WRPS-AR-2022-1970 Responsible Manager: [REDACTED]

EIR Number: EIR-2022-054 Event Investigator: [REDACTED]

Lessons Learned or Information That the Work Force Needs Immediately:

None. Per TFC-OPS-OPER-C-28, "Operating Experience/Lessons Learned", this event did not meet the criteria requiring generation of a Lessons Learned.

- 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:

Investigation determined the Ventis Pro (005679) personnel ammonia monitor alarm was not an indication of an employee chemical exposure event or changing Tank Farm conditions related to Tank Farm vapors, and was likely resultant of a faulty electrochemical ammonia sensor and/or instrument electronics.

This event does not require continuation of the event investigation process under TFC-OPS-OPER-C-14, "Event Investigation Process". The facts, findings, and comprehensive account captured under this Event Summary and the Industrial Hygiene Event Investigation Report, IHIR-00042 "TF-AOP-015 for a personal monitor alarm at 15ppm in T-Farm", form the basis that further investigation will provide no additional information or operational benefit. Further actions will be managed under WRPS-AR-2022-1970 in the iCAS system.

Responsible Manager:

[REDACTED] [REDACTED]
Print First and Last Name Signature / Date
Digitally signed by [REDACTED]
Date: 2022.06.30 16:48:16 -0700

CAS Manager:

[REDACTED] [REDACTED]
Print First and Last Name Signature / Date
Digitally signed by [REDACTED]
Date: 2022.06.30 17:02:37 -0700

Washington River Protection Solutions
INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT

Event Title: TF-AOP-015 for a personal monitor alarm at 15ppm in T-Farm	PER Number: N/A
	IHIR Number: IHIR-00042

Date: 06/24/2022	Time: 0820	Location: Southwest Corner of T-Farm
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Event Summary and Timeline:

Event Summary:

At approximately 0820 on June 24, 2022 a Personal Ammonia Monitor alarmed and indicated greater than 12 ppm ammonia inside T-Farm. Two Health Physics Technicians were present at the time when the Personal Ammonia Monitor alarmed. Only one of the Health Physics Technicians Personal Ammonia Monitor alarmed. The individuals did not report the presence of any odors and both declined precautionary medical surveillance.

On the job personnel: Two Health Physics Technicians.
 Field Response Team: One Industrial Hygiene Technician and One Health Physics Technician

Field Response Timeline:

0820 Approximate Time of Event - Personal Ammonia Monitor alarm

0851 Shift Office Event Notification (SOEN): "Entered TF-AOP-015 for a personal ammonia monitor alarm at 15ppm in T-Farm. Access is restricted to T-Farm, personnel stay clear of T-Farm. CSM"

0858 Production Operations West Level Three Safety and Health Manager communicated details of event to Production Operations East Level Three Safety and Health Manager, Tank Farm Projects Level Three Safety and Health Manager, and Industrial Hygiene Level 2 Manager:

- "Radcon routines was working in T Farm. Ventis Pro alarmed at 15ppm and then dropped to zero. Worker was near the 200 series tanks and about to walk onto yellow pad. I have the instrument number. Worker is at the shift office."

0922 Production Operations East Level Three Safety and Health Manager communicated with Central Shift Manager on entry into AOP-15 and details about event in T-Farm:

- Two Health Physicist Technicians present
- Only one Personal Ammonia Monitor alarmed
- Peak reading reported at 15 ppm
- Neither employee reported any odors and declined medical evaluation

0929 Production Operations East Level Three Safety and Health Manager contacted Production Operations Industrial Hygiene Technician Supervisor to contact Production Operations Shift Industrial Hygiene Technicians and direct them to central shift office for field response.

0930 Production Operations East Level Three Safety and Health Manager communicated details to Productions Operations West Level Three Safety and Health Manager, Tank Farm Projects Safety and Health Level Three Manager and Industrial Hygiene Level Two Manager that the ventis pro that alarmed 15ppm in the field had also starting alarming in the shift office once it was returned to central shift manager and Production Operations Shift Industrial Hygiene Technician.

0933 Production Operations East Level Three Safety and Health Manager communicated with Central Shift Manager discussing malfunctioning Ventis Pro and alarm that erroneously alarmed in the central shift office.

0935 Productions Operations East Level Three Safety and Health Manager communicated with Production Operations West Level Three Safety and Health Manager on details of event and path forward.

Field Response Timeline continued on next page.

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INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT(Continued)

Event Summary and Timeline:

Field Response (continued):

0947 Production Operations East Level Three Safety and Health Manager communicated with Central Shift Manager on response steps and Industrial Hygiene Sample Plan requirements.

- Monitor as per IHP-09001 "Response to ammonia monitor alarm"

1115 Shift Office Event Notification (SOEN): "Exited TF-AOP-015 for T-Farm. Response actions have been completed and the results are at or below backgrounds levels. CSM"

Sampling/Monitoring Results:

Field Response area readings:

- Ammonia: Less than Detectable (< 1 ppm)

Ventis Pro 005679 (Event Initiating Ventis Pro):

- Ammonia: Peak of 17 ppm Alarm Event @ 0823
- Ammonia: Peak of 8 ppm on data log @ 0824

Ventis Pro 005294 (Present at Initiating Event):

- Ammonia: No Alarm Event @ 0823
- Ammonia: Peak of 0.00 ppm on data log @ 0824

SWIHD References:

- Event Response Site Wide Industrial Hygiene Database Direct Reading Instrument Survey #22-03856 "TF-AOP-015 Response T Farm"

Additional Information:

At the time of the initiating event two Health Physics Technicians were wearing Respiratory Protection Equipment in accordance with Management Directed Respiratory Protection Form "MDRF-STD-07". Both employees were wearing a FF-APR. Both Health Physics Technicians were wearing Ventis Pros (Personal Ammonia Monitors) at the time of the initiating event. One Health Physics Technician's Personal Ammonia Monitor (Ventis Pro 005679) began to alarm, with a peak reading of 17 ppm and both exited the farm. The other Health Physics Technician's Personal Ammonia Monitor (Ventis Pro 005294) did not alarm. No odors were reported by either Health Physics Technician.

One Industrial Hygiene Technician and one Health Physics Technician responded to complete background sweeps of T-Farm. The Industrial Hygiene Technician found ammonia readings of less than Detectable (< 1 ppm). The responding personnel wore Respiratory Protection Equipment in accordance with Management Directed Respiratory Protection Form "MDRF-STD-07". Both employees were wearing a FF-APR.

Both Health Physics Technicians had arrived at the Central Shift Office by 0858. While at the Central Shift Office, the Ventis Pro 005679, which alarmed in T-Farm, alarmed at 6 ppm ammonia at 0925. The Ventis Pro 005294, which did not alarm in T-Farm, also did not alarm at the Central Shift Office and recorded 0.00 ppm ammonia at 0925.

Data Fusion and Advisor System (DFAS) application displays information for only the 200 East Area ventilated Tank Farms. T-Farm is not included. Therefore; review of the Data Fusion and Advisor System (DFAS) application, powered by SmartSite™, Weather Details dashboard is for informational purposes only, per TFC-OPS-OPER-C-67 4.2.8. Weather Details for the approximate time of the event are for informational purposes only as no odor was reported:

06/15/2022 @ 0830

- Wind Speed: 8.9 mph
- Wind Direction: 106.60° (out of the East Southeast)
- Mixing Height: 1,200 feet above grade
- Stability Class: D (Neutral Conditions)

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INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT(Continued)

Additional Information:

06/15/2022 @ 0845

- Wind Speed: 9.6 mph
- Wind Direction: 35.10° (out of the Northeast)
- Mixing Height: 1,200 feet above grade
- Stability Class: D (Neutral Conditions)

Additional Information regarding the Ventis Pros (Personal Ammonia Monitors):

Ventis Pro 005679 (event initiating event):

Put into service: 05/22/2022

Unit ID: 005679

Unit Serial Number: 22033PE-018

Data Log Interval: 10 seconds

Passed Daily Function Test for Ammonia (Bump Test): 06/24/2022

Last Successful Calibration of Unit for Ammonia: 06/23/2022

Ventis Pro 005294:

Put into service: 05/22/2022

Unit ID: 005294

Unit Serial Number: 220377-154

Data Log Interval: 10 seconds

Passed Daily Function Test for Ammonia (Bump Test): 06/24/2022

Last Successful Calibration of Unit for Ammonia: 06/23/2022

Data Log Summary Ventis Pro 005679 from 0823 to 0826:

The data log shows rapid uncharacteristic fluctuations in the data. This is due in part to the Ventis Pro response time (t90) being 60 seconds, which is the time needed for the Ventis Pro to read 90% full-scale of the true concentration of ammonia in the atmosphere. This results, in a typical exposure event, with the device data log showing a gradual increase from 0.00 ppm to an observed peak, for a given time interval. However, the data log for Ventis Pro 005679 during the time period of concern, shows rapid spikes in ppm followed by rapid declines. These spikes ranged from 0.00 ppm to 8.00 ppm and back to 0.00 ppm for ammonia and occurred over 10 second intervals.

Data Log Summary Ventis Pro 005294 from 0823 to 0826:

The data log shows a peak reading of 0.00 ppm over the entire time period.

Ammonia is used as sentinel Tank Waste Chemical Vapor for chemicals of potential concern (COPC) and Personal Ammonia Monitors are worn by workers in the Tank Farms to detect its presence. Two Health Physics Technicians were working in tandem in T-Farm when one of their Personal Ammonia Monitors alarmed. If ammonia had been present it is expected that both Personal Ammonia Monitors would have alarmed. Additionally, the Personal Ammonia Monitor (Ventis Pro 005679) that alarmed, showed unusual readings at the time of the event, and alarmed inside of the Central Shift Office, which has no ammonia source. Based on the above it is highly likely the electrochemical ammonia sensor, the instrument electronics, or both are faulty. The instrument has been removed from service.

Recommendations/Conclusions:

Recommendations:

N/A

Conclusions:

Direct Reading Instrumentation monitoring performed during response actions did not indicate further action was necessary to protect worker safety and health. As a result TF-AOP-015 for T-Farm was existed and the area was released from restricted access.

