Hanford Tank Waste Operations & Closure

EVENT REPORT FORM

1. Project: Retrieval and Closure Construction **2. Report Date:** 11/05/2025

3. Investigation Title: TF-AOP-015 for S-Farm

4. Investigation Report Number: EIR-2026-005

5. Responsible Manager: [redacted]

6. Event Investigator: [redacted]

7. Area / Building / Location: 200W/241-S Farm/Near Tank S-109

8. Date and Approximate Time of Event: Date: 10/28/2025 **Time *(military)*:** 0820 hours

9. Associated Action Request (AR) Number: ITDC-AR-2026-0296

10. Associated Occurrence Report Number *(if applicable)*: N/A

11. Event Learning Meeting Held: Yes [ ] or No [X] **Date:** N/A **Time *(military)*:** N/A

12. Brief Summary of Event: What Happened?

At approximately 0820 on 10/28/2025, Apollo Construction workers supporting WO# 1215709, *241-S-109 South Hatchway Equipment Removal and Cover Installation*, had just entered 241-S Farm to install ground cover for upcoming work activities removing a condenser pit demister assembly from 241-S-109 when a laborers' Ventis® Pro Personal Ammonia Monitor (PAM) action-level alarm activated (≥ 12 ppm ammonia) while accessing a job box. The laborer stated the Ventis® Pro PAM displayed 28 ppm ammonia at the time of the action-level alarm. Three additional workers were in the work area at the time of the Ventis® Pro PAM action-level alarm. The remaining three workers' Ventis® Pro PAMs did not alarm or have elevated readings above the response level (6 ppm ammonia).

Ground cover setup is classified as a Tank Vapor Work Category (WC) 1 (general farm entry) activity. Ground cover setup is not a tank intrusive or tank vapor containing system intrusive activity. As required for 241-S Farm entry, all workers were wearing full-faced air purifying respirators (FF-APRs) with chemical vapor cartridges in accordance with Respiratory Protection Form (RPF) MDRPF-STD-07. Workers reported no odors were encountered and no symptoms were experienced. The laborer wearing the Ventis® Pro PAM with the action-level alarm elected to receive precautionary medical surveillance by the Site Occupational Medical Contractor (SOMC). The other three workers declined precautionary medical surveillance.

Upon returning the initiating Ventis® Pro PAM to the checkout station (which is known to maintain a clean air environment without ammonia present), the action-level alarm again activated and the PAM displayed 26 ppm ammonia. Additionally, during physical inspection of the initiating Ventis® Pro PAM, abnormal sensor response was exhibited when the instrument inlet was temporarily covered.

To summarize the conclusions of Industrial Hygiene Event Investigation Report (IHIR), *IHIR-00127 TF-AOP-015 Response S-109,* and Industrial Hygiene Equipment Investigation (IHEI) Report #00005; the Ventis® Pro PAM action-level alarm was determined to be resultant of abnormal ammonia sensor response and increased ammonia sensor sensitivity that is not consistent with normal operating parameters. The Ventis® Pro PAM action-level alarm was determined to not be resultant of changing 241-S farm tank vapor conditions, exhaust plume ground receptor emissions from the nearby actively ventilated 241-SY Farm tank farm exhauster, or other potential chemical vapor sources (e.g. contents within the job box located near S-109).

[Note: Refer to IHIR-00127 and IHEI #00005 for further detail/supporting evidence regarding these conclusions].

Direct Reading Instrument (DRI) monitoring performed during TF-AOP-015 response actions indicated less than detectable (<1 ppm) ammonia concentrations and did not indicate further action was necessary to protect workers' safety and health from an occupational exposure limit standpoint. As a result, the area was released from restricted access and work was allowed to resume.

13. What Should Have Happened?

PAM shouldn't have indicated increased ammonia concentrations or activated the action-level alarm (≥ 12 ppm ammonia) unless changing tank vapor conditions were present (which includes the COPC sentinel indicator of ammonia).

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

No impacts to facility safety status, operational capabilities, or facility reliability occurred.

The work crew was instructed to leave the work area and access was restricted for approximately 5 $^{1/2}$ hours until TF-AOP-015 response actions were complete. Delays in completion of the WO# 1215709 work activities were encountered.

15. Problem Statements (Who, What, Where, When, Consequence/Impact):

At 0820 hours on 10/28/2025, Apollo Construction was performing WO# 1215709 work area preparations around 241-S-109 when a laborers' Ventis® Pro PAM action-level alarm activated; resulting in 241-S Farm access restriction and WO# 1215709 work delays.

16. Facts/Timeline:	17. Issues/Gaps	18. Causes (Why?) (Include Cause Code)	19. Safe Stable/Immediate Actions	20. Extent of Condition	21. Short Term Action(s)	22. Corrective Action(s)
10/28/2025 [0820 hours] Fact: Field Response and Notification of Ventis® Pro PAM Action-level Alarm Near 241-S-109	N/A	N/A	Following the Ventis® Pro PAM action-level alarm, the Apollo Construction FWS had work crew exit 241-S Farm and notified the CSM.	N/A	N/A	N/A
10/28/2025 [0832 hours] Fact: Precautionary Medical Surveillance by Site Occupational Medical Contractor (SOMC)	N/A	N/A	N/A	N/A	The CSM and FWS offered precautionary medical surveillance to the four workers within the 241-S-109 area when the PAM action-level alarm initiated. The Apollo laborer wearing the alarming PAM elected to receive precautionary medical surveillance from the SOMC. Individual was evaluated and released to return-to-work with no restrictions at 1031 hours.	N/A
10/28/2025 [0908 hours] Fact: TF-AOP-015 Entry	N/A	N/A	CSM dispatches Nuclear Chemical Operators (NCOs) to post restricted access boundary at S-Farm entry points. The restricted access boundary was down-posted/ normal S-Farm access restored at 1257 hours.	N/A	N/A	N/A
10/28/2025 [0922 to 1007 hours] Fact: TF-AOP-015 Response Actions	N/A	N/A	N/A	N/A	Industrial Hygiene Technicians (IHTs) performed TF-AOP-015 response actions around the affected area including, but not limited to: - S-109 south hatchway, - job-boxes, - S-109 breather filter - S-109 exclusion zone (EZ). All DRI monitoring results were non-detectable (<1 ppm ammonia) and below anticipated background levels.	N/A

10/28/2025 [0951 to 1519 hours] Fact: Inspection of the alarming Ventis® Pro (005223/ SN 2203377-229)	Ventis® Pro (005223/ SN 2203377-229) Ammonia Sensor Performance/ Sensitivity	**Cause Code:** C Node: A2B6C01 *[Defective or failed part]* B Node: B6 *[Defective, Failed or Contaminated]* A Node: A2 *[Equipment/Material Problem]*	N/A	N/A	Industrial Hygienist Equipment SME/ Program Owner evaluated calibration and bump test records, alarm/data logs, and performed physical inspection of the alarming Ventis® Pro (005223/ SN 2203377-229). Alarm logs indicated two previous atypical sensor behavior events that resulted in instrumentation alarm. The PAM exhibited abnormal sensor response when the inlet was temporarily covered. The device also displayed positive readings in clean air environments that are not consistent with normal operating parameters. It was concluded the PAM sensor exhibited increased sensitivity and reduced reliability. *Note: Further detail provided in Industrial Hygiene Equipment Investigation (IHEI) Report #00005.*	Ventis® Pro (005223/ SN 2203377-229) was removed from service for ammonia sensor replacement.
10/29/2025 Fact: Evaluation of Ventis® Pro PAMs dispatched to the temporary S-Farm issuance station	Ventis® Pro Ammonia Sensor Performance/ Sensitivity	**Cause Code:** C Node: A2B6C01 *[Defective or failed part]* B Node: B6 *[Defective, Failed or Contaminated]* A Node: A2 *[Equipment/Material Problem]*	N/A	Industrial Hygienist Equipment SME/Program Owner evaluated alarm logs of all Ventis® Pro PAMs dispatched to the temporary S-Farm issuance station (~50 instruments) due to the previous sensor replacements having occurred on the same day. Multiple PAMs displayed atypical sensor behavior/ abnormal sensor response; indicating sensors were experiencing increased sensitivity not consistent with normal/ expected operating parameters.	N/A	All Ventis® Pro PAMs dispatched to the temporary S-Farm issuance station were removed from service for ammonia sensor replacement.

23. Signatures

[redacted]

INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR)

Event Title:	IHIR Number:
TF-AOP-015 Response S-109	**IHIR-00127**
	IHEI Number: **IHEI-00005**

Date:	Time:	Location:
10/28/2025	0820	241-S Farm, S-109

Event Summary and Timeline:

Event Summary:

At approximately 0820 on 10/28/2025, one Personal Ammonia Monitor (PAM) alarmed and indicated greater than 12 ppm ammonia inside the 241-S Farm around S-109. Four workers were present at the time of the PAM alarm. The workers were setting up ground cover for work near S-109 at the time of the alarm. Of the remaining three workers, one worker's PAM had elevated reading, and the remaining two workers' PAMs did not alarm or have elevated readings. All workers reported that no odors were encountered, and no symptoms were experienced. The worker with a high alarm accepted precautionary medical surveillance, all other workers declined.

Field Response Timeline:

0820 Shift Office receives call from FWS at 241-S Farm that worker had high PAM alarm above 12 ppm Ammonia.

0820 Retrieval West Operations (RWO) Industrial Hygienist (IH) receives call from Industrial Hygiene Technician (IHT) that worker had a high PAM alarm above 12 ppm Ammonia and requests the affected PAMs be brought to shift office, affected workers complete Odor/Vapor Response Cards (OVRCs), and requested workers with elevated readings complete Personal Ammonia Monitor Equipment Alarm, Issues and Concerns forms.

0822 RWO IH arrives at Central Shift Office (CSO).

0824 Production Operations (PO) Level 3 Manager arrives at CSO.

0825 RWO IH calls PO IH to request additional support for TF-AOP-015.

0825 PO Level 3 IH Manager notifies PO Shift Industrial Hygiene Technician (IHT) Supervisor of TF-AOP-015 and requests IHT support for response actions.

0828 Shift Office Event Notification (SOEN): "Entering TF-AOP-015 Response to Personal Ammonia Monitor Alarm at S-Farm. Exit S-Farm in an orderly fashion. Access Restricted to S-Farm."

0830 PO IH arrives at CSO.

0832 RWO IH calls FWS and offers precautionary medical surveillance to all affected workers at Site Occupational Medical Contractor (SOMC). Affected worker with high alarm accepted precautionary medical surveillance and proceeds to SOMC. RWO IH requests FWS and remaining affected workers report to CSO to complete Odor Response Cards

0834 PO IH Checks DFAS for 0815 at the approximate time of the high alarm.

0837 PO IH Attempted to check DFAS, however system weather data did not load. Meteorological Station data reported mixing height of 140 meters at 0600.

0841 PO IH requests IHIR number.

0844 PO IH checks VMDS for Ammonia concentrations at approximately 0815:

- POR518: 1.025 ppm
- POR519: 0 ppm
- AN Farm: 0 ppm
- AW Farm: 0 ppm
- POR126: N/A
- POR127: N/A
- 702AZ: 0 ppm

Event Summary and Timeline:

- AP Farm: N/A
- SY Farm: 9.32 ppm

0850 PO IH contacts Hanford Weather Station to obtain meteorological information for Station #19 on 10/28/2025 @ 0815 (approximate time of Initiating Event):

- Temperature: 39°F
- Relative Humidity: 91%
- Wind Speed: 5 mph
- Wind Direction: Northwest
- Barometric Pressure: 29.65 inches of mercury (inHg) and Steady

0855 PO IH creates SWIHD survey 25-07370 for TF-AOP-015 field response.

0858 FWS reports that there were four individuals in the affected area at the time of the event initiating alarm.

0859 PO Level 3 Manager reports update to ESHQ Level 1 Manager, Deputy, and IH Level 2 Manager on the TF-AOP-015 high alarm.

0904 Central Shift Manager (CSM) updated Department of Energy (DOE) Facility Representative (Fac. Rep.) on TF-AOP-015 high alarm.

0907 FWS and affected workers arrive at CSO and begin filling out OVRCs and verifying information with RWO IH. The PAM involved in the initiating event alarm was collected and IHT began downloading data log.

0908 CSM dispatches Nuclear Chemical Operators (NCOs) to post restricted access boundary at the entry points to S-Farm.

0910 DOE Fac. Rep calls to request update from CSM.

0915 CSM receives OVRCs from three of the four affected workers. No reported odors or symptoms.

0920 RWO IH briefs IHT:

- IHSP-TI-MULTI-TF-AOP-015: Action Limits, work area, and potential sources.
- RPF-TF-AOP-015: Task, minimum Respiratory Protective Equipment (RPE) required, and voluntary upgrade options.

0922 Response team enroute to affected area.

0922 Event Investigator calls CSM to request update on TF-AOP-015 and report Investigation Report number: EIR-2026-005.

0930 CSM calls to report update to DOE Fac. Rep.

0951 IH Instrument Specialist calls PO IH to report initial findings from event initiating PAM data log and gathering information on the events leading up to the alarm and the conditions of the affected area.

0951-0955 IH Instrument Specialist received event initiating PAM to review sensor behavior and any potential issues with physical instrument.

1007 RWO IH calls PO IH to report IHT has completed sweeps of the affected area and all monitoring results were below background level (< 1 ppm). Areas surveyed included:

- All areas surrounding S-109 South Hatchway and job-boxes.
- Breather Filter and surrounding Exclusion Zone directly north of the work area, pausing at the breather filter.

RWO IH and IHT enroute to conduct post-use function check to validate instrument readings.

1035 IHT reports to RWO IH that post-use function checks were within range and instrument readings are validated.

1111 CSM completes response actions, and requests Area Day Manager (ADM) to remove Restricted Access postings to S-Farm.

1304 Shift Office Event Notification (SOEN): “Response actions for the TF-AOP-015 event have been completed and the results are at or below back-ground levels. Exited TF-AOP-015 Response to Personal Ammonia Monitor Alarm. Normal access to S-Farm is restored.”

Event Summary and Timeline:

Field Response Timeline Acronyms:

%	Percent	IH	Industrial Hygienist/Industrial Hygiene
°F	degrees Fahrenheit	IHSP	Industrial Hygiene Sample Plan
AL	Action Limit	IHT	Industrial Hygiene Technician
AOP	Abnormal Operating Procedure	mph	miles per hour
CA	Contamination Area	OE	Operations Engineer
CSM	Central Shift Manager	OVRC	Odor/Vapor Response Card
CSO	Central Shift Office	PAM	Personal Ammonia Monitor
DOE	Department of Energy	PO	Production Operations
DRI	direct reading instrument	ppm	parts per million
ESH&Q	Environmental, Safety, Health, & Quality	RBA	Radiological Buffer Area
FWS	Field Work Supervisor	SOEN	Shift Office Event Notification

Sampling/Monitoring Results:

Direct Reading Instrument Monitoring Results- Field Response:

Response Monitoring performed in and around Affected Area (#25-07370):

- Comments by Responding IHT- "IHT… reported to central shift office for AOP-015 response to Ventis alarm. IHT received a map from odor response card and IHSP from responding IH… along with instructions for monitoring. Peak reading on PAM was 28ppm that would initiate required respiratory and IHT declined to voluntarily upgrade to SCBA. IHT monitored around S109 in S Farm all readings were below detectable limits. IHT did not notice any unusual odors while monitoring the area. IHT exited the change tent and notified IH of monitoring results."

  Peak Readings During Response:

Location	Ammonia
Affected Work Area (see Figure 1)	< 1 ppm
Exclusion Zone/Breather filter	< 1 ppm

Sampling/Monitoring Results:

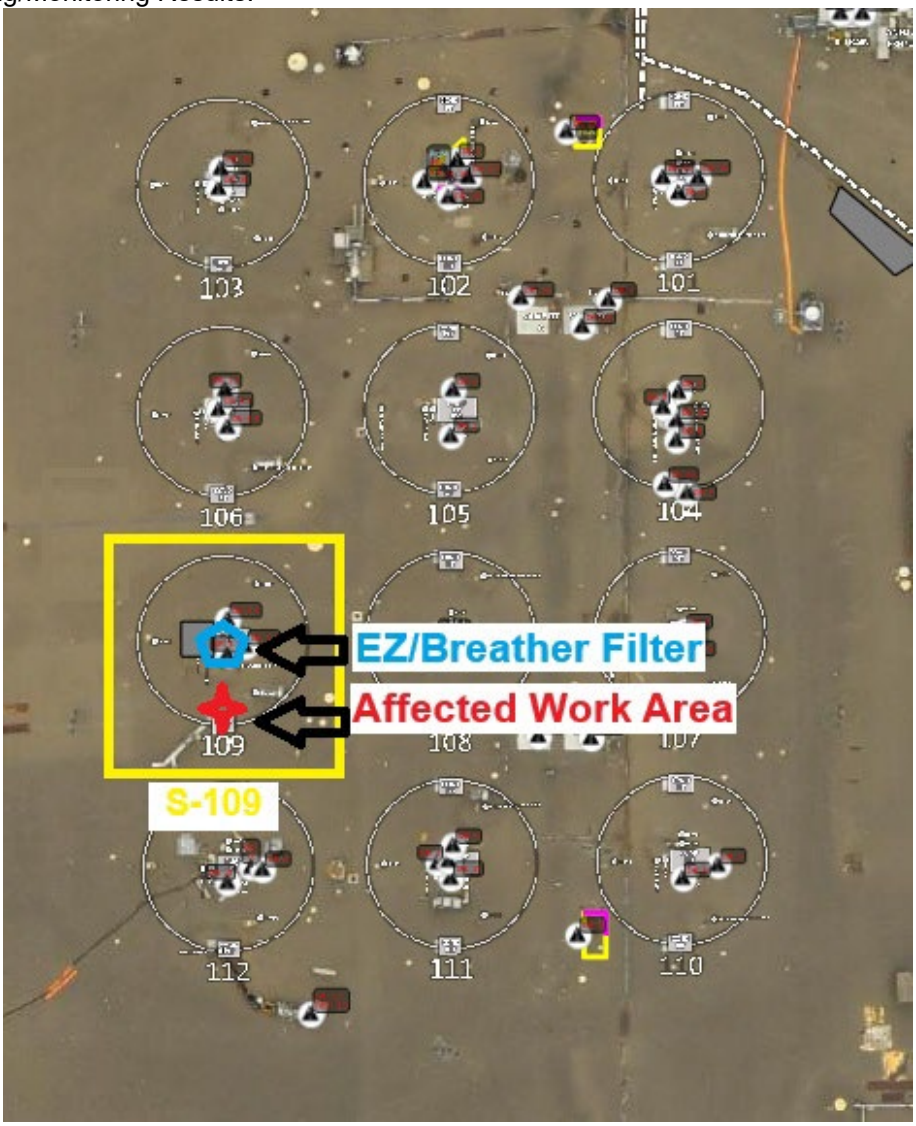


Figure 1. Affected Work Area Map (S-Farm)

Direct Reading Instrument Monitoring Results- PAMs:

Event Initiating PAM #005226 (Ventis Pro5- Serial No. 2203377-229, Sensor 23112M7006, Gas Type- Ammonia)

Type : Ventis Pro5 Multi-Gas Monitor
Serial Number : 2203377-229
Part Number : VP5-06001000111
Software Version : 4.30.45.0
Location Last Docked : 2750E A-121

Latest Alarm Events

Choose Columns | Print

History	Serial Number	Latest Alarm Time	Type	Duration	Peak Reading
History	23112M7006	10/28/2025 9:06:17 AM	Ammonia	00:01:05	26
History	21090N1213	1/24/2024 6:39:43 AM	Ammonia	00:00:03	6

Showing 1 to 2 of 2 entries

Figure 2. Event Initiating PAM #005226 Alarm Events Report

Sampling/Monitoring Results:

Leading up to the initiating event at approximately 08:09:58 AM, where readings (10 second average) spiked to 68 ppm, readings were 0 ppm. A second peak reading of 8 ppm occurred at approximately 09:06:21 AM and continued to rise to a peak of 18 ppm at approximately 09:06:41 AM before gradually dropping back down at 2 ppm by 09:10:10 AM. Referring to Figure 2, the first lasted approximately one (1) minute and 20 seconds (08:09:58 AM to 08:11:18 AM) until dropping below 6 ppm and the second lasted one (1) minute and 10 seconds (09:06:21 AM to 09:07:31 AM).

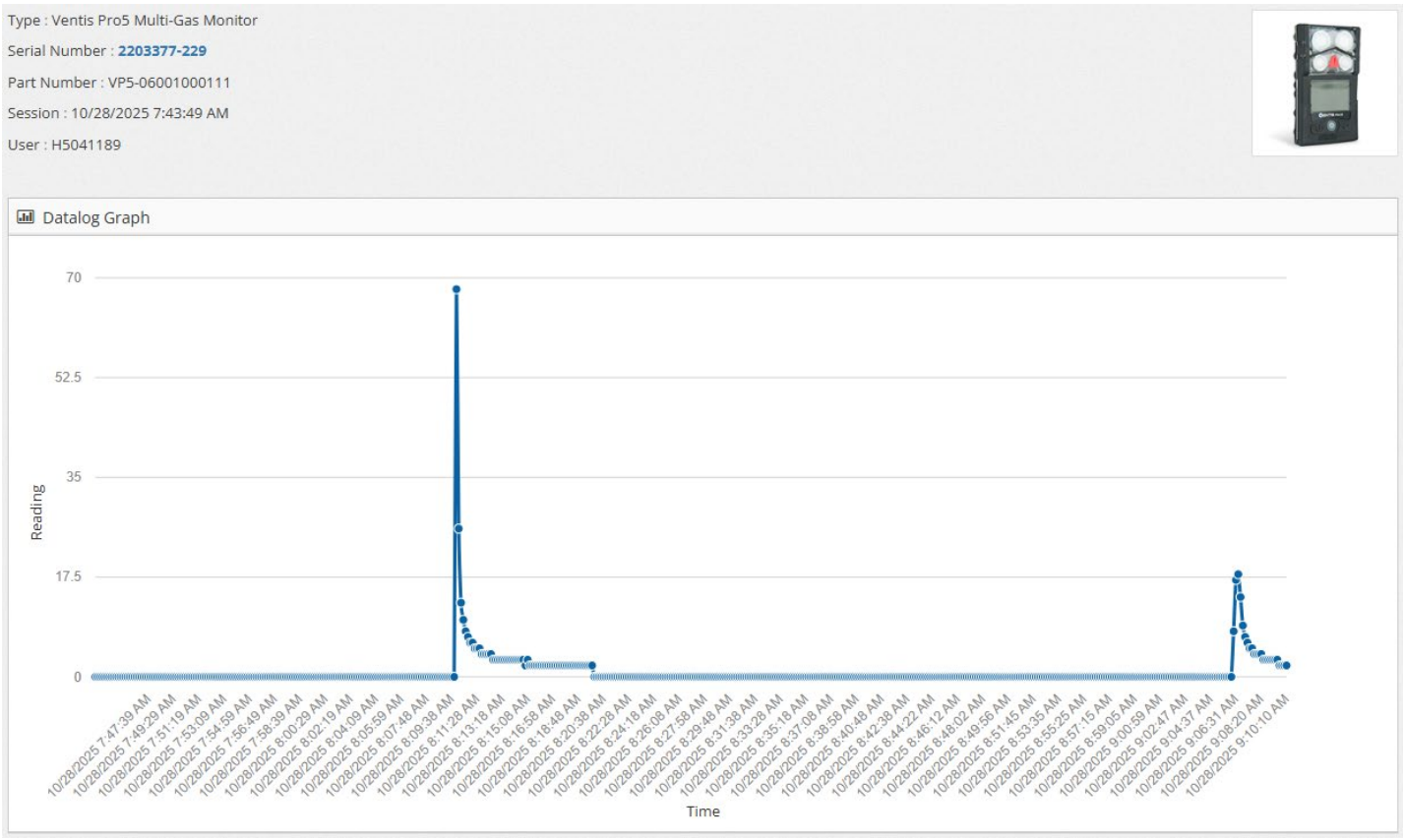


Figure 3. Event Initiating PAM #005226 Datalog Graph 10/28/2025 (10 Second Average)

SWIHD References:

Event Response SWIHD DRI Survey:

- #25-07370 “AOP-015 Response S Farm”.

Additional Information:

At the time of the Initiating Event, the Affected Workers were not working intrusively in a tank vapor containing system (in accordance with the definitions in TF-ESHQ-IH-C-48, current revision), and the second alarm event occurred when workers entered the 274-AW Central Shift Office.

Response Monitoring:

The PAM is utilized as the primary personal monitoring device during work activities where Tank Vapor exposure is not anticipated [Tank Vapor Work Category (WC) 1 & WC-2]. To enhance the safety of Hanford Tank Farm workers, IH has established a Response Limit (RL) for use with PAMs, set at 6 ppm ammonia. The RL is a

Additional Information:
conservative and timely indicator of potentially changing conditions in Tank Farm gas/vapor concentrations (e.g., fugitive emission points, exhauster plume to ground interaction).

At the time of the Initiating Event, all four Affected Workers were wearing a PAM. These Affected Workers had just entered 241-S Farm to perform work.

During the TF-AOP-015 response actions, monitoring for Tank Waste Chemical Vapors was performed:

> Ammonia is used as a sentinel Tank Waste Chemical Vapor for chemicals of potential concern (COPC). Each Hanford production process had different feedstock chemicals and generated different waste streams. Hanford production processes were also separated temporally, with different processes being performed at different times in the history of Hanford production (1943 – 1986). Some chemicals are common to all processes/waste streams (e.g., nitric acid), while others are specific to particular processes/waste streams. Some in-tank waste treatment processes (e.g., neutralization and de-nitrification) used the same chemical feed stocks (e.g., sodium hydroxide solution) in most, if not all Tank Farms. The chemistry and radiochemistry of these compounds result in waste stream similarities across all tank farms. Because nitric acid was common to nearly all processes that generated tank waste, and the most common result of those processes was reduction of nitrate ion to ammonia during the dissolution (oxidation) of irradiated fuel, ammonia is the most common COPC and is found in all tanks. It is logical to choose ammonia for the sentinel as it is a byproduct of all production processes and found in all tanks.
>
> Therefore, when monitoring Tank Waste Chemical Vapors/COPCs, DRI equipped with an ammonia sensor is utilized at a minimum. Refer to TOC-IH-59014 for more information.

Response Monitoring References:

- WRPS (2024). TOC-IH-59014. *Tank Waste Chemical Vapor: Evaluation and Management Strategy*.

Meteorological Conditions:

Meteorological conditions affect the dispersion of chemical contaminants in the atmosphere. The term dispersion is used to describe the evolution of the chemical contaminant from the point of origin through the atmosphere by way of dispersion. Essentially, how the contaminant is transported by the wind, perpendicular to the wind's direction, both vertically and horizontally. The aspects of meteorological variables that affect dispersion include wind speed, wind direction, the atmospheric stability (e.g., turbulence), and the atmosphere mixing height (Casal, 2008).

Wind is the natural motion of air, influenced by the atmospheric pressure and the temperature gradient of the ground. The concentrations of contaminants in a plume are inversely proportional to the wind speed (Casal, 2008).

Atmospheric stability is the tendency of the atmosphere to increase or decrease the vertical displacement of air through mode of force such as the wind. This function is closely related to the ability of the atmosphere to disperse pollutants. Atmospheric stability cannot be measured directly. Rather, it is generally estimated based on the wind velocity and the solar radiation (Casal, 2008). The stability is also impacted by the slope of the temperature relative to altitude (environmental lapse rate) (Cushman-Roisin, 2012). An unstable atmosphere is characterized by significant vertical displacement of air, a negative vertical temperature gradient (the

Additional Information:
temperature decreases with height), along with frequent fluctuations in wind direction and strong solar radiation. A stable atmosphere on the other hand, has low turbulence, positive vertical temperature (temperature increases with height), little fluctuation in the wind direction, and limited solar radiation (Casal, 2008). The National Oceanic and Atmospheric Administration (NOAA) Pasquill stability classes are denoted by seven letters ranging from A (extremely unstable conditions) to G (extremely stable conditions) (NOAA, n.d.).

The atmospheric mixing height is the height above the ground level (surface) throughout which a contaminant is dispersed. During times of temperature inversion (typically nighttime with clear skies), the mixing height goes to zero and the contaminant dispersion is minimal. At Hanford, waste disturbing activities conducted during a capping inversion (typical of sunny, highly unstable morning conditions with stable conditions remaining aloft) or with highly stable to unstable, low wind conditions (nighttime including surface inversion conditions), there exists the potential for ammonia, nitrous oxide, furan, formaldehyde, and Nitrosamines group to reach ground at or above the Occupational Exposure Limit (OEL) concentration value (dependent upon the Tank Farm). It should be noted that a capping inversion is typically a brief occurrence that exists approximately 2% of the time at the Hanford Site (WRPS, 2024).

Meteorological Conditions References:

- Casal, J. (2008). Chapter 6 Atmospheric dispersion of toxic or flammable clouds. *Industrial Safety Series, 8, 195-248.* Retrieved from https://doi.org/10.1016/S0921-9110(08)80008-0
- Cushman-Roisin, B. (2012). *Environmental Transport and Fate- Smokestack Plumes (lecture slides).* Dartmouth College: Thayer School of Engineering. Retrieved from https://cushman.host.dartmouth.edu/courses/engs43/Smokestack-plumes.pdf
- National Oceanic and Atmospheric Administration (n.d.). *Air Resource Laboratory Ready Tools: Pasquill Stability Classes.* Retrieved from https://www.ready.noaa.gov/READYpgclass.php
- WRPS (2024). TOC-IH-59014. *Tank Waste Chemical Vapor: Evaluation and Management Strategy.*

NOTE: Additional Information continued on next page.

Meteorological Conditions- Approximate Time of the Initiating Event (10/28/2025 @ 0800):

Review of the DFAS application, powered by SmartSite™, Weather Details dashboard for the approximate time of the Event:

- Wind Speed: 6.4 mph (15-minute average)
- Wind Direction: 331° (out of NorthWest)
- Mixing Height: 140 feet above grade
- Stability Class: E (slightly stable conditions)

Refer to Figures 4 and 5.

Additional Information:

Figure 4. 200-West Area (with 241-SY Farm projected plume model) at 0809 10/28/2025 from Data Fusion and Advisory System (DFAS) application, powered by SmartSite™ (Approximate Time of Initiating Event).

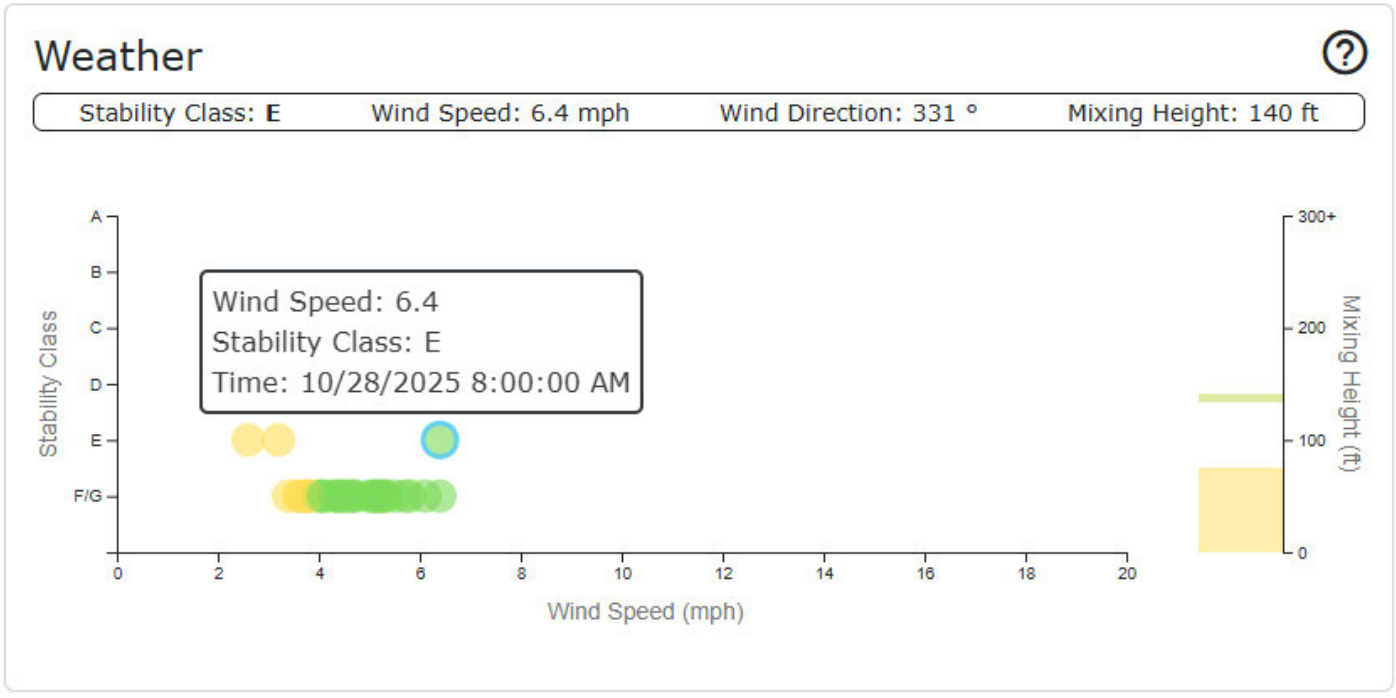


Figure 5. 241-SY Farm Weather Data from Data Fusion and Advisory System (DFAS) application, powered by SmartSite™ at 0800 10/28/2025 (Approximate Time of Initiating Event).

Additional Information:

Meteorological information from the Hanford Weather Station for Station #19 on 10/28/2025 @ 0815:

- Temperature: 39°F
- Relative Humidity: 91%
- Wind Speed: 5 mph
- Wind Direction: Northwest
- Barometric Pressure: 29.65 inches of mercury and steady
- Mixing Height: 0 feet above grade

Tank Farm Exhauster Concentrations:

The ventilation exhaust system (exhauster) plume behavior is dependent on meteorological conditions. Exhauster plumes may be bent over (stability classes A, B, C, and D) or vertical (stability classes E, F, and G). The bent over plumes are found during unstable and neutral states are further characterized by their pattern: fanning, fumigation, coning, looping, and lofting (TOC-IH-59014 Section 3.1.2.1). The most probable meteorological conditions for a ventilation exhaust system touchdown to occur is during a capping inversion. For a ventilation exhaust system "touchdown" to result in ground level exposures above action limits, the stack concentration also needs to exceed the High High Alarm limit.

Hanford Tank Waste Operations & Closure (H2C) employs a Vapor Monitoring and Detection System (VMDS) to enhance worker protection from chemical vapor compound emissions from the Hanford Site tank farms (VMDS Overview). The objective of the VMDS is to provide continuous, near real-time measurements of tank farm vapors, meteorological conditions, and the ability to assess this information for a worker protective response. The VMDS consists of chemical vapor sensors, meteorological sensors, vapor sampling technologies, and data management and evaluation software.

Memo WRPS-1904672.1, TANK FARM EXHAUST ~ CK CONCENTRATION ALARM/ ACTION LEVELS FOR AMMONIA establishes stack alarm/action set points for Tank Farm Exhausters. The alarm/action set points are based on a linear extrapolation of the Quantitative Risk Assessment (QRA) model prediction; conservatively established at the ammonia stack concentration that could result in various ammonia concentrations at an unspecified ground receptor:

- High Alarm → ammonia concentration of 2.5 ppm at an unspecified ground receptor
- High High Alarm → ammonia concentration of 5 ppm at an unspecified ground receptor

Memo WRPS-1904672.1, TANK FARM EXHAUST ~ CK CONCENTRATION ALARM/ ACTION LEVELS FOR AMMONIA:

Tank Farm	Exhauster	High Alarm	High High Alarm
241-A	POR518/POR519	160 ppm	320 ppm
241-AN	Primary		
241-AP	Primary		
241-AW	Primary	460 ppm	920 ppm
241-AX	POR126/POR127		
241-AY/AZ	702AZ		
241-SY	Primary	310 ppm	620 ppm

200-West VMDS Exhauster Ammonia Readings on 10/28/2025 (See Figure 6 and 7):

Tank Farm	Exhauster	Maximum Value
241-SY	Primary	9.93 ppm

Additional Information:

10/27/2025 11:59:59 PM 1d 10/28/2025 11:59:59 PM

Name	Description	Value	Units	Trend	Minimum	Maximum
SY241-VTP-AE-710|NH3	Ammonia Concentration	9.2139	ppm		8.053	9.9323
A241-VTP-AE-810U|NH3	Ammonia Concentration	0	ppm		0	20.467
AN241-VTP-AE-653U|NH3	Ammonia Concentration	0	ppm		0	0
AP241-VTP-AE-507I|NH3	NH3 Concentration (5ppm	Scan Off	ppm		No Data	No Data
AP241-VTP-AE-507U|NH3	NH3 Concentration (5ppm	Scan Off	ppm		No Data	No Data
AP241-VTP-AE-710|NH3	Ammonia Concentration	Unit Down	ppm		No Data	No Data
AW241-VTP-AE-653I|NH3		No Data			No Data	No Data
AW241-VTP-AE-653U|NH3	Ammonia Concentration	0	ppm		0	0
AX241-VTP-AE-710|NH3	Ammonia Concentration	Unit Down	ppm		No Data	No Data
AX241-VTP-AE-810|NH3	Ammonia Concentration	Unit Down	ppm		No Data	No Data
AZ702-VTP-AE-653U|NH3	Ammonia Concentration	7.026	ppm		0	13.109

Figure 6. OSIsoft Pi Vision VMDS Ammonia Concentrations for 10/27/2025 @ 11:59:59 PM through 10/28/2025 @ 11:59:59) PM.

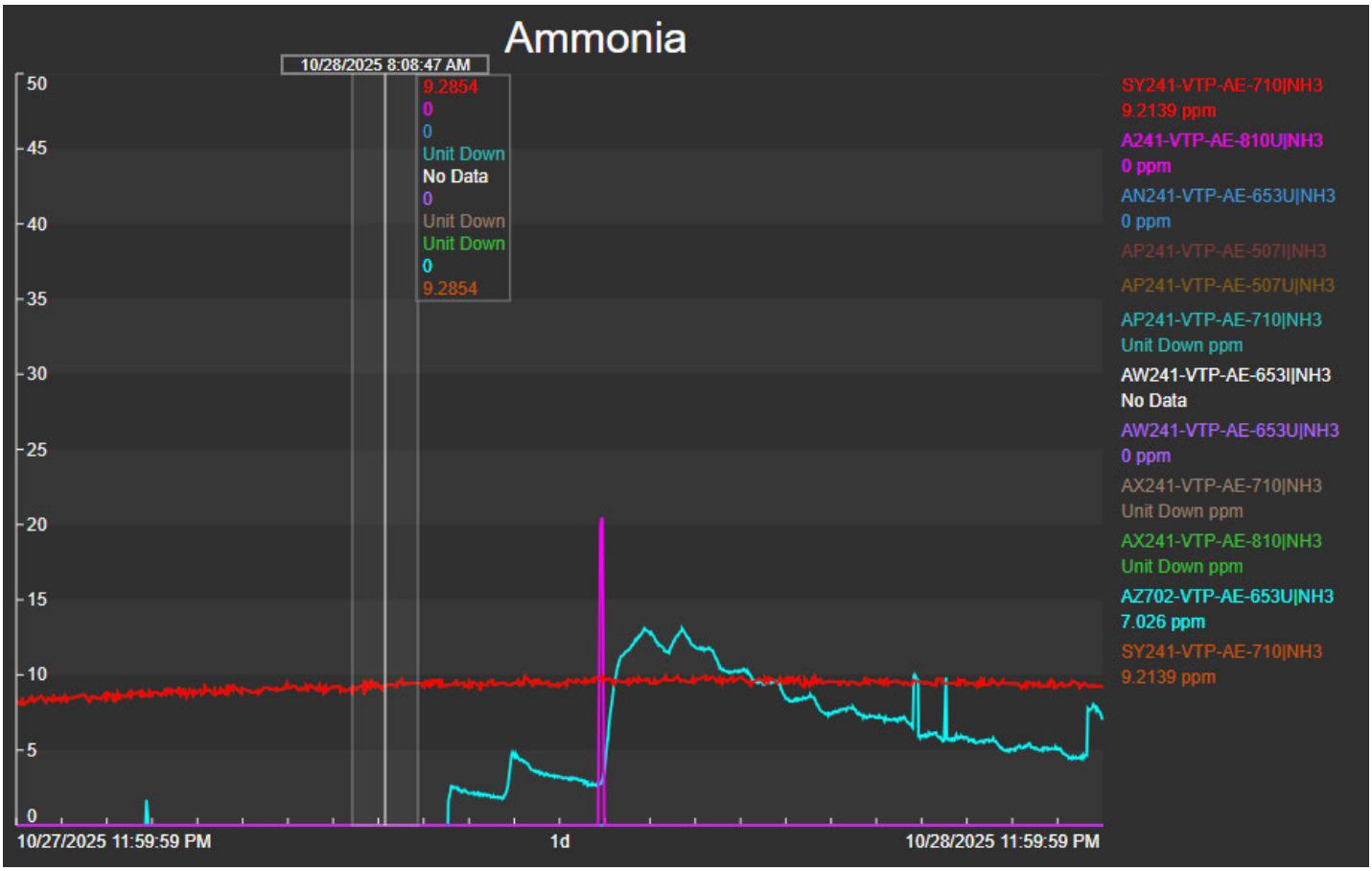


Figure 7. OSIsoft Pi Vision VMDS Ammonia Concentrations for 10/27/2025 @ 11:59:59 PM through 10/28/2025 @ 11:59:59 PM.

Additional Information:

When stack monitoring via the VMDS is unavailable, and ventilation is operating, IH will conduct alternate monitoring for ammonia. Report TOC-IH-RPT-50042, Ammonia Monitoring- Rate of Change of Tank Vapor Source Concentration and Monitoring Frequency, recommends measuring the exhaust ventilation systems once every 4 days. Conservatively, stack readings are required once per calendar day when VMDS is unavailable. Additionally, monitoring is performed in accordance with ARP-T-041-00002 to react to specific alarms. The VMDS alternate monitoring readings are obtained in accordance with TF-OPS-IHT-037.

Tank Farm Exhauster Concentration References:

- AVEVA™ PI Vision™. VMDS Overview.
- H2C (2025). ARP-T-041-00002. *Tank Farm Alarm Response Procedure*.
- H2C (2025). TF-OPS-IHT-037. IHT Ammonia Monitoring on Exhausters.
- SmartSite™. Data Fusion & Advisory System. *Hanford Multi-Farm View*.
- WRPS (2019). Memo WRPS-1904672.1. *Interoffice Memorandum: Tank Farm Exhaust Stack Concentration Alarm/Action Levels for Ammonia*.
- WRPS (2021). TOC-IH-RPT-50042. *Ammonia Monitoring – Rate of Change of Tank Vapor Source Concentration and Monitoring Frequency*.
- WRPS (2024). TOC-IH-59014. *Tank Waste Chemical Vapors: Evaluation and Management Strategy*.

Additional Information Acronyms:

%	Percent	NOAA	National Oceanic and Atmospheric Administration
°	degrees	OEL	Occupational Exposure Limit
°F	degrees Fahrenheit	PAM	Personal Ammonia Monitor
COPC	Chemicals of Potential Concern	ppm	parts per million
DFAS	Data Fusion & Advisory System	QRA	Quantitative Risk Assessment
DRI	direct reading instrument	RL	Response Limit
H2C	Hanford Tank Waste Operations & Closure	VMDS	Vapor Monitoring & Detection System
IH	Industrial Hygiene	WC	Tank Vapor Work Category
mph	miles per hour	WRPS	Washington River Protection Solutions

Recommendations/Conclusions:

Recommendations:

A review of the data log for the Event Initiating PAM #005226 in IHEI-00005 concluded atypical alarm response at approximately 09:06:41 AM inside the Central Shift Office while being returned to a checkout station. It was further concluded that the sensor behavior during inspection may have been a result of increased sensor sensitivity. As a result, it is recommended that the instrument sensor be replaced.

Conclusions:

Review of the DFAS application, powered by SmartSite™, Weather Details dashboard and VMDS exhauster ammonia readings for the approximate time of the Event, indicate the cause of the Personal Ammonia Monitor alarm is unlikely to be from Tank Farm Exhauster emissions. The atmospheric stability at the time of the event was reported “slightly stable” conditions and the mixing height was 140 feet above grade. These atmospheric conditions typically do not result in ground level exposures from the exhausters. Additionally, VMDS exhauster

Recommendations/Conclusions:

ammonia readings for the approximate time of the Event were below levels that could result in ground level exposures above ALs.

Hanford Tank Waste Operations & Closure (H2C) Industrial Hygiene Department has established a conservative, reasonable, and data-derived response limit of 6 ppm 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.

During response actions, monitoring was performed around the work area of the imitating event near S-109 South Hatchway and around the secured hatchway. Continuous monitoring was then performed inside the Exclusion Zone (EZ) to the direct north or the work area, pausing at the breather filter. Additionally, extra time was spent searching for potential sources, pausing over job boxes nearby. Monitoring results did not indicate further action was necessary to protect workers' safety and health. As a result, the area was released from restricted access and work was allowed to continue.

Others:

No symptoms or Odors were reported, and the Affected Workers that received precautionary medical surveillance was released with no restrictions. All other Affected Workers declined precautionary medical surveillance.

Associated Documents:

iCAS Number: N/A EIR Number: EIR-2026-005

[redacted]

Washington River Protection Solutions

INDUSTRIAL HYGIENE EQUIPMENT INVESTIGATION (IHEI)

Event Title:	IHEI Number:00005
AOP-015 S Farm	IHIR Number:0000127

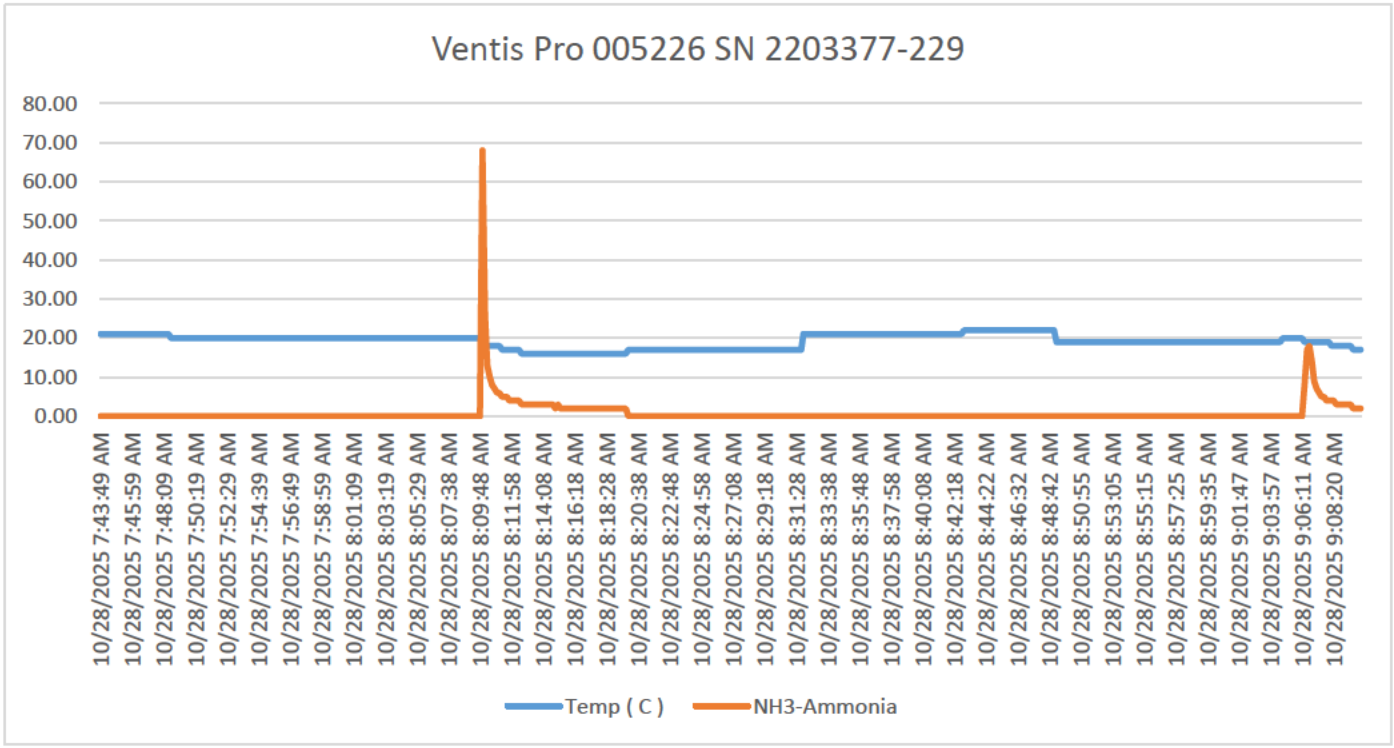
Date: 10/28/2025	Time: 8:09:52 AM	Location: S Farm

Device Information:

WRPS ID: 005226 SN: 2203377-229

Last Calibration:	Last Bump:
10/6/2025 Result: Passed	10/28/2025 Result: Passed

Event Data Log:



Peak readings:

Time	Duration	Peak Reading
10/28/2025 8:09:52 AM	00:01:21	107
10/28/2025 9:06:17 AM	00:01:05	26

Recommendations/Conclusions:

A comprehensive assessment was undertaken to evaluate the operational performance of the Ventis Pro 5 instrument. This assessment included an in-depth review of the instrument's full span reserve, analysis of its alarm and data logs, examination of its calibration and bump test records and physical inspection.

The instrument successfully passed its most recent calibration on October 6, 2025. Additionally, a bump test was performed on October 28, 2025, prior to going into the field.

The worker utilizing the instrument reported that the instrument alarmed while accessing a job box inside S Farm, recalling a concentration reading of 28 ppm at the time of the alarm event.

A review of the alarm logs revealed two significant events. The first occurred at 8:09 AM while the device was inside S Farm, where a peak concentration of 107 ppm was recorded. This elevated reading remained steady for a duration of one minute and twenty-one seconds before a rapid decrease to 0 ppm was observed. The second alarm was logged at 9:06 AM, with the instrument recording a peak concentration of 26 ppm sustained for one minute and five seconds while being returned to a checkout station known to maintain a clean air environment. This is atypical behavior.

To further investigate, a thorough physical inspection of the Ventis Pro 5 detector was performed. The inspection focused on identifying any physical damage, wear, or configuration anomalies that could have influenced the device's performance. No visible indicators of damage or improper configuration were detected during this process. However, the instrument exhibited abnormal sensor response when the inlet was temporarily covered for a few seconds. The device displayed positive readings up to 3 ppm, which is not consistent with normal operating parameters.

Due to alarming in a clean air environment, as well as the observed sensor behavior during inspection, it is concluded that the sensor may be experiencing increased sensitivity. This condition indicates a reduced reliability, and it is recommended that the affected sensor be replaced.

Other: NA

Associated Reports:

iCAS Number: NA PAM AIC Number: NA

[redacted]

ODOR/VAPOR RESPONSE CARD

1. Complete below information and map *(Page 1)*.

- Date and time of event: 10/28/25 0830
- Check Applicable:
  ☐ Odor ☐ Ammonia Alarm *(6 ppm)* ☐ Ammonia Alarm *(12 ppm)* ☒ Alarm *(other - describe)*: O
- Your name and the work you were performing: [redacted] moving plastic/rubber matting
- Other Work Underway? Describe: N/A
- Location of event *(mark area on map and wind direction)*: S Farm
- Name(s) of others in or near the affected area: [redacted]
- Was Industrial Hygiene present, who? N/A
- Describe the odor:
  ☐ Sweet ☐ Sour ☐ Smoky ☐ Septic/Sewer ☐ Musty ☐ Rotten
  ☐ Metallic ☐ Onion ☐ Earthy ☐ Ammonia ☐ Citrus ☐ Solvent
  ☒ Other *(describe)*: None
- Is source known/likely? Describe:
- Your symptoms? ☒ None
  ☐ Headache ☐ Dizziness ☐ Nausea ☐ Cough ☐ Fatigue
  ☐ Weakness ☐ Sore Throat ☐ Difficulty Breathing ☐ Eye Irritation ☐ Rash
  ☐ Itch ☐ Tingling ☐ Numbness ☐ Taste
  ☐ Other *(describe)*:

2. Provide this completed card *(Page 1 & 2)* to Supervisor, Industrial Hygiene, your Union Safety Representative or the CSM.
If received by Supervisor/IH/U-SR, Supervisor/IH/U-SR will ensure card is provided to the CSM.

[redacted]

ODOR/VAPOR RESPONSE CARD

Instructions:

1. Notify Immediate Supervisor.
2. Contact Central Shift Manager (CSM), at (509) 373-2689.
3. Complete both pages of this form and include as many details as possible, including:
    a. Approximate location, see map at right;
    b. Wind direction, speed and description, such as stable or gusty wind;
    c. Environmental conditions, such as hot, cold, windy, rainy;
    d. Other work or contractors in the area;
    e. Anything else you think is relevant.
4. Provide the completed card to your Supervisor*, Industrial Hygiene*, Union Safety Representative* or the CSM.

* If received by Supervisor, IH, or Union Safety Representative, the Supervisor/IH/ Union-SR will ensure card it is provided to the CSM.

[redacted]

ODOR/VAPOR RESPONSE CARD

1. Complete below information and map *(Page 1)*.

- Date and time of event: 10-28-25 8:30 AM
- Check Applicable:
  - ☐ Odor ☐ Ammonia Alarm *(6 ppm)* ☐ Ammonia Alarm *(12 ppm)* ☐ Alarm *(other - describe)*: 4 PPM
- Your name and the work you were performing: [redacted] I was moving Plastic
- Other Work Underway? Describe: We Just got in the Farm. opened Job box and moved Plastic
- Location of event *(mark area on map and wind direction)*: S Farm West Change Trailer
- Name(s) of others in or near the affected area: [redacted]
- Was Industrial Hygiene present, who? No
- Describe the odor:
  - ☐ Sweet ☐ Sour ☐ Smoky ☐ Septic/Sewer ☐ Musty ☐ Rotten
  - ☐ Metallic ☐ Onion ☐ Earthy ☐ Ammonia ☐ Citrus ☐ Solvent
  - ☐ Other *(describe)*: No odor
- Is source known/likely? Describe: N/A
- Your symptoms? ☒ None
  - ☐ Headache ☐ Dizziness ☐ Nausea ☐ Cough ☐ Fatigue
  - ☐ Weakness ☐ Sore Throat ☐ Difficulty Breathing ☐ Eye Irritation ☐ Rash
  - ☐ Itch ☐ Tingling ☐ Numbness ☐ Taste
  - ☐ Other *(describe)*:

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[redacted]

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[redacted]

ODOR/VAPOR RESPONSE CARD

1. Complete below information and map *(Page 1)*.

- Date and time of event: 10-28-25 8:30
- Check Applicable:
  - ☐ Odor ☐ Ammonia Alarm *(6 ppm)* ☐ Ammonia Alarm *(12 ppm)* ☐ Alarm *(other - describe)*: 0 ppm
- Your name and the work you were performing: [redacted] fixing plastic & rubber matting
- Other Work Underway? Describe: Ø
- Location of event *(mark area on map and wind direction)*: S farm
- Name(s) of others in or near the affected area: [redacted]
- Was Industrial Hygiene present, who? NO
- Describe the odor:
  - ☐ Sweet ☐ Sour ☐ Smoky ☐ Septic/Sewer ☐ Musty ☐ Rotten
  - ☐ Metallic ☐ Onion ☐ Earthy ☐ Ammonia ☐ Citrus ☐ Solvent
  - ☑ Other *(describe)*: Ø
- Is source known/likely? Describe: N/A
- Your symptoms? ☒ None
  - ☐ Headache ☐ Dizziness ☐ Nausea ☐ Cough ☐ Fatigue
  - ☐ Weakness ☐ Sore Throat ☐ Difficulty Breathing ☐ Eye Irritation ☐ Rash
  - ☐ Itch ☐ Tingling ☐ Numbness ☐ Taste
  - ☐ Other *(describe)*:

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[redacted]

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    d. Other work or contractors in the area;
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[redacted]

ODOR/VAPOR RESPONSE CARD

1. Complete below information and map *(Page 1)*.

- Date and time of event: 10/28/25 830 Am
- Check Applicable:
  - ☐ Odor ☐ Ammonia Alarm *(6 ppm)* ☐ Ammonia Alarm *(12 ppm)* ☑ Alarm *(other - describe)*: 28ppm
- Your name and the work you were performing: [redacted] getting in job box setting up table
- Other Work Underway? Describe:
- Location of event *(mark area on map and wind direction)*: S farm
- Name(s) o[redacted]
- Was Industrial Hygiene present, who? [redacted]
- Describe the odor:
  - ☐ Sweet ☐ Sour ☐ Smoky ☐ Septic/Sewer ☐ Musty ☐ Rotten
  - ☐ Metallic ☐ Onion ☐ Earthy ☐ Ammonia ☐ Citrus ☐ Solvent
  - ☐ Other *(describe)*:
- Is source known/likely? Describe:
- Your symptoms? ☒ None
  - ☐ Headache ☐ Dizziness ☐ Nausea ☐ Cough ☐ Fatigue
  - ☐ Weakness ☐ Sore Throat ☐ Difficulty Breathing ☐ Eye Irritation ☐ Rash
  - ☐ Itch ☐ Tingling ☐ Numbness ☐ Taste
  - ☐ Other *(describe)*:

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   a. Approximate location, see map at right;
   b. Wind direction, speed and description, such as stable or gusty wind;
   c. Environmental conditions, such as hot, cold, windy, rainy;
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calm wind, cold

Charge trailer

[redacted]