

Washington River Protection Solutions
EVENT SUMMARY

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:

1. Project: Maintenance 2. Report Date: 09/11/2024
3. Investigation Title: C-67 Response between 274AW and AW Farm
4. Investigation Report Number: EIR-2024-071
5. Responsible Manager: [REDACTED]
6. Event Investigator: [REDACTED]
7. Area / Building / Location: 200E/Between 274-AW and 241-AW Farm
8. Date and Approximate Time of Event: Date: 09/09/2024 Time (military): 0730 Hours
9. Associated Action Request (AR) Number: WRPS-AR-2024-2722
10. Associated Occurrence Report Number (if applicable): N/A
11. Event Investigation Meeting Held: Yes [] or No [X] Date: Time (military):

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

Two A/AN/AX/AY/AZ Farm Maintenance Electricians were driving back to their office (MO-577) in a government vehicle after completion of a job in 702-AZ.

13. Personnel Involved: (Job positions, number of personnel, identify any support organizations or subcontractors)

- 2 Electricians

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

On 09/11/2024, at approximately 0715 hours, two A/AN/AX/AY/AZ Farm Maintenance Electricians completed their walkdown of the lighting in 702-AZ per approved Skill-of-the-Craft activities. After completion of the walkdown, Electricians got into a government vehicle and began driving to their office (MO-577). The windows were rolled down on the vehicle while driving.

At approximately 0730 hours, the Electricians reported to the A/AN/AX/AY/AZ Farm Maintenance Manager they encountered a stronger than normal "sewer/sulfur" odors when driving between Canton Ave and 4th Street Loop (Refer to Figure 1 below). The two Electricians reported no symptoms and declined reporting to the onsite medical provider for precautionary medical surveillance.

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Figure 1 - Location Where Stronger Than Normal "Sewer/Sulfur" Odors Were Reported

15. Where Did It Happen: (Description of work area and working conditions. Include information on weather conditions, PPE, Postings, etc.)
Between 274-AW and 241-AW Farm.

Electricians were wearing standard street clothes and were in a work location that is not posted as a radiological controlled area. Workers were performing work activities that do not require use of respiratory protection or a personal ammonia monitor (VentisPro).

The Hanford Site Meteorological Station #32 and Data Fusion and Advisory System (DFAS) application, powered by SmartSite™, were utilized for outdoor weather details at the time odors were reported. The Hanford Site Meteorological Station #32 and DFAS dashboard indicated the following weather conditions at 0730 hours on 09/09/2024:

- . Wind Speed: 8.1 miles per hour (mph)
- . Wind Direction: 308 ° (out of Northwest)
- . Mixing Height: 140 feet above grade
- . Stability Class: F/G (stable conditions)
- . Temperature: 67 ° F
- . Barometric Pressure: 29.12 inches Hg
- . Humidity: 49%

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

Access was restricted between 274-AW and 241-AW Farm for approximately an hour.

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

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

- Central Shift Manager (CSM) initiated TFC-OPS-OPER-C-67, restricted access between 274-AW and 241-AW Farm, and issued SOEN, "Responding to stronger than normal odors per OPS-OPER-C-67 between the Central Shift Office and AW Farm. Personnel should avoid the area until response is complete."
- Production Operations Industrial Hygienist and CSM reviewed the DFAS data and determined no additional access restrictions were required.
- CSM made required TFC-OPS-OPER-C-67 notifications.
- Production Operations Shift Industrial Hygiene Technician (IHT) initiated TFC-OPS-OPER-C-67 response actions and monitoring per IHSP-POE-MULTI-TFCOPSOPERC67. The Production Operations Shift IHT reported direct-reading instrument (DRI) readings were below action levels between 274-AW and 241-AW Farm.
- Event Investigation EIR-2024-071 "C-67 Response between 274AW and AW Farm" was initiated.

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18. Compensatory Actions Taken:

None.

19. Remedial Actions Taken:

None.

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

To summarize the conclusions of IHIR-00104, "TFC-OPS-OPER-C-67 Response near 272A W, 241-AW, 274A W," although the source of odors could not be definitively identified, anecdotal reports suggest that portable toilet service was ongoing during and after the time of the event. DRI monitoring performed during odor investigation and TFC-OPS-OPER-C-67 response actions did not indicate further actions were necessary with regard to a worker safety and health occupational exposure limit standpoint. The following considerations support the IHIR-00104 conclusion:

(1) Evaluation of the weather details determined the cause of the odor source was unlikely to be resultant of Tank Farms exhauster emissions based on the wind speed, wind direction, atmospheric stability class being neutral, and atmospheric mixing height of 140 feet above grade at the time of event (Refer to Figure 2).

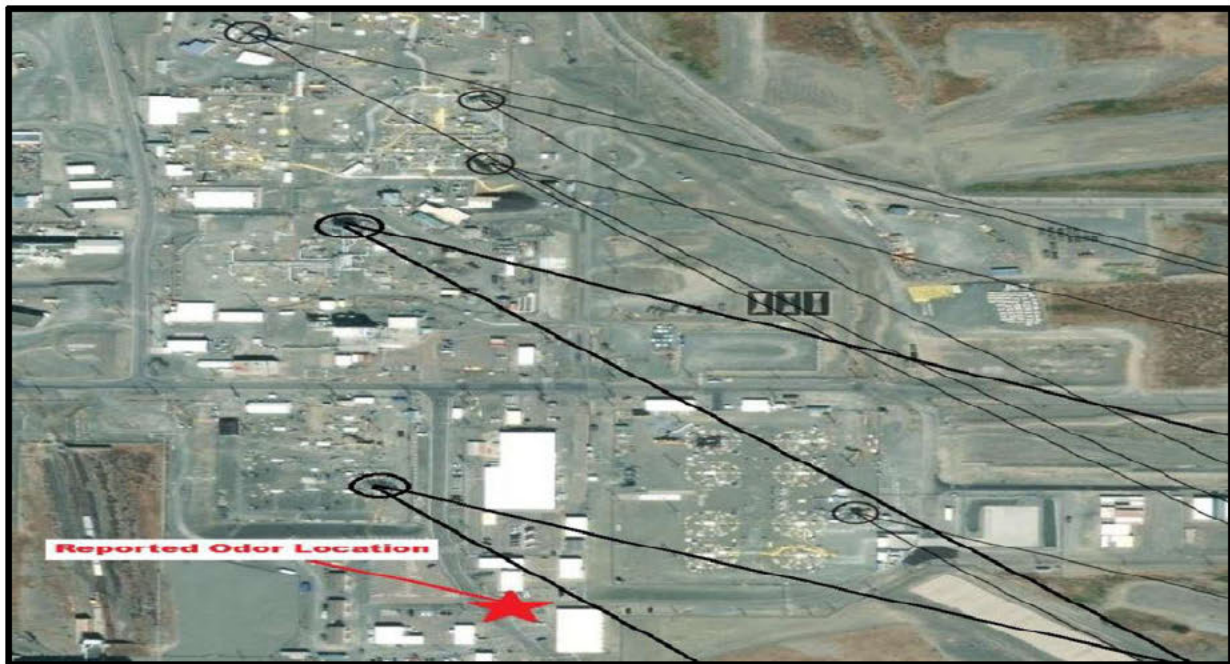


Figure 2 – DFAS PEZ Model

(2) While the odor description is inconsistent with Tank Waste Chemical Vapors, due to the proximity to the Tank Farms, monitoring for Tank Waste Chemical Vapors was still conducted during the TFC-OPS-OPER-C-67 response.

Because nitric acid was utilized in nearly all production processes that generated tank waste, and the most common byproduct of those processes was reduction of nitrate ion to ammonia during the dissolution (oxidation) of irradiated fuel, ammonia is the most prevalent chemical of potential concern (COPC) found in all tanks. Therefore, ammonia is utilized as a sentinel indicator for Tank Waste Chemical Vapor COPCs, thus direct reading instruments (DRIs) equipped with an ammonia sensor are utilized at a minimum when monitoring for tank waste chemical vapors/COPCs. Monitoring for VOCs utilizing a DRI equipped 10.6 eV photoionization detector provides further indication for Tank Waste Chemical Vapors/COPCs.

Investigative TFC-OPS-OPER-C-67 DRI monitoring indicated less than detectable concentrations for ammonia (<1 ppm) and VOCs (<0.010 ppm) utilizing a DRI equipped

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with a 10.6 eV photoionization detector. Providing further indication the odor source was unlikely to be resultant of Tank Farms exhauster emissions.

(3) Based on the "sewer" odor descriptor reported by the Affected workers, further DRI monitoring for hydrogen sulfide and sulfur dioxide was performed. The investigative TFC-OPS-OPER-C-67 DRI monitoring indicated less than detectable concentrations for hydrogen sulfide (< 0.010 ppm) and sulfur dioxide (< 1.0 ppm).

(4) The Tank Farm Exhauster's ammonia concentrations were significantly less than the high level alarm set point at the time odors were reported. Memo WRPS-1904672.1, "TANK FARM EXHAUST STACK CONCENTRATION ALARM/ACTION LEVELS FOR AMMONIA," establishes ammonia concentration stack alarm/action set points for tank farm exhausters based on the predicated ammonia concentration at unspecified ground receptors utilizing the Quantitative Risk Assessment (QRA) model. The exhauster high level alarm was established at concentrations where the predicted ground receptor ammonia concentration of 2.5 ppm (or 10% of the established Occupational Exposure Limit for ammonia) could be observed.

The exhauster high level alarm conservatively established for A Complex (excluding A farm) is 460 ppm. According to the Vapor Monitoring and Detection System (VMDS), the ammonia concentration observed at the time of event occurrence was 0.000 ppm at the 241-AP exhauster, 13.464 ppm at the 241-AW exhauster, 0.000 ppm at the POR-126 exhauster, 0.000 ppm at POR-127, and 0.000 ppm at 702-AZ Exhauster. The 241-AN exhauster VMDS ammonia readings were not reporting at the time of event occurrence; therefore, alternate readings were acquired once per calendar day in accordance with TF-OPS-IHT-037. The highest ammonia concentration observed at the 241-AN Exhauster between 09/02/2024 and 09/09/2024 was 22 ppm. Conservatively utilizing the highest ammonia concentration observed in the 241-AN exhauster, a predicted ground receptor ammonia concentration of 0.12 ppm (or 0.478% of the established Occupational Exposure Limit for ammonia) would be expected if AN, AY/AZ, AW, AP, or AX tank farm exhauster emissions were present.

The exhauster high level alarm conservatively established for A Farm is 160 ppm. According to VMDS, the ammonia concentration observed at the time of event occurrence was 3.601 ppm at the POR-519 exhauster. Conservatively utilizing the ammonia concentration observed in the POR-519 exhauster, a predicted ground receptor ammonia concentration of 0.056 ppm (or 0.225% of the established Occupational Exposure Limit for ammonia) would be expected if A tank farm exhauster emissions were present.

The predicated ammonia concentrations at unspecified ground receptors provides further justification the odor source was unlikely to be resultant of Tank Farms exhauster emissions.

(5) The 200 East, 200 West, and 600 Areas have a long history of odors that have been found to be associated with sources other than tank waste chemical vapors, such as portable restrooms/"blue rooms" or septic tank gaseous emissions. These odors are known to change odor profile across a gradient when diluted by ambient atmosphere with distance from a point source.

Additional sources of septic/sewer chemical vapors include the service vehicles that routinely service the portable restrooms/"blue rooms" and septic storage tanks. The major roadways in the 200 East, 200 West, and 600 Areas are often traveled by septic service vehicles in route to the numerous local septic storage tanks and portable restrooms/"blue rooms".

21. Positive Aspects Identified:

None.

22. Key Take Aways / Learning Opportunities:

None.

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23. Event Investigation:

- ☐ 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.

Responsible Manager Approval:

	9/12/24
Name (First, Middle Initial, Last)	Signature / Date

CAS Manager Approval:

	Digitally signed by Date: 2024.09.12 06:59:43 -07'00'
Name (First, Middle Initial, Last)	Signature / Date

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INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR)

Event Title: TFC-OPS-OPER-C-67 Response near 272AW, 241-AW, 274AW.		IHIR Number: IHIR-000104
		IHEI Number: N/A

Date: 09/09/2024	Time: 0740	Location: Between 272AW, 241-AW, and 274AW.
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Event Summary and Timeline:

Event Summary:

At approximately 0740 on September 9th 2024, 2 workers reported stronger than normal “septic/sewer, sulfur” odors in between 274AW, 241-AW and 272AW. No symptoms were reported. Both workers declined precautionary medical evaluation.

Field Response Timeline:

0750 Central Shift Manager (CSM) contacts Direct Feed Low Activity Waste (DFLAW) Industrial Hygienist (IH) requesting support for odor related field response actions.

0751 DFLAW IH contacts Production Operations (PO) Shift Industrial Hygiene Technician (IHT) Supervisor to notify that C-67 imminent.

0751 SOEN: “Responding to stronger than normal odors per OPS-OPER-C-67 between the Central Shift Office and AW Farm. Personnel should avoid the area until response is complete. CSM”

0752 DFLAW IH, Production Operations (PO) IH-1, and PO Shift IHT Supervisor arrive at Central Shift Office (CSO) and are briefed on event:

- “Sewer, sulfur” odor,
- No symptoms reported, precautionary medical evaluation declined,
- occurring in between 241-AW, 274AW, and 272AW at approximately 0740.

0755 PO IH-2 notifies DFLAW IH that portable toilet service truck has been observed driving East on 4th Avenue.

0756 PO IH-2 notifies DFLAW IH that the portable toilet service truck has been observed on 4th Avenue East of Canton Place actively pumping portable toilets.

0756 DFLAW IH informs CSM of current weather conditions from Data Fusion Advisory System (DFAS):

- Stability Class E
- Wind speed 7.8 mph from 297 degrees (from West-Northwest)
- Mixing height 140 ft above grade

0800 POE IH informs CSM of Vapor Monitoring Detection System (VMDS) Ammonia (NH₃) readings @ 0740 09/09/2024:

- POR-518 – N/A
- POR-519 – 3.601 ppm
- AN VTP - N/A
- AW VTP – 13.464 ppm
- POR-126 - 0 ppm
- POR-127- 0 ppm
- 702-AZ VTP - 0 ppm
- AP VTP – 0 ppm

0802 DFLAW IH consults TOC-IH-58956 to determine field response actions for “sewer/sulfur” odors.

0802 PO Shift IHT Supervisor requests preparation of H₂S sensor equipped Direct Reading Instrumentation (DRI).

0807 Complete Odor/Vapor Response Cards (OVRCS) arrive at CSO. Odor Description given:
“septic/sewer, rotten, sulfur” and “sour, septic/sewer, sulfur.”

0809 TFC-OPS-OPER-C-67 Attachment A Page 1 signed by DFLAW IH and CSM.

0841 PO IHT arrives at CSO with DRI.

0842 DFLAW IH provides event response briefing:

- Perform monitoring as per IHSP-POE-MULTI-TFCOPSOPERC67:
 - NH₃ – Action Limit 12 ppm
 - VOCs (10.6 eV PID) – Action Limit 2 ppm
 - H₂S – Action Limit 0.5 ppm
 - SO₂ – Action Limit 0.1 ppm
- Respiratory Protection Equipment (RPE) – voluntary use
- Monitor in and around affected area.

0844 DFLAW IH, PO IHT, and PO Shift IHT Supervisor deploy to odor location.

0852 DFLAW IH, PO IHT, and PO Shift IHT Supervisor return to CSO. All readings less than detectable.

0902 DRI passed post-use-function tests.

0903 CSM and DFLAW IH sign TFC-OPS-OPER-C-67 Attachment A page 2.

0906 SOEN: “C-67 Odor Response is complete. All readings are below background. Normal Access is restored between 274AW and AW Farm. CSM”

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INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)

Event Summary and Timeline:

Field Response Timeline Acronyms:

CO	Carbon Monoxide
CSM	Central Shift Manager
CSO	Central Shift Office
DFAS	Data Fusion & Advisory System
DFLAW	Direct Feed Low Activity Waste Team
DOE	Department of Energy
DRI	direct reading instrument
ESH&Q	Environmental, Safety, Health, & Quality
eV	electron-volts
HAMTC	Hanford Atomic Metal Trades Council
H ₂ S	Hydrogen Sulfide
IH	Industrial Hygienist
IHIR	Industrial Hygiene Investigation Report
IHT	Industrial Hygiene Technician
IM	Issues Management Organization
mph	miles per hour
NH ₃	Ammonia
N ₂ O	Nitrous Oxide
OVRC	Odor/Vapor Response Card
PID	photoionization detector
POC	Point of Contact
POE	Production Operations-East
ppm	parts per million
S&H	Safety & Health
SOEN	Shift Office Event Notification
SWIHD	Site Wide Industrial Hygiene Database
TSCR	Tank Side Cesium Removal facility
VMDS	Vapor Monitoring Detection System
VOC	Volatile Organic Compound

Sampling/Monitoring Results:

Direct Reading Instrument Monitoring Results:

- Monitoring performed in and around Affected Area
- DRI readings acquired during field response:

Location	NH ₃	VOCs	H ₂ S	SO ₂
South of 274 AW	< 1 ppm	< 0.010 ppm	< 0.010 ppm	< 0.1 ppm
West of 272AW	< 1 ppm	< 0.010 ppm	< 0.010 ppm	< 0.1 ppm
East of 241-AW	< 1 ppm	< 0.010 ppm	< 0.010 ppm	< 0.1 ppm

Sampling/Monitoring Results Acronyms:

H ₂ S	Hydrogen Sulfide
NH ₃	Ammonia
ppm	Parts Per Million
SO ₂	Sulfur Dioxide
VOCs	Volatile Organic Compounds

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INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)

SWIHD References:

Event Response Site Wide Industrial Hygiene Database DRI Survey:

- # 24-07230 "TFC-OPS-OPER-C-67 near 241-AW"

Additional Information:

Respiratory Protection Equipment was not prescribed for the Initiating Event. Accordingly, at the time of the Initiating Event, the Affected Workers were not wearing Respiratory Protection Equipment. Respiratory Protection Equipment was not required, nor worn, for Response Actions.

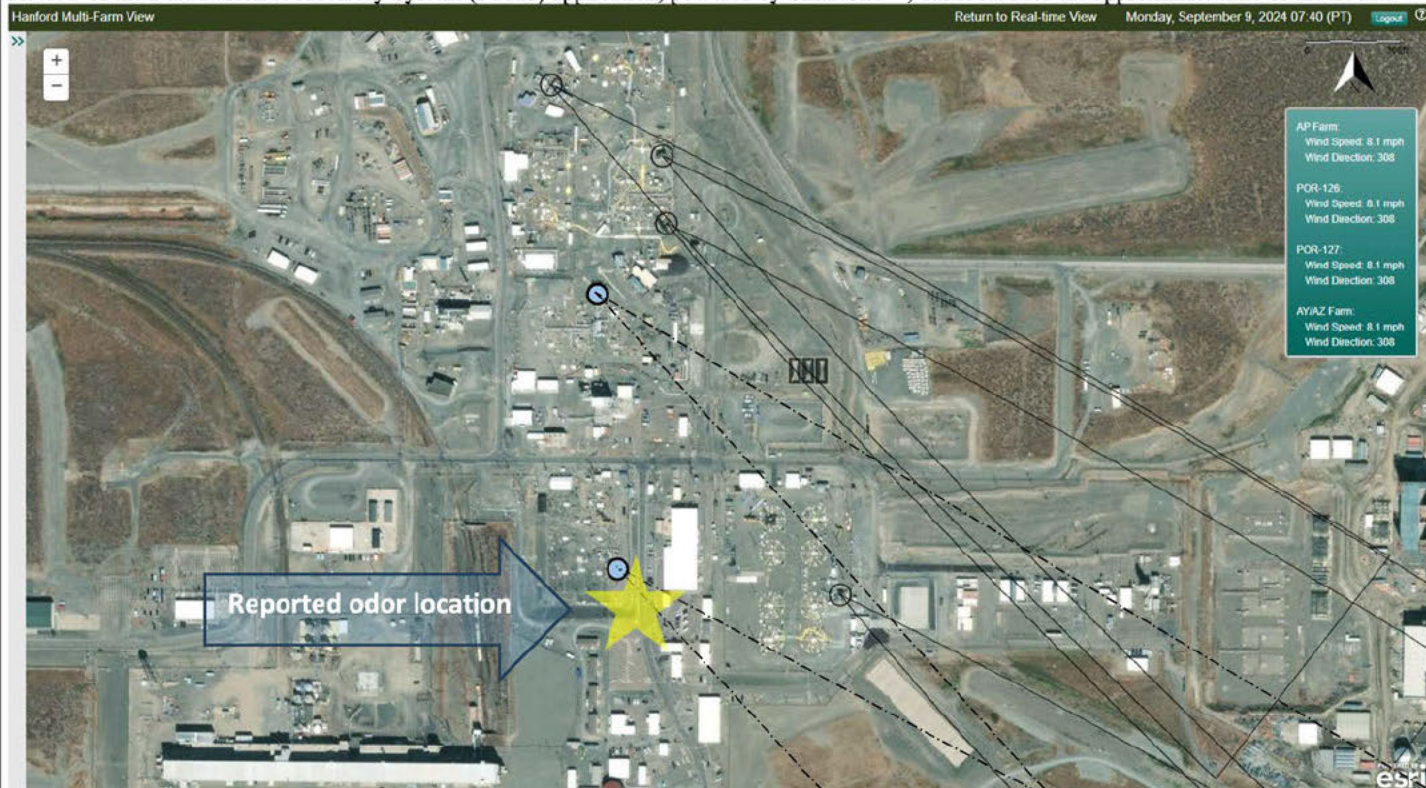
While the odor description is inconsistent with Tank Waste Chemical Vapors, due to the proximity to the Tank Farms, monitoring for Tank Waste Chemical Vapors was performed:

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 for Tank Waste Chemical Vapors/COPCs, DRI equipped with an ammonia sensor is utilized at a minimum. Additional COPC monitoring was conducted concurrently with ammonia during the event response. The COPC with DRI monitoring capabilities readily available at the Tank Farms includes VOCs. As individual agents are not identified when monitoring for VOCs, an Action Limit was developed as an indicator of Tank Farm emissions (mixture of organic vapors) that could impact workers' health and conservatively set at 2 ppm. When monitoring for Tank Waste VOC vapors, DRI equipped with a 10.6 eV PID is utilized to detect multiple VOC COPCs simultaneously.

NOTE: The 2 ppm Action Limit is not applicable to chemical use.

Review of the Data Fusion & Advisory System (DFAS) application, powered by SmartSite™, dashboard for the approximate time of the Event:



NOTE: 241-AW Farm and POR-518/519 Exhausters are not connected to the DFAS; however, an approximate exhauster plume was added based on other modeled plumes.

NOTE: Additional Information continued on next page.

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INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)

Additional Information:

Additional Information continued:

09/09/2024 @ 0740 (approximate time of initiating event):

- Wind Speed: 8.1 mph (15-minute average)
- Wind Direction: 208° (out of Northwest)
- Mixing Height: 140 feet above grade
- Stability Class: E (slightly stable conditions)

Review of the DFAS application, powered by SmartSite™, dashboard for current conditions during response actions, per TFC-OPS-OPER-C-67 4.2.8:

09/09/2024 @ 0845 (current weather data for Response actions):

- Wind Speed: 5.9 mph (15-minute average)
- Wind Direction: 202° (out of South-Southwest)
- Mixing Height: 300 feet above grade
- Stability Class: E (slightly stable conditions)

Vapor Monitoring Detection System (VMDS) exhauster ammonia readings on 09/09/2024 @ 0740:

- POR518 (241-A): N/A
- POR519 (241-A): 3.601 ppm
- 241-AN: N/A
- 241-AW: 13.464 ppm
- POR126 (241-AX): 0.000 ppm
- POR127 (241-AX): 0.000 ppm
- 702AZ (241-AY/AZ): 0.000 ppm
- 241-AP: 0.000 ppm

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

Vapor Monitoring Detection System (VMDS) 09/02/2024 @ 0740 to 09/09/2024 @ 0740:

Tank Farm	Exhauster	Minimum ^{*A}	Maximum ^{*A}
241-A	POR518/POR519	N/A	7.784 ppm
241-AN	Primary	N/A	N/A
241-AP	Primary	0.000 ppm	0.000 ppm
241-AW	Primary	0.550 ppm	28.816 ppm
241-AX	POR126/POR127	0.000 ppm	11.316 ppm
241-AY/AZ	702AZ	0.000 ppm	0.000 ppm

^{*A} VMDS Alternate Real Time Monitoring performed 09/02/2024 to 09/09/2024 for 241-A (POR518/POR519), 241-AN, 241-AP, 241-AX (POR126/POR127, 241-AY/AZ, and 241-SY.

NOTE: Additional Information continued on next page.

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INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)

Additional Information:

Additional Information continued:

The 241-AP Primary Exhauster and 241-SY Primary Exhauster are not currently connected to the VMDS software. 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, in accordance with ARP-T-041-00002 and are acquired in accordance with TF-OPS-IHT-037.

Vapor Monitoring Detection System (VMDS) Alternate Monitoring 09/02/2024 to 09/09/2024:

Tank Farm	Exhauster	Minimum	Maximum
241-A	POR518/POR519	1	3
241-AN	Primary	9	22
241-AP	Primary	0	9
241-AW	Primary	N/A	N/A
241-AX	POR126/POR127	26	26
241-AY/AZ	702AZ	20	20
241-SY	Primary	23	29

Odor descriptors provided by Affected Workers are inconsistent with Tank Vapors. Additionally, 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 odor is unlikely to be from Tank Farm Exhauster emissions.

Monitoring Selections Based on Information Provided by Affected Workers:

Based on the odor descriptors provided upon submission of the Odor/Vapor Response Cards DRI monitoring for Hydrogen Sulfide and Sulfur Dioxide was requested:

Sewer or Septic gases:

- Based on the odor descriptor "sewer", monitoring for hydrogen sulfide and ammonia vapors was performed:
 - The 200 East, 200 West, and 600 Areas have a long history of odors that have been found to be associated with sources other than tank waste chemical vapors, such as septic tank gaseous emissions. These odors are known to change odor profile across a gradient when diluted by ambient atmosphere with distance from a point source. Additional sources of septic/sewer chemical vapors include the service vehicles that routinely service the septic storage tanks. The major roadways in the 200 East, 200 West, and 600 Areas are often traveled by septic service vehicles in route to the numerous local septic storage tanks and portable toilets.

The WRPS Chemical Vapor Solutions Team (CVST) chartered a Fugitive Emissions (FE) sub-team. The primary focus of the FE workscope was to identify odor sources around the Tank Farms work areas, characterizing the type and concentration of the odor constituents. The FE sub-team's investigations included characterizing how septic/sewer odors change odor profile across a gradient when diluted by ambient atmosphere with distance from a point source. The major components of sewer gases can include hydrogen sulfide, carbon dioxide, methane, and ammonia. The FE sub-team's investigations found that close to the septic system (within approximately 20 ft) the odor was described as "sewer". Further away from septic system (within approximately 100 ft) the odor was described as "skunk". Even further away from septic system (within approximately 200 ft) the odor was described as "body odor".

When monitoring for septic/sewer chemical vapors, DRI equipped with a hydrogen sulfide sensor should be utilized at a minimum. Additional septic/sewer chemical vapor monitoring may be conducted concurrently with hydrogen sulfide DRI monitoring.

Biodegradation of biota:

- Based on the odor descriptors "sewer" and "propane-like", monitoring for hydrogen sulfide and ammonia vapors was performed:
 - The main constituents to monitor for when the suspected source of an odor event is environmental chemical vapors are ammonia and hydrogen sulfide. Ammonia and hydrogen sulfide biodegradation byproducts that generate malodors. Therefore, when monitoring for environmental chemical vapors, DRI equipped with an ammonia sensor and a hydrogen sulfide sensor should be utilized at a minimum.

Refer to TOC-IH-58956 for more detail on the monitoring strategy for response to odors.

NOTE: Additional Information continued on next page.

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INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)

Additional Information:

Additional Information continued:

Additional Information Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienists
AIHA	American Industrial Hygiene Association
IARC	International Agency for Research on Cancer
CF	correction factor
CFM	cubic feet per minute
COPC	chemicals of potential concern
DFAS	Data Fusion & Advisory System
DRI	direct reading instrument
eV	electron-volts
GHS-SDS	Globally Harmonized System Safety Data Sheet
OSHA	Occupational Safety & Health Administration
OVRC	Odor/Vapor Response Card
PEL	Permissible Exposure Limit
PID	photoionization detector
ppm	parts per million
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
TWA	Time Weighted Average
VMDS	Vapor Monitoring Detection System
VOC	Volatile Organic Compounds

References:

- American Conference of Governmental Industrial Hygienists (2016). TLVs® and BEIs® Based on the Documentation of the Threshold Limit Values for Chemicals Substances and Physical Agents & Biological Exposure Indices. Cincinnati, OH: Signature Publications.
- American Industrial Hygiene Association (2013). Odor Thresholds for Chemicals with Established Health Standards, 2nd Edition.
- Honeywell (2018). Technical Note TN-106: A Guideline for PID Instrument Response. Retrieved from https://prod-edam.honeywell.com/content/dam/honeywell-edam/sps/his/en-us/products/gas-and-flame-detection/documents/Technical-Note-106_A-Guideline-for-Pid-Instrument-Response.pdf
- Occupational Safety & Health Administration (n.d.). Permissible Exposure Limits- Annotated Tables, OSHA Annotated Table Z-1. Retrieved from <https://www.osha.gov/annotated-pels/table-z-1>
- TOC-IH-58956. Monitoring Strategy for Response to Odors: Common Odor Sources in the 200 East, 200 West, & 600 Areas.

Recommendations/Conclusions:

Recommendations:

N/A

Conclusions:

As Direct Reading Instrumentation monitoring of possible odor sources did not indicate further action was necessary to protect worker safety and health, the area was released from restricted access and work was allowed to continue.

Odor descriptors provided by Affected Workers are inconsistent with Tank Vapors. Based on a review of the DFAS application, powered by SmartSite™, Weather Details dashboard and VMDS exhaust ammonia readings for the approximate time of the Event, the cause of the odor is unlikely to be from Tank Farm Exhauster emissions. The atmospheric stability at the time of the event was slightly stable conditions and the mixing height was 140 feet above grade.

A survey of possible sources of odors matching the provided odor descriptors did not identify a source. Odors were not encountered during the field responses actions in and around the affected area. Anecdotal reports suggest that portable toilet service was ongoing during and after the time of the event. A definitive source of odors and/or chemical emissions at the time of the event could not be positively identified.

Others:

N/A

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INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)

Associated Documents:

iCAS Number: N/A

EIR Number: EIR 2024-071

Industrial Hygienist:

Print First and Last Name

Signature / Date

Digitally signed by _____
Date: 2024.09.09 10:20:12 -07'00'

Industrial Hygiene Level 3 Manager (acting)

Print First and Last Name

Signature / Date

Digitally signed by _____
Date: 2024.09.09 10:17:29 -07'00'

Industrial Hygiene Level 2 Manager:

Print First and Last Name

Signature / Date

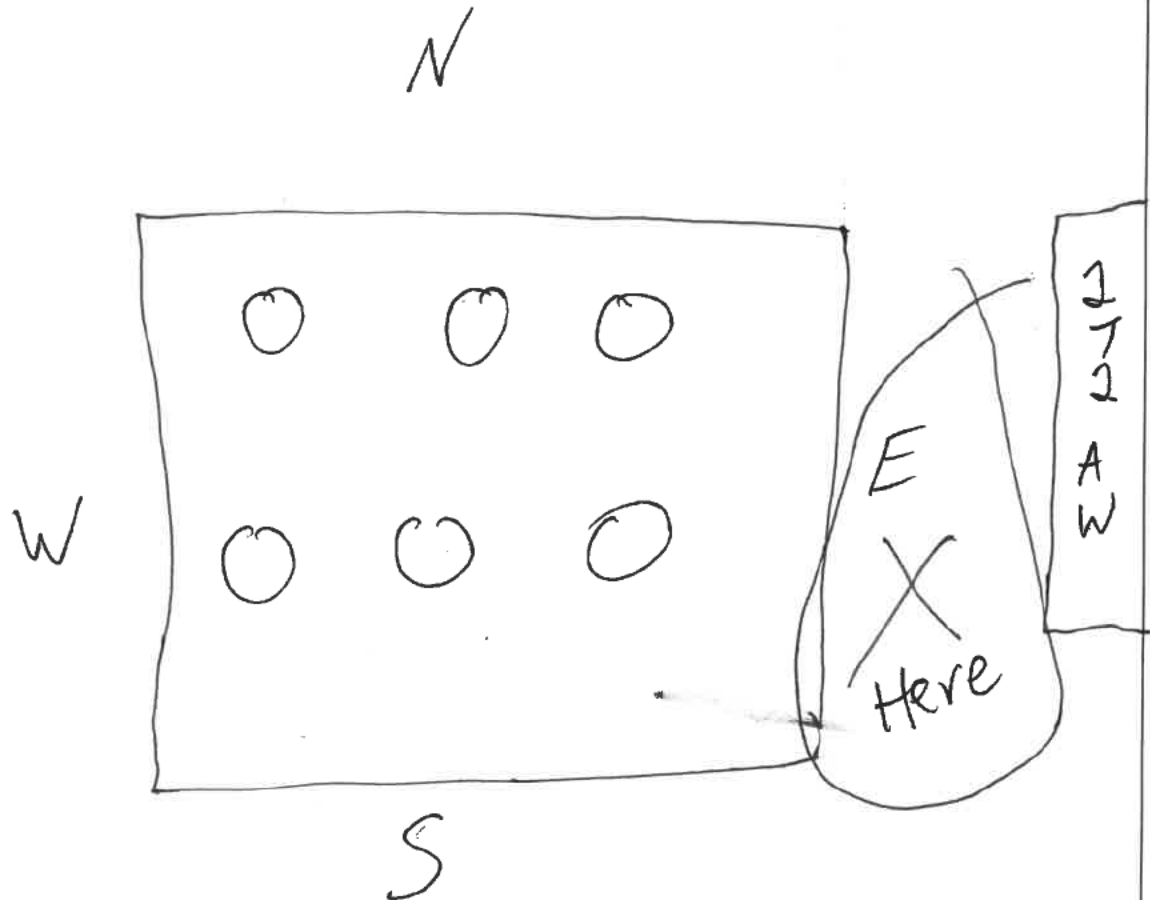
Digitally signed by _____
Date: 2024.09.09 19:03:59 -07'00'

ODOR/VAPOR RESPONSE CARD

Instructions:

1. Notify Immediate Supervisor.
2. Contact Central Shift Manager (CSM), at [REDACTED]
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.



ODOR/VAPOR RESPONSE CARD

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

• Date and time of event: 9-9-24 07:30

• Check Applicable:

☒ Odor ☐ Ammonia Alarm (6 ppm) ☐ Ammonia Alarm (12 ppm) ☐ Alarm (other - describe):

• Your name and the work you were performing:

Driving back From a job. Windows in truck down. Smelt Sulfur

• Other Work Underway? Describe:

• Location of event (mark area on map and wind direction):

AW Farm / 272 av, Canton + 4th St loop

• Name(s) of others in the affected area:

• Was Industrial Hygiene present, who?

• Describe the odor:

☐ Sweet ☒ Sour ☐ Smoky ☒ Septic/Sewer ☐ Musty ☐ Rotten
☐ Metallic ☐ Onion ☐ Earthy ☐ Ammonia ☐ Citrus ☐ Solvent
☒ Other (describe): Sulfur

• Is source known/likely? Describe:

NO

• Your symptoms? ☒ None

☐ Headache ☐ Dizziness ☐ Nausea ☐ Cough ☐ Fatigue
☐ Weakness ☐ Sore Throat ☐ Difficulty Breathing ☐ Eye Irritation ☐ Rash
☐ Itch ☐ Tingling ☐ Numbness ☐ Taste
☐ Other (describe):

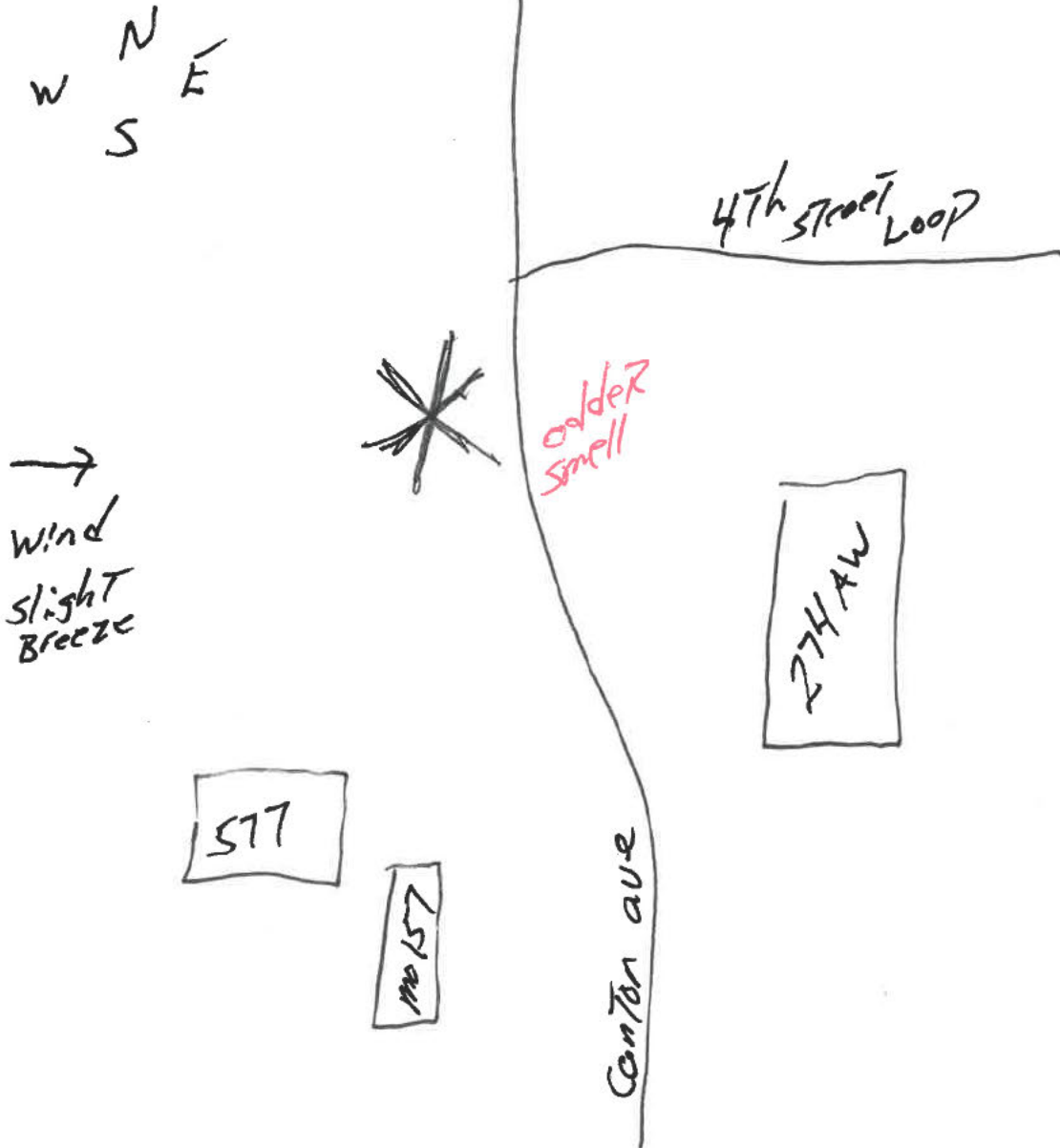
2. Provide this completed card (Page 1 & 2) to Supervisor, Industrial Hygiene, your Union Safety Representative or the CSM.
If received by Supervisor/IH/U-SR, Supervisor/IH/U-SR will ensure card is provided to the CSM.

ODOR/VAPOR RESPONSE CARD

Instructions:

- ✓ 1. Notify Immediate Supervisor.
- ✓ 2. Contact Central Shift Manager (CSM), at [REDACTED]
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.



ODOR/VAPOR RESPONSE CARD

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

- Date and time of event: 9-9-24
- Check Applicable:
 - ☒ Odor
 - ☐ Ammonia Alarm (6 ppm)
 - ☐ Ammonia Alarm (12 ppm)
 - ☐ Alarm (other - describe):
- Your name and the work you were performing:
[REDACTED] walk down lights in 702
- Other Work Underway? Describe:

- Location of event (mark area on map and wind direction):
Just North of central shift office Canton ave & 4th Street Loop
- 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): Sulfur
- Is source known/likely? Describe:
NO
- 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.