

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:** DFLAW Operations 2. **Report Date:** 11/26/2024

3. **Investigation Title:** C-67 Response at TSCR Process Enclosure

4. **Investigation Report Number:** EIR-2025-005

5. **Responsible Manager:** [REDACTED]

6. **Event Investigator:** [REDACTED]

7. **Area / Building / Location:** 200E/241AP25/POR655/Tank Side Cesium Removal (TSCR) Process Enclosure

8. **Date and Approximate Time of Event:** **Date:** 10/16/2024 **Time (military):** 0921 hours

9. **Associated Action Request (AR) Number:** WRPS-AR-2025-0262

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

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

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

At the time of the event, WRPS was performing electrical inspections per Work Order (WO) #1072592, Repetitive DFLAW Team Electrical Skill Based Maintenance 2024.

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

The following employees reported smelling stronger than normal odors on Odor/Vapor Response Cards (OVRC) on 10/16/2024:

- 2-WRPS Radiological Control Technician (RCT)
- 1-WRPS Maintenance Electrician
- 1-WRPS Industrial Hygiene Technician (IHT)
- 1-WRPS Nuclear Chemical Operator (NCO)

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

On 10/16/2024, at approximately 0921 hours, five workers reported stronger than normal odors within the TSCR Process Enclosure (POR655), the odors reported were similar to those noted on 10/15/2024. The Central Shift Manager (CSM) initiated TFC-OPS-OPER-C-67, Response to Stronger than Normal Odors. The odor was described as "stale," "sticky/sweet," "rubbery/rubber mask," and "hot plastic." One worker noted a slight burning sensation in their nose, the remaining four workers did not report any symptoms. The symptomatic worker was evaluated at the Inomedic Health Applications (IHA) onsite medical provider and was released to return to work with no restrictions.

Response actions occurred over multiple days to include Direct Read Instrumentation (DRI) monitoring per Industrial Hygiene Sampling Plan (IHSP), IHSP-POE-MULTI-TFCOPSOPERC67, to monitor for Ammonia (NH₃) and Volatile Organic Compounds (VOC). Response actions also included dilution ventilation, grab air sampling, Shinyei odor monitoring, removal of the rubber matting, and reconfiguration of IXC bay doors.

Grab air samples were collected for further VOC, aldehyde, phenol, and cresol analysis. Sampling was conducted in two evolutions. Two grab air samples were collected during the initial sampling performed on 10/16/2024 during the TFC-OPS-OPER-C-67 field response actions and used to perform comparative analysis between ambient atmosphere conducted within the Process Enclosure Process Area (odor location) and a suspected odor source (rubber matting off-gassing) as indicated by DFLAW management. The second sampling evolution was conducted on 10/21/2024 to

acquire additional ambient atmosphere samples for expanded analytical processing as requested by WRPS Management for the purposes of source identification (Phenol and Cresol by OSHA Method 32). Eight grab air samples were collected during this evolution.

On 10/22/2024 at approximately 1040 hours the rubber matting was removed from TSCR Process Enclosure Process Area. By 1305 hours the odor had significantly diminished.

DRI instrumentation results obtained on 10/16/2024, 10/21/2024, and 10/22/2024 were all below action limits (AL) indicating that further actions were not necessary to protect worker safety and health, therefore the area was released from restricted access and work was allowed to continue. TFC-OPS-OPER-C-67 response actions were deemed complete at approximately 1515 hours on 10/22/2024.

10/15/2024 Summary:

At approximately 1032 hours on 10/15/2024, workers entered the TSCR Process Enclosure to support column installation utilizing procedure TO-270-705, *Install and Connect New TSCR IXCs*. The work crew smelled a burning electrical smell. The odor was described as "melting/burning plastic," "Simple Green," "rubber/off gas of rubber," and "electrical." An IHT was performing DRI monitoring for NH₃, VOC, flammable gas, oxygen, and Carbon Monoxide (CO) within the TSCR Process Enclosure at the time of the event. All DRI readings were below ALs.

The Hanford Fire Department (HFD) was called and in route to TSCR at approximately 1035 hours. The CSM initiated TF-ERP-006, *Emergency Response Procedure 006 Facility Fire Response*. At approximately 1119 hours the HFD made entry into the TSCR Process Enclosure and found no sign of fire utilizing thermal imaging and a flammable gas meter. The termination criteria was met for TF-ERP-006 at 1125 hours. Access control of the TSCR Process Enclosure was turned back over to WRPS operations. Between 1300- and 1500-hours Refrigeration Equipment Services (RES) entered the TSCR Process Enclosure to investigate possible malfunction of POR655-VT-HP-902 environmental Heating Ventilation & Air Conditioning (HVAC) mini-split unit on the North wall for abnormal conditions. No malfunctions were identified.

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

The stronger than normal odor was smelled within the TSCR Process Enclosure Process Area (POR655).

Workers within the TSCR Enclosure Process Area were within a posted radiological Contamination Area (CA) and were wearing anti-contamination clothing including cloth booties, rubber booties, and two pairs of gloves as required by Radiological Work Permit (RWP) TF-100 Rev 44 Task 1.

The use of respiratory protection was not required nor worn for the area and task the workers were supporting. Voluntary use respiratory protection was available for response efforts. Personal ammonia monitors (e.g., VentisPro or ToxiRAE) are not required for work within the TSCR Process Enclosure.

The odor event took place indoors at standard conditions. Weather details are included due to the proximity of the TSCR Process Enclosure to 241-AP Farm.

Hanford Meteorological Station 6 @ 0900 on 10/16/2024:

- Temperature - 60° Fahrenheit
- Barometric Pressure - 29.184 inHg and rising
- Wind - 4 miles per hour (mph) from Southeast
- Relative Humidity - 56%

The Data Fusion and Advisory System (DFAS) application, powered by SmartSite™, was utilized for outdoor weather details at the time odors were reported. The DFAS

dashboard indicated the following weather conditions at approximately 1023 hours on 10/16/2024.

- Wind Speed: 4.8 mph (15-minute average)
- Wind Direction: 274 degrees (from the West)
- Mixing Height: 1000 feet above grade
- Stability Class: A (Extremely unstable conditions)

16. 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.

Access to the TSCR Process Enclosure was restricted during C-67 response actions.

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

- Access to the TSCR Process Enclosure was restricted.
- The CSM initiated TFC-OPS-OPER-C-67 response actions.
- The IHTs responded per TFC-OPS-OPER-C-67, Attachment A-Response Plan.
- Event Investigation EIR-2025-005, *C-67 Response at TSCR Process Enclosure*, was initiated.

18. Compensatory Actions Taken:

None.

19. Remedial Actions Taken:

The rubber matting inside the TSCR Process Enclosure was removed.

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

To summarize the conclusions of the Industrial Hygiene Investigative Report (IHIR), IHIR-00107, *TFC-OPS-OPER-C-67 Response at 241AP25/POR655 Process Enclosure*, it is likely that off-gassing of chemicals from the rubber matting was the source of the odor. Odors quickly declined in observed strength after the rubber matting was removed. POR657 TSCR Process Enclosure Ventilation was in operation continuously during the time odors were initially reported, and during all TFC-OPS-OPER-C-67 field response actions. Odors were not indicative of Tank Vapor sources.

The following considerations support the IHIR-000107 conclusions:

Rubber Matting Discussion:

On 10/08/2024 rubber matting was placed over the entirety of the floor grating within the Process Enclosure Process Area as required to support TO-270-723, *TSCR IXC Disconnect, Prepare for Storage, and Transport to Storage Pads*, and TO-270-705, *Install and Connect New TSCR IXCs*, removal and replacement of IXC-A and IXC-B. TO-270-723 began on 10/09/2024 and was completed on 10/10/2024. As required by TO-270-723, and TO-270-705, rubber matting is utilized for groundcover to control the spread of radiological contamination.

Odor descriptors provided by Affected Workers and the Field Response team were consistent with chemicals detected in atmosphere from off-gassing of rubber matting samples. Analytical sample results did contain a subset of chemical constituents found in atmosphere from off-gassing of rubber matting samples.

During the performance of TO-270-723, completed prior to the odor event, when process piping systems are breached but before the IXC passive ventilation stacks are installed, RPE was utilized. RPE was not required or worn during the odor event. It

was noted by personnel supporting Field Response Activities who voluntarily utilized RPE with combination cartridges that the RPE was effective in blocking the odor. It was likely the odor existed prior to the event, however, wasn't perceived as the RPE was effectively blocking the odors.

Based on weather data it is likely that on 10/15/2024 the environmental Heating Ventilation and Air Conditioning (HVAC) system was utilized after a continued period of relative inactivity to raise the temperature of the Process Enclosure. It is common for dust, dirt, and deposits to settle on the heat exchanger after prolonged periods of inactivity, commonly associated with a "dusty, burning" odor once the unit is operated. Heating of the rubber matting was likely based on the position of the heater, which may have contributed to increase of chemical off-gassing.

An inspection of the environmental HVAC system did not identify abnormal conditions that may have contributed to odors. Investigation of electrical systems with thermal imaging cameras did not reveal any indication that hot wiring was the source of the odor. Visual inspection of equipment and materials within the Process Enclosure did not reveal a readily apparent odor emission source.

Analytical Results Discussion:

Analytical results from the grab samples collected from within the Process Enclosure during the initial field response actions were at or above published odor detection concentrations for some tentatively identified compounds with similar odor descriptors as provided on Odor Vapor Response Cards (OVRs).

Chemicals detected at levels above published odor thresholds from samples collected on 10/16/2024 include:

- Acetaldehyde
- Butanal
- Phenol
- Nonanal

Chemicals detected at levels above published odor thresholds from samples collected on 10/21/2024 above the grating include:

- Acetaldehyde
- Butanal
- Nonanal

Chemicals detected at levels above published odor thresholds from samples collected on 10/21/2024 below the grating include:

- Acetaldehyde
- Butanal

All source sample results were found to be below OELs for chemical compounds identified, including samples from off-gassing of rubber matting samples which were intentionally allowed to accumulate concentrations well above those found at the odor location. A review of possible chemicals based on odor descriptors shows that most plausible chemical odor thresholds are well below applicable TWA OELs. It is unlikely applicable OELs were exceeded.

Tank Vapor Discussion:

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 extremely unstable conditions, however the mixing height was 1000 feet above grade.

At the time odors were first reported TSCR was in Maintenance Mode. Transfer pathways for Tank Waste from AP-107 and to 241-AP-106 were isolated and feed pumps were

administratively locked. Ventilation to the 241-AP-108 Tank Headspace was isolated by POR655-WP-AOV-605 sump isolation valve. The 241-AP-VTP Primary Exhauster was in operation providing negative ventilation to the TSCR IXC vent air system. Two IXCs from IXC Bay A and IXC Bay B had been removed and all connection points were capped or plugged. Process Piping to the IXC connection points were isolated at POR655-WP-AOV-413A (IXC-A Inlet), POR655-SA-AOV-420A (IXC-A sweep air), POR655-VP-AOV-410A (IXC-A vent), POR655-WP-AOV-415A (IXC-A outlet), POR655-WP-V-413C (IXC-C Inlet), POR655-SA-AOV-420C (IXC-C sweep air), POR655-VP-AOV-410C (IXC-C vent), and POR655-WP-AOV-415C (IXC-C outlet). Tank vapor migration from AP-108 through the TSCR drain system is also unlikely as the drain system was isolated from the tank headspace and all vent system process piping still under active ventilation was connected to IXC B. Disconnected vent system piping was capped and/or plugged and isolated.

On 10/15/202 during the initial report of odors in the Process Enclosure the AP08A supernatant pump and slurry distributor was being removed per WO #1082904, *AP08A Pump Replacement*. Activities related to the active removal of the supernatant pump and/or slurry distributor occurred at approximately 0915 hours. At approximately 1000 hours, AP-108 pressure indicators indicated slight positive pressure within the AP-108 headspace, corresponding to a significant increase in flow as indicated by the AP-108 flow meter. The positive pressure event does not correspond to presence of odors within TSCR as the pressurization event occurred after the initial indication of odors.

DRI monitoring results where odors were present were inconsistent with tank chemical vapors. Odor duration was significant, lasting approximately 6 days. Odors not quickly dissipating when subjected to continuous dilution ventilation of the Process Enclosure via POR657 suggests a continuous odor emission source inconsistent with the short duration of AP-108 headspace pressurization events. Furthermore, indication of increased flow in the AP-108 vent header directly correlate to pressurization events indicating that negative flow into the AP-108 headspace was maintained.

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. Nitric acid was utilized in nearly all production processes that generated tank waste, and the most common by-product 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 and DRIs equipped with an ammonia sensor are utilized at a minimum when monitoring for tank waste chemical vapors/COPCs. Monitoring for VOCs utilizing DRIs equipped with 10.6 eV and 11.7 eV lamps.

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 parts per million (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 241-A Farm) is 460 ppm, while the exhauster high level alarm conservatively established for 241-A farm is 160 ppm, reference Figure 1.

The highest A Complex (excluding 241-A Farm) ammonia reading of 85.412 ppm came from 241-AP on 10/22/24 at 1300 hours. Conservatively using the highest ammonia concentration, the worst-case ground ammonia concentration from the A complex would be 1.85% of the established occupational exposure limit would be expected if AN, AY/AZ, AX, or AW farm exhauster emissions were present, Reference Table 1.

The highest A Farm (POR 518/519 exhausters) ammonia reading of 111.526 ppm came from POR 519(241-A Farm) on 10/21/24. Conservatively using the highest ammonia

concentration, the worst-case ground ammonia concentration would be 6.97% of the established occupational exposure limit would be expected if A Tank Farm emissions were present, Reference Table 1.

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

Figure 1. Tank Farm Exhaust Concentration Alarm Levels

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; as concentrations at emission points were insufficient to allow for the possibility of notable concentrations at the ground receptor, weather conditions did not allow for ground-plume interaction, reference Table 1 and Figure 2.

Table 1. VMDS Exhauster Ammonia Readings

Exhaust Ventilation System	10/15/24 0950 hrs	10/16/24 0930 hrs	10/16/24 1340 hrs	10/21/24 0950 hrs	10/22/24 1010 hrs	10/22/24 1300 hrs	10/22/24 1430 hrs
POR518 (241-A)	12.756	7.086	5.900	43.955	43.955	10.122	9.240
POR519 (241-A)	N/A	15.242	12.599	111.526	25.918	22.884	20.900
241-AN	N/A	N/A	N/A	N/A	N/A	N/A	N/A
241-AW	13.952	12.945	13.131	8.592	12.428	11.441	11.292
POR126 (241-AX)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
POR127 (241-AX)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
702AZ (241-AY/AZ)	27.677	28.061	27.878	25.657	26.020	26.206	26.141
241-AP	14.602	11.602	9.757	23.091	80.111	85.412	69.084

*Exhauster reading units in Table 1 are ppm

Vapor Monitoring Detection System (VMDS) summary: 10/08/2024 @ 0950 to 10/16/2024 @ 0950:			
Tank Farm	Exhauster	Minimum ^{*A}	Maximum ^{*A}
241-A	POR518/POR519	0.000 ppm	219.187 ppm
241-AN	Primary	N/A	N/A
241-AP	Primary	N/A	24.762 ppm
241-AW	Primary	10.529 ppm	36.039 ppm ^{*B}
241-AX	POR126/POR127	0.000 ppm	25.876 ppm
241-AY/AZ	702AZ	0.000 ppm	28.806 ppm

Figure 2. VMDS Summary 10/08/24-10/16/24

21. Positive Aspects Identified:

The management team, work force and Industrial Hygiene team collaborated effectively to achieve a positive outcome by fostering open communication, mutual respect, in the creation of a thorough response plan and in-depth investigation to prioritize worker safety.

22. Key Take Aways / Learning Opportunities:

None

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:

Name (First, Middle Initial, Last)

Signature / Date

CAS Manager Approval:

Name (First, Middle Initial, Last)

Signature / Date

Washington River Protection Solutions (WRPS)
INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR)

Event Title:

TFC-OPS-OPER-C-67 Response at 241AP25/POR655 Process Enclosure.

IHIR Number:

IHIR-000107

IHEI Number:

N/A

Executive Summary:

On October 15th, 2024 atypical odors were reported within the 241AP25/POR655 Tank Side Cesium Removal Process Enclosure during work activities to set-up for installation of Ion Exchange Columns. Facility management directed an initial investigation of possible causes and likely sources of the odors. After exhausting investigative actions limited by facility configuration and procedural limitations, TFC-OPS-OPER-C-67 "Response to Stronger than Normal Odors" was initiated on October 16th, 2024 to provide guidance for additional investigative actions and controls necessary to support expanded response actions. Facility personnel and facility management, Hanford Atomic Metals Trades Council Safety Representatives, and Senior Management participated in the planning and execution of an extended investigation evolution. Field response actions were completed on October 22nd, 2024, when odor sources were methodically and systematically eliminated; at that time, it was decided to use the in-process IHIR as the mechanism for documentation and delay IHIR issuance/approval until all additional data was compiled/analyzed. Additional requested analysis of grab samples and material samples collected during the field response actions was completed on November 20th, 2024. Analytical contracts and specialized media was procured to support analysis necessary to provide additional data to be applied to future use of potential odor source materials. This Industrial Hygiene Investigation Report provides an overview and conclusion of the first-time-use of TFC-OPS-OPER-C-67 to perform a thorough investigation of potential hazards in a high hazard, high risk process facility.

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INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)

Date:	Time:	Location:
10/16/2024	0930	241AP25/POR655 Process Enclosure Process Area

Event Summary and Timeline:**Event Summary:**

The TFC-OPS-OPER-C-67 initiating event occurred at approximately 0921 on October 16th 2024 when five workers encountered a stronger than normal “plastic getting hot, rubber mask, rubber, slightly sweet” odor inside the TSCR 241AP25/POR655 Process Enclosure Process Area. Affected Workers were either performing electrical skill based maintenance or preparing to perform placement of new Ion Exchange Columns as per TO-270-705 when they encountered the odor. Affected Workers indicated possible source could be rubber matting or long length equipment installation in AP Farm. One worker reported a symptom of “slight burning sensation in nose”. The affected worker was sent for precautionary medical evaluation. The remaining four workers reported no symptoms and declined precautionary medical evaluation.

Field Response Timeline:

October 15th 2024:

0950 DFLAW team enters 241AP25/POR655 Process Enclosure Process Area to perform TO-270-705 steps to place Ion Exchange Columns (IXCs) into IXC Bay A and IXC Bay B. Approximate time odors are first encountered and reported.

1030 SOE notifies CSM of “hot/burning-like” smell in 241AP25/POR655 Process Enclosure Process Area. 373-0911 call made and Hanford Fire Department (HFD) sent to investigate. HFD entered Process Enclosure Process Area and used thermal camera to identify any hot spots throughout. No hot spots were identified with thermal imaging and access control of 241AP25/POR655 turned back over to WRPS operations.

1117 Direct Feed Low Activity Waste (DFLAW) Team Industrial Hygiene Technician (IHT) contacts DFLAW Industrial Hygienist:

- Odor descriptors of “hot electrical”, “rubber matting” present inside of Tank Side Cesium Removal (TSCR) Process Enclosure Process Area. Shift Operating Engineer (SOE) reporting odors to Central Shift Manager (CSM)
- Direct Reading Instrumentation (DRI) for Ammonia (NH₃) and Volatile Organic Compounds (VOCs) indicate background levels.

1226 Central Shift Manager (CSM) contacts DFLAW Industrial Hygienist (IH) to notify that TFC-OPS-OPER-C-67 will not be initiated in response to odors due to the presence of DRI readings indicating background levels during odor event.

1226 DFLAW IH consults TOC-IH-58956 and informs CSM that only additional monitoring applicable based on provided odor descriptors would be TSI Dustrak DRX for Particulates Not Otherwise Specified (PNOS), but notes utilization would not provide much utility as visual indication of particulate emissions would be present if near Occupational Exposure Limit.

1300-1500 DFLAW Electricians used thermal imaging camera to perform secondary investigation within 241AP25/POR655 process enclosure.

1300-1500 Refrigeration Equipment Services (RES) entered the 241AP25/POR655 to investigate possible malfunction of POR655-VT-HP-902 environmental Heating Ventilation & Air Conditioning (HVAC) mini-split unit on North wall of Process Area for abnormal condition that may be leading to production of odors. Typical preventative maintenance (PM) work performed, no malfunction identified.

October 16th 2024:

0900 DFLAW Electricians enter 241AP25/POR655 Process Enclosure Process Area to perform additional thermal imaging camera assisted investigation for possible electrical issues. No hot-spots identified.

0937 DFLAW IHT contacts DFLAW IH:

- Odor of same descriptors as previous day present inside of TSCR Process Enclosure Process Area at similar apparent strength.
- Direct Reading Instrumentation (DRI) for Ammonia (NH₃) and Volatile Organic Compounds (VOCs) indicate background levels.

Note: Field Response Timeline continued on next page.

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INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)

Field Response Timeline continued:

- 0949 DFLAW Operations Manager contacts DFLAW IH to notify intent to utilize TFC-OPS-OPER-67 Response Plan to perform actions in response to odor not directed by TO-270-705: removal or rubber floor matting and opening of multiple Ion Exchange Column (IXC) bay doors to provide additional ventilation. DFLAW Operations Manager is in-route to the Central Shift Office (CSO).
- 0952 DFLAW IH Contacts Production Operations (PO) IH and DFLAW IH Manager to inform TFC-OPS-OPER-C-67 response is imminent.
- 0957 Production Operations (PO) Industrial Hygienist 1, PO IH 2, and DFLAW IH Manager arrive at the CSO to support response actions.
- 1001 DFLAW IH calls CSO to participate in development of response actions.
- 1005 DFLAW IH requests samples of rubber matting from within TSCR be collected for further sampling and evaluation.
- 1010 PO IH 1, DFLAW IH, discuss response plan, monitoring strategy, and sampling strategy with CSM and TSCR Operations Manager.
- 1011 SOEN: "Responding to stronger than normal odors per C-67 at the TSCR Process Enclosure, access restricted to TSCR Process Enclosure CSM"
- 1012 CSM requests Radiological Controls (RadCon) support for response plan review and approval.
- 1015 TSCR SOE reports no symptoms have been reported and all personnel have declined precautionary medical evaluation.
- 1017 CSM contacts DFLAW Level 1 Manager to provide briefing.
- 1017 PO IH 1 requests RadCon support for release of rubber matting samples from TSCR.
- 1018 Odor/Vapor Response Cards (OVRs) arrive at CSO.
- 1019 PO IH 1 requests IHTs acquire additional DRI sensors to support response actions.
- 1020 CSM requests atmospheric mixing height.
- 1022 PO IH Manager briefs Environmental Safety Health & Quality (ESH&Q) manager on event.
- 1023 PO IH 1 informs CSM of weather conditions at current time from Data Fusion Advisory System (DFAS):
- Stability Class - A
 - Wind speed - 4.8 mph from 274 degrees (from West)
 - Mixing height - 1000 ft above grade
- 1025 CSM briefs Department of Energy (DOE) Facility Representative (FacRep) on event status.
- 1032 PO IH 1 reviews O/VRCs and requests CSM contact SOE to ensure employee who reported symptoms reports to on-site occupational medical provider.
- 1033 DFLAW RadCon 1st Line Supervisor departs CSO to transport affected worker to on-site occupational medical provider.
- 1044 PO IH Manager contacts IH Sample Management Office (SMO) to request preparation for shipment of RUSH turn-around-time (TAT) sample analysis.
- 1047 PO IHT Supervisor contacts PO IH1 to confirm air sampling strategy.
- 1100 Issues Management (IM) Point-of-Contact (POC) contacts CSM to assign Event Investigation Report (EIR) Number.
- 1103 DFLAW IHTs report to CSO to support field response actions.
- 1105 Field Response support personnel determine location and time of pre-job briefing to support field response actions.
- 1122 IH SMO contacts PO IH Manager to confirm RUSH TAT sample analysis support.
- 1130 PO IH Manager contacts IH SMO to discuss delivery of RUSH TAT samples to IH SMO sample custodians.
- 1133 PO IH Manager updates ESH&Q manager on employee symptoms and transport to on-site occupational medical provider.
- 1138 TFC-OPS-OPER-C-67 Attachment A "Response Plan" approved.
- 1153 CSM, PO IH Manager, DFLAW IH Manager, PO IH 1 and PO IH 2 discuss TSCR ventilation status, request information from DFLAW Operations Manager:
- 2 IXCs removed, all isolation valves should be closed, all piping breaches should be capped.
- 1157 Hanford Meteorological Station provides weather conditions for Station 6 @ 0900 10/16/2024:
- Temperature – 60° Fahrenheit
 - Barometric Pressure – 29.184 inHg and rising.
 - Wind – 4 miles per hour (mph) from Southeast.
 - Relative Humidity – 56%

Note: Field Response Timeline continued on next page.

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INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)

Field Response Timeline continued:

1201 DFLAW IH Manager and TSCR SOE provide briefing on field response actions:

- Perform monitoring as per IHSP-POE-MULTI-TFCOPSOPERC67:
 - NH₃ – Action Limit (AL) 12 parts per million (ppm).
 - VOCs (10.6 eV PID) – AL 2 ppm.
 - VOCs (11.7 eV PID) - AL N/A, for indication purposes only.
 - Collect grab samples of ambient atmosphere, samples of rubber matting for further analysis.
- Voluntary use RPF as per RPF-TFC-OPS-OPER-C-67.
- Lock-out-tag-out briefing.
- Removal of rubber matting (pen and ink removal from approved response plan based on worker feedback).
- Re-configuration of IXC bay doors.

1315 RPF approved by RadCon.

1330 Field Response actions initiated.

1341 Field Response Team enters TSCR Process Enclosure Airlock.

1345 Field Response Team enters TSCR Process Enclosure Process Area.

1347 DFLAW Nuclear Control Operator collects rubber matting sample.

1405 DFLAW IHT reports DRI readings from within TSCR Process Enclosure Process Area:

- VOCs (11.7 eV PID) – 0.160 ppm
- VOCs (10.6 eV PID) – 0.000 ppm
- NH₃ – 0 ppm

1442 DFLAW IHT reports DRI instrumentation passed post-use-function-testing, all readings acquired during field response actions were below applicable action limits.

1457 TFC-OPS-OPER-C-67 Attachment A “Response Plan” page 2 approved.

October 17th, 2024:

0827 DFLAW IHT Supervisor notifies DFLAW IH that sample collection from rubber-matting samples will commence at 1145.

0918 DFLAW IH Manager contacts DFLAW IH to notify that Chief Operations Officer (COO) has inquired about adding Phenol and Cresol analysis for collected grab samples.

0927 DFLAW IH provides media, flow rate, volume, and analytical method recommendations for Phenol and Cresol analysis.

1017 DFLAW IH Manager contacts SMO to determine availability of analytical support for Phenol and Cresol analysis.

1132 DFLAW IH Manager notifies DFLAW IH that SMO has confirmed analytical support for Phenol and Cresol analysis, media will have to be procured.

1136 DFLAW IH directs analytical laboratory and method selections for Phenol and Cresol analysis, requests collection of additional grab samples.

1214 PO IH Manager contacts DFLAW IH to determine correct sampling selections for Site Wide Industrial Hygiene Database (SWIHD) survey for rubber matting samples, confirms sample collection in progress.

1350 RUSH TAT samples are relinquished to shipper.

October 21st, 2024:

0615 DFLAW IH reports to CSO to revise Response Plan to include additional response actions:

- Perform DRI monitoring from POR655-VT-V-921:
 - NH₃ – AL 12 ppm
 - VOCs (10.6 eV PID) – AL 2 ppm
 - VOCs (11.7 eV PID) – No AL (source indication purposes only)
- Perform DRI monitoring from POR655-VT-V-922:
 - NH₃ – AL 12 ppm
 - VOCs (10.6 eV PID) – AL 2 ppm
 - VOCs (11.7 eV PID) – No AL (source indication purposes only)

Note: Field Response Timeline continued on next page.

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INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)

Field Response Timeline continued:

- Collect grab samples from POR655-VT-V-922:
 - 2 x 25L Tedlar (for analysis via OSHA Method 32/NIOSH 2546 and EPA TO-11A)
 - 2 x 10L Tedlar (for analysis via EPA TO-17A, spare)
- Enter POR-655 Process Enclosure Process Area to perform visual investigation.
- Perform DRI monitoring from below grating with long reach extension:
 - NH₃ – AL 12 ppm
 - VOCs (10.6 eV PID) – AL 2 ppm
 - VOCs (11.7 eV PID) – No AL (source indication purposes only)
- Collect grab samples from below grating with long reach extension:
 - 2 x 25L Tedlar (for analysis via OSHA Method 32/NIOSH 2546 and EPA TO-11A)
 - 2 x 10L Tedlar (for analysis via EPA TO-17A, spare)
- After DRI monitoring/sampling is complete, if directed by DFLAW Management:
 - Open facility door(s) and secure door(s) open as requested.
 - Remove rubber matting, sleeving/sheeting, and/or other materials as requested.
 - Initiate and/or secure facility ventilation as requested.

0630 DFLAW IH Requests support from DFLAW Industrial Safety (IS) for review of revised Response Plan.

0647 DFLAW IH, DFLAW IS, DFLAW IH Manager report to DFLAW Team to provide support of Response Plan revision briefing.

0700 Pre-Job Briefing is conducted with DFLAW personnel to support additional field response actions.

- TSCR SOE and DFLAW Operations Manager facilitate discussion and defer decision making for facility configuration changes and removal of matting to consensus by DFLAW Team personnel supporting field response actions:
 - Facility configuration changes will not be made until sample results are received and briefed with DFLAW Team.
 - Additional intended action to install IXC's into IXC bays is suspended pending receipt and briefing of analytical results from previously collected grab samples.

0935 Field response team enters TSCR Process Enclosure to perform field response actions.

0944 DFLAW IHT reports DRI readings from TSCR Process Enclosure Airlock:

- VOCs (11.7 eV PID) – 0.070 ppm
- VOCs (10.6 eV PID) – 0.000 ppm
- NH₃ – 0 ppm

0948 DFLAW IHT reports DRI readings from TSCR Process Enclosure Process Area:

- VOCs (11.7 eV PID) – 0.060 ppm
- VOCs (10.6 eV PID) – 0.000 ppm
- NH₃ – 0 ppm

1004 DFLAW IHT and DFLAW IH collect grab samples from TSCR Process Enclosure Process Area.

1026 DFLAW IHT reports DRI readings from TSCR Process Enclosure Process Area after entry:

- VOCs (11.7 eV PID) – 0.100 ppm
- VOCs (10.6 eV PID) – 0.000 ppm
- NH₃ – 0 ppm

1030 DFLAW IHT reports DRI readings from TSCR Process Enclosure Process Area below grating area:

- VOCs (11.7 eV PID) – 0.180 ppm
- VOCs (10.6 eV PID) – 0.000 ppm
- NH₃ – 0 ppm

1032 DFLAW IHT and DFLAW IH collect grab samples from TSCR Process Enclosure Process Area below grating area.

1032 DFLAW IHT reports DRI readings from tool box 1 (hand tools) on tool cart:

- VOCs (11.7 eV PID) – 0.190 ppm
- VOCs (10.6 eV PID) – 0.030 ppm
- NH₃ – 0 ppm

Note: Field Response Timeline continued on next page.

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INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)

Field Response Timeline continued:

1033 DFLAW IHT reports DRI readings from tool box 2 (fittings and parts) on tool cart:

- VOCs (11.7 eV PID) – 0.220 ppm
- VOCs (10.6 eV PID) – 0.010 ppm
- NH₃ – 0 ppm

1035 DFLAW IHT reports DRI readings from tool box 3 (hose parts) on tool cart:

- VOCs (11.7 eV PID) – 0.190 ppm
- VOCs (10.6 eV PID) – 0.010 ppm
- NH₃ – 0 ppm

1041 DFLAW IHT reports DRI readings from TSCR Process Enclosure Process Area Air Conditioner outlet:

- VOCs (11.7 eV PID) – 0.220 ppm
- VOCs (10.6 eV PID) – 0.000 ppm
- NH₃ – 0 ppm

1100 Field Response Team exits TSCR Process Enclosure.

1330 DFLAW IHT reports that samples have been collected from grab samples and are being delivered to SMO sample custodians.

October 22nd 2024:

0700 DFLAW Team is briefed on sample results from grab samples collected on 10/16/2024.

0800 ESH&Q Manager inquires about potential utilization of Shinyei Odor Monitors for investigation.

0822 Pre-Job Briefing is performed for additional field response actions:

- Perform DRI monitoring from POR655-VT-V-921:
 - NH₃ – AL 12 ppm
 - VOCs (10.6 eV PID) – AL 2 ppm
 - VOCs (11.7 eV PID) – No AL (source indication purposes only)
- Perform DRI monitoring from POR655-VT-V-922:
 - NH₃ – AL 12 ppm
 - VOCs (10.6 eV PID) – AL 2 ppm
 - VOCs (11.7 eV PID) – No AL (source indication purposes only)
- Enter POR-655 Process Enclosure Process Area to perform visual investigation.
- After DRI monitoring is complete, if directed by DFLAW Management:
 - Open facility door(s) and secure door(s) open as requested.
 - Remove rubber matting, sleeving/sheeting, and/or other materials as requested.
 - Initiate and/or secure facility ventilation as requested.
- DFLAW Operations Manager notifies DFLAW Team that air compressor was secured on back-shift to determine if the compressed air system was a potential odor source.

0835 DFLAW IH request Shinyei Odor Monitors be acquired from Pacific Northwest National Laboratory (PNNL)

0950 DFLAW Team arrives at consensus to enter TSCR Process Enclosure to determine if securing compressed air system reduced or eliminated odor source, then if odor still present remove floor matting and open ingress/egress door and IXC bay A and IXC Bay C doors to see if odors dissipate.

1007 DFLAW IHT reports DRI readings from TSCR Process Enclosure Airlock:

- VOCs (11.7 eV PID) – 0.000 ppm
- VOCs (10.6 eV PID) – 0.000 ppm
- NH₃ – 0 ppm

1015 DFLAW IHT reports DRI readings from TSCR Process Enclosure Process Area:

- VOCs (11.7 eV PID) – 0.000 ppm
- VOCs (10.6 eV PID) – 0.000 ppm
- NH₃ – 0 ppm

Note: Field Response Timeline continued on next page.

INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)

Field Response Timeline continued:

1018 DFLAW IHT reports DRI readings from TSCR Process Enclosure Process Area after entry:

- VOCs (11.7 eV PID) – 0.090 ppm
- VOCs (10.6 eV PID) – 0.000 ppm
- NH₃ – 0 ppm
- Odor still present at similar strength to previous entry.

1034 IXC bay A door opened.

1040 Rubber matting is removed from TSCR Process Enclosure Process Area.

1041 IXC bay C door opened.

1130 All 241AP25/POR655 doors are shut.

1305 Field Response Team enters TSCR Process Enclosure Process Area to determine if intensity of odor has decreased.

- VOCs (11.7 eV PID) – 0.000 ppm
- VOCs (10.6 eV PID) – 0.000 ppm
- NH₃ – 0 ppm
- Odor is still present, but significantly diminished.

1318 Field Response Team exits the TSCR Process Enclosure Process Area.

1410 TSCR Air Compressor is re-started.

1433 Field Response enters the TSCR Process Enclosure Process Area .

- VOCs (11.7 eV PID) – 0.000 ppm
- VOCs (10.6 eV PID) – 0.000 ppm
- NH₃ – 0 ppm
- Odor is still present at intensity similar to 1305 entry.

1438 Field Response Team exits the TSCR Process Enclosure Process Area.

1440 DFLAW Operations Manager and TSCR SOE notify DFLAW IH that securing POR655/241AP25 Ventilation will not be performed, as removing floor matting has already caused a significant decline in odor intensity.

1515 DFLAW Team meets to discuss investigation actions, results, and to discuss worker concerns and hypothesize additional investigation actions. With worker and management concurrence the decision was made to exit TFC-OPS-OPER-C-67 response actions, and continue with any additional investigative or corrective actions outside of the guidance of TFC-OPS-OPER-C-67.

Note: Field Response Timeline continued on next page.

INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)

Field Response Timeline continued:

Field Response Timeline Acronyms:

AL	Action Limit
COO	Chief Operating Officer
CSM	Central Shift Manager
CSO	Central Shift Office
DFAS	Data Fusion & Advisory System
DFLAW	Direct Feed Low Activity Waste
DOE	Department of Energy
DRI	direct reading instrument
EPA	Environmental Protection Agency
ESH&Q	Environmental, Safety, Health, & Quality
eV	electron-volts
HFD	Hanford Fire Department
HVAC	Heating Ventilation & Air Conditioning
IH	Industrial Hygienist
IHT	Industrial Hygiene Technician
IM	Issues Management
inHg	Inches of Mercury
IS	Industrial Safety
IXC	Ion Exchange Column
mph	miles per hour
N/A	Not applicable
NH ₃	Ammonia
NIOSH	National Institute of Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
O/VRC	Odor/Vapor Response Card
PID	photoionization detector
PM	Preventative Maintenance
PNOS	Particulates Not Otherwise Specified
POC	Point of Contact
PO	Production Operations
ppm	parts per million
RES	Refrigeration Equipment Services
RPF	Respiratory Protection Form
SMO	Sample Management Office
SOE	Shift Operating Engineer
SOEN	Shift Office Event Notification
SWIHD	Site Wide Industrial Hygiene Database
TAT	Turn-around-time
TSCR	Tank Side Cesium Removal
VOC	Volatile Organic Compound

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INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)**Sampling/Monitoring Results:****Direct Reading Instrument Monitoring Results:**

- DRI readings acquired during initial report of odors on 10/15/2024:

Location	NH ₃	VOCs (10.6 eV PID)	CO
Inside TSCR Process Enclosure with IXC Bay B door open	< 1 ppm	< 0.010 ppm	< 1 ppm

- DRI readings acquired to support entry by RES and DFLAW Electricians and to support collection of TSR LFL measurements on 10/15/2024:

Location	NH ₃	VOCs (10.6 eV PID)	CO
TSCR Process Enclosure Airlock (via POR655-VT-V-921)	< 1 ppm	< 0.010 ppm	<1 ppm
TSCR Process Enclosure Process Area (via POR655-VT-V-922)	< 1 ppm	< 0.010 ppm	<1 ppm
TSCR Process Enclosure Process Area (via POR655-VT-V-922)	< 1 ppm	0.050 ppm	<1 ppm

- DRI readings acquired to support collection of backshift TSR LFL measurements on 10/15/2024:

Location	NH ₃	VOCs (10.6 eV PID)
TSCR Process Enclosure Airlock (via POR655-VT-V-921)	< 1 ppm	< 0.010 ppm
TSCR Process Enclosure Process Area (via POR655-VT-V-922)	< 1 ppm	< 0.010 ppm

- DRI readings acquired during initial field response evolution (10/16/2024):

Location	NH ₃	VOCs (10.6 eV PID)	VOCs (11.7 eV PID)
Inside TSCR Process Enclosure Process Area with door closed	< 1 ppm	< 0.010 ppm	0.090 ppm
Inside TSCR Process Enclosure Process Area with door closed	< 1 ppm	< 0.010 ppm	0.100 ppm
Inside TSCR Process Enclosure Process Area with door closed	< 1 ppm	< 0.010 ppm	0.110 ppm
Inside TSCR Process Enclosure Process Area with door closed	< 1 ppm	0.030 ppm	0.120 ppm
Inside TSCR Process Enclosure Process Area with door closed	< 1 ppm	< 0.010 ppm	0.160 ppm

- DRI readings acquired during second field response evolution (10/21/2024):

Location	NH ₃	VOCs (10.6 eV PID)	VOCs (11.7 eV PID)
TSCR Process Enclosure Airlock (via POR655-VT-V-921)	< 1 ppm	0.010 ppm	0.070 ppm
TSCR Process Enclosure Process Area (via POR655-VT-V-922)	< 1 ppm	< 0.010 ppm	0.060 ppm
Immediately inside ingress/egress door to TSCR Process Area	< 1 ppm	< 0.010 ppm	0.100 ppm
Center of TSCR Process Area after 1 st grab sample collected	< 1 ppm	< 0.010 ppm	0.180 ppm
Tool box (hand tools)	< 1 ppm	0.030 ppm	0.190 ppm
Tool box (hose fittings)	< 1 ppm	0.010 ppm	0.220 ppm
Tool box (miscellaneous parts)	< 1 ppm	0.010 ppm	0.190 ppm
Center of TSCR Process Area	< 1 ppm	< 0.010 ppm	0.190 ppm
At outlet vent of A/C unit on North end of Process Area	< 1 ppm	< 0.010 ppm	0.220 ppm
Center of TSCR Process Area after 2 nd grab sample collected	< 1 ppm	< 0.010 ppm	0.230 ppm
Center of TSCR Process Area after 3 rd grab sample collected	< 1 ppm	0.010 ppm	0.220 ppm
Center of TSCR Process Area after 4 th grab sample collected	< 1 ppm	0.010 ppm	0.240 ppm

NOTE: Sampling/Monitoring Results continued on next page:

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INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)

Sampling/Monitoring Results:

Sampling/Monitoring Results continued.

- DRI readings acquired during third field response evolution (10/22/2024):

Location	NH ₃	VOCs (10.6 eV PID)	VOCs (11.7 eV PID)
TSCR Process Enclosure Airlock (via POR655-VT-V-921)	< 1 ppm	< 0.010 ppm	< 0.010 ppm
TSCR Process Enclosure Process Area (via POR655-VT-V-922)	< 1 ppm	< 0.010 ppm	< 0.010 ppm
Center of TSCR Process Area	< 1 ppm	< 0.010 ppm	0.090 ppm
North side of TSCR Process Area	< 1 ppm	< 0.010 ppm	0.110 ppm
South side of TSCR Process Area	< 1 ppm	< 0.010 ppm	0.120 ppm
Center of TSCR Process Area	< 1 ppm	< 0.010 ppm	0.010 ppm

- DRI readings acquired during fourth field response evolution (10/22/2024):

Location	NH ₃	VOCs (10.6 eV PID)	VOCs (11.7 eV PID)
Inside TSCR Process Enclosure Process Area	< 1 ppm	< 0.010 ppm	< 0.010 ppm

- DRI readings acquired during fifth field response evolution (10/22/2024):

Location	NH ₃	VOCs (10.6 eV PID)	VOCs (11.7 eV PID)
Inside TSCR Process Enclosure Process Area	< 1 ppm	< 0.010 ppm	< 0.010 ppm

Shinyei Odor Monitoring results:

- Shinyei odor monitoring was performed on various grab samples collected during field response actions evolutions. See [Additional Information: Shinyei Odor Monitoring](#) for more information.

Sample description / location	OMX-ADM		OMX-SRM	
	Strength	Intensity	Strength	Class
Outside ambient (for comparative purposes)	0	2.5	0	0
TSCR Change Trailer ambient (similar materials)	3	2.5	18.8	51-53
Grab sample from Process Enclosure Process Area	0	2.5	7	67-71
Grab Sample from Process Enclosure Sump	0	2.5	18.0	60-62
Old rubber matting sample	219	3.0	17.9	50-51
New rubber matting sample	68	2.5	53	66-68

Sampling Results:

Sampling was conducted in two evolutions: Sampling was performed on 10/16/2024 during the initial TFC-OPS-OPER-C-67 field response actions and used to perform comparative analysis between ambient atmosphere conducted within the 241AP25/POR655 Process Enclosure Process Area (odor location) and a suspected odor source (rubber matting off-gassing) as indicated by DFLAW management. The second sampling evolution was conducted on 10/21/2024 to acquire additional ambient atmosphere samples for expanded analytical processing as requested by WRPS Management for the purposes of source identification (Phenol and Cresol by OSHA Method 32).

NOTE: Sampling/Monitoring Results continued on next page:

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

Sampling/Monitoring Results:

Sampling/Monitoring Results continued.

- Two grab samples of the atmosphere within the 241AP25/POR655 Process Enclosure Process Area were collected during initial response actions on 10/16/2024. One grab sample was transferred to Carbotrap 300 TDU media for VOC analysis by Gas Chromatography/Mass Spectrometry as per EPA method TO-17A. The other grab sample was transferred to SKC-226-119-7 media for Aldehyde analysis by High Performance Liquid Chromatography as per EPA method TO-11A. Additionally, two material samples were collected for comparative purposes: One approximately 1 ft² section of rubber matting from within the 241AP25/POR655 Process Enclosure Process Area and one approximately 1 ft² section of unused rubber matting from the same stock. Material samples were placed into 25 L Tedlar bags, the bags were sealed then inflated to approximately 25 L. After a period of approximately 21 hours the gaseous contents of the bags were transferred to Carbotrap 300 TDU media for VOC analysis by Gas Chromatography/Mass Spectrometry as per EPA method TO-17A and SKC-226-119-7 media for Aldehyde analysis by High Performance Liquid Chromatography as per EPA method TO-11A. Detectable results are highlighted in gray.

VOCs by TO-17A:

Analytes	Results (ppm)			Applicable OEL (ppm)	
	At odor location	Used floor matting	New floor matting		
1,4-Dichlorobenzene	< 0.0004	< 0.0006	< 0.0006	10	ACGIH TLV
1,1,2,2-Tetrachloroethane	< 0.0004	< 0.0005	< 0.0005	1	ACGIH TLV
1,1,2-Trichloroethane	< 0.0005	< 0.0006	< 0.0006	10	ACGIH TLV
1,1-Dichloroethane	< 0.0006	< 0.0008	< 0.0008	100	ACGIH TLV
1,1-Dichloroethene	< 0.0006	< 0.0008	< 0.0008	5	ACGIH TLV
1,2-Dichloroethane	< 0.0006	< 0.0008	< 0.0008	10	ACGIH TLV
1,4-Dioxane	< 0.0007	< 0.0009	0.0053	20	OSHA PEL
1-Propanol	< 0.0010	< 0.0014	< 0.0014	100	ACGIH TLV
2,5-Dihydrofuran	< 0.0009	< 0.0012	< 0.0012	0.002	ACGIH TLV
2-Butanone	< 0.0008	< 0.0011	0.0057	200	NIOSH REL
2-Hepatanone	< 0.0005	< 0.0007	< 0.0007	50	ACGIH TLV
2-Hexanone	< 0.0006	< 0.0008	< 0.0008	5	ACGIH TLV
2-Methylfuran	< 0.0007	< 0.0010	< 0.0010	0.002	HTF OEL
2-Propenenitrile	< 0.0007	< 0.0009	< 0.0009	2	NIOSH REL
3-Buten-2-one	< 0.0009	< 0.0012	< 0.0012	0.2	ACGIH Ceiling
3-Heptanone	< 0.0005	< 0.0007	0.0009	50	ACGIH TLV
3-Octanone	< 0.0005	< 0.0006	< 0.0006	N/A	
Acetone	0.0101	0.0210	0.0364	250	NIOSH REL
Acetonitrile	0.0032	0.0028	0.0111	20	NIOSH REL
Acetophenone	< 0.0005	< 0.0007	0.0030	10	ACGIH TLV
Acrylonitrile	< 0.0011	< 0.0014	0.0138	2	NIOSH REL
Allyl Chloride	< 0.0008	< 0.0011	< 0.0011	1	NIOSH REL
Benzene	< 0.0008	0.0047	0.0135	0.5	NIOSH REL
Benzonitrile	< 0.0006	< 0.0008	< 0.0008	N/A	
Butanenitrile	< 0.0009	< 0.0012	< 0.0012	8	ACGIH TLV
Carbon Tetrachloride	< 0.0004	< 0.0005	< 0.0005	5	OSHA PEL

Note: Analytical results continued on next page.

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

Sampling/Monitoring Results:

Analytical results for VOCs by TO-17A continued:

Analytes	Results (ppm)			Applicable OEL (ppm)	
	At odor location	Used floor matting	New floor matting		
Chlorobenzene	< 0.0005	< 0.0007	< 0.0007	10	OSHA PEL
Chloroform	< 0.0005	< 0.0007	< 0.0007	10	OSHA PEL
cis-1,3-Dichloropropene	< 0.0005	< 0.0007	< 0.0007	1	ACGIH TLV
Cyclohexane	< 0.0007	0.0050	< 0.0010	100	ACGIH TLV
Decane	< 0.0004	< 0.0006	< 0.0006	200	ACGIH TLV
Ethanol	0.0075	0.0741	0.0547	1000	NIOSH REL
Ethyl Acetate	< 0.0007	< 0.0009	< 0.0009	400	ACGIH TLV
Ethyl Benzene	< 0.0006	0.0100	0.0008	20	ACGIH TLV
Ethyl Chloride	< 0.0009	< 0.0013	< 0.0013	100	ACGIH TLV
Hexanenitrile	< 0.0006	< 0.0008	< 0.0008	6	ACGIH TLV
Methyl Acrylonitrile	< 0.0009	< 0.0012	< 0.0012	1	ACGIH TLV
Methyl isobutyl ketone	< 0.0006	< 0.0008	0.0195	20	ACGIH TLV
Methylene Chloride	< 0.0007	< 0.0010	< 0.0010	25	OSHA PEL
n-Butyl acetate	< 0.0005	< 0.0007	< 0.0007	50	NIOSH REL
n-Heptane	< 0.0006	0.0024	0.0038	400	ACGIH TLV
n-Hexane	< 0.0007	0.0071	< 0.0009	50	ACGIH TLV
Naphthalene	< 0.0005	< 0.0006	< 0.0006	10	ACGIH TLV
Nitrobenzene	< 0.0005	< 0.0007	< 0.0007	1	ACGIH TLV
Pentanenitrile	< 0.0007	< 0.0010	< 0.0010	5	ACGIH TLV
Propanenitrile	< 0.0011	< 0.0015	< 0.0015	6	ACGIH TLV
Styrene	< 0.0006	< 0.0008	< 0.0008	20	ACGIH TLV
Tetrachloroethylene	< 0.0004	< 0.0005	< 0.0005	25	ACGIH TLV
Toluene	< 0.0007	0.0459	0.0071	20	ACGIH TLV
trans-1,3-Dichloropropene	< 0.0005	< 0.0007	< 0.0007	1	ACGIH TLV
Trichloroethylene	< 0.0005	< 0.0006	< 0.0006	10	ACGIH TLV
Trichlorofluoromethane	< 0.0004	< 0.0006	< 0.0006	1000	ACGIH Ceiling
Tentatively Identified Compounds*1:					
2,2,4-trimethyl-Pentane	ND	0.01992	ND	75	NIOSH REL
2,2,5-trimethyl-Hexane	ND	0.00824	ND	N/A	
2,3,4-trimethyl-Pentane	ND	0.01423	ND	N/A	
2,3-dimethyl-Pentane	ND	0.00568	0.00381	N/A	
2,5-dimethyl-hexane	ND	0.00555	ND	N/A	
2-Methyl Pentane	ND	0.0083	ND	100	NIOSH REL
2-Methyl-1-Propene	ND	ND	0.00796	800	NIOSH REL
2-Methyl-Butane	ND	0.01239	ND	120	NIOSH REL
2-methyl-Hexane	ND	ND	0.00543	N/A	
3-Ethyl-4-Methyl-2-pentene	ND	ND	0.00869	N/A	

Note: Analytical results continued on next page.

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

Sampling/Monitoring Results:

Analytical results for VOCs by TO-17A continued:

Analytes	Results (ppm)			Applicable OEL (ppm)	
	At odor location	Used floor matting	New floor matting		
3-Methyl-2-Heptene	ND	ND	0.00869	N/A	
3-Methylene-Heptane	ND	ND	0.02968	N/A	
4-cyanocyclohexene	ND	0.0044	ND	N/A	
α-Pinene	ND	0.00597	ND	20	ACGIH TLV
Cyclohexanone	ND	ND	0.00488	20	ACGIH TLV
Hexanal	ND	ND	0.00641	N/A	
Methyl Methacrylate	ND	ND	0.00414	50	ACGIH TLV
Nonanal	0.0014	ND	ND	N/A	
o-Xylene	ND	0.02144	0.00337	20	ACGIH TLV
Pentane	ND	0.00755	ND	120	NIOSH REL
Phenol	0.0017	ND	0.14673	5	ACGIH TLV
p-Xylene	ND	0.06355	0.00612	20	ACGIH TLV
Unknown Compound 1	ND	0.0142 mg/m ³ *2	ND	N/A	
Unknown Compound 2	ND	ND	0.0432 mg/m ³ *2	N/A	
Unknown Compound 3	ND	ND	0.4561 mg/m ³ *2	N/A	

Aldehydes by TO-11A:

Analytes	Results (ppm)			Applicable OEL (ppm)	
	At odor location	Used floor matting	New floor matting		
Formaldehyde	< 0.0056	< 0.0070	0.0081	0.3	ACGIH TLV
Acetaldehyde	0.0030	0.0058	0.0348	25	ACGIH TLV
Acrolein	< 0.0009	< 0.0011	< 0.0011	0.1	ACGIH TLV
Propionaldehyde	< 0.0029	< 0.0036	0.0204	20	ACGIH TLV
Butyraldehyde (Butanal)	0.0023	0.0033	0.0069*3	25	ACGIH TLV
Valeraldehyde	< 0.0020	< 0.0024	0.0025	50	ACGIH TLV
Hexanal	< 0.0017	< 0.0021	0.0059	N/A	

*1 Tentatively Identified Compounds are analytes not associated with a calibration standard, but instead identified only through a Data System Library search based on retention time and mass. Results are not definitive as results are not subject to Laboratory Quality Control requirements. "ND" indicates that analyte was not detected in sample as analytical laboratory does not provide a RDL for analyte.

*2 ppm air concentration results could not be calculated as MW of compound is unknown, analyte mass per unit volume result provided.

*3 Results were blank corrected utilizing results from field blank provided for individual sample.

NOTE: All analytes from the ambient air sample collected from within the 241AP25/POR655 Process Enclosure Process Area were below 10% of applicable OELs except for 2,5-Dihydrofuran (Less than detectable at 45% of OEL [0.002 ppm]) and 2-Methylfuran (Less than detectable at 35% of OEL [0.002 ppm]) due to RDL.

NOTE: Sampling/Monitoring Results continued on next page:

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

Sampling/Monitoring Results:

Sampling/Monitoring Results continued.

- Eight grab samples of the atmosphere within the 241AP25/POR655 Process Enclosure Process Area were collected during follow-up response actions on 10/21/2024. Four grab samples were collected from the odor location via POR655-VT-V-922 prior to entry, and another four grab samples were collected from the airspace below grating (below rubber matting) near the 241AP25/POR655 Process Enclosure Process Area sump via insertion of Tygon® tubing through a penetration in the rubber matting to approximately 6 inches above the floor. One grab sample from each location was transferred to Carbotrap 300 TDU media for VOC analysis by Gas Chromatography/Mass Spectrometry as per EPA method TO-17A. One grab sample from each was transferred to SKC-226-119-7 media for Aldehyde analysis by High Performance Liquid Chromatography as per EPA method TO-11A. Detectable results are highlighted in gray.

VOCs by TO-17A:

Analytes	Results (ppm)		Applicable OEL (ppm)	
	At odor location	Under Grating		
1,4-Dichlorobenzene	< 0.0004	< 0.0004	10	ACGIH TLV
1,1,2,2-Tetrachloroethane	< 0.0004	< 0.0004	1	ACGIH TLV
1,1,2-Trichloroethane	< 0.0005	< 0.0005	10	ACGIH TLV
1,1-Dichloroethane	< 0.0006	< 0.0006	100	ACGIH TLV
1,1-Dichloroethene	< 0.0006	< 0.0006	5	ACGIH TLV
1,2-Dichloroethane	< 0.0006	< 0.0006	10	ACGIH TLV
1,4-Dioxane	< 0.0007	< 0.0007	20	OSHA PEL
1-Propanol	< 0.0010	< 0.0010	100	ACGIH TLV
2,5-Dihydrofuran	< 0.0009	< 0.0009	0.002	ACGIH TLV
2-Butanone	< 0.0008	< 0.0008	200	NIOSH REL
2-Hepatanone	< 0.0005	< 0.0005	50	ACGIH TLV
2-Hexanone	< 0.0006	< 0.0006	5	ACGIH TLV
2-Methylfuran	< 0.0007	< 0.0007	0.002	HTF OEL
2-Propenenitrile	< 0.0007	< 0.0007	2	NIOSH REL
3-Buten-2-one	< 0.0009	< 0.0009	0.2	ACGIH Ceiling
3-Heptanone	< 0.0005	< 0.0005	50	ACGIH TLV
3-Octanone	< 0.0005	< 0.0005	N/A	
Acetone	0.0104	0.0135	250	NIOSH REL
Acetonitrile	0.0043	0.0018	20	NIOSH REL
Acetophenone	< 0.0005	< 0.0005	10	ACGIH TLV
Acrylonitrile	< 0.0011	< 0.0011	2	NIOSH REL
Allyl Chloride	< 0.0008	< 0.0008	1	NIOSH REL
Benzene	< 0.0008	< 0.0008	0.5	NIOSH REL
Benzonitrile	< 0.0006	< 0.0006	N/A	
Butanenitrile	< 0.0009	< 0.0009	8	ACGIH TLV
Carbon Tetrachloride	< 0.0004	< 0.0004	5	OSHA PEL
Chlorobenzene	< 0.0005	< 0.0005	10	OSHA PEL
Chloroform	< 0.0005	< 0.0005	10	OSHA PEL

Note: Analytical results continued on next page.

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

Sampling/Monitoring Results:

Analytical results for VOCs by TO-17A continued:

Analytes (continued)	Results (ppm)		Applicable OEL (ppm)	
	At odor location	Under Grating		
cis-1,3-Dichloropropene	< 0.0005	< 0.0005	1	ACGIH TLV
Cyclohexane	< 0.0007	< 0.0007	100	ACGIH TLV
Decane	< 0.0004	< 0.0004	200	ACGIH TLV
Ethanol	0.0038	0.0060	1000	NIOSH REL
Ethyl Acetate	< 0.0007	< 0.0007	400	ACGIH TLV
Ethyl Benzene	< 0.0006	< 0.0006	20	ACGIH TLV
Ethyl Chloride	< 0.0009	< 0.0009	100	ACGIH TLV
Hexanenitrile	< 0.0006	< 0.0006	6	ACGIH TLV
Methyl Acrylonitrile	< 0.0009	< 0.0009	1	ACGIH TLV
Methyl isobutyl ketone	0.0011	0.0008	20	ACGIH TLV
Methylene Chloride	< 0.0007	< 0.0007	25	OSHA PEL
n-Butyl acetate	< 0.0005	< 0.0005	50	NIOSH REL
n-Heptane	< 0.0006	< 0.0006	400	ACGIH TLV
n-Hexane	< 0.0007	< 0.0007	50	ACGIH TLV
Naphthalene	< 0.0005	< 0.0005	10	ACGIH TLV
Nitrobenzene	< 0.0005	< 0.0005	1	ACGIH TLV
Pentanenitrile	< 0.0007	< 0.0007	5	ACGIH TLV
Propanenitrile	< 0.0011	< 0.0011	6	ACGIH TLV
Styrene	< 0.0006	< 0.0006	20	ACGIH TLV
Tetrachloroethylene	< 0.0004	< 0.0004	25	ACGIH TLV
Toluene	< 0.0007	< 0.0007	20	ACGIH TLV
trans-1,3-Dichloropropene	< 0.0005	< 0.0005	1	ACGIH TLV
Trichloroethylene	< 0.0005	< 0.0005	10	ACGIH TLV
Trichlorofluoromethane	< 0.0004	< 0.0004	1000	ACGIH Ceiling

Tentatively Identified Compounds*1:

Isoprene	ND	0.0027	N/A
Nonanal	0.0014	ND	N/A

Aldehydes by TO-11A:

Analytes	Results (ppm)		Applicable OEL (ppm)	
	At odor Location	Under Grating		
Formaldehyde	< 0.0056	< 0.0056	0.3	ACGIH TLV
Acetaldehyde	0.0019* ³	0.0024	25	ACGIH TLV
Acrolein	< 0.0009	< 0.0009	0.1	ACGIH TLV
Propionaldehyde	< 0.0027	< 0.0027	20	ACGIH TLV
Butyraldehyde (Butanal)	0.0003* ³	0.0025	25	ACGIH TLV

Note: Analytical results continued on next page.

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

Sampling/Monitoring Results:

Analytical results for Aldehydes by TO-11A continued:

Analytes (continued)	Results (ppm)		Applicable OEL (ppm)
	At odor Location	Under Grating	
Valeraldehyde	< 0.0019	< 0.0019	50 ACGIH TLV
Hexanal	< 0.0017	< 0.0017	N/A

*1 Tentatively Identified Compounds are analytes not associated with a calibration standard, but instead identified only through a Data System Library search based on retention time and mass. Results are not definitive as results are not subject to Laboratory Quality Control requirements. "ND" indicates that analyte was not detected in sample as analytical laboratory does not provide a RDL for analyte.

*3 Results were blank corrected utilizing results from field blank provided for individual sample.

NOTE: All analytes from the ambient air samples collected from within the 241AP25/POR655 Process Enclosure Process Area were below 10% of applicable OELs except for 2,5-Dihydrofuran (Less than detectable at 43% of OEL [0.002 ppm] at the odor location and below grating) and 2-Methylfuran (Less than detectable at 37% of OEL [0.002 ppm] at the odor location and below grating) due to RDL.

- Due to longer than expected lead time to procure SKC-226-95 media to support Phenol and Cresol analysis by OSHA method 32 sampling was conducted on 11/06/2024. Previously collected material samples were placed into 25 L Tedlar bags, the bags were sealed then inflated to approximately 25 L. After a period of approximately 25 hours the gaseous contents of the bags were transferred to SKC-226-95 media and analyzed Phenol/Cresol by Gas Chromatography/Mass Spectrometry by OSHA Method 32. For comparative purposes an additional sample was collected from the only remaining atmospheric grab sample with sufficient volume to meet requested Data Quality Objectives (limited by RDL applied to collected volume): Ambient atmosphere from below grating. Detectable results are highlighted in gray.

Phenol/Cresol by OSHA Method 32

Analytes	Results			Applicable OEL	
	Under Grating	Used Floor Matting	New Floor Matting		
Phenol	< 0.0053 ppm	0.0174 ppm	< 0.0054 ppm	5 ppm	ACGIH TLV
Cresol (all isomers)	< 0.0202 mg/m ³	< 0.0209 mg/m ³	< 0.0208 mg/m ³	20 mg/m ³	ACGIH TLV

NOTE: All analytes from the ambient air samples collected from within the 241AP25/POR655 Process Enclosure Process Area were below 10% of applicable OELs.

NOTE: Sampling/Monitoring results continued on next page.

INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)**Sampling/Monitoring Results:**

Sampling/Monitoring results continued:

Sampling/Monitoring Results Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienists
DRI	Direct Reading Instrumentation
eV	Electron Volts
LFL	Lower Flammability Level
mg/m ³	Milligrams per cubic meter
MW	Molecular Weight
ND	Not Detected (non-detect)
NH ₃	Ammonia
NIOSH	National Institute of Occupational Safety and Health
OEL	Occupational Exposure Limit
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
PID	Photo Ionization Detector
ppm	Parts Per Million
RDL	Reporting Detection Limit
REL	Recommended Exposure Limit
RES	Refrigeration Equipment Services
STEL	Short Term Exposure Limit (typically 15 minutes)
TDU	Thermal Desorb Unit sample media
TLV	Threshold Limit Value
TSR	Time Sensitive Requirement
TWA	Time Weighted Average (typically 8 hours)
VOCs	Volatile Organic Compounds

INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)**SWIHD References:****Initiating Event Site Wide Industrial Hygiene Database DRI Surveys:**

- DRI # 24-08443 *"Odor investigation at TSCR"*
- DRI # 24-08453 *"TSCR Habitability"*
- DRI # 24-08454 *"TSCR Habitability"*

Event Response Site Wide Industrial Hygiene Database DRI and Air Surveys:

- DRI # 24-08477 *"TFC-OPS-OPER-C-67 response at TSCR #1"*
- Air # 24-08478 *"TFC-OPS-OPER-C-67 TSCR VOC grab sample 1"*
- Air # 24-08479 *"TFC-OPS-OPER-C-67 TSCR Aldehyde grab sample 1"*
- Air # 24-08523 *"TFC-OPS-OPER-C-67 TSCR floor matting used 1"*
- Air # 24-08524 *"TFC-OPS-OPER-C-67 TSCR floor matting new 1"*
- AIR # 24-08594 *"TFC-OPS-OPER-C-67 TSCR Aldehyde grab sample 2"*
- AIR # 24-08595 *"TFC-OPS-OPER-C-67 TSCR VOC grab sample 2"*
- AIR # 24-08596 *"TFC-OPS-OPER-C-67 TSCR Aldehyde grab sample 3"*
- AIR # 24-08598 *"TFC-OPS-OPER-C-67 TSCR VOC grab sample 3"*
- DRI # 24-08605 *"TFC-OPS-OPER-C-67 response at TSCR #2"*
- DRI # 24-08660 *"TFC-OPS-OPER-C-67 response at TSCR #3"*
- AIR # 24-08978 *"TFC-OPS-OPER-C-67 TSCR Phenol/Cresol Analysis"*

INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)**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. Voluntary-use of Respiratory Protection Equipment was offered to event response participants.

While the odor description is inconsistent with Tank Waste Chemical Vapors, due to the proximity to the Tank Farms and workforce cultural expectations, 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.

NOTE: Additional Information continued on next page.

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INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)

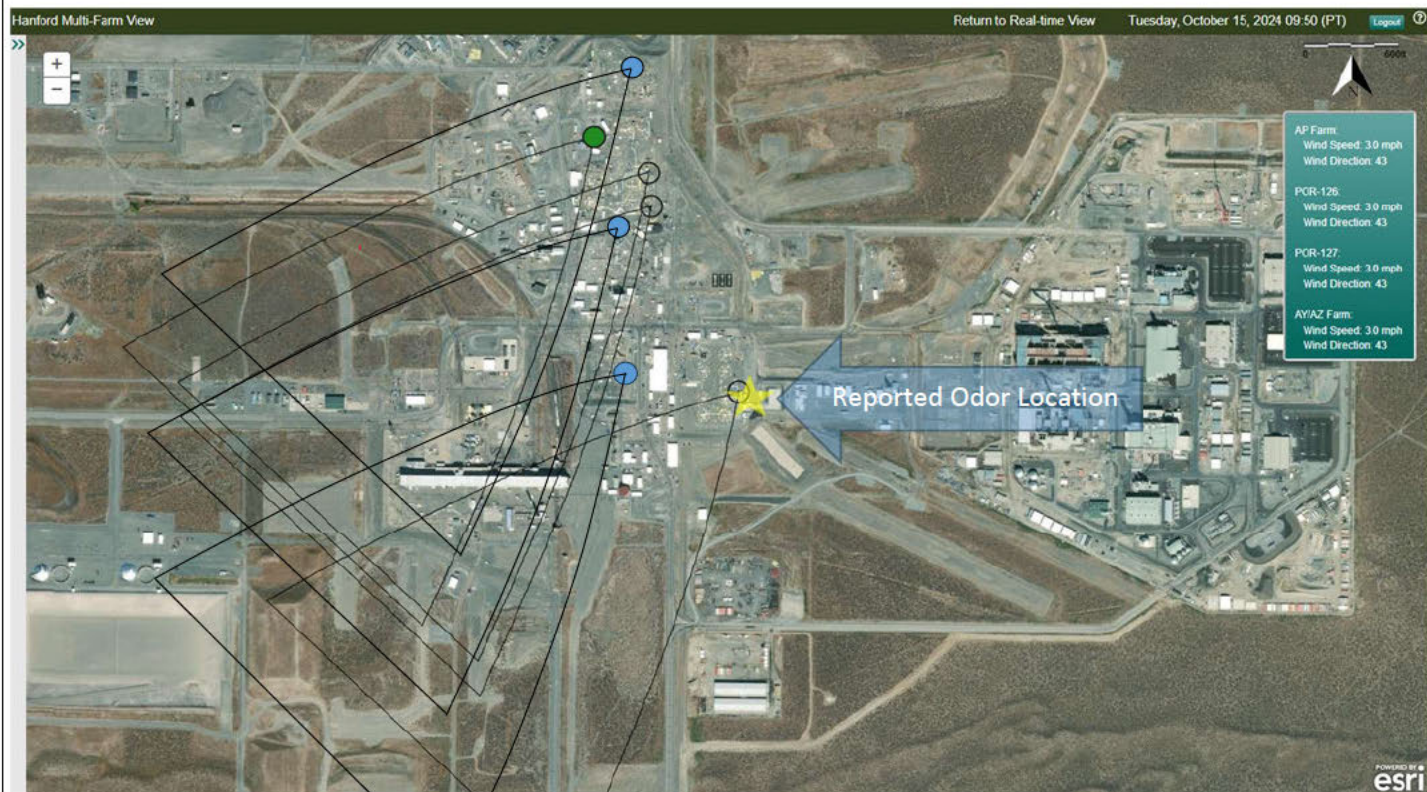
Additional Information:

Additional Information continued:

Data Fusion & Advisory System (DFAS)

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

DFAS Multi-Farm View Exhauster Plume Model: 10/15/2024 @ 0950 (time of first indication of odors):



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

DFAS Weather Conditions: 10/15/2024 @ 0915 (time of first indication of odors):

- Wind Speed: 3.0 mph (15-minute average)
- Wind Direction: 43° (out of Northeast)
- Mixing Height: 140 feet above grade
- Stability Class: A (Extremely Unstable conditions)

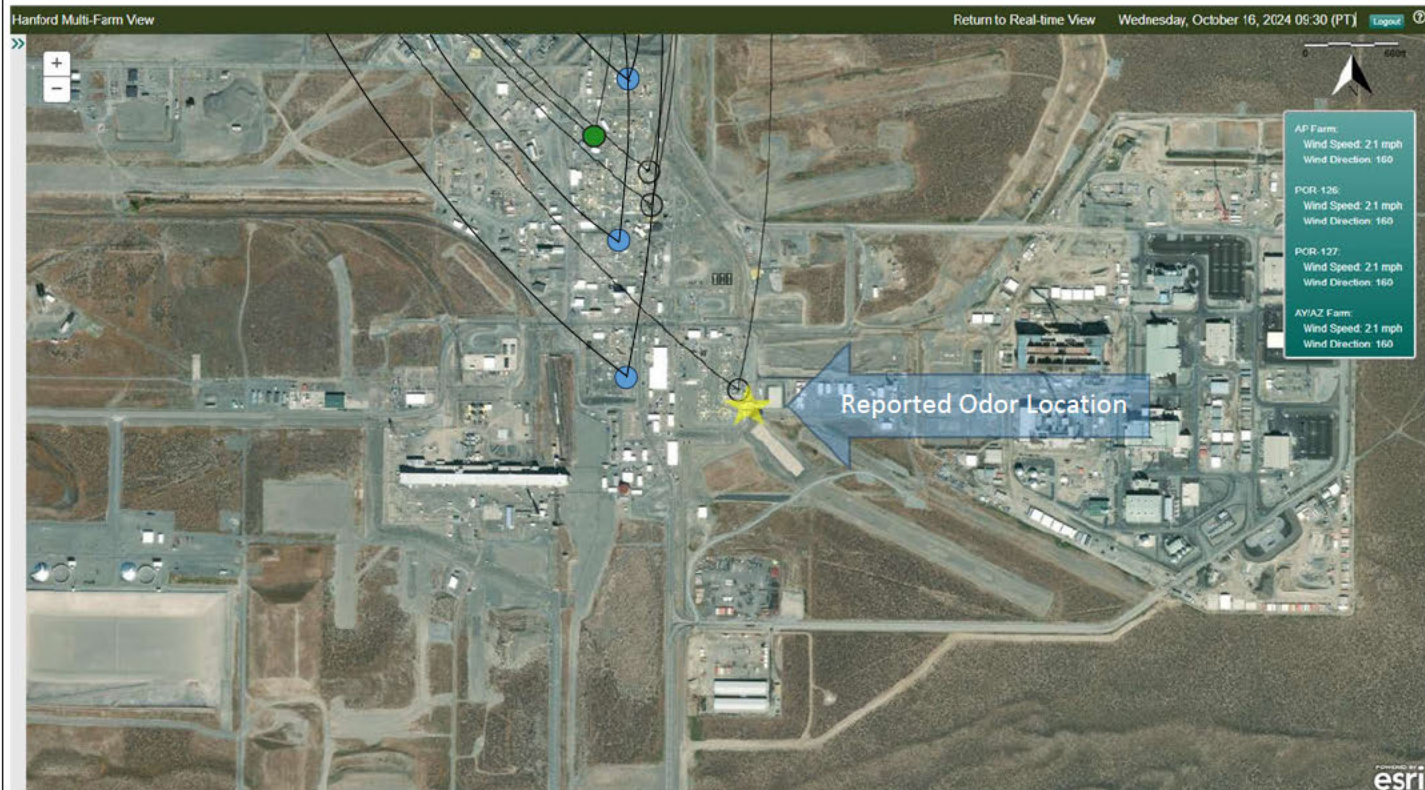
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Washington River Protection Solutions
INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)

Additional Information:

Additional Information continued:

DFAS Multi-Farm View Exhauster Plume Model: 10/16/2024 @ 0930 (approximate time of initiating event):



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

DFAS Weather Conditions: 10/16/2024 @ 0930 (approximate time of initiating event):

- Wind Speed: 2.1 mph (15-minute average)
- Wind Direction: 160° (out of South-Southeast)
- Mixing Height: 800 feet above grade
- Stability Class: A (Extremely Unstable conditions)

NOTE: Additional Information continued on next page.

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

Additional Information:

Additional Information continued:

DFAS Multi-Farm View Exhauster Plume Model: 10/16/2024 @ 1340 (approximate time of initial Field Response Actions evolution):



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

DFAS Weather Conditions: 10/16/2024 @ 1340 (current weather data for initial Field Response Actions evolution, per TFC-OPS-OPER-C-67 4.2.8.a):

- Wind Speed: 7.6 mph (15-minute average)
- Wind Direction: 265° (out of West)
- Mixing Height: 1400 feet above grade
- Stability Class: A (Extremely Unstable conditions)

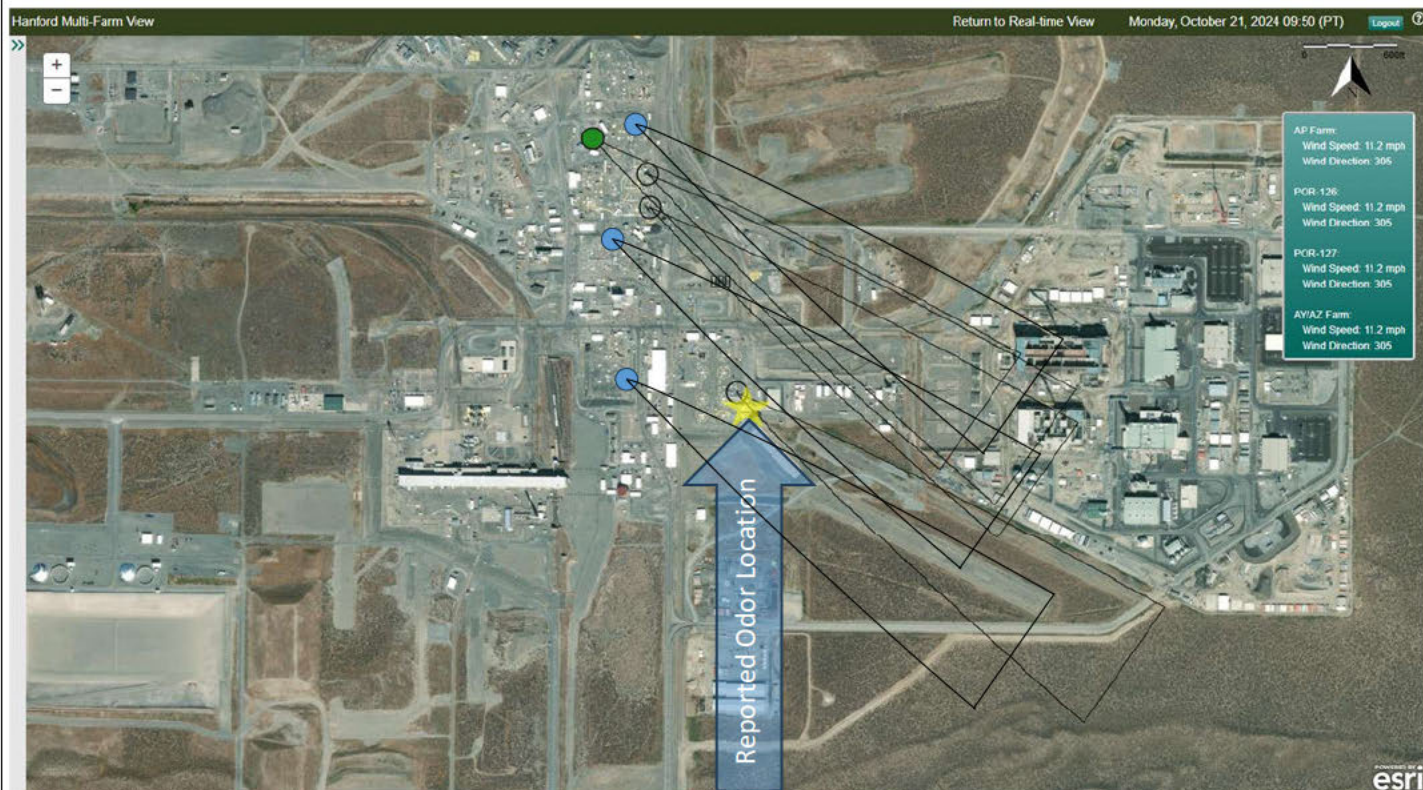
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Washington River Protection Solutions
INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)

Additional Information:

Additional Information continued:

DFAS Multi-Farm View Exhauster Plume Model: 10/21/2024 @ 0950 (approximate time of second Field Response Actions evolution):



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

DFAS Weather Conditions: 10/21/2024 @ 0950 (current weather data for second Field Response Actions evolution, per TFC-OPS-OPER-C-67 4.2.8.a):

- Wind Speed: 11.2 mph (15-minute average)
- Wind Direction: 305° (out of Northwest)
- Mixing Height: 800 feet above grade
- Stability Class: E (Slightly Stable conditions)

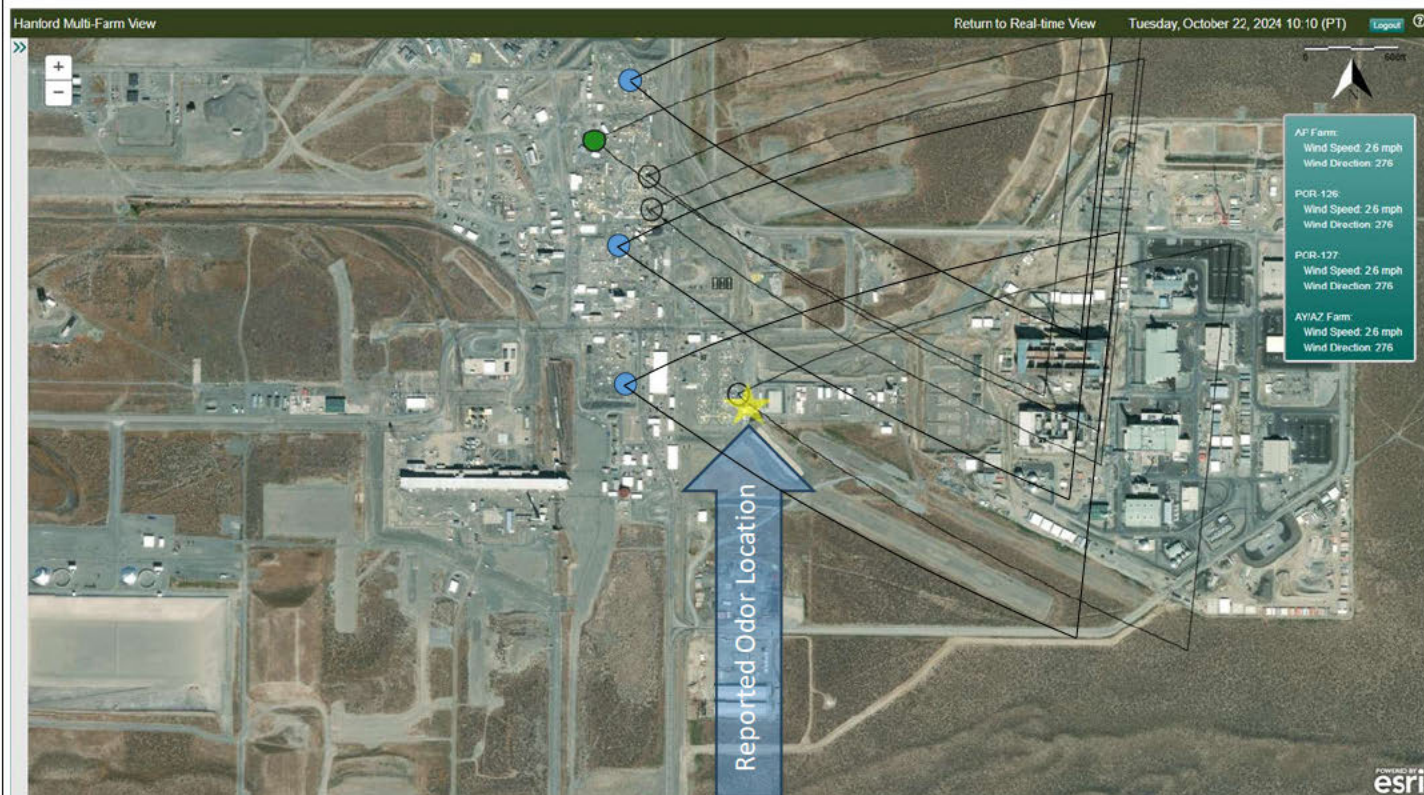
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Washington River Protection Solutions
INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)

Additional Information:

Additional Information continued:

DFAS Multi-Farm View Exhauster Plume Model: 10/22/2024 @ 1010 (approximate time of third Field Response Actions evolution):



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

DFAS Weather Conditions: 10/22/2024 @ 1010 (current weather data for third Field Response Actions evolution, per TFC-OPS-OPER-C-67 4.2.8.a):

- Wind Speed: 2.6 mph (15-minute average)
- Wind Direction: 276° (out of West)
- Mixing Height: 500 feet above grade
- Stability Class: A (Extremely Unstable conditions)

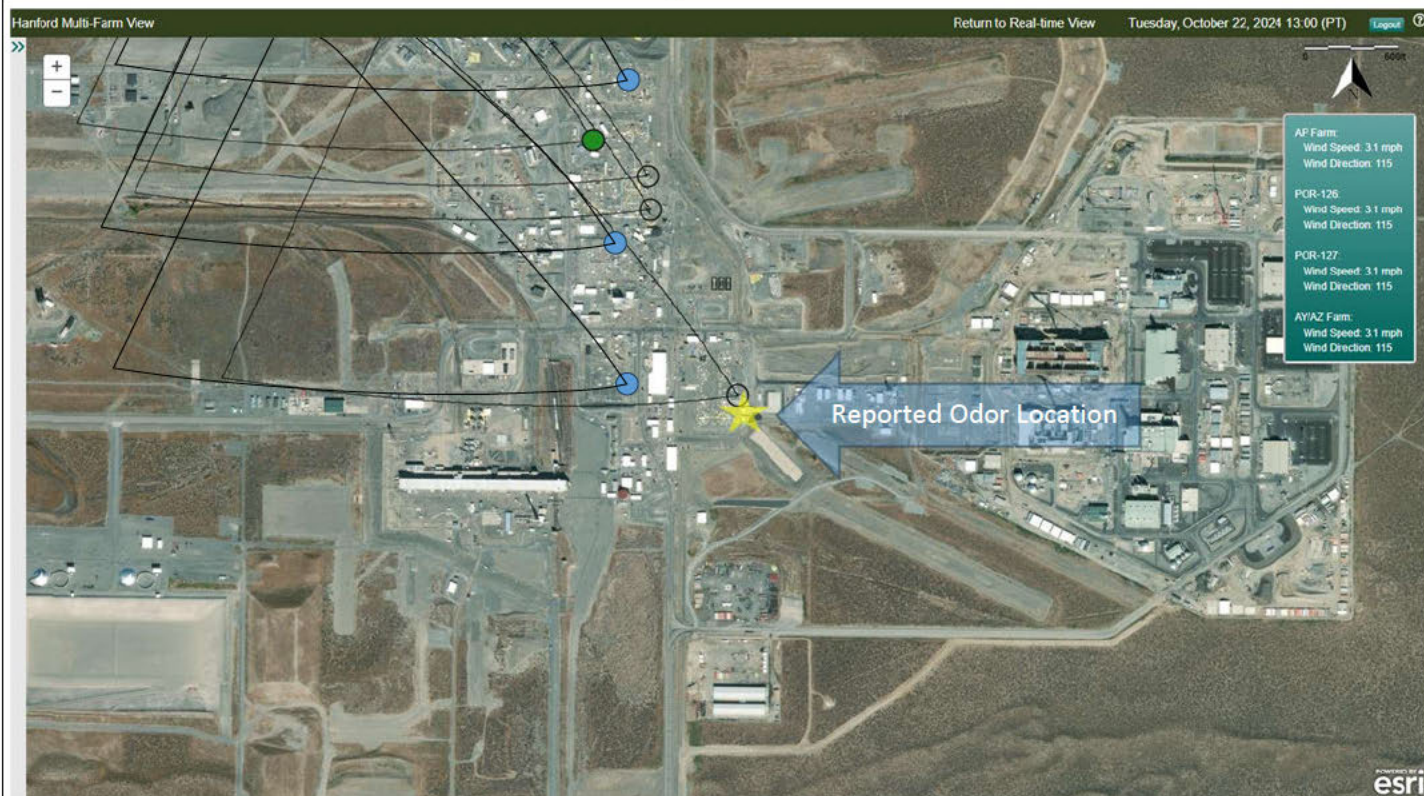
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Washington River Protection Solutions
INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)

Additional Information:

Additional Information continued:

DFAS Multi-Farm View Exhauster Plume Model: 10/22/2024 @ 1300 (approximate time of fourth Field Response Actions evolution):



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

DFAS Weather Conditions: 10/22/2024 @ 1300 (current weather data for fourth Field Response Actions evolution, per TFC-OPS-OPER-C-67 4.2.8.a):

- Wind Speed: 3.1 mph (15-minute average)
- Wind Direction: 115° (out of East-Southeast)
- Mixing Height: 1300 feet above grade
- Stability Class: A (Extremely Unstable conditions)

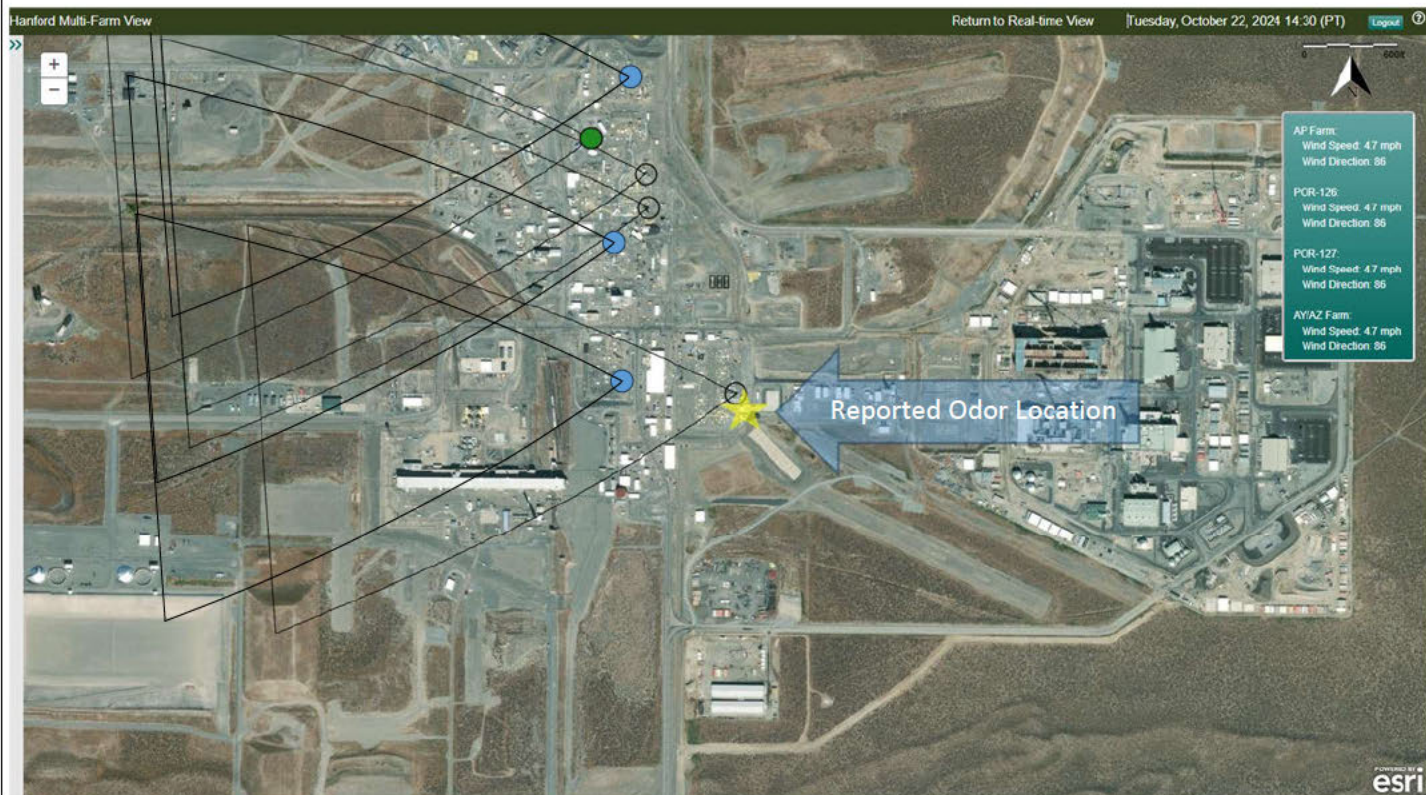
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Washington River Protection Solutions
INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)

Additional Information:

Additional Information continued:

DFAS Multi-Farm View Exhauster Plume Model: 10/22/2024 @ 1430 (approximate time of fifth Field Response Actions evolution):



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

DFAS Weather Conditions: 10/22/2024 @ 1430 (current weather data for fifth Field Response Actions evolution, per TFC-OPS-OPER-C-67 4.2.8.a):

- Wind Speed: 4.7 mph (15-minute average)
- Wind Direction: 86° (out of East)
- Mixing Height: 1500 feet above grade
- Stability Class: A (Extremely Unstable conditions)

NOTE: Additional Information continued on next page.

INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)**Additional Information:**

Additional Information continued:

The 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) (CushmanRoisin, 2012). The National Oceanic and Atmospheric Administration (NOAA) Pasquill stability classes are denoted by 7 letters ranging from A (extremely unstable conditions) to G (extremely stable conditions). An unstable atmosphere is characterized by significant vertical displacement of air, a negative vertical temperature gradient (the temperature decreases with height), along with frequent fluctuations in wind direction and strong solar radiation. A stable atmosphere has low turbulence, positive vertical temperature (temperature increases with height), little fluctuation in the wind direction, and limited solar radiation (Casal, 2008). Exhauster plumes may move horizontally (stability classes A, B, C, and D) or vertical (stability classes E, F, and G). Horizontal plumes found during unstable and neutral states are further characterized by their pattern: fanning, fumigation, coning, looping, and lofting. At Hanford Tank Farms exhauster plumes may interact with ground level during stability class A conditions if the Mixing Height constricts plume dispersion at sufficiently low levels (typically less than 100 ft. above grade). The concentration of plume-borne contaminants at the ground level receptor is dependent on the concentration of the emission and the factor of dilution occurring through dispersion as the plume emission moves away from the emission point.

Vapor Monitoring Detection System (VMDS)

Active ventilation systems exhaust a mixture of all connected tanks with output through a "stack". The emission of exhaust ventilation systems is monitored either continuously by the VMDS or periodically by alternate monitoring.

VMDS exhauster ammonia readings on 10/15/2024 @ 0950 (approximate time of first indication of odors):

- POR518 (241-A): 12.756 ppm
- POR519 (241-A): N/A
- 241-AN: N/A
- 241-AW: 13.952 ppm
- POR126 (241-AX): 0.000 ppm
- POR127 (241-AX): 0.000 ppm
- 702AZ (241-AY/AZ): 27.677 ppm
- 241-AP: 14.602 ppm

VMDS exhauster ammonia readings on 10/16/2024 @ 0930 (approximate time of first initiating event):

- POR518 (241-A): 7.086 ppm
- POR519 (241-A): 15.242 ppm
- 241-AN: N/A
- 241-AW: 12.945 ppm
- POR126 (241-AX): 0.000 ppm
- POR127 (241-AX): 0.000 ppm
- 702AZ (241-AY/AZ): 28.061 ppm
- 241-AP: 11.602 ppm

NOTE: Additional Information continued on next page.

INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)**Additional Information:**

Additional Information continued:

VMDS exhauster ammonia readings on 10/16/2024 @ 1340 (approximate time of initial Field Response Actions evolution):

- POR518 (241-A): 5.900 ppm
- POR519 (241-A): 12.599 ppm
- 241-AN: N/A
- 241-AW: 13.131 ppm
- POR126 (241-AX): 0.000 ppm
- POR127 (241-AX): 0.000 ppm
- 702AZ (241-AY/AZ): 27.878 ppm
- 241-AP: 9.757 ppm

VMDS exhauster ammonia readings on 10/21/2024 @ 0950 (approximate time of second Field Response Actions evolution):

- POR518 (241-A): 43.955 ppm
- POR519 (241-A): 111.526 ppm
- 241-AN: N/A
- 241-AW: 8.592 ppm
- POR126 (241-AX): 0.000 ppm
- POR127 (241-AX): 0.000 ppm
- 702AZ (241-AY/AZ): 25.657 ppm
- 241-AP: 23.091 ppm

VMDS exhauster ammonia readings on 10/22/2024 @ 1010 (approximate time of third Field Response Actions evolution):

- POR518 (241-A): 10.861 ppm
- POR519 (241-A): 25.918 ppm
- 241-AN: N/A
- 241-AW: 12.428 ppm
- POR126 (241-AX): 0.000 ppm
- POR127 (241-AX): 0.000 ppm
- 702AZ (241-AY/AZ): 26.020 ppm
- 241-AP: 80.111 ppm

NOTE: Additional Information continued on next page.

INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)**Additional Information:**

Additional Information continued:

VMDS exhauster ammonia readings on 10/22/2024 @ 1300 (approximate time of fourth Field Response Actions evolution):

- POR518 (241-A): 10.122 ppm
- POR519 (241-A): 22.884 ppm
- 241-AN: N/A
- 241-AW: 11.441 ppm
- POR126 (241-AX): 0.000 ppm
- POR127 (241-AX): 0.000 ppm
- 702AZ (241-AY/AZ): 26.206 ppm
- 241-AP: 85.412 ppm

VMDS exhauster ammonia readings on 10/22/2024 @ 1430 (approximate time of fifth Field Response Actions evolution):

- POR518 (241-A): 9.240 ppm
- POR519 (241-A): 20.900 ppm
- 241-AN: N/A
- 241-AW: 11.292 ppm
- POR126 (241-AX): 0.000 ppm
- POR127 (241-AX): 0.000 ppm
- 702AZ (241-AY/AZ): 26.141 ppm
- 241-AP: 69.084 ppm

NOTE: Additional Information continued on next page.

Washington River Protection Solutions

INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)**Additional Information:**

Additional Information continued:

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) summary: 10/08/2024 @ 0950 to 10/16/2024 @ 0950:

Tank Farm	Exhauster	Minimum ^{*A}	Maximum ^{*A}
241-A	POR518/POR519	0.000 ppm	219.187 ppm
241-AN	Primary	N/A	N/A
241-AP	Primary	N/A	24.762 ppm
241-AW	Primary	10.529 ppm	36.039 ppm ^{*B}
241-AX	POR126/POR127	0.000 ppm	25.876 ppm
241-AY/AZ	702AZ	0.000 ppm	28.806 ppm

^{*A} VMDS Alternate Real Time Monitoring performed 10/08/2024 to 10/16/2024 for 241-A (POR518/POR519), 241-AN, 241-AP, 241-AW, 241-AY/AZ, and 241-SY.

^{*B} AW VMDS Calibration (WO1122476) was performed on 10/14/2024. Calibration involves introduction of high concentration NH₃ standard gas to the VMDS sensor cell. Highest recorded value during calibration was 1434.971 ppm.

VMDS Alternate Real Time Monitoring

The 241-SY Primary Exhauster is 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.

NOTE: Additional Information continued on next page.

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INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)**Additional Information:**

Additional Information continued:

Vapor Monitoring Detection System (VMDS) Alternate Monitoring 10/08/2024 to 10/16/2024:

Tank Farm	Exhauster	Minimum	Maximum
241-A	POR518/POR519	49 ppm	49 ppm
241-AN	Primary	8 ppm	21 ppm
241-AP	Primary	19 ppm	27 ppm
241-AW	Primary	3 ppm	4 ppm
241-AX	POR126/POR127	N/A	N/A
241-AY/AZ	702AZ	5 ppm	41 ppm
241-SY	Primary	7 ppm	23 ppm

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; as concentrations at emission points was insufficient to allow for the possibility of notable concentrations at the ground receptor, weather conditions did not allow for ground-plume interaction.

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 Ammonia, VOCs (10.6 eV PID and 11.7 eV PID), was requested:

Chemical use vapors:

If chemical use is the suspected source of odors, a review of the applicable MSDS/GHS-SDS will be conducted to determine the appropriate DRI and applicable manufacturer's correction factor (CF). The development of a compound specific AL will be performed on a case-by-case and documented on the Response Plan. The most probable DRI options for chemical use vapors are Total VOCs by 10.6 eV PID and 11.7 eV PID. As provided odor descriptors were similar to chemicals known to be used during facility maintenance DRI monitoring typical utilized for response to chemical use odors was utilized. Additionally, as chemical emission related to off-gassing of chemical vapors utilized in production of rubber matting was identified by TSCR Management as a suspected source, DRI monitoring typical utilized for response to chemical use odors was utilized. As a specific chemical constituent could not be identified as the cause of the odor an action level could not be developed, therefore an action level was not applied and the 11.7 eV PID was utilized for indication purposes only.

NOTE: Additional Information continued on next page.

INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)**Additional Information:**

Additional Information continued:

Miscellaneous odor descriptor – Burnt plastic:

The odor character “burnt plastic” is associated with cresol, all isomers (AIHA, 2013). The main constituents to monitor for to detect cresol are Total VOCs and Particulates Not Otherwise Specified (PNOS). Therefore, when monitoring for the odor descriptor of “burnt plastic”, DRI equipped with a 10.6 eV PID for VOCs and a particulate DRI should be utilized at a minimum. As visually detectable concentrations of particulate were confirmed to be not present by affected personnel particulate DRI was omitted. The OSHA (2017) has established the cresol (all isomers) 8-hour TWA-PEL at 5 ppm. The ACGIH (2016) has established the cresol 8-hour TWA-TLV at 20 mg/m³ (4.52 ppm). The cresol Total VOCs AL is conservatively rounded down from 4.52 ppm to 4 ppm for area DRI readings, however because the AL for Tank Chemical Vapors (2ppm) was more conservative, this action level was applied to DRI monitoring results for the 10.6 eV PID.

Shinyei Odor Monitoring:

Shinyei Odor Monitoring was utilized to determine if odors encountered in ambient atmosphere are similar to odors produced by material samples when isolated from other odorants from indeterminate sources existing within the 241AP25/POR655 Process Enclosure Process Area. Material samples were placed inside of and sealed within Tedlar bags normally utilized from grab sample collection, the bags were inflated, and after approximately 23 hours were monitored with Shinyei OMX-SRM and OMX-ADM instruments. Results were compared to reading acquired from ambient air grab samples collected from inside of the 241AP25/POR655 Process Enclosure during TFC-OPS-OPER-C-67 field response actions. The TSCR Change Structure contains similar materials such as rubber matting, gloves, sleeving, and plastic bags in similar abundance per unit volume as the 241AP25/POR655 Process Enclosure Process Area. Additional monitoring was performed in the TSCR Change Structure for comparative purposes to determine the potential odor contribution of product off-gas constituent mixtures. As the Shinyei Odor Monitors have not been approved for use in radiologically controlled areas by the WRPS Radiological Controls Organization, the Shinyei Odor Monitors were not utilized at the odor location.

The Shinyei Odor Monitors were developed by Shinyei Technology Company to provide a quantitative method for evaluation of odors offensive to the human neuro-olfactory system. The Shinyei OMX series of DRI instrumentation differs from typical IH DRI instrumentation in that the values output are correlated with odor strength and/or offensiveness or odorous chemicals or chemical mixtures rather than atmospheric concentration of said chemicals. The values are quantitative in capacity for comparison of odor levels of air spaces rather than comparison to applicable OELs for the chemical constituents measured. Shinyei produces three OMX series instruments intended for different purposes: the OMX-SRM, the OMX-ADM, and the OMX-TDM. The capability of the OMX-TDM is largely duplicated by and exceeded in capability by the MultiRAE and ppbRAE 10.6 eV PID and 11.7 eV PID instrumentation already possessed by WRPS IH, therefore is not possessed by WRPS, nor was utilized for field response actions.

OMX-SRM:

The manufacturer’s stated use case for the Shinyei OMX-SRM is “for odor measurement in smoking rooms and lavatories, detecting smell of medicines and foods, detecting odor from production process”. The OMX-SRM instrument displays two metrics; odor strength level in numeric values, and odor “tendency” (as denoted by “odor class”) in numeric values. Odor strength is measured in two ranges: High range (0-999 odor units), and low range (0-99.9 odor units), with 0 being the lowest. Odor classification is performed by comparison of responses between two different semiconductor gas sensors (1-99) as a ratio of sensor responses.

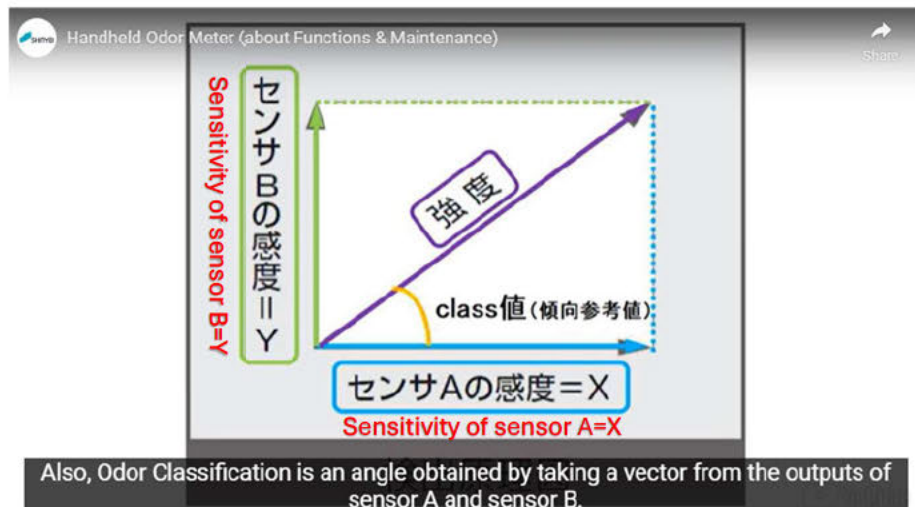
NOTE: Additional Information continued on next page.

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INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)

Additional Information:

Additional Information continued:

Screenshot of manufacturer's instructional video for OMX-SRM odor class (including translation where necessary):



It is important to note that as per the manufacturer: “OMX cannot specify types or the concentration of detected gas, only detecting compound odors” and “there is no correlation between the OMX and the human nose” (in reference to odor detection threshold). The actual physical specifications of the sensors are proprietary information however the manufacturer provides the object gasses as “ethanol, acetone, hydrogen, etc.”

The odor classification metric is useful in determining the causal similarity between the odor of different airspaces or potential odor sources. If chemical mixtures are present in an airspace in similar ratios the odor classification will be similar independent of the difference in overall concentration of the chemical mixture between airspaces. Relative difference in odor classification may be used to indicate similarity in odor constituents based on disparity in ratio of contribution from multiple odorous chemical sources. The greater the difference in odor classification values then indicates the dissimilarity of the odor. Conversely similar odor classification values indicate similarity in odorous chemical constituents regardless of difference in perceived or measured odor strength. This can be used to determine if a known odor source is the cause of a faint odor in an adjacent air space where odor profile may differ from source as the concentration gradient drops below the human odor detection threshold for some odorous chemical constituents of a mixture and not others.

The odor strength metric is useful in determination of an odor source by following increases or moving away from decreases in indicated value.

For more information on the OMX-SRM please reference the manufacturer's video link at: <https://youtu.be/Iciulovebn8>

NOTE: Additional Information continued on next page.

INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)**Additional Information:**

Additional Information continued:

OMX-ADM:

The manufacturer's stated use case for the OMX-ADM is "For odor measurement in manufacturing and processing plants detecting pet smell, measuring kitchen garbage and excrement odor" and "for putrid odors such as ammonia". This instrument displays numeric odor strength level and odor intensity level. The "displayed value is converted into ammonia odor intensity by the scale of 2.5 to 5.0 based on odor concentration of measurement environment." Based on proprietary formula for calculating the level of compound odor concentration. The manufacturer emphasizes that (utilization of [scale]) "level different than standard 0-6 odor level scale used as standard in Japan because odor intensity of such six levels is said rough, with wide variation among individuals because it is quantifying the human sense of smell" (the most likely interpretation being that utilization of the 2.5-5.0 scale provided by the OMX-ADM eliminates subjectivity inherent in human assigned odor intensity levels). The OMX-ADM utilizes 2 semiconductor gas sensors with sensitivity to different gasses and ammonia (by both sensors). It is important to note that as per the manufacturer: "OMX cannot specify types or the concentration of detected gas, only detecting compound odors." The actual physical specifications of the sensors are proprietary information however the manufacturer provides the object gasses as "hydrogen sulfide, methyl mercaptan, ammonia, etc."

Like the OMX-SRM the OMX-ADM provided odor strength metric is useful in determination of an odor source by following a concentration gradient indicated by increasing value. The OMX-ADM provides for indication of chemicals with a different set of sensors which respond to a different suite of chemicals than the OMX-ADM or OMX-TDM.

The odor intensity metric provides a semi-quantitative indication of the offensiveness of an odor, useful in determination if an airspace will be occupiable (or re-occupiable after odor remediation or source elimination) without discomfort.

For more information on the OMX-SRM please reference the manufacturer's video link at: [Video: https://youtu.be/sPGdsGN1Ylg](https://youtu.be/sPGdsGN1Ylg)

Monitoring Strategy References:

Refer to [TOC-IH-58956](#) for more detail on the monitoring strategy for response to odors.

For more information on the OMX series DRI instrumentation please reference the manufacturer's brochure at: https://www.shinyei.co.jp/stc/eng/pdf/catalog/OMX_BrochureEN.pdf

And the manufacturer website at: <https://www.shinyei.co.jp/stc/eng/products/iaq/odor.html>

NOTE: Additional Information continued on next page.

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INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)

Additional Information:

Additional Information continued:

Odor Characteristics and Odor Thresholds of Identified and Tentatively Identified Compounds:

Atmosphere within TSCR during initial field response actions:

Analytical results from the grab sample collected from within the POR655/241AP25 Process Enclosure Area during the initial field response actions were at or above published odor detection concentrations for some Tentatively Identified Compounds with similar odor descriptors as provided on O/VRCs. Chemicals detected at levels above published odor thresholds are highlighted in gray.

Identified Compounds	Result (ppm)	Odor Threshold		Odor Characteristic
		Detectable	Recognizable	
Acetonitrile	0.0162	13 ppm		"aromatic", "ether-like"
Ethanol	0.0007	0.34 ppm	4.6 ppm	"characteristic", "wine-like", "medicinal"
Acetone	0.0040	0.42 ppm	1.7 ppm	"characteristic-pungent"
Acetaldehyde	0.0121	0.0014 ppm	0.015 ppm	"ethereal", "fresh". "sweet", "Pungent"
Butanal	0.0094	0.0033 ppm	0.12 ppm	"unpleasant", "sweet", "fruity"
Tentatively Identified Compounds				
Phenol	0.0017	0.001 ppm	0.034 ppm	"acid", rubber", "plastic", "sweet"
Nonanal	0.0014	0.0009 ppm		"pungent", "old people smell"

Atmosphere within TSCR during second field response actions:

Analytical results from the grab sample collected from within the POR655/241AP25 Process Enclosure Process Area above the grating during the second field response actions were at or above published odor detection concentrations for some Tentatively Identified Compounds with similar odor descriptors as provided on O/VRCs. Chemicals detected at levels above published odor thresholds are highlighted in gray.

Identified Compounds	Result (ppm)	Odor Threshold		Odor Characteristic
		Detectable	Recognizable	
Acetonitrile	0.0213	13 ppm		"aromatic", "ether-like"
Ethanol	0.0004	0.34 ppm	4.6 ppm	"characteristic", "wine-like", "medicinal"
Acetone	0.0041	0.42 ppm	1.7 ppm	"characteristic-pungent"
Methyl Isobutyl Ketone	0.0057	0.03 ppm	0.15 ppm	"camphor", "dairy", "fruity", "solvent"
Acetaldehyde	0.0119	0.0014 ppm	0.015 ppm	"ethereal", "fresh". "sweet", "Pungent"
Butanal	0.0099	0.0033 ppm	0.12 ppm	"unpleasant", "sweet", "fruity"
Tentatively Identified Compounds				
Nonanal	0.0014	0.0009 ppm		"pungent", "old people smell"

NOTE: Additional Information continued on next page.

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

Additional Information:

Additional Information continued:

Analytical results from the grab sample collected from within the POR655/241AP25 Process Enclosure Process Area below the grating during the second field response actions were at or above published odor detection concentrations for some Tentatively Identified Compounds with similar odor descriptors as provided on O/VRCs. Chemicals detected at levels above published odor thresholds are highlighted in gray.

Identified Compounds	Result (ppm)	Odor Threshold		Odor Characteristic
		Detectable	Recognizable	
Acetonitrile	0.0088	13 ppm		"aromatic", "ether-like"
Ethanol	0.0006	0.34 ppm	4.6 ppm	"characteristic", "wine-like", "medicinal"
Acetone	0.0054	0.42 ppm	1.7 ppm	"characteristic-pungent"
Methyl Isobutyl Ketone	0.0042	0.03 ppm	0.15 ppm	"camphor", "dairy", "fruity", "solvent"
Acetaldehyde	0.0098	0.0014 ppm	0.015 ppm	"ethereal", "fresh", "sweet", "Pungent"
Butanal	0.0100	0.0033 ppm	0.12 ppm	"unpleasant", "sweet", "fruity"
Tentatively Identified Compounds				
Isoprene	0.0041	0.047 ppm		"aromatic", "tires"

Chemicals associated with Odor Descriptors provided by O/VRCs and Associated Odor Thresholds:

The American Industrial Hygiene Association "Odor Thresholds for Chemicals with Established Health Standards" (2nd Edition) and the American Industrial Hygiene Association "Odor Thresholds for Chemicals" (4th Edition) provides a reference list of chemicals associated with typical odor descriptors. Below is the reference list of chemicals associated with odor descriptors provided by O/VRCs and their applicable OELs. Chemicals where the odor detection concentration is similar to or greater than the associated OEL are notated in gray. Chemicals that were detected in analytical sample results are highlighted in blue.

Odors as indicated on Odor/Vapor Response Cards submitted on 10/15/2024 (initial indication of odors):

Odor Descriptor	Chemical	Lowest Detection Concentration	Lowest Recognition Concentration	Applicable OEL
Electrical burning/Smoky (Burnt; Burnt Plastic; Smoky)	2,3-Pentanedione (Acetylpropionyl)	0.0098 ppm	N/A	0.0093 ppm TWA (NIOSH REL)
	Benzaldehyde	0.0009 ppm	0.01 ppm	N/A
	Cresol	0.00000398 ppm	0.00023 ppm	20 mg/m ³ TWA (ACGIH TLV)
	Ethyl Lactate (Lactic Acid)	14 ppm	N/A	N/A
	Furan	9.90 ppm	N/A	0.001 ppm TWA (HTFOEL)
	Furfuryl Alcohol	8 ppm	N/A	10 ppm TWA (ACGIH TLV)
	Isobutyric Acid	8.1 ppm	N/A	N/A
	Methyl n-butyl Ketone (2-Hexanone)	0.024 ppm	0.068 ppm	N/A
	n-Butyric Acid (Butanoic Acid)	0.00019 ppm	0.001 ppm	N/A
Odor Descriptor	Chemical	Lowest Detection Concentration	Lowest Recognition Concentration	Applicable OEL
Hot Plastic (plastic)	Acrylic Acid	0.0088 ppm	1 ppm	2 ppm TWA (ACGIH TLV)
	Benzyl Acetate	20.59 ppm	1450 ppm	10 ppm TWA (ACGIH TLV)
	n-Butyl Acrylate	0.002 ppm	0.0093 ppm	2 ppm TWA (ACGIH TLV)
	Ethyl Acrylate (Acrylic Acid Ethyl Ester)	0.0000066 ppm	0.00037 ppm	5 ppm TWA (ACGIH TLV)
	n-Hexyl Alcohol	0.006 ppm	0.024 ppm	N/A
	Methyl Acrylate	0.0017 ppm	0.020 ppm	2 ppm TWA (ACGIH TLV)
	Methyl Methacrylate	0.049 ppm	0.21 ppm	50 ppm TWA (ACGIH TLV)
	Phenol	0.0055 ppm	0.034 ppm	5 ppm TWA (ACGIH TLV)
	Styrene	0.016 ppm	0.047 ppm	20 ppm TWA (ACGIH TLV)
	Trimethyl Benzene	0.028 ppm	0.061 ppm	25 ppm TWA (ACGIH TLV)
	Xylene	0.081 ppm	0.23 ppm	100 ppm TWA (ACGIH TLV)

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INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)

Additional Information:

Additional Information continued:

Odor Descriptor	Chemical	Lowest Detection Concentration	Lowest Recognition Concentration	Applicable OEL
Rubber	1,3-Butadiene	0.23 ppm	1.1 ppm	2 ppm TWA (ACGIH TLV)
	Chloroprene	0.11 ppm	138.07 ppm	10 ppm TWA (ACGIH TLV)
	Dimethyl Disulfide	0.00029 ppm	0.0028 ppm	0.5 ppm TWA (ACGIH TLV)
	Ethyl Mercaptan (Ethanethiol)	0.000017 ppm	0.00029 ppm	0.5 ppm TWA (ACGIH TLV)
	Isoamyl Alcohol	0.00169 ppm	0.044 ppm	10 ppm TWA (ACGIH TLV)
	Isobutyl Alcohol (Isobutyl Cellosolve)	0.019 ppm	0.11 ppm	50 ppm TWA (ACGIH TLV)
	Phenol	0.0055 ppm	0.034 ppm	5 ppm TWA (ACGIH TLV)
	Quinoline	0.0057 ppm	0.0095 ppm	N/A
	Styrene	0.016 ppm	0.047 ppm	20 ppm TWA (ACGIH TLV)
Odor Descriptor	Chemical	Lowest Detection Concentration	Lowest Recognition Concentration	Applicable OEL
Metallic	Diisobutyl Ketone	0.103 ppm	0.309 ppm	25 ppm TWA (ACGIH TLV)
	Lauric Acid	0.012 ppm	0.00049 ppm	N/A
	1-Octanol	N/A	0.0009 ppm	N/A
	Sulfur Dioxide	0.11 ppm	0.46 ppm	0.25 ppm STEL (ACGIH TLV)

Odors as indicated on Odor/Vapor Response Cards submitted on 10/16/2024 (initiating event):

Odor descriptor of “stale” was not listed in “Odor Thresholds for Chemicals with Established Health Standards” (2nd Edition) or the American Industrial Hygiene Association “Odor Thresholds for Chemicals” (4th Edition). Additionally, chemicals or products with associated odor characteristic of “stale” was not listed by the Agency for Toxic Substances and Disease Registry (ATSDR) Environmental Odor registry. Chemicals associated with all other provided odor descriptors:

Odor Descriptor	Chemical	Lowest Detection Concentration	Lowest Recognition Concentration	Applicable OEL
Sweet	Acetaldehyde	0.001 ppm	0.015 ppm	25 ppm Ceiling (ACGIH TLV)
	Acetone	0.42 ppm	1.7 ppm	250 ppm TWA (ACGIH TLV)
	Acetophenone	0.002 ppm	0.59 ppm	10 ppm TWA (ACGIH TLV)
	Acrylic Acid	0.0088 ppm	1 ppm	2 ppm TWA (ACGIH TLV)
	Benzaldehyde	0.0009 ppm	0.01 ppm	N/A
	Benzene	0.020 ppm	0.6 ppm	0.5 ppm TWA (ACGIH TLV)
	Benzyl Acetate	20.6 ppm	1450.2 ppm	10 ppm TWA (ACGIH TLV)
	Bromoform	0.19 ppm	0.21 ppm	0.5 ppm TWA (ACGIH TLV)
	2-Butoxyethanol	0.043 ppm	0.35 ppm	2 ppm TWA (ACGIH TLV)
	2-Butoxyethyl Acetate	0.107 ppm	0.198 ppm	20 ppm TWA (ACGIH TLV)
	n-Butyl Acetate	0.002 ppm	0.0093 ppm	50 ppm TWA (ACGIH TLV)
	n-Butyl Acrylate	0.00055 ppm	0.0027 ppm	2 ppm TWA (ACGIH TLV)
	n-Butyl Alcohol (butanol)	0.0033 ppm	0.12 ppm	20 ppm TWA (ACGIH TLV)
	Tert-Butyl Alcohol	3.3 ppm	11.875 ppm	100 ppm TWA (ACGIH TLV)
	Carbon Disulfide	0.022 ppm	0.21 ppm	1 ppm TWA (ACGIH TLV)
	Carbon Tetrachloride	4.6 ppm	21 ppm	5 ppm TWA (ACGIH TLV)
	Chlorobenzene	0.09 ppm	0.21 ppm	10 ppm TWA (ACGIH TLV)
	Chlorodifluoromethane	200192 ppm		1000 ppm TWA (ACGIH TLV)
	Chloroform	0.1 ppm	2.9 ppm	10 ppm TWA (ACGIH TLV)
	Chloropicrin	1.09 ppm		0.1 ppm TWA (ACGIH TLV)
	Chlorotrifluoromethane	199888 ppm		1000 ppm Ceiling (ACGIH TLV)
	Citral	0.01 ppm	0.0097 ppm	5 ppm TWA (ACGIH TLV)
	Cresol	0.00000398 ppm	0.00023 ppm	20 mg/m ³ TWA (ACGIH TLV)
	Cyclohexane	2.47 ppm	35 ppm	100 ppm TWA (ACGIH TLV)
	Cyclohexanone	0.12 ppm	0.12 ppm	20 ppm TWA (ACGIH TLV)
	Cyclohexene	0.18 ppm		300 ppm TWA (ACGIH TLV)
	Diacetone Alcohol	0.27 ppm	1.1 ppm	50 ppm TWA (ACGIH TLV)
	Diacetyl	0.0000019 ppm	0.00085 ppm	0.01 ppm TWA (ACGIH TLV)
	Diborane	1.8 ppm		0.1 ppm TWA (ACGIH TLV)

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Additional Information:

Additional Information continued:

Odor Descriptor	Chemical	Lowest Detection Concentration	Lowest Recognition Concentration	Applicable OEL
Sweet (continued)	1,3-Dichloropropene	0.99 ppm		1 ppm TWA (ACGIH TLV)
	Dicyclopentadiene	0.011 ppm	0.02 ppm	5 ppm TWA (ACGIH TLV)
	Diisobutyl Ketone	0.103 ppm	0.309 ppm	25 ppm TWA (ACGIH TLV)
	Dimethylbenzenes (Xylenes)	0.012 ppm	0.23 ppm	10 ppm TWA (ACGIH TLV)
	1,4-Dioxane	0.8 ppm	1.8 ppm	20 ppm TWA (ACGIH TLV)
	Diphenylamine		0.022 ppm	10 mg/m ³ TWA (ACGIH TLV)
	2-Ethoxyethanol	0.3 ppm	0.54 ppm	5 ppm TWA (ACGIH TLV)
	2-Ethoxyethyl Acetate	0.048 ppm	0.13 ppm	5 ppm TWA (ACGIH TLV)
	Ethyl Acetate	0.24 ppm	1 ppm	400 ppm TWA (ACGIH TLV)
	Ethyl Acrylate (Acrylic Acid Ethyl Ester)	0.0000066 ppm	0.00037 ppm	5 ppm TWA (ACGIH TLV)
	Ethyl Alcohol (Ethanol)	0.34 ppm	4.6 ppm	1000 ppm STEL (ACGIH TLV)
	Ethylene Dibromide		10 ppm	N/A
	Ethylene Dichloride	6 ppm	41 ppm	10 ppm TWA (ACGIH TLV)
	Ethylene Glycol	5.12 ppm		100 mg/m ³ STEL (ACGIH TLV)
	Ethylene Oxide	257 ppm	493 ppm	1 ppm TWA (ACGIH TLV)
	Ethyl Ether	0.165 ppm	1.58 ppm	400 ppm TWA (ACGIH TLV)
	2-Ethylhexyl Alcohol (2-Ethyl Hexanol)	0.024 ppm	N/A	N/A
	Ethyl Isoamyl Ketone	5.9 ppm		N/A
	Ethyl Silicate	3.6 ppm		10 ppm TWA (ACGIH TLV)
	Furfural	0.036 ppm		2 ppm TWA (ACGIH TLV)
	Furfuryl Alcohol (2-furanmethanol)	8 ppm	N/A	10 ppm TWA (ACGIH TLV)
	Halothane		33 ppm	50 ppm TWA (ACGIH TLV)
	Sec-Hexyl Acetate	0.0018 ppm		50 ppm TWA (ACGIH TLV)
	n-Hexyl Alcohol	0.0066 ppm	0.024 ppm	N/A
	Hexylene Glycol	3.93 ppm		25 ppm STEL (ACGIH TLV)
	Isoamyl Alcohol	0.0034 ppm	0.044 ppm	100 ppm TWA (ACGIH TLV)
	Isobutyl Alcohol (Isobutyl Cellosolve)	0.019 ppm	0.11 ppm	50 ppm TWA (ACGIH TLV)
	Isoamyl Acetate	0.0034 ppm	0.0028 ppm	N/A
	Isobutyl Acetate	0.002 ppm	0.008 ppm	10 ppm TWA (ACGIH TLV)
	Isophorone	0.0003 ppm	0.53 ppm	5 ppm Ceiling (ACGIH TLV)
	Isopropyl Acetate	0.14 ppm	0.45 ppm	100 ppm TWA (ACGIH TLV)
	Isopropyl Ether	0.017 ppm	0.053 ppm	250 ppm TWA (ACGIH TLV)
	D-Limonene (cyclohexene)	0.00808 ppm	0.3948 ppm	300 ppm TWA (ACGIH TLV)
	Menthol	0.000063 ppm	0.000078 ppm	N/A
	Mesityl Oxide (Methyl Isobutyl Ketone)	0.017 ppm	0.05 ppm	20 ppm TWA (ACGIH TLV)
	2-Methoxyethanol (Methyl Cellosolve)	2.7 ppm		0.1 ppm TWA (ACGIH TLV)
	2-Methoxyethyl Acetate	0.3 ppm	0.64 ppm	0.1 ppm TWA (ACGIH TLV)
	Methyl Acetate	0.231 ppm	20.8 ppm	200 ppm TWA (ACGIH TLV)
	Methyl Alcohol (Methanol)	3.05 ppm	7.63 ppm	200 ppm TWA (ACGIH TLV)
	Methyl n-Amyl Ketone	0.0065 ppm		50 ppm TWA (ACGIH TLV)
	2-Methyl Butyl Acetate	0.026 ppm		N/A
	Methyl n-butyl Ketone (2-Hexanone)	0.024 ppm	N/A	1 ppm TWA (NIOSH REL)
	Methyl Chloride		10 ppm	50 ppm TWA (ACGIH TLV)
	Methyl Chloroform	0.97 ppm	16 ppm	350 ppm TWA (ACGIH TLV)
	Methylene Chloride (Dichloromethane)	12 ppm		50 ppm TWA (ACGIH TLV)
	Methyl Ethyl Ketone	0.07 ppm	5.4 ppm	200 ppm TWA (ACGIH TLV)
	Methyl Isoamyl Ketone	0.0021 ppm	0.049 ppm	20 ppm TWA (ACGIH TLV)
	Methyl Isobutyl Ketone	0.024 ppm	0.15 ppm	20 ppm TWA (ACGIH TLV)
	Methyl Isopropyl Ketone	0.51 ppm	4.3 ppm	20 ppm TWA (ACGIH TLV)
	2-Methylnaphthalene	0.00069 ppm		0.5 ppm TWA (ACGIH TLV)
	Methyl Propyl Ketone	0.028 ppm	3.1 ppm	150 ppm STEL (ACGIH TLV)
	Methyl Vinyl Ketone (3-Buten-2-one)	0.175 ppm		0.2 ppm STEL (ACGIH TLV)
	Pentane	1.29 ppm		1000 ppm TWA (ACGIH TLV)
	Pentanol	0.0017 ppm	0.23 ppm	N/A

NOTE: Additional Information continued on next page.

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

Additional Information:

Additional Information continued:

Odor Descriptor	Chemical	Lowest Detection Concentration	Lowest Recognition Concentration	Applicable OEL
Sweet (continued)	Perchloryl Fluoride	14.58 ppm		3 ppm TWA (ACGIH TLV)
	Phenol	0.0055 ppm	0.034 ppm	5 ppm TWA (ACGIH TLV)
	Picolines (Methyl Pyridines)	0.0026 ppm	0.0236 ppm	1 ppm TWA (ACGIH TLV)
	Piperidine	0.14 ppm	0.57 ppm	N/A
	n-Propyl Acetate	0.048 ppm	0.084 ppm	200 ppm TWA (ACGIH TLV)
	n-Propyl Alcohol (1-Propanol)	0.03 ppm	0.081 ppm	100 ppm TWA (ACGIH TLV)
	Propylene Dichloride	0.26 ppm	0.52 ppm	10 ppm TWA (ACGIH TLV)
	Propylene Glycol	5.14 ppm		N/A
	Propylene Oxide	10 ppm	35 ppm	2 ppm TWA (ACGIH TLV)
	Propyl Mercaptan (1-Propanethiol)	0.000013 ppm	0.00074 ppm	0.5 ppm Ceiling (NIOSH REL)
	Styrene	0.016 ppm	0.047 ppm	20 ppm TWA (ACGIH TLV)
	Toluene	0.089 ppm	0.93 ppm	20 ppm TWA (ACGIH TLV)
	Toluene 2,4-Diisocyanate	0.020 ppm	2 ppm	0.001 ppm TWA (ACGIH TLV)
	Toluene 2,6-Diisocyanate	0.020 ppm	2 ppm	0.001 ppm TWA (ACGIH TLV)
	Turpentine	0.041 ppm	4.49 ppm	20 ppm TWA (ACGIH TLV)
	Vanillin (Benzaldehyde)	0.00000016 ppm	0.000000643 ppm	N/A
	Vinyl Chloride	203 ppm		1 ppm TWA (ACGIH TLV)
	Vinylidene Chloride	50 ppm		5 ppm TWA (ACGIH TLV)
	Xylene	0.081 ppm	0.23 ppm	100 ppm TWA (ACGIH TLV)
	Styrene Oxide (Epoxyethyl Benzene)	0.063 ppm	0.4 ppm	N/A
	Carbitol Acetate	0.26 ppm	0.157 ppm	N/A
	p-Diethylbenzene	0.00038 ppm		N/A
	Skatole	0.0000056 ppm	0.019 ppm	N/A
	Isobutyl n-Butyrate	0.03 ppm		N/A
	Methyl Cyclopentane	1.7 ppm		N/A
	Ethyl Phenylacetate	0.7 ppm		N/A
	Isobutyl Formate	0.49 ppm		N/A
	Nitric Oxide	0.29 ppm		25 ppm TWA (ACGIH TLV)
	Nitrogen Dioxide	0.12 ppm		0.2 ppm TWA (ACGIH TLV)
	Methyl Propionate			N/A
	Caryophyllene			N/A
	p-Xylene	0.058 ppm		100 ppm TWA (ACGIH TLV)
	m-Xylene	0.04 ppm		100 ppm TWA (ACGIH TLV)
	Myrcene			N/A
	n-Butyl Isovalerate	0.12 ppm		N/A
	n-Hexyl Acetate	0.0018 ppm		N/A
	Allyl Mercaptan	0.0015 ppm		N/A
	Ethyl n-butyrate	0.00004 ppm		N/A
	Musk Xylene	0.081 ppm	0.23 ppm	100 ppm TWA (ACGIH TLV)
Odor Descriptor	Chemical	Lowest Detection Concentration	Lowest Recognition Concentration	Applicable OEL
Rubber	1,3-Butadiene	0.23 ppm	1.1 ppm	2 ppm TWA (ACGIH TLV)
	Chloroprene	0.11 ppm	138.07 ppm	10 ppm TWA (ACGIH TLV)
	Dimethyl Disulfide	0.00029 ppm	0.0028 ppm	0.5 ppm TWA (ACGIH TLV)
	Ethyl Mercaptan (Ethanethiol)	0.000017 ppm	0.00029 ppm	0.5 ppm TWA (ACGIH TLV)
	Isoamyl Alcohol	0.00169 ppm	0.044 ppm	10 ppm TWA (ACGIH TLV)
	Isobutyl Alcohol (Isobutyl Cellosolve)	0.019 ppm	0.11 ppm	50 ppm TWA (ACGIH TLV)
	Phenol	0.0055 ppm	0.034 ppm	5 ppm TWA (ACGIH TLV)
	Quinoline	0.0057 ppm	0.0095 ppm	N/A
	Styrene	0.016 ppm	0.047 ppm	20 ppm TWA (ACGIH TLV)

NOTE: Additional Information continued on next page.

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

Additional Information:

Additional Information continued:

Odor Descriptor	Chemical	Lowest Detection Concentration	Lowest Recognition Concentration	Applicable OEL
Hot Plastic (plastic)	Acrylic Acid	0.0088 ppm	1 ppm	2 ppm TWA (ACGIH TLV)
	Benzyl Acetate	20.59 ppm	1450 ppm	10 ppm TWA (ACGIH TLV)
	n-Butyl Acrylate	0.002 ppm	0.0093 ppm	2 ppm TWA (ACGIH TLV)
	Ethyl Acrylate (Acrylic Acid Ethyl Ester)	0.0000066 ppm	0.00037 ppm	5 ppm TWA (ACGIH TLV)
	n-Hexyl Alcohol	0.006 ppm	0.024 ppm	N/A
	Methyl Acrylate	0.0017 ppm	0.020 ppm	2 ppm TWA (ACGIH TLV)
	Methyl Methacrylate	0.049 ppm	0.21 ppm	50 ppm TWA (ACGIH TLV)
	Phenol	0.0055 ppm	0.034 ppm	5 ppm TWA (ACGIH TLV)
	Styrene	0.016 ppm	0.047 ppm	20 ppm TWA (ACGIH TLV)
	Trimethyl Benzene	0.028 ppm	0.061 ppm	25 ppm TWA (ACGIH TLV)
	Xylene	0.081 ppm	0.23 ppm	10 ppm TWA (ACGIH TLV)

Odor Threshold References:

- American Industrial Hygiene Association (2013). Odor Thresholds for Chemicals with Established Health Standards, 2nd Edition.
- American Industrial Hygiene Association (2024). Odor Thresholds for Chemicals, 4th Edition.
- Agency for Toxic Substances and Disease Registry Environmental Odors Library. Retrieved from: https://www.atsdr.cdc.gov/odors/search_results.html

TSCR Operational Configuration:

At the time odors were first reported TSCR was in Maintenance Mode. Transfer pathways for Tank Waste from AP-107 and to 241-AP-106 were valve isolated and feed pumps were administratively locked. Ventilation to the 241-AP-108 Tank Headspace was isolated by POR655-WP-AOV-605 sump isolation valve. The 241-AP-VTP Primary Exhauster was in operation providing negative ventilation to the TSCR IXC vent air system. Two IXCs (from IXC Bay A and IXC Bay B) had been removed and all connection points were capped or plugged. Process Piping to the IXC connection points was valve-isolated at POR655-WP-AOV-413A (IXC-A Inlet), POR655-SA-AOV-420A (IXC-A sweep air), POR655-VP-AOV-410A (IXC-A vent), POR655-WP-AOV-415A (IXC-A outlet), POR655-WP-V-413C (IXC-C Inlet), POR655-SA-AOV-420C (IXC-C sweep air), POR655-VP-AOV-410C (IXC-C vent), and POR655-WP-AOV-415C (IXC-C outlet). IXC-B was connected to all connection points.

POR657 TSCR Process Enclosure Ventilation was in operation continuously during the time odors were initially reported, and during all TFC-OPS-OPER-C-67 field response actions. The POR657 Process Enclosure Ventilation system provides approximately 200 Cubic Feet Per Minute (CFM) flow rate (250 CFM nominal) single pass ventilation with uptake below the floor grating level and make-up air provided by facility penetrations. Although not utilized as such, the POR657 TSCR Ventilation system can be utilized for RCA ventilation to prevent the emission of radiological particulate to the atmosphere. Currently POR657 is utilized to ensure concentrations of hydrogen (H₂) from radiolysis of water in the IXCs emitted through IXC vent stacks installed on spent IXCs does not reach lower flammability levels (LFLs) within the process enclosure.

On 10/08/2024 rubber matting was placed over the entirety of the floor grating within the 241AP25/POR655 Process Enclosure Process Area as required to support TO-270-723 and TO-270-705 removal and replacement of IXC-A and IXC-B. TO-270-723 began on 10/09/2024 and was completed on 10/10/2024.

NOTE: Additional Information continued on next page.

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

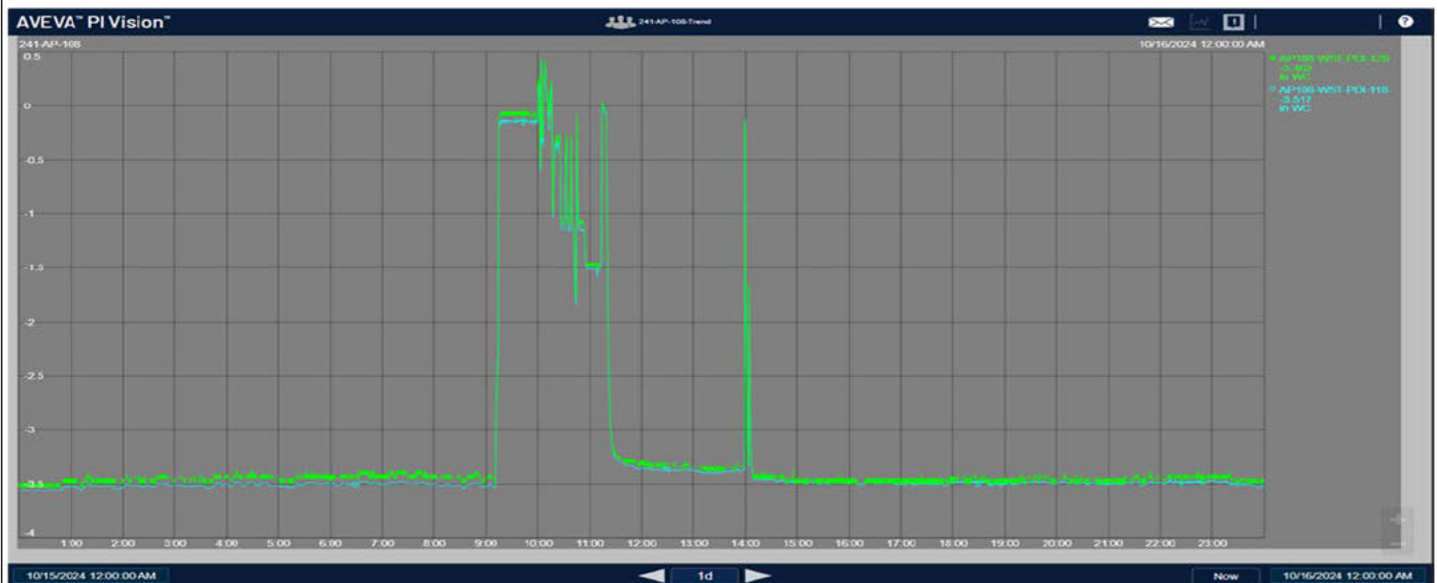
Additional Information:

Additional Information continued:

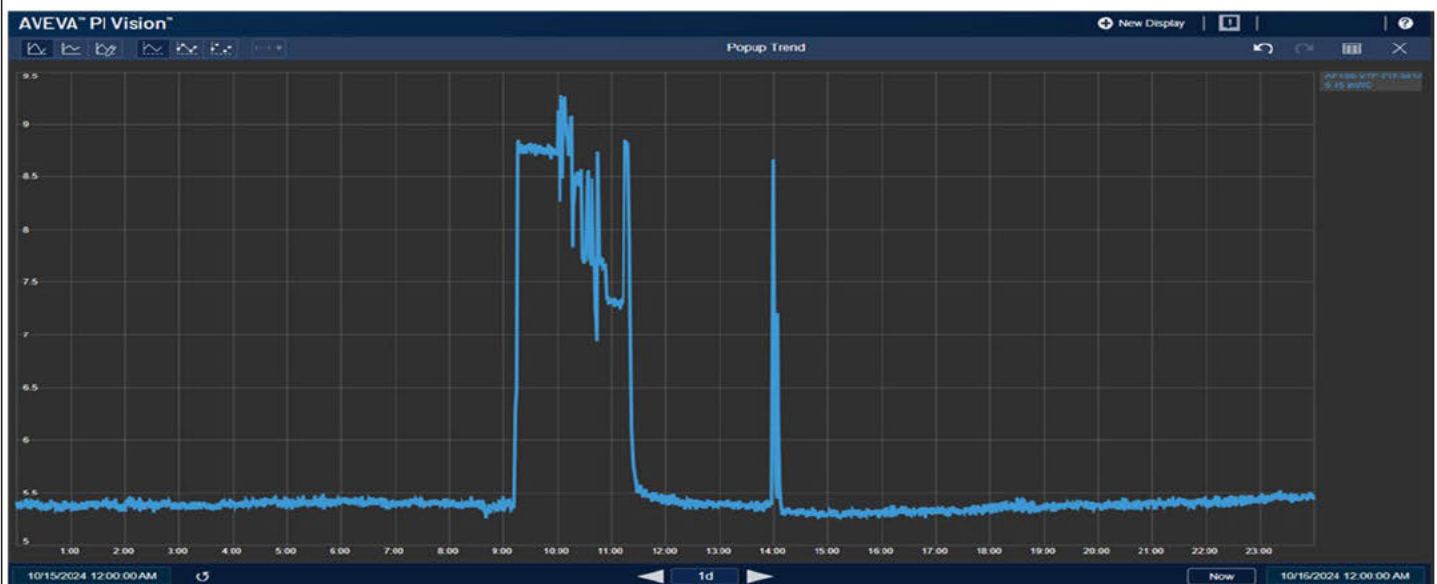
AP-108 Operational Configuration:

On 10/15/202 during the initial report of odors in the 241AP25/POR655 Process Enclosure Process Area the AP08A supernatant pump and slurry distributor was being removed as per WO1082904. Activities related to the active removal of the supernatant pump and/or slurry distributor occurred at approximately 0915. At approximately 1000 AP-108 pressure indicators indicated slight positive pressure within the AP-108 headspace, corresponding to a significant increase in flow as indicated by the AP-108 flow meter. The positive pressure event does not correspond to presence of odors within TSCR as the pressurization event occurred after the initial indication of odors.

AVEVA™ PI Vision™ AP-108 Tank Pressure readings on 10/15/2024:



AVEVA™ PI Vision™ 241-AP-108 Tank Flow readings on 10/15/2024:



NOTE: Additional Information continued on next page.

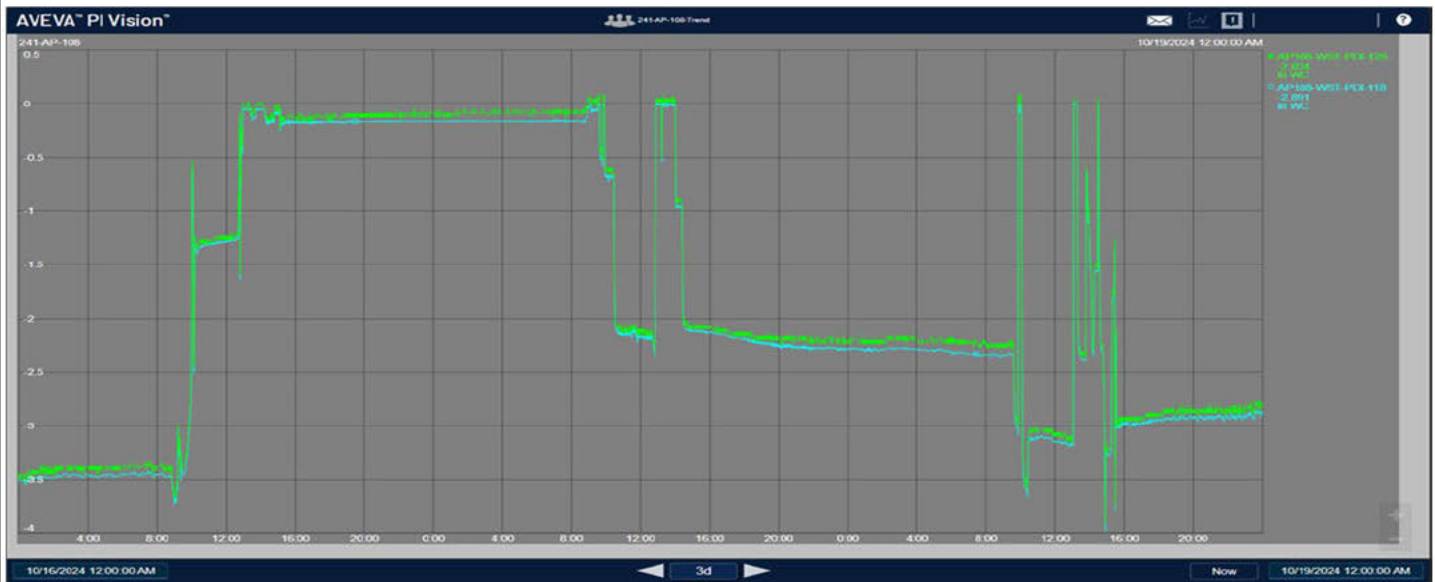
Washington River Protection Solutions
INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)

Additional Information:

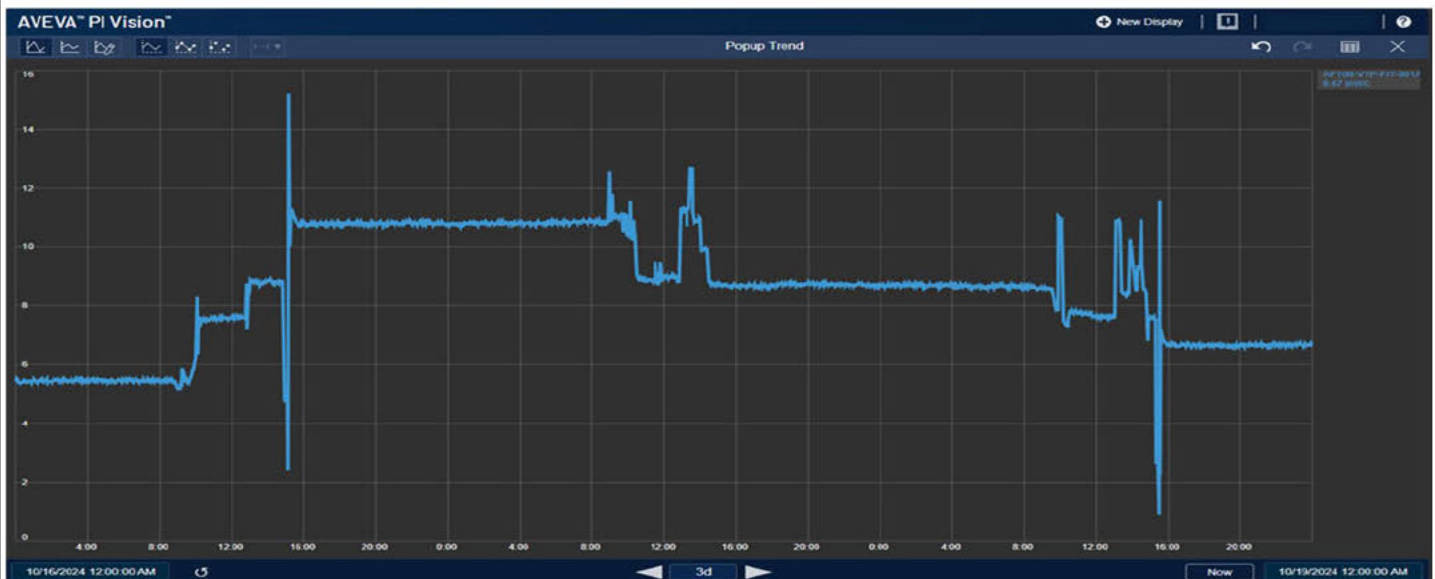
Additional Information continued:

WO1082904 was continued during day-shift 10/16/2024 through 10/19/2024. After the initiating event (0900 10/16/2024) ongoing pit work at AP-108 as per WO1082904 caused a series of short duration static to slightly positive pressurization events between 1200 to 1215. These events were also accompanied by indication of increased flow. Pressure remained slightly below zero until approximately 0900 on 10/17/2024 when a series of short duration pressurization events occurred until approximately 1000, as indicated on one of the two pressure indicators. A similar event occurred at approximately 1300-1400 on 10/17/2024. All increases in pressure were corresponded with increased flow.

AVEVA™ PI Vision™ AP-108 Tank Pressure readings from 10/16/2024 – 10/19/2024:



AVEVA™ PI Vision™ AP-108 Tank Flow readings from 10/16/2024 – 10/19/2024:



NOTE: Additional Information continued on next page.

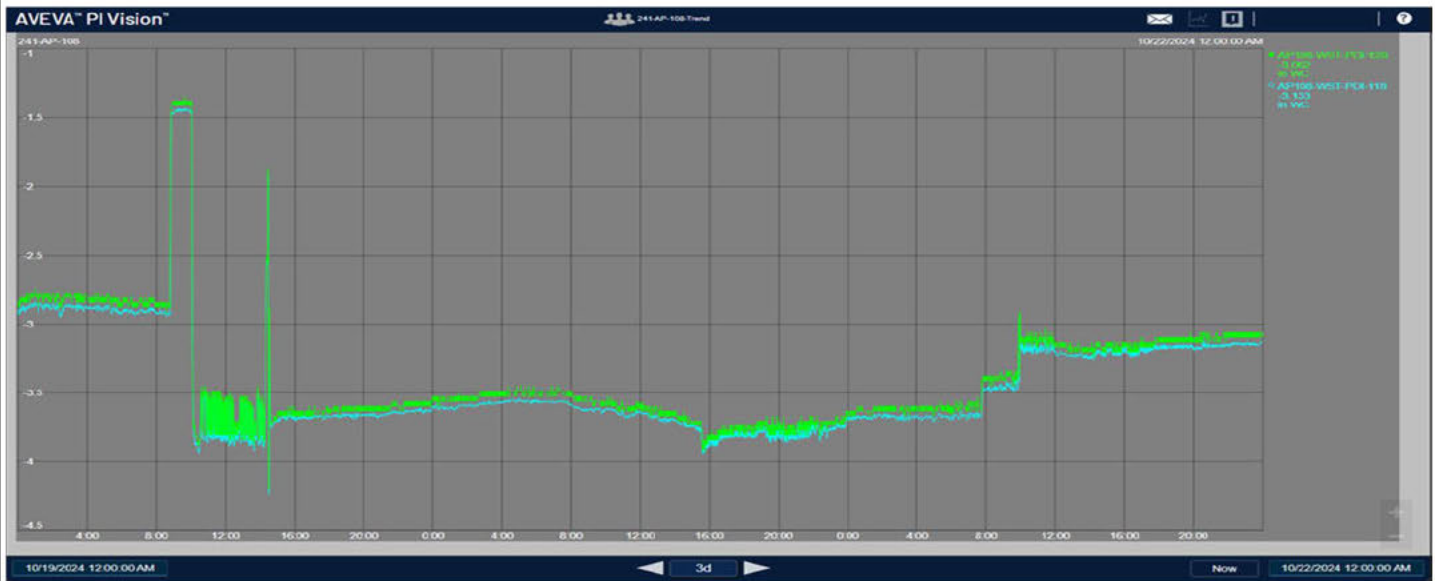
Washington River Protection Solutions
INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)

Additional Information:

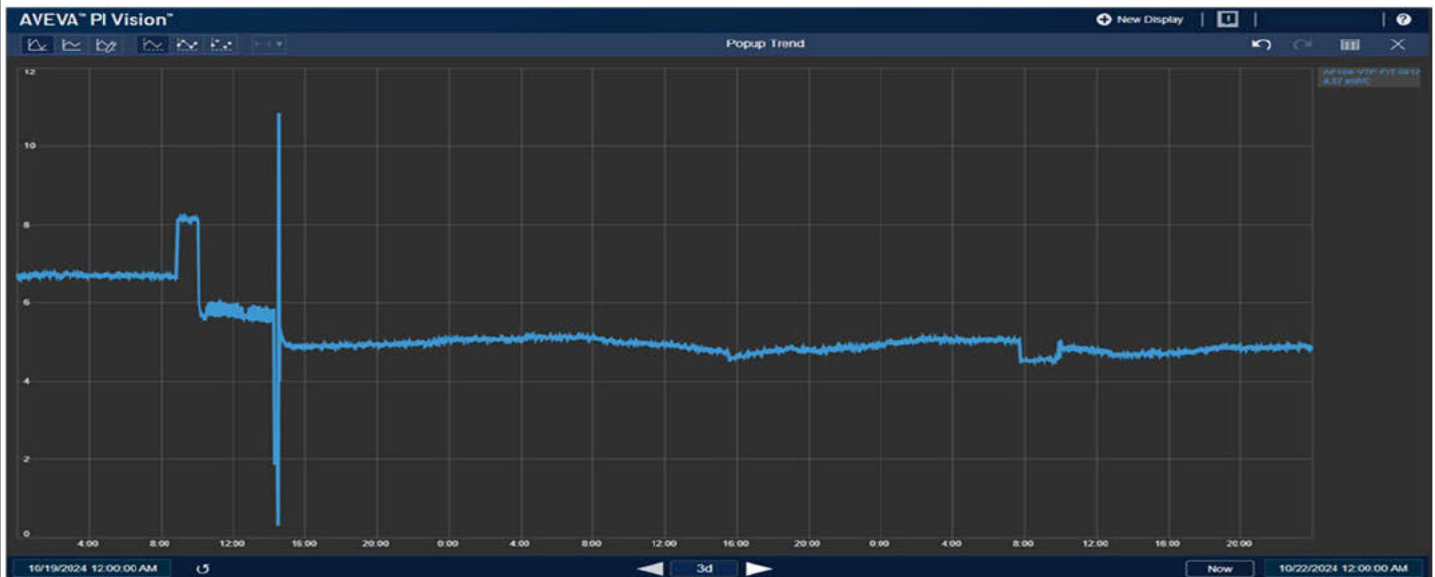
Additional Information continued:

On 10/21/2024 work in support of WO1082904 was limited to equipment de-mobilization activities. On 10/22/2024 a valve actuator was installed through a penetration in the AP08A Pit cover block. During odor investigation activities occurring on 10/21/2024 and 10/22/2024 AP-108 headspace pressure was negative.

AVEVA™ PI Vision™ AP-108 Tank Pressure readings from 10/19/2024 – 10/22/2024:



AVEVA™ PI Vision™ AP-108 Tank Flow readings from 10/19/2024 – 10/22/2024:



NOTE: Additional Information continued on next page.

INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)**Additional Information:**

Additional Information continued:

Rubber Matting Information:

As required by TO-270-723 and TO-270-705 and other work activities involving breaching of contaminated systems rubber matting is utilized for groundcover to control the spread of radiological contamination. Rubber matting was selected in lieu of other options traditionally utilized at Tank Farms due to concerns related to abrasion or puncture from mechanical forces placed on the underlying floor grating (e.g. rolling tool-carts, walking, dropped tools). The rubber matting utilized inside of the 241AP25/POR655 Process Enclosure Process Area is Westlake® Dimex™ Nitrile Corrugated Rubber Runner Matting part number: 41V-018-48-75. This product is made of partially recycled Nitrile Rubber with additives necessary to meet FMVSS 302 flammability requirements. Although the manufacturer does not specify the actual formulation, nitrile rubbers are typically made from Acrylonitrile, butadiene/polybutadiene, and small proportions of styrene, with polymerization control agents such as dimethyldithiocarbamate and diethylhydroxylamine added to control product density. Various -disulfide chemicals and/or Disulfur Dichloride may be added to facilitate vulcanization. Acetonitrile is an expected contaminant as it is used as a solvent in the production of Butadiene and is a common contaminant in industrial use acrylonitrile stock. Recycling of Nitrile rubbers typically utilizes a chemo-mechanical process which utilizes chemicals to de-vulcanize and heat to re-process products into usable stock.

NOTE: Additional Information continued on next page.

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
AL	Action Limit
ATSDR	Agency for Toxic Substances and Disease Registry
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
FID	Flow Indicating Transmitter
GHS-SDS	Globally Harmonized System Safety Data Sheet
FMVSS	Federal Motor Vehicle Safety Standards
H ₂	Hydrogen
MSDS	Material Safety Data Sheet
NH ₃	Ammonia
NOAA	National Oceanic and Atmospheric Administration
OEL	Occupational Exposure Limit
OSHA	Occupational Safety & Health Administration
O/VRC	Odor/Vapor Response Card
PEL	Permissible Exposure Limit
pH	Percent Hydrogen
PID	photoionization detector
PIT	Pressure Indicating Transmitter
ppm	parts per million
QRA	Quantitative Risk Assessment
RCA	Radiologically Controlled Area (ventilation)
REL	Recommended Exposure Limit
RPE	Respiratory Protection Equipment
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
TSCR	Tank Side Cesium Removal
TWA	Time Weighted Average
VMDS	Vapor Monitoring Detection System
VOC	Volatile Organic Compounds

NOTE: Additional Information continued on next page.

INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT (IHIR) (Continued)**Additional Information:**

Additional Information continued:

Additional Information 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.
- American Industrial Hygiene Association (2024). Odor Thresholds for Chemicals, 4th Edition.
- American Industrial Hygiene Association (2013). Odor Thresholds for Chemicals with Established Health Standards, 2nd Edition.
- Agency for Toxic Substances and Disease Registry Environmental Odors Library. Retrieved from: https://www.atsdr.cdc.gov/odors/search_results.html
- 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
- Memo WRPS-1904672.1, TANK FARM EXHAUST ~ CK CONCENTRATION ALARM/ ACTION LEVELS FOR AMMONIA
- National Institute of Standards and Technology. NIST Chemistry WebBook, SRD#69. Retrieved from: <https://webbook.nist.gov/chemistry/>
- NIOSH Pocket Guide to Chemical Hazards. Dept. of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health.
- NIST Chemistry WebBook , SRD 69. Retrieved from: <https://webbook.nist.gov/cgi/cbook.cgi?Name=acetonitrile&Units=SI>
- 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:

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 that odors were first reported was extremely unstable, but the mixing height was 140 ft. At the time of the event the atmospheric stability was extremely unstable conditions, but the mixing height was 800 feet above grade. Tank vapor migration from AP-108 through the TSCR drain system is also unlikely as the drain system was isolated from the tank headspace and all vent system process piping still under active ventilation was connected to IXC B. Disconnected vent system piping was capped and/or plugged and valve isolated. DRI monitoring results at locations where odors were present were inconsistent with tank chemical vapors. Odor duration was significant, lasting approximately 6 days. Odors not quickly dissipating when subjected to continuous dilution ventilation of the 241AP25/POR655 Process Enclosure via POR657 suggests a continuous odor emission source inconsistent with the short duration of AP-108 headspace pressurization events. Furthermore, indication of increased flow in the AP-108 vent header directly correlate to pressurization events indicating that negative flow into the AP-108 headspace was maintained.

Thorough inspection of the environmental HVAC system did not identify any conditions that could contribute to odors consistent with provided odor descriptors. Investigation of electrical systems with thermal imaging cameras did not reveal any indication that hot wiring was the source of the odor. Visual inspection of equipment and materials within the 241AP25/POR655 Process Enclosure did not reveal a readily apparent odor emission source.

Odor descriptors provided by Affected Workers and the Field Response team were consistent with chemicals detected in atmosphere from off-gassing of rubber matting samples. Analytical sample results from grab samples collected of atmosphere at the odor location, although too dilute for direct correlation due to associated RDLs, did contain a subset of chemical constituents found in atmosphere from off-gassing of rubber matting samples. Odors quickly declined in perceived strength after the rubber matting was removed and similar odors returned after new rubber matting was re-installed. It is likely that off-gassing of chemicals from the rubber matting was the source of the odor.

It is unknown why odorant chemicals from the rubber matting were not noticed during subsequent entries before 10/15/2024, however it should be noted that during performance of TO-270-723 (completed soon before the odor event) during activities where process piping systems are breached but before the IXC passive ventilation stacks are installed RPE utilizing combination cartridges are required. It was noted by personnel supporting Field Response Activities who voluntarily utilized RPE with combination cartridges that said cartridges were effective in blocking the odor. It should also be noted that based on weather data it is likely that 10/15/2024 was the first time after a prolonged period of relative inactivity that environmental HVAC made a sizeable contribution to the temperature of the 241AP25/POR655 Process Enclosure by providing electrical resistance generated heating. Initial activation of electrical resistance generated heat after a prolonged period of inactivity is commonly associated with a “dusty, burning” odor at other Tank Farm facilities. Based on the positioning of the 241AP25/POR655 Process Enclosure Process Area heating unit, heating of the rubber matting was likely, which may have contributed to increase of chemical off-gassing.

All source sample results were found to be below OELs for chemical compounds identified, including samples from off-gassing of rubber matting samples which were intentionally allowed to accumulate concentrations well above those found at the odor location. A review of possible chemicals based on odor descriptors shows that most plausible chemical odor thresholds are well below applicable TWA OELs. It is unlikely applicable OELs were exceeded.

DRI instrumentation results indicated that further actions were not necessary to protect worker safety and health, therefore the area was released from restricted access and work was allowed to continue.

Other:

N/A

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

Associated Documents:

iCAS Number: N/A

EIR Number: EIR 2025-005

Industrial Hygienist:

[REDACTED]

First and Last Name

Industrial Hygiene Level 3 Manager:

[REDACTED]

Print First and Last Name

Industrial Hygiene Level 2 Manager:

[REDACTED]

Print First and Last Name

Signature / Date

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.



ODOR/VAPOR RESPONSE CARD

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

- Date and time of event: 10-15-24 10:00 am
- Check Applicable:
 - ☒ Odor
 - ☐ Ammonia Alarm (6 ppm)
 - ☐ Ammonia Alarm (12 ppm)
 - ☐ Alarm (other - describe): _____
- Your name and the work you were performing:
 Spotter for tiser operations
- Other Work Underway? Describe:
 Colom swap
- Location of event (mark area on map and wind direction):
 Tiser Access enclosure
- Name(s) of others in or near the affected area: _____
- Was Industrial Hygiene present, who?
 Yes
- Describe the odor:

☐ Sweet	☐ Sour	☐ Smoky	☐ Septic/Sewer	☐ Musty	☐ Rotten
☐ Metallic	☐ Onion	☐ Earthy	☐ Ammonia	☐ Citrus	☐ Solvent

☒ Other (describe): _____
- Is source known/likely? Describe:
 Electrical burning smell. Plastic burning
- Your symptoms? ☐ None None of the time

☐ 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

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 - 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: 10/15/24 9:50
- Check Applicable:
 - ☒ Odor ☐ Ammonia Alarm (6 ppm) ☐ Ammonia Alarm (12 ppm) ☐ Alarm (other - describe): _____
- Your name and the work you were performing: TSC2 NEW COLUMN INSTALL [REDACTED]
- Other Work Underway? Describe: ADOB CRANE WORK IN FARM
- Location of event (mark area on map and wind direction): TSC2 PROCESS ENCLOSURE
- Name(s) of others in or near the affected area: 2 IH, DCT, NCO, FOS
- Was Industrial Hygiene present, who? yes [REDACTED]
- Describe the odor:

☐ Sweet	☐ Sour	☒ Smoky	☐ Septic/Sewer	☐ Musty	☐ Rotten
☐ Metallic	☐ Onion	☐ Earthy	☐ Ammonia	☐ Citrus	☐ Solvent
☐ Other (describe): <u>Burnt wire, electrical</u>					
- 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): _____				

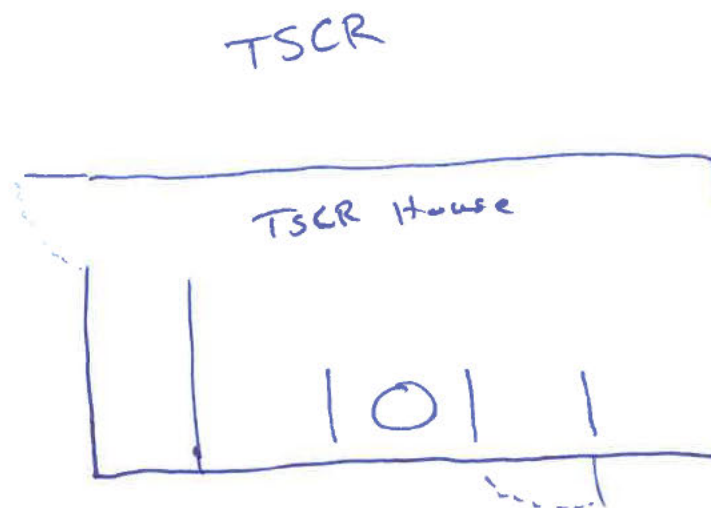
2. Provide this completed card (Page 1 & 2) to Supervisor, Industrial Hygiene, your Union Safety Representative or the CSM.
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ODOR/VAPOR RESPONSE CARD

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.



ODOR/VAPOR RESPONSE CARD

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

- Date and time of event: 10-15-24 0950
- Check Applicable:
 - ☒ Odor ☐ Ammonia Alarm (6 ppm) ☐ Ammonia Alarm (12 ppm) ☐ Alarm (other - describe): _____
- Your name and the work you were performing:
 guiding an IRC into the TSCR House
- Other Work Underway? Describe:
 AP-108
- Location of event (mark area on map and wind direction):
 TSCR
- Name(s) of others in or near the affected area:
 2 H, Ironworkers, Teamster, RCT, AP-108 workers
- Was Industrial Hygiene present, who?
 Yes
- Describe the odor:

☐ Sweet	☐ Sour	☒ Smoky	☐ Septic/Sewer	☐ Musty	☐ Rotten
☒ Metallic	☐ Onion	☐ Earthy	☐ Ammonia	☐ Citrus	☐ Solvent
☒ Other (describe): _____					
- Is source known/likely? Describe:
 Possible burning rubber/plastic/electrical
- Your symptoms? ☒ None

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

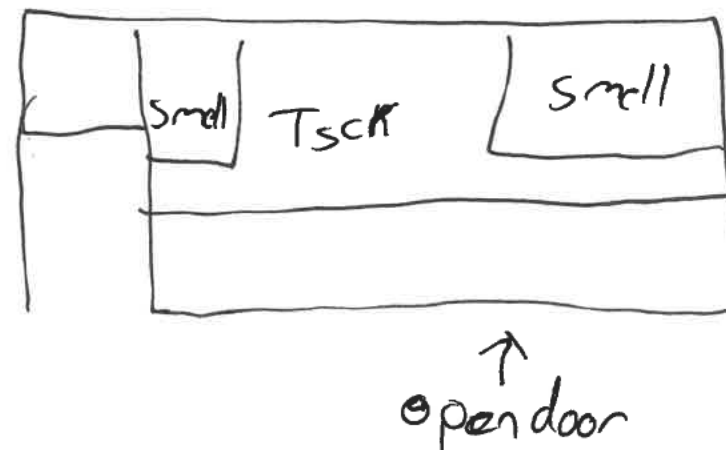
2. Provide this completed card (Page 1 & 2) to Supervisor, Industrial Hygiene, your Union Safety Representative or the CSM.
 If received by Supervisor/IH/U-SR, Supervisor/IH/U-SR will ensure card is provided to the CSM.

ODOR/VAPOR RESPONSE CARD

Instructions:

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



ODOR/VAPOR RESPONSE CARD

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

- Date and time of event: 10-15-24 → 9:50am
- Check Applicable:
 - ☒ Odor ☐ Ammonia Alarm (6 ppm) ☐ Ammonia Alarm (12 ppm) ☐ Alarm (other - describe): _____
- Your name and the work you were performing: [REDACTED] installing Ixc columns
- Other Work Underway? Describe: N/A
- Location of event (mark area on map and wind direction): TSCR
- Name(s) of others in or near the affected area: 2 RCTs, INCO, Iron worker and Teamster.
- Was Industrial Hygiene present, who? yes
- Describe the odor:

☐ Sweet	☐ Sour	☐ Smoky	☐ Septic/Sewer	☐ Musty	☐ Rotten
☐ Metallic	☐ Onion	☐ Earthy	☐ Ammonia	☐ Citrus	☐ Solvent

☒ Other (describe): smell like burned plastic
- 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.

ODOR/VAPOR RESPONSE CARD

Instructions:

1. Notify Immediate Supervisor. [REDACTED]
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. [REDACTED]



* 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: 10-15-2024 0950
- Check Applicable:
 - ☒ Odor ☐ Ammonia Alarm (6 ppm) ☐ Ammonia Alarm (12 ppm) ☐ Alarm (other - describe): _____
- Your name and the work you were performing:

FHT Column being installed into TSCR
- Other Work Underway? Describe: N/A
- Location of event (mark area on map and wind direction): TSCR
- Name(s) of others in or near the affected area: 1, Fran work, 1 NEW, 1 RCT, 1 FWS
- Was Industrial Hygiene present, who?

Fran work, 1 NEW, 1 RCT, FWS
- Describe the odor:

☐ Sweet	☐ Sour	☐ Smoky	☐ Septic/Sewer	☐ Musty	☐ Rotten
☐ Metallic	☐ Onion	☐ Earthy	☐ Ammonia	☐ Citrus	☐ Solvent

☒ Other (describe): off gas of the rubber
- 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): _____

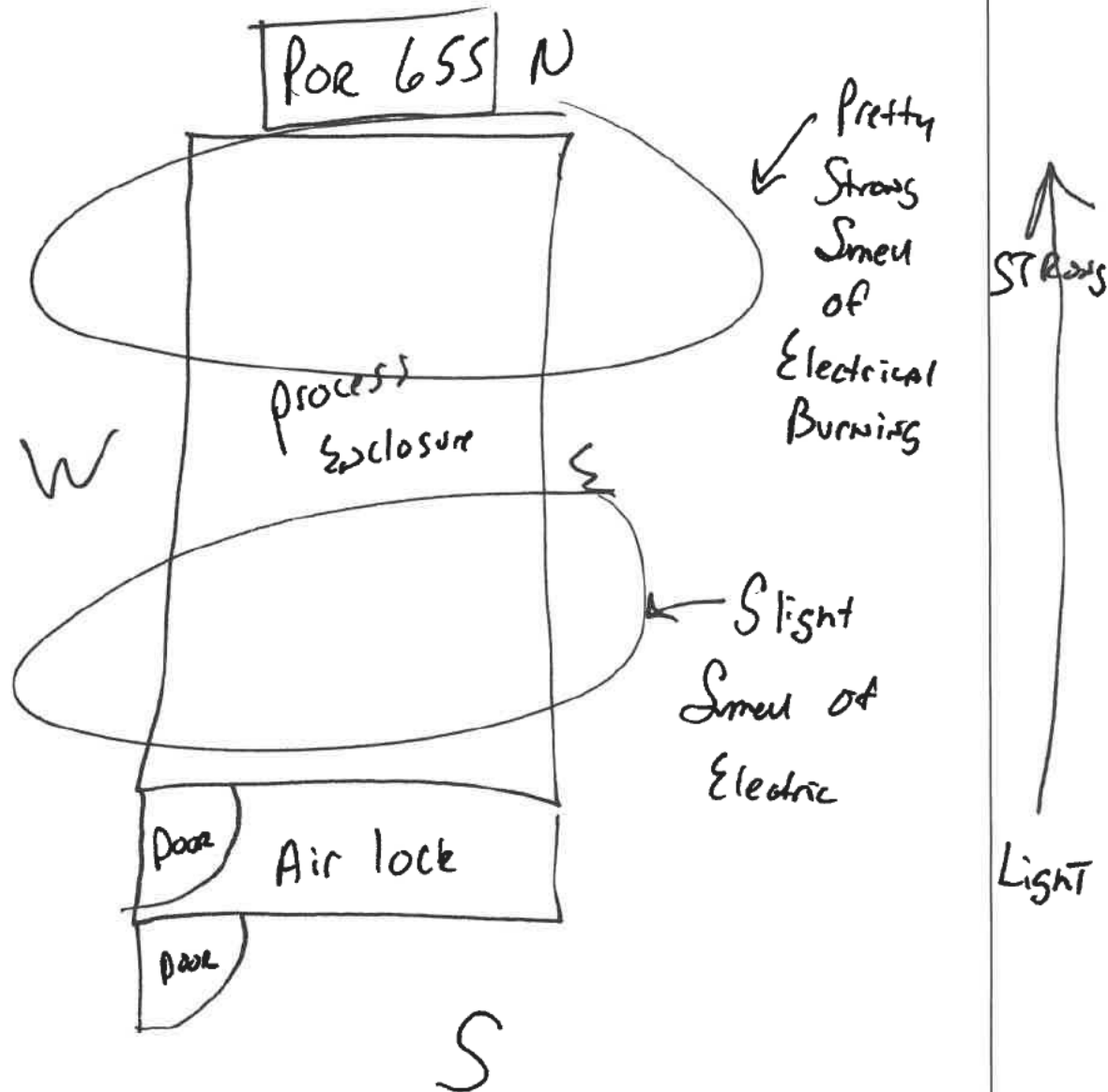
2. Provide this completed card (Page 1 & 2) to Supervisor, Industrial Hygiene, your Union Safety Representative or the CSM.
 If received by Supervisor/IH/U-SR, Supervisor/IH/U-SR will ensure card is provided to the CSM.

ODOR/VAPOR RESPONSE CARD

Instructions:

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



ODOR/VAPOR RESPONSE CARD

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

- Date and time of event: 10/15/24 10:10:15 AM?
- Check Applicable:
 - ☒ Odor
 - ☐ Ammonia Alarm (6 ppm)
 - ☐ Ammonia Alarm (12 ppm)
 - ☐ Alarm (other - describe):
- Your name and the work you were performing [REDACTED] NCO Duties
- Other Work Underway? Describe: Moving TSCC Columns into Process enclosure
- Location of event (mark area on map and wind direction):
- Name(s) of others in or near the affected area: 3-RCT's, 2-Teamsters, FWS, Each person is filling out a response
- Was Industrial Hygiene present, who? Yes [REDACTED] 1-Newer guy
- Describe the odor:

☐ Sweet	☐ Sour	☒ Smoky	☐ Septic/Sewer	☐ Musty	☐ Rotten
☐ Metallic	☐ Onion	☐ Earthy	☐ Ammonia	☐ Citrus	☐ Solvent
☐ Other (describe):					
- Is source known/likely? Describe: Electrical, Burning, plastic
- Your symptoms? ☒ None yet or at this time.

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

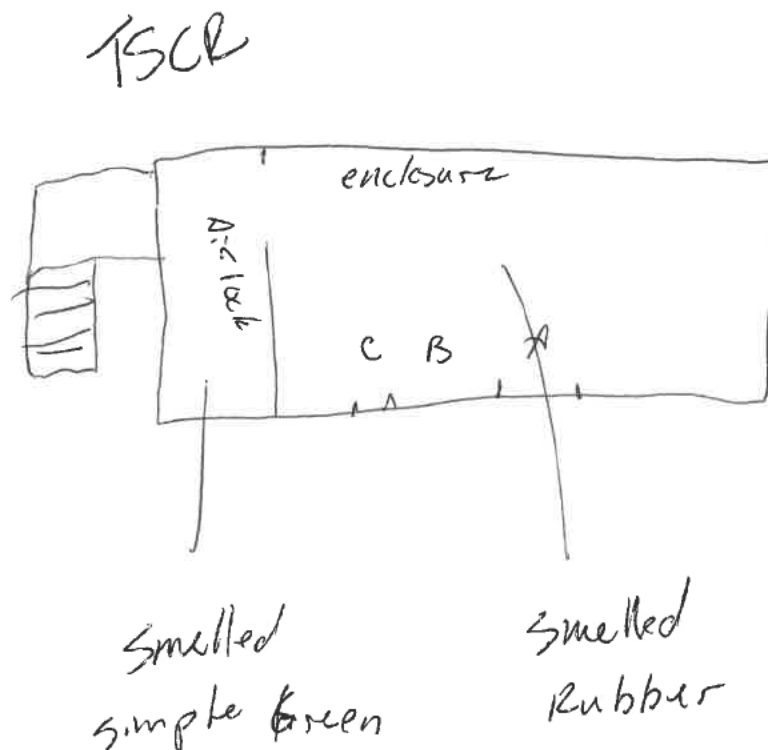
2. Provide this completed card (Page 1 & 2) to Supervisor, Industrial Hygiene, your Union Safety Representative or the CSM.
If received by Supervisor/IH/U-SR, Supervisor/IH/U-SR will ensure card is provided to the CSM.

ODOR/VAPOR RESPONSE CARD

Instructions:

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



ODOR/VAPOR RESPONSE CARD

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

- Date and time of event: 10 AM 10/15/24
- Check Applicable:
 - ☒ Odor
 - ☐ Ammonia Alarm (6 ppm)
 - ☐ Ammonia Alarm (12 ppm)
 - ☐ Alarm (other - describe): _____
- Your name and the work you were performing: [REDACTED] PCT placing HCl into a spot in TSC12
- Other Work Underway? Describe: _____
- Location of event (mark area on map and wind direction): _____
- Name(s) of others in or near the affected area: _____
- Was Industrial Hygiene present, who? yes
- Describe the odor:

☐ Sweet	☐ Sour	☐ Smoky	☐ Septic/Sewer	☐ Musty	☐ Rotten
☐ Metallic	☐ Onion	☐ Earthy	☐ Ammonia	☐ Citrus	☐ Solvent

☒ Other (describe): _____
- Is source known/likely? Describe: smelled like Simple Green / Rubber
- 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 (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.

POR 655

TSCR

ODOR/VAPOR RESPONSE CARD

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

- Date and time of event: 10-15-24 10:00
- Check Applicable:
 - ☒ Odor
 - ☐ Ammonia Alarm (6 ppm)
 - ☐ Ammonia Alarm (12 ppm)
 - ☐ Alarm (other - describe): _____
- Your name and the work you were performing:

[REDACTED] RLT support for installing IXL's
- Other Work Underway? Describe:

NO
- Location of event (mark area on map and wind direction):

POR 655 TSCR
- Name(s) of others in or near the affected area:

N/A
- Was Industrial Hygiene present, who?

Yes [REDACTED]
- Describe the odor:

☐ Sweet	☐ Sour	☐ Smoky	☐ Septic/Sewer	☐ Musty	☐ Rotten
☐ Metallic	☐ Onion	☐ Earthy	☐ Ammonia	☐ Citrus	☐ Solvent

☒ Other (describe): Melting/Burning Plastic
- Is source known/likely? Describe:

unknown
- Your symptoms? ☒ None

☐ Headache	☐ Dizziness	☐ Nausea	☐ Cough	☐ Fatigue
☐ Weakness	☐ Sore Throat	☐ Difficulty Breathing	☐ Eye Irritation	☐ Rash
☐ Itch	☐ Tingling	☐ Numbness	☐ Taste	

☐ Other (describe): _____

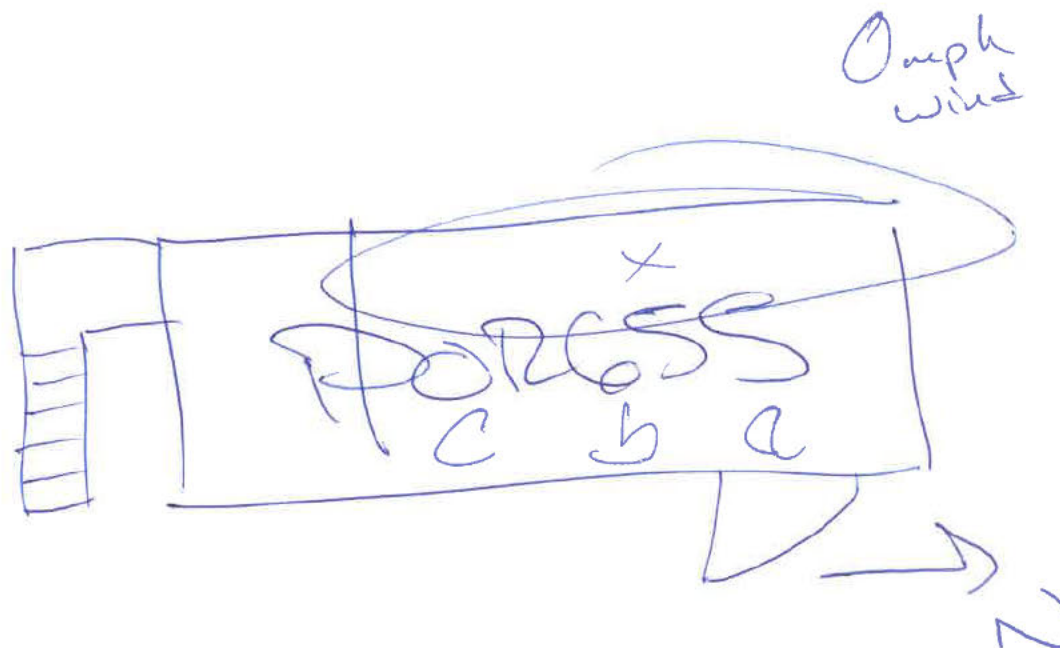
2. Provide this completed card (Page 1 & 2) to Supervisor, Industrial Hygiene, your Union Safety Representative or the CSM.
If received by Supervisor/IH/U-SR, Supervisor/IH/U-SR will ensure card is provided to the CSM.

ODOR/VAPOR RESPONSE CARD

Instructions:

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



ODOR/VAPOR RESPONSE CARD

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

- Date and time of event: 10-15-24 1000
- Check Applicable:
 - ☒ Odor
 - ☐ Ammonia Alarm (6 ppm)
 - ☐ Ammonia Alarm (12 ppm)
 - ☐ Alarm (other - describe): _____
- Your name and the work you were performing: TSCR IXC Column Installation
- Other Work Underway? Describe: AP-108 equipment pull in motion
- Location of event (mark area on map and wind direction): Port 655
- Name(s) of others in or near the affected area: _____
- Was Industrial Hygiene present, who? Yes
- Describe the odor:

☐ Sweet	☐ Sour	☐ Smoky	☐ Septic/Sewer	☐ Musty	☐ Rotten
☐ Metallic	☐ Onion	☐ Earthy	☐ Ammonia	☐ Citrus	☐ Solvent

☒ Other (describe): _____
- Is source known/likely? Describe: Didn't smell anything
- 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

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

- Date and time of event: 10-16-24 0940
- Check Applicable:
 - ☒ Odor ☐ Ammonia Alarm (6 ppm) ☐ Ammonia Alarm (12 ppm) ☐ Alarm (other - describe): _____
- Your name and the work you were performing:
 PCT work
- Other Work Underway? Describe:
 API08 pulling spray wings.
- Location of event (mark area on map and wind direction):
 Process
- Name(s) of others in or near the affected area:
- Was Industrial Hygiene present, who?
 yes
- Describe the odor:

☒ Sweet	☐ Sour	☐ Smoky	☐ Septic/Sewer	☐ Musty	☐ Rotten
☐ Metallic	☐ Onion	☐ Earthy	☐ Ammonia	☐ Citrus	☐ Solvent
☒ Other (describe): <u>Stale, dry, sickly sweet, slight burning sensation in nose.</u>					
- Is source known/likely? Describe:
 Must be inside process or from API08 pull.
- Your symptoms? ☒ None

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

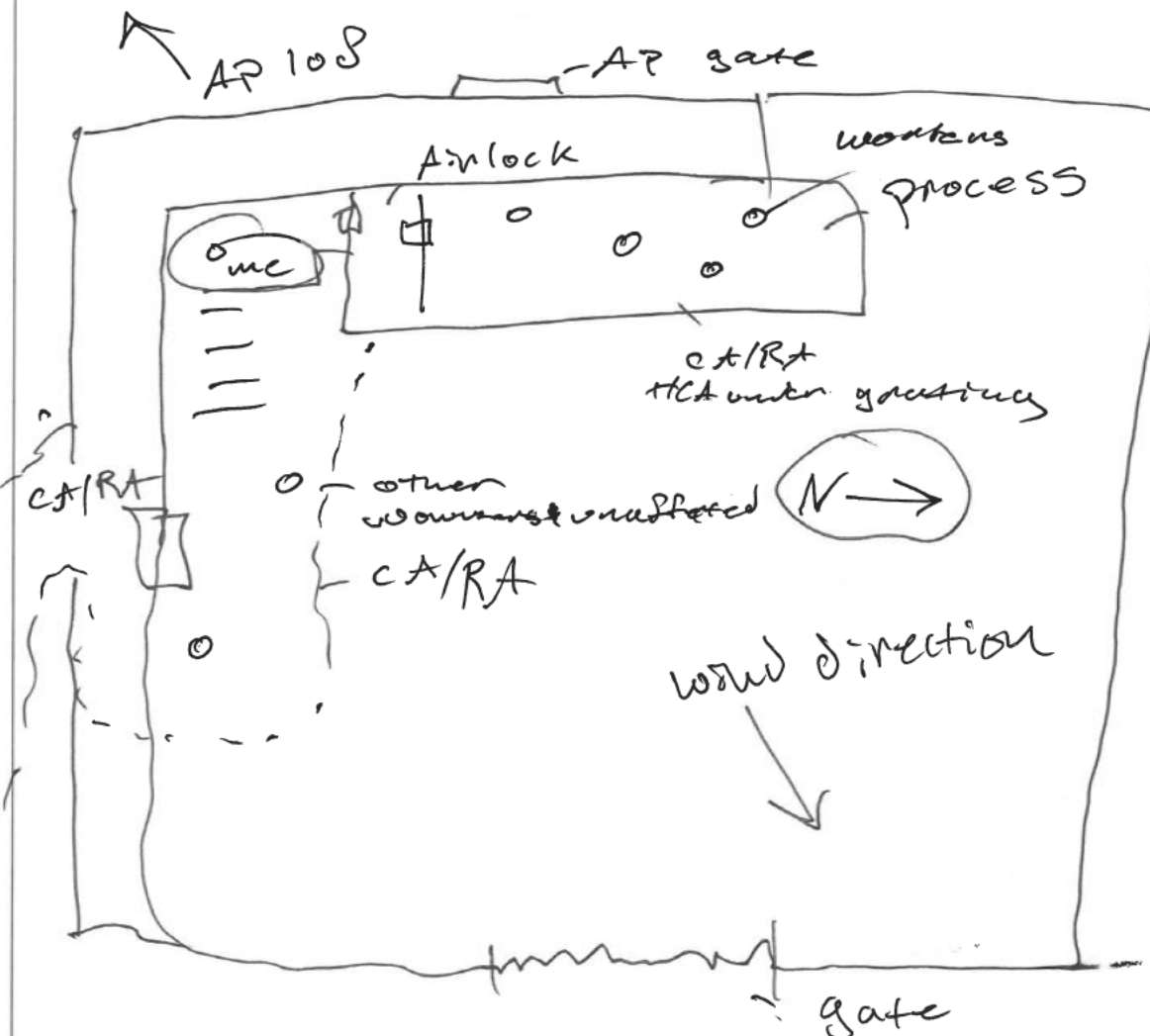
2. Provide this completed card (Page 1 & 2) to Supervisor, Industrial Hygiene, your Union Safety Representative or the CSM.
 If received by Supervisor/IH/U-SR, Supervisor/IH/U-SR will ensure card is provided to the CSM.

ODOR/VAPOR RESPONSE CARD

Instructions:

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



ODOR/VAPOR RESPONSE CARD

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

- Date and time of event: 10-16-24 0920
- Check Applicable:
 - ☒ Odor ☐ Ammonia Alarm (6 ppm) ☐ Ammonia Alarm (12 ppm) ☐ Alarm (other - describe): _____
- Your name and the work you were performing:

[REDACTED] Rct coverage inside POR655
- Other Work Underway? Describe:

N/A
- Location of event (mark area on map and wind direction):

inside POR655
- Name(s) of others in or near the affected area:

[REDACTED]
- Was Industrial Hygiene present, who?

yes [REDACTED]
- Describe the odor:

☐ Sweet	☐ Sour	☐ Smoky	☐ Septic/Sewer	☐ Musty	☐ Rotten
☐ Metallic	☐ Onion	☐ Earthy	☐ Ammonia	☐ Citrus	☐ Solvent
☒ Other (describe): <u>Slightly rubbery</u>					
- 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): _____				

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 (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.



ODOR/VAPOR RESPONSE CARD

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

- Date and time of event: 10/10/24 9:30 AM.
- Check Applicable:
 - ☒ Odor ☐ Ammonia Alarm (6 ppm) ☐ Ammonia Alarm (12 ppm) ☐ Alarm (other - describe): _____
- Your name and the work you were performing:
 Electrical inspection
- Other Work Underway? Describe:
 N/A
- Location of event (mark area on map and wind direction):
 TSEP process enclosure.
- Name(s) of others in or near the affected area:
- Was Industrial Hygiene present, who?
 yes.
- Describe the odor:

☐ Sweet	☐ Sour	☐ Smoky	☐ Septic/Sewer	☐ Musty	☐ Rotten
☐ Metallic	☐ Onion	☐ Earthy	☐ Ammonia	☐ Citrus	☐ Solvent
☒ Other (describe): _____					
- Is source known/likely? Describe:
 smells like Rubber / cheap Halloween mask
- 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.
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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.



ODOR/VAPOR RESPONSE CARD

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

- Date and time of event: 10/16/2024 0921
- Check Applicable:
 - ☒ Odor ☐ Ammonia Alarm (6 ppm) ☐ Ammonia Alarm (12 ppm) ☐ Alarm (other - describe): _____
- Your name and the work you were performing:
 INT checking for odors with the multi RAC
- Other Work Underway? Describe:
 going in to check for smells stronger than normal
- Location of event (mark area on map and wind direction):
 Per 655
- Name(s) of others in or near the affected area:
- Was Industrial Hygiene present, who?
 YES
- Describe the odor:

☐ Sweet	☐ Sour	☐ Smoky	☐ Septic/Sewer	☐ Musty	☐ Rotten
☐ Metallic	☐ Onion	☐ Earthy	☐ Ammonia	☐ Citrus	☐ Solvent

☒ Other (describe): _____
- Is source known/likely? Describe:
 like a Rubber mask halloween mask
- Your symptoms? ☒ None

☐ Headache	☐ Dizziness	☐ Nausea	☐ Cough	☐ Fatigue
☐ Weakness	☐ Sore Throat	☐ Difficulty Breathing	☐ Eye Irritation	☐ Rash
☐ Itch	☐ Tingling	☐ Numbness	☐ Taste	

☐ Other (describe): _____

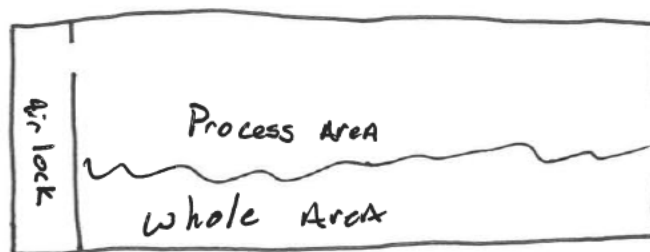
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 If received by Supervisor/IH/U-SR, Supervisor/IH/U-SR will ensure card is provided to the CSM.

ODOR/VAPOR RESPONSE CARD

Instructions:

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



ODOR/VAPOR RESPONSE CARD

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

- Date and time of event: 10/16/24 09:15
- Check Applicable:
 - ☒ Odor ☐ Ammonia Alarm (6 ppm) ☐ Ammonia Alarm (12 ppm) ☐ Alarm (other - describe): _____
- Your name and the work you were performing:
 TSLR check for odor
- Other Work Underway? Describe:
 N/A
- Location of event (mark area on map and wind direction):
 Por 655
- Name(s) of others in or near the affected area:
- Was Industrial Hygiene present, who?
 Yes
- Describe the odor:

☐ Sweet	☐ Sour	☐ Smoky	☐ Septic/Sewer	☐ Musty	☐ Rotten
☐ Metallic	☐ Onion	☐ Earthy	☐ Ammonia	☐ Citrus	☐ Solvent
☒ Other (describe): <u>Plastic getting hot</u>					
- 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 (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.

