TOC-WP-23-3597
Revision 0

C-67 Event Investigation Reports (Redacted) EIR-2023-047 (06/20/2023)

(Settlement Agreement Deliverable)

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Contractor for the U.S. Department of Energy
Office of River Protection under Contract DE-AC27-08RV14800

P.O. Box 850
Richland, Washington 99352

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A. L. Beerman
Washington River Protection Solutions

Date Published
July 2023

WRPS

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P.O. Box 850
Richland, Washington 99352

APPROVED
By Lynn M Ayers at 8:22 am, Jul 24, 2023

Release Approval Date

Washington River Protection Solutions

EVENT SUMMARY

Check PART 1 box to hide that section of the form. Check PART 2 box it will show that section.

☐ **PART 1 *(hide)**** ☒ **PART 2 *(show)****

NOTE: *This form provides timely notification to management and documents preliminary information of an event that may require a more formal investigation. Details may change upon further examination and analysis. The following is a current status of available information:*

Project: Production Operations Date: 6/20/2023

Area/Building/Location: 200E/242A/AMU Approximate Time of Event: 1239 hours

AR Number: AR-2023-1767 Responsible Manager: [redacted]

EIR Number: EIR-2023-047 Event Investigator: [redacted]

EVENT SUMMARY PART 1

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

Workers were staging scaffolding material for Work Order (WO)#939080, "242-A Erect/Modify/Dismantle Scaffold at Height Greater than 10 Feet."

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

2 Hanford Mission Integration Solutions (HMIS) Iron Workers.

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

At 1239 hours on 6/20/2023, two Iron Workers encountered a "rotten egg, sewer" like odor within the 242-A Evaporator Aqueous Makeup Unit (AMU) while performing ingress/egress activities to stage scaffolding material. No symptoms were reported. The two Iron Worker personnel declined precautionary medical evaluation, however, HMIS management required that the Iron Workers report to the onsite medical provider (HPMC) for precautionary medical evaluation. The Iron Workers were evaluated and released to return-to-work without restriction.

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

Odor was observed while staging scaffolding in the 242-A Evaporator AMU, therefore, weather conditions are not applicable.

Personnel were in Level D PPE. The AMU is not a radiologically posted area requiring anti-contamination clothing. Personnel were not performing work activities that require use of respiratory protection or a personal ammonia monitor (e.g., VentisPro or ToxiRAE).

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

No significant operational impacts, impacts to facility safety status, or delays in scheduled work activities occurred. Access was temporarily restricted to the AMU, resulting in minor delays to other scheduled work activities in the area.

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

- Workers were instructed to leave the area and access to the area was restricted.
- The Central Shift Manager (CSM) made required TFC-OPS-OPER-C-67, "Response to Stronger than Normal Odors," notifications.
- Production Operations shift Industrial Hygiene Technician (IHT) initiated TFC-OPS-OPER-C-67 response actions and monitoring per IHSP-POE-MULTI-TFCOPSOPERC67.
- Event Investigation EIR-2023-047 "C-67 Odor Response at 242-A AMU" was initiated.

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

[1300 hours]- The CSM contacted by 242-A Shift Manager and informed them that two HMIS Iron Workers who were moving scaffolding parts from the 242-A AMU to the Condenser room reported smelling stronger than usual odors. Neither worker reported experiencing symptoms. The HMIS workers declined precautionary medical evaluation, however, HMIS management requires the Iron Workers to report to the onsite medical provider (HPMC) for precautionary medical evaluation.

[1301 hours]- The CSM initiated TFC-OPS-OPER-C-67, restricted access, provided radio announcement, and issued SOEN "Initiating C-67 Odor Response for a stronger than normal odors at 242-A in the AMU. Access to the 242-A AMU is restricted."

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EVENT SUMMARY (Continued)

Project: Production Operations **Date:** 6/20/2023

Area/Building/Location: 200E/242A/AMU **Approximate Time of Event:** 1239 hours

AR Number: AR-2023-1767 **Responsible Manager:** [redacted]

EIR Number: EIR-2023-047 **Event Investigator:** [redacted]

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

[1320 hours] - The CSM provided TFC-OPS-OPER-C-67, Attachment B - Initial Communication Summary email to distribution list "DL - WRPS Odor/Vapor Event Notification".

[1419 hours]- The CSM provided radio announcement and issued SOEN "Response per C-67 Odor Response for a stronger than normal odors at 242-A AMU has been completed. IH results at or below background levels. Normal access restored."

[1541 hours]- The CSM provided TFC-OPS-OPER-C-67, Attachment C - Follow-up Event Summary to email to distribution list "DL - WRPS Odor/Vapor Event Notification."

[1544 hours]- The CSM noted HMIS Iron Workers were both released to return to work without restrictions. The CSM contacted the on-call DOE Facility Representative and informed them of TFC-OPS-OPER-C-67 event initiation and exit.

☒ This event does not merit an Event Investigation meeting

☐ This event merits an Event Investigation meeting

Basis for Determination:

Information gathered from interviews and documentation reviews have provided sufficient information regarding this event.

Responsible Manager:

[redacted] *Print First and Last Name*

[redacted] Digitally signed by [redacted] Date: 2023.06.21 13:23:31 -07'00' *Signature / Date*

CAS Manager:

[redacted] *Print First and Last Name*

[redacted] *Signature / Date*

EVENT SUMMARY PART 2

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

To summarize the conclusions of IHIR-00075, "TFC-OPS-OPER-C-67 Response 242A Evaporator AMU," investigation and direct reading instrument (DRI) monitoring could not readily identify a source. Although, observations during TFC-OPS-OPER-C-67 Response Actions determined the likely source of the odors is the 242A Evaporator AMU Room's KAESER KAD115-C Air Dryer Purge Valve release. Odor descriptors provided by Affected Workers are consistent with stagnant water associated with the 242A Evaporator AMU Room's KAESER Air Compressors and is an anticipated occurrence in the 242A AMU Room. The odor was also perceived by Responding TFC-OPS-OPER-C-67 Personnel when the Air-Dryer purge valve (PSV-DRE1-1) released. These results and observations are consistent with the conclusions from a similar previous event occurrence that occurred on 05/31/2023 [Reference EIR-2023-037 and IHIR-00069].

Direct Reading Instrumentation monitoring performed during TFC-OPS-OPER-C-67 response actions did not indicate further action was necessary with regard to a worker safety and health occupational exposure standpoint. As a result, the area was released from restricted access and work was allowed to continue.

The following considerations support the IHIR-00075 conclusion:

(1) IH personnel performing TFC-OPS-OPER-C-67 Response Actions noted a definitive sulfur smell, consistent with the Affected Workers' odor descriptors, when the Air-Dryer purge valve (PSV-DRE1-1)

Project: Production Operations | Date: 6/20/2023

Area/Building/Location: 200E/242A/AMU | Approximate Time of Event: 1239 hours

AR Number: AR-2023-1767 | Responsible Manager: [redacted]

EIR Number: EIR-2023-047 | Event Investigator: [redacted]

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

released. The Air Dryer System supplies the 242-A building with pressurized dry air, which is needed to support various Evaporator building equipment, and is set to cycle between dual tanks every 10 minutes. Similarly, HMIS Riggers reported experiencing "rotten egg" odors in the 242A AMU Room on 05/31/2023 that were coincident with activation of an air dryer pop-off valve. IH personnel performing odor investigation and TFC-OPS-OPER-C-67 response actions for the 05/31/2023 event occurrence also noted a brief "rotten-egg" odor every time the air dryer relief valve activated, which occurred about 4 times during field response actions.

(2) Transient odors are associated with stagnant water and is an anticipated occurrence in the 242A AMU Room. Low levels of hydrogen sulfide gas (consistent with Affected Workers' odor description), ammonia, and various VOCs may be produced by stagnant water when it's within a confined area for an extended period and is primarily resultant of natural decay of organic material through biological decomposition.

While odors may be readily perceived, concentrations are still well below levels of worker exposure concern due to a combination of factors:
1. There is not a continuous emission source.
2. There's a large air dilution coefficient inside the 242A Evaporator AMU Room (ventilated space).
3. Minimal source volume (i.e., Air Supply System has a finite volume upstream of, and inside, the Air Dryer).

(3) DRI monitoring for hydrogen sulfide was conducted during the TFC-OPS-OPER-C-67 response based on the odor descriptors "rotten eggs" provided by the affected employee. According to the American Industrial Hygiene Association (AIHA), "Odor Threshold for Chemicals with Established Health Standards", 2nd Edition, "rotten eggs" is listed as the odor characteristic of hydrogen sulfide. Investigative TFC-OPS-OPER-C-67 DRI monitoring indicated hydrogen sulfide concentrations of <0.1 ppm, which is below anticipated background levels.

The resolution of DRI equipped with hydrogen sulfide (0.1 ppm) is comparatively inadequate as a detection tool at the concentrations perceived by the human olfactory sense. Hydrogen sulfide gas has an offensive distinct rotten egg odor that is detectable at very low concentrations, with the lower range odor threshold value for hydrogen sulfide being 40 ppt (or 0.04 ppb or 0.00004 ppm). While the resolution of the DRI is insufficient to detect concentrations at the lower range of the odor threshold value, they are sufficient to detect hydrogen sulfide at concentrations below their established action level and occupational exposure limit (OEL).

(4) Evaluation of the weather details determined the cause of the odor source was unlikely to be resultant of Tank Farms exhauster emissions based on the wind direction, wind speed, mixing height, and stability class at the reported time of event (Refer to Attachment 1 for DFAS PEZ Model).

(5) While the reported odor location and odor descriptions are inconsistent with Tank Waste Chemical Vapors, due to the proximity of 242-A Evaporator to the Tank Farms, monitoring for Tank Waste Chemical Vapors was still conducted during the TFC-OPS-OPER-C-67 response.

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

Investigative TFC-OPS-OPER-C-67 Direct Reading Instrument (DRI) monitoring indicated less than detectable concentrations for ammonia (< 1 ppm) and Volatile Organic Compounds (VOCs) (≤ 0.01 ppm)

Project: Production Operations | Date: 6/20/2023

Area/Building/Location: 200E/242A/AMU | Approximate Time of Event: 1239 hours

AR Number: AR-2023-1767 | Responsible Manager: [redacted]

EIR Number: EIR-2023-047 | Event Investigator: [redacted]

utilizing a DRI equipped 10.6 eV photoionization detector. Providing further indication the cause of the reported odor was unlikely to be resultant of Tank Farms exhauster emissions.

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

The exhauster high level alarm conservatively established for A Complex (excluding A farm) is 460 ppm. According to the Vapor Monitoring and Detection System (VMDS), the ammonia concentration observed at the time of event occurrence was 0.0 ppm at the 702-AZ exhauster, 5.580 ppm at the POR-127 exhauster, and 28.654 ppm at the AN exhauster. The AP exhauster is not currently connected to VMDS, issues have been identified with the AW exhauster VMDS, in addition to the POR-126 VMDS being "down" at the time of the event occurrence; therefore, readings are acquired once per calendar day in accordance with TF-OPS-IHT-037 when ammonia stack monitoring via VMDS is unavailable. The highest ammonia concentrations observed between 06/13/2023 and 06/19/2023 was 9.0 ppm at the AP Exhauster, 10 ppm at the AW exhauster, and 0 ppm at the POR-126. Conservatively utilizing the higher ammonia concentration observed in the AN exhauster, a predicted ground receptor ammonia concentration of 0.156 ppm (or 0.62% of the established Occupational Exposure Limit for ammonia) would be expected if AN, AY/AZ, AX tank, or AW farm exhauster emissions were present.

The exhauster high level alarm conservatively established for A farm is 160 ppm. According to the Vapor Monitoring and Detection System (VMDS), the ammonia concentration observed at the time of event occurrence was 1.963 ppm at the POR-518 exhauster and 1.139 ppm at the POR-519 exhauster. Conservatively utilizing the higher ammonia concentration observed in the POR-518 exhauster, a predicted ground receptor ammonia concentration of 0.031 ppm (or 0.12% of the established Occupational Exposure Limit for ammonia) would be expected if A tank farm exhauster emissions were present.

Therefore, providing additional indication the cause of the personal ammonia alarm was unlikely to be resultant of Tank Farms exhauster emissions.

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

None.

Lessons Learned or Information That the Work Force Needs Immediately:

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

☐ An Event Investigation will be completed per TFC-OPS-OPER-C-14

☐ This event will be managed by another process, i.e., Operability Evaluation, Engineering Technical Evaluation, etc.

☒ This event does not require continuation of the Event Investigation process

Basis for Determination:

This event does not require continuation of the event investigation process under TFC-OPS-OPER-C-14, "Event Investigation Process." The facts, findings, and comprehensive account captured under this Event Summary and the Industrial Hygiene Event Investigation Report, IHIR-00075, "TFC-OPS-OPER-C-67 Response 242A Evaporator AMU," form the basis that further investigation will provide no additional information or operational benefit.

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EVENT SUMMARY (Continued)

Project: Production Operations Date: 6/20/2023

Area/Building/Location: 200E/242A/AMU Approximate Time of Event: 1239 hours

AR Number: AR-2023-1767 Responsible Manager: [redacted]

EIR Number: EIR-2023-047 Event Investigator: [redacted]

Basis for Determination:

Further corrective actions will be managed in the iCAS system under WRPS-AR-2023-1663 (i.e. iCAS associated with the initial odor response in the 242A AMU Room on 05/31/2023).

Responsible Manager:

[redacted] [redacted] [redacted]

Print First and Last Name *Signature / Date*

CAS Manager:

[redacted] [redacted] [redacted]

Print First and Last Name *Signature / Date*

Attachment 1: SmartSite™ Summary, Response Map, and Response Pictures

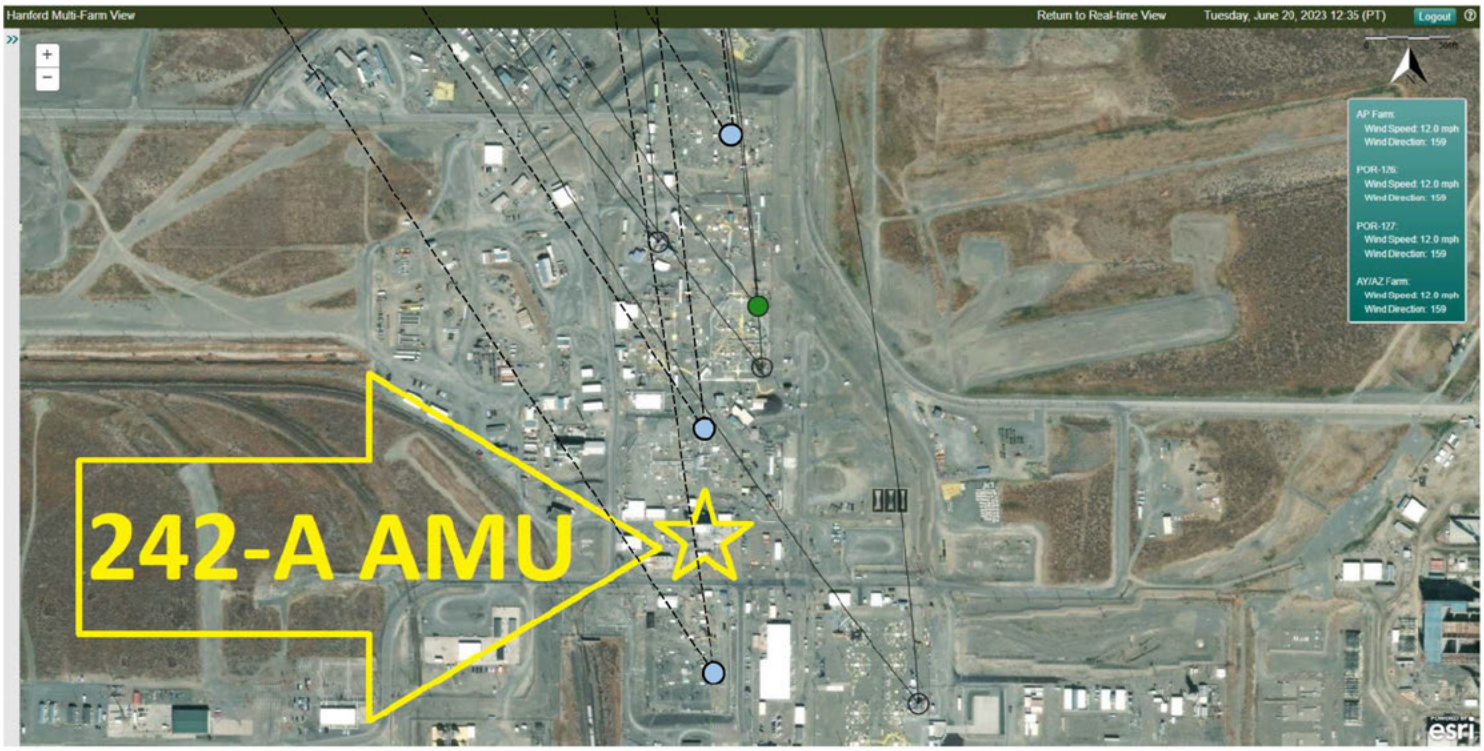


Figure 1. 200-East Area (with 241-AW, 241-AP, 241-AN, 241-AY/AZ, 241-AX, 241-A Farm projected plume models) at 1235 06/20/2023 from Data Fusion and Advisory System (DFAS) application, powered by SmartSite™

NOTE: 241-AN, 241-A, 241-AW Farm Exhausters are not connected to the DFAS; however, an approximate exhauster plume was added for each based on other modeled plumes.

Washington River Protection Solutions

INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT

Event Title:	PER Number:
TFC-OPS-OPER-C-67 Response 242A Evaporator AMU	N/A
	IHIR Number: IHIR-00075

Date:	Time:	Location:
06/20/2023	1237	242A Evaporator AMU Room

Event Summary and Timeline:

Event Summary:

At approximately 1239 on 06/20/2023 two (2) Hanford Mission Integration Solutions (HMIS) Riggers encountered a stronger than normal "rotten egg, sewer smell" odor inside the 242A AMU Room near the doors located on the South side of the room. Affected Workers were bringing in scaffolding material from the AMU Room to the Condenser Room when they encountered the odor. No symptoms were reported, and both declined precautionary medical evaluation. Per HMIS procedure, Affected Workers were sent for precautionary medical evaluation.

Field Response Timeline:

1239 242A Evaporator Area Dayshift Manager (ADM) notifies Central Shift Manager (CSM) of stronger than normal odors

1247 CSM Administrative Assistant notifies Production Operations-East (POE) Industrial Hygienist (IH)-1 of stronger than normal odors at the 242A Evaporator and TFC-OPS-OPER-C-67 response

1247 POE IH-1 notifies POE IH-2 of stronger than normal odors and TFC-OPS-OPER-C-67 response

1247 POE IHs notify POE Industrial Hygiene Technician (IHT) Supervisor of stronger than normal odors at the 242A Evaporator and TFC-OPS-OPER-C-67 response

1248 POE IHs arrive at Central Shift Office (CSO)

1250 CSM contacts 242A Evaporator ADM for update

- 242A Evaporator ADM → CSM/POE IH-1: Two iron workers, 242A AMU Room, AMU Room has been posted Restricted Access
- CSM/POE IH-1 → 242A Evaporator ADM: Odor descriptor?
- 242A Evaporator ADM → CSM/POE IH-1: Printing Odor/Vapor Response Cards for Affected Workers
- CSM/POE IH-1 → 242A Evaporator ADM: Symptoms/medical?
- 242A Evaporator ADM → CSM/POE IH-1: Will confirm if there were any symptoms & offer medical

1252 POE IHT Supervisor updates Level 1 Environmental, Safety, Health, & Quality (ESH&Q) Manager, Level 2 IH Manager, and POE Level 3 Safety & Health (S&H) Manager on stronger than normal odors and TFC-OPS-OPER-C-67 response

- 242A Evaporator AMU Room
- Two Iron Workers

1254 POE IHs check Data Fusion Advisory System (DFAS), powered Smart Site™, for current weather details:

- Wind Speed: 11.5 mph
- Wind Direction: 159° (out of South Southeast)
- Mixing Height: 1500 feet above grade
- Stability Class: D (neutral conditions)

1255 POE IHs check Vapor Monitoring Detection System (VMDS) exhauster ammonia readings for approximate time of Initiating Event (06/20/2023 @ 1239):

- POR518 (241-A): 1.963 ppm
- POR519 (241-A): 1.139 ppm
- 241-AN: 28.654 ppm
- 241-AW: 11.720 ppm
- POR126 (241-AX): N/A
- POR127 (241-AX): 5.580 ppm
- 702AZ (241-AY/AZ): 0 ppm
- 241-AP: N/A

All available readings << High Alarm set point

1257 POE IH-3 and POE IH-4 arrive at CSO

Field Response Timeline continued on next page.

Event Summary and Timeline:

Field Response Timeline (continued):

1257 POE IH-1 informs POE IH-3 and POE IH-4 Affected Workers are currently sitting outside 242A Evaporator populating Odor/Vapor Response Cards
- POE IH-1 requests POE IH-3 and POE IH-4 follow-up with the Affected Workers and then POE IH-3 wait outside 242A Evaporator for responding POE IHTs

1258 POE IH-3 and POE IH-4 depart CSO
1259 242A Evaporator ADM contacts CSM with update:
- Odor Descriptor: "Rotten Eggs"
- No symptoms
- Both declined precautionary medical evaluation; however, per HMIS procedure, Affected Workers will be sent for precautionary medical evaluation

1259 POE IH-1 requests POE IHT Supervisor have Direct Reading Instrumentation (DRI) equipped with the following sensors prepared:
- Hydrogen Sulfide
- Ammonia
- Volatile Organic Compound (VOC) 10.6 eV photoionization detector (PID)

1300 POE IHT Supervisor contacts POE Shift IHTs to request TFC-OPS-OPER-C-67 response support
1300 Shift Office Event Notification (SOEN): "Initiating C-67 Odor Response for a stronger than normal odors at 242-A in the AMU. Access to the 242-A AMU is restricted. CSM"
1301 POE IHT Supervisor updates Level 1 ESH&Q Manager, Level 2 IH Manager, and POE Level 3 S&H Manager on TFC-OPS-OPER-C-67 response
- Rotten egg smell
- No symptoms
- Declined precautionary medical surveillance; however, per HMIS Management will be sent for precautionary medical surveillance

1305 CSM and POE IH-1 discuss Response Respiratory Protection Requirements
- Respiratory Protection Equipment non required, Voluntary Use

1305 POE IH-4 updates POE Level 3 S&H Manager, POE IH-1, POE IH-2, and POE IH-3:
- POE IH-4 → POE Level 3 S&H Manager & POE IHs: Asphalt Work ongoing in 242A Parking Lot
- POE IH-2 → POE Level 3 S&H Manager & POE IHs: Odors?
- POE IH-4 → POE Level 3 S&H Manager & POE IHs: "Asphalt", not strong, work is on East side of 242A Evaporator building

1307 POE IHT Supervisor requests POE Shift IHTs to report to CSO when response equipment are ready
1307 POE IH-3 updates POE IH-1:
- Two Workers
- Sulfur odor near double doors of the AMU Room

1308 POE Shift IHTs arrive at CSO
1309 POE IH-3 updates POE IH-1:
- Currently unattended running vehicle outside 242A AMU Room doors

1310 POE IH-4 updates POE Level 3 S&H Manager, POE IH-1, POE IH-2, and POE IH-3:
- POE IH-4 → POE Level 3 S&H Manager & POE IHs:
  - o Odor/Vapor Response Cards are complete
  - o No symptoms currently
  - o Sulfur odor

1311 POE IH-2 submits request to Hanford Meteorological Station to obtain weather information for Station #6 at 1240 on 06/20/2023
1311 POE IH-1 shows POE Shift IHTs pictures of Affected Area, and likely odor source, from IHIR-00069 Attachment A
1312 242A Evaporator ADM contacts CSM with update:
- Affected Workers were moving scaffolding from AMU Room to Condenser Room

1313 POE IH-4 returns to CSO with Odor/Vapor Response Cards
1313 POE IH-1 and CSM review Odor/Vapor Response Cards
- No symptoms
- Odor Descriptors: "[Sulfur] smell"
  - o Consistent with verbal report

1310 POE IH-3 updates POE Level 3 S&H Manager, POE IH-1, POE IH-2, and POE IH-4:
- "Faint sulfur odor near the door on the outside that has a faint sewage undertone"

1316 CSM and POE IH-2 sign TFC-OPS-OPER-C-67 Attachment A Sheet 1 of 2, Response Plan

Field Response Timeline continued on next page.

Field Response Timeline (continued):

1316 POE IH-1 provides POE Shift IHTs briefing for response:
- Monitor per IHSP-POE-MULTI-TFCOPSOPERC67:
  - DRI equipped with the following sensors:
    - Hydrogen Sulfide
    - Ammonia
    - VOC 10.6 eV PID
  - Survey around the air dryer
  - Survey the air dryer purge valves
  - Survey around the air compressor
  - Survey around the floor drains
  - General area inside 242A AMU Room
- Respiratory Protection Equipment not required, Voluntary Use
- Safety glasses
- POE IH-3 outside 242A Evaporator, meet up for Response Actions

1317 POE Shift IHTs depart CSO
1317 POE IH-3 updates POE Level 3 S&H Manager, POE IH-1, POE IH-2, and POE IH-4:
- Riggers have departed in their vehicle for precautionary medical surveillance

1317 POE IHT Supervisor updates Level 1 ESH&Q Manager, Level 2 IH Manager, and POE Level 3 S&H Manager on TFC-OPS-OPER-C-67 response
- POE Shift IHTs in route to response
- Monitoring for Ammonia, VOCs, and Hydrogen Sulfide

1329 CSM contacts Performance Assurance (PA) Technical Specialist
- PA Technical Specialist → CSM: PA Point-of-Contact assigned
- CSM → PA Technical Specialist: Event Investigation Report (EIR) #2023-047

1330 POE IH-3 updates POE IH-1:
- Entered 242A Evaporator AMU Room
- Only a tinge of odor
- Every once in a while it very faintly smells like "boiled eggs"

1331 CSM call with PA Technical Specialist (continued)
- POE IH-1 → PA Technical Specialist/CSM:
  - "Rotten Eggs"
  - 242A Evaporator AMU Room
  - Responding Personnel have encountered a faint odor consistent with Affected Workers' odor descriptors
  - Monitoring for Ammonia, VOCs, and Hydrogen Sulfide

1334 POE IH-3 updates POE IH-1:
- Air Dryer Purge Valve "definite odor release with a sulfur smell"
- No elevated readings
- Reading was obtain at the Air Dryer Purge Valve at the time of release

1339 POE IH-3 updates POE IH-1:
- POE Shift IHTs in route to perform DRI Post-Use Function Test

1339 POE IHT Supervisor updates Level 1 ESH&Q Manager, Level 2 IH Manager, and POE Level 3 S&H Manager on TFC-OPS-OPER-C-67 response
- Air dryer purge valve likely odor source
- Odor increased during purge valve release- "Sulfur"
- No elevated readings on DRI

1340 POE IH-3 returns to CSO
1343 242A Evaporator ADM contacts CSM with update:
- 242A Evaporator ADM → CSM: IHTs have completed their sweep, readings at or below background
- 242A Evaporator ADM → CSM: Going to release Restricted Access
- CSM/POE IH-1 → 242A Evaporator ADM: No
- POE IH-1 → 242A Evaporator ADM: IHTs need to perform Post-Use Function Test to confirm readings are valid
- POE IH-1 → 242A Evaporator ADM: After DRI pass the Post-Use Function Test the Restricted Access may be downposted
- CSM → 242A Evaporator ADM: A SOEN will be sent out when the Restricted Access may be downposted
- 242A Evaporator ADM → CSM: Understood, will await notification

Field Response Timeline continued on next page.

Field Response Timeline (continued):

1343 Hanford Meteorological Station provides weather information for Station #6 at Station #6 at 1240 on 06/20/2023 to POE IH-2:
- Temperature: 64˚F
- Relative Humidity: 42%
- Wind Speed: 12 mph
- Wind Direction: from South
- Barometric Pressure: 29.41 inches of mercury and rising

1345 POE IH-3 provides POE IH-1 and POE IH-2 peak readings during response:
- Hydrogen Sulfide- Less than detectable (< 0.1 ppm)
- Ammonia- Less than detectable (< 1 ppm)
- VOCs- 0.010 ppm

1347 POE Shift IHT notifies POE IHT Supervisor and POE IHs that DRI have passed the post-use function test

1352 CSM and POE IH-2 sign TFC-OPS-OPER-C-67 Attachment A Sheet 2 of 2, Response Plan

1419 SOEN: "Response per C-67 Odor Response for a stronger than normal odors at 242-A AMU has been completed. IH results at or below background levels. Normal access restored. CSM"

Field Response Timeline Acronyms:

ADM	Area Dayshift Manager	IHT	Industrial Hygiene Technician
CSM	Central Shift Manager	mph	miles per hour
CSO	Central Shift Office	PA	Performance Assurance
DFAS	Data Fusion Advisory System	PID	photoionization detector
DRI	Direct Reading Instrument	POE	Production Operations-East
EIR	Event Investigation Report	ppm	parts per million
ESH&Q	Environmental, Safety, Health, & Quality	S&H	Safety & Health
eV	electron-volts	SOEN	Shift Office Event Notification
HMIS	Hanford Mission Integration Solutions	VMDS	Vapor Monitoring Detection System
IH	Industrial Hygienist	VOC	volatile organic compound

Sampling/Monitoring Results:

DRI Monitoring Results:
- Monitoring performed in and around Affected Area
  - Comments by Responding POE IH- "[Purge] valve definite odor release with a sulfur smell. No elevated readings. Took readings at the time of release."
  - Comments by Responding POE Shift IHT- "IHTs monitored multiple drains, valves, and splash zones. During the survey [an air dryer purge valve] (PSV-DRE1-1) [purged] @1331 revealing a very faint odor of Sulphur."
- Peak readings during response at or below background.

Location	Ammonia	VOCs	Hydrogen Sulfide
AMU Room	< 1 ppm	0.010 ppm	< 0.1 ppm
Air Dryer Purge Valve (PSV-DRE1-1)	< 1 ppm	< 0.010 ppm	< 0.1 ppm
AMU Room	< 1 ppm	< 0.010 ppm	< 0.1 ppm

Refer to IHIR-00075 Attachment A for SmartSite™ Summary, Response Map, and Response Pictures.

SWIHD References:

Event Response Site Wide Industrial Hygiene Database Direct Reading Instrumentation (DRI) Survey:
- #23-03853 "TFC-OPS-OPER-C-67 Response 242A AMU"

Additional Information:

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

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

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

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

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

06/20/2023 @ 1245 (weather data for 8 minutes after approximate time of Initiating Event):
- Wind Speed: 11.5 mph
- Wind Direction: 158.60° (out of South Southeast)
- Mixing Height: 1500 feet above grade
- Stability Class: D (neutral conditions)

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

06/20/2023 @ 1254 (current weather data for Response actions):
- Wind Speed: 11.5 mph
- Wind Direction: 159° (out of South Southeast)
- Mixing Height: 1500 feet above grade
- Stability Class: D (neutral conditions)

Meteorological information from the Hanford Weather Station for Station #6 on 06/20/2023 @ 1240:
- Temperature: 64°F
- Relative Humidity: 42%
- Wind Speed: 12 mph
- Wind Direction: from South
- Barometric Pressure: 29.41 inches of mercury and rising

Additional Information continued on next page.

Additional Information:

Vapor Monitoring Detection System (VMDS) exhauster ammonia readings on 6/20/2023 @ 1239:

- POR518 (241-A): 1.963 ppm
- POR519 (241-A): 1.139 ppm
- 241-AN: 28.654 ppm
- 241-AW: 11.720 ppm
- POR126 (241-AX): N/A
- POR127 (241-AX): 5.580 ppm
- 702AZ (241-AY/AZ): 0 ppm
- 241-AP: N/A

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		

Vapor Monitoring Detection System (VMDS) 06/13/2023 @ 1733 to 06/20/2023 @ 1733:

Tank Farm	Exhauster	Minimum*A	Maximum*A
241-A	POR518/POR519	0 ppm	10.652 ppm
241-AN	Primary	25.972 ppm	54.093 ppm
241-AW	Primary	0 ppm	--*B
241-AX	POR127	0 ppm	19.139 ppm
241-AY/AZ	702AZ	--	--*B

*A VMDS Alternative Real Time Monitoring performed 06/13/2023 to 06/19/2023 for 241-AP, 241-AW, and 241-AX (POR126).

*B On 06/20/2023, the 241-AN VMDS underwent calibration and VMDS calibration was attempted on 702AZ and 241-AW. Calibration activities confirmed by the AZ Team Instrument Technician Field Work Supervisor (FWS), EV Team IHT, and EV Team Maintenance FWS assigned to the work scopes.

The 241-AP Primary Exhauster is not currently connected to Vapor Monitoring Detection System (VMDS). Readings are acquired in accordance with TF-OPS-IHT-037 when Stack Monitoring for Ammonia via the Vapor Monitoring Detection System (VMDS) is unavailable. Stack readings are required once per calendar day in accordance with ARP-T-041-00002.

Vapor Monitoring Detection System (VMDS) Alternate Monitoring 06/13/2023 to 06/19/2023:

Tank Farm	Exhauster	Minimum	Maximum
241-AP	Primary	2 ppm	9 ppm
241-AW	Primary	7 ppm	10 ppm
241-AX	POR126	0 ppm	0 ppm

Additional Information continued on next page.

Additional Information (continued):

Based on the odor descriptor "rotten eggs", monitoring for hydrogen sulfide vapors was performed:
- "Rotten Eggs": The American Industrial Hygiene Association (AIHA) Odor Threshold for Chemicals with Established Health Standards, 2nd Edition, lists hydrogen sulfide with this odor character. Therefore, direct reading instrumentation equipped with a hydrogen sulfide sensor was selected.
- Refer to TOC-IH-58956 for more detail on the monitoring strategy for response to odors.

RPP-RPT-60381, Facility Design Description for 242-A Evaporator Systems and Buildings-

The function of the Aqueous Makeup Unit (AMU) room is receipt (or makeup), storage, and transfer of anti-foam and decontamination solutions. It also serves as an operating area for the bridge crane. The principal systems and components in the AMU room include the Compressed Air System, the exhaust fan (K2-5-2), Fire Protection System components, Electrical Distribution System components, and three chemical storage tanks.

The AMU room is 27' by 24', and 22' from floor to ceiling. The AMU room shares a common wall with the loading room, loadout and hot equipment storage room, pump room, and the associated crane gallery. That portion of the wall common with the pump room and loadout and hot equipment storage room is 1'10"-thick concrete. All other walls are 1'-thick concrete.

The 242A Evaporator's K2 Ventilation System provides heating, ventilation, and air conditioning (HVAC) to the 242A Evaporator Building Office Areas, AMU Room, HVAC Room, Change Rooms, Cleaned and Soiled Clothes Storage Room, and building corridors. The supply fan (K2-5-1) supplies a maximum of 13,010 CFM of outside air. Additional air is recirculated from the HVAC room. Air is exhausted directly to the atmosphere via exhaust fans, power wall ventilators, and gravity dampers.

Contaminated water is collected in the 242A Building at various locations within the facility, including the AMU Room floor drains. The collected water gravity drains from the AMU Room to the Condenser Room. From the Condenser Room, the collected water gravity drains to the evaporator feed tank (TK-241-AW-102) via three penetrations in the 242A Building for the Evaporator Drain System. The three drain penetrations are double-contained pipe.

The 242A Evaporator AMU Room KAESER Air Compressors-

The compressed air supply system in the 242A Evaporator AMU Room consists of two KAESER rotary screw air compressor units (CP-E-1 and CP-E-2). The units are from the product line ASD 30T, with the specific model number ABT 57. These units are set to provide a nominal 100 SCFM at 100 psig. The compressor units draw a maximum of 60 amps from the electrical supply system and discharge into the compressed air system receiver (R-E-1), which has a relief valve set at a pressure of 125 psig (WRPS Engineering, 2019).

The KAESER KAD115-C Air Dryer System consists of a regenerative desiccant dryer (DR-E-1) with a dry air receiver (ECN-715202, RPP-RPT-62735). The air dryer (DR-E-1) is a duel tank air dryer that dries the air in one desiccant tank by adsorbing moisture on the desiccant, while the other tank's desiccant is regenerating utilizing purge air to evaporate the water on the desiccant. The Air Dryer System is set to cycle between these tanks every 10 minutes (KAESER Compressors®, n.d.; PMID-BAS-5606). The air dryer (DR-E-1) is a pressure-swing regenerative desiccant compressed air dryer, with a working pressure range of 60-150 psig (RPP-RPT-62735). The Air Dryer System supplies the 242-A building with pressurized dry air which is needed to support various Evaporator building equipment (PMID-BAS-5606).

The 242A Evaporator AMU Room KAESER Air Compressors References-
- Engineering Change Notice (ECN-715202), 242A Evaporator Air Dryer Replacement.
- H-2-99001, Piping & Instrumentation Diagram (P&ID) Process & Inst Air System.
- Kaeser Compressors® (n.d.). Regenerative Desiccant Dryers: KAD, KED, and KBD Series. Retrieved from https://us.kaeser.com/download.ashx?id=tcm:46-37609
- RPP-RPT-62735, Spare Parts List for the 242-A Air Dryer.
- PMID-BAS-5605, Technical Basis for the Preventative Maintenance of the Air Dryer System in 242-A.
- WRPS Engineering (2019). Engineering Evaluation of 242-A Air Compressor Automatically After Outage (Response to PER WRPS-PER-2019-0753).

Additional Information continued on next page.

Additional Information (continued):

Stagnant Water Odors-

Transient odors are associated with stagnant water and is an anticipated occurrence in the 242A AMU Room. Low levels of hydrogen sulfide gas (consistent with Affected Workers' odor description), ammonia, and various VOCs may be produced by the stagnant water when its within a confined area for an extended period. While odors may be readily perceived, concentrations are still well below levels of worker exposure concern due to a combination of factors:

1. Not a continuous emission source
2. Large air dilution coefficient inside the 242A Evaporator AMU Room (ventilated space)
3. Minimal source volume (i.e., Air Supply System has a finite volume upstream of, and inside, the Air Dryer)

The factors listed above indicate that gas dispersion is transient in nature and undergoes significant dilution. Low levels of hydrogen sulfide, ammonia, and VOCs may be produced when water, low airflow, and sulfur seeking bacteria stagnate within a confined area for an extended period. This is primarily the result of natural decay of organic material through biological decomposition. The biological decomposition process produces a great number of odors from decomposition of organic material into simpler intermediate chemical compounds which can be re-introduced into the environment in the form of solids (particulates), liquids (volatile organic compounds such as alcohols, organic acids), and gases (hydrogen sulfide, sulfur dioxide, ammonia, methane) (Silva, 2002; Texas A&M, 2009).

Hydrogen sulfide gas has an offensive distinct rotten egg odor that is detectable at very low concentrations. The lower range of odor values for hydrogen sulfide as 40 ppt (or 0.04 ppb or 0.00004 ppm). Ammonia gas has an offensive pungent, irritating odor that is detectable at very low concentrations. The lower range of odor values for ammonia as 43 ppb (or 0.043 ppm) (AIHA, 2013). While odors may be readily perceived, concentrations are still well below levels of worker exposure concern. Hydrogen sulfide, ammonia, and VOC gas production rate is a function of bacteria/organics concentrations, temperature, and dissolved oxygen. The limiting factor is relatively low bacterial levels associated with stagnant water.

The resolution of DRI equipped with hydrogen sulfide (0.1 ppm) and ammonia (1 ppm) sensors are comparatively inadequate as a detection tool at the concentrations perceived by the human olfactory sense. While the resolution of the DRI equipped with these sensors are insufficient to detect concentrations at the lower range of odor threshold values, they are sufficient to detect hydrogen sulfide and ammonia at concentrations that approach their established occupational exposure limits (OELs).

	Concentrations		
Limit Type	Hydrogen Sulfide	Ammonia	VOCs
Odor Response Action Limit	0.5 ppm	12 ppm	2 ppm
ACGIH 8-hour TWA-TLV	1 ppm	25 ppm	--
ACGIH 15-minute STEL-TLV	5 ppm	35 ppm	--
OSHA 8-hour TWA-PEL	--	50 ppm	--
OSHA Ceiling-PEL	20 ppm	--	--
OSHA 10-minute Peak-PEL*	50 ppm	--	--
NIOSH IDLH	100 ppm	300 ppm	--

*Allowed for 10-mintues if there is no other exposure to hydrogen sulfide during the shift

Additional Information continued on next page.

Additional Information (continued):

Stagnant Water Odor References-

- American Conference of Governmental Industrial Hygienists (2016). TLVs® and BEIs® Based on the Documentation of the Threshold Limit Values for Chemicals Substances and Physical Agents & Biological Exposure Indices. Cincinnati, OH: Signature Publications.
- American Industrial Hygiene Association (2013). Odor Thresholds for Chemicals with Established Health Standards, 2nd Edition.
- Silva, D.P. (2002). The chemical logic behind… Fermentation and Respiration. Retrieved from https://aggie-horticulture.tamu.edu/earthkind/landscape/dont-bag-it/chapter-1-the-decomposition-process/
- Texas A&M (2009). Earth-Kind Landscaping: Chapter 1, The Decomposition Process. Retrieved from https://web.archive.org/web/20080917123419/http://www2.ufp.pt/~pedros/bq/respi.htm

Additional Information Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienist		
AIHA	American Industrial Hygiene Association	ppb	parts per billion
AMU	Aqueous Makeup Unit	ppm	parts per million
COPC	Chemical of Potential Concern	ppt	parts per trillion
CFM	cubic feet per minute	psig	pounds per square inch gauge
HVAC	Heating, Ventilation, and Air Conditioning	QRA	Quantitative Risk Assessment
IDLH	Immediately Dangerous to Life or Health	SCFM	standard cubic feet per minute
mph	miles per hour	STEL	Short-Term Exposure Limit
NIOSH	National Institute for Occupational Safety & Health	TLV	Threshold Limit Value
OEL	Occupational Exposure Limit	TWA	Time-Weighted Average
OSHA	Occupational Safety & Health Administration	VMDS	Vapor Monitoring Detection System
PEL	Permissible Exposure Limit	VOC	Volatile Organic Compound

The event response DRI results were less than detectable in the Affected Area for ammonia and hydrogen sulfide. The event response DRI results were at or below background for VOCs. These results along with the review of the atmospheric conditions (DFAS application, powered by SmartSite™, and those provided by On-Duty Forecaster) outside of Affected Area around the reported time of the event indicate the cause of the odor is unlikely to be from Tank Farm emissions. The Atmospheric Stability Class at 1245 was neutral conditions. The Atmospheric Mixing Height was steady at 1500 feet above grade.

Refer to IHIR-00075 Attachment A for SmartSite™ Summary, Response Map, and Response Pictures.

Recommendations/Conclusions:

Recommendations:

- Evaluate the 242A Evaporator AMU Room's KAESER KAD115-C Air Dryer System operability/ effectiveness.
- Communicate the expected conditions encountered during the 242A Evaporator AMU Room's KAESER KAD115-C Air Dryer System Purge Valve release to the 242A Evaporator Facility Personnel.

Conclusions:

Direct Reading Instrumentation monitoring performed during response actions did not indicate further action was necessary to protect worker safety and health. As a result the area was released from restricted access and work was allowed to continue. Odor descriptors provided by Affected Workers are consistent with stagnant water associated with the 242A Evaporator AMU Room's KAESER Air Compressors, and is an anticipated occurrence in the 242A AMU Room. The odor was also perceived by Responding Personnel when the Air-Dryer purge valve (PSV-DRE1-1) released. These results and observations are consistent with the conclusion of IHIR-00069. Although known nearby sources exist, monitoring performed to support response actions did not readily identify a source, as readings indicated that further response action was not necessary. Based on observations during Response Actions, the source of the odors is the 242A Evaporator AMU Room's KAESER KAD115-C Air Dryer Purge Valve release.

Washington River Protection Solutions

INDUSTRIAL HYGIENE EVENT INVESTIGATION REPORT(Continued)

Other:

- No symptoms reported and both Affected Workers declined precautionary medical surveillance.
  - Per HMIS procedure, Affected Workers were sent for a precautionary medical surveillance.
- Event Investigation Report (EIR) #2023-047.

Industrial Hygienist:

[redacted] *Print First and Last Name*

[redacted] *Signature / Date*

Industrial Hygiene Level 2 Manager:

[redacted] *Print First and Last Name*

[redacted] *Signature / Date*

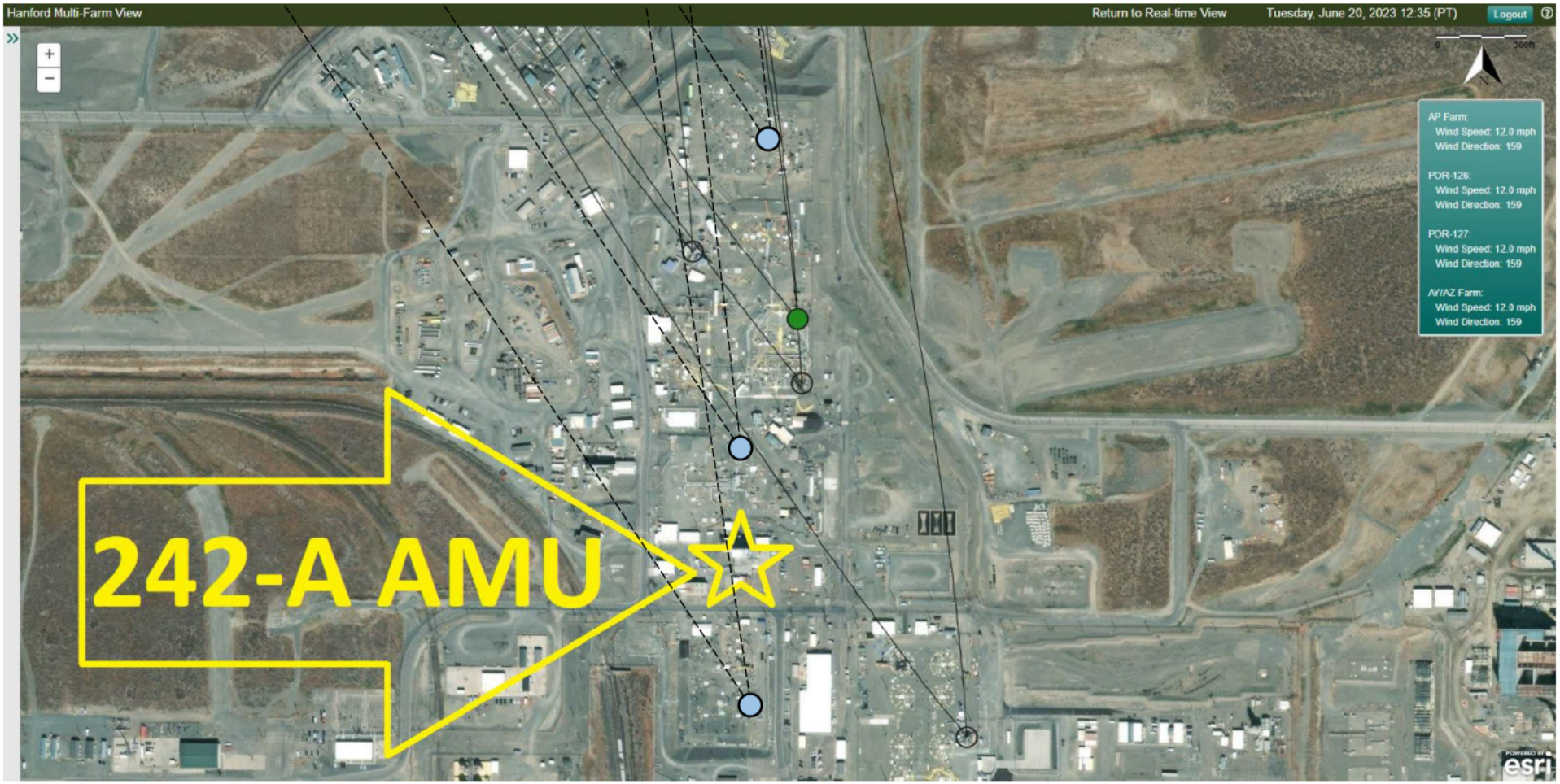


Figure 1. 200-East Area (with 241-AW, 241-AP, 241-AN, 241-AY/AZ, 241-AX, 241-A Farm projected plume models) at 1235 06/20/2023 from Data Fusion and Advisory System (DFAS) application, powered by SmartSite™

NOTE: 241-AN, 241-A, 241-AW Farm Exhausters are not connected to the DFAS; however, an approximate exhauster plume was added for each based on other modeled plumes.

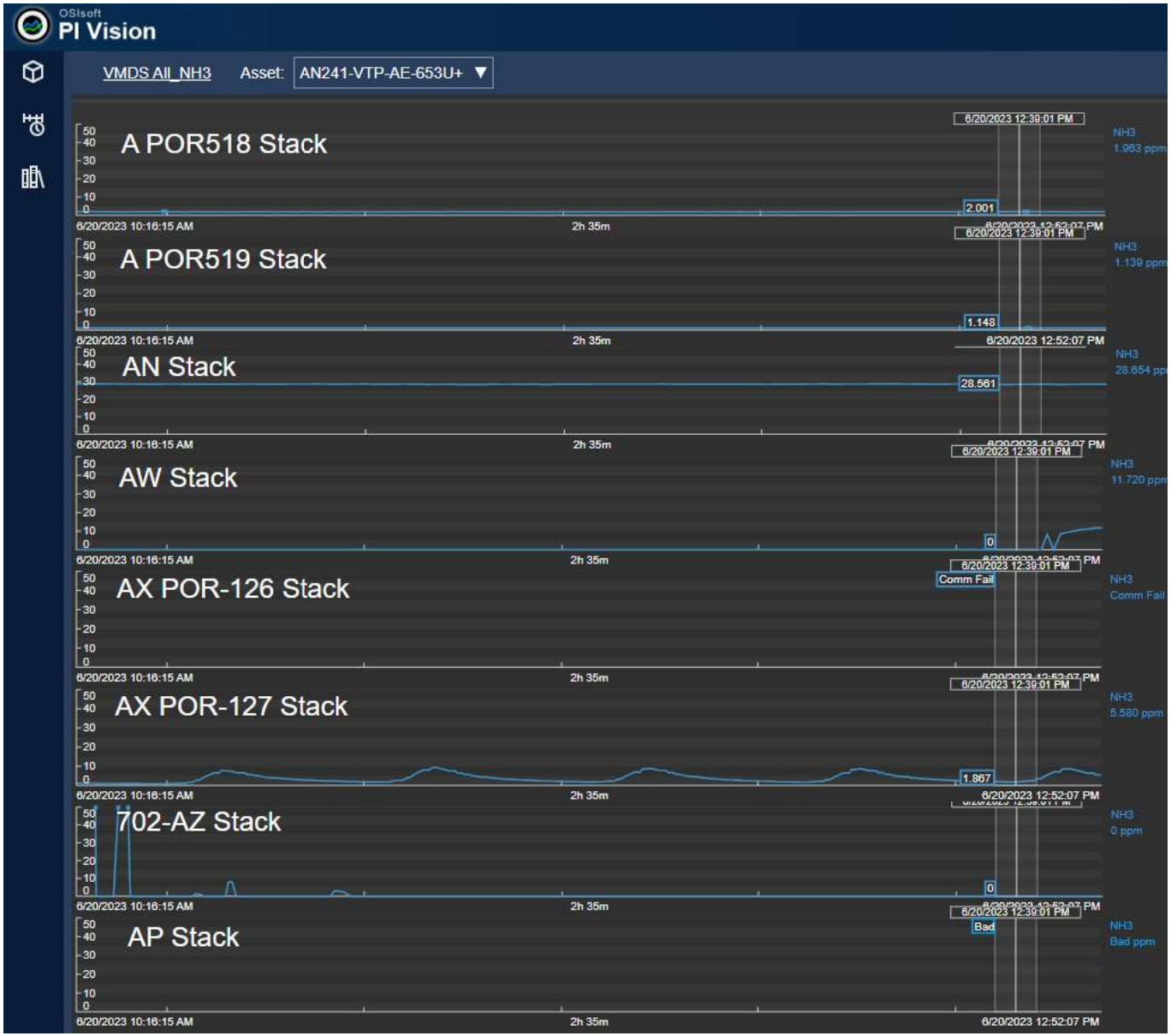
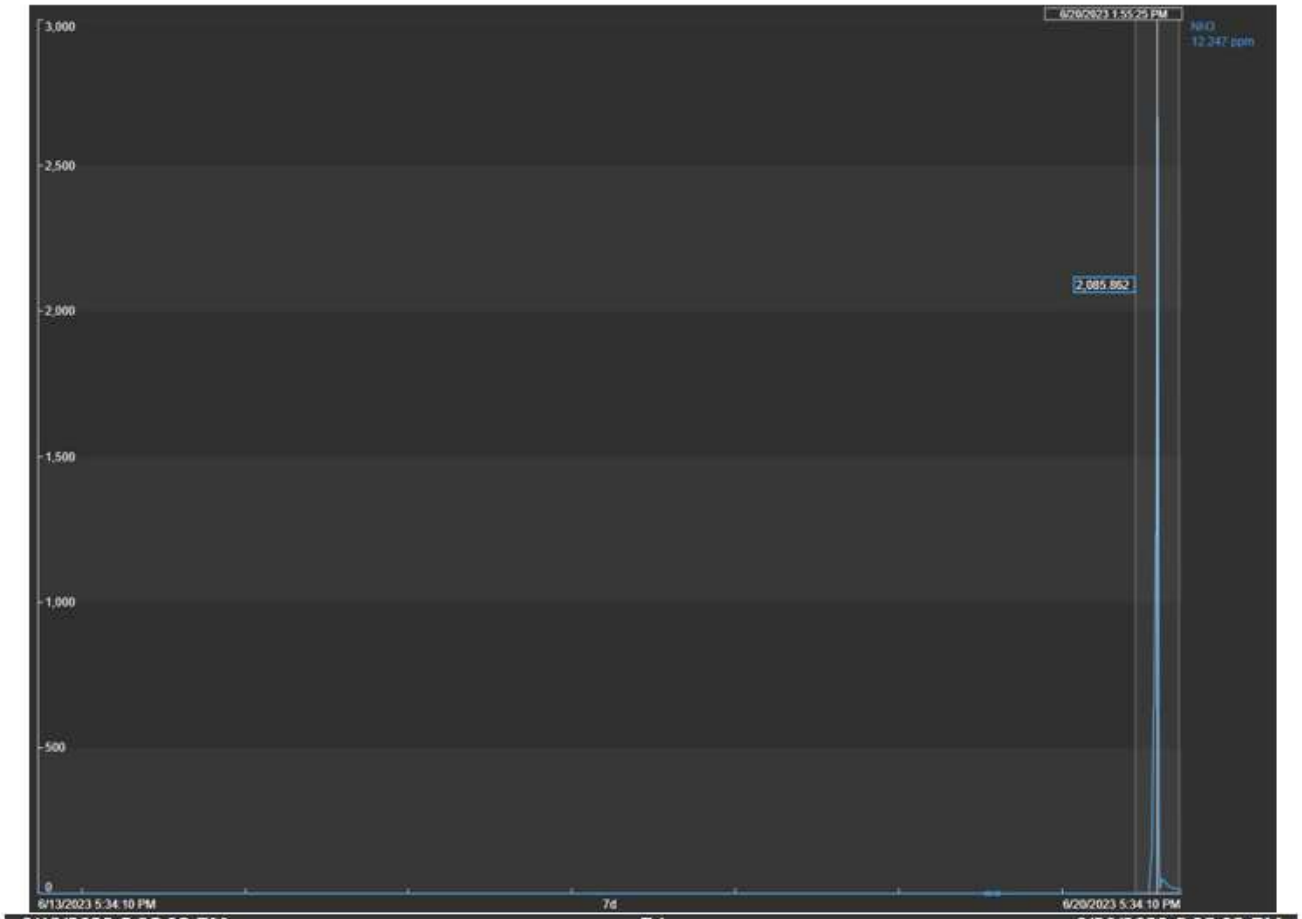


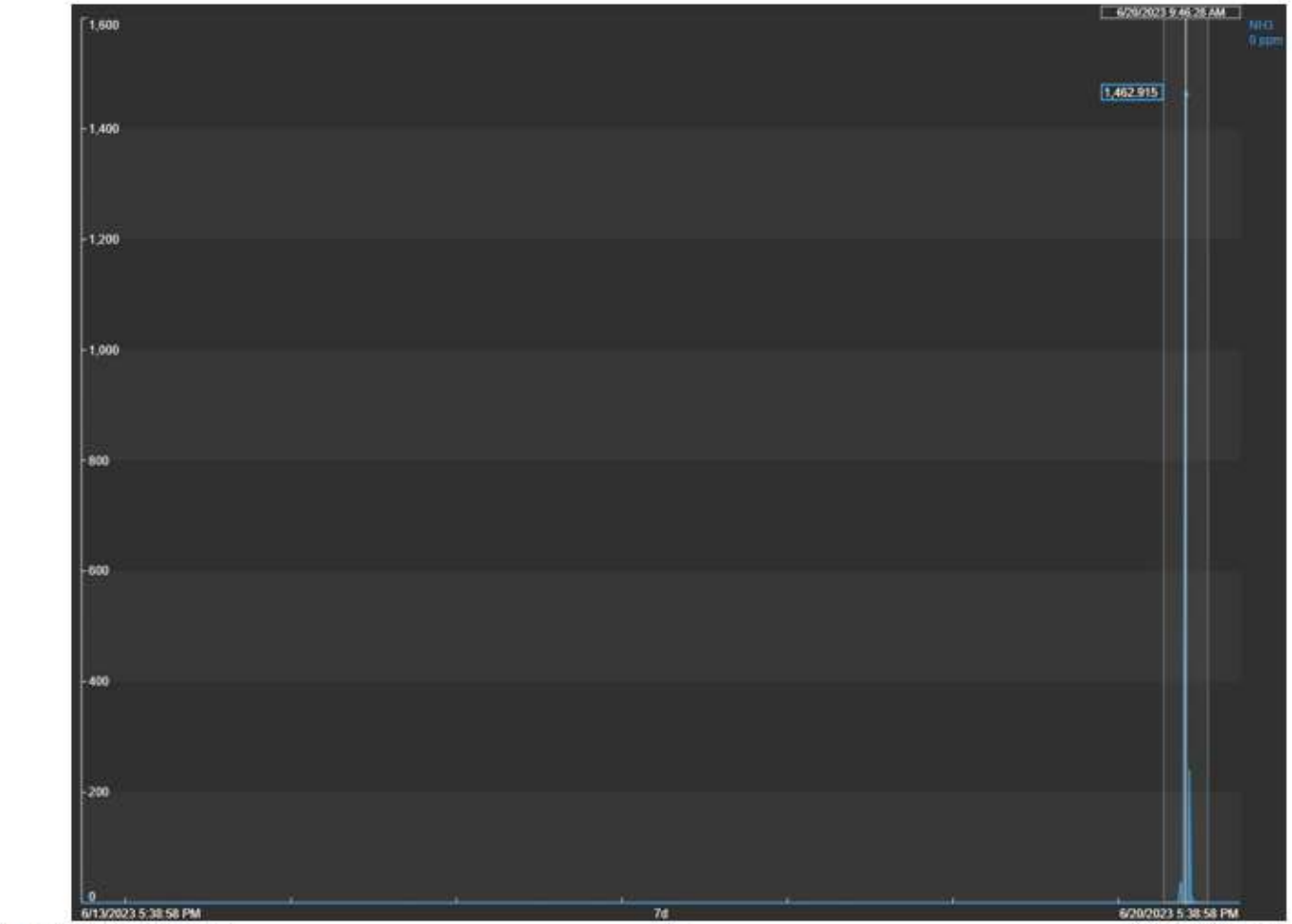
Figure 2. OSIsoft Pi Vision VMDS Ammonia Concentrations for 1239 06/20/2023.



6/13/2023 5:35:32 PM 7d 6/20/2023 5:35:32 PM

Name	Description	Value	Units	Trend	Minimum	Maximum
AW241-VTP-AE-653U|NH3	Ammonia Concentration	12.243	ppm		0	2,664.281

Figure 3. OSIsoft Pi Vision VMDS Ammonia Concentrations for 241-AW 06/13/2023- 06/20/2023 Showing Spike During Calibration Activities



6/13/2023 5:35:32 PM 7d 6/20/2023 5:35:32 PM

Name	Description	Value	Units	Trend	Minimum	Maximum
AZ702-VTP-AE-653U|NH3	Ammonia Concentration	0	ppm		0	1,469.093

Figure 4. OSIsoft Pi Vision VMDS Ammonia Concentrations for 702AZ 06/13/2023- 06/20/2023 Showing Spike During Calibration Activities

Figure 5. DFAS application, powered by SmartSite™ Weather Data (wind direction) from 1245 06/20/2023.

Figure 6. DFAS application, powered powered by SmartSite™ Weather Data (wind speed) from 1245 06/20/2023.

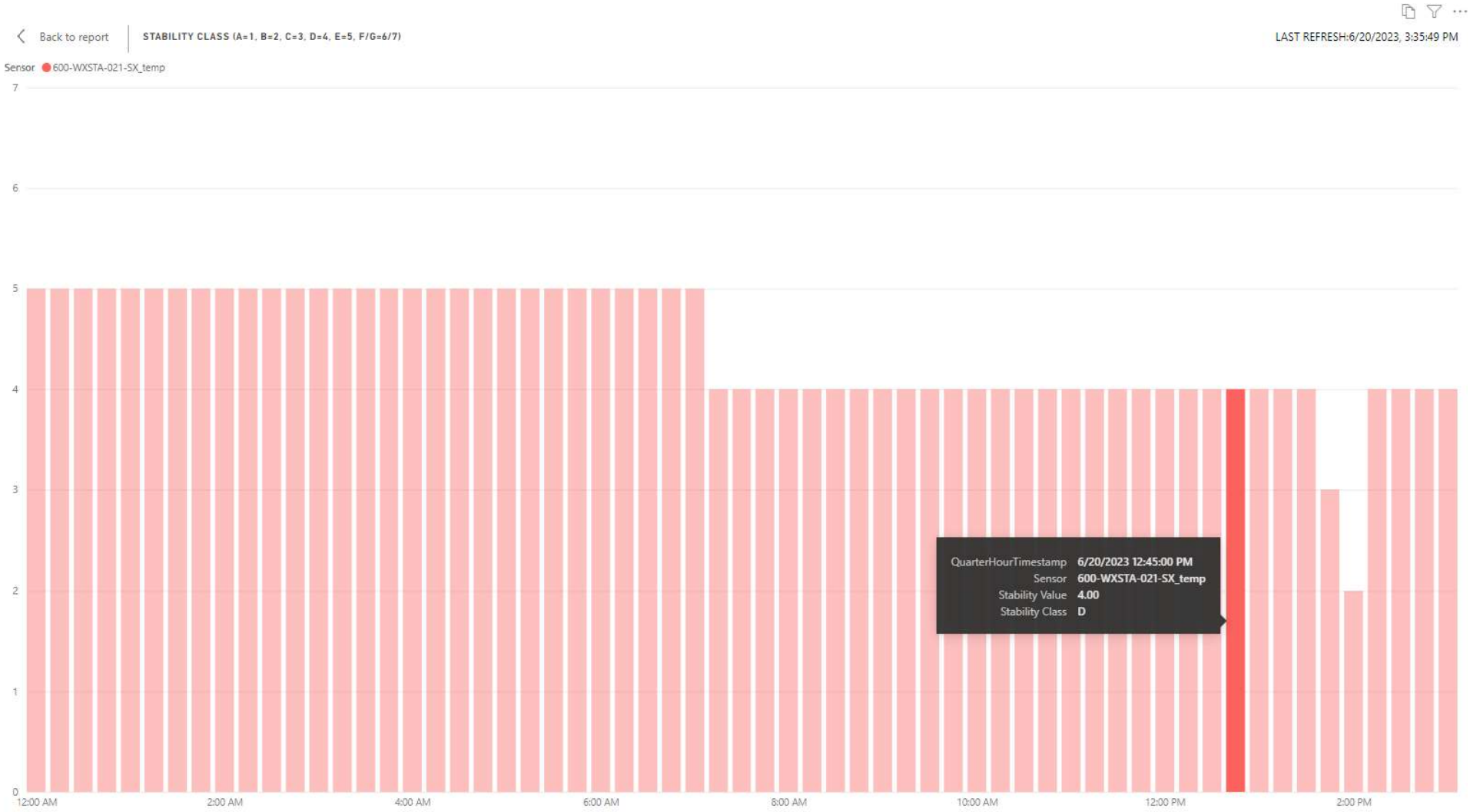


Figure 7. DFAS application, powered by SmartSite™ Weather Data (stability class) from 1245 06/20/2023.

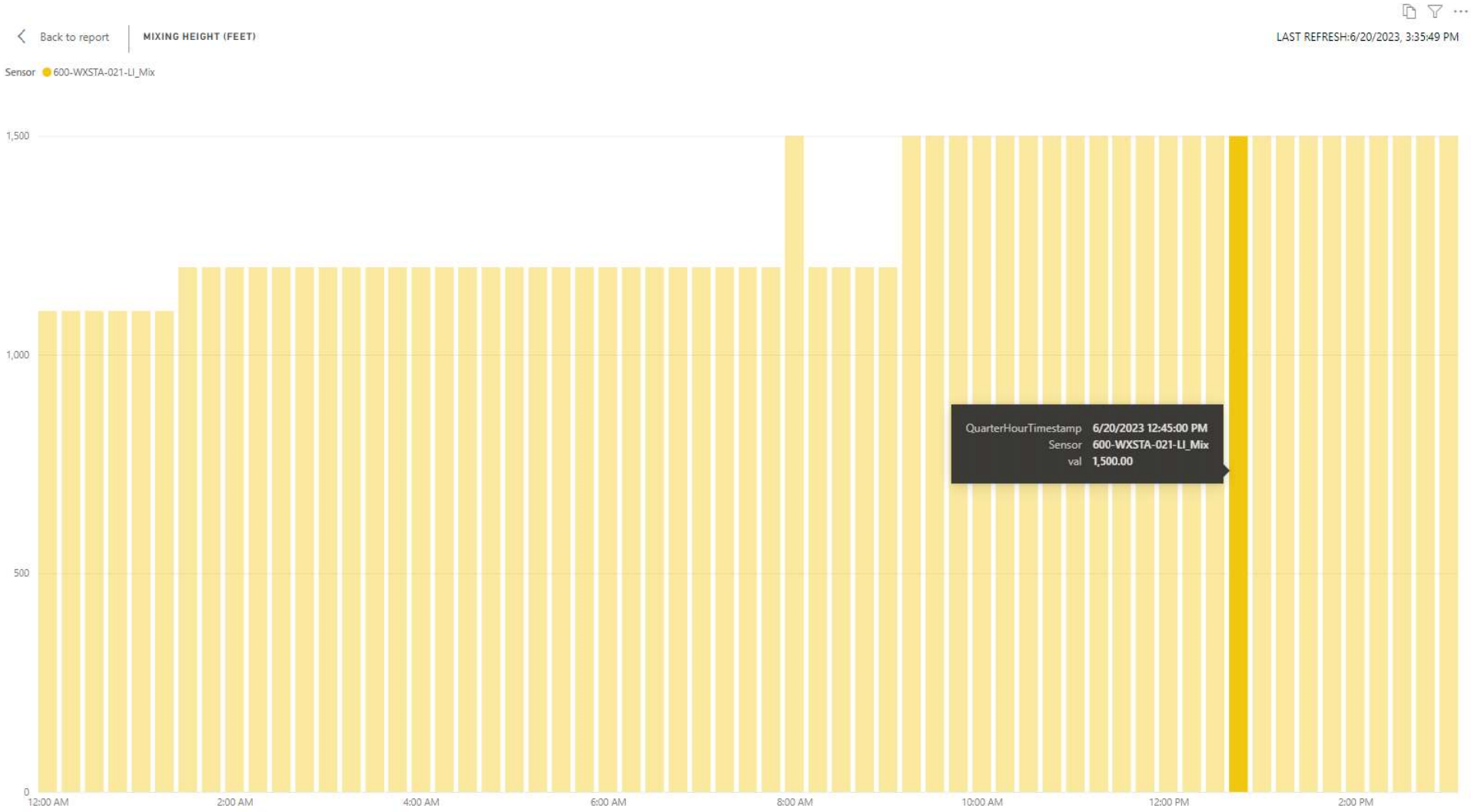


Figure 8. DFAS application, powered by SmartSite™ Weather Data (mixing height) from 1245 06/20/2023.

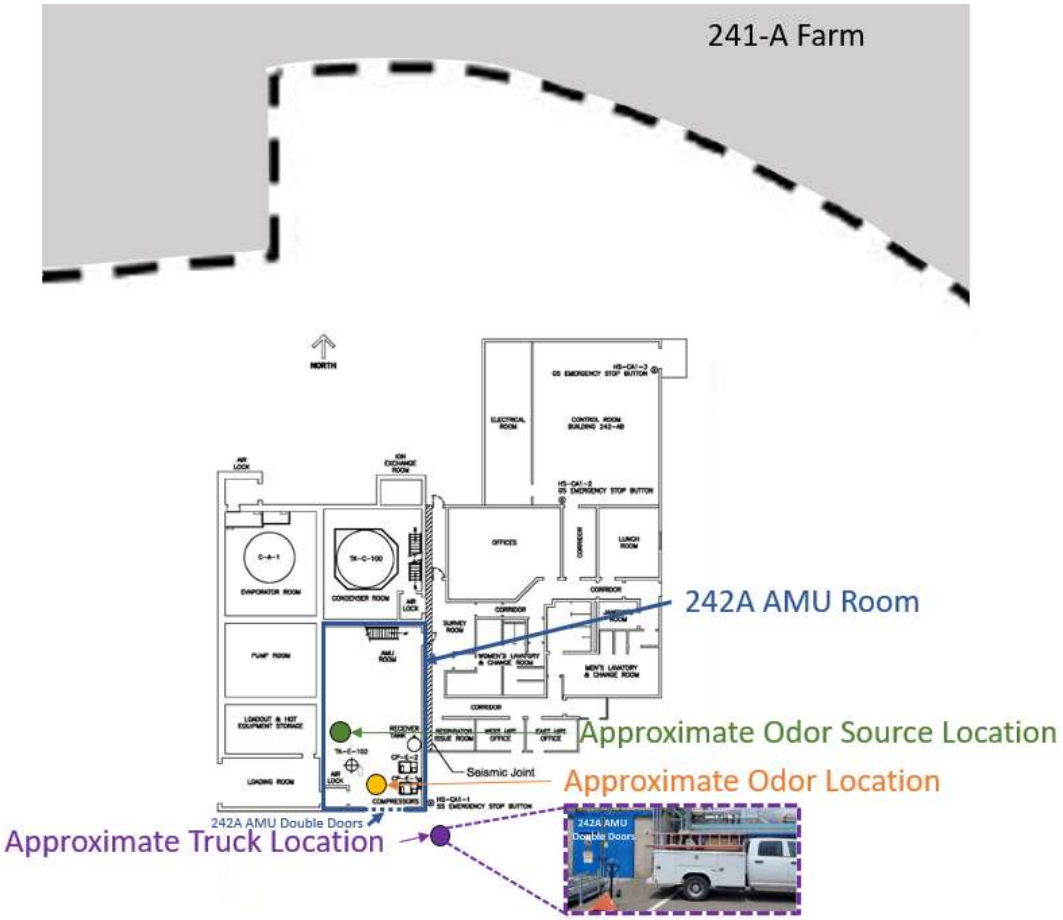


Figure 9. 242A 1st Floor Map

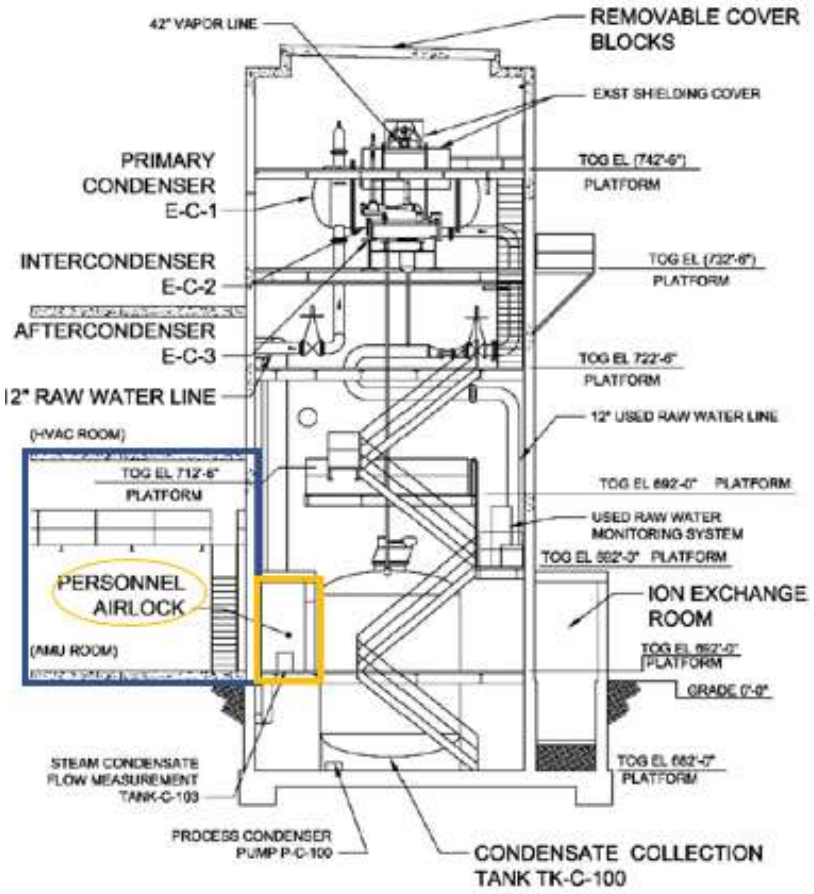


Figure 10. 242A Evaporator Facility Condenser Room (East Elevation).

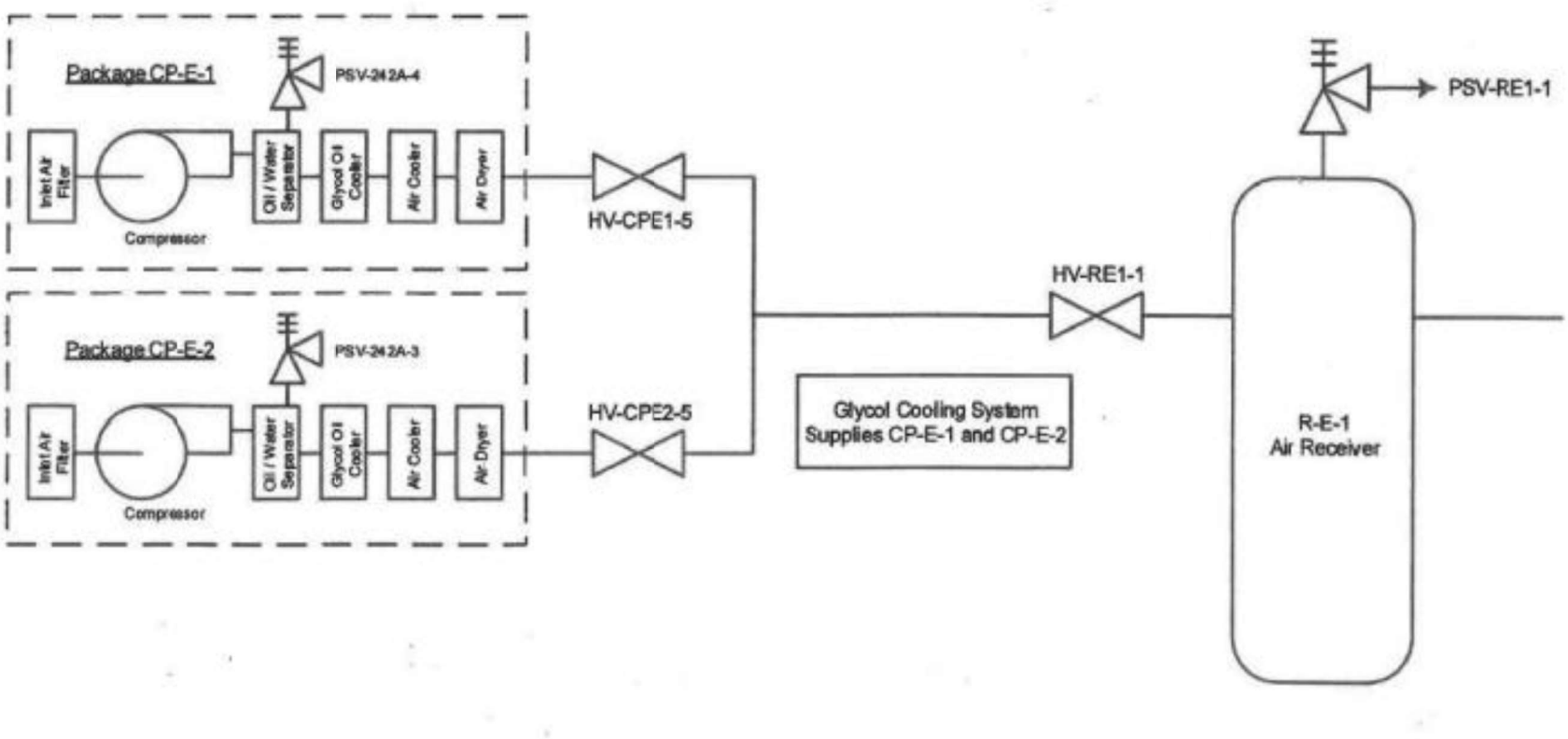


Figure 11. Simplified Schematic Showing the Air Compressors Connection to the Compressed Air System

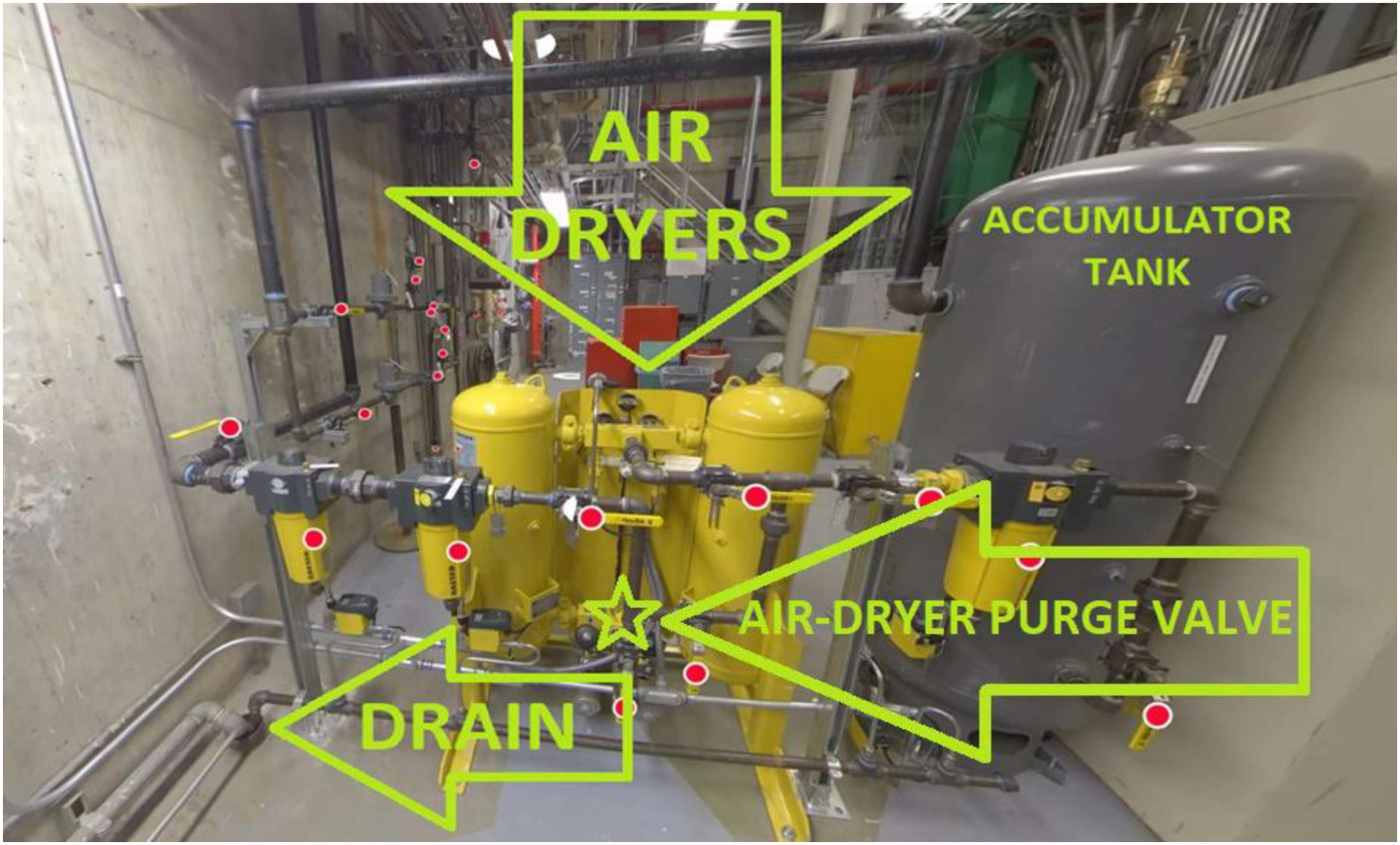


Figure 12. 242-A Service Air Dryer System Overview

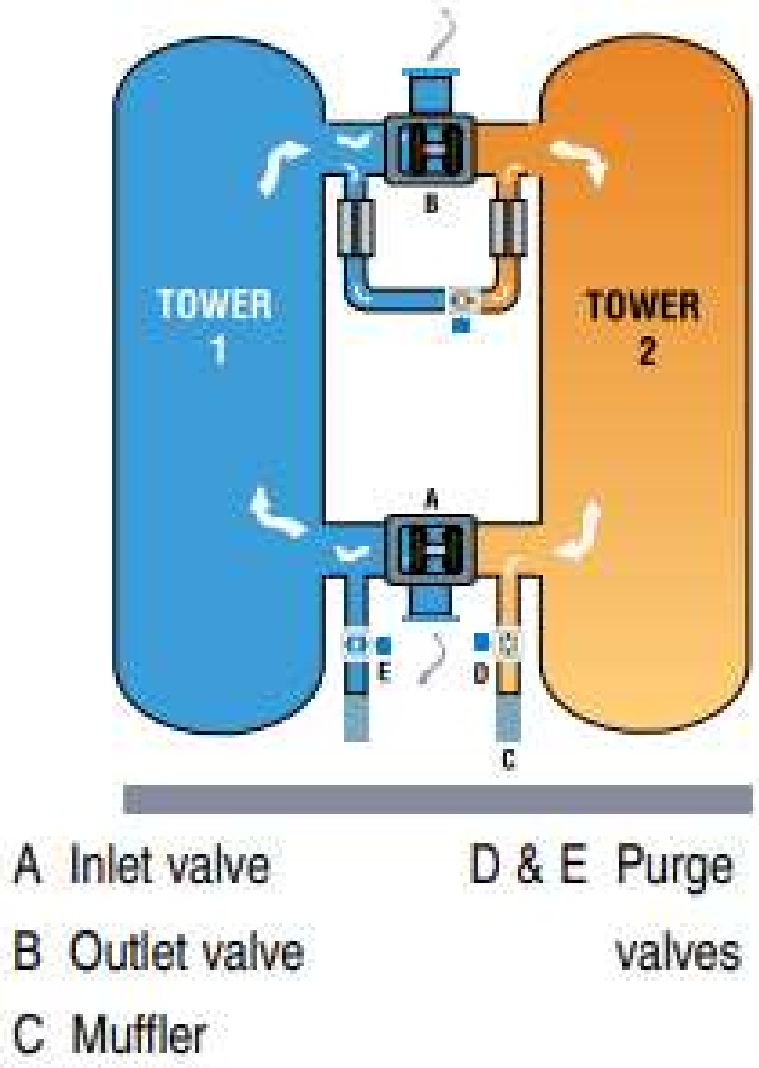


Figure 13. KAESER Compressors® Desiccant Dryer Diagram

Figure 14. AMU Air Compressor Maintenance ongoing.

Figure 15. IHT Monitoring 242-A AMU Drain.

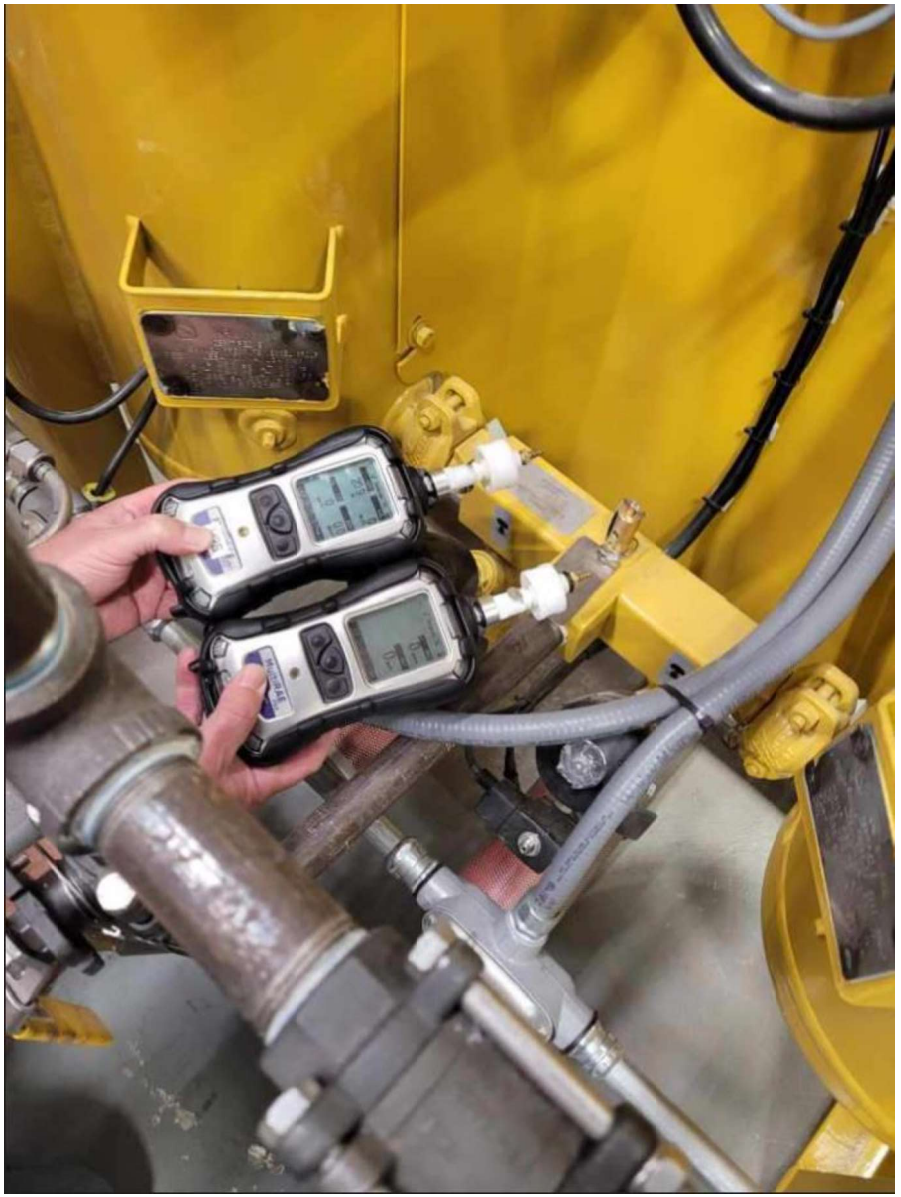


Figure 16. IHT Monitoring Air-Dryer Purge Valve.

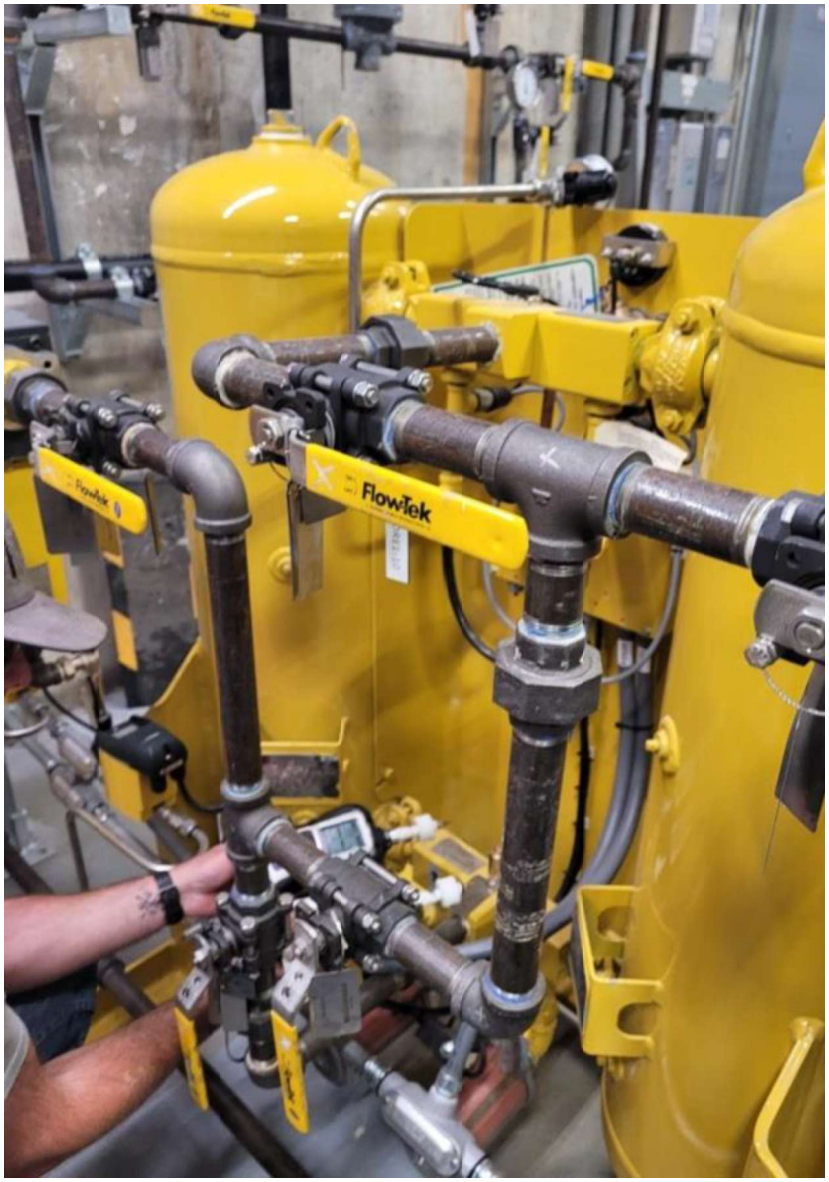


Figure 17. IHT Monitoring Air-Dryer Purge Valve.

Figure 18. Vehicle idling outside of 242-A AMU exterior doors.

ODOR/VAPOR RESPONSE CARD - 242 A

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

- Date and time of event: Jun 20-23 / 12:37 Am
- Check Applicable:
  - ☑ Odor ☐ Ammonia Alarm *(6 ppm)* ☐ Ammonia Alarm *(12 ppm)* ☐ Alarm *(other - describe)*: Sulfar Smell
- Your name and the work you were performing: [redacted] Moving Scaffolding
- Other Work Underway? Describe: NA
- Location of event *(mark area on map and wind direction)*: twin Door Southside AMU Evaporator
- Name(s) of others in or near the affected area: [redacted]
- Was Industrial Hygiene present, who? no
- Describe the odor:
  - ☐ Sweet ☐ Sour ☐ Smoky ☐ Septic/Sewer ☐ Musty ☐ Rotten
  - ☐ Metallic ☐ Onion ☐ Earthy ☐ Ammonia ☐ Citrus ☐ Solvent
  - ☑ Other *(describe)*:
- Is source known/likely? Describe: Sulfar smell
- Your symptoms? ☐ None None for now
  - ☐ Headache ☐ Dizziness ☐ Nausea ☐ Cough ☐ Fatigue
  - ☐ Weakness ☐ Sore Throat ☐ Difficulty Breathing ☐ Eye Irritation ☐ Rash
  - ☐ Itch ☐ Tingling ☐ Numbness ☐ Taste
  - ☐ Other *(describe)*:

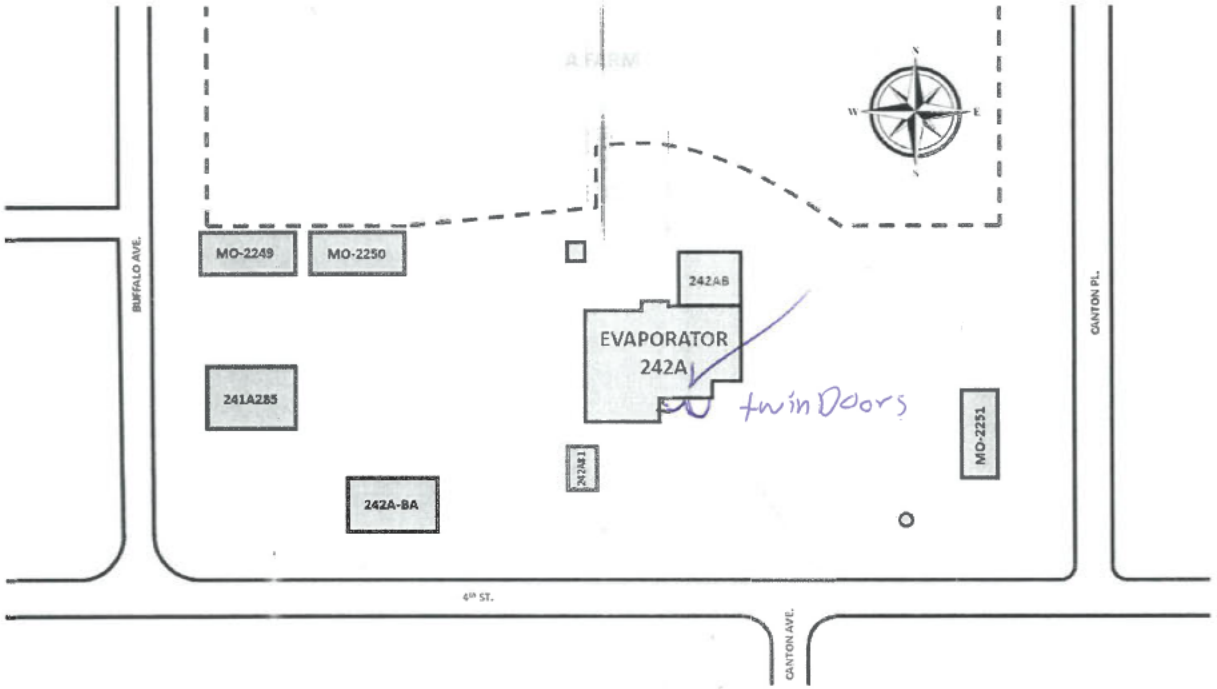
2. Provide this completed card *(Page 1 & 2)* to Supervisor, Industrial Hygiene, your Union Safety Representative or the CSM.
If received by Supervisor/IH/U-SR, Supervisor/IH/U-SR will ensure card is provided to the CSM.

ODOR/VAPOR RESPONSE CARD - 242 A

Instructions:

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

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



ODOR/VAPOR RESPONSE CARD - 242 A

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

- Date and time of event: 6-20-23 12:37pm
- Check Applicable:
  - ☑ Odor ☐ Ammonia Alarm *(6 ppm)* ☐ Ammonia Alarm *(12 ppm)* ☐ Alarm *(other - describe)*: Sulfar
- Your name and the work you were performing: [redacted] Bring in scaffold material
- Other Work Underway? Describe: none
- Location of event *(mark area on map and wind direction)*: Evaporator (AMU)
- Name(s) of others in or near the affected area: [redacted]
- Was Industrial Hygiene present, who? NO
- Describe the odor:
  - ☐ Sweet ☐ Sour ☐ Smoky ☐ Septic/Sewer ☐ Musty ☐ Rotten
  - ☐ Metallic ☐ Onion ☐ Earthy ☐ Ammonia ☐ Citrus ☐ Solvent
  - ☑ Other *(describe)*:
- Is source known/likely? Describe: Sulfar
- 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 - 242 A

Instructions:

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

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