

C-67 Event Investigation Reports (Redacted) EIR-2024-066 C-67 (08/20/2024)

(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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Date Published

September 2024

WRPS

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APPROVED

By Lynn M Ayers at 3:03 pm, Sep 24, 2024

Release Approval

Date

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Washington River Protection Solutions
EVENT SUMMARY

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

1. Project: West Area Operations 2. Report Date: 08/26/2024

3. Investigation Title: C-67 Odors at 242-S

4. Investigation Report Number: EIR-2024-066

5. Responsible Manager: [REDACTED]

6. Event Investigator: [REDACTED]

7. Area / Building / Location: 200W/242S Evaporator Roof

8. Date and Approximate Time of Event: Date: 08/20/2024 Time (military): 1315 hours

9. Associated Action Request (AR) Number: WRPS-AR-2024-2570

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)
Quarterly rounds were being performed per Technical Procedure TF-OR-QR-ST, ST Quarterly Rounds, 242-S Evaporator Rounds.

13. Personnel Involved: (Job positions, number of personnel, identify any support organizations or subcontractors)
2 - Nuclear Chemical Operator (NCO)
1 - Radiological Control Technician (RCT)
1 - Industrial Hygiene Technician (IHT)

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

On 08/20/2024, at approximately 1315 hours, four workers were conducting quarterly rounds at the 242S Evaporator. One NCO and one RCT were on the roof of building 242S and opened the hatch to the ion exchange (IX) column pipe chamber to open a valve, while another NCO observed nearby. The NCO and RCT were checking to confirm the "IX Column Water was above resin." Upon opening the hatch, an odor was detected that was described as "septic/sewer," "ammonia," "rotten," and "sour," with the odor becoming stronger when the valve was subsequently opened.

NOTE: From discussions, the work crew is aware that this hatch is known to have odors. The NCO had performed these quarterly rounds before, with the last time during this past winter when the temperatures were much colder. The odor encountered on this day was deemed stronger than before.

The NCO took the rounds reading then closed the valve and the hatch. The NCO requested the IHT come to the roof to monitor the odor with instrumentation.

At approximately 1335 hours, the hatch was again opened (valve remained closed) and the IHT performed direct reading instrument (DRI) monitoring directly above the open chamber (see Pictures 1 & 2).

Results of DRI monitoring:

- o Ammonia - 6 parts per million (ppm)
- o Volatile Organic Compounds (VOCs) - 330 parts per billion (ppb)

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The IHT reported that the ammonia levels dissipated to 0 ppm quickly after the peak reading. The IHT took readings of the Breathing Zone (BZ) of the NCO and the RCT. There were no detectable levels of ammonia or VOCs in the BZ.

At approximately 1350 hours, the IHT notified the responsible Industrial Hygienist (IH) who then notified the West Area Shift Manager and a TFC-OPS-OPER-C-67, *Response to Stronger than Normal Odors*, was initiated. At 1400 hours, access was restricted to the roof of the 242S Evaporator.

No symptoms were experienced by any of the individuals involved and all declined precautionary medical surveillance.



Picture 1-Location on 242S Evaporator Roof



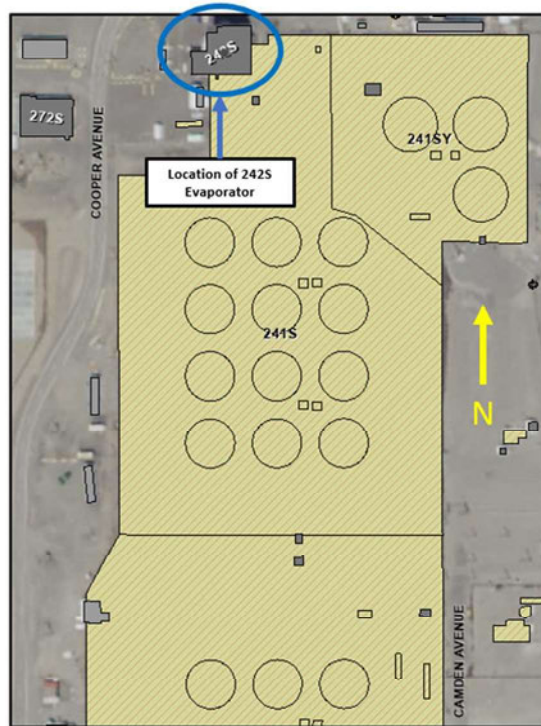
Picture 2-IHT Monitoring of Open Lid and Pipe Chamber

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

Location

The 242S Evaporator is located at 241-S-Farm in the 200 West Area of the Hanford site. The odor was smelled while the workers were on the 242S Evaporator roof when the IX column hatch was opened.

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Personal Protective Equipment (PPE)

At the time the odor was reported, the four workers were wearing standard street clothing (which is considered Level D PPE) and were in a work location that is not posted as a radiologically controlled area. The workers were not in an area requiring the use of respiratory protection or a personal ammonia monitor (e.g., VentisPro or ToxiRAE).

Weather

The Hanford Site Meteorological Report at 200 West at 1315 hours was:

- Wind Speed: West at 5 miles per hour
- Temperature: 83 F
- Relative Humidity: 22 %
- Barometric Pressure: 29.21 inHg

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.

Workers were instructed to leave the area and access was restricted to the roof from 1400 hours until 1626 hours when normal access was restored.

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

- The Central Shift Manager (CSM) initiated response actions for TFC-OPS-OPER-C-67, *Response to Stronger than Normal Odors*.
- The CSM made required TFC-OPS-OPER-C-67 notifications.
- Production Operations Shift IHT initiated TFC-OPS-OPER-C-67 response actions and monitoring per Industrial Hygiene Sample Plan (IHSP) POE-MULTI-TFCOPSOPER67.
- Event Investigation EIR-2024-066, *C-67 Odors at 242S*, was initiated.

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18. Compensatory Actions Taken:

None.

19. Remedial Actions Taken:

None.

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

DRI monitoring performed during TFC-OPS-OPER-C-67 response actions did not indicate further action was necessary regarding a worker safety and health occupational exposure limit standpoint. As a result, the area was released from restricted access.

DRI monitoring was performed on the 242S roof at the opening of the IX column where the workers reported the odor. During DRI monitoring, the valve remained closed, no odors were noted by the Response Team, and the results were as follows:

- o Ammonia - Less than detectable (<1 ppm)
- o Volatile Organic Compounds (10.6 eV PID) - 40 ppb
- o Hydrogen Sulfide - Less than detectable (<0.1 ppm)
- o Sulfur Dioxide - Less than detectable (<0.1 ppm)
- o Nitric Oxide - Less than detectable (<0.5 ppm)

Stack reading at SY exhaustor on day of odor event was 24 ppm ammonia.

To summarize the conclusion of Industrial Hygiene Investigation Report (IHIR)-00102, *TFC-OPS-OPER-C-67 Response at 242S*, based upon the facts that there was no odor detected prior to opening the lid of the pipe chamber, that the odor was detected once the chamber was opened, increased with the opening of the valve, and dissipated with the closure of the valve, it can be concluded that the source of the odor was the pipe chamber.

Operations has requested that Industrial Hygiene create a sampling plan to further investigate what is causing the odors in the pipe chamber.

The work crew should have stopped once the stronger than normal odor was initially noticed and notified the Field Work Supervisor (FWS). The FWS should have notified the Shift Manager and entry into TFC-OPS-OPER-C-67 should have occurred for response actions and monitoring per Industrial Hygiene Sample Plan (IHSP) POE-MULTI-TFCOPSOPER67.

21. Positive Aspects Identified:

None.

22. Key Take Aways / Learning Opportunities:

WRPS conduct of operations expectations is that employees have technical inquisitiveness or a questioning attitude. Stop when unsure, do not proceed in the face of uncertainty, and inform the responsible supervisor. This is essential to ensure workers are protected from potential unknown hazards.

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The Integrated Safety Management System (ISMS) Core Functions require that hazards are analyzed and hazard controls are implemented to prevent/mitigate potential hazards prior to performing work.

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.

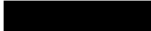
Responsible Manager Approval:



Name (First, Middle Initial, Last)



Signature / Date

Digitally signed by 
Date: 2024.08.28 15:59:58 -07'00'

CAS Manager Approval:



Name (First, Middle Initial, Last)



Signature / Date

Digitally signed by 
Date: 2024.08.28 17:10:18 -07'00'

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

Event Title: TFC-OPS-OPER-C-67 Odor Response at 242S		IHIR Number: IHIR-00102
		IHEI Number: N/A
Date: 08/20/2024	Time: 1315	Location: 242S Roof

EW

Event Summary and Timeline:

Event Summary:

- Around 1315 on 08/20/2024 four Washington River Protection Solutions (WRPS) employees were conducting quarterly rounds at 242S, no respiratory protection was required nor worn. One Nuclear Chemical Operator (NCO) and One Radiation Control Technician (RCT) were on the roof of 242S and opened the lid to the pipe chamber, then opened the valve pipe. Upon opening the lid an odor was detected that was described as "rancid/sewer" and that odor became stronger when the valve was subsequently opened. The NCO took readings then closed the valve and the lid. The NCO requested the Industrial Hygiene Technician (IHT) come to the roof to monitor the odor with instrumentation.
- Around 1335 the IHT arrived to the roof of 242S, the lid was again opened (valve remained closed) and the IHT performed direct reading instrument (DRI) monitoring directly above the open chamber.
Results of DRI Monitoring:
 - Ammonia - 6 ppm
 - Volatile Organic Compounds - 330 ppbThe IHT reports Ammonia levels dissipating to 0 ppm quickly after the peak reading. IHT took readings of the Breathing Zone (BZ) of the NCO and the RCT. There were no detectable levels of Ammonia or VOCs in the BZ.
- Around 1350 the IHT notified the responsible Industrial Hygienist (IH) of findings of stronger than normal odors. No symptoms were experienced by any of the individuals involved and all declined precautionary medical surveillance.
- At 1355 the IH notified West Area Shift Manager of stronger than normal odors detected at 242S and C-67 response was initiated.
- At 1400 access was restricted to the roof of 242S.
- A C-67 response plan was initiated which included further IH monitoring. DRI monitoring was performed at 242S roof at the opening of IX column where the workers reported the odor.
During DRI monitoring, the valve remained closed and results were as follows:
 - Ammonia - Less than detectable (<1 ppm)
 - Volatile Organic Compounds (10.6 eV PID) - 40 ppb
 - Hydrogen Sulfide - Less than detectable (<0.1 ppm)
 - Sulfur Dioxide - Less than detectable (<0.1 ppm)
 - Nitric Oxide - Less than detectable (<0.5 ppm)
- Access to the area was restored around 1626.

Field Response Timeline:

1350 IHT notifies Retrievals and West Area Operations (RWO) IH of stronger than normal odors at 242S.

1355 RWO IH notifies West Area Shift Manager of stronger than normal odors. West Area Shift manager notifies Central Shift Manager (CSM) of stronger than normal odors and C-67 response is initiated.

1400 West Area Shift Manager and RWO IH meet with all involved workers. All involved workers are offered medical surveillance which is declined, report no symptoms, and complete Odor/Vapor Response Cards (OVRG).

1409 CSM contacts DFLAW IH for C-67 response support.

1413 DFLAW IH arrives at Central Shift Office (CSO).

1417 2nd IH arrives at CSO.

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

Event Summary and Timeline:

1420 Data Fusion Advisory System (DFAS) is checked for current weather conditions:
Stability Class-C, Wind Speed 6.8 mph at 204°, Mixing Height 1400ft above grade

1443 IHT support notifies Environmental Safety Health and Quality (ESHQ) Level 1 Manager, ESHQ Level 1 Deputy, IH Level 2 Manager, Acting Level 3 200E Safety and Health (S&H) Manager of C-67 response.

1503 Three RWO IHs arrive at CSO for Response Plan support.

1509 DFLAW Radiation Control Supervisor arrives at CSO for Response Plan support.

1510 RWO IH delivers OVRCS to CSO.

1511 IHT at CSO for Response Plan support.

1512 DFLAW IH briefs Response Team consisting of three RWO IHs, 1 IHT.

- o Respiratory Protection Plan
- o Radiation Work Permit
- o Industrial Hygiene Sample Plan

1514 Response Team enroute to 242S.

1530 Response Team arrives at 242S, awaiting RCT, NCOs, and building access.

1540 1 RCT and 2 NCOs arrive and Response Team enters 242S and gains access to the roof.

1545 Response Team performs DRI monitoring at 242S rooftop pipe chamber with lid open and valve in closed position. No odors noted by Response Team at time of monitoring.

1558 Response Team enroute to CSO to post-test DRI instruments.

1601 RWO IH reports to CSO results of DRI monitoring.

1626 CSM and DFLAW IH sign TFC-OPS-OPER-C-67 Attachment A Sheet 2 of 2, Response Plan. Exit C-67 and access to 242S is restored.

Sampling/Monitoring Results:

- o Ammonia - Less than detectable (<1 ppm)
- o Volatile Organic Compounds (10.6 eV PID) - 40 ppb
- o Hydrogen Sulfide - Less than detectable (<0.1 ppm)
- o Sulfur Dioxide - Less than detectable (<0.1 ppm)
- o Nitric Oxide - Less than detectable (<0.5 ppm)

DRI monitoring at 242S rooftop pipe chamber with lid open and valve in closed position. No odors noted by Response Team at the general building area or on the roof at the time of monitoring.

SWIHD References:

SWIHD ID# 24-06683, "TF-OPS-OPER-C-67 response at 242-S"

Additional Information:

Stack reading at SY exhauster on day of odor event was 24 ppm Ammonia.

Event occurred outside of Tank Farm boundaries, thus RPE and PAMs were not required nor worn during initial odor event.

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

Additional Information:

Around 1600, SOEN system was discovered faulty by operations and "Exiting C-67" alert was not delivered.

See Attachment A for images of odor response event.

Recommendations/Conclusions:

Based on the facts that there was no odor detected prior to opening the lid of the pipe chamber, that the odor was detected once the chamber was opened, and increased with the opening of the valve, and dissipated with the closure of the valve, it can be concluded that the source of the odor was the pipe chamber. Further investigation of the contents of the pipe chamber and connected systems in 242S is recommended.

Others:

EIR-2024-066 "Odors at 242S"

Associated Documents:

iCAS
Number:

N/A

EIR
Number:

EIR-2024-066

Industrial Hygienist:

Print First and Last Name

Digitally signed by _____
Date: 2024.08.22 08:49:53 -07'00'

Signature / Date

Industrial Hygiene Level 3 Manager

Print First and Last Name

Digitally signed by _____
Date: 2024.08.22 07:34:04 -07'00'

Signature / Date

Industrial Hygiene Level 2 Manager:

Print First and Last Name

Digitally signed by _____
Date: 2024.08.22 09:10:51 -07'00'

Signature / Date

Additional Information



Figure 1. 242S Evaporator south side roof where odor event occurred.

Additional Information



Figure 2. Photographs showing open lid and pipe chamber (A) and IHT monitoring (B).

ODOR/VAPOR RESPONSE CARD

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

- Date and time of event: 8/20/2021 1410
- Check Applicable:
 - ☒ Odor
 - ☐ Ammonia Alarm (6 ppm)
 - ☐ Ammonia Alarm (12 ppm)
 - ☐ Alarm (other - describe): Multi PAE Reach 6ppm No ALARM
- Your name and the work you were performing: monitoring for VOC & Ammonia
- Other Work Underway? Describe: N/A
- Location of event (mark area on map and wind direction): Roof of 242-S EVAP
- Name(s) of others in or near the affected area: 
- Was Industrial Hygiene present, who?
- Describe the odor:
 - ☐ Sweet
 - ☐ Sour
 - ☐ Smoky
 - ☒ Septic/Sewer
 - ☐ Musty
 - ☒ Rotten
 - ☐ Metallic
 - ☐ Onion
 - ☐ Earthy
 - ☐ Ammonia
 - ☐ Citrus
 - ☐ Solvent
 - ☐ Other (describe):
- 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.
2. Contact Central Shift Manager (CSM),
at [REDACTED]
3. Complete both pages of this form and
include as many details as possible,
including:
 - a. Approximate location, see map
at right;
 - b. Wind direction, speed and
description, such as stable or
gusty wind;
 - c. Environmental conditions, such
as hot, cold, windy, rainy;
 - d. Other work or contractors in the
area;
 - e. Anything else you think is
relevant.
4. Provide the completed card to your
Supervisor*, Industrial Hygiene*, Union
Safety Representative* or the CSM.

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

ODOR/VAPOR RESPONSE CARD

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

- Date and time of event: 8/20/24 1410
- Check Applicable:
 - ☒ Odor
 - ☐ Ammonia Alarm (6 ppm)
 - ☐ Ammonia Alarm (12 ppm)
 - ☐ Alarm (other - describe): _____
- Your name and the work you were performing:
[REDACTED] observation
- Other Work Underway? Describe: N/A
- Location of event (mark area on map and wind direction):
242 S - Roof
- 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): _____
- 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 [REDACTED]
3. Complete both pages of this form and
include as many details as possible,
including:
 - a. Approximate location, see map
at right;
 - b. Wind direction, speed and
description, such as stable or
gusty wind;
 - c. Environmental conditions, such
as hot, cold, windy, rainy;
 - d. Other work or contractors in the
area;
 - e. Anything else you think is
relevant.
4. Provide the completed card to your
Supervisor*, Industrial Hygiene*, Union
Safety Representative* or the CSM.

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

ODOR/VAPOR RESPONSE CARD

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

- Date and time of event: 8-20-24
- Check Applicable:
 - ☒ Odor
 - ☐ Ammonia Alarm (6 ppm)
 - ☐ Ammonia Alarm (12 ppm)
 - ☐ Alarm (other - describe): _____
- Your name and the work you were performing:
[REDACTED] lifted lid to check water level above resin.
- Other work underway? Describe:
NA
- Location of event (mark area on map and wind direction):
not area of 2425
- Name(s) of others in or near the affected area:
[REDACTED]
- Was Industrial Hygiene present, who? _____
- Describe the odor:
 - ☐ Sweet
 - ☒ Sour
 - ☐ Smoky
 - ☒ Septic/Sewer
 - ☐ Musty
 - ☒ Rotten
 - ☐ Metallic
 - ☐ Onion
 - ☐ Earthy
 - ☐ Ammonia
 - ☐ Citrus
 - ☐ Solvent
 - ☐ Other (describe): _____
- Is source known/likely? Describe: _____
- Your symptoms? ☒ None
 - ☐ Headache
 - ☐ Dizziness
 - ☐ Nausea
 - ☐ Cough
 - ☐ Fatigue
 - ☐ Weakness
 - ☐ Sore Throat
 - ☐ Difficulty Breathing
 - ☐ Eye Irritation
 - ☐ Rash
 - ☐ Itch
 - ☐ Tingling
 - ☐ Numbness
 - ☐ Taste
 - ☐ Other (describe): _____

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

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

ODOR/VAPOR RESPONSE CARD

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

- Date and time of event: 8/20/24 1410
- Check Applicable:
 - ☒ Odor
 - ☐ Ammonia Alarm (6 ppm)
 - ☐ Ammonia Alarm (12 ppm)
 - ☐ Alarm (other - describe):
- Your name and the work you were performing [REDACTED] - observation check
- Other Work Underway? Describe: NA
- Location of event (mark area on map and wind direction): Roof top evaporator west area 2425
- Name(s) of others in or near the affected area: [REDACTED]
- Was Industrial Hygiene present, who? NO 1st time Yes Secalfind
- Describe the odor:
 - ☐ Sweet
 - ☒ Sour
 - ☐ Smoky
 - ☐ Septic/Sewer
 - ☐ Musty
 - ☒ Rotten
 - ☐ Metallic
 - ☐ Onion
 - ☐ Earthy
 - ☐ Ammonia
 - ☐ Citrus
 - ☐ Solvent
 - ☐ Other (describe):
- Is source known/likely? Describe:
- Your symptoms? ☒ None
 - ☐ Headache
 - ☐ Dizziness
 - ☐ Nausea
 - ☐ Cough
 - ☐ Fatigue
 - ☐ Weakness
 - ☐ Sore Throat
 - ☐ Difficulty Breathing
 - ☐ Eye Irritation
 - ☐ Rash
 - ☐ Itch
 - ☐ Tingling
 - ☐ Numbness
 - ☐ Taste
 - ☐ Other (describe):

2. Provide this completed card (Page 1 & 2) to Supervisor, Industrial Hygiene, your Union Safety Representative or the CSM.
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 - c. Environmental conditions, such as hot, cold, windy, rainy;
 - d. Other work or contractors in the area;
 - e. Anything else you think is relevant.
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