

EVENT INVESTIGATION REPORT

EIR-2019-012: Investigation of MO2249 AOP-015 Entry



Figure 1: Location of A Farm Egress Trailer where odors were reported

[Redacted Name]

Event Investigator

4/23/2019
Date

[Redacted Name]

PER Responsible Manager

4/23/2019
Date

PER No. WRPS-PER-2019-0520

MO2249 Egress Trailer AOP-015 Event

AOP-015 Summary

Date/Time of Event	March 19, 2019 at ~0830
Location	MO2249, A Farm Egress Trailer (Inside and Outside)
Personnel Affected	Nine (9) personnel reported odors: Evaluated at HPMC: <ul style="list-style-type: none"> • Seven (7)
Odor	<ul style="list-style-type: none"> • (7) Cleaning Solvent • (5) Sweet
Symptoms	<ul style="list-style-type: none"> • Headache • Dizziness/Light-headed • Taste/Sensation in mouth • Dry throat • Cough
Direct Read Instrumentation (DRI) Monitoring	Ammonia: < detection limit (DL) VOCs: < DL
Sampling	2 bag samples collected, results were at or below background levels.
Potential Source	Vadose garbage bags and/or latex gloves doffed by Vadose field crew (Minutes prior to event initiation)
Wind Speed / Direction	N/A
Weather Conditions	Barometric pressure: 29.47 inHg Temperature @ 42 degrees
Waste Disturbing or Tank Work in Adjacent Area	None
Other Work in Adjacent Area	Vadose activities in A Farm

Investigation

At approximately 0830hrs on Tuesday, March 19, 2019, nine workers (three construction subcontractors and six WRPS health physics technicians [HPTs]) encountered odors described as cleaning solvent, sweet, musty, and acetone/hydrocarbon smell inside MO-2249 (A-Farm Egress Trailer).

The A-Farm Egress Trailer was staffed with one subcontractor supporting self-contained breathing apparatus (SCBA) bottle changes and six HPTs performing radiological support for workers exiting A-Farm. Around 0820 workers with bagged trash entered the egress trailer from A-Farm, doffed their personal protective equipment (PPE) and exited the trailer. Approximately 10 minutes later workers began to notice a sweet, cleaning solvent smell. An HPT called the Central Shift Manager (CSM) to report an odor inside MO-2249. There were no reported symptoms, and workers remained inside the egress trailer. A radio announcement was made restricting access to MO-2249. Two construction carpenters supporting the 241-A POR518/POR519 were unable to understand/hear the announcement, assumed A-Farm was restricted. The carpenters exited A-Farm using the egress trailer. The HPTs were still inside, so the carpenters did not realize the trailer was restricted. Another field work supervisor (FWS) and HPT working on a crane in A-Farm, observed people inside MO-2249. The FWS and HPT opened the door and notified the workers that the building was restricted and they needed to leave. All nine workers who encountered the odor completed odor response cards. Seven of the nine workers identified symptoms, and reported to HPMC for evaluation. Remaining workers inside A-Farm were directed to exit A-Farm via a safe path of travel to traverse the A/AX Farm boundary and egress through the AX-Farm.

The Shift Manager entered TF-AOP-015, Response to Reported Odors or Unexpected Changes to Vapor Conditions, at 0850, and a SOEN message was sent at 0851. The COMs and EV team Field Industrial Hygienist (IH) were notified at 0854, it was then determined that the odor was not associated with tank waste. At 0911 a nuclear chemical operator (NCO) posted MO-2249 exterior doors as restricted access however farm side doors are unable to be posted. IH using direct reading instruments (DRIs) with ammonia and volatile organic compounds (VOC) media begin sweeps inside and outside of MO-2249. IH also collected two bag samples both inside and outside of MO-2249. The monitoring results were all below the detection limit (DL). The bag sample analysis was completed and results were at or below background levels. TF-AOP-015 was exited at 1756. All seven workers that reported to HPMC for evaluation were later released and returned to work without restrictions. An IH Event Report was not performed.

TF-AOP-015 Attachment 1- Odor Response Plan Response Timeline

Time	Note
0853	COMs Field Industrial Hygienist (IH) and EV Field IH arrive at Central Shift Office (CSO) Central Shift Manager (CSM) briefs Nuclear Chemical Operator (NCO) on posting restricted access to MO-2249 CSM briefs COMs Field IH and EV Field IH <ul style="list-style-type: none"> • Ether like odor • No symptoms
0854	Production Operations (PO) S&H Manager and PO Shift Industrial Hygiene Technician (IHT) arrive at CSO
0901	NCO updates CSM on MO-2249 posting <ul style="list-style-type: none"> • Outside of trailer posted • Cannot post the farm door without entering MO-2249
0903	CSM determines 3.1.13 for Immediate Actions
0903	COMs IH gives initial brief to PO Shift IHT <ul style="list-style-type: none"> • DRI monitor for Ammonia (NH₃) and Volatile Organic Compounds (VOC) • Collect grab air "bag" sample • TF-AOP-015 Respirator Protection Form (RPF) Task 3 • Awaiting Odor Response Cards (ORC). Check back in with COMs Field IH after gathering equipment prior to responding in the field
0904	PO Shift IHT departs CSO to gather Instrumentation and Respiratory Protection Equipment (RPE)
~0930	Two PO Shift IHTs arrive at CSO
~0930	ORCs arrive at CSO
0932	COMs Field IH brief PO Shift IHTs on response steps <ul style="list-style-type: none"> • IH Sampling Plan: IHP-09001 • DRI Monitor for NH₃ and VOCs • Collect two (2) bag samples <ul style="list-style-type: none"> ○ One outside MO-2249 ○ One inside MO-2249, including sweeping around Argos
0933	PO Shift IHTs depart CSO
0959	PO Shift IHTs arrive at CSO <ul style="list-style-type: none"> • NH₃: < Detection Limit (DL) • VOCs: < DL
1026	PO Shift IHT Supervisor contacts COMs Field IH: Instrument passed the post-use function test
1101	PO Shift IHT notifies COMs Field IH bag samples have been delivered to 2704-HV for analysis

Immediate Actions Taken

Employees contacted the CSM. The CSM entered TF-AOP-015.

Discussion of Potential Cause

The Vadose field crew was performing normal maintenance on equipment inside A-Farm around 0800. Speaking with the FWS, the field crew was checking for any leakage from hoses, which included cleaning hydraulic oil/fluid and grease/lubricant with Simple Green. The cleaning rags were bagged and sealed. The work team brought the bags into the egress trailer when they exited and doffed the outer latex gloves inside the radiological waste trash bin inside MO-2249. It is likely the trash bags and/or gloves inside the radiological waste trash bin containing the cleaning solution was the source of the odor.

Preliminary Extent of Condition Review/Historical Review

A search of the PER database did not find any result of "cleaning solution" or "sweet" as an odor descriptor. In the past 24 months there were no TF-AOP-015 entries inside the A Farm egress trailer.

Recommendations/Proposed Corrective Actions

- The SOEN message identified MO-2249 as restricted, the trailer is commonly known as the A-Farm Egress trailer. Consider adding common nomenclature or location for SOEN messages when referring to building numbers.
- There is reportedly no signage denoting building number from inside the farm. Workers were unable to identify MO-2249.
- Evaluate if egress trailers/tents should be staffed with radios for emergency announcements.

Attachments:

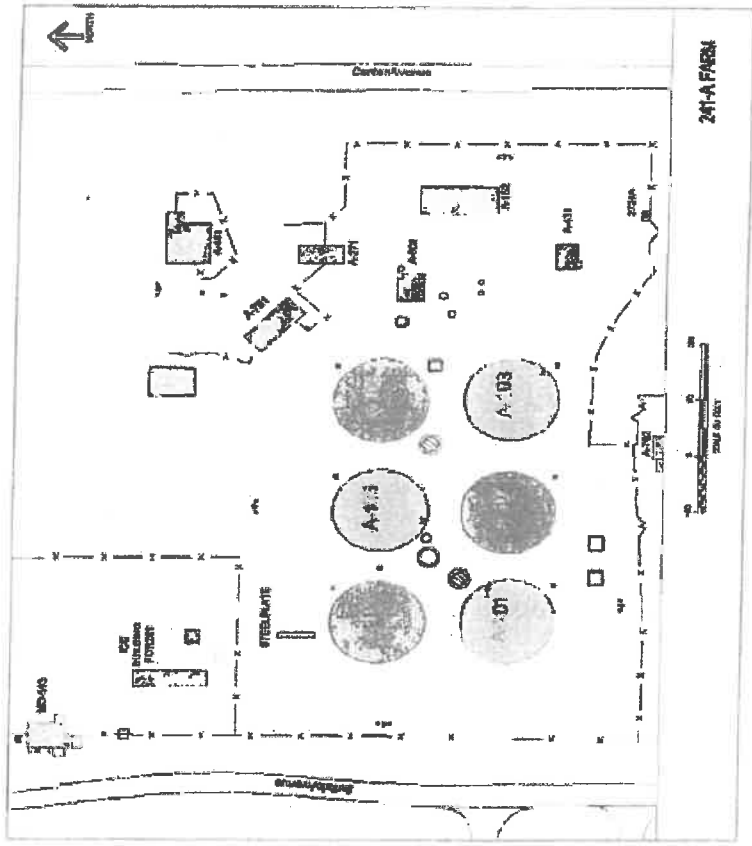
Attachment 1: Odor Response Cards

Attachment 2: IH Sample Results

Attachment 1: Odor Response Cards

ODOR RESPONSE CARD - 241-A FARM

- Odors Detected with NO Immediate symptoms**
1. Notify Immediate Supervisor.
 2. Contact Central Shift Manager, [REDACTED]. Provide the bulleted information below.
 3. Complete map, return to Central Shift Office as soon as practicable.
- Odors Detected WITH Symptoms**
4. Notify Immediate Supervisor.
 5. Contact CSM, [REDACTED] completes below bulleted information and map.
 - Your name and the work you were performing
 - Your symptoms (if any)
 - Date and time odor was noticed
 - Location of odors (mark area on map and the wind direction)
 - Describe the odor
 - Name of other in or near the affected area
 - Was an IHT present?
 - Possible source
 6. Provide information on the back of card.
 7. Send this card immediately to the Central Shift Office.



6/19

Attachment 1: Odor Response Cards (Cont.)

ODOR RESPONSE CARD - 241-A FARM

1. Contact CSM, Complete below bulleted information and map.

- Date and time odor was noticed 4:00
- Your name and the work you were performing Trailer bottle at roadport
- Location of odors (mark area on map and wind direction) S entering from on east side of 2049
- Name(s) of others in or near the affected area [redacted]
- Was an IHT present? no
- Describe the odor Sweet Sour Musty Earthy Metallic Smoky Rotten Onion
 Clearing Solution Ammonia Other:
- Possible Source None came to mind
- Your symptoms (if any) Headache Dizziness/Light-Headed Nausea Cough
 Fatigue/Drowsiness/Weakness Sore/Burning Throat Difficulty Breathing
 Watery/Irritated Eyes/Trouble with Vision Tingling/Numbness/Paralysis Rash/Itching
 Other: Sore throat only

2. Send this card to the Central Shift Office.

Attachment 1: Odor Response Cards (Cont.)

ODOR RESPONSE CARD - 241-A FARM

7/19

1. Contact GSM, Complete below bulleted information and map.

- Date and time odor was noticed 5/19/10
- Your name and the work you were performing [Redacted] Air Act daily, weekly surveys
- Location of odors (mark area on map and wind direction) 25100 100249
- Name(s) of others in or near the affected area [Redacted]
- Was an IHT present? no

- Describe the odor Sweet Sour Musty Earthy Metallic Smoky Rotten Onion
- Cleaning Solution Ammonia Other: _____
- Possible Source ?

- Your symptoms (if any) Headache Dizziness/Light-Headed Nausea Cough
- Fatigue/Drowsiness/Weakness Sore/Burning Throat Difficulty Breathing
- Watery/Irritated Eyes/Trouble with Vision Tingling/Numbness/Paralysis Rash/Itching
- Other: _____

NA

2. Send this card to the Central Shift Office.

Attachment 1: Odor Response Cards (Cont.)

ODOR RESPONSE CARD - 241-A FARM

3/19/2019 @ 0815
MO-2249 P20F2

Odors Detected with NO
Immediate symptoms

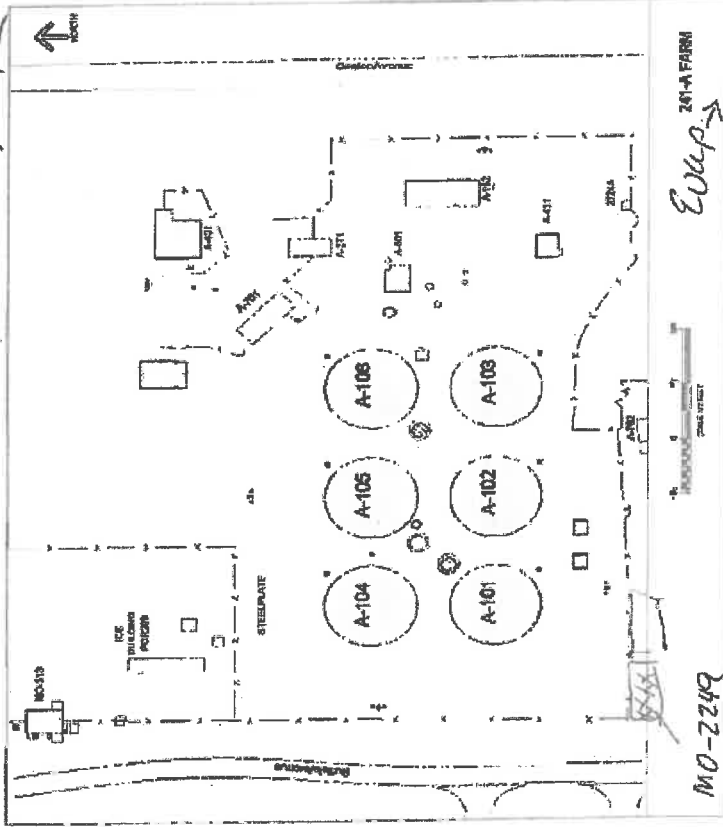
1. Notify Immediate Supervisor.
2. Contact Central Shift Manager [REDACTED]
Provide the bulleted information below.
3. Complete map, return to Central Shift Office
as soon as practicable.

Odors Detected WITH Symptoms

4. Notify Immediate Supervisor.
5. Contact CSM [REDACTED]
complete below bulleted information and
map.
 - Your name and the work you were performing
 - Your symptoms (if any)
 - Date and time odor was noticed
 - Location of odors (mark area on map and the wind direction)
 - Describe the odor
 - Name of other in or near the affected area
 - Was an IHT present?
 - Possible source

6. Provide information on the back
of card.

7. Send this card immediately to the
Central Shift Office.



Attachment 1: Odor Response Cards (Cont.)

ODOR RESPONSE CARD - 241-A FARM

P. 1 of 2

1. Contact CSM, Complete below bulleted information and map.

- Date and time odor was noticed 3/19/19 about 0815
- Your name and the work you were performing HIT in Eggs + trailer MO-2249
- Location of odors (mark area on map and wind direction) I was inside the trailer
- Name(s) of others in or near the affected area [Redacted]
- Was an IHT present? NO
- Describe the odor Sweet Sour Musty Earthy Metallic Smoky Rotten Onion
 Cleaning Solution Ammonia Other: kind of maybe acetone? See white Hydrocarbon
- Possible Source
- Your symptoms (if any) Headache Dizziness/Light-Headed Nausea Cough
 Fatigue/Drowsiness/Weakness Sore/Burning Throat Difficulty Breathing
 Watery/Irritated Eyes/Trouble with Vision Tingling/Numbness/Paralysis Rash/Itching
 Other: mostly I smelled it, a bit of taste

2. Send this card to the Central Shift Office.

Attachment 1: Odor Response Cards (Cont.)

ODOR RESPONSE CARD - 241-A FARM

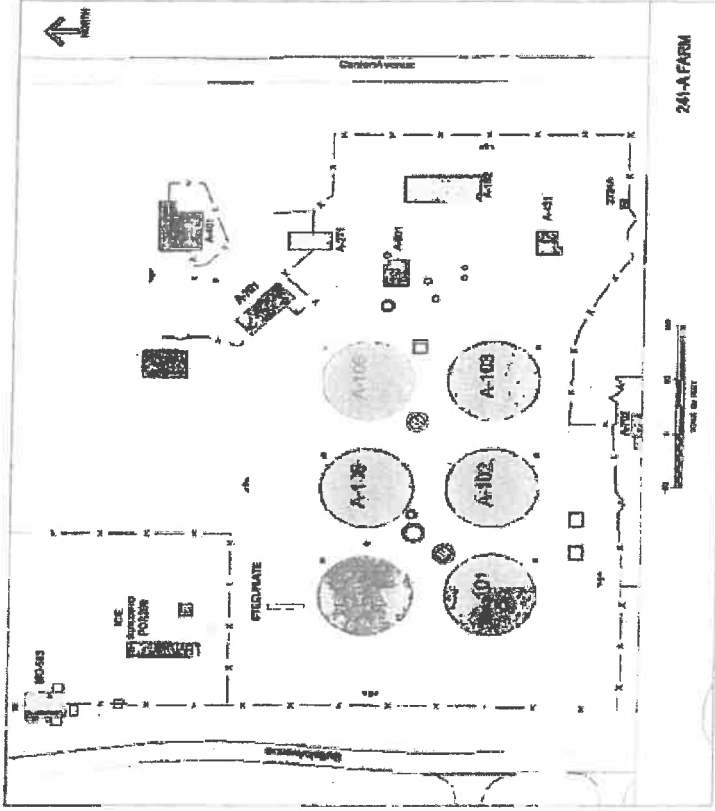
Odors Detected with **NO**
Immediate symptoms

1. Notify Immediate Supervisor.
2. Contact Central Shift Manager, [REDACTED].
Provide the bulleted information below.
3. Complete map, return to Central Shift Office as soon as practicable.

Odors Detected **WITH** Symptoms

4. Notify Immediate Supervisor.
5. Contact CSM, [REDACTED], complete below bulleted information and map.
 - Your name and the work you were performing
 - Your symptoms (if any)
 - Date and time odor was noticed
 - Location of odors (mark area on map and the wind direction)
 - Describe the odor
 - Name of other in or near the affected area
 - Was an IHT present?
 - Possible source

6. Provide information on the back of card.
7. Send this card immediately to the Central Shift Office.



Handwritten notes on the form include a circled 'E' and the number '2249' next to a small diagram, and another '2250' next to another small diagram. A wind direction indicator shows 'W', 'N', 'S', 'E' with 'N' and 'S' marked.

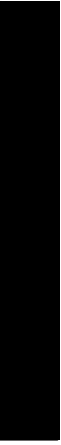
Attachment 1: Odor Response Cards (Cont.)

ODOR RESPONSE CARD - 241-A FARM

1. Contact CSI, Complete below bulleted information and map.

- Date and time odor was noticed 3/19 8:45 AM
- Your name and the work you were performing [REDACTED] - SCAFFOLD WALKDOWN
- Location of odors (mark area on map and wind direction) 2249 TRAILER
- Name(s) of others in or near the affected area [REDACTED]
- Was an IHT present? NO
- Describe the odor Sweet Sour Musty Earthy Metallic Smoky Rotten Onion
- Cleaning Solution Ammonia Other:
- Possible Source NOT SURE
- Your symptoms (if any) Headache Dizziness/Light-Headed Nausea Cough
- Fatigue/Drowsiness/Weakness Sore/Burning Throat Difficulty Breathing
- Watery/Irritated Eyes/Trouble with Vision Tingling/Numbness/Paralysis Rash/Itching
- Other: TASTE IN MOUTH / SENSATION IN MOUTH

2. Send this card to the Central Shift Office.



Attachment 1: Odor Response Cards (Cont.)

ODOR RESPONSE CARD - 241-A FARM

Odors Detected with NO Immediate symptoms

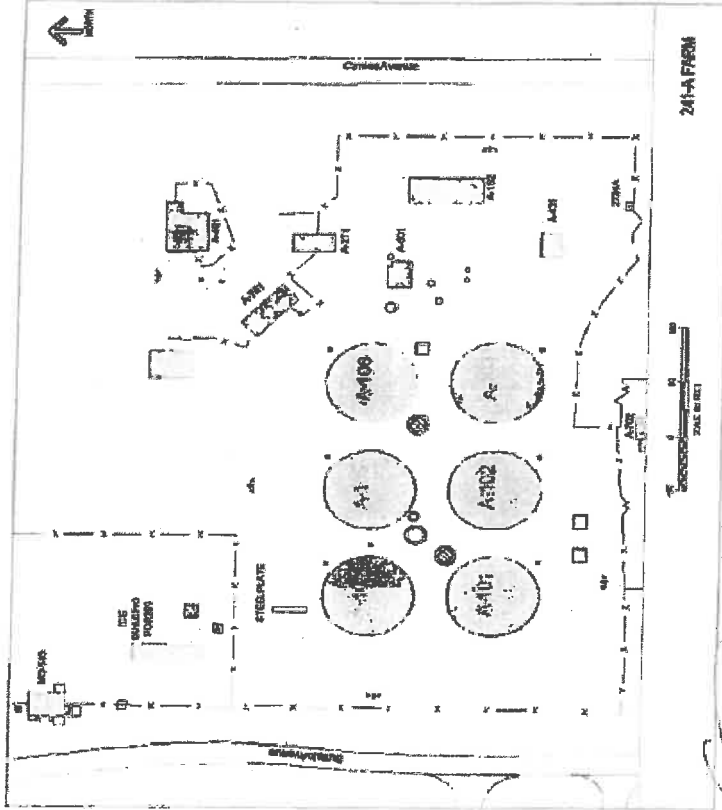
1. Notify Immediate Supervisor.
2. Contact Central Shift Manager, [REDACTED]. Provide the bulleted information below.
3. Complete map, return to Central Shift Office as soon as practicable.

Odors Detected WITH Symptoms

4. Notify Immediate Supervisor.
5. Contact CSM, [REDACTED], complete below bulleted information and map.
 - Your name and the work you were performing
 - Your symptoms (if any)
 - Date and time odor was noticed
 - Location of odors (mark area on map and the wind direction)
 - Describe the odor
 - Name of other in or near the affected area
 - Was an IHT present?
 - Possible source

6. Provide information on the back of card.

7. Send this card immediately to the Central Shift Office.



241-A FARM

Wind Direction

W	N	E
		S

2249

7250

A-0106-012 (REV 1)

Attachment 1: Odor Response Cards (Cont.)

ODOR RESPONSE CARD - 241-A FARM

1. Contact CSNI, Complete below bulleted information and map.

- Date and time odor was noticed 3/19/19 8:45 Am
- Your name and the work you were performing [REDACTED] - SCAFFOLD WALK DOWN
- Location of odors (mark area on map and wind direction) BLDG 2249
- Name(s) of others in or near the affected area [REDACTED]
- Was an IHT present? NO

• Describe the odor Sweet Sour Musty Earthy Metallic Smoky Rotten Onion

Cleaning Solution Ammonia Other:

• Possible Source UNSURE

• Your symptoms (if any) Headache Dizziness/Light-Headed Nausea Cough

Fatigue/Drowsiness/Weakness Sore/Burning Throat Difficulty Breathing

Watery/Irritated Eyes/Trouble with Vision Tingling/Numbness/Paralysis Rash/Itching

Other: FOUL TASTE IN MOUTH

2. Send this card to the Central Shift Office.

Attachment 1: Odor Response Cards (Cont.)

ODOR RESPONSE CARD - 241-A FARM

Odors Detected with NO Immediate symptoms

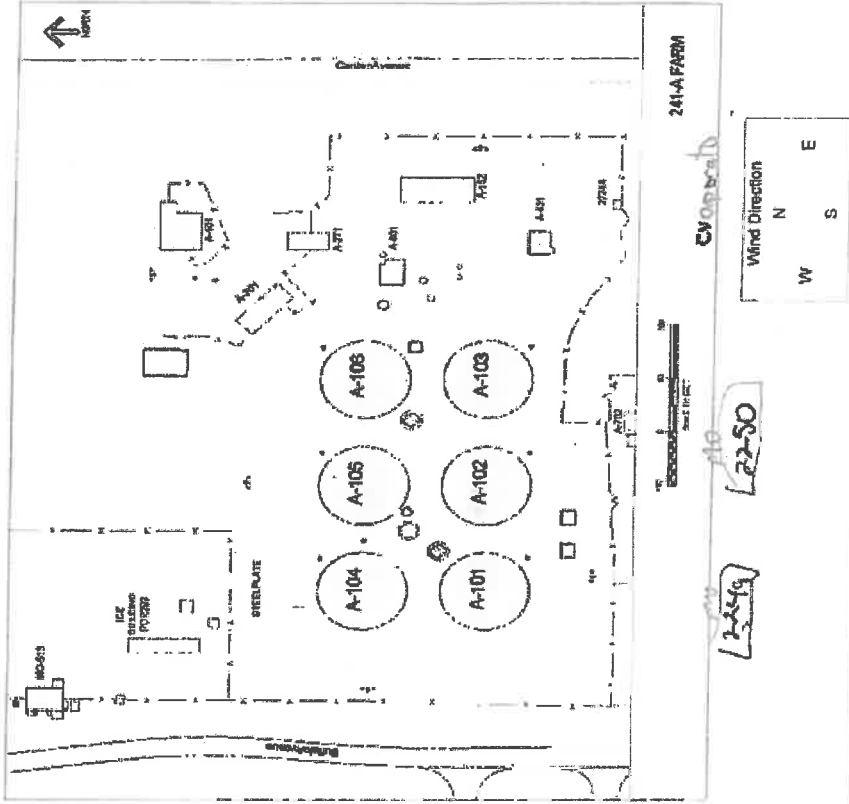
1. Notify Immediate Supervisor.
2. Contact Central Shift Manager, [REDACTED]. Provide the bulleted information below.
3. Complete map, return to Central Shift Office as soon as practicable.

Odors Detected WITH Symptoms

4. Notify Immediate Supervisor.
5. Contact CSM, [REDACTED]. Complete below bulleted information and map.
 - Your name and the work you were performing
 - Your symptoms (if any)
 - Date and time odor was noticed
 - Location of odors (mark area on map and the wind direction)
 - Describe the odor
 - Name of other in or near the affected area
 - Was an IHT present?
 - Possible source

6. Provide information on the back of card.

7. Send this card immediately to the Central Shift Office.



Attachment 1: Odor Response Cards (Cont.)

ODOR RESPONSE CARD - 241-A FARM

1. Contact CSM, Complete below bulleted information and map.

- Date and time odor was noticed 3/9/19 @ 3:30 AM approx.
- Your name and the work you were performing [redacted] servicing equipment out of SA
- Location of odors (mark area on map and wind direction) no 241 inside
- Name(s) of others in or near the affected area [redacted]
- Was an IHT present? Yes
- Describe the odor Sweet Sour Musty Earthy Metallic Smoky Rotten Onion
- Cleaning Solution Ammonia Other: _____
- Possible Source Unknown
- Your symptoms (if any) Headache Dizziness/Light-Headed Nausea Cough
- Fatigue/Drowsiness/Weakness Sore/Burning Throat Difficulty Breathing
- Watery/Irritated Eyes/Trouble with Vision Tingling/Numbness/Paralysis Rash/Itching
- Other: _____

2. Send this card to the Central Shift Office.

Attachment 1: Odor Response Cards (Cont.)

ODOR RESPONSE CARD - 241-A FARM

Odors Detected with NO Immediate symptoms

1. Notify Immediate Supervisor.
2. Contact Central Shift Manager, [REDACTED]. Provide the bulleted information below.
3. Complete map, return to Central Shift Office as soon as practicable.

Odors Detected WITH Symptoms

4. Notify Immediate Supervisor.
5. Contact CSM, [REDACTED], complete below bulleted information and map.
 - Your name and the work you were performing
 - Your symptoms (if any)
 - Date and time odor was noticed
 - Location of odors (mark area on map and the wind direction)
 - Describe the odor
 - Name of other in or near the affected area
 - Was an IHT present?
 - Possible source
6. Provide information on the back of card.
7. Send this card immediately to the Central Shift Office.

Wind Direction
 N
 W S E

A-8006-022 (REV 1)

Attachment 1: Odor Response Cards (Cont.)

ODOR RESPONSE CARD - 241-A FARM

1. Contact CSM, Complete below bulleted information and map.

- Date and time odor was noticed 3/19/19 0830
- Your name and the work you were performing [REDACTED]
- Location of odors (mark area on map and wind direction) CONTROL HOIST HAT (LEAD)
- Name(s) of others in or near the affected area [REDACTED] SEE MAP - EAST END OF MO-2249
- Was an IHT present? NU.

- Describe the odor Sweet Sour Musty Earthy Metallic Smoky Rotten Onion
- Cleaning Solution Ammonia Other: ETHER/HYDROCARBON
- Possible Source P-ID GAS FROM PEMS OR WORKER CLEANING MATERIALS
- Your symptoms (if any) Headache Dizziness/Light-Headed Nausea Cough
- Fatigue/Drowsiness/Weakness Sore/Burning Throat Difficulty Breathing
- Watery/Irritated Eyes/Trouble with Vision Tingling/Numbness/Paralysis Rash/Itching
- Other: NAUSEA

2. Send this card to the Central Shift Office.

Attachment 1: Odor Response Cards (Cont.)

ODOR RESPONSE CARD - 241-A FARM

Odors Detected with *NQ*
Immediate symptoms

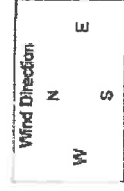
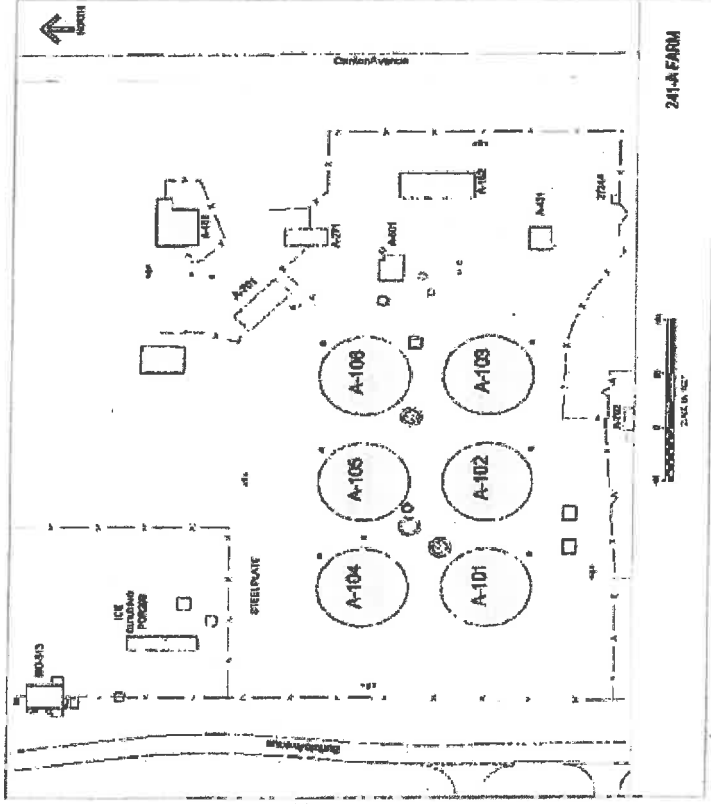
1. Notify Immediate Supervisor.
2. Contact Central Shift Manager: [REDACTED]
Provide the bulleted information below.
3. Complete map, return to Central Shift Office as soon as practicable.

Odors Detected *WITH* Symptoms

4. Notify Immediate Supervisor.
5. Contact CSM, [REDACTED] complete below bulleted information and map.
 - Your name and the work you were performing
 - Your symptoms (if any)
 - Date and time odor was noticed
 - Location of odors (mark area on map and the wind direction)
 - Describe the odor
 - Name of other in or near the affected area
 - Was an IHT present?
 - Possible source

6. Provide information on the back of card.

7. Send this card immediately to the Central Shift Office.



241-A FARM

Attachment 1: Odor Response Cards (Cont.)

ODOR RESPONSE CARD - 241-A FARM

1. Contact CSM, Complete below bulleted information and map.

- Date and time odor was noticed 3-19-19 ≈ 8:15 AM
- Your name and the work you were performing [REDACTED] TRAILER EGGS
- Location of odors (mark area on map and wind direction) MO-2249
- Name(s) of others in or near the affected area _____
- Was an iHT present? NO
- Describe the odor Sweet Sour Musty Earthy Metallic Smoky Rotten Onion
- Cleaning Solution Ammonia Other: _____
- Possible Source _____
- Your symptoms (if any) Headache Dizziness/Light-Headed Nausea Cough
- Fatigue/Drowsiness/Weakness Sore/Burning Throat Difficulty Breathing
- Watery/Irritated Eyes/Trouble with Vision Tingling/Numbness/Paralysis Rash/Itching
- Other: Dry throat, taste in mouth

2. Send this card to the Central Shift Office.

A-8006-922 (REV 1)

Attachment 1: Odor Response Cards (Cont.)

ODOR RESPONSE CARD - 241-A FARM

Odors Detected with **NO**
Immediate symptoms

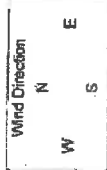
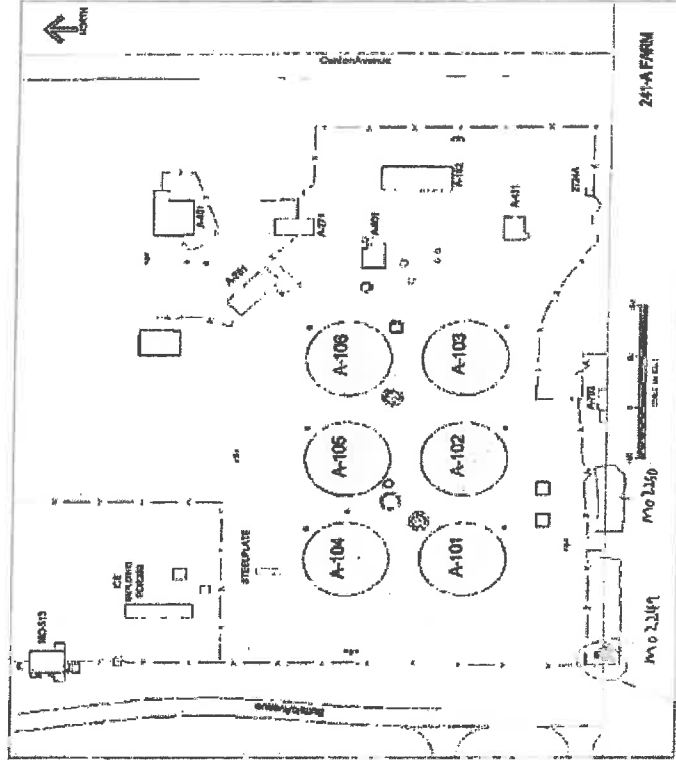
1. Notify Immediate Supervisor.
2. Contact Central Shift Manager, [REDACTED].
Provide the bulleted information below.
3. Complete map, return to Central Shift Office
as soon as practicable.

Odors Detected **WITH** Symptoms

4. Notify Immediate Supervisor.
5. Contact CSM, [REDACTED],
complete below bulleted information and
map.
 - Your name and the work you were performing
 - Your symptoms (if any)
 - Date and time odor was noticed
 - Location of odors (mark area on map and the wind direction)
 - Describe the odor
 - Name of other in or near the affected area
 - Was an IHT present?
 - Possible source

6. Provide information on the back
of card.

7. Send this card immediately to the
Central Shift Office.



Attachment 1: Odor Response Cards (Cont.)

ODOR RESPONSE CARD - 241-A FARM

1. Contact CSM, Complete below bulleted information and map.

- Date and time odor was noticed 8:30 to 8:50
- Your name and the work you were performing Surveying City work on
- Location of odors (mark area on map and wind direction) Eastern side
- Name(s) of others in or near the affected area [Redacted]
- Was an IHT present? No
- Describe the odor Sweet Sour Musty Earthy Metallic Smoky Rotten Onion
- Cleaning Solution Ammonia Other: Ethyl methyl parathion, acetone
- Possible Source No idea
- Your symptoms (if any) Headache Dizziness/Light-Headed Nausea Cough
- Fatigue/Drowsiness/Weakness Sore/Burning Throat Difficulty Breathing
- Watery/Irritated Eyes/Trouble with Vision Tingling/Numbness/Paralysis Rash/Itching
- Other:

2. Send this card to the Central Shift Office.

Attachment 2: IH Sample Results

HAPSITE GC-MS Bag Sample Results Survey 19-01736: AOP-15 at MO-2249

Two bag samples were collected in response to an odor reported at MO-2249. These samples were analyzed using an inficon HAPSITE GC-MS on March 19, 2019. Data was interpreted on March 19, 2019, and reported the same day. Results for the Air Blank Sample were satisfactory. The same compounds were found in Bag Sample #1 and Bag Sample #2 at concentrations consistent with sample bag contaminants. No compounds were found at concentrations of concern. No compounds were found at concentrations above background.

Compounds Found in Samples

Compound	Clean Air Blank	Bag #1	Bag #2	Sample Bag Contaminant	Comments
Internal Standard #1	X	X	X		Added by instrument during analysis
Toluene		X	X	X	Not found above background
Internal Standard #2	X	X	X		Added by instrument during analysis
Xylene		X	X	X	Not found above background
C9 Alkane Hydrocarbon		X	X	X	Not found above background
Trimethylbenzene		X	X	X	Not found above background
D-Limonene		X	X	X	Not found above background
Silane Compound		X	X	X	Not found above background
C11-15 Alkane Hydrocarbons		X	X	X	Not found above background

If you have questions contact [REDACTED] CIH at [REDACTED]

