EVENT INVESTIGATION REPORT

AOP-015 Entry in AP07A-WT-TBX-002 Cabinet

Event Investigation Report Number: EIR-2016-009

Event Investigation Team Lead	4/12/16 Date
PER Responsible Manager	4/13/16 Date

PER No. WRPS-PER-2016-0475

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Investigation Summary

On, Tuesday 3/8/16 at 1430 hours, two Nuclear Chemical Operators (NCOs) smelled a "chemical like" odor at the AP07A-WT-TBX-002 cabinet while performing temperature readings per TO-040-790, "Perform Waste Transfer System Temperature Surveillance." Initially the NCOs reported no symptoms but the Central Shift Manager CSM) initiated an investigative survey in 241-AP Tank Farm as a precaution. However, after a few minutes headaches and a "funny taste in the mouth" were reported. The NCOs were transported to the HPMC. Weather conditions were fairly calm at 3-4 mph from NNW wind direction per the Hanford MET station.

The CSM entered AOP-015 due to reported odors that caused symptoms of exposure (e.g. headaches, irritation of the skin, eyes, nose, or lungs, nausea, difficulty breathing, metallic taste in mouth). The AP Tank Farm was posted access restricted and was cleared.

The Industrial Health Technicians (IHT) responded to AP Farm and took sampling bags (Bag Sample #1: in area surrounding the electrical box and Bag Sample #2: from inside the box with it cracked open). All readings from DRI instruments showed no detectable readings for Volatile Organic Compounds (VOCs) or Ammonia. (NOTE: Bag Sample #2 was determined to have had a pinhole leak). Results from the bag samples were provided to the CSM at 2300 hours. All results were at or below background levels, therefore, the CSM exited AOP-015; notified the Senior On-Call Manager and ORP; and issued a Shift Office Event Notification (SOEN) message.

Weather Information

At the time the odors were detected, wind speeds were approximately 3-4 mph blowing in a NNW direction. The following data was provided by the Hanford Weather Station for Tuesday, March 8, 2016:

200E/Station 6 Weather Data for March 14, 2016

Time (PDT)	Direction (degrees)	Speed (mph)	Gust (mph)
8:00	96	4	8
9:00	120	4	6
10:00	110	4	6
11:00	110	5	10
12:00	180	4	8
13:00	100	3	5
14:00	22	4	6
15:00	28	3	5
16:00	75	4	7
17:00	79	4	7
18:00	132	6	8

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Map of Area

241-AP Tank Farm

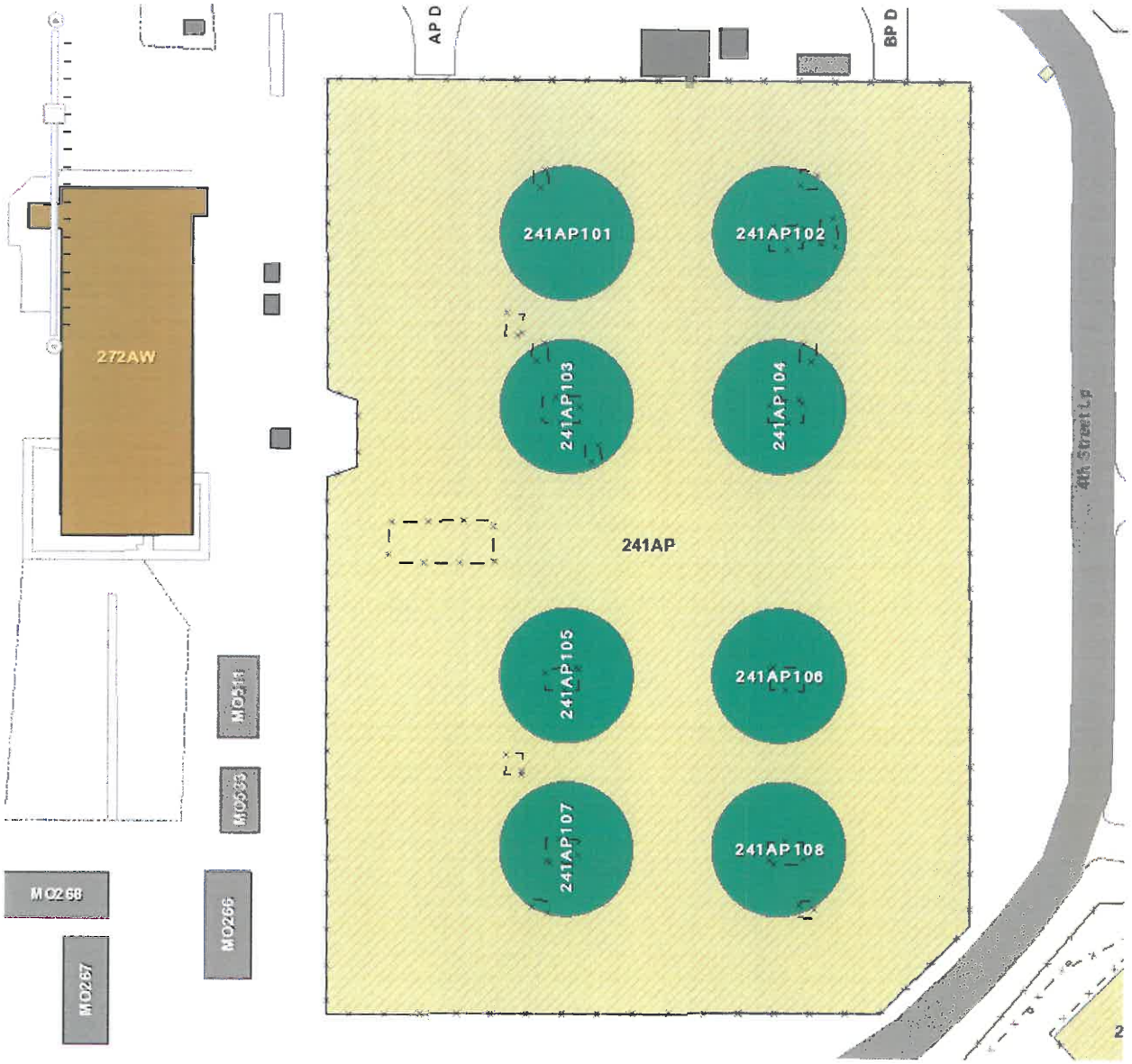

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Photo of Area

241-AP Farm and AP07A-WT-TBX-002 Cabinet

Event Timeline

3/08/16

1430	(Odor Response Card, NCOs) – NCO #1 and NCO #2, while taking temperatures per TO-040-790, smelled an odor in 241-AP Tank Farm near the AP07A-WT-TBX-002 cabinet.
1445	(IH Report) – Contacted by CSM about odors in AP farm without symptoms. Not being classified as an AOP-015.

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1446	(IH Report) – Contact shift IHTs about doing an investigative survey in AP farm.
1450	(SM Logbook) – Entering AOP-015 for chemical odors causing headaches upon the opening of AP07A-WT-TBX-002 cabinet to obtain TO-040-790 temperature readings. NCO #1 and NCO #2 reported the concern with no symptoms. But after a few minutes started to get headaches and have been taken to HPMC for evaluation. The farm has been posted access restricted and is clear. IHT to sample per AOP-015. SOEN sent; ORP On-Call Representative, WRPS On-Call Manager and Industrial Safety (IS) On-Call Representatives were notified.
1450	(IH Report) – Becomes AOP-015 event. Employees report headaches and funny taste in mouth.
1453	(IH Report) – Employees are transported to HPMC.
1455	(IH Report) – IHTs arrive at shift office.
1457	(IH Report) – Brief IHTs on plan of action. Take three tedlar bags into farm. One bag sample from around the electrical box and one from inside the box with it cracked open. If there is a visible opening, take a third bag from potential source. Monitor box with direct reading instrumentation (DRI).
1459	(IH Report) – IHTs go to get SCBAs.
1510	(IH Report) – IHTs leave mask station with bottles to ACE.
1514	(IH Report) – IHTs waiting to ensure they are ACE'd appropriately for responding to AOP event.
1539	(IH Report) – Get call from IHT in the field about pulling a third bag. Decide not to pull third bag with less than detectable readings from DRI instruments.
1558	(IH Report) – Receive phone call from IHT about a pinhole leak in bag #2 which was taken at the source with the door open. All readings from DRI instruments were zeros.
1749	(SM Logbook) – Initiated Event Investigation, EIR-2016-009 for AP Farm cabinet odor, AOP-015 Entry. PER-2016-0475; SOEN sent, notified ORP On-Call Representative.
2300	(SM Logbook) – Exiting AOP-015 for AP Farm. DRI and HAPSITE readings below action levels. Notified ORP On-Call Representative and SOEN sent. Notified WRPS On-Call Manager and Production Operations Manager.

3/09/16

0210	(IH Report) – An IHT, using a direct reading instrument, accompanied an operator while they were taking their rounds in AP Farm. All readings were less than detectable and no odors were experienced (16-01488).
0830	(IH Report) – An IHT, using a direct reading instrument, accompanied an operator while they were taking their rounds in AP Farm. All readings were less than detectable and no odors were experienced (16-01501).
1256	(SM Logbook) – IS Representative reports that NCO #1 and NCO #2 were released from HPMC to return to work without restrictions.
1334	(SM Logbook) – SOEN completed for 1256 entry. Notified ORP On-Call Representative and Production Operations Manager.

Immediate Actions Taken

1. NCO #1 and NCO #2 voluntarily went to HPMC for evaluation.
2. 241-AP Tank Farm was posted as access restricted and farm cleared.
3. SOEN message was sent and On-Call personnel notified.
4. Initiated EIR-2016-009.
5. IHT responded and took sampling bags (Bag Sample #1: in area surrounding the electrical box; Bag Sample #2: from inside the box with it cracked open). All readings from DRI instruments showed no detectable readings for VOC's or Ammonia. (NOTE: Bag Sample #2 was determined to have had a pinhole leak).
6. IHTs reported that DRI and Hapsite readings were below action levels.

Compensatory Measures

1. An Industrial Hygiene Technician accompanied an operator during the operator rounds on 3/9/16 at 0210 hours with direct reading instrumentation (16-01488). All readings were less than detectable and no odors were experienced.
2. Again, an Industrial Hygiene Technician accompanied an operator during the operator rounds on 3/9/16 at 0830 hours with direct reading instrumentation (16-01501). All reading were less than detectable and no odors were experienced

Discussion of Potential Causes

Based on a review of the following, the source of the odors encountered by the two NCOs was not able to be definitively determined.

1. Review of information and investigative IH monitoring and sampling of the area. All samples came back at or below background.
2. No fugitive emissions were identified.
3. There is a thermocouple conduit that leads from the AP07A Pump Pit to the AP07A-WT-TBX-002 cabinet. Since the 241-AP Primary Ventilation Exhauster was in operation

during this event and the AP07A Pump pit would have been under a vacuum, it is highly unlikely that this 'pathway' would have been the cause of the odors. However, as a precaution, sealing of the conduit at both the terminal box and at the temperature monitoring cabinet itself were completed on March 11, 2016.

4. Input from affected workers described the odor as "chemical odor".
5. Follow up DRI readings on 3/9/16 at 0210 hours (16-01488) and 0830 hours (16-01501) were less than detectable and no odors were experienced.

Preliminary Extent of Condition Review

The AOP-015 entry was specific to the AP07A-WT-TBX-002 cabinet. However, odors have the potential to be detected in any tank farm and similar in-tank temperature cabinets.

Discussion of Barriers That Could Have Impacted the Cause

Impacting barriers is an unknown because the cause of the odors was not able to be definitively determined.

Conditions Adverse to Quality

None.

Recommendations/Proposed Corrective Actions

There are no proposed corrective actions as the cause of the odors was not able to be definitively determined. However, an issue was raised about the treatment of the personnel that occurred at the West Area HPMC and also at the downtown HPMC. This issue was passed on to the HAMTC Safety Representative for further investigation/evaluation and is not further discussed in this report.

Attachments (As they apply):

1. Photos
2. Odor Response Card
3. Industrial Hygiene GCMS Sample Results

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Attachment 1
Photos

241-AP Farm and AP07A-WT-TBX-002 Cabinet

Attachment 2
Odor Response Cards

Odor Response Card

1. Contact CSM, [redacted] complete below bulleted information and map.

- Date and time odor was noticed 03/08/16 1430
- Your name and the work you were performing [redacted] – temps 790's
- Location of odors (mark area on map and wind direction) _____
- Name 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 chem
- Possible source AP 107
- 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 funny taste in mouth

2. Send this card to the Central Shift Office.

Revised 2/9/15

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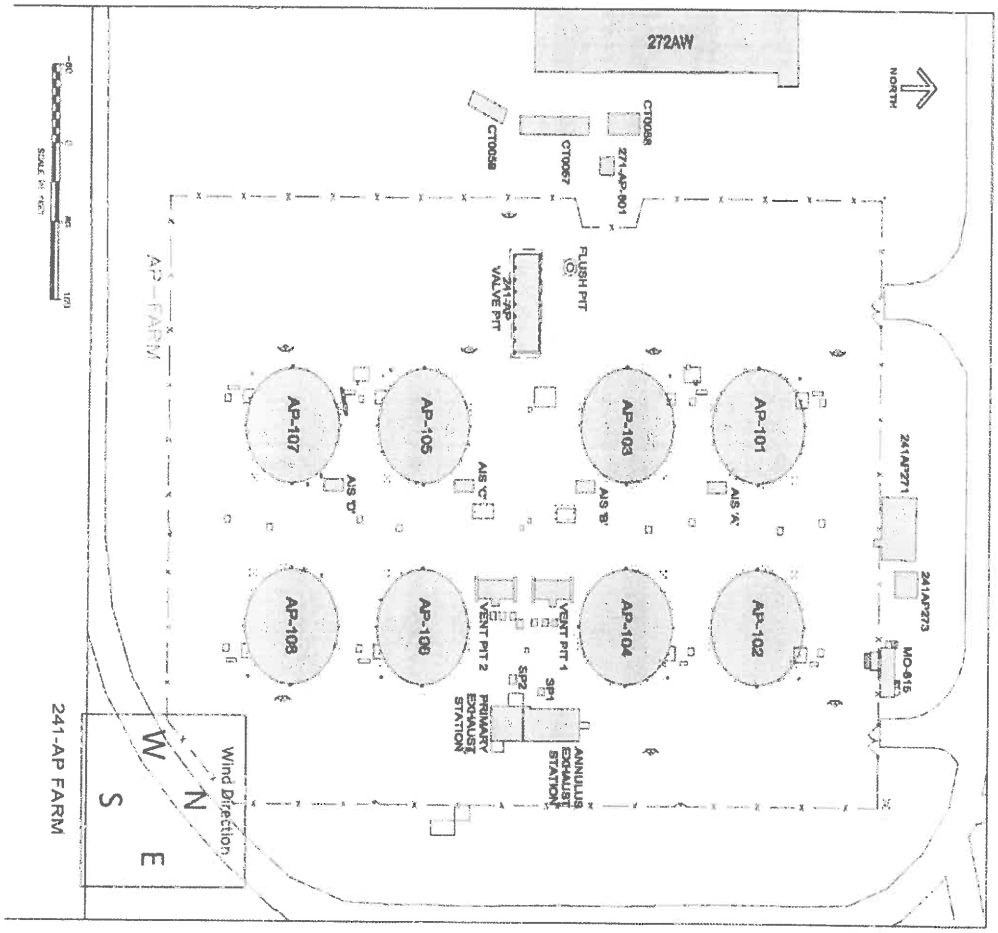
Odor Response Card

Odors Detected with NO Immediate symptoms

1. Notify Immediate Supervisor.
2. Contact Central Shift Manager, [redacted] Provide below bulleted information.
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 wind direction)
   - Describe the odor
   - Name of others 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.



Odor Response Card

1. Contact CSM, [redacted] complete below bulleted information and map.

- Date and time odor was noticed 3/8/16 1430
- Your name and the work you were performing [redacted] temps
- Location of odors (mark area on map and wind direction) ✓
- Name 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_____

2. Send this card to the Central Shift Office.

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Odor Response Card

Odors Detected with NO Immediate symptoms

1. Notify Immediate Supervisor.
2. Contact Central Shift Manager, [redacted] Provide below bulleted information.
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 wind direction)
   - Describe the odor
   - Name of others in or near the affected area
   - Was an IHT present?
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6. Provide information on the back of card.
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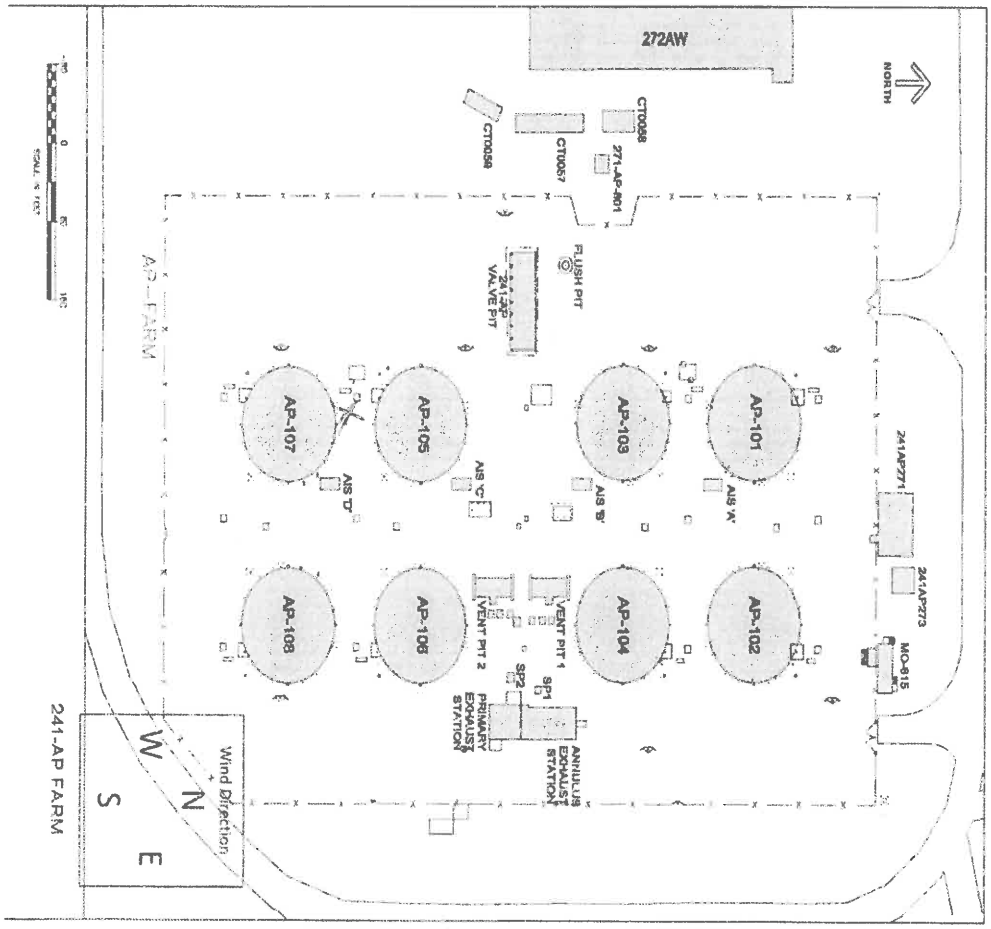
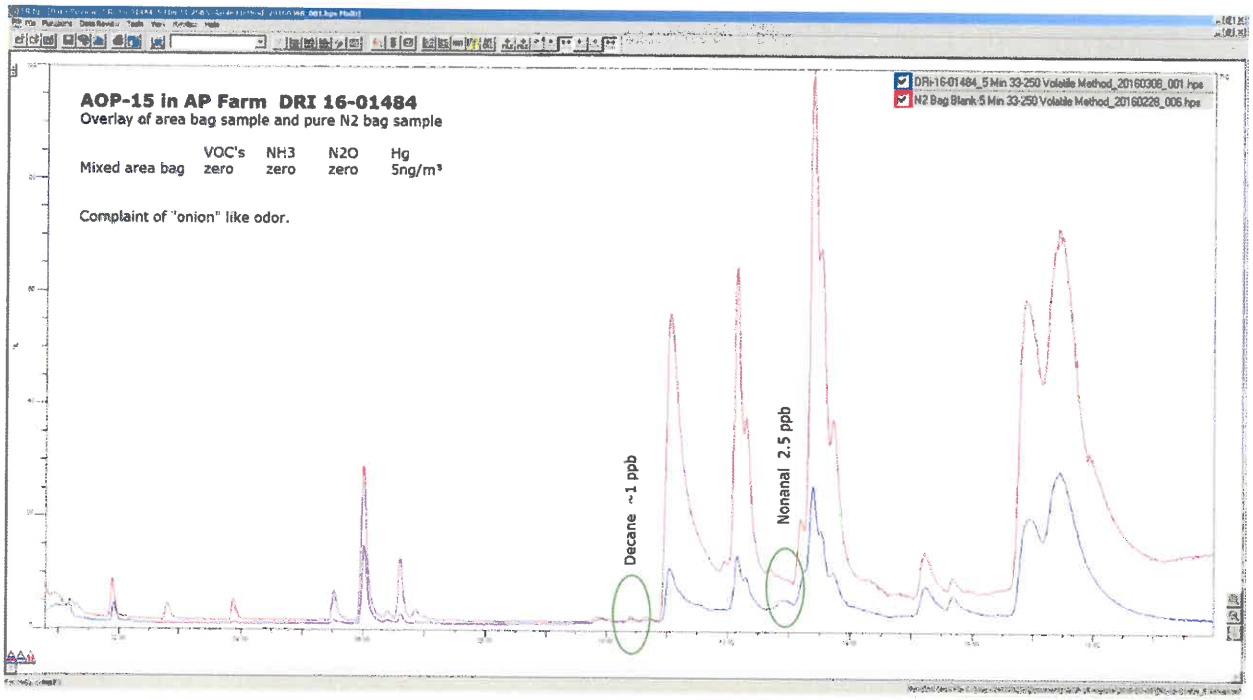


Attachment 3
Industrial Hygiene GCMS Sample Results



One bag sample, which can be considered the representative sample with the majority of the back being filled from the cracked cabinet, was brought to 2704HV/H104 for screening due to an AOP-15 near 241-AP-07A Pump Pit. Unfortunately, the second bag sample had a pin hole in it and was not useable.

An overlay chromatogram was prepared to determine any differences from normal bag outgassing products.

The sample has almost nothing different from the bag material off gassing itself. The two materials that differed from the 1 to 1 correspondence with the blank bag off-gas were Decane and Nonanal. Both at very low ppb concentrations.

Decane has a heavy oil or wax-like odor. Nonanal is an ingredient of perfumes and has a rose-orange odor.

Neither of these two have any correlation with the reported odor of onions.

Hapsite analysis provided by

[redacted]

From: [redacted]
Sent: Friday, April 15, 2016 6:40 AM
To: [redacted]
Cc: [redacted]
Subject: EIR-2016-009 - Ready for Distribution
Attachments: EIR-2016-009 Interoffice Memo (WRPS-1601861).dot; EIR-2016-009 Odors in AP07A-WT-TBX-002 Cabinet 3-8-16.docx

[redacted]

The attached EIR, with cover letter, is ready for distribution. Please look it over and if you have any comments, please call me at [redacted] You may Sign for me on the Cover Page per this e-mail.

Thanks for your Help!!

[redacted]