

EVENT INVESTIGATION REPORT

AOP-015 Entry on SE Exterior of AP Farm

Event Investigation Report Number: EIR-2016-015

Event Investigation Team Lead

5/2/16

Date

PER Responsible Manager

5/18/16

Date

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Investigation Summary

On Thursday 4/7/16 at 0730 hours, an Industrial Hygiene Technician (IHT #1) performed a courtesy survey for FE&C personnel outside AP farm (SE corner), due to a potential odor report. In addition, he also performed a courtesy survey at an electrical box, located outside AP farm fence, on the East side of farm, near the exhauster. Both courtesy surveys yielded no conclusive results. FE&C personnel decided not to work at either location (i.e., the electrical box and the SE corner of the farm). IHT #1 stated he had no symptoms and would work with his Industrial Hygienist (IH) to pull precautionary bag samples. At this time, the criteria for entry into AOP-015 had not been met. IHT #2 began performing DRI monitoring in support of bag sampling by IHT #1. At about 0845 hours, while driving back to 2750-E, they both started to experience headaches. When they got back to 2750-E, they reported their headaches to their Retrieval/Closure (R/C) IHT Supervisor. The Supervisor reported the symptoms to the Central Shift Manager (CSM) and transported the IHTs to the HPMC.

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 and surrounding roads were posted access restricted and later were cleared. Weather conditions were breezy at 7-13 mph (gusts to 15 mph) from North to Northwest (N-NW) wind direction per the Hanford MET station.

As directed, the Industrial Health Technicians responded to AP Farm and took Bag Sample #1: Primary Stack Area; and Bag Sample #2: AP Farm Exterior Bay 1. All readings from DRI instruments for VOCs, Mercury and Nitrous Oxide closely aligned with the blank sample. At 1501 hours, results from the bag samples were provided to the CSM. The CSM then exited AOP-015; notified the Senior On-Call Manager and ORP; and issued a SOEN message.

Weather Information

At the time the odors were detected, wind speeds were approximately 7-13 mph (gusts to 15 mph) blowing from N-NW direction. The following data was provided by the Hanford Weather Station for Thursday, April 7, 2016:

200E/Station 6 Weather Data for April 7, 2016

Time (PDT)	Direction (degrees)	Speed (mph)	Gust (mph)
7:00	316	13	18
7:15	323	11.7	16
7:30	324	11	15
7:45	332	9.3	13.8
8:00	337	7.6	11
8:15	319	8.9	13.5
8:30	320	8.4	13
8:45	313	11.7	20
9:00	308	14	20
9:30	315	12.8	17.5
10:00	310	11.7	18
10:30	32	5.8	11

Map of Area 241-AP Tank Farm

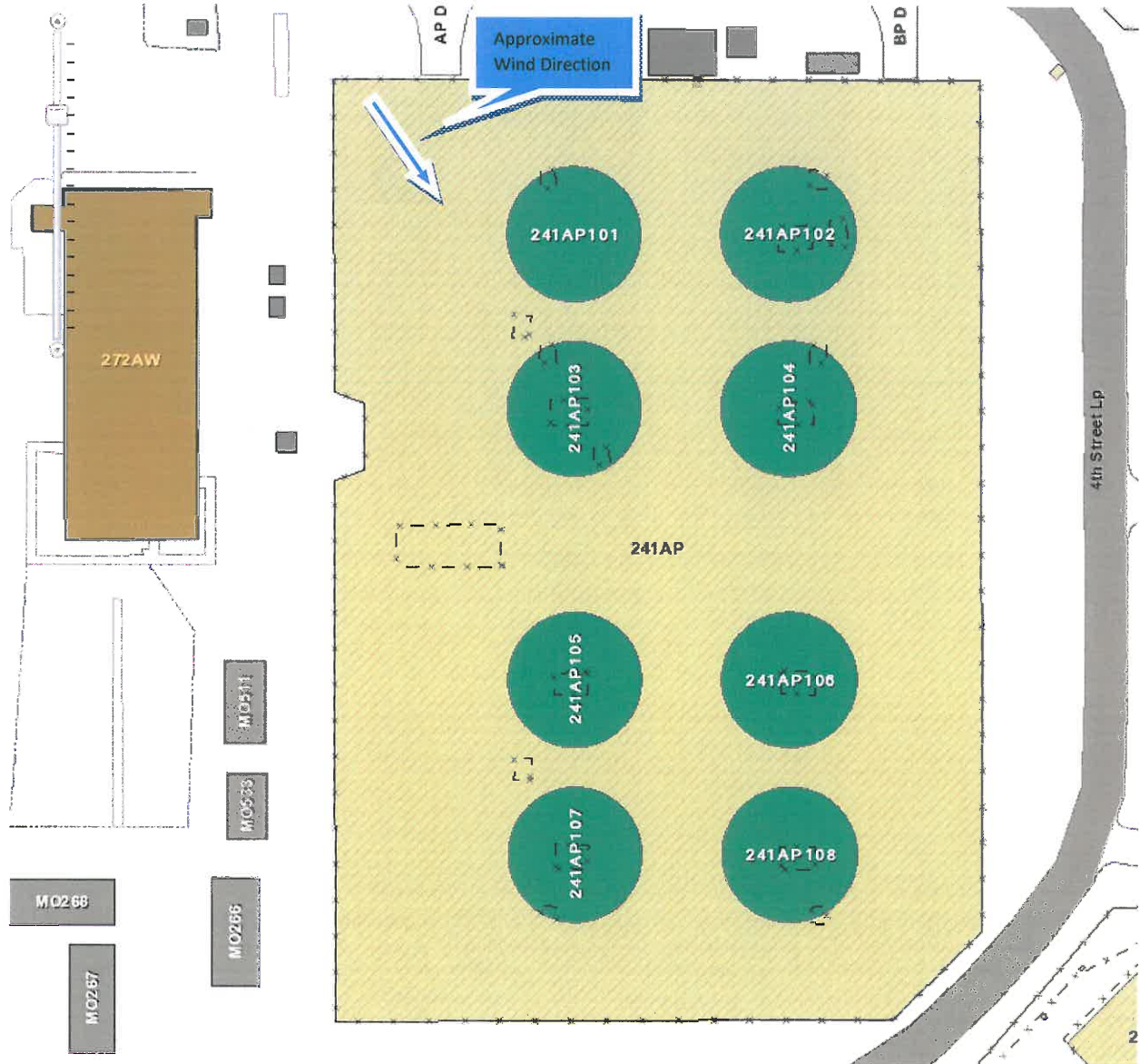


Photo of Area

241-AP Farm



Event Timeline

4/06/16

2353 (SM Logbook) – Retrieval OE reported AY and AP Farms posted respiratory protection required for the AY-102 to AP-102 retrieval.

4/07/16

0002 (SM Logbook) – Granted permission to remove AY-102 to AP-102 retrieval administrative locks.

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- 0006 (SM Logbook) – Administrative lock condition removed for AY-102 to AP-102 retrieval (slurry pump and supernate pump).
- 0013 (SM Logbook) – AY-102 slurry pump started.
- 0730 (IH Report) – IHT #1 performed a courtesy survey for FE&C personnel outside AP farm (SE corner), due to a potential odor report. Also performed survey at an electrical box, located outside AP farm fence, on the East side of farm, near the exhauster. Courtesy surveys yielded no conclusive results. FE&C decided not to work at either location (i.e., the electrical box and the SE corner of the farm).
- 0750 (SM Logbook) – IHT #1 for Retrieval/Closure reports odors outside of AP Farm on the South/Southeast side. He has no symptoms and will work with his IH to pull precautionary bag samples. Does not currently meet AOP-015 entry requirements. Safety and Health Manager coordinating. Medical declined.
- 0818 (SM Logbook) – Late Entry at 0720: 242-A started slurry out to AP-103.
- 0845 (Odor Response Card, IHT #2) – Provided support monitoring for IHT #1 during bag sample evolution.
- (Interview with IHT #1 & #2) – Reported information to the CSO. While driving back to 2750-E, they started to get headaches. When they got back to 2750-E, they reported their headaches to the Retrieval/Closure IHT Supervisor.
- 0850 (IH Report) – AN Team Field IH, EV Team Field IH and AY/AZ Team Field IH report to shift office to discuss anecdotal reports of odors from multiple tank farm locations.
- 0900 (SM Logbook) – Entering AOP-015 for odors outside AP Farm on the South East corner. Two IHTs, while pulling bag samples developed headaches. They are being taken to HPMC for evaluation. Access restrictions are being placed on 4th St. next to 274-AW; 4th St. just South of entrance to Grout Loop road North; and just East of MO-284 on Grout Loop road. IHTs are being dispatched per AOP-015. SOEN sent, All-Call made, On-Call ORP Facility Representative (FR), WRPS On-Call Manager, and ORP FR Manager were notified. Safety and Health Representative also notified.
- 0900 (IH Report) – Retrieval IHT Supervisor calls CSM to inform him of two IHTs reporting headache related to odors to the SE of AP farm.
- 0902 (IH Report) – CSM enters AOP-015, access to area is restricted.

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- 0904 (IH Report) – Field His contact Production Operations IHT lead to recruit additional IHT resources. Case manager, Programs IH/Chemist and acting Safety and Health Programs Manager were notified.
- 0907 (IH Report) – PO Safety and Health manager arrives at CSO. Shift IHT arrives at CSO.
- 0910 (IH Report) – Two additional IHTs arrive at CSO.
- 0913 (IH Report) – AY/AZ Team Field IH and EV Team Field IH brief IHTs on situation and response actions.
- IHTs to sweep area with DRI.
 - Collect bag sample in affected area (SE of AP Farm).
 - Analyze grab samples with Lumex and Miran and send to 2704-HV for Hapsite analysis.
- 0920 (IH Report) – IHTs are deployed to obtain Respiratory Protection Equipment (RPE), DRI and grab sample equipment.
- 0932 (IH Report) – CSM repeats access restriction instructions via radio.
- 0939 (IH Report) – IHTs collect grab sample in area of concern.
- 0955 (IH Report) – SOEN: "AOP-015 Exterior of AP-Farm on the South/Southeast/East sides. Road Blocks in place. CSM."
- 1200 (SM Logbook) – Initiated EIR-2016-015, "AP Farm South East Corner External AOP-015." POC: Greg Hanson. SOEN sent, On-Call ORP FR (Facility Representative) notified.
- 1233 (SM Logbook) – Employees from AOP-015 event were released to return to work with no restrictions. SOEN sent, On-Call ORP FR and Safety and Health Representative notified.
- 1409 (SM Logbook) – WRPS-PER-2016-0645 has been initiated for 0900 Entry.
- 1501 (SM Logbook) – Exited AOP-015 for exterior AP Farm SW Corner. All sampling came back at or below background. Industrial Hygiene Manager has approved sample analysis. SOEN sent, All-Call made, On-Call ORP FR and WRPS Manager notified.

Immediate Actions Taken

1. IHT #1 and IHT #2 voluntarily went to HPMC for evaluation.
2. Access restrictions were placed on 4th St. next to 274-AW; 4th St., just South of entrance to Grout Loop road North; and just East of MO-284 on Grout Loop road.
3. SOEN message was sent and On-Call personnel notified.

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4. Initiated EIR-2016-015.
5. IHT #1, who reported the symptoms, took Bag Sample #1: Primary Stack Area. IHT #3 took Bag Sample #2: AP Farm Exterior Bay 1. All readings from DRI instruments for VOC's or Ammonia, VOCs, Mercury and Nitrous Oxide are as follows:

Summary of IH Monitoring and Sampling Data:

SEE DRI SURVEY# 16-02323 AOP-015 AP Farm-Exterior
SEE DRI SURVEY# 16-02342 AOP-015 AP (Outside Farm)

a. Monitoring

AGENT	@ODOR	@SOURCE	EXPOSURE LIMIT	REPORTING LIMIT
Ammonia	0.0 ppm	N/A ppm	25 ppm OEL/35ppm STEL	>0 ppm
Total VOCs	0.048 ppm	N/A ppm	2 ppm AL	>0 ppm
Mercury	0.000004 mg/m ³	N/A mg/m ³	0.025 mg/m ³ OEL	0.000016 mg/m ³
Nitrous Oxide	0.0 ppm	N/A ppm	25 ppm AL	>0 ppm

Compensatory Measures

1. Prior to exiting AOP-015, the CSM validated with the IH Manager that readings were at or below background prior to down-posting the farm.

Discussion of Potential Causes

Based on a review of the following, the source of the odors encountered by the two IHTs was not able to be definitively determined. However, it is highly likely, based on wind direction and the location of the odors, that the 241-AP Primary Exhaust stack may have been a potential source of the odors.

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. Input from affected workers described the odor as "burning plastic" and/or plastic-organic."
4. The AY-102 to AP-102 Retrieval transfer was in progress during this event. However, vapor monitoring was ongoing in AP Tank Farm as part of this evolution.
5. The 242-A Evaporator Campaign EC4 had been initiated prior to this event and the PB-2 Slurry pump was started at 0720 hrs. However, as stated in #4 above, vapor monitoring was ongoing in AP Tank Farm as part of the AY-102 Retrieval activity.

Preliminary Extent of Condition Review

The AOP-015 entry was specific to the areas just East and Southeast of the Primary Ventilation Exhauster and ongoing vapor monitoring was in progress. However, odors, depending on wind direction and speed, have the potential to be detected anywhere downwind on the primary ventilation exhauster.

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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. However, continuing activity-specific (e.g., 242-A Evaporator campaigns, transfers, etc.) vapor monitoring may mitigate potential exposure consequences.

Conditions Adverse to Quality

None.

Recommendations/Proposed Corrective Actions

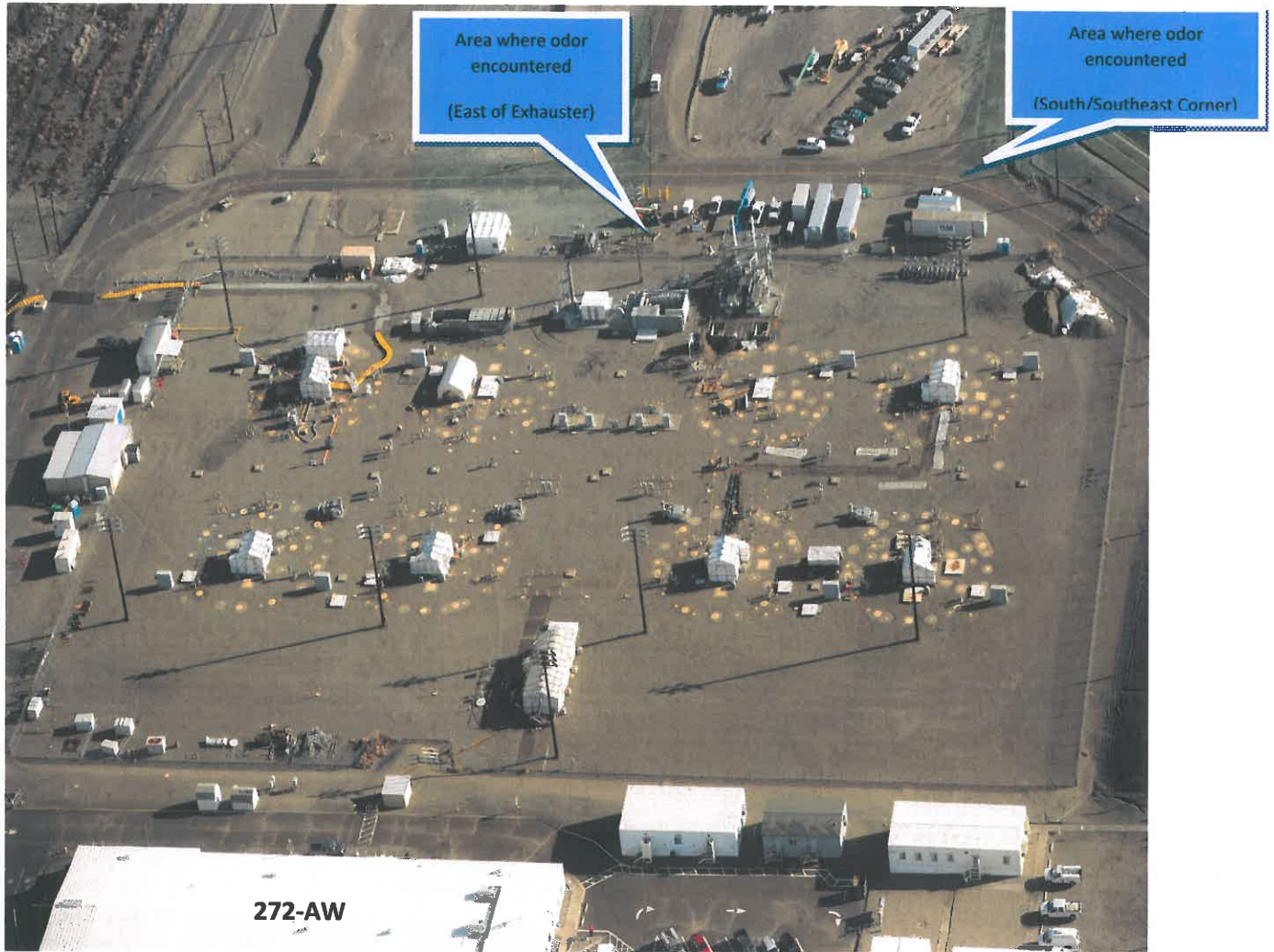
There are no proposed corrective actions as the cause of the odors was not able to be definitively determined. However, continue activity-specific vapor monitoring in support of transfers and 242-A Evaporator campaigns.

Attachments (As they apply):

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

**Attachment 1
Photos**

241-AP Farm



Attachment 2 Odor Response Cards

ODOR RESPONSE CARD - 241-AP FARM

Odors Detected with NO Immediate symptoms

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

Odors Detected WITH Symptoms

- Notify Immediate Supervisor.
- 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
- Provide information on the back of card.
- Send this card immediately to the Central Shift Office.

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ODOR RESPONSE CARD - 241-AP FARM

- Contact CSM, Complete below bulleted information and map.
 - Date and time odor was noticed 4-7-16 ~ 0730
 - Your name and the work you were performing IHT MONITORING
 - Location of odors (mark area on map and wind direction) SEE MAP
 - Name(s) of others in or near the affected area: _____
 - Was an IHT present? YES
 - Describe the odor Sweet Sour Musty Earthy Metallic Smoky Rotten Onion Cleaning Solution Ammonia Other: PLASTIC ORGANIC
 - Possible Source AP PRIMARY EXHAUSTER
 - 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: STOMACH ACHE / PLASTIC TASTE
- Send this card to the Central Shift Office.

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ODOR RESPONSE CARD - 241-AP 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 E
S

241-AP FARM

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ODOR RESPONSE CARD - 241-AP FARM

1. Contact CSM, Complete below bulleted information and map.
 - Date and time odor was noticed 4-7-16 0845
 - Your name and the work you were performing monitoring during bag sample
 - Location of odors (mark area on map and wind direction) see map
 - Name(s) of others in or near the affected area _____
 - Was an IHT present? yes
 - Describe the odor Sweet Sour Musty Earthy Metallic Smoky Rotten Onion Cleaning Solution Ammonia Other: burning plastic
 - Possible Source AP Inhauser stack
 - 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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ren
Monitoring
7:40:00 PM

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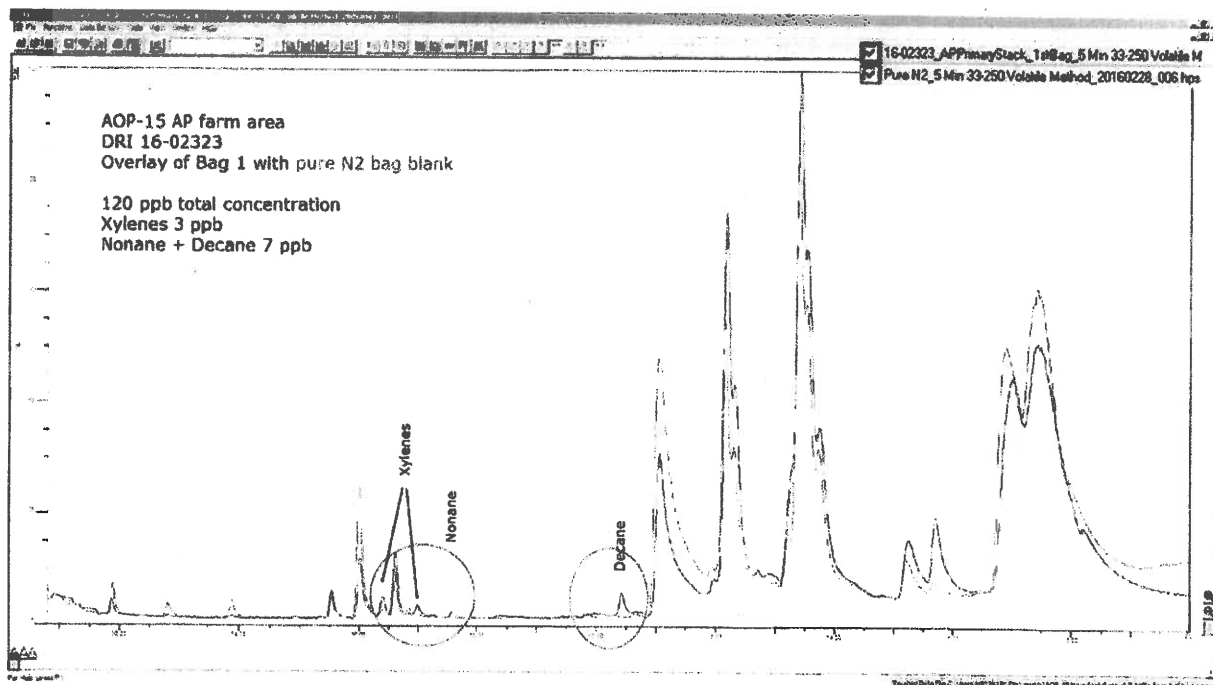
Attachment 3

Industrial Hygiene GCMS Sample Results

There were two bag samples for this AOP. The first was taken by the IHT #1 who reported symptoms. The second was taken some time after IHT #1 left the area.

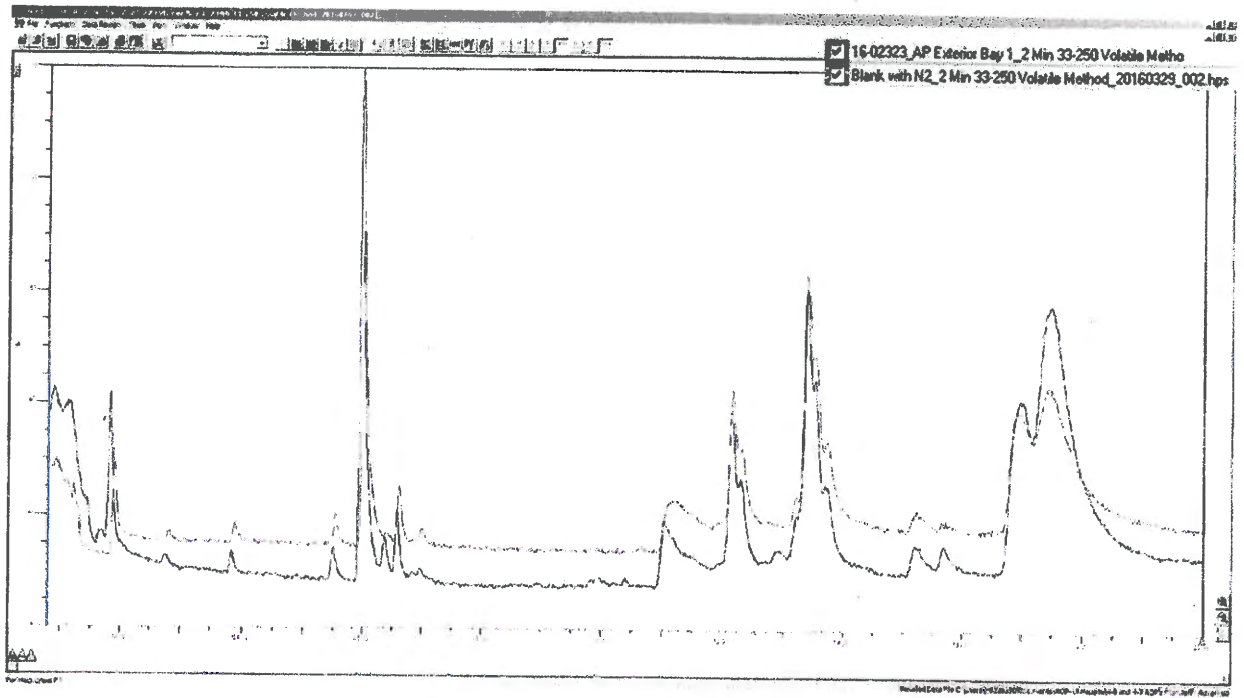
Bottom line: First bag taken does have some indication of solvents (xylene) at less than 10 ppb, but still closely aligns with blank sample. Second bag closely aligns with blank sample. No information was found that would inhibit an AOP cancellation.

The first bag, Primary Stack Area bag 1, was run for a 5-min sample time. Initial information included a 0 ppb VOC measurement. In this case, a 5 min sample loop was chosen to analyze any remaining substances. The picture shows areas where some solvent presence at low levels were captured.



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The second bag, AP Farm Exterior Bay 1, was run for a 2-min sample time. There was an initial VOC measurement of 40 ppb. The sample closely aligns with the blank sample.



Hapsite analysis provided by