

EVENT INVESTIGATION REPORT

**Event Investigation Report, EIR-2019-006, AOP-015 for Odors
Reported Between AY1 and AY2
EIR-2019-006**

[Redacted Signature]

Event Investigator

2/19/19
Date

[Redacted Signature]

PER Responsible Manager

2/19/19
Date

PER No. WRPS-PER-2019-0216

AOP-015 for Odors Reported Outside AY-1 Change Trailer

AOP-015 Summary

Event	Abnormal Operations for Odors Reported Outside Between AY-1 and AY-2 Change Trailer
PER	WRPS-PER-2019-0216
Date/Time of Event	<ul style="list-style-type: none"> February 4, 2019 0920 hours
Location	<ul style="list-style-type: none"> West of AY-1 Change Trailer
Personnel Affected	<p>(2) WRPS personnel reported odors:</p> <p>(1) WRPS personnel experienced no symptoms and elected not to receive a medical evaluation</p> <p>(1) WRPS personnel experienced latent symptoms of shortness of breath and elected to receive a medical evaluation the next day on 2/5/19</p>
Odor / Taste	<ul style="list-style-type: none"> Very stale body odor Body odor Musty Rotten
Industrial Hygiene (IH) Investigative Monitoring / Sampling	<p>Monitoring and Sampling data results:</p> <ul style="list-style-type: none"> Ammonia: 0 ppm Total VOCs: 0 ppm Nitrous Oxide: 0 ppm Mercury: 31 ng/m³ (actionable hazard level for Mercury in 12,500 ng/ m³)* <p>*Odorless</p>
Potential Source	<ul style="list-style-type: none"> The MO-596 sewer holding tank 240 meters N/NW of the odor location is a plausible source of the AOP-15 odors
Wind Speed / Direction	Prevailing wind was NW at 17mph with gusts up to 23mph
Waste Disturbing or Tank Work in Adjacent Area	No waste disturbing activities were occurring at the time.
Other Work in Adjacent Area	No adjacent work was being performed at the time

Investigation Summary

On February 4, 2019, at 0920 hours, two WRPS Instrument Specialists experienced a rotten, musty, stale body odor just west of the AY-1 and AY-2 change trailers. The temperature was below freezing and the wind was swirling and shifting directions at speeds up to 25 mph with gusts up to 40 mph. The Instrument Specialists had exited AY-2 change trailer and were loading their SCBA bottles in a truck when they experienced the odors. Neither of the individuals experienced symptoms and both declined a medical evaluation. Both Instrument Specialists believed the symptoms to be coming from A Farm based on past similar odors experienced. They contacted their Field Work Supervisor (FWS) and AZ Team Shift Manager. Both individuals declined a medical evaluation by HPMC at the time. The next day, one individual requested a medical evaluation after experiencing some shortness of breath. After the medical evaluation, the individual was cleared to return to work.

At 1002 hours, the Central Shift Office (CSO) sent out a shift office event notification (SOEN) announcing the entry into procedure TF-AOP-015, *Response to Reported Odors or Unexpected Changes to Vapor Conditions* (AOP-015). The SOEN notice also announced restricted access to the area. Industrial Hygiene Technicians (IHT) were dispatched to support the sampling response actions per the Industrial Hygiene Plan, IHP-09001.

Monitoring and grab sampling began at 1057 hours. Monitoring confirms that the area of concern is safe and personnel can commence using that area without protective equipment. Sampling results indicate no compounds to be above concentrations of concern. See Attachment 2 for the signed Industrial Hygiene Sampling Report.

The IH sampling team completed their survey by 1348 hours. Results indicated that none of the constituents were encountered at levels of concern for ammonia, volatile organic compounds (VOCs), mercury, and nitrous oxide. On February 5, 2019 at 1241 hours, the CSM sent out a notice to exit out of TF-AOP-015 and normal operations were resumed.

An Event Investigation was initiated and the Office of River Protection (ORP) Facility Representative was informed. An interview with one of affected individuals was held the next day, but an official Fact Find Meeting or Event Investigation meeting was not held.

At the time of the event, there were zero (0) waste disturbing or tank-intrusive activities occurring in the nearby tank farms. Wind directions were from the northwest traveling at 17 mph with gusts up to 23 mph.

The event investigation reached out to the APGEMS-TF Modeling Team for additional data on potential sources. The APGEMS-TF Modeling team is able to take data from several pieces of monitoring equipment in the area and map any potential fugitive emission sources and potential plumes. The results of their analysis rule out tank waste vapors. However, the WRPS personnel were located in the downwind direction of MO596 septic making it the more likely source. More detailed information as well as plume charting can be found in Attachment 1.

Figure 1 - AOP-015 for Odors Reported Between AY-1 and AY-2 Change Trailers

AOP-015 Diagram



Legend	
	Location where Instrument Specialists experienced odors

Event Investigation Report, EIR-2019-006, AOP-015 for Odors Reported
Between AY-1 and AY-2 Change Trailers

Event Timeline

Field Response Timeline:

02/04/2019:

- 0953: Shift PO Manager contacts AN Field IH to notify of TF-AOP-015 entry
- 0955: COMS Field IH AN Team IH and EV Team IH arrive at CSO
- 0957: CSM briefs COMs Field IH, AN Field IH, EV Field IH
- 0958: CSM contacts PO shift IHT supervisor to acquire IHT resources
- 1001: SOEN: "Entering AOP-015 for odors between AY-2 and AY-1 change trailers exterior of AY Farm. Stay clear of the area. CSM"
- 1003: AYZ Field IH arrives at CSO
- 1004: CSM initiates response as per TF-AOP-015 3.1.12
 - Monitor as per IHP-09001
 - Initiate IHIR
 - RPE as per RPF TF-AOP-015 Task 2
- 1005: Shift PO Manager requests grab samples at EIR department request
- 1005: PO Shift IHTs arrive at CSO
- 1006: PO Shift IHT supervisor notifies HAPSITE is ready to support
- 1006: COMs Field IH briefs PO Shift IHTs of response actions as per TF-AOP-015 3.1.12
- 1007: CSM sends PO Shift IHTs to acquire instrumentation and supplies
- 1010: Odor Response Cards arrive at CSO
- 1019: CSM decides Terra Graphics Van response not requested due to concern over response time.
- 1024: PO Shift IHT lead contacts PO Shift IHT supervisor for response action details
- 1026: PO Shift IHT lead contacts COMs Field IH with response survey number
- 1031: CSM confirms with COMs Field IH that grab samples will be acquired during initial response
- 1032: AYZ Field IH contacts AYZ IHT to support FID analysis of grab samples
- 1039: AYZ Field IH contacts AYZ Field IH to confirm FID is warming up
- 1047: AYZ Field IH, AN Field IH, and EV Field IH assist PO Shift IHTs, AYZ IHT and PO IHT Lead with grab sample processing in PO IHT lab
- 1057: AN Field IH notifies CSM that preliminary DRI results obtained in the area of concern indicate that no additional protective actions are necessary to protect worker safety and health
- 1115: IH Programs IHT Lead contacts PO Shift IHT Supervisor to acquire IH Programs IHT Supervisor and PO Field IH guidance and direction on HAPSITE operation
- 1348: IH Programs IHT Lead issues HAPSITE results

02/05/2019:

- 1241: SOEN: "Sample analysis for the TF-AOP-015 even has been completed and the results are below action limits. Exiting TF-AOP-015. CSM"

Immediate Actions Taken

1. 2/4/2019 At 0920 hours personnel report odors to their supervisor who notifies the Shift Office. CSM issues SOEN at 1001 hours which restricts access in the area around AY-2 and AY-1 change trailers. Industrial Hygiene is notified. They began monitoring and sampling at 1047 hours. Monitoring and sampling data determine that chemicals of concern are below threshold and the area is safe for personnel. On February 5, 2019 at 1241 hours, the shift office sends out another notification, that the AOP-015 has been exited.

Discussion of Potential Causes

Refer to modeling data (Attachment 1) for discussion on potential causes.

Event Investigation Report, EIR-2019-006, AOP-015 for Odors Reported
Between AY-1 and AY-2 Change Trailers

Attachments:

1. APGEMS-TF Plume Modeling for February 4, 2019 AOP-015 Event
2. Industrial Hygiene Investigative Report
3. WRPS-PER-2019-0216

Attachment 1 – APGEMS-TF Plume Modeling for February 4, 2019 AOP-015 Event

APGEMS-TF Plume Modeling for February 4, 2019 AOP-015 Event

An AOP-015 event was reported on February 4, 2019 near the AY tank farm. A couple of Instrument Specialists were just west of the AY-1 and AY-2 change trailers along Buffalo and reported a musty, body odor smell at 9:20 AM. See Figure 1 for the AOP-15 location on a map.

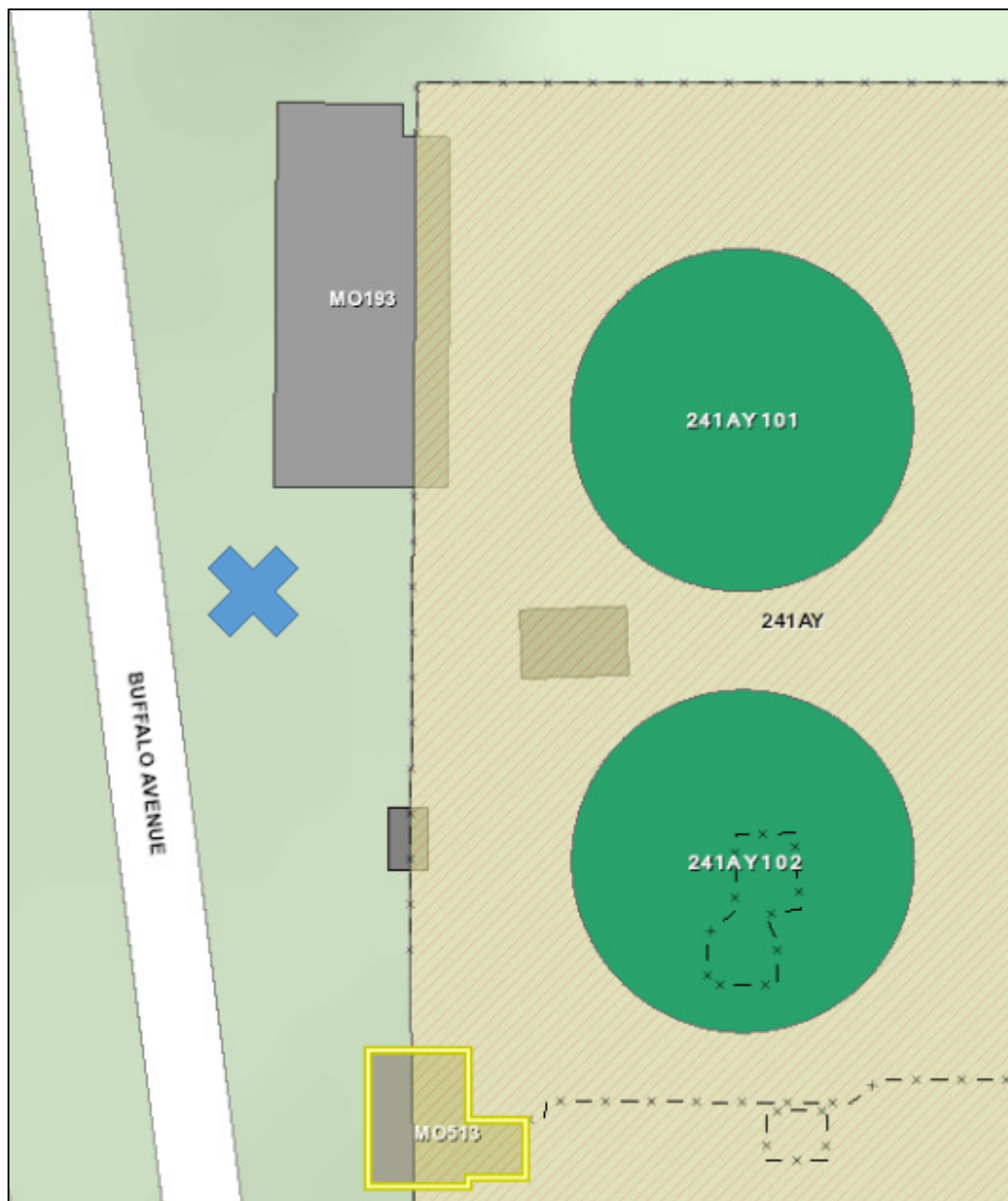


Figure 1. Location of the Odor Event is Identified by the Blue X.

APGEMS-TF Modeling Results Conclusions:

The APGEMS Tank Farm plume model (APGEMS-TF) was used to support investigation of the AOP-15 event and evaluate nearby sources as potential culprits. Results of the modeling are summarized as follows:

- **Tank waste vapors were not the likely source of the AOP-15 odors.** The reasoning for this conclusion are as follows:
 - Per the Central Shift Office no waste disturbing events or other activities that may have lead to a vapor event were conducted in the nearby tank farms on the day of the AOP-15 event.
 - The AOP-15 location was generally upwind or perpendicular to the A Corridor stacks and passive breather filters (PBFs).
 - C-Farm PBFs were upwind, but not directly upwind of the AOP-15 location.
 - APGEMS-TF modeling predicts that the maximum concentration of ammonia from tank vapors at the AOP-15 location was about 200 ppt, which represents roughly a million times dilution over headspace concentrations. Based on principles of atmospheric dispersion, all other tank farm vapors will be diluted by the same amount.
 - Based on APGEMS-TF model results all tank farm vapor concentrations at the location of the AOP-15 location were several orders of magnitude below their respective odor thresholds.
 - Finally, none of the Hanford Tank Farm Chemicals of Potential Concern (HTFCOPC) are identified as having a “musty” or “body odor” smell.
- **The MO-596 sewer holding tank 240 meters N/NW of the odor location is a plausible source of the AOP-15 odors.** The reasoning for this conclusion are as follows:
 - The AOP-15 location was directly downwind of the MO-596 sewer holding tank.
 - APGEMS-TF modeling indicates that the AOP-15 location was in the center of the sewer holding tank plume and in the center of the highest concentration region.
 - Heavy sewer gases are known to travel close to the ground and resist dispersion more so than lighter gases.
 - Recent studies by the WRPS Fugitive Emissions team attribute an odor characteristic of ‘musty/body odor’ to sewer gases at a distance from its source, similar to the distance between the MO-596 sewage holding tank and the AOP-15 location.
 - In the general area of this AOP-015 on 2/4/19, there have been many reports of the musty/body odor smell when the AOP-015 location is down-wind of a sewer system (MO-596 holding tank, 2607E12 septic system, and 2607E10 septic system). Although the direct cause/effect relationship cannot be proven in these cases, there seems to be definite correlation between these odors and proximity to sewer systems. For example, of the 15 AOP-015 events in the A-corridor complex reported with musty/body odor/onion smell, 13 were downwind of one of the sewer systems noted above (see endnote for Table)ⁱ. Work is underway in the Fugitive emissions task to develop more analytical proof.

Selection of Sources to be Modeled:

Investigation of work activities in the area just prior and during the AOP-15 event indicated no waste disturbing events or other activities within the nearby tank farms that would cause an odor event. MSA personnel also confirmed that no work was performed on the nearby sewer holding tank (MO-596) on the date of the odor event. However, tank vapors continuously and periodically emit from actively and passively ventilated tanks, respectively, and under certain

Event Investigation Report, EIR-2019-006, AOP-015 for Odors Reported
Between AY-1 and AY-2 Change Trailers

meteorological conditions could be an issue. Additionally, septic/sewer systems continuously emit odors to varying degrees based on use and atmospheric conditions. Based on this and wind conditions at the time, the following sources were investigated using APGEMS-TF modeling to determine likelihood of being the source for the odor event.

- AY/AZ Stack
- AN Stack
- AX-Farm PBFs
- A-Farm PBFs
- C-Farm PBFs
- MO-596 sewer holding tank

APGEMS-TF Modeling:

The APGEMS-TF model generates a 3-D wind field utilizing meteorological data from 30 weather stations on the Hanford site. The model then utilizes measured mixing heights and stability classes to estimate mixing and dispersion of contaminants within the wind field. The model estimates dispersion of chemical contaminants from a source and estimated concentrations downwind of the source, but does not estimate a source location based on a receptor location. Winds for the AOP-15 period were at the high end of where AOP-15 events are normally reported. At 9:20 AM on 2/04/19, the Hanford meteorological tower located at the 200W area had a wind speed of 14.7 mph and wind direction from the NW (45 deg from north). One would expect relatively moderate to high levels of mixing due to the moderate to high winds, but horizontal plume widths would be relatively narrow due to a steady wind direction. The stability class was neutral, so vertical mixing is expected to be moderate as well. See Figure 2 for a map of modeled vapor sources around the AOP-15 Location.

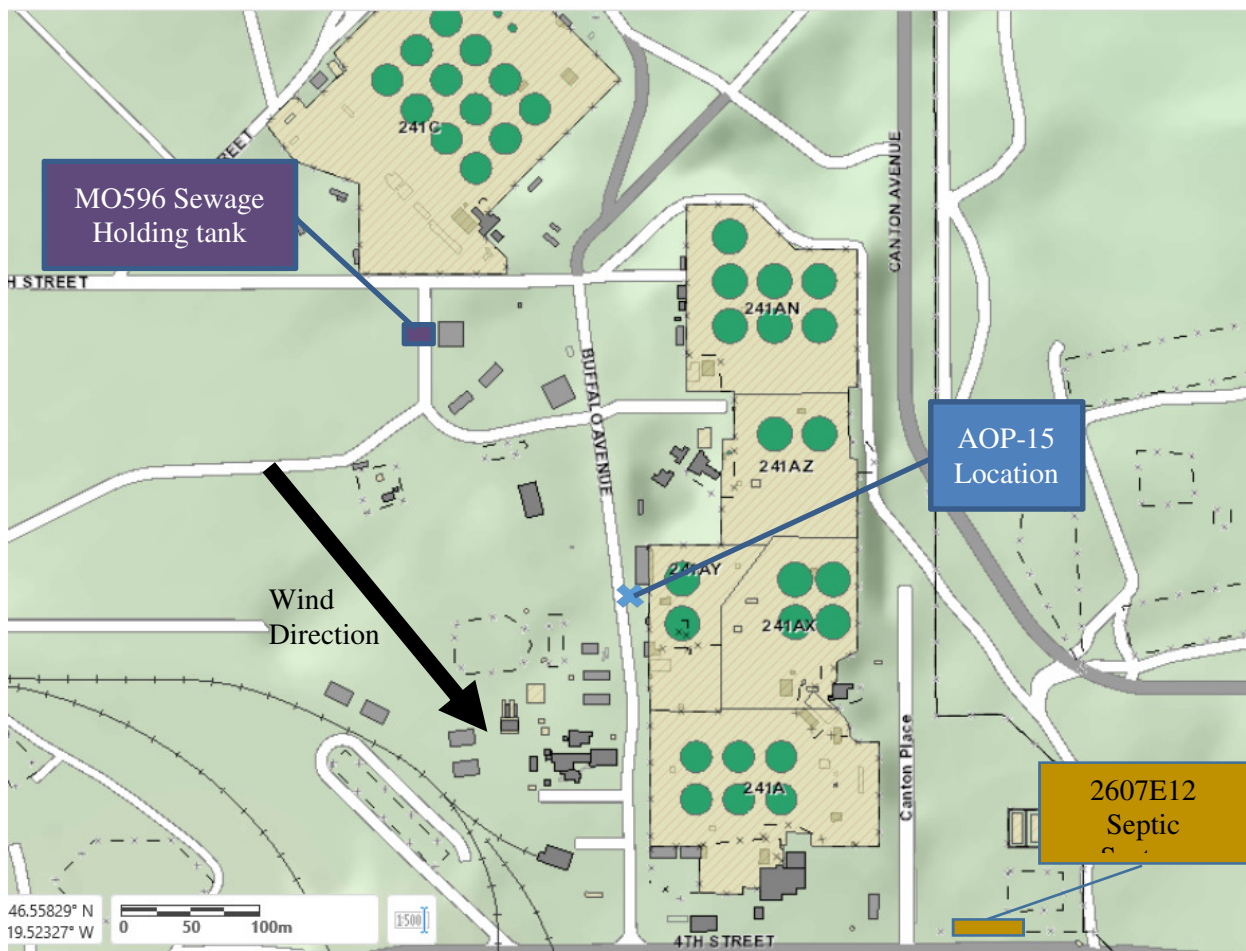


Figure 2. AOP-15 Location in Relation to Potential Vapor Sources.

Modeling of A-Corridor PBFs and Stacks as Potential Sources:

Figures 3 - 7 show APGEMS-TF modeling results for the AN-Stack, AY/AZ-Stack, AX-Farm PBFs, C-Farm BPFs and A-Farm PBFs. The images include predicted ammonia concentrations at the time of the AOP-15 event as shown by concentration contour lines with the innermost contour line equal to the highest concentration shown in the right-hand legend. Each successive contour line moving out from the center is 1/10 the concentration of the prior. The APGEMS-TF model predicts concentration contours for all 61 COPCs, but only the ammonia figures are shown in this report for simplicity. Per the model, each chemical is diluted/dispersed to the same degree and thus the concentrations are linearly correlated to the starting headspace concentrations. By linear interpolation, ammonia can be used to calculate the predicted concentration contours for any chemical in the headspace. The model uses pre-populated source terms equal to the highest measured headspace concentration for each chemical and each tank and an upper bound emission rate for each tank or exhauster.

Based on the results of the model, the highest contribution of tank vapors at the AOP-15 location were from C-Farm PBFs, which was about 100 ppt ammonia or 5+ orders of magnitude below the OEL and odor threshold for ammonia. The total combined concentration of ammonia at the AOP-15 location from all tank farm sources was estimated at 200 ppt. The _{HTF}COPC with the lowest reported odor threshold is pyridine with an odor threshold around 10 ppb¹. Since ammonia is one of the most prominent chemicals in the tanks and at the AOP-15 location and its

¹ EPA600/R-92/047, Reference Guide to Odor Thresholds for Hazardous Air Pollutants Listed in the Clean Air Act Amendments of 1990, May 1992

Event Investigation Report, EIR-2019-006, AOP-015 for Odors Reported Between AY-1 and AY-2 Change Trailers

concentration was almost three orders of magnitude lower than odor threshold for pyridine, it follows that all tank vapors at the AOP-15 location were several orders of magnitude below their respective odor thresholds. Additional, none of the _{HTF}COPC reported in the literature have odor characteristics consistent with ‘musty’ or ‘body odor.’ Based on model results and literature reported odor thresholds and odor characteristics, tank vapors do not seem to be a credible source of the AOP-15 event.

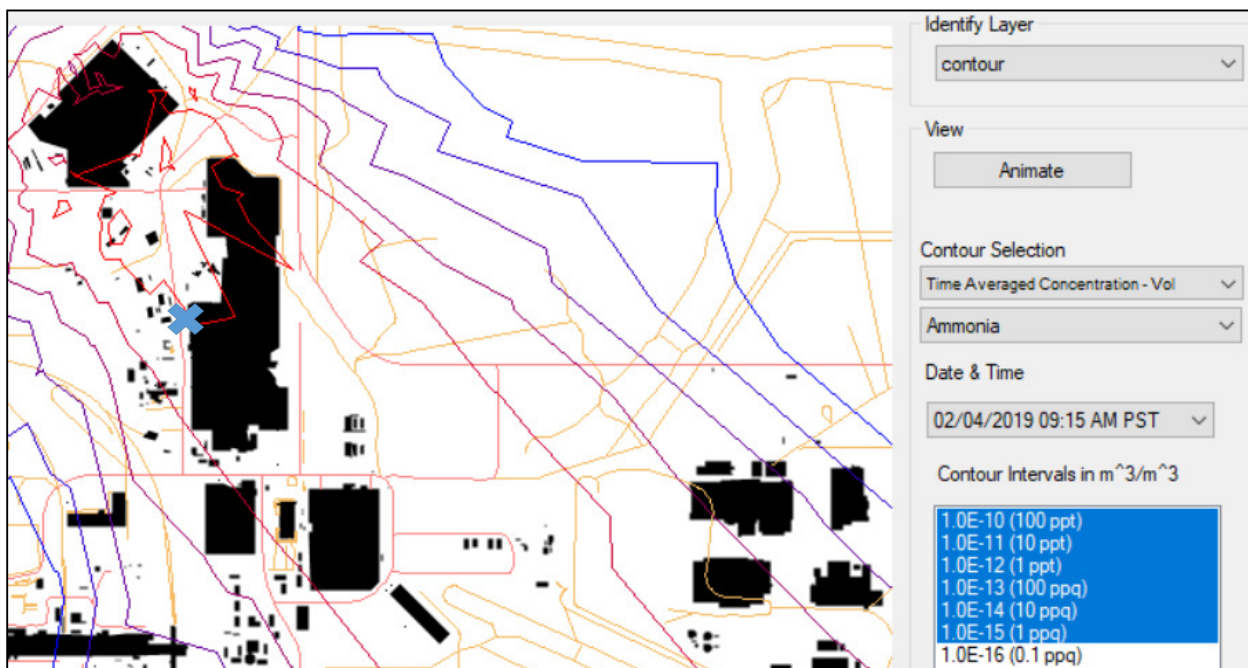


Figure 3. APGEMS Modeling of C-Farm PBFs at time of AOP-15 Event, Predicted Ammonia Concentration at AOP-15 Location is about 100 ppt (5+ orders of magnitude below its OEL)

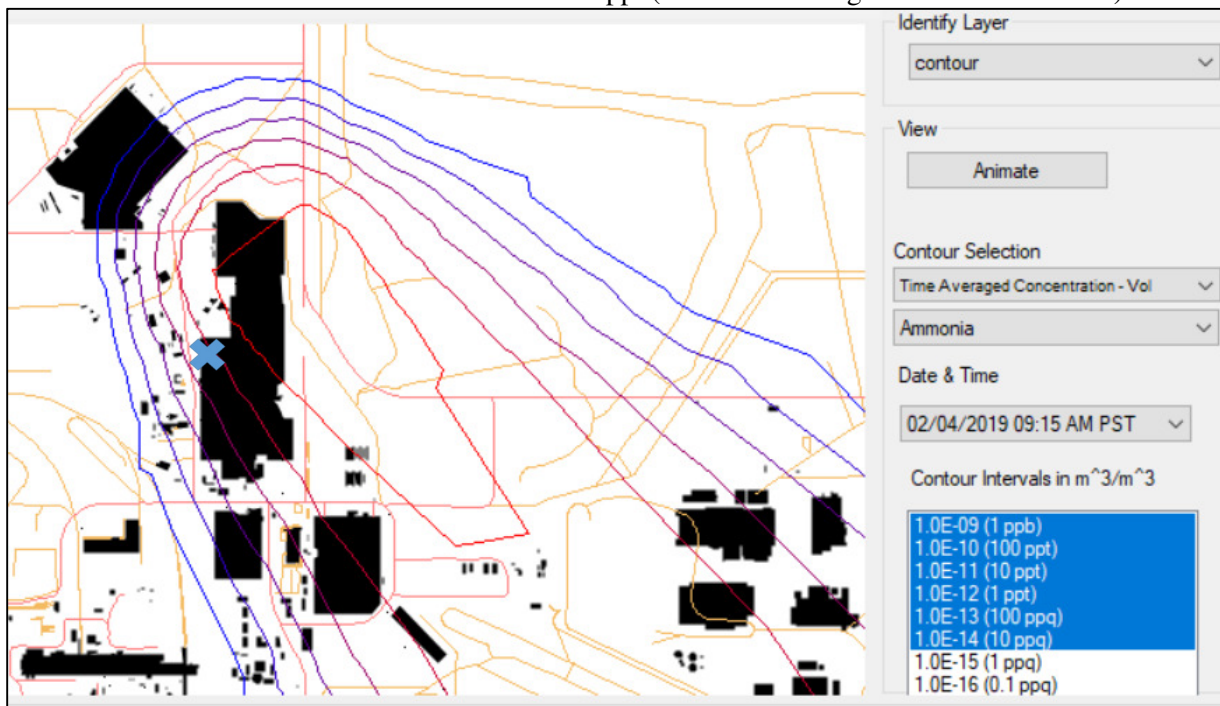


Figure 4. APGEMS Modeling of AN Stack at time of AOP-15 Event, Predicted Ammonia Concentration at AOP-15 Location is Between 10 ppt and 100 ppt (6 orders of magnitude below its OEL)

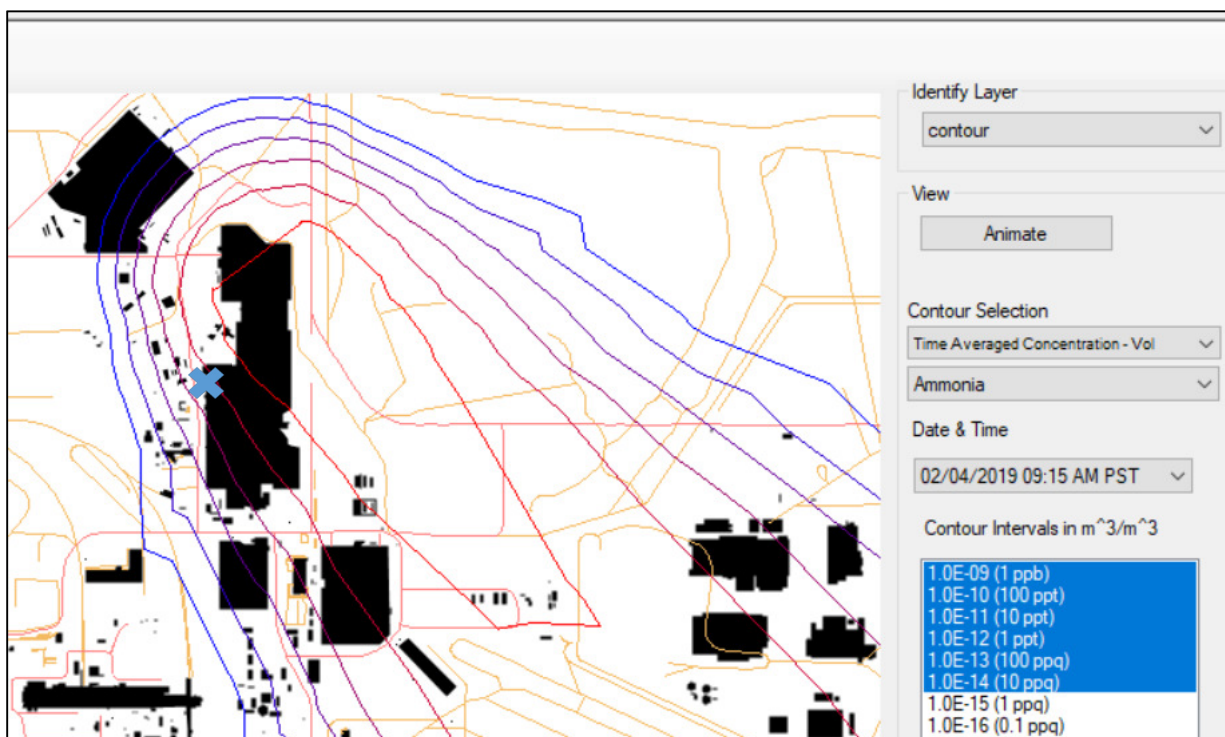


Figure 5. APGEMS Modeling of AY/AZ Stack at time of AOP-15 Event, Predicted Ammonia Concentration at AOP-15 Location is Between 10 ppt and 100 ppt (6 orders of magnitude below its OEL)

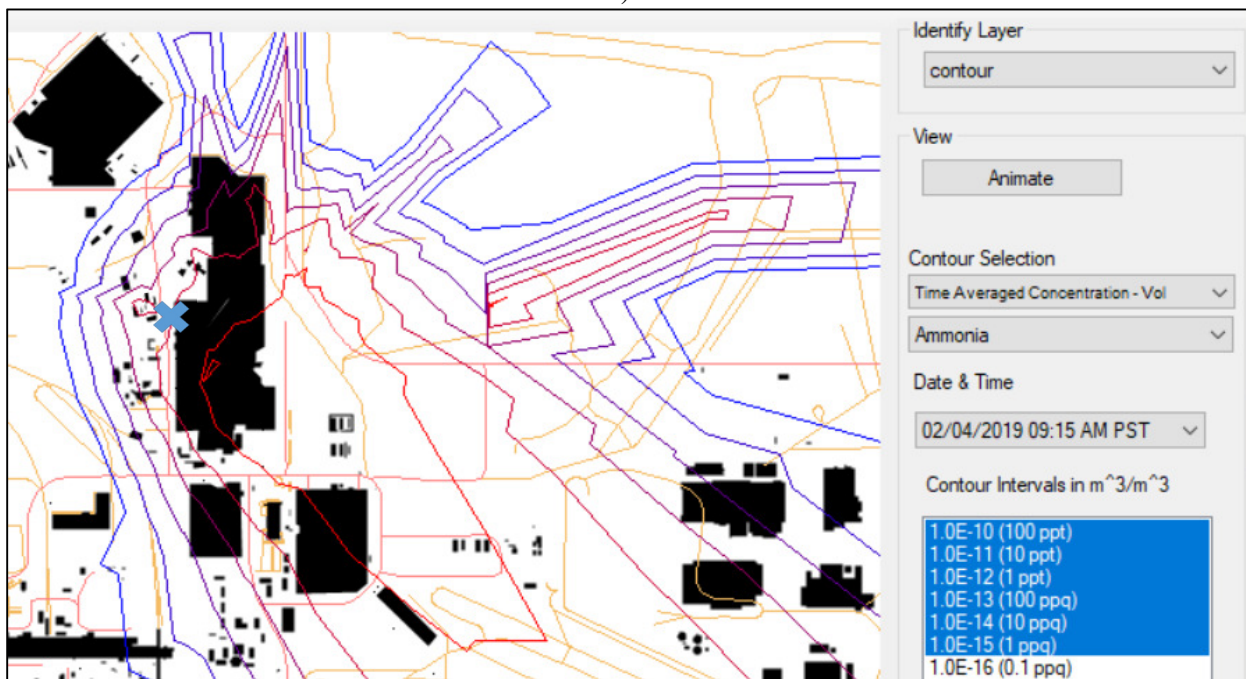


Figure 6. APGEMS Modeling of AX-Farm PBFs at time of AOP-15 Event, Predicted Ammonia Concentration at AOP-15 Location is about 10 ppt (6+ orders of magnitude below its OEL)

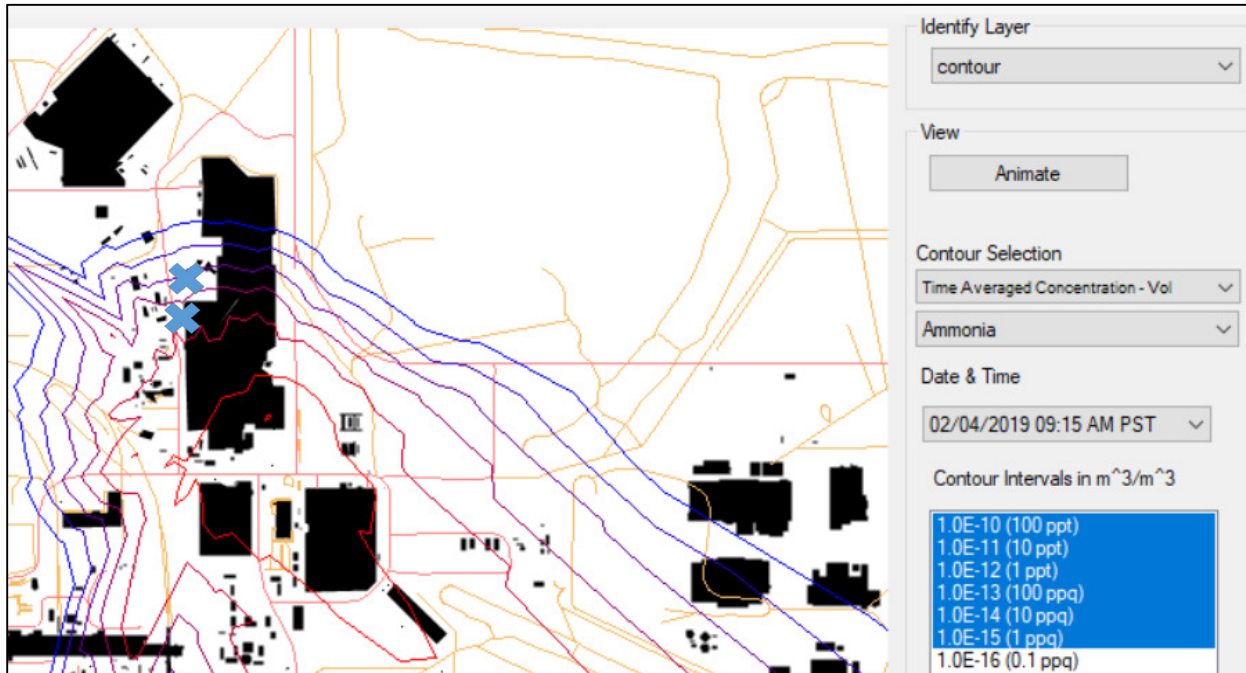


Figure 7. APGEMS Modeling of A-Farm PBFs at time of AOP-15 Event, Predicted Ammonia Concentration at AOP-15 Location is Between 1 ppt and 10 ppt (7 orders of magnitude below its OEL)

Modeling of MO-596 Sewage Holding Tank:

Figure 8 provides APGEMS-TF modeling of the MO-596 Sewage Holding Tank. The sewer vapors were modeled as methyl mercaptan (a common odor causing chemical in sewer gases), but the source term was arbitrarily set at 1 g/s. This is due to the fact there is not a data driven source term (chemical type, concentration, and volumetric gas emission rate) for the sewer systems around the Hanford site. The contour lines shown in Figure 8 cannot be attributed to specific methyl mercaptan concentrations, but they do reflect the direction of the sewer vapor plume and relative concentrations (each contour line from the center out is 1/10 the concentration of the previous).

It is evident that the AOP-15 location was dead center in the MO-596 sewer plume and within the highest concentration contour. Many sewer gases are large, heavy molecules and do not disperse as easily as lighter gas molecules. Heavy sewer gases are known to migrate along the ground and resist dilution. Finally, the WRPS Fugitive Emissions team has observed that sewer gases at some distance from the source (following dilution and likely chemical decomposition) take on the odor characteristic of 'musty/body odor.' Based on the modeling results and recent experience of the WRPS Fugitive Emissions team it seems very plausible that the odor event of 2/4/19 was caused by sewer gases from the MO-596 sewage holding tank.

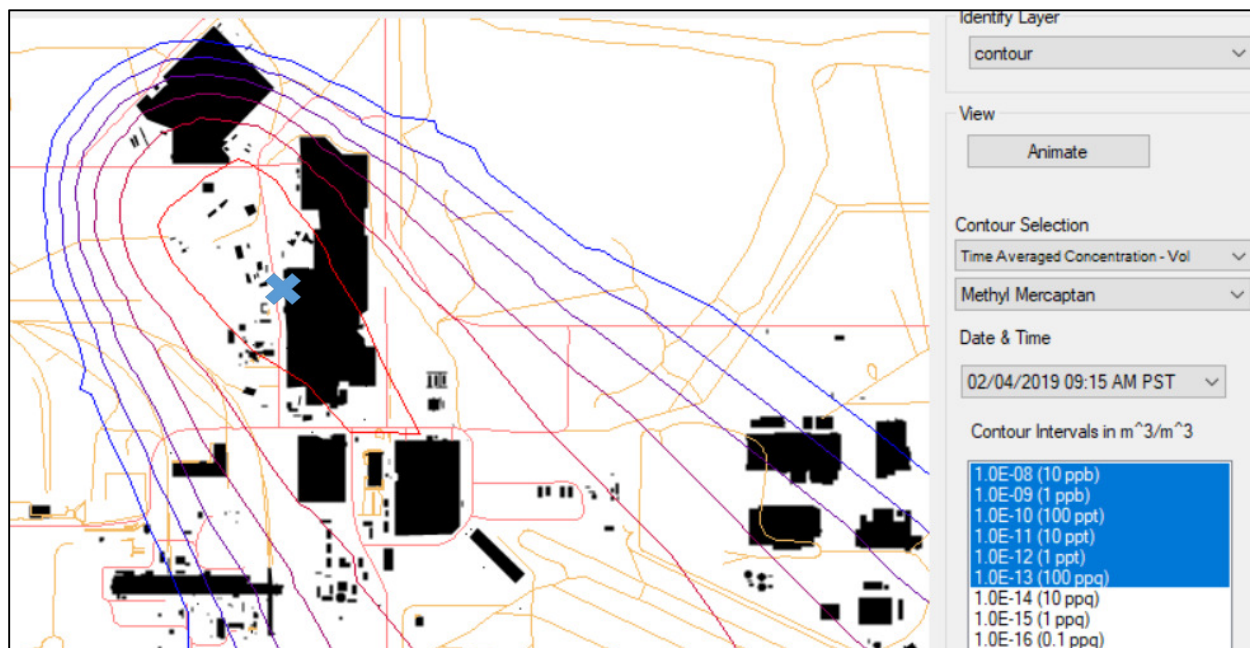


Figure 8. APGEMS Modeling of MO-596 Sewer Holding Tank, Methyl Mercaptan concentrations are arbitrary but the AOP-15 Location is directly in the Center of the Plume and within the Highest Concentration Contour

Event Investigation Report, EIR-2019-006, AOP-015 for Odors Reported
Between AY-1 and AY-2 Change Trailers

Event Report	Date	Location Description	Odor Described	Wind	Sewer in Line
EIR-2015-18	04/06/15	AN-104 vent pit	Rotten onion/body odor	NW 7	MO596 Holding Tank
EIR-2015-30	07/13/15	Buffalo Street 100 ft S of 7th	Rotten eggs/sulfur	NW 10	MO596 Holding Tank
EIR-2016-06	02/26/16	Outside 204AR	Body odor/onion	N 5	MO596 Holding Tank
EIR-2016-10	03/14/16	AW A-valve pit	Onion-like/rotten onion	W	none
EIR-2016-14	04/06/16	Near AP-107	Onion/rotten/earthy/musty	E-NE 6	2607E10
EIR-2016-19	4/28/16	Between AP-103 and AP-104 (during Transfer)	Musty/metallic/onion	N-NE 12	2607E12
EIR-2016-21	05/03/16	West of Buffalo St.	Metallic/ Body odor/ onion/chemical smell/ sharp pungent	N-NW 5	MO596 Holding Tank
EIR-2016-22	05/03/16	Gate 8 corridor AN/AZ Farm	musty	E 5	none
EIR-2016-24	05/04/16	AZ-702	Ammonia/body odor	NW 5	MO596 Holding Tank
EIR-2016-28	06/20/16	702-AZ	Sulfur/rotten egg	NW 8	MO596 Holding Tank
EIR-2016-34	07/12/16	4th St and 4th St Loop	Sweet/metallic/smoky	NW 3-5 NE 1-2	2607E10
EIR-2016-39	08/03/16	AY-1 Change Trailer	Rotten/strong onion/ musty/metallic taste	SE 4-5	2607E10
EIR-2016-54	11/30/16	AX Change Tent	Cat Urine	SW 5-7	2607E12
EIR-2017-01	01/25/17	Grout Loop	Rotten/onion/eggs/sulfur	W-SW 5-7	2607E10
EIR-2017-24	06/13/17	285-A (4th & Buffalo)	Metallic after taste, Sulfur, Ammonia, Rotten Egg	NW 15	MO596 Holding Tank

Attachment 2 – Industrial Hygiene Investigative Report

Event Investigation Report, EIR-2019-006, AOP-015 for Odors Reported
Between AY-1 and AY-2 Change Trailers

Washington River Protection Solutions		PER Number: PER-2019-0216
TF-AOP-015 INDUSTRIAL HYGIENE INVESTIGATION REPORT		
Time/Date & Event location: 0920 02/04/2019 AY-1 and AY-2 change trailers		EIR Number: EIR-2019-006

1. **Event Summary** (including number of workers involved and activity in progress):

At approximately 0920 on Monday 02/04/2019 2 Instrument Technicians (IT)s encountered a "musty, rotten, very stale body odor" immediately west of and inbetween AY-1 (MO513) and AY-2 (MO193) change trailers.

- Was an IHT Present during initiating event? [] Yes [X] No

IH Monitoring/ Sample Survey Reports:

19-00726 "AOP-015 Between AY-1 and AY-2 Change Trailer"

Weather Conditions at Time of Event:

- Weather station: 6
- Wind Direction and Speed: NW 17 mph with gusts to 23 mph
- Barometric Pressure (steady/rising/falling): 28.85" and rising
- Temperature (F°): 24
- Humidity: 73%

Event Investigation Report, EIR-2019-006, AOP-015 for Odors Reported
Between AY-1 and AY-2 Change Trailers

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Time/Date & Event location: 0920 02/04/2019 AY-1 and AY-2 change trailers		

Field Response Timeline:


02/04/2019:


- 0953: Shift PO Manager contacts AN Field IH to notify of TF-AOP-015 entry
- 0955: COMS Field IH AN Team IH and EV Team IH arrive at CSO
- 0957: CSM briefs COMs Field IH, AN Field IH, EV Field IH
- 0958: CSM contacts PO shift IHT supervisor to acquire IHT resources
- 1001: SOEN: "Entering AOP-015 for odors between AY-2 and AY-1 change trailers exterior of AY Farm. Stay clear of the area. CSM"
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- 1348: IH Programs IHT Lead issues HAPSITE results


02/05/2019:

- 1241: SOEN: "Sample analysis for the TF-AOP-015 even has been completed and the results are below action limits. Exiting TF-AOP-015. CSM"

Field IH Author:


Print First and Last Name


Signature


Phone No.

02/07/2019
Date


Event Investigation Report, EIR-2019-006, AOP-015 for Odors Reported
Between AY-1 and AY-2 Change Trailers

Washington River Protection Solutions		PER Number:
TF-AOP-015 INDUSTRIAL HYGIENE INVESTIGATION REPORT		PER-2019-0216
Time/Date & Event location:		EIR Number:
0920 02/04/2019 AY-1 and AY-2 change trailers		EIR-2019-006


2. GCMS Sample Results:

GCMS results are attached to this IHIR


Programs IH Author:



Print First and Last Name



Signature



Phone No.

2/7/2019

Date

Event Investigation Report, EIR-2019-006, AOP-015 for Odors Reported
Between AY-1 and AY-2 Change Trailers

Washington River Protection Solutions TF-AOP-015 INDUSTRIAL HYGIENE INVESTIGATION REPORT	PER Number: PER-2019-0216
Time/Date & Event location: 0920 02/04/2019 AY-1 and AY-2 change trailers	EIR Number: EIR-2019-006

3. Additional Information:

- Odor Response Cards received:

ODOR RESPONSE CARD - 241-AY FARM

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

- Date and time odor was noticed 3-4-2019 09:20 AM
- Your name and the work you were performing MAINTENANCE RETURNALE 80776
- Location of odors (mark area on map and wind direction)
- 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: Very STALE BODY ODOR
- Possible Source A TARD
- 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: None

2. Send this card to the Central Shift Office.

Page 2 of 2 OFFICIAL USE ONLY (when filled in) A-6005-401 (REV 1)

ODOR RESPONSE CARD - 241-AY 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.

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

Page 1 of 2 OFFICIAL USE ONLY (when filled in) A-6005-401 (REV 1)

Event Investigation Report, EIR-2019-006, AOP-015 for Odors Reported
Between AY-1 and AY-2 Change Trailers

Washington River Protection Solutions TF-AOP-015 INDUSTRIAL HYGIENE INVESTIGATION REPORT		PER Number: PER-2019-0216
Time/Date & Event location: 0920 02/04/2019 AY-1 and AY-2 change trailers		EIR Number: EIR-2019-006

ODOR RESPONSE CARD - 241-AY FARM

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

- Date and time odor was noticed 2-4-19 9:20 am
- Your name and the work you were performing [redacted]
- Location of odors (mark area on map and wind direction) west was circulating South
- 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: fecal odor
- Possible Source A Sation
- 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: none

2. Send this card to the Central Shift Office.

Page 2 of 2 OFFICIAL USE ONLY (when filled in) A-6005-931 (REV 1)

ODOR RESPONSE CARD - 241-AY 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.

Page 1 of 2 OFFICIAL USE ONLY (when filled in) A-6005-931 (REV 1)

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Washington River Protection Solutions TF-AOP-015 INDUSTRIAL HYGIENE INVESTIGATION REPORT		PER Number: PER-2019-0216																
Time/Date & Event location: 0920 02/04/2019 AY-1 and AY-2 change trailers		EIR Number: EIR-2019-006																
<ul style="list-style-type: none">Summary of IH Monitoring and Sampling Data:<ul style="list-style-type: none">a. Monitoring:<p>Event Response: 19-00726 "AOP-015 Between AY-1 and AY-2 Change Trailer"</p><table><tbody><tr><td>CO</td><td>0.000 ppm</td></tr><tr><td>Hg</td><td>31 ng/m³</td></tr><tr><td>LEL</td><td>0.000%</td></tr><tr><td>N₂O</td><td>0.000 ppm</td></tr><tr><td>NH₃</td><td>0.000 ppm</td></tr><tr><td>O₂</td><td>20.900%</td></tr><tr><td>VOC (FID)</td><td>Results consistent with background</td></tr><tr><td>VOC (PID)</td><td>0.000 ppb</td></tr></tbody></table>b. Sampling:<p>N/A</p>			CO	0.000 ppm	Hg	31 ng/m ³	LEL	0.000%	N ₂ O	0.000 ppm	NH ₃	0.000 ppm	O ₂	20.900%	VOC (FID)	Results consistent with background	VOC (PID)	0.000 ppb
CO	0.000 ppm																	
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LEL	0.000%																	
N ₂ O	0.000 ppm																	
NH ₃	0.000 ppm																	
O ₂	20.900%																	
VOC (FID)	Results consistent with background																	
VOC (PID)	0.000 ppb																	
4. Summary of Employee Reported Information (e.g., symptoms) <p>No symptoms were reported, Voluntary medical evaluation was declined.</p>																		
5. Recommendations/Conclusions: <p>Identification of Source of the Concern: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>No recommendations at this time.</p>																		
6. Other: <p>The results of the DIR monitoring and HAPSITE GC-MS sampling performed for this AOP-015 found that chemical concentrations measured are at or below back ground levels in the AOP-015 area of concern. This information was relayed to the Central Shift Office. Shortly after, the Central Shift Manager lifted the AOP-015 for area between AY-1 and AY-2 Change Trailer. According to SOEN message, the AOP-015 was lifted at approximately 12:41 on 02/05/2019.</p>																		
S&H Program Management: <table><tbody><tr><td> Print First and Last Name</td><td> Signature</td><td> Phone No.</td><td>2/12/19 Date</td></tr></tbody></table>			 Print First and Last Name	 Signature	 Phone No.	2/12/19 Date												
 Print First and Last Name	 Signature	 Phone No.	2/12/19 Date															

GCMS Results

HAPSITE

Event Investigation Report, EIR-2019-006, AOP-015 for Odors Reported Between AY-1 and AY-2 Change Trailers

HAPSITE GC-MS Bag Sample Results Survey 19-00726 AY Change Trailer

Two bag samples were collected in response to an odor reported between AY-1 and AY-2 change trailers. These samples were analyzed using an Inficon HAPSITE GC-MS on February 4, 2019. Data was interpreted on February 4 2019, and reported on February 7, 2019. Bag sample 1 results are not reported because an instrument malfunction during sample introduction made data collected invalid. Bag sample 2 results indicate no compounds found above concentrations of concern. D-Limonene, a compound found in many cleaning products, was identified and was found at an estimated concentration of <5 ppb. Detailed sample results are found below:

Compounds identified in Bag Sample Collected Outside 271 AP Survey 19-00550

Compound	COPC	Estimated Sample Concentration (ppb)	Typical Sample Bag Concentration (ppb)	Net Concentration (ppb)
Toluene + Xylenes	No	<1	<10	Not Found
D-Limonene	No	<1	<5	Not Found
Aliphatic Hydrocarbons, C10 – C16	Yes	75	100	Not Found

If you have questions contact

2-2-19

Attachment 3 – WRPS-PER-2019-0216

Event Investigation Report, EIR-2019-006, AOP-015 for Odors Reported
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PER

Page 1 of 3

Problem Evaluation Request (PER)		WRPS-PER-2019-0216 In Process/Work	
PER No	WRPS-PER-2019-0216		
Discovery Date/Time	02/04/2019 09:20		
Project	Maintenance		
Location	AY Farm		
How Discovered?	Routine Work/Maintenance		
Equipment ID Number			
Source Document			
PER Title			
outside odor aop15			
Description of Concern or Problem			
odor between ay change trailer 101 and 102			
Immediate actions Taken			
left area reported to supervisor and area manager			
Recommended Corrective Actions			
I don't know			
Shift Office Contact	Originator indicates contact was made with the appropriate Shift Office.		
Originator Contact			
No			
Originators Name	Originators ID	Originators Phone	Date Initiated
			02/04/2019
SHIFT OFFICE REVIEW			
Reportability	Non-Reportable		
SSC Operability	N/A		
Operability Review	N/A		
Compensatory Actions Taken			
Entered AOP-015, secured affected area, performed DRI readings with nothing above detectable found. Bag samples are being processed.			
Additional Actions Taken or Recommended			
No additional actions taken by Shift Operations.			
SO Reviewer Name	SO Reviewer ID	SO Reviewer Phone	SO Review Date
			02/04/2019
SCREENING			
PER Significance Level	Analysis Level	How Discovered	
PER with Resolution	Not Applicable	1 Internal (Self-Identified; Internal Assessments)	
Ind Assessment Rev	Occurrence Rpt #	DOE CAP Required?	
		No	
Assigned Responsible Manager	Facilities Rep / SSO	Safety Mgmt Rep	Potentially Recurring Issue
			No
Program		Trend Codes	
• ^N/A^			
PER Screening Comments			
02-05-19			

2/18/2019

Event Investigation Report, EIR-2019-006, AOP-015 for Odors Reported
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PER

Page 2 of 3

PER with Resolution to M Daniels, EIR-2019-006			
ORPS Code	Functional Area	Work Process	ISMS
Not Applicable			
PER Screening Chair	PER Screening Chair ID	PER Screening Chair Phone	PER Screening Date
		(02/05/2019
PAAA REVIEW			
PAAA Screening	PAAA Codes	Function Codes	
Not subject to PAAA			
PAAA Cause Analysis Review	NTS Report Number	NTS Report Date	
No			
PAAA Screening Comments			
1) Basis for PAAA screening is in file attached to PER. In file, see highlighted green text for non-compliance. 2) Approval per procedure TFC-ESHQ-PAAA-D-08 dated 9/12/2018 (paragraph 4.1.5-7).			
PAAA Reviewer Name	PAAA Review Date		
	02/05/2019		
PAAA Approver Name	PAAA Approve Date		
	02/05/2019		
CAUSE ANALYSIS			
Cause Analyst			
Problem Statement			
Compensatory Actions			
Cause Analysis			
Causes			
Extent of Condition			
HPI Error Precursors			
Task Demands	Work Environment	Individual Capabilities	Natural Tendencies/ Human Nature
Has the evaluation of this PER resulted in additional information that could affect the Central Shift Office (CSO) determination of operability or reportability?			
No			
Comments			
Submitter Name	Submitter ID	Submitter Phone	Initial Submit Date
CAUSE CODES			
ATTACHMENTS			
Link to PER			
PER Screening 2-05-19.pdf			
AUDIT HISTORY			

2/18/2019

Event Investigation Report, EIR-2019-006, AOP-015 for Odors Reported
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PER

Page 3 of 3

Change Date	Auditor	Comments
02/04/2019 12:55		Initiator Tab initial submission.
02/04/2019 15:12		SO Tab initial submission.
02/05/2019 13:38		Screening Tab initial submission.
02/05/2019 14:39		PAAA Tab initial submission.
02/06/2019 10:21		Responsible Manager Task Launched by [REDACTED]

-- End of Report --
02/18/2019 12:51 PM

[REDACTED]

2/18/2019