EVENT INVESTIGATION REPORT

TF-AOP-015 Event West of TX Change Trailer

EIR-2019-038
TF-AOP-015 Event West of TX Change Trailer

Executive Summary

On Wednesday, September 4, 2019 at 1330, while performing Winterization (WO#505553) at the TX Farm Change Trailer (MO817), two electricians encountered odors outside the Farm near the change trailer. They immediately left the area and returned to 272WA. They notified the Field Work Supervisor (FWS), who then contacted the Central Shift Office (CSO). The CSO declared entry into TF-AOP-015 and made notifications per procedure. The CSO initiated an Event Investigation and Industrial Hygiene (IH) responded. Neither electrician exhibited any signs or symptoms. Both individuals declined medical evaluation at HPMC. All sample results were below detectable and/or action levels.

Interviews with the affected individuals were conducted in lieu of an event investigation meeting. Considering wind direction, plausible odor source was the TX/TY Tank Farm.

Investigation Summary

On Wednesday, September 4, 2019 two electricians performing Winterization (WO#505553) drove together to the TX Farm Change Trailer (MO817), entering the area from the north, and parking in front of the change trailer. Electrician 1 entered the change trailer to perform duties. Electrician 2 exited the truck and proceeded to the disconnect rack near the fence. Electrician 1 exited the Change Trailer at approximately 1330. As Electrician 1 approached the disconnect rack, he noticed a faint “onion-like” odor. When he got closer, Electrician 2 asked, “Do you smell that?” Both Electricians noticed odors described as Ammonia. The two electricians immediately left the area and returned to 272WA. Upon arrival at 272AW, Electrician 2 notified the FWS who contacted the Shift Office. Both electricians then completed odor response cards. Both indicated they had no symptoms and declined medical evaluation.

At 1351, the CSO sent out a Shift Office Event Notification (SOEN) declaring a TF-AOP-015 at the TX Farm Change Trailer and at 1356 Odor Response Cards were received at the CSO. CSO restricted access to the Tank Farm and requested assistance from IH. At 1441, IHTs depart CSO to perform TF-AOP-015 field response actions. At 1708, SOEN was issued “Response actions for the TF-AOP-015 event at TX Farm have been completed and the results are at or below background levels. Exiting TF-AOP-015. CSM”

Interviews with the two electricians and the FWS were conducted in lieu of an event investigation meeting based on the limited number of individuals involved.
Event Timeline

09/04/2019

1351: SOEN: “Entering TF-AOP-015 for odors at the TX Farm change trailer outside the farm. Stay clear of this area” CSM

1354: Central Shift Manager (CSM) briefs Shift Production Operations Operating Engineer (SPO OE) and Shift Production Operations Nuclear Control Operators (SPO NCOs) on access restriction. SPO OE and SPO NCOs depart CSO to perform access restriction activities.

1356: Odor Response Cards (ORCs) arrive at CSO

1358: CSM initiates response actions as per TF-AOP-015 3.1.12

1414: COMs FIHP briefs PO IHTs on response actions
  - Respiratory Protection Equipment (RPE) will be worn in accordance with RPF TF-AOP-015 task 2
  - Monitoring will be performed as per Industrial Hygiene Sampling Plan IHP-09001
  - Ammonia (NH₃), Volatile Organic Compound (VOC), H₂S monitoring will be performed in area of concern
  - Two (2) grab samples will be collected.
    - One (1) grab sample form general area
    - One (1) grab sample from source if identified, or from general area if no source is identified
  - Perform monitoring of grab samples for Nitrous Oxide (N₂O), elemental mercury (Hg) at Production Operations Temporary IHT Lab (MO511), transport grab samples to 2704 HV Industrial Hygiene Programs IHT Lab for analysis by NUCON HAPSITE® portable GC/MS.

1438: CSM contacts Plutonium Finishing Plant Central Shift Manager (PFP CSM) to acquire access to PFP Restricted Access Zone (PFP RAZ) for PO IHTs performing response actions.

1708: SOEN: “Response actions for the TF-AOP-015 event at TX Farm have been completed and the results are at or below background levels. Exiting TF-AOP-015. CSM”
### Meteorological Data

<table>
<thead>
<tr>
<th>Event</th>
<th>TF-AOP-015 Event West of TX Change Trailer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date/Time of event</td>
<td>September 04, 2019/1330</td>
</tr>
<tr>
<td>Location</td>
<td>West of TX Change Trailer (MO817)</td>
</tr>
<tr>
<td>Odor</td>
<td>Ammonia, “Onion-like”</td>
</tr>
<tr>
<td>Symptoms</td>
<td>No symptoms reported</td>
</tr>
<tr>
<td>DRI results during event</td>
<td>Less than Detection Level (DL) for ammonia (NH$_3$) and Hydrogen Sulfide (H$_2$S) on sweep of reported odor location</td>
</tr>
<tr>
<td>Possible source(s)</td>
<td>Vapors from the TX/TY Tank Farm</td>
</tr>
</tbody>
</table>

**Weather conditions on September 04, 2019 1330**
(data from weather station 6)

<table>
<thead>
<tr>
<th>Time</th>
<th>Wind Dir (From)</th>
<th>Wind Speed</th>
<th>Ave Temp</th>
<th>Bar</th>
<th>Relative Humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1300</td>
<td>114</td>
<td>4.0mph</td>
<td>83.5F</td>
<td>29.3</td>
<td>24%</td>
</tr>
<tr>
<td>1330</td>
<td>66</td>
<td>5.0mph</td>
<td>84.0F</td>
<td>29.3</td>
<td>24%</td>
</tr>
<tr>
<td>1400</td>
<td>58</td>
<td>8.0mph</td>
<td>84.7</td>
<td>29.2</td>
<td>25%</td>
</tr>
</tbody>
</table>

Waste disturbing or tank work in adjacent area: No waste disturbing activities or tank work occurring in TX/TY Farm or adjacent areas.

### IH Response Team Sample Results (Adjacent to TX/TY Farm)

<table>
<thead>
<tr>
<th>Agent</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>NH$_3$</td>
<td>&lt;IDL</td>
</tr>
<tr>
<td>H$_2$S</td>
<td>&lt;IDL</td>
</tr>
<tr>
<td>N$_2$O</td>
<td>0.3ppm (actionable hazard level 25 ppm)</td>
</tr>
<tr>
<td>Hg</td>
<td>13 ng/m$^3$ (actionable hazard level 12,500 ng/m$^3$)</td>
</tr>
<tr>
<td>VOC</td>
<td>10ppb (actionable hazard level 2 ppm)</td>
</tr>
</tbody>
</table>

*Instrument Detection Limit (IDL)
Compensatory Measures

- The affected in-field workers immediately left the area and returned to 272WA, where they notified the FWS, who contacted the CSO.

Preliminary Extent of Condition Review

- No extent of condition exists for this investigation

Facility Impact

- No facility impact associated with this event

Discussion of Potential Causes

- Vapors from the TX/TY Tank Farm are a potential source

Discussion of Positive Aspects of the Event

- Event response was well coordinated from the CSO
- Electricians immediately left the area and informed their supervisor

Recommendations/Proposed Corrective Actions

- No recommendations or proposed corrective actions

Figures:

1. Aerial View of TX/TY farm

Attachments:

1. Industrial Hygiene Investigation Report
Figure 1- Aerial View of TX Farm- This figure shows the relative location of the electricians and the wind direction when odors were detected.
Attachment 1
Industrial Hygiene Investigation Report
1. **Event Summary (including number of workers involved and activity in progress):**

   At approximately 1330 two (2) Electricians South West of the 241TX/TY change trailer (MO817) smelled an “ammonia, onion” odor. No symptoms were reported at that time.

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

**IH Monitoring/ Sample Survey Reports:**

   Event response: 19-07997"AOP 15 TX Change Trailer"

**Weather Conditions at Time of Event:**

**Ambient outside conditions:**

   - **Weather station:** Station 19 @ 1330
   - **Wind Direction and Speed:** E @ 5 mph
   - **Barometric Pressure (steady/rising/falling):** 29.26"Hg and falling
   - **Temperature (°F):** 84
   - **Humidity:** 26%
Field Response Timeline:

1351: SOEN: "Entering TF-AOP-015 for odors at the TX Farm change trailer outside the farm. Stay clear of this area. CSM"

1354: AN Team Field Industrial Hygiene Professional (AN FIHP), Central Operations and Maintenance Field Industrial Hygiene Professional (COMs FIHP), AY/AZ Team Field Industrial Hygiene Professional (AY/AZ FIHP), Production Operations East Industrial Hygiene Manager (PO EIHM) arrive at Central Shift Office (CSO)

1354: Central Shift Manager (CSM) briefs Shift Production Operations Operating Engineer (SPO OE) and Shift Production Operations Nuclear Control Operators (SPO NCOs) on access restriction. SPO OE and SPO NCOs depart CSO to perform access restriction activities.

1356: Odor Response Cards (ORCs) arrive at CSO

1356: SY Team Field Industrial Hygiene Professional (SY FIHP) Contacts AN FIHP to offer support of TF-AOP-015 response actions.

1358: CSM initiates response actions as per TF-AOP-015 3.1.12

1400: Effluent Treatment Facility Team Field Industrial Hygiene Professional (ETF FIHP), Evaporator Team Field Industrial Hygiene Professional (EV FIHP), Production Operations Field Industrial Hygiene Professional PO FIHP

1403: COMs FIHP is notified that Hydrogen Sulfide (H₂S) sensor equipped MultiRAE is in route to ETF for pre-use-function-test.

1404: AY/AZ FIHP contacts Production Operations Industrial Hygiene Technician Lead (PO IHTL) to initialize Ohio Lumex and Miran SapphirRe

1405: Terra Graphics Engineering Technicians (TGETs) arrive at CSO

1406: COMs FIHP briefs TGETs

1413: Production Operations Industrial Hygiene Technicians (PO IHTs) and Production Operations Industrial Hygiene Technician Supervisor (PO IHTS) arrive at CSO.

1414: COMs FIHP briefs PO IHTs on response actions
- Respiratory Protection Equipment (RPE) will be worn in accordance with RPF TF-AOP-015 task 2
- Monitoring will be performed as per Industrial Hygiene Sampling Plan IHP-09001
- Ammonia (NH₃), Volatile Organic Compound (VOC), H₂S monitoring will be performed in area of concern
- Two (2) grab samples will be collected.
  - One (1) grab sample from general area
  - One (1) grab sample from source if identified, or from general area if no source is identified
- Perform monitoring of grab samples for Nitrous Oxide (N₂O), elemental mercury (Hg) at Production Operations Temporary IHT Lab (MO511), transport grab samples to 2704 HV Industrial Hygiene Programs IHT Lab for analysis by NUCON HAPSITE® portable GC/MS.

1417: PO IHTs depart CSO to collect RPE, instruments, and supplies

1418: COMs FIHP requests AY/AZ FIHP request NUCON HAPSITE® initialization

1420: COMs FIHP attempts to contact Industrial Hygiene Programs (IHP) Instrument Lead to support NUCON HAPSITE® initialization

1421: AY/AZ FIHP attempts to contact Industrial Hygiene Programs (IHP) Instrument Lead to support NUCON HAPSITE® initialization

1421: TGETs depart CSO

1423: H₂S sensor equipped MultiRAE arrives at CSO, ETF IHT communicates instrument pre-use function check values to COMs FIHP

1423: Industrial Hygiene Programs Manager (IHPM) initiates initialization of NUCON HAPSITE®

1424: COMs FIHP contacts PO IHT to notify H₂S sensor equipped MultiRAE has arrived at CSO

1438: CSM contacts Plutonium Finishing Plant Central Shift Manager (PFP CSM) to acquire access to PFP Restricted Access Zone (PFP RAZ) for PO IHTs performing response actions.

1441: COMs FIHP provides PO IHT the H₂S sensor equipped MultiRAE.

1441: PO IHTs depart CSO to perform TF-AOP-015 field response actions

1708: SOEN: "Response actions for the TF-AOP-015 event at TX Farm have been completed and the results are at or below background levels. Exiting TF-AOP-015. CSM"
Glossary:

AOP  Abnormal Operating Procedure
ANFIHP  AN Team Field Industrial Hygiene Professional
AYAZFIHP  AY/AZ Team Field Industrial Hygiene Professional
ASAP  As Soon As Possible
COMs  Central Operations and Maintenance
COMsFIHP  Central Operations and Maintenance Field Industrial Hygiene Professional
CSM  Central Shift Manager
CSO  Central Shift Office (274AW Room 5)
CVST  Chemical Vapors Solutions Team
DL  Detection Limit
EIR  Event Investigation Report
ESH&Q  Environmental Safety Health and Quality
ETF  Effluent Treatment Facility
ETFITH  Effluent Treatment Facility Industrial Hygiene Technician
EV  Evaporator
EVFIHP  EV Team Field Industrial Hygiene Professional
FEI  Fugitive Emissions Investigation
FEST  Fugitive Emissions Sub-Team
H₂S  Hydrogen Sulfide
Hg  Mercury
HPMC  Hollie P. Mooers Corporation
IH  Industrial Hygiene
IHP  Industrial Hygiene Plan
IHPIHTL  Industrial Hygiene Programs Industrial Hygiene Technician Lead
IHT  Industrial Hygiene Technician
MO  Mobile Office
N₂O  Nitrous Oxide
NH₃  Ammonia
OE  Operating Engineer
ORC  Odor Response Card
PNLNL  Pacific Northwest National Laboratories
PO  Production Operations
POIHT  Production Operations Industrial Hygiene Technician
POIHTL  Production Operations Industrial Hygiene Technician Lead
POIHTS  Production Operations Industrial Hygiene Technician Supervisor
POSIHT  Production Operations Shift Industrial Hygiene Technician
POSIHTS  Production Operations Shift Industrial Hygiene Technician Supervisor
POWASHM  Production Operations West Area Safety and Health Manager
R/C  Retrieval and Closure
RPE  Respiratory Protection Equipment
RPF  Respiratory Protection Form
SM  Shift Manager
TF  Tank Farms
TGET  Terra Graphics Engineering Technician
TGIHRV  Terra Graphics Industrial Hygiene Response Van
TVA2020  Toxic Vapor Analyzer 2020
<table>
<thead>
<tr>
<th>Glossary (cont.):</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>UTNCOL</td>
<td>Ultrasonic Testing Nuclear Control Operator Lead</td>
</tr>
<tr>
<td>VOC</td>
<td>Volatile Organic Compounds</td>
</tr>
</tbody>
</table>
2. GCMS Sample Results:

See Attachment A for HAPSITE (GCMS) Results
3. Additional Information:
   - Odor Response Cards received:

   **ODOR RESPONSE CARD - 241-TX FARM**

   Odors Detected with **NO** Immediate Symptoms

   1. Notify Immediate Supervisor.

   2. Contact Central Shift Manager:
      - 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, 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.

   [Map of 241-TX Farm with odor locations marked]
ODOR RESPONSE CARD - 241-TX FARM

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

- Date and time odor was noticed: 130 PM
- Your name and the work you were performing: [Redacted] Winterization
- Location of odors (mark area on map and wind direction): Change Trailer SW outside
- Name(s) of others in or near the affected area: [Redacted]
- Was an IHT present? No
- Describe the odor: [Redacted] Ammonia
- Possible Source: [Redacted]
- Your symptoms (if any): [Redacted] None

2. Send this card to the Central Shift Office.
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 others in or near the effected
     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 - 241-TX FARM

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

- Date and time odor was noticed: 9-4-19 1:30 PM
- Your name and the work you were performing: [Redacted]
- Location of odors (mark area on map and wind direction): Ammonia
- Name(s) of others in or near the affected area: [Redacted]
- Was an IHT present? No
- Describe the odor: Ammonia
- Possible Source: TX Farm Tanks
- Your symptoms (if any): Headache, Dizziness/Light-Headed, Nausea
- Other:

2. Send this card to the Central Shift Office.
• Summary of IH Monitoring and Sampling Data:

  a. Monitoring:

     Event Response: 19-07997 "AOP 15 TX Change Trailer"

     DRI field readings:
     
     VOC: 10 ppb
     NH₃: <DL
     H₂S: <DL

     Grab samples:
     
     VOC: 10 ppb
     NH₃: <DL
     Hg: 13 ng/m³
     CO: <DL
     O₂: 20.9%
     LEL: 0.000%
     N₂O: 0.3 ppm
     H₂S: <DL

  b. Sampling:
     
     N/A

4. **Summary of Employee Reported Information** *(e.g., symptoms)*

   None of the employees reported experiencing symptoms

5. **Recommendations/Conclusions:**

   Identification of Source of the Concern: [ ] Yes  [x ] No

6. **Other:**

   **S&H Program Management:**

   [Redacted]

   **Phone No.**
   
   **Date**
   
   10/9/19

   [Redacted]
Attachment A

GCMS Laboratory Results
HAPSITE GC-MS Bag Sample Results Survey 19-07997, TX Tank Farm: (EIR-2019-038).

Two bag samples were collected in response to an odor reported at TX Tank Farm. These samples were analyzed using an Inficon HAPSITE GC-MS on September 5, 2019. Data was submitted for interpretation on September 30, 2019, interpreted on October 1, 2019, and reported the same day. Results for the System and Bag Blank Samples were satisfactory. Bag sample results are found below. The compounds listed below were found in both samples and the zero air-sample bag blank at concentrations consistent with sample bag contaminants.

Compounds Found In Samples

<table>
<thead>
<tr>
<th>Compound</th>
<th>Clean Air Blank</th>
<th>Zero Air-Bag Blank</th>
<th>Bag #1</th>
<th>Bag #2</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Standard #1</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Added by instrument during analysis</td>
</tr>
<tr>
<td>Plasticizer (Methyl Methacrylate)</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>Typical sample bag component</td>
</tr>
<tr>
<td>Internal Standard #2</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Added by instrument during analysis</td>
</tr>
<tr>
<td>C10 Terpene (D-Limonene)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Typical sample bag component</td>
</tr>
<tr>
<td>Silane Compound (Tetramethylsilane)</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>Typical sample bag component</td>
</tr>
<tr>
<td>C9-15 Alkane Hydrocarbons</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Not found above background</td>
</tr>
</tbody>
</table>

No compounds were found at concentrations above background.

If you have questions contact [Contact Information].