Event Investigation Report
EIR-2017-035
"Investigation of AOP-015 Entry outside TX Change Trailer"

Aerial Shot of TX Farm, showing location where odors were reported and wind direction at odor report times.

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**Introduction**

On October 18, 2017 at approximately 0815 three electricians, along with the coverage of two Health Physics Technicians (HPTs), entered TX Farm to perform lighting maintenance. Activities were being concluded for lunch at approximately 1015. Upon exit from the farm, two of the electricians, both HPTs and one Nuclear Control Operator (NCO 1) who was performing rounds outside of TX Farm, noticed an onion like odor just west of TX farm Change Trailer, MO-817, at approximately 1030. No reports were made at this time.

During lunch the electricians were talking amongst themselves and at approximately 1230, Electrician 1 decided to report the odor to ST Operations Engineer (ST OE). ST OE immediately reported this information to ST Area Dayshift Manager (ST ADM). ST ADM requested all five personnel having smelled the odor complete odor response cards. All personnel reported no symptoms and declined medical evaluation.

At 1255 ST ADM contacted the Central Shift Manager (CSM) to inform them of the odor report. Per procedure TF-AOP-015, "Response to Reported Odors or Unexpected Changes to Vapor Conditions", due to the fact that the report did not reach the CSM until 1257, approximately 2.5 hours after the odor was noticed at TX Farm, and because no symptoms were reported, entry into TF-AOP-015 was not made at this time.

Even though entry into TF-AOP-015 was not made, at approximately 1310 the CSM dispatched Shift Industrial Hygiene Technician 1 (Shift IHT 1) to perform Direct Reading Instrumentation (DRI) sweeps outside of TX Farm near MO-817, in the area where the odors were reported. At 1340 Shift IHT 1 reported DRI readings below action levels.

Because an entry into TF-AOP-015 was not made and because no verbal direction was provided to the crew returning to work at TX Farm, at 1330 the electricians and HPTs resumed their work at TX Farm, even though the same odor was present. The 3 electricians entered the farm to complete the 10-15 minute lighting maintenance and IHTs remained in the TX Change Trailer.

After exiting the farm and doffing their Self-Contained Breathing Apparatus (SCBA) in the change trailer, Electrician 1 called Field Work Supervisor (FWS) and notified them of the smell. FWS told the personnel to leave the area and come to 272WA to fill out odor response cards. FWS immediately went into ST ADM's office at 272WA and gave them the second report of odors at TX Farm. ST ADM contacted CSM and TF-AOP-015 was entered at 1410. All five personnel detecting odors for the second occurrence reported no symptoms and declined medical evaluation.

Having overheard conversations between ST ADM and ST Maintenance Manager and without formal direction from management, Industrial Hygienist 1 (IH 1) went to TX Farm to follow-up on odor reports with the crew. Upon arrival at TX Farm, IH 1 also noticed the odor outside of MO-817. IH 1 filled out an odor response card and reported no symptoms and declined medical evaluation.

At 1411 ST ADM reported that all personnel cleared the TX Farm area and are accounted for. At 1435 Relief Central Shift Manager (Relief CSM) reports that the affected area has been restricted and posted. Shift IHT 1 and Shift IHT 2 were dispatched at 1410 and reported DRI reading as below action levels at
1529. Shift IHT’s also took two Tedlar bag samples and delivered them to the 2704HV lab for processing. Sample analysis of the bags was completed and reported as below action limits at 1823 on October 18, 2017. At this time TF-AOP-015 entry was exited. At 2148 the area outside of TX Change Trailer was down posted.

On October 19, 2017 Engineer 1 heard of the TF-AOP-015 entry and came to the Central Shift Office (CSO) to report that they too had smelled the odor occurring on October 18, 2017 at approximately 1100 when they were driving past TX Farm to head to lunch. Engineer 1 experienced no symptoms and declined medical evaluation.

**AOP-015 Summary**

<table>
<thead>
<tr>
<th>Event</th>
<th>AOP-015 Entry outside of TX Change Trailer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date/Time of Event</td>
<td>October 18, 2017</td>
</tr>
<tr>
<td></td>
<td>First occurrence ~1030</td>
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<tr>
<td></td>
<td>Second occurrence ~1330</td>
</tr>
<tr>
<td>Location</td>
<td>TX Farm, outside Change Trailer MO-817</td>
</tr>
<tr>
<td>Personnel Affected</td>
<td>1st Occurrence:</td>
</tr>
<tr>
<td></td>
<td>2 Electricians</td>
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<tr>
<td></td>
<td>2 HPTs</td>
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<td></td>
<td>1 NCO</td>
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<td>1 Engineer</td>
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<td>2nd Occurrence:</td>
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<tr>
<td></td>
<td>3 Electricians (same as first occurrence)</td>
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<tr>
<td></td>
<td>2 HPTs (same as first occurrence)</td>
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<td></td>
<td>1 IH</td>
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<tr>
<td>Odor/Taste</td>
<td>Odor described as onion, body odor (B.O.), earthy, musty and burnt rubber</td>
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<tr>
<td>Symptoms</td>
<td>None</td>
</tr>
<tr>
<td>Direct Reading Instrumentation (DRI) Result during Event</td>
<td>Shift IHT 1 performed DRI sweeps for first occurrence at ~1310 and completed at ~1340 with readings less than detectable. Shift IHT 1 and Shift IHT 2 dispatched for second occurrence at 1410 and reported their readings at 1529 as less than detectable</td>
</tr>
<tr>
<td>Industrial Hygiene (IH) Investigative Monitoring/Sampling</td>
<td>~1410-1429 Shift IHTs deployed to obtain Respiratory Protection Equipment (RPE) and report to the field. Shift IHTs pulled 2 Tedlar bags and performed Ammonia (NH3) and total Volatile Organic Compound (VOC) monitoring. Bag samples were delivered immediately to 2704HV Lab. At 1823 sample analysis for the AOP-015 completed with results below action limits</td>
</tr>
<tr>
<td>Possible Source(s)</td>
<td>Barometric pressure conditions combined with TX Farm tank vapors/tank waste, Pelletized herbicide application mixed with rain</td>
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<tr>
<td>Weather Conditions on October 18, 2017</td>
<td>Time</td>
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<table>
<thead>
<tr>
<th>Work Description</th>
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<tr>
<td>Waste Disturbing or Tank Work in Adjacent Area</td>
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<tr>
<td>Mission Support Alliance (MSA) Teamsters present at TX Farm picking up Genie lift</td>
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**Investigation Summary**

On October 18, 2017 at approximately 0815 Electrician 1, Electrician 2 and Electrician 3 entered TX Farm to perform lighting maintenance along with two HPTs, HPT 1 and HPT 2, performing coverage for the work. Upon entry into the farm personnel noted there was a slight breeze heading from the direction described as blowing from NE to SW with no odors present. The morning work was being concluded for lunch at approximately 1015. At this time conditions were noted as having no wind present. HPTs were inside the farm surveying out the lift used for re-lamping activities of TX Farm’s RBA. HPT 1 concluded surveying electricians and was exiting the farm through TX Farm change trailer, MO-817. HPT 2 was still inside TX Farm surveying the lift out of the Radiological Buffer Area (RBA) and across the gravel roadway into the fenced Radiological Materials Area (RMA). HPT 1 noted smelling an onion like odor as soon as they exited the change trailer. Upon exit from the farm two of the three electricians and HPT 2 also noted smelling the onion like odor, one electrician did not detect an odor. NCO 1 who was outside TX Farm performing routine Electronic Shift Operations Management System (eSOMS) rounds also noticed the odor. All personnel remarked the odor was detected at approximately 1030, however no reports were made at this time.

At approximately 1045, ST Maintenance Manager arrives at the RMA across from TX Farm to ensure a recall notification did not apply to a Genie lift. Electrician 1 stated in passing to ST Maintenance Manager, "Something smells kinda stinky out here." Their conversation was concluded and Electrician 1 followed suit of HPT 1, HPT 2, Electrician 2, Electrician 3 and NCO 1 to lunch. ST Maintenance Manager left the RMA shortly after checking the Genie lift and during interviews stated they never detected an odor. Follow-up interviews with Electrician 1 were conducted and they stated they did not believe the conversation they had with ST Maintenance Manager was notification of an event.

During lunch the electricians were discussing the odor and Electrician 1 walked to ST OE's office and reported the odor to them at approximately 1230. ST OE then immediately reported this information to
ST ADM. ST ADM requested all five personnel having detected the odor complete odor response cards. All five personnel smelling the odors, plus the two that did not report odors, had no symptoms and declined medical evaluation. (Odor response cards were sent to the CSM at approximately 1337.)

At 1255 ST ADM contacted the CSM to inform them of the odor report. CSM questioned why the odor had not been reported sooner. In interviewing ST ADM they stated that they may have been given a reason but due to their frustration with the situation they do not recall having been given a reason for the delay in the odor report.

From interviewing the CSM they stated that they did not enter TF-AOP-015, “Response to Reported Odors or Unexpected Changes to Vapor Conditions” which states;

2.0 Entry Conditions:
This AOP is for odors reported at the time the event occurred, so that timely data collection is achievable.

2.1.1 NOTIFICATION from personnel that odors are present and meet any of the following conditions:
Odors have caused symptoms of exposure (e.g., headaches, irritation of the skin, eyes, nose, or lungs, nausea, difficulty breathing, metallic taste in mouth)

A stronger than normal odor is detected by multiple personnel outside of areas where potential or actual vapor concerns are expected such as waste transfers, 242-A operations, or cover block removal.

TF-AOP-015 was not entered since the report did not reach the CSM until ~1257, approximately 2.5 hours after the odor was noticed at TX Farm, and because no symptoms were reported. Even though entry into TF-AOP-015 was not made, at approximately 1310, the CSM dispatched Shift IHT 1 to perform DRI sweeps outside of TX Farm near MO-817, in the area where the odors were reported. At 1340 Shift IHT 1 reported DRI readings below action levels.

Because an entry into TF-AOP-015 was not made and because no verbal direction was provided to the crew returning to work at TX Farm, at 1330 the electricians and HPTs resumed their work at TX Farm, even though the same odor was present. The 3 electricians entered the farm to complete the 10-15 minute lighting maintenance and HPTs remained in the TX Change Trailer. After exiting the farm and doffing their SCBA in the change trailer, Electrician 1 called FWS and notified them of the smell. FWS told the personnel to leave the area and come to 272WA to fill out odor response cards. FWS immediately went into ST ADM's office at 272WA and gave them the second report of odors at TX Farm. ST ADM contacted CSM and TF-AOP-015 was entered at 1410. All five personnel detecting odors for the second occurrence reported no symptoms and declined medical evaluation.

Having overheard conversations between ST ADM and ST Maintenance Manager and without formal direction from management, IH 1 went to TX Farm to follow-up on odor reports with the crew. When IH 1 reached TX Farm it was vacant. IH 1 called the Hanford Meteorological Station (MET Station) and asked for the wind and barometric pressure conditions of the area for the last 4 hours and was told that
the pressure was steadily dropping and wind was 0-2 MPH North to South. IH 1 stated that personnel reporting from the MET station concurred with IH 1 that the smell was common for those weather conditions and this area at this time of year. IH 1 reported smelling the odor at approximately 1410 just outside of MO-817. IH 1 was at TX Farm for a few minutes and returned to 272WA to fill-out an odor response card and reported no symptoms and declined medical evaluation. (Odor response cards were sent to the CSM at approximately 1450 for the second occurrence.)

At 1411 ST ADM reported that all personnel cleared the TX Farm area and are accounted for. At 1435 Relief CSM reported that the affected area has been restricted and posted. Two MSA teamsters were reported to have been outside MO-817 during the second entry into TX Farm, but it was confirmed with their manager that they had already cleared ST area and were in the east area when the TF-AOP-015 entry was made. The MSA teamsters reported having smelled no odors and declined medical surveillance.

Shift IIHT 1 and Shift IIHT 2 were dispatched at 1410 and at 1529 reported DRI readings as below action levels. Shift IIHT's also took two Tedlar bag samples and delivered them to the 2704HV lab for processing. Sample analysis of the bags was completed and reported as below action limits at 1823 on October 18, 2017. At this time TF-AOP-015 entry was exited. At 2148 the area outside of TX Change Trailer was down posted.

On October 19, 2017 Engineer 1 heard of the TF-AOP-015 entry and went to the CSÖ to report that they too had smelled the odor occurring on October 18, 2017 at approximately 1100 when they were driving past TX Farm to head to lunch. Engineer 1 experienced no symptoms and declined medical evaluation. An odor response card was submitted by Engineer 1 to the CSO.

During interviews when asked if personnel had any indications as to where the smell was coming from it was noted that the odor experienced is common during the spring and fall months for this area. It was also mentioned that the smell could be a source from pelletized herbicide having recently been dispersed near the farm. It was confirmed on The Daily Report Sheet from October 5, 2017 that herbicide was applied to the 241TX Tank Farm Interior.

End of Summary

Personnel interviews were conducted in lieu of Fact Finding Meeting for this event.

Event Timeline

October 18, 2017

~0815: 3 Electricians & 2 HPTs arrived at TX Farm to perform lighting maintenance

~1015: 3 Electricians and 2 HPT exited TX Farm for lunch

1030: Odor detected outside of change trailer MO-817 by Electrician 1, Electrician 2, HPT 1, HPT 2 & NCO 1

1045: ST Maintenance Manager arrived at RMA across from TX Farm, Electrician 1 mentions odor
1230: Electrician 1 notified ST OE of 1030 odor at TX Farm
~1240: First odor report personnel to ST ADM office to fill out odor response cards
1255: CSM contacted by ST ADM regarding first odor report
1310: Shift IHT 1 dispatched from CSO to perform DRI sweeps where odor was reported near MO-817
1330: The 3 electricians and 2 HPTs returned to TX Farm to resume work prior to lunch
1337: Odor response cards from first report of odors sent to CSM
1340: Shift IHT 1 reported DRI readings from first odor report below action level
~1345: Electrician 1 called FWS and notified them of the smell. FWS directed personnel to leave the area and come to 272WA to fill out odor response cards
1410: IH 1 reported smelling the odor just west of MO-817 and returned to 272WA and filled out an odor response card
1410: Entered TF-AOP-015 for odors reported outside of TX Farm change trailer
1410: Shift IHT 1 and Shift IHT 2 dispatched from CSO to perform DRI sweeps where odor was reported near MO-817 and pulled 2 Tedlar bags to perform NH3 and total VOC monitoring
1411: ST ADM reported that all personnel cleared the TX Farm area and are accounted for
1435: Relief CSM reported that the affected area has been restricted and posted
1435: MSA supervisor confirmed with Relief CSM that MSA teamsters reported as being outside of MO-817 during the second entry were in east area prior to TF-AOP-015 entry
1450: Odor response cards from second report of odors sent to CSM
1529: Shift IHT 1 and Shift IHT 2 reported DRI readings from second odor occurrence as below action levels
1823: Sample analysis of the bags were completed and reported as below action limits
1823: Exited TF-AOP-015 for odors reported just west of TX Farm change trailer
2148: Area west of TX Change Trailer down posted

*Throughout the course of this event Department of Energy Facility Representative (DOEFR) was made aware of the events taking place.*

October 19, 2017
Initiated event investigation "AOP-015 entry outside TX change trailer."
After hearing a TF-AOP-015 entry was made Engineer 1 reported to the CSO that they too had smelled the odor occurring on October 18, 2017 at approximately 1100 when they were driving past TX Farm to head to lunch. Engineer 1 experienced no symptoms and declined medical evaluation. An odor response card was submitted by Engineer 1 to the CSO.

October 25, 2017
In response to this event WRPS-PER-2017-2434, "Odors were Reported by Five Individuals Outside TX Farm by the TX/TY Change Trailer", was generated.

November 2, 2017
WRPS-PER-2017-2491, "TX Farm Odor Response", WRPS-PER-2017-2492, "TX Farm Odor Response 2" and WRPS-PER-2017-2493, "TX Farm Odor Response", were generated as a result of the responses taking place during this event.

**Preliminary Extent of Condition Review**

This TF-AOP-15 entry was specific to the area outside of TX-Farm change trailer MO-817, and odors were detected outside of Tank Farm boundaries. Given the potential source and associated potential causes, the preliminary extent of condition is bound to the immediate area.

**Discussion of Potential Causes**

1. During interviews with IH personnel and information gathered from the MET Station it was determined that the barometric pressure conditions could be a contributing factor to the odor. Barometric pressure differences, in this case decreasing pressure, decreasing temperature outside due to seasonal changes and higher temperatures inside the tanks all combined can cause gas to escape from the tanks. (Attachment 1)

2. It was suggested during interviews that odors could have possibly came from a pelletized herbicide application stimulated by recent rain. Daily Report sheets document that a Non-Selective Herbicide was applied along the 241TX Tank Farm interior on October 5, 2017.

**Immediate Actions**

1. Shift IHT dispatched from CSO to perform DRI sweeps for 1030 odor report with readings reported below action levels.

2. Entered TF-AOP-015 for 1410 odor report, IHTs dispatched to perform DRI sweeps and pulled 2 Tedlar bags for NH3 and total VOC monitoring, with readings reported below action levels.

3. Following the second odor report all personnel were cleared from TX Farm area and accounted for. Affected area was restricted and posted.
**Recommendations/Proposed Corrective Actions**

1. Reinforce SWIM actions and warn/notify others at the presence of something such as abnormal odors present, see TF-AOP-015 ACTIONS below.
   a) Stopping work and reporting needs to happen at the first sign of adverse conditions.
   b) Management provide direction to workforce such as not entering areas where odors are being reported. Even though a TF-AOP-015 entry was not made, management still needed to communicate to the workforce the importance of stopping work immediately and notifying if any abnormal odors are present.
   c) During events and developing events personnel are not to respond to areas of concern unless formal direction is given by management. The chain of command needs to be heeded by all and responded to accordingly, particularly during abnormal situations.

### Response to Reported Odors or Unexpected Changes to Vapor Conditions

#### 3.0 ACTIONS

##### 3.1 Immediate Actions

**Implement SWIM Response Actions at Event Scene**

3.1.1 ASSIGN field lead to implement SWIM response actions.

**NOTE:** Evacuation does not include the Tank Farm change trailers or facilities such as the 242-A Evaporator building, unless odor issues are impacting the interior of the facility.

3.1.2 ANNOUNCE entering TF-AOP-015 over Tank Farms radio channel(s) AND SEND SOEN message that includes the following:
- Entry into TF-AOP-015
- Event and location
- Required actions for affected personnel/protective actions as applicable
- Access approval and authority as applicable.

3.1.3 STOP access to affected area except for activities required for safe operations or the TF-AOP-015 response.

3.1.4 NOTIFY other personnel as needed in adjacent work areas and/or other facilities that may not receive radio communication.

3.1.5 IF emergency assistance is required, CALL Hanford Fire Department (HFD) at 911.

3.1.6 IF the odor could impact a large area, CONSIDER activating a take cover per TF-ERP-001 and RLEP 1.1.

3.1.7 ISOLATE area AND MINIMIZE personnel exposure by preventing inadvertent entry into hazardous area.

3.1.8 ENSURE employees exhibiting symptoms report to Occupational Medicine for medical surveillance. (See TFC-ESHQ-S_CMLI-C-02),

3.1.9 OFFER medical surveillance to employees who detected odors.

3.1.10 REQUEST odor response card be completed and submitted to the Central Shift Manager.
Documents Reviewed:

1. Odor Response Cards
2. Industrial Hygienist Investigation Report
3. TF-AOP-015, "Response to Reported Odors or Unexpected Changes to Vapor Conditions"
4. Daily Reports from October 2nd-19th 2017
5. CSM log entries
6. Annotated chromatogram of bag sample survey #17-09153, taken in TX-TY area in response to the AOP-15
7. RPP-22491, "Industrial Hygiene Chemical Vapor Technical Basis"
8. WRPS-PER-2017-2434, "Odors were Reported by Five Individuals Outside TX Farm by the TX/TY Change Trailer"
9. WRPS-PER-2017-2491, "TX Farm Odor Response"
10. WRPS-PER-2017-2492, "TX Farm Odor Response 2"
11. WRPS-PER-2017-2493, "TX Farm Odor Response"

Attachments:

1. RPP-22491 "Industrial Hygiene Chemical Vapor Technical Basis", Page 24
2. Industrial Hygienist Investigation Report, 28 pages
3. Pictures of TX Farm
3.0 MEASURED AND PROJECTED HEADSPACE COMPOSITIONS

Headspace gas and vapor characterization was systematically conducted in the 1990s on those SSTs thought to have the highest concentrations of noxious gases and vapors (WHC-EP-0562). Samples were collected from a majority of the SSTs and analyzed using robust methods that allowed the quantification of the major volatile waste species (e.g., hydrogen, nitrous oxide, ammonia) and the identification of a broad array of trace organic vapors to provide source term data to the IH program (WHC-SD-WM-ER-514). Vapor headspace sampling has continued through the present, and over 2,000 headspace samples have been collected and analyzed since 1994, and over 1,200 organic vapors have been identified in the waste tank headspaces (PNWNL-13566). These headspace characterization data indicate the following:

- Which chemicals may be released into the worker breathing zone,
- Identification of tanks from which chemicals may be released, and
- Approximate maximum chemical concentrations at the point of release.

This section provides overviews of vapor sampling basics, sampling media and analytical methods, the characterization data, the observed variability in headspace compositions with time, and a discussion of the effects of waste-disturbing activities.

3.1 VAPOR SAMPLING BASICS

Vapor source characterization is best done by sampling the air inside the headspaces of the passively-ventilated tanks and at the exhaust stacks of the actively-ventilated tanks. Tank headspace air from passively-ventilated tanks should be collected from the headspace itself; far enough below the end of the riser to avoid air drifting down the riser. Samples collected directly from a riser may not be representative of the headspace. Source samples collected at likely points in the worker breathing zone (e.g., at the breather filter) should be accompanied by vapor monitoring (e.g., an ammonia monitor) to demonstrate that tank air was being emitted by the source.

As a general rule, it is desirable to minimize the tubing, valves, filters, etc. between the sampling devices (e.g. sorbent traps, SUMMA1 canisters, bubblers) and the air being sampled. This reduces the loss of analytes via adsorption onto tubing walls, the filter, etc., and the potential for condensation of water vapor. Sampling manifold components that must be upstream of the sampling devices should be free of contaminants (such as plasticizers, perfluoroalkoxy, polyurethane foam; tubing is plasticizer-free) and chosen to minimize adsorption of analytes (e.g., C-Flex® and Tygon® are known to aggressively adsorb many analytes and should not be used). Cleaning of the manifold should be done with consideration of the analytes being sampled and any previous uses of the manifold. To ensure cleaning solvents do not get trapped in valves and at tubing connections, it is advisable to completely dismantle all manifold components before cleaning, and thoroughly dry all components before reassembly.

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1 SUMMA is a trademark of Nislerics, Inc., Cleveland, Ohio.
Attachment 2: TF-AOP-015 Industrial Hygiene Investigation Report

1. Field response actions:
   Event Summary (including number of workers involved and activity in progress):
   Event 1: 2 Electricians, 2 HPT's and 1 NCO performing re-lamping outside of TX change trailer
   noticed stronger than usual "onion, B.O., earthy, musty" odor at approximately 1030. Crew continued
   working and reported odors to CSO at 1250. CSM deployed IHT shift workers to perform DRI sweep of the
   area. DRI sweeps were less than (<) detectable for total VOC and NH3. Workers were cleared to continue
   with work.
   Event 2: 2 Electricians and 2 HPT's from the 1st event crew, with 1 NCO experienced stronger than usual
   "onion, B.O., earthy, and/or musty" odor at approximately 1330. Additionally, during a follow-up to event 1
   at approximately 1410, 1 IH documented odors near TX as "onion, B.O.." According to the IH during phone
   turnover, odors are consistent with those experienced in the past for the location. CSM received report of
   odors at 1410 and entered AOP-15. No symptoms reported and all personnel declined medical.

   • Was an IHT Present during initiating event? [ ] Yes [X] No
     o IH Monitoring/ Sample Survey Reports:
     - 17-09153 Odor Response Outside TX-Farm AOP-015

Weather Conditions at Time of Event:
- Weather station: 1030 10/18/2017
  - Wind Direction & Speed: 3mph ENE
  - Barometric Pressure (steady/rising/falling): 29.22 inHg and steady
  - Temperature (°F): 51.6°F
  - Humidity: 38.1%

Weather Conditions at Time 2nd of Event:
- Weather station: 1230 10/18/2017
  - Wind Direction & Speed: 3mph ENE
  - Barometric Pressure (steady/rising/falling): 28.05 inHg and falling
  - Temperature (°F): 54.7°F
  - Humidity: 70%

Field Response Timeline:
1410 CSO enters AOP-15 for odors outside the farm around the TX change trailer. SCEN issued: "Entering
AOP-015 for odors outside the farm around the TX change trailer. Stay clear of this area and move to
an upwind location. CSM"
1411 COMS/ENV IHs arrive at CSO and briefed by CSM.
1412 COMS IH notifies shift IH supervisor.
1414 IHT supervisor arrives at CSO.
1415 IHT supervisor calls shift IHs.
1416 AN IH calls EV IH: AN IH informs EV IH that IH Program Chemist and Instrument Custodian
have been contacted and are preparing HAPSITE.
1419 Shift IHs arrive at CSO. Inform CSO personnel that Direct Reading Instrumentation (DRI)
sweeps for NHs and total VOC were completed in response to first event. Readings were all
Time/Date & Event Location:
1030 10/18/2017 and 1330 10/18/2017 Outside 241-TX Farm
less than detectable with no detectable odors. Sweeps were performed at approximately 1310 and completed around 1340.

1420 COMS and EV IH brief IHTs.
1421 CSM briefs shift IHTs.
1423 Tank waste as possible odor source determined to be feasible by IH based upon odor history and odors reported.
1424 Shift IHTs deployed to obtain RPE and report to the field. IHTs instructed to pull 2 Tedlar bags and perform additional NHs and total VOC monitoring.
1428 IH manager updates IH programs AOP-016 SME. AOP-016 SME en-route to site to meet with IH Program Chemist
1433 CSM notified more than 3 personnel reported odors.
1436 CSM updated by shift NCO that barricades are in place.
1438 ST IH contacts EV IH with update. ST IH reported odors were typical for the area.
1503 Second set of Odor Response Cards arrive at CSO. 6 cards (2 Electricians, 2 HPTs, 1 NCO and 1 IH).
1528 IHT supervisor called COMS IH: DRI sweeps are completed with <detectable readings found. Tedlar bags are delivered to the IH lab at 2704HV. IH Program Chemist running 1mm/100ml method on HAPSITE.
1540 Shift IHTs post instrumentation. NHs and VOC pass post testing.
1555 IHT supervisor updates COMS IH on the need to call OT for HAPSITE analysis.
1558 IH OT callout found no volunteers from all qualified IHT staff.
1559 IHT Supervisor contacts Instrument Custodian who is performing HAPSITE run. Approximately 12 min left on blank and should be able to complete run by end of shift. 1 Bag will be run tonight and 1 will be saved.
1600 IHT supervisor notifies IH Program Chemist of update and of approximate time results will be sent. IH supervisor then attempts to contact CSO with update regarding cancellation of overtime.
1603 CSO contacts IHT supervisor and receives update.
2150 SOEN issued: “Sample analysis for the TF-AOP-016 event has been completed and the results are below action limits. Exiting TF-AOP-015. CSM”
10/19/2017
1503 Engineering support personnel driving to lunch near TX farm at time of AOP-015 (1100 on 10/18/2017) sends odor response card to CSO. Description includes “burnt rubber” odor with no symptoms.
2. GCMS Sample Results:

AOP-15 TX Farm 10-18-2017
Survey 17-09153
Zero VOC and NH3 via DRI
TX-TY sample in BLUE
Sample bag outgassing in RED
Compounds of Interest circled in GREEN

[Graph showing GCMS results]
3. Additional Information:
   • Odor Response Cards received:

   ![Odor Response Card - 241-TX Farm]

   1. Notify immediate supervisor.
   2. Contact Central Shift Manager. Provide the bulletted information below.
   3. Complete map, return to Central Shift Office as soon as possible.
   4. Notify Immediate Supervisor.
   5. Contact CSM. Complete below indicated information and map:
      • Your name and the work you were performing.
      • Your symptoms (if any).
      • Date and time odor was noticed.
      • Location of odor (mark area on map and winds direction).
      • Describe the odor.
      • Name of other persons nearby the affected area.
      • Was an SHT present?
      • Possible source.
   6. Provide information on the back of card.
   7. Send this card immediately to the Central Shift Office.
Time/Date & Event location:
1030 10/18/2017 and 1330 10/18/2017 Outside 241-TX Farm

ODOR RESPONSE CARD - 241-TX FARM

1. Contact CSIA, Complete below bulleted Information and map.
   ○ Date and time odor was noticed 10-18-17 10:30 am
   ○ Your name and the work you were performing
   ○ Location of odors (mark area on map and wind direction)
   ○ Name(s) of others in or near the affected area
   ○ Was an IHT present? No
   ○ Describe the odor □ Sweet □ Sour □ Musty □ Earthy □ Metallic □ Smoky □ Robbery □ Onion
     □ Cleaning Solution □ Ammonia □ Other:
   ○ Possible Source

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

2. Send this copy to the Central Office.
   No Symptoms
Washington River Protection Solutions
TF-AOP-015 INDUSTRIAL HYGIENE INVESTIGATION REPORT

Time/Date & Event location:
1030 10/18/2017 and 1330 10/18/2017 Outside 241-TX Farm

ODOR RESPONSE CARD - 241-TX FARM

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.
4. Notify Immediate Supervisor.
5. Contact CSRM. 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 odor (mark area on map and the wind direction)
   - Describe the odor
   - Name of other in or near the affected area
   - Was an H-T present?
   - Possible source
6. Provide information on the back of card.
7. Send this card immediately to the Central Shift Office.

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ODOR RESPONSE CARD - 241-TX FARM

1. Contact CSM. Complete below bulleted information and map.
   - Date and time odor was noticed: 10-18-2017 @ 1030
   - Your name and the work you were performing: [Redacted] - HPT
   - Location of odors (mark area on map and wind direction): Outside TyTy Change Trailers
   - Name(s) of others in or near the affected area: [Redacted] and Electricians
   - Was an IHT present? No
   - Describe the odor: [Redacted] - Other: Body Odor
   - Possible Source: [Redacted]
   - Your symptoms (if any): [Redacted]

2. Send this card to the Central Shift Office.
Washington River Protection Solutions
TF-AOP-015 INDUSTRIAL HYGIENE INVESTIGATION REPORT

Time/Date & Event location:
1030 10/18/2017 and 1330 10/18/2017 Outside 241-TX Farm

ODOR RESPONSE CARD - 241-TX FARM

1. Notify Immediate Supervisor.
2. Contact Central Shift Manager.
   Provide the indicated information below.
3. Complete map, return to Central Shift Office
   as soon as practicable.
   (Footnote: Indicated ON/TU Syndrome)
4. Notify Immediate Supervisor.
5. Complete OSHA.
   Complete此次 indicated information and
   map.
   - Your name and the work you were
     performing
   - Your symptoms (if any)
   - Date and time odor was noticed
   - Location of odor (mark area on map
     and the wind direction)
   - Describe the odor
   - Name of other in or near the affected
     area
   - Was an OIT present?
   - Possible source
6. Provide information on the back
   of card.
7. Contact Central Shift Manager.
   Return to Central Shift Office.

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ODOR RESPONSE CARD - 241-TX FARM

1. Contact CSM, Complete below bulleted information and map.
   - Date and time odor was noticed: 10-18-17, 10:30
   - Your name and the work you were performing: [Redacted]
   - Location of odor (mark area on map and wind direction): outside of the Tyson change tower
   - Name(s) of others in or near the affected area: [Redacted]
   - Was an IHT present? No
   - Describe the odor: [Check all that apply] Sweet, Sour, Musty, Metallic, Smoky, Rotten, Onion, Cleaning Solution, Ammonia, Other: [Redacted]
   - Possible Source: I do not know
   - 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: [Redacted]

2. Send this card to the Central Shift Office.
WASHINGTON RIVER PROTECTION SOLUTIONS
TF-AOP-015 INDUSTRIAL HYGIENE INVESTIGATION REPORT

Time/Date & Event location:
1030 10/18/2017 and 1330 10/18/2017 Outside 241-TX Farm

ODOR RESPONSE CARD - 241-TX FARM

1. Notify Immediate Supervisor.
2. Contact Central Shift Manager.
   Provide the bulletin information below.
3. Complete map, return to Central Shift Office as soon as practicable.
   [Map section]
5. Contact CSAR, complete below bulletin 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 areas on map and the wind direction)
   - Describe the odor
   - Name of other in or near the affected area
   - Was an BIT present?
   - Possible source
6. Provide information on the back of card.

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ODOR RESPONSE CARD - 241-TX FARM

1. Contact CSM, Complete below bulleted information and map.
   - Date and time odor was noticed: 10/18/17
   - Your name and the work you were performing:
   - Location of odors (mark area on map and wind direction):
   - Name(s) of others in or near the affected area:
   - Was an IHT present?
   - Describe the odor: [Select options]
   - Possible Source:
   - Your symptoms (if any): [Select options]

2. Send this card to the Central Shift Office.
Washington River Protection Solutions

TF-AOP-015 INDUSTRIAL HYGIENE INVESTIGATION REPORT

Time/Date & Event location:
1030 10/18/2017 and 1330 10/18/2017 Outside 241-TX Farm

ODOR RESPONSE CARD - 241-TX FARM

1. Notify immediate supervisor.
2. Contact Central Shift Manager. Provide information below.
3. Complete map, return to Central Shift Office as soon as possible.
4. Notify immediate supervisor.
5. Contact GSM complete below bulleted information and map.
   - Your name and the work you were performing
   - Symptoms (if any)
   - Date and time odor was noticed
   - Location of odor (mark area on map and the wind direction)
   - Describe odor
   - Name of other in or near the affected area
   - Was an HV present?
   - Possible source
6. Provide information on the back of card.
7. Send this card and map to
   Central Shift Office

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ODOR RESPONSE CARD - 241-TX FARM

1. Contact CSM, Complete below bulleted information and map.
   • Date and time odor was noticed 10:30 AM 10-18-17
   • Your name and the work your were performing
   • Location of odors (mark area on map and wind direction) N North
   • Name(s) of others in or near the affected area
   • Was an IHT present?
   • Describe the odor □ Sweet □ Sour □ Musty □ Earthy □ Metallic □ Smoky □ Rotten 22 Onion □ Cleaning Solution □ Ammonia □ Other:
   • Possible Source
   • Your symptoms (if any) □ Headache □ Dizziness/Light-Headed □ Nausea □ Cough □ Fatigue/Weakness □ Sore/Throat □ Difficulty Breathing □ Watery/Irritated Eyes/Trouble with Vision □ Tingling/Numbness/Paralysis □ Rash/Irritation □ Other:
     □ No

2. Forward to the Control Shift Office.

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Time/Date & Event location:
1030 10/18/2017 and 1330 10/18/2017 Outside 241-TX Farm

ODOR RESPONSE CARD - 241-TX FARM

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.
4. Notify Immediate Supervisor.
5. Contact CSM, complete below noted information and map:
   - Year name and the work you were performing
   - Year symptoms (if any)
   - Data and time odor was noticed
   - Location of odor (mark area on map and the wind direction)
   - Describe the odor
   - Name of other in or near the affected area
   - Was an H2S present?
   - Possible source
6. Provide information on back of card.

Page 1 of 2
ODOR RESPONSE CARD - 241-TX FARM

1. Contact CSM, Complete below bulleted information and map.
   ○ Date and time odor was noticed: 4/10/12 17:41
   ○ Your name and the work you were performing: [Redacted]
   ○ Location of odor (mark area on map and wind direction): [Redacted]
   ○ Name(s) of others in or near the affected area: [#A]
   ○ Was an IHT present? No
   ○ Describe the odor: Sweet, Sour, Rotten
   ○ Cleaning Solution: TX/TV
   ○ Possible Source: Ammonia
   ○ 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
      □ No

2. Send this card to the Central Shift Office.
Washington River Protection Solutions
TF-AOP-015 INDUSTRIAL HYGIENE INVESTIGATION REPORT

PER Number: N/A
EIR Number: EIR-2017-35

Time/Date & Event location:
1030 10/18/2017 and 1330 10/18/2017 Outside 241-TX Farm

ODOR RESPONSE CARD - 241-TX FARM

Odors Detected with NO
Immediate symptoms

1. Notify Immediate Supervisor.
2. Contact Control Shift Manager. Provide the buffeted information below.
3. Complete map, return to Control Shift Office as soon as practicable.
4. Notify Immediate Supervisor.
5. Contact GUN. Complete below buffeted information and map.

- Your name and the work you were performing
- Your symptoms (if any)
- Date and time odor was noticed
- Location of odor (mark area on map and the wind direction)
- Describe the odor
- Name of other(s) or near the affected area
- Was an HRT present?
- Possible source

6. Provide Information on the back of card.

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241-TX FARM
Washington River Protection Solutions
TF-AOP-015 INDUSTRIAL HYGIENE INVESTIGATION REPORT

Time/Date & Event location:
1030 10/18/2017 and 1330 10/18/2017 Outside 241-TX Farm

ODOR RESPONSE CARD - 241-TX FARM

1. Contact CSM, Complete below bulletted information and map.
   a. Date and time odor was noticed 10.18.17 6:30 pm
   b. Your name and the work you were performing [Redacted]
   c. Location of odor (mark area on map and wind direction) [Redacted]
   d. Name(s) of others in or near the affected area [Redacted]
   e. Was an IHT present? [Redacted]
   f. Describe the odor □ Sweet □ Sour □ Musty □ Earthy □ Metallic □ Smoky □ Rotten □ Onion
      □ Cleaning Solution □ Ammonia □ Other: □
   g. Possible Source [Redacted]
   h. Your symptoms (if any) □ Headache □ Dizziness/Light-Headed □ Nauseas □ Cough
      □ Fatigue/Drowsiness/Weakness □ Sore/Burning Throat □ Difficulty Breathing
      □ Watery/Redness Eyes/Trouble with Vision □ Tingling/Numbness/Paralysis □ Rash/Nicking
      □ Other: [Redacted]

2. Send this report to the Central Shift [Redacted]
ODOR RESPONSE CARD - 241-TX FARM

1. Contact CSM, Complete below bulleted information and map.
   - Date and time odor was noticed: 1:30 PM 10-18-17
   - Your name and the work you were performing:
   - Location of odors (mark area on map and wind direction):
   - Name(s) of others in or near the affected area:
   - Was an IHT present?: No

2. Describe the odor:
   - Sweet
   - Sour
   - Musty
   - Earthy
   - Metallic
   - Smoky
   - Rotten
   - Onion
   - Cleaning Solution
   - Ammonia
   - Other:

3. Possible Source:
   - Headache
   - Dizziness/Light-Headed
   - Nausea
   - Cough
   - Fatigue/Weakness
   - Sore/Burning Throat
   - Difficulty Breathing
   - Watery/Red/Itchy Eyes/Trouble with Vision
   - Tingling/Numbness/Paralysis
   - Rash/Itching
   - Other: Note: I know 100% this is true.

Send this card 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: 10-18-17 1:30 PM
   - Your name and the work you were performing: [redacted]
   - Location of odor(s) (mark area on map and wind direction)
   - Name(s) of others in or near the affected area
   - Was an IH present? [redacted]
   - Describe the odor: Sweet, Sour, Musty, Earthy, Metallic, Smoky, Rotten, Onion
     - Cleaning Solution, Ammonia, Other
   - Possible Source:
     - Your symptoms (if any): Headache, Dizziness/Lightheaded, Nausea, Cough
     - Fatigue/Drowsiness/Weakness, Sore/Running Throat, Difficulty Breathing
     - Watery/Red/Itched Eyes/Trouble with Vision, Tingling/Numbness/Paralysis, Rash/Itching
     - Other: NO Symptoms

2. Submit this to the IH Specialist
Washington River Protection Solutions
TF-AOP-015 INDUSTRIAL HYGIENE INVESTIGATION REPORT

Time/Date & Event location:
1030 10/18/2017 and 1330 10/18/2017 Outside 241-TX Farm

<table>
<thead>
<tr>
<th>ODOR RESPONSE CARD - 241-TX FARM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Contact CSM, Complete below bulleted information and map.</td>
</tr>
<tr>
<td>- Date and time odor was noticed <strong>10-18-17</strong> 10:30</td>
</tr>
<tr>
<td>- Your name and the work you were performing ____________ HPT ____________</td>
</tr>
<tr>
<td>- Location of odors (mark area on map and wind direction) <strong>outside of the 241-TX change trailer</strong></td>
</tr>
<tr>
<td>- Name(s) of others in or near the affected area ________________</td>
</tr>
<tr>
<td>- Was an HRT present? <strong>NO</strong></td>
</tr>
<tr>
<td>- Describe the odor <strong>Sweet, Sour, Musty, Earthy, Metallic, Smoky, Rotten, Onion</strong></td>
</tr>
<tr>
<td>- Cleaning Solution, Ammonia, Other: ____________</td>
</tr>
<tr>
<td>- Possible Source ____________</td>
</tr>
<tr>
<td>- Your symptoms (if any) <strong>Headache, Dizziness, Light-Headed, Nauseas, Cough</strong></td>
</tr>
<tr>
<td><strong>Fatigue, Drowsiness, Weakness, Sore/Burning Throat, Difficulty Breathing</strong></td>
</tr>
<tr>
<td><strong>Water/Irritated Eyes, Trouble with Vision, Tingling, Numbness, Paralysis, Rash/Itching</strong></td>
</tr>
<tr>
<td>__Other: ____________</td>
</tr>
<tr>
<td>2. Send this card to the contact center ____________</td>
</tr>
</tbody>
</table>

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Washington River Protection Solutions

TF-AOP-015 INDUSTRIAL HYGIENE INVESTIGATION REPORT

Time/Date & Event location:
1030 10/18/2017 and 1330 10/18/2017 Outside 241-TX Farm

ODOR RESPONSE CARD - 241-TX FARM

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.
   [Map of 241-TX Farm]
5. 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 odor (mark area on map and the wind direction)
   • Describe odor
   • Name of other in or near the affected area
   • Was an HRT present?
   • Possible source
6. Provide information on the back of card.
7. Send in immediately to Central Shift

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A-6006-744 (REV 4)
Washington River Protection Solutions
TF-AOP-015 INDUSTRIAL HYGIENE INVESTIGATION REPORT

Time/Date & Event location:
1030 10/18/2017 and 1330 10/18/2017 Outside 241-TX Farm

ODOR RESPONSE CARD - 241-TX FARM

1. Contact CSM, Complete below bulleted information and map.
   • Date and time odor was noticed 10-18-2017 @ 1400
   • Your name and the work you were performing
     [Redacted] HPT
   • Location of odor(s) (mark area on map and wind direction) Outside TX/RT Change Trailer
   • Name(s) of others in or near the affected area [Redacted] Electricians, Transistors
   • Was an HPT present? No
   • Describe the odor □ Sweet □ Sour □ Musty □ Earthy □ Metallic □ Smoky □ Rotten □ Onion
     □ Clearing Solution □ Ammonia □ Other: Body Odor
   • Possible Source [Redacted] I Don't Know
   • Your symptoms (if any) □ Headache □ Dizziness/Light-Headed □ Nausea □ Cough
     □ Fatigue/Drowsiness/Weakness □ Sore/Burning Throat □ Difficulty Breathing
     □ Watery/Itched Eyes/Trouble with Vision □ Tingling/Numbness/Paralysis □ Rash/Itching
     □ Other: None

Send this card to the Central Shift Office.
Washington River Protection Solutions
TF-AOP-015 INDUSTRIAL HYGIENE INVESTIGATION REPORT

Time/Date & Event location:
1030 10/18/2017 and 1330 10/18/2017 Outside 241-TX Farm

The following odor response card was received from the shift office 10/19/2017@1503.

ODOR RESPONSE CARD - 241-TX FARM

1. Contact CSM, Completes below bulleted information and map.
   - Date and time odor was noticed 10-18-17 1100
   - Your name and the work you were performing: [Redacted] to Lunch
   - Location of odor (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: [Redacted] Other: [Redacted]
   - Possible Source: [Redacted]
   - 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.
• Summary of IH Monitoring and Sampling Data:
  a. Monitoring:  
  b. Sampling: The Hapate results indicated sub part per billion traces of acetone, 1, 3-dichloropropene, toluene, mesitylene, and nonanal. There were no chemicals that exceeded action levels. At these lower levels a person would be unable to sense the compounds reported.

4. Summary of Employee Reported Information (e.g., symptoms):
Since the odors were noticed in the morning and again mid-afternoon, some employees turned in more than one odor response card. Eight employees filled out at least one card. One employee filled out two cards for the same time period. Reported odor in general was of an onion or body odor. One employee reported the odor as burnt rubber. No one experienced symptoms.

5. Recommendations/Conclusions:
Identification of Source of the Concern: [ ] Yes [x] No
Washington River Protection Solutions
TF-AOP-015 INDUSTRIAL HYGIENE INVESTIGATION REPORT

Time/Date & Event location:
1030 10/18/2017 and 1330 10/18/2017 Outside 241-TX Farm

The odor response cards did not offer information on a possible source. One employee thought it might be tank waste. There are no recommendations with regard to the event.

Other:
Strong onion odors were reported near Energy Northwest at 1500 hours and again later in the evening at 1833 hours.
Attachment 3: Pictures of TX Farm
Picture facing south, TX Farm to the left, fenced in RMA on the right