Event Investigation Report
EIR-2018-010
“Investigation of SY Farm Emergency Shower AOP-015 Event”
Executive Summary

On February 6, 2018 two Federal Engineers and Constructors (FE&C) employees, one electrician and one laborer, smelled a pine sol/lemony chemical odor while hand digging a trench to lay the electrical conduit for the SY Safety shower on the northwest corner of SY Farm exterior. The odor was detected at approximately 1020, employees immediately exited the area upon smelling the odor and returned to their office location in the 200E area, where they reported the odor to their Field Work Supervisor (FWS). The odor was reported to the Central Shift Office (CSO) at approximately 1040 by the employees’ FWS. Personnel were asked by their FWS and the Central Shift Manager (CSM) if they wanted to seek medical attention, but both individuals reported having no symptoms and declined a medical evaluation.

At approximately 1045 the CSM entered into an AOP-015 event for the reported odors, and at 1048 sent a Shift Office Event Notification (SOEN) notifying people to stay clear of the SY Farm area. At approximately 1050 two Production Operations Industrial Hygienists (PO IHs) and two Production Operations Shift Industrial Hygiene Technician supervisors (PO IHT supervisors) arrived at the CSO and were briefed by the CSM on the event status. At about 1101 the PO Shift IHTs were briefed by the PO IH on odor response actions. At approximately 1057 two PO Shift IHTs arrive at CSO and were briefed by the PO IH on response actions. At approximately 1104 event investigation EIR-2018-010, Investigation of SY Farm Emergency Shower AOP-015 Event, was initiated by the CSM. At approximately 1105 the PO Shift IHTs were deployed to acquire Respiratory Protective Equipment (RPE).

At approximately 1108 the area of concern was restricted and at approximately 1153 the PO IHT Supervisor updated the CSM that, utilizing Direct Reading Instrumentation (DRI), IHTs reported less than detectable for Ammonia (NH₃) and Volatile Organic Compounds (VOCs) on a sweep of reported odor location and sent grab bag samples to the 2704HV Labs for sampling. At approximately 1201 odor response cards were received at the CSO with no symptoms reported. At approximately 1726 the CSM reported that sample analysis for the event was completed with results below action limits and exited TF-AOP-015. WRPS-PER-2018-0296, SY Emergency Shower AOP-015 Event, was generated to document the issues.

End of summary
Personnel interviews were conducted in lieu of fact finding meeting for this event.
Event Timeline

February 6, 2018

0800: Two FE&C employees begin hand digging a trench to lay the electrical conduit for the SY Safety shower at the northwest corner of SY Farm exterior

~0945: FE&C employees take a break and arrive back at job site at 1000

1020: FE&C employees smell odor and immediately leave job site and return to their office in 200E and reported odor to their FWS

1040: FWS contacted CSM to report that while digging for installation of the SY safety shower concrete pad two personnel, one electrician and one laborer, experienced a chemical smell, later narrowed down to a pine sol/lemony smell

1045: Entered TF-AOP-015 for reported odors

1048: SOEN initiated, “Entering AOP-015 for odors on the exterior north/northwest side of SY Farm Stay clear of this area. CSM”

1049: PO IHT supervisor contacts PO Shift IHTs and asks them to report to CSO

1050: 2 PO IH, 2 PO IHT Supervisors arrive at CSO

1052: PO IHs and IHT supervisors briefed by CSM

1053: ST IH updates PO IH: “Pine sol” odor

1057: PO Shift IHTs arrive at CSO

1058: Projects IHs arrive at CSO and are briefed on situation and ongoing response actions

1101: PO Shift IHTs briefed by PO IH on response actions

1103: PO IHT Supervisor contacts Programs IHT Lead to facilitate HAPSITE warm up actions

1105: IHTs deployed to acquire RPE

1106: FWS contacted by CSM to get more specific location details

1108: CSM contacts mask issuing station supervisor for support on issuing RPE for responding IHTs

1108: Area of concern is restricted

1117: PO IHT supervisor notifies CSO staff that responding IHTs are en-route

1153: PO IHT supervisor updates CSM: IHTs reported < Level of Detection (LOD) for NH3 and VOC on sweep of reported odor location. Grab samples routed to 2704HV IHT lab

1155: 2 Projects IHs arrive at CSO and are briefed on situation and ongoing response actions

1158: Projects IHs head to event scene to acquire more information

1201: Odor response cards received at CSO

1211: Department of Energy on-call Fact Representative (DOEFR) notified of TF-AOP-015 event

1220: PO Shift IHTs contact PO IHT Supervisor with update. Readings from grab samples: Mercury (Hg) < LOD, Nitrous Oxide (N2O) < LOD

1725: SOEN: “Sample analysis for the TF-AOP-015 event has been completed and the results are below action limits. Exiting TF-AOP-015. CSM”

1725: TF-AOP-015 exited for report of odors

1725: DOEFR notified of TF-AOP-015 exit

End of event timeline
### Event Details

<table>
<thead>
<tr>
<th>Event</th>
<th>Investigation of SY Farm Emergency Shower AOP-015 Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date/time of event</td>
<td>February 6, 2018, time of occurrence ~1020</td>
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<tr>
<td>Location</td>
<td>North/Northwest of SY Farm exterior</td>
</tr>
<tr>
<td>Personnel affected</td>
<td>Two FE&amp;C employees, one project laborer and one electrician</td>
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<tr>
<td>Odor/taste</td>
<td>Odor described as a soap like cleaner, Windex, pine sol, lemony and cleaning solution</td>
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<td>Symptoms</td>
<td>None</td>
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<tr>
<td>DRI results during event</td>
<td>Less than LOD for NH3 and VOC on sweep of reported odor location</td>
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<tr>
<td>IH investigative monitoring/sampling</td>
<td>Readings from grab samples: Hg less than LOD and N2O less than LOD</td>
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<td>Possible source(s)</td>
<td>D-limonene, a component of many cleaning agents was identified as present in analysis of the air and bag samples taken where odor was detected</td>
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<tr>
<td></td>
<td>SY portable toilet, located approximately 200 feet west/northwest of digging area and was serviced prior to event on February 5, 2018</td>
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### Weather conditions on February 6, 2018

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<th>Wind Spd</th>
<th>Peak Spd</th>
<th>Ave Temp</th>
<th>Max Temp</th>
<th>Min Temp</th>
<th>RH</th>
<th>Bar Pres.</th>
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Values taken from station 21

*Barometric pressure and humidity not recorded at 223S station*

### Other Work in Adjacent Area

- **Waste disturbing or tank work in adjacent area**: None present
- **Other work in adjacent area**: No work identified as being a potential or contributing cause, see attached release sheet
Preliminary Extent of Condition Review

This TF-AOP-015 entry is specific to the electrical conduit dig site for the safety shower located on the north/northwest exterior side of SY-Farm. Given the potential source and associated potential causes, the preliminary extent of condition is bound to the immediate area.

Discussion of Potential Causes

Industrial Hygiene analysis of the air and bag samples taken where odor was detected and identified d-Limonene present, a component of many cleaning agents. D-Limonene is utilized as a “green” grease and oil solvent in industry. Limonene has an odor of citrus, and can be detected in the 10-30 ppb range. From comparison of peak area with the internal standard, the sample contained approximately 19 ppb of Limonene. Other compounds identified but not quantified were mesitylene, decane, and a C11-C14 hydrocarbon. Mesitylene is also a component of solvents with a sweet aromatic d-Limonene, but peculiar odor. The odor threshold is wide, as there were a mixture of isomers detected in the 6 ppb to 2.4 ppm range. ACGIH TLV-8hr 25 ppm. The identified hydrocarbons are also consistent with solvent, and with degradation products of C10-C14 alkyl substituted surfactants.

An additional potential source for the reported odor is the portable toilet located north of SY Farm in front of 272SY building, approximately 200 feet east/northeast of digging area and was serviced prior to the event on February 5, 2018. According to the local Ace representative the portable toilets are cleaned by two different methods. The toilet, tank and the unit is sprayed down with a mild soap detergent referred to as the deodorizer. The scent is marionberry and this deodorizer is what makes the water blue. A chemical called Scalex is sprayed in the urinal and is a diluted bleach descaler. No other work was taking place in the adjacent areas at the time of the event that could be considered as a potential source for the odor. The SY safety shower was drained and dumped immediately above its foundation on February 1, 2018. Maintenance confirmed that no chemicals or cleaning agents are used during this process.
Immediate Actions Taken
1. FWS contacted CSM to report odors on behalf of affected personnel
2. SOEN notifications sent for entrance into TF-AOP-015 for reported odors
3. SOEN sent to stay clear of SY farm area
4. Area of concern was restricted
5. Odor response cards completed and received at CSO
6. Communication between PO IHTs, PO IHs, PO IHT supervisor and CSM on event status, response actions and to ensure facilitation of HAPSITE warm up actions
7. DRI readings and grab sample analysis performed and completed
8. Event investigation EIR-2018-010 initiated
9. SOEN sent stating: “Sample analysis for the TF-AOP-015 event has been completed and the results are below. Exiting TF-AOP-015. CSM”
10. DOEFR notified of TF-AOP-015 entrance and exit
11. WRPS-PER-2018-0296, SY Emergency Shower AOP-015 Event, was generated to document the issues.

Recommendations/Proposed Corrective Actions /Lessons Learned
No recommendations or proposed corrective actions were identified. Good communication was conducted with all involved in this event. Personnel reported odors in a timely manner, FWS relayed message to CSO in a timely manner, PO IHs, PO IHTs and PO IHT supervisor all communicated efficiently with each other and with CSM. This is an example of a well handled event by all parties involved.

Documents Reviewed
1. Odor response cards
2. Industrial Hygiene Investigation Report
3. TF-AOP-015, Response to Reported Odors or Unexpected Changes to Vapor Conditions
4. Daily release sheet for February 6, 2018
5. CSM log entries for, “Investigation of SY Farm Emergency Shower AOP-015 Event”

Attachments
1. Picture of area where FE&C employees smelled pine sol/lemony odor while hand digging a trench to lay the electrical conduit for the SY Safety shower, 1 page
2. Daily release sheet for SY farm on February 6, 2018, 1 page
3. CSM log entries for, “Investigation of SY Farm Emergency Shower AOP-015 Event“, 1 page
4. Industrial Hygiene Investigation Report, 6 pages
Attachment 1, Picture of area where FE&C employees smelled pine sol/lemony odor while hand digging a trench to lay the electrical conduit for the SY Safety shower, 1 page
**PRODUCTION OPERATIONS RELEASE SHEET**

**Team ST**  
**Tank Farm:** BX, SY, TY, TW

**Area Manager:** [Name Omitted]  
**Maintenance Manager:** [Name Omitted]  
**Work-Mate Manager:** [Name Omitted]

**Customer Number:**  
**Phone:**  
**Date:** Tuesday, February 6, 2018  
**Location:** Washington Pier Protection Solutions  
**Purpose:** All activities and drawings to be used PM, PFT, Environmental and Safety requirements must be provided by incharge of SW at transfer point

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<th>No.</th>
<th>Facility</th>
<th>Team</th>
<th>Activity</th>
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<th>Related Authority Comments</th>
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For confidentiality, names have been omitted.
Entered TF-AOP-015 Response to Reported Odors or Unexpected Changes to Vapor Conditions. Entered AOP-015 at 10:45 for a chemical smell experienced at the exterior northwest corner of SY Farm reported at 10:40 that while digging for installation of the SY safety shower concrete pad they experienced a chemical smell on initial report. It was later narrowed down to a pine/lemon smell. Access to the area has been restricted. The two individuals that smelled the odor were FE&C Electrician and Laborer who have no symptoms and declined medical evaluation. Initial DRI readings performed by IHF’s have come back at less than detectable. Bag samples have been obtained and are being processed at the lab. Odor response cards have been obtained from the two individuals involved.

02/06/2018 – 12:11
Notification Notified for AOP, at 02/06/2018 12:11

02/06/2018 – 17:25
Closing reported that the sample results and HAPSITE results are below action levels. Exited AOP-015. Notified (FACREP), SOEN sent, radio announcement complete.
## Event Summary (including number of workers involved and activity in progress):
Projects Laborer and Electrician were hand digging to support laying electrical conduit for Safety Shower N/NW of SY Farm. Both employees smelled a chemical odor (Pinesol-like). No symptoms were reported.

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

### IH Monitoring/ Sample Survey Reports:
18-01067 ‘SY Outside Farm AOP-015’

### Weather Conditions at Time of Event:
- Weather station: 233S
- Wind Direction and Speed: 3 MPH sustained from SSE
- Barometric Pressure (steady/rising/falling): N/A
- Temperature (F°): 51.6°F
- Humidity: N/A
- Weather station: 21
- Wind Direction and Speed: N/A
- Barometric Pressure (steady/rising/falling): 29.46 inHg and rising
- Temperature (F°): N/A
- Humidity: 54.3%

NOTE: Odor Response Cards indicated that the wind was from the NE.

### Field Response Timeline:
1040: Affected personnel contacted CSM to report odors.
1045: Entered AOP-015
1048: SOEN: “Entering AOP-015 for odors on the exterior north/northwest side of SY Farm. Stay clear of this area. CSM”
1049: PO IHT supervisor contacts PO Shift IHTs and asks them to report to CSO
1050: 2 PO IH, 2 PO IHT Supervisors arrive at CSO
1052: PO IHs and IHT supervisors briefed by CSM
1053: ST IH updates PO IH: “Pinesol” odor
1155: PO IH asks CSM for odor response cards, none were available at that time.
1057: PO Shift IHs arrive at CSO
1101: PO Shift IHs briefed by PO IH on response actions:
  - 10.6 Lamp/NHE EC
  - SCBA as Per AOP-015 RPF Task 2
  - 2 area grab samples minimum, 1 extra just in case source is identified
  - Miran, Lumex and HAPSITE of grab samples
1103: PO IHT Supervisor contacts Programs IHT Lead to facilitate HAPSITE warm up actions
1105: IHTs deployed to acquire RPE
1106: FWS contacted by CSM to get more specific location details
1108: CSM contacts Mask Issuing Station Supervisor for support on issuing RPE for responding IHTs
1108: Area of concern is restricted
1117: PO IHT supervisor notifies CSO staff that responding IHTs are in-route.
1119: Event Investigator arrives at CSO and is briefed by PO IH and CSM
1141: Affected employees report to CSO to acquire Odor Response Cards
1153: PO IHT supervisor updates CSM:
   - IHTs reported <LOD for NH3 and VOC on sweep of reported odor location
   - In route to 2704HV IHT lab
1155: 2 Projects IHTs arrive at CSO and are briefed on situation and ongoing response actions
1158: Projects IHTs head to event scene to acquire more information
1201: Odor Response Cards received at CMO
1217: Event investigator leaves CSO
1220: PO Shift IHTs contact PO IHT Supervisor with update:
   - Readings from grab samples:
     - Hg <LOD
     - N2O <LOD
1219: WRPS General Delivery is dispatched
1221: Projects IHTs contact PO IH with update from event scene:
   - No odors were detectable. Wind from Odor Response Cards was accurate. No collocated
     work at time of incident. Other work inside of farm was not ongoing at time of incident.
     - Portable toilet pumping service visited on 02/05/2018, and definitely did not visit on
       02/06/2018
1726: SOCN: “Sample analysis for the TF-AOP-015 event has been completed and the results
are below action limits. Exiting TF-AOP-015. CSM”
The attached is an annotated chromatogram overlay of the air sample from SY Farm in blue along with the chemicals outgassing from the bag material itself in red. With this high of sensitivity, the bag materials can be confused with sample materials unless overlaid. Chemicals different between the two chromatograms are circled in GREEN. The most predominant chemical found, d-Limonene is a component of many cleaning agents. It is also utilized as a “green” grease and oil solvent in industry. Limonene has an odor of citrus, and can be detected in the 10-30 ppb range. From comparison of peak area with the internal standard, this sample contained approximately 19 ppb of Limonene. Other compounds identified but not quantified were mesitylene, decane, and a C13-C14 hydrocarbon. Mesitylene is also a component of solvents, with a sweet aromatic, but peculiar odor.

Neither the direct-reading instruments nor the Hapsite analysis exceeded the action level for any chemical.

IH Author: [Redacted]

Signature: [Redacted]

Phone No.: [Redacted]

Date: 3-17-18
## 3. Additional Information:
- Odor Response Cards received:

### ODOUR RESPONSE CARD - 241-SY FARM

**1. Contact CSM, Complete below listed information and map.**
- Date and time odor was noticed
- Your name and the work you were performing
- Location of odor/marker area or map and wind direction
- Name(s) of others in or near the affected area
- Was an HRT present?
- Describe the odor [X] Sweet [ ] Sour [ ] Musty [ ] Earthy [ ] Metallic [ ] Smoky [ ] Rotten [ ] Onion [ ]
- Possible Source
  - [ ] Headache
  - [ ] Business/Office/Industrial
  - [ ] Hunan
  - [ ] Dough
  - [ ] Farting/Stomach/Gastric
  - [ ] Odoriferous Material
  - [ ] Intermittent or Continuous
  - [ ] Other

**2. Send this card to the Central SHF Office.**
### 4. Recommendations/Conclusions:

**Identification of Source of the Concern:** [ ] Yes [X] No

The workers hand digging north or northwest of SY farm reported a "pinesol" like odor. There were no symptoms noted. The source was not determined.

### 5. Other:  

No comments

**S & H Program Management:**

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<th>Signature</th>
<th>Phone No.</th>
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