

EVENT INVESTIGATION REPORT

SY Farm TF-AOP-015 Response
EIR-2014-030

Event Investigation Team Lead

9/30/14

Date

EIR Responsible Manager

9/30/14

Date

PER No. WRPS-PER-2014-1697

SY Farm TF-AOP-015 Response

Investigation Summary

On September 15, 2014, after set-up and the refueling of equipment in 241-SY Tank Farm, the construction work crew that was working on the removal of the pump laydown area in the northeast corner of 241-SY Tank Farm (TFC-WO-14-2849) had started watering down the work area when two (2) workers located outside of the tank farm reported smelling odors without symptoms. The Central Shift Office was notified of the reported odors.

After the Central Shift Manager was notified, the employees started to develop symptoms. Two (2) additional employees working inside of the tank farm (one (1) supporting construction and one (1) performing routine tank farm surveillance) also reported smelling odors. The Core Sampling crew set-up on tank 241-SY-102 (west of the construction work area) reported no smells. At 0945, TF-AOP-015, Response to Reported Odors or Unexpected Changes to Vapor Conditions, was entered.

Workers exited the work area, got upwind, and made notifications to the shift manager and safety. SY change trailer access was restricted and the roped barrier between S and SY Tank Farms and the one-hundred (100) foot demolition boundary around SY change trailer became the established boundaries to control access.

An event investigation was initiated and a fact finding meeting was held at 1400. Workers were also interviewed and logbooks and sample results were reviewed.

Event Timeline

September 15, 2014

- 0600 Pre-job Briefing for construction (TFC-WO-14-2849).
- 0720 The subcontractor's Site Superintendent arrives at jobsite (SY Tank Farm). He observed the fueling of the track hoe and generator and the startup of work.
- ~0900 Health Physics Technicians supporting construction reported smelling odors to the Construction General Foreman while outside of SY Tank Farm (northeast corner) near MO-296.
- 0905 The subcontractor's Site Superintendent was told of odors being smelled.
- 0908 The subcontractor's Site Superintendent called the Central Shift Manager to report the event. The Superintendent was told to call ST Area Day Shift Manager.
- 0909 The Core Sampling Field Work Supervisor called the ST Area Day Shift Manager after being told by the Radiological Control Oversight of the odor event. The Shift Manager was told that the other work crew (construction) in the tank farm was exiting the tank farm. The (sampling) work crew was directed to leave the 241-SY-102 work area and the (sampling) work crew exited via the S and SX change trailers.

- 0910 Subcontractor's Safety Representative contacted the subcontractor's General Foreman and was initially notified of event occurring by the General Foreman (odor reported outside of the tank farm).
- 0915 Second call from the subcontractor's Safety Representative to the subcontractor's General Foreman to clarify which work crew was reporting smells, request the current wind direction (slight (3-5 mph) wind from the north/northwest), and confirm that no symptoms were being reported. [Subcontractor's Safety Representative was in route to the event scene.]
- 0917 The subcontractor's Site Superintendent called the ST Area Day Shift Manager. No contact.
- 0920 Subcontractor's Safety Representative contacts the Washington River Protection Solutions (WRPS) Industrial Hygiene Manager to report event (workers outside of tank farm were from the construction crew and that there may be a potential TF-AOP-015 entry).
- 0922 Subcontractor's Safety Representative attempts to contact the WRPS Production Operations Safety and Health Manager and alternate. No contact made.
- 0923 Central Shift Manager notified by the subcontractor's Site Superintendent that two (2) Health Physics Technicians smelled odors outside of SY Tank Farm. The reported smell was sweet, mothball, onion. No symptoms were reported. The location was near MO-296 and the construction activity underway was water spraying for demolition work. [Additional details from the on-call Facility Representative notes: Workers were not wearing personal monitoring equipment or respiratory protection. The Central Shift Manager was not entering TF-AOP-015. The construction work was northeast of the exhauster, which was running. No one else from the demolition crew smelled anything.]
- 0925 The ST Area Day Shift Manager called the subcontractor's Site Superintendent. The Site Superintendent reported that two (2) people smelled odors, no symptoms. A third person reported smelling vapors during telephone call. The ST Area Day Shift Manager reported that the Central Shift Manager was not entering TF-AOP-015.
- 0927 Subcontractor's Safety Representative contacts a WRPS Tank Farm Projects Industrial Hygienist, informing him that the workers outside of tank farm were from the construction crew and that there may be a potential TF-AOP-015 entry.
- 0932 (0942 late entry) ST Area Day Shift Manager update. Two (2) Health Physics Technicians were exhibiting symptoms to what they smelled near the SY change trailer. They were being transported to the Onsite Medical Provider. The Central Shift Manager was notified. Contacted the Core Sampling Field Work Supervisor to clear his crew from the tank farm. Contacted a ST Maintenance Field Work Supervisor to clear his crew from S Tank Farm. The ST Area Day Shift Manager had already spoken with construction about clearing the tank farm. The roped barrier between S and SY Tank Farms and the one-hundred (100) foot demolition boundary around SY change trailer were the established boundaries to control access.

- 0938 ST Area Team Day Shift Manager attempts to call the Core Sampling Field Work Supervisor (call missed due the need to have equipment frisked).
- 0941 Core Sampling Field Work Supervisor returned call to the ST Area Team Day Shift Manager (to instruct him to clear the tank farm). See late entry under 0932.
- 0945 Central Shift Manager enters TF-AOP-015. Two (2) employees are reporting symptoms of a headache with metallic taste in their mouths. Tank Farm is being cleared and a boundary setup outside of the tank farm. Radio announcement made.
- 0948 Shift Office Event Notification (SOEN) sent out for entry into TF-AOP-015 due to symptoms now being reported. Odors reported for SY Tank Farm and areas west of the tank farm. Access to SY Tank Farm restricted until further notice, stay clear and upwind.
- 0950 Subcontractor's Safety Representative contacts WRPS Retrieval/Projects Safety and Health Manager. At SY Tank Farm, the Health Physics Technicians were leaving (number of impacted workers in question), an Industrial Hygiene Technician reported smells (from inside of the tank farm where they were working and decided not to go to Onsite Medical Provider), a second Industrial Hygiene Technician did not smell odors, and a Nuclear Chemical Operator was reporting smells (informed by Industrial Hygiene Technicians of this and that the identification of this worker was is being pursued by Production Operations). The Industrial Hygiene Technician supporting construction reported that the instruments he was using were reporting non-detects for volatile organic compounds (VOCs) and ammonia.
- 0955 SY Tank Farm cleared of all personnel. One-hundred (100) foot boundary outside of farm established. Additional employee (Industrial Hygiene Technician) is reporting to Onsite Medical Provider for odors as a precautionary measure. No symptoms were reported. Notifications were made. Shift Office Event Notification (SOEN) sent. Industrial Hygiene Technician was in the area monitoring for demolition and showed no elevated readings for volatile organic compounds (VOCs) or ammonia: nothing above background. WRPS Employee Advocate notified.
- 1006 Subcontractor's Safety Representative contacts WRPS Tank Farm Projects Industrial Hygiene Supervisor (supervisor for the Industrial Hygiene Technicians on scene).
- 1030 Subcontractor's Safety Representative documents the arrival of the TF-AOP-015 responding Industrial Hygiene Technicians (with self-contained breathing apparatus for response per the requirements of the Operations Red Arrow).
- 1035 Central Shift Manager updates the on-call Facility Representative.
- 1040 Central Shift Manager notified by Tank Farm Projects Industrial Hygienist that additional employee (Industrial Hygiene Technician) was taken to Onsite Medical Provider as a precaution: no symptoms. The Central Shift Manager was also informed that a Nuclear Chemical Operator had also reported smelling odors while performing rounds in SY Tank Farm, but reporting it as nothing out of the ordinary.

- 1045 Subcontractor's Safety Representative receives a call from ST Area Team Day Shift Manager asking for information on what has occurred. Closed the loop on the identification of ST Area Team Nuclear Chemical Operator reporting odors.
- 1100 Subcontractor's Safety Representative arrives at the Onsite Medical Provider. Turnover provided to Safety Programs (employee advocate), Tank Farm Projects Radiological Controls (worker status), Retrieval/Projects Safety and Health Manager (worker status), and Tank Farm Projects Industrial Hygiene Supervisor (worker status), and Tank Farm Projects Safety and Health (odor response card completion). Three (3) Odor Response Cards were completed by the three (3) workers with symptoms [two (2) Health Physics Technicians and one (1) Industrial Hygiene Technician].
- 1145 Facility Representative call to ST Area Day Shift Manager. There was a one-hundred (100) foot roped off area setup outside the farm for the pump laydown area demolition zone that was being used as the physical boundary for TF-AOP-015 access restriction. SOENs were sent out describing this roped barrier as a restricted area and personnel were sent to the area to respond to the abnormal operating procedure and were used to notify people and control the area.
- 1145 Subcontractor's Safety Representative returned to SY Tank Farm, verified the current wind direction (steady to the south), and discussed a path forward with the General Foreman and Field Work Supervisor. The construction crew is housed in the general area, at CC1231, and they were told to evacuate if wind direction changed.
- 1150 Central Shift Manager was notified by WRPS Employee Advocate that all people [three (3) = two (2) Health Physics Technicians and one (1) Industrial Hygiene Technician] that reported to the Onsite Medical Provider for the SY Tank Farm odor event were released to work without restriction. The Industrial Hygiene Technician's symptom was a metallic taste. A second Industrial Hygiene Technician was not evaluated by the Onsite Medical Provider because he had not smelled anything, nor did he report having symptoms. [He served primarily as the driver for the first Industrial Hygiene Technician.]
- 1156 Central Shift Manager updated the on-call Facility Representative. Clarified that the Industrial Hygiene Technician from an earlier reporting (1035) did smell odors and had gone to the Onsite Medical Provider. Also clarified that the second Industrial Hygiene Technician that had gone to the Onsite Medical Provider but declined evaluation and left the Onsite Medical Provider. It was also reported that a Nuclear Chemical Operator reported smelling odors described them as normal and declined evaluation at the Onsite Medical Provider.
- 1251 Event investigation initiated for SY Tank Farm TF-AOP-015 entry.
- 1400 Fact Finding meeting held.
- 2053 Central Shift Manager. Sample analysis for the TF-AOP-015 event had been complete and the results were at or below background levels. Exited TF-AOP-015 for SY Tank Farm.

Compensatory Measures

Vapor exposure as low as reasonably achievable principles:

- 241-SY Tank Farm access restricted minimizing number of workers at risk by administrative and physical control. Complete 9/15/14
- TF-AOP-015 response actions implemented. Complete 9/15/14
- Respiratory equipment used for post event vapor sampling. Complete 9/15/14
- All employee communication sent informing them of the vapor event. Complete 9/15/14

Discussion of Potential Extent of Condition

A review of prior (recent) vapor events in S-complex was conducted for similarities, such as potential vapor sources/potential causes, weather conditions, and response actions.

Discussion of Potential Causes

The refueling of both the sampling air compressor and generator and the construction equipment were discussed at the fact finding meeting and the general consensus was that this activity was not what caused the odor event. This was also the conclusion for the running equipment (air compressor, generators, and track hoe). [Smells were inconsistent with reports.]

Core Sampling at 241-SY-102 was evaluated, but due to progression on the job before the event occurred no source was available. In event response, the radiological bags just opened were rewrapped and the power to the HPU turned off.

Smells reported inside of the tank farm could have been from the SY Primary (B-train) exhaust, but the wind direction reported does not support this as a potential source.

Based on interviews and the above information, a possible source of the odors could have been the water mister being used to support demolition.

A review of possible Waste Information Data System (WIDS) site locations near the event scene that could have affected the event area was conducted. The WIDS site UPR-200-W-127 is the closest to the event scene (spill area east of the 242-S Evaporator); however it is outside of the event scene so was most likely not a contributor. This is supported by no reports of odors from the Core Sampling crew at work on 241-SY-102 at the time of the event. 241-SY-102 is between the WIDS site and the initially reported event area (at the concrete pad outside of 241-SY near MO-296).

Waste tank level readings were reviewed for the three (3) double-shelled tanks in SY Tank Farm for a possible indication of a gas release event. There does not appear to have been a level drop in tank's waste level which would provide an indication of a possible gas release event.

An interview with the Mission Support Alliance Biological Controls Supervisor provided that no herbicide was being sprayed on 9/15/14 near the S-Complex work area. Tumbleweed pickup had occurred earlier in the day, but the work crew was at T-Complex when the SOEN was received for TF-AOP-015 entry.

Recommendations/Proposed Corrective Actions

1. Delays in symptom reporting delayed entry into TF-AOP-015. The first workers reporting smells were outside of the tank farm which does not mandate TF-AOP-015 entry. Until a full accounting of the personnel in the tank farm was made and additional worker reports of smells and symptoms, entry into TF-AOP-015 was not made.
2. Communications between the location of the event, the Central Shift Manager, the Area Day Shift Manager, and others working in SY Tank Farm could be improved to smooth entry into TF-AOP-015 and the timely evacuation of the affected area.
3. Evaluation of the suite of sample results occurring at the time of the event and in support of TF-AOP-015 should be completed. (1) Industrial Hygiene sampling inside of SY Tank Farm by the Industrial Hygiene Technician supporting construction, (2) Industrial Hygiene sampling inside of the tank farm by the Industrial Hygiene Technician supporting Core Sampling at 241-SY-102, (3) the personal monitor in use at 241-SY-102, and (4) the sampling results from inside and outside of SY Tank Farm in response to TF-AOP-015 (post event).
4. Evaluate the possibility that the odor was as a result of water mister in use during demolition. The odor was reported to be on and off (pulsing) which may align with water mister spraying.
5. Ensure that the Area Day Shift Manager is made aware of changes in Field Work Supervisor status to support communication with work crews during events.

Lessons Learned

To be addressed, if required, by the causal analysis via a corrective action under WRPS-PER-2014-1697.

Attachments

- A. Listing of Personnel Interviewed/Contacted
- B. Shift Manager's Logbook Entries

Attachment A
Listing of Personnel Interviewed/Contacted

1. Operations Specialist, Retrieval
2. ORP Facility Representative
3. Tank Farm Projects Safety and Health
4. Tank Farm Projects Industrial Hygienist
5. Health Physics Technician
6. Health Physics Technician
7. Conduct of Operations (Senior Supervisory Watch Core Sampling)
8. Core Sampling Field Work Supervisor
9. Core Sampling Field Work Supervisor
10. Nuclear Chemical Operator Core Sampling
11. American Electric Field Work Supervisor
12. American Electric Safety Representative
13. URS Construction Safety
14. URS Construction
15. American Electric Site Superintendent
16. American Electric General Foreman
17. Tank Farm Projects Radiological Controls
18. HAMTC Safety Rep
19. Sampling Manager
20. Industrial Hygiene Technician, Production Operations
21. Industrial Hygiene Technician, SST Retrieval/Closure
22. IH Technical Services
23. Nuclear Chemical Operator, Production Operations ST Area Team
24. Area Day Shift Manager, ST Area Team
25. Mission Support Alliance Biological Controls.

**Attachment B
Shift Manager's Logbook Entries**

7/15/14 7:30 AM

0730 - Follow up to entry 0600. Employee injury is a personal medical, manager has been notified. DOE FR and S. Mgmt notified, SOEN set.

0849 - Retrieval RM OS for power outage, HVAC OS for LOTO. Running permanent power to safety shower.

0923 - Notified by American Electric () that 2 HPTs () smell odors outside ST Farm. Reported smell sweet, mothball, onion no symptoms by 10:00 AM, water spraying for Demolition.

0945 - Update entry 0923. Entered HAP-015, 2 employees having symptoms (headache) metallic taste in mouth. Farm is being cleaned boundaries set up outside Farm area. Radio Announcement made.

0955 - ST-Farm cleaned of all personnel, 100' boundary OS farm established. Additional employee reporting to HPTZ () IHT) for odors as a precautionary measure w/o symptoms. Notified DOE FR and S. Mgmt SOEN set. IHT was in area monitoring for Demolition and showed no elevated readings for VOC or ammonia nothing above background. notified.

1006 - Notified by () that NEO () received abrasion to head at Upper C-Farm in Low Level waste while picking up laundry. Injury occurred in R49A but surveyed for contamination as a precaution then taken to HPTZ for evaluation. DOE FR notified and SOEN set.

1040 - Notified by () that additional employee IHT () taken to HPTZ as a precaution, no symptoms, also NEO () reported smelling odors but nothing out of the ordinary while doing rounds.

9/15/14 A-Shift

1150 - Notified by [redacted] that all people that reported to Home for the SY-Farm odor [redacted], and [redacted] were released to work with out restrictions. [redacted] also report that she had symptoms of a metallic taste. [redacted] left and was not evaluated. DOEFR. SOEN

1232 - Late entry 1150 Notified by that the individual from entry @ 1006 released to work without restrictions. DOEFR notified, SOEN sent

1233 - Late entry 1127 Notified by [redacted] that waste services employee report personal contamination of 350cpm ^{gamma} alpha and 500 DPM Beta gamma on pants and palm of hands from SY-101 roof repair. HPT reporting to trailer to decon & release employee

1237 - PCM LB a U-Farm O/S

1249 - [redacted] has been cleared per

1251 - Initiated a ent investigation for SY-Farm 1 AOF-015 entry. Report number 2014-030, POE. DOEFR. notified,

SOEN sent

1323 - Cancel CSO SR-LB C-Farm

pulled and transported manually.

9-15-14 1715 - Relieved by CSM.
0515 - Assumed ST ADM Duties.
0746 - Projects re-established 100ft demolition boundary for SY pump laydown area removal has been posted at SY Change Trailer. SOW sent.
0834 - Flush truck entering TX/TY Farm.
0858 - TMACS notified SM that SY101 Annulus leak detector alarm is going in and out of communication. No level changes.
0859 - LOW van entering T Farm.
0909 - the FUS for SY Core Sampling, called to notify SM that other crew in farm is exiting the farm.
0941 - LOW van exiting T Farm.
0942 - late entry 0932 [redacted] and [redacted] are exhibiting symptoms to what they smelled near SY Change Trailer. They are being transported to HPMC. CSM notified. Contacted to clear his crew, to clear his crew, and had already spoke with whose crew had identified the vapors. Rope barrier between Sand SY Farm + 100ft demolition boundary around SY Change trailer are the established boundary to control access at this.

redy

9-15-14 ST Team

2-S.

0955- SY Farm is cleared.

1004- U Farm PCM OOS.

1053- Spoke with

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██████████ and ██████████ were outside SY Farm. Only ██████████ had symptoms, headache and bloody nose. Two IHT ██████████ smelled odors, she had 2 instruments on her and did not read anything above normal background. ██████████ did not smell an odor, but opted to go to HPMC with the other 3. ██████████ also smelled an odor in SY Farm but declined to go to HPMC.

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1127-

██████████ called notifying that ██████████ alarmed the PCM in TY Charge Trailer. 350dpm Alpha and 500dpm Beta/Gamma on his palms and on his pants. requested NCO Support/D assist in removing his pants. ██████████ was on the TY-101 enraf drum replacement job.

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