

EVENT INVESTIGATION REPORT

EIR-2019-033: Investigation of TF-AOP-015 Event at LERF Basins

[Redacted]

Event Investigator Under Instruction

8/22/19

Date

[Redacted]

Event Investigator

8/22/19

Date

[Redacted]

PER Responsible Manager

8-22-19

Date

PER No. WRPS-PER-2019-1463

TF-AOP-015 Summary

Date/Time of Event	July 11, 2019 at ~0951 hours & ~1038 hours
Locations	0951: One (1) person reported taste south of LERF Basin 42/43. 1038: One (1) person reported an odor and taste north of LERF Basin 43.
Personnel Affected	Two (2) personnel reported odors and/or taste and were evaluated at HPMC.
Odor	Personnel described odors as: <ul style="list-style-type: none"> • Metallic taste/smell • Bitter, heavy taste • Rotten smell
Symptoms	<ul style="list-style-type: none"> • One (1) reported rash and an unpleasant taste on lips and mouth.
Direct Read Instrumentation (DRI) Monitoring	<p>Readings were conducted in two areas. Both readings produced the same result:</p> <p>Hydrogen Sulfide: < DL Ammonia: < DL Carbon Monoxide: < DL Volatile Organic Compound: < DL</p> <p>*DL – detectable level</p>
Sampling	Two (2) bag samples were collected. One (1) bag sample was taken near the catch basin on the northeast side of Basin 43; all readings were below actions levels. The second bag sample was taken on the south end of Basin 43 (southeast of the well head); all readings were below action levels.
Potential Source	Portable toilet, modu-tanks, LERF Basin
Wind Speed / Direction during IH Sampling	WSW @ 7 mph (Time: 1100)
Weather Conditions during IH Sampling	Barometric pressure: 29.23" in Hg and rising Temperature @ 84 degrees Humidity 32%

Waste Disturbing or Tank Work in Adjacent Area	None.
Other Work in Adjacent Area	None.

Investigation

This Event Investigation Report (EIR) number EIR-2019-033 is in response to a Problem Evaluation Request (PER) WRPS-PER-2019-1463. A formal Event Investigation Meeting was not conducted. Facts were gathered by interviews and data collected from Industrial Hygiene (IH) and the Hanford site Meteorological station. Central to this investigation is: 1) weather conditions at the time, 2) locations of potential source points, 3) interviews, and 4) WRPS IH findings.

At approximately 0951 hours a Construction Laborer that was supporting movement of gravel for the Liquid Effluent Retention Facility (LERF) Basin change trailer installation (south of Basins 43 and 44) reported a rash on their arms, and a “metallic” and “bitter-heavy” taste in their mouth and on their lips. The Construction Laborer indicated the source could be from a “sample well” or “LERF Basin 42.” The Construction Laborer was walking in the vicinity of CHPRC ground water operations. The worker was transported to HPMC Occupational Medical Services (HPMC OMS).

The Central Shift Office (CSO) entered TF-AOP-015 at 1014 hours. The Central Shift Manager (CSM) determined the source is not suspected to be from tank waste and is outside a tank farm boundary. Therefore the IHIR is not conducted, however bag samples were taken and the Odor Response Plan was completed; see Attachments 2 and 4.

At approximately 1038 hours a Nuclear Chemical Operator (NCO) who was supporting maintenance calibrations at the LERF Basins reported smelling a “metallic” and “rotten” odor. The NCO did not indicate any possible sources of the odor. The NCO did not report any symptoms, but was transported to HPMC OMS for evaluation.

One individual provided information using Odor Response Cards submitted to the CSO. The NCO provided an Odor Response Card at the request of the Event Investigator. See Attachment 1 for Odor Response Cards.

CH2M Hill Plateau Remediation Company (CHRPC) Groundwater was contacted regarding a statement that groundwater sampling was being conducted south of LERF Basin 43 at the time of the event. CHRPC Groundwater reviewed their work logs and reported they didn’t have any personnel in the area on July 11, 2019. With regard to the modu-tanks and their contents, CHRPC personnel stated the modu-tanks are two large tanks located just northeast of the LERF Basin at ETF. The modu-tanks hold about

a million gallons of water above ground. CHPRC Groundwater dumps the water they pump from different wells into the modu-tanks. The modu-tanks fill with stagnant water that they let evaporate away over time. CHPRC personnel stated there is no particular hazard with the contents of the modu-tank. The odors in the modu-tanks are organic and come from items such as decaying wood or mud. WRPS requested from CHPRC a breakdown of the modu-tank content. As of the date of this report, WRPS has not received this data.

Weather

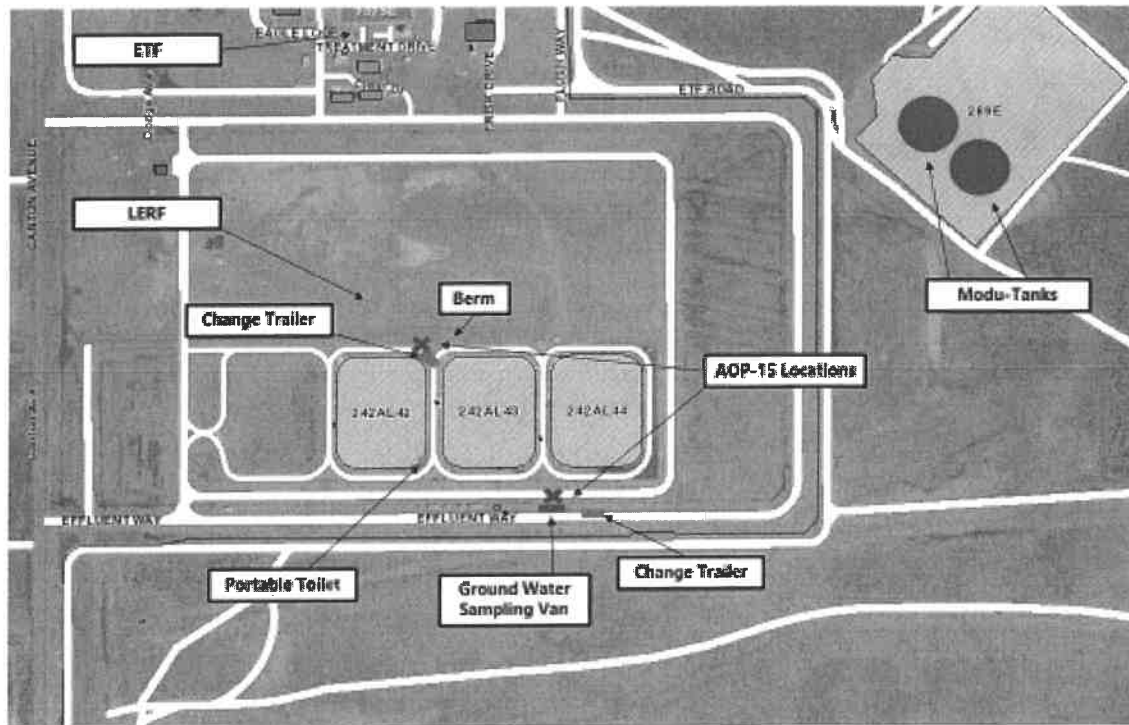
Data collected from the Hanford site Meteorological station for the morning of 7/11/19 showed:

Time	1000 hours
Wind Direction	W @ 4 mph
Temperature	77 degrees
Barometric Pressure	29.4 Hg steady
Humidity	40.9%

Time	1030 hours
Wind Direction	SE @ 4 mph
Temperature	79 degrees
Barometric Pressure	29.4 Hg steady
Humidity	37.6%

Location

The figure below is an aerial photograph showing the locations of the two odor events and some select proximal features of interest. Areas of interest have been artificially colored for emphasis. The Liquid Effluent Retention Facility (LERF) is located immediately south of the Effluent Treatment Facility (ETF). LERF is designed to store about 23 million gallons of liquid waste until it can be processed at the ETF. Also nearby are portable toilets, change trailers, CHPRC modu-tanks, and it was reported on the day of the events that a CHPRC crew was conducting ground water operations south of LERF.



Immediate Actions Taken

The CSM was notified and entered TF-AOP-015. SOEN message issued stating:

“Entering TF-AOP-015 for odors south of LERF Basin 42 and 43. Stay clear of this area. CSM.” The CSM declared step 3.1.13 in AOP15, “Odor source is not suspected to be from tank waste and is outside a Tank Farm boundary and respiratory protection is required by management.”

Industrial Hygiene (IH) dispatched to conduct monitoring and sampling per Odor Response Plan. The Construction Laborer and NCO were transported to HPMC for evaluation.

Discussion of Potential Source

The Odor Response Plan which directed IHT monitoring did not result in any NH₃, VOC, Hg, N₂O readings that were all at or below background levels. The grab/bag samples were analyzed; see Attachment 4. The same compounds were found in bag sample number 1, Basin 43 north, and bag sample number 2, Basin 43 south, at concentrations consistent with sample bag contaminants. No compounds were found at concentrations of concern, and no compounds other than known sample bag constituents were found at concentrations above background.

Upon evaluation of plausible sources, metrological conditions, industrial hygiene sampling, and interviews, the investigation was unable to conclude or determine the source of the odors. The investigation team was able to find potential nearby sources: a portable toilet located on the south side of LERF between Basins 42 and 43, or modu-tanks located northeast of the Effluent Treatment Facility (ETF). The contents of the modu-tanks are organic and stagnant. The wind direction the morning of the event was in a west direction at 1000 hours and then shifted to a southeast direction at 1030 hours. It's plausible that odor emitted from the stagnant contents in the modu-tanks could have been carried in a west direction towards the LERF Basin area initially, and then back towards LERF when the winds shifted again in a southeast direction. The odors have not persisted up to this report's finalization.

Preliminary Extent of Condition Review/Historical Review

A search of the Event Investigation Report (EIR) database found one occurrence of a TF-AOP-15 event in 2015, "Room 131 at ETF." Additionally, a review of the Problem Evaluation Request (PER) database from 2014 to 2019 didn't identify any events of odors detected in the location of ETF or the LERF Basins. Work crews consistently perform work in the vicinity of the LERF Basins and the historical review doesn't indicate prior events of odors that are abnormal to that work environment.

Recommendations/Proposed Corrective Actions

N/A

Attachments:

Attachment 1: Odor Response Cards

Attachment 2: Odor Response Plan

Attachment 3: IH Field Response Timeline

Attachment 4: Sample HAPSITE GC-MS Analysis

Attachment 1: TF-AOP-15 Odor Response Card

ODOR RESPONSE CARD

Draw the Location of the Odors

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 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.

Attachment 1: TF-AOP-15 Odor Response Card

ODOR RESPONSE CARD

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

- Date and time odor was noticed: 7-11-19
- Your name and the work you were performing: [REDACTED]
- Location of odors (mark area on map and wind direction): West North West
- Name(s) of others in or near the affected area: operator in an enclosed cab
- Was an IHT present?: yes out of work area
- Describe the odor: ^{taste} Sweet Sour Musty Earthy Metallic Smoky Rotten Onion
 Cleaning Solution Ammonia Other: bitter heavy
- Possible Source: sample well or Lert basin 32
- 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: unpleasant taste on lips and in mouth

2. Send this card to the Central Shift Office.

Attachment 1: TF-AOP-15 Odor Response Card

ODOR RESPONSE CARD

Draw the Location of the Odors

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 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.

LERF

Wind Direction

N
↑
S
W E

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Attachment 1: TF-AOP-15 Odor Response Card

ODOR RESPONSE CARD

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

- Date and time odor was noticed: 7-12-19 10:00
- Your name and the work your were performing: [REDACTED]
- Location of odors (mark area on map and wind direction): SEE MAP
- Name(s) of others in or near the affected area: N/A
- Was an IHT present?: No
- Describe the odor Sweet Sour Musty Earthy Metallic Smoky Rotten Onion
 Cleaning Solution Ammonia Other: _____
- Possible Source: UNKNOWN
- 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.

Attachment 2: TF-AOP-15 Odor Response Plan

Response to Reported Odors or Unexpected Changes to Vapor Conditions

Attachment 1 – Odor Response Plan

DESCRIPTION OF EVENT (date/time & description of odors detected, location, symptoms, etc):			
7/11/19 @ 0931 Follower Construction worker walked by a ground water sample crew at the south of LERF Basin 42/43 and experienced an undescribed odor causing a taste in his mouth and rash on his arms.			
RESPONSE STEPS:			
<ul style="list-style-type: none"> - Area vacated and secured. - Dispatch RHT's to monitor as per IHP-09001 and collect two grab samples for analysis. 			
IHP Sampling Plan #	IHP-09001	RWP #	N/A
N/A:	N/A	Other	RFP TF-AOP-015 Task 3
REQUIRED APPROVAL SIGNATURES			
Industrial Hygiene:	[Redacted Signature]		7/11/19 Date
Shift Manager:	[Redacted Signature]		7/11/19 Date
ADDITIONAL SIGNATURES (as determined by Shift Manager or Safety & Health Rep; N/A if not applicable)			
RadCon:	N/A	N/A	N/A
Environmental:	N/A	N/A	N/A
Engineer:	N/A	N/A	N/A
Industrial Safety:	N/A	N/A	N/A
Odor Response Plan Notes (monitoring data, results of actions taken, etc. Use more sheets as necessary)			
Two SHTEs returned from location; Area south of Basin 43 and north of Basin 42/43 were monitored. See DR RPT 19-05569 from 7/11/19 for NH ₃ , NO _x , H ₂ , N ₂ O readings that were all at or below background levels.			
RESPONSE PLAN COMPLETED:			
Safety & Health Rep:	[Redacted Signature]		7/11/19 Date

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Attachment 2: TF-AOP-15 Odor Response Plan

Response to Reported Odors or Unexpected Changes to Vapor Conditions

Attachment 2 - Communication Template

The following is example of detail to provide in the electronic form of Communication Template.

One Mansford worker was taken to HPMC for precautionary medical evaluation after reporting odors at the LERF basins. The one worker reported symptoms.

The employee was moving gravel in support of change trailer installation and were not in an area that requires use of a supplied air respirator.

Workers were instructed to leave the area, and access to this area has been restricted.

NOTE - This communication template is to be completed as soon as enough information is available.

Central Shift Manager:

[Redacted Signature]

Signature

Print (First and Last)

Date

Attachment 2: TF-AOP-15 Odor Response Plan

Response to Reported Odors or Unexpected Changes to Vapor Conditions

Attachment 3 - Follow-Up Event Summary

The following is example of detail to provide in the electronic form of Follow-Up Event Summary.

TF-AOP-015 Initial Report		
Date: 7/11/19	Time: 0951 hours	Location: LERF
Number of Workers Involved: 2	Sampling Results #: 19-05509	
Event Summary		
<p>At approximately 0951 hours a Fowler Laborer that was supporting movement of gravel for LERF Basin change trailer installation, reported a rash on their arms and a nondescript taste in mouth and on lips while walking near CHPRC ground water operations in the vicinity. The worker was transported to HPMC.</p> <p>At approximately 1035 hours an ETF NCO reported experiencing a nondescript odor and taste while supporting maintenance calibrations at the LERF basins. The ETF NCO was transported to HPMC for medical evaluation.</p> <p>At the time odors were reported, the individuals were not working in an area requiring use of supplied-air respiratory protection. All workers were instructed to leave the area. Access to the area was restricted.</p> <p>IHTs responded to the area and took DRI readings and a bag samples. DRI instrument readings were below action levels. Analytical results for bag samples are being analyzed and will be posted upon receipt.</p> <p>An event investigation has been initiated.</p>		
Return to Work Status		
Number of workers returned to work without restriction		2
Number of workers returned to work with restriction		0
Number of workers referred for further evaluation		0
<p>NOTE - Complete once event is stabilized and all details are known. - To learn more about chemical exposure evaluations see http://hanfordvapors.com/wp-content/uploads/2016/09/2a-HPMC-procedure.pdf</p>		
Central Shift Manager:	[Redacted Signature]	
	Signature	Date

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Attachment 2: TF-AOP-15 Odor Response Plan

LERF
2019/07/11

Response to Reported Odors or Unexpected Changes to Vapor Conditions

5.0 RECORDS

5.1.1 **PERFORM** the following for records identified within this procedure.

5.1.1.1 **RECORD** the number of times the record was generated in applicable column

OR

PLACE a check mark (✓) in the N/A column.

5.1.1.2 **SUBMIT** the package to the central shift office.

Records Submittal Checklist	Number of times completed	N/A (✓)
Attachments		
Attachment 1 – Odor Response Plan	1	
Attachment 2 - Communication Template (Printed copy of electronic version)	1	
Attachment 3 - Follow-Up Event Summary (Printed copy of electronic version)	1	
FWS/OE/Shift Manager SEND the completed records to the Central Shift Office for records retention.		
Signature FWS/OE/Shift Manager	Print (First and Last)	Date

The record custodian identified in the company-level Records Retention and Disposition Schedule (RIDS) is responsible for record retention in accordance with TFC-BSM-IRM_DC-C-02.

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Attachment 3: TF-AOP-15 Odor Response Timeline

1012	AN IHP, and Shift IHTS arrived at CSO.
1014	SOEN message "Entering TF-AOP-015 for odors south of LERF Basin 42 and 43. Stay clear of this area. CSM."
1015	CSM declared step 3.1.13 in AOP15
	"Odor source is not suspected to be from tank waste and is outside a Tank Farm boundary and respiratory protection is required by management."
1017	Shift IHTS calls IHP for HAPSITE.
1019	PO IHP arrived at CSO.
1020	Shift IHTS attempted phone calls to TerraGraphics mobile lab personnel: No contact was made.
1022	Shift IHTS requested Miran Sapphire be warmed up via phone call to IHT.
1023	Shift IHTS requested ETF IHTs prepare the H2S sensor on a MultiRAE.
1026	1 st Shift IHT arrived, ETF IHP arrived, Shift IHTS contacted Projects about other IHTs in the area of the odor.
1028	Projects IHP called AN IHP.
~1030	CSM had multiple phone calls providing details of the 2 affected employees.
1033	2 nd Shift IHT arrived.
1034	CSM receives name of NCO affected, this was the 2 nd employee to report odor, this employee went to HPMC.
1037	AN IHP briefed 2 Shift IHTs on RPF and sample plan, PIC arrived and received odor response card and indicated the location of the odor: south end of middle basin near a wellhead.
1041	CSM has more phone calls.
1045	2 ETF IHTs arrived with MultiRAE with H2S sensor.
1046	AN IHP briefed 2 Shift IHTs on the location to be investigated and IHTs depart
1050	Odor response plan signed by AN IHP.
1057	ETF IHP leaves, informational phone call to AN IHP from Project IHP.
~1100	AN IHP and PO IHP leave CSO.
1120	Area reading at "Catch basin area on the North East side of Basin 43."
1135	Area reading at "South end of Basin 43."
1220	Shift IHTs notify Shift IHTS of readings, IHTS notified PO IHP and EV IHP of readings.
1318	SOEN message "Response actions for the AOP-015 event at LERF basins have been completed and the results are at or below background levels. Exiting AOP-015. CSM."
1329	Production Operations (PO) IHM confirmed with ETF FWS that the location could be entered for a walk down.
~1330	PO IHP, PO IHTs, and PO IHM walk down area around construction trailer on south side of LERF basins and found no unusual odors.

Attachment 4: Sample HAPSITE GC-MS Analysis

AOP-15 Sample HAPSITE GC-MS Analysis, Survey 19-05569, EIR-2019-033

Two bag samples were collected in response to an odor reported at LERF. These samples were analyzed using an Inficon HAPSITE GC-MS on July 15. Data was interpreted on July 18, 2019 and reported the same day. The same compounds were found in Bag Sample #1, Basin 43 North and Bag Sample #2, Basin 43 South at concentrations consistent with sample bag contaminants. No compounds were found at concentrations of concern. No compounds other than known sample bag constituents were found at concentrations above background.



if you have questions contact

Compounds Found in Samples

Compound	Clean Air Blank	Bag #1 Basin 43 North	Bag #2 Basin 43 South	Sample Bag Contaminant	Comments
Internal Standard #1 Methyl Methacrylate	X	X	X		
Toluene		X		X	Added by instrument during analysis
Internal Standard #2 C9 Alkane Hydrocarbon	X	X	X		
D-Limonene		X	X	X	Added by instrument during analysis
Silane Compound		X	X	X	
C11-15 Alkane Hydrocarbons		X	X	X	