

EVENT INVESTIGATION REPORT

Potential Exposure to Tank Farm Vapors

Event Investigation Report Number: EIR-2014-026

[Redacted Signature]

Event Investigation Team Lead

8-5-2014

Date

[Redacted Signature]

PER Responsible Manager

8-6-2014

Date

Potential Exposure to Tank Farm Vapors

Investigation Summary

While performing the weekly routine surveys of the Gate 8 Corridor between AY/AZ Farm and AN Farm, a Health Physics Technician (HPT) encountered an odd, bitter odor and it resulted in a bitter taste in the HPT's mouth.

During the morning of July 25, 2014, an HPT performing routine surveillance activities of radiological surveys of the tank farm contamination area (CA) perimeters encountered an odor and subsequent taste described as "sharp and bitter". During the investigative interview, the HPT stated that the taste was not metallic, and was emphatic that it was not reported as metallic. The HPT was working alone.

The area where the odor was encountered is termed the Gate 8 Corridor which resides between AY/AZ Farm and AN Farm. Wind condition at the location was described as "very slight" and from the NE to the SW.

The HPT reported the odor and taste to the Radiological Controls First Line Manager (RCFLM) at 0915 via telephone. The HPT then went to the AZ team office and reported to the AZ Team Area Dayshift Manager (ADM). The decision was made to send the HPT to HPMC Occupational Medical Services (HPMC) for a medical assessment. At 0943, the Central Shift Office Shift Manager (CSM) was notified. CSM referred to TF-AOP-015 *Response to Reported Odors or Unexpected Changes to Vapor Conditions* because the reports did not meet entry criteria, the CSM called the ADM back to clarify the reported conditions. The ADM called the RCFLM to confirm the report and asked if there was a metallic taste reported. The RCFLM then asked the HPT as they were entering the HPMC office if she had experienced a metallic taste. The RCFLM stated that the HPT confirmed the metallic taste, (the HPT does not recall this exchange). The metallic taste was then reported back to the ADM then to the CSM. The CSM then communicated the report of odors and metallic taste to senior management and entered TF-AOP-015 response at 1050.

Prior to the HPT conducting surveys at the AY/AZ, AN Farm area, a filter change out was conducted by another work team. The AN Primary Ventilation System prefilter was changed out and the bagged filter was stored adjacent to the Gate 8 Corridor on the AN Farm side of the fence.

Retrieval activities were ongoing moving tank waste from tank C107 to Tank AN101. Minimum respiratory protection requirements were in place for Farm work consisting of a minimum half mask. (The HPT was not working within the AN Farm fence line so was not subject to this requirement).

Initially, the HPT did not report any symptoms. Upon arrival at HPMC, the HPT stated that a headache set in as well as a feeling of heat on her face, "burning". The HPT washed her face at HPMC and the sensation went away.

No Fact Finding Meeting was held.

Potential Exposure to Tank Farm Vapors

Event Timeline

07/25/2014

Initial conditions:

Early morning – prior to 0700 the AN Primary Ventilation System prefilter is changed out.

Waste retrieval activities moving tank waste from C-107 to AN 101 are ongoing.

Wind is slight, from the NE to the SW. Outside temperature is 93F with 25% humidity. Barometric pressure is 29.63n.

~ 0700 HPT is conducting CA perimeter surveys at A Farm

0915 HPT reports “sharp and bitter” taste to RCFLM.

HPT reports to ADM office and reports odor/taste.

ADM directs HPT to report to HPMC.

HPT’s supervisor, the RCFLM takes the HPT to HPMC.

ADM reports to CSM reported odor/taste.

0943 CSM reviews TF-AOP-015 Response to Reported Odors or Unexpected Changes to Vapor Conditions, and determines conditions do not meet entry criteria for the Abnormal Operating Procedure (AOP).

1005 Hanford Atomic Metal Trades Council (HAMTC) Safety Representative notified Production Operations Safety and Health Manager of taste in mouth report by HPT.

1010 Following discussions between the ADM, the RCFLM reports confirming “metallic taste” with HPT.

1050 CSM reports conditions to senior management and determines to enter AOP-015 response.

1052 Radio announcement made to stop work and exit AN, AY and AZ Farms in accordance with AOP-015.

1120 Industrial Hygiene Technicians (IHT) begin collecting bag samples.

1123 SOEN message is sent for AOP-015 entry at AN & AY/AZ Farms.

~1140 IHT samples delivered to laboratory for analysis.

1132 Event Investigation initiated.

1205 HPT returned to work with no restrictions.

1427 Preliminary review of bag samples indicates no readings above background concentrations.

Potential Exposure to Tank Farm Vapors

1440 Bag sample analysis complete with no readings above normal background concentrations.

1446 AOP-015 exited for AY/AX & AN Farms.

Compensatory Measures

- Entered AOP-015.
- Restricted access to AY/AX & AN Farms
- IH planned and executed IH sample plan.

Preliminary Extent of Condition Review

Extent of condition is the focus of the Chemical Vapor Solution Team (CVST). This report will provide for process improvement and details to the CVST of the incident.

Discussion of Potential Causes

WRPS has several efforts ongoing to address chemical vapors. This report is a synopsis of one response.

Discussion of Barriers That Could Have Impacted the Cause

1. The HPT suggested that the creation of a berm nearby for utilities related to the vitrification plant may inhibit ground level airflow.

Recommendations/Proposed Corrective Actions

1. Consider further clarification of TF-AOP-015 entry criteria.

Lessons Learned

To be addressed, if required, by the causal analysis via a corrective action under WRPS-PER-2014-1289.

Attachments (as they apply):

1. List of personnel contacted
2. Log Book Entries
3. AOP-15 Vapor Exposure Communication Form
4. Hanford Meteorological Data for 7-25-2014
5. Area Map

Potential Exposure to Tank Farm Vapors

Attachment 1 List of Personnel Contacted

1. Central Shift Office Shift Manager
2. HPT

Potential Exposure to Tank Farm Vapors

Attachment 2 Logbook Entries

7/28/14 U-Shift
1620 [REDACTED] reports that the FACP is at JOHN'S receiving a trouble alarm due to elevator maint. Currently performing once per shift firewatch so no actions required

1702 Relieved as CSM by [REDACTED]
1702 Relieved [REDACTED] as CSM

2115 Adding 10,000 gallons of hot water to C-107
2133 Water addition at C-107 was stopped due to hot water skid heater problems.

7/29/14 B-Shift
0507 Relieved as CSM by [REDACTED]
0507 Relieved [REDACTED] as CSM [REDACTED]
0742 Issued new Process memo PM-14-018
New 242-A Cold Run 13-CR operator, PGC

0757 Relieved by [REDACTED]
0753 ASSUMED DUTIES AS CSM, [REDACTED]
0825 [REDACTED] BANGED SHIN ON PIPE WITH MANAGEMENT APPROVAL ELECTED TO SELF-TREAT. [REDACTED] FAC REP/ [REDACTED] (SAFETY) NOTIFIED.

0833 UPDATE TO 0825 ENTRY AFTER FURTHER REVIEW, THE EMPLOYEES MGR DECIDED TO TAKE THE EMPLOYEE TO HPMC. [REDACTED] NOTIFIED, SOEN SPNT.

0943 [REDACTED] REPORTS [REDACTED] A SMELLED ODOR INSIDE GATE 8 CORRIDOR. SHE HAD A FUNNY TASTE IN HER MOUTH, BUT NO SYMPTOMS OF EXPOSURE. NO IRRITATION, HEADACHE OR DIFFICULTY BREATHING. DOES NOT MEET ENTRY REQUIREMENTS FOR ACP-015.

1010 [REDACTED] REPORTS THAT [REDACTED] TAKEN TO HPMC. SHE REPORTS A METALLIC TASTE IN MOUTH. VERIFYING WITH SAFETY

Potential Exposure to Tank Farm Vapors

Attachment 2 Logbook Entries

234

- 7/29/14 D SHIFT
- CONT 100 9 HEALTH IF METALLIC TASTE IS A SYMPTOM OF EXPOSURE OR IS IT A SENSE. METALLIC TASTE IS NOT LISTED IN ENTRY CRITERIA. MSD DECISION MADE BY SAFETY & HEALTH TO ENTER INTO ADP-DIS
- 1055 RADIO ANNOUNCEMENT MADE TO RESTRICT ACCESS TO AN & AY/AZ FARMS. SOEN SENT.
- 1102 VERIFIED AN, CORRIDOR 8 & AY/AZ FARMS CLEAR OF PERSONNEL.
- 1104 CONSTRUCTION WORK NEAR AZ-156 SECURE AND PERSONNEL MOVED OUT OF AREA.
- 1109 [REDACTED] NOTIFIED OF ADP-DIS ENTRY.
- 1112 [REDACTED] (ORP) NOTIFIED OF ADP-DIS ENTRY.
- 1113 SOEN SENT FOR ADP-DIS ENTRY.
- 1132 [REDACTED] INITIATED EVENT INVESTIGATION FOR GATE 8 CORRIDOR ADP-DIS ENTRY. SOEN SENT.
- 1140 NEW PROCESS MEMO RELEASED, PM-14-018 FOR 242-A EVAPORATOR COLD RUN CAMPAIGN.
- 1149 [REDACTED] REPORTS RETURNED TO WORK.
- 1228 AN VTP STANDBY FAN DECLARED OPERABLE EXITING TIME MONITORING.
- 1300 IHT COMPLETED FLAM GAS READINGS FOR AY/AZ TANKS. ALL READINGS 0% LFL
- 8/1/14 NEXT SF 3.7.1 AY/AZ READINGS DUE NEXT 8/3/14
- 8/1/14 ENTERED LCO 3.1.A ON 6/8/14 @ 1635. FOR AY/AZ IN-SERVICE VTP O/S. LCO 3.1.A.2.1 DUE NEXT 8/1/14 @ 0753. LCO 3.1.A.2.3 DUE 8/15/14
- 1352 EMPLOYEE IN 0833 ENTRY RETURNED TO WORK W/RESTRICTION TO WEAR IMPER-PROOF BANDAGE.

Potential Exposure to Tank Farm Vapors

Attachment 2 Logbook Entries

7/29/14	D SHIFT
1446	SAMPLE ANALYSIS FOR ADP-015 EVENT AT GATE 8 CORRIDOR - HAVE BEEN COMPLETED AND THE RESULTS ARE AT OR BELOW BACKGROUND LEVELS. EXITING ADP-015. SOEN SENT, RADIO ANNOUNCEMENT MADE
1704	Relieved as CSM by
1704	- Assumed duties as CSM
2100	- ERZ reported an AP Farm CAM cabinet "enclosure #500" high temp alarm. Cabinet doors have been propped open to help cool.
2228	- Granted permission to remove admin locks for C-102 to AN-101 retrieval. SOEN sent.
2233	- C-102 to AN-101 admin lock condition removed. SOEN sent.
7/30/14	C-shift
0347	- POR-107 is now ventilating C-101, C-102, and C-107.
0452	- Relieved as CSM by
0452	Relieved as CSM
0620	TRACS reports a loss of communication with 200 I/O systems. Notified Engineers & ST ADM
0725	was agreed to lift his stop work on the use of Grade D Breathing Air. ←
0734	Notified DOE FR Sr. Mgt
0810	Environmental notified WDOH of the AP101 Annulus EORAF repairs (update). Notified DOE FR
1114	is taking (Ins. Tech) for HPAC for personal medical condition. Notified Safety
1225	Entering ADP-021 for unplanned shutdown of AW Farm VTP. Radio Announcement & SOEN complete.
1230	Notified DOE FR Frw. On Call & Sr. Mgt

Potential Exposure to Tank Farm Vapors

Attachment 3

AOP-15 Vapor Exposure Communication Form

WASHINGTON RIVER PROTECTION SOLUTIONS Industrial Hygiene Program		AOP-15 VAPOR EXPOSURE COMMUNICATION FORM			
Event	Date: 07/29/2014	Odor Location: Gate 8 Corridor (Between AN and AZ Farms)			
	Farm/Site: Gate 8 Corridor	Source Location: N/A			
DRI	AGENT	@ ODOR	@ SOURCE	EXPOSURE LIMIT	REPORTING LIMIT
	Ammonia	0 ppm	ppm	25 ppm OEL/35 ppm STEL	>0 ppm
	Total VOCs	0 ppb	ppb	2,000 ppb AL	>0 ppb
	Mercury	9 ng/m ³	ng/m ³	25,000 ng/m ³ OEL	16 ng/m ³
	Nitrous Oxide	1.1 ppm	ppm	25 ppm AL	>0 ppm
GC/MS	AGENT	@ ODOR	@ SOURCE	EXPOSURE LIMIT	All Analytes 20 ppb
	*Limonene	~10 ppb		*Highest Detectable	
	* 2-ethyl-1-hexanol	~9 ppb			
	* Dodecanes	~ 9 ppb			
	* Butane	8 ppb			
	Total- All Analytes	~57 ppb			
Comments:					
<p>Timeline of Events:</p> <p>09:43- CSM received phone call from employee supervisor who stated his employee reported a funny taste in mouth when she was performing AY/AZ perimeter surveys at the Gate 8 corridor.</p> <p>10:05- HAMTC Safety Representative notified Production Ops Safety & Health Manager that employee reported a taste in mouth when performing HPT routine surveillances at Gate 8 corridor.</p> <p>10:10- Production Ops IH and Safety & Health Manager reported to the Central Shift Office. Production Ops IH noted outside temperature 93F, 25% humidity, wind was 0 mph, and barometric pressure was 29.63 n and steady.</p> <p>10:10- Employee's supervisor contacted the CSM. Supervisor said employee was now reporting experiencing a "metallic taste in mouth"; supervisor was at HPMC with employee to begin medical evaluation.</p> <p>10:11- CSM stated a metallic taste did not meet AOP-015 entry criteria. Production Ops IH and Safety & Health Manager stated that was ultimately his call, however, didn't understand how it did not meet AOP-015 entry criteria. A reported "metallic taste in mouth" has always previously been treated as an AOP-015 entry.</p> <p>10:12- Shift IHT entered the CSO.</p> <p>10:18- Shift Operations manager arrived at the Central Shift Office to continue discussion regarding AOP-015 entry criteria. Shift Operations manager agreed with CSM that "metallic taste" was not an AOP-015 entry criteria. Stated he had signed off on AOP-015 procedure PCA on 07/28/14 and "taste" was not an entry criteria and that the new procedure revision should be out. CSM looked on the WRPS procedure web-page and noted a new AOP-015 procedure revision had not yet been issued, so Rev F-2 was still applicable. CSM stated "taste" was not listed as an AOP-015 entry condition in the F-2 procedure revision either. Production Ops Safety & Health Manager challenged how they could justify not entering AOP-015 and asked the CSM to contact the Industrial Hygiene Programs Manager and ask if she considers "metallic taste" as a symptom.</p> <p>~10:25 - CSM tried to contact the ESH&Q Director; left voice message.</p> <p>10:28- Industrial Hygiene Programs Manager contacted the Production Ops Safety & Health Manager. Her interpretation was a "metallic taste in mouth" is a symptom of potential exposure.</p> <p>10:28- Production Ops IHT Lead contacted to try to find another available IHT to help in the AOP-015 response.</p> <p>10:30- ESH&Q Director contacted the CSM. CSM provided summary of discussions on if "metallic taste" meets the AOP-015 entry criteria. ESH&Q Director said he understood the discussion and we would call right back.</p>					

Potential Exposure to Tank Farm Vapors

Attachment 3

AOP-15 Vapor Exposure Communication Form

WASHINGTON RIVER PROTECTION SOLUTIONS Industrial Hygiene Program		AOP-15 VAPOR EXPOSURE COMMUNICATION FORM (CONTINUED)
Event	Date: 07/29/2014	Odor Location: Gate 8 Corridor (Between AN and AZ Farms)
	Farm/Site: Gate 8 Corridor	Source Location: N/A
<p>10:36- 2nd IHT arrives at the CSO.</p> <p>10:38- Production Ops IH asked the responding IHT's to go check out SCBA for AOP-015 response before the mask station closes for lunch. Also, to get bags and instruments ready while still waiting for determination to be made on if AOP-015 was going to be entered.</p> <p>10:42- Production Ops IHT Supervisor stated he had provided field oversight on the AN exhauster pre-filter replacement job earlier that morning and the waste box containing the old per-filters was staged near the Gate 8 corridor. Production Ops IH stated she will get the DRI information for the AN pre-filter replacement job and the retrieval AreaRAE data.</p> <p>10:43- Production Ops IH provided direction to shift IHT to collect a polypropylene bag from around the waste container and another polypropylene bag from the Gate 8 corridor area.</p> <p>10:44- ESH&Q Director contacted the CSM. Stated his interpretation was a "metallic taste" is still considered a symptom. He had made phone calls and verified the CVST and AOP-015 CVST subcommittee had not made any changes to the AOP-015 entry criteria specifically regarding taste as a symptom, there has not been anything vetted in the CVST, and there were not procedural entry criteria changes. ESH&Q Director recommended CSM conservatively enter AOP-015.</p> <p>10:49- CSM made determination to enter AOP-015.</p> <p>10:52- Radio communication made for AOP-015 entry for AN, AY, and AZ Farms. All personnel are to stop work and exit farms.</p> <p>10:53- IHT's left to respond to AOP-015.</p> <p>10:56- Production Ops IH talked with the IHT that had provided continuous DRI monitoring during the AN pre-filter replacement job. The highest DRI readings during the work evolution were 0 ppm ammonia and 60 ppb VOC's (SWIHD Survey# 14-04662).</p> <p>11:00- Production Ops IH contacted the Retrieval IHT Lead to gather AreaRAE information from the deployed locations in AN Farm. AreaRAEs are currently deployed near AN-101, AN-106, and outside AN Farm in the retrieval corridor. Retrieval IHT stated the AreaRAEs were swapped out at 09:17; and the deployed AreaRAE's had 0 ppm ammonia and 0 ppm VOC's since 09:17. Production Ops IH asked if he could check the AreaRAE data from the set that was deployed previously. The highest detectable DRI reading was from the AreaRAE near AN-101, which had 0.6 ppm ammonia and 0 ppm VOC's. The detectable ammonia reading began around ~23:00 on 07/28/14 and lasted until ~07:00 on 07/29/14.</p> <p>~11:00- As IHT's attempt to leave the AN change-trailer, they noticed it was coridorred off and posted a CA. IHT's suited up into whites, but then realized they could not access the Gate 8 area because of the CA corridor. IHT's undressed, exited the AN change-trailer, and entered through the Gate 8.</p> <p>11:20- IHT's began collecting polypropylene bag samples from Gate 8 corridor and near the waste container. DRI monitoring indicated 0ppm ammonia, 0 ppb VOC's, 9 ng/m3 mercury, and 1.1 ppm of nitrous oxide.</p> <p>11:23 - Received SOEN "Entering AOP-015 for odors reported in Gate 8 corridor between AN & AY/AZ Farm. Access to AN & AY/AZ Farms restricted until further notice."</p> <p>11:40- Employee released to return to work with no restriction from HPMC.</p> <p>~11:40- IHT's dropped off polypropylene bag samples at 2704HV IH Lab to begin Hapsite analysis.</p> <p>12:02- Received SOEN "Production Ops HPT reported odors in Corridor 8 between AN & AY/AZ farms, taken to HPMC for evaluation."</p> <p>12:05- Received SOEN "Production Ops HPT was released to return to work."</p> <p>14:27- Production Ops IH contacted the IH Programs Analytical Chemist who was performing the Hapsite analysis to determine if preliminary polypropylene bag analysis was completed. IH Programs Analytical Chemist stated that preliminary review indicated there was nothing above normal background concentrations.</p> <p>14:40- Production Ops IH contacted the CSM and informed him that there were no readings</p>		

Potential Exposure to Tank Farm Vapors

Attachment 3

AOP-15 Vapor Exposure Communication Form

WASHINGTON RIVER PROTECTION SOLUTIONS Industrial Hygiene Program		AOP-15 VAPOR EXPOSURE COMMUNICATION FORM (CONTINUED)	
Event	Date: 07/29/2014	Odor Location: Gate 8 Corridor (Between AN and AZ Farms)	
	Farm/Site: Gate 8 Corridor	Source Location: N/A	
<p>above normal background concentrations detected.</p> <p>14:46- Received SOEN "Sample analysis for the AOP-015 event at Gate 8 corridor have been completed and the results are at or below background levels. Exiting AOP-015."</p> <p>15:16- Production Ops IH reviewed the Hanford Meteorological Station Observations. At 08:00 the wind speed was 4 mph from the 330° NNW direction, at 09:00 the wind speed was 5 mph from the 300° WNW direction, and at 10:00 the wind speed was 4 mph from the 10° N direction.</p> <p>15:36- Received Hapsite analysis write-up from the IH Programs Analytical Chemist: "More very light hydrocarbons were observed than normal, however, the sum did not exceed 5 ppb. Normal background compounds were observed at the high molecular weight range."</p> <p>* Additional information can be viewed in SWIHD survey 14-04678.</p>			
Prepared by:			

Potential Exposure to Tank Farm Vapors

Attachment 4 Hanford Meteorological Data for 7-25-2014

Tower Information

Wed Jul 30

00:02:20 PST 2014

yr	mo	day	hr	Solar	Prevailing Wind			Peak Gust		Time	Stab
					Degrees	Speed	Direction	Degrees	Speed		
14	7	29	1	0.00	290.0	8.5	WNW	308.0	15.009	00:11	E
14	7	29	2	0.00	280.0	8.1	W	292.9	12.486	01:17	E
14	7	29	3	0.00	190.0	4.1	S	254.0	10.593	02:07	G
14	7	29	4	0.00	150.0	4.2	SSE	157.5	8.701	03:06	G
14	7	29	5	0.01	180.0	2.2	S	161.8	6.598	04:56	G
14	7	29	6	0.12	240.0	1.8	WSW	218.3	6.178	05:15	F
14	7	29	7	0.34	300.0	5.5	WNW	297.1	9.963	06:33	E
14	7	29	8	0.58	320.0	4.9	NW	325.1	8.491	07:43	C
14	7	29	9	0.80	320.0	2.7	NW	51.9	6.808	08:53	B
14	7	29	10	0.99	80.0	2.0	ENE	110.9	8.701	09:29	A
14	7	29	11	1.13	120.0	4.8	ESE	115.4	11.855	10:31	A
14	7	29	12	1.21	130.0	4.2	SE	187.6	12.486	11:38	A
14	7	29	13	1.21	160.0	4.3	SSE	158.9	11.855	12:32	A
14	7	29	14	1.14	120.0	3.7	SE	160.3	12.907	13:39	A
14	7	29	15	1.01	130.0	5.9	SE	94.9	16.481	14:22	A
14	7	29	16	0.84	160.0	6.9	SSE	190.9	19.005	15:12	A
14	7	29	17	0.62	140.0	6.0	SE	113.6	19.425	16:12	A
14	7	29	18	0.36	100.0	9.5	E	93.4	18.374	17:29	B
14	7	29	19	0.08	120.0	8.7	ESE	104.5	14.378	18:10	D
14	7	29	20	0.01	120.0	7.0	SE	156.7	10.383	19:58	F
14	7	29	21	0.00	320.0	3.9	NW	322.8	15.220	20:39	F
14	7	29	22	0.00	290.0	9.1	WNW	290.2	20.687	21:39	E
14	7	29	23	0.00	280.0	8.4	WNW	306.9	16.481	22:31	E
14	7	29	24	0.00	280.0	9.8	WNW	298.1	16.061	23:44	D

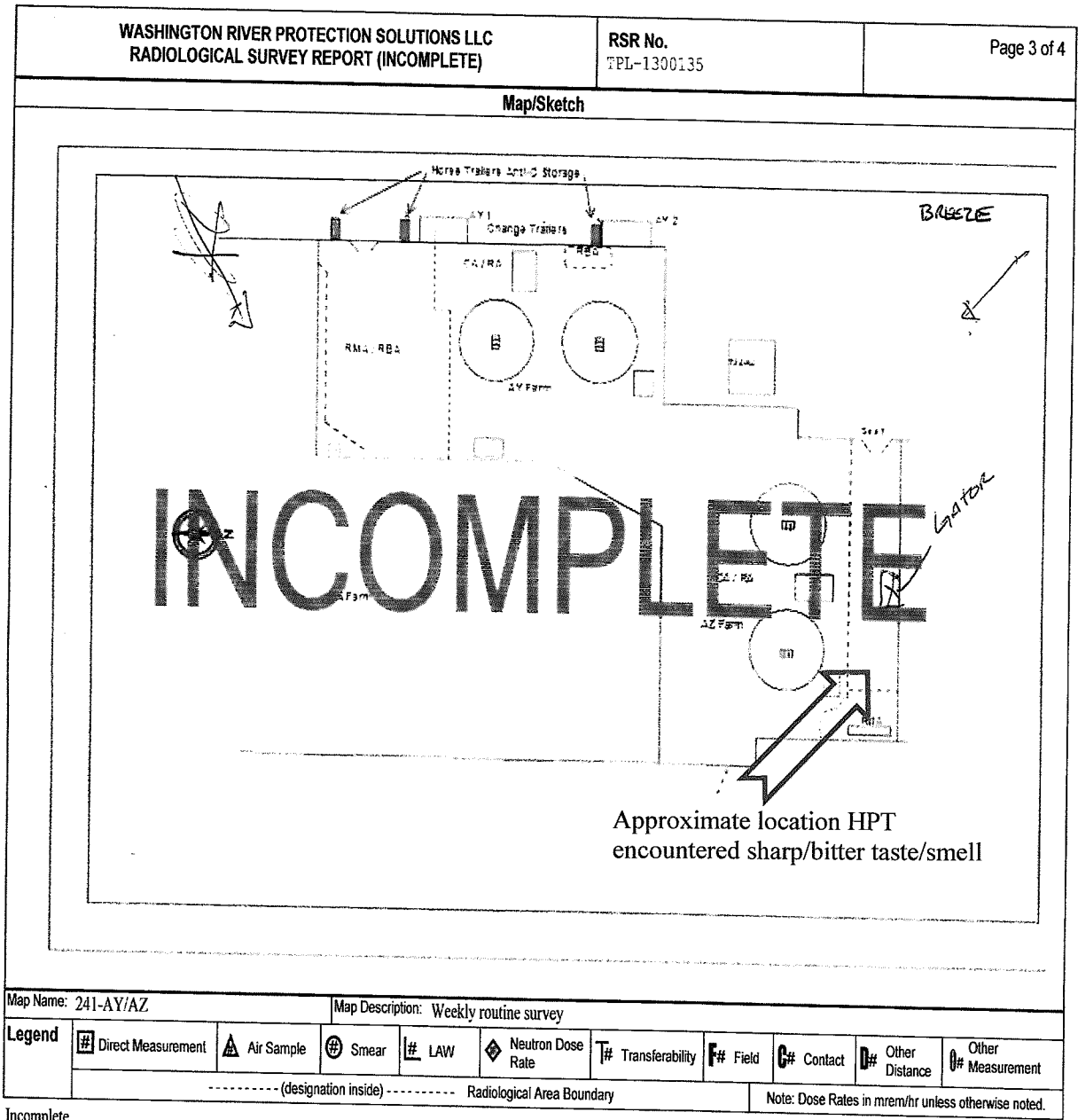
14 72924 917 839-999 853 866 874 862 862 859 857 852 99281099281499302030167

Delta T1 = T200 - T3 = 0.9
 Delta T2 = T250 - T50 = -1.5
 Delta T3 = T200 - T30 = -0.4 (NRC)

Pasquill Category = E
 200 ft Winds = 2814
 Least Dilution = 18.8

Potential Exposure to Tank Farm Vapors

Attachment 5 Area Map



BD-6003-343-SS (Rev. 2)