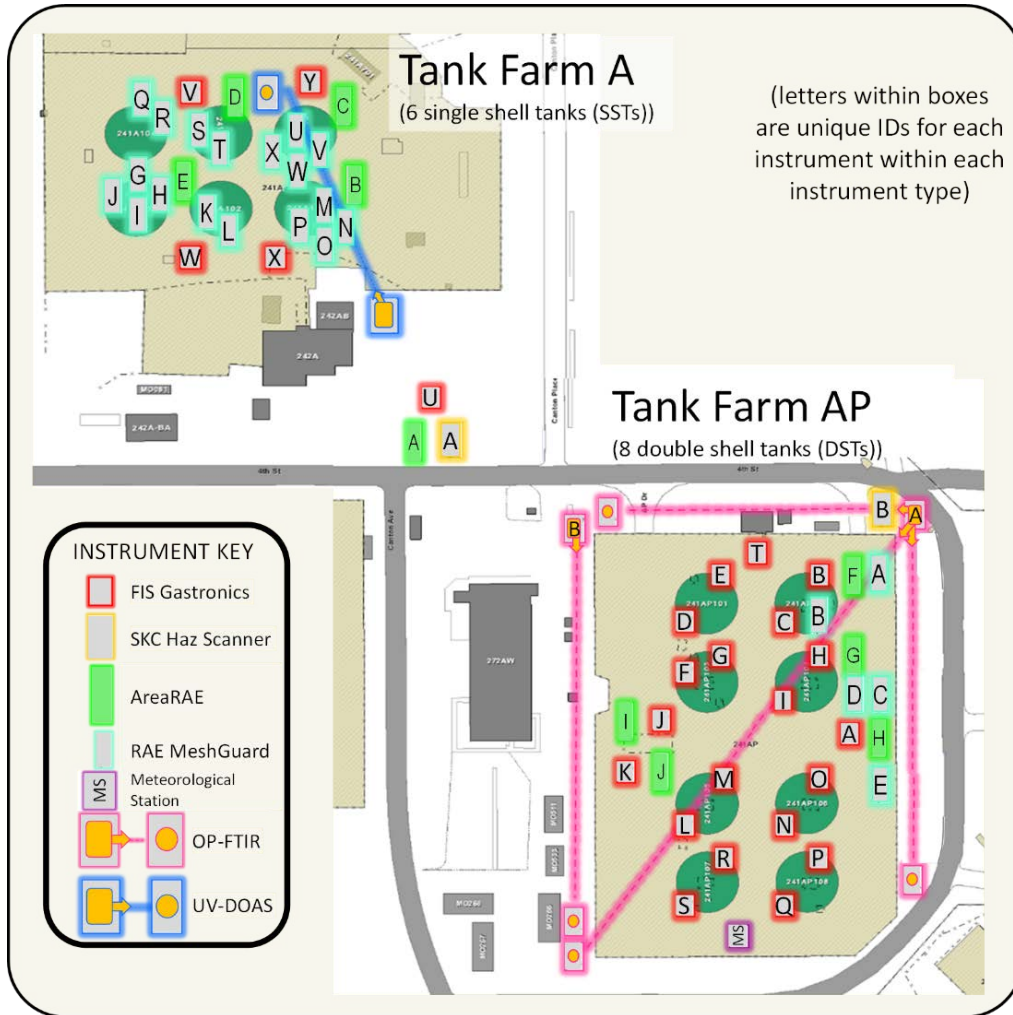


Direct Reading Instrumentation Weekly Summary

1/11/17 6:00 – 1/18/17 6:00

Sampling Location –A & AP-Tank Farms (map below)



This summary contains Vapor Monitoring and Detection System (VMDS) pilot-scale data collected over one week (January 11th at 6:00 a.m. through January 18th at 6:00 a.m.) using direct reading vapor detection instruments. Pilot-scale testing is focused on evaluating component integration and functionality. Data shown may include results for calibration and calibration check (bump test) tests performed to verify sensors are functioning; these tests are visible in the data as spikes. Any direct reading instrument alarms occurring during pilot-scale testing are taken to be actual events and the appropriate actions/notifications are undertaken.

- Abbreviations:
- NH₃ = ammonia
 - CO = carbon monoxide
 - CO₂ = carbon dioxide
 - LEL = lower explosive limit
 - NO = nitric oxide
 - N₂O = nitrous oxide
 - NO₂ = nitrogen dioxide
 - VMDS = Vapor Monitoring and Detection System
 - VOC = volatile organic compounds, which include both volatile and semi-volatile compounds.

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Weekly Summary: The ToxiRAE and MultiRAE instruments are personal monitors and were not deployed for use during this week. The AreaRAE systems were taken offline to address calibration issues and did not report data during this week¹. RAE MeshGuards have sensors for ammonia and reported data (see Table 4). Bump tests were conducted on the MeshGuards on 1/17/17. No ammonia was detected by the RAE MeshGuards during this week.

Gastronics instruments (512) have sensors for NH₃, VOCs, and N₂O. All NH₃ sensors (except 512S) have been calibrated since 12/1/16. Sensor 512S was last calibrated in August 2016. The most recent bump tests on the NH₃ sensors indicated that three units (512C, H, and I) reported sensor readings that were not within 10% of the test gas concentration. No ammonia was detected by the Gastronics instruments that were in calibration and/or verified by bump tests during this week.

VOC sensors were replaced and the new sensors were calibrated. Calibration checks of the VOC sensors indicated that six of the instruments (512F, G, I, L, Q, and T) reported values not within 10% of the test gas concentration.

Data for VOC are reported only when the VOC sensors are considered to be in calibration and verified by bump tests (i.e., within 10% of the test gas concentration). Of the Gastronics instruments reporting VOCs, none reported ≥ 2 ppm during the week (except for bump tests). Seven of the 512 instruments reported VOCs < 2 ppm (see Table 5), typically reporting 0.2 ppm for most of these instruments. Three of the 512 instruments did not detect VOCs. A total VOC limit of 2 ppm is currently employed by the Industrial Hygiene Program Technical Basis².

The N₂O sensors continue to report numerous data peaks up to full scale (512A, B, C, D, and S), and recurring patterns and spikes of N₂O at high concentrations > 100 ppm (512H, I, N, Q, and R). N₂O has not been detected above background levels (0.3 to 0.4 ppm) by spectroscopic instruments around the tank farm. The N₂O sensors on the 512 instruments do not hold calibration and the calibration procedure for the N₂O sensor/transmitter is being modified to correct for transmitter output drift. The N₂O data from Gastronics sensors are not considered accurate or reliable.

Waste retrieval operations resumed on 1/12/2017 at 11:12 pm and sluicing operations were performed continuously for approximately 12 hours until the system was shut down on 1/13/2017. Operations were shut down due to low temperature measured in a waste transfer pit. Retrieval operations were restarted on 1/14/2017 at 10:36 pm and continued intermittently until 1/15/2017 at 5:10 am, when operations were shut down for a few hours because the material balance exceeded the allowable level. Sluicing operations resumed on 1/15/2017 at 9:42 am and ran continuously until the system was intentionally shut down on 1/16/2017 at

¹ Note that instrument tags (labels) reported in OSI PI and often presented in weekly summary information are captured directly from OSI PI and that all gas monitoring instruments begin with 200-GM, followed by the target analyte (such as NH₃), followed by the instrument type (three digit number), and the instrument unit as sequential letters. For example, "200-GM-NH3-512C" is an ammonia sensor reporting from Gastronics (denoted as "512") instrument "C".

² RPP-22491, Rev 1, "Industrial Hygiene Chemical Vapor Technical Basis": http://hanfordvapors.com/wp-content/uploads/2016/10/Industrial-Hygiene-Chemical-Vapor-Technical-Basis-RPP-22491-Rev_1.pdf

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3:17 am. No anomalies in response to the waste retrieval activities were observed this week with any of the direct reading instruments that were in use and reporting data.

January 11th – 18th 2016 Observations By Instrument:

HazScanner (501) – The HazScanners, 501A and 501B, have not been calibrated, and work is ongoing to complete their configuration. Therefore no data is presented from these instruments.

AreaRAE (502) – Not reporting during this week.

Table 1. AreaRAE Comments.

Compound (units)	Comment	OEL	Action Level	Detection Range
CO (ppm)	No data reported.	50	25	1 – 500
LEL (%)	No data reported.			0 – 100
NH3 (ppm)	No data reported.	25	12.5	1 – 50
Oxygen (%)	No data reported.		<19.5	1 - 30
VOC (ppm)	No data reported.		2	1 - 200

ToxiRAE (503) – Not used during this week.

Table 2. ToxiRAE Comments.

Compound (units)	Comment	OEL	Action Level	Detection Range
VOC (ppm)	Not in use.	N/A	2	0.1 - 2000

MultiRAE (504) – Not used during this week.

Table 3. MultiRAE Comments.

Compound (units)	Comment	OEL	Action Level	Detection Range
CO (ppm)	A – Not in use. B – Not in use. C – Not in use.	50	25	0 – 500
LEL (%)	A – Not in use. B – Not in use. C – Not in use.	N/A		0 – 100
NH ₃ (ppm)	A – Not in use. B – Not in use. C – Not in use.	25	12.5	1 – 500
Oxygen (%)	A – Not in use. B – Not in use. C – Not in use.		<19.5	1 – 30
VOC (ppm)	A – Not in use.	N/A	2	0.1 – 5000

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Compound (units)	Comment	OEL	Action Level	Detection Range
	B – Not in use. C – Not in use.			

RAE MeshGuard (505) – Ammonia detection instruments are located in A Tank Farm (505G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, and X) and AP Tank Farm (505A, B, C, D, E, and F). Calibration checks were performed on the following units on 1/17/17: 505A, C, D, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, and X. No ammonia was detected by any of the RAE MeshGuards.

Table 4. RAE MeshGuard Comments.

Compound (units)	Comment	OEL	Action Level	Detection Range
NH ₃ (ppm)	<ul style="list-style-type: none"> • Instruments reporting: 505A, C, D, F, H, I, J, K, M, N, O, P, Q, R, S, T, U, V, W, and X. • Out of calibration*: 505G, I, K, N, and O • No ammonia detected 	25	12.5	1 – 50

* Only instruments reading within 10% of the calibration gas concentration during their most recent bump/calibration test are considered in calibration and reported here.

FIS-Gastronics (512) – Monitor for ammonia, volatile organic compounds, and nitrous oxide. Units located in AP Tank Farm include: 512A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, and T. Unit 512U is located between AP Tank Farm and A Tank Farm. Units 512V, W, X, and Y are located in A Tank Farm. Calibration checks were performed on instrument 512B on 1/16/17 and instruments 512K, L, M, N, O, P, Q, R, and S on 1/17/17, but the 512S calibration check could not be performed due to low power supply.

Table 5. Gastronics Comments.

Compound (units)	Comment	OEL	Action Level	Detection Range
NH ₃ (ppm)	<ul style="list-style-type: none"> • Out of calibration*: 512C, H, and I (1/10/17) • No ammonia detected 	25	12.5	1 – 500

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Table 5. Gastronics Comments.

Compound (units)	Comment	OEL	Action Level	Detection Range
VOC (ppm)	<ul style="list-style-type: none"> Out of calibration*: 512F, G, I, and T (1/10/17) and 512L and Q (1/17/17) Instruments reporting no detection of VOCs: 512B, E, and H Instruments that reported a maximum value of <2 ppm: 512C, D, K, N, O, R, and U No instruments reported maximum values ≥ 2 ppm 	N/A	2	0 – 1000
N ₂ O (ppm)	N ₂ O sensors reporting from 512A, B, C, D, E, F, H, I, K, N, O, Q, R, S, T, and U. The N ₂ O sensors on the 512 instruments do not hold calibration and the calibration procedure for the N ₂ O sensor/transmitter is being modified to correct for transmitter output drift. The N ₂ O data from Gastronics are not considered accurate or reliable.	50	25	0 – 1000

*NH₃/VOC: Only instruments reading within 10% of the calibration gas concentration during their most recent bump/calibration test are considered in calibration and reported here.

January 11th – 18th 2017 Instrument Operational Status:

Time reporting is calculated using the time sensors are reporting to OSI PI System³ for each instrument:

Table 6. HazScanner (501) % Time Reporting by Instrument.

Instrument	% Time Reporting	Instrument	% Time Reporting
501A	0	501B	0

Table 7. AreaRAE (502) % Time Reporting by Instrument.

Instrument	% Time Reporting	Instrument	% Time Reporting	Instrument	% Time Reporting	Instrument	% Time Reporting
502A	0	502D	0	502G	0	502J	0
502B	0	502E	0	502H	0		
502C	0	502F	0	502I	0		

Notes: % time reporting is estimated on review of graphs from OSI PI.

³ OSI PI System is a data visualization software package from [OSIsoft](http://OSIsoft.com).

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**Table 8. ToxiRAE (503) % Time Reporting by Instrument.
(personal monitors only used when operators are in the field)**

Instrument	% Time Reporting	Instrument	% Time Reporting	Instrument	% Time Reporting
503A	0	503E	0	503I	0
503B	0	503F	0	503J	0
503C	0	503G	0	503K	0
503D	0	503H	0		

**Table 9. MultiRAE (504) Time Reporting by Instrument.
(personal monitors only used when operators are in the field)**

Instrument	% Time Reporting	Instrument	% Time Reporting	Instrument	% Time Reporting
504A	0	504B	0	504C	0

Table 10. RAE MeshGuard (505) % Time Reporting.

Instrument	% Time Reporting	Instrument	% Time Reporting	Instrument	% Time Reporting	Instrument	% Time Reporting
505A	47	505H	52	505O	52	505V	53
505B	0	505I	37	505P	52	505W	53
505C	51	505J	53	505Q	52	505X	53
505D	47	505K	43	505R	22		
505E	0	505L	0	505S	<1		
505F	49	505M	49	505T	53		
505G	0	505N	51	505U	53		

Table 11. Gastronics (512) % Time Reporting by Instrument^a.

Instrument	% Time Reporting	Instrument	% Time Reporting	Instrument	% Time Reporting	Instrument	% Time Reporting
512A	44 ^b	512H	87	512N	96	512T	96
512B	91	512I	97	512O	75	512U	>99
512C	97	512J	0	512P	0	512V	0
512D	80	512K	95	512Q	89	512W	0
512E	92	512L	0	512R	73	512X	0
512F	92	512M	0	512S	31 ^b	512Y	0
512G	0						

(a) % time reporting typically based off NH₃.

(b) % time reporting for N₂O only. NH₃ and VOC sensors did not report data.