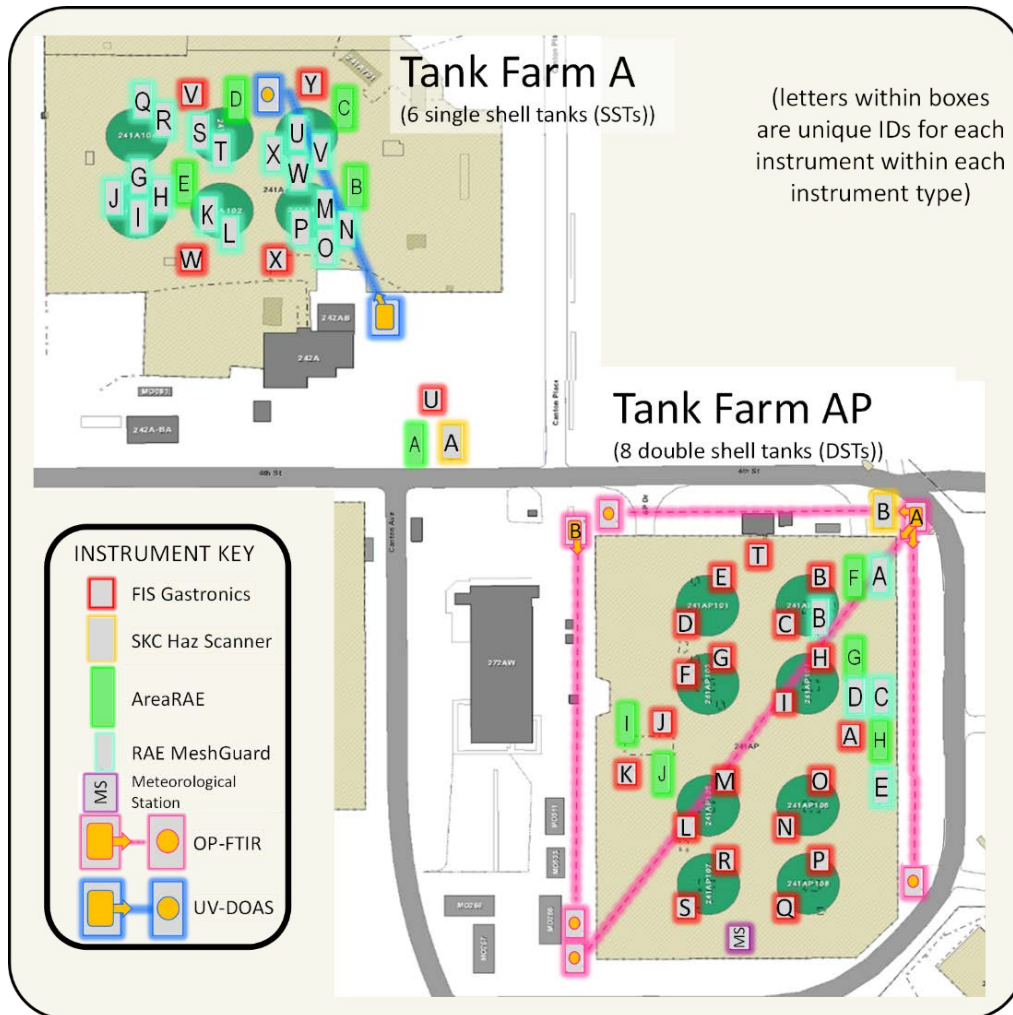


Direct Reading Instrumentation Weekly Summary

10/26/16 6:00 – 11/02/16 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 (October 26th at 6:00 a.m. through November 2nd 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.

Direct Reading Instrumentation Weekly Summary

10/26/16 6:00 – 11/02/16 6:00

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 earlier this month and did not report data during this week.

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".

Gastronics instruments (512) have sensors for NH₃, VOCs, and N₂O. No ammonia was detected by Gastronics instruments. The N₂O sensors continue to report numerous data peaks up to full scale, and recurring patterns of N₂O at high concentrations (>100 ppm). N₂O has not been detected above background levels (0.3 to 0.4 ppm) by spectroscopic instruments around the 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 are not considered accurate or reliable.

Three Gastronics instruments reported VOCs >2 ppm during the week. Unit 512E reported a 30.6 ppm spike for a 5-second interval on November 1 between 2200 and 2300, immediately returning to 0. Unit 512 I reported recurring 10-second data spikes that showed values bouncing between 0 and 3.9 ppm. Unit 512Q reported values from 2 ppm to 4 ppm on October 27 between 400 and 1200 hours, and from 2 ppm to 2.5 ppm on October 28 between 400 and 1000 hours. The VOC sensors are overdue for cleaning and maintenance; a number of sensors are failing calibration checks. Replacement sensors have been ordered to switch out existing sensors for cleaning, but until this is accomplished, the reported high values are considered questionable. A total VOC limit of 2 ppm currently is employed by the Industrial Hygiene Program Technical Basis¹.

October 26th – November 2nd 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 – other than up-time.

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

¹ 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>

Direct Reading Instrumentation Weekly Summary

10/26/16 6:00 – 11/02/16 6:00

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. B – Not in use. C – Not in use.	N/A	2	0.1 – 5000

RAE MeshGuard (505) – Ammonia detection instruments located in A Tank Farm (18 sensors) and located in AP Tank Farms (4 sensors).

Table 4. RAE MeshGuard Comments.

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

Direct Reading Instrumentation Weekly Summary

10/26/16 6:00 – 11/02/16 6:00

FIS-Gastronics (512) – Monitor for ammonia, volatile organic compounds, and nitrous oxide.

Figure 1. FIS-Gastronics VOC Review.
(Note that concentration units are ppm)

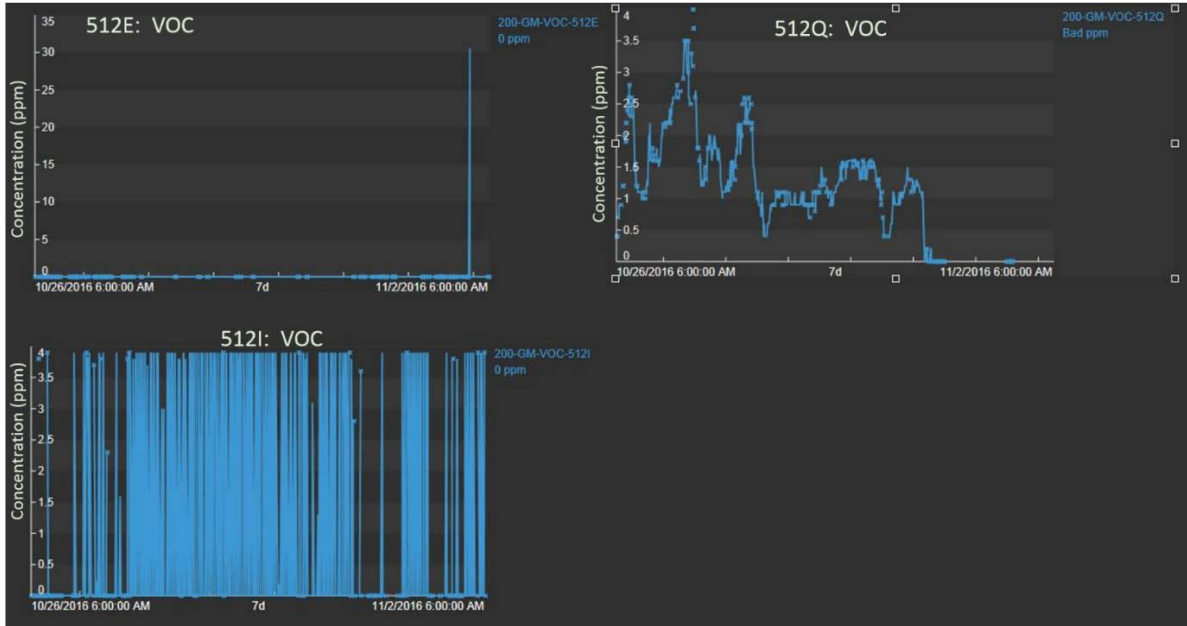


Table 5. Gastronics Comments.

Compound (units)	Comment	OEL	Action Level	Detection Range
NH ₃ (ppm)	No ammonia reported on any instrument (other than calibration tests)	25	12.5	1 – 500
VOC (ppm)	<ul style="list-style-type: none"> • Instruments A, D, S, and Y report 10X actual values. Instrument 512X is suspected to report 10X actual values based on calibration checks²³. • Instruments reporting no detection of VOCs: 512F, G, K, M, N, O, and U • Instruments that reported a maximum value of ≤ 2 ppm: A, D, H, P, and T, • Instruments reporting maximum values > 2 ppm: E (30.6 ppm), I (3.9 ppm), 512Q (4.0 ppm) and X (4.3 ppm). Based on calibration data, 512X is suspected of reporting VOC at 10X actual values 	N/A	2	0 – 1000
N ₂ O (ppm)	N ₂ O sensors reporting from 512E, F, G, H, I, K, M, N, O, P, Q, and T. The N ₂ O	50	25	0 – 1000

² OSHA Calibrating and Testing Direct-Reading Portable Gas Monitors. <https://www.osha.gov/dts/shib/shib093013.html>

³ OSHA Technical Manual. https://www.osha.gov/dts/osta/otm/otm_ii/pdfs/otmii_chpt3_directreading.pdf

Direct Reading Instrumentation Weekly Summary

10/26/16 6:00 – 11/02/16 6:00

Table 5. Gastronics Comments.

Compound (units)	Comment	OEL	Action Level	Detection Range
	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.			

October 26th – November 2nd 2016 Instrument Operational Status:

Time reporting is calculated using the time sensors are reporting to OSI PI System⁴ for each instrument:

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

Instrument	% Time Reporting	Instrument	% Time Reporting
501A	8	501B	6

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.

**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

⁴ OSI PI System is a data visualization software package from [OSIsoft](http://www.osisoft.com).

Direct Reading Instrumentation Weekly Summary

10/26/16 6:00 – 11/02/16 6:00

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

Instrument	% Time Reporting	Instrument	% Time Reporting	Instrument	% Time Reporting	Instrument	% Time Reporting
505A	64	505H	0	505O	63	505V	64
505B	0	505I	0	505P	63	505W	0
505C	64	505J	63	505Q	63	505X	64
505D	65	505K	87	505R	0		
505E	0	505L	0	505S	0		
505F	64	505M	59	505T	56		
505G	0	505N	64	505U	0		

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

Instrument	% Time Reporting	Instrument	% Time Reporting	Instrument	% Time Reporting	Instrument	% Time Reporting
512A	95	512H	89	512N	94	512T	94
512B	0	512I	94	512O	94	512U	93
512C	0	512J	0	512P	94	512V	0
512D	6	512K	97	512Q	67	512W	0
512E	95	512L	0	512R	0	512X	3
512F	97	512M	94	512S	0	512Y	0
512G	81						