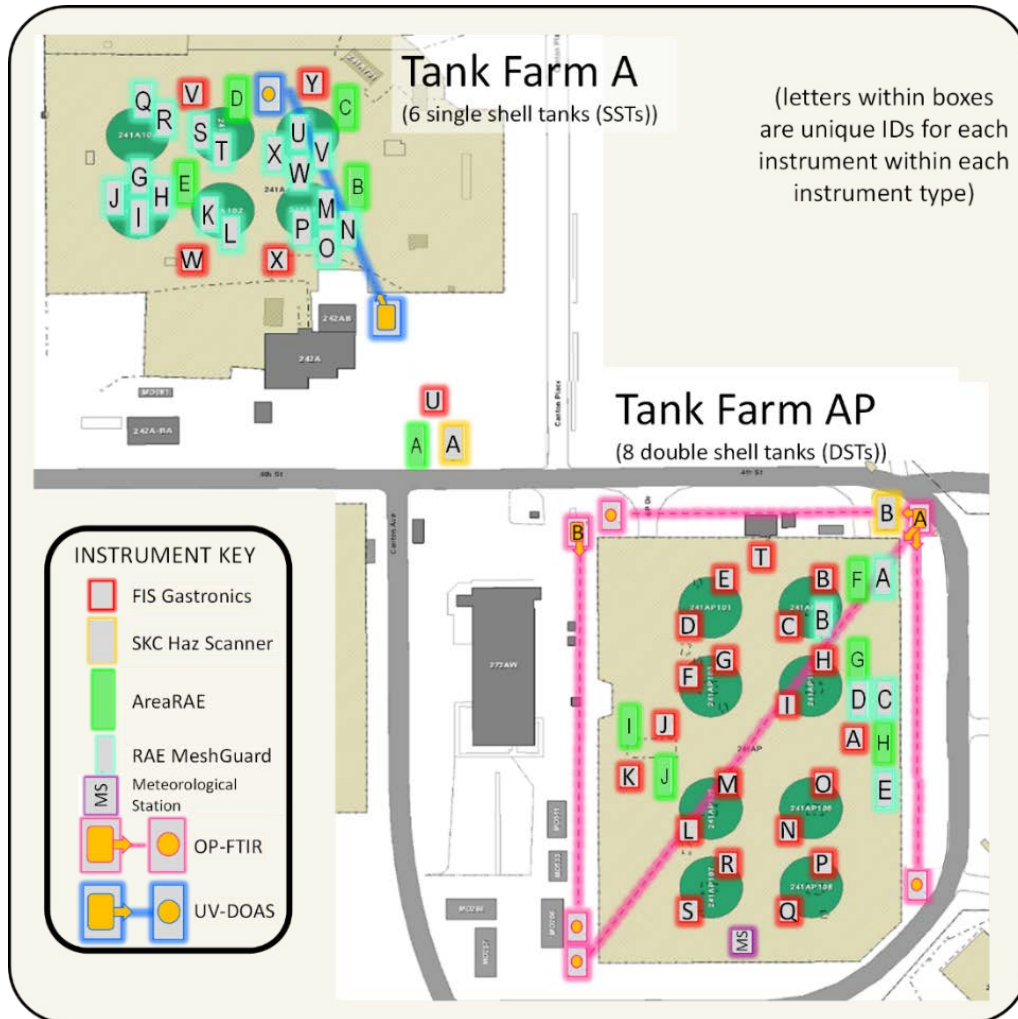


Direct Reading Instrumentation Weekly Summary

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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 19th at 6:00am through October 26th at 6:00am) 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 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 show numerous sharp 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 appear to 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 and reliable.

Two Gastronics instruments reported VOCs >2 ppm during the week. Unit 512A reported VOC concentrations up to 2.2 ppm over a 30-s period on October 25. Unit 512I reported recurring 10-second data spikes that showed values bouncing between 0 and 3.9 ppm and reported two 10-second VOC peaks above 7 ppm outside of regular working 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 19th – October 26th 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
NH ₃ (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

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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. No units communicating during bump tests. 	25	12.5	1 – 50

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

Figure 1. VOC Detected on 512A and 512I.

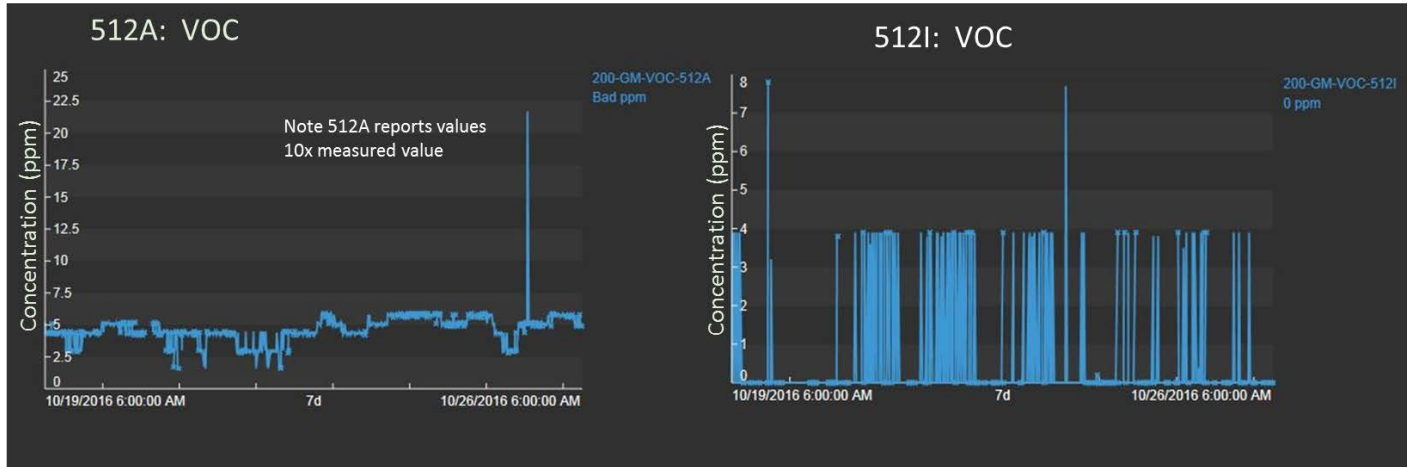


Table 5. Gastronics Comments.

Compound (units)	Comment	OEL	Action Level	Detection Range
NH ₃ (ppm)	No ammonia reported on any instrument (other than calibration tests) <ul style="list-style-type: none"> Calibration/check²³ tests performed on 512N, O, P, and Q. 	25	12.5	1 – 500
VOC (ppm)	<ul style="list-style-type: none"> Calibration/check tests performed on 512N, O, P, and Q. Instruments A, D, S, and Y report 10x actual values. Instrument 512X is suspected to report 10X actual values based on calibration checks. Instruments reporting no detection of VOCs: E, F, K, M, N, and O Instruments that reported a maximum value of ≤ 2 ppm: D, H, P, Q, T, U and Y Instruments reporting maximum values > 2 ppm: A (2.2 ppm), I (7.8 ppm), and X (4.4 ppm). Based on calibration data, 512 X 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 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.			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

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October 19th – October 26th 2016 Instrument Operational Status:

The percent time reporting is calculated using the instrument data from OSI PI System⁴:

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

Instrument	% Time Reporting	Instrument	% Time Reporting
501A	~10	501B	35

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).

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

Instrument	% Time Reporting	Instrument	% Time Reporting	Instrument	% Time Reporting	Instrument	% Time Reporting
505A	54	505H	0	505O	54	505V	54
505B	0	505I	0	505P	54	505W	0
505C	54	505J	54	505Q	54	505X	54
505D	54	505K	79	505R	0		
505E	0	505L	0	505S	0		
505F	54	505M	55	505T	54		
505G	0	505N	55	505U	0		

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

Instrument	% Time Reporting	Instrument	% Time Reporting	Instrument	% Time Reporting	Instrument	% Time Reporting
512A	92	512H	93	512N	95	512T	95
512B	0	512I	97	512O	99	512U	99
512C	0	512J	0	512P	94	512V	0
512D	93	512K	89	512Q	16	512W	0
512E	94	512L	0	512R	0	512X	36
512F	97	512M	95	512S	0	512Y	88
512G	98						