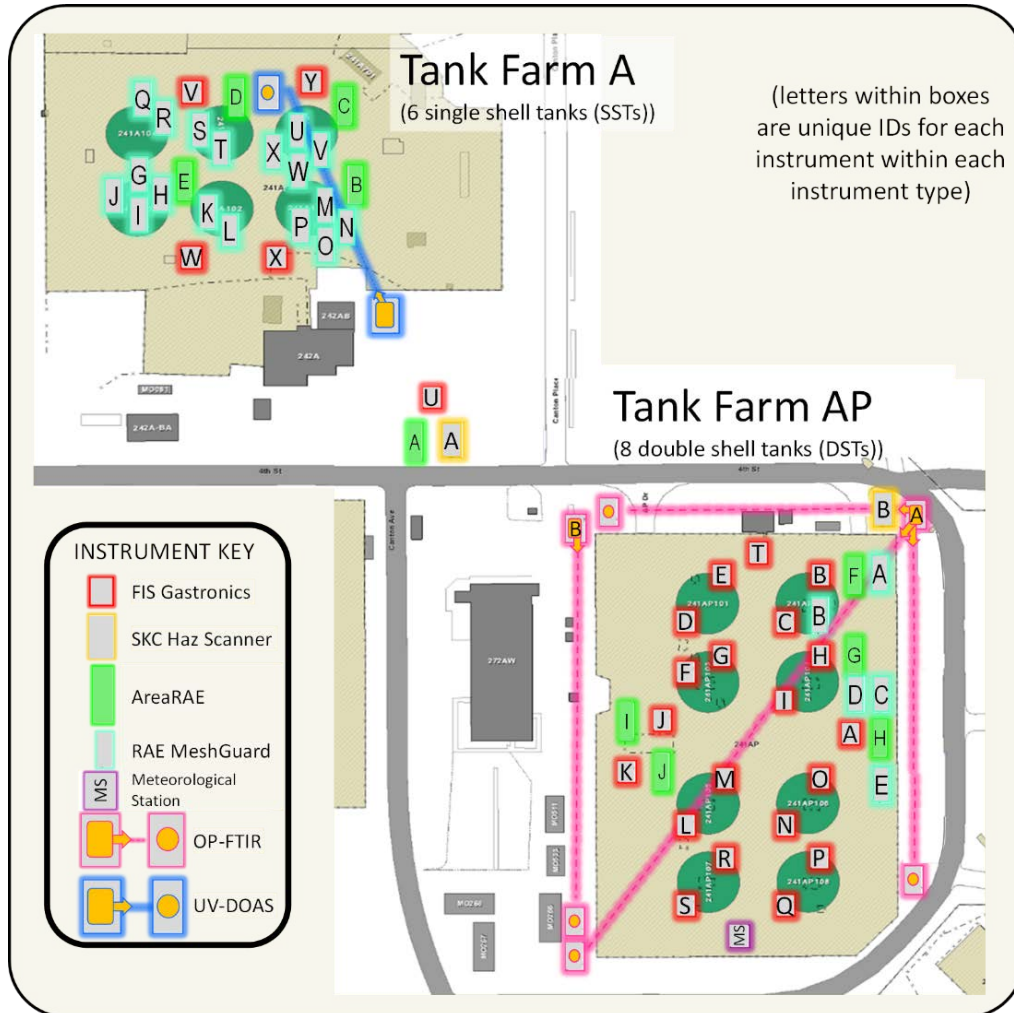


Direct Reading Instrumentation Weekly Summary

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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 (December 14th at 6:00 a.m. through December 21st 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. No ammonia was detected by the RAE MeshGuards during this week.

Gastronics instruments have sensors for NH₃, VOCs and N₂O. No ammonia was detected by Gastronics instruments that were in calibration. The NH₃ sensor on 512L is reporting a continuous value of 19 ppm NH₃ and is not in calibration.

VOC sensors were replaced and new sensors are being calibrated. Of the 512 instruments reporting, VOC sensors on 512A, B, C, E, H, I, Q, R, T, U, V, W, X, and Y were calibrated between 12/1 and 12/13; 512J was calibrated on 12/14; and 512F, G, K, and M were calibrated on 12/19. VOC data are reported only when sensors are considered to be in calibration. On the calibrated units, no VOCs were detected by 512F, I, K, M, Q, R, and U. Units 512A, B, C, and T reported VOCs <2 ppm (0.2 to 1.5 ppm). None of the calibrated units reported VOCs > 2 ppm. Sensors on the remaining units will be calibrated over the next week as access to the tank farms is allowed. A total VOC limit of 2 ppm currently is employed by the Industrial Hygiene Program Technical Basis²

The N₂O sensors on 512 instruments in AP Farm (512A – 512T) were recently re-calibrated and will be observed for a period to determine whether the instruments will hold calibration. The N₂O sensors on the 512 instruments have been difficult to keep in calibration and the calibration procedure for the N₂O sensor/transmitter was modified to correct for transmitter output drift. The N₂O data will remain suspect until the stability of the sensor and calibration can be confirmed. N₂O has not been detected above background levels (0.3 to 0.4 ppm) by spectroscopic instruments along the fencelines around the farm.

December 14th – December 21st 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.

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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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

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).

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Table 4. RAE MeshGuard Comments.

Compound (units)	Comment	OEL	Action Level	Detection Range
NH ₃ (ppm)	Instruments reporting: 505A, C, D, F, H, I, J, K, M, N, O, P, Q, R, S, T, U, V, W, 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

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

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 calibrated 12/1 – 12/14: 512A, B, C, E, H, I, J, Q, R, T, and U. 512V, W, X, and Y were calibrated, but do not report. Instruments 512F, G, K, and M calibrated on 12/19 and considered in calibration last 1.5 days of reporting period. • Instruments that reported no VOCs detected: 512F, I, K, M, Q, R, and U • Instruments that reported a maximum value of ≤ 2 ppm: 512A, B, C, and T • Instruments that reported maximum values > 2 ppm: None. 	N/A	2	0 – 1000
N ₂ O (ppm)	N ₂ O sensors reported from 512A, B, C, D, F, I, J, K, M, N, O, P, Q, R, S, T, and U. The N ₂ O sensors on 512A, B, C, I, M, N, P, Q, and R reported recurring N ₂ O spikes. The N ₂ O data remain suspect until the stability of the sensor and calibration can be confirmed.	50	25	0 – 1000

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December 14th – December 21st 2016 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.

**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	52	505H	30	505O	47	505V	29
505B	0	505I	19	505P	32	505W	38
505C	55	505J	48	505Q	35	505X	27
505D	54	505K	11	505R	15		
505E	0	505L	0	505S	12		
505F	53	505M	48	505T	45		
505G	0	505N	43	505U	29		

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

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

Instrument	% Time Reporting	Instrument	% Time Reporting	Instrument	% Time Reporting	Instrument	% Time Reporting
512A	97	512H	0	512N	74	512T	99
512B	96	512I	88	512O	9	512U	100
512C	94	512J	0	512P	72	512V	0
512D	88	512K	95	512Q	94	512W	0
512E	0	512L	98	512R	78	512X	3
512F	96	512M	34	512S	0	512Y	0
512G	0						