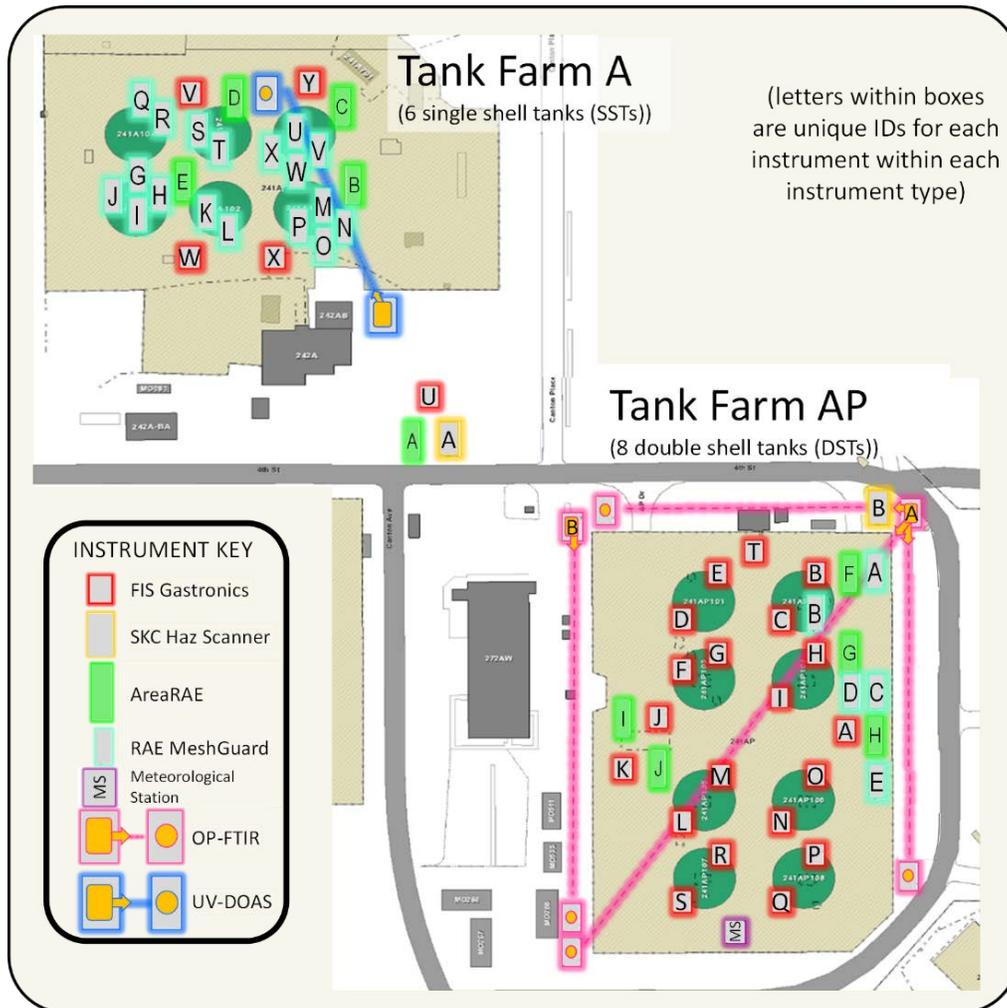


# Direct Reading Instrumentation Weekly Summary

12/21/16 6:00 – 12/28/16 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 (December 21<sup>st</sup> at 6:00 a.m. through December 28<sup>th</sup> 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:
- NH<sub>3</sub> = ammonia
  - CO = carbon monoxide
  - CO<sub>2</sub> = carbon dioxide
  - LEL = lower explosive limit
  - NO = nitric oxide
  - N<sub>2</sub>O = nitrous oxide
  - NO<sub>2</sub> = 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 week<sup>1</sup>. 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 NH<sub>3</sub>, VOCs and N<sub>2</sub>O. No ammonia was detected by Gastronics instruments that were in calibration. The NH<sub>3</sub> sensor on 512L was reporting a continuous value of 19 ppm NH<sub>3</sub> until it was calibrated 12/27, values then dropped to less than detectable.

VOC sensors were replaced and new sensors are being calibrated. Of the 512 instruments reporting, VOC sensors on 512A, B, C, E, F, H, I, J, K, M, Q, R, T, and U. were calibrated between 12/6 and 12/19; 512D, L, N, O, P, and S were calibrated on 12/27. VOC data are reported only when sensors are considered to be in calibration. On the calibrated units, no VOCs were detected by 512A, C, D, I, L, N, Q, and R. Units 512B, F, K, M, P, T, and U reported VOCs <2 ppm (0.2 to 1.6 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 Basis<sup>2</sup>

The N<sub>2</sub>O 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 N<sub>2</sub>O sensors on the 512 instruments have been difficult to keep in calibration and the calibration procedure for the N<sub>2</sub>O sensor/transmitter was modified to correct for transmitter output drift. The N<sub>2</sub>O data will remain suspect until the stability of the sensor and calibration can be confirmed. N<sub>2</sub>O has not been detected above background levels (0.3 to 0.4 ppm) by spectroscopic instruments along the fencelines around the farm.

## **December 21<sup>st</sup> – December 28<sup>th</sup> 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.

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<sup>1</sup> 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 NH<sub>3</sub>), 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".

<sup>2</sup> 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 <sub>3</sub> (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 <sub>3</sub> (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 <sub>3</sub> (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"> <li>• No ammonia detected.</li> <li>• Calibration/check tests on: none</li> </ul>	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 <sub>3</sub> (ppm)	No ammonia reported on any instrument (other than calibration tests)	25	12.5	1 – 500
VOC (ppm)	<ul style="list-style-type: none"> <li>• Instruments calibrated 12/6 – 12/20: 512A, B, C, E, F, G, H, I, J, K, M, Q, R, S, T, U, V, W, X, and Y. Instruments 512D, L, N, O, P and S calibrated on 12/27 and in calibration only last 0.5 day of reporting period.</li> <li>• Instruments that reported no VOCs detected: 512A, C, D, I, L, N, Q, and R</li> <li>• Instruments that reported a maximum value of ≤ 2 ppm: 512B, F, K, M, P, T and U</li> <li>• Instruments that reported maximum values &gt; 2 ppm: None.</li> </ul>	N/A	2	0 – 1000
N <sub>2</sub> O (ppm)	N <sub>2</sub> O sensors reported from 512A, B, C, D, F, I, K, M, N, O, P, Q, R, T, and U. The N <sub>2</sub> O sensors on 512A, B, C, I, K, M, N, P, Q, and T reported N <sub>2</sub> O spikes. The N <sub>2</sub> O data remain suspect until the stability of the sensor and calibration can be confirmed.	50	25	0 – 1000

**December 21<sup>st</sup> – December 28<sup>th</sup> 2016 Instrument Operational Status:**

Time reporting is calculated using the time sensors are reporting to OSI PI System<sup>3</sup> for each instrument:

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

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**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						
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						
505A	85	505H	97	505O	95	505V	99
505B	0	505I	36	505P	99	505W	99
505C	91	505J	99	505Q	99	505X	98
505D	86	505K	11	505R	29		
505E	0	505L	0	505S	11		
505F	85	505M	94	505T	98		
505G	0	505N	95	505U	98		

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

Instrument	% Time Reporting						
512A	98	512H	0	512N	< 1	512T	99
512B	97	512I	97	512O	17	512U	100
512C	99	512J	0	512P	54	512V	0

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Instrument	% Time Reporting						
512D	13	512K	95	512Q	96	512W	0
512E	0	512L	98	512R	68	512X	3
512F	99	512M	97	512S	0	512Y	0
512G	0						