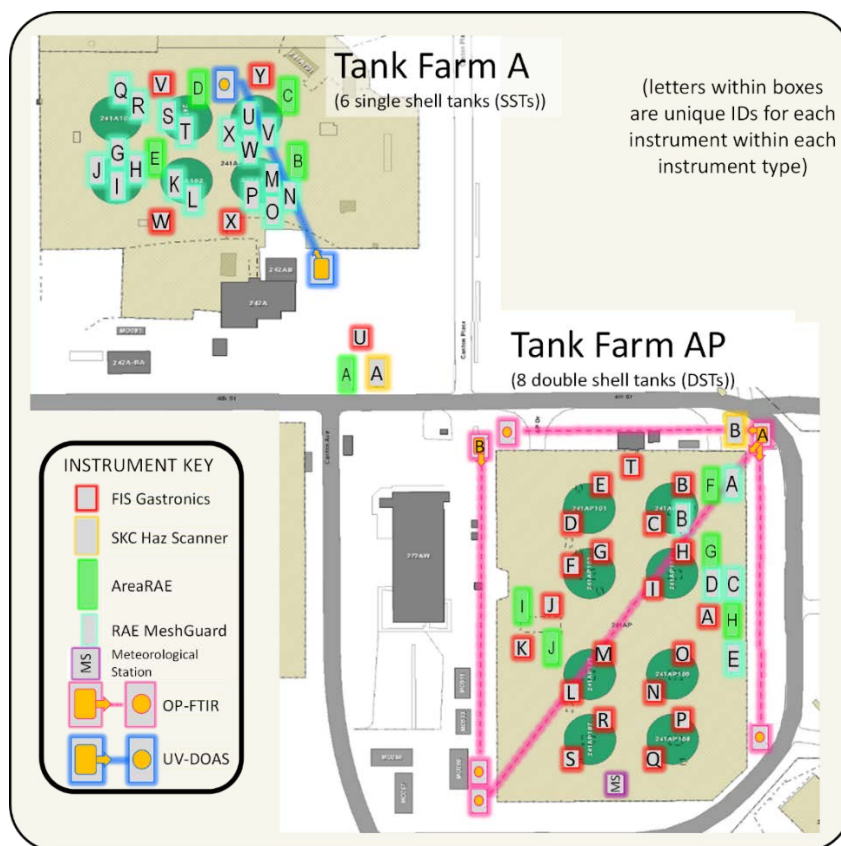


Direct Reading Instrumentation Weekly Summary

11/16/16 6:00 – 11/23/16 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 November 16th at 6:00am through November 23rd 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
 - PM 2.5 / PM 10 = particulate matter <2.5 μm and <10 μm, respectively
 - H₂S = hydrogen sulfide
 - SO₂ = sulfur dioxide
 - 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.

Gastronics instruments have sensors for NH₃, VOCs and N₂O. No ammonia was detected by Gastronics instruments.

Three of the VOC sensors on the 512 instruments consistently returned acceptable values during calibration check tests this week (512A, C, and U). None of the instruments that met calibration checks reported VOCs above 2 ppm. Instrument 512A reported a consistent value for VOCs of 0.2 ppm during the week (except during the bump tests). This consistent value may represent sensor drift from 0. 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 values are considered questionable. 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 re-calibrated this week 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.

November 16th – November 23rd 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

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
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

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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: 505A, C, D, F, G, H, I, J, M, N, O, P, Q, T, U, V, W, and X. No ammonia detected. Calibration/check tests on: 505A, 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. Calibration check tests³ were performed on the following instruments:

- November 16th 512B, C, D, N, O, P, U, V, W, X, and Y
- November 22nd 512A, B, C, D, E, F, G, H, I, J, and T

Table 5. Gastronics Comments.

Compound (units)	Comment	OEL	Action Level	Detection Range
NH ₃ (ppm)	Instruments reporting: 512A, B, C, D, E, F, H, I, J, K, L, M, N, O, P, T, U, and X <ul style="list-style-type: none"> • No ammonia reported on any instrument (other than calibration tests) 	25	12.5	1 – 500
VOC (ppm)	Instruments reporting: 512A, B, C, D, E, F, H, I, J, K, L, M, N, O, P, T, U, and X. <ul style="list-style-type: none"> • In Calibration: 512A, C, and U • Instruments reporting no detection of VOCs (other than calibration checks): 512U • Instruments that reported a maximum value of ≤ 2 ppm: 512A and C • Instruments reporting maximum values > 2 ppm: none 	N/A	2	0 – 1000
N ₂ O (ppm)	Instruments reporting: 512A, B, C, D, E, F, H, I, K, M, N, O, P, T, and U. The N ₂ O sensors on 512H, I, M, and N did not hold calibration and will be reviewed. The N ₂ O data from Gastronics will continue to be reviewed until instruments are determined to function correctly.			0 – 1000

³ OSHA Calibrating and Testing Direct-Reading Portable Gas Monitors. <https://www.osha.gov/dts/shib/shib093013.html>

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November 16th – November 23rd 2016 Instrument Operational Status:

Time reporting is calculated using the amount of time during the week that sensors reported to OSI PI System⁴.

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		

**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
505A	58	505I	71	505Q	71
505B	0	505J	71	505R	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
505C	63	505K	0	505S	0
505D	62	505L	0	505T	71
505E	0	505M	69	505U	70
505F	57	505N	68	505V	71
505G	72	505O	70	505W	71
505H	71	505P	71	505X	71

Table 11. Gastronics (512) % Time Reporting by Instrument (based on NH₃).

Instrument	% Time Reporting	Instrument	% Time Reporting	Instrument	% Time Reporting
512A	75	512J	2	512S	0
512B	12	512K	97	512T	97
512C	91	512L	98	512U	98
512D	87	512M	94	512V	0
512E	89	512N	94	512W	0
512F	95	512O	94	512X	1
512G	0	512P	46	512Y	0
512H	97	512Q	0		
512I	88	512R	0		