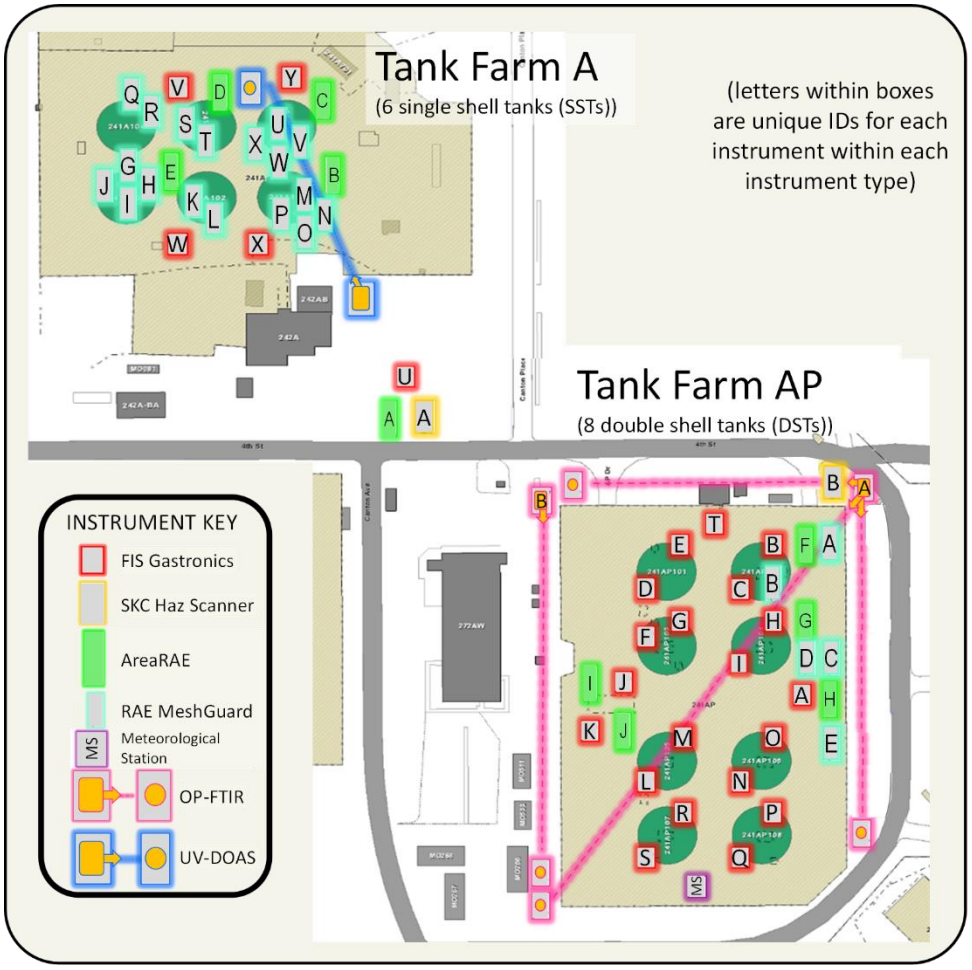
Direct Reading Instrumentation Weekly Summary

10/5/16 6:00 – 10/12/16 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 5th at 6:00 a.m. through October 12th 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 Phase 1 pilot-scale testing are taken to be actual events and the appropriate actions/notifications are taken.

Abbreviations: NH_3 = ammonia
CO = carbon monoxide
LEL = lower explosive limit N_2O = nitrous oxide
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 AreaRAE, ToxiRAE, and MultiRAE instruments were not reporting during this time period.

No ammonia was detected on either the MeshGuards or the FIS-Gastronics. Gastronics N_2O sensors continue to show very sharp spikes, often to full scale. The 512G N_2O sensor exhibited a recurring pattern early morning which could be caused by atmospheric conditions. Four Gastronics instruments reported VOCs >1 ppm with instrument 512F showed a spike to 21 ppm over several minutes. The spike occurred Sunday evening when no personnel were in the tank farm. Unit 512Q again showed a recurring pattern on three separate days where values increased over a several hour period before peaking and decreasing. The highest VOC peak measured by 512Q was 6.9 ppm. This pattern appears to correspond to increasing and decreasing relative humidity and is being further investigated. Further review of the data and information on VOC detections by the Gastronics FIS instruments determined that the VOC sensors are overdue for cleaning and maintenance. 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 Basis[1].

Note that instrument tags (labels) reported in OSI PI System (OSI PI)[2] 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_3), 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".

October 5th – October 12th 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

[2] OSI PI System is a data visualization software package from OSIsoft.

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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 deployed primarily in A Tank Farm with a couple located AP Tank Farms.

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, R, S, T, V, X, and Y. • No ammonia detected. • Calibration 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

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FIS-Gastronics (512) – Monitor for ammonia, volatile organic carbon, 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) • Calibration/check tests performed on A, D, E, F, H, I, K, M, N, P, T, U, X, and Y.	25	12.5	1 – 500
VOC (ppm)	• Calibration/check tests performed on A, D, E, F, H, I, K, M, N, T, U, X, and Y. Instruments A, D, S, and Y report 10x actual values. • Instruments reporting no detection of VOCs: E, H, and T • Instruments that reported a maximum value of ≤ 1ppm: A, D, G, K, P, S, U , X and Y • Instruments reporting maximum values > 1ppm: F (21 ppm), I (1.6 ppm), M (1.6 ppm), N (1.2 ppm), and Q (6.9 ppm). ○ 512Q continued to show a recurring pattern on three separate days (graph below).	N/A	2	0 – 1000
N_2O (ppm)	N_2O sensors only reporting from 512 E, F, G, H, I, K, M, N, O, P, Q, T, and U. • Below detection levels on A, D, H, I, K, M, O, P, Q, T, and U. • A, D, M, O, P, Q, T, and U reported only for brief periods. • Spikes to full scale reported on E and G. • F reported values up to 993 ppm and N reported values up to 412 ppm (see figure).			0 – 1000

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Figure 1. VOC reported by 512Q.

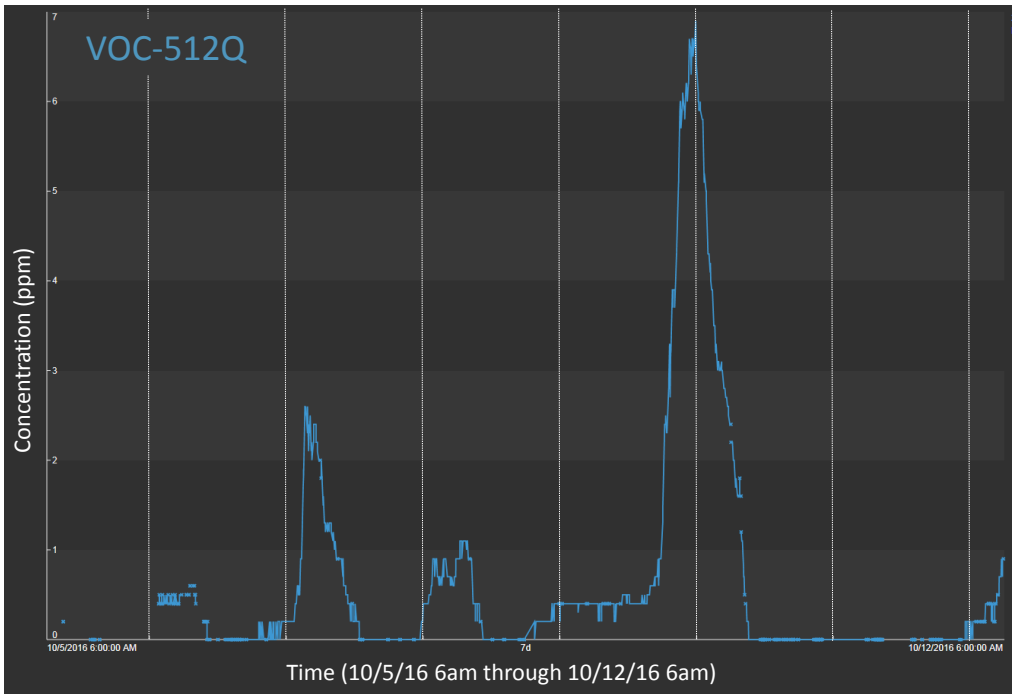

Figure 2. Gastronics N_2O; Recurring Pattern on 512G.

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October 5th – October 12th 2016 Instrument Operational Status:

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

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

Instrument	% Time Reporting	Instrument	% Time Reporting
501A	0	501B	70

Notes: a) % time reporting is estimated on review of graphs from OSI PI.

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: a) % 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		

Notes: a) % time reporting is estimated on review of graphs from OSI PI.

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

Notes: a) % time reporting is estimated on review of graphs from OSI PI.

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

Instrument	% Time Reporting	Instrument	% Time Reporting	Instrument	% Time Reporting	Instrument	% Time Reporting
505A	>95	505H	0	505O	>95	505V	>95

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

Instrument	% Time Reporting	Instrument	% Time Reporting	Instrument	% Time Reporting	Instrument	% Time Reporting
505B	0	505I	0	505P	>95	505W	0
505C	>95	505J	>95	505Q	>95	505X	>95
505D	>95	505K	20	505R	70	505Y	80
505E	0	505L	0	505S	10		
505F	>95	505M	>95	505T	>95		
505G	0	505N	>95	505U	0		

Notes: a) % time reporting is estimated on review of graphs from OSI PI.

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

Instrument	% Time Reporting	Instrument	% Time Reporting	Instrument	% Time Reporting	Instrument	% Time Reporting
512A	>95	512H	>95	512N	30	512T	>95
512B	0	512I	>95	512O	0	512U	>95
512C	0	512J	0	512P	>95	512V	0
512D	>95	512K	>95	512Q	>95	512W	0
512E	>95	512L	0	512R	0	512X	80
512F	>95	512M	>95	512S	<5	512Y	80
512G	>95						

Notes: a) % time reporting is based on review of graphs from OSI PI for NH_3 sensors.