ISTR Operations Monthly Progress Report

Reporting Period: October 2021*

Operable Unit 3 VOC Source Area Remedy
Former Grumman Settling Ponds, Bethpage, NY
NYSDEC Site No. 130003A
December 09, 2021

* Covers period of 10/1 through 10/21 (see note on page 3)

In-Situ Thermal Remediation (ISTR) Operations Monthly Progress Report

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Prepared per Section 8.2 of the OU3 Remedial Action Work Plan (RAWP) and DER-10, Section 5.7(b):

1. Remedy Progress / Performance Monitoring
2. Ambient Air
3. Significant Activities
4. Schedule / Proposed Modifications
5. Pending RAWP Modifications
6. Data Tables

Remedy Progress / Performance Monitoring October 2021*

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ISTR Operations Summary

- Air emissions comply with effluent concentration limits specified in the RAWP
- No exceedances of NYSDEC Community Air Monitoring Plan (CAMP) PID action levels**
- No liquid discharges during reporting period

** The October reporting period covers 10/1 through 10/21. After 10/21, following completion of the "crossover" piping construction (per NYSDEC 9/21 approval), existing OU3 SGCS process equipment began extracting vapors from the ISTR wellfield. October operations post "crossover" will be presented in the November 2021 report.*

*** See slide 12 for additional information*

Reporting Period: October 2021

System Startup	8/26/2020
Days of Operation Since Startup	421
Estimated cumulative TVOC Mass Removed, lbs	1,371

Remedy Progress / Performance Monitoring
October 2021

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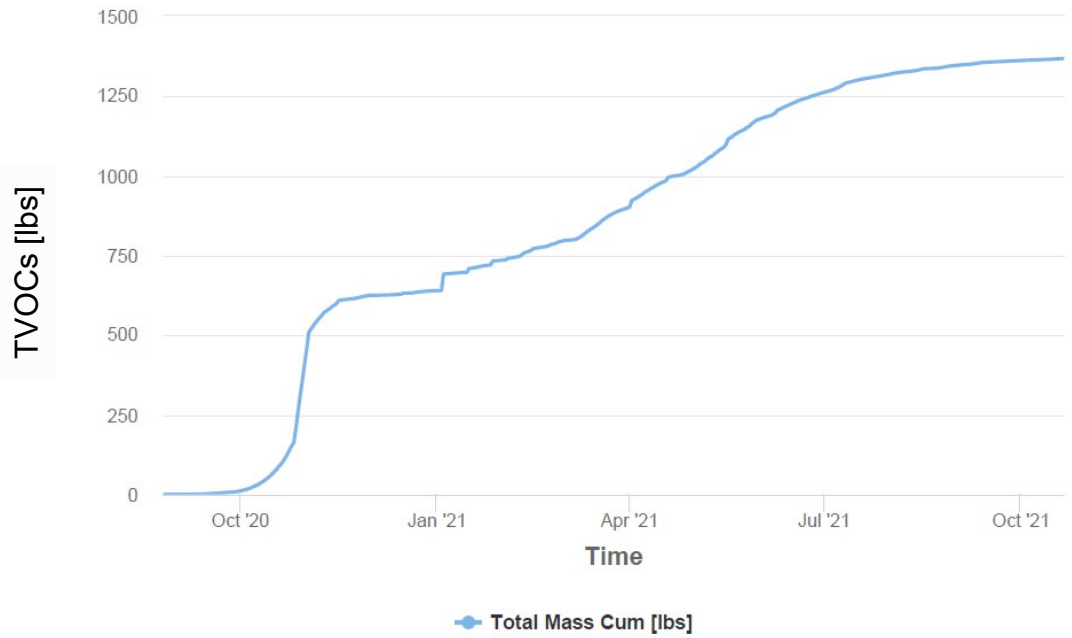
Cumulative TVOC Mass Removed



Estimated 1,368 lbs of total volatile organic compounds (TVOCs) removed through 10/21.

Cumulative TVOC mass is the sum of the following:

- Photoionization detector (PID) TVOC vapor mass
- Liquid TVOC mass
- Condensed non-aqueous phase liquid (NAPL) mass

Remedy Progress / Performance Monitoring
October 2021

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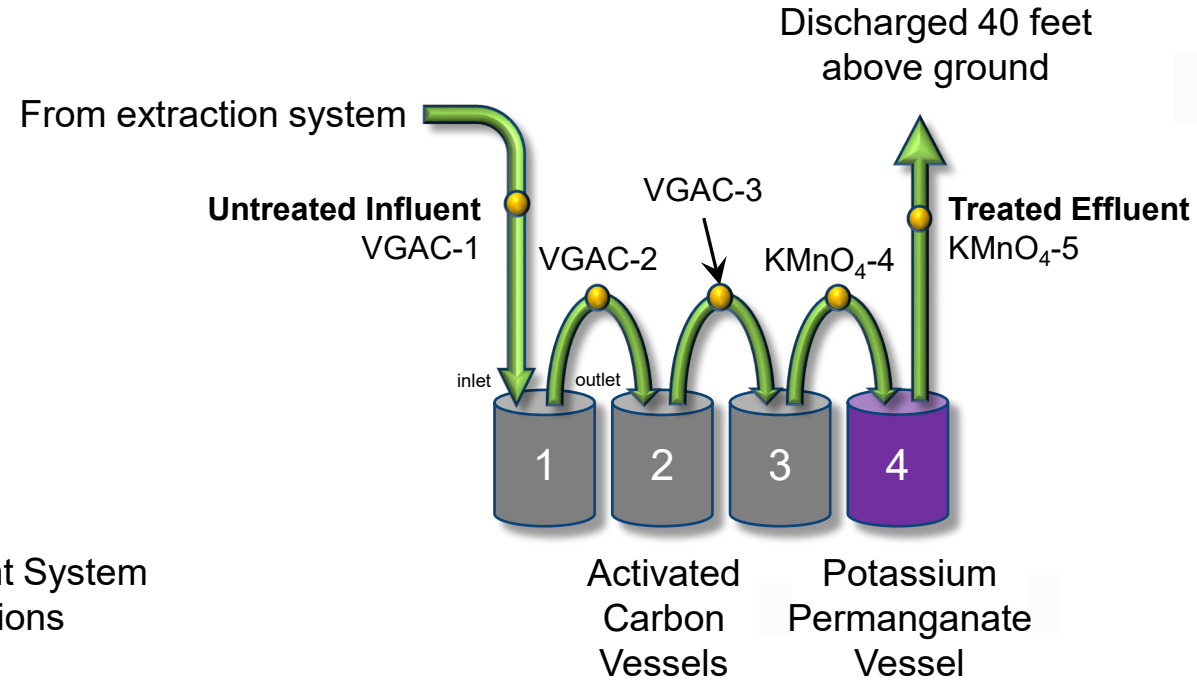
Vapor Treatment System



- Vapor Treatment System Sampling Locations

Remedy Progress / Performance Monitoring
October 2021

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Vapor Treatment System

Air emissions meet treatment criteria in the RAWP:

- Stack concentrations less than 7.6 mg/m^3 for TCE and 1.9 mg/m^3 design limits for vinyl chloride throughout the October reporting period.*

** Vapor treatment system analytical results for October reporting period provided in Table 1*

Remedy Progress / Performance Monitoring
October 2021

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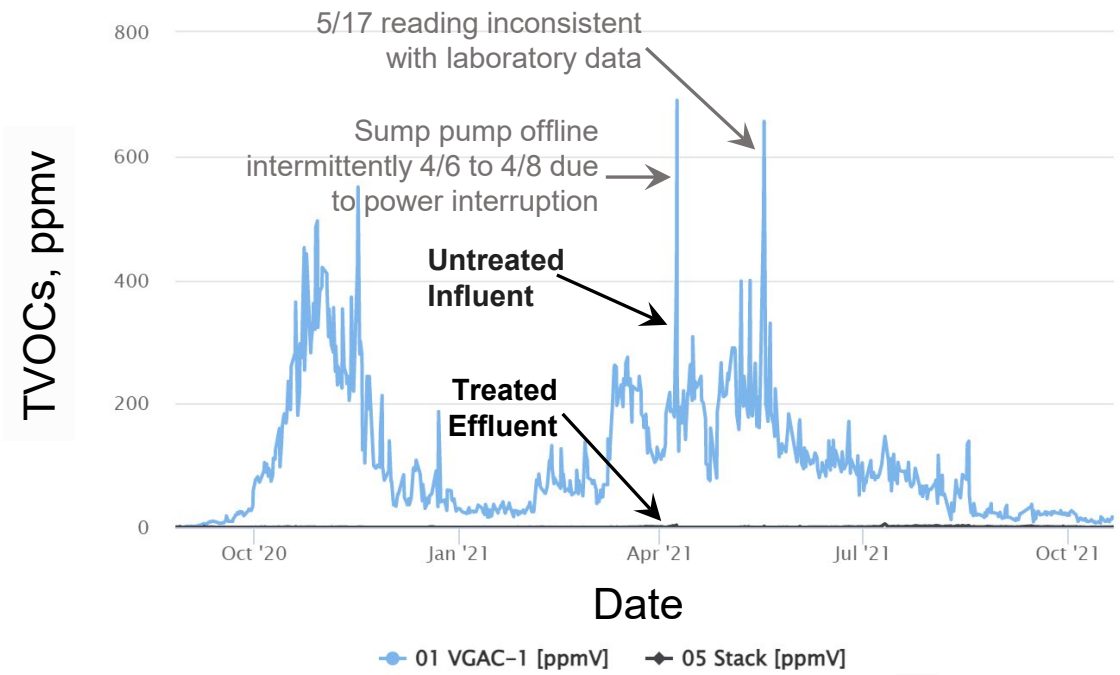
Vapor Treatment System (PID)



TVOC concentrations (PID) on October 21:

- Influent = 14.9 ppmv
- Effluent = 0.4 ppmv

Maximum TVOC concentrations (PID) during October reporting period:

- Influent = 27 ppmv (10/2)
- Effluent = ~~0.9~~1 ppmv (10/4)

Remedy Progress / Performance Monitoring October 2021

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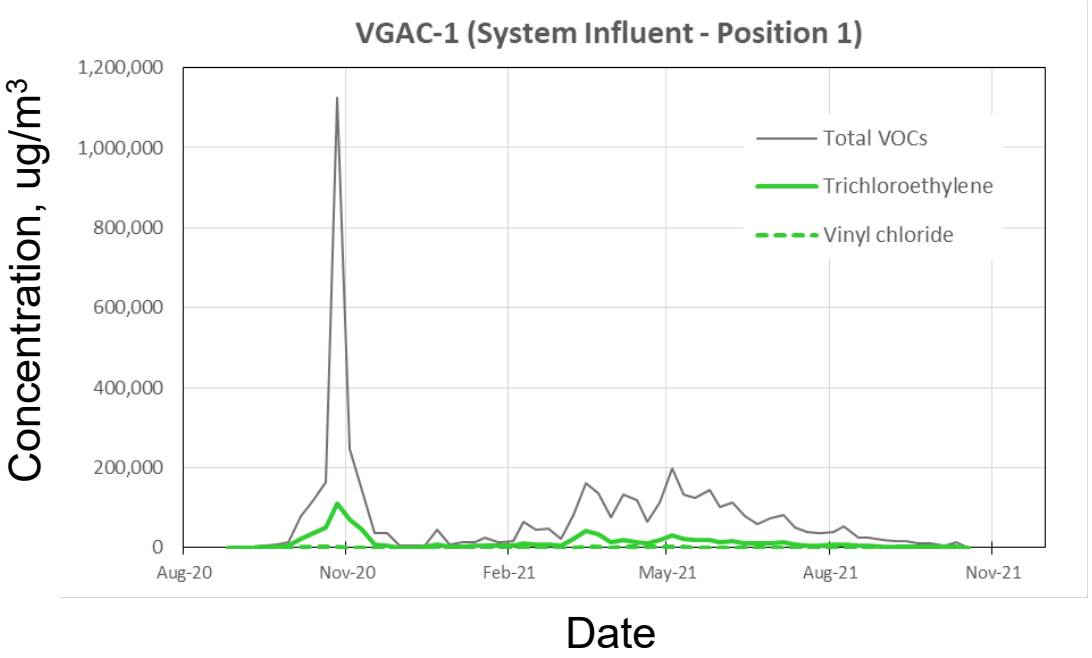
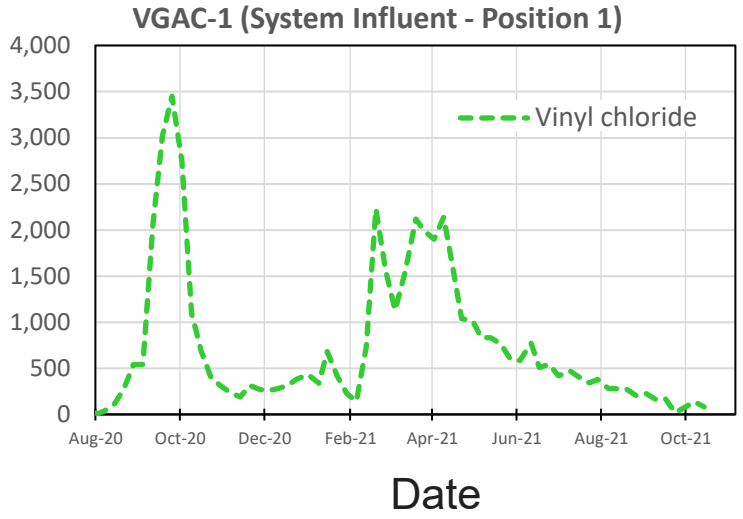
Vapor Treatment System Influent



Influent concentrations (Summa) on 10/18:

- TVOCs = 1,133 ug/m^3
- TCE = 275 ug/m^3
- Vinyl chloride = 20 ug/m^3



Remedy Progress / Performance Monitoring October 2021

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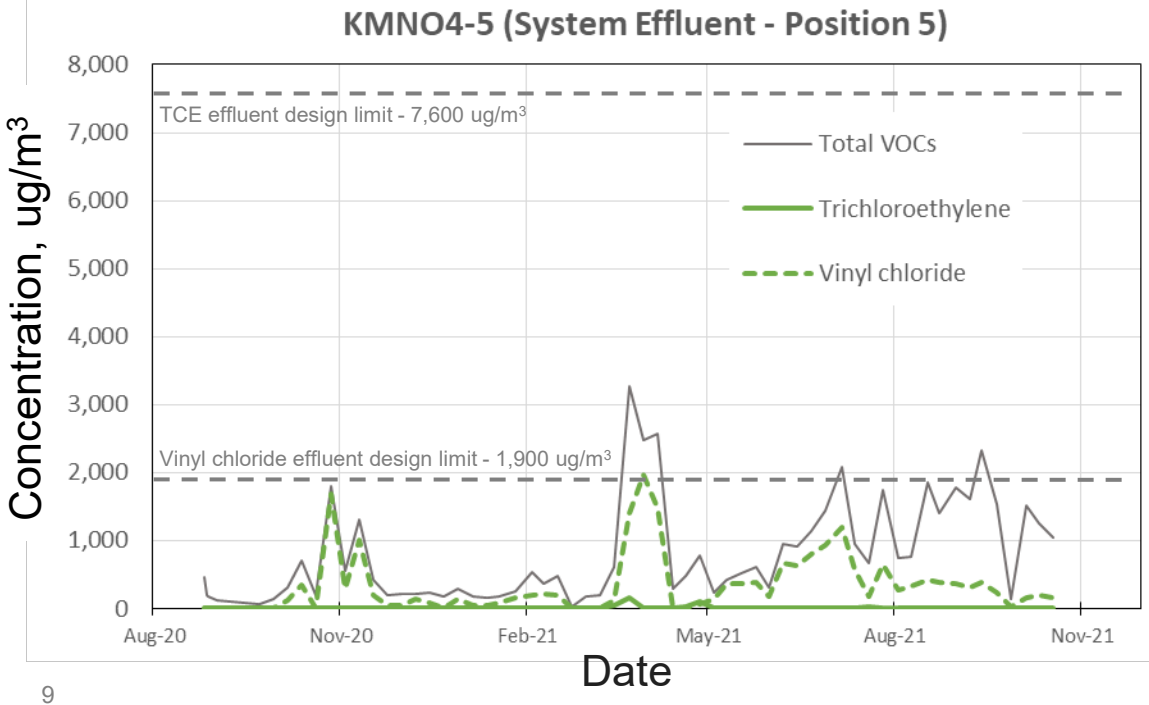
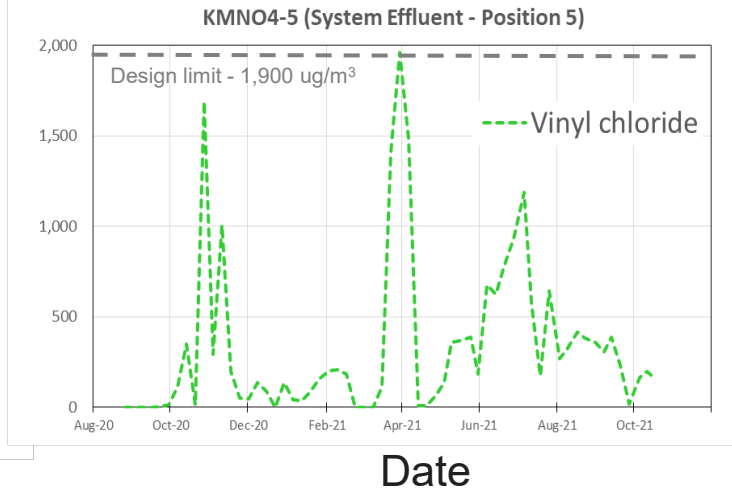
Vapor Treatment System Effluent



Effluent concentrations (Summa) on 10/18:

- TVOCs = 1,044 ug/m^3
- TCE < 1 ug/m^3
- Vinyl chloride = 155 ug/m^3



Remedy Progress / Performance Monitoring
October 2021

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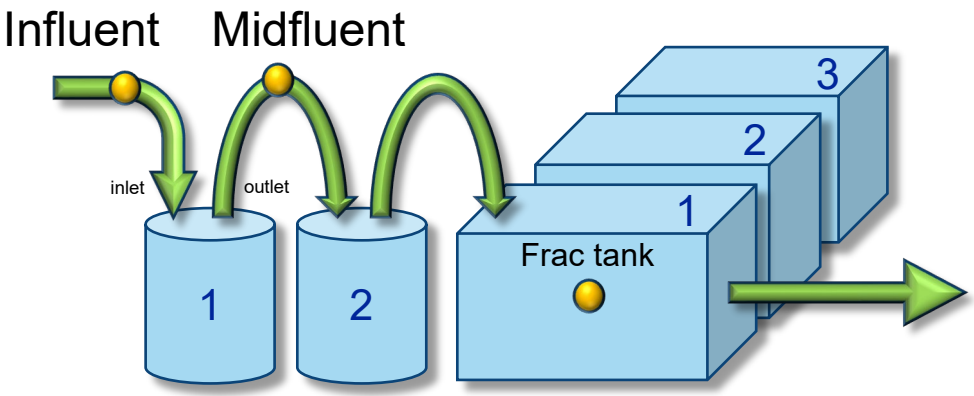
Liquid Treatment System

- Liquid Treatment System Sampling Locations



Activated Carbon Vessels

Treated Effluent Storage (~14,000-gallon batches)

Treated liquid pumped to OU3 Groundwater Treatment System

Remedy Progress / Performance Monitoring October 2021

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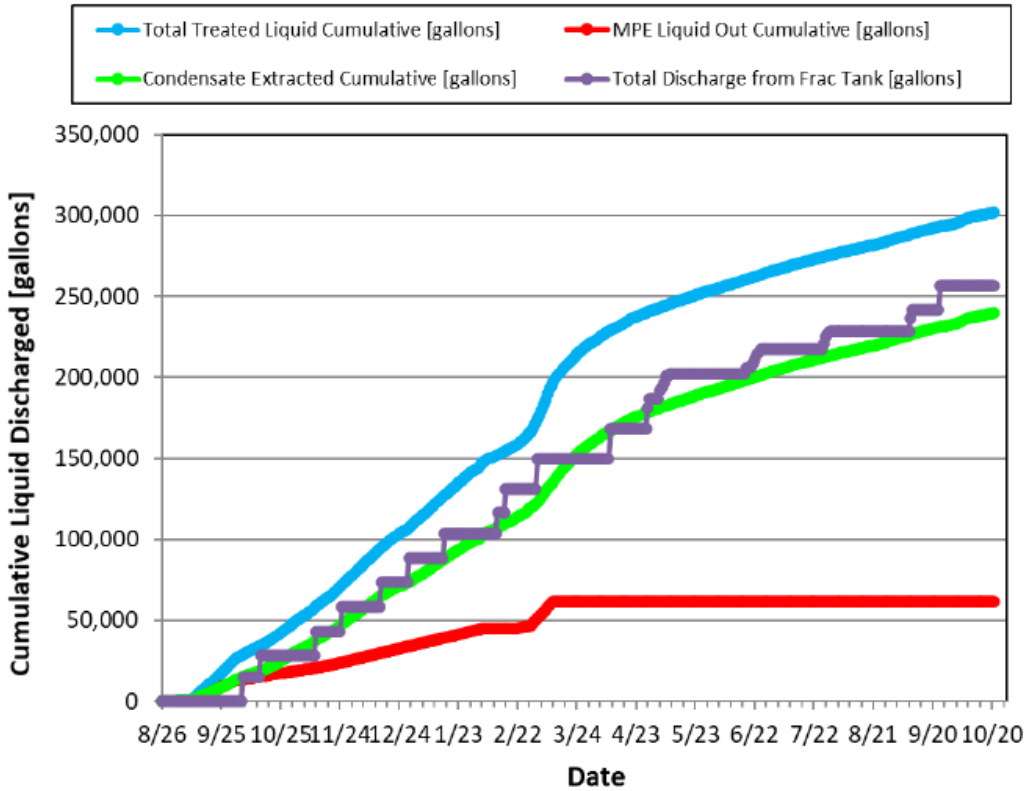
Cumulative Liquid Produced



301,671 total gallons extracted and treated through 10/21

256,720 total gallons treated effluent discharged to OU3 groundwater treatment system through 10/21 *(no discharges occurred in October)*

Ambient Air PID Monitoring
October 2021

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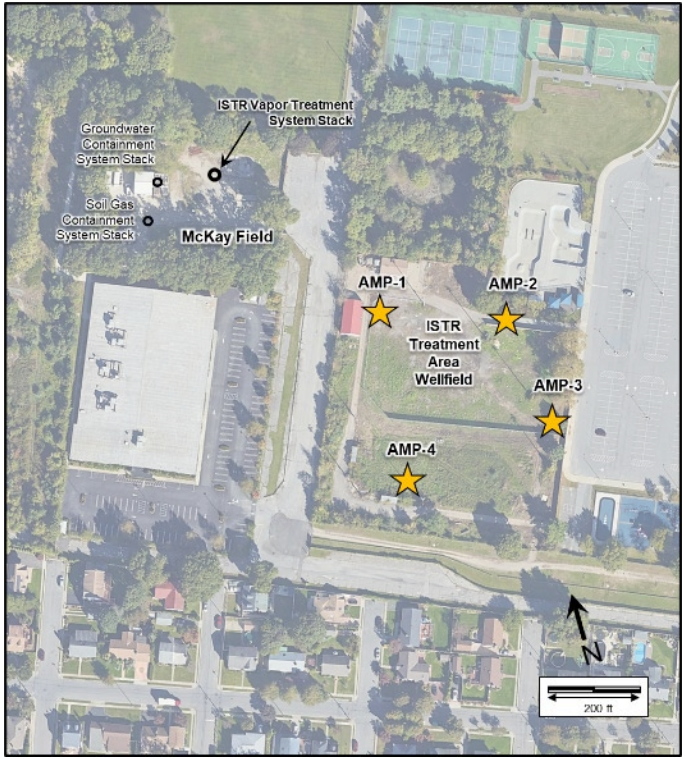
PID levels comply with Community Air Monitoring Plan (CAMP) criteria in the RAWP:

- PID readings recorded continuously at locations AMP-1 through 4
- Results emailed daily to the State and Town of Oyster Bay (Monday through Saturday)
- PID monitoring results did not exceed NYSDEC's CAMP action level (5 ppm TVOCs for a 15-minute average)*

* As described in daily CAMP monitoring emails, elevated PID readings were recorded on 10/2, 3, 4, 7, and 8 at AMP-1 and/or AMP -3. These PID readings were the result of atmospheric conditions and/or instrument errors/faults and not confirmed by downwind station readings and/or hand-held PID units. Also, inspections did not identify any remedial equipment malfunctions or releases to ambient air. On 10/16, AMP-1 and AMP-2 units were replaced after unsuccessful calibration attempts.



Significant Activities
October 2021

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Major equipment repairs and significant downtime:

None

Other significant activities:

- On 10/22, following completion of the “crossover” piping construction (per NYSDEC 9/21 approval), existing OU3 SGCS process equipment began extracting vapors from the ISTR wellfield.
- Installed pneumatic pumps to purge water from two additional shallow VEWs (8 total).
- Continued to purge water from VEWs.
- Continued LNAPL gauging and removal in 8 VEWs.

Planned Significant Activities During Next Two Months

- Maintain vapor extraction and treatment system operation, monitoring, and maintenance at the modified OU3 SGCS in preparation for system shutdown.
- Discontinue LNAPL gauging and removal in 8 VEWs and evaluate rebound.
- Continue purging water from shallow VEWs.
- Continue decommissioning of ISTR system.

Schedule

Activity	RAWP Schedule	Current Status
Remedial System Operation	Q3/20 – Q1/21	Q3/20 – Q1/22
Post-Treatment Confirmation Sampling	Q1/21	Complete
Remedy Cool-down	Q1/21-Q2-21	Q1/21 – Q2/22
Equipment Removal & Site Restoration	Q2/21	Q1/22

ISTR vapor extraction and treatment continues to operate in the modified OU3 SGCS.

Pending RAWP Modifications

None

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Table 1. Vapor Treatment System Air Sampling Results
Routine Monitoring

Compound (ug/m^3)	Sample ID:	VGAC-1	VGAC-3	KMNO4-5	DUPLICATE	
	Lab Sample ID:	JD32848-1	JD32848-2	JD32848-3	JD32848-4	
	Date Sampled:	10/5/2021	10/5/2021	10/5/2021	10/5/2021	
1,1,1-Trichloroethane		< 3.6	< 3.6	< 1.8	< 3.6	
1,1-Dichloroethane		**29**	**79.7**	< 0.49	**74.1**	
1,1-Dichloroethylene		**13**	**44.4**	< 0.67	**41.6**	
1,2,4-Trimethylbenzene		< 3.2	< 3.2	< 1.6	< 3.2	
1,2-Dibromoethane		< 2.8	< 2.8	< 1.4	< 2.8	
1,3,5-Trimethylbenzene		< 3.3	< 3.3	< 1.7	< 3.3	
1,3-Butadiene		< 2.0	< 2.0	< 1.0	< 2.0	
1,4-Dioxane*		< 3.6	< 3.6	< 1.9	< 3.6	
2,2,4-Trimethylpentane		**19**	< 2.1	< 1.0	< 2.1	
2-Hexanone		< 3.0	< 3.0	< 1.5	**28**	
4-Ethyltoluene		< 2.9	< 2.9	< 1.5	< 2.9	
Acetone*		**1,820**	**2,230**	**506**	**1,980**	
Benzene		**6.1 J**	< 0.77	< 0.38	< 0.77	
Bromoform		< 7.8	< 7.8	< 3.8	< 7.8	
Carbon disulfide		**27**	**141**	**102**	**129**	
Carbon tetrachloride		< 3.0	< 3.0	< 1.5	< 3.0	
Chloroethane		< 2.6	< 2.6	**4.0 J**	< 2.6	
Chloroform		< 2.0	< 2.0	< 0.98	< 2.0	
Chloromethane*		**6.2 J**	**7.8 J**	**5.6**	**7.6 J**	
cis-1,2-Dichloroethylene		**1,460**	**2,760**	< 0.48	**2,330**	
Cyclohexane		< 1.5	< 1.5	< 0.76	< 1.5	
Dichlorodifluoromethane		< 1.6	< 1.6	< 0.84	< 1.6	
Ethanol		**59.2**	**125**	**354**	**118**	
Ethyl acetate		< 2.7	< 2.7	**280**	< 2.7	
Ethylbenzene		**16 J**	< 1.3	< 0.65	< 1.3	
Heptane		**25**	< 1.4	< 0.74	< 1.4	
Hexane		**27**	< 0.74	< 0.39	< 0.74	
Isopropyl alcohol*		**35.4**	< 3.2	**8.1**	< 3.2	
m,p-Xylene		**41**	< 3.0	< 1.5	**11 J**	
m-Dichlorobenzene		< 2.3	< 2.3	< 1.1	< 2.3	
Methyl ethyl ketone		**339**	< 2.5	< 1.2	**34.8**	
Methyl isobutyl ketone		< 3.0	< 3.0	< 1.5	< 3.0	
Methylene chloride*		< 1.0	< 1.0	**8.7**	< 1.0	
o-Dichlorobenzene		< 2.6	< 2.6	< 1.3	< 2.6	
o-Xylene		**12 J**	< 1.5	< 0.74	< 1.5	
Propylene*		**73.2**	**88.3**	**64.4**	**84.9**	
Styrene		< 1.6	< 1.6	< 0.81	< 1.6	
Tertiary butyl alcohol		**25**	< 0.85	< 0.42	< 0.85	
Tetrachloroethylene		< 4.2	< 4.2	< 2.1	< 4.2	
Tetrahydrofuran		< 2.9	< 2.9	< 1.5	< 2.9	
Toluene		**599**	< 1.1	**4.1 J**	< 1.1	
trans-1,2-Dichloroethylene		**40.8**	**233**	**8.7**	**212**	
Trichloroethylene		**1,440**	**8.1**	**4.4**	< 2.0	99.7%
Trichlorofluoromethane		< 3.1	< 3.1	< 1.6	< 3.1	
Vinyl acetate		< 2.4	< 2.4	< 1.2	< 2.4	
Vinyl chloride*		**156**	**215**	**165**	**205**	
Xylenes (total)		**52.6**	< 1.5	< 0.74	**11 J**	
TVOCs		**6,270**	**5,930**	**1,515**	**5,260**	
TVOCs less poor adsorbers*		**4,180**	**3,390**	**757**	**2,980**	

Footnotes:

ug/mg^3 micrograms per cubic meter

* Compound is poorly adsorbed by activated carbon.

< Compound was not detected at or above the indicated value.

J Detected concentration is less than the quantitation limit.

TVOCs Total volatile organic compounds

Detections are highlighted.

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Table 1. Vapor Treatment System Air Sampling Results
Routine Monitoring

Compound (ug/m^3)	Sample ID:	VGAC-1		VGAC-3		KMNO4-5		
	Lab Sample ID:	JD33304-1		JD33304-2		JD33304-3		
	Date Sampled:	10/11/2021		10/11/2021		10/11/2021		
1,1,1-Trichloroethane		< 7.1		< 0.71		< 0.71		
1,1-Dichloroethane		**38**		**80.1**		< 0.19		
1,1-Dichloroethylene		**16**		**26**		< 0.27		
1,2,4-Trimethylbenzene		**38**	J	**23**		**3.2**	J	
1,2-Dibromoethane		< 5.5		< 0.55		< 0.55		
1,3,5-Trimethylbenzene		**27**	J	**8.8**		< 0.64		
1,3-Butadiene		< 4.0		< 0.40		< 0.40		
1,4-Dioxane*		< 7.6		< 0.76		< 0.76		
2,2,4-Trimethylpentane		**31**	J	< 0.41		< 0.41		
2-Hexanone		**123**		< 0.61		< 0.61		
4-Ethyltoluene		< 5.9		**16**		< 0.59		
Acetone*		**2,360**		**1,750**		**625**		
Benzene		< 1.5		< 0.15		**7.3**		
Bromoform		< 16		< 1.6		< 1.6		
Carbon disulfide		**37.1**		**114**		**112**		
Carbon tetrachloride		< 5.9		< 0.59		< 0.59		
Chloroethane		< 5.0		**5.0**		**5.3**		
Chloroform		< 3.9		< 0.39		< 0.39		
Chloromethane*		< 1.3		**7.6**		**6.8**		
cis-1,2-Dichloroethylene		**2,090**		**2,320**		**18**		
Cyclohexane		< 3.0		< 0.30		**1.7**	J	
Dichlorodifluoromethane		< 3.3		**2.6**	J	**2.1**	J	
Ethanol		**73.1**		**134**		**116**		
Ethyl acetate		< 5.4		< 0.54		< 0.54		
Ethylbenzene		**260**		**4.3**		**5.2**		
Heptane		**55.7**		**3.2**	J	**6.1**		
Hexane		**36.7**		< 0.15		**4.2**		
Isopropyl alcohol*		**49.7**		< 0.64		< 0.64		
m,p-Xylene		**777**		**41**		**19**		
m-Dichlorobenzene		< 4.6		< 0.46		< 0.46		
Methyl ethyl ketone		**628**		< 0.50		**3.2**		
Methyl isobutyl ketone		**39**		< 0.57		< 0.57		
Methylene chloride*		< 2.0		**4.9**		**4.9**		
o-Dichlorobenzene		< 5.2		< 0.52		< 0.52		
o-Xylene		**238**		**11**		**3.6**		
Propylene*		**80.6**		**96.9**		**83.5**		
Styrene		< 3.2		< 0.32		< 0.32		
Tertiary butyl alcohol		**31.8**		< 0.17		< 0.17		
Tetrachloroethylene		**25**		< 0.81		< 0.81		
Tetrahydrofuran		< 5.9		< 0.59		< 0.59		
Toluene		**2,580**		**14**		**23**		
trans-1,2-Dichloroethylene		**57.9**		**168**		< 0.11		
Trichloroethylene		**3,430**		**5.4**		**12**		99.7%
Trichlorofluoromethane		< 6.2		< 0.62		< 0.62		
Vinyl acetate		< 4.9		< 0.49		< 0.49		
Vinyl chloride*		**170**		**217**		**198**		
Xylenes (total)		**1,010**		**52.1**		**23**		
TVOCs		**13,290**		**5,050**		**1,260**		
TVOCs less poor adsorbers*		**10,630**		**2,970**		**342**		

Footnotes:

ug/mg^3 micrograms per cubic meter

* Compound is poorly adsorbed by activated carbon.

< Compound was not detected at or above the indicated value.

J Detected concentration is less than the quantitation limit.

TVOCs Total volatile organic compounds

Detections are highlighted.

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Table 1. Vapor Treatment System Air Sampling Results
Routine Monitoring

Compound (ug/m^3)	Sample ID:	VGAC-1		VGAC-3		KMNO4-5		
	Lab Sample ID:	JD33710-1		JD33710-2		JD33710-3		
	Date Sampled:	10/18/2021		10/18/2021		10/18/2021		
1,1,1-Trichloroethane		< 0.71		< 0.71		< 0.71		
1,1-Dichloroethane		**4.0**		**58.7**		< 0.19		
1,1-Dichloroethylene		**1.9**		**23**		< 0.27		
1,2,4-Trimethylbenzene		**3.9**		< 0.64		< 0.64		
1,2-Dibromoethane		< 0.55		< 0.55		< 0.55		
1,3,5-Trimethylbenzene		**2.2**	J	< 0.64		< 0.64		
1,3-Butadiene		< 0.40		< 0.40		< 0.40		
1,4-Dioxane*		< 0.76		< 0.76		< 0.76		
2,2,4-Trimethylpentane		< 0.41		< 0.41		< 0.41		
2-Hexanone		< 0.61		< 0.61		< 0.61		
4-Ethyltoluene		**2.9**	J	< 0.59		< 0.59		
Acetone*		**259**		**2,490**		**594**		
Benzene		**1.5**	J	< 0.15		< 0.15		
Bromoform		< 1.6		< 1.6		< 1.6		
Carbon disulfide		**5.0**		**73.5**		**86.3**		
Carbon tetrachloride		< 0.59		< 0.59		< 0.59		
Chloroethane		< 0.50		**3.2**		**4.0**		
Chloroform		< 0.39		< 0.39		< 0.39		
Chloromethane*		**1.5**	J	**6.8**		**6.0**		
cis-1,2-Dichloroethylene		**222**		**3,140**		**6.3**		
Cyclohexane		< 0.30		< 0.30		< 0.30		
Dichlorodifluoromethane		**2.1**	J	**2.0**	J	< 0.33		
Ethanol		**16**		**98.9**		**116**		
Ethyl acetate		**3.6**		**6.1**		**4.7**		
Ethylbenzene		**13**		< 0.26		< 0.26		
Heptane		**4.5**		< 0.29		< 0.29		
Hexane		< 0.15		< 0.15		< 0.15		
Isopropyl alcohol*		**6.6**		< 0.64		< 0.64		
m,p-Xylene		**41**		< 0.61		< 0.61		
m-Dichlorobenzene		< 0.46		< 0.46		< 0.46		
Methyl ethyl ketone		**59.0**		< 0.50		< 0.50		
Methyl isobutyl ketone		< 0.57		< 0.57		< 0.57		
Methylene chloride*		< 0.20		**3.1**		**3.8**		
o-Dichlorobenzene		< 0.52		< 0.52		< 0.52		
o-Xylene		**13**		< 0.30		< 0.30		
Propylene*		**11**		**83.3**		**64.1**		
Styrene		< 0.32		< 0.32		< 0.32		
Tertiary butyl alcohol		**3.9**		< 0.17		< 0.17		
Tetrachloroethylene		**1.6**		< 0.81		< 0.81		
Tetrahydrofuran		< 0.59		< 0.59		< 0.59		
Toluene		**151**		**1.5**	J	**2.0**	J	
trans-1,2-Dichloroethylene		**7.9**		**129**		**2.1**	J	
Trichloroethylene		**275**		< 0.41		< 0.41		100%
Trichlorofluoromethane		< 0.62		< 0.62		< 0.62		
Vinyl acetate		< 0.49		< 0.49		< 0.49		
Vinyl chloride*		**20**		**158**		**155**		
Xylenes (total)		**53.9**		< 0.30		< 0.30		
TVOCs		**1,133**		**6,280**		**1,044**		
TVOCs less poor adsorbers*		**835**		**3,540**		**221**		

Footnotes:

ug/mg^3 micrograms per cubic meter

* Compound is poorly adsorbed by activated carbon.

< Compound was not detected at or above the indicated value.

J Detected concentration is less than the quantitation limit.

TVOCs Total volatile organic compounds

Detections are highlighted.


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