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ORANGETOWN SAMPLING REPORT

VOCs in Short-Duration Samples

Prepared for:
Town of Orangetown, NY

Prepared by:
TRC Environmental Corporation

December 21, 2017

Orangetown Air Sampling Report
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Prepared by
TRC
TRC Project No. 267443.1000.0000

December 21 2017

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Introduction

Aluf Plastics Incorporated (API) manufactures plastic bags and has been the subject of odor complaints in the neighborhoods surrounding the facility for over a year. The odor descriptions included burning/burnt plastic, with and without a floral odor; melting plastic, with and without a floral odor; plastic; floral/perfume; chemical; "Aluf odor"; choking, noxious and "urinal cake". Other non-specific descriptions such as strong odor/smell and potent smell have also been also recorded.

In July of 2017, TRC was retained by the Town to conduct an air quality monitoring program in two phases; including ambient air sampling in the vicinity of API and meteorological monitoring in Orangeburg, NY. TRC installed a meteorological monitoring station on the roof of the Orangeburg Highway Department building on August 7th and began collecting ambient air samples on August 8, 2017. Air samples were collected in accordance with US EPA Method TO-15 and submitted for analysis for volatile organic compounds (VOCs) to Con-Test Laboratory in East Longmeadow, Massachusetts.

In addition to scheduled weekly 24-hour VOC sampling performed in Phase I, Town staff and local residents have collected short-duration samples when triggered by odor complaints. Results reported within this report represent samples collected over one to two hour long periods during September through November of 2017.

Short-duration air sampling for Volatile Organic Compounds (VOCs)

VOC samples were collected using 1-liter evacuated stainless steel SUMMA® canisters fitted with a calibrated regulator at the sample inlet. The regulator allowed for continuous sample collection for a sampling period for two hours or less. Sampling was initiated by trained Town staff and/or by trained local residents in response to active odor complaints.

A total of fourteen short-duration samples were collected in this manner during August, September, October and November of 2017. Sampling Locations are marked with red flags in the Google Earth image shown in Figure 1. Short-term sampling events and relevant field conditions are summarized in Table 1.

Figure 1: Short-duration Sampling Locations

Table 1: Short-duration Sampling Events

Sample Date	Sampling Time	Sampling Location	Proximity to API	Wind Direction (coming from)
Sunday 8/27/17	19:13 – 21:09	8 Murphy Court	< 0.5 miles Northwest	Southeast
Friday 9/15/17	10:03 – 11:59	End of Murphy Court	< 0.5 miles Northwest	Southeast
	09:15 – 11:10	65 Hayes Street	< 0.5 miles Northwest	Southeast
Sunday 9/17/17	18:53 – 20:48	8 Murphy Court	< 0.5 miles Northwest	East
Monday 9/18/17	19:45 – 21:36	8 Murphy Court	< 0.5 miles Northwest	East
	19:26 – 20:26	Rail Trail, near Blauvelt Library	< 0.5 miles Northwest	East
Monday 9/25/17	19:07 – 21:02	8 Murphy Court	< 0.5 miles Northwest	East
Tuesday 9/26/17	19:19 – 21:19	10 Murphy Court	< 0.5 miles Northwest	East/East Southeast
Monday 10/23/17	16:30 – 18:35	31 Arthur Street	< 0.5 miles North Northwest	Southeast
	16:35 – 18:36	44 S. Moison Road	< 0.5 miles North	Southeast
Thursday 11/2/17	18:55 – 20:30	42 Arthur Street	< 0.5 miles North Northwest	South Southeast
Tuesday 11/14/17	19:38 - 21:35	St. Catharine's	< 0.25 miles West	North Northeast
Monday 11/20/17	08:25 – 10:10	250 S. Greenbush Road	< 0.5 miles Northeast	West Southwest
Tuesday 11/28/17	08:36 – 10:32	Bataan Road	< 0.5 miles South Southeast	North/North Northeast

Summary of Results

Individual samples were collected over a 1 to 2-hour period at locations where strong odors were observed by residents and/or Town staff. Of the 63 compounds analyzed, as part of US EPA Method TO-15, 28 were detected in one or more of the samples collected in response to active odor complaints. A summary of average and maximum concentrations of detected results from these VOC samples are presented in Table 2.

Please note average concentrations were calculated by handling non-detected results as values half of the lab's analytical reporting limit. This approach assumes that on the average all values between the RL and zero could be present, and that the average value of non-detects could be as high as half the detection limit.

Complete results from each of the fourteen samples collected during September 2017 – November 2017 are presented in Attachment A. Laboratory Data Packages are included in Attachment C.

Table 2: Summary of Detected VOCs in Short-Duration Samples

	Average Concentration		Maximum Values			
			Concentration			
Detected Volatile Organic Compounds	ppbV	ug/m^3	ppbV	ug/m^3	**Sample Date**	**Sampling Location**
Acetone	11.96	28.29	25	59	9/17/2017	8 Murphy Court
Acrolein	1.29	2.94	2.6	5.9	8/27/2017	8 Murphy Court
Benzene	0.13	0.43	0.32	1	11/2/2017	42 Arthur St
2-Butanone (MEK)	3.00	8.81	7.1	21	10/23/2017	31 Arthur St
Carbon Disulfide	0.07	0.21	0.3	0.93	11/2/2017	42 Arthur St
Chloroform	0.06	0.28	0.11	0.52	9/26/2017	10 Murphy Ct
Chloromethane	0.55	1.12	0.72	1.5	10/23/2017	44 S.Moison Rd
Dichlorodifluoromethane (Freon 12)	0.35	1.72	0.51	2.5	10/23/2017	44 S.Moison Rd
cis-1,2-Dichloroethylene	0.11	0.42	0.86	3.4	11/2/2017	42 Arthur St
Ethanol	10.91	19.62	27	50	11/20/2017	250 S. Greenbush Rd
Ethyl Acetate	0.22	0.78	0.86	3.1	11/20/2017	250 S. Greenbush Rd
Heptane	0.25	1.07	0.98	4	9/17/2017	8 Murphy Court
Hexane	0.40	1.43	1.2	4.4	9/17/2017	8 Murphy Court
2-Hexanone (MBK)	0.25	1.04	0.93	3.8	9/17/2017	8 Murphy Court
Isopropanol	2.30	5.58	5	12	9/17/2017	8 Murphy Court
Methylene Chloride	0.28	0.96	0.57	2	11/2/2017	42 Arthur St
4-Methyl-2-pentanone (MIBK)	0.11	0.47	0.36	1.5	11/2/2017	42 Arthur St
Naphthalene	0.07	0.39	0.14	0.72	9/25/2017	10 Murphy Ct
Propene	0.46	0.80	1.6	2.7	11/2/2017	42 Arthur St
Tetrachloroethylene	4.97	33.84	69	470	11/2/2017	42 Arthur St
Tetrahydrofuran	0.06	0.19	0.23	0.67	11/2/2017	42 Arthur St
Toluene	1.05	3.92	4.8	18	11/2/2017	42 Arthur St
Trichloroethylene	0.26	1.36	3	16	11/2/2017	42 Arthur St
Trichlorofluoromethane (Freon 11)	0.22	1.21	0.28	1.6	11/20/2017	250 S. Greenbush Rd
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	0.06	0.44	0.098	0.75	10/23/2017	31 Arthur St
1,2,4-Trimethylbenzene	0.06	0.28	0.2	1	11/2/2017	42 Arthur St
m&p-Xylene	0.13	0.54	0.42	1.8	11/2/2017	42 Arthur St
o-Xylene	0.05	0.24	0.16	0.71	11/2/2017	42 Arthur St

Conclusions

The results reported previously as part of Phase I VOC air sampling showed that concentrations of acrolein, benzene, carbon tetrachloride and hexachlorobutadiene exceeded New York State Department of Environmental Conservation's respective short-term guideline concentrations (SGCs) and annual guideline concentrations (AGCs).

Concentrations of acrolein (7 samples) and tetrachloroethylene (1 sample) exceeded their respective SGCs, and acrolein (9 samples) and benzene (10 samples) exceeded their respective AGCs in the short-duration samples presented in this report, refer to Attachment A for individual sample concentrations.

Acrolein, present in API's stack emissions, is a clear or yellow liquid with a burned, sweet, pungent odor. Primarily used as an intermediate in the synthesis of acrylic acid and as a biocide. It may be formed from the breakdown of certain pollutants in outdoor air or from the burning of organic matter including tobacco, or fuels such as gasoline or oil. (EPA, 2009) As discussed in TRC's December 1, 2017 letter to the Town Board in response to Dr. Dimitri Laddis' November 27th letter to the Board, it was determined that the laboratory results for acrolein are likely biased high due to "acrolein growth" in the canisters. NYS DEC has reviewed the acrolein data collected by TRC in Orangetown and has concurred with this assessment.

Tetrachloroethylene was not present in API's stack emission samples. It is used as a dry cleaning agent and metal degreasing solvent. Other names for tetrachloroethylene include perchloroethylene, PCE, PERC, tetrachloroethene, and perchlor. (ATSDR, 2014) The SGC for tetrachloroethylene has been adapted from the NYS DOH's action level of 300 ug/m^3 for indoor air, representing an overly conservative value based on long-term exposures (months to years) to concentrations greater than 300 ug/m^3.

Overall, TRC does not believe that exposure to these measured concentrations would result in negative health effects. Short-duration sample data, in addition to data collected during the previous Phase I sampling program has been reviewed and compared to applicable NYS DEC guidance. Based on the total set of samples collected in Orangetown, Dr. Karen Vetrano of TRC conducted a human health risk assessment on compounds detected above SGCs/AGCs. The updated Review and Human Health Risk Assessment of TRC Air Monitoring Results for Volatile Organic Compounds (VOCs) is included with this report as Attachment B.

Attachment A

Detected Results VOC Analysis of Short Duration Samples

Orangetown Air Quality Sampling Program - Short-Duration Sampling (2 hours or less)
TO-15 (VOC) Results - Detected Compounds Only

Lab ID	17I0756-01		17I0923-01		17I0924-01		17J0125-01		17J0125-02		17I1164-01		17J0125-03	
Sample Location	8 Murphy Ct		End of Murphy Ct.		65 Hays Ct.		8 Murphy Ct.		8 Murphy Ct.		Rail Trail Near		8 Murphy Ct.	
Sample Date	27-Aug-17		15-Sep-17		15-Sep-17		17-Sep-17		18-Sep-17		18-Sep-17		25-Sep-17	
Sample Time	19:13 - 21:09		10:03 - 11:59		09:15 - 11:10		18:53 - 20:48		19:45 - 21:36		19:26 - 20:26		19:07 - 21:02	
VOCs	ppbV	ug/m^3	ppbV	ug/m^3	ppbV	ug/m^3	ppbV	ug/m^3	ppbV	ug/m^3	ppbV	ug/m^3	ppbV	ug/m^3
Acetone	**11**	**27**	**8**	**19**	**9.8**	**23**	**25**	**59**	**13**	**31**	**9.7**	**23**	**15**	**36**
Acrolein	**2.6**	**5.9**	<1.2	<2.8	<1.2	<2.8	**2.4**	**5.4**	**1.5**	**3.3**	<1.2	<2.8	**0.71**	**1.6**
Benzene	**0.078**	**0.25**	<0.13	<0.41	**0.13**	**0.42**	**0.14**	**0.43**	**0.11**	**0.35**	<0.13	<0.41	**0.29**	**0.92**
2-Butanone (MEK)	**2.2**	**6.4**	**1.3**	**4**	**2.7**	**7.9**	**4.1**	**12**	**2**	**6**	**1.6**	**4.6**	**3.4**	**10**
Carbon Disulfide	<0.068	<0.21	<0.14	<0.42	<0.14	<0.42	**0.086**	**0.27**	<0.068	<0.21	<0.14	<0.42	<0.068	<0.21
Chloroform	<0.073	<0.36	<0.15	<0.71	<0.15	<0.71	<0.073	<0.36	<0.073	<0.36	<0.15	<0.71	<0.073	<0.36
Chloromethane	**0.6**	**1.2**	**0.46**	**0.95**	**0.49**	**1**	**0.5**	**1**	**0.45**	**0.92**	**0.48**	**0.98**	**0.57**	**1.2**
Dichlorodifluoromethane (Freon 12)	**0.43**	**2.1**	**0.5**	**2.5**	**0.5**	**2.5**	**0.21**	**1**	**0.18**	**0.9**	**0.2**	**0.97**	**0.17**	**0.83**
cis-1,2-Dichloroethylene	<0.068	<0.27	<0.14	<0.54	<0.14	<0.54	<0.068	<0.27	<0.068	<0.27	<0.14	<0.54	<0.068	<0.27
Ethanol	**13**	**24**	**<3.6**	**<6.7**	**5.7**	**11**	**12**	**23**	**14**	**26**	**15**	**28**	**11**	**22**
Ethyl Acetate	<0.085	<0.31	<0.17	<0.61	**0.84**	**3**	<0.085	<0.31	<0.085	<0.31	<0.17	<0.61	<0.085	<0.31
Heptane	<0.066	<0.27	<0.13	<0.54	**0.17**	**0.7**	**0.98**	**4**	**0.2**	**0.8**	<0.13	<0.54	**0.24**	**1**
Hexane	<0.18	<0.62	<0.35	<1.2	<0.35	<1.2	**1.2**	**4.4**	**0.48**	**1.7**	<0.35	<1.2	**0.62**	**2.2**
2-Hexanone (MBK)	<0.059	<0.24	<0.12	<0.49	<0.12	<0.49	**0.93**	**3.8**	**0.43**	**1.8**	**0.24**	**1**	**0.4**	**1.6**
Isopropanol	**0.69**	**1.7**	**0.68**	**1.7**	**2.1**	**5**	**5**	**12**	**0.92**	**2.3**	**0.82**	**2**	**4.2**	**10**
Methylene Chloride	**0.18**	**0.62**	<0.24	<0.84	<0.24	<0.84	**0.22**	**0.75**	**0.22**	**0.78**	**0.26**	**0.9**	**0.33**	**1.1**
4-Methyl-2-pentanone (MIBK)	<0.085	<0.35	<0.17	<0.70	<0.17	<0.70	**0.18**	**0.75**	**0.13**	**0.52**	<0.17	<0.70	**0.15**	**0.63**
Naphthalene	<0.087	<0.46	<0.17	<0.91	<0.17	<0.91	**0.11**	**0.6**	<0.087	<0.46	<0.17	<0.91	**0.14**	**0.72**
Propene	<0.31	<0.53	**1.5**	**2.6**	<0.61	<1.1	<0.31	<0.53	<0.31	<0.53	<0.61	<1.1	<0.31	<0.53
Tetrachloroethylene	<0.061	<0.41	<0.12	<0.82	<0.12	<0.82	<0.061	<0.41	<0.061	<0.41	<0.12	<0.82	<0.061	<0.41
Tetrahydrofuran	<0.069	<0.20	<0.14	<0.41	<0.14	<0.41	**0.082**	**0.24**	<0.069	<0.20	<0.14	<0.41	<0.069	<0.20
Toluene	**0.094**	**0.35**	**0.3**	**1.1**	**1.6**	**6**	**0.38**	**1.4**	**0.21**	**0.81**	<0.13	<0.48	**1**	**3.9**
Trichloroethylene	<0.063	<0.34	<0.13	<0.68	<0.13	<0.68	<0.063	<0.34	<0.063	<0.34	<0.13	<0.68	<0.063	<0.34
Trichlorofluoromethane (Freon 11)	**0.23**	**1.3**	**0.2**	**1.1**	**0.22**	**1.3**	**0.19**	**1.1**	**0.18**	**0.99**	**0.2**	**1.1**	**0.2**	**1.1**
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	<0.069	<0.53	<0.14	<1.1	<0.14	<1.1	<0.069	<0.53	<0.069	<0.53	<0.14	<1.1	<0.069	<0.53
1,2,4-Trimethylbenzene	<0.065	<0.32	<0.13	<0.64	<0.13	<0.64	<0.065	<0.32	<0.065	<0.32	<0.13	<0.64	<0.065	<0.32
m&p-Xylene	<0.13	<0.56	<0.26	<1.1	<0.26	<1.1	<0.13	<0.56	<0.13	<0.56	<0.26	<1.1	<0.13	<0.56
o-Xylene	<0.062	<0.27	<0.12	<0.54	<0.12	<0.54	<0.062	<0.27	<0.062	<0.27	<0.12	<0.54	<0.062	<0.27

Orangetown Air Quality Sampling Program - Short-Duration Sampling (2 hours or less)
TO-15 (VOC) Results - Detected Compounds Only

(continued)

Lab ID	17J0125-04		17J1532-01		17J1532-02		17K0600-01		17K1116-01		17K1666-01		17K1676-01	
Sample Location	10 Murphy Ct.		31 Arthur St.,		44 S.Moison		42 Arthur St.		St. Catharine's		250 S. Greenbush		Bataan Rd.	
Sample Date	26-Sep-17		23-Oct-17		23-Oct-17		2-Nov-17		14-Nov-17		20-Nov-17		28-Nov-17	
Sample Time	19:19 - 21:19		16:30 - 18:35		16:35 - 18:36		18:55 - 20:30		19:38 - 21:35		08:25 - 10:10		08:36 - 10:32	
VOCs	ppbV	ug/m^3	ppbV	ug/m^3	ppbV	ug/m^3	ppbV	ug/m^3	ppbV	ug/m^3	ppbV	ug/m^3	ppbV	ug/m^3
Acetone	**9.1**	**22**	**12**	**28**	**14**	**33**	**13**	**30**	**8.9**	**21**	**11**	**25**	**7.9**	**19**
Acrolein	**0.8**	**1.8**	**1.7**	**4**	**2.3**	**5.2**	**1.8**	**4.1**	**1.2**	**2.8**	<1.2	<2.8	<1.2	<2.8
Benzene	**0.086**	**0.27**	**0.12**	**0.39**	**0.15**	**0.49**	**0.32**	**1**	**0.2**	**0.63**	<0.13	<0.41	<0.13	<0.41
2-Butanone (MEK)	**1.8**	**5.2**	**7.1**	**21**	**4.2**	**12**	**6.8**	**20**	**1.6**	**4.6**	**1.9**	**5.7**	**1.3**	**4**
Carbon Disulfide	<0.068	<0.21	<0.068	<0.21	<0.068	<0.21	**0.3**	**0.93**	<0.068	<0.21	<0.14	<0.42	<0.14	<0.42
Chloroform	**0.11**	**0.52**	<0.073	<0.36	<0.073	<0.36	<0.15	<0.71	<0.073	<0.36	<0.15	<0.71	<0.15	<0.71
Chloromethane	**0.5**	**1**	**0.69**	**1.4**	**0.72**	**1.5**	**0.65**	**1.3**	**0.49**	**1**	**0.59**	**1.2**	**0.5**	**1**
Dichlorodifluoromethane (Freon 12)	**0.19**	**0.94**	**0.51**	**2.5**	**0.51**	**2.5**	**0.42**	**2.1**	**0.32**	**1.6**	**0.37**	**1.8**	**0.37**	**1.8**
cis-1,2-Dichloroethylene	<0.068	<0.27	<0.068	<0.27	<0.068	<0.27	**0.86**	**3.4**	<0.068	<0.27	<0.14	<0.54	<0.14	<0.54
Ethanol	**7.1**	**13**	**7.3**	**14**	**8.6**	**16**	**16**	**31**	**7.6**	**14**	**27**	**50**	**6.6**	**12**
Ethyl Acetate	<0.085	<0.31	<0.085	<0.31	<0.085	<0.31	**0.75**	**2.7**	<0.085	<0.31	**0.86**	**3.1**	<0.17	<0.61
Heptane	**0.73**	**3**	<0.066	<0.27	**0.14**	**0.56**	**0.69**	**2.8**	<0.066	<0.27	**0.22**	**0.92**	**<0.13**	**<0.54**
Hexane	**0.96**	**3.4**	**0.19**	**0.66**	**0.28**	**0.99**	**0.64**	**2.2**	<0.18	<0.62	<0.35	<1.2	**0.38**	**1.4**
2-Hexanone (MBK)	**0.32**	**1.3**	<0.059	<0.24	**0.35**	**1.4**	**0.27**	**1.1**	**0.33**	**1.4**	<0.12	<0.49	<0.12	<0.49
Isopropanol	**3.8**	**9.4**	**2.6**	**6.3**	**3.9**	**9.5**	**3.7**	**9.2**	**0.44**	**1.1**	**2**	**4.8**	**1.3**	**3.1**
Methylene Chloride	**0.23**	**0.81**	**0.2**	**0.7**	**0.24**	**0.83**	**0.57**	**2**	**0.23**	**0.81**	**0.54**	**1.9**	**0.39**	**1.4**
4-Methyl-2-pentanone (MIBK)	**0.13**	**0.52**	<0.085	<0.35	**0.092**	**0.38**	**0.36**	**1.5**	<0.085	<0.35	<0.17	<0.70	<0.17	<0.70
Naphthalene	<0.087	<0.46	<0.087	<0.46	<0.087	<0.46	<0.17	<0.91	<0.087	<0.46	<0.17	<0.91	<0.17	<0.91
Propene	<0.31	<0.53	<0.31	<0.53	<0.31	<0.53	**1.6**	**2.7**	**1**	**1.8**	<0.61	<1.1	<0.61	<1.1
Tetrachloroethylene	<0.061	<0.41	<0.061	<0.41	<0.061	<0.41	**69**	**470**	<0.061	<0.41	<0.12	<0.82	<0.12	<0.82
Tetrahydrofuran	<0.069	<0.20	<0.069	<0.20	<0.069	<0.20	**0.23**	**0.67**	<0.069	<0.20	<0.14	<0.41	<0.14	<0.41
Toluene	**0.47**	**1.8**	**2.6**	**9.7**	**1.2**	**4.5**	**4.8**	**18**	**0.18**	**0.68**	**1.5**	**5.5**	**0.24**	**0.89**
Trichloroethylene	<0.063	<0.34	<0.063	<0.34	<0.063	<0.34	**3**	**16**	<0.063	<0.34	<0.13	<0.68	<0.13	<0.68
Trichlorofluoromethane (Freon 11)	**0.19**	**1**	**0.24**	**1.3**	**0.24**	**1.4**	**0.21**	**1.2**	**0.2**	**1.1**	**0.28**	**1.6**	**0.25**	**1.4**
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	<0.069	<0.53	**0.098**	**0.75**	**0.07**	**0.54**	<0.14	<1.1	<0.069	<0.53	<0.14	<1.1	<0.14	<1.1
1,2,4-Trimethylbenzene	<0.065	<0.32	<0.065	<0.32	<0.065	<0.32	**0.2**	**1**	<0.065	<0.32	<0.13	<0.64	<0.13	<0.64
m&p-Xylene	<0.13	<0.56	**0.14**	**0.61**	**0.18**	**0.78**	**0.42**	**1.8**	<0.13	<0.56	<0.26	<1.1	<0.26	<1.1
o-Xylene	<0.062	<0.27	<0.062	<0.27	**0.072**	**0.31**	**0.16**	**0.71**	<0.062	<0.27	<0.12	<0.54	<0.12	<0.54

Attachment B

Review and Human Health Risk Assessment of TRC Air Monitoring Results for Volatile Organic Compounds (VOCs)

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December 21, 2017

Mr. Thomas Diviny
Town Board Member
Town of Orangetown
26 W. Orangeburg Rd
Orangeburg, NY 10962

Submitted via e-mail
tdiviny@orangetown.com

Re: Review and human health risk assessment of TRC Air Monitoring Results for Volatile Organic Compounds (VOCs)

Dear Tom;

This is an update to the November 10, 2017 report submitted that reviewed the results of the Phase I VOC air sampling, documented in TRC's *Air Quality Monitoring Report. Phase I: VOC Air Sampling & Meteorological Monitoring*, as well as the results from the resident VOC samples obtained September 15th – October 23rd. This letter report includes the additional residential VOC data collected on November 2, 14, 20 and 28, 2017. Additionally, additional discussion pursuant to the Acrolein analysis issues as well as the statistical analysis discussed in the December 1, 2017 letter to the Town Board that provided TRC's response to Dr. Dimitri Laddis' November 27th letter to the Board have been added to this report.

The results from the Phase I VOC air sampling showed that concentrations of Acrolein, Benzene, Carbon Tetrachloride and Hexachlorobutadiene exceeded New York State Department of Environmental Conservation's respective short-term guideline concentrations (SGCs) and annual guideline concentrations (AGCs). Additionally, concentrations of acrolein (7 samples) and tetrachloroethylene (1 sample) exceeded their respective SGCs, and acrolein (9 samples) and benzene (10 samples) exceeded their respective AGCs in the resident samples. No other detected compound exceeded their respective benchmark concentrations. TRC does not believe that exposure to these measured concentrations would result in negative health effects as discussed further below.

The SGCs and AGCs were developed to evaluate the potential for offsite fence line concentrations of toxic air pollutants emitted by a facility by using an USEPA approved air dispersion model. The model calculates worst-case air concentrations at specific receptor locations using measured stack emissions data, stack input data (height, flow rate and

temperature) and local meteorology. The SGCs and AGCs do not take into account any background concentrations or additional sources that may be present in ambient air. As stated in the report, stack testing was conducted at the API stack outlets on June 28-29, 2017. Results from that testing and subsequent air dispersion modeling of the maximum short-term and maximum annual average ground concentrations indicated the stack emissions from API do not exceed the corresponding SGCs or AGCs or the Odor Thresholds for any of the pollutants measured, including Acrolein.

Additionally, as stated in the report, the SGC is for comparison against a modeled maximum 1 –hour concentration, while the AGC is for comparison against a modeled maximum annual average air concentration and the Phase I samples were taken over a 24 hour period, while the resident samples were collected over a one to two hour period. Therefore, the direct comparison of the measured concentrations from the 24-hour, and resident samples to the AGCs (annual guideline concentrations) are not comparable as it is a comparison of a short-term sample to a long-term average. Although the 24-hour sample is collected over a longer time period than the 1-hour short-term SGC, it is still a short-term sample and therefore, a comparison can be made. Additionally, the Center for Disease Control's (CDC's) Agency for Toxic Substances and Disease Registry (ATSDR) has developed minimal risk levels (MRLs) for those chemicals for which there is an adequate toxicological database. MRLs are developed for short-term (14 days or less), intermediate (15 days – 364 days) and long-term (more than 365 days) exposures. The short-term MRL would be an appropriate comparison value for the 24 hour samples.

A. Acrolein was detected in concentrations above the SGC and the AGC in the Phase I VOC sampling. Acrolein is commonly found in car exhaust, cigarette smoke, and is also released from burning wood, other plant material and burning oil (e.g., home heating oil) (ATSDR Toxicological Profile for Acrolein, 2007). Measurements of Acrolein in smokers' homes have ranged from 1.6-3.6 ug/m^3 (Nazaroff and Singer 2004, as cited in ATSDR Toxicological Profile for Acrolein, 2007). Irritation of the eyes and nose is the primary effect associated with short-term exposures to Acrolein. Eye irritation has been noticed at levels as low as 137 ug/m^3 in human volunteers in a laboratory setting. The SGC of 2.5 ug/m^3 is calculated by dividing the lowest observable adverse effect level (137 ug/m^3) by a health protective uncertainty factor of 60 which takes into account protection of susceptible children.

   As stated previously, modeled maximum 1-hour and maximum average annual concentrations of Acrolein directly attributable to API, did not exceed the SGCs or AGCs at the facility fenceline.

   The resident VOC samples, which were taken over a period of 1 to 2 hours, showed concentrations of Acrolein ranging from non-detect to 5.95 ug/m^3, which are comparable to the 24-hour monitoring samples obtained by TRC. Nine of 14 samples exceeded the SGC of 2.5 ug/m^3. It should also be noted that the detection limits of the non-detected samples were also higher than the SGC.

As discussed in the December 1, 2017 letter to the Town Board that provided TRC's response to Dr. Dimitri Laddis' November 27th letter to the Board, it was determined that the laboratory did not conduct EPA recommended cleaning procedures to the Summa Canisters used to conduct the ambient air sampling, which potentially resulted in acrolein concentrations that were biased high due to "acrolein growth" in the canisters. Acrolein was a late addition to the analysis list (after sampling had commenced) and therefore the canister did not undergo the EPA recommended cleaning prior to being sent out for use. NYS DEC has reviewed the acrolein data collected by TRC in the Blauvelt area and has concurred with this assessment. The DEC will be conducting side-by-side sampling during the second phase of the ambient air sampling collected in Blauvelt. Therefore, any comparisons with the SGCs and AGCs are not appropriate at this time due to problems with the analysis of acrolein.

B. Benzene was detected above its AGC in the 24-hour samples. However, as noted above, since the sample obtained was a 24-hour sample, it is not comparable to the long-term AGC benchmark value. The SGC value for Benzene is 1300 ug/m^3. Benzene is a component of gasoline and is emitted in the exhaust and through evaporation. A statistical comparison of the Blauvelt 24-hour sample benzene dataset and a dataset comprised of the maximum detected concentrations over the course of the sampled years (2008-2016) for each individual community (as provided in the NYS DEC database found at: http://www.dec.ny.gov/chemical/66478.html), was conducted using a two-tailed t-test. The results of the statistical testing showed that the benzene concentrations measured in Blauvelt were statistically less than the maximum measured concentrations across New York, including rural areas such as Pinnacle State Park and Whiteface Mountain, when the means of the data sets were compared. This indicates that the Blauvelt benzene concentrations are statistically less than the measured background concentrations across the state.

The ATSDR has developed a short-term MRL for benzene of 0.009 parts per million (equivalent to 28.71 ug/m^3) for exposures of 14 days or less (ATSDR Toxicological Profile for Benzene, 2007). The maximum concentration measured during the 24-hr sampling was 0.80 ug/m^3 which is well below the ATSDR's minimal risk level.

The resident VOC samples, which were taken over a period of 1 to 2 hours, showed concentrations of Benzene ranging from non-detect to 1 ug/m^3 which are well below the SGC of 1300 ug/m^3 and ATSDR's MRL of 28.71 ug/m^3, and, although they are 1-2 hour samples, are still within measured annual background concentrations across the state.

C. Carbon Tetrachloride was detected above its AGC in all 12 24-hour samples. However, as noted above, since the sample obtained was a 24-hour sample, it is not comparable to the long-term AGC benchmark value. The SGC for Carbon Tetrachloride is 1900 ug/m^3. Carbon Tetrachloride is an industrial chemical. A statistical comparison of the Blauvelt 24-hour sample carbon tetrachloride dataset and a dataset comprised of the maximum detected concentrations over the course of the

sampled years (2008-2016) for each individual community (as provided in the NYS DEC database found at: http://www.dec.ny.gov/chemical/66478.html) was conducted using a two-tailed t-test. The results of the statistical testing showed that the carbon tetrachloride concentrations measured in Blauvelt were statistically less than the maximum measured concentrations across New York including rural areas such as Pinnacle State Park and Whiteface Mountain, when the means of the datasets were compared. This indicates that the Blauvelt carbon tetrachloride concentrations are statistically less than the measured background concentrations measured across the state.

The ATSDR has developed an intermediate-term minimum risk level for carbon tetrachloride of 0.03 parts per million (equivalent to 188.7 ug/m^3) for exposures of 15 to 364 days, which is also considered protective of short-term exposures. The maximum concentration measured during the sampling was 0.51 ug/m^3 which was well below the ATSDR's MRL.

All detected samples were well below the SGC of 1900 ug/m^3 and the MRL of 188.7 ug/m^3 and therefore it is not expected that exposure would cause adverse health effects. Additionally, the resident VOC samples showed no detected concentrations of Carbon Tetrachloride.

D. Hexachlorobutadiene was detected in one out of 12 24-hour samples, and that detected concentration was above its AGC. However, as noted above, since the sample obtained was a 24-hour sample, it is not comparable to the long-term AGC benchmark value. Hexachlorobutadiene is an industrial chemical. A statistical comparison of the Blauvelt 24-hour sample hexachlorobutadiene dataset and a dataset comprised of the maximum detected concentrations over the course of the sampled years (2008-2016) for each individual community (as provided in the NYS DEC database found at: http://www.dec.ny.gov/chemical/66478.html) using a two-tailed t-test. The results of the statistical testing showed that the hexachlorobutadiene concentrations measured in Blauvelt were statistically less than the maximum measured concentrations across New York including rural areas such as Pinnacle State Park and Whiteface Mountain, when the means of the datasets were compared. This indicates that the Blauvelt hexachlorobutadiene concentrations are statistically less than the measured background concentrations measured across the state.

   The results of the resident VOC samples showed no detected concentrations of Hexachlorobutadiene.

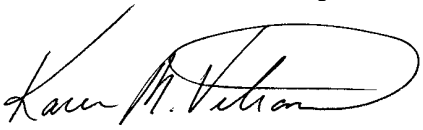
E. Tetrachloroethylene was detected in one resident VOC sample on November 2nd at a concentration of 470 ug/m^3 which exceeds the SGC. Tetrachloroethylene is commonly used as a dry cleaner solvent. It should be noted that there are two dry cleaner establishments located to the northeast of where the sample was taken. Although the sample exceeds the SGC, it is not expected that health effects would occur as a result of exposure to these concentrations. The SGC has been adapted from the NYS DOH's tetrachloroethylene action level of 300 ug/m^3 for indoor air.

The action level is based on longer term exposures and reflects the NYS DOH's "concerns about lengthy exposure (months to years) to air levels higher than 300 ug/m^3" in indoor air as a result of tetrachloroethylene exposures in apartments above dry cleaners (https://www.health.ny.gov/environmental/chemicals/tetrachloroethene/). Therefore, although the NYS DEC has set the SGC at 300 ug/m^3, it is not reflective of health effects due to acute, short-term exposures. California EPA has calculated an Acute Relative Exposure Level (AREL), which is based upon short-term exposures in human subjects. The AREL of 20,000 ug/m^3 is protective of sensitive subjects, such as children and the elderly. Therefore, the NYS DEC is very overly conservative and should not be used as a benchmark for potential acute health effects. The detected concentration of tetrachloroethylene is well below the health-based AREL of 20,000 ug/m^3.

Since these chemicals are often present at low levels in ambient air, TRC will collect background samples during the next phase of sampling to determine the impact of local conditions on ambient air and to determine whether alternative sources are present. Additionally, a laboratory that follows USEPA guidelines for cleaning of canisters used for acrolein sampling will be used for the Phase II sampling.

Very Truly Yours,

TRC Environmental Corporation



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