ON THE STUDY DESIGN AND THE DATA INTERPRETATION

Dr. Vetrano and I agreed that her review was not intended to comment on long-term exposure risk. Her reasoning is that there is not sufficient data to confidently characterize the longterm exposure that residents are being exposed to. Instead she focuses her conclusions on the short-term exposure, such as a visitor to Dominican campus, or someone doing work at Murphy court for a day. My objection is that if we only take this approach we can never answer whether there is any health risk to residents, students in the vicinity of the industrial zone who are exposed over months or years. I believe we must try to answer this question.

The measurements taken in August were done over 24 hour periods and repeated three times. These samples were scheduled, and not triggered by odor events. They were intended to be representative samples. It is fair to make a qualified statement such as “if the measured concentrations of toxins in the air are representative of daily concentrations, then longterm exposure would…..”. In this way the data can be used as a screening tool. In that regard we have a positive screen, meaning that four substances exceed annual exposure thresholds, and raise the question of possible harm from long-term exposure, so.. …

If the measured concentrations of these four substances are representative of daily air quality through most of the year, then the exposure to these toxins might cause adverse health effects to residents, students and those employed in the area who may be exposed on a daily basis over months, or years.

ON ACROLEIN

Specifically with regards to acrolein, Dr. Vetrano and I agree that acrolein levels in the vicinity of Aluf exceed not only NYS DEC longterm exposure thresholds but **acrolein also exceeded short term exposure thresholds for NJ and NY.** This is a problem. This means that even exposures of an hour may cause adverse health effects. In her discussion Dr. Vetrano argues that the levels are not high enough to cause concern because of protective factors that are built in to these limits, to account for "susceptible children". I strongly disagree with the implication that this human child safety factor can be removed. I believe that the safety of human children is one of our primary concerns, and we should be appreciative rather than dismissive of these child-protective factors. I would hope that Dr. Vetrano would change that aspect of her review.

I also shared with Dr. Vetrano that her statement that concentrations in Blauvelt are "below ASTDR's minimum risk levels and within measured US background concentrations" is incorrect; **In addition to exceeding NY DEC annual guideline concentrations by 8-fold, NJ long-term reference concentration by more than 100-fold, Blauvelt average concentrations exceed ATSDR minimum risk levels for exposure of 15-365 days by more than 20-fold.**

I also spoke to Dr. Vetrano regarding her use of the term "US background concentrations" to refer to EPA monitored sites. These EPA values are from EPA sites that include some of the most polluted air quality in the nation. This, in my opinion is neither a "background" or a "norm" (as Mr. Diviny choses to interpret it). Her statements using these "background ranges" are misleading and falsely reassuring. ATSDR is quite clear that ""The levels of acrolein are usually low in outside air, averaging around 0.20 parts acrolein in one billion parts air (0.2 ppb) in urban air and 0.12 ppb in rural air." The average Acrolein concentration measured in Blauvelt is 0.91ppB, which is 4x higher than average "urban air", and 8x higher than "rural air". The NYSDEC publishes annual data from monitored sites in NY state.

The recorded average concentrations in Blauvelt are about 8-fold higher than the highest published averages in NY State.
The recorded average concentrations in Blauvelt are about 20-fold higher than the highest averages of any NJ county.
https://www26.state.nj.us/doh-shad/indicator/view/med_air_conc.html
http://www.dec.ny.gov/chemical/66478.html
Dr. Vetrano does not chose to make this comparison.

So what is acrolein, and why are we concerned about it?
Per ATSDR regarding acrolein
"Acrolein is very irritating to the eyes, nose, throat, lungs, stomach, and skin. In general, children are not likely to be affected by acrolein more than adults. However, children who are sensitive to irritants in the air (such as children with asthma) may be more sensitive to lung irritation from acrolein." There is no classification of acrolein as a carcinogen but it is believed to be a mutagen at below "toxic levels".
https://www.ncbi.nlm.nih.gov/pubmed/8935782/
There is also evidence that acrolein contributes to the carcinogenic effects of other air pollutants
http://www.pnas.org/content/103/42/15404

Below is TRC's background comparison table from the October 2017 report

Table 3: Comparison of Selected VOCs of Interest

	Orangetown Ambient Air Samples - August 2017		Comparison of Average Concentrations in Ambient Air Samples Collected in the United States									
	Average Concentration		Residential/Industrial New Jersey - December 2016		Residential/Commercial/ Urban New York - October 2016		Residential/Commercial /Urban New York - September 2017		Residential/Commercial Florida - July 2017		Rural/Industrial Ohio - August 2015	
	ND = 1/2 RL											
VOCs - TO-15	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	8.60	20.25	3.59	8.70	8.5	20.5	6.92	16.56	3.81	9.05	6.99	16.61
Acrolein	0.91	2.20	N/A	N/A	N/A	N/A	N/A	N/A	0.15	0.34	0.46	1.05
2-Butanone (MEK)	1.47	4.32	ND	ND	1.55	4.5	1.55	4.6	0.31	0.91	0.77	2.26
Ethanol	4.27	8.07	3.66	6.86	5.05	9.55	47.36	88.24	3.15	5.93	25.24	47.56
Ethylbenzene	0.06	0.26	0.06	0.27	ND	ND	0.09	0.40	ND	ND	0.98	4.26
Toluene	1.58	5.96	0.46	1.71	0.17	0.61	0.71	2.68	0.41	1.54	0.64	2.42
m&p-Xylene	0.19	0.83	0.18	0.78	0.08	0.355	0.26	1.108	0.13	0.58	3.30	14.32
o-Xylene	0.08	0.33	0.06	0.28	0.036	0.16	0.0912	0.402	ND	ND	1.66	7.21

Notes:
ND = 1/2 RL : one half the reporting limits are used as concentration for non-detect results when calculating average concentrations
N/A - Not analyzed

NY State site specific data, and NJ county-specific data is available for acrolein in 2016 (shown below). Why don't they include it in above table??

Rochester [Site #2701-22, Monroe County] Annual VOC Data (2008-2016)

Annual VOC data for Rochester, ppb

AQS ID	Parameter	2016			2015			2014			2013			2012			2011			2010		
		#	Max	Avg	#	Max	Avg	#	Max	Avg	#	Max	Avg	#	Max	Avg	#	Max	Avg	#	Max	Avg
43207	Freon 113	52	0.079	0.068	54	0.085	0.072	59	0.083	0.072	58	0.078	0.068	56	0.089	0.067	52	0.079	0.063	56	0.085	0.06
43208	Freon 114	52	0.026	0.016	54	0.022	0.015	59	0.03	0.017	58	0.036	0.016	56	0.024	0.015	52	0.026	0.016	56	0.034	0.02
43218	*1,3*-Butadiene	52	0.064	0.014	54	0.069	0.017	59	0.038	0.013	58	0.036	0.012	56	0.045	0.012	52	0.052	0.008	56	0.038	0.01
43372	Methyl Tert-Butyl Ether	52	0.038	0.002	54	0.007	0.002	59	0.013	0.002	58	0.011	0.001	56	0.01	0.001	52	0.008	0	56	0.005	0.00
43502	Formaldehyde	53	8.913	1.883	58	7.623	1.376	58	3.069	1.099	54	2.821	1.364	53	3.489	1.433	52	8.078	1.432	56	4.271	1.27
43503	Acetaldehyde	53	2.358	0.613	58	3.199	0.577	58	1.415	0.531	54	1.404	0.559	53	1.062	0.533	52	1.42	0.481	56	1.455	0.50
43504	Propionaldehyde	53	0.31	0.091	58	0.315	0.069	58	0.208	0.064	54	0.158	0.076	53	0.248	0.086	52	0.187	0.063	56	0.213	0.06
43505	Acrolein	40	0.294	0.111	54	0.901	0.162	59	0.237	0.096	53	0.351	0.130	56	0.401	0.116	52	0.237	0.077	56	0.306	0.09
43510	Butyraldehyde	53	0.441	0.079	58	0.308	0.022	58	0.309	0.029	54	0.294	0.047	53	0.083	0.030	52	0.289	0.039	56	0.121	0.02

Grand Island Blvd - (Tonawanda Study) [Site #1472-13, Erie County] Annual VOC Data (2008-2016)

Annual VOC data for Grand Island Blvd, ppb

AQS ID	Parameter	2016			2015			2014			2013			2012			2011			2010		
		#	Max	Avg	#	Max	Avg	#	Max	Avg	#	Max	Avg	#	Max	Avg	#	Max	Avg	#	Max	
42153	Carbon Disulfide	59	3.085	0.213	56	1.033	0.116	58	1.23	0.120	56	1.7	0.230	60	1.424	0.184	56	2.7	0.284	58	2.225	
43207	Freon 113	59	0.08	0.068	56	0.085	0.071	58	0.087	0.071	56	0.087	0.071	60	0.168	0.069	56	0.077	0.062	58	0.066	
43208	Freon 114	59	0.024	0.016	56	0.023	0.015	58	0.028	0.017	56	0.026	0.015	60	0.569	0.134	56	0.021	0.015	58	0.076	
43218	*1,3*-Butadiene	59	0.058	0.014	56	0.05	0.018	58	0.054	0.013	56	0.062	0.015	60	0.044	0.011	56	0.078	0.018	58	0.008	
43372	Methyl Tert-Butyl Ether	59	0.011	0.001	56	0.008	0.001	58	0.022	0.002	56	0.008	0.001	60	0.006	0.001	56	0.004	0	58	0.263	
43502	Formaldehyde	60	11.369	3.688	58	3.371	1.654	58	10.211	2.401	57	3.139	1.583	56	6.386	1.642	56	2.957	1.023	57	2.803	
43503	Acetaldehyde	60	2.005	0.767	58	1.545	0.588	58	1.427	0.584	57	1.357	0.546	56	1.36	0.536	56	0.85	0.408	57	1.545	
43504	Propionaldehyde	60	0.379	0.116	58	0.291	0.087	58	0.262	0.092	57	0.283	0.09	56	0.224	0.076	56	0.167	0.048	57	0.163	
43505	Acrolein	60	0.291	0.106	56	0.256	0.071	58	0.197	0.080	56	0.624	0.118	60	0.389	0.083	56	0.367	0.09	58	0.263	
43510	Butyraldehyde	60	0.3	0.06	58	0.063	0.021	58	0.21	0.040	57	0.087	0.031	56	0.109	0.031	56	0.129	0.025	57	0.119	

IS 52 [Site #7094-07, Bronx County] and Morrisania [Site #7094-05, Bronx County] Annual VOC Data (2008-2016)

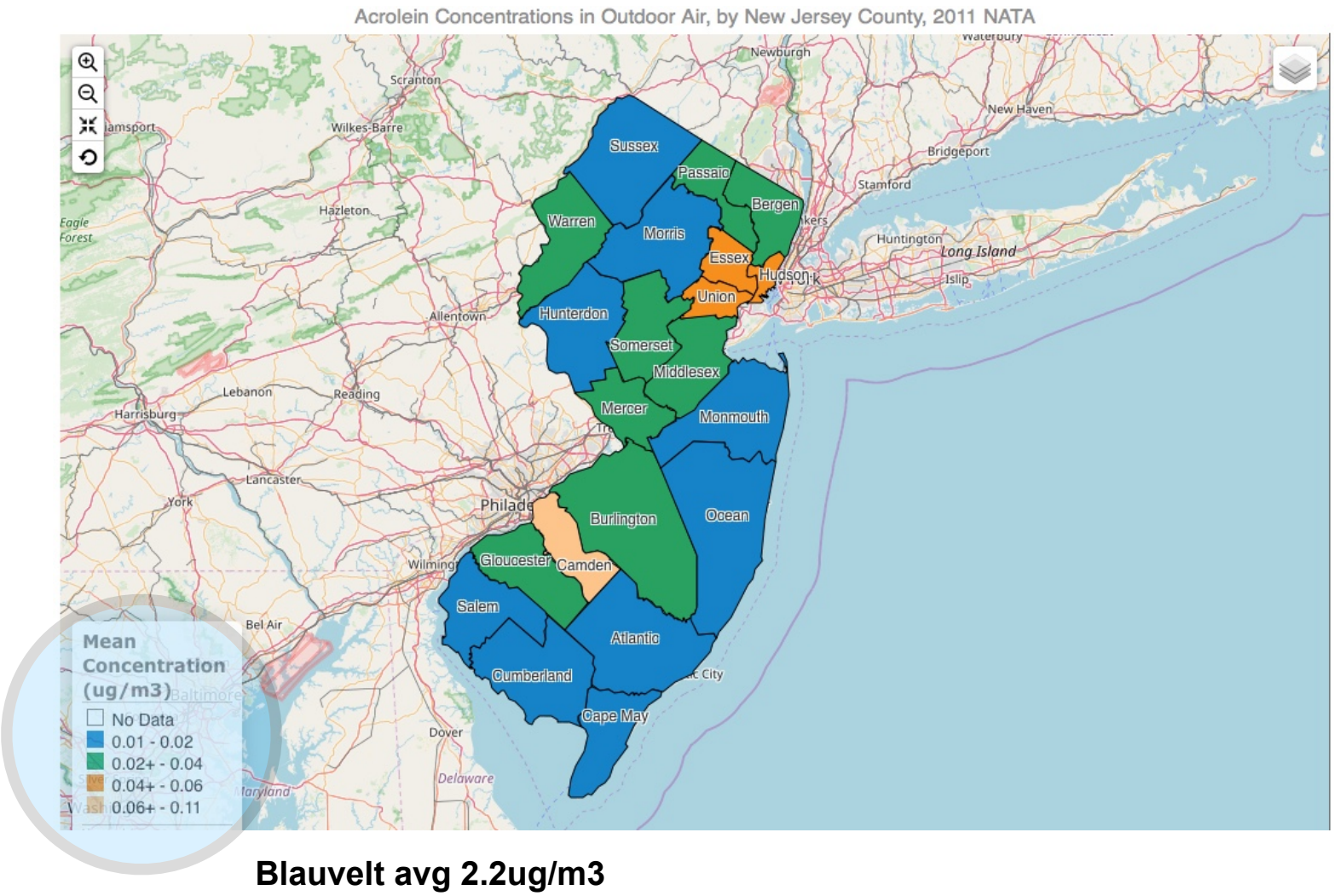
Annual VOC data for IS 52 and Morrisania, ppb

AQS ID	Parameter	IS 52			IS 52			IS 52			IS 52/Morrisania			Morrisania			IS 52/Morisania					
		2016			2015			2014			2013			2012			2011			2010		
		#	Max	Avg	#	Max	Avg	#	Max	Avg	#	Max	Avg	#	Max	Avg	#	Max	Avg	#	Max	Avg
43207	Freon 113	60	0.084	0.069	56	0.087	0.073	54	0.088	0.073	60	0.098	0.069	60	0.092	0.068	60	0.08	0.064	28	0.085	0.074
43208	Freon 114	60	0.023	0.017	56	0.025	0.016	53	0.032	0.018	60	0.025	0.014	60	0.023	0.015	60	0.028	0.017	28	0.034	0.025
43218	*1,3*-Butadiene	60	0.128	0.034	56	0.134	0.039	54	0.117	0.032	60	0.088	0.034	60	0.14	0.041	60	0.174	0.033	28	0.28	0.046
43372	Methyl Tert-Butyl Ether	60	0.01	0.002	56	0.01	0.003	54	0.028	0.003	60	0.015	0.002	60	0.013	0.002	60	0.008	0.001	28	0.011	0.003
43502	Formaldehyde	56	5.078	2.278	59	6.635	2.498	61	5.22	1.965	54	6.428	2.535	49	6.462	2.349	55	7.243	2.191	26	5.998	2.84
43503	Acetaldehyde	56	1.925	0.78	59	2.105	0.853	61	1.829	0.785	54	1.742	0.973	49	1.841	0.876	55	1.745	0.802	26	1.6	0.901
43504	Propionaldehyde	56	0.235	0.111	59	0.587	0.120	61	0.305	0.106	54	0.365	0.140	49	0.348	0.179	55	0.5	0.146	26	0.26	0.128
43505	Acrolein	60	0.303	0.144	56	0.303	0.148	54	0.447	0.155	59	0.493	0.166	60	0.421	0.146	60	0.45	0.109	28	0.242	0.126
43510	Butyraldehyde	56	0.086	0.037	59	0.114	0.037	61	0.12	0.040	54	0.14	0.058	49	0.148	0.069	55	0.192	0.063	26	0.272	0.086

Brookside Terrace - (Tonawanda Study) [Site #1472-14, Erie County] Annual VOC Data (2008-2016)

Annual VOC data for Brookside Terrace, ppb

AQS ID	Parameter	2016			2015			2014			2013			2012			2011				
		#	Max	Avg	#	Max	Avg	#	Max	Avg	#	Max	Avg	#	Max	Avg	#	Max	Avg	#	
42153	Carbon Disulfide	58	0.831	0.166	58	1.63	0.185	59	0.567	0.091	52	0.928	0.174	54	1.054	0.216	55	1.27	0.136	54	
43207	Freon 113	58	0.074	0.068	58	0.086	0.071	59	0.088	0.071	52	0.123	0.073	54	0.094	0.067	55	0.077	0.061	54	
43208	Freon 114	58	0.029	0.016	58	0.024	0.016	59	0.029	0.017	52	0.029	0.016	54	0.024	0.015	55	0.025	0.016	54	
43218	*1,3*-Butadiene	58	0.072	0.01	58	0.034	0.014	59	0.044	0.012	52	0.046	0.009	54	0.075	0.009	55	0.057	0.007	54	
43372	Methyl Tert-Butyl Ether	58	0.01	0.001	58	0.009	0.002	59	0.038	0.003	52	0.01	0.002	54	0.021	0.001	55	0.005	0	54	
43502	Formaldehyde	58	7.386	1.792	60	12.151	4.470	28	4.791	1.101	0	--	--	43	8.33	2.008	57	3.426	1.067	56	
43503	Acetaldehyde	58	3.379	0.570	60	1.953	0.893	28	1.06	0.441	0	--	--	43	1.079	0.496	57	1.018	0.441	56	
43504	Propionaldehyde	58	0.352	0.087	60	0.196	0.111	28	0.154	0.062	0	--	--	43	1.193	0.210	57	0.34	0.070	56	
43505	Acrolein	58	0.231	0.082	58	0.222	0.093	59	0.189	0.072	52	0.574	0.128	54	0.442	0.114	55	0.31	0.068	54	
43510	Butyraldehyde	58	0.178	0.035	60	0.175	0.064	28	0.086	0.020	0	--	--	43	0.2	0.043	57	0.13	0.032	56	
43516	*Trans*-Crotonaldehyde	58	0.013	--	60	0.113	0.002	28	0.022	0.006	0	--	--	43	0.208	0.031	57	0.543	0.05	56	



Blauvelt avg 2.2ug/m3

ON BENZENE

Benzene is a well described carcinogen whose carcinogenic effects are proportional to the concentration in the air. The lower the better.

EPA suggests that 0.4ppb will result in 1 additional cancer death in 100,000 people

However, blood analyses are not useful when exposure levels are low.

1.9 WHAT RECOMMENDATIONS HAS THE FEDERAL GOVERNMENT MADE TO PROTECT HUMAN HEALTH?

The federal government develops regulations and recommendations to protect public health. Regulations *can* be enforced by law. The EPA, the Occupational Safety and Health Administration (OSHA), and the Food and Drug Administration (FDA) are some federal agencies that develop regulations for toxic substances. Recommendations provide valuable guidelines to protect public health, but *cannot* be enforced by law. The Agency for Toxic Substances and Disease Registry (ATSDR) and the National Institute for Occupational Safety and Health (NIOSH) are two federal organizations that develop recommendations for toxic substances.

include the following:

EPA has set 5 ppb as the maximum permissible level of benzene in drinking water. EPA has set a goal of 0 ppb for benzene in drinking water and in water such as rivers and lakes because benzene can cause leukemia. EPA estimates that 10 ppb benzene in drinking water that is consumed regularly or exposure to 0.4 ppb in air over a lifetime could cause a risk of one additional cancer case for every 100,000 exposed persons. EPA recommends 200 ppb as the maximum permissible level of benzene in water for short-term exposures (10 days) for children.

EPA requires that the National Response Center be notified following a discharge or spill into the environment of 10 pounds or more of benzene.

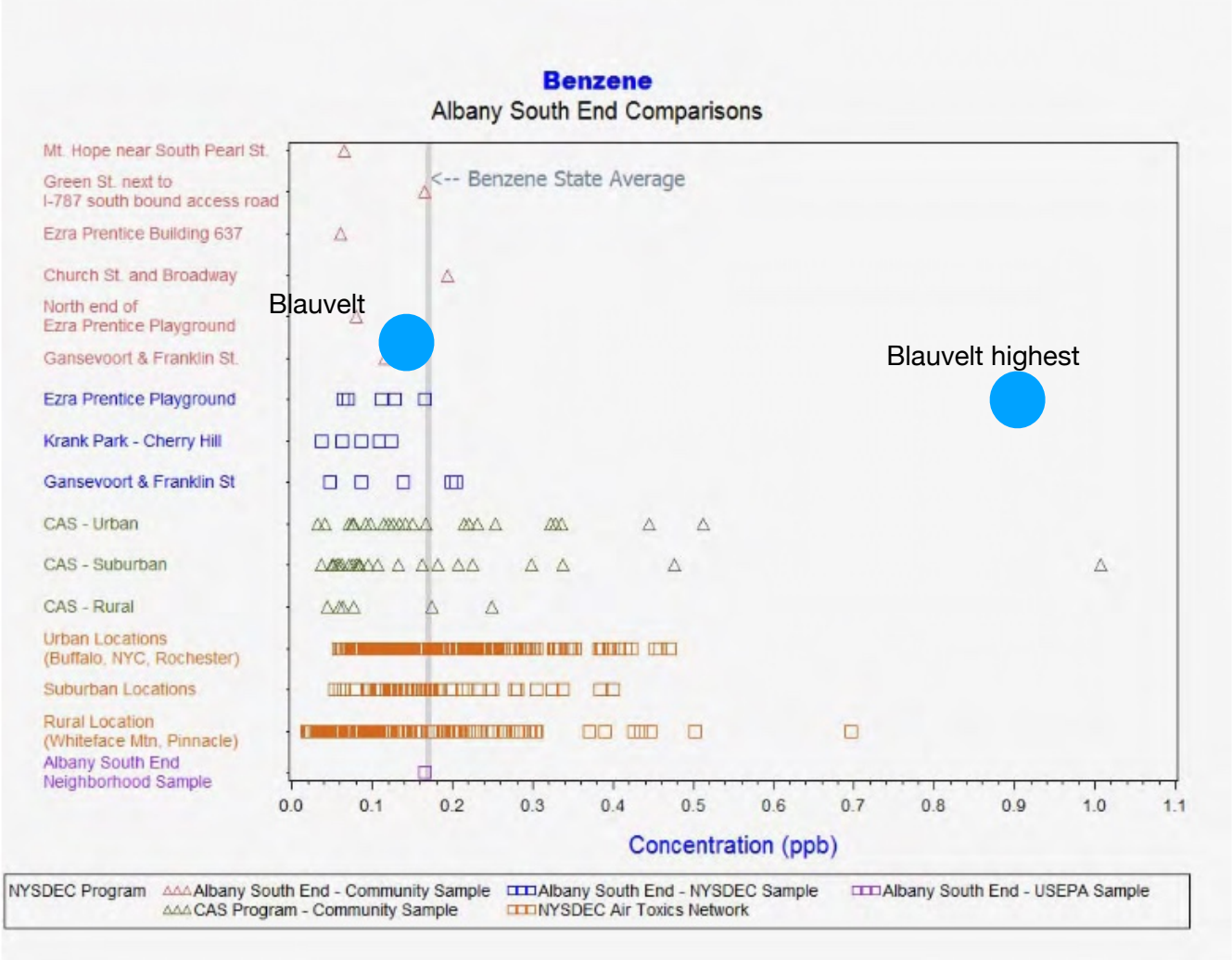
OSHA regulates levels of benzene in the workplace. The maximum allowable amount of benzene in workroom air during an 8-hour workday, 40-hour workweek is 1 ppm. Because benzene can cause

Measured Blauvelt, Aluf vicinity samples 0.14ppb average means approximately 1 additional cancer death in 300,000 people

This may be largely due to car exhaust but we need comparisons from other sites on 303 away from Light Industrial zone, but the industry there, and the type of traffic it attracts is likely a contributor.

Regardless of the source, further development will add to the benzene levels and thus should be avoided.

One sample of the one hour canisters <u>exceeded any monitored average in NYS that I can find in 2016-17</u> (thats impressive though the significance is unclear). Below are some 2013 values to compare to.



ON HEXACHLOROBUTADIENE

Background levels cited for HCBD are 2-3ppTrillion (0.002- 0.003 ppB) Blauvelt measured average concentration is 13-20 fold higher than background and within the range (0.0022-43 ppB) found inside a production facility. This is also the highest reported DEC measurement in NYS . It is important that this is based on a single measured sample, unrelated to odor events.

PUBLIC HEALTH STATEMENT
Hexachlorobutadiene
CAS#: 87-68-3

Division of Toxicology **May 1994**

1.2 WHAT HAPPENS TO HEXACHLOROBUTADIENE WHEN IT ENTERS THE ENVIRONMENT?

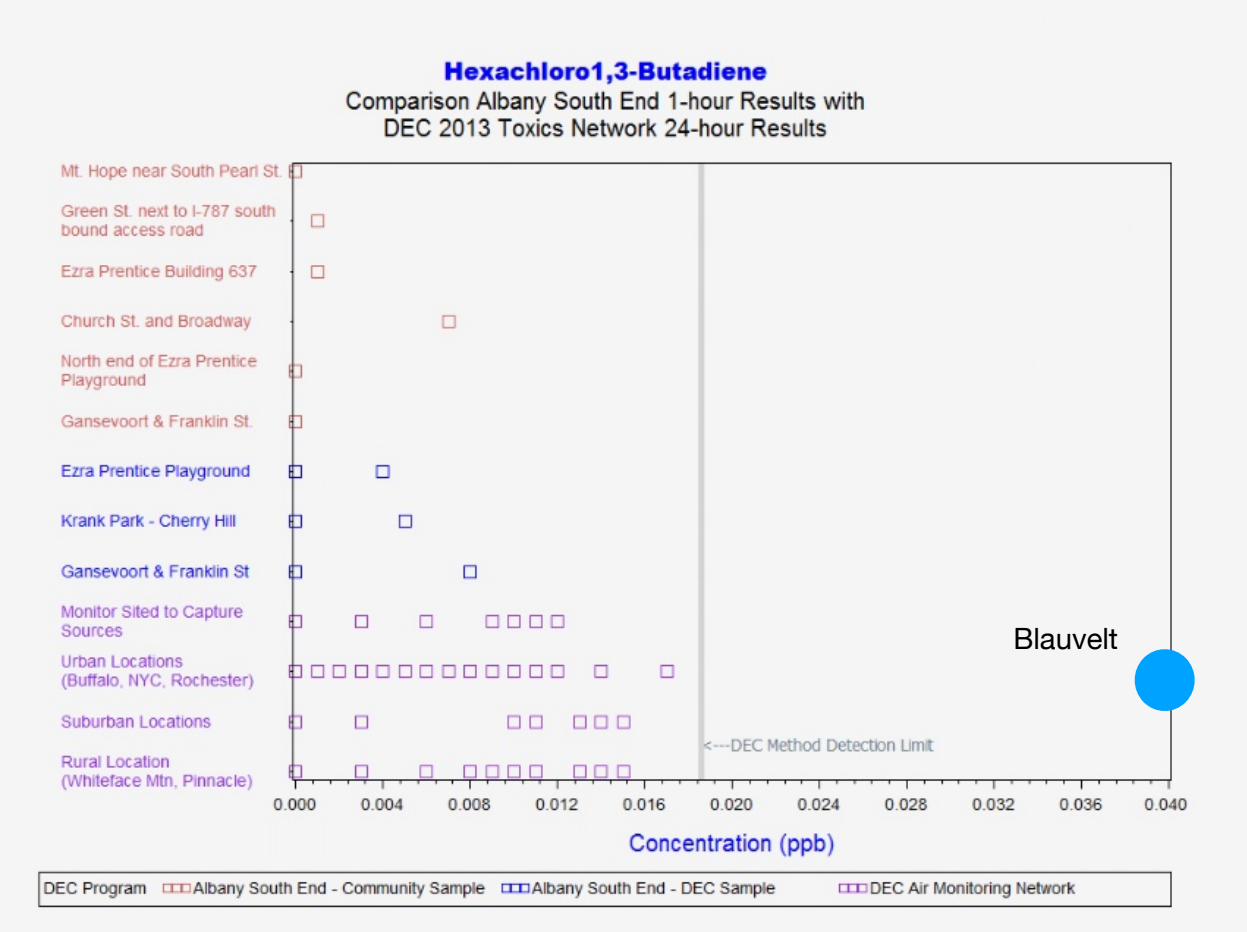
Hexachlorobutadiene is released to the environment in air, water, and soil, mainly as a result of its disposal following industrial use. Most of the hexachlorobutadiene wastes are destroyed by burning; some are released to the air in this process. It is not known what happens to hexachlorobutadiene after it enters the air. Based on the information we have on similar compounds, it may be broken down by sunlight and react with gases in the atmosphere. It is not known what chemicals are formed by these reactions or if the compounds formed are harmful. Based on the properties of similar compounds, one-half of the hexachlorobutadiene in the air is expected to be broken down to other chemicals within 60 days.

1.3 HOW MIGHT I BE EXPOSED TO HEXACHLOROBUTADIENE?

You may be exposed to hexachlorobutadiene by breathing contaminated air, eating contaminated food, drinking contaminated water, or by direct skin contact with this chemical. People working in the industrial facilities where hexachlorobutadiene is formed or used may be exposed. Concentrations found in outside air were 2–3 parts hexachlorobutadiene per trillion parts of air (ppt). Levels were much higher in or near industrial facilities where hexachlorobutadiene is formed or used. One survey detected air concentrations ranging from 22 to 43,000 ppt in a production facility. No information is available on how many workers are potentially exposed to hexachlorobutadiene.

Table 2: Summary of VOC Results - Phase I

VOCs - TO-15	Number of Detects[a]	Average Concentration ND = 1/2 RL[b]		Maximum Concentration			
		ppbV	ug/m^3	ppbV	ug/m^3	Date Sampled	Location Sampled
Acetone	***12***	8.60	20.25	20	48.0	8/14/17-8/15/17	Rail Trail SW
Acrolein	***9***	0.91	2.20	2.4	5.4	8/14/17-8/15/17	Rail Trail SW
Benzene	***12***	0.14	0.44	0.25	0.8	8/14/17-8/15/17	Murphy Court
2-Butanone (MEK)	***4***	1.47	4.32	4.6	14.0	8/14/17-8/15/17	Rail Trail SW
Carbon Tetrachloride	***12***	0.07	0.44	0.081	0.5	8/8/17-8/9/17	Murphy Court
Chloroform	***11***	0.06	0.27	0.16	0.8	8/8/17-8/9/17	Rail Trail NW
Chloromethane	***12***	0.59	1.23	0.81	1.7	8/14/17-8/15/17	Rail Trail SW
Cyclohexane	***4***	0.13	0.46	0.6	2.1	8/14/17-8/15/17	Murphy Court
Dichlorodifluoromethane (Freon 12)	***12***	0.35	1.71	0.54	2.7	8/14/17-8/15/17	Rail Trail SW
Ethanol	***12***	4.27	8.07	12	23.0	8/14/17-8/15/17	Rail Trail SW
Ethyl Acetate	***12***	1.10	4.02	5.5	20.0	8/14/17-8/15/17	Murphy Court
Ethylbenzene	***4***	0.06	0.26	0.24	1.0	8/14/17-8/15/17	Murphy Court
4-Ethyltoluene	***2***	0.04	0.12	0.046	0.2	8/14/17-8/15/17	Murphy Court
Heptane	***12***	0.14	0.57	0.52	2.1	8/14/17-8/15/17	Murphy Court
Hexachlorobutadiene	***1***	0.04	0.20	0.044	0.5	8/14/17-8/15/17	Rail Trail SW
2-Hexanone (MBK)	***12***	0.06	0.26	0.13	0.5	8/14/17-8/15/17	Rail Trail SW
Isopropanol	***12***	3.56	8.73	9.5	23.0	8/14/17-8/15/17	Rail Trail SW



Here is what we found on effects on children and pregnant moms. Our concern is that these chemicals can settle on toys in the yards near the Aluf site and children can put the toys in their mouths. The federal ATSDR clearly states that it is a possible carcinogen and gives weighted amounts of exposure.

https://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=864&tid=168

The state of NJ labels it as a carcinogen on their fact sheet.
http://nj.gov/health/eoh/rtkweb/documents/fs/0979.pdf

This article states it is difficult to state unequivocally that is could not cause cancer in humans as it is only tested on rats and other small animals. On them, it damaged lungs, kidney, liver and the skin

https://www.epa.gov/sites/production/files/2014-09/documents/support_cc1_hexachlorobutadiene_healtheffects.pdf

The average measured level reported by TRC is based on a single measurement. While this is an impressive measurement, it is unclear what this represents in terms of the air quality. If this measurement was in any way representative of daily air quality it would be concerning. Further long-term testing is required.

Dr. Vetrano states “the measured concentration of hexachlorobutadiene exceeds the maximum background concentration by approximately fourfold.” Thus **the following statement by Mr. Diviny can not be true**: “Additionally, the report states that the levels are not out of the norm when compared to other communities throughout the US “ (councilman Diviny). This is a misrepresentation of Dr. Vetrano’s report. This has been pointed out to Mr. Diviny on multiple occasions. It has yet to be corrected.

ON CARBON TETRACHLORIDE

Table 2: Summary of VOC Results - Phase I

VOCs - TO-15	Number of Detects[a]	Average Concentration ND = 1/2 RL[b]		Maximum Concentration			
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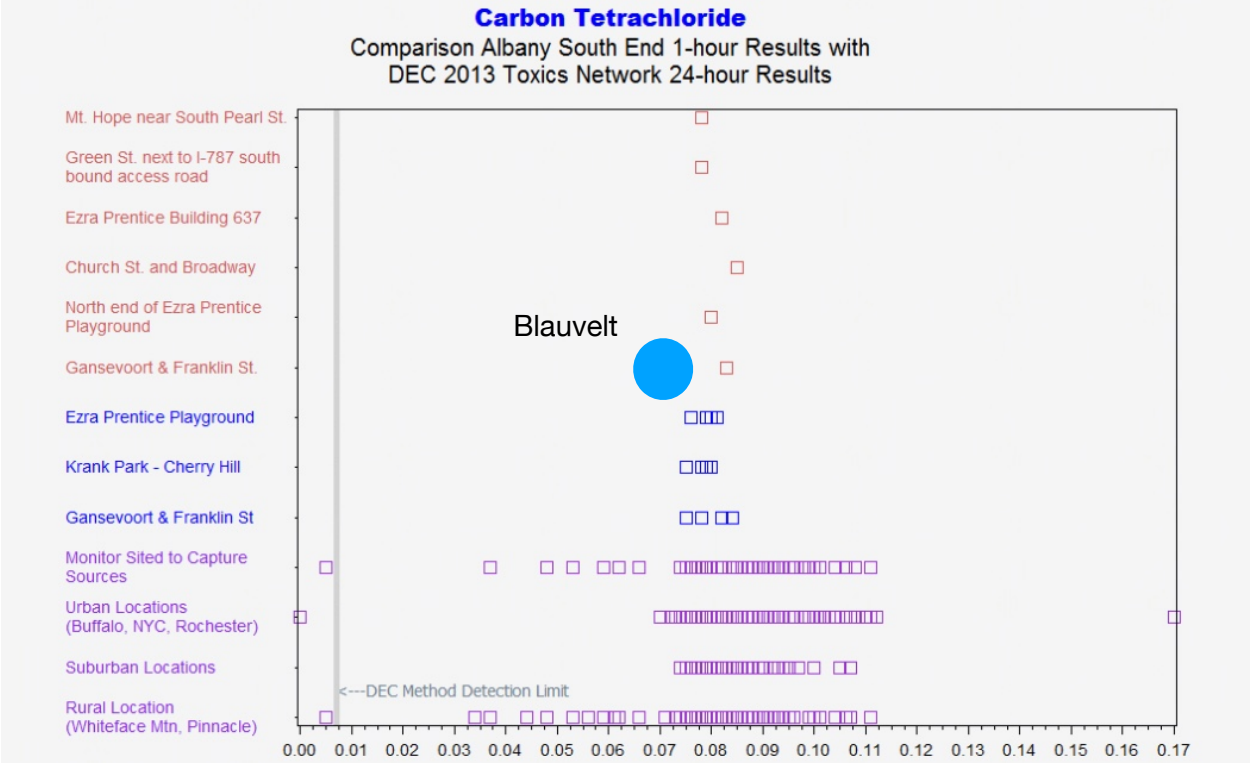
Acetone	***12***	8.60	20.25	20	48.0	8/14/17-8/15/17	Rail Trail SW
Acrolein	***9***	0.91	2.20	2.4	5.4	8/14/17-8/15/17	Rail Trail SW
Benzene	***12***	0.14	0.44	0.25	0.8	8/14/17-8/15/17	Murphy Court
2-Butanone (MEK)	***4***	1.47	4.32	4.6	14.0	8/14/17-8/15/17	Rail Trail SW
Carbon Tetrachloride	***12***	0.07	0.44	0.081	0.5	8/8/17-8/9/17	Murphy Court
Chloroform	***11***	0.06	0.27	0.16	0.8	8/8/17-8/9/17	Rail Trail NW



The values for Carbon Tetrachloride are elevated but in the range of other suburban locations.

per the toxicological profile for carbon tetrachloride

“Most information on the health effects of carbon tetrachloride in humans comes from cases where people have been exposed to relatively high levels of carbon tetrachloride, either only once or for a

short period, for example, by accidental poisoning or by working with the chemical in a confined space without ventilation. Experiments have not been performed on the effects of long-term exposure of humans to low levels of carbon tetrachloride, so the human health effects of such exposures are not known."

https://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=35