

Toxic air pollutant testing in the Fore River Basin

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On behalf of:

Fore River Residents Against
the Compressor Station,
North Weymouth Civic Association

Disclosures

- Grant funding provided by the Island Foundation, with fiscal sponsorship from Toxics Action Center
- No individuals involved with this effort received personal compensation
- I have training, experience, and peer reviewed publications in cell biology, cancer biology, ophthalmology, and clinical medicine
- Some of my patients live in Quincy, Weymouth, and Braintree

Air pollution: Two major categories

“Criteria” Pollutants

Particulate matter
Sulfur dioxide
Nitrogen dioxide
Ozone
Lead

Legally enforceable standards

VOCs, Hazardous Air Pollutants, Air Toxics

Benzene
Formaldehyde
Toluene
Methylene chloride
Many more...

Guidelines, not legally
enforceable

“Air toxics” guidelines: Not standards

- AAL: Ambient Air Level (annual)
- TEL: Threshold Effect Exposure Limits (24 hour)
- MassDEP guidelines for the air we breath, to protect health
- Do not relate to how much air pollution is released from a specific facility
- Legal standard for “air toxics” not included in Clean Air Act

“Air toxics” in Spectra's compressor station draft air pollution permit

Table 5

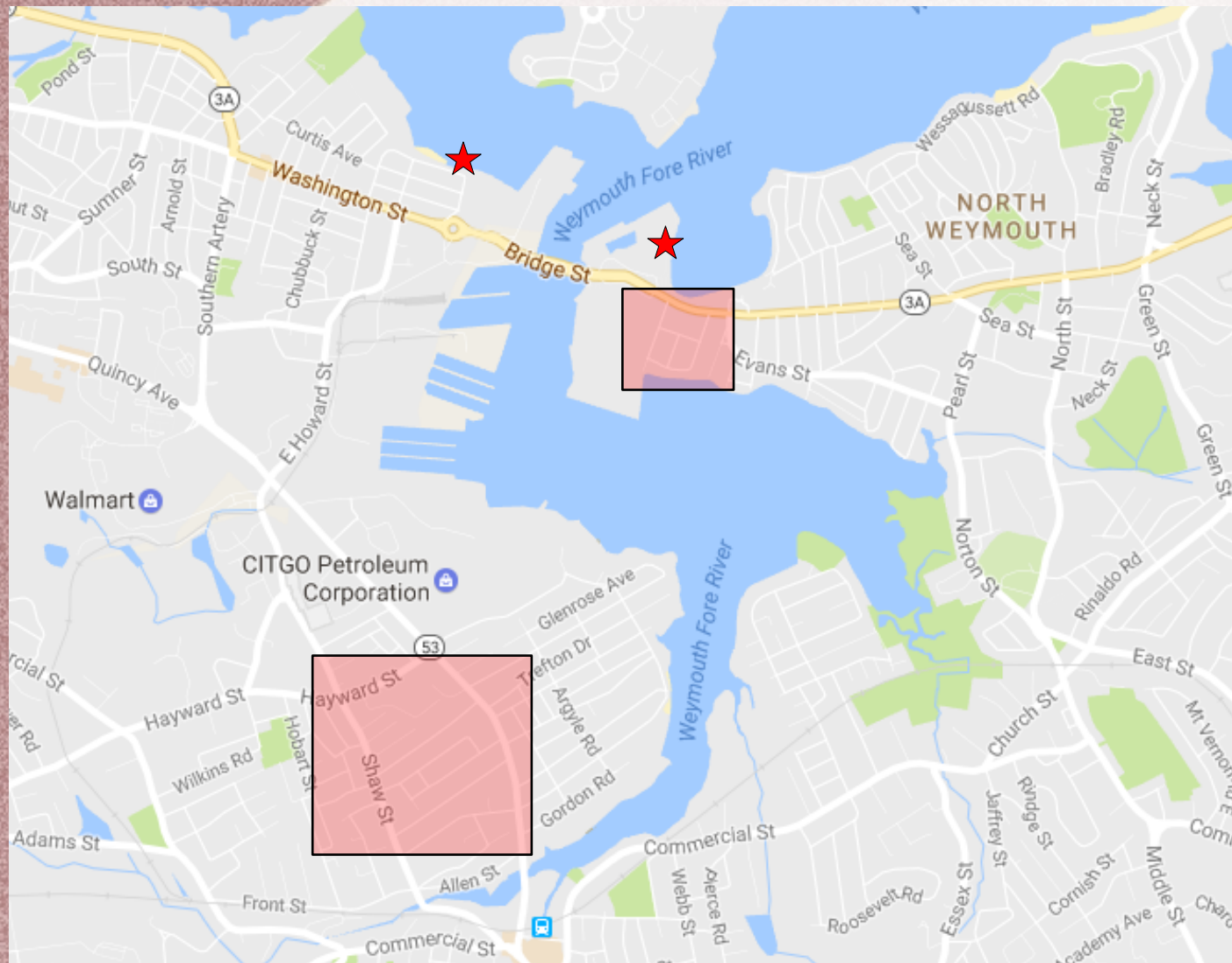
Pollutant	TEL (24-hour)			AAL (annual)		
	TEL Limit ($\mu\text{g}/\text{m}^3$)	Modeled concentration ($\mu\text{g}/\text{m}^3$)	percent of limit ¹	AAL Limit ($\mu\text{g}/\text{m}^3$)	Modeled concentration ($\mu\text{g}/\text{m}^3$)	percent of limit ¹
Acetaldehyde	30	5.95E-02	0.2	0.40	9.54E-03	2.4
Acrolein	0.07	3.67E-02	52.5	0.07	5.88E-03	8.4
Benzene	0.6	3.96E-01	66.0	0.1	5.66E-02	56.6
1,3 Butadiene	1.20	1.91E-03	0.2	0.003	3.10E-04	10.3
Carbon tetrachloride	85.52	2.60E-04	0.0	0.07	4.00E-05	0.1
Chlorobenzene	93.88	2.20E-04	0.0	6.26	3.00E-05	0.0
Chloroform	132.76	2.00E-04	0.0	0.04	3.00E-05	0.1
Dichloromethane	100.00	1.40E-04	0.0	60.00	2.00E-05	0.0
Diphenyl	0.34	1.52E-03	0.4	0.09	2.40E-04	0.3
Ethylbenzene	300	1.19E-01	0.0	300	1.70E-02	0.0
Formaldehyde	2.00	3.82E-01	19.1	0.08	6.92E-02	86.5

How testing was done

- Testing by EPA method TO-15 (Determination of VOCs in air collected in specially prepared canisters and analyzed by GC-MS)
- Canister preparation and sample analysis by certified labs Geolabs & Phoenix Environmental Labs
- Samples collected Apr 2017 on 4 different days



Four testing sites



Avalon Beach
Quincy
2 hour sample

North parcel (site)
North Weymouth
2 hour sample

North Weymouth
24 hour sample

Braintree
24 hour sample

Results

- 67 air pollutants evaluated

Rush Request: Standard

Analyzed by: see "By" below

P.O.#: 1704058

Laboratory Data

SDG ID: GBY18012

Canister Id: 1171

Phoenix ID: BY18012

Project ID: 1704058

Client ID: 1704058-001A

Parameter	ppbv Result	ppbv RL	ug/m3 Result	ug/m3 RL	Date/Time	By	Dilution
<u>Volatiles</u>							
1,1,1,2-Tetrachloroethane	ND	0.500	ND	3.43	05/11/17	KCA	1
1,1,1-Trichloroethane	ND	0.500	ND	2.73	05/11/17	KCA	1
1,1,2,2-Tetrachloroethane	ND	0.035	ND	0.24	05/11/17	KCA	1
1,1,2-Trichloroethane	ND	0.035	ND	0.19	05/11/17	KCA	1
1,1-Dichloroethane	ND	0.150	ND	0.61	05/11/17	KCA	1
1,1-Dichloroethene	ND	0.200	ND	0.79	05/11/17	KCA	1
1,2,4-Trichlorobenzene	ND	0.400	ND	2.97	05/11/17	KCA	1
1,2,4-Trimethylbenzene	ND	0.500	ND	2.46	05/11/17	KCA	1
1,2-Dibromoethane(EDB)	ND	0.035	ND	0.27	05/11/17	KCA	1
1,2-Dichlorobenzene	ND	0.100	ND	0.60	05/11/17	KCA	1
1,2-Dichloroethane	ND	0.035	ND	0.14	05/11/17	KCA	1
1,2-dichloropropane	0.482	0.035	2.23	0.16	05/11/17	KCA	1
1,2-Dichlorotetrafluoroethane	ND	0.500	ND	3.49	05/11/17	KCA	1
1,3,5-Trimethylbenzene	ND	0.500	ND	2.46	05/11/17	KCA	1
1,3-Butadiene	ND	0.500	ND	1.11	05/11/17	KCA	1
1,3-Dichlorobenzene	ND	0.100	ND	0.60	05/11/17	KCA	1

Number of toxic air pollutants per sample

- Avalon Beach: 2
(2hr sample, Quincy Point)
- North Parcel: 6
(2hr sample, compressor site)
- North Weymouth: 5
(24hr sample, near site)
- Braintree: 15
(24 hour sample, near Citgo)

8 violations of MassDEP “TEL” 24 hour guideline*

- Benzene
- Methylene chloride
- 1,2 Dichloropropane
- 2-hexanone
- Total alkanes and hexane
- Acetone
- Ethanol
- Butanone

* All violations from Braintree 24 hour canister; concentrations exceed MassDEP guidelines in 2hr sample at north parcel but not collected for 24 hours

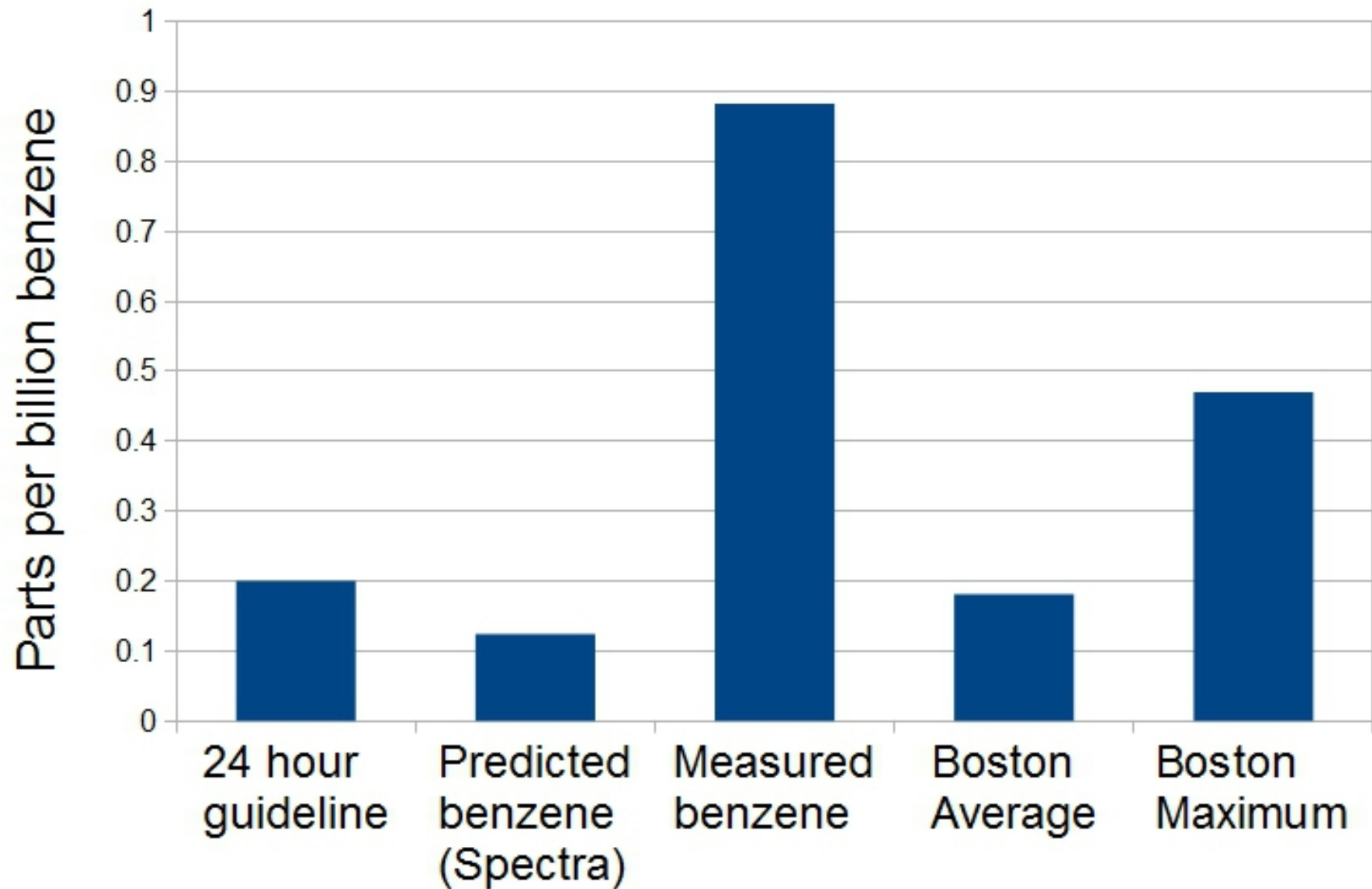
An incomplete list of possible health effects

- Neurologic: Headache, dizziness, numbness, weakness, confusion, tremors
- Respiratory: Asthma, lung damage, irritation of respiratory tract, cough
- Hematologic: Anemia, bleeding, weakened immunity, leukemia
- Gastrointestinal: Liver damage, liver cancer, nausea
- Reproductive: Irregular periods, abnormal ovaries, (low birth weight and damaged bone marrow in animals)

Benzene: Background

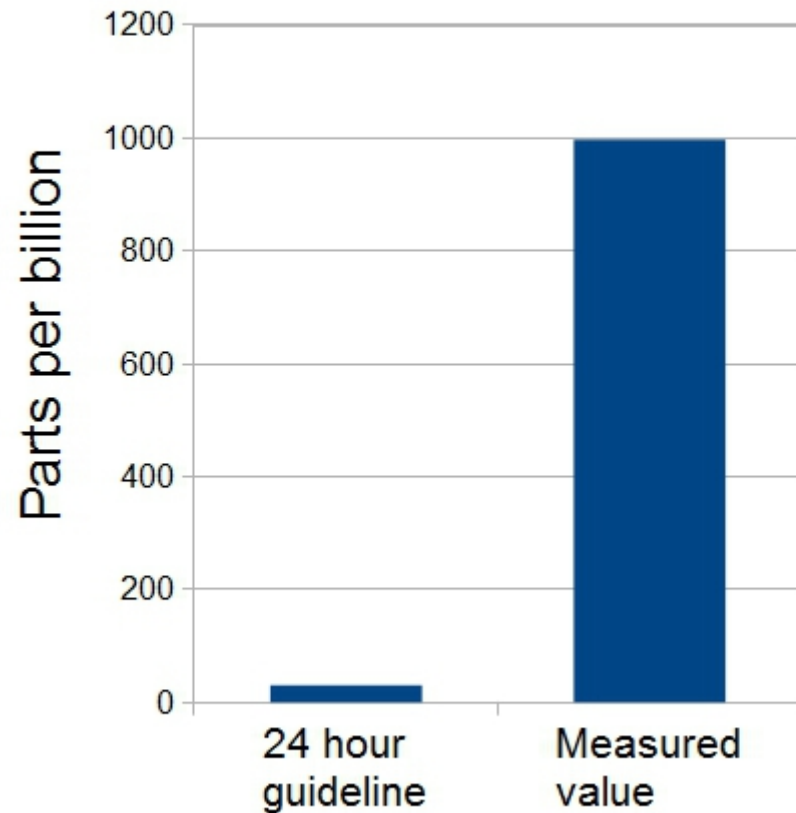
- Air sources: Cigarette smoke, gasoline vapors, car/truck/diesel/boat emissions, fossil fuel infrastructure, hazardous waste
- Headache, dizziness, tremors, bone marrow damage (anemia, aplastic anemia, bleeding, anemia, weakened immune system)
- Benzene is present in the Boston area, but decreasing over time (MassDEP data)

Benzene: The Data

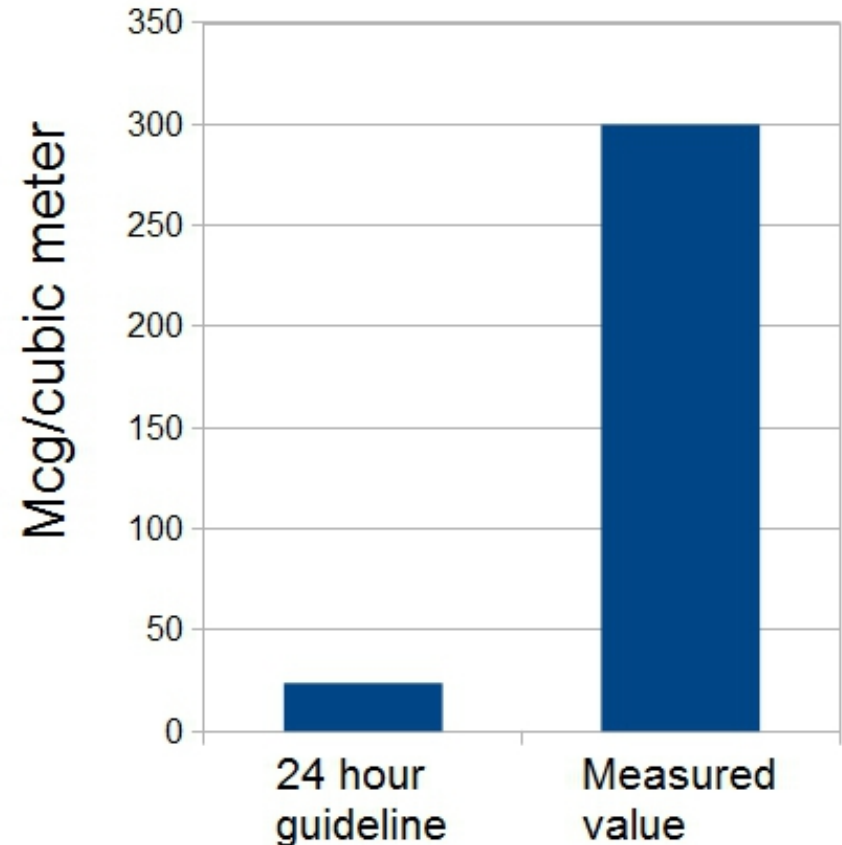


Methylene chloride & hexane

Methylene chloride



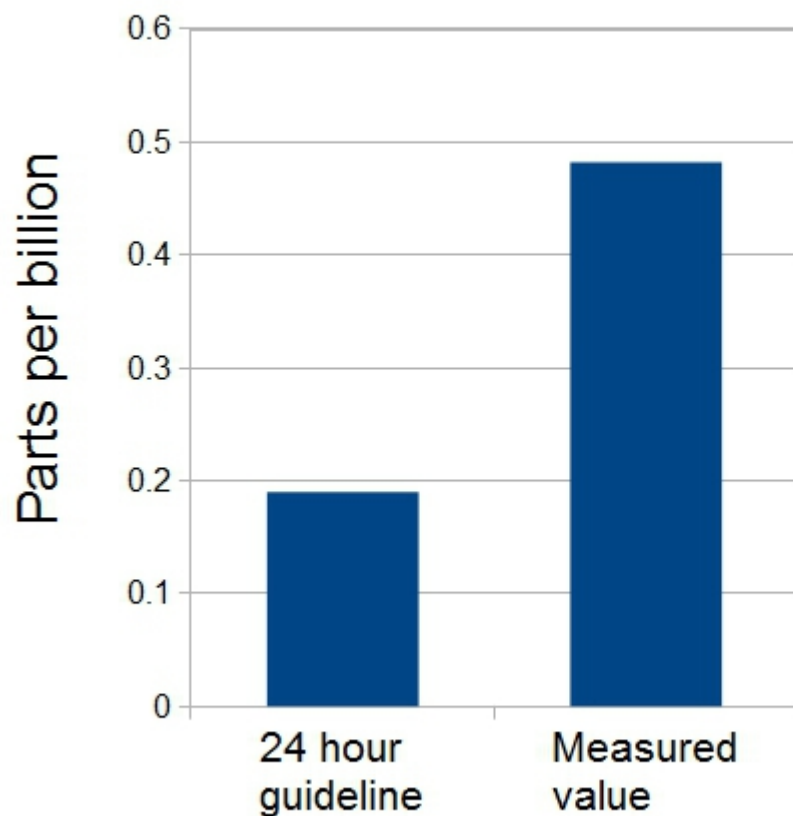
Hexane*



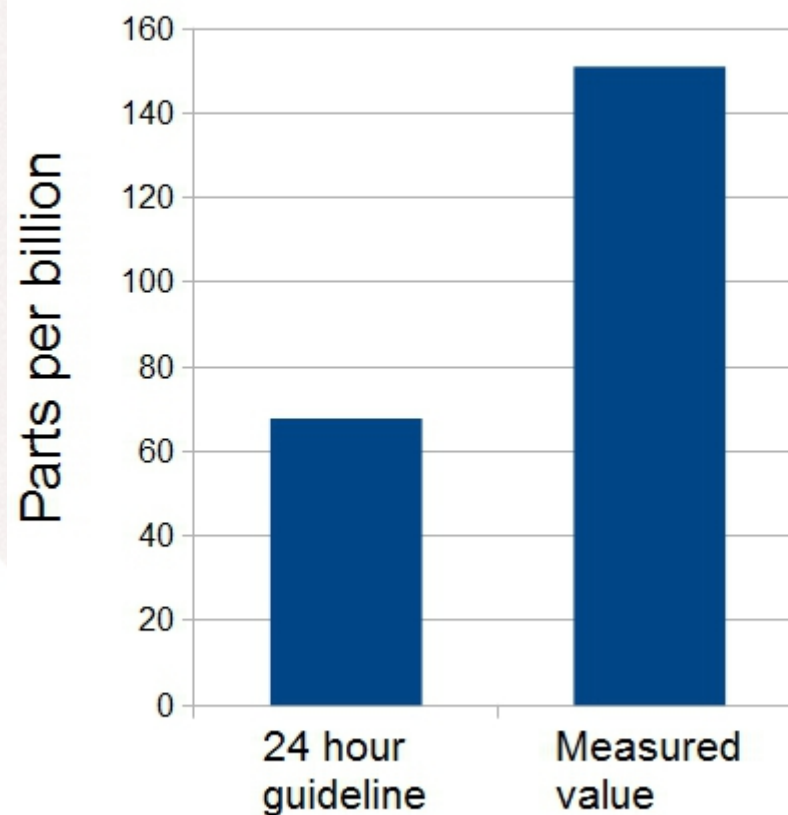
*Derived from total alkanes standard

1,2-dichloropropane & 2-hexanone

1,2-dichloropropane

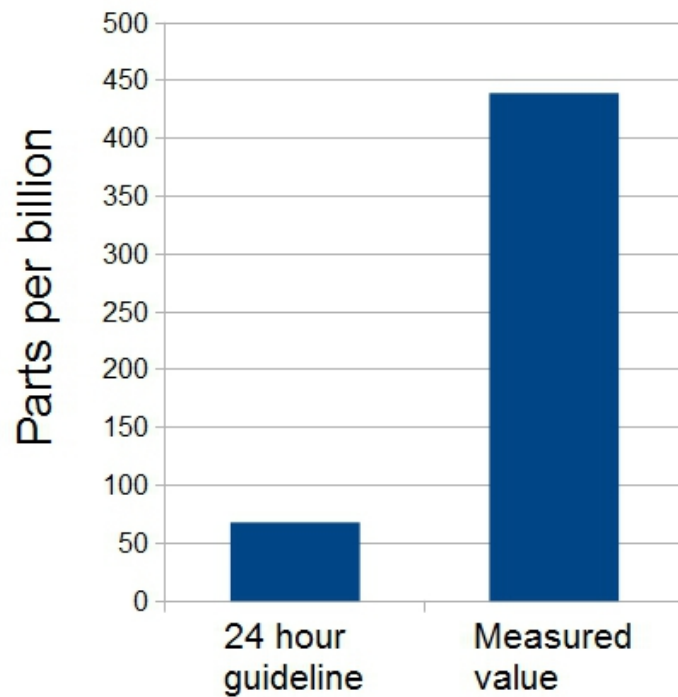


2-hexanone

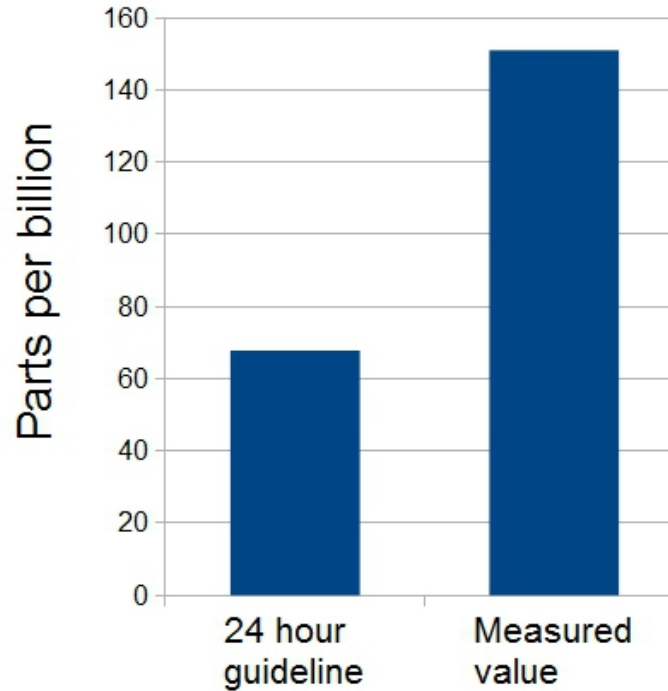


Acetone, butanone, ethanol

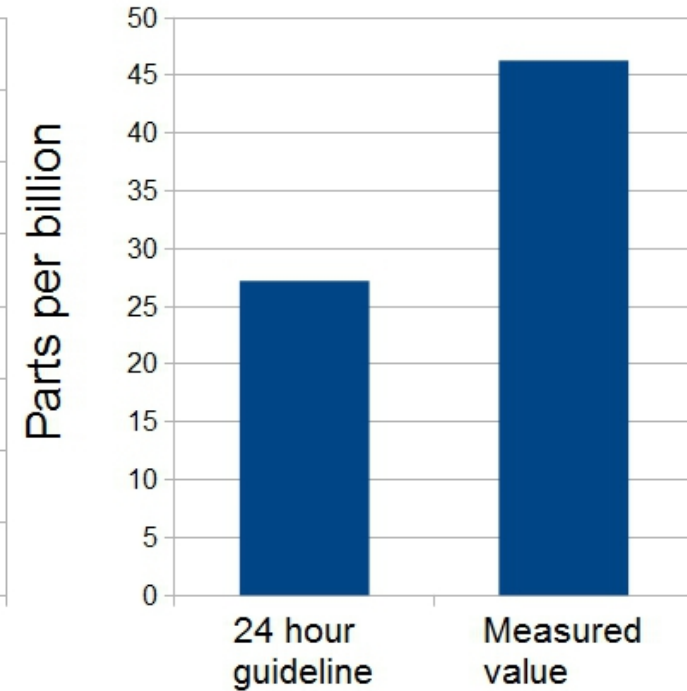
Acetone



Butanone



Ethanol



Where is the hazardous air pollution coming from?

- Industrial activity
- Transportation (cars, trucks, trains, boats)
- Home heating
- Contaminated soil and water
- Others?

Guidelines are often designed to be the point where no risk is expected.

Therefore, health risks are present when these guidelines are violated.

As we have shown.

Cancer-causing chemicals were detected in multiple samples.

But, cancer risks result from prolonged exposure. Therefore,

It is difficult to evaluate cancer risks from these short term tests.

What is your personal risk assessment?

- Risk tolerant vs risk averse
- Relative risk:
 - Air pollution vs smoking (e-) cigarettes
 - Air pollution vs natural gas stove exhaust
- Additional risk:
 - Health risks from wanted activities (drinking toxic ethanol)
 - Health risks from unwanted activities (compressor station)

Relevant bills in the House and Senate

- Senate Bill S.469 (Sen O'Connor): An Act Relative to the Positioning of Compressor Stations
- House Docket 3239 (Rep Ed Copping): An Act Relative to the Electric Facility Siting Board (requires health assessments)

We need a health assessment

- Dept of Public Health (Massachusetts)
- Agency for Toxic Substance & Disease Research (Federal)

Northampton, MA benzene and methylene chloride sampling

Sample ID Sample Date Location Description Contaminant	#1 - Residence A 8/21/2007 Front porch (ppb)	#2 - Residence A 9/23/2007 At edge of wooded area (ppb)	#3 - Residence B 10/26/2007 East of house (ppb)	#4 - City Hall 11/9/2007 Front Steps (ppb)
Benzene	ND	0.05	ND	0.29
Methylene chloride (dichloromethane)	0.83	0.26	ND	0.18

Some requests previously made of MassDEP

- Retract and/or deny the draft air pollution permit for the compressor station
- Repeat the air pollution analyses with independent consultant
- More citizen involvement at every step of permit
- Start monitoring and testing in the area

Many thank you's

- Residents, North Weymouth Civic Assoc
- Island Foundation, Toxics Action Center
- Towns of Weymouth, Quincy, & Braintree
- Local, state, federal elected officials
- FRRACS, Families Against Spectra, Hingham Residents Against the Compressor station, Quincy Climate Action Network, 350MA South Shore
- Mothers Out Front, 350MA Franklin Node, SCNU, CARRCS, Food & Water Watch, Sierra Club, and many more