



# 2009 Air Toxics Summary

New Jersey Department of Environmental Protection

## INTRODUCTION

Air pollutants can be divided into two categories: the criteria pollutants (ozone, sulfur dioxide, carbon monoxide, nitrogen dioxide, particulate matter, and lead); and air toxics. The criteria pollutants have been addressed at the national level since the 1970s. The United States Environmental Protection Agency (USEPA) has set National Ambient Air Quality Standards (NAAQS) for them, and they are subject to a standard planning process that includes monitoring, reporting, and control requirements. Each of these pollutants is discussed in its own section of this New Jersey Department of Environmental Protection (NJDEP) 2009 Air Quality Report.

Air toxics are basically all the other chemicals released into the air that have the potential to cause adverse health effects in humans. These effects cover a wide range of conditions, from lung irritation to birth defects to cancer. There are no NAAQS for these pollutants, but in 1990 the U.S. Congress directed the USEPA to begin to address a list of almost 200 air toxics by developing control technology standards for specific categories of sources that emit them. These air toxics are known as the Clean Air Act Hazardous Air Pollutants (HAPs). You can get more information about HAPs at the USEPA Air Toxics web site at [www.epa.gov/ttn/atw](http://www.epa.gov/ttn/atw). NJDEP also has several web pages dedicated to air toxics. They can be accessed at [www.state.nj.us/dep/airtoxics](http://www.state.nj.us/dep/airtoxics).

## HEALTH EFFECTS

People exposed to significant amounts of air toxics may have an increased chance of getting cancer or experiencing other serious health effects. The non-cancer health effects can range from respiratory, neurological, reproductive, developmental, or immune system damage, to irritation and effects on specific organs. In addition to inhalation exposure, there can be risks from the deposition of toxic pollutants onto soil or surface water. There, they can be taken up by plants and animals which are later consumed by humans.

The effects on human health resulting from exposure to

specific air toxics can be estimated by using chemical-specific "health benchmarks." These toxicity values are developed by the USEPA and other agencies, using health studies on a chemical. For carcinogens, the health benchmark is the concentration of the pollutant that corresponds to a one-in-a-million increase in the risk of getting cancer if a person was to breathe that concentration over his or her entire lifetime. The health benchmark for non-carcinogens is a concentration at which no adverse health effect is expected to occur (this is also known as a reference concentration). Not all air toxics have health benchmarks, because of a lack of toxicity studies. Available health benchmarks for the air toxics monitored in New Jersey are listed in Tables 4 through 7. If ambient air concentrations exceed the health benchmarks then some action, such as a reduction in emissions, should be considered.

## SOURCES OF AIR TOXICS

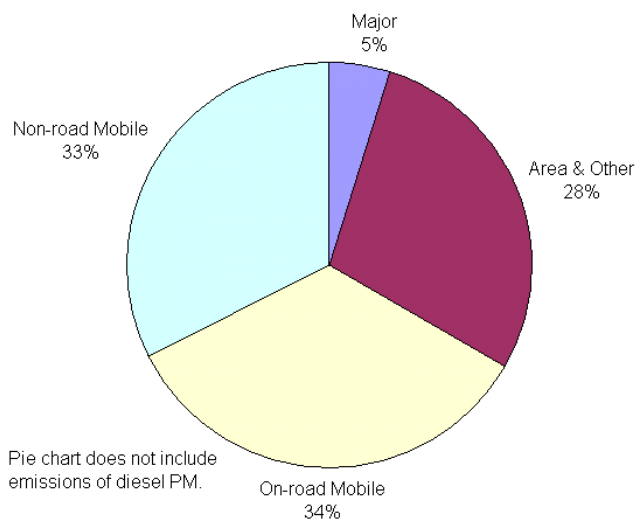
A number of years ago, USEPA began the National-Scale Air Toxics Assessment (NATA). Starting with the year 1996, they set out on a three-year cycle to determine people's exposure to air toxics around the country. To do this, USEPA first prepares a comprehensive inventory of air toxics emissions from all man-made sources. The emissions inventory is reviewed and updated by each state. Although there are likely to be some errors in the details of such a massive undertaking, the emissions inventory still can give us a reasonable indication of the most important sources of air toxic emissions in our state. The pie chart in Figure 1, based on the 2002 NATA emissions estimates, shows that mobile sources are the largest contributors of air toxics emissions in New Jersey. On-road mobile sources (cars and trucks) account for 33% of the air toxics emissions, and non-road mobile sources (airplanes, trains, construction equipment, lawnmowers, boats, dirt bikes, etc.) contribute an additional 34%. Area sources (residential, commercial, and small industrial sources) represent 28% of the inventory, and major point sources (such as factories and power plants) account for the remaining 5%.

## ESTIMATING AIR TOXICS EXPOSURE

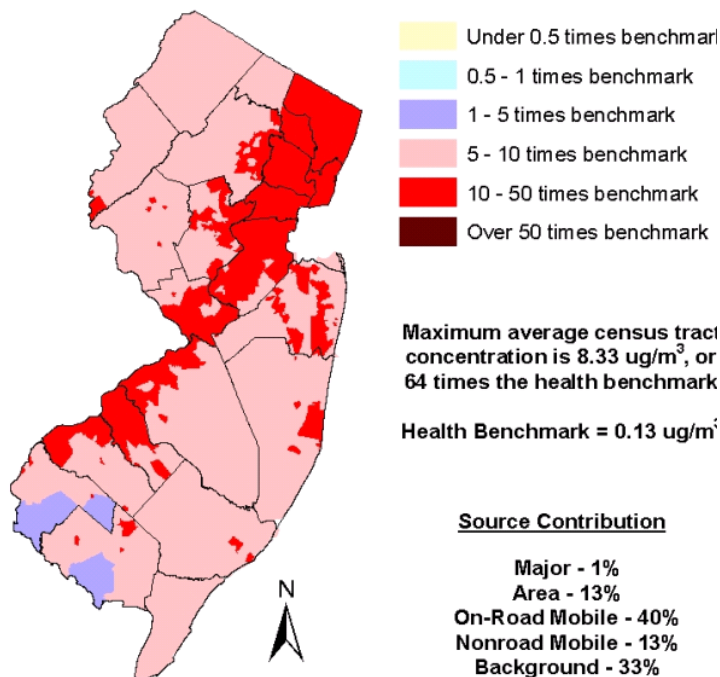
The second step in USEPA's NATA project is to use the emissions information in an air dispersion model to estimate air toxic concentrations across the country. The map in Figure 2 shows the predicted concentrations of benzene throughout New Jersey. The high concentration areas tend to overlap the more densely populated areas of the state, following the pattern of emissions. Not all air toxics follow this pattern, as some are more closely associated with individual point sources, but in general, larger populations result in greater emissions of, and exposure to, air toxics.

Analysis of the NATA state and county average air toxics concentrations indicates that twenty-one chemicals were predicted to exceed their health benchmarks, or level of concern, in one or more counties in 2002. Twenty of these are considered to be cancer-causing (carcinogenic) chemicals, and one (acrolein) is not. Estimated air concentrations of these 21 pollutants vary around the state, depending on the types of sources that emit them. This is summarized in Table 1.

**Figure 1.**  
**2002 Air Toxics Emissions Source Estimates for New Jersey**



**Figure 2. BENZENE**  
**2002 NATA Predicted Concentrations for NJ**



**Table 1.**  
**Air Toxics of Greatest Concern in New Jersey**  
**Based on 2002 National-Scale Air Toxics Assessment**

<b>Pollutant of Concern</b>	<b>Number of Counties Above Health Benchmark</b>	<b>Primary Source of Emissions</b>
Acetaldehyde	Statewide	Mobile & background
Acrolein	Statewide	Mobile
Arsenic Compounds	19	Background & area
Benzene	Statewide	Mobile & background
1,3-Butadiene	Statewide	Mobile & background
Cadmium Compounds	1 (Warren)	Major
Carbon Tetrachloride	Statewide	Background
Chloroform	Statewide	Area & background
Chromium (hexavalent)	19	Major & background
1,4-Dichlorobenzene	8	Area & background
1,3-Dichloropropene	1 (Hudson)	Area
Diesel Particulate Matter	Statewide	Mobile
Ethylbenzene	7	Mobile
Ethylene Oxide	7	Area & background
Formaldehyde	Statewide	Mobile & background
Methyl Chloride	Statewide	Background
Methyl tert-Butyl Ether	Statewide	Background
Naphthalene	19	Area
PAH/POM	18	Area
Perchloroethylene	7	Area & background
1,1,2-Trichloroethane	1 (Salem)	Area

## NJ AIR TOXICS MONITORING PROGRAM RESULTS FOR 2009

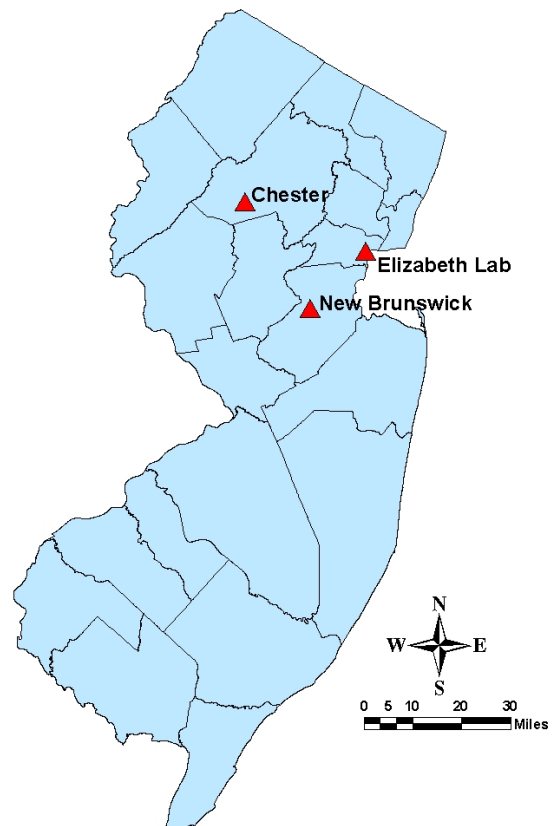
NJDEP has established three air toxics monitoring sites around the state. They are located in Elizabeth, New Brunswick and Chester (see Figure 3). The Camden Lab site, which had been measuring several toxic volatile organic compounds (VOCs) since 1989, was shut down on September 29, 2008, because the NJDEP lost access to the station. The Elizabeth Lab site began measuring VOCs in 2000, and the New Brunswick and Chester sites became operational in July 2001. Analysis of toxic metals at each site also began in 2001. Metals data can be found in Appendix B (Fine Particulate Speciation Summary 2009) of the Air Quality Report.

2009 air toxic monitoring results for VOCs are shown in Table 2. This table contains the annual average concentration for each air toxic measured at the four New Jersey monitoring sites. All values are in micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ). More detail can be found in Tables 5 through 7, including additional statistics, detection limit information, health benchmarks used by NJDEP, risk ratios, and concentrations in parts per billion by volume (ppbv). The ppbv units are more common for monitoring results, while  $\mu\text{g}/\text{m}^3$  units are generally used in modeling and health studies. Many of the compounds that were analyzed were below the detection limit of the method used. These are listed separately in Table 8.

Reported averages for which significant portions of the data (more than 50%) were below the detection limit should be viewed with extreme caution. Median values (the value of the middle sample value when the results are ranked) are reported along with the mean (average) concentrations because for some compounds only a single or very few high values were recorded. These high values will tend to increase the average concentration significantly but would have less effect on the median value. In such cases, the median value may be a better indicator of long-term exposures (the basis for most of the air toxics health benchmarks).

The Chester and New Brunswick sites had the lowest concentrations for the majority of the prevalent air toxics, while Elizabeth had the highest concentration for most compounds. This is comparable to previous years, along with Elizabeth detecting the most individual compounds.

**Figure 3.**  
**2009 Air Toxics**  
**Monitoring Network**



**Table 2**  
**New Jersey Air Toxics Summary – 2009**

**Annual Average Concentration**  
**micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ )<sup>a</sup>**

<b>Pollutant</b>	<b>Chester</b>	<b>Elizabeth</b>	<b>New Brunswick</b>
Acetaldehyde	1.34	2.47	2.02
Acetone	2.18	3.39	3.05
Acetonitrile	2.95	0.85	1.25
Acetylene	0.51	1.39	0.83
Acrolein	0.53	1.20	0.85
Acrylonitrile	(0.06)	(0.11)	(0.06)
tert-Amyl Methyl Ether	-	(0.0005)	-
Benzaldehyde	0.10	0.15	0.08
Benzene	0.53	1.36	0.70
Bromochloromethane	(0.001)	(0.0004)	-
Bromodichloromethane	(0.001)	(0.004)	(0.001)
Bromoform	(0.001)	(0.002)	(0.002)
Bromomethane	0.05	0.06	0.05
1,3-Butadiene	0.02	0.16	0.05
Butyraldehyde	0.25	0.39	0.26
Carbon Disulfide	11.18	4.53	0.60
Carbon Tetrachloride	0.76	0.73	0.73
Chlorobenzene	(0.003)	(0.002)	-
Chloroethane	0.03	0.05	0.06
Chloroform	0.11	0.17	0.15
Chloromethane	1.38	1.44	1.45
Chloromethylbenzene	-	(0.01)	-
Chloroprene	(0.0005)	(0.004)	-
Crotonaldehyde	0.26	0.33	0.24
Dibromochloromethane	(0.003)	(0.003)	(0.002)
1,2-Dibromoethane	(0.001)	(0.0004)	(0.001)
m-Dichlorobenzene	-	(0.0004)	(0.0004)
o-Dichlorobenzene	-	(0.001)	-
p-Dichlorobenzene	(0.02)	0.11	0.06
Dichlorodifluoromethane	3.12	3.15	3.20
1,1-Dichloroethane	(0.0002)	(0.001)	(0.0003)
1,2-Dichloroethane	(0.004)	(0.01)	(0.004)
1,1-Dichloroethene	-	(0.0003)	(0.0004)
cis-1,2-Dichloroethylene	(0.01)	(0.01)	-
trans-1,2-Dichloroethylene	-	(0.0005)	(0.002)
Dichloromethane	0.40	0.78	0.62
1,2-Dichloropropane	(0.001)	(0.001)	-
cis-1,3-Dichloropropene	-	(0.0002)	-
trans-1,3-Dichloropropene	-	(0.0002)	-
Dichlorotetrafluoroethane	0.13	0.13	0.13

<sup>a</sup> Numbers in parenthesis indicate averages based on less than 50% detection and dashes represent 100% non-detects

**Table 2 (Continued)**  
**New Jersey Air Toxics Summary – 2009**

Annual Average Concentration  
micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ )<sup>a</sup>

Pollutant	Chester	Elizabeth	New Brunswick
Ethyl Acrylate	-	(0.0001)	-
Ethyl tert-Butyl Ether	-	(0.0001)	-
Ethylbenzene	0.07	0.46	0.17
Formaldehyde	2.42	3.79	2.53
Hexaldehyde	0.15	0.23	0.11
Isovaleraldehyde	(0.01)	(0.01)	(0.01)
Methyl Ethyl Ketone	0.73	1.33	0.92
Methyl Isobutyl Ketone	0.05	0.15	0.09
Methyl Methacrylate	(0.001)	(0.02)	(0.001)
Methyl tert-Butyl Ether	(0.002)	(0.02)	(0.01)
n-Octane	0.04	0.23	0.07
Propionaldehyde	0.25	0.45	0.28
Propylene	0.36	4.26	0.72
Styrene	0.02	0.19	0.05
1,1,2,2-Tetrachloroethane	(0.0003)	(0.001)	-
Tetrachloroethylene	0.08	0.26	0.16
Tolualdehydes	0.13	0.17	0.12
Toluene	0.45	3.34	1.90
1,2,4-Trichlorobenzene	-	(0.001)	-
1,1,1-Trichloroethane	0.09	0.09	0.09
1,1,2-Trichloroethane	-	(0.001)	-
Trichloroethylene	(0.01)	0.08	(0.03)
Trichlorofluoromethane	1.67	1.72	1.73
Trichlorotrifluoroethane	0.82	0.82	0.84
1,2,4-Trimethylbenzene	0.05	0.99	0.14
1,3,5-Trimethylbenzene	0.02	0.33	0.05
Valeraldehyde	0.10	0.18	0.09
Vinyl chloride	(0.004)	(0.01)	(0.004)
m,p-Xylene	0.14	1.28	0.40
o-Xylene	0.06	0.57	0.16

<sup>a</sup> Numbers in parenthesis indicate averages based on less than 50% detection and dashes represent 100% non-detects

## ESTIMATING HEALTH RISK

A simplified way to determine whether the ambient concentration of an air toxic could pose a potential human health risk is to compare the air concentration to a health benchmark. The number that we get when we divide the air concentration by the benchmark is called a “risk ratio.” If the risk ratio is less than one, the air concentration should not pose a health risk. If it is greater than one, it may be of concern. The risk ratio also indicates how much higher or lower the estimated air concentration is compared to the health benchmark.

Elizabeth had twelve compounds with annual average concentrations that exceeded their health benchmarks, New Brunswick had nine and Chester had eight. The toxic air pollutants that exceeded their health benchmarks at all sites are acetaldehyde, acrolein, acrylonitrile, benzene, carbon tetrachloride, chloroform, chloromethane, and formaldehyde.

The top five toxic compounds of concern based on annual risk ratios are listed in Table 3. Acrolein or

formaldehyde contributed the highest risks at every site, but note that the magnitude of the risks was highest at Elizabeth. Carbon tetrachloride and benzene and were common to all four sites as well.

## TRENDS AND COMPARISONS

The closed site in Camden was the New Jersey monitoring location that had the longest history of measuring air toxics. The graph in Figure 4 shows the change in concentrations for three of the most prevalent air toxics, benzene, toluene, and xylene, from 1990 to 2008. The graph shows that while average concentrations can vary significantly from year to year, the overall trend is downward. High individual samples may also result in high annual averages in some years. Concentrations of most air toxics have declined significantly over the last ten years. Because air toxics comprise such a large and diverse group of compounds, however, these general trends may not hold for other compounds.

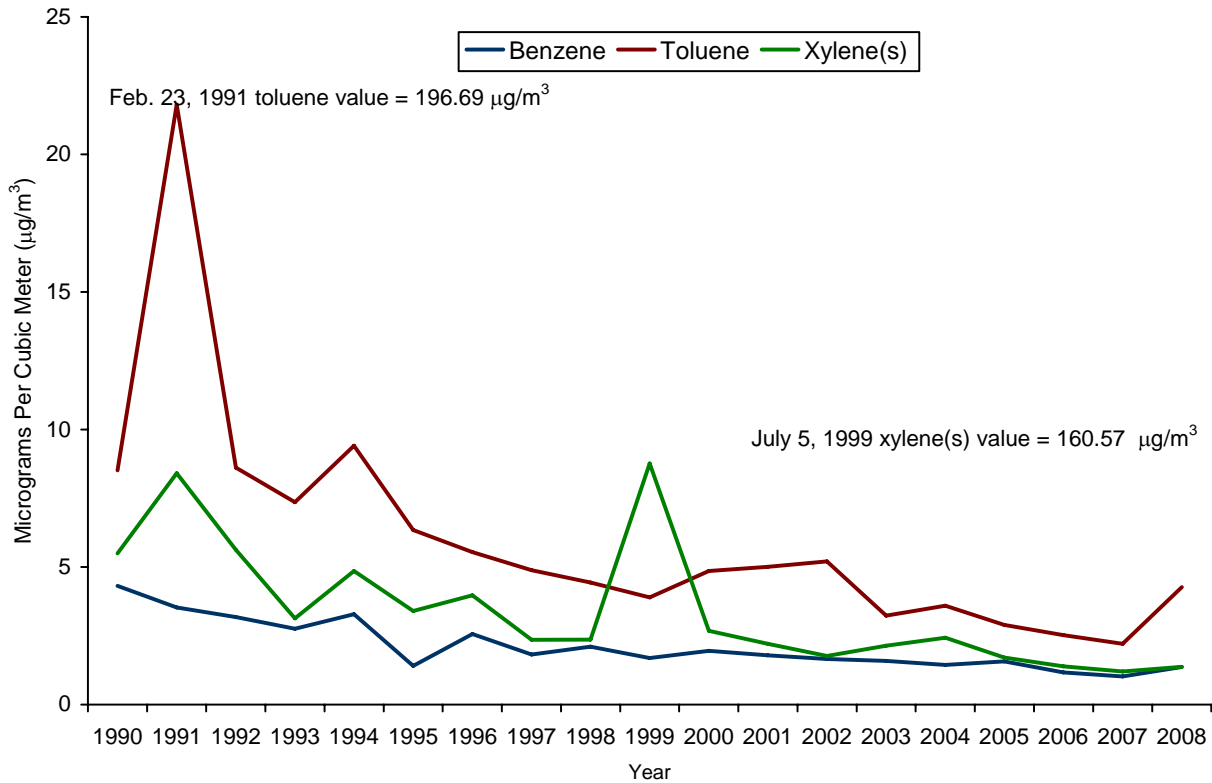
**Table 3**  
**Analytes with the Five Highest Risk Ratios<sup>a,b</sup>**  
**at NJ’s Air Toxics Monitoring Sites in 2009**

Rank	Chester		Elizabeth		New Brunswick	
	Analyte	Risk Ratio	Analyte	Risk Ratio	Analyte	Risk Ratio
1	Formaldehyde	31.5	Acrolein	60.1	Acrolein	42.5
2	Acrolein	26.3	Formaldehyde	49.2	Formaldehyde	32.8
3	Carbon Tetrachloride	11.4	Carbon Tetrachloride	10.9	Carbon Tetrachloride	11.0
4	Benzene	4.1	Benzene	10.5	Benzene	5.4
5	Acrylonitrile	3.7	Acrylonitrile	7.3	Acetaldehyde	4.5

<sup>a</sup> The risk ratio for a chemical is a comparison of the annual mean air concentration to a long-term health benchmark.

<sup>b</sup> The long-term health benchmark is defined as the chemical-specific air concentration above which there may be human health concerns. For a carcinogen (cancer-causing chemical), the health benchmark is set at the air concentration that would cause no more than a one-in-a-million increase in the likelihood of getting cancer, even after a lifetime of exposure. For a non-carcinogen, the health benchmark is the maximum air concentration to which exposure is likely to cause no harm, even if that exposure occurs on a daily basis for a lifetime. These toxicity values are not available for all chemicals. For more information, go to [www.nj.gov/dep/agpp/risk.html](http://www.nj.gov/dep/agpp/risk.html).

**Figure 4.**  
**Annual Averages for Selected Hazardous Air**  
**Pollutants (HAPs) at Camden from 1990-2008<sup>a</sup>**



<sup>a</sup> Annual concentrations for Camden in 2008 calculated from data spanning January 1<sup>st</sup> to October 21<sup>st</sup>.

The graphs in Figures 5 through 8 below show concentrations of some of the air toxics in New Jersey with the highest risk ratios (see Table 3): benzene, acetaldehyde, carbon tetrachloride, and formaldehyde. These graphs compare data from our three different monitoring sites (and Camden through 2008) over the past seven or more years. (Acrolein data began to be reported in 2005.) As seen in Figures 4 and 5, benzene concentrations have been gradually decreasing over the past decade. Most benzene now comes from mobile and area sources, and is transported in from other regions. Acetaldehyde, shown in Figure 6, is also emitted primarily by on-road mobile sources such as cars.



Figure 5. Benzene Monitored Concentrations 1990-2009

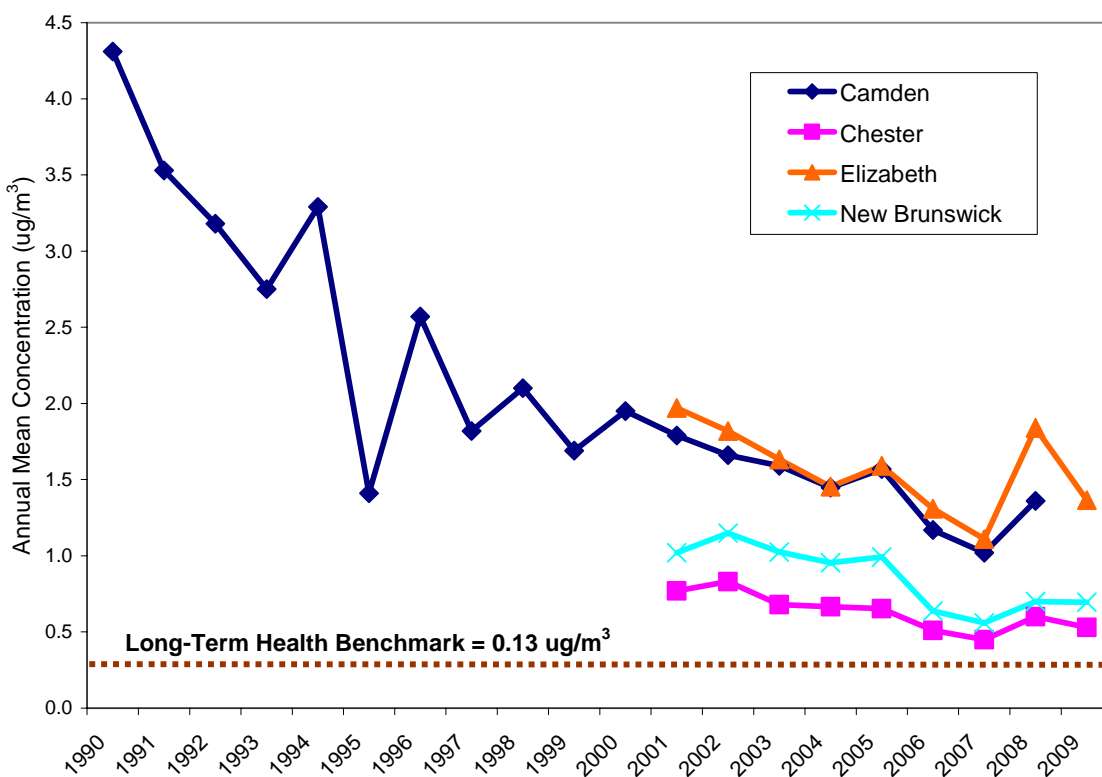
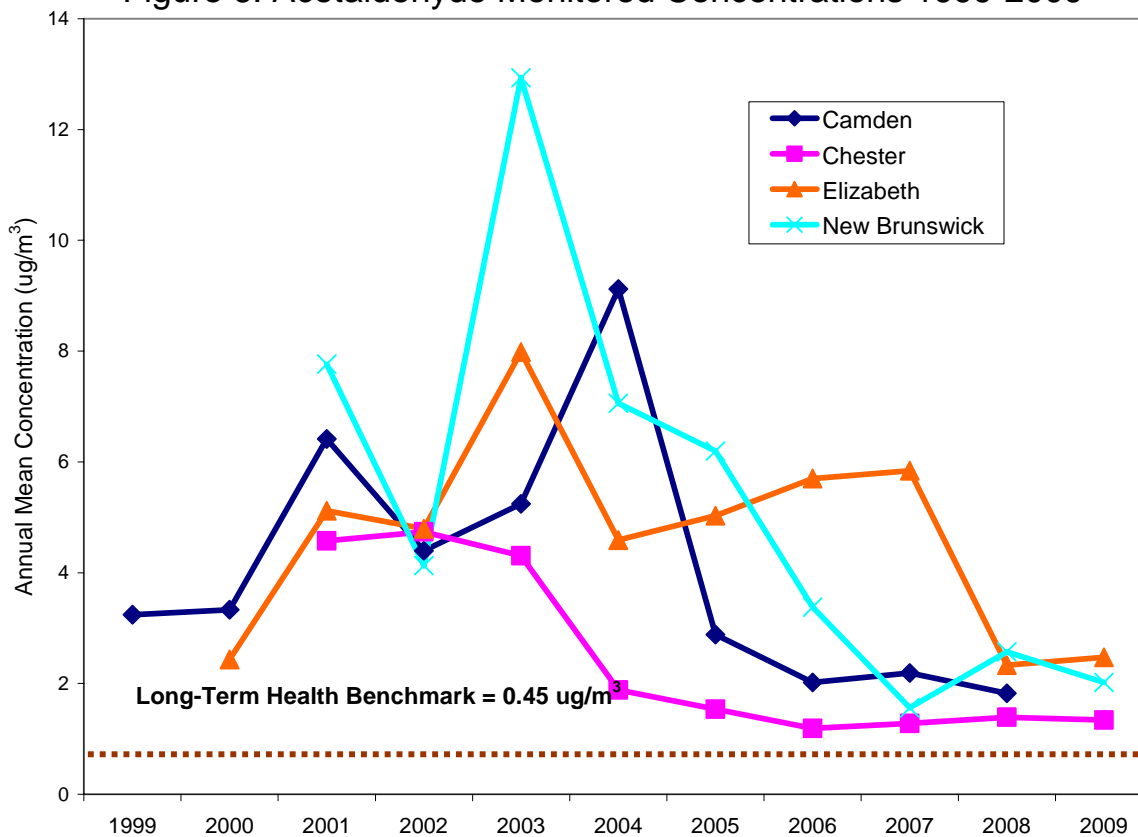
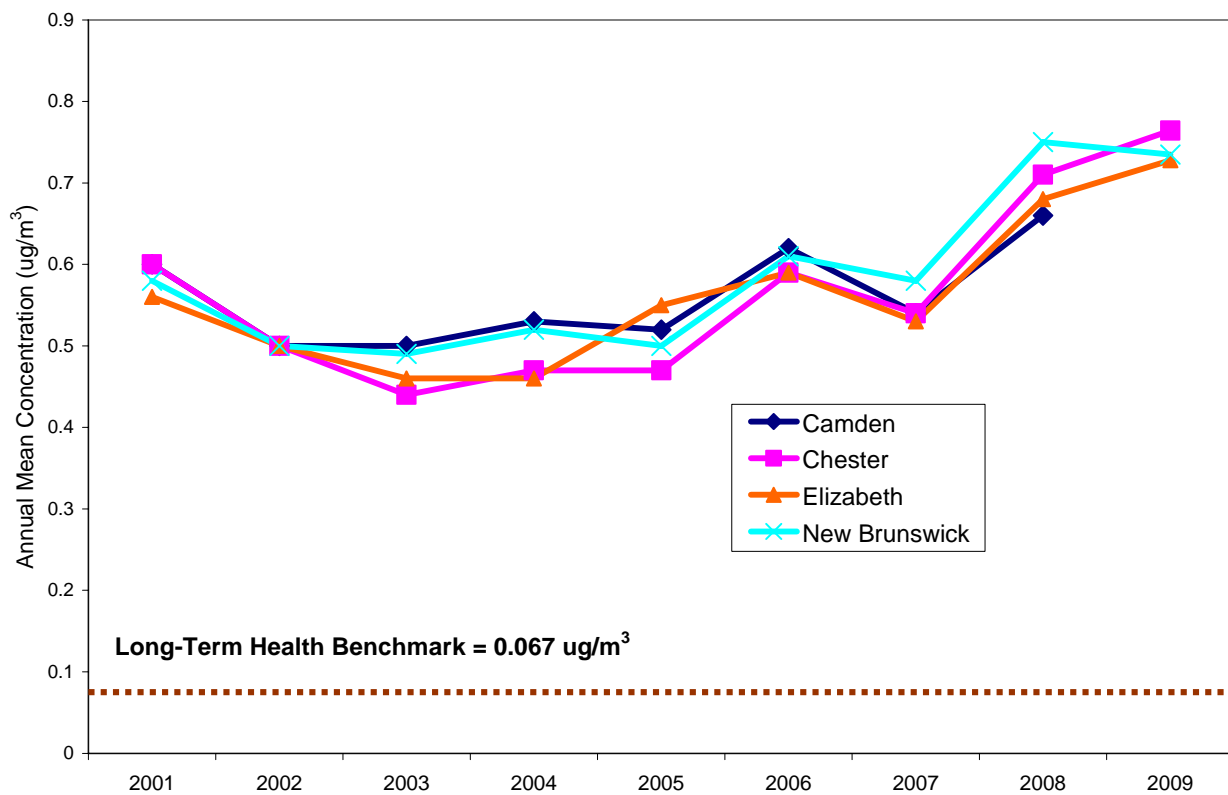


Figure 6. Acetaldehyde Monitored Concentrations 1999-2009



Carbon tetrachloride (Figure 7) was once used extensively as a degreaser, household cleaner, propellant, refrigerant, and fumigant. It has been phased out of most production and use because of its toxicity and its ability to deplete stratospheric ozone. However, about 100 tons are still emitted annually by industry in the U.S, although no emissions have been reported in New Jersey for a number of years. It degrades slowly in the environment, so levels in the air remain relatively steady.

Figure 7. Carbon Tetrachloride Monitored Concentrations 2001-2009



Formaldehyde (Figure 8) is a ubiquitous pollutant that is often found at higher concentrations indoors rather than outdoors because of its use in many consumer goods. It is used in the production of fertilizer, paper, plywood, and urea-formaldehyde resins. In New Jersey the primary emitters of formaldehyde are on-road mobile sources, although secondary formation and transport can contribute significantly to high outdoor concentrations. Monitored concentrations in New Jersey average around 30 times over the health benchmark (thirty in a million risk level).

Figure 8. Formaldehyde Monitored Concentrations 1996-2009

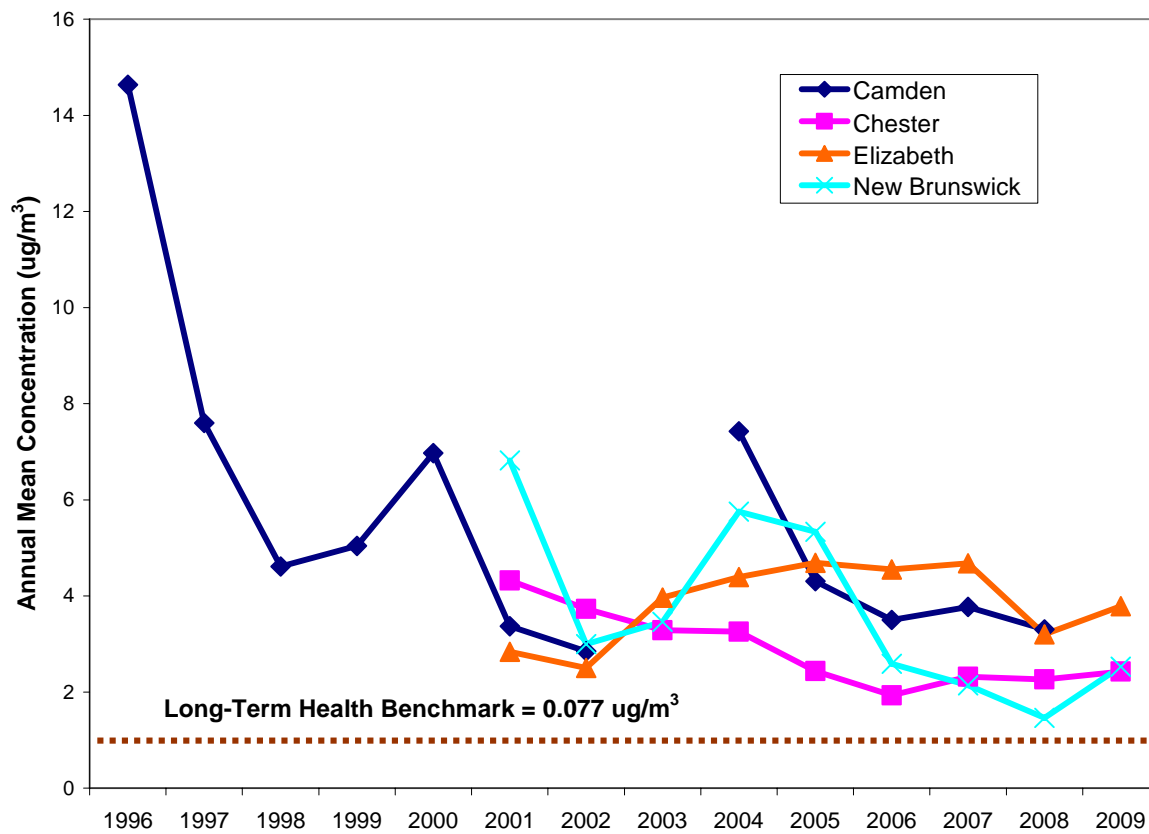
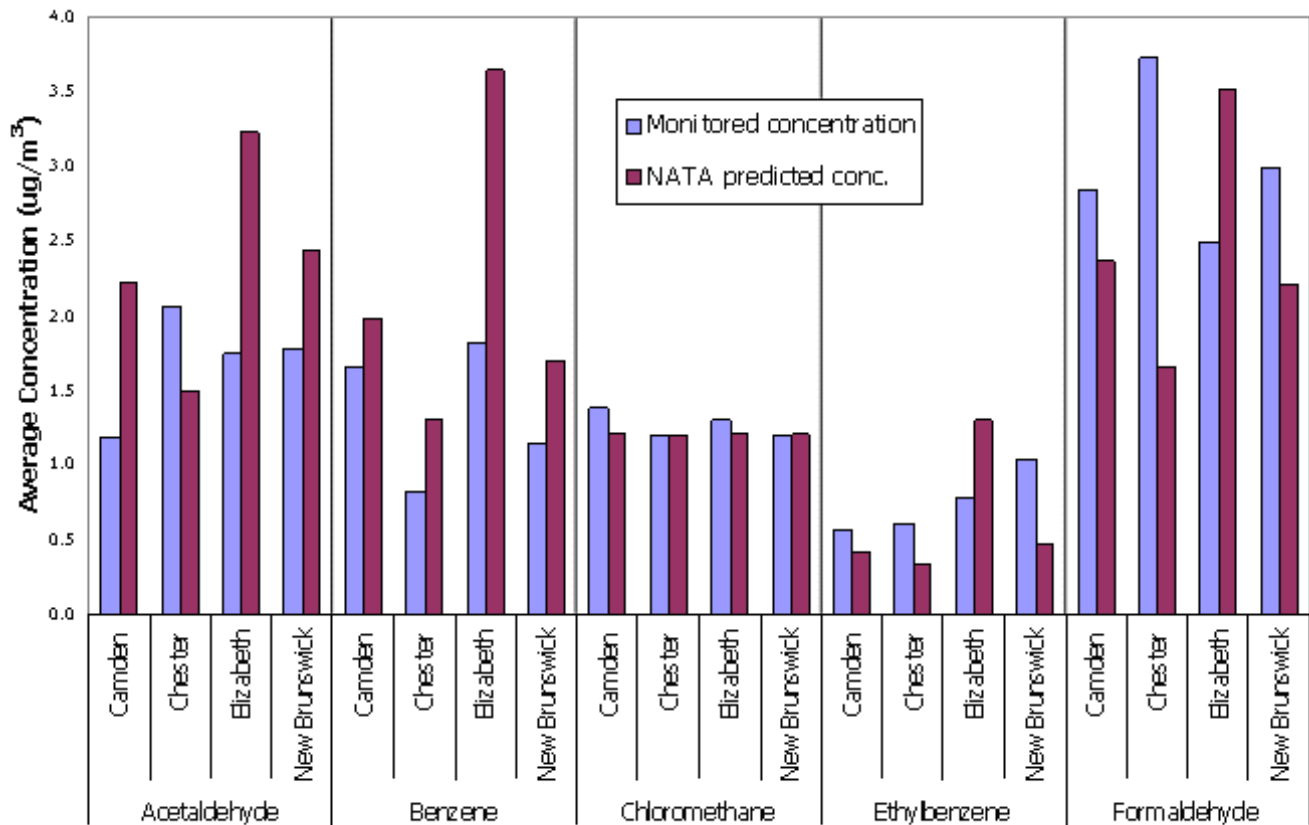


Figure 9 below shows a comparison of annual average concentrations measured at New Jersey's four air toxics monitoring sites in 2002 with annual average concentrations predicted by USEPA's 2002 NATA (at the monitoring site census tract). The comparison for five chemicals (acetaldehyde, benzene, chloromethane, ethylbenzene and formaldehyde) at all four monitoring sites shows agreement within a factor of 2 or less.

**Figure 9.**  
**2002 NJ Monitored Air Toxics Concentrations**  
**Compared to NATA Predicted Concentrations**



**Table 5  
2009 Air Toxics Data for Chester, NJ**

Analyte <sup>a</sup>	CAS No.	Annual Mean (ppbv) <sup>b,c</sup>	Annual Median (ppbv) <sup>b</sup>	24-Hour Max. (ppbv)	Annual Mean (µg/m <sup>3</sup> ) <sup>b,c</sup>	Annual Median (µg/m <sup>3</sup> ) <sup>c</sup>	24-Hour Max. (µg/m <sup>3</sup> )	Long-Term Health Benchmark (µg/m <sup>3</sup> ) <sup>d</sup>	Annual Mean Risk Ratio <sup>e</sup>	Detection Limit (µg/m <sup>3</sup> )	% Above Minimum Detection Limit <sup>f</sup>
<b>Acetaldehyde</b>	75-07-0	<b>0.74</b>	0.69	1.66	<b>1.34</b>	1.25	2.99	0.45	<b>2.97</b>	0.0072	100
Acetone	67-64-1	0.92	0.84	2.43	2.18	2.01	5.77	31000	0.0001	0.0166	100
Acetonitrile	75-05-8	1.76	0.31	85.50	2.95	0.51	143.55	60	0.05	0.1662	100
Acetylene	74-86-2	0.48	0.38	1.29	0.51	0.40	1.37			0.0245	100
<b>Acrolein</b>	107-02-8	<b>0.23</b>	0.1580	1.28	<b>0.53</b>	0.36	2.93	0.02	<b>26.31</b>	0.2453	100
<b>Acrylonitrile</b>	107-13-1	<b>(0.03)</b>	0	0.13	<b>(0.06)</b>	0	0.28	0.015	<b>3.69</b>	0.1237	46
Benzaldehyde	100-52-7	0.02	0.02	0.06	0.10	0.10	0.27			0.0087	98
<b>Benzene</b>	71-43-2	<b>0.17</b>	0.12	0.69	<b>0.53</b>	0.40	2.21	0.13	<b>4.08</b>	0.0160	100
Bromochloromethane	74-97-5	(0.0001)	0	0.01	(0.001)	0	0.03			0.1005	2
Bromodichloromethane	75-27-4	(0.0001)	0	0.01	(0.001)	0	0.06			0.0469	2
Bromoform	75-25-2	(0.0001)	0	0.004	(0.001)	0	0.04	0.91	0.001	0.1758	2
Bromomethane	74-83-9	0.01	0.0110	0.05	0.05	0.04	0.17	5	0.01	0.0388	97
1,3-Butadiene	106-99-0	0.01	0.0060	0.05	0.02	0.01	0.11	0.033	0.55	0.0133	72
Butyraldehyde	123-72-8	0.08	0.08	0.15	0.25	0.24	0.43			0.0029	98
Carbon Disulfide	75-15-0	3.59	3.46	6.97	11.18	10.77	21.71	700	0.02	0.0280	100
<b>Carbon Tetrachloride</b>	56-23-5	<b>0.12</b>	0.11	0.26	<b>0.76</b>	0.68	1.60	0.067	<b>11.41</b>	0.0566	100
Chlorobenzene	108-90-7	(0.001)	0	0.03	(0.0030)	0	0.13	1000	0.000003	0.0230	3
Chloroethane	75-00-3	0.01	0.0080	0.06	0.03	0.02	0.17			0.0211	74
<b>Chloroform</b>	67-66-3	<b>0.02</b>	0.0210	0.05	<b>0.11</b>	0.10	0.22	0.043	<b>2.61</b>	0.0195	100
<b>Chloromethane</b>	74-87-3	<b>0.67</b>	0.6420	1.01	<b>1.38</b>	1.33	2.09	0.56	<b>2.46</b>	0.0289	100
Chloroprene	126-99-8	(0.0001)	0	0.01	(0.0005)	0	0.03	7	0.0001	0.0797	2
Crotonaldehyde	123-73-9	0.09	0.03	0.46	0.26	0.10	1.32			0.0029	100
Dibromochloromethane	594-18-3	(0.0003)	0	0.01	(0.003)	0	0.10			0.0993	5
1,2-Dibromoethane	106-93-4	(0.0001)	0	0.01	(0.001)	0	0.05			0.1383	3
p-Dichlorobenzene	106-46-7	(0.003)	0	0.02	(0.02)	0	0.10	0.091	0.19	0.0361	49
Dichlorodifluoromethane	75-71-8	0.63	0.6020	0.98	3.12	2.98	4.86	200	0.02	0.0247	100
1,1-Dichloroethane	75-34-3	(0.00005)	0	0.003	(0.0002)	0	0.01	0.63	0.0003	0.0243	2
1,2-Dichloroethane	107-06-2	(0.001)	0	0.02	(0.0040)	0	0.07	0.038	0.11	0.0607	7
cis-1,2-Dichloroethylene	156-59-2	(0.003)	0	0.11	(0.01)	0	0.45			0.0634	3
Dichloromethane	75-09-2	0.12	0.10	0.42	0.40	0.33	1.46	2.10	0.19	0.0591	100
1,2-Dichloropropane	78-87-5	(0.0002)	0	0.01	(0.001)	0	0.03			0.1525	3
Dichlorotetrafluoroethane	1320-37-2	0.02	0.0190	0.03	0.13	0.13	0.18			0.0210	100
Ethylbenzene	100-41-4	0.02	0.0140	0.04	0.07	0.06	0.19	0.4	0.18	0.0217	100
<b>Formaldehyde</b>	50-00-0	<b>1.97</b>	1.69	5.17	<b>2.42</b>	2.07	6.35	0.077	<b>31.49</b>	0.0061	100
Hexaldehyde	66-25-1	0.04	0.03	0.08	0.15	0.14	0.31			0.0082	100
Isovaleraldehyde	590-86-3	(0.002)	0	0.02	(0.01)	0	0.08			0.0035	13

**Table 5 (Continued)**  
**2009 Air Toxics Data for Chester, NJ**

Analyte <sup>a</sup>	CAS No.	Annual Mean (ppbv) <sup>b,c</sup>	Annual Median (ppbv) <sup>b</sup>	24-Hour Max. (ppbv)	Annual Mean ( $\mu\text{g}/\text{m}^3$ ) <sup>b,c</sup>	Annual Median ( $\mu\text{g}/\text{m}^3$ ) <sup>c</sup>	24-hour Max. ( $\mu\text{g}/\text{m}^3$ )	Long-Term Health Benchmark ( $\mu\text{g}/\text{m}^3$ ) <sup>d</sup>	Annual Mean Risk Ratio <sup>e</sup>	Detection Limit ( $\mu\text{g}/\text{m}^3$ )	% Above Minimum Detection Limit <sup>f</sup>
Methyl Ethyl Ketone	78-93-3	0.25	0.20	1.62	0.73	0.58	4.77	5000	0.0001	0.1296	100
Methyl Isobutyl Ketone	108-10-1	0.01	0.01	0.05	0.05	0.05	0.20			0.0287	84
Methyl Methacrylate	80-62-6	(0.0002)	0	0.01	(0.001)	0	0.04	700	0.000001	0.0211	2
Methyl tert-Butyl Ether	1634-04-4	(0.001)	0	0.02	(0.002)	0	0.05	3.8	0.001	0.0072	5
n-Octane	111-65-9	0.01	0.0080	0.03	0.04	0.04	0.14			0.0280	69
Propionaldehyde	123-38-6	0.10	0.10	0.21	0.25	0.23	0.50	8	0.03	0.0048	100
Propylene	115-07-1	0.21	0.16	1.81	0.36	0.27	3.12	3000	0.0001	0.0155	100
Styrene	100-42-5	0.01	0.01	0.04	0.02	0.02	0.17	1.8	0.01	0.0426	70
1,1,2,2-Tetrachloroethane	79-34-5	(0.00005)	0	0.003	(0.0003)	0	0.02	0.017	0.02	0.0893	2
Tetrachloroethylene	127-18-4	0.01	0.01	0.04	0.08	0.07	0.25	0.17	0.50	0.0746	82
Tolualdehydes		0.03	0.02	0.08	0.13	0.11	0.40			0.0147	98
Toluene	108-88-3	0.12	0.092	0.49	0.45	0.35	1.85	5000	0.0001	0.0188	100
1,1,1-Trichloroethane	71-55-6	0.02	0.02	0.02	0.09	0.09	0.13	1000	0.0001	0.0164	100
Trichloroethylene	79-01-6	(0.002)	0	0.02	(0.01)	0	0.09	0.5	0.02	0.0537	16
Trichlorofluoromethane	75-69-4	0.30	0.295	0.46	1.67	1.66	2.56	700	0.002	0.0393	100
Trichlorotrifluoroethane	26523-64-8	0.11	0.106	0.17	0.82	0.81	1.30			0.0920	100
1,2,4-Trimethylbenzene	95-63-6	0.01	0.0090	0.04	0.05	0.04	0.20			0.0147	89
1,3,5-Trimethylbenzene	108-67-8	0.004	0.0040	0.02	0.02	0.02	0.08			0.0197	79
Valeraldehyde	110-62-3	0.03	0.0275	0.06	0.10	0.10	0.21			0.0035	100
Vinyl chloride	75-01-4	(0.002)	0	0.04	(0.004)	0	0.09	0.11	0.04	0.0204	15
m,p-Xylene	1330-20-7	0.03	0.03	0.11	0.14	0.11	0.49	100	0.001	0.0391	98
o-Xylene	95-47-6	0.01	0.01	0.05	0.06	0.05	0.20	100	0.001	0.0174	100

<sup>a</sup> Analytes in bold text had annual means above the long-term health benchmark.

<sup>b</sup> Numbers in parentheses are arithmetic means (or averages) based on less than 50 percent detection.

<sup>c</sup> For a valid 24-hour sampling event when the analyzing laboratory reports the term "Not Detected" for a particular pollutant, the concentration of 0.0 ppbv is assigned to that pollutant. These zero concentrations were included in the calculation of annual averages and medians for each pollutant regardless of percent detection.

<sup>d</sup> The long-term health benchmark is defined as the chemical-specific air concentration above which there may be human health concerns. For a carcinogen (cancer-causing chemical), the health benchmark is set at the air concentration that would cause no more than a one-in-a-million increase in the likelihood of getting cancer, even after a lifetime of exposure. For a non-carcinogen, the health benchmark is the maximum air concentration to which exposure is likely to cause no harm, even if that exposure occurs on a daily basis for a lifetime. These toxicity values are not available for all chemicals. For more information, go to [www.nj.gov/dep/aqpp/risk.html](http://www.nj.gov/dep/aqpp/risk.html).

<sup>e</sup> The risk ratio for a chemical is a comparison of the annual mean air concentration to the long-term health benchmark. If the annual mean is 0, then the annual mean risk ratio is not calculated.

<sup>f</sup> There were 61 total VOC samples and 60 total carbonyl samples collected in 2009 in Chester.

**Table 6**  
**2009 Air Toxics Data for Elizabeth, NJ**

Analyte <sup>a</sup>	CAS No.	Annual Mean (ppbv) <sup>b,c</sup>	Annual Median (ppbv) <sup>b</sup>	24-Hour Max. (ppbv)	Annual Mean ( $\mu\text{g}/\text{m}^3$ ) <sup>b,c</sup>	Annual Median ( $\mu\text{g}/\text{m}^3$ ) <sup>c</sup>	24-Hour Max. ( $\mu\text{g}/\text{m}^3$ )	Long-Term Health Benchmark ( $\mu\text{g}/\text{m}^3$ ) <sup>d</sup>	Annual Mean Risk Ratio <sup>e</sup>	Detection Limit ( $\mu\text{g}/\text{m}^3$ )	% Above Minimum Detection Limit <sup>f</sup>
<b>Acetaldehyde</b>	75-07-0	<b>1.37</b>	1.26	4.33	<b>2.47</b>	2.27	7.80	0.45	<b>5.49</b>	0.0072	100
Acetone	67-64-1	1.43	1.18	5.39	3.39	2.80	12.80	31000	0.0001	0.0166	100
Acetonitrile	75-05-8	0.51	0.45	1.19	0.85	0.76	2.00	60	0.01	0.1662	100
Acetylene	74-86-2	1.31	0.91	8.08	1.39	0.97	8.60			0.0245	100
<b>Acrolein</b>	107-02-8	<b>0.52</b>	0.37	3.07	<b>1.20</b>	0.85	7.04	0.02	<b>60.07</b>	0.2453	100
<b>Acrylonitrile</b>	107-13-1	<b>(0.05)</b>	0	0.91	<b>(0.11)</b>	0	1.97	0.015	<b>7.30</b>	0.1237	38
tert-Amyl Methyl Ether	994-05-8	(0.0001)	0	0.01	(0.0005)	0	0.03			0.0501	2
Benzaldehyde	100-52-7	0.03	0.03	0.10	0.15	0.14	0.43			0.0087	98
<b>Benzene</b>	71-43-2	<b>0.43</b>	0.30	2.50	<b>1.36</b>	0.95	7.99	0.13	<b>10.50</b>	0.0160	100
Bromochloromethane	74-97-5	(0.0001)	0	0.01	(0.0004)	0	0.03			0.1005	2
Bromodichloromethane	75-27-4	(0.0006)	0	0.01	(0.004)	0	0.09			0.0469	5
Bromoform	75-25-2	(0.0002)	0	0.01	(0.002)	0	0.06	0.91	0.002	0.1758	3
Bromomethane	74-83-9	0.01	0.01	0.05	0.06	0.05	0.19	5	0.01	0.0388	100
<b>1,3-Butadiene</b>	106-99-0	<b>0.07</b>	0.04	1.16	<b>0.16</b>	0.09	2.57	0.033	<b>4.78</b>	0.0133	100
Butyraldehyde	123-72-8	0.13	0.13	0.34	0.39	0.37	0.99			0.0029	100
Carbon Disulfide	75-15-0	1.46	1.30	9.26	4.53	4.03	28.84	700	0.01	0.0280	100
<b>Carbon Tetrachloride</b>	56-23-5	<b>0.12</b>	0.11	0.20	<b>0.73</b>	0.67	1.28	0.067	<b>10.86</b>	0.0566	100
Chlorobenzene	108-90-7	(0.0005)	0	0.01	(0.002)	0	0.06	1000	0.000002	0.0230	5
Chloroethane	75-00-3	0.02	0.02	0.06	0.05	0.04	0.16			0.0211	95
<b>Chloroform</b>	67-66-3	<b>0.03</b>	0.03	0.11	<b>0.17</b>	0.14	0.55	0.043	<b>3.92</b>	0.0195	98
<b>Chloromethane</b>	74-87-3	<b>0.70</b>	0.70	0.95	<b>1.44</b>	1.45	1.97	0.56	<b>2.58</b>	0.0289	100
Chloromethylbenzene	100-44-7	(0.001)	0	0.06	(0.01)	0	0.33			0.0259	3
Chloroprene	126-99-8	(0.001)	0	0.04	(0.004)	0	0.14	7	0.001	0.0797	3
Crotonaldehyde	123-73-9	0.11	0.05	0.54	0.33	0.15	1.54			0.0029	100
Dibromochloromethane	594-18-3	(0.0003)	0	0.01	(0.003)	0	0.07			0.0993	7
1,2-Dibromoethane	106-93-4	(0.0001)	0	0.003	(0.0004)	0	0.02			0.1383	2
m-Dichlorobenzene	541-73-1	(0.0001)	0	0.004	(0.0004)	0	0.02			0.0241	2
o-Dichlorobenzene	95-50-1	(0.0001)	0	0.01	(0.001)	0	0.03			0.0301	2
<b>p-Dichlorobenzene</b>	106-46-7	<b>0.02</b>	0.01	0.11	<b>0.11</b>	0.08	0.67	0.091	<b>1.22</b>	0.0361	95
Dichlorodifluoromethane	75-71-8	0.64	0.63	0.93	3.15	3.11	4.61	200	0.02	0.0247	100
1,1-Dichloroethane	75-34-3	(0.0002)	0	0.01	(0.001)	0	0.03	0.63	0.001	0.0243	5
1,2-Dichloroethane	107-06-2	(0.002)	0	0.02	(0.01)	0	0.09	0.038	0.17	0.0607	8
1,1-Dichloroethene	75-35-4	(0.0001)	0	0.01	(0.0003)	0	0.02	200	0.000002	0.0555	2
cis-1,2-Dichloroethylene	156-59-2	(0.003)	0	0.11	(0.01)	0	0.42			0.0634	3
trans-1,2-Dichloroethylene	156-60-5	(0.0001)	0	0.01	(0.0005)	0	0.03			0.0714	2
Dichloromethane	75-09-2	0.22	0.19	0.86	0.78	0.65	2.97	2.1	0.37	0.0591	100
1,2-Dichloropropane	78-87-5	(0.0002)	0	0.01	(0.001)	0	0.02			0.1525	3
cis-1,3-Dichloropropene	542-75-6	(0.0001)	0	0.003	(0.0002)	0	0.01			0.0635	2
trans-1,3-Dichloropropene	542-75-6	(0.0001)	0	0.003	(0.00020)	0	0.01			0.0409	2
Dichlorotetrafluoroethane	1320-37-2	0.02	0.02	0.03	0.13	0.13	0.19			0.0210	100

**Table 6 (Continued)**  
**2009 Air Toxics Data for Elizabeth, NJ**

Analyte <sup>a</sup>	CAS No.	Annual Mean (ppbv) <sup>b,c</sup>	Annual Median (ppbv) <sup>b</sup>	24-Hour Max. (ppbv)	Annual Mean ( $\mu\text{g}/\text{m}^3$ ) <sup>b,c</sup>	Annual Median ( $\mu\text{g}/\text{m}^3$ ) <sup>c</sup>	24-Hour Max. ( $\mu\text{g}/\text{m}^3$ )	Long-Term Health Benchmark ( $\mu\text{g}/\text{m}^3$ ) <sup>d</sup>	Annual Mean Risk Ratio <sup>e</sup>	Detection Limit ( $\mu\text{g}/\text{m}^3$ )	% Above Minimum Detection Limit <sup>f</sup>
Ethyl Acrylate	140-88-5	(0.00003)	0	0.002	(0.0001)	0	0.01	2	0.0001	0.0450	2
Ethyl tert-Butyl Ether	637-92-3	(0.00003)	0	0.002	(0.0001)	0	0.01			0.0293	2
<b>Ethylbenzene</b>	100-41-4	<b>0.10</b>	0.08	0.96	<b>0.46</b>	0.33	4.16	0.4	<b>1.14</b>	0.0217	100
<b>Formaldehyde</b>	50-00-0	<b>3.08</b>	2.73	8.83	<b>3.79</b>	3.35	10.84	0.077	<b>49.18</b>	0.0061	100
Hexaldehyde	66-25-1	0.06	0.05	0.52	0.23	0.19	2.12			0.0082	100
Isovaleraldehyde	590-86-3	(0.003)	0	0.03	(0.01)	0	0.12			0.0035	21
Methyl Ethyl Ketone	78-93-3	0.45	0.34	2.23	1.33	1.00	6.57	5000	0.0003	0.1296	98
Methyl Isobutyl Ketone	108-10-1	0.04	0.03	0.14	0.15	0.13	0.59			0.0287	98
Methyl Methacrylate	80-62-6	(0.004)	0	0.06	(0.02)	0	0.22	700	0.00002	0.0211	18
Methyl tert-Butyl Ether	1634-04-4	(0.01)	0	0.06	(0.02)	0	0.21	3.8	0.005	0.0072	30
n-Octane	111-65-9	0.05	0.03	0.25	0.23	0.15	1.16			0.0280	98
Propionaldehyde	123-38-6	0.19	0.16	0.48	0.45	0.38	1.13	8	0.06	0.0048	100
Propylene	115-07-1	2.48	1.21	15.90	4.26	2.07	27.36	3000	0.001	0.0155	100
Styrene	100-42-5	0.04	0.03	0.73	0.19	0.13	3.12	1.8	0.11	0.0426	98
1,1,2,2-Tetrachloroethane	79-34-5	(0.0001)	0	0.003	(0.001)	0	0.02	0.017	0.04	0.0893	3
<b>Tetrachloroethylene</b>	127-18-4	<b>0.04</b>	0.03	0.13	<b>0.26</b>	0.20	0.89	0.17	<b>1.50</b>	0.0746	98
Tolualdehydes		0.03	0.03	0.08	0.17	0.14	0.41			0.0147	98
Toluene	108-88-3	0.89	0.62	8.77	3.34	2.35	33.05	5000	0.001	0.0188	100
1,2,4-Trichlorobenzene	102-82-1	(0.0002)	0	0.01	(0.001)	0	0.07			0.1113	2
1,1,1-Trichloroethane	71-55-6	0.02	0.02	0.03	0.09	0.09	0.16	1000	0.0001	0.0164	100
1,1,2-Trichloroethane	79-00-5	(0.0002)	0	0.004	(0.001)	0	0.02	0.063	0.01	0.0327	5
Trichloroethylene	79-01-6	0.01	0.01	0.19	0.08	0.06	1.00	0.5	0.15	0.0537	73
Trichlorofluoromethane	75-69-4	0.31	0.30	0.46	1.72	1.69	2.57	700	0.002	0.0393	100
Trichlorotrifluoroethane	26523-64-8	0.11	0.11	0.15	0.82	0.80	1.16			0.0920	100
1,2,4-Trimethylbenzene	95-63-6	0.20	0.06	7.64	0.99	0.29	37.56			0.0147	100
1,3,5-Trimethylbenzene	108-67-8	0.07	0.02	2.46	0.33	0.11	12.09			0.0197	100
Valeraldehyde	110-62-3	0.05	0.05	0.32	0.18	0.16	1.14			0.0035	100
Vinyl chloride	75-01-4	(0.002)	0	0.02	(0.01)	0	0.04	0.11	0.05	0.0204	37
m,p-Xylene	1330-20-7	0.29	0.21	2.72	1.28	0.91	11.81	100	0.01	0.0391	100
o-Xylene	95-47-6	0.13	0.08	1.40	0.57	0.36	6.08	100	0.01	0.0174	100

<sup>a</sup> Analytes in bold text had annual means above the long-term health benchmark.

<sup>b</sup> Numbers in parentheses are arithmetic means (or averages) based on less than 50 percent detection.

<sup>c</sup> For a valid 24-hour sampling event when the analyzing laboratory reports the term "Not Detected" for a particular pollutant, the concentration of 0.0 ppbv is assigned to that pollutant. These zero concentrations were included in the calculation of annual averages and medians for each pollutant regardless of percent detection.

<sup>d</sup> The long-term health benchmark is defined as the chemical-specific air concentration above which there may be human health concerns. For a carcinogen (cancer-causing chemical), the health benchmark is set at the air concentration that would cause no more than a one-in-a-million increase in the likelihood of getting cancer, even after a lifetime of exposure. For a non-carcinogen, the health benchmark is the maximum air concentration to which exposure is likely to cause no harm, even if that exposure occurs on a daily basis for a lifetime. These toxicity values are not available for all chemicals. For more information, go to [www.nj.gov/dep/agpp/risk.html](http://www.nj.gov/dep/agpp/risk.html).

<sup>e</sup> The risk ratio for a chemical is a comparison of the annual mean air concentration to the long-term health benchmark. If the annual mean is 0, then the annual mean risk ratio is not calculated.

<sup>f</sup> There were 60 total VOC samples and 61 total carbonyl samples collected in 2009 in Elizabeth.



**Table 7**  
**2009 Air Toxics Data for New Brunswick, NJ**

Analyte <sup>a</sup>	CAS No.	Annual Mean (ppbv) <sup>b,c</sup>	Annual Median (ppbv) <sup>b</sup>	24-Hour Max. (ppbv)	Annual Mean ( $\mu\text{g}/\text{m}^3$ ) <sup>b,c</sup>	Annual Median ( $\mu\text{g}/\text{m}^3$ ) <sup>c</sup>	24-Hour Max. ( $\mu\text{g}/\text{m}^3$ )	Long-Term Health Benchmark ( $\mu\text{g}/\text{m}^3$ ) <sup>d</sup>	Annual Mean Risk Ratio <sup>e</sup>	Detection Limit ( $\mu\text{g}/\text{m}^3$ )	% Above Minimum Detection Limit <sup>f</sup>
<b>Acetaldehyde</b>	75-07-0	<b>1.12</b>	0.99	2.59	<b>2.02</b>	1.79	4.67	0.45	<b>4.48</b>	0.0072	100
Acetone	67-64-1	1.29	1.12	4.00	3.05	2.66	9.50	31000	0.00	0.0166	100
Acetonitrile	75-05-8	0.74	0.33	9.69	1.25	0.56	16.27	60	0.02	0.1662	98
Acetylene	74-86-2	0.78	0.60	2.44	0.83	0.64	2.60			0.0245	100
<b>Acrolein</b>	107-02-8	<b>0.37</b>	0.21	3.08	<b>0.85</b>	0.48	7.06	0.02	<b>42.50</b>	0.2453	100
<b>Acrylonitrile</b>	107-13-1	<b>(0.03)</b>	0	0.14	<b>(0.060)</b>	0	0.30	0.015	<b>4.04</b>	0.1237	41
Benzaldehyde	100-52-7	0.02	0.02	0.06	0.08	0.08	0.24			0.0087	93
<b>Benzene</b>	71-43-2	<b>0.22</b>	0.17	1.08	<b>0.70</b>	0.56	3.45	0.13	<b>5.35</b>	0.0160	100
Bromodichloromethane	75-27-4	(0.0001)	0	0.01	(0.001)	0	0.05			0.0469	2
Bromoform	75-25-2	(0.0002)	0	0.01	(0.002)	0	0.05	0.91	0.00	0.1758	4
Bromomethane	74-83-9	0.01	0.01	0.02	0.05	0.05	0.09	5	0.01	0.0388	98
<b>1,3-Butadiene</b>	106-99-0	<b>0.02</b>	0.02	0.09	<b>0.05</b>	0.03	0.20	0.033	<b>1.45</b>	0.0133	95
Butyraldehyde	123-72-8	0.09	0.07	0.49	0.26	0.20	1.45			0.0029	100
Carbon Disulfide	75-15-0	0.19	0.10	0.64	0.60	0.31	1.98	700	0.00	0.0280	100
<b>Carbon Tetrachloride</b>	56-23-5	<b>0.12</b>	0.11	0.25	<b>0.73</b>	0.68	1.56	0.067	<b>10.97</b>	0.0566	100
Chloroethane	75-00-3	0.02	0.02	0.13	0.06	0.04	0.35			0.0211	95
<b>Chloroform</b>	67-66-3	<b>0.03</b>	0.03	0.06	<b>0.15</b>	0.16	0.27	0.043	<b>3.55</b>	0.0195	100
<b>Chloromethane</b>	74-87-3	<b>0.70</b>	0.70	1.28	<b>1.45</b>	1.44	2.64	0.56	<b>2.59</b>	0.0289	100
Crotonaldehyde	123-73-9	0.08	0.04	0.33	0.24	0.12	0.95			0.0029	98
Dibromochloromethane	594-18-3	(0.0002)	0	0.01	(0.002)	0	0.05			0.0993	5
1,2-Dibromoethane	106-93-4	(0.0001)	0	0.01	(0.001)	0	0.04			0.1383	2
m-Dichlorobenzene	541-73-1	(0.0001)	0	0.004	(0.0004)	0	0.02			0.0241	2
p-Dichlorobenzene	106-46-7	0.01	0.01	0.03	0.06	0.06	0.17	0.091	0.67	0.0361	88
Dichlorodifluoromethane	75-71-8	0.65	0.61	1.17	3.20	3.01	5.79	200	0.02	0.0247	100
1,1-Dichloroethane	75-34-3	(0.0001)	0	0.004	(0.0003)	0	0.02	0.63	0.00	0.0243	2
1,2-Dichloroethane	107-06-2	(0.001)	0	0.02	(0.004)	0	0.09	0.038	0.10	0.0607	5
1,1-Dichloroethene	75-35-4	(0.0001)	0	0.01	(0.0004)	0	0.02	200	0.00	0.0555	2
trans-1,2-Dichloroethylene	156-60-5	(0.001)	0	0.03	(0.002)	0	0.13			0.0714	2
Dichloromethane	75-09-2	0.18	0.14	0.62	0.62	0.50	2.15	2.1	0.30	0.0591	100
Dichlorotetrafluoroethane	1320-37-2	0.02	0.02	0.04	0.13	0.13	0.24			0.0210	100
Ethylbenzene	100-41-4	0.04	0.03	0.11	0.17	0.14	0.49	0.4	0.42	0.0217	100
<b>Formaldehyde</b>	50-00-0	<b>2.06</b>	1.55	15.80	<b>2.53</b>	1.90	19.40	0.077	<b>32.84</b>	0.0061	100
Hexaldehyde	66-25-1	0.03	0.02	0.14	0.11	0.08	0.59			0.0082	88
Isovaleraldehyde	590-86-3	(0.004)	0	0.08	(0.01)	0	0.27			0.0035	16
Methyl Ethyl Ketone	78-93-3	0.31	0.26	1.18	0.92	0.77	3.47	5000	0.00	0.1296	100

**Table 7 (Continued)**  
**2009 Air Toxics Data for New Brunswick, NJ**

Analyte <sup>a</sup>	Cas #	Annual Mean (ppbv) <sup>b,c</sup>	Annual Median (ppbv) <sup>b</sup>	24-Hour Max. (ppbv)	Annual Mean ( $\mu\text{g}/\text{m}^3$ ) <sup>b,c</sup>	Annual Median ( $\mu\text{g}/\text{m}^3$ ) <sup>c</sup>	24-Hour Max. ( $\mu\text{g}/\text{m}^3$ )	Long-Term Health Benchmark ( $\mu\text{g}/\text{m}^3$ ) <sup>d</sup>	Annual Mean Risk Ratio <sup>e</sup>	Detection Limit ( $\mu\text{g}/\text{m}^3$ )	% Above Minimum Detection Limit <sup>f</sup>
Methyl Isobutyl Ketone	108-10-1	0.02	0.02	0.08	0.09	0.08	0.33			0.0287	91
Methyl Methacrylate	80-62-6	(0.0002)	0	0.01	(0.001)	0	0.03	700	0.00	0.0211	2
Methyl tert-Butyl Ether	1634-04-4	(0.003)	0	0.04	(0.01)	0	0.14	3.8	0.00	0.0072	21
n-Octane	111-65-9	0.01	0.01	0.04	0.07	0.06	0.20			0.0280	91
Propionaldehyde	123-38-6	0.12	0.11	0.34	0.28	0.27	0.81	8	0.03	0.0048	100
Propylene	115-07-1	0.42	0.36	1.20	0.72	0.61	2.07	3000	0.00	0.0155	100
Styrene	100-42-5	0.01	0.01	0.03	0.05	0.05	0.12	1.8	0.03	0.0426	91
Tetrachloroethylene	127-18-4	0.02	0.02	0.10	0.16	0.13	0.68	0.17	0.95	0.0746	95
Tolualdehydes		0.03	0.02	0.07	0.12	0.11	0.33			0.0147	89
Toluene	108-88-3	0.50	0.19	15.20	1.90	0.70	57.28	5000	0.00	0.0188	100
1,1,1-Trichloroethane	71-55-6	0.02	0.02	0.03	0.09	0.09	0.14	1000	0.00	0.0164	100
Trichloroethylene	79-01-6	(0.01)	0	0.10	(0.03)	0	0.52	0.5	0.06	0.0537	38
Trichlorofluoromethane	75-69-4	0.31	0.30	0.52	1.73	1.67	2.93	700	0.00	0.0393	100
Trichlorotrifluoroethane	26523-64-8	0.11	0.11	0.19	0.84	0.82	1.43			0.0920	100
1,2,4-Trimethylbenzene	95-63-6	0.03	0.02	0.12	0.14	0.12	0.57			0.0147	98
1,3,5-Trimethylbenzene	108-67-8	0.01	0.01	0.04	0.05	0.04	0.20			0.0197	98
Valeraldehyde	110-62-3	0.03	0.02	0.09	0.09	0.08	0.32			0.0035	98
Vinyl chloride	75-01-4	(0.002)	0	0.02	(0.004)	0	0.04	0.11	0.04	0.0204	27
m,p-Xylene	1330-20-7	0.09	0.08	0.33	0.40	0.34	1.44	100	0.00	0.0391	100
o-Xylene	95-47-6	0.04	0.03	0.10	0.16	0.14	0.42	100	0.00	0.0174	100

<sup>a</sup> Analytes in bold text had annual means above the long-term health benchmark.

<sup>b</sup> Numbers in parentheses are arithmetic means (or averages) based on less than 50 percent detection.

<sup>c</sup> For a valid 24-hour sampling event when the analyzing laboratory reports the term "Not Detected" for a particular pollutant, the concentration of 0.0 ppbv is assigned to that pollutant. These zero concentrations were included in the calculation of annual averages and medians for each pollutant regardless of percent detection.

<sup>d</sup> The long-term health benchmark is defined as the chemical-specific air concentration above which there may be human health concerns. For a carcinogen (cancer-causing chemical), the health benchmark is set at the air concentration that would cause no more than a one-in-a-million increase in the likelihood of getting cancer, even after a lifetime of exposure. For a non-carcinogen, the health benchmark is the maximum air concentration to which exposure is likely to cause no harm, even if that exposure occurs on a daily basis for a lifetime. These toxicity values are not available for all chemicals. For more information, go to [www.nj.gov/dep/agpp/risk.html](http://www.nj.gov/dep/agpp/risk.html).

<sup>e</sup> The risk ratio for a chemical is a comparison of the annual mean air concentration to the long-term health benchmark. If the annual mean is 0, then the annual mean risk ratio is not calculated.

<sup>f</sup> There were 56 total VOC samples and 56 total carbonyl samples collected in 2009 in New Brunswick.

**Table 8.**  
**Analytes with 100 Percent Non-Detects in 2009**

Analyte	CAS #	Detection Limit ( $\mu\text{g}/\text{m}^3$ )	Location		
			Chester	Elizabeth	New Brunswick
1,1,2,2-Tetrachloroethane	79-34-5	0.09			X
1,1,2-Trichloroethane	79-00-5	0.03	X		X
1,1-Dichloroethene	75-35-4	0.06	X		
1,2,4-Trichlorobenzene	102-82-1	0.11	X		X
1,2-Dichloropropane	78-87-5	0.15			X
2,5-Dimethylbenzaldehyde	5799-94-2	0.00	X	X	X
Bromochloromethane	74-97-5	0.10			X
Chlorobenzene	108-90-7	0.02			X
Chloromethylbenzene	100-44-7	0.03	X		X
Chloroprene	126-99-8	0.08			X
cis-1,2-Dichloroethylene	156-59-2	0.06			X
cis-1,3-Dichloropropene	542-75-6	0.06	X		X
Ethyl Acrylate	140-88-5	0.05	X		X
Ethyl tert-Butyl Ether	637-92-3	0.03	X		X
Hexachloro-1,3-butadiene	87-68-3	0.14	X	X	X
m-Dichlorobenzene	541-73-1	0.02	X		
o-Dichlorobenzene	95-50-1	0.03	X		X
tert-Amyl Methyl Ether	994-05-8	0.05	X		X
trans-1,2-Dichloroethylene	156-60-5	0.07	X		
trans-1,3-Dichloropropene	542-75-6	0.04	X		X

In 2009, collected samples of these chemicals were never above the detection limits at the specific monitoring locations. However, they may be present in the air below the detection limit level.

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