



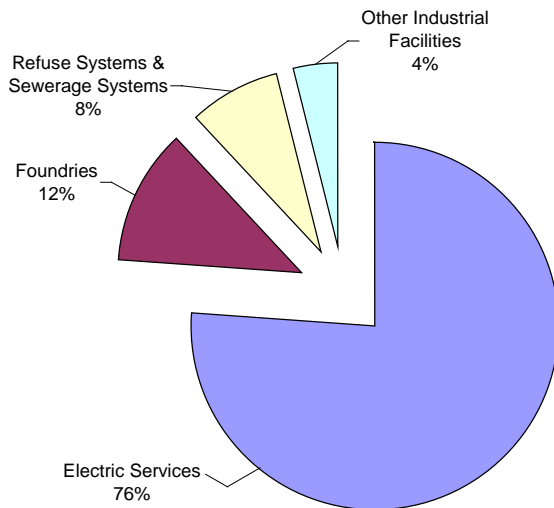
2002 Lead Summary

New Jersey Department of Environmental Protection

NATURE AND SOURCES

Lead (Pb) is a metal that occurs naturally in the environment as well as being produced by a variety of human activities. Historically, the major sources of lead in the air have been motor vehicles and industrial facilities. With the phase out of lead in gasoline, however, the industrial sources now predominate. Because of the reductions in lead emissions from cars and trucks, levels in the air have decreased dramatically. When high levels do occur they are usually near industrial sources. The pie chart below shows the major industrial source of lead in New Jersey. The industrial sources include Electric Services (Energy generating facilities), Foundries (Metal casting facilities), and Refuse and Sewage systems.

Figure 1
New Jersey's Summary of 2002
Lead Emissions by Industrial Category



Source: NJDEP, Air Quality Planning Data 2002

HEALTH AND ENVIRONMENTAL EFFECTS

Lead accumulates in the blood, bones, muscles, and fat. People are mainly exposed to lead by breathing it from the air

or by ingesting food, water, soil, or dust that has been contaminated with lead. Infants and small children are especially sensitive to lead, even at low levels. Lead can damage the kidneys, liver, brain, and nerves and very high exposures can result in mental retardation, behavioral disorders, memory problems, and seizures. Lower levels of lead can damage the brain and nerves in fetuses and young children, resulting in learning disabilities. Lead can also cause high blood pressure and increase the risk of heart disease.

Animals can ingest lead while grazing and may experience health effects similar to those seen in humans. Lead can enter water systems through runoff and from sewage and industrial waste streams. Elevated levels of lead in water can cause reproductive damage in aquatic life and may cause changes in the blood and nerves of fish.

STANDARDS

The primary (health based) and secondary (welfare based) standards for lead are the same. The national standards are set at a maximum quarterly average concentration of 1.5 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). The table below shows the National and New Jersey Ambient Air Quality Standards (NAAQS and NJAAQS) for lead. The difference between the national and state standards is that the national standards are based on calendar quarters (Jan-Mar, Apr-Jun, Jul-Sep, Oct-Dec) while the state standards are based on concentrations recorded over any three consecutive month period during the year.

Table 1
National and New Jersey Ambient Air Quality Standards for Lead

$\mu\text{g}/\text{m}^3$ = Micrograms Per Cubic Meter

Averaging Period	Type	New Jersey	National
3-Month Arithmetic Means	Primary and Secondary	1.5 $\mu\text{g}/\text{m}^3$	
Calendar Quarter Arithmetic Mean	Primary and Secondary		1.5 $\mu\text{g}/\text{m}^3$

MONITORING LOCATIONS

Lead concentrations in recent years have been so low that many of the monitoring sites have been discontinued. As a result, New Jersey monitored lead at only one location in 2002. This location, near a battery manufacturing plant in New Brunswick, is shown in the map in Figure 2.

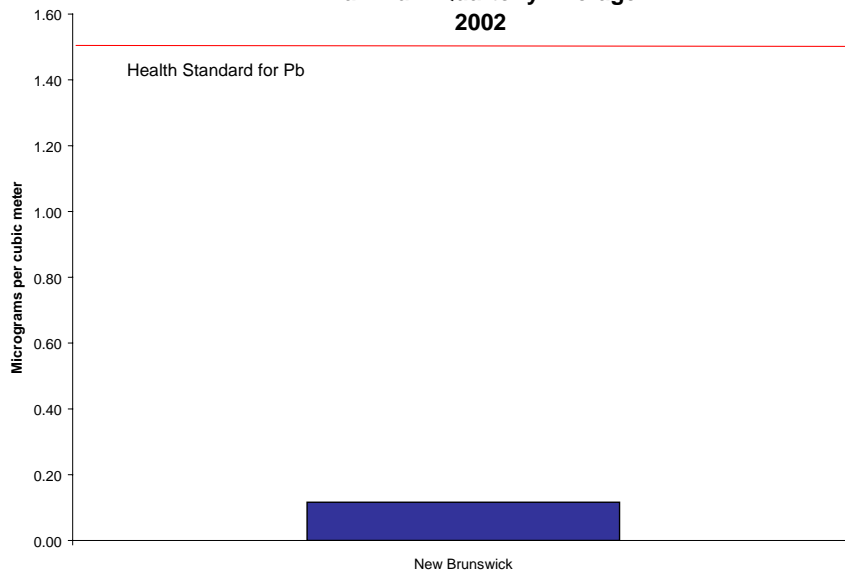
LEAD LEVELS IN 2002

A summary of the lead levels monitored in 2002 is shown in Table 2 and Figure 3. No exceedances of the primary or secondary standards were recorded. The maximum 3-month average was 0.116 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), less than a tenth of the health standard.

Figure 2
2002 Lead
Monitoring Network



Figure 3
Lead Concentration in New Jersey
Maximum Quarterly Average
2002



**Table 2
Lead Data – 2002
3-Month and Calendar Quarter Averages**

$\mu\text{g}/\text{m}^3$ = Micrograms Per Cubic Meter

Monitoring Site	3-Month Average $\mu\text{g}/\text{m}^3$		Calendar Quarter Averages $\mu\text{g}/\text{m}^3$			
	Maximum	Month ¹	1 st Quarter	2 nd Quarter	3 rd Quarter	4 th Quarter
New Brunswick	.116	Dec.	.016	.062	.032	.116

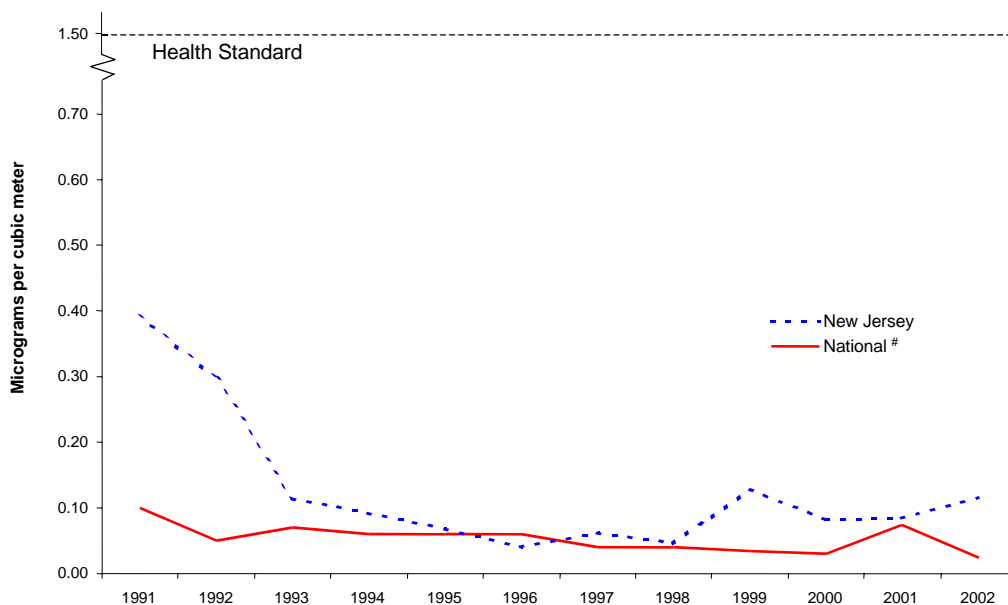
¹ The month indicates the last month in the 3-month period

TRENDS

The phase out of lead in gasoline has resulted in substantial improvements in air quality and lead levels in New Jersey are now well within the air quality standards. Below is a trend graph showing New Jersey's maximum quarterly average concentrations from 1991 to 2002, compared to the national maximum quarterly average concentrations during the same time frame. New Jersey's lead levels decreased by 70% from 1991 to 2002, compared to national lead levels, which decreased by 75% over the same time span. New Jersey values in more recent years are based on data from very few

sites (only one site in 2002). While meeting the NAAQS for lead is no longer a major environmental issue in New Jersey, concern still exists over lead exposure via routes other than direct inhalation. Lead may have accumulated in the soil over time and children playing in such areas may ingest the lead directly.

**Figure 4
Lead Concentrations in New Jersey
1991 - 2002
Maximum Quarterly Average**



Source: U.S. Environmental Protection Agency, 2002 Air Trends Report

REFERENCES

United States Environmental Protection Agency (USEPA), 2002 Air Trends Report, URL: <http://www.epa.gov/airtrends/lead.html>

New Jersey Department of Environmental Protection (NJDEP), Air Quality Planning, 2002 Lead Emission Inventory Data

Lead – How Lead Affects the Way We Live and Breathe, USEPA, Office of Air Quality Planning and Standards, Research Triangle Park, NC, November 2000, URL: <http://www.epa.gov/air/urbanair/lead/index.html>

Health Assessment of Exposure to Developmental Toxicants, Kimmel, Carole A. , Office of Health and Environmental Assessment, Office of Research and Development, U.S. Environmental Protection Agency, 1987 EPA-600/D-87-210

Health Effects Assessment for Lead, U.S. Environmental Protection Agency, Office of Research and Development, Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, 1984 EPA -540/1-86-055

National Air Quality and Emissions Trend Report, 1999, EPA-454/R-01-004, USEPA, Office of Air Quality Planning and Standards, Research Triangle Park, NC, March 2001, URL: www.epa.gov/oar/aqtrnd99/

Latest Findings on National Air Quality: 2000 Status and Trends, EPA-454/K-01-002, USEPA , Office of Air Quality Planning and Standards, Research Triangle Park, NC, September 2001, URL: www.epa.gov/oar/aqtrnd00/