



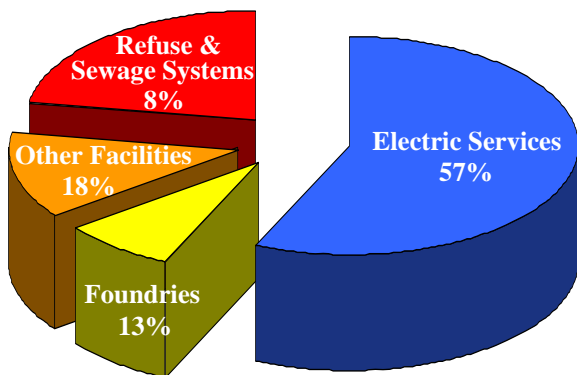
2006 Lead Summary

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 sources 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 Lead Emissions by Industrial Category



Source: NJDEP, Air Quality Planning Data 2004

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 months.

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 Mean	Primary and Secondary	1.5 $\mu\text{g}/\text{m}^3$	
Calendar Quarter Arithmetic Mean	Primary and Secondary		1.5 $\mu\text{g}/\text{m}^3$

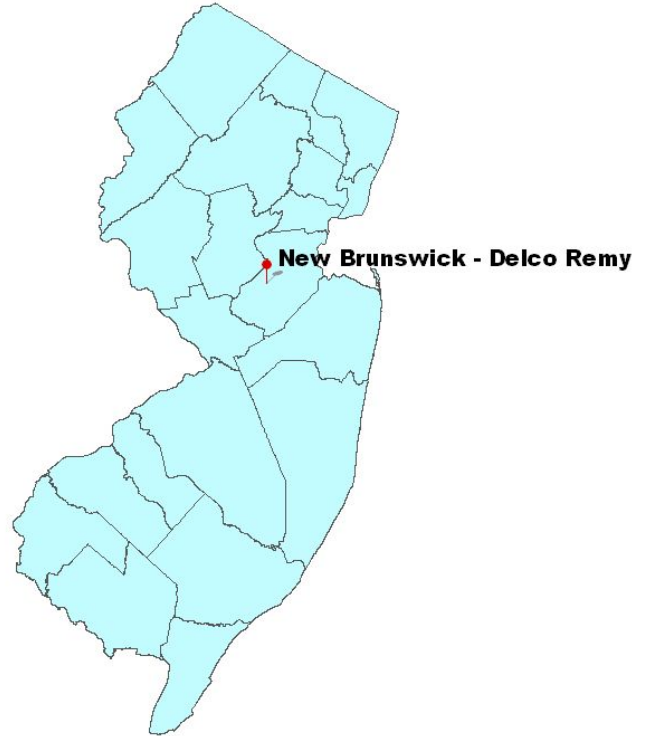
MONITORING LOCATIONS

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 2006. This location, near a battery manufacturing plant in New Brunswick, is shown on the map in Figure 2.

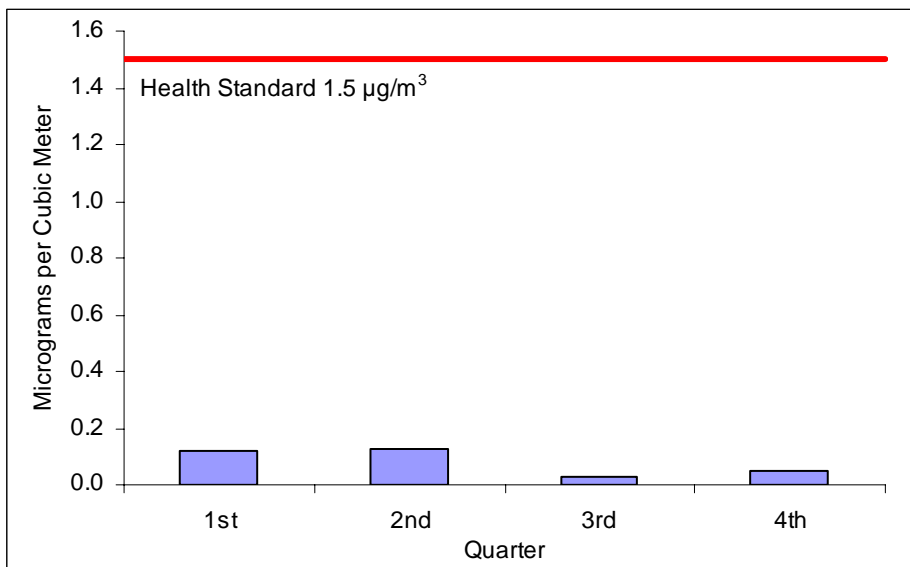
LEAD LEVELS IN 2006

A summary of the lead levels monitored in 2006 is shown in Table 2 and Figure 3. No exceedances of the primary or secondary standards were recorded. The maximum 3-month average was 0.154 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), barely one tenth of the health standard.

**Figure 2
2006 Lead
Monitoring Network**



**Figure 3
2006 New Jersey Quarterly Average Lead Concentration**



**Table 2
Lead Data – 2006
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	.154	Jan.	.122	.129	.026	.051

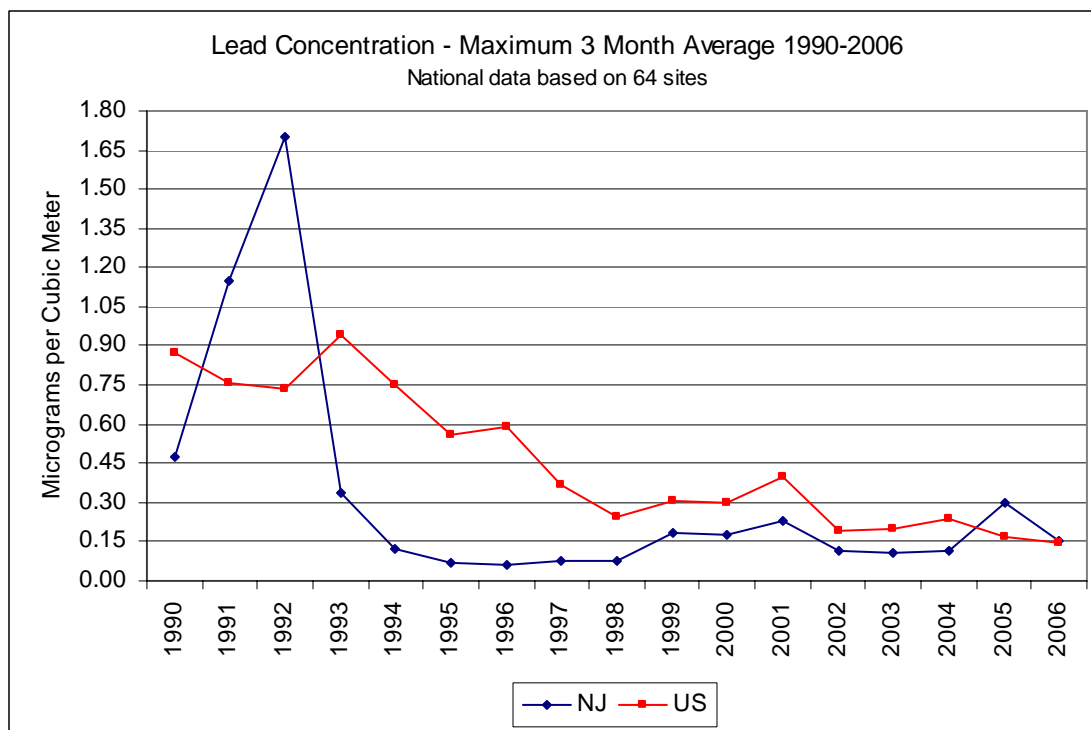
¹ The month indicates the last month in the 3-month period

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. The trend graph below (Figure 4) shows New Jersey's Annual Maximum 3-Month Average concentrations from 1990 to 2006, compared to EPA's national Annual Maximum 3-Month Average (based on 64 sites). New Jersey's lead levels have decreased steadily since 1990 to about 14% of the levels seen in previous years. National concentrations have declined consistently over the same

time span. New Jersey values are based on data from one site, New Brunswick, which has been the only Lead monitoring site in operation since 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



REFERENCES

Daily Lead Data from the New Brunswick air monitoring site, sampler 057, United States Environmental Protection Agency (USEPA), AQS Data Mart, URL: <http://www.epa.gov/ttn/airs/aqsdatamart/access.htm>

National Trends in Lead Levels, Lead Air Quality 1990-2008, United States Environmental Protection Agency (USEPA), URL: <http://www.epa.gov/airtrends/lead.html>

2004 Lead Emission Inventory, New Jersey Department of Environmental Protection (NJDEP), Air Quality Planning

Lead in Air, United States Environmental Protection Agency (USEPA), URL: <http://www.epa.gov/air/lead/index.html>

Health Assessment of Exposure to Developmental Toxicants, Kimmel, Carole A., United States Environmental Protection Agency (USEPA), 1987, EPA-600/D-87-210, URL: <http://nepis.epa.gov/EPA/html/Pubs/pubtitleOAR.htm>

Health Effects Assessment for Lead., United States Environmental Protection Agency (USEPA), 1984, EPA -540/1-86-055, URL: <http://nepis.epa.gov/EPA/html/Pubs/pubtitleOAR.htm>

National Air Quality and Emissions Trend Report, 1999, United States Environmental Protection Agency (USEPA), March 2001, EPA-454/R-01-004 URL: <http://nepis.epa.gov/EPA/html/Pubs/pubtitleOAR.htm>

Latest Findings on National Air Quality - Status and Trends through 2006 - LEAD (Pb), United States Environmental Protection Agency (USEPA), URL: <http://www.epa.gov/air/airtrends/2007/report/lead.pdf>