



2018 Lead Summary

New Jersey Department of Environmental Protection

SOURCES

Lead is a criteria pollutant as well as a Hazardous Air Pollutant listed under the 1990 Clean Air Act. It is one of the first known and most widely studied environmental and occupational toxins.

Lead was once commonly used in paint and gasoline, and is still used in batteries, solder, pipes, pottery, roofing materials and some cosmetics. Since 1980, there has been a 99% decrease in the average lead air concentration nationwide. A phase-out of lead additive in gasoline began in the mid-1970s. It is still used in aviation fuel in some smaller aircraft, accounting for about 74% of the estimated 9 tons emitted in New Jersey in 2014. New Jersey no longer has any significant industrial sources of lead.

HEALTH EFFECTS

Lead that is emitted into the air can be inhaled, or ingested after it settles (this is actually the main route of human exposure to airborne lead). There is no level of lead exposure that is considered safe. The main target for lead toxicity is the nervous system, both in adults and children. However, children's developing brains are the most vulnerable to the effects of lead, leading to lifelong effects, even after exposure ceases. The brain damage caused by lead exposure can result in learning disabilities and delinquent behavior, impacting IQ and academic achievement. Lead can also damage red blood cells and weaken the immune system. Other effects in adults include increased blood pressure, cardiovascular disease, and decreased kidney function. In addition, lead is classified as a "probable human carcinogen."

AMBIENT AIR QUALITY STANDARDS

A NAAQS for lead was first promulgated in 1978. A value of 1.5 $\mu\text{g}/\text{m}^3$ was established as both the primary and secondary standard. It was based on an average for each calendar quarter, and was not to be exceeded. The New Jersey AAQS was based on a rolling three-month average. Thirty years later, in 2008, the NAAQS was lowered tenfold to 0.15 $\mu\text{g}/\text{m}^3$, also averaged over a rolling three-month period, and not to be exceeded.

A rolling three-month average considers each of the 12 three-month periods associated with a given year, not just the four calendar quarters within that year. The old NAAQS required lead to be sampled as total suspended particulate (TSP). In New Jersey, lead is now measured as PM_{10} .

Table 9-1
National Ambient Air Quality Standards for Lead
Micrograms Per Cubic Meter ($\mu\text{g}/\text{m}^3$)

Averaging Period	Type	Level
3 Months (Rolling)	Primary & Secondary	0.15 $\mu\text{g}/\text{m}^3$

LEAD AIR LEVELS IN 2018

In the 1980s NJDEP had more than 20 lead monitors around the state, including a few specifically located near lead-emitting facilities, such as a battery manufacturer in New Brunswick and a paint factory in Newark. By 2008, after years of decreasing measurements, all of New Jersey's lead monitors were shut down. In 2012, a lead monitor was installed at the Newark Firehouse monitoring station in accordance with new NAAQS requirements. Figure 9-1 presents all of the data from the Newark site since it started operating. Table 9-1 shows the rolling three-month averages for 2018.

Figure 9-1
Lead Concentrations at Newark Firehouse in New Jersey, 2012-2018
24-Hour Averages
Micrograms per Cubic Meter ($\mu\text{g}/\text{m}^3$)

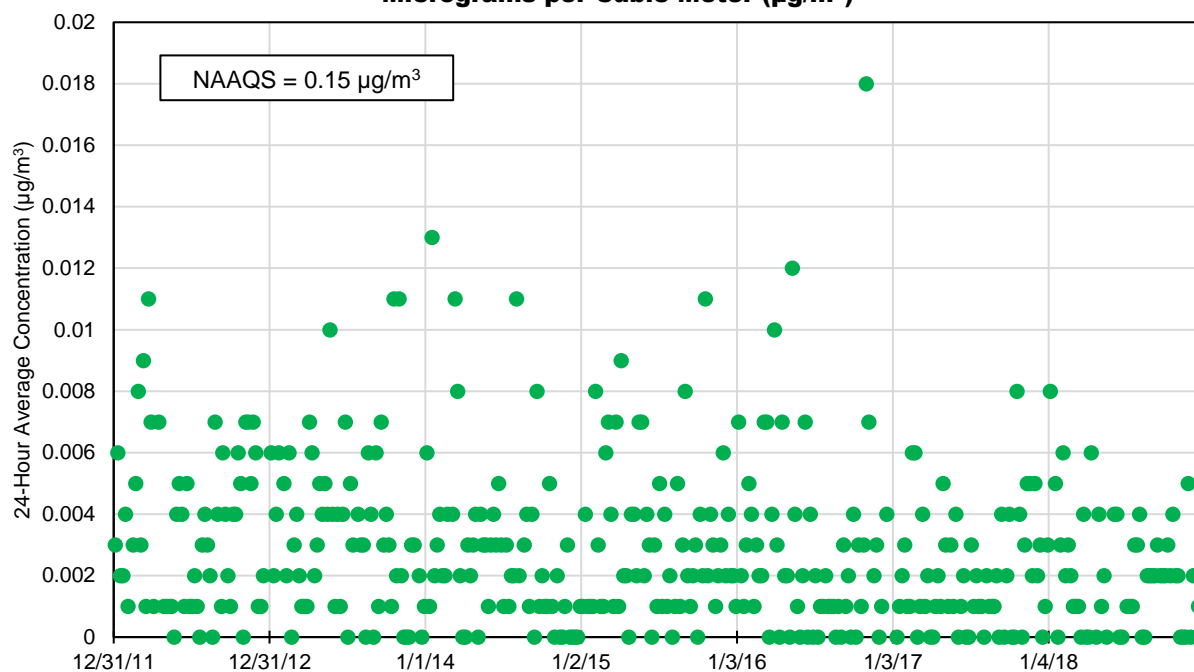


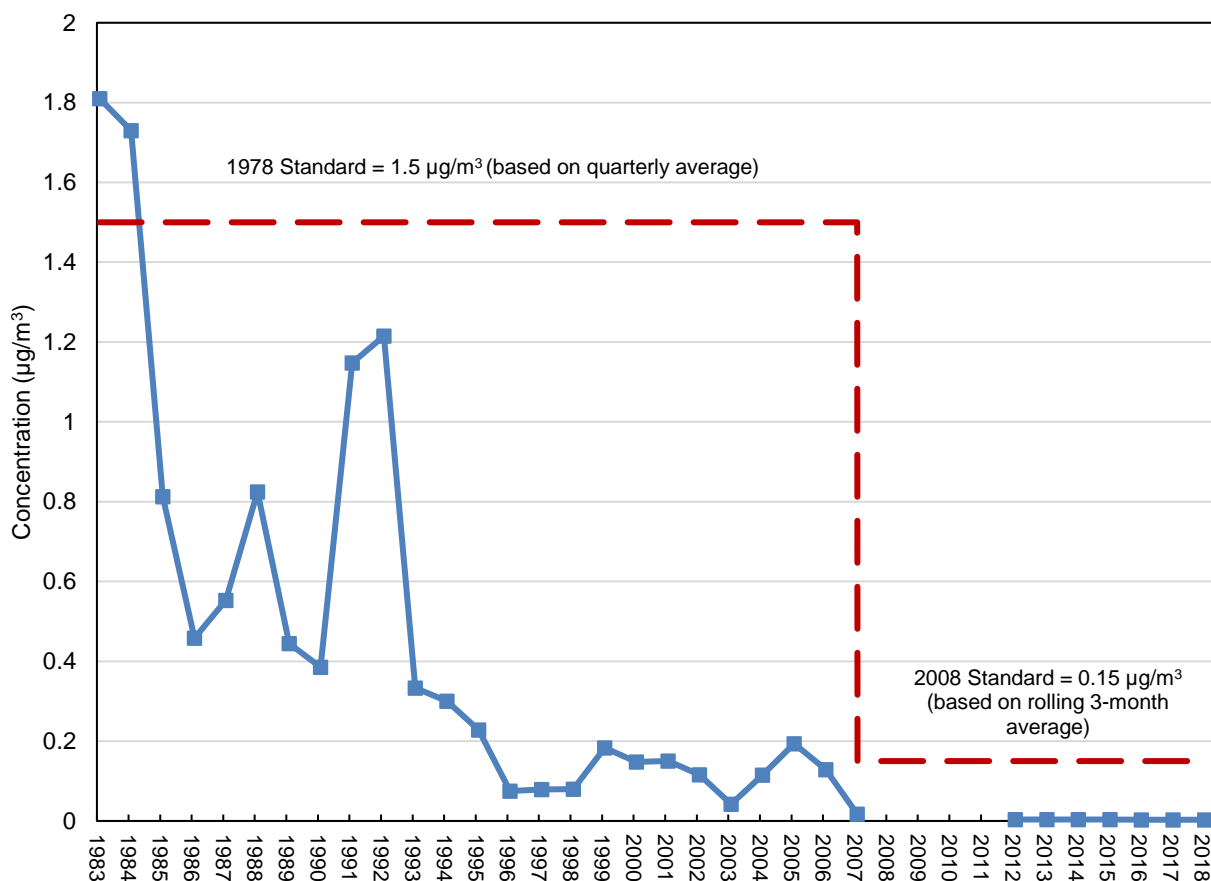
Table 9-1
2018 Lead Concentrations in New Jersey
3-Month Rolling Averages
Micrograms per Cubic Meter ($\mu\text{g}/\text{m}^3$)

3-Month Period	3-Month Average
November-January	0.003
December-February	0.003
January-March	0.002
February-April	0.002
March-May	0.001
April-June	0.001
May-July	0.001
June-August	0.001
July-September	0.001
August-October	0.002
September-November	0.002
October-December	0.001

LEAD AIR TREND

The last exceedances of the NAAQS were in 1983 and 1984 (as shown in Figure 9-2), and the last exceedance of the NJAAQS was in 1992 (based on a rolling 3-month average; not shown in the graph). Since then, air concentrations of lead in New Jersey have dropped considerably. The highest annual 3-month rolling average concentrations at Newark Firehouse since 2012 have ranged from 0.003 to 0.004 $\mu\text{g}/\text{m}^3$.

Figure 9-2
Lead Design Value Trend in New Jersey, 1983-2018
Highest 3-Month Average
Micrograms per Cubic Meter ($\mu\text{g}/\text{m}^3$)



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