

Tests by NRDC and Oceana Find High Mercury Levels Near Wisconsin Chlorine Plant

This section discusses the results of air monitoring performed by NRDC and Oceana around the ERCO Worldwide chlor-alkali plant in Port Edwards, Wisconsin in June 2006 and presents recommendations for EPA and state officials to address pollution from mercury-cell chlor-alkali plants.

Mercury-cell chlor-alkali plants, chemical plants that manufacture chlorine and caustic soda (lye) using mercury-based production techniques, are large sources of toxic mercury pollution. About 90 percent of the chlorine manufactured in chlor-alkali plants in the U.S. is made without the use of mercury, but eight chlor-alkali plants continue to use obsolete mercury technology (two of them have announced they will end mercury use by the end of 2008). From 2002 to 2004 the mercury-cell chlor-alkali industry reported releasing 23 tons of mercury to the air, water and land, but could not account for an additional 65 tons of the mercury it consumed during that period. This has raised fears that a significant portion of this mercury may have been released to the environment.

Mercury released by these plants pollutes the air in surrounding areas and eventually finds its way into water bodies where it contaminates fish that people eat. People who live or work near mercury cell chlor-alkali plants may also be exposed to elevated levels of mercury through the air they breathe. Mercury exposure can cause learning and developmental problems in children, and cause a variety of neurological problems in adults. Recent air sampling in the vicinity of a mercury-cell chlor-alkali plant in Port Edwards, Wisconsin has confirmed the presence of high levels of mercury in the air, at concentrations far exceeding those found in remote locations without local mercury sources.

ERCO plant is the largest source of mercury in Wisconsin

Mercury-cell chlor-alkali plants are usually the worst mercury polluters in the states in which they operate. That is the case in Wisconsin, where the ERCO Worldwide chlor-alkali plant in Port Edwards is the largest mercury polluter in the state, with an industry-estimated 1,117 pounds reported released to the air in 2004, the most recent year for which data are available. This plant, which has been operating since 1967, in 2004 alone emitted 374 pounds more mercury to the air than the next largest mercury source in the state, the Pleasant Prairie Power Plant in Kenosha, which released 743 pounds. ERCO accounted for 29 percent of all reported air releases of mercury in Wisconsin in 2004.

Air monitoring finds high mercury levels

Air sampling around the ERCO Worldwide chlor-alkali plant in Port Edwards, WI in June 2006 conducted by the Natural Resources Defense Council (NRDC) and Oceana showed elevated mercury concentrations consistent with those detected near six other plants during a 2005 study (for the report, "Lost and Found," go to <http://www.nrdc.org/health/effects/chlor/contents.asp>). The maximum mercury level detected around the ERCO facility was 955 nanograms per cubic meter (ng/m³). This concentration is 38 times the maximum concentration detected in a rural unpolluted area in Waunakee with no known local mercury sources (only 25 ng/m³), and over 600 times the natural background concentration of 1.5 ng/m³ determined by Wisconsin's air sampling program. This maximum value greatly exceeds the "safe level" for chronic mercury exposure set by the Agency for Toxic Substances and Disease Registry (ATSDR) and EPA (200 ng/m³ and 300 ng/m³ respectively). The highest 30-minute average concentration found near the ERCO facility was 187 ng/m³, which is close to the ATSDR guideline.

Sampling run	Duration (minutes)	Monitor location	Mercury concentration		
			Min. (ng/m ³)	Max. (ng/m ³)	Avg. (ng/m ³)
Waunakee	10	Stationary sampling in control site in Waunakee, Dane County	ND	25*	ND
Port Edwards 1	30	Mobile sampling on State Hwy. 54, State Hwy. 73, and Nekoosa Junction	ND	319	--
Port Edwards 2	30	Mobile sampling on State Hwy. 54, State Hwy. 73, Wilhorn Rd., Greengrove Ln. and nearby unnamed roads	ND	41	--
Port Edwards 3	30	Mobile sampling on State Hwy. 73 and unnamed roads northwest of ERCO plant	ND	786	--
Port Edwards 4	15	Stationary sampling on School Forest Rd. west of ERCO plant	ND	228	63
Port Edwards 5	30	Mobile sampling near Nekoosa Junction, and stationary sampling along railroad tracks northwest of ERCO plant	ND	251	64
Port Edwards 6	30	Stationary sampling northwest of ERCO plant	ND	268	53
Port Edwards 7	30	Stationary sampling near Nekoosa Junction, north of ERCO plant	ND	955	122**
Port Edwards 8	30	Stationary sampling near Nekoosa Junction, north of ERCO plant	ND	542	52
Port Edwards 9	15	Stationary and mobile sampling on ERCO auxiliary parking lot east of ERCO plant	ND	28	7
Port Edwards 10	30	Mobile sampling on State Hwy. 73 and State Hwy. 54, and stationary sampling on State Hwy. 54	ND	462	187
Port Edwards 11	15	Mobile sampling on State Hwy. 54, stationary sampling near intersection of State Hwy. 54 and 73 mobile sampling on State Hwy. 54, and stationary sampling on State Hwy. 54	ND	279	31

*The range of values recorded for this control site was -20 to 25 ng/m³. The "noise" around the zero baseline was significant relative to the low average concentration measured at this site (~0 ng/m³). Thus, values less than ~20 ng/m³ are indistinguishable from zero and other measured values are accurate to within +/-20 ng/m³.

** Excludes the last 10 minutes of sampling, when the instrument experienced interference that produced large negative values.

ND = Not detected

Maximum concentrations detected during nine of the eleven sampling runs near the ERCO plant exceeded the ATSDR Minimal Risk Level (MRL) for mercury of 200 ng/m³, and five of them exceeded the EPA Reference Concentration (RfC) of 300 ng/m³. While these reference values are for chronic exposure,

the average concentrations at some sites were also a concern. The site with the highest average concentration had a mercury level of 187 ng/m^3 , which is near the ATSDR "safe level" or MRL.

Mercury levels detected during our two days of sampling were within the range of values observed by the Wisconsin Department of Natural Resources (WDNR) in its earlier studies, although they did not reach the reach the $\sim 2,000 - 3,000 \text{ ng/m}^3$ values observed by WDNR during August and September 2002. Since we suspect that emissions from these facilities are episodic, and because airborne mercury levels at a given location are highly wind-dependent and wind direction is variable, our shorter sampling survey was less likely to detect such peak concentrations.



This aerial photo shows the sampling route. The red symbol indicates the location with the highest mercury concentration, 955 ng/m^3 . This level is 600 times higher than the natural background concentration measured by the Wisconsin Department of Natural Resources at a background site without mercury sources, 1.5 ng/m^3 . It is also 38 times higher than the maximum of 25 ng/m^3 NRDC and Oceana measured at a control site.

High mercury levels around other chlor-alkali plants

Mercury levels around the ERCO plant were the third highest found during a broad sampling study of other mercury-cell chlor-alkali facilities across the country performed by NRDC in 2005 (see Table 2).

Results of this study can be found at <http://www.nrdc.org/health/effects/chlor/contents.asp>.

Table 2. Airborne mercury concentrations around chlor-alkali plants			
Monitor location	Date	Mercury concentration	
		Minimum (ng/m ³)	Maximum (ng/m ³)
Pioneer Americas, St. Gabriel, LA	7/16/2005	ND	2,629
Olin Corporation, Charleston, TN	8/3/2005	ND	1,788
ERCO Worldwide, Port Edwards, WI	6/15/2006	ND	955
Occidental Chemical, New Castle, DE*	7/13/2005	8	618
PPG Industries, Lake Charles, LA	7/16/2005	ND	371
Olin Corporation, Augusta, GA	8/4/2005	ND	252
Occidental Chemical, Muscle Shoals, AL	8/2/2005	ND	103
"Safe levels" for chronic exposure:			
ATSDR Minimal Risk Level (MRL): 200 ng/m ³ ; EPA Reference Concentration (RfC): 300 ng/m ³			
* Concentrations at this site were recorded as ten-second averages, rather than second-by-second (instantaneous) measurements. The concentrations shown represent the minimum and maximum ten-second averages found during the sampling period. This plant closed in late 2005.			
ND = Not detected			

Recommendations

Mercury emissions from mercury-cell chlor-alkali plants pose significant health risks to those exposed to mercury in the air by inhalation, but the danger does not end there. Mercury settles into water bodies where it enters the food chain and accumulates in fish. People who consume mercury-polluted fish and children born to women who eat polluted fish during pregnancy are at higher risk of suffering neurological problems and learning disabilities. These risks attributable to mercury-cell chlor-alkali plants could be entirely prevented if EPA and state officials would take strong measures to put an end to mercury pollution from these plants.

We strongly recommend that EPA and state officials take the following steps to address this mercury emissions problem:

- 1. End mercury use.** EPA should require that the remaining mercury-cell chlor-alkali plants convert their production to widely available mercury-free technology such as membrane cells, which have already been adopted by most of the chlorine industry, by a date certain.
- 2. Require continuous mercury monitoring.** Until the process of converting to mercury-free technology is complete, EPA and state officials should require mercury-cell chlor-alkali plants to install air monitoring equipment to continuously monitor fugitive and stack mercury releases, set

enforceable emissions limits, and require the plants to act immediately to correct any problems that cause emissions at the facilities to exceed regulatory limits.

- 3. Test communities surrounding the plants.** EPA should immediately monitor mercury concentrations in air in the communities surrounding these chlor-alkali plants. State officials should also monitor mercury levels in residents of these areas to determine their levels of mercury exposure and take remedial measures if necessary.