ALASKA TOP HAZARDOUS AIR POLLUTANTS

MANGANESE COMPOUNDS

#5	Non Cancer Endpoints

Reference Concentration

- Manganese Compounds- 0.00005 mg/m^3 for impairment of neurobehavioral function - humans

Inventory Estimates of Manganese Compounds

Community	Ranking by Mass	Total Emitted (tons per year)*	Top Sources
Anchorage	48 of 71	0.065	residential woodstoves, military
Fairbanks	32 of 58	0.791	residential woodstoves, power generation
Juneau	37 of 52	0.032	residential heating with oil
Total of 3 Communities		0.888	

* The mass emission rates are based on input data that may or may not be accurate. The reader should not consider the inventory accurate to three decimal places (one thousandth of a ton). The use of three decimal places allows us to acknowledge small quantities of pollutants rather than showing the emission rate as zero.

Manganese Compound Sources Expected in Alaska

vehicles	locomotives	boats and ships
non-road sources like chainsaws, snow blowers, snowmobiles, outboards, and personal watercraft	asphalt plants	residential woodstoves
open burning	residential heating-oil and natural gas	seafood processing
airports	hospitals	power

		generators
military bases	incinerators	mines

Potential Occupational Exposure to Manganese Compounds

mines	ore processing	battery plants
ferromanganese plants	steel production	

Manganese Compound Emission Inventory Improvements

- Update emission factors for locomotives and barges
- Update emission factors for asphalt plants, residential woodstoves, open burning and residential heating with oil
- Update emission factors for area source and point source facilities

Manganese Compound Health Effects

Low level (< 0.3 mg/m^3): Little evidence to support neurological impairment from exposures below this level.

Medium level (0.3 - 5 mg/m^3): Increasing symptoms of neurological impairment in workers. Exposure to 5 mg/m^3 for one or more years lead to clinical signs of intoxication - changes in brain activity. Possible increase in bronchitis.

High level (>5 mg/m^3): 30 minute exposures to 30 mg/m^3 led to manganese intoxication in some. Chronic exposures lead to apathy, anorexia, and weakness. Eventually, exposures greater than 30 mg/m^3 can lead to manganese psychosis, or "manganism" or "manganese madness", defined by unaccountable laughter, euphoria, impulsiveness, insomnia, speech disturbances, mask-like face, stumbling gate, and many other problems. Some evidence for this disease at lower (5 mg/m^3) exposure concentrations. Increase incidence of bronchitis.

Cancer ranking: EPA has classified manganese as a Group D, not classifiable as to carcinogenicity in humans.