RADIONUCLIDES (including Radon, Radium and Uranium)

#4	Minimum Risk Level

The inventory method and available data do not indicate emissions occurring in the three inventoried communities. However, this does not mean there are no emissions of this pollutant in the state.

Minimum Risk Level

- Uranium - 0.0003 mg/m^3 for kidney lesions - dogs

Inventory Estimates of Radionuclides

Community	Ranking by Mass	Total Emitted (tons per year)	Top Sources
Anchorage*	n/a	---	n/a
Fairbanks*	n/a	---	n/a
Juneau*	n/a	---	n/a
Total of 3 Communities		---	

* No data to indicate emissions

Radionuclide Sources Expected in Alaska

The methods used to calculate the inventory numbers do not capture every pollutant source. There is evidence of radon in Alaskan homes, especially in areas of the interior. Further, use of radioactive materials for scientific research at universities also occurs - see occupational exposures.

Potential Exposure to Radionuclides

mining (radium and uranium)	intermediate in production of nuclear technology (uranium)	nuclear reactors (uranium)
smelting (uranium)	release from nuclear warheads	radon in building from water and soil off-gassing

Radionuclide Emission Inventory* Improvements

* No data to indicate emissions

Radionuclide Health Effects

General: Short term, high dose exposures - Blood cell death occurs from 200 to 1000 rads (radiation absorbed dose - the basic unit of measure for absorbed energy per unit mass of material. Absorbed radiant energy heats, ionizes, and/or destroys the material which it hits.) Death and dysfunction of intestinal cells occurs at exposure from 600 to 2000 rads. 5000 rads or more produces the blood cell and intestinal effects, as well as affecting the brain causing vomiting, drowsiness, tremors, stumbling, and within a few days, death.

Radium: There is not a lot of data correlating air concentrations to specific health effects. Inhalation of sufficient dose can lead to lung and bone cancer, inflammation of the bone, skin damage and thickening, and abnormal blood cell counts.

Uranium: Kidney toxicity is the primary toxic effect of the metal itself, discounting the effects of its radioactivity. It exerts effects on the heart, liver, muscle and nervous system as well. Externally, it is not much of a radiation hazard, but is if inhaled or ingested. Primary radioactive health effects come from disintegration of uranium into its radioactive isotopes like radon.

Radon: Associated with excess lung cancer in miners. Long term exposures in homes linked to increase lung cancer.

Cancer ranking: Considered human carcinogens. However, dose response relationship not identified yet.

ALASKA TOP HAZARDOUS AIR POLLUTANTS
