



## Environmental Science and Research Foundation

### Results of INEEL Offsite Environmental Surveillance Program Fourth Quarter, 1998

The Environmental Science and Research Foundation samples pathways by which radioactive contaminants, called radionuclides, could potentially reach members of the public from operations at the Department of Energy's Idaho National Engineering and Environmental Laboratory (INEEL). **Environmental surveillance during the fourth quarter of 1998 (October - December) found no radionuclides in the offsite environment attributable to the INEEL.** The pathways sampled during the fourth quarter were air, potatoes, milk, water, environmental radiation, game animals, and fine particulate matter. A total of 588 samples were collected and analyzed. Detailed results are presented in the report, *Idaho National Engineering and Environmental Laboratory Offsite Environmental Surveillance Program Report: Fourth Quarter 1998* [ESRF-029(4QT98)], which is available on the Foundation's web site at <http://esrf.org>.

**Air** – The Foundation maintained a network of 17 continuously-operating air samplers on and near the INEEL. Three of these were located on the INEEL; nine were offsite, but on the INEEL boundary; and the remaining five were distant from the INEEL. Air filters from the samplers were collected weekly for analysis. The filters were analyzed weekly for “gross” activity – a measurement of the total amount of radioactivity per milliliter of air pulled through the filter. (For example, gross alpha measures all of the alpha-emitting radionuclides in a sample, but does not identify the radionuclides.) At the end of the quarter, all of the filters from each location were combined and analyzed for specific radionuclides. Charcoal cartridges included with the air filters trapped iodine-131, which exists as a gas. These cartridges were analyzed weekly. Atmospheric moisture and precipitation samples were collected and analyzed for tritium, a radioactive form of hydrogen.

- \* All concentrations of radionuclides were within the range typical of background radioactivity. Background radioactivity comes from natural sources as well as from above-ground nuclear weapons testing conducted during the 1950s, '60s, and early '70s.
- \* Gross alpha and gross beta concentrations were within expected ranges, representing background radiation.
- \* The average of weekly gross beta concentrations observed at stations on the INEEL was significantly higher than that of the distant stations. There was no statistical difference between the average of weekly gross beta concentrations observed at stations on the INEEL and boundary stations.
- \* No human-made radionuclides (strontium-90, iodine-131, plutonium, or americium-241) were found in any sample.
- \* Tritium was found in one atmospheric moisture sample from Idaho Falls. The amount detected was very low and can be attributed to natural cosmic radiation or statistical fluctuations.
- \* Tritium was found in one precipitation sample from the Experimental Field Station on the INEEL. This may be from INEEL operations, but the low level found was consistent with concentrations attributed to natural causes.

**Potatoes** – Seven potato samples were collected and analyzed for gamma-emitting radionuclides, such as strontium-90.

- \* Strontium-90 was detected in three of the potato samples. The concentrations found were consistent with past results seen in

potatoes and are likely due to worldwide fallout from above-ground nuclear weapons testing and nuclear accidents.

**Milk** — Milk samples were collected weekly from a dairy in Idaho Falls and monthly from eight other dairies across southeastern Idaho. Each milk sample was analyzed for iodine-131. Selected milk samples were analyzed for strontium-90.

- \* Iodine-131 was not detected in any of the 38 samples.
- \* Strontium-90 was found in one of the four samples tested for this radionuclide. The concentration found was consistent with concentrations found in milk throughout the world from historic above-ground nuclear testing and past nuclear accidents, such as Chernobyl.

**Water** — The Foundation collected 18 surface and drinking water samples. Surface water sampling locations included springs in the Magic Valley that are outlets for the Snake River Plain Aquifer which runs under the INEEL. Each sample was tested for tritium, gross alpha, and gross beta.

- \* No samples contained detectable concentrations of tritium.
- \* One sample contained a detectable amount of gross alpha activity.
- \* All samples contained gross beta activity. The concentrations of both gross alpha and gross beta found were consistent with those acquired naturally as water flows through deposits of uranium and thorium in the earth's crust.

**Environmental Radiation** — A network of 14 thermoluminescent dosimeters (TLDs) monitors environmental radiation around the INEEL. TLDs are collected every May and November. They provide a direct measure of radiation occurring in the environment.

- \* No differences were found in radiation exposure between locations near to and distant from the INEEL. Amounts of radiation measured were similar to those seen in previous years.

**Game** — The thyroid glands, muscle, and liver from two elk and five mule deer accidentally killed on INEEL roads were analyzed for gamma-emitting radionuclides, such as iodine-131 and cesium-137.

- \* No iodine-131 was found in any of the samples.
- \* Muscle samples from one elk and four deer contained low concentrations of cesium-137. A liver sample from one of these deer also contained cesium-137. These small concentrations are within the range of values observed in past wild game samples and can be attributed to the ingestion of radionuclides from worldwide fallout from above-ground nuclear weapons testing.

**Fine Particulate Matter (PM-10)** — A network of three PM-10 air samplers collects 24-hour samples every sixth day to measure tiny particles of dust in the air. Such particles are small enough for a person to breathe and may cause health problems. PM-10 samplers are located at Community Monitoring Stations in Blackfoot and Rexburg. An additional sampler is located in Atomic City.

- \* Dust concentrations averaged 26 micrograms per cubic meter in Rexburg, 11 micrograms per cubic meter in Blackfoot, and 18 micrograms per cubic meter in Atomic City. These averages are well below the regulatory standard of an annual average of 50 micrograms per cubic meter, with a maximum 24-hour concentration of 150 micrograms per cubic meter.

**For questions or more detailed results, contact:**

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