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Los Alamos to present new data on water-borne contaminants

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LOS ALAMOS, N.M., September 23, 1997 — Los Alamos National Laboratory researchers on Wednesday will present to the public new information about pre-1960s plutonium that has moved beyond Laboratory boundaries.

In response to a request from Cochiti Pueblo leaders, Los Alamos researchers recently analyzed sediment from a U.S. Geological Survey core sample taken from the bottom of Cochiti Reservoir. Using a sensitive analytical process called thermal ionization mass spectrometry, the researchers were able to take "isotopic fingerprints" of radionuclides found in the sediment and determine how much plutonium was deposited by worldwide fallout from above-ground nuclear weapons tests and how much came from pre-1960s Laboratory operations.

The analysis shows that about 50 percent of the plutonium-239 and 240 found in the sediments came from early Laboratory operations; the remaining plutonium came from fallout dispersed by above-ground nuclear tests. Most recent estimates indicated that Laboratory-derived plutonium ratios in Rio Grande sediments ranged from 10 to 20 percent.

But although the Laboratory ratio found in the core sample is on the high end of previous estimates, the overall amount of plutonium in the sediments - one quadrillionth of a gram of plutonium per gram of sediment - is the same as what researchers had found in previous analyses performed since the early 1980s as part of Los Alamos' Environmental Surveillance Program.

In contrast to portions of the USGS core, sediment samples scooped from the top layers of the reservoir bottom by researchers at five other locations showed little or no evidence of Laboratory-derived plutonium. Worldwide fallout was the predominant source of plutonium in those samples.

"Because the higher-than-expected ratio was found only in the USGS core sample, we don't know if the result is representative of all sediments in the reservoir," said Bruce Gallaher, a Los Alamos hydrologist who will talk about the research at a public meeting planned for 6 p.m. Wednesday at Fuller Lodge.

Gallaher stressed that the plutonium levels in the lake sediments are low.

"We have not found any radiological concerns that would affect the use of Cochiti Reservoir," he said. "If Cochiti Reservoir were drained, someone living on top of the sediments would receive an increased radiological dose of about 1 percent above naturally occurring background radiation levels."

In addition, no plutonium has been found to have leached into reservoir water and none has been found in fish living in the reservoir, Gallaher said.

Based on the isotopic analysis of the Cochiti Reservoir core and other sediments, researchers say that the plutonium entering the Rio Grande from the Laboratory originated from activities during the Manhattan Project and the early 1950s. Plutonium used at the Laboratory from more recent times has a different isotopic fingerprint and has not been seen along the Rio Grande.

Historically, small amounts of pre-1960s Laboratory contaminants migrated beyond Laboratory boundaries in sediments that were moved by storm runoff during early operations. Until 1964, effluent was discharged into Acid Canyon. The contaminants included plutonium-238, 239 and 240; strontium-90 and cesium-137. Researchers estimate that a total of two to 12 grams of plutonium were

In lower Los Alamos Canyon, sediments mix with clean sediments as they make their way toward the Rio Grande. Consequently, plutonium concentrations in lower Los Alamos Canyon are 1 percent of concentrations found in Acid Canyon.

After its construction in 1973, Cochiti Reservoir has acted as a trap for radionuclides coming from Los Alamos Canyon and from fallout. Researchers previously were unable to determine the relative proportions from these two sources because they exist in such minute quantities.

Los Alamos scientists only recently were able to determine the isotopic fingerprint of plutonium in Cochiti sediments thanks to the mass spectrometry process, which can provide extremely precise measurements on extremely small quantities of materials.

In addition, Los Alamos researchers analyzed the Cochiti Reservoir sediment for uranium isotopes. They didn't find any depleted uranium, which has been used in some Laboratory activities.

Researchers also completed calculations that compare radiological levels from Cochiti Reservoir to other reservoirs upstream from Cochiti. They found that plutonium-239 and 240 levels in Cochiti Reservoir sediments are higher than in sediments from Abiquiu, El Vado and Heron reservoirs. The greatest difference was between Cochiti and Abiquiu, which had levels three-and-a-half times lower than those seen in Cochiti.

However, plutonium levels in Rio Grande Reservoir, located at the headwaters of the Rio Grande in Southern Colorado, and Elephant Butte Reservoir in Southern New Mexico were similar to those found in Cochiti.

At all sites, plutonium levels are less than 0.1 percent of screening action levels used by Los Alamos' Environmental Restoration Project as an initial standard by which to judge whether further study or remedial action is required.

Gallaher said best estimates indicate that contaminant concentrations in Cochiti Reservoir should remain at the same magnitude in the coming years. About three fourths of the pre-1960s plutonium released from Acid Canyon and DP Canyon - which received contamination during early plutonium processing activities - still resides in lower Pueblo Canyon.

To prevent migration of modern contaminants beyond its boundaries, Laboratory personnel have installed sediment traps in Mortandad Canyon that retain most, if not all, contaminated sediments that move down the canyon. Los Alamos officials also have undertaken a comprehensive watershed management planning process to identify any waste sites that must be stabilized or monitored.

As part of environmental surveillance activities - which have gone on since the 1940s - researchers in Los Alamos' Water Quality and Hydrology Group have set up surface water sampling stations on the Rio Grande, the Rio Chama and the Jemez River and are sampling storm water runoff in numerous locations near the Laboratory's perimeter.

They also sample groundwater and stream sediments. The samples are analyzed for radionuclides, metals, volatile and semivolatile organic chemicals, and other chemicals.

Wednesday's meeting is the second in a series of quarterly environmental meetings being hosted by the Laboratory to answer questions that people may have about Laboratory operations. The meetings are part of a negotiated settlement of a lawsuit brought against the Laboratory by Concerned Citizens for Nuclear Safety for failure to comply with the federal Clean Air Act.

In addition to the sediment results Gallaher will present, the meeting will feature a discussion of panelists from the University of New Mexico, Concerned Citizens for Nuclear Safety, San Ildefonso Pueblo, Cochiti Pueblo, the Pajarito Chapter of the Sierra Club, New Mexico Environment

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