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Los Alamos, New Mexico 87545

DATE: May 17, 1993
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Ms. Kathleen M. Sisneros, Director
Water and Waste Management Division
Environment Department
P. O. Box 26110
Santa Fe, New Mexico 87502

**THRU: ALLEN J. TIEDMAN, ASSOCIATE DIRECTOR FOR OPERATIONS**

Dear Ms. Sisneros:

The question of the possible presence of Cesium-137 in water that is or could be used for human consumption has received our serious attention. We understand your concern over the values we have reported for Cesium-137 measurements of samples of water from the main aquifer, the source of public water supply for Los Alamos as well as the Pueblo of San Ildefonso. In the annual Environmental Surveillance Report (ESR) we tabulate all data from these sources and compare the results with the standards applicable to drinking water systems. In the 1990 ESR several values were reported for individual wells that, considering their statistical uncertainty could be, but were not necessarily, above the standards applicable to DOE drinking water systems.

The samples in question came from the Los Alamos water supply wells, the Laboratory test wells in the main aquifer, several community and private water supply wells on San Ildefonso Pueblo, and springs along White Rock Canyon. The concern, if Cesium-137 were actually present in water in the main aquifer from wells in Los Alamos Canyon, is that it could be an indication of contaminants moving downward from the known (and routinely monitored and reported) radioactive contamination in the Los Alamos Canyon stream channel and alluvial perched groundwater. The known contamination in Los Alamos Canyon includes cesium, plutonium, strontium, and tritium.

In 1990, the Department of Energy (DOE) issued guides applicable to drinking water systems in order to have concentrations that correspond to a 4 mrem a year dose from the drinking water pathway. They were calculated as 1/25 of DOE's Derived Concentration Guides applicable to uncontrolled areas. Thus, in the 1990 ESR we reported a number of measurements for Cesium-137 that, considering their statistical uncertainty, might be greater than the new DOE drinking water guidance. (That DOE guidance of 120 pCi/L corresponds closely with the EPA calculated value of 119 pCi/L contained in Appendix B of the proposed rules at 56 FR 33120.) Similar ranges of Cesium-137 measurements were obtained on samples collected during the 1991 and 1992 sampling, though not at the identical locations. There has not been any change in the ranges of actual measurement values over the years, either before or since 1990. Additionally, there are no corroborating measurements indicating the presence in the main aquifer of any of the other radioactive contaminants from the Los Alamos Canyon surface, including the much more mobile tritium. Thus, we do not expect that any real contamination of the main aquifer by Cesium-137 from Los Alamos Canyon has occurred. Nevertheless, the standard analytical methodology is not adequate to answer the question with certainty either way.

The Environmental Protection Group (EM-8) and the Environmental Chemistry Group (EM-9) have discussed the need for improvements in detection limits for some time. Initial attempts to improve the detection limits by using different instruments and longer counting times were not sufficient. In the fall of 1992, EM-9 initiated work on a completely new method. The status of progress was reported by EM-9 on March 16, 1993. That new method achieves a detection limit of about 2 pCi/L, well below the DOE Derived Concentration Guide for Drinking Water Systems of 120 pCi/L. Accordingly the new measurements should provide a high statistical confidence of whether Cesium-137 is present or not, at levels considerably below the guide.

The normal method detection limit for Cesium-137 by direct Gamma Spectroscopy of water samples was about 40 pCi/L (as shown in Table C-26 of the 1990 annual monitoring report, which you note in your letter). To achieve a detection limit of 12 pCi/L Cesium-137 or lower, which would correspond with requirements in the New Mexico State Regulations Governing Water Supplies, Section 306.C.2, EM-9 has modified the sample preparation step to concentrate the Cesium-137 and has obtained a massive box of pre-World War II steel for improved shielding. The new procedure, which is more efficient than the suggested co-precipitation and chemical preparation method, has a detection limit of 2 pCi/L. This detection limit meets the needs for the analysis.

The new analytical procedure described above is now being applied to both archived and new water samples. Group EM-9 had archived portions of more than 100 of the water samples collected during Calendar Year 1992, including all of those taken from the Los Alamos water supply wells and the wells on San Ildefonso lands in August and October. These samples are currently being processed for analysis by the new method. Some new results should be available after full laboratory Quality Assurance review in about a month. However, it will be three or more months before all of the archived samples can be rerun, because of competing priorities for newly collected samples.

The routine sampling of water supply wells and test wells in the main aquifer of Los Alamos is planned to take place during May of this year. The collection of samples from San Ildefonso locations under the terms of the Memorandum of Understanding among the Bureau of Indian Affairs, the Department of Energy, and the Pueblo de San Ildefonso is now being planned by our staff along with personnel from the Bureau of Indian Affairs and the Pueblo de San ildefonso. Members of the Environment Department were included in some of those activities last year. We hope that sampling will occur in May, and will inform you as the specific plans become definite.

We invite the Environment Department to participate in the sampling of both the LANL wells and the San Ildefonso wells and to provide independent duplicate analyses for comparison and validation of our results. This would be appropriate as the EM-9 laboratory is not certified for making measurements to show compliance with drinking water standards. We will request the State Scientific Laboratory to perform isotopic specific Cesium-137 analyses on samples collected this year from the Los Alamos water supply distribution system for determining compliance with the State Regulations Governing Water Supplies.

If you wish additional information about the water samples, please contact Alan Stoker of the Environmental Protection Group (7-0818) If you wish additional information about the analytic procedures, please contact Craig Leasure of the Environmental Chemistry Group (7-3269).

Sincerely,

Thomas C. Gunderson,
Division Leader
Environmental Management

TCG/AS:smm

Attachment: a/s

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