



UNITED STATES DEPARTMENT OF COMMERCE
National Institute of Standards and Technology
Gaithersburg, Maryland 20899-

OFFICE OF THE DIRECTOR

May 7, 2009

Mr. Arthur T. Howell, III
Director, Division of Nuclear Materials Safety
U.S. Nuclear Regulatory Commission, Region IV
612 East Lamar Boulevard, Suite 400
Arlington, TX 76011-4125

Subject: Confirmatory Action Letter Item 4.a: Assessment of Release of Plutonium to the
City of Boulder Sanitary Sewerage

Dear Mr. Howell:

As you know, the July 2, 2008 Confirmatory Action Letter (CAL) required NIST "to provide a written report of [its] assessment of the release of plutonium into the sanitary sewerage pursuant to the provisions of 10 CFR 20.2003 and the applicable limits specified in Table 3 of Appendix B to 10 CFR Part 20. In addition to providing your assessment to the NRC, you will also provide the results of your assessment to the Hazardous Materials and Waste Management Division of the Colorado Department of Public Health and Environment, and the City of Boulder, Waste Water Treatment Facility."

In that regard, I have enclosed a report detailing the results of NIST's final assessment of the release that occurred as a result of an individual washing his hands in a laboratory sink following the spill on June 9, 2008. This report supersedes all previous reports to the Nuclear Regulatory Commission on the release to the sanitary sewerage.

The report indicates that the release to the City of Boulder sanitary sewerage did not exceed the applicable limits specified in Table 3 of Appendix B to 10 CFR Part 20. Also, the City of Boulder completed surveys, sponsored by NIST, of the sanitary sewerage and of biosolids collected subsequent to the incident. The surveys found no significant differences between the measured concentrations and background.

As required by the CAL, I am also providing this letter and the enclosed report to the Hazardous Materials and Waste Management Division of the Colorado Department of Public Health and Environment and to the City of Boulder Waste Water Treatment Facility.

If you have any questions, please contact me at 301-975-2300 or richard.kayser@nist.gov.

Sincerely,

Richard F. Kayser
Chief Scientist

Enclosure

cc: Colorado Department of Public Health and Environment
Hazardous Materials & Waste Management Division
Attn: Gary Baughman, Director
HMWMD-B2
4300 Cherry Creek Drive South
Denver, CO 80246-1530

City of Boulder
Water Quality and Environmental Services
Attn: Mr. Ridge Dorsey
4049 North 75th Street
Boulder, CO 80301



May 6, 2009

MEMORANDUM FOR File

From: Timothy Mengers
Leader, Health Physics Group, Safety Health and Environment Division
National Institute of Standards and Technology

Subject: Final Boulder Plutonium Spill Effluent Release Determination

A combination of gamma spectroscopy measurements, smears, and direct readings were performed by Department of Energy Radiological Assistance Program teams and EnergySolutions, Inc. contract personnel on the material remaining in the broken vial and the contaminated material recovered from the lab during the decontamination process. These measurements have been used to determine the fraction of material retained in the facility following the June 9, 2008 Plutonium spill at the NIST Laboratories in Boulder, Colorado. Subtracting this retained fraction from the original source term provides the estimate of the material that may have been released to the sanitary sewer. The NIST Boulder facility effluent rate is monitored for a 24 hour period every other month. Measurements made on May 5, 2008, preceding the incident, and July 1, 2008, following the incident, yielded an average daily effluent rate of 8.972×10^8 ml/day.

The following table summarizes the results of the effluent concentration calculations and compares these against the regulatory limits.

Primary Source Isotopes	Maximum Estimated Release 16% of original source term uCi	30 day Average Release Concentration uCi/ml	% of release limits (per 10CFR20 appendix B table 3)
Pu-238	5.2E+01	1.9E-09	1%
Pu-239	2.2E+03	8.3E-08	42%
Pu-240	7.0E+02	2.6E-08	13%
Pu-241	3.4E+03	1.3E-07	1%
Pu-242	5.1E-02	1.9E-12	0%
Daughter Isotopes			
U-234	7.9E-03	2.9E-13	0%
U-235	9.8E-05	3.6E-15	0%
U-236	8.9E-04	3.3E-14	0%
Am-241	7.7E+02	2.9E-08	14%
Np-237	7.3E-07	2.7E-17	0%
U-238	0.0E+00	0.0E+00	0%
Total	7,131	2.6E-07	71%

The data indicates that the release to the City of Boulder sanitary sewerage that occurred as a result of an individual washing his hands in a laboratory sink following the plutonium spill did not exceed the applicable sanitary sewerage release limits per 10 CFR 20 appendix B table 3.