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Date: OCT 08 2010
Refer To: EP2010-0459

Mr. Brian Snyder, Water Division Director
Acting Public Utilities Division Director
Sangre de Cristo Water Division
City of Santa Fe
801 West San Mateo
P.O. Box 909
Santa Fe, New Mexico 87504

Subject: Los Alamos National Laboratory Sitewide Monitoring Program Drinking Water Results for the City of Santa Fe Buckman Water Supply Wells

Dear Mr. Snyder:

This report, prepared by Los Alamos National Laboratory (the Laboratory), provides the analytical results from the June 8 and 22, 2010, sampling and analysis of the City of Santa Fe Buckman Water Supply Wells Nos. 1, 6, and 8. All results were below the U.S. Environmental Protection Agency (EPA) primary and secondary drinking water standards.

Routine monitoring of select Buckman water supply wells is conducted in accordance with the April 22, 2010, sampling and analysis plan cooperatively developed between the Laboratory and City of Santa Fe staff. Under this plan, Buckman Wells Nos. 1, 6, and 8 will be sampled quarterly by the Laboratory: twice per year for full-suite analysis (radiologicals [including tritium], general inorganics [including perchlorate], metals [including chromium], and organics); and twice per year for low-level tritium.

The attached CD also contains the following items: (1) General Engineering Laboratories (GEL) data packages; and (2) an Excel file of the analytical results with a glossary of laboratory qualification codes, secondary validation codes, and secondary validation reason codes. The analytical results are as follows.

Radiologicals: Analytical results from sampling Buckman Wells Nos. 1, 6, and 8 for radionuclides are presented in Table 1.0.

- **Americium-241, Cesium-137, Neptunium-237, Plutonium-238, Plutonium-239/240, and Strontium-90**: All results at all locations were nondetect, as indicated by the analytical laboratory qualifier code "U."

- **Gross Alpha:** The gross-alpha activities at Buckman Wells Nos. 1, 6, and 8 were 11.2 pCi/L, 8.50 pCi/L, and 12.9 pCi/L, respectively. All results were below the EPA maximum contaminant level (MCL) for gross alpha in drinking water of 15 pCi/L.

- **Gross Beta:** Gross-beta activities at Buckman Wells Nos. 1, 6, and 8 were 6.29 pCi/L, 5.31 pCi/L, and 5.81 pCi/L, respectively. All results were below the EPA screening level for gross beta in drinking water of 50 pCi/L (40 Code of Federal Regulations § 141.26).

- **Combined Radium-226 and Radium-228:** The combined radium-226 and radium-228 activities at Buckman Wells Nos. 1, 6, and 8 ranged from nondetect (lab qualifier code "U") to a maximum value of 2.1 pCi/L. The results at all locations were below the EPA MCL of 5 pCi/L for the combined radium-226 and radium-228 in drinking water.

- **Tritium:** Tritium results were pending at the time this report was prepared.

- **Isotopic Uranium:** Unfiltered samples from Buckman Wells Nos. 1, 6, and 8 were analyzed for isotopic uranium using alpha spectroscopy (alpha spec), an analytical method that indirectly measures the alpha activity in a sample. Using alpha spectroscopy, GEL analyzed the samples for uranium isotopes, uranium-234, uranium-235/236, and uranium-238. EPA has not established an activity-based MCL for uranium isotopes in drinking water; the current EPA MCL of 30 µg/L is a mass-based standard.

  The mass of total uranium in the sample was calculated using the following formula, which incorporates the specific activities for the isotopes:

$$\text{Total uranium } (\mu g/L) = (^{234}U/6250) + (^{235/236}U/2.16) + (^{238}U/0.336)$$

  The calculated concentrations of total uranium are presented in the table below, along with the results obtained from inductively coupled plasma mass spectrometry (ICPMS) analysis (see Table 3.0). All results were below the EPA MCL for uranium in drinking water of 30 µg/L.

Total Uranium Concentrations, Buckman Wells Nos. 1, 6, and 8. June 2010.

All Units: µg/L	Buckman Well No. 1	Buckman Well No. 6	Buckman Well No. 8
Total U: Calculated	15.9	5.2	12.3
Total U: ICPMS	19.1	5.23	12.0

* FD = Field duplicate sample.

General Inorganics: The analytical results from sampling Buckman Wells Nos. 1, 6, and 8 for general inorganics are summarized in Table 2.0.

- **Perchlorate:** Perchlorate concentrations ranged between 0.31 µg/L and 0.39 µg/L. The perchlorate concentration at O-1 was 1.05 µg/L. Currently, neither the federal government nor the State of New Mexico has established a drinking water standard for perchlorate. On January 8, 2009, EPA issued an interim health advisory of 15 µg/L for perchlorate in drinking water, replacing the existing preliminary remediation goal of 24.5 µg/L.

- **Cyanide, Chloride, Fluoride, Nitrate+Nitrite, Sulfate, and Total Dissolved Solids:** Cyanide, chloride, fluoride, nitrate+nitrite (as N), sulfate, and total dissolved solids concentrations at all locations were below the EPA primary and secondary drinking water standards.

Metals: The analytical results from sampling Buckman Wells Nos. 1, 6, and 8 for metals are summarized in Table 3.0.

- **Arsenic:** The unfiltered arsenic concentrations at Buckman Wells Nos. 1, 6, and 8 were 9.1 µg/L, 5.8 µg/L, and 8.9 µg/L, respectively. All results were below the EPA MCL of 10 µg/L for arsenic in drinking water.

- **Chromium:** The filtered and unfiltered chromium concentrations at all locations ranged between nondetect (lab qualifier code "U") and 10.1 µg/L, well below the EPA MCL of 100 µg/L and the New Mexico groundwater standard of 50 µg/L.

Organics: The analytical results from sampling Buckman Wells Nos. 1, 6, and 8 for organics are summarized in Tables 4.0, 5.0, and 6.0.

- **High Explosives (HE):** No HE compounds were detected at concentrations greater than GEL's method detection limit (MDL).

- **Polychlorinated Biphenyls (PCBs):** No PCBs were detected at concentrations greater than GEL's MDL.

- **Volatile Organic Compounds (VOCs):** No VOCs were detected in samples or in field trip blanks at concentrations greater than GEL's MDL, with the exception of the following:

  - Chloromethane (CAS#74-87-3) was detected at Buckman Well Nos. 1 and 6 at 0.42 µg/L and 0.35 µg/L, respectively. Both results were assigned the lab qualifier code "J" to indicate that the reported values were greater than the MDL but less than the practical quantitation limit. Buckman Well No. 1 has been sampled annually for chloromethane since 2004 with one previous detection in June 2005 (1.5 µg/L). Since 2008, Buckman Well No. 6 has been sampled annually for chloromethane with no detections. The EPA has not established an MCL for chloromethane in drinking water.

In summary, all results presented in this report are below EPA MCLs and New Mexico groundwater standards.

If you would like additional information regarding this report, please contact Bob Beers at (505) 667-7969 (bbeers@lanl.gov).

Sincerely,

Michael J. Graham, Associate Director
Environmental Programs
Los Alamos National Laboratory

MG/DM/SV/RB:sm

Attachment: CD with the following items:
(1) GEL data packages
(2) Excel file of Tables 1.0–6.0 and glossary of laboratory qualification codes, secondary validation codes, and secondary validation reason codes (LA-UR-10-6004)

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