Los Alamos
NATIONAL LABORATORY
EST. 1943
Los Alamos, New Mexico 87545
(505) 606-2337/FAX (505) 665-1812

National Nuclear Security Administration
Los Alamos Site Office, MS A316
Environmental Restoration Program
Los Alamos, New Mexico 87544
(505) 667-4255/FAX (505) 606-2132

Date: NOV 19 2010
Refer To: EP2010-0490

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 Surface Water Monitoring Results, Rio Grande at Otowi Bridge

Dear Mr. Snyder:

This report, prepared by Los Alamos National Laboratory (LANL or the Laboratory), provides analytical results from the May 10, 2010, sampling of the Rio Grande at Otowi Bridge. All results were below U.S. Environmental Protection Agency (EPA) drinking water standards, with the exception of the following naturally occurring metals.

- Aluminum (Al) was measured in an unfiltered sample at a concentration of 2570 µg/L; the EPA national secondary drinking water standard for aluminum is 50 µg/L to 200 µg/L. The concentration of aluminum in the filtered sample was <200 µg/L.

- Iron (Fe) was measured in an unfiltered sample at a concentration of 1810 µg/L; the EPA national secondary drinking water standard for iron is 300 µg/L. The concentration of iron in the filtered sample was <100 µg/L.

- Manganese (Mn) was measured in an unfiltered sample at a concentration of 98.1 µg/L; the EPA national secondary drinking water standard for manganese is 50 µg/L. The concentration of manganese in the filtered sample was 3.97 µg/L.

In a November 1, 2007, letter the Buckman Direct Diversion (BDD) Board requested that LANL and the U.S. Department of Energy (DOE) fund and implement six actions to protect public drinking water supplies (H. Montoya, Chair, BDD Board, to G. Rael, DOE, and S. Stiger, LANL). Pursuant to the letter's action item 2, *Properly monitor the transport of legacy contaminants in both the surface water and groundwater flow systems*, on July 30, 2008, LANL initiated bimonthly sampling of the Rio Grande at Otowi Bridge and at Buckman upstream of the BDD. This report presents the analytical results from the May 10, 2010, 9:10 a.m., sampling event at Otowi Bridge. The results from sampling the Rio Grande at Buckman were reported to your agency separately in an August 16, 2010, letter (EP2010-0358).

Analytical results from the May 10, 2010, event are summarized in Tables 1.0 to 6.0. The attached CD also contains an Excel file of Tables 1.0 to 6.0 and a glossary of laboratory qualification codes, secondary validation codes, and secondary validation reason codes. A discussion of the analytical results follows.

Radionuclides: Samples were collected from the Rio Grande at Otowi Bridge and submitted to General Engineering Laboratories, Inc. (GEL) and American Radiation Services Laboratory, Inc. (ARSL) for the analysis of radionuclides. Analytical results are summarized in Table 1.0. The results are discussed below.

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

- **Gross Alpha:** All filtered and unfiltered results were nondetect, as indicated by the analytical laboratory qualifier code "U."

- **Gross Beta:** Gross-beta activities in the filtered and unfiltered samples were 2.86 pCi/L and 3.09 pCi/L, respectively, below the EPA screening level of 50 pCi/L for gross beta in drinking water.

- **Tritium:** Tritium activity in an unfiltered sample was 17.18 pCi/L, below the EPA maximum contaminant level (MCL) of 20,000 pCi/L for tritium in drinking water and consistent with background atmospheric tritium levels in northern New Mexico of about 30 pCi/L.

- **Radium-226:** Radium-226 was not detected in the filtered sample, as indicated by the analytical laboratory qualifier code "U." Radium-226 was detected in the unfiltered sample at 0.48 pCi/L, below the EPA MCL for radium-226 in drinking water of 5 pCi/L.

- **Radium-228:** Radium-228 was not detected in the filtered sample, as indicated by the analytical laboratory qualifier code "U." Radium-228 was detected in the unfiltered sample at 1.8 pCi/L, below the EPA MCL for radium-228 in drinking water of 5 pCi/L.

- **Isotopic Uranium**: Filtered and unfiltered samples were submitted to GEL for isotopic uranium (U) analysis using alpha spectroscopy. The 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 uranium in each sample was calculated using the following formula, which incorporates the specific activities for the isotopes:

  $$\text{Total uranium } (\mu g/L) = ({}^{233/234}U/6250) + ({}^{235/236}U/2.16) + ({}^{238}U/0.336)$$

  The calculated concentrations of total uranium are presented below. These values are consistent with the total uranium results obtained from inductively coupled plasma mass spectrometry (ICPMS) analysis presented in Table 6.0. All results are below the EPA MCL of 30 µg/L for total uranium in drinking water.

Location	Field Prep (F/UF*)	Total Uranium –Calculated– (pCi/L)	Total Uranium –ICPMS– (pCi/L)
Rio Grande at Otowi Bridge	F	0.95	1.2
Rio Grande at Otowi Bridge	UF	1.1	1.4

* F = Filtered; UF = unfiltered.

Organics: Samples were collected from the Rio Grande at Otowi Bridge and submitted to GEL for the analysis of organics. The analytical results are summarized in Tables 2.0, 3.0, and 4.0 and are discussed below.

- **Volatile Organic Compounds (VOCs):** No VOCs were detected in the unfiltered sample or field trip blank (FTB) at concentrations greater than GEL's method detection limit (MDL).

- **Semivolatile Organic Compounds (SVOCs):** No SVOCs were detected in the unfiltered sample at concentrations greater than GEL's MDL.

- **Pesticides:** No pesticides were detected in the unfiltered sample at concentrations greater than GEL's MDL.

- **Polychlorinated Biphenyls (PCBs):** An unfiltered sample and unfiltered field blank (FB) were submitted to Cape Fear Analytical (CFA) for the analysis of 209 PCB congeners using analytical method EPA:1668A. Congeners are individual PCB compounds. Table 4.0 presents the total detected PCBs—the sum of detected PCB congeners—in each sample. The results are summarized below.

Location	Analyte	Field Prep	Result (µg/L)	Result (pg/L)	Lab Qual Code	Concat Flag Code	Fld QC Type Code
Rio Grande at Otowi Bridge	Total detected PCBs	UF*	<0.0000000	<0.00	U	U	
Rio Grande at Otowi Bridge	Total detected PCBs	UF	<0.0000000	<0.00	U	U	FB

* UF = Unfiltered.

The sample and FB were reported as nondetect for PCBs by CFA, as indicted by the analytical laboratory qualifier code "U." The EPA MCL for total PCBs in drinking water is 0.5 µg/L. Individual congener results have not been included in this report but are available online at RACER NM (http://www.racernm.com/).

General Inorganics: Samples were submitted to GEL for the analysis of general inorganics. Field measurements were taken for dissolved oxygen, conductivity, temperature, turbidity, and pH. The results are summarized in Table 5.0 and discussed below.

- **Perchlorate**: The unfiltered perchlorate concentration was 0.09 µg/L. Currently, neither the federal government nor the State of New Mexico has established a drinking water standard for perchlorate.

- **Cyanide, Fluoride, and Nitrate+Nitrite (as N):** All results were below EPA MCLs.

- **Chloride, Sulfate, Total Dissolved Solids, and pH:** All results were below EPA secondary drinking water standards.

- **Turbidity, Suspended Solids Concentration, and Streamflow:** Turbidity was measured at 47.6 nephelometric turbidity units (NTU). Turbidity values in the Rio Grande at Otowi Bridge have ranged from 10 to 121 NTU since July 2008.

  The unfiltered suspended solids concentration (SSC) was <10 mg/L. Since July 2008, SSC values in the Rio Grande at Otowi Bridge have ranged from <10 mg/L to 196 mg/L.

  The U.S. Geologic Survey (USGS) collects real-time streamflow data from the Rio Grande and Rio Chama. Daily mean discharge data for May 10, 2010, are presented below.

USGS Station Name	Date	Daily Mean Discharge (ft^3/s)
Rio Grande at Otowi Bridge (USGS 08313000)	5/10/10	4,080
Rio Grande at Embudo (USGS 08279500)	5/10/10	1,570
Rio Chama near Chamita (USGS 08290000)	5/10/10	2,060

Source: http://waterdata.usgs.gov/nm/nwis/current/?type=flow.

Metals: Filtered and unfiltered samples were collected from the Rio Grande at Otowi Bridge and submitted to GEL for metals analysis. All results are summarized in Table 6.0. The concentrations of filtered and unfiltered metals were below the EPA national primary and secondary drinking water standards, with the exception of the naturally occurring aluminum, iron, and manganese reported on page 1 of this report.

Particle Size: Results from the geotechnical laboratory were pending at the time this report was prepared and will be submitted when available under separate cover.

In summary, all results presented in this report are below EPA drinking water standards, with the exception of unfiltered aluminum, iron, and manganese.

If you have any questions, please contact Bob Beers at (505) 667-7969 (bbeers@lanl.gov) or Cheryl Rodriguez at (505) 665-5330 (crodriguez2@doeal.gov).

Sincerely,

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

Sincerely,

for

George J. Rael, Manager
Environmental Projects Office
Los Alamos Site Office

MG/GR/SP/BB:sm

Attachment: CD with Excel file of Tables 1.0–6.0 and glossary of laboratory qualification codes, secondary validation codes, and secondary validation reason codes (LA-UR-10-6841)

Cy: (w/enc.)
Virginia Vigil, Buckman Direct Diversion Board, Santa Fe, NM
Rick Carpenter, City of Santa Fe, Santa Fe, NM
Sandy Hurlocker, USDA, Santa Fe National Forest, Santa Fe, NM
Neil Weber, San Ildefonso Pueblo
James Bearzi, NMED-HWB, 2905 Rodeo Park Dr. East, Bldg 1, SFe, NM 87505
Steve Yanicak, NMED-DOE-OB, MS M894
Hai Shen, DOE-LASO, MS A316
Gene Turner, DOE-LASO, MS A316
Bob Beers, ENV-RCRA, MS K490
RPF, MS M707 (with two CDs)

Cy: (Letter and CD and/or DVD only)
Laurie King, EPA Region 6, Dallas, TX
Steve Paris, EP-CAP, MS M992
Danny Katzman, EP-ET-DO, MS M992
Suzanne Coyne, IRM-DCS, MS M992
William Alexander, EP-BPS, MS M992

Cy: (w/o enc.)
Tom Skibitski, NMED-OB, Santa Fe, NM
Annette Russell, DOE-LASO (date-stamped letter emailed)
Dave McInroy, EP-CAP, MS M992
James C. Cantwell, ADESHQ, MS K491
Mike Saladen, ENV-RCRA, MS K490
Michael J. Graham, ADEP, MS M991