

7A-35

**ENVIRONMENTAL  
RESTORATION  
PROJECT**

*Los Alamos National Laboratory/University of California*  
Risk Reduction & Environmental Stewardship (RRES)  
Environmental Restoration (ER) Project, MS M992  
Los Alamos, New Mexico 87545

Date: May 6, 2002  
Refer to: ER2002-0327

Mr. John Young, Corrective Action Project Leader  
Permits Management Program  
NMED – Hazardous Waste Bureau  
2905 Rodeo Park Drive East  
Building 1  
Santa Fe, NM 87505-6303



**SUBJECT: SAMPLING NOTIFICATION FOR WELL R-14**

Dear Mr. Young:

The Groundwater Investigations Focus Area will begin drilling of a borehole approximately 1664 feet deep for the installation of a regional groundwater characterization well, R-14, in Ten Site Canyon on or about May 17, 2002. This well is being installed as part of the Laboratory's Hydrogeologic Work Plan (LAAME:6BK-010; ESH-18/WQH-97-0014).

Samples will be collected during drilling as shown in the enclosed tables. If you have any questions, please contact me at (505) 667-0819.

Sincerely,

David McInroy  
Environmental Restoration Project

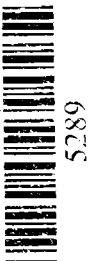
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Enclosure: Sampling Activities at R-14



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**Well R-14  
Sampling of Cuttings and Core**

Sample Description	Test	Sample Frequency
<b>Coring</b>		
Core	Anions and moisture	For upper 100 ft: Every 5 ft when drilling dry; otherwise every 10 ft. For below 100 ft: Every 50 ft
Core	Tritium	For upper 100 ft: Every 5 ft when drilling dry; otherwise every 10 ft. For below 100 ft: Every 50 ft
Core	Radiological screening for gross alpha, beta, and gamma (for off-site transport of samples)	Every 50 ft
Core	Radionuclides	Every 10 ft for first 100 ft, then every 50 ft. Also at contacts, weathered zones, fracture fills, high-moisture zones, and oxidized zones
Core	Metals	Every 10 ft for first 100 ft, then every 50 ft. Also at contacts, weathered zones, fracture fills, high-moisture zones, and oxidized zones
Core	Stable Isotopes	Every 10 ft for first 100 ft, then every 50 ft. Also at contacts, weathered zones, fracture fills, high moisture zones, and oxidized zones
<b>Drilling</b>		
Cuttings	Bulk cuttings systematically collected for archival purposes and for supplemental sample needs	One sample every cuttings run (nominally every 5 ft), beginning at the bottom of the core hole
Cuttings	Sieved cuttings for lithology description, binocular microscope examination	One sample every cuttings run (nominally every 5 ft), including over drilling the core hole. Normally, an unsieved sample, a >10 mesh sample, and a > 30 mesh sample every cuttings run
Cuttings	Sieved cuttings for XRD, XRF, petrography	One >10-mesh sample every cuttings run (nominally every 5 ft); finer sizes or bulk split will be substituted where >10-mesh size can not be obtained
Cuttings	Radiological	Up to 5 samples for the entire borehole within water-bearing zones; Sample location to be determined by the geochemistry task leader
Cuttings	Metals and Anions	Up to 5 samples for the entire borehole within water-bearing zones; sample location to be determined by the Geochemistry Task Leader

Note: N/A = Not applicable

**Well R-14  
Analysis of Cuttings and Core**

Analyte	EDL <sup>a</sup>	Analytical Method <sup>b</sup>	Analytical Protocol
<b>Anions<sup>c</sup>/ Stable Isotopes/ <sup>3</sup>H Profiles</b>			
Bromide	0.02	IC	SW-846 – EPA Method 300
Chloride	0.02	IC	SW-846 – EPA Method 300
Fluoride	0.02	IC	SW-846 – EPA Method 300
Nitrate	0.02	IC	SW-846 – EPA Method 300
Sulfate	0.02	IC	SW-846 – EPA Method 300
Perchlorate	0.002	IC	SW-846 – EPA Method 300
TKN	0.1	Titration-distillation	SW-846 – EPA Method 351
<sup>18</sup> O/ <sup>16</sup> O	N/A	Mass Spectrometry	N/A
D/H	N/A	Mass Spectrometry	N/A
<sup>15</sup> N/ <sup>14</sup> N	N/A	Mass Spectrometry	N/A
<sup>3</sup> H	300 pCi/l	LSC	N/A
<b>Contaminant Characterization Constituents</b>			
<sup>241</sup> Am	0.01	α-Spectrometry	N/A
<sup>238</sup> Pu	0.1	α-Spectrometry	N/A
<sup>239,240</sup> Pu	0.1	α-Spectrometry	N/A
<sup>90</sup> Sr	2	GPC	N/A
<sup>234</sup> U	0.1	α-Spectrometry	N/A
<sup>235</sup> U	0.1	α-Spectrometry	N/A
<sup>238</sup> U	0.1	α-Spectrometry	N/A
Gamma spectroscopy	1.0	γ-Spectroscopy	N/A
Gross alpha	10	α-Spectrometry	N/A
Gross beta	10	GPC or LSC	N/A
Gross gamma	2.0	Nal(Tl) HPGe detection	N/A

- a. EDL = estimated detection limit; listed as (mg/kg) for metals, mg/L for anions, and pCi/g for radionuclide constituents except for tritium (pCi/l) extracted water.
- ♦ Analytical Methods - IC = ion chromatography, C = colorimetric analysis, LSC = liquid scintillation counting, GPC = gas proportional counter, NaI(Tl) = thallium-doped sodium iodide, HPGe = high-purity germanium.
- ♦ Anion analyses will be performed on the leachate formed from a deionized water slurry of the homogenized core sample.

**Well R-14  
Sampling and Analysis of Groundwater**

Estimated Number of Water Samples	Analysis	Container	Preservation	Filtered Through Acetate 0.45 Micrometer	Volume of Each Sample (L)
3	Metals (dissolved)	100 ml plastic	HNO <sub>3</sub> to pH 2, 4°C	Yes	0.25
3	Anions (dissolved)	100 ml plastic		Yes	0.25
3	Tc-99	1 gallon plastic	HNO <sub>3</sub> to pH 2, 4°C	No	4.55
3	γ spec, <sup>241</sup> Am, <sup>137</sup> Cs, <sup>238,239,240</sup> Pu, <sup>234,235,238</sup> U, <sup>90</sup> Sr	1 gal. plastic	HNO <sub>3</sub> to pH 2, 4°C	No	4.55
3	Stable isotopes ( <sup>18</sup> O/ <sup>16</sup> O, D/H)	30 ml glass w/ poly-seal cap	Ambient temperature	No	0.03
3	Stable isotopes ( <sup>15</sup> N/ <sup>14</sup> N)	1 gal. plastic	HCL or H <sub>2</sub> SO <sub>4</sub> to pH 2, 4°C	No	4.55
3	Tritium <sup>(1)</sup>	500 ml poly	Ambient temperature	No	0.5
3	Tritium (low level or direct counting) <sup>(1)</sup>	500 ml poly	Ambient temperature	No	0.5
3	Gross α,β,γ (for off-site shipping)	500 ml poly	Ambient temperature	No	0.5
3	TUICPMS <sup>(2)</sup>	500 ml poly	HNO <sub>3</sub> to pH 2, 4°C	Yes	0.5
3	TKN	1L poly	H <sub>2</sub> SO <sub>4</sub> to pH 2, 4°C <sup>(3)</sup>	No	1
3	ClO <sub>4</sub> <sup>-</sup>	250 ml poly	Ambient temperature	Yes	0.25
Total Volume: Filtered and Nonfiltered Part of Total Volume to be Filtered					17.43
					1.25

- (1) Initially analyze tritium using liquid scintillation. If activity is less than 300 pCi/l, analyze archival sample using direct counting or electrolytic enrichment at University of Miami.
- (2) TUICPMS = total uranium inductively coupled plasma mass spectrometry.
- (3) No preservation for ClO<sub>4</sub><sup>-</sup>; Br<sup>-1</sup>; Cl<sup>-1</sup>; F<sup>-1</sup>; SO<sub>4</sub><sup>-2</sup>; and PO<sub>4</sub><sup>-3</sup>.

**Well R-14**  
**Parameters to be Measured in the Field When Sampling Groundwater**

<b>Measurement</b>	<b>Precision<sup>(1)</sup></b>
pH	±0.02
Specific conductance	±1 µmho/cm (25 °C)
Temperature	±1 °C
Turbidity (nephelometric)	±1 NTU <sup>(2)</sup>

(1) Precision with which measurement shall be recorded

(2) NTU = Nephelometric turbidity unit