

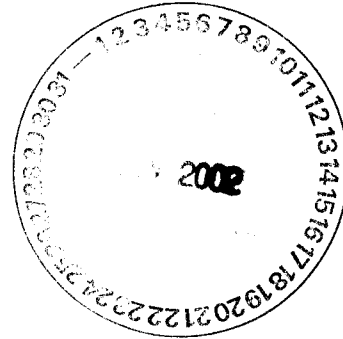


DEPARTMENT OF ENERGY
Albuquerque Operations Office
Office of Los Alamos Site Operations
Los Alamos, New Mexico 87544

Risk Reduction & Environmental Stewardship Division
PO Box 1663, MS J591
Los Alamos, New Mexico 87545
(505) 665-4681/Fax: (505) 665-9344

Date: June 3, 2002
Refer to: RRES-DO: 02-22

Mr. John Young, Corrective Action Project Leader
Permits Management Program
New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-2002



SUBJECT: DATA QUALITY OBJECTIVES FOR CY02 REGIONAL AQUIFER WELLS

Dear Mr. Young:

This letter follows our March 29, 2002 letter responding to the Hazardous Waste Bureau regarding the drilling schedule for the Hydrogeologic Workplan. In addition to the completion of well R-8 and present construction of well R-14, Los Alamos National Laboratory (LANL) is proceeding with plans to additionally install 5 regional aquifer wells in CY02. These wells were originally proposed in the Hydrogeologic Workplan, which included the technical rationale for the location and data collection of regional aquifer wells R-16, R-20, R-21, R-23, and R-32. In the four years since the Hydrogeologic Workplan was approved, significant new data have been obtained from approximately 11 regional aquifer wells. As described in the Hydrogeologic Workplan, new data is used to reiterate and refine the Data Quality Objectives for subsequent wells.

Proposed Data Quality Objectives for regional aquifer wells R-16, R-20, R-21, R-23, and R-32 were developed by the Department of Energy and LANL and forwarded to you on April 25, 2002. Two subsequent discussions have been held with Michael Dale, David Cobrain, and you on Friday May 17 and Monday May 20, 2002. At the conclusion of the May 20 conference call, there was consensus on the majority of the Data Quality Objectives. However, there were some items that required further evaluation by LANL. The intent of this letter is to formalize our agreements and notify you of our planned actions on the undecided items, along with the technical bases for those actions.

Attachment 1 provides the final Data Quality Objectives for regional aquifer wells R-16, R-20, R-21, R-23, and R-32. Attachment 2 provides a map of the well locations. The Data Quality Objectives that were revised and gained consensus during our conference calls are:

- R-21 will be relocated to Canada del Buey, approximately mid-way between Areas L and G (new location shown on Attachment 2).
- R-23 will be relocated to just west of the intersection of Pajarito Road and State Road 4 (new location shown on Attachment 2).



- R-32 will be relocated to Pajarito Canyon, approximately mid-way between Areas L and G (new location shown on Attachment 2).
- Core will be collected in R-20, R-21, R-23, and R-32; the core will be collected to approximately 50 feet into basalt or about a 400-foot depth.

We agree that relocation of characterization wells R-23 and R-32, pursuant to NMED's request, relieves LANL of installing additional characterization wells in their previous locations as shown in the Hydrogeologic Workplan.

Please note that the collection of core, and core samples, to depths that intersect the basalt results in a significant additional technical challenge and cost impact compared to previously planned collection of drill cuttings and geophysical logs, which we still have included in the DQOs (Attachment 1). However, we believe that this extra data collection will help better define the occurrence of any intermediate perched saturated zones in the vicinity of TA-54, and is justified because of regulatory focus on TA-54.

There were two DQO items that were deferred for further consideration: vapor samples in the vadose zone of boreholes and the location of R-16. Our planned actions regarding these two items and the technical rationale for those actions are described in the following paragraphs.

Vapor Sampling

Vapor sampling relative to disposal areas within TA-54 has been, and will continue to be, planned and performed by the Material Disposal Area (MDA) activity of LANL's Environmental Restoration Project. NMED has suggested that a vapor sampling activity be added to the regional aquifer characterization wells. However, the regional aquifer well locations are not appropriate for investigation of vapor transport from MDAs within TA-54. NMED has not provided information indicating the possibility of vapor transport to these locations, and LANL's records indicates no vapor transport to these locations. If such transport is deemed to be likely by NMED, we believe the appropriate course is to pursue vapor phase investigation independent of the Hydrogeologic Workplan. Any vapor phase investigation needed is best performed separately for technical and regulatory reasons.

Moreover, LANL has conducted quarterly pore-gas monitoring in 28 wells at TA-54 since 1985 in accordance with a compliance order issued by the State of New Mexico. This data provides an excellent observational basis from which to conclude that the organic vapor plume source is coincident with the disposal shafts in Area L and that the plume has been defined in nature and extent, and has not grown at a detectable rate over the past 3 years. Two wells have no detectable organics demonstrating that the vertical boundaries of the plume are known with a high degree of confidence. A revision to the 2000 draft RCRA Facility Investigation report is currently in progress and is anticipated to be completed by the end of FY02. This report will provide a description of nature and extent of the vapor plume and will include the last two years of monitoring data. It will also include recommendations for further data collected. The lateral extent of the vapor plume has been adequately defined, and the future data needs are expected to be in the immediate source area. Therefore, no vapor samples will be collected in the boreholes of the regional aquifer characterization wells.

R-16 Location

The location of R-16 will remain as shown in the Hydrogeologic Workplan, near the Rio Grande in the Town of White Rock. The NMED representatives requested that R-16 be moved to the west side of State Route 4. The rationale for R-16 in the Hydrogeologic Workplan location is:

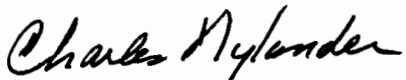
- Provide baseline information on the geology, hydrology, and water quality for a large uncharacterized area between the eastern boundary of the Laboratory and the Rio Grande
- Clarify the relationship between the springs in White Rock Canyon and various saturated zones
- Determine the depth to the regional aquifer
- Refine boundary conditions for the hydrologic modeling

In addition to the rationale presented in the Hydrogeologic Workplan, analysis of the data through hydrologic modeling indicates that vertical gradients near the Rio Grande are important data to obtain. R-16 will provide a key missing information defining groundwater flow in the eastern portion of the Laboratory. The water table map of the regional aquifer (Attachment 3) shows that there is a change in slope between R-22 and the Rio Grande which can be better investigated with a well located near the Rio Grande. Without this information, our estimates of flow amounts and velocities beneath the Pajarito Plateau are more uncertain. The need for flow, vertical gradient data and clarification of the source of the springs in White Rock Canyon are considered priority data needs that would not be met by moving R-16 west of State Route 4.

While the alternate proposed location near State Route 4 would provide some information regarding water table levels downgradient of TA-54, it is largely redundant of the existing well R-22 and proposed well R-23 in attempting to meet this purpose. Because R-22 currently provides downgradient information for TA-54, immediately adjacent to TA-54, an additional well along the same flow line, one mile distant, provides little extra value. Also, we note that the proposed location near State Route 4 does not appear as a planned location in the HWP or in the draft LANL Order issued by NMED on May 2, 2002. Because of these issues, we are concerned that new and inconsistent criteria are being applied to well siting by NMED.

In order to meet the schedule of installing these five wells in CY02, the planning and procurement must proceed rapidly. Therefore, if you have concerns about the Data Quality Objectives for regional aquifer wells R-16, R-20, R-21, R-23, and R-32 as described in this letter, please contact Mr. Nylander at 665-4681 or nylander@lanl.gov or Mr. Johansen at 665 5046 or mjohansen@lanl.gov as soon as possible.

Sincerely,



Charles Nylander, Program Manager
Groundwater Protection Program
Los Alamos National Laboratory



Mathew Johansen, P.E., Program Manger
Groundwater Protection Program
Department of Energy
Office of Los Alamos Site Operations

CN/am

Attachments: a/s

Cy: B. Ramsey, RRES-DO, w/att., MS J591
K. Hargis, RRES-DO, w/att., MS J591
D. Stavert, RRES-EP, w/att., MS J978
H. Granzow, RRES-DO, w/att., MS M992
S. Rae, RRES-WQH, w/att., MS K497
J. McCann, RRES-WQH, w/att., MS M992
D. Broxton, EES-6, w/att., MS M992
D. McNroy, RRES-R, w/att., MS M992
J. Hopkins, RRES-R, w/att., MS M992
J. Vozella, DOE/OLASO, w/att., MS A316
H. LeDoux, DOE/OLASO, w/att., MS A316
E. Trollinger, DOE/OLASO, w/att., MS A316
T. Whitacre, DOE/OLASO, w/att., MS A316
RRES-WQH File (02-217), w/att., MS K497
IM-5, w/att., MS A150

Attachment 1: Data Quality Objectives for R-16, R-20, R-21, R-23, and R-32

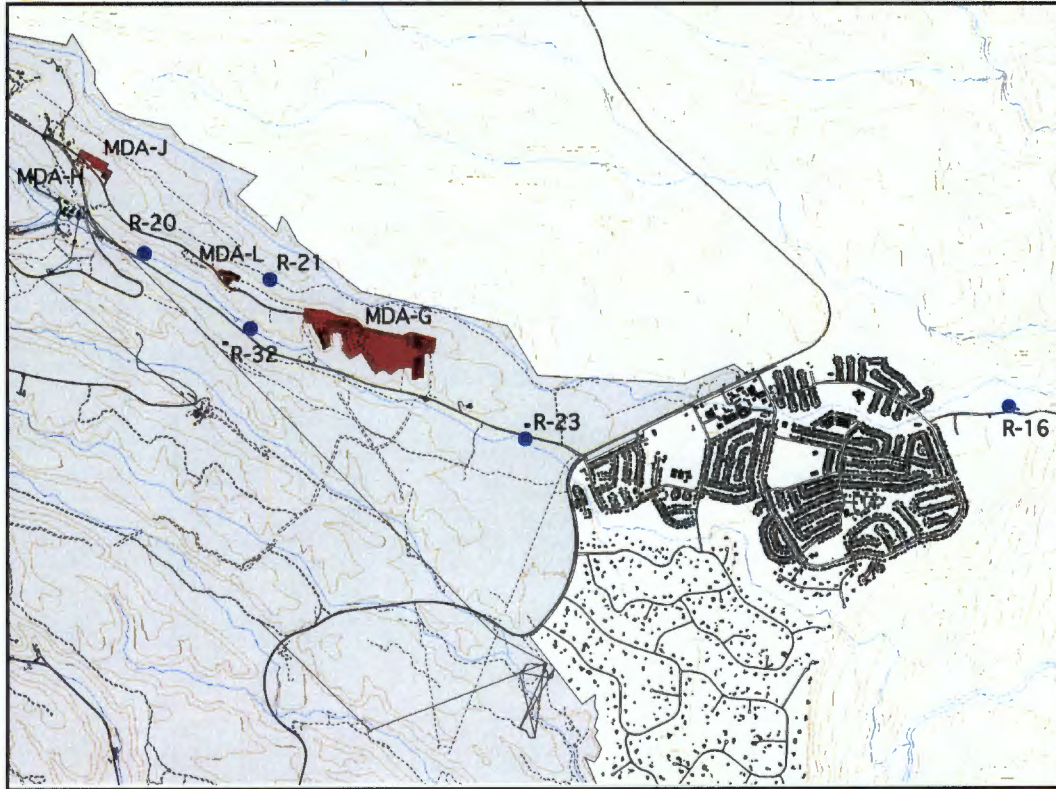
Data Quality Objectives for Wells at TA-54

Well	R-16	R-20	R-21	R-23	R-32
Primary Purposes	Determine water table and vertical gradients for the regional aquifer near the Rio Grande. Act as a monitoring point between TA-54 and the Rio Grande. Determine relationship between regional water table and springs in White Rock Canyon. Contribute to understanding of flow paths between Mortandad Canyon and springs in White Rock Canyon.	Serve as a sentry well between PM-2 and MDA L. Determine if perched groundwater occurs beneath Pajarito Canyon. Provide data for evaluating the groundwater capture zone for PM-2.	Determine water quality and vertical gradients for the regional aquifer downgradient of MDA L. Refine water table map for TA-54. Determine thicknesses and distribution of basalts (potential fast pathways) in regional aquifer. Determine if perched groundwater occurs beneath Canada del Buey	Determine water quality of the regional aquifer downgradient of TA-54. Refine water table map area near TA-54. Determine if perched groundwater occurs beneath Pajarito Canyon. Determine thicknesses and distribution of basalts (potential fast pathways) in regional aquifer.	Determine water quality of the regional aquifer upgradient of MDA G. Determine water table and vertical gradients for the regional aquifer in the vicinity of TA-54. Determine if perched groundwater occurs beneath Pajarito Canyon. Determine thicknesses and distribution of basalts (potential fast pathways) in regional aquifer.
Projected Depth	1273 ft; Regional water table expected at ~773 ft.	1350 ft; Regional water table expected at ~850 ft; may need to deepen hole 50 to 100 ft to penetrate top of rock unit beneath the Totavi Lentil.	1341 ft; Regional water table expected at ~841 ft.	1341 ft; Regional water table expected at ~841 ft.	1316 ft; Regional water table expected at ~816 ft.
Geology Issues	Determine thicknesses and distribution of basalts (potential fast pathways) in regional aquifer. Identify contacts for Puye fanglomerates, Totavi Lentil, and Tesuque Formation for site-wide models.	Small increments to geologic understanding expected because of this well's proximity to PM-2 and R-21. Will allow "ground truthing" of PM-2 well logs.	Determine thicknesses and distribution of basalts (potential fast pathways) in regional aquifer, particularly for developing alternative conceptual models to account for the great thickness of basalts at R-22. Identify contacts for Totavi Lentil and older units for site-wide models.	Provide general geologic characterization for site-wide models in a little studied area. Determine thicknesses and distribution of basalts (potential fast pathways) in regional aquifer, particularly for developing alternative conceptual models to account for the great thickness of basalts at R-22. Aid correlation of basalt units that may have widespread hydrologic significance.	Small increments to geologic understanding expected because of this well's proximity to R-20 and R-21.
Hydrology Issues	Determine source of springs in White Rock Canyon. Determine relationship of regional water table to Rio Grande. Define vertical gradients near the Rio Grande.	Protect water quality of PM-2 by providing early warning of potential contaminants moving from sources at TA-54. Provide data for evaluating groundwater flow directions in the vicinity of TA-54 by providing data on the capture zone for PM-2. Determine if infiltration from Pajarito Canyon	Together with other nearby wells, determine gradients in the regional aquifer at TA-54.	Determine if infiltration from Pajarito Canyon and its associated wetlands leads to the development of intermediate-depth perched groundwater.	Together with other nearby wells, determine gradients in the regional aquifer at TA-54. Definition of vertical gradients near TA-54. Determine if infiltration from Pajarito Canyon and its associated wetlands leads to the development of intermediate-depth perched groundwater.
		(cont.) and its associated wetlands leads to the development of intermediate-depth perched groundwater.			
Geochemistry Issues	Relationship of springs in White Rock Canyon to deep groundwater. No vadose zone issues.	Evaluate possible effect of releases from TA-18 and other surface release sites on water quality in deep groundwater.	Determine water quality downgradient of MDA L.		Determine water chemistry upgradient of MDA-G. Evaluate possible effect of releases from TA-18 and other surface release sites on water quality in deep groundwater.
Vadose Zone	No core collected.	Collect vadose zone core	Collect vadose zone	Collect vadose zone	Collect vadose zone core and

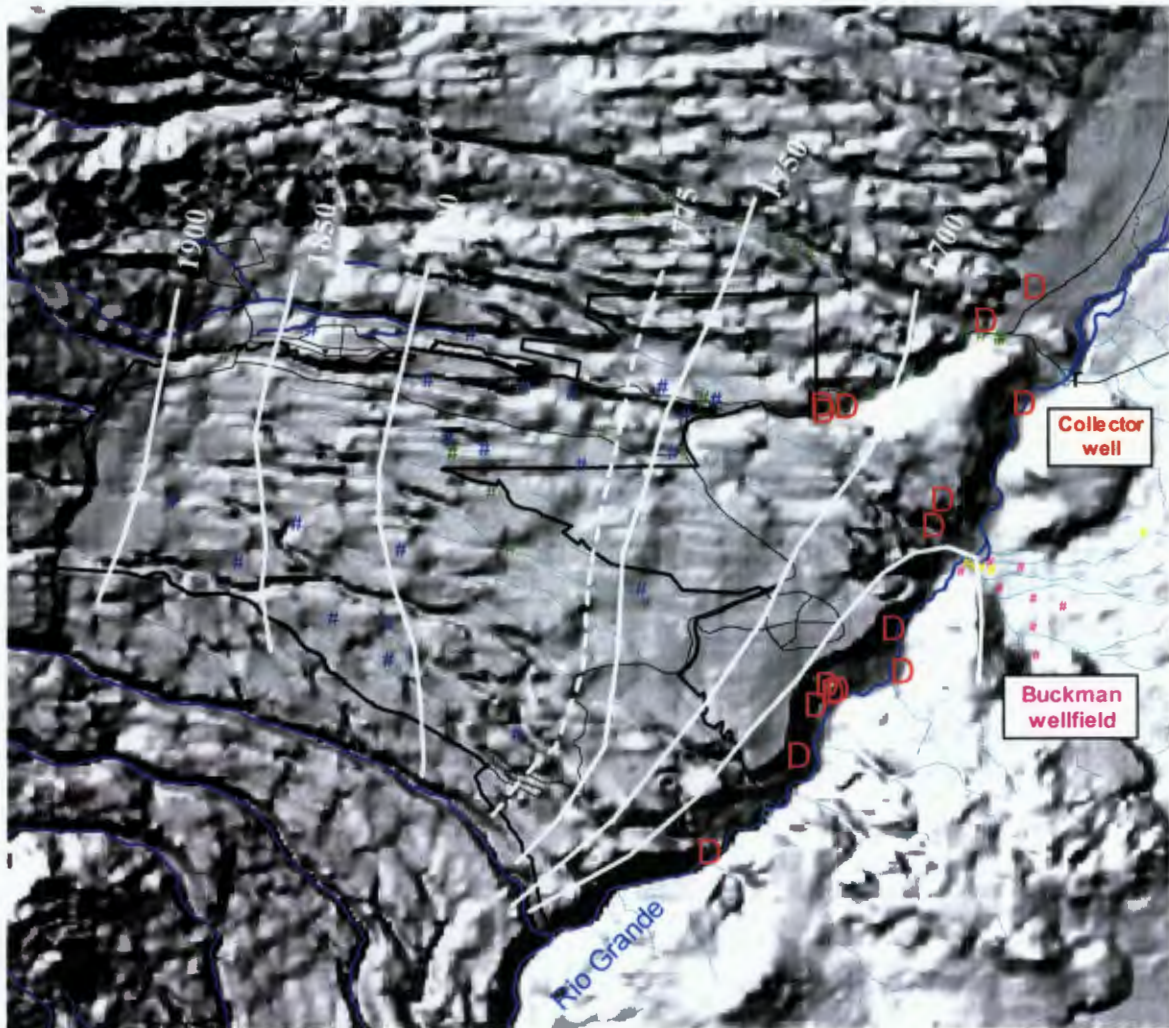
Attachment 1: Data Quality Objectives for R-16, R-20, R-21, R-23, and R-32

Well	R-16	R-20	R-21	R-23	R-32
Sampling	Water samples will be collected if perched water is encountered during drilling.	and analyze for moisture, perchlorate, organics, 99Tc, nitrate, U, 3H, stable isotopes, and other anions. Samples will be collected at 10 ft intervals for the upper 50 ft and at depths of 75, 100, 150, 200, 300, and 400 ft. Water samples will be collected if perched water is encountered during drilling	core and analyze for moisture, perchlorate, organics, 99Tc, nitrate, U, 3H, stable isotopes, and other anions. Samples will be collected at 10 ft intervals for the upper 50 ft and at depths of 75, 100, 150, 200, 300, and 400 ft. Water samples will be collected if perched water is encountered during drilling.	core and analyze for moisture, perchlorate, organics, 99Tc, nitrate, U, 3H, stable isotopes, and other anions. Samples will be collected at 10 ft intervals for the upper 50 ft. Water samples will be collected if perched water is encountered during drilling	analyze for moisture, perchlorate, organics, 99Tc, nitrate, U, 3H, stable isotopes, and other anions. Samples will be collected at 10 ft intervals for the upper 50 ft and at depths of 75, 100, 150, 200, 300, and 400 ft. Water samples will be collected if perched water is encountered during drilling
Regional Aquifer Sampling	Screening water samples will be collected during drilling at the top of the regional aquifer. Well screen will be installed to collect water-quality data for the regional aquifer.	Screening water samples will be collected during drilling at the top of the regional aquifer. Well screen will be installed to collect water quality data for the regional aquifer.	Screening water samples will be collected during drilling at the top of the regional aquifer. Well screen will be installed to collect water quality data for the regional aquifer.	Screening water samples will be collected during drilling at the top of the regional aquifer. Well screen will be installed to collect water quality data for the regional aquifer.	Screening water samples will be collected during drilling at the top of the regional aquifer. Well screen will be installed to collect water quality data for the regional aquifer.
Core Needs	None	Core samples will be collected from the surface to 50 ft into the Tb4 basalt (top of basalt estimated at 379 ft depth), but no deeper than 450 ft.	Core samples will be collected from the surface to 50 ft into the Tb4 basalt (top of basalt estimated at 253 ft depth), but no deeper than 400 ft.	Core samples will be collected from the surface to 50 ft into the Tb4 basalt (top of basalt estimated at 12 ft depth), but no deeper than 75 ft.	Core samples will be collected from the surface to 50 ft into the Tb4 basalt (top of basalt estimated at 295 ft depth), but no deeper than 400 ft..
Hydraulic Testing	Injection/straddle packer test in all screens completely below the regional water table.	Injection/straddle packer test in all screens completely below the regional water table.	Injection/straddle packer test in all screens completely below the regional water table.	Injection/straddle packer test in all screens completely below the regional water table.	Injection/straddle packer test in all screens completely below the regional water table.
Geophysical Testing	Suite and timing of geophysical logging will depend on borehole conditions. The suite of possible logs is under development and will be included in the SAP. Laboratory borehole video camera to be used when open hole conditions in the vadose zone are favorable for logging.	Suite and timing of geophysical logging will depend on borehole conditions. The suite of possible logs is under development and will be included in the SAP. Laboratory borehole video camera to be used when open hole conditions in the vadose zone are favorable for logging.	Suite and timing of geophysical logging will depend on borehole conditions. The suite of possible logs is under development and will be included in the SAP. Laboratory borehole video camera to be used when open hole conditions in the vadose zone are favorable for logging.	Suite and timing of geophysical logging will depend on borehole conditions. The suite of possible logs is under development and will be included in the SAP. Laboratory borehole video camera to be used when open hole conditions in the vadose zone are favorable for logging.	Suite and timing of geophysical logging will depend on borehole conditions. The suite of possible logs is under development and will be included in the SAP. Laboratory borehole video camera to be used when open hole conditions in the vadose zone are favorable for logging.
Number of Well Screens	Up to 2	Up to 5	Up to 5	Up to 2	Up to 5

Attachment 2: Location of Wells at TA-54



Attachment 3: Regional Aquifer Water Table Map



2 0 2 4 6 8 10 Kilometers