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**CERTIFIED MAIL  
RETURN RECEIPT REQUESTED**

August 29, 2003

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Mr. Mat Johansen, Groundwater Program  
Compliance Manager  
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**SUBJECT: WELL COMPLETION REPORTS SUBMITTED IN 2003  
LOS ALAMOS NATIONAL LABORATORY  
EPA ID# NM0890010515**

Dear Mr. Nanos and Mr. Johansen:

The New Mexico Environment Department (NMED) has reviewed nine recently submitted Well Completion Reports prepared by the Los Alamos National Laboratory (Laboratory). The reports describe the drilling, installation, and completion of regional characterization wells R-5, R-8, R-13, R-14, R-16, R-20, R-21, R-23, and R-32. NMED takes this opportunity to comment on the content of the nine reports.

NMED is generally pleased with the new format of the well completion reports and believes the reports show improvement over those produced in previous years. More efficient organization is apparent, and the essential information and data are retained. NMED has both general and well-specific comments regarding the content of the well completion reports, as well as suggestions to improve and refine future reports. The format of the report for R-21 differs from that of the other eight reports and contains more information than is essential. NMED suggests that the Laboratory follow the format found in the other eight reports for future submittals.

A summary of the "Important Results" from the geophysical reports should be included in the Borehole Geophysics section of each well completion report. A list of the contaminants of potential concern (COPCs) should be included in either the Introduction section (as in the report for well R-13) or in the Abstract (as in the report for well R-32). If chemical dispersants or



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treatments are added to the well during development activities, a reference to the appendix that includes the drill-additive product specifications should be included in the Well Development section. If hydrologic testing was performed in a well, a statement regarding the fate of the transducer(s) should be included in the Hydrologic Testing section. It should be noted whether transducer(s) were either left in the well to continue collecting water level measurements or removed after testing was concluded. If transducer(s) were left in a well, include a statement regarding the availability of water level data. The use of drilling fluids, including water, and the depths at which such fluids were used may be noted in the description of the video logs. Inclusion of this information may be helpful to the viewer of the logs, as wet zones are seen on the borehole walls in several videos. For example, water appears to be running down the borehole starting at 97 feet in the video for well R-16, but no perched groundwater zones were encountered during drilling.

Occasional instances of careless work are found in several of the well completion reports. General examples include inconsistencies between the text in the report and that in the Actual Work column of Appendix A; tables with improperly totaled volumes of water produced during development activities; inaccurate or inconsistent descriptions of the number of samples collected and the depths at which samples were collected; and incorrect descriptions of the Unified Soil Classification System (USCS) symbols in the notes at the bottom of lithologic logs. A specific example from the report for well R-32 is an inconsistency in documentation of work. In the report, the Actual Work column of Appendix A states, "at the start of well development a groundwater sample was bailed from the bottom of the well and analyzed for metals (dissolved) including total U and anions (dissolved)." The text of the report neither mentions nor provides any data for this sample.

Potentially serious procedural problems were noted in the well completion reports for wells R-21 and R-23. The R-21 report notes that approximately 19,161 gallons of fluids additives were used, but only 16,542 gallons were removed from the well (3,205 gallons during development and 13,337 during pumping tests). There was poor circulation and fluid recovery while drilling the bottom 400 feet of the borehole. R-21 was not sampled following development; however, further removal of water from the well is essential before sampling activities occur. In the R-23 report, Tables 3.0-1 and 8.1-1 note that more than 55,000 gallons of fluid additives (including water) were used during drilling activities, but only 31,870 gallons were removed from the well during development activities. The Notice of Intent (NOI) for the well states that 65,000 gallons of fluids were produced at the well. The report does not state that circulation was lost during drilling. NMED understands that the additional volume of fluids noted in the NOI may be recirculated drilling fluids stored in the drilling pit. NMED suggests that the Laboratory track the volume of fluids that are recirculated and recovered at the end of drilling activities for each well. This will provide assurance to NMED and other stakeholders that an attempt was made to remove as much of the added fluids from the well as possible before conducting sampling. It

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will also provide assurance that formation water is actually being sampled from the well. As noted above, well R-21 was not sampled following well development. NMED requires that sampling regional groundwater be included in the scope of work for future well installation.

Several of the well completion reports claim that the regional groundwater aquifer has not been affected by Laboratory releases. These claims are not justified by the data contained in the reports. For example, the report for well R-20 states that Strontium-90 was detected near the minimum detection activity in the two samples analyzed from the regional aquifer, but claims that the absence of tritium in those samples suggests that the waters have not been impacted by Laboratory releases. NMED does not consider the data in this report to be conclusive enough for the Laboratory to claim that the regional aquifer at R-20 has not been affected at this time. In addition, during development and pumping of the individual screens in well R-20, screen 1 was pumped dry; therefore, no water sample was obtained for contaminant analysis. NMED believes that, in similar situations in the future, the Laboratory should invest enough time to allow the water level to recover so that a groundwater sample may be collected.

The report for well R-13 claims that contamination from Laboratory discharges is not present in the regional aquifer at the well site. However, analyses for the radionuclides that are listed as COPCs at the well site were not conducted on the groundwater samples collected from the well. The report states that, because tritium was detected at a low level in a screening sample collected at 933 feet, the presence of other dissolved radionuclides is very unlikely. NMED does not consider this a valid or necessarily accurate statement, as the detection of Technetium-99 in well R-22 was unexpected. Consequently, the claim that Laboratory contamination is not present at this location, based on the results of screening samples, is not appropriate for inclusion in the report at this time.

NMED needs clarification regarding the rationale for the Laboratory's selective analysis of tritium in groundwater samples. For example, in wells R-5 and R-23, one sample of perched groundwater from each well was analyzed for tritium, but the regional aquifer samples were not analyzed for tritium. No justification is provided in the reports for changing the analyte suite for these regional aquifer samples.

NMED believes that the portrayal of well screen information in Table 7.1-1 in the report for well R-16 is misleading. The table describes screen 1 as spanning the regional water table in the Puye Formation, but fails to include the significant information that the screen cannot be accessed, because it is isolated behind abandoned drill casing. Consequently, the stated objective for the placement of the screen, to monitor the top of the regional zone of saturation, was not, and cannot be, attained.

NMED is not satisfied with the rationale provided by the Laboratory for not analyzing core or

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cuttings samples for contaminants. For example, the report for well R-16 states, "the lack of any contaminants of concern in screening-water samples collected from the regional aquifer precluded the usefulness of submitting cuttings samples for analysis." However, no samples were collected from the top screen. The Laboratory should provide adequate justification for making the decision to not analyze samples.

NMED has previously discussed the construction of well R-13 with the Laboratory. The screen was placed more than 100 feet below the top of the regional zone of saturation in a "productive zone" in the aquifer to "permit adequate development of the well". The report for well R-20 similarly states that the top screen was placed so that it "would be completely submerged for proper well development" and it "also can be used to monitor groundwater quality near the top of the regional zone of saturation." NMED has repeatedly reminded the Laboratory that monitoring groundwater quality should be the top priority, not a secondary concern, of wells installed at the Facility. NMED requires wells to be screened across the top of the regional aquifer for contaminant detection. The intent of the well drilling program at the Laboratory is to install RCRA-compliant (Resource Conservation and Recovery Act) wells that provide accurate and defensible characterization information and facilitate detection of any potential contaminants.

NMED has concerns regarding the perched zone of groundwater encountered from 30 to 96 feet in well R-8. Core samples collected from 45 feet to 146 feet in the borehole reveal high tritium activities. The perched zone was not sampled because it "became dry at the time of sampling as a result of a leak through the borehole to the Cerros del Rio basalt." Additionally, shallow contamination may have been brought down into the regional aquifer during drilling. Installation of a planned intermediate well near well LAO-4.5 in Los Alamos Canyon may satisfy the need to investigate this perched zone.

If you have any questions regarding these comments, please contact Carolyn Cooper of my staff at (505) 428-2539.

Sincerely,



John Young  
LANL Corrective Action Project Leader  
Permits Management Program

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