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National Nuclear Security Administration
Los Alamos Site Office, MS A316
Environmental Restoration Program
Los Alamos, New Mexico 87544

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Refer To: EP2009-0624

James Bearzi, Bureau Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303

Subject: Recently Identified Issues with Inflatable Packers in Monitoring Wells

Dear Mr. Bearzi:

The National Nuclear Security Administration (NNSA) and Los Alamos National Security (LANS) have notified the New Mexico Environment Department (NMED) of recent issues identified with inflatable packers in monitoring wells at Los Alamos National Laboratory (the Laboratory). On October 15, 2009, LANS provided the 24-hour verbal notification to NMED pursuant to 20.6.2.1203 New Mexico Administrative Code of the New Mexico Water Quality Control Commission Regulations based on recommendations by NMED-Groundwater Quality Bureau personnel. Additionally, 7- and 15-day release reports were submitted to NMED on October 22, 2009.

The issue involves the loss of pressure and the resulting underinflation of the packers used to separate discrete monitoring horizons. The affected packer systems fall into two categories: (1) dedicated packers that are part of the Baski two-screen sampling systems, and (2) temporary packers used to isolate well screens pending conversion of wells from Westbay sampling systems to an alternate sampling system. This letter provides the NMED with near- and long-term corrective actions that have been or will be taken by the Laboratory to mitigate this issue and to ensure proper future performance of the packer systems.

The specific packer systems identified as underinflated include the dedicated Baski packers in wells R-20 and R-23i and the temporary packers in R-16 and R-22. The issue was initially discussed with NMED in a telephone conversation on October 15, 2009, and in a follow-up meeting on October 27, 2009. The short-term corrective actions taken have mitigated the issue observed in these four wells, while the long-term corrective actions planned will significantly reduce the potential for this type of issue in the future.

A recent review of water level data from R-20 was the first indication the Baski packer had been underpressurized from June 20, 2009, to September 1, 2009, resulting in the possible commingling of water between the two well screens. Shortly thereafter, similar observations were made at well R-23i, where water-level data indicated commingling of water between screens during several

periods between June 5, 2009, and September 29, 2009. Figures showing the R-20 and R-23i water levels are presented in an attachment to this letter.

After the above-mentioned observations were made, Laboratory personnel promptly conducted a facility-wide survey of all Baski and temporary packers in monitoring wells to determine the extent of this issue. The assessment indicated that Baski systems in all other Laboratory monitoring wells were operating properly, with no evidence of leakage between well screens. The issue was identified with temporary packers in R-16 and R-22, which had been recently rehabilitated and were awaiting conversion to new sampling systems. The temporary packer in R-16 was found to be deflated. The two lowermost packers in the four-packer system in R-22 were also found to be deflated. In both cases, it is assumed that cross-flow had occurred between screens, but the duration of cross-flow cannot be determined because no water-level data are available for these wells.

The types of packer systems installed in Laboratory monitoring wells, the groundwater zones screened in each, and observations regarding the packer systems are presented in the table included in the attachment to this letter.

A two-part corrective-action process was promptly initiated once the issue was identified. Near-term corrective action was implemented immediately to stop any further cross-flow from occurring. The Laboratory is also implementing long-term corrective-action steps to minimize the potential for packer pressure problems in the future. The immediate, near-, and long-term corrective actions are summarized below.

Immediate and Near-Term Corrective Actions

Immediate and near-term corrective action steps include the following.

1. All monitoring wells with dedicated or temporary packers have been reviewed in detail to determine if the packers are currently operating properly and whether water-level data indicate any history of cross-flow.
2. The frequency of field checks of packer-systems has been increased from approximately once or twice per month to approximately every other day. Data and field observations are being compiled for each well to identify any trends in packer performance that indicate a packer system may need repairs. Where appropriate, dedicated nitrogen tanks will be deployed to wells with packers to ensure adequate packer pressures are maintained.
3. Immediate actions were taken on temporary packers in R-16 and R-22. The packer in R-16 was removed and replaced with a permanent Baski dual-valve system, and the two damaged temporary packers in R-22 were replaced with new high-pressure packers.
4. Plans are being made to repair the Baski systems in R-20 and R-23i. The Baski systems will be removed from the wells, temporary packers will be placed between screens to prevent cross-flow, and the systems will be tested to identify the cause of the pressure loss. The Baski systems will be repaired and reinstalled.

5. Groundwater level data at all wells with packers are being reviewed to identify periods when low packer pressures may have resulted in potential cross-flow between screens. The objective is to determine if groundwater samples were collected from periods when groundwater-level data indicate cross-communication between screens. Where appropriate, data collected from such periods will be flagged if the data review indicates commingled water shortly before or at the time of sample collection.

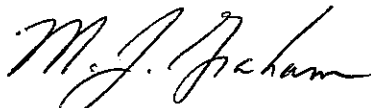
Long-Term Corrective Actions

1. The Laboratory is conducting a root-cause analysis to identify the causes of the packer-pressure issues.
2. The current designs for dual-pump and dual-valve Baski systems are being reviewed to identify possible improvements to reduce the potential for similar issues in the future.
3. A formal procedure(s) is being developed to address long-term operations and maintenance of the Baski systems. The procedure will include well-specific minimum and maximum pressure ranges for the packers and a summary of actions required should pressure levels drop below the minimum required pressure.
4. Potential security measures for packer systems are being evaluated to prevent tampering. Packer-pressure fittings will be standardized and labeled.

At this point, all packers in monitoring wells are properly inflated, and pressures are being monitored approximately every other day. Any transient impacts from cross-flow that may have occurred in wells R-20, R-23i, R-16, and R-22 will be assessed and will be summarized in a technical report to NMED to be submitted no later than February 28, 2010. The report will include a summary of the causal analysis results to date, and any recommended improvements to the Baski systems. The report will also include bounding calculations on the quantity of cross-flow that may have occurred in each well, based on differences between well screens, and specific capacity data for each screen, and the period of time that the packer may have been under-inflated. Finally, the report will include estimates on the length of time for transient effects of the cross flow to dissipate.

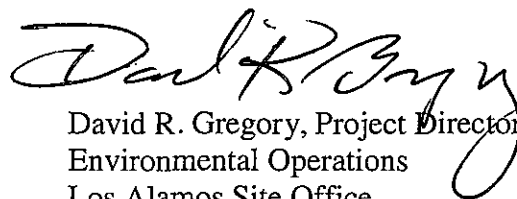
If you have any questions, please contact Tim Goering at (505) 665-0996 (goering@lanl.gov) or Hai Shen at (505) 665-5046 (hshen@doeal.gov).

Sincerely,



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

Sincerely,



David R. Gregory, Project Director
Environmental Operations
Los Alamos Site Office

MG/DG/DM/TG:sm

Attachments: Figure 1, Water-level data in screens 1 and 2 of R-20, showing period when packer was underinflated, allowing commingling between screens; Figure 2, Water-level data in screens 1 and 2 of R-23i, showing period when packer was underinflated, allowing commingling between screens; and Table 1, Summary of Baski and Temporary Packer Systems in Monitoring Wells at Los Alamos National Laboratory, November 4, 2009 (LA-UR-09-7478)

Cy: (w/att.)
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