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Permit

BENITC

Date: March 12, 1996

Ms. Barbara Hoditscheck
New Mexico Environment Department
P.O. Box 26110
Santa Fe, NM 87502

Request for Classification of Determination of Class for "Request for Modification to LANL HSWA Permit"

The Environmental Restoration Project at Los Alamos National Laboratory requests a classification of determination of class for the enclosed document "Request for Modification to LANL HSWA Permit". We have discussed the proposed changes to the permit with Terry Davis and Stu Dinwiddie of the New Mexico Environmental Division, and they suggested that the document be first routed through your office for determination of class. We ask that this request receive a high priority because we would need to implement the proposed changes in ongoing field investigations.

Thank you for your assistance in this matter.

Sincerely,

Jorg Jansen
Program Manager
Environmental Restoration

Sincerely,

Theodore Taylor
Program Manager
Los Alamos Area Office

Attachments: a/s

AP/JJ/sm

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REQUEST FOR MODIFICATION TO LANL HSWA PERMIT

Los Alamos National Laboratory (LANL) requests two modifications to the monitor well construction requirements included in Module VIII, Section C (1) paragraph 4 of LANL's Hazardous Waste Permit dated 20 May 1990. With one exception, (the length of well screens), the requested modifications meet the requirements of the New Mexico Environment Department Monitoring Well Construction and Abandonment Guidelines (NMED, 1992). The issues concerning well screen lengths are discussed in this document and the necessary modification to the regulations are described.

The first modification is requested for the sentence in paragraph four which reads as follows:

> **"The boreholes for casings and screens shall be a minimum of six (6) inches greater in diameter than the well casing or screen outer diameter."**

LANL requests the following modification to this well construction requirement:

> **"The boreholes for casings and screens shall be a minimum of *four* (4) inches greater in diameter than the well casing or screen outer diameter."**

The requested modification will provide a 2 inch annular space between the well casing and screen and the borehole wall. The two inch annular space meets requirements of the U.S. EPA, Nov. 1992 document: "RCRA Ground Water Monitoring: Draft Technical Guidance". The 1992 document is distributed by the USEPA to update technical information contained in other sources of USEPA guidance, such as Chapter Eleven of SW-846 (Revision 0, September 1986) and the RCRA Technical Enforcement Guidance Document (TEGD) issued in 1988. The two inch annular space between the well casing

and screen and the borehole wall meets the requirements of most state regulatory agencies including (as examples) Arizona, Colorado, Texas and Illinois.

Modification of the LANL HSWA Permit to allow a 2 inch annular space in construction of monitor wells will result in the following advantages:

1. Significant cost savings in required drilling equipment.
2. Significant cost savings in well construction materials.
3. Significant cost savings by reducing quantities of generated wastes.
4. Enhancement of activities related to groundwater sampling and aquifer characterization.

The four issues are discussed in the following paragraphs:

1. Significant cost savings in required drilling equipment:

This cost savings is an issue on completing monitor wells in perched aquifers and in the main aquifer. The three inch annular space, rather than the requested two inch annular space, requires larger diameter drill tools which require drill rigs with greater pull down and pull back power for both advancement and retraction of drill tools from boreholes.

The cost to drill the larger diameter boreholes is greater because of the need for more powerful drilling equipment, and also because the time required to drill the larger diameter borehole is greater than the time required to drill a smaller diameter borehole. Required drilling time per foot of borehole advancement becomes greater as a function of borehole depth. Many proposed monitor well locations at LANL are unaccessible by roads. Construction of these monitor wells by all terrain drill rigs will be a great savings compared to the high cost of road construction for truck-mounted drill rigs. At many drill sites, the all terrain drill

rigs will have the power to operate the drill tools to construct monitor wells with a 2 inch annular space between the well casing and the borehole wall. The all terrain drill rig may not have the power required to operate the larger drill tools to construct monitor wells (especially deep monitor wells to the main aquifer) with a 3 inch annular space between the well casing and borehole wall. The more powerful drill rigs are truck mounted. Access of truck mounted drill rigs to many well sites will require costly road construction.

2. Significant cost savings in well construction materials:

   The ideal well casing diameter to support collection of groundwater samples and other aquifer characterization activities is 4 inch inside diameter (4.5 inch outside diameter). This casing dimension requires a 8.5 inch borehole for a 2 inch annular space or a 10.5 inch borehole for a 3 inch annular space.

   For monitor wells constructed with 4.5 inch outside diameter well casing, the 3 inch annular space requires <u>55% more</u> backfill materials than the requested 2 inch annular space.

3. Significant cost savings in reducing quantities of generated waste:

   This cost savings results from a reduction in the volume of drill cuttings from the 2 inch annular space compared to the 3 inch annular space as a monitor well construction requirement. The reduced volume of drill cuttings results in a reduction of waste management costs and a reduction of waste disposal costs.

   For the example monitor well constructed with a 4.5 inch outside diameter casing in a 8.5 inch borehole (2 inch annular space) or 10.5 inch borehole (3 inch annular space), the quantity of cuttings generated in drilling the 10.5 inch borehole is <u>40% greater</u> than the quantity of cuttings generated in drilling the 8.5 inch borehole.

Drilling boreholes with the 2 inch annular space rather than the 3 inch annular space results in a reduced amount of time spent in well drilling and well construction. This time savings results in lower PPE costs for field personnel. This is a savings not only in the purchase cost of PPE but also in the cost for disposal of PPE.

This reduction of drill cuttings and other investigation - derived waste complies with the DOE waste minimization directives specified in DOE ORDERS 5400.1 and 5820.A.

4. Enhancement of activities related to groundwater sampling and aquifer characterization.

The 4 inch inside diameter well casing will allow the installation of a dedicated groundwater sampling pump and the necessary clearance to also instrument the well with pressure transducers to monitor changes in water level. A large selection of commercially manufactured pumps are available for the 4 inch inside diameter well casing while the pump choice for smaller diameter well casings is very limited. Importantly, the pump lift capacity is also a function of pump diameter and the 4 inch inside diameter well casing will meet the lift requirements for pumps installed at LANL in deep monitor wells completed in the main aquifer.

The dedicated sampling pumps are important to assure the quality of groundwater samples collected for both contaminant characterization and for characterization of groundwater geochemistry (especially unstable measurements such as Eh, pH, and bicarbonate concentration).

The 4 inch inside diameter well casing will also meet requirements for large production pumps that are necessary to perform pump tests to evaluate aquifer

properties. These tests are important for analysis of travel time for contaminated groundwater.

Another characterization activity which is important to an understanding of the vadose zone hydrology at LANL is to monitor the annual variation of the moisture regime in the vadose zone. This monitoring activity is especially important in unsaturated rock units that underlie alluvial or perched aquifers. A borehole geophysical method than can perform this activity through PVC well casing in boreholes of less than 9 inches diameter is the electromagnetic induction borehole sonde manufactured by Geonics. The attached figure shows the close correlation between the borehole conductivity log and the in situ moisture content profile for a borehole located at LANL. The moisture content profile was generated by analysis of moisture content in continuous core collected during drilling of the borehole. The borehole conductivity log was collected with the Geonics electromagnetic sonde soon after the borehole was drilled.

The second modification requested for the LANL HSWA PERMIT is the sentence in paragraph four which reads as follows:

> **"Well screen lengths shall be no more than (10) ten feet in length."**

The requirements of the New Mexico Monitoring Well Construction and Abandonment Well Standards concerning the length of screens in monitor wells is as follows:

> **Well screen lengths shall be a minimum of (20) twenty feet in length and the top of the screen shall extend (5) five feet above the static elevation of the groundwater table".**

LANL requests the following modification to the LANL HSWA Permit and to the New Mexico Monitoring Well Construction and Abandonment Well Standards:

> "For monitor wells constructed in aquifers that are greater than (20) twenty feet thick, well screen lengths shall be a minimum of (20) twenty feet in length and the top of the screen shall extend (5) five feet above the static elevation of the groundwater table. When the alluvial or perched aquifer is less than (20) twenty feet thick, then the total thickness of the aquifer shall be screened".

The requested modification to the LANL HSWA permit to increase the length of monitor well screens is very important because of seasonal variations which occur in the static elevation of the groundwater table in alluvial aquifers. Some monitor wells presently installed in alluvial aquifers at LANL are showing a yearly fluctuation in the static water levels as great as 20 feet. These monitor wells would be "dry" part of each year if they were constructed with a screen length of 10 feet.

The deep main aquifer at LANL is showing a general ongoing decline in static groundwater levels. The measured drop in static groundwater levels in many deep monitor wells at LANL is greater than 10 feet. It is very important to construct new monitor wells completed in the main aquifer with screen lengths that allow these wells to be used for monitoring activities for periods greater than 20 years.