



Date: June 28, 2005  
Refer To: ER2005-0421

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



**SUBJECT: REQUEST FOR APPROVAL OF CHARACTERIZATION AND DISPOSAL METHODS FOR INVESTIGATION-DERIVED WASTE FOR WELLS AND BOREHOLES CONSTRUCTED AT LOS ALAMOS NATIONAL LABORATORY**

Dear Mr. Young:

The purpose of this letter is to request approval of standard characterization and disposal methods relative to investigation-derived waste (IDW) from construction of the intermediate and regional aquifer wells and boreholes at Los Alamos National Laboratory (the Laboratory). Approval by the New Mexico Environment Department (NMED) is required under Consent Order Section IX.B.5, "Collection and Management of Investigation Derived Waste" prior to removal of IDW from temporary storage areas. Because handling of IDW is often subject to time constraints, advance approval by NMED of standard methods will help facilitate timely characterization and appropriate disposal of IDW as work is performed under the Consent Order.

Approval of IDW management methods is typically accomplished through submittal of work plans, or in the case of routine groundwater monitoring, through submittal of the Interim Facility –Wide Groundwater Monitoring Plan. However, approval of IDW methods for well and borehole construction is necessary because some wells scheduled in the near term are being constructed in advance of work plan approval. Specifically, a list of wells to be constructed in calendar year 2005 was submitted to NMED on March 29, 2005. Well construction activities addressed in this proposal are those performed prior to well completion and are not included in the IDW management plan for the Interim Facility-Wide Groundwater Monitoring Plan; these activities include drilling, gathering screening samples, and initial well testing.

Standard IDW methods are proposed for characterization and discharge of IDW liquids, and characterization and management of IDW solids, from construction of wells and boreholes. The standard methods are not new, comply with established guidance, and



are described in the enclosed set of letters dating back to 2001. These letters provide method details; a brief summary of the standard methods follows:

- **Characterization and discharge of IDW liquids from construction of wells and boreholes.** Water produced from the drilling, development, and sampling of wells constructed since 2002 has been discharged under a Notice of Intent (NOI) approved by the NMED dated August 7, 2002 (Enclosure 1). All conditions of the existing NOI will be applied to future wells and borehole construction activities. Water that is purged during the drilling and development of wells and boreholes will be containerized, sampled, and evaluated for compliance with NM WQCC Regulation 3103 ground water standards and applicable RCRA regulatory limits before any discharge occurs. Decisions regarding the discharge of drilling and development water will be made in accordance with the "Workplan NOI Decision Tree," revised July 15, 2002 (Enclosure 2), and in coordination with the NMED. And finally, drilling and development water approved for discharge will be applied to the land surface or used for dust suppression on access roads or the drill site in accordance with the terms and conditions of the existing NOI, described in the August 2, 2001 letter from the Laboratory to NMED (Enclosure 3).
- **Characterization and management of IDW solids from construction of wells and boreholes.** A standard method for characterization and management of solids, primarily drill cuttings for canyons wells and boreholes, was established by letter dated November 18, 2004 (Enclosure 4). This standard method is consistent with past practice and documentation (Enclosures 4 and 5). Drill cuttings are analyzed for hazardous constituents according to EPA standard methods. Analysis results are compared to New Mexico Soil Screening Levels, Revision 2, February 2004. If no exceedences exist, the cuttings are used on site, (e.g. left in place in the drill pit, or used as fill in site restoration or road maintenance). If an exceedence exists, a plan for disposal is developed on a case-by-case basis consistent with applicable requirements.

The procedures for evaluation and comparison to existent standards for both liquids and solids associated with this work will ensure that subsequent management will be protective of human health and the environment.

This letter is intended to provide sufficient documentation for the general standard methods for IDW management related to construction of wells and boreholes. Well construction work for 2005 is currently scheduled to begin the week of July 11. Please review this proposal and provide a timely response approving the standard methods for managing IDW liquids and solids from borehole and well construction activities. Please contact Tom Whitacre at (505) 665-5042, or Danny Katzman at (505) 667-6333 with any questions.

Mr. John Young  
ER2005-0421

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June 28, 2005

Sincerely,

Sincerely,

David McInroy, Deputy Program Director  
Environmental Remediation & Surveillance  
Los Alamos National Laboratory

David Gregory, Federal Project Director  
Department of Energy  
Los Alamos Site Office

MJ/ds

Enclosures: 1) Response to Notice of Intent to Discharge for Los Alamos National Laboratory's Hydrogeologic Workplan Wells, August 7, 2002  
2) Notice of Intent to Discharge, Hydrogeologic Workplan Wells, July 16, 2002  
3) Notice of Intent to Discharge, Hydrogeologic Workplan Wells, August 2, 2001  
4) Management of Drill Cuttings from Wells and Boreholes Constructed Under Canyons Workplans, November 18, 2004  
5) Management of Drill Cuttings From Hydrogeologic Workplan Wells (R-Wells), January 22, 2003

Cy:(w/enc)

J. Dewart, ENV-ERS, MS M992  
J. McCann, ENV-ECR, MS M992  
D. Katzman, ENV-ECR, MS M992  
K. VanDerpoel, ENV-SWRC, MS M992  
S. Pearson, ENV-WQH, MS M992  
B. Beers, ENV-WQH, MS K497  
M. Johansen, EM, LASO, MS A316  
T. Whitacre, OPM, LASO, MS A316  
P. Reneau, ENV-ECR, MS M992  
D. Gregory, LASO, MS A316  
B. Rich, ADO, MS A104  
J. Kieling, NMED-HWB  
M. Leavitt, NMED-SWQB  
L. King, EPA Region 6  
D. Pepe, NMED-OB  
ENV-ECR File, MS M992  
RPF, MS M707

Cy:(w/o enclosure)

D. McInroy, ENV-ERS, MS M992  
A. Dorries, ENV-ECR, MS M992

Mr. Christopher F. Vick  
Ground Water Quality Bureau  
New Mexico Environment Department  
P O Box 26110  
Santa Fe, NM 87502

**Mr. John Young  
ER2005-0421**

**4**

**June 28, 2005**

**Ms. Cindy Padilla  
Solid Waste Bureau  
New Mexico Environment Department  
PO Box 26110  
Santa Fe, New Mexico 87502**



**GARY E. JOHNSON**  
GOVERNOR

*State of New Mexico*  
**ENVIRONMENT DEPARTMENT**

*Ground Water Quality Bureau*  
*Harold Runnels Building*  
1190 St. Francis Drive, P.O. Box 26110  
Santa Fe, New Mexico 87502  
(505) 827-2918 phone  
(505) 827-2965 fax



**PETER MAGGIORE**  
Secretary

**CERTIFIED MAIL - RETURN RECEIPT REQUESTED**

August 7, 2002

Steven Rae, Group Leader  
Water Quality & Hydrology Group  
Los Alamos National Laboratory  
P.O. Box 1663, MS K497  
RRES-WQH: 02-273  
Los Alamos, New Mexico 87545

**RE: Response to Notice of Intent to Discharge for Los Alamos National Laboratory's Hydrogeologic Workplan Wells**

Dear Mr. Rae:

The New Mexico Environment Department (NMED), Ground Water Quality Bureau (GWQB) has reviewed your notices of intent, dated July 16, 2002, and August 2, 2001, for the discharge of up to 96,000 gallons per day (gpd) of drilling and development water, and 1,500 gpd of sampling purge water from 23 regional aquifer wells described under Los Alamos National Laboratory's Hydrogeologic Workplan. The wells will be drilled at various locations throughout T18N, T19N, R5E, R6E, and R7E, Los Alamos County. The notices of intent satisfy the requirements of Section 20.6.2.1201 NMAC of the Water Quality Control Commission (WQCC) Regulations.

Based on the presently available information in your notices of intent, a discharge plan is not being required for this discharge as long as the discharge is as described in the notices of intent. The decision to discharge must follow the guidelines specified in the Workplan NOI Decision Tree (Figure 1, Revised 07/15/02). The Ground Water Quality Bureau has concluded that if the guidelines specified in the NOI are met, then the proposed discharge will not adversely impact ground water, and a discharge plan will not be required. However, if the results of the analysis of drilling water, development water, or sampling purge water exceed the Section 20.6.2.3103 NMAC WQCC ground water standards or applicable RCRA regulatory limits, then disposal must be coordinated with NMED on a site specific basis.

The exempt discharge is briefly described as follows: A maximum of 96,000 gpd of drilling water and development water, and a maximum of 1,500 gpd of sampling purge water from 23 regional aquifer wells will be land applied with a portable sprinkler system, or applied to the access roads and

Steven Rae  
August 7, 2002  
Page 2

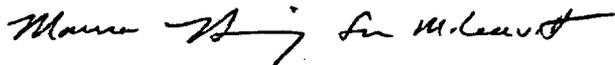
well site for dust suppression. Prior to discharge, the drilling water and development water will be sampled and analyzed to determine compliance with Section 20.6.2.3103 NMAC WQCC ground water standards and applicable RCRA regulatory limits.

Although a discharge plan is not being required for this discharge at this time, you are not relieved of liability should your operation result in actual pollution of surface or ground waters. Further, this decision by the NMED does not relieve you of your responsibility to comply with any other applicable federal, state, and/or local laws and regulations, such as zoning requirements, plumbing codes and nuisance ordinances.

If at some time in the future you intend to change the amount, the character, the screening process, or the location of your discharge so that it will not be as described, or if observation or monitoring shows that the discharge is not as described, you must file a new notice of intent with the Ground Water Pollution Prevention Section (GWPPS).

If you have any questions, please contact either Curt Frischkorn of the GWPPS staff at 827-0078 or Maura Hanning, Program Manager of the GWPPS at 827-2945.

Sincerely,



Marcy Leavitt, Chief  
Ground Water Quality Bureau

ML:CSF/csf

xc: ~~Bob Beers~~, Water Quality and Hydrology Group, Los Alamos National Laboratory, P.O. Box 1663, MS K497, RRES-WQH: 02-273, Los Alamos, New Mexico 87545  
Courte Voorhees, District Manager, NMED District II  
John Young, Hazardous Waste Bureau, NMED, P.O. Box 26110, Santa Fe, NM 87502  
NOI File



**Los Alamos**  
NATIONAL LABORATORY

*Risk Reduction & Environmental Stewardship Division*  
*Water Quality & Hydrology Group (RRES-WQH)*  
PO Box 1663, MS K497  
Los Alamos, New Mexico 87545  
(505) 667-7969/Fax: (505) 665-9344

Date: July 16, 2002  
Refer to: RRES-WQH: 02-273

Mr. Curt Frischkorn  
Pollution Prevention Section  
Ground Water Quality Bureau  
New Mexico Environment Department  
P.O. Box 26110  
Santa Fe, New Mexico 87502

**SUBJECT: NOTICE OF INTENT TO DISCHARGE, HYDROGEOLOGIC WORKPLAN  
WELLS**

Dear Mr. Frischkorn:

At our July 11, 2002, meeting at your Santa Fe office (Attendees: Mike Saladen (RRES-WQH), Roy Bohn (RRES-R), Bob Beers (RRES-WQH), John Young (NMED-HWB), and Curt Frischkorn (NMED-GWQB)), we reviewed the Notice of Intent to Discharge (NOI) submitted by Los Alamos National Laboratory to your agency on August 2, 2001, for the Hydrogeologic Workplan Wells. In addition to our general review of the NOI, we discussed the Laboratory's immediate need to discharge approximately 50,000 gallons of containerized drilling fluid from Hydrogeologic Workplan Well R-14. I have addressed both of these topics below.

It was my understanding from our July 11<sup>th</sup> meeting that both you and Mr. Young were satisfied with the Laboratory's NOI for the Hydrogeologic Workplan Wells with the exception of the NOI Decision Tree (Figure 1.0). Per your request, attached is a revised NOI Decision Tree that incorporates a reference to applicable RCRA regulatory limits' into the decision process. In addition, it was also my understanding that your agency would not require a ground water discharge plan for the discharge of drilling fluid, development water, and purge water from Hydrogeologic Workplan Wells as long as all discharges were compliant with the terms and conditions of the NOI.

In addition to our general discussions about the Hydrogeologic Workplan NOI, we discussed the discharge of approximately 50,000 gallons of containerized drilling fluid produced during the drilling of Hydrogeologic Workplan Well R-14. Per your request, please find the following enclosed water quality data and Material Safety Data Sheets (MSDSs) for the drilling fluid produced from R-14.

**Water Quality Data.** Attachment 1.0 contains water quality data (metals, general chemistry, SVOA, VOA, perchlorate, nitrate, and tritium) for the approximately 50,000 gallons of containerized drilling fluid produced during the drilling of R-14. It should be noted that the data table titled, "ER Water Samples" contains analytical results from two samples, GW14-02-46382 and GW14-02-46383, submitted for metals analysis. These samples were collected from the upper and lower portion of the storage tanks, respectively. Both samples were filtered prior to analysis.

The approximately 50,000 gallons of containerized drilling fluid from R-14 is compliant with New Mexico Water Quality Control Commission (NM WQCC) Regulation 3103 ground water standards with the exception of the following three contaminants:

Contaminant	Max. Result (mg/L)	Min. Result (mg/L)	WQCC ground water standard (mg/L)
Al	42.0	7.69	5.0
Fe	9.25	1.51	1.0
Mn	0.36	0.13	0.2

With the exception of acetone, no VOA or SVOA compounds were detected in R-14 drilling fluids. Acetone, detected at 1.6 mg/L, is present as a byproduct of the drilling additives. No perchlorate or tritium were detected in the R-14 drilling fluid at concentrations greater than analytical laboratory's Method Detection Limits (MDLs). Nitrate/nitrite (as N) was detected at 0.56 mg/L.

**MSDS Information.** Attachment 2.0 contains Material Safety Data Sheets (MSDSs) for the drilling fluid additives used in the top 1068 feet of the R-14 borehole including the formulation quantities for each product.

The Laboratory requests your agency's permission to discharge the approximately 50,000 gallons of drilling fluid from R-14 in accordance with the August 2, 2001, NOI. Please call me at (505) 667-6969 or Roy Bohn of the Laboratory's Environmental Restoration Project (RRES-R) at (505) 665-5138 if additional information is required.

Sincerely,



Bob Beers  
Water Quality & Hydrology Group

BB/am

Attachments: a/s

Cy: M. Leavitt, NMED/GWQB, Santa Fe, New Mexico, w/att.  
J. Davis, NMED/SWQB, Santa Fe, New Mexico, w/att.  
J. Bearzi, NMED/HWB, Santa Fe, New Mexico, w/att.  
J. Young, NMED/HWB, Santa Fe, New Mexico, w/att.  
J. Vozella, DOE/OLASO, w/att., MS A316  
G. Turner, DOE/OLASO, w/att., MS A316  
B. Stine, ADO, w/att., MS A104  
B. Ramsey, RRES-DO, w/o att., MS J591  
K. Hargis, RRES-DO, w/o att., MS J591  
D. Stavert, RRES-EP, w/att., MS J978  
S. Rae, RRES-WQH, w/att., MS K497  
C. Nylander, RRES-DO, w/att., MS K497  
D. Rogers, RRES-WQH, w/o att., MS K497  
M. Saladen, RRES-WQH, w/att., MS K497  
R. Bohn, RRES-R, w/att., MS M992  
D. McInroy, RRES-R, w/o att., MS M992  
RRES-WQH File, w/att., MS K497  
IM-5, w/att., MS A150

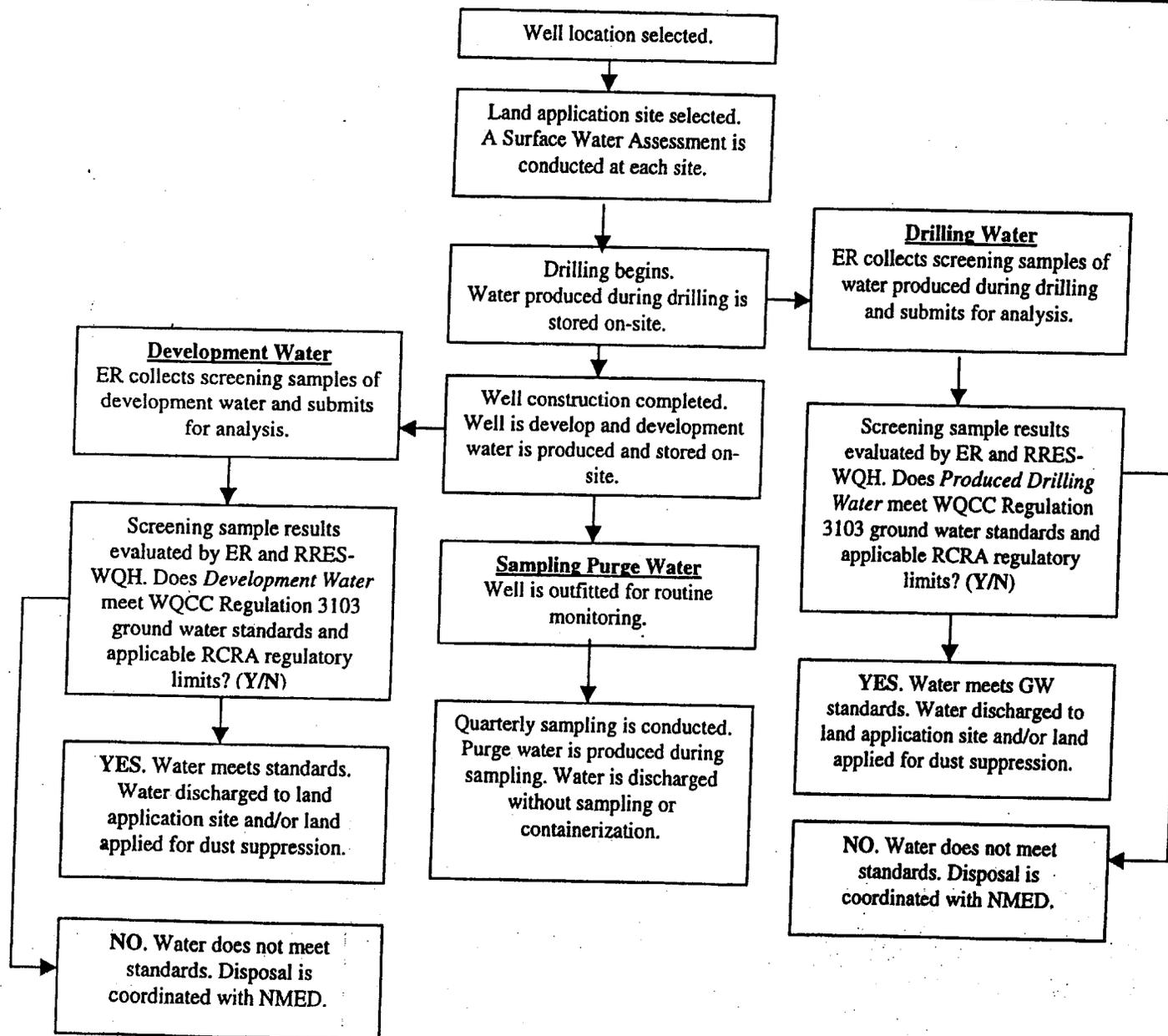


Fig. 1.0. Workplan NOI Decision Tree

# Los Alamos

NATIONAL LABORATORY

Los Alamos National Laboratory  
Los Alamos, New Mexico 87545

Date: August 2, 2001  
In Reply Refer To: ESH-18/WQ&H:01-234  
Mail Stop: K497  
Telephone: (505) 665-1859

Mr. John Young  
Hazardous Materials Bureau  
New Mexico Environment Department  
P.O. Box 26110  
Santa Fe, New Mexico 87502

Ms. Phyllis Bustamante  
Ground Water Quality Bureau  
New Mexico Environment Department  
P.O. Box 26110  
Santa Fe, New Mexico 87502

**SUBJECT: NOTICE OF INTENT TO DISCHARGE, HYDROGEOLOGIC WORKPLAN  
WELLS**

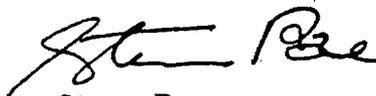
Dear Mr. Young and Ms. Bustamante:

Please find the enclosed Notice of Intent to Discharge (NOI) covering the discharge of drilling, development and sample purge water from the proposed regional aquifer wells described under Los Alamos National Laboratory's Hydrogeologic Workplan. This NOI is being submitted for your review and approval pursuant to Section 1201 of the New Mexico Water Quality Control Regulations. Since April, 1996, the Laboratory has submitted nine individual NOI's for each regional aquifer well constructed under the Workplan. As many as 23 additional regional aquifer wells have been proposed for construction over the next four years.

As an alternative to individual NOIs, the Laboratory is proposing that a single NOI be utilized for all discharges from regional aquifer wells constructed under the Workplan. It is the Laboratory's intent to improve coordination and administration of the NOI process for both the NMED and the Laboratory by eliminating the redundancy of individual NOIs for each well.

Thank you for your consideration of this request. Please call Bob Beers of the Laboratory's Water Quality and Hydrology Group at (505) 667-7969 if additional information would be helpful.

Sincerely,



Steven Rae,  
Group Leader  
Water Quality and Hydrology Group

SR:BB/tml

Mr. Young and Ms. Bustamante  
ESH-18/WQ&H:01-234

- 2 -

August 2, 2001

Enclosures: a/s

Cy: B. Lucas, NMED/SWQB, Santa Fe, New Mexico, w/enc.  
S. Yanicak, NMED/DOE/OB, w/enc., MS J993  
J. Vozella, DOE/LAAO, w/enc., MS A316  
M. Johansen, DOE/LAAO, w/enc., MS A316  
D. McInroy, E-ER, w/enc., MS M992  
R. Bohn, E-ER, w/enc., MS M992  
D. Erickson, ESH-DO, w/enc., MS K491  
L. McAtee, ESH-DO, w/enc., MK K491  
C. Nylander, ESH-18, w/enc., MS K 497  
M. Saladen, ESH-18, w/enc., MS K497  
B. Beers, ESH-18, w/enc., MS K497  
H. Decker, ESH-18, w/enc., MS K497  
WQ&H File, w/enc., MS K497  
IM-5, w/enc., MS A150

*Notice of Intent to Discharge*  
*Los Alamos National Laboratory*  
*Hydrogeologic Workplan*

**NOTICE OF INTENT TO DISCHARGE**  
**WATER PRODUCED DURING THE INSTALLATION AND MONITORING OF**  
**HYDROGEOLOGIC WORKPLAN WELLS**

**Introduction**

In March 1998, NMED approved a comprehensive hydrogeologic characterization work plan for Los Alamos National Laboratory (Laboratory). The Hydrogeologic Workplan (LANL 1998) proposes a multiyear drilling and hydrogeologic analysis program to characterize the Pajarito Plateau and to assess the potential for groundwater contamination from waste disposal operations. The goal of the project is to develop greater understanding of the geology, groundwater flow, and geochemistry beneath the 43-square-mile Laboratory area and to assess any impacts that Laboratory activities may have had on groundwater quality. The Hydrogeologic Workplan (Workplan) will result in an enhanced understanding of the Laboratory's groundwater setting and an improved ability to ensure adequate groundwater monitoring. The centerpiece of the Workplan is the proposed installation of as many as 32 regional aquifer wells.

Beginning with well R-9 in April 1996, the Laboratory has submitted a Notice of Intent to Discharge (NOI) for each Workplan well prior to installation. Table 1.0 below presents a summary of the wells completed to date, the date that the NOI was submitted for each well, and the ESH-18 file number for each respective NOI.

**Table 1.0. Completed Hydrogeologic Workplan Wells.**

<b>Well Name</b>	<b>Completion Date</b>	<b>Watershed</b>	<b>Type of Well</b>	<b>Date of NOI</b>	<b>NOI File No.</b>
R-25	Feb-99	Water/Valle	regional	7/7/98	98-0227
R-9	Sept-99	LA/Pueblo	regional	4/3/96	96-0189
R-15	Sept-99	Mortandad	regional	6/25/99	99-0245
R-12	Jan-00	Sandia	regional	3/27/98	98-0106
R-31	Feb-00	Ancho	regional	5/18/99	99-0165
R-19	Mar-00	Pajarito	regional	1/25/00	00-0019
R-22	Dec-00	Pajarito	regional	12/12/00	00-0412
R-7	Mar-01	LA/Pueblo	regional	2/29/00	00-0063
R-5	June-01	Pueblo	regional	4/10/01	01-0112

For the remaining Workplan wells, the Laboratory proposes to utilize a single, Generic NOI. That is, in lieu of submitting individuals NOIs for each well, as was previously conducted, this NOI is being submitted to comprehensively cover all discharges from regional aquifer wells constructed under the Workplan. It is currently estimated that R-well construction will be completed by 2005.

**Notice of Intent to Discharge**  
**Los Alamos National Laboratory**  
**Hydrogeologic Workplan**

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1. **Name and address of facility making the discharge.**  
Los Alamos National Laboratory  
P.O. Box 1663  
Los Alamos, New Mexico 87545
2. **Location of the discharge.**  
See attached Map 1.0 for the location of all completed and proposed Hydrogeologic Workplan (Workplan) wells. As prescribed in Standard Operating Procedure (SOP) 2.01, *Surface Water Assessment/Erosion Matrix*, the land application area will be located on the generally flat canyon bottom outside of the active channel. An assessment will be conducted at each proposed land application site prior to discharge.
3. **The means of discharge. (to Lagoon, Flowing stream, Water course, Arroyo, Septic tank, other).**  
All water produced during the drilling and development of Workplan wells will be containerized, sampled, and evaluated for compliance with NM WQCC Regulation 3103 ground water standards before any discharge occurs. See attached Figure 1.0, *Workplan NOI Decision Tree*, for further information on the sequence of activities conducted prior to a discharge of water to the environment.

Once it has been confirmed by the ER Project and ESH-18 that the containerized water is compliant with NM WQCC Regulation 3103 ground water standards then the water will be either (1) applied to the surface of the land in the vicinity of the well, or (2) applied to the well site or access roads for dust suppression. Land application will be conducted using the following means:

1. Aluminum piping with sprinkler heads will serve as the conduit for the discharge. A typical installation will consist of two separate piping runs, each approximately 250 feet long with 5 sprinkler heads on each run. Piping runs will be situated to prevent any overlap of spray. Sprinkler heads will be adjusted to maximize evaporation.
2. Each sprinkler head has a discharge rate of approximately 16 gallons per minute; ten sprinkler heads will discharge approximately 160 gallons per minute. Therefore, a typical system would have a design capacity of approximately 9,600 gallons per hour, weather and soil conditions permitting.
3. Land application will be conducted for 8 to 10 hours a day. The discharge will be monitored routinely during the hours of operation to (1) ensure that no ponding or run-off is occurring, (2) to inspect any BMP's installed on the application site, and (3) to inspect for leaks in the system or malfunctioning sprinkler heads.
4. If at any time the land application site shows signs of ponding or run-off, all discharge operations will be immediately halted. The site will be evaluated for the need of any additional BMP's and the discharge will not start again until the site has returned to an appropriate condition (i.e., no standing water or visible run-off).

**Notice of Intent to Discharge**  
**Los Alamos National Laboratory**  
**Hydrogeologic Workplan**

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The alternative method of land application is for dust suppression at the drilling site and on access roads serving the drilling site. A water truck will apply water used for dust suppression. A second alternate means of disposal would be discharge to one of the Laboratory's three wastewater treatment facilities (High Explosive Wastewater Treatment Facility, Sanitary Wastewater Systems Facility, Radioactive Liquid Wastewater Treatment Facility) if the quality of the water meets the treatment facility's Waste Acceptance Criteria (WAC) and the treatment facility has adequate capacity available.

4. **The estimated concentration of contaminants (if any) in the discharge.**  
The concentrations of contaminants in the discharge are expected to be equivalent to the concentrations of contaminants in the aquifer(s) penetrated during installation of the borehole. The quality of groundwater beneath the Laboratory is characterized and documented annually in the Laboratory's *Environmental Surveillance Report*. The *Environmental Surveillance Report* for 1999 is available on the World Wide Web at the following address: <http://lib-www.lanl.gov/pubs/la-13775.htm>. The *Environmental Surveillance Report* for 2000 is scheduled for release in October 2001.

In addition to the extensive characterization data available from the annual *Environmental Surveillance Reports*, each new Workplan well will also be sampled for specific contaminants of concern. Analyte lists will be prepared on a well-by-well basis. As identified in Figure 1.0, these results will be used to determine compliance with NM WQCC Regulation 3103 ground water standards prior to the commencement of land application. Analytical results will be submitted to the NMED as soon as they are available for release.

5. **The type of operation from which the discharge is derived**  
All of the wells referenced in this NOI are part of the Hydrogeologic Characterization Program undertaken by Los Alamos National Laboratory in order to better understand the geologic and hydrologic characteristics of the regional aquifer, intermediate perched zones, and intercalated unsaturated zones at the Laboratory. The discharges from each well are produced from the following three sources:

1. **Drilling Water.** During well drilling, water is produced from two sources:
  - Small quantities of drilling additives (e.g., EZ Mud™, Quick Foam™) are mixed with potable water and used during the drilling process to improve efficiency. Material Safety Data Sheets (MSDS) are available for these products upon request.
  - Groundwater (alluvial, intermediate, and regional) encountered as the borehole penetrates water-bearing strata.

Between 20,000 and 125,000 gallons of drilling water will be produced during the drilling of each Workplan regional aquifer well.

**Notice of Intent to Discharge  
Los Alamos National Laboratory  
Hydrogeologic Workplan**

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In addition to above drilling additives, there is the possibility that drilling mud may be used in the construction of certain Workplan wells. Drilling mud, such as Quick-Gel™, is commonly used during the drilling of wells to: (1) lift cuttings out of the hole, (2) cool the drill bit, and (3) support the walls of the borehole in unconsolidated formations. Drilling fluids containing drilling mud will be isolated in a designated holding tank where the solids will be settled and the water can be decanted. Settled solids will be disposed of at an approved disposal site. Decanted water will be sampled and land applied if compliant with NM WQCC Regulation 3103. Ground Water Standards.

2. **Development Water.** Following well construction, the well is developed to remove any fine material that may be blocking the wells screens or ports. This water is essentially ground water with the potential for small, deminimus, quantities of drilling additives. Between 20,000 and 125,000 gallons of well development water will be produced during the drilling of each Workplan regional aquifer well.
3. **Sampling Purge Water.** Once well construction is complete, each well will be routinely sampled. During sample collection it is necessary to purge the well prior to collecting a sample to ensure that the water sampled is representative of the ground water in the aquifer. Between 100 and 1,500 gallons of water will be produced during each sampling event. Since the volumes of sampling purge water are small and the source is exclusively ground water, it will be directly discharged to the land surface without sampling or containerization. In addition, no sprinkler system will be used during the discharge of sampling purge water. All discharges will be directed away from any surface water.
6. **The estimated flow to be discharged per day.**  
The daily discharge volumes from the land application of drilling and well development water are estimated to be as much as 96,000 gallons per day. Routine well sampling is expected to generate as much as 1,500 gallons of purge water per sampling event. Daily discharge volumes are dependent on the capacity of the soil, weather conditions, and equipment considerations.
7. **The estimated depth to Groundwater.** Depth to the regional aquifer varies from 700 to 1200 feet.

Signed: Steven Rae  
Steven Rae, Group Leader, ESH-18

Date: Aug 2, 2001

Signed: Julie A. Canepa  
Julie Canepa, Program Manager, ER Project

Date: 8/2/01

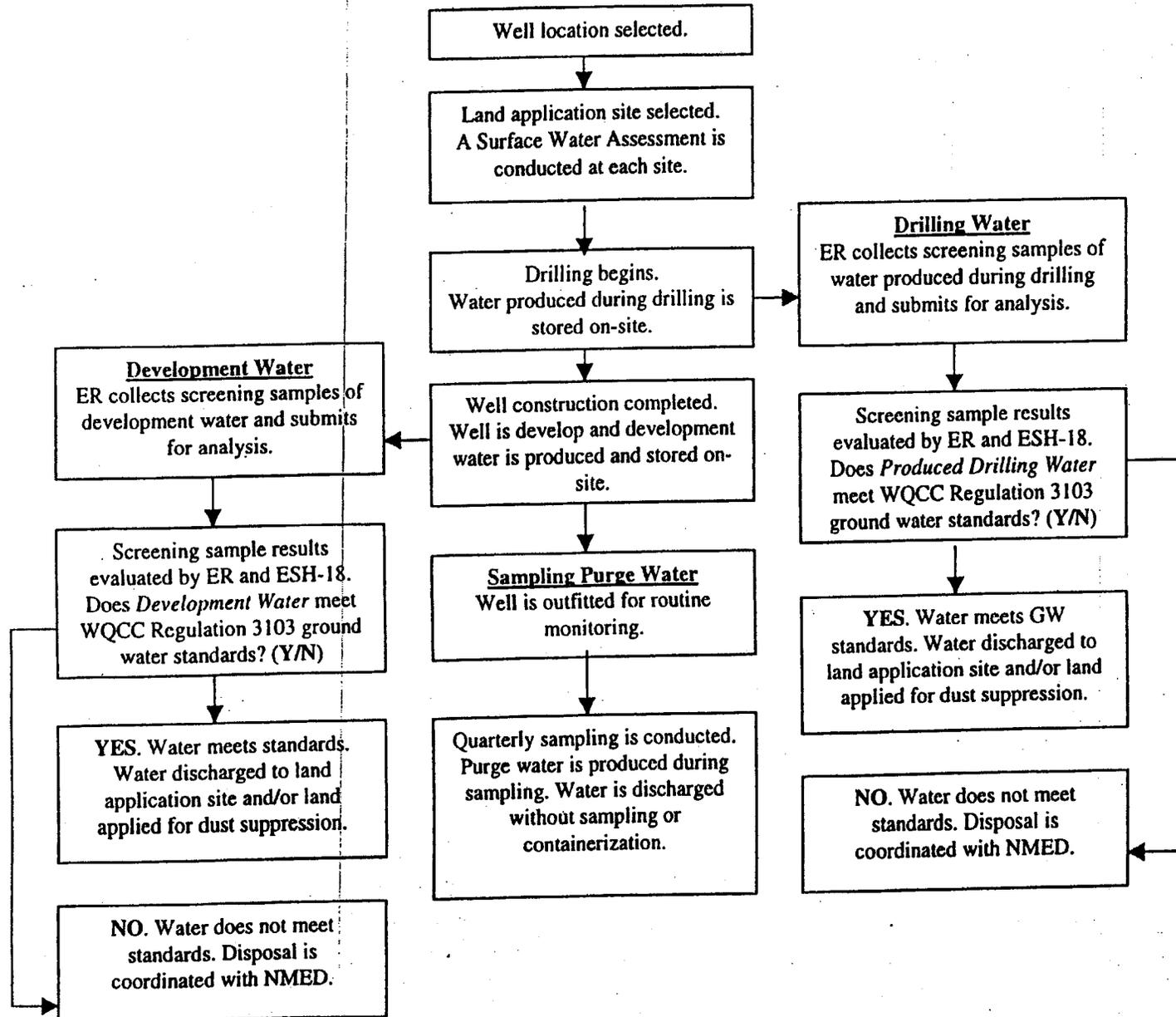


Figure 1.0. Workplan NOI Decision Tree

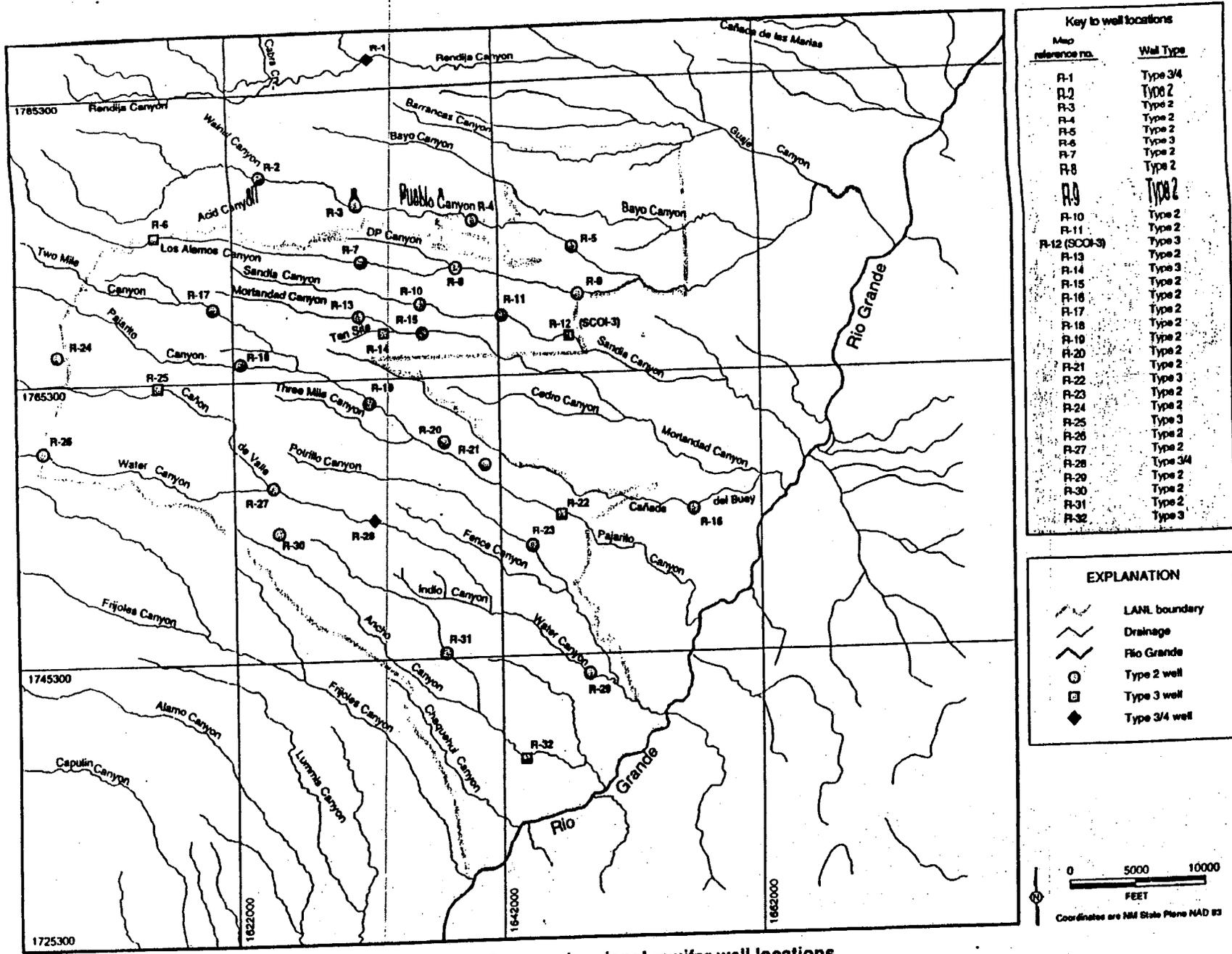


Figure 4-2. Proposed regional aquifer well locations.



**DEPARTMENT OF ENERGY**  
 National Nuclear Security Administration  
 Los Alamos Site Office  
 Los Alamos, New Mexico 87544



NOV 18 2004

CERTIFIED MAIL/RETURN RECEIPT

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

Ms. Cindy Padilla  
 Bureau Chief  
 NMED-Solid Waste Bureau  
 P.O. Box 26110  
 Santa Fe, NM 87502

Subject: Management of Drill Cuttings from Wells and Boreholes Constructed Under  
 Canyons Workplans

Dear Mr. Young and Ms. Padilla:

The topic of drill cuttings was discussed on a site visit by NMED staff on Friday, November 5, 2004. The purpose of this letter is to document a standard practice for management of drill cuttings of regional and intermediate wells at the Los Alamos National Laboratory (LANL) as well as boreholes drilled under Canyons Work Plans. Currently, numerous wells and boreholes are being drilled at LANL under the Mortandad Canyon Groundwater Work Plan, which did not contain a description of drill cuttings management. This letter provides NMED with documentation for these wells and boreholes as well as any other wells and boreholes drilled in the near future for canyons investigation purposes.

The drill cuttings management practice outlined below is consistent with past practice and past documentation (see enclosed letter dated January 22, 2003) and is also consistent with negotiations to date on this subject associated with the draft Consent Order (Order) for Hazardous Waste Bureau regulated activities. We understand that in the future the NMED will require documentation of such practices in work plans submitted under the Order.

The standard drill cuttings management practice is as follows:

- Before restoration of a drilling site, drill cuttings will be analyzed for hazardous waste constituents to include organics (EPA 8260-B and 8270-C), total inorganics (EPA 6010-B), and where appropriate, high explosives (EPA 8330) and PCBs (EPA 8082). TCLP analysis may be performed based on knowledge of the area being investigated. Review of the analytical data will consist of comparing the drill cuttings analytical data to the human health soil screening levels (SSL) from the New Mexico Environment Department (NMED) Soil Screening Levels, Revision 2 (February 2004). If available, analytical results from core samples may be used in lieu of sampling drill cuttings. Results will be included in reports to NMED as required and analytical data packages will be retained by the DOE and made available upon request.

- ❑ If analytical results demonstrate that the cuttings do not contain hazardous waste constituent concentrations exceeding soil screening levels, then the cuttings will be used during site restoration. Specifically, the drill pit liner will be removed and the cuttings will be retained in place within the drill pit. The cuttings may also be spread and recontoured on the drill site or roads in a manner that does not change existing drainage patterns or surface runoff patterns.
- ❑ If analytical results demonstrate that the cuttings contain constituent concentrations exceeding soil screening levels, then these results shall be provided to the NMED in writing along with a proposed disposal plan consistent with applicable requirements.
- ❑ DOE will also assess cuttings for radionuclide concentrations to determine appropriate disposition of cuttings relative to radionuclides. When available, radionuclide analysis results will be provided to NMED under the voluntary agreement for sharing radionuclide data.

This letter is intended to provide sufficient documentation of a standard practice for drill cuttings management for canyons wells and boreholes. We are currently implementing this practice based on previous correspondence and discussions with NMED. If further documentation, or any change to the standard practice is needed, please contact Tom Whitacre at (505) 665-5042, or Danny Katzman at (505) 667-6333.

Sincerely,



Mathew P. Johansen  
Groundwater Program  
Compliance Manager

EM:3MJ-003

**Enclosure:**

January 2003 letter titled Management of Drill Cuttings from Hydrogeologic Workplan Wells (R-wells) from Mr. Charles Nylander and Mr. Mat Johansen to Mr. John Young and Mr. Butch Tongate.

**cc w/ enclosure:**

C. Hules,  
NMED-Solid Waste Bureau  
P.O. Box 26110  
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**cc w/o enclosure:**

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**Los Alamos National Laboratory/University of California**  
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**Date:** January 22, 2003  
**Refer to:** RRES-GPP:03-006

Mr. John Young, Corrective Action Project Leader  
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**SUBJECT: MANAGEMENT OF DRILL CUTTINGS FROM HYDROGEOLOGIC  
 WORKPLAN WELLS (R-WELLS)**

Dear Messrs. Young and Tongate:

The purpose of this letter is to inform the New Mexico Environment Department Hazardous Waste Bureau (NMED-HWB) and Solid Waste Bureau (NMED-SWB) that the Los Alamos National Laboratory (LANL) will use the cuttings from the drilling of regional aquifer wells for restoration of the drilling site upon completion of drilling activities. The decision to use the cuttings for this purpose is supported by the information included below.

LANL will remove the drill pit liner and leave the cuttings in place as fill for the drill pit upon completion of drilling activities. The drill pits will then be filled to ground level with original site material. The sites will be revegetated and appropriate Best Management Practices will be put in place to prevent erosion. This practice has been used successfully at LANL at all previous regional well drill sites. Unlike previous wells, however, R-Wells 14, 16, 20, 23 and 32 were drilled using drilling fluids, and residuals remain in the cuttings. The attachment to this letter includes data demonstrating that the residuals in the cuttings do not constitute a waste management concern.

Management of the cuttings as part of site restoration is appropriate because the analytical results for the cuttings are consistent with that of purged water being discharged to the ground, per the conditions of Notices of Intent (NOIs) approved by the NMED-Groundwater Bureau (GWB) for R-Wells 14, 16, 20, 23, and 32. The analytes detected in wet cuttings from R-Wells 14 and 32, the minimum, maximum, and mean values, soil geochemical background values, screening levels, and TCLP regulatory limits are shown in the attachment. The screening levels are from "NMED Soil Screening Levels," Revision 1.0, December 18, 2000, with the exception of acetone, 4-methyl-2-pentanone, n-propylbenzene, and 1,2,4-trimethylbenzene, which are Environmental Protection Agency (EPA) screening levels. ESLs are from the ECORISK database, version 1-5, September 2002. Analytes are compared to background values, where available. If background values are unavailable,

analytes are compared to the screening levels. The comparison of mean values of analytical results for the cuttings to screening levels illustrates that concentrations are well below the appropriate human health or ecological screening level.

The wet cuttings from R-Wells 14 and 32 were analyzed for radionuclides, organics, high explosives, PCBs, total inorganics, and TCLP inorganics. Of the radionuclides analyzed, only tritium was higher than background, but it did not exceed the screening level. No organics exceeded the screening levels, and no high explosives or PCBs were detected. Of the inorganics analyzed, only magnesium, nickel, and sodium, were higher than background. Of these inorganics, screening levels exist for iron and nickel, and they were not exceeded. The TCLP analytical results indicate that there are no hazardous characteristic waste issues associated with the metals present in the cuttings. The TCLP analytical results for metals shown in the attachment do not approach any of the TCLP regulatory limits. Based on these results, LANL believes that use of the cuttings on site is an acceptable management practice and that the cuttings do not warrant off-site disposal as a solid/industrial waste.

Based on the concentrations and potential sources of organics in the cuttings, LANL believes there are no hazardous waste issues associated with the organics present. The organic compound detected at the highest level in the wet cuttings was acetone, which is often a false positive for isopropyl alcohol, a major constituent of Quik Foam. The presence of acetone as a false positive for isopropyl alcohol has been identified in several characterization wells where Quik Foam has been used.

The data provided for R-Wells 14 and 32 are representative of cuttings data from the other three wells, R-16, 20, and 23. Data for cuttings from those wells will be provided when available, which is anticipated to be in late January 2003. In addition to the five wells included in this request, LANL wishes to establish the use of drill cuttings for site restoration as an accepted management practice for all future R-Well drilling projects, provided that the analytical results for the cuttings remain consistent with the results presented in this request.

LANL believes that managing the drill cuttings on site would allow for site restoration that is both protective of human health and the environment and cost effective. LANL will begin site restoration activities by the end of this month, so please contact us by January 31, 2003 if you have concerns; otherwise, we will proceed with management of the cuttings as described herein. If you have any questions, please contact myself at (505) 665-4681 or Mat Johansen at (505) 665-5046.

Sincerely,



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

Sincerely,



Mat Johansen, Groundwater Program  
Program Compliance Manager  
National Nuclear Security Admin.  
Office of Los Alamos Site Operations

CN/MJ/kmv/th

Enclosure: Attachment – Analytes Detected in Wet Cuttings for Regional Wells R-14  
and 32

Cy (w/enc.):

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L. King, EPA Region 6 (2 copies)  
RRES-GPP File, MS M992  
RRES-RPF, MS M992 (ER2003-0050)

## Attachment

## Analytes Detected in Wet Cuttings for Wells (R-14, R-32)

Detected Analyte	Minimum Value	Maximum Value	Mean Value	Soil Geochemical Background Value	Screening Action Levels	Ecological Screening Levels	TCLP Regulatory Limit
<b>Radionuclides (pCi/g):</b>							
Am-241 (alpha spec)	0	0	0	0.013	NA	NA	NA
Cs-137 (gamma spec)	0	0	0	1.65	NA	NA	NA
Pu-238 (alpha spec)	0	0	0	0.023	NA	NA	NA
Pu-239 (alpha spec)	0	0	0	0.054	NA	NA	NA
Sr-90 (proportional counting)	0	0	0	1.31	NA	NA	NA
Tritium (liquid scintillation)	0.035	31.860	10.6	0.17 (Qbt 3)*	890	36,000	NA
Th-232 (gamma spec)	0	1.25	0.417	2.33	NA	NA	NA
U-234 (alpha spec)	1.10	1.28	1.19	2.59	NA	NA	NA
U-235 (alpha spec)	0	0.073	0.037	0.2	NA	NA	NA
U-238 (alpha spec)	1.13	1.23	1.19	2.29	NA	NA	NA
<b>Organics (EPA 8260-B &amp; 8270-C, mg/kg):</b>							
Acetone (isopropyl alcohol)	2.9	17.6	14.7	Unavailable	1,600	3.8	NA
Benzene	0	0.010	0.002	Unavailable	6.4	55	0.5 mg/L
Bromomethane	0	0.620	0.160	Unavailable	3.7	NA	NA
Chloroform	0	0.0078	0.0018	Unavailable	0.38	28	6 mg/L
Chloromethane	0	0.0079	0.0026	Unavailable	12.0	NA	NA
Ethylbenzene	0	0.015	0.003	Unavailable	68	NA	NA
4-Methyl-2-pentanone	0	0.033	0.007	Unavailable	790	NA	NA
Methylene chloride	0	0.710	0.182	Unavailable	8.9	7.1	NA
n-Propylbenzene	0	0.0065	0.001	Unavailable	140	NA	NA
Toluene	0	0.510	0.138	Unavailable	180	70	NA
1,2,4-Trimethylbenzene	0	0.038	0.008	Unavailable	52	NA	NA
Xylenes (total)	0	0.064	0.013	Unavailable	63	5.4	NA
<b>High Explosives (EPA 8330, mg/kg):</b>							
No compounds were detected.							
<b>PCBs (EPA 8082, mg/kg):</b>							
No compounds were detected.							
<b>Total Inorganics (EPA 6010-B, mg/kg):</b>							
Aluminum	1.93	9,670	3,228	29,200	NA	NA	NA
Antimony	0	0.068	0.023	0.83	NA	NA	NA
Arsenic	0.005	1.57	0.528	8.17	NA	NA	NA
Barium	0.018	61.3	20.5	295	NA	NA	NA
Beryllium	0	0.333	0.111	1.83	NA	NA	NA
Cadmium	0	0.285	0.095	0.40	NA	NA	NA
Calcium	45.2	9,370	3,392	6,120	NA	NA	NA
Chromium	0.0034	29.7	10.2	19.3	NA	NA	NA
Cobalt	0	15.9	5.3	8.64	NA	NA	NA
Copper	0.008	24.3	8.1	14.7	NA	NA	NA
Iron	0	28,170	9,390	21,500	23,000	NA	NA
Lead	0	2.69	0.898	22.3	NA	NA	NA
Magnesium	0.08	14,390	4,800	4,610	NA	NA	NA
Manganese	0	501	167.3	671	NA	NA	NA
Mercury	0	0.0011	0.0004	0.1	NA	NA	NA
Nickel	0.004	48.1	16.0	15.4	1,500	NA	NA
Potassium	37.3	733	390.8	3,460	NA	NA	NA
Selenium	0	1.75	0.59	1.52	NA	NA	NA
Silver	0	0.084	0.028	1	NA	NA	NA
Sodium	227	2,620	1,260	915	NA	NA	NA
Thallium	0	0.107	0.036	0.73	NA	NA	NA
Vanadium	0	54.8	18.3	39.6	NA	NA	NA
Zinc	0	42	14.0	48.8	NA	NA	NA
<b>TCLP Inorganics (EPA 1311/6010-B, mg/L):</b>							
Arsenic	0	0	0	NA	NA	NA	5
Barium	0.152	0.241		NA	NA	NA	100
Cadmium	0	0	0	NA	NA	NA	1
Chromium	0	0.0169		NA	NA	NA	5
Lead	0	0.003		NA	NA	NA	5
Mercury	0	0	0	NA	NA	NA	0.2
Selenium	0	0	0	NA	NA	NA	1
Silver	0	0	0	NA	NA	NA	5

\* Background value is calculated from Bandelier Tuff unit 3 (Qbt 3) value of 0.3 pCi/mL at 18.5% moisture concentration.