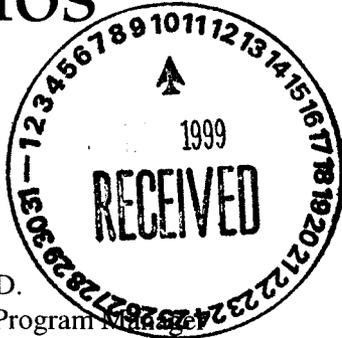


Los Alamos

NATIONAL LABORATORY

Los Alamos National Laboratory
Los Alamos, New Mexico 87545



Date: March 4, 1999
In Reply Refer To: ESH-18/WQ&H:99-0069
Mail Stop: K497
Telephone: (505) 665 - 1859

Mr. Robert S. Dinwiddie, Ph.D.
RCRA Permits Management Program
Hazardous and Radioactive Materials Bureau
New Mexico Environment Dept.
P.O. Box 26110
Santa Fe, New Mexico 87502

SUBJECT: ADDENDUM TO NOTICE OF INTENT TO DISCHARGE (NOI). LAND APPLICATION PLAN FOR R-25 WATER

Dear Mr. Dinwiddie:

Los Alamos National Laboratory has received your letter of February 23, 1999, detailing requirements for the land application of the containerized water from the R-25 Characterization Borehole. Enclosed is the information which you requested.

The R-25 Characterization Borehole is being completed under the Laboratory's Hydrogeologic Workplan. This characterization borehole is located on the mesa top above Canon de Valle at Technical Area (TA) 16. The enclosed plan details the location and manner in which the discharge of the approximately 63,000 gallons of containerized water will be applied to the mesa top. Applied water will not be allowed to flow into any watercourse.

Water quality data concerning Tank 8 was included in our data package submitted to your office on January 29, 1999. Tank 8 was inadvertently left out of your requirements letter of February 23, 1999, and we understand that Tank 8 may be considered as part of this land application project.

Please call Harvey Decker (665-2014) or Steve Veenis (665-9735) of the Laboratory's Water Quality and Hydrology Group (ESH-18) if you need any additional information.

Sincerely,

A handwritten signature in black ink, appearing to read "Steven Rae".

Steven Rae
Group Leader
Water Quality and Hydrology Group



6151

HWA Lane 3/1082/16 [R-25]

TC

HD/mm

Cy: P. Bustamante, NMED/GWPB, Santa Fe, New Mexico, w/enc.
B. Hoditschek, NMED/SWQB, Santa Fe, New Mexico, w/enc.
J. Kieling, NMED/HRMB, Santa Fe, New Mexico, w/enc.
S. Yanicak, NMED/DOE OB, w/o enc., MS J993
J. Vozella, DOE LAAO, w/o enc., MS A316
D. Broxton, EES-1, w/enc., MS D462
R. Bohn, EM-ER, w/enc., MS M992
T. George, EM-ER, w/o enc., MS M992
A. Pratt, ER/ FPL, w/o enc., MS J521
A. Crowder, ERM Golder, w/enc., MS M327
D. Erickson, ESH-DO, w/o enc., MS K491
C. Nylander, ESH-18, w/o enc., MS K497
S. Rae, ESH-18, w/o enc., MS K497
M. Saladen, ESH-18, w/o enc., MS K497
S. Veenis, ESH-18, w/o enc., MS K497
WQ&H File, w/enc., MS K497
CIC-10, w/enc., MS A150

METHOD OF LAND APPLICATION OF WATER FROM CHARACTERIZATION BOREHOLE R-25

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.

The R-25 Characterization Borehole is located at Technical Area (TA)-16. This mesa top area is located between the TA-16-260 Building and the TA-16 Burn Ground Area. This is generally a flat area with a less than 10% slope. A map of the location is attached with this plan. This borehole is being drilled as part of the Laboratory's Hydrogeologic Workplan in order to characterize the regional subsurface geohydrology of the Pajarito Plateau.

3. The means of discharge. (to lagoon, flowing stream, water course, arroyo, septic tank, other).

The discharge will be applied to the surface of approximately 2.3 acres of land on the mesa top approximately 300 feet west of the borehole. The method of land application is described below.

1. Aluminum piping with sprinkler heads will serve as the conduit for the discharge of the approximately 63,000 gallons of purge and sampling water from Characterization Borehole R-25.
2. There will be two separate aluminum piping runs, each 500 feet in length spaced approximately 200 feet apart with 6 sprinkler heads each. Spacing of the sprinkler heads is to be approximately 83 feet apart along the piping runs. Each sprinkler head will have a discharge radius of approximately 40 feet. This will allow an approximately 7 foot buffer area of no water impact between each sprinkler head on the 500 foot line.
3. Only one 500 foot piping run will be used at a time. This will allow for rotation of the discharge from area to area to prevent any ponding or run-off of the discharged water. As prescribed in the "AP 4.5 Surface Water Assessment" the discharge area has been located away from the roadway to the south and from the mesa edge to the north.

Land application will be conducted for 8 to 10 hours a day. The discharge will be monitored periodically during each discharge day to ensure that no ponding or run-off is occurring and to determine when to rotate the discharge area. **Ponding**, as defined for this discharge of containerized water is, *a body of standing water, often artificially formed*. **Erosion**, is *the process in which, by the actions of wind or water, soil particles are displaced and transported*.

4. A corkscrew type sprinkler (Beta Spray Nozzle) is to be used. These sprinkler heads are fog type heads in order to maximize evaporation. Each sprinkler head has a discharge rate of approximately 16 gallons per minute. An estimated 25,000 gallons per day may be discharged resulting in approximately 2 to 3 discharge days, dependant on weather and equipment considerations.
5. The rate of application is expected to be approximately 100 gpm. Water from the well is currently containerized in 2 Frac Tanks of 21,000 gallons each (FT 200 and 213) and 7 Poly Tanks (Tanks 1 through 6 and 8) of approximately 3000 gallons each, for a total of approximately 63,000 gallons. The discharge will be occasionally interrupted in order to transfer pumping from one container to the next. These interruptions will allow previously discharged water to infiltrate and will help prevent to ponding and run-off.
6. The land application site will be monitored during discharge hours. This will allow site staff, as necessary, to rotate the discharge areas or stop discharge if a problem with the sprinkler system occurs. Additionally, if the discharge area shows signs of ponding or saturation, all discharge operations will be immediately halted. The area will be evaluated and the discharge will not start again until the area is suitable (i.e., no standing water or visible run-off) for the discharge to resume.
7. Soil at the land application site will be sampled for High Explosive (HE) compounds and TAL metals prior to the initiation of the discharge. Additional samples will also be collected immediately after application and 6 to 12 months later. Soil sampling locations are delineated on the enclosed map of the discharge area. There will be a total of 4 soil samples collected from the discharge area. Two soil samples from each 500 foot length of discharge area. The soil samples will be collected from 0" to 6" inches in depth. Each soil sample will be analyzed for HE by EPA SW 846 Method 8330 and TAL metals by EPA 6010 7000 Series Methods. All soil analytical data will be provided to the NMED/HRMB/RPMP by separate letter.

An AP 4.5 Surface Water Assessment/Erosion Matrix for this location was performed on December 10, 1998. An assessment of "minimal" surface/ground water impact for the land application area has been determined for the described process (Please see enclosed AP 4.5 worksheets).

This discharge of approximately 63,000 gallons of the well water is equal to approximately 0.18 acre-feet of water.

4. The estimated concentration of contaminants (if any) in the discharge.

Based on analytical results of samples collected from the containerized water, the HE compound RDX had the highest concentration measured in the storage tanks. The value for RDX was used to calculate the total loading value to be discharged on the approximately 2.3 acres of land application area. This calculation indicates that approximately $.082 \mu\text{g per cm}^2$ will be discharged to the mesa top. This calculation does not account for losses due to evaporation. (Please see enclosed loading calculations).

5. The type of operation from which the discharge is derived

Characterization Borehole R-25 is part of the on-going study undertaken by Los Alamos National Laboratory in order to better understand the geologic and hydrologic characteristics of the vadose zone and regional aquifer. The approximately 63,000 gallons of water to be discharged has been collected from the drilling, purging and sampling operations at this borehole.

6. The estimated flow to be discharged per day.

The discharge amount is estimated to be approximately 25,000 gallons per day for approximately 2 to 3 discharge days. Discharge amount variability will be dependant on weather and equipment considerations.

7. The estimated depth to ground-water (if available)

Current information indicates that the ground water exists at 747 feet below the mesa top at this location.

Los Alamos National Laboratory

Environment, Safety & Health Division
 ESH-18 Water Quality & Hydrology Group

Surface Water Assessment Erosion Matrix for PRS R-25

CRITERIA EVALUATED	Value	Erosion/Sediment Transport Potential			Calculated Score
		Low 0.1	Medium 0.5	High 1.0	
Site Setting (43)					
On mesa top	1	Defined based on topographic setting			1.0
Within bench of canyon	4				
Within the canyon floodplain but not watercourse	13				
Within bottom of canyon channel in watercourse	17				
Estimated % ground and canopy cover	13	>75%	25-75%	<25%	1.3
Slope	13	0-10%	10-30%	>30%	1.3
Surface Water Factors-Run-off (46)					
Visible evidence of runoff discharging? (Yes/No)	5	If no, score of 0 for runoff section. If yes, score 5 and proceed with section.			0.0
Where does runoff terminate?	19	Other	Bench Setting	Drainage/Wetland	0.0
Has runoff caused visible erosion? (Yes/No)	22	Sheet	Rill	Gully	0.0
					If no, score as 0. If yes, calculate as appropriate.
Surface Water Factors-Run-on (11)					
Structures adversely affecting run-on (Yes/No)	7*	If yes, score as 7. If no, score as 0.			0.0
Current operations adversely impacting (Yes/No)	4	If yes, score as 4. If no, score as 0.			0.0
Natural drainages onto site (Yes/No)	7*	If yes, score as 7. If no, score as 0.			0.0
<i>*Select either structures or natural drainages.</i>					
MAX. POSSIBLE EROSION MATRIX SCORE:	100	Total Score			3.6**

** Indicates BMPs in place. Erosion potential without BMPs may be greater.

**Los Alamos National Laboratory
SURFACE WATER
SITE ASSESSMENT**

Part B: page 2 of 4

SITE INFORMATION

1a) PRS Number 1b) Structure Number 1c) FMU Number
 2. Date/Time (M/D/Y H:M am/pm)

SITE SETTING (check all that apply)

3. On mesa top (a). In the canyon floor, but not in an established channel (c).
 Within a bench of a canyon (b). Within established channel in the canyon floor (d).

Explanation: Located on mesa top west of TA-16 Burn Ground and MDA P.

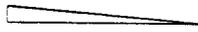
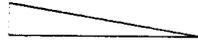
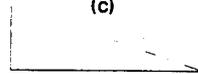
4. Estimated ground and/or canopy cover at site: (deciduous leaves, pine needles, rocks, vegetation, trees, structures, asphalt, etc.)

(illustration) (a)
 (b)
 (c) 

Estimated % of ground/canopy cover: 0% to 25% 25% to 75% 75% to 100

Explanation: Heavy pine tree/pine needle coverage throughout the site.

5. Steepest slope at the area impacted:

(a)  (b)  (c) 

Less than 10% 10% to 30% 30% and greater

Explanation: Flat area. Canon de Valle tributary drops off north of site, access road located south of site.

RUNOFF FACTORS

Y / N

6. Is there visible evidence of runoff discharging from site? If yes, answer a) - c) below:
 6a) Is runoff channelized? If yes, describe Man-made channel. Natural channel.

Explanation: No visible evidence due to heavy vegetation and flat slope.

RUNOFF FACTORS, CONT'D

6b) Where does evidence of runoff terminate?

- Drainage or wetland (name) _____
- Within bench of canyon setting (name) _____
- Other (i.e., retention pond, meadow, mesa top) _____

Explanation: Infiltrates into surround area.

Y / N

6c) Has runoff caused visible erosion at the site? If yes, explain below Sheet Rill Gully

Explanation: None observed.

RUN-ON FACTORS

Please rate the potential for storm water to run on to this site: (Check EITHER #7 or #9)

7. Are structures (i.e., buildings, roof drains, parking lots, storm drains) creating run-on to the site?

Explanation: No structures are located nearby.

8. Are current operations (i.e., fire hydrants, NPDES outfalls) adversely impacting run-on to the site?

Explanation: No current operations impact run-on to site.

9. Are natural drainage patterns directing stormwater onto site?

Explanation: Area is flat, so no natural drainage is affecting run-on.

ASSESSMENT FINDING:

10. Based on the above criteria and the assessment of this site, does soil erosion potential exist? (REFER TO EROSION POTENTIAL MATRIX.)

Veenis, Steve

11. Signature of Water Quality/Hydrology Representative

Initials of independent reviewer.

Check here when information is entered in database:

This page is for ESH-18 notes, recommendations, and photos.

Y / N

12. a) Is there visible trash/debris on the site?

b) Is there visible trash/debris in a watercourse?

Description of existing BMPs:

BMPs are in place at the well head.

Are BMPs being properly maintained? If no, describe in "Other Internal Notes."

Are BMPs effectively keeping sediment in place and reducing erosion potential?

OTHER INTERNAL NOTES:

Site west of R-25 well head is proposed for land application of drill/purge water generated at drill site. If water is applied at appropriate rate and away from access road (south) and mesa edge (north) the impact to surface/ground water would be negligible.

R-25 LAND APPLICATION LOADING CALCULATION

GIVEN

100,000 ft² land application area

32 µg/l RDX as the highest measured concentration of any HE compound in the storage tanks

ASSUMING

63,000 gallons total discharge

USING

1 GALLON = 3.785 LITERS

1 FOOT² = 929 CM²

1000 CM³ = 1 LITER

CALCULATE

$$63,000 \text{ gal}/100,000 \text{ ft}^2 = 0.63 \text{ gal}/\text{ft}^2$$

$$0.63 \text{ gal} * 3.785 * 10^3 \text{ cm}^3/\text{gal} = 2385 \text{ cm}^3$$

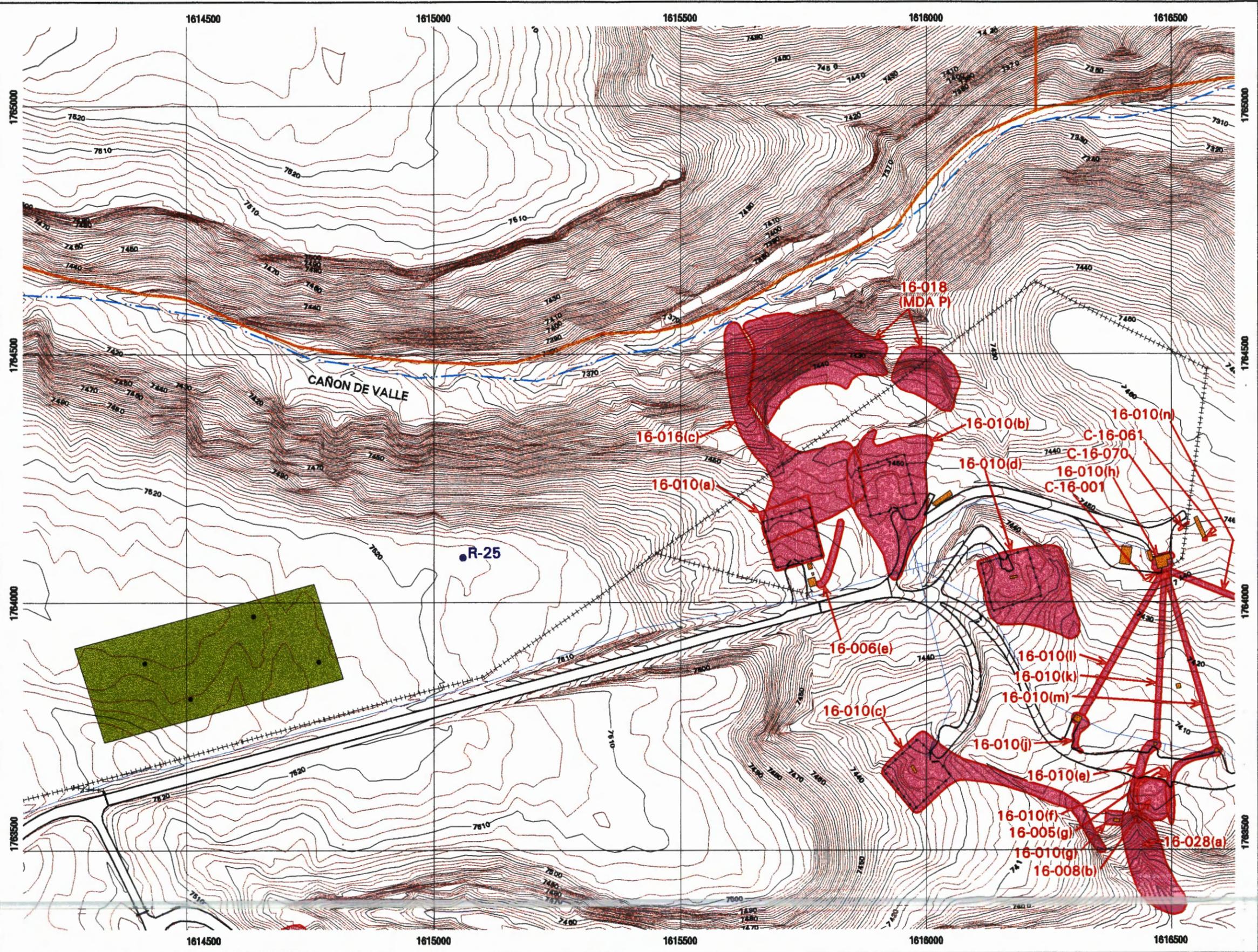
OR

$$2385 \text{ cm}^3/929 \text{ cm}^2 = 2.57 \text{ cm}^3/\text{cm}^2$$

$$2.57 \text{ cm}^3/\text{cm}^2 * 32 \text{ µg}/1000\text{cm}^3 = 0.082 \text{ µg}/\text{cm}^2$$

Groundwater Land-Application Area at Well R-25

-  Boundary, TA
-  Contour, 2 foot
-  Contour, 10 foot
-  Drainage
-  Fence
-  Roads, Paved
-  Telephone Line
-  Water Line
-  Potential Release Site
-  Structure
-  Water Application Area
-  Soil Sample Point
-  Well R-25



State Plane Coordinate System, New Mexico Cent
1983 North American Datum

Grid provides NM State Plane coordinates in feet.
Grid interval, in feet: 500
Feet per inch on map = 200
SCALE 1:2400

Notice: The information on this map is provisional and the accuracy has not been confirmed. Locations are dependent on scale and symbology and should not be relied upon to establish legal boundaries. Sources: Boundary, structure, and utility data are from Los Alamos National Laboratory Engineering Division and Los Alamos County Utility and Engineering Departments. Contour data are from Los Alamos National Laboratory Environmental Restoration Program aerial survey, September 1998.

University of California
Los Alamos National Laboratory
Earth and Environmental Sciences
EES-5 GIS TEAM

Produced by: Doug Walther
Date: March 04, 1999
GIS Plot ID: G107412