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NEW MEXICO  
ENVIRONMENT DEPARTMENT



SUSANA MARTINEZ  
Governor  
JOHN A. SANCHEZ  
Lieutenant Governor

Harold Runnels Building  
1190 South St. Francis Drive (87505)  
P.O. Box 5469, Santa Fe, NM 87502-5469  
Phone (505) 827-0187 Fax (505) 827-0160  
www.env.nm.gov



ENTERED

RYAN FLYNN  
Cabinet Secretary  
BUTCH TONGATE  
Deputy Secretary

September 11, 2015

Gene E. Turner, Env. Permitting Manager  
U.S. DOE National Nuclear Security Administration  
Los Alamos Field Office, A316  
3747 West Jemez Road  
Los Alamos, NM 87545

Ms. Alison Dorries, Division Leader  
Environmental Protection Division (ENV-CP)  
Los Alamos National Security, LLC (LANS)  
P.O. Box 1663, MS K490  
Los Alamos, NM 87545

**RE: SWQB Response to Notice of Intent to Discharge, Tracer Test, Los Alamos National Laboratory (LANL), Technical Area (TA) 16, Cañon de Valle near Burning Ground Spring**

Dear Mr. Turner and Ms. Dorries:

The New Mexico Environment Department (NMED), Surface Water Quality Bureau (SWQB) received your Notice of Intent (NOI) to discharge per 20.6.2.1201 New Mexico Administrative Code (NMAC) dated August 6, 2015 (Reference ENV-DO-15-0225, LA-UR 15-25882) and additional information provided by LANS correspondence dated September 9, 2015.

DOE/LANS proposes to conduct a naphthalene disulfonate (NDS) tracer test in the Cañon de Valle surface water/alluvial system at TA-16 to determine recharge rates from the alluvial aquifer to the deep perched-intermediate zone. DOE/LANS also proposes that surface water discharge is to be measured along the TA-16 Cañon de Valle flowing reach using a salt (NaCl) dilution with "clean" water technique. Source water for the "clean" water was not identified. Salt is proposed to be used on a quarterly basis—expected for up to six quarters at two or three locations along the flowing reach each quarter. Anticipated stream flow during the proposed test to determine dilution of the tracers was not provided. The NOI did not discuss if the tracers deployed in Cañon de Valle or in wells of the larger workplan for tracer tests at TA-16 would be observed in downgradient waters, springs or seeps.

NMED SWQB recognizes the importance of activities to test connectivity of hydrological systems and supports the future assessment of potential remedial alternatives from groundwater contaminated with high explosives, as described in your NOI. NMED SWQB also recognizes the potential need to use higher concentration of tracers in surface water to groundwater applications, than only surface water applications.

Perennial portions of Cañon de Valle from LANL boundary to stream gage E256 upstream to Burning Ground Spring are in classified Segment 20.6.4.126 NMAC in the Rio Grande Basin with designated uses coldwater aquatic life, livestock watering, wildlife habitat and secondary contact. Applicable general and numeric surface water quality standard (WQS) criteria include:

- pH within the range of 6.6 to 8.8 (20.6.4.900.H(2) NMAC Coldwater Aquatic Life)
- surface waters of the state shall be free of toxic pollutants from other than natural causes in amounts, concentrations or combinations that affect the propagation of fish or that are toxic to humans, livestock or other animals, fish or other aquatic organisms, wildlife using aquatic environments for habitation or aquatic organisms for food, or that will or can reasonably be expected to bioaccumulate in tissues of fish, shellfish and other aquatic organisms to levels that will impair the health of aquatic

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organisms or wildlife or result in unacceptable tastes, odors or health risks to human consumers of aquatic organisms (20.6.4.13.F NMAC)

- Total residual chlorine (TRC) numeric criteria is 11 and 19 micrograms per liter (20.6.4.900.J(2) NMAC Wildlife Habitat and Chronic Aquatic Life, and Acute Aquatic Life Criteria)

DOE/LANS's NOI provided a material safety data sheet (MSDS) for sodium 2-naphthalene sulfonate indicating that the toxicity to daphnia and other aquatic invertebrates--lethal concentration for 50% population (LC50) *Daphnia magna* (water flea) to be 135 mg/L in a 4.2 day test.

In a separate DOE/LANS's NOI dated July 28, 2015 (ENV-DO-15-0216, LA-UR-15-25449, Enclosure 4) eco-toxicity information was provided for NDS, Greim et al., Geothermics 30 (2001) *Toxicity and Ecotoxicity of Sulfonic Acids: Structure-Activity Relationship*, which states:

*The value of acute toxicity to fish is greater than 100 mg/L for seven of the naphthalene sulfonic acids. There is an acute fish toxicity value less than 100 mg/L only for branched and linear butyl derivatives of naphthalene sulfonic acids, sodium salts (91078-64-7).*

*No degradation was observed for six of the eight naphthalene sulfonic acids...Accordingly, the substances must be classified as "not readily biodegradable."*

*Toxicity to Algae...[f]or naphthalene sulfonic acids (68153-01-5) the 96-hr effect concentration are 54.3 and 73.3 mg/L.*

Total Dissolved Solid (TDS), the measurement of inorganic salts, organic matter and other dissolved materials in water, can cause toxicity through increases and changes in salinity or individual ions. "*Increases in salinity have been shown to cause shifts in biotic communities, limit biodiversity, exclude less-tolerant species and cause acute or chronic effects at specific life stages*" (Source: Alaska Department of Fish and Game Division of Habitat and Restoration (ADF&G), Technical Report 01-06, June 2001 available at [http://www.adfg.alaska.gov/static/home/library/pdfs/habitat/01\\_06.pdf](http://www.adfg.alaska.gov/static/home/library/pdfs/habitat/01_06.pdf)). For toxicity of TDS to aquatic species, ADF&G's report focused on a TDS range of concern of 500 to 1,500 mg/L.

In the additional information dated September 9, 2015, revised measures to reduce the proposed target concentrations below 135 mg/L of NDS and less than 500 mg/L of sodium chloride were described. For NDS, the mixing volume is proposed to be increased from 12,000 gallons described in the August 6, 2015 NOI to 24,000 gallons. DOE/LANS proposes to add tracer to the stream by gravity from a tank at a flow rate of 0.25 L/second. DOE/LANS estimates that the tracer concentration in the stream would be approximately 72 mg/L and the tracer would be added over 5 days. For sodium chloride, the tracer stock volume is proposed to be increased from 1L to 2L, and the salt concentration is proposed to be reduced to 35 grams from 100 grams originally described in the August 6, 2015 DOE/LANS NOI. DOE/LANS estimates that the sodium chloride concentration in the receiving stream would be approximately 350 mg/L within one minute of addition to the stream and dilution would continue to lower the concentration with additional time.

DOE/LANS's NOI toxicity test results and additional information with revised proposed concentrations provide some assurance that the proposed study will not have a toxic effect on surface water. However, this letter does not provide approval or disapproval of the use of the tracers. The applicable surface WQS will apply. Therefore, in the event that any WQS were to be violated, you could be subject to enforcement pursuant to the New Mexico Water Quality Act [Section 74-6-10 NMSA].

Mr. Turner and Ms. Dorries

September 11, 2015

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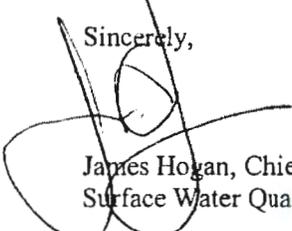
SWQB recommends that any work plan for the study be revised to ensure surface waters are protected and that surface WQS are not violated. SWQB recommends the following general practices for tracer studies in surface waters:

- If possible, tracer tests should not occur during winter or springtime, generally defined as between November 1 and April 30, when most sensitive juvenile life forms are likely to be present in the receiving water.
- If using potable water, then the water would need to be de-chlorinate or allowed to dissipate to TRC levels at or below surface water quality standards numeric criteria prior to discharge.
- As appropriate to the location of the study, conduct public notification prior to and/or during the study.
- Keep records of use and observations (e.g., notifications, manufacture's label instructions, MSDS, calculations for dye concentrations, monitoring for pH and TRC, etc.).

SWQB understands the United States Environmental Protection Agency (USEPA) Region 6 has not required a federal Clean Water Act National Pollutant Discharge Elimination System (NPDES) permit for the introduction of chemical tracers into waters of the United States for study purposes. However, DOE/LANS is advised to contact Mr. Brent Larsen, USEPA Region 6 Permits, 214-665-7523, [larsen.brent@epa.gov](mailto:larsen.brent@epa.gov) to inquire whether there may be federal permit requirements.

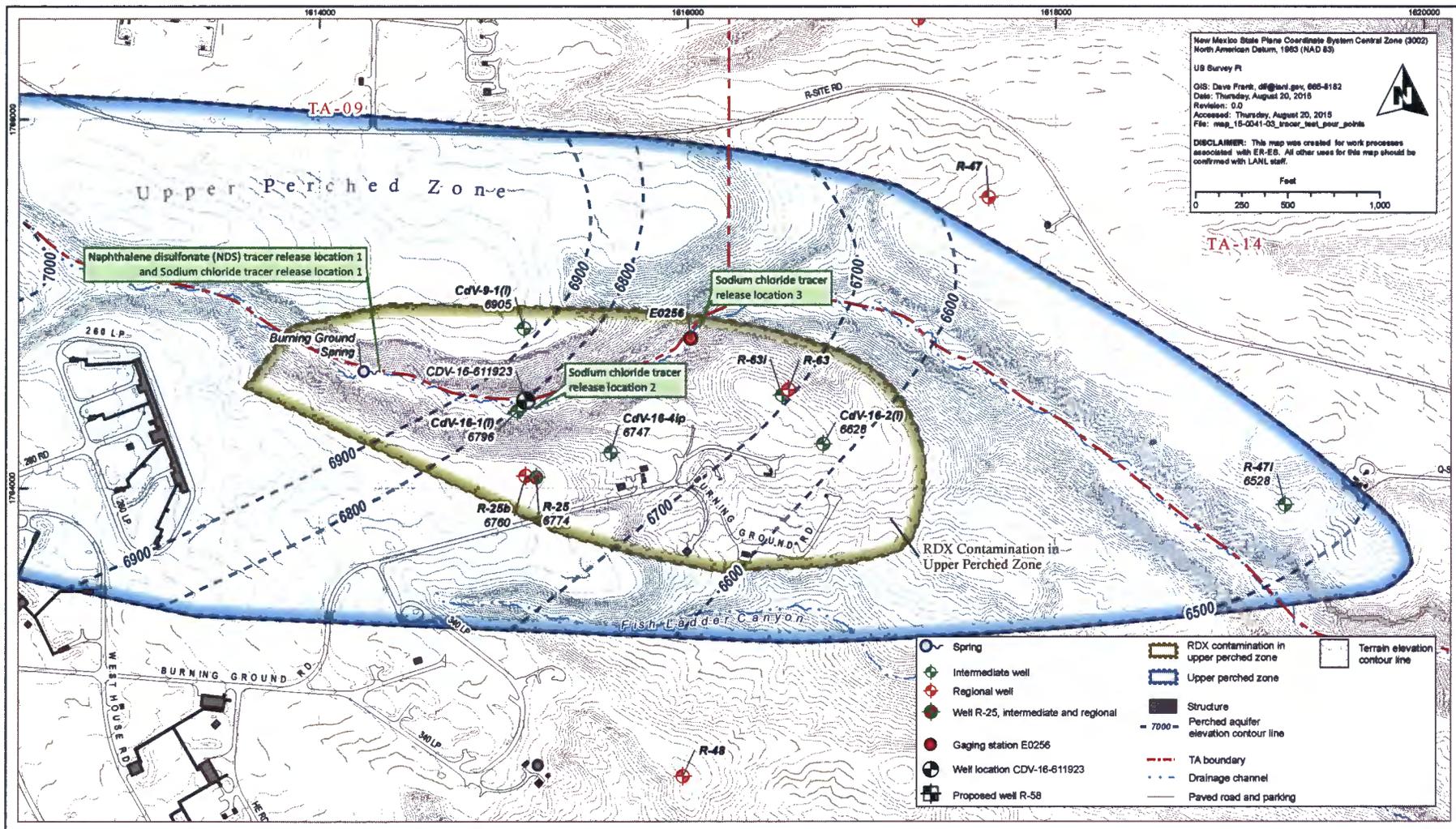
If you have any questions, please contact Bruce Yurdin at 505-827-2795 or Erin Trujillo at 505-827-0418 of my staff.

Sincerely,



James Hogan, Chief  
Surface Water Quality Bureau

cc: Sarah Holcomb, NMED/SWQB by email  
Gerald Knutson, NMED/GWQB by email  
Steven Huddleson, NMED/GWQB by email  
Greg Huey, NMED/GWQB by email  
Steve Yanicak, NMED DOE OB by email  
Michael Saladen, LANS, LLC by email  
Bob Beers, LANS, LLC by email  
John E. Kieling, NMED/HWB by email  
Brent Larsen, USEPA R6 by email



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Figure 1.0-1 Location of wells and other hydrologic features within the Canon de Valle watershed. The extent of the upper perched zone (with water-elevation contour lines) and the extent of RDX contamination in this zone are shown as an example of the subsurface conditions at TA-16.