Los Alamos
NATIONAL LABORATORY
EST. 1943
Associate Director for
Environmental Programs
P.O. Box 1663, MS M991
Los Alamos, New Mexico 87545
(505) 606-2337/Fax (505) 665-1812

Date: MAY 20 2011
Refer To: EP2011-0191

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

Subject: 15-Day Sampling Notification for Material Disposal Area B, at Technical Area 21 and Sampling and Analysis Plan Addendum for Borehole Drilling Task, Solid Waste Management Unit 21-015, Material Disposal Area B, at Technical Area 21

Dear Mr. Kieling:

Los Alamos National Laboratory (the Laboratory), in accordance with Section III.O of the Compliance Order on Consent (hereafter, the Consent Order), hereby provides written 15-day notification to the New Mexico Environment Department (NMED) of field sampling activities associated with the implementation of the April 2010 Sampling and Analysis Plan for Post-Remediation Borehole Drilling at Material Disposal Area B, Solid Waste Management Unit 21-015, Technical Area 21 and sampling and analysis plan (SAP) addendum based on data obtained to date from waste excavation and corrective actions. Drilling will be performed in accordance with the following borehole drilling task addendum and are planned to begin on June 6, 2011.

Summary of Excavation Activities

As of May 9, 2011, excavation of MDA B is approximately 78% complete. Over 27,000 yd^3 of material has been removed from the site. Material has been excavated from a maximum depth of 22 ft below ground surface (bgs). Excavation was conducted to the maximum depth that could be safely performed at the site. A total of 66 confirmation sample results have been received. Confirmation sample results have been provided to NMED in three quarterly reports submitted in fiscal year 2011. In accordance with the SAP for the postremediation borehole drilling task for Material Disposal Area (MDA) B, characterization of the subsurface will be addressed with the installation and sampling of two boreholes within the excavation area.

Borehole Selection Criteria

Candidate borehole locations have been evaluated using the following criteria:

- Evidence of heavy staining, severe fracturing, and/or high moisture content
- Residual soils containing contamination above residential cleanup levels
- Areas with high levels of contamination identified during excavation

Based upon confirmation sampling results, the following borehole candidate areas have been identified:

- Enclosure 2 row 51 and
- Enclosure 1 row 250

Section IV.C.2.d.iii of the Consent Order recommends installing eight boreholes, with two boreholes advanced to the base of the Cerro Toledo interval. Based on an evaluation of the 66 confirmation sampling results received to date and observations of the excavation, it is evident radionuclides are the primary contaminants, and limited organic or inorganic contamination is present in the native substrate. Limited evidence of staining or elevated moisture has been noted in the excavation walls. Based upon the findings to date, the Laboratory proposes installing and sampling two boreholes at this time.

One deep borehole will be placed in grid cell row 250, where confirmation samples measured plutonium-239/249 and cesium-137 activities above the residential screening action levels (SALs). This location is also in the center of the overall MDA B site, providing an area representative of the former disposal site. The deep borehole will be drilled to the base of the Cerro Toledo interval, estimated to be at or about 380 ft bgs.

A shallow borehole will be placed in grid cell row 51 where uranium-234/235 and uranium-238 measurements exceeded the residential SALs on the northern sidewall and where plutonium-239/240 activities exceeded the residential SAL at the trench bottom. This section of trench was excavated to the maximum depth which could be safely achieved on-site. The proposed shallow borehole will be drilled to a total depth of 25 ft below the bottom of the waste trench or 25 below the deepest field-screening detection beneath the base of the trench, estimated to be at a total depth of 50 ft bgs. This target depth is in accordance with the requirements in the investigation/ remediation work plan (IRWP). Total depth of the shallow borehole will be determined in the field and will be based upon field screening for radionuclides, volatile organic vapors, or visual observations (staining or fractures in the soil-rock matrix). Field locations of both boreholes are shown in the attached Figure 1, MDA B planned borehole locations.

Clarification of the SAP

The following clarifications to the April 2010 SAP should be noted.

- *Geotechnical Analysis*. The April 2010 SAP identifies the collection of a minimum of three geotechnical samples from the tuff units overlying the Cerro Toledo interval and one from within the Cerro Toledo unit. Additional samples would be based upon distinct visual

observations or elevated field-screening results. Geotechnical analysis would support characterization of the local vadose zone hydrogeology. Analyses would include saturated and unsaturated hydraulic conductivity, matric potential, porosity, chloride-ion concentration, moisture content, and bulk density. Collection of geotechnical samples will be based upon the conditions observed in the field during drilling and visual inspection of the recovered core.

- *Borehole Plug and Abandonment.* From a worker safety perspective, it is necessary to plug and abandon the boreholes once soil vapor gas samples have been collected. The open borehole poses an inherent risk to ongoing field operations. If the soil vapor gas sample results indicate a need to collect additional samples or establish a soil vapor gas monitoring program, an additional borehole would be installed and sampled. This is a necessary operational deviation from the April 2010 SAP to ensure worker safety.
- *Borehole Geophysical Logging.* It is proposed that geophysical logging of the subsurface be deferred until review of the lithologic logging determines the need. If the lithologic logs indicate significant porous or fractured zones warranting additional characterization, the Laboratory will propose geophysical logging and an appropriate location and depth profile.
- *Borehole Associated with Areas 9 and 10.* As noted in the May 26, 2010, submittal to NMED of the Investigation Report for Material Disposal Area B, Solid Waste Management Unit 21-015, at Technical Area 21, the sampling results do not warrant installation of the proposed borehole as described in section 4.0 of the April 2010 SAP.
- *Equipment Air Filters.* Section 5.8, Equipment Decontamination Methods, currently indicates drilling operations conducted inside the excavation enclosures will result in contamination of equipment air filters and will require their removal and disposal. Current plans are for drilling operations to be conducted outside the excavation enclosures and, as such, the air filters on drilling equipment within the drilling exclusion zone will be evaluated by the radiation control technician and health and safety oversight staff to determine if the equipment air filters are contaminated and evaluate the need removal and disposal. The equipment will be thoroughly surveyed and tagged for free release before demobilization from the site.

April 2010 Sampling Method

Sampling will be conducted in accordance with the April 2010 MDA B postremediation borehole drilling SAP and is summarized below.

- Continuous lithologic logs will be collected continuously from the ground surface to total depth from each borehole.
- All lithologic cores will be visually examined in the field and screened for radiological contamination and headspace vapor screening for volatile organic compounds (VOCs), in accordance with Section IX.B of the Consent Order.
- A minimum of four samples from the deep borehole and two soil-rock matrix samples for the shallow borehole will be submitted to a laboratory for analysis of VOCs, semivolatile organic compounds, explosive compounds, pH, polychlorinated biphenyls, dioxins/furans, nitrates, perchlorate, target analyte list metals, total uranium, cyanide, tritium, isotopic

uranium, isotopic plutonium, strontium-90, and radionuclides by gamma spectroscopy, in accordance with the approved IRWP.

Sampling intervals will be selected using the following criteria:

- The sample exhibiting the highest field screening detection
- The sample collected from the maximum depth in each borehole that shows field-screening evidence of contamination
- The sample located immediately below the base of the disposal trench
- The sample from the base of the borehole (e.g., total depth)
- Fracture-fill material and adjacent tuff matrix (paired sample) if fracture material volume is present in sufficient volume to sample

- Radiological screening will target gross alpha, beta, and gamma radiation. Field screening for alpha, beta, and gamma radiation will be conducted within 6 in. of the core material. All instrument background checks, background ranges, and calibration procedures will be documented daily in the field logbooks.
- Field screening for VOCs will be accomplished using headspace analysis at 10-ft intervals in each borehole, in accordance with Section IX.B of the Consent Order. Headspace vapor screening of subsurface core for VOCs will be conducted using a photoionization detector equipped with an 11.7 electronvolt lamp, as specified in Standard Operating Procedure 06.33. The maximum sustained reading and the ambient air temperature will be recorded in the field borehole log for each sample.
- Soil pore gas will be collected from both boreholes using a two-bladder straddle packer configuration from within the open borehole. One sample will be collected at a depth equivalent to the base of the target disposal unit. A second sample will be collected from the total depth of the borehole. It should be noted the soil-vapor sample is collected from the center of the straddle packer assembly, resulting in a sample horizon approximately 6.5 ft above the base of the available open borehole.
- The boreholes will be plugged and abandoned in accordance with the April 2010 SAP and Consent Order requirements.

If you have any questions, please contact Allan Chaloupka at (505) 665-4858 (allanc@lanl.gov).

Sincerely,

Alan Chaloupka, Program Director
Environmental Programs – MDA B
Los Alamos National Laboratory

AC/MSG:sm

Cy: Laurie King, EPA Region 6, Dallas, TX
Steve Yanicak, NMED-DOE-OB, MS M894
Tom Skibitski, NMED-OB (date-stamped letter emailed)
Annette Russell, DOE-LASO (date-stamped letter emailed)
Arturo Duran, DOE-LASO, MS A316 (date-stamped letter emailed)
Everett Trollinger, DOE-LASO, MS A316 (date-stamped letter emailed)
Mitch Goldberg, EP-TA-21, MS C349 (date-stamped letter emailed)
Kevin Finn, EP-TA-21, MS C349 (date-stamped letter emailed)
Allan Chaloupka, EP-TA-21, MS C349 (date-stamped letter emailed)
Dave McInroy, EP-CAP, MS M992 (date-stamped letter emailed)
William Alexander, EP-BPS, MS M992 (date-stamped letter emailed)
RPF, MS M707 (electronic)

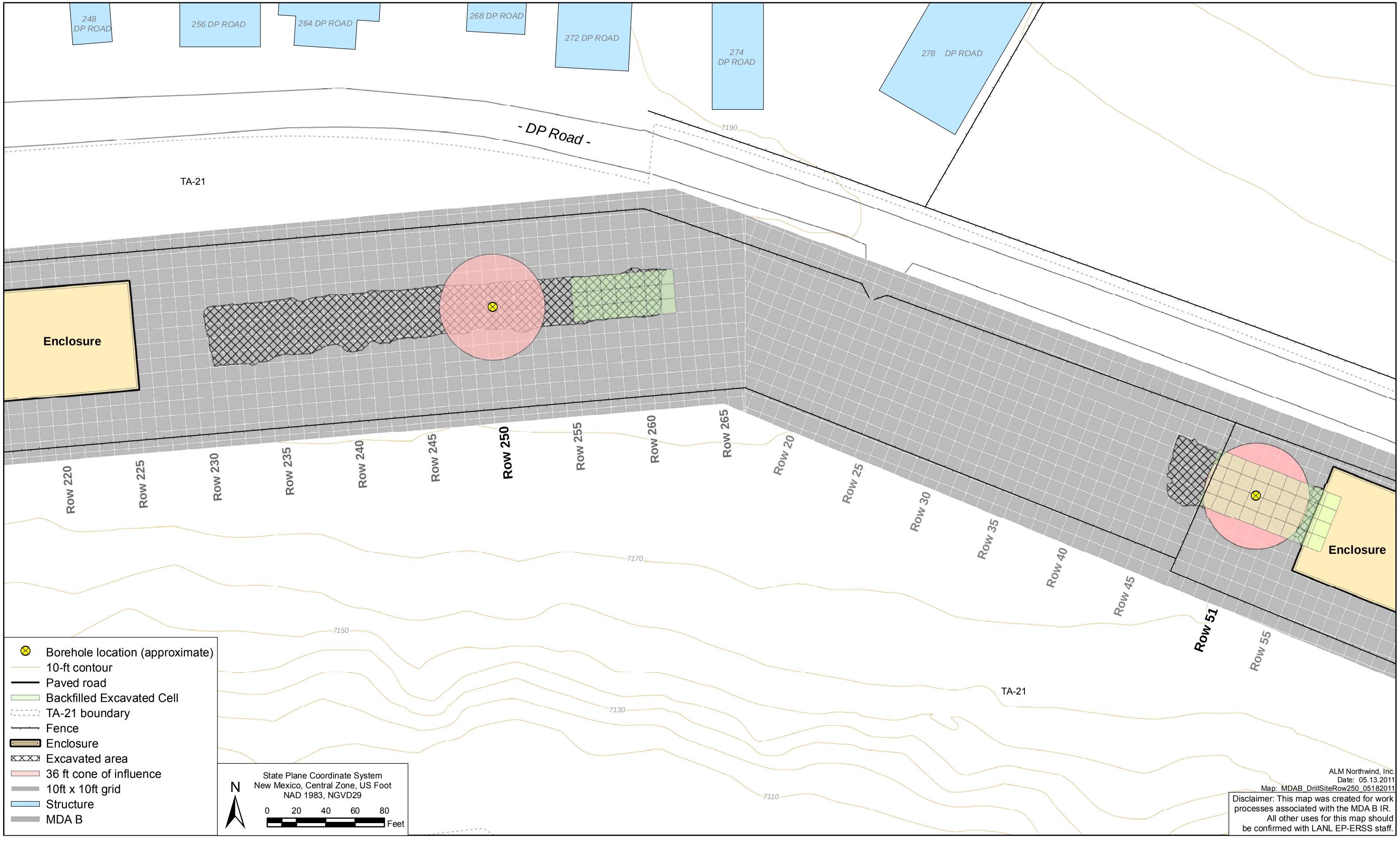

Figure 1 - MDA B planned borehole locations