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Date: February 15, 2007
Refer To: EP2007-0108

Mr. James P. Bearzi
NMED – Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505 - 6303

RECEIVED
FEB 2007
Hazardous Waste Bureau

Subject: Submittal of the Phase II Investigation Work Plan for Consolidated Unit 21-016(a)-99, Material Disposal Area T, at Technical Area 21

Dear Mr. Bearzi:

Enclosed please find two hard copies with electronic files of the "Phase II Investigation Work Plan for Consolidated Unit 21-016(a)-99, Material Disposal Area T, at Technical Area 21." This work plan addresses each of the required actions from the January 16, 2007 "Notice of Approval With Direction Investigation Report For Material Disposal Area T, Consolidated Unit 21-016(a)-99, At Technical Area 21."

The Los Alamos National Laboratory and the Department of Energy take note of the New Mexico Environment Department's General and Specific Comments; however, these comments are not addressed in this work plan. Instead, the comments will be addressed by submitting appropriate replacement pages for the "Investigation Report for Consolidated Unit 21-016(a)-99, Material Disposal Area T, at Technical Area 21" along with the submittal of the "Phase II Investigation Report for Consolidated Unit 21-016(a)-99, Material Disposal Area T, at Technical Area 21."

If you have questions, please contact Mark Thacker at (505) 699-1963 (mthacker@lanl.gov) or Woody Woodworth at (505) 665-5820 (lwoodworth@doeal.gov).

Sincerely,

Andrew K. Phelps, Associate Director
Environmental Programs
Los Alamos National Laboratory

Sincerely,

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

AKP/DRG/MST:jk

Enclosure: Two hard copies with electronic files – "Phase II Investigation Work Plan for Consolidated Unit 21-016(a)-99, Material Disposal Area T, at Technical Area 21." (EP2007-0105)

Cy: (w/ enc)
L. Woodworth, DOE LASO, MS A316 (w/CD)
M. Thacker, EP-TA21, MS C349 (w/CD)
EP-TA21 File, MS C349 (w/CD)
RPF, MS M707 (w/CD)
Public Reading Room, MS J591 (w/CD)

Cy: (Letter and CD only)
L. King, EPA Region 6
P. Reneau, EP-ERSS, MS M992

Cy: (w/o enc)
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B. Criswell, EP-TA21, MS C349
A. Dorries, EP-ERSS, MS M992
IRM-RMMSO, MS A150
ADEP File

PHASE II INVESTIGATION WORK PLAN FOR MATERIAL DISPOSAL AREA T, CONSOLIDATED UNIT 21-016(a)-99, AT TECHNICAL AREA 21, LOS ALAMOS NATIONAL LABORATORY

Required Actions	Work Description	Rationale
1) The Permittees must submit characterization data from additional investigative work at MDA T. This additional work must be contained in a Phase II Work Plan for the site, submitted to NMED for its review and acceptance. The Permittees must include a proposed date for completion for the required Phase II activities in the Work Plan. The Phase II Work Plan must incorporate the following elements:	Additional characterization data will be collected for subsurface pore gas and from the DP Canyon slope area. The Phase II activities and investigation report will be completed 12 months following approval of the new scope by DOE. Once approved the work will be contracted. The pore gas monitoring plan will be submitted to the New Mexico Environment Department 30 days following approval of the new scope by DOE. The contractor will conduct a readiness review and mobilize to the site 45 days after notice to proceed. Installation of the pore gas monitoring well, abandonment of open boreholes, and collection of DP Canyon surface and subsurface soil samples will require one month to complete. Two quarters of pore gas data will be collected. The pore gas and soil data will be validated and the risk assessment will be updated with the new data. The report will undergo the required LANL peer review process, be approved by DOE, and submitted to NMED.	1A) No deviation from required action. Samples will be collected from DP Canyon slope.
A) Sample locations: The Permittees must resample (continuing to appropriate reportable depths) the locations for which contaminants, (*e.g*. Pu-239 and Am-241), increase with depth; example locations are 21-02568 and 21-01862. In addition, because surface conditions may have changed due to recent storm runoff and the December 2006 water main leaks at TA-21, the Permittees must resample those locations on the DP Canyon slope identified as having the three highest surface concentrations of Pu-239: 21-01642, 21-25274, and 21-25272; and in addition, investigate any new sediment deposits.	1A) A total of 11 locations on DP Canyon slope will be sampled. Nine locations (21-25274, 21-25272, 21-01642, 21-25266, 21-02568, 21-01861, 21-01860, 21-01862, and 21-02569) consist of the six locations where Am or Pu concentrations increased with depth, plus the three locations having the highest surface concentrations of Pu-239. Two additional locations will be selected based on field evidence of recent deposition to determine whether conditions have changed as a result of recent storm runoff and the December 2006 water main leak. Figure 1 shows the proposed sampling locations. These proposed locations will also address Required Action #8.	

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NMED notes that surface samples were only collected at approximately half the locations on the DP Canyon slope, limiting any discussion of vertical extent at those locations. The Permittees must sample locations at a minimum of three depths where possible, including one at the soil/tuff interface.	No additional sampling required.	As required by the approved investigation work plan (IWP), in 2005-2006, a minimum of two samples were collected from all locations to a depth of 2 ft where the soil horizon was thick enough.
1B) Sampling Methods/Intervals: Samples may be collected using spade-and-scoop or hand-auger methods to a depth of four feet. The Permittees must collect a minimum of three samples from each location, including one sample at the soil/tuff interface, to determine vertical extent.	1B) Each location will include, at a minimum, a surface sample and a sample 1 ft into bedrock. Where the soil horizon is thicker, for instance at the toe of the slope, at least one additional soil-tuff interface sample will also be collected. Samples will be collected in accordance with Section 5.1 and 5.2 of the approved IWP for MDA T.	1B) On the upper and middle slope the soil horizon is typically very shallow and there is not enough soil to collect three sampling intervals. At locations with a thin soil horizon, one soil sample will be collected at the surface and a second deeper sample will be collected 1 ft into tuff. At the toe of the slope, the soil horizon is typically much thicker and may permit the collection of at least three samples. One surface sample will be collected. Then, samples will be collected at 5-ft intervals until the tuff is reached. A sample will be collected at the soil-tuff interface. The deepest sample will be collected 1 ft into the tuff. To ensure collection of samples deeper than 5 ft and into bedrock, a drill rig may be used.
1C) Analytical Suites: Samples should be analyzed for Am-241, isotopic plutonium by alpha spectroscopy, nitrate, and perchlorate.	1C) Samples will be analyzed for nitrate. Samples will not be analyzed for perchlorate. As directed by DOE, Am-241 and isotopic plutonium analysis will also be conducted on the samples to confirm the extent of contamination and the radiological sampling results will, in accordance with DOE policy, be voluntarily provided to NMED. The proposed suite will also address Required Action #8.	1C) During the 2005-2006 campaign, 30 samples were collected from the DP Canyon slope and analyzed for perchlorate. Of the 30 samples analyzed, only three had perchlorate above the detection limit and at all three locations extent is bounded. Location 21-25277 had a concentration of 0.000617 mg/kg from 0–0.5 ft and is bounded laterally by locations 21-25275, 21-25276, and downslope by location 21-25274, which were all below the detection limit. Location 21-25271 had a concentration of 0.000872 mg/kg from 0–0.5 ft and is bounded laterally and downslope by locations

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		21-25270 and 21-25269, which were all below detection limit. Location 21-25268 had a concentration of 0.000684 mg/kg from 0–0.5 ft and is bounded vertically by the sample collected at the same location from 1.5–2.0 ft and downslope by locations 21-25267 and 21-25266, which were all below detection limit. Perchlorate is not considered a COPC on DP Canyon slope.
2) Decontamination and decomissioning of building 21-257 is scheduled for next year (Report, page 5). NMED notes that the data set evaluated for human health risk under the construction worker scenario in the vicinity of building 21-257 significantly exceeds (greater than 25 times) DOE's target dose limit of 15 mrem/yr. If a screening level risk assessment were to be applied to the entire consolidated unit under the construction worker scenario, the potential total estimated dose to the construction worker would be greater than 9,000 mrem/yr for the consolidated unit vs. 397 mrem/yr for the area around building 21-257. In addition to the dose calculation under the construction scenario, the Permittees must also provide the human health risk assessment and cite appropriate references regarding the precautions that will be taken during D&D to protect construction workers from receiving unacceptable dose levels in the Phase II Investigation Report.	No action needed.	The risk assessment addresses potential exposure that may occur following completion of corrective actions. Decontamination and decomissioning (D&D) activities will be conducted prior to corrective actions at MDA T and the DP Aggregate and, therefore, are not considered in the risk assessment. Similarly, the 15 mrem/yr target dose limit applies to future exposure following completion of corrective actions. Dose limits for D&D and other construction activities associated with corrective action are regulated by DOE under 10 CFR 835, "Occupational Radiation Protection."
3) The Permittees must remove the slough from the boreholes and collect pore-gas samples from the TD, similar to the additional work performed at MDAs U and V. The samples must be analyzed for both tritium and VOCs and included in the Phase II Investigation Report.	A single pore gas monitoring well will be installed at the location of 21-25262 (see Figure 1). In accordance with Section 5.4 of the approved IWP for MDA T, a pore gas monitoring well design will be submitted to NMED. This design will be submitted within 30 days following approval of the new scope by DOE. The other two boreholes (21-25263 and 21-25264) will be plugged and abandoned in accordance with Section 5.5 of the	Location 21-25262 is centrally located with respect to the MDA T absorption beds and the central axis of DP Mesa. The results of the pore gas screening for MDA T indicate very low potential for VOCs at depth to be a source of groundwater contamination. For this reason, a single monitoring well with multiple ports sampled over time will be sufficient to monitor the VOC and tritium concentrations in the subsurface of MDA T. The proposed monitoring

Required Actions	Work Description	Rationale
	approved IWP for MDA T (see Required Action #5). Two additional rounds of VOC and tritium samples will be collected in accordance with Section 4.2.6 of the approved IWP for MDA T from the same depth intervals as previously sampled: 80 ft, 115 ft, 190 ft, 235 ft, 295 ft, and 380 ft bgs.	depths will also provide data on the distribution of vapor-phase contaminants among the various stratigraphic units beneath DP Mesa.
4) The Permittees must clarify the dates and depths of pore gas sampling for each of the three boreholes described in the Report, and submit this information with the Phase II Work Plan.	Table 1 lists the depth intervals and collection dates for the two initial rounds of pore gas sampling.	Table included in this work plan as required.
5) The Permittees must identify which boreholes remain open, and which should remain open until such time as NMED determines a need for additional vapor monitoring. The Permittees must, in the interim, install a packer to limit vapor migration in the borehole until further sampling is completed. This information must be included in the Phase II Work Plan.	Seven boreholes remain open: 21-25372 (279 ft), 21-25373 (279 ft), 21-25375 (280 ft), 21-25376 (283 ft), 21-25262 (380 ft), 21-25263 (354 ft), and 21-25264 (354 ft). Figure 1 shows the open borehole locations. LANL will plug and abandon six of the boreholes in accordance with Section 5.5 of the approved IWP for MDA T. No packers will be installed. A vapor monitoring well will be installed in borehole 21-25262 following removal of slough to the original total depth – see Required Action #3.	All boreholes have approximately 10 ft of surface casing grouted into tuff bedrock and have flush mounted surface completions. No packers need to be installed because the formation is permeable to the borehole's total depth. There are no discrete zones to isolate with a packer. The four existing open 280 ft boreholes are located within 30 ft to 100 ft of the deeper (354 ft or 380 ft) and previously sampled boreholes. The 280 ft boreholes will be plugged and abandoned. A single pore gas monitoring well with multiple sampling ports will be installed to monitor vapor-phase contaminants. The single well will be located and installed at the location of borehole 21-25262. See Required Action #3.
6) The Permittees must calculate an SSL to assess magnesium toxicity, so that a quantitative approach can be developed for evaluating essential nutrients above background for risk assessment purposes. This information must be included in the Phase II Investigation Report.	No action needed.	Magnesium was detected above the background value but was less than the maximum background concentration (2820 mg/kg) in three of 11 samples from 0-10 ft bgs. Therefore, magnesium was never detected above background in the depth interval used to evaluate residential and construction

Required Actions	Work Description	Rationale
		worker risk. The 4200 mg/kg mentioned in specific comment number 12 was from a sample collected from 10–11.6 ft bgs, not within the depth interval of interest. Therefore, magnesium does not need to be evaluated further for risk.
7) The Permittees must resample the following borehole locations (to be proposed in the Phase II Investigation Work Plan) at adequate depths to determine the vertical extent of Am-241 in the subsurface: 21-02547 21-02546 21-02541 21-02543 21-02544 21-02539 21-02609 21-02610	No additional boreholes are needed to define vertical extent of Am-241 near the following locations: 21-02547, 21-02546, 21-02541, 21-02543, 21-02544, 21-02539, 21-02609, 21-02610.	As discussed during the January 30, 2007, meeting with NMED, the vertical extent of Am-241 is adequately defined. The vertical extent of Am-241 at locations 21-02547, 21-02546, 21-02609, 21-02610 is defined by location 21-25262: No Am-241 was detected deeper than 118 ft. The vertical extent of Am-241 at locations 21-02539 and 21-02544 is defined by location 21-05064: No Am-241 was detected deeper than 13.90 ft. The vertical extent of Am-241 at location 21-02543 is defined by location 21-05060: No Am-241 was detected deeper than 139.5 ft. The vertical extent of Am-241 at location 21-02541 is defined by locations 21-02540 and 21-25358: No Am-241 was detected at 7.5–10 ft or 38–40 ft, respectively.
8) The Permittees must resample at appropriate depths and locations (to be proposed in the Phase II Work Plan) to adequately determine the vertical and lateral extent of Pu-238 contamination relative to background.	See work description for Required Action #1.	DP Canyon Slope sampling locations with elevated concentrations of Pu-238 also had elevated concentrations of Pu-239. The additional sampling directed by DOE to confirm the extent of Pu-239 will also address the extent of Pu-238.

Required Actions	Work Description	Rationale
9) The Permittees must submit a Phase II Investigation Report that presents the results of the newly acquired data and provide revised versions of any conclusions that change as a result of the supplemental investigation (e.g., risk assessment).	A Phase II investigation report will be submitted following completion of the additional characterization work. New results from the DP Canyon slope will be included in a revised risk assessment for the trail user scenario. Additional pore gas results will be used to establish trends of subsurface VOC concentrations and tritium pore water activities. Radiological sampling results will, in accordance with DOE policy, be voluntarily provided to NMED.	No deviation from required action.

Table 1:

Summary of Pore Gas Sampling Depths and Collection Dates

Location ID	Begin Depth (ft)	End Depth (ft)	Round 1 Collection Date	Round 2 Collection Date
21-25262	79	81	11-Jan-2006	20-Apr-2006
21-25262	114	116	23-Jan-2006	19-Apr-2006
21-25262	189	191	10-Jan-2006	18-Apr-2006
21-25262	234	236	20-Jan-2006	18-Apr-2006
21-25262	294	296	11-Jan-2006	17-Apr-2006
21-25262	370	380	5-Jan-2006	Not Collected
21-25263	79	81	13-Apr-2006	23-May-2006
21-25263	172	174	13-Apr-2006	22-May-2006
21-25263	228.5	230.5	12-Apr-2006	22-May-2006
21-25263	311	313	12-Apr-2006	19-May-2006
21-25263	350	354	7-Apr-2006	Not Collected
21-25264	69	71	8-Feb-2006	2-May-2006
21-25264	152	154	10-Feb-2006	2-May-2006
21-25264	224	226	8-Feb-2006	28-Apr-2006
21-25264	325	327	7-Feb-2006	27-Apr-2006
21-25264	350	354	3-Feb-2006	Not Collected

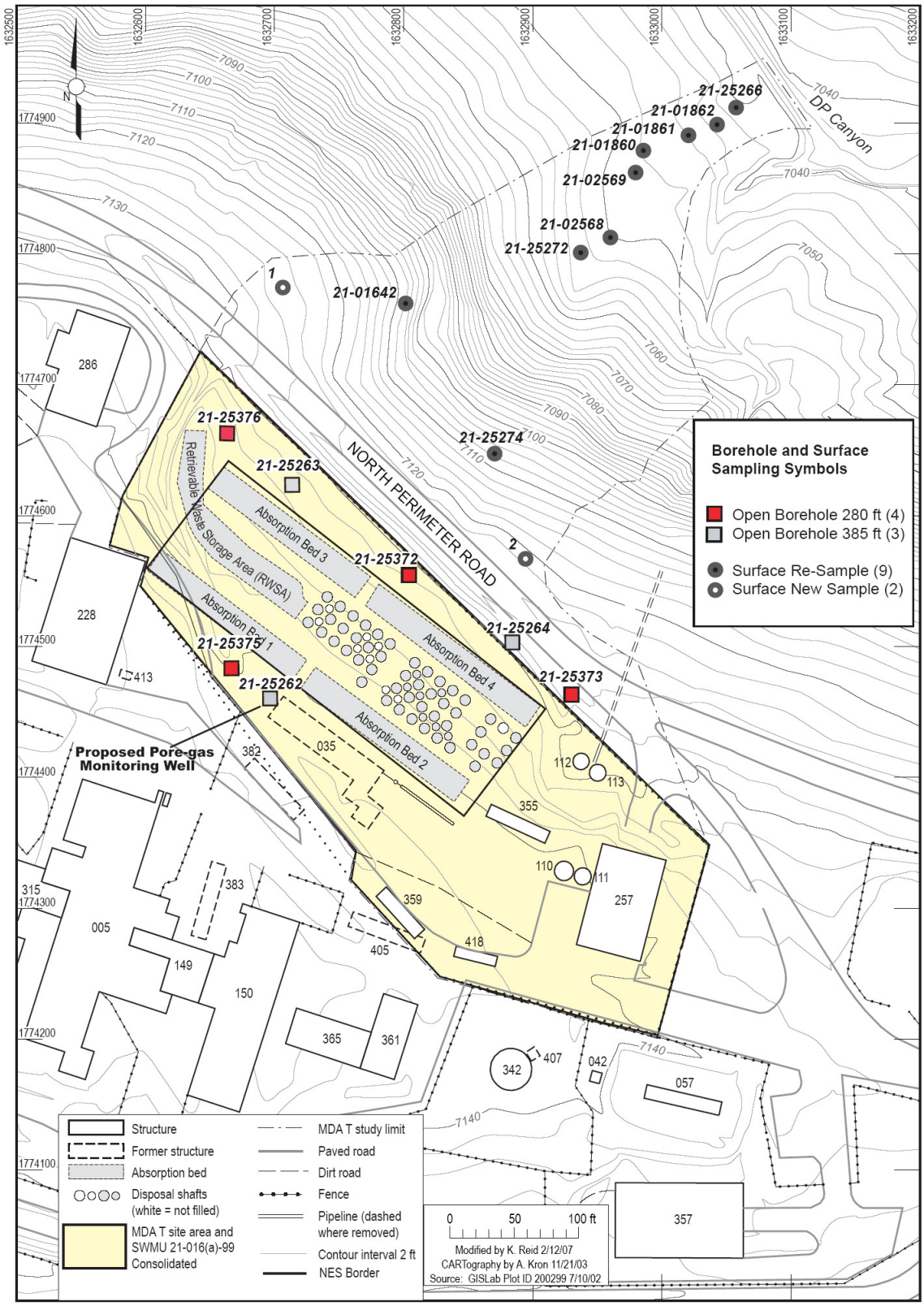

Figure 1: Phase II sampling locations.*

*Note: New DP Canyon slope sampling locations will be identified based on field indication of recent sediment deposition.