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Los Alamos

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Date: March 4, 2005

Refer To: ER2005-0111

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



**SUBJECT: RESPONSE TO THE NOTICE OF DISAPPROVAL FOR THE INVESTIGATION WORK PLAN FOR SOLID WASTE MANAGEMENT UNIT 21-017(a)-99, MATERIAL DISPOSAL AREA U, AT TECHNICAL AREA 21**

Dear Mr. Bearzi:

Enclosed please find two copies of the response of the Los Alamos National Laboratory (LANL) and the Department of Energy (DOE) to the New Mexico Environment Department's Notice of Disapproval (NOD) of the "Investigation Work Plan for Material Disposal Area U, Solid Waste Management Unit 21-017(a)-99, at Technical Area 21." This Notice of Disapproval was received by the Environmental Stewardship-Remediation Services (ENV-RS) project office on February 4, 2005.

If you have any questions, please contact Becky Coel-Roback at 505-665-5011 or David Gregory at 505-667-5808.

Sincerely,

David McInroy, Deputy Project Director  
Remediation Services  
Los Alamos National Laboratory

Sincerely,

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

DM/DG/BCR/ds

Enclosures: 1. LANL's and DOE's responses to NMED's comments to the NOD for MDA U



Cy:(w/enc)

A. Dorries, ENV-ECR, MS M992  
B. Coel-Roback, ENV-ECR, MS M992  
E. Rainey, ENV-ECR, MS M992  
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IM-9, MS A150  
RPF MS M707  
S-7, MS F674

Cy:(w/o enclosure)

D. McInroy, ENV-RS, MS M992  
B. Rich, ADO, MS A104  
C. Voorhees, NMED-OB

**Response to the "Notice of Disapproval for the Investigation Work Plan  
for Solid Waste Management Unit 21-017(a)-99,  
Material Disposal Area U, at Technical Area 21  
Los Alamos National Laboratory (LANL), EPA ID #NM0890010515 HWB-LANL-04-015"  
Dated January 28, 2005**

**INTRODUCTION**

This submittal is the response by Los Alamos National Laboratory (LANL or the Laboratory) to the "Notice of Disapproval for the Investigation Work Plan for Solid Waste Management Unit 21-017(a)-99, Material Disposal Area U, at Technical Area 21," issued by the New Mexico Environment Department (NMED) Hazardous Waste Bureau on January 28, 2005, and received by LANL on February 4, 2005. The Investigation Work Plan for Material Disposal Area U, Solid Waste Management Unit 21-017(a)-99, at Technical Area 21 (LA-UR-04-7268, 87454) was submitted by LANL to NMED in November 2004.

To facilitate review of these responses, NMED's comments are included verbatim in italics. The comments are divided into general and specific categories as presented by NMED. LANL's responses follow each NMED comment.

**GENERAL COMMENTS**

**NMED Comment**

1. *Figure 2.1-1 in the Historical Investigation Report (HIR) is incorrectly labeled. All MDA boundaries should be in green and buildings/structures in yellow. The figure shows all MDAs in yellow except MDA V. The Permittees must ensure the legend corresponds to the figure.*

**LANL Response**

1. LANL has revised Figure 2.1-1 from the historical investigation report (HIR) for MDA U to ensure that the legend corresponds to the figure. Two replacement pages showing the revised figure are provided with this response.

**NMED Comment**

2. *There are a handful of items listed in Section 8.0, References that are not included in the Reference Set for TA-21. NMED cannot adequately evaluate the work plan without reviewing the references provided throughout the report. The Permittees must supply these references to the NMED for review. A list of these references is attached.*

**LANL Response**

2. LANL has included four of the six missing references (Benson 2004, 87383; LANL 1995, 54320; Francis 1996, 76137; and Walker 1981, 06277) along with the MDA A TA-21 reference set update, which will be delivered to NMED in early March 2005. Christensen 1973 (00940) was already included in the existing TA-21 reference set. The remaining reference (LANL 2004, 87454) is the HIR for Material Disposal Area U, which was submitted to NMED on November 30, 2004, along with the MDA U work plan, which has the same ER ID number (87454).

## SPECIFIC COMMENTS

### 1. Section 2.1, Operational History, page 3, paragraph 1

#### NMED Comment 1, Part 1

*The Permittees must provide more information regarding the trench that was dug in 1985. There is no map showing the location of the excavation and no explanation as to why records at TA-54 only show that 3000 ft<sup>3</sup> of material was taken for disposal at Area G. The Permittees must explain where the remaining 5000 ft<sup>3</sup> of material is located.*

#### LANL Response to Comment 1, Part 1

LANL has conducted a thorough search of existing records and has determined that further documentation and data concerning the 1985 excavation effort do not exist. The best available information has been presented comprehensively in the HIR and summarized in the work plan. As discussed in Section 3.2 of the HIR for MDA U, LANL has assumed that the referenced trenches were installed along the centerline of the east and west absorption beds. This is consistent with the identified objective of the 1985 excavation activity, which was to remove the subsurface pipelines and distribution box located along the centerline of the MDA U absorption beds. However, any figure representing the 1985 trench location would be speculation.

As indicated in Section 2.1 of the work plan, material above the pipelines was excavated, stockpiled, and used to backfill the pipeline trench. The best available information indicates that the remaining 5000 ft<sup>3</sup> of excavated material were returned to the site.

#### NMED Comment 1, Part 2

*Figure 2.1.2 does not show the distribution lines from all buildings that contributed waste to MDA U. The Permittees must include on a figure the location of the distribution line from the cooling tower at Building 21-155 to the MDA U western absorption bed and explain if the line is part of this investigation.*

#### LANL Response to Comment 1, Part 2

Figure 2.1-2, as presented in the work plan, shows the best available information regarding the former location of the distribution line from the cooling tower associated with Building 21-155. This undocumented line, which ran into the west end of the western MDA U absorption bed, was discovered during the 1985 excavation activities. Although this former distribution line is not part of SWMU 21-017(a)-99 and is not specifically addressed in the investigation work plan for MDA U, borehole location 21-10838, drilled and sampled in 1998, falls in the immediate area of the former line (see work plan figure 4.2-1). This location had trace concentrations of tritium and organic chemicals in soil vapor at the total depth of 75 ft below ground surface (bgs). Metals, which are commonly associated with cooling tower effluent, were detected to a depth of 55 ft bgs at concentrations just above background values.

## **2. Section 2.5.1.2, Pre-RFI Subsurface Sampling, page 7**

### **NMED Comment**

*Based on the information provided on page 5 , Section 2.4, MDA U Waste Inventory, Christenson (Christenson 1973, 0440.1) suggests that the primary contaminant at MDA U is Polonium-210 followed closely by actinium-227. The Permittees must explain why these constituents were not analyzed in the 1983 subsurface sampling event.*

### **LANL Response**

The following radionuclide data are provided for informational purposes only. No information has been found to indicate why samples from the 1983 subsurface investigation were not analyzed for polonium-210 and actinium-227. Polonium-210 has a half-life of 138 days, and is unlikely to have been a significant concern in 1983, by which time 40 half-lives had passed. Presently, polonium-210 has undergone nearly 100 half-lives since operational discharges from Buildings 21-152 and 21-153 ceased in 1968, and has decayed to undetectable levels. Therefore, it is not included in the current analytical suite prescribed in the work plan for MDA U. LANL has analyzed and evaluated actinium-227 progeny activity levels in investigations conducted since the inception of the RCRA corrective action process at MDA U. In addition, the MDA U work plan prescribes alpha spectroscopy analysis for all samples specifically to define the extent of actinium-227 progeny at MDA U.

## **3. Section 4.2, Subsurface Investigations, page 14, paragraph 3**

### **NMED Comment**

*The Permittees must also state that if the Qbt2 unit is not reached by the estimated 120 ft bgs, the borehole will be drilled until the appropriate depth (20 ft into Qbt2) is attained. As a reminder, in accordance with Section X.B.2.b.i, Drilling, of the proposed Consent Order, the boreholes must be drilled 25 feet past the last detected contamination based on field screening, laboratory analyses, and/or previous investigations at the site.*

### **LANL Response**

LANL explicitly states in Section 4.2 (page 14, paragraph 3) of the work plan for MDA U that the boreholes will be advanced 20 ft into unit 2 of the Tshirege Member of the Bandelier Tuff. LANL will ensure that all boreholes are advanced at least 20 ft into Qbt 2, regardless of total depth of the borehole. LANL will also ensure that all boreholes will be drilled to a minimum total depth 25 ft beyond the deepest interval from which a sample containing a detectable level of a contaminant was collected, based on the field screening methods prescribed in the work plan.

#### 4. Table 4.0-1, Crosswalk between NMED Proposed Consent Order (September 2004) and LANL Response for Investigation Activities at MDA U, pages 53-58

##### NMED Comment 4, Item 3

*NMED does not agree with the justifications provided by the Permittees for this item. Boreholes proposed to the Cerro Toledo interval in the MDA A & T work plans are not suitable for assessing the conditions beneath MDA U. The eight boreholes drilled in 1998 to 75 ft, did not determine lateral or vertical extent of contamination based on the analytical results provided in various figures and tables in this work plan (i.e. Figure 2.5-6). Based on information provided in the HIR, the Permittees identified soil and vegetation contamination outside the MDA U fence line in 1980 and 1984. Also, the extent of the fractured/clay interbed zone has not been defined and is a potential contaminant migration pathway. Based on this information, the Permittees must complete the additional boreholes at the locations identified by NMED (see attached map) to determine lateral and vertical extent of contamination. If contamination is found in any of the boreholes, the Permittees must use a 'step-out' approach to determine lateral extent of contamination.*

##### LANL Response to Comment 4, Item 3

LANL acknowledges that the extent of contamination has not been determined. The four boreholes prescribed by the MDA U work plan are positioned to address the remaining data issues at the site. Specifically, these boreholes

- bound the lateral extent of mercury contamination to the south, which has already been defined to the north, east, and west (borehole 1);
- penetrate the fractured/clay interbed zone and provide data addressing contaminant migration along this potential pathway (boreholes 1, 2, and 3);
- define lateral extent of actinium-227 contamination, which is believed to be confined to the eastern absorption bed and the interbed zone (boreholes 1, 2, and 3);
- define lateral extent of tritium contamination identified at shallower depths (boreholes 1, 2, and 3);
- define extent of uranium contamination that remains undefined to the west of the site and possibly vertically (boreholes 1 and 4);
- define the vertical extent of low-level (<1 pCi/g) tritium contamination identified at a depth of 75 ft (borehole 4);
- define the extent of mercury contamination at depth (borehole 4); and
- support the characterization of a subsurface vapor plume should the presence of such a plume be verified (boreholes 1, 2, 3 and 4).

If contamination is detected in any of the four boreholes described in the MDA U work plan, the additional boreholes proposed by NMED will not allow further definition of the lateral extent of contamination because they are all roughly the same distance away from the source (i.e., the absorption beds). However, implementation of a step-out approach will enable full definition of the extent of contamination at MDA U. LANL proposes to implement the step-out approach in the field by using field screening data to determine if the four boreholes prescribed in the MDA U work plan effectively bound the extent of contamination. If screening data indicate the need for supplemental data, additional boreholes will be sited accordingly. Additionally, if analytical laboratory results

indicate that the extent of contamination at MDA U has not been defined, additional sampling will be conducted. This step-out approach, coupled with the approach of drilling and sampling all boreholes to a minimum total depth of 25 ft beyond the deepest detectable contamination (see LANL response to specific comment 3), will ensure that the extent of contamination is adequately determined. Therefore, LANL does not agree that the five additional boreholes as recommended by NMED in the notice of disapproval are appropriate. (Note that application of the step-out approach may yield more boreholes than are currently prescribed by the Consent Order without the five additional boreholes recommended by NMED.)

The 1980 and 1984 investigations referenced by NMED were conducted prior to the inception of the RCRA corrective action process; the results were presented for informational purposes only and have not been used to support any site decisions. LANL has conducted extensive investigations under Module VIII in the areas outside the MDA U fence. These investigations effectively defined the nature and extent of contamination in the surface associated with MDA U, and are discussed in the HIR and work plan for MDA U. The MDA U work plan requires the collection of additional surface samples at all borehole locations, three of which are positioned outside the MDA U fence. Sample results from these locations will effectively address any remaining concerns regarding surface contamination resulting from activities at MDA U.

#### **NMED Comment 4, Item 6**

*In accordance with Section IV.C.2.f.vi of the proposed Consent Order, the Permittees must submit for review and written approval a work plan to collect subsurface vapor samples.*

#### **LANL Response to Comment 4, Item 6**

The MDA U work plan describes subsurface vapor sampling. Section 2.6 of the work plan identifies vapor phase data as an explicit data need and objective of the MDA U investigation. Section 4.2.1 identifies organic-vapor field screening as an explicit investigation activity and prescribes the collection of organic-vapor field-screening samples from every 10-ft interval of all boreholes drilled during the investigation. Section 4.2.6 identifies subsurface pore gas sampling for both organic vapors and tritium as an explicit investigation activity and prescribes the frequency and target depths of pore-gas sample collection. Section 4.2.6 further defines the pore-gas data collection activities that will be conducted in the event that air-rotary drilling will be required to install the boreholes. Section 4.2.6 establishes that the initial pore-gas data collected during the investigation prescribed in the MDA U work plan will form the basis of a decision regarding a vapor phase monitoring well installation. Section 5.2 defines the field methods that will be implemented for collecting organic-vapor screening data. Section 5.4 defines the methods that will be implemented during pore-gas sample collection and analysis, and outlines the quality assurance/quality control protocols that will be used to control the quality of pore-gas data. This section also explicitly prescribes the submittal of any required pore-gas monitoring well designs to NMED for their review and approval. Finally, Section 6 explicitly requires the development and submittal of a monitoring plan to NMED for review and approval in the event that a subsurface vapor plume is identified through the implementation of the MDA U work plan.

#### **NMED Comment 4, Item 13**

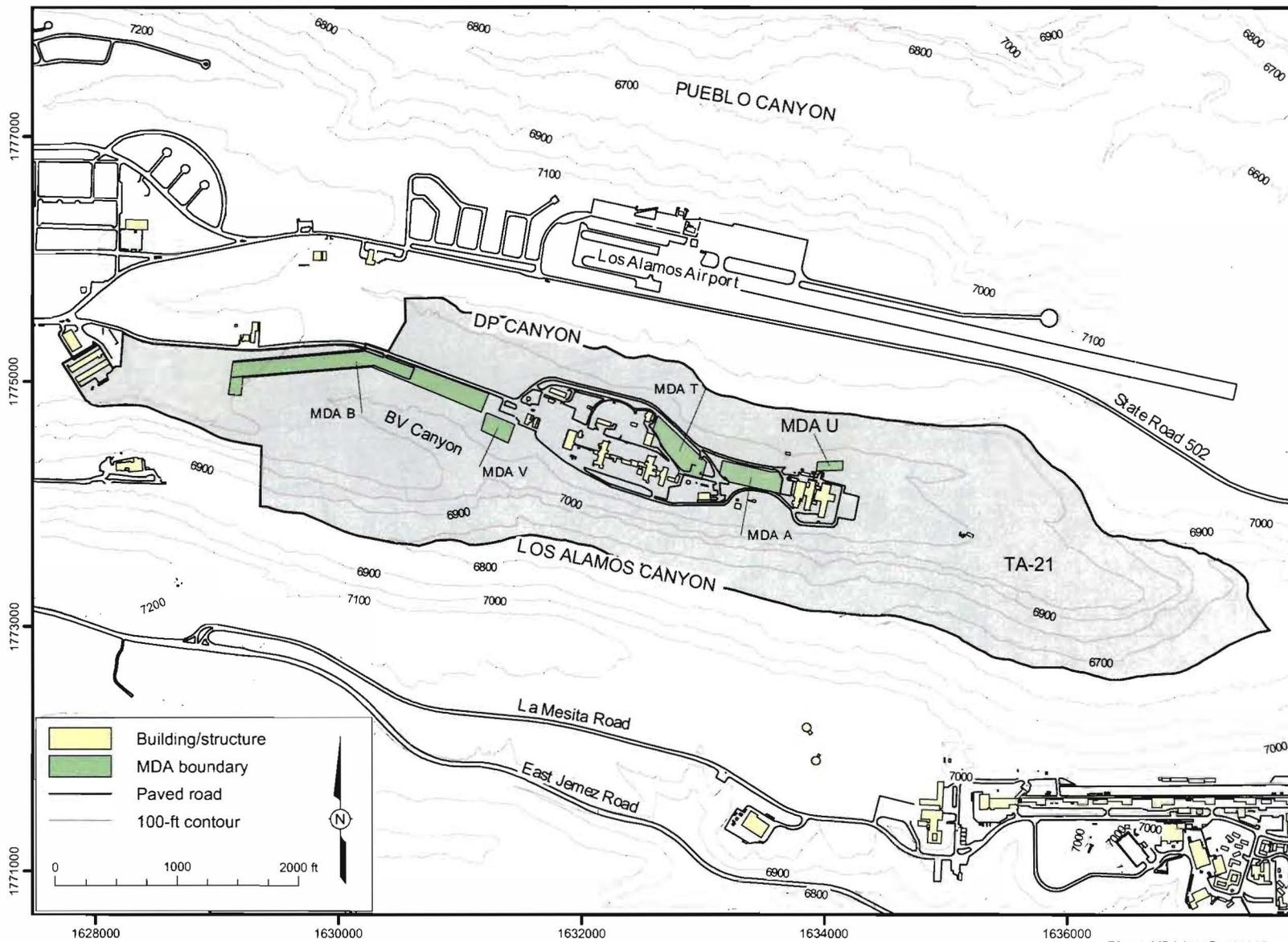
*Section 2.4, MDA U Waste Inventory, states that, "Known documentation does not provide any information on the constituents, types, or volumes of non-radioactive waste discharged to MDA U." Based on this statement, NMED recommends that the Permittees select their most contaminated*

*sample based on field screening results and complete a full analytical suite, as described in Section IV.C.2.f.iv of the Consent Order, on the selected sample. If dioxins, furans, and HE are not detected in the sample, NMED may not require the Permittees to include them in the remainder of the analyses.*

**LANL Response to Comment 4, Item 13**

LANL agrees with the recommendation to select the most contaminated sample based on field screening results and to complete a full analytical suite on the selected sample, as described in Section IV.C.2.f.iv of the Consent Order. If screening results do not indicate contamination, historical data will be used to choose the sample likely to represent the most contaminated area of the site.

Because of scheduling issues associated with analytical turnaround and hold times, the process for determining whether site samples need additional analysis will require a planned and coordinated effort. LANL proposes to proceed with drilling and sample collection activities following standard practices; however, in addition to collecting sample aliquots for the analytical suite prescribed in the MDA U work plan, LANL will also collect additional aliquots for possible dioxins, furans, and HE analysis from all sample intervals. These additional aliquots will be stored under chain-of-custody and in accordance with analytical method requirements while the selected sample undergoes quick-turnaround analysis for dioxins, furans, and HE. The data from the selected sample will be transmitted to NMED, via fax, for their review. Based on NMED's review, the stored aliquots may or may not be submitted for laboratory analysis of dioxins, furans, and HE.



F2.1-1, MDA U HIR, 030205, ptm

Figure 2.1-1. Material disposal areas in TA-21

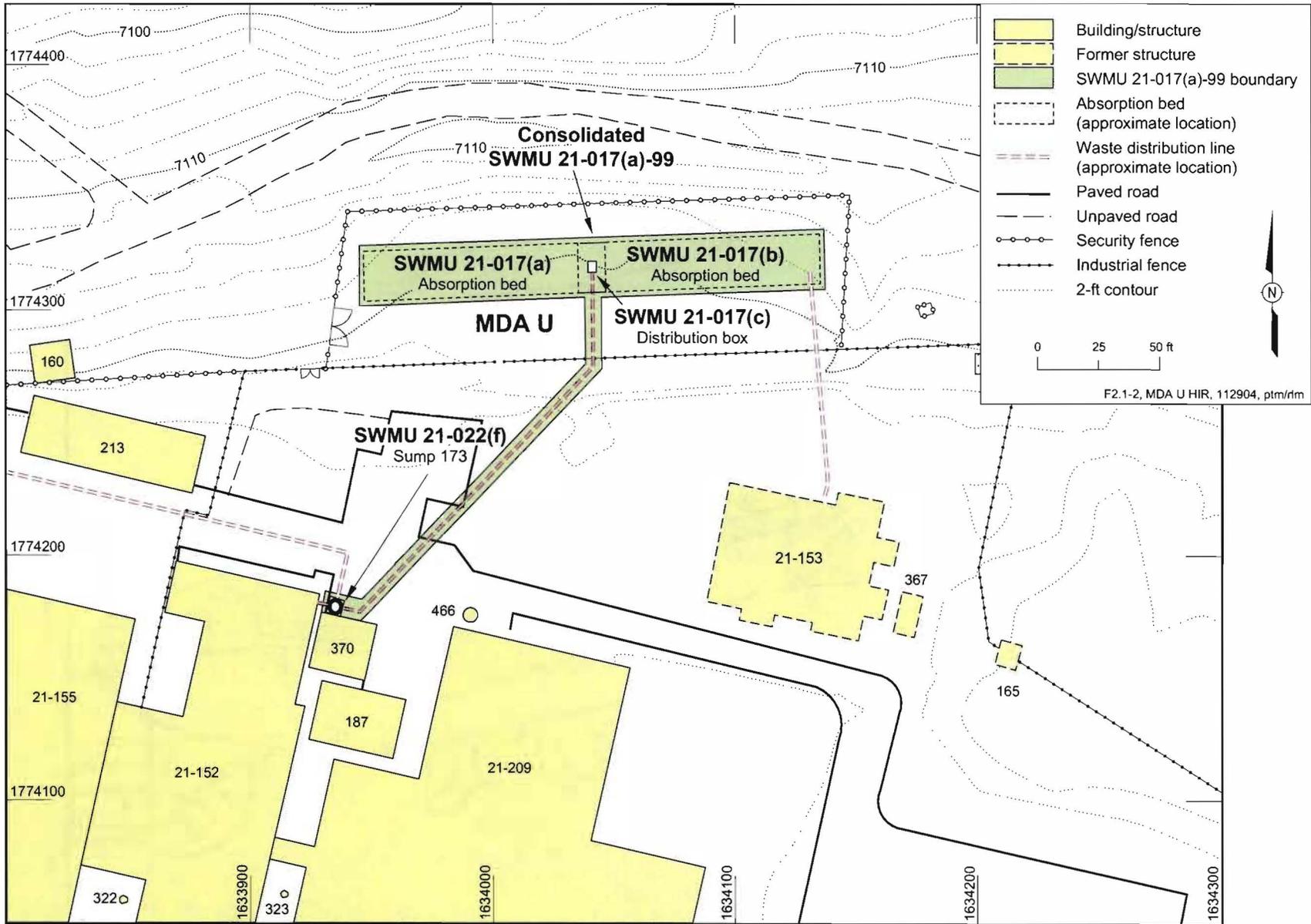
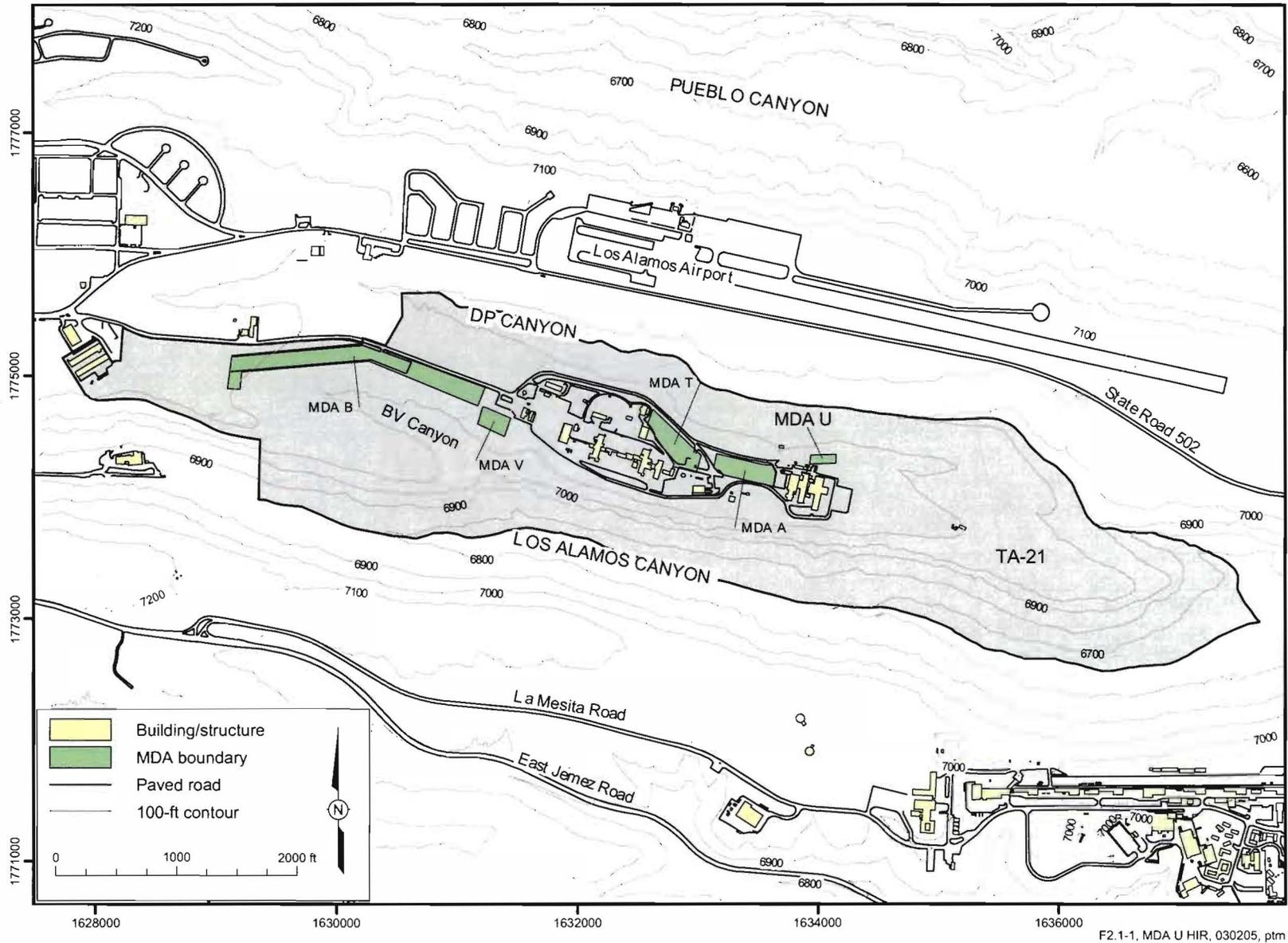


Figure 2.1-2. Consolidated SWMU 21-017(a)-99



F2.1-1, MDA U HIR, 030205, ptrn

Figure 2.1-1. Material disposal areas in TA-21

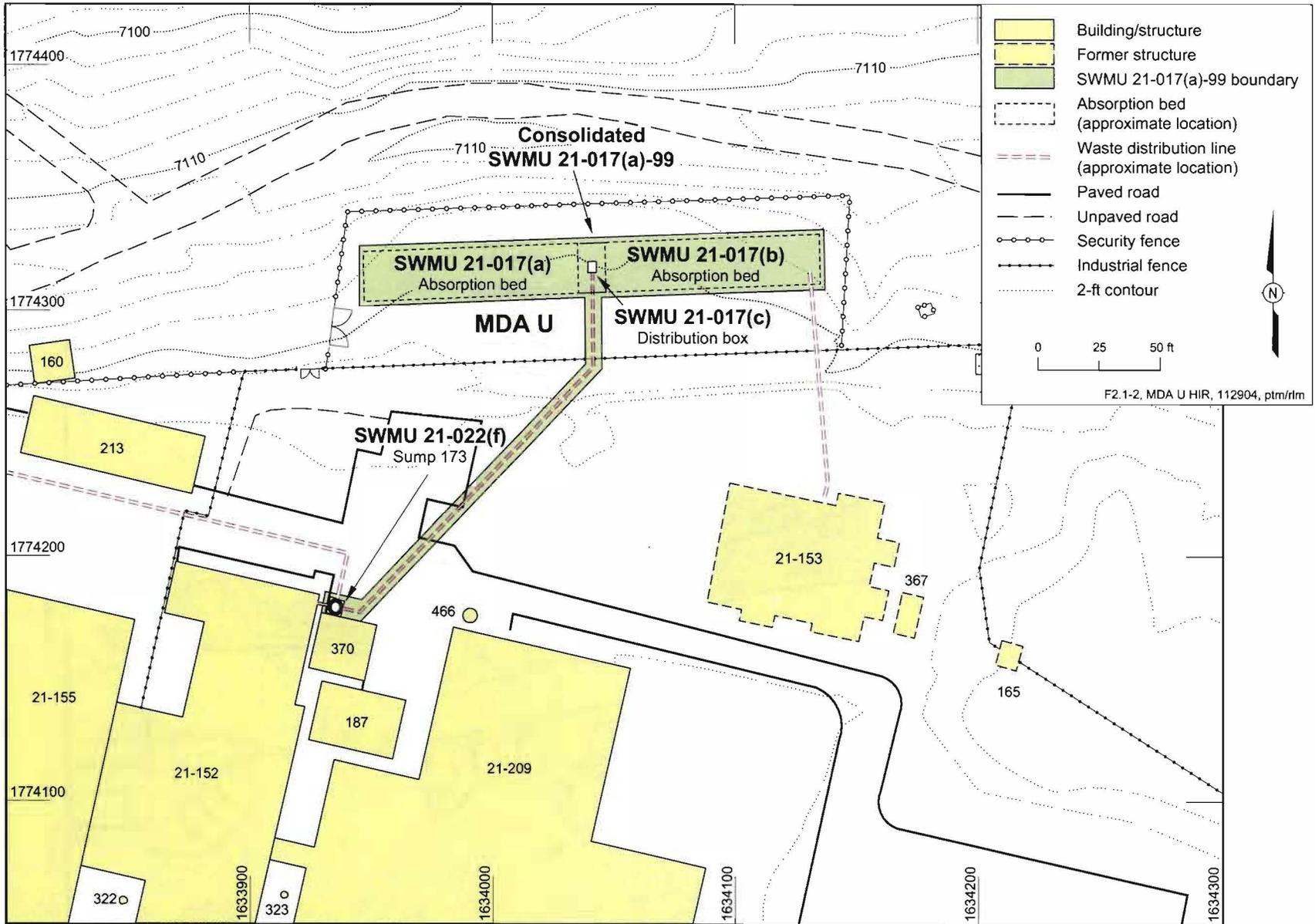


Figure 2.1-2. Consolidated SWMU 21-017(a)-99