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MAR 2007
NMED Hazardous Waste Bureau

National Nuclear Security Administration
Los Alamos Site Office, MS A316
Environmental Restoration Program
Los Alamos, New Mexico 87544
(505) 667-4255/FAX (505) 667-5948

Date: March 23, 2007
Refer To: EP2007-0177

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

Subject: Submittal of the Response to the Notice of Disapproval for Response to the Notice of Disapproval for Material Disposal Area C, Solid Waste Management Unit 50-009, at Technical Area 50

Dear Mr. Bearzi:

Los Alamos National Laboratory (LANL) and the Department of Energy are in receipt of your notice of disapproval (NOD) for the Material Disposal Area (MDA) C investigation report. Enclosed please find two hard copies with electronic files of the "Response to the Notice of Disapproval for Material Disposal Area C, Solid Waste Management Unit 50-009, at Technical Area 50."

The NOD requires LANL to drill additional boreholes and collect samples for laboratory analysis to further characterize the extent of contamination at MDA C. A Phase II investigation work plan will be submitted to the NMED within 60 days of receipt of the NOD. Following implementation of the work plan, LANL will prepare a Phase II investigation report that incorporates the results of the investigation. The schedule for the investigation work and report will be included in the work plan.

If you have any questions, please contact Kent Rich at (505) 665-4272 (krich@lanl.gov) or Rich Nevarez at (505) 845-5804 (rnevarez@doeal.gov).

Sincerely,

Carolyn A. Mangeng, Acting Associate Director
Environmental Programs
Los Alamos National Laboratory

Sincerely,

George J. Rael, Assistant Manager
Department of Energy
Los Alamos Site Office

9076

CAM/GJR/KR:ew

Enclosure: 1) Two hard copies with electronic files of the "Response to the Notice of Disapproval for Material Disposal Area C, Solid Waste Management Unit 50-009, at Technical Area 50"

Cy: (w/enc):
J. Sena, LATA (w/CD)
D. Davenport, LATA (w/CD)
G. Rael, DOE-LASO, MS A316 (w/CD)
D. Gregory, DOE LASO, MS A316 (w/CD)
R. Nevarez, DOE AL, OST Service Center-1 (w/CD)
K. Rich, EP-CAP, MS M992, (w/CD)
EP-CAP File, MS M992 (w/CD)
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Cy: (Letter and CD only)
L. King, EPA Region 6
P. Reneau, EP-ERSS, MS M992

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T. Skibitski, NMED OB
C. Mangeng, ADEP, MS J591
A. Dorries, EP-ERSS, MS M992
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Response to the "Notice of Disapproval for Material Disposal Area C, Solid Waste Management Unit 50-009, at Technical Area 50, Los Alamos National Laboratory EPA ID No: NM0890010515, HWB-LANL-06-028," Dated February 19, 2007

INTRODUCTION

To facilitate review of this response, the New Mexico Environment Department's (NMED's) comments are included verbatim. Los Alamos National Laboratory's (LANL's or the Laboratory's) responses follow each NMED comment. As requested, an outline of the Phase II investigation work plan is included with this response (Attachment 1). This response contains data on radioactive materials, including source, special nuclear, and byproduct material. Information on radioactive materials and radionuclides, including the results of sampling and analysis of radioactive constituents, is voluntarily provided to NMED in accordance with U.S. Department of Energy policy.

GENERAL COMMENTS

NMED Comment

1. *One of the primary objectives of the Investigation Report is to determine the nature and extent of contamination associated with waste disposal activities at MDA C. However, Tables 6.6-1 and 6.6-3 reveal the extent of vapor phase volatile organic compounds (VOCs) around Pits 1-4 in the eastern portion of MDA C—especially the vertical extent—has not been established. Much higher concentrations of VOCs have been observed in samples collected from the deeper sampling ports around the four pits compared to those collected at more shallow intervals. For example, trichloroethene (TCE) in subsurface pore gas increased from 11,000 µg/m^3 at a depth of 17 feet to 50,000 µg/m^3 at a depth of 150 feet in borehole 50-24771 (BH-14), which is located to the north of Pit 4. To the south of Pit 1, TCE concentrations increased from 6,100 µg/m^3 at a depth of 20 feet to 36,000 µg/m^3 at a depth of 150 feet in borehole 50-24811 (BH 23). TCE at these levels pose a significant risk of contaminating groundwater if concentrations continue to increase or do not significantly decrease at depths below 150 feet below ground surface (bgs).*

   Using the approach and method for evaluation of pore gas sampling data proposed by the Permittees (June 15, 2006, ER2006-0582, LA-UR-06-4107), TCE and PCE at concentrations as low as 120 µg/m^3 and 3500 µg/m^3, respectively, in the vapor phase can result in groundwater concentrations above the tap water soil screening level of 0.277 µg/L (as defined in the Technical Background Document for Development of Soil Screening Levels (NMED 2006, Revision 4.0)). Further calculations indicate that TCE and PCE concentrations in subsurface pore gas must be maintained below 2100 µg/m^3 and 3800 µg/m^3, respectively, to conservatively prevent vapor-phase TCE and PCE from partitioning into groundwater. Based on the criteria of 2100 µg/m^3 and 3800 µg/m^3 established for vapor-phase partitioning to water at the MCL for TCE and PCE, the VOC plume in subsurface pore gas at MDA C has not been adequately defined laterally or vertically, at least for the purposes of determining that levels in the subsurface will not contaminate groundwater.

   In addition, TCE concentrations were detected well above 2,100 µg/m^3 at the deepest sampling ports in most boreholes surrounding Pits 1-4. To the north of Pit 4, TCE was detected at 19,000 µg/m^3, 3,800 µg/m^3, 43,000 µg/m^3, 50,000 µg/m^3, 16,000 µg/m^3, and 43,000 µg/m^3, at the deepest sampling ports in boreholes 50-24783 (BH-17), 50-24782 (BH-16), 50-24773 (BH-15), 50-24771 (BH-14),

50-24770 (BH-13), and 50 24769 (BH-12), respectively. East of the four pits, TCE was detected at 3,700 µg/m^3 and 4,800 µg/m^3 at the deepest sampling ports of boreholes 50-24815 (BH-27) and 50-24814 (BH-26). To the south of Pit 1, TCE was detected at 54,000 µg/m^3, 51,000 µg/m^3, and 36,000 µg/m^3, respectively, at the deepest depths of boreholes 50-24813 (BH 25), 50 24812 (BH-24), and 50-24811 (BH-11). To the west of the pits, TCE was detected at 8,100 µg/m^3, 16,000 µg/m^3, 2,700 µg/m^3, and 8,600 µg/m^3, respectively, at the deepest sampling ports of boreholes 50-24810 (BH-22), 50-24804 (BH-21), 50 24803 (BH 20), and 50-24802 (BH-19). These data are insufficient to determine the vertical extent of TCE contamination. The potential risk of groundwater contamination by TCE in subsurface pore gas therefore cannot be evaluated. Appropriate corrective measures likewise cannot be effectively evaluated at this time. See comment #1 under Phase Two Investigation Work Plan Requirements.

LANL Response

1. The boreholes referenced in NMED's comment were all drilled to total depths (TDs) of between 150 and 160 ft below ground surface (bgs). Data from the 12 deeper boreholes drilled to TDs from 225 to 600 ft are more appropriate for evaluating vertical extent of pore gas volatile organic compounds (VOCs) at Material Disposal Area (MDA) C. Trichloroethene (TCE) data from the 12 deeper boreholes are plotted with depth in Figure 1 of this response. These data show that the highest TCE concentrations in the deeper boreholes are detected in the interval from approximately 100 ft to 300 ft bgs, and the data are consistent with the increasing trends noted in the 150- to 160-ft boreholes. As shown in the data from borehole 50-24818 (which also had the highest maximum TCE concentration for the deeper boreholes), the TCE concentration begins to decrease significantly near the top of the Cerro Toledo interval at approximately 317 ft bgs, and TCE concentrations are approximately 2 orders of magnitude below the maximum value in samples collected below the top of the Otowi Member (approximately 383 ft bgs).

   Concentrations of VOCs detected in pore-gas samples collected in the Otowi Member in borehole location 50-24818 at depths of 414 ft bgs and greater were all below the groundwater protection screening levels referenced in NMED's comment. These results indicate that the vertical extent of VOC vapor contamination has been defined at that location and no threat of groundwater contamination exists. The results from borehole 50-24818 show a marked decrease in VOC concentrations in samples collected from the Otowi Member compared to samples collected from the overlying unit Qbt 1g of the Tshirege Member (see Table F 2.10-3 of the investigation report and Figure 1 of this response). Results of borehole sampling at other LANL sites, including MDA G and MDA L, also indicate that the VOC concentrations are linked to the lithology (i.e., VOC concentrations at MDAs L and G also decreased significantly below the Tshirege Member).

   Because a single borehole may not provide sufficient coverage for a site the size of MDA C, LANL proposes to advance several existing boreholes deeper into the Otowi Member to confirm that the vertical extent of VOC contamination has been determined, and currently no threat of groundwater contamination exists. Based on the vertical distribution of VOC pore-gas concentrations in different geologic units in borehole 50-24818, the TD of the boreholes is best defined by the geologic unit rather than by field screening. The number and locations of these boreholes and supporting rationale will be provided in a Phase II investigation work plan.

NMED Comment

2. *The Permittees have not defined the extent of inorganic chemicals in tuff at MDA C, particularly in the western portion of the site near Pit 6 and the chemical pit. For example, the Permittees detected*

chromium at a concentration of 19.4 mg/kg at the termination depth (TD) (299.8 feet) in borehole 50-24784, more than seven times the background value (2.6 mg/kg for Qbtlg). Lead was detected at a concentration of 81.5 mg/kg at the TD (275 feet) in borehole 50-24785, six times the background value (13.5 for Qbtlg). The Permittees explain in Section F-3.1.2 that the extent of chromium is defined because it is less than the maximum concentration of 23.4 mg/kg detected at 50 feet; that the extent of lead was defined because lead was not detected above background at or below 275 feet in a nearby borehole. The data for inorganic compounds are strongly indicative of a release. The Permittees must collect additional samples to define the vertical and lateral extent of inorganic constituents. See comment #2 under Phase Two Investigation Work Plan Requirements.

LANL Response

2. A small number of results that exceed the background value (BV) does not automatically represent a contaminant release, particularly in the lower tuff units where the background data set is possibly less representative of the natural variability of the medium. The comparison of sample concentrations to media-specific BVs is affected by the number of samples used to calculate the upper tolerance limit of the background data set. For the deeper units of the Bandelier Tuff, the number of background samples used to calculate a BV decreases dramatically; for Qbt 1g/Qct/Qbo, the inorganic chemical background data sets consist of only 19 sample results for chromium and 26 sample results for lead compared to 173 chromium and 164 lead sample results for soil and 48 chromium and 63 lead sample results for Qbt 2/Qbt 3/Qbt 4 (LANL 1998, 059730). As the number of site sample results increases beyond the number of background samples, the chances increase that the sample concentrations will exceed the BV because of the natural variability of the medium being sampled. Additionally, to get a statistically significant number of samples for the deeper tuff units, data from unit Qbt 1g of the Tshirege Member, the Cerro Toledo interval, and the Otowi Member were combined, thereby introducing more uncertainty.

   It is also appropriate and important to view data from each borehole in the context of data from other boreholes at the site rather than attempting to define releases and the nature and extent of contamination on the basis of individual boreholes alone or single isolated detections at depth. Borehole concentration trends of inorganic chemical data with depth will be included in the Phase II investigation report to illustrate this point. Additional subsurface sampling at each proposed borehole location will be included in the Phase II investigation work plan.

3. *On September 8, 2005, the Permittees sent a letter to NMED requesting a deviation from the scope of work required in the Approval with Modifications (April 6, 2005). The Permittees committed to drilling vertical boreholes between Pits 1 through 4 as originally stipulated in the Order, rather than the horizontal boreholes required in the Approval with Modifications. NMED believes that sufficient time (September 8, 2005 to the present) was available to determine the safety requirements associated with site work at MDA C. NMED must assume the Permittees proposed work for which they had not received adequate internal review. Additionally, NMED's evaluation of the geophysical surveys indicated that the boundary between Pits 2 and 3 is reasonably well-defined. NMED understands that the Permittees intend to drill these four boreholes as soon as practical. A summary of the drilling and sampling results from these four boreholes must be submitted in a separate document with the Phase Two Investigation Work Plan required by this NOD.*

LANL Response

3. LANL will submit the information as soon as possible. Drilling was completed on February 26, 2007, and pore-gas sampling of the deepest of the four boreholes was completed on March 2, 2007. The

information to be submitted will include the detailed borehole logs and data summary tables from the four boreholes.

NMED Comment

4. *Section IX.B.2.c (Logging of Soil/Rock and Sediment Samples) of the Order states that detailed logs of each boring shall include descriptions and classifications in accordance with ASTM 2487 and 2488 or AGI methods, and information such as the presence of water-bearing zones or unusual or noticeable conditions encountered during drilling. The borehole logs provided in Appendix C do not contain lithologic descriptions, notations regarding fractures or moisture content of the tuff, and otherwise offer only limited information about the subsurface conditions at MDA C. As part of the response to this NOD, the Permittees must revise Appendix C to include borehole logs that comply with Section IX.B.2.c of the Order.*

LANL Response

4. Appendix C has been revised, and the detailed borehole logs requested by NMED are included as Attachment 2 to this response.

NMED Comment

5. *Table 6.3-3 (Summary of Radionuclides Detected or Detected above Background Values in Tuff at MDA C) indicates that background values are "not available" for nearly all radionuclides in all members of the Bandelier Tuff. NMED recognizes that the Qbt2, Qbt3, Qbt1v, QBt1g, and Qbo units were all formed prior to fallout, and therefore fallout values of radionuclides should not be present. However, NMED has used Inorganic and Radionuclide Background Data for Soils, Canyon Sediments, and Bandelier Tuff at Los Alamos National Laboratory" (Ryti et al., 1998) to establish whether releases of contaminants have occurred since 1998. As a response to this NOD, the Permittees must provide an explanation as to why these NMED-approved background values are not being utilized.*

LANL Response

5. A fallout value (FV) for fallout radionuclides (tritium, cesium-137, americium-241, plutonium-238, plutonium-239, and strontium-90) applies only to surface samples, generally from depths of 0 to 0.5 ft, as stated in “Inorganic and Radionuclide Background Data for Soils, Canyon Sediments, and Bandelier Tuff at Los Alamos National Laboratory” (LANL 1998, 059730). The FVs presented in this document for the fallout radionuclides in tuff listed above are nominal detection limits, which indicates that anything detected in tuff should be retained as a chemical of potential concern (COPC). For other fallout radionuclides listed in Table 6.3-3 (cesium-134, cobalt-60, europium-152, ruthenium-106, and sodium-22), FVs are not presented in the background document. Therefore, for several years it has been LANL’s approach to evaluate all fallout radionuclides in tuff based on detection status and not to use the nominal detection limit FVs presented in LANL’s background document (LANL 1998, 059730). Because no measured tuff FVs exist for the fallout radionuclides, Table 6.3-3 indicates that FVs are not available for these radionuclides. In addition, the nominal detection limit FVs are not used because if a fallout radionuclide was detected at concentrations below the nominal detection limit FVs, it would be eliminated as a COPC. As a result, the evaluation of fallout radionuclides in tuff according to detection status is a more conservative approach.

NMED Comment

6. *In Section 6.5 (Subsurface Vapor Sampling Field-Screening Results) the Permittees reference Chamberlain 2006, 94162. This citation is not included in the list of references provided in Section 10 of the Report and is not in NMED' s Administrative Record. The Permittees must provide all references cited in all submittals to NMED, including those for this Report.*

LANL Response

6. The email from Ms. K. Chamberlain (2006, 094162) was included in the reference list of Appendix B but was inadvertently left off the reference list for the main text. The reference is included as Attachment 3 to this response, and the pdf is provided on the CD that accompanies this response.

NMED Comment

7. *Due to the clear migration of inorganics laterally from MDA C (see arsenic and barium at TD in borehole 50-24820), the Permittees must evaluate all potential migration pathways, in particular fracture density and orientation to determine whether fracture flow creates migration pathways for contamination at MDA C. Investigation of fracture flow beneath MDA C will be essential for future remedy selection. The fracture characterization study must be included in the Phase Two Investigation Report.*

LANL Response

7. Studies of fracture orientations at other LANL sites have determined that the fractures in the Tshirege Member of the Bandelier Tuff are overwhelmingly at or near a vertical orientation (Wohletz 1995, 054404; Reneau and Vaniman 1998, 063135; SEA 2001, 070182). As such, it is unlikely that inorganic chemicals from MDA C could migrate laterally more than 200 ft to location 50-24820. In addition, the concentrations of barium and arsenic probably represent the natural variability of the tuff being sampled and are not indicators of a release from MDA C (see Comment #2). Barium at TD (248.3 to 250 ft bgs) in borehole 50-24820 is only 30% above its BV. Arsenic was detected at 1.84 mg/kg (Qbt 1g BV = 0.56 mg/kg) at TD (248.3 to 250 ft bgs). The sample was collected at a depth just 1.6 ft below unit Qbt 1v, which has a BV for arsenic of 1.81 mg/kg and a maximum concentration of 2 mg/kg. This detection of arsenic is the only one above the BV in borehole 50-24820, and the arsenic concentrations do not vary significantly throughout the borehole (1.02 to 1.84 mg/kg). Therefore, the single detected concentrations of barium and arsenic are only slightly above background and do not indicate a contaminant release or migration of inorganic chemicals from MDA C.

   Several studies of fractures at LANL (e.g., Soll 1995, 072642; Soll and Birdsell 1998, 070011; Robinson et al. 2001, 070222) have concluded that clay-filled fractures are more likely to impede movement of liquids and contaminants rather than to provide a preferred migration pathway. A detailed evaluation of the potential for fracture flow at MDA H was performed in response to comments received from independent reviewers of the MDA H corrective measures study. This evaluation indicated that the preponderance of clay-filled fractures in the Tshirege Member makes flow in fractures unlikely and difficult to sustain (LANL 2004, 088787). The study further found that the travel time to the regional aquifer was controlled by flow through the unfractured Otowi Member. Thus, very little difference occurs in travel times, assuming saturated conditions and fracture flow in the Tshirege Member and assuming no fracture flow through the Tshirege Member. The results of the fracture-flow analysis prepared for MDA H indicate that investigation of fracture flow is relatively

unimportant for remedy selection. The MDA H study showed that the rate of migration of contaminants to the regional aquifer was far more dependent on the rate of infiltration of moisture into the buried wastes than on the presence or absence of fractures.

Very few significant fractures were observed in the 36 boreholes drilled at and around MDA C. Field observations of the core did not indicate any significant open fractures, and only a few minor (i.e., very small aperture) fractures with stained or weathered zones were present (see Attachment 2, Borehole Logs). Most fractures observed in the area are filled with expansive clay, which tends to preclude significant flow of liquids. The two significant fractures that were identified and sampled at locations 50-24784 and 50-24804 did not indicate contamination by either organic chemicals or radionuclides, and inorganic chemicals in the clay fracture fill were generally below soil BVs or less than twice the BVs.

Based on the borehole data from MDA C and on previous studies of fractures at other LANL sites, fractures are not likely to be a significant pathway for contaminant migration, especially lateral migration, and a fracture characterization study at MDA C is not warranted. LANL will continue to note any fractures observed during the course of drilling the boreholes proposed in the Phase II investigation work plan. Samples of fracture fill material and tuff will be collected where practicable and consistent with the methods used in previous sampling activities at MDA C.

NMED Comment

8. *Analysis of human health and ecological risk is premature because the Permittees have not completed investigation of MDA C. The Risk Assessment provided in Appendix G will be evaluated only after investigation activities are complete. (No response required)*

LANL Response

8. As indicated in the investigation report, the human health and ecological risks will be re-evaluated after additional surface samples have been collected to confirm the nature and extent of inorganic chemical contamination with decision-level data. These additional surface samples will be included in the Phase II investigation work plan. The inorganic chemical data collected from the proposed boreholes will not change the current risk screening assessments because the data collected will be below depths relevant to any exposure scenarios for present day risk. The revised risk screening assessments, which will include the additional surface sample data, will be presented in the Phase II investigation report.

REFERENCES

Chamberlain, K., February 23, 2006. E-mail message to K. Rich (LANL) from K. Chamberlain (NMED), Santa Fe, New Mexico. (Chamberlain 2006, 094162)

LANL (Los Alamos National Laboratory), September 22, 1998. “Inorganic and Radionuclide Background Data for Soils, Canyons Sediments and Bandelier Tuff at Los Alamos National Laboratory,” draft, Los Alamos National Laboratory document LA-UR-98-4847, Los Alamos, New Mexico. (LANL 1998, 059730)

LANL (Los Alamos National Laboratory), September 2004. “An Alternate Groundwater-Pathway Risk Assessment for Material Disposal Area H: Fracture-Facilitated Contaminant Transport,” Los Alamos National Laboratory document LA-UR-04-4956, Los Alamos, New Mexico. (LANL 2004, 088787)

Reneau, S.L., and D.T. Vaniman, December 1, 1998. “Fracture Characteristics in a Disposal Pit on Mesita del Buey, Los Alamos National Laboratory,” Los Alamos National Laboratory report LA-13539-MS, Los Alamos, New Mexico. (Reneau and Vaniman 1998, 063135)

Robinson, B., S. McLin, and G. Bussod, May 2001. “Hydrologic Behavior of Unsaturated, Fractured Tuff: Interpretation and Modeling of a Wellbore Injection Test and Implications for Contaminant Transport,” Los Alamos National Laboratory, Los Alamos, New Mexico. (Robinson et al. 2001, 070222)

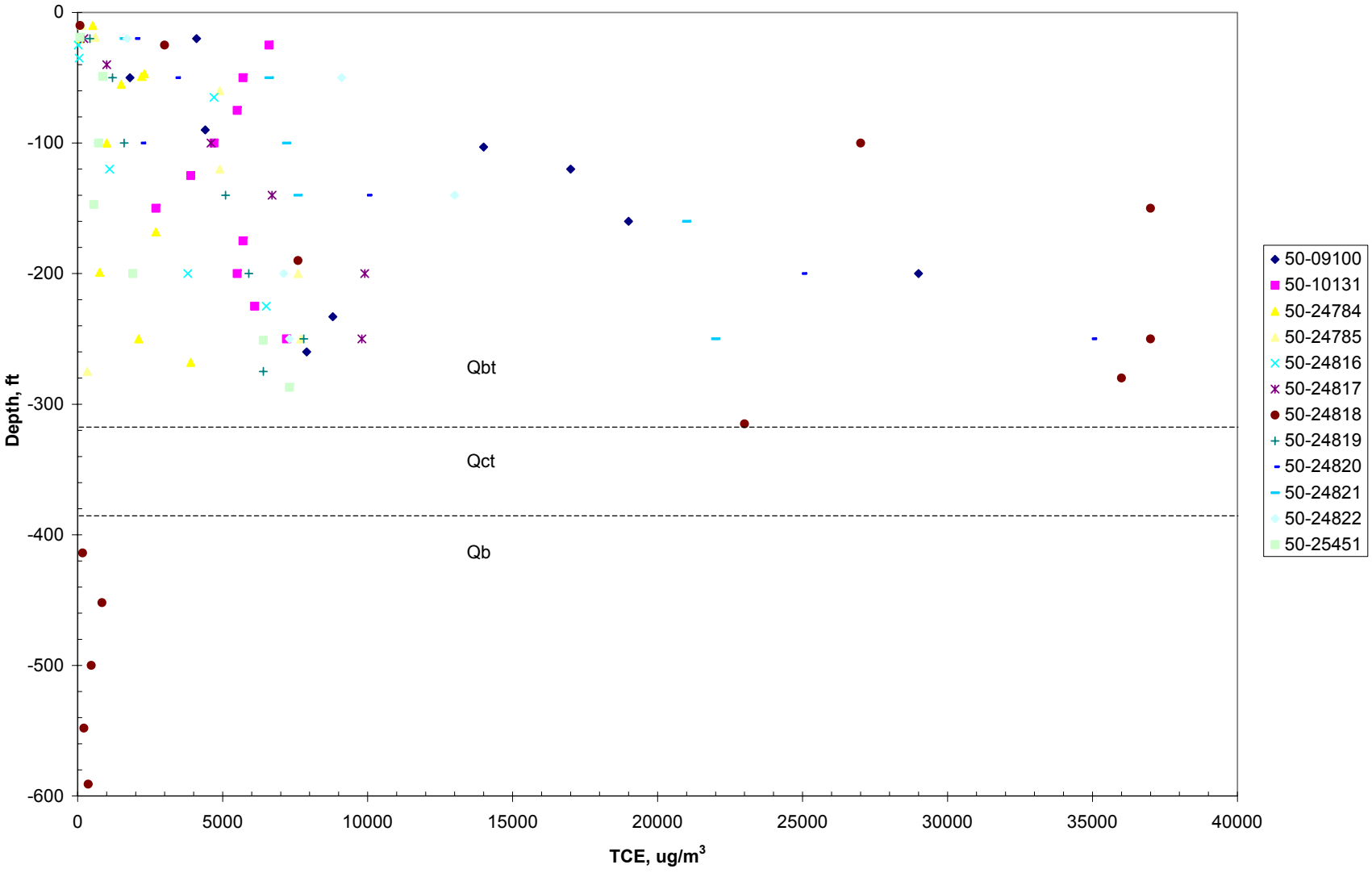
SEA (Scientific Engineering Associates, Inc.), July 2001. “TA-54, MDA J Fracture Characterization,” Scientific Engineering Associates report SEASF-TR-01-268, Santa Fe, New Mexico. (SEA 2001, 070182)

Soll, W., and K. Birdsell, February 1998. “The Influence of Coatings and Fills on Flow in Fractured, Unsaturated Tuff Porous Media System,” *Water Resources Research,* Vol. 34, No. 2, pp. 193-202. (Soll and Birdsell 1998, 070011)

Soll, W.E., August 1995. “Influence of Fracture Fills and Fracture Coatings on Flow in Bandelier Tuff,” Los Alamos National Laboratory document LA-UR-95-2695, Los Alamos, New Mexico. (Soll 1995, 072642)

Wohletz, K., June 1995. “Measurement and Analysis of Rock Fractures in the Tshirege Member of the Bandelier Tuff Along Los Alamos Canyon Adjacent to Technical Area-21,” in *Earth Science Investigations for Environmental Restoration—Los Alamos National Laboratory, Technical Area 21*, Los Alamos National Laboratory report LA-12934-MS, Los Alamos, New Mexico. (Wohletz 1995, 054404)

Figure 1. First Round TCE Data, MDA C Deep Boreholes



Attachment 1

Draft Outline of Phase II Investigation Work Plan

Draft Outline
Phase II Investigation Work Plan for Material Disposal Area C,
Solid Waste Management Unit 50-009, at Technical Area 50

1.0 INTRODUCTION

1.1 General Site Information

1.2 Investigation Objectives

2.0 BACKGROUND

2.1 Summary of Previous Investigations

2.2 Results of Previous Investigations

3.0 SCOPE OF ACTIVITIES

3.1 Surface Soil Sampling

3.2 Subsurface Sampling

3.2.1 Number, Locations, and Depths of Boreholes

3.2.2 Field Screening

3.2.3 Subsurface Tuff Sampling

3.2.4 Subsurface Vapor Sampling

3.3 Analytical Suites

3.4 Investigation-Derived Waste

4.0 INVESTIGATION METHODS

4.1 Drilling Methods

4.2 Collection of Surface Soil Samples

4.3 Collection of Subsurface Tuff Samples

4.4 Collection of Subsurface Vapor Samples

4.5 Screening of Subsurface Vapor Samples

5.0 SUBSURFACE VAPOR MONITORING

5.1 Number, Locations, and Depths of Vapor-Monitoring Boreholes

5.2 Vapor-Monitoring Borehole Installation and Configuration

5.3 Vapor-Monitoring Sample Collection

5.3.1 Sampling Methods and Analytical Suites

5.3.2 Sample Collection Interval/Schedule

6.0 SCHEDULE (includes proposed submittal date for Phase II investigation report)

7.0 REFERENCES

FIGURES

TABLES

APPENDICES

Attachment 2

Borehole Logs

Appendix C

Borehole Logs

Los Alamos National Laboratory
Borehole Log

Project: MDA C Investigation Work Plan | **TA-50 SWMU: 50-009** | **Page 1 of 3**

Borehole Location ID: 50-24766 | **Start Date:** 04/21/06 **End Date:** 04/24/06

Coordinates : 1625975.35 E / 1768834.52 N | **Ground Surface Elevation:** 7250.86 ft

Attitude: Vertical | **Total Depth (TD):** 150.0 ft

Driller/Co.: Stanley Johnson/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Tracy McFarland/LATA

Estimated depth of adjacent disposal unit(s): 23.6 ft | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: CME 750 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	72%	0	NDA				No			Fill	(0.0, 5.6) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-24766 is located in the northcentral portion of MDA C, east of Pit 6, and northwest of Pit 5.
	60%	0	NDA				No					
5	68%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(5.6, 97.8) Qbt3: Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing.
	72%	0	NDA				No					
10	72%	0	NDA				No					
	60%	0	NDA				No					
15	84%	0	NDA	64603	64597	65331	No					
	76%	0	NDA				No					
20	88%	0	NDA				No					
	84%	0	NDA				No					
25	80%	0	NDA				No					
	72%	0.1	NDA	64604	64596	65330	No					
30	0%	NA	NA				NA					
	76%	0	NDA				No					
35	88%	0	NDA				No					
	80%	0.1	NDA				No					
40	88%	0.6	NDA				No					
	80%	0.5	NDA				No					
45	80%	0.6	NDA				No					
	72%	0.5	NDA				No	@ 48 ft., Minor, clay filled				
50	100%	1.2	NDA				No					
	%											

Los Alamos National Laboratory
Borehole Log
TA-50/SWMU 50-009

MDA C Investigation Work Plan
Sample Location ID: 50-24766

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	84%	0.9	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	72%	1.6	NDA				No					
60	84%	1.5	NDA				No	@ 57.5 ft., Minor, clay filled				
	80%	1.6	NDA				No					
65	64%	1.0	NDA				No					
	60%	1.2	NDA				No					
70	64%	1.0	NDA				No					
	56%	0.6	NDA				No					
75	56%	1.0	NDA				No					
	52%	0.9	NDA				No					
80	80%	0	NDA				No					
	56%	0	NDA				No					
85	48%	0	NDA				No					
	44%	0	NDA				No					
90	28%	0	NDA				No					
	36%	0	NDA				No					
95	100%	0	NDA				No					
	100%	0	NDA				No					
100	100%	0	NDA	64586 64606	64595	65329	No			Unit 2, Tshirege Member, Bandelier Tuff	(97.8, 150.0) Qbt2: Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	100%	0	NDA				No					
105	100%	0	NDA				No					
	100%	0	NDA				No					
110	100%	0	NDA				No					
	100%	0	NDA				No					
115	center bit	NA	NA				NA					
		NA	NA				NA					
120		NA	NA				NA					
		NA	NA				NA					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	76%	0	NDA	64587	64594	65328	No			Unit 2, Tshirege Member, Bandelier Tuff	Qbt2 continued. Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	center bit	NA	NA				No					
130		NA	NA				NA					
		NA	NA				NA					
135		NA	NA				NA					
		NA	NA				NA					
140		NA	NA				NA					
		NA	NA				NA					
145		NA	NA				NA					
		NA	NA				NA					
150	84%	0	NDA	64605	64593	65327	NA					TD = 150 ft.

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Borehole Location ID: 50-24767 | **Start Date:** 03/09/06 **End Date:** 03/14/06

Coordinates : 1626471.73 E / 1768753.92 N | **Ground Surface Elevation:** 7227.25 ft

Attitude: Vertical | **Total Depth (TD):** 150.0 ft

Driller/Co.: Stanley Johnson/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Tracy McFarland/LATA

Estimated depth of adjacent disposal unit(s): 17.3 ft | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: CME 750 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	28%	0.5	NDA				No			Fill	(0.0, 2.8) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-24767 is located in the northeastern portion of MDA C, north of Pit 5.
	40%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(2.8, 90.0) Qbt3: Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing.
5	100%	0.2	NDA				No					
	100%	0.5	NDA				No					
10	100%	0.8	NDA	64635	64625	65362	No					
	100%	0.4	NDA				No					
15	100%	0.4	NDA				No					
	100%	0.2	NDA				No					
20	100%	0.8	NDA				No					
	100%	2.3	NDA				No					
25	enter b	NA	NA				NA					
	100%	7.3	NDA	64636			No					
30	80%	0	NDA	66770 66771	64626 64642	65361	No					
	76%	0	NDA				No					
35	88%	0	NDA				No					
	92%	0	NDA				No					
40	64%	0	NDA				No					
	96%	0	NDA				No	@ 44 ft., Minor, some clay				
45	80%	0	NDA				No					
	84%	0	NDA				No					
50	72%	0	NDA				No					
	%											

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	76%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	88%	0	NDA				No					
60	68%	0	NDA	64618 66772	64627	65360	No					
	72%	0	NDA				No					
65	68%	0	NDA				No					
	84%	0	NDA				No					
70	80%	0	NDA				No					
	72%	0	NDA				No					
75	64%	0	NDA				No					
	72%	0	NDA				No					
80	80%	0	NDA				No					
	76%	0	NDA				No					
85	76%	0	NDA				No					
	72%	0	NDA				No					
90	76%	0	NDA				No			Unit 2, Tshirege Member, Bandelier Tuff	(90.0, 150.0) Qbt2: Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	68%	0	NDA				No					
95	72%	0	NDA				No					
	92%	0	NDA				No					
100	80%	0	NDA				No					
	68%	0	NDA				No					
105	72%	0	NDA				No					
	84%	0	NDA				No					
110	60%	0	NDA				No					
	56%	0	NDA				No					
115	32%	0	NDA				No					
	52%	0	NDA				No					
120	68%	0	NDA				No					
	56%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	80%	0	NDA	64619	64628	65359	No	@ 124 ft., Minor, some clay		Unit 2, Tshirege Member, Bandelier Tuff	Qbt2 continued. Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	60%	0	NDA				No					
130	64%	0	NDA				No					
	76%	0	NDA				No					
135	52%	0	NDA				No					
	72%	0	NDA				No					
140	64%	0	NDA				No					
	88%	0	NDA				No					
145	68%	0	NDA				No					
	64%	0	NDA				No					
150	68%	0	NDA	64637	64629	65358	No					TD = 150 ft.

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Borehole Location ID: 50-24768 | **Start Date:** 03/15/06 **End Date:** 03/16/06

Coordinates : 1626689.88 E / 1768717.7 N | **Ground Surface Elevation:** 7219.31 ft

Attitude: Vertical | **Total Depth (TD):** 151.5 ft

Driller/Co.: Stanley Johnson/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Jon Marin/LATA

Estimated depth of adjacent disposal unit(s): 18.5 ft | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: CME 750 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening (αβγ)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	84%	0	NDA				No			Fill	(0.0, 4.5) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-24768 is located in the northeastern corner of MDA C, northeast of the northeast corner of Pit 5.
	84%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(4.5, 90.0) Qbt3: Pinkish gray to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing.
5	100%	0	NDA				No					
	100%	0	NDA				No					
10	84%	0	NDA				No					
	92%	0	NDA	64667	64661	65370 65373	No					
15	100%	0	NDA				No					
	100%	0	NDA				No					
20	92%	0	NDA				No					
	92%	0	NDA				No					
25	84%	0	NDA				No					
	80%	0	NDA	64668	64660	65369	No					
30	80%	0	NDA				No					
	100%	0	NDA				No					
35	68%	0	NDA				No					
	92%	0	NDA				No					
40	96%	0	NDA				No					
	60%	0	NDA				No					
45	72%	0	NDA				No					
	72%	0	NDA				No					
50	60%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	76%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Pinkish gray to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	76%	0	NDA				No					
60	72%	0	NDA				No					
	76%	0	NDA				No					
65	76%	0	NDA				No					
	56%	0	NDA				No					
70	84%	0	NDA				No					
	40%	0	NDA				No					
75	64%	2.7	NDA				No					
	68%	4.6	NDA				No					
80	72%	2.2	NDA				No					
	60%	2.7	NDA				No					
85	76%	2.3	NDA				No					
	72%	1.7	NDA				No					
90	60%	1.5	NDA				No					
	80%	1.7	NDA				No			Unit 2, Tshirege Member, Bandelier Tuff	(90.0, 151.5) Qbt2: Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
95	76%	1.9	NDA				No					
	60%	1.9	NDA				No					
100	84%	1.5	NDA	64650	64659	65368	No					
	100%	1.8	NDA				No					
105	80%	2	NDA				No					
	64%	1.5	NDA				No					
110	76%	1.5	NDA				No					
	44%	1.9	NDA				No					
115	80%	1.9	NDA				No					
	56%	1.5	NDA				No					
120	60%	1.8	NDA				No					
	60%	1.7	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	100%	1.6	NDA	64670 64651	64658	65367	No			Unit 2, Tshirege Member, Bandelier Tuff	Qbt2 continued. Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	center bit	NA	NA				NA					
130		NA	NA				NA					
		NA	NA				NA					
135		NA	NA				NA					
		NA	NA				NA					
140		NA	NA				NA					
		NA	NA				NA					
145		NA	NA				NA					
		NA	NA				NA					
150	78%	1.5	NDA	64669	64657	62366	No					TD = 151.5 ft.

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Borehole Location ID: 50-24769 | **Start Date:** 03/17/06 **End Date:** 03/20/06

Coordinates : 1626592.51 E / 1768584.39 N | **Ground Surface Elevation:** 7240.61 ft

Attitude: Vertical | **Total Depth (TD):** 150.0 ft

Driller/Co.: Stanley Johnson/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Tracy McFarland/LATA

Estimated depth of adjacent disposal unit(s): 36.9 ft | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: CME 750 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	76%	0	NDA				No			Fill	(0.0, 11.3) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-24769 is located in the eastern portion of MDA C, south of Pit 5, and northeast of Pit 4.
	72%	0	NDA				No					
5	96%	0	NDA				No					
	100%	0	NDA				No					
10	100%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(11.3, 102.5) Qbt3: Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing.
	92%	0	NDA				No					
15	80%	0	NDA				No					
	88%	0	NDA				No					
20	80%	0	NDA	64699	64693	65378	No					
	84%	0	NDA				No					
25	56%	0	NDA				No					
	0%	NA	NA				NA					
30	80%	0	NDA				No					
	100%	0	NDA				No					
35	76%	0	NDA				No					
	100%	0	NDA	64700	64692	65377	No					
40	92%	0	NDA				No					
	56%	0	NDA				No					
45	88%	0	NDA				No					
	80%	0	NDA				No					
50	60%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisure in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	100%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	92%	0	NDA				No					
60	72%	0	NDA				No					
	92%	0	NDA				No					
65	88%	0	NDA				No					
	72%	0	NDA				No					
70	84%	0	NDA				No					
	84%	0	NDA				No					
75	68%	0	NDA				No					
	88%	0	NDA				No					
80	80%	0	NDA				No					
	64%	0	NDA				No					
85	76%	0	NDA				No					
	84%	0	NDA				No					
90	60%	0	NDA				No					
	76%	0	NDA				No					
95	76%	0	NDA				No					
	60%	0	NDA				No					
100	76%	0.2	NDA	64682	64691	65376	No					
	64%	0	NDA				No					
105	44%	1.2	NDA				No			Unit 2	(102.5, 150.0) Qbt2: Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence.	
	76%	1.2	NDA				No					
110	80%	0.8	NDA				No					
	76%	0.9	NDA				No					
115	68%	0.8	NDA				No					
	68%	0.2	NDA				No					
120	80%	0.6	NDA				No					
	4%	0.2	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisure in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	80%	0.5	NDA	64683	64690 64706	65375	No			Unit 2, Tshirege Member, Bandelier Tuff	Qbt2 continued. Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	100%	0	NDA				No					
130	center bit	NA	NA				NA					
		NA	NA				NA					
135		NA	NA				NA					
		NA	NA				NA					
140		NA	NA				NA					
		NA	NA				NA					
145		NA	NA				NA					
		NA	NA				NA					
150	84%	0.3	NDA	64701	64689	65374	No					TD = 150 ft.

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Borehole Location ID: 50-24770 | **Start Date:** 03/27/06 **End Date:** 03/29/06

Coordinates : 1626454.99 E / 1768612.87 N | **Ground Surface Elevation:** 7242.97 ft

Attitude: Vertical | **Total Depth (TD):** 150.0 ft

Driller/Co.: Tombert Frank/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Dave Frank/LATA

Estimated depth of adjacent disposal unit(s): 36.9 ft | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: Failing F-10 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening (αβγ)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	100%	0	NDA				No			Fill	(0.0, 9.5) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-24770 is located n the east-central portion of MDA C between Pits 4 and 5.
	100%	0	NDA				No					
5	100%	0	NDA				No					
	100%	0	NDA				No					
10	60%	0.4	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(9.5, 115.0) Qbt3: Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing.
	100%	0	NDA				No	@ 12.5 ft., Minor, clay filled, 30 degrees to core axis				
15	0%	NA	NA				NA					
	76%	0.2	NDA	64731	64738	65387	No					
20	100%	0	NDA	64734			No	@ 19 ft., Major, clay > 80% of 2.5-ft core run				@ 19 ft., sampled fracture.
	100%	0	NDA				No					
25	100%	0	NDA	64717	64725	65386	No	@ 23 ft., Minor, some clay				
	100%	0	NDA				No					
30	100%	0	NDA				No					
	100%	0	NDA				No					
35	0%	NA	NA				NA					
	100%	0	NDA	64732	64724	65385	No					
40	100%	0	NDA				No					
	100%	0	NDA				No					
45	100%	0	NDA				No					
	100%	0	NDA				No					
50	100%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	100%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	100%	0	NDA				No					
60	100%	0	NDA				No					
	100%	3.9	NDA				No					
65	20%	4.8	NDA				No					
	0%	NA	NA				NA					
70	0%	NA	NA				NA					
	84%	6.5	NDA				No					
75	100%	0	NDA				No					
	100%	1.3	NDA				No					
80	100%	2.8	NDA				No					
	20%	2.3	NDA				No					
85	100%	2.3	NDA				No					
	100%	1.8	NDA				No					
90	100%	0	NDA				No					
	100%	0	NDA				No					
95	100%	0	NDA				No					
	100%	0	NDA				No					
100	100%	0	NDA	64714	64723	65384	No					
	100%	0	NDA				No					
105	100%	0	NDA				No					
	100%	0	NDA				No					
110	100%	0	NDA				No					
	100%	0	NDA				No					
115	0%	NA	NA				NA					
	100%	NA	NDA				No			Unit 2	(115.0, 150.0) Qbt2: Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20%	
120	100%	0	NDA				No					
	0%	0	NA				NA					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	84%	0	NDA	64715	64722	65383	No			Unit 2, Tshirege Member, Bandelier Tuff	quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	center bit	NA	NA				NA					
130		NA	NA				NA					
		NA	NA				NA					
135		NA	NA				NA					
	40%	0	NDA				No					
140	center bit	NA	NA				NA					
		NA	NA				NA					
145		NA	NA				NA					
	100%	0	NDA			65382	No					
150	100%	0	NDA	64733	64721		No					TD = 150 ft.

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Borehole Location ID: 50-24771 | **Start Date:** 03/22/06 **End Date:** 03/24/06

Coordinates : 1626333.11 E / 1768634.18 N | **Ground Surface Elevation:** 7246.39 ft

Attitude: Vertical | **Total Depth (TD):** 150.0 ft

Driller/Co.: Tombert Frank/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Dave Frank/LATA

Estimated depth of adjacent disposal unit(s): 36.2 ft | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: Failing F-10 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	40%	0	NDA				No			Fill	(0.0, 11.2) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-24771 is located in the east-central portion of MDA C between Pits 4 and 5.
	100%	0	NDA				No					
5	100%	0	NDA				No					
	100%	0	NDA				No					
10	100%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(11.2, 110.0) Qbt3: Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing.
	100%	0	NDA				No					
15	84%	0	NDA	64756	64750 64763	65394	No					
	0%	NA	NA				NA					
20	0%	NA	NA				NA					
	0%	NA	NA				NA					
25	0%	NA	NA				NA					
	100%	0	NDA				No					
30	100%	0	NDA				No					
	96%	0	NDA				No					
35	96%	0	NDA				No					
	100%	0	NDA	64757	64749	65393	No					
40	100%	0	NDA				No					
	100%	0	NDA				No					
45	0%	NA	NA				NA					
	20%	0	NDA				No					
50	100%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	100%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	100%	0	NDA				No					
60	0%	NA	NA				NA					
	100%	0	NDA				No					
65	100%	0	NDA				No					
	100%	0	NDA				No					
70	100%	0	NDA				No					
	100%	0	NDA				No					
75	100%	0	NDA				No					
	80%	0	NDA				No					
80	100%	0	NDA				No					
	100%	0	NDA				No					
85	100%	0	NDA				No					
	100%	0	NDA				No					
90	100%	0	NDA				No					
	100%	0	NDA				No					
95	100%	0	NDA				No					
	100%	0	NDA				No					
100	100%	0	NDA	64739	64748	65392	No					
	100%	0	NDA				No					
105	100%	0	NDA				No					
	100%	0	NDA				No					
110	100%	0	NDA				No					
	100%	0	NDA				No			Unit 2	(110.0, 150.0) Qbt2: Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0	
115	100%	0	NDA				No					
	0%	NA	NA				NA					
120	100%	0	NDA				No					
	100%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	80%	0.5	NDA	64740	64747	65391	No			Unit 2, Tshirege Member, Bandelier Tuff	mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	center bit	NA	NA				NA					
130		NA	NA				NA					
		NA	NA				NA					
135		NA	NA				NA					
	40%	0.2	NDA				No					
140	center bit	NA	NA				NA					
		NA	NA				NA					
145		NA	NA				NA					
		NA	NA				NA					
150	100%	0	NDA	64758	64746	65390	No					TD = 150 ft.

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Borehole Location ID: 50-24773 | **Start Date:** 03/17/06 **End Date:** 03/21/06

Coordinates : 1626239.31 E / 1768634.18 N | **Ground Surface Elevation:** 7249.78 ft

Attitude: Vertical | **Total Depth (TD):** 153.0 ft

Driller/Co.: Tombert Frank/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Dave Frank/LATA

Estimated depth of adjacent disposal unit(s): 31.0 ft | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: Failing F-10 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	80%	0	NDA				No			Fill	(0.0, 6.0) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-24773 is located in the central portion of MDA C between Pits 4 and 5, and at the eastern end of a row of shafts.
	0%	NA	NA				NA					
5	100%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(6.0, 109.0) Qbt3: Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing.
	100%	0	NDA				No					
10	0%	NA	NA				NA					
	0%	NA	NA				NA					
15	100%	0	NDA				No					
	8%	0	NDA				No					
20	100%	0	NDA	64781 64784	64775	65405	No					
	100%	0	NDA				No					
25	100%	0	NDA				No					
	0%	NA	NA				NA					
30	100%	0.6	NDA				No					
	100%	1.1	NDA				No					
35	92%	1.2	NDA				No					
	100%	0.6	NDA				No					
40	100%	0	NDA	64782	64774	65404	No					
	100%	0	NDA				No					
45	100%	0	NDA				No					
	100%	0	NDA				No					
50	100%	0	NDA				No	@ 51 ft., Minor				

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	100%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	100%	0	NDA				No					
60	100%	0	NDA				No					
	100%	0	NDA				No					
65	100%	0	NDA				No					
	100%	0	NDA				No					
70	100%	0	NDA				No					
	100%	0	NDA				No					
75	60%	0	NDA				No					
	100%	0	NDA				No					
80	100%	0	NDA				No					
	60%	0	NDA				No					
85	100%	0	NDA				No					
	60%	0	NDA				No					
90	100%	0	NDA				No					
	100%	0	NDA				No					
95	100%	0	NDA				No					
	100%	0	NDA				No					
100	100%	0	NDA	64764	64773 64788	65403	No					
	100%	0	NDA				No					
105	100%	0	NDA				No					
	100%	0	NDA				No					
110	100%	0	NDA				No			Unit 2	(109.0, 153.0) Qbt2: Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller	
	100%	0	NDA				No					
115	100%	0	NDA				No					
	100%	0	NDA				No					
120	100%	0	NDA				No					
	00%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	100%	0	NDA	64765	64776	65402	No			Unit 2, Tshirege Member, Bandelier Tuff	blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	center bit	NA	NA				NA					
130		NA	NA				NA					
		NA	NA				NA					
135		NA	NA				NA					
	100% center bit	0	NDA				No					
140		NA	NA				NA					
	100%	0	NDA				No					
145	center bit	NA	NA				NA					
		NA	NA				NA					
150		NA	NA				NA					
	100%	0	NDA	64783	64772	65401	No					TD = 153 ft.

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Borehole Location ID: 50-24782 | **Start Date:** 03/13/06 **End Date:** 03/16/06

Coordinates : 1626092.53 E / 1768673.21 N | **Ground Surface Elevation:** 7255.23 ft

Attitude: Vertical | **Total Depth (TD):** 157.5 ft

Driller/Co.: Stanley Johnson/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Tracy McFarland/LATA

Estimated depth of adjacent disposal unit(s): 33.8 ft | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: CME 750 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	52%	1.4	NDA				No			Fill	(0.0, 8.8) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-24782 is located in the central portion of MDA C between Pits 4 and 5, and west of the row of shafts.
	36%	1.3	NDA				No					
5	100%	1.6	NDA				No					
	84%	1.1	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(8.8, 101.0) Qbt3: Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing.
10	52%	0	NDA				No					
	0%	NA	NA				NA					
15	100%	0.9	NDA				No					
	16%	0.4	NDA	64813	64803	65413	No					
20	100%	1.9	NDA				No					
	100%	0	NDA				No					
25	100%	0	NDA				No					
	100%	0	NDA				No					
30	96%	0	NDA				No					
	92%	0	NDA				No					
35	84%	0	NDA				No					
	100%	0.5	NDA	64814	64804	65412	No					
40	center bit	NA	NA				NA					
		NA	NA				NA					
45		NA	NA				NA					
	100%	0.4	NDA				No					
50		NA	NA				NA					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	center bit	NA	NA				NA			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
		NA	NA				NA					
		NA	NA				NA					
60	100%	0	NDA				No					
	0%	NA	NA				NA					
65	96%	0	NDA				No					
	100%	0	NDA				No					
70	100%	0	NDA				No					
	100%	0	NDA				No					
75	88%	0	NDA				No					
	0%	NA	NA				NA					
80	20%	0	NDA				No					
	100%	0	NDA				No					
85	100%	1.6	NDA				No					
	100%	0.4	NDA				No					
90	40%	0	NDA				No					
	84%	0	NDA				No					
95	100%	0	NDA				No					
	100%	0	NDA	64976	64805	65411	No					
100	100%	0	NDA				No			Unit 2	(101.0, 157.5) Qbt2: Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	100%	0	NDA				No					
105	100%	0	NDA				No					
	20%	0	NDA				No					
110	100%	0	NDA				No					
	0%	NA	NA				NA					
115	0%	NA	NA				NA					
	100%	0	NDA				No					
120	00%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	80% 1	0	NDA	64797	64806	65410	No			Unit 2, Tshirege Member, Bandelier Tuff	Qbt2 continued. Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	center bit	NA	NA				NA					
130		NA	NA				NA					
		NA	NA				NA					
135		NA	NA				NA					
		NA	NA				NA					
140		NA	NA				NA					
		NA	NA				NA					
145		NA	NA				NA					
	20%	0	NDA				No					
150	center bit	NA	NA				NA					
		NA	NA			65409	NA					
		NA	NA				NA					
155	100%	0	NDA	64815	64807		No					TD = 157.5 ft.

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Borehole Location ID: 50-24783 | **Start Date:** 03/06/06 **End Date:** 03/13/06

Coordinates : 1625977.0 E / 1768686.3 N | **Ground Surface Elevation:** 7258.8 ft

Attitude: Vertical | **Total Depth (TD):** 152.5 ft

Driller/Co.: Stanley Johnson/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Tracy McFarland/LATA

Estimated depth of adjacent disposal unit(s): 34.3 ft | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: CME 750 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	72%	0	NDA				No			Fill	(0.0, 7.0) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-24783 is located in the central portion of MDA C, between and at the western ends of Pits 4 and 5.
	56%	0.2	NDA				No					
5	100%	0	NDA				No					
	100%	2.5	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(7.0, 113.0) Qbt3: Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing.
10	68%	4	NDA				No	@ 10.7 ft., Minor				
	100%	0.9	NDA				No	@ 13.2 ft., Minor				
15	100%	1.2	NDA				No					
	100%	2.5	NDA	64838	64832	65421 65424	No					
20	80%	2.2	NDA				No					
	100%	1.5	NDA				No					
25	96%	1.5	NDA				No					
	100%	2.1	NDA				No					
30	100%	1.1	NDA				No					
	48%	1.2	NDA				No					
35	100%	1.5	NDA	64839	64831	65420	No	@ 35 ft., Minor				
	100%	1.1	NDA				No					
40	100%	1.1	NDA				No					
	100%	2.3	NDA				No					
45	24%	0.5	NDA				No					
	80%	0	NDA				No					
50	80%	1.6	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	92%	1.8	NDA				No	@ 53.7 ft., Minor		Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	84%	3.8	NDA				No	@ 55.3 ft., Minor				
	92%	4.4	NDA				No					
60	80%	5	NDA				No					
	100%	4.7	NDA				No					
65	96%	5.2	NDA				No					
	100%	3.2	NDA				No					
70	100%	0.9	NDA				No					
	84%	1.2	NDA				No					
75	60%	1.3	NDA				No					
	60%	0.7	NDA				No					
80	20%	1.6	NDA				No					
	80%	0.9	NDA				No					
85	52%	2.6	NDA				No					
	64%	1.1	NDA				No					
90	64%	1.3	NDA				No					
	52%	1	NDA				No					
95	68%	1.1	NDA				No					
	72%	1.1	NDA	64821	64830	65419	No					
100	92%	0.6	NDA				No					
	56%	1.4	NDA				No					
105	100%	0.8	NDA				No					
	100%	0	NDA				No					
110	100%	0	NDA				No					
	92%	0.2	NDA				No			Unit 2	(113.0, 152.5) Qbt2: Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and	
115	72%	0.2	NDA				No					
		NA	NA				NA					
120		NA	NA				NA					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	center bit	NA	NA	64822	64829	65418	NA			Unit 2, Tshirege Member, Bandelier Tuff	10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
		NA	NA				NA					
130		NA	NA				NA					
		NA	NA				NA					
135		NA	NA				NA					
		NA	NA				NA					
140		NA	NA				NA					
		NA	NA				NA					
145		NA	NA				NA					
		NA	NA				NA					
150		NA	NA			65417	NA					
	100%	1.8	NDA	64840	64828 64845	slough	No					TD = 152.5 ft.

Los Alamos National Laboratory
Borehole Log

Project: MDA C Investigation Work Plan | **TA-50 SWMU: 50-009** | **Page 1 of 5**

Borehole Location ID: 50-24784 | **Start Date:** 02/10/06 **End Date:** 02/28/06

Coordinates : 1625429.58 E / 1768845.82 N | **Ground Surface Elevation:** 7279.23 ft

Attitude: Vertical | **Total Depth (TD):** 300.0 ft

Driller/Co.: Stanley Johnson/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Tracy McFarland/LATA

Estimated depth of adjacent disposal unit(s): 17.0 ft | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: CME 750 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	72%	0	NDA				No			Fill	(0.0, 5.0) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-24784 is located in the western portion of MDA C west of the Chemical Pit;
	100%	0.2	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(5.0, 116.0) Qbt3: Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing.
5	100%	0	NDA				No					
	80%	0	NDA	64380	64374	70724	No					
10	88%	0.3	NDA				No					
	100%	0	NDA				No					
15	100%	0	NDA				No					
	80%	0	NDA	64381	64373	70723	No					
20	100%	3	NDA				No	@ 21.5 ft., Minor, clay filled				
	100%	2.5	NDA				No					
25	100%	2.4	NDA				No					
	100%	2.3	NDA				No	@ 27.5 ft., Minor, clay filled				
30	100%	3.3	NDA				No					
	100%	1	NDA				No					
35	100%	0.5	NDA				No	@ 35 ft., Minor, clay filled				
	100%	1.1	NDA				No	@ 39 ft., Minor				
40	100%	0.2	NDA				No					
	100%	0.6	NDA				No					
45	56%	0	NDA				No					
	92%	2.5	NDA	64363	64372	70722	No					
50	100%	2.8	NDA	64364	64371	70721	No	@ 49 ft., Major, clay > 80% of 2.5 ft				@ 49 ft., sampled fracture

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Borehole Log
MDA C Investigation Work Plan **TA-50/SWMU 50-009**

Sample Location ID: 50-24784

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	68%	2.7	NDA	64365 64383	64370	65292	No	core run		Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	68%	2.4	NDA				No					
60	60%	2.5	NDA				No					
	56%	0.5	NDA				No					
65	100%	1.3	NDA				No					
	100%	1.7	NDA				No					
70	100%	1.8	NDA				No					
	100%	2.8	NDA				No					
75	100%	2.9	NDA				No					
	64%	3.3	NDA				No					
80	80%	4.4	NDA				No					
	80%	3.1	NDA				No					
85	40%	3.6	NDA				No					
	56%	3.9	NDA				No					
90	84%	2.8	NDA				No					
	64%	3.8	NDA				No					
95	72%	3.6	NDA				No					
	60%	2.6	NDA				No					
100	100%	3.5	NDA	64367	64375 64394	65291	No					
	100%	0	NDA				No					
105	60%	0	NDA				No					
	88%	0	NDA				No					
110	68%	0	NDA				No					
	56%	0	NDA				No					
115	100%	0	NDA				No					
	68%	0	NDA				No			Unit 2	(116.0, 192.9) Qbt2: Pinksish gray to pale red, dry, devitrified ash flow.	
120	76%	0	NDA				No					
	100%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	100%	0	NDA				No			Unit 2, Tshirege Member, Bandelier Tuff	Qbt2 continued. Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	100%	0	NDA				No					
130	72%	0	NDA				No					
	100%	0	NDA				No					
135	center bit	NA	NA				NA					
		NA	NA				NA					
140	92%	0	NDA				No					
	center bit →	NA	NA				NA					
145	←	NA	NA				NA					
		NA	NA				NA					
150	52%	0.2	NDA				No					
	center bit →	NA	NA				NA					
155	←	NA	NA				NA					
		NA	NA				NA					
160	28%	0	NDA				No					
	center bit →	NA	NA				NA					
165	←	NA	NA				NA					
		NA	NA				NA					
170	100%	2.5	NDA	64366	64379	65290	No					
	100%	0.7	NDA				No					
175	100%	1.7	NDA				No					
	center bit	NA	NA				NA					
180		NA	NA				NA					
	100%	0.4	NDA				No					
185	100%	0	NDA				No					
	100%	0	NDA				No					
190	100%	1.1	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
	100%	0	NDA				No					
	100%	1	NDA				No			Unit 1v, Tshirege Member, Bandelier Tuff	(192.9, 237.5) Qbt1v: Pinkish gray to light gray, nonindurated to slightly indurated, nonwelded, dry, devitrified ash flow with local light pinkish gray clay alteration in pumice lapilli.	
195	100%	0	NDA				No					
	76%	0	NDA	64369	64378	65289	No					
200	100%	1.1	NDA				No					
	100%	1.6	NDA				No					
205	100%	0.1	NDA				No					
	100%	0.3	NDA				No					
210	100%	0.2	NDA				No					
	88%	0.2	NDA				No					
215	100%	0	NDA				No					
	100%	0	NDA				No					
220	76%	0	NDA				No					
	100%	0	NDA				No					
225	100%	1	NDA				No					
	100%	0	NDA				No					
230	100%	0	NDA				No					
	100%	0	NDA				No					
235	100%	0	NDA				No					
	100%	0.1	NDA				No			Colonnade	(237.5, 250.8) Qbt1v(c): Pinkish reddish gray to orangish gray, moderately indurated, non welded, dry devitrified ash flow with chocolate brown pumice lapilli and dacite lithics from 1% to 5%	
240	100%	0	NDA				No					
	100%	0	NDA				No					
245	100%	0	NDA				No					
	100%	0	NDA	64368	64377	65288	No					
250	100%	0	NDA				No			Unit 1g	(250.8, 300.0) Qbt1g: Vapor Phase Notch at upper contact.	
	100%	0	NDA				No					
255	100%	1	NDA				No					
	72%	0.2	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
260	68%	0.3	NDA				No			Unit 1g, Tshirege Member, Bandelier Tuff	Unit 1 g continued. Pinkish reddish gray to orangish gray, moderately indurated in upper few feet, changing to light pinkish gray, nonindurated, dry, vitric, ash flow below. Olive gray phenocryst-rich pumice lapilli show wavy fibrous texture due to well developed glass tube structures.	
	72%	0.5	NDA				No					
265	60%	1.1	NDA			65287 65294	No					
	92%	0.4	NDA	65526	64376		No					
270	76%	1.3	NDA				No					
	84%	2.1	NDA				No					
275	68%	0	NDA				No					
	100%	0	NDA				No					
280	100%	0.3	NDA				No					
	76%	0.3	NDA				No					
285	100%	0.4	NDA				No					
	100%	0	NDA				No					
290	100%	1	NDA				No					
	100%	0	NDA				No					
295	100%	1	NDA				No					
	68%	0.7	NDA	64382	slough	slough	No					TD = 300 ft.
300												

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Borehole Log

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Borehole Location ID: 50-24785 | **Start Date:** 01/23/06 **End Date:** 02/06/06

Coordinates : 1625481.71 E /1768809.87 N | **Ground Surface Elevation:** 7277.76 ft

Attitude: Vertical | **Total Depth (TD):** 275.0 ft

Driller/Co.: Tombert Frank/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Jon Marin/LATA

Estimated depth of adjacent disposal unit(s): 16.1 ft | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: Failing F-10 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	0%	NA	NA				NA			Fill	(0.0, 4.1) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-24785 is located in the western portion of MDA C south of the Chemical Pit.
	100%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(4.1, 117.0) Qbt3: Pinkish gray brown to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	The borehole is open below a capped and secured, 13-ft deep, 10-in diameter steel surface casing.
5	40%	0	NDA				No					
	100%	0	NDA	64412	64402	66783	No					
10	100%	0.2	NDA				No					
	100%	0.4	NDA				No					
15	100%	0.4	NDA				No					
	100%	0	NDA	64413	64403	65300	No					
20	100%	0	NDA				No					
	92%	0	NDA				No					
25	100%	0	NDA				No					
	100%	3.2	NDA				No					
30	100%	0	NDA				No					
	100%	0	NDA				No	@ 32 ft., Minor, clay, 10 degrees to core axis				
35	76%	0	NDA				No					
	100%	0	NDA				No					
40	100%	0	NDA				No					
	100%	0.2	NDA				No					
45	100%	0.2	NDA				No					
	64%	0	NDA				No					
50	benter b	NA	NA				NA					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	enter bente	NA	NA				NA			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Pinkish reddish brown to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	enter	NA	NA				NA					
	100%	0	NDA	64395	64408 64419	65299	No					
60	100%	0.2	NDA				No					
	100%	0	NDA				No					
65	100%	0	NDA				No					
	100%	0.4	NDA				No					
70	100%	0	NDA				No					
	100%	0	NDA				No					
75	100%	0	NDA				No					
	100%	0	NDA				No					
80	84%	0	NDA				No					
	80%	0	NDA				No					
85	40%	0	NDA				No					
	100%	0	NDA				No					
90	60%	0	NDA				No					
	80%	0	NDA				No					
95	100%	0	NDA				No					
	80%	0	NDA				No					
100	60%	0	NDA				No					
	100%	0	NDA				No					
105	100%	0	NDA				No					
	100%	0	NDA				No					
110	48%	0	NDA				No					
	60%	0	NDA				No					
115	56%	0	NDA				No					
	100%	0	NDA	64396	64407	65298	No			Unit 2	(117.0, 190.0) Qbt2: Pale red, strongly indurated, slightly welded, dry, devitrified	
120	100%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	100%	0	NDA				No			Unit 2, Tshirege Member, Bandelier Tuff	ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	88%	0	NDA				No					
130	84%	0	NDA				No					
	92%	0	NDA				No					
135	center bit	NA	NA				NA					
		NA	NA				NA					
140		NA	NA				NA					
		NA	NA				NA					
145		NA	NA				NA					
		NA	NA				NA					
150	56%	0	NDA				No					
	center bit	NA	NA				NA					
155		NA	NA				NA					
		NA	NA				NA					
160		NA	NA				NA					
		NA	NA				NA					
165		NA	NA				NA					
		NA	NA				NA					
170	52%	0	NDA				No					
	center bit	NA	NA				NA					
175		NA	NA				NA					
		NA	NA				NA					
180		NA	NA				NA					
	60%	0.1	NDA				No					
185	center bit	NA	NA				NA					
		NA	NA				NA					
190		NA	NA				NA					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
	100%	0.3	NDA				No			Unit 1v, Tshirege Member, Bandelier Tuff	(190.0, 235.0) Qbt1v: Pinkish gray to light gray, nonindurated to slightly indurated, nonwelded, dry, devitrified ash flow with local light pinkish gray clay alteration in pumice lapilli.	
	100%	0.3	NDA				No					
195	100%	1.7	NDA				No					
	100%	1.3	NDA	64397	64404	65297	No					
200	100%	0	NDA				No					
	100%	0	NDA				No					
205	100%	0	NDA				No					
	100%	0.1	NDA				No					
210	100%	1	NDA				No					
	100%	0.6	NDA				No	@ 214 ft., Minor, FeOx, clay, 25 degrees to core axis, 2 cm wide				
215	100%	1	NDA				No					
	100%	1.4	NDA				No					
220	100%	0	NDA				No					
	100%	0	NDA				No					
225	40%	0	NDA				No					
	40%	1.8	NDA				No					
230	100%	0	NDA				No					
	100%	0	NDA				No	@ 233 ft., Minor, clay filled, 3 mm wide, along core axis				
235	100%	0	NDA				No			Colonnade	(235.0, 248.5) Qbt1v(c): Pinkish reddish gray to orangish gray, moderately indurated, non welded, dry devitrified ash flow with chocolate brown pumice lapilli and dacite lithics from 1 to 5 percent.	
	100%	0	NDA				No					
240	100%	3.1	NDA				No					
	72%	2.4	NDA				No					
245	100%	0	NDA				No					
	100%	6.7	NDA	64398	64405	65296	No			Unit 1g	(248.5, 275.0) Qbt1g: Pinkish reddish gray to orangish gray, moderately indurated, nonwelded, dry, vitric, ash flow.	
250	100%	1.7	NDA				No					
	100%	0	NDA				No					
255	88%	0	NDA			65295 65302	No					
	100%	2.3	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
260	100%	0	NDA				No			Unit 1g, Tshirege Member	Qbt1g continued. Pinkish gray, nonindurated to slightly indurated, nonwelded, dry, vitric, ash flow.	
	60%	0	NDA				No					
265	100%	0	NDA				No					
	100%	0	NDA				No					
270	100%	0	NDA				No					
	100%	0	NDA	64414	64406	slough	No					TD = 275 ft.
275												

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Borehole Location ID: 50-24796 | **Start Date:** 12/20/05 **End Date:** 01/05/06

Coordinates : 1625668.13 E / 1768793.01 N | **Ground Surface Elevation:** 7269.66 ft

Attitude: Vertical | **Total Depth (TD):** 150.0 ft

Driller/Co.: Stanley Johnson/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Jon Marin/LATA

Estimated depth of adjacent disposal unit(s): 18.0 ft | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: CME 750 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	80%	0	NDA				No			Fill	(0.0, 6.0) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-24796 is located in the west-central portion of MDA C southeast of the Chemical Pit and south of Pit 6.
	80%	0	NDA				No					
5	100%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(6.0, 111.0) Qbt3: Pinkish reddish brown to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing.
	100%	1	NDA	64457	64448	65308	No					
10	100%	0	NDA				No					
	100%	0	NDA				No					
15	100%	1.5	NDA				No					
	68%	0	NDA	64458	64447	65307	No					
20	100%	0	NDA				No					
	100%	0	NDA				No					
25	100%	0	NDA				No					
	100%	0.3	NDA				No					
30	80%	0	NDA				No					
	100%	0	NDA				No					
35	100%	0	NDA				No					
	72%	0	NDA	64440	64449	65306	No					
40	100%	0	NDA				No					
	80%	0	NDA				No					
45	80%	0	NDA				No					
	80%	0	NDA				No					
50	80%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	68%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Pinkish reddish brown to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	68%	0	NDA				No					
60	72%	0	NDA				No					
	100%	0	NDA				No					
65	100%	0	NDA				No					
	100%	0.2	NDA				No					
70	100%	0	NDA				No					
	100%	0	NDA				No					
75	100%	0	NDA				No					
	100%	0	NDA				No					
80	100%	0	NDA				No					
	100%	0	NDA				No					
85	100%	0	NDA				No					
	100%	0	NDA				No					
90	100%	0	NDA				No					
	100%	0	NDA				No					
95	100%	0	NDA				No					
	100%	0	NDA				No					
100	100%	0	NDA	64441 64460	64450	65305	No					
	100%	0	NDA				No					
105	100%	0	NDA				No					
	100%	0	NDA				No					
110	100%	0	NDA				No					
	100%	0	NDA				No			Unit 2	(111.0, 150.0) Qbt2: Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine	
115	100%	0	NDA				No					
	100%	0	NDA				No					
120	100%	0	NDA	64442	64451 64464	65304	No					
	100%	0	NDA				No					

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Sample Location ID: 50-24796

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	100%	0	NDA				No			Unit 2, Tshirege Member, Bandelier Tuff	phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	100%	0	NDA				No					
130	100%	0	NDA				No					
	60%	0	NDA				No					
135	40%	0	NDA				No					
	80%	0	NDA				No					
140	100%	0	NDA				No					
	100%	0	NDA				No					
145	88%	0	NDA			65303	No					
	52%	0	NDA				No					
150	76%	0	NDA	64459	64452	slough	No					TD = 150 ft.

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Borehole Location ID: 50-24797 | **Start Date:** 01/06/06 **End Date:** 01/09/06

Coordinates : 1625839.74 E / 1768790.84 N | **Ground Surface Elevation:** 7261.92 ft

Attitude: Vertical | **Total Depth (TD):** 160.0 ft

Driller/Co.: Tombert Frank/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Jon Marin/LATA

Estimated depth of adjacent disposal unit(s): 36.5 ft | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: Failing F-10 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	100%	0.6	NDA				No			Fill	(0.0, 6.4) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-24797 is located west-central portion of MDA C south of Pit 6.
	68%	0	NDA				No	@ 3.5 ft., Minor, 1 cm.				
5	100%	0.3	NDA				No	@ 6.3 ft., Minor, 2 cm.				
	88%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(6.4, 109.0) Qbt3: Pinkish reddish brown to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing.
10	100%	0	NDA				No					
	72%	0	NDA				No					
15	100%	0	NDA				No					
	100%	0	NDA	64506	64496	65315	No					
20	68%	0	NDA				No					
	100%	0	NDA				No					
25	56%	0	NDA				No					
	100%	0	NDA				No					
30	56%	0.3	NDA				No					
	100%	0.9	NDA				No					
35	100%	0.2	NDA				No					
	100%	1.1	NDA	64509	64497	65314	No					
40	20%	0	NDA				No					
	68%	0	NDA				No					
45	76%	0	NDA				No					
	100%	0	NDA				No					
50	98%	1.3	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	76%	1.1	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Pinkish reddish brown to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	80%	0.5	NDA				No					
60	100%	0.6	NDA	64489	66198	65313 65318	No					
	100%	0.3	NDA				No					
65	60%	0.2	NDA				No					
	40%	0.2	NDA				No					
70	100%	0	NDA				No					
	100%	0	NDA				No					
75	100%	0	NDA				No					
	100%	0.1	NDA				No					
80	100%	0.1	NDA				No					
	100%	0.7	NDA				No					
85	100%	0.7	NDA				No					
	100%	0	NDA				No					
90	100%	0	NDA				No					
	100%	0	NDA				No					
95	100%	0	NDA				No					
	100%	0	NDA				No					
100	100%	0	NDA				No					
	100%	0.4	NDA				No					
105	100%	0.4	NDA				No					
	100%	0	NDA				No					
110	100%	0	NDA				No			Unit 2	(109.0, 160.0) Qbt2: Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller	
	100%	0	NDA				No					
115	100%	0	NDA				No					
	100%	0	NDA				No					
120	100%	0	NDA	64490 64492	64498	65312	No					
	100%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	100%	0	NDA				No			Unit 2, Tshirege Member, Bandelier Tuff	blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	100%	0	NDA				No					
130	100%	0	NDA				No					
	40%	0	NDA				No					
135	40%	0	NDA				No					
	center bit	NA	NA				NA					
140		NA	NA				NA					
	60%	0	NDA				No					
145	center bit	NA	NA				NA					
		NA	NA				NA					
150		NA	NA				NA					
		NA	NA				NA					
155		NA	NA				NA					
		NA	NA				NA					
160	100%	1.8	NDA	64508	64500	65311	No					TD = 160 ft.

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Borehole Location ID: 50-24799 | **Start Date:** 04/21/06 **End Date:** 01/17/06

Coordinates : 1625948.11 E / 1768772.76 N | **Ground Surface Elevation:** 7256.32 ft

Attitude: Vertical | **Total Depth (TD):** 160.0 ft

Driller/Co.: Stanley Johnson/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Tracy McFarland/LATA

Estimated depth of adjacent disposal unit(s): 32.2 ft | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: CME 750 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening (αβγ)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	100%	0	NDA				No			Fill	(0.0, 5.4) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-24799 is located in the north-central portion of MDA C between Pits 5 and 6.
	100%	0	NDA				No					
5	100%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(5.4, 109.2) Qbt3: Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing.
	100%	0	NDA				No					
10	100%	0	NDA				No	@ 11 ft., Minor, 80 degrees to core axis				
	100%	0	NDA	64516	66197	NA	No					
15	100%	0	NDA	64517	64521	NA	No	@ 16 ft., Major, clay > 80% of 2.5-ft core run				@ 16 ft., sampled fracture.
	100%	0	NDA	64531	64522	65323	No					
20	92%	0	NDA				No	@ 21 ft., Minor, along core				
	100%	0	NDA				No					
25	100%	0	NDA				No	@ 26 ft., Minor, along core				
	100%	0	NDA				No					
30	100%	0	NDA	64532	64523	65322	No	@ 30 ft., Minor, along core				
	100%	0	NDA	64518	64538	NA	No	@ 34 ft., Major, clay > 80% of core				
35	72%	0	NDA				No					
	100%	0	NDA	64519	64524	NA	No					
40	92%	0	NDA				No					
	100%	0	NDA				No					
45	100%	0	NDA				No					
	100%	0	NDA				No					
50	100%	0	NDA				No	@ 51 ft., Minor				

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Geotechnical Sample #	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	100%	0	NDA				No	@ 53 ft., Minor		Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	56%	0	NDA				No					
60	100%	0	NDA				No					
	100%	0	NDA				No					
65	93%	0	NDA				No					
	84%	0	NDA				No					
70	64%	0	NDA				No					
	84%	0	NDA				No					
75	72%	0	NDA				No					
	72%	0	NDA				No					
80	80%	0	NDA				No					
	100%	0	NDA				No					
85	76%	0	NDA				No					
	100%	0	NDA				No					
90	72%	0	NDA				No					
	100%	0	NDA				No					
95	96%	0	NDA				No					
	100%	0	NDA				No					
100	84%	0	NDA	64514	64525	65321 65326	No					
	100%	0	NDA				No					
105	100%	0	NDA				No					
	100%	0	NDA				No					
110	100%	0	NDA				No			Unit 2	(109.2, 160.0) Qbt2: Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller	
	100%	0	NDA				No					
115	100%	0	NDA				No					
	100%	0	NDA				No					
120	100%	0	NDA	64515	64526	65320	No					
	100%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Geotechnical Sample #	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	44%	0	NDA				No			Unit 2, Tshirege Member, Bandelier Tuff	blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	center bit	NA	NA				NA					
130		NA	NA				NA					
		NA	NA				NA					
135		NA	NA				NA					
		NA	NA				NA					
140		NA	NA				NA					
		NA	NA				NA					
145		NA	NA				NA					
		NA	NA				NA					
150	40%	0	NDA				No					
	center bit	NA	NA				NA					
155		NA	NA				NA					
		NA	NA				NA	@ 159 ft., Minor, some clay				
160	100%	0	NDA	64533	64527	65319	No					TD = 160 ft.

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Borehole Location ID: 50-24801 | **Start Date:** 01/31/06 **End Date:** 02/06/06

Coordinates : 1625941.85 E / 1768711.17 N | **Ground Surface Elevation:** 7259.24 ft

Attitude: Vertical | **Total Depth (TD):** 150.0 ft

Driller/Co.: Stanley Johnson/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Tracy McFarland/LATA

Estimated depth of adjacent disposal unit(s): 31.1 ft | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: CME 750 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	100%	3.6	NDA				No			Fill	(0.0, 6.1) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-24801 is located in the central portion of MDA C south west of the south-western corner of Pit 5 and north of a shaft row.
	100%	0	NDA				No					
5	100%	0.2	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(6.1, 109.5) Qbt3: Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing.
	100%	0	NDA				No					
10	100%	0.1	NDA				No	@ 9.6 ft., Minor, clay filled				
	100%	0	NDA				No					
15	100%	0	NDA				No					
	100%	0	NDA	64863 64866	64853	65429	No					
20	100%	1.7	NDA				No					
	92%	2.2	NDA				No					
25	96%	0.4	NDA				No	@ 25 ft., Minor				
	100%	0.5	NDA				No	@ 28 ft., Minor				
30	100%	0	NDA				No					
	100%	0	NDA	64864	64870	65428	No	@ 33.4 ft., Minor				
35	100%	0	NDA				No					
	100%	1.5	NDA				No	@ 37 ft., Minor, along core axis				
40	100%	1.5	NDA				No					
	100%	1.5	NDA				No					
45	72%	0.7	NDA				No					
	100%	1.1	NDA				No					
50	72%	0.3	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	60%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	100%	0.8	NDA				No					
60	100%	0.5	NDA				No					
	100%	0.3	NDA				No					
65	100%	0.5	NDA				No					
	100%	1.2	NDA				No					
70	92%	1.1	NDA				No					
	100%	0.3	NDA				No					
75	60%	0.2	NDA				No					
	76%	1	NDA				No					
80	100%	0.1	NDA	64846	64856	65427	No	@ 79 ft., Minor				
	100%	0.3	NDA				No					
85	100%	0.6	NDA				No					
	76%	0.3	NDA				No					
90	80%	0.4	NDA				No					
	76%	0.1	NDA				No					
95	100%	0.5	NDA				No					
	80%	0.3	NDA				No					
100	100%	0	NDA				No					
	100%	0	NDA				No					
105	100%	0	NDA				No					
	100%	0.4	NDA				No					
110	100%	0	NDA				No					
	100%	0	NDA				No			Unit 2	(109.5, 150.0) Qbt2: Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller	
115	100%	0.2	NDA				No					
	100%	0	NDA				No					
120	100%	0	NDA	64847	64855	65426 65432	No					
	100%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	100%	0	NDA				No			Unit 2, Tshirege Member, Bandelier Tuff	blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	48%	0	NDA				No					
130	28%	0	NDA				No					
	center bit	NA	NA				NA					
135		NA	NA				NA					
		NA	NA				NA					
140	72%	0	NDA				No					
	center bit	NA	NA				NA					
145		NA	NA				NA					
		NA	NA				NA					
150	100%	0	NDA	64865	64854	65425	No					TD = 150 ft.

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Borehole Location ID: 50-24802 | **Start Date:** 03/01/06 **End Date:** 03/02/06

Coordinates : 1625929.44 E / 1768633.24 N | **Ground Surface Elevation:** 7261.51 ft

Attitude: Vertical | **Total Depth (TD):** 159.1 ft

Driller/Co.: Stanley Johnson/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Tracy McFarland/LATA

Estimated depth of adjacent disposal unit(s): 33.8 ft | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: CME 750 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	72%	0	NDA				No			Fill	(0.0, 8.8) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-24802 is located in the central portion of MDA C east of a row of shafts and Pit 4.
	100%	0.2	NDA				No	@ 4 ft., Minor, clay filled				
5	80%	0.3	NDA				No					
	100%	0.2	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(8.8, 113.1) Qbt3: Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing.
10	100%	0.2	NDA				No					
	100%	0.3	NDA	64888 64891	64878	65437	No					
15	88%	0	NDA				No					
	92%	0	NDA				No					
20	100%	0	NDA				No					
	52%	0	NDA				No					
25	100%	0	NDA				No					
	100%	0	NDA				No	@ 27 ft., Minor, clay filled, 80 degrees to core				
30	100%	0.2	NDA				No					
	88%	0	NDA				No					
35	100%	0.1	NDA				No					
	CB	NA	NA				NA					
40	100%	0	NDA	64889	64879	65436	No	@ 40 ft., Minor, high angle to core				
	100%	0	NDA				No					
45	100%	0.2	NDA				No					
	100%	0	NDA				No					
50	92%	0	NDA				No	@ 49 ft., Minor, high angle to core				

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	88%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	100%	0	NDA				No					
60	100%	0	NDA				No					
	100%	0	NDA				No					
65	56%	0	NDA				No					
	100%	0	NDA				No					
70	88%	0	NDA				No					
	100%	0	NDA				No					
75	100%	0	NDA				No					
	100%	0	NDA				No	@ 75 ft., Minor				
80	100%	0	NDA				No	@ 79 ft Minor, clay filled				
	100%	0	NDA				No					
85	76%	0.1	NDA				No					
	76%	0	NDA				No					
90	44%	0.1	NDA				No					
	64%	0	NDA				No					
95	64%	0	NDA				No					
	64%	0	NDA				No					
100	72%	0	NDA	64871	64880	65435	No					
	60%	0	NDA				No					
105	52%	0	NDA				No					
	68%	0	NDA				No					
110	100%	0	NDA				No					
	88%	0	NDA				No					
115	100%	0	NDA				No			Unit 2	(113.1, 159.1) Qbt2: Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and	
	100%	0	NDA				No					
120	100%	0.2	NDA				No					
	100%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	100%	0	NDA	64872	64881	65434	No			Unit 2, Tshirege Member, Bandelier Tuff	10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	100%	0	NDA				No					
130	20%	0	NDA				No					
	center bit	NA	NA				NA					
135		NA	NA				NA					
		NA	NA				NA					
140		NA	NA				NA					
		NA	NA				NA					
145		NA	NA				NA					
		NA	NA				NA					
150	0%	NA	NA				NA					
	center bit	NA	NA				NA					
155		NA	NA				NA					
		NA	NA			65433	NA					
	00%	0	NDA	64890	64882	65440	No					TD = 159.1 ft.

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Borehole Location ID: 50-24803 | **Start Date:** 03/03/06 **End Date:** 03/06/06

Coordinates : 1625914.6 E /1768576.24 N | **Ground Surface Elevation:** 7263.34 ft

Attitude: Vertical | **Total Depth (TD):** 154.1 ft

Driller/Co.: Stanley Johnson/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Tracy McFarland/LATA

Estimated depth of adjacent disposal unit(s): 34.8 ft | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: CME 750 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	76%	0	NDA				No			Fill	(0.0, 9.8) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-24803 is located in the south-central portion of MDA C north of a shaft row, east of another shaft row, and east of Pit 2. The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing.
	76%	0	NDA				No					
5	68%	0	NDA				No					
	72%	0	NDA				No					
10	100%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(9.8, 110.7) Qbt3: Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	100%	0	NDA				No					
15	100%	0	NDA	64913	64904	65445	No					
	100%	0	NDA				No					
20	100%	0	NDA				No					
	80%	0	NDA				No	@ 24 ft., Minor, clay filled, high angle to core				
25	68%	0	NDA				No					
	100%	0	NDA				No					
30	100%	0	NDA				No					
	100%	0	NDA				No	@ 32 ft., Minor clay filled				
35	72%	0.2	NDA	64914	64903	65444	No					
	100%	0	NDA				No					
40	92%	0	NDA				No	@ 40.2 ft, Minor				
	84%	0	NDA				No	@ 43.4 ft, Minor				
45	100%	0	NDA				No					
	100%	0	NDA				No					
50	100%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	100%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	100%	0	NDA				No					
60	100%	0	NDA				No					
	100%	0	NDA				No					
65	100%	0	NDA				No	@ 63 ft., Minor clay filled, high angle to core				
	100%	0	NDA				No					
70	100%	0	NDA				No					
	100%	0.2	NDA				No					
75	68%	0	NDA				No					
	56%	0	NDA				No					
80	52%	0	NDA				No					
	60%	0	NDA				No					
85	76%	0	NDA				No					
	76%	0	NDA				No					
90	100%	0	NDA				No					
	64%	0	NDA				No					
95	60%	0	NDA				No					
	64%	0	NDA				No					
100	52%	0	NDA	64896	64905	65443	No					
	60%	0	NDA				No					
105	72%	0	NDA				No					
	56%	0	NDA				No					
110	68%	0	NDA				No					
	100%	0	NDA				No			Unit 2	(110.7, 154.1) Qbt2: Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0	
115	100%	0	NDA				No	@ 113 ft., Minor, clay filled				
	64%	0	NDA				No					
120	100%	0	NDA				No					
	100%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	100%	0	NDA	64897	64906	65442	No			Unit 2, Tshirege Member, Bandelier Tuff	mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	100%	0	NDA				No					
130	100%	0	NDA				No					
	88%	0	NDA				No					
135	100%	0.1	NDA				No					
	center bit	NA	NA				NA					
140		NA	NA				NA					
		NA	NA				NA					
145		NA	NA				NA					
		NA	NA				NA					
150		NA	NA				NA					
	100%	0	NDA	64915	64907		No					
		0	NDA	64916	64920	65441	No					TD = 154.1 ft.

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Borehole Location ID: 50-24804 | **Start Date:** 04/26/06 **End Date:** 04/28/06

Coordinates : 1625886.31 E /1768502.66 N | **Ground Surface Elevation:** 7264.97 ft

Attitude: Vertical | **Total Depth (TD):** 150.0 ft

Driller/Co.: Stanley Johnson/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Tracy McFarland/LATA

Estimated depth of adjacent disposal unit(s): 31.8 ft | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: CME 750 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	100%	0	NDA				No			Fill	(0.0, 6.8) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-24804 is located in an asphalt approach just outside the south-central perimeter fence and gate of MDA C, east of two shaft rows and Pit 1.
	100%	0	NDA				No					
5	100%	0	NDA				No					
	56%	0	NDA	64965	NA	NA	No			Unit 3, Tshirege Member, Bandelier Tuff	(6.8, 120.0) Qbt3: Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing positioned inside a flushmount steel cellar.
10	100%	0	NDA	64966	64670	65454	No	@ 10 ft., Major, clay > 80% of 2.5-ft core run				@ 10 ft., sampled fracture.
	68%	0	NDA				No					
15	84%	0	NDA	64980	64971	65453	No					
	100%	0.3	NDA				No					
20	92%	0	NDA				No					
	52%	0	NDA				No					
25	80%	0	NDA				No	@ 26 ft., Minor, clay filled				
	60%	0	NDA				No					
30	60%	0	NDA				No					
	68%	0	NDA	64981	64972	65452 65456	No					
35	88%	0	NDA				No					
	56%	0	NDA				No					
40	72%	0	NDA				No					
	64%	0	NDA				No					
45	52%	0	NDA				No					
	60%	0	NDA				No					
50	64%	0	NDA				No					
	%											

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	72%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	76%	0	NDA				No					
60	56%	0	NDA				No					
	76%	0	NDA				No					
65	68%	0	NDA				No					
	64%	0	NDA				No					
70	60%	0	NDA				No					
	72%	0	NDA				No					
75	72%	0	NDA				No					
	80%	0	NDA				No					
80	68%	0	NDA				No					
	60%	0	NDA				No					
85	64%	0	NDA				No					
	64%	0	NDA				No					
90	60%	0	NDA				No					
	68%	0	NDA				No					
95	72%	0	NDA				No					
	64%	0	NDA				No					
100	68%	0	NDA	64963	64973	65451	No					
	72%	0	NDA				No					
105	64%	0	NDA				No					
	60%	0	NDA				No					
110	60%	0	NDA				No					
	68%	0	NDA				No					
115	64%	0.1	NDA				No					
	72%	0	NDA				No					
120	60%	0	NDA				No					
	72%	0	NDA				No				(120.0, 150.0)	

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	64%	0	NDA	64964	64974	65450	No			Unit 2, Tshirege Member, Bandelier Tuff	Qbt2: Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	72%	0	NDA				No					
130	60%	0	NDA				No					
	72%	0	NDA				No					
135	center bit	NA	NA				NA					
		NA	NA				NA					
140		NA	NA				NA					
		NA	NA				NA					
145		NA	NA				NA					
		NA	NA				NA					
150	100%	0	NDA	64982	64975	65449	No					TD = 150 ft.

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Borehole Location ID: 50-24810 | **Start Date:** 04/13/06 **End Date:** 04/17/06

Coordinates : 1625903.49 E /1768476.07 N | **Ground Surface Elevation:** 7265.21 ft

Attitude: Vertical | **Total Depth (TD):** 151.7 ft

Driller/Co.: Stanley Johnson/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Tracy McFarland/LATA

Estimated depth of adjacent disposal unit(s): 34.0 ft | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: CME 750 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	68%	0	NDA				No			Fill	(0.0, 9.0) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-24810 is located in the south central portion of MDA C south of two shaft rows, east of Pit 1 and the Strontium-90 shaft. The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing.
	100%	0	NDA				No					
5	64%	0	NDA				No					
	100%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(9.0, 113.8) Qbt3: Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
10	72%	0	NDA				No					
	84%	0.5	NDA				No					
15	84%	0.7	NDA				No					
	68%	0.6	NDA	65005	64999	65461	No					
20	72%	0	NDA				No					
	76%	0	NDA				No					
25	88%	0	NDA				No					
	72%	0	NDA				No					
30	76%	0	NDA				No					
	92%	0	NDA				No					
35	84%	0	NDA	65006	64998	65460	No					
	76%	0	NDA				No					
40	100%	0	NDA				No					
	100%	0	NDA				No					
45	72%	0	NDA				No					
	68%	0	NDA				No					
50	64%	0	NDA				No					
	%											

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	80%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	68%	0	NDA				No					
60	100%	0	NDA				No					
	80%	0	NDA				No					
65	76%	0	NDA				No					
	96%	0	NDA				No					
70	84%	0	NDA				No					
	60%	0	NDA				No					
75	80%	0	NDA				No					
	76%	0	NDA				No					
80	52%	0	NDA				No					
	48%	0	NDA				No					
85	100%	0	NDA				No					
	72%	0	NDA				No					
90	60%	0	NDA				No					
	68%	0	NDA				No					
95	72%	0	NDA				No					
	68%	0	NDA				No					
100	64%	0	NDA	64988	64997 65012	65459	No					
	68%	0	NDA				No					
105	52%	0	NDA				No					
	76%	0	NDA				No					
110	52%	0	NDA				No					
	72%	0	NDA				No					
115	56%	0	NDA				No			Unit 2	(113.8, 151.7) Qbt2: Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts	
	72%	0	NDA				No					
120	72%	0	NDA				No					
	100%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	60%	0	NDA	64989	64996	65458	No			Unit 2, Tshirege Member, Bandelier Tuff	from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	68%	0	NDA				No					
130	68%	0	NDA				No					
	64%	0	NDA				No					
135	84%	0	NDA				No					
	center bit	NA	NA				NA					
140		NA	NA				NA					
		NA	NA				NA					
145		NA	NA				NA					
		NA	NA				NA					
150	88%	0	NDA	65007			No					
	68%	0	NDA	65008	64995	65457	No					TD = 151.7 ft.

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Borehole Location ID: 50-24811 | **Start Date:** 04/07/06 **End Date:** 04/12/06

Coordinates : 1626173.77 E /1768421.45 N | **Ground Surface Elevation:** 7255.68 ft

Attitude: Vertical | **Total Depth (TD):** 150.6 ft

Driller/Co.: Stanley Johnson/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Tracy McFarland/LATA

Estimated depth of adjacent disposal unit(s): 37.2 ft | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: CME 750 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	40%	0	NDA				No			Fill	(0.0, 12.2) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-24811 is located just inside the south-central perimeter fence of MDA C south of Pit 1. The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing.
	56%	0	NDA				No					
5	88%	0	NDA				No					
	92%	0	NDA				No					
10	100%	0	NDA				No					
	100%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(12.2, 114.1) Qbt3: Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
15	100%	0	NDA				No					
	100%	0	NDA	65075	65069	65469 65472	No					
20	100%	0	NDA				No					
	100%	0	NDA				No					
25	60%	0	NDA				No	@ 25 ft., Minor, clay filled				
	100%	0	NDA				No					
30	100%	0	NDA				No	@ 31 ft., Minor, clay filled				
	100%	0	NDA				No					
35	60%	0	NDA	65076	65068	65468	No					
	100%	0	NDA				No					
40	100%	0	NDA				No	@ 41 ft. and 42.5 ft, Minor, clay filled				
	100%	0	NDA				No					
45	100%	0	NDA				No					
	0%	NA	NA				NA					
50	88%	0	NDA				No	@ 52 ft., Minor, some clay				

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	100%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	100%	0	NDA				No					
	76%	0	NDA				No					
60	100%	0	NDA				No					
	100%	0.5	NDA				No					
65	100%	0.2	NDA				No					
	76%	0.3	NDA				No	@ 68 ft., Minor some clay				
70	60%	0	NDA				No					
	60%	0	NDA				No					
75	60%	0	NDA				No					
	84%	0	NDA				No					
80	64%	0	NDA				No					
	64%	0	NDA				No					
85	60%	0	NDA				No					
	64%	0	NDA				No					
90	44%	0	NDA				No					
	76%	0	NDA				No					
95	60%	0	NDA				No					
	48%	0	NDA	65058	65067	65467	No					
100	56%	0	NDA				No					
	52%	0	NDA				No					
105	68%	6.2	NDA				No					
	48%	5.6	NDA				No					
110	56%	3.7	NDA				No					
	76%	7.9	NDA				No					
115	92%	5.6	NDA				No			Unit 2	(114.1, 150.6) Qbt2: Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts	
	92%	6.4	NDA				No					
120	20%	6.3	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	100%	6.3	NDA	65059	65066	65466	No			Unit 2, Tshirege Member, Bandelier Tuff	from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	100%	7.4	NDA				No					
130	100%	7.1	NDA				No					
	84%	8	NDA				No					
135	center bit	NA	NA				NA					
		NA	NA				NA					
140		NA	NA				NA					
		NA	NA				NA					
145		NA	NA				NA					
		NA	NA				NA					
150	100%	0	NDA	65077	65065	65465	No					TD = 150.6 ft.

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Borehole Log

Project: MDA C Investigation Work Plan | **TA-50 SWMU: 50-009** | **Page 1 of 3**

Borehole Location ID: 50-24812 | **Start Date:** 04/03/06 **End Date:** 04/05/06

Coordinates : 1626332.11 E /1768396.57 N | **Ground Surface Elevation:** 7249.94 ft

Attitude: Vertical | **Total Depth (TD):** 150.0 ft

Driller/Co.: Stanley Johnson/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Tracy McFarland/LATA

Estimated depth of adjacent disposal unit(s): 31.4 ft | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: CME 750 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	48%	0	RAD				No			Fill	(0.0, 6.4) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-24812 is located just inside the southern perimeter fence of MDA C south of Pit 1.
	76%	0	NDA				No					
5	88%	0	NDA				No					
	100%	0	NDA	65100	65094	65477	No			Unit 3, Tshirege Member, Bandelier Tuff	(6.4, 110.9) Qbt3: Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing.
10	84%	0	NDA				No					
	80%	0	NDA				No					
15	84%	0	NDA				No	@ 16.5 ft., Minor, clay filled				
	80%	0	NDA				No					
20	76%	0	NDA				No					
	84%	0	NDA				No					
25	68%	0	NDA				No					
	72%	0	NDA				No					
30	68%	0	NDA				No					
	76%	0	NDA	65101	65093	65476	No					
35	72%	0	NDA				No					
	64%	0	NDA				No					
40	44%	0	NDA				No					
	76%	0	NDA				No					
45	68%	0	NDA				No					
	80%	0	NDA				No					
50	72%	0	NDA				No					
	%											

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	68%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	80%	0	NDA				No					
60	76%	0	NDA				No					
	68%	0	NDA				No					
65	64%	0	NDA				No					
	68%	0	NDA				No	@ 66 ft., Minor, clay filled				
70	60%	0	NDA				No					
	68%	0	NDA				No					
75	80%	0	NDA				No					
	64%	0	NDA				No					
80	100%	0	NDA				No					
	76%	0	NDA				No					
85	60%	0	NDA				No					
	68%	0	NDA				No					
90	72%	0	NDA				No					
	64%	0	NDA				No					
95	100%	0	NDA				No					
	84%	0	NDA				No					
100	60%	0	NDA	65083	65092	65474	No					
	68%	0	NDA				No					
105	84%	0	NDA				No					
	64%	0	NDA				No					
110	68%	0	NDA				No					
	88%	0	NDA				No			Unit 2	(110.9, 150.0) Qbt2: Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0	
115	60%	0	NDA				No					
	68%	0	NDA				No					
120	80%	0.2	NDA				No					
	64%	1	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	52%	1.2	NDA	65084	65091	65475	No			Unit 2, Tshirege Member, Bandelier Tuff	mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	60%	1.3	NDA				No					
130	40%	1.6	NDA				No					
	64%	0.4	NDA				No					
135	68%	0.2	NDA				No					
	64%	0	NDA				No					
140	68%	0	NDA				No					
	center bit	NA	NDA				NA					
145		NA	NA				NA					
	100%	5.6	NA				No	@ 148 ft., Minor, clay filled				
150	100%	6.2	NDA	65102 65103	65090 65107	65473	No					TD = 150 ft.

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Borehole Location ID: 50-24813 | **Start Date:** 03/29/06 **End Date:** 03/30/06

Coordinates : 1626470.19 E /1768374.83 N | **Ground Surface Elevation:** 7245.68 ft

Attitude: Vertical | **Total Depth (TD):** 150.0 ft

Driller/Co.: Stanley Johnson/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Tracy McFarland/LATA

Estimated depth of adjacent disposal unit(s): 29.1 ft | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: CME 750 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	48%	0	NDA				No			Fill	(0.0, 4.1) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-24813 is located just inside the southern perimeter fence of Pit 6 south of the eastern portion of Pit 1.
	100%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(4.1, 119.2) Qbt3: Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing.
5	100%	0	NDA				No					
	72%	0	NDA				No					
10	92%	0	NDA				No					
	92%	0	NDA				No					
15	100%	0	NDA				No					
	100%	0	NDA	65132	65126	65485	No					
20	92%	0	NDA				No					
	84%	0	NDA				No					
25	92%	0	NDA				No					
	92%	0	NDA				No					
30	76%	0	NDA	65133	65125	65484	No					
	88%	0	NDA				No					
35	72%	0	NDA				No					
	84%	0	NDA				No					
40	88%	0	NDA				No					
	76%	0	NDA				No					
45	92%	0	NDA				No					
	84%	0	NDA				No					
50	100%	0	NDA				No					
	%											

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	64%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	92%	0	NDA				No					
60	100%	0	NDA				No					
	100%	0	NDA				No					
65	100%	0	NDA				No					
	96%	0	NDA				No					
70	100%	0	NDA				No					
	88%	0	NDA				No					
75	84%	0	NDA				No					
	88%	0	NDA				No					
80	84%	0	NDA				No					
	68%	0	NDA				No					
85	88%	0	NDA				No					
	84%	0	NDA				No					
90	80%	0	NDA				No					
	84%	0	NDA				No					
95	80%	0	NDA				No					
	80%	0	NDA				No					
100	88%	0	NDA	65115	65124	65483 65488	No					
	76%	0	NDA				No					
105	84%	0	NDA				No					
	92%	0	NDA				No					
110	84%	0	NDA				No					
	84%	0	NDA				No					
115	88%	0	NDA				No					
	80%	0	NDA				No					
120	100%	0	NDA				No					
	100%	0	NDA				No				(119.2, 150.0) Qbt2:	

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	100%	0	NDA	65116	65123	65482	No			Unit 2, Tshirege Member, Bandelier Tuff	Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	100%	0	NDA				No					
	68%	0	NDA				No					
130	center bit	NA	NA				NA					
		NA	NA				NA					
135		NA	NA				NA					
		NA	NA				NA					
140		NA	NA				NA					
		NA	NA				NA					
145		NA	NA				NA					
	80%	0	NDA	65134	65122	65481	No					TD = 150 ft.
150												

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Borehole Location ID: 50-24814 | **Start Date:** 03/24/06 **End Date:** 03/27/06

Coordinates : 1626588.33 E /1768384.39 N | **Ground Surface Elevation:** 7241.63 ft

Attitude: Vertical | **Total Depth (TD):** 150.0 ft

Driller/Co.: Stanley Johnson/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Tracy McFarland/LATA

Estimated depth of adjacent disposal unit(s): 29.8 ft | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: CME 750 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	80%	0	NDA				No			Fill	(0.0, 4.8) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-24814 is located in the southeastern corner of MDA C east of Pit 1.
	100%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(4.8, 106.6) Qbt3: Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing.
5	92%	0	NDA				No					
	64%	0	NDA	65157	65151	65493 65496	No	@ 11 ft., Minor, FeOx, high angle to core				
10	100%	0	NDA				No					
	100%	0	NDA				No					
15	100%	0	NDA				No	@ 15 ft., Minor, FeOx, high angle to core				
	100%	0	NDA				No					
20	60%	0	NDA				No					
	100%	0	NDA				No					
25	100%	0	NDA				No					
	84%	0	NDA	65158	65150	65492	No	@ 28 ft., Minor, FeOx, high angle to core				
30	64%	0.1	NDA				No					
	100%	0	NDA				No	@ 32 ft., Minor, FeOx, high angle to core				
35	100%	0	NDA				No					
	92%	0.2	NDA				No					
40	72%	0.1	NDA				No					
	84%	0	NDA				No					
45	88%	0.1	NDA				No					
	100%	0	NDA				No					
50	84%	0	NDA				No					
	%											

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	56%	0.6	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	76%	0	NDA				No	@ 55.4 ft., Minor, clay filled				
60	84%	0.1	NDA				No					
	84%	0	NDA				No					
65	76%	0	NDA				No					
	100%	0	NDA				No					
70	76%	0	NDA				No					
	84%	0	NDA				No					
75	80%	0	NDA				No					
	100%	0	NDA				No					
80	84%	0	NDA				No					
	76%	0	NDA				No					
85	68%	0	NDA				No					
	88%	0	NDA				No					
90	88%	0.7	NDA				No					
	76%	0.3	NDA				No					
95	72%	0	NDA				No					
	84%	0	NDA				No					
100	100%	0	NDA	65140 65160	65149	65491	No					
	56%	0	NDA				No					
105	80%	0	NDA				No					
	84%	0	NDA				No					
110	72%	0	NDA				No			Unit 2	(106.6, 150.0) Qbt2: Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger	
	88%	0	NDA				No					
115	72%	0	NDA				No					
	80%	0	NDA				No					
120	76%	0	NDA				No					
	100%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	100%	0	NDA	65141	65148 65164	65490	No			Unit 2, Tshirege Member, Bandelier Tuff	drilling typically required use of pull down force or center bit.	
	84%	0	NDA				No					
130	72%	0	NDA				No	@ 128.4 ft., Minor, clay filled				
	60%	0	NDA				No					
135	20%	0	NDA				No					
	center bit	NA	NA				NA					
140		NA	NA				NA					
		NA	NA				NA					
145		NA	NA				NA					
		NA	NA				NA					
150	84%	0	NDA	65159	65147	65489	No					TD = 150 ft.

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Borehole Location ID: 50-24815 | **Start Date:** 03/21/06 **End Date:** 03/22/06

Coordinates : 1626603.26 E /1768484.21 N | **Ground Surface Elevation:** 7241.66 ft

Attitude: Vertical | **Total Depth (TD):** 150.0 ft

Driller/Co.: Stanley Johnson/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Tracy McFarland/LATA

Estimated depth of adjacent disposal unit(s): 37.2 ft | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: CME 750 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	24%	0	NDA				No			Fill	(0.0, 10.0) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-24815 is located in the eastern portion of MDA C east of Pit 2.
	72%	0	NDA				No					
5	80%	0	NDA				No					
	100%	0	NDA				No					
10	100%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(10.0, 118.3) Qbt3: Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing.
	100%	0	NDA				No					
15	100%	0	NDA				No	@ 14.9 ft., Minor, clay filled				
	100%	0	NDA	65189			No	@ 17.3 ft., Minor, clay filled				
20	76%	0	NDA				No	@ 19.4 ft., Minor, clay filled				
	100%	0	NDA				No	@ 22 ft., Minor, clay filled				
25	88%	0	NDA				No					
	68%	0	NDA		65183	65501	No					
30	88%	0	NDA				No					
	92%	0	NDA				No					
35	80%	0	NDA				No					
	88%	0	NDA				No					
40	100%	0	NDA	65190 65192	65182	65500	No					
	96%	0	NDA				No					
45	100%	0	NDA				No					
	100%	0	NDA				No					
50	84%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	80%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	88%	0	NDA				No					
60	72%	0	NDA				No					
	100%	0	NDA				No					
65	88%	0	NDA				No					
	84%	0	NDA				No					
70	100%	0	NDA				No					
	100%	0	NDA				No					
75	84%	0	NDA				No					
	100%	0	NDA				No					
80	100%	0	NDA				No					
	72%	0	NDA				No					
85	60%	0	NDA				No					
	52%	0	NDA				No					
90	72%	0	NDA				No					
	80%	0	NDA				No					
95	88%	0	NDA				No					
	72%	0	NDA				No					
100	100%	0	NDA	65172	65181	65499	No					
	92%	0	NDA				No					
105	76%	0	NDA				No					
	92%	0	NDA				No					
110	88%	0	NDA				No					
	72%	0	NDA				No					
115	68%	0	NDA				No					
	80%	0	NDA				No					
120	60%	0	NDA				No				(118.3, 150.0) Qbt2: Pale red, strongly indurated, slightly	
	80%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	100%	0	NDA	65173	65180	65498	No			Unit 2, Tshirege Member, Bandelier Tuff	welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	60%	0	NDA			65504	No					
130	center bit	NA	NA				NA					
		NA	NA				NA					
135		NA	NA				NA					
		NA	NA				NA					
140		NA	NA				NA					
		NA	NA				NA					
145		NA	NA				NA					
		NA	NA				NA					
150	88%	0	NDA	65191	65179	65497	No					TD = 150 ft.

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Borehole Location ID: 50-24816 | **Start Date:** 01/19/06 **End Date:** 01/27/06

Coordinates : 1625456.06 E /1768949.3 N | **Ground Surface Elevation:** 7278.91 ft

Attitude: Vertical | **Total Depth (TD):** 225.0 ft

Driller/Co.: Stanley Johnson/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Tracy McFarland/LATA

Estimated depth of adjacent disposal unit(s): 31.0 ft | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: CME 750 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	72%	0	NDA				No			Fill	(0.0, 22.5) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-24816 is located in the northwestern corner of MDA C west of Pit 6. The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing.
	40%	1.2	NDA				No					
5	24%	0	NDA				No					
	80%	0	NDA				No					
10	80%	0	NDA				No					
	0%	NA	NA				NA					
15	0%	NA	NA				NA					
	20%	0.6	NDA				No					
20	0%	NA	NA				NA					
	100%	0	NDA	65214	65204	65510	No			Unit 3, Tshirege Member, Bandelier Tuff	(22.5, 111.4) Qbt3: Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
25	64%	0	NDA				No					
	100%	0	NDA				No					
30	92%	0	NDA				No	@ 29.7 ft., Minor, 1 cm, FeOx, 60 degrees to core				
	60%	0	NDA	65215	65205	65509	No					
35	72%	0	NDA				No					
	100%	0	NDA				No	@ 38 ft., Minor, some clay				
40	100%	0	NDA				No					
	36%	0	NDA				No					
45	16%	0	NDA				No					
	100%	0	NDA				No					
50	72%	0	NDA				No					
	%											

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	100%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	100%	0	NDA				No					
60	100%	0	NDA				No					
	80%	0	NDA				No					
65	72%	0	NDA	65197	65209	65508	No	@ 64, Minor, clay filled				
	100%	0	NDA				No					
70	100%	0	NDA				No					
	100%	0	NDA				No					
75	100%	0.2	NDA				No	@ 72 ft and 75 ft, Minor, clay filled				
	84%	1	NDA				No					
80	100%	0.9	NDA				No					
	100%	0	NDA				No					
85	100%	0	NDA				No					
	100%	0	NDA				No	@ 86.5 ft., Minor, clay filled high angle to core				
90	100%	0	NDA				No					
	100%	0	NDA				No					
95	100%	0	NDA				No					
	100%	0	NDA				No					
100	100%	0	NDA				No					
	92%	0	NDA				No					
105	92%	0	NDA				No					
	100%	0	NDA				No					
110	76%	0	NDA				No					
	100%	0	NDA				No			Unit 2	(111.4, 173.5) Qbt2: Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine	
115	100%	0	NDA				No					
	100%	0.3	NDA				No					
120	100%	0	NDA	65198	65206	65507	No					
	100%	0.8	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	100%	0.7	NDA				No			Unit 2, Tshirege Member, Bandelier Tuff	phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	100%	0.6	NDA				No					
130	88%	0.6	NDA				No					
	80%	0.7	NDA				No					
135	12%	0.4	NDA				No					
	center bit	NA	NA				NA					
140		NA	NA				NA					
		NA	NA				NA					
145		NA	NA				NA					
		NA	NA				NA					
150	96%	0	NDA				No					
	72%	0	NDA				No					
155	center bit	NA	NA				NA					
		NA	NA				NA					
160		NA	NA				NA					
		NA	NA				NA					
165		NA	NA				NA					
	76%	0	NDA				No					
170	100%	0.6	NDA				No					
	100%	0.8	NDA				No					
175	52%	0	NDA				No			Unit 1v	(173.5, 225.0) Qbt1v: Pinkish gray to light gray, nonindurated to slightly indurated, nonwelded, dry, devitrified ash flow with local light pinkish gray clay alteration in pumice lapilli.	
	100%	0.3	NDA				No					
180	80%	0	NDA				No					
	100%	0.1	NDA				No					
185	76%	0	NDA				No					
	88%	0	NDA				No					
190	76%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
	56%	0	NDA				No			Unit 1v, Tshirege Member, Bandelier Tuff		
	64%	0	NDA				No					
195	84%	0	NDA				No	@ 196.4, Minor, clay filled				
	100%	0	NDA	65199	65208 65221	65506	No					
200	100%	0	NDA				No					
	100%	0	NDA				No					
205	100%	0	NDA				No					
	100%	0	NDA				No					
210	76%	0	NDA				No					
	100%	0	NDA				No					
215	100%	0	NDA			65505	No					
	80%	0	NDA				No					
220	80%	0	NDA				No					
225	100%	0	NDA	65216	65207	slough	No					TD = 225 ft.

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Borehole Location ID: 50-24817 | **Start Date:** 09/22/05 **End Date:** 10/03/05

Coordinates : 1625784.46 E /1768969.64 N | **Ground Surface Elevation:** 7267.37 ft

Attitude: Vertical | **Total Depth (TD):** 250.0 ft

Driller/Co.: Stanley Johnson/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Jon Marin/LATA

Estimated depth of adjacent disposal unit(s): NA | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: CME 750 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-05 or RE50-05-XXXXX)	1st Pore-gas Sample # (MD50-05 or RE50-05-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	60%	0.3	NDA				No			Fill	(0.0, 6.4) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-24817 is located north and outside the northwestern portion of MDA C in an asphalt parking area.
	40%	0	NDA				No					
5	100%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(6.4, 104.8) Qbt3: Pinkish reddish brown to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing, positioned inside a flushmount steel cellar.
	100%	0	NDA				No					
10	100%	0	NDA				No					
	100%	0.3	NDA				No					
15	100%	0	NDA				No					
	100%	0	NDA	M-63837 R-63807	M-63841	65903	No					
20	100%	0	NDA				No					
	100%	0	NDA				No					
25	100%	0	NDA				No					
	100%	0	NDA				No	@ 29.5 ft., Minor, 1 cm, 45 degrees to core				
30	100%	0	NDA				No					
	100%	0	NDA				No					
35	100%	0	NDA				No					
	100%	0	NDA	M-63838 M-63840 R-63809 R-63808	M-63842	65904	No					
40	80%	0	NDA				No					
	100%	0	NDA				No					
45	100%	0	NDA				No					
	100%	0	NDA				No					
50	100%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-05 or RE50-05-XXXXX)	1st Pore-gas Sample # (MD50-05 or RE50-05--XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	100%	0.1	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Pinkish reddish brown to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	100%	0	NDA				No					
60	100%	0	NDA				No					
	100%	1.2	NDA				No	@ 61 ft, 63 ft, and 66 ft., Minor, clay rich, along core				
65	80%	0	NDA				No					
	100%	0	NDA				No					
70	100%	0	NDA				No					
	100%	0	NDA				No					
75	80%	0	NDA				No					
	80%	0	NDA				No					
80	80%	0	NDA				No					
	100%	0	NDA				No	@ 81 ft., Minor, 1 cm, FeOx, 10 degrees to core				
85	100%	0	NDA				No					
	100%	0	NDA				No	@ 86 ft., Minor, 1 cm, FeOx, 10 degrees to core				
90	100%	2.5	NDA				No					
	100%	0	NDA				No					
95	100%	0	NDA				No					
	100%	0	NDA				No					
100	100%	0	NDA	R-63810	R-63816	65905	No					
	100%	0	NDA				No					
105	100%	0	NDA				No					
	100%	0	NDA				No			Unit 2, Tshirege Member	(104.8, 172.2) Qbt2: Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence.	
110	100%	0	NDA				No					
	100%	0	NDA				No					
115	100%	0	NDA				No					
	100%	0	NDA				No					
120	100%	0	NDA				No					
	100%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-05 or RE50-05-XXXXX)	1st Pore-gas Sample # (MD50-05 or RE50-05--XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	100%	0	NDA				No			Unit 2, Tshirege Member, Bandelier Tuff	Qbt2 continued. Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	92%	0	NDA				No					
130	100%	0	NDA				No					
	80%	0	NDA				No					
135	80%	0	NDA				No					
	40%	0	NDA				No					
140	80%	0	NDA	R-63811	R-63817	65906	No					
	100%	0	NDA				No					
145	40%	0	NDA				No					
	100%	0	NDA				No					
150	80%	0	NDA				No					
	100%	0.3	NDA				No					
155	100%	0.1	NDA				No					
	100%	0	NDA				No					
160	100%	0	NDA				No					
	100%	0	NDA				No					
165	100%	0	NDA				No					
	100%	0	NDA				No					
170	100%	0	NDA				No					
	100%	0	NDA				No					
175	100%	0	NDA				No			Unit 1v, Tshirege Member	(172.2, 239.4) Qbt1v: Pinkish gray to light gray, nonindurated to slightly indurated, nonwelded, dry, devitrified ash flow with local light pinkish gray clay alteration in pumice lapilli.	
	100%	0	NDA				No					
180	100%	0	NDA				No					
	100%	0	NDA				No					
185	100%	0	NDA				No					
	100%	0	NDA				No					
190	100%	0	NDA				No					

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Sample Location ID: 50-24817

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-05 or RE50-05-XXXXX)	1st Pore-gas Sample # (MD50-05 or RE50-05--XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
	100%	0	NDA				No			Unit 1v, Tshirege Member, Bandelier Tuff		
	100%	0	NDA				No					
195	100%	0	NDA				No					
	100%	0	NDA	R-63812	R-63818	65907 65910	No					
200	100%	0	NDA				No					
	100%	0	NDA				No					
205	100%	0	NDA				No					
	100%	0	NDA				No					
210	100%	0	NDA				No					
	100%	0	NDA				No					
215	100%	0	NDA				No					
	100%	0	NDA				No					
220	100%	0	NDA				No					
	100%	0	NDA				No					
225	100%	0	NDA				No					
	100%	0	NDA				No					
230	100%	0	NDA				No					
	100%	0	NDA				No					
235	100%	0	NDA				No					
	100%	0	NDA				No					
240	100%	0	NDA				No					
	100%	0	NDA				No			Colonnade	(239.4, 248.0) Qbt1v(c): Pinkish reddish gray to orangish gray, moderately indurated, non welded, dry devitrified ash flow.	
245	100%	0	NDA				No					
	100%	0.5	NDA				No					
250	100%	0	NDA	M-63839	M-63843	65908	No			1g	(248.0, 250.0) Qbt1g: Pinkish to orangish gray, vitric, ash flow.	TD = 250 ft.

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Borehole Location ID: 50-24818 | **Start Date:** 02/08/06 **End Date:** 05/30/06

Coordinates : 1626197.99 E /1768797.31 N | **Ground Surface Elevation:** 7239.13 ft

Attitude: Vertical | **Total Depth (TD):** 620.0 ft

Drilling Co. Stewart Brothers Drilling Co. | **Geologist/ Co.:** Jon Marin/LATA

Estimated depth of adjacent disposal unit(s): 20.8 ft | **Depth to Groundwater:** Not encountered

(0 to 332.5 ft) Driller/Equipment: Tombert Frank/Failing F-10 HSA with stainless steel core barrel

(332.5 ft to 620 ft) Driller/Equipment: Paul Garcia/Failing 2500 with 94 mm core system and air rotary

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	Geotechnical Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	100%	0	NDA				No			Fill	(0.0, 5.0) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-24818 is located in the north-central portion of MDA C north of Pit 5.
	88%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(5.0, 97.5) Qbt3: Pinkish reddish brown to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	The borehole is open below a capped and secured, 20-ft deep, 10-in diameter steel surface casing grouted in place.
5	76%	1	NDA				No					
	100%	1.2	NDA	65229	65232 65253		No	@ 7.4 ft., Minor, clay filled, roots, 0.5 cm, 20 degrees to core				
10	100%	0	NDA				No					
	100%	0	NDA				No					
15	100%	0	NDA				No					
	100%	0	NDA				No					
20	100%	5	NDA				No					
	100%	1	NDA	65230 65255	65233		No					
25	100%	1.5	NDA				No					
	100%	1	NDA				No					
30	100%	1.5	NDA				No					
	0%	NA	NA				NA					
35	0%	NA	NA				NA					
	100%	5.3	NDA				No					
40	80%	1.4	NDA				No	@ 41.4 ft and 43 ft, Minor, clay filled, along core				
	100%	0	NDA				No					
45	88%	0.3	NDA				No					
	92%	0	NDA				No					
50	48%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	Geotechnical Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	100%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Pinkish reddish brown to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	60%	0	NDA				No					
60	52%	0	NDA				No					
	40%	0	NDA				No					
65	100%	0	NDA				No					
	40%	0	NDA				No					
70	100%	0	NDA				No					
	100%	0	NDA			66061	No					
75	100%	0	NDA				No					
	100%	1.9	NDA				No					
80	20%	1	NDA				No					
	100%	0.7	NDA				No					
85	100%	2.3	NDA				No					
	84%	1.3	NDA				No					
90	100%	1.3	NDA				No					
	100%	0.7	NDA				No					
95	100%	2.5	NDA				No					
	72%	2	NDA				No	@ 97 ft., Minor, clay filled, 1 cm, 20 degrees to core				
100	100%	0	NDA	66261 66758	65234		No			Unit 2, Tshirege Member	(97.5, 163.9) Qbt2: Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	100%	0	NDA				No					
	enter b	NA	NA				NA					
105	68%	0	NDA				No					
	8%	0	NDA				No					
110	96%	0	NDA				No					
	100%	4.4	NDA				No					
115		NA	NA				NA					
		NA	NA				NA					
120	nter bit	NA	NA				NA					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	Geotechnical Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	ce	NA	NA				NA			Unit 2, Tshirege Member, Bandelier Tuff	Qbt2 continued. Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
		NA	NA				NA					
130	40%	5.1	NDA				No					
	center bit	NA	NA				NA					
135		NA	NA				NA					
		NA	NA				NA					
140	40%	0	NDA			66063	No					
		NA	NA				NA					
145	enter b	NA	NA				NA					
		NA	NA				NA					
150	68%	0	NDA	65262	65235		No					
	80%	0	NDA				No					
155	80%	0	NDA				No					
	enter b	NA	NA				NA					
160	84%	0	NDA				No					
	80%	0	NDA				No					
165	100%	0	NDA				No			Unit 1v, Tshirege Member	(163.9, 224.4) Qbt1v: Pinkish gray to light gray, nonindurated to slightly indurated, nonwelded, dry, devitrified ash flow with local light pinkish gray clay alteration in pumice lapilli.	
	56%	0	NDA				No					
170	100%	0	NDA				No					
	92%	0	NDA				No					
175	76%	0	NDA				No					
	92%	0	NDA				No					
180	100%	0	NDA				No					
	100%	0	NDA				No					
185	72%	0	NDA				No					
	100%	0	NDA				No					
190	100%	0	NDA	65263 66759	65236		No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	Geotechnical Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
	100%	0	NDA				No			Unit 1v, Tshirege Member, Bandelier Tuff	Qbt1v continued. Pinkish gray to light gray, nonindurated to slightly indurated, nonwelded, dry, devitrified ash flow with local light pinkish gray clay alteration in pumice lapilli.	
	100%	0	NDA				No					
195	100%	0	NDA				No					
	20%	0	NDA			66736	No					
200	100%	0	NDA				No					
	100%	0	NDA				No					
205	100%	0	NDA				No					
	100%	0	NDA				No					
210	100%	0	NDA				No					
	60%	0	NDA				No					
215	100%	0	NDA				No					
	100%	0	NDA				No					
220	100%	0	NDA				No					
	100%	0	NDA				No					
225	100%	0	NDA				No			Colonnade	(224.4, 238.0) Qbt1v(c): Pinkish reddish gray to orangish gray, moderately indurated, non welded, dry, devitrified ash flow with chocolate brown sugary pumice lapilli and dacite lithics from 1 to 5 percent.	
	100%	0	NDA				No					
230	100%	0	NDA				No					
	8%	0	NDA				No					
235	100%	0	NDA			66737	No					
	100%	0	NDA				No			Unit 1g, Tshirege Member, Bandelier Tuff	(238.0, 314.2) Qbt1g: Vapor Phase Notch at upper contact is sharp transition between vitric ash flows below and devitrified units above. Reddish gray to orangish gray, moderately indurated, nonwelded, dry, vitric, ash flow. Olive gray phenocryst-rich pumice lapilli show wavy fibrous texture from well developed glass tube structures.	
240	100%	0	NDA				No					
	100%	0	NDA				No					
245	40%	0	NDA				No					
	68%	0	NDA	65664	65237 65254		No					
250	100%	0	NDA				No					
	88%	0.6	NDA				No					
255	12%	0.4	NDA				No					
	84%	2.8	NDA				No					

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MDA C Investigation Work Plan
Sample Location ID: 50-24818

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	Geotechnical Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
260	84%	3.2	NDA				No			Unit 1g, Tshirege Member, Bandelier Tuff	Pinkish reddish gray to light pinkish gray, nonindurated, dry, vitric, ash flow.	
	68%	4.6	NDA				No					
265	0%	NA	NA				NA					
	100%	3.7	NDA			66738	No					
270	68%	0	NDA				No					
	40%	0	NDA				No					
275	0%	NA	NA				NA					
	0%	NA	NA	65265	65238		NA					
280	100%	1	NDA	65285			NA					
	100%	10.3	NDA				No					
285	100%	9.1	NDA				No					
	72%	7.3	NDA				No					
290	100%	7.8	NDA				No					
	100%	5.3	NDA				No					
295	100%	4	NDA				No					
	76%	4.2	NDA				No					
300	72%	5.7	NDA				No					
	100%	9.4	NDA				No					
305	92%	7.8	NDA				No					
	100%	8	NDA				No					
310	100%	6.4	NDA				No					
	100%	8.4	NDA	66760			No					
315	100%	6.7	NDA	65266	65239	66739	No			Bed	(314.2, 316.7) Qbt1g(Ts): Tsankawi Pumice Bed is the basal airfall pumice deposit for the Tshirege Member cooling units.	
	100%	7.2	NDA				No			Cerro Toledo Interval		
320	60%	7.3	NDA				No					
	68%	8.8	NDA				No				(316.7, 383.4) Qct: Pinkish gray to pale red, locally strongly oxidized,	
325	60%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	Geotechnical Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
330	100% 100%	0	NDA			66740	No			Tephras and Volcaniclastic Sediments of the Cerro Toledo Interval	volcaniclastic sediments consisting mostly of reworked Otowi Formation Tuff, pumice beds, sand, gravel, and local cobble deposits.	
		0	NDA				No					
335	tricone bit											
340		NA	NA				NA					
345												
350	40% 100%	0	NDA				No					
		0	NDA				No					
355	100%	0	NDA				No					
	100%	0	NDA				No					
	100%	0	NDA				No					
360	100%	0	NDA				No					
	100%	0	NDA				No					
365	100%	0	NDA				No					
	100%	0	NDA				No					
	100%	0	NDA				No					
370	100%	0	NDA				No					
	100%	0	NDA				No					
375	100%	0	NDA				No					
	100%	0	NDA				No					
	100%	0	NDA				No					
380	100%	0	NDA				No					
	100%	0	NDA				No					
385	100%	0	NDA				No			Otowi Formation Tuff	(383.4, 610.0) Qbo: Pinkish gray, nonindurated to slightly indurated, nonwelded, dry, vitric, ash flow with olive gray glassy pumice lappilli and bombs up to 0.5 ft across.	
	100%	0	NDA				No					
		0	NDA				No					
390	50%	0	NDA				No					
395	67%	0	NDA				No					
		0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	Geotechnical Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
400	50%	0	NDA	66761			No			Otowi Formation Tuff		
	50%	0	NDA	65267			No				Qbo continued. Pinkish gray, nonindurated to slightly indurated, nonwelded, dry, vitric, ash flow with olive gray glassy pumice lappilli and bombs up to 0.5 ft across.	
405	50%	0	NDA				No					
410	50%	0	NDA				No					
	100%	0	NDA		65240 67516		No					
415	75%	0	NDA				No					
420	94 mm w/o core											
425												
430												
435		NA	NA				NA				Qbo continued. Pinkish gray, nonindurated to slightly indurated, nonwelded, dry, vitric, ash flow with olive gray glassy pumice lappilli and bombs up to 0.5 ft across.	
440												
445	100%	0	NDA				No					
	100%	0	NDA				No					
450	100%	0	NDA				No					
	50%	0	NDA	65268 66741	65242	66741	No					
455												
460												
465												

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	Geotechnical Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
470	94 mm w/o core				71578					Otowi Formation Tuff		
475		NA	NA				NA					
480												
485												
490												
495	50%	0	NDA				No				Qbo continued. Pinkish gray, nonindurated to slightly indurated, nonwelded, dry, vitric, ash flow with olive gray glassy pumice lappilli and bombs up to 0.5 ft across.	
	75%	0	NDA				No					
500	75%	0	NDA	66762 65270	65245 67520		No					
505												
510												
515												
520	94 mm w/o core	NA	NA				NA					
525												
530												

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	Geotechnical Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
535												
540												
545	50%	2.8	NDA		65244		No			Otowi Formation Tuff	Qbo continued. Pinkish gray, nonindurated to slightly indurated, nonwelded, dry, vitric, ash flow with olive gray glassy pumice lappilli and bombs up to 0.5 ft across.	
	67%			65270	67519							
550		4.3	NDA				No					
	75%	2.3	NDA				No					
555												
560												
565												
570	94 mm w/o core											
		NA	NA				NA					
575												
580												
585												
590					65243 67518							
595	100%											
	75%	2	NDA				No					
		1.5	NDA	65271			No					
600	75%	1.5	NDA	66763			No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	Geotechnical Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
605	94 mm w/o core	NA	NA				NA			Otowi	Qbo continued.	
610										Guaje Pumice	(610.0, 620.0) Qbog: Guaje Puimce Bed is the basal airfall pumice deposit for the Otowi Formation.	
615												
620												TD = 620 ft.

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Borehole Log

Project: MDA C Investigation Work Plan | **TA-50 SWMU: 50-009** | **Page 1 of 5**

Borehole Location ID: 50-24819 | **Start Date:** 08/09/05 **End Date:** 08/19/05

Coordinates : 1625561.29 E /1768568.01 N | **Ground Surface Elevation:** 7276.7 ft

Attitude: Vertical | **Total Depth (TD):** 275.0 ft

Driller/Co.: Stanley Johnson/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Jon Marin/LATA

Estimated depth of adjacent disposal unit(s): NA | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: CME 750 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (RE50-05-XXXXX)	1st Pore-gas Sample # (RE50-05-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	60%	0	NDA				No			Fill	(0.0, 15.5) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-24819 is located outside and southwest of the western portion of MDA C. The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing with a 3-ft riser.
	100%	0	NDA				No					
5	80%	0	NDA				No					
	100%	0	NDA				No					
10	100%	0	NDA				No					
	100%	0	NDA				No					
15	100%	0	NDA				No	@ 14 ft., Minor, 10 degrees to core				
	100%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(15.5, 118.7) Qbt3: Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
20	100%	0	NDA	61422	61430	63863 63870	No					
	100%	0	NDA				No					
25	100%	0	NDA				No	@ 24 ft., Minor. 45 degrees to core				
	100%	0	NDA				No					
30	40%	0	NDA				No					
	100%	0	NDA				NA					
35	100%	0	NDA				NA					
	80%	0	NDA				No					
40	28%	0	NDA				NA					
	100%	0	NDA				NA					
45	100%	0	NDA				NA					
	100%	0	NDA				NA					
50	80%	0	NDA	61423	61431	63864	No					
	100%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # RE50-05-XXXXX)	1st Pore-gas Sample # RE50-05-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	100%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	100%	0	NDA				No					
60	60%	0	NDA				No					
	40%	0	NDA				No					
65	40%	0	NDA				No					
	0%	NA	NA				No					
70	0%	NA	NA				No					
	60%	0	NDA				No					
75	60%	0	NDA				No					
	60%	0	NDA				No					
80	60%	0	NDA				No					
	100%	0	NDA				No					
85	100%	0	NDA				No					
	92%	0	NDA				No					
90	80%	0	NDA				No					
	80%	0	NDA				No					
95	100%	0	NDA				No					
	88%	0	NDA				No					
100	80%	0	NDA	61424	61432	63865	No					
	80%	0	NDA				No					
105	88%	0	NDA				No					
	92%	0	NDA				No					
110	100%	0	NDA				No					
	100%	0	NDA				No					
115	80%	0	NDA				No					
	100%	0	NDA				No					
120	100%	0	NDA				No			Unit 2	(118.7, 181.5) Qbt2: Pale red, strongly	
	100%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # RE50-05-XXXXX)	1st Pore-gas Sample # RE50-05-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	100%	0	NDA				No			Unit 2, Tshirege Member, Bandelier Tuff	indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	80%	0	NDA				No					
130	72%	0	NDA				No					
	60%	0	NDA				No					
135	80%	0	NDA				No					
	100%	0	NDA				No					
140	60%	0	NDA	61425	61732	63866	No					
	88%	0	NDA				No					
145	60%	0	NDA				No					
	20%	0	NDA				No					
150	center bit	NA	NA				No					
		NA	NA				No					
155	100%	0	NDA				No					
	center bit	NA	NA				No					
160		NA	NA				No					
		NA	NA				No					
165		NA	NA				No					
	100%	0	NDA				No					
170	100%	0	NDA				No					
	100%	0	NDA				No					
175	100%	0	NDA				No					
	100%	0	NDA				No					
180	100%	0	NDA				No					
	100%	0	NDA				No			Unit 1v	(181.5, 241.5) Qbt1v: Pinkish gray to light gray, nonindurated to slightly indurated, nonwelded, dry, devitrified ash flow with local light pinkish gray	
185	100%	0	NDA				No					
	100%	0	NDA				No					
190	100%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # RE50-05-XXXXX)	1st Pore-gas Sample # RE50-05-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
	100%	0	NDA				No			Unit 1v, Tshirege Member, Bandelier Tuff	clay alteration in pumice lapilli.	
	100%	0	NDA				No					
195	100%	0	NDA				No					
	100%	0	NDA	61426	61733 61437	63867	No					
200	100%	0	NDA				No					
	100%	0	NDA				No					
205	100%	0	NDA				No					
	100%	0	NDA				No					
210	100%	0	NDA				No					
	100%	0	NDA				No					
215	100%	0	NDA				No					
	100%	0	NDA				No					
220	100%	0	NDA				No					
	100%	0	NDA				No					
225	100%	0	NDA				No					
	100%	0	NDA				No					
230	100%	0	NDA				No					
	100%	0	NDA				No					
235	100%	0	NDA				No					
	100%	0	NDA				No					
240	100%	0	NDA				No					
	100%	0	NDA				No			Colonnade	(241.5, 254.5) Qbt1v(c): Pinkish reddish gray to orangish gray, moderately indurated, non welded, dry devitrified ash flow with chocolate brown pumice lapilli and dacite lithics from 1 to 5 percent.	
245	100%	0	NDA				No					
	100%	0	NDA				No					
250	100%	0	NDA	61427 61434	61734	63868	No					
	100%	0	NDA				No					
255	100%	0	NDA				No					
	100%	0	NDA				No			Unit 1g	(254.5, 275.0) Qbt1g: Pinkish reddish	
	100%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # RE50-05-XXXXX)	1st Pore-gas Sample # RE50-05-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
260	100%	0	NDA				No			Unit 1g, Tshirege Member	gray to orangish gray, moderately indurated in upper few feet, changing to light pinkish gray, nonindurated, dry, vitric, ash flow.	
	100%	0	NDA				No					
265	100%	0	NDA				No					
	100%	0	NDA				No					
270	100%	0	NDA				No					
	100%	0	NDA	61428	61735	63869	No					TD = 275 ft.
275												

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Borehole Log

Project: MDA C Investigation Work Plan | **TA-50 SWMU: 50-009** | **Page 1 of 4**

Borehole Location ID: 50-24820 | **Start Date:** 08/23/05 **End Date:** 08/30/05

Coordinates : 1626014.41 E /1768274.96 N | **Ground Surface Elevation:** 7254.76 ft

Attitude: Vertical | **Total Depth (TD):** 250.0 ft

Driller/Co.: Stanley Johnson/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Jon Marin/LATA

Estimated depth of adjacent disposal unit(s): NA | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: CME 750 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening (αβγ)	Core Sample # (RE50-05-XXXXX)	1st Pore-gas Sample # (RE50-05-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	60%	0	NDA				No			Fill	(0.0, 3.7) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-24820 is located outside and south of MDA C, south of Pajarito Road.
	60%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(3.7, 109.0) Qbt3: Pinkish reddish brown to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing with a 9-ft riser.
5	60%	0	NDA				No					
	100%	0	NDA				No					
10	100%	0	NDA				No					
	100%	0	NDA				No					
15	100%	0	NDA				No					
	100%	0	NDA				No					
20	100%	0	NDA	61438	61446	64240	No					
	100%	0	NDA				No					
25	100%	0	NDA				No					
	100%	0	NDA				No					
30	100%	0	NDA				No					
	100%	0	NDA				No					
35	100%	0	NDA				No					
	100%	0	NDA				No					
40	100%	0	NDA				No					
	100%	0	NDA				No					
45	100%	0	NDA				No					
	100%	0	NDA				No					
50	100%	0	NDA	63429	61449	64241	No					
	80%	0	NDA	61439	61455		No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (RE50-05-XXXXX)	1st Pore-gas Sample # (RE50-05-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	80%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Pinkish reddish brown to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	100%	0	NDA				No	@ 57 ft., Minor, FeOx				
60	100%	0	NDA				No					
	100%	0	NDA				No					
65	100%	0	NDA				No					
	100%	0	NDA				No					
70	100%	0	NDA				No					
	100%	0	NDA				No					
75	100%	0	NDA				No					
	100%	5.6	NDA				No					
80	100%	1.3	NDA				No					
	100%	1.3	NDA				No					
85	100%	0	NDA				No					
	50%	0	NDA				No					
90	100%	0	NDA				No					
	100%	0	NDA				No					
95	100%	0	NDA				No					
	100%	0.2	NDA				No					
100	100%	0	NDA	61440 61452	61447	64242	No					
	100%	0	NDA				No					
105	100%	0	NDA				No					
	100%	0	NDA				No					
110	100%	0	NDA				No			Unit 2, Tshirege Member	(109.0, 172.5) Qbt2: Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller	
	100%	0	NDA				No					
115	100%	0	NDA				No					
	100%	0	NDA				No					
120	100%	0	NDA				No					
	100%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (RE50-05-XXXXX)	1st Pore-gas Sample # (RE50-05-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	60%	0	NDA				No			Unit 2, Tshirege Member, Bandelier Tuff	blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	100%	0	NDA				No					
130	100%	0	NDA				No					
	center bit	NA	NA				NA					
135		NA	NA				NA					
		NA	NA				NA					
140	100%	0	NDA	61441	61448	64243	No					
	center bit	NA	NA				NA					
145		NA	NA				NA					
		NA	NA				NA					
150		NA	NA				NA					
		NA	NA				NA					
155		NA	NA				NA					
		NA	NA				NA					
160	100%	0	NDA				No					
	100%	0	NDA				No					
165	100%	0	NDA				No					
	100%	0	NDA				No					
170	100%	0	NDA				No					
	100%	0	NDA				No					
175	100%	0	NDA				No			Unit 1v, Tshirege Member	(172.5, 236.0) Qbt1v: Pinkish gray to light gray, nonindurated to slightly indurated, nonwelded, dry, devitrified ash flow with local light pinkish gray clay alteration in pumice lapilli.	
	100%	0	NDA				No					
180	100%	0	NDA				No					
	100%	0	NDA				No					
185	100%	0	NDA				No					
	100%	0	NDA				No					
190	100%	0	NDA				No					

Los Alamos National Laboratory
Borehole Log
MDA C Investigation Work Plan **TA-50/SWMU 50-009**

Sample Location ID: 50-24820

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (RE50-05-XXXXX)	1st Pore-gas Sample # (RE50-05-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
	100%	0	NDA				No			Unit 1v, Tshirege Member, Bandelier Tuff	Qbt1v continued. Pinkish gray to light gray, nonindurated to slightly indurated, nonwelded, dry, devitrified ash flow.	
	100%	0	NDA				No					
195	60%	0	NDA				No					
	72%	0	NDA	61442	61450	64244	No					
200	60%	0	NDA				No					
	100%	0	NDA				No					
205	32%	0	NDA				No					
	60%	0	NDA				No					
210	100%	0	NDA				No					
	100%	0	NDA				No					
215	100%	0	NDA				No					
	100%	0	NDA				No					
220	100%	0	NDA				No					
	100%	0	NDA				No					
225	100%	0	NDA			64245	No					
	100%	0	NDA				No					
230	100%	0	NDA				No					
	100%	0	NDA				No					
235	100%	0	NDA				No					
	100%	0	NDA				No			Colonnade	(236.0, 246.7) Qbt1v(c): Pinkish reddish gray to orangish gray, moderately indurated, non welded, dry devitrified ash flow.	
240	100%	0	NDA				No					
	100%	0	NDA				No					
245	100%	0	NDA				No					
	100%	0	NDA				No			Qbt1g	(246.7, 250.0) Qbt1g: Pinkish reddish gray to orangish gray, moderately indurated, dry, vitric, ash flow.	
250	100%	0	NDA	61443	61736	slough	No					TD = 250 ft.

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MDA C Investigation Work Plan
Sample Location ID: 50-24820

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (RE50-05-XXXXX)	1st Pore-gas Sample # (RE50-05-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	60%	0	NDA				No			Unit 2, Tshirege Member, Bandelier Tuff	blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	100%	0	NDA				No					
130	100%	0	NDA				No					
	center bit	NA	NA				NA					
135		NA	NA				NA					
		NA	NA				NA					
140	100%	0	NDA	61441	61448	64243	No					
	center bit	NA	NA				NA					
145		NA	NA				NA					
		NA	NA				NA					
150		NA	NA				NA					
		NA	NA				NA					
155		NA	NA				NA					
		NA	NA				NA					
160	100%	0	NDA				No					
	100%	0	NDA				No					
165	100%	0	NDA				No					
	100%	0	NDA				No					
170	100%	0	NDA				No					
	100%	0	NDA				No					
175	100%	0	NDA				No			Unit 1v, Tshirege Member	(172.5, 236.0) Qbt1v: Pinkish gray to light gray, nonindurated to slightly indurated, nonwelded, dry, devitrified ash flow with local light pinkish gray clay alteration in pumice lapilli.	
	100%	0	NDA				No					
180	100%	0	NDA				No					
	100%	0	NDA				No					
185	100%	0	NDA				No					
	100%	0	NDA				No					
190	100%	0	NDA				No					

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MDA C Investigation Work Plan
Sample Location ID: 50-24821

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample #	2nd Pore-gas Sample #	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	100%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	100%	0	NDA				No					
60	100%	0	NDA				No					
	92%	0	NDA				No					
65	100%	0	NDA				No					
	80%	0	NDA				No					
70	80%	0	NDA				No					
	100%	0	NDA				No					
75	100%	0	NDA				No					
	68%	0	NDA				No					
80	100%	0	NDA				No					
	100%	0	NDA				No					
85	88%	0	NDA				No					
	100%	0	NDA				No					
90	100%	0	NDA				No					
	100%	0	NDA				No					
95	68%	0	NDA				No					
	84%	0	NDA				No					
100	64%	0	NDA	61458	61465	62456	No					
	100%	0	NDA				No					
105	100%	0	NDA				No					
	100%	0	NDA				No			Unit 2, Tshirege Member	(106.2, 167.2) Qbt2: Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger	
110	100%	0	NDA				No					
	100%	0	NDA				No					
115	100%	0	NDA				No					
	100%	0	NDA				No					
120	100%	0	NDA				No					
	60%	0	NDA				No					

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MDA C Investigation Work Plan
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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample #	2nd Pore-gas Sample #	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	100%	0	NDA				No			Unit 2, Tshirege Member, Bandelier Tuff	drilling typically required use of pull down force or center bit.	
	56%	0	NDA				No					
130	80%	1.1	NDA				No					
	52%	1.3	NDA				No					
135	center bit	NA	NA				NA					
		NA	NA				NA					
140	80%	0.6	NDA	61460	61469 61467	64251	No					
	100%	0.5	NDA				No					
145	center bit	NA	NA				NA					
		NA	NA				NA					
150	100%	1.4	NDA				No					
	100%	1.6	NDA				No					
155	100%	1.1	NDA				No					
	100%	1.3	NDA				No					
160	100%	1.8	NDA	61459	61473	64254	No					
	100%	1.8	NDA				No					
165	100%	0.9	NDA				No					
	100%	0.4	NDA				No					
170	100%	0.6	NDA				No			Unit 1v, Tshirege Member, Bandelier Tuff	(167.2, 217.0) Qbt1v: Pinkish gray to light gray, nonindurated to slightly indurated, nonwelded, dry, devitrified ash flow with local light pinkish gray clay alteration in pumice lapilli.	
	80%	0.4	NDA				No					
175	100%	0.4	NDA				No					
	100%	0.1	NDA				No					
180	100%	0.1	NDA				No					
	100%	1.4	NDA				No					
185	100%	0.9	NDA				No					
	72%	0.4	NDA				No					
190	52%	0.8	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample #	2nd Pore-gas Sample #	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
	100%	0.6	NDA				No			Unit 1v, Tshirege Member, Bandelier Tuff	Qbt1v continued. Pinkish gray to light gray, nonindurated to slightly indurated, nonwelded, dry, devitrified ash flow.	
	52%	0	NDA				No					
195	100%	0	NDA				No					
	100%	0.4	NDA		NA	64252	No					
200	64%	0.1	NDA				No					
	68%	0	NDA				No					
205	100%	0	NDA				No					
	100%	0	NDA				No					
210	100%	0	NDA				No					
	100%	0	NDA				No					
215	100%	0	NDA				No					
	100%	0	NDA				No			Colonnade	(217.0, 237.0) Qbt1v(c): Pinkish reddish gray to orangish gray, moderately indurated, non welded, dry devitrified ash flow with chocolate brown pumice lapilli and dacite lithics from 1 to 5 percent.	
220	100%	0	NDA				No					
	100%	0.1	NDA				No					
225	100%	0	NDA				No					
	100%	0	NDA				No					
230	100%	0	NDA				No					
	100%	0	NDA				No					
235	100%	0	NDA				No					
	100%	0	NDA		NA	64253	No			Unit 1g	(237.0, 250.0) Qbt1g: Pinkish reddish gray to orangish gray, moderately indurated, dry, vitric, ash flow.	
240	100%	0	NDA				No					
	100%	0	NDA				No					
245	100%	0	NDA				No					
	100%	0	NDA				No					
250	100%	0	NDA	61461	61468	slough	No					TD = 250 ft.

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Borehole Log

Project: MDA C Investigation Work Plan | **TA-50 SWMU: 50-009** | **Page 1 of 4**

Borehole Location ID: 50-24822 | **Start Date:** 09/13/05 **End Date:** 09/20/05

Coordinates : 1626758.15 E /1768436.53 N | **Ground Surface Elevation:** 7231.79 ft

Attitude: Vertical | **Total Depth (TD):** 250.0 ft

Driller/Co.: Stanley Johnson/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Jon Marin/LATA

Estimated depth of adjacent disposal unit(s): NA | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: CME 750 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (RE50-05-XXXXX)	1st Pore-gas Sample # (RE50-05-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	60%	0.2	NDA				No			Fill	(0.0, 4.7) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-24822 is located outside and east of MDA C.
	80%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(4.7, 101.1) Qbt3: Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing with a 3-ft riser.
5	80%	0	NDA				No					
	80%	0	NDA				No					
10	40%	0	NDA				No					
	80%	0	NDA				No					
15	100%	0	NDA				No					
	100%	0	NDA	61474	61482	64928	No					
20	100%	0	NDA				No					
	100%	0	NDA				No					
25	100%	0	NDA				No					
	80%	0	NDA				No					
30	100%	0	NDA				No					
	80%	0	NDA				No					
35	100%	0	NDA				No					
	92%	0	NDA				No					
40	76%	0	NDA				No					
	68%	0	NDA				No					
45	80%	0	NDA				No					
	100%	0	NDA	61475	61483	64929	No	@ 47 ft., Minor, Clay filled, FeOx halo, roots, 2 cm wide				
50	100%	0	NDA	63431	61491		No					

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MDA C Investigation Work Plan
Sample Location ID: 50-24822

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (RE50-05-XXXXX)	1st Pore-gas Sample # (RE50-05-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	100%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	100%	0	NDA				No					
60	100%	0	NDA				No					
	92%	0	NDA				No					
65	100%	0	NDA				No					
	80%	0	NDA				No					
70	80%	0	NDA				No					
	100%	0	NDA				No					
75	100%	0	NDA				No					
	68%	0	NDA				No					
80	100%	0	NDA				No					
	100%	0	NDA				No					
85	88%	0	NDA				No					
	100%	0	NDA				No					
90	100%	0	NDA				No					
	100%	0	NDA				No					
95	68%	0	NDA				No					
	84%	0	NDA				No					
100	64%	0	NDA	61476	61484	64930	No					
	100%	0	NDA				No			Unit 2, Tshirege Member	(101.1, 182.0) Qbt2: Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
105	100%	0	NDA				No					
	100%	0	NDA				No					
110	100%	0	NDA				No					
	100%	0	NDA				No					
115	100%	0	NDA				No					
	100%	0	NDA				No					
120	100%	0	NDA				No					
	60%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (RE50-05-XXXXX)	1st Pore-gas Sample # (RE50-05-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	100%	0	NDA				No			Unit 2, Tshirege Member, Bandelier Tuff	Qbt2 continued. Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	56%	0	NDA				No					
130	80%	1.1	NDA				No					
	52%	1.3	NDA				No					
135	center bit	NA	NA				NA					
		NA	NA				NA					
140	80%	0.6	NDA	61477	61485	64931	No					
	100%	0.5	NDA				No					
145	center bit	NA	NA				NA					
		NA	NA				NA					
150	100%	1.4	NDA				No					
	100%	1.6	NDA				No					
155	100%	1.1	NDA				No					
	100%	1.3	NDA				No					
160	100%	1.8	NDA				No					
	100%	1.8	NDA				No					
165	100%	0.9	NDA				No					
	100%	0.4	NDA				No					
170	100%	0.6	NDA				No					
	80%	0.4	NDA				No					
175	100%	0.4	NDA				No					
	100%	0.1	NDA				No					
180	100%	0.1	NDA				No					
	100%	1.4	NDA				No					
185	100%	0.9	NDA				No			Unit 1v	(182.0, 225.0) Qbt1v: Pinkish gray to light gray, nonindurated to slightly indurated, nonwelded, dry, devitrified ash flow.	
	72%	0.4	NDA				No					
190	52%	0.8	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (RE50-05-XXXXX)	1st Pore-gas Sample # (RE50-05-XXXXX)	2nd Pore-gas Sample # (MD50-06-XXXXX)	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
	100%	0.6	NDA				No			Unit 1v, Tshirege Member, Bandelier Tuff	Unit 1v continued. Pinkish gray to light gray, nonindurated to slightly indurated, nonwelded, dry, devitrified ash flow.	
	52%	0	NDA				No					
195	100%	0	NDA				No					
	100%	0.4	NDA	61478	61486	64932	No					
200	64%	0.1	NDA				No					
	68%	0	NDA				No					
205	100%	0	NDA				No					
	100%	0	NDA				No					
210	100%	0	NDA				No					
	100%	0	NDA				No					
215	100%	0	NDA				No					
	100%	0	NDA				No					
220	100%	0	NDA				No					
	100%	0.1	NDA				No					
225	100%	0	NDA				No			Colonnade	(225.0, 241.3) Qbt1v(c): Pinkish reddish gray to orangish gray, moderately indurated, non welded, dry devitrified ash flow with chocolate brown pumice lapilli and dacite lithics from 1 to 5 percent.	
	100%	0	NDA				No					
230	100%	0	NDA				No					
	100%	0	NDA				No					
235	100%	0	NDA				No					
	100%	0	NDA				No					
240	100%	0	NDA				No					
	100%	0	NDA				No			Unit 1g	(241.3, 250.0) Qbt1g: Reddish gray to orangish gray, moderately indurated, dry, vitric, ash flow.	
245	100%	0	NDA				No					
	100%	0	NDA				No					
250	100%	0	NDA	61479	61737	64933 64934	No					TD = 250 ft.

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Borehole Log

Project: MDA C Investigation Work Plan | **TA-50 SWMU: 50-009** | **Page 1 of 5**

Borehole Location ID: 50-25451 | **Start Date:** 04/03/06 **End Date:** 04/12/06

Coordinates : 1626133.88 E / 1768023.31 N | **Ground Surface Elevation:** 7235.44 ft

Attitude: Vertical | **Total Depth (TD):** 300.0 ft

Driller/Co.: Tombert Frank/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Dave Frank/LATA

Estimated depth of adjacent disposal unit(s): NA | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: Failing F-10 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample #	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	100%	0.1	NDA				No			Fill	(0.0, 4.2) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-25451 is located outside and south of MDA C, south of Pajarito Road.
	100%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(4.2, 90.0) Qbt3: Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing with a 9-ft riser.
5	100%	0	NDA				No					
	100%	0	NDA				No					
10	100%	0	NDA				No					
	100%	0	NDA				No					
15	100%	0	NDA				No					
	100%	0	NDA				No					
20	100%	0	NDA	66697	66691	NA	No					
	0%	NA	NA				NA					
25	0%	NA	NA				NA					
	100%	0	NDA				No					
30	100%	0	NDA				No					
	100%	0.4	NDA				No					
35	100%	0.3	NDA				No					
	100%	0	NDA				No					
40	100%	0	NDA				No					
	0%	NA	NA				NA					
45	100%	3.7	NDA				No					
	100%	0	NDA				No					
50	100%	0	NDA	66698	66690	NA	No					
	100%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample #	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	100%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	100%	0	NDA				No					
60	100%	0	NDA				No					
	100%	0	NDA				No					
65	88%	0	NDA				No					
	0%	NA	NA				NA					
70	100%	0	NDA				No					
	100%	0	NDA				No					
75	100%	0	NDA				No					
	20%	0	NDA				No					
80	100%	0	NDA				No					
	100%	0	NDA				No					
85	60%	0	NDA				No					
	60%	0	NDA				No					
90	100%	0	NDA				No					
	0%	NA	NA				NA			Unit 2, Tshirege Member, Bandelier Tuff	(90.0, 165.0) Qbt2: Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
95	100%	0	NDA				No					
	100%	0	NDA				No					
100	100%	0	NDA	66671 66702	66689	NA	No					
	100%	0	NDA				No					
105	100%	0	NDA				No					
	100%	0	NDA				No					
110	0%	NA	NA				NA					
	100%	0	NDA				No					
115	100%	0	NDA				No					
	center bit →	NA	NA				NA					
120		NA	NA				NA					
		NA	NA				NA					

Los Alamos National Laboratory
Borehole Log
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MDA C Investigation Work Plan
Sample Location ID: 50-25451

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample #	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125		NA	NA				NA			Unit 2, Tshirege Member, Bandelier Tuff	Qbt2 continued. Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
	0%	NA	NA				NA					
130	center bit	NA	NA				NA					
		NA	NA				NA					
135		NA	NA				NA					
	0%	NA	NA				NA					
140	center bit	NA	NA				NA					
		NA	NA				NA					
145		NA	NA				NA					
	100%	0.3	NDA	66672	66688	NA	No					
150	0%	NA	NA				NA					
	100%	0	NDA				No					
155	100%	0	NDA				No					
	center bit	NA	NA				NA					
160		NA	NA				NA					
		NA	NA				NA					
165		NA	NA				NA					
	0%	NA	NA				NA			Unit 1v, Tshirege Member, Bandelier Tuff	(165.0, 227.5) Qbt1v: Pinkish gray to light gray, nonindurated to slightly indurated, nonwelded, dry, devitrified ash flow with local light pinkish gray clay alteration in pumice lapilli.	
170	100%	0	NDA				No					
	100%	0	NDA				No					
175	100%	0	NDA				No					
	0%	NA	NA				NA					
180	center bit	NA	NA				NA					
		NA	NA				NA					
185		NA	NA				NA					
	88%	0	NDA				No					
190	100%	0	NDA				No					

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MDA C Investigation Work Plan
Sample Location ID: 50-25451

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample #	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
	100%	0	NDA				No			Unit 1v, Tshirege Member, Bandelier Tuff	Qbt1v continued. Pinkish gray to light gray, nonindurated to slightly indurated, nonwelded, dry, devitrified ash flow.	
	100%	0	NDA				No					
195	100%	0	NDA				No					
	100%	0	NDA	66673	66687	NA	No					
200	100%	0	NDA				No					
	0%	NA	NA				NA					
205	100%	0	NDA				No					
	100%	0	NDA				No					
210	20%	0	NDA				No					
	100%	0	NDA				No					
215	100%	0	NDA				No					
	100%	0	NDA				No					
220	100%	0	NDA				No					
	100%	0	NDA				No					
225	100%	0	NDA				No					
	100%	0	NDA				No					
230	100%	0	NDA				No			Colonnade	(227.5, 237.5) Qbt1v(c): Pinkish reddish gray to orangish gray, moderately indurated, non welded, dry devitrified ash flow with chocolate brown pumice lapilli and dacite lithics from 1 to 5 percent.	
	100%	0	NDA				No					
235	100%	0	NDA				No					
	0%	NA	NA				NA					
240	100%	0	NDA				No			Unit 1g, Tshirege Member, Bandelier Tuff	(237.5, 300.0) Qbt1g: Pinkish reddish gray to orangish gray, moderately indurated in upper few feet, changing to light pinkish gray, nonindurated, dry, vitric, ash flow.	
	100%	0	NDA				No					
245	0%	NA	NA				NA					
	100%	0	NDA				No					
250	40%	0	NDA	66674	66686	NA	No					
	100%	0	NDA				No					
255	0%	NA	NA				NA					
	0%	NA	NA				NA					
	0%	NA	NA				NA					

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MDA C Investigation Work Plan
Sample Location ID: 50-25451

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample #	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
260	100%	0	NDA				No			Unit 1g, Tshirege Member, Bandelier Tuff	Qbt1g continued. Pinkish gray, nonindurated, dry, vitric ash flow	
	100%	0	NDA				No					
265	100%	0	NDA				No					
	100%	0	NDA				No					
270	100%	0	NDA				No					
	100%	0	NDA				No					
275	100%	0	NDA				No					
	100%	0	NDA				No					
280	100%	0	NDA				No					
	100%	0	NDA				No					
285	100%	0	NDA				No					
	100%	0	NDA		66685	NA	No					
290	80%	0	NDA		66684		No					
	0%	NA	NA				NA					
295	100%	0	NDA				No					
	100%	0	NDA				No					
300	100%	0	NDA	66699		slough	No					TD = 300 ft.

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Borehole Location ID: 50-25621 | **Start Date:** 03/23/06 **End Date:** 03/24/06

Coordinates : 1626187.17 E / 1768800.32 N | **Ground Surface Elevation:** 7239.57 ft

Attitude: Vertical | **Total Depth (TD):** 90.0 ft

Driller/Co.: Stanley Johnson/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Tracy McFarland/LATA

Estimated depth of adjacent disposal unit(s): 20.8 ft | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: CME 750 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample #	2nd Pore-gas Sample #	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	60%	0	NDA		NA	NA	No			Fill	(0.0, 5.0) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-25621 is located in the north-central portion of MDA C north of Pit 5 and adjacent to borehole 50-24818. The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing.
	80%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(5.0, 90.0) Qbt3: Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
5	80%	0	NDA				No					
	100%	0	NDA				No					
10	48%	0	NDA				No					
	80%	0	NDA				No					
15	100%	0	NDA				No					
	100%	0	NDA				No					
20	100%	0	NDA				No					
	100%	0	NDA				No					
25	100%	0	NDA				No					
	80%	0	NDA	68034			No					
30	100%	0	NDA				NA					
	100%	0	NDA				No					
35	100%	0	NDA				No					
	92%	0	NDA				No					
40	40%	0	NDA				No					
	68%	0	NDA				No					
45	80%	0	NDA				No					
	100%	0	NDA				No					
50	100%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample #	2nd Pore-gas Sample #	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	100%	0	NDA		NA	NA	No			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	100%	0	NDA				No					
60	100%	0	NDA	68035			No					
	100%	0	NDA				No					
65	88%	0	NDA				No					
	100%	0	NDA				No					
70	100%	0	NDA				No					
	100%	0	NDA				No					
75	100%	0	NDA				No					
	90%	0	NDA				No					
80	100%	0	NDA				No					
	100%	0	NDA				No					
85	60%	0	NDA				No					
	60%	0	NDA				No					
90	100%	0	NDA				No					TD = 90 ft.

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Borehole Location ID: 50-26823 | **Start Date:** 08/07/06 **End Date:** 08/09/06

Coordinates : 1626285.65 E /1768641.33 N | **Ground Surface Elevation:** 7248.04 ft

Attitude: Vertical | **Total Depth (TD):** 300.0 ft

Driller/Co.: Stanley Johnson/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Jon Marin/LATA

Estimated depth of adjacent disposal unit(s): 35.2 | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: CME 750 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample #	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	100%	0	NDA				No			Fill	(0.0, 8.0) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-26823 is located in the east-central portion of MDA C between pits 3 and 5.
	100%	0	NDA				No					
5	60%	0	NDA				No					
	100%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(8.0, 115.0) Qbt3: Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing.
10	100%	0	NDA				No					
	100%	0	NDA				No					
15	100%	0	NDA				No					
	100%	0	NDA				No					
20	96%	0	NDA	72711	72730	NA	No					
	100%	0	NDA				No					
25	100%	0	NDA				No					
	100%	0	NDA				No					
30	100%	0	NDA				No					
	100%	0.2	NDA				No					
35	100%	0	NDA	72712	72729	NA	No					
	100%	0	NDA				No					
40	100%	0	NDA				No					
	100%	0	NDA				No					
45	88%	0	NDA				No					
	92%	0	NDA				No					
50	76%	0	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample #	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	76%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	100%	0	NDA				No					
60	center bit											
65		NA	NA				NA					
	100%	0	NDA	72713	27228	NA	No					
70	center bit											
75												
80		NA	NA				NA					
85												
90												
95												
	68%	0	NDA	72714	72727	NA	No					
100												
105												
110												
115										Unit 2	(115.0, 175.0) Qbt2: Pale red, strongly indurated, slightly welded, dry, devitrified ash flow.	
120												

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample #	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	center bit	NA	NA				NA			Unit 2, Tshirege Member, Bandelier Tuff	Qbt2 continued. Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
130												
135												
140												
145												
150	40%	0	NDA	72715	72726 72736	NA	No					
155	center bit											
160												
165												
170		NA	NA				NA					
175										Unit 1v, Tshirege Member	(175.0, 230.0) Qbt1v: Pinkish gray to light gray, nonindurated to slightly indurated, nonwelded, dry, devitrified ash flow with local light pinkish gray clay alteration in pumice lapilli.	
180												
185												
190												

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample #	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
195										Unit 1v, Tshirege Member, Bandelier Tuff	Qbt1v continued. Pinkish gray to light gray, nonindurated to slightly indurated, nonwelded, dry, devitrified ash flow.	
200	100%	0	NDA	72716 72735	72725	NA	No					
205	center bit											
210												
215												
220		NA	NA				NA					
225												
230										Colonnade	(230.0, 243.0) Qbt1v(c): Pinkish reddish gray to orangish gray, moderately indurated, non welded, dry devitrified ash flow with chocolate brown pumice lapilli and dacite lithics from 1 to 5 percent.	
235												
240												
245											(243.0, 300.0) Qbt1g: Reddish gray to orangish gray, moderately indurated, dry, vitric, ash flow.	
250	100%	0	NDA	72717	72724	NA	No					
255												

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample #	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
260–300	center bit	NA	NA				NA			Unit 1g, Tshirege Member, Bandelier Tuff	Qbt1g continued. Light pinkish gray, nonindurated, dry, vitric ash flow with olive gray, phenocryst-rich, vitreous pumice lapilli.	
300	100%	0	NDA	72718	72723	NA	No					TD = 300 ft.

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Borehole Location ID: 50-26824 | **Start Date:** 08/02/06 **End Date:** 08/03/06

Coordinates : 1625935.5 E /1768672.17N | **Ground Surface Elevation:** 7260.47 ft

Attitude: Vertical | **Total Depth (TD):** 200.0 ft

Driller/Co.: Stanley Johnson/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Jon Marin/LATA

Estimated depth of adjacent disposal unit(s): 33.4 | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: CME 750 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample #	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	72%	0	NDA				No			Fill	(0.0, 8.4) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-26824 is located in the central portion of MDA C west of a shaft row and Pit 4.
	88%	0	NDA				No					
5	76%	0	NDA				No					
	100%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(8.4, 113.1) Qbt3: Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing.
10	100%	0	NDA				No					
	100%	0	NDA				No	@ 12 ft., minor, low angle to core				
15	100%	0	NDA				No	@ 16 ft., minor, low angle to core				
	100%	0	NDA	72739	72751	NA	No					
20	100%	0	NDA				No					
	100%	0	NDA				No					
25	100%	0	NDA				No					
	100%	0	NDA				No					
30	100%	0	NDA				No					
	100%	0	NDA				No					
35	100%	0	NDA	72740	72750	NA	No					
	100%	0	NDA				No					
40	100%	0	NDA				No					
	100%	0	NDA				No					
45	100%	0	NDA				No					
	100%	0	NDA				No					
50	88%	1.5	NDA				No					

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample #	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	100% center bit	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
60		NA	NA				NA					
65												
70	100% center bit	0	NDA	72741	72749	NA	No					
75												
80		NA	NA				NA					
85												
90												
95												
100	100%	0	NDA	72742	72748	NA	No					
105												
110												
115										Unit 2	(113.1, 170.0) Qbt2: Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and	
120												

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample #	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	center bit	NA	NA				NA			Unit 2, Tshirege Member, Bandelier Tuff	10% sanidine phenocryrsts up to 1.0 mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
130												
135												
140												
145												
150	88%	0	NDA	72743	72747	NA	No					
155												
160												
165												
170	center bit	NA	NA				NA			Unit 1v, Tshirege Member	(170.0, 200.0) Qbt1v: Pinkish gray to light gray, nonindurated to slightly indurated, nonwelded, dry, devitrified ash flow with local light pinkish gray clay alteration in pumice lapilli.	
175												
180												
185												
190												

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Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample #	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
195	100%	0	NDA	72744 72753	72746 72754	NA	No			Unit 1v	Qbt1v continued. Pinkish gray to light gray, nonindurated to slightly indurated, nonwelded, dry, devitrified ash flow.	TD = 200 ft.
200												

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Borehole Location ID: 50-26825 | **Start Date:** 07/31/06 **End Date:** 08/02/06

Coordinates : 1625753.45 E /1768792.52 N | **Ground Surface Elevation:** 7265.48 ft

Attitude: Vertical | **Total Depth (TD):** 200.0 ft

Driller/Co.: Stanley Johnson/Stewart Brothers Drilling Co. | **Geologist/ Co.:** Jon Marin/LATA

Estimated depth of adjacent disposal unit(s): 35.8 | **Depth to Groundwater:** Not encountered

Core Barrel: 3.5" OD, 2.5 ' long stainless steel split-spoon

Drilling Equipment: CME 750 4 1/4" ID hollow stem auger (HSA) with continuous wireline core

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening (αβγ)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample #	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
0	20%	0	NDA				No			Fill	(0.0, 5.7) Fill: Brown gravelly clayey silt with local weathered tuff fragments up to 0.2 ft across surrounded by silty fill matrix.	Borehole 50-26825 is located in the west-central portion of MDA C south of Pit 6.
	100%	0	NDA				No					
5	100%	0	NDA				No			Unit 3, Tshirege Member, Bandelier Tuff	(5.7, 110.0) Qbt3: Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	The borehole is open below a capped and secured, 10-ft deep, 10-in diameter steel surface casing.
	100%	0	NDA				No					
10	100%	0	NDA				No					
	100%	0	NDA				No					
15	100%	0	NDA				No					
	100%	0	NDA	72757	72770	NA	No					
20	100%	0	NDA				No					
	100%	0	NDA				No					
25	100%	0.9	NDA				No	@ 27 ft., Minor, clay filled, 70 degrees to core, 1 cm wide				
	100%	1.5	NDA				No					
30	100%	0	NDA				No					
	100%	1.9	NDA				No					
35	100%	0	NDA	72758 72771	72768	NA	No					
	100%	0	NDA				No					
40	100%	2.6	NDA				No					
	100%	2.7	NDA				No					
45	80%	2.3	NDA				No					
	100%	2.2	NA				No					
50	100%	1.8	NDA				No					

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Sample Location ID: 50-26825

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample #	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
55	64%	2.2	NA				No			Unit 3, Tshirege Member, Bandelier Tuff	Qbt3 continued. Weak red, reddish brown, to reddish gray, slightly indurated to moderately indurated, nonwelded, dry, devitrified ash flow.	
	76%	2.2	NDA				No					
60	center bit											
65		NA	NA				NA					
70	72%	1.5	NDA	72759	72767	NA	No					
75	center bit											
80		NA	NA				NA					
85												
90												
95												
100	88%	0	NDA	72760	72766	NA	No					
105												
110										Unit 2	(110.0, 170.0) Qbt2: Pale red, strongly indurated, slightly welded, dry, devitrified ash flow with 20% quartz phenocryrsts from 0.5 - 1.0 mm, and 10% sanidine phenocryrsts up to 1.0	
115												
120												

Los Alamos National Laboratory
Borehole Log
TA-50/SWMU 50-009

MDA C Investigation Work Plan
Sample Location ID: 50-26825

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample #	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
125	center bit	NA	NDA				NA			Unit 2, Tshirege Member, Bandelier Tuff	mm showing schiller blue iridescence. Hollow-stem auger drilling typically required use of pull down force or center bit.	
130												
135												
140												
145												
150	60%	0	NDA	72761	72765	NA	No					
155												
160												
165												
170	center bit	NA	NDA				NA			Unit 1v, Tshirege Member	(170.0, 200.0) Qbt1v: Pinkish gray to light gray, nonindurated to slightly indurated, nonwelded, dry, devitrified ash flow with local light pinkish gray clay alteration in pumice lapilli.	
175												
180												
185												
190												

Los Alamos National Laboratory
Borehole Log
TA-50/SWMU 50-009

MDA C Investigation Work Plan
Sample Location ID: 50-26825

Depth (ft)	Core run/% recovery	Core PID Screening (ppm)	Core Rad Screening ($\alpha\beta\gamma$)	Core Sample # (MD50-06-XXXXX)	1st Pore-gas Sample # (MD50-06-XXXXX)	2nd Pore-gas Sample #	Visible Moisture in core	Fractures	Graphic Log	Lithologic Unit	Lithology	Notes
195	100%	0		72762	72764	NA	No			Unit 1v	Qbt1v continued. Pinkish gray to light gray, nonindurated to slightly indurated, nonwelded, dry, devitrified ash flow.	TD = 200 ft.
200												

Attachment 3

Chamberlain Reference

094162
1

X-Sieve: CMU Sieve 2.2
Subject: MDA C
Date: Thu, 23 Feb 2006 09:04:39 -0700
X-MS-Has-Attach:
X-MS-TNEF-Correlator:
Thread-Topic: MDA C
Thread-Index: AcY4ktmSooZ5usanSf2NbpRikQl8Yg==
From: "chamberlain, kathryn, NMENV" <kathryn.chamberlain@state.nm.us>
To: "Kent" <krich@lanl.gov>
Cc: "Dave" <dave.cobrain@state.nm.us>
X-OriginalArrivalTime: 23 Feb 2006 16:04:48.0231 (UTC) FILETIME=[DEE10F70:01C63892]
X-Proofpoint-Spam: 0
X-PMX-Version: 4.7.1.128075

Kent,

In response to your email of February 17 and per our conversation this morning (2/23/06), NMED agrees that the PID is not an effective field screening tool for guiding drilling activities a this site. Therefore, LANL may discontinue use of the PID for field screening.

NMED agrees with the proposed borehole locations, which will be used to determine lateral and vertical extent. However, NMED asks that borehole BH-33 be added to this group. Adding this borehole between Pits 2 and 3 will provide a 3-dimensional picture and better define the contaminaiton plume beneath MDA C.

Finally, NMED agrees with the proposed tuff sampling intervals at BH-9, however, NMED asks that additional samples be taken at 150-ft and 600-ft intervals. Based on our conversation this morning, drilling may have surpassed 150-ft. If drilling has not proceeded beyond 180-ft, NMED would like a sample collected from this interval. If drilling has gone beyond a depth of 180-ft, NMED asks that a sample be taken at 200-ft (as proposed) and another at 300-ft.

Please keep us updated on the drilling and sampling activities. Feel free to contact me if you have questions or concerns.

Thanks,
Katie

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