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Los Alamos National Laboratory/University of California
Environmental Stewardship (ENV)
Environmental Remediation & Surveillance Program (ERS), MS M992
Los Alamos, New Mexico 87545
(505) 667-0469/FAX (505) 665-4747

Date: March 16, 2006
Refer to: ER2006-0205

Ms. Darlene Goering
NMED – Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303

SUBJECT: RESPONSE TO INFORMAL REQUESTS FOR SUPPLEMENTAL INFORMATION ON THE TA-16-260 OUTFALL [CONSOLIDATED UNIT 16-021(c)-99] CORRECTIVE MEASURE STUDY

Dear Ms. Goering:

During recent discussions concerning the Technical Area (TA) 16-260 Outfall [Consolidated Unit 16-021(c)-99] corrective measures study (CMS), you requested several pieces of information concerning the CMS for the administrative record. In an email dated February 2, 2006, you requested cross sections of Cañon de Valle and Martin Spring Canyons showing the geophysical data, the proposed locations of permeable reactive barriers (PRBs), and the alluvial well locations and water depths. In a high-performing team (HPT) meeting on February 27, 2006, you requested additional information on the relative difficulty of implementing the three different remedies proposed for the TA-16 Cañon de Valle alluvial system and information on whether Martin Spring could potentially be tied to discharges at the 260 Outfall. This information is provided below and in the enclosures.

Cañon de Valle Map, Cross Section, and Rationale for Locations of PRBs

Enclosure 1 is a base map showing hydrologic features in Cañon de Valle; this figure was originally presented as Figure 3.3-6 in the "Phase III RFI Report for Solid Waste Management Unit 16-021(c)-99" (LA-UR 03-0480). Enclosure 2 is a cross section that includes

- data from the high-resolution resistivity (HRR) geophysics study completed in 2001;
- the locations of the alluvial wells, including maximum and minimum water elevations (note that the water elevations fluctuate depending on the season as well as the amount of precipitation and runoff in the alluvial system); and
- the proposed locations of the PRBs within Cañon de Valle.

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As can be seen from this enclosure, the PRB locations were selected for the following reasons:

- The farthest upgradient PRB is proposed to capture water where stream concentrations are highest before the water is diluted by inflow from Burning Ground Spring.
- The next PRB downgradient is designed to capture alluvial water before the alluvial system impinges on an area postulated to be a losing reach based on geophysics and surface stream profile results.
- The farthest downgradient PRB is designed to capture water during high-flow events and alluvial water exiting the downgradient end of the Cañon de Valle alluvial system.

Discussion of the Relative Difficulty of Implementing Proposed CMS Remedies

As suggested in the February 27, 2006, HPT meeting, the Los Alamos National Laboratory (LANL) has ranked, from least to most, the relative difficulties of implementing the three proposed remedies for the Cañon de Valle alluvial system as follows:

- PRB installation
- central treatment plant installation
- soil removal

PRB Installation

PRB installation is judged to be the least difficult to implement for the following reasons:

- The smallest amount of the canyon bottom would be disturbed, which includes minimal tree removal; this remedy also implies site restoration requirements would be minimized.
- Minimal installation of infrastructure (haul roads, staging areas, piping systems, electrical systems) would be required.
- Impacts on the riparian system and associated ecological resources would be minimal, requiring the least mitigation under a 401/404 permit. Water would need to be captured and diverted at three locations during installation.
- No discharge permitting would be required, and 401/404 permitting would probably be the easiest of any of the three options.
- According to National Environmental Protection Agency (NEPA) experts at LANL, the evaluation would probably only require an environmental assessment (EA) rather than an environmental impact statement (EIS).

Central Treatment Plant Installation

Installation of capture walls and a central treatment plant would rank second in difficulty of implementation for the following reasons:

- The next smallest amount of canyon bottom would be disturbed since five capture trenches would be required. Site restoration would be more complicated than the PRB option but would be simpler than a large-scale soil removal option.
- A significant amount of infrastructure would be required to be installed, including water piping able to withstand freeze-thaw cycles and electrical wiring.
- A moderate amount of impact on riparian systems and associated ecological resources would occur, since this option has a slightly larger footprint than the PRB option. It would also be difficult to maintain the water balance in the perennial reach.
- Because a discharge permit would probably be required, 401/404 restrictions might be slightly more burdensome than the PRB option; however, the NEPA evaluation requirements would probably be similar to those associated with the PRB option.

Soil Removal in Cañon de Valle

Removal of approximately 25,000 cubic yards of soil from Cañon de Valle would be the most difficult option to implement for the following reasons:

- Large areas of the canyon bottom would be disturbed, and a considerable number of fairly mature trees would have to be cut. While soil removal in itself is fairly straightforward, restoring the site to its pre-excavation condition would be extremely difficult. For example, activities to restore the aquatic ecosystem and the riparian environment after such a disturbance would exceed a reasonable time frame.
- Infrastructure installation would be extensive, including haul roads and staging areas.
- Impacts on the ecosystem would be extensive. The riparian system would probably be impacted for many years, and given that the canyon is part of the habitat of the spotted owl, this option would be extremely problematic.
- 401/404 permitting would be difficult.
- As a result of the large scale disturbances of the ecosystem anticipated for this option, it is likely the NEPA evaluation would require an EIS, which would be time-consuming and costly.

Possible Hydrologic Ties between the 260 Outfall and Martin Spring

The possibility of a hydrologic tie between the 260 Outfall and Martin Spring is problematic. Martin Spring has distinct chemistry from SWSC and Burning Ground Springs, and distinct contaminant signatures (see Chapter 4 of the Phase III RFI report) when compared to those springs. However, early in the 260 Outfall investigations, two lines of evidence suggested there might be such a hydrologic tie:

- Some of the subunits within the upper Bandelier Tuff near the 260 Outfall have a slight southerly dip component [see Figure 4.4-4 of the Phase II RFI report "RFI Report for Solid Waste Management Unit 16-021(c)" (LA-UR-98-4101). Although other subunits have a northern component, all

superimposed on the overall regional west to east dip in the Tshirege Member. The internal structure of the Tshirege Member of the Bandelier Tuff at TA-16 is very complex.

- Geophysical studies completed for the Phase II RFI report (see Figure 4.4-2 of that report) showed northwest-southeast trending resistivity anomalies near the head of Martin Spring canyon that suggested a possible hydrologic connection between the outfall and the spring.

These findings supported the decision to include Martin Spring in the TA-16-260 CMS investigations.

If you have any questions, please contact Don Hickmott at (505) 667-8753 (dhickmott@lanl.gov) or Woody Woodworth at (505) 665-5820 (lwoodworth@doeal.gov).

Sincerely,

David McInroy, Deputy Program Director
Environmental Remediation & Surveillance
Los Alamos National Laboratory

DH/jk

Enclosures: Two hard copies with electronic files:
1) Basemap showing location of HRR cross sections in Cañon de Valle
2) Cross section down Cañon de Valle showing HRR geophysics data, alluvial well locations with maxima and minima water levels, and proposed PRB locations

Cy:(w/enc)
D. Gregory, DOE LASO, MS A316
L. King, EPA Region 6
D. Hickmott, EES-6, MS D462
L. Woodworth, DOE LASO, MS A316
P. Reneau, ENV-ECR, MS M992
ENV-ECR File, MS M992
RPF, MS M707

Cy:(w/o enc)
A. Dorries, ENV-ECR, MS M992
D. McInroy, ENV-ERS, MS M992
G. Lopez Escobedo, ENV-ERS, MS M992
B. Rich, ADTS, MS A104

L. Woodworth, DOE LASO, MS A316
D. Pepe, NMED-OB
IM-9, MS A150

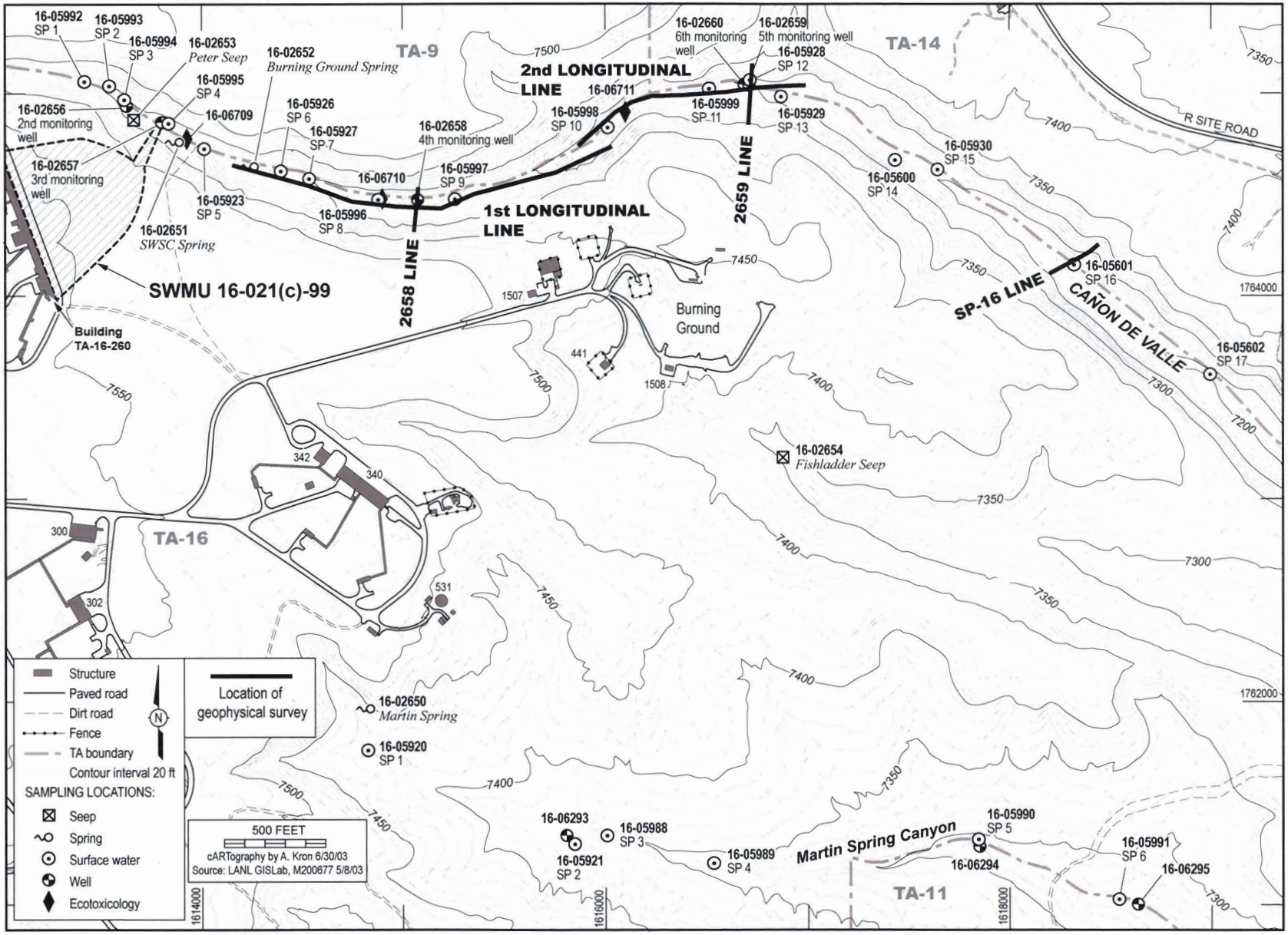


Figure 3.3-6. Locations for High Resolution Resistivity and Refraction Seismic Survey Lines (hydroGEOPHYSICS 2001, XXXXX)

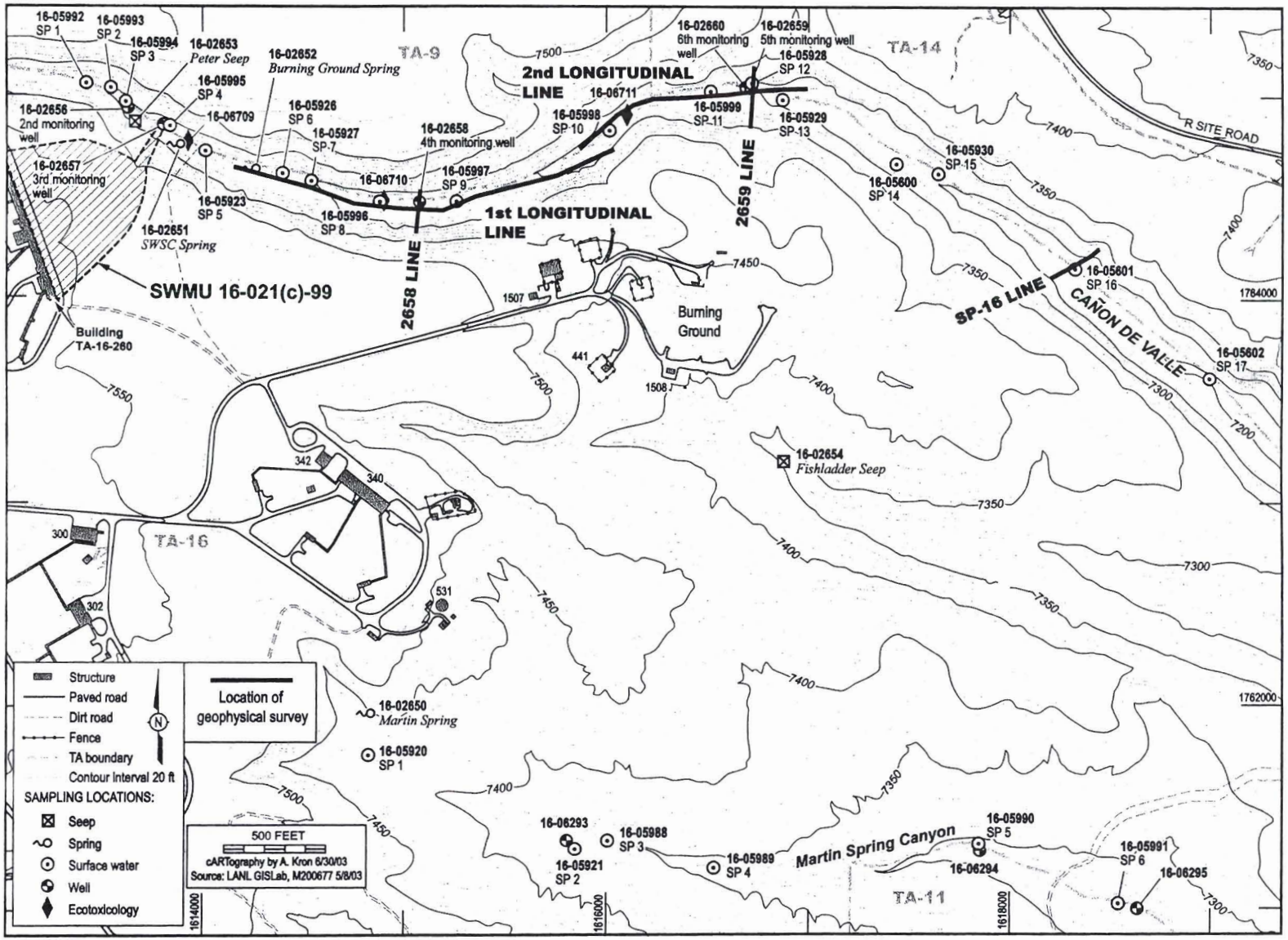
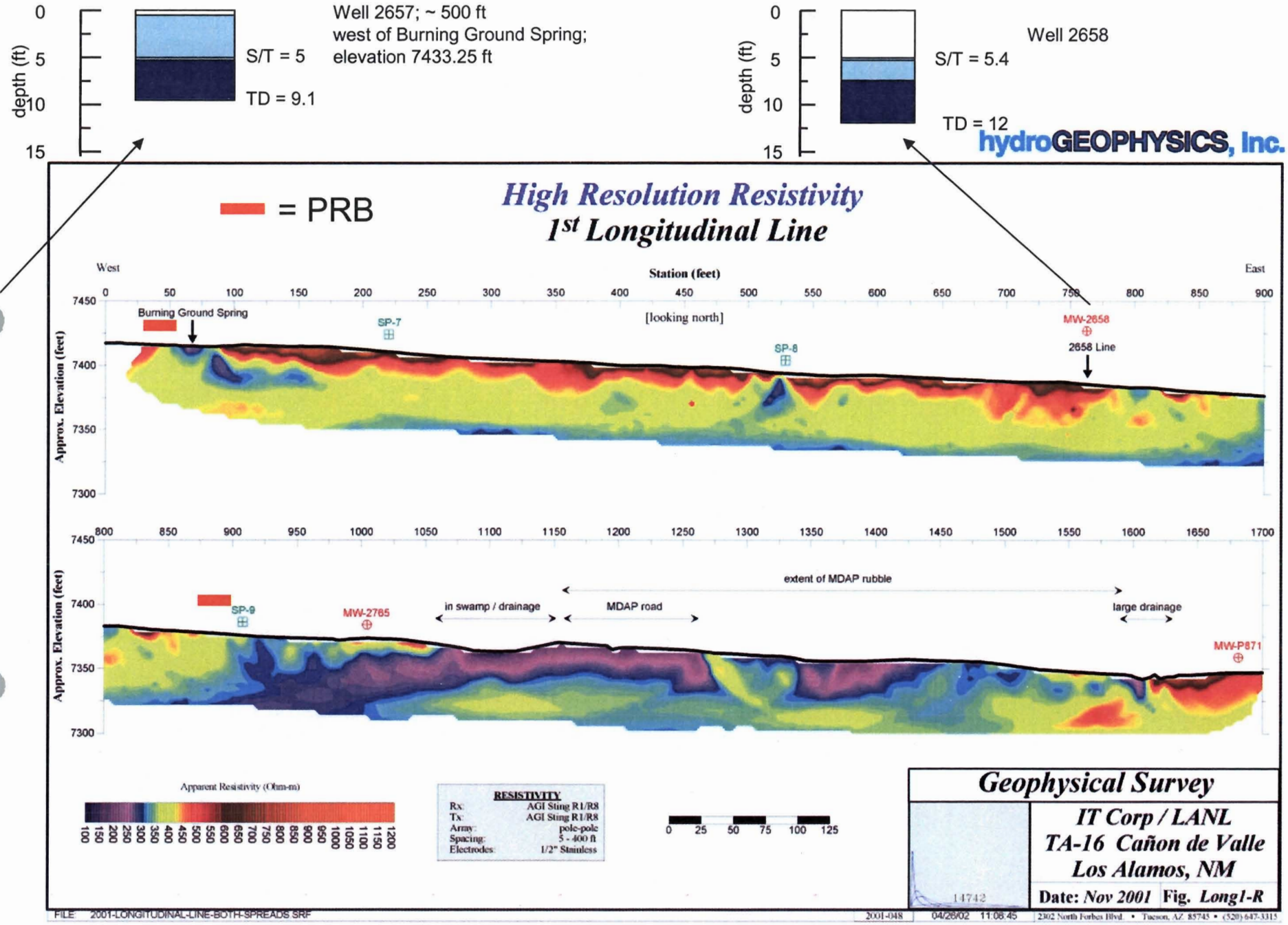


Figure 3.3-6. Locations for High Resolution Resistivity and Refraction Seismic Survey Lines (see Appendix D-2)


depth (ft)
0
5
10
15
S/T = 5
TD = 9.1
Well 2657; ~ 500 ft
west of Burning Ground Spring;
elevation 7433.25 ft
S/T = 5.4
TD = 12
Well 2658
hydroGEOPHYSICS, Inc.
= PRB
High Resolution Resistivity
1st Longitudinal Line
West
East
Station (feet)
Approx. Elevation (feet)
Burning Ground Spring
SP-7
SP-8
[looking north]
MW-2658
2658 Line
SP-9
MW-2765
in swamp / drainage
MDAP road
extent of MDAP rubble
large drainage
MW-P871
Apparent Resistivity (Ohm-m)
RESISTIVITY
Rx: AGI Sting R1/R8
Tx: AGI Sting R1/R8
Array: pole-pole
Spacing: 5 - 400 ft
Electrodes: 1/2" Stainless
Geophysical Survey
IT Corp / LANL
TA-16 Cañon de Valle
Los Alamos, NM
Date: Nov 2001
Fig. Long1-R
14742
FILE: 2001-LONGITUDINAL-LINE-BOTH-SPREADS.SRF
2001-048
04/26/02 11:08:45
2302 North Forbes Blvd. • Tucson, AZ 85745 • (520) 647-3315

S/T = soil (alluvium)/tuff interface
TD = total depth

= maximum water in well 1998-2002

= minimum water in well 1998-2002

hydroGEOPHYSICS, Inc.