09647
(6)

DC Resistivity Profiling in DP, Los Alamos, Pajarito, Pueblo and Sandia Canyons Los Alamos National Laboratory Los Alamos, NM

Geophex Job No. 1333

Submitted to:

Kleinfelder, Inc.
8300 Jefferson NE, Suite B
Albuquerque, NM 87113
&
U.S. Dept. of Energy
National Nuclear Security Administration
Los Alamos Area Office
528 35th Street
Los Alamos, NM 87544

under subcontract:
No. 05-0029L-042-1011
DOE Monitoring Wells @ Los Alamos National Laboratory

Headquarters

Geophex, Ltd.
605 Mercury Street
Raleigh, NC 27603-2343

Tel: (919) 839-8515
Fax: (919) 839-0096
Website: www.geophex.com
Email: geophex@geophex.com

January 2006

RECEIVED
OCT 24 2006
By

14496

Table of Contents

List of Tables i
List of Figures ii
List of Acronyms iii
List of Definitions iv
1.0 Introduction 1
2.0 Resistivity Method 4
2.1 Surveying/Locations 5
3.0 Results 6
3.1 2002, 2003 and 2005 Resistivity results 6

List of Tables

Table 1 Resistivity Profiles in Mortandad, Ten Site, and DP Canyons 2

Survey Location Plates

Resistivity Profile Plates

Digital Data DVD

List of Figures

Figure 1. View of resistivity profiling within upper Pueblo Canyon 2005 1
Figure 2. AGI SuperSting R8IP Resistivity Meter 4
Figure 3. SuperSting electrode attached to stake 4

List of Acronyms

AGI	Advanced Geosciences, Inc.
bgs	Below ground surface
DC	Direct Current
DOE	U.S. Dept. of Energy
ERT	Electrical Resistance Tomography
ft	Feet
GPS	Global Positioning System
LANL	Los Alamos National Laboratory
RES	Two dimensional DC resistivity
RMS	Root Mean Square

List of Definitions[1]

conductivity: The ability of a material to conduct electrical current. In isotropic material, the reciprocal of resistivity. Sometimes called **specific conductance**. Units are siemens per meter.

dipole-dipole array: Inline electrode array used in induced polarization, electrical, and electromagnetic surveying, where both current and potential-measuring electrodes are closely spaced.

ohm-meter: A unit of resistivity, also written ohm-meter2/meter; the resistance of a meter cube to the flow of current between opposite faces. Reciprocal of mho/m

Permeability: A measure of the ease with which a fluid can pass through the pore spaces of a formation.

Porosity; Pore volume per unit gross volume. Effective porosity is the porosity available to free fluids, excluding unconnected porosity and space occupied by bound water and disseminated shale.

RMS Error: The square root of the average of the squares of the differences between a series of n measurements m and their mean. Also called the standard deviation.

[1] Sheriff, Robert E. *Encyclopedic Dictionary of Applied Geophysics.* Tulsa, Oklahoma : Society of Exploration Geophysicists. 2002.

Executive Summary

From November 7, 2005 to December 17, 2005, Geophex performed DC resistivity profiling within DP, Los Alamos, Pajarito, Pueblo, and Sandia canyons at the Los Alamos National Laboratory, New Mexico. The purpose of these surveys was to assist in efforts to characterize and predict the groundwater conditions at LANL and provide potential sites for future monitoring wells.

Combined with 2002 and 2003 resistivity data collected in Mortandad, Upper DP and Ten Site canyons, these profiles identify numerous low resistivity zones in the alluvium and upper Bandelier Tuff. These low resistivity zones are currently interpreted to represent: 1) areas of increased moisture weight, or 2) clay-rich fracture zones. In light of these interpretations, these data may highlight pathways for groundwater to reach depth.

Included in this report and data package are both electronic and large scale plates of the geophysical data collected at the site. Additionally, data are included in an ASCII format for input to EARTHVISION software.