Reports

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Date: November 10, 2003
Refer to: ER2003-0715

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NOV 2003
NMED Hazardous Waste Bureau

Mr. John Young, Corrective Action Project Leader
Permits Management Program
NMED – Hazardous Waste Bureau
2905 Rodeo Park Drive East
Building 1
Santa Fe, NM 87505-6303

SUBJECT: QUARTERLY TECHNICAL REPORT FOR JULY THROUGH SEPTEMBER 2003

Dear Mr. Young:

Enclosed are two copies of the Remediation Services Quarterly Technical Report, July through September 2003. The Quarterly Technical Report presents information on the quarter's activities, including regulatory meetings, sampling, cleanups, and report writing. Also enclosed is a certification statement signed by the designee owner and operator for the Los Alamos National Laboratory. In accordance with Laboratory security requirements, copies of this report are available upon request through the external Remediation Services Web site at http://erproject.lanl.gov/documents/virtualhome.html. The report is also available on the internal Web site at http://erproject.lanl.gov/documents/VL/status.html.

If you have questions regarding this report, please contact Dave McInroy at (505) 667-0819 or David Gregory at (505) 667-5808.

Sincerely,

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

Sincerely,

David R Gregory

David Gregory, Project Manager
Department of Energy
Los Alamos Site Operations

DM/DG/MB/dv

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B. Ramsey, RRES-DO, MS J591
D. Rogers, RRES-WQH, MS K497
S. Martin, NMED-HWB
C. Voorhees, NMED-OB

CERTIFICATION

CERTIFICATION BY THE RISK REDUCTION AND ENVIRONMENTAL STEWARDSHIP-REMEDIATION SERVICES (RRES-RS) PROJECT TECHNICAL REPRESENTATIVES

Document Title: **QUARTERLY TECHNICAL REPORT FOR JULY THROUGH SEPTEMBER 2003**

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Name: _____ Date: Nov 13, 2003

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

or

_____ Date: _____

Beverly A. Ramsey, Division Leader
Risk Reduction and Environmental Stewardship Division
Los Alamos National Laboratory

_____ Date: Nov 13, 2003

David Gregory, Project Manager
Environmental Restoration Program
Department Of Energy/Los Alamos Site Office

or

_____ Date: _____

Herman LeDoux,
Assistant Area Manager of
Environmental Projects
Department Of Energy/Los Alamos Site Office

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November 12, 2003
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Quarterly Technical Report July–September 2003

Los Alamos
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Los Alamos NM 87545

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Department Of Energy/Los Alamos Site Office

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Assistant Area Manager of
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LIST OF ACRONYMS AND ABBREVIATIONS

bgs	below ground surface
BMP	best management practice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMS	corrective measures study
D&D	decontamination and decommissioning
DOE	US Department of Energy
EES-6	Earth and Environmental Sciences Division—Hydrology, Geochemistry, and Geology Group
EM	DOE Office of Environmental Management
EPA	US Environmental Protection Agency
ER	environmental restoration
ERDB	Environmental Restoration Database
ESA-OPS	Engineering Sciences and Applications Division—Operations Group
ESH ID	environment, safety, and health identification number
FWO-CGRP	Facilities and Waste Operations Division—Cerro Grande Rehabilitation Project
FY	fiscal year
GIS	Geographical Information System
HSWA	Hazardous and Solid Waste Amendments
Laboratory	Los Alamos National Laboratory
MDA	material disposal area
NMED	New Mexico Environment Department
NNSA	National Nuclear Security Administration
NTISV	nontraditional in situ vitrification
PM	Program Management Division
PRG	preliminary remediation goal
PR-ID	permit and requirement identification (system)
PRS	potential release site
RCRA	Resource Conservation and Recovery Act
RFI	RCRA facility investigation
RRES	Risk Reduction and Environmental Stewardship Division
RRES-ECO	Risk Reduction and Environmental Stewardship Division—Ecology Group

RRES-ECR	Risk Reduction and Environmental Stewardship Division—Environmental Characterization and Remediation Group
RRES-MAQ	Risk Reduction and Environmental Stewardship Division—Meteorology and Air Quality Group
RRES-RS	Risk Reduction and Environmental Stewardship Division—Remediation Services
RRES-SWRC	Risk Reduction and Environmental Stewardship Division—Solid Waste Regulatory Compliance Group
RRES-WQH	Water Quality and Hydrology Group
RSI	request for supplemental information
SAP	sampling and analysis plan
SMART	Spatial Mapping and Reporting Tool
SMO	Sample Management Office
SWMU	solid waste management unit
SOP	standard operating procedure
TA	technical area
TRV	toxicity reference value
VCA	voluntary corrective action
VCM	voluntary corrective measure
VOC	volatile organic compound
WQDB	Water Quality Database

QUARTERLY TECHNICAL REPORT

JULY–SEPTEMBER 2003

LOS ALAMOS NATIONAL LABORATORY

RISK REDUCTION AND ENVIRONMENTAL STEWARDSHIP DIVISION

REMEDIATION SERVICES

ALBUQUERQUE OPERATIONS OFFICE

CONTRACTOR: University of California

DEPUTY PROJECT DIRECTOR: David McInroy

NUMBER OF POTENTIAL RELEASE SITES: Approximately 830

POTENTIAL WASTE: Radionuclides, High Explosives, Inorganic Chemicals, Organic Chemicals

1.0 INTRODUCTION

This quarterly report describes the technical status of activities in the Los Alamos National Laboratory (the Laboratory) Risk Reduction and Environmental Stewardship Division—Remediation Services (RRES-RS), formerly the Environmental Restoration (ER) Project. The activities are reported according to the current program structure and then, when applicable, by the technical area (TA) where the specific activity is located. The Hazardous and Solid Waste Amendments (HSWA) portion of the Laboratory's Hazardous Waste Facility Permit (Module VIII, Section P, Task V, C) requires the submission of a technical progress report on a quarterly basis. This report, submitted to fulfill the permit's requirement, summarizes much of the fieldwork and report-writing performed this quarter in RRES-RS.

2.0 WORK PACKAGES

2.1 Townsites — Project Team Leader: Terry Rust

2.1.1 TA-00

DP Road Land Transfer Tract [SWMUs 00-030(b)-00, 00-030(a), 00-033 and part of SWMU 21-021 and AOCs 00-010(a,b), 00-027, and 00-029(a,b,c]. The voluntary corrective action (VCA) report for DP Road Land Transfer Tract [Solid Waste Management Units (SWMUs) 00-030(b)-00, 00-030(a), 00-033 and part of SWMU 21-021and Areas of Concern (AOC) 00-010(a,b), 00-027, and 00-029(a,b,c)] has been submitted to the respective administrative authorities for review and approval.

2.1.2 TA-02

The Remediation Services project completed activities at TA-02 that were being coordinated with the Facilities and Waste Operations Division—Cerro Grande Rehabilitation Project (CGRP) decontamination

and decommissioning (D&D) efforts. Plans are underway to detail the remaining work necessary to confirm which of the SWMUs and AOCs were not completed during the CGRP work and to fully characterize and remediate those sites.

2.1.3 TA-19

Personnel began work on an accelerated VCA in support of land transfer activities at TA-19.

2.1.4 TA-73

Staff provided support for a US Department of Energy (DOE) subcontractor executing the interim measure at Airport Landfill 73-1.

Plans are underway for the design and construction of the airport landfill cover and for the remediation and confirmation sampling of SWMU 73-002-99.

2.1.5 Facility Integration Activities

Land transfer, private property, Los Alamos community development, and other non-DOE property-related issues were addressed this quarter.

2.2 Industrial Sites — Project Team Leader: Gabriela Lopez Escobedo

2.2.1 TA-03

SWMU 03-010(a). Monitoring of temperature and water levels continues at monitoring well B1/MW-1 at SWMU 03-010(a), a former systematic release from a vacuum repair shop west of Building SM-30. Over the last six months the temperature has remained constant between 13.2 °C and 13.5 °C, and the water level remained constant at 21.0 to 22.0 ft bgs.

The Laboratory's Program Management (PM) Division personnel completed preconstruction geotechnical investigations for a parking structure near SWMU 03-010(a); the structure will be south of Building SM-30 at TA-03. RRES-RS personnel coordinated sample collection from borehole location ID 03-22098 to help determine the extent of the groundwater present below the asphalt and determine if SWMU 03-010(a) contaminants extended eastward into the proposed parking lot. The borehole was drilled to a depth of 40 ft; groundwater was not encountered. Samples were collected at six intervals located every 4 to 8 ft and were submitted for analysis for moisture content, volatile organic compounds (VOCs), and tritium. Moisture content was reported in the previous quarter. Analytical results for borehole location ID 03-22098 for VOCs and tritium were received with two samples having detects of acetone and three samples having detects of tritium slightly above the minimum detectable activity. See Table 1 (values in boldface for tritium are detects).

Table 1
Analytical Results for Borehole Location ID 03-22098

Sample ID	Location ID	Depth bgs (ft)	Tritium Results (pCi/L)	Minimum Detectable Activity/Detection Limit (pCi/L)	Acetone Results (μg/kg)
RE03-03-51220	03-22098	4.5–6.0	31.1	193	Not detected
RE03-03-51221	03-22098	14.5–16.0	**197**	191	Not detected
RE03-03-51222	03-22098	24.5–26.0	**241**	191	6.8
RE03-03-51223	03-22098	34.5–36.0	164	193	5.3 (J)
RE03-03-51224	03-22098	38.0–40.0	**239**	188	Not detected

A decision peer-review was completed to discuss the proposed investigations at SWMU 03-010(a) and discuss the approach to the continued investigations. The peer-review team included members of the groundwater team, DOE, and RRES-RS. All issues pertaining to a phased-approach investigation covering all New Mexico Environment Department (NMED) requirements were discussed, with a major component being the identification of any surface water sources that may be contributing to the shallow water zone encountered in monitoring well B1/MW-1. The peer reviewers discussed including the geophysical investigation conducted in 2002 in the investigation work plan, as well as the results and interpretations. Before submittal of the plan to NMED, personnel plan to video-log the north culvert to determine if the Building SM-30 roof drains are a possible water source. The investigation work plan for SWMU 03-010(a), including results of the geophysical investigation, was drafted, and the draft was submitted for peer review on September 26, 2003. The document is on schedule to be submitted to NMED by October 31, 2003.

2.2.2 Supplement to the Sampling and Analysis Plan for Middle Mortandad/Ten Site Aggregate

Work on the Middle Mortandad/Ten Site Aggregate supplemental sampling and analysis plan (SAP) continued this quarter. This document will describe the sampling and analysis work proposed for the remainder of the SWMUs/AOCs in the Middle Mortandad/Ten Site Watershed Aggregate that were not included in the March 2002 SAP (Environmental Restoration Project 2002, 73092). The sites that will be included in the supplemental plan are in TAs-04, -05, -52, -60, and -63. Site descriptions and site history sections have been completed; sections addressing the existing data analysis and assessment and data gap determination are underway.

2.2.3 TA-53

SWMU 53-002(a)-99, Northern and Southern Surface Impoundments. The investigation report for SWMU 53-002(a)-99 (surface impoundments), AOC 53-008 (a storage area), and surrounding areas is progressing on schedule. Data review and site assessment are in progress, and preliminary human health and ecological risk screening has been performed. A decision peer review was held on September 9, 2003. Not all data were available; therefore, one subject remained to be discussed, the distribution of tritium at the site. A second brief presentation is anticipated for further discussions and will include DOE in the decision process. Work continues on the report, with attention to points raised by the peer-review panel. Tritium data from boreholes is being further evaluated relative to sample moisture content and analytical uncertainty.

2.2.4 Facility Integration Activities

During the fourth quarter of fiscal year (FY) 2003, Industrial Sites Team members responded to approximately 128 requests for excavation permits; environment, safety, and health identification (ESH-ID) questionnaires; and facility inquiries about new construction projects. In addition, the team worked with facility managers (by attending meetings, conducting field visits, and providing information) on ongoing projects and planned construction projects collocated with SWMUs/AOCs. See Section 2.10.4 for more detail.

2.3 High Explosives Production Sites and MDA P Closure — Project Team Leaders: Don Hickmott and Bill Criswell

2.3.1 TA-16-260 Outfall Corrective Action

The TA-16-260 Outfall Corrective Action Team continued fieldwork, data analysis, and report-writing activities in support of the corrective measures study (CMS) at SWMU 16-021(c)-99 (the 260 outfall). The major focus this quarter continued to be data analysis and writing of the Phase III Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) report and the CMS report. The RFI report was completed and submitted to the administrative authority. Hydrogeology studies and high-performance team activities continued.

2.3.1.1 TA-16 CMS Hydrogeology and Monitoring

The field team continued to monitor water levels in the Cañon de Valle alluvial wells and in the intermediate-depth wells. The hydrologic system in that canyon is extremely dry. Cañon de Valle surface water was present only between Burning Ground Spring and Material Disposal Area (MDA) P. All five of the alluvial wells in Cañon de Valle contained water this quarter; the uppermost well was wet. Two of the three alluvial wells in Martin Spring Canyon also contained water during the reporting period. None of the intermediate-depth boreholes contained water throughout the quarter. Martin Spring dried up during July for the first time during this project. SWSC Spring was dry. The Cañon de Valle headwaters were saturated, and a small, new spring continued to flow in the headwaters region.

Deep wells CdV-R-15-3 and CdV-R-37-2 were sampled during August, and preparation for drilling three intermediate-depth boreholes was continued. Pad preparation began in late September.

Stable isotope samples were collected during precipitation events. Every-other-day samples were collected and archived for eventual stable isotope analysis.

The Phase III RFI report for SWMU 16-021(c)-99 was completed and submitted to NMED in September. This document included a baseline risk assessment for the source area and for the alluvial system in Canon de Valle. The source-region risk assessment yielded a target cancer risk slightly higher than 10^{-5} (NMED's target level) under a site-specific industrial (environmental worker) scenario, whereas the carcinogenic risks in the alluvial system were acceptable under a recreational scenario. Similarly, the noncarcinogenic hazard index in the source region was slightly higher than NMED's target level of 1 under a site-specific industrial (construction worker) scenario, but was less than 1 in the alluvial system under a recreational scenario. Ecological risk assessment results suggested minimal impacts on ecological receptors in the canyon system.

2.3.1.2 PRS 16-021(c)-99 CMS

A rough draft of the CMS report was completed in September. The contents of this report were discussed among the high-performance team members.

2.3.1.3 Surface Water

Best management practices (BMPs) were inspected and maintained.

2.3.2 MDA P Closure

Work continues on the MDA P Flash Pad 387, closure certification, and SWMU 16-016(c)-99 VCA reports that will be submitted in October and November 2003, respectively.

2.4 Canyon Investigations — Project Team Leader: Kent Rich

2.4.1 Los Alamos and Pueblo Canyons

2.4.1.1 Surface Water Investigation (Biota Study)

Mountain blue bird and ash-throated flycatcher eggs from 14 nests were submitted for radionuclide analysis. These data will supplement existing data on organic and inorganic chemicals from another 70 nests. A separate report will be prepared to summarize these data. Work continued with the Laboratory's Ecology Group (RRES-ECO) staff on reports for the small-mammal trapping, plant quantitative habitat analysis, bird point counts, and rapid bioassessment protocol. Final reports were produced for plant quantitative habitat analysis and bird point counts. Team members continued to work with other RRES-ECO staff on initial runs of the ECORSK.7 model. These studies will be incorporated in the Los Alamos and Pueblo Canyons investigation report.

2.4.1.2 Los Alamos and Pueblo Canyons Surface Aggregate Report

The surface aggregate report will present the assessment and evaluation of all Canyons Team investigations conducted to date in the Los Alamos Canyon and Pueblo Canyon watersheds. Other data relevant to a watershed-scale assessment of contamination will also be evaluated. The primary objective of the report, currently planned for submittal to the NMED in March 2004, will be to assess potential human health and ecological risk associated with current and estimated future contamination in sediment, surface water, and alluvial groundwater in the watershed. Progress during the fourth quarter included the following: (1) developed a comprehensive list of standards to be used in the report; (2) developed a draft approach to human health risk assessment, including land-use scenarios, exposure parameters, and data evaluation methods; (3) reviewed validated analytical data for biota samples associated with the ecological risk assessment; (4) continued to revise and refine the all-media, all-pathway screening assessment protocols; and (5) completed a draft of the supporting document on the statistical/geomorphological approach to sediment deposit characterization.

2.4.2 Mortandad Canyon

A watershed-scale assessment of sediment data was completed this quarter, which included identifying data needs in previously sampled reaches to help focus future sampling. This effort included compiling all analytical data from sediment samples in 12 reaches sampled between 1998 and 2002; conducting data quality checks on these analyses; evaluating spatial variations in contaminant concentrations and

contaminant inventory; and performing an initial evaluation of these data in the context of potential human health or ecological risk. As part of this process, ecological scoping of reaches in Mortandad Canyon was completed in July.

A status report on Mortandad Canyon sediment investigations was submitted to the NMED on September 12 (Reneau et al. 2003, 77103), which briefly summarizes the sediment investigation conducted to date under the "Work Plan for Mortandad Canyon" (LANL 1997, 56835). The analytical data from all sediment samples collected by the former ER Project (now RRES-RS) in Mortandad Canyon and its tributaries, and maps showing sample locations were also included. A more complete presentation and assessment of data will occur in a future Mortandad Canyon investigation report scheduled to be delivered to the NMED by December 31, 2005.

The "Mortandad Canyon Groundwater Work Plan" was submitted to the NMED on August 29, 2003, in response to an NMED letter dated December 2002 requesting that the Laboratory address deficiencies in groundwater characterization activities the NMED identified for the "Work Plan for Mortandad Canyon," LANL 1997, 56835), and the "Response to Request for Supplemental Information (RSI) Concerning the Work Plan for Mortandad Canyon," dated August 31, 1999. The characterization activities discussed in the groundwater work plan include the installation of 6 piezometers, 8 alluvial wells, 7 intermediate wells, 4 regional aquifer wells, and 16 shallow characterization boreholes, and associated sampling and analysis. The results of the groundwater investigations will be reported in the Mortandad Canyon investigation report, scheduled for delivery to the NMED by December 31, 2005.

2.4.3 DP Canyon

Field and laboratory activities related to the DP Canyon tracer study have been significantly reduced to minimal monitoring of DP Spring and Reach-3 with an automated Isco sampler. This effort will continue for the next two months. Continuous data from the bromide Temphion probes have been compiled and are currently being checked and evaluated. Bromide results from the manual sampling effort have also been compiled and are undergoing a quality assurance/quality control check. Surface-water samples collected throughout the study are currently being analyzed at the Laboratory's Hydrology, Geochemistry, and Geology Group (EES-6) facility for bromide, and the results will be reported by the end of October. All strontium-90 samples have been sent to a contract laboratory, and eighty percent of the results have been reported. These data sets will be used to assess groundwater movement, contaminant exchange with the tracer, and the fate and transport of strontium-90 as the tracer moves through the aquifer. Results from the tracer study will help support the evaluation of potential remedial alternatives in DP Canyon.

2.5 Deep Groundwater Wells — Project Team Leader: John McCann

This quarter, the Groundwater Protection Program supported the DOE in drilling four regional characterization wells. Wells R-2, R-4, and R-13 were installed in September, and well R-26 will be completed in October. In addition, a SAP for drilling wells R-1, R-28, R-33, and R-34 in Mortandad Canyon has been completed and will be submitted to the DOE in November.

Sampling was conducted this quarter at wells CdV-R-15-3 and CdV-R-37-2. Work continued on data management activities, including importing groundwater analytical data to the Laboratory's Water Quality and Hydrology Group (RRES-WQH) Water Quality Database (WQDB).

Appendix A presents hydrochemical data for MCOBT-4.4, fourth sample round; R-13, fourth sample round; CdV-R-15-3, tenth sample round; and CdV-R-37-2, sixth sample round. Data not returned from the

analytical laboratories include tritium results for R-13, CdV-R-15-3, and CdV-R-37-2; delta $^{18}O/^{16}O$ and delta $^{2}H/^{1}H$ results for CdV-R-15-3 and CdV-R-37-2; and delta $^{15}N/^{14}N$ results for MCOBT-4.4, R-13, CdV-R-15-3, and CdV-R-37-2. These data will be reported in future quarterly technical reports.

2.6 TA-21 Material Disposal Areas — Project Team Leader: Bill Criswell

SWMU 21-014 (MDA A) General's Tanks. Because the General's Tanks contain radionuclide inventories that exceed the thresholds in DOE STD 1027, "Hazards Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports," safety-basis documentation is being prepared in compliance with 10 CFR 830 Subpart B, "Nuclear Safety Management—Safety Basis Requirements." The tanks have been categorized as containing Nuclear Hazard Category 2 inventories; hence, a documented safety analysis must be prepared and approved by DOE/National Nuclear Security Administration (NNSA). The compilation and review of the safety analysis are being coordinated with the Laboratory's Safety Basis Office. The plan is scheduled for submittal to NNSA in the first quarter of FY2004.

SWMU 21-014 (MDA A) SWMU 21-015 (MDA B), SWMU 21-016(a)-99 (MDA T), SWMU 21-017(a)-99 (MDA U), and SWMU 21-018(a)-99 (MDA V). Investigation work plans are being developed for MDA A, MDA B, MDA T, MDA U, and MDA V.

All of these MDAs are undergoing categorization in accordance with 10 CFR 830, "Safety Basis." If the sites are categorized as Nuclear Hazard 2 or 3, then all field activities will require a documented safety analysis. These efforts are being coordinated with the Laboratory's Safety Basis Office. The categorizations are anticipated to be complete in the first quarter of FY2004. Compilation of documented safety analyses for the work activities will also start the first quarter of FY2004. A parallel effort to complete the investigation work plans for these MDAs and the safety basis analyses is in progress to ensure that safety requirements are incorporated into the plans.

2.7 TA-21 Non-Material Disposal Areas — Project Team Leaders: Mark Thacker and Becky Coel-Roback

SWMU 21-018(a)-99, NTISV Hot Demonstration at MDA V. Mineralogical analysis of the glass samples from the nontraditional in situ vitrification (NTISV) hot demonstration was completed. The interim measure completion report for the NTISV hot demonstration project at MDA V was finalized and submitted to NMED on September 30, 2003.

SWMU 21-011(k), VCM Activities. Voluntary corrective measure (VCM) field activities at the SWMU 21-011(k) outfall have been completed, including revegetation. Approximately 1850 yd^3 of low-level radioactively contaminated soil, sediment, and tuff have been excavated from the site. Each 100 yd^3 of generated waste was sampled for VOCs in accordance with the no-longer-contained-in determination received from NMED on November 25, 2002. The VOC results for 19 samples were transmitted to NMED. NMED agreed that hazardous waste management requirements do not apply, and the waste has been transported to TA-54, Area G, for disposal.

A sediment package in DP Canyon, just east of SWMU 21-011(k), was also removed. The approximately 15 yd^3 of material had levels of cesium-137 above the cleanup criteria for the site. This material was also disposed at TA-54, Area G.

The final radiological walkover survey was conducted to ensure that no "hot spots" above the cleanup criteria remain at the site. Some additional removal was conducted on the basis of the final radiological

survey results. Confirmation sampling has been conducted, and the results are expected soon. The VCM completion report has been drafted and will be submitted to NMED by the end of October 2003.

SWMU 21-013(d)-99, VCA Activities. The VCA completion report for the SWMU 21-013(d)-99 surface disposal areas was submitted to NMED on September 30, 2003.

SWMU 21-024(f), and AOC 21-030 and C-21-015 VCA Activities. Final site restoration was completed, and the VCA completion report for the SWMU 21-024(f) septic system and AOCs 21-030 and C-21-015, a sump and Building 21-45, respectively, was submitted to NMED on September 30, 2003.

SWMU 21-029, DP Tank Farm. The quarterly site inspection at the two hydrocarbon seep areas in DP Canyon was conducted for September 2003. The inspection report for the fourth quarter of FY2003 is included as Appendix B of this document. A letter requesting that DP Canyon quarterly inspections cease was submitted to NMED in May. Quarterly inspections will continue until RRES-RS receives concurrence from NMED.

TA-21 Combined Plans. A VCA/VCM plan is being developed for 13 outfalls and associated seepage pits, septic systems, and drainage systems, including SWMUs 21-006(c)-99, 21-022(h)-99, 21-024(a,d,e,g,h,j,k,n,o), 21-026(a)-99, and 21-027(a,c). Work has also begun on the development of a SAP for SWMUs 21-003-99 and 21-024(c) and on a combined SAP addendum for SWMUs 21-004(b)-99, 21-012(b), and 21-013(c) and AOCs 21-002(b) and 21-008.

2.8 TA-49, TA-50, and TA-54 — Project Team Leaders: John Hopkins and Bill Criswell

2.8.1 TA-49

PRS 49-001(a)-00, MDA AB, Areas 2, 2A, and 2B. Monthly moisture monitoring continued at this site during the fourth quarter of FY2003, and a review of the data for FY2003 is presented in Appendix C of this report. In accordance with the NMED letter of April 4, 2003 (NMED 2003, 76023), the moisture-monitoring frequency was reduced to bi-monthly for the neutron-based measurements. The continuous measurements utilizing the time domain reflectometry probes remain unchanged. The field efforts to perform these measurements during the first part of each monitoring month will continue so the entire year of data (October through September) will be reported in the annual report (previously, the annual report included September through August).

Erosion-control BMPs were inspected following precipitation events and remain in good condition.

2.8.2 TA-50

SWMUs 50-004(c) and 50-011(a). Twelve samples were collected from eight boreholes for characterization of these SWMUs prior to installation of new lines in the same area for the TA-50 influent pumphouse project.

MDA C. The IWP and historical investigation report for MDA C were submitted to NMED July 31, 2003.

2.8.3 TA-54

MDA H. The environmental assessment for MDA H was completed and will be submitted for public review the first quarter of FY2004.

Pore-Gas Monitoring. The quarterly pore-gas monitoring at MDA G and MDA L was completed as required by Module VIII of the Laboratory's Hazardous Waste Facility Permit. The field-screening information and final analytical data for the fourth quarter of FY2003 and a summary for the year is presented in Appendix D of this report.

MDA L. The investigation work plan and historical investigation report for MDA L were submitted to NMED August 29, 2003.

MDA G. The investigation work plan and historical investigation report for MDA G was submitted to NMED September 30, 2003.

2.9 Corrective Action Strategy — Project Team Leader: Richard Mirenda

2.9.1 Science-Based Monitoring Stewardship

The task leader developed a work scope and schedule for completing the Risk-Based End State Vision document to meet the October 31, 2003, deadline for the preliminary draft and the January 31, 2004, final draft. Scoping meetings were held with NNSA land-use and facility planners. The Task Leader completed a draft strategy for identifying cleanup sites that will require long-term environmental stewardship after DOE Environmental Management (EM) completion; for systematically optimizing long-term environmental stewardship across the facility; for transitioning from cleanup to long-term environmental stewardship; and for adaptively planning and implementing a long-term stewardship program that integrates recommendations from the National Academy of Sciences and the National Academy of Public Administration.

The task team completed the risk-based decision analysis for groundwater in the Mortandad Watershed, demonstrating a fully quantitative risk-based decision analysis that integrates and optimizes remediation and long-term monitoring objectives. This tool will be the technical foundation of risk-based cleanup, completion, and transition in a manner fully consistent with the EM-1 accelerated cleanup initiative. It is believed that this is the first application of coupled probabilistic risk assessment-decision analysis for cleanup in the DOE complex. The task team developed recommendations for expanding the application to develop an integrated, remediation-monitoring decision optimization model, specifically for designing a site-wide monitoring program that meets, at once, the requirements for detection, compliance, and surveillance monitoring.

2.9.2 Data Quality

Data-quality activities for the fourth quarter include the following:

- continued data assessment for the draft SWMU report;
- continued generating sample location maps, TA by TA, in order to assist team leader review of sample location coordinates;
- continued checking Sample Management Office (SMO)-vintage chemistry data orders, working with SMO personnel to upload MDA P Phase I data into the Environmental Restoration Database (ERDB);
- continued writing a new desk instruction for using the Verification and Validation Application;
- finalized LANL-ER Standard Operating Procedure (SOP) 1.13, "Initiating and Managing Data Set Requests"; and

- finalized the "Where is my data?" screen on the RRES-RS internal web site to allow data users to track the status of their data sets.

In addition, the data stewardship team continued to design and improve the external database web page to provide administrative authorities and other stakeholders real-time access to data.

2.9.3 Peer Review Team

Team members coordinated and participated in peer reviews for RRES-RS documents this quarter, as needed.

2.9.4 Data Validation

Data validators completed the validation of 396 suite combinations and verified 434 suite combinations during the fourth quarter. Data validators remained current with incoming data packages. The process consists of validating external laboratory data packages, based on the US Environmental Protection Agency's (EPA's) National Functional Guidelines. Data validators also assisted with the assignment and review of reporting qualifiers and reason codes for data sets in preparation.

2.9.5 Data Stewardship

2.9.5.1 Integrated Information Management System Support

The Data Stewardship Team continued to work with the Information Management Team to design and implement the Integrated Information Management System. The system consists, in part, of software tools intended to ensure consistency and accuracy in data and information management and to allow tracking and traceability of environmental data. In this quarter, the Data Stewardship Team continued to provide technical support for the development and implementation of the software applications described below.

- The Sample Tracking Application provides software tools that interface with the ERDB Planning Module to track the sample planning and analysis process, from planning and initiating a sampling event, generating field paperwork, ordering sample analytics, checking-in samples at the SMO, and shipping samples to analytical laboratories, to completing a sampling event. The Decision Analysis and Assessment Team is working to enhance tracking and other functions. This tool is also used by other organizations in RRES Division. A new version was delivered, which provides management tracking, reporting, editing of look-up tables, and location coordinates loading functions. A new screen entitled "Where is my data?" is now available to the data users at the RRES-RS internal web site and instantly provides the data status for recent sampling events.
- The Verification and Validation Application provides software tools that interface with the ERDB to track the verification and validation processes for analytical chemistry data. Verification is the comparison of the electronic record received in an electronic data deliverable file with the hard-copy data package. Validation is a process in which qualifier flags and accompanying reason codes are applied to the data to indicate the data quality. The application software has improved the productivity of the verification and validation process.
- The Spatial Mapping, Analysis, and Reporting Tool (SMART) Application provides software tools to enable the following functions: (1) allow data users to create lists on Geographical Information System (GIS) maps and view preliminary data sets; (2) allow data stewards to pull data sets,

review and edit records and generate reports (replacing the functions of the analysis and assessments toolbox); and (3) provide data users a tool for spatial and statistical analysis of a data set. SMART Phase I and Phase II have been delivered. Data stewards reviewed and provided comments on Phase I and II.

2.9.5.2 Data Stewardship and Reporting

The Data Stewardship Team continued to deliver quality data sets to meet RRES-RS needs in the fourth quarter. The team continued to make progress with the cleanup of legacy data. Data stewards also continued optimizing the data process.

Data Set Preparation. Team members prepared and delivered 30 electronic data sets for RRES-RS data users and RRES Division requests. In addition, 10 new sampling events were documented, and the required field paperwork for 162 samples was generated.

Data Management and Legacy Data Cleanup. Data management and legacy data cleanup activities continued this quarter. Data stewards generated the tables for the locations that do not have x-y coordinates in ERDB and distributed the tables to the responsible project team leaders so the missing coordinates can be added. The data stewards continued work on other types of global data cleanup, such as the removal of duplicate records in the ERDB, before use with the new SMART software. The Data Stewardship Team provided logic and review comments to the algorithm for automatically standardizing the reporting units in the ERDB. A field information review of 6158 sample records was performed using LANL-ER Desk Instruction 4.26, "Legacy Field Data Review Process," and the new field quality assurance screen in the SMO application.

Groundwater Data. Data steward personnel are writing a desk instruction regarding the acquisition, interim storage, and formal submission of electronic and hard-copy data to the RRES-RS Records Processing Facility. The desk instruction will also address documentation of geophysical data acquisition events, as well as a process for promptly notifying the data steward that data have been collected and a process for acquiring those data. The draft version of this desk instruction has been completed and is currently under review.

All well construction data and legacy geophysical data have been carefully reviewed and migrated to the WQDB database. The groundwater data steward also prepared and delivered analytical data tables to the data users for quarterly groundwater sampling.

2.9.6 Risk Assessment

Personnel from the Human Health and Ecological Risk Assessment Teams participated in the decision reviews for the SWMU 03-010(a) groundwater investigation work plan, the 260 outfall CMS report, and the SWMU 53-002(a)-99 VCA report. The team also completed read reviews of the status of Mortandad Canyon sediment investigation report, the 260 outfall Phase III RFI report, a VCA report for SWMU 21-024(f), a VCA report for SWMU 21-013(d)-99, the MDA L and MDA G investigation work plans, and the long-term environmental stewardship strategy document.

2.9.6.1 Human Health Risk

Team members provided support to the Los Alamos and Pueblo Canyons surface aggregate report team regarding human health and data quality issues. Team members also participated in Risk Assessment

Corporation discussions on site-wide risk assessment and provided documentation and rationale to NMED for using surrogate chemicals in risk assessments.

2.9.6.2 Ecological Risk

A manuscript submitted in the third quarter to *Human & Ecological Risk Assessment,* describing the methods and utility of deriving ecological preliminary remediation goals for chemicals, was accepted for publication. The guidance for deriving ecological preliminary remediation goals for chemicals of potential ecological concern was updated and finalized to coincide with the publication of the manuscript.

Team members continued working on the approach for calculating air ecological screening levels for animals living in burrows in the vicinity of vapor-phase VOCs. Two posters and a platform presentation were accepted for presentation at the November 2003 meeting of the Society of Environmental Toxicology and Chemistry.

Ecological Risk Database: Team members continued to implement the new, tiered toxicity reference value (TRV) development approach, which will use the EPA Eco-soil screening level TRV, if available. If no EPA Eco-soil screening level is available, then a geometric mean TRV will be derived. If primary toxicity study evaluation toxicity data are not sufficient to derive a geometric mean TRV, then a critical-study TRV will be derived instead. The team finalized the geometric mean TRV reports and distributed them for review and approval.

The team reviewed toxicity studies for VOCs as part of the inhalation TRV development process. A literature review included studies on acetone, benzene, carbon tetrachloride, chloromethane, 1,1-dichloroethene, dichlorodifluoromethane, methylene chloride, toluene, trichlorofluoromethane, 1,1,1-trichloroethane, and trichloroethene in mammals.

2.9.7 Native American Risk

Team members provided Department of Environmental and Cultural Preservation personnel at San Ildefonso Pueblo with a spreadsheet to calculate human health risks and conducted training on the use of the spreadsheet in July. Team members also discussed the risk assessment approach for the Los Alamos and Pueblo Canyons surface aggregate report with San Ildefonso preservation personnel.

The team submitted ash and sediment samples from lower Mortandad Canyon for radionuclide analyses.

2.10 Regulatory Compliance — Project Team Leader (Acting): Alison Dorries

No monthly meetings were held with NMED this quarter. A few informal discussions were held with NMED on topics such as ongoing RFIs, VCAs/VCMs, a closure report, RFI reports, VCA/VCM reports, CMS reports, and RSIs.

Regulatory Compliance staff performed the following tasks:

- Conducted inspections of RRES-RS field operations and waste management activities.
- Met with Los Alamos and Pueblo Canyons surface aggregate report team to develop the strategy for identifying chemicals of potential concern in the report. Team members identified appropriate regulatory standards and other numeric criteria that will be used to screen potential contaminants in surface water, alluvial groundwater, and sediments and develop a tiered screening approach to be used in identifying chemicals of potential ecological concern.

2.10.1 Long-Term Environmental Stewardship

RRES-RS staff members completed and submitted for peer review a document addressing the strategy for long-term environmental stewardship at Los Alamos National Laboratory.

Staff assisted the RRES Division Office in implementing an Environmental Management System. The implementation team has conducted a division-wide gap analysis; drafted a white paper that summarizes the effort and the findings and makes recommendations; provided revised language for the integrated safety management description document; and commented on the contractor requirements document that was issued as part of DOE Order 450.1, "Environmental Protection Program."

2.10.2 Waste Management and Waste Minimization

Staff provided field operations support for Area G debris cleanup, purge water disposal for the MCOBT 4.4 well in Mortandad Canyon, and low-level waste disposal for waste from SWMUs 21-011(k) and 21-024(f) at TA-21, which are nearing completion. Staff also performed drilling and sampling activities at TA-03 and TA-60 at the Asphalt Batch Plant.

Work began this quarter on the annual waste minimization awareness plan. Staff also tracked project-wide active waste storage and waste management progress.

2.10.3 Stakeholder Involvement

2.10.3.1 Outreach Activities

A risk communication panel discussion, sponsored by INTEL and the Laboratory's Remediation Services and Health, Safety, and Radiation Protection organizations, was held on July 16, 2003, at the College of Santa Fe for the Laboratory's 60th Anniversary events. Approximately 30 members of the public attended.

Staff arranged for technical personnel to participate in a Laboratory student tour of TA-21 on July 22, 2003. Approximately 19 students attended.

Staff prepared a summary report of deliverables for the Northern New Mexico Citizens Advisory Board to help them plan their review and comment opportunities in FY2004. Communication continues with the advisory board on several environmental issues. Staff attended waste management, environmental monitoring, and environmental restoration subcommittee meetings.

Communications staff organized and hosted the Laboratory's sixth MDA H focus group session held on August 20, 2003. Focus group members decided to have a final meeting on October 8, 2003, to reach a consensus regarding a preferred corrective measure for MDA H and to provide recommendations on long-term stewardship and ways to improve the focus group process.

In other activities, personnel volunteered to staff an institutional information booth at the Española Spirit Day and Española Fiestas and began to prepare logistics for a public meeting on groundwater to be held in Santa Fe on October 28, 2003.

Division Integration Activities: Communications staff helped the RRES-Division Office plan and coordinate the perchlorate public update meeting on August 6, 2003, in Los Alamos. Approximately 20 members of the public attended.

Staff met with RRES-MAQ personnel to discuss the permit renewal process and to discuss public outreach ideas and strategies. Participants decided to prepare display advertisements announcing the permit renewal. Staff finalized display advertisements for newspapers regarding the introduction of the Laboratory permit renewal process.

2.10.3.2 Virtual Library/Public Reading Room

Outreach staff continued building the external server to complete the RRES-RS Virtual Library and to maintain the external and internal web sites. Currently, this information is accessible only to internal staff because the NNSA decision is still pending regarding what types of documents can be available to the public on the external web pages. However, it appears that documents may not be accessible in the Virtual Library to external audiences because of the strict guidelines NNSA has set regarding documents.

RRES-RS staff delivered several documents to Community Relations Office Public Reading Room: the monthly CMS 16-021(c) report for June 2003; notice of approval of the Class III request for permit modification for seven SWMUs; well completion report for CdV-R-37-2; and the April–June 2003 quarterly technical report.

2.10.4 Facility Integration and Short-Term Stewardship

Participation continued in testing the new permit and requirement identification (PR-ID) system, which will ensure that RRES-RS is involved as early as possible in the project planning process to coordinate soil sampling with any soil disturbances, either as part of site characterization or cleanup confirmation for the Laboratory. The PR-ID will replace the ESH-ID and will come on line October 1, 2003.

Personnel continued to meet with the Laboratory's Infrastructure Projects Group (FWO-IP) D&D and PM Division staffs to provide information, regulatory status, current data and location maps and to recommend various approaches to address numerous issues associated with SWMUs and AOCs located at the sites where D&D and construction/land development activities are planned.

Staff corrected two sets of sampling data (specifically, location ID coordinate values) associated with sampling activities at AOCs 00-029 (b,c), which were surveyed in 1992. The 1992 survey was referenced to semi-permanent objects (subsequently destroyed) at the two sites. When the location IDs were plotted, they appeared to be 200–400 ft from the AOCs; staff reviewed old surveying field notes and translated/rotated the 1992 coordinate data into the appropriate AOC.

Facility integration and short-term stewardship personnel also performed the following activities this quarter.

- Continued to represent RRES-RS in weekly meetings regarding the revision of the Laboratory's Comprehensive Site Planning Laboratory Implementation Requirement (LIR 210-01-01).
- Participated in the review of and provided comments on approximately 116 excavation permits and corresponding ESH IDs.
- Continued to work with the SMO to ensure post-D&D and preconstruction confirmation sampling data and corresponding sample survey locations are input correctly into the ERDB, in accordance with RRES-RS project requirements.
- Continued integration activities with Laboratory's Solid Waste Regulatory Compliance Group (RRES-SWRC) and RRES-WQH on the Laboratory Tank Survey Project. Activities included

researching the Laboratory's Environmental Characterization and Remediation Group (RRES-ECR) documentation to verify tank survey accuracy.

- Revised three SOPs (LANL-ER-SOP-6.10, "Hand Auger and Thin-Wall Tube Sampler"; LANL-ER-SOP-6.24, "Sample Collection from Split-Spoon Samplers and Shelby Tube Samplers"; and LANL-ER-SOP-6.26, "Core Barrel Sampling for Subsurface Earth Materials") for the Quality Assurance Team. This is part of the periodic review and updating required by the RRES-RS Quality Assurance Program.

- Worked with RRES-RS personnel to revise LANL-ER-SOP-3.11, Rev 2," Geographic Surveying." This procedure will expand on how surveys must be conducted to ensure improved accuracy and will caution persons performing the surveys of the uncertainties associated with the Laboratory's Reference Monument Network.

2.10.4.1 D&D at TA-03

RRES-RS staff continued to work with D&D staff to plan the collection of confirmation samples at SWMU 03-003(c) following the D&D of the Syllac Building (Building 03-287), which is scheduled for late 2003. SWMU 03-003(c) was a temporary equipment storage area for used dielectric oils and capacitors and was located outdoors on the south side of the Syllac Building.

2.10.4.2 New Construction at TA-03

Meetings were held with FWO-IP and PM Division staffs to provide information, regulatory status, current data and location maps, and the recommended approaches to address numerous issues associated with SWMUs and AOCs located at the planned locations of the future security perimeter road and bypass road around TA-03; the adjustment of culverts beneath Anchor Ranch Road near the historic gun site at TA-08 and the associated waste management issues; the new TA-03 parking structure adjacent to Building SM-30 and collocated with SWMU 03-011 and adjacent to SWMU 03-010(a); and the new TA-03 parking lot to be located at the old Asphalt Batch Plant. Personnel conducted several visits to each site.

Staff prepared a field implementation plan and other planning documents for the collection of characterization/confirmation samples from SWMUs 03-009(a), 03-028, and 03-036(a,c,d) and AOCs 03-043(b), 03-036(b), and C-03-016, associated with the old and new Asphalt Batch Plant locations at TAs-03 and -60.

Work continued with facility personnel regarding the planned construction of a new storage vault and cartridge filter house adjacent to the Beryllium Facility (Building 03-141) at TA-03. The proposed location of the new storage vault overlaps the location of SWMU 03-056(l). A subcontractor collected confirmation samples within the boundary of SWMU 03-056(l) in support of a pending no-further-action determination. Analytical results showed no beryllium concentrations detected above the background value. Staff notified facility and PM Division staffs of the results, which allowed construction to begin on schedule, and worked with the SMO to ensure the preconstruction confirmation sampling data and corresponding sample survey locations are input correctly into the ERDB, in accordance with RRES-RS project requirements.

2.10.4.3 New Construction at TA-16

RRES-RS staff continued to provide information, regulatory status, current data and location maps, and the recommended approaches to address numerous SWMUs and AOCs located at the planned construction of the following new structures and supporting infrastructure: the new TA-16 Weapons Plant

Support Facility (Building 16-969) and corresponding detour and access roads, security fences, and parking lots within the Administrative Area at TA-16 and a new fueling facility. Staff conducted numerous site visits with TA-16 Engineering Sciences and Applications Division—Operations Group (ESA-OPS) staff to confirm SWMU/AOC locations in relation to planned construction locations. Staff also prepared a memorandum of understanding between RRES-RS and ESA-OPS to ensure future access to SWMU 16-015(b) following the installation of a new fueling station near the new Weapons Plant Support Facility (Building 16-969).

2.10.5 Deployed Regulatory Coordinators

Regulatory coordinators provided assistance to project remediation teams regarding regulatory compliance issues for activities within RRES-RS this quarter. Deployed personnel from the Laboratory's RRES-WQH and RRES-SWRC Groups participated in document reviews as subject matter experts regarding water issues and hazardous and solid waste issues, respectively.

RRES-RS, RRES-WQH, and RRES-SWRC personnel completed peer reviews of the VCA completion reports for SWMU 21-024(f) and AOCs 21-030 and C-21-015 and for SWMU 21-013(d)-99; investigation work plans and historical investigation reports for MDAs C, G, and L; the interim measure completion report for the NTISV at SWMU 21-018(a)-99; the DP Road VCA/interim action completion report, the Phase III RFI report for the 260 outfall [SWMU 16-021(c)-99]; sections of the SWMU report; and the second reformatted MDA P deliverable, the Phase II closure implementation report (submitted to NMED on July 25, 2003).

2.10.5.1 Water Regulatory Support

This quarter, staff presented a paper entitled "Implementation of LANL's Multi-Sector General Permit for Storm Water Discharges" at the North American Surface Water Quality Conference and Exposition in San Antonio, Texas.

A briefing was provided to EPA Permitting and Enforcement Branches of Region VI in Dallas, Texas, discussing the Laboratory's intention to pursue an Individual Permit for discharges of stormwater from SWMUs at the Laboratory. Staff then briefed the NMED-Surface Water Quality Bureau regarding the meeting with EPA. Negotiations will continue on the individual permitting efforts in October and November 2003.

Staff prepared a response letter to the DOE Oversight Bureau regarding CGRP impacts to SWMUs during tree thinning, fuel mitigation, and defensible space efforts.

2.10.5.2 TA-02 Activities

Staff continued integration with the CGRP for remediation work at TA-02 to be performed by their contractors. Sixty-eight soil samples were collected during CGRP D&D activities, and staff finalized Revision 1 of the memorandum of understanding between CGRP and RRES-RS for characterization sampling and remediation activities.

2.10.5.3 TA-49, -50 and -54 Activities

Meetings were held with TA-50 staff to ensure the successful integration of RRES-ECR supplemental RFI sampling activities for SWMUs 50-011(a) and 50-004(a)-00 with construction activities associated with the new pumphouse and influent tank vault at TA-50. The start of construction on the new pumphouse was

delayed by several months; therefore, RRES-ECR began conducting the planned supplemental RFI sampling during September 2003.

Staff provided responses to the Laboratory's Ecology Group (RRES-ECO) comments on potential inconsistencies between the MDA H CMS report and the draft environmental assessment for MDA H corrective measures. Assistance was provided to resolve issues regarding the CMS in support of DOE's National Environmental Policy Act analysis of MDA H corrective measures.

2.10.6 PRS Deliverable Information Management

2.10.6.1 Compliance Schedule Tracking

Potential Release Site Deliverables Team members provided information to management regarding baseline deliverables and scheduling.

2.10.6.2 SWMU Report

Management and staff reprioritized the SWMU report working team to assist in the submittal of the Laboratory's permit renewal applications for the Hazardous Waste Facility Permit. The team revisited and corrected data issues associated with the four chapters that accompanied the permit renewal applications submitted in July and August. All chapters were submitted and complete for the applications.

Staff continues to work on the draft SWMU report. Data stewards are verifying the analytical data for the report, and the report continues to go through the six rigorous review cycles. Approximately 53% percent of the report has gone through all 6-review cycles. The publication date for the SWMU report will depend on the length of review cycles.

2.10.7 Surface Water Activities and BMPs

BMP maintenance activities completed this quarter consisted of installing straw wattles, riprap and sandbags at TAs-14, -15, -36, and -40.

This quarter, staff completed two sets of annual site compliance evaluations required by the Multi-Sector General Permit. The BMP Inspection and Maintenance Team completed follow-up maintenance resulting from the first set of compliance evaluation findings at SWMUs covered by the Laboratory's Umbrella SWMU/Storm Water Pollution Prevention Plan. The BMP Inspection and Maintenance Team will complete follow-up maintenance resulting from findings of the second set of annual site compliance evaluations during the first part of October.

Surface Water Site Assessments (LANL-ER-SOP-2.01) were completed this quarter at TAs-01, -02, -09, -15, -16, -21, and -33.

Staff assisted the DOE Oversight Bureau in siting and installing single-stage samplers to collect stormwater runoff from SWMUs within Los Alamos Canyon near TA-21 and Hillside SWMUs. Nearly twenty samples were collected during August and September.

The final engineering design was started for a solution to the severe erosion occurring at Hillside 137 within Los Alamos Canyon. The design had been put on hold when a proposal for further development at the Los Alamos Inn was presented to Los Alamos County.

Staff provided support to FWO facilities within TA-54 and TA-60 regarding Storm Water Pollution Prevention Plan modifications and BMP installations and completed channel bank stabilization within the upper and middle reaches of Pueblo Canyon. The BMP Team coordinated with the Canyons Team to install jute matting in several locations with elevated plutonium concentrations.

2.10.8 Work-Off and Permit Modification Activities

Staff peer-reviewed and commented on VCA completion reports for SWMUs 21-013(d)-99 and 21-024(f). Staff also compiled a list of sites for which remedial actions have been conducted to prepare for a presentation by the Deputy Project Director for Remediation Services to New Mexico state representatives and senators. Staff worked on the Long-Term Environmental Stewardship Team that finished drafting (for peer review) the strategy document for developing an integrated Long-Term Environmental Stewardship program at the Laboratory.

2.11 Land Transfer — Project Team Leader (Acting): Terry Rust

Staff members continue to participate as members of the Laboratory's Land Transfer Team and the DOE's Land Transfer Project Office Team by attending regularly scheduled land transfer working group meetings and responding to information requests. These teams are responsible for the activities leading up to the final transfer of Laboratory property. Staff also completed and submitted the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) 120(h) reports for two sub-parcels, TA-21 West (A-15) and DP Road South (A-8), to DOE.

2.12 Documentation and Tracking — Project Team Leader: Stephen Bolivar

2.12.1 Information Management

The primary focus of Information Management personnel is business process reengineering. This effort focuses on four main activities: rebuilding the ERDB, which is completed; developing a series of applications for the SMO work, which are used to get the data into the database (completed); developing a SMART Application, which is used to get data out of the database; and GeoPro which is an application used to track modeling input and output parameters. Development efforts this quarter focused on SMART; SMART applications are used to extract data from the database and produce data for evaluation, both in a desktop and web-based environment. The Phase I portion of this application allows user-determined data pulls, provides the ability to select and display a sample event in a GIS format, all on a desktop environment. The ability to view tabular data in a GIS format was completed three months ahead of schedule. Several demonstrations have proved the concept and provided opportunity for evaluation. The development team is now making final modifications. This application will go into production early next quarter. The associated requirements, design, and test documents were also produced. As part of this effort, cleanup of unit standardizations was also completed.

Personnel continue to synchronize database changes with RRES-WQH as part of a data-sharing agreement, ensuring that both organizations maintain identical structures to facilitate data transfers. Transfers now occur on a periodic schedule, and databases are kept in sync.

2.12.2 Records Management

Records Processing Facility personnel received 80 walk-in, e-mail, and phone requests for documents. There were 617 database queries, and 7309 retrieved pages. There are now 234,102 documents for

query on the Records Processing Facility database. The microfilm process was replaced by a more efficient scanning process. Staff trained on the new scanning equipment, and LANL-ER-QP 4.3, "Records Management," was revised to reflect the new process.

SMO personnel are scanning more than 10,000 data packages to meet DOE dual-storage requirements. To date, 70% of the documents have been scanned electronically, with completion scheduled for this calendar year. A process improvement was incorporated whereby data packages, once scanned, are shipped directly to the Information Management Division—Information and Records Management Group (IM-5). This has greatly reduced the workload for Records Processing Facility personnel.

Three hundred twenty-four roles of film will be transferred to electronic media as part of the new scanning process. Various examples of film types were sent to three vendors for evaluation. The most cost effective was selected and a statement of work was issued, and a response from the vendor is pending. When completed, the scanned documents will be available electronically for anyone wishing to view a historical document.

The Records Processing Facility and all corresponding documents were successfully moved to a new facility. Staff continue to review the consequences and steps needed to convert to a Lotus domino.com software package. This package is being required by RRES Division to establish a formal electronic records retrieval system.

2.12.3 Sample Management Office

The SMO issued 57 field data groups (number of discrete samples) and had 266 customers this quarter. Personnel handled and shipped 4234 containers. These totals are 29% below the two-year average and 7% below the five-year average. This reduction is the result of budget uncertainties and the decision to move new work to out-years. For the year, the SMO handled 10, 231 containers. The effort to scan 10,000 SMO analytical data packages is 70% complete and will be completed by the end of the calendar year. As a process improvement, these scanned data packages are being shipped directly to IM-5, reducing the Records Processing Facility work load. The files are locally available electronically.

Efforts to move all equipment from the Field Support Facility building continue, in preparation for a building departure. Personnel are working with other RRES groups to identify items for transfer and items for salvage. About 85% of the yard and storage areas have been cleared.

2.12.4 Computer Support

Computer support personnel received 301 service requests this quarter; 32 remain open. For the fiscal year, 1188 requests have been received and 44 remain open. As part of a 4-year maintenance plan, 25 aging computer systems were replaced. Staff decided to continue to use Image Cast for placing computer software on new systems. Two new printers and a new standard query language (SQL) server were tested and installed. A software package, called SMS, was used to automatically deploy vulnerability patches for virus and worm protection to more than 100 machines. A single backup server was replaced by two machines. This will increase performance by more than 40%. As part of a self-assessment, we were informed that we cannot make the Virtual Library available on the external web. It will remain available to internal users, or to external users with SMART cards.

2.12.5 Geographic Information System

Seventy-eight users, from 11 unique groups, accessed the flat-file repository and/or relational database management system to view spatial data. The Project's GIS Team and EES Cartographic Laboratory (GISLab) produced 77 map products and/or figures. The Emergency Management and Response Center has started to copy feature data for MDAs and potential release sites into their facility. The Geodetic Survey SOP was undated to comply with the US Army Corps of Engineers engineer manual. New and revised themes for two AOCs, all PRSs, and location IDs were updated and issued.

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Appendix A

Groundwater Sampling Results,
Wells R-13, CdV-R-15-3, CdV-R-37-2, and MCOBT-4.4

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Table A-1
Samples Taken at Wells

Sample ID	Location ID	Depth (ft)	Media	Alkalinity	Ammonia	Anions[a]	Cyanide	Metals	Phosphorus	Stable Isotopes	Total Kjeldahl Nitrogen	High Explosives	Humic Acid	Polychlorinated Biphenyls
R-13, Round 4														
GW05-03-51693	R-13	958–1018	Groundwater, regional	—	—	—	1770S	1770S	—	1772S 1773S	1770S	1769S	—	1769S
GW05-03-51694	R-13	958–1018	Groundwater, regional	1770S	1770S	1770S	—	1770S	1770S	—	1770S	—	1774S	—
CdV-R-15-3, Round 10														
GW15-03-51669	CdV-R-15-3	1254	Groundwater, regional	—	1719S	—	—	1719S	—	1730S 1731S	—	1717S	—	—
GW15-03-51670	CdV-R-15-3	1254	Groundwater, regional	1719S	1719S	1719S	—	1719S	1719S	—	1719S	—	—	—
GW15-03-51671	CdV-R-15-3	1350	Groundwater, regional	—	1723S	1723S	—	1723S	—	1733S 1734S	—	1721S	—	—
GW15-03-51672	CdV-R-15-3	1350	Groundwater, regional	1723S	1723S	1723S	—	1723S	1723S	—	1723S	—	—	—
GW15-03-51675	CdV-R-15-3	1640	Groundwater, regional	—	1725S	—	—	1725S	—	1736S 1737S	—	1724S	—	—
GW15-03-51676	CdV-R-15-3	1640	Groundwater, regional	1725S	1725S	1725S	—	1725S	1725S	—	1725S	—	—	—
CdV-R-37-2, Round 6														
GW37-03-51660	CdV-R-37-2	1200	Groundwater, regional	—	1728S	—	—	1728S	—	1739S 1740S	—	1727S	—	—
GW37-03-51661	CdV-R-37-2	1200	Groundwater, regional	1728S	1728S	1728S	—	1728S	1728S	—	1728S	—	—	—
GW37-03-51662	CdV-R-37-2	1359	Groundwater, regional	—	1744S	1744S	—	1744S	—	1746S 1747S	—	1743S	—	—
GW37-03-51663	CdV-R-37-2	1359	Groundwater, regional	1744S	1744S	1744S	—	1744S	1744S	—	1744S	—	—	—
GW37-03-51664	CdV-R-37-2	1551	Groundwater, regional	—	1755S	—	—	1755S	—	1751S 1752S	—	1753S	—	—
GW37-03-51665	CdV-R-37-2	1551	Groundwater, regional	1755S	1755S	1755S	—	1755S	1755S	—	1755S	—	—	—
MCOBT-4.4, Round 4														
GW05-03-51696	MCOBT-4.4	482–524	Groundwater, intermediate depth perched	—[b]	—	—	1763S[c]	1763S	—	1766S 1767S	1763S	1762S	—	1762S
GW05-03-51697	MCOBT-4.4	482–524	Groundwater, intermediate depth perched	1763S	1763S	1763S	—	1763S	1763S	—	1763S	—	1768S	—

Table A-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Pesticides	Semivolatile Organic Compounds	Total Organic Carbon	Volatile Organic Compounds	Strontium-90	Americium-241	Gamma Spectroscopy	Gross Alpha/Beta	Tritium	Isotopic Plutonium	Isotopic Uranium
R-13, Round 4														
GW05-03-51693	R-13	958–1018	Groundwater, regional	1769S	1769S	1770S	1769S	1771S	1771S	1771S	1771S	1775S	1771S	1771S
GW05-03-51694	R-13	958–1018	Groundwater, regional	—	—	—	—	1771S	1771S	1771S	—	—	1771S	1771S
CdV-R-15-3, Round 10														
GW15-03-51669	CdV-R-15-3	1254	Groundwater, regional	—	—	1719S	—	—	—	—	—	1732S	—	—
GW15-03-51670	CdV-R-15-3	1254	Groundwater, regional	—	—	—	—	—	—	—	—	—	—	—
GW15-03-51671	CdV-R-15-3	1350	Groundwater, regional	—	—	1723S	—	—	—	—	—	1735S	—	—
GW15-03-51672	CdV-R-15-3	1350	Groundwater, regional	—	—	—	—	—	—	—	—	—	—	—
GW15-03-51675	CdV-R-15-3	1640	Groundwater, regional	—	—	1725S	—	—	—	—	—	1738S	—	—
GW15-03-51676	CdV-R-15-3	1640	Groundwater, regional	—	—	—	—	—	—	—	—	—	—	—
CdV-R-37-2, Round 6														
GW37-03-51660	CdV-R-37-2	1200	Groundwater, regional	—	—	1728S	—	—	—	—	—	1741S	—	—
GW37-03-51661	CdV-R-37-2	1200	Groundwater, regional	—	—	—	—	—	—	—	—	—	—	—
GW37-03-51662	CdV-R-37-2	1359	Groundwater, regional	—	—	1744S	—	—	—	—	—	1748S	—	—
GW37-03-51663	CdV-R-37-2	1359	Groundwater, regional	—	—	—	—	—	—	—	—	—	—	—
GW37-03-51664	CdV-R-37-2	1551	Groundwater, regional	—	—	1755S	—	—	—	—	—	1750S	—	—
GW37-03-51665	CdV-R-37-2	1551	Groundwater, regional	—	—	—	—	—	—	—	—	—	—	—
MCOBT-4.4, Round 4														
GW05-03-51696	MCOBT-4.4	482–524	Groundwater, intermediate depth perched	1762S	1762S	1763S	1762S	1764S	1764S	1764S	1764S	1764S	1764S	1764S
GW05-03-51697	MCOBT-4.4	482–524	Groundwater, intermediate depth perched	—	—	—	—	1764S	1764S	1764S	—	—	1764S	1764S

[a] Anions = Ammonia, bromide, chloride, fluoride, nitrate/nitrite, oxalate, perchlorate, sulfate.

[b] — = Not available or applicable.

[c] Laboratory sample number.

Table A-2
Well R-13 Screen 1 Fourth Round Sample Results: Data Summary for Inorganic Chemicals

Parameter and Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Field Parameter												
Field Alkalinity (total as $CaCO_3$)	1	958–1018	05/22/03	NF[e]	1	1	47000	—[f]	—	—	—	—
Dissolved Oxygen	1	958–1018	05/22/03	NF	1	1	5280	—	—	—	—	—
pH	1	958–1018	05/22/03	NF	1	1	8.17	—	>6 & <9	0/1	>6 & <9	0/1
Specific Conductance (µS/cm)	1	958–1018	05/22/03	NF	1	1	141	—	—	0/1	—	0/1
Temperature (°C)	1	958–1018	05/22/03	NF	1	1	21.8	—	—	0/1	—	0/1
Turbidity (NTU[g])	1	958–1018	05/22/03	NF	1	1	0.18	—	—	0/1	—	0/1
Analyte												
Lab Alkalinity (total as $CaCO_3$)	1	958–1018	05/22/03	F[h]	1	1	61200	—	—	—	—	—
Aluminum	1	958–1018	05/22/03	F	1	1	40.5	—	50	0/1	5000	0/1
Aluminum	1	958–1018	05/22/03	NF	1	0	—	[100]	—	—	—	—
Ammonia (as N)	1	958–1018	05/22/03	F	1	0	—	[50]	—	—	—	—
Antimony	1	958–1018	05/22/03	F	1	0	—	[2]	6	0/1	—	—
Antimony	1	958–1018	05/22/03	NF	1	0	—	[2]	—	—	—	—
Arsenic	1	958–1018	05/22/03	F	1	0	—	[5]	50	0/1	100	0/1
Arsenic	1	958–1018	05/22/03	NF	1	0	—	[5]	—	—	—	—
Barium	1	958–1018	05/22/03	F	1	1	28.5	—	2000	0/1	1000	0/1
Barium	1	958–1018	05/22/03	NF	1	1	26.7	—	—	—	—	—
Beryllium	1	958–1018	05/22/03	F	1	0	—	[0.2]	4	0/1	—	—
Beryllium	1	958–1018	05/22/03	NF	1	0	—	[0.2]	—	—	—	—
Boron	1	958–1018	05/22/03	F	1	1	21.5	—	—	—	750	0/1
Boron	1	958–1018	05/22/03	NF	1	1	21.5	—	—	—	—	—
Bromide	1	958–1018	05/22/03	F	1	0	—	[200]	—	—	—	—
Cadmium	1	958–1018	05/22/03	F	1	0	—	[1]	5	0/1	10	0/1

Table A-2 (continued)

Parameter and Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Cadmium	1	958–1018	05/22/03	NF	1	0	—	[1]	—	—	—	—
Calcium	1	958–1018	05/22/03	F	1	1	14700	—	—	—	—	—
Calcium	1	958–1018	05/22/03	NF	1	1	13800	—	—	—	—	—
Chloride	1	958–1018	05/22/03	F	1	1	2300	—	250000	0/1	250000	0/1
Chromium	1	958–1018	05/22/03	F	1	1	3.73	—	100	0/1	50	0/1
Chromium	1	958–1018	05/22/03	NF	1	1	3.08	—	—	—	—	—
Cobalt	1	958–1018	05/22/03	F	1	1	1.6	—	—	—	50	0/1
Cobalt	1	958–1018	05/22/03	NF	1	0	—	[5]	—	—	—	—
Copper	1	958–1018	05/22/03	F	1	0	—	[5]	1300	0/1	1000	0/1
Copper	1	958–1018	05/22/03	NF	1	0	—	[5]	—	—	—	—
Cyanide (total)	1	958–1018	05/22/03	NF	1	0	—	[5]	—	—	—	—
Fluoride	1	958–1018	05/22/03	F	1	1	354	—	4000	0/1	1600	0/1
Iron	1	958–1018	05/22/03	F	1	1	15.9	—	300	0/1	1000	0/1
Iron	1	958–1018	05/22/03	NF	1	1	14.5	—	—	—	—	—
Lead	1	958–1018	05/22/03	F	1	0	—	[2]	15	0/1	50	0/1
Lead	1	958–1018	05/22/03	NF	1	0	—	[2]	—	—	—	—
Magnesium	1	958–1018	05/22/03	F	1	1	3710	—	—	—	—	—
Magnesium	1	958–1018	05/22/03	NF	1	1	3490	—	—	—	—	—
Manganese	1	958–1018	05/22/03	F	1	0	—	[5]	50	0/1	200	0/1
Manganese	1	958–1018	05/22/03	NF	1	0	—	[5]	—	—	—	—
Mercury	1	958–1018	05/22/03	F	1	0	—	[0.2]	2	0/1	—	—
Mercury	1	958–1018	05/22/03	NF	1	0	—	[0.2]	—	—	2	0/1
Molybdenum	1	958–1018	05/22/03	F	1	1	1.05	—	—	—	—	—
Molybdenum	1	958–1018	05/22/03	NF	1	1	1.1	—	—	—	—	—
Nickel	1	958–1018	05/22/03	F	1	0	—	[5]	100	0/1	200	0/1
Nickel	1	958–1018	05/22/03	NF	1	0	—	[5]	—	—	—	—
Nitrate + Nitrite (as N)	1	958–1018	05/22/03	F	1	1	710	—	10000	0/1	—	—

Table A-2 (continued)

Parameter and Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Oxalate	1	958–1018	05/22/03	F	1	0	—	[1000]	—	—	—	—
Perchlorate	1	958–1018	05/22/03	F	1	0	—	[4]	—	—	—	—
Phosphorus (total)	1	958–1018	05/22/03	F	1	1	22	—	—	—	—	—
Potassium	1	958–1018	05/22/03	F	1	1	1440	—	—	—	—	—
Potassium	1	958–1018	05/22/03	NF	1	1	1350	—	—	—	—	—
Selenium	1	958–1018	05/22/03	F	1	0	—	[5]	50	0/1	50	0/1
Selenium	1	958–1018	05/22/03	NF	1	1	2.98	—	—	—	—	—
Silica	1	958–1018	05/22/03	F	1	1	35300	—	—	—	—	—
Silica	1	958–1018	05/22/03	NF	1	1	33100	—	—	—	—	—
Silver	1	958–1018	05/22/03	F	1	0	—	[5]	100	0/1	50	0/1
Silver	1	958–1018	05/22/03	NF	1	0	—	[5]	—	—	—	—
Sodium	1	958–1018	05/22/03	F	1	1	11100	—	—	—	—	—
Sodium	1	958–1018	05/22/03	NF	1	1	10500	—	—	—	—	—
Strontium	1	958–1018	05/22/03	F	1	1	55.1	—	—	—	—	—
Strontium	1	958–1018	05/22/03	NF	1	1	51.7	—	—	—	—	—
Sulfate	1	958–1018	05/22/03	F	1	1	3060	—	250000	0/1	600000	0/1
Thallium	1	958–1018	05/22/03	F	1	1	0.031	—	2	0/1	—	—
Thallium	1	958–1018	05/22/03	NF	1	1	0.042	—	—	—	—	—
Total Kjeldahl Nitrogen	1	958–1018	05/22/03	F	1	1	140	—	—	—	—	—
Total Kjeldahl Nitrogen	1	958–1018	05/22/03	NF	1	1	141	—	—	—	—	—
Uranium	1	958–1018	05/22/03	F	1	1	0.477	—	20	0/1	5000	0/1
Uranium	1	958–1018	05/22/03	NF	1	1	0.473	—	—	—	—	—
Vanadium	1	958–1018	05/22/03	F	1	0	—	[7.11]	—	—	—	—
Vanadium	1	958–1018	05/22/03	NF	1	0	—	[6.58]	—	—	—	—
Zinc	1	958–1018	05/22/03	F	1	0	—	[5]	5000	0/1	10000	0/1
Zinc	1	958–1018	05/22/03	NF	1	0	—	[5]	—	—	—	—

Table A-2 (continued)

Parameter and Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Stable Isotope (‰)												
δD	1	958–1018	05/22/03	NF	1	1	–80	—	—	—	—	—
$\delta^{15}N$	1	958–1018	05/22/03	NF	1	1	NRL[i]	—	—	—	—	—
$\delta^{18}O$	1	958–1018	05/22/03	NF	1	1	–10.5	—	—	—	—	—

[a] The static water level for the regional aquifer at R-13 was 833.7 ft when the well was drilled.

[b] MCL = Maximum contaminant level. US Environmental Protection Agency (EPA) MCLs are from *National Primary Drinking Water Regulations*, 40 CFR Part 141. US EPA secondary MCLs are from *National Secondary Drinking Water Regulations*, 40 CFR Part 143. State of New Mexico MCLs are from *Drinking Water Regulations*, 20 NMAC 7.1.

[c] NMED = New Mexico Environment Department.

[d] State of New Mexico groundwater standards are from *New Mexico Water Quality Control Commission Regulations, Ground and Surface Water Protection*, 20 NMAC 6.2.

[e] NF = Nonfiltered.

[f] — = Not available or not applicable.

[g] NTU = Nephelometric turbidity unit.

[h] F = Filtered.

[i] NRL = Not returned from the laboratory.

Table A-3
Well R-13 Screen 1 Fourth Round Sample Results: Data Summary for Detected Organic Chemicals

Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
DDE[4,4'-]	1	958–1018	05/22/03	NF[e]	1	1	0.0059	—[f]	—	—	—	—
Dissolved Organic Carbon	1	958–1018	05/22/03	F[g]	1	1	460	—	—	—	—	—
Total Organic Carbon	1	958–1018	05/22/03	NF	1	1	333	—	—	—	—	—

[a] The static water level for the regional aquifer at R-13 was 833.7 ft when the well was drilled.

[b] MCL = Maximum contaminant level. US Environmental Protection Agency (EPA) MCLs are from *National Primary Drinking Water Regulations*, 40 CFR Part 141. US EPA secondary MCLs are from *National Secondary Drinking Water Regulations*, 40 CFR Part 143. State of New Mexico MCLs are from *Drinking Water Regulations*, 20 NMAC 7.1.

[c] NMED = New Mexico Environment Department.

[d] State of New Mexico groundwater standards are from *New Mexico Water Quality Control Commission Regulations, Ground and Surface Water Protection*, 20 NMAC 6.2.

[e] NF = Nonfiltered.

[f] — = Not available or not applicable.

[g] F = Filtered.

Table A-4
Well R-13 Screen 1 Fourth Round Sample Results: Data Summary for Radionuclides

Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (pCi/L)	Nondetected Value (pCi/L)	Drinking Water MCL[b] (pCi/L)	Frequency of Detects > Drinking Water MCL
Americium-241	1	958–1018	05/22/03	F[c]	1	0	—[d]	[0.00803]	15	0/2
Americium-241	1	958–1018	05/22/03	NF[e]	1	0	—	[0.00787]	—	—
Cesium-137	1	958–1018	05/22/03	F	1	0	—	[–0.788]	—	—
Cesium-137	1	958–1018	05/22/03	NF	1	0	—	[0.314]	—	—
Cobalt-60	1	958–1018	05/22/03	F	1	0	—	[0.0892]	—	—
Cobalt-60	1	958–1018	05/22/03	NF	1	0	—	[0.594]	—	—
Gross Alpha/Beta Radiation	1	958–1018	05/22/03	NF	1	0	—	[1.94]	—	—
Gross Beta Radiation	1	958–1018	05/22/03	NF	1	1	2.58	—	—	—
Gross Gamma Radiation	1	958–1018	05/22/03	NF	1	0	—	[55.4]	—	—
Plutonium-238	1	958–1018	05/22/03	F	1	0	—	[0.00477]	15	0/1
Plutonium-238	1	958–1018	05/22/03	NF	1	0	—	[2.07E–09]	—	—
Plutonium-239	1	958–1018	05/22/03	F	1	0	—	[0.0405]	15	0/1
Plutonium-239	1	958–1018	05/22/03	NF	1	0	—	[0.013]	—	—
Strontium-90	1	958–1018	05/22/03	F	1	0	—	[0.0631]	8	0/1
Strontium-90	1	958–1018	05/22/03	NF	1	0	—	[0.0111]	—	—
Uranium-234	1	958–1018	05/22/03	F	1	1	0.266	—	—	—
Uranium-234	1	958–1018	05/22/03	NF	1	1	0.313	—	—	—
Uranium-235	1	958–1018	05/22/03	F	1	0	—	[0.00448]	—	—
Uranium-235	1	958–1018	05/22/03	NF	1	0	—	[0.00704]	—	—
Uranium-238	1	958–1018	05/22/03	F	1	1	0.105	—	—	—
Uranium-238	1	958–1018	05/22/03	NF	1	1	0.115	—	—	—

[a] The static water level for the regional aquifer at R-13 was 833.7 ft when the well was drilled.

[b] MCL = Maximum contaminant level. US Environmental Protection Agency (EPA) MCLs are from *National Primary Drinking Water Regulations*, 40 CFR Part 141. US EPA secondary MCLs are from *National Secondary Drinking Water Regulations*, 40 CFR Part 143. State of New Mexico MCLs are from *Drinking Water Regulations*, 20 NMAC 7.1.

[c] F = Filtered.

[d] — = Not available or not applicable.

[e] NF = Nonfiltered.

Table A-5
Well CdV-R-15-3 Screen 4 Tenth Round Sample Results: Data Summary for Inorganic Chemicals

Parameter and Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Field Parameter												
Field Alkalinity (total as $CaCO_3$)	4	1254	05/01/03	NF[e]	1	1	55000	—[f]	—	—	—	—
Dissolved Oxygen	4	1254	05/01/03	NF	1	1	4400	—	—	—	—	—
pH	4	1254	05/01/03	NF	1	1	8.32	—	>6 & <9	0/1	>6 & <9	0/1
Specific Conductance (µS/cm)	4	1254	05/01/03	NF	1	1	124	—	—	0/1	—	0/1
Temperature (°C)	4	1254	05/01/03	NF	1	1	17.9	—	—	0/1	—	0/1
Turbidity (NTU[g])	4	1254	05/01/03	NF	1	1	0.39	—	—	0/1	—	0/1
Analyte												
Lab Alkalinity (total as $CaCO_3$)	4	1254	05/01/03	F[h]	1	1	51000	—	—	—	—	—
Aluminum	4	1254	05/01/03	F	1	1	45.2	—	50	0/1	5000	0/1
Aluminum	4	1254	05/01/03	NF	1	1	49.7	—	—	—	—	—
Ammonia (as N)	4	1254	05/01/03	F	1	1	40	—	—	—	—	—
Ammonia (as N)	4	1254	05/01/03	NF	1	0	—	[50]	—	—	—	—
Antimony	4	1254	05/01/03	F	1	0	—	[2]	6	0/1	—	—
Antimony	4	1254	05/01/03	NF	1	0	—	[2]	—	—	—	—
Arsenic	4	1254	05/01/03	F	1	0	—	[5]	50	0/1	100	0/1
Arsenic	4	1254	05/01/03	NF	1	0	—	[5]	—	—	—	—
Barium	4	1254	05/01/03	F	1	1	20.5	—	2000	0/1	1000	0/1
Barium	4	1254	05/01/03	NF	1	1	21.5	—	—	—	—	—
Beryllium	4	1254	05/01/03	F	1	0	—	[0.2]	4	0/1	—	—
Beryllium	4	1254	05/01/03	NF	1	0	—	[0.2]	—	—	—	—
Bromide	4	1254	05/01/03	F	1	0	—	[200]	—	—	—	—
Cadmium	4	1254	05/01/03	F	1	0	—	[1]	5	0/1	10	0/1
Cadmium	4	1254	05/01/03	NF	1	0	—	[1]	—	—	—	—

Table A-5 (continued)

Parameter and Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Calcium	4	1254	05/01/03	F	1	1	10600	—	—	—	—	—
Calcium	4	1254	05/01/03	NF	1	1	10800	—	—	—	—	—
Chloride	4	1254	05/01/03	F	1	1	1440	—	250000	0/1	250000	0/1
Chromium	4	1254	05/01/03	F	1	1	0.893	—	100	0/1	50	0/1
Chromium	4	1254	05/01/03	NF	1	1	6.36	—	—	—	—	—
Cobalt	4	1254	05/01/03	F	1	1	4.07	—	—	—	50	0/1
Cobalt	4	1254	05/01/03	NF	1	1	5.61	—	—	—	—	—
Copper	4	1254	05/01/03	F	1	0	—	[5]	1300	0/1	1000	0/1
Copper	4	1254	05/01/03	NF	1	0	—	[5]	—	—	—	—
Fluoride	4	1254	05/01/03	F	1	1	185	—	4000	0/1	1600	0/1
Iron	4	1254	05/01/03	F	1	0	—	[100]	300	0/1	1000	0/1
Iron	4	1254	05/01/03	NF	1	1	37.9	—	—	—	—	—
Lead	4	1254	05/01/03	F	1	1	0.565	—	15	0/1	50	0/1
Lead	4	1254	05/01/03	NF	1	1	0.063	—	—	—	—	—
Magnesium	4	1254	05/01/03	F	1	1	3450	—	—	—	—	—
Magnesium	4	1254	05/01/03	NF	1	1	3520	—	—	—	—	—
Manganese	4	1254	05/01/03	F	1	1	2.17	—	50	0/1	200	0/1
Manganese	4	1254	05/01/03	NF	1	1	3.59	—	—	—	—	—
Mercury	4	1254	05/01/03	F	1	0	—	[0.2]	2	0/1	—	—
Mercury	4	1254	05/01/03	NF	1	0	—	[0.2]	—	—	2	0/1
Nickel	4	1254	05/01/03	F	1	0	—	[5]	100	0/1	200	0/1
Nickel	4	1254	05/01/03	NF	1	1	3.34	—	—	—	—	—
Oxalate	4	1254	05/01/03	F	1	0	—	[1000]	—	—	—	—
Phosphorus (total)	4	1254	05/01/03	F	1	0	—	[50]	—	—	—	—
Potassium	4	1254	05/01/03	F	1	1	1480	—	—	—	—	—
Potassium	4	1254	05/01/03	NF	1	1	1440	—	—	—	—	—
Selenium	4	1254	05/01/03	F	1	0	—	[5]	50	0/1	50	0/1

Table A-5 (continued)

Parameter and Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Selenium	4	1254	05/01/03	NF	1	0	—	[5]	—	—	—	—
Silver	4	1254	05/01/03	F	1	0	—	[5]	100	0/1	50	0/1
Silver	4	1254	05/01/03	NF	1	0	—	[5]	—	—	—	—
Sodium	4	1254	05/01/03	F	1	1	10400	—	—	—	—	—
Sodium	4	1254	05/01/03	NF	1	1	10600	—	—	—	—	—
Sulfate	4	1254	05/01/03	F	1	1	1720	—	250000	0/1	600000	0/1
Thallium	4	1254	05/01/03	F	1	1	0.094	—	2	0/1	—	—
Thallium	4	1254	05/01/03	NF	1	1	0.345	—	—	—	—	—
Total Kjeldahl Nitrogen	4	1254	05/01/03	F	1	1	157	—	—	—	—	—
Vanadium	4	1254	05/01/03	F	1	1	4.4	—	—	—	—	—
Vanadium	4	1254	05/01/03	NF	1	1	4.8	—	—	—	—	—
Zinc	4	1254	05/01/03	F	1	0	—	[5]	5000	0/1	10000	0/1
Zinc	4	1254	05/01/03	NF	1	1	1.38	—	—	—	—	—
Stable Isotope (‰)												
δD	4	1254	05/01/03	NF	1	—	NRL[i]	—	—	—	—	—
$\delta^{15}N$	4	1254	05/01/03	NF	—	—	NRL	—	—	—	—	—
$\delta^{18}O$	4	1254	05/01/03	NF	1	—	NRL	—	—	—	—	—

[a] The static water level for the regional aquifer at CdV-R-15-3 was 1246 ft when the well was drilled.

[b] MCL = Maximum contaminant level. US Environmental Protection Agency (EPA) MCLs are from *National Primary Drinking Water Regulations*, 40 CFR Part 141. US EPA secondary MCLs are from *National Secondary Drinking Water Regulations*, 40 CFR Part 143. State of New Mexico MCLs are from *Drinking Water Regulations*, 20 NMAC 7.1.

[c] NMED = New Mexico Environment Department.

[d] State of New Mexico groundwater standards are from *New Mexico Water Quality Control Commission Regulations, Ground and Surface Water Protection*, 20 NMAC 6.2.

[e] NF = Nonfiltered.

[f] — = Not available or not applicable.

[g] NTU = Nephelometric turbidity unit.

[h] F = Filtered.

[i] NRL = Not returned from the laboratory.

Table A-6
Well CdV-R-15-3 Screen 5 Tenth Round Sample Results: Data Summary for Inorganic Chemicals

Parameter and Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Field Parameter												
Field Alkalinity (total as $CaCO_3$)	5	1350	05/02/03	NF[e]	1	1	72000	—[f]	—	—	—	—
Dissolved Oxygen	5	1350	05/02/03	NF	1	1	2600	—	—	—	—	—
pH	5	1350	05/02/03	NF	1	1	7.17	—	>6 & <9	0/1	>6 & <9	0/1
Specific Conductance (µS/cm)	5	1350	05/02/03	NF	1	1	163	—	—	0/1	—	0/1
Temperature (°C)	5	1350	05/02/03	NF	1	1	17	—	—	0/1	—	0/1
Turbidity (NTU[g])	5	1350	05/02/03	NF	1	1	0.31	—	—	0/1	—	0/1
Analyte												
Lab Alkalinity (total as $CaCO_3$)	5	1350	05/02/03	F[h]	1	1	66300	—	—	—	—	—
Aluminum	5	1350	05/02/03	F	1	1	28.2	—	50	0/1	5000	0/1
Aluminum	5	1350	05/02/03	NF	1	1	44.6	—	—	—	—	—
Ammonia (as N)	5	1350	05/02/03	F	1	1	110	—	—	—	—	—
Ammonia (as N)	5	1350	05/02/03	NF	1	1	110	—	—	—	—	—
Antimony	5	1350	05/02/03	F	1	0	—	[2]	6	0/1	—	—
Antimony	5	1350	05/02/03	NF	1	0	—	[2]	—	—	—	—
Arsenic	5	1350	05/02/03	F	1	1	2.39	—	50	0/1	100	0/1
Arsenic	5	1350	05/02/03	NF	1	0	—	[5]	—	—	—	—
Barium	5	1350	05/02/03	F	1	1	125	—	2000	0/1	1000	0/1
Barium	5	1350	05/02/03	NF	1	1	120	—	—	—	—	—
Beryllium	5	1350	05/02/03	F	1	0	—	[0.2]	4	0/1	—	—
Beryllium	5	1350	05/02/03	NF	1	0	—	[0.2]	—	—	—	—
Bromide	5	1350	05/02/03	F	1	0	—	[200]	—	—	—	—
Cadmium	5	1350	05/02/03	F	1	0	—	[1]	5	0/1	10	0/1
Cadmium	5	1350	05/02/03	NF	1	0	—	[1]	—	—	—	—

Table A-6 (continued)

Parameter and Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Calcium	5	1350	05/02/03	F	1	1	17700	—	—	—	—	—
Calcium	5	1350	05/02/03	NF	1	1	16500	—	—	—	—	—
Chloride	5	1350	05/02/03	F	1	1	2060	—	250000	0/1	250000	0/1
Chromium	5	1350	05/02/03	F	1	0	—	[5]	100	0/1	50	0/1
Chromium	5	1350	05/02/03	NF	1	1	0.701	—	—	—	—	—
Cobalt	5	1350	05/02/03	F	1	1	3.14	—	—	—	50	0/1
Cobalt	5	1350	05/02/03	NF	1	1	6.5	—	—	—	—	—
Copper	5	1350	05/02/03	F	1	0	—	[5]	1300	0/1	1000	0/1
Copper	5	1350	05/02/03	NF	1	0	—	[5]	—	—	—	—
Fluoride	5	1350	05/02/03	F	1	1	418	—	4000	0/1	1600	0/1
Iron	5	1350	05/02/03	F	1	1	161	—	300	0/1	1000	0/1
Iron	5	1350	05/02/03	NF	1	1	171	—	—	—	—	—
Lead	5	1350	05/02/03	F	1	1	0.09	—	15	0/1	50	0/1
Lead	5	1350	05/02/03	NF	1	1	0.118	—	—	—	—	—
Magnesium	5	1350	05/02/03	F	1	1	2240	—	—	—	—	—
Magnesium	5	1350	05/02/03	NF	1	1	2230	—	—	—	—	—
Manganese	5	1350	05/02/03	F	1	1	219	—	50	1/1	200	1/1
Manganese	5	1350	05/02/03	NF	1	1	227	—	—	—	—	—
Mercury	5	1350	05/02/03	F	1	0	—	[0.2]	2	0/1	—	—
Mercury	5	1350	05/02/03	NF	1	0	—	[0.2]	—	—	2	0/1
Nickel	5	1350	05/02/03	F	1	1	1.89	—	100	0/1	200	0/1
Nickel	5	1350	05/02/03	NF	1	1	1.7	—	—	—	—	—
Nitrate + Nitrite (as N)	5	1350	05/02/03	F	1	0	—	[10]	10000	0/1	—	—
Nitrate + Nitrite (as N)	5	1350	05/02/03	NF	1	0	—	[10]	—	—	—	—
Oxalate	5	1350	05/02/03	F	1	0	—	[1000]	—	—	—	—
Phosphorus (total)	5	1350	05/02/03	F	1	1	28.8	—	—	—	—	—
Potassium	5	1350	05/02/03	F	1	1	2040	—	—	—	—	—

Table A-6 (continued)

Parameter and Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Potassium	5	1350	05/02/03	NF	1	1	1960	—	—	—	—	—
Selenium	5	1350	05/02/03	F	1	0	—	[5]	50	0/1	50	0/1
Selenium	5	1350	05/02/03	NF	1	0	—	[5]	—	—	—	—
Silver	5	1350	05/02/03	F	1	0	—	[5]	100	0/1	50	0/1
Silver	5	1350	05/02/03	NF	1	0	—	[5]	—	—	—	—
Sodium	5	1350	05/02/03	F	1	1	16800	—	—	—	—	—
Sodium	5	1350	05/02/03	NF	1	1	14900	—	—	—	—	—
Sulfate	5	1350	05/02/03	F	1	0	—	[400]	250000	0/1	600000	0/1
Thallium	5	1350	05/02/03	F	1	0	—	[0.5]	2	0/1	—	—
Thallium	5	1350	05/02/03	NF	1	1	0.027	—	—	—	—	—
Total Kjeldahl Nitrogen	5	1350	05/02/03	F	1	1	305	—	—	—	—	—
Vanadium	5	1350	05/02/03	F	1	0	—	[5]	—	—	—	—
Vanadium	5	1350	05/02/03	NF	1	0	—	[5]	—	—	—	—
Zinc	5	1350	05/02/03	F	1	0	—	[5]	5000	0/1	10000	0/1
Zinc	5	1350	05/02/03	NF	1	1	5.3	—	—	—	—	—
Stable Isotope (‰)												
δD	5	1350	05/02/03	NF	1	—	NRL[i]	—	—	—	—	—
$\delta^{15}N$	5	1350	05/02/03	NF	—	—	NRL	—	—	—	—	—
$\delta^{18}O$	5	1350	05/02/03	NF	1	—	NRL	—	—	—	—	—

[a] The static water level for the regional aquifer at CdV-R-15-3 was 1246 ft when the well was drilled.

[b] MCL = Maximum contaminant level. US Environmental Protection Agency (EPA) MCLs are from *National Primary Drinking Water Regulations*, 40 CFR Part 141. US EPA secondary MCLs are from *National Secondary Drinking Water Regulations*, 40 CFR Part 143. State of New Mexico MCLs are from *Drinking Water Regulations*, 20 NMAC 7.1.

[c] NMED = New Mexico Environment Department.

[d] State of New Mexico groundwater standards are from *New Mexico Water Quality Control Commission Regulations, Ground and Surface Water Protection*, 20 NMAC 6.2.

[e] NF = Nonfiltered.

[f] — = Not available or not applicable.

[g] NTU = Nephelometric turbidity unit.

[h] F = Filtered.

[i] NRL = Not returned from the laboratory.

Table A-7
Well CdV-R-15-3 Screen 6 Tenth Round Sample Results: Data Summary for Inorganic Chemicals

Parameter and Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Field Parameter												
Field Alkalinity (total as $CaCO_3$)	6	1640	05/05/03	NF[e]	1	1	55000	—[f]	—	—	—	—
Dissolved Oxygen	6	1640	05/05/03	NF	1	1	11400	—	—	—	—	—
pH	6	1640	05/05/03	NF	1	1	7.11	—	>6 & <9	0/1	>6 & <9	0/1
Specific Conductance (µS/cm)	6	1640	05/05/03	NF	1	1	132	—	—	0/1	—	0/1
Temperature (°C)	6	1640	05/05/03	NF	1	1	15.9	—	—	0/1	—	0/1
Turbidity (NTU[g])	6	1640	05/05/03	NF	1	1	0.46	—	—	0/1	—	0/1
Analyte												
Lab Alkalinity (total as $CaCO_3$)	6	1640	05/05/03	F[h]	1	1	50000	—	—	—	—	—
Aluminum	6	1640	05/05/03	F	1	1	37.9	—	50	0/1	5000	0/1
Aluminum	6	1640	05/05/03	NF	1	1	36.5	—	—	—	—	—
Ammonia (as N)	6	1640	05/05/03	F	1	1	70	—	—	—	—	—
Ammonia (as N)	6	1640	05/05/03	NF	1	1	180	—	—	—	—	—
Antimony	6	1640	05/05/03	F	1	0	—	[2]	6	0/1	—	—
Antimony	6	1640	05/05/03	NF	1	0	—	[2]	—	—	—	—
Arsenic	6	1640	05/05/03	F	1	0	—	[5]	50	0/1	100	0/1
Arsenic	6	1640	05/05/03	NF	1	0	—	[5]	—	—	—	—
Barium	6	1640	05/05/03	F	1	1	21.3	—	2000	0/1	1000	0/1
Barium	6	1640	05/05/03	NF	1	1	21.3	—	—	—	—	—
Beryllium	6	1640	05/05/03	F	1	0	—	[0.2]	4	0/1	—	—
Beryllium	6	1640	05/05/03	NF	1	0	—	[0.2]	—	—	—	—
Bromide	6	1640	05/05/03	F	1	0	—	[200]	—	—	—	—
Cadmium	6	1640	05/05/03	F	1	0	—	[1]	5	0/1	10	0/1
Cadmium	6	1640	05/05/03	NF	1	0	—	[1]	—	—	—	—

Table A-7 (continued)

Parameter and Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Calcium	6	1640	05/05/03	F	1	1	9650	—	—	—	—	—
Calcium	6	1640	05/05/03	NF	1	1	9720	—	—	—	—	—
Chloride	6	1640	05/05/03	F	1	1	1610	—	250000	0/1	250000	0/1
Chromium	6	1640	05/05/03	F	1	0	—	[5]	100	0/1	50	0/1
Chromium	6	1640	05/05/03	NF	1	0	—	[5]	—	—	—	—
Cobalt	6	1640	05/05/03	F	1	1	7.46	—	—	—	50	0/1
Cobalt	6	1640	05/05/03	NF	1	1	4.28	—	—	—	—	—
Copper	6	1640	05/05/03	F	1	0	—	[5]	1300	0/1	1000	0/1
Copper	6	1640	05/05/03	NF	1	0	—	[5]	—	—	—	—
Fluoride	6	1640	05/05/03	F	1	1	181	—	4000	0/1	1600	0/1
Iron	6	1640	05/05/03	F	1	1	650	—	300	1/1	1000	0/1
Iron	6	1640	05/05/03	NF	1	1	731	—	—	—	—	—
Lead	6	1640	05/05/03	F	1	1	0.058	—	15	0/1	50	0/1
Lead	6	1640	05/05/03	NF	1	1	0.085	—	—	—	—	—
Magnesium	6	1640	05/05/03	F	1	1	3030	—	—	—	—	—
Magnesium	6	1640	05/05/03	NF	1	1	3030	—	—	—	—	—
Manganese	6	1640	05/05/03	F	1	1	322	—	50	1/1	200	1/1
Manganese	6	1640	05/05/03	NF	1	1	331	—	—	—	—	—
Mercury	6	1640	05/05/03	F	1	0	—	[0.2]	2	0/1	—	—
Mercury	6	1640	05/05/03	NF	1	0	—	[0.2]	—	—	2	0/1
Nickel	6	1640	05/05/03	F	1	0	—	[5]	100	0/1	200	0/1
Nickel	6	1640	05/05/03	NF	1	1	0.895	—	—	—	—	—
Oxalate	6	1640	05/05/03	F	1	0	—	[1000]	—	—	—	—
Phosphorus (total)	6	1640	05/05/03	F	1	0	—	[50]	—	—	—	—
Potassium	6	1640	05/05/03	F	1	1	2020	—	—	—	—	—
Potassium	6	1640	05/05/03	NF	1	1	2030	—	—	—	—	—
Selenium	6	1640	05/05/03	F	1	0	—	[5]	50	0/1	50	0/1

Table A-7 (continued)

Parameter and Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Selenium	6	1640	05/05/03	NF	1	0	—	[5]	—	—	—	—
Silver	6	1640	05/05/03	F	1	0	—	[5]	100	0/1	50	0/1
Silver	6	1640	05/05/03	NF	1	0	—	[5]	—	—	—	—
Sodium	6	1640	05/05/03	F	1	1	13900	—	—	—	—	—
Sodium	6	1640	05/05/03	NF	1	1	14000	—	—	—	—	—
Sulfate	6	1640	05/05/03	F	1	1	999	—	250000	0/1	600000	0/1
Thallium	6	1640	05/05/03	F	1	0	—	[0.5]	2	0/1	—	—
Thallium	6	1640	05/05/03	NF	1	0	—	[0.5]	—	—	—	—
Total Kjeldahl Nitrogen	6	1640	05/05/03	F	1	1	563	—	—	—	—	—
Vanadium	6	1640	05/05/03	F	1	0	—	[5]	—	—	—	—
Vanadium	6	1640	05/05/03	NF	1	0	—	[5]	—	—	—	—
Zinc	6	1640	05/05/03	F	1	0	—	[5]	5000	0/1	10000	0/1
Zinc	6	1640	05/05/03	NF	1	1	9.59	—	—	—	—	—
Stable Isotope (‰)												
δD	6	1640	05/05/03	NF	1	—	NRL[i]	—	—	—	—	—
$\delta^{15}N$	6	1640	05/05/03	NF	1	—	NRL	—	—	—	—	—
$\delta^{18}O$	6	1640	05/05/03	NF	1	—	NRL	—	—	—	—	—

[a] The static water level for the regional aquifer at CdV-R-15-3 was 1246 ft when the well was drilled.

[b] MCL = Maximum contaminant level. US Environmental Protection Agency (EPA) MCLs are from *National Primary Drinking Water Regulations*, 40 CFR Part 141. US EPA secondary MCLs are from *National Secondary Drinking Water Regulations*, 40 CFR Part 143. State of New Mexico MCLs are from *Drinking Water Regulations*, 20 NMAC 7.1.

[c] NMED = New Mexico Environment Department.

[d] State of New Mexico groundwater standards are from *New Mexico Water Quality Control Commission Regulations, Ground and Surface Water Protection*, 20 NMAC 6.2.

[e] NF = Nonfiltered.

[f] — = Not available or not applicable.

[g] NTU = Nephelometric turbidity unit.

[h] F = Filtered.

[i] NRL = Not returned from the laboratory.

Table A-8
Well CdV-R-15-3 Screen 4 Tenth Round Sample Results: Data Summary for Detected Organic Chemicals

Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
No organic chemicals detected	4	1254	05/01/03	—[e]	—	—	—	—	—	—	—	—

[a] The static water level for the regional aquifer at CdV-R-15-3 was 1246 ft when the well was drilled.

[b] MCL = Maximum contaminant level. US Environmental Protection Agency (EPA) MCLs are from *National Primary Drinking Water Regulations*, 40 CFR Part 141. US EPA secondary MCLs are from *National Secondary Drinking Water Regulations*, 40 CFR Part 143. State of New Mexico MCLs are from *Drinking Water Regulations*, 20 NMAC 7.1.

[c] NMED = New Mexico Environment Department.

[d] State of New Mexico groundwater standards are from *New Mexico Water Quality Control Commission Regulations, Ground and Surface Water Protection*, 20 NMAC 6.2.

[e] — = Not available or not applicable.

Table A-9
Well CdV-R-15-3 Screen 5 Tenth Round Sample Results: Data Summary for Detected Organic Chemicals

Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Total Organic Carbon	5	1350	05/02/03	NF[e]	1	1	4470	—[f]	—	—	—	—

[a] The static water level for the regional aquifer at CdV-R-15-3 was 1246 ft when the well was drilled.

[b] MCL = Maximum contaminant level. US Environmental Protection Agency (EPA) MCLs are from *National Primary Drinking Water Regulations*, 40 CFR Part 141. US EPA secondary MCLs are from *National Secondary Drinking Water Regulations*, 40 CFR Part 143. State of New Mexico MCLs are from *Drinking Water Regulations*, 20 NMAC 7.1.

[c] NMED = New Mexico Environment Department.

[d] State of New Mexico groundwater standards are from *New Mexico Water Quality Control Commission Regulations, Ground and Surface Water Protection*, 20 NMAC 6.2.

[e] NF = Nonfiltered.

[f] — = Not available or not applicable.

Table A-10
Well CdV-R-15-3 Screen 6 Tenth Round Sample Results: Data Summary for Detected Organic Chemicals

Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Total Organic Carbon	6	1640	05/05/03	NF[e]	1	1	983	—[f]	—	—	—	—

[a] The static water level for the regional aquifer at CdV-R-15-3 was 1246 ft when the well was drilled.
[b] MCL = Maximum contaminant level. US Environmental Protection Agency (EPA) MCLs are from *National Primary Drinking Water Regulations*, 40 CFR Part 141. US EPA secondary MCLs are from *National Secondary Drinking Water Regulations*, 40 CFR Part 143. State of New Mexico MCLs are from *Drinking Water Regulations*, 20 NMAC 7.1.
[c] NMED = New Mexico Environment Department.
[d] State of New Mexico groundwater standards are from *New Mexico Water Quality Control Commission Regulations, Ground and Surface Water Protection*, 20 NMAC 6.2.
[e] NF = Nonfiltered.
[f] — = Not available or not applicable.

Table A-11
Well CdV-R-15-3 Screen 4 Tenth Round Sample Results: Data Summary for Radionuclides

Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (pCi/L)	Nondetected Value (pCi/L)	Drinking Water MCL[b] (pCi/L)	Frequency of Detects > Drinking Water MCL
Tritium	4	1254	05/01/03	NF[c]	1	NRL[d]	—[e]	—	20000	0/1

[a] The static water level for the regional aquifer at CdV-R-15-3 was 1246 ft when the well was drilled.
[b] MCL = Maximum contaminant level. US Environmental Protection Agency (EPA) MCLs are from *National Primary Drinking Water Regulations*, 40 CFR Part 141. US EPA secondary MCLs are from *National Secondary Drinking Water Regulations*, 40 CFR Part 143. State of New Mexico MCLs are from *Drinking Water Regulations*, 20 NMAC 7.1.
[c] NF = Nonfiltered.
[d] NRL = Not returned from the laboratory.
[e] — = Not available or not applicable.

Table A-12
Well CdV-R-15-3 Screen 5 Tenth Round Sample Results: Data Summary for Radionuclides

Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (pCi/L)	Nondetected Value (pCi/L)	Drinking Water MCL[b] (pCi/L)	Frequency of Detects > Drinking Water MCL
Tritium	5	1350	05/02/03	NF[c]	1	NRL[d]	—[e]	—	20000	0/1

[a] The static water level for the regional aquifer at CdV-R-15-3 was 1246 ft when the well was drilled.

[b] MCL = Maximum contaminant level. US Environmental Protection Agency (EPA) MCLs are from *National Primary Drinking Water Regulations*, 40 CFR Part 141. US EPA secondary MCLs are from *National Secondary Drinking Water Regulations*, 40 CFR Part 143. State of New Mexico MCLs are from *Drinking Water Regulations*, 20 NMAC 7.1.

[c] NF = Nonfiltered.

[d] NRL = Not returned from the laboratory.

[e] — = Not available or not applicable.

Table A-13
Well CdV-R-15-3 Screen 6 Tenth Round Sample Results: Data Summary for Radionuclides

Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (pCi/L)	Nondetected Value (pCi/L)	Drinking Water MCL[b] (pCi/L)	Frequency of Detects > Drinking Water MCL
Tritium	6	1640	05/05/03	NF[c]	1	NRL[d]	—[e]	—	20000	0/1

[a] The static water level for the regional aquifer at CdV-R-15-3 was 1246 ft when the well was drilled.

[b] MCL = Maximum contaminant level. US Environmental Protection Agency (EPA) MCLs are from *National Primary Drinking Water Regulations*, 40 CFR Part 141. US EPA secondary MCLs are from *National Secondary Drinking Water Regulations*, 40 CFR Part 143. State of New Mexico MCLs are from *Drinking Water Regulations*, 20 NMAC 7.1.

[c] NF = Nonfiltered.

[d] NRL = Not returned from the laboratory.

[e] — = Not available or not applicable.

Table A-14
Well CdV-R-37-2 Screen 2 Sixth Round Sample Results: Data Summary for Inorganic Chemicals

Parameter and Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Field Parameter												
Field Alkalinity (total as $CaCO_3$)	2	1200	05/06/03	NF[e]	1	1	124000	—[f]	—	—	—	—
Dissolved Oxygen	2	1200	05/06/03	NF	1	1	1500	—	—	—	—	—
pH	2	1200	05/06/03	NF	1	1	6.93	—	>6 & <9	0/1	>6 & <9	0/1
Specific Conductance (µS/cm)	2	1200	05/06/03	NF	1	1	291	—	—	0/1	—	0/1
Temperature (°C)	2	1200	05/06/03	NF	1	1	18.3	—	—	0/1	—	0/1
Turbidity (NTU[g])	2	1200	05/06/03	NF	1	1	12.1	—	—	0/1	—	0/1
Analyte												
Lab Alkalinity (total as $CaCO_3$)	2	1200	05/06/03	F[h]	1	1	112000	—	—	—	—	—
Aluminum	2	1200	05/06/03	F	1	1	24.7	—	50	0/1	5000	0/1
Aluminum	2	1200	05/06/03	NF	1	1	36.2	—	—	—	—	—
Ammonia (as N)	2	1200	05/06/03	F	1	1	670	—	—	—	—	—
Ammonia (as N)	2	1200	05/06/03	NF	1	1	640	—	—	—	—	—
Antimony	2	1200	05/06/03	F	1	0	—	[2]	6	0/1	—	—
Antimony	2	1200	05/06/03	NF	1	0	—	[2]	—	—	—	—
Arsenic	2	1200	05/06/03	F	1	0	—	[5]	50	0/1	100	0/1
Arsenic	2	1200	05/06/03	NF	1	0	—	[5]	—	—	—	—
Barium	2	1200	05/06/03	F	1	1	234	—	2000	0/1	1000	0/1
Barium	2	1200	05/06/03	NF	1	1	241	—	—	—	—	—
Beryllium	2	1200	05/06/03	F	1	0	—	[0.2]	4	0/1	—	—
Beryllium	2	1200	05/06/03	NF	1	0	—	[0.2]	—	—	—	—
Bromide	2	1200	05/06/03	F	1	0	—	[200]	—	—	—	—
Cadmium	2	1200	05/06/03	F	1	0	—	[1]	5	0/1	10	0/1
Cadmium	2	1200	05/06/03	NF	1	0	—	[1]	—	—	—	—

Table A-14 (continued)

Parameter and Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Calcium	2	1200	05/06/03	F	1	1	24100	—	—	—	—	—
Calcium	2	1200	05/06/03	NF	1	1	24200	—	—	—	—	—
Chloride	2	1200	05/06/03	F	1	1	2650	—	250000	0/1	250000	0/1
Chromium	2	1200	05/06/03	F	1	1	0.669	—	100	0/1	50	0/1
Chromium	2	1200	05/06/03	NF	1	1	0.777	—	—	—	—	—
Cobalt	2	1200	05/06/03	F	1	1	2.56	—	—	—	50	0/1
Cobalt	2	1200	05/06/03	NF	1	1	12.7	—	—	—	—	—
Copper	2	1200	05/06/03	F	1	0	—	[5]	1300	0/1	1000	0/1
Copper	2	1200	05/06/03	NF	1	0	—	[5]	—	—	—	—
Fluoride	2	1200	05/06/03	F	1	1	233	—	4000	0/1	1600	0/1
Iron	2	1200	05/06/03	F	1	1	12300	—	300	1/1	1000	1/1
Iron	2	1200	05/06/03	NF	1	1	16300	—	—	—	—	—
Lead	2	1200	05/06/03	F	1	1	0.13	—	15	0/1	50	0/1
Lead	2	1200	05/06/03	NF	1	1	0.173	—	—	—	—	—
Magnesium	2	1200	05/06/03	F	1	1	6880	—	—	—	—	—
Magnesium	2	1200	05/06/03	NF	1	1	6890	—	—	—	—	—
Manganese	2	1200	05/06/03	F	1	1	3600	—	50	1/1	200	1/1
Manganese	2	1200	05/06/03	NF	1	1	3610	—	—	—	—	—
Mercury	2	1200	05/06/03	F	1	1	0.085	—	2	0/1	—	—
Mercury	2	1200	05/06/03	NF	1	1	0.086	—	—	—	2	0/1
Nickel	2	1200	05/06/03	F	1	1	4.26	—	100	0/1	200	0/1
Nickel	2	1200	05/06/03	NF	1	1	6.9	—	—	—	—	—
Oxalate	2	1200	05/06/03	F	1	0	—	[1000]	—	—	—	—
Phosphorus (total)	2	1200	05/06/03	F	1	0	—	[50]	—	—	—	—
Potassium	2	1200	05/06/03	F	1	1	2980	—	—	—	—	—
Potassium	2	1200	05/06/03	NF	1	1	3010	—	—	—	—	—
Selenium	2	1200	05/06/03	F	1	0	—	[5]	50	0/1	50	0/1

Table A-14 (continued)

Parameter and Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Selenium	2	1200	05/06/03	NF	1	0	—	[5]	—	—	—	—
Silver	2	1200	05/06/03	F	1	0	—	[5]	100	0/1	50	0/1
Silver	2	1200	05/06/03	NF	1	0	—	[5]	—	—	—	—
Sodium	2	1200	05/06/03	F	1	1	18300	—	—	—	—	—
Sodium	2	1200	05/06/03	NF	1	1	18500	—	—	—	—	—
Sulfate	2	1200	05/06/03	F	1	0	—	[400]	250000	0/1	600000	0/1
Thallium	2	1200	05/06/03	F	1	0	—	[0.5]	2	0/1	—	—
Thallium	2	1200	05/06/03	NF	1	0	—	[0.5]	—	—	—	—
Total Kjeldahl Nitrogen	2	1200	05/06/03	F	1	1	720	—	—	—	—	—
Vanadium	2	1200	05/06/03	F	1	0	—	[5]	—	—	—	—
Vanadium	2	1200	05/06/03	NF	1	0	—	[5]	—	—	—	—
Zinc	2	1200	05/06/03	F	1	1	1.72	—	5000	0/1	10000	0/1
Zinc	2	1200	05/06/03	NF	1	1	7.16	—	—	—	—	—
Stable Isotope (‰)												
δD	2	1200	05/06/03	NF	1	—	NRL[i]	—	—	—	—	—
$\delta^{15}N$	2	1200	05/06/03	NF	1	—	NRL	—	—	—	—	—
$\delta^{18}O$	2	1200	05/06/03	NF	1	—	NRL	—	—	—	—	—

[a] The static water level for the regional aquifer at CdV-R-37-2 was 1195.6 ft when the well was drilled.

[b] MCL = Maximum contaminant level. US Environmental Protection Agency (EPA) MCLs are from *National Primary Drinking Water Regulations*, 40 CFR Part 141. US EPA secondary MCLs are from *National Secondary Drinking Water Regulations*, 40 CFR Part 143. State of New Mexico MCLs are from *Drinking Water Regulations*, 20 NMAC 7.1.

[c] NMED = New Mexico Environment Department.

[d] State of New Mexico groundwater standards are from *New Mexico Water Quality Control Commission Regulations, Ground and Surface Water Protection*, 20 NMAC 6.2.

[e] NF = Nonfiltered.

[f] — = Not available or not applicable.

[g] NTU = Nephelometric turbidity unit.

[h] F = Filtered.

[i] NRL = Not returned from the laboratory.

Table A-15
Well CdV-R-37-2 Screen 3 Sixth Round Sample Results: Data Summary for Inorganic Chemicals

Parameter and Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Field Parameter												
Field Alkalinity (total as $CaCO_3$)	3	1359	05/07/03	NF[e]	1	1	40000	—[f]	—	—	—	—
Dissolved Oxygen	3	1359	05/07/03	NF	1	1	10800	—	—	—	—	—
pH	3	1359	05/07/03	NF	1	1	7.46	—	>6 & <9	0/1	>6 & <9	0/1
Specific Conductance (µS/cm)	3	1359	05/07/03	NF	1	1	130	—	—	0/1	—	0/1
Temperature (°C)	3	1359	05/07/03	NF	1	1	19.4	—	—	0/1	—	0/1
Turbidity (NTU[g])	3	1359	05/07/03	NF	1	1	0.25	—	—	0/1	—	0/1
Analyte												
Lab Alkalinity (total as $CaCO_3$)	3	1359	05/07/03	F[h]	1	1	64200	—	—	—	—	—
Aluminum	3	1359	05/07/03	F	1	1	33.1	—	50	0/1	5000	0/1
Aluminum	3	1359	05/07/03	NF	1	1	23.5	—	—	—	—	—
Ammonia (as N)	3	1359	05/07/03	F	1	0	—	[50]	—	—	—	—
Ammonia (as N)	3	1359	05/07/03	NF	1	0	—	[50]	—	—	—	—
Antimony	3	1359	05/07/03	F	1	0	—	[2]	6	0/1	—	—
Antimony	3	1359	05/07/03	NF	1	0	—	[2]	—	—	—	—
Arsenic	3	1359	05/07/03	F	1	0	—	[5]	50	0/1	100	0/1
Arsenic	3	1359	05/07/03	NF	1	0	—	[5]	—	—	—	—
Barium	3	1359	05/07/03	F	1	1	11.2	—	2000	0/1	1000	0/1
Barium	3	1359	05/07/03	NF	1	1	11.8	—	—	—	—	—
Beryllium	3	1359	05/07/03	F	1	0	—	[0.2]	4	0/1	—	—
Beryllium	3	1359	05/07/03	NF	1	0	—	[0.2]	—	—	—	—
Bromide	3	1359	05/07/03	F	1	0	—	[200]	—	—	—	—
Cadmium	3	1359	05/07/03	F	1	0	—	[1]	5	0/1	10	0/1
Cadmium	3	1359	05/07/03	NF	1	0	—	[1]	—	—	—	—

Table A-15 (continued)

Parameter and Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Calcium	3	1359	05/07/03	F	1	1	10300	—	—	—	—	—
Calcium	3	1359	05/07/03	NF	1	1	10200	—	—	—	—	—
Chloride	3	1359	05/07/03	F	1	1	1660	—	250000	0/1	250000	0/1
Chromium	3	1359	05/07/03	F	1	1	1.38	—	100	0/1	50	0/1
Chromium	3	1359	05/07/03	NF	1	1	4.69	—	—	—	—	—
Cobalt	3	1359	05/07/03	F	1	1	4.02	—	—	—	50	0/1
Cobalt	3	1359	05/07/03	NF	1	1	1.52	—	—	—	—	—
Copper	3	1359	05/07/03	F	1	0	—	[5]	1300	0/1	1000	0/1
Copper	3	1359	05/07/03	NF	1	0	—	[5]	—	—	—	—
Fluoride	3	1359	05/07/03	F	1	1	230	—	4000	0/1	1600	0/1
Iron	3	1359	05/07/03	F	1	1	29.2	—	300	0/1	1000	0/1
Iron	3	1359	05/07/03	NF	1	1	101	—	—	—	—	—
Lead	3	1359	05/07/03	F	1	0	—	[2]	15	0/1	50	0/1
Lead	3	1359	05/07/03	NF	1	0	—	[2]	—	—	—	—
Magnesium	3	1359	05/07/03	F	1	1	3080	—	—	—	—	—
Magnesium	3	1359	05/07/03	NF	1	1	3070	—	—	—	—	—
Manganese	3	1359	05/07/03	F	1	1	6.68	—	50	0/1	200	0/1
Manganese	3	1359	05/07/03	NF	1	1	13.2	—	—	—	—	—
Mercury	3	1359	05/07/03	F	1	0	—	[0.2]	2	0/1	—	—
Mercury	3	1359	05/07/03	NF	1	0	—	[0.2]	—	—	2	0/1
Nickel	3	1359	05/07/03	F	1	1	0.901	—	100	0/1	200	0/1
Nickel	3	1359	05/07/03	NF	1	1	2.86	—	—	—	—	—
Nitrate + Nitrite (as N)	3	1359	05/07/03	F	1	1	350	—	10000	0/1	—	—
Nitrate + Nitrite (as N)	3	1359	05/07/03	NF	1	1	350	—	—	—	—	—
Oxalate	3	1359	05/07/03	F	1	0	—	[1000]	—	—	—	—
Phosphorus (total)	3	1359	05/07/03	F	1	0	—	[50]	—	—	—	—
Potassium	3	1359	05/07/03	F	1	1	1420	—	—	—	—	—

Table A-15 (continued)

Parameter and Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Potassium	3	1359	05/07/03	NF	1	1	1420	—	—	—	—	—
Selenium	3	1359	05/07/03	F	1	0	—	[5]	50	0/1	50	0/1
Selenium	3	1359	05/07/03	NF	1	0	—	[5]	—	—	—	—
Silver	3	1359	05/07/03	F	1	0	—	[5]	100	0/1	50	0/1
Silver	3	1359	05/07/03	NF	1	0	—	[5]	—	—	—	—
Sodium	3	1359	05/07/03	F	1	1	11600	—	—	—	—	—
Sodium	3	1359	05/07/03	NF	1	1	11400	—	—	—	—	—
Sulfate	3	1359	05/07/03	F	1	1	1620	—	250000	0/1	600000	0/1
Thallium	3	1359	05/07/03	F	1	0	—	[0.5]	2	0/1	—	—
Thallium	3	1359	05/07/03	NF	1	0	—	[0.5]	—	—	—	—
Total Kjeldahl Nitrogen	3	1359	05/07/03	F	1	1	178	—	—	—	—	—
Vanadium	3	1359	05/07/03	F	1	1	8.35	—	—	—	—	—
Vanadium	3	1359	05/07/03	NF	1	1	8.83	—	—	—	—	—
Zinc	3	1359	05/07/03	F	1	1	1.1	—	5000	0/1	10000	0/1
Zinc	3	1359	05/07/03	NF	1	1	3.05	—	—	—	—	—
Stable Isotope (‰)												
δD	3	1359	05/07/03	NF	1	—	NRL[i]	—	—	—	—	—
$\delta^{15}N$	3	1359	05/07/03	NF	1	—	—	—	—	—	—	—
$\delta^{18}O$	3	1359	05/07/03	NF	1	—	NRL	—	—	—	—	—

[a] The static water level for the regional aquifer at CdV-R-37-2 was 1195.6 ft when the well was drilled.

[b] MCL = Maximum contaminant level. US Environmental Protection Agency (EPA) MCLs are from *National Primary Drinking Water Regulations*, 40 CFR Part 141. US EPA secondary MCLs are from *National Secondary Drinking Water Regulations*, 40 CFR Part 143. State of New Mexico MCLs are from *Drinking Water Regulations*, 20 NMAC 7.1.

[c] NMED = New Mexico Environment Department.

[d] State of New Mexico groundwater standards are from *New Mexico Water Quality Control Commission Regulations, Ground and Surface Water Protection*, 20 NMAC 6.2.

[e] NF = Nonfiltered.

[f] — = Not available or not applicable.

[g] NTU = Nephelometric turbidity unit.

[h] F = Filtered.

[i] NRL = Not returned from the laboratory.

Table A-16
Well CdV-R-37-2 Screen 4 Sixth Round Sample Results: Data Summary for Inorganic Chemicals

Parameter and Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Field Parameter												
Field Alkalinity (total as $CaCO_3$)	4	1551	05/08/03	NF[e]	1	1	47000	—[f]	—	—	—	—
Dissolved Oxygen	4	1551	05/08/03	NF	1	1	9800	—	—	—	—	—
pH	4	1551	05/08/03	NF	1	1	6.74	—	>6 & <9	0/1	>6 & <9	0/1
Specific Conductance (µS/cm)	4	1551	05/08/03	NF	1	1	121	—	—	0/1	—	0/1
Temperature (°C)	4	1551	05/08/03	NF	1	1	16.8	—	—	0/1	—	0/1
Turbidity (NTU[g])	4	1551	05/08/03	NF	1	1	0.75	—	—	0/1	—	0/1
Analyte												
Lab Alkalinity (total as $CaCO_3$)	4	1551	05/08/03	F[h]	1	1	48900	—	—	—	—	—
Aluminum	4	1551	05/08/03	F	1	1	63.2	—	50	1/1	5000	0/1
Aluminum	4	1551	05/08/03	NF	1	1	61.6	—	—	—	—	—
Ammonia (as N)	4	1551	05/08/03	F	1	1	250	—	—	—	—	—
Ammonia (as N)	4	1551	05/08/03	NF	1	1	300	—	—	—	—	—
Antimony	4	1551	05/08/03	F	1	0	—	[2]	6	0/1	—	—
Antimony	4	1551	05/08/03	NF	1	0	—	[2]	—	—	—	—
Arsenic	4	1551	05/08/03	F	1	1	3.45	—	50	0/1	100	0/1
Arsenic	4	1551	05/08/03	NF	1	1	4.34	—	—	—	—	—
Barium	4	1551	05/08/03	F	1	1	16.9	—	2000	0/1	1000	0/1
Barium	4	1551	05/08/03	NF	1	1	16.1	—	—	—	—	—
Beryllium	4	1551	05/08/03	F	1	0	—	[0.2]	4	0/1	—	—
Beryllium	4	1551	05/08/03	NF	1	0	—	[0.2]	—	—	—	—
Bromide	4	1551	05/08/03	F	1	0	—	[200]	—	—	—	—
Cadmium	4	1551	05/08/03	F	1	0	—	[1]	5	0/1	10	0/1
Cadmium	4	1551	05/08/03	NF	1	0	—	[1]	—	—	—	—

Table A-16 (continued)

Parameter and Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Calcium	4	1551	05/08/03	F	1	1	7980	—	—	—	—	—
Calcium	4	1551	05/08/03	NF	1	1	7740	—	—	—	—	—
Chloride	4	1551	05/08/03	F	1	1	1780	—	250000	0/1	250000	0/1
Chromium	4	1551	05/08/03	F	1	0	—	[0.859]	100	0/1	50	0/1
Chromium	4	1551	05/08/03	NF	1	0	—	[2.91]	—	—	—	—
Cobalt	4	1551	05/08/03	F	1	1	5.9	—	—	—	50	0/1
Cobalt	4	1551	05/08/03	NF	1	1	0.9	—	—	—	—	—
Copper	4	1551	05/08/03	F	1	0	—	[2.14]	1300	0/1	1000	0/1
Copper	4	1551	05/08/03	NF	1	0	—	[5]	—	—	—	—
Fluoride	4	1551	05/08/03	F	1	1	198	—	4000	0/1	1600	0/1
Iron	4	1551	05/08/03	F	1	1	3690	—	300	1/1	1000	1/1
Iron	4	1551	05/08/03	NF	1	1	3650	—	—	—	—	—
Lead	4	1551	05/08/03	F	1	1	0.123	—	15	0/1	50	0/1
Lead	4	1551	05/08/03	NF	1	1	0.095	—	—	—	—	—
Magnesium	4	1551	05/08/03	F	1	1	2580	—	—	—	—	—
Magnesium	4	1551	05/08/03	NF	1	1	2490	—	—	—	—	—
Manganese	4	1551	05/08/03	F	1	1	123	—	50	1/1	200	0/1
Manganese	4	1551	05/08/03	NF	1	1	121	—	—	—	—	—
Mercury	4	1551	05/08/03	F	1	0	—	[0.2]	2	0/1	—	—
Mercury	4	1551	05/08/03	NF	1	0	—	[0.2]	—	—	2	0/1
Nickel	4	1551	05/08/03	F	1	1	5.9	—	100	0/1	200	0/1
Nickel	4	1551	05/08/03	NF	1	1	6.43	—	—	—	—	—
Oxalate	4	1551	05/08/03	F	1	0	—	[1000]	—	—	—	—
Phosphorus (total)	4	1551	05/08/03	F	1	1	24.9	—	—	—	—	—
Potassium	4	1551	05/08/03	F	1	1	2050	—	—	—	—	—
Potassium	4	1551	05/08/03	NF	1	1	2000	—	—	—	—	—
Selenium	4	1551	05/08/03	F	1	0	—	[5]	50	0/1	50	0/1

Table A-16 (continued)

Parameter and Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Selenium	4	1551	05/08/03	NF	1	0	—	[5]	—	—	—	—
Silver	4	1551	05/08/03	F	1	0	—	[5]	100	0/1	50	0/1
Silver	4	1551	05/08/03	NF	1	0	—	[5]	—	—	—	—
Sodium	4	1551	05/08/03	F	1	1	10600	—	—	—	—	—
Sodium	4	1551	05/08/03	NF	1	1	10400	—	—	—	—	—
Sulfate	4	1551	05/08/03	F	1	1	1070	—	250000	0/1	600000	0/1
Thallium	4	1551	05/08/03	F	1	1	0.077	—	2	0/1	—	—
Thallium	4	1551	05/08/03	NF	1	0	—	[0.5]	—	—	—	—
Total Kjeldahl Nitrogen	4	1551	05/08/03	F	1	1	453	—	—	—	—	—
Vanadium	4	1551	05/08/03	F	1	1	1.24	—	—	—	—	—
Vanadium	4	1551	05/08/03	NF	1	1	0.614	—	—	—	—	—
Zinc	4	1551	05/08/03	F	1	0	—	[5.1]	5000	0/1	10000	0/1
Zinc	4	1551	05/08/03	NF	1	0	—	[3.07]	—	—	—	—
Stable Isotope (‰)												
δD	4	1551	05/08/03	NF	1	—	NRL[i]	—	—	—	—	—
$\delta^{15}N$	4	1551	05/08/03	NF	1	—	NRL	—	—	—	—	—
$\delta^{18}O$	4	1551	05/08/03	NF	1	—	NRL	—	—	—	—	—

[a] The static water level for the regional aquifer at CdV-R-37-2 was 1195.6 ft when the well was drilled.

[b] MCL = Maximum contaminant level. US Environmental Protection Agency (EPA) MCLs are from *National Primary Drinking Water Regulations*, 40 CFR Part 141. US EPA secondary MCLs are from *National Secondary Drinking Water Regulations*, 40 CFR Part 143. State of New Mexico MCLs are from *Drinking Water Regulations*, 20 NMAC 7.1.

[c] NMED = New Mexico Environment Department.

[d] State of New Mexico groundwater standards are from *New Mexico Water Quality Control Commission Regulations, Ground and Surface Water Protection*, 20 NMAC 6.2.

[e] NF = Nonfiltered.

[f] — = Not available or not applicable.

[g] NTU = Nephelometric turbidity unit.

[h] F = Filtered.

[i] NRL = Not returned from the laboratory.

Table A-17
Well CdV-R-37-2 Screen 2 Sixth Round Sample Results: Data Summary for Detected Organic Chemicals

Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Amino-2,6-dinitrotoluene[4-]	2	1200	05/06/03	NF[e]	1	1	0.18	—[f]	—	—	—	—
Total Organic Carbon	2	1200	05/06/03	NF	1	1	5220	—	—	—	—	—

[a] The static water level for the regional aquifer at CdV-R-37-2 was 1195.6 ft when the well was drilled.

[b] MCL = Maximum contaminant level. US Environmental Protection Agency (EPA) MCLs are from *National Primary Drinking Water Regulations*, 40 CFR Part 141. US EPA secondary MCLs are from *National Secondary Drinking Water Regulations*, 40 CFR Part 143. State of New Mexico MCLs are from *Drinking Water Regulations*, 20 NMAC 7.1.

[c] NMED = New Mexico Environment Department.

[d] State of New Mexico groundwater standards are from *New Mexico Water Quality Control Commission Regulations, Ground and Surface Water Protection*, 20 NMAC 6.2.

[e] NF = Nonfiltered.

[f] — = Not available or not applicable.

Table A-18
Well CdV-R-37-2 Screen 3 Sixth Round Sample Results: Data Summary for Detected Organic Chemicals

Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Total Organic Carbon	3	1359	05/07/03	NF[e]	1	1	296	—[f]	—	—	—	—

[a] The static water level for the regional aquifer at CdV-R-37-2 was 1195.6 ft when the well was drilled.

[b] MCL = Maximum contaminant level. US Environmental Protection Agency (EPA) MCLs are from *National Primary Drinking Water Regulations*, 40 CFR Part 141. US EPA secondary MCLs are from *National Secondary Drinking Water Regulations*, 40 CFR Part 143. State of New Mexico MCLs are from *Drinking Water Regulations*, 20 NMAC 7.1.

[c] NMED = New Mexico Environment Department.

[d] State of New Mexico groundwater standards are from *New Mexico Water Quality Control Commission Regulations, Ground and Surface Water Protection*, 20 NMAC 6.2.

[e] NF = Nonfiltered.

[f] — = Not available or not applicable.

Table A-19
Well CdV-R-37-2 Screen 4 Sixth Round Sample Results: Data Summary for Detected Organic Chemicals

Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Total Organic Carbon	4	1551	05/08/03	NF[e]	1	1	817	—[f]	—	—	—	—

[a] The static water level for the regional aquifer at CdV-R-37-2 was 1195.6 ft when the well was drilled.
[b] MCL = Maximum contaminant level. US Environmental Protection Agency (EPA) MCLs are from *National Primary Drinking Water Regulations*, 40 CFR Part 141. US EPA secondary MCLs are from *National Secondary Drinking Water Regulations*, 40 CFR Part 143. State of New Mexico MCLs are from *Drinking Water Regulations*, 20 NMAC 7.1.
[c] NMED = New Mexico Environment Department.
[d] State of New Mexico groundwater standards are from *New Mexico Water Quality Control Commission Regulations, Ground and Surface Water Protection*, 20 NMAC 6.2.
[e] NF = Nonfiltered.
[f] — = Not available or not applicable.

Table A-20
Well CdV-R-37-2 Screen 2 Sixth Round Sample Results: Data Summary for Radionuclides

Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (pCi/L)	Nondetected Value (pCi/L)	Drinking Water MCL[b] (pCi/L)	Frequency of Detects > Drinking Water MCL
Tritium	2	1200	05/06/03	NF[c]	1	NRL[d]	—[e]	—	—	—

[a] The static water level for the regional aquifer at CdV-R-37-2 was 1195.6 ft when the well was drilled.
[b] MCL = Maximum contaminant level. US Environmental Protection Agency (EPA) MCLs are from *National Primary Drinking Water Regulations*, 40 CFR Part 141. US EPA secondary MCLs are from *National Secondary Drinking Water Regulations*, 40 CFR Part 143. State of New Mexico MCLs are from *Drinking Water Regulations*, 20 NMAC 7.1.
[c] NF = Nonfiltered.
[d] NRL = Not returned from the laboratory.
[e] — = Not available or not applicable.

Table A-21
Well CdV-R-37-2 Screen 3 Sixth Round Sample Results: Data Summary for Radionuclides

Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (pCi/L)	Nondetected Value (pCi/L)	Drinking Water MCL[b] (pCi/L)	Frequency of Detects > Drinking Water MCL
Tritium	3	1359	05/07/03	NF[c]	1	NRL[d]	—[e]	—	—	—

[a] The static water level for the regional aquifer at CdV-R-37-2 was 1195.6 ft when the well was drilled.

[b] MCL = Maximum contaminant level. US Environmental Protection Agency (EPA) MCLs are from *National Primary Drinking Water Regulations*, 40 CFR Part 141. US EPA secondary MCLs are from *National Secondary Drinking Water Regulations*, 40 CFR Part 143. State of New Mexico MCLs are from *Drinking Water Regulations*, 20 NMAC 7.1.

[c] NF = Nonfiltered.

[d] NRL = Not returned from the laboratory.

[e] — = Not available or not applicable.

Table A-22
Well CdV-R-37-2 Screen 4 Sixth Round Sample Results: Data Summary for Radionuclides

Analyte	Screen	Depth (ft)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (pCi/L)	Nondetected Value (pCi/L)	Drinking Water MCL[b] (pCi/L)	Frequency of Detects > Drinking Water MCL
Tritium	4	1551	05/08/03	NF[c]	1	NRL[d]	—[e]	—	—	—

[a] The static water level for the regional aquifer at CdV-R-37-2 was 1195.6 ft when the well was drilled.

[b] MCL = Maximum contaminant level. US Environmental Protection Agency (EPA) MCLs are from *National Primary Drinking Water Regulations*, 40 CFR Part 141. US EPA secondary MCLs are from *National Secondary Drinking Water Regulations*, 40 CFR Part 143. State of New Mexico MCLs are from *Drinking Water Regulations*, 20 NMAC 7.1.

[c] NF = Nonfiltered.

[d] NRL = Not returned from the laboratory.

[e] — = Not available or not applicable.

Table A-23
Well MCOBT-4.4 Screen 1 Fourth Round Sample Results: Data Summary for Inorganic Chemicals

Parameter and Analyte	Screen	Depth of Pump Intake (ft bgs)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Field Parameter												
Field Alkalinity (total as $CaCO_3$)	1	524	05/21/03	NF[e]	1	1	30000	—[f]	—	—	—	—
Dissolved Oxygen (mg/L)	1	524	05/21/03	NF	1	1	6650	—	—	—	—	—
pH	1	524	05/21/03	NF	1	1	7.54	—	>6 & <9	0/1	>6 & <9	0/1
Specific Conductance (µS/cm)	1	524	05/21/03	NF	1	1	330	—	—	0/1	—	0/1
Temperature (°C)	1	524	05/21/03	NF	1	1	20.5	—	—	0/1	—	0/1
Turbidity (NTU[g])	1	524	05/21/03	NF	1	1	0.34	—	—	0/1	—	0/1
Analyte												
Lab Alkalinity (total as $CaCO_3$)	1	524	05/21/03	F[h]	1	1	45900	—	—	—	—	—
Aluminum	1	524	05/21/03	F	1	0	—	[100]	50	0/1	5000	0/1
Aluminum	1	524	05/21/03	NF	1	1	23.6	—	—	—	—	—
Ammonia (as N)	1	524	05/21/03	F	1	0	—	[50]	—	—	—	—
Antimony	1	524	05/21/03	F	1	0	—	[2]	6	0/1	—	—
Antimony	1	524	05/21/03	NF	1	0	—	[2]	—	—	—	—
Arsenic	1	524	05/21/03	F	1	0	—	[5]	50	0/1	100	0/1
Arsenic	1	524	05/21/03	NF	1	0	—	[5]	—	—	—	—
Barium	1	524	05/21/03	F	1	1	13.6	—	2000	0/1	1000	0/1
Barium	1	524	05/21/03	NF	1	1	14.4	—	—	—	—	—
Beryllium	1	524	05/21/03	F	1	0	—	[0.2]	4	0/1	—	—
Beryllium	1	524	05/21/03	NF	1	0	—	[0.2]	—	—	—	—
Boron	1	524	05/21/03	F	1	1	47.4	—	—	—	750	0/1
Boron	1	524	05/21/03	NF	1	1	50.9	—	—	—	—	—
Bromide	1	524	05/21/03	F	1	0	—	[200]	—	—	—	—

Table A-23 (continued)

Parameter and Analyte	Screen	Depth of Pump Intake (ft bgs)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Cadmium	1	524	05/21/03	F	1	0	—	[1]	5	0/1	10	0/1
Cadmium	1	524	05/21/03	NF	1	0	—	[1]	—	—	—	—
Calcium	1	524	05/21/03	F	1	1	32400	—	—	—	—	—
Calcium	1	524	05/21/03	NF	1	1	34800	—	—	—	—	—
Chloride	1	524	05/21/03	F	1	1	16700	—	250000	0/1	250000	0/1
Chromium	1	524	05/21/03	F	1	1	37.4	—	100	0/1	50	0/1
Chromium	1	524	05/21/03	NF	1	1	41.4	—	—	—	—	—
Cobalt	1	524	05/21/03	F	1	1	0.923	—	—	—	50	0/1
Cobalt	1	524	05/21/03	NF	1	1	4.82	—	—	—	—	—
Copper	1	524	05/21/03	F	1	0	—	[5]	1300	0/1	1000	0/1
Copper	1	524	05/21/03	NF	1	0	—	[5]	—	—	—	—
Cyanide (total)	1	524	05/21/03	NF	1	0	—	[5]	—	—	—	—
Fluoride	1	524	05/21/03	F	1	1	426	—	4000	0/1	1600	0/1
Iron	1	524	05/21/03	F	1	0	—	[100]	300	0/1	1000	0/1
Iron	1	524	05/21/03	NF	1	0	—	[100]	—	—	—	—
Lead	1	524	05/21/03	F	1	0	—	[2]	15	0/1	50	0/1
Lead	1	524	05/21/03	NF	1	0	—	[2]	—	—	—	—
Magnesium	1	524	05/21/03	F	1	1	5590	—	—	—	—	—
Magnesium	1	524	05/21/03	NF	1	1	6030	—	—	—	—	—
Manganese	1	524	05/21/03	F	1	0	—	[5]	50	0/1	200	0/1
Manganese	1	524	05/21/03	NF	1	0	—	[5]	—	—	—	—
Mercury	1	524	05/21/03	F	1	0	—	[0.2]	2	0/1	—	—
Mercury	1	524	05/21/03	NF	1	0	—	[0.2]	—	—	2	0/1
Molybdenum	1	524	05/21/03	F	1	1	0.813	—	—	—	—	—
Molybdenum	1	524	05/21/03	NF	1	1	0.853	—	—	—	—	—
Nickel	1	524	05/21/03	F	1	1	2.25	—	100	0/1	200	0/1
Nickel	1	524	05/21/03	NF	1	1	3.73	—	—	—	—	—

Table A-23 (continued)

Parameter and Analyte	Screen	Depth of Pump Intake (ft bgs)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Nitrate + Nitrite (as N)	1	524	05/21/03	F	1	1	15800	—	10000	1/1	—	—
Oxalate	1	524	05/21/03	F	1	0	—	[1000]	—	—	—	—
Perchlorate	1	524	05/21/03	F	1	1	178	—	—	—	—	—
Phosphorus (total)	1	524	05/21/03	F	1	1	51	—	—	—	—	—
Potassium	1	524	05/21/03	F	1	1	676	—	—	—	—	—
Potassium	1	524	05/21/03	NF	1	1	712	—	—	—	—	—
Selenium	1	524	05/21/03	F	1	0	—	[5]	50	0/1	50	0/1
Selenium	1	524	05/21/03	NF	1	0	—	[5]	—	—	—	—
Silica	1	524	05/21/03	F	1	1	32300	—	—	—	—	—
Silica	1	524	05/21/03	NF	1	1	34300	—	—	—	—	—
Silver	1	524	05/21/03	F	1	0	—	[5]	100	0/1	50	0/1
Silver	1	524	05/21/03	NF	1	0	—	[5]	—	—	—	—
Sodium	1	524	05/21/03	F	1	1	21100	—	—	—	—	—
Sodium	1	524	05/21/03	NF	1	1	21800	—	—	—	—	—
Strontium	1	524	05/21/03	F	1	1	157	—	—	—	—	—
Strontium	1	524	05/21/03	NF	1	1	168	—	—	—	—	—
Sulfate	1	524	05/21/03	F	1	1	25500	—	250000	0/1	600000	0/1
Thallium	1	524	05/21/03	F	1	1	0.083	—	2	0/1	—	—
Thallium	1	524	05/21/03	NF	1	0	—	[0.5]	—	—	—	—
Total Kjeldahl Nitrogen	1	524	05/21/03	F	1	1	171	—	—	—	—	—
Total Kjeldahl Nitrogen	1	524	05/21/03	NF	1	1	213	—	—	—	—	—
Uranium	1	524	05/21/03	F	1	1	0.128	—	20	0/1	5000	0/1
Uranium	1	524	05/21/03	NF	1	1	0.124	—	—	—	—	—
Vanadium	1	524	05/21/03	F	1	0	—	[2.51]	—	—	—	—
Vanadium	1	524	05/21/03	NF	1	0	—	[1.82]	—	—	—	—
Zinc	1	524	05/21/03	F	1	1	1.06	—	5000	0/1	10000	0/1

Table A-23 (continued)

Parameter and Analyte	Screen	Depth of Pump Intake (ft bgs)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Zinc	1	524	05/21/03	NF	1	0	—	[5]	—	—	—	—
Stable Isotope (‰)												
δD	1	524	05/21/03	NF	1	1	–76	—	—	—	—	—
$\delta^{15}N$	1	524	05/21/03	NF	1	1	NRL[i]	—	—	—	—	—
$\delta^{18}O$	1	524	05/21/03	NF	1	1	–10.5	—	—	—	—	—

[a] The static water level for the perched zone at MCOBT-4.4 was 493 ft when the well was drilled.

[b] MCL = Maximum contaminant level. US Environmental Protection Agency (EPA) MCLs are from *National Primary Drinking Water Regulations*, 40 CFR Part 141. US EPA secondary MCLs are from *National Secondary Drinking Water Regulations*, 40 CFR Part 143. State of New Mexico MCLs are from *Drinking Water Regulations*, 20 NMAC 7.1.

[c] NMED = New Mexico Environment Department.

[d] State of New Mexico groundwater standards are from *New Mexico Water Quality Control Commission Regulations, Ground and Surface Water Protection*, 20 NMAC 6.2.

[e] NF = Nonfiltered.

[f] — = Not available or not applicable.

[g] NTU = Nephelometric turbidity unit.

[h] F = Filtered.

[i] NRL = Not returned from the laboratory.

Table A-24
Well MCOBT-4.4 Screen 1 Fourth Round Sample Results: Data Summary for Detected Organic Chemicals

Analyte	Screen	Depth of Pump Intake (ft bgs)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (µg/L)	Non-detected Value (µg/L)	Drinking Water MCL[b] (µg/L)	Frequency of Detects > Drinking Water MCL	NMED[c] Groundwater Standard[d] (µg/L)	Frequency of Detects > NMED Groundwater Standard
Bis(2-ethylhexyl)phthalate	1	524	05/21/03	NF[e]	1	1	1.6	—[f]	6	0/1	—	—
Dissolved Organic Carbon	1	524	05/21/03	F[g]	1	1	820	—	—	—	—	—
Total Organic Carbon	1	524	05/21/03	NF	1	1	669	—	—	—	—	—

[a] The static water level for the perched zone at MCOBT-4.4 was 493 ft when the well was drilled.

[b] MCL = Maximum contaminant level. US Environmental Protection Agency (EPA) MCLs are from *National Primary Drinking Water Regulations*, 40 CFR Part 141. US EPA secondary MCLs are from *National Secondary Drinking Water Regulations*, 40 CFR Part 143. State of New Mexico MCLs are from *Drinking Water Regulations*, 20 NMAC 7.1.

[c] NMED = New Mexico Environment Department.

[d] State of New Mexico groundwater standards are from *New Mexico Water Quality Control Commission Regulations, Ground and Surface Water Protection*, 20 NMAC 6.2.

[e] NF = Nonfiltered.

[f] — = Not available or not applicable.

[g] F = Filtered.

Table A-25
Well MCOBT-4.4 Screen 1 Fourth Round Sample Results: Data Summary for Radionuclides

Analyte	Screen	Depth of Pump Intake (ft bgs)[a]	Collection Date	Field Preparation	Number of Analyses	Number of Detects	Detected Value (pCi/L)	Nondetected Value (pCi/L)	Drinking Water MCL[b] (pCi/L)	Frequency of Detects > Drinking Water MCL
Americium-241	1	524	05/21/03	F[c]	1	0	—[d]	[0.0171]	15	0/2
Americium-241	1	524	05/21/03	NF[e]	1	0	—	[0.00973]	—	—
Cesium-137	1	524	05/21/03	F	1	0	—	[–0.458]	—	—
Cesium-137	1	524	05/21/03	NF	1	0	—	[–0.541]	—	—
Cobalt-60	1	524	05/21/03	F	1	0	—	[0.179]	—	—
Cobalt-60	1	524	05/21/03	NF	1	0	—	[0.598]	—	—
Gross Alpha/Beta Radiation	1	524	05/21/03	NF	1	0	—	[0.579]	—	—
Gross Beta Radiation	1	524	05/21/03	NF	1	0	—	[1.39]	—	—
Gross Gamma Radiation	1	524	05/21/03	NF	1	0	—	[46.5]	—	—
Plutonium-238	1	524	05/21/03	F	1	0	—	[–0.02]	15	0/1
Plutonium-238	1	524	05/21/03	NF	1	0	—	[–0.00428]	—	—
Plutonium-239	1	524	05/21/03	F	1	0	—	[0.00223]	15	0/1
Plutonium-239	1	524	05/21/03	NF	1	0	—	[0.0107]	—	—
Strontium-90	1	524	05/21/03	F	1	0	—	[0.0263]	8	0/1
Strontium-90	1	524	05/21/03	NF	1	0	—	[0.0529]	—	—
Tritium	1	524	05/21/03	NF	1	1	14900	—	20000	0/1
Uranium-234	1	524	05/21/03	F	1	1	0.0967	—	—	—
Uranium-234	1	524	05/21/03	NF	1	0	—	[0.0708]	—	—
Uranium-235	1	524	05/21/03	F	1	0	—	[0.00451]	—	—
Uranium-235	1	524	05/21/03	NF	1	0	—	[–0.00473]	—	—
Uranium-238	1	524	05/21/03	F	1	1	0.0652	—	—	—
Uranium-238	1	524	05/21/03	NF	1	1	0.0448	—	—	—

[a] The static water level for the perched zone at MCOBT-4.4 was 493 ft when the well was drilled.

[b] MCL = Maximum contaminant level. US Environmental Protection Agency (EPA) MCLs are from *National Primary Drinking Water Regulations*, 40 CFR Part 141. US EPA secondary MCLs are from *National Secondary Drinking Water Regulations*, 40 CFR Part 143. State of New Mexico MCLs are from *Drinking Water Regulations*, 20 NMAC 7.1.

[c] F = Filtered.

[d] — = Not available or not applicable.

[e] NF = Nonfiltered.

Appendix B

DP Canyon Quarterly Inspection Report
Fourth Quarter, Fiscal Year 2003

DP Canyon Inspection Report
September 30, 2003

Introduction: Regular inspections are conducted to assess the status of two petroleum hydrocarbon seeps in DP Canyon. These seeps, which are downgradient from Solid Waste Management Unit 21-029 (DP Tank Farm), are referred to as the upstream and downstream seeps (Figure 1). The frequency of the inspections has been reduced to quarterly, following nearly four years of monthly or semimonthly inspections. The results of these inspections are used to document any changes in the petroleum hydrocarbon seep areas in relation to seasonal changes and recent precipitation.

Date: September 30, 2003

Time: 3:45 p.m.

Personnel: Becky Coel-Roback and Valisa Nez

Weather: 25 °C, dry, sunny, and still

Precipitation: 2.53 in., approximate total since the June inspection (source: Los Alamos National Laboratory Weather Machine).

Presence of standing or running water: At the time of the inspection, abundant flow was coming from the northern culvert (source unknown), but none reached the upstream or downstream seep areas. No standing water was noted at either of the seep areas.

Location and intensity of odors, staining, or sheen (see Figure 1 for locations):

	Air	Water	Soil/Sediment
Upstream Location	Petroleum hydrocarbon odor in air	No standing water	Petroleum hydrocarbon odor in disturbed sediments
Downstream Location	No petroleum hydrocarbon odor in air	No standing water	No petroleum hydrocarbon odor in disturbed sediments

Photographs: The following photographs were taken during the site visit (see Figure 1 for locations).

Location 1, canyon head. Flow from north culvert (source unknown)

Location 2, upstream location. No standing water during the September 2003 inspection

Location 3, upstream location. During the September 2003 inspection, petroleum hydrocarbon odors were noted in disturbed sediments at the upstream location.

Location 4, upstream location. Stream channel, looking upstream from sample location 21-11136

Location 5, downstream location. No standing water was noted at the downstream location during the September 2003 inspection.

Location 6, downstream location. No petroleum hydrocarbon odors were noted in sediments from the downstream location during the September 2003 inspection.

Location 7, downstream location. Stream channel, looking downstream from sample location 21-11176

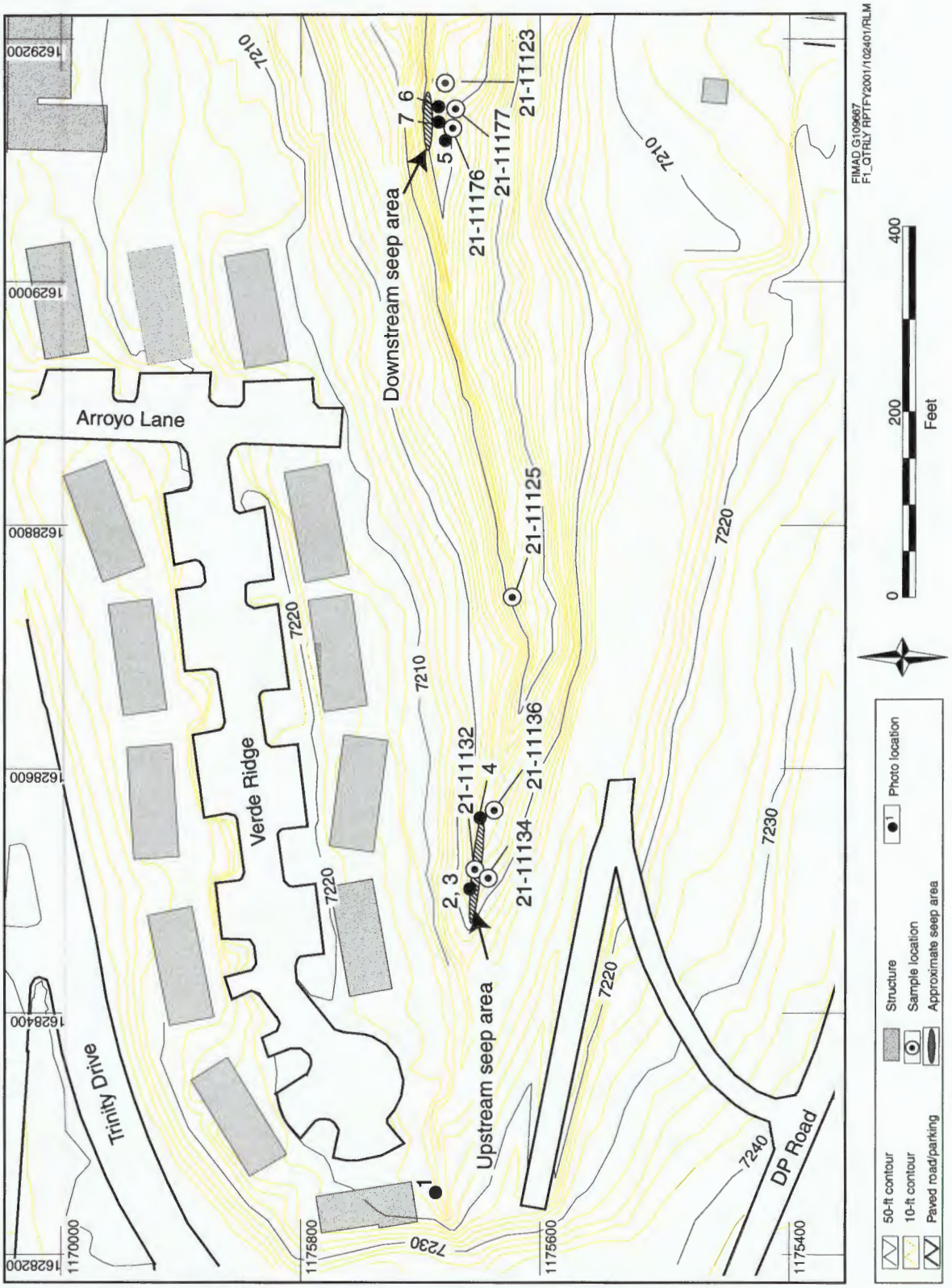

Figure 1. DP Tank Farm photo locations, seep areas, and sampling locations

Appendix C

Annual Moisture-Monitoring Report
Fiscal Year 2003
Technical Area 49, Material Disposal Area AB

ANNUAL MOISTURE-MONITORING REPORT
FISCAL YEAR 2003
TECHNICAL AREA 49
MATERIAL DISPOSAL AREA AB

Risk Reduction and Environmental Stewardship—Remediation Services

Los Alamos National Laboratory

November 2003

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1.0 INTRODUCTION

The TA-49 moisture-monitoring system began collecting data in March of 2000 to assess the performance of the Material Disposal Area (MDA) AB Area 2 cover with respect to maintaining and/or reducing subsurface moisture content. The Area 2 cover was installed after the historical asphalt pad was removed during an interim measure (IM) implemented in 1998 at the direction of the New Mexico Environment Department Hazardous and Radioactive Materials Bureau (NMED-HRMB). The area was covered with soil, gravel, and a bio-barrier as part of stabilization activities. The IM was conducted to address concerns arising from moisture accumulation beneath the asphalt pad.

From 1998 to 1999, the IM and associated best management practice (BMP) activities conducted at Area 2 included

- installation of a run-on diversion channel to the west of Area 2;
- removal of the asphalt cover over Area 2;
- surface regrading of Area 2 to eliminate surface-water ponding;
- grouting and abandonment of CH-2 and the two 150-ft-deep RFI neutron access holes;
- installation of an evapotranspiration (ET) cover composed of crushed tuff monofill with topsoil and covered with a steel mesh bio-barrier;
- installation of a silt fence surrounding the ET cover to control both erosion and contaminant transport; and
- seeding the ET cover with shallow-rooting grasses.

For details on the 1998–1999 BMP at Area 2, refer to Environmental Restoration Project (1998, 59166; 1998, 63041; and 1999, 63919).

In February 2000, a moisture-monitoring system was installed to monitor the ET cover at Area 2. Three shallow neutron logging access tubes were installed through the ET cover, and time domain reflectometry (TDR) probes were installed at two depths and at two locations in the ET cover. The TDR probes were wired into a Campbell Scientific, Inc., datalogger for automated measurements. The moisture-monitoring system utilizes three neutron access holes, four TDR probes, and a rain gauge to evaluate moisture content and relative changes within and beneath the new cover material. Additionally, eight neutron access holes located in the surrounding area are monitored monthly for moisture content. These neutron access holes characterize the moisture content of undisturbed areas immediately adjacent to the cover area. It is anticipated that the new cover material will behave similarly to native undisturbed areas by restoring the semi-arid, moisture limited, near-surface environment.

Monthly moisture monitoring began at the site in March of 2000. Monitoring is performed in accordance with ER-SOP-7.05, Rev. 1, "Subsurface Moisture Measurements Using a Neutron Probe." Neutron logging is performed with a dedicated CPN 503DR probe the last two workdays of each month to provide a consistent data set for trend analysis. The TDR probes record moisture content measurements twice a day. The two TDR arrays are located adjacent to neutron access holes 49-10046 and -10048 for data comparison and confirmation. The TDR arrays consist of a shallow TDR probe positioned horizontally just beneath the surface soil (approximately 6 in.), and a TDR probe positioned vertically beneath the cover materials at 10 ft and 6 ft, respectively. The shallow TDR probes were positioned to detect infiltration through the topsoil. A rain gauge was located at the surface of the cover near neutron access hole 49-10046 in order to monitor levels of precipitation at the site. Continuous measurement of site precipitation and the 12-hour TDR data characterizes the cover's infiltration response to rain events.

Figure 1 shows the locations of neutron access holes, TDR probes, the cover, and the gopher barrier boundary. Table 1 gives the corresponding depths of the TDR probes.

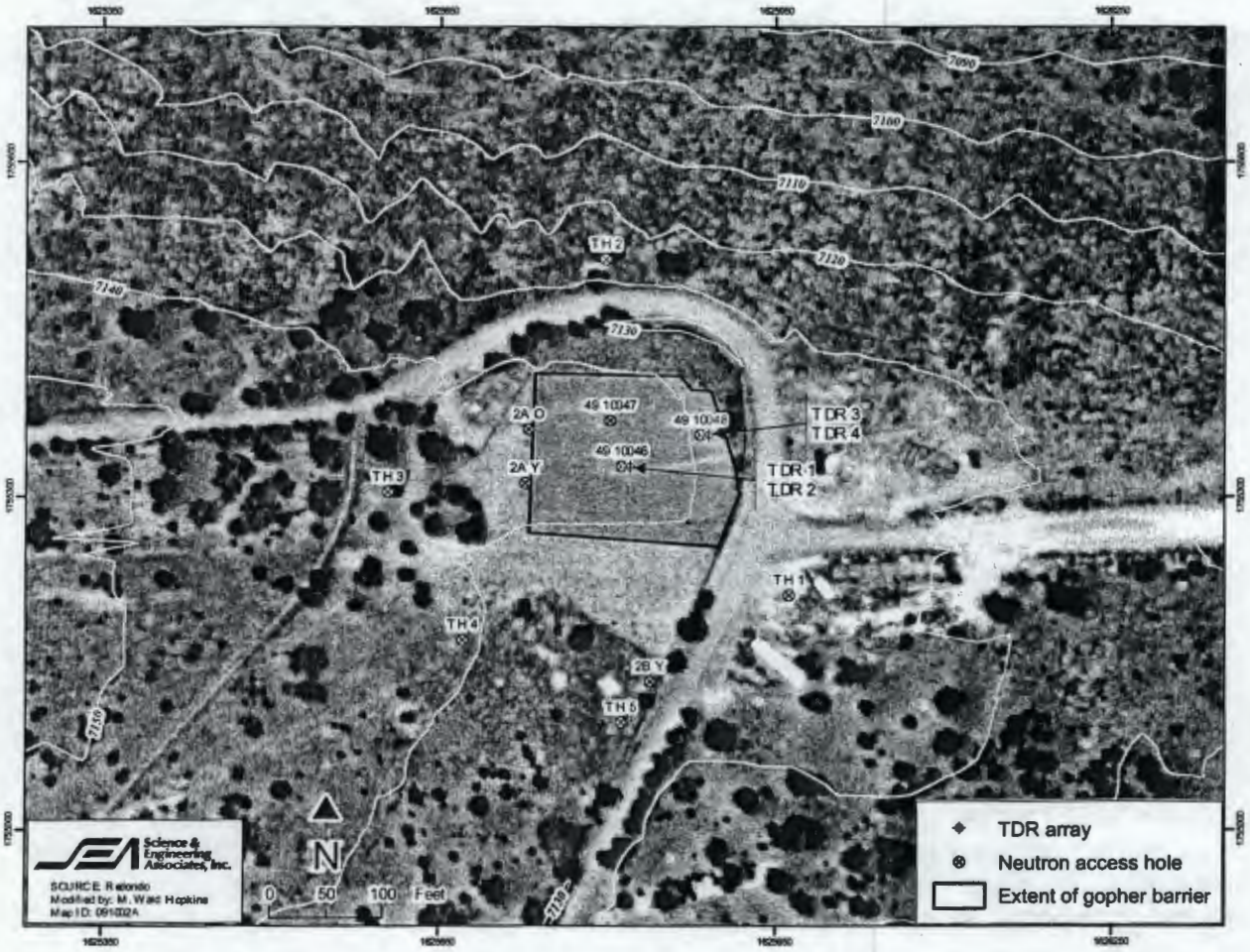

Figure 1. Location of instrumentation and neutron access holes on XY plane at TA-49, MDA AB Area 2

Table 1
TDR Array Descriptions

TDR Number	Array Type	Depth (ft)
TDR1	Vertical, within soil overlaying Bandelier Tuff	6
TDR2	Horizontal, at bottom of topsoil	0.5
TDR3	Vertical, within El Cajete pumice formation	10
TDR4	Horizontal, at bottom of topsoil	0.5

In July, August, and September 2003, neutron moisture measurements were performed at neutron access holes TH-1, TH-2, TH-3, TH-4, TH-5, 2A-O, 2A-Y, 2B-Y, 10046, 10047, and 10048. TDR

measurements and precipitation quantities were recorded twice a day to a Campbell Scientific datalogger over the same period. This report will include a discussion of moisture trends over time, a comparison of moisture results from the neutron probe and the TDR instruments, and a discussion of the relationship between precipitation and moisture content.

2.0 MOISTURE-MONITORING RESULTS

2.1 Neutron Logging

The neutron-logging event occurred on August 6 and September 24 and 25. Results for September were compared with the average from April 2000 to August 2003. Logging was performed with a dedicated CPN 503DR probe at all neutron access holes. The neutron counts from each of the 11 monitoring holes were recorded into a spreadsheet, and corresponding volumetric moisture content was calculated for each. The neutron-logging event that occurred at the beginning of August also included five new neutron access holes that were proposed for monitoring in the third quarter report. These wells are listed in Table 2. Plots of volumetric moisture content for each sampling period and all of the holes, including the five new holes, are shown in Attachment 1. Fourth quarter data for each neutron access hole is shown compared with the average for each hole from 2000 to third quarter 2003.

Table 2
Previously Drilled Neutron Access Holes Found in TA-49

Neutron Access Hole ID	Condition	Depth from Top of Casing	Diameter of Casing	Y Coordinate	X Coordinate
1M-3	Good	19.5 ft	2-in. PVC	1755379.25	1624526.12
1M-3A	Good	47.5 ft	2-in. PVC	1755378.73	1624533.26
2M-3	Good	19.5 ft	2-in. PVC	1755260.10	1625621.26
5M-1	Good	40 ft	2-in. PVC	1754798.19	1625441.33
4M-4	Good	20 ft	2-in. PVC	1754057.79	1625462.37

2.2 TDR and Precipitation Measurements

TDR measurements and precipitation quantities were collected uninterrupted twice a day through the fourth quarter of FY 2003 and were recorded to a Campbell Scientific datalogger. The Campbell Scientific datalogger was programmed to record a timestamp, temperature, TDR raw frequencies, and precipitation in inches. The program converts raw frequency to volumetric moisture content and then records the data (both raw and converted) to a *.dat file. Figures 2 and 3 display moisture content and precipitation measurements since installation of the probes in April 2000 through September 2003. The cumulative precipitation was calculated from the on-site rain gauge from August 2000 to April 30, 2001. On May 1, 2001, it became apparent that the rain gauge was not functioning because debris was blocking the instrument. Therefore, from May 1, 2001, to date, precipitation data were obtained from the Laboratory TA-49 weather station.

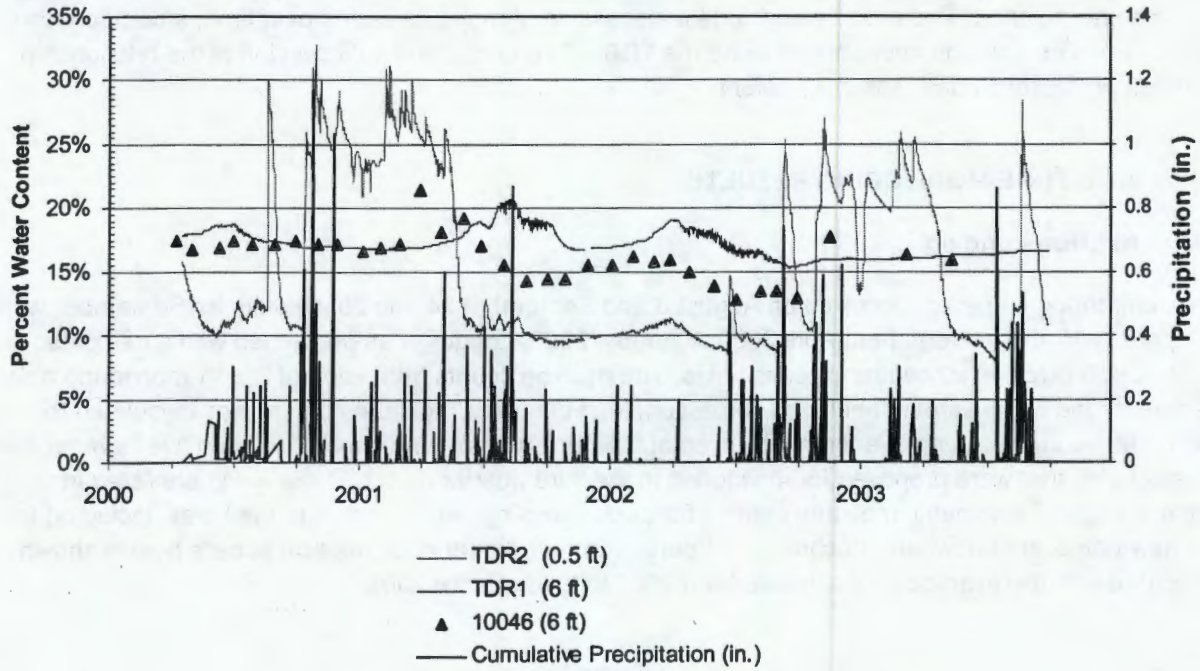

Figure 2. TDR measurements compared with neutron measurements at neutron access hole 10046, which is in close proximity and at the same corresponding depths as TDR1

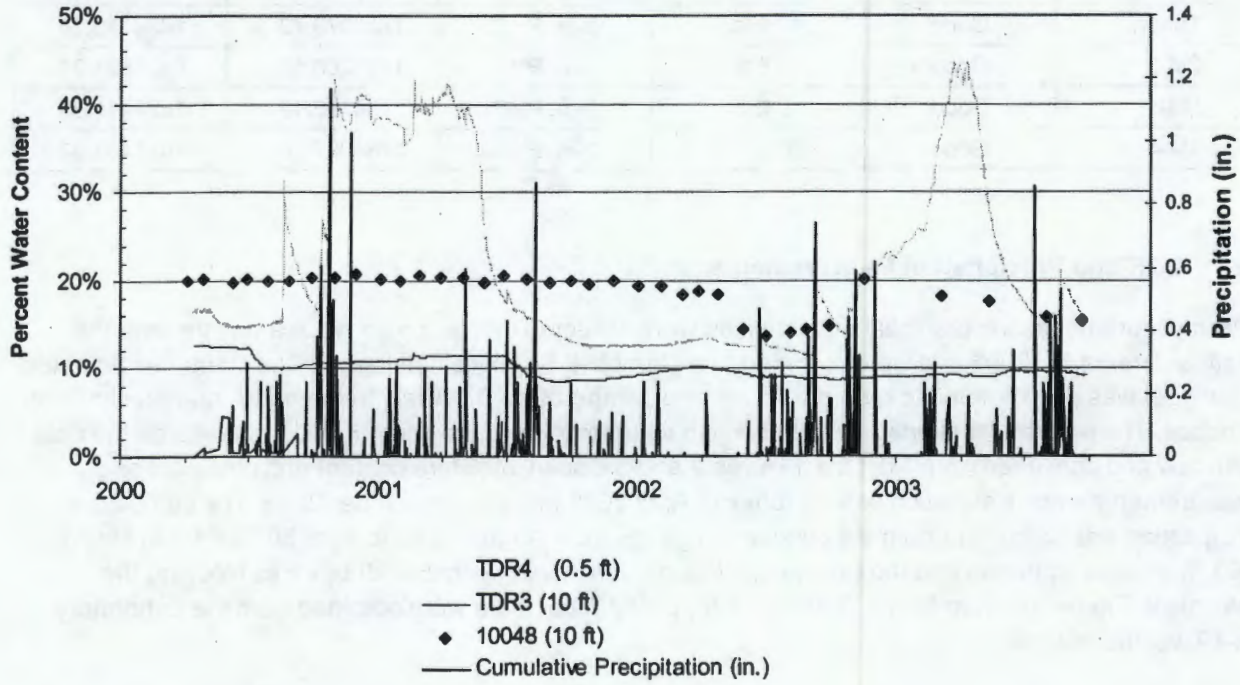

Figure 3. TDR measurements compared with neutron measurements at neutron access hole 10048, which is in close proximity and at the same corresponding depth as TDR3

3.0 MOISTURE-MONITORING RESULTS AND DATA ANALYSIS

3.1 Introduction

TDR and neutron data from April 2000 to June 2003 show fluctuations in volumetric moisture content near the surface. Measurements below the surface indicate that most of the moisture trends are relatively steady, while a few trends have decreased (Attachment 1). Table 3 shows the student t-test tracking these trends. Trend plots of time versus moisture content were created for specific depth intervals (Attachment 2).

Table 3
Results of the Student T-test Analysis, Based on a 95% Confidence Interval

Neutron Access Hole Number	Moisture Trending Results
TH-1	Analysis shows a decreasing moisture trend from 1 to 110 ft.
TH-2	Analysis shows a decreasing moisture trend from 6 to 104 ft.
TH-3	Analysis shows a decreasing moisture trend from 1 to 5 ft, 51 to 108 ft.
TH-4	Analysis shows a decreasing moisture trend from 1 to 10 ft, 21 to 25 ft, and 31 to 90 ft.
TH-5	Analysis shows a decreasing moisture trend from 1 to 114 ft.
2B-Y	Analysis shows no significant change in moisture trends.
2A-Y	Analysis shows no significant change in moisture trends.
2A-O	Analysis shows a decreasing moisture trend from 6 to 20 ft, and increasing moisture trend from 41 to 55 ft.
49-10046	Analysis shows a decreasing moisture trend from 3 to 13 ft.
49-10047	Analysis shows a decreasing moisture trend from 1 to 2 ft and 5 to 12 ft.
49-10048	Analysis shows a decreasing moisture trend from 1 to 12 ft.

3.2 Correlation between TDR Measurements and Precipitation Events

The results of the shallow TDR probes at 0.5 ft have ranged between 20 and 25 percent moisture content. This is due to precipitation seeping into the first few feet of soil. In contrast, the results of deeper TDR probes (>6 ft) have remained constant throughout the quarter.

3.3 TDR and Neutron Comparisons

The moisture-monitoring system is performing as expected with consistent results between TDR arrays and neutron logging. Figures 2 and 3 display the deep TDR data associated with neutron access holes 49-10046 and -10048 respectively. The neutron probe data from the same depth as the deep TDR probes are also shown. The measurements are in agreement, differing by less than 2%.

3.4 Student T-test of Neutron Data

A student t-test analysis was performed to statistically track trends in moisture over time for each of the neutron access holes. The student t-test evaluates the significance of an apparent trend based on a selected confidence interval. For the purpose of this analysis, a 95% confidence interval was selected.

As of September 2003, 42 months of data events were available for statistical analysis. See Table 3 for the results of the student t-test analyses for each of the neutron access holes, with the exception of this quarter's added locations. The trending analysis results show that moisture levels have decreased since measurements began in April 2000.

In addition to the student t-test analyses, trend plots of time vs. moisture content for specific depth intervals in neutron access holes are shown in Figures 2-1 through 2-11 in Attachment 2.

4.0 CONCLUSIONS

The neutron log and TDR data indicate that the behavior of subsurface moisture levels fluctuates in the near surface (<10 ft) and remains constant at greater depth as expected for a moisture limited semi-arid climate. The precipitation at TA-49 has been below average: 4.71 in. from July through September 2003 (weather.com 2003). The moisture levels of the cover at the majority of the locations have decreased when compared to the average moisture levels from April 2000 to August 2003. The shallow TDR probes have shown moisture content responses to relatively small rainfall events, while the deeper probes (>6 ft) have remained constant. This can be attributed to small precipitation events detected in the near-surface with no deep infiltration. The data from neutron access holes 10047 and 10048 show that the moisture content of the cover has decreased from the surface to the bottom of each neutron access hole. In neutron access holes adjacent to the cover (TH-3, TH-4, TH-5), the moisture levels have decreased from the surface to the bottom. The data from two of the moderate depth neutron access holes (<60 ft) surrounding the cover (2A-Y, 2B-Y) have not provided significant changes in moisture content; however, during the fourth quarter, 2B-Y showed a slight decrease of moisture near the surface.

5.0 RECOMMENDATIONS

The TA-49 moisture-monitoring system was installed to assess the performance of the MDA AB Area 2 cover with respect to maintaining and/or reducing subsurface moisture content. The Area 2 cover was installed as part of the 1998 IM to address concerns arising from moisture accumulation beneath the former asphalt pad on top of the test shafts. The routine moisture monitoring and site inspections conducted since March 2000 have shown the IM to be successful in eliminating run-on, reducing surface-water ponding, and promoting evapotranspiration. This is evidenced by the reduction and/or stabilization of the subsurface moisture content within the covered area. Additionally, the increased vegetation, site BMPs, and steel-mesh bio-barrier have controlled runoff, erosion, and bio-intrusion, thus reducing the potential for contaminant migration and cover degradation.

MDA G at TA-54 is a mesa-top setting similar to MDA AB. Routine moisture monitoring has been performed at MDA G for more than 10 years. The results have indicated that very little, if any, detectable changes in moisture content occur below the near-surface environment and that any significant changes or trends are effectively captured by bimonthly monitoring. The moisture-monitoring results for the past 36 months at MDA AB have been consistent with those from MDA G. Measurements of the moisture content within the Bandelier Tuff at both mesa-top sites indicate that seasonal precipitation results in little, if any, deep infiltration. The current frequency of TDR measurements will continue to monitor the performance of the cover materials.

There are three additional neutron access holes at TA-49 located across the site (Figure 4) that are not currently neutron logged. These neutron access holes are listed in Table 4. Monitoring of these neutron access holes, along with the additional five for which monitoring began this quarter, will provide a more comprehensive data set of the moisture trends across TA-49. These holes have been identified and are

considered to be in good condition for neutron logging. The melted casing for two of the neutron access holes—9M-2 and 9M-4—will be cut away and the condition of all three will then be confirmed by camera logging.

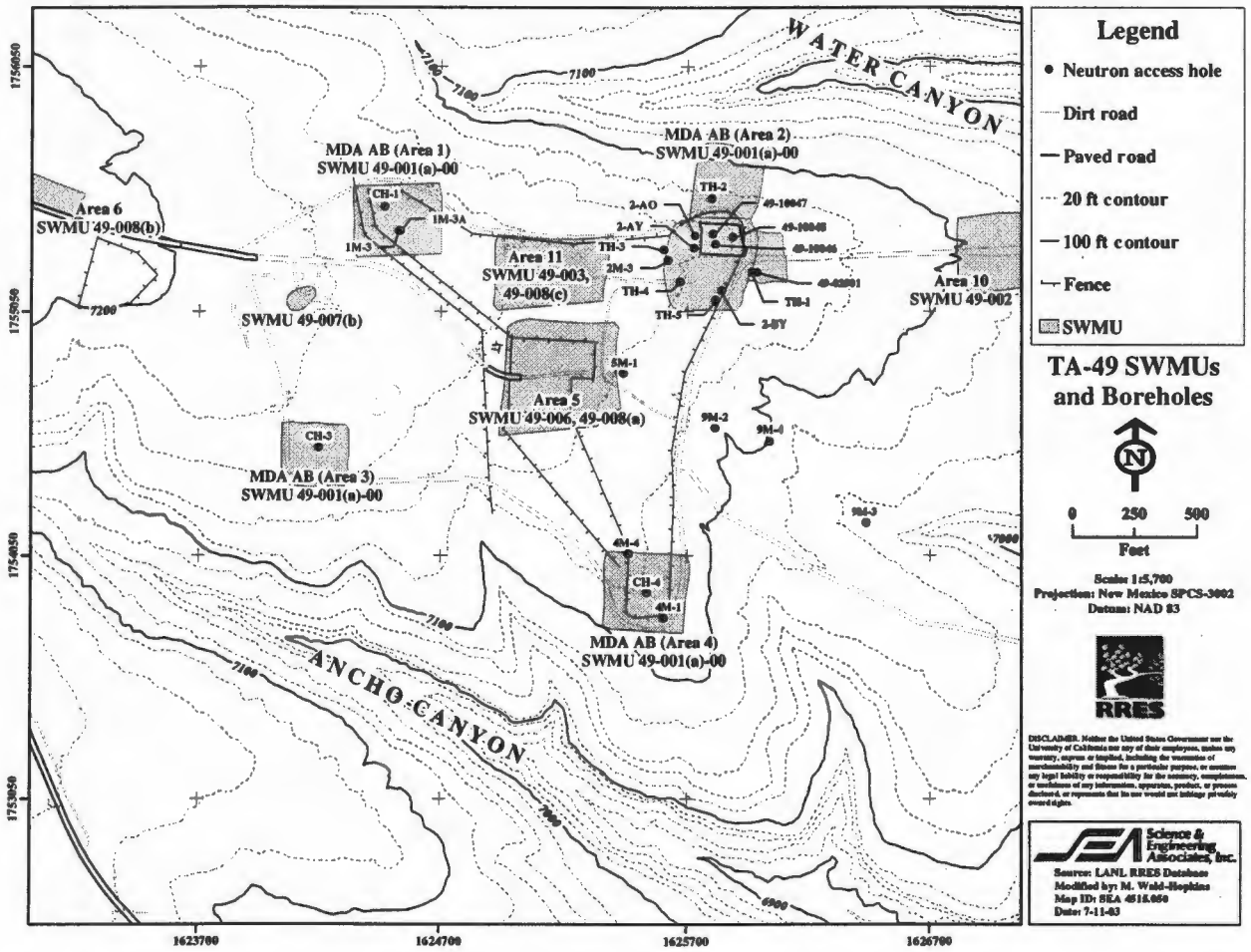

Figure 4. TA-49 neutron access holes

Table 4
Previously Drilled Neutron Access Holes Found in TA-49 Recommended for Logging

Neutron Access Hole ID	Condition	Depth from Top of Casing	Diameter of Casing	Y Coordinate	X Coordinate
9M-2	Casing melted	Unknown	2-in. PVC	1754574.50	1625811.19
9M-4	Casing melted	Unknown	2-in. PVC	1754518.73	1626037.78
4M-1	Good	Unknown	2-in. PVC	1753794.24	1625605

6.0 REFERENCES

Environmental Restoration Project, June 1998. "Stabilization Plan for Implementing Interim Measures and Best Management Practices at Potential Release Sites 49-001 (b, c, d, and g)," Los Alamos National Laboratory report LA-UR-98-1534, Los Alamos, New Mexico. (Environmental Restoration Project 1998, 59166)

Environmental Restoration Project, September 1998. "Best Management Practices Report for Installation of Stabilization Measures at Potential Release Sites 49-001(b, c, d, and g)," Los Alamos National Laboratory report LA-UR-98-4170, Los Alamos, New Mexico. (Environmental Restoration Project 1998, 63041)

Environmental Restoration Project, August 1999. "Interim Measures Report for Potential Release Sites 49-001(b), 49-001(c), 49-001(d), 49-001(g)," Los Alamos National Laboratory report LA-UR-99-2169, Los Alamos, New Mexico. (Environmental Restoration Project 1999, 63919)

weather.com. 2003. http://www.weather.com

Attachment 1

Neutron Moisture Measurements

ATTACHMENT 1 NEUTRON MOISTURE MEASUREMENTS

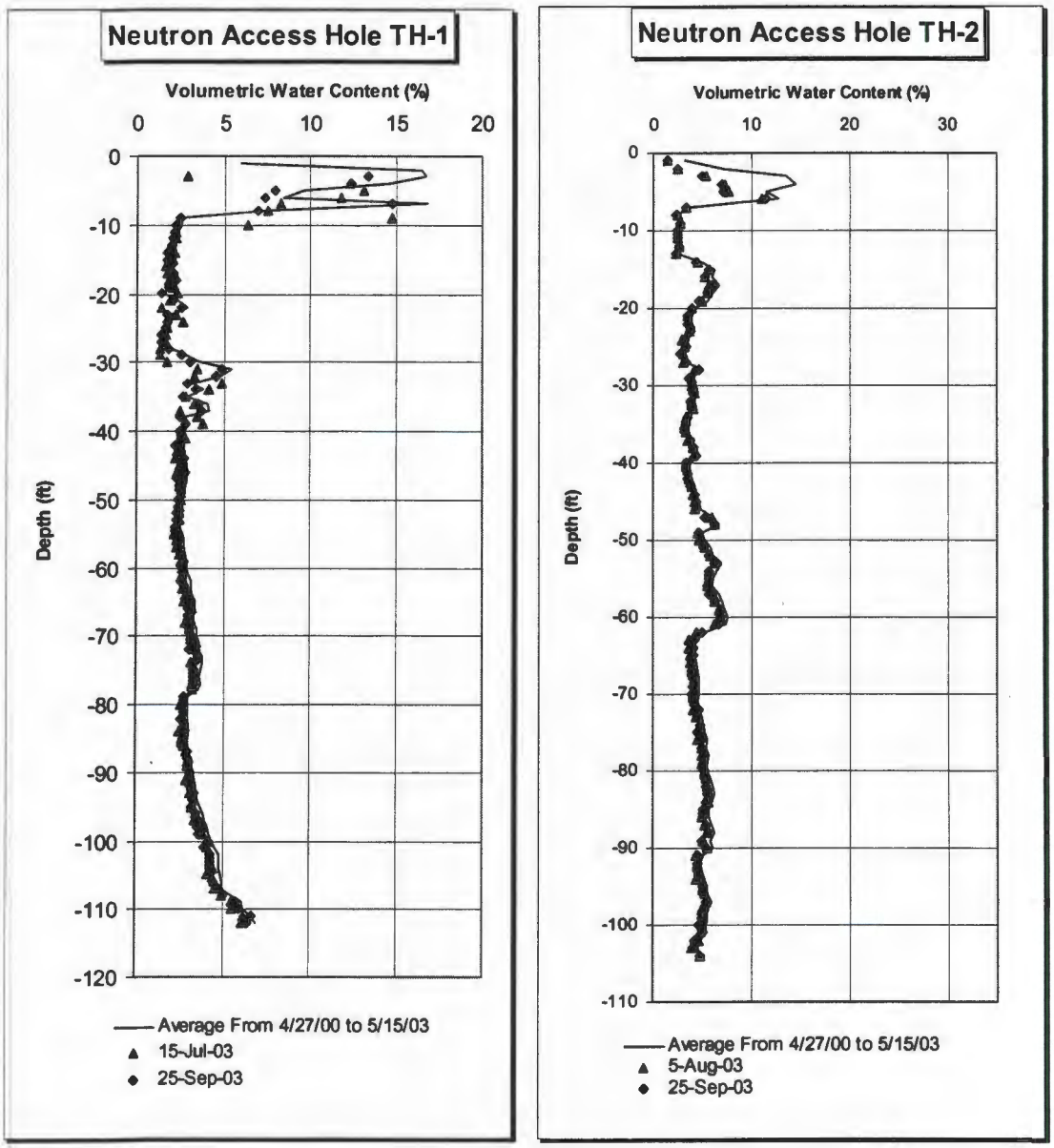

Figure 1-1. Neutron probe moisture measurements for neutron access holes TH-1 and TH-2

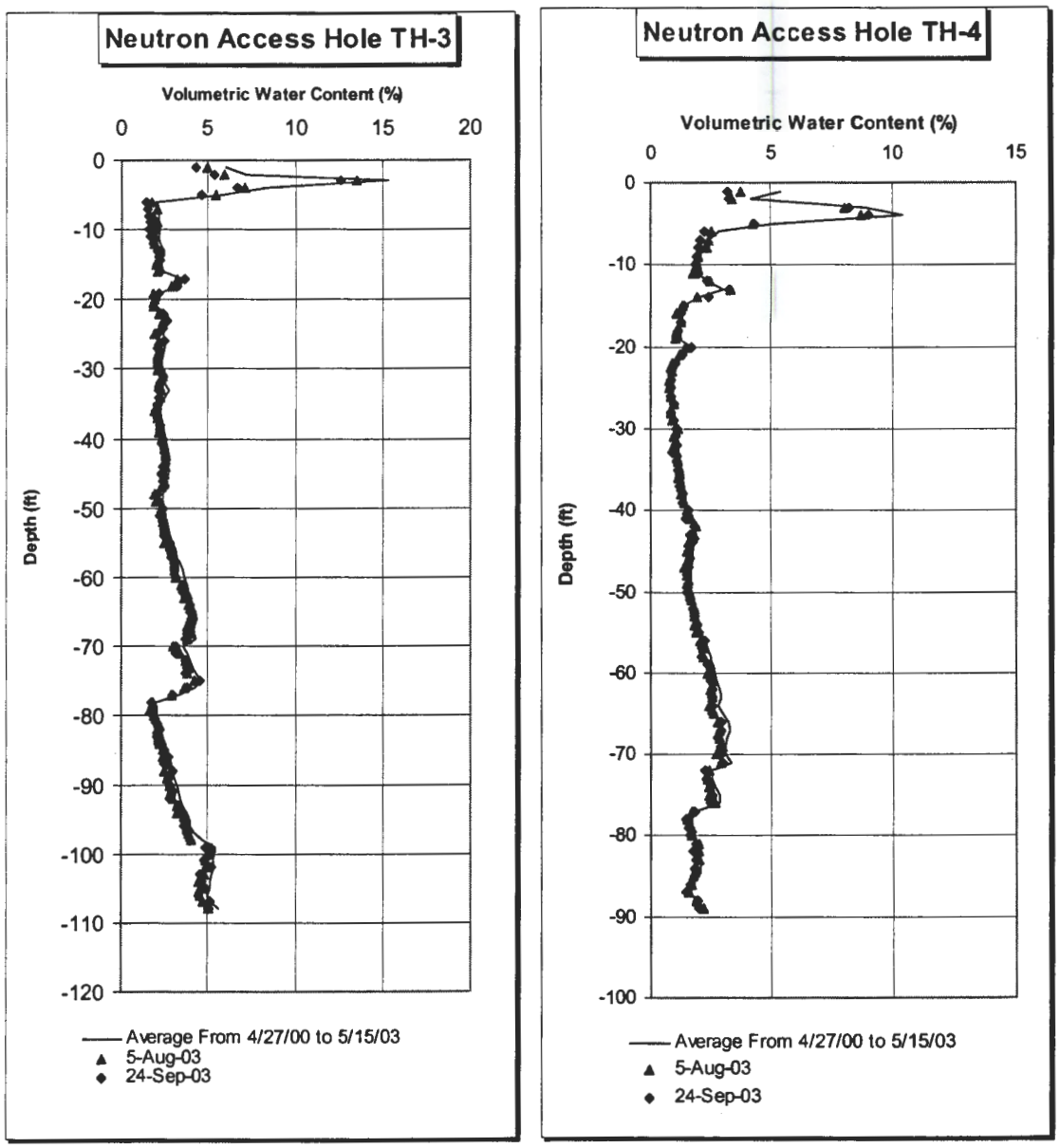

Figure 1-2. Neutron probe moisture measurements for neutron access holes TH-3 and TH-4

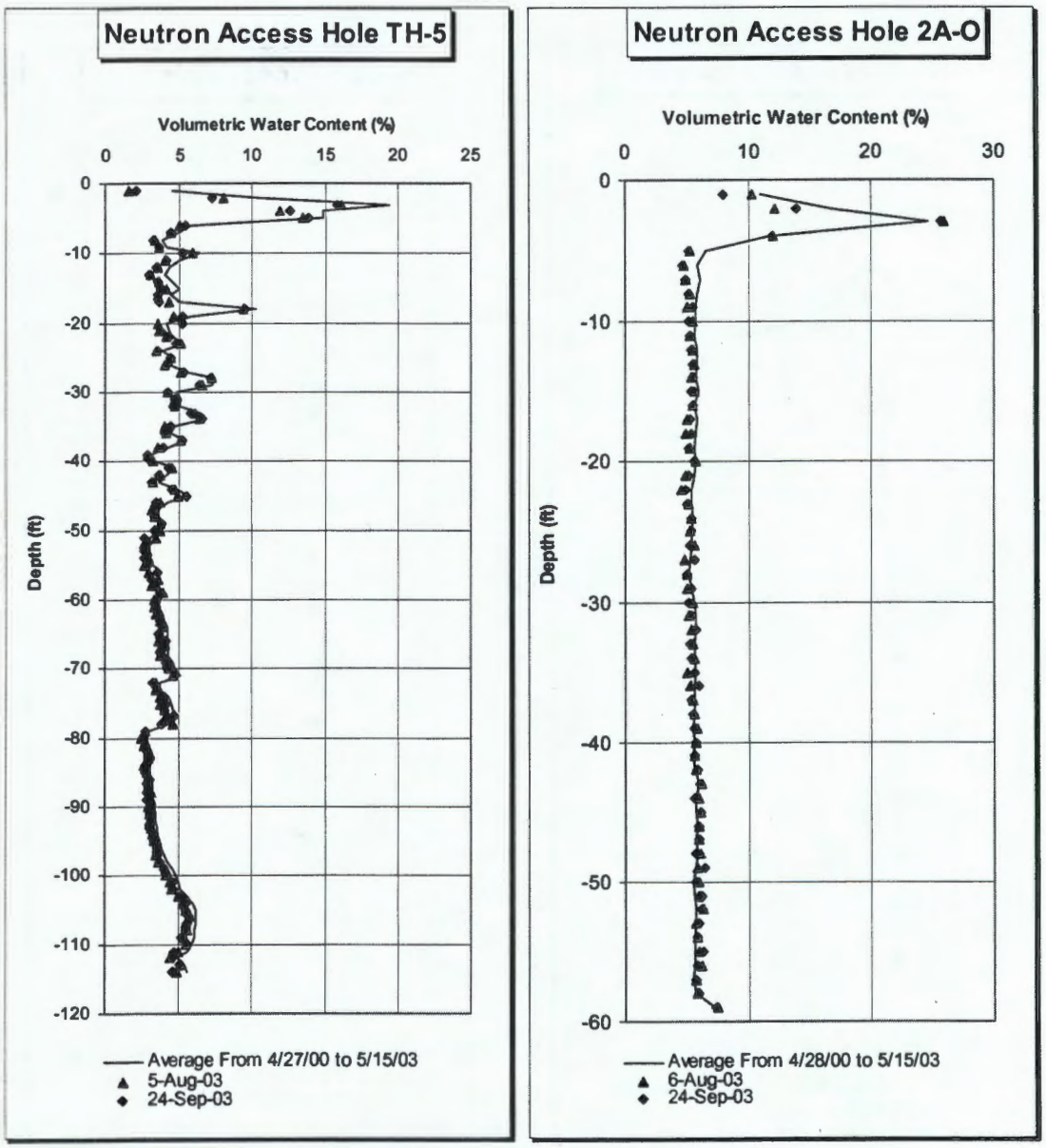

Figure 1-3. Neutron probe moisture measurements for neutron access holes TH-5 and 2A-0

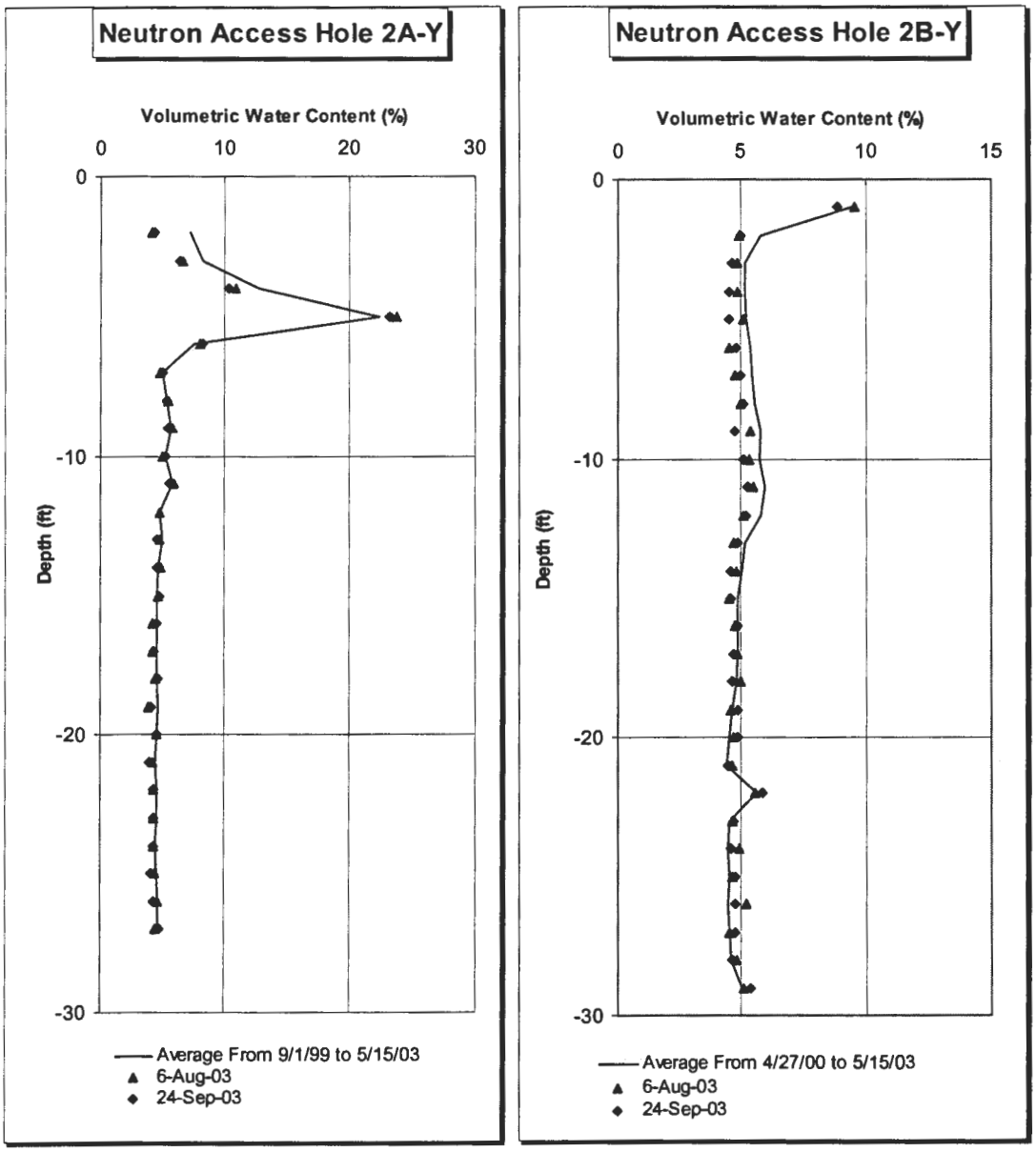

Figure 1-4. Neutron probe moisture measurements for neutron access holes 2A-Y and 2B-Y

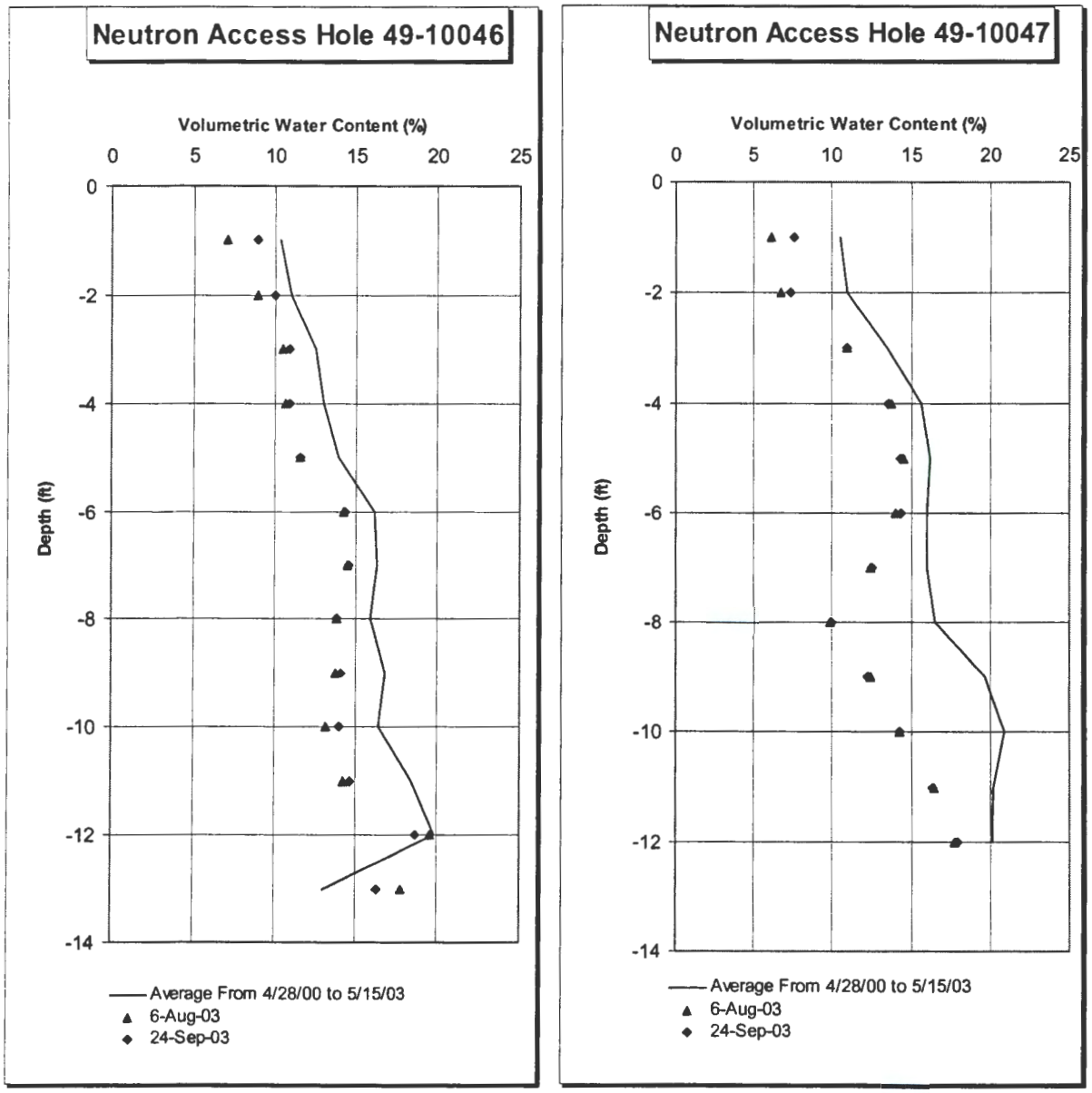

Figure 1-5. Neutron probe moisture measurements for neutron access holes 49-10046 and 49-10047

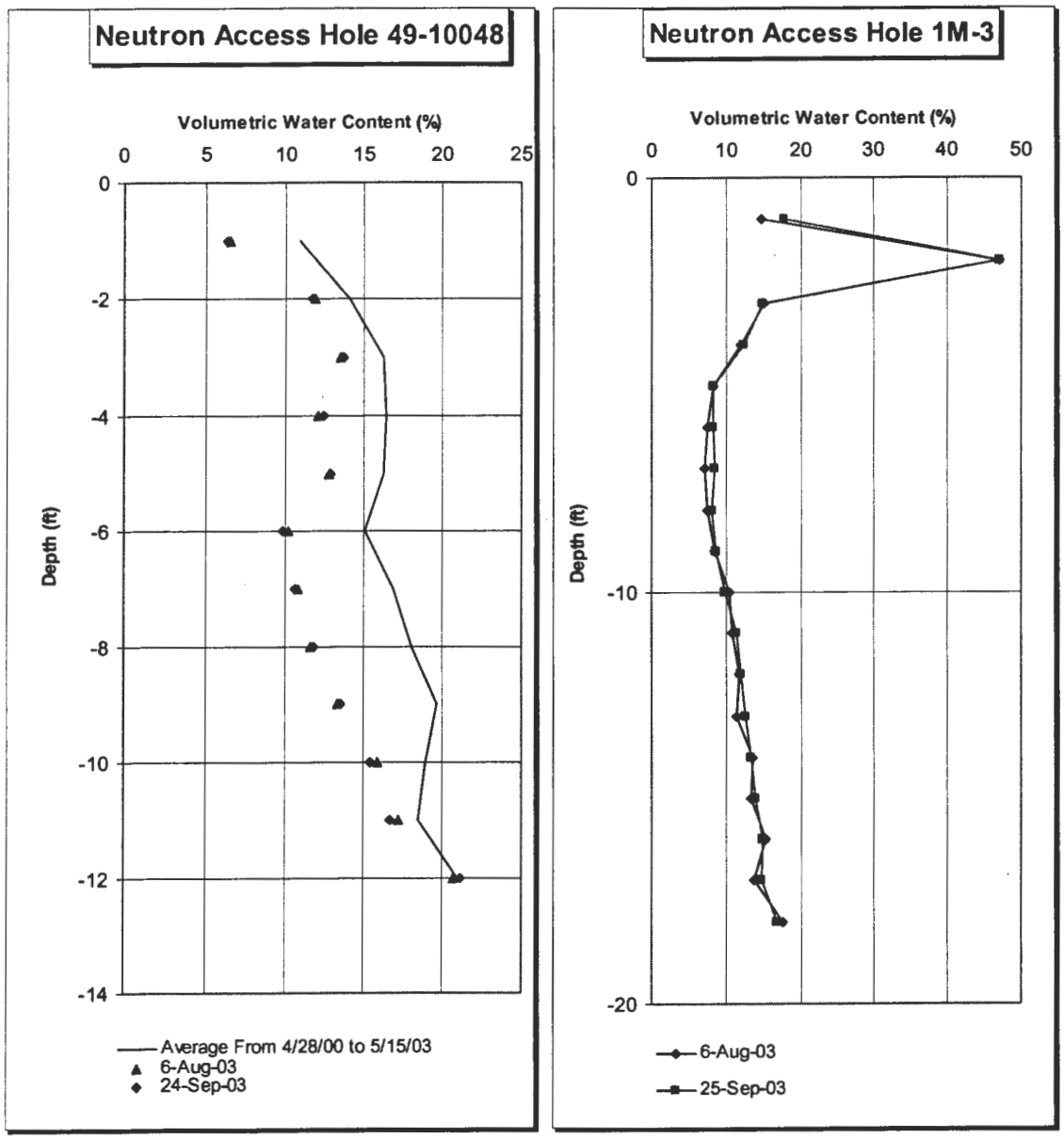

Figure 1-6. Neutron probe moisture measurements for neutron access holes 49-10048 and 1M-3

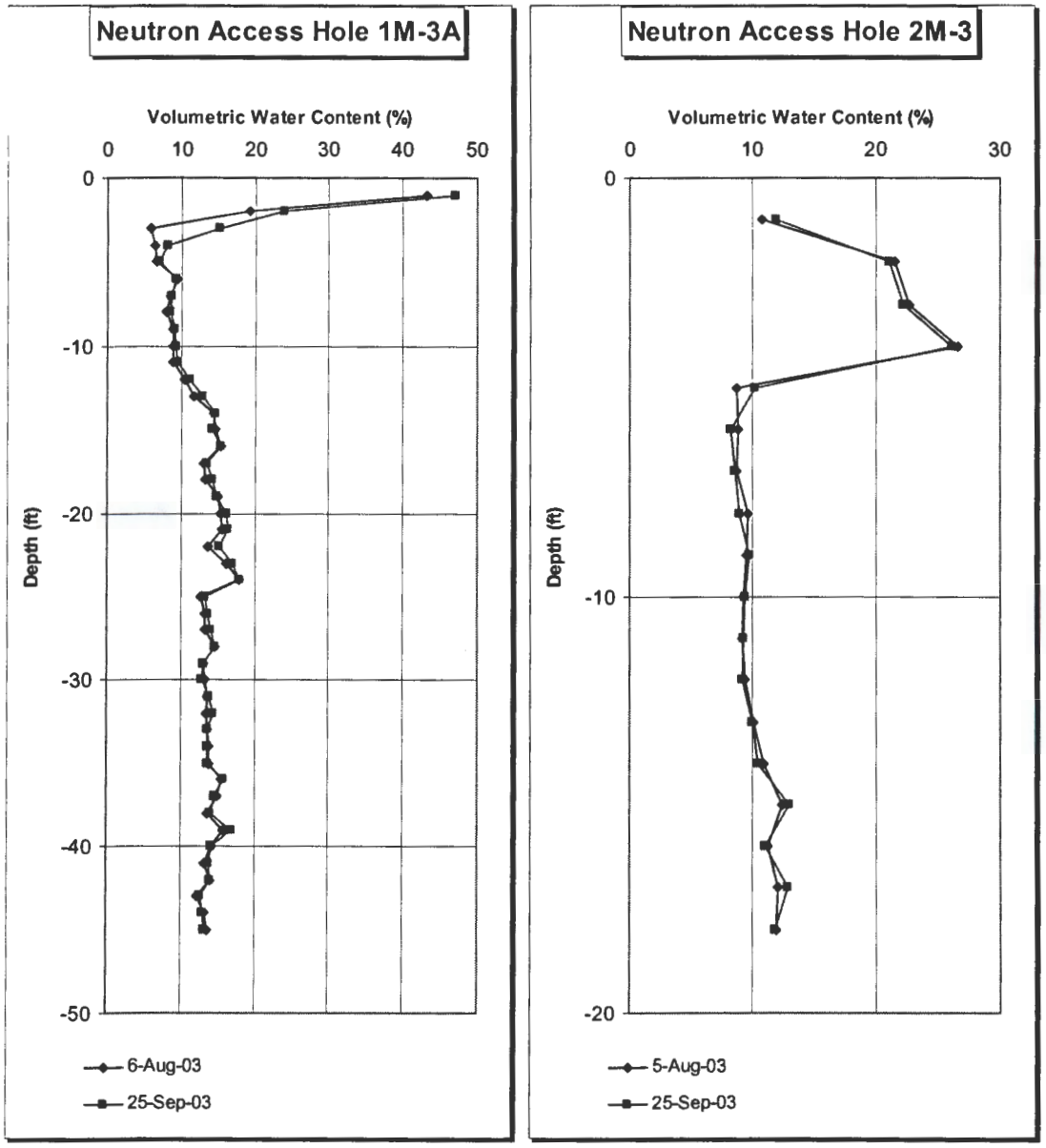

Figure 1-7. Neutron probe moisture measurements for neutron access holes 1M-3A and 2M-3

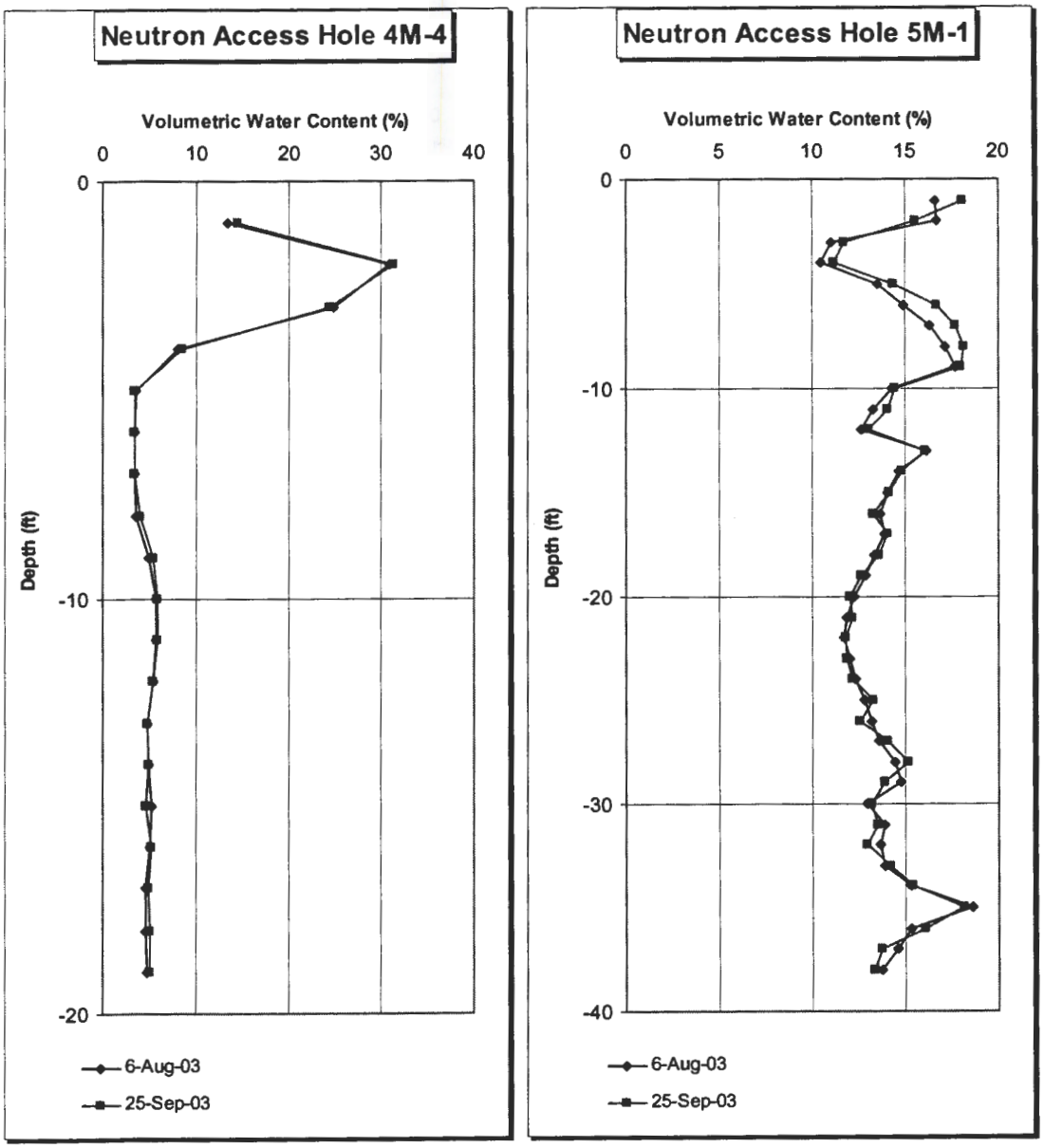

Figure 1-8. Neutron probe moisture measurements for neutron access holes 4M-4 and 5M-1

Attachment 2

Time Versus Moisture Content Plots

ATTACHMENT 2 TIME VERSUS MOISTURE CONTENT PLOTS

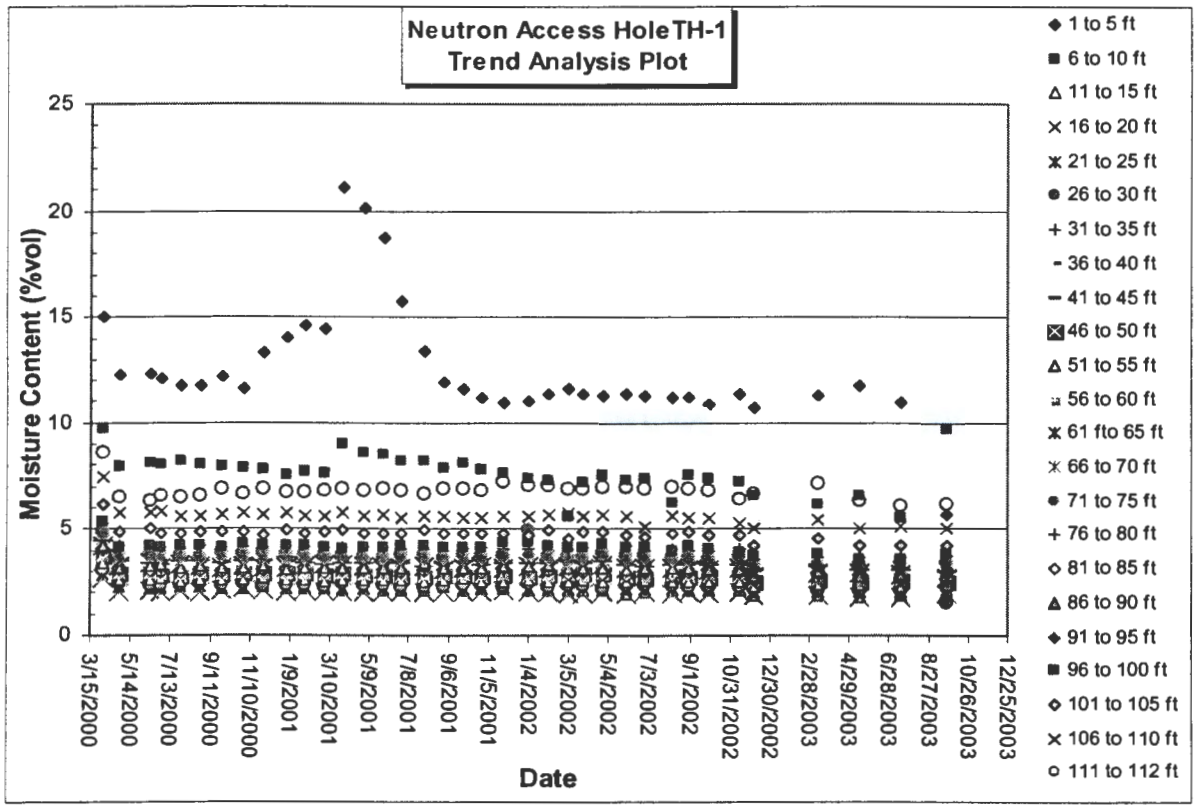

Figure 2-1. Trend plot of neutron moisture measurements, neutron access hole TH-1

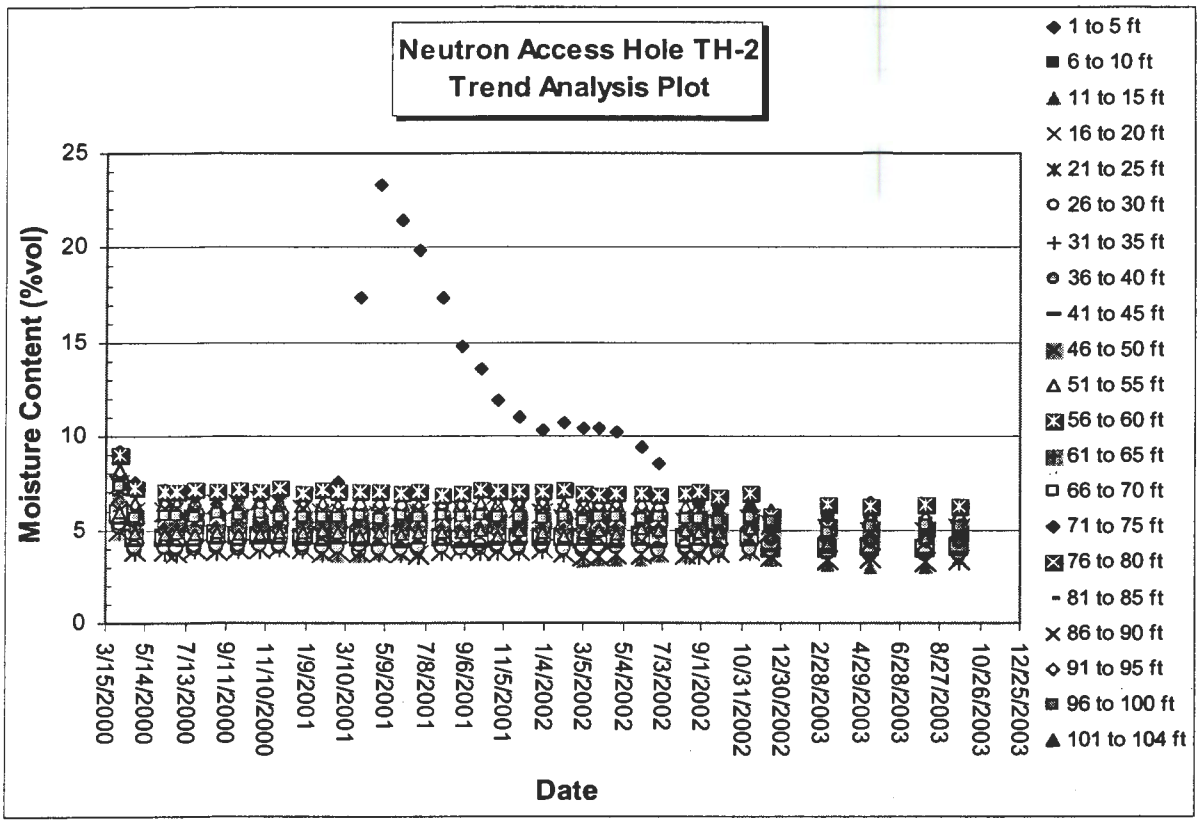

Figure 2-2. Trend plot of neutron moisture measurements, neutron access hole TH-2

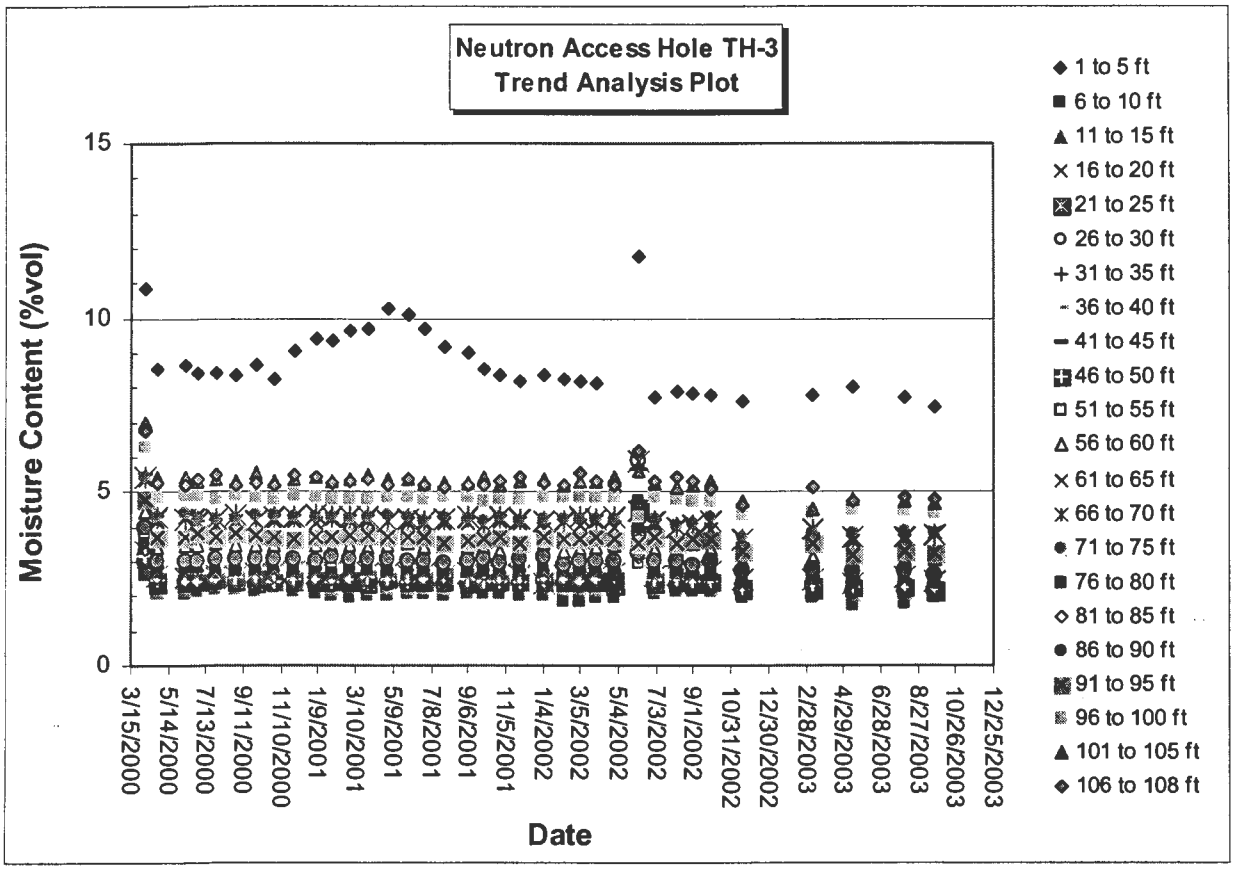

Figure 2-3. Trend plot of neutron moisture measurements, neutron access hole TH-3

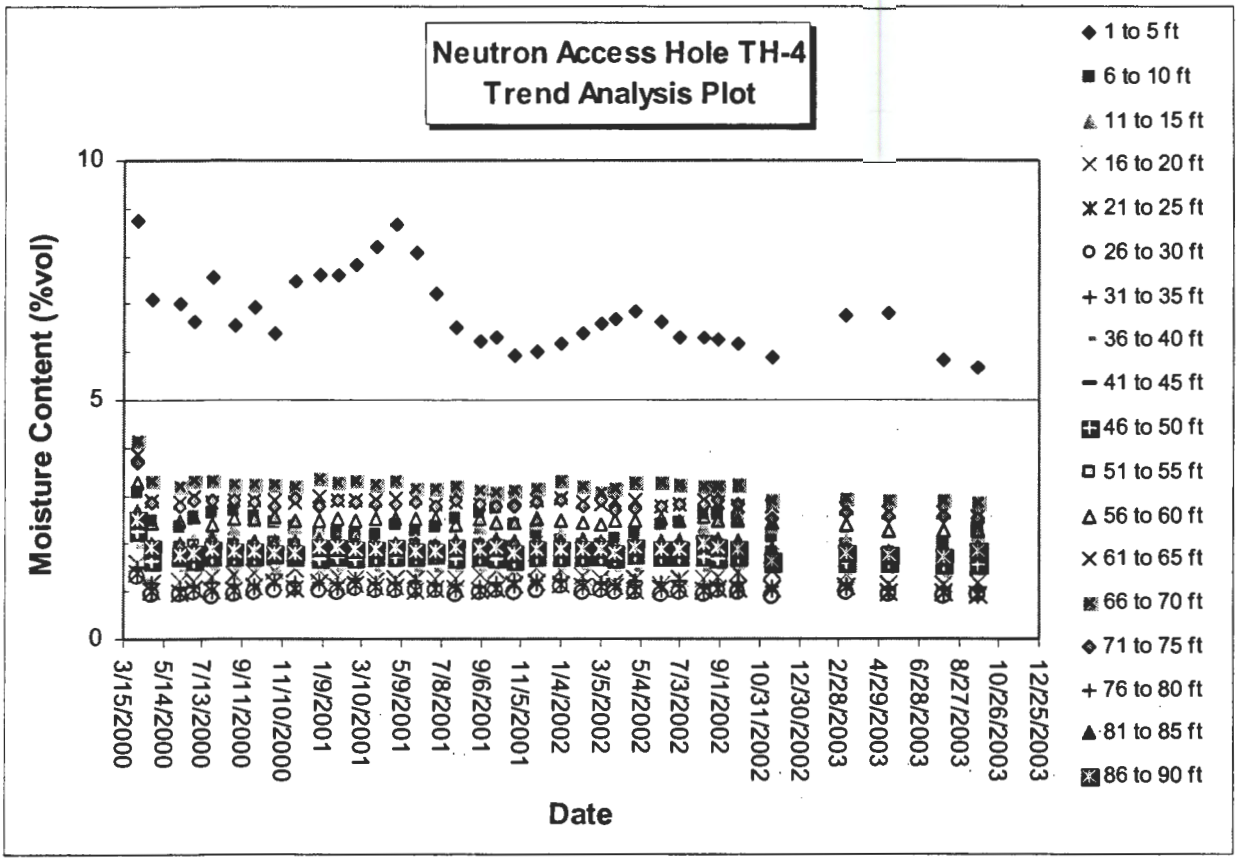

Figure 2-4. Trend plot of neutron moisture measurements, neutron access hole TH-4

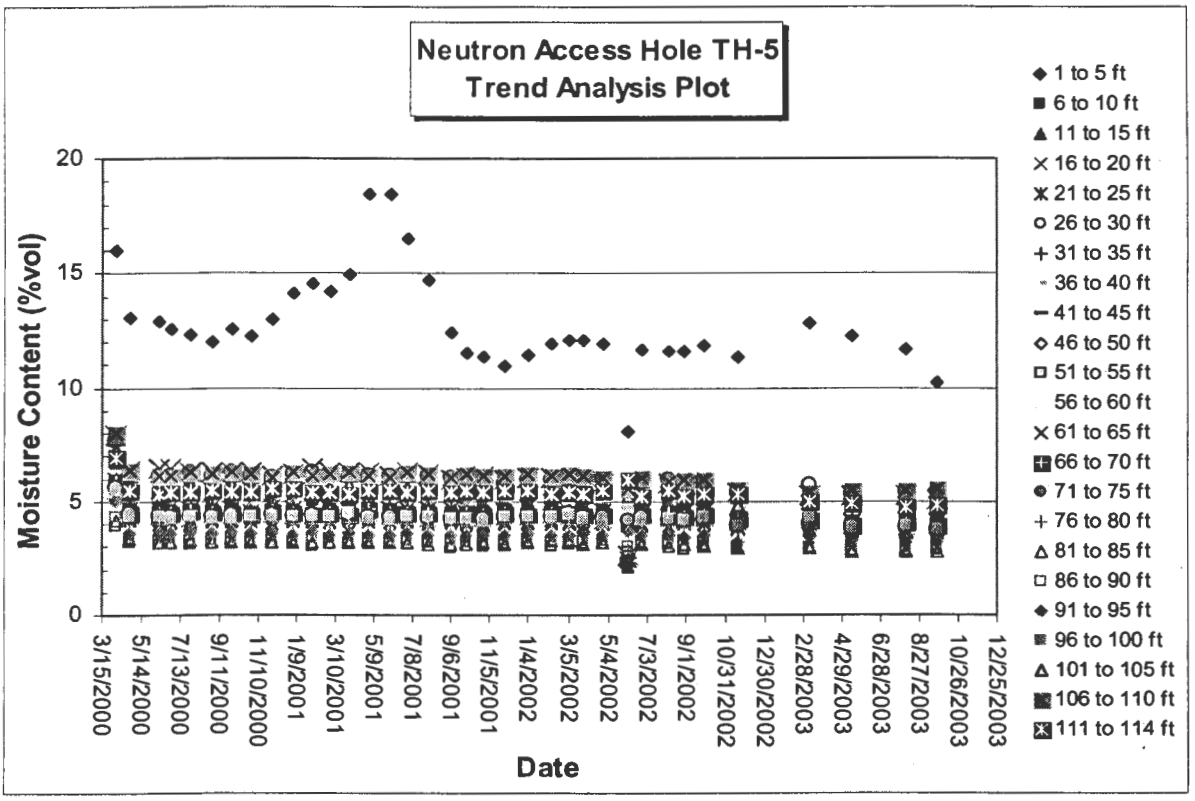

Figure 2-5. Trend plot of neutron moisture measurements, neutron access hole TH-5

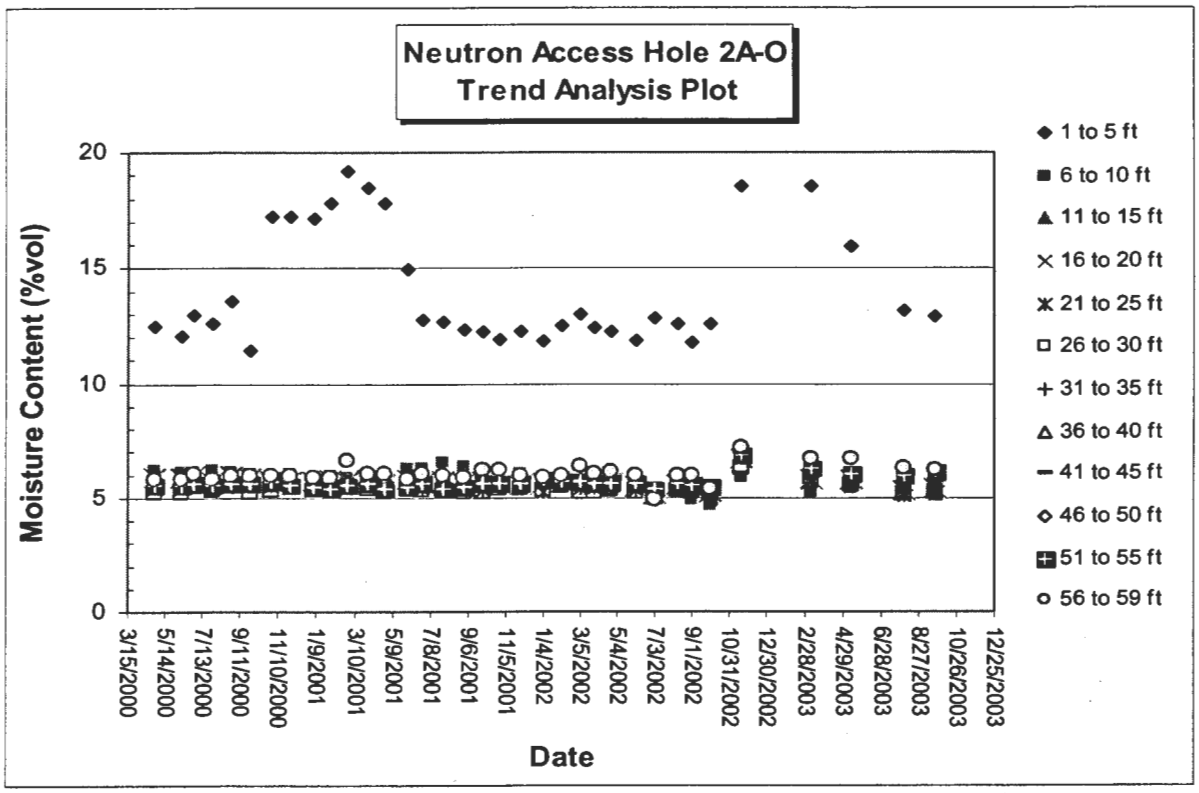

Figure 2-6. Trend plot of neutron moisture measurements, neutron access hole 2A-O

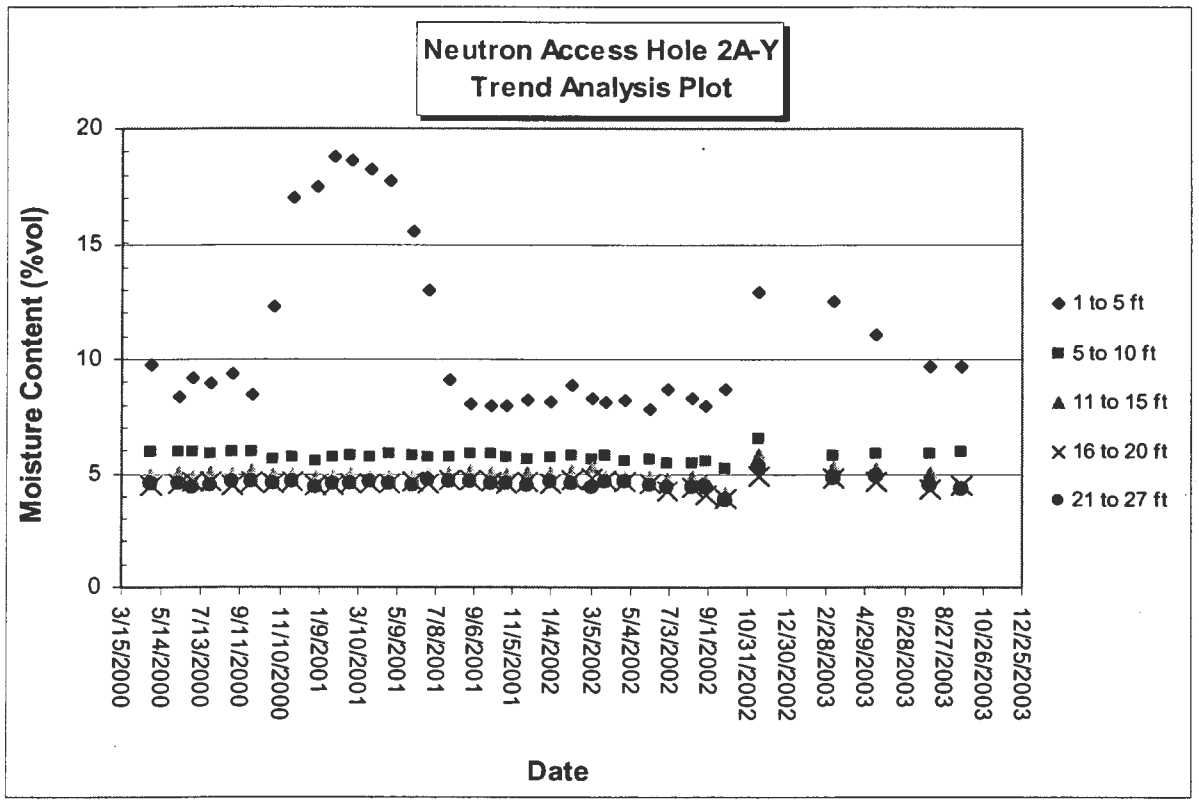

Figure 2-7. Trend plot of neutron moisture measurements, neutron access hole 2A-Y

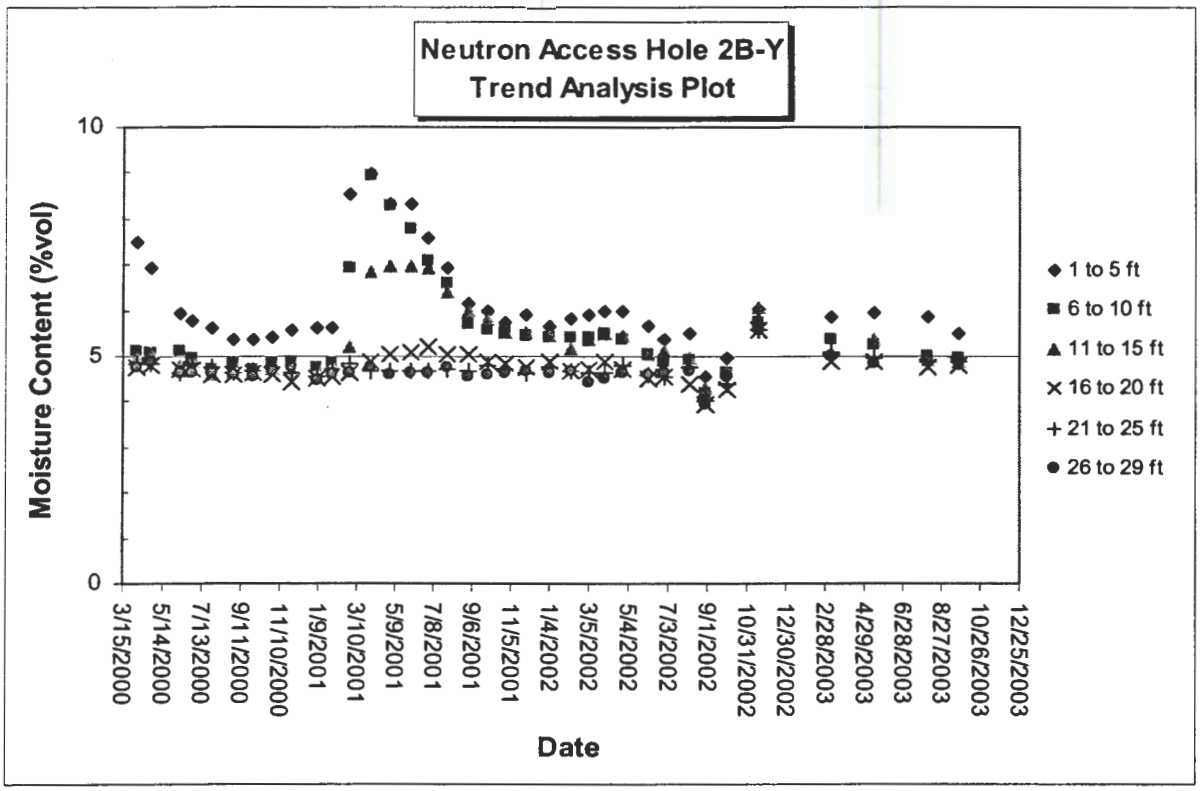

Figure 2-8. Trend plot of neutron moisture measurements, neutron access hole 2B-Y

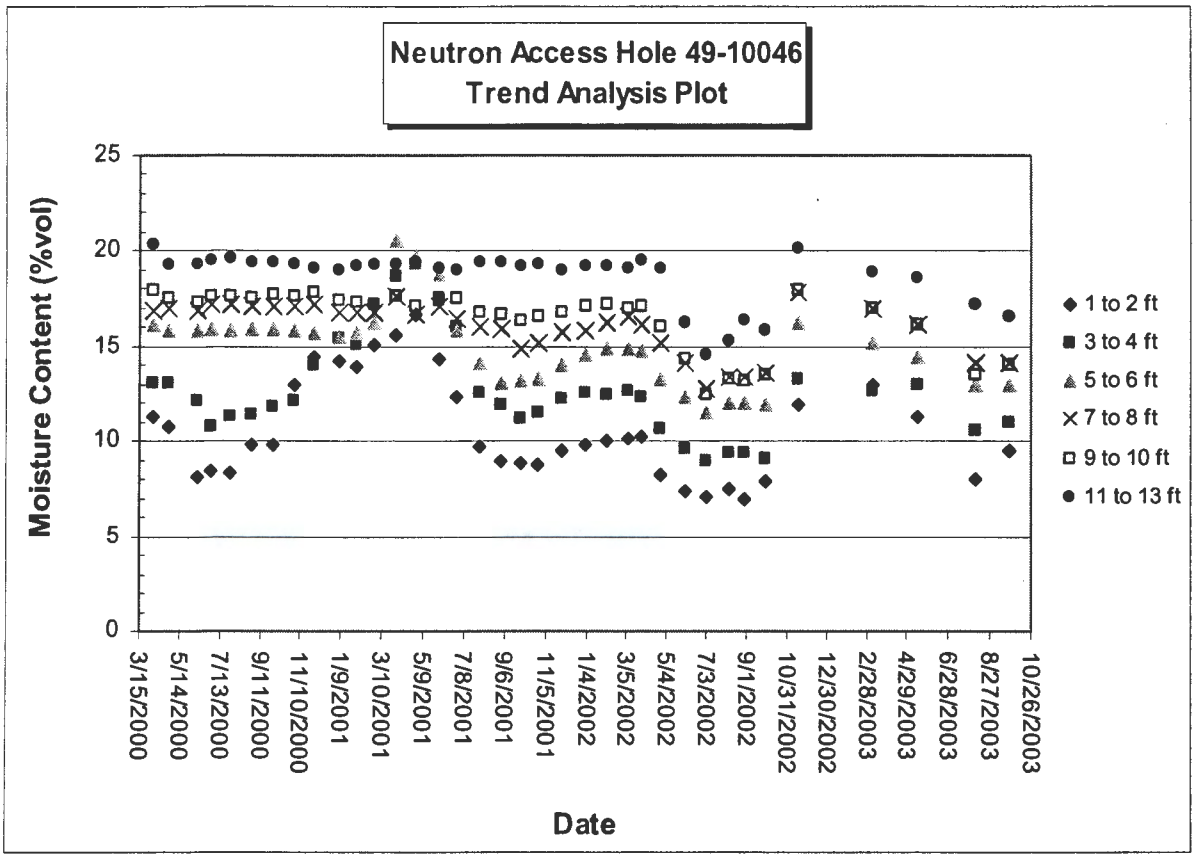

Figure 2-9. Trend plot of neutron moisture measurements, neutron access hole 49-10046

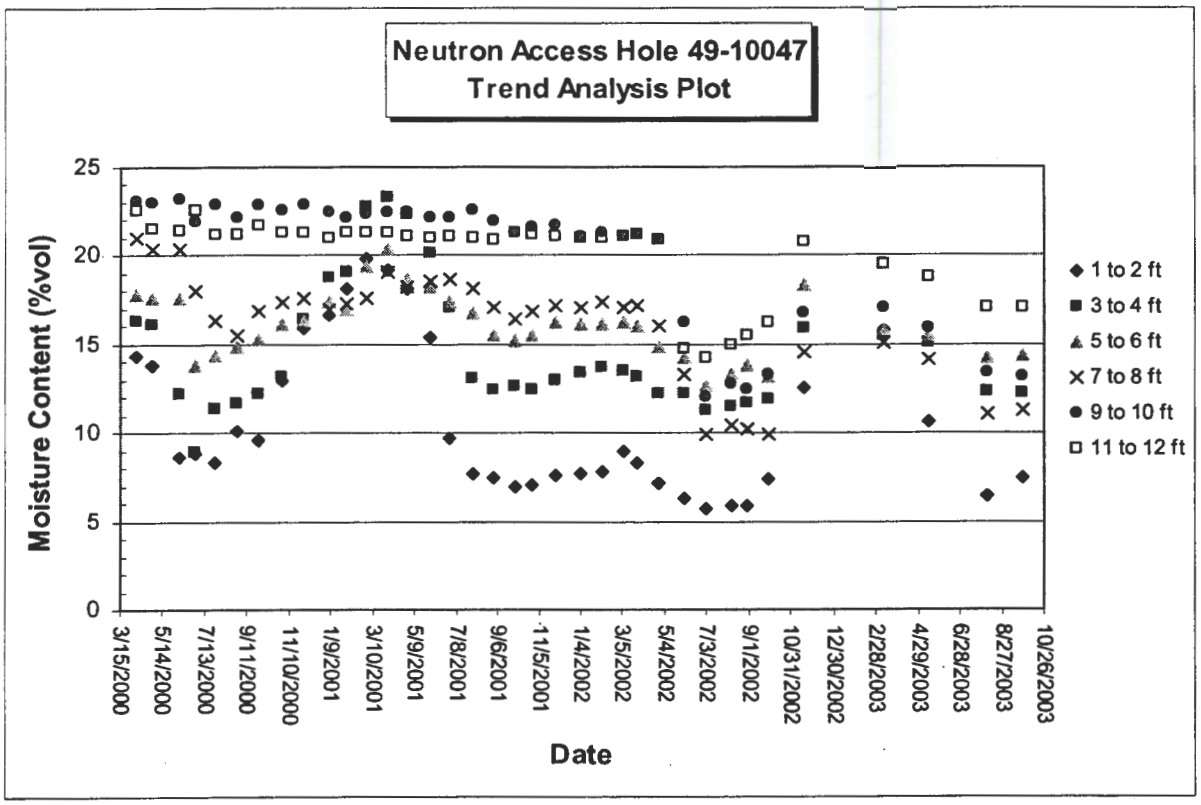

Figure 2-10. Trend plot of neutron moisture measurements, neutron access hole 49-10047

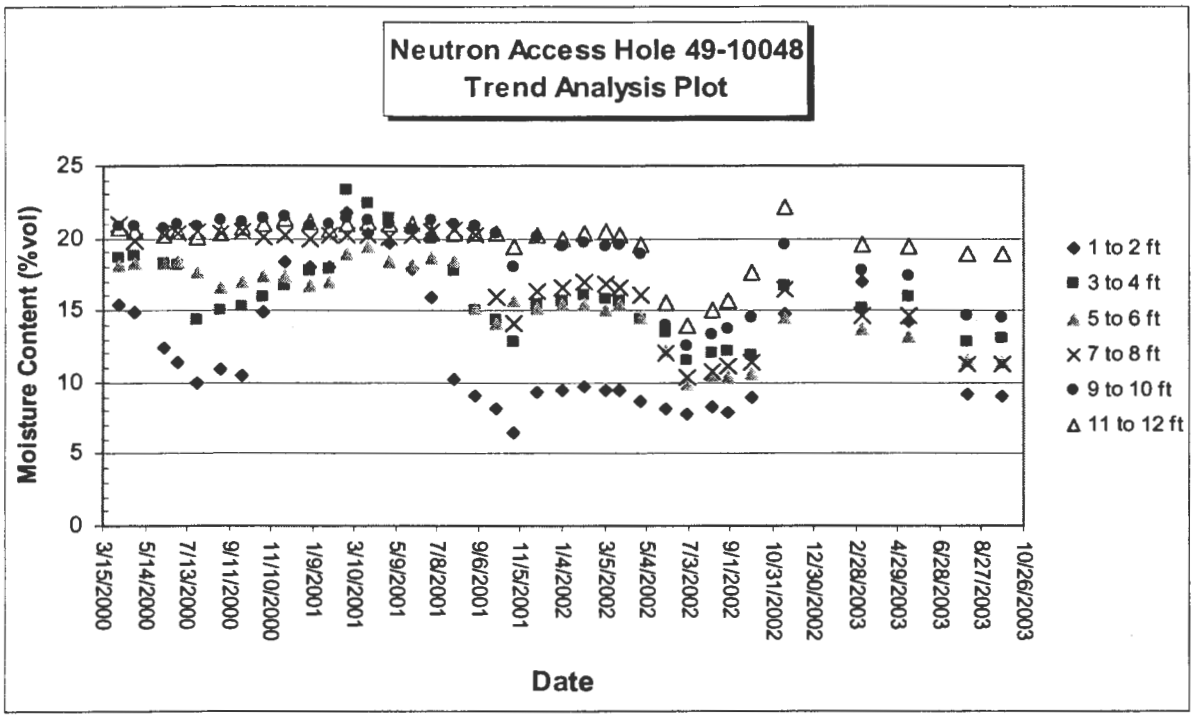

Figure 2-11. Trend plot of neutron moisture measurements, neutron access hole 49-10048

Appendix D

Pore-Gas Sampling at Technical Area 54,
Material Disposal Areas L and G
Annual Report for Fiscal Year 2003

PORE-GAS SAMPLING AT TECHNICAL AREA 54 MATERIAL DISPOSAL AREAS L AND G ANNUAL REPORT FOR FISCAL YEAR 2003

Risk Reduction and Environmental Stewardship—Remediation Services

Los Alamos National Laboratory

November 2003

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1.0 INTRODUCTION

This report discusses fourth quarter 2003 subsurface pore-gas sampling at Los Alamos National Laboratory (the Laboratory), at Technical Area (TA) 54; it also presents a review of the data for Fiscal Year (FY) 2003. Monitoring at TA-54 is required by Module VIII of the Laboratory's Hazardous Waste Facility Permit in Section C.5, "Unsaturated Zone Monitoring" (EPA 1990, 1585). The approved plan (Davis 1993, 38812) for pore-gas sampling at TA-54 is described in the Laboratory's response (Glatzmaier 1993, 30987) to an Environmental Protection Agency (EPA) notice of deficiency (Driscoll 1992, 3849.3) addressing the Laboratory's Resource Conservation and Recovery Act facility investigation (RFI) work plan for TA-54 (LANL 1992, 7669).

1.1 Sampling Plan Requirements

Twenty-eight Risk Reduction and Environmental Stewardship Division–Remediation Services (RRES-RS) wells are available for pore-gas sampling at TA-54. The sampling and analysis plan requires the collection of samples from 12 wells each quarter. These 12 samples are collected for analysis of volatile organic compounds (VOCs). Of these 12 samples, 7 are to be selected from a list of 10 wells located at Material Disposal Area (MDA) L, and 2 are to be selected from a list of 4 wells located at MDA G. Thus, 9 of the 12 samples collected each quarter are constrained to a defined set of 14 wells. This leaves 3 samples per quarter that may be distributed among the remaining 14 available RRES-RS project pore-gas sampling wells or the boreholes provided by the TA-54 Area G Performance Assessment Maintenance Group (PAMG) wells.

The SUMMA canister sampling method is currently being used with analysis by EPA TO-14 (gas chromatography/mass spectrometry) (EPA 1999, 70063). SUMMA canister samples are drawn from one of the several sampling ports available at each well. Table 4 in Appendix F of the fourth-quarter report for FY 2000 (Environmental Restoration Project 2000, 70064) lists the ports to be sampled to establish trends near the source and at the plume boundaries. Results from these locations are evaluated in section 5.0.

Before the required sampling is performed, all available wells (RRES-RS project wells and PAMG wells) are screened with a B&K multigas monitor, Type 1302. Each port is purged and monitored with field instruments until CO_2 levels have stabilized at values representative of subsurface pore-gas conditions and is then screened for four VOCs (1,1,1-trichloroethane, trichloroethene, perchloroethene, and Freon-11).

Three types of field quality assurance (QA) samples are collected and analyzed. These three samples include a duplicate sample, an equipment blank of zero-grade air (zero-grade air is a common term for air that is certified to be free from VOC contamination) or nitrogen drawn through the sampling apparatus in the working area, and a performance evaluation sample/calibration gas sample taken from a tank of a certified gas mixture. Laboratory QA for EPA Method TO-14 includes internal standards, surrogates, replicates, blanks, laboratory control samples, and reference standards.

1.2 Sampling Purpose

The purpose of the pore-gas sampling at TA-54 MDAs L and G is three-fold:

- to identify changes in contaminant concentrations at the perimeter of the relatively well-characterized plume at MDA L as an indicator of outward plume expansion (i.e., extent);

- to monitor for contaminants and changes in contaminant concentration distributions within the plumes at MDAs L and G as an indicator of changes warranting further attention (i.e., nature); and
- to monitor wells for data-gap needs for future modeling and trend analyses.

2.0 FOURTH-QUARTER SAMPLING

2.1 Sampling Event

Sampling for the fourth quarter of FY 2003 (July through September) was conducted during the period of July 22 through July 31 (Table 1). These analytical results are reported in Table 2. Field-screening results are available upon request.

Table 1 identifies the wells sampled (from the list of all wells available) and lists the port at each well from which the SUMMA canister sample was drawn. Twelve wells were sampled in accordance with the approved sampling plan. Seven wells at MDA L were sampled, including seven from the defined list. Five wells at MDA G were sampled, including two from the defined list of wells and three from PAMG wells. The two QA samples (field duplicate and equipment blank) were collected as planned. In total, fourteen samples were collected for laboratory analysis.

There were a total of 31 wells screened with the B&K monitor. One hundred seventy-eight ports were screened from 31 wells and are indicated in Table 1. Wells 54-1015 and 54-1016 were not sampled this quarter due to fire hazards in undeveloped areas.

2.2 Sampling Results

The highest VOC concentrations detected in the SUMMA samples were measured in well 54-2002 at a depth of 100 ft. Trichloroethane (TCA), trichloroethene (TCE), and tetrachloroethene (PCE) were measured at concentrations of 290 parts per million by volume (ppmv), 73 ppmv, and 8.4 ppmv respectively. This well is situated close to a source area, so these results are not unexpected. A total of 15 VOCs were detected in well 54-2002, with TCA being the prominent analyte.

2.3 Evaluation of Quality Assurance Samples

Field duplicate sample. A field duplicate sample is drawn from the same port on a well immediately after the original sample. The field duplicate was collected on well 54-1121 at the 98-ft sampling port. See Table 3 for the field duplicate results.

Field equipment blank. A field equipment blank sample documents the effectiveness of equipment purges between samples. A sample was collected by drawing zero-grade air through the sample train after the normal purge performed before each sample. The field equipment blank was taken in the immediate vicinity of well 54-1121 at ground level.

Calibration gas sample (performance evaluation sample). A calibration gas sample was drawn into a SUMMA canister and submitted to the analytical laboratory for analysis. The calibration gas contained 100 ppmv of TCA, 50 ppmv of TCE, and 10 ppmv of PCE. The results of the analysis for sample MD54-03-52135 were 73 ppmv (73%) for TCA, 39 ppmv (78%) for TCE, and 8.9 ppmv (89%) for PCE.

Table 1
Summary of Sampling Event, Fourth Quarter of FY 2003

Well ID	Site	On Defined Sampling List (Y/N)	Number of Ports Screened	Depths of Screened Ports (ft)	Depth of Port Sampled (ft)	Sample ID
54-1015	MDA L	N	0	Not screened (fire danger restriction)	—[a]	n/a[b]
54-1016	MDA L	N	0	Not screened (fire danger restriction)	—	n/a
54-1107	PAM G	N	6	20, 44.5, 56.5, 74, 91, 100	91	MD54-03-52127
54-1110	PAM G	N	6	20, 48, 60, 70, 85, 90	—	n/a
54-1111	PAM G	N	7	20, 39.5, 50, 70, 78, 100, 139	50	MD54-03-52132
54-1117	PAM G	N	6	20, 31.5, 55, 73, 82, 85	—	n/a
54-1121	PAM G	N	7	20, 26, 61.5, 70, 76, 98, 121	98 98	MD54-03-52133 MD54-03-52134
54-1126	MDA G	N	6	15, 35, 57, 70, 85, 99	—	n/a
54-1128	MDA G	N	5	15, 30, 40, 60, 78	—	n/a
54-2002	MDA L	Y	8	40, 60, 100, 120, 140, 157, 180, 200	100	MD54-03-52125
54-2009	MDA G	Y	3	37, 62, 92	62	MD54-03-52123
54-2010	MDA G	Y	3	30, 53, 95	—	n/a
54-2012	MDA L	Y	3	8, 28, 42	—	n/a
54-2013	MDA L	N	3	20, 43, 63	—	n/a
54-2014	MDA L	N	1	13	—	n/a
54-2016	MDA L	N	1	31	—	n/a
54-2020	MDA L	N	10	20, 40, 60, 80, 95, 120, 140, 160, 180, 200	—	n/a
54-2021	MDA L	Y	9	20, 40, 60, 80, 100, 140, 160, 180, 198	100	MD54-03-52128
54-2022	MDA L	Y	10	20, 40, 60, 80, 100, 120, 140, 160, 180, 200	—	n/a
54-2023	MDA L	Y	9	20, 40, 80, 100, 120, 140, 159, 180, 200	159	MD54-03-52129
54-2025	MDA L	N	5	20, 60, 100, 160, 190	—	n/a
54-2026	MDA L	Y	6	20, 60, 100, 160, 200, 215	160	MD54-03-52137
54-2027	MDA L	N	6	20, 60, 100, 200, 220, 250	—	n/a
54-2028	MDA L	N	7	20, 60, 100, 160, 200, 220, 250	—	n/a
54-2029	MDA L	Y	8	20, 60, 100, 160, 200, 220, 260, 288	100	MD54-03-52126
54-2030	MDA L	Y	6	20, 60, 100, 160, 200, 220	100	MD54-03-52130
54-2031	MDA L	Y	6	20, 60, 100, 160, 200, 260	—	n/a
54-2032	MDA G	Y	4	20, 60, 100, 156	—	n/a
54-2033	MDA G	Y	8	20, 60, 100, 160, 200, 220, 260, 277	100	MD54-03-52124
54-2034	MDA L	Y	7	20, 60, 100, 160, 200, 220, 260	60	MD54-03-52131
54-2087	MDA L	N	4	13, 31, 46, 86	—	n/a
54-2088	MDA L	N	4	13, 31, 46, 86	—	n/a
54-2089	MDA L	N	4	13, 31, 46, 86	—	n/a
Total wells sampled					12	
MDA L defined list wells sampled (7 expected)					7	
MDA G defined list wells sampled (2 expected)					2	
PAMG wells sampled					3	
QA samples taken					1 field duplicate	1 equipment blank

[a] A dash indicates that the port was not sampled.
[b] n/a = Not applicable.

Table 2
Summary of Sampling Event, Fourth Quarter FY 2003

Location ID	Sample ID	Depth (ft)	Analyte Code	Analyte	Sample Concentration (ppbv)
54-01107	MD54-03-52127	91	95-47-6	Xylene[1,2-]	16
54-01107	MD54-03-52127	91	127-18-4	Tetrachloroethene	180
54-01107	MD54-03-52127	91	Xylene[1,3 and 1,4]	Xylene[1,3-]+Xylene[1,4-]	21
54-01107	MD54-03-52127	91	75-69-4	Trichlorofluoromethane	28
54-01107	MD54-03-52127	91	109-99-9	Tetrahydrofuran	2900
54-01107	MD54-03-52127	91	95-63-6	Trimethylbenzene[1,2,4-]	30
54-01107	MD54-03-52127	91	75-45-6	Chlorodifluoromethane	32
54-01107	MD54-03-52127	91	71-55-6	Trichloroethane[1,1,1-]	320
54-01107	MD54-03-52127	91	75-71-8	Dichlorodifluoromethane	40
54-01107	MD54-03-52127	91	76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	58
54-01107	MD54-03-52127	91	79-01-6	Trichloroethene	7.5
54-01107	MD54-03-52127	91	75-35-4	Dichloroethene[1,1-]	9.1
54-01111	MD54-03-52132	50	71-55-6	Trichloroethane[1,1,1-]	1700
54-01111	MD54-03-52132	50	79-01-6	Trichloroethene	26
54-01111	MD54-03-52132	50	75-34-3	Dichloroethane[1,1-]	29
54-01111	MD54-03-52132	50	127-18-4	Tetrachloroethene	32
54-01111	MD54-03-52132	50	75-71-8	Dichlorodifluoromethane	44
54-01111	MD54-03-52132	50	75-09-2	Methylene Chloride	44
54-01111	MD54-03-52132	50	75-35-4	Dichloroethene[1,1-]	54
54-01111	MD54-03-52132	50	76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	860
54-01121	MD54-03-52133	98	127-18-4	Tetrachloroethene	1100
54-01121	MD54-03-52133	98	76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	190
54-01121	MD54-03-52133	98	75-71-8	Dichlorodifluoromethane	210
54-01121	MD54-03-52133	98	79-01-6	Trichloroethene	2100
54-01121	MD54-03-52133	98	75-34-3	Dichloroethane[1,1-]	3200
54-01121	MD54-03-52133	98	71-55-6	Trichloroethane[1,1,1-]	41000
54-01121	MD54-03-52133	98	75-35-4	Dichloroethene[1,1-]	7700
54-01121	MD54-03-52134	98	127-18-4	Tetrachloroethene	1100
54-01121	MD54-03-52134	98	76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	180
54-01121	MD54-03-52134	98	75-71-8	Dichlorodifluoromethane	190
54-01121	MD54-03-52134	98	79-01-6	Trichloroethene	2100
54-01121	MD54-03-52134	98	75-34-3	Dichloroethane[1,1-]	3100
54-01121	MD54-03-52134	98	71-55-6	Trichloroethane[1,1,1-]	40000
54-01121	MD54-03-52134	98	75-35-4	Dichloroethene[1,1-]	7400
54-02009	MD54-03-52123	62	75-34-3	Dichloroethane[1,1-]	2000

Table 2 (continued)

Location ID	Sample ID	Depth (ft)	Analyte Code	Analyte	Sample Concentration (ppbv)
54-02009	MD54-03-52123	62	79-01-6	Trichloroethene	340
54-02009	MD54-03-52123	62	75-35-4	Dichloroethene[1,1-]	3800
54-02009	MD54-03-52123	62	71-55-6	Trichloroethane[1,1,1-]	48000
54-02009	MD54-03-52123	62	127-18-4	Tetrachloroethene	830
54-02033	MD54-03-52124	100	75-09-2	Methylene Chloride	1.2
54-02033	MD54-03-52124	100	75-35-4	Dichloroethene[1,1-]	1.6
54-02033	MD54-03-52124	100	127-18-4	Tetrachloroethene	12
54-02033	MD54-03-52124	100	76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	15
54-02033	MD54-03-52124	100	71-55-6	Trichloroethane[1,1,1-]	20
54-02033	MD54-03-52124	100	75-69-4	Trichlorofluoromethane	32
54-02033	MD54-03-52124	100	75-71-8	Dichlorodifluoromethane	39
54-02002	MD54-03-52125	100	95-47-6	Xylene[1,2-]	1000
54-02002	MD54-03-52125	100	78-87-5	Dichloropropane[1,2-]	12000
54-02002	MD54-03-52125	100	75-69-4	Trichlorofluoromethane	13000
54-02002	MD54-03-52125	100	56-23-5	Carbon Tetrachloride	1400
54-02002	MD54-03-52125	100	75-35-4	Dichloroethene[1,1-]	14000
54-02002	MD54-03-52125	100	Xylene[1,3 and 1,4]	Xylene[1,3-]+Xylene[1,4-]	1600
54-02002	MD54-03-52125	100	75-09-2	Methylene Chloride	18000
54-02002	MD54-03-52125	100	71-55-6	Trichloroethane[1,1,1-]	290000
54-02002	MD54-03-52125	100	76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	38000
54-02002	MD54-03-52125	100	75-34-3	Dichloroethane[1,1-]	4800
54-02002	MD54-03-52125	100	108-88-3	Toluene	5000
54-02002	MD54-03-52125	100	67-66-3	Chloroform	6700
54-02002	MD54-03-52125	100	79-01-6	Trichloroethene	73000
54-02002	MD54-03-52125	100	107-06-2	Dichloroethane[1,2-]	7500
54-02002	MD54-03-52125	100	127-18-4	Tetrachloroethene	8400
54-02021	MD54-03-52128	100	76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1000
54-02021	MD54-03-52128	100	75-34-3	Dichloroethane[1,1-]	1500
54-02021	MD54-03-52128	100	75-09-2	Methylene Chloride	1500
54-02021	MD54-03-52128	100	107-06-2	Dichloroethane[1,2-]	1600
54-02021	MD54-03-52128	100	127-18-4	Tetrachloroethene	1600
54-02021	MD54-03-52128	100	79-01-6	Trichloroethene	17000
54-02021	MD54-03-52128	100	75-35-4	Dichloroethene[1,1-]	2600
54-02021	MD54-03-52128	100	75-71-8	Dichlorodifluoromethane	580
54-02021	MD54-03-52128	100	71-55-6	Trichloroethane[1,1,1-]	67000
54-02023	MD54-03-52129	159	56-23-5	Carbon Tetrachloride	140
54-02023	MD54-03-52129	159	75-34-3	Dichloroethane[1,1-]	150

Table 2 (continued)

Location ID	Sample ID	Depth (ft)	Analyte Code	Analyte	Sample Concentration (ppbv)
54-02023	MD54-03-52129	159	75-09-2	Methylene Chloride	150
54-02023	MD54-03-52129	159	75-35-4	Dichloroethene[1,1-]	1500
54-02023	MD54-03-52129	159	71-55-6	Trichloroethane[1,1,1-]	16000
54-02023	MD54-03-52129	159	75-71-8	Dichlorodifluoromethane	240
54-02023	MD54-03-52129	159	76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	4000
54-02023	MD54-03-52129	159	127-18-4	Tetrachloroethene	440
54-02023	MD54-03-52129	159	79-01-6	Trichloroethene	5200
54-02023	MD54-03-52129	159	75-69-4	Trichlorofluoromethane	560
54-02026	MD54-03-52137	160	127-18-4	Tetrachloroethene	110
54-02026	MD54-03-52137	160	75-69-4	Trichlorofluoromethane	130
54-02026	MD54-03-52137	160	75-34-3	Dichloroethane[1,1-]	20
54-02026	MD54-03-52137	160	75-35-4	Dichloroethene[1,1-]	240
54-02026	MD54-03-52137	160	71-55-6	Trichloroethane[1,1,1-]	3100
54-02026	MD54-03-52137	160	56-23-5	Carbon Tetrachloride	36
54-02026	MD54-03-52137	160	75-09-2	Methylene Chloride	50
54-02026	MD54-03-52137	160	75-71-8	Dichlorodifluoromethane	68
54-02026	MD54-03-52137	160	79-01-6	Trichloroethene	820
54-02026	MD54-03-52137	160	76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	940
54-02029	MD54-03-52126	100	76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	180
54-02029	MD54-03-52126	100	79-01-6	Trichloroethene	190
54-02029	MD54-03-52126	100	127-18-4	Tetrachloroethene	21
54-02029	MD54-03-52126	100	75-69-4	Trichlorofluoromethane	26
54-02029	MD54-03-52126	100	75-09-2	Methylene Chloride	4.2
54-02029	MD54-03-52126	100	75-35-4	Dichloroethene[1,1-]	47
54-02029	MD54-03-52126	100	75-34-3	Dichloroethane[1,1-]	5
54-02029	MD54-03-52126	100	56-23-5	Carbon Tetrachloride	6.3
54-02029	MD54-03-52126	100	71-55-6	Trichloroethane[1,1,1-]	640
54-02030	MD54-03-52130	100	56-23-5	Carbon Tetrachloride	10
54-02030	MD54-03-52130	100	71-55-6	Trichloroethane[1,1,1-]	1200
54-02030	MD54-03-52130	100	75-71-8	Dichlorodifluoromethane	25
54-02030	MD54-03-52130	100	79-01-6	Trichloroethene	290
54-02030	MD54-03-52130	100	76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	320
54-02030	MD54-03-52130	100	127-18-4	Tetrachloroethene	44
54-02030	MD54-03-52130	100	67-66-3	Chloroform	45
54-02030	MD54-03-52130	100	75-69-4	Trichlorofluoromethane	45
54-02030	MD54-03-52130	100	75-34-3	Dichloroethane[1,1-]	7.9
54-02030	MD54-03-52130	100	75-35-4	Dichloroethene[1,1-]	89

Table 2 (continued)

Location ID	Sample ID	Depth (ft)	Analyte Code	Analyte	Sample Concentration (ppbv)
54-02034	MD54-03-52131	60	79-01-6	Trichloroethene	1000
54-02034	MD54-03-52131	60	75-69-4	Trichlorofluoromethane	25
54-02034	MD54-03-52131	60	75-09-2	Methylene Chloride	26
54-02034	MD54-03-52131	60	75-35-4	Dichloroethene[1,1-]	260
54-02034	MD54-03-52131	60	107-06-2	Dichloroethane[1,2-]	33
54-02034	MD54-03-52131	60	71-55-6	Trichloroethane[1,1,1-]	4200
54-02034	MD54-03-52131	60	75-71-8	Dichlorodifluoromethane	49
54-02034	MD54-03-52131	60	127-18-4	Tetrachloroethene	55
54-02034	MD54-03-52131	60	76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	67
54-02034	MD54-03-52131	60	75-34-3	Dichloroethane[1,1-]	78

Table 3
Field Duplicate Sample Results Comparison (Well 54-1121, 98 ft)

Analyte	Sample MD54-03-52133[a] (ppmv[b])	Sample MD54-03-52134[c] (ppmv)	RPD[d]
Tetrachloroethene	1100	1100	0
Trichloro-1,2,2-trifluoroethane[1,1,2-]	190	180	5.4
Dichlorodifluoromethane	210	190	10
Trichloroethene	2100	2100	0
Dichloroethane[1,1-]	3200	3100	3.2
Trichloroethane[1,1,1-]	41000	40000	2.5
Dichloroethene[1,1-]	7700	7400	4

[a] Detection limit = 0.18 ppmv.
[b] ppmv = Parts per million by volume.
[c] Detection limit = 0.17 ppmv.
[d] RPD = Relative percent difference.

3.0 THIRD-QUARTER SAMPLING

3.1 Sampling Event

Sampling for the third quarter of FY 2003 (April through June) was conducted during the period of April 17 through May 22 (Table 4). The analytical results from this quarter were not available for the third quarter report and are therefore reported in Table 5 of this report. Field screening analytical results for the first through the third quarter are available upon request.

Table 4
Summary of Sampling Event, Third Quarter of FY 2003

Well ID	Site	On Defined Sampling List (Y/N)	Number of Ports Screened	Depths of Screened Ports (ft)	Depth of Port Sampled (ft)	Sample ID
54-1015	MDA L	N	7	45, 187, 350, 385, 435, 485, 525	385	MD54-03-51498
54-1016	MDA L	N	7	36, 188, 318, 390, 481, 533, 601	—[a]	n/a[b]
54-1107	PAMG	N	n/a	Well needs repair[c]	—	n/a
54-1111	PAMG	N	7	20, 40, 50, 70, 78, 100, 139	50	MD54-03-51504
54-1117	PAMG	N	6	20, 32, 55, 73, 82, 85	—	n/a
54-1121	PAMG	N	7	20, 26, 62, 70, 76, 98, 121	98 98	MD54-03-51505 MD54-03-51506
54-2002	MDA L	Y	8	20, 40, 60, 80, 100, 120, 140, 157, 180, 200	100	MD54-03-51496
54-2009	MDA G	Y	3	37, 62, 79, 92	62	MD54-03-51494
54-2010	MDA G	Y	3	30, 53, 95	—	n/a
54-2012	MDA L	Y	3	8, 28, 42	—	n/a
54-2013	MDA L	N	3	20, 43, 63	—	n/a
54-2014	MDA L	N	1	13, 31, 46, 86	—	n/a
54-2016	MDA L	N	1	18, 31, 82	—	n/a
54-2020	MDA L	N	10	20, 40, 60, 80, 95, 120, 140, 160, 180, 200	—	n/a
54-2021	MDA L	Y	9	20, 40, 60, 80, 100, 120, 140, 160, 180, 200	100	MD54-03-51499
54-2022	MDA L	Y	10	20, 40, 60, 80, 100, 120, 140, 160, 180, 200	—	n/a
54-2023	MDA L	Y	9	20, 40, 60, 80, 100, 120, 140, 159, 180, 200	159	MD54-03-51500
54-2025	MDA L	N	5	20, 60, 100, 160, 180	—	n/a
54-2026	MDA L	Y	6	20, 60, 100, 160, 200, 215	160	MD54-03-51503
54-2027	MDA L	N	6	20, 60, 100, 160, 200, 220	—	n/a
54-2028	MDA L	N	6	20, 60, 100, 160, 200, 220, 250	—	n/a
54-2029	MDA L	Y	8	20, 60, 100, 160, 200, 220, 260, 288	100	MD54-03-51497
54-2030	MDA L	Y	6	20, 60, 100, 160, 200, 220, 243	100	MD54-03-51501
54-2031	MDA L	Y	6	20, 60, 100, 160, 200, 220, 260	—	n/a
54-2032	MDA G	Y	4	20, 60, 100, 130, 156	—	n/a
54-2033	MDA G	Y	8	20, 60, 100, 160, 200, 220, 260, 277	100	MD54-03-51495
54-2034	MDA L	Y	9	20, 40, 60, 80, 100, 160, 200, 220, 260	60	MD54-03-51502
54-2087	MDA L	N	4	13, 31, 46, 86	—	n/a
54-2088	MDA L	N	4	13, 31, 46, 86	—	n/a
54-2089	MDA L	N	4	13, 31, 46, 86	—	n/a
Total wells sampled					12	
MDA L defined list wells sampled (7 expected)					7	
MDA G defined list wells sampled (2 expected)					2	
PAMG wells sampled					2	
QA samples taken					1 field duplicate	1 equipment blank

[a] A dash indicates that the port was not sampled.

[b] n/a = Not applicable.

[c] This well was taken out of service because of failure of positive pressure membranes or irreparable damage to ports.

Table 5
Summary of Sampling Event, Third Quarter FY 2003

Location ID	Sample ID	Depth (ft)	Analyte Code	Analyte	Sample Concentration (ppbv)
54-02009	MD54-03-51494	62	75-34-3	Dichloroethane[1,1-]	2500
54-02009	MD54-03-51494	62	75-35-4	Dichloroethene[1,1-]	4500
54-02009	MD54-03-51494	62	127-18-4	Tetrachloroethene	810
54-02009	MD54-03-51494	62	71-55-6	Trichloroethane[1,1,1-]	57000
54-02009	MD54-03-51494	62	79-01-6	Trichloroethene	400
54-02033	MD54-03-51495	100	75-71-8	Dichlorodifluoromethane	36
54-02033	MD54-03-51495	100	75-09-2	Methylene Chloride	1.8
54-02033	MD54-03-51495	100	127-18-4	Tetrachloroethene	17
54-02033	MD54-03-51495	100	76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	26
54-02033	MD54-03-51495	100	71-55-6	Trichloroethane[1,1,1-]	42
54-02033	MD54-03-51495	100	79-01-6	Trichloroethene	3.7
54-02033	MD54-03-51495	100	75-69-4	Trichlorofluoromethane	57
54-02002	MD54-03-51496	100	56-23-5	Carbon Tetrachloride	1900
54-02002	MD54-03-51496	100	107-06-2	Dichloroethane[1,2-]	8700
54-02002	MD54-03-51496	100	75-34-3	Dichloroethane[1,1-]	6100
54-02002	MD54-03-51496	100	75-35-4	Dichloroethene[1,1-]	35000
54-02002	MD54-03-51496	100	78-87-5	Dichloropropane[1,2-]	15000
54-02002	MD54-03-51496	100	75-09-2	Methylene Chloride	20000
54-02002	MD54-03-51496	100	127-18-4	Tetrachloroethene	8900
54-02002	MD54-03-51496	100	108-88-3	Toluene	5800
54-02002	MD54-03-51496	100	76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	43000
54-02002	MD54-03-51496	100	71-55-6	Trichloroethane[1,1,1-]	360000
54-02002	MD54-03-51496	100	79-01-6	Trichloroethene	89000
54-02002	MD54-03-51496	100	75-69-4	Trichlorofluoromethane	18000
54-02002	MD54-03-51496	100	Xylene[1,3 and 1,4]	Xylene[1,3-]+Xylene[1,4-]	2000
54-02029	MD54-03-51497	100	56-23-5	Carbon Tetrachloride	8
54-02029	MD54-03-51497	100	67-66-3	Chloroform	29
54-02029	MD54-03-51497	100	75-71-8	Dichlorodifluoromethane	12
54-02029	MD54-03-51497	100	75-34-3	Dichloroethane[1,1-]	7.8
54-02029	MD54-03-51497	100	75-09-2	Methylene Chloride	6.6
54-02029	MD54-03-51497	100	127-18-4	Tetrachloroethene	27
54-02029	MD54-03-51497	100	76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	270
54-02029	MD54-03-51497	100	71-55-6	Trichloroethane[1,1,1-]	1000
54-02029	MD54-03-51497	100	79-01-6	Trichloroethene	260
54-02029	MD54-03-51497	100	75-69-4	Trichlorofluoromethane	44

Table 5 (continued)

Location ID	Sample ID	Depth (ft)	Analyte Code	Analyte	Sample Concentration (ppbv)
54-01015	MD54-03-51498	385	67-64-1	Acetone	31
54-01015	MD54-03-51498	385	78-93-3	Butanone[2-]	23
54-01015	MD54-03-51498	385	56-23-5	Carbon Tetrachloride	4.9
54-01015	MD54-03-51498	385	107-06-2	Dichloroethane[1,2-]	17
54-01015	MD54-03-51498	385	75-34-3	Dichloroethane[1,1-]	14
54-01015	MD54-03-51498	385	75-35-4	Dichloroethene[1,1-]	83
54-01015	MD54-03-51498	385	75-09-2	Methylene Chloride	39
54-01015	MD54-03-51498	385	127-18-4	Tetrachloroethene	24
54-01015	MD54-03-51498	385	108-88-3	Toluene	15
54-01015	MD54-03-51498	385	76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	100
54-01015	MD54-03-51498	385	71-55-6	Trichloroethane[1,1,1-]	860
54-01015	MD54-03-51498	385	79-01-6	Trichloroethene	200
54-01015	MD54-03-51498	385	75-69-4	Trichlorofluoromethane	42
54-01015	MD54-03-51498	385	95-47-6	Xylene[1,2-]	4.9
54-01015	MD54-03-51498	385	Xylene[1,3 and 1,4]	Xylene[1,3-]+Xylene[1,4-]	7.5
54-02021	MD54-03-51499	100	107-06-2	Dichloroethane[1,2-]	1700
54-02021	MD54-03-51499	100	75-34-3	Dichloroethane[1,1-]	1800
54-02021	MD54-03-51499	100	75-35-4	Dichloroethene[1,1-]	2600
54-02021	MD54-03-51499	100	75-09-2	Methylene Chloride	1600
54-02021	MD54-03-51499	100	127-18-4	Tetrachloroethene	1400
54-02021	MD54-03-51499	100	76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1300
54-02021	MD54-03-51499	100	71-55-6	Trichloroethane[1,1,1-]	77000
54-02021	MD54-03-51499	100	79-01-6	Trichloroethene	18000
54-02023	MD54-03-51500	159	56-23-5	Carbon Tetrachloride	120
54-02023	MD54-03-51500	159	67-66-3	Chloroform	480
54-02023	MD54-03-51500	159	75-34-3	Dichloroethane[1,1-]	160
54-02023	MD54-03-51500	159	75-09-2	Methylene Chloride	170
54-02023	MD54-03-51500	159	127-18-4	Tetrachloroethene	350
54-02023	MD54-03-51500	159	76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	4200
54-02023	MD54-03-51500	159	71-55-6	Trichloroethane[1,1,1-]	17000
54-02023	MD54-03-51500	159	79-01-6	Trichloroethene	4600
54-02023	MD54-03-51500	159	75-69-4	Trichlorofluoromethane	670
54-02030	MD54-03-51501	100	75-34-3	Dichloroethane[1,1-]	14
54-02030	MD54-03-51501	100	56-23-5	Carbon Tetrachloride	16
54-02030	MD54-03-51501	100	67-66-3	Chloroform	82
54-02030	MD54-03-51501	100	75-09-2	Methylene Chloride	9.3
54-02030	MD54-03-51501	100	127-18-4	Tetrachloroethene	65

Table 5 (continued)

Location ID	Sample ID	Depth (ft)	Analyte Code	Analyte	Sample Concentration (ppbv)
54-02030	MD54-03-51501	100	76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	540
54-02030	MD54-03-51501	100	71-55-6	Trichloroethane[1,1,1-]	2100
54-02030	MD54-03-51501	100	79-01-6	Trichloroethene	480
54-02030	MD54-03-51501	100	75-69-4	Trichlorofluoromethane	86
54-02034	MD54-03-51502	60	67-66-3	Chloroform	26
54-02034	MD54-03-51502	60	75-34-3	Dichloroethane[1,1-]	100
54-02034	MD54-03-51502	60	107-06-2	Dichloroethane[1,2-]	40
54-02034	MD54-03-51502	60	75-35-4	Dichloroethene[1,1-]	230
54-02034	MD54-03-51502	60	75-09-2	Methylene Chloride	45
54-02034	MD54-03-51502	60	127-18-4	Tetrachloroethene	60
54-02034	MD54-03-51502	60	76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	83
54-02034	MD54-03-51502	60	71-55-6	Trichloroethane[1,1,1-]	5500
54-02034	MD54-03-51502	60	79-01-6	Trichloroethene	1200
54-02034	MD54-03-51502	60	75-69-4	Trichlorofluoromethane	38
54-02026	MD54-03-51503	160	56-23-5	Carbon Tetrachloride	32
54-02026	MD54-03-51503	160	67-66-3	Chloroform	99
54-02026	MD54-03-51503	160	75-71-8	Dichlorodifluoromethane	42
54-02026	MD54-03-51503	160	75-34-3	Dichloroethane[1,1-]	21
54-02026	MD54-03-51503	160	75-09-2	Methylene Chloride	60
54-02026	MD54-03-51503	160	127-18-4	Tetrachloroethene	96
54-02026	MD54-03-51503	160	76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	980
54-02026	MD54-03-51503	160	71-55-6	Trichloroethane[1,1,1-]	3200
54-02026	MD54-03-51503	160	79-01-6	Trichloroethene	820
54-02026	MD54-03-51503	160	75-69-4	Trichlorofluoromethane	150
54-01111	MD54-03-51504	50	75-71-8	Dichlorodifluoromethane	53
54-01111	MD54-03-51504	50	75-34-3	Dichloroethane[1,1-]	32
54-01111	MD54-03-51504	50	75-35-4	Dichloroethene[1,1-]	130
54-01111	MD54-03-51504	50	75-09-2	Methylene Chloride	31
54-01111	MD54-03-51504	50	127-18-4	Tetrachloroethene	29
54-01111	MD54-03-51504	50	76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	430
54-01111	MD54-03-51504	50	71-55-6	Trichloroethane[1,1,1-]	1500
54-01111	MD54-03-51504	50	79-01-6	Trichloroethene	35
54-01111	MD54-03-51504	50	75-69-4	Trichlorofluoromethane	12
54-01121	MD54-03-51505	98	75-34-3	Dichloroethane[1,1-]	3700
54-01121	MD54-03-51505	98	75-35-4	Dichloroethene[1,1-]	8800
54-01121	MD54-03-51505	98	127-18-4	Tetrachloroethene	970
54-01121	MD54-03-51505	98	71-55-6	Trichloroethane[1,1,1-]	46000

Table 5 (continued)

Location ID	Sample ID	Depth (ft)	Analyte Code	Analyte	Sample Concentration (ppbv)
54-01121	MD54-03-51505	98	79-01-6	Trichloroethene	2100
54-01121	MD54-03-51506	98	67-66-3	Chloroform	130
54-01121	MD54-03-51506	98	75-34-3	Dichloroethane[1,1-]	3500
54-01121	MD54-03-51506	98	127-18-4	Tetrachloroethene	900
54-01121	MD54-03-51506	98	76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	200
54-01121	MD54-03-51506	98	71-55-6	Trichloroethane[1,1,1-]	44000
54-01121	MD54-03-51506	98	79-01-6	Trichloroethene	2000

Table 4 identifies the wells sampled (from the list of all wells available) and lists the port at each well from which the SUMMA canister sample was drawn. Twelve wells were sampled in accordance with the approved sampling plan. Eight wells at MDA L were sampled, including seven from the defined list. Four wells at MDA G were sampled, including two from the defined list of wells and two from PAMG wells. The two QA samples (field duplicate and equipment blank) were collected as planned. In total, fourteen samples were collected for laboratory analysis.

There were a total of 29 wells screened with the B&K monitor. One hundred seventy ports were sampled from 29 wells. Wells 54-1018 and 54-2024 have both been taken out of service and were not sampled. Well 54-1107 needed maintenance and could not be sampled.

3.2 Sampling Results

The highest VOC concentrations detected in the SUMMA samples were measured in well 54-2002 at a depth of 100 ft. TCA, TCE, and PCE were measured at concentrations of 360 ppmv, 89 ppmv, and 8.9 ppmv respectively. This well is situated close to a source area, so these results are not unexpected. A total of 13 VOCs were detected in well 54-2002, with TCA being the prominent analyte.

3.3 Evaluation of Quality Assurance Samples

Field duplicate sample. A field duplicate sample is drawn from the same port on a well immediately after the original sample. The field duplicate was collected on well 54-1121 at the 98-ft sampling port. See Table 6 for the field duplicate results.

Field equipment blank. A field equipment blank sample documents the effectiveness of equipment purges between samples. A sample was collected by drawing zero-grade air through the sample train after the normal purge performed before each sample. The field equipment blank was taken in the immediate vicinity of well 54-1121 at ground level.

Calibration gas sample (performance evaluation sample). A calibration gas sample was not collected in the third quarter of FY 2003.

Table 6
Field Duplicate Sample Results Comparison (Well 54-1121, 98 ft)

Analyte	Sample MD54-03-51505[a] (ppmv)	Sample MD54-03-51506[b] (ppmv)	RPD
Trichloro-1,2,2-trifluoroethane(R-113)	ND[c]	0.2	n/a[d]
1,1-Dichloroethene	8.8	ND	n/a
1,1-Dichloroethane	3.7	3.5	11.1
1,1,1-Trichloroethane	46	44	8.9
Trichloroethene	2.1	2	9.8
Tetrachloroethene	0.97	0.9	15
Chloroform	ND	0.13	n/a

[a] Detection limit = 0.18 ppmv.
[b] Detection limit = 0.11 ppmv.
[c] ND = not detected.
[d] n/a = Not applicable.

4.0 REVIEW OF SCREENING DATA FOR PREVIOUS 20 QUARTERS

All available ports were screened with the B&K multigas monitor every quarter during the last 20 quarters. Analytical laboratory results and field-screening measurements indicated higher concentrations of TCA near the source area and at the plume boundaries than any other VOC. Therefore, B&K screening results of TCA concentrations have been used to develop three-dimensional visualizations representative of VOC plume extent.

Figures 1-1 through 1-19 in Attachment 1 display quarterly results of the three-dimensional visualization for MDA L for FY 1999 through FY 2003. Note that there is no figure for the first quarter of 2002 due to equipment failure. Complete screening of all available boreholes began in FY 1999; earlier screening data sets lack sufficient spatial measurements to allow meaningful interpolation for visualization.

TCA concentration contours for 10, 100, and 500 ppmv are represented on the figures. The 10-ppmv contour represents the lower limit of the field-screening data reliability (5 ppmv to 10 ppmv). The first figure of each set displays an aerial view of the plume contours at 60 ft below the mesa top; borehole locations are identified. Cross section A–A' is perpendicular to the mesa, and cross section B–B' is along the middle of the mesa parallel to the sides. Structures are the current operational facilities. The second and third figures of each set depict the plume contours across transects A–A' and B–B'.

The figures indicate that the VOC plume, as represented by TCA screening data, has been near a steady condition since the first quarter of FY 1999. The extent of the plume along transect A–A' is bounded by the mesa sides. The screening results also indicate that the 10-ppmv contour remained relatively constant at a depth, nominally 650 ft above the regional groundwater table. The maximum TCA concentrations, represented by the 500-ppmv contour, is coincident with the disposal shafts and pits of MDA L and have remained steady since FY 1999. The aerial figures show that the lateral extent of the MDA L plume is borehole-constrained by the extensive array of vapor-monitoring boreholes.

Figures 1-20 through 1-24 display results of the three-dimensional visualizations of 20 quarters for MDA G for FY 1999 through FY 2003. A three-dimensional visualization similar to that shown for MDA L

was initiated to evaluate the extent of VOCs at MDA G. However, to date, insufficient data exist spatially and through time to show a meaningful three-dimensional interpretation. Further sampling of all the MDA G boreholes is anticipated to fill this data need.

5.0 TRENDS ESTABLISHED USING ANALYTICAL RESULTS FROM SUMMA CANISTERS

Wells 54-2002 and 54-2009 were selected to establish trends of TCA from 1997 to 2003 near the source areas of MDA L and MDA G respectively. Well 54-2002 has a total of 13 sampling events at 100 ft, and well 54-2009 has a total of 18 sampling events at 62 ft. These wells had the highest number of analytical samples taken since 1997. Well 54-2002 is just southeast of the disposal shafts located in MDA L. The sampling from this well was taken at 100 ft. This well also consistently has the highest concentration of TCA. Well 54-2009 is located just south of disposal units 1 and 3 in the southeast corner of MDA G.

Both wells show a decreasing trend of TCA over time (Figure 1). TCA degrades into 1,1-Dichlorethene by elimination or 1,1-Dichlorethane by reductive dechlorination. The detection of 1,1-Dichlorethene in well 54-2002 shows an increasing trend while 1,1-Dichlorethane shows a decreasing trend (Figure 2). Trends of these two analytes in 54-2009 both show decreasing trends (Figure 3). Both wells also show a decrease in concentration of TCE and PCE.

Wells 54-2002 and 54-2009 will continue to be monitored to establish trends. Other wells will continue to be sampled to develop a statistically meaningful data set for trend analysis.

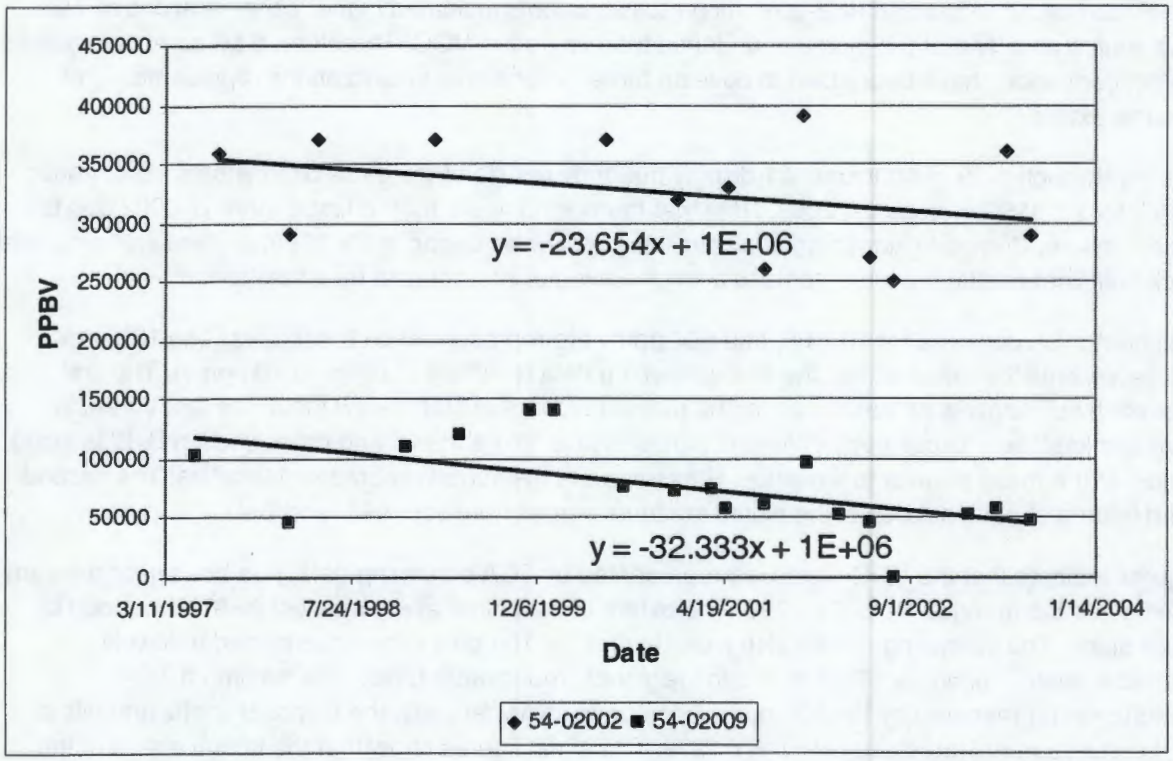

Figure 1. TCA trends of wells 54-2002 and 54-2009

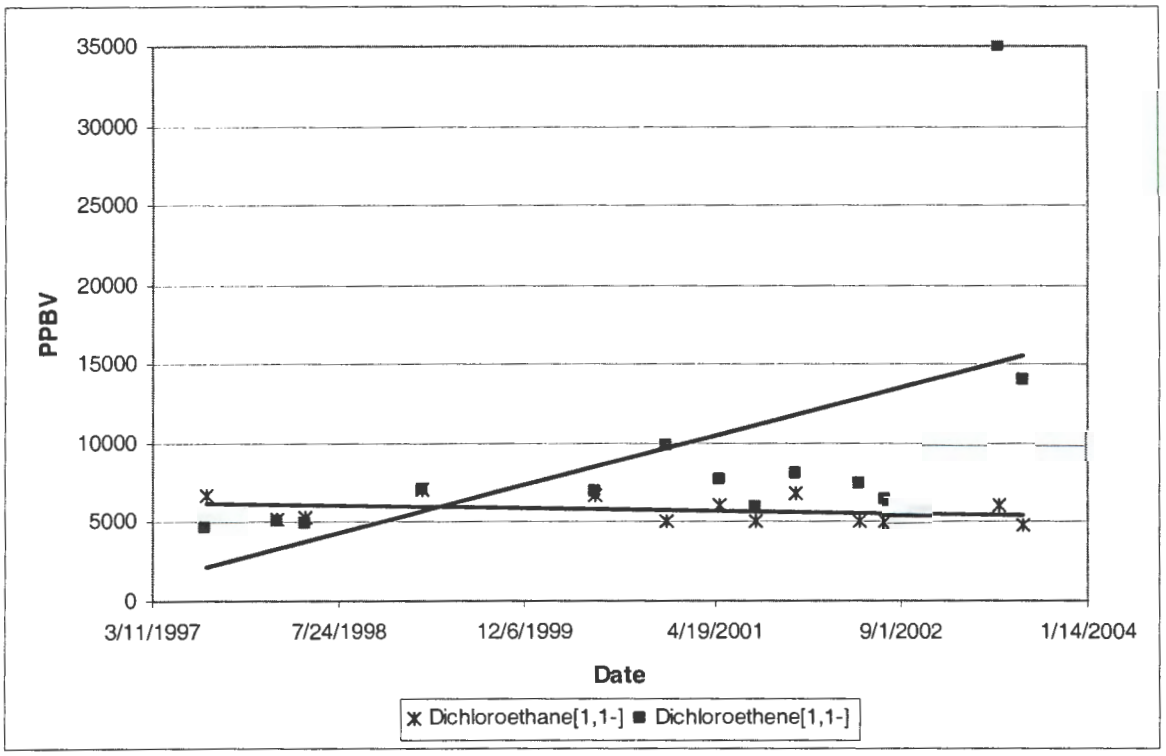

Figure 2. Trends of 1,1-dichloroethane and 1,1-dichloroethene of well 54-2002

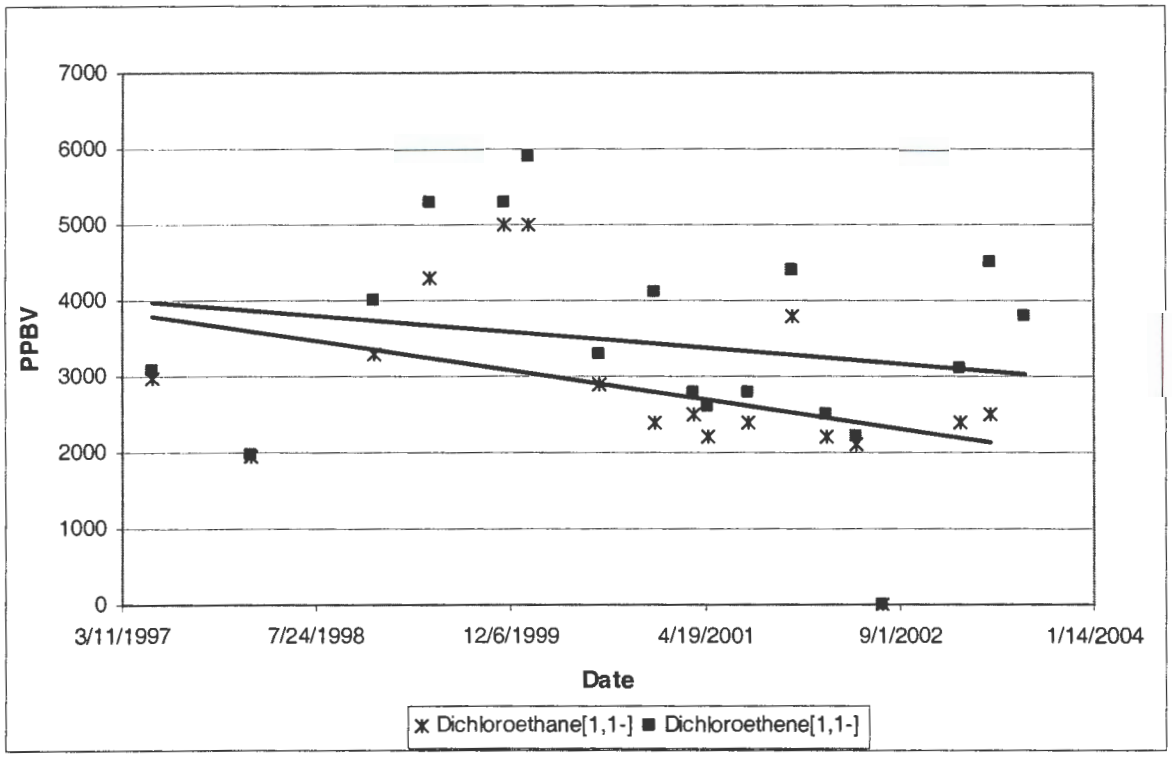

Figure 3. Trends of 1,1-dichloroethane and 1,1-dichloroethene of well 54-2009

6.0 REFERENCES

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Attachment 1

Quarterly Field-Screening Results

ATTACHMENT 1 QUARTERLY FIELD-SCREENING RESULTS

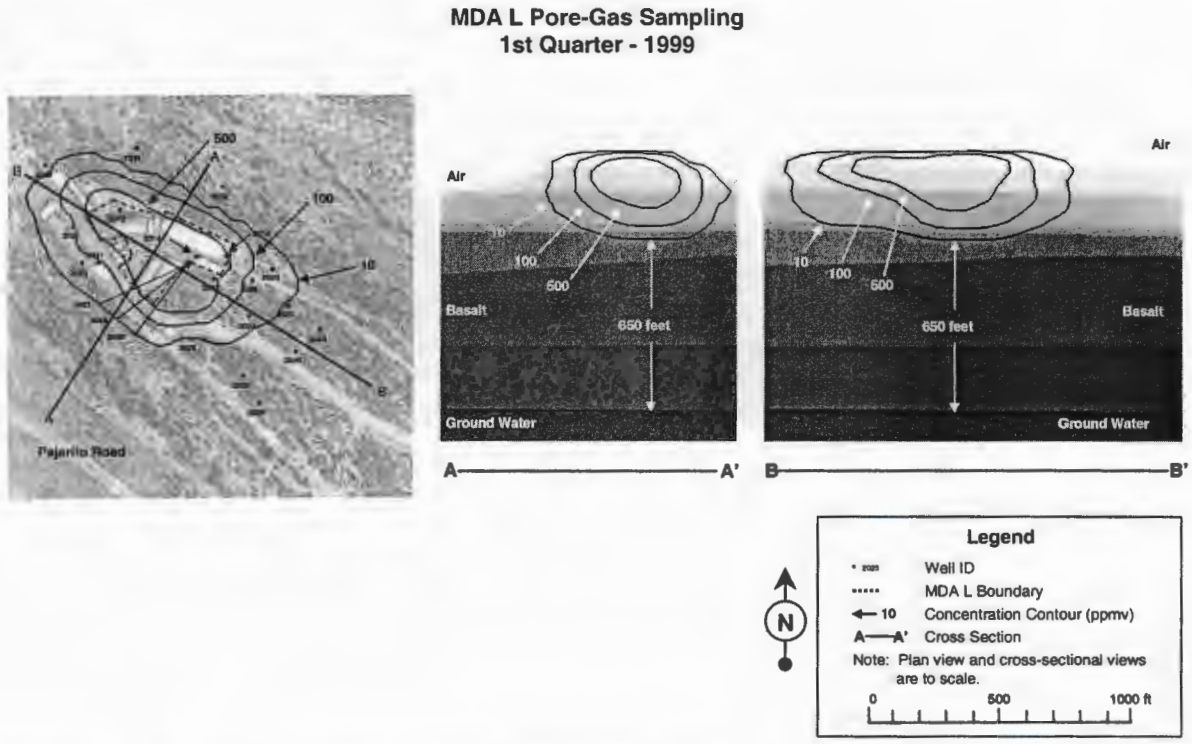


Figure 1-1. MDA L pore-gas sampling, 1st quarter 1999

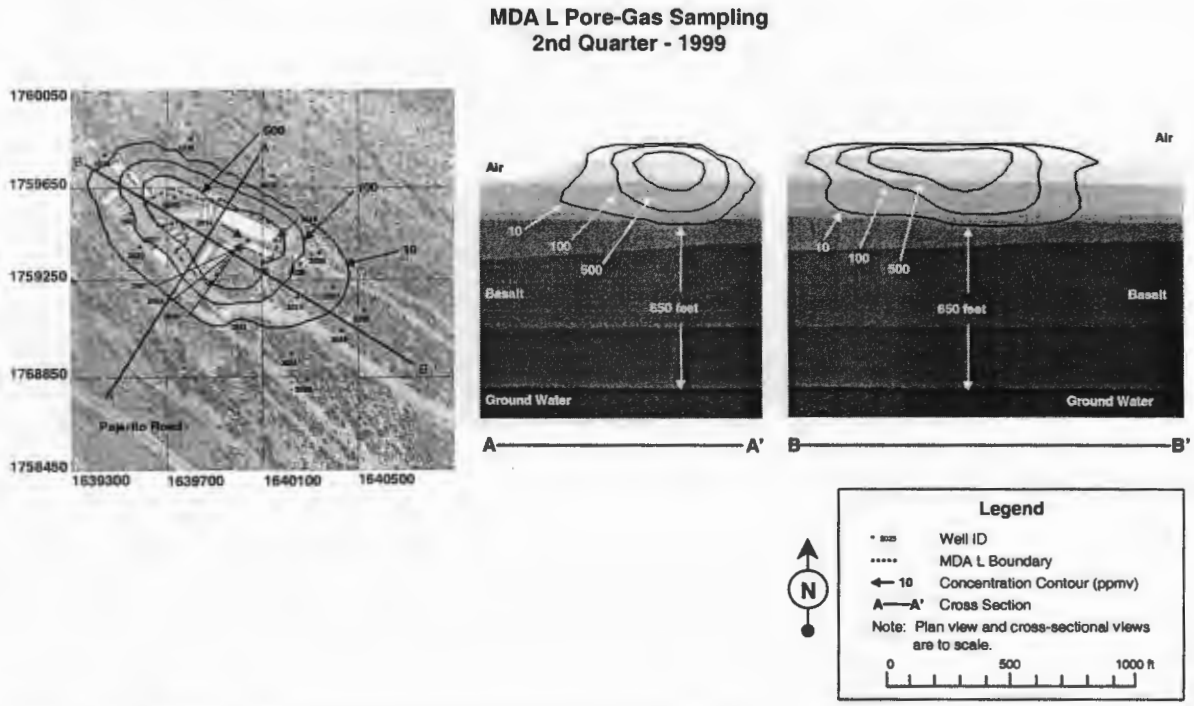


Figure 1-2. MDA L Pore-gas sampling, 2nd quarter 1999

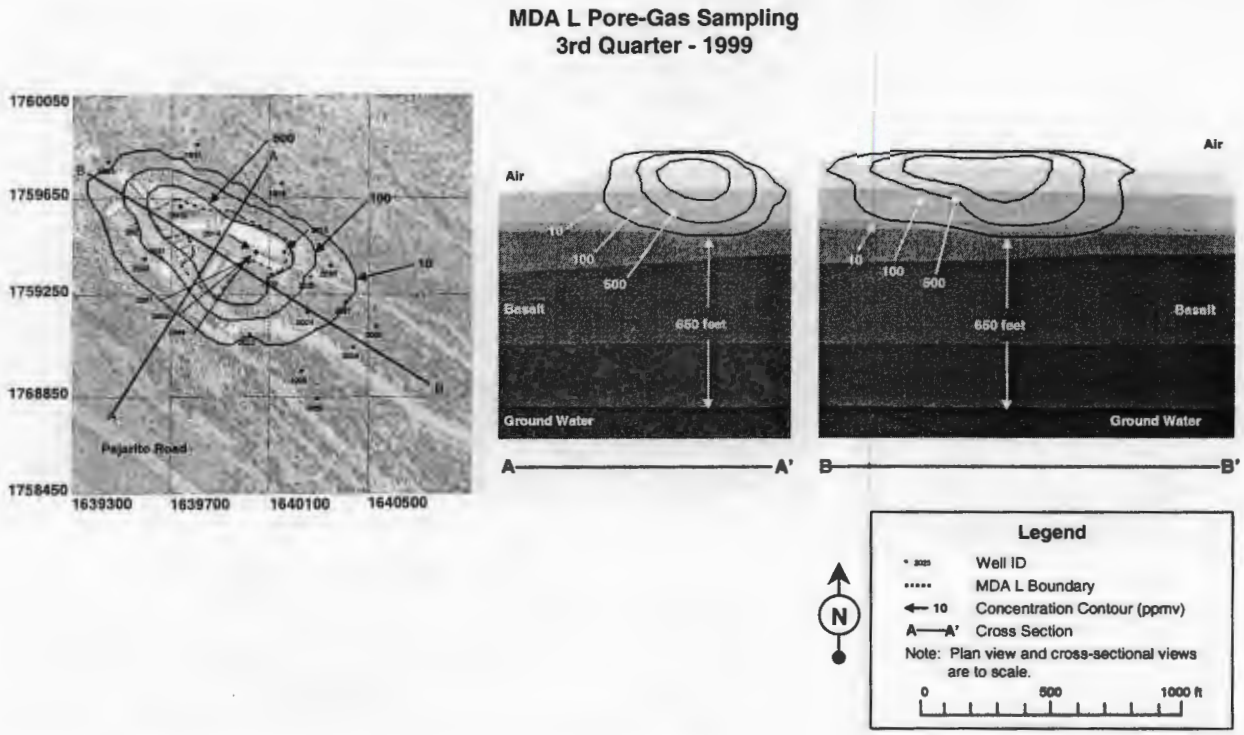


Figure 1-3. MDA L pore-gas sampling, 3rd quarter 1999

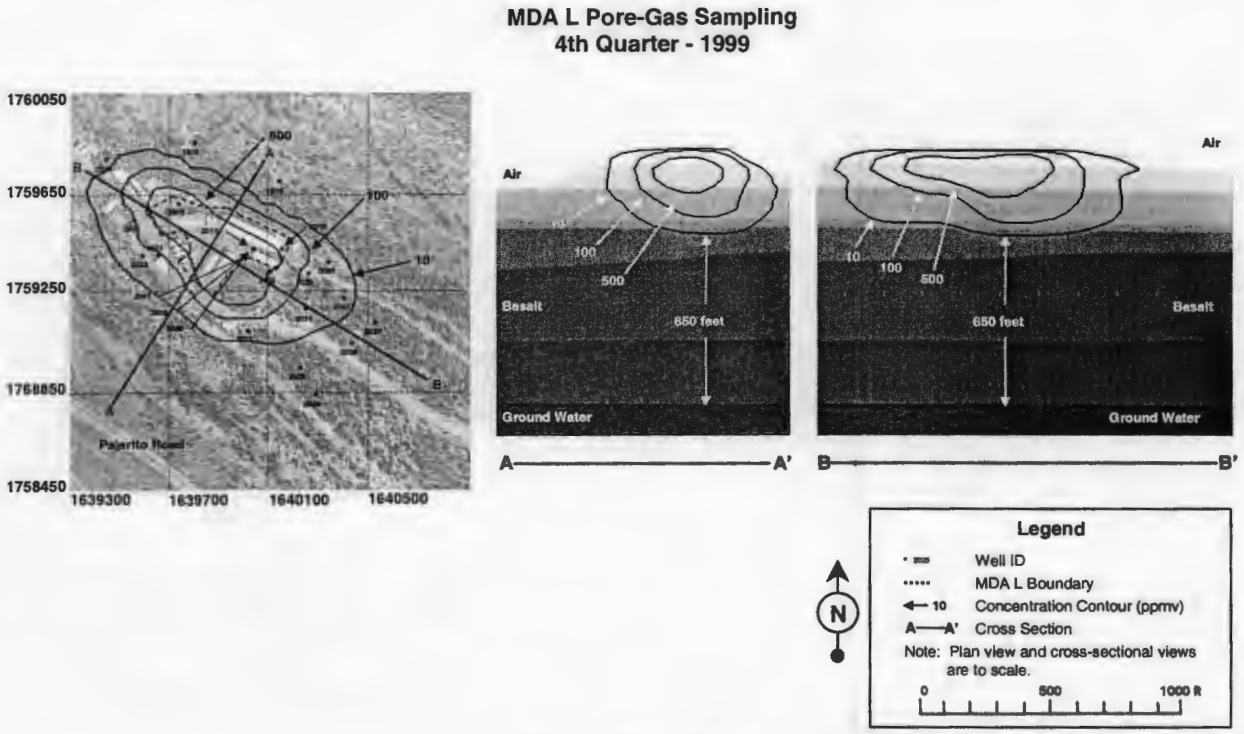


Figure 1-4. MDA L pore-gas sampling, 4th quarter 1999

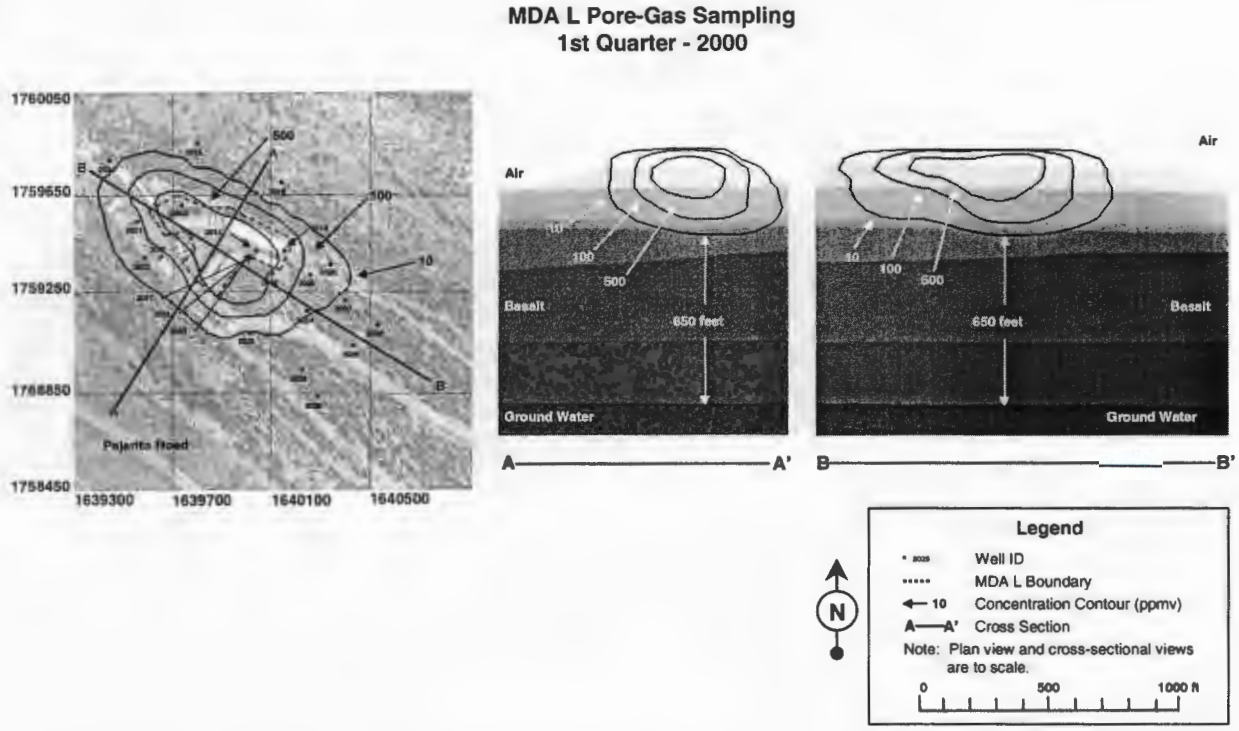


Figure 1-5. MDA L pore-gas sampling, 1st quarter 2000

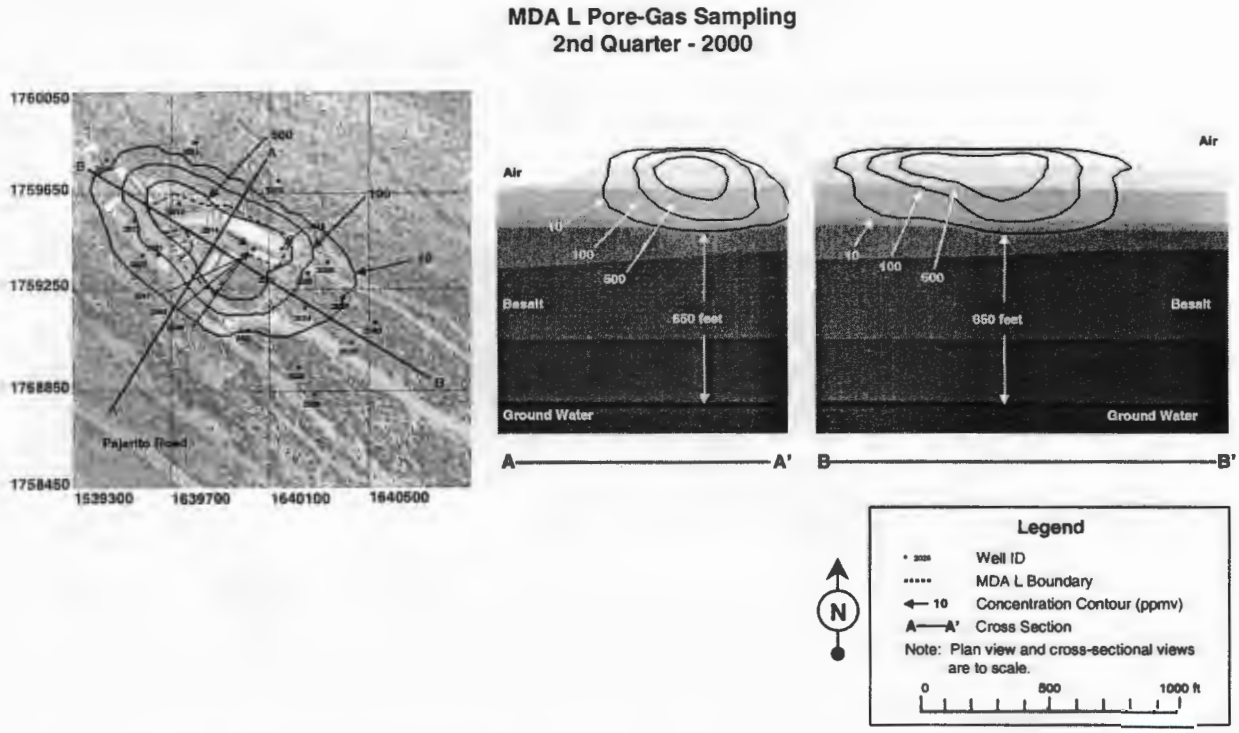


Figure 1-6. MDA L pore-gas sampling, 2nd quarter 2000

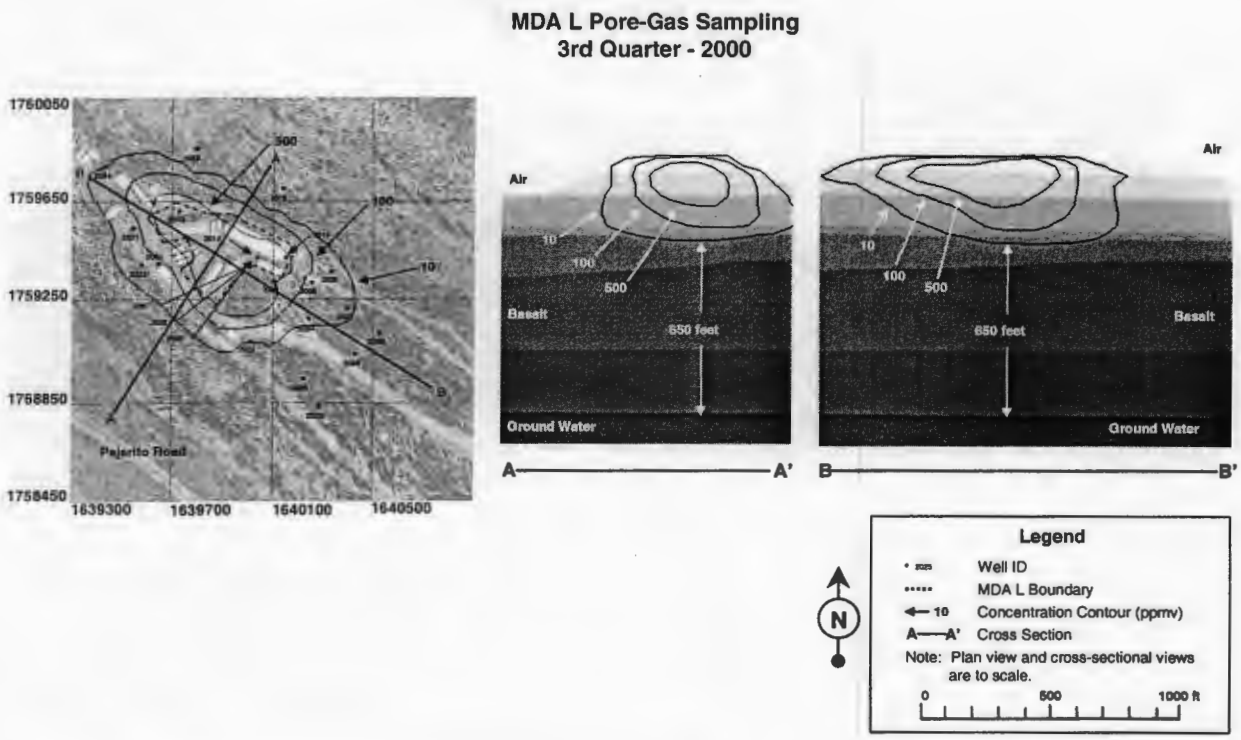


Figure 1-7. MDA L pore-gas sampling, 3rd quarter 2000

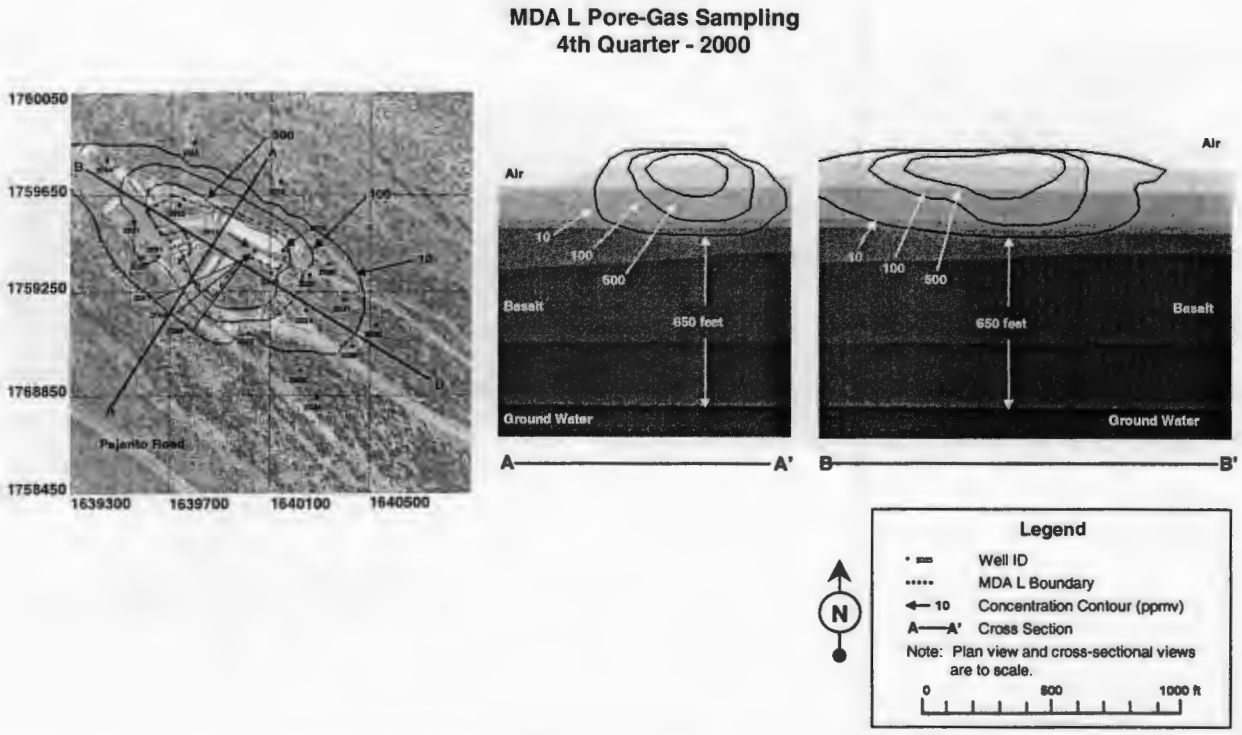


Figure 1-8. MDA L pore-gas sampling, 4th quarter 2000

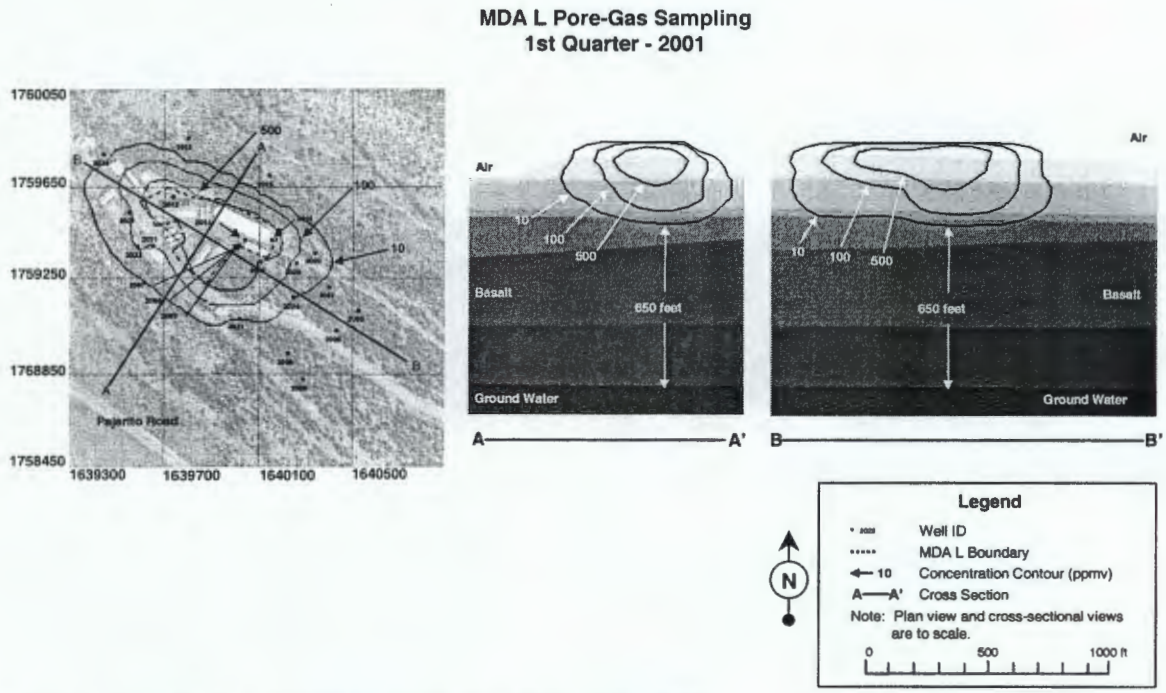
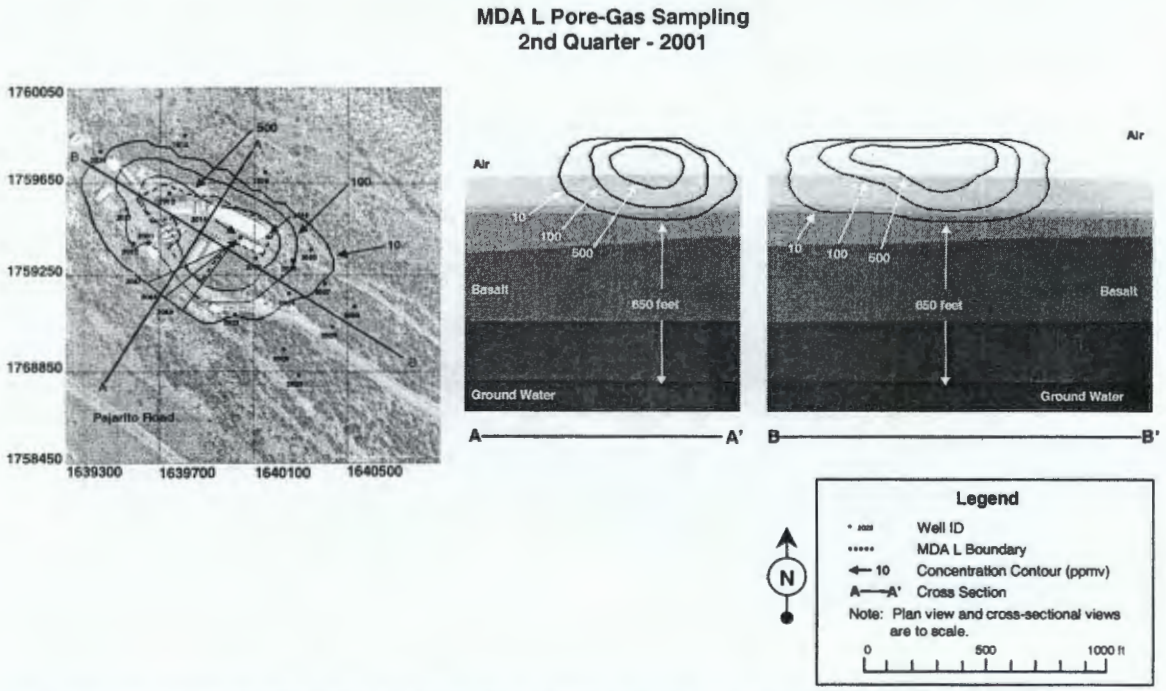
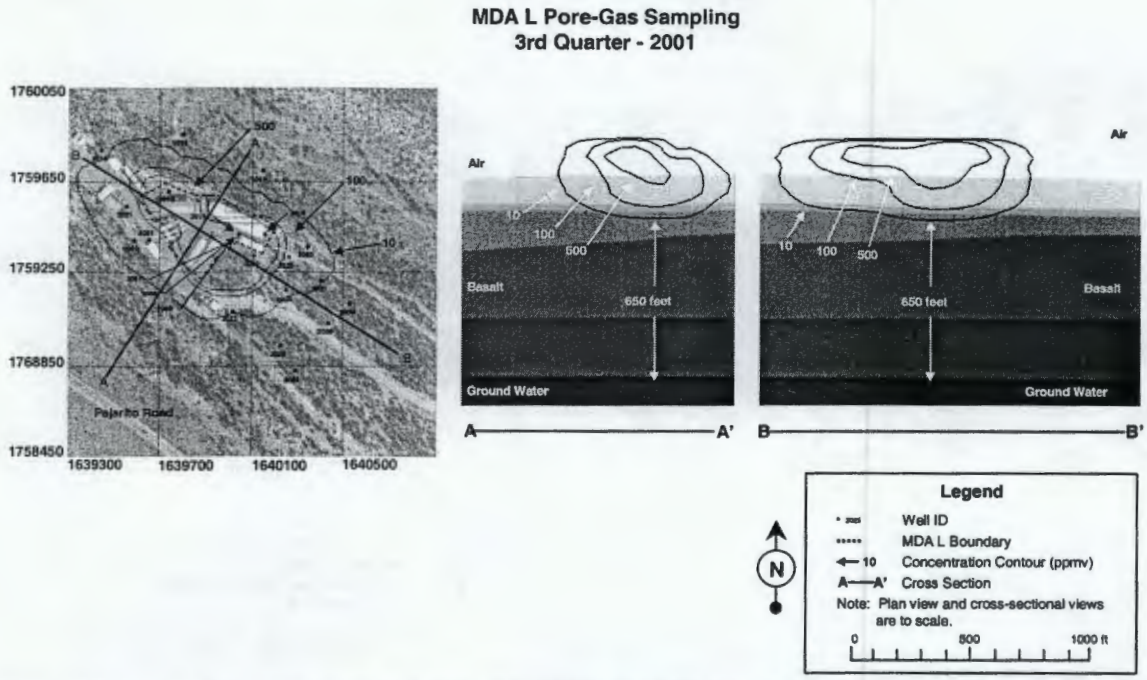


Figure 1-9. MDA L pore-gas sampling, 1st quarter 2001



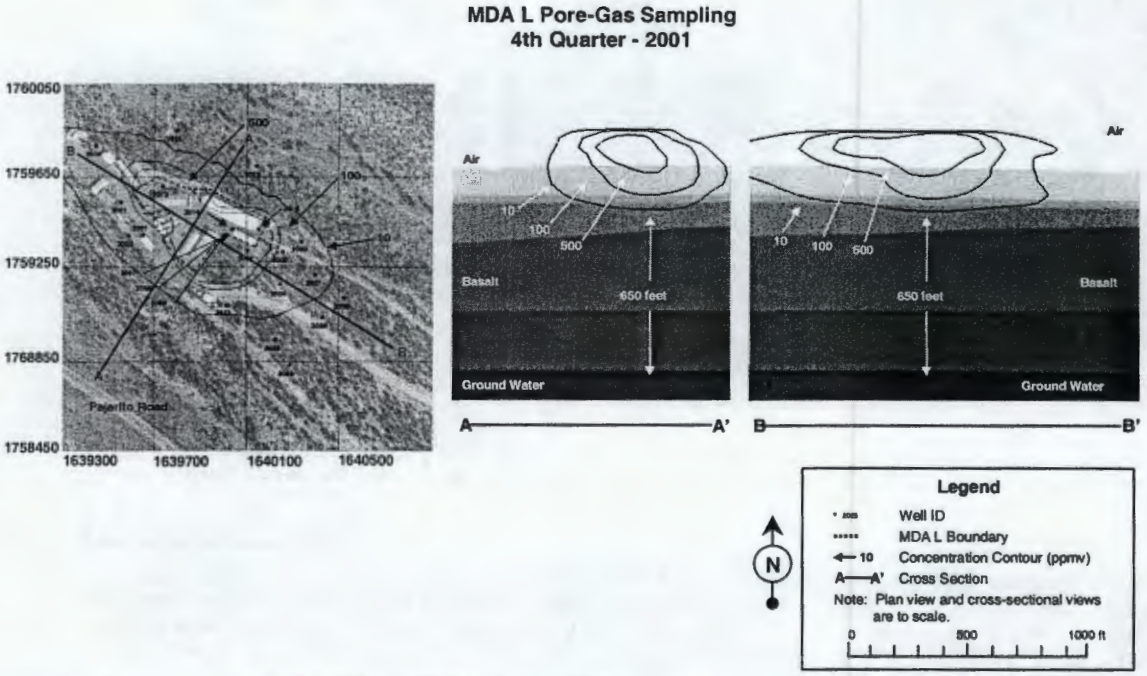
Note: Data from boreholes 2087, 2088, and 2089 will be omitted from the pore-gas sampling analysis from Q2-2002 forward. It was determined that these wells had soil gas interaction from port to port in addition to interaction from the subsurface to the atmosphere because of the way the wells were constructed. Well 2014, which is located in close proximity to 2087, 2088, and 2089 can be used in the future to capture the soil gas data for that same location.

Figure 1-10. MDA L pore-gas sampling, 2nd quarter 2001



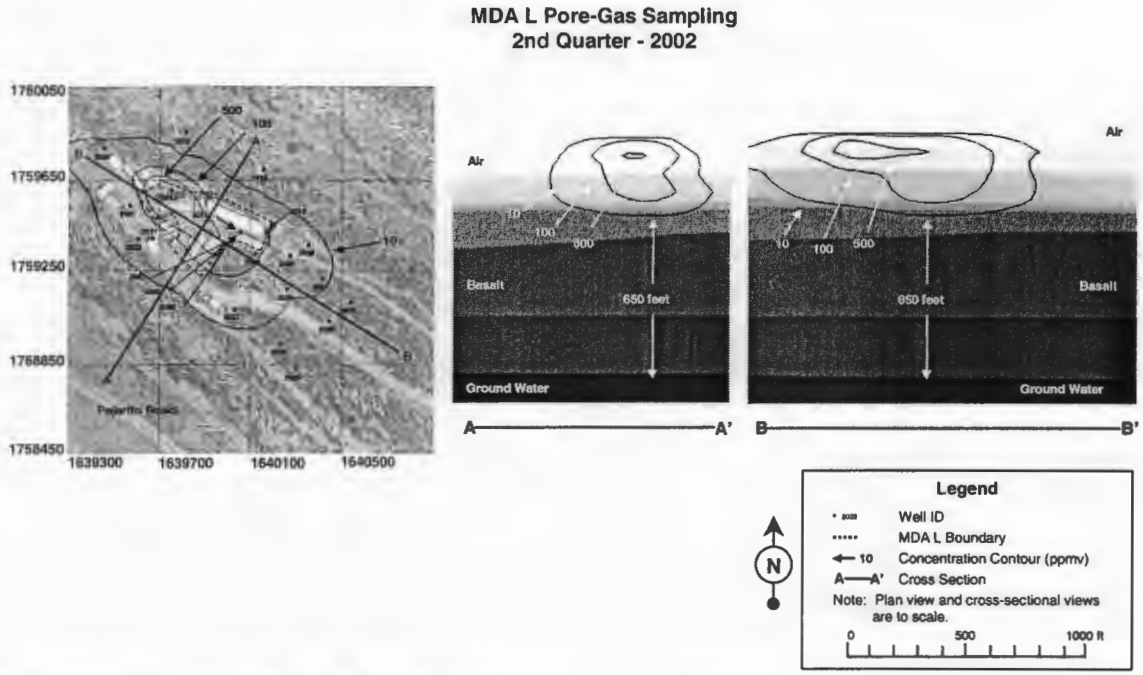
Note: Data from boreholes 2087, 2088, and 2089 will be omitted from the pore-gas sampling analysis from Q2-2002 forward. It was determined that these wells had soil gas interaction from port to port in addition to interaction from the subsurface to the atmosphere because of the way the wells were constructed. Well 2014, which is located in close proximity to 2087, 2088, and 2089 can be used in the future to capture the soil gas data for that same location.

Figure 1-11. MDA L pore-gas sampling, 3rd quarter 2001



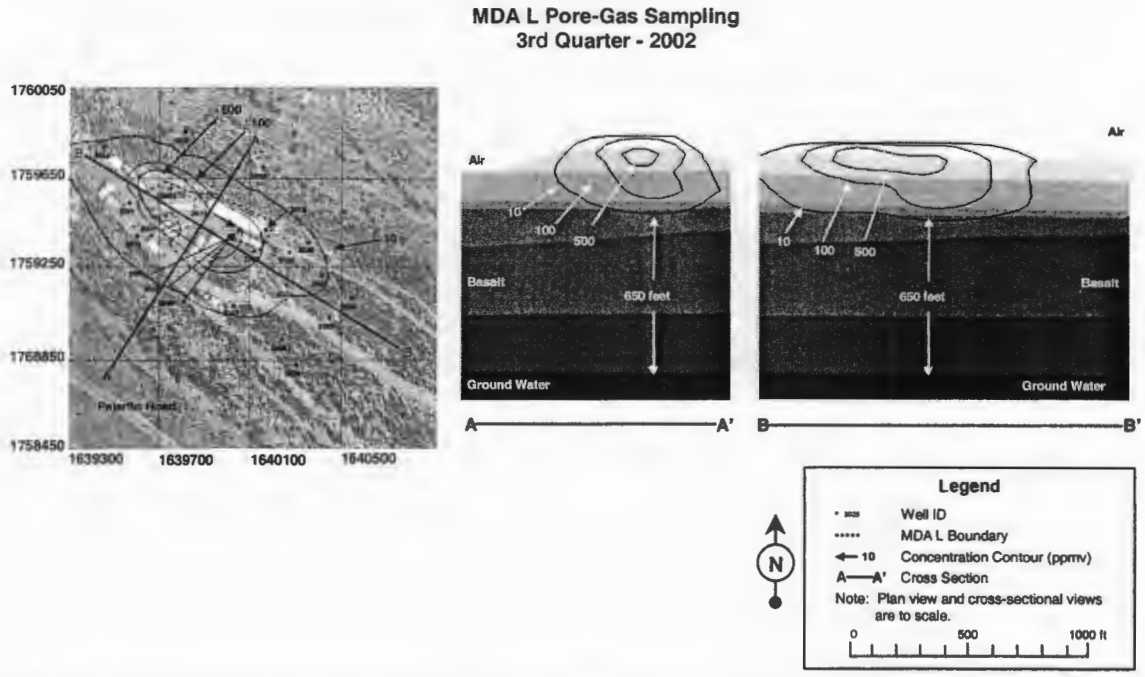
Note: Data from boreholes 2087, 2088, and 2089 will be omitted from the pore-gas sampling analysis from Q2-2002 forward. It was determined that these wells had soil gas interaction from port to port in addition to interaction from the subsurface to the atmosphere because of the way the wells were constructed. Well 2014, which is located in close proximity to 2087, 2088, and 2089 can be used in the future to capture the soil gas data for that same location

Figure 1-12. MDA L pore-gas sampling, 4th quarter 2001



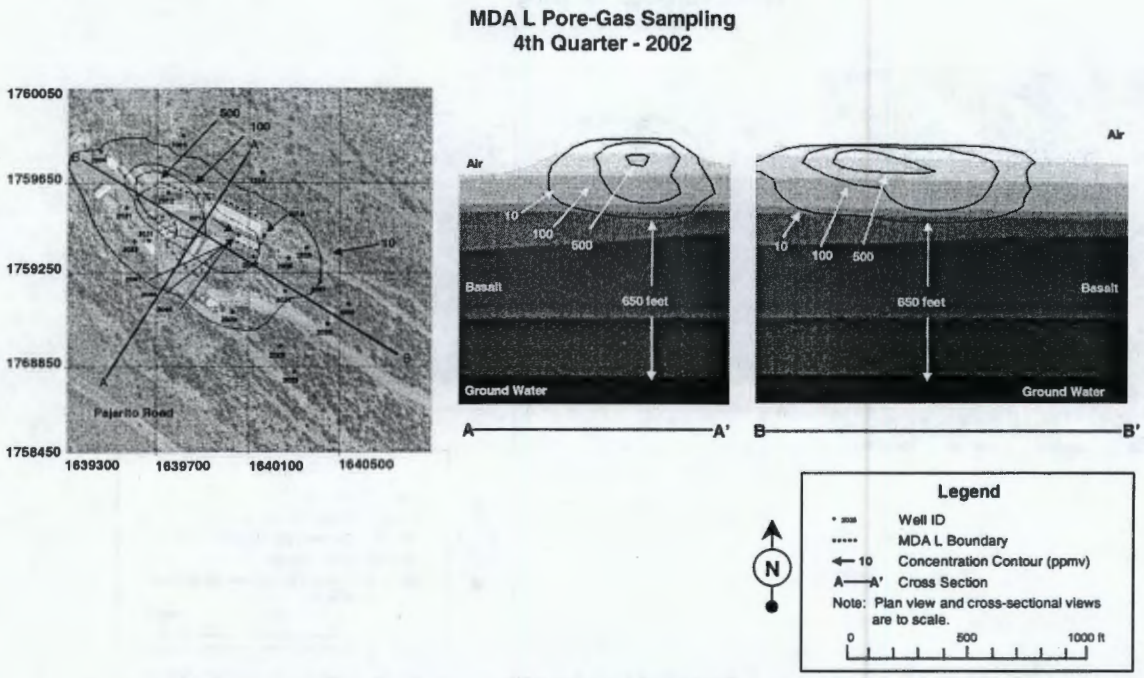
Note: Data from boreholes 2087, 2088, and 2089 will be omitted from the pore-gas sampling analysis from Q2-2002 forward. It was determined that these wells had soil gas interaction from port to port in addition to interaction from the subsurface to the atmosphere because of the way the wells were constructed. Well 2014, which is located in close proximity to 2087, 2088, and 2089 can be used in the future to capture the soil gas data for that same location.

Figure 1-13. MDA L pore-gas sampling, 2nd quarter 2002



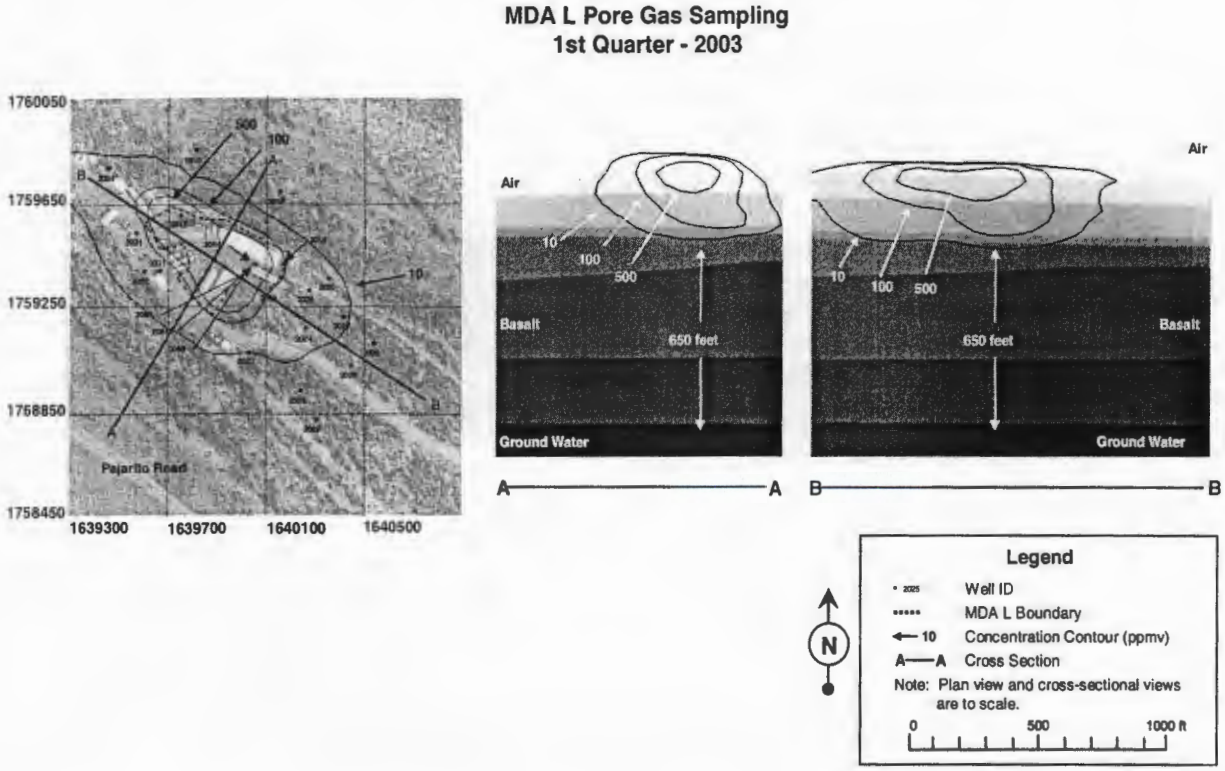
Note: Data from boreholes 2087, 2088, and 2089 will be omitted from the pore-gas sampling analysis from Q2-2002 forward. It was determined that these wells had soil gas interaction from port to port in addition to interaction from the subsurface to the atmosphere because of the way the wells were constructed. Well 2014, which is located in close proximity to 2087, 2088, and 2089 can be used in the future to capture the soil gas data for that same location.

Figure 1-14. MDA L pore-gas sampling, 3rd quarter 2002



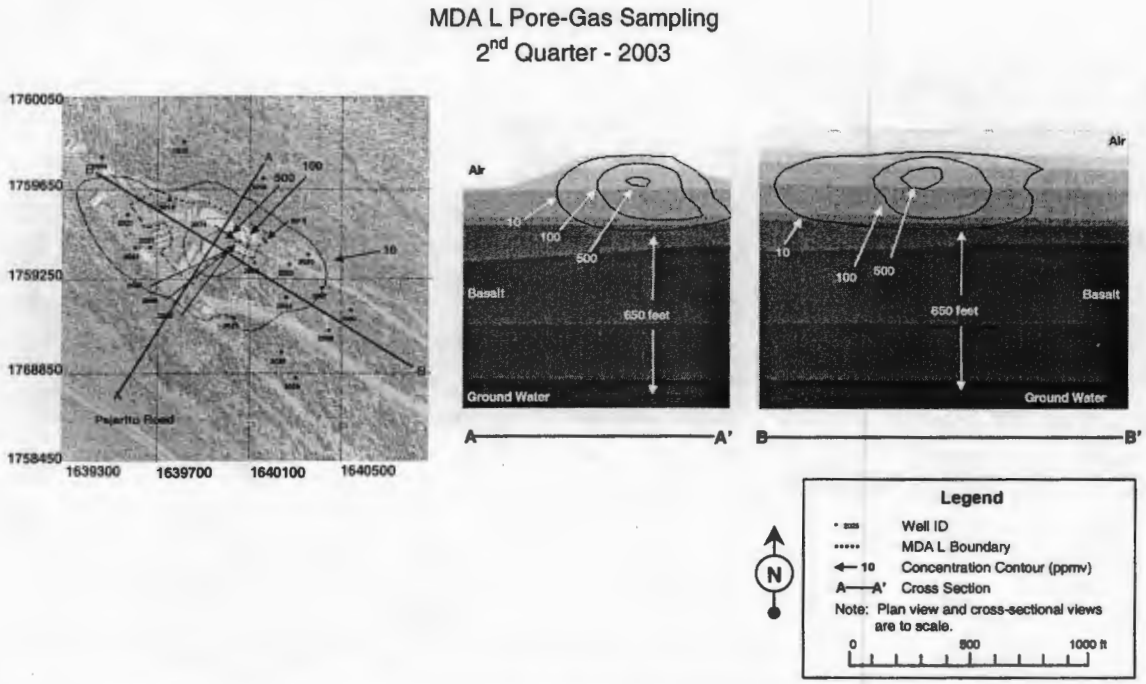
Note: Data from boreholes 2087, 2088, and 2089 will be omitted from the pore-gas sampling analysis from Q2-2002 forward. It was determined that these wells had soil gas interaction from port to port in addition to interaction from the subsurface to the atmosphere because of the way the wells were constructed. Well 2014, which is located in close proximity to 2087, 2088, and 2089 can be used in the future to capture the soil gas data for that same location

Figure 1-15. MDA L pore-gas sampling, 4th quarter 2002



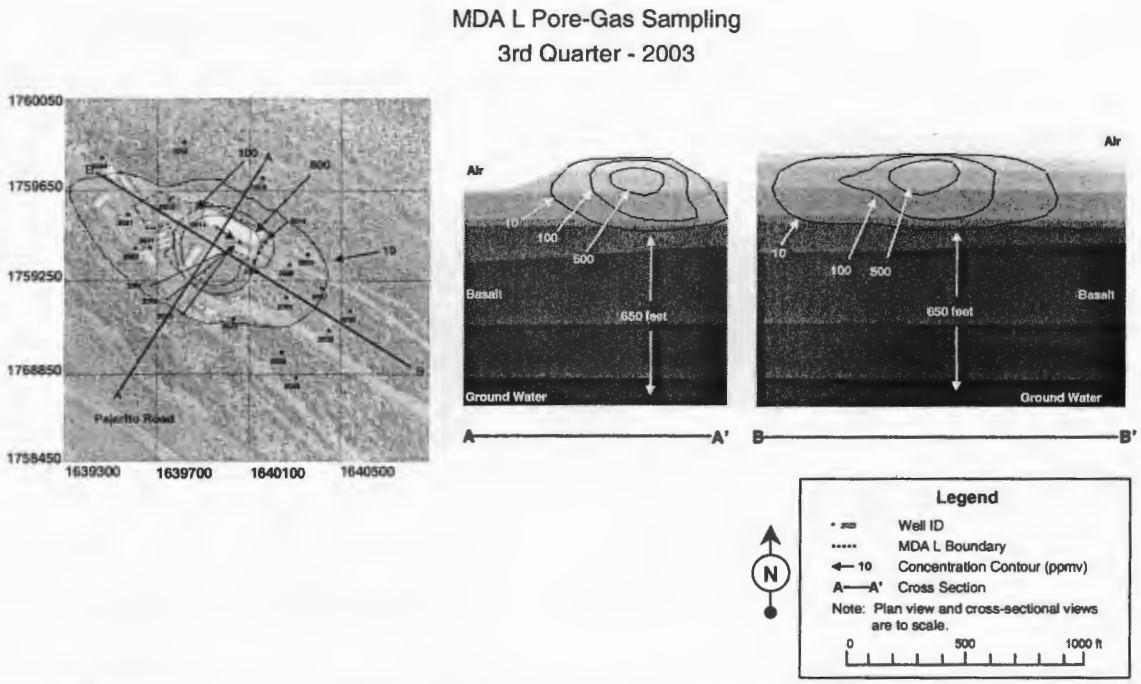
* Well 2014, which has historically shown the highest concentration of TCA had blocked ports this quarter. Therefore borehole 2089, one of the three wells that was omitted from the 2002 data analysis due to poor construction, was selected as a replacement for borehole 2014. Borehole 2089 was chosen as the best replacement for 2014 because it was close in proximity to 2014 and it was constructed in a better manner than 2087 and 2088. Data from boreholes 2087 and 2088 was not used in this analysis. Well 2014 will be monitored closely in the coming months to determine if the blockage noted this quarter was temporary (ie.caused by frozen condensation) or is a permanent blockage. It is important to note that two wells are slated to be drilled in 2003 at MDA L and will be located in close proximity to well 2014.

Figure 1-16. MDA L pore-gas sampling, 1st quarter 2003



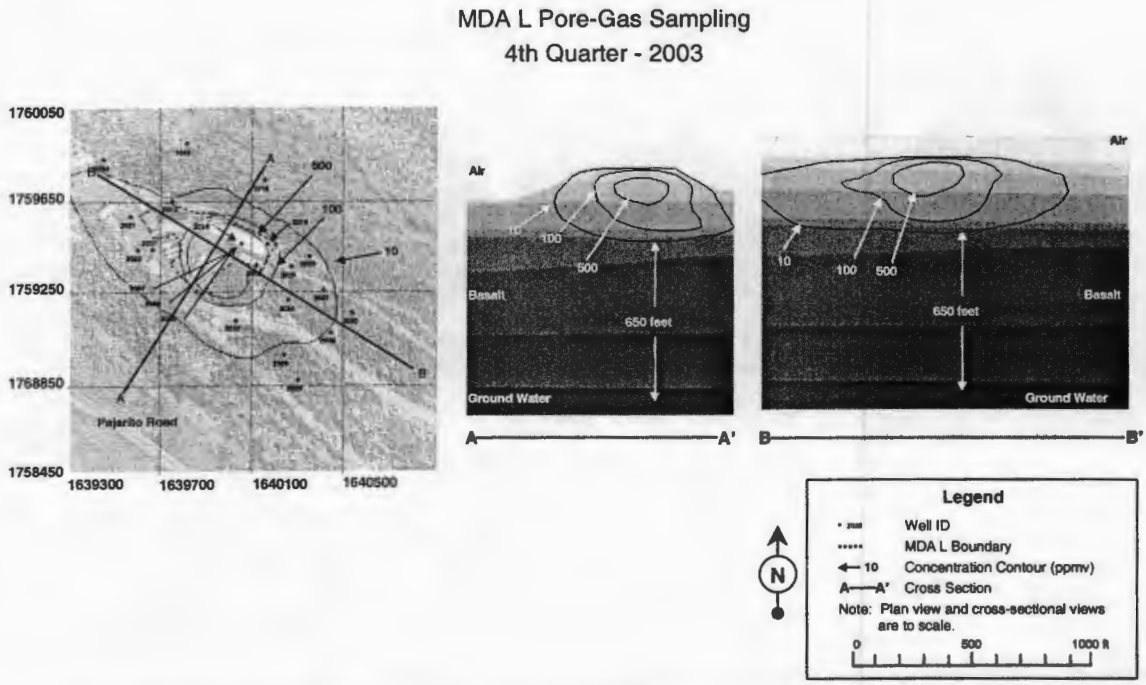
* Well 2014, which has historically shown the highest concentration of TCA had blocked ports this quarter. Therefore borehole 2089, one of the three wells that was omitted from the 2002 data analysis due to poor construction, was selected as a replacement for borehole 2014. Borehole 2089 was chosen as the best replacement for 2014 because it was close in proximity to 2014 and it was constructed in a better manner than 2087 and 2088. Data from boreholes 2087 and 2088 was not used in this analysis.

Figure 1-17. MDA L pore-gas sampling, 2nd quarter 2003



* Well 2014, which has historically shown the highest concentration of TCA had blocked ports this quarter. Therefore borehole 2089, one of the three wells that was omitted from the 2002 data analysis due to poor construction, was selected as a replacement for borehole 2014. Borehole 2089 was chosen as the best replacement for 2014 because it was close in proximity to 2014 and it was constructed in a better manner than 2087 and 2088. The data for 2089 was averaged for this quarter using 9 previous quarters. The averages were used due to the uncommonly low readings on this well for this quarter. Data from boreholes 2087 and 2088 was not used in this analysis.

Figure 1-18. MDA L pore-gas sampling, 3rd quarter 2003



* Well 2014, which has historically shown the highest concentration of TCA had blocked ports this quarter. Therefore borehole 2089, one of the three wells that was omitted from the 2002 data analysis due to poor construction, was selected as a replacement for borehole 2014. Borehole 2089 was chosen as the best replacement for 2014 because it was close in proximity to 2014 and it was constructed in a better manner than 2087 and 2088. Data from boreholes 2087 and 2088 was not used in this analysis.

Figure 1-19. MDA L pore-gas sampling, 4th quarter 2003

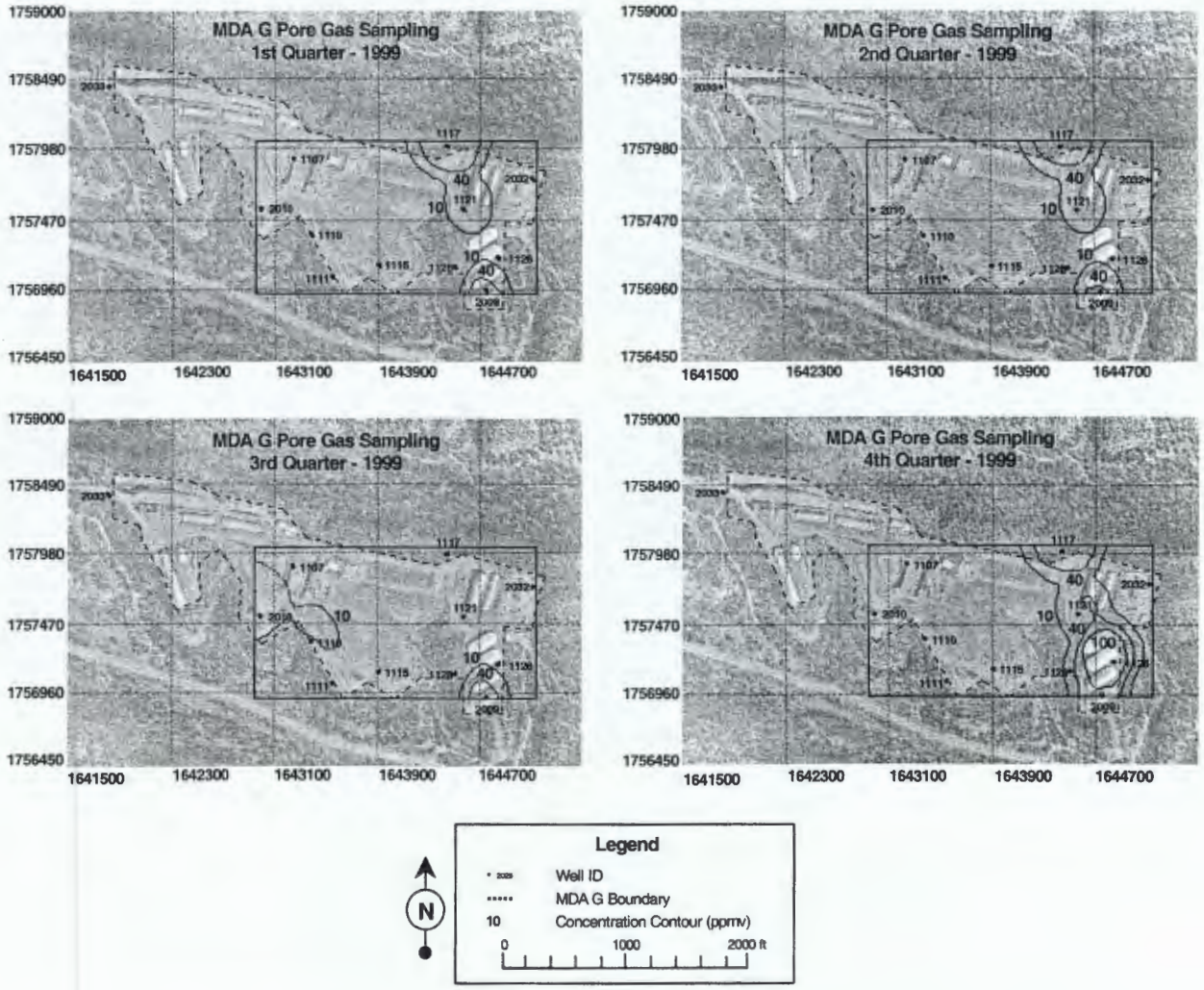
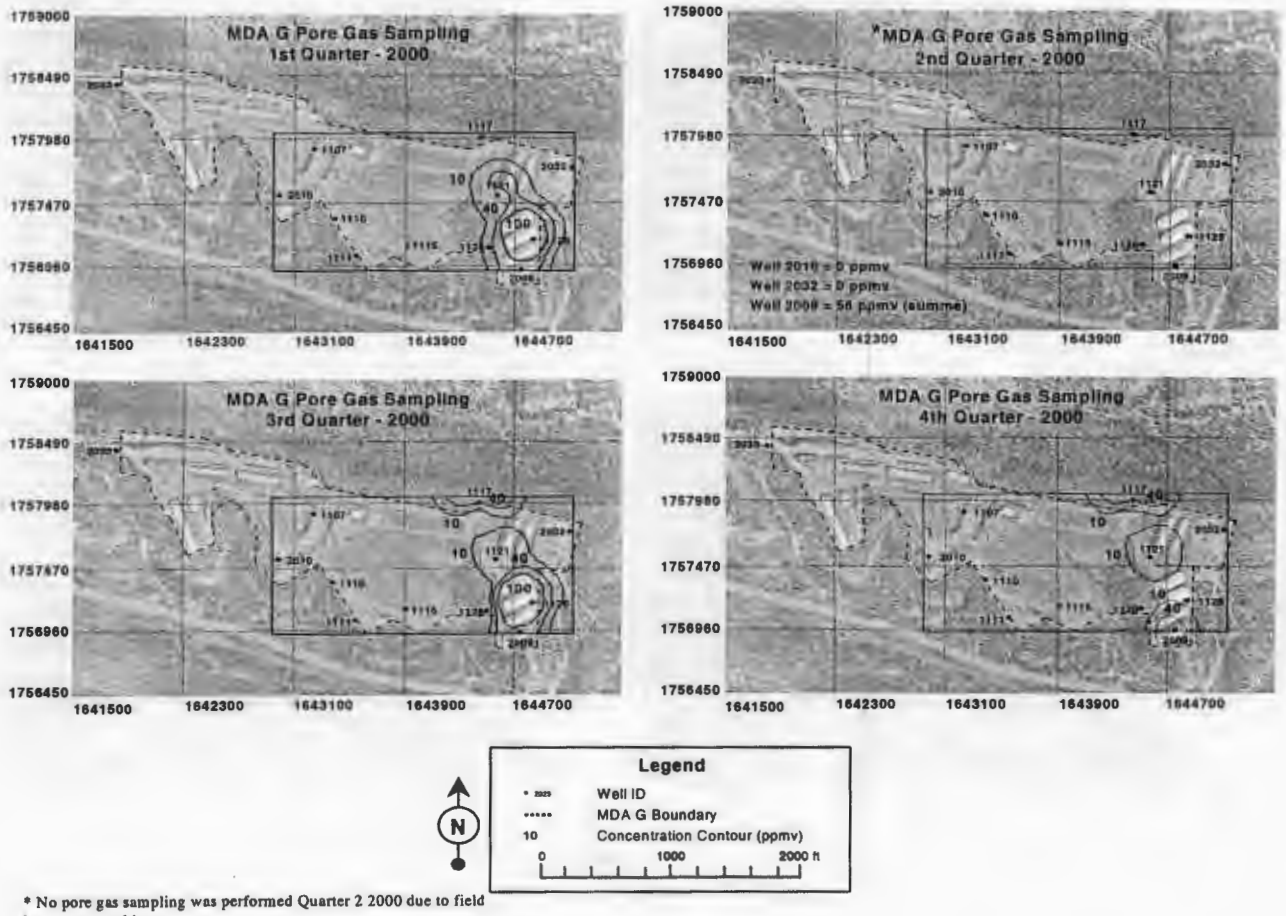


Figure 1-20. MDA G pore-gas sampling, 1999



* No pore gas sampling was performed Quarter 2 2000 due to field instrument problems.

Figure 1-21. MDA G pore-gas sampling, 2000

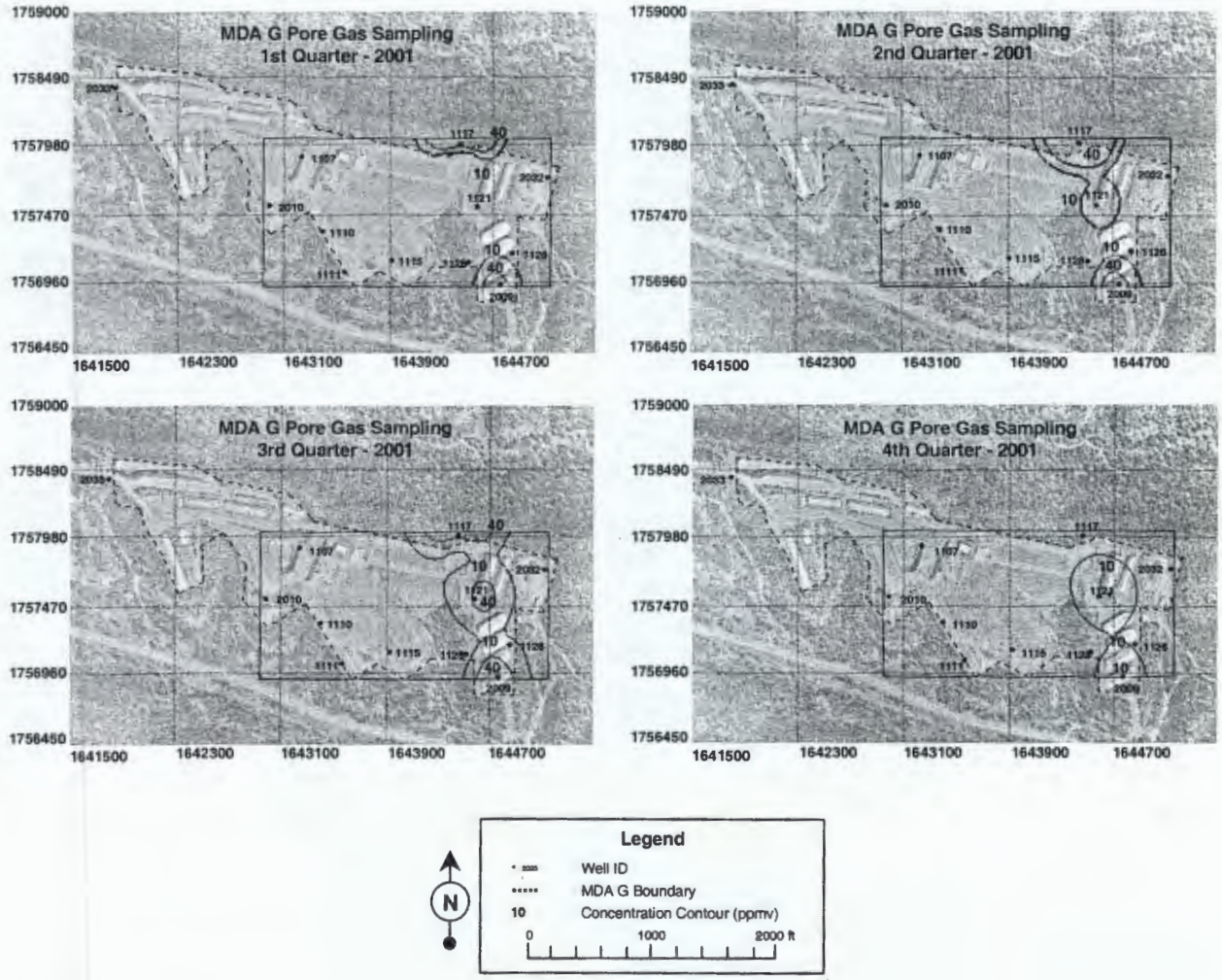
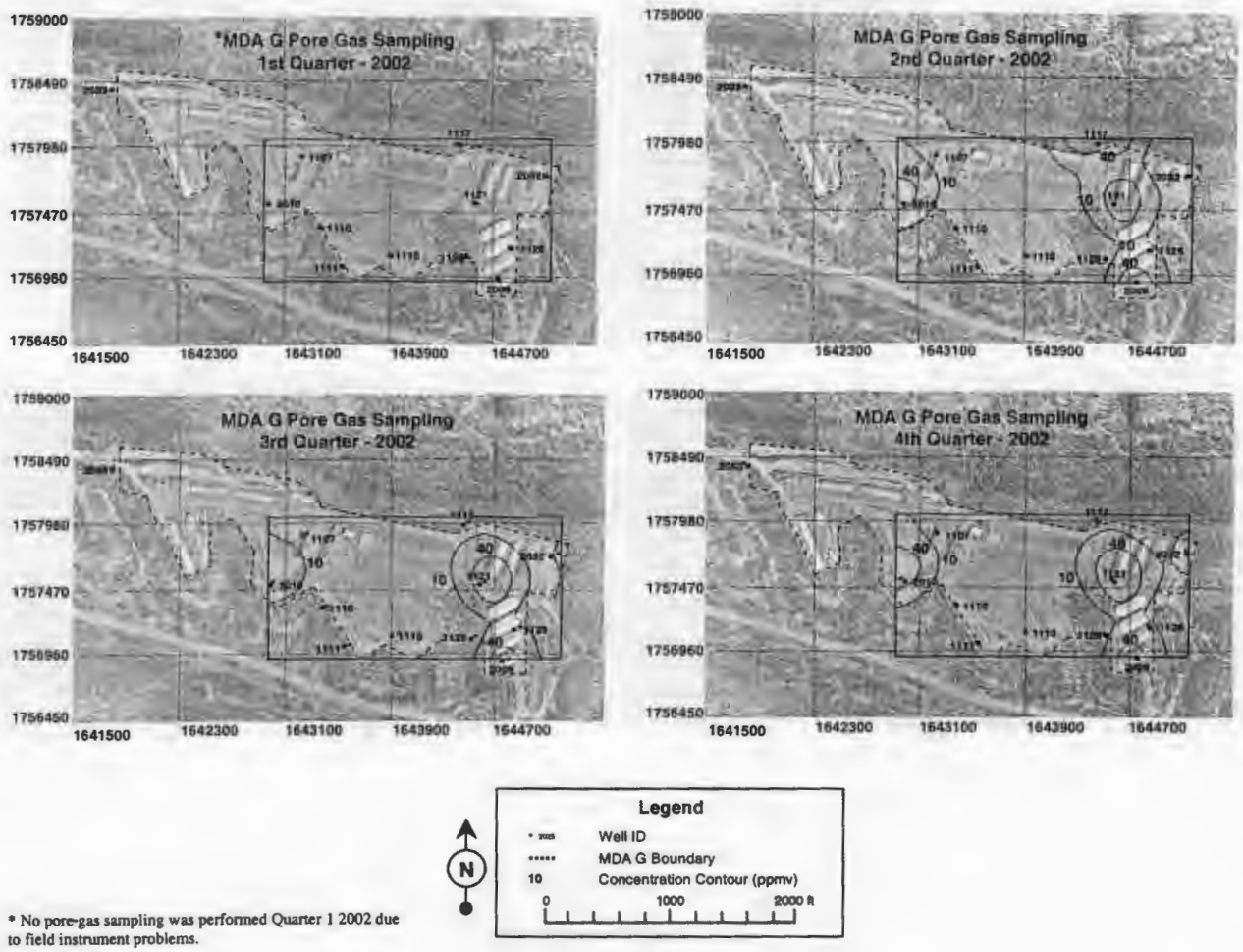


Figure 1-22. MDA G pore-gas sampling, 2001



* No pore-gas sampling was performed Quarter 1 2002 due to field instrument problems.

Figure 1-23. MDA G pore-gas sampling, 2002

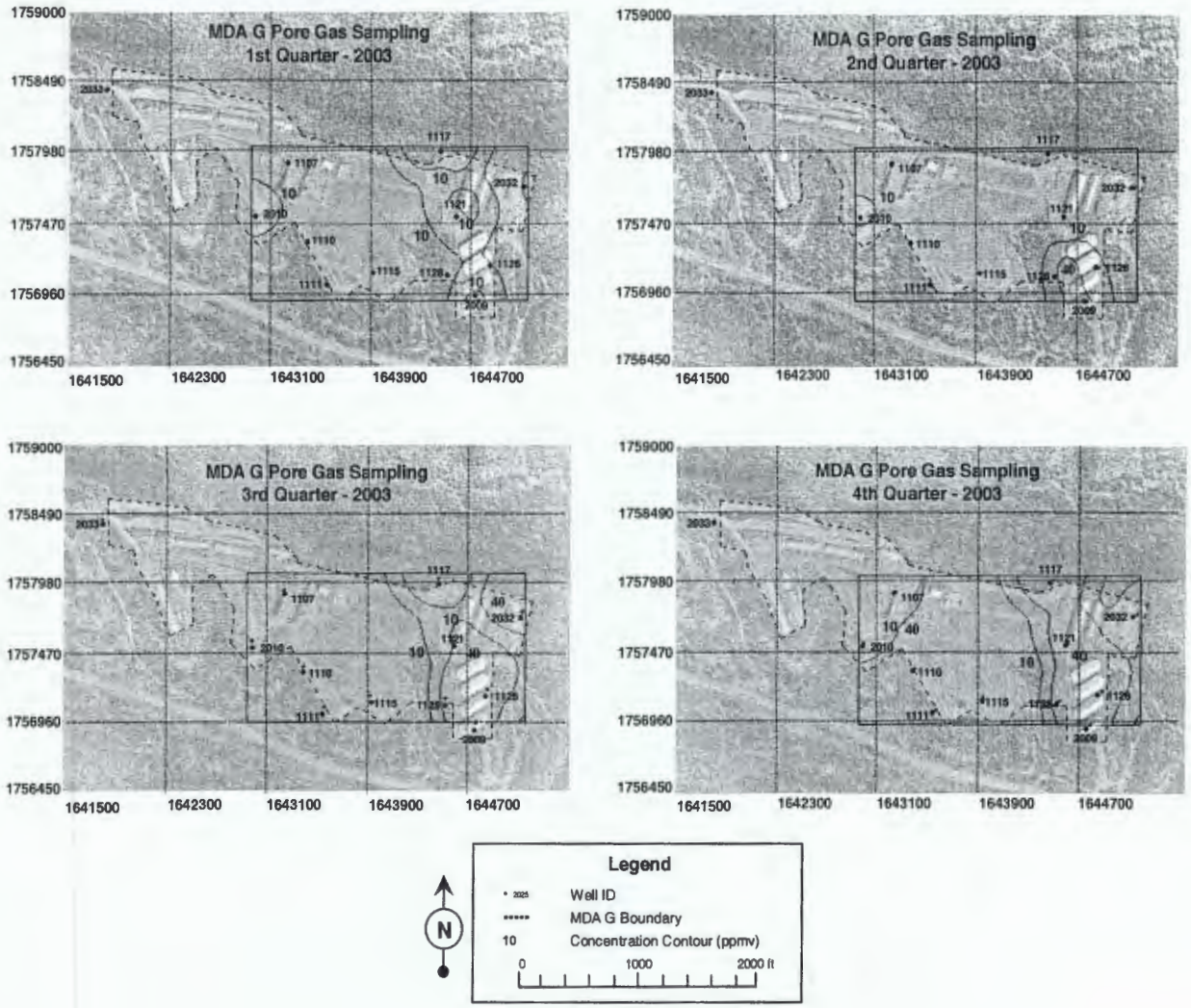


Figure 1-24. MDA G pore-gas sampling, 2003