Reports

Los Alamos National Laboratory/University of California
Risk Reduction & Environmental Stewardship (RRES)
Remediation (R) Program, MS M992
Los Alamos, New Mexico 87545
(505) 667-0808/FAX (505) 665-4747

National Nuclear Security Administration.
Los Alamos Site Operations, MS A316
Environmental Restoration Program
Los Alamos, New Mexico 87544
(505) 667-7203/FAX (505) 665-4504

Date: May 12,2003
Refer to: ER2003-0335

MAY 2003

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 JANUARY THROUGH MARCH 2003

Dear Mr. Young:

Enclosed are two copies of the Remediation Program Quarterly Technical Report, January through March 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 Program 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, Acting Program Manager
Remediation Program
Los Alamos National Laboratory

Sincerely,

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

DM/DG/MB/am

8217

Enclosure: 1) Quarterly Technical Report for January through March 2003 (ER2003-0276)
2) Certification

Cy:(w/enc)
M. Boettner, RRES-R, MS M992 (2 copies)
D. McInroy, RRES-R, MS M992
C. Nylander, RRES-WQH, MS M992
N. Quintana, RRES-R, MS M992
G. Rael, DOE-AL, MS A906
T. Trujillo, DOE-AL, MS A906
D. Gregory, LASO, MS A316
G. Turner, LASO, MS A316
M. Leavitt, NMED-GWQB
J. Davis, NMED-SWB
J. Kieling, NMED-HWB
J. Young, NMED-HWB
S. Yanicak, NMED-OB
L. King, EPA Region 6
Publications, S-7, MS F674
RRES-R File, MS M992
IM-5, MS A150
RPF MS M707

Cy:(w/o enclosure)
B. Beers, RRES-WQH, MS K497
S. Bolivar, RRES-R, MS M992
A. Dorries, RRES-R, MS M992
B. Gallaher, RRES-WQH, MS K497
D. Hickmott, EES-6, MS D462
J. Hopkins, RRES-R, MS M992
R. Hutton, SAIC, MS J521
J. McCann, RRES-R, MS M992
B. Ramsey, RRES-DO, MS J591
D. Rogers, RRES-WQH, MS K497
S. Rae, RRES-WQH, MS K497
T. Grieggs, RRES-SWRC, MS K490
J. Parker, NMED-HRMB
J. Bearzi, NMED-HWB

Bcc (w/encs.):
A. Jordan, Washington, DC
T. Longo, DOE-HQ, EM-453
C. Rodriguez,RRES-ER, MS M992 (7 copies)
D. Vasquez, Los Alamos, NM 87544

LIBRARY COPY

Remediation Program

LA-UR-03-3093
May 14, 2003
ER2003-0276

Quarterly Technical Report
January–March 2003

Los Alamos
NATIONAL LABORATORY
Los Alamos NM 87545

Produced by the Risk Reduction and Environmental Stewardship Remediation Program

Los Alamos National Laboratory, an affirmative action/equal opportunity employer, is operated by the University of California for the United States Department of Energy under contract W-7405-ENG-36.

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the Regents of the University of California, the United States Government nor any agency thereof, nor any of their employees make any warranty, express or implied, or assume any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represent that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the Regents of the University of California, the United States Government, or any agency thereof.

Los Alamos National Laboratory strongly supports academic freedom and a researcher's right to publish; as an institution, however, the Laboratory does not endorse the viewpoint of a publication or guarantee its technical correctness. By acceptance of this article, the publisher recognizes that the U.S. Government retains a nonexclusive, royalty-free license to publish or reproduce the published form of this contribution, or to allow others to do so, for U.S. Government purposes. Los Alamos National Laboratory requests that the publisher identify this article as work performed under the auspices of the U.S. Department of Energy.

CONTENTS

1.0 INTRODUCTION **1**

2.0 WORK PACKAGES **1**

2.1 Townsites — Project Team Leader: Terry Rust 1
2.2 Industrial Sites — Project Team Leader: Gabriela Lopez Escobedo 2
2.3 High Explosives Production Sites and MDA P Closure — Project Team Leader: Don Hickmott 4
2.4 Canyon Investigations — Project Team Leader: Kent Rich 6
2.5 Deep Groundwater Wells — Project Team Leader: John McCann 7
2.6 TA-21 Material Disposal Areas — Project Team Leader: Bill Criswell 7
2.7 TA-21 Non-Material Disposal Areas — Project Team Leaders: Mark Thacker and Becky Coel-Roback 8
2.8 TA-49, TA-50, and TA-54 — Project Team Leaders: John Hopkins and Bill Criswell 9
2.9 Corrective Action Strategy — Project Team Leader: Richard Mirenda 10
2.10 Regulatory Compliance — Project Team Leader (Acting): Alison Dorries 14
2.11 Land Transfer — Project Team Leader (Acting): Alison Dorries 22
2.12 Documentation and Tracking — Project Team Leader: Stephen Bolivar 22

3.0 REFERENCES **23**

APPENDIX A GROUNDWATER SAMPLING RESULTS, WELL MCOBT 4.4

APPENDIX B DP CANYON MONTHLY INSPECTION REPORTS SECOND QUARTER, FISCAL YEAR 2003

APPENDIX C QUARTERLY MOISTURE-MONITORING REPORT, SECOND QUARTER, FISCAL YEAR 2003: TECHNICAL AREA 49, MDA AB

APPENDIX D QUARTERLY PORE-GAS SAMPLING AT TECHNICAL AREA 54 MATERIAL DISPOSAL AREAS L AND G, SECOND QUARTER, FISCAL YEAR 2003

LIST OF ACRONYMS AND ABBREVIATIONS

BMP	best management practice
CFR	Code of Federal Regulations
CMS	corrective measures study
D&D	decontamination and decommissioning
DOE	US Department of Energy
DX	Dynamic Experimentation (Division)
EPA	US Environmental Protection Agency
ER	environmental restoration
ERDB	Environmental Restoration Database
ESH ID	environment, safety, and health identification number
ESL	ecological screening level
FWO-SWO	Facility and Waste Operations Division-Solid Waste Operations Group
FY	fiscal year
GIS	Geographical Information System
HE	high explosives
HIR	historical investigation report
HSWA	Hazardous and Solid Waste Amendments
IWP	investigation work plan
the Laboratory	Los Alamos National Laboratory
LANL	Los Alamos National Laboratory
MDA	material disposal area
NMED	New Mexico Environment Department
NNMCAB	Northern New Mexico Citizens Advisory Board
NTISV	nontraditional in situ vitrification
PRS	potential release site
PTSE	Primary Toxicity Study Evaluation
RCRA	Resource Conservation and Recovery Act
RDX	1,3,5-trinitro-1,3,5-triazacyclohexane
RFI	RCRA facility investigation
RRES-ECO	Risk Reduction and Environmental Stewardship Division-Ecology Group
RRES-R	Risk Reduction and Environmental Stewardship Division-Remediation Program
RRES-SWRC	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
SOP	standard operating procedure
SSL	soil screening level
SWMU	solid waste management unit
SWPPP	Stormwater Pollution Prevention Plan
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

JANUARY–MARCH 2003

LOS ALAMOS NATIONAL LABORATORY

RISK REDUCTION AND ENVIRONMENTAL STEWARDSHIP

REMEDIATION PROGRAM

ALBUQUERQUE OPERATIONS OFFICE

CONTRACTOR: University of California

PROGRAM MANAGER: 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-Remediation (RRES-R) Program, 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 the RRES-R Program.

2.0 WORK PACKAGES

2.1 Townsites — Project Team Leader: Terry Rust

2.1.1 TA-0

DP Road Land Transfer Tract [PRSs 00-004, 00-010(a,b), 00-027, 00-030(a,b,l,m), and 00-033 and part of PRS 21-021]. A response to the New Mexico Environment Department (NMED) request for supplemental information (RSI) for the DP Road Land Transfer Tract voluntary corrective action (VCA) plan was submitted. Approval of the VCA plan was subsequently received.

2.1.2 TA-02

RRES-R Program personnel continued to coordinate program activities affected by the Cerro Grande fire with the Facility and Waste Operations Division-Cerro Grande Rehabilitation Project decontamination and

decommissioning (D&D) staff charged with the removal of the remaining TA-02 (Omega Reactor) structures.

2.1.3 TA-19

Preliminary estimates were developed for the US Department of Energy (DOE) land transfer staff regarding the economic and schedule impact of creating a stand-alone work element.

2.1.4 TA-73

PRSs 73-001(a,b)-99 [73-001(a–d) and 73-004(d)]. The NMED requested clarification on the 73-1 Airport Landfill voluntary corrective measure (VCM) plan but preferred not to issue a formal RSI. Clarification was provided and documented in a record of communication.

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

During this quarter, the Industrial Sites Team reviewed and provided information for the draft solid waste management unit (SWMU) report for sites in TAs-04, -05, -46, -52, -60 and, -63.

2.2.1 TA-03

PRS 03-010(a). Results of a geophysical survey (completed in August 2002) were received for Potential Release Site (PRS) 03-010(a), a systematic release from a vacuum repair shop. The purpose of the geophysical survey was to determine whether geophysical methods can be used to define the extent of a localized perched aquifer beneath and west of Building SM-30 in TA-03, and, if so, to map the extent of the aquifer.

The preliminary results of the investigation indicate that

- the alluvial fill appears to be limited in lateral extent to the north, west, and south;
- any associated increase in moisture in the fill appears to be vertically limited by a layer of welded Bandelier Tuff underlying the fill; and
- no seepage, weepage, or increase in moisture content is evident in the alluvial-fill slope west of the chainlink fence.

The Laboratory's Project Management Division personnel anticipate beginning construction of a parking structure near PRS 03-010(a), south of Building SM-30 at TA-03, during the last quarter of fiscal year (FY) 2003. RRES-R Program personnel are coordinating environmental sample collection with Project Management Division's pre-construction geotechnical characterization activities. Sample results will be used to define the extent of contamination at PRS 03-010(a) and to plan remediation activities, if required, before construction begins. Sample collection is scheduled for the third quarter of FY 2003, and construction activities are anticipated to begin the last quarter of FY 2003.

2.2.2 Middle Mortandad/Ten Site Aggregate

Preparations continue for the execution of the sampling and analysis plan (SAP) for the Middle Mortandad/Ten Site Aggregate (Environmental Restoration Project 2002, 73092).

An RSI was received from NMED on March 13, 2003, for the Middle Mortandad/Ten Site Canyon Aggregate SAP. In January, the High-Performance Team (NMED, the Laboratory, and DOE) negotiated a reduction in the total number of comments from 51 comments on the draft RSI to 26 comments on the final RSI. Work to respond to the RSI comments is ongoing; the response to the RSI is due April 13, 2003.

2.2.3 TA-53

PRS 53-002(a)-99, Northern and Southern Surface Impoundments.

TA-53 Field Work in Los Alamos Canyon Drainage. All analytical results from samples collected in the last quarter of FY 2002 have been received, and all data are now captured in the ER Database (ERDB).

PRS 53-002(a) Interim Action. All analytical results submitted for analysis last quarter were received for samples collected from the two northern impoundments. All data are now captured in the ERDB.

TA-53 Continuation Field Work. All analytical results were received from samples collected and submitted for analysis in the last quarter of FY 2002. These samples were analyzed for anions (e.g., bromide, chloride, nitrate, nitrite, phosphate, and sulfate) and stable isotopes ($\delta^{18}O$ and δD). The data will be used to estimate downward fluxes and to look at contaminant levels (i.e., nitrate and nitrite); the data will provide a needed comparison point with Laboratory-wide studies because little information has been collected regarding water movement directly below ponded water on the mesas at the Laboratory. The stable isotope data may be useful for estimating the amount of evaporation that has occurred and may be a fingerprint for the depth of downward movement of water from the impoundments.

TA-53 RFI Report. Preparations have begun for the Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) report for PRSs 53-002(a)-99 (surface impoundments), 53-008 (a storage area), and surrounding areas; the report will include all data collected by the ER Project during field campaigns in 1994/1995, 1999/2000, and 2002.

2.2.4 Addendum to the Sampling and Analysis Plan for the Middle Mortandad/Ten Site Aggregate

Planning has begun for the addendum to the Middle Mortandad/Ten Site Aggregate SAP. This document will contain the SAP for the remainder of the PRSs in the Middle Mortandad/Ten Site Watershed Aggregate that were not included in the March 2002 SAP (Environmental Restoration Project 2002, 73092). Those PRSs are in TAs-04, -05, -52, and -63.

2.2.5 Facility Integration Activities

During the second quarter of FY 2003, Industrial Sites Team members responded to approximately 102 requests for excavation permits; environment, safety, and health (ESH)-ID questionnaires; and facility inquiries about new construction projects. In addition, the team worked with facility managers (by attending meetings and providing information) on ongoing projects and planned construction projects collocated with PRSs.

Personnel provided support for the turbine generator project at the TA-03 power plant because the utility lines required for the new turbine will be located within the boundary of PRS 03-012(b)-00. Phase I RFI samples were collected and analyzed in accordance with Addendum 1 of the Operable Unit 1114 RFI work plan (LANL 1995, 57590), and RRES-R Program personnel worked with the facility contractor to conduct background comparisons and screening assessments. A report was prepared with the results of the assessments.

Personnel worked with the facility contractor for decontamination of portions of PRS 03-033, a historical liquid-waste collection system for the printed-circuit shop formerly located in the northwest corner of the Physics Building (Building 03-40). The facility is removing contaminated lines and concrete beneath the former shop as part of the conversion of the space into offices. Samples will be collected beneath the drainlines in the crawl space beneath the former shop to determine the nature and extent of any contamination from the drainlines. The requirement for cleanup of potentially contaminated media will be determined by the results of the human health risk screening and assessment. If contaminated media are removed, confirmation samples will be collected to verify that cleanup levels have been met for that portion of the PRS.

Personnel worked with Project Management Division personnel for sampling PRS 03-056(l) before the construction of a storage vault at the site of the PRS. PRS 03-056(l) is the former location of a staging area for drums of used disposable beryllium-contaminated clothing to be incinerated. The staging area was located on the east side of Building 03-141, the beryllium facility. Four asphalt chip samples and four surface soil confirmation samples will be collected from beneath each asphalt sample location to determine extent of contamination.

2.3 High Explosives Production Sites and MDA P Closure — Project Team Leader: Don Hickmott

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 PRS 16-021(c)-99 (the 260 outfall). The major focus this quarter continued to be data analysis and writing of the Phase III RFI report and the CMS report. Hydrogeology studies, including a stream profile, were continued. High-performance team activities continued at a low level. A revision to the 260 outfall CMS plan addendum was submitted to the administrative authority. An approval of the interim measure report for the 260 outfall cleanup was received from the administrative authority.

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 remains relatively dry. Cañon de Valle surface water was present only between Burning Ground Spring and Material Disposal Area (MDA) P and in a short reach downgradient from the alluvial well pair in middle Cañon de Valle, even during spring runoff. However, all five of the alluvial wells in Cañon de Valle contained water this quarter; the uppermost well was wet this quarter. Two of the three alluvial wells in Martin Spring Canyon also contained water during the reporting period. The Fish Ladder seep and 90s-Line pond became wet during spring runoff. None of the intermediate-depth boreholes contained water throughout the quarter. SWSC Spring was dry. The Cañon de Valle headwaters were saturated, and a small new spring continued to flow in the headwaters region. Quarterly sampling locations were sampled during March.

Deep wells CdV-R-15-3 and CdV-R-37-2 were sampled during January.

The final report on the controlled-source auto-magnetotellurics study completed in September was received from the geophysical subcontractor. The results of the study suggest there are narrow zones of high conductivity (possible recharge pathways) within Cañon de Valle and in the middle of the TA-16 mesa top. These data were used to help site intermediate-depth boreholes at TA-16. A tour for NMED personnel was held, after which the locations of the intermediate depth wells were finalized. A revision to the grcundwater addendum to the CMS plan was submitted to the administrative authority.

Stable isotope samples were collected during precipitation events. Every-other-day samples were collected and archived for eventual stable isotope analysis. Flow-integrated samples were collected in Burning Ground and Martin Springs. Stream profiles that included analytical laboratory sampling were completed. All second-quarter analytical results are pending.

A review of all water data collected to date from the springs and alluvial system was continued. Time series at all locales that are being sampled during quarterly sampling continued to be reviewed. It appears that high explosives (HE) in spring water are the only constituents in the spring that will require cleanup during the CMS.

Sections of the Phase III RFI report that did not depend on high-performance team interactions were written.

2.3.1.2 PRS 16-021(c)-99 CMS

Additional data from the stormwater management system at the 260 outfall were received. This barrier unit is designed to remove HE and barium from spring waters. Data indicate the barrier unit is removing HE effectively but not barium. Stabilization studies were continued.

The 260 Outfall and the Ecological Risk High-Performance Teams continued to evaluate ecological sampling in Cañon de Valle. Data from resampling aquatic invertebrates were received. Impacts observed in previous sampling events appeared to be reduced in the latest round of sampling.

Sections of the CMS report that did not require high-performance team discussions were drafted.

2.3.1.3 Surface Water

Best management practices (BMPs) were inspected and maintained.

2.3.2 MDA P Closure

The MDA P closure certification report was completed and delivered to NMED on January 31, 2003. This report included closure certification of MDA P and the TA-16-387 Flash Pad, as well as a VCA completion report on remediation of SWMU 16-016(c)-99. Work continued this quarter on production of additional copies of the report for distribution.

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)

Fourteen samples of earthworms that were the subject of mortality tests were submitted for inorganic chemical analyses, along with two negative control samples. Ninety-nine mice collected from Los Alamos, Pueblo, Acid, and Guaje Canyons and 10 quality-control mice were submitted for analyses of inorganic chemicals, radionuclides, and organic constituents. Validated analytical data were received for sediment and water samples collected from the small-mammal trapping arrays and from sample sites for earthworm mortality, plant germination, and aquatic ecosystem tests. 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. Team members also worked with other RRES-ECO staff on the initial model runs of the ECORSK.6 model.

2.4.1.2 Pueblo Plutonium Transport – Canyons Assessment of Remedial Alternatives

Plutonium is being measured by both the Laboratory and NMED at elevated concentrations in nonfiltered stormwater in Pueblo Canyon. A recent increase in plutonium transport is associated with the increase in the number and magnitude of floods that have been sustained through the length of the canyon following the Cerro Grande fire. Stormwater samples were collected in the summer of 2002 from eight stations located along the length of Pueblo Canyon to evaluate spatial variations in plutonium concentration and variations associated with a range of flood discharges. The locations were chosen to partition the watershed in a way that will support an evaluation of how variations in plutonium concentrations in sediment and variations in valley-floor and channel geomorphology affect concentrations of plutonium in floods. Samples have been analyzed for suspended sediment concentration; particle-size distribution and plutonium concentration analyses are underway. Assessment of these data and associated modeling efforts will support an evaluation of potential mitigation options to reduce plutonium transport in floods. The current target date for implementation of mitigation work is June 2003.

2.4.1.3 Los Alamos and Pueblo Canyons Surface Aggregate Report

This report will present the assessment and evaluation of all Canyons 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 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. The report is currently planned for submittal to the NMED in April 2004. Progress during the second quarter included the following: (1) submittal of earthworm and mammal samples for analyses; (2) receipt of validated analytical data for sediment and water samples associated with the ecological risk assessment; (3) development of a draft human health risk assessment approach; (4) initial screening of sediment data against screening action levels as a step in the assessment of potential human health risks; (5) compilation of applicable water quality standards to be used for screening purposes; (6) preparation of an initial outline and a draft annotated outline for NMED approval; and (7) research of methods for calculating UCL95 values for the sediment data set.

2.4.2 Mortandad Canyon

Validated Phase I analytical data were received from sediment samples collected from reaches MCW-1, MCW-2, and M-6 in the Mortandad Canyon watershed. Assessment of these data is in progress.

A watershed-scale data assessment is in progress to identify remaining data needs in previously sampled reaches and to help focus future sampling. This effort includes compiling all analytical data from sediment samples in nine reaches sampled between 1998 and 2001; 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.

2.4.3 DP Canyon

The DP Canyon tracer study was initiated this quarter. Approximately 48 kg of potassium bromide tracer dissolved in 100 gal. of water was injected on the morning of February 24, 2003, into a well screened across the entire saturated thickness of the aquifer. Locations adjacent to the injection well were continually monitored for hydraulic head and tracer movement throughout the injection. Bromide-specific electrodes and data loggers are being used in a network of monitoring locations to measure tracer movement. Data have been collected from the electrodes in 30-minute intervals since the onset of tracer injection. In addition, groundwater and surface water samples are being collected and screened for bromide to provide additional spatial coverage of bromide data. Groundwater and surface water samples for cation and strontium-90 analysis have been systematically collected and archived. A subset of these samples will be submitted for analyses at a later date. These data will be used to assess the mobility of strontium-90 as the tracer moves through the aquifer. Results from the tracer study will enhance the understanding of the distribution and mobility of strontium-90 in the alluvial aquifer and support an evaluation of potential remedial alternatives, if necessary.

2.5 Deep Groundwater Wells — Project Team Leader: John McCann

Drill site restoration, waste management, sampling, database management, and reporting activities were conducted this quarter under the Groundwater Protection Program.

Sampling was conducted this quarter at wells CdV-R-15-3, CdV-R-37-2, R-13, and MCOBT-4.4. 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).

Accomplishments in the reporting area this quarter include significant progress toward the preparation of well completion reports for wells R-5, R-8, R-13, R-14, R-16, R-20, R-23, and R-32. These reports will be finalized in the next quarter after NMED comments on a sample report are addressed.

Groundwater hydrochemical data for MCOBT-4.4 sample rounds one and two are presented in Appendix A. Results for $^{15}N/^{14}N$ stable isotopes for these two sample rounds are not back from the laboratory and will be reported at a later date.

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

<u>PRS 21-014 (MDA A) General's Tanks.</u> The health and safety plan for MDA A has been revised and will be submitted to DOE for review and approval. 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 must be prepared in compliance with 10 CFR 830 Subpart B, "Nuclear Safety Management—Safety Basis Requirements." The compilation and review of the health and safety plan are being coordinated with the Laboratory's Safety Basis Office, formerly the Office of Authorization Basis. The plan is anticipated to be complete in the third quarter of FY 2003.

PRS 21-015 (MDA B) and PRS 21-017(a)-99 (MDA U). An investigation work plan (IWP) will be developed for MDA B and MDA U.

PRS 21-016(a)-99 (MDA T), PRSA 21-014 (MDA A) and PRS 21-018(a)-99 (MDA V). An IWP will be developed for MDA T and will include the historical investigation report as an appendix. Work on this plan will begin the third quarter of FY 2003. An IWP will be developed for MDA A. An IWP, including a historical investigation report, will be developed for MDA V once adequate funding is received.

The subsurface efforts at these MDAs will require an approved safety basis in accordance with 10 CFR 830. These efforts are being coordinated with the Laboratory's Safety Basis Office and are anticipated to be complete in the fourth quarter of FY 2003.

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

PRS 21-027(d)-99, NTISV Cold Demonstration VCM. NMED has approved the VCM completion report for PRS 21-027(d)-99, the nontraditional in situ vitrification (NTISV) cold demonstration; however, NMED did not approve the no-further-action status proposed in the report.

PRS 21-018(a)-99, NTISV Hot Demonstration at MDA V. Analytical data for the glass samples were received last quarter and are being evaluated and incorporated into the interim measure completion report. Mineralogical analysis of the glass samples is not yet complete.

PRS 21-011(k), VCM Activities. A notice of deficiency on the VCM plan for the PRS 21-011(k) outfall was received from NMED on December 23, 2002. The Laboratory response to the notice was submitted to NMED on January 17, 2003. Since the start of VCM fieldwork in November 2002, approximately 1600 yd^3 of low-level radioactively contaminated soil, sediment, and tuff have been excavated from PRS 21-011(k). Each 100 yd^3 of generated waste has been sampled for volatile organic compounds (VOCs) in accordance with the no-longer-contained-in determination received from NMED on November 25, 2002. The VOC results have been transmitted to NMED, and permission to dispose of the waste at MDA G has been received. Approximately 1200 yd^3 of the waste has been transported to MDA G. The NMED DOE Oversight Bureau conducted a walk-around at PRS 21-011(k) on January 21, 2003, and provided recommendations to enhance stormwater controls at the site. These recommendations were formally received from NMED on January 29, 2003. Immediately following the Oversight Bureau site walk-around, the Laboratory began implementing the recommendations. The Laboratory submitted a response to the recommendations for enhanced stormwater controls to NMED on February 18, 2003. The response outlined the enhancements that had been completed at the site.

All removal VCM activities have been completed in accordance with the October 2002 VCM plan. After completion of the remaining waste management activities, a final radiological walkover survey will be conducted to ensure that no "hot spots" above the cleanup goals remain at the site. Confirmation sampling will be completed after the final radiological survey and before site restoration. The VCM completion report will be submitted to NMED 90 days after completion of all field activities.

PRS 21-013(d)-99, VCA Activities. The final VCA plan addendum for PRS 21-013(d)-99, a historic disposal site comprising former PRSs 21-013(d) and 21-013(e), was completed and submitted to DOE in February 2003. Fieldwork began after submittal of the plan and was completed during the first week of March. The VCA completion report is planned for submittal to NMED in July 2003.

PRS 21-024(f) VCA Activities. In January, additional samples were collected at PRS 21-024(f), a former septic system, to address data gaps; the analytical results have been received. A small removal action is planned for the pit at the septic system outfall during April 2003. Site restoration will also take place during the third quarter of FY 2003. The VCA completion report is planned for submittal to NMED in June 2003.

PRS 21-024(i), Interim Action Activities. The interim action completion report for PRS 21-024(i), a former septic system, was submitted to NMED on March 31, 2003.

PRS 21-029, DP Tank Farm. Site inspections at the two hydrocarbon seep areas in DP Canyon were conducted in January and March 2003. The February inspection was not conducted because of health and safety issues associated with the icy conditions in DP Canyon at that time. The inspection reports for January and March are included as Appendix B of this document.

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 second quarter of FY 2003, and a review of the data is presented in Appendix C of this report. Neutron-based measurements were not collected during February because the manufacturer was performing maintenance on the equipment. The field efforts to perform these measurements during the first part of each month will continue so the entire year of data (October through September) will be reported in the annual report (previously the yearly report included September through August).

SAP addenda for the TA-49 fieldwork were in progress during the second quarter of FY 2003. These plans include a SAP addendum for surface radiation and sampling surveys at MDA AB and adjacent PRSs and a SAP addendum for subsurface drilling and sampling at MDA AB. An investigation work plan is being developed for MDA AB. The documents will be delivered in FY 2005. The subsurface efforts require an approved safety basis in accordance with 10 CFR 830, Subpart B, "Nuclear Safety Management—Safety Basis Requirements." These efforts are being coordinated with the Laboratory's Safety Basis Office and are anticipated to be complete in the fourth quarter of FY 2003.

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

2.8.2 TA-50

Meetings were held with TA-50 Influent Pump House Project personnel to define the scope for sampling TA-50 PRSs affected by new construction activities.

MDA C. Pore-gas, shallow subsurface tritium, and biota samples were collected per the MDA C SAP addendum to fill data gaps required to finalize the MDA C RFI.

2.8.3 TA-54

MDA H. The MDA H inventory and fate and transport modeling were revised for the MDA H CMS report based on updated data from a similar site, the Sandia National Laboratories/New Mexico Classified Waste Landfill. Monthly MDA H CMS progress reports for December 2002 and January and February 2003 were submitted to NMED during the second quarter of FY 2003 in accordance with Module VIII of the Laboratory's Hazardous Waste Facility Permit. Responses were submitted to the NMED for the RSI received on the MDA H RFI report addendum.

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 for the second quarter of FY 2003 is presented in Appendix D of this report.

MDA L. The draft of the MDA L RFI report was peer reviewed, and comment resolution was initiated.

MDA G. The draft RFI report for MDA G was submitted to the University technical representative for review before being submitted for peer review.

2.9 Corrective Action Strategy — Project Team Leader: Richard Mirenda

2.9.1 Science-Based Monitoring Stewardship

In the second quarter of FY 2003, the Science-Based Monitoring Stewardship Team completed the point-estimate risk assessment for perchlorate in Mortandad Canyon. The exposure pathway was ingestion of drinking water pumped from supply-well PM-5. On the basis of this point estimate, two decisions were made: (1) to conduct a fully probabilistic risk assessment of the same source term and pathway and (2) to analyze core samples available from Los Alamos/Pueblo Canyons for perchlorate. The probabilistic risk assessment was initiated, and core samples were analyzed. Perchlorate was detected in pore water in preserved core. On the basis of this fact, the decision was made to proceed with fully probabilistic risk groundwater pathway assessments for perchlorate sources in Los Alamos/Pueblo Canyons and to identify available core samples from Pajarito Canyon and Water Canyon/Cañon de Valle to analyze for perchlorate.

The results of the point-estimate risk assessment of perchlorate in Mortandad Canyon also led to the consideration of alternative risk management actions to minimize the potential for perchlorate transport toward the supply wells. The most effective action identified is to reduce or eliminate the hydraulic head produced in Mortandad Canyon by discharging perchlorate-free liquid from the radioactive liquid waste treatment facility. Characterization and fate and transport data suggest that the majority of the perchlorate inventory in Mortandad Canyon is associated with pore water in the vadose zone. Without hydraulic head, perchlorate transport through the vadose zone and the regional aquifer should be greatly retarded. Additional point-estimate calculations are being conducted to demonstrate the qualitative impact of discharge reduction and elimination.

In addition to the groundwater pathway risk assessment work, the task leader for Science-Based Stewardship and Monitoring participated as a member of the Project 7 Risk-Based End States Team that is charged with developing policy and guidance to ensure efficient cleanup programs applying the principles of risk-based corrective action.

2.9.2 Data Quality

Data quality activities for the second quarter include the following:

- continued data assessment for the draft SWMU report;
- compiled canyon/subject module information for samples collected in canyon areas;
- worked with the RRES-R Quality Integration and Improvement Team to finalize an interim change notice for Standard Operating Procedure (SOP) 1.04, R5, Sample Control and Field Documentation;
- worked on new SOP 1.13, R0, Initiating Data Requests; discussed overall process and drafted flowchart;
- continued writing a new desk instruction for using the Verification and Validation Application; and
- continued revision of the data dictionary.

In addition, the data stewardship team continued to design and improve the database web page to provide administrative authorities and stakeholders real-time access to data. The second release was posted on the RRES-R Program internal web page, and it includes canyon water and sediment data.

2.9.3 Peer Review Team

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

2.9.4 Data Validation

Data validators completed the validation of 569 suite combinations and verified 659 suite combinations during the second quarter. Data validators continued to stay current with incoming data packages. The validation process consists of performing validation of external laboratory data packages based on the US Environmental Protection Agency's (EPA's) National Functional Guidelines. Data stewards 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 continues 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 Sample Management Office (SMO), and shipping samples to analytical laboratories, to completing a sampling event. The Decision Analysis and Assessment Team is working on the enhancement of tracking and other functions. This tool is also used by other organizations in

RRES Division. A new version was delivered in February, and it provides management tracking, reporting, editing of look-up tables, and location coordinates loading functions.

- The Verification and Validation Application provides software tools that interface with the ERDB to provide tracking of 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 geographic 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. The Decision Analysis and Assessment Team has provided the requirements for SMART Phase I and reviewed, tested, and provided comments on the screen design.

2.9.5.2 Data Stewardship and Reporting

The Data Stewardship Team continued to deliver quality data sets to meet RRES-R Program needs in the second 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 34 electronic data sets for RRES-R Program data users and RRES Division requests. In addition, 42 sampling events were created, and the required field paperwork for 897 samples was generated.

Data Management and Legacy Data Cleanup. Data management and legacy data cleanup activities continued this quarter. Data stewards continued assigning reporting qualifiers and reason codes to the last 1% of the legacy data, an activity that involves extensive hard-copy data package quality assurance review. Data stewards are also in the process of generating location maps for each TA in order to assist team leader review of sample location coordinates. A field information review of 6612 sample records was performed using Desk Instruction 4.26, Legacy Field Data Review Process, and the new field quality assurance screen in the SMO application.

Groundwater Data. The data steward for the Groundwater Investigations Team performed the following activities during the second quarter:

- reported two sampling rounds of hydrochemical data from MCOBT-4.4 to the NMED and
- worked on the remaining data from R-13, CdV-R-37-2, and CdV-R-15-3; the data will be reported at a later date.

Staff continued to make progress in well construction and borehole geophysics activities. The data stewards entered geophysics data and performed a final quality check on well construction data for wells completed last year. During the second quarter, all well construction data, having gone through the quality assurance process, was successfully transferred to the WQDB. Geophysical data for wells R-12, R-15, R-7, R-9, R-9i, and R-19 and chemistry data for wells CdV-R-15-3 and CdV-R-37-2 have been migrated successfully to the WQDB.

2.9.6 Risk Assessment

2.9.6.1 Human Health Risk

The guidance document for developing human health preliminary remediation goals for nonradiological chemicals of potential concern was peer reviewed, edited, and finalized. The team completed peer reviews of the MDA P closure report, the VCA completion report for PRS 16-016(c)-99, the interim action report for PRS 21-024(i), a field implementation plan for PRS 02-006(a), and the MDA L RFI report. Members also provided support to the Los Alamos and Pueblo Canyons surface aggregate report team on human health and data quality issues.

2.9.6.2 Ecological Risk

The draft guidance for deriving ecological preliminary remediation goals for chemicals of potential ecological concern was peer reviewed and edited. Team members also reviewed the ecological risk assessment for the MDA P closure report and the VCA completion report for PRS 16-016(c)-99. Closure and VCA reports with supporting information were submitted to NMED on January 31, 2003. Peer reviews were also completed on the interim action report for PRS 21-024(i) and the MDA L RFI report.

2.9.6.3 Ecological Risk Database

Team members updated the primary toxicity study evaluation (PTSE) tracking database and FY 2003 priority analyte status spreadsheet this quarter. Team members completed Part 1 and Part 2 reviews for selenium in mammals; nickel in plants; copper and pentachlorophenol in invertebrates; and 1,3,5-trinitro-1,3,5-triazacyclohexane (RDX) in birds. Peer review comments for cobalt in mammals and birds were also incorporated into the database.

Team members also prepared responses to comments on the Ecorisk Database R1.4 and R1.5 toxicity reference value (TRV) comparisons. The necessary quality assurance corrections identified by review of the Ecorisk Database R1.5 TRVs were made. Corrections were also made to primary toxicity values, TRVs, and ecological screening levels (ESLs) for antimony in mammals, cadmium in birds, and copper in mammals. Changes to final ESLs for soil, sediment, and water were also noted. A formal memorandum outlining quality assurance changes to Ecorisk Database R1.5 TRVs/ESLs was prepared. Risk assessors will cite this memorandum if the revised values are used. The September 2003 version of the database will contain documentation supporting these revised values. New PTSE-derived TRVs will undergo a risk team review and approval process, which will occur before the release of a new database.

The risk team decided on a new, tiered TRV development approach. The tiered approach will use the EPA Eco-soil screening level (SSL) TRV, if available. If no EPA Eco-SSL is available, then the risk team will derive a geometric mean TRV. If PTSE toxicity data are not sufficient to derive a geometric mean TRV, then the team will derive a critical study TRV as is the current practice. Implementing this tiered approach is the priority for this FY and to date has included the following preparation activities:

- Reviewed the EPA Eco-SSL information to determine which chemical/organism pairs have an Eco-SSL TRV and their status (i.e., draft or final value).
- Began reviewing the existing PTSE toxicity data records to determine eligibility for geometric mean TRV derivation.

- Identified the PTSE-derived TRVs that are currently based on "other" endpoints, and determined that only two PTSE TRVs fall into this category. After final approval from the client, these values will be retracted until better data can be acquired.
- Developed a geometric mean TRV database calculation engine and began testing the calculation engine.

2.9.7 Native American Risk

RRES-R Program staff and San Ildefonso Pueblo environmental staff are working together on environmental sampling. San Ildefonso Pueblo environmental staff provided samples of muscle and bone for deer and rabbit, and samples of muscle, bone, and liver for elk collected from the sacred area in lower Mortandad Canyon. In addition, samples of muscle and bone for deer from TA-74 were provided. The samples were processed by the Laboratory's RRES-ECO Group and shipped off the site for radiological and inorganic chemical analyses.

Team members met with other RRES groups, the DOE Albuquerque Operations Office, and San Ildefonso Pueblo environmental staff to discuss this fiscal year environmental sampling as part of ongoing surveillance and RRES-R Program investigations. These discussions led to an agreement on the types of samples and locations of samples to be collected this fiscal year.

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 permit modification and ongoing RFIs, interim measures, VCAs/VCMs, RFI reports, CMS reports, and RSIs.

Team members performed the following miscellaneous tasks:

- Conducted inspections of RRES-R Program field operations and waste management activities.
- Continued reviewing and revising information in the PRS database and draft SWMU report.
- Completed peer reviews of the RFI report for MDA L, CMS report for MDA H, and SAP addendum for TA-49 and resolved peer review comments on the CMS plan addendum for PRS 16-021(c).
- Collected data and developed sampling strategy for PRS 03-047(d).
- Prepared a response to an issue identified by NMED in the DP Road VCA plan approval letter and provided an evaluation of the regulatory status of each site in the VCA plan with respect to polychlorinated biphenyl (PCB) contamination.
- Provided support to the TA-54 MDA team. Personnel developed summaries of regulatory status of each PRS at MDAs G and L to include in RFI reports/investigation work plans.
- Reviewed new DOE occurrence reporting requirements for potential impacts on environmental restoration activities.

2.10.1 Long-Term Environmental Stewardship

A RRES-R Program staff member is serving as a representative on a TA-21 Revitalization Team. The team is evaluating potential future land-use alternatives for TA-21.

RRES-R staff gave long-term environmental stewardship-related presentations to DOE and the Northern New Mexico Citizens Advisory Board (NNMCAB) this quarter. Staff also attended the implementation workshop for DOE Order 450.1, "Environmental Protection Program," which focused on environmental management systems. The staff member began active participation in the Environmental Management System Implementation Team.

Team members worked with RRES-R Program management to determine a path forward for long-term environmental stewardship activities. Work continues on the format for the long-term environmental stewardship plan; the plan is due to DOE the end of FY 2003.

2.10.2 Waste Management and Waste Minimization

Staff provided support for, and served as a liaison with, other groups regarding the Mortandad Canyon Permeable Reactive Barrier, waste shipments from a historic disposal site [PRS 21-013(d)-99], and the PRS 21-011(k) outfall soil removal project.

Staff also interfaced with the Laboratory's Solid Waste Operations Group (FWO-SWO) to obtain RRES-R Program waste volumes and waste volumes for all Laboratory programs. Waste characterization results were reported for excavated soil from PRS 21-011(k) to NMED in accordance NMED's no-longer-contained-in determination to allow disposal of the material at MDA G. A regulatory coordinator reviewed an amendment to the waste characterization strategy form for the VCM at PRS 21-011(k).

2.10.3 Stakeholder Involvement

2.10.3.1 Outreach Activities

Outreach staff conducted an open house regarding the Laboratory's Air Permit Title V Permit Application. The permit application is for the operation of a variety of existing facilities located at the Laboratory. The open house was held at Fuller Lodge in Los Alamos on February 25, 2003. Communications Team members prepared poster presentations and information sheets for the open house.

Other presentation materials prepared this quarter included poster presentations on nontraditional in situ vitrification, sample management, and waste management for the 29th Annual Waste Management Symposia and Exhibition Conference held in February 2003. Staff also finalized a draft information sheet on MDA L.

A staff member continues to serve as a liaison with the NNMCAB on several environmental issues and attended waste management, environmental monitoring, and environmental restoration subcommittee meetings.

2.10.3.2 Virtual Library/Public Reading Room

Outreach staff continued working on the RRES-R Program's Virtual Library. To date, approximately 410 documents have been copied, scanned, and converted to portable document format files. Ten new compact disks containing documents ready for uploading to the web were delivered to RRES-R Program outreach personnel this quarter. Currently, this information is accessible only to internal staff because the National Nuclear Security Administration decision is still pending regarding what types of documents can be available to the public on the external web pages.

2.10.4 Facility Integration and Short-Term Stewardship

RRES-R Program personnel attended facility-related D&D and preconstruction meetings. Early participation allows RRES-R personnel to address outstanding characterization and/or remediation of PRSs located at the sites where D&D and construction/land development activities are planned. Personnel provided input to the ongoing TA-21 Master Plan process.

RRES-R Program personnel attended weekly D&D meetings to ensure RRES-R integration at the beginning of any D&D project collocated with PRSs to coordinate and implement activities for expedited investigation, analysis, or remediation of the affected PRSs; proper sampling notification and/or other communications to NMED; and subsequent data review, evaluation, and reporting. RRES-R facility integration activities will also ensure that various construction and land-development activities will occur without disruption and in conformance with all DOE, Laboratory, state, and federal orders, regulations, and mandates. This early participation will also ensure that the RRES-R Program will continue to positively interact with regulatory agencies to ensure that corrective actions will be approvable by the administrative authority, as well as the public, and it will aid the Laboratory in achieving no-further-action designations at potentially contaminated sites.

Staff provided background information, regulatory status, and current data and location maps and recommended any needed pre-D&D/renovation characterization sampling and analysis activities for PRSs collocated with the following structures planned for D&D in FY 2003 and early FY 2004: structures 1 through 9 at TA-06, the former TA-69 incinerator (structure 69-03), and Buildings 21-01 and 21-21 at TA-21.

2.10.4.1 D&D at TA-03

RRES-R staff continued to provide support to the turbine generator project at the TA-03 power plant. The utility lines required for the new turbine will be located within the boundary of PRS 03-012(b)-00 (outfalls and a tank associated with the TA-03 power plant). Personnel assisted in the preparation and review of the soil characterization report for this project, which documents the Phase I investigation and results for the portion of PRS 03-012(b)-00 that will be impacted. RRES-R personnel will coordinate with facility personnel for the collection and analysis of confirmation samples from the bottom of the utility corridor trench; this sampling is scheduled to occur in September 2003. Before the installation of utility lines, RRES-R Program personnel will collect approximately 10 confirmation soil samples from 2 depth intervals from the bottom of the excavation trench for analysis of target analyte list metals to ensure nature and extent of those metals are defined for that portion of PRS 03-012(b)-00.

RRES-R personnel met with D&D staff regarding the collection of confirmation samples beneath the former printed-circuit shop, located in the northwest corner of the Physics Building (Building 03-40). PRS 03-033 is the inactive liquid waste collection system for the shop and consists of a 200-gal. transfer tank and pumps housed in an 8-ft-deep concrete vault and two container storage areas with containment adjacent to the northwest corner of the Physics Building. Drainlines from the former printed-circuit shop discharged to the containment tank, and contents of the containment tank were subsequently pumped to drums in the container storage areas before transportation and disposal. The shop was decommissioned in the early 1990s, and the containment tank and associated pumps were removed in 1992. The space formerly occupied by the shop will be converted to office space. All structural components of the former shop, including ceilings, walls, drains, concrete floors, and drainlines beneath the shop, will be removed. RRES-R Program personnel will collect confirmation soil samples beneath the drainlines under the former shop to ensure that the nature and extent of contaminants of potential concern (as identified in the RFI work plan) are defined for that portion of PRS 03-033. The requirement for cleanup of potentially

contaminated media will be determined by the results of the human health risk screening and assessment. If contaminated media are removed, confirmation samples will be collected to verify that cleanup levels have been met for that portion of the PRS. Sample collection and analysis have been postponed until the fourth quarter of FY 2003 because of funding issues.

RRES-R personnel provided background information, regulatory status, and current data and location maps and recommended any needed pre-D&D/renovation characterization sampling and analysis activities for PRSs collocated with the following TA-03 structures planned for D&D in FY 2003 and early FY 2004: the sub-basement of the former printed-circuit shop in the Physics Building (Building 03-40) and the former Ion Beam Facility (Building 03-16).

Work continued with D&D staff regarding the collection of confirmation samples at PRS 03-003(c) following the D&D of the Syllac Building (Building 03-287), which is scheduled for mid-2003. PRS 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. RRES-R staff prepared a post-D&D confirmation sampling and analysis plan based on the approved RFI work plan for active PRSs at the Syllac Facility (Building 03-287).

2.10.4.2 New Construction at TA-03

RRES-R staff met with facility personnel regarding the TA-03 parking structure planned for construction near PRS 03-010(a). It was agreed that a borehole will be advanced and core samples collected and analyzed for geotechnical purposes to ensure that VOC and tritium contamination from PRS 03-010(a) is not present at this location. A 10-day notification letter was sent to NMED, and the borehole will be drilled in early April 2003. If a saturated zone is encountered, the borehole will be completed as a monitoring well, and water samples will be collected. However, it is unlikely that groundwater will be encountered because only tuff was encountered immediately below the asphalt in two other geotechnical boreholes drilled for the planned parking structure.

RRES-R staff met with facility personnel regarding the planned construction of a new storage vault and cartridge filter house adjacent to the TA-03 beryllium facility (Building 03-141). The proposed location of the new storage vault overlaps the location of PRS 03-056(l), an outdoor storage area. RRES-R provided a SAP previously prepared to complete the characterization of PRS 03-056(l) through the collection of three asphalt samples and three soil samples beneath the asphalt for total beryllium analysis in support of a pending NFA determination. The SAP has not yet been implemented because site workers need the required beryllium training. A 10-day notification letter was sent to NMED, and the confirmation samples will be collected in early April 2003.

In support of other construction activities at TA-03, RRES-R staff provided background information, regulatory status, current data and location maps, and the recommended approach to address PRSs located at the planned location for the new Health, Safety, and Radiation Protection Division's medical building at TA-03.

2.10.4.3 D&D at TA-16

RRES-R Program and D&D staff met regarding the collection and surveying of characterization samples at PRSs and/or portions of PRSs associated with ongoing TA-16 D&D projects, including the 220 Complex; the former TA-16 service station and administration buildings (structures 16-195, -206 and -208); and the basket-wash facility (structure 16-390) and remaining D&D projects planned for FY 2003, including the 340 Complex at TA-16 and Buildings 16-7 and 16-88. Although future construction is not

currently planned for these locations, where possible, RRES-R personnel will collect characterization samples while portions of the PRSs are accessible. Characterization samples will be collected and analyzed in accordance with applicable RFI work plans, which are cited in the 10-day notification letters to NMED. Staff prepared post-D&D confirmation SAPs based on approved RFI work plans for active PRSs at the 220 Complex at TA-16, the TA-16 service station (Building 16-195), Building 16-208, the 340 Complex at TA-16, and the basket-wash facility (structure 16-390). Staff worked with the SMO to ensure post-D&D confirmation samples were collected and analyzed and sample locations were surveyed in accordance with RRES-R program requirements.

Staff provided background information, regulatory status, and current data and location maps and recommended any needed pre-D&D/renovation characterization sampling and analysis activities for PRSs collocated with the following TA-16 structures planned for D&D in FY 2003 and early FY 2004: the TA-16 steam plant (Building 16-540), former TA-16 casting rest house (structure 16-88), former TA-16 office and laboratory (Building 16-7), and Building 300 at TA-16.

2.10.4.4 New Construction at TA-16

RRES-R staff provided background information, regulatory status, current data and location maps, and the recommended approach to address PRSs located at the planned location for the new Weapons Plant Support Facility (Building 16-969) at TA-16 and corresponding detour and access roads, security fences, parking lots, and fueling stations within the administrative area at TA-16.

2.10.5 Deployed Regulatory Coordinators

Regulatory coordinators provided assistance to project remediation teams regarding regulatory compliance issues for activities within the RRES-R Program this quarter. The coordinators provided regulatory reviews of 21 documents prepared by the RRES-R Program and participated in a peer review of a new Quality Procedure 5.2, Integrating Work with Other LANL Organizations. Coordinators participated in a review of Quality Procedures 5.8 and 5.9, which address reporting requirements for PRSs. Deployed personnel from the Laboratory's RRES-WQH and RRES-SWRC groups participated in the reviews as subject matter experts regarding water issues and hazardous and solid waste issues, respectively.

Coordinators provided regulatory compliance support to the MDA P Team for the final closure certification report, which was submitted to NMED January 31, 2003. This support included participation in peer reviews; regulatory research; and assistance with authoring key portions of text for the closure certification report, the VCA completion report for SWMU 16-016(c)-99, and the Phase I closure implementation report. A coordinator also participated in a lesson-learned session for MDA P.

A regulatory coordinator reviewed and provided comments on applicable portions of the Part B permit renewal application for TA-16.

Ten-day notification letters were prepared this quarter for supplemental RFI sampling at MDA C and post-D&D confirmation sampling at numerous PRSs associated with the D&D of the 220 Complex at TA-16, the TA-16 service station (Building 16-195), Building 16-208, and the basket-wash facility (structure 16-390. A chemical waste disposal request for 500 gal. of waste oil being stored at the Field Support Facility was also prepared. Staff placed low-level radioactive water drums in a temporary location for transport to the TA-50 Radioactive Liquid Waste Treatment Facility for disposal and reviewed and approved waste profile forms for the disposition of archived core at the SMO.

2.10.5.1 Water Regulatory Support

Water regulatory support personnel completed the following activities this quarter:

- Provided support to the SWMU/Storm Water Pollution Prevention Plan (SWPPP).
- Participated in discussions with RRES Division Office and FWO Division on obtaining funding to support BMP inspection and maintenance, gauging station installations, and SWPPP support required by the Multi-Sector General Permit.
- Briefed the NNMCAB Environmental Surveillance committee on TA-46 BMPs, ongoing surface water monitoring, and SWPPPs.
- Attended the final Surface Water Assessment Team meeting regarding data quality objectives associated with monitoring stormwater runoff from SWMUs. A summary will be developed to provide approach options.
- Assisted with a response letter to the NMED DOE Oversight Bureau regarding the inspection and findings at the PRS 21-011(k) VCA project. The staff member recommended inviting the Oversight Bureau to the site for additional follow-up.

A regulatory coordinator reviewed new regulations pertaining to effluent limitations, pretreatment standards, and new source performance standards for the landfills point source category for potential applicability to landfill operations.

2.10.5.2 Groundwater Activities

Coordinators provided regulatory compliance support for the land application of approximately 30,000 gal. of water produced during the drilling of well R-21. The land application was approved by NMED under the notice of intent to discharge for hydrogeologic workplan wells (LANL 1998, 59599) submitted to NMED by the Laboratory.

Staff reviewed drill-cutting data from wells R-20 and R-23 and worked with the Groundwater Team and NMED to obtain approval to use cuttings for site restoration. Following the approval, the Laboratory used these drill cuttings for site restoration.

2.10.5.3 TA-02 Activities

Staff developed the scope of work for Cerro Grande Rehabilitation Project contractors to include remediation activities during D&D activities at TA-02.

The field implementation plan was completed for Cerro Grande Rehabilitation Project contractors to collect samples at the French drain system at PRS 02-006(a), the former Omega West Reactor stack.

2.10.5.4 TA-21 MDA Activities

A regulatory coordinator provided guidance regarding the approach to complete the RFIs of MDAs B and U and provided preliminary comments on the draft RFI reports for both MDAs.

2.10.5.5 TA-21 Non-MDA Activities

A regulatory coordinator assisted in the preparation and submittal to NMED of waste characterization data in accordance with NMED's no-longer-contained-in determination for material excavated during the ongoing VCM at PRS 21-011(k). NMED requested that waste characterization samples be collected and analyzed for VOCs and the results be reported to NMED before disposal of the material as low-level radioactive waste at Area G. To date, all of the material excavated from PRS 21-011(k) has received from NMED a no-longer-contained-in determination.

In other activities this quarter, a coordinator continued to provide support for the draft interim measures report for PRS 21-018(a)-99 and the NTISV hot demonstration at MDA V and kept NMED apprised of the status of the report. Regulatory coordinators also participated in the peer review for the interim action completion report for PRS 21-024(i), which was delivered to NMED on March 31, 2003.

2.10.5.6 TA-49, -50 and -54 Activities

Regulatory coordinators performed the following tasks this quarter.

- Attended meetings with TA-50 staff regarding the sampling strategies and data quality objectives for PRSs 50-011(a), 50-004(a)-00, and 50-006(a)-00 for confirmation samples to be collected from the bottom of the excavation for the new pump house and influent tank vault at TA-50 during the summer of 2003.
- Reviewed and provided comments on applicable portions of the Part B permit renewal application for TA-54.
- Continued to assist in the review and revision of the final MDA H CMS report. Staff comments resulted in significant revisions to the MDA H waste inventory, corrective measure alternatives, modeling assumptions, and evaluation of corrective measure alternatives and related cost estimates.
- Continued to review and revise monthly MDA H CMS progress reports submitted to NMED for December 2002, and January and February 2003.
- Continued to peer review and comment on the draft RFI report for MDA L, including the regulatory history, identification of data gaps, and proposed approaches to addressing the data gaps. A draft information sheet on MDA L is underway.

2.10.6 PRS Deliverable Information Management

2.10.6.1 Compliance Schedule Tracking

RRES-R staff for the PRS deliverables team performed the following tasks this quarter.

- Provided scheduling information for work to be completed in the upcoming 120-day period. This schedule has been finalized with the NMED. Staff prepared the list of sites to be evaluated under DOE STD 1027 and coordinated team leader response.
- Provided comments to the Quick-Look Tank Survey with regard to RRES-R Program's relationship to the structures tracked. Overall report review and comments.

- Provided updated RRES-R information for the FY 2002 Site-Wide Environmental Impact Statement update and the 2002 Environmental Surveillance Report update.
- Completed the draft Web Data application, and the web application for analytical data on the Green Server (open/public).

2.10.6.2 SWMU Report

Work continues on the draft SWMU report. Management and staff reprioritized the SWMU report working team to expedite delivery of the final report. Data stewards continue to verify the analytical data for the report, and the report continues to go through the six rigorous review cycles.

2.10.7 Surface Water Activities and BMPs

The BMP Inspection and Maintenance Team completed follow-up maintenance, as required by the Multi-Sector General Permit, resulting from findings of the recently completed annual site compliance evaluations at SWMUs covered by the Laboratory's Umbrella SWMU/SWPPP.

In March, staff conducted quarterly BMP inspections at TAs-01, -02, -03, -04, -05, -06, -09, -11, -14, -15, -16, -21, -35, -45, -46, -48, -53 and -73. Staff also conducted BMP maintenance or BMP installations at PRSs within TAs-01, -03, -06, -14, -15, -16, -21, -35, -46, and --73. The maintenance is currently underway and will be summarized in next month's report.

Staff submitted an ESH-ID for potential work to be conducted at Hillside 137.

Staff met with Cerro Grande Rehabilitation Project staff to discuss impacts of tree-thinning activities on PRSs and BMPs.

2.10.8 Work-Off and Permit Modification Activities

Personnel worked with RRES-R GIS personnel to develop and revise localized firing site maps that incorporate all PRSs associated with the firing site "zones" used by the Dynamic Experimentation (DX) Division.

Personnel also continued working with DX Division and RRES-R GIS personnel to develop a map of the DX corridor, based on a 1992 DX Division map. DX Division has completed the determination of the testing hazard zones and the safety/security buffer for Laboratory explosives operations, which are now shown on the map. RRES-R GIS personnel are in the process of adding PRS locations to the map.

Other activities included the following:

- Assisted RRES-R Program facility integration personnel in assessing the history and regulatory status of PRS 54-007(b) and in providing recommended activities to TA-54 personnel before constructing a building over this PRS.
- Began working on a three-person team of RRES-R Program personnel tasked to draft the Laboratory's long-term environmental stewardship plan. A meeting was held to strategize the contents of the plan.

2.11 Land Transfer — Project Team Leader (Acting): Alison Dorries

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.

Team members prepared a cost estimate for remedial activities at TA-19 and transmitted the RRES-R Program's portion of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) 120(h) report for subparcels A-5 (Airport Central), B-3 (Little Otowi), and C-4 (White Rock "Y"-4).

Team members presented both DOE-Los Alamos Site Office and Los Alamos County with updated information on the RRES-R Program's land transfer activities for FY 2003.

2.12 Documentation and Tracking — Project Team Leader: Stephen Bolivar

2.12.1 Information Management

The primary focus of Information Management personnel is the business process reengineering, which has two main thrusts, SMO (Sample Management Office) and SMART (Spatial Mapping and Reporting Tool). The SMO applications move the data into the database; SMART applications are used to extract data from the database and produce data for evaluation, both in a desktop and web-based environment. Second quarter efforts resulted in completion of the latest SMO enhancements. The goals for the remainder of FY 2003 focus on SMART Phase 1, which is designed to provide the ability to select and display a sample event, with a web-based application that allows user-determined data pulls. A requirements document and screen shots showing how the application is envisioned to work were designed and reviewed. Programming has started. Phase 1 deployment is expected mid-summer.

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.

A new web site, which has been in test mode for the last several weeks while the NMED DOE Oversight Bureau and other users were reviewing it, was transferred to the open partition. The site allows users to select sample analyses by PRS or by canyon.

2.12.2 Records Management

Records Processing Facility personnel handled 1004 customers, resulting in 3200 database queries. They received 7929 record pages this quarter for processing and retrieved 3117 pages per 440 separate requests. There are now 231,029 records for query on the Records Processing Facility database. The microfilm process has been discontinued until several reengineering issues are addressed. SMO personnel are transferring 10,000 data packages to the Records Processing Facility for scanning, microfilming, dual storage, archiving, etc. To date, 314 boxes of documents have been scanned electronically, with 710 boxes pending (as boxes are scanned, boxes of new analytical data are also being entered into the system). The staff was reduced by 50% in January.

2.12.3 Sample Management Office

The SMO issued 89 field data groups (number of discrete samples) and had 382 customers this quarter. Personnel handled and shipped 2209 containers. These totals are near the two-year average and well above the five-year average. The effort to scan 10,000 SMO analytical data packages to compact disks continues; a total of 314 boxes have been scanned, with 710 remaining (30% completion).

Efforts to move all equipment from the Field Support Facility building continue, in preparation for an October 2003 closure date. Personnel are working with other RRES groups to identify items for transfer and items for salvage. About 40% of the yard and storage areas have been cleared.

2.12.4 Computer Support

Computer support personnel received 291 service requests this quarter; 44 remain open. For the fiscal year, 580 requests have been received and 50 remain open. The staff completed a transfer from the old NT system to a Laboratory-mandated Windows Directory Active Domain structure. This will improve network performance and decrease support costs. More than 100 systems were converted with only 4 causing problems.

2.12.5 Geographic Information System

This quarter, the Cartographic Laboratory produced 87 map products and/or figures. Forty-four users accessed the flat-file repository and/or relational database management system to view spatial data. New and revised themes for data set locations, waste storage, aerial extents of PRSs, a land-transfer data set, and near-surface excavations were issued.

3.0 REFERENCES

Environmental Restoration Project, March 2002. "Sampling and Analysis Plan for the Middle Mortandad/Ten Site Watershed Aggregate," Los Alamos National Laboratory document LA-UR-02-0244, Los Alamos, New Mexico. (Environmental Restoration Project 2002, 73092)

LANL (Los Alamos National Laboratory), July 1995. "RFI Work Plan for Operable Unit 1114, Addendum 1," Los Alamos National Laboratory document LA-UR-95-731, Los Alamos, New Mexico. (LANL 1995, 57590)

LANL (Los Alamos National Laboratory), 1998. "Hydrogeologic Workplan," Los Alamos National Laboratory document, Los Alamos, New Mexico. (LANL 1998, 59599)

Appendix A

Groundwater Sampling Results,
Well MCOBT-4.4

List of Tables

Table A-1 Samples Taken at Wells A-1

Table A-2 Well MCOBT-4.4 Screen 1 First Round Sample Results: Data Summary for Inorganic Chemicals A-3

Table A-3 Well MCOBT-4.4 Screen 1 First Round Sample Results: Data Summary for Detected Organic Chemicals A-7

Table A-4 Well MCOBT-4.4 Screen 1 First Round Sample Results: Data Summary for Radionuclides A-8

Table A-5 Well MCOBT-4.4 Screen 1 Second Round Sample Results: Data Summary for Inorganic Chemicals A-9

Table A-6 Well MCOBT-4.4 Screen 1 Second Round Sample Results: Data Summary for Detected Organic Chemicals A-13

Table A-7 Well MCOBT-4.4 Screen 1 Second Round Sample Results: Data Summary for Radionuclides A-14

Table A-1
Samples Taken at Wells

Sample ID	Location ID	Sample Round	Depth (ft)	Media	Alkalinity	Ammonia	Anions[a]	Cyanide	Metals	Phosphorus	Stable Isotopes	Total Kjeldahl Nitrogen
MCOBT-4.4												
GWM4-02-46377	MCOBT-4.4	1	482–524	Groundwater, regional	—[b]	—	—	927S[c]	927S	—	929S	927S
GWM4-02-46378	MCOBT-4.4	1	482–524	Groundwater, regional	927S	927S	927S	—	927S	927S	—	927S
GWM4-02-49495	MCOBT-4.4	2	482–524	Groundwater, regional	—	—	—	1300S	1300S	—	1301S	1300S
GWM4-02-49496	MCOBT-4.4	2	482–524	Groundwater, regional	1300S	1300S	1300S	—	1300S	1300S	—	1300S

Table A-1 (continued)

Sample ID	Location ID	Sample Round	Depth (ft)	Media	High-Explosive	Humic Acid	Polychlorinated Biphenyls	Pesticides	Semivolatile Organic Compounds	Total Organic Carbon	Volatile Organic Compounds
MCOBT-4.4											
GWM4-02-46377	MCOBT-4.4	1	482–524	Groundwater, regional	926S	—	926S	926S	926S	927S	926S
GWM4-02-46378	MCOBT-4.4	1	482–524	Groundwater, regional	—	931S	—	—	—	—	—
GWM4-02-49495	MCOBT-4.4	2	482–524	Groundwater, regional	1298S	—	1298S	1298S	1298S	—	1298S
GWM4-02-49496	MCOBT-4.4	2	482–524	Groundwater, regional	—	—	—	—	—	—	—

Table A-1 (continued)

Sample ID	Location ID	Sample Round	Depth (ft)	Media	Strontium-90	Americium-241	Gamma Spectroscopy	Gross Alpha/Beta	Tritium	Isotopic Plutonium	Isotopic Uranium
MCOBT-4.4											
GWM4-02-46377	MCOBT-4.4	1	482–524	Groundwater, regional	932S	932S	932S	932S	932S	932S	932S
GWM4-02-46378	MCOBT-4.4	1	482–524	Groundwater, regional	932S	932S	932S	—	—	932S	932S
GWM4-02-49495	MCOBT-4.4	2	482–524	Groundwater, regional	1304S	1304S	1304S	1304S	1304S	1304S	1304S
GWM4-02-49496	MCOBT-4.4	2	482–524	Groundwater, regional	1304S	1304S	1304S	—	—	1304S	1304S

[a] Anions = Ammonia, bromide, chloride, fluoride, nitrate/nitrite, oxalate, perchlorate, sulfate.
[b] — = Not available or applicable.
[c] Laboratory sample number.

Table A-2
Well MCOBT-4.4 Screen 1 First 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	06/28/02	NF[e]	1	1	40000	—[f]	—	—	—	—
Dissolved Oxygen	1	524	06/28/02	NF	1	1	7800	—	—	—	—	—
pH	1	524	06/28/02	NF	1	1	7.50	—	>6 & <9	0/1	>6 & <9	0/1
Specific Conductance (µS/cm)	1	524	06/28/02	NF	1	1	333	—	—	0/1	—	0/1
Temperature (°C)	1	524	06/28/02	NF	1	1	19.6	—	—	0/1	—	0/1
Turbidity (NTU[g])	1	524	06/28/02	NF	1	1	0.48	—	—	0/1	—	0/1
Analyte												
Lab Alkalinity (total as $CaCO_3$)	1	524	06/28/02	F[h]	1	1	34500	—	—	—	—	—
Aluminum	1	524	06/28/02	F	1	0	—	[50]	50	0/1	5000	0/1
Aluminum	1	524	06/28/02	NF	1	0	—	[50]	—	—	—	—
Ammonia (as N)	1	524	06/28/02	F	1	0	—	[50]	—	—	—	—
Antimony	1	524	06/28/02	F	1	0	—	[2]	6	0/1	—	—
Antimony	1	524	06/28/02	NF	1	0	—	[2]	—	—	—	—
Arsenic	1	524	06/28/02	F	1	0	—	[5]	50	0/1	100	0/1
Arsenic	1	524	06/28/02	NF	1	1	2.24	—	—	—	—	—
Barium	1	524	06/28/02	F	1	0	—	[13.4]	2000	0/1	1000	0/1
Barium	1	524	06/28/02	NF	1	1	13.9	—	—	—	—	—
Beryllium	1	524	06/28/02	F	1	0	—	[0.2]	4	0/1	—	—
Beryllium	1	524	06/28/02	NF	1	0	—	[0.2]	—	—	—	—
Boron	1	524	06/28/02	F	1	1	14.6	—	—	—	750	0/1
Boron	1	524	06/28/02	NF	1	1	15.7	—	—	—	—	—
Bromide	1	524	06/28/02	F	1	1	255	—	—	—	—	—

Table A-2 (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	06/28/02	F	1	0	—	[1]	5	0/1	10	0/1
Cadmium	1	524	06/28/02	NF	1	0	—	[1]	—	—	—	—
Calcium	1	524	06/28/02	F	1	1	32700	—	—	—	—	—
Calcium	1	524	06/28/02	NF	1	1	32700	—	—	—	—	—
Chloride	1	524	06/28/02	F	1	1	16700	—	250000	0/1	250000	0/1
Chromium	1	524	06/28/02	F	1	1	50.5	—	100	0/1	50	1/1
Chromium	1	524	06/28/02	NF	1	1	50.7	—	—	—	—	—
Cobalt	1	524	06/28/02	F	1	0	—	[5]	—	—	50	0/1
Cobalt	1	524	06/28/02	NF	1	0	—	[5]	—	—	—	—
Copper	1	524	06/28/02	F	1	1	1.72	—	1300	0/1	1000	0/1
Copper	1	524	06/28/02	NF	1	1	4	—	—	—	—	—
Cyanide (total)	1	524	06/28/02	NF	1	1	5.08	—	—	—	—	—
Fluoride	1	524	06/28/02	F	1	1	414	—	4000	0/1	1600	0/1
Iron	1	524	06/28/02	F	1	0	—	[50]	300	0/1	1000	0/1
Iron	1	524	06/28/02	NF	1	0	—	[50]	—	—	—	—
Lead	1	524	06/28/02	F	1	0	—	[2]	15	0/1	50	0/1
Lead	1	524	06/28/02	NF	1	0	—	[2]	—	—	—	—
Magnesium	1	524	06/28/02	F	1	1	5360	—	—	—	—	—
Magnesium	1	524	06/28/02	NF	1	1	5270	—	—	—	—	—
Manganese	1	524	06/28/02	F	1	1	1.96	—	50	0/1	200	0/1
Manganese	1	524	06/28/02	NF	1	1	1.95	—	—	—	—	—
Mercury	1	524	06/28/02	F	1	0	—	[0.2]	2	0/1	—	—
Mercury	1	524	06/28/02	NF	1	0	—	[0.2]	—	—	2	0/1
Molybdenum	1	524	06/28/02	F	1	1	0.788	—	—	—	—	—
Molybdenum	1	524	06/28/02	NF	1	1	1.19	—	—	—	—	—
Nickel	1	524	06/28/02	F	1	0	—	[2.87]	100	0/1	200	0/1
Nickel	1	524	06/28/02	NF	1	0	—	[3.69]	—	—	—	—

Table A-2 (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	06/28/02	F	1	1	12500	—	10000	1/1	—	—
Oxalate	1	524	06/28/02	F	1	0	—	[1000]	—	—	—	—
Perchlorate	1	524	06/28/02	F	1	1	179	—	—	—	—	—
Phosphorus (total)	1	524	06/28/02	F	1	1	30	—	—	—	—	—
Potassium	1	524	06/28/02	F	1	1	623	—	—	—	—	—
Potassium	1	524	06/28/02	NF	1	1	618	—	—	—	—	—
Selenium	1	524	06/28/02	F	1	0	—	[5]	50	0/1	50	0/1
Selenium	1	524	06/28/02	NF	1	0	—	[5]	—	—	—	—
Silica	1	524	06/28/02	F	1	1	33400	—	—	—	—	—
Silica	1	524	06/28/02	NF	1	1	33000	—	—	—	—	—
Silver	1	524	06/28/02	F	1	0	—	[5]	100	0/1	50	0/1
Silver	1	524	06/28/02	NF	1	0	—	[5]	—	—	—	—
Sodium	1	524	06/28/02	F	1	1	21300	—	—	—	—	—
Sodium	1	524	06/28/02	NF	1	1	21100	—	—	—	—	—
Strontium	1	524	06/28/02	F	1	1	157	—	—	—	—	—
Strontium	1	524	06/28/02	NF	1	1	161	—	—	—	—	—
Sulfate	1	524	06/28/02	F	1	1	25300	—	250000	0/1	600000	0/1
Thallium	1	524	06/28/02	F	1	0	—	[0.5]	2	0/1	—	—
Thallium	1	524	06/28/02	NF	1	1	0.108	—	—	—	—	—
Total Kjeldahl Nitrogen	1	524	06/28/02	F	1	0	—	[100]	—	—	—	—
Total Kjeldahl Nitrogen	1	524	06/28/02	NF	1	1	60	—	—	—	—	—
Uranium	1	524	06/28/02	F	1	1	0.141	—	20	0/1	5000	0/1
Uranium	1	524	06/28/02	NF	1	1	0.163	—	—	—	—	—
Vanadium	1	524	06/28/02	F	1	0	—	[5]	—	—	—	—
Vanadium	1	524	06/28/02	NF	1	1	0.71	—	—	—	—	—
Zinc	1	524	06/28/02	F	1	0	—	[2.41]	5000	0/1	10000	0/1

Table A-2 (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	06/28/02	NF	1	0	—	[2.39]	—	—	—	—
Stable Isotope (‰)												
δD/H	1	524	06/28/02	NF	1	1	–62	—	—	—	—	—
$\delta^{5}N/^{14}N$	1	524	06/28/02	NF	1	1	—	—	—	—	—	—
$\delta^{18}O/^{16}O$	1	524	06/28/02	NF	1	1	–10.6	—	—	—	—	—

[a] The static water level for the regional aquifer 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.

Table A-3
Well MCOBT-4.4 Screen 1 First 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
DDD[4,4'-]	1	524	06/28/02	NF[e]	1	1	0.0063	—[f]	—	—	—	—
DDT[4,4'-]	1	524	06/28/02	NF	1	1	0.015	—	—	—	—	—
Dissolved Organic Carbon	1	524	06/28/02	F[g]	1	1	680	—	—	—	—	—
Total Organic Carbon	1	524	06/28/02	NF	1	1	727	—	—	—	—	—

[a] The static water level for the regional aquifer 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-4
Well MCOBT-4.4 Screen 1 First 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	06/28/02	F[c]	1	0	—[d]	[0.0128]	15	0/2
Americium-241	1	524	06/28/02	NF[e]	1	0	—	[0.0108]	—	—
Cesium-137	1	524	06/28/02	F	1	0	—	[0.892]	—	—
Cesium-137	1	524	06/28/02	NF	1	0	—	[1.5]	—	—
Cobalt-60	1	524	06/28/02	F	1	0	—	[0.892]	—	—
Cobalt-60	1	524	06/28/02	NF	1	0	—	[–1.98]	—	—
Gross Alpha/Beta Radiation	1	524	06/28/02	NF	1	0	—	[0.956]	—	—
Gross Beta Radiation	1	524	06/28/02	NF	1	0	—	[3.97]	—	—
Gross Gamma Radiation	1	524	06/28/02	NF	1	0	—	[54.9]	—	—
Plutonium-238	1	524	06/28/02	F	1	0	—	[0.00563]	15	0/1
Plutonium-238	1	524	06/28/02	NF	1	0	—	[0.0141]	—	—
Plutonium-239,240	1	524	06/28/02	F	1	0	—	[0.0141]	—	—
Plutonium-239,240	1	524	06/28/02	NF	1	0	—	[0.00468]	—	—
Strontium-90	1	524	06/28/02	F	1	0	—	[–0.012]	8	0/1
Strontium-90	1	524	06/28/02	NF	1	0	—	[0.0171]	—	—
Tritium	1	524	06/28/02	NF	1	1	14900	—	20000	0/1
Uranium-234	1	524	06/28/02	F	1	1	0.0963	—	—	—
Uranium-234	1	524	06/28/02	NF	1	1	0.0999	—	—	—
Uranium-235	1	524	06/28/02	F	1	0	—	[0.0107]	—	—
Uranium-235	1	524	06/28/02	NF	1	0	—	[0.00238]	—	—
Uranium-238	1	524	06/28/02	F	1	1	0.0514	—	—	—
Uranium-238	1	524	06/28/02	NF	1	1	0.0404	—	—	—

[a] The static water level for the regional aquifer 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.

Table A-5
Well MCOBT-4.4 Screen 1 Second 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	09/30/02	NF[e]	1	1	83000	—[f]	—	—	—	—
Dissolved Oxygen	1	524	09/30/02	NF	1	1	7200	—	—	—	—	—
pH	1	524	09/30/02	NF	1	1	7.45	—	>6 & <9	0/1	>6 & <9	0/1
Specific Conductance (µS/cm)	1	524	09/30/02	NF	1	1	335	—	—	0/1	—	0/1
Temperature (°C)	1	524	09/30/02	NF	1	1	20.1	—	—	0/1	—	0/1
Turbidity (NTU[g])	1	524	09/30/02	NF	1	1	0.2	—	—	0/1	—	0/1
Analyte												
Lab Alkalinity (total as $CaCO_3$)	1	524	09/30/02	F[h]	1	1	62000	—	—	—	—	—
Aluminum	1	524	09/30/02	F	1	0	—	[100]	50	0/1	5000	0/1
Aluminum	1	524	09/30/02	NF	1	1	16.3	—	—	—	—	—
Ammonia (as N)	1	524	09/30/02	F	1	0	—	[50]	—	—	—	—
Antimony	1	524	09/30/02	F	1	0	—	[2]	6	0/1	—	—
Antimony	1	524	09/30/02	NF	1	0	—	[2]	—	—	—	—
Arsenic	1	524	09/30/02	F	1	0	—	[5]	50	0/1	100	0/1
Arsenic	1	524	09/30/02	NF	1	0	—	[5]	—	—	—	—
Barium	1	524	09/30/02	F	1	1	13.7	—	2000	0/1	1000	0/1
Barium	1	524	09/30/02	NF	1	1	13.9	—	—	—	—	—
Beryllium	1	524	09/30/02	F	1	0	—	[0.2]	4	0/1	—	—
Beryllium	1	524	09/30/02	NF	1	0	—	[0.2]	—	—	—	—
Boron	1	524	09/30/02	F	1	1	16.4	—	—	—	750	0/1
Boron	1	524	09/30/02	NF	1	1	17.2	—	—	—	—	—
Bromide	1	524	09/30/02	F	1	1	302	—	—	—	—	—

Table A-5 (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	09/30/02	F	1	1	0.044	—	5	0/1	10	0/1
Cadmium	1	524	09/30/02	NF	1	0	—	[1]	—	—	—	—
Calcium	1	524	09/30/02	F	1	1	34200	—	—	—	—	—
Calcium	1	524	09/30/02	NF	1	1	34200	—	—	—	—	—
Chloride	1	524	09/30/02	F	1	1	16900	—	250000	0/1	250000	0/1
Chromium	1	524	09/30/02	F	1	1	48.8	—	100	0/1	50	0/1
Chromium	1	524	09/30/02	NF	1	1	49.9	—	—	—	—	—
Cobalt	1	524	09/30/02	F	1	0	—	[5]	—	—	50	0/1
Cobalt	1	524	09/30/02	NF	1	0	—	[5]	—	—	—	—
Copper	1	524	09/30/02	F	1	1	1.49	—	1300	0/1	1000	0/1
Copper	1	524	09/30/02	NF	1	1	1.67	—	—	—	—	—
Cyanide (total)	1	524	09/30/02	NF	1	0	—	[5]	—	—	—	—
Fluoride	1	524	09/30/02	F	1	1	448	—	4000	0/1	1600	0/1
Iron	1	524	09/30/02	F	1	0	—	[100]	300	0/1	1000	0/1
Iron	1	524	09/30/02	NF	1	0	—	[100]	—	—	—	—
Lead	1	524	09/30/02	F	1	0	—	[2]	15	0/1	50	0/1
Lead	1	524	09/30/02	NF	1	0	—	[2]	—	—	—	—
Magnesium	1	524	09/30/02	F	1	1	5670	—	—	—	—	—
Magnesium	1	524	09/30/02	NF	1	1	5670	—	—	—	—	—
Manganese	1	524	09/30/02	F	1	0	—	[5]	50	0/1	200	0/1
Manganese	1	524	09/30/02	NF	1	0	—	[5]	—	—	—	—
Mercury	1	524	09/30/02	F	1	0	—	[0.2]	2	0/1	—	—
Mercury	1	524	09/30/02	NF	1	0	—	[0.2]	—	—	2	0/1
Molybdenum	1	524	09/30/02	F	1	1	0.991	—	—	—	—	—
Molybdenum	1	524	09/30/02	NF	1	1	0.961	—	—	—	—	—
Nickel	1	524	09/30/02	F	1	0	—	[2.43]	100	0/1	200	0/1
Nickel	1	524	09/30/02	NF	1	0	—	[2.44]	—	—	—	—

Table A-5 (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	09/30/02	F	1	1	12500	—	10000	1/1	—	—
Oxalate	1	524	09/30/02	F	1	0	—	[1000]	—	—	—	—
Perchlorate	1	524	09/30/02	F	1	1	162	—	—	—	—	—
Phosphorus (total)	1	524	09/30/02	F	1	1	47.1	—	—	—	—	—
Potassium	1	524	09/30/02	F	1	1	658	—	—	—	—	—
Potassium	1	524	09/30/02	NF	1	1	657	—	—	—	—	—
Selenium	1	524	09/30/02	F	1	0	—	[5]	50	0/1	50	0/1
Selenium	1	524	09/30/02	NF	1	0	—	[5]	—	—	—	—
Silica	1	524	09/30/02	F	1	1	34500	—	—	—	—	—
Silica	1	524	09/30/02	NF	1	1	34500	—	—	—	—	—
Silver	1	524	09/30/02	F	1	0	—	[5]	100	0/1	50	0/1
Silver	1	524	09/30/02	NF	1	0	—	[5]	—	—	—	—
Sodium	1	524	09/30/02	F	1	1	22000	—	—	—	—	—
Sodium	1	524	09/30/02	NF	1	1	21900	—	—	—	—	—
Strontium	1	524	09/30/02	F	1	1	160	—	—	—	—	—
Strontium	1	524	09/30/02	NF	1	1	159	—	—	—	—	—
Sulfate	1	524	09/30/02	F	1	1	26000	—	250000	0/1	600000	0/1
Thallium	1	524	09/30/02	F	1	0	—	[0.5]	2	0/1	—	—
Thallium	1	524	09/30/02	NF	1	0	—	[0.5]	—	—	—	—
Total Kjeldahl Nitrogen	1	524	09/30/02	F	1	1	156	—	—	—	—	—
Total Kjeldahl Nitrogen	1	524	09/30/02	NF	1	1	139	—	—	—	—	—
Uranium	1	524	09/30/02	F	1	1	0.129	—	20	0/1	5000	0/1
Uranium	1	524	09/30/02	NF	1	1	0.127	—	—	—	—	—
Vanadium	1	524	09/30/02	F	1	1	1.06	—	—	—	—	—
Vanadium	1	524	09/30/02	NF	1	1	1.83	—	—	—	—	—
Zinc	1	524	09/30/02	F	1	1	9.4	—	5000	0/1	10000	0/1

Table A-5 (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	09/30/02	NF	1	1	21.1	—	—	—	—	—
Stable Isotope (‰)												
δD/H	1	524	09/30/02	NF	1	1	—	—	—	—	—	—
$\delta^{5}N/^{14}N$	1	524	09/30/02	NF	1	1	—	—	—	—	—	—
$\delta^{18}O/^{16}O$	1	524	09/30/02	NF	1	1	—	—	—	—	—	—

[a] The static water level for the regional aquifer 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.

Table A-6
Well MCOBT-4.4 Screen 1 Second 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
No detects	1	524	09/30/02	—[e]	—	—	—	—	—	—	—	—

[a] The static water level for the regional aquifer 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] — = Not available or not applicable.

Table A-7
Well MCOBT-4.4 Screen 1 Second 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	09/30/02	F[c]	1	0	—[d]	[0.0137]	15	0/2
Americium-241	1	524	09/30/02	NF[e]	1	0	—	[0.0345]	—	—
Cesium-137	1	524	09/30/02	F	1	0	—	[–1.37]	—	—
Gross Alpha/Beta Radiation	1	524	09/30/02	NF	1	0	—	[0.665]	—	—
Gross Beta Radiation	1	524	09/30/02	NF	1	0	—	[2.62]	—	—
Gross Gamma Radiation	1	524	09/30/02	NF	1	0	—	[154]	—	—
Plutonium-238	1	524	09/30/02	F	1	0	—	[–0.00435]	15	0/1
Plutonium-238	1	524	09/30/02	NF	1	0	—	[2.6E-04]	—	—
Plutonium-239	1	524	09/30/02	F	1	0	—	[–0.0218]	15	0/1
Plutonium-239	1	524	09/30/02	NF	1	0	—	[–0.00436]	—	—
Strontium-90	1	524	09/30/02	F	1	0	—	[0.0176]	8	0/1
Strontium-90	1	524	09/30/02	NF	1	0	—	[0.139]	—	—
Tritium	1	524	09/30/02	NF	1	1	15000	—	20000	0/1
Uranium-234	1	524	09/30/02	F	1	0	—	[0.0879]	—	—
Uranium-234	1	524	09/30/02	NF	1	1	0.108	—	—	—
Uranium-235	1	524	09/30/02	F	2	0	—	[–0.0415]	—	—
Uranium-235	1	524	09/30/02	NF	1	0	—	[0]	—	—
Uranium-238	1	524	09/30/02	F	1	0	—	[0.0465]	—	—
Uranium-238	1	524	09/30/02	NF	1	0	—	[0.044]	—	—

[a] The static water level for the regional aquifer 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 Monthly Inspection Reports
Second Quarter, Fiscal Year 2003

DP Canyon Inspection Report
January 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 Potential Release Site 21-029 (DP Tank Farm), are referred to as the upstream and downstream seeps (Figure 1). Inspections are generally conducted on a monthly basis. However, during wetter months, these inspections are conducted on a semimonthly basis. The results of these inspections will help document any changes in the petroleum hydrocarbon seep areas in relation to seasonal changes and recent precipitation.

Date: January 30, 2003

Time: 9:00 a.m.

Personnel: Becky Coel-Roback and Alison Dorries

Weather: 3 °C and sunny

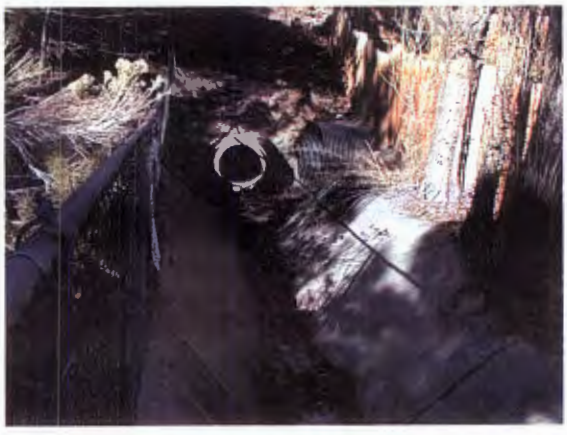
Precipitation: 0.03 in., approximate total since the last inspection (source: Los Alamos National Laboratory Weather Machine).

Presence of standing or running water: At the time of the inspection, there was no flow in the drainage, due to freezing conditions. Standing water at both locations was frozen.

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

	Air	Water	Soil/Sediment
Upstream Location	No petroleum hydrocarbon odor in air	No standing water	No sheen, staining, or odor in disturbed sediments
Downstream Location	No petroleum hydrocarbon odor in air	No standing water	No sheen, staining, or odor in disturbed sediments

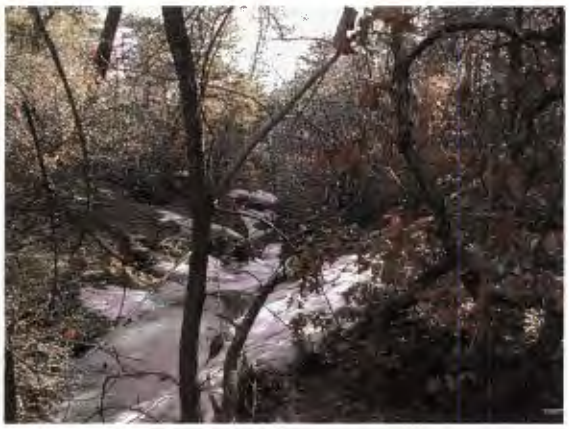
Photographs: The following photographs were taken during the site visit (see Figure 1 for locations).



Location 1, canyon head. Culverts at the head of DP Canyon, showing no water flow due to freezing conditions

Location 2, upstream location. Small pool completely frozen

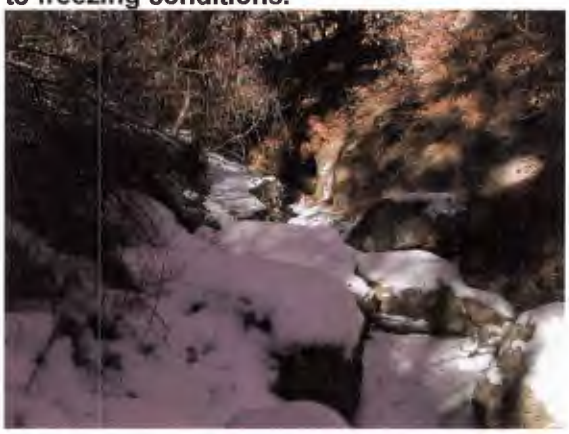
Location 3, upstream location. During the January inspection, there was no evidence of petroleum hydrocarbons at the upstream seep location.



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

Location 5, downstream location. There was no standing water at the downstream location during the January inspection due to freezing conditions.

Location 6, downstream location. There was no evidence of petroleum hydrocarbons at the downstream location during the January inspection.



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

DP Canyon Inspection Report
February 2003

Introduction: Regular inspections are conducted to assess the status of two petroleum hydrocarbon seeps in DP Canyon. These seeps, which are downgradient from Potential Release Site 21-029 (DP Tank Farm), are referred to as the upstream and downstream seeps (Figure 1). Inspections are generally conducted on a monthly basis. However, during February 2003, extremely icy conditions on the steep, north-facing slope of the drainage presented an excessive risk to personnel safety. Therefore, no inspection was conducted. The monthly inspection was resumed in March.

DP Canyon Inspection Report
March 31, 2003

Introduction: Regular inspections are conducted to assess the status of two petroleum hydrocarbon seeps in DP Canyon. These seeps, which are downgradient from Potential Release Site 21-029 (DP Tank Farm), are referred to as the upstream and downstream seeps (Figure 1). Inspections are generally conducted on a monthly basis. However, during wetter months, these inspections are conducted on a semimonthly basis. The results of these inspections will help document any changes in the petroleum hydrocarbon seep areas in relation to seasonal changes and recent precipitation.

Date: March 31, 2003

Time: 4:00 p.m.

Personnel: Becky Coel-Roback and Mark Thacker

Weather: 17 °C, dry and sunny

Precipitation: 2.2 in., approximate total since the January inspection (source: Los Alamos National Laboratory Weather Machine).

Presence of standing or running water: At the time of the inspection, there was very little flow in the drainage, but standing water was present due to thawing of recent snows.

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

	Air	Water	Soil/Sediment
Upstream Location	No petroleum hydrocarbon odor in air	Sheen on standing water following sediment disturbance	Petroleum hydrocarbon odor and sheen in disturbed sediments
Downstream Location	No petroleum hydrocarbon odor in air	No sheen on water	Petroleum hydrocarbon odor in sediments but no sheen

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

Location 1, canyon head. Culverts at the head of DP Canyon showing little water flow.

Location 2, upstream location. Standing water during the March inspection

Location 3, upstream location. During the March inspection, there is evidence of petroleum hydrocarbons in disturbed sediments at the upstream location.

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

Location 5, downstream location. Some standing water was present at the downstream location during the March inspection.

Location 6, downstream location. Petroleum hydrocarbon odors were present in sediments from the downstream location during the March inspection.

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

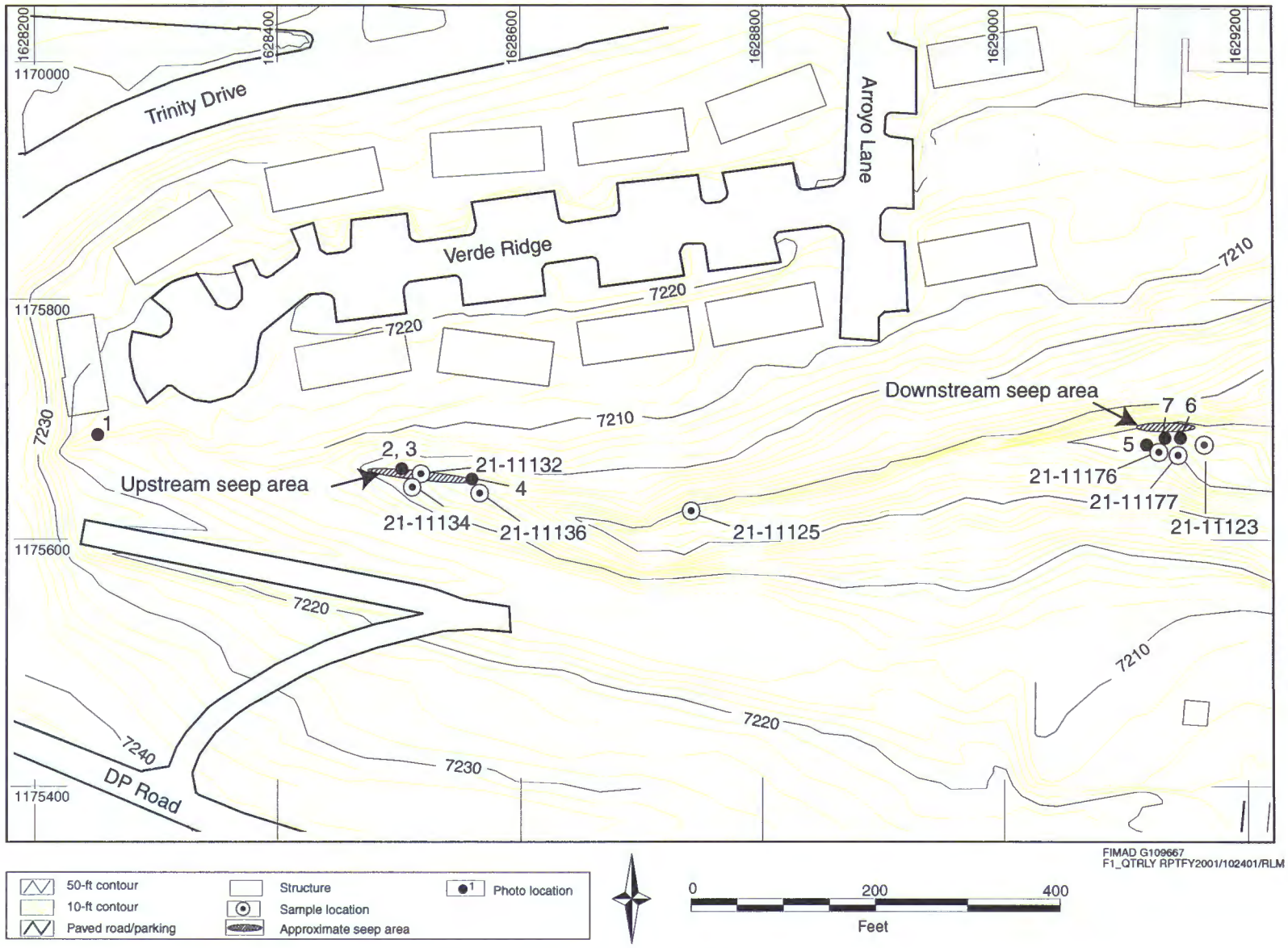


Figure 1. DP Tank Farm photo locations, seep areas, and sampling locations

Appendix C

Quarterly Moisture-Monitoring Report
Second Quarter, Fiscal Year 2003
Technical Area 49, Material Disposal Area AB

QUARTERLY MOISTURE-MONITORING REPORT
SECOND QUARTER, FISCAL YEAR 2003
TECHNICAL AREA 49
MATERIAL DISPOSAL AREA AB

MDA Focus Area

Environmental Restoration Project

Los Alamos National Laboratory

MAY 2003

FY 2003, one of the these boreholes (2A-O) began to show a decreasing moisture trend at both the near-surface depth, and at the bottom of the borehole.

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 an IM implemented in 1998 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. Therefore, it is recommended that moisture monitoring of all boreholes be reduced from monthly to bimonthly. This will be sufficient to capture any potential long-term variability in moisture content below the near-surface environment. The current frequency of TDR measurements will continue to monitor the performance of the cover materials.

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)

shown. Following repair of the neutron probe in January and February, 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 boreholes. 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 March 2003, 36 months of data events were available for statistical analysis. See Table 2 for the results of the student t-test analyses for each of the boreholes. The trending analysis results show that moisture levels have decreased as previously reported.

Table 2
Results of the Student T-test Analysis, Based on a 95% Confidence Interval

Borehole Number	Moisture Trending Results
TH-2	Analysis shows a decreasing moisture trend from 6 to 100 ft.
TH-3	Analysis shows a decreasing moisture trend from 1 to 5 ft, 51 to 75 ft, and 86 to 105 ft.
TH-4	Analysis shows a decreasing moisture trend from 1 to 10 ft, and 41 to 80 ft.
TH-5	Analysis shows a decreasing moisture trend from 1 to 95 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 10 ft, and 51 to 55 ft.
49-10046	Analysis shows a decreasing moisture trend from 1 to 13 ft.
49-10047	Analysis shows a decreasing moisture trend from 1 to 2 ft and 7 to 12 ft.
49-10048	Analysis shows a decreasing moisture trend from 1 to 13 ft.

In addition to performing the student t-test analyses, trend plots of time vs. moisture content were created for specific depth intervals (see Figures B-1 through B-10 in Attachment B). These plots exhibit the impact of winter snow in the near surface depth (1–5 ft) for all the boreholes (inside the cover and outside the cover), during the time period of October 2002 through March of 2003.

4.0 CONCLUSIONS

The neutron log and TDR data indicate that subsurface moisture levels have behaved consistent with the conceptual model for the site over the period of performance. The precipitation at TA-49 has been below average, 1.4 in. from January through March 2003. The moisture levels of the cover have decreased despite the low evapotranspiration during the winter. The shallow TDR probes have shown moisture content responses to relatively small snowfall events, while the deeper probes (>6 ft) have remained constant. This can be attributed to above-average temperatures and below-average precipitation during the second quarter of FY 2003. The data from boreholes 10046, 10047, and 10048 show that the moisture content of the cover has decreased from the surface to the bottom of each borehole. In boreholes 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 boreholes (<60 ft) surrounding the cover (2A-Y, 2B-Y) have not provided significant changes in moisture content; however, during the second quarter of

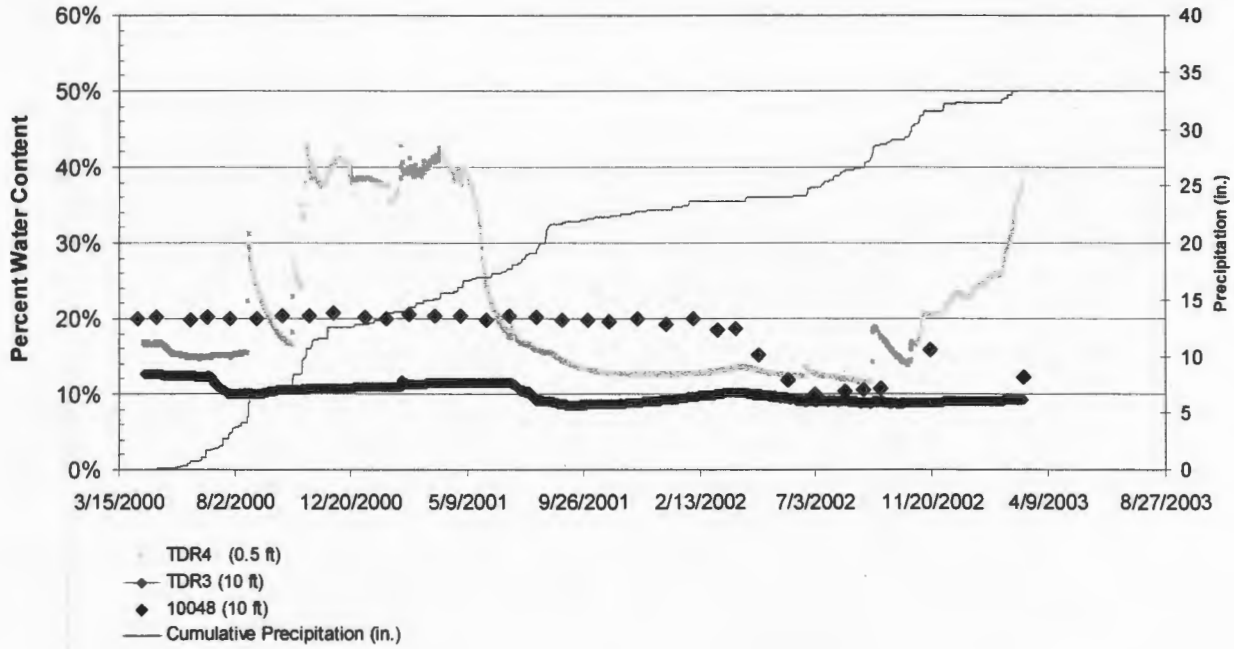


Figure 3. TDR measurements compared with neutron measurements at borehole 10048, which is in close proximity and at the same corresponding depth as TDR3

3.0 MOISTURE-MONITORING RESULTS AND DATA ANALYSIS

3.1 Introduction

During the second quarter of 2003, most boreholes have shown a slight increase in volumetric moisture content in the first 5 ft, an interval of unconsolidated materials and/or the soil tuff interface, while below 5 ft. the moisture trends have decreased. Trend plots of time versus moisture content were created for specific depth intervals (Attachment B). These plots exhibit the impact of snowfall and low temperatures preventing the moisture from infiltrating the cover.

3.2 Correlation between TDR Measurements and Precipitation Events

January was unseasonably warm and dry. These conditions removed all snow cover and slightly reduced shallow moisture contents. The light to moderate snowfall occurring in February and March caused a noticeable effect on the shallow TDR probes. The results of the shallow TDR probes at 0.5 ft have ranged between 20 and 25% moisture content. In contrast, the results of deeper TDR probes (>6 ft) have remained constant through the quarter. This behavior can be attributed to minimal evapotranspiration due to the cold temperatures and relatively small snowfall events barely wetting the topsoil.

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 boreholes 49-10046 and 49-10048 respectively. The neutron probe data from the same depth as the deep TDR probes is also

2.0 MOISTURE-MONITORING RESULTS

2.1 Neutron Logging

Neutron-logging events scheduling has changed from occurring at the end of the month to occurring at the middle of the month March 10. Logging was performed with a dedicated a CPN 503DR probe at all boreholes. The neutron counts from each of the 10 monitoring holes were recorded into a spreadsheet, and corresponding volumetric moisture content was calculated for each. Plots of volumetric moisture content for each sampling period and all of the holes are shown in Attachment A.

2.2 TDR and Precipitation Measurements

TDR measurements and precipitation quantities were collected twice a day through March 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 in April 2000 through March 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 are obtained from the Laboratory TA-49 weather station.

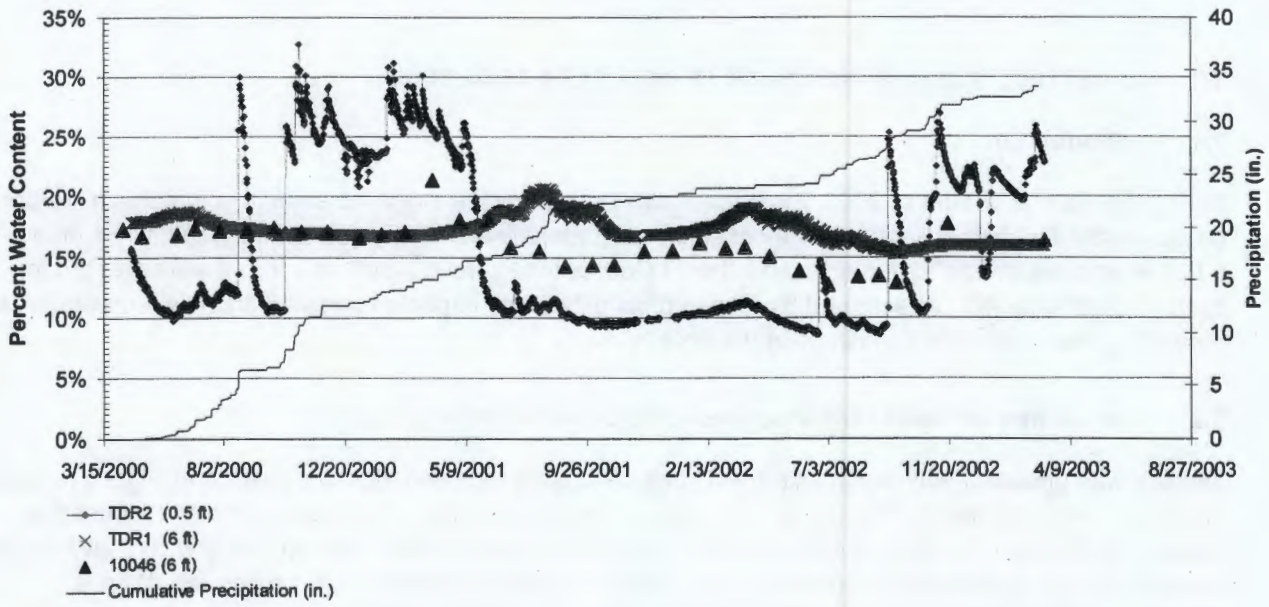


Figure 2. TDR measurements compared with neutron measurements at borehole 10046, which is in close proximity and at the same corresponding depths as TDR1

TDR probes, the rain gauge, the cover, and the silt fence. Table 1 gives the corresponding depths of the TDR probes.

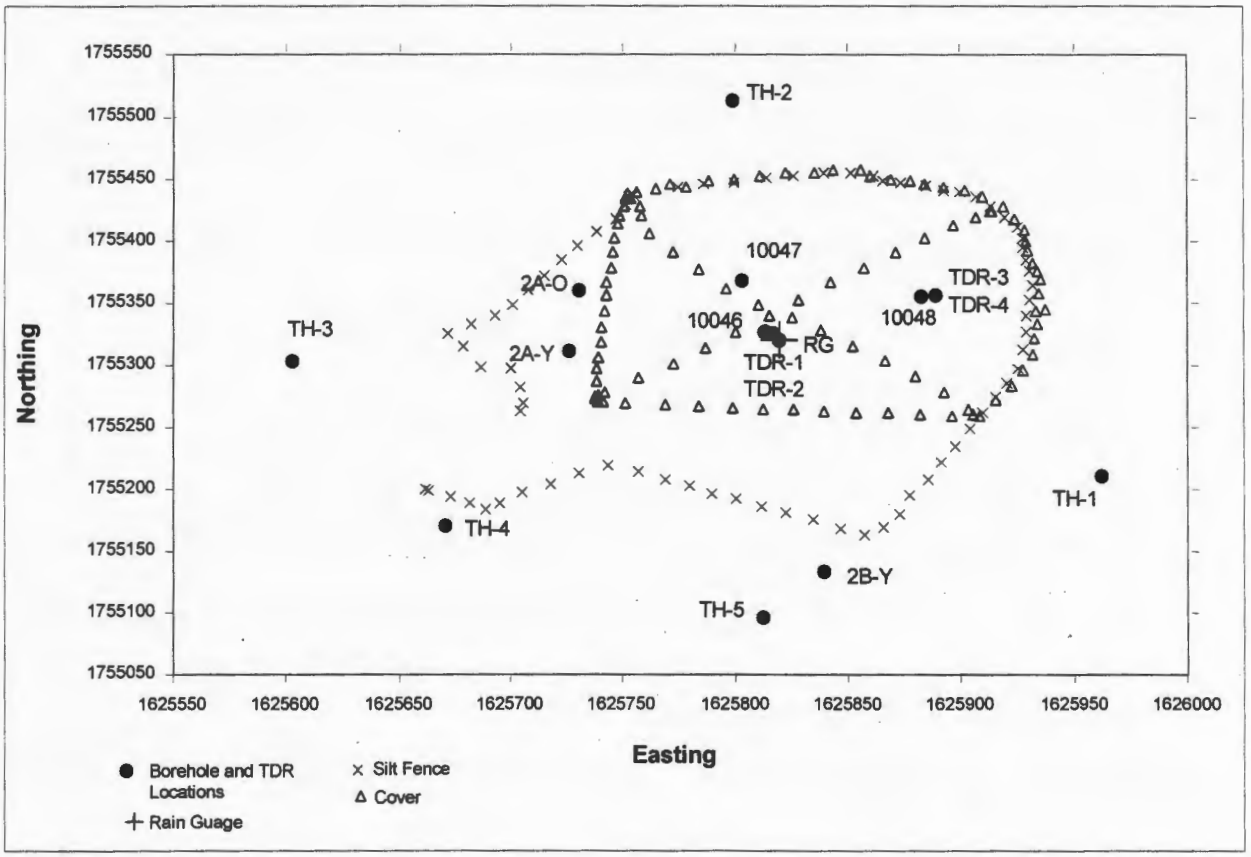


Figure 1. Location of instrumentation, and boreholes on XY plane at TA-49

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 March 2003, neutron moisture measurements were performed at boreholes 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 result and the TDR instruments, and a discussion of the relationship between precipitation and moisture content.

1.0 INTRODUCTION

The TA-49 moisture-monitoring system began collecting data in March of 2000 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 after the historical asphalt pad was removed during an interim measure (IM) implemented in 1998 at the direction of New Mexico Environment Department Hazardous and Radioactive Materials Bureau (NMED-HRMB). The area was covered with soil, gravel, and bio-barrier as part of stabilization activities. The IM was conducted to address concerns arising from moisture accumulation beneath the asphalt pad.

In 1998–1999, the IM and associated best management practice (BMP) activities conducted at Area 2 included the following:

- 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 boreholes;
- 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 boreholes, four TDR probes, and a rain gauge to evaluate moisture content and relative changes within and beneath the new cover material. Additionally, eight boreholes located in the surrounding area are monitored monthly for moisture content. These boreholes 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 boreholes 49-10046 and 49-10048 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 are positioned to detect infiltration through the topsoil. A rain gauge was located at the surface of the cover near borehole 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 boreholes,

List of Figures

Figure 1 Location of instrumentation, and boreholes on XY plane at TA-49 ..... C-2
Figure 2 TDR measurements compared with neutron measurements at borehole 10046, which is in close proximity and at the same corresponding depths as TDR1 ..... C-3
Figure 3 TDR measurements compared with neutron measurements at borehole 10048, which is in close proximity and at the same corresponding depth as TDR3 ..... C-4
Figure A-1 Neutron probe moisture measurements for boreholes TH-2 and TH-3 ..... AttA-1
Figure A-2 Neutron probe moisture measurements for boreholes TH-4 and TH-5 ..... AttA-2
Figure A-3 Neutron probe moisture measurements for boreholes 2A-O and 2A-Y AttA-3
Figure A-5 Neutron probe moisture measurements for boreholes 49-10047 and 49-10048 ..... AttB-5
Figure B-1 Trend plot of neutron moisture measurements, borehole TH-2 ..... AttB-1
Figure B-2 Trend plot of neutron moisture measurements, borehole TH-3 ..... AttB-2
Figure B-3 Trend plot of neutron moisture measurements, borehole TH-4 ..... AttB-3
Figure B-4 Trend plot of neutron moisture measurements, borehole TH-5 ..... AttB-4
Figure B-5 Trend plot of neutron moisture measurements, borehole 2A-O AttB-5
Figure B-6 Trend plot of neutron moisture measurements, borehole 2A-Y AttB-6
Figure B-7. Trend plot of neutron moisture measurements, borehole 2B-Y AttB-7
Figure B-8 Trend plot of neutron moisture measurements, borehole 49-10046 ..... AttB-8
Figure B-9 Trend plot of neutron moisture measurements, borehole 49-10047 ..... AttB-9
Figure B-10 Trend plot of neutron moisture measurements, borehole 49-10048 ..... AttB-10

List of Tables

Table 1 TDR Array Descriptions C-2
Table 2 Results of the Student T-test Analysis, Based on a 95% Confidence Interval C-5

CONTENTS

1.0 INTRODUCTION C-1

2.0 MOISTURE-MONITORING RESULTS C-3

2.1 Neutron Logging C-3

2.2 TDR and Precipitation Measurements C-3

3.0 MOISTURE-MONITORING RESULTS AND DATA ANALYSIS C-4

3.1 Introduction C-4

3.2 Correlation between TDR Measurements and Precipitation Events C-4

3.3 TDR and Neutron Comparisons C-4

3.4 Student T-test of Neutron Data C-5

4.0 CONCLUSIONS C-5

5.0 RECOMMENDATIONS C-6

6.0 REFERENCES C-6

ATTACHMENT A NEUTRON MOISTURE MEASUREMENTS AttA-1

ATTACHMENT B TIME VERSUS MOISTURE CONTENT PLOTS AttB-1

Attachment A

Neutron Moisture Measurements

ATTACHMENT A NEUTRON MOISTURE MEASUREMENTS

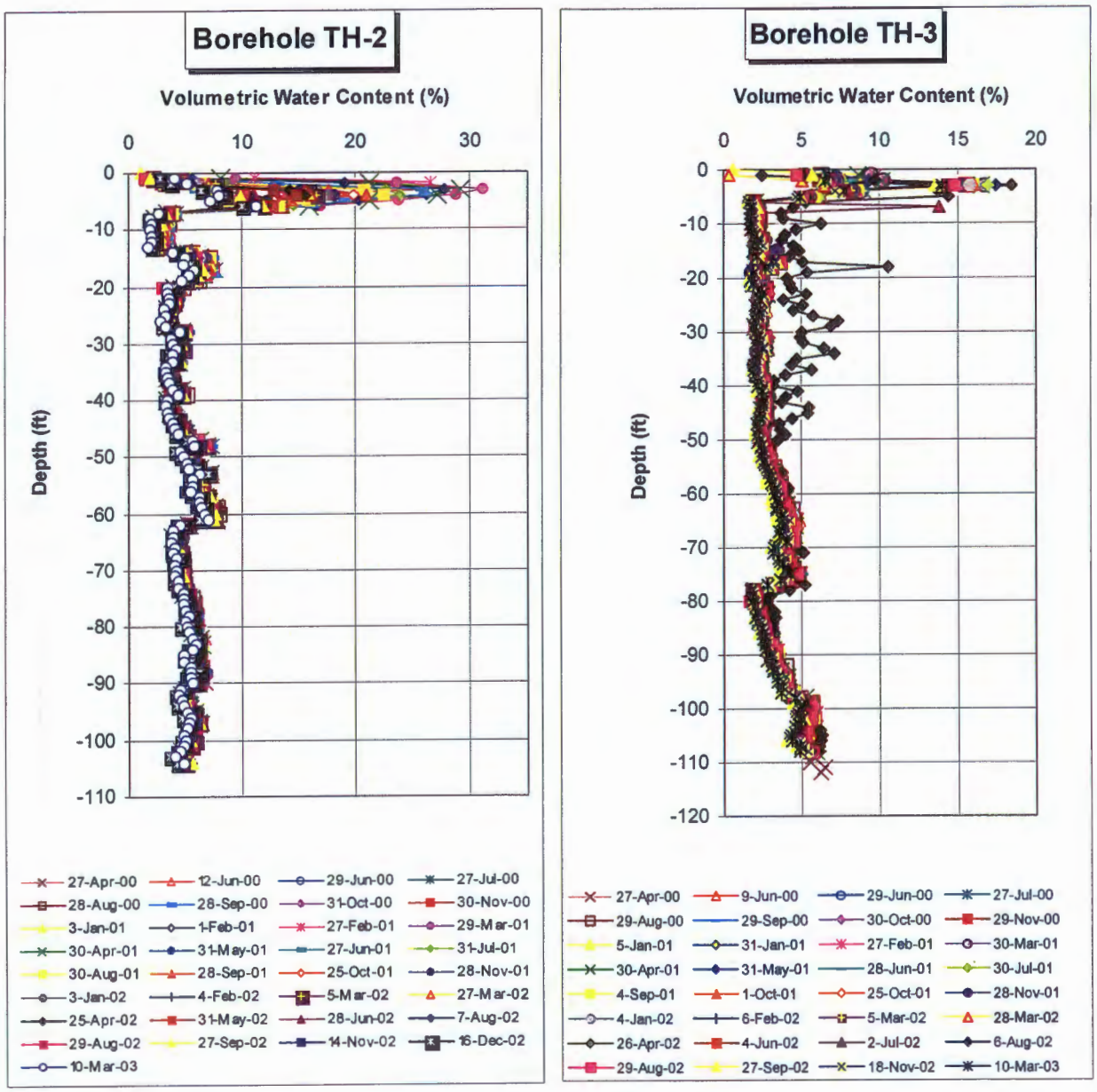


Figure A-1. Neutron probe moisture measurements for boreholes TH-2 and TH-3

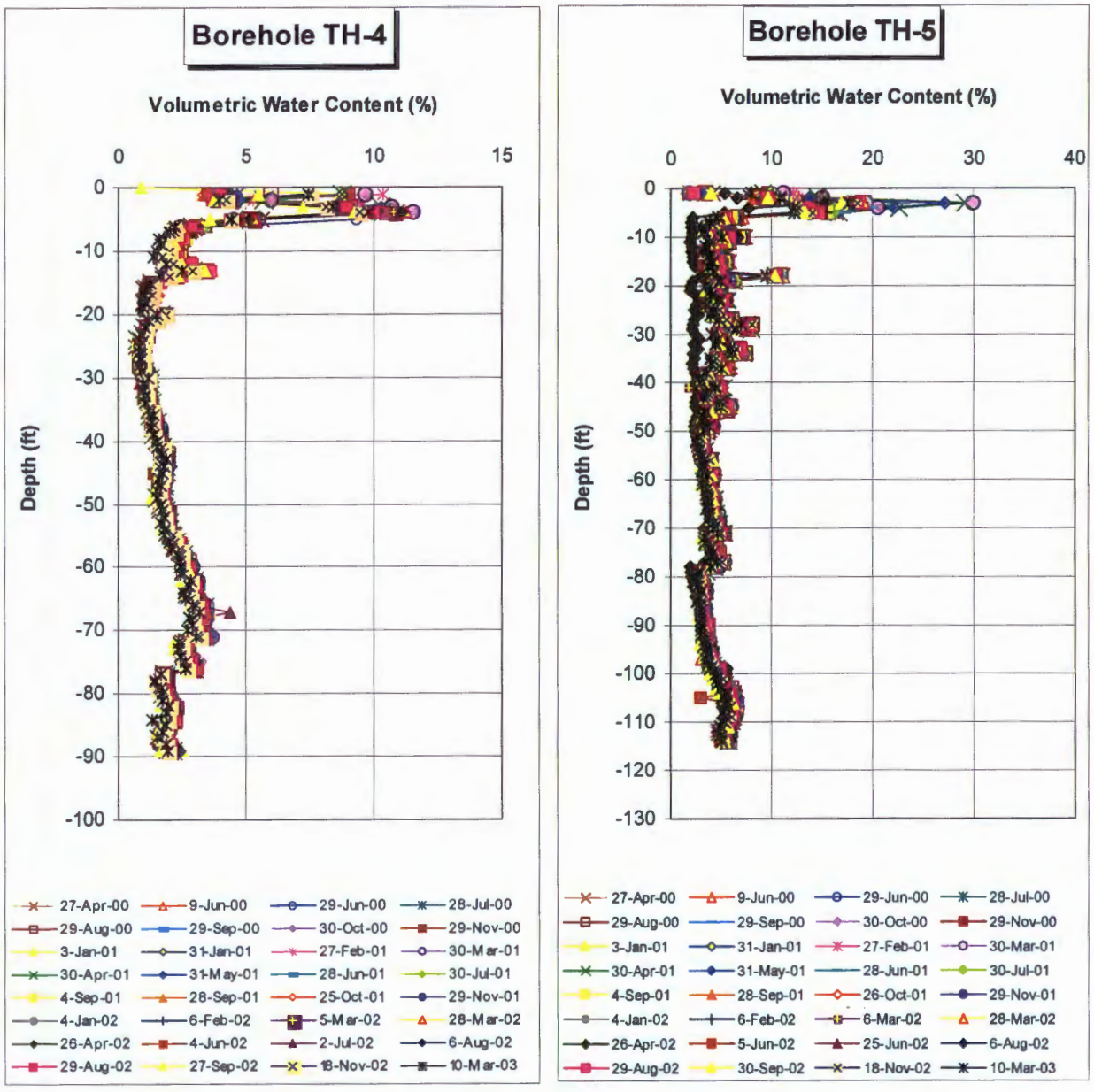


Figure A-2. Neutron probe moisture measurements for boreholes TH-4 and TH-5

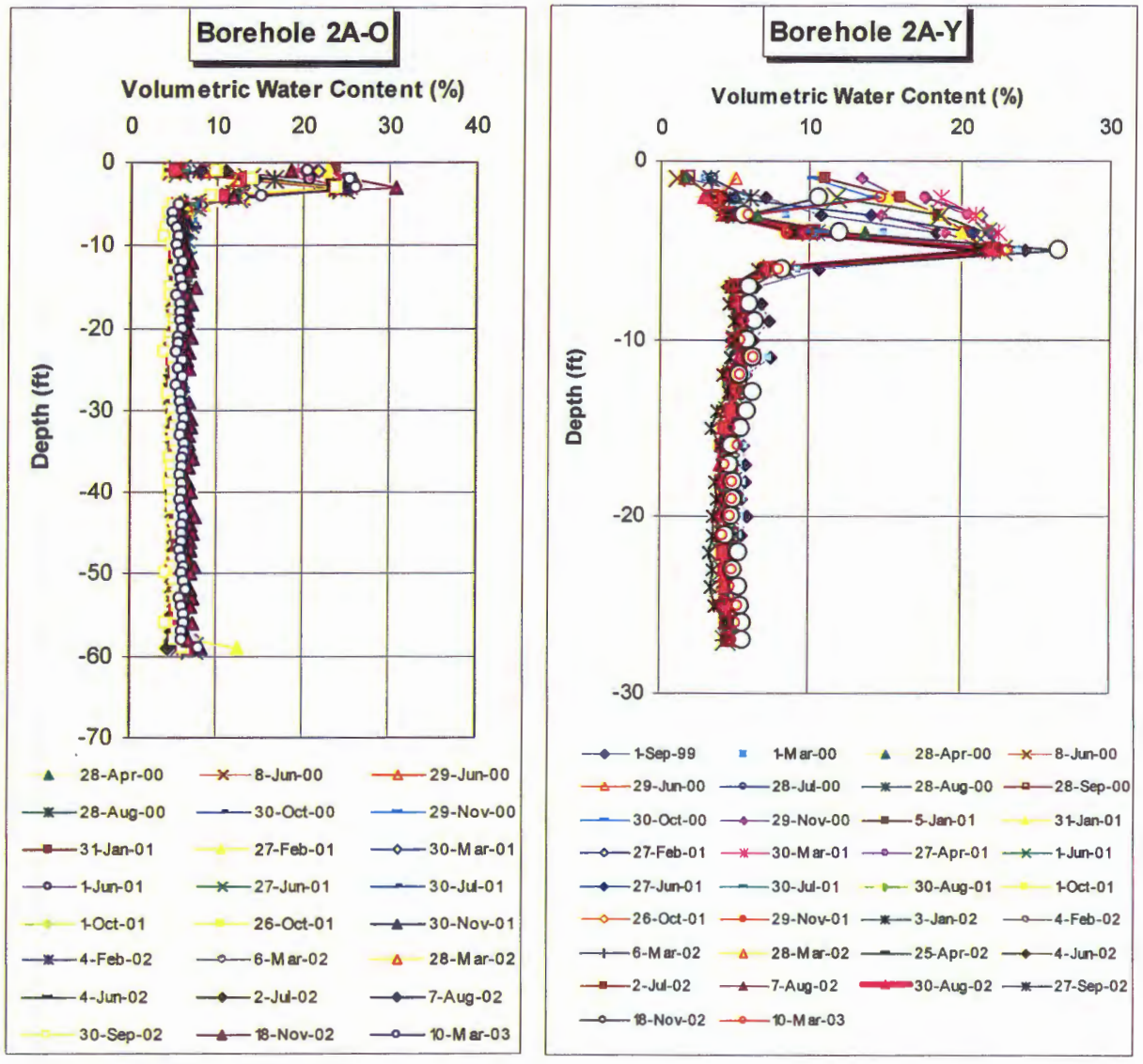


Figure A-3. Neutron probe moisture measurements for boreholes 2A-O and 2A-Y

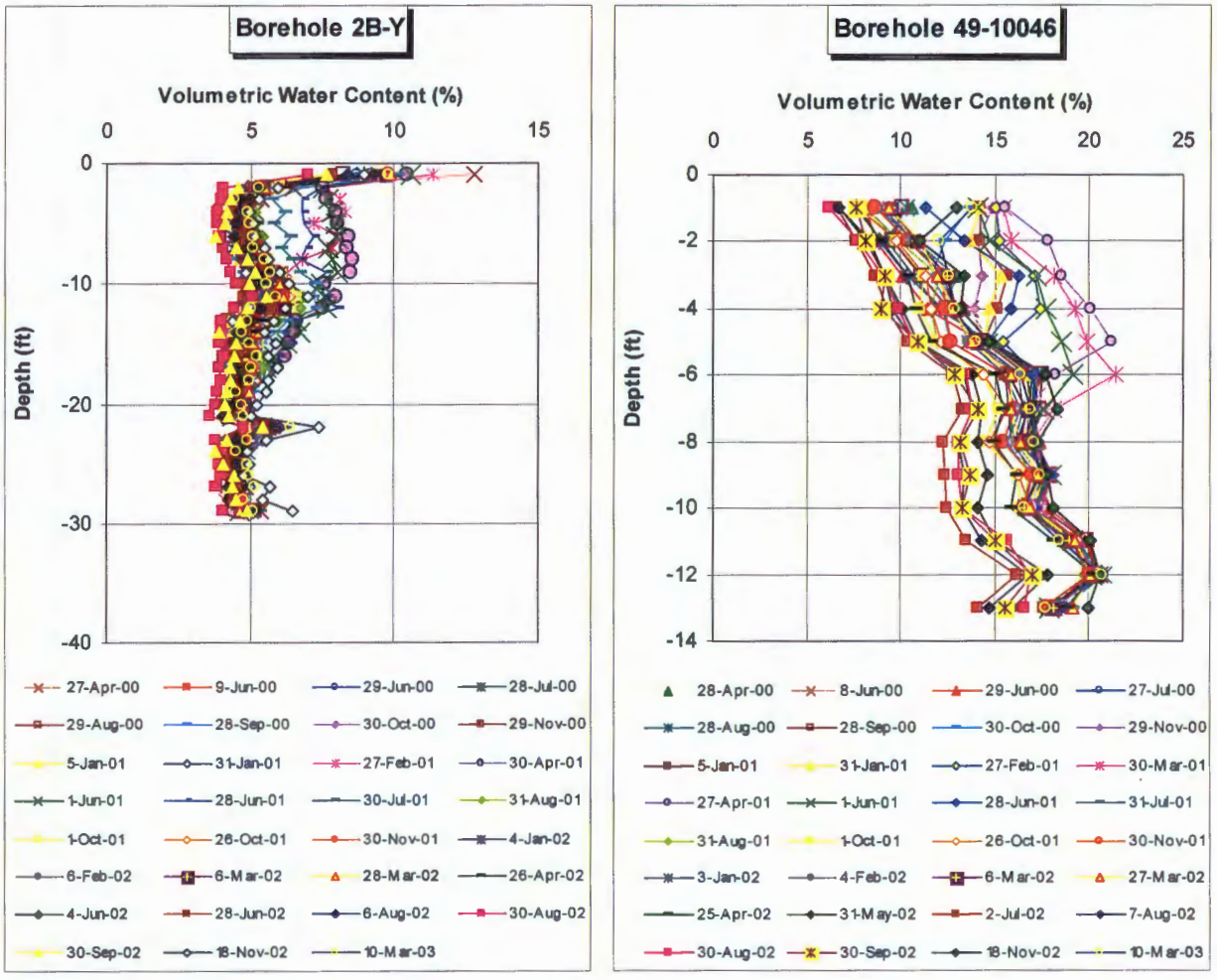


Figure A-4. Neutron probe moisture measurements for boreholes 2B-Y and 49-10046

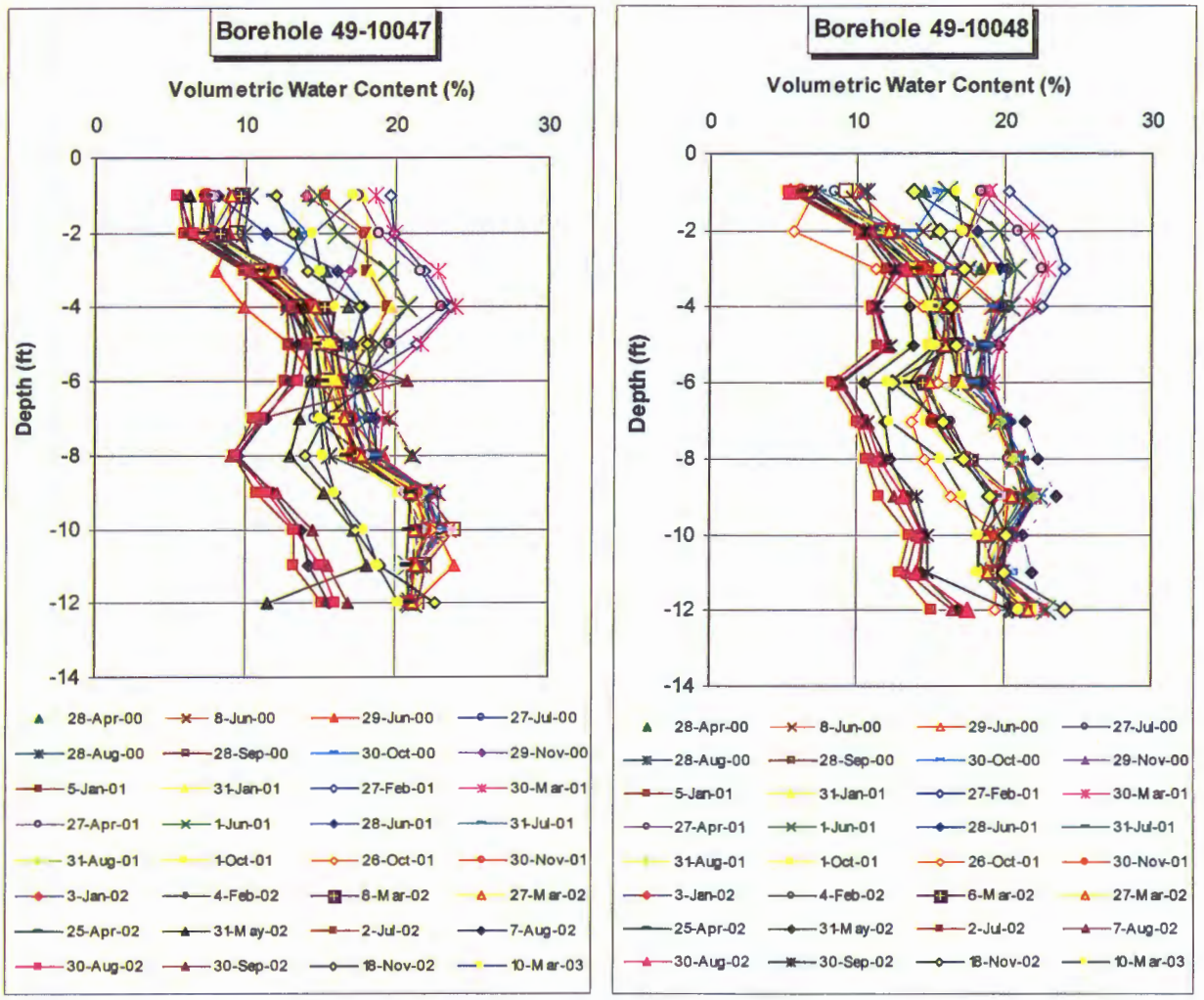


Figure A-5. Neutron probe moisture measurements for boreholes 49-10047 and 49-10048

Attachment B

Time Versus Moisture Content Plots

ATTACHMENT B TIME VERSUS MOISTURE CONTENT PLOTS

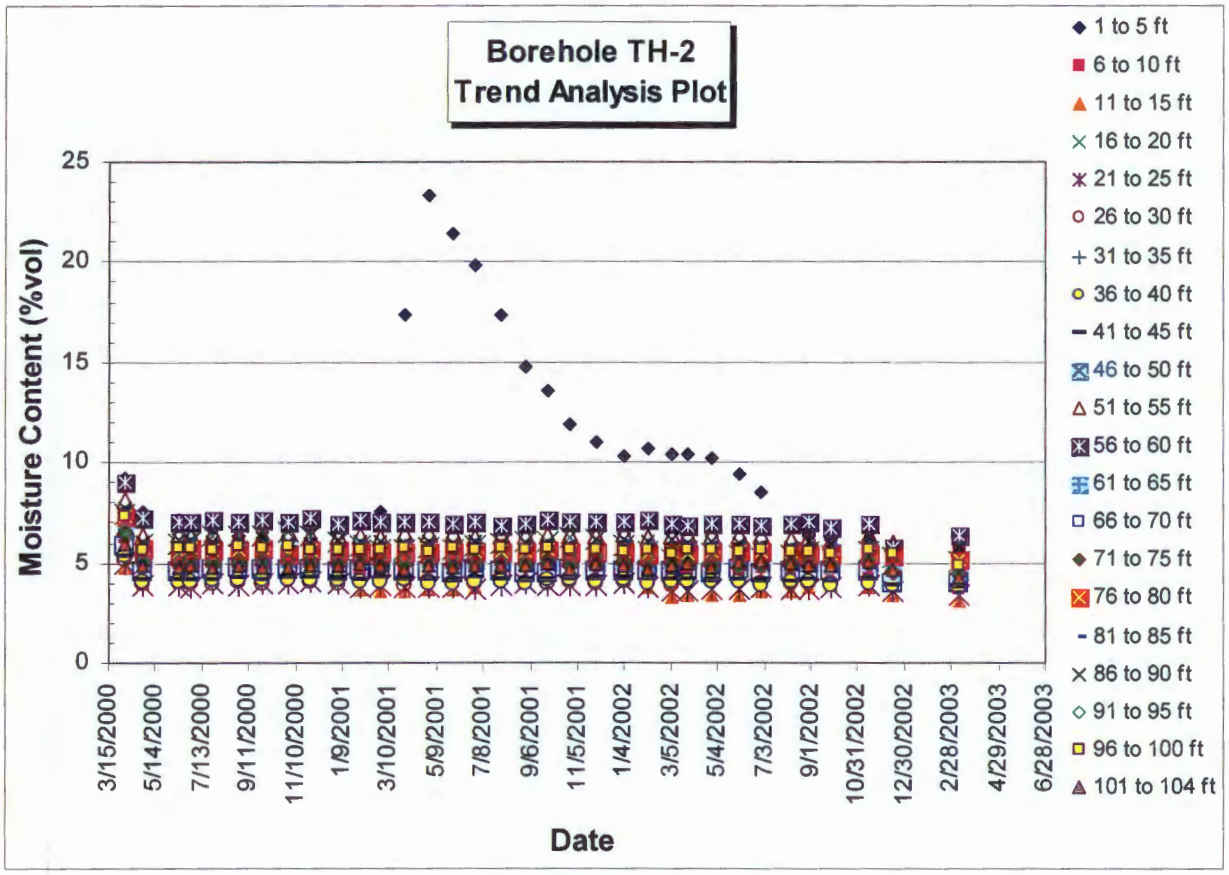


Figure B-1. Trend plot of neutron moisture measurements, borehole TH-2

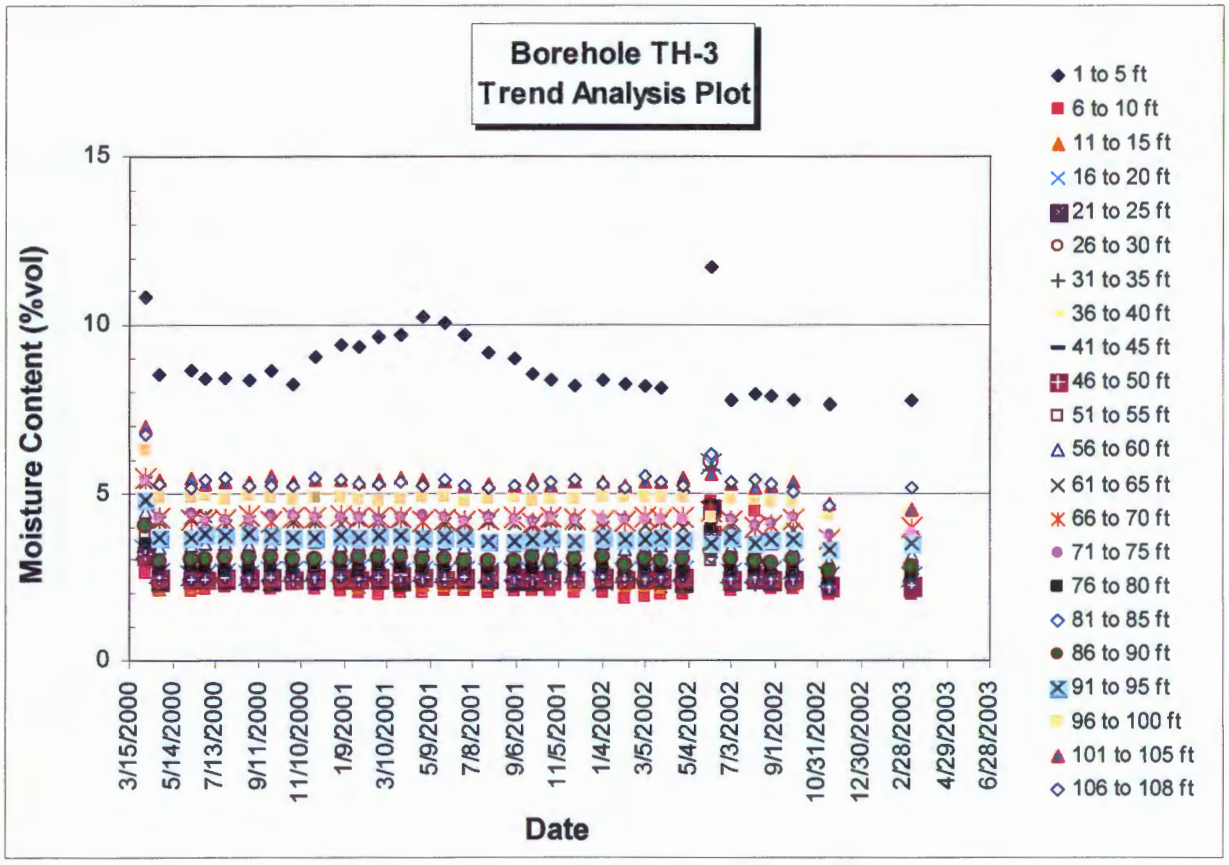


Figure B-2. Trend plot of neutron moisture measurements, borehole TH-3

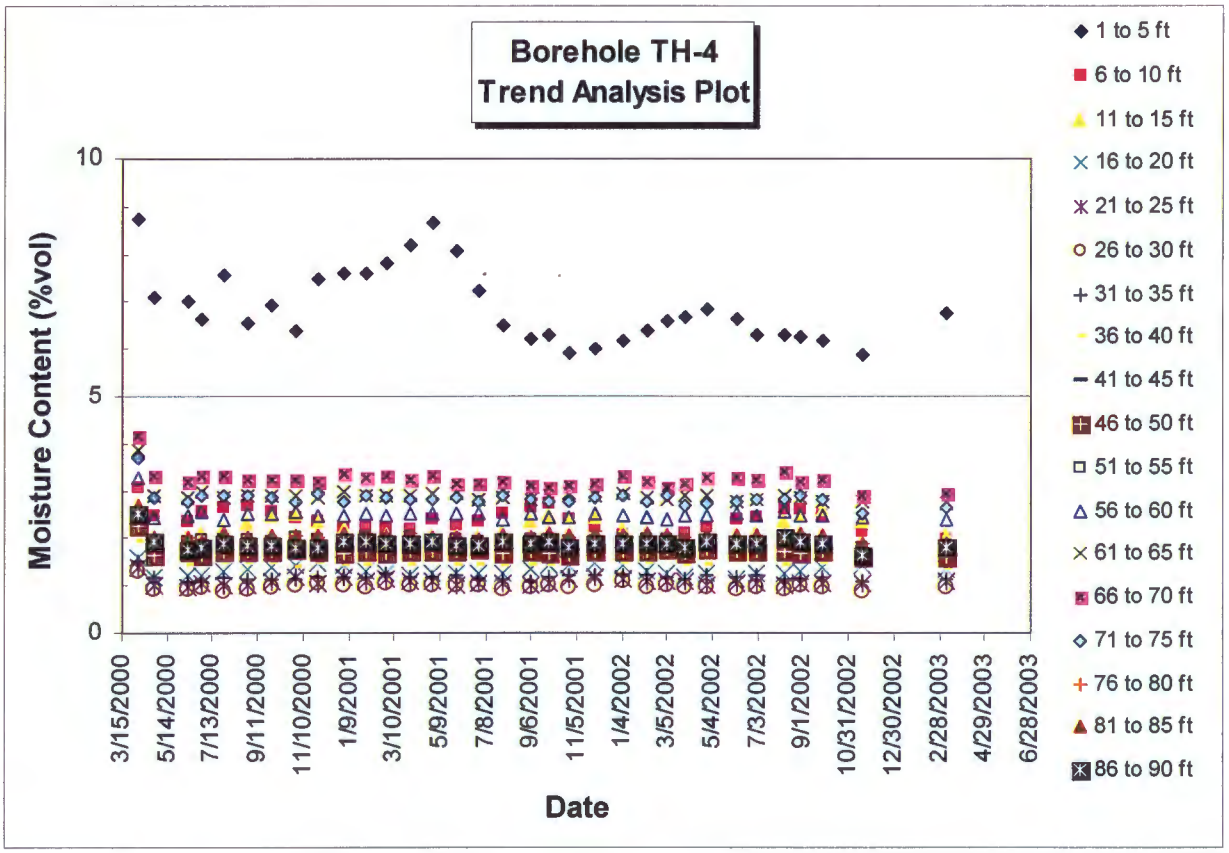


Figure B-3. Trend plot of neutron moisture measurements, borehole TH-4

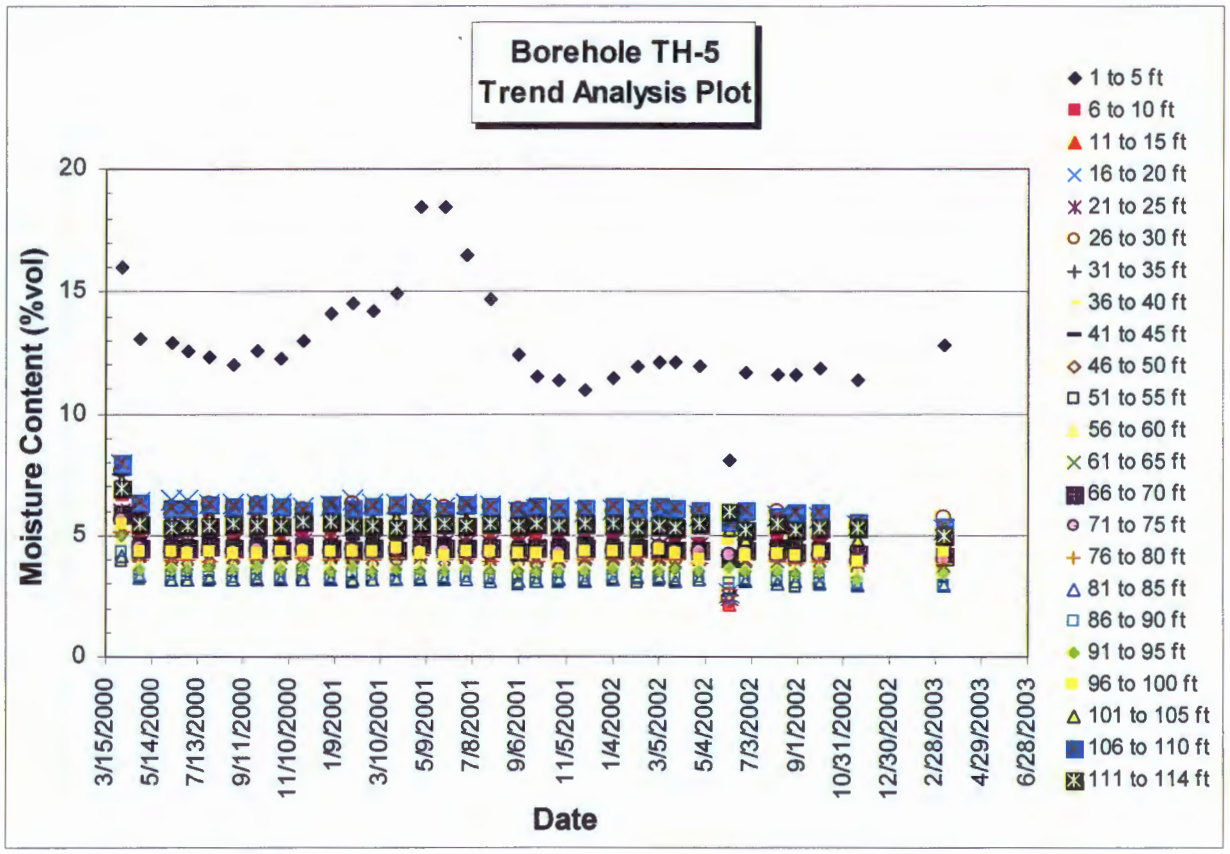


Figure B-4. Trend plot of neutron moisture measurements, borehole TH-5

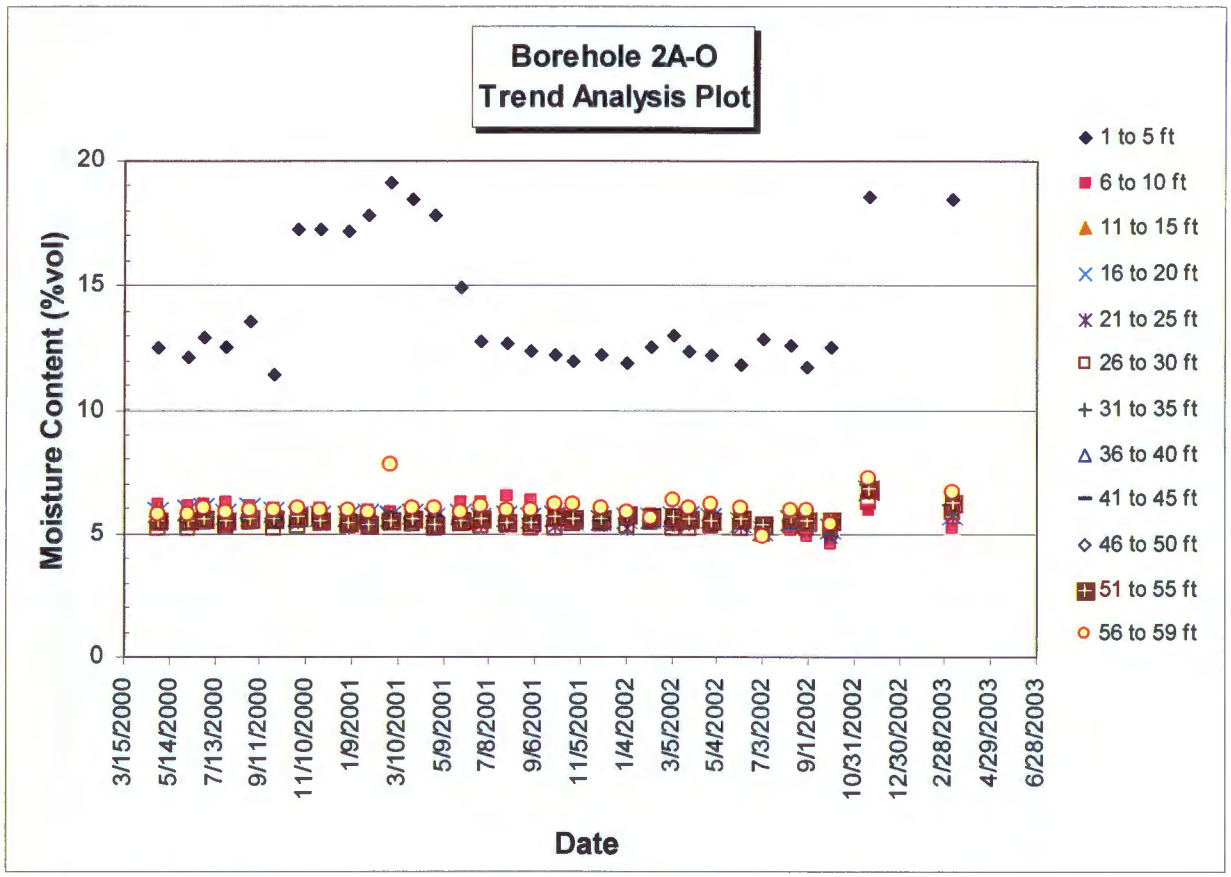


Figure B-5. Trend plot of neutron moisture measurements, borehole 2A-O

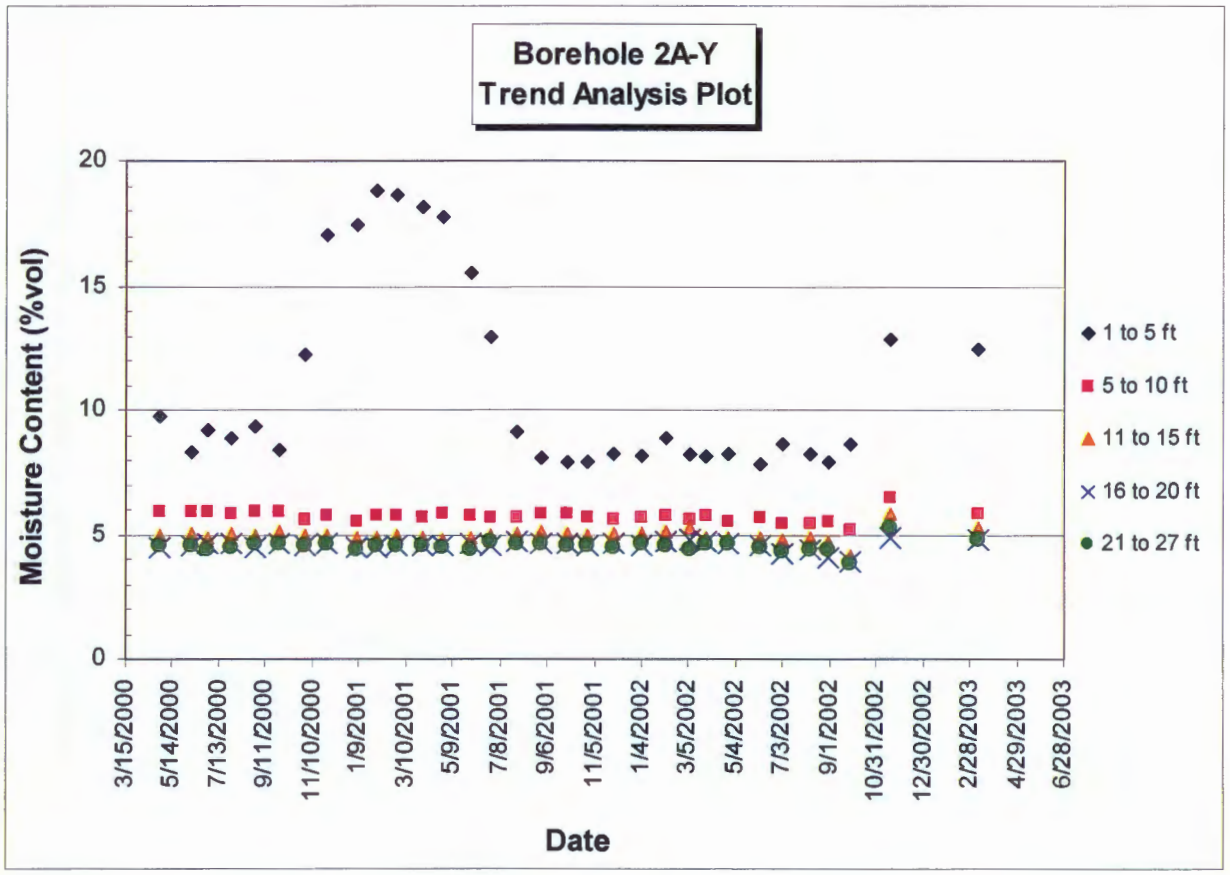


Figure B-6. Trend plot of neutron moisture measurements, borehole 2A-Y

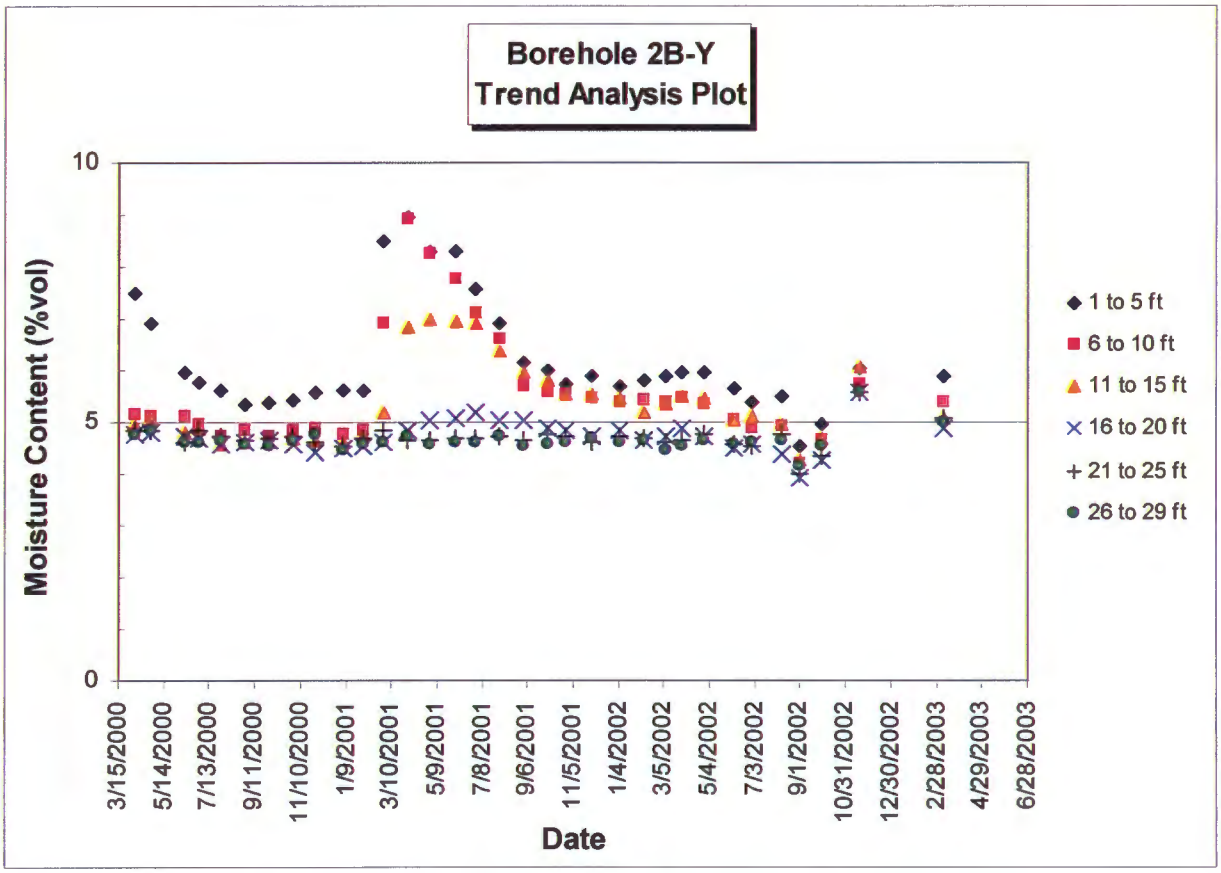


Figure B-7. Trend plot of neutron moisture measurements, borehole 2B-Y

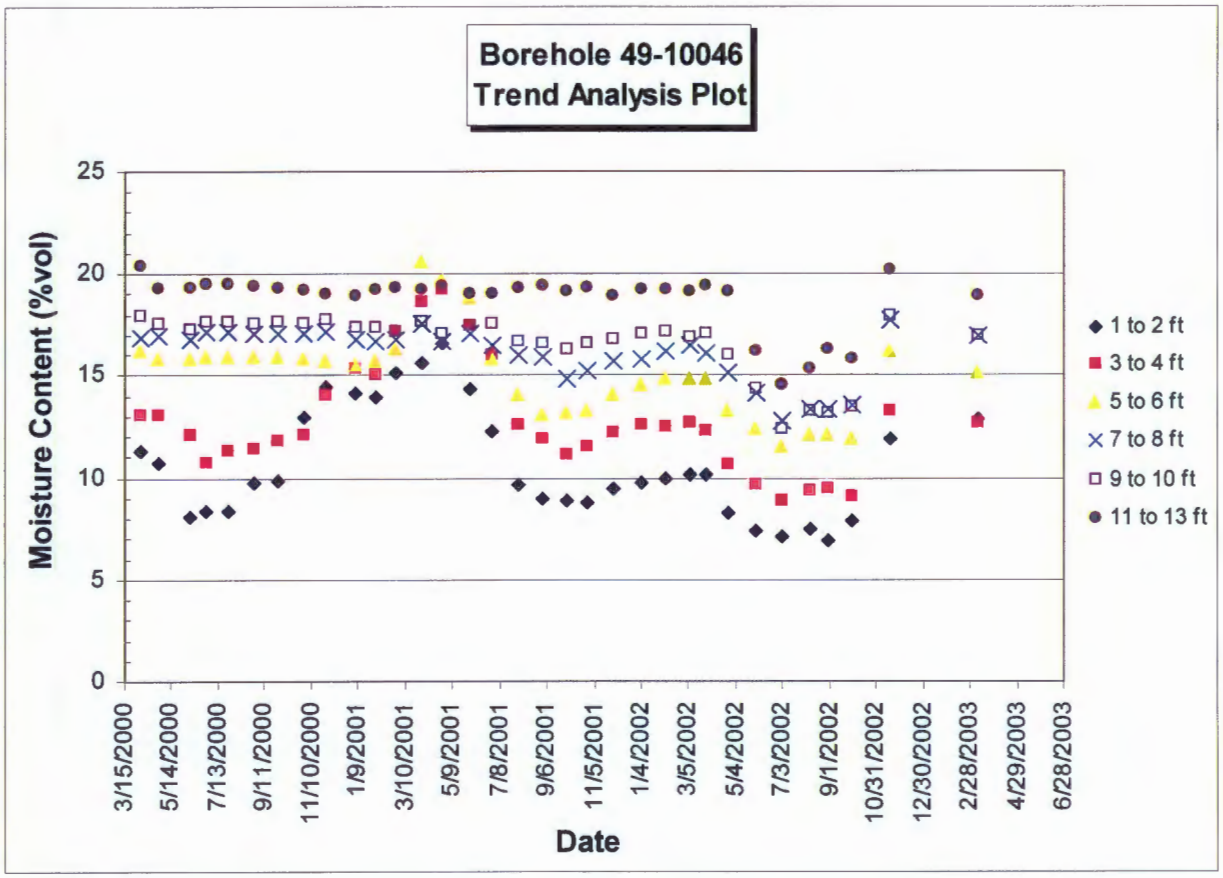


Figure B-8. Trend plot of neutron moisture measurements, borehole 49-10046

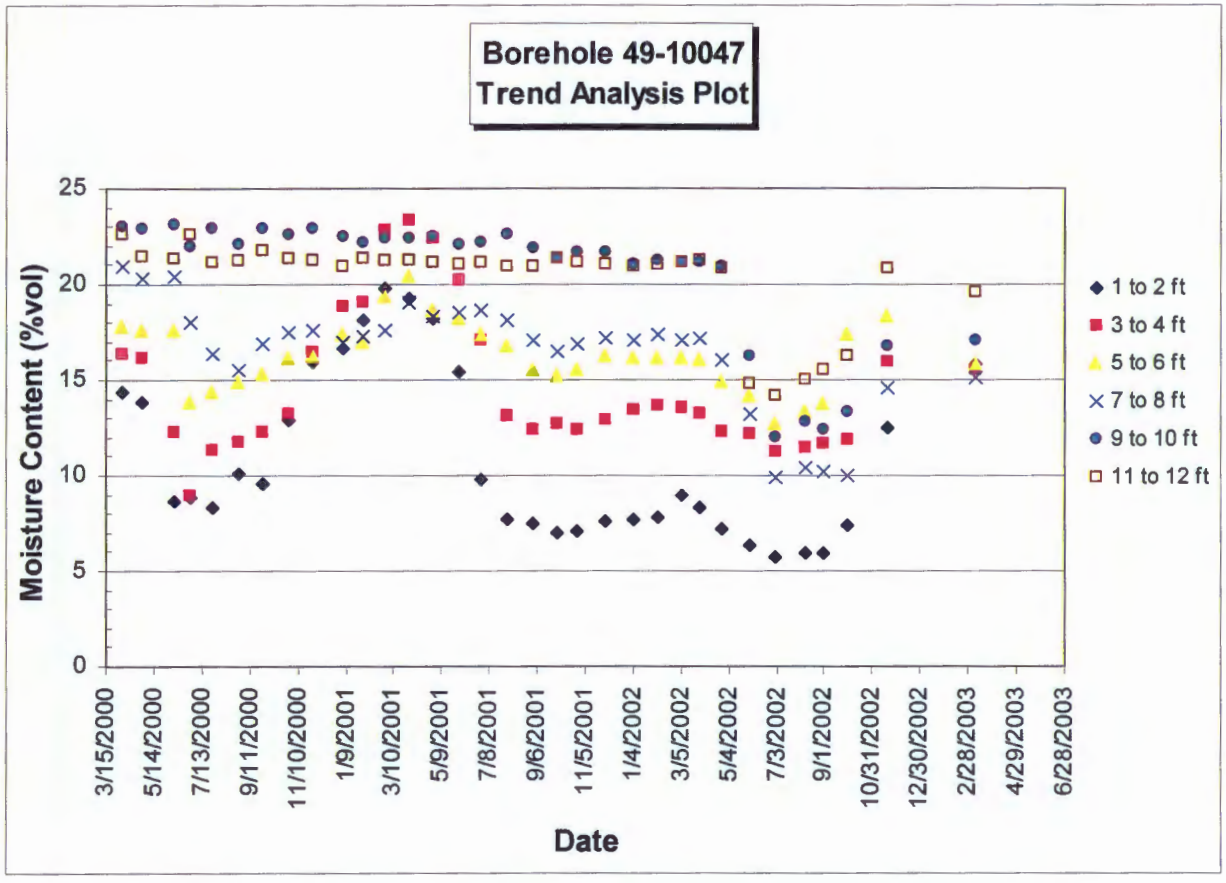


Figure B-9. Trend plot of neutron moisture measurements, borehole 49-10047

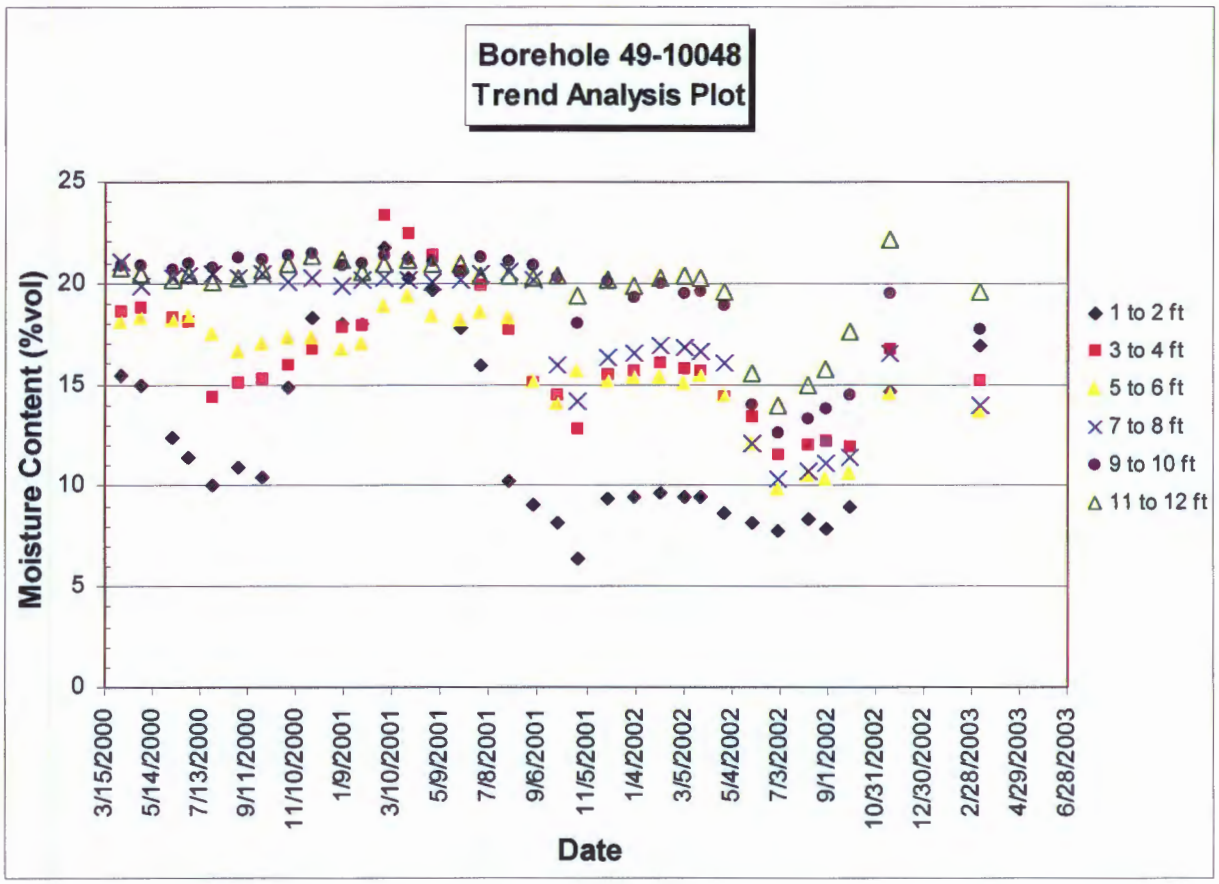


Figure B-10. Trend plot of neutron moisture measurements, borehole 49-10048

Appendix D

Quarterly Pore-Gas Sampling at
Technical Area 54, Material Disposal Areas L and G
Second Quarter Fiscal Year 2003

PORE-GAS SAMPLING AT TECHNICAL AREA 54 MATERIAL DISPOSAL AREAS L AND G SECOND QUARTER FISCAL YEAR 2003

MDA Focus Area

Environmental Restoration Project

Los Alamos National Laboratory

MAY 2003

CONTENTS

1.0 INTRODUCTION **1**
1.1 Sampling Plan Requirements 1
1.2 Sampling Purpose 1

2.0 SECOND-QUARTER SAMPLING **2**
2.1 Sampling Event 2
2.2 Sampling Results 2
2.3 Evaluation of Quality Assurance Samples 2

REFERENCES **4**

List of Tables

Table 2-1. Summary of Sampling Event, Second Quarter of FY 2003 3

1.0 INTRODUCTION

This report discusses second quarter subsurface pore-gas sampling at Los Alamos National Laboratory (the Laboratory), Technical Area (TA) 54. 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 (RRES–R) Program 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-R Program 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 Fiscal Year (FY) 2000 (Environmental Restoration Project 2000, 70064) lists the reasons for selecting ports to be sampled during FY 2001.

Before the required sampling is performed, all available wells (RRES-R Program wells and PAMG wells) are screened with a Brüel and Kjaer 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 SECOND-QUARTER SAMPLING

2.1 Sampling Event

Sampling for the second quarter of FY 2003 (January through March) was conducted during the period of January 31 through February 6, 2003. Analytical results were not available for the second quarter report and will be discussed in the third quarter.

Table 2-1 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. 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.

2.2 Sampling Results

Both the field screening and analytical sampling for MDA G and L were finished by February 6. Field-screening results for first quarter are available upon request. Analytical results will be reported in the third quarter report.

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 54-2002 at the 60-ft sampling port.

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. Two compounds were detected. The field equipment blank was taken in the immediate vicinity of 54-1121 at ground level.

Calibration gas sample (performance evaluation sample). A calibration gas sample was not collected in the second quarter of fiscal year 2003.

Table 2-1
Summary of Sampling Event, Second 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		45, 187, 350, 385, 435, 485, 525	—[a]	n/a[b]
54-1016	MDA L	N		36, 188, 318, 390, 481, 533, 601	36	MD54-03-50264
54-1018	MDA L	N	n/a	Well needs repair[c]	—	n/a
54-1107	PAMG	N	n/a	Well needs repair	—	n/a
54-1111	PAMG	N		20, 40, 50, 70, 78, 100, 139	—	n/a
54-1117	PAMG	N		20, 32, 55, 73, 82, 85	41	MD54-03-50265
54-1121	PAMG	N		20, 26, 62, 70, 76, 98, 121	26 —	MD54-03-50266 MD54-03-50278
54-2002	MDA L	Y		20, 40, 60, 80, 100, 120, 140, 157, 180, 200	60 60	MD54-03-50267 MD54-03-50276
54-2009	MDA G	Y		37, 62, 79, 92	62	MD54-03-50268
54-2010	MDA G	Y		30, 53, 95	—	n/a
54-2012	MDA L	Y		8, 28, 42	28	MD54-03-50269
54-2013	MDA L	N		20, 43, 63	—	n/a
54-2014	MDA L	N		13, 31, 46, 86	—	n/a
54-2016	MDA L	N		18, 31, 82	—	n/a
54-2020	MDA L	N		20, 40, 60, 80, 95, 120, 140, 160, 180, 200	—	n/a
54-2021	MDA L	Y		20, 40, 60, 80, 100, 120, 140, 160, 180, 200	40	MD54-03-50270
54-2022	MDA L	Y		20, 40, 60, 80, 100, 120, 140, 160, 180, 200	40	MD54-03-50271
54-2023	MDA L	Y		20, 40, 60, 80, 100, 120, 140, 159, 180, 200	—	n/a
54-2024	MDA L	N		20, 40, 60, 80, 100, 120, 140, 160, 180, 200	—	n/a
54-2025	MDA L	N		20, 60, 100, 160, 180	—	n/a
54-2026	MDA L	Y		20, 60, 100, 160, 200, 215	60	MD54-03-50272
54-2027	MDA L	N		20, 60, 100, 160, 200, 220	—	n/a
54-2028	MDA L	N		20, 60, 100, 160, 200, 220, 250	—	n/a
54-2029	MDA L	Y		20, 60, 100, 160, 200, 220, 260, 288	60	MD54-03-50273
54-2030	MDA L	Y		20, 60, 100, 160, 200, 220, 243	—	n/a
54-2031	MDA L	Y		20, 60, 100, 160, 200, 220, 260	20	MD54-03-50274
54-2032	MDA G	Y		20, 60, 100, 130, 156	60	MD54-03-50275
54-2033	MDA G	Y		20, 60, 100, 160, 200, 220, 260, 277	—	n/a
54-2034	MDA L	Y		20, 40, 60, 80, 100, 160, 200, 220, 260	—	n/a
54-2087	MDA L	N		13, 31, 46, 86	—	n/a
54-2088	MDA L	N		13, 31, 46, 86	—	n/a
54-2089	MDA L	N		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 has been taken out of service because of failure of positive pressure membranes or irreparable damage to ports.

REFERENCES

Davis, A., December 14, 1993. "RFI Work Plan for OU 1148, Approval Los Alamos National Laboratory NM0890010515," Environmental Protection Agency memorandum to J. Vozella, Dallas, Texas. (Davis 1993, 38812)

Driscoll, B., November 30, 1992. "EPA NOD to LANL," EPA memorandum to C. Rofer, Los Alamos National Laboratory, Los Alamos, New Mexico. (Driscoll 1992, 3849.3)

Environmental Restoration Project, November 14, 2000. "Quarterly Technical Report, July–September 2000," Los Alamos National Laboratory report LA-UR-00-5107, Los Alamos, New Mexico. (Environmental Restoration Project 2000, 70064)

EPA (US Environmental Protection Agency), April 1990. United States Environmental Protection Agency, Region 6 Hazardous Waste Permit (Hazardous and Solid Waste Amendments). (EPA 1990, 1585)

EPA (US Environmental Protection Agency), January 1999. "Compendium Method TA-14A, Determination of Volatile Organic Compounds (VOCs) in Ambient Air Using Specially Prepared Canisters With Subsequent Analysis by Gas Chromatography," in "Compendium of MEthods for the Determination of Toxic Organic Compounds in Ambient Air," EPA/625/R-96/010b, Office of Researach and Development, Cincinnati, Ohio. (EPA 1999, 70063)

Glatzmaier, T., November 12, 1993. "Final Notice of Deficiency (NOD) Response for Operable Unit (OU) 1148," Los Alamos National Laboratory memorandum EM-13:93-A232, Los Alamos, New Mexico. (Glatzmaier 1993, 30987)

LANL (Los Alamos National Laboratory), May 1992. "RFI Work Plan for Operable Unit 1148," Los Alamos National Laboratory document LA-UR-92-855, Los Alamos, New Mexico. (LANL 1992, 7669)