Environmental
Restoration
University of California
Environmental Science and Waste Technology (E)
Environmental Restoration, MS M992
Los Alamos, New Mexico 87545
505-667-0808/FAX 505-665-4747

U.S. Department of Energy
Los Alamos Area Office, MS A316
Environmental Restoration Program
Los Alamos, New Mexico 87544
505-667-7203/FAX 505-665-4504

Date: February 15, 2000
Refer to: E/ER:00-032

Mr. John Kieling
NMED-HRMB
P.O. Box 26110
Santa Fe, NM 87502

HSWA LADL 6/14/00

SUBJECT: QUARTERLY TECHNICAL REPORT FOR OCTOBER–DECEMBER 1999

Dear Mr. Kieling

Enclosed are two copies of the Environmental Restoration Project's Quarterly Technical Report, October-December 1999. The Quarterly Technical Report presents information from each focus area 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.

If you have questions regarding this report, please contact Dave McInroy at (505) 667–0819 or Joe Mose at (505) 667–5808.

Sincerely,

Julie A. Canepa, Program Manager
LANL/ER

Sincerely,

Theodore J. Taylor, Program Manager
DOE/LAAO

JC/TT/MB/dm

Enclosures: (1) Quarterly Technical Report, October-December 1999
(2) Certification

Cy (w/ encs.):
M. Boettner, E/ER, MS M992 (2 copies)
J. Brown, S-7, MS F674
M. Buksa, E/ET, MS M992
D. Daymon, EES-13, MS M992
A. Dorries, EES-13, MS M992
T. George, E/ER, MS M992
J. Mose, LAAO, MS A316
W. Neff, E/ET, MS M992
D. Neleigh, EPA, R.6, 6PD–N
J. Plum, LAAO, MS A316
A. Pratt, EES-13, MS M992
G. Rael, AL-ERD, MS A906
T. Taylor, LAAO, MS A316
T. Trujillo, AL-ERD, MS A906
M. Leavitt, NMED–GWQB
J. Parker, NMED–HRMB
G. Saums, NMED–SWQB
S. Yanicak, NMED–AIP, MS J993
RPF, (ER Catalog ER20000036), MS M707

Cy (w/o encs.):
M. Baker, E/DO, MS J591
R. Hutton, SAIC, MS J521
M. Kirsch, E/ER, MS M992
B. Martin, E/ER, MS M992
D. McInroy, E/ER, MS M992
J. Vozella, LAAO, MS A316
J. Bearzi, NMED–HRMB
E/ER File, MS M992

CERTIFICATION

I certify under penalty of law that these documents and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violation.

Document Title: Quarterly Technical Report, October-December 1999

Name: Julie A. Canepa Date: 2/15/00
Julie A. Canepa, Program Manager
Environmental Restoration Project
Los Alamos National Laboratory

or

Michael P. Baker, Acting Program Director
Environmental Science & Waste Technology
Los Alamos National Laboratory

Name: T. J. Taylor Date: 2-15-00
Theodore J. Taylor, Program Manager
Environmental Restoration Program
DOE–Los Alamos Area Office

or

Joseph Vozella,
Acting Assistant Area Manager of
Environmental Projects
Environment, Safety, and Health Branch
DOE–Los Alamos Area Office

LA-UR-00-473
ER20000036

Los Alamos National Laboratory

Environmental Restoration

A Department of Energy Environmental Cleanup Program

QUARTERLY TECHNICAL REPORT

October–December 1999

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FEB 2000
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LIST OF ACRONYMS AND ABBREVIATIONS

BMP	best management practice
CAB	Citizens' Advisory Board
CMS	corrective measures study
DOE	US Department of Energy
DOE-HQ	US Department of Energy-Headquarters
DOE-LAAO	US Department of Energy-Los Alamos Area Office
DX	Dynamic Experimentation (Division)
EES	Earth and Environmental Science (Division)
EES-5	Geoanalysis Group
EPA	US Environmental Protection Agency
ER	environmental restoration
ERDB	Environmental Restoration Database
ESH	Environment, Safety, and Health (Division)
ESH-1	Health Physics Operations Group
ESH 17	Air Quality Group
ESH-18	Water Quality and Hydrology Group
ESH-19	Hazardous and Solid Waste Group
ESH-20	Environmental Assessments and Resource Evaluations Group
FIMAD	Facility for Information Management, Analysis, and Display
FY	fiscal year
HE	high explosives
HRMB	Hazardous and Radioactive Materials Bureau
HSWA	Hazardous and Solid Waste Amendments
IM	interim measure
LANL	Los Alamos National Laboratory
MDA	material disposal area
MOU	memorandum of understanding
NFA	no further action
NMED	New Mexico Environment Department
NOD	notice of deficiency
NTISV	nontraditional in situ vitrification
PCB	polychlorinated biphenyl
PRS	potential release site
QC	quality control
RCRA	Resource Conservation and Recovery Act
RFI	RCRA facility investigation
RSI	request for supplemental information
SAP	sampling and analysis plan
SOP	standard operation procedure
SSHASP	Site-Specific Health and Safety Plan
SWQB	Surface Water Quality Bureau
TA	technical area
USDA	US Department of Agriculture
USGS	US Geographical Survey
VCA	voluntary corrective action
VCM	voluntary corrective measure
VOC	volatile organic compound
WWTP	Wastewater Treatment Plant

QUARTERLY TECHNICAL REPORT

OCTOBER–DECEMBER 1999

LOS ALAMOS NATIONAL LABORATORY

ENVIRONMENTAL RESTORATION PROJECT

ALBUQUERQUE OPERATIONS OFFICE

CONTRACTOR: University of California

PROJECT MANAGER: Julie Canepa

NUMBER OF POTENTIAL RELEASE SITES: Approximately 2,000

POTENTIAL WASTE: Radionuclides, High Explosives, Metals, Organics

1.0 INTRODUCTION

This quarterly report describes the technical status of activities in the Los Alamos National Laboratory (the Laboratory) Environmental Restoration (ER) Project. The activities are divided according to the current focus area 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 efforts performed this quarter in the ER Project.

2.0 FOCUS AREAS

2.1 Canyons — Focus Area Leader: Allyn Pratt

2.1.1 Ongoing Reach Investigations

2.1.1.1 Acid Canyon (within the Pueblo Canyon watershed)

Phase I sediment investigations were conducted in four reaches in Acid Canyon, a major tributary to Pueblo Canyon. These investigations included preparing detailed geomorphologic maps showing the distribution of post-1942 sediment deposits and collecting approximately 1000 field measurements for alpha, beta, and gamma radiation. The geomorphologic maps and field radiation measurements were used to develop a sampling strategy to evaluate sediment contamination in Acid Canyon. Forty-seven Phase I sediment samples were collected for either an extensive limited-suite, including radionuclides, metals, and organic constituents, or solely for isotopic plutonium analyses. These data will be used to (1) identify contaminants of potential concern and their sources; (2) perform a preliminary evaluation of the potential for risk to trail users and the plutonium inventory in Acid Canyon; and (3) identify Phase II data needs.

2.1.1.2 Pueblo Canyon

Phase I supplemental sediment investigations were conducted in reach P-1 to reduce uncertainties in the nature and sources of contamination in upper Pueblo Canyon that had been identified in the Pueblo Canyon reach report ("Evaluation of Sediment Contamination in Pueblo Canyon: Reaches P-1, P-2, P-3, and P-4"). The largest uncertainties pertain to the concentrations and sources of metals and organic contaminants in Pueblo Canyon, including the relative contributions from the former Pueblo Wastewater Treatment Plant (WWTP) and from non-Laboratory sources in the Los Alamos townsite. Eighteen sediment samples were collected for metals and organic constituents upstream and downstream of the Pueblo WWTP and from Walnut Canyon, a major tributary to Pueblo Canyon that drains the townsite.

2.1.1.3 Cañada del Buey (White Rock Land Transfer Parcel)

Phase I analytical data were assessed and a Phase II sampling strategy was developed to reduce uncertainties in the nature of possible sediment contamination in the White Rock land transfer parcel. Thirty Phase II sediment samples were collected for a limited analytical suite, which will be used to determine if there is a need for additional sampling in this reach.

2.1.1.4 Cañon de Valle

Canyons Focus Area personnel provided support for sediment characterization activities in Cañon de Valle. This work is in support of the corrective measures study (CMS) plan for Potential Release Site (PRS) 16-021(c) (the 260 outfall) conducted by the ER Project's Remedial Actions Focus Area. Analytical data were received for 30 sediment samples and were used to develop preliminary inventories of barium and high explosives (HE) in parts of Cañon de Valle.

2.1.1.5 Groundwater Activities

A single-screen well was installed at R-9. The borehole at R-12 is currently being deepened so that a three-screen well can be installed in the regional aquifer and in a perched groundwater body. Selected core samples from R-9, R-12, and R-25 were analyzed for hydraulic properties.

2.2 Material Disposal Areas — Focus Area Leader: Deba Daymon

2.2.1 General Information for Material Disposal Areas Focus Area

DOE accepted the Material Disposal Area (MDA) core document and provided comments on October 13, 1999.

Under the MDA core document task, members of the MDA Focus Area attended a 3-day training course on GoldSim, a probabilistic computer model that will be used to develop quantitative decision rules for the MDA decision strategy.

2.2.2 Technical Area Activities

2.2.2.1 TA-21

PRS 21-027(d)-99, NTISV Cold Demonstration. Analytical results from the samples related to the diesel release and taken before and after the nontraditional in situ vitrification (NTISV) cold demonstration indicated that the extent of diesel contamination has been defined around the location of the former PRS

C-21-028, an aboveground diesel tank. However, the outfall area of former PRS 21-027(d) has not been completely defined. In order to complete field activities at this consolidated PRS, a revised sampling and analysis plan (SAP) for sampling locations in the outfall area was discussed with the New Mexico Environment Department (NMED) in October 1999. A site visit was conducted with NMED in early October to determine the sampling locations for the outfall area and the appropriate analytical suite. The revised sampling and analysis approach for these samples was submitted to NMED on October 21, 1999. Seven outfall samples were collected in mid-November.

Analytical results for waste samples collected from the offgas liquid condensate were received on November 1, 1999. Results indicated that the 60 gal. of liquid condensate was mixed waste. A <90-day storage area was set up and weekly inspections were initiated. The drums were transported off-site to TA-54 during the week of December 20, 1999.

During the week of December 6, 1999, waste samples were collected from high-efficiency particulate air filters and the scrubber waters generated during the NTISV cold demonstration.

PRS 21-018(a), NTISV, Hot Demonstration at MDA V. A revised draft copy of the IM plan for the hot demonstration at MDA V was submitted to the US Department of Energy (DOE) in October for review. The revised draft copy included results from the cold demonstration.

Preparation and planning for the NTISV hot demonstration continued through October and November. The readiness review was conducted on November 9, 1999. There were several outstanding items that needed to be resolved before field activities could begin. These items included completion of the site-specific health and safety plan (SSHASP), completion of the air emission calculations by the Laboratory's Air Quality Group (ESH-17), and completion of the IM plan and its submittal to NMED.

All activities were stopped in mid-November, with one exception, in response to a DOE memorandum that requested additional information on generation of mixed waste, project roles and responsibilities, and project costs. The only activity that has continued is the air emission calculations by ESH-17.

PRS 21-005. Comments for the draft RFI report for PRS 21-005 were received from DOE in October 1999. These comments will be addressed and the RFI report will be submitted to NMED in February 2000.

DP Tank Farm, PRS 21-029. Monthly site inspections of the hydrocarbon sheen area in DP Canyon were conducted on October 22, November 19, and December 21, 1999. Copies of these inspection reports are attached (see Appendixes A, B, and C at the end of this report).

NMED agreed to a 120-day extension for responding to the response for supplemental information (RSI) received in August 1999. Meetings were held with NMED on October 4 and 20, and December 1, 1999, to discuss the RSI response being prepared by the Laboratory. The response was submitted to NMED on December 13, 1999.

2.2.2.2 TA-49

PRS 49-001(b,c,d,g), MDA AB, Areas 2, 2A, and 2B. Moisture monitoring was not conducted at MDA AB during this quarter based on discussions with NMED regarding the inadequacy of the current moisture-monitoring plan. A new plan has been proposed, and a meeting to discuss the plan with NMED has been scheduled for January 19, 2000.

2.2.2.3 TA-54

The DOE provided comments on the draft TA-54 Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) report on December 10, 1999. Focus area team members are working to address DOE comments and finalize the report.

The quarterly pore gas monitoring at MDAs G and L was completed as required by Module VIII of the Laboratory's Hazardous Waste Facility Permit. The summary results are provided in Appendix D of this report. The field screening results referenced on page 2 of Appendix D and in the Field Summary Memo are not included because of space constraints but are available through the MDA data steward, Bill Hardesty of the ER Project (505-667-0808).

2.3 Remedial Actions — Focus Area Leader: Warren Neff

2.3.1 High Explosives Production Sites (HEPS) Team

The High Explosives Production Sites Team spent most of the last quarter in fieldwork and report writing activities in support of the PRS 16-021(c) (the 260 outfall) CMS. Preparation for the IM at the outfall continued. Hydrogeology studies, including stream profiles and quarterly sampling, were completed.

2.3.1.1 TA-16

Hydrogeology. The field team continued to monitor water levels in the Cañon de Valle alluvial wells and in the intermediate-depth wells. Four of the five alluvial wells in Cañon de Valle contained water; none of the intermediate-depth boreholes contained water during this quarter.

In December, quarterly samples were collected from Cañon de Valle springs and surface water. Stable isotope samples were collected at precipitation events and during quarterly sampling. In addition, every-other-day water samples (bromide tracer) were collected from the TA-16 springs; no bromide tracer breakthrough was observed. Flow-integrated samplers were deployed in SWSC, Burning Ground, and Martin Springs. These three springs and the alluvial wells were instrumented with transducers and data loggers. Flow-integrated water samples were collected; all first quarter results are pending.

Results of geomorphologic sampling done during the fourth quarter of FY99 in Cañon de Valle were received and validated. High levels of barium (greater than 1000 mg/kg) were observed in sediments that are downgradient from MDA R, TA-16-260, and MDA P. The highest levels of barium were found in the older channel and floodplain deposits. HE levels were generally low (less than 100 mg/kg), and HE detects were scattered.

Site selection and drilling plans were completed for deep groundwater well CdV-R-15-3, the TA-16 "plume-chasing well." All readiness-review paperwork was completed, including work for the Environment, Safety, and Health (ESH)-ID, the SSHASP, the security plan, and the memorandum of understanding (MOU) with the operating group. The readiness review itself was held during December 1999.

PRS 16-021(c) CMS. The team continued its on-site study of zero-valent iron treatment of HE-contaminated soils. Preliminary results for this study suggest that the process degrades RDX and TNT, but that HMX is much more recalcitrant. The study protocol has been modified in an attempt to improve HMX breakdown. A series of meetings was held with the NMED to discuss possible implementation of a passive barrier best management practice (BMP) in Cañon de Valle. This BMP would remove HE from the surface water in the canyon.

PRS 16-021(c) IM. The IM plan was peer-reviewed during this quarter. Several meetings were held with NMED representatives to discuss technical and regulatory issues associated with the IM. A request for a health-based contained-in determination for F-listed waste was submitted to the NMED. Readiness review paperwork was initiated for the IM, including work for the ESH-ID, the SSHASP, and the MOU. Additionally, in collaboration with the Innovative Technology Remediation Demonstration program, the team began a laboratory-scale study of compost mixes potentially appropriate for use during IM activities.

Surface Water. BMPs were inspected and maintained.

2.3.2 Firing Sites Team

2.3.2.1 TA-33

Work is nearing completion on the TA-33 segmented gate system voluntary corrective action (VCA). Work during this quarter included site restoration, surface water runoff control and waste management activities. Waste profiles were completed and submitted for all waste streams accumulated at the site. The only remaining activities for this project are waste transportation and disposal and minor site restoration.

2.3.3 Industrial Sites Team

Industrial Sites Team personnel participated in a Surface Water Assessment Team meeting and provided an update regarding the Upper Sandia Canyon investigations at TA-3.

2.3.3.1 TA-3

PRS 03-010(a). Road construction plans written by the Laboratory's engineering groups spearheaded new interest in PRS 03-010(a), the vacuum pump oil disposal area, because the planned road could disturb the PRS. Because the PRS had not been formally accepted for no further action (NFA) and removal from the Laboratory's Hazardous Waste Facility Permit, the Laboratory escalated the review of the PRS proposal for NFA with the NMED.

The Laboratory, the DOE, and NMED's Hazardous and Radioactive Materials Bureau (HRMB) personnel met on October 18, 1999, to discuss several issues: (1) the need to develop the well at PRS 03-010(a), (2) well development and sampling protocols, and (3) potential use of data from samples collected from the well.

On December 1,1999, the NMED sent a letter regarding the 1996 RFI report response to the notice of deficiency (NOD) for PRS 03-010(a). The NMED letter required that the undeveloped well (B1/MW-1) within the PRS boundary be developed and sampled. In addition, the NMED letter required that further surface water and sediment samples be collected downstream from the PRS. A formal plan for these activities was approved by pertinent ER Project personnel and sent to the NMED for final approval on December 22, 1999. The NMED was involved with plan development through several meetings and conference calls.

The well was developed and sampled in December 1999; results are pending. Sediment samples in the canyon were collected from four locations, one upgradient and three downgradient from the site. The investigation focused on contaminants that are of concern to the NMED-HRMB and that are necessary for the evaluation of the hydrogeologic conceptual model.

During spring runoff, surface water samples will be collected from the channel at locations with standing water and at locations that are identified as side-channel sources of water.

PRS 03-056(c). The NMED is reviewing the VCA plan for PRS 03-056(c), the transformer storage area. The VCA project is expected to start in April 2000.

2.3.3.2 TA-35

The TA-35 integrated SAP preparation continues as follows:

- Facility for Information Analysis, Management, and Display (FIMAD) cartography personnel prepared a detailed map of the Middle Mortandad/Ten-Site Aggregate showing all PRS boundaries and ER location IDs.
- The canyon floor's sediment reach boundaries were also redefined, based on the geomorphologic mapping and sampling performed by Canyons Focus Area personnel in Mortandad, Ten-Site, and Effluent Canyons.
- To develop the conceptual model for the Ten-Site Aggregate, it was necessary to evaluate the canyon sediment data from samples taken within, and immediately upstream and downstream from, the aggregate. Sediment data associated with eight reaches were retrieved from the FIMAD Oracle database, along with TA-5, TA-35, and TA-50 sample data associated with locations within the reach boundaries. A chemist is assigning focused validation qualifiers to the data.
- The data summaries in the Mortandad Canyon work plan are being reviewed for incorporation into the aggregate conceptual model.

2.3.3.3 TA-53

An NOD regarding the TA-53 work plan/SAP was received from the NMED-HRMB on October 13. The NOD contained two major points: (1) a requirement to sample the sludge in the bottom of the radioactive liquid wastewater decay tanks [PRSs 53-006(b,c,d,e)], and (2) a requirement to sample the berm surrounding the southern surface impoundment in a statistical manner to locate radioactive hot spots from the former northern surface impoundment's drainage ditch.

PRS 53-002(a)-99, Northern and Southern Surface Impoundments. In response to the NOD cited above, archival research was done to learn more about the location of the former drainage ditch material that was excavated during construction of the southern impoundment.

It was recorded on Job # 8110-53 construction records that the radiologically contaminated soil from the former drainage ditch was removed and taken to TA-54. However, the Industrial Sites Team located no ESH Division records indicating what concentration of radioactively contaminated soil was left in place (if any), what kind of sampling was done after removal, and how much soil was removed. Therefore, to ensure that no radiologically contaminated soil is left within the southern surface impoundment berm, a sampling strategy was proposed in the NOD response, which was sent to the NMED on December 10, 1999. The strategy was derived from consulting the original berm construction plans, which show, in detail, where soil had to be added and where it was excavated. This information reduced the sample area size, as the northern berm was created by excavation instead of soil placement.

In mid-December, ER Project personnel collected samples from the southern surface impoundment sludge on top of the Hypalon liner to assess future waste stream potential. The samples required special attention during handling and shipping because of their high radioactivity readings.

Results from the fall sampling campaign for the northern surface impoundment have been received by the ER Project; however, a complete evaluation of the data is not scheduled for this fiscal year.

PRSs 53-006(a,b,c,d,e). In early December, the user group sampled the sludge in the concrete tanks at the Manuel Lujan Building for toxicity-characteristic-leaching-procedure metals. Sample results are pending. The user group plans to empty and clean out the tanks. In addition, the tank sludge will be sampled for polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), and metals. The sampling will take place before March 12, 2000.

2.3.4 Town Sites Team

The NMED Surface Water Quality Bureau (SWQB) has revisited the Tar Site (C-00-041) and is satisfied with the erosion control measures implemented and with the debris removal from the stream banks. The US Department of Agriculture (USDA) Forest Service (the property owner) also revisited the site and is again satisfied with the site conditions.

2.3.4.1 TA-0

PRSs 00-003, 00-012, and 00-030(i). During the first quarter, a VCA plan for the DOE's Los Alamos Area Office (DOE-LAAO) land transfer tract [PRSs 00-003, 00-012, and 00-030(i)] was submitted to the DOE for review.

PRS 00-019. A VCA plan addendum for the Central Wastewater Treatment Plant (PRS 00-019) was requested by the NMED-HRMB. It is currently pending resolution of final details with the subcontractor; the VCA is scheduled to resume in early January.

PRS 00-030(g). The preparation of the RFI report for PRS 00-030(g) (the old Catholic church septic tank) has resumed.

PRS 00-016. Concerns expressed by the NMED-HRMB in their approval letter for the former Small Arms Firing Range (PRS 00-016) have been satisfactorily addressed; therefore, the site will be added to a permit modification request for removal.

2.3.4.2 TA-73

TA-73 Aggregate 1. A letter from the NMED-HRMB was received authorizing the Laboratory to proceed with TA-73 Aggregate 1 (Airport Landfill) using the presumptive remedy approach outlined in the airport landfill RFI report, which was submitted in November 1998.

A site tour of the TA-73 Aggregate 1 area was conducted for DOE-LAAO, NMED-HRMB, NMED-SWQB, and NMED Solid Waste Bureau personnel. The tour included areas below the mesa top that have a large quantity of debris in arroyos leading into Pueblo Canyon. The goal of the tour was to familiarize the regulators and the DOE with the situation and with Laboratory concerns about remediating the site in conjunction with the mesa-top landfill area.

TA-73 Aggregate 2. The TA-73 RFI report for PRS Aggregate 73-2, consolidated PRS 73-005-99, is under way; all data are available and a decision peer review has been held.

2.3.5 MDA P Closure

Remote excavation of soil and debris from the West Lobe of MDA P was completed this quarter. A total of approximately 24,320 yd^3 of soil and debris have been excavated from the West Lobe; approximately 5500 yd^3 of that was excavated this quarter. Total material excavated this fiscal year was 18,866 yd^3. Remote excavation of the East Lobe began in early December.

Disposal of soil and debris continued this quarter and included the following volumes:

Contaminated soil (hazardous waste)	2160 yd^3
Solid waste soil	4360 yd^3
Decontaminated concrete	2600 yd^3
Scrap metal (steel)	400 yd^3
Decontaminated rock	958 yd^3

To date, 1305 lbs of asbestos and asbestos-containing material have also been disposed. Other material that was disposed included 126 lb of detonable HE and 3200 lbs of barium nitrate.

MDA P Closure Project presentations were given this quarter. These included a status update for the NMED on November 3, 1999, and a public outreach meeting in Santa Fe on November 9, 1999. A briefing and site tour was provided for DOE Assistant Secretary Huntoon on November 18, 1999.

2.4 Analysis and Assessment — Focus Area Leader: Alison Dorries

2.4.1 Team Activities

2.4.1.1 Data Analysis and Assessment Team

The team leader attended the December monthly HRMB meeting to discuss submittal of electronic analytical quality control (QC) data with RFI reports. It was agreed that the Laboratory would no longer submit QC data electronically, but would provide the QC data in hardcopy format upon request.

Data Quality. Team members continued work on incorporating peer review comments into six routine validation standard operating procedures (SOPs) and revising figures in order to finalize these documents. Two new SOPs, "Routine Validation of Gamma Spectroscopy Data" and "Routine Validation of Radionuclide Data," are in preparation for peer review. Several SOPs and a technical paper, "Technical Guidance on EPA Method 5035 Sampling for VOCs," were submitted for peer review. Under this task, work has been initiated on six new technical papers in addition to completing five papers already in preparation.

Data Stewardship. This activity was created in the first quarter of FY 2000 to encompass new and expanding responsibilities in support of the Integrated Information Management System and the Integrated Technical Strategy (LANL 1999, 63491). Since the Analysis and Assessment Focus Area

assumed stewardship of the ER Project electronic data, work has started on (1) testing the new design for the Environmental Restoration Database (ERDB), developed jointly with the Laboratory's Water Quality and Hydrology Group (ESH-18); (2) developing a data migration strategy from the FIMAD Oracle tables to the new ERDB table structures; (3) locating, staging, and loading all the existing R-hole data into the new ERDB table structures; (4) and developing a data management plan specific to the deep well drilling program. Team members also participated in focus area meetings for the reengineering of Field Support Facility processes.

Support to Focus Areas. Data stewards have been deployed to the operational focus areas to assist in task-specific data management and data set preparation activities, to ensure the quality and integrity of the electronic technical data.

Integrated Data Sets. This activity was created during this quarter to encompass new and expanding responsibilities in support of the Integrated Technical Status and the Integrated Information Management System, particularly with respect to development of Laboratory-specific background and baseline data sets. A field implementation plan for the background groundwater study was prepared for completion of two additional quarters of sampling. First quarter sampling activities began in December.

2.4.1.2 Risk Assessment and Review Team

Risk Assessment. The document "Screening Level Ecological Risk Assessment Methods," Revision 1, and the response to the RSI were delivered to NMED December 16, 1999. Revisions and updates continued to be made to the ecological screening level database. These revisions included database structure documentation and updates to ecological screening level calculation spreadsheets. A change control process was also added to track changes in the database over time.

The focus area leader participated as a key member on the institutional ecological risk team, established under the Integrated Resource Management Plan. A charter and criteria were developed to characterize ecological risk requirements across the Laboratory.

Team members continued work on the ecological risk screening results for Cañon de Valle. In addition, a focused evaluation of the information was performed in support of the draft problem formulation for ER Project baseline risk planning for PRS 16-021(c) (the 260 outfall). Team members also provided input to the draft response on the TA-6 RSI and attended a meeting with NMED on December 16, 1999, to discuss the RSI response, particularly as it pertains to the programmatic approach to ecological screening processes.

The Risk Assessment Team provided support to the Acid Canyon team to evaluate results of resampling floodplain sediments in November. These results are being examined in relation to the sampling carried out by the DOE Oversight Bureau earlier in the year and by the US Environmental Protection Agency (EPA) in November. Team members are working with DOE to develop under DOE Order 5400.5, "Radiation Protection of the Public and the Environment," an approach to determine further action, if any, required to protect the public. This approach will need to examine the consequences of potential exposure to a very heterogeneous distribution of radionuclides. Team members are also working with the Community Outreach Team to communicate conditions in the canyon to stakeholders, especially the County of Los Alamos and local residents who use the area for recreation.

The Risk Assessment and Community Outreach teams are working together with members of the local Pueblo environmental departments to develop a risk-based decision approach relevant to Native American uses of Laboratory lands and environs. The approach will address exposure pathways that

reflect special cultural and subsistence uses of physical and biological resources that are unique to the local Pueblos. The effort will also develop special environmental sampling plans that will allow Pueblo members to carry out sampling of unique resources or in special areas. The goals are to allow Pueblo members to become familiar with risk assessment and management techniques, to frame risk-based decisions in ways relevant to Native American land uses, and to proceed with decision-making that protects culturally relevant resource uses while protecting the cultural privacy of Native American users.

Peer Review. Six peer reviews were conducted in this quarter: a review of the ER Project Hazard Control Plan, a decision review for the TA-73-2 RFI, and four read reviews.

2.4.1.3 Strategic Decision Analysis Team

Decision Support. Decision support activities this quarter included the following:

- Drafted a revised Section 3.1 and portions of Section 3.2 of the ER Project's Installation Work Plan, to incorporate the Integrated Technical Strategy and portions of the Programmatic Assumptions Document.
- Began writing the Canyons Focus Area Implementation Plan based on the core document for Canyons Investigations. The team leader reviewed the core document to determine what parts should be included in the Canyons Implementation Plan and developed a preliminary list of features, events, and processes based on the Canyons conceptual model.
- Began writing the MDA Focus Area Implementation Plan based on the MDA core document. The team leader reviewed the core document to determine what parts of the document should be included in the MDA Implementation Plan.

Integrated Modeling. Activities this quarter included:

- Work on the completion of the Finite Element Heat and Mass computer code (FEHM) subsurface flow and transport model of LA/Pueblo Canyon watershed. New geologic data were reviewed to determine if the grid and flow model needs to be updated. The dual porosity flow algorithm was enhanced to better simulate transport in unsaturated basalt; enhancements were also made to the numerical algorithm of perched water beneath the canyon.
- Continued work on the completion of the FEHM subsurface flow and transport model of TA-54, including:
- completion of 3-D dispersion calculations,
- calibration of subsurface concentration contours to pore gas data,
- verification of the EM Flux data to calibrate surface flux,
- completion of a series of 1-D flow calibration runs.
- Began surface flow and erosion modeling of Middle LA/DP aggregate: Team members researched US Geological Survey (USGS) and EPA models/approaches to contaminant transport in watersheds. They further examined a USGS model called SPARROW (Spatially Referenced Regressions on Watershed Attributes), and an EPA tool called BASINS (Better Assessment Science Integration Point and Nonpoint Sources), which integrates geographical information system, watershed data, and environmental assessment and modeling tools.

- Researched the OTIS (One-dimensional Transport in Streams) family of codes from the USGS for linking alluvial/vadose zone systems.
- Developed preliminary GoldSim model of vadose-zone contaminant transport to help convert fate and transport models of TA-54.
- Provided geologic data from new wells to the Laboratory's Geoanalysis Group (EES-5) for evaluation/incorporation into numerical grids to maintain and update the 3-D geologic model.
- Provided Site-Wide Atlas maps to ER Project team leaders to maintain and update 2-D geologic model.
- Researched several commercial visualization and data integration packages to develop tools to visualize contamination within LA/Pueblo Canyon watershed and to provide interface to numerical model results.
- Completed incorporation of water chemistry data into flow calibration process for a single 2-D east-west cross section.
- Completed incorporation of new Stratamodel version of basin hydrostratigraphy and updated flow calibration.
- Began work on incorporation of new permeability and water level data collected in deep wells, and updated flow calibration.

2.5 Regulatory Compliance — Focus Area Leader: Tori George

2.5.1 Team Activities

2.5.1.1 Communication and Outreach Team

The Communications and Outreach Team coordinated three tours for the public during this quarter. Team members coordinated and conducted an all-day ER Project Geology Workshop/Tour for the Northern New Mexico Citizens Advisory Board (CAB) on October 19, 1999; the tour included stops at the Rio Grande Bridge, Anderson Overlook, Los Alamos Canyon, the Ice Skating Rink and the R-9 Monitoring Well. The second tour was of TA-54, Area G, on October 30, 1999; CAB members and other interested individuals participated in the tour. The third tour was a full-day Environmental and Waste Management Operation tour on November 18, 1999, for an assistant secretary of DOE-Headquarters (DOE-HQ). Areas visited included TA-54 and the following sites at TA-16: the historic V-Site, MDA P, and the R-25 monitoring well.

The Communications and Outreach Team also organized and coordinated exhibits, posters, and technical support for the ER Project public meeting that was held on November 9, 1999, in Santa Fe, New Mexico. The public meeting was held to discuss current Acid Canyon findings and the latest environmental restoration activities that were completed by the ER Project. More than 70 people attended the meeting.

On December 16, 1999, the team coordinated and hosted the first ER Project Availability Session in Los Alamos, New Mexico. The purpose of the Information Availability Sessions is for DOE and Laboratory ER Project staff to discuss, in real time and in an informal setting, current ER Project issues and activities with local governments, tribes, the media, and the public.

The Communications and Outreach Team participated in various meetings this quarter, including regularly scheduled meetings with DOE and Los Alamos County regarding ER issues that relate to Los Alamos County. Members of the team also met with the Laboratory Community Relations staff to discuss the status of the Laboratory's Public Reading Room. Discussions included what documents need to be in the reading room.

The Communications and Outreach Team attended the monthly meetings of the CAB held at the Santa Clara Pueblo Tribal Council Chambers in October, at San Juan Pueblo in November, and in Santa Fe in December. Our staff also attended the CAB Office open house in December. The staff remains in contact with the CAB members and staff through subcommittee meetings, requests for documents, and tours.

Other outreach activities included the following.

- Hosted the kick-off meeting on the Native American Risk Scenario Project with the Four Accord Pueblos; staff from San Ildefonso Pueblo and Santa Clara Pueblo attended the meeting;
- Assisted with the coordination of the White Rock Wildlife Refuge opening ceremony and attended the ceremony, which was held on October 30, 1999.
- Participated in media interviews and a site tour of the R-15 monitoring well on November 16, 1999, which resulted in a newspaper article in the *Journal North*.
- Coordinated an ER Project poster session for the Los Alamos County Recycling Office. This poster session was part of the New Mexico Trek for Trash event that was held in October in Los Alamos.

Land Transfer Activities. The ER Project Land Transfer Environmental Restoration Project Report was released from DOE Secretary Bill Richardson's office in December 1999. The report will be delivered to Congress in January 2000.

The Communications and Outreach Team was involved in the following land transfer activities during this quarter:

- provided ER Project input on the proposed location of the KRSN radio towers;
- reviewed and provided comments on two drafts of the land transfer Combined Data Report being developed by DOE-HQ; and
- attended the Land Transfer Allocation Agreement Signing Ceremony between the Los Alamos County and San Ildefonso Pueblo on December 22, 1999, at Fuller Lodge in Los Alamos.

2.5.1.2 Deliverables Tracking and Consistency Team

PRS and Future Deliverables Tracking. In support of the PRS tracking effort, team members updated the regulatory status for PRSs, produced PRS reports to support the Baseline effort, and continued conducting quality assurance checks on data for the PRS core database. The team also integrated the PRS database with other project databases to streamline the data entry effort and provided support to the Integrated Information Management Systems Team. In support of future deliverables tracking, team members coordinated with ER Project, Planning, and Control Team to develop a formalized process for tracking regulatory deliverables in the Baseline.

Closeout for PRSs. Team members continued progress on quality review for PRS closeout files, coordinated with the RPF on closeout issues, and began development of work plan closeout files.

2.5.1.3 ER Policy and Guidance Team

Permitting. Members of the team continued discussions and coordination of permit and permit-related issues with NMED, ESH Division, and DOE. NMED has not yet made a completeness determination on the Laboratory's Part B Permit Application, but during the monthly NMED/ER meeting in December, NMED Staff stated that the first section of the new draft permit may be out for review by late summer. NMED personnel and ER Policy Team members worked together to finalize permit language on well completions. Team members also began discussions with NMED on temporary authorizations for certain activities, and closure or post-closure permits for active units.

Discussions were held with the Dynamic Experimentation (DX) Division director regarding potential closure–post-closure issues with certain firing sites and coordination with ER activities.

TA-16. The team provided regulatory expertise in developing a position regarding the contained-in policy for certain wastes generated from the closure of MDA P. A determination by HRMB that certain potentially contaminated media do not contain a hazardous waste would provide greater flexibility and economy in treatment and disposal options without compromising environmental protection. The team also worked with NMED regarding the applicability of the policy for the planned IM and CMS at PRS 16-021(c) (the 260 outfall).

Team members also worked to identify a path forward for 260 outfall media contaminated with HE by helping identify a process for determining whether the wastes were reactive as defined by Title 20, Chapter 4, Part 1, Subpart II of the New Mexico Administrative Code and the RCRA. This determination is necessary to help ensure safety in handling, treating, or shipping these wastes and to maintain compliance. Team members continued working with NMED on the ER Project's proposal to blend 260 outfall soils in situ to reduce or eliminate the potential for accidental detonation. That process could potentially eliminate the D003 code that applies to reactive wastes. Pending the outcome of these decisions by NMED, a path for treatment and disposal of the wastes can be identified.

Regulatory analysis and evaluation of treatment and disposal options for 260 outfall wastes continued. On-site treatment options currently being considered by the HE Production Sites Team are zero-valent iron and composting processes. Numerous solid and hazardous waste issues need to be resolved and a path selected before the IM plan can be completed. Some of these operations may require a permit or temporary authorization. Team members also discussed with NMED a proposal to install a water treatment plant in a perennial stream in Cañon de Valle. Lastly, regulatory expertise was provided for development of closure plans for the flash pad at TA-16-387 and the oil burn tray at TA-16-394.

Compliance Orders. Team members helped develop the response to the RSI on the DP Tank Farm SAP. The SAP was submitted to NMED in response to Compliance Order (CO) 98-01. Team members also reviewed Compliance Order 99-03, which addressed findings of the NMED's annual hazardous waste inspection of 1997.

Institutional Issues. Team members worked on the following issues:

- Met with the Deputy Director of Operations' Environmental Working Group to help assess the Laboratory's position on PCBs in upper Sandia Canyon and associated ecological risk issues.
- Participated on the Laboratory's Integrated Resource Management Steering Committee. The committee is identifying roles and responsibilities of Laboratory and DOE organizations currently involved in the various aspects of resource management and completed the draft Integrated Resource Management Plan required under the Site-Wide Environmental Impact Statement.
- Participated on the ecological risk subteam by identifying the applicable regulatory drivers that effect or require ecological risk assessment.
- Worked with Canyons Focus Area and ESH Division to evaluate air and mud drilling techniques and to select methodology to be used for ER wells and those for the Hydrogeologic Workplan (LANL 1998, 59599).
- Provided regulatory and permit expertise on a completion strategy for R-9.

Other Activities. Team members performed the following miscellaneous tasks:

- Participated in the development and/or review of the integrated SAP for TA-35, the ER Project Hazard Control Plan, and the ER Waste Minimization Plan.
- Began working with ER Project and NMED personnel to review and revise the RFI report annotated outline.
- In support of a DOE request, the team evaluated the possibility of treating mixed waste generated in the NTISV cold-demonstration by incorporating it into the hot-demonstration.

2.5.1.4 Regulatory Integration and Operations Team

Team members provided assistance with regulatory compliance issues for activities within the ER Project this quarter. Personnel provided regulatory reviews of documents prepared by the ER Project and participated in peer reviews. Deployed personnel from the Laboratory's Hazardous and Solid Waste Group (ESH-19) participated in the reviews as subject matter experts regarding hazardous and solid waste issues. Documents receiving reviews included an interim measure plan, a closure plan, sampling and analysis plans, responses to a request for supplemental information, an RFI glossary, the nontraditional in situ vitrification completion report, a corrective measure study, monthly status reports, a waste analysis plan, ESH-ID forms, and a quarterly technical report. Monthly meetings with NMED continued as well as meetings regarding special topics such as permit modification, IMs, VCAs, and RSI responses.

Team members continued working with facility managers, the office of Deputy Director for Laboratory Operations, and ESH Division, focusing on Laboratory integration to enhance environmental protection and compliance.

Team personnel continued information-gathering, meetings, and site visits with NMED to address NFAs proposed in previous requests for permit modification but requiring additional documentation and/or sampling. Each site requires additional research and in many instances a site visit to clarify outstanding issues. To date, 30 recommendations for NFA have been approved for removal from Module VIII of the

Laboratory's Hazardous Waste Facility Permit, approximately 40 PRSs require between two and five samples to confirm NFA, and approximately 20 PRSs have been withdrawn.

Team personnel also began review of potential PRSs for consolidation as part of the FY00 Annual Unit Audit and continued preparation of the ER PRS closeout files.

Clean Water Compliance. Team members participated in various meetings this quarter addressing clean water compliance issues. Monthly SWMU Working Group meetings were held with representatives from Los Alamos County, DOE, and the Laboratory's ER Project. Issues discussed included the Acid Canyon press release, proposed fieldwork at PRS 0-019 (Central Waste Water Treatment Plant), DOE-LAAO land transfer parcel, TA-73 landfill, TA-74 sampling status, proposed independent Bayo Canyon Study by the county, and long-term stewardship issues.

Team members met with the Watershed Management Core Team to consider what actions will be taken when watershed analytical indices are exceeded and to finalize details of the surface water sampling approach. Additional meetings were held to begin the Pajarito Plateau watershed Partnership, which includes most of the surrounding stakeholders; members discussed the wording of a statement of purpose.

The Surface Water Assessment Team meeting was held to discuss recommendations for BMPs needed at ER/facility management sites. The Regulatory Compliance Team member provided a summary of the BMPs installed throughout the Laboratory during FY99. The status of the Sandia Canyon characterization effort and the upcoming PRS 16-021(c) (the 260 outfall) interim measure were also discussed at the meeting.

Other clean water compliance activities included the following.

- Continued follow-up on the design for the installation of BMPs at TA-33 segmented gate system sites, including PRSs C-33-003, 33-007(b) and 33-010(c). The Laboratory's Health Physics Group (ESH-1), ESH-18, and the facility manager approved the design for the BMPs; the work has been completed.

- Reviewed and commented on the draft PRS 16-021(c) interim measure plan and provided support in the modification of the current Storm Water Pollution Prevention Plan for the proposed activities.

- Participated in the focus group to help standardize ER Project sample collection logs for soil, sediment, surface water, and groundwater sampling and for waste field screening; chain-of-custody forms were also standardized. This effort is key to the implementation of an effective information management system.

Waste Management Activities. Team members reviewed and provided comments on waste characterization strategy forms and waste profile forms, conducted waste storage area inspections, and coordinated waste transportation and disposal from several sites. Team members are also pursuing the "as found" interpretation of waste remaining at PRS 21-024(i) (a septic system) in an effort to find a path forward for waste disposal. Regulatory support continued for the MDA P project. The Annual Waste Minimization Awareness Plan was delivered to NMED.

Natural Resource Damage Assessment Activities. A representative of the Regulatory Integration and Operations Team continued to work on National Resource Damage Assessment issues. The team member participated in Interagency Wildfire Management Team meetings and represented the ER

Project on the focus team for development of the Laboratory Implementation Requirement (LIR 404-30-02.0), and the Laboratory Implementation Guidelines addressing the National Environmental Policy Act and biological and cultural resources. The representative also participated in the following activities:

- a conference on Biological Research in the Jemez Mountains and Pajarito Plateau;
- a field trip to the Piñon-Juniper Habitat Restoration and Treatment project, a cooperative effort by the Laboratory's Ecology Group (ESH-20) and the USDA Forest Service; and
- an ESH-20 conference on Natural Resources at LANL, reviewing past accomplishments and future activity associated with natural resource management on DOE property.

Support to Focus Areas. Personnel from the Regulatory Integration and Operations Team are deployed to the operational focus areas to provide support regarding regulatory issues. In addition to providing general regulatory compliance assistance this quarter, such as reviewing documents, attending operational focus area meetings, and participating in peer reviews for operational focus area documents, the deployed members of the team assisted with the following tasks in the operational focus areas.

Canyons Activities. The deployed regulatory generalist assigned to the Canyons Focus Area provided support by helping develop and signing as waste generator and waste coordinator for the waste characterization strategy form for deep wells R-19, R-27, R-28, and CdV-R-15-3. Other activities included the coordination for the disposal of 50 gal. of low-level radioactive liquid waste at TA-50, submitting notifications for fieldwork at R-12, R-19, Acid and Pueblo Canyon, and background groundwater sampling. The generalist also assisted in the preparation and review of the Response to RSI for PRSs 18-003(a–h) submitted to NMED on December 21, 1999, and assisted in sample collection activities in Acid and Pueblo Canyons.

ESH-19 personnel provided assistance to the Canyons Focus Area by drafting proposed language changes regarding well installation and design to Module VIII of the Laboratory's Hazardous Waste Facility Permit.

MDA Activities. The deployed regulatory generalist assigned to the MDA Focus Area participated in numerous meetings regarding the pending NTISV hot demonstration at MDA V, which is currently scheduled for March or April 2000. Other activities included assisting with preparation, review, and comment resolution of several documents, including the draft IM plan for the NTISV hot demonstration; the RSI Response for the DP Tank Farm Work Plan, Volume II; and the TA-54 RFI report.

In support of field activities, the team member completed waste management and stormwater inspections at TA-21 and TA-49 and supervised the BMP maintenance activities to repair storm damage to the cap on MDA AB. The team member communicated and met with NMED numerous times regarding the content and approach of the DP Tank Farm RSI response and the status of the IM plan for the NTISV hot demonstration. An additional meeting and site visit are scheduled for January 2000 to gain timely approval of the work plan and allow fieldwork to begin in April 2000. The deployed team member also met with NMED to determine confirmatory sample locations in the drainage of consolidated PRS 21-027(d)-99. NMED agreed to the sample locations and analytical suite. Samples were collected in November 1999 and the VCM report proposing NFA for PRS 21-027(d)-99 will be submitted to NMED during the second quarter of FY 2000.

Meetings with NMED were scheduled for early January to present a new moisture monitoring system and approach for MDA AB at TA-49 prior to implementation of that approach.

Remedial Actions Activities. The deployed regulatory generalist assigned to Remedial Actions Focus Area participated in meetings regarding various activities this quarter. Topics of discussion included RSI comments and draft responses for the TA-6 RFI report; the tank and berm sampling strategies and activities for the TA-53 NOD response; the TA-73 Airport RFI report and the path forward strategy for site activities; and the TA-53 facility waste management activities potentially affecting ER activities.

Support was also provided for PRS 16-021(c) (the 260 outfall) activities. Meetings were held with ER Project and NMED personnel to discuss the contained-in policy and "blending" issues for the site. Following the discussions, the generalist prepared two letters to NMED-HRMB regarding these topics: one letter requesting a decision regarding the contained in policy for environmental media generated during IM activities at the 260 outfall, and second letter (a draft) providing notification of in situ blending of HE-contaminated and reactive soil/sediment/tuff during IM activities at the outfall. The deployed generalist also provided a regulatory review of the IM plan for the 260 outfall and incorporated initial ESH-19 comments into the waste analysis plan for the outfall.

Other activities included the following:

- participated in a tour of all corrective action sites at TA-16, including the burning ground and the 260 outfall;
- participated in peer reviews and/or internal reviews of an RFI report for TA-73, Aggregate 73-2; and an RSI response for the TA-53 work plan/SAP and SAP addendum;
- prepared extension request letters for the NOD tank sampling requirement at TA-53 and the TA-6 RFI report RSI response;
- completed and submitted the TA-16-394 closure plan;
- researched background documentation (for Laboratory Legal Counsel) related to activities associated with PRS 0-016, the Small Arms Firing Range; and
- initiated the integrated safety management task involving review and comparison of ER Project standard operating procedures with Laboratory implementation requirements (LIRs) .

3.0 REFERENCES

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

LANL (Los Alamos National Laboratory), July 1999. "Integrated Technical Strategy," Los Alamos National Laboratory Report LA-UR-99-3506, Los Alamos, New Mexico. (LANL 1999, 63491)

Appendix A

DP Tank Farm Site Inspection, October 22, 1999

APPENDIX A

DP Tank Farm "Localized Hydrocarbon Sheen Area" Site Inspection

1. Date and time of visit:

The site was visited on **Friday, October 22, 1999** at 2:30 pm by Rick Kelley and Michelle Benak. Conditions were sunny, warm (65°), dry and calm. The first snow fell last Sunday (2 – 3inches) with a hard freeze afterward.

2. Presence of standing or running water:

Standing water was present in holes and low spots in the drainage. No water flow was observed. The precipitation total from the previous inspection until this inspection is 0.83 inches (measured at the TA-53 station).

3. Location and intensity of odors, staining, or sheens:

No odor was detected in the ambient air in the streambed. Petroleum hydrocarbon odors were noted in soil in the streambed wall at the soil – rock interface approximately 15 yards upstream from where samples were first collected. Slight staining of sand grains and small rock faces was observed. A hydrocarbon sheen (Photo 4) was observed on standing water just above the large pool of water shown in Photo 2. No odors or sheens were observed in the area of the existing sample locations.

4. Medium in which stains or sheens are observed:

Staining was observed in soil and sand in the streambed wall, and underneath small rocks in the streambed.. Sheens were observed on standing water near the soil stain areas

5. How odors were identified:

No hydrocarbon odor was detected in the ambient air near the streambed. Petroleum hydrocarbon odors were identified in loose sediment held to the nose.

6. Photographs:

The following photographs were made during the site visit;

Photo 1. Culverts at the head of DP Canyon showing no water flow.

Photo 2. Large pool of water with submerged clay-filled fracture in streambed.

Photo 3. Standing water in the area of soil staining, looking downstream.

Photo 4. Hydrocarbon sheen on standing water in area of soil staining.

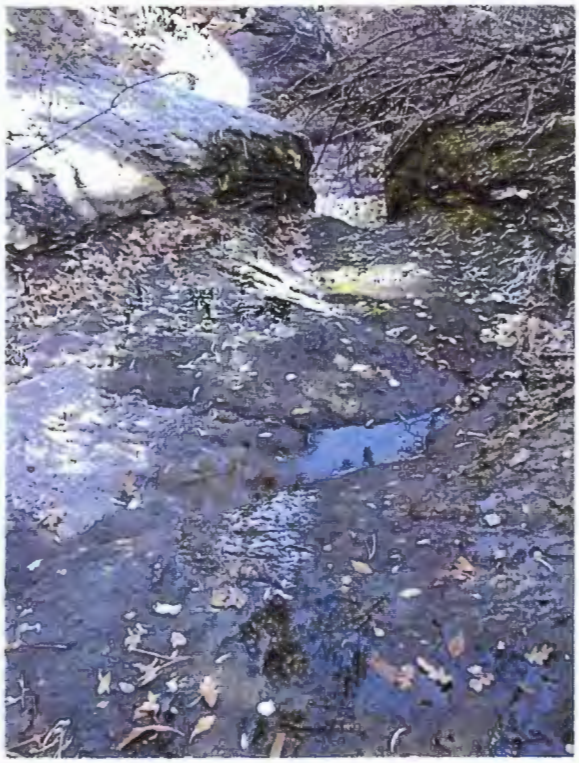

Photo 5. Standing water in the area of sample locations, looking downstream.

Photo 6. Standing water in the area of sample locations, looking upstream.

Appendix B

DP Tank Farm Site Inspection, November 19, 1999

APPENDIX B

DP Tank Farm "Localized Hydrocarbon Sheen Area" Site Inspection

1. Date and time of visit:

The site was visited on **Friday, November 19, 1999** at 2:15 pm by Rick Kelley and Robert Trujillo. Conditions were sunny, cool (45-50°), very dry and calm.

2. Presence of standing or running water:

A small amount of standing water was present in holes and low spots in the drainage. No water flow was observed. A thin layer of ice was present on pools of standing water. No precipitation has fallen since last month's visit.

3. Location and intensity of odors, staining, or sheens:

No odor was detected in the ambient air in the streambed, possibly due to lower ambient air temperatures. Strong petroleum hydrocarbon odors were noted in soil in the streambed wall at the soil – rock interface approximately 15 yards upstream from where samples were first collected. Heavy staining of sand grains and small rock faces was observed (Photo 4). A slight hydrocarbon sheen was observed on standing water and ice just in the small pool of water shown in Photo 2. No odors or sheens were observed in the area of the existing sample locations.

4. Medium in which stains or sheens are observed:

Heavy staining was observed in soil and sand in the streambed wall, and underneath small rocks in the streambed. The soil appeared to be hydrocarbon saturated. Sheens were observed on standing water near the soil stain areas

5. How odors were identified:

No hydrocarbon odor was detected in the ambient air near the streambed. Petroleum hydrocarbon odors were identified in loose sediment held to the nose.

6. Photographs:

The following photographs were made during the site visit;

Photo 1. Culverts at the head of DP Canyon, showing no water flow.

Photo 2. Small pool of standing water with submerged clay-filled fracture in streambed.

Photo 3. Steambed in the area of soil staining, looking downstream.

Photo 4. Heavy petroleum hydrocarbon staining in streambed soil (surface debris was pushed aside to show staining), located just above small water pool in Photo 3.

Photo 5. Area of previous sample locations, looking downstream, showing lack of standing water.

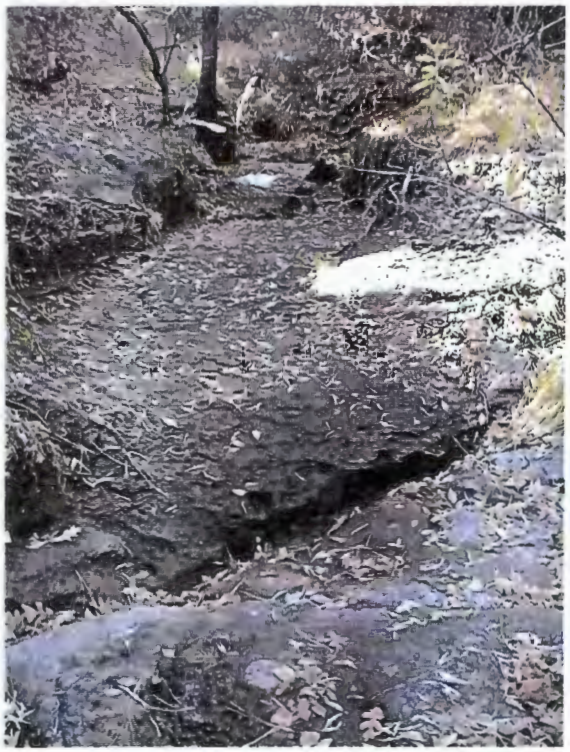

Photo 6. Area of previous sample locations, looking upstream, showing lack of standing water.

Appendix C

DP Tank Farm Site Inspection, December 21, 1999

DP Tank Farm "Localized Hydrocarbon Sheen Area" Site Inspection

1. Date and time of visit:

The site was visited on **Tuesday, December 21, 1999** at 2:15 pm by Rick Kelley and Michele Benak. Conditions were cloudy, very cold (20-25°), and breezy with light snow in the area. A dusting of snow remained on the ground.

2. Presence of standing or running water:

No standing water was present in holes and low spots in the drainage. However, a thick layer of ice was present most everywhere on the canyon bottom. 0.26 inches of precipitation have fallen since last month's visit.

3. Location and intensity of odors, staining, or sheens:

No odors were detected in the air in the streambed soils, due to low temperatures and the thickness of ice. No soil staining was observed due to the frozen nature of the soil. No hydrocarbon sheens were observed in the ice.

4. Medium in which stains or sheens are observed:

No stains or sheens were observed

5. How odors were identified:

No hydrocarbon odors were detected.

6. Photographs:

The following photographs were made during the site visit;

Photo 1. Culverts at the head of DP Canyon, showing no water flow.

Photo 2. Small pool of solid ice with submerged clay-filled fracture in streambed.

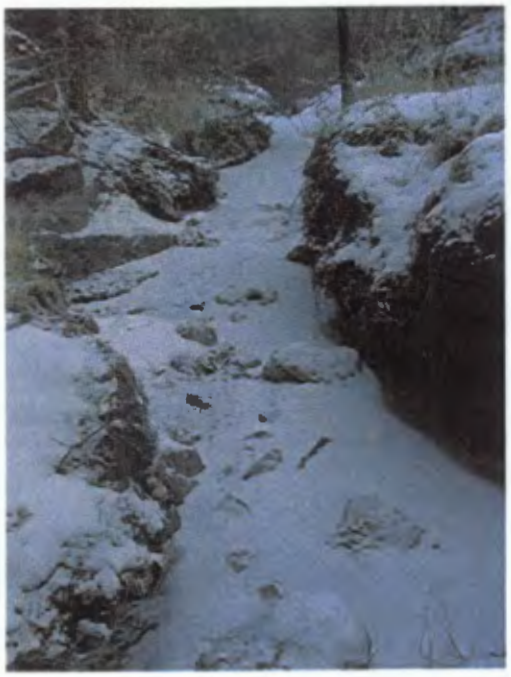

Photo 3. Streambed in the area of soil staining, looking downstream, showing frozen soil and ice build-up.

Photo 4. Thick ice build-up in the area of previous sample locations, looking upstream.

Photo 5. Area of previous sample locations, looking downstream, showing ice build-up.

Appendix D

Quarterly Pore Gas Sampling Results,
TA-54 MDA L and MDA G, Third Quarter FY99

APPENDIX D

QUARTERLY PORE GAS SAMPLING AT TA-54 MDA L AND MDA G THIRD QUARTER FY99

prepared for:

MDA Focus Area
Environmental Restoration Project
Los Alamos National Laboratory

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QUARTERLY PORE GAS SAMPLING AT TA-54 MDA L AND MDA G THIRD QUARTER FY99

MDA Focus Area
Environmental Restoration Project
Los Alamos National Laboratory

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1. INTRODUCTION

This report documents the results from quarterly subsurface pore gas sampling at Los Alamos National Laboratory ("the Laboratory") Technical Area 54 (TA-54) as required by the HSWA Module (Module VIII) of the Laboratory's RCRA Operating Permit in Section C.5, Unsaturated Zone Monitoring (EPA 1990). The approved plan (EPA 1993b) for pore gas sampling is described in the Laboratory's response (LANL 1993a) to an EPA Notice of Deficiency (EPA 1993a) addressing the Laboratory's RFI work plan for TA-54 (LANL 1992).

1.1 SAMPLING PLAN

A total of 28 ER Project wells are available for pore gas sampling at TA-54. The sampling and analysis plan calls for the collection of samples from 12 wells each quarter. Of these 12, seven are to be selected from a list of ten wells located at Material Disposal Area L (MDA L), and two are to be selected from a list of four wells located at MDA G. Thus nine of the 12 samples collected each quarter are constrained to a defined set of 14 wells. This leaves three samples per quarter that may be distributed among the remaining 14 available pore gas sampling wells. In addition to the required sampling, all available wells are now screened with field instruments, rather than only those formally sampled.

Two methods for sampling and analysis were identified in the work plans (LANL 1992, LANL 1993a). We use the SUMMA canister method with analysis by gas chromatography/mass spectrometry by EPA TO-14 (EPA 1988, LANL 1997).

SUMMA canister samples are drawn from one of the several sampling ports available at each well. The port sampled is the one showing the highest contaminant concentrations as determined by field screening of every port using field instruments. 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 volatile organic compounds.

Field quality assurance samples are a duplicate sample drawn from one well, an equipment blank of "zero" air or nitrogen drawn through the sampling apparatus in the working area, and a sample of a known "calibration" gas. Laboratory quality assurance for the TO-14 gas chromatography method includes internal surrogates, replicates, blanks, laboratory control samples, and reference standards.

1.2 SAMPLING STRATEGY

The defined set of wells on which the quarterly sampling focuses is biased toward 1) identifying changes in contaminant concentrations at the perimeter of the relatively well characterized plume at MDA L as an indicator of outward plume expansion, and 2) monitoring for changes in contaminant concentrations within the plume at MDA G as an indicator of changes warranting further attention.

2. *QUARTERLY SAMPLING FOR THIRD QUARTER FY99*

The sampling for the third quarter of FY99 (April - June 1999) was conducted in the period May 11 - 20, 1999.

2.1 *SAMPLING EVENT*

Table 2-1 identifies the wells sampled (from the list of all wells available), indicates how the selection of wells for this quarter matched against the expectations for the plume monitoring program, and lists the port at each well from which the SUMMA canister sample was drawn. The list of wells has been updated to remove some wells that have been taken out of service because of either failure of SEAMIST® membranes or irreparable blocked ports.

Eleven wells were sampled rather than 12 expected from the approved sampling plan, because additional sampling was done on the two canyon wells. Seven of the ten wells identified for MDA L were sampled, as expected. Two of the four identified MDA G wells were sampled, meeting sampling plan expectations. Neither the nitrogen purge "field blank" nor the calibration gas "known" QA samples were collected because of a field team oversight. Two samples were taken from each of the two canyon wells, 54-1015 and 54-1016. Each canyon well was sampled from ports immediately above and below the upper surface of the Cerros del Rio basalt formation.

A total of 14 samples were collected for laboratory analysis:

- 7 samples from within and around MDA L,
- 2 samples from within and around MDA G,
- 4 samples from the two canyon wells beneath MDA L, and
- 1 duplicate sample,

No calibration gas sample or nitrogen purge field blank was collected this quarter.

Monitoring of the pore gas sampling ports with field instruments to identify the port having the highest contaminant concentrations for each well was conducted as planned. The field screening has been expanded to all available wells, including 5 wells maintained by the Performance Assessment Management Group (PAMG). This change was made at the request of the ER Project MDA Focus Area TA-54 Team Leader. The field screening results are documented in Attachment 1.

2.2 *OVERVIEW OF RESULTS*

Validated results were received for 14 SUMMA canister samples submitted for analysis. Appendix A contains the analyte list for the gas chromatograph/mass spectrometer method, with the typical detection limits. Appendix B provides

Table 2-1 Summary of Sampling Event

Well ID	Site	On Defined Sampling List	Number of Pore Gas Ports Monitored with Field Instruments (port depths, ft)		Depth of Port Sampled with SUMMA Canister, Sample ID
54-1015	MDA L		7	(45, 187, 350, 385, 435, 485, 525)	350' MD54-99-0027 350' Dup MD54-99-0028 285' MD54-99-0029
54-1016	MDA L		7	(36, 188, 318, 390, 481, 533, 601)	318' MD54-99-0025 390' MD54-99-0026
54-1018	MDA L		Well needs repair		
54-1107	PAMG		Well needs repair		
54-1111	PAMG		7	(20, 40, 50, 70, 78, 100, 139)	
54-1117	PAMG		6	(20, 32, 55, 73, 82, 85)	
54-1121	PAMG		7	(20, 26, 62, 70, 76, 98, 121)	
54-2001	MDA L		Well needs repair		
54-2002	MDA L	X	10	(20, 40, 60, 80, 100, 120, 140, 157, 180, 200)	186' MD54-99-0020
54-2009	MDA G	X	4	(37, 62, 79, 92)	62' MD54-99-0019
54-2010	MDA G	X	3	(30, 53, 95)	
54-2012	MDA L	X	3	(8, 28, 42)	
54-2013	MDA L			(20, 43, 63)	
54-2014	MDA L		4	(13, 31, 46, 86)	
54-2016	MDA L		3	(18, 31, 82)	
54-2020	MDA L		10	(20, 40, 60, 80, 95, 120, 140, 160, 180, 200)	
54-2021	MDA L	X	10	(20, 40, 60, 80, 100, 120, 140, 160, 180, 200)	100' MD54-99-0021
54-2022	MDA L	X	10	(20, 40, 60, 80, 100, 120, 140, 160, 180, 200)	80' MD54-99-0023
54-2023	MDA L	X	9	(20, 40, 60, 80, 100, 120, 140, 159, 200)	200' MD54-99-0017
54-2024	MDA L		10	(20, 40, 60, 80, 100, 120, 140, 160, 180, 200)	
54-2025	MDA L		5	(20, 60, 100, 160, 180)	
54-2026	MDA L	X	6	(20, 60, 100, 160, 200, 215)	
54-2027	MDA L		6	(20, 60, 100, 160, 200, 220)	
54-2028	MDA L		7	(20, 60, 100, 160, 200, 220, 250)	
54-2029	MDA L	X	8	(20, 60, 100, 160, 200, 220, 260, 288)	
54-2030	MDA L	X	7	(20, 60, 100, 160, 200, 220, 243)	100' MD54-99-0018
54-2031	MDA L	X	7	(20, 60, 100, 160, 200, 220, 260)	100' MD54-99-0022
54-2032	MDA G	X	5	(20, 60, 100, 130, 156)	
54-2033	MDA G	X	8	(20, 60, 100, 160, 200, 220, 260, 277)	277' MD54-99-0016
54-2034	MDA L	X	7	(20, 40, 60, 80, 100, 160, 200, 220, 260)	100' MD54-99-0024
54-2087	MDA L		4	(13, 31, 46, 86)	
54-2088	MDA L		4	(13, 31, 46, 86)	
54-2089	MDA L		4	(13, 31, 46, 86)	

Total wells sampled	11
MDA L defined list wells sampled (7 expected)	7
MDA G defined list wells sampled (2 expected)	2
QA Samples Taken	1 Field Duplicate

Table 2-2 Summary of SUMMA Canister Results for TCA (ppmv*)

Well ID	FY97 1Q	2Q	3Q	4Q	FY98 1Q	2Q	3Q	4Q	FY99 1Q	2Q	3Q	4Q	Average	Std Dev
54-1003		12.7							Out of service				12.7	
54-1004		82.1	106.0			90.9	82.9		Out of service				90.5 +/-	11.1
54-1005		21.9							Out of service				21.9	
54-1015					0.9		0.1			0.05	**0.16**		0.3 +/-	0.4
54-1016							19.2		14.0		**1.1**		11.4 +/-	9.3
54-1018		37.5							Out of service				37.5	
54-2001									Well needs repair					
54-2002				358.0	398.0	291.0	424.0			370.0	**520.0**		393.5 +/-	76.5
54-2009			104.0	69.2		46.5			110.0		**120.0**		89.9 +/-	30.9
54-2010			18.8		14.5		167.0	19.0		22.0			48.3 +/-	66.4
54-2012					100.0	2,830.0			2,500.0	3,500.0			2,232.5 +/-	1,481.3
54-2013														
54-2014	1,000.0	837.0							1,400.0				1,079.0 +/-	289.7
54-2016								1,300.0		670.0			985.0	
54-2020	38.3			95.6			70.1		73.0				69.3 +/-	23.6
54-2021			125.0			29.5		50.0		54.0	**64.0**		64.5 +/-	36.1
54-2022				98.4	76.3	56.6	819.0		110.0		**120.0**		213.4 +/-	297.6
54-2023	12.0		20.0	27.7			216.0	22.0	22.0		**20.0**		48.5 +/-	74.0
54-2024		59.2					492.0	45.0					198.7 +/-	254.1
54-2025	216.0	163.0		136.0			159.0						168.5 +/-	33.8
54-2026	2.7	1.5	2.8		2.7			4.2		3.4			2.9 +/-	0.9
54-2027	14.2	24.5			514.0			23.0					143.9 +/-	246.8
54-2028	3.9		3.0					4.9					3.9 +/-	1.0
54-2029			0.8		0.4	16.9	15.8	1.0	1.1	1.0			5.3 +/-	7.6
54-2030	1.8		2.1	1.3		15.9	37.2	1.4		2.3	**2.6**		8.1 +/-	12.8
54-2031				24.9	345.0		240.0	20.0	27.0		**29.0**		114.3 +/-	142.0
54-2032			29.7	15.4		10.9		13.0		14.0			16.6 +/-	7.5
54-2033			0.2		0.1		0.0		0.0		**0.0**		0.1 +/-	0.1
54-2034			3.6	2.7		7.5	41.5		4.9	0.2	**7.3**		9.7 +/-	14.3
54-2087	2,540.0	3,110.0		3,610.0									3,086.7 +/-	535.4
54-2088	1,410.0	6,970.0								2,400.0			3,593.3 +/-	2,965.9
54-2089	1,760.0	1,910.0	5,540.0										3,070.0 +/-	2,140.4

* ppmv = parts per million by volume.

Table 2-3 Summary of Associated B&K Screening Results TCA (ppmv[a])

Well ID	FY97 1Q	2Q	3Q	4Q	FY98 1Q	2Q	3Q	4Q	FY99 1Q	2Q	3Q	4Q	Average	Std Dev
54-1003									Out of service				n/a[b]	n/a
54-1004			15.1			133.0	150.0		Out of service				99.4 +/-	73.5
54-1005									Out of service				n/a	n/a
54-1015					0.0					0.6	**4.5**		1.7 +/-	2.4
54-1016					0.0	17.6			12.5		**5.2**		8.8 +/-	7.8
54-1018									Out of service				n/a	n/a
54-2001									Well needs repair				n/a	n/a
54-2002				402.0	380.0	505.0	490.0			338.0	**321.0**		406.0 +/-	76.7
54-2009			90.9	95.3		113.0			85.1		**78.3**		92.5 +/-	13.1
54-2010			49.3		3.9		24.4	40.8		0.0			23.7 +/-	21.8
54-2012						3,760.0	3,570.0		2,360.0	2,140.0			2,957.5 +/-	825.5
54-2013													n/a	n/a
54-2014	488.0	297.0							1,250.0				678.3 +/-	504.2
54-2016						1,050.0		986.0		590.0			875.3 +/-	249.2
54-2020	22.6			154.0			107.0		64.7				87.1 +/-	56.4
54-2021			81.7	38.9		45.5		53.4		33.7	**31.0**		47.4 +/-	18.7
54-2022				72.4	81.6	88.6	96.6		87.6		**73.4**		83.4 +/-	9.4
54-2023	7.7		11.5	25.1			28.7	36.0	8.6		**13.9**		18.8 +/-	11.1
54-2024		34.2					62.7	51.6					49.5 +/-	14.4
54-2025	92.3	146.0		70.4			203.0						127.9 +/-	59.3
54-2026	4.0	4.1	7.5		0.0			2.7		2.6			3.5 +/-	2.5
54-2027	12.4	18.1			109.0			25.6					41.3 +/-	45.5
54-2028	3.7		5.5					6.1					5.1 +/-	1.2
54-2029	5.3		5.1		0.0	72.3	0.0	0.0	0.0	0.0			10.3 +/-	25.1
54-2030	4.1		5.1	2.8		4.9	4.7	0.0		1.1	**6.3**		3.6 +/-	2.1
54-2031				27.5	28.2		32.8	25.9	13.5		**19.0**		24.5 +/-	7.0
54-2032			17.3	10.4		8.8		19.2		5.0			12.1 +/-	6.0
54-2033			2.6		0.0		0.0		0.0		**0.0**		0.5 +/-	1.2
54-2034			8.9	3.8		0.0	10.5		0.0	0.0	**6.7**		4.3 +/-	4.5
54-2087	1,270.0	871.0		2,330.0									1,490.3 +/-	754.0
54-2088	2,680.0	2,450.0								1,650.0			2,260.0 +/-	540.6
54-2089	989.0	826.0	1,850.0										1,221.7 +/-	550.2

[a] ppmv = parts per million by volume.

[b] n/a = not applicable.

tables giving the detected compounds for each well. Tables 2-2 and 2-3 summarize this quarter's results, along with previous results for each well. In several FY98 sampling events we had noted several wells exhibiting results about an order of magnitude above their historical levels, and above the associated B&K screening values. Sample collection procedures were changed and in the results for the last four quarters, all of those wells have returned to former levels and there is good agreement between the SUMMA and B&K results.

2.3 *EVALUATION OF QUALITY ASSURANCE SAMPLES*

A field duplicate sample was submitted for analysis. The duplicate sample was drawn from the same port on a well immediately after the original sample. No calibration gas sample or field blank sample was collected as part of this event.

The field duplicate was collected on well 54-1015 at the 350 ft sampling port (above the basalt). As indicated in Table 2-4, the agreement between the two samples was good, considering the very low levels sampled.

Table 2-4 Field Duplicate Sample Results Comparison: Well 54-1015 (350 ft)

		Sample MD54-99-0027 (Det Lmt 0.0026)	Sample MD54-99-0028 (Det Lmt 0.0005)	
CAS No.	**Compound**	**ppmv**[a]	**ppmv**	**RPD**[b]
75-15-0	Carbon Disulfide	Not Detected	0.0150	-
56-23-5	Carbon Tetrachloride	Not Detected	0.0015	-
75-71-8	Dichlorodifluoromethane	0.0084	0.0066	24.0%
75-35-4	Dichloroethene[1,1-]	0.0180	0.0150	18.2%
78-87-5	Dichloropropane[1,2-]	Not Detected	0.0017	-
75-09-2	Methylene Chloride	0.0028	0.0016	54.6%
91-20-3	Napthalene	Not Detected	0.0016	-
109-66-0	Pentane	Not Detected	0.0038	-
127-18-4	Tetrachloroethene	0.0076	0.0068	11.1%
76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	0.0460	0.0360	24.4%
71-55-6	Trichloroethane[1,1,1-]	0.1600	0.1300	20.7%
79-01-6	Trichloroethene	0.0490	0.0430	13.0%
75-69-4	Trichlorofluoromethane	0.0190	0.0140	30.3%
95-63-6	Trimethylbenzene[1,2,4-]	Not Detected	0.0014	-

[a] ppmv = parts per million by volume.

[b] rpd = relative percent difference.

3. *REFERENCES*

EPA 1988 Compendium Method TO-14, "The Determination of Volatile Organic Compounds in Ambient Air Using SUMMA Passivated Canister Sampling and Gas Chromatography Analysis. May 1988.

EPA 1990 "Hazardous Waste Permit, Module VIII, Special Conditions Pursuant to the 1984 Hazardous and Solid Waste Amendments to RCRA for Los Alamos National Laboratory." US Environmental Protection Agency, Region 6, ID Number NM0890010515. May 23, 1990.

EPA 1993a "Notice of Deficiency, RFI Work Plan for OU-1148." US Environmental Protection Agency, Region 6. Date Not Known, 1993.

EPA 1993b "RFI Work Plan for OU-1148" US Environmental Protection Agency, Region 6. Approval letter from A. Davis to J. Vozella. December 14, 1993.

EPA 1993c "Pilot Extraction Study Plan for the Organic Vapor Plume." US Environmental Protection Agency, Region 6. Approval letter from W. Honker to J. Vozella. August 25, 1993

LANL 1992 "RFI Work Plan for Operable Unit OU-1148." Los Alamos National Laboratory Report LA-UR-92-855. May 1992 (ER ID 7669).

LANL 1993a "Response to EPA Notice of Deficiency, RFI Work Plan for OU-1148." Los Alamos National Laboratory. November 12, 1993.

LANL 1993b "Pilot Extraction Study Plan for the Organic Vapor Plume at MDA L." Los Alamos National Laboratory, July 1993 (ER ID 22430)

LANL 1997 "Sampling of Vapor Port Equipped Monitoring Wells" LANL ER SOP-06.3, Draft in review. May, 1999.

APPENDIX A

ANALYTE LIST AND DETECTION LIMITS FOR SUMMA CANISTER ANALYSIS

Detection limits vary from sample to sample depending on the compounds present, their concentrations, and dilutions that are made by the laboratory. The lowest detection limits that have been obtained are presented below.

CAS No.	Compound	Concentration (ppmv*)
67-64-1	Acetone	0.01200
75-05-8	Acetonitrile	0.00250
107-02-8	Acrolein	0.00120
107-13-1	Acrylonitrile	0.00120
71-43-2	Benzene	0.00050
100-44-7	Benzyl Chloride	0.00050
75-27-4	Bromodichloromethane	0.00050
75-25-2	Bromoform	0.00050
74-83-9	Bromomethane	0.00050
106-99-0	Butadiene[1,3-]	0.00050
106-97-8	Butane[n-]	0.00050
71-36-3	Butanol[1-]	0.00120
78-93-3	Butanone[2-]	0.00120
75-15-0	Carbon Disulfide	0.00050
56-23-5	Carbon Tetrachloride	0.00050
107-05-1	Chloro-1-propene[3-]	0.00050
108-90-7	Chlorobenzene	0.00050
124-48-1	Chlorodibromomethane	0.00050
75-45-6	Chlorodifluoromethane	0.00050
75-00-3	Chloroethane	0.00050
67-66-3	Chloroform	0.00050
74-87-3	Chloromethane	0.00120
110-82-7	Cyclohexane	0.00050
124-18-5	Decane[n-]	0.00050
106-93-4	Dibromoethane[1,2-]	0.00050
74-95-3	Dibromomethane	0.00050
76-14-2	Dichloro-1,1,2,2-tetrafluoroethane[1,2-]	0.00050
95-50-1	Dichlorobenzene[1,2-]	0.00050
541-73-1	Dichlorobenzene[1,3-]	0.00050
106-46-7	Dichlorobenzene[1,4-]	0.00050
75-71-8	Dichlorodifluoromethane	0.00050
75-34-3	Dichloroethane[1,1-]	0.00050
107-06-2	Dichloroethane[1,2-]	0.00050
75-35-4	Dichloroethene[1,1-]	0.00050
156-59-2	Dichloroethene[cis-1,2-]	0.00050
156-60-5	Dichloroethene[trans-1,2-]	0.00050
78-87-5	Dichloropropane[1,2-]	0.00050
10061-01-5	Dichloropropene[cis-1,3-]	0.00050
10061-02-6	Dichloropropene[trans-1,3-]	0.00050
60-29-7	Diethyl Ether	0.00120
112-40-3	Dodecane[n-]	0.00050
100-41-4	Ethylbenzene	0.00050
142-82-5	Heptane	0.00050
87-68-3	Hexachlorobutadiene	0.00050
110-54-3	Hexane	0.00050
591-78-6	Hexanone[2-]	0.00120
98-82-8	Isopropylbenzene	0.00050
67-56-1	Methanol	0.02500
1634-04-4	Methyl tert-Butyl Ether	0.00120
108-10-1	Methyl-2-pentanone[4-]	0.00120

75-09-2	Methylene Chloride	0.00050
98-83-9	Methylstyrene[alpha-]	0.00050
91-20-3	Naphthalene	0.00050
111-84-2	Nonane[1-]	0.00050
111-65-9	Octane[n-]	0.00050
109-66-0	Pentane	0.00120
103-65-1	Propylbenzene[1-]	0.00050
100-42-5	Styrene	0.00050
79-34-5	Tetrachloroethane[1,1,2,2-]	0.00050
127-18-4	Tetrachloroethene	0.00050
108-88-3	Toluene	0.00050
76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	0.00050
120-82-1	Trichlorobenzene[1,2,4-]	0.00050
71-55-6	Trichloroethane[1,1,1-]	0.00050
79-00-5	Trichloroethane[1,1,2-]	0.00050
79-01-6	Trichloroethene	0.00050
75-69-4	Trichlorofluoromethane	0.00050
95-63-6	Trimethylbenzene[1,2,4-]	0.00050
108-67-8	Trimethylbenzene[1,3,5-]	0.00050
1120-21-4	Undecane[n-]	0.00050
108-05-4	Vinyl Acetate	0.00120
75-01-4	Vinyl Chloride	0.00050
1330-20-7	Xylene (Total)	0.00050
95-47-6	Xylene[1,2-]	0.00050

* ppmv = parts per million by volume.

APPENDIX B

SUMMA CANISTER RESULTS ABOVE DETECTION LIMITS

Well:	**54-2033**	**FY99 3Q**
Depth:	**277 FT**	**MDA G Perimeter**
Date	**5/11/99**	**Det. Lmt. 0.00050**
Sample ID:	**MD54-99-0016**	

CAS	Compound	Concentration (ppmv)
67-64-1	Acetone	0.02200
107-02-8	Acrolein	0.00150
106-97-8	Butane[n-]	0.00067
78-93-3	Butanone[2-]	0.00280
75-15-0	Carbon Disulfide	0.00100
75-45-6	Chlorodifluoromethane	0.00180
75-71-8	Dichlorodifluoromethane	0.01100
75-34-3	Dichloroethane[1,1-]	0.00050
107-06-2	Dichloroethane[1,2-]	0.00069
75-35-4	Dichloroethene[1,1-]	0.00800
110-54-3	Hexane	0.00071
75-09-2	Methylene Chloride	0.00720
127-18-4	Tetrachloroethene	0.00250
108-88-3	Toluene	0.00055
76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	0.00210
71-55-6	Trichloroethane[1,1,1-]	0.01900
79-01-6	Trichloroethene	0.01200
75-69-4	Trichlorofluoromethane	0.01100

Well:	**54-2023**	**FY99 3Q**
Depth:	**200 FT**	**MDA L Mid Plume**
Date	**5/12/99**	**Det. Lmt. 0.41000**
Sample ID:	**MD54-99-0017**	

CAS	Compound	Concentration (ppmv)
67-66-3	Chloroform	0.51000
75-35-4	Dichloroethene[1,1-]	1.20000
76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	4.70000
71-55-6	Trichloroethane[1,1,1-]	20.00000
79-01-6	Trichloroethene	5.30000
75-69-4	Trichlorofluoromethane	0.92000

Well:	**54-2030**	**FY99 3Q**
Depth:	**100 FT**	**MDA L Perimeter**
Date	**5/12/99**	**Det. Lmt. 0.02100**
Sample ID:	**MD54-99-0018**	

CAS	Compound	Concentration (ppmv)
56-23-5	Carbon Tetrachloride	0.02400
67-66-3	Chloroform	0.11000
75-71-8	Dichlorodifluoromethane	0.04100
75-35-4	Dichloroethene[1,1-]	0.11000
75-09-2	Methylene Chloride	0.02200
127-18-4	Tetrachloroethene	0.07900
76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	0.68000
71-55-6	Trichloroethane[1,1,1-]	2.60000
79-01-6	Trichloroethene	0.58000
75-69-4	Trichlorofluoromethane	0.14000

Well:	**54-2009**	**FY99 3Q**
Depth:	**62 FT**	**MDA G Perimeter**
Date	**5/13/99**	**Det. Lmt. 1.00000**
Sample ID:	**MD54-99-0019**	

CAS	Compound	Concentration (ppmv)
75-34-3	Dichloroethane[1,1-]	4.30000
75-35-4	Dichloroethene[1,1-]	5.30000
127-18-4	Tetrachloroethene	1.30000
71-55-6	Trichloroethane[1,1,1-]	120.00000

Well:	**54-2002**	**FY99 3Q**
Depth:	**186 FT**	**MDA L Central**
Date	**5/17/99**	**Det. Lmt. 7.60000**
Sample ID:	**MD54-99-0020**	

CAS	Compound	Concentration (ppmv)
67-66-3	Chloroform	18.00000
75-34-3	Dichloroethane[1,1-]	9.80000
107-06-2	Dichloroethane[1,2-]	14.00000
75-35-4	Dichloroethene[1,1-]	15.00000
78-87-5	Dichloropropane[1,2-]	21.00000
75-09-2	Methylene Chloride	68.00000
127-18-4	Tetrachloroethene	12.00000
108-88-3	Toluene	11.00000
76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	96.00000
71-55-6	Trichloroethane[1,1,1-]	520.00000
79-01-6	Trichloroethene	140.00000
75-69-4	Trichlorofluoromethane	60.00000

Well:	**54-2021**	**FY99 3Q**
Depth:	**100 FT**	**MDA L Mid Plume**
Date	**5/18/99**	**Det. Lmt. 0.80000**
Sample ID:	**MD54-99-0021**	

CAS	Compound	Concentration (ppmv)
75-34-3	Dichloroethane[1,1-]	1.70000
107-06-2	Dichloroethane[1,2-]	2.00000
75-35-4	Dichloroethene[1,1-]	1.00000
75-09-2	Methylene Chloride	2.60000
127-18-4	Tetrachloroethene	0.85000
76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.50000
71-55-6	Trichloroethane[1,1,1-]	64.00000
79-01-6	Trichloroethene	17.00000

Well:	**54-2031**	**FY99 3Q**
Depth:	**100 FT**	**MDA L Mid Plume**
Date	**5/18/99**	**Det. Lmt. 0.41000**
Sample ID:	**MD54-99-0022**	

CAS	Compound	Concentration (ppmv)
75-34-3	Dichloroethane[1,1-]	0.58000
75-35-4	Dichloroethene[1,1-]	0.88000
110-54-3	Hexane	0.42000
75-09-2	Methylene Chloride	2.60000
127-18-4	Tetrachloroethene	1.00000
76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	2.20000
71-55-6	Trichloroethane[1,1,1-]	29.00000
79-01-6	Trichloroethene	8.20000
75-69-4	Trichlorofluoromethane	0.47000

Well:	**54-2022**	**FY99 3Q**
Depth:	**80 FT**	**MDA L Mid Plume**
Date	**5/18/99**	**Det. Lmt. 0.79000**
Sample ID:	**MD54-99-0023**	

CAS	Compound	Concentration (ppmv)
67-66-3	Chloroform	0.83000
75-71-8	Dichlorodifluoromethane	0.91000
75-34-3	Dichloroethane[1,1-]	3.10000
107-06-2	Dichloroethane[1,2-]	3.90000
75-35-4	Dichloroethene[1,1-]	1.30000
75-09-2	Methylene Chloride	4.20000
127-18-4	Tetrachloroethene	1.20000
76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.70000
71-55-6	Trichloroethane[1,1,1-]	120.00000
79-01-6	Trichloroethene	28.00000

Well:	**54-2034**	**FY99 3Q**
Depth:	**100 FT**	**MDA L Perimeter**
Date	**5/18/99**	**Det. Lmt. 0.07100**
Sample ID:	**MD54-99-0024**	

CAS	Compound	Concentration (ppmv)
75-34-3	Dichloroethane[1,1-]	0.13000
75-35-4	Dichloroethene[1,1-]	0.14000
75-09-2	Methylene Chloride	0.14000
76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	0.13000
71-55-6	Trichloroethane[1,1,1-]	7.30000
79-01-6	Trichloroethene	1.20000
75-69-4	Trichlorofluoromethane	0.11000

Well:	**54-1016**	**FY99 3Q**
Depth:	**318 FT**	**MDA L Canyon**
Date	**5/20/99**	**Det. Lmt. 0.01100**
Sample ID:	**MD54-99-0025**	

CAS	Compound	Concentration (ppmv)
106-97-8	Butane[n-]	0.02700
56-23-5	Carbon Tetrachloride	0.05000
110-82-7	Cyclohexane	0.02900
75-71-8	Dichlorodifluoromethane	0.09600
75-35-4	Dichloroethene[1,1-]	0.55000
78-87-5	Dichloropropane[1,2-]	0.01100
110-54-3	Hexane	0.01600
109-66-0	Pentane	0.04000
127-18-4	Tetrachloroethene	0.02400
76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	0.99000
71-55-6	Trichloroethane[1,1,1-]	1.10000
79-01-6	Trichloroethene	0.46000
75-69-4	Trichlorofluoromethane	0.16000

Well:	**54-1016**	**FY99 3Q**
Depth:	**390 FT**	**MDA L Canyon**
Date	**5/20/99**	**Det. Lmt. 0.00100**
Sample ID:	**MD54-99-0026**	

CAS	Compound	Concentration (ppmv)
75-15-0	Carbon Disulfide	0.00150
67-66-3	Chloroform	0.00100
75-71-8	Dichlorodifluoromethane	0.00510
75-34-3	Dichloroethane[1,1-]	0.00260
75-35-4	Dichloroethene[1,1-]	0.02300
78-87-5	Dichloropropane[1,2-]	0.00110
110-54-3	Hexane	0.00120
75-09-2	Methylene Chloride	0.00190
127-18-4	Tetrachloroethene	0.00400
76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	0.01900
71-55-6	Trichloroethane[1,1,1-]	0.08300
79-01-6	Trichloroethene	0.02900
75-69-4	Trichlorofluoromethane	0.00440
75-01-4	Vinyl Chloride	0.00110

Well:	**54-1015**	**FY99 3Q**
Depth:	**350 FT**	**MDA L Canyon**
Date	**5/20/99**	**Det. Lmt. 0.00260**
Sample ID:	**MD54-99-0027**	

CAS	Compound	Concentration (ppmv)
75-71-8	Dichlorodifluoromethane	0.00840
75-35-4	Dichloroethene[1,1-]	0.01800
75-09-2	Methylene Chloride	0.00280
127-18-4	Tetrachloroethene	0.00760
76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	0.04600
71-55-6	Trichloroethane[1,1,1-]	0.16000
79-01-6	Trichloroethene	0.04900
75-69-4	Trichlorofluoromethane	0.01900

Well:	**54-1015**	**FY99 3Q**
Depth:	**350 FT**	**MDA L Canyon**
Date	**5/20/99**	**Det. Lmt. 0.00054**
Sample ID:	**MD54-99-0028**	

CAS	Compound	Concentration (ppmv)
75-15-0	Carbon Disulfide	0.01500
56-23-5	Carbon Tetrachloride	0.00150
75-71-8	Dichlorodifluoromethane	0.00660
75-35-4	Dichloroethene[1,1-]	0.01500
78-87-5	Dichloropropane[1,2-]	0.00170
75-09-2	Methylene Chloride	0.00160
91-20-3	Naphthalene	0.00160
109-66-0	Pentane	0.00380
127-18-4	Tetrachloroethene	0.00680
76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	0.03600
71-55-6	Trichloroethane[1,1,1-]	0.13000
79-01-6	Trichloroethene	0.04300
75-69-4	Trichlorofluoromethane	0.01400
95-63-6	Trimethylbenzene[1,2,4-]	0.00140

Well:	**54-1015**	**FY99 3Q**
Depth:	**385 FT**	**MDA L Canyon**
Date	**5/20/99**	**Det. Lmt. 0.00054**
Sample ID:	**MD54-99-0029**	

CAS	Compound	Concentration (ppmv)
75-15-0	Carbon Disulfide	0.00078
75-71-8	Dichlorodifluoromethane	0.00360
75-34-3	Dichloroethane[1,1-]	0.00170
107-06-2	Dichloroethane[1,2-]	0.00054
75-35-4	Dichloroethene[1,1-]	0.01600
78-87-5	Dichloropropane[1,2-]	0.00070
75-09-2	Methylene Chloride	0.00096
127-18-4	Tetrachloroethene	0.00310
76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	0.00750
71-55-6	Trichloroethane[1,1,1-]	0.04000
79-01-6	Trichloroethene	0.01500
75-69-4	Trichlorofluoromethane	0.00240
95-63-6	Trimethylbenzene[1,2,4-]	0.00065
1120-21-4	Undecane[n-]	0.00054

ATTACHMENT 1

FIELD SUMMARY MEMO

M E M O R A N D U M

MK/PMC
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TO: **John Hopkins** **CC: Diana Hollis, Dennis Newell**
FROM: Bill Hardesty, John Smith, Ken Kisiel
DATE: 8 July 1999

SUBJ: MDA L & G Pore Gas Sampling Field Report
3rd Quarter FY99

This memo serves to inform you that the third quarterly pore gas sampling event of FY99 for MDAs L and G began on May 11, 1999 and was completed on May 20, 1999.

The enclosed data spreadsheets summarize the screening results for the boreholes that were sampled. In this quarter's sampling event the field screening included all available wells, including those maintained by the Performance Assessment Monitoring Group. Our list of available wells has been updated to remove some that have been taken out of service because of either failure of SEAMIST membranes or irreparable blocked ports.

As shown in Table 1, SUMMA canister sampling was conducted on 11 wells, rather than 12 as expected from the approved sampling plan, because of additional sampling that was conducted on the two canyon wells. The expected nitrogen purge equipment blank was not collected because of a field team oversight. The expected field duplicate sample was collected on well 54-1015. The calibration gas "known" QA sample was not collected again because of a field team oversight. Table 1 also indicates how the SUMMA sampling of wells for this quarter matched against the expectations set out for the plume monitoring program:

- Eleven wells were sampled, rather than the 12 expected.
- Seven of the ten wells specified for MDA L by sampled, as expected.
- Two of the four wells specified for MDA G were sampled, as expected.

In addition, two SUMMA samples were taken from each of the two canyon wells, 54-1015 and 54-1016. Each well was sampled from ports immediately above and below the upper surface of the Cerros del Rio Basalt. In total, 14 SUMMA samples were collected.

Attachment 1 presents the Bruel and Kjaer (B&K) model 1302 infrared photoradiometer field data for TCA, TCE, Freon-11, Freon-113, H_2O, and CO_2 for each port of each borehole monitored. In total 27 wells with a total of 170 ports were monitored with the B&K.

If you have any questions regarding the pore gas sampling task, do not hesitate to contact me. SUMMA canister analytical data from the laboratory will be summarized after they are received.

Table 1 Borehole Pore Gas Sampling

Available Boreholes			B& K Screened	SUMMA Sampled
54-1015	**ER**		**X**	**XXX[1,2]**
54-1016	**ER**		**X**	**XX[1]**
54-1107	**PAMG**		**Well Needs Repair**	
54-1110	**PAMG**		**X**	
54-1111	**PAMG**			
54-1117	**PAMG**			
54-1121	**PAMG**			
54-2001	**ER**		**Well Needs Repair**	
54-2002	**ER**	(NMED L)	**X**	**X**
54-2009	**ER**	(NMED G)	**X**	**X**
54-2010	**ER**	(NMED G)	**X**	
54-2012	**ER**	(NMED L)	**X**	
54-2013	**ER**			
54-2014	**ER**		**X**	
54-2016	**ER**		**X**	
54-2020	**ER**		**X**	
54-2021	**ER**	(NMED L)	**X**	**X**
54-2022	**ER**	(NMED L)	**X**	**X**
54-2023	**ER**	(NMED L)	**X**	**X**
54-2024	**ER**		**X**	
54-2025	**ER**		**X**	
54-2026	**ER**		**X**	
54-2027	**ER**		**X**	
54-2028	**ER**		**X**	
54-2029	**ER**	(NMED L)	**X**	
54-2030	**ER**	(NMED L)	**X**	**X**
54-2031	**ER**	(NMED L)	**X**	**X**
54-2032	**ER**	(NMED G)	**X**	
54-2033	**ER**	(NMED G)	**X**	**X**
54-2034	**ER**	(NMED L)	**X**	**X**
54-2087	**ER**		**X**	
54-2088	**ER**		**X**	
54-2089	**ER**		**X**	
Number of Wells Sampled				**11**
NMED L Wells Sampled (7 expected).				7
NMED G Wells Sampled (2 expected).				2

[1] Two ports sampled in this well, one above and one within basalt

[2] Duplicate sample collected