



## **New Mexico Environment Department DOE Oversight Bureau**



### **2008 Annual Report**

**Environmental Oversight and Monitoring  
At Department of Energy Facilities  
In New Mexico**

## **Cover Photograph**

Upper Left: A Bureau staff scientist records data from the ambient air monitoring station outside the Carlsbad office.

Upper Right: A Bureau staff scientist collects a snowpack sample at Sandia Crest.

Lower Left: Bureau staff members in a raft assemble and tie up to a motor boat minutes before being towed out of Cochiti Lake following the 2008 White Rock Canyon and Rio Grande springs sampling event.

Lower Right: Bureau staff collects samples for low-level tritium/helium and noble gases at one of the old exploration wells, H-1, in the US Government-owned Valle Toledo.

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## LIST OF ACRONYMS

AIP	Agreement-In-Principle
AIRNET	Air Radioactive Particulate and Tritium Monitoring Network at LANL
AQB	Air Quality Bureau (NMED)
BMP	Best Management Practices
BSL-3	Bio-Safety Lab, Level Three
CCNS	Concerned Citizens for Nuclear Safety
CDC	Centers for Disease Control and Prevention
CEMRC	Carlsbad Environmental Monitoring and Research Center (WIPP)
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980 (also known as “Superfund”)
CH Waste	Contact Handled Waste (WIPP)
COOC	Compliance Order on Consent
CRMG	Community Radiation Monitoring Group
CWA	Clean Water Act
D & D	Decommissioning and Demolition
DARHT	Dual Access Radiographic Hydro Test Facility
DDT	DichloroDiphenylTrichloroethane
DOE	U.S. Department of Energy
DOE/NNSA	National Nuclear Security Administration of the DOE, operators of the LASO, SSO, and WSO
DOE OB	DOE Oversight Bureau (Bureau) of the NMED
DPR	Direct Penetrating Radiation
EA	Environmental Assessment
EMIG	Effluent Monitoring Improvement Group (WIPP)
EIS	Environmental Impact Statement
EES-6 Group	Earth and Environmental Sciences Division at LANL
EMSR	Environmental Monitoring, Surveillance and Remediation (Committee) (NNMCAB)
EPA	U.S. Environmental Protection Agency
EVEMG	Embudo Valley Environmental Monitoring Group
FFCA	Federal Facility Compliance Act
FFY	Federal Fiscal Year
GAP	Government Accountability Project
GIS	Geographic Information Systems
GNEP PEIS	Global Nuclear Energy Partnership Programmatic Environmental Impact Statement
GTCC LLW	Greater-Than-Class C Low-Level (Radioactive) Waste
HEPA	High Efficiency Particulate Air
HWB	Hazardous Waste Bureau (NMED)
IEER	Institute for Energy and Environmental Research
IWD	Integrated Work Document
LANL	Los Alamos National Laboratory, the physical location

LANS	LANS, LLC is the Los Alamos National Security, Limited Liability Corporation, the operators of the LANL facility
LANSCE	Los Alamos Neutron Science Center (LANL)
LASG	Los Alamos Study Group
LASO	Los Alamos Site Office (DOE)
LA-UR	Los Alamos – Unclassified Report (LANL)
LC/MS/MS	Liquid Chromatography/Mass Spectrometry/MS (Tandem MS)
LRR1	Lovelace Respiratory Research Institute (Formerly the Inhalation Toxicology Research Institute)
LVAS	Low-Volume Air Sampling
MDA	Material Disposal Area
MW	Monitoring Well
MWL	Mixed Waste Landfill (SNL)
NAS	National Academy of Sciences
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NMDOH	New Mexico Department of Health
NMDOT	New Mexico Department of Transportation
NMED	New Mexico Environment Department
NMWQCC	New Mexico Water Quality Control Commission
NNMC	Northern New Mexico College
NPDES	National Pollutant Discharge Elimination System
NNMCAB	Northern New Mexico Citizens’ Advisory Board
NNSA	National Nuclear Security Administration
NRC	Nuclear Regulatory Commission
PCB	Polychlorinated Biphenyl
PPE	Personal Protective Equipment
QAPP	Quality Assurance Project Plan
RAC	Risk Assessment Corporation
RACER	Risk Analysis Communication Evaluation Reduction
RCRA	Resource Conservation and Recovery Act
RH Waste	Remote Handled Waste (WIPP)
RSRL	Regional Statistical Reference Level
R-Well	Regional Aquifer Monitoring Well
Ri-Well	Intermediate Aquifer Monitoring Well
SAP	Sampling Analysis Plan
SEIS	Site Environmental Impact Statement
Sandia	Sandia Corporation, the operators of the SNL/NM facility
SNL	Sandia National Laboratories/New Mexico, the physical location of the facility in Albuquerque
SSO	Sandia Site Office (DOE)
SWMU	Solid Waste Management Unit
SWQB	Surface Water Quality Bureau (NMED)
TA	Technical Area
TLD	Thermoluminescent Dosimeter
TMDL	Total Maximum Daily Load

UNM	University of New Mexico
USGS	U.S. Geological Survey
VOC	Volatile Organic Compound
WIPP	Waste Isolation Pilot Plant, the physical location southeast of Carlsbad
WQH	Water Quality and Hydrology (LANL)
WSO	WIPP Site Office (DOE)
WTS	Washington Tru Solutions (WIPP), operators of the WIPP facility



## **EXECUTIVE SUMMARY**

The mission of the New Mexico Environment Department DOE Oversight Bureau is to assure that activities at DOE facilities in New Mexico are managed and controlled in a manner that is protective of public health and safety, and the environment. The mission is achieved through four primary objectives: (1) Assessing DOE management of its New Mexico facilities to assure attainment of public health and environmental standards; (2) Providing inputs to DOE for prioritization of its cleanup and compliance activities; (3) Developing and implementing an independent monitoring and oversight program; and (4) Increasing public knowledge and awareness of environmental matters at DOE facilities in New Mexico.

In order to meet these objectives, the New Mexico Environment Department DOE Oversight Bureau (Bureau) continues to develop and implement vigorous monitoring and assessment programs at Los Alamos National Laboratory (LANL), Sandia National Laboratories (SNL), the Lovelace Respiratory Research Institute (LRRI) formerly the Inhalation Toxicology Research Institute (ITRI) located on Kirtland Air Force Base (KAFB), the Waste Isolation Pilot Plant (WIPP), and areas surrounding these facilities. These programs include both joint and independent evaluations for environmental and public health protection of all media, including air, soils and sediments, groundwater, and surface water. In addition, the Bureau collects macro invertebrate and fish tissue samples. The focus of these evaluations is on the potential contaminant levels of heavy metals, organic and inorganic compounds, and radionuclides.

The Bureau conducts radioactive particulate and tritium monitoring of the air at WIPP, SNL and LANL. Results have correlated well with facility-generated particulate and tritium data, as applicable. The Bureau conducts penetrating radiation monitoring using electret devices at all three facilities and results correlate well with facility-generated data from Thermoluminescent Dosimeters (TLDs) and fall within expected background ranges. The WIPP Oversight Section has added monitoring locations along the WIPP route, and it continues to collect samples from the exhaust shaft at WIPP. The SNL Oversight Section has Electret monitoring stations as far away from KAFB as Placitas and Los Lunas. All LANL Oversight Section air monitoring stations are currently co-located with facility units. However, consideration is being given to independent monitoring in the LANL region by the Bureau.



The Bureau has continued to conduct biota monitoring at LANL and SNL, and it began biota and soil sampling at WIPP in February 2008 for the first time.

The Bureau assesses the potential impacts of past and present activities at LANL and SNL by monitoring groundwater conditions in perched systems and regional aquifers. At LANL, this also includes the monitoring of municipal supply wells. As part of the groundwater monitoring, the Bureau is providing stable isotope, tritium/helium, radiocarbon and noble gas data to support the determination of contaminant-mixing fractions, diffusion-dispersion gradients, contaminant travel times, and variability in recharge rates and spatial migration.

Stormwater monitoring is conducted at both SNL and LANL. At SNL the focus is on outfall flows below Solid Waste Management Units (SWMUs) and Environmental Restoration (ER) sites. At LANL the focus is primarily on characterizing and quantifying offsite contaminant transport in the Los Alamos Canyon watershed. The Bureau provides estimates of the inventory of plutonium transported through the canyon and compares total PCB and dioxin levels to state water quality criteria.

The Bureau monitors wastewater discharges at both LANL and SNL. The Bureau monitored effluent from four NPDES outfalls at LANL and at the wastewater outfalls at SNL. The Bureau evaluates legacy waste at decommissioning and demolition sites as well as construction sites at LANL and SNL, and advises facility staff on the status of erosion control and the use of best management practices.

The Bureau continues to collect fish tissue samples from fish caught at Cochiti and Abiquiu reservoirs as well as northern reaches of the Rio Grande and several feeder systems. The samples are analyzed for polychlorinated biphenyls, organochlorinated pesticides, polybrominated diphenyl ethers (flame retardants), dioxin/furans, arsenic, and methyl mercury. Data from these samples are provided to the New Mexico Department of Health, the New Mexico Game and Fish Department and the Surface Water Quality Bureau of NMED to be used to re-evaluate consumption advisories to the public on the Rio Grande for PCBs and mercury. The Bureau sampled the benthic macroinvertebrate (aquatic insect) communities in the watersheds flowing from LANL into Pajarito, Sandia and Los Alamos canyons to evaluate post-Cerro Grande fire watershed recovery.

# DOE Oversight Bureau Overview

## Background

On June 27, 1989, the Secretary of Energy announced a 10-point initiative that addressed the need for the Department of Energy (DOE) to improve its accountability in the areas of public health, safety, and environmental protection. The initiative allowed states with DOE facilities direct access to those facilities and provided funding to underwrite the costs of state oversight of DOE environmental monitoring programs. To implement this program, the DOE entered agreements, collectively known as the Agreements-In-Principle, with various states. In October 1990, New Mexico Governor Garrey Carruthers signed the first Agreement-In-Principle, known then as the Environmental Oversight and Monitoring Agreement between the United States Department of Energy and the State of New Mexico. It specified the facilities at Los Alamos (LANL) and Albuquerque (SNL/NM and ITRI). In November 2000, Governor Gary Johnson signed the third Agreement-In-Principle, and in October 2005 the AIP was once again renewed. That AIP was extended in September 2008 through September 2013.

In 2004, DOE and the State of New Mexico joined in discussions to establish a DOE Oversight Bureau office in Carlsbad, NM for the oversight of activities at the Waste Isolation Pilot Plant (WIPP). These discussions were the result of the loss of the Environmental Evaluation Group (EEG), which was established by federal law for the independent oversight of the design and disposal phases of the WIPP project. In 2004, DOE and NMED established a separate basic Agreement-In-Principle for WIPP. In late 2005, a revised and comprehensive AIP was developed between the State of New Mexico and the DOE along with a separate Scope of Work and Statement of Joint Objectives to further specify the roles of NMED oversight for WIPP operations. The agreement between the NMED and the DOE provides for three years of funding at \$600,000 per year, payable in equal quarterly installments. That agreement also was extended in September 2008 through September 2013.

In calendar year (CY) 2008 the Bureau continued progress on implementing a vigorous program of environmental monitoring and study of legacy environmental contaminants. Environmental samples totaling 254 (142 LANL, 112 SNL) with a contract value of approximately \$232,336 were shipped to laboratories for analyses. The Bureau evaluated environmental data and provided DOE site officials with updates on findings as well as trend analyses, as appropriate. The Bureau continued its collaboration with LANL scientists on joint investigations and reports, and it coordinated split sampling activities as well as independent environmental monitoring at SNL and WIPP. Overall, the Bureau expended approximately 96% of its anticipated work plan budget, which is based on the federal fiscal year (October 2007 through September 2008). Part of the expenditure shortfall resulted from personnel vacancies and reduced sampling opportunities from low precipitation and other seasonal impacts on projects.

## Administrative:

Staff delivered the revised (2008) Quality Management Plan (QMP) to DOE.

Staff delivered the final 2006 Annual Report to DOE and published the report on the Bureau website. Staff compiled the 2007 Annual Report, and it has conducted the final review and

editing with the DOE representatives prior to publication. A workplan for FFY 2009 has been submitted and approved.

The Bureau Chief and the Los Alamos Oversight Section (LOS) Manager evaluated four sites in Los Alamos proper as possible locations for a new site office. The lease in White Rock for the LOS Office expired in October 2008 and LANS would not provide leased office space for the Bureau after that time. The Bureau has been working with DOE to arrange for new office space and to secure steady funding for increased operational costs and this will be determined in FY09. In the meantime, the White Rock office space has been leased on a month-by-month basis. The laboratory management had provided this space accommodation to the Bureau on behalf of the DOE for the past 16 years. The new operator of the laboratory, LANS, has elected to discontinue this service and return the responsibility to the DOE, as stipulated in the Agreement-In-Principle.

The Bureau released two reports this year: “Naturally Occurring Perchlorate in Ground Water, Northern Rio Grande Basin, New Mexico” by Michael Dale and “Los Alamos National Laboratory Legacy Contaminant Study at the Buckman Direct Diversion” by Dave Englert.

### **Personnel:**

Sandia Oversight Section filled three new positions this year. The Business Operations Specialist position was filled in April, the Environmental Scientist/Specialist position in May and the Office and Admin Support Worker in November. The Sandia Oversight Section currently has one vacancy.

The Los Alamos Section has one vacancy. Three college students were hired as summer interns to assist with field work.

The WIPP Section currently has one vacancy and three positions were filled. The Office and Admin Support worker and two Environmental Scientist/Specialist positions were all hired in November 2008. One college student was hired as a summer intern to assist with field work.

### **Financial:**

The 2008 calendar year includes the last three quarters of FFY 2008 and the first quarter of FFY 2009. Through the AIP grant for FFY 2008, the Bureau expended approximately 96% of its anticipated work plan budget for LANL and SNL oversight by the end of September 2008. The Bureau expended approximately 17% of its anticipated FYY 2009 work plan budget by the end of December 2008. The Bureau expended approximately 52% of its anticipated FFY 2008 work plan budget for WIPP oversight by the end of September 2008. The Bureau expended approximately 10% of its anticipated FYY 2009 work plan budget for WIPP by the end of December 2008. Now that the Bureau is nearly fully staffed, the expenditure-to-budget ratio should be greatly improved.

**Outreach:**

The Bureau has continued a strong public outreach effort by participating in numerous public meetings as well as many informal meetings with interested citizens throughout the state. Bureau staff also participated with the DOE site managers, facility officials and staff, and with regulatory agencies to develop effective environmental protection measures and effective monitoring and remediation programs. Exchanging ideas has been an integral function of the Bureau as it has met with numerous activist groups around the state to improve monitoring and cleanup, various Pueblo officials to implement MOUs for working together, and the general public to understand concerns and explain operations.

Bureau public outreach activities included hosting the monthly Community Radiation Monitoring Group meetings concerning LANL air emissions; attendance and participation in Northern New Mexico Citizen Advisory Board meetings; attendance and participation in RACER (Risk Analysis Communication Evaluation Reduction) working group meetings; attendance and participation in department sponsored “Listening Sessions” regarding the impact of LANL activities in northern New Mexico; attendance and participation at joint SNL/KAFB Semi-Annual Public Outreach meetings; and attendance and participation at SNL LTES public meetings.

The Bureau has been rebuilding its internet website to comply with the Department “Brand Standards” for graphics and website templates. The new format provides for a standard “look and feel” for department sites and improves organization and download speeds. Additional technical content is being added to the site to provide greater public access to Bureau publications and analytical results. The department site may be viewed at: <http://www.nmenv.state.nm.us> and the Bureau site may be accessed directly at: [http://www.nmenv.state.nm.us/doe\\_oversight/](http://www.nmenv.state.nm.us/doe_oversight/)

**Training:**

Bureau staff attended conferences and gatherings of professionals and peer groups. Frequently, staff presented scientific findings and pursued professional development through training and continuing education.

Bureau staff continued to seek training opportunities as well as to meet periodic requirements. Examples of site-specific and general training included Radiation Worker I and II, first aid, cardiopulmonary resuscitation, GIS, safety and security and personnel management courses. Other specific training included staff participating in ITRC-sponsored Perchlorate on-line training, Radiological/Radiochemistry Technician training, RockWare Earth Science Software training, Job Hazard Analysis (JHA) Preparers/Approvers training, and an EPA course on Quality Management Plans, Data Quality Objectives, and Quality Assurance Project Planning. Staff also attended an International Erosion Control Conference in Orlando, Florida to enhance current credentials. The EPA provided a three-day Explosives Investigation and Technology Workshop attended by staff. This workshop was particularly useful because it explored different sampling techniques that may lower costs of some sampling while reducing the error distribution of the data.

## **Los Alamos National Laboratory Oversight**

### **LAD01 General Administration:**

Under this Activity ID, the Bureau manages, administers, and finances the overall activities of staff members in the LANL and Santa Fe offices. Staffs provide assistance to the Bureau and DOE developing workplans, budgets and training requirements.

Bureau staff met with DOE and Environmental Management staff at LANL to discuss better means for communication between the Bureau, and LANS and DOE. Arrangements were made for future quarterly meetings to initiate discussions on "hot topics" looming on the horizon (for DOE, NMED, and the Public) and opportunities for collaborative discussions with appropriate staff to address those issues. The Surface Water Assessment Team (SWAT) was discussed as an example of a regular technical meeting that had been used to address surface water issues. The SWAT has not been held for over two years and reinitiating of that format was recommended.

Bureau staff reviewed and updated the Integrated Work Documents (IWDs) for fieldwork at LANL. The IWDs incorporate worker safety, hazard awareness, and site security for staff conducting unescorted fieldwork at LANL.

Bureau staff obtained four pagers from LANS. The pagers are LANS property and would be on-loan to the Bureau throughout the duration of the 2008 sampling season. The loan will be extended in 2009. The pagers offer a second type of IWD-required emergency communication that staff must employ while working on-site at LANL. Personnel are also required check in and out at the LANL activity planning center (TA-64) when conducting on-site independent activities.

Bureau and DOE management met to discuss security issues concerning collecting, storing and moving electronic data at LANL in secure and property-control areas: Digital photos, GPS coordinates and PC flash drives. Bureau staff must be able to work freely under both NMED and DOE/LANS security procedures to effectively meet AIP goals. Points-of-contact information was exchanged to begin coordination. Meetings were planned in order to bring NMED staff into strict compliance with DOE and LANS requirements. The Bureau desired the same level of security authorization as the LANS and contract workers when using the above-mentioned media equipment while performing similar environmental activities on-site.

All appropriate Q-Cleared Bureau staff reported to the DOE Service Center in Albuquerque to replace badges by 9/30/08. In addition, Bureau personnel were processed (fingerprinted, photographed, biometric data collection) for the new HSPD-12 Credentials that were required by the Homeland Security Presidential Directive 12 secure personal identification verification document. The new credentials were issued in early October 2008.

The search for new office space for the staff completed its initial phase on September 24<sup>th</sup> when all the responses to the RFP were received. Ranking began immediately to minimize transition time.

Bureau staff participated in the Annual CPR and AED refresher course administered at the White Rock office by an instructor affiliated with the National Safety Council. The annual refresher is a requirement of the Bureau Health and Safety training to maintain staff certification and proficiency in First Aid and CPR/AED.

Bureau and DOE managers met each quarter in accordance with AIP requirements to review progress, status and projection of workplan efforts and expenditures. During 2008, several positions have been filled in the Bureau at WIPP and SNL. One position remains unfilled at each of those locations. The oversight office at LANL still maintains one vacancy, and it is intended to be filled in 2009, but a state-wide hiring freeze has hampered the efforts. Funding support to the oversight workplans has been adequate due in part to carryover funds from previous years. During the last quarter, the federal budget has been supported by a continuing resolution. Training and escorting of Bureau personnel onto LANL sites have been of some concern, and the management group has continued to address these issues. Updated training, authorizations and governing documents have been put into place.

Bureau staff met with representatives of Santa Clara Pueblo to learn about environmental issues confronting the Pueblo. Staff also discussed opportunities to collaborate with Santa Clara in establishing contaminant reference values for base flows in streams in northern New Mexico. Earlier efforts included reconnaissance, and split sampling and analysis of water samples from select Pajarito Plateau streams north and west of Santa Clara Pueblo. Ongoing efforts have included data evaluation and establishment of reference stream reaches by the Pueblo. In order to formalize these interactions, Bureau staff drafted a MOU between the NMED and the Santa Clara Pueblo. This MOU parallels similar arrangements either active or being considered with other Pueblos, such as Isleta and San Ildefonso.

### **LPO02 Public Outreach:**

Under this Activity ID, Bureau staff interacts with the public through meetings, listening sessions, website development, consultations, and reports.

#### Participation in Community Activities

The Bureau 2006 Annual Report and the Radionuclides in Rio Grande Sediment Report were made available in hard copy and have been provided to the State Depository Library Program. The program disseminates the information compiled by state agencies as widely as possible in order for all New Mexico citizens to have access to the reports, statistics and studies published each year by state agencies. The documents are also available on the Bureau website at [www.nmenv.state.nm.us/doe\\_oversight/pubs.htm](http://www.nmenv.state.nm.us/doe_oversight/pubs.htm)

Bureau staff attended the “Turning Swords into Ploughshares” community event at the Genevieve Chavez Community Center in Santa Fe on Saturday, March 1, 2008. The Event was billed to “Protect Our Health, Children, and Water from the Nuclear Weapons Complex.” It was hosted by the City of Santa Fe, Concerned Citizens for Nuclear Safety (CCNS), Nuclear Watch New Mexico (NWNM), New Mexico Conference of Churches and Faithful Security, National Religious Partnership on Nuclear Weapons Danger as well as a variety of business and NGO Co-Sponsors. The key agenda item was a press conference with Picuris Pueblo Governor Craig Quanchello, Santa Fe Mayor David Coss, New Mexico Conference of Catholic Bishops Allen

Sanchez and Espanola Mayor Joseph Maestas. The event also encouraged public participation and comment on the recently-released DOE document titled “Complex Transformation Supplemental Programmatic Environmental Impact Statement.” Public hearings were held later in March.

Bureau representatives, Michael Dale and Kim Granzow, teamed with Pat Longmire of LANS to lead a discussion at the “EES Frontiers in Geoscience Colloquium” on April 28, 2008, at the Los Alamos National Laboratory TA-3 Physics Auditorium. The Colloquium topic was titled: “Isotope and Aqueous Chemistry Investigations of Groundwater in the Espanola Basin, New Mexico.”

Bureau staff met with EPA representatives from Dallas, Denver, and Washington D.C. to describe the oversight program being conducted by the Bureau under the AIP, including the use of solar power to run air and storm water monitoring equipment, results of the alpine and stormwater monitoring programs, and coordination with Santa Fe city officials in order to support development and increased supply of the its drinking water system. The EPA members were in Santa Fe to present “brown to green” workshops and facilitate discussions of using replenishable energy options for environmental clean-up.

Bureau staff conducted a tour for the Bandelier National Park Chief Ranger into White Rock Canyon. Staff identified springs being investigated for groundwater fate and transport studies. Staff members subsequently provided spring resource maps and poster presentations developed by the Bureau and LANS to the Park.

Bureau staff attended the “Town Hall Community Meeting” hosted by the Environment Department at Los Alamos in April. The NMED Secretary, Deputy Secretary and local representatives of the department attended the meeting. The agenda included overviews from the Secretary and several Bureau Chiefs followed by a Q&A session. The meeting presented information about the department and provided a forum to listen to citizens’ concerns and to facilitate a discussion about how the department can improve its programs. The meeting was summarized in the April 30<sup>th</sup> *Los Alamos Monitor*.

Staff also participated in “Listening Sessions” held in Santa Fe, Taos, Espanola and Albuquerque during the summer. The sessions were hosted by the NMED/HWB. Members of the public in attendance voiced their concerns and opinions about National Laboratory operations in New Mexico and their potential environmental and societal impacts. They were interested in establishing groups for collaborative efforts to inform the public on environmental issues related to laboratory operations. All of the sessions were well attended, sometimes with as many as 40-50 members of the public as well as public officials, including U.S. Representatives. Bureau staff answered questions related to monitoring and surveillance efforts at the laboratories.

Bureau staff attended the DOE/NNSA Complex Transformation Draft Supplemental Programmatic Environmental Impact Statement Public Hearings hosted at Los Alamos and Espanola. The hearings provided platforms for public input into the proposal at LANL to upgrade its plutonium facility. The attendees at the Los Alamos meeting were mostly supportive of the DOE/NNSA-Preferred Alternative discussed below. The attendees (approximately 100) at

the hearing in Espanola were mostly supportive of the NMED position against the DOE/NNSA-Preferred Alternative. The NMED Deputy Secretary stated that the DOE should pursue cleanup as required in the Consent Order rather than prioritize its funding to expand Pit Production at the expense of consuming greater resources and increased potential for environmental releases. Other public comments included a request for DOE to extend the public comment period until July 2008. The DOE/NNSA-Preferred Alternative included a restructuring of SNM (Special Nuclear Materials) facilities and consolidation of all programmatic alternatives through “Distributed Centers of Excellence”.

Bureau staff attended the 4<sup>th</sup> Annual Tribal Environmental Summit at the Hotel Santa Fe. The focus of the conference was “Government-to-Government Relations: Leadership Dialogue.” The Governor provided a televised statement that was followed by introductory remarks and welcoming by the Tribal Liaison Officer of NMED. Several tribal groups were not represented at the summit.

#### Development of Documents for the Public

##### *Risk Analysis Communication Evaluation Reduction (RACER) Database Support*

Staff collaborated with risk modelers on the RACER database team. RACER is designed to provide useful access to environmental measurement data collected in and around the LANL site. The RACER database will be populated by all multi-media environmental data collected by the Bureau within the past six years. The RACER database team is independent of LANS and works under a contract with Colorado State University.

- Bureau staff met with LANL and Risk Assessment Corporation, DOE, LANL, HWB and NNM Community Foundation to discuss RACER project comments, database issues, concerns and milestones;
- Bureau staff linked environmental sampling locations to Solid Waste Management Units (SWMUs) for inclusion in the RACER database to ensure that when all sampling data inputs for a particular SWMU are queried, the Bureau data will also be included in the resulting data set. Staff defined NMED non-detects and data quality notes for RACER and changed the naming convention for sampling locations at LANL watershed gage stations to match those of LANS for inclusion in RACER database;
- Staff collaborated with LANS to assure the appropriate "watershed" GIS layers were used in the RACER database;
- Staff met with the RACER technical team to discuss milestones and issues needed to complete the project prior to the September release to public;
- Staff participated in multiple training sessions where participants learned how to select data based on spatial trends (compares data from numerous locations to a standard), and temporal trends (compares how an analyte at a single location has varied over time). They also learned how to select locations using the GIS tool and how to export data to excel. Participants also identified several "glitches" that will need to be corrected before the web site goes live. Feedback was provided to the designers on appropriate units to display the data (unit standardization), what standards we would recommend to be included in the tool (comparison values), identification of co-located samples and locations that lack coordinate data;



- Oversight Bureau staff continue participation in the RACER Project by beta testing the RACER data analysis website; and
- Oversight Bureau staff supplied RACER with a glossary of terms and abbreviations used.

The RACER project was turned over to the New Mexico Community Foundation (NMCF) on September 30, 2008. The NMCF will maintain day-to-day operation of the database while NMED and LANS will provide data updates to the foundation.

#### Other General Documents

Staff collected photos of NPDES discharges into an ephemeral reach and provided them to the Sierra Club for an article on the Clean Water Restoration Act, which is currently being discussed in Congress.

Staff provided responses to the press on PCBs in the Rio Grande reported in a UNM graduate student thesis.

Staff compiled data in response to an information request for all polychlorinated biphenyls (PCB) data in soils, sediments and water. In other PCB related work, staff met with LANL for preliminary discussions on a Regional PCB study outlining scope, data quality assurance, and data assessment protocols.

Staff researched, fixed and compiled files for inclusion on the Bureau web site. These files included most of the poster presentations that the Bureau has produced over the last 10 years. Staff also compiled references for NMED publications on website.

#### Interactions With Citizen Action Groups

##### Amigo Bravos

Bureau staff discussed the Perimeter Bypass Project Report with LANS representatives. Stormwater concerns were raised for further review. Staff discussed the DRAFT NPDES Individual Stormwater Permit at LANL with an Amigo Bravos representative. Staff compiled all Bureau PCB and NMED/LANS Cooperative PCB Study data; 2003, 2005, and 2006 water quality data; and PDF versions of reports in response to requests from Amigo Bravos and LANS, and also discussed PCB occurrences in surface water on the Pajarito Plateau and Rio Grande. Staff developed a map for Amigo Bravos showing the Bureau 2000-2006 sampling locations for PCBs in storm water.

##### Concerned Citizens For Nuclear Safety (CCNS)

Staff provided two recent Bureau publications to CCNS, as requested. The publications were “Distribution of Radionuclides in Northern Rio Grande Fluvial Deposits near Los Alamos National Laboratory, New Mexico, April 2007” by Dave Englert, and “Post Cerro Grande Fire Channel Morphology in Lower Pueblo Canyon, Reach P-4 West: and Stormwater Transport of Plutonium 239/240 in Suspended Sediments, Los Alamos County, New Mexico, October 2004” by Dave Englert. Bureau staff also discussed the involvement of CCNS in several on-going issues concerning the quality of groundwater samples obtained from the LANL Regional Wells and the potential contamination of groundwater at the SNL Mixed Waste Landfill. Staff provided CCNS and other organizations with a detailed summary of a 3.9 million gallon potable

water release that occurred at TA-21 over the 4<sup>th</sup> of July weekend. Staff met with a CCNS representative to discuss the Buckman Direct Diversion (BDD) sampling project, RACER progress, FFY08 stormwater monitoring plans, progress by LANL in implementing sediment transport controls in Pueblo and Los Alamos Canyons, availability of high elevation soils data, and progress on plans for additional high elevation sample collections for FFY08.

At the request from a consultant to CCNS, Bureau staff provided information regarding technical aspects of the LANL Regional Wells, particularly confirmatory analyses of data collected at LANL Regional Wells that were drilled between 1997 and 2008. Concerns of the CCNS were the potential of improper readings due to the stainless steel screens/casings and well drilling and development methods. Data results were provided, and staff assured the requestor that the data collected from the LANL Regional Wells have been useful for DOE, LANS and NMED decision makers.

*The Community Radiation Monitoring Group (CRMG)*

The CRMG is an active organization interested primarily in air quality issues related to LANL. The Bureau had been hosting its monthly meetings for several years. During 2008, however, the group began to experience mission creep, and it lost focus and productivity. Therefore, Bureau staff contacted the primary participants individually, and together they decided that NMED would not only host, but moderate and determine the agenda for future meetings. In that manner, activities were assured to be consistent with the scope of work in the Agreement-In-Principle and the CRMG would return to a focus on subjects relevant to air emissions. The Bureau would attempt to publicize future dates, times and locations of the CRMG meetings through the *Los Alamos Monitor* and the NMED Communications Director. It was hoped that this would attract greater participation by a more diverse audience. Air emission impacts from LANL or other sources in vicinity of LANL would continue to be the main focus of the group. Agenda and minutes would be provided by NMED. Scheduling would remain in place with meetings occurring every second Wednesday of each month. Sixty percent of the CRMG meetings would occur at the Northern New Mexico College in Espanola and 40% at White Rock or Los Alamos. Other locations would be arranged by agreement of the group.

Since the restructuring, procedures and discussions have been less contentious, and the participation fluctuates (between 10-30 attendees) depending on content. Prescribed burns were the focus of several meetings with attention drawn to containment and potential downwind contaminants. Other meetings focused on operational constraints while conducting open detonation events, and an Emergency Preparedness Exercise. At one meeting, Bureau staff assured attendees that it operates as an independent oversight of operations at LANL by maintaining five perimeter AIRNET sites that are co-located with LANS monitoring units. At one meeting, a LANS representative addressed the issues related to monitoring of cesium-137 at Picuris Pueblo AIRNET site, monitoring of strontium-90 in the AIRNET network, and the source of radionuclides measured in the soils by the Oversight Bureau near the high-elevation Trampas Lake in the upper Embudo watershed. The representative clarified that cesium-137 was being monitored at Picuris Pueblo and that cesium-137 was monitored at all AIRNET sites using gamma spectroscopy. The AIRNET station samples were analyzed for strontium-90 in 2002 and 2003, but there were no detections on-site or off-site and the monitoring and analyses of strontium-90 were discontinued based on these results. Bureau staff stated that detectable

concentrations of cesium-137, strontium-90, and plutonium-239 had been measured at Trampas Lake; however, these concentrations appeared to be consistent with those measured at other high elevation lakes in the Rocky Mountains.

At another meeting, speakers from the LANS staff hosted discussions on the topic of the TA-39 North Ancho Canyon fire on June 11, 2008, and they addressed a list of questions pertaining to the fire that was provided by CCNS and EVMG. As a result of the fire and considerable analysis, the LANS representatives stated changes to future experimental tests would include approval from higher LANS management and that the Los Alamos County Fire Department would be onsite during extreme or red flag conditions. According to LANS staff, air-monitoring analysis after the fire indicated no hazardous concentrations, including cesium-137, at any of the locations. More information on this issue is available on the LANL webpage, [www.lanl.gov/emergency/fire](http://www.lanl.gov/emergency/fire), and in a Los Alamos Monitor newspaper front-page article on August 21, 2008.

At one meeting the Bureau Chief gave an overview of the Bureau air particulate and direct penetrating radiation monitoring activities at WIPP and in the vicinity. Some citizens were concerned about radiation exposure along the WIPP route. The Bureau Chief described the radiation types most likely to be encountered (mainly gamma radiation) along the WIPP route. Bureau electret methodology was mutually supported as adequate and as a cost effective method of monitoring for gamma radiation. Data showed no exposure hazard existed, and additional monitors along the route were not necessary.

The final meeting of the CRMG for 2008 was hosted by the Bureau on December 10, 2008 in Espanola at the Northern New Mexico Community College. The meeting was attended by 23 participants representing the Bureau, LANS, DOE, the neighboring Pueblos, NGOs and the non-affiliated public. The subject matter focused on the two dust studies that were updated at the community meeting earlier in December at the Picuris Pueblo. After a controversial presentation by LANS staff and considerable discussion among the participants, no resolution was reached. A modified study with revised parameters has been proposed.

#### *Espanola Basin Technical Assessment Group (EBTAG)*

On March 6<sup>th</sup>, staff members participated in the presentation of two main agenda items for the 7th Annual Meeting of the EBTAG held at the Santa Fe Community College. The Bureau support of EBTAG has ensured continued discussion among stakeholders in the joint efforts of environmental work conducted with LANS. Staff member, Dave Englert, presented his paper titled "Distribution of Radionuclides in Northern Rio Grande Fluvial Deposits near Los Alamos National Laboratory, New Mexico" in poster form, which displayed the current impacts that may be occurring from LANL stormwater discharges into the Rio Grande. Pat Longmire of LANL presented a report co-authored by Bureau staff members Michael Dale and Kim Granzow titled "<sup>14</sup>C Ages of Regional Ground Water Beneath the Pajarito Plateau, Los Alamos, New Mexico."

#### *Embudo Valley Environmental Monitoring Group (EVEMG)*

Bureau staff delivered a presentation at the EVEMG public meeting on March 2, 2008. Staff discussed 2007 soil and water data collected throughout the Embudo Valley watershed and provided an assessment of the source of elevated uranium values found in produce from the prior

year. Soils data from a high elevation location near Trampas Lake showed significantly high concentrations of radionuclides and metals. The investigation of potential causes is continuing, and as a result of discussions with LANS and the EVEMG, additional soil samples will be collected in the future for confirmation and validation and comparison with other regional studies. The anomalous results were also the subject of a discussion between a reporter from the Star newspaper and NMED staff, including the Communications Director. At the request of the Executive Director of EVEMG, staff prepared a response letter documenting previously-acquired alpine sampling data.

In early December the EVEMG along with the Picuris Pueblo hosted a community meeting at Picuris Pueblo. About 30 people attended including representatives from the Bureau, DOE and LANS. The central topic focused on potential LANL impacts on indoor and outdoor air quality with a particular interest in revisiting the Government Accountability Project (GAP) study. The GAP published a report in July 2007 showing detectable levels of radionuclides such as strontium-90 and plutonium-239 in household dust in a number of residences in Los Alamos and vicinity. In the 2007 GAP report, the two highest results came from the Los Alamos Monitor office on DP Road in Los Alamos and the Bureau office in White Rock. Following the GAP findings, LANS and the Bureau jointly launched a project to measure detectable radon gas as well as radioactivity in dust samples found at LANL worksites as well as the Bureau office and the *Los Alamos Monitor* office. The study would eventually be extended to the immediate communities of Los Alamos and White Rock as well as off-the-hill communities such as El Rancho and Espanola. Both the GAP and the joint NMED-LANS studies used certified laboratories for the analyses of the radionuclides in the respective dust samples. Even so, the amount of uncertainty involved with identifying dust types, coupled with large quantities of sample material required for accurate results, has led most scientists to reason that it will remain undetermined whether or not the radionuclides found in dust can be traced back to a source such as LANL. A follow up of this topic, as well as an update on AIRNET and NEWNET, will be presented at the December 10th CRMG meeting in Espanola (see CRMG heading, above).

#### Pajarito Plateau Working Group (PPWG)

Bureau staff attended monthly meetings of the PPWP to discuss stormwater issues on the Pajarito Plateau. After one meeting, Bureau staff participated in two courtesy site evaluations for stormwater and sediment and erosion control. Staff made recommendations to Los Alamos County to help them achieve NPDES permit compliance.

#### **LGE03 General ER/EM:**

Under this Activity ID, Bureau staff provides verification and validation of projects conducted by LANS to remediate environmental and human hazards from legacy waste and to monitor current activities for safe practices.

#### Buckman Direct Diversion (BDD) Project

Bureau staff prepared and provided tours of the Pajarito Plateau for NMED management, City of Santa Fe staff, the U.S. Army Corp of Engineers, LANS, and Pueblo de San Ildefonso staff. During the tours, the groups observed areas that pose potential LANL impacts from stormwater on the Pueblo property and City of Santa Fe, the BDD Project. Staff discussed the baseline chemical conditions of Rio Grande, data evaluation methods, location of an early stormwater

warning station, and efforts to reduce sediment transport from LANL property into neighboring Pueblo de San Ildefonso and Rio Grande through Los Alamos and Pueblo Canyons. Staff also discussed methods to stabilize channels and reduce flood intensities, the appropriateness and locations of gage installations, grade control, and in-stream channel and diversion structures in the Los Alamos watershed.

Bureau staff participated in bi-weekly meetings with the BDD Board (including City of Santa Fe and Santa Fe county officials) and LANS representatives to discuss issues related to potential Laboratory impacts to the planned BDD, a new community water resource. Topics included:

- Stopping migration of LANL contaminants to the Rio Grande and to groundwater;
- Properly monitoring the transport of legacy contaminants in both the surface water and groundwater flow systems;
- Measuring the radioactive and toxic contamination of buried sediments containing higher concentrations of post-World War II LANL legacy contaminants now buried in the slough upstream of the BDD diversion site;
- Providing an early warning system so that the BDD could temporarily cease diversion of any water from the Rio Grande when the Rio Grande would be expected to contain elevated levels of contaminants of LANL origin;
- Monitoring the mass of any LANL-origin contaminants diverted with BDD raw water supplies and account for that mass in water treatment plant residuals and treated drinking water; and
- Providing funding for the BDD Board to retain independent peer review by qualified persons with regard to matters of LANL-origin contamination of the public drinking water resources of Santa Fe County and the City of Santa Fe.

Staff met with HWB, LANS and the City of Santa Fe to discuss the Santa Fe application for an innovative grant from the State to install telemetry at various points along the Rio Grande watershed. These sites would be designed to provide early warning to future operators of the BDD Project of potential elevated contaminant levels from stormwater discharges from the Pueblo Canyon and Los Alamos Canyon into the Rio Grande.

Staff coordinated with the City of Santa Fe and LANS to collect 13 samples (from 11 boreholes) along and perpendicular to the proposed BDD construction alignment. Samples were analyzed for radionuclides, metals, and particle size distribution. Staff completed geomorphic and chemical evaluations and confirmed that the southern extent of the slough is north of the areas planned for construction activities. This had been a major concern for the safety of the construction workers and the possible disturbance of contaminated slough sediments. Staff completed a report and submitted it to DOE for review. It was subsequently released to the public as a report titled “Los Alamos National Laboratory Legacy Contaminant Study at the Buckman Direct Diversion.” David Englert, Michael Dale, Ralph Ford-Schmid, and Kim Granzow of the Bureau authored the report.

#### Soil Sampling Project

Bureau staff shipped three high elevation soil samples to a contract laboratory for analysis. This project seeks to determine how background levels of certain constituents may vary from reference levels established at lower elevations.

### Embudo Valley Project

Bureau staff submitted 2007 surface water and soil data from the Embudo watershed project to the DOE for review. Determination of the source (soil or water) of unusually high uranium concentrations found in lettuce samples collected in 2006 was a major study objective. All water results met irrigation, wildlife habitat, and livestock watering quality criteria. Staff then compared the analytical results for soils to the LANS-derived Regional Statistical Reference Levels (RSRLs). These levels represent the probability (99.9%) of highest concentration in areas not affected by laboratory operations. The measurements for iron, barium, and calcium in some garden plot soils exceeded the RSRLs, barium was elevated at the Trampas site, mercury was elevated at the Llano de la Yuego plot, calcium was elevated at the Vallecito plot, and iron was elevated at the two Picuris plots. Measurements of radionuclide isotopes in soil samples were below RSRLs at all garden plots and the mean uranium measurements were less than one-half the RSRLs. There was no evidence of LANL-derived material since radionuclide measurements in the garden plots were all below RSRLs. The levels of uranium in the 2006 lettuce samples appear to have been due to the elevated levels of uranium in the acequia irrigation waters and not the levels of uranium in the soils. The uranium-234 ( $^{234}\text{U}$ ) to uranium-238 ( $^{238}\text{U}$ ) isotopic ratios in both the 2006 lettuce (1.7) and the 2007 acequia waters (2.1) were similar, suggesting that the availability of the uranium isotopes in the irrigation water influenced the concentrations found in irrigated lettuce crops. Acequia results from this study had mean values of  $^{234}\text{U}$  and  $^{238}\text{U}$  that were 2.5 and 1.9 times higher than the mean values from the Pajarito Plateau, respectively.

One soil sample was collected near Truchas Lake. That area is a potential watershed for the Embudo Valley. Several measurements of radionuclides and metals were reported above RSRLs. Unexpectedly the levels of  $^{90}\text{Sr}$ ,  $^{137}\text{Cs}$ , and  $^{239/240}\text{Pu}$  found at the Truchas Lake location significantly exceeded the RSRLs. The elevation of the Truchas Lake site was 11,415 ft, the soil was thin (<2 inches deep), and it had high levels of organic matter. The measurements of  $^{137}\text{Cs}$  approached the screening action level of 5.7 pCi/g used by LANS. The  $^{90}\text{Sr}$  measurements exceeded the RSRL by 6 times and up to 17 times the mean of the garden plot sites. These levels could represent historical operations or accidental releases from the Laboratory. They could also reflect conditions at high elevations from atmospheric fallout from pre-1963 nuclear tests and/or bio-concentration of fallout, but measurements at similar elevations and latitude are not available. Further assessment is considered prudent for determining the source(s) of contamination.

Bureau staff also compared the levels of  $^{234}\text{U}$  and  $^{238}\text{U}$  to 95 isotopic uranium results obtained by the Bureau and LANS Water Quality and Hydrology Group from 1997 through 2005. These 95 results were selected from the RACER database and represented surface water samples collected either from the Rio Grande near the Pajarito Plateau or tributaries that drain from the Pajarito Plateau. Bureau staff interpreted the uranium concentration variability in the acequia waters to be related to the inhomogeneous nature of the geologic matrix in the mountains of the Embudo watershed. The granitic rocks of the Sangre de Cristo Mountains most likely contribute to the higher levels of uranium than those found in waters of the volcanic Pajarito Plateau.

Staff released a data transmittal report, "Transmittal of 2008 Radiochemical and Heavy and Trace Metals at Alpine Sites in Northern New Mexico." This report summarized radiochemical and heavy and trace metal data for five northern New Mexico alpine samples collected during

the summer of 2008. Bureau and HWB staff members collected samples within the Pecos Wilderness at elevations exceeding 11,000 feet. The samples were analyzed and the results were compared to older data from locations in montane (below tree line) and alpine (above tree line) areas in southern Colorado and northern New Mexico. Staff discussed variability in radioactivity in soil found at high elevations in Colorado with Dr. Ward Whicker of Colorado State University. Dr. Whicker provided pertinent literature for staff review and met with staff to discuss issues and sampling protocol. The alpine samples showed elevated values for radionuclides and some metals when compared to the LANS Regional Statistical Reference Levels (RSRLs). These values were generally 20 times greater than the background references and in some cases up to twice the health risk based Screening Action Levels. When the project is completed it will help to determine whether the contaminant source for these elements is predominantly from fallout of worldwide atmospheric testing, which includes Nevada Test Site, or from operations at LANL, as well as determine the mobility of the contaminants to lower elevations. Bureau findings at this time remain inconclusive based on the limited data sets although recent LANS research (McNaughton, 12/9/2008, LA-UR 08-07159) shows that operations at LANL are not a contributing source for this contamination. The Bureau cannot yet verify or support the LANS conclusion since a subset of the mountain samples, four from New Mexico and one from Colorado, are currently being analyzed for plutonium by the Thermal Ionization Mass Spectroscopy method. When these results are analyzed and they become available, the information could begin to provide a more solid basis for determining the source of the contamination.

#### Fire Investigation at TA-39

A multi-agency team consisting of LANS and NMED representatives including Tori George (LANS), James Bearzi (HWB) and Steve Yanicak (DOE-OB) visited the burned site on June 13, 2008 and were briefed on the cause and resulting damage of the fire. The fire did not burn or affect any structures or SWMUs, but the slope that burned will have to be mitigated for erosion and monitored for potential contaminants to ensure that there are no stormwater impacts to the facility and canyon drainages. The experiment at TA-39 that started the fire was designated by LANS as a “contained shot”. The fire danger rating during the experiment on Wednesday afternoon was a “red-flag” day requiring certain precautions and denying certain activities. The fire began near the rear of a gun-like vessel designed to contain projectile-based shockwave experiments. The fire resulted when a high-velocity valve failed and breached the containment cylinder during performance testing of the vessel system. A solid propellant, similar to gunpowder, is used to close a specialized valve at very high speeds. When the valve failed, hot gas escaped and ignited nearby grasses. The vessel system is an experimental apparatus under research and development for eventual deployment and experiments at the Nevada Test Site. As told during the site visit and excerpted from the LANL news briefing, personnel on the scene initially attempted to put the fire out; however, it eventually grew too large for their limited resources and the Los Alamos Fire Department was called.

Approximately 40 firefighters from the Los Alamos Fire Department, the U.S. Forest Service, the U.S. Park Service, Santa Clara Pueblo, and the Laboratory quickly responded to the fire with a variety of equipment including Forest Service air tankers that made two precautionary fire-retardant drops. An over-flight Thursday morning revealed no hot spots outside the 15-acre burned area.

The Laboratory maintains that it follows rigorous procedures at all firing sites, both open-air and containment sites, and does not conduct open-air operations during adverse weather such as red-flag, or high-wind conditions.

The Laboratory will review and critique this event and response and will implement corrective actions as appropriate before resuming operations.

#### **LDP04 Direct Penetrating Radiation Project:**

Under this Activity ID, Bureau staff monitors the environment at LANL and in the vicinity for gamma radiation that could be LANL-induced or ambient. The on-going program reads electrets at the end of each quarter, records data in field books, converts readings into quarterly dose values, and submits quarterly results for DOE, LANS and the public.

The Bureau has continued to collect quarterly measurements of Direct Penetrating Radiation (DPR) using fifteen radiation-monitoring electret devices. Staff read the CY07 Q-4 electret unit measurements on January 3, 2008. All data values were entered into the database. The CY08 Q-1 electret readings were completed on April 2, 2008. Staff submitted DPR data to DOE for CY07 Q-3/4 and CY08 Q-1. The data reports showed DPR dose levels measured at various locations in the vicinity of Los Alamos including at the surface water station in Pueblo Canyon, one site in Santa Fe and one site in Espanola. The data results tracked adequately with LANS results where the measurements were collected at co-located stations. The LANS staff uses a different DPR-measuring technology (Thermoluminescent Dosimeter (TLD)).

The CY08 Q-2 electrets were read in July and the DPR data report was forwarded to DOE for review. The data values were reported as gross dose without subtracting the background. The reported values fell within acceptable background limits, and compared to the values from previous quarters. The values continued to track well with the LANS TLD monitoring values at co-located stations. Bureau staff collected DPR measurements for CY08 Q-4. A data report was drafted for submission to DOE showing comparison results at all co-located stations.

#### **LPL05 Particulates Low-Volume Air Project:**

Under this Activity ID, Bureau staff conducts continuous air monitoring for radioactive particles and tritium using low-volume air pumps. Filter samples and gel collectors are submitted and analyzed quarterly and results are provided for DOE, LANS and the public.

The Bureau maintains five fixed AIRNET stations for low-volume particulates and tritium collection throughout the year. All Bureau AIRNET samples were obtained using continually operating air samplers that collected airborne particles on filters and atmospheric moisture with silica gel. The filters were composited and analyzed quarterly for the radionuclides, gross alpha/beta, gamma-emitting isotopes, isotopic americium, plutonium, and uranium. The silica gel was also analyzed for tritium content in moisture on a quarterly basis. Hi-volume incremental samples were collected at a sixth site, the Los Alamos Inn, to test whether the Bureau hi-volume units could be used as mobile air monitors in the vicinity of LANL.



Samples from each of the five Bureau stations co-located with LANS stations were collected on schedule. No data packets were submitted during the first quarter due to modifications to the database for the inclusion of the Sandia and WIPP data, and subsequently to input data to the RACER database required by the DOE/LANS Compliance Agreement with NMED. All results received to date (including CY06 Q-4 and CY07 Q-1/2/3) were reported to DOE during April 2008. The database, Statistica, was loaded during the second quarter and considerable time has been spent learning the software and experimenting with descriptive statistics suitable for inclusion with data reports and as part of an annual summary.

The particulate and final tritium samples from CY08 Q-2/3 were submitted for analysis to the analytical lab. The AIRNET data reports for CY07 Q-4 and CY08 Q-1/2 were submitted to DOE for review. The CY08 Q-1 results were re-submitted to DOE with corrections for tritium air concentrations. Values for CY07 Q-4 and CY08 Q-1 fell within acceptable background and range of the Bureau values from previous quarters. Although particulate values definitely show more variability in results, the Bureau AIRNET data results have a history of tracking (within acceptable ranges) accordingly with the LANS AIRNET monitoring values at co-located stations.

A low-volume particulates and tritium sampler was deployed to Picuris Pueblo to collect two quarters of sampling from October 2008 through March 2009.

Equipment upgrades were made for the five AIRNET stations. They included new gooseneck connections for the air filters. The upgrades were designed to help to achieve consistency within the air monitoring programs at the LANL, SNL and WIPP.

### **LPH06 Particulates High-Volume Air Project:**

Under this Activity ID, Bureau staff conducts continuous air monitoring for radioactive particles, metals and organic compounds using high-volume air pumps to independently monitor environmental restoration clean-ups and D&D operations. Filter samples are submitted and analyzed quarterly and results are provided for DOE, LANS and the public.

The LANL AIRNET samplers are primarily used to measure radionuclides in the ambient air. A network of approximately 60 AIRNET samplers are located on LANL property, within and around the perimeter of the laboratory in Los Alamos County, and in more distant northern New Mexico communities such as Pueblo de San Ildefonso, Espanola, Santa Fe, Jemez Pueblo, El Rancho and Picuris Pueblo. The AIRNET samples are analyzed for tritium, plutonium-238, plutonium-239, americium-241, uranium-234/235/238 as well as gamma-emitting isotopes including arsenic-73/74, beryllium-7, cadmium-109, cobalt-60, cesium-134/137, manganese-54, sodium-22, rubidium-83/86, ruthenium-103, zinc-65 and lead-210. Other radionuclide and elemental analyses are conducted on an as-needed basis.

Gamma spectroscopy measurements are made on biweekly filters grouped across sites for a single sampling period. These are known as clumps. Clumping the filters provides more sensitivity for detecting gamma-emitting radionuclides. The LANS investigates any measurement above its Minimum Detectable Activity (MDA) other than lead-210, potassium-40, and beryllium-7, which are naturally occurring radionuclides typically present in measurable

quantities. Any such investigation would include additional analyses of individual filters to pinpoint the location(s) where the radionuclides were detected.

Bureau staff removed two stations deployed during the first quarter when one caused a power failure at a LANL AIRNET station. New GFCI units were purchased to replace power strips at all stations for safety and reliability (and to meet code requirements). Staff performed Data Quality Assurance on the background data set and submitted airborne particulate results to DOE from samples collected near MDA-B. The data are to be used as a background data set prior to remediation. The samples were obtained on DP Road, Los Alamos directly north of MDA-B using intermittently operating hi-volume air samplers that collected airborne particles on filters. The background collection and results will be useful for comparison to samples taken at the same locations during the DP Site (TA-21) remediation operations scheduled for 2008 through 2010.

Bureau staff submitted airborne particulate results collected during the Ash Pile Cleanup at the Los Alamos County Airport. The data showed dioxin and isotopic radionuclide results (isotopic Pu, Am, U and Sr-90) for two different time periods during the cleanup of the Airport Ash Pile. The samples were collected using an intermittently operated hi-volume air sampler that collected airborne particulates on filters.

### **LPW07 Drinking Water Monitoring:**

Under this Activity ID, Bureau staff conducts annual sampling in a cooperative event with LANS Water Quality and Hydrology, Los Alamos County, and San Ildefonso Pueblo for supplemental and verification sampling of Los Alamos County and San Ildefonso Pueblo production wells. Generally, the analytes are substances not addressed under Safe Drinking Water Act.

Bureau staff collected samples from the City of Santa Fe wells at the Buckman well field. Specific wells sampled were Buckman 1 (July and September), and Buckman 8 (September). Samples were analyzed for sulfur and oxygen isotopes, perchlorate and strontium-90.

Bureau staff met with Los Alamos County and LANS personnel concerning the presence of trace contamination in the drinking-water aquifer. The meeting stemmed from the 2006 evaluation by the Bureau of all the low-level tritium data (LANL, NMED and EPA) for the LANL Pajarito Mesa Production wells that showed PM-1 historically containing very low, but detectable concentrations of tritium. The preliminary interpretation by the Bureau was that the tritium data, along with the elevated (above background) chloride, sulfate, etc., indicated PM-1 was susceptible to contamination. After the Bureau discussed the results, the group concurred that the contaminant levels were very low and not alarming at the time; however, the data may be useful to Los Alamos County and LANL with respect to their long-term monitoring efforts, determination of sampling frequency, and conceptual modeling with reference to deep contaminant transport.

Bureau staff collected samples from Los Alamos County wells Otowi 1 & 4, PM-1, PM-4, PM-5 and G-5A and the artesian well H-1 in Valle Toledo. All samples were analyzed for sulfur and oxygen isotopes, and perchlorate. Bureau staff mined the Discoverer database for comparative SO<sub>4</sub> values.

Bureau staff collected oxyanions (iodate, chlorate, chlorite, and bromate) from six drinking water production wells (O-1, O-4, PM-1, PM-3, PM-4, PM-5) and a regional well (R-42) and an intermediate-depth monitoring well (SCI-2). Oxyanion data have been used to support a joint flow and pathway project for the Bureau and LANS that will also involve the use of supplemental data concurrently collected under several other joint groundwater projects.

### **LMW08 GW Monitoring:**

Under this Activity ID, Bureau staff conducts verification and supplemental sampling of the LANL Regional Wells in cooperation with LANS Water Quality and Hydrology, Los Alamos County, and Pueblos of San Ildefonso and Santa Clara. The focus is on new regional wells, and this year the monitoring and assessment has tried to track the hexavalent chromium plume in the regional aquifer, along with noble gas sampling for the determination of contaminant pathways and flow rates within specified aquifer material beneath LANL and vicinity. The activity includes sampling of springs located within the LANL boundary and regional background springs.

The Bureau staff conducts an extensive program of sampling, analysis and evaluation of groundwater systems affecting Los Alamos and the surrounding area. Monitoring wells have been developed to evaluate intermediate-depth and deep (regional) aquifers for determining differences between historic, background and anthropogenic contaminants. Although some monitoring events are targeting general aspects of the groundwater systems, others are targeting specific phenomena. Heavy metals, VOCs, SVOCs and non-specific radionuclides are examples of general aspects of targeting. Noble gases, PCBs and perchlorates are specific targets. Evaluations of PCBs and perchlorates are discussed under separate Activity IDs because they generally cross several media.

### General Groundwater Monitoring

During the first two weeks of January 2008, the staff collected samples at R-9 and LAOI-7 (a new intermediate well) to be analyzed for Carbon 14. Staff continuously evaluated field parameters at the site during well purging and determined that stabilization had occurred before any samples were collected.

Bureau staff notified DOE and LANS that analytical results indicated tritium in the ground water at a depth of approximately 200 feet below the water table at R-35. The sample, collected at 980 feet below ground surface during drilling of the adjacent well (R-35a), also showed abnormal concentrations of manganese (Mn), perchlorate, sulfate, chlorine (Cl), strontium (Sr), bromine (Br), calcium (Ca), iron (Fe), and silicon (Si) with respect to the many other samples collected above and below this depth. The tritium results were 1.26 pCi/L or 0.39 TU with a detection limit at about 0.29 pCi/L (0.09 TU). The detectable tritium, combined with the other species data confirms that ground water at or near this depth contains anthropogenic constituents. Some interpretations suggest that the contaminants may be present or traveling at depths far below the water table and may be confined to short intervals. Interpretation of these results may lead to improved understanding of the current conceptual groundwater model for the chromium contamination at R-28 and R-11.

Staff observed drilling activities of a new regional well R-42 in Mortandad Canyon (about ¼ mile west of R-28, which has shown chromium contamination). No issues, problems or delays were reported. After development of the well R-42 was completed, Bureau staff collected a sample from it (1,000+ feet depth) and from SCI-2 (intermediate depth approximately 650+ feet depth) in Sandia Canyon. These new wells are part of the LANS chromium investigation effort that will produce data for characterizing the Hex-chromium contamination in both the intermediate aquifers as well as the deep regional system (the system that produces all the drinking water for Los Alamos County and the Laboratory). Currently, Hex-chromium has not been detected in any of the Los Alamos County drinking water production wells above background values. The samples were sent for analyses of Sulfur and Oxygen isotopes, perchlorate, oxyanions and tritium as part of a Bureau workplan project. In addition, staff analyzed the R-42 sample for Hex-chromium using a portable HACH kit (the sample was filtered through a 0.2-micron filter to give better water clarity for using the color-metric instrument). The sample concentration was calculated at 1020 ppb, following a 50/50 dilution with deionized water. This value is far above the State standard for Cr. Previous LANS results using GEL Laboratory showed a result in the lower 800 ppb range. The sample from SCI-2 (filtered on the well site through a 0.2-micron filter) showed a concentration result for the raw sample of 690 ppb, and 350 ppb with a 50/50 dilution. The dilution-corrected concentration was 700 ppb that closely matched the raw sample result. Estimated error for these data is in the 20 to 40 ppb range. Bureau results corroborate LANS results measured to date and were quickly reported to DOE and LANS.

Bureau staff met with LANS representatives to develop a path forward for collecting representative data from each of the regional wells. The LANS committed to evaluating individual well field parameter data collected over the past several sampling events in addition to looking at all past data to devise a best set of target field parameters for each designated R-Well. The parameters of interest were dissolved oxygen, temperature, ORP, pH, conductivity and turbidity, and they would be evaluated against purge volumes. Bureau staff has recommended to LANS that it investigate past data that may have been compromised by insufficient purging prior to sample collection. Accepted practices recommend a minimum of three purge volumes prior to collection, in addition to stabilization of physical characteristics. The LANS report for each well would allow the subcontractor to more quickly collect representative samples from the individual screened intervals when it was determined that parameter stabilization had occurred.

Staff consulted with LANS on the scope of the sulfur and oxygen (S/O) isotopes in a sulfate (SO<sub>4</sub>) study. The sulfur-isotope project is as an independent Bureau study to measure trace, man-made impacts to certain aquifers within the Los Alamos region. The premise for the sulfur isotope investigation is based upon the concept that each aquifer ideally has its own unique sulfur-isotopic signature. Thus, sulfur-isotope measurements may be an important geochemistry tool that can be used in conjunction with other tools such as age dating and chromium isotope work used by hydrologists to help delineate human-impact plumes (contamination) or subtle changes in water quality over time.

Data from the S/O isotope analysis will be used to delineate the source of sulfate-tainted contaminant plumes present in the regional aquifer such as the hexavalent chromium plume beneath Mortandad and Sandia Canyons.

Bureau staff sampled a variety of offsite springs for S/O isotopes including: PC Spring, Los Alamos Spring, CDV-5.0 Spring, CDV-5.97 Spring, and Campsite Spring, Water Canyon Gallery, PC Spring in Pajarito Canyon. Staff sampled a variety of onsite wells including: R-15, R-28, R-14, R-9, R-4, LAOI-3.2, LAOIA-1.1, POI-4, LAOI-3.2(a), R-17 Zone 1, R-23, R-32, R-23i Zone 2a, R-18, and R-20. Staff also collected samples from two Santa Fe Production wells (Buckman 8 & 1) in Cañada Ancha and the TA-53 cooling tower outfall for SO<sub>4</sub> isotopes. Bureau and LANS staffs met to discuss the Bureau SO<sub>4</sub> isotopes study. The LANS staff provided suggestions to the Bureau for consideration of future collections at several preferred locations. The group discussed developing a joint report to summarize the findings.

Bureau staff conducted close-out activities for the joint-effort (NMED/LANS) Perchlorate Project. The fall field activities included maintaining the condition of perchlorate-collection columns at well H-1 in the Valle Grande and evaluating water quality parameters such as oxidation-reduction potential (ORP) and dissolved oxygen (DO) to assure that values were equal upstream and downstream of the collection apparatus. Samples were also collected for major ions, trace elements, low-level tritium, carbon-13, SO<sub>4</sub> isotopes, and stable isotopes of O and H. The total amounts of perchlorate collected during the study are estimated at 9 mg for Column A and 12 mg for Column B at well H-1. Samples were also collected (same suite as H-1) at Valle Grande Spring. The spring data should provide the study some additional and needed results for water-age and mixing ratio to be used by the hydrologists and water chemists. At the conclusion of the study, staff will prepare a joint paper to be finalized during 2009.

#### Noble Gas Study

Bureau staff collected samples for the Noble Gas Project that ran through December 2008. Staff compiled groundwater temperature data for mountain block-front sources to develop a reference data set for noble-gas evaluations and a recharge temperature/elevations report. Samples were collected at intermediate depth well R-23i and regional deep well R-20 (screens 1 & 2) that are both located in Pajarito Canyon in the vicinity of TA-18 (closed criticality facility) and TA-54 (the low-level radioactive solid waste disposal area, MDA G). Certain parameters from this event such as ORP (oxygen reduction potential) are being scrutinized by both NMED and LANS to ensure that the wells are producing representative water from the desired well intervals. Regional wells MCOI-6, R-14, and R-1 were sampled separately. All noble gas samples were shipped to the USGS Analytical Laboratory in Denver for analyses, and the first set of data has been returned. The data will be used to determine location and rate of recharge and contamination movement throughout the Pajarito Plateau groundwater system. A joint report is planned with LANS concerning all project data collected during 2007 and 2008.

Bureau staff collected additional water samples at Regional Wells 35a and b, R-12 scr2 (screen 2), MCOI-4, MCOI-5, MCOI-6, MCOI-8 and MCBT-4.4 for analyses of RCRA metals, tritium, VOCs, SVOCs, N-Species, stable isotopes, noble gases and PCBs. The project was completely funded by NMED/HWB for its own study, but Bureau staff will be able to use the results to support both the Noble Gas Project and the PCB study as parts of the Bureau FFY08 Workplans. Additional single event activities performed by Bureau staff included submitting R-28 pump test data from 7 time intervals for dissolved U, total <sup>237</sup>Np, low-level gamma-emitting isotopes, total <sup>90</sup>Sr, and dissolved metals for analysis, entering purge field data into the database for R-4, R-11,

R-15, R-21 and R-27, and providing the NMED/HWB with time-series water/sample-quality data results.

### **LSM09 WR Springs Monitoring:**

Under this Activity ID, Bureau staff conducts annual sampling in a cooperative event with LANS Water Quality and Hydrology and San Ildefonso Pueblo. The sampling includes approximately 25 groundwater springs off-site from LANL and on San Ildefonso Pueblo in White Rock Canyon along the Rio Grande.

Operations at LANL have had the potential to contaminate numerous springs located on the Pajarito Mesa and in the canyons influenced from the LANL property. As a part of the AIP, the Bureau periodically collects samples from these springs to determine if activities at the LANL site have impacted human health and the environment. Bureau activities during CY08 have included sampling support to LANS staff, joint studies with LANS staff, independent sampling for the Department of Defense, verification and validation of LANS operations and independent analyses of samples collected at area springs.

Bureau staff, along with LANS representatives, conducted the annual White Rock Canyon (WRC) raft trip beginning on September 29<sup>th</sup> for the purpose of sampling springs in the various canyons below LANL influence, and downstream from the Otowi Bridge to Frijoles Canyon along the Rio Grande (see Figure LSM09-1). Two springs of particular interest are La Mesita on the east side and Sandia on the west side of the Rio Grande. The Bureau and LANS teams completed the four-day, three-night excursion down the river by raft to more safely support the collection of water samples in very difficult-to-access reaches of the canyons. The Bureau GIS specialist compiled and printed maps, and assisted other staff to assemble sample bottle sets, ice, and sampling equipment for the WRC sampling teams. The Bureau contracted a rafting outfitter for three rafts and food for six staff for the entire WRC sampling event. Water samples were collected from 20 springs and staff collected bottom-feeder fish (catfish) for tissue samples from three locations. The water samples were analyzed for S/O (SO<sub>4</sub>) isotopes, ClO<sub>4</sub>, oxy-anions (bromate, chlorate, chlorite, and iodate) and quality parameters.



Figure LMS09-1. LANS and NMED/DOE OB teams get a safety briefing at Sandia Canyon sampling location

Staff sampled Bulldog, SWSC, Martin, and Burning Ground Springs at the request of the Department of Defense. The U.S. Naval Research Laboratory in White Oak, Maryland was conducting a study on high explosive contamination in groundwater. The DOD requested assistance in identifying surface waters containing high explosive compounds.

Bureau staff blank-corrected its own hi-resolution, congener data from Spring 1 to determine if the LANS sample collected in 2005 that detected Aroclor 1262 at Spring 1 was a false positive. The exercise confirmed the false-positive result and was reported to DOE.

Bureau staff collected water samples at Springs 5, 8A, 9, 9A, 9B and 10 and Ancho Springs in White Rock to be analyzed for RCRA metals, tritium, VOCs, SVOCs, nitrogen species and stable isotopes. The expedition was completely funded by NMED/HWB to assist its determination of LANS compliance with its Consent Order, and Bureau staff took the opportunity to show LANS staff the locations of the springs for later sampling events.

### **LSF10 Storm Water Below SWMUS Project:**

Under this Activity ID, Bureau staff conducts on-going sampling of storm water discharges from solid waste management units (SWMU) and areas of concern (AOC) for compliance with Federal Facility Compliance Agreement and the General Storm Water Permit.

Bureau staff, along with LANS representatives, visited TA-22 to propose long- and short-term storm water controls. The concentration of copper found in storm water runoff from the location visited has exceeded acute water quality criteria and the Bureau suggested BMPs that LANS could implement to address this particular concern. Staff deployed two single-stage NALGENE® samplers below the site.

Staff compiled data from stormwater sampling below the metallurgy and electro-plating SWMU at TA-22 where dissolved metals exceed acute aquatic life criteria. Staff consulted with LANS to assure implementation of stormwater controls to stabilize the area and prevent future criteria exceedances.

Staff compiled and evaluated over 1300 dissolved metals data points collected by LANS from 2004 through 2007 for compliance with acute aquatic life criteria. Staff compiled data from analytes of dissolved copper, lead, zinc, silver, chromium, nickel and arsenic indicating SWMUs are potential contaminant sources within each stormwater monitoring area and they potentially are contributing to the exceedances of acute aquatic life criteria.

### **LSW11 Storm Water In Water Shed Project:**

Under this Activity ID, Bureau staff conducts on-going sampling of LANL watersheds for water quality standards compliance verification. The focus is on post Cerro Grande fire plutonium inventory transport assessments in Pueblo and Los Alamos Canyons and cooperative watershed monitoring with San Ildefonso Pueblo.

A majority of data obtained in support of the stormwater In watershed Project comes from samples collected in automatic ISCO® samplers during the monsoon season. In preparation for the monsoon season, staff reconditioned the batteries and decontaminated the equipment. Staff then deployed the automatic ISCO® samplers at four stations in Los Alamos and Pueblo Canyons. One sampler was deployed upstream of the wetlands in Pueblo Canyon and another above the confluence with Los Alamos Canyon (E060 gage). One sampler was deployed below the weir in Los Alamos Canyon (E050 gage) and another on San Ildefonso Pueblo lands upstream from the Rio Grande (E110 gage). Staff deployed one additional sampler on the Rio Grande near the Buckman Direct Diversion site to determine water quality during storm events. Staff conducted regular monitoring and maintenance of the sampling systems.

The season, from July through October, provided numerous stormwater collection opportunities. The first, however, came as the result of a water main break at TA-21 during the July 4<sup>th</sup> weekend. The incident caused a release of nearly four million gallons of potable water before the system could be shut off. The multiple samples were collected at E050 (Los Alamos Canyon below weir). Preliminary data indicated the concentration of radiochemical constituents was extraordinary, and further laboratory quality control analysis and discussion would be conducted to verify the data's integrity before being released.

Bureau staff collected and submitted for analyses three sample sets from two stations in Los Alamos Canyon, one just above the Rio Grande at E110, and one above the LA/Pueblo confluence at E050. Samples were analyzed for suspended sediment concentration, radionuclides in water and suspended sediments, and metals.

Bureau staff also collected and submitted three sample sets from stormwater events along the Rio Grande near the BDD. However, it is unlikely the stormwater events occurred concurrently with discharges from the Los Alamos watershed. Sample sets normally include up to 5 individual samples collected at 1-hour intervals during the entire duration of a flood event. Samples were



analyzed for radionuclides, metals, and PCBs. The single sample collected at Buckman during July indicated that the diversion had not been impacted from the previous Los Alamos watershed event. The Buckman sample was collected to demonstrate normal stormwater conditions in the Rio Grande in the vicinity of the Buckman Direct Diversion.

Bureau staff prepared and forwarded draft data submittals and evaluations to DOE, San Ildefonso, and the BDD regarding the samples collected during the potable water release and stormwater events during the summer months. The bureau reported data from the three events on July 5<sup>th</sup>, July 26<sup>th</sup>, and August 9<sup>th</sup> at two locations, E050 and near the Buckman Landing along the Rio Grande. Automated ISCO stormwater collection equipment had collected five samples from flow in Los Alamos Canyon at 40- to 60-minute intervals during the evening of July 5<sup>th</sup> at E050. That flow had originated from the potable water line break a TA-21 that discharged approximately four million gallons of water into Los Alamos Canyon over a 26 hour period. The ISCO equipment also collected five samples at 45- to 60-minute intervals at the same location during an August 9<sup>th</sup> stormwater event, and a sample from the Rio Grande near the Buckman Landing during a July 26<sup>th</sup> regional stormwater event in northern New Mexico.

Chemical analysis of samples collected at E050, Los Alamos Canyon below the low head weir, on July 5<sup>th</sup> demonstrated extraordinary plutonium values in the suspended sediment. The plutonium-239/240 values ranged from 87 to 160 pCi/g. The following stormwater event during August 8<sup>th</sup> contained plutonium in suspended sediments at diminished, but elevated, levels ranging in values from 10 to 18 pCi/g. It appears the water discharge from the potable water line break at TA-21 eroded contaminants from SWMU 21-027(a) into Los Alamos Canyon and transported them beyond the Laboratory boundaries.

These measurements may have implications to several LANS efforts, including:

- Appropriate characterization and planned disposal of sediments from the low head weir in Los Alamos Canyon;
- Characterization of contaminants within and status of SWMU 21-027(a) and AOC C-00-06;
- Characterization of contaminants in sediments in Los Alamos Canyon within Laboratory boundaries and San Ildefonso Pueblo;
- Status of the Interim Measures Work Plan, LA-UR-08-6588, addressing off site contaminant transport in Los Alamos and Pueblo Canyons; and
- Commitments made to, and concerns of, the Buckman Direct Diversion Board regarding potential contaminants discharged to the Rio Grande.

Bureau staff met with LANS, DOE, HWB and City of Santa Fe representatives to discuss watershed control measures proposed by LANS for installation in Pueblo and DP Canyons. Just upstream from the confluence of Pueblo Canyon with Los Alamos Canyon, LANS has proposed to install a low-head weir. Just below the proposed low-head weir, LANS will re-locate the E060 water quality monitoring station. In addition, LANS proposed intensive planting of 6,000 willows in the spring of 2009 within eroding and incising wetland channels to stabilize banks and trap sediments. This will be a first cut at controlling the incision and will be assessed for performance for one to two years. Follow-up actions may be required if the plantings do not perform as predicted. Another low-head weir was proposed by LANS in the meadows reach of

DP Canyon, and if the actions at LA-SMA-2 (major source of PCBs into Los Alamos Canyon) and the DP low-head weir do not reduce PCB concentrations significantly, an additional weir in Los Alamos Canyon above the confluence of DP Canyon might be required. Three cross-vane structures intended to reduce velocity of flood peaks were proposed.

### **LNP12 NPDES Monitoring Assessment Project:**

Under this Activity ID, Bureau staff conducts on-going sampling of National Pollution Discharge Elimination System (NPDES) outfalls and outfall closure verification. The focus is on stormwater management assessment at construction and Environmental Restoration remediation projects. Staff verifies that LANS has proper spill action plans, and staff provides closeout assessment and recommendations.

Bureau staff reviewed LANL NFA proposal for SWMUs covered under the NPDES stormwater permit. Staff compiled data on total mercury in the watercourse below one SWMU that had low levels of mercury in surface soils near a septic tank outfall. Staff conferred with HWB and determined that the site merits an NFA with controls that limit or prevent downstream migration of surface soils.

Staff collected two monthly NPDES samples for perchlorate at the LANL Super Computer Complex.

Staff participated in a conference call with EPA Region VI, HWB, and SWQB to discuss the Draft LANL Individual Storm Water Permit concerns, which include additional sites for monitoring, and an increased number of samples.

Staff completed the DOE-OB Site Evaluation Report for Stormwater and Erosion Controls at the Security Perimeter Bypass Road, November 13, 2007. The security road bypass project is a result of a settlement agreement reached between LANL/LANS and the County of Los Alamos and is designed to allow skiers who are in route to the Pajarito Ski Area to reach the facilities without having to pass through newly erected guard gates designed to add additional security at LANL. This project is currently undergoing transfer proceedings between the Laboratory and the County which will include permanent transfer of storm water related controls and maintenance. Additionally, DOE Oversight staff was told that at no time would the Laboratory file a Notice of Termination (NOT) without having Los Alamos County filing a Notice of Intent (NOI) so that the site would always be covered by a NPDES General Permit for Large and Small Construction activities. The site had several problems to be addressed related to poor implementation and maintenance of best management practices (BMPs) and their possible failure during large or moderate rain events. Although much of the site was well maintained staff recommend that all cited problem areas requiring project erosion prevention activities be re-considered or replaced. This report serves as part of a non-regulatory approach to NPDES permit compliance through consultation between Bureau staff and LANS. Compliance issues are addressed by the EPA through the NMED/SWQB.

Staff submitted a report to DOE detailing observations by the Bureau of stormwater and erosion controls based on our second site evaluation of the TA-21 Haul Road. Bureau staff favorably noted the pro-active use by LANS of natural materials for many of the site's BMPs and the

innovativeness of their implementation in a construction area that is both constricted by natural topography and site boundaries. In addition, construction site management also has the responsibility of protection of the adjacent water body. Because of these actions and the positive attitude of the site's management and associated WQ/RCRA staff, the Bureau believes the intent of the Construction General Storm Water permit is being met on the TA-21 Haul Road project.

Staff submitted the Bureau site evaluation on the Chemistry, Metallurgy Research Replacement complex construction project to LANL/LANS and DOE for review.

Staff evaluated six regional well sites for compliance with the NPDES General Permit for Large and Small Construction activities and submitted report to DOE and LANS. Staff determined that LANS management performed acceptable stormwater management practices, and all parties concerned had a positive attitude toward overall construction stormwater management and permit compliance.

As mentioned above in the Stormwater in Watershed section, staff investigated a spill of 3.9 million gallons of potable water at TA-21 that obliterated a SWMU depositing approximately 100 cubic yards of contaminated sediment in Los Alamos Canyon (see Figure LNP12-1).



Figure LNP12-1. Erosion from July 5, 2008 release of 3.9 million gallon potable water at TA-21

Bureau staff blank-corrected PCB data from a 2007 NPDES outfall sampling event and notified LANS staff of results. The levels of PCBs in the TA-50 Radioactive Waste Treatment Facility discharge were below MDL for the first time since monitoring of PCBs with hi-resolution method 1668A at LANL began. This indicates there are viable treatment technologies available (and in place at TA-50) to remove PCBs from LANL liquid waste streams. LANS is

investigating which combinations of treatment technologies can be applied to the power plant outfall 001 to bring discharges from 001 into compliance with their NPDES permit limit.

Staff drafted a recommendation for closeout of a sewage spill at TA-53 Building 406 and a potable water spill at TA-53 Building 52. The Bureau reviewed the spill response action report received on August 11, 2008, and determined the response to the releases adequate.

Bureau staff forwarded the following spill reports to DOE for review and use:

- “Spill Response Assessment and Suggestion for Close-Out of Diesel Fuel Oil Soil Contamination at TA-3, Above Ground Storage Tank 26, LANL Tier 1 Evaluation Report received on August 15, 2008 of a Release and Soil Contamination Notification Received on April 3, 2003”

The Bureau review concurred with the LANS findings that there was “no potential for current and future risk” concerning surface and sub-surface soil exposure pathways. The Bureau was in agreement that “the concentrations on-site are protective of groundwater and surface water” in the report were adequately supported and the Bureau recommended that no further action was required under the discharge notification. This submittal helped LANS to close out an action resulting from an accidental release and associated soil contamination that was reported to the Emergency Spill Hotline on April 3, 2003. The amount of the release was approximately 300 gallons and the notification was for diesel-contaminated soil of an area approximately 30 ft by 70 ft with a maximum depth of 20 feet.

- “NMED-DOE-OB Site Evaluation Report for Stormwater and Erosion Controls at Inactive and Active Regional Wells at LANL, August 5, 2008 and August 12, 2008”

This report summarized Bureau participation in several site evaluations for a Regional Well Project for stormwater and erosion controls on August 5, 2008 and August 12, 2008. All of the regional well sites visited were required to file a Notice of Intent to Discharge and have a Stormwater Pollution Prevention Plan (SWPPP) in place as part of a common plan of development that has a foot print of one (1) acre or greater. During the site evaluations, five of the six sites including (R-17), (R-16r), (R-25) (R-35) and (R-36a and b) were in an inactive or stand-down mode. At well site (R-37), drilling was being conducted during its site evaluation. No erosion or stormwater/sediment control problems were documented at the time of these site visits. The Bureau determined that LANS performed appropriate stormwater management practices in compliance with its permit. These non-regulatory site evaluations were made for the benefit of LANS staff pursuant to the NPDES General Permit for Large and Small Construction activities.

- “Stormwater Metals Data for TA-22 Sampling Project at Los Alamos National Laboratories (LANL) on July 8, 2008”

The report summarized Bureau participation in stormwater data collection to verify that run-off from a non-operational photo-facility outfall at TA-22 was not impacting down gradient drainages into the Pajarito Canyon watercourse. Bureau data results show that at

a calculated hardness of 30, dissolved aluminum, lead, and nickel exceeded the “chronic” aquatic life standards for in-stream designated uses while only dissolved silver exceeded the “acute” the aquatic life standards for stream designated uses. Both Copper and Cadmium exceeded both the “acute” and “chronic” aquatic life standards for in-stream designated uses.

- “Spill Response Assessment and Suggestion for Closure of Steam Condensate Release at TA-3, Diamond Drive, LANL Discharge Notification Report # 206 on October 15, 2008”

The report summarized the notification and response/follow-up to a release that occurred on October 16, 2008. The release consisted of steam condensate at Technical Area 3 at the southeast corner of the intersection of Diamond Drive and Jemez Road located at Los Alamos National Laboratory, Los Alamos, New Mexico. This accidental release was reported to the Emergency Spill Hotline as required by 20.6.2.1203 NMAC of the Water Quality Control Commission. The approximate amount of the release was 3,500 gallons. The steam condensate slowly discharged into a nearby storm drain and then flowed into Los Alamos Canyon. There were no consolidated solid waste management units (SWMUs) or Potential Release Sites (PRS) impacted by this release and no erosion impacts were observed following this release. Laboratory utilities personnel stopped the release and made repairs on October 22, 2008. The Bureau report acknowledged that it had reviewed both the 15- and 30-day release/discharge notification reports and found the LANS responses adequate such that no further action was recommended to the NMED/GWQB under the discharge notification.

- “Spill Response Assessment and Suggestion Report for a Closeout of Dry Fire Suppression Water System Water Release at TA-54, Building 412, LANL Report # 183, on October 11, 2007”

A potable water release occurred on October 11, 2007 from a failed valve on a dry fire suppression water system at TA-54, Building 412, located at Los Alamos National Laboratory. The spill was reported to the Emergency Spill Hotline as required by 20.6.2.1203 NMAC of the Water Quality Control Commission. The amount of the discharge was approximately 2,200 gallons with a portion of water flowing to a nearby shaft field. The water flowed around waste shafts 205 and 214 and then infiltrated into the nearby soil. Follow-up site investigation showed that the sandbags placed by facility staff at the time of the spill were very effective at diverting the release around the shafts, thus no infiltration or erosion occurred. On October 12, 2007, the dry line fire suppression system was repaired and placed back into service. The DOE Oversight Bureau reviewed the spill discharge notification report and found the inspection and follow-up repair program sufficient to protect the environment of New Mexico. The Oversight Bureau believes the response and clean up was adequate and recommended no further action under this discharge notification.

- “Spill Response Assessment and Suggestion for Closure of Steam Condensate Waterline Release at TA-3, Building 39, LANL Discharge Notification Report # 189 on November 9, 2007”

The report concurred with the LANS spill close-out action. There were no erosion impacts due to this discharge and all further steam condensate water discharges to the environment were eliminated on November 11, 2007.

- “Spill Response Assessment and Suggestion for Closeout of Fire Suppression Water (Potable) Release at TA-3 Building 28, LANL report # 190 on December 18, 2007”

The incident was reported to NMED on December 21, 2007. The release issued from a fire suppression water (potable) line break due to sub-freezing conditions at Technical Area 3, Building 28, located at LANL. The spill was reported to the Emergency Spill Hotline as required by 20.6.2.1203 NMAC of the Water Quality Control Commission. The approximate amount of the discharge was 5,000 gallons of potable water. The water crossed an area of asphalt along a road and flowed into a storm drain that discharges into upper Sandia Canyon. The water flowed over SWMUs 03-045(a) and 03-012(b)-00 and an AOC C-00-007. The Bureau’s review showed that the facility performed an adequate follow-up with the line being repaired and site investigation shows no erosion impacts to the SWMUs and AOCs. The Bureau determined that the response and clean up was complete and recommended no further action under this discharge notification.

- “Spill Response Assessment and Suggestion for Closeout of Domestic Wastewater (Sewage) release at TA-3 Building 316, LANL report # 191 on December 20, 2007”

The incident was reported to NMED on December 20, 2007. The release issued from a domestic wastewater (sewage) blocked line south of TA-3, Building 316, located at LANL. The spill was reported to the Emergency Spill Hotline as required by 20.6.2.1203 NMAC of the Water Quality Control Commission. The approximate amount of the discharge was 40 gallons. The Bureau review showed that the facility performed an adequate follow-up with the line being repaired, sanitized and a site investigation showing no erosion impacts to the SWMUs and AOCs. The Bureau determined that the response and clean up was complete and recommended no further action under this discharge notification.

- “Spill Response Assessment and Suggestion for Closeout of Potable Water release at TA-3, Building 261, LANL report # 192 on January 2, 2008”

The incident was reported to NMED on January 9, 2008. The release issued from a potable water release that occurred on the south side of TA-3, Building 316. The spill resulted from a 10-inch diameter pipe that ruptured due to sub-freezing conditions. The spill was reported to the Emergency Spill Hotline as required by 20.6.2.1203 NMAC of the Water Quality Control Commission. The approximate amount of the discharge was 6,750 gallons and flowed over concrete, soil, and over riprap into Sandia Canyon. This release ultimately flowed over SWMU 03-013(a)-00 requiring reporting under 20.6.2.1203 NMAC. SWMU 03-013(a)-00 includes the storm drains around the TA-3 National Security Science Building (NSSB) and Administration Buildings and an outfall area protected by riprap east of the new parking lot structure at TA-3-261 Otowi

Complex. The Bureau review showed that the facility performed an adequate follow-up with the repair and site assessment of any erosion impacts to SWMUs and AOCs. The Bureau determined that the response was appropriate and clean up was complete, and it recommended no further action under this discharge notification.

- “Spill Response Assessment and Suggestion for Closure of Potable Water Release at TA-41, Building FH4830, LANL Discharge Notification Report # 207 on December 18, 2008”

This report summarized a Potable Water release at TA-41, Building FH 483, located at Los Alamos National Laboratory. The release was reported to the Emergency Spill Hotline on December 18, 2008 and the approximate amount of the discharge was 1,000 gallons of potable water. The discharge was part of an emergency planned release from a pressure relief valve that was required to drain the line in order to make repairs to the system. The water was discharged into the Los Alamos Canyon watercourse at a flow rate less than 50 gallons per minute. Best Management Practices (BMPs) were installed and utilized to prevent any potential erosion impacts. The Bureau recommended that no further action was needed under the discharge notification following its review of the spill response action report from December 22, 2008.

- “Spill Response Assessment and Suggestion for Close-out of Potable Water Release at TA-54, Building 51, LANL Discharge Notification Report # 205, August 1, 2008”

The LANS staff had reported an accidental release of 7,000 gallons of potable water due to a faulty valve on a fire hydrant. The release flowed over, but did not cause any erosion SWMU 54-001(a) before discharging into Cañada del Buey. The hydrant was scheduled for repair, and it would not be put back into service until the faulty valve was replaced. The Bureau found that LANS provided an adequate spill response and recommended that the spill be closed out.

- “Spill Response Assessment and Suggestion for Close-out of Antifreeze and Motor Oil Release at TA-55, LANL Discharge Notification Report # 203, July 8, 2008”

The LANS staff reported an accidental release of 0.5 gallons of motor oil and 2.5 gallons of antifreeze due to a collision between a privately owned vehicle and a government vehicle on Pajarito Road outside of TA-55. The release was isolated by the application of Microblaze® to the impacted area, and the use of oil absorbent booms to help prevent oil and antifreeze from entering the drainage system. The Bureau concluded that the response by Laboratory HAZMAT personnel was adequate and recommended no further action was required and that the spill be closed out.

Staff prepared two additional closeout letter(s): one for a 1,350 gallon potable water spill at TA-3 Building 195, and one for a domestic wastewater spill of 500 gallons at TA-53 Lift station 107. Both non-regulatory letters were sent to DOE/LANS management for review. No erosion or sediment movement occurred from either the 500 gallon domestic wastewater spill or the potable water spill. The wastewater release was quickly isolated, cleaned and the area disinfected. The

potable water spill drained to a storm drain and into Upper Mortandad Canyon. The Bureau recommended that no further action was required under the discharge notification. Staff also prepared a letter to DOE recommending close-out of the spill report for the LANL TA-46 treated effluent release.

### **LPC13 Regional PCB Study Project:**

Under this Activity ID, Bureau staff conducts a special study to characterize PCB concentrations in stormwater on a regional basis (upper & middle Rio Grande) to put LANL and SNL contributions to the Rio Grande in perspective.

Bureau staff submitted ten stormwater samples from Rio Grande tributaries, seven snowmelt runoff samples from the Rio Grande and perennial tributaries, four snowpack samples, two rain-on-snowpack runoff samples from LANL tributaries, four well samples, and three stormwater samples from the Rio Grande at the BDD project site along with multiple equipment rinsate blanks. All samples were analyzed for PCBs, suspended sediment concentration, and depending on the amount of sediment available, particle size and organic carbon.

One of the three BDD samples exceeded the human health criteria for PCBs of 640 pg/L at 11,426 pg/L. Total PCB in the remaining three BDD samples ranged from 2 pg/L to 479 pg/L. Seven of the remaining eight samples collected from tributaries to the Rio Grande and Chama exceeded the human health criteria and two exceeded the wildlife habitat criteria of 14,000 pg/L. The concentrations in tributaries ranged from 254 pg/L to 22,656 pg/L. The rain-on-snow runoff samples were collected in Pajarito and Sandia Canyons at State Road 4 at the eastern boundary of LANL. Both samples exceeded the wildlife habitat criteria and were 18,285 pg/L in Pajarito and 739,155 pg/L in Sandia Canyon. Total PCB in all snowmelt runoff samples met all water quality criteria and ranged from non-detect to 14.5 pg/L.

Four wells were sampled on LANL property, two of which were located in Mortandad Canyon (MCOI-5 and MCOI-6) and two that were located in Sandia Canyon (R-12, Screen 1, and SCI-1). These wells were chosen as potentially impacted by dissolved PCBs in water from the Power Plant Outfall 001 and its subsequent passage through the Sandia Wetlands. A fifth well was chosen as most likely not impacted by anthropogenic sources and was an artesian well located in Valle Toledo.

Total PCB for all well samples was very low, ranging from non-detect in SCI1 and MCOI-6 to 105 pg/L and 121 pg/L in R-12, Screen 1 and H-1 Well, respectively. The levels found in H-1 well were unexpected and will be re-sampled in 2009.

Bureau staff purchased three Level Troll® stage height recorders. This equipment will provide a time and date stamp for samples collected in ephemeral channels. The three units purchased will supplement other equipment being made available (on loan) from SWQB (9 units) and HWB (7 units).

Eight single-stage sample heads were lost due to flash flooding or vandalism and more than 25 samples had to be discarded due to equipment malfunction. A disposable sampler head will be



substituted for the mechanical samplers next season and the mechanical samplers will be returned to the manufacturer for re-furbishing.

Bureau staff blank-corrected PCB data from snowpack samples collected in the spring of 2008, evaluated the data and then provided the data and assessment to DOE and LANS. The highest levels of total PCBs were found in the Sandia Crest snowpack samples, followed by Pajarito Mountain, Kachina Peak, and Aspen Peak (605 pg/L, 402 pg/L, 390 pg/L, and 185 pg/L respectively). Additional sampling of area snowpack accumulations is planned for FFY09 (see Figures LPC13-1 and -2).

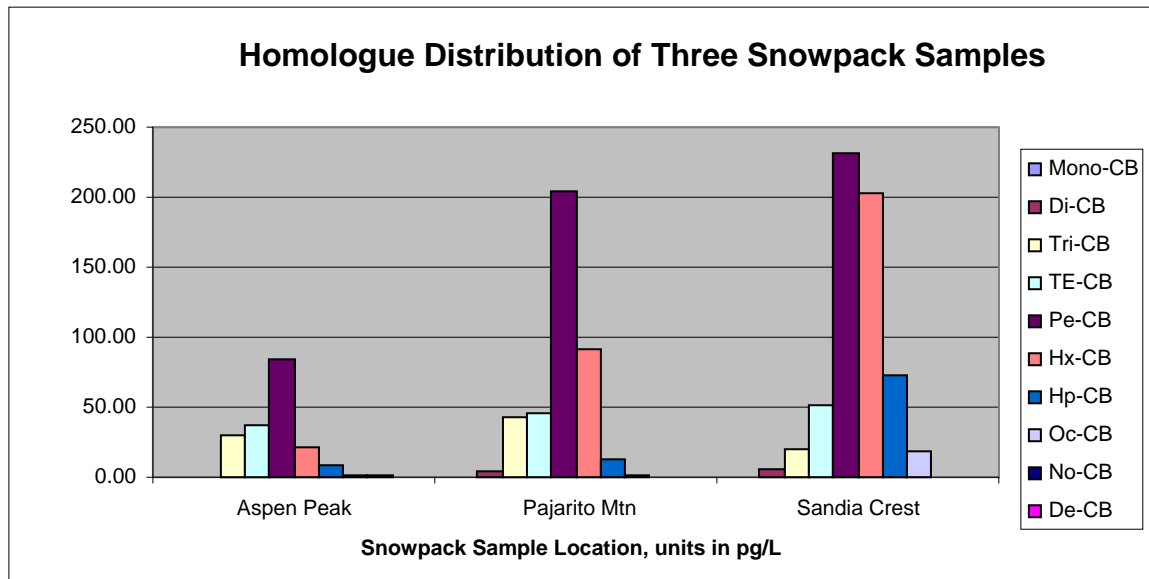


Figure LPC13-1. Homologue distribution of three snowpack samples collected at Aspen Peak (above Santa Fe), Pajarito Mountain (above LANL), and Sandia Crest (above Albuquerque) spring 2008.

### Homologue Distribution of Equipment Rinsate Blank and HPLC Water

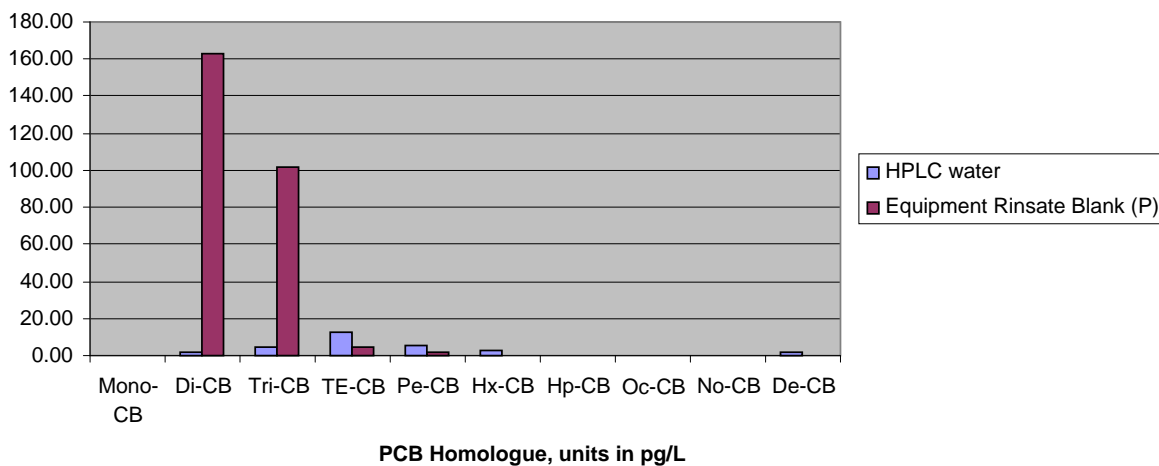


Figure LPC13-2. Homologue distribution of an equipment rinsate blank and a high performance liquid chromatography (HPLC) water lab blank.

Bureau staff is collaborating with LANS to collect precipitation samples in 2009. The Bureau will purchase the equipment and provide the analytical support while LANS will provide two graduate students to collect samples and maintain the samplers.

Bureau staff collected a sample for PCBs at H-1 artesian well in the Valle Grande. The results at H-1 artesian well will be used to determine if PCB levels are low enough to be used for QA purposes (field blanks, trip blanks, and equipment rinsate blanks) in the regional PCB Study Project. . The levels of PCBs at H-1 Artesian well were determined to be too high to be considered for QA uses.

Bureau staff received sediment PCB data from LANL in report LA-SMA-2.0, prepared an analysis of the data and submitted it to DOE & LANS. Staff also compiled PCB-in-sediment data collected at Hillside 140 and submitted the results to LANS and DOE.

Staff evaluated the homologue congener patterns found in equipment rinsate blanks. Water used for the equipment rinsate blanks was obtained from the State Laboratory Division (SLD) and is double distilled and passed through a reverse osmosis unit. High performance liquid chromatography (HPLC) water is produced for use as blanks in organic laboratories that need ultra-pure water. Blanks were run using both types of water. Total PCB in both the SLD and HPLC water was 271 pg/L and 29.1 pg/L respectfully. The data indicate that in the SLD water, lower chlorinated homologues (Di-CB and Tri-CB) may be carried over in the distilling process and not removed by the polishing step or they are leaching from the plastic carboy used for storage. The HPLC has over all lower levels of PCBs and a more normal bell-shaped distribution curve. The Bureau is ordering HPLC water for use in future equipment rinsate blanks to eliminate any bias from SLD distilled water.

Bureau staff met with LANS and DOE to discuss revising the Bureau SAP for the new increment of the Project. Management questions that the study will try to address are:

- Do the levels of PCBs found in precipitation account for a significant portion of total PCBs found in storm water runoff?
- What is the regional background concentration of PCBs in the Upper Rio Grande watershed in water and soils?
- Can we use relationships between suspended sediment concentration, particle size, total organic carbon, and PCB concentrations to prioritize source control and to measure BMP effectiveness?

Bureau staff researched precipitation samplers for PCBs, conducted literature review, discussed details with LANS representatives and conducted pricing review for purchase of units to support the Project.

### **LFT14 Fish Tissue Project:**

Under this Activity ID, Bureau staff conducts annual sampling of fish tissue in the Rio Grande and reservoirs under a cooperative sampling plan developed with Santa Clara Pueblo. A primary

result of this effort is the fish consumption advisory development. During this year, staff participated on the steering committee for the EPA 2007 contaminant in fish forum.

The fish tissue project supports several programs in NMED, but it is primarily designed to determine if fish in the various waterways near, or in the watershed of, LANL are affected by LANL-derived contaminants, primarily PCBs, radionuclides and metals. Ancillary to this primary effort, the data results assist the NMED/SWQB and other state agencies, such as the Department of Health, to provide the public with health advisories.

Staff submitted seven composite tissue samples (one replicate) to be analyzed for dioxin/furans, PCBs, PBDEs (fire retardants), organochlorine pesticides, radionuclides, and metals. All samples should indicate concentrations of contaminants from locations upstream from LANL discharges. The six fish samples were collected from Abiquiu reservoir and consisted of walleye, catfish, rainbow trout, carp and smallmouth bass. Four additional samples were collected from Cochiti reservoir and consisted of walleye, catfish, and carp. One fish sample of carp was collected from McAllister Lake, a playa lake near Las Vegas as a background or reference sample. Sample tissue sizes ranged from single fish samples to composite samples of up to ten fish.

Tissue data were evaluated using risk-based consumption tables found in EPA Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories. Based on discussions with the NMED/SWQB and the New Mexico Health Department (DOH), all non-detects were treated as 1/2 the detection limit for fish consumption advisory development purposes.

Mercury levels in Abiquiu reservoir resulted in the proposed consumption limits range from one 8-ounce meal per month for carp and walleye, to two 8-ounce meals per month for catfish and smallmouth bass, to four 8-ounce meals per month for trout. Mercury levels in Cochiti reservoir resulted in the proposed consumption limits range from one half 8-ounce meal per month for walleye, to two 8-ounce meals per month for catfish and carp. There are no restrictions due to mercury at McAllister Lake. The levels of mercury in Cochiti and Abiquiu reservoirs are consistent with those found in samples collected by LANS in the past.

Dioxin/furan and polychlorinated biphenyls (PCBs) were evaluated using the World Health Organization toxic equivalency quotient (TEQ) approach and the resulting TEQs were combined and used to generate proposed consumption limits. Proposed consumption limits for Abiquiu and Cochiti reservoir carp are one, and one half 8-ounce meals per month, respectively. Proposed consumption limits for Abiquiu and Cochiti reservoir walleye are 16 and four 8-ounce meals per month, respectively. Proposed consumption limits for Abiquiu and Cochiti reservoir catfish are two and one 8-ounce meals per month, respectively. Proposed consumption limits for Abiquiu reservoir trout and smallmouth bass are three and sixteen 8-ounce meals per month respectively. Proposed consumption limits for McAllister carp are three 8-ounce meals per month respectively (see Figure LFT14-1).

Site	Number of 8 ounce meals recommended per month based on PCBs and mercury									
	Carp		Walleye		Catfish		Trout		Smallmouth Bass	
	PCB	Mercury	PCB	Mercury	PCB	Mercury	PCB	Mercury	PCB	Mercury
Abiquiu	1	1	16	1	2	2	3	4	16	2
McAllister	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cochiti	0.5	2	4	0.5	1	2	N/A	N/A	N/A	N/A

Figure LFT14-1. Fish Advisory for areas along the Rio Grande in northern New Mexico

Toxicity from dioxin/furan comprises about 83 percent of the TEQ for carp in Abiquiu reservoir as compared to 14 percent at Cochiti Reservoir. Dioxin/furan levels in carp from Abiquiu reservoir were two times those found in Cochiti reservoir carp while PCB levels in Cochiti reservoir carp were 16 times as high as those found in Abiquiu reservoir.

PBDEs are organic compounds used as fire retardants which are recognized as an emerging contaminant of concern in the United States. Levels of PBDE were found from 314 pg/g in McAllister carp to 2,800 pg/g in Abiquiu reservoir carp and up to 33,463 pg/g in Cochiti reservoir carp. A preliminary assessment, using methodology found in the EPA guidance document, indicates that even at the highest levels found in Cochiti reservoir, no consumption restrictions are warranted.

Bureau staff assisted NMED/SWQB in the blank-correction and assessment of fish tissue data from samples collected in the middle Rio Grande region. The data will be used to develop fish consumption advisories in New Mexico.

Staff caught fish by various methods, including fly fishing and electro-shocking. Figure LFT14-2 shows staff using the backpack electro-shocker and angling methods for carp, catfish, and white sucker in the Rio Grande above Española.



Figure LFT14-2. Bureau staff along with NMED/SWQB prepares to electro-shock carp in the Rio Grande at Lyden. The fish within a 1-meter radius of the probe are shocked and then netted

Staff obtained fish tissue samples (catfish, carp, and carpsucker) for analysis that LANS staff had collected from Abiquiu Reservoir and the Rio Grande on Pueblo de San Ildefonso lands. Bureau staff evaluated the data analyzed from samples collected by LANS and used the results in recommending to NMED/SWQB that it modify the New Mexico Fish Consumption guidelines.

### **LMI15 Macroinvertebrate Project:**

Under this Activity ID, Bureau staff conducts LANL-area stream aquatic community assessment utilizing benthic macro-invertebrate population sampling and assessment methods. Macro-invertebrate populations are a long-term indicator of the chemical, biological and physical health of flowing waters. Density and diversity of species, numbers of individual within taxa, and overall population numbers reflect water quality stressors and/or water quality trends.

The Macroinvertebrate Project conducted by Bureau staff evaluates the LANL Area stream aquatic community utilizing benthic macro-invertebrate population sampling and assessment methods. Macro-invertebrate populations are a long-term indicator of the chemical, biological and physical health of flowing waters. Density and diversity of species and overall population numbers reflect water quality stressors and/or water quality trends.

During the first quarter, staff received laboratory analysis data results and taxonomic identification from four samples submitted in the previous quarter. Staff compiled reference material for macro invertebrate assessment protocols, reviewed macro invertebrate data from area streams and compared them to NMED assessment protocols. The final assessment of the data and completion of the report reviews are pending.

### **LDD16 Demolition And Decommission Project:**

Under this Activity ID, Bureau staff conducts site-specific monitoring of air quality downwind from ongoing demolition and decommissioning projects.

The Allred 2007 Rad-NESHAP audit focused on how emissions from D&D or environmental cleanup sites are evaluated and how new LANL projects are evaluated for radiological NESHAPS requirements. Visits to MDA-B clean up operations were scheduled during the third quarter of 2008 to follow-up on issues raised by the Allred 2007 Rad-NESHAP audit. Stack sampling equipment is being considered to enhance the monitoring efforts of the Bureau.

### **LTM17 Background Perchlorate Report:**

Under this Activity ID, Bureau staff conducts a specialized study to evaluate perchlorate in groundwater in the northern Rio Grande Basin.

The Bureau released the report titled “Naturally Occurring Perchlorate in Ground Water, Northern Rio Grande Basin, New Mexico.” The report was authored by Michael Dale along with Kim Granzow and David Englert of the Bureau. Additional authors from LANS included Patrick Longmire, Mike Rearick, and George Perkins. The report detailed a multi-year groundwater analysis study that determined trace concentrations of naturally occurring perchlorate in the Los Alamos area regional drinking water aquifer as well as the groundwater system as a whole. Background levels were also determined for select groundwater sources in the Taos area. The groundwater system in the Los Alamos area contains background concentrations of perchlorate ranging from 0.09 to 0.45 mg/L (milligram/Liter) with a mean of  $0.28 \pm 0.07$  mg/L. Perchlorate is present at similar concentrations in both modern and submodern-age groundwater. Concentrations are consistent along flow paths from the mountain-block recharge area to deep saturation within the Rio Grande basin. A correlation between perchlorate and other parameters is not apparent for the Los Alamos area groundwater system. However, if the regional aquifer data set is analyzed separately, then some degree of correlation between perchlorate and chloride, sulfate, and age is evident. Natural perchlorate concentrations in groundwater within the Taos area ranged from 0.07 to 0.18  $\mu\text{g/L}$  (microgram/Liter). Two of the thirteen precipitation samples collected contained detectable perchlorate at 0.0210 and 0.0099  $\mu\text{g/L}$ . This data set suggests that naturally occurring perchlorate may be accumulated through evapotranspiration processes. The LANS staff and others see benefits to being able to use the data from the Bureau report for contaminant-detection monitoring and measuring natural attenuation in groundwater below the Pajarito Plateau.

After the completion of the study, staff collected snowpack samples from Pajarito Mt. and Aspen and shipped them to an independent laboratory for perchlorate analysis. This additional effort will help to determine potential sources and causes for perchlorate deposition and migration.

A joint NMED-LANS project required researchers to obtain a 2-year work permit from the Federal Valles Caldera National Reserve and Bandelier National Monument. The sampling procedure uses a special perolite resin column designed by LANS and NMED researchers to target and capture the perchlorate ( $\text{ClO}_4$ ) anion as water flows through it. NMED performs most of the fieldwork and LANS is utilizing Louisiana State University to perform the isotopic analyses (see Figure LTM17-1). Samples are being collected in the Valle Toledo wells and in

Bandelier National Monument from Barbara Spring in Frijoles Canyon (see Figure LTM17-2). The project is designed to determine the chlorine and oxygen isotopic ratios present in trace amounts of perchlorate found in pristine ground water (naturally-occurring  $\text{ClO}_4$ ) thus assessing a natural signature for those types of waters. This signature can then be used for comparisons to water signatures of non-natural or man-made perchlorate. This has the potential to be a very useful tool for decision makers to help determine whether LANL is a source of pollution when looking at low-levels of perchlorate in the 1 to 10 ppb range. The theory behind this study is similar to what hydrologists routinely use to determine source signatures of isotopic nitrogen in liquid waste streams (e.g., septic, dairy or nitric acid wastewater).



Figure LTM17-1: Bureau Staff adjusts the perolite resin column at H-1 in Valle Toledo



Figure LTM17-2. Staff examines CIO<sub>4</sub> Resin Column at Barbara Spring (Frijoles Canyon)

Staff placed perchlorate extraction columns at two locations, the H-1 artesian well in the Valle Caldera and Barbara Spring in the upper reach of Frijoles Canyon for isotope specific forensic applications for background perchlorate in ground water. Data will be used to fingerprint the natural isotopic composition of chlorine and oxygen within the perchlorate ion and will be used to distinguish anthropogenic sources from natural or background sources of perchlorate. Staff performed maintenance work on the perchlorate extraction columns and also collected and submitted for analysis several water samples from H-1, H-2, H-3, and Barbara Spring for perchlorate (see figure LTM17-3). These late 1940s Atomic Energy Commission artesian wells are continuously flowing due to old and corroded steel casing and valve-works. The extraction columns will be removed and analyzed in early first quarter FFY 2009.





Figure LTM17-3. Staff collects samples for the Sulfur/Oxygen Isotope study at H-3 in Valle Toledo.

Bureau staff collected Boron-Isotope, cations, anions, trace elements and stable isotopes (O, H, C, and N) samples at Barbara Spring and in Frijoles stream in Frijoles Canyon to support a LANS project that will involve the Bureau working with LANS on a future fate and transport report. The staff also collected Noble gases, Sulfur and Oxygen –Isotope and tritium samples at Barbara Spring for project LMW08. Upon arrival at Barbara Spring, the staff noticed that the perchlorate study apparatus consisting of a collection column and tubing had been vandalized. Extra time at the site was required in order to re-assemble the study equipment and protect it from future damage.

Bureau staff continued collecting samples for the Forensic Perchlorate (CLO<sub>4</sub>) studies that are also NMED/LANS joint-projects. The Forensic Perchlorate effort included setting up and maintaining an additional perolite resin column designed by LANS and NMED researchers to capture the CLO<sub>4</sub> anion in White Rock Canyon at Springs 9-A and 9-B. Bureau staff has been performing most of the field work and LANS is conducting most of the analyses. Staff also collected samples for oxy-anions (iodate, chromate, chlorate, chlorite, +/- perchlorate) at a variety of groundwater locations including: R-13, R-15, R-28, R-12 (zones 1 & 2), R-33 (zones 1 & 2), SCI-1, MCOI-5, and MCOI-6.

### **LGD19 GIS Data And Reports Info Project:**

Under this Activity ID Bureau staff provides map generation, internal database management and RACER database support.

For the GIS Data and Reports Information Project, the Bureau staff creates maps and figures for reports and publications, queries databases to mine information, builds the Crystal Seagate Reports for yearly accounting; imports electronic data deliverables (EDDs) for various LANL

media samples from all laboratory analytical reports into the database; downloads and digitally corrects GPS coordinates; and updates the NMED database, as needed, with new locations, analytes, analytical methods, and other pertinent information. During this year, staff evaluated data from five projects for quality control and imported the data into the database.

During the first quarter, Bureau staff entered Spring 10 coordinates and corrected them as discussed with LANS staff, downloaded information from the Department GIS system maintained by the SWQB, installed ArcGIS 9.2 to update the Bureau GIS system to the latest revision, and developed and expanded the air database.

During the second quarter, Bureau staff examined data for quality and imported the data from five projects into the database. Air station locations were updated in both White Rock databases. Staff generated a data report on monitoring well, R-32, for HWB. Staff worked extensively on activating the RACER database for public access and use under an agreement that when fully operational, the database would be maintained by the Northern New Mexico Foundation. The staff attended RACER database meetings, fine-tuned RACER database issues and successfully imported NMED data into the RACER shell for automatic upload to the public web site. Data also have been exported to Excel and Statistica formats. Staff designed, developed and provided to DOE, LANS and HWB a new water-level contour map that better depicts ground-water flow directions. It will be particularly useful in predicting contaminant migration in a chromium plume.

During the third quarter, Bureau staff continued to work with the RACER database to provide Bureau data in a compatible format. Staff imported EDDs for fifteen sampling projects, added new R-well and surface water locations to the database, downloaded and corrected Buckman Direct Diversion drill-hole locations, created a shape file and re-projected it, supported the fish tissue sampling project, printed a Bear Spring Mountain quad map showing the PE-15 sample location, with corrected PCO-3 coordinates, and produced and provided a map for HWB and LANS ER group use. Staff evaluated software issues and coordinated with various outside agencies to assist in preparation for joint sampling exercises with LANS staff by uninstalling and reinstalling the AllTopo software package, correcting the Peralta Canyon Trail coordinates, downloading the EPA RADMAP software package, and researching PCB data issues with Test America Laboratories.

During the fourth quarter, Bureau staff continued to update the various databases and prepared and distributed maps for reference and field sampling. Staff provided reference location maps to NMED/GWQB for LANL gage stations and NPDES and watershed evaluations. Staff added PBDE and organochlorine pesticide analytes to database. Staff digitally corrected coordinates for Valle Toledo wells and researched their names using historical literature in preparation for sampling exercises, and also digitally corrected coordinates for the TA-53 cooling tower outfall. In support of developing 2007 data reports; staff downloaded and digitally corrected alpine sampling location coordinates and created a map. Staff reconstructed the EDD format received from Test America Laboratories to support the NMED/HWB study project of more than 140 analytes.

### RACER-Specific Developments

Bureau staff participated in meetings with stakeholders to discuss outputs and timelines for completing the RACER project, a comprehensive, multi-media database of environmental samples collected at LANL and in the vicinity. The meetings discussed milestone schedules for turnover of the project to the New Mexico Community Foundation (NMCF). Bureau staff imported 2007 field data such as dissolved oxygen, pH, conductivity, and temperature and oxygen reduction potential into the database. The groundwater field data allows for a more reliable interpretation of the chemical data at each location. The Bureau has completed its required tasks and has met all deadlines for completion of project milestones. After the turnover of the database maintenance to the NMCF, Bureau staff continued working with RACER personnel to troubleshoot data entry and retrieval in RACER. When it was discovered that several thousand entries were missing from the database, the Bureau staff investigated. Database sharing within the LANS system was the issue, and between LANS and the Bureau it was resolved, and all data have been made available. Other areas needing attention included the inability of the system to consistently report data without enough significant figures. The RACER team discussed implementation issues, data completeness, and accuracy. The RACER data can now be accessed by the public. This milestone has raised another issue related to interpretation of PCB concentration results. Because of the very high-resolution being obtained by a new analytical method (1668A), results must be blank corrected to remove any bias introduced by the analytical laboratory. Staff is implementing procedures to blank-correct data to remove the bias-high results.

### **LMP23 Technical Review:**

Under this Activity ID Bureau staff provides technical support to DOE and LANS, other bureaus in NMED, state and federal entities, and public interest and oversight groups.

As a function of technical review, Bureau staff interacts and consults with other bureaus within NMED; supports the RACER database continuing development, implementation and maintenance; provides analytical data and remediation assistance to the Pueblos, DOE, and LANS; and makes recommendations to the other state agencies and the EPA. Staff also supports the Citizen Advisory Board in its oversight capacity. Specific elements of this activity include data analysis to support fish consumption advisory documents published through collaboration among the NMED, DOH and NM Game & Fish Department; review of technical documents generated by LANS for well rehabilitation, R-well screen analysis, R-well completion, yearly site-wide groundwater and baseflow monitoring, and canyons characterization work; Beta testing of the RACER database; and assistance in developing Water Quality Standards, including radionuclides, with EPA, NMED/HWB, and NMED/SWQB on the DRAFT NPDES Individual Stormwater Permit at LANL.

During the first quarter, Bureau staff reviewed and provided comments on LANL Consent Order documents titled "Pilot Well Rehabilitation Study Summary Report, March 2007," "Well R-12 Rehabilitation and Conversion Summary Report," "Well R-32 Rehabilitation and Conversion Summary Report," "Technical Area 54 Well Evaluation and Network Recommendations," and the R-28 pumping test plan (informal document). Staff evaluated historical field data and water-quality data collected at single-screen and dual-screen completed R-wells with respect to sample quality and representativeness, and provided recommendations on current well-purging

procedures by LANS. The NMED/SWQB was tasked to recommend a perchlorate standard to EPA, and the Bureau staff provided inputs. Staff also developed PCB assessment protocol, recommended inputs to the LANL Individual Stormwater Permit, and the Buckman Direct Diversion NPDES permit.

During the second quarter, staff continued to collaborate with LANS on RACER database implementation. Staff also provided written comments to HWB and LANS on the LANL documents "Los Alamos and Pueblo Canyons Groundwater Monitoring Well Network Evaluation and Recommendations" and "Well R-20 Rehabilitation and Conversion Summary Report." Staff compiled and evaluated all low-level tritium data collected at production wells in the Los Alamos area to determine anthropogenic impacts. A report of the findings was submitted to DOE, LANS and NMED/HWB. Subsequent to internal evaluations, staff submitted recommendations to DOE and LANS concerning the placement of dedicated pumps at wells LADP-3 and LAOI(a)-1.1. In support of NMED/SWQB, staff queried the LANL Water Quality Data Base for determining the existence of historical aluminum concentrations in the Jemez Mountains.

During the third quarter, staff continued to support development and implementation of the RACER database. Staff participated in Beta Testing and discussed milestones and issues needed to be completed prior to September release to public with the RACER technical team. Staff accompanied LANS Environmental Restoration staff into Pueblo Canyon to evaluate contaminated sediment transport control efforts by LANS. Following this and several other tours of the LANL watershed, staff met with NMED/HWB, DOE and LANS to recommend further remedial actions to control off-site sediment transport and reduce pollutant loads to the Rio Grande. Staff reviewed sediment PCB data from the LANS LA-SMA-2.0 report and prepared an evaluation for DOE & LANS. This effort provided background support to the joint NMED/LANS regional PCB study that would begin in earnest in 2009. Staff also reviewed the LANS preliminary comments regarding the use of EPA Method 1668A for NPDES Stormwater compliance monitoring of PCBs. The LANS position stated that the method has not been validated specifically for stormwater matrices and PCBs are often found in laboratory blanks. Also, LANS stated that high concentrations of PCBs in precipitation (world-wide) invalidate the method for use in stormwater monitoring. The Bureau position stated that data can be blank corrected, only the 1668A method is sensitive enough to adequately monitor for human health and wildlife standards, and the LANS world-wide data were region specific and therefore not applicable (Green Bay, Chicago, Greece Sweden and France). Comments were provided to NMED/SWQB. Method 1668A has been proposed to replace Method 608 in order to evaluate compliance with the New Mexico surface water criteria. Staff reviewed the DRAFT NPDES permit for storm water discharges at LANL and prepared comments to NMED/SWQB for submittal to EPA.

During the fourth quarter, Bureau staff reviewed and commented on the LANS document titled "Development of an Infiltration Map for the Los Alamos Area, New Mexico." The document was written in 2005, and it was more recently published in the Vadose Zone Journal. Data from the report are currently being used in the LANS ground-water flow and transport models. Staff is assisting in the analysis of bromate, chlorate, chlorite, and iodate in ground and surface water.

Data will be used for contaminant detection monitoring, source-term delineation, and monitoring/measuring natural attenuation.

The following were specific elements of the Bureau staff technical review:

- Staff met with SWQB to discuss path forward for incorporating new criteria for radionuclides into the surface Water standards;
- Staff reviewed the LANL Interim Measure Work Plan for Contaminated Sediment Transport Mitigation;
- Staff met with SWQB, GWB, & LANL to discuss a Notice of Intent to discharge as part of a 2008 dye tracer study used for flow measurement calibration at watershed gage stations at LANL;
- Staff reviewed dioxin data from Oversight Bureau Pueblo Canyon Sediment work from 2005 and re-evaluated Toxic Equivalency Quotients and compared them to ecological screening action levels for discussion with the HWB contract risk assessor. While levels exceed the ecological screening action levels by over 20 times, it was determined they are not high enough to warrant further action;
- Staff has been in consultation with NMED/SWQB on establishing a perchlorate standard, reviewing a background surface water report, writing a PCB assessment protocol, and reviewing and providing comments on the Buckman Direct Diversion workplan. The process is continuing, and to-date no deadlines have been established;
- Bureau staff performed a cursory review of the 2008 Interim Facility-Wide Ground Water Monitoring Plan that LANL submitted to HWB. The review found the document was adequate, and it included the following specific comments including potential operational cost savings, renaming monitoring point descriptions, correcting inaccuracies, and a recommendation for plugging procedures at TW-8;
- Staff provided technical consultation and interactions with EPA Region 6 with respect to the staff reviews of the LANL Well Screen Analysis Report and Groundwater Background Investigation Report;
- Staff produced a detailed water-level map for the regional aquifer at and near the chromium plume surrounding chromium contaminated well R-28. Maps were presented to DOE and LANL in order to fine tune locations for future plume delineation wells;
- Staff initiated the scope of work for a joint DOE/LANL and Oversight Bureau project that involves the use of environmental forensics for determining the isotope signature and abundances of chlorine-37/36 and oxygen-18/16 in natural perchlorate in ground water;
- Staff consulted with LANL and DOE concerning rehabilitation efforts at regional monitoring wells R-22, R-16, R-19, CdV-R-37-2, and CdV-R-15-3;
- Staff provided technical input to LANL/DOE and HWB with respect to drilling locations for intermediate and alluvial monitoring wells as part of the Pajarito Canyon Work Plan;
- Staff provided technical input to LANL/DOE and HWB with respect to drilling locations for regional aquifer monitoring wells at TA-54, MDAs H, L, and G;
- Bureau staff provided insight to LANS on the decision to dismantlement of the Permeable Reactive Barrier (PRB) in Mortandad Canyon. Mortandad Canyon is the location of the effluent stream from the LANL Radioactive Liquid Waste Treatment Facility. The RLWTF discharges about 60,000 gallons of treated effluent per week on average. Bureau staff generally concurred with LANS that the excavation should be stopped, and LANS should begin the backfilling and reclamation processes. The PRB

was first installed in 2003 at a cost of over \$900K to help control legacy contamination in the canyon by scrubbing shallow groundwater of radionuclides such as strontium-90, americium-241, plutonium-238/239/240, and uranium isotopes as well as chemicals such as perchlorate, nitrate and heavy metals. It had not been operating as designed. It was removed during May and June 2008;

- Bureau staff met with SWQB and LANS to discuss a proposal by LANS to use a hardness value in the NPDES Individual Storm Water permit that is higher than that required by SWQB in the 401 Certification of the LANL permit. The WQCC heard an appeal filed by LANS on the State 401 certification of its new NPDES stormwater discharge permit. The NMED opposed the appeal on a timeliness issue (LANS filed some 52 days after the certification was issued which in the view of NMED was beyond the 30 days allowed). The WQCC on a split vote decided in favor of NMED to dismiss the appeal; and
- Bureau staff compiled data for storm water monitoring below the Burning Grounds (E057.5) station for use by HWB in evaluating monitoring needs in RCRA Permit negotiations. Staff attended only the storm water monitoring portion of the permit negotiations.

Bureau staff reviewed the following LANS documents:

- "Los Alamos and Pueblo Canyons Groundwater Monitoring Well Network Evaluation and Recommendations"
- "Well R-20 Rehabilitation and Conversion Summary Report"
- "Development of an Infiltration Map for the Los Alamos Area, New Mexico"

## **Sandia National Laboratories/New Mexico Oversight**

### **SAD40 General Administration:**

Under this Activity ID the Bureau manages and administers the overall activities of staff members in the Albuquerque and Santa Fe office. Staff provides assistance to the Bureau and DOE developing workplans, budgets and training requirements.

Staff attended the Spring 2008 New Mexico Tech Institute for Engineering Research and Applications ESRI GIS course on May 15-16th. The course introduced participants to ArcGIS 9.2. The course provided a foundation for using ArcMap, ArcCatalog, and ArcToolbox. The course covered fundamental GIS concepts as well as how to create, edit and work with geo-referenced spatial data. Highlighted information included how to manipulate tabular data, query a GIS database, and present data clearly and efficiently using maps and charts.

Staff attended new employee orientation in Santa Fe; Human Resources staff presented an overview of the Environment Department and introduced all Division Directors and additional key management personnel.

Staff attended a three day Data Quality Objective class at Sandia Pueblo sponsored by the U.S. Environmental Protection Agency.

ESRI software (ArcMap) was installed on staff computers allowing the Sandia Oversight Section to develop maps and implement a GIS program to consolidate Oversight Bureau and Sandia data. Staff received assistance from the NMED GIS technician in the District One office with data projection, data point conversion, and map creation.

Staff met with personnel from Assaigai Analytical Laboratory to discuss utilization of that laboratory for analyzing Bureau stormwater project samples along with samples from various other Bureau projects.

Staff completed stormwater and wastewater sections of the 2007 annual report. Staff completed the federal fiscal year 2009 work proposals for stormwater, Tijeras Arroyo, soil & sediment, and biota & terrestrial projects.

Sampling and Analysis Plans were composed for biota & terrestrial, stormwater, Tijeras Arroyo, and soil & sediment projects for federal fiscal year 2009. Staff received the new HSPD-12 Personal Identity Verification credentials from NNSA service center.

Bureau staff completed the required Sandia Radiological Worker I & II classroom and hands on practical training refresher course. Staff also completed CPR training in White Rock. Staff attended an ESRI GIS 9.3 rollout seminar at the Marriot Pyramid hotel in Albuquerque. The seminar demonstrated numerous changes and new features available with ArcGIS 9.3.

### **SPO41 Public Outreach:**

Under this Activity ID Bureau staff interacts with the public through meetings, listening sessions, website development, consultations, and reports.

Bureau staff attended the Semi-Annual Public Meeting sponsored by the DOE/NNSA on October 16<sup>th</sup>. The meeting was held in conjunction with a similar meeting sponsored by the USAF/KAFB. Both meetings were very well attended. Public concerns were once again raised about potential dangers caused by the covered, mixed waste landfill (MWL), particularly the amount of plutonium deposited. The DOE is still seeking approval for capping the landfill and completing closure procedures, which have been on-going for seven years.

Bureau staff attended several public listening sessions sponsored by the HWB and the Community Foundation in northern New Mexico and one in Albuquerque held on December 9<sup>th</sup>. Members of the public were encouraged to raise concerns about potential impacts to the Rio Grande from past or present operations at the LANL facility. Several members of the public were concerned about drinking water in Albuquerque now that river water is being used. As one result, Bureau staff committed to increased sampling of the river for potential impacts to drinking water. However, sampling for numerous potential contaminants of concern, such as pharmaceuticals, is outside the mission of the DOE Oversight Bureau. Therefore the public has been advised to refer these concerns to the SWQB for specific attention. The Bureau has offered to coordinate sampling efforts, but it will not be able to support the costs of analyses.

### **SGE42 General GW Monitoring (ER):**

Under this Activity ID Bureau staff evaluates groundwater parameters to determine whether there is any change in groundwater contamination at SNL and also compares data results from the analytical laboratory used by Sandia to data results obtained by the analytical laboratory used by the Bureau as an independent verification. Groundwater samples collected at SNL are based on Sandia sampling protocols and standard operating procedures. Each monitoring well is purged of required standing well volume, and groundwater field parameters (D.O., pH, conductivity, turbidity, and temperature) are measured until stabilization prior to sample collection. Each month the Bureau and Sandia staffs meet to coordinate monitoring efforts and to report analytical results as well as sampling difficulties. The Bureau staff provides periodic reports to DOE with copies to Sandia. The groundwater monitoring wells are scattered throughout the SNL property, as indicated below and shown on the accompanying site map (see Figure SGE42-1).



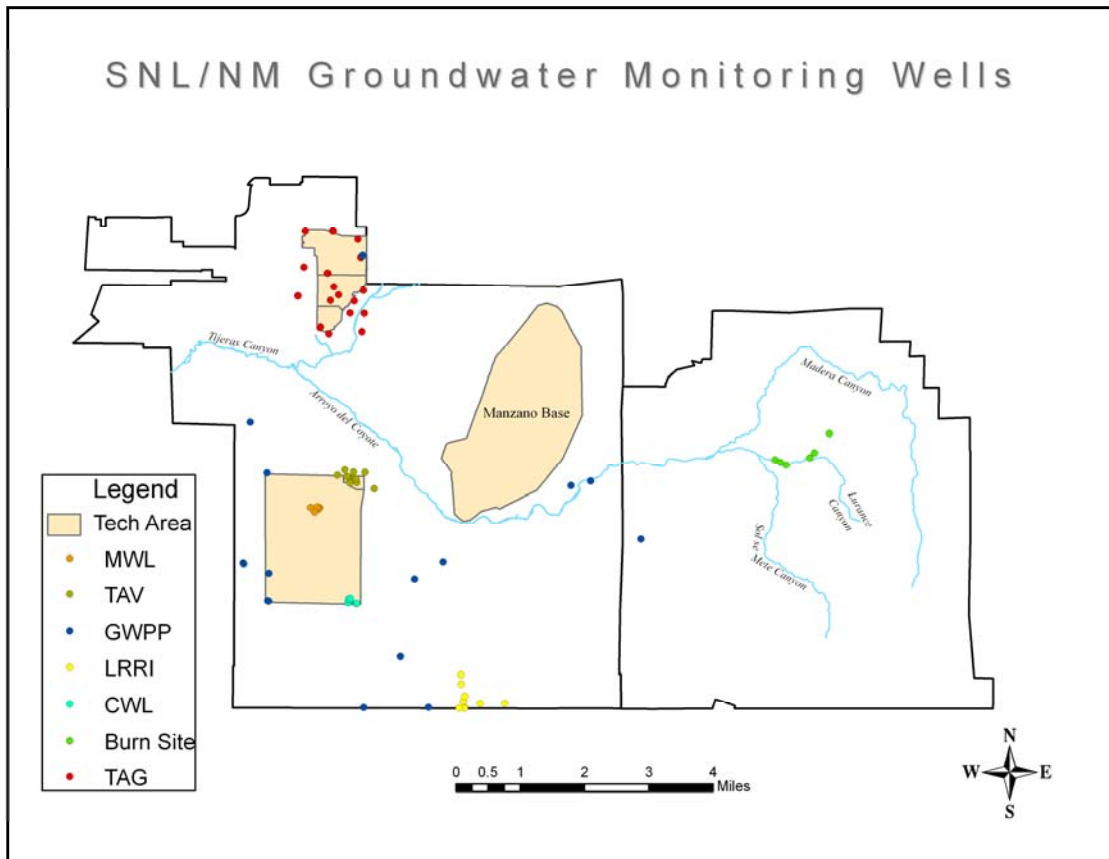


Figure SGE42-1. Groundwater monitoring locations

The Bureau staff has contracted with four primary certified laboratories to conduct chemical analyses, and they have sub-contracted to several other certified laboratories for specialty analyses, such as radionuclides. Paragon Analytics located in Fort Collins, Colorado was the primary laboratory used in 2008. Analytes being investigated included Target Analytical List (TAL) metals, high explosives compounds, numerous organic and inorganic compounds, and radionuclides. The following are highlights of the sampling and analyses efforts conducted by staff as part of the General Groundwater Monitoring (Environmental Restoration) Project. Data results are compared to applicable Maximum Allowable Concentrations (MAC) from the New Mexico Water Quality Control Commission (WQCC) (20.6.2.3103A NMAC Human Health Standards) and Maximum Contaminant Levels (MCL) from the EPA National Primary Drinking Water Regulations (40 CFR 141).

*Burn Site Groundwater Monitoring*

During 2008 Bureau staff collected groundwater samples from Burn Site monitoring wells CYN-MW1D, CYN-MW3, CYN-MW6, CYN-MW7 and CYN-MW8. Samples were collected and analyzed for nitrate plus nitrite (NPN), perchlorate, VOCs, semi-volatile organic compounds (SVOCs), TAL metals plus uranium, gasoline range organics (GROs) and diesel range organics (DROs), anions, cations, and radionuclides.

Nitrate plus nitrite (NPN) concentrations exceeded the MCL of 10 mg/L at monitoring wells CYN-MW3 (15 mg/L) and CYN-MW6 (29 mg/L- 51 mg/L). Perchlorate was detected above the NMED screening level of 4 µg/L at CYN-MW6. Perchlorate concentrations ranged from 5.9 µg/L- 8.7 µg/L during 2008.

Bureau staff submitted the FFY 2007 Lurance Canyon Burn Site groundwater monitoring results to DOE for review. During the second, third, and fourth quarters, the Bureau split groundwater samples with SNL at Lurance Canyon/Burn Site monitoring wells: CYN-MW3, MW4, MW6, MW7, MW8, and MW1D. The Bureau samples were submitted to an independent laboratory for organics, radiological, metals and general chemistry analyses.

- The TAL metals results from all samples collected at Lurance Canyon/ Burn Site monitoring wells were all below established MCLs;
- Uncorrected gross alpha was detected above the MCL of 15 pCi/L at monitoring wells: CYN-MW4, -MW6, -MW7 and -MW8. Uncorrected gross alpha activity ranged from  $15.2 \pm 4.75$  pCi/L at CYN-MW6 to  $54.3 \pm 11.1$  pCi/L at CYN-MW4. Unfortunately, these well samples were not analyzed for isotopic uranium. Thus, the corrected gross alpha values were not determined. This omission will be corrected in the request for analyses for the FFY 2008, 2nd quarter sampling. The Bureau plans to compare those corrected and uncorrected results with the results from FFY 2007 quarterly analyses. Trending analysis done by SNL on CYN-MW4 indicated that corrected gross alpha has consistently exceeded the MCL and has been slightly increasing over time. The Bureau recommended that SNL continue to sample these wells for gross alpha;
- The RDX and O-Nitrotoluene were detected above the method detection limit (MDL) at CYN-MW3. The O-Nitrotoluene was also detected above the MDL at CYN-MW6. These analytical values were 'J' qualified, indicating the concentrations were detected above the MDL, but not in a sufficient amount to be quantified reliably. CYN-MW3 was re-sampled for HE during the 4th quarter and both RDX and O-Nitrotoluene were non-detects. CYN-MW6 was also re-sampled during the 3rd and 4th quarter for HE, and no compounds were detected above the MDL;
- The NPN concentrations exceeded the MCL of 10 mg/L at monitoring wells CYN-MW3 and CYN-MW6. CYN-MW3 had a concentration of 12.2 mg/L when sampled during the 4th quarter. CYN-MW6 had a concentration of 21.4 mg/L when sampled during the 3rd quarter and 23.3 mg/L during 4th quarter. Results are comparable to past sampling events. Trending analysis performed by Sandia indicated that NPN concentrations at CYN-MW6 have continually exceeded the MCL and have been stable to slightly decreasing over time. In addition, trending analysis at CYN-MW3 demonstrated that NPN concentrations have been slightly decreasing over time. Fluoride was detected above the MAC of 1.6 mg/L at monitoring well CYN-MW1D. The Bureau recommended that Sandia continue to sample these wells for NPN and major anions;
- No organic compounds were detected above method detection limits in any of the monitoring wells sampled at Burn Site; and
- Perchlorate samples collected by Bureau and Sandia at monitoring well CYN-MW6 were above the SNL Compliance Order screening level of 4 µg/L. Results were comparable using EPA method 6850 Modified by LC-MS/MS and EPA method 314.0. In addition, perchlorate results compared well to previous sampling Sandia had performed at CYN-MW6. Trending

analysis conducted by Sandia indicates that perchlorate levels at CYN-MW6 have been stable to slightly increasing over time.

#### Chemical Waste Landfill Groundwater Monitoring

During 2008 Bureau staff collected split groundwater samples at the Chemical Waste Landfill (CWL) from monitoring well CWL-2BL, CWL-BW3, CWL-BW4A, CWL-MW2BL, CWL-MW2BU, CWL-MW4, CWL-MW5L, CWL-MW5U, CWL-MW6L, and CWL-MW6U. Samples were sent for TAL metals plus uranium and VOC analyses.

The single Bureau sample detected chromium in monitoring well CWL-MW4. The chromium concentration measured 0.142 mg/L, which slightly exceeded the MCL of 0.1 mg/L. The chromium concentration analyzed in the Sandia sample measured 0.007 mg/L, which is 20 times less than the sample collected by Bureau. The Bureau sample was re-analyzed and yielded the same concentration results as before. The Sandia sample was unable to be re-analyzed. Monitoring well CWL-MW4 was re-sampled during the next sampling event and chromium was not detected above the MCL. The chromium concentration was 0.0096 mg/L.

#### Groundwater Protection Program (GWPP) Monitoring

Bureau staff collected one groundwater sample from Groundwater Protection Program (GWPP) monitoring well CTF-MW2 to be analyzed for high explosive compounds. No HE compounds were detected above the method detection limit (MDL).

#### Lovelace Respiratory Research Institute

Bureau staff submitted the FFY 2007 Lovelace Respiratory Research Institute (LRRI) groundwater monitoring results to DOE for review. Samples were collected during the 3rd quarter and were split with LRRI staff from monitoring wells: ITRI MW-4, -6, -9, -11, -17, -18, -19; Isleta Pueblo wells IP-1, -3, -5; and NMED-1. The Bureau samples were submitted to an independent laboratory for organic, radiological, metals and general chemistry analysis.

- Total uranium was detected above the MCL of 0.03 mg/L at a concentration of 0.0504 mg/L at monitoring well ITRI-MW4. This is the first time uranium has been detected above the MCL at monitoring well ITRI-MW4. The Bureau has since re-sampled this well to verify the results. Results are still pending. The Bureau also recommended that LRRI split samples with Bureau if values of uranium continue to be above the MCL;
- Gamma Spectroscopy analysis detected Radium-226 above the established MCL of 5 pCi/L for Radium-226/228 combined. Elevated activity ranged from  $41.495 \pm 69.969$  pCi/L at monitoring well ITRI-MW11 to  $86.636 \pm 61.947$  pCi/L at monitoring well IP-1. Although Radium-226 was detected above the MCL at three monitoring wells, the EPA method 901.1 produced large uncertainties. The Bureau has since re-sampled monitoring wells ITRI MW-11 and ITRI MW-17 for analyses using the more sensitive EPA methods 903.1 and 904.0. Results are still pending, and they may indicate smaller ranges of uncertainty;
- Uncorrected gross alpha activity in ITRI-MW4 was  $32.084 \pm 5.431$  pCi/L, which exceeds the MCL of 15 pCi/L. When gross alpha was corrected by subtracting the activity for total uranium the value dropped, but it was still above the MCL. Corrected gross alpha activity at ITRI-MW4 was 26.106 pCi/L. In previous years this well has exhibited elevated levels of gross alpha. To date, trending analysis has not yet been conducted by

the Bureau for gross alpha at ITRI MW-4 to determine if levels are decreasing or increasing but this effort will be initiated during the next year. The Bureau has since re-sampled ITRI -MW-4 for gross alpha to verify results. It has been recommended that LRRI consider adding gross alpha to its list of analytes to be sampled during routine sampling of ITRI MW-4, even though NMED/GWQB has not required that analysis;

- Nitrate plus nitrite (NPN) concentrations were all below the MCL and MAC of 10 mg/L. The average concentration for nitrates was 4.7 mg/L; and
- Organic analyses were performed for Diesel Range Organics (DRO), Gasoline Range organics and volatile organic compounds (VOCs). No organic compounds were detected in any of the wells sampled at LRRI.

Staff submitted the First Quarter FFY 2008 LRRI groundwater monitoring results to DOE for review. On November 14 and 15, 2007 the Bureau staff split groundwater samples with LRRI staff at LRRI monitoring wells: ITRI-MW4, -MW6, -MW9, -MW11, -MW17, -MW18, -MW19 and NMED-1.

- Major anions were analyzed using EPA method 300.0 and TDS (total dissolved solids) concentration was analyzed using EPA method 160.1. Fluoride was detected above the NM MAC standard of 1.6 mg/L at six (6) monitoring wells. Elevated concentrations ranged from 1.64 mg/L at ITRI-MW9 to 2.13 mg/L at NMED-1. Sulfate was detected above the MAC of 600 mg/L at ITRI-MW4 at a concentration of 620 mg/L. The TDS concentration was also detected above the MAC of 1000 mg/L at ITRI-MW4, ITRI-MW17 and ITRI-MW19. Concentrations were 1650 mg/L, 1280 mg/L, and 1350 mg/L respectively;
- Trending analysis performed by staff from previous sampling events indicates fluoride concentrations at ITRI-MW9, MW17, MW18 and NMED-1 have been stable to slightly decreasing over time. Fluoride concentrations at ITRI-MW4 and -MW11 have been stable to slightly increasing over time. Sulfate and TDS concentrations at ITRI-MW4 have been decreasing over time; and
- The Bureau recommended that LRRI continue to sample these monitoring wells for major anions and TDS. Radiological data from the analytical laboratory has not been delivered and the analyses report will be submitted separately.

Bureau staff submitted Third Quarter FFY 2008 groundwater monitoring results to DOE from eleven monitoring wells at LRRI to DOE.

- Fluoride was detected at or above the MAC standard of 1.6 mg/L at five (5) monitoring wells. Fluoride concentrations ranged from 1.6 mg/L at ITRI-MW9 to 2.1 mg/L at IP-1. Sulfate was detected slightly above the MAC of 600 mg/L at monitoring well ITRI-MW17 at a concentration of 610 mg/L. The TDS concentration was also detected above the MAC of 1000 mg/L at ITRI-MW4, ITRI-MW17 and ITRI-MW19. Concentrations were 1400 mg/L, 1300 mg/L, and 1300 mg/L respectively. The NPN concentrations were below the MAC of 10 mg/L at all monitoring wells;
- No metal parameters were detected above established regulatory limits, except for uranium. Total uranium was detected above the MAC and MCL of 0.03 mg/L in monitoring well ITRI-MW4 at a concentration of 0.047 mg/L;
- Adjusted gross alpha activity from ITRI-MW4 was below the MCL of 15 pCi/L. No gamma-emitting isotopes were detected above their associated Minimum Detectable

Activity (MDA). Radium-226/228 was detected below the MCL of 5 pCi/L from all samples collected at LRRI. No alpha-emitting isotopes were detected above their associated MDA, except for isotopic uranium, at monitoring well ITRI-MW4. When the uranium activity was converted to a mass, by dividing the specific activity, the total concentration was 0.048 mg/L, which exceeds the MCL of 0.03 mg/L;

- The Bureau performed a trending analysis from previous sampling events. It indicates fluoride concentrations at IP-1, ITRI-MW9, -MW18 and NMED-1 have been stable to slightly decreasing over time. Fluoride concentrations at ITRI-MW4 have been stable to slightly increasing over time. Sulfate and TDS concentrations at ITRI-MW4 and ITRI-MW17 have been decreasing over time. There were insufficient data results for ITRI-MW19 to conduct a trending analysis. The Bureau recommends that LRRI continue to sample these wells that contain elevated levels of fluoride, sulfate and TDS; and
- Total and dissolved uranium concentrations at ITRI-MW4 were detected above the MAC of 0.03 mg/L for a consecutive sampling event. The Bureau measured uranium using both mass and alpha spectroscopy methods. When the alpha spectroscopy activity was converted to mass, the results were similar using the two different analytical methods. The Bureau reiterated the recommendation that LRRI add uranium to the list of analytes that are currently sampled.

#### Mixed Waste Landfill Groundwater Monitoring

Bureau staff collected samples from Mixed Waste Landfill (MWL) groundwater monitoring wells MWL-MW4, MWL-MW5, MWL-MW6 and the newly constructed wells MWL-BW2, MWL-MW7, MWL-MW8, and MWL-MW9. Samples were analyzed for dissolved metals, gross alpha/beta, gamma-emitting isotopes, major anions, (NPN), VOCs, perchlorate, and low-level tritium. No analytes were detected above established MACs and MCLs.

Bureau staff submitted the 2007 General ER Groundwater monitoring results to DOE for samples collected at one MWL monitoring well located directly down gradient from the landfill on the northwest corner. All analytes sampled at MWL-MW4 were below established MACs and MCLs. The Bureau recommended that Sandia continue to monitor this well to determine if any contaminants from the MWL are infiltrating into the groundwater. The Bureau will continue to split groundwater samples with Sandia at the MWL to compare data results.



Figure SGE42-2. Sandia contractors collecting tritium soil samples utilizing a Geoprobe 6620 DT direct push machine at the Mixed Waste Landfill

#### Technical Area-V Groundwater Monitoring

During 2008 Bureau staff collected groundwater samples from Technical Area-V (TAV) monitoring wells LWDS-MW1, TAV-MW6 and TAV-MW10. Samples were analyzed for TAL metals, VOCs, NPN, gamma-emitting isotopes, and gross alpha/beta.

Nitrate plus nitrite was detected above the MCL of 10 mg/L at TAV monitoring wells LWDS-MW1 (12 mg/L) and TAV-MW10 (11 mg/L). Trichloroethylene (TCE) was detected above the MCL of 5 µg/L at monitoring wells LWDS-MW1, TAV-MW6, and TAV-MW10. Concentrations at LWDS-MW1 ranged from 13-15 µg/L, concentrations at TAV-MW6 ranged from 10-12 µg/L, and the concentration at TAV-MW10 was 14 µg/L.

Staff submitted the FFY 2007 Technical Area-V Groundwater monitoring results to DOE for review. Between November 2006 and September 2007, the Bureau split groundwater samples with Sandia at Technical Area-V monitoring wells: TAV-MW1, TAV-MW2, TAV-MW3, TAV-MW4, TAV-MW5, TAV-MW6, TAV-MW7, TAV-MW8, TAV-MW9, AVN-1, LWDS-MW1 and LWDS-MW2. The Bureau samples were submitted for organics, radiological, metals and general chemistry analyses.

- Metal concentrations at all monitoring wells were detected below established Maximum Contaminant Levels (MCLs);
- Gamma spectroscopy detected radium-226/228 above the MCL of 5 pCi/L at monitoring wells TAV-MW4 and TAV-MW9. However, when the original samples were analyzed using EPA methods 903.1 and 904.0, radium-226/228 was not detected above the Minimum Detectable Activity (MDA). All other radionuclides were below established MCLs;

- Nitrate concentrations exceeded the MCL of 10 mg/L at TAV monitoring wells AVN-1, MW6, and LWDS-MW1. The results were 10.1 mg/L, 10.2 mg/L, and 13.1 mg/L respectively. Historical data provided by Sandia indicate that nitrate concentrations at AVN-1 and MW6 have been relatively stable to slightly increasing over time. The NPN concentration at LWDS-MW1 compares well to historical data provided by Sandia. Trending analysis performed by Sandia at LWDS-MW1 suggests that nitrate levels appear to be slightly decreasing over time. The Bureau recommends that Sandia continue to sample these wells for NPN; and
- Trichloroethylene (TCE) was detected above the MCL of 5 µg/L at monitoring wells TAV-MW6 and LWDS-MW1. During these two sampling events, concentrations at TAV-MW6 were 7.2 µg/L and 8.3 µg/L, respectively. Concentrations at LWDS-MW1 were 13.5 µg/L and 14 µg/L. Trending analysis performed by Sandia suggests that TCE concentrations at TAV-MW6 have been increasing over time and concentrations at LWDS-MW1 indicate that TCE has been slightly decreasing. The Bureau has recommended that Sandia continue to sample these wells for VOCs.

#### Tijeras Arroyo Groundwater Monitoring

Bureau staff collected groundwater samples for Tijeras Arroyo Groundwater (TAG) Monitoring. Samples were collected from monitoring wells: TA1-W-01, W-02, W-03, W-04, W-05, W-06, W-08, TA2-SW1-320, TA2-W-19, TJA-2, TJA-4, TJA-6, and PGS-2. Samples were analyzed for TAL metals plus uranium, VOCs, NPN, gamma-emitting isotopes, gross alpha/beta, and low level tritium.

Concentrations at monitoring wells WYO-4 and TA2-W-19 were above the EPA MCL of 5 µg/L. Concentrations were 7.69 µg/L and 5.39 µg/L, respectively. The TCE concentrations at monitoring wells WYO-4 and TA2-W-19 have been slightly increasing over time.

Staff submitted the FFY07 Tijeras Arroyo Groundwater (TAG) Monitoring results to DOE for review. During the 3<sup>rd</sup> and 4<sup>th</sup> quarters of FFY2007, the Oversight Bureau collected a total of 22 split groundwater samples with SNL staff from 14 TAG monitoring wells. Samples were submitted to an independent laboratory for organic, radiological, TAL metals, and general chemistry analyses.

- The results from the sample collected from TA-1-W-08 on July 30, 2007 yielded an iron concentration of 1.6 mg/L, which exceeds the MAC of 1.0 mg/L. This is the first time iron exceeded the MAC at TA1-W-08. The Bureau recommends that SNL sample this well for dissolved iron during the next sampling event;
- Inorganic chemical analyses were performed for NPN (reported as nitrogen) and perchlorate at the TAG sites. Nitrate concentrations exceeded the MCL of 10 mg/L in five wells: TJA-2, TJA-4, TJA-7, TA2-W-19 and TA2-SW1-320. The exceeded concentrations ranged from 14.3 mg/L at TJA-2 to 41.7 mg/L at TJA-4. Overall, analytical results for NPN were similar to previous years and should be continually sampled;
- Perchlorate was detected above the Method Detection Limit (MDL) at monitoring well TA2-SW1-320 at 0.911 µg/L, but below the SNL perchlorate screening level of 4 µg /L;
- TCE was detected above the MCL of 5 µg/L in samples collected from monitoring wells WYO-4 and TA2-W-19. TCE concentrations at WYO-4 were 7.0 µg/L during the 3<sup>rd</sup>

quarter and 5.6 µg/L during the 4<sup>th</sup> quarter. During the 3<sup>rd</sup> quarter the TCE concentration at TA2-W-19 was 5.7 µg/L. Based on trending done by SNL, TCE concentrations in these wells vary from stable to slightly increasing over time. These wells should be continually sampled and monitored for TCE; and

- Gamma Spectroscopy analysis did not detect any isotopes above the associated minimum detectable activity (MDA). Uncorrected gross alpha activities were all below the MCL of 15pCi/L. Uranium-233/234 was detected above the MDA at monitoring wells TA2-W-26, WYO-4, TJA-2,-4,-7, and TA2-W-19. Values ranged from 0.651-1.50 pCi/L. Uranium-238 was also detected above the MDA at monitoring wells TA2-W-26, TJA-2,-4, -7, and TA2-W-19 at values ranging from 0.391-1.09 pCi/L.

### **SDP43 DPR Project:**

Under this Activity ID Bureau staff uses electret passive ion chambers to evaluate the ambient gamma radiation at SNL. The Electret passive ion chamber functions on the principle of ion pair production resulting from gamma photons interacting with air molecules within an air-vented “S” type chamber of predetermined volume to reduce the voltage of a charged Teflon™ disk. The voltage drop is proportional to the amount of gamma photons passing through the chamber. By using the change in voltage, a dose in units of milliRem (mrem) at a particular location can be determined with the use of a pre-prepared software algorithm.

During 2008 the Bureau staff continued to collect quarterly DPR measurements from all 12 electret stations. There are a total of 6 stations on base located at Four Hills, TAV, USGS, McCormick Gate, Officer’s Club, and ITRI/LRRI. Off-site stations are located at Albuquerque Fire Station #11, Oak Flats campground, Bernalillo County Fire Department #10 (Tijeras), Placitas Fire Station, Corrales Fire Station, and Los Lunas Fire Station (See Figure SDP43-1). All electret stations are co-located with Sandia TLDs except for the ITRI/LRRI station.



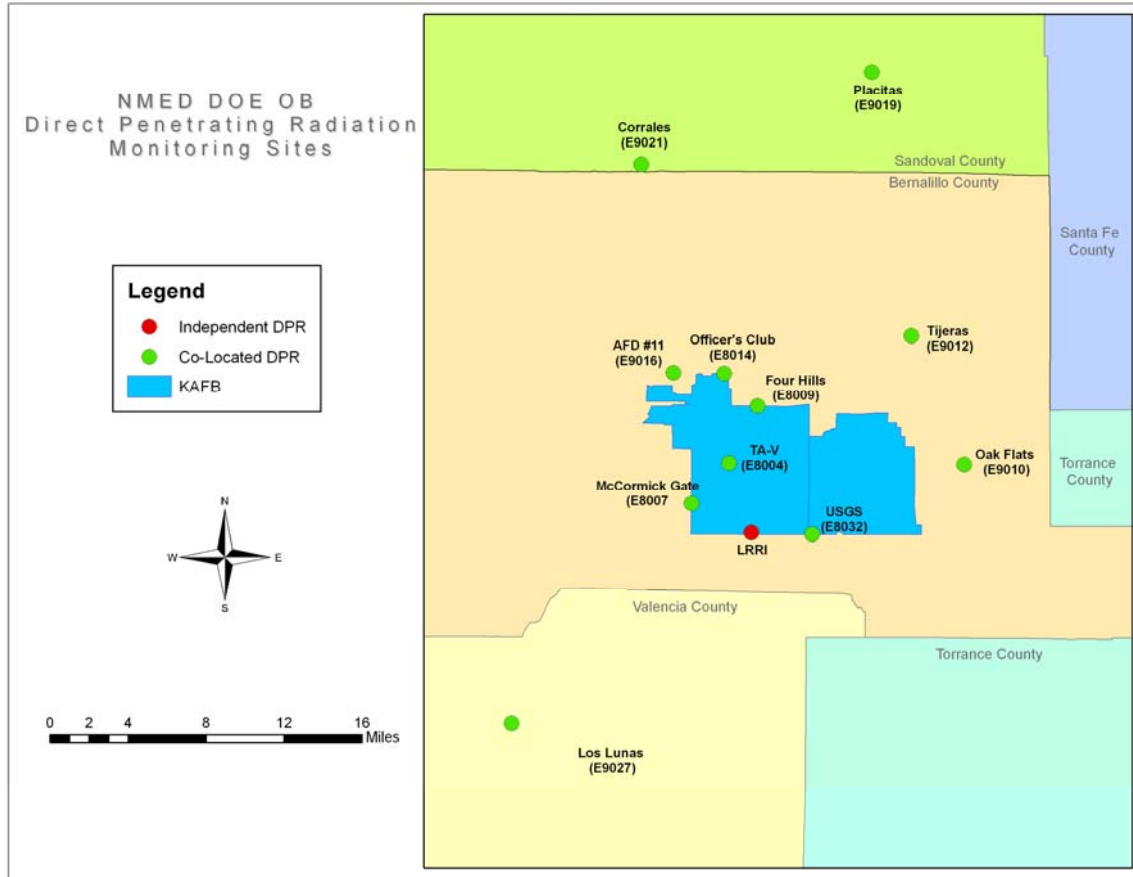


Figure SDP43-1. Oversight Bureau DPR sites located on KAFB and in the surrounding areas

Staff provided a fourth calendar quarter 2007 DPR data submittal to DOE. Overall, DPR results from on-site compared to background levels. Bureau results were somewhat higher than Sandia TLDs but both systems were comparable.

Staff submitted first and second calendar quarter 2008 DPR transmittal letters and data tables to DOE. Overall, the on-site and off-site DPR readings compared well, indicating background levels. Specifically, the off-site readings were slightly higher. In addition, the quarterly dose readings using electrets were compared to Sandia TLD readings. The electret readings were consistently, slightly higher, but both sets indicated background levels.

**SPL44 Low-Volume Air Monitoring:**

Under this Activity ID Bureau staff evaluates the ambient air concentrations of gross alpha/beta, isotopic americium, isotopic plutonium, isotopic uranium, gamma-emitting isotopes, and tritium at the SNL. The Bureau operates air monitoring stations to collect airborne particulate matter and water vapor at SNL using NMED sampling protocols and procedures. Air particulate matter consists of minute “dust” particles collected on a polypropylene particulate filter. Water vapor is collected by passing a known volume of air through a silica gel-filled cartridge, a hydrophilic compound that traps ambient air moisture.

Bureau staff continued bi-weekly collection of radioactive air particulate filters from three perimeter locations and one on-site location. Perimeter locations include Four Hills (KAIR-01), USGS (KAIR-02), and SW Base (KAIR-03). The on-site station is located directly north of the Mixed Waste Landfill (KAIR-04) see map below (See Figure SPL44-1). The filters are composited quarterly and analyzed for gross alpha/beta, gamma-emitting isotopes, and isotopic americium, plutonium, and uranium. Silica gel canisters are exchanged bi-weekly at the MWL, and they are exchanged after each quarter from the perimeters locations. Silica gel samples from each site were analyzed for tritium.

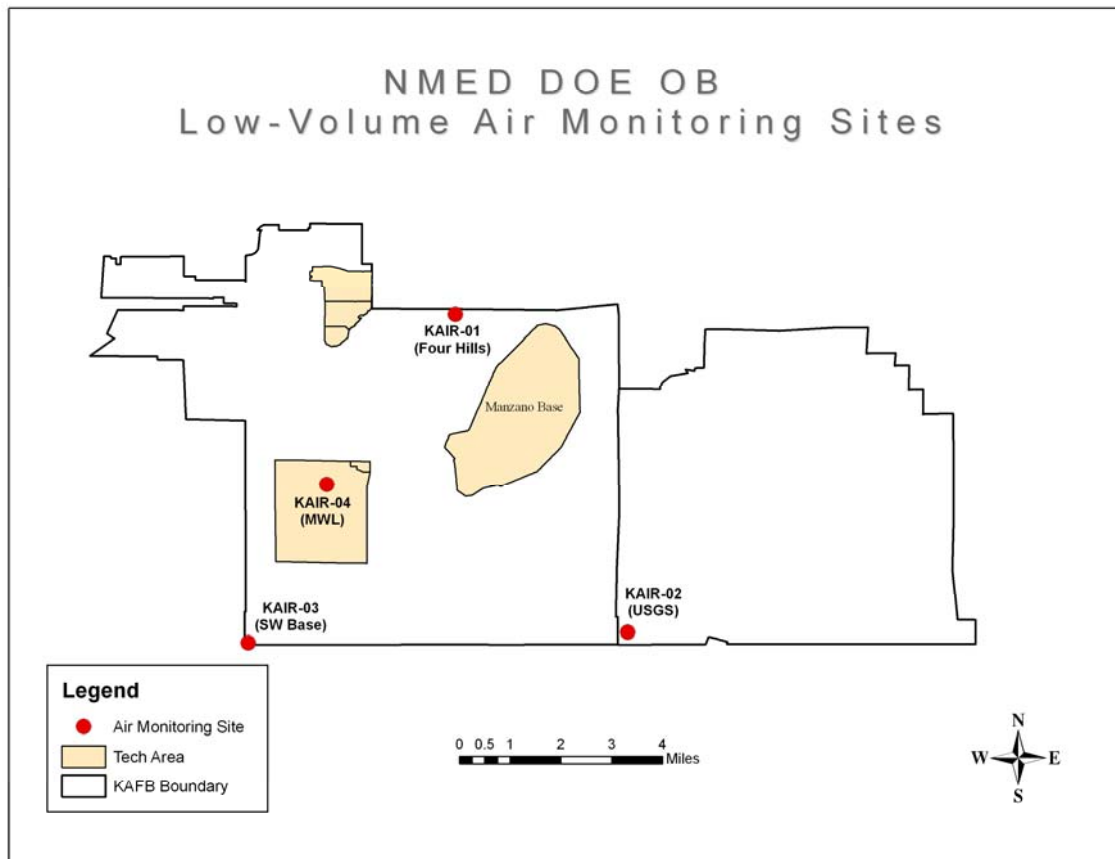


Figure SPL44-1. Oversight Bureau low volume air monitoring sites located on KAFB

Staff submitted the third calendar quarter Air Monitoring results to DOE for review. No anomalies were noted.

Staff completed a draft Sampling and Analysis Plan (SAP) for FFY 2008 Air Monitoring at SNL.

Staff drafted air monitoring reports for fourth calendar quarter 2007 and first and second calendar quarter 2008 Airborne Particulate and Atmospheric Tritium Results for review prior to release to DOE.

Bureau staff received air monitoring equipment ordered from Hi-Q. Equipment includes new monitoring panels and gooseneck connections for the air filters (See Figure SPL44-2). The

upgrades will mirror the AIRNET program equipment at the White Rock and Carlsbad offices. Upgrades were made at all monitoring stations and were activated at the beginning of the first calendar quarter 2009. Staff also shipped air flow meters to Hi-Q Environmental for annual calibration.



Figure SPL44-2. Inside and outside of a low-volume air monitoring station

Sandia staff invited DOE Health and Safety Engineer, Mr. Dave Barber, to visit each air monitoring site at SNL. Safety concerns about proper setup and wiring at each station were discussed. Recommendations from Mr. Barber included replacing existing surge protectors with heavy duty outdoor-use protectors, replacing existing extensions cords that showed signs of weather damage, adding covers to existing outlets, and also requesting that the Bureau re-wire motor #8 at the Four Hills air station.

Staff subsequently performed maintenance to motor #8 currently at the Four Hills air station by adding new vanes and replacing gaskets, o-rings and mufflers. In addition, motor #8 was properly re-wired and was redeployed at the Four Hills monitoring location.

### **SSW45 Stormwater Project:**

Under this Activity ID Bureau staff conducts stormwater monitoring at stations generally co-located with Sandia monitoring stations down gradient from AOCs or SWMUs.

Bureau staff completed data tables for 2005, 2006, and 2007 stormwater samples. Transmittal letters and data tables were undergoing final edits at the end of the third quarter prior to forwarding to the DOE and Sandia.

Stormwater samples submitted for PCB analysis require a blank correction of the data package due to the sensitivity of the method (EPA method 8082). All PCB data from 2005 and 2007 have been blank-corrected by Bureau staff. The analytical method for isotopic uranium used to analyze 2006 stormwater samples was in question by Bureau staff, due to the absence of <sup>234</sup>U. Bureau staff and Paragon Analytics Laboratory discussed this issue and concluded that ICP-MS cannot provide <sup>234</sup>U data, thus a different method must be used when this isotope is of concern. Staff completed an amendment to the pricing contract with Assaigai Analytical Laboratory to add Desert Research Institute as a subcontract laboratory for Particle Size Analysis (PSA), Loss-On-Ignition (LOI), and Suspended Sediment Concentration (SSC) services. The additional analytical methods are available for Bureau staff to use with a multitude of samples collected.

Staff generated data tables from stormwater events 4 & 5 and forwarded transmittal letters to Sandia and DOE. The stormwater 4 data set included SWMP09. Protactinium-234m was reported at 100 pCi/L and 3-Nitrotoluene was detected above the method detection limit (MDL) at a concentration of 0.99 µg/L. The stormwater 5 data set included SWMP06, SWMP10, and SWMP05 (see Figure SSW45-1). Actinium-228 was reported at 100 pCi/L for SWMP06 and Beryllium-7 was reported at 48 pCi/L for SWMP05. The gamma spectroscopy results include isotopes that were detected above their Minimum Detectable Concentration (MDC) but there are no water quality criteria for these analytes. Gross alpha activity at SWMP06, SWMP10, and SWMP05 exceeded the New Mexico Livestock Watering criteria of 15 pCi/L. The activity levels were 680 pCi/L, 250 pCi/L, and 150 pCi/L, respectively. The exceedances are most likely due to the sediment load for each sample.

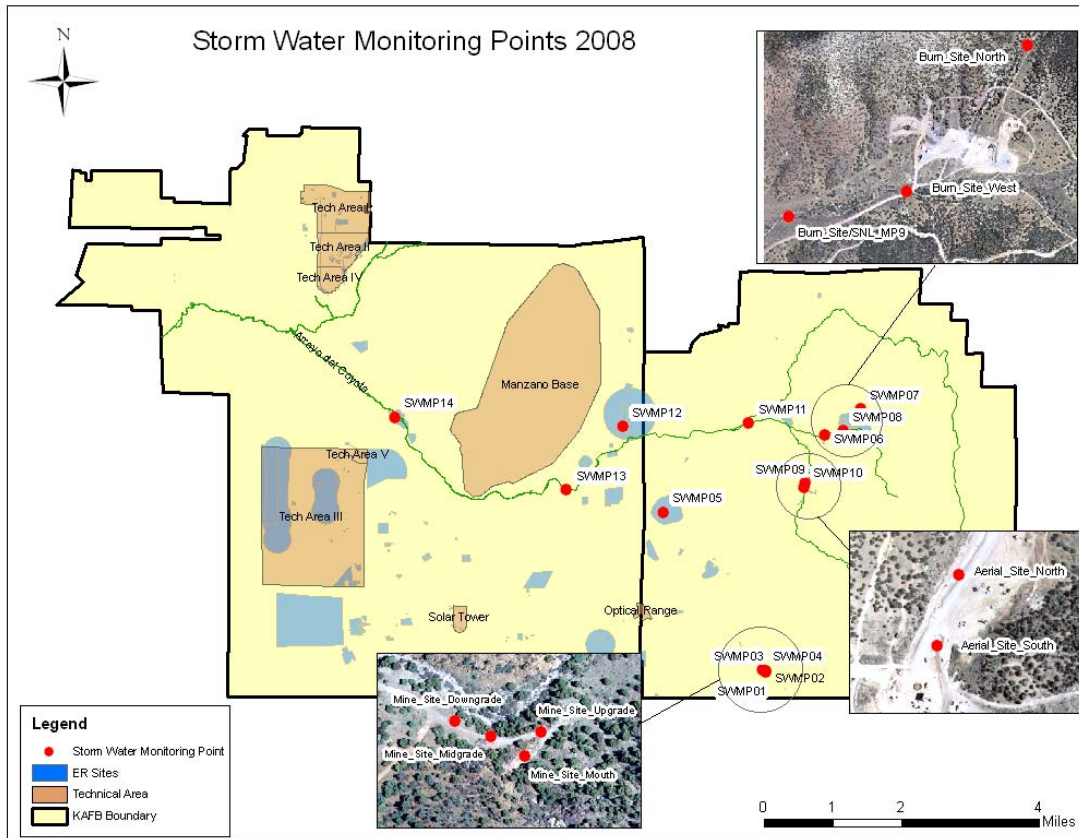


Figure SSW45-1. Stormwater monitoring locations

Stormwater six encompasses samples collected from SWMP02, SWMP01, SWMP09, SWMP06, and SWMP05; analyzed for Target Analyte List (TAL) dissolved metals, perchlorate, gross alpha/beta, gamma-emitting isotopes, and high explosive compounds. All TAL metals, perchlorate, and high explosive compound results were below their respective screening levels. Gross alpha activity exceeded the New Mexico Water Quality Control Commission (WQCC) Livestock watering standard of 15 pCi/L at four of the five monitoring sites; SWMP06 is 480 pCi/L, SWMP01 is 130 pCi/L, SWMP02 is 360 pCi/L, and SWMP05 is 660 pCi/L. The following isotopes exceeded their minimum detectable activities for gamma spectroscopy analysis; actinium-228, thallium-208, antimony-124, uranium-235, and bismuth-214.

The seventh stormwater event was the largest with a total of six samples collected; SWMP02, SWMP01, SWMP09, SWMP10, SWMP06, and SWMP14. The samples were analyzed for TAL dissolved metals, perchlorate, isotopic uranium, gross alpha/beta, gamma-emitting isotopes, high explosive compounds, and dioxin/furans. All TAL metals, perchlorate, and high explosive compound results were below their respective screening levels. The New Mexico WQCC Livestock watering standard of 15 pCi/L for gross alpha was exceeded at all six monitoring sites; SWMP02 is 143 pCi/L, SWMP01 is 138 pCi/L, SWMP09 is 59 pCi/L, SWMP10 is 219 pCi/L, SWMP06 is 707 pCi/L, and SWMP14 is 416 pCi/L. Gamma spectroscopy results suggest beryllium-7 activity exceeds the minimum detectable activity for the isotope but is otherwise unremarkable. The resultant activity for SWMP09 is 97 pCi/L with a MDA of 39 pCi/L, and for

SWMP10 is 120 pCi/L with a MDA of 56 pCi/L. Dioxin/furan analyses were performed on the samples collected at SWMP06 and SWMP14. Concentrations were first blank-corrected and then assigned a Toxic Equivalency Factor (TEF) based on their relative toxicity to 2,3,7,8-TCDD (2005 World Health Organization). The toxic equivalency (TEQ) was then calculated for each dioxin/furan congener by multiplying the blank-corrected value by the TEF. All congeners were added up for each site and a total maximum TEQ was calculated. The total TEQ at SWMP06 was 14.34 pg/L and the total TEQ at SWMP14 was 35.38 pg/L, both exceeded the New Mexico WQCC Human Health criteria of 0.051 pg/L.

Stormwater eight incorporated three monitoring sites; SWMP10, SWMP09, and SWMP05. The three samples were analyzed for isotopic uranium, high explosive compounds, and gamma-emitting isotopes. The activity data results for isotopic uranium ( $^{232}\text{U}$ ,  $^{234}\text{U}$ ,  $^{235}\text{U}$ , and  $^{238}\text{U}$ ) are reported in pCi/L from the analytical laboratory. The activity is converted to density by dividing the result by a specific activity constant. This provides the density of the uranium in each sample collected at each monitoring site. The density of total uranium for SWMP09 is 0.0048 mg/L, SWMP10 is 0.0045 mg/L, and SWMP05 is 0.0126 mg/L. All high explosive compound concentrations are below applicable Standards for Interstate and Intrastate Surface Waters for Livestock Watering, Wildlife Habitat and Human Health Standards from the New Mexico WQCC. The gamma spectroscopy results display five isotopes that exceeded their minimum detectable activity; Aluminum-26, Bismuth-212, Bismuth-214, Actinium-228, and Thallium-208. All of the mentioned isotopes were flagged by the analytical laboratory with a "TI" indicating the nuclide identification is tentative.

Stormwater nine is composed of four samples from monitoring sites SWMP05, SWMP01, SWMP02, and SWMP11. The samples were analyzed for TAL dissolved metals, perchlorate, isotopic uranium, gross alpha/beta, gamma emitting isotopes, and high explosive compounds. Perchlorate and high explosive compounds are below state screening levels for all samples collected. TAL metals with detectable concentrations above the quantitation limit for the analytical method used by the contract laboratory that are not regulated under the New Mexico WQCC standards or the US EPA Region 6 screening values include Ca, Fe, Mg, K, and U. The detectable concentrations of TAL metals were found at SWMP02 and SWMP05. The isotopic uranium data ( $^{232}\text{U}$ ,  $^{234}\text{U}$ ,  $^{235}\text{U}$ , and  $^{238}\text{U}$ ) is reported in pCi/L by the analytical laboratory. The activity is converted to mass by dividing the result by a laboratory provided specific activity constant in order to post the total uranium mass for each monitoring site. The total uranium mass for SWMP11 is 0.0177 mg/L, SWMP01 0.1911 mg/L, and SWMP05 is 0.0389 mg/L. Gross alpha activity at all four monitoring sites exceeded the New Mexico WQCC Livestock watering standard of 15 pCi/L; SWMP11 is 390 pCi/L, SWMP02 is 140 pCi/L, SWMP01 is 180 pCi/L, and SWMP05 is 190 pCi/L. Gamma spectroscopy results show four isotopes exceeding their MDC; bismuth-214, antimony-124, thallium-208, and beryllium-7. All of the mentioned isotopes were flagged by the analytical laboratory with a "TI" and/or "J" laboratory qualifier indicating nuclide identification is tentative or the value is an estimate.

Stormwater ten includes one sample collected at SWMP05; analyzed for TAL dissolved metals, gross alpha/beta, and high explosive compounds. Gross alpha activity is 4.11 pCi/L, which does not exceed the New Mexico WQCC Livestock watering standard of 15 pCi/L. All high explosive compound concentrations are below detection levels. The TAL metal results display

arsenic at a concentration of 0.0124 mg/L; exceeding the New Mexico WQCC Human Health Standard of 0.009 mg/L. The New Mexico WQCC has not established standards for lead and manganese but the US EPA has screening values. Lead is reported at a concentration of 0.0278 mg/L, exceeding the EPA screening value of 0.015 mg/L. Manganese is reported at a concentration of 2.7 mg/L, exceeding the EPA screening value of 1.7 mg/L.

Data results for stormwater eleven are pending from the analytical laboratory. A data submittal will be composed and forwarded to DOE.

Staff began developing a database to compile all historic stormwater data. Analytical results for 2007 and 2008 have been incorporated into the database and the remainder of the historic data will be added at a future date.

All of the D-Tec single stage storm water samplers were disassembled and decontaminated at the laboratory facility at NMED in Santa Fe. The samplers were not performing properly due to sediment buildup, and they require complete disassembly and decontamination after each field deployment. Staff researched the use of the D-Tec single stage stormwater sampling devices and the effectiveness of the sampler; the D-Tec samplers require an operator to follow an extensive disassembly procedure for cleaning and decontamination prior to reuse. Even after carefully following procedures, the emplaced units sometimes will not function properly, providing analytical results that are suspect. Staff conducted a literature search and discovered disposable Nalgene sampling devices which do not require maintenance. Thirteen cases of the disposable Nalgene samplers have been ordered for the Sandia Oversight Section. Staff also researched the use of solar panels for powering field equipment such as ISCO® automated samplers.

A new Standard Operating Procedure (SOP) for Nalgene single stage disposable samplers has been submitted by Bureau staff. The samplers will be field tested during FFY2009 sampling season. Staff ordered approximately 50 Nalgene disposable sampling devices that will be used exclusively for stormwater collection. The Bureau does not intend to deploy the D-Tec Environmental Liquid Samplers due to numerous problems associated with the mechanical devices.

Staff ordered a Teflon Dekaport splitter from Rickly Hydrological Company to split stormwater samples into multiple containers. Staff secured approximately 20 pieces of eight inch diameter PVC pipe, one foot in length, for installation in the field as protective barriers for the one gallon glass jars used to collect stormwater samples.

#### **STA47 Tijeras Arroyo Sediment Project:**

Under this Activity ID Bureau staff conducts stormwater monitoring by collecting samples from single-stage one-gallon containers located down gradient from areas of concern or solid waste management units along the Tijeras Arroyo.

Bureau Staff completed a reconnaissance of Tijeras Arroyo from the western boundary of Kirtland Air Force Base to the Four Hills Ranch area in the east. Staff collected GPS coordinates approximately every ¼ mile as potential sediment sampling. Stormwater samplers will be

deployed at five or more different locations throughout the arroyo in order to collect samples up-gradient of Kirtland Air Force Base and on Base.

A project-specific sampling and analysis plan has been drafted as a reference for a National Environmental Policy Act (NEPA) request through the U. S. Air Force at Kirtland Air Force Base (KAFB) to conduct stormwater monitoring throughout Tijeras Arroyo from the canyon in the northeast to the boundary of KAFB to the southwest.

Staff downloaded high-resolution aerial photographs to produce high-resolution maps of Tijeras Arroyo. Staff from Albuquerque and Santa Fe conducted a reconnaissance survey of Tijeras Arroyo to collect field data. The survey covered the entire length of the arroyo starting at the western boundary of KAFB and continuing east through the Four Hills subdivision to the intersection with Tramway Boulevard. During the survey staff collected GPS coordinates every one-quarter mile, made field notes related to erosion and aggradations, and took pictures throughout the arroyo.

### **SDD48 D&D Project:**

Under this Activity ID Bureau staff conducts site evaluations and media monitoring during decommissioning and demolition operations.

Staff completed the NPDES stormwater site inspection for building SNL 807, which was to undergo decontamination and demolition. To monitor for potential air-borne contamination during the operation, staff installed a hi-volume air monitoring station adjacent to (on the north side) building 810, which is located directly east of building 807. The high volume air monitoring station is programmed to run Monday through Friday, 10 hours per day at a flow rate of 30 cubic feet per minute. Staff replaced the filter in the high-volume air monitoring station after building 807 was demolished to the foundation. The air monitoring filter was cut in half and shipped to two different laboratories for dual analyses of isotopic plutonium, uranium, thorium, and americium, TAL metals + total uranium, gross alpha/beta, gamma-emitting isotopes, and asbestos. Monitoring is continuing after the filter was replaced in order to establish background levels. Data results are pending.

Bureau staff reviewed the “Final Report: Building 807: Characterization and Removal Project, Sandia National Laboratories/New Mexico” to determine the best utilization of resources for validation and verification of building clean-up prior to demolition and decommissioning (D&D). Bureau staff reviewed information provided by Sandia and its contractor on a PCB Remediation Waste Removal Project at Building 806. Even though this building was not part of the current 807 and 807A D&D project, bureau staff completed a through review in order to gain familiarity with the PCB removal at the Building 807 complex.

Staffs of the Bureau, Sandia and Shaw Environmental (prime contractor of Sandia for the D&D project) met to develop a Sampling and Analysis Plan (SAP), including data quality objectives, for air, water (QA/QC from rinsate) and soil media at, and around, the building site. The group concluded that it would split jointly-collected samples and independently analyze for heavy metals, radionuclides, high explosives, and PCBs at several designated locations.



The split samples were first collected on October 22nd from the laboratory sump and the remediated site of a PCB spill in the basement. A second round of samples was collected on November 5 from the building drain pipe exit area and the junction of the sanitary sewer and the laboratory drain.

Bureau staff began table development of the data received from the first round of sampling. Preliminary results have been provided to the DOE and Sandia staffs and data submittals will be published during the third quarter. Bureau and Shaw Environmental data results were consistent.

Bureau staff collected an air particulate filter sample from the high-volume air monitoring device, which has been located downwind of Sandia operations during the D&D of building 807. The sample was split with half sent to Paragon Analytics and the other half to Assaigai Laboratory. Paragon will analyze the sample for low-level isotopic americium, plutonium, thorium, and uranium; metals plus uranium; gross alpha/beta and gamma emitting isotopes. Assaigai will analyze the sample for metals plus uranium, asbestos, gross alpha/beta and gamma-emitting isotopes.

Staff has completed three site evaluations of compliance with the stormwater NPDES permit at the Building 807 D&D project. A fourth site evaluation is being coordinated with Sandia staff (see Figure SSW48-1). Reports of these site evaluations are being drafted for review by DOE.



Figure SSW48-1. Staff discusses proper wattle installation at the Building 807 and 807A Decommission and Demolition Project at Sandia National Laboratories

## STE49 Biota and Terrestrial Project:

Under this Activity ID Bureau staff conducts annual sampling of soils and plants in a cooperative effort with Sandia on KAFB and the surrounding area.

Staff revised the draft transmittal letter and data tables for the annual Biota and Terrestrial monitoring conducted during FFY 2007.

Staff drafted the FFY 2007 transmittal letter and data tables for the Thunder Range baseline study. On September 4, 2007, the Bureau split surface soil samples with Sandia personnel near and around the bermed area at the shock tube in the old ER-91 Lead Firing Site designated as T-Range-1 (Thunder Range). Staff collected soil samples from 19 locations for the purpose of determining baseline conditions against which potential future impacts to the environment from operations could be evaluated (see Figure STE49-1). Samples included a dense 16-point grid superimposed over the circular basin conducted by SNL. In addition, 3 judgmental samples were collected from discolored or low-level areas that showed signs of water accumulation. Soil samples were collected from a depth of 0 to 2 inches and sent to an independent analytical laboratory for Target Analyte List (TAL) metals plus total uranium, high explosive compounds and perchlorate analyses. Staff received the 2007 Thunder Range Baseline data from split samples collected by SNL. Staff has reviewed the data results and has compared SNL data to NMED data. Results will be delivered to DOE during 3<sup>rd</sup> quarter FFY 2008.

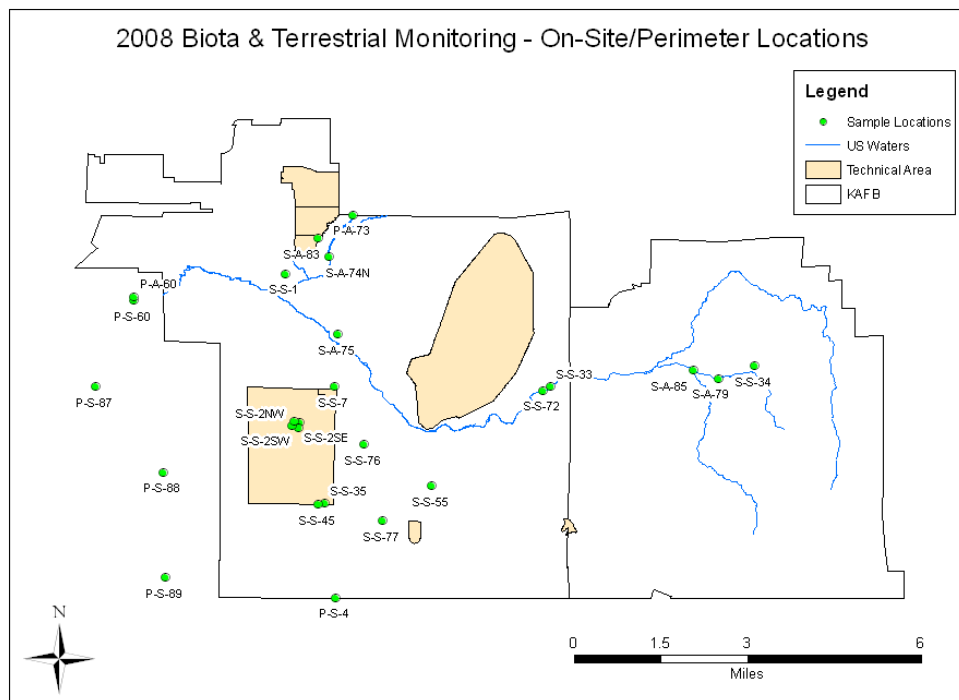


Figure STE49-1. Biota and Terrestrial monitoring locations

Bureau staff collected three soil samples from Mesa del Sol, west of KAFB, with the Sandia environmental team. Samples were split between SNL and the Bureau. These three specific locations are monitored on an annual basis and samples are analyzed for TAL metals plus uranium, gamma-emitting isotopes and tritium.

Sandia staff provided a copy of SNL soil and sediment data encompassing over 25 years of analytical results. Bureau staff launched a campaign to consolidate all historical soil and sediment data into a database whereby Bureau data and Sandia data can be shared freely.

Staff compiled historic biota and terrestrial data from 1996 to 2008 into an Excel spreadsheet that contains all the analytical results for soil, sediment, vegetation, and water samples; and analyzed for TAL metals, gamma-emitting isotopes, tritium, total uranium, perchlorate, and high explosive compounds.

Staff composed a transmittal letter and data tables for the annual 2008 Biota and Terrestrial sampling that incorporated 31 samples; 21 soil samples (3 community, 4 perimeter, and 14 on-site) and 10 sediment samples (2 community, 2 perimeter, and 6 on site). The sample set was analyzed for tritium, perchlorate, high explosive compounds, gamma-emitting isotopes, and TAL metals. All results for tritium, high explosive compounds, and TAL metals are below the New Mexico Environment Department soil screening levels for industrial/occupational standards and US EPA Region 6 human health screening levels. All perchlorate results are below the US EPA screening level of 790 mg/kg. The New Mexico Environment Department Hazardous Waste Bureau has established maximum background activities for  $^{137}\text{Cs}$  (1.5 pCi/g),  $^{234}\text{Th}$  (2.3 pCi/g), and  $^{235}\text{U}$  (0.18 pCi/g) at SNL. Sample S-S-35, located in the southeast corner of TA-III, exceeded the NMED HWB background activity for  $^{235}\text{U}$  at an activity of 0.22 pCi/g. Numerous isotopes were detected in the sample set that do not have regulatory standards or screening levels established;  $^{228}\text{Ac}$ ,  $^{212}\text{Bi}$ ,  $^{214}\text{Bi}$ ,  $^{109}\text{Cd}$ ,  $^{56}\text{Co}$ ,  $^{60}\text{Co}$ ,  $^{212}\text{Pb}$ ,  $^{214}\text{Pb}$ ,  $^{40}\text{K}$ ,  $^{85}\text{Sr}$ ,  $^{208}\text{Tl}$ , and  $^{65}\text{Zn}$ .

### **SWW51 Waste Water Project:**

Under this Activity ID Bureau staff conducts annual sampling of wastewater discharges from SNL operations in a cooperative effort with Sandia and the City of Albuquerque.

Staff completed a draft sampling and analysis plan (SAP) for FFY 2008 Waste Water Monitoring at SNL.

Staffs from the Bureau, Sandia and the City of Albuquerque met to discuss wastewater sampling protocol and then together they completed the semi-annual sampling activities during the week of April 21st. The Bureau samples were shipped to Paragon Analytics for radionuclides, TAL metals, fluoride, and total cyanide analyses.

Staff submitted a report entitled “NMED DOE Oversight Bureau Data Submittal Results from Wastewater Monitoring at Sandia National Laboratories, October 2008” to DOE for review. The Oversight Bureau split wastewater samples with Sandia and the City of Albuquerque at SNL wastewater monitoring stations WW001 (City of Albuquerque permit number 2069A), WW006 (City of Albuquerque permit number 2069F), WW007 (City of Albuquerque permit number 2069G), WW008 (City of Albuquerque permit number 2069I), and WW0011 (City of

Albuquerque permit number 2069K). (see Figure SWW51-1). Data results were compared to applicable Sewer Release Limits in Table III of 20.3.4 NMAC, in addition to Limitations on Pollutant Concentration in Table 3-2-13 of the Albuquerque Bernalillo County Water Utility Authority Sewer Use and Wastewater Control Ordinance. There were no exceedances.

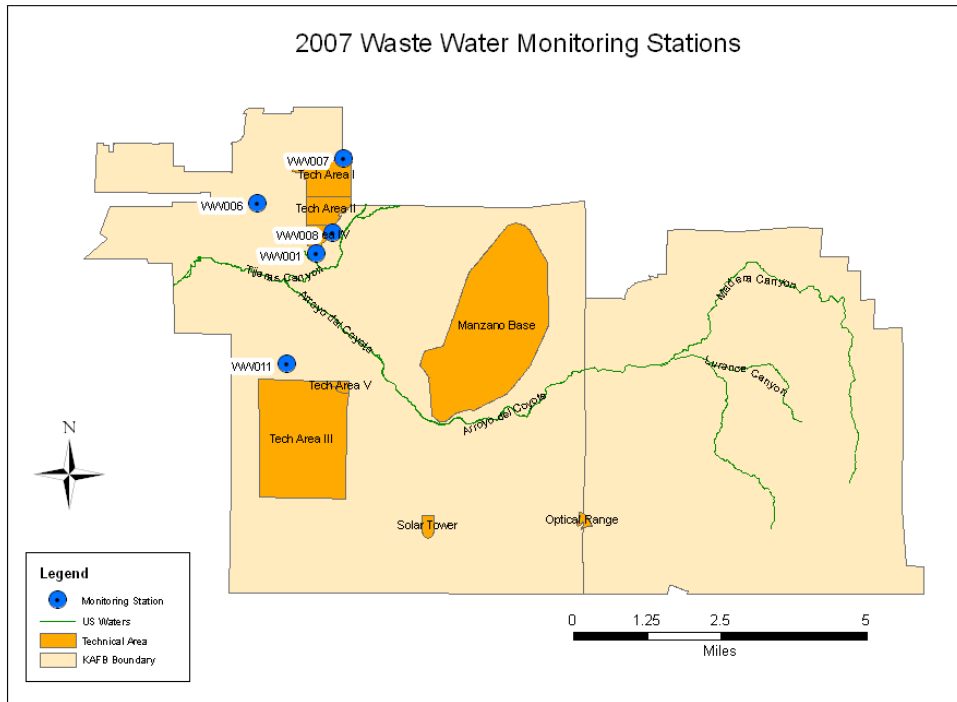


Figure SWW51-1. Wastewater monitoring locations

**SSS53 Soil and Sediment Sampling:**

Under this Activity ID Bureau staff conducts annual soil sampling in a cooperative effort with Sandia to evaluate clean-up efforts by Sandia after open-air explosive experiments.

Staff split 35 soil samples with Sandia at the Thunder Range Complex. The sampling occurred at six different firing sites (Range 1, 2, 5, 6, and Storage Area) to establish a baseline for metals plus total uranium, high explosive compounds, and perchlorate (see Figure SSS53-1). Five additional samples were collected for submission to Assagai Analytical Laboratory to compare their analytical methods and procedures to other analytical laboratories.

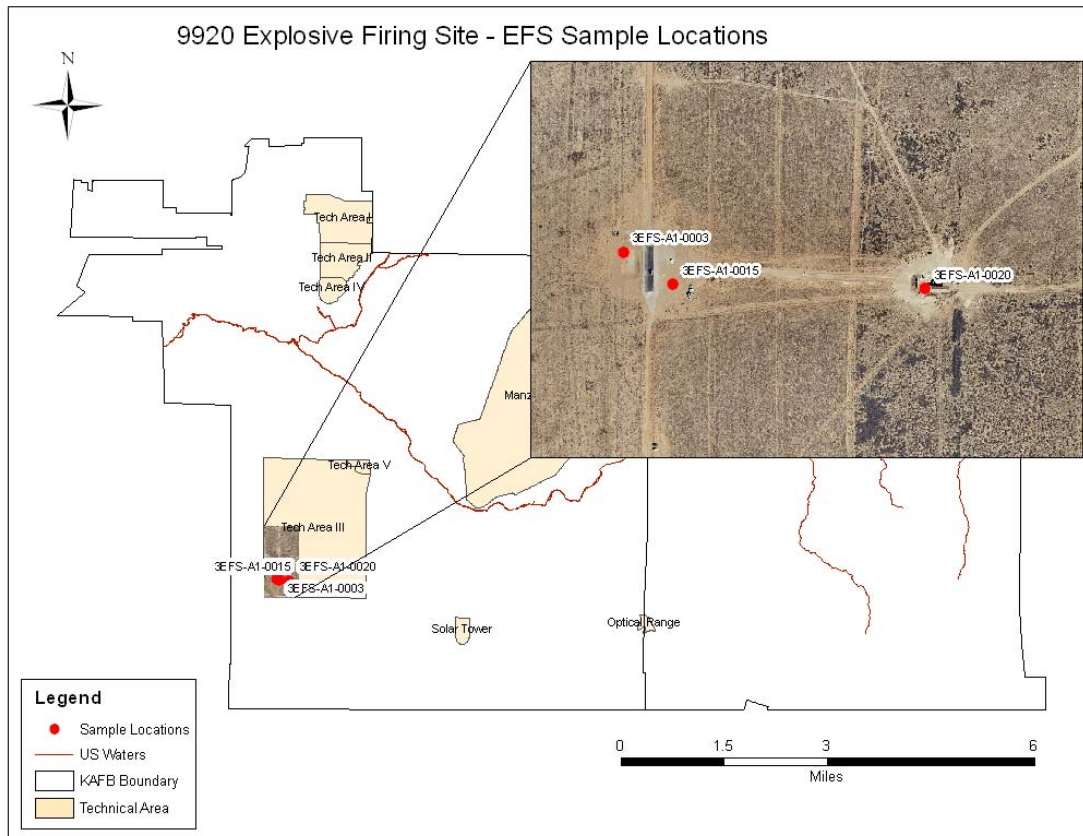


Figure SSS53-1. Soil and Sediment monitoring locations

Staff composed two letters for transmittal to Sandia and DOE regarding the soil data from Thunder Range. The results were compared to New Mexico Soil Screening Levels and EPA Region 6 Human Health Screening Levels, and they showed no exceedances for the firing sites throughout the Thunder Range complex.

Staff split three soil samples with Sandia at TA-III, sled track area, to establish a baseline for perchlorate, high explosive compounds, and metals + total uranium. The data package is pending; upon arrival the Bureau will compose a transmittal letter and forward to DOE and Sandia.

Three soil samples collected at 9920 Explosives Firing Site in TA-III (3EFS-A1-0003, 3EFS-A1-0015, and 3EFS-A1-0020) were submitted to an independent analytical laboratory for analysis of TAL metals, perchlorate, and high explosive compounds. All analytical results are below applicable New Mexico Environment Department Soil Screening levels and EPA Region 6 Human Health Screening levels. Transmittal letter to DOE and SNL is pending.

### **SNP55 NPDES Monitoring:**

Under this Activity ID Bureau staff conducts site evaluations in consultation with Sandia to determine compliance with facility-generated Stormwater Pollution Prevention Plans, and to monitor activities after reportable spills on SNL.

Staff submitted recommendations to close-out four spill reports, including spills dating back to April of 2006, previously submitted to NMED/SWQB and NMED/GWQB.

Staff prepared a sampling and analysis plan for monitoring the demolition of building 807 at KAFB. Staff will monitor the best management practices being implemented by SNL in accordance with its Stormwater Pollution Prevention Plan (SWPPP), and staff will monitor air emissions and collect soil samples, as appropriate.

Staff met with Sandia staff to discuss stormwater controls to be implemented during the building 807 decommissioning and demolition. A cursory site visit was conducted and preliminary recommendations were made. Staff reviewed the SWPPP, and a formal site evaluation was planned for July 7, 2008.

Staff submitted recommendations to close-out four spill reports, including spills dating back to April of 2006, previously submitted to NMED/SWQB and NMED/GWQB.

Staff prepared a sampling and analysis plan for monitoring the demolition of building 807 at KAFB. Staff will monitor the best management practices being implemented by Sandia in accordance with its Stormwater Pollution Prevention Plan (SWPPP), and staff will monitor air emissions and collect soil samples, as appropriate. This plan was replaced as the “primary” sampling plan by one created by Shaw Environmental the primary contractor for Sandia.

Staff met with Sandia staff to discuss stormwater controls to be implemented during the building 807 decommissioning and demolition. A cursory site visit was conducted and preliminary recommendations were made. Staff reviewed the SWPPP, and conducted a site evaluation.

Staff met with representatives from DOE and Sandia for a base-wide stormwater site inspection. Stormwater monitoring sites were established for co-location of Bureau and Sandia sampling equipment. The Bureau and Sandia currently have three stormwater monitoring sites co-located; they are SWMP-10 (ER site 16) TA-V, SWMP-07 Madera Canyon, and SWMP-09 west of Burn Site.

## **Waste Isolation Pilot Plant Oversight**

### **WAD70 General Administration:**

Under this Activity ID the Bureau manages and administers the overall activities of staff members in the Carlsbad office. Staffs provide assistance to the Bureau and DOE developing workplans, budgets and training requirements.

Bureau staff met with WIPP and WTS managers during the first week of August to review oversight activities at the facility. It was also agreed that the Agreement-In-Principle would be extended administratively for an additional year to expire after fiscal year 2009 (September 30, 2009).

In November the Bureau filled three vacant positions in the Carlsbad office by hiring two Environmental Scientists and an Administrator.

### **WPO71 Public Outreach:**

Under this Activity ID Bureau staff interacts with the public through meetings, listening sessions, consultations, and reports posted on the Bureau website.

Bureau staff met with representatives of Citizens for an Alternative to Radioactive Dumping (CARD) at the Carlsbad office. The meeting was primarily an introduction and information exchange between the organizations. Bureau staff provided information and listened to concerns of the group.

Bureau staff attended a public meeting in Eunice scheduled by the Nuclear Regulatory Commission with officials of Louisiana Energy Services to discuss the company's performance in constructing the National Enrichment Facility in Eunice.

Bureau staff participated in the 101<sup>st</sup>, 102<sup>nd</sup>, 103<sup>rd</sup>, and 104<sup>th</sup> WIPP Quarterly meetings. Highlights are discussed below in the WGE75 Activity ID Section.

Bureau staff attended a DOE meeting in Carlsbad on the Global Nuclear Energy Partnership (GNEP), one of a series of public hearings on the GNEP Draft Programmatic Environmental Impact Statement. This meeting was widely attended by local townspeople including Carlsbad Mayor Forrest and State Representative Heaton.

### **WEA72 Exhaust Air Monitoring Project:**

Under this Activity ID Bureau staff conducts daily air monitoring of the mine exhaust and observes weekly inspections of the monitoring probes for salt occlusion at the nozzles.

The primary pathway for exposure at the WIPP would be through an airborne release scenario. The primary air discharge points at the WIPP are stations A, B, C, and, in part, D.

Station A is on the surface at the top of the exhaust shaft and samples unfiltered air from the underground (see Figure WEA72-1). Station B is on the surface and resides in the exhaust

ductwork after the HEPA filtration units and confirms the effectiveness of the HEPA units should an airborne release occur.

Station C is on the surface on the second floor of the Waste Handling Building and samples the exhaust air from waste handling activities. All Waste Handling Building air is HEPA filtered and the exhaust system utilizes a once through, negative pressure air circuit and station C samples air that will be released to the environment.

Stations A and C are fitted with Continuous Air Monitors (CAM) that alert personnel of a potential release of radioactivity. At station D a CAM alarm triggers a switch to HEPA filtering of ventilation air prior to release to the accessible environment. Station D is unusual in that it is located in the underground at the base of the exhaust shaft and monitors air flow from the waste disposal area of the repository. Station D is not monitored by the Bureau because it does not sample all the air circuits within the underground and is therefore unsuitable for collecting representative samples of total mine exhaust air.

Bureau staff has been collecting air filters from station A since August 2005. Each day a staff member collects primary and back-up NESHAP filters at station A and loads the new filters into the collection ports. The primary filters are composited monthly and submitted to the analytical laboratory quarterly. Backup filters are not composited but rather archived in case they are needed in the future. Three skids (A-1, A-2, and A-3) are located inside station A and two of these skids are in operation at any given time as the “Skid of Record” and the “Back-up.” The third skid is usually secured (shut down) until needed to replace one of the others when it is scheduled for preventive maintenance or repairs. The WTS personnel periodically rotate one of the three skids to be the skid of record at station A. One of the other skids is then designated as the back-up.

Two vacuum pumps are located at each skid. One pump continuously operates and the second pump is operated in stand-by mode ready to automatically engage at a low-flow condition. The vacuum pumps pull air through three separate filters on three separate sampling legs at a rate of 2.0 standard cubic feet per minute (SCFM). Each leg is assigned to each of the three groups tasked to monitor the air quality at WIPP: the WTS Air Monitoring staff, the Carlsbad Environmental Monitoring and Research Center (CEMRC), and the Bureau.

Station B (see Figure WEA72-2 below) is located approximately forty meters north of station A in a small, ground-level building. Station B has one skid arranged similarly to those described in station A and samples HEPA-filtered exhaust air when the exhaust stream is in filtration mode.

Bureau staff, CEMRC, and WTS personnel meet at the Radiation Control Technician’s building at approximately 0730 every weekday morning to prepare for taking monitor readings at stations A and B. The station B filter is usually collected on Wednesdays; at the end of an “event” in the underground; after “shift to filtration” checks; or whenever necessary.





Figure WEA72-1. A view of Station A from the south-east.



Figure WEA72-2. A view of Station B from the west.

The filters that are collected daily are archived until shipped to contract laboratories on a quarterly basis. Station A filters for July through December 2007 were composited into monthly allotments and were shipped to an analytical laboratory for analysis. Parameters for analysis include isotopic plutonium, americium-241, and cesium-137, gross alpha and gross beta, and

strontium-90. Monitored analytes were not detected above background levels (reference: EEG-90). Difficulties encountered in digesting the station A filters prior to analysis led the Bureau to seek a new analytical laboratory. Archived filters from quarters one and two of 2008 have been shipped for analysis.

During the first quarter station A experienced flow problems at all three skids and WTS personnel worked to resolve this issue. Following the probe pull of March 18, staff members attended a brief meeting with WRES, DOE, and EPA personnel about the flow problems. The issue was resolved in early April by replacement of the flow control valves and by implementing a maintenance program to clean the small, very fine mesh screen in the air flow regulators that were occluding with salt particles.

The Bureau was notified in April by HWB of a plutonium detection at station A. The CAP 88 modeling indicated the release was 1/50,000 of the allowable release limit. No release was detected at station D which serves for back-up detection in the underground. The plutonium detection was observed in the WIPP compiled station A filters for the month of February. The DOE results from the analysis of these filters indicated a radiation level of 0.75 disintegrations per minute (dpm). Subsequent analysis of the back-up filters returned results of 0.60 dpm. Bureau filters collected from the same time frame have not been analyzed for comparison at the time of this writing. At this time it is suspected that the positive detection may be a result of background contamination related to past atmospheric testing.

Staff routinely observes probe pulls at station A and has been requested to photograph the nozzles at the time of their removal and to forward the images to the EPA. Depending upon the season and work activity in the underground probe pulls are normally scheduled at two-week intervals. On at least one occasion the crane used for extracting the probes experienced mechanical problems with its hydraulic system causing a postponement of the operation. In that instance, the contractor utilized a different crane brought in from Hobbs, and the process continued.

The probe inspections have occasionally revealed significant occluding of the shrouds around the nozzles. One observation of significant occluding was noted during the annual EPA site inspection on July 21 instigating a change of inspection frequency to a weekly basis. The WTS personnel implemented a predictive maintenance procedure conducted weekly to determine probe inspection frequency based upon atmospheric conditions, mining activity and probe occlusion. The WTS personnel are evaluating a method to include instrumentation that will have the ability to determine the effects of air borne particulates present in drift S400.

After several cycles of weekly probe pulls where no significant salt accumulation was found the parties agreed to reduce probe pull frequency back to the two-week interval. A salt build-up from the exhaust duct was removed in September.

### **WPD73 Direct Penetrating Radiation Project:**

Under this Activity ID Bureau staff uses electret passive ion chamber devices (electret) to evaluate the ambient gamma radiation at WIPP. The Electret passive ion chamber functions on the principle of ion pair production resulting from gamma photons interacting with air molecules

within an air-vented “S” type chamber of predetermined volume to reduce the voltage of a charged Teflon™ disk. The voltage drop is proportional to the amount of gamma photons passing through the chamber. By using the change in voltage, a dose in units of milliRem (mrem) at a particular location can be determined with the use of a pre-prepared software algorithm.

Electrets are deployed by the Bureau to measure direct penetrating (gamma) radiation in the environment surrounding the WIPP site (see Figure WPD73-1). This monitoring effort has indicated that waste transportation and handling activities at WIPP has not resulted in additional external radiation doses exceeding the average background radiation of 25 mrem per quarter to any member of the public outside of the exclusive-use boundary.



Figure WPD73-1. E-perm Electret Gamma Monitor canister containing three electret devices.

Readings from eighteen electret gamma monitors deployed since July 2006 are collected quarterly. Fourteen electret monitors are placed along the fence line of the WIPP site with three devices placed directly behind the waste handling bay. An electret monitor is placed southeast of WIPP at Malaga along the southern transportation route and another is placed at the terminus of the North Access Road and the Hobbs Highway. Two control monitors are located inside and outside of the Bureau office in Carlsbad.

The first control monitor located inside the Carlsbad office consistently returns higher exposures than those electrets surrounding WIPP or along the transportation route. It is suspected that the masonry building materials in the office are contributing to these higher measurements. Consequently an additional control device has been located outside the office away from the building. Results from all the electret monitor stations indicate that nuclear waste disposal activities at WIPP have not contributed to gamma radiation doses above normally expected background levels in the vicinity of the facility.

### **WPL74 Particulates Low-Volume Air Project:**

Under this Activity ID Bureau staff evaluates the ambient air concentrations of gross alpha/beta; isotopic americium, plutonium, and uranium; gamma-emitting isotopes; and tritium at the WIPP. The Bureau operates air monitoring stations to collect airborne particulate matter and water vapor at WIPP using NMED sampling protocols and procedures. Particulate matter consists of minute air borne particles collected on a polypropylene particulate filter. Water vapor is collected by passing a known volume of air through a cartridge filled with silica gel, a hydrophilic compound that traps the ambient air moisture.

Seven low-volume air samplers are deployed in the region. Four samplers are at the WIPP site (LVAS 1, 2, 3, 7), one is located at the Carlsbad office (LVAS 5), one is located on the grounds of the Malaga Volunteer Fire Department (LVAS 4), and one is located at Jaycee Park in Artesia (LVAS 6). Individual units may be temporarily removed from operations for maintenance, repairs or malfunctions. During the course of the year the unit (LVAS 4) in Malaga was temporarily shut down while the fire department investigated an unusual spike in its electrical bill over a two-month period. During routine collection of LVAS filters, the pump at LVAS 3 (WIPP) was found shut down and the circuit breaker would not reset. This pump motor was swapped out and brought back to the office for maintenance and repair. The pump motor from LVAS 6 in Artesia was also rebuilt by Bureau staff. The pump motors have been placed on a regular maintenance schedule based upon operational run time.



Figure WPL74-1. Low Volume Air Station outside the Oversight Bureau office in Carlsbad.

Filters are collected from these samplers every week and are compiled for analysis by quarter. The Bureau has standardized low-volume air sampling activities including preventative maintenance, filter collection, type of filter used, and analytical laboratory at all three oversight facility locations (LANL, SNL, and WIPP). As a result of this standardization effort WIPP air filters are now collected bi-weekly for quarterly compilation.

Filters compiled over the last two quarters of calendar year 2007 were sent to an analytical laboratory during the first quarter of calendar year 2008 for analysis of isotopic plutonium, americium-241, cesium-137, gross alpha and beta, and strontium-90. Strontium-90 concentrations were measured above the background levels determined by the Environmental Evaluation Group (EEG-90) before the WIPP site was opened. The following items were noted in the review of the laboratory data packet:

- The Sr-90 concentrations reported were lower than the required reporting limit, but exceeded the minimum detectable concentrations;
- A spiked clean filter showed 125% recovery. This result is on the upper range of acceptability and indicates a high bias with control spikes;
- The analytical laboratory reported no anomalies with the Sr-90 data; and
- Results from samples analyzed at the WIPP contract laboratory CEMRC show no activity for Sr-90.

Bureau staff reviewed the Sr-90 reagent blank activity control charts and background-versus-sample count information from the laboratory and has not yet validated the results.

### **WGE75 General ER/EM Projects:**

Under this Activity ID, Bureau staff conducts periodic multimedia environmental sampling and provide technical review to the DOE, WTS and public interest groups.

The Bureau periodically conducts sampling and analysis of groundwater, surface water, soils, sediments, biota and fish tissue on WIPP property and in the surrounding area as part of its environmental monitoring and surveillance programs to help ensure that facility operations will not impair human health or the environment.

#### Groundwater Monitoring

In March 2008 Bureau staff observed an external audit of the WIPP groundwater detection monitoring program. Staff accompanied WRES personnel in the field as facility operators demonstrated the techniques for taking water-level measurements and a pressure density survey at Well H-2B2. Discussions were held on how best to coordinate collection of split groundwater samples with WRES personnel. Subsequently, staff collected groundwater samples from monitoring well WQSP-4 and had it analyzed for general chemistry and metals. Groundwater parameters measured included specific conductance, TOC, TDS, density, chloride, and metals (including mercury).

#### Surface Water and Sediment Monitoring

Bureau staff conducted surface water sampling with WRES staff during the summer months. Onsite surface water bodies include Ponds 1 and 2, the Evaporation Basin A, the Salt Pile Evaporation Pond and H-19. Surface water bodies in the vicinity of WIPP include Hoya Tank, Under-the-Hill Tank, Lost Tank, Noya Tank, Hill Tank, and Indian Tank.

#### Soils Monitoring

Bureau staff completed independent soil sampling during February 2008 collecting 18 samples from six separate sites. Bureau staff also accompanied WRES personnel in the field and collected spit soil samples. The two sets of samples were sent to an independent contract

laboratory for analysis of total metals, isotopic uranium, isotopic plutonium, americium-241, cesium-137, and strontium-90.

#### *Fish Tissue Monitoring*

Bureau staff accompanied NMED/SWQB staffs and the local Game and Fish Officer to collect fish tissue samples during March 2008. Fish were collected north of Brantley Reservoir from the Pecos River along the old lake bed of McMillan Reservoir, east of Roswell at the Bitter Lake National Wildlife Refuge, and along the Black River. All samples were analyzed for radionuclides. Subsequent collection of fish tissue samples below Carlsbad in the Pecos River is also planned.

#### *Technical Review*

Bureau staff observed routine Level VI truck inspection by WRES personnel at the Loving rest area. Penetrating radiation around the tractor and trailer was measured with a Thermo-Scientific RadEye II personal radiation detector at a distance of approximately five feet. Measured dose rates ranged from an 8  $\mu\text{R/h}$  to 29  $\mu\text{R/h}$  alongside the TRUPACTS and 13.7  $\mu\text{R/h}$  at the rear of the trailer. Measurements were within expected background levels and were below regulatory limits of 10 mrem/ hour at one-meter distance.

On April 24, 2008 the NMED/HWB Emergency Coordinator was informed of a loss of water pressure for the fire suppression system to the WIPP Waste Handling Building contact handling bay due to a broken water supply pipe. Operations in the contact handling bay ceased and repair of the supply line commenced. Bureau staff observed the repair, pressure testing and engineer certification of the repaired line and waste handling operations resumed.