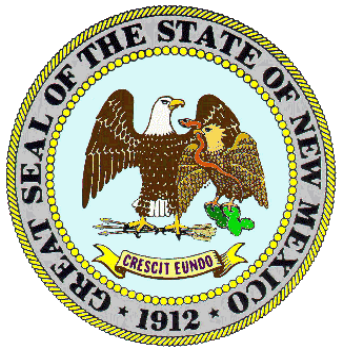
QUALITY ASSURANCE PROJECT PLAN
FOR
ENVIRONMENTAL MONITORING PROGRAMS

2009

REVISION 4-30-09

DOE Oversight Bureau
New Mexico Environment Department



2009

Quality Assurance Project Plan

For

Environmental Monitoring

DOE Oversight Bureau
New Mexico Environment

APPROVALS:

_____Date _____
Thomas Skibitski, Bureau Chief, DOE Oversight Bureau

_____Date _____
Barry Birch, QA Officer, DOE Oversight Bureau

_____Date _____
Steve Yanicak, Staff Manager, DOE Oversight Bureau, Los Alamos National Laboratory Office

_____Date _____
Tom Kesterson, Environmental Scientist, DOE Oversight Bureau, Waste Isolation Pilot Plant Office

_____Date _____
Barry Birch, Staff Manager, DOE Oversight Bureau, Sandia National Laboratories Office

TABLE OF CONTENTS

MISSION OF THE DOE OVERSIGHT BUREAU

The mission of the Department of Energy (DOE) Oversight Bureau of the New Mexico Environment Department is to ensure 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:

- Assessing DOE management of its New Mexico facilities to ensure attainment of public health and environmental standards
- Providing inputs to DOE for prioritization of its cleanup and compliance activities
- Developing and implementing an independent monitoring and oversight program
- Increasing public knowledge and awareness of environmental matters at DOE facilities in New Mexico, and coordinate with local and tribal governments

In order to meet these objectives, the DOE Oversight Bureau continues to develop and implement vigorous monitoring and assessment programs at Los Alamos National Laboratory (LANL), Sandia National Laboratories (SNL), 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. The focus of these evaluations is on the potential contaminant levels of heavy metals, organic and inorganic compounds, and radionuclides.

The bureau's activities are funded through a grant from the DOE in accordance with the provisions set forth in the Agreement-in-Principle between the State of New Mexico and the DOE. The oversight objectives and work elements at DOE facilities in New Mexico are described in the Umbrella Work Plan.

LIST OF ACRONYMS

AIP	Agreement-In-Principle
AOC	Area of Concern
AWWA	American Water Works Association
BMP	Best Management Practices
Ci	Curie
CFR	Code of Federal Regulations
CL	Control Limit
COD	Chemical Oxygen Demand
CWA	Clean Water Act
DI	Deionized Water
DO	Dissolved Oxygen
DOE	U.S. Department of Energy
DOE/OB	DOE Oversight Bureau
DPR	Direct Penetrating Radiation
DQI	Data Quality Indicator
DQO	Data Quality Objective
ELS	Environmental Liquid Sampler
FFCA	Federal Facility Compliance Agreement
ft/sec	Feet per second
GC/MS	Gas Chromatography/Mass Spectrometry
GIS	Geographic Information System
GSD	General Services Department
GPS	Global Positioning System
HCl	Hydrochloric Acid
HNO_3	Nitric Acid
H_2SO_4	Sulfuric Acid
HSP	Health and Safety Plan
HWB	Hazardous Waste Bureau
ICPMS	Inductively Coupled Plasma Mass Spectrometry
IWD	Integrated Work Document
KCl	Potassium Chloride
Kg	Kilogram
mCi	Millicurie
MDL	Minimum Detectable Level
mg/L	Milligram(s) per liter
Mrem	Millirem
MQL	Minimum Quantitation Limit
MSGP	Multi-Sector General Permit
µCi/L	Microcurie per liter
LANL	Los Alamos National Laboratory
µmhos/cm	Microhos per centimeter
µsi	Microsiemens
N/A	Not Applicable
NIST	National Institute of Standards and Technology
NM	New Mexico

NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NMSA	New Mexico Statues Annotated
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint source per 20.6.4.7(PP)
PARCC	Precision, Accuracy, Representativeness, Comparability, Completeness
pCi/l	Picocuries Per Liter
pCi/g	Picocuries per Gram
pg/g	Picrograms per gram
POC	Point of Contact
PRS	Potential Release Site
QA	Quality Assurance
QC	Quality Control
QA/QC	Quality Assurance & Quality Control
QAPP	Quality Assurance Project Plan
RBP	Rapid Bioassessment Protocol
RFP	Request For Proposals For Laboratory Analytical Services
RID	Request ID
RPD	Relative Percent Difference
SAP	Sampling and Analysis Plan
SNL	Sandia National Laboratory
SOP	Standard Operating Procedure
SQL	Sample Quantitation Limit
SSWP	Site Specific Work Plan
SWMUs	Solid Waste Management Unit
SWQB	Surface Water Quality Bureau
TAL	Target Analyte List
TDS	Total Dissolved Solids
TMDL	Total Maximum Daily Load
TRU	Transuranic
TSS	Total Suspended Solids
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
VOA	Volatile Organic Analytes
WEF	Water Environment Federation
WIPP	Waste Isolation Pilot Project
WQA	Water Quality Act
WQCC	New Mexico Water Quality Control Commission
WS	Water Supply
WSAL	Water Screening Action Level
WWTP	Wastewater Treatment Plant

Problem Definition

Background

The Department of Energy Oversight Bureau (DOE OB or Oversight Bureau) collects and analyzes environmental data through implementation of a systematic approach to monitoring in order to assess compliance with all federal, state, and facility mandates of protecting the public health and environment of New Mexico. Although the DOE OB's role in New Mexico is non-regulatory, its purpose is intended to help assure compliance of environmental laws or regulations at DOE facilities. Given this mission, the scope of the DOE OB's data collection programs is to meet rigorous data quality standards so that test results may be used by the Department of Energy (DOE), New Mexico Environment Department (NMED) or a third party to evaluate such issues as background conditions and compliance with applicable environmental standards and regulations.

The DOE OB also validates and verifies the methodologies used, actions taken and reported data produced by United States Department of Energy (DOE) facilities in New Mexico in order to carry out the provisions of the AGREEMENT-IN-PRINCIPLE (AIP) under Federal Grant, DE-FG04-91AL65779, between the DOE under the authority of 40 U.S.C. §7101 et seq., the Department of Energy Organization Act, and the State of New Mexico (the State).

Oversight Bureau data collection activities are routinely subject to resource limitations such as a Federal AIP Grant reduction that directly affects staffing, data collection and analysis. In light of such uncertainty, work plan activities are developed with contingencies based on several funding options that accommodate some variation in staffing and yearly budgets (see current AIP and DOE OB Organization Chart at http://www.nmenv.state.nm.us/DOE_oversight).

The AIP is intended to help assure that the activities at DOE facilities are protective of the public health and environment. Such assurance is accomplished through a vigorous program of independent monitoring and oversight by the State of New Mexico. The parties of the AIP understand that the oversight activities authorized by this Agreement are intended to supplement activities conducted under applicable environmental laws and regulations, but are not intended to support specific State regulatory, permitting, and legally-required environmental oversight activities such as issuance of regulatory permits, the review of DOE regulatory submissions when such review is intended to serve as the primary basis for State action under regulatory programs, required regulatory inspections, required monitoring, issuance of regulatory notices of violation and other citations.

The AIP is also not intended to support the activities of the Citizen Advisory Boards. The Agreement is intended to support non-regulatory activities of the State of New Mexico in working with the DOE to evaluate the adequacy of DOE activities related to environmental monitoring and to support periodic State monitoring of discharges, emissions, or biological parameters as necessary to verify the effectiveness of the DOE programs. The AIP recognizes the continued need for the

State of New Mexico to have access to DOE facilities and to exchange relevant technical information with the DOE to support the State's environmental monitoring efforts.

Achieving compliance with applicable environmental laws and regulations is crucial to the success of environmental programs. The DOE OB implements several methods for assuring compliance with environmental laws and regulations. Most important are the Oversight Bureau's methods for conducting independent and verification compliance monitoring of air quality, municipal water supplies, ground water, storm water discharges and NPDES point source discharges to detect permit non-compliance. Monitoring samples are collected from regional air stations, ground waters, surface waters, storm waters, and effluent discharges within and around the borders of all DOE regulated facilities in New Mexico. The Oversight Bureau has no regulatory authority and works cooperatively with DOE and NMED regulatory Bureaus to properly identify and correct any compliance issues that are discovered through the Oversight Bureau's monitoring program.

The DOE OB manages its monitoring programs from its Los Alamos National Laboratory (LANL), Sandia National Laboratory (SNL), and the Waste Isolation Pilot Plant (WIPP) site offices. The yearly amount of samples collected for analysis by each site office approaches 5% of the sample volume collected by DOE facility monitoring programs e.g., LANL's Water Stewardship Program collected 234,045 analytical results in 2007.

All data obtained by the Oversight Bureau is public information under the Agreement. The DOE OB will provide its data to DOE facilities, USEPA, NMED, Tribal Governments and Activist Groups. Although the intent of DOE OB data is to supplement activities conducted under applicable environmental laws and regulations, the DOE OB can make data available to a third party for any purpose including the enforcement of environmental regulations within the State of New Mexico. Some examples of third party data use may be to:

1. Determine compliance of effluent discharges with applicable NPDES permit limits,
2. Determine compliance of air emission discharges with applicable permit limits under "National Emission Standards for Emissions of Radionuclides other than Radon from Department of Energy Facilities," *Code of Federal Regulations*, Title 40, Part 61, Subpart H,
3. Determine compliance with the *Standards for Interstate and Intrastate Surface Waters* (20.6.4 NMAC),
4. Determine compliance of storm water discharges from SWMUs and AOCs with FFCA water screening action levels
5. Assist in the development of proposed revisions to the *Standards for Interstate and Intrastate Surface Waters* (20.6.4 NMAC),
6. Support refinement of designated uses and specific criteria for water bodies,
7. Aid in assessing designated use attainment status of New Mexico's surface waters for the Integrated §303(d)/§305(b) list and report (NMED/SWQB 2004),

8. Determine water quality trends and identify potential "trouble spots",
9. Determine the effectiveness of Nonpoint Source (NPS) Best Management Practices (BMPs) at DOE facilities,
10. Assist in the development of use attainability analyses for water bodies,
11. Assist in the development of TMDL planning documents for water bodies contained on the State's Integrated §303(d)/§305(b) List of Impaired Waters, and
12. Provide public information.

The three (3) DOE facilities monitored by the Oversight Bureau in New Mexico: LANL, SNL and WIPP, conduct weapons research and development and produce a wide range of waste products including, biological, chemical, radiological, and mixed waste. Oversight Bureau staff are detailed on site to assure that these products and their byproducts are being treated, disposed of, and handled in a safe and environmentally sound manner in order to preserve and protect New Mexico's environment and its citizens. LANL is the premier "pit" developer for the United States nuclear arsenal as well as performs other weapons and biological research. SNL also performs weapons research. WIPP is the only disposal facility in the country for low level, transuranic, and mixed nuclear waste.

Project Description

There are four (4) primary media categories of the Oversight Bureau's environmental monitoring programs:

- air
- water
- terrestrial
- biota

DOE OB monitoring programs are planned and budgeted on an annual basis to test environmental media for both naturally occurring and man-made chemical and radioactive substances known or perceived to be associated with DOE operations in New Mexico. Air monitoring generally addresses the measurement of direct penetrating radiation (DPR) and contaminants that occur on particulates suspended in air. Water monitoring covers aspects of measuring substances in both ground water and surface water but also includes sampling of springs, municipal drinking water supply wells, liquid waste, outfall or discharge streams, and suspended sediment components of storm water erosional events. Terrestrial monitoring generally covers measurements of surface soils and sediments. Biota monitoring involves the testing of both plants and animals impacted by DOE operations.

INTRODUCTION

The purpose of the Quality Assurance Project Plan (QAPP) is to document planning results for environmental data operations and to provide a project-specific "blueprint" for obtaining the type and quality of environmental data needed for a specific decision or use. The QAPP documents how quality assurance (QA) and quality control (QC) are applied to an environmental data operation to assure that the results obtained are of the type and quality needed and expected. The Oversight Bureau data collection operation is very similar to the LANL data cycle and utilizes the following elements:

- Planning (Annual work plan activities)
- Implementation (Management input and budget approval)
- Collection (Field analyses and sample collection)
- Laboratory Analyses (Accredited contract/outside laboratories)
- Data Validation (Evaluation for use under acceptance criteria)
- Data Processing & Management (Data uploaded to sample management database)
- Data Use & Reporting (Work plan project/activity reports and independent studies)
- RACER (General Public)

DOE requires that all environmental projects involving the generation, acquisition, and use of data be planned and documented. This QAPP is prepared for all activities performed by the DOE Oversight Bureau of the New Mexico Environment Department (NMED) that involve the collection of environmental data to ensure that:

- the intended measurements or data acquisition methods are appropriate for project objectives
- assessment procedures are sufficient for obtaining data of the type and quality needed and expected
- any limitations on the use of data can be identified and documented

The QAPP elements that follow are presented in an order corresponding to planning, implementation, assessment and reporting:

- Section 1 describes project management and the goal of the site assessment program
- Section 2 describes the aspects of data generation, acquisition, measurement systems design and implementation
- Section 3 describes the activities for assessing the effectiveness of the implementation of the project and associated QA/QC
- Section 4 describes the QA/QC data storage and reporting activities after the data phase of the project is completed

1.0 PROJECT MANAGEMENT

1.1 PROJECT ORGANIZATION

This QAPP will be implemented at every management and technical level and by all staff to ensure that effective QA is achieved. The DOE Oversight Bureau QA Officer shall assume QA responsibilities for the Oversight Bureau. Implementation of the QAPP requires that the entire staff be cognizant of the plans, goals, and procedures. Table 1-1 shows the Oversight Bureau Environmental Programs Organization.

1.1.1 Responsibilities

1.1.1.1 Bureau Chief

The Chief of the DOE Oversight Bureau is responsible for directing the planning, management, and implementation of environmental programs for the Bureau.

1.1.1.2 Staff Manager

The Oversight Bureau site office Staff Manager coordinates the overall management of the DOE OB, including the following tasks:

- communicates NMED policy to DOE OB staff
- ensures that the DOE OB's activities are consistent with the goals and objectives of AIP and NMED program requirements
- coordinates with the Bureau Chief on NMED management, other NMED programs, and on site-specific and policy issues
- manages program cost, schedules, and performance
- delegates projects and tasks to staff
- reporting to the Bureau Chief, if QA matters are not resolved within the Bureau
- ensures the establishment, implementation, and support of the QA and Health and Safety Programs
- performs personnel actions.

The DOE OB Staff Managers are the principal decision-makers and are responsible for accepting final products and deliverables.

1.1.1.3 Technical Supervisors/Senior Technical Staff

The Technical Supervisor in the DOE OB is equivalent to a subject matter expert (SME) and responsible for:

- oversight of day-to-day operations, including planning, scheduling, and reporting of technical and related activities
- reviews all DOE OB deliverables to DOE, NMED and public for technical content and composition
- ensures that deliverables are completed in a timely manner
- coordinates site-specific issues within program and bureau

- peer review of information/reports generated by other technical staff
- compliance with the DOE OB's QA Plan
- interaction with the DOE OB Staff Manager to resolve quality concerns

1.1.1.4 Project Managers

The responsibilities of the DOE OB Project Managers and Leaders include the following:

- preparation and implementation of project specific Work Plans, Sampling Analysis Plans (SAPs), Job Hazard Analysis Plans (JHAs), Integrated Work Documents (IWDs), and Technical Reports
- report project status to supervisors and staff manager
- coordinate collection of GPS data at sites
- oversight of contractors, as appropriate
- compliance with the DOE Oversight Bureau QA Plan
- peer review of information/reports generated by other project managers
- procurement and maintenance of field and laboratory equipment

1.1.1.5 Quality Assurance Officer

Oversight Bureau QA Officer responsibilities include the following:

- contact for all internal and external QA matters (i.e. subcontractor and DOE facility QA Officer)
- liaison between the DOE OB and the DOE facility QA Officer and the State's Contract Laboratories
- maintaining and initiating QA improvements
- implementing corrective actions, peer review system, and document and information control for the DOE OB
- assisting Project Managers in the development of Work Plans, Work Plans, Sampling Analysis Plans (SAPs), Job Hazard Analysis Plans (JHAs), Integrated Work Documents (IWDs), and Technical Reports;
- providing training and QA guidance
- verifying that all procurement/maintenance of equipment/supplies meets QA guidance
- verifying that personnel are qualified to conduct assigned work

The QA Officer will be independent of the unit generating the data, which in most cases will be the State and DOE facility Contract Laboratories.

Table 1-1. Environmental Programs Organization

Surface Water: Watershed Monitoring	Surface Water: NPDES/SWMU Monitoring

Program Manager Barry Birch (SNL) (505) 845-5933 Steve Yanicak (LANL) (505) 672-0448 VACANT (WIPP) (575) 887-6851 ext 22	*Program Manager* Barry Birch (SNL) (505) 845-5933 Steve Yanicak (LANL) (505) 672-0448 VACANT (WIPP) (575) 887-6851 ext 22
Project Manager/Leader Dave Englert (LANL)(505) 476-6022 Chris Armijo (SNL) (505) 845-5824 Julia Marlpe (WIPP) (575) 887-6851 ext 23	*Project Manager/Leader* Erik Galloway *(LANL)* (505) 476-6024 Chris Armijo (SNL) (505) 845-5824 Julia Marlpe (WIPP) (575) 887-6851 ext 23
QA Officer Erik Galloway (LANL) (505) 476-6024 Tom Kesterson (WIPP) (575) 887-6851 ext 24 Ryan Channell (SNL) (505) 845-5823	*QA Officer* Ralph Ford-Schmid (LANL) (505) 476-6023 Tom Kesterson (WIPP) (575) 887-6851 ext 24 Ryan Channell (SNL) (505) 845-5823
Project Leader/Field Operations Dave Englert (LANL) (505) 476-6022 Ralph Ford-Schmid (LANL) (505) 476-6023 Chris Armijo (SNL) (505) 845-5824 Julia Marlpe (WIPP) (575) 887-6851 ext 23	*Project Leader/Field Operations* Chris Armijo (SNL) (505) 845-5824 Erik Galloway (LANL) (505) 476-6024 Julia Marlpe (WIPP) (575) 887-6851 ext 23
Project Leader/Data Processing Kim Granzow (LANL) (505) 672-0447 Chris Armijo (SNL) (505) 845-5824 Julia Marlpe (WIPP) (575) 887-6851 ext 23	*Project Leader/Data Processing* Kim Granzow (LANL) (505) 672-0447 Erik Galloway (LANL) (505) 476-6024 Chris Armijo (SNL) (505) 845-5824 Julia Marlpe (WIPP) (575) 887-6851 ext 23
Technical Supervisor/QC Chris Armijo (SNL) (505) 845-5824 Dave Englert (LANL) (505) 476-6022 Erik Galloway (LANL) (505) 476-6024 Ralph Ford-Schmid (LANL) (505) 476-6023 Tom Kesterson (WIPP) (575) 887-6851 ext 24	*Technical Supervisor/QC* Kim Granzow (LANL) (505) 672-0447 Chris Armijo (SNL) (505) 845-5824 Ralph Ford-Schmid (505) 476-6023 Erik Galloway (LANL) (505) 476-6024 Julia Marlpe (WIPP) (575) 887-6851 ext 23

Air (AIRNET) & DPR Monitoring	**Biota Monitoring**
Program Manager Barry Birch (SNL) (505) 845-5933 Steve Yanicak (LANL) (505) 672-0448 VACANT (WIPP) (575) 887-6851 ext 22	*Program Manager* Barry Birch (SNL) (505) 845-5933 Steve Yanicak (LANL) (505) 672-0448 VACANT (WIPP) (575) 887-6851 ext 22
Project Manager/Leader Bill Bartels (LANL)(505) 672-0458 Chris Armijo (SNL) (505) 845-5824 Tom Kesterson (WIPP) (575) 887-6851 ext 24	*Project Manager/Leader* Ralph Ford-Schmid (LANL) (505) 476-6023 Chris Armijo (SNL) (505) 845-5824 Carmela Smith (WIPP) (575) 887-6851 ext 25
QA Officer Ralph Ford-Schmid (LANL) (505) 476-6023 Ryan Channell (SNL) (505) 845-5823 Carmela Smith (WIPP) (575) 887-6851 ext 25	*QA Officer* Kim Granzow (LANL) (505) 672-0447 Ryan Channell (SNL) (505) 845-5823 Tom Kesterson (WIPP) (575) 887-6851 ext 24
Project Leader/Field Operations Bill Bartels (LANL) (505) 672-0458	*Project Leader/Field Operations* Chris Armijo (SNL) (505) 845-5824

Chris Armijo (SNL) (505) 845-5824 Tom Kesterson (WIPP) (575) 887-6851 ext 24	Ralph Ford-Schmid (LANL) (505) 476-6023 Erik Galloway (LANL) (505) 476-6024 Carmela Smith (WIPP) (575) 887-6851 ext 25
Project Leader/Data Processing Bill Bartels (LANL)(505) 672-0458 Chris Armijo (SNL) (505) 845-5824 Tom Kesterson (WIPP) (575) 887-6851 ext 24	*Project Leader/Data Processing* Kim Granzow (LANL) (505) 672-0447 Chris Armijo (SNL) (505) 845-5824 Carmela Smith (WIPP) (575) 887-6851 ext 25
Technical Supervisor/QC Kim Granzow (LANL) (505) 672-0447 Dave Englert (LANL) (505) 476-6022 Tom Kesterson (WIPP) (575) 887-6851 ext 24 Bill Bartels (LANL)(505) 672-0458	*Technical Supervisor/QC* Kim Granzow (LANL) (505) 672-0447 Chris Armijo (SNL) (505) 845-5824 Ralph Ford-Schmid (505) 476-6023 Carmela Smith (WIPP) (575) 887-6851 ext 25

Ground & Drinking Water Monitoring	**Terrestrial Monitoring**
Program Manager Barry Birch (SNL) (505) 845-5933 Steve Yanicak (LANL) (505) 672-0448 VACANT (WIPP) (575) 887-6851 ext 22	*Program Manager* Barry Birch (SNL) (505) 845-5933 Steve Yanicak (LANL) (505) 672-0448 VACANT (WIPP) (575) 887-6851 ext 22
Project Manager/Leader Kim Granzow (LANL) (505) 672-0447 Ryan Channell (SNL) (505) 845-5823 Tom Kesterson (WIPP) (575) 887-6851 ext 24	*Project Manager/Leader* Dave Englert (LANL) (505) 476-6022 Chris Armijo (SNL) (505) 845-5824 Carmela Smith (WIPP) (575) 887-6851 ext 25
QA Officer Erik Galloway (LANL) (505) 476-6024 Carmela Smith (WIPP) (575) 887-6851 ext 25 Chris Armijo (SNL) (505) 845-5824	*QA Officer* Ralph Ford-Schmid (LANL) (505) 476-6023 Ryan Channell (SNL) (505) 845-5823 Tom Kesterson (WIPP) (575) 887-6851 ext 24
Project Leader/Field Operations Steve Yanicak (LANL) (505) 672-0448 Ryan Channell (SNL) (505) 845-5823 Tom Kesterson (WIPP) (575) 887-6851 ext 24	*Project Leader/Field Operations* Chris Armijo (SNL) (505) 845-5824 Dave Englert (LANL) (505) 476-6022 Erik Galloway (LANL) (505) 476-6024 Carmela Smith (WIPP) (575) 887-6851 ext 25
Project Leader/Data Processing Kim Granzow (LANL) (505) 672-0447 Ryan Channell (SNL) (505) 845-5823 Tom Kesterson (WIPP) (575) 887-6851 ext 24	*Project Leader/Data Processing* Kim Granzow (LANL) (505) 672-0447 Chris Armijo (SNL) (505) 845-5824 Carmela Smith (WIPP) (575) 887-6851 ext 25
Technical Supervisor/QC Kim Granzow (LANL) (505) 672-0447 Ryan Channell (SNL) (505) 845-5823 Michael Dale (LANL) (505) 476-0449 Tom Kesterson (WIPP) (575) 887-6851 ext 24	*Technical Supervisor/QC* Chris Armijo (SNL) (505) 845-5824 Erik Galloway (LANL) (505) 476-6024 Ralph Ford-Schmid (LANL) (505) 476-6023 Carmela Smith (WIPP) (575) 887-6851 ext 25 Dave Englert (LANL) (505) 476-6022

1.2 Site Assessment Program

The goal of the Site Assessment Program is twofold: 1) link all work objectives and data collection programs to the Agreement-in-Principal "STATEMENT OF JOINT OBJECTIVES" and "SCOPE OF WORK" which targets the goal embodied in the AIP: "help assure that activities at DOE facilities are protective of the public health and environment," and 2) efficiently manage all aspects of AIP environmental activities through a systematic process of:

- Planning
- Implementation/Collection
- Assessment

1.2.1 Site-Specific Workplans (SSWPs)

Annual project activities will be described in site-specific workplans (SSWP). Activities, including sampling, which are appropriate for a given project, will be determined on a site-by-site basis in accordance with the Bureau Chief, Staff Manager and the DOE Point-of-Contact or designated facility representative. The purpose of the SSWP is to document all anticipated work hours, equipment/supply procurement, fieldwork and laboratory activities associated with a sampling effort for DOE and NMED budget review and approval.

The SSWP is used as a tool by DOE OB QA Management and Technical staff as a reference to manage labor hours, contract for laboratory analyses as well as provide for equipment and supplies. The SSWP is a "stand alone" document. It is not included as a part of any other document, nor does it reference field procedures specified in other documents, such as this QAPP.

1.2.2 Sampling Analysis Plans (SAPs)

Sampling analysis plans (SAPs) will be prepared by the Project Leaders for each project, activity or survey and will be submitted to management for approval. The sampling plan will include a brief description of the site, a complete list of the sample stations and will also identify any health and safety concerns. NMED's "General Field Safety Manual" in Appendix C describes basic health and safety guidance for conducting environmental activities. Required health and safety guidance for a site-specific project or activity will be referenced in a facility "Integrated Work Document (IWD)." The SAP also shows a planning strategy or DQO process that shows the logic and thought behind the sample locations and data quality. During future surveys, additional stations may be added to bracket new potential points of contaminants or to delineate the contributions from several sources. The reasons behind the selection of existing stations will be stated. The SAP will also include a list of the parameters to be studied at each station and the frequency of sampling. SAPS are further discussed in the following section. Program or project SAPs will contain the following:

- Table of Contents
- A brief overview of the project, activities and intended data use/outcome
- Job Hazard Analysis (SAP will reference IWD, a separate document)
- Training Matrix (SAP will reference a separate document)
- Cost analysis and FY budget constraints
- Target Population

- Sampling Unit
- Sampling Frame
- The DQO process (or similar planning process)
- A sampling design including frequency, volume, and scheduling
- Sampling Support
- Measurement Protocol
- The description of the sampling methodology to be used for the study

The SAP will identify the project goal(s) as per the AIP (e.g. data verification or independent study etc.) and include the number of sampling events. Determination of the appropriate number of sample events (sampling frequency) is a function of the media as well as collection availability e.g. wild fire air monitoring, storm water flows and NPDES discharges. Estimation of these events is challenging given that the variation associated with each of the measurements of interest has not been quantified, and given that this value changes as a function of air or water flow. A sampling frequency is determined based on the application of attainment criteria and human and budget resource constraints.

1.3 Data Quality Objectives

The Site Assessment Program enables management of environmental activities through Data Quality Objectives (DQOs) that are a "tried and true" planning process. The DQO process, based on EPA's *Guidance for the Data Quality Objectives* Process (QA/G-5) (EPA 2002), is a tactical, systematic process for planning data collection efforts. It helps answer the following questions:

- Why do we need data?
- What must the data represent?
- How will we use the data?
- How much uncertainty is tolerable?

Steps followed in the DQO Process are listed below:

1. State the Problem
2. Identify the Decision
3. Identify Inputs to the Decision
4. Define the Study Boundaries
5. Develop a Decision Rule
6. Specify Limits on Decision Errors
7. Optimize the Decision for Obtaining Data

The data quality objectives (DQOs) defined in this QAPP, are to be used for the development of the program or project specific SAPs. The SAPs will be approved by the Bureau Chief, Staff Manager and Project Leader and kept at site offices as well as in the Bureau's QA/QC library.

DQOs are criteria used to evaluate the overall level of uncertainty that a decision-maker is willing to accept in results derived from environmental data. DQOs are defined in order to produce data of a known and verifiable quality and which are of quality sufficient to meet the overall objectives of environmental monitoring investigations. Data quality for all Oversight Bureau programs will be achieved by several means, with emphasis on establishing DQOs for analytical results, and a SAP for field sample collections and field measurement activities. DQOs include measures such as precision, accuracy, representitiveness, completeness, and comparability of data. These parameters are briefly described here and with more detail in the Laboratory Quality Control Section:

- *Precision* refers to the level of agreement among repeated measurements of the same parameter
- *Accuracy* refers to the difference between a measured value for a parameter and the true value for the parameter. It is an indicator of the bias in the measurement system
- *Comparability* expresses the confidence with which one data set can be compared to another
- *Representativeness* is a measure of the degree to which the measured results accurately reflect the medium being sampled. It is a qualitative parameter which is addressed through the proper design of the sampling program in terms of sampling program objectives, sample locations, number of samples, collection methods, actual materials collected as a "sample" of the whole, preservation techniques, and analytical methods
- *Completeness* is a measure of the amount of the useable data collected during a field investigation for successful achievement of the project objectives, as compared to the amount of data intended to be collected

1.3.1 Reconciliation With Data Quality Objectives

All Oversight Bureau deliverables shall undergo an internal review process through Project Management identified in Section 1 to ensure that all work products are of sufficient quality and meet DQOs. The internal review process will consist of peer reviews with subsequent reviews by the Technical Supervisor. A review shall include the following as a minimum:

- Spelling, punctuation, and grammar
- technical accuracy
- consistency with DOE, EPA and NMED/DOE OB guidance
- accuracy of transcription
- format correctness
- fulfillment of intended purpose

The Project Leader, QA officer or an independent peer reviewer, will conduct review of documents. Comments generated are made upon draft copies of reports and discussed verbally with the Project Manager. Disagreements between reviewer and Project Manager may be discussed with other staff members either informally or during monthly staff meetings. The DOE OB Staff Manager shall perform a final review for completeness and fulfillment of intended

purpose before submitting the work to the DOE or facility.

1.3.2 Special Training/Certificates

Although no special certification is required for compliance with this QAPP, proper training of field personnel represents a critical aspect of Quality Control. Staff and/or interns within the Oversight Bureau undergo a period of apprenticeship and are accompanied by an experienced Project Leader or Oversight Bureau staff person when collecting samples or field measurements. Basic training requirements of NMED personnel include having a valid New Mexico State Driver's License and completing the National Safety Council Defensive Driving Course, which is made available through the NMED Bureau of Human Resources (HR) and General Services Department (GSD)/Transportation Services Division of the State of New Mexico. Employees are required to keep a copy of the Defensive Driving training certificate at all times while driving a state vehicle or must have a valid state drivers license while driving a federal vehicle. Additionally, Oversight Bureau personnel are required to obtain a Q clearance and meet the training requirements identified in a Personnel Training Matrix established for each DOE facility. The Training Matrix generally lists all required courses and annual refresher training such as RadWorker Classroom Training II, OSHA 29 CFR 1910.120 (40-hour HAZWOPER: General Site Worker), Integrated Work Management, CPR: Adult, General Employee Training (Live), and site specific trainings.

1.3.3 Documentation and Records

Oversight Bureau supporting documents and records associated and referenced in this QAPP are managed through a process where site managers approve their development and direct their revisions as needed. The DOE OB generally follows a five-year timeframe for assessing records and documents for revision. Following management approval, this QAPP and other supporting documents will be made available on the NMED Oversight Bureau web site at http://www.nmenv.state.nm.us/DOE_oversight/. In addition, electronic copies are distributed to appropriate project personnel as well as facility staff upon request. Management of additional Oversight Bureau documents and records are discussed in following sections.

1.3.4 Standard Operating Procedures (SOPs)

The DOE OB maintains a set of Standard Operating Procedures (SOPs) that support four primary categories of the Bureau's overall environmental monitoring program: air, water, terrestrial, and biota. Each SOP lists specific details regarding sampling process design; field collection documentation, sampling methods; sample handling; analytical methods; QC; instrument/equipment testing; inspection; and maintenance; instrument/equipment calibration and frequency; inspection/acceptance of supplies and consumables; non-direct measurements; and data management. The guidelines specified in this section were developed to ensure that data collected for each program study or inspection according to the category/media are appropriate and reliable. SOPs are developed and revised by each site office as needed. Oversight Bureau SOPs are listed according to identification number, title, revision and effective date in Table 1-2 and on the DOE OPB web site at http://www.nmenv.state.nm.us/DOE_oversight/.

Table 1-2 Oversight Bureau Standard Operating Procedures (SOPs)

SOP ID#	*SOP TITLE*	*REVISION*	*EFFECTIVE DATE*
OB-SOP-XX	Introduction	2	02/01/97
OB-SOP-XX	Field Measurements	2	02/01/97
OB-SOP-XX	Sample Preservation and Handling	2	02/01/97
OB-SOP-XX	Record Keeping	2	02/01/97
OB-SOP-XI	Quality Assurance/Quality Control	2	02/01/97
OB-SOP-XX	Air Particulate Sampling	3	02/17/06
OB-SOP-XX	Air Monitoring Station (AIRNET) Preventative Maintenance Plan	3	03/16/09
OB-SOP-XX	Ambient Gamma Monitoring	2	04/16/96
OB-SOP-10	Decontamination	3	02/17/06
OB-SOP-01	Development of a Sampling and Analysis Plan	3	02/17/06
SNL-SOP-03	Soil and Sediment Sampling	3	02/17/06
OB-SOP-XX	Shipping Analytical Samples	1	03/16/09
OB-SOP-XX	Surface Water	2	02/01/97
OB-SOP-XX	Ground Water Sampling	4	03/16/09
OB-SOP-XX	NALGENE® Storm Water Sampler and Mounting Tube Kit	1	04/01/09
OB-SOP-XX	General Field Safety Manual	1	05/03/06
OB-SOP-XX	Rain Gauge Installation Protocol & ELS Installation	1	05/03/06
OB-SOP-XX	ISCO® Flow Meter and Sampler Setup Procedure and RTD Use	1	05/03/06
Reserved			
Reserved			
Reserved			
Reserved			

2.0 DATA GENERATION AND ACQUISITION

The DOE OB goal for data generation and acquisition is to collect representative samples from all environmental media under its programs to produce data of a quality that is both useable and

legally defensible. This section provides detailed information regarding sampling process design; sampling methods; sample handling; analytical methods; QC; instrument/equipment testing; inspection; and maintenance; instrument/equipment calibration and frequency; inspection/acceptance of supplies and consumables; non-direct measurements; and data management. The guidelines specified in this section were developed to ensure that data collected under Oversight Bureau programs are appropriate and reliable.

Beginning in 2002, the Oversight Bureau and its contract laboratories began the electronic transfer of chemical analysis data through an electronic data deliverable (EDD). Samples are submitted to Oversight Bureau contract laboratories with Oversight Bureau chain of custody forms. These forms are provided in Appendix A and contain station identification information, applicable information on preservation techniques, and sample collection date and time. The database manager enters electronically transferred data into the Bureau's environmental data database. Data reported in hardcopy form is entered into the database under the supervision of the project leader or database manager. Details of this process are described below in the Data Repository Section.

2.1 Sampling Process Design

Sampling process design will be developed based on the program, project or site-specific SAP to be utilized. This design will be detailed in the SAP and based upon the DQOs or project plan that determines the type of sampling required, for example, automated (High-Volume/Low-Volume), single stage, or grab samples or a combination of each.

2.1.1 Data Analysis and Assessment

Specific procedures and guidance provided in OB-SOP-XI "Quality Assurance/Quality Control" and Appendix B: "Quality Assurance Criteria" will be applied when reviewing data derived from a project. After data has been reviewed by a QC Technical Supervisor, it will be submitted as a data report to the Agreement in Principle (AIP) Point of Contact (POC), who will distribute the data as prescribed by AIP protocol. Following the data release, a written report and maps may be assembled and submitted to the AIP POC for publication and distribution.

2.1.2 Sample Collection, Preservation, and Analysis

All methods of sample collection, preservation, and analysis used in environmental monitoring, as a part of this QAPP, shall be in accordance with the following non-exhaustive list of test procedures:

(1) "Guidelines establishing test procedures for the analysis of pollutants under the Clean Water Act," 40 CFR Part 136 or any test procedure approved or accepted by EPA using procedures provided in 40 CFR Parts 136.3(d), 136.4, and 136.5,

(2) *Standard Methods for the Examination of Water and Wastewater*, latest edition, American Public Health Association,

(3) *Methods for Chemical Analysis of Water and Waste*, and other methods published by

EPA Office of Research and Development or Office of Water,

(4) *Techniques of Water Resource Investigations* of the U.S. Geological Survey,

(5) Annual *Book of ASTM Standards*. Volumes 11.01 and 11.02, Water (1) and (II), latest edition, ASTM International,

(6) Federal Register, latest methods published for monitoring pursuant to Resource Conservation and Recovery Act regulations,

(7) *National Handbook of Recommended Methods for Water-Data Acquisition*, latest edition, prepared cooperatively by agencies of the United States Government under the sponsorship of the U.S. Geological Survey,

(9) McNaughton et al. 2000: M. W. McNaughton, D. H. Kraig, and J. C. Lochamy, "Siting of Environmental Direct-Penetrating-Radiation Dosimeters," Los Alamos National Laboratory document LA-UR-00-1168 (2000),

(10) NCRP 1975: "Natural Background Radiation in the United States," National Council on Radiation Protection and Measurements report 45 (November 1975),

(11) NCRP 1987a: "Ionizing radiation exposure of the population of the United States," National Council on Radiation Protection and Measurements report 93 (September 1987),

(12) NCRP 1987b: "Exposure of the United States and Cañada from Natural Background Radiation," National Council on Radiation Protection and Measurements report 94 (December 1987),

(13) Federal Register, latest methods published for monitoring pursuant to the Safe Drinking Water Act regulations, and/or

(14) Other recognized scientific journals or organizations that describe performance based, defensible, new and currently evolving analytical techniques.

Detailed procedures for conducting field activities and obtaining representative samples for surveillance and compliance monitoring, including sampling procedures, frequencies, containers, preservatives, and holding times, are provided in the Oversight Bureau's SOP and/or project SAPs. Site conditions, or project-specific data collection objectives, may necessitate the use of alternative field procedures not presented in this QAPP. The use of field methods other than those presented in the project SOP or SAP must be approved by the Project Manager and documented properly.

2.1.3 Sample Handling and Custody

The details of the sample handling and custody procedures, and copies of all contract laboratory forms for compliance monitoring and water quality surveys are found in the Oversight Bureau's SOPs and project SAPs (see also Appendix B).

2.2 Quality Control

2.2.1 Field Quality Control

Newly hired DOE Oversight Bureau's field personnel and/or interns will learn sampling techniques through apprenticeship with experienced Oversight Bureau, NMED or DOE facility staff. When new Oversight Bureau's personnel and/or interns can take field measurements that consistently agree with field measurements taken by the Project Leader (within the limits of the instruments), the personnel will be approved for that measurement. New personnel will also collect grab samples for lab analysis—particularly QC samples—until their technique is consistently good. Only after an appropriate period of apprenticeship (usually about one year) will an individual be qualified to serve as a Project Leader and even then, experienced personnel will generally accompany them until they have served at least a year in that capacity.

The frequency required for replicate sampling and QC criteria are specified in the tables in Appendix B. Under AIRNET, ground water, storm water monitoring programs and the NPDES water quality survey, replicate samples are submitted to the laboratory as blind samples. The location and other information given on the label do not reveal the sample as a replicate. The analytical results of replicate sampling are entered into the Oversight Bureau's water quality database and identified as QC duplicates.

The use of blanks is another important part of the continuing effort to improve data quality by improving collection techniques. Blank samples are prepared before an event and consist of certified clean samples, such as de-ionized water. The samples are carried throughout the entire event, from bottle preparation at the laboratory, to field sampling activities, to submittal to the contract laboratory. Chemical analyses of the blanks determine whether conditions or processes may have contaminated the field samples. The use, types, and frequency of blank samples are described in Appendix B.

Occasionally discrepancies arise in reported data. The Project Leader is responsible for contacting the QA Project Manager and the proper laboratory representatives to resolve the discrepancies. This data review process is described in detail in this QAPP. Corrective procedures are then initiated by Bureau and contract laboratory staff whenever predetermined limits of acceptability are exceeded. These limits and corrective measures are described in the contract laboratory QAPPs found in the Santa Fe DOE Oversight Office QA/QC library along with a summary of the analytical methods and equipment used by Oversight Bureau's contract laboratories. If a corrective action is indicated, results are not reported without proper annotation. Corrective actions include stopping the analysis, identifying the problem, and resolving the difficulty. All documents are reviewed and approved by an immediate supervisor once they are revalidated.

2.2.2 Sampling Notebooks

The use of sampling notebooks for specific projects and activities are described in SOPs. They are used by DOE OB personnel to record all field information required for data acquisition and are essential for each program or project. Each Project Leader conducting a Site or facility assessment keeps a bound sampling notebook. All field data, other than those entered on the field sheets, are clearly entered into this notebook. Mistakes are lined out and then dated and initialed, entries are never erased nor pages removed. The Oversight Bureau Project Leader reviews all field notes and field sheets for completeness and clarity after each sampling event. All non-privileged or proprietary notes and information concerning a particular survey are kept in a survey file maintained by the Project Leader. Field sheets used for surveys will always contain fields for the station location, date and time of sample collection. Specific programs or projects, e.g. water monitoring, require additional information detailed in the SOP such as water temperature, specific conductance, dissolved oxygen, pH, salinity, and turbidity. A login sheet or itemized list below each location is prepared for all samples collected during a given sampling trip. The field notebook is used as the basis for preparing reports and to refresh the investigator's memory regarding the specifics of information gathered during the sampling event. Field notebooks are maintained for a minimum of three years after the sampling event date. Reports cover, in detail, all findings made during the sampling event and may include photographs taken during the collection. The sample collector reviews each report for accuracy and signs the report form.

2.2.3 Global Positioning System (GPS) Data Acquisition

GPS data acquisition for specific projects and activities are described in SOPs. If locational data are collected, the data will be used to create facility maps or regional maps. The maps will be used as reference documents, to present data and to make decisions about the site. The DOE OB currently uses Trimble GeoXT and GeoExplorer 3 units for GPS data collection. Trimble GeoExplorer Standard Operating Procedures and NMED GPS Guidance, June 2000.
are provided in Appendix B.

The acceptable accuracy for horizontal locational data is five meters horizontal accuracy at 95% confidence interval. This level of accuracy is achieved by differentially correcting filed data to the closest base station. Corrected GPS data will be evaluated using Pathfinder Office Version 2.80 to determine data spreads, outliers, standard deviations, and uncorrectable data, by viewing position properties and feature properties. Data accuracy will be expressed as the Two Degree Root Mean Square Error.

If data are collected specifically to determine geospatial information, data collected will be site specific based on the features at the facility, such as the possible waste/sources, sampling points and monitoring wells. At a minimum, latitude/longitude for the following site features will be collected: AIRNET stations, ISCO stations, NPDES Outfalls, municipal wells and monitoring wells. For large facilities, the center of the facility (as best as can be determined) will be located as a point.

2.3 Laboratory Quality Control

The NMED Oversight Bureau can have confidence in analytical laboratory data because all analyses are performed in compliance with EPA methods. In order that DOE and third parties (e.g., municipalities and public) maintain confidence in Oversight Bureau contract laboratory-generated data, NMED submits a *Request For Proposals For Laboratory Analytical Services (RFP)* to nation-wide candidates that operate environmental analytical laboratories. The RFP's primary intent is that NMED enter into price agreements with laboratories for the analyses of environmental samples so that the data meets a high standard of quality and is both useable and legally defensible. The RFP is also intended to allow a confident selection of qualified and competent laboratories that meet or exceed NMED's QA/QC requirements as well as fulfilling Bureau missions within NMED. The RFP outlines crucial qualifications and audit programs expected as and integral part of each laboratory's resume so that they meet NMED's QA/QC specifications. Such qualifications include participation in 1) Contract Laboratory Program (CLP), 2) National Institute of Standards and Technology (NIST), and 3) Internal Organization for Standardization (ISO9002). In a manner very similar to LANL, NMED also evaluates annual qualification audits of environmental analytical laboratories as part of its RFP process:

- Quality Assurance Management Systems and General Laboratory Practices
- Data Quality for Inorganic Analyses
- Data Quality for Organic Analyses
- Data Quality for Radiochemistry Analyses
- Laboratory Information Management Systems (LIMS) Electronic Data Management
- Hazardous and Radioactive Materials Management

RFP language instructs qualified laboratories to submit a proposal with completion costs for NMED's specified scope of work. The scope of work consists of analyses of environmental samples in accordance with the approved U.S. EPA methods. Other methods of analysis may also be utilized, when approved in advance by NMED in writing, which have detection limits that are lower than state and federal Maximum Contaminant Levels. All samples must be analyzed within the appropriate holding times according to the methods listed in an attachment to the RFP. Appendix D shows NMED's most recent RFP for Laboratory Analytical Services. The RFP attachment shown in Appendix E "NMED Fee Schedule" is a list of the methods and method revisions that NMED requires. Table 2-1 shows the current analytical laboratories under contract to NMED and the general analyte suites they provide. Details of individual Laboratory QA/QC certification and procedures can be found at the web sites provided in the Table.

Table 2-1 NMED Contract Analytical Laboratories

LABORATORY	ANALYTE LIST
Paragon Analytics 225 Commerce Dr. Fort Collins, CO 80524	Diesel Range Organics, Metals, General Chemistry, Herbicides,

800.443.1511 970.490.1511 Lance Steere – Project Manager http://www.datachem.com/certifications.aspx	High Explosives,Pesticides, PCBs, Radionuclides, Semivolatile Organic Compounds, Volatile Organic Compounds
Assaigai Analytical Laboratories 4301 Masthead NM Albuquerque, New Mexico 87109 505.345.7259 Contact: John Morris http://www.assaigai.com/Certifications.aspx	Diesel Range Organics, Metals, General Chemistry, Herbicides, High Explosives,Pesticides, PCBs, Radionuclides, Semivolatile Organic Compounds, Volatile Organic Compounds
Eberline Services 7021 Pan American Freeway NE Albuquerque, New Mexico 87109 505.761.5414 Contact: Karen Schoendaller http://www.eberlineservices.com/documents/LvLI-SOQ.pdf	Diesel Range Organics, Metals, General Chemistry, Herbicides, High Explosives,Pesticides, PCBs, Radionuclides, Semivolatile Organic Compounds, Volatile Organic Compounds
Transwest Geochem/Columbia Analytical Services, Inc. 3725 E. Atlanta Ave Phoenix, AZ 85040 602.437.0330 http://www.caslab.com/	Diesel Range Organics, Metals, General Chemistry, Herbicides, High Explosives,Pesticides, PCBs, Radionuclides, Semivolatile Organic Compounds, Volatile Organic Compounds
U.S. Geological Survey (USGS) US Department of Interior DFC BLDG 53 MS 414 Lakewood CO 80225 Contact: Andy Manning http://crustal.usgs.gov/projects/isotope-geochron/index.html	Analysis of water samples for dissolved noble gases including Ne, Ar, Kr, Xe, 4He, and 3He/4He ratio
AXYS Analytical Services Ltd. 2045 Mills Road W. Sidney BC Canada V8L 5X2 1 888 373 0881 Tel +1 (250) 655-5800 Fax +1 (250) 655-5811	Dioxin Furans and Conginer Method PCBs

askaxys@axysanalytical.com http://www.axysanalytical.com/about_us/facility/	
University of Miami Tritium and Stable Isotope Laboratory http://www.rsmas.miami.edu/groups/tritium/	Low Level Tritium and Stable Isotopes
American Radiation Services Local: 225-381-2991, Toll Free: 800-401-4277 2609 North River Road, Port Allen, Louisiana 70767 http://www.amrad.com/	Screening Data - Radionuclides

2.3.1 Laboratory QA/QC techniques

Laboratory QA/QC techniques for the analysis of environmental samples have become standardized, and currently accepted techniques are established in several USEPA publications (see also Appendix B). For example, contract laboratories' used for Oversight Bureau water programs are subject to the latest USEPA-accepted edition of *Standard Methods for the Examination of Water and Wastewater*, *Methods for Chemical Analysis of Water and Wastes* (American Public Health Association [APHA], American Water Works Association [AWWA], and the Water Environment Federation [WEF] 1998) and in 40 Code of Federal Regulations (CFR) Part 136, *Guidelines Establishing Test Procedures for the Analysis of Pollutants under the Clean Water Act* (USEPA 2000).

Statistical criteria used by the contract laboratories for validating and expressing the variability of analytical results are derived from the standard deviation, coefficient of variation, range, 95-percent confidence limits, and control charts. Outliers are analytical results that fall outside of the limits of the control chart appropriate for the analysis being performed. If such a result is obtained the analysis is "out of control," and immediate action is then taken to determine the cause of the outlying result. The analyses are then repeated after corrective action has been taken.

2.3.2 General Quantitative Analysis

All analytical laboratories under contract to NMED generally follow these required QA/QC Steps before Sample Analysis:

1. Ensure laboratory standards are traceable and not expired. Certificate of Analysis ensures:
    - Name and address of certifying body
    - Description of material
    - Reference material code and batch number
    - Certified values and their uncertainties
    - Traceability
    - Values obtained by individual laboratories or methods
    - Date of certification
    - Period of validity
    - Names and signatures of certifying officers
    - Laboratory control sample standards and daily calibration check standards musty be from independent vendors
2. Check sample preservation and holding time
3. Check for a current valid Method Detection Limit (MDL) Study
4. Analyze a 5-popint initial calibration curve
5. Analyze daily calibration sample to demonstrate instrument accuracy
6. Analyze laboratory method blank to ensure all reagents used during sample preparation are

not contaminated with target analytes

7. Analyze a laboratory control sample (LCS) to demonstrate method extraction efficiency
8. Analyze a matrix spike/matrix spike duplicate

A. Inorganic Chemicals

Precision and accuracy data are determined by analyzing aqueous solutions covering a wide range of concentrations. Standard curves are determined by using at least one concentration level and a blank. At least one standard concentration is used after every ten samples to verify the original curve. Analytical variability is calculated and recorded by instrument software.

The above method is used in the evaluation of daily performance as it refers to replicates, spikes, split samples, blanks, low and high concentration standards, reagents, and the preparation of quality control charts.

The method described in paragraph 1, is used for all inorganic methods, (including metals) and some organic methods that use titrimetry, specific ion electrodes, turbidimeters, automated Technicon, atomic absorption and flame emission spectroscopy, inductively coupled argon plasma spectroscopy, inductively coupled argon plasma spectrometry, and colorimetry.

B. Organic Analyses

1. Glassware used for organic analyses is Class A, and is properly calibrated and cleaned to be free of all trace organic contaminants,
2. Chemicals are of pesticide-analysis quality and stored according to manufacturers' guidelines,
3. Reagents, stock solutions, and standard solutions are prepared and stored as required by the method used,
4. Finished water and solvents used are of a quality prescribed for water quality analyses,
5. Samples analyzed by gas chromatography are prepared according to the method involved and contain the proper replicates, standard controls, blanks, and reagent markers,
6. Methods used for liquid chromatography follow the required guidelines of the manufacturer and the quality control requirements of the published methodology,
7. Quality control comprises 15-20 percent of the analyst's output,
8. Acceptable performance is demonstrated by Oversight Bureau's contract laboratories routine participation in the USEPA administered, and NIST certified, Proficiency Testing Studies; formerly distributed directly by USEPA, but now 'privatized'.

C. Radiochemical Analyses

This class of analyses requires rigorous attention to quality control procedures in order to produce valid results.

1. The laboratory is physically arranged such that the storage area, counting area, and preparation area are separated in order to prevent cross contamination,
2. The service utilities to the lab meet or exceed the requirements of the methodology guidelines, for example, finished water, compressed air, natural gas, and electrical services have been designed for use in a radio analytical lab,
3. The instrumentation is carefully calibrated and standardized routinely. Proper shielding and cleanliness minimize background count rates. Proper procurement of quality reagents, and their careful preparation, minimizes reagent interferences,
4. Sample handling follows the recommendations of the methodology,
5. A "routine check source" is used for each counting system to determine, monitor, and document instrument performance stability,
6. Instrument and analytical control charts are maintained to detect deviations from acceptable performance,
7. Reagents and chemicals are of the appropriate quality, and purified when necessary. Standards are obtained from NIST, or from NIST-traceable vendors, when ever possible,
8. Analyzing known compounds, duplicates, spiked samples, and blanks monitors internal quality control. Control charts for analytic performance are maintained,
10. All calculations are performed by vendor supplied software and/or custom Excel spreadsheets. Gaussian (normal) and Poisson statistical distribution methods are used to calculate limits of detection.

Daily lab performance is monitored by the use of spikes, duplicates, and concentration standards to verify standard curves. Precision, accuracy, representativeness, completeness, and comparability are data parameters that are calculated to verify and quantify laboratory performance. These parameters are discussed below. Detailed information regarding laboratory QC criteria is provided in Appendix B.

Precision:

Precision is the agreement among a set of replicate measurements without assumption of knowledge of the true value. Precision is estimated by means of duplicate/replicate analyses. These samples should have analyte concentrations above the method detection limit (MDL) and may involve the use of matrix spikes (USEPA 1998). Precision is expressed as the relative percent difference (RPD) between field duplicate measurements, which is calculated as follows (USEPA 1998):

$$RPD = \left(\frac{X_1 - X_2}{(X_1 + X_2)/2} \right) \times 100$$

Where,

RPD = Relative percent difference (%)
X_1 and X_2 = Duplicate measurements of the same sample

The smaller the RPD, the more precise are the measurements. The usability of duplicate measurements is assessed during data validation by comparing RPDs for field replicate measurements to established control limits (CLs). Because measurements near the MDL (defined as less than two times the MDL) are extremely imprecise, ± 200 % is considered to be the best possible level of precision in practice (U.S. Fish and Wildlife Service 2003). Therefore, for near-detection limit analyses (defined as less than two times the MDL), CLs for precision range from zero (no difference between duplicate control samples) to ± 200 %. When analyte concentrations are greater than 2 to 10 times the MDL, the CLs for precision range from zero to ±20%, and when the analyte concentrations are greater than 10 times the MDL, the CLs for precision are zero to ±10% The QA Director at the contracting laboratories is responsible for establishing measurement criteria for precision and accuracy of the analytical procedures used in water, air, terrestrial and biota media projects. Data for these QC procedures are obtained by analyses of replicate, split and spiked samples, and blanks.

Duplicate Error Ratio (DER):
In the comparison of radiochemistry results the total propagated uncertainty, which includes the random and systematic uncertainties involved, must be evaluated with the results to determine the validity of the duplicate measurement. This is accomplished by evaluating the Duplicate Error Ratio (DER), which is defined as:

$$DER = \left(\frac{/S - D/}{2 * \sqrt{\sigma_S^2 + \sigma_D^2}} \right)$$

Where:

/S – D/ = is the absolute value of the difference in the result from the sample minus the result of the duplicate:

σ_S^2 = is the square of the sample's sigma
σ_D^2 = is the square of the duplicate's sigma

This number gives the degree to which the sample and duplicate are comparable, with respect to the associated uncertainties.

The DOE Oversight Bureau evaluates the DER at the 2σ confidence interval. A DER less than or

equal to 1.42 indicates that the results, with their associated uncertainties, are statistically equivalent. A DER greater than 1.42 places the results in the 2σ "warning" range. A DER greater than 2.13 places the results outside the 3σ control range.

Accuracy (or Percent Bias):

Accuracy is the closeness of agreement between an observed value and an accepted reference value. Bias is assessed by comparing a measured value to an accepted reference value in a sample of known concentration or by determining the recovery of a known concentration spiked into a sample (USEPA 1998). Bias due to matrix effects based on a matrix spike is calculated as:

$$\%R = \frac{100(x_s - x_u)}{K}$$

Where,

%R = Percent recovery
x_s = Measured value for spiked sample
x_u = Measured value for unspiked sample
K = Known value of the spike in the sample

This technique quantifies accuracy in terms of percent recovery of the added spike and takes into account matrix effects specific to a particular sample and should fall within 80-120%. USEPA (1998) stipulates those constituents appropriate for spiking and subsequent measurement, and defines the %R required for proper QA/QC to meet method requirements. A QA Project Director at each of the Oversight Bureau's contract laboratories is responsible for developing measurement criteria that establishes legally acceptable precision and accuracy for the analytical procedures used to generate data from various environmental media. Data for these QC procedures are obtained by analyses of replicate, split and spiked samples and blanks.

Representativeness:

Representativeness expresses the degree to which data accurately and precisely represent the true condition of the assessment unit. The evaluation of representativeness is a qualitative procedure that addresses the overall design of a sampling program. Representativeness is improved by the selection and use of appropriate numbers of samples, sampling stations, and techniques proven to obtain samples reflective of the actual environmental medium e.g., air, water, terrestrial, and biota.

The QA Project Director at each of the Oversight Bureau's contract laboratories is responsible for developing measurement criteria that establishes legally acceptable precision and accuracy for analytical procedures used to generate data from various environmental media. These criteria are described in more detail below and in Appendix B.

Comparability:

Given that environmental monitoring can involve different contractors or personnel, and often

include new and currently evolving analytical techniques, the QA/QC standards necessary to ensure data comparability are a critical element in the designated work. Comparability of data is achieved by uniformity in sampling procedures, preservatives, and "standardization" among staff members. This standardization is achieved by periods of apprenticeship for new staff members and by strict adherence to SOPs and/or project SAPs. Detailed sample collection and handling procedures are specified in the Oversight Bureau's SOP and/or project SAP. The consistent use of these procedures will ensure that data sets are comparable on the basis of field variables.

Completeness:
Is a measure of the amount of the useable data collected during a field investigation for successful achievement of the project objectives, as compared to the amount of data intended to be collected.

Goals for precision, accuracy, and completeness for analytical procedures are summarized in Table 2-2. For each project or activity, a list of the substances and contaminants to be analyzed will be prepared as part of the SAP. In this plan, detailed goals for each of the substances will be set. For some of these substances, the goals set will be higher than those described in Table 2-2. This table is analogous to that used by the GWQB Superfund Section QAPP and provides the minimum Oversight Bureau requirements for the goals that must be achieved.

TABLE 2-2 Data Uses and Goals for Analytical Precision, Accuracy, and Completeness

Sample Type	Data Uses	Precision	Accuracy	Completeness
Soil Sediment Water Air Biota	* Establish Background * Identify/Verify Contamination * Document Releases * Identify Receptor Exposures	20-40%	60-120%	90%

2.3.3 Instrument/Equipment Testing, Inspection and Maintenance
All field equipment must be inspected and serviced, as necessary, prior to each sampling event. A service log is maintained for each instrument. Results of inspections and maintenance will be noted in the equipment log. All deficiencies must be noted in the equipment log and reported immediately to the appropriate staff. Field staff, responsible for the equipment, will verify the problem and arrange for repair by the manufacturer, or for purchase of a replacement. The equipment will not be used if the working condition is in doubt.

Most field instruments used by Oversight Bureau are expensive and must be treated with care. Well-maintained field equipment is essential for acquiring high quality data. Several example pieces of

field equipment, owned by this Bureau, are listed below. Routine testing, inspection, and maintenance requirements are briefly outlined in Table 2-3.

Table 2-3 Routine Equipment Testing, Inspection, and Maintenance

Field Equipment	Testing, Inspection, and Maintenance Procedures
GeoTech GeoPump II	Wipe off outside of GeoPump with a damp cloth; check pump head and power cords; recharge batteries after each field use.
ISCO® Automatic Sampler	At the beginning of a monitoring season (May – Oct) replace peristaltic pump tubing and check program for compliance with SAP. Prior to deployment, charge battery if needed. Replace paper in flow meter if needed. Replace suction line at each deployment. Taking a spare ISCO® , flow meter, and battery is advised. After a sampling trip, thoroughly clean (and acid rinse) the sample bottles, and peristaltic pump tubing of the ISCO® and allow to air dry. If repair is required new parts will be ordered and replaced. Upon retrieval from field in fall or when changing locations decontaminate sampler and do winter maintenance for the next deployment. Follow the ISCO® instruction manual and decontamination procedures in SOP.
Laser Level and Sensors	Charge Level battery prior to field use. Check batteries in sensors, and carry spares. Check accuracy, precision, and reproducibility by closing a survey loop back to an initial benchmark. After use, clean instrument, repack it in carrying case and carefully secure in the vehicle.
Environmental Liquid Samplers (ELSs)	Two Types of Inspections: 1) In Use; clean off debris using paper towel, rinse with distilled water until clean of debris, inspect sampling port operation, and replace with clean ELS if not opening or closing properly. 2) In-House maintenance (for replaced, and or post –sampling ELSs): Rinse off debris with tap water, soak overnight in solution of ALCONOX, DO NOT USE ACID TO CLEAN, Disassemble ELSs individually and rewash in ALCONOX (do not mix ELS parts). Rinse in distilled water 3X, set ELS parts out to air dry. Inspect ELS springs, and washer before reassembling. Test each ELS to assure that the sampling port works properly. Use ELS inspection manual for troubleshooting or for telephone # of manufacturer. Store in plastic bag.

Field Equipment	Testing, Inspection, and Maintenance Procedures
Dekaport® Sample Splitter	During use and after each sample. Check ports for debris. Flush out body and Teflon tubes with tap water, wash body and tubes in ALCONOX. Use tube brush to scrub ports, followed by rinse with distilled water 3X. Check ports, pat dry with paper towel, reuse or prep for storage. For Storage: Check ports for debris, remove Teflon tubes, soak, and wash body and tubes in ALCONOX, rinse 3X with distilled water, air dry, store in box.

If there are any questions concerning operation or maintenance of equipment, check with staff designated to care for that equipment.

2.3.4 Instrument/Equipment Calibration and Frequency

Calibration requirements for some frequently used field instruments are provided in this Section. The requirements shown here are examples and are not meant to be exhaustive procedures—always refer to the manufacturer's instruction manual for each instrument.

Complete procedures for operating, maintaining and calibrating instruments used in field environmental measurements are contained in the manufacturer's instruction manual for each instrument in addition to DOE OB SOPs. Manufacturer's instruction manuals are stored with the equipment or at site offices. Oversight Bureau personnel using field instruments are expected to read and be thoroughly familiar with all procedures detailed in these manuals. In particular, project leaders and lead samplers shall meticulously follow the calibration procedures given by the instrument manufacturer. A calibration log shall be kept for each instrument. DOE Oversight Bureau's staff shall routinely enter dates of calibration, calibration methods used, and any other pertinent data, e.g., erratic instrument behavior, in the logbook.

Additional calibration and instrument information can be found in the Oversight Bureau's SOP and/or project SAP for AIRNET, biota, ground water, storm water, stream, and NPDES monitoring. Several example pieces of field equipment are listed below Table 2-4.

Table 2-4 Instrument Calibration Information

Field Equipment	Calibration Procedures
HACH Sension5/YSI Conductivity Meter Model 30 T-L-CYSI Probe Model 3050	This meter and probe can only be recalibrated at the factory. Check against two or more other meters and probes or compare to a 1,000-µmhos/cm standard (conductivity) or circulating ice bath (temperature) before each sample season to determine accuracy
Thermo/Orion Model SA 230/290pH/ISE Meter (used as a backup)	This meter auto calibrates. If an error condition is indicated, refer to manual to correct. If correction cannot be made, meter must be returned to the manufacturer. To

Field Equipment	Calibration Procedures
	calibrate pH probe, see instructions given under below.
Thermo/Orion Ross pH Electrode (used as a backup)	Perform two-buffer calibration daily; use pH 7 and pH 10 buffers when readings are expected to be near or above pH 7, and use pH 7 and pH 4 buffers if samples are expected to be below pH 7. Carefully follow the directions in the probe manual. Do not turn meter off between measurements. The meter must always be recalibrated after replacement of batteries
Thermo/Orion Gel-Filled Combination pH Electrode (used as a backup)	Perform two-buffer calibration every two hours; use pH 7 and pH 10 buffers when readings are expected to be near or above pH 7; if samples are expected to be below pH 7, use pH 7 and pH 4 buffers. Carefully follow the directions in the probe manual. Do not turn meter off between measurements; if batteries must be replaced, the meter must always be recalibrated
HACH® Turbidimeter Model 2100P	Check the turbidity of the Gelex secondary standard closest to the expected range daily. If the reading varies by more than ±5 percent, recalibrate with primary formazin standards. Instrument must be recalibrated with primary formazin standards every three months or after battery replacement if calibration is lost. Refer to manual for formazin-standard preparation. After calibration, read each of the Gelex secondary standards in the kit and mark the lids with the proper reading. These secondary standards must always be re-read after formazin calibration of the meter
HACH® Pocket Colorimeter	The instrument is factory calibrated and is ready for use. Test the accuracy of the meter by using a chlorine voluette ampoule standard solution at least once a quarter. Refer to the manual for proper procedures. If there are any discrepancies, contact the manufacturer.
ISCO® Automatic Sampler	When in use, check periodically to assure that the aliquot bottles, pumps are in working order, sample and bubble tube are free of debris, the battery has enough power to run the next sample cycle, each aliquot is filling properly and that a new aliquot is automatically collected at the lapsed time selected, replace pump tubing as needed.

2.3.5 Contract Laboratory Calibration Requirements

All contract laboratory instruments and equipment are calibrated prior to each batch using manufacturer's recommended procedures and the guidelines provided in the *Handbook for Analytical Quality Control* (USEPA 1979) and their laboratory specific QAPP's and SOPs.

Class-S or better weights are used in calibrating analytical balances. Specific-ion electrodes are calibrated with appropriate standard solutions. Spectrophotometric and turbidimetric instruments are calibrated with appropriate standard solutions and spectral devices. Heating and cooling devices are calibrated with a National Institute of Standards and Technology certified thermometer. Automated instruments are calibrated by generating at least a seven-point standard curve and a blank with each new batch of samples and checked with a standard concentration every tenth sample.

2.3.6 Inspection/Acceptance of Supplies and Consumables

All supplies and consumables upon receipt will be verified with shipping/receiving documents, purchase orders and invoices to verify quantity ordered equals quantity received. Incorrect quantity shipments will be reported to the purchasing agent, quality assurance officer and site staff manager for resolution with the supplier. Incorrect items will be evaluated by receiving entity for suitability of use.

2.3.7 Non-direct Measurements

Existing data from entities such as DOE, other Departmental Bureaus, and other Agencies can been evaluated and considered. Computer databases, spreadsheets, programs and literature files are used whenever they meet Oversight Bureau inspection and QA analysis.

3.0 Assessment and Oversight

3.1 Quality System Assessment and Response Actions

Oversight Bureau field sampling and measurement techniques are continually undergoing review and modification. It is envisioned that all Oversight Bureau procedures will continue to evolve and be refined. Techniques will never be considered "final," but will always be examined for possible improvements. The findings of procedural evaluations should be shared and discussed with other Oversight Bureau field personnel, Project Leaders, and Staff Managers. Decisions will be made by Project Leaders and Staff Managers, with input from field staff, whether to continue with existing methods and techniques, switch to new methods and techniques or to use combinations of both.

Procedural changes in SOP/SAP documents may be made by staff during the field season with concurrence of the appropriate Staff Manager and Project Leaders. When the need arises all required changes will be documented through an SOP or SAP revision. Above all else, the collection of high-quality data is the most important consideration. All techniques and procedures used must be consistent with or yield results equal to or better than those techniques and procedures listed in or referenced by 40 CFR 136, the EPA publication for SW-846 methods, entitled *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, or those methods published by EPA Office of Research and Development or Office of Water.

At the end of each field season QA results are validated by the Oversight Bureau Project Lead to determine variability and data usability. Problem areas will be identified through this process and

the QA Project Manager, the contract laboratory coordinator, and appropriate Project Leaders will work to take corrective actions. Since analytical methods are continuously becoming more sensitive, this communication process is vital and must be on-going.

It is important that all Oversight Bureau technical staff communicate throughout the entire survey process, from initial planning to final report publication. Various Oversight Bureau field personnel will accompany Project Leaders on sampling trips to ensure standardization of procedures among staff. At the beginning of each field sampling season, the Santa Fe office will ensure that the field offices are following standard procedures described in the SOP and project SAPs. Additional standardization efforts between the four offices will be made if procedures change significantly or if needed for some other reason. Staff from other offices and Santa Fe should conduct fieldwork together whenever possible. Strict adherence to operating procedures described in the SOPs and/or SAPs will ensure data collected by all four offices will be of comparable quality.

3.2 Reports to Management

The Project Leader is responsible for keeping the Staff Manager, Bureau Chief, and QA Project Manager informed concerning the progress and problems or anomalies encountered during a project. The Staff Manager and Project Leaders prepare reports summarizing the status of all outstanding projects. These reports are distributed to the Bureau Chief, other sections and Bureaus in the NMED, the public, USEPA Region 6 and DOE. Any QA problem noted by the Oversight Bureau staff during the year will be conveyed to the QA Project Manager. Oversight Bureau technical personnel, QA Project Manager and the Bureau Chief will determine corrective actions to be taken. Any adopted changes will be subsequently reflected as changes to this QAPP.

Project reports will be prepared for most environmental surveys or projects completed by Oversight Bureau. The findings of these reports may eventually be incorporated into an NMED publication such as the Integrated §303(d)/§305(b) biennial report to Congress. Upon request, these project reports will also be posted in the "Library" and on the NMED Oversight Bureau web page at: http://www.nmenv.state.nm.us/DOE_oversight, and copies are sent to interested state and federal agencies and members of the public.

4.0 QA Activities following Data Phase Completion

4.1 Data Validation and Usability

Data validation is the process whereby data are determined to be useable or non-useable because of acceptable or unacceptable quality based on a set of predefined criteria. These criteria, normally identified in a DQO process, depend upon the type(s) of data involved and the purpose for which the data are collected. Following validation, the data are flagged with codes indicating what, if any, quality issues are present and what the effect is on the detect status of the data. The Oversight Bureau's data validation progression is very similar to what is used by many agencies including LANL:

- Data Verification
- Data Validation
- Validation Check
- Data Upload into DOE OB Database

Validation goes above and beyond the data review done by the analytical laboratory to improve data quality. Validation highlights quality issues. For example, if the analytical laboratory reports blank contamination and poor recoveries, the validation translates that information for the user. The verification process generally considers that:

- Hard copy is considered the legally valid copy
- Hard copy data and electronic data are compared line by line
- Hard copy and electronic results must match or data package fails verification
- Verification of all analytical results occurs (60% - 100%, as directed by the QA Officer)

Validation reviews issues the analytical laboratory cannot, such as results of field QA/QC samples. Validation review is not biased toward the analytical laboratory, NMED or DOE.

Requirements and criteria used by the DOE OB to validate the data are described in the Functional Guidelines for Data Review (EPA guidance "*Data Usability in Superfund Site Assessment and the Hazard Ranking System*" and "*USEPA Contract Laboratory Program National Functional Guidelines For Low Concentration Organic Data Review* (EPA-540-R-00-006, 6/2001)", "*USEPA Contract Laboratory Program National Functional Guidelines For Organic Data Review* (EPA-540-R-99-008, PB99-963506, 10/1999)", and "*USEPA Contract Laboratory Program National Functional Guidelines For Inorganic Data Review* (EPA-540-R-99-008, PB99-963506, 02/1994)").

Project Leaders will carefully review (verify) all environmental data received from the laboratories using their best professional judgment and knowledge of site and media background conditions and facility operations. Any anomalous results will be reported to the appropriate section at the contract laboratory for a full review of the QA results of the relevant run, consisting of spikes, duplicates, and concentration standards used to verify standard curves. The Project Leader may request that the sample be rerun or that a second sample be collected. The Project Leader will note and initial the results of this contact on the QA checklist (Appendix A).

For surveys including water quality, the type of qualifier attached to certain data indicates how that data should be used in an assessment. For example, most of the laboratory qualifiers for both inorganic chemical data and organic chemical data indicate uncertainty in the reported concentration of the chemical, but not in its assigned identity. Therefore, these data may be used just as positive data with no qualifiers or codes. In general, data with qualifiers that indicate uncertainties in concentrations but not in identification may be used for assessments. All qualified data are considered unusable for compliance monitoring.

4.2 Data Review, Verification, and Validation

4.2.1 Validation and Verification Methods

Statistical criteria used by the contract laboratories for validating and expressing the variability of analytical results are the standard deviation, coefficient of variation, range, 95-percent confidence limits and control charts. Outliers are analytical results that fall outside of the limits of the control chart appropriate for the analysis being performed. If such a result is obtained, the analysis is "out of control." Immediate action is then taken by the contract laboratory to determine the cause of the outlying result. The analyses are repeated after corrective action has been taken. Microsoft Excel® and other statistical packages are used to calculate test results, generate calibration curves, perform precision and accuracy determinations, and update control charts.

The QA checklist serves as the data validation summary for data collected under the Oversight Bureau's sampling program. Errors in electronic files received from the laboratories will be addressed as described in Appendix B and will be summarized on the "Result Verification Form" (Appendix A), which should be attached to the QA checklist and included in the survey file. This form serves as a record for the Project Manager, who will resolve any data quality issues with the contract laboratory. All correspondence should be documented and included in the project file.

4.2.2 Quality Assurance Criteria

An example of the Oversight Bureau's data validation process, conducted for water quality data collected under the water quality surveys, is presented in Appendix B, "Quality Assurance Criteria."

4.2.3 Reconciliation with User Requirements

DOE OB Project Leaders using their best professional judgment, knowledge of environmental chemistry, facility operations and site history will carefully review environmental data received from NMED's contract laboratories. Any anomalous results will be reported to the appropriate section at contract laboratory for a full review of the QA results of the relevant run, consisting of spikes, duplicates, and concentration standards used to verify standard curves. The Project Leader may request that the sample be rerun or that a second sample be collected. The Project Leader will note and initial the results of this contact on the QA checklist (Appendix A).

Water quality surveys necessitate that the type of qualifier attached to certain data indicates how that data should be used in an assessment. For example, most of the laboratory qualifiers for both inorganic chemical data and organic chemical data indicate uncertainty in the reported concentration of the chemical, but not in its assigned identity. Therefore, these data may be used just as positive data with no qualifiers or codes. In general, data with qualifiers that indicate uncertainties in concentrations but not identification may be used for assessments. All qualified data are considered unusable for compliance monitoring unless they do not meet their holding times. Table 4-1 lists the data qualifiers used by the Bureau.

Note: EPA Method 1631 for mercury (in addition to EPA Methods 1632, 1636, 1637, 1638, 1639, 1640) requires the collection of field blanks and the rejection of results for regulatory compliance purposes if contamination is demonstrated. If a permit requires the use of this method, such results would be qualified and considered unusable.

When any Oversight Bureau data do not comply with applicable QA requirements, the details of the limitations will be discussed in the assessment or inspection report. Oversight Bureau water quality data not complying with applicable QA requirements will not be used for comparison with existing standards or regulatory limits etc., for example NPDES permit limits, or for development of NPDES permit limits for new or reissued permits.

Table 4-1 DOE Oversight Bureau Data Validation Codes

LAB QUAL CODE	LAB QUALIFIER DESCRIPTION
UJ	(Inorganic) - The material was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise. (Organic) -The material was analyzed for, but was not detected. Quantitation limit is an estimated quantity.
BE	Low surrogate recovery; analyzed twice
BN	Ignites but does not sustain ignition
E	(Inorganic) Paragon- Reported value is estimated because of the presence of interference. GEL- Percent difference between the parent sample and its serial dilution's concentration exceeds 10%. (Organic) - Analyte concentration exceeded the upper level of detection.
UN	(Inorganic) - Compound was analyzed for, but was not detected. - Spiked sample recovery not within control limits.
UN*	(Inorganic) - Compound was analyzed for, but was not detected. - Spiked sample recovery not within control limits. - Duplicate Analysis not within control limits.
J*	(Inorganic) -The associated numerical value is an estimated quantity. - Duplicate Analysis not within control limits.
*	(Inorganic)- Duplicate analysis not within control limits. (Organic) - Spike recovery is equal to or outside the control criteria used. STL - Surrogate recovery is outside stated control limits.
+	(Inorganic) GEL- Correlation coefficient the Method of Standard Addition (MSA) is less than 0.095. Paragon- no meaning (Organic) - Duplicate Analysis (relative percent difference) not within control limits.
B	(Inorganic) - reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL) but greater than or equal to the Instrument Detection Limit (IDL). (Organic) - Analyte present in the blank and the sample.
J	(Inorganic) -The associated numerical value is an estimated quantity. (Organic) - The associated numerical value is an estimated quantity.
LAB QUAL CODE	**LAB QUALIFIER DESCRIPTION**
N	(Inorganic) - Spiked sample recovery not within control limits. (Organic) -Presumptive evidence based on a mass spectral library search to make a tentative identification of the analyte.

NJ	(Organic) -Analyte has been tentatively identified and the associated numerical value is estimated based upon 1:1 response factor to the nearest eluting internal standard
R	(Inorganic) -The data are not useable. (Organic) -The data are unusable (compound may or may not be present.) Re-sampling and reanalysis is necessary for verification.
U	(Inorganic) -The material was analyzed for, but was not detected above the level of the associated numeric value. The associated numerical value is either the sample quantitation limit or the sample detection limit. (Organic) -The material was analyzed for, but was not detected.
P	(Organic) - > 25% difference for detected concentrations between two columns. (Paragon) - LCS recovery within control limits.
JB	(Inorganic)-The associated numeric value is an estimated quantity. The reported value was obtained from a reading that was less the Contract Required Detection Limit.
EB	(Organic)--Analyte concentration exceeded the upper level of calibration range of the instrument. Analyte present in the blank and the sample.
U*	(Inorganic) - Compound was analyzed for, but was not detected. Duplicate analysis not within control limits.
D	(Organic) - Analytes analyzed at a secondary dilution. NMSSL - Spike recovery < 80% or > 120%.
JD	(Organic) - Estimated value. Analytes analyzed at a secondary dilution.
UE	(Inorganic) - Compound was analyzed for, but was not detected. Reported value is estimated because of the presence of interference.
B*N	(Inorganic) - Reported value < CRDL and > IDL. Duplicate Analysis not within control limits. Spiked sample recovery not within control limits.
N*	(Inorganic) - Spiked sample recovery not within control limits. Duplicate analysis not within control limits.
**	(Inorganic) and (Organic) GEL- Laboratory Control Sample recovery outside of acceptance limit.
B*	(Inorganic) - reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL) but greater than or equal to the Instrument Detection Limit (IDL). (Inorganic)- Duplicate analysis not within control limits.
JP	(Organic) - The associated numerical value is an estimated quantity. > 25% difference for detected concentrations between two columns.
X	Reported concentration is a false positive
BE*	(Inorganic) - Concatenation of B, E, and *.
BEN	(Inorganic) - Concatenation of B, E, and N.
EN	(Inorganic) - Concatenation of E and N.
UEN	(Inorganic) - Concatenation of U, E, and N.
Q	(Severn Trent) - Elevated reporting limit. The reporting limit is elevated due to high analyte levels.
LT	(Paragon) - Result is less than requested MDC and greater than sample specific MDC.
SQ	(Paragon) - Spectral interference prevents accurate quantitation.
LAB QUAL CODE	**LAB QUALIFIER DESCRIPTION**
Y2	(Paragon) - Chemical yield outside default limits
K	AXYS - Peak detected but did not meet quantification criteria
C	AXYS - Co-eluting congener. NMSSL - Spike recovery between 80% and 120%.

H	NMSSL - Sample analyzed in duplicate. GEL - Analytical holding time exceeded.
h	GEL- Sample preparation or preservation holding time exceeded.
UI	Denotes uncertain identification for gamma spectroscopy
NC	(Paragon) - RPD Not Calculated

4.3 Reporting and Data Repository (DOE OB Data Base)

Environmental programs that manage the collection and acquisition of data require safe, secure and useable data storage that meets acceptable DOE OB criteria for completeness (see 2.3.2 General Quantitative Analysis). Useable data is stored in the Oversight Bureau's database at each site office and is available for the compilation and submittal of project or activity reports. Project reports are a requirement under the Agreement. A report may be a simple table listing chemical data for an activity or a detailed summary from a major finding or study. The SAP indicates the type and detail of the project and/or activity summary report. Under the Bureau's Public Outreach task, all AIP reports, detailed findings, interpretations, independent- and joint-studies may eventually be incorporated into an NMED publication that will be posted in the "Library" and on the NMED Oversight Bureau web page at: http://www.nmenv.state.nm.us/DOE_oversight. Publications and Reports are also sent to interested state and federal agencies and members of the public.

Safe and secure useable environmental data is a high priority of the Oversight Bureau. In 2002, the Oversight Bureau and its contract laboratories began the electronic transfer of chemical analysis data through an electronic data deliverable (EDD). The database manager enters electronically transferred data from an EDD into the Bureau's environmental database for permanent storage. Each DOE OB site office (SNL, LANL & WIPP) has or is developing a permanent database for this purpose. All information stored in the DOE OB database may be retrieved by the database manager for individual project use or as a compilation for public submittals. Data reported in hardcopy form is entered into the database under the supervision of the project leader or database manager. Contract laboratories are now required to follow a specified format for the EDD to ensure accurate and rapid loading of electronic data into the DOE OB database. The format is presented in Table 4-2. Data reported to the Bureau in hardcopy are manually entered into an Excel® template for short-term assessment.

Samples are submitted to Oversight Bureau's contract laboratories along with a Request ID (RID) and supporting location and date/time information. Electronic data deliverables are sent from the contract laboratories by e-mail to the Oversight Bureau database manager or project leader. The analytical data are uploaded to the Oversight Bureau database using the RID to match data to the appropriate sample event**.**

Table 4-2 Format Of Electronic Data Deliverables (All Laboratories)

Station ID	Sample Request ID	Sample Date	Sample Time	Analysis Date	Analysis Time	Procedure Code	Analyte	Result	Units	Lab Qualifier Codes	Lab Number	Less Than	ML	MDL
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)

Notes:

(a) Oversight Bureau unique sample location ID (specific to location)
(b) Oversight Bureau unique analysis/location ID (specific to both chemical group and location)
(c) Date sample was collected
(d) Time sample was collected
(e) Date sample was analyzed
(f) Time sample was analyzed
(g) Analytical method
(h) Analyte name
(i) Concentration value
(j) Concentration units
(k) Qualifier codes pertaining to QA/QC problems encountered during laboratory analysis
(l) Laboratory sample number
(m) If result is less than the minimum quantitation limit (ML), TRUE; if result is greater than ML, FALSE
(n) Minimum quantitation limit as defined by USEPA (2003). Value is 10 times the same standard deviation used to calculate the MDL (or 3.18 times the MDL)
(o) Minimum Detection Limit

4.4 RACER Database and Data Analysis Tool

Beginning in 2006, all environmental data in the DOE OB database concerning Los Alamos National Laboratory was systematically copied into the RACER Database and Data Analysis Tool for permanent storage and use by the public. RACER stands for Risk Analysis, Communication, Evaluation, and Reduction.

The RACER project was implemented in 2003 to provide a process to enhance Los Alamos National Laboratory's (LANL) ability to effectively manage and reduce health risks and ecological impacts. Implementation of the RACER process has required working closely with members of the community, New Mexico Pueblos, New Mexico Environment Department (NMED), and LANL to create a process that could provide information to regulators, LANL, and the community about the chemicals and radioactive materials in the environment at and around LANL.

The project is carried out independent of LANL and the DOE by Colorado State University who has subcontracted the technical work to Risk Assessment Corporation (RAC) (www.racteam.com) and has subcontracted with the New Mexico Community Foundation to serve as the "process steward". The project was turned over to the New Mexico Community Foundation in October 2008 for long-term management.

LANL has stated its commitment to this process and to working closely with all interested parties by adopting a policy to continually reduce potential impacts to human health and the environment from operations and cleanup and remediation activities.

LANL provides weekly updates of its environmental measurement data to the Data Analysis Tool. These updates include newly collected data and any necessary updates to data already provided to RACER. NMED also provides updates of its measurement data, although on a less frequent basis because of their less extensive sampling efforts.

4.4.1 RACER Project Highlights

- First time measurement data are presented in a uniform way from both Los Alamos National Laboratory and the New Mexico Environment Department. It contains approximately 6 million analytical results

- RACER public data access project consists of a set of tools, including:
    - A central database containing LANL, NMED, and possibly other environmental data
    - A web-based, publicly accessible means of viewing the data
    - Rapid updates (as often as weekly)
    - RACER is about data transparency; the public has access to the data used in environmental decisions at LANL

- RACER Online Data Analysis Tool (DAT)
    - Designed to interact with the RACER measurement database and allows a user to select, evaluate, and analyze LANL data via comparisons or trends; help available at the site data
    - At www.racernm.com; can be accessed by anyone
    - Data can be selected by collecting organization (e.g. LANL, NMED), media types (e.g., soil, groundwater, sediment), and analytes (e.g., chromium, arsenic, tritium)
    - Data may be exported in Excel format for additional analysis
    - Analyte concentrations may be compared to LANL background values and state and federal standards
    - Sample locations, detections, and comparisons to standards and screening values may be mapped

- Provides computer tools to help people understand these data and the potential human health risks associated with exposure to chemicals and radionuclides released from LANL

- Provides a mechanism for the community around LANL to give feedback and advice on risk reduction at LANL

- Has been developed independently of LANL but with input from LANL, NMED, San Ildefonso Pueblo, EPA, and members of the community

- RACER will save substantial money and resources by organizing key data and

automating typical site assessment and data evaluation tasks

5.0 References

American Public Health Association, American Water Works Association, and Water Environment Federation 1998: *Standard Methods for the Examination of Water and Wastewater*, 20th ed. (1998).

Barbour et al. 1999: M. T. Barbour, J. Gerritsen, B. D. Snyder, and J. B. Stribling, *Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish*, 2nd ed. Office of Water report EPA 841/B-99/002, Washington, D.C. (1999).

Bennett et al. 2001: K. J. Bennett, J. Biggs, P. R. Fresquez, and H. T. Haagenstad, "DARHT facility small mammal baseline report for radionuclides (1997–1999),", in: Baseline concentrations of radionuclides and trace elements in soil, sediment, vegetation, small mammals, birds, and bees around the DARHT facility: construction phase (1996 through 1999), Los Alamos National Laboratory report LA-13808-MS (2001), pp. 41–50.

Blake et al. 1995: W. D. Blake, F. Goff, A. I. Adams, and D. Counce, "Environmental Geochemistry for Surface and Subsurface Waters in the Pajarito Plateau and Outlying Areas, New Mexico," Los Alamos National Laboratory report LA-12912-MS (May 1995).

Corely et al. 1981: J. P. Corely, D. H. Denham, R. E. Jaquish, D. E. Michels, A. R. Olsen, and D. A. Waite, "A Guide for Environmental Radiological Surveillance at US Department of Energy Installations," US Department of Energy report DOE/EP-0023 (1981).

DOE 1991: "Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance," US Department of Energy report DOE/EH-0173T (January 1991).

DOE 1993: "Radiation Protection of the Public and the Environment," US Department of Energy Order 5400.5 (1993).

DOE 1999: "Site-Wide Environmental Impact Statement For Continued Operation of the Los Alamos National Laboratory," US Department of Energy report DOE/EIS-0238 (January 1999).

DOE 2002: "A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota," US Department of Energy Standard DOE-STD-1153-2002 (July 2002).

DOE 2003: "Strategy for evaluation of surface water quality relative to DOE Order 5400.5," US Department of Energy memorandum from R. J. Borders, Albuquerque Operations Office, to G.

Turner, Los Alamos Site Office (January 9, 2003).

Eisenbud and Gesell 1997: M. Eisenbud and T. Gesell, *Environmental Radioactivity from Natural, Industrial, and Military Sources*, 4th ed. (Academic Press, San Diego, California, 1997).

Emelity 1996: L. A. Emelity, "A History of Radioactive Liquid Waste Management at Los Alamos," Los Alamos National Laboratory document LA-UR-96-1283 (1996).

EPA 1989: US Environmental Protection Agency, "National Emission Standards for Emissions of Radionuclides other than Radon from Department of Energy Facilities," *Code of Federal Regulations*, Title 40, Part 61, Subpart H (December 15, 1989).

EPA 1996: US Environmental Protection Agency, "PCBs: Cancer Dose-Response Assessment and Application to Environmental Mixtures", National Center for Environmental Assessment, Office of Research and Development report EPA/600/P-96/001F, Washington, D.C. (1999).

EPA 2001: US Environmental Protection Agency, "EPA Requirements for Quality Assurance Project Plans," Office of Environmental Information report EPA QA/R-5, EPA/240/B-01/003, Washington, D.C. (March 2001).

EPA 2006: US Environmental Protection Agency Office of Water, "National Recommended Water Quality Criteria," (2006) http://www.epa.gov/waterscience/criteria/wqctable.

EPA 2007: US Environmental Protection Agency Region 6, "EPA Region 6 Human Health Medium-Specific Screening Levels," (December 2007) http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm.

ERSP 2006: Environmental Remediation and Surveillance Program, "Interim Measures Work Plan for Chromium Contamination in Groundwater," Los Alamos National Laboratory report LA-UR-06-1961 (March 2006).

ESP 1981: Environmental Surveillance Program, "Radiological Survey of the Site of a Former Radioactive Liquid Waste Treatment Plant (TA-45) and the Effluent Receiving Areas of Acid, Pueblo, and Los Alamos Canyons, Los Alamos, New Mexico, Final Report," Los Alamos National Laboratory report LA-8890-ENV/US Department of Energy report DOE/EV-0005/30 (May 1981).

FDA 2000: Food and Drug Administration, "Action Levels for Poisonous or Deleterious Substance in Human Food and Animal Feed," Washington, D.C. (2000).

Fetter 1993: C. W. Fetter, *Contaminant Hydrology* (Macmillan Publishing Co., New York, 1993), p. 334.

Fresquez 2007: P. R. Fresquez, "Soil Monitoring," pp. 233-249 in: Environmental Surveillance at Los Alamos during 2006, Los Alamos National Laboratory report LA-14341-ENV (2007).

Fresquez and Gonzales 2004: P. R. Fresquez and G. J. Gonzales, "Radionuclide Concentrations in Vegetation at the Los Alamos National Laboratory in 2002/2003," Los Alamos National Laboratory report LA-14160-PR (2004).

Fresquez and Lopez 2004: P. R. Fresquez and E. Lopez, "Radionuclide Concentrations in Soils and Vegetation at Low-Level Radioactive Waste Disposal Area G during the 2004 Growing Season," Los Alamos National Laboratory report LA-14181-PR (2004).

Fresquez et al. 1996: P. R. Fresquez, D. R. Armstrong, and M. A. Mullen, "Radionuclides and Radioactivity in Soils Collected from within and around Los Alamos National Laboratory, 1974 through 1994: Concentrations, Trends, and Dose Comparisons," Los Alamos National Laboratory report LA-13149-MS (1996).

Fresquez et al. 2001: P. R. Fresquez, J. W. Nyhan, and H. T. Haagenstad, "Baseline Concentrations of Radionuclides and Trace Elements in Soils, Sediments, and Vegetation Around the DARHT Facility," in Nyhan et al., "Baseline Concentrations of Radionuclides and Trace Elements in Soils, Sediments, Vegetation, Small Mammals, Birds, and Bees Around the DARHT Facility: Construction Phase (1996 through 1999)," Los Alamos National Laboratory report LA-13808-MS (2001), pp. 48–76.

Fresquez et al. 2003: P. R. Fresquez, L. Vasquez-Tator, and E. A. Lopez, "Tritium Concentrations in Vegetation as a Function of Distance from a Low-Level Waste Site at Los Alamos National Laboratory," Los Alamos National Laboratory report LA-14091-MS (2003).

Fresquez et al. 2005: P. R. Fresquez, M. W. McNaughton, and M. J. Winch, "Radionuclide Concentrations in Soils and Vegetation at Low-Level Radioactive Waste Disposal Area G during 2005," Los Alamos National Laboratory report LA-14251-PR (2005).

Fresquez et al. 2006: P. R. Fresquez, G. J. Gonzales, M. McNaughton, C. Hathcock, and G. Vigil, "Foodstuffs and Biota Monitoring," pp. 213-230, In: Environmental Surveillance at Los Alamos during 2005, Los Alamos National Laboratory report LA-14304-ENV (2006).

Fresquez et al. 2007a: P. R. Fresquez, C. Hathcock, and D. Keller, "Foodstuffs and Biota Monitoring,", in: Environmental Surveillance at Los Alamos during 2006, Los Alamos National Laboratory report LA-14341-ENV (2007), pp. 253-266.

Fresquez et al. 2007b: P. R. Fresquez, J. K. Ferenbaugh, and L. Naranjo, Jr., "Moisture Conversion Ratios for the Foodstuffs and (Biota) Biota Environmental Surveillance Programs at Los Alamos National Laboratory, Revision 3," Los Alamos National Laboratory document LA-

UR-07-0280 (2007).

Gallaher 2007: B. M. Gallaher, "Watershed Monitoring," in Environmental Surveillance at Los Alamos During 2006, Los Alamos National Laboratory report LA-14341, pp. 195-230 (September 2007).

Gallaher and Efurd 2002: B. M. Gallaher and D. W. Efurd, "Plutonium and Uranium from Los Alamos National Laboratory in Sediments of the Northern Rio Grande Valley," Los Alamos National Laboratory report LA-13974 (August 2002).

Gallaher and Koch 2004: B. M. Gallaher and R. J. Koch, "Cerro Grande Fire Impacts to Water Quality and Stream Flow near Los Alamos National Laboratory: Results of Four Years of Monitoring," Los Alamos National Laboratory report LA-14177 (September 2004).

Gilbert 1987: R. O. Gilbert, *Statistical Methods for Environmental Pollution Monitoring*, (Van Nostrand Reinhold, New York, 1987), 320 pp.

Gough et al. 1979: L. P. Gough, H. T. Shacklette, and A. A. Case, "Element Concentrations Toxic to Plants, Animals, and Man," Geological Survey Bulletin 1466 (US Government Printing Office, Washington, D.C. 1979).

Graf 1996: W. L. Graf, "Transport and Deposition of Plutonium-Contaminated Sediments by Fluvial Processes, Los Alamos Canyon, New Mexico," *Geological Society of America Bulletin*, v. 108, no. 10, p. 1342-1355 (October 1996).

Hem 1986: J. D. Hem, "Study and Interpretation of the Chemical Characteristics of Natural Water," US Geological Survey Water-Supply Paper 2254 (1986).

Keith 1991: L. H. Keith, *Environmental Sampling and Analysis: A Practical Guide* (CRC Press, Inc., Baca Raton, FL, 1991).

Langmuir 1997: D. Langmuir, "Aqueous Environmental Geochemistry," (Prentice Hall, Inc., Upper Saddle River, NJ, 1997), ISBN 0-02-367412-1.

LANL 1996: Water Quality and Hydrology Group, "Groundwater Protection Management Program Plan, Rev. 0.0," Los Alamos National Laboratory document LA-UR-02-1667 (January 1996).

LANL 1998: Water Quality and Hydrology Group, "Hydrogeologic Workplan," Final Version, Los Alamos National Laboratory (May 1998).

LANL 2005a: "Derivation and Use of Radionuclide Screening Action Levels, Revision 1," Los Alamos National Laboratory report LA-UR-05-1849 (May 2005).

LANL 2005b: "Los Alamos and Pueblo Canyons Supplemental Investigation Report," Los Alamos National Laboratory report LA-UR-05-9230 (December 2005).

LANL 2006a: "Interim Facility-Wide Groundwater Monitoring Plan, Revision 1, Final Version," Los Alamos National Laboratory document LA-UR-06-2888, ER2006-0195 (April 2006).

LANL 2006b: "Interim Measures Investigation Report for Chromium Contamination in Groundwater," Los Alamos National Laboratory report LA-UR-06-8372 (November 2006).

LANL 2006c: "Mortandad Canyon Investigation Report," Los Alamos National Laboratory report LA-UR-06-6752 (October 2006).

LANL 2007a: "2007 General Facility Information," Los Alamos National Laboratory report LA-UR-07-1839, EP2007-0183 (March 2007).

LANL 2007b: "2007 Interim Facility-Wide Groundwater Monitoring Plan," Los Alamos National Laboratory document LA-UR-07-3271, ER2007-0277 (May 2007).

LANL 2007c: "Fate and Transport Modeling Report for Chromium Contamination from Sandia Canyon," Los Alamos National Laboratory report LA-UR-07-6018 (September 2007).

LANL 2007d: "Technical Approach for Calculating Recreational Soil Screening Levels for Chemicals," Los Alamos National Laboratory report LA-UR-06-8826 (January 2007).

LANL 2007e: "Summary of Pajarito Canyon Phase 2 Sediment Investigations," Los Alamos National Laboratory report LA-UR-07-1497 (March 2007).

LANL 2007f: "Summary of Sandia Canyon Phase 1 Sediment Investigations," Los Alamos National Laboratory report LA-UR-07-6019 (September 2007).

LANL 2008: "Interim Measure Work Plan to Mitigate Contaminated Sediment Transport in Los Alamos and Pueblo Canyons," Los Alamos National Laboratory report LA-UR-08-1071 (February 2008).

LANL 2009: "The Groundwater Data Cycle," Los Alamos National Laboratory Unclassified report LA-UR-09-00170 (January 2009).

Longmire et al. 1996: P. A. Longmire, S. L. Reneau, P. M. Watt, L. D. McFadden, J. N. Gardner, C. J. Duffy, and R. T. Ryti, "Natural Background Geochemistry, Geomorphology, and Pedogenesis of Selected Soil Profiles and Bandelier Tuff, Los Alamos, New Mexico," Los Alamos National Laboratory report LA-12913-MS (May 1996).

Malmon et al. 2004: D. V. Malmon, S. L. Reneau, and T. Dunne. 2004, "Sediment Sorting and Transport by Flash Floods," *Journal of Geophysical Research – Earth Surface*, v. 109, F02005, doi:10.1029/2003JF000067 (2004).

McDonald et al. 2003: E. V. McDonald, R. T. Ryti, S. L. Reneau, and D. Carlson, "Natural Background Geochemistry of Sediments, Los Alamos National Laboratory," Los Alamos National Laboratory reportLA-UR-03-2661 (May 2003).

McLin 2004: S. G. McLin, "Background Radioactivity in Sediments near Los Alamos, New Mexico," *Science of the Total Environment* 328: 143-159 (2004).

McLin and Lyons 2002: S. G. McLin and D. W. Lyons, "Background Radioactivity in River and Reservoir Sediments near Los Alamos, New Mexico," Los Alamos National Laboratory report LA-13603-MS (May 2002).

McNaughton 2005: M. McNaughton, "Biota Dose Assessment at LANL," Los Alamos National Laboratory report LA-UR-05-4699 (June 2005).

McNaughton 2006: M. McNaughton, "Calculating Dose to Non-Human Biota," ENV-MAQ-514, R1 (2006).

McNaughton et al. 2000: M. W. McNaughton, D. H. Kraig, and J. C. Lochamy, "Siting of Environmental Direct-Penetrating-Radiation Dosimeters," Los Alamos National Laboratory document LA-UR-00-1168 (2000).

NCRP 1975: "Natural Background Radiation in the United States," National Council on Radiation Protection and Measurements report 45 (November 1975).

NCRP 1976: "Structural shielding and evaluation for medical use of x-rays and gamma rays of energies up to 10 MeV, recommendations of the National Council on Radiation Protection and Measurements," National Council on Radiation Protection and Measurements report 49 (1976).

NCRP 1987a: "Ionizing radiation exposure of the population of the United States," National Council on Radiation Protection and Measurements report 93 (September 1987).

NCRP 1987b: "Exposure of the United States and Cañada from Natural Background Radiation," National Council on Radiation Protection and Measurements report 94 (December 1987).

NIH 2005: National Institute of Health, Office of Dietary Supplements, "Dietary Supplement Fact Sheet: Chromium," (2005) http://ods.od.nih.gov/factsheets/chromium.asp.

NMED 2004: New Mexico Environment Department, "State of New Mexico Surface Water Quality Bureau Standard Operating Procedures for Sample Collection and Handling," (April

2004).

NMED 2006a: New Mexico Environment Department, "Technical Background Document for Development of Soil Screening Levels, Rev. 4.0," (2006).

NMED 2006b: New Mexico Environment Department, "State of New Mexico Procedures for Assessing Standards Attainment for Section §303(d)/§305(b) Water Quality Monitoring and Assessment Report: Assessment Protocol," (January 2006) http://www.nmenv.state.nm.us/swqb/protocols/AssessmentProtocol.pdf.

NMED 2006c: New Mexico Environment Department, "Technical Background Document for Development of Soil Screening Levels, Revision 4.0," (June 2006) ftp://ftp.nmenv.state.nm.us/hwbdocs/HWB/guidance_docs/NMED_June_2006_SSG.pdf.

NMWQCC 1978: New Mexico Water Quality Control Commission: "New Mexico Water Quality Act," New Mexico Statutes Annotated (1978).

NMWQCC 2002: New Mexico Water Quality Control Commission, "Ground and Surface Water Protection," 20.6.2 NMAC (September 15, 2002).

NMWQCC 2003: New Mexico Water Quality Control Commission, "State of New Mexico Statewide Water Quality Management Plan, Work Element 10: Determination of Compliance with Water Quality Standards for the Protection of Human Health Criteria" (2003).

NMWQCC 2006: New Mexico Water Quality Control Commission, "2006-2008 State of New Mexico Integrated Clean Water Act 303(d)/305(b) Report" (2006) http://www.nmenv.state.nm.us/swqb/303d-305b/2006-2008/.

NMWQCC 2006: New Mexico Water Quality Control Commission, "State of New Mexico Standards for Interstate and Intrastate Surface Waters," 20.6.4 NMAC, (February 16, 2006).

Nyhan et al. 2001: J. W. Nyhan, P. R. Fresquez, K. D. Bennett, J. R. Biggs, T. K. Haarmann, D. C. Keller, and H. T. Haagenstad, "Baseline Concentrations of Radionuclides and Trace Elements in Soils, Sediments, Vegetation, Small Mammals, Birds, and Bees around the DARHT Facility: Construction Phase (1996 through 1999)," Los Alamos National Laboratory report LA-13808-MS (2001).

Purtymun and Stoker 1987: W. D. Purtymun and A. K. Stoker, "Environmental Status of Technical Area 49, Los Alamos, New Mexico," Los Alamos National Laboratory report LA-11135-MS (November 1987).

Purtymun et al. 1980: W. D. Purtymun, R. J. Peters, and J. W. Owens, "Geohydrology of White Rock Canyon from Otowi to Frijoles Canyon," Los Alamos Scientific Laboratory report LA-

8635-MS (December 1980).

Reneau et al. 1998: S. Reneau, R. Ryti, M. Tardiff, and J. Linn, "Evaluation of Sediment Contamination in Lower Los Alamos Canyon," Los Alamos National Laboratory report LA-UR-98-3975 (September 1998).

Reneau et al. 2002: S. Reneau, T. Benson, and R. Ryti, "Interim Action Completion Report for the South Fork of Acid Canyon," Los Alamos National Laboratory report LA-UR-02-5785 (September 2002).

Rishel et al. 2003: J. Rishel, S. Johnson, D. Holt, B. Olsen, and M. Coronado, "Meteorological Monitoring at Los Alamos," Los Alamos National Laboratory document LA-UR-03-8097 (2003).

Romero and Fresquez 2007: D. D. Romero and P. R. Fresquez, "Baseline Radionuclide and Nonradionuclide Concentrations in Soils, Vegetation, and Small Mammals at the Proposed Expansion Area at TA-54 Area G," Los Alamos National Laboratory report LA-14354 (2007).

Ryti et al. 1998: R. T. Ryti, P. A. Longmire, D. E. Broxton, S. L. Reneau, and E. V. McDonald, "Inorganic and Radionuclide Background Data for Soils, Canyon Sediments, and Bandelier Tuff at Los Alamos National Laboratory," Los Alamos National Laboratory report LA-UR-98-4847 (September 1998).

Sather et al. 2001: P. J. Sather, M. G. Ikonomou, R. F. Addison, T. He, P. S. Ross, and B. Fowler, "Similarity of an Aroclor-Based and Full Congener-Based Method in Determining Total PCBs and a Modeling Approach to Estimate Aroclor Speciation from Congener-Specific PCB data," Environmental Science and Technology, 35:4874-4880 (2001).

Van den Berg et al. 2006: M. Van den Berg, L. S. Birnbaum, M. Denison, M. De Vito, W. Farland, M. Feeley, H. Fiedler, H. Hakansson, A. Hanberg, L. Haws, M. Rose, S. Safe, D. Schrenk, C. Tohyama, A. Tritscher, J. Tuomisto, M. Tysklind, N. Walker and R.E. Peterson, "The 2005 World Health Organization Reevaluation of Human and Mammalian Toxic Equivalency Factor for Dioxins and Dioxin-Like Compounds, Toxicological Sciences 93(2):223-241 (2006).

Veenis et al. 2007: S. J. Veenis, C. H. Smith, S. L. McMichael, S. R. Loftin, L. Gullapalli, and S. Duren, "Storm Water Pollution Prevention Plan for SWMUs and AOCs and Storm Water Monitoring Plan, Annual Update -- 2007," Los Alamos National Laboratory document LA-UR-07-1789 (March 2007).

Appendix A. Forms

A.1. Example, Quality Assurance Checklist, DOE Oversight Bureau

Study Name_____

Date(s) of Sampling Event(s)_____

Study Lead_____

Checklist of Items Reviewed

1. *Presence of Identical Records or Possible Outliers-Export data:* *Sort records by parameter, location, date ads result; Scan through data (conduct qualitative review) for identical records and potential outliers. If value appears to be an outlier, conduct the Q-test in accordance with QAPP Provide database manager with list of identical records (i.e .same RID, analyte, date/time result)*

   ☐ Action Required ☐ No Action Required

2. *Field Duplicates within Control Limits*-Following this sequence of events in the DOE/OB database will produce the relative percent difference (RPD) report for field duplicates: From the opening screen, "Review Data," "Select Study," "Reports to Evaluate Data Quality," "Duplicate comparison."

   ☐ Action Required ☐ No Action Required

3. *Total Metals versus Dissolved Metals*- Following this sequence of events in the Oversight Bureau database will produce the RPD between total and dissolved results when dissolved is greater than total: From the opening screen, Review Data," "Select Study," "Reports to Evaluate Data Quality, " "Diss-Tot Metals Comparison"

   ☐ Action Required ☐ No Action Required

QUALITY ASSURANCE SUMMARY:

Based on the quality assurance review, data for the above samples are:
☐ Acceptable for use
☐ Acceptable as qualified
☐ Unacceptable for use

Is action required on any QA items? ☐ Yes ☐ No
Explain:

Initial QA Reviewer (Study Lead):_____Date:_____

Database Editor:_____Date:_____

QA Project Manager Reviewer_____Date_____

A.2. Example, Result Verification Form, DOE Oversight Bureau

This form is a request by the DOE Oversight Bureau for verification of analytical results by Oversight Bureau's *contract laboratories for the environmental samples listed below*.

STUDY NAME:

DATE(S) OF SAMPLING EVENT(S):

STUDY LEAD:

Request Date:

Requested By:

Station ID	RID	Problem	Action*	Database Corrected**	Initials**
				☐	
				☐	
				☐	
				☐	
				☐	
				☐	
				☐	
				☐	
				☐	
				☐	
				☐	
				☐	
				☐	
				☐	
				☐	
				☐	
				☐	
				☐	

Additional Comments:

To be completed by DOE/OB Contract Laboratory
** To be completed by Oversight Bureau Database Manager

A 3. Example, Sample Chain of Custody Form (COC), DOE Oversight Bureau

Laboratory Used: Paragon Analytics, Inc. | **Chain of Custody** | **Date:** | **Page:__1__ of__1___**

PAI Project Manager: Lance Steere

ANALYSIS REQUEST

Laboratory Address:
Paragon Analytics, Inc.
225 Commerce Drive
Fort Collins, Colorado 80524
(800) 443-1511 Fax (970) 490-1522

Authorized by/ Attn: Project leader
CLIENT: NMED DOE OB
ADDRESS: 2905 Rodeo park Drive East, Building 1
CITY: Santa Fe; STATE: New Mexico; ZIP: 87505
(505) 428-2560 Fax (505)428-2567

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Suspended Sediment Concentration (Line # 90-$40)	Total TAL Metals plus total U (Line Item 34b)	Acid digestion for total metals (ICP) (Line Item 40)	Dissolved TAL Metals plus total U (Line Item 34b)[1]	Acid digestion for total metals (ICP) (Line Item 40)	Total Gross Alpha/Beta (Line Item 133)	Isotopic Americium (Line Item 110)	Isotopic Plutonium (Line Item 112)	Isotopic Uranium (Line Item 113)	Strontium 89/90 (Line Item 137)	Total[See note 7] Gamma Spec Low Level (Line Item 129a)	$1,275.00	NUMBER OF CONTAINERS	
					40	200	15	200	15	55	165	155	155	170	105			Project Cost
					$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00			$0.00

PROJECT INFORMATION	SAMPLE RECEIPT		SAMPLES SENT TO:	RELINQUISED BY: 2
PROJECT #:	Total Number of Containers	0		Signature:
PROJ. NAME:	Chain of Custody Seals			
QC LEVEL: STD. IV	Received Intact?			Printed Name:
QC REQUIRED: MS MSD BLANK	Received Good Cond./Cold			
TAT: STANDARD	LAB NUMBER:			RECEIVED BY: 2
DUE DATE:	NOTES			Signature:
RUSH SURCHARGE:				
CLIENT DISCOUNT:				Printed Name:
SPECIAL CERTIFICATION REQUIRED: YES NO				Company:

A.4. Example, Sampling Stations Form (Water Programs)

DOE Oversight Sampling Stations Form

Use this form to add new sample stations to the DOE Oversight database.
(print out and fill in or click inside boxes to enter data)

Required items:

Waterbody Segment (Assessment Unit):

Station Description: (Location, access, Etc.)

Required Location Data:

Latitude: **(31 to 37 degrees)**

Longitude: **(–103 to 109 degrees):**

Elevation (Feet):

Location Datum: **(Check one)**

☐ **NAD 83** ☐ **WGS 84**

☐ **NAD 27** ☐ **Other**

☐ **UnKnown**

Location Method: **(Check one)**

☐ **G1-(GPS)** ☐ **-(Interpolation Map)** ☐ **UN-(Unknown)** ☐ OT-(Other)

Additional Information: **(Optional)**

Old Sampling stations ID: **Watershed Size (square miles):**

Driving Directions:

Site Rationale:

New Sample Station ID:

(This ID will be assigned by the database administrator. After the station has been entered in the database this form will be returned to you with this ID field filled in. Please use this ID in all future references to this station.)

Appendix B. Quality Assurance Criteria

Note: For Laboratory Specific QAPP(s), see Laboratory web sites (Table B9-1 Analytical Lab Contractors) or Oversight Bureau's QAPP Library)

LIST OF ABBREVIATIONS

AMU	Atomic Mass Unit
CFR	Code of Federal Regulations
DOE	Department of Energy
GC/MS	Gas Chromatography/Mass Spectrometry
ICP-MS	Inductively Couple Plasma-Mass Spectrometry
IDL	Instrument Detection Limit
LC	Liquid Chromatology
MDL	Method Detection Limit
mg/L	Milligrams per Liter
ML	Minimum Quantitation Level
pCi/L	Picocuries per Liter
pCi/µg	Picocuries per microgram
QA	Quality Assurance
QAPO	Quality Assurance Project Officer
QAPP	Quality Assurance Project Plan
QC	Quality Control
RPD	Relative Percent Difference
SWQB	Surface Water Quality Bureau
USEPA	U.S. Environmental Protection Agency
VOC	Volatile Organic Compound
µg/mg	Micrograms per Milligram

B1.0. Introduction

This Appendix provides a set of criteria that comprises the means by which data generated by various analytical and field methods are deemed acceptable for reporting. Laboratory performance is evaluated through analysis of holding times, calibration procedures, blanks, and laboratory duplicates and spikes. The level of quality associated with field procedures is evaluated through analysis of field replicate samples (i.e., split samples) and blanks.

B2.0. Documentation Procedures

All data results for environmental sampling are documented by the Oversight Bureau's contract laboratories and kept on file for 10 years. Results of the Oversight Bureau's data validation process are documented through a Quality Assurance (QA) checklist and report.

The Oversight Bureau's contract laboratories have developed a QA program designed to control and monitor the quality of data generated. In addition, this appendix describes a data validation process to evaluate the quality of data used for assessment purposes and for the Oversight Bureau's contract laboratories database upload. When quality control (QC) deficiencies are identified through the data review process, Oversight Bureau's contract laboratories document the deficiencies by assigning data qualifiers to sample results.

B3.0. Analytical Methods and Quantitation Limits

All methods of sample collection, preservation, and analysis used in determining analytical results for environmental media as a part of this QAPP, shall be in accordance with the following test procedures:

(1) "Guidelines establishing test procedures for the analysis of pollutants under the Clean Water Act," 40 CFR Part 136 or any test procedure approved or accepted by EPA using procedures provided in 40 CFR Parts 136.3(d), 136.4, and 136.5.

(2) *Standard Methods for the Examination of Water and Wastewater*, latest edition, American Public Health Association,

(3) *Methods for Chemical Analysis of Water and Waste*, and other methods published by EPA Office of Research and Development or Office of Water,

(4) *Techniques of Water Resource Investigations* of the U.S. Geological Survey,

(5) Annual *Book of ASTM Standards*. Volumes 11.01 and 11.02, Water (1) and (II), latest edition, ASTM International,

(6) Federal Register, latest methods published for monitoring pursuant to Resource Conservation and Recovery Act regulations,

(7) *National Handbook of Recommended Methods for Water-Data Acquisition*, latest edition, prepared cooperatively by agencies of the United States Government under the sponsorship of the U.S. Geological Survey,

(8) Federal Register, latest methods published for monitoring pursuant to the Safe Drinking Water Act regulations, and/or

(9) Other recognized scientific journals or organizations that describe performance based, defensible, new and currently evolving analytical techniques.

Note (Water Programs): In order to determine an exceedance of the water quality criterion for gross alpha, the value reported by Oversight Bureau's contract laboratories for "gross alpha (U natural reference)" is used. If the result exceeds the applicable criterion (15 picocuries per liter [pCi/L]), total uranium is subtracted from the total result for gross alpha. To do this, the reported total uranium value (if mass spectrometry is used) must first be converted to pCi/L. If the value is reported in µg/L, the value must be multiplied by 0.67 picocuries per microgram (pCi/µg) to convert from µg/L to pCi/L. If the value is reported in mg/L, the value must be multiplied by 0.67 pCi/µg and 1,000 micrograms per milligram (µg /mg) to convert from milligrams per liter (mg/L) to pCi/L. If uranium alpha spectrometry is used, sum the values for U-234, U-235, and U-238. If there is data available on any source, special, or byproduct material then this should be also subtracted from the adjusted gross alpha value.

MDL Determination:

The minimum detection level (MDL) used for environmental media monitoring and compliance data is the concentration value that corresponds to an instrument signal/noise ratio in the range of 2.5 to 5, the concentration equivalent of three times the standard deviation of replicate instrumental measurements of the analyte in reagent water, that region of the standard curve where there is a significant change in sensitivity (i.e., a break in the slope of the standard curve), or the instrumental limitations.

If the measurements indicate the sample is in the correct range, the MDL is computed as follows:

$$MDL = t_{(n-1,1-\alpha=0.99)}$$

where,

$t_{(n-1,\ 1-a\ =\ 0.95)}$ = the students' t-value appropriate for a 99 percent confidence level and a standard

deviation estimate with n-1 degrees of freedom (corresponds to 3.143 for seven replicates)

The quantitation limit used for environmental media monitoring and compliance data is the minimum level of quantitation (ML), which is defined by USEPA (2003) as "*the lowest level at which the entire analytical system must give a recognizable signal and acceptable calibration point for the analyte*." The ML is considered a compliance evaluation threshold and is estimated as 10 times the same standard deviation of the seven replicates used to estimate the MDL, or 3.18 times the MDL. The ML is rounded to the whole number nearest to (1, 2, or 5) times 10^n where n is an integer (USEPA 2003).

Historical Note on MDL Determination: Thank Guinness Brewery for the student test method for determining MDLs:

- Guinness pioneered several quality control efforts
- In 1899 statistician and chemist William Sealy Gosset, pseudonym "Student" developed techniques for
  * Student's distribution
  * Student's t-test
- Brewery did not allow employees to publish their research
- Gossett was responsible for ensuring the similarity of batches of Guinness
  * t-test was developed to measure how closely the yeast content of a batch of beer corresponded to the brewery's standard
- T-test was designed to evaluate statistical differences for samples of 30 or less

MDC Determination:

The MDC is a conversion in radiometric measurements used to estimate the detection limit using a simple statistical analysis. Unless otherwise specified in documentation of specific analytical method, instrumentation software, or client requirements, the MDC shall be estimated as:

$$MDC = \frac{(4.65 \times \sigma_b) + 2.73}{T * K}$$

MDC = Minimum Detection Concentration

Σ_b = Standard deviation of the measurement background

T = Sample count time

K = Factor for incorporating efficiency, abundance, aliquot yield, in-growth and decay, and activity conversion factors.

B4.0. Holding Times

Oversight Bureau's contract laboratories for environmental media monitoring and compliance data not meeting required holding times specified in 40 CFR 136 or other USEPA or DOE accepted methods (Table B.1), will still be entered. Extreme violations of holding times may result in the rejection of analytical results based on professional judgment. Holding times are evaluated at the time of laboratory analysis. Samples that were analyzed outside the prescribed holding time may be assessed as estimates.

B5.0. Quality Control Criteria

The following subsections describe the criteria examined by the Oversight Bureau's contract laboratories to control and monitor the quality of monitoring and compliance data generated under the Oversight Bureau's environmental monitoring programs.

B5.1. Field Replicates

QA replicates (i.e., split samples) for all chemical and microbiological parameters are collected at one or more of the normal sampling sites at the frequencies specified in Table B.2. Replicate samples are submitted to Oversight Bureau's contract laboratories as blind samples (i.e., the location and other information given on the label does not reveal that the sample is a replicate). The analytical results of replicate sampling are entered into the Oversight Bureau's in-house database and identified as QA replicates.

The relative percent difference (RPD) between field replicate results is estimated to quantify the level of precision associated with the entire sample collection and measurement process. Field duplicates should not be used as a measure of laboratory performance. A comparison of the RPD between replicates is conducted during the data validation process. After validation is completed, qualifiers are assigned to the data points that are outside control limits. To the data user, qualifiers indicate that the analyte concentrations may be unusable or estimated because of QC deficiencies that reduce confidence in the results. If precision is poor (i.e., outside control limits), positive results are qualified as estimated (i.e., assigned a validation code of, which indicates the results are estimated based on RPDs outside control limits).

Control limits on replicate RPDs are based on information from published references such as: U.S. Fish and Wildlife Service, Patuxent Analytical Control Facility, Laurel, Maryland and are presented in Table B.3.

B5.2. Dissolved Metals Results Greater than Totals(Water Programs)

Relative percent differences between dissolved metals concentrations greater than the associated total metals concentrations are calculated in Step 2d of the data validation process described here.

The control limits for RPDs are based on limits defined by USGS (1996) to identify chemicals that do not vary appreciably in concentration. The control limit for dissolved metals results greater than total results is 20 percent if the concentrations are both greater than 10 times the method detection limit. If either concentration is less than 10 times the method detection limit, the control limit is 50 percent (USGS 1996).

B5.3. Field Equipment, and Trip Blanks

The use of blanks is an important part of the continuing effort to improve the quality of the resultant data by improving the collection techniques. Table B.2 lists the collection frequencies for routine ambient water quality samples. A blank is a water sample that is intended to be free of the analytes of interest. Blank samples are analyzed to test for contamination of environmental samples by the analytes of interest during any stage of sample collection, processing, and analysis. A field blank is prepared in the field and used to demonstrate that: Equipment has been adequately cleaned to remove any pre-existing contamination, and Sample collection and processing have not resulted in contamination.

In addition, because the field blank is treated like an environmental sample at the laboratory, it includes potential contamination introduced during laboratory handling and analysis. To prepare a field blank, an aliquot of reagent water is placed in a clean sample container during the field trip. Field blanks are treated as regular samples in all respects, including contact with the sampling devices and exposure to sampling-station conditions, storage, preservation and filtration, if applicable. The purpose of these blanks is to determine if any of these conditions or processes have caused sample contamination, and, if so, to what extent.

Equipment blanks are a subset of field blanks used to demonstrate that sample-collection and sample-processing equipment are not introducing contamination. Equipment blanks can be prepared using individual pieces of collection and processing equipment. Typically, equipment blanks are only prepared to assure non-contamination of samples during the filtration process.

A trip blank is a sample of analyte-free water that is prepared in the laboratory. It is transported, unopened, to the field with other sample containers and is shipped to the laboratory for analysis with the collected samples. Trip blanks are used to identify contamination that might occur during sample transport and analysis rather than because of sample collection and processing in the field. Trip blanks are normally prepared only for volatile organic chemicals (VOCs).

An analysis of blank data is conducted during the data validation process. After validation is completed, qualifiers are assigned to the data points that may have been contaminated. To the data user, qualifiers indicate that chemicals were detected in the associated blank, and the concentrations in the sample may be potentially contaminated. If a chemical is detected in a blank sample, analytical results (for the same chemical(s) detected in the blank) from the monitoring samples collected during the same sample event as the contaminated blank, will be

assigned a validation code.

B5.4. Laboratory Matrix Spike and Matrix Spike Duplicate

A matrix spike, also known as a spike, is the addition of an aliquot of method analyte(s) of known concentration to a solution. The results are used to assess the analysts' ability to spike samples, to evaluate any loss of method analyte(s) through the digestion procedure and assess any matrix effect on the quantitated analyte. The spike is added to both a volume of reagent water and carried through the entire digestion process (called a Reagent Blank Spike), and to a control solution which has a concentration of method analytes at or near the detection limit (called the Low Control Spike or Laboratory Fortified Blank). Control limits on the matrix spike and matrix spike duplicate are provided in Table B.4.

B5.5. Surrogate and Internal Standards

Surrogates and internal standards are compounds that have properties similar to the target analyte(s) that a particular analytical method is designed to identify and measure. The compounds are not expected to be present in an environmental field sample and should not interfere with the identification or quantification of the target analytes. They are added to each sample aliquot in known amounts before extraction and are measured with the same procedures used to measure other sample components. By demonstrating that the compounds can be recovered from the sample matrix with reasonable efficiency, they perform a QC function on the ability of the laboratory to execute the analytical method with reasonable proficiency. If the compound is not recovered, an analyte of concern also may not be recovered. The Air & Heavy Metals Sections of Oversight Bureau's contract laboratories uses internal standards to monitor method performance, while the Organic Chemistry Sections of Oversight Bureau's contract laboratories uses surrogate spikes.

The Organic Chemistry Sections at the Oversight Bureau's contract laboratories uses surrogates to measure extraction efficiency. The compound(s) is spiked into the sample before the extraction, and then measured in the resulting extract to evaluate the robustness (efficiency) and/or the analyst competency of the extraction procedure. Samples with surrogate recoveries outside control limits are never adjusted to compensate for the poor recovery. The control limits on surrogate recoveries are presented in Table B.5.

In the Air & Heavy Metals Sections of Oversight Bureau's contract laboratories, five to six elements are added to each sample that undergoes Inductively Couple Plasma-Mass Spectrometry (ICP-MS) analysis immediately before analysis. If a sample is digested, the internal standards are not added until sometime after the digestion. The instrument software uses the internal standard recoveries to adjust the analyte concentrations as the internal standards change (if they change). The purpose is to compensate analyte values for instrument drift over time and/or difficult matrices. Several analytes are "grouped" to a given internal standard,

according to mass. The internal standards cover the entire mass spectrum (6-210 atomic mass units [AMU]).

According to USEPA Method 200.8, data that have internal standard recoveries greater than 125% or less than 60% are not usable (Table B.5). When this happens, the only course of action is to dilute the sample. When the analyte is positively detected at the dilution, it has no practical effect on the sample. That is, the value and the dilution factor are reported with no qualifier. When the analyte is less than detection limit, the detection limit is multiplied by the dilution factor and the results are assigned a data qualifier.

B5.6. Laboratory Method Blank

A reagent blank consists of a sample of laboratory prepared water treated with an appropriate amount of one of the preservatives used during the sampling effort. Reagent blanks assure non-contamination of samples by preservatives. In the absence of a suspected contamination event, one reagent blank per preservative type per sampling effort is adequate. If contamination is suspected to have occurred, e.g. blowing dust, further reagent blanks may be prepared. Oversight Bureau's contract laboratory assigns a data qualifier to sample results with associated laboratory blank contamination.

B6.0. Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount expected under normal conditions. For example, data may become unusable due to laboratory error, holding time violations, or errors in field collection procedures (e.g., incorrect sample preservation). Completeness of Oversight Bureau project data will be determined by comparing all valid data obtained for a study with the number of results expected. To be considered complete, the data set must contain all QC check analyses verifying precision and accuracy for the analytical protocol. Completeness is then determined by the following formula:

$$\%\ Completeness = \frac{Number\ of\ Valid\ Measurements}{Total\ Number\ of\ Measurements\ Planned} \times 100$$

The QA Director at the Oversight Bureau's contract laboratories is responsible for establishing measurement criteria for precision and accuracy of the analytical procedures used in projects where water quality data are collected. Because seasonal variability is a concern in water quality monitoring programs, it is important that a complete analytical record be obtained during each study. Therefore, the measurement quality objective for completeness is set at 90 percent.

B7.0. Corrective Actions

There are various degrees of personnel involvement in corrective activities at the Oversight Bureau's contract laboratories, depending on the seriousness or potential consequences of the problem. These range from problems which affect only a single data batch, usually evidenced by daily QC/QA, to long term undetected problems which require more intervention by the supervisor of the section, the Chemistry Laboratory Chief, or QA Officer Project Manager (QAPM). A good measure of the efficiency of a lab's QC/QA program is how often problems require Bureau Chief or QAPM intervention, and this occurs infrequently at Oversight Bureau's contract laboratories.

At the Oversight Bureau's contract laboratories, most problems are detected early because of the high percentage of QC that is done for each sample, and the multiple reviewing and crosschecking that takes place in the labs. In addition to these procedures, blind sampling activities implemented by the QAPM aid in monitoring quality of daily lab data and early problem detection.

In the event that a QC/QA issue requires high-level action, communication is immediately set up between lab personnel, supervisor(s) involved, the Chemistry Laboratory Chief, the QAPM and any field personnel directly involved. These interactions generally take place at the regularly scheduled chemistry supervisor meetings, unless the urgency of the problem requires more immediate action. One instance, which requires upper level management intervention, is a missed proficiency. When this occurs, the QAPM, together with the supervisor of the section and the Chemistry Laboratory Chief investigate the problem to determine the cause. The results of the investigation and actions taken to remedy the problem are then documented and submitted to the QC Office.

B8.0. References

U.S. Environmental Protection Agency (USEPA). 2003. *Technical Support Document for the Assessment of Detection and Quantitation Approaches*. EPA-821-R-03-005. Office of Water, Washington, DC. February.

U.S. Geological Survey (USGS). 1996. *Quality Assurance Project Plan for the Data Collection Activities of the Sacramento River Metals Transport Study, Appendix 1*. Prepared by the USGS for the Sacramento Regional County Sanitation District. November.

B9.0. Table B9-1 Analytical Lab Contractors

Paragon Analytics	Diesel Range Organics,

225 Commerce Dr. Fort Collins, CO 80524 800.443.1511 970.490.1511 Lance Steere – Project Manager http://www.datachem.com/certifications.aspx	Metals, General Chemistry, Herbicides, High Explosives,Pesticides, PCBs, Radionuclides, Semivolatile Organic Compounds, Volatile Organic Compounds
Assaigai Analytical Laboratories 4301 Masthead NM Albuquerque, New Mexico 87109 505.345.7259 Contact: John Morris http://www.assaigai.com/Certifications.aspx	Diesel Range Organics, Metals, General Chemistry, Herbicides, High Explosives,Pesticides, PCBs, Radionuclides, Semivolatile Organic Compounds, Volatile Organic Compounds
Eberline Services 7021 Pan American Freeway NE Albuquerque, New Mexico 87109 505.761.5414 Contact: Karen Schoendaller http://www.eberlineservices.com/documents/LvLI-SOQ.pdf	Diesel Range Organics, Metals, General Chemistry, Herbicides, High Explosives,Pesticides, PCBs, Radionuclides, Semivolatile Organic Compounds, Volatile Organic Compounds
Transwest Geochem/Columbia Analytical Services, Inc. 3725 E. Atlanta Ave Phoenix, AZ 85040 602.437.0330 http://www.caslab.com/	Diesel Range Organics, Metals, General Chemistry, Herbicides, High Explosives,Pesticides, PCBs, Radionuclides, Semivolatile Organic Compounds, Volatile Organic Compounds
U.S. Geological Survey (USGS) US Department of Interior DFC BLDG 53 MS 414 Lakewood CO 80225 http://crustal.usgs.gov/projects/isotope-geochron/index.html	Analysis of water samples for dissolved noble gases including Ne, Ar, Kr, Xe, 4He, and 3He/4He ratio

AXYS Analytical Services Ltd. 2045 Mills Road W. Sidney BC Canada V8L 5X2 1 888 373 0881 Tel +1 (250) 655-5800 Fax +1 (250) 655-5811 askaxys@axysanalytical.com http://www.axysanalytical.com/about_us/facility/	Dioxin Furans and Conginer Method PCBs
University of Miami Tritium and Stable Isotope Laboratory http://www.rsmas.miami.edu/groups/tritium/	Low Level Tritium and Stable Isotopes
American Radiation Services Local: 225-381-2991, Toll Free: 800-401-4277 2609 North River Road, Port Allen, Louisiana 70767 http://www.amrad.com/	Screening Data - Radionuclides

Table B.1 Analytical Methods and Holding Times

Table B.2 Analytical Methods and Holding Times

Please see specific Laboratory QAPP in the DOE Oversight Bureau's QAPP Library for Analytical Methods and holding times.

Below is an example of what can be found.

Sample Type		Extraction/ Cleanup	Sample Holding Time	Analytical Method
Standard Laboratory Methods				
Surface Water[(1)]	Volatile Organics		14 days	**USEPA 8260B (1996)**: *Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)*
	Semivolatile Organics		7 days	**USEPA 8270D (1998)**: *Determination Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)*
	Pesticides/Herbicides/PCBs		14 days	**USEPA 508.1 (1995)**: *Determination of Chlorinated Pesticides, Herbicides, and Organohalides by Liquid-Solid Extraction and Electron Capture Gas Chromatography*;
			7 days	**USEPA 608 (current)**: *Organochlorine Pesticides and PCBs via GC with Electron Capture Detector (ECD)*;
			7 days	**USEPA 8081B (2000)**: *Analysis of Organochlorine Pesticides by GC-ECD*
	Polychlorinated Biphenyls		12 months	**USEPA 1668 Revision A (1999)** Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by HRGC/HRMS
	Dioxin/Furan		12 months	**USEPA 1613 (1994)**: *Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution HRGC/HRMS*
	Metals		6 months	**USEPA 200.7 (1994)**: *Determination of Metals and Trace Elements in Water and Wastes by Inductively Coupled Plasma-Atomic Emission Spectrometry*;
			6 months (Hg is not analyzed by ICP-MS)	**USEPA 200.8 (1994)**: *Determination of Trace Elements in Waters by Inductively Coupled Plasma - Mass Spectrometry*;
			6 months	**USEPA 202.1 (1978)**: *Aluminum (Atomic Absorption, Direct Aspiration)*;

Table B.2 Analytical Methods and Holding Times

Please see specific Laboratory QAPP in the DOE Oversight Bureau's QAPP Library for Analytical Methods and holding times.

Below is an example of what can be found.

Sample Type		Extraction/ Cleanup	Sample Holding Time	Analytical Method
Standard Laboratory Methods				
			6 months	**USEPA 206.2 (1978)**: *Arsenic (Atomic Absorption, Furnace Technique)*;
			6 months	**USEPA 213.2 (1978)**: *Cadmium (Atomic Absorption, Furnace Technique)*;
			6 months	**USEPA 220.1 (1978)**: *Copper (Atomic Absorption, Direct Aspiration)*;
			6 months	**USEPA 236.1 (1978)**: *Iron (Atomic Absorption, Direct Aspiration);*
			6 months	**USEPA 239.2 (1978)**: *Lead (Atomic Absorption, Furnace Technique)*;
			28 days	**USEPA 245.1 (1994)**: *Mercury (Manual Cold Vapor AA Technique)*;
			6 months	**USEPA 270.2 (1978)**: *Selenium (Atomic Absorption, Furnace Technique)*
	Major Ions/Nutrients		7 days	**USEPA 160.1 (1971)**: *Residue, Filterable (Gravimetric, Dried at 180 ^{o}C)*;
			7 days	**USEPA 160.2 (1971)**: *Residue, Non-Filterable (Gravimetric, Dried at 103-105 ^{o}C)*;
			48 Hours (NO_2-N, NO_3-N, Ortho-P)	**USEPA 300.0 (1993)**: *Determination of Inorganic Anions by Ion Chromatography*;
			14 days	**USEPA 310.1 (1978)**: *Alkalinity (Titrimetric, pH 4.5)*;
			28 days	**USEPA 340.2 (1974)**: *Fluoride (Potentiometric, Ion Selective Electrode)*;
			28 days	**USEPA 350.1 (1993)**: *Nitrogen, Ammonia (Colorimetric, Automated Phenate)*;

Table B.2 Analytical Methods and Holding Times

Please see specific Laboratory QAPP in the DOE Oversight Bureau's QAPP Library for Analytical Methods and holding times.

Below is an example of what can be found.

Sample Type		Extraction/ Cleanup	Sample Holding Time	Analytical Method
Standard Laboratory Methods				
			28 days	**USEPA 351.2 (1978)**: *Nitrogen, Kjeldahl Total (Colorimetric, Semi-Automated Block Digestor, AAII)*;
			28 Days (NO_2^- + NO_3^-); 48 hours (NO_2^-); 48 hours (NO_3^-)	**USEPA 353.2 (1993)**: *Nitrogen, Nitrate-Nitrite (Colorimetric, Automated, Cadmium Reduction)*;
			48 hours (ortho-P, dissolved)	**USEPA 365.1 (1993)**: *Phosphorus, All Forms (Colorimetric, Automated, Ascorbic Acid)*;
			28 days (total-P)	**USEPA 365.4 (1974)**: *Phosphorus, Total (Colorimetric, Automated, Block Digestor AA II)*;
			28 days	**USEPA 415.1 (1974)**: *Organic Carbon, Total (Combustion or Oxidation)*
	Cyanide, free		14 days	**SM 4500-CN F (20th Ed.)**:
	Radionuclides	N/A	Unspecified but taken to be 6 months	**USEPA 900 (1980)**: *Gross Alpha and Gross Beta Radioactivity in Drinking Water*;
		N/A	Half-life of the shortest nuclide of interest when possible; else ASAP up to 10 half-lives	**USEPA 901.1 (1980)**: *Gamma Emitting Radionuclides*;
	Radionuclides	Pyrosulfate fusion if turbid	Unspecified, but taken to be 6 months	**USEPA 903.1 (1980)**: *Radium-226 in Drinking Water (Radon Emanation Technique)*;
		Pyrosulfate fusion if turbid	Unspecified, but taken to be 6 months	**USEPA 904.0 (1980)**: *Radium 228 using Radiochemical Methodology*;
		Pyrosulfate fusion if turbid	Unspecified, but taken to be 6 months	Literature for U-234/8, Pu-238/9/40, and/or Am-241. **Lieberman, R. and A.A. Moghissi (1968)**, *Coprecipitation Technique for Alpha Spectroscopic Determination of Uranium, Thorium, and Plutonium*, Health Phy. 15, 359-362;
			NR	**Sill, C.W. (1969)**, *Separation and Radiochemical Determination of Uranium and the Transuranium*

Table B.2 Analytical Methods and Holding Times

Please see specific Laboratory QAPP in the DOE Oversight Bureau's QAPP Library for Analytical Methods and holding times.

Below is an example of what can be found.

Sample Type		Extraction/ Cleanup	Sample Holding Time	Analytical Method
Standard Laboratory Methods				
				Elements Using Barium Sulfate, Health Phy. 17, 89-107;
			NR	**Sill, C.W. (1974)**, *Purification of Radioactive Tracers for Use In High Sensitivity Alpha Spectrometry*, Anal. Chem. 46, 1426-1431;
			NR	**Sill, C.W. and R.L. Williams (1981)**, *Preparation of Actinides for Alpha Spectrometry without Electrodeposition*, Anal. Chem. 53, 412-415
			NR	**Talvitie, N.A. (1971)**, *Radiochemical Determination of Plutonium in Environmental and Biological Samples by Ion Exchange*, Anal. Chem., 43, 1827-1830.
	Perchlorate		28 days	**USEPA Method 314** Ion chromatography
			28 days	**USEPA 8321A Modified** LC/MS/MS
	Bacteria		8 hours	**USEPA 1103.1 (2000)**: *Test method for Escherichia coli and enterococci in water by the membrane-filter procedure*;
			8 hours	**SM 9222D (20th Ed.)**: *Membrane Filter Technique for Members of the Coliform Group*
	Pharmaceuticals		Extracted within 24 hours	(Modified) **Barber, L.B., Brown, G.K., and Zaugg, S.D., (2000)**, *Potential endocrine disrupting organic chemicals in treated municipal wastewater and river water*: In Analysis of Environmental Endocrine Disruptors; Keith, L.H., Jones-Lepp, T.L., and Needham, L.L., eds.; ACS Symposium Series 747; American Chemical Society: Washington D.C., p. 97-123.

Notes:

(1) This table provides analytical methods used by Oversight Bureau's contract laboratories for the analysis of surface water. Sediment samples are currently analyzed by Oversight Bureau's contract laboratories for organic compounds using USEPA Methods 8270 (semivolatile organics, with holding time of 14 days) and 608 (pesticides/herbicides with holding time of 7 days). Sediment samples are analyzed for radionuclides by pyrosulfate fusion, using a dissolution extraction (holding time is unspecified). Currently, Oversight Bureau's contract laboratories have not established methods for sediment analyses of nutrients.

N/A = Not applicable

NR = Not reported

Table B.3 Collection Frequencies for Routine Ambient Water Quality Samples

Constituent or Group	**Number of quality control samples per total number of environmental samples at all surface stations each year**			
	Field Blanks	**Trip Blanks**	**Equipment Blanks(1)**	**Replicates (splits)(2)**
Metals, dissolved	1 in 10 samples[1]	—	1 per trip	1 in 10 samples
Metals, total	—	—	—	1 in 10 samples
Anions/Cations	1 in 30 samples	—	—	1 in 10 samples
Nutrients	—	—	—	1 in 10 samples
Pesticides	—	—	—	1 in 20 samples
Volatile organic compounds	1 in 10 samples	1 in 20 samples	—	1 in 10 samples
Fecal coliform and *E. coli*	—	—	—	1 in 10 samples

(1) Equipment blanks should be subjected to the same conditions as the original sample.
(2) The principal investigator should choose sampling locations where the results are expected to be above the minimum quantitation limit; nondetect information will not provide the requisite information to estimate the magnitude of variation of the sample.

DEFINITIONS

- Field Blanks: evaluate sources of field contamination
- Equipment rinsate blanks: detect contamination in samples resulting from contaminated equipment
- Field duplicates or Replicates (splits): test ability to duplicate the sampling and analysis process
- Trip blanks: determine if sample integrity affected by sample bottles or sample handling & storage
- Temperature blanks: determine if samples have been adequately preserved to temperature of 4^0 C

Table B.4 Control Limits on Field Replicate RPDs

Analyte Concentration[1] **(multiples of method detection limit)**	**Maximum Acceptable RPD**[2]
0 - 2	200%
>2 - 10	20%
> 10	10%

Notes:

[1] If each result falls into a different category (i.e., one result is 2 times the MDL and one is 5 times the MDL), use the larger control limit.

[2] Control limits based on information from the U.S. Fish and Wildlife Service, Patuxent Analytical Control Facility, Laurel, Maryland.

Table B.5 Matrix Spike Recovery and Duplicate Control Limits

Table B.6 Matrix Spike Recovery and Duplicate Control Limits

Analytical Methods	Matrix Spike Compound	Recovery Control Limits for SW (%)	Duplicate Control Limits for SW (%)
Metals:			
USEPA 200.7	See USEPA method	100 ± 20%	10%
USEPA 200.8	See USEPA method	100 ± 20%	10%
USEPA 200.9	See USEPA method	100 ± 20%	10%
USEPA 202.1	See USEPA method	100 ± 20%	10%
USEPA 206.2	See USEPA method	100 ± 20%	10%
USEPA 213.2	See USEPA method	100 ± 20%	10%
USEPA 220.1	See USEPA method	100 ± 20%	10%
USEPA 236.1	See USEPA method	100 ± 20%	10%
USEPA 239.2	See USEPA method	100 ± 20%	10%
USEPA 245.1	See USEPA method	100 ± 20%	10%
USEPA 270.2	See USEPA method	100 ± 20%	10%
Major Ions/Nutrients:			
USEPA 160.1	See USEPA method	100 ± 20%	100 ± 30%(1)
USEPA 160.2	See USEPA method	100 ± 20%	
USEPA 300.0	See USEPA method	100 ± 20%	
USEPA 310.1	See USEPA method	100 ± 20%	
USEPA 340.2	See USEPA method	100 ± 20%	
USEPA 350.1	See USEPA method	100 ± 20%	
USEPA 351.2	See USEPA method	100 ± 20%	
USEPA 353.2	See USEPA method	100 ± 20%	
USEPA 365.1	See USEPA method	100 ± 20%	
USEPA 365.4	See USEPA method	100 ± 20%	
USEPA 415.1	See USEPA method	100 ± 20%	
SM 4500-CN-E	See USEPA method	100 ± 20%	
Volatile Organics:			
USEPA 8260	See USEPA method	100 ± 20%	20%
Semivolatile Organics:			
USEPA 8270	See USEPA method	± 2 SD	20%
Pesticides/Herbicides/PCBs:			
USEPA 508.1	See USEPA method	100 ± 30%	—(2)
USEPA 608	See USEPA method	Varies	30%
USEPA 8081A	See USEPA method	100 ± 30%(3)	30%

Table B.6 Matrix Spike Recovery and Duplicate Control Limits

Analytical Methods	Matrix Spike Compound	Recovery Control Limits for SW (%)	Duplicate Control Limits for SW (%)
N-methylcarbamoylozimes/ates:			
USEPA 531.1	See USEPA method	100 ± 30%	–[(2)]
Glyphosate:			
USEPA 547	See USEPA method	100 ± 30%	±30%
Radionuclides:			
USEPA 900	Gross α: Am-241 or U-nat Gross α: Sr/Y-90 or Cs-137 Both to pseudomatrix	+/- 3SD with warning for ± 2SD to ± 3SD ± 3SD with warning for ± 2SD to ± 3SD	± 3SD with warning for ± 2SD to ± 3SD ± 3SD with warning for ± 2SD to ± 3SD
USEPA 901.1	N/A	N/A	N/A
USEPA 903.1	Radium-226	20 %	15 %
USEPA 904.0	Radium-228	± 3SD with warning for ± 2SD to ± 3SD	± 3SD with warning for ± 2SD to ± 3SD
Pharmaceuticals			
(Modified) Barber et al. 2000		50 –130 %	

Notes:

[(1)] As a general rule, RPD control limits are not set values for these analytes.

[(2)] Precision assessment from batch to batch is not universal for the 500 methods. Four to five laboratory performance check (LPC) samples are analyzed annually in an initial demonstration of capability (IDC) study – the relative standard deviation (RSD) between duplicate samples must be 20% or less.

[(3)] From USEPA Method 8000B.

N/A = Not applicable

SW = Surface Water

SD = Standard deviation

USEPA = U.S. Environmental Protection Agency

Table B.7 Surrogate and Internal Standard Recovery Control Limits

Analytical Methods	Surrogate Compound	Recovery Control Limits for SW (%)
Metals:		
USEPA 200.7	N/A	N/A
USEPA 200.8	Li, Sc, Y, In, Tb, Bi	60 – 125%
USEPA 200.9	N/A	N/A
USEPA 202.1	N/A	N/A
USEPA 206.2	N/A	N/A
USEPA 213.2	N/A	N/A
USEPA 220.1	N/A	N/A
USEPA 236.1	N/A	N/A
USEPA 239.2	N/A	N/A
USEPA 245.1	N/A	N/A
USEPA 270.2	N/A	N/A
Volatile Organics:		
USEPA 8260	See USEPA method	100 ± 20%
Semivolatile Organics:		
USEPA 8270	Six compounds(1)	± 3 SD
Pesticides/Herbicides/PCBs:		
USEPA 508.1	See USEPA method	100 ± 20%
USEPA 608	See USEPA method	100 ± 20%
USEPA 8081B	See USEPA method	100 ± 20%
N-methylcarbamoylozimes/ates:		
USEPA 531.1	See USEPA method	100 ± 30 %
Glyphosate:		
USEPA 547	See USEPA method	100 ± 30 %
Pharmaceuticals		
(Modified) Barber et al. 2000	Three compounds	50 – 130 %

Notes:
N/A = Not applicable
PCB = Polychlorinated biphenyl
USEPA = U.S. Environmental Protection Agency
SD = Standard deviation
(1) USEPA recommends toluene-d_8, 4-bromofluorobenzene, 1,2-dichloroethane-d_4, and dibromofluoromethane

Table B.6 Sample Volumes, Containers, Preservation, and Hold times

Analytes	Amount required	Container type	Preservation	Hold time
Total Metals (except Hg) –Water	500 ml	Plastic	HNO-3 <2.0 pH, 4 ^{O} C	6 months
Dissolved Metals (except Hg) –Water	500 ml	Plastic	HNO-3 <2.0 pH, 4 ^{O} C	6 months
Mercury – Water	1 Liter	Plastic	HNO-3 <2.0 pH, 4 ^{O} C	28 days
Isotopic plutonium & Isotopic uranium – Water	1 liter	Plastic	HNO-3 <2.0 pH, 4 ^{O} C	6 months
Sr-90 – Water	1 liter	Plastic	HNO-3 <2.0 pH, 4 ^{O} C	6 months
Gross Alpha/Beta – Water	1 Liter	Plastic	4 ^{O} C HNO-3 <2.0 pH, 4 ^{O} C	6 months
Gamma Spec	1 liter	Plastic	HNO-3 <2.0 pH, 4 ^{O} C	6 months
SSC – Water	1 Liter	Plastic	4 ^{O} C	6 months
Isotopic plutonium - Suspended sediment	2 grams	Plastic	HNO-3 <2.0 pH, 4 ^{O} C	6 months
PCBs	2 Liters	Amber Glass	H2SO-4 >2.0 but < 3.0 pH, 4 ^{O} C	12 months
Dioxin/Furan	2 Liters	Amber Glass	If residual chlorine is present, add 80 mg sodium thiosulfate per liter of water. If sample pH is greater than 9, adjust to pH 7-9 with sulfuric acid, 4 ^{O} C	12 months

Figure B.1 Quality Assurance Data Validation Protocol (Page 1 of 2)

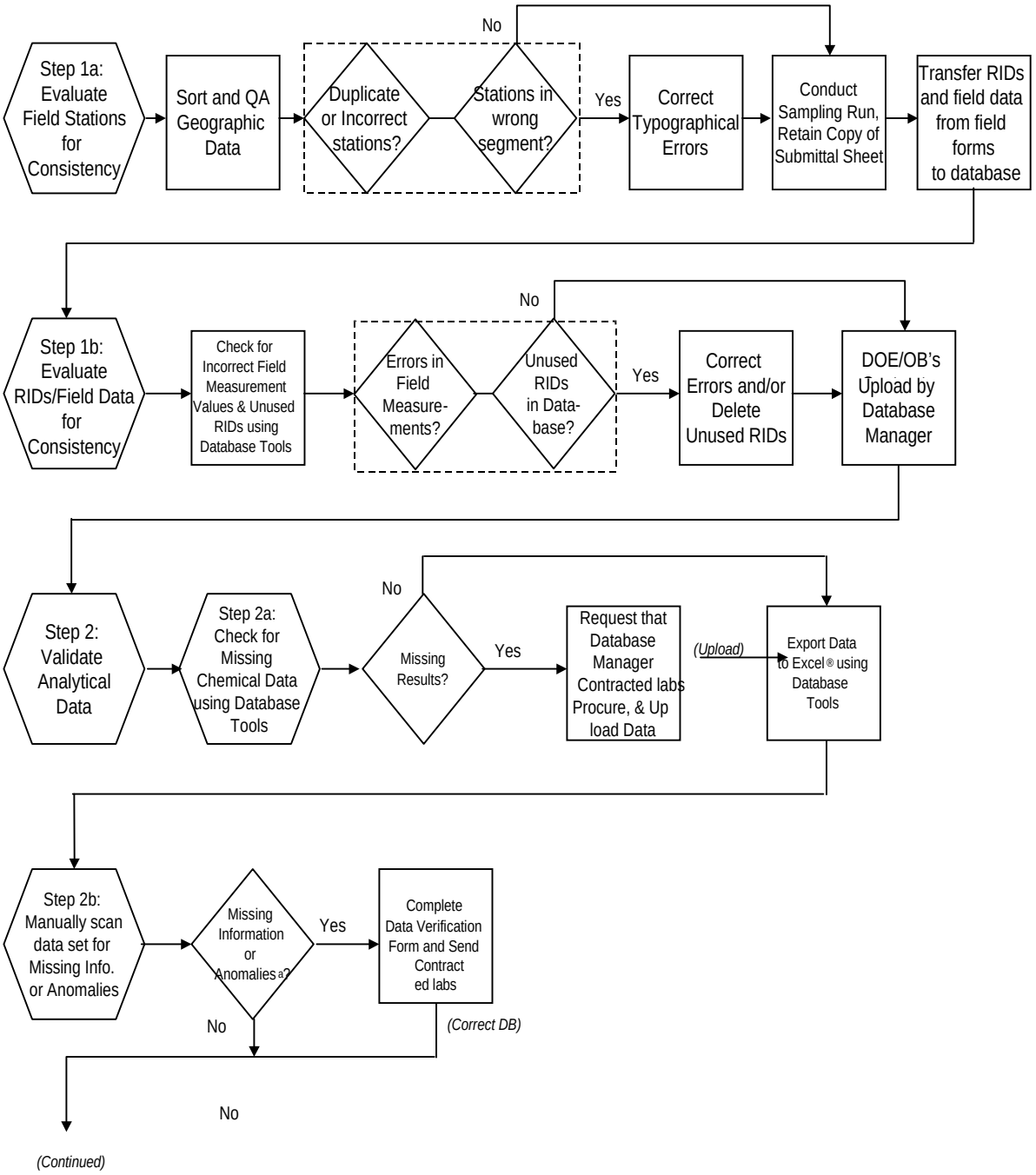
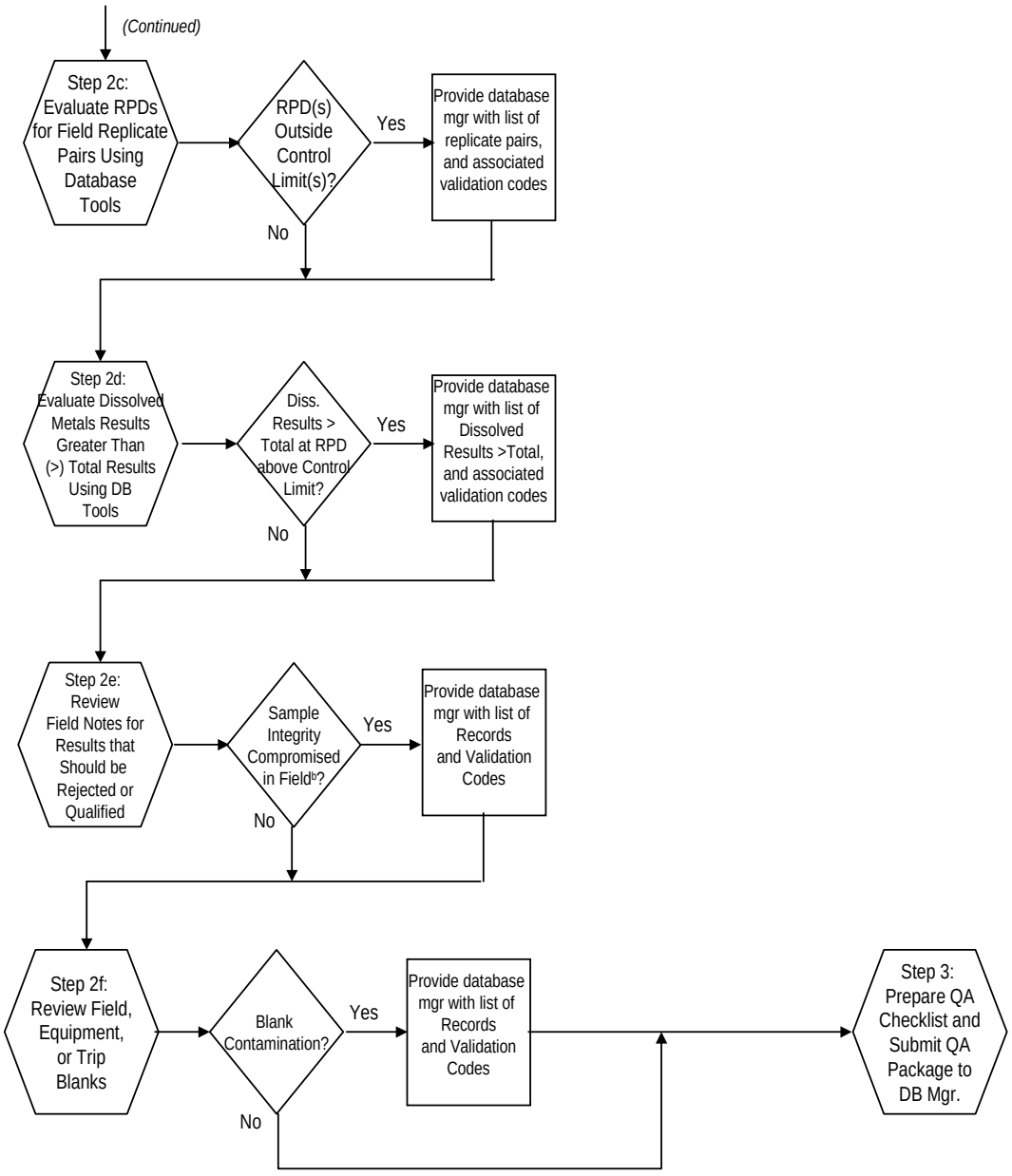


Figure B.1 Quality Assurance Data Validation Protocol (Page 2 of 2)



Notes:
[a]Missing information/anomalies may include missing detection limits, incorrect "less than" field, incorrect results, etc.
[b]Field notes may indicate that a sample was preserved improperly, or otherwise contaminated/altered. Data should be rejected if compromised
RID = Request identification
QA = Quality Assurance
CL = Control Limit
RPD = Relative Percent Difference
DB = Database
> = Greater than

Additional space available on this page

Appendix C. General Field Safety Manual

(Site Specific Health and Safety Plans need to be read and followed for specific sampling locations)

LIST OF ACRONYMS

CFR	Code of Federal Regulations
CPR	Cardiopulmonary Resuscitation
GSD	General Services Department
HIV	Human Immunodeficiency Virus
mph	Miles per Hour
MSDS	Material Safety Data Sheet
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
OSHA	Occupational Safety and Health Administration
PFD	Personal Floatation Device
DOE OB	DOE Oversight Bureau
Td	Tetanus-diphtheria
TSD	Transportation Services Division
USGS	U.S. Geological Survey

C1.0 Introduction

All New Mexico Environment Department (NMED) DOE Oversight Bureau employees are responsible for safety in the workplace, including performing fieldwork in a safe manner and reporting observed unsafe conditions to supervisors. It is therefore the responsibility of Project Leaders to ensure that the safety procedures and guidance prescribed in this document are followed. The following information is provided to assist field personnel in the safe performance of water quality data collection.

C2.0 Safety Policies, Regulations, and Requirements

Although no special health and safety policies are in place for water quality data collection activates, NMED personnel are required to complete the National Safety Council Defensive Driving Course, which is made available through the General Services Department (GSD)/Transportation Services Division (TSD) of the State of New Mexico. Employees are required to keep a copy of the Defensive Driving training certificate and driver's license at all times while driving a federal vehicle. Additionally, in order to perform Oversight activities at DOE facilities, personnel are required to receive a Q security clearance and complete general Radworker II training, OSHA Hazwopper training, and a baseline medical examination.

Employees are provided with worker's compensation insurance to protect them in the event of injury or illness arising out of and in the course of their employment. In accordance with NMED policy (NMED Policy 1995a), all accidental injuries arising out of and in the course of employment, including occupational illness disease or injured disablement, no matter how minor, shall be reported to the supervisor immediately or at the earliest possible time by the injured employee, or by a witness if the injured employee is unable to do the reporting. Details of this policy and procedures to be followed are provided in the NMED Policy Number 02-37 (NMED Policy 1995a).

Also, while conducting business-related activities off NMED premises, no employee may use, possess, distribute, sell, or be under the influence of alcohol or illegal drugs. The legal use of prescribed drugs is permitted on the job only if it does not impair the employee's ability to perform the essential functions of the job effectively and in a safe manner that does not endanger other individuals in the workplace. Violations of this policy may lead to disciplinary action, up to and including termination. Such violations may also have legal consequences. Details of this policy are provided in the NMED Policy Number 02-38 (NMED Policy1995b).

Equipment and vehicles essential in accomplishing job duties are expensive and may be difficult to replace. When using NMED property, employees are expected to exercise care, perform required maintenance, and follow all operating instructions, safety standards, and guidelines. Employees must notify the supervisor if any equipment, tools, or vehicles appear to be damaged, defective, or in need of repair. The improper, careless, negligent, destructive, or unsafe use or operation of equipment or vehicles, as well as excessive or avoidable traffic and parking violations, can result in

disciplinary action, up to and including dismissal. Details of this policy are provided in the NMED Policy Number 01-02, Section VI Use of Government Vehicles (NMED Policy 2005).

C3.0 Transportation

C3.1 Road Vehicles

Surface water monitoring activities require extensive periods of driving on a variety of road and, possibly, off-road surfaces. The employees engaged as drivers may be at risk from the following hazards:

- Faults in the vehicle due to inadequate servicing and maintenance;
- Refueling and roadside repairs;
- Long hours;
- Overloading;
- Falls of person or loads from vehicles;
- Speeding;
- Road and weather conditions; or
- Noise.

Santa Fe, Los Alamos National Laboratories, and Sandia National Laboratories Fleet Coordinators are responsible for contacting the vehicle service center (505) 827-1951 for all regular vehicle inspections and repairs. The federal General Services Administration (GSA) provides Fleet Coordinators with a schedule for maintenance, and Fleet Coordinators are contacted approximately one month before preventive maintenance is due. The Fleet Coordinators also maintain a sign-out sheet for staff requiring use of a vehicle. Fleet Coordinators for the OVERSIGHT BUREAU are:

Barry Birch (505) 845-5933
Cecilia Garcia-Frank (505) 672-0443

All vehicles must contain an owner's manual, registration, insurance waiver/incident report, vendor list, exemption of the mandatory financial responsibility act, and the automobile loss notice. Vehicles must be inspected every 5,000 miles of use or 4 months, which ever comes first. The vehicle mileage is monitored by means of a log, which is located within each vehicle. The driver should update the log after each use.

All drivers must wear a seat belt and have a responsible attitude towards the care and maintenance of government vehicles. Drivers are required to obey all traffic regulations. If vehicles are malfunctioning, they are not to be driven until reported defects are investigated and any malfunctioning parts have been repaired. Drivers involved in vehicle accidents resulting in injury to another person (or animal) or damage to another vehicle (or property) must perform the following procedures:

1. Complete a police report/incident report immediately;
2. Notify Fleet Coordinator or Marcia Washington at Risk Management, (505) 827-0457;
3. Submit all original documents to Marcia Washington and copies to the TSD Agency Coordinators.

The Oversight Bureau's Fleet Coordinator should be contacted with any questions about the above procedures.

C3.2 Watercraft

This section applies to DOE Oversight Bureau employees that use any type watercraft. Oversight Bureau watercraft shall be operated in compliance with U.S. Coast Guard Boating Safety Regulations and Standards (http://www.uscgboating.org/safety.htm) and Federal Requirements. Watercraft will be operated at all times with safety as the primary requirement and in accordance with recognized Federal, state, and local laws and standards. All accidents and incidents involving watercraft must be reported and investigated. There are four conditions that require a boating accident report (United States Coast Guard 2003):

- A life is lost due to the accident;
- Someone is injured and requires medical attention beyond first aid;
- There is damage by or to the vessel and other property; and
- Any person on board a vessel disappears (under circumstances indicating possible death or injury).

Boating accidents include capsizing falls, overboard collisions, sinking/flooding, explosions, disappearance, fire. All serious injuries and loss of life must be reported to local authorities immediately. Reports must be filed within:

1. 48 hours of the occurrence if a person dies within one day (24 hours of the accident),
2. 48 hours if a person is injured and medical treatment beyond first aid is required, and
3. 10 days if there is only damage to the vessel and/or property (United States Coast Guard 2003).

Watercraft operators should know the boats capacity, which includes the combined weight of passengers and gear. The air compartments should be checked for leaks, and the condition of the raft should be inspected and weather conditions and air compartment levels checked before departure. The operator should always carry a radio or cellular telephone, and boating should be done in pairs. Safety equipment onboard should include:

- Boat plugs;
- Air pump;
- Emergency paddles;
- First aid kit;

- Fire extinguisher;
- Flashlight;
- Air horn;
- Rain gear;
- Personal floatation devices;
- Radio or cell phone; and
- Throw rope.

In 2002, approximately 70 percent of all boating fatalities were drowning, and nearly 85 percent of the victims who drowned were not wearing a life vest (United States Coast Guard 2002). Life vests should be the right size for the person's weight and chest size.

C4.0 Surface-Water Activities

C4.1 Wading

The following information was taken from the *National Field Manual for the Collection of Water-Quality Data*, Chapter A9, "Safety in Field" (U.S. Geological Survey [USGS] 1997):

"Examine the section of a stream or river you plan to wade. Check the field folder for information relating to safety, including maximum depths in relation to stage, wading-section anomalies such as slippery conditions and drop-offs or holes (a wading rod can be used to help assess streambed conditions), and velocity curves for determining wadeable stages. Do not attempt to wade a stream for which values of depth multiplied by velocity equal or exceed 10 square feet per second (ft^2/s). For example, a stream only 2 feet deep but with velocities of 5 feet per second (ft/s) or more can be dangerous to wade.

- Wear a personal flotation device (PFD) during wading activities.
  - *Approved PFDs for wading include the standard jacket type and the suspender type. The PFD must fit properly, be rated for your weight, and be in good condition.*
  - *The PFD should be dried and kept indoors between trips.*

- Wear hip boots or chest waders. Boots and waders provide protection from cold and pollutants, as well as from underwater objects. Be aware of the possibility of slipping and going underwater (feet up, head down) while wearing them. Practice wearing hip boots and waders in a controlled, group-training situation before using for field work. The following recommendations are the result of experiments with boots (Joseph, 1957) and field experience.

  - *Hip boots with a strap at the top are better than boots that are open. The strap should be pulled closed. This allows air to be trapped in the boot in case you are submerged. The air cushion can be used as a partial mechanism for flotation until you reach shore or are rescued.*

- *Avoid hip boots with tight ankles. These are difficult to remove in an emergency situation.*
- *Avoid chest waders that are tight fitting at the top. Like tight-ankled hip boots, they are difficult to remove in an emergency situation. Whenever chest waders are worn, a PFD also must be worn.*
- *Chest waders should cinch at the waist or be worn with a tight belt to avoid complete filling of waders with water if staff accidentally slip and fall.*

- Be aware of surrounding conditions.

- *Watch for debris floating downstream, such as logs, aquatic vegetation, or "rafts" of animals seeking higher ground.*
- *Watch for sand channels that can shift under foot and become quicksand.*
- *Watch the stream stage, especially when it could rise rapidly.*
- *When wading below a dam or control structure, contact the gate operator before entering the stream."*

C4.2 Working On Bridges

Employees working from bridges should wear high-visibility vests with reflective tape. Other safety equipment should include orange safety cones. If a vehicle is to be parked on the shoulder, cones should be placed beginning 40 feet before the vehicle, where the speed limit is 30 miles per hour (mph) or less, and up to 250 feet before the vehicle where the speed limit is 70 mph. If the field vehicle is parked on the bridge, the employee should not stand in front of it while sampling. Sampling should be conducted away from the vehicle where traffic can be monitored.

C4.3 Working From Boats

See Section C3.2 of this Appendix.

C4.4 Working From Cableways

In the event that a cableway is to be used to collect water quality data, the employee should contact USGS and refer to USGS Memorandum No. 92.42, "*Plan for Insuring the Safety of Cableways*" (USGS 1991).

C5.0 Chemicals

Material Safety Data Sheets (MSDSs) for all chemicals used on a trip should be made available to employees involved in the sampling activity. MSDSs are required by Occupational Safety and Health Administration (OSHA) 29 Code of Federal Regulations (CFR) 1910.1200 (hazard

communication) and are shipped with chemicals when purchased. All chemicals should be secured in the field vehicle in a container that will resist and contain the material in the event of an accident. A spill kit should be available to contain and neutralize agents in the event of a leak or spill. The following precautions should be taken when working with chemicals in the field (USGS 1997):

- Avoid unnecessary exposures and spills. Never place chemical containers where they can be knocked over;
- Work with adequate ventilation when working with hazardous or reactive chemicals and gases;
- Keep eye wash kits readily accessible while working with chemicals;
- Handle and mix chemicals and compounds appropriately (check the MSDS).

Bottles should be labeled as to their contents and chemical wastes should not be allowed to accumulate in a vehicle. Disposal of chemicals should be in accordance federal regulations.

C6.0 Contaminated Water

The following information was taken from the *National Field Manual for the Collection of Water-Quality Data*, Chapter A9, "Safety in Field" (USGS 1997):

"Water being sampled could be contaminated with pathogens and hazardous chemicals. Use caution and extra protection when working with water known or suspected to contain high concentrations of pathogens. Sample containers, shipping containers, and paperwork must indicate the type and severity of the contamination. This alerts personnel to the appropriate personal protective equipment and procedures needed. Communicate known or suspected contamination to all personnel who could come in contact with the sample.

Waterborne, disease-causing organisms (pathogens) are found in nearly all surface-water systems, and occur in some ground-water systems as well. Most pathogens originate from the body fluids and feces of animals and humans. Pathogens enter surface-water resources primarily through sewage discharges and spills, storm and agricultural runoff, and direct contact. Microorganisms also are transported on small particles such as dust or aerosols (gaseous suspension of very fine particles). Pathogens enter ground water through infiltration from septic tank effluent, leachate from fields and ponds, and from faulty well seals and casings. Bacteria, viruses, and other pathogenic organisms can occur in the most pristine environments. Never drink sample water, no matter how pristine the environment appears.

To minimize exposures to and effects from contaminated water:

- Receive required inoculations.

- Use personal protective equipment, including respiratory equipment (certification required) when working over turbulent, polluted flows, and in shelters containing evidence of excrement. Pathogens can enter your body through many openings such as your mouth, eyes, nose, cuts, scrapes, or chapped skin.

- Wear rubber boots, coveralls or aprons, gloves, and splash protection (a disposable dust mask offers splash and dust protection at a very low cost).

- Do not ingest pathogens or other contaminants. Never eat or drink while sampling or put pencils or other items in your mouth, and do not store food or drink in sample coolers.

- Carry antibacterial soap; wash before leaving the site. Remember to wash again after unloading supplies.

- Disinfect all contaminated surfaces as soon as possible.

Employees should consider the possibility that any water being sampled may be contaminated with pathogens; however, the above precautions should always be observed when working in areas with known or suspected contamination."

Because the Human Immunodeficiency Virus (HIV) and Hepatitis B are not transmitted by the fecal-oral route, risk of transmission through sewage and wastewater is very low (State of California 1998). There are no state immunization requirements for field personnel who contact wastewater; however, staff regularly sampling in surface waters and wastewater are advised to receive the following immunizations:

- Tetanus-diphtheria (Td)
- No other immunizations are routinely recommended

There is currently no evidence of significant occupational risk for sewage workers from HIV, Hepatitis A, or Hepatitis B (State of California 1998).

C7.0. Environmental Conditions

The following information was taken from the *National Field Manual for the Collection of Water-Quality Data*, Chapter A9, "Safety in Field" (USGS 1997):

"Extremes of air temperature occur in all parts of the country. The ideal comfort range for humans is

between 16 to 32ºC (60 to 90ºF). Hypothermia and hyperthermia normally occur in temperatures outside this range. Hypothermia is a condition of reduced body temperature caused by exposure to cold, and aggravated by wet clothes, wind, hunger, and exhaustion. Hypothermia in extremities can lead to frostbite. Hypothermia can occur with air temperature above 16ºC (60ºF) under wet and (or) windy conditions. The best way to avoid hypothermia is to dress warm and stay dry. "

"The warning signals of hypothermia are uncontrollable fits of shivering, incoherence, listlessness, fumbling hands, frequent stumbling, drowsiness, and inability to get up after resting. Victims of hypothermia must be treated immediately by removing them from exposure to the elements, replacing wet clothes with dry ones, and giving them warm, non-alcoholic drinks. Seek emergency facilities as soon as possible.

To prevent hypothermia:

- Put on rain gear before it starts to rain or snow.
- Put on additional clothes before starting to shiver.
- Seek shelter immediately if conditions become severe.

Hyperthermia is a condition of increased body temperature caused by exposure to excessive heat. Contributing factors are physical exertion, clothing, humidity, lack of air movement, and temperature, but the most important factor is body hydration. The normal body requirement for fluids in temperate regions is 2 1/2 quarts per day; desert conditions require more fluid. Early warning symptoms of hyperthermia are chilling, a throbbing pressure in the head, unsteadiness, dizziness, nausea, dry skin (either hot and red or cool and pale), rapid pulse, and muscle pains and spasms.

Persons suffering from hyperthermia should seek medical attention immediately. First aid involves cooling down and rehydrating.

To avoid hyperthermia:

- Drink water in moderate amounts on a scheduled basis---do not wait until you are thirsty.
- Avoid alcohol, caffeine, and soda---these liquids are not water substitutes.
- Wear lightweight clothing and a wide-brimmed hat.
- Schedule activities that require the most exertion in early morning or late afternoon, if possible, and not when air temperature is at its highest.

Sun exposure can have painful and dangerous short-term and long-term effects. Regardless of the region in which you are working, take the proper precautions to protect your skin and eyes from excessive sun exposure.

To prevent excessive sun exposure:

- Wear sunscreen on all exposed skin to avoid burning and skin cancer.

- Wear sunglasses with polarized lenses to protect eyes, reduce glare, and improve vision, especially when working on water or snow.

Thunderstorms, which can be accompanied by hail, are common throughout the United States. Some are predicted by weather forecasters. Others can move into an area with almost no advance warning. Watch the sky for signs of thunderstorms, and seek shelter before the weather deteriorates. Lightning is extremely dangerous and should be respected.

To protect yourself during thunderstorms, heed the following advice from Lockhart (1988):

- Seek shelter inside a vehicle or building; keep away from open doors and windows, plugged in appliances, and metal. Avoid contact with metal objects in a vehicle.
- Do not use a telephone.
- If outside, do not congregate. In case of a lightning strike, someone must be able to begin revival techniques immediately, such as cardiopulmonary resuscitation (CPR).
- Put on rubber boots or rubber-soled shoes.
- Do not work on electrical lines, pipes, cableways, or steel structures.
- Do not use metal objects such as wading rods, bridge cranes, and well-logging equipment.
- If caught in the open, crouch down low, but do not lie flat on the ground.
- Avoid standing near isolated trees.
- Avoid working on streams and lakes.
- Seek lower elevations such as valleys or canyons---avoid being on peaks or ridges.
- If you feel your hair standing on end and your skin tingling, this is a sign that lightning might be about to strike---crouch immediately (feet together, hands on knees).

Tornadoes sometimes accompany thunderstorms. Tornadoes are violently rotating columns of air that descend from the clouds in a funnel formation. A weather channel or weather-band radio will sometimes provide advance warning of possible tornadoes.

To protect yourself during a tornado, heed the following advice from Lockhart (1988):

- Seek shelter immediately if there is a sudden, violent change in weather involving wind, rain, hail, or funnel-shaped clouds.
- Avoid occupying vehicles or mobile homes.
- If you are caught outside, find a ravine, ditch, or culvert and lie flat.
- If inside, go to the basement or lowest interior reinforced part of the structure, such as a closet or bathroom. Stay away from windows.

Rain can fall at a rate of several inches per hour and rapidly create dangerous flash flood conditions, either in the area where you are working or several miles away. Weather forecasts will be helpful in planning your activities accordingly to ensure your safety. Maintain an updated copy of your district floodplan. Always be aware of rapidly rising stages in rivers and creeks. Beware of dry creekbeds that can become raging rivers in a short period of time.

Fire can spread out of control rapidly--call 911 if you notice a brush fire or other type of threatening fire or smoke. Working inside your field vehicle or outside at your field site requires fire prevention measures. Do not smoke. Keep matches stored in a metal container. Keep fire extinguishers visible and accessible.

- Know how to operate fire extinguishers.
- Know the type of fire for which an extinguisher is designed (extinguishers are different for ordinary combustibles, flammable liquids, and electrical equipment).
- Never point an extinguisher at a person's face.

Recharge fire extinguishers according to the schedule provided with the extinguisher.

Snow and ice are dynamic mediums that change quickly in structure and strength. Snow and ice can accumulate rapidly, hiding hazards, and creating slippery conditions. Heavy snowfall (white-outs) can be disorienting and can produce avalanche conditions in steep terrain. Working on ice requires experience, training, and knowledge of the water body over which the ice has formed. Wear layers of appropriate clothing and work in teams."

C8.0 Checklists for Standard Safety Equipment

Field Sampling Equipment Checklist for:

General
Plastic sample bottles (for pH and
Cubitainers (liters, gallons)
Fecal bottles (and forms)
Organics sample bottles

Water carboy (w/DI water)
Wash bottles
Kemwipes
Rubber (nitrile) gloves
Trash bags
Calculator
Extra batteries (AA, C, 9 volt)
Cell phone
Camera (digital or film)

Sample Preservation
Coolers
Ice

Pipetters (and repair
Pipetter tips
NaOH (for cyanide)
Nitric acid
Sulfuric acid
Geo pump
Tubing
Cartridge filters

Field Sampling Equipment Checklist for: (continued)

Maps
Clipboard
Tool box
First aid kit
Flashlight
Access authorization documents
Replacement flow meter tape

Meters,
Extra ISCO® and Flow meter

Data/notes
Pencils/pens
Sharpies
Field sheets
Lab forms
RID stickers

Miscellaneous

Extra battery for ISCO®

Conductivity meter
Conductivity standard
pH meter
pH buffers and storage solution
Turbidity meter (and
D.O. meter
D.O. probe repair kit
Digital thermometer

Site list/directions
Basin
Rain gear, Boots/waders
Lunch/water
Neoprene gloves
Hat/sun protection
Sunglasses/polarized glasses
Field notebook
NMED ID/business cards
Phone card
Binoculars/Field guides

C9 REFERENCES

New Mexico Environment Department Policy. 1995a. Section 02-37: *Worker's Compensation*. Effective Date: December 15, 1995.

———. 1995b. Section 02-38: *Drug and Alcohol Use*. Effective Date: December 15, 1995.

New Mexico Environment Department Policy 2006. Section 07-07: *Code of Conduct*. Section VI Use of Government Vehicles. Effective Date: January 19, 2005.

State of California. 1998. *Recommended Immunization for Sewage Workers*. Department of Health Services, "California Morbidity" Publication. February.

U.S. Coast Guard. 2003. *Federal Requirements and Safety Tips for Recreational Boats: Reporting Boating Accidents*. Online at http://www.uscgboating.org/safety/fed_reqs/law_report.htm.

———. 2002. *Boating Statistics – 2002*. COMDTPUB P16754.16. U.S. Department of Homeland Security, U.S. Coast Guard.

U.S. Geological Survey (USGS). 1997. *National Field Manual for the Collection of Water Quality Data*. Chapter A9: Safety in Field Activities. Techniques of Water-Resources Investigations, Book 9, Handbooks for Water-Resources Investigations.

———. 1991. *Plan for Insuring the Safety of Cableways*. USGS Water Resources Division Memorandum No. 92.42. June 25.

———. 1993. Requirements for Water Resources Division Personnel Performing Electrofishing, USGS Memorandum No. 93.19. February 24.

Appendix D. Request for Proposals for Laboratory Analytical Services

REQUEST FOR PROPOSALS

FOR

LABORATORY ANALYTICAL SERVICES

RFP: 60-667-55-01754

STATE OF NEW MEXICO

ENVIRONMENT DEPARTMENT

January 06, 2006

1190 SAINT FRANCIS DRIVE

SANTA FE, NEW MEXICO 87505

TABLE OF CONTENTS

I. INTRODUCTION

Purpose

The State of New Mexico Environment Department (NMED) is requesting proposals for analytical laboratory services to support Department Bureaus. The purpose of this Request For Proposals (RFP) is to select an offeror(s) which can provide physical, microbiological, chemical and radiological analyses of air, soil, sediment, water and biological tissue samples. This will be a Department-wide price agreement. The NMED reserves the right to award price agreements to multiple prime contractors. NMED also reserves the right to cancel this procurement if it is determined to be in the best interest of NMED or the State of New Mexico.

Summary Scope of Work

In order to manage the water resources of the State of New Mexico, protect human health and the environment and meet the strategic goals of the New Mexico Environment Department, NMED requests that qualified firms submit a proposal, with costs for completion of the following scope of work. The scope of work for NMED shall consist of analyses of environmental samples in accordance with the approved U.S. EPA methods. Other methods of analysis may be utilized, when approved in advance by NMED in writing, which have detection limits that are lower than state and federal Maximum Contaminant Levels. All samples must be analyzed within the appropriate holding times according to the methods listed in Appendix D (See QAPP Appendix E).

A list of the methods and method revisions required are set forth in Appendix D (See QAPP Appendix E). The agency (NMED) expects high quality data according to performance standards in the technical specification section IV.

The goal of this RFP is to put into place price agreement(s) for analytical laboratory services.

The agreement(s) shall begin upon Agency approval, with the option to renew for an additional two year agreement.

In no case will the agreement(s), including all extensions thereof, exceed a total of four years in duration.

Scope of Procurement

The scope of the procurement is to establish a price agreement(s) and a Services Schedule(s) covering a specified range of analytical services from qualified offerors for an initial period of one year. Additional analytical services not listed in this RFP or in the accompanying price agreement may be requested by the Agency.

The initial agreement(s) will end on April 18, 2008, with the possibility of one - two year extensions.

This procurement may result in a single source award, multiple source awards or no award at all if such is deemed in the best interest of the State.

Procurement Manager

The Agency has designated a Procurement Manager who is responsible for the conduct of this procurement whose name, address and telephone numbers are listed below.

NMED Representative
Attn: New Mexico Environment Department – DOE Oversight Bureau
H and Pennsylvania St, Albuquerque, NM 87116
(505) 845-5824 (Telephone)
(505) 845-5853 (Fax)
e-mail: NMED Representative@state.nm.us

All deliveries via express carrier, except proposals, should be addressed to the Procurement Manager at the address above. Allow one extra day for delivery.

It is **mandatory** that all proposals be delivered to the address listed below.

NMED Representative
NMED – District 1 Office

5500 San Antonio Dr NE
Albuquerque, NM 87109

Any inquiries or requests regarding this procurement should be submitted to the Procurement Manager in writing. Offerors must contact ONLY the Procurement Manager regarding the procurement. Other state employees do not have the authority to respond on behalf of the Agency.

It is **mandatory** that each offeror have a legal e-mail address since a lot of the correspondence will be electronically submitted.

Definition of Terminology

This section contains definitions that are used throughout this procurement document, including appropriate abbreviations.

Agency - The New Mexico Environment Department

Agreement - An agreement for the procurement of fixed price services

Compact Disc (CD) - A small optical disk containing computer data

Contractor - A successful offeror

Determination - The written documentation of a decision of a procurement manager including findings of fact required to support a decision. A determination becomes part of the procurement file to which it pertains.

Desirable - Terms "may", "can", "should", "preferably", or "prefers" identify a desirable or discretionary item or factor.

DFA - Department of Finance and Administration for the State of New Mexico

Evaluation Committee - A body appointed by the Agency management to perform the evaluation of offeror proposals

Evaluation Committee Report - A report prepared by the Procurement Manager and Evaluation Committee for submission to the NMED for agreement award that contains all written

determinations resulting from the conduct of a procurement requiring the evaluation of competitive sealed proposals

Finalist - An offeror who meets all the mandatory specifications of the Request for Proposal and whose score on evaluation factors is sufficiently high to qualify that offeror for further consideration by the Evaluation Committee

Mandatory - The terms "must", "shall", "will", "is required", or "are required", identify a mandatory item or factor. Failure to meet a mandatory item or factor will result in the rejection of the offeror's proposal.

Multiple Source Award - An award of an indefinite quantity agreement for one or more similar services or items of tangible personal property to more than one offeror

NMED - New Mexico Environment Department

Offeror - Any person, corporation, or partnership that chooses to submit a proposal

Price Agreement - A definite quantity contract or indefinite quantity contract which requires the contractor to furnish items of tangible personal property or services to a state agency which issues a purchase order, if the purchase order is within the quantity limitations of the agreement.

Procurement Manager - Person or designee authorized by the Agency to manage or administer a procurement requiring the evaluation of competitive sealed proposals

Purchase Order - A document, which directs a contractor to deliver services pursuant to an existing agreement

Request for Proposals (RFP) - All documents, including those attached or incorporated by reference, used by the agency for soliciting proposals

Responsible Offeror - An offeror who submits a responsive proposal and who has furnished, when required, information and data to prove its financial resources, production or service facilities, personnel, service reputation and experience are adequate to make satisfactory delivery of the services described in the proposal.

Responsive Offer or *Responsive Proposal* - An offer or proposal which conforms in all material respects to the requirements set forth in the request for proposals. Material respects of a request for proposals include, but are not limited to, price, quality, quantity or delivery requirements.

State Purchasing Agent (SPA) - Purchasing agent for the State of New Mexico or a designated

representative

Services Schedule (SS) - Refers to a complete list, grouped by major product categories, of the products and services provided by the offeror which consists of an item number, item description, and the Agency's price for each product or service.

Technical Definitions

Biological Samples - Samples of fish, vegetation, produce, and animal flesh, bones and organs

Electronic Data Deliverable (EDD) – data that is delivered in an electronic form, for example, but not limited to an electronic spreadsheet, text format file sent by e-mail or compact disc

Minimum Detection Limit (MDL) - The minimum concentration of an analyte that can be distinguished from a blank with a 99% confidence that the analytical concentration is greater than zero; the lowest concentration which an analyte can be detected in a sample that does not cause matrix interferences (typically determined by using spiked reagent water). This measurement is laboratory specific and usually dependent on the instrumentation used by that particular laboratory and the skill of the technician using it. This number can change.

Minimum Quantification Limit (MQL) - A measurement concentration that is routinely achievable independent of time and laboratory. For the purposes of this RFP and any resulting agreements, the MQL is 4 times the MDL.

Reporting Limit (RL) - The lowest concentration that an analyte can be detected in a sample and its concentration can be reported with a reasonable degree of accuracy and precision. A criterion of ± 20% accuracy and 20% Relative Percent Difference for replicate determinations is often used to define "reasonable." The acceptable ranges depend on the analytical methodology used.

Total Water Samples - Samples of ground or surface water that may contain solids larger than 0.45 um; usually not filtered

Background Information

The Agency's mission is to provide the highest quality of life throughout the state by promoting a safe, clean, and productive environment. In meeting the goals of our mission, we are committed to:

Providing clear articulation of our goals, standards, and expectations in a professional manner so that employees and the public can make informed decisions and be actively involved in setting priorities,

Promoting environmental awareness through the practice of open and direct communication and sound decision-making by carrying out the mandates and initiatives of the department in a fair and consistent manner.

The Agency's goals and objectives:

We, as custodians of our environment will:

a. Take a holistic approach to the protection of human health and the environment;

b. Protect the environmental resources of New Mexico and the health and safety of its citizens and visitors;

c. Establish environmental baselines for communities across the state and focus on pollution prevention;

d. Revamp and restructure the pollution prevention program in a way that truly prevents and reduces pollution throughout New Mexico;

e. Value diversity to improve our ability as a Department to communicate across racial, linguistic and socio-economic lines, public participation and the quality of our decisions will improve;

f. Seek out that diversity in every corner of the state and we will listen to it;

g. Focus to looking outside of Santa Fe and Albuquerque, and into our communities;

h. Harness the energy of our best employees in order to achieve results that matter to the

mission of the Department and to the health and environment of New Mexico;

i. Reward high performance and conversely provide sanctions for workers that aren't accomplishing what is required.

The New Mexico Environment Department Secretary's Office is located in the Harold Runnels Building, 1190 St. Francis Drive, Santa Fe, NM.

Procurement Library

The Procurement Manager has established an Internet Procurement Library. Offerors are encouraged to review the material contained in the Procurement Library by selecting the link provided in the electronic version of this document through your own internet connection or by contacting the Procurement Manager and scheduling an appointment.
The library contains information listed below:

New Mexico State Purchasing Division includes links to Procurement Regulations and Request for Proposal – RFP instructions http://www.state.nm.us/spd/spd.html

New Mexico Petroleum Storage Tank Regulations
http://www.nmenv.state.nm.us/NMED_regs/ust_regs.html
Petroleum Storage Tank Soil and Water Sampling & Disposal Guidelines
http://www.nmenv.state.nm.us/ust/lustrem.html

New Mexico Water Quality Control Commission Regulations
http://www.nmenv.state.nm.us/NMED_Regs/gwb/20_6_2_NMAC.pdf

New Mexico Drinking Water Regulations which includes methods and MCL
http://www.nmenv.state.nm.us/NMED_regs/dwcsb/20nmac7_1.html

Federal Safe Drinking Water Act http://www.epa.gov/safewater/sdwa/sdwa.html

U.S. EPA Safe Drinking Water Standards http://www.epa.gov/safewater/standards.html
Solid Waste Test Methods SW-846, Draft Updates and new
methodshttp://www.epa.gov/epaoswer/hazwaste/test/sw846.htm

Sources for EPA Test Methods http://www.epa.gov/epahome/index/sources.htm

New Mexico Air Quality Regulations http://www.nmenv.state.nm.us/aqb/regs/index.html

Air Monitoring Test Methods http://www.epa.gov/ttn/amtic/ ,
http://www.epa.gov/ttn/amtic/airtox.html , http://www.epa.gov/ttn/amtic/inorg.html ,
http://www.epa.gov/ttn/emc/tmethods.html\

New Mexico Surface Water Quality Standards
http://www.nmenv.state.nm.us/swqb/Standards/20.6.4NMAC.pdf

New Mexico Surface Water TMDLs http://www.nmenv.state.nm.us/swqb/TMDL/index.html
U.S. Geological Survey National Water-Quality Assessment (NAWQA)
http://water.usgs.gov/nawqa/protocols/doc_list.html

New Mexico Hazardous Waste Regulations http://www.nmenv.state.nm.us/hwb/stareg.html

New Mexico Soil Screening Levels (NMED Technical Background Document for Development of Soil Screening Levels, Revision 3, Updated August 2005)
http://www.nmenv.state.nm.us/hwb/data/NMED_Tech_Background_Doc---_Rev3.0_(August_2005;_Updated_November_2005).pdf

New Mexico Radiation Protection http://www.nmcpr.state.nm.us/nmac/_title20/T20C003.htm

Radiation Guidance, DOE Order 5400.5 http://www.eh.doe.gov/oepa/guidance/risk/54005.pdf

Nuclear Regulatory Commission, CFR 10 http://www.nrc.gov/reading-rm/doc-collections/cfr/

Goals and objectives of each bureau expected to participate in the agreement
http://www.nmenv.state.nm.us/ust/ustbtop.html,
http://www.nmenv.state.nm.us/DOE_Oversight/doetop.html,
http://www.nmenv.state.nm.us/gwb/gwqbhome.html,
http://www.nmenv.state.nm.us/aqb/aqb_home.html,
http://www.nmenv.state.nm.us/HWB/hazwaste_home.html
http://www.nmenv.state.nm.us/swqb/index.html

Maps of key locations:

State Library - Santa Fe, NM
http://maps.yahoo.com/py/maps.py?BFCat=&Pyt=Tmap&newFL=Use+Address+Below&addr=1205+Camino+Carlos+Rey&csz=Santa+Fe%2C+NM&Country=us&Get%A0Map=Get+Map
District 1 Office – Albuquerque, NM
http://maps.yahoo.com/maps_result?addr=5500+San+Antonio+NE&csz=87109&country=us&new=1&name=&qty=

II. CONDITIONS GOVERNING THE PROCUREMENT

Sequence of Events

The Procurement Manager will make every effort to adhere the following schedule:

	Action	Responsibility	Date
1.	Issue RFP	NMED/SPD	01/06/06
2.	Pre-Proposal Conference	NMED, Potential Offerors	01/17/06
3.	Distribution List Response	Potential Offerors	01/17/06
4.	Deadline to Submit Additional Written Questions **No later than 5:00 pm MST**	Potential Offerors	01/19/06
5.	Response to Written Questions/RFP Amendments	NMED	01/24/06
6.	**Submission of Proposal** 02/07/06 **No later than 3:00 pm MST**	Offeror	
7.	Proposal Evaluation	Evaluation Committee	02/28/06
8.	Selection of Finalists	Evaluation Committee	02/28/06
9.	Best & Final Offers from Finalists	Offeror	03/13/06
10.	Oral Presentation and/or Product Demonstrations by Finalists 03/14/06	Offeror	

11.	Finalize Agreement	NMED, Offeror	04/04/06
12.	Agreement Award	State Purchasing Agent	04/18/06
13.	Protest Deadline 05/03/06 No later than 5:00 pm MDT	Offeror	

Explanation of Events

The following paragraphs describe the activities listed in the sequence of events shown in Section II.

Issue RFP

This RFP is being issued by NMED and the State Purchasing Division of the General Services Department on January 6, 2006. Additional copies of the RFP can be obtained from the Procurement Manager or from the State Purchasing Division at http://www.state.nm.us/spd.

Pre-Proposal Conference

A pre-proposal conference will be held on January 17, 2006 at 1:30 pm Mountain Standard Time in the New Mexico State Library room #2022 (Yucca Room), 1209 Camino Carlos Rey, Santa Fe, New Mexico. Potential offerors are encouraged to submit written questions in advance of the conference to the Procurement Manager (See Section I, page 2). The identity of the organization submitting the question(s) will not be revealed. Additional written questions may be submitted at the conference. All written questions will be addressed at the conference. A public log will be kept of the names of potential offerors that attended the pre-proposal conference. Attendance at the pre-proposal conference is not a prerequisite for submission of a proposal.

Distribution List Response Due

Potential offerors must hand deliver or return by facsimile or by registered or certified mail the "*Acknowledgment of Receipt of Request For Proposals Form*" that accompanies this document (See Appendix A) to have their organization placed on the procurement distribution list. The form must be signed by an authorized representative of the organization, dated and returned by close of business (5:00 pm MST) on January 17, 2006.

The procurement distribution list will be used for the distribution of written responses to questions and any RFP amendments.

Failure to return this form shall constitute a presumption of receipt and rejection of the RFP, and the potential offeror's organization name shall not appear on the distribution list.

Deadline to Submit Additional Written Questions

Potential offerors may submit additional written questions as to the intent or clarity of this RFP until close of business on January 19, 2006. All written questions must be addressed to the Procurement Manager (See Section I, Page 2).

Response to Written Questions/RFP Amendments

Written responses to written questions and any RFP amendments will be distributed on January 24, 2006 to all potential offerors whose organization name appears on the procurement distribution list. An Acknowledgment of Receipt Form will accompany the distribution package. The form should be signed by the offeror's representative, dated, and hand-delivered or returned by facsimile or by registered or certified mail by the date indicated thereon. Failure to return this form shall constitute a presumption of receipt and withdrawal from the procurement process. Therefore, the offeror's organization name shall be deleted from the procurement distribution list.

Additional written requests for clarification of distributed answers and/or amendments must be received by the Procurement Manager no later than seven (7) days after the answers and/or amendments were issued.

Submission of Proposal

ALL PROPOSALS MUST BE RECEIVED FOR REVIEW AND EVALUATION BY THE PROCUREMENT MANAGER OR DESIGNEE NO LATER THAN 3:00 PM MOUNTAIN

STANDARD TIME ON February 7, 2006. Proposals received after this deadline will not be accepted. The date and time will be recorded on each proposal. Proposals must be addressed and delivered to the Procurement Manager at the address listed in Section I, page 2. Proposals must be sealed and labeled on the outside of the package to clearly indicate that they are in response to the Laboratory Analytical Services - Request for Proposals. Proposals submitted by facsimile will not be accepted.

A public log will be kept of the names of all offeror organizations that submitted proposals. Pursuant to NMSA 1978 Section 13-1-16, the contents of any proposal shall not be disclosed to competing offerors prior to agreement award(s).

Proposal Evaluation

The evaluation of proposals will be performed by an evaluation committee appointed by NMED management. This process will take place between February 08, 2006 and February 28, 2006. During this time, the Procurement Manager may at their option initiate discussions with offerors who submit responsive or potentially responsive proposals for the purpose of clarifying aspects of the proposals, but proposals may be accepted and evaluated without such discussion. Discussions **SHALL NOT** be initiated by the offerors.

Selection of Finalists

The Evaluation Committee will select and Procurement Manager will notify the finalist offeror(s) on February 28th and March 1, 2006. Only finalists will be invited to participate in the sub-sequent steps of the procurement. The oral presentation schedule will be determined at this time.

Best and Final Offers From Finalists

Finalist offerors may be asked to submit revisions to their proposals for the purpose of obtaining best and final offers by March 13, 2006. Best and final offers may be clarified and amended at the finalist offeror's oral presentation.

Oral Presentation/Demonstration by Finalists

Finalist offerors may be required to present their proposals to the Evaluation Committee. The Procurement Manager will schedule the time for each offeror presentation. All offeror presentations will be held in the Sandia Room located at the District 1 Office, 5500 San Antonio Dr. NE, Albuquerque, New Mexico beginning on March 14, 2006. Each presentation will be limited to a maximum of 35 minutes in duration to be followed by a question and answer session. NMED shall not be responsible for any costs or expenses incurred by an offeror to make an oral presentation.

Finalize Agreement

The agreement will be finalized with the most advantageous offeror(s) between April 4, 2006 and April 17, 2006. In the event that mutually agreeable terms cannot be reached within the time specified, the Agency reserves the right to finalize an agreement with the next most advantageous offeror(s) without undertaking a new procurement process or to cancel the procurement if NMED may deem it to be in the best interest of the State of New Mexico.

Agreement Awards

After review of the Evaluation Committee Report, the recommendation of the Agency management and the signed agreement, it is intended that the NMED will award agreements on April 18, 2006. This date is subject to change at the discretion of NMED and/or the State Purchasing Agent.

The agreement shall be awarded to the offeror(s) whose proposal is most advantageous, taking into consideration the evaluation factors set forth in the RFP. The most advantageous proposal may or may not have received the most points.

The award is subject to appropriate State approvals.

Protest Deadline

Any protest by an offeror must be timely and in conformance with Section 13-1-172 NMSA 1978 and applicable procurement regulations. The fifteen (15) day protest period for responsive offerors shall begin on the day following the agreement award and will end as of close of business (5:00 pm MDT) fifteen (15) days thereafter. Protests must be written and must include the name and address of the protester and the RFP number. It must also contain a statement of grounds for protest including appropriate supporting exhibits, and it must specify the ruling requested from the State Purchasing Agent. The protest must be delivered to the NMED Purchasing Agent.

Ms. Margaret Trujillo, Bureau Chief
NMED – ASD Purchasing Bureau
Harold Runnels State Building, Room S4100
1190 St. Francis Drive
Santa Fe, New Mexico 87505
Mailing Address:
P.O. Drawer 26110
Santa Fe, New Mexico 87502-0110

PROTESTS RECEIVED AFTER THE DEADLINE WILL NOT BE ACCEPTED.

General Requirements

This procurement will be conducted in accordance with the State Purchasing Agent's procurement regulations, 1.5.2 NMAC.

1. Acceptance of Conditions Governing the Procurement

Offerors must indicate their acceptance of the Conditions Governing the Procurement section in their letter of transmittal. Submission of a proposal constitutes acceptance of the Evaluation Factors contained in Section V of this RFP.

2. Incurring Cost

Any cost incurred by the offeror in preparation, transmittal, presentation of any proposal or

material submitted in response to this RFP shall be borne solely by the offeror.

3. Prime Contractor Responsibility

Any agreement that may result from this RFP shall specify that the prime contractor is solely responsible for fulfillment of the agreement with the Agency. The Agency will make agreement payments to only the prime contractor.

4. Subcontractors

Subcontracting of services is permissible with the prior approval of the Agency. Use of subcontractors must be clearly explained in the proposal and must be identified by name. The prime contractor shall be wholly responsible for the entire performance in the agreement whether or not subcontractors are used.

5. Amended Proposals

An offeror may submit an amended proposal before the deadline for receipt of proposals. Such amended proposals must be complete replacements for a previously submitted proposal and must be clearly identified as such in the transmittal letter. The Agency personnel will not merge, collate, or assemble proposal materials.

6. Offerors' Rights to Withdraw Proposal

Offerors will be allowed to withdraw their proposals at any time prior to the deadline for receipt of proposals. The offeror must submit a written withdrawal request signed by the offeror's duly authorized representative addressed to the Procurement Manager.

The approval or denial of withdrawal requests received after the deadline for receipt of the proposals is governed by the applicable procurement regulations.

7. Proposal Offer Firm

Responses to this RFP, including proposal prices, will be considered firm for ninety (90) days after the due date for receipt of proposals or sixty (60) days after receipt of a best and final offer, if one is submitted.

8. Disclosure of Proposal Contents

The proposals will be kept confidential until an agreement is awarded by the NMED. At that time, all proposals and documents pertaining to the proposals will be open to the public, except for the material that is proprietary or confidential. The Procurement Manager will not disclose or make public any pages of a proposal on which the offeror has stamped or imprinted "proprietary" or "confidential" subject to the following requirements.

Proprietary or confidential data shall be readily separable from the proposal in order to facilitate eventual public inspection of the non-confidential portion of the proposal. Confidential data is normally restricted to confidential financial information concerning the offeror's organization and data that qualifies as a trade secret in accordance with the Uniform Trade Secrets Act, 57-3A-1 to 57-3A-7 NMSA 1978. The price of products offered or the cost of services proposed shall not be designated as proprietary or confidential information.

If a request is received for disclosure of data for which an offeror has made a written request for confidentiality, the Agency shall examine the offeror's request and make a written determination that specifies which portions of the proposal should be disclosed. Unless the offeror takes legal action to prevent the disclosure, the proposal will be so disclosed. The proposal shall be open to public inspection subject to any continuing prohibition on the disclosure of confidential data.

9. No Obligation

This procurement in no manner obligates the State of New Mexico or any of its agencies to the eventual rental, lease, purchase, etc., of any equipment, software, or services offered until a valid written agreement is approved by the Agency and other appropriate authorities.

10. Termination

This RFP may be canceled at any time and any and all proposals may be rejected in whole or in part when the Agency determines such action to be in the best interest of the State of New Mexico.

11. Sufficient Appropriation

Any agreement awarded as a result of this RFP process may be terminated if sufficient appropriations or authorizations do not exist. Such termination will be effected by sending written notice to the contractor. The Agency's decision as to whether sufficient appropriations and authorizations are available will be accepted by the contractor as final.

12. Legal Review

The Agency requires that all offerors agree to be bound by the General Requirements contained in this RFP. Any offeror concerns must be promptly brought to the attention of the Procurement Manager.

13. Governing Law

This procurement and any agreement with offerors that may result shall be governed by the laws of the State of New Mexico.

14. Basis for Proposal

Only information supplied by the Agency in writing through the Procurement Manager or in this RFP should be used as the basis for the preparation of offeror proposals.

15. Agreement Terms and Conditions

The agreement between the Agency and a contractor will follow the format specified by the Agency and contain the terms and conditions set forth in Appendix B, "Agreement Terms and Conditions". However, the Agency reserves the right to negotiate with a successful offeror provisions in addition to those contained in this RFP. The contents of this RFP, as revised and/or supplemented, and the successful offeror's proposal will be incorporated into and become part of the agreement.

Should an offeror object to any of the Agency's terms and conditions, as contained in this Section or in Appendix B, that offeror must propose specific alternative language. The Agency may or may not accept the alternative language. General references to the offeror's terms and conditions or attempts at complete substitutions are not acceptable to the Agency and will result in disqualification of the offeror's proposal.

Offerors must provide a brief discussion of the purpose and impact, if any, of each proposed change followed by the specific proposed alternate wording.

Pursuant to 1.4.1.48 NMAC and DFA Rule 87-1, all price agreement contracts which may involve the aggregate expenditure of more than $200,000.00 shall be reviewed and approved by the Attorney General and the Department of Finance and Administration prior to execution by the Agency.

16. Offeror's Terms and Conditions

Offerors must submit with the proposal a complete set of any additional terms and conditions which they expect to have included in an agreement negotiated with the Agency.

17. Agreement Deviations

Any additional terms and conditions, which may be the subject of negotiation, will be discussed only between the Agency and the selected offeror and shall not be deemed an opportunity to amend the offeror's proposal.

18. Offeror Qualifications

The Evaluation Committee may make such investigations as necessary to determine the ability of the offeror to adhere to the requirements specified within this RFP. The Evaluation Committee will reject the proposal of any offeror who is not a responsible offeror or fails to submit a responsive offer as defined in 1.4.1.38 NMAC.

19. Right to Waive Minor Irregularities

The Evaluation Committee reserves the right to waive minor irregularities. The Evaluation Committee also reserves the right to waive mandatory requirements provided that all of the otherwise responsive proposals failed to meet the same mandatory requirements and the failure to do so does not otherwise materially affect the procurement. This right is at the sole discretion of the Evaluation Committee.

20. Change in Contractor Representatives

The Agency reserves the right to request a change in contractor representatives if the assigned representatives are not, in the opinion of the Agency, meeting its needs adequately.

21. Notice

The Procurement Code, Sections 13-1-28 through 13-1-199 NMSA 1978, imposes civil and misdemeanor criminal penalties for its violation. In addition, the New Mexico criminal statutes impose felony penalties for bribes, gratuities and kick-backs.

22. Agency Rights

The Agency reserves the right to accept all or a portion of an offeror's proposal.

23. Right to Publish

Throughout the duration of this procurement process and agreement term, potential offerors, and contractors must secure from the Agency written approval prior to the release of any information that pertains to the potential work or activities covered by this procurement or the subsequent agreement. Failure to adhere to this requirement may result in disqualification of the offeror's proposal or termination of the agreement.

24. Ownership of Proposals

All documents submitted in response to this Request for Proposals shall become the property of NMED and the State of New Mexico.

28. Service Schedules

The contractor may offer only equipment and services that are included on its individual Services Schedule (SS). The items included on the contractor's SS must be within the scope of the procurement. The contractors will be encouraged to amend their Services Schedules on a periodic basis to ensure that the items under agreement keep pace with advances in technology.

III. RESPONSE FORMAT AND ORGANIZATION

Number of Proposals

Only one proposal shall be submitted by each offeror for consideration.

Number of Copies

Offerors shall deliver one original, three identical copies including electronic media (CD), and

nine copies of their proposal on compact disc (CD) to the location specified in Section I on or before the closing date and time for receipt of proposals.

Proposal Format

Responses consisting solely of marketing material will be deemed non-responsive and rejected on that basis.

All proposals must be typewritten on standard 8 1/2 x 11 paper (larger paper is permissible for charts, spreadsheets, etc., but in no instance shall the paper exceed 11" x 17") and placed within a binder with tabs delineating each section. The appropriate supporting forms provided to the offeror in Appendices A, C and D must be completed. Proposals must be complete, and should be clear and brief. Each proposal will include the proposal on electronic media such as a compact disc (CD) Appendices C and D will be on a separate CD along with the hard copy inside the sealed envelope. All information on the CD must be in Adobe Acrobat, Microsoft Word, or Excel (2000) format.

1. Proposal Organization

The proposal must be organized and indexed in the following format and must contain, as a minimum, all listed items in the sequence indicated.

INDEX

TAB	CONTENTS
A)	Letter of Transmittal
B)	Table of Contents
C)	Proposal Summary (optional)
D)	Response to Technical and Business Specifications
E)	Response to Agency Terms and Conditions
F)	Offeror's Additional Terms and Conditions
G)	Other Supporting Material
H)	Cost Response Forms (Appendices C and D- See QAPP Appendix E) in a sealed envelope

Within each section of their proposal, offerors should address the items in the order in which they appear in this RFP. All forms provided in the RFP must be thoroughly completed and included in the appropriate section of the proposal.
All discussion of proposed costs, rates or expenses must occur only on the cost response form

(Appendix D- See QAPP Appendix E) and placed in a sealed envelope in section H of their proposal.

Any proposal that does not adhere to these requirements may be deemed non-responsive and rejected on that basis.

The proposal summary may be included by offerors to provide the Evaluation Committee with an overview of the technical and business features of the proposal; however, this material will not be used in the evaluation process unless specifically referenced from other portions of the offeror's proposal.

Offerors may attach other materials which they feel may improve the quality of their responses. However, these materials should be included as items in a separate appendix.

2. Letter of Transmittal

Each proposal must be accompanied by a letter of transmittal. The letter of transmittal MUST:

a) Identify the submitting organization;

b) Identify the name and title of the person authorized by the organization to contractually obligate the organization;

c) Identify the name, title and telephone number of the person authorized to negotiate the agreement on behalf of the organization;

d) Identify the names, titles and telephone numbers of persons to be contacted for clarification;

e) Explicitly indicate acceptance of the Conditions Governing the Procurement stated in Section II;

f) Be signed by the person authorized to contractually obligate the organization;

g) Acknowledge receipt of any and all amendments to this RFP.

IV. SPECIFICATIONS

Technical Specifications

This section contains technical and other relevant information concerning the tasks to be performed by the contractor.

Any offeror may submit a proposal for any or all technical specifications of this RFP.

For variations or exceptions, the offeror should respond in the form of a narrative to each specific deviation from the technical price sheet and sampling specifications in form. The narratives along with the required supporting material will be evaluated accordingly.

Offerors must include in the response, the ability to perform the analyses in Appendix D (- See QAPP Appendix E) within the criteria listed below. Offeror may also include other testing they do as well as tests with lower detection limits.

Offerors must describe how they will meet the quality assurance objectives of precision, accuracy, representativeness, completeness, and comparability,

Appropriate EPA or equivalent methods should be used for analysis of air (as either particulate or moisture), soil and water; offerors should identify the methods to be used, compounds that can be quantified with each method, and the detection limits and minimum quantification limits associated with the methods proposed on Appendix D - See QAPP Appendix E.

All methods for analysis of groundwater must have minimum detection limits (MDLs) that are $1/10^{th}$ of the State and Federal drinking water standards. Any analyses that cannot meet this MDL must be stated in the proposal.

Offerors should specify procedures for separating and concentrating sediment (greater than 0.45 um solids) from total water samples.

Offerors may propose modified EPA methods stating the significance of the modification and the EPA acceptance history.

Offerors must demonstrate their capability to perform radiological and chemical analysis of

biological samples such as plants, produce, fish and other animals.

Offerors must include chain-of-custody procedures, and willingness to include appropriate chain-of-custody forms along with sample results.

Offerors must consent to analyzing samples within the holding time specified by the appropriate EPA method.

Offerors must specify their ability to report data in hard copy form as well as electronically.

NMED has some need for Mobile Laboratory Services. Proposals should indicate if the offeror can provide mobile lab service and should include terms and a cost summary or fee schedule for such service.

Business Specifications

1. Offerors must consent to providing the Agency within five working days of verbal notice, at no extra cost, ice chests, sample containers, lab forms, field blanks, and shipping charges for five (5) or more samples. Offerors must also consent to analyzing field blanks included with five or more samples at no extra cost.

2. Offerors must consent to providing the Agency with electronic copies of their data at no extra cost; format to be negotiated with individual Bureaus.

3. Offerors must include in the proposal credentials of the key laboratory personnel responsible for analytical services. These credentials must include but may not be limited to the following: degrees and other pertinent training information, experience in the analytical field and familiarity with the methods listed in Appendix D - See QAPP Appendix E. Additional laboratory information should be included regarding facility size, instruments used for analysis, and administrative support staff.

4. Offerors must submit five (5) customer references for previous clients who have received similar services to those proposed by the offeror for this agreement. Each reference must include the organization name, name of contact person, address, telephone number and description of services provided. Current NMED personnel may not be used as references.

Named subcontractors and partners of your firm may not be used as references.

5. Offerors must submit a statement of qualifications, quality control/quality assurance (QA/QC) manual, detection limits, results of EPA proficiency (WP and WS) tests and Idaho National Engineering and Environmental Laboratory Mixed Analyte Performance Evaluation Program (MAPEP) or its equivalent, and a representative example of a complete analytical report. All QA/QC manuals and proficiency results may be provided in electronic form (CD) in lieu of paper copy.

6. Offerors must include a completed and signed financial history form (included as Appendix C) submitted in section H in a sealed envelope.

7. Offerors must include a completed Fee Schedule Form (Appendix D - See QAPP Appendix E) for the completion of all methods. A proposed service schedule and cost formula should also be included for methods not listed in Appendix D. The proposed costs must include sample preparation and digestion if required by the method. Appendix D (- See QAPP Appendix E) is an Excel 2000 spreadsheet that can be filled in electronically and submitted in section H inside the sealed envelope.

8. Offerors should include fixed rates for Mobile Laboratory Services.

9. Offerors must include any other element of cost that is appropriate for the procurement.

10. The agency does not and will not offer in-house support for work completed in response to this RFP or the resulting agreement.

11. If selected as a finalist, offerors agree to provide the Procurement Manager and the Evaluation Committee the opportunity to question the offeror representative and pertinent technical staff regarding any portion of the proposal at the oral presentation.

V. EVALUATION

Evaluation Point Summary

The following is a summary of evaluation factors and the point value assigned to each. These weighted factors will be used in the evaluation of the individual offeror proposals. Only finalist offerors will receive points for oral presentation.

Specification	**Points**	
1. Offeror performance on EPA Proficiency (WS and WP) Test, Offeror performance on Idaho National Engineering and Environmental Laboratory Mixed Analyte Performance Evaluation Program (MAPEP), or equivalent		150
2. Experience in Laboratory Services	25	
a. Offeror's organizational experience		
b. Proposed project staff members' technical experience	25	
c. References	25	
3. Detection Limits	50	
4. QA/QC Procedures	50	
5. Cost	400	
6. Oral presentation	50	
7. Ability to perform EPA methods and comprehensiveness of services available	50	
8. Ability to meet specified turnaround times	100	
9. Financial History based on Financial History Form (App. C)	75	
Total	1,000	possible points

Evaluation Factors

Points will be awarded on the basis of the following evaluation factors:

1. Offeror performance on EPA Proficiency (WS and WP) Test and Idaho National Environmental and Engineering Laboratories (INEEL) MAPEP (Mixed Analyte Performance Evaluation Program) or equivalent (150 points)

Points will be awarded based on the offeror's complete history of performance on EPA proficiency tests related to the methods listed in section IV. Explanations of non-proficiencies and descriptions of implementations leading to increased proficiencies will also be considered. Points will also be awarded to offeror's proposals based on performance on INEEL's Mixed Analyte Performance Evaluation Program. Offeror must provide complete history of performance and explanation as to equivalent certification. Explanations of non-proficiencies and descriptions of implementations leading to improved proficiencies will also be considered.

2. Experience in Laboratory Services

a. Offeror's organizational experience **(25 points)**

Points will be awarded based on the offeror's relevant organizational experience in accepting samples, analyzing samples and structure and thoroughness of data reports.

b. Proposed project staff members' technical experience **(25 points)**

Points will be awarded based on the experience of staff members responsible for accepting samples, analyzing samples and producing data reports.

c. References **(25 points)**

Points for references will be awarded based upon an evaluation of offeror's work for previous clients receiving similar services to those proposed by the offeror for the methods and MDLs listed in Appendix D - See QAPP Appendix E.

3. Detection Limits (50 points)

Points for offeror's detection limits will be awarded based on how offeror can meet method requirements and specific requirements listed in section IV and Appendix D - See QAPP Appendix E.

4. QA/QC Procedures (50 points)

Points will be awarded on the thoroughness of the offeror's Quality Control/Quality Assurance Manual.

5. Cost (400 points)

The evaluation of each offeror's cost proposal will be conducted using the following formula:

Lowest Responsive Offer x 400 (maximum points) = Award Points
This Offeror's Response

6. Oral presentation (50 points)
Finalist offerors will be awarded up to 50 points for their oral presentation based upon clarity of presentation, ability to answer technical questions and demonstrated understanding of the methods listed in Appendix D - See QAPP Appendix E.

7. Ability to perform EPA methods and comprehensiveness of services available. (50 points)

Points will be awarded based the offeror's ability to perform all of the methods listed in section IV and the comprehensiveness of the offeror's available services.

8. Ability to meet specified turnaround times. (100 points)

Offerors will be awarded points based on their ability to meet turnaround times (30 days from sample receipt to data report submittal for normal priority, 15 days for priority 2 and 24 hours for priority 1).

9. Financial History based on Financial History Form (75 points)

Points will be awarded based on the financial stability of the offeror based on the financial history form (Appendix C).

Evaluation Process

1. All offeror proposals will be reviewed for compliance with the mandatory requirements stated within the RFP. A mandatory checklist is located in Appendix E. Proposals deemed non-responsive will be eliminated from further consideration.

2. The Procurement Manager may contact the offeror for clarification of the response as specified in Section II.

3. The Evaluation Committee may use other sources of information to perform the evaluation as specified in Section II.

4. Responsive proposals will be evaluated on the factors in Section V, which have been assigned a point value. The responsible offerors with the highest scores will be selected as finalist offerors based upon the proposals submitted. Finalist offerors who are asked or choose to submit revised proposals for the purpose of obtaining best and final offers will have their points recalculated accordingly. Points awarded from the (oral presentations/oral presentations and product demonstrations) will be added to the previously assigned points to attain final scores. The top four (4) responsible offerors whose proposals are most advantageous to the NMED, taking into consideration the evaluation factors in Section V, will be recommended for agreement award to the State Purchasing Agent as specified in Section II.

Please note, however, that a serious deficiency in the response to any one factor may be grounds for rejection regardless of overall score.

APPENDIX A

Acknowledgment of Receipt Form

REQUESTS FOR PROPOSALS

ANALYTICAL LABORATORY SERVICES

In acknowledgment of receipt of this Request for Proposal the undersigned agrees that they have received a complete copy of the RFP including appendices.

The acknowledgment of receipt should be signed and returned to the Procurement Manager no later than **5:00 pm MST on January 05, 2006** via facsimile or US mail. Only potential offerors who elect to return this form completed with the indicated intention of submitting a proposal will receive copies of all offeror written questions and the Agency's written responses to those questions as well as RFP amendments, if any are issued.

FIRM: _____

REPRESENTED BY: _____

TITLE: _____ PHONE NO.: _____

E-MAIL: _____FAX NO.: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIP CODE: _____

SIGNATURE: _____ DATE: _____

This name and address will be used for all correspondence related to the Request for Proposal.

NMED Representative
NMED - DOE Oversight Bureau
PO Box 5400, MS 1396
Albuquerque, NM 87185-5400
(505) 845-5824 (Phone)
(505) 845-5853 (Fax)
NMED Representative@state.nm.us (e-mail)

APPENDIX B

CONTRACT EXAMPLE

STATE OF NEW MEXICO

DEPARTMENT OF ENVIRONMENT
PROFESSIONAL SERVICES PRICE AGREEMENT #

THIS AGREEMENT (Agreement) is made and entered into by and between the State of New Mexico, **Environment Department**, hereinafter referred to as the "Agency" and [insert name] **CONTRACTOR**, hereinafter referred to as the "Contractor".

IT IS MUTUALLY AGREED BETWEEN THE PARTIES*:*

1. Scope of Work.
   The Contractor shall perform the work outlined in the Scope of Work as follows:

Upon request of the Agency, the Contractor shall perform specified chemical analyses on soil, water, tissue and air samples delivered by the Agency to the Contractor's laboratory. These chemical analyses shall be performed in accordance with U.S. Environmental Protection Agency (EPA) methods including SW-846 (latest edition) and within EPA's method detection limits, or in accordance with methods approved in advance by the Agency. All routine chemical analyses results shall be reported to the Agency within thirty (30) days of delivery of the samples to the Contractor's laboratory. All samples shall be analyzed within the holding time specified by EPA standard methods for the particular chemical constituents. Special priority samples shall be analyzed as required by the Agency within a time frame specified by the Agency and agreed to by the Contractor.

All handling of samples submitted for chemical analyses to the Contractor's laboratory shall be documented in accordance with generally accepted chain-of-custody procedures. The Contractor shall provide the Agency, as soon as possible after the chemical analyses is completed, but in no event later than 30 days, a written sample result form and an electronic data deliverable in formats mutually agreeable to the Agency as well as all chain-of-custody documents. The Contractor shall be responsible for the disposal of all samples, but shall not dispose of samples for at least thirty (30) days after delivery of the sample results form to the Agency, unless otherwise specified by the Agency.

Upon the request of the Agency, the Contractor shall make available to the Agency, laboratory personnel who performed particular chemical analyses for the purpose of providing oral or written testimony in administrative or legal proceedings. Request For Proposal No.60-667-55-01754 and the Contractor's proposal are incorporated by reference into this Agreement and are made part of this Agreement. In addition, any work requested by the Agency through submission of a Chain-Of-Custody Form will become part of this Agreement. In the event of any conflict among these documents, the following order of precedence shall apply:

(1) The terms and conditions of this Agreement;
(2) The Chain-of-Custody Form;
(3) The Request for Proposals;
(4) The Contractor's Proposal;
(5) The Contractor's Standard agreement terms and conditions (which may or may not have been submitted as part of the contractor's proposal).

Performance Measures, default by Contractor – Contractor shall substantially perform the Performance Measures set forth in **Attachment 1**. In the event the Contractor fails to obtain the results described in **Attachment 1**, the Agency may provide written notice to the Contractor of the default and specify a reasonable period of time in which the Contractor shall advise the Agency of specific steps that it will take to achieve these results in the future and the timetable for implementation. Nothing in this subparagraph shall be construed to prevent the Agency from exercising its right pursuant to Paragraph 4 below.

2. Compensation.

A. The Agency shall pay to the Contractor in full payment for services satisfactorily performed pursuant to the Scope of Work at a rate listed in Appendix D - See QAPP Appendix E. The New Mexico gross receipts tax levied on the amounts payable under this Agreement shall be paid by the Agency to the Contractor. Payment is subject to availability of funds pursuant to the Paragraph 5 set forth below and to any negotiations between the parties from year to year pursuant to Paragraph 1, Scope of Work, and to approval by the Department of Finance and Administration (DFA).

B. The Agency shall pay the Contractor upon receipt of a detailed statement of accounting for services performed and expenses incurred hereunder.

C. Within fifteen days after the date the Agency receives written notice from the Contractor that payment is requested for services or items of tangible personal property delivered on site and received, the Agency shall issue a written certification of complete or partial acceptance or rejection of the services or items of tangible personal property. If the Agency finds that the services or items of tangible personal

property are not acceptable, it shall, within thirty days after the date of receipt of written notice from the Contractor that payment is requested, provide to the Contractor a letter of exception explaining the defect or objection to the services or delivered tangible personal property along with details of how the Contractor may proceed to provide remedial action. Upon certification by the Agency that the services or items of tangible personal property have been received and accepted, payment shall be tendered to the Contractor within thirty days after the date of certification. If payment is made by mail, the payment shall be deemed tendered on the date it is postmarked. After the thirtieth day from the date that written certification of acceptance is issued, late payment charges shall be paid on the unpaid balance due on the contract to the Contractor at the rate of 1.5% per month.

Payment shall be made upon receipt of detailed, certified Statement of Account. All invoices shall be submitted by Contractor to the Bureau of the Agency that submitted the samples.

D. The Agency shall compensate the Contractor for work satisfactorily performed hereunder in accordance with the fee schedule submitted by the Contractor and attached hereto as Appendix D - See QAPP Appendix E. Invoices shall be submitted by the Contractor on a monthly basis. The Agency shall have forty-five (45) days after receipt of said invoice within which to declare such work to be satisfactory and submit payment in accordance with the fee schedule which appears as Appendix D - See QAPP Appendix E. In the event the Agency finds any such work unsatisfactory, notice thereof will be tendered to Contractor within thirty (30) days of the date of the invoice in question, and the Agency shall provide a listing of its objections to the work in said written notice. In this instance, payment will only be forwarded for that portion of the work which the Agency deems satisfactory. The Contractor shall have ten working days to cure the cause or causes of such dissatisfaction. Upon cure, the Agency shall tender the remaining payment of the invoice. Final payment is subject to the release requirements set out in paragraph 9 of this Agreement.

E. The Contractor shall provide the Agency within five working days of verbal notice, at no extra cost, ice chests, sample containers, lab forms, field blanks, and shipping charges for five (5) or more samples.

F. Field blanks included with five (5) or more samples shall be analyzed at no extra cost to the Agency.

G. Invoices shall include site specific cost center codes which will be furnished by the Agency on sample sheets. The Agency shall be responsible for completing the sample sheet correctly so that the invoice can be routed to the appropriate Bureau

within the Agency. Contractor shall not accept a sample sheet without specific cost center code(s) on them.

H. Sample results shall be reported to the appropriate Agency representative at the address shown on the Chain-Of-Custody form within thirty (30) days for normal priority samples, within fourteen (14) days for priority 2 samples, and within 24 hours for priority 1 samples. Surcharges for priority 1 and 2 samples are included in appendix I. Cost for normal priority samples not received within a thirty calendar day turnaround time shall be reduced at a rate of 10% of the standard rate of the overdue analysis for each additional work week up to 50% of the total cost of the analysis. Samples not analyzed within the required holding time shall not be billed for payment to the Agency.

I. Payment of taxes for any money received under this Agreement shall be the Contractor's sole responsibility and shall be reported under the Contractor's federal and state tax identification numbers. The Contractor may invoice the Agency for New Mexico gross receipts tax or local option taxes for services.

3. Term.

THIS AGREEMENT SHALL NOT BECOME EFFECTIVE UNTIL APPROVED BY THE DEPARTMENT OF FINANCE AND ADMINISTRATION. This Agreement shall terminate on April 18, 2008, unless terminated pursuant to paragraph 4 or paragraph 5 herein. The State Purchasing Agent may extend this Agreement for one - two year term, after the Agency gives the Contractor written notice at least forty-five (45) prior to the expiration of the then-current term. The renewal acceptance and Service Schedule (SS or Appendix D - See QAPP Appendix E) must be delivered to the State Purchasing Division for processing fifteen (15) days prior to the expiration date. With exception of price, all terms and conditions of this Agreement shall apply to any option terms exercised by the Agency. Changes to terms and conditions are subject to mutual acceptance. In accordance with Section 13-1-150 NMSA 1978, no contract term, including extensions and renewals, shall exceed four years, except as set forth in Section 13-1-150 NMSA 1978.

4. Termination.

A. Termination

This Agreement may be terminated by either of the parties hereto upon written notice delivered to the other party at least thirty (30) days prior to the intended date of termination. By such termination, neither party may nullify obligations already incurred for performance or failure to perform prior to the date of termination. This Agreement may be terminated immediately upon written notice to the Contractor, if

the Contractor becomes unable to perform the services contracted for, as determined by the Agency or if, during the term of this Agreement, the Contractor or any of its officers, employees or agents is indicted for fraud, embezzlement or other crime due to misuse of state funds. *THIS PROVISION IS NOT EXCLUSIVE AND DOES NOT WAIVE THE STATE'S OTHER LEGAL RIGHTS AND REMEDIES CAUSED BY THE CONTRACTOR'S DEFAULT OR BREACH OF THIS AGREEMENT.*

B. Termination Management

Immediately upon receipt by either the Agency or the Contractor of notice of termination of this Agreement, the Contractor shall: 1) not incur any further obligations for salaries, services or any other expenditure of funds under this Agreement without written approval of the Agency; 2) comply with all directives issued by the Agency in the notice of termination as to the performance of work under this Agreement; and 3) take such action as the Agency shall direct for the protection, preservation, retention or transfer of all property titled to the Agency and [client records generated under this Agreement]. Any non-expendable personal property or equipment purchased by the Contractor with contract funds shall become property of the Agency upon termination. On the date the notice of termination is received, the Contractor shall furnish to the Agency a complete, detailed inventory of non-expendable personal property purchased with funds provided under this Agreement and previous Agency agreements with the Contractor; the property listed in the inventory report including client records and a final closing of the financial records and books of accounts which were required to be kept by the Contractor under the paragraph of this Agreement regarding financial records.

5. Appropriations.

The terms of this Agreement are contingent upon sufficient appropriations and authorization being made by the Legislature of New Mexico for the performance of this Agreement. If sufficient appropriations and authorization are not made by the Legislature, this Agreement shall terminate immediately upon written notice being given by the Agency to the Contractor. The Agency's decision as to whether sufficient appropriations are available shall be accepted by the Contractor and shall be final. If the Agency proposes an amendment to the Agreement to unilaterally reduce funding, the Contractor shall have the option to terminate the Agreement or agree to the reduced funding within thirty (30) days of receipt of the proposed amendment.

6. Warranties

The contractor shall provide the Agency with the following warranties:

A. Service Warranty

The Contractor warrants that service will be provided in a workmanlike manner by qualified technicians in accordance with EPA methods or industry accepted methods where EPA methods do not apply.

B. Guaranteed Turn-Around Time

The Contractor warrants that all routine chemical analyses data results will be delivered to the Agency within the specified time as stated in paragraph 1 of this Agreement.

7. Status of Contractor.
The Contractor and its agents and employees are independent contractors performing professional services for the Agency and are not employees of the State of New Mexico. The Contractor and its agents and employees shall not accrue leave, retirement, insurance, bonding, use of state vehicles, or any other benefits afforded to employees of the State of New Mexico as a result of this Agreement. The Contractor acknowledges that all sums received hereunder are personally reportable by it for income tax purposes as self-employment or business income and are reportable for self-employment tax [**CHOICE** – unless the contract is between two public entities].

8. Assignment.
The Contractor shall not assign or transfer any interest in this Agreement or assign any claims for money due or to become due under this Agreement without the prior written approval of the Agency.

9. Subcontracting.
The Contractor shall not subcontract any portion of the services to be performed under this Agreement without the prior written approval of the Agency.

10. Release.
The Contractors acceptance of final payment of the amount due under this Agreement shall operate as a release of the Agency, its officers and employees, and the State of New Mexico from all liabilities, claims and obligations whatsoever arising from or under this Agreement. The Contractor agrees not to purport to bind the State of New Mexico unless the Contractor has express written authority to do so, and then only within the strict limits of that authority.

11. Confidentiality.
Any confidential information provided to or developed by the Contractor in the performance of this Agreement shall be kept confidential and shall not be made available to any

individual or organization by the Contractor without the prior written approval of the Agency.

12. Product of Service -- Copyright.
All materials developed or acquired by the Contractor under this Agreement shall become the property of the State of New Mexico and shall be delivered to the Agency no later than the termination date of this Agreement. Nothing produced, in whole or in part, by the Contractor under this Agreement shall be the subject of an application for copyright or other claim of ownership by or on behalf of the Contractor.

13. Conflict of Interest.
The Contractor warrants that it presently has no interest and shall not acquire any interest, direct or indirect, which would conflict in any manner or degree with the performance or services required under the Agreement. The Contractor certifies that the requirements of the Governmental Conduct Act, Sections 10-16-1 through 10-16-18, NMSA 1978, regarding contracting with a public officer or state employee or former state employee have been followed.

14. Amendment.
This Agreement shall not be altered, changed or amended except by instrument in writing executed by the parties hereto.

15. Changes to the Equipment and Service/Fee Schedule

After the initial Service/Fee Schedule (Appendix D - See QAPP Appendix E) has been accepted by the Agency and filed with the State Purchasing Division, the Contractor may change the prices for equipment and services subject to the following provisions:

A. The Contractor shall not raise prices for products or services during the term of the Agreement.

B. If the Contractor lowers the price of any product or service, the Contractor may subsequently raise the price back to the original price but no higher. Published price reductions must be offered to the Agency at the time of the announced reduction and must be submitted to the State Purchasing Division as soon as practicable after the effective date of the reductions.

C. The Contractor may request permission to add new products and services to the Service/Fee Schedule provided that the pricing is agreed to between the Agency and the Contractor and the new products and services are within the scope of the procurement as

defined in the Request for Proposals. Additions to the Service/Fee Schedule must be submitted to the contract administrator for review and approval. All items added must be deliverable within sixty (60) days of receipt of a purchase order.

D. Upon ninety (90) days written notice to the Agency, the contractor may withdraw any product or service from the Service/Fee Schedule. Once withdrawn, the product or service may not be resubmitted during the then-current term of the Agreement. Approval of resubmitted items is at the sole discretion of the Agency.

E. The Agency reserves the right to require demonstrations of new products before allowing them to be added to the Service/Fee Schedule and to reject products that the Agency believes to be inappropriate for use by the Agency. All such demonstrations must be conducted in Santa Fe or Albuquerque, New Mexico. Except for travel by State employees, the direct expense for such demonstrations is the sole obligation of the Contractor.

F. All changes to the Service/Fee Schedule must be filed with the State Purchasing Division to become effective.

G. The contract administrator shall be responsible for management of the Agreement and the Service/Fee Schedule. The contract administrator shall be responsible for filing all changes to the Service/Fee Schedule with the State Purchasing Division. The contract administrator shall be responsible for initiating any extensions of the Agreement as described in paragraph 4 of this Agreement.

16. Merger.

This Agreement incorporates all the agreements, covenants and understandings between the parties hereto concerning the subject matter hereof, and all such covenants, agreements and understandings have been merged into this written Agreement. No prior agreement or understanding, oral or otherwise, of the parties or their agents shall be valid or enforceable unless embodied in this Agreement.

17. Penalties.

The Procurement Code, Sections 13-1-28 through 13-1-199, NMSA 1978, imposes civil and criminal penalties for its violation. In addition, the New Mexico criminal statutes impose felony penalties for illegal bribes, gratuities and kickbacks.

18. Equal Opportunity Compliance.

The Contractor agrees to abide by all federal and state laws and rules and regulations, and executive orders of the Governor of the State of New Mexico, pertaining to equal employment opportunity. In accordance with all such laws of the State of New Mexico, the

Contractor agrees to assure that no person in the United States shall, on the grounds of race, religion, color, national origin, ancestry, sex, age, physical or mental handicap, or serious medical condition, or, if the employer has fifty or more employees, spousal affiliation, or, if the employer has fifteen or more employees, sexual orientation or gender identity, be excluded from employment with or participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity performed under this Agreement. If Contractor is found not to be in compliance with these requirements during the life of this Agreement, Contractor agrees to take appropriate steps to correct these deficiencies.

19. Applicable Law.
The laws of the State of New Mexico shall govern this Agreement.

20. Workers Compensation.
The Contractor agrees to comply with state laws and rules applicable to workers compensation benefits for its employees. If the Contractor fails to comply with the Workers Compensation Act and applicable rules when required to do so, this Agreement may be terminated by the Agency.

21. Records and Financial Audit.
The Contractor shall maintain detailed time and expenditure records that indicate the date; time, nature and cost of services rendered during the Agreement's term and effect and retain them for a period of three (3) years from the date of final payment under this Agreement. The records shall be subject to inspection by the Agency, the Department of Finance and Administration and the State Auditor. The Agency shall have the right to audit billings both before and after payment. Payment under this Agreement shall not foreclose the right of the Agency to recover excessive or illegal payments. [**CHOICE** - If, pursuant to this Agreement, the Contractor receives federal funds subject to the Single Audit Act, the Contractor shall submit to the Agency an audit conducted by a certified public accountant in compliance with the Single Audit Act.]

22. Indemnification.
The Contractor shall defend, indemnify and hold harmless the Agency and the State of New Mexico from all actions, proceeding, claims, demands, costs, damages, attorneys' fees and all other liabilities and expenses of any kind from any source which may arise out of the performance of this Agreement, caused by the negligent act or failure to act of the Contractor, its officers, employees, servants, subcontractors or agents, or if caused by the actions of any client of the Contractor resulting in injury or damage to persons or property during the time when the Contractor or any officer, agent, employee, servant or subcontractor thereof has or is performing services pursuant to this Agreement. In the event that any action, suit or proceeding related to the services performed by the Contractor or any

officer, agent, employee, servant or subcontractor under this Agreement is brought against the Contractor, the Contractor shall, as soon as practicable but no later than two (2) days after it receives notice thereof, notify the legal counsel of the Agency and the Risk Management Division of the New Mexico General Services Department by certified mail.

23. Notices.

Any notice required to be given to either party by this Agreement shall be in writing and shall be delivered in person, by courier service or by U.S. mail, either first class or certified, return receipt requested, postage prepaid, as follows:

To the Agency: Mr. Ron Curry, Secretary
New Mexico Environment Department
Harold Runnels Building
1190 St. Francis Drive, PO Drawer 26110
Santa Fe, New Mexico 87502-0100

To the Contractor: [insert name, address and email].

IN WITNESS WHEREOF, parties have executed this Agreement as of the date of signature by the DFA Contracts Review Bureau, below.

By: _____ Date:_____
Agency

By: _____ Date:_____
Agency's Legal Counsel –Certifying legal sufficiency

By: _____ Date: _____
Contractor

The records of the Taxation and Revenue Department reflect that the Contractor is registered with the Taxation and Revenue Department of the State of New Mexico to pay gross receipts and compensating taxes.

ID Number: **00-000000-00-0**

By: _____ Date:_____
Taxation and Revenue Department

This Agreement has been approved by the DFA Contracts Review Bureau:

By: _____ Date:_____

DFA Contracts Review Bureau

Attachment One

Scope of Work

Performance Measures

Bureau: Hazardous Waste

Key FY06 Performance Objectives

- *Increase the number of hazardous waste generator inspections completed where needed.* These contacts are crucial for reducing hazardous waste generation and ensuring better management of hazardous waste throughout the state.
- *Complete most if not all DOE generator site audits for WIPP on which agency action will be taken within 45 days.* DOE cannot ship waste until these highly technical and complex audits are approved by NMED. This measure will help track individual program efficiency at reviewing and evaluating waste entering New Mexico for permanent disposal at the WIPP facility.
- *Notify Federal facilities of any cases of agency action on document submittals within the timeframes specified in the executed consent orders.* This measure will increase NMED's success at reviewing and taking action (e.g., approval, denial, approval with modifications or conditions) on documents submitted by the facilities that demonstrate cleanup progress.

Bureau: Ground Water

Key FY06 Performance Objectives

- *Increase the number of permitted facilities receiving field inspections for more effective implementation of ground water protection requirements.* These actions will minimize the quantities of ground water throughout the state that are likely to be degraded by waste discharges and reduce the likelihood of drinking water supplies becoming polluted, thereby enhancing the protection of human health.
- *Significantly increase the number of permitted facilities where monitoring results do not exceed standards.* By specifically increasing the number of facilities that have successfully prevented ground water pollution, the availability of high-quality ground water supplies is maximized. These actions will help preserve drinking water supplies for present and future generations of New Mexicans. Also, private and public sector financial resources that would have been used for cleanup activities can be redirected to other initiatives that improve environmental quality (such as groundwater) thus helping protect the health of New Mexico residents.

Bureau: Surface Water

Key FY06 Performance Objectives

- *Determine if State Standards for Interstate and Intrastate Streams (including lakes) are met and that designated uses are supported* while conducting intensive water quality surveys of select watersheds each year. The information generated by these surveys aid to preparation of the biennial Clean Water Act list of impaired waters and the CWA report to Congress which provides an overview of New Mexico's water quality and its associated programs.
- *Address nonpoint source pollution impairing streams and develop watershed restoration plans that incorporate best management practices.* These watershed restoration efforts will help improve surface water quality.

Bureau: Drinking Water

Key FY06 Performance Objectives

- *Complete drinking water chemical samplings within the regulatory timeframe.* This allows for actions to be taken to prevent exposure to contaminants in drinking water that are harmful to humans.
- *Inspect public drinking water systems within one week of notification of system problems that might impact public health.* The application of performance measures for this activity is warranted to ensure and improve response time to prevent critical health impacts that can effect a large population.
- *Require compliance of public water systems with acute maximum contaminant levels.* This compliance will effectively prevent public exposure to harmful contaminants in drinking water.

Bureau: Radiation Control

Key FY06 Performance Objectives

- *Complete license inspections and radiation producing machine inspections within Nuclear Regulatory Commission (NRC) and Food and Drug Administration (FDA) guidelines.* In New Mexico, meeting or exceeding the U.S. Nuclear Regulatory Commission and the U.S. Food and Drug Administration (FDA) guidelines for inspection frequency will assure protection of workers and the public from ionizing radiation.

Bureau: Air Quality

Key FY06 Performance Objectives

- *Improve visibility at all monitored locations in New Mexico based on a rolling average of the previous four quarters.* These improvements will help New Mexico achieve the Congress national visibility goal (through the federal regional haze rule) to steadily improve visibility in national parks and wildness areas where an important aesthetic value is the view.
- *Require corrective action from most if not all facilities to mitigate any air quality violations discovered as a result of inspections.* Immediate and appropriate corrective action by facilities that contribute to air pollution and are out of compliance with regulations or their permit will help protect human health and the environment.
- *Allow only 8 days (or fewer) per year in which the EPA's Air Quality Index (AQI) rating exceeds 100 exclusive of natural events and provide a list of these days with an explanation for occurrence or the need for further study.* This measure will help ensure that local air quality is safe for the health of the people of New Mexico.
  Note: Natural events include wildfires and dust storms that can sometimes cause particulate AQI values to exceed 100. Days that exceed AQI are grouped annually because they do not occur evenly over the calendar quarters.

Bureau: Petroleum Storage Tanks Bureau

Key FY06 Performance Objectives

- *Confirm at least half of all releases from leaking storage tank sites that are undergoing assessment or corrective action and enforcement related to corrective action.* This confirmation allows tracking of remediation actions and progress directly funded by the Corrective Action Fund.
- *Require significant operational compliance of underground storage tank facilities with release prevention (spill, overfill, and corrosion protection) and release detection regulations of the Petroleum Storage Tank regulations.* This statistic is a direct measure of actions designed to prevent a petroleum product release from occurring. Compliance with these requirements allows a facility to access the Corrective Action Fund for remediation purposes in the case of a release at the facility.
  Note: The significant operational compliance performance measure will be calculated for the total number of facilities inspected during the reporting period.

APPENDIX C

Three Year Financial Form

Offeror Name:

Measure	Year 1 (2002)	Year 2 (2003)	Year 3 (2004)
Total Current Assets			
Total Current Liabilities			
Cash and Equivalents			
Trade Receivables			
Net Sales			
Cost of Sales			
Annual Interest Expenses			
Earnings before Interest and Taxes			
Net Fixed Assets			

Tangible Net Worth			
Profit before Taxes			
Total Assets			

Signature of Authorized Representative: _____

Additional space available on this page

Appendix E. NMED Fee Schedule (referred to as Appendix D in RFP)

Price Agreement No. 60-667-55-01754

Edited 3/7/08 LRS to add approved new LIC's
New LIC's added 4/15/08
New LIC's added 5/12/08
New LIC's added 5/16/08
New LIC's added 9/10/08
New LIC's added 10/30/08

m Detection Limits

Mod2	2/25/08
Mod 3	4/15/08
Mod 4	5/21/08
Mod 6	6/06/08
Mod 8	10/23/08
Mod 9	12/09/08

Paragon Analytics

Line Item	Analytical Method	Sub-contracor	Short Description	Cost/ water sample/ test	MDL/MDA for water	Cost/ solid sample/ test	MDL/MDA for solid	Cost/ air sample/ test	MDL/MDA for air	Cost/ biota sample/ test	MDL/MDA for biota
1			Level 4 QA/QC packet	7%	NA	7%	NA	7%	NA	7%	NA
2			Shipping at cost not to exceed	BID		BID		BID		BID	
3			InternationalCustoms Fee								
4			24 hour turnaround	2.5X		2.5X		2.5X		2.5X	
5			72 hour turn around	2.25X		2.25X		2.25X		2.25X	
6			1 week or less turnaorund	1.75X		1.75X		1.75X		1.75X	
7			2 week or less turnaround	1.5X		1.5X		1.5X		1.5X	

Notes:

All rush samples require laboratory approval prior to sample receipt.

Estimated Rush Turn Around Surcharges:

Priorit	24 hour 2.5 x listed price
Priorit	72 hour (3 business days) 2.25 x listed price
Priorit	5 business days 1.75 x listed price
Priorit	10 business days 1.5 x listed price

ORGANICS											
100	25-D		Total Volatile Organics (minimum of 10 samples)								
101	8260-B		Volatile Organics Compounds (VOCs)	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
102	8260-B-TCL		VOC-Target Compound List	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
103	8260-B		Volatile Organics, GC/MS (Hazardous Waste)	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
104	8260		Appendix IX VOCs (Some compounds identified & quantified as TICs)***(Appx IX compounds are not routine, please inquire for current capacity.)***	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.

Price Agreement No. 60-667-55-01754

Edited 3/7/08 LRS to add approved new LIC's
New LIC's added 4/15/08
New LIC's added 5/12/08
New LIC's added 5/16/08
New LIC's added 9/10/08
New LIC's added 10/30/08

m Detection Limits

Mod2	2/25/08
Mod 3	4/15/08
Mod 4	5/21/08
Mod 6	6/06/08
Mod 8	10/23/08
Mod 9	12/09/08

Paragon Analytics

Line Item	Analytical Method	Sub-contracor	Short Description	Cost/ water sample/ test	MDL/MDA for water	Cost/ solid sample/ test	MDL/MDA for solid	Cost/ air sample/ test	MDL/MDA for air	Cost/ biota sample/ test	MDL/MDA for biota
105	5035		Prep Method for 8260	NA				NB		NA	
106	Synthetic Organic Compounds (SOC)		No.1 Group Pricing for Methods 504.1; 505, 515.3; 524.2; 525.2; 531.1; 547; 548.1; 549.2, & 552.2	NB		NB		NB		NB	
107	Synthetic Organic Compounds (SOC)		No.2 Group Pricing for Methods 504.1; 505, 515.3; 524.2; 525.2; 531.1; 547; 548; & 549	NB		NB		NB		NB	
108			Encore samplers	NA		BID	per sampler	NA		NA	
110	8280/8290	AXYS	Dioxins and Furans MDL: 1.0-5.0 pg/L (water) 0.1-0.5 pg/g (soil,seds,tissue)	BID	1.0-5.0 pg/L	$850.00	0.1-0.5 pg/g	BID	1.0-5.0 pg/sample	BID	0.1-0.5 pg/g
111	1613B/8290	AXYS	Dioxins and Furans Incl. DB5 primary inst. run & DB225 confirm. run for 2,3,7,8 TCDF MDL: 1.0-5.0 pg/L (water) 0.1-0.5 pg/g (soil,seds,tissue)	BID	1.0-5.0 pg/L	BID	0.1-0.5 pg/g	BID	1.0-5.0 pg/sample	BID	0.1-0.5 pg/g
112		AXYS	Single Dioxin (2,3,7,8)	BID	1.0 pg/L	BID	0.1 pg/g	BID	1.0 pg/samp	BID	0.1 pg/g
115	8270C		Semi-Volatile Organics	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
116	8270		Append. IX SVOCs (Some compounds identified & quantified as TICs) ***(Appx IX compounds are not routine, please inquire for current capacity.)***	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.

Price Agreement No. 60-667-55-01754

Edited 3/7/08 LRS to add approved new LIC's
New LIC's added 4/15/08
New LIC's added 5/12/08
New LIC's added 5/16/08
New LIC's added 9/10/08
New LIC's added 10/30/08

m Detection Limits

Mod2	2/25/08
Mod 3	4/15/08
Mod 4	5/21/08
Mod 6	6/06/08
Mod 8	10/23/08
Mod 9	12/09/08

Paragon Analytics

Line Item	Analytical Method	Sub-contracor	Short Description	Cost/ water sample/ test	MDL/MDA for water	Cost/ solid sample/ test	MDL/MDA for solid	Cost/ air sample/ test	MDL/MDA for air	Cost/ biota sample/ test	MDL/MDA for biota
120	8081/8082		Organochlorine Pesticides & PCBs	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
121	8081-B		Organochlorine Pesticides only	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
122			MS Confirmation	BID	NA	BID	NA	NB		BID	NA
123	8081B/608		Organochlorine Pesticides only	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
124	8081-B Modified for isotope dilution LR/GCMS	AXYS	PCB Congeners (209) MDL: 0.1-5.0 ng/L (water) 0.1-5.0 ng/g (soils & seds) 0.1-5.0 ng/g (tissue)	BID	1.0-5.0 ng/L	BID	0.1-0.5 ng/g	BID	1.0-5.0 ng/sample	BID	0.1-0.5 ng/g
125	8081-B Modified for isotope dilution LR/GCMS	AXYS	PCB as Aroclors MDL: 0.1-5.0 ng/L (water) 0.1-5.0 ng/g (soils & seds) 0.1-5.0 ng/g (tissue)	BID	10 ng/L	BID	1.0 ng/g	BID	10 ng/sample	BID	1.0 ng/g
126	8082		PCBs only	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
127	8082	AXYS	PCBs, only MDL: 10-20 ng/L 1-5 ng/g (soils/seds) 1-5 ng/g (tissue)	BID	1.0-5.0 ng/L	BID	0.1-0.5 ng/g	BID	1.0-5.0 ng/sample	BID	1.0-5.0 ng/g
128	8082	AXYS	PCB Congeners (209) MDL:0.1-5 ng/g **ADD**	BID	1.0-5.0 ng/L	BID	0.1-0.5 ng/g	BID	1.0-5.0 ng/sample	BID	0.1-0.5 ng/g
	8081/8082 Modified										
130a		AXYS	GC/HRMS PCB Congeners (209) MDL: 0.1-5 ng/g**ADD**	BID	MDL: 1.0-5.0 pg/L	BID	MDL: 0.1-0.5 pg/g	BID	MDL: 1.0-5.0 pg/samp	BID	MDL: 0.1-0.5 pg/g
130b		AXYS	PCB Congeners (Toxic list) **ADD**	BID	MDL: 1.0-5.0 pg/L	BID	MDL: 0.1-0.5 pg/g	BID	MDL: 1.0-5.0 pg/samp	BID	MDL: 0.1-0.5 pg/g

Price Agreement No. 60-667-55-01754

Edited 3/7/08 LRS to add approved new LIC's
New LIC's added 4/15/08
New LIC's added 5/12/08
New LIC's added 5/16/08
New LIC's added 9/10/08
New LIC's added 10/30/08

m Detection Limits

Mod2	2/25/08
Mod 3	4/15/08
Mod 4	5/21/08
Mod 6	6/06/08
Mod 8	10/23/08
Mod 9	12/09/08

Paragon Analytics

Line Item	Analytical Method	Sub-contracor	Short Description	Cost/ water sample/ test	MDL/MDA for water	Cost/ solid sample/ test	MDL/MDA for solid	Cost/ air sample/ test	MDL/MDA for air	Cost/ biota sample/ test	MDL/MDA for biota
130c		AXYS	Organochlorine Pesticides**ADD**	BID	1.0-5.0 ng/L	BID	0.1-1.0 ng/g	BID	1.0-5.0 ng/samp	BID	0.1-1.0 ng/g
130d		AXYS	PDBE (from a 1668A extract) **ADD**	BID	MDL: 2-200 pg/L, 3000 pg/L for PBDPE209	BID	MDL: 0.2-20 pg/g, 300 pg/g for PBDPE209	BID	MDL: 2-200 pg/sample, 3000 pg/sample for PBDPE209	BID	MDL: 0.2-20 pg/g, 300 pg/g for PBDPE209
130e		AXYS	% Lipid **ADD**	BID	NA	BID	NA	BID	NA	BID	NA
130f		AXYS	Homogenization	BID	NA	BID	NA	BID	NA	BID	NA
130g	Varies	AXYS	Extra Extraction PCB/Dioxin	BID	NA	BID	NA	BID	NA	BID	NA
130h		Test America Knoxville	GC/HRMS PCB Congeners (209) MDL: 0.1-5 ng/g **Level 2 package**	BID	MDL: 1.0-5.0 pg/L	BID	MDL: 1.0-5.0 pg/L	NB		NB	
130i		Test America Knoxville	GC/HRMS PCB Congeners (209) MDL: 0.1-5 ng/g **Level 4 package**	BID	MDL: 1.0-5.0 pg/L	BID	MDL: 1.0-5.0 pg/L	NB		NB	
131	1668A	AXYS	PCBs as congeners only (209), SPB Octyl run included	BID	MDL: 1.0-5.0 pg/L	BID	MDL: 0.1-0.5 pg/g	BID	MDL: 1.0-5.0 pg/samp	BID	MDL: 0.1-0.5 pg/g
132		AXYS	PCBs as congeners only (54)	BID	MDL: 1.0-5.0 pg/L	BID	MDL: 0.1-0.5 pg/g	BID	MDL: 1.0-5.0 pg/samp	BID	MDL: 0.1-0.5 pg/g
133		AXYS	DBI Confirmation	BID	MDL: 1.0-5.0 pg/L	BID	MDL: 0.1-0.5 pg/g	BID	MDL: 1.0-5.0 pg/samp	BID	MDL: 0.1-0.5 pg/g
134	HR/GCMS	AXYS	MDL: 1-10 pg/L (water) 1-5 ng/g (soils/seds & tissues)	NB		NB		NB		NB	
135		AXYS	WHO Tox List 1-10 pg/L (water) 1-5 ng/g (soils/seds & tissues)	BID	MDL: 1.0-5.0 pg/L	BID	MDL: 0.1-0.5 pg/g	BID	MDL: 1.0-5.0 pg/samp	BID	MDL: 0.1-0.5 pg/g

Select Annotations

Price Agreement No. 60-667-55-01754

Edited 3/7/08 LRS to add approved new LIC's
New LIC's added 4/15/08
New LIC's added 5/12/08
New LIC's added 5/16/08
New LIC's added 9/10/08
New LIC's added 10/30/08

m Detection Limits

Mod2	2/25/08
Mod 3	4/15/08
Mod 4	5/21/08
Mod 6	6/06/08
Mod 8	10/23/08
Mod 9	12/09/08

Paragon Analytics

Line Item	Analytical Method	Sub-contracor	Short Description	Cost/ water sample/ test	MDL/MDA for water	Cost/ solid sample/ test	MDL/MDA for solid	Cost/ air sample/ test	MDL/MDA for air	Cost/ biota sample/ test	MDL/MDA for biota
136		AXYS	PCB 209 Congeners ADD	BID	MDL: 1.0-5.0 pg/L	BID	MDL: 0.1-0.5 pg/g	BID	MDL: 1.0-5.0 pg/samp	BID	MDL: 0.1-0.5 pg/g
140	EPA 1614 draft	AXYS	Polybrominated Diphenyl Ethers (PBDEs) by GC/HRMS	BID		BID		NB		BID	
141	8270		Polybrominated Diphenyl Ethers (PBDE)								
142	8141		Organophosphorus Pesticides	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
143	8151		Chlorinated Herbicides, Alt. Method 8151/1658 prep	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
144	LR- GCMS	AXYS	Nonylphenols	BID		NB		NB		NB	
150	9020		Total Organic Halogens	NB		NB		NB		NB	
151	8330		Nitroaromatics and Nitrosamines	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
152	531.1		Carbamate Pesticides	NB		NB		NB		NB	
153	EPA 532		Carbamate Pesticides (Urea = Diuron & Linuron)	NB		NB		NB		NB	
154	EPA 556		Formaldehyde -LC	NB		NB		NB		NB	
155	NIOSH		Formaldehyde - Wet Chemistry	NB		NB		NB		NB	
156	8310/8270 SIMS		PNAs (PAHs) including Benzo-a Pyrene, napthalene, monomethyl napthalenes (BaP < 0.7)	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
157	8011		EDB & DBCP (equivalent to Method 504.1) low level(by 8260B)	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
158	8021-B (SHORT)		EDB and EDC(by 8260B)	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.

Price Agreement No. 60-667-55-01754

Edited 3/7/08 LRS to add approved new LIC's
New LIC's added 4/15/08
New LIC's added 5/12/08
New LIC's added 5/16/08
New LIC's added 9/10/08
New LIC's added 10/30/08

m Detection Limits

Mod2	2/25/08
Mod 3	4/15/08
Mod 4	5/21/08
Mod 6	6/06/08
Mod 8	10/23/08
Mod 9	12/09/08

Paragon Analytics

Line Item	Analytical Method	Sub-contracor	Short Description	Cost/ water sample/ test	MDL/MDA for water	Cost/ solid sample/ test	MDL/MDA for solid	Cost/ air sample/ test	MDL/MDA for air	Cost/ biota sample/ test	MDL/MDA for biota
159	8021-B (HALO)		Purgeables, Halogenated Volatile Organics GC-Hall(by 8260B)	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
160	8021-B (TCL)		Purgeables, Halogenated & Aromatic Vol. Org. ELCD/PID (by 8260B)	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
161	8021-B (FULL)		Purgeables, Halogenated & Aromatic Vol. Org. ELCD/PID (by 8260B)	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
162	8015		Purgable, Non-Halogenated Volatile Organics GC-FID, for Gasloine Range Organic**GRO**	BID	15.7 ug/L	BID	52.6 ug/Kg	NB		BID	
163	8015		Fuel Hydrocarbons, Full Range (inc. Diesel) Diesel Range Organics **DRO**	BID	195 ug/L	BID	1670 ug/Kg	NB		BID	
164	8015		Low Molecular Weight Hydro catbons (methane, ethane, ethene, propane)**MEEP**	NB		NB		NB		NB	
165	8015 - MEOH		Methanol by GC-FID	NB		NB		NB		NB	
166	8021-B		Aromatic Volatile Organics, GC-PID **BTEX**	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
167	418.1 1664		Total Petrolium Hydrocarbons (by 1664)	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
168	413.1		Oil & Grease Extraction by Freon 113	NB		NB		NB		NB	

Notes:

AXYS charges unit rate for reanalyses. These charges will be billed back to NMED.

Price Agreement No. 60-667-55-01754

Edited 3/7/08 LRS to add approved new LIC's
New LIC's added 4/15/08
New LIC's added 5/12/08
New LIC's added 5/16/08
New LIC's added 9/10/08
New LIC's added 10/30/08

m Detection Limits

Mod2	2/25/08
Mod 3	4/15/08
Mod 4	5/21/08
Mod 6	6/06/08
Mod 8	10/23/08
Mod 9	12/09/08

Paragon Analytics

Line Item	Analytical Method	Sub-contracor	Short Description	Cost/ water sample/ test	MDL/MDA for water	Cost/ solid sample/ test	MDL/MDA for solid	Cost/ air sample/ test	MDL/MDA for air	Cost/ biota sample/ test	MDL/MDA for biota
TCLP											
180	1311,1311/6010 & 1311/8260		FULL TCLP & RCRA Characterization (metals, herbicides, pesticides, volatiles and semi-volatiles) [full; with and without	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
181	1311/SW-846 methods		PARTIAL (less Herbicides,Pesticides, and less RCI)	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
182	1311		TCLP VOCs & ZHE extraction	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
183	1311/ tumbling		TCLP Tumble for SVOCs, herbicidess, pesticides, & metals	BID	NA	BID	NA	NB		BID	NA
184	8260		TCLP Volatiles	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
185	8270		TCLP SVOCs	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
186	8151		TCLP Herbicides	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
187	8081		TCLP Pesticides	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
188	6010/7470		TCLP Metals (RCRA-8)	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
189	9014/9034		Reactivity CN & S	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
190	150.1		Corrosivity	BID	NA	BID	NA	NB		BID	NA
191	1110		Corrosivity	NB	NA	NB	NA	NB		NB	NA
192	1010 Penske-Marteens		Ignitability	BID	NA	BID	NA	NB		BID	NA
METALS											

Price Agreement No. 60-667-55-01754

Edited 3/7/08 LRS to add approved new LIC's
New LIC's added 4/15/08
New LIC's added 5/12/08
New LIC's added 5/16/08
New LIC's added 9/10/08
New LIC's added 10/30/08

m Detection Limits
Mod2 2/25/08
Mod 3 4/15/08
Mod 4 5/21/08
Mod 6 6/06/08
Mod 8 10/23/08
Mod 9 12/09/08

Paragon Analytics

Line Item	Analytical Method	Sub-contracor	Short Description	Cost/ water sample/ test	MDL/MDA for water	Cost/ solid sample/ test	MDL/MDA for solid	Cost/ air sample/ test	MDL/MDA for air	Cost/ biota sample/ test	MDL/MDA for biota
200	6010B/7000		Metals first individual metal	BID	See multiple compound table.	BID	See multiple compound table.	BID	See multiple compound table.	BID	See multiple compound table.
201			Unit price for ea. additonal metal	BID	See multiple compound table.	BID	See multiple compound table.	BID	See multiple compound table.	BID	See multiple compound table.
202			TAL List metals total or dissolved	BID	See multiple compound table.	BID	See multiple compound table.	BID	See multiple compound table.	BID	See multiple compound table.
203			TAL List Metals plus Total U; **combined 6010/6020 methods**	BID	See multiple compound table.	BID	See multiple compound table.	BID	See multiple compound table.	BID	See multiple compound table.
204	6010B/9012		23 TAL metals with Cyanide	BID	See multiple compound table.	BID	See multiple compound table.	NB	See multiple compound table.	BID	See multiple compound table.
205			RCRA list metals total or dissolved	BID	See multiple compound table.	BID	See multiple compound table.	BID	See multiple compound table.	BID	See multiple compound table.
210	6020		ICP/MS first individual metal	BID	See multiple compound table.	BID	See multiple compound table.	BID	See multiple compound table.	BID	See multiple compound table.
211			Unit price for ea. Addnl metal	BID	See multiple compound table.	BID	See multiple compound table.	BID	See multiple compound table.	BID	See multiple compound table.
220	3020		Acid digestion for total metals (GFAA)	NB		NB		NB		NB	
221	**3005 / 3010 / 3050**		Acid digestion for total metals (ICP)	BID	NA	BID	NA	BID	NA	BID	NA
230	7840		Thallium **Alt. Method 6020**	See 6020, line items 210, 211, & 221							
231	7740/7741		Selenium **Alt. Method 6020**	See 6020, line items 210, 211, & 221							
232	7870		Tin **Alt. Method 6020**	See 6020, line items 210, 211, & 221							
240	245.1	**propose 7470/7471**	Low Level Mercury, Hg (MDL: 0.1 ug/L)	BID	0.00445 ug/L	BID	PRL 0.01 mg/kg	NB		BID	PRL 0.01 mg/kg

Price Agreement No. 60-667-55-01754

Edited 3/7/08 LRS to add approved new LIC's
New LIC's added 4/15/08
New LIC's added 5/12/08
New LIC's added 5/16/08
New LIC's added 9/10/08
New LIC's added 10/30/08

m Detection Limits

Mod2	2/25/08
Mod 3	4/15/08
Mod 4	5/21/08
Mod 6	6/06/08
Mod 8	10/23/08
Mod 9	12/09/08

Paragon Analytics

Line Item	Analytical Method	Sub-contracor	Short Description	Cost/ water sample/ test	MDL/MDA for water	Cost/ solid sample/ test	MDL/MDA for solid	Cost/ air sample/ test	MDL/MDA for air	Cost/ biota sample/ test	MDL/MDA for biota
241	1631		Low Level Mercury, Hg (MDL: 0.2 ng/L)	BID	0.2ng/L						
242	245.6		Total Mercury in Tissue								
243	1630		Methyl Mercury in Tissue								
244	1630		Fillet Charge for Methyl Mercury								
245	1630		Freeze Drying Preservation								
246			Metal Tissue Prep	NA		NA		NA		BID	
AIR											
260	TO-14		Volatile Organics (air) with Summa Cannister					NB			
261	TO -14		Volatile Organics (air) **WITHOUT** Summa Cannister					NB			
262	TO-15		Volatile Organics (MDL 0.1 - 0.5 ppbv)					NB			
263	IO 3.5		Metals- first metal methods 6010/6020					NB			
264	IO 3.5		Pricing for ea. Additional metal					NB			
265	IO 3.5		TAL list metals total price incl. U					NB			
266	PM_{10}		Quality Assurance Handbook for Air Pollution Measurement Systems, Vol. II, Ambient Air Specific Methods, Sect.2.11 Reference method for the Determination Particulate Matter as PM10 in the Atmosphere(High Vol., PM10 Sampler Method)					NB			

Price Agreement No. 60-667-55-01754

Edited 3/7/08 LRS to add approved new LIC's
New LIC's added 4/15/08
New LIC's added 5/12/08
New LIC's added 5/16/08
New LIC's added 9/10/08
New LIC's added 10/30/08

m Detection Limits

Mod2	2/25/08
Mod 3	4/15/08
Mod 4	5/21/08
Mod 6	6/06/08
Mod 8	10/23/08
Mod 9	12/09/08

Paragon Analytics

Line Item	Analytical Method	Sub-contracor	Short Description	Cost/ water sample/ test	MDL/MDA for water	Cost/ solid sample/ test	MDL/MDA for solid	Cost/ air sample/ test	MDL/MDA for air	Cost/ biota sample/ test	MDL/MDA for biota
267	Asbestos		See 40 CFR, Part 763, Subpart F, Appendix A, Section 1, Polarized light microscopy (1987)					NB			
268	TO-11A		Carbonyl Compounds					NB			
RADIOCHEMISTRY											
	Transuranic and Addn. Low Level Isotopes										
300	900.0/ 9010		Low Background Alpha/Beta	BID	3.0 / 4.0 pCi/L	BID	3.0 / 4.0 pCi/g	BID	3.0 / 4.0 pCi/sample	BID	3.0 / 4.0 pCi/g
301	900.0/ 9310		Low Level Gross Alpha/Beta1.5 pCi/g or 1.5 pCi/L (600 Minute Count Time) **(Assumes 1000 minute count time. Water MDC may be raised due to high sediment / solid content.)**	BID	1.5 / 1.5 pCi/L	BID	1.5 / 1.5 pCi/g	BID	1.5 / 1.5 pCi/sample	BID	1.5 / 1.5 pCi/g
302	900.02		Gross Alpha/Beta for hard water							BID	
303	ASTM D3972-90		Iso U Low Level	BID	0.03 pCi/L	BID	0.03 pCi/g	BID	0.03 pCi/S	BID	0.03 pCi/g
304	ASTM D3972-90		Iso Th Low Level	BID	0.05 pCi/L	BID	0.05 pCi/g	BID	0.05 pCi/S	BID	0.05 pCi/g
305	ASTM D3972-90		Iso Pu Low level	BID	0.03 pCi/L	BID	0.03 pCi/g	BID	0.03 pCi/S	BID	0.03 pCi/g
306	ASTM D3972-90		Am-241 Low Level	BID	0.05 pCi/L	BID	0.05 pCi/g	BID	0.05 pCi/S	BID	0.05 pCi/g
307	310A		Am-243								
308	315A		Po-209								

Price Agreement No. 60-667-55-01754

Edited 3/7/08 LRS to add approved new LIC's
New LIC's added 4/15/08
New LIC's added 5/12/08
New LIC's added 5/16/08
New LIC's added 9/10/08
New LIC's added 10/30/08

m Detection Limits

Mod2	2/25/08
Mod 3	4/15/08
Mod 4	5/21/08
Mod 6	6/06/08
Mod 8	10/23/08
Mod 9	12/09/08

Paragon Analytics

Line Item	Analytical Method	Sub-contracor	Short Description	Cost/ water sample/ test	MDL/MDA for water	Cost/ solid sample/ test	MDL/MDA for solid	Cost/ air sample/ test	MDL/MDA for air	Cost/ biota sample/ test	MDL/MDA for biota
309	**Transuranic Np, Cm, Am, Pu (Low Level)**		Np 237, Iso Pu, Am 241, Cm 244	BID	See line items above	BID	See line items above	BID	See line items above	BID	See line items above
	Alpha Spectroscopy										
310	(Methods EPA 907.0,		Isotopic Americium (Am-241, Am243)	BID	0.1 pCi/L	BID	0.05 pCi/g	BID	0.1 pCi/sample	BID	0.05 pCi/g
311	HASL 300, Eichrom		Isotopic Plutonium (Pu-239/240, Pu-238)	BID	0.1 pCi/L	BID	0.05 pCi/g	BID	0.1 pCi/sample	BID	0.05 pCi/g
312	as appropriate)		Isotopic Curium	BID	0.1 pCi/L	BID	0.05 pCi/g	BID	0.1 pCi/sample	BID	0.05 pCi/g
313			Isotopic Thorium (Th-232, Th-230, Th-228)	BID	0.2 pCi/L	BID	0.1 pCi/g	BID	0.2 pCi/sample	BID	0.1 pCi/g
314			Isotopic Uranium (U-238, U 235, U-234)	BID	0.2 pCi/L	BID	0.1 pCi/g	BID	0.2 pCi/sample	BID	0.1 pCi/g
315			Isotopic Polonium (Po-209, Po-210)	BID	0.5 pCi/L	BID	0.25 pCi/g	BID	0.5 pCi/sample	BID	0.25 pCi/g
316			Np-237	BID	0.2 pCi/L	BID	0.1 pCi/g	BID	0.2 pCi/sample	BID	0.1 pCi/g
317	**903.0**		Ra 226/228 as Total Alpha Emitting Radium **(Ra-226 only, see line item 325 for Ra-228.)**	BID	0.2 pCi/L	BID	1 pCi/g	BID	1 pCi/sample	BID	1 pCi/g
	Gamma Spectrometry										
320	(EPA 901.1, HASL 300)		Gamma Emitters: Cs-137, Cs-134, Am-241,	BID	10 pCi/L	BID	0.5 pCi/g	BID	10 pCi/sample	BID	0.5 pCi/g
321	Gamma Emitters: Low Level Gamma Spec. (0.05 pCi/g or 5 pCi/L as Cs-137)**(1000 minute maximum count time. Solid samples require larger volume of ~1200 g. Water MDC of 5 pCi/L may not be acheivable.)**			BID	5 pCi/L	BID	0.05 pCi/g	BID	5 pCi/sample	BID	0.05 pCi/g

Price Agreement No. 60-667-55-01754

Edited 3/7/08 LRS to add approved new LIC's
New LIC's added 4/15/08
New LIC's added 5/12/08
New LIC's added 5/16/08
New LIC's added 9/10/08
New LIC's added 10/30/08

m Detection Limits

Mod2	2/25/08
Mod 3	4/15/08
Mod 4	5/21/08
Mod 6	6/06/08
Mod 8	10/23/08
Mod 9	12/09/08

Paragon Analytics

Line Item	Analytical Method	Sub-contracor	Short Description	Cost/ water sample/ test	MDL/MDA for water	Cost/ solid sample/ test	MDL/MDA for solid	Cost/ air sample/ test	MDL/MDA for air	Cost/ biota sample/ test	MDL/MDA for biota
322	901.1 (mod kahn)		Ra226/228 (Full Ingrowth)	NB		BID	1 pCi/g	NB		BID	1 pCi/g
323	901.1M		Ra 226/228 (Screening)	NB		BID	1 pCi/g	NB		BID	1 pCi/g
324	903.1		Radium 226	BID	1 pCi/L	BID	1 pCi/g	BID	1 pCi/sample	BID	1 pCi/g
325	904		Radium 228	BID	1 pCi/L	BID	1 pCi/g	BID	1 pCi/sample	BID	1 pCi/g
326	**Eichrom**		Sr89/Sr90 **(See line items 335 & 336 below.)**								
	Gas Flow Proportional Counting (GFP)										
330	~~903.1~~903.0/ 9315		Total Alpha emitting Radium	BID	1 pCi/L	BID	1 pCi/g	BID	1 pCi/sample	NB	
331	900.0/~~9010~~9 310		Gross Alpha/Beta	BID	3.0 / 4.0 pCi/L	BID	3.0 / 4.0 pCi/g	BID	3.0 / 4.0 pCi/sample	BID	3.0 / 4.0 pCi/g
332	902		Iodine 129 (-129)	BID	10 pCi/L	BID	10 pCi/g	BID	10 pCi/sample	BID	10 pCi/g
333	ASTM D5811-95M		Lead 210 (Pb-210) **(Liquid Scintillation)**	BID	1 pCi/L	BID	1 pCi/g	BID	1 pCi/sample	BID	1 pCi/g
334	ASTM D5811-95M		Promethium (Pm 147) **(Liquid Scintillation)**	BID	10 pCi/L	BID	10 pCi/g	BID	10 pCi/sample	BID	10 pCi/g
335	ASTM D5811-95M		Strontium 89/90 (Sr89/Sr90)	BID	1 pCi/L	BID	0.5 pCi/g	BID	1 pCi/sample	BID	0.5 pCi/g
336	ASTM D5811-95M		Strontium-90 (Sr-90) **(Reported as "Total Radiostrontium as Sr-90")**	BID	1 pCi/L	BID	0.5 pCi/g	BID	1 pCi/sample	BID	0.5 pCi/g
336a	ASTM D5811-95M		Strontium-90 (Sr-90) (Reported as "Total Radiostrontium as Sr-90")	BID	0.06 pCi/L	NB		NB		BID	0.06 pCi/g
337	**Eichrom**		Technetium-99 (Tc-99)	BID	10 pCi/L	BID	3 pCi/g	BID	3 pCi/sample	BID	3 pCi/g
	Liquid Scintillation										

Price Agreement No. 60-667-55-01754

Edited 3/7/08 LRS to add approved new LIC's
New LIC's added 4/15/08
New LIC's added 5/12/08
New LIC's added 5/16/08
New LIC's added 9/10/08
New LIC's added 10/30/08

m Detection Limits

Mod2	2/25/08
Mod 3	4/15/08
Mod 4	5/21/08
Mod 6	6/06/08
Mod 8	10/23/08
Mod 9	12/09/08

Paragon Analytics

Line Item	Analytical Method	Sub-contracor	Short Description	Cost/ water sample/ test	MDL/MDA for water	Cost/ solid sample/ test	MDL/MDA for solid	Cost/ air sample/ test	MDL/MDA for air	Cost/ biota sample/ test	MDL/MDA for biota
340	(EPA 906, HASL 300)		Beta Emitters:Tritium, C-14, Ni-63, Pu-241, ~~Se-79, Sm-151~~	BID	See line items below	BID	See line items below	BID	See line items below	BID	See line items below
341			Carbon-14 (C14) Alt. Method: EERF 00-01	BID	500 pCi/L	BID	20 pCi/g	BID	20 pCi/sample	BID	20 pCi/g
342			Nickel-63 (Ni-63) Alt. Method: Ni-01	BID	10 pCi/L	BID	10 pCi/g	BID	10 pCi/sample	BID	10 pCi/g
345			Plutonium-241 (Pu241)	BID	20 pCi/L	BID	20 pCi/g	BID	20 pCi/sample	BID	20 pCi/g
346			Selenium--79 (Se-79)	NB		NB		NB		NB	
347			Samarium-151 (Sm151)	NB		NB		NB		NB	
348	More H-3 below		Tritium (H-3)	BID	400 pCi/L	BID	1 pCi/g	BID	1 pCi/sample	BID	1 pCi/g
360	**(KPA) Kinetic**		Total Uranium	NB		NB		NB		NB	
361	6020		Total Uranium by ICP-MS**(Prep included.)**	BID	0.000258 ug/L	BID	0.0311 ug/Kg	BID	NA	BID	0.0311 ug/Kg
	Tritium										
370	Tritium	U Miami	MDA: 10 pCi/L requires 15 mL	BID	10 pCi/L						
371	Tritium	U Miami	MDA: 0.3 pCi/L requires 1 L	BID	0.3 pCi/L						
372	Tritium	U Miami	MDA: 0.03 pCi/L requires 1L	BID	0.03 pCi/L	prices eff 4/1/07 preclude using this LIC					
373	Tritium	U Miami	Direct Count for H-3 Enrichment Decision **ADD**	BID	NA						
374	Fusion Prep		Fusion prep for Radiochemistry	NA		BID	NA	BID	NA	BID	NA

Price Agreement No. 60-667-55-01754

Edited 3/7/08 LRS to add approved new LIC's
New LIC's added 4/15/08
New LIC's added 5/12/08
New LIC's added 5/16/08
New LIC's added 9/10/08
New LIC's added 10/30/08

m Detection Limits

Mod2	2/25/08
Mod 3	4/15/08
Mod 4	5/21/08
Mod 6	6/06/08
Mod 8	10/23/08
Mod 9	12/09/08

Paragon Analytics

Line Item	Analytical Method	Sub-contracor	Short Description	Cost/ water sample/ test	MDL/MDA for water	Cost/ solid sample/ test	MDL/MDA for solid	Cost/ air sample/ test	MDL/MDA for air	Cost/ biota sample/ test	MDL/MDA for biota
375	Paragon Rad Tissue Prep		Muffle Furnace Radiochemstry Tissue Prep **ADD**							BID	NA
376	Tritium		MDA:400pCi/L (Air as Silica Gel) Liquid Scintillation					BID	400 pCi/L		
378	Tritium	U Miami	MDA:200pCi/L(Air as Silica Gel) Liquid Scintillation					BID	200 pCi/L		
379	Tritium	U Miami	MDA:150pCi/L(Air as Silica Gel) Liquid Scintillation					BID	150 pCi/L		

Notes:

U. of Miami H-3 policy: Direct counting (see LIC 373) will be performed for a set period of time to determine if H-3 is low enough to require prior enrichment. Criterion for enrichment must be provided by sumitter beforehand. If sample doesn't require enrichment, the counting will continue until the criterion under the catagory) is met and the total cost is the same as the (1st catagory). If enrichment is required, *U. of Miami) has to start from scratch and the cost is the sum of

MISCELLANEOUS											
500	9010/9012		Cyanide, Dissociable	BID	NA	BID	NA	NB		BID	NA
501	335.1		Cyanide, Amenable	BID	NA	BID	NA	NB		BID	NA
502	**9010/9012**		Cyanide, Total	BID	4.06 ug/L	BID	NA	NB		BID	NA
503	9030/376.1		Sulfide	BID	520 ug/L	NB		NB		NB	
504	365.2		Phosphate (ortho)	BID		BID					
505	365.2		Phosphate (Total)	BID		BID					
506	SM314A	6010	Hardness	BID							
507	415.2	Walkley Black ASA-9 90-3	TOC	BID		BID	250mg/kg				
508	120.1		Specific Conductance	BID							
509			Total Phenols								
510	1625 mod		NDMA								

Price Agreement No. 60-667-55-01754

Edited 3/7/08 LRS to add approved new LIC's
New LIC's added 4/15/08
New LIC's added 5/12/08
New LIC's added 5/16/08
New LIC's added 9/10/08
New LIC's added 10/30/08

m Detection Limits

Mod2	2/25/08
Mod 3	4/15/08
Mod 4	5/21/08
Mod 6	6/06/08
Mod 8	10/23/08
Mod 9	12/09/08

Paragon Analytics

Line Item	Analytical Method	Sub-contracor	Short Description	Cost/ water sample/ test	MDL/MDA for water	Cost/ solid sample/ test	MDL/MDA for solid	Cost/ air sample/ test	MDL/MDA for air	Cost/ biota sample/ test	MDL/MDA for biota
520	various		Major Cations-inc K, Mg, Ca, Na, Si, Sr, Li	BID	See 6010B list on multiple compound table.	BID	See 6010B list on multiple compound table.	BID	NA	BID	See 6010B list on multiple compound table.
521	various		Major Anions- Br, Cl, F, PO4, SO_4	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
522	300		Major Anions + Nitrogen Species (NO3, NO2)	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
523	300 series	TKN GPL	Ammonia, TKN, N species, Br, Cl. F, PO4, SO4	BID	See multiple compound table.	BID	See multiple compound table.	NB			See multiple compound table.
524	300 series - short		Br, Cl, F, SO_4	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
525	9252		Chloride	BID		BID		NB		NB	
526	340.2		Fluoride	BID	NA	BID	NA	NB		NB	
527	353.2		Sulfate? Nitrate?	NB		NB		NB		NB	
528	9038		Sulfate	NB		NB		NB		NB	
529	300		Bromide								
530	310.1		Alkalinity	BID	NA	BID	NA	NB		BID	NA
531	310.1		Alkalinity + Carbonate and Bicarbonate	BID	NA	BID	NA	NB		BID	NA
532	160.1		Total Dissolved Solids (TDS)	BID	NA	NA		NA		NA	
533	160.2		Total Suspended Solids (TSS)	BID	NA	NA		NA		NA	
534	ASTM D3977-97		Suspended Sediment Concentration (SSC)(Limit volume to 4L)	BID	NA	NA		NA		NA	
535	ASTM D3977-97		Isolation of sediments from water samples for separate analysis; no SSC determination required.	BID	NA	NA		NA		NA	
536			HF acid digestion of sediment/water samples	BID	NA						

Price Agreement No. 60-667-55-01754

Edited 3/7/08 LRS to add approved new LIC's
New LIC's added 4/15/08
New LIC's added 5/12/08
New LIC's added 5/16/08
New LIC's added 9/10/08
New LIC's added 10/30/08

m Detection Limits

Mod2	2/25/08
Mod 3	4/15/08
Mod 4	5/21/08
Mod 6	6/06/08
Mod 8	10/23/08
Mod 9	12/09/08

Paragon Analytics

Line Item	Analytical Method	Sub-contracor	Short Description	Cost/ water sample/ test	MDL/MDA for water	Cost/ solid sample/ test	MDL/MDA for solid	Cost/ air sample/ test	MDL/MDA for air	Cost/ biota sample/ test	MDL/MDA for biota
540	300 series	TKN GPL	Nitrogen Species- NO_3, NO_2, TKN, Ammonia	BID	See multiple compound table.	NB		NB		NB	
541	300		Nitrate and Nitrite	BID	See multiple compound table.	BID	See multiple compound table.	NB		NB	
542	353.3/352.1		Nitrate and Nitrite (NO_3 & NO_2)	BID	See multiple compound table.	BID	See multiple compound table.	NB		NB	
542a	354.1		Nitrite only	BID		BID					
542b	353.2		Total Nitrates and NO3 by difference (must also order LIC 542a)	BID		BID					
543	350.3		Ammonia as N	BID	12.7 ug/L	BID	189 ug/Kg	NB		NB	
544	351.4	GPL	TKN	BID		BID		NB		NB	
545	Isotopic Nitrogen, Ammonia (NH_3)	U Miami	Isotopic Nitrogen, Ammonia (N15 ratio) *Isotopic Nitrogen: TKN, NH3, or nitrates analyses are required prior to Isoptopic Nitrogen analysis.* Samples must contain >1-3 ppm of analyte in order to qualify for any of these analyses.	BID		NB		NB		NB	
546	Isotopic Nitrogen, Nitrates	U Miami	Isotopic Nitrogen, Nitrates (N15 ratio)	BID		NB		NB		NB	
547	Isotopic Nitrogen, TKN	U Miami	Isotopic Nitrogen, (TKN)Total Kjeldahl Nitrogen (N15 ratio)	BID		NB		NB		NB	
550	8321A(Mod)		High Explosives (14 compounds) by LC/MS/MS	NB		NB		NB		NB	

Price Agreement No. 60-667-55-01754

Edited 3/7/08 LRS to add approved new LIC's
New LIC's added 4/15/08
New LIC's added 5/12/08
New LIC's added 5/16/08
New LIC's added 9/10/08
New LIC's added 10/30/08

m Detection Limits

Mod2	2/25/08
Mod 3	4/15/08
Mod 4	5/21/08
Mod 6	6/06/08
Mod 8	10/23/08
Mod 9	12/09/08

Paragon Analytics

Line Item	Analytical Method	Sub-contracor	Short Description	Cost/ water sample/ test	MDL/MDA for water	Cost/ solid sample/ test	MDL/MDA for solid	Cost/ air sample/ test	MDL/MDA for air	Cost/ biota sample/ test	MDL/MDA for biota
551			High Explosives (14 compounds) by LC/MS/MS + (2,4-DANT.2,6-DANT,3,5DNA,TCP,TATB,o-cresyl)	NB		NB		NB		NB	
552			High Explosives (14 compounds) by LC/MS/MS + PETN & Nitroglycerin	NB		NB		NB		NB	
553			High Explosives (14 compounds) by LC/MS/MS + (2,4-DANT.2,6-DANT,3,5DNA,TCP,TATB,o-cresyl) PETN & Nitroglycerin	NB		NB		NB		NB	
554			RDX Degradates	NB		NB		NB		NB	
555	8330		High Explosives (14 compounds)	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
556	8330		HMX, RDX, TNT	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
557	8332/8330		Nitroglycerin and PETN	BID	See multiple compound table.	BID	See multiple compound table.	NB		BID	See multiple compound table.
560	8321A(Mod)/6850		Perchlorate by LC/MS/MS	BID	0.05 ug/L	BID	0.5 ug/Kg	NB		NB	
561			Perchlorate by IC/MS/MS	NB		NB		NB		NB	
562	314.0		Perchlorate	BID	0.756 ug/L	BID	8.67 ug/Kg	BID	NA	BID	8.67 ug/Kg
563	331		Perchlorate								
564	332		Perchlorate								
565	6850		Perchlorate by LC/MS								
566	6860		Perchlorate by IC/MS/MS								
567	6850Mod		Oxyanions by LC/MS/MS	BID	TBD	BID	TBD	BID	TBD	BID	TBD
570	ASTM D-422	DRI	Grain Size Analysis of Soil	NB		BID	NA	NB		NB	

Price Agreement No. 60-667-55-01754

Edited 3/7/08 LRS to add approved new LIC's
New LIC's added 4/15/08
New LIC's added 5/12/08
New LIC's added 5/16/08
New LIC's added 9/10/08
New LIC's added 10/30/08

m Detection Limits

Mod2	2/25/08
Mod 3	4/15/08
Mod 4	5/21/08
Mod 6	6/06/08
Mod 8	10/23/08
Mod 9	12/09/08

Paragon Analytics

Line Item	Analytical Method	Sub-contracor	Short Description	Cost/ water sample/ test	MDL/MDA for water	Cost/ solid sample/ test	MDL/MDA for solid	Cost/ air sample/ test	MDL/MDA for air	Cost/ biota sample/ test	MDL/MDA for biota
570a	ASTM D-422	DRI	Grain Size Analysis of Soil- rad sample			BID	NA				
571	ASTM D-2487		Unified Soil Classification	NB		NB		NB		NB	
572	--		Standard Proctor Density	NB		NB		NB		NB	
573	--		Saturated Hydraulic Conductivity, Undisturbed	NB		NB		NB		NB	
574	--		Saturated Hydraulic Conductivity, Remolded	NB		NB		NB		NB	
575	CaCO3		Acid Base Accounting	NB		NB		NB		NB	
576	SW-846, 6010/7471		Whole Rock analysis--11 metals	NB		NB		NB		NB	
577			Whole Rock analysis--34metals	NB		NB		NB		NB	
578	8321 (mod)		"+" Ionization Compounds: Caffeine,Flouxetine, Progesterone,Testosterone	NB		NB		NB		NB	
579			"-" Ionization Compounds: Dilantin(Phenytoin),17β-estradiol,17α-ethynylestradiol,17α-estradiol, Diethylstilbestrol, estrone	NB		NB		NB		NB	
580			Full List "+" and "-"	NB		NB		NB		NB	
581	XRF		XRF of Metals								
582	TEM, FTIR, X-Ray		microscopic investigation of soil								
583	Polarized Light Microscopy (PLM)		Asbestos in soil	NB		NB		NB		NB	
584			As,Cr speciation								
585			leach (As III) for soils								
586			leach (As V)for soils								

Price Agreement No. 60-667-55-01754

Edited 3/7/08 LRS to add approved new LIC's
New LIC's added 4/15/08
New LIC's added 5/12/08
New LIC's added 5/16/08
New LIC's added 9/10/08
New LIC's added 10/30/08

m Detection Limits

Mod2	2/25/08
Mod 3	4/15/08
Mod 4	5/21/08
Mod 6	6/06/08
Mod 8	10/23/08
Mod 9	12/09/08

Paragon Analytics

Line Item	Analytical Method	Sub-contracor	Short Description	Cost/ water sample/ test	MDL/MDA for water	Cost/ solid sample/ test	MDL/MDA for solid	Cost/ air sample/ test	MDL/MDA for air	Cost/ biota sample/ test	MDL/MDA for biota
587			leach (Cr VI) for soils								
588			total As								
589			As III								
590			Cr VI								
591		DRI	Loss in Ignition			BID	0.10%				
592			Bulk Density								
593			Particle Size/Sieve Analysis		@DRI						
594			Nitrate-Nitrite (soild) Sections 33-3.2 Method of Soils Analysis(KCL extraction)								
595			Homogenization (via meat grinder; per specimen charge)							BID	NA
596			Compositing (up to 5 samples)	BID	NA	BID	NA	BID	NA	BID	NA
600	H3/He3 Ratio	U Miami	Tritium/Helium3 Ratio	BID		NB		NB		NB	
601			Tritium/Helium3 Equipment Rental-Shipping	No rental fee, shipping charges vary							
602	CFC Analysis		CFC Analysis	BID	$10x10^{-15}$ moles/Kg	NB		NB		NB	
603			CFC Equipment Rental-Shipping	No rental fee, shipping charges vary							
604	AMS method w/NOSAMS	U AZ Tucson	Inorganic ΔC_{14}	BID		NB		NB		NB	
605			Inorganic ΔC14: 2-5 samples	BID		NB		NB		NB	
606	AMS method w/NOSAMS & prep		Inorganic ΔC_{14} with prep	BID		NB		NB		NB	
607			Inorganic ΔC_{14} with prep : 2-5 samples	BID		NB		NB		NB	
608			ΔDeuterium								

Price Agreement No. 60-667-55-01754

Edited 3/7/08 LRS to add approved new LIC's
New LIC's added 4/15/08
New LIC's added 5/12/08
New LIC's added 5/16/08
New LIC's added 9/10/08
New LIC's added 10/30/08

m Detection Limits

Mod2	2/25/08
Mod 3	4/15/08
Mod 4	5/21/08
Mod 6	6/06/08
Mod 8	10/23/08
Mod 9	12/09/08

Paragon Analytics

Line Item	Analytical Method	Sub-contracor	Short Description	Cost/ water sample/ test	MDL/MDA for water	Cost/ solid sample/ test	MDL/MDA for solid	Cost/ air sample/ test	MDL/MDA for air	Cost/ biota sample/ test	MDL/MDA for biota
609			D O^{18}								
610			C^{13}								
611	MS	Zymax	Δ O18 & S34 in sulfate	BID	NA						
620			Special analytical services as required an approved by NMED on a case by case basis.	BID	NA	BID	NA	BID	NA	BID	NA

Notes:

Isotopic Nitrogen: TKN, NH3, or nitrates analyses are required prior to Isoptopic Nitrogen analysis. Samples must contain >1-3 ppm of analyte in order to quali for any of these analyses.

DRINKING WATER					MRL						
800	Various		Primary DW Group: Nitrate, Nitrite, CN, F, Sb, As, Ba, Be, Cd, Cr, Hg, Se, Tl, Ni, Pb	NB		NB		NB		NB	
802	Various		Secondary DW Group: Al,Cl, Foaming Agents, Fl, Fe, Mn, pH, Ag, Sulfate, TDS, Zn, Cu	NB		NB		NB		NB	
803	300.1		Bromate	NB							
804	317.0		Bromate	NB							
805	300		Chlorite	NB							
810	DW/2320B		Alkalinity, Bicarbonate	NB	1 mg/L	NB		NB		NB	
811	DW/2320B		Alkalinity, Carbonate	NB	1 mg/L	NB		NB		NB	
812	200.8		Al, Aluminum, Drinking Water	NB		NB		NB		NB	
813	200.8		Antimony, Drinking Water	NB	1 ug/L	NB		NB		NB	
814	200.8		Arsenic, Drinking Water	NB	2 ug/L	NB		NB		NB	
815	200.8		Barium, Drinking Water	NB	2 ug/L	NB		NB		NB	

Price Agreement No. 60-667-55-01754

Edited 3/7/08 LRS to add approved new LIC's
New LIC's added 4/15/08
New LIC's added 5/12/08
New LIC's added 5/16/08
New LIC's added 9/10/08
New LIC's added 10/30/08

m Detection Limits

Mod2	2/25/08
Mod 3	4/15/08
Mod 4	5/21/08
Mod 6	6/06/08
Mod 8	10/23/08
Mod 9	12/09/08

Paragon Analytics

Line Item	Analytical Method	Sub-contracor	Short Description	Cost/ water sample/ test	MDL/MDA for water	Cost/ solid sample/ test	MDL/MDA for solid	Cost/ air sample/ test	MDL/MDA for air	Cost/ biota sample/ test	MDL/MDA for biota
816	200.8		Beryllium, Drinking Water	NB	0.3 ug/L	NB		NB		NB	
817	200.8		Cadmium, Drinking Water	NB	1 ug/L	NB		NB		NB	
818	3111B		Calcium, Drinking Water	NB	0.1 ug/L	NB		NB		NB	
819	300		Chloride, Drinking Water	NB	2 mg/L	NB		NB		NB	
820	200.8		Chromium, Total (DW)	NB	2 ug/L	NB		NB		NB	
821	200.7/200.8		Cu, Copper, Drinking Water	NB		NB		NB		NB	
822	2120B		Color	NB	5 Pt/Co	NB		NB		NB	
823	335.4		Cyanide, Total (DW)	NB	0.02 mg/L	NB		NB		NB	
824	380-75WE		Fluoride	NB	0.1 mg/L	NB		NB		NB	
825	3111B		Iron, Drinking Water	NB	0.1 mg/L	NB		NB		NB	
826	200.7/200.8		Pb, Lead, Drinking Water	NB		NB		NB		NB	
827	3111B		Magnesium, Drinking Water	NB	0.05 mg/L	NB		NB		NB	
828	200.8		Manganese, Drinking Water	NB	2 ug/L	NB		NB		NB	
829	200.8		Mercury, Drinking Water	NB	0.2 ug/L	NB		NB		NB	
830	200.8		Nickel, Drinking Water	NB	1 ug/L	NB		NB		NB	
831	300		Nirtogen,Nitrate	NB	0.5 mg/L	NB		NB		NB	
834	353.2		Nitorgen, Nitrite	NB	0.01 mg/L	NB		NB		NB	
835	140.1		Odor	NB	1 TON	NB		NB		NB	
836	150.1		pH	NB	units	NB		NB		NB	
837	3111B		Potassium, Drinking Water	NB	0.05 mg/L	NB		NB		NB	
838	200.8		Selenium, Drinking Water	NB	2 ug/L	NB		NB		NB	
839	200.8		Silver, Drinking Water	NB	2 ug/L	NB		NB		NB	
840	200.7/200.8		Na, Sodium, Drinking Water	NB		NB		NB		NB	
841	160.1		Solids, Dissolved (DW)	NB	10 mg/L	NB		NB		NB	
842	300		Sulfate (DW)	NB	5 mg/L	NB		NB		NB	
843	200.8		Thallium, Drinking Water	NB	0.4 ug/L	NB		NB		NB	
844	200.7/200.8		Zn, Zinc, Drinking Water	NB		NB		NB		NB	
845	180.1		Turbidity	NB	0.1 NTU	NB		NB		NB	
850	531.1		Carbamates, Phase II & V	NB		NB		NB		NB	
			3-Hydroxycarbofuran	NB	0.5 ug/L	NB		NB		NB	
			Aldicarb Sulfone	NB	0.7 ug/L	NB		NB		NB	

Price Agreement No. 60-667-55-01754

Edited 3/7/08 LRS to add approved new LIC's
New LIC's added 4/15/08
New LIC's added 5/12/08
New LIC's added 5/16/08
New LIC's added 9/10/08
New LIC's added 10/30/08

m Detection Limits

Mod2	2/25/08
Mod 3	4/15/08
Mod 4	5/21/08
Mod 6	6/06/08
Mod 8	10/23/08
Mod 9	12/09/08

Paragon Analytics

Line Item	Analytical Method	Sub-contracor	Short Description	Cost/ water sample/ test	MDL/MDA for water	Cost/ solid sample/ test	MDL/MDA for solid	Cost/ air sample/ test	MDL/MDA for air	Cost/ biota sample/ test	MDL/MDA for biota
			Carbaryl	NB	0.5 ug/L	NB		NB		NB	
			Methomyl	NB	0.5 ug/L	NB		NB		NB	
			Aldicarb	NB	0.5 ug/L	NB		NB		NB	
			Aldicarb Sulfoxide	NB	0.5 ug/L	NB		NB		NB	
			Carbofuran	NB	0.9 ug/L	NB		NB		NB	
			Oxamyl	NB	1 ug/L	NB		NB		NB	
851	515.3		Chlorinated Acids, II & V	NB		NB		NB		NB	
			2,4,5-TP	NB	0.1 ug/L	NB		NB		NB	
			Dalapon	NB	1 ug/L	NB		NB		NB	
			Dinoseb	NB	0.1 ug/L	NB		NB		NB	
			Picloram	NB	0.1 ug/L	NB		NB		NB	
			2,4 -D	NB	0.1 ug/L	NB		NB		NB	
			Dicamba	NB	0.1 ug/L	NB		NB		NB	
			Pentachlorophenol	NB	0.04 ug/L	NB		NB		NB	
852	549.2		Diquat	NB	0.4 ug/L	NB		NB		NB	
853	504.1		EDB	NB	0.01 ug/L	NB		NB		NB	
854			DBCP	NB	0.01 ug/L	NB		NB		NB	
855	548.1		Endothall	NB	9 ug/L	NB		NB		NB	
856	547		Glyphosate	NB	6 ug/L	NB		NB		NB	
857	552.2		Haloacetic Acids	NB		NB		NB		NB	
			Bromochloracetic Acid	NB	1 ug/L	NB		NB		NB	
			Dichloroacetic Acid	NB	1 ug/L	NB		NB		NB	
			Monochloroacetic Acid	NB	2 ug/L	NB		NB		NB	
			Dibromoacetic Acid	NB	1 ug/L	NB		NB		NB	
			Monobromoacetic Acid	NB	1 ug/L	NB		NB		NB	
			Trichloracteic Acid	NB	1 ug/L	NB		NB		NB	
858	524.2		Regulated & Unregulated Volati	NB		NB		NB		NB	
			Phase I, II & V	NB		NB		NB		NB	
			1,1,1,2-Tetrachloroethane	NB	0.5 ug/L	NB		NB		NB	
			1,1,2,2-Tetrachloroethane	NB	0.5 ug/L	NB		NB		NB	
			1,1-Dichlroethane	NB	0.5 ug/L	NB		NB		NB	

Price Agreement No. 60-667-55-01754

Edited 3/7/08 LRS to add approved new LIC's
New LIC's added 4/15/08
New LIC's added 5/12/08
New LIC's added 5/16/08
New LIC's added 9/10/08
New LIC's added 10/30/08

m Detection Limits

Mod2	2/25/08
Mod 3	4/15/08
Mod 4	5/21/08
Mod 6	6/06/08
Mod 8	10/23/08
Mod 9	12/09/08

Paragon Analytics

Line Item	Analytical Method	Sub-contracor	Short Description	Cost/ water sample/ test	MDL/MDA for water	Cost/ solid sample/ test	MDL/MDA for solid	Cost/ air sample/ test	MDL/MDA for air	Cost/ biota sample/ test	MDL/MDA for biota
			1,1-Dichloropropylene	NB	0.5 ug/L	NB		NB		NB	
			1,2,3-Trichloropropane	NB	0.5 ug/L	NB		NB		NB	
			1,2,4-Trimethylbenzene	NB	0.5 ug/L	NB		NB		NB	
			1,2-Dibromoethane	NB	0.2 ug/L	NB		NB		NB	
			1,2-Dichloroethane	NB	0.5 ug/L	NB		NB		NB	
			1,2-Xylene	NB	0.5 ug/L	NB		NB		NB	
			1,3-Dichlorobenzene	NB	0.5 ug/L	NB		NB		NB	
			1,3-Xylene	NB	0.5 ug/L	NB		NB		NB	
			1,4-Xylene	NB	0.5 ug/L	NB		NB		NB	
			2-Chlorotoluene	NB	0.5 ug/L	NB		NB		NB	
			4-Isopropyltoluene	NB	0.5 ug/L	NB		NB		NB	
			Bromobenzene	NB	0.5 ug/L	NB		NB		NB	
			Bromodichloroethane	NB	0.5 ug/L	NB		NB		NB	
			Bromomethane	NB	0.5 ug/L	NB		NB		NB	
			Chlorobenzene	NB	0.5 ug/L	NB		NB		NB	
			Chloroform	NB	0.5 ug/L	NB		NB		NB	
			Dibromochloromethane	NB	0.5 ug/L	NB		NB		NB	
			Dichlorodifluoromethane	NB	0.5 ug/L	NB		NB		NB	
			Ethylbenzene	NB	0.5 ug/L	NB		NB		NB	
			Isopropylbenzene	NB	0.5 ug/L	NB		NB		NB	
			Naphthalene	NB	0.5 ug/L	NB		NB		NB	
			Tetrachloroethylene	NB	0.5 ug/L	NB		NB		NB	
			Trichlorethylene	NB	0.5 ug/L	NB		NB		NB	
			Vinyl Chloride	NB	0.5 ug/L	NB		NB		NB	
			cis-1,2-Dichloroethylene	NB	0.5 ug/L	NB		NB		NB	
			n-Butyl Benzene	NB	0.5 ug/L	NB		NB		NB	
			sec-Butyl Benzene	NB	0.5 ug/L	NB		NB		NB	
			trans-1,2-Dichloroethylene	NB	0.5 ug/L	NB		NB		NB	
			1,1,1-Trichloroethane	NB	0.5 ug/L	NB		NB		NB	
			1,1,2-Trichloroethane	NB	0.5 ug/L	NB		NB		NB	
			1,1-Dichloroethylene	NB	0.5 ug/L	NB		NB		NB	

Price Agreement No. 60-667-55-01754

Edited 3/7/08 LRS to add approved new LIC's
New LIC's added 4/15/08
New LIC's added 5/12/08
New LIC's added 5/16/08
New LIC's added 9/10/08
New LIC's added 10/30/08

m Detection Limits

Mod2	2/25/08
Mod 3	4/15/08
Mod 4	5/21/08
Mod 6	6/06/08
Mod 8	10/23/08
Mod 9	12/09/08

Paragon Analytics

Line Item	Analytical Method	Sub-contracor	Short Description	Cost/ water sample/ test	MDL/MDA for water	Cost/ solid sample/ test	MDL/MDA for solid	Cost/ air sample/ test	MDL/MDA for air	Cost/ biota sample/ test	MDL/MDA for biota
			1,2,3-Trichlorobenzene	NB	0.5 ug/L	NB		NB		NB	
			1,2,4-Trichlorobenzene	NB	0.5 ug/L	NB		NB		NB	
			1,2-Dibromo-3-chloropropane	NB	0.2 ug/L	NB		NB		NB	
			1,2-Dichlorobenzene	NB	0.5 ug/L	NB		NB		NB	
			1,2 -Dichloropropane	NB	0.5 ug/L	NB		NB		NB	
			1,3,5-Trimethylbenzene	NB	0.5 ug/L	NB		NB		NB	
			1,3-Dichloropropane	NB	0.5 ug/L	NB		NB		NB	
			1,4-Dichlorobenzene	NB	0.5 ug/L	NB		NB		NB	
			2,2-Dichloropropane	NB	0.5 ug/L	NB		NB		NB	
			4-Chlorotoluene	NB	0.5 ug/L	NB		NB		NB	
			Benzene	NB	0.5 ug/L	NB		NB		NB	
			Bromochloromethane	NB	0.5 ug/L	NB		NB		NB	
			Bromoform	NB	0.5 ug/L	NB		NB		NB	
			Carbon Tetrachloride	NB	0.5 ug/L	NB		NB		NB	
			Chloroethane	NB	0.5 ug/L	NB		NB		NB	
			Chloromethane	NB	0.5 ug/L	NB		NB		NB	
			Dibromomethane	NB	0.5 ug/L	NB		NB		NB	
			Dichloromethane	NB	0.5 ug/L	NB		NB		NB	
			Hexachlorobutadiene	NB	0.5 ug/L	NB		NB		NB	
			Methyl-t-Butyl Ether	NB	0.5 ug/L	NB		NB		NB	
			Styrene	NB	0.5 ug/L	NB		NB		NB	
			Toluene	NB	0.5 ug/L	NB		NB		NB	
			Trichlorofluoromethane	NB	0.5 ug/L	NB		NB		NB	
			Xylenes	NB	0.5 ug/L	NB		NB		NB	
			cis-1,3-Dichloropropylene	NB	0.5 ug/L	NB		NB		NB	
			n-Propylbenzene	NB	0.5 ug/L	NB		NB		NB	
			tert-Butylbenzene	NB	0.5 ug/L	NB		NB		NB	
			trans-1,3-Dichloropropylene	NB	0.5 ug/L	NB		NB		NB	
859	552.2, 524.2		Combines Line Items 857,858 Disinfection Byproducts	NB		NB		NB		NB	
				NB		NB		NB		NB	

Price Agreement No. 60-667-55-01754

Edited 3/7/08 LRS to add approved new LIC's
New LIC's added 4/15/08
New LIC's added 5/12/08
New LIC's added 5/16/08
New LIC's added 9/10/08
New LIC's added 10/30/08

m Detection Limits

Mod2	2/25/08
Mod 3	4/15/08
Mod 4	5/21/08
Mod 6	6/06/08
Mod 8	10/23/08
Mod 9	12/09/08

Paragon Analytics

Line Item	Analytical Method	Sub-contracor	Short Description	Cost/ water sample/ test	MDL/MDA for water	Cost/ solid sample/ test	MDL/MDA for solid	Cost/ air sample/ test	MDL/MDA for air	Cost/ biota sample/ test	MDL/MDA for biota
860	525.2		Phase II & V	NB		NB		NB		NB	
			Alachlor	NB	0.1 ug/L	NB		NB		NB	
			Atrazine	NB	0.1 ug/L	NB		NB		NB	
			Butachlor	NB	0.1 ug/L	NB		NB		NB	
			Di(2-ethylhexyl)phthalate	NB	0.6 ug/L	NB		NB		NB	
			Endrin	NB	0.01 ug/L	NB		NB		NB	
			Heptachlor Epoxide	NB	0.02 ug/L	NB		NB		NB	
			Hexachlorocyclopentadiene	NB	0.1 ug/L	NB		NB		NB	
			Metolachlor	NB	0.1 ug/L	NB		NB		NB	
			Propachlor	NB	0.1 ug/L	NB		NB		NB	
			gamma-BHC	NB	0.02 ug/L	NB		NB		NB	
			Aldrin	NB	0.1 ug/L	NB		NB		NB	
			Benzo (a) pyrene	NB	0.02 ug/L	NB		NB		NB	
			Di(2-ethylhexyl)adipate	NB	0.6 ug/L	NB		NB		NB	
			Dieldrin	NB	0.1 ug/L	NB		NB		NB	
			Heptachlor	NB	0.04 ug/L	NB		NB		NB	
			Hexachlorobenzene	NB	0.1 ug/L	NB		NB		NB	
			Methoxychlor	NB	0.1 ug/L	NB		NB		NB	
			Metribuzin	NB	0.1 ug/L	NB		NB		NB	
			Simazine	NB	0.07 ug/L	NB		NB		NB	
				NB		NB		NB		NB	
861	505		Phase II & V PCB/Toxaphene/C	NB		NB		NB		NB	
			Aroclor 1016	NB	0.08 ug/L	NB		NB		NB	
			Aroclor 1221	NB	2 ug/L	NB		NB		NB	
			Aroclor 1232	NB	0.5 ug/L	NB		NB		NB	
			Aroclor 1242	NB	0.3 ug/L	NB		NB		NB	
			Aroclor 1248	NB	0.1 ug/L	NB		NB		NB	
			Aroclor 1254	NB	0.1 ug/L	NB		NB		NB	
			Aroclor 1260	NB	0.2 ug/L	NB		NB		NB	
			Toxaphene	NB	1 ug/L	NB		NB		NB	
			Chlordane	NB	0.1 ug/L	NB		NB		NB	

Price Agreement No. 60-667-55-01754

Edited 3/7/08 LRS to add approved new LIC's
New LIC's added 4/15/08
New LIC's added 5/12/08
New LIC's added 5/16/08
New LIC's added 9/10/08
New LIC's added 10/30/08

m Detection Limits

Mod2	2/25/08
Mod 3	4/15/08
Mod 4	5/21/08
Mod 6	6/06/08
Mod 8	10/23/08
Mod 9	12/09/08

Paragon Analytics

Line Item	Analytical Method	Sub-contracor	Short Description	Cost/ water sample/ test	MDL/MDA for water	Cost/ solid sample/ test	MDL/MDA for solid	Cost/ air sample/ test	MDL/MDA for air	Cost/ biota sample/ test	MDL/MDA for biota
862	524.2		Trihalomethanes	NB		NB		NB		NB	
			Bromodichloromethane	NB	0.5 ug/L	NB		NB		NB	
			Chloroform	NB	0.5 ug/L	NB		NB		NB	
			Bromoform	NB	0.5 ug/L	NB		NB		NB	
			Dibromochloromethane	NB	0.5 ug/L	NB		NB		NB	
				NB		NB		NB		NB	
863	515.4-UCMR		DCPA acid metabolites	NB	1 ug/L	NB		NB		NB	
562	314.0-UCMR		Perchlorate	NB	4 ug/L	NB		NB		NB	
864	525.2-UCMR		UCMR SOC's	NB		NB		NB		NB	
			2,4-Dinitrotoluene	NB	0.5 ug/L	NB		NB		NB	
			4,4'-DDE	NB	0.1 ug/L	NB		NB		NB	
			EPTC	NB	0.1 ug/L	NB		NB		NB	
			Terbacil	NB	0.1 ug/L	NB		NB		NB	
			2,6-Dinitrotoluene	NB	0.5 ug/L	NB		NB		NB	
			Acetochlor	NB	0.1 ug/L	NB		NB		NB	
			Molinate	NB	0.1 ug/L	NB		NB		NB	
865	524.2-UCMR		UCMR Volatiles	NB		NB		NB		NB	
			Methyl-t-Butyl Ether	NB	0.5 ug/L	NB		NB		NB	
			Nitrobenzene	NB		NB		NB		NB	
866	Drinking Water List I		Combo 863,562,864,865 Methods: 314UCMR, 515.4UCMR, 524.2UCMR, & 525.2UCMR	NB	5 ug/L	NB		NB		NB	
106	524.2; 525.2; 531.1; 547; 548.1; 549.2, & 552.2		Synthetic Organic Compounds (SOC) Group Pricing #1	NB		NB		NB		NB	
107	524.2; 525.2; 531.1; 547; 548; & 549		Synthetic Organic Compounds (SOC) Group Pricing #2	NB		NB		NB		NB	
869	515.1,525.2, 531.1,547, 548.1,549.2, 550		Synthetic Organic Compounds (SOC) Group Pricing #3	NB		NB		NB		NB	
870	EPA 526		1,2-Diphenylhydrazine; Diazinon; Disulfoton; Fonofos; Nitrobenzene; Prometon; and Terbufos	NB		NB		NB		NB	

Price Agreement No. 60-667-55-01754

Edited 3/7/08 LRS to add approved new LIC's
New LIC's added 4/15/08
New LIC's added 5/12/08
New LIC's added 5/16/08
New LIC's added 9/10/08
New LIC's added 10/30/08

m Detection Limits

Mod2	2/25/08
Mod 3	4/15/08
Mod 4	5/21/08
Mod 6	6/06/08
Mod 8	10/23/08
Mod 9	12/09/08

Paragon Analytics

Line Item	Analytical Method	Sub-contracor	Short Description	Cost/ water sample/ test	MDL/MDA for water	Cost/ solid sample/ test	MDL/MDA for solid	Cost/ air sample/ test	MDL/MDA for air	Cost/ biota sample/ test	MDL/MDA for biota
871	EPA 528		2-Methyl-phenol; 2,4-Dichlorophenol; 2,4 Dinitrophenol; and 2,4,6-Trichlorophenol	NB		NB		NB		NB	
872	EPA 532		Diuron, Linuron	NB		NB		NB		NB	
873	EPA 526, 528, 532			NB		NB		NB		NB	
874	EPA 1605		Aeromonas (30 hr hold time)	NB		NB		NB		NB	
875	EPA 1605		Aeromonas (confiormation)	NB		NB		NB		NB	
876	TEM/100.2		Asbestos	NB		NB		NB		NB	
877	970-R-96-001 970/9-92-029		Giardia & Crytosporidium	NB		NB		NB		NB	
878	970-R-96-001 970/9-92-029		MPA of a surface/groundwater	NB		NB		NB		NB	
879	970-R-96-001 970/9-92-029		MPA,Giardia,& Crytosporidium	NB		NB		NB		NB	
880			Surfactants	NB		NB		NB		NB	
881	507		Atrazine								
			Alachlor								
			Simazine								
882	550		Benzo(a)pyrene								
883			BOD								
884			CBOD								
885			UV254								
886			COD								
887	556/SM6252mod		Carbonyl								
889	UCMR2-Assessment Monitoring		527, 529, 331								
890	527		Polybrominated diphenyl ethers								

Price Agreement No. 60-667-55-01754

Edited 3/7/08 LRS to add approved new LIC's
New LIC's added 4/15/08
New LIC's added 5/12/08
New LIC's added 5/16/08
New LIC's added 9/10/08
New LIC's added 10/30/08

m Detection Limits

Mod2	2/25/08
Mod 3	4/15/08
Mod 4	5/21/08
Mod 6	6/06/08
Mod 8	10/23/08
Mod 9	12/09/08

Paragon Analytics

Line Item	Analytical Method	Sub-contracor	Short Description	Cost/ water sample/ test	MDL/MDA for water	Cost/ solid sample/ test	MDL/MDA for solid	Cost/ air sample/ test	MDL/MDA for air	Cost/ biota sample/ test	MDL/MDA for biota
891	529		explosives								
892	UCMR2-Assessment Monitoring		525.2, 535, 521, 317.0								
893	525.2		Acetanilide pest.								
894	535		Acetanilide pest. Degredation products								
895	521		Nitrosamines								
896			Radon (DW)								
897	DW		1106.1/ E. coli								
898	DW		9222-A-2 (MPN) Fecal Coliform								
		Aquatic Testing (EPA/600/4-90/027F) ACUTE (5 dilution series									
900			48 hr static, 2 rep., Daphnia								
901			49 hr static, 2 rep., Fathead Minnow								
		Aquatic Testing (EPA/600/4-91/002) Chronic (5 dilution series)									
902			Cladoceran (C.Duba)								
903			Fathead Minnow								
		Toxicity Testing									
904			ASTM 1383, Hyalella azteca, 10 day survival								
905			ASTM 1383, Chironomus spp., 10-day survival								
906			EPA 600/R-94/024 (Hyalella)								
907			EPA 600/R-94/024 (Chironomus)								

Price Agreement No. 60-667-55-01754

Edited 3/7/08 LRS to add approved new LIC's
New LIC's added 4/15/08
New LIC's added 5/12/08
New LIC's added 5/16/08
New LIC's added 9/10/08
New LIC's added 10/30/08

m Detection Limits

Mod2	2/25/08
Mod 3	4/15/08
Mod 4	5/21/08
Mod 6	6/06/08
Mod 8	10/23/08
Mod 9	12/09/08

Paragon Analytics

Line Item	Analytical Method	Sub-contracor	Short Description	Cost/ water sample/ test	MDL/MDA for water	Cost/ solid sample/ test	MDL/MDA for solid	Cost/ air sample/ test	MDL/MDA for air	Cost/ biota sample/ test	MDL/MDA for biota
MOBILE SERVICES											
950	8021B		BTEX & MTBE (add PCE, TCE, cis- & trans-DCE)	N/A		N/A		N/A		N/A	
951	8015, mod		Hydrocarbons C10-C32	N/A		N/A		N/A			
952	8015, mod		Hydrocarbons C6-C10	N/A		N/A		N/A			
953						N/A					
954	8021B & 8015, mod		VOCs and HC	N/A		N/A		N/A			
955	metals by EDXRF		most metals heavier than Na	N/A		N/A		N/A			
956	8081/8082, mod		Screen for Chlorinated Pesticides or PCBs	N/A		N/A		N/A			
957			Dioxin screen	N/A		N/A					

Notes:

Mobile Laboratory services can be made available for radiochemistry or other parameters by quote basis for each project. Additional services, including metho development are available on quote basis, with mutual agreement between the agency and Paragon.