484376

JACOBS SMELTER OU 1 SUPERFUND SITE
STOCKTON, UTAH
WA-07

FINAL
REMEDIAL ACTION COMPLETION REPORT

State of Utah
Department of Environmental Quality
Division of Environmental Response and Remediation

March 2001

Jacobs Smelter OU 1 Superfund Site
Stockton, Utah

FINAL
OPERABLE UNIT 1 REMEDIAL ACTION COMPLETION REPORT

UDEQ Contract No. 996393

Prepared by:

URS Corporation

756 East Winchester Street, Suite 400
Salt Lake City, Utah 84107

8181 East Tufts Avenue
Denver, Colorado 80237

Approved: _____ Date: 3/29/01
Chris Stotler, URS Corporation
Project Manager

This document was prepared for the Utah Department of Environmental Quality (UDEQ) under Contract No. 996393. The material contained herein is not to be disclosed to, discussed with, or made available to, any person or persons for any reason without prior express approval of a responsible UDEQ officer. This report is based on data, site conditions, and other information generally applicable as of March 30, 2001. Therefore, the conclusions and recommendations herein are applicable only to that time frame.

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Report Coverage:	This report covers the remedial action construction activities for the months of May 2000 through February 2001 at the Jacobs Smelter OU 1 Superfund Site, Stockton, Utah, under UDEQ Contract No.996393. These services are provided by URS Corporation as Remedial Action Oversight Contractor.

DISTRIBUTION LIST

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File	Jacobs Smelter OU 1 Superfund Site Project File URS Corporation/Denver, Colorado (2 copies)
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ACRONYMS AND ABBREVIATIONS

ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CF	Cubic Feet
CMP	Corrugated Metal Pipe
CQAMP	Construction Quality Assurance and Management Plan
EPA	United States Environmental Protection Agency
FT	Feet
IFTO	Invitation for Technical Offers
$\mu g/m^3$	Microgram per cubic meter
mg/kg	Milligrams per kilogram
NAAQS	National Ambient Air Quality Standard
NPL	National Priorities List
OU	Operable Unit
PM_{10}	Particulate matter of 10 microns or less in diameter
POTW	Publicly Owned Treatment Works
PVC	Polyvinyl chloride
QA	Quality Assurance
QC	Quality Control
QAPP	Quality Assurance Program Plan
RA	Remedial Action
RAMP	Remedial Action Monitoring Program
RAR	Remedial Action Report
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RFB	Request for Bid
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
UDEQ	Utah Department of Environmental Quality
URS	URS Corporation
XRF	X-Ray Fluorescence

1.0 INTRODUCTION

This Remedial Action Report (RAR) summarizes the environmental cleanup activities that occurred at the Jacobs Smelter Operable Unit (OU) 1 Site in Stockton, Utah. The Jacobs Smelter Site was listed on the National Priorities List (NPL) in February 2000. The RAR addresses the remedial action (RA) that was conducted for the off-site disposal of contaminated and hazardous soil. The RAR also describes the current site conditions and verifies that the remediation goals were met in accordance with the Record of Decision (ROD). URS Corporation (URS) designed and provided construction oversight services for the RA for the Utah Department of Environmental Quality (UDEQ), Division of Environmental Response and Remediation, under their Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Level-of-Effort Contract #996393.

2.0 SUMMARY OF SITE CONDITIONS

The following sections describe the Jacobs Smelter site and the investigations that have been completed to characterize and remediate the contamination in OU1.

2.1 Site Name, Location and Description

The Jacobs Smelter site, hereafter referred to as the "Site," is located in Tooele County, Utah, approximately 38 miles southwest of Salt Lake City via Interstate 80 and Utah State Highway 36 (see Figure 1-1). The Town of Stockton, the primary population center in Rush Valley, is located 5 miles southwest of the City of Tooele, the county seat of Tooele County.

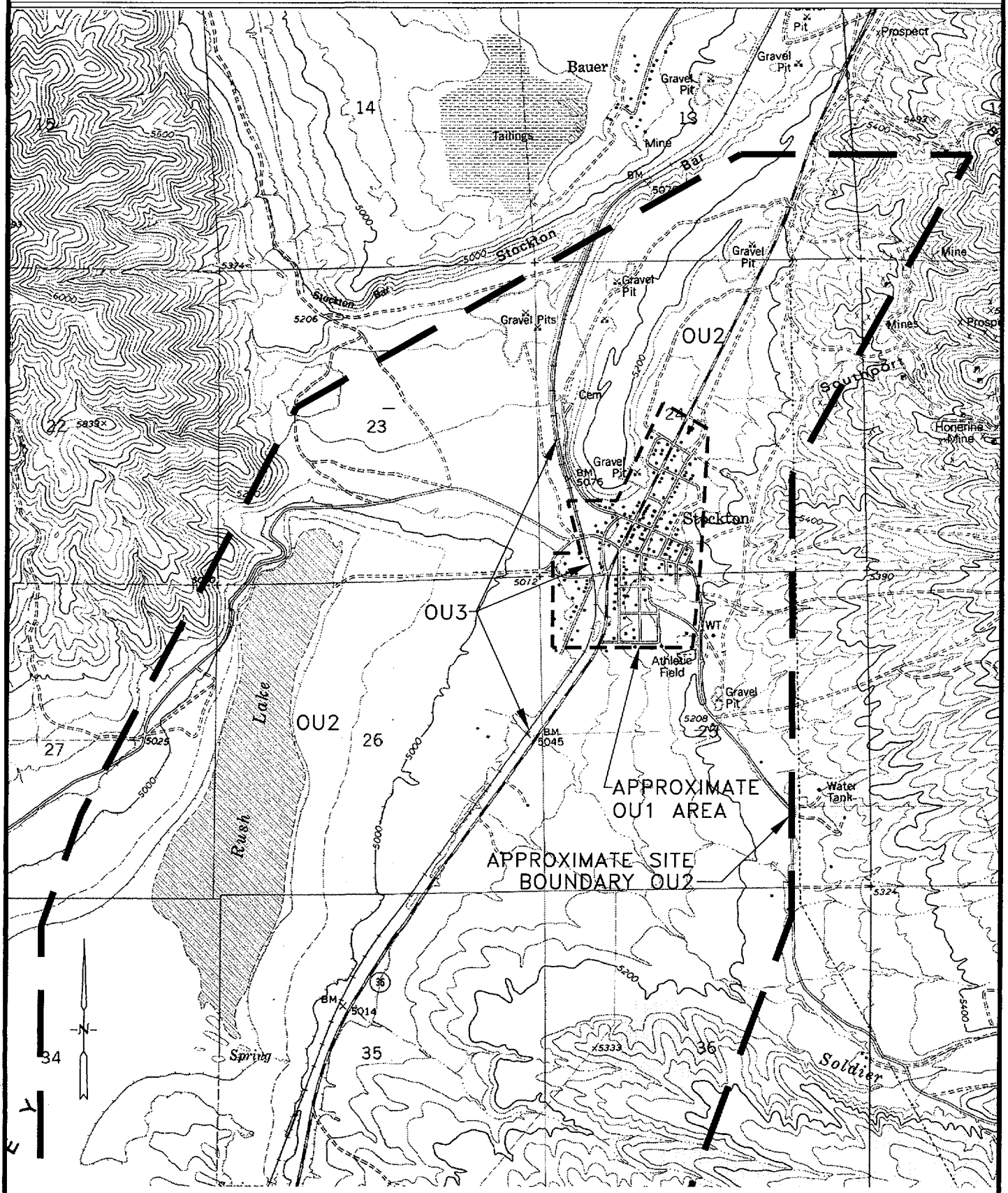
Several historic smelter and milling locations in the general area of Stockton, Tooele, and Rush Valley are sources of heavy-metal contamination. No mineral extraction industry currently exists in Stockton or Tooele and very few retail or commercial businesses of any type currently exist in Stockton.

The Jacobs Smelter Site is approximately bounded on the:

- West by the north-south centerline of Rush Lake;
- South by a line which runs from the southeastern corner of Rush Lake to the mouth of Soldier Canyon;
- East by a north-south line directed from the mouth of Soldier Canyon to the intersection of State Highway 36 with the northern boundary of Section 24, T4S, R5W; and
- North by a line which runs from the Highway 36-Section 24 intersection to the northern end of Rush Lake.

Jacobs Smelter OU1, defined as contaminated residential soils, is located within the town boundary of Stockton, Plate 2. OU2 is defined as all areas outside of OU1, except for the Union Pacific Railroad right-of-way through Stockton, which was defined as OU3. An RI/FS is currently underway for OU2 and OU3 was remediated by Union Pacific under agreement with EPA in 1999.

Residences in Stockton consist of single-family homes or mobile homes on individual lots, ranging in size from 0.1 acre to 1 acre. Several new houses have recently been completed or are under construction. Multi-family housing is not available in Stockton. All of the homes in Stockton are on individual septic tanks. The Town of Stockton provides potable water to all of its residents, with the supply intake and treatment plant located southeast of Stockton in the canyon of Soldier Creek.



SOURCE: 7.5" TOPOGRAPHIC MAP, STOCKTON QUADRANGLE, UT. USGS 1980.

0 1100 2200 4400

SCALE IN FEET

Job No. : 680004434807	FIGURE 1-1 JACOBS SMELTER SITE SITE LOCATION MAP STOCKTON, UTAH
Prepared By : B.L.B.	
Date : 03/01	

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2.2 Nature and Extent of Contamination

The Stockton area was the center of a silver and base-metal mining, milling, and smelting district from the 1860s to the 1970s. The primary products of the mills and smelters were lead, silver, and copper, with the majority of the mined ore ending up on piles of waste rock, mill tailings, and smelter slag. The primary metals remaining in these wastes were compounds of iron, lead, arsenic, copper, manganese, and zinc.

The principal smelter in the Stockton area was the Jacobs Smelter, located in northeast Stockton. In the latter years of the 19th century, the Jacobs Smelter also operated as the Great Basin Concentrator (mill), so produced large quantities of mill tailings as well as smelter slag. During World War II, most of Stockton's smelter slag was reprocessed at the International Smelter in Tooele.

Soils contaminated by smelter slag and mill tailings in the area formerly occupied by the Jacobs Smelter and in several drainageways flowing from the smelter site through Stockton toward Rush Lake constituted the primary threat to human health and were the primary basis for the proposed NPL listing. The soils of the Jacobs Smelter area were also the primary source identified for the Environmental Protection Agency (EPA) Emergency Removal Action comprising 29 properties, which was conducted in 1999.

During several site investigations, speciation tests were performed on site soils to determine which forms of arsenic and lead were present because some types of heavy metal compounds are more available than others for uptake into the human body. Also, certain species dissolve more easily in water and are, therefore, more available for dissolution into groundwater or surface water. The primary species found at OU1 were lead carbonate and lead arsenic oxide, which are both readily bioavailable. The very small primary particle size (less than 50 microns) also contributed to this bioavailability.

During site investigations, soil samples were collected from nearly every yard and vacant lot in Stockton. Lead concentrations ranged from less than 500 mg/kg (parts per million) to 23,000 mg/kg. Isolated pockets of mill tailings near the smelter had concentrations as high as 150,000 mg/kg. Arsenic concentrations ranged from 20 mg/kg to more than 1,800 mg/kg. After soil samples were composited for each property, most of the properties with an average lead concentration greater than 3,000 mg/kg were included in EPA's Emergency Removal Action. Those remaining properties with average lead concentrations greater than 500 mg/kg in surface soils or 800 mg/kg in subsurface soils or with average arsenic concentrations greater than 100 mg/kg were included in the OU1 RA described below.

2.3 Site Chronology

The following events, in chronological order, formed the basis for this RA, which was performed by UDEQ under a cooperative agreement with Region VIII EPA:

- 1997—Preliminary Assessment/Site Inspection (PA/SI): UDEQ performed soil and surface water sampling investigations in the greater Stockton area; showed that conditions justified further action, including screening for potential emergency action within Stockton and potential listing on the National Priorities List.
- October 1998—follow-up investigation for Emergency Removal Action: Region VIII EPA's START contractor, URS Operating Services (UOS) (then part of URS Greiner Woodward Clyde (URSGWC)), determined that emergency action was warranted in the Stockton residential area; work included soil, dust, and drinking water analyses.

- February 1999—Remedial Investigation (RI): URS, contracted to UDEQ, conducted a CERCLA RI within OU1 to further define nature and extent contamination.
- May 1999—RI/FFS: URS completed the Final RI/Focused Feasibility Study (FFS) for OU1.
- March – October 1999—EPA ERA: Region VIII EPA emergency contractors excavated and replaced soil from 29 highly contaminated properties in Stockton.
- May-June 1999—Proposed Plan—UDEQ/EPA issued the OU1 Proposed Plan and held the Public Meeting on the preferred alternative for OU1 (excavate residential soils to as much as 18 inches, transport contaminated soil to an approved landfill, and replace contaminated soil with clean soil).
- June and August 1999—Pre-Design Investigation: Additional surface soil, subsurface soil, geotechnical, and TCLP samples were collected by URS in OU1 during 30% and 60% Remedial Designs (RD).
- July 1999—Record of Decision (ROD) and NPL Proposal—EPA prepared and released the ROD for Jacobs Smelter OU1; UDEQ/EPA also prepared the Responsiveness Summary for OU1; EPA proposed site for inclusion on the National Priorities List (NPL).
- December 1999—100% Remedial Design: The Final 100% RD (Design Analysis Report, Design Drawings, Design Specifications, and RA Cost Estimate) was approved by UDEQ/EPA.
- January 2000—Invitation to Bid: Announcements of availability of Bid Documents were released in the Commerce Business Daily (CBD) and specified Utah newspapers.
- February 2000—Site Walk: Potential bidders participated in a required site walk and voluntary question and answer session.
- March 2000—Bid Opening and Selection of RA Contractor: Winning bidder was notified, contract was awarded.
- April/May 2000— Notice to Proceed was issued. Mobilization to Site: RA Contractor (Envirocon) and Oversight Contractor (URS) mobilized trailers and equipment to site after receiving NTP.
- May-December 2000—RA: RA Contractor excavated contaminated soil and replaced with clean soil, replaced fences, retaining walls, sheds, etc., and re-landscaped 125 properties in OU1.
- February 2001—Pre-Final Inspection: UDEQ and Region VIII EPA jointly determined that the RA was operational and functional.
- Spring 2001—Minor RA Items: Remaining landscaping punchlist items, halted due to encroaching winter conditions at OU1, will be completed

3.0 REMEDIAL ACTION ACTIVITIES

The data acquired during the removal assessment was used to assess the human health risk to Stockton residents and prepare the Baseline Risk Assessment (BRA). Residential properties containing surface soils with lead concentrations exceeding 3000 ppm were considered to present an immediate risk to the residents and were identified for remediation under an emergency removal action. The BRA results indicated that an unacceptable level of risk existed on residential properties not remediated during the emergency removal and a Remedial Investigation (RI) was initiated. RI sampling completed the characterization of residential properties in OU1. Five Remedial Action Objectives were established based on the results of the BRA:

1. Reduce risks from exposure to lead contaminated soil such that no child has more than a 5% chance of exceeding a blood lead level of 10 micrograms per deciliter.
2. Reduce risks from exposure to arsenic contaminated soil such that no person has greater than a 1 x 10^{-4} chance of contracting cancer.
3. Clean the site up to levels that allow for residential use.
4. Remove as much contamination as practicable which could serve as source of contamination to ground water.
5. Prevent the occurrence and spread of windblown contamination.

Based on the removal assessment and RI results, and residential land use Preliminary Remediation Goal (PRG) ranges were developed using models and formulas consistent with the BRA. The PRG ranges in combination with other risk management factors were used to select site specific action levels that equate with an unacceptable level of risk. Residential properties that contained lead concentrations greater than the surface soil (0 – 2 inches) action level of 500 ppm, the subsurface soil action level of 800 ppm, or soil arsenic concentrations greater than the 100 ppm action level were selected for remediation.

Alternatives for remediating the selected OU1 residential properties were identified and evaluated in the Focused Feasibililty Study (FFS) according to nine criteria specified by the National Contingency Plan (NCP). The criteria include: 1) Overall Protection of Human Health and the Environment; 2) Compliance with ARARs; 3) Long-Term Effectiveness; 4) Reduction of Toxicity, Mobility, or Volume of Contaminants; 5) Short-Term Effectiveness; 6) Implementability; 7) Cost; 8) State Acceptance; and 9) Community Acceptance. The preferred alternative proposed in the FFS was excavation and off-site disposal. This alternative was designated as the selected remedy through the Proposed Plan and Record of Decision process which provides an opportunity for public comment. Based on comments received, and UDEQ and EPA acceptance, the ROD was finalized and the excavation and off-site disposal alternative was offically designated as the remedial alternative to be implemented during the remedial action. In addition, the ROD formally established the lead and arsenic action levels.

The details regarding the implementation of the selected remedy were prepared during the remedial design in three phases 30%, 60%, and 100%. Data acquired during the removal assessment investigation and RI were used to characterize the subgrade surface and determine the depth of cut for each property, i.e., 6 inches, 12 inches, or 18 inches. The final Design (100%) was approved by UDEQ and EPA in December 1999 and the RA Construction Contract was awarded in April 2000.

3.1 RA Scope

The physical construction portion of the RA was initiated in May 2000, with the selection of Envirocon Inc. (hereafter referred to as the "Contractor") as the RA contractor. The notice to proceed was given on May 4, 2000; work at the site started immediately thereafter.

Four performance standards or measures for implementation of the selected remedy were identified in the ROD and were based on ensuring achievement of the RAOs. These performance measures, which essentially define the RA Scope of Work, include:

- Excavate soils within OU1 exhibiting (1) mean surface lead concentrations greater than 500 ppm, (2) mean subsurface lead concentrations greater than 800 ppm, or (3) mean surface arsenic concentrations greater than 100 ppm. Excavation will occur to a depth at which mean concentrations are below 500 ppm lead and 100 ppm arsenic or to a maximum depth of eighteen inches. Affected properties include residential yards, vacant lots, rights of way, and unpaved streets and sidewalks.

Test excavated material for characterization as hazardous waste. If material is classified as hazardous waste, treat off-site using fly-ash or cement stabilization and dispose of in an off-site, RCRA Subtitle C landfill. If material is classified non-hazardous waste, dispose of in an off-site, RCRA Subtitle D landfill.

- Replace the excavated soil with up to twelve inches of clean backfill and six inches of clean topsoil. Re-landscape affected properties.
- Clean the interior of affected properties to remove any previously contaminated indoor dust.
- Develop and implement institutional controls to restrict exposure to residual contamination below eighteen inches or below existing structures.

Primary construction activities conducted during the RA included

- Pre construction conference with homeowners;
- Tree removal;
- Excavation of properties to 6, 12, or 18" depth per construction drawings;
- Transportation and disposal of non-hazardous contaminated soils and hazardous contaminated soils to approved commercial/demolition debris and hazardous waste landfills, respectfully;
- Indicator sampling at the bottom of excavation at properties excavated to a depth of 18";
- Backfill with up to 12" of general backfill and a minimum of 6" of topsoil, and regrade;
- Reestablish fences, sidewalks, right-of-ways and other preexisting structures;
- Reestablish trees, bushes, sod, and other landscape items.

3.2 Pre-Excavation Activities

The contractor divided the town's work sites into quadrants. Work progressed block by block within the quadrants, generally from north to south. Work started in the northeast quadrant and proceeding counter-clockwise as shown on Plate 1.

A pre-construction (pre-con) meeting was held prior to work on each individual residential property. Representatives of URS, the Contractor, and the property owner attended all pre-con meetings. The purpose of these pre-con meetings was two-fold: first and foremost, the meetings served as notification to the property owner that work would soon commence on his or her property; secondly, these meetings gave opportunity for all present to discuss the planned remediation activities that would take place on each property. Following the pre-con, the Contractor's tree removal subcontractor removed and disposed of any large trees from each residential property. This tree removal undertaking took place in two separate mobilizations, with roughly half of the town having trees removed per mobilization.

3.3 Excavation

Prior to the initiation of excavation procedures, the Contractor's survey subcontractor performed an original grade and existing condition survey. Individual lots were then excavated to the required depths of six, twelve, or eighteen inches based on the drawings and preliminary surveys. A variety of excavation equipment was used including bobcats, small backhoes and large trackhoe excavation machinery. For tight areas, hand excavation procedures were utilized. When feasible, individual lot excavation material

was incorporated into larger block sourced stockpiles for more efficient loadout procedures. The contractor estimated that approximately 58,670 cubic yards of contaminated soil was excavated to complete the project.

During excavation procedures, special precautions were implemented to locate and protect existing utilities. In the rare case that a utility was impacted by excavation procedures, the appropriate repair personnel were contacted immediately, resulting in little or no interruption of utility services to the property owner.

During periods in which excavation sites were left open, dust and erosion control procedures were implemented to protect against erosion from rain, run-off or wind. Excavated surfaces were kept wet to control dust through use of water trucks. If a storm was expected during periods of no construction activity, erosion control measures such as hay bail barriers, erosion control fabric, and temporary berms were constructed.

During excavation, additional health and safety procedures were implemented to protect the public. Orange construction fencing was put up around active excavation areas. Flagmen were employed to help slow and direct traffic while excavation and load out was occurring on Connor Avenue, the main thoroughfare. Special attention was given to children in areas of active excavation. When children and the general public were found viewing or near excavation activities, informal caution conferences were held to warn the public of hazards associated with the operations.

Dust control was another focus of excavation health and safety procedures as described above. A detailed description of the air monitoring for dust control is presented in Section 3.5.

3.4 Indicator Soil Sampling

Indicator soil sampling was conducted to characterize the residual soil total lead and total arsenic concentrations along the subgrade surface upon completion of excavation activities. Indicator soil samples were collected on 53 properties where contaminated soil was removed to a depth of 18". The soil lead and arsenic concentration data will be incorporated into the institutional controls to be established for each property upon completion of remedial activities.

3.4.1 Indicator Sampling Methodology

Indicator samples were collected from the bottom of the 18-inch excavations at six equally spaced locations which were ideally arranged in a pattern similar to the six on the face of a die. The samples were collected using a stainless steel spoon and were homogenized in a large stainless steel bowl. The samples were placed in two 8-ounce plastic containers after it was homogenized. The stainless steel bowl and spoon were decontaminated using an alconox wash and a distilled water rinse.

3.4.2 Indicator Sampling Results

Indicator soil samples were shipped to Northern Analytical Laboratories, Inc of Billings, Montana for total lead and total arsenic using inductively coupled plasma emission spectroscopy (ICP), method 6010B. Samples were held under proper chain of custody. Soil total lead and total arsenic levels range from 155 to 23,500 mg/kg (ppm), and 39.6 to 1390 ppm respectively, Table 3-1. Plate 2 presents the lead and arsenic concentrations for all properties sampled. The analytical data validation report is included as Attachment A.

Table 3-1
Indicator Sampling Results

EPA J#	Total Arsenic	Qualifier Arsenic	Total Lead	Qualifier Lead
Method	**6010B**		**6010B**	
Detection Limits	**3**		**5**	
Units	**mg/kg**		**mg/kg**	
12	80		785	
25	43		332	
27	23		215	
46	60	J, MS-L	742	
48	80	J, MS-L	8890	
49	46	J, MS-L	519	
53	110		1730	
54	140		1880	
55	60		752	
63	80		1180	
66	60		818	
70	50		699	
72	24		498	J, MS-L
75	100	J, LCS-H	1180	J, MS-L
76	90	J, LCS-H	1340	J, MS-L
77	140	J, LCS-H	1620	J, MS-L
78/79	80	J, LCS-H	701	J, MS-L
83	290	J, LCS-H	4560	
84	230	J, LCS-H	3740	J, MS-L
85	100	J, LCS-H	1050	
101	640	J, LCS-H	8780	J, MS-L
102	690	J, LCS-H	9100	J, MS-L
103	650	J, LCS-H	7520	J, MS-L
104	270	J, LCS-H	3440	J, MS-L
105	150	J, LCS-H	2060	J, MS-L
106	300	J, LCS-H	4250	
107	490	J, MS-L	7060	
109	110		1630	J, MS-L
122	120	J, MS-L	2100	
124	130		2910	J, MS-L
125	230	J, MS-L	5260	
126S	380	J, MS-L	4700	J, PDS-L
126N	1390	J, PDS-L	20800	
127EP	10	U	258	J, SD-L
127WP	14		169	J, SD-L
127WW	10	U	66	J, SD-L
128	40	J, MS-L	671	
133E	270	J, MS-L	1880	
133W	100	J, MS-L	1240	

Table 3-1
Indicator Sampling Results

EPA J#	Total Arsenic	Qualifier Arsenic	Total Lead	Qualifier Lead
Method	**6010B**		**6010B**	
Detection Limits	**3**		**5**	
Units	**mg/kg**		**mg/kg**	
141	150		1460	
142	40	J, MS-L	805	
144	550	J, MS-L	1050	
150	600	J, MS-L	10400	
151	40	J, MS-L	638	
152	40	J, MS-L	582	
169	110	J, MS-L	1490	
181	90	J, MS-L	778	
198	150		2570	
233	750		5980	
235	140	J, LCS-H	3110	
249	140		1540	
254	880	J, LCS-H	23500	
255	150	J, LCS-H	2980	
256	800	J, LCS-H	20200	
261	340		2760	
272	100	J, LCS-H	922	
274	32		155	

Legend:

J = estimated
LCS-H = laboratory control sample high
mg/kg = milligrams per kilogram
MS-L = matrix spike low
PDS-L = post-digestate spike low
SD-L = serial dilution B21low
U = undetected

3.4.3 Deviations from the OU1 Remedial Action Monitoring Plan (RAMP)

The OU1 RAMP called for one composite subgrade soil sample to be collected per lot excavated to a depth of 18 inches. Lot J126 was split into a north and south zone due to the large size of the property and differences in physical appearances of the soil. The north zone (J126N) consisted of lots 1 and 2 of block 98. The south zone (J126S) consisted on lots 3, 4, and 9 feet of lot 5 of block 98. The soils within the north zone of J126N consist of large amounts of debris. The soils within the south zone J126S do not contain debris.

3.5 Air Monitoring

One of the major concerns during the RA was spread of contamination due to transport of dust particles by wind. During the RA, the Air Monitoring Program was designed to:

- Provide controls and limit exposure of the public and RA workers.
- Provide data to enable the contractor to adjust dust mitigation measures as needed in order to protect residents and workers from exposure to unacceptable levels of dust.
- Provide a means of measuring contractor performance regarding fugitive dust controls as specified in Section 01567, Fugitive Dust Control, of the RD technical specifications.

The Air Monitoring Program consisted of the following components:

- Personal Air Monitoring
- Total Suspended Particulates Monitoring
- Opacity Monitoring

3.5.1 Personal Air Monitoring

The contractor equipped at least 10% of the daily workforce with personal air sampling monitors to determine daily lead and arsenic exposures. Results were tracked and reported on a regular basis and indicated that none of the monitored site construction workers were exposed to dust levels that would exceed the Occupational Safety and Health Administration (OSHA) permissible exposure limit for lead or arsenic.

3.5.2 Total Suspended Particulates (TSP) Monitoring

Residential exposure to contaminated soil and dust was monitored through the use of DataRams, which measure real-time fugitive dust emissions. The DataRams were setup both downwind and upwind of the work areas. The contractor was required to maintain one-hour average concentrations of less than 0.350 mg/m^3. The 0.350 mg/m^3 action level was established in Final Remedial Action Monitoring Plan and is based on the National Ambient Air Quality Standards (NAAQS) for ambient lead and Particulate Matter less than 10 microns (PM_{10}). URS has daily fugitive dust measurements for the site from June through October. After October the site soils were sufficiently moist such that dust-producing activities were limited

and DataRam monitoring was deemed unnecessary. These daily fugitive dust measurements are included in the project files.

3.5.3 Opacity Monitoring

URS field personnel who were certified by the State of Utah to perform opacity monitoring observed atmospheric opacity downwind of the work areas. The opacity monitoring was performed in accordance with the State of Utah requirements during daylight operating periods when excavation and materials handling procedures were occurring. Opacity readings were also taken during daylight non-working periods when high winds were affecting the site. The opacity readings were recorded in the Construction Inspectors field logs which are included in the project files. The Contractor was required to prevent exceedance of the visual opacity criteria of 20% established for the project.

3.5.4 Site Dust Control During the RA

Opacity measurements proved more effective at real time measurement of the Contractor's dust control performance. Since the TSP measurement was downloaded to a computer after the event was measured this monitoring method was a valuable backup to the opacity measurements. If the opacity measurements exceeded 20% the Contractor was issued a warning that they had exceeded their Emission Limitation. If opacity was not brought into compliance within two hours of opacity violation notice using other mitigation methods, the Contractor had to reduce construction activities except those associated with dust control. If opacity was not brought into compliance within four hours of opacity violation notice the Contractor was required to temporarily cease construction activities, except for those activities associated with dust control, until levels fell below the opacity standard. During several high wind events, the Contractor was issued opacity "warnings", during which time construction activities were limited and dust control activities were increased. The contractor was directed to halt all construction activities only twice due to high opacity readings occurring consecutively over a 4-hour period. These events were associated with unusually high, sustained wind events

3.6 Contaminated Soil Transportation and Disposal

Prior to the start of excavation at the site, the contractor started construction of a landfill cell at the Tooele County Landfill. This cell was designed to receive the non-hazardous contaminated soil. The Tooele County Landfill is located approximately three road miles north of Stockton. The excavated soil was loaded into 10-wheel dump trucks and transported to this landfill cell for disposal. The Contractor estimated that approximately 80,300 tons (58,670 cubic yards) of non-hazardous, contaminated soil was disposed of in this cell. Dry decon procedures were practiced at the point of dumping to ensure the contaminated soils were removed from the truck bed and outer carriage. After decon, these trucks were utilized for back haul of clean borrow material.

Hazardous contaminated soils excavated from the project were handled separately. Soils greater than 5 mg/L extractable lead (using TCLP) existed on four of the remediated properties. The soils excavated from these four properties were loaded into lined, 20-cubic yard, end-dump trucks and transported to Envirosafe's RCRA Subtitle C hazardous waste landfill facility in Grandview, Idaho for disposal. The Contractor estimated that approximately 1974 tons of hazardous contaminated soil was transported and disposed of at this facility as hazardous waste.

3.7 Backfill

Backfill activities entailed placement of up to 12 inches of common backfill and six inches of topsoil backfill to achieve the final grade for each property specified in the design drawings. Backfill material was tested to verify compliance with the design requirements.

3.7.1 Common Backfill

The Contractor's source of clean borrow backfill was from the northern and central portions of the Tooele County Landfill. The contractor performed tests on the borrow sources and certified that it did not contain hazardous waste or substances defined in 40 CFR Part 261, Subpart D and CERCLA Section 101(4) as amended. In addition, all borrow material had to be free of noxious weeds, roots, debris or frozen material.

Common backfill (below topsoil) was developed by scraping and blending the upper surface layers of the borrow area following topsoil stripping. This material was mixed with different strata from within the borrow boundaries to meet grain size requirements. Some of this material was screened to remove particle sizes greater than 2". The Contractor estimated that approximately 15,000 cubic yards of common fill were generated at this borrow source.

Common backfill, within 2% of optimum moisture content, as defined by the design specifications, was placed in the excavated areas up to six inches from the original grade. This common material was compacted to at least 90% of maximum dry density with a medium-sized vibratory roller, hand operated sheepsfoot roller, or hand-operated vibratory plate.

3.7.2 Topsoil Backfill

The topsoil backfill was developed from the existing topsoil at the borrow source. This material was removed from the uppermost strata of surface soil following clearing and grubbing. The topsoil had to meet specified gradation and organic content of at least 3%. To meet the gradation requirements, the Contractor set up a screening plant to remove ¾" and greater particle sized material. Topsoil developed from the central area of the Tooele County Landfill required an additional organic amendment material to meet specification requirements. The Contractor estimates that a total of approximately 35,000 cubic yards of topsoil was developed from this borrow source.

Topsoil was placed in the top six inches to the original grade. Topsoil was held to within 2% of optimum moisture, but no additional compaction was performed other than that which occurred during placement with small equipment and hand placement. This was to avoid over compaction of the surface topsoil layer. Performance tests on the in place topsoil indicated that approximately 90% of maximum dry density was being obtained through these minimal compaction procedures.

3.8 Site Restoration

During backfill procedures, special attention was given to each property to maintain natural drainage. Modifications were made in original grade to facilitate drainage away from structures. The overall site was also analyzed for field engineered berms, swales and other drainage enhancements since the town had no curb and gutter or storm drain infrastructure.

Following backfill, the fencing and "Tuffshed" subcontractors were the first to perform restoration activities. Once fence construction on a given property was complete, the Contractor's landscape

subcontractor, Bland Brothers Inc., commenced work. Bland Brothers planted trees and bushes, installed irrigation systems and sod. Irrigation systems were only installed on those properties that requested them or had pre-existing systems. Following the installation of sod, the landscape subcontractor watered the new lawns for a period of 30 days.

3.9 Institutional Controls

The detailed description of the selected remedy included implementation of institutional controls (ICs) to inform current and future property owners about contamination remaining below 18 inches on their properties, Plate 2. The ICs will restrict property owners exposure, allow them to manage contaminated soils disturbed during household gardening and landscaping activities, and protect workers and residents during construction activities on residential and public property within OU1. UDEQ prepared and submitted ICs to the Town of Stockton and Tooele County for approval and enactment. The Stockton Town Council approved and adopted the ICs on May 8, 2001. The ICs require permit applications for all work that requires excavation below 18 inches to ensure excavated material is tested and handled according to federal, state and local regulations governing handling, transportation, and disposal of lead and arsenic contaminated soils. IC enforcement is the joint responsibility of the Town of Stockton and the Tooele County Department of Health. Excavation permits are issued by the town of Stockton. All IC documentation will be retained on file at both the Stockton Town Hall and the Tooele County Building. The OU1 Post-Remediation Monitoring and Maintenance Plan requires submittal of annual reports to UDEQ by the Tooele County Department of Health to verify IC enforcement. The Town Ordinance (#20004) enacting the ICs is included as Attachment B.

4.0 DEMONSTRATION OF QUALITY ASSURANCE (QA) AND QUALITY CONTROL (QC) DURING THE REMEDIATION

Quality assurance (QA) and quality control (QC) activities encompassed construction QA including management plan training, survey QA, and material QA/QC.

4.1 Construction Quality Assurance and Management Plan Training

The URS Field Engineer, Resident Engineer and Site Construction Inspectors conducted training for all URS support field staff prior to and during the RA on an as-needed basis. The training consisted of:

- Documentation before, during, and after field activities, including:
  - Contractor oversight
  - Contractor submittal review
  - Air and soil sampling
  - Site files
  - Daily field reports
  - Log book entries
- Correct transmittal procedures
- Review of the Contractor's Decontamination Procedures

- Survey QA procedures
- Material QA procedures.

4.1.1 Contractor Oversight

Members of URS field staff were on-site during construction activities. Field personnel kept detailed log books describing construction activities observed on a daily basis. In addition, each employee filled out a daily log sheet at the end of the day that summarized all the days' work onto one concise form.

4.1.2 Site Files

Documentation related to the RA was kept in three separate main files labeled: EPA, UDEQ and URS. Identical copies of personnel's daily logs, materials submittals and sampling results, certified payrolls, contractor correspondence, change orders, pay requests, survey results, etc. were filed on site.

4.2 Survey QA

URS employed a subcontractor, REDCON Inc., to perform survey QA to verify The Contractor's survey and QC measurements. REDCON visited the site once every one to two weeks to spot check excavation depths, as well as intermediate and final grade elevations surveyed by The Contractor. If QA survey measurements indicated a discrepancy, a QA stake was placed in the field with cut or fill notation to correct grade. The URS QA team used these stakes to ensure any areas of grade dispute were resolved prior to final acceptance. Some final grades were adjusted in the field for drainage concerns.

4.3 Material QA/QC

The Contractor performed soil QC testing which included gradation and soil density compaction.

Soil QA testing was performed by URS utilizing their in-house (former Dames & Moore) soils and materials laboratory and staff for quality assurance of the Contractor's QC for soil measurements. URS QA efforts included soil gradation and soil density compaction. The weekly site visits by D&M were used to collect QA soil sample for gradation testing and QA soil density compaction tests.

In addition, a URS Construction Inspector coordinated mapping of the town to verify that the required level of compaction testing was completed throughout the project. The mapping verified that compaction testing was being performed by the Contractor through the Town and the QA effort was tracking the Contractor's efforts.

URS also performed QC testing of concrete material properties including: slump, air, temperature, and the testing of approximately 4 test cylinders per 50 cubic yards of concrete poured. A 24- to 48-hour notice was required for all concrete pours allowing ample time to coordinate and schedule for an onsite concrete technician. URS construction inspectors verified that concrete was poured within allotted time from dispatch from concrete plant.

All QA/QC results indicated that specification requirements were met for both soil and concrete properties. These results are included in the project files.

5.0 MATERIAL VARIANCES, RFIs, PROPOSAL REQUEST AND CHANGE ORDERS

The procedures for requesting contract clarification, variances, and modifications are specified in the RA contract documents. Material variances, requests for information (RFIs), and proposal requests (PRs) were submitted by the Contractor to the URS Resident Engineer for review.

5.1 Material Variance

Through the submittal process, the Contractor requested a variance from the general backfill design criteria requiring a minimum 75% passing the #4 sieve. The Contractor requested this be modified to allow 100% passing the #4 sieve. This request was initially rejected by URS. On the second request for variance, the Contractor presented a material that had been more homogeneously mixed with existing materials on-site such that a 90% passing by weight on the #4 sieve was attained. This variance was deemed acceptable along with a stipulation that the percent passing the #200 sieve not exceed 30%. As a condition of the acceptance of this variance, the Contractor agreed to provide additional testing verifying attainment of this gradation at no extra cost to UDEQ.

5.2 Request for Information (RFIs)

Contractor questions regarding the design drawings or specifications were addressed by the Request for Information (RFI) process established in the RA contract documents. When necessary, an RFI was submitted clearly stating the question and the recommended resolution, if applicable. URS evaluated the request and returned the RFI with either an acceptance of the Contractor's suggested solution or a response clarifying the project documents. RFIs generally did not have any cost impact to the project. RFIs with associated cost adjustments were incorporated into a proposal request.

5.3 Proposal Request

The proposal request process established in the RA contract documents was used to address homeowner requests or field design modifications. A proposal request (PR) describing the change was prepared by URS and transmitted to the Contractor for costing. The PR cost estimate was then returned to URS for approval prior to commencing work. However, in many cases, the work progressed and was completed in advance of final cost acceptance and negotiation of a PR in order to avoid schedule delays and inefficiencies in work activities and equipment use. This system proved acceptable. PR pricing was established based on unit prices submitted by the Contractor during the Contract Award Period. In some cases, work described on the PR was not listed in the unit cost submittal and the Contractor estimated the cost using other tracking methods. These methods included time and materials calculations and industry standard acceptable unit cost. Approximately 80% of the 294 PRs were generated by homeowner requests or were due to unforeseen subsurface conditions.

5.4 Change Orders

Incorporation of finalized PRs into the contract was accomplished by grouping PRs into change orders that in turn were processed and approved. To date 8 change orders have been prepared incorporating 294 PRs into the contract. Change orders were typically prepared and transmitted to UDEQ monthly, at least

one week prior to preparation of a pay application. This enabled the change order to be approved for inclusion on the current month's pay application.

On August 21, 2000 UDEQ sent a letter to the Contractor directing them to remove backfill which had been placed on 13 properties. This backfill material was obtained from an unapproved source at the Tooele County Landfill that potentially contained contamination from an abandoned landfill site. The Contractor was directed to remove this material from the 13 properties onto which it had been placed. The Contractor complied with this direction, removed the unapproved soil, and replaced it with clean backfill on these 13 properties. This work was completed within the required schedule allotted for the original contract. The Contractor submitted their cost estimate for the cost of this work. Through negotiations between UDEQ, URS and the Contractor, an amount of $93,000 was included in CO No.7 in consideration of the removal of the unacceptable fill. This additional cost was included in the cost approved for change order #7 issued on December 13, 2000.

6.0 COST SUMMARY

Cost estimates were prepared at various stages of the FFS to RA process as a basis for evaluating remedial alternatives and ultimately for project funding planning. The cost breakdown summaries for the ROD, Remedial Design and RA construction bid process are presented in the following sections.

6.1 ROD Cost Estimate

The original capital construction cost presented in the Record of Decision for the remedial action construction was $13,627,649. Costs assumptions include the following:

1. An equal number of landscaping items trees and bushes per lot.
2. The excavation depth was the same for all lots.
3. A percentage of the lots were assumed to exceed the 5 mg/kg TCLP criteria for leachable lead.
4. Transportation for disposal of contaminated soil was assumed to Grassy Mountain, a distance of about 60 miles from Stockton, and the disposal facility used for the EPA emergency removal action.
5. Asphalt replacement on the roads was assumed.

6.2 Remedial Design – Construction Cost Estimate

The remedial design (RD) construction cost estimate was based on a detailed quantity take-off for each lot. At the time of the quantity take off preparation, the design had sufficiently progressed enough that all property owners had reviewed drawings and discussed the replacement of landscape issues associated with their property. Unit prices were estimated for all items and applied to the quantities to establish an overall project cost.

The construction cost estimate dated January 2000, based on this design, was itemized as follows:

Construction Subtotal	$9,080,100	(based on unit prices and quantity take-off)
Mobilization (10%)	$908,010	
Demobilization (3%)	$272,403	
Subtotal	$10,260,513	
Unidentified Construction Costs (10%)	$1,026,051	
Construction Management (10%)	$1, 026,051	
Total	$12,312,600	

The RD construction cost estimate varies from the ROD estimate because of the better defined quantities. In addition, the following assumptions were better defined as they relate to the ROD costing assumptions:

1. The actual number of landscaping items was detailed for each lot. In some cases, properties had no landscaping at all.
2. Excavation depth for each lot was based on the vertical distribution of contaminant concentrations for each lot. For example, if concentrations above the action level only extended to 12 inches below ground surface, only 12 inches was excavated. Not all properties were taken to 18 inches depth. This saved on both the excavation process, load out, transportation and disposal costs.
3. The design documents identified which properties had soil that exceeded the TCLP criteria. The quantity estimated during final design was less than an assumed percentage used in estimating during the ROD. This saved in the transportation and disposal of hazardous soil.
4. Disposal of contaminated soil was assumed to go to Grassy Mountain. Costs were estimated for transporting soils with a haul distance of about 60 miles. Disposal was finally made at the Tooele County Landfill, about 3 miles from the excavation site.
5. Initial estimates were to have the contractor repair a portion of the existing asphalt roads due to damage during the removal activities. To date, the contractor has not damaged the roads and no asphalt replacement costs have been incurred.

6.3 Construction Bid Results

The Utah Department of Environmental Quality publicly opened construction bids on April 4, 2000. The results of the bid opening are presented in Table 6-1.

Table 6-1

RA Construction Bid Summary

BIDDER	TOTAL BID PRICE
Envirocon, Inc	$4,919,458.00
Environmental Reclamation, Inc.	$5.978,915.71
Thomas J. Peck & Sons	$6,717,629.00
Clearwater Environmental, Inc.	$6,748,225.00
OHM Remediation Services Corp.	$7,150,000.00
S&L Landscape & Excavating, Inc.	$7,368,000.00
Pacific West, LLC	$8,722,719.73
Broken Arrow Inc.	$12,274,883.00

Envirocon, Inc. was awarded the contract on April 13, 2000 and began work shortly after the Notice-to-Proceed was issued on May 4, 2000. Differences in the actual bid price and the engineer's estimate may include the following:

1. Lump sum nature of the bid process may have created a more competitive bid process among the Contractors.
2. Bidding climate at the time of bidding.
3. The incorporation of the short haul distance for disposal of the contaminated material.
4. The number of contractors bidding on the project.

Through the proposal request and change order process discussed in Section 5, Envirocon has requested, and UDEQ has approved, seven change orders. The seven change orders to date total $321,854.86. This represents approximately 6.5% of the original contract value. Of the $321,854.86, approximately 75% of the change orders, or about $241,400 are attributed to property owners reevaluating their property and wanting design changes, which affected the construction. A summary of the change orders is presented in Table 6-2.

Table 6-2

Change Order Summary

Change Order Number	Amount of Change Order
1	$28,443.00
2	$16,577.00
3	$11,061.00
4	$22,234.00
5	$35,874.71
6	$44,561.76
7	$163,103.39

The total contract has been increased to $5,241,312.86, which includes the 7 change orders. It is anticipated that one more change order will be issued during final construction beginning in April 2001.

7.0 FINAL INSPECTION

A pre-final inspection was conducted on February 19, 2001 at the job site in Stockton, Utah. The pre-final inspection verified that the Remedial Action Objectives and performance standards stated in the ROD were met. EPA and UDEQ jointly determined the remedy was "Operational and Functional" at the time of pre-final inspection per the EPA's memorandum dated March 6, 2001 entitled *Operational and Functional Determination for Jacobs Smelter OU1 Remedial Action.*

As part of the pre-final inspection, a pre-final punchlist was distributed to Envirocon. The punchlist items will be completed when Envirocon re-mobilizes in April 2001 to complete the remaining work. UDEQ will conduct a final inspection to certify that the punchlist items have been completed.

All excavation of contaminated soil, and therefore all work related to the protection of public health, as defined in the RAOs, is complete. Per the pre-final punch list, the work to be completed in April 2001 entails only minor work items which include:

- Landscape planting that could not be planted because of frozen ground conditions.
- Providing perennials to the property owners, for planting by the owners.
- Final alley grading.
- Removal of miscellaneous construction debris.
- Fence repair.
- General repair, cleanup, grading.
- Sod placement.

The Town of Stockton, will use the institutional controls (ICs) in place to prevent exposure of the public to contaminated soil below the 18-inch depth. The ICs are discussed in Section 3.9 of this report.

In summary, the ICs provide protection of public health for excavation work conducted in Stockton within the OU1 boundary. Requirements include established handling and testing procedures for all excavation activities and an excavation permit for all work that will disturb unremediated soil and generate more than one cubic yard of excavation material. The Town designated staff will review all projects that will disturb unremediated soil areas. Projects that disturb more than one cubic yard of soil will require testing to assess levels of lead and arsenic. Proper handling disposal will be required as provided in the ICs. These regulations will maintain the integrity of the remedial design and remedial action that has been completed for OU 1.

8.0 FINAL CONSTRUCTION AND CLOSE OUT

On December 6, 2000, the Contractor requested a winter dormant period in order to effectively finish the project during acceptable conditions for contract quality. This change was granted in CO No. 7 providing the Contractor a winter dormant period of 107 calendar days. The dormant period began on December 15, 2000, and shall end on April 1, 2001. Work shall proceed on the contract on April 2, 2001.

Final Inspection will be completed when the Contractor remobilizes in the Spring of 2001. Anticipated final completion is June 8, 2001.

Final inspection procedures will be documented upon their completion in the Spring of 2001.

PLATES

EPA REGION VIII
SUPERFUND DOCUMENT MANAGEMENT SYSTEM

DOC ID # 484376

IMAGERY COVER SHEET
UNSCANNABLE ITEM(S)

Contact the Superfund Records Center to view this (these) document(s).
(303-312-6473)

SITE NAME: Jacobs Smelter

REPORT OR DOCUMENT TITLE: Final OU2 Remedial action completion report

DATE OF DOCUMENT: 3/29/01

DESCRIPTION: 2 oversized charts

ATTACHMENT A
Indicator Sample Data Validation Report

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1. INTRODUCTION

This report contains the results of the data validation conducted for the soil samples and rinsate samples collected in the summer and fall of 2000 in support of the Jacobs Smelter OU1 Remedial Action (RA) Investigation. The objective of this investigation was to provide arsenic and lead data to establish institutional controls after the completion of the remedial action.

The soil samples and rinsate samples were sent to Northern Analytical, Inc. in Billings, Montana for analysis. The soil samples and rinsate samples were analyzed for arsenic and lead by ICP (Method 6010B). Some of the soil samples were analyzed for arsenic by Method 7062 (Atomic Absorption – Borohydride Reduction) to achieve lower reporting limits (RLs).

This data validation report describes the data validation process used and presents the data review results for the soil samples and associated Quality Control (QC) sample analyses.

In accordance with the Quality Assurance Project Plan (QAPP), a review of all data was conducted independently of the laboratory. The review consisted of evaluation of laboratory performance criteria and sample-specific criteria using guidance from the United States Environmental Protection Agency (USEPA) National Functional Guidelines for Inorganic Data Review (February 1994). The laboratory performance criteria evaluated included: initial calibration procedures and results, continuing calibration procedures and results, ICP interference check sample results, laboratory control sample results, and result quantitation and verification. An evaluation of laboratory performance criteria was conducted on all of the data packages received. Section 2.0 and Table 2-1 summarizes the QC requirements for the laboratory performance criteria.

The sample-specific criteria evaluated included: Chain of Custody (COC) and sample receipt documentation, holding times, blank contamination, duplicate sample analysis, matrix spike/matrix spike duplicate sample analysis, serial dilution results, post digestion spike recovery, and field duplicate results agreement. The sample-specific criteria were evaluated for every data package received. Section 3.0 and Table 3-1 summarize the sample-specific criteria that were used in the data validation process and how data were qualified.

The evaluation of laboratory performance criteria and sample-specific criteria is presented in Section 4.0. The results obtained for field quality control samples are

discussed in Section 5.0 and an overall assessment of data, with respect to the data quality indicators, is presented in Section 6.0.

During the data validation process, the data reviewer annotated on the analytical data sheets any data validation qualifiers assigned ("U", "J", "UJ", and "R") and associated qualifier and bias codes as listed in Tables 1-1 and 1-2. The purpose of the qualifier codes is to provide information with regard to the data quality condition(s) that resulted in the assigned qualifiers. The bias code provides an indication of the bias direction of the results qualified as estimated based on data quality condition(s) that resulted in the data qualification and the results of the other associated QC analyses. The data qualifier codes are followed by a hyphen and the applicable bias code. For example, a result qualified as estimated due to a holding time exceedance, which resulted in a potential low bias in the result, has the following code annotated on the data sheet, "HT-L". In the case of multiple data quality conditions resulting in qualification, each qualifier code is listed and separated by a comma. For example, a result qualified as estimated due to low matrix spike recovery and poor method duplicate precision would have the following codes annotated on the data sheet, "MS, MD – I. The data reporting forms with assigned data qualifiers are included in Appendix A.

TABLE 1-1
DATA VALIDATION QUALIFIER DEFINITIONS

QUALIFIER	DEFINITIONS [1]
U	The analyte was analyzed for, but was not detected above the level of the associated value. The associate value is either the sample quantitation limit or the sample detection limit.
J	The associated value is an estimated quantity
UJ	The material was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
R	The data are unusable. (Note: Analyte may or may not be present.)

[1] USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, February 1994.

TABLE 1-2
DATA VALIDATION QUALIFIER CODES

Qualifier Code	Data Quality Condition Resulting In Assigned Qualification
General use	
HT	Holding time requirement was not met
MB or PB	Method blank or preparation blank contamination
LCS	Laboratory control sample evaluation criteria not met
RB	Rinsate blank contamination
FD	Field duplicate evaluation criteria not met
RL	Reporting limit exceeds decision criteria (for nondetects)
Inorganic methods	
ICV	Initial calibration verification evaluation criteria not met
CCV	Continuing calibration verification evaluation criteria not met
CCB	Continuing calibration blank contamination
PB	Preparation Blank
ICS	Interference check sample evaluation criteria not met
LD	Laboratory duplicate precision evaluation criteria not met
MS and/or MSD	Matrix spike and/or matrix spike duplicate recovery outside acceptance range
PDS	Post-digestion spike recovery outside acceptance range
MSA	Method of standard additions correlation coefficient ≤ 0.995
MD	Method Duplicate precision evaluation criteria not met
MS/MSD	Duplicate precision evaluation criteria not met
IS	Internal standard recovery outside acceptance range for ICP-MS
ICS	Interferent check solution evaluation criteria not met
SD	Serial dilution results did not met evaluation criteria
Bias Codes	**Bias Direction**
H	Bias in sample result likely to be high
L	Bias in sample result likely to be low
I	Bias in sample result is indeterminate

2. EVALUATION OF LABORATORY PERFORMANCE CRITERIA

The review of laboratory performance criteria is summarized in Table 2-1. Table 2-1 is pertinent to Method 6010B metals by ICP and Arsenic by Method 7062. The laboratory performance criteria were evaluated for all data packages. The results of the laboratory performance criteria review are presented in Section 4.0.

TABLE 2-1
LABORATORY PERFORMANCE CRITERIA – 6010B AND 7062

Methods	QC Check	Minimum Frequency	Acceptance Criteria	Qualifiers
6010B/ 7062	Initial calibration (minimum 1 standard and a blank) 6010B	Daily prior to sample analysis	N/A	
	Initial multipoint calibration (minimum 5 stds. and a blank) 7062	Daily prior to sample analysis	• Correlation Coefficient ≥ 0.995 for linear regression	• If r < 0.995, qualify all results as estimated (J/UJ).
	Second source initial calibration verification (ICV)	Daily after initial calibration	• All analytes within ±10% of expected value. • RSD of replicate integrations <5%.	• If %R falls outside the acceptance range but within range of 75-89% or 111-125%, qualify results >IDL as estimated (J). • If %R is within 111-125%, results <IDL are acceptable. • If %R is 75-89%, qualify results <IDL as estimated (UJ). • If %R is <75%, qualify all results as unusable (R). • If %R is >125%, qualify results >IDL as unusable (R); results <IDL are acceptable without qualification. • No qualification issued for RSD >5%.
	Continuing calibration verification (CCV)	After every 10 samples and at the end of the analysis sequence	• All analytes within ±10% of expected value. • RSD of replicate integrations <5%.	
	Interference check solution (ICS) 6010B	At the beginning and end of the analytical run	• Recovery of spiked analytes within ±20% of expected value. • Results for analytes not present in the ICS solution must be <RL.	• If %R is >120%, results <IDL are acceptable. • If %R is >120%, qualify results >IDL as estimated (J). • If %R is within 50-79%, qualify results >IDL as estimated (J). • If %R is within 50-79%, qualify results <IDL as estimated (UJ). • If %R is <50%, qualify all results as unusable (R). • If results > IDL are observed that are not present in the ICS solution and the sample has concentrations at the level of the interferents concentrations, qualify sample results >IDL as estimated (J) if the amount of bias is ≥25% of sample result. • If negative concentrations are observed that are not present in the ICS solution at a concentration where the absolute value is >IDL, qualify sample results as estimated (J/UJ) if the bias was more than 25% of the reported result and the sample has a concentration comparable to the interferent concentrations in the ICS solution.
	Laboratory Control Sample (LCS)	One per analytical batch containing samples	• 80-120% recovery for soil and aqueous samples.	• If %R is within 50-79% or >120%, qualify results >IDL as estimated (J). • If %R >120%, results <IDL are acceptable without qualification. • If %R is within 50-79%, qualify results <IDL as estimated (J/UJ) • If %R is <50%, qualify all results as unusable (R).

3. EVALUATION OF SAMPLE-SPECIFIC CRITERIA

Sample-specific criteria were reviewed for all data packages. The review criteria and resultant actions are summarized in Table 3-1. The results of the sample-specific review are detailed in Section 4.0. Each subsection presents the review narrative for a data package.

TABLE 3-1
SAMPLE-SPECIFIC CRITERIA

Methods	QC Check	Minimum Frequency	Acceptance Criteria	Qualifiers
6010B/ 7062	Continuing calibration blank (CCB)	After every calibration verification	• <RL for positive results. • <|RL| for negative results.	• Sample results <5x the blank concentration qualify as nondetect (U). • Sample results for an analyte reported in an associated blank at a negative concentration >|4x blank concentration|, qualify results as estimated (J/UJ).
	Method Blank	One per analytical batch	• No analytes detected ≥ RL.	• Sample results <5x the blank concentration, qualify as nondetect (U). • Sample results for an analyte reported in the method blank at a negative concentration >|4x blank concentration|, qualify results as estimated (J/UJ).
	Serial Dilution Test 6010B	One per analytical batch	• 1:5 dilution must agree within ±10% of the original determination for analytes present at concentrations >50x MDL.	• If %D is >10%, qualify associated data as estimated (J/UJ).
	Matrix spike (MS)	One per 20 samples	• Recovery within 75-125% for both water and soils. • If sample results is ≥4x the spike amount then the matrix spike is not an appropriate for assessing accuracy measurement.	• If % R is >125%, results <IDL are acceptable without qualification. • If %R is >125% or <75%, qualify results >IDL as estimated (J). • If % R is within 30-74%, qualify results <IDL as estimated (J/UJ). • If % R is <30%, qualify results <IDL as unusable(R).
	Field Duplicate		If both results >5x RL • RPD for water is ≤30%. • RPD for soils is ≤50%. If either sample result is <5x the RL then • Absolute difference ≤2x RL (waters). • Absolute difference ≤4x CRDL (soils).	• If the RPD or absolute difference fall outside the appropriate fixed control windows, qualify the results for that analyte as estimated (J/UJ).
	Duplicate or Matrix Spike Duplicate	One per 20 samples	If both results >5x RL • RPD for water is ≤20%. • RPD for soils is ≤35%. If either sample result is <5x the RL then • Absolute difference ≤1x RL (waters). • Absolute difference ≤2x CRDL (soils).	• If the RPD or absolute difference fall outside the appropriate fixed control windows, qualify the results for that analyte as estimated (J/UJ).

4. REVIEW OF LABORATORY PERFORMANCE CRITERIA AND SAMPLE-SPECIFIC CRITERIA FOR ALL DATA PACKAGES

Laboratory performance criteria and sample-specific criteria were evaluated for all the data packages. The evaluation of laboratory performance criteria and sample-specific criteria was conducted as summarized in Tables 2-1 and 3-1. The data review narratives for the data packages are presented in Subsections 4.1 through 4.6. The data review narratives for the three rinsate samples are presented in Subsection 4.7 and 4.8.

4.1 Data Package 2000110002

Data package 2000110002 contained the analytical results for seven soil samples and one field duplicate sample. All samples were analyzed for total lead and arsenic. The table below lists the laboratory IDs, corresponding field IDs, and QC designations.

Lab ID	Field ID	QC Designation
2000110002-1	SRA-J027-SGZ-1000	
2000110002-2	SRA-J198-SGZ-1000	MS/MSD/MD
2000110002-3	SRA-J027-SGY-1000	FD to sample SRA-J027-SGZ-1000
2000110002-6	SRA-J025-SGZ-1000	
2000110002-7	SRA-J233-SGZ-1000	SD
2000110002-8	SRA-J249-SGZ-1000	
2000110002-9	SRA-J012-SGZ-1000	
2000110002-10	SRA-J261-SGZ-1000	

MD – Method Duplicate
MS – Matrix Spike
SD – Serial Dilution
MSD – Matrix Spike Duplicate
PDS – Post Digestion Spike
FD – Field Duplicate

4.1.1 Overall Assessment

After reviewing the initial data package submitted by Northern Analytical, the reviewer noted that the RL for two samples for arsenic analyzed by ICP did not satisfy the requirement specified in the QAPP. Therefore, Northern Analytical reanalyzed samples SRA-J027-SGZ-1000 and SRA-J025-SGZ-1000 by Method 7062 to achieve a lower RL. The ICP RL for lead met the QAPP requirements.

The data are considered usable for meeting project objectives without qualification. The data sample reporting forms are included in Appendix A.

4.1.2 COC and Sample Receipt Documentation

The samples were shipped to Northern Analytical under chain-of-custody (COC). The sample custodian noted that all samples were received intact.

4.1.3 Holding Times

The samples were prepared and analyzed within the required holding time limits. Data qualification on the basis of holding times was not necessary.

4.1.4 Initial Calibration

Each ICP analytical run was initiated with the analysis of a blank and at least one standard, which satisfied the initial calibration criterion. Each arsenic batch analyzed by Method 7062 was initiated with the analysis of a blank and five standards, which satisfied the initial calibration criterion. All metals in the second source initial calibration verification (ICV) were recovered within the acceptance range of 90-110% for all ICV analyses. The initial calibration blank sample results for all analytes were acceptable. Therefore, data qualification was not necessary based on initial calibration.

4.1.5 Continuing Calibration Verification

The continuing calibration verification solutions (CCV) were analyzed at the required frequency for all the ICP and arsenic methods. The continuing calibration criterion was satisfied and data qualification was not necessary.

4.1.6 Interference Check Standard (ICS)

The frequency of analysis of the ICS AB solution was acceptable. The percent recoveries for all analytes present in the ICS AB solution were within the acceptance range of 80-120%. Therefore, data qualification was not necessary.

4.1.7 Laboratory Control Sample (LCS)

A solid and aqueous LCS was prepared with this batch of samples. The recovery for all analytes were within the control limits given in the QAPP for the solid matrix and the aqueous matrix. This indicates that satisfactory levels of accuracy were attained on clean sample matrices. Data qualification based on laboratory control sample results was not necessary.

4.1.8 Preparation Blanks and Calibration Blanks

Preparation Blanks

No target analytes were detected in the preparation blank. Therefore, data qualification was not necessary.

Calibration Blanks

No target analytes were detected in the calibration blanks. Therefore, data qualification was not considered necessary.

4.1.9 Duplicate Sample Analysis

An additional aliquot of sample SRA-J198-SGZ-1000 was used by the laboratory to prepare the method duplicates for the ICP lead and arsenic analysis and the AA arsenic analysis. The concentration-dependent evaluation criteria listed in Table 3-1 were met for all analytes. Data qualification was not necessary.

4.1.10 Matrix Spike Analysis

An additional aliquot of sample SRA-J198-SGZ-1000 was used to prepare the matrix spike sample and matrix spike duplicate sample for the ICP lead and arsenic analysis and AA arsenic analysis. The recoveries for arsenic were within the acceptance range of 75-125%. The matrix spike recovery for lead was not appropriate for assessing accuracy because the sample concentration was greater than four times the spike level. Therefore, data qualification was not considered necessary based on matrix spike recoveries.

4.1.11 Serial Dilutions

The serial dilution analysis was conducted on samples SRA-J233-SGZ-1000. The analyte concentrations of arsenic and lead were greater than 50 times their respective MDLs, and as such the results were appropriate for comparing to the evaluation criterion. The percent difference (%Ds) between the original sample results and the results obtained from a sample diluted 1:5 were <10% and data qualification was not necessary.

4.1.12 Field Duplicate Analysis

The field duplicate pair was SRA-J027-SGZ-1000 and SRA-J027-SGY-1000. The concentration-dependent evaluation criteria listed in Table 3-1 were met for all analytes. Data qualification was not necessary.

4.2 Data Package 2000100194-1

Data package 2000100194-1 contained the analytical results for eleven soil samples. All samples were analyzed for lead and arsenic. The table below lists the laboratory IDs, corresponding field IDs, and QC designations.

Lab ID	Field ID	QC Designation
2000100194-1	SRA-J072-SGZ-0800	MS/MSD/MD
2000100194-2	SRA-J78/79-SGZ-0800	
2000100194-3	SRA-J075-SGZ-0800	
2000100194-4	SRA-J077-SGZ-0800	
2000100194-5	SRA-J076-SGZ-0800	
2000100194-6	SRA-J101-SGZ-0800	SD
2000100194-8	SRA-J102-SGZ-0800	
2000100194-9	SRA-J103-SGZ-0800	
2000100194-10	SRA-J104-SGZ-0800	
2000100194-11	SRA-J105-SGZ-0800	
2000100194-12	SRA-J84-SGZ-0900	

MD – Method Duplicate SD – Serial Dilution PDS – Post Digestion Spike
MS – Matrix Spike MSD – Matrix Spike Duplicate FD – Field Duplicate

4.2.1 Overall Assessment

After reviewing the initial data package submitted by Northern Analytical, the reviewer noted that the RL for one sample for arsenic analyzed by ICP did not satisfy the requirement specified in the QAPP. Therefore, Northern Analytical reanalyzed the sample SRA-J072-SGZ-0800 by Method 7062 to achieve a lower RL. The ICP RL for lead met the QAPP requirements.

The data are considered usable for meeting project objectives with the qualifications noted in the narrative below. The data qualifiers and qualification codes were hand-entered on the reporting forms. The data sample reporting forms are included in Appendix A.

4.2.2 COC and Sample Receipt Documentation

The samples were shipped to Northern Analytical under chain-of-custody (COC). The sample custodian noted that all samples were received intact.

4.2.3 Holding Times

The samples were prepared and analyzed within the required holding time limits. Data qualification on the basis of holding times was not necessary.

4.2.4 Initial Calibration

Each ICP analytical run was initiated with the analysis of a blank and at least one standard, which satisfied the initial calibration criterion. Each AA arsenic analytical run was initiated with the analysis of a blank and five standards, which satisfied the initial calibration criterion. All metals in the second source ICV were recovered within the acceptance range of 90-110% for all ICV analyses. The initial calibration blank sample results for all analytes were acceptable. Therefore, data qualification was not necessary based on initial calibration.

4.2.5 Continuing Calibration Verification

The CCV solutions were analyzed at the required frequency for all methods. The continuing calibration criterion was satisfied and data qualification was not necessary.

4.2.6 Interference Check Standard

The frequency of analysis of the ICS AB solution was acceptable. The percent recoveries for all analytes present in the ICS AB solution were within the acceptance range of 80-120%. Therefore, data qualification was not necessary.

4.2.7 Laboratory Control Sample

A solid and aqueous LCS was prepared with this batch of samples. With the exception of the solid arsenic recovery (ICP), all analytes were within the control limits given in the QAPP for the solid and aqueous matrices. The solid arsenic recovery exceeded the upper limit of the acceptance range of 80-120% with a recovery of 121%. Therefore, all arsenic results reported by ICPwere qualified as estimated (J) to reflect the potential high bias. However, the recovery for all analytes were within the control limits established by the EPA for the solid matrix and the laboratory historical limits for the

aqueous matrix. This indicates that satisfactory levels of accuracy were attained on clean sample matrices.

4.2.8 Preparation Blanks and Calibration Blanks

Preparation Blanks

No target analytes were detected in the preparation blank. Therefore, data qualification was not necessary.

Calibration Blanks

No target analytes were detected in the calibration blanks. Therefore, data qualification was not considered necessary.

4.2.9 Duplicate Sample Analysis

An additional aliquot of sample SRA-J072-SGZ-0800 was used by the laboratory to prepare the method duplicates for the ICP and AA arsenic analyses. The concentration-dependent evaluation criteria listed in Table 3-1 were met for all analytes. Data qualification was not necessary.

4.2.10 Matrix Spike Analysis

An additional aliquot of sample SRA-J-72-SGZ-0800 was used to prepare the matrix spike sample and matrix spike duplicate sample for the ICP and AA arsenic analysis. The recoveries for arsenic were within the acceptance range of 75-125%. The matrix spike recovery for lead was below the lower limit of the acceptance range with a recovery of 63%. Therefore, all lead results were qualified as estimated (J/UJ) to reflect the potential low bias.

4.2.11 Serial Dilutions

The serial dilution analysis was conducted on samples SRA-J101-SGZ-0800. The analyte concentrations of arsenic and lead were greater than 50 times their respective MDLs, and as such the results were appropriate for comparing to the evaluation criterion. The %Ds between the original sample results and the results obtained from a sample diluted 1:5 were <10% and data qualification was not necessary.

4.3 Data Package 2000100194-13

Data package 2000100194-13 contained the analytical results for nine soil samples and one field duplicate sample. All samples were analyzed for lead and arsenic. The table below lists the laboratory IDs, corresponding field IDs, and QC designations.

Lab ID	Field ID	QC Designation
2000100194-13	SRA-J83-SGZ-0900	SD (Lead)
2000100194-14	SRA-J106-SGZ-0900	
2000100194-15	SRA-J106-SGY-0900	FD to SRA-J106-SGZ-0900
2000100194-16	SRA-J85-SGZ-0900	
2000100194-17	SRA-J235-SGZ-0900	
2000100194-18	SRA-J255-SGZ-0900	
2000100194-19	SRA-J256-SGZ-0900	
2000100194-20	SRA-J254-SGZ-0900	SD (Arsenic)
2000100194-22	SRA-J274-SGZ-1000	
2000100194-23	SRA-J272-SGZ-1000	MS/MSD/MD

MD – Method Duplicate SD – Serial Dilution PDS – Post Digestion Spike
MS – Matrix Spike MSD – Matrix Spike Duplicate FD – Field Duplicate

4.3.1 Overall Assessment

After reviewing the initial data package submitted by Northern Analytical, the reviewer noted that the RL for one sample for arsenic analyzed by ICP did not satisfy the requirement specified in the QAPP. Therefore, Northern Analytical reanalyzed the sample SRA-J274-SGZ-1000 by Method 7062 to achieve a lower reporting limit. The ICP RL for lead met the QAPP requirements.

The data are considered usable for meeting project objectives with the qualifications noted in the narrative below. The data qualifiers and qualification codes were hand-entered on the reporting forms. The data sample reporting forms are included in Appendix A.

4.3.2 COC and Sample Receipt Documentation

The samples were shipped to Northern Analytical under COC. The sample custodian noted that all samples were received intact.

4.3.3 Holding Times

The samples were prepared and analyzed within the required holding time limits. Data qualification on the basis of holding times was not necessary.

4.3.4 Initial Calibration

Each ICP analytical run was initiated with the analysis of a blank and at least one standard, which satisfied the initial calibration criterion. Each AA arsenic analytical run was initiated with the analysis of a blank and five standards, which satisfied the initial calibration criterion. All metals in the second source ICV were recovered within the acceptance range of 90-110% for all ICV analyses. The initial calibration blank sample results for all analytes were acceptable. Therefore, data qualification was not necessary based on initial calibration.

4.3.5 Continuing Calibration Verification

The CCV solutions were analyzed at the required frequency for both methods. The continuing calibration criterion was satisfied and data qualification was not necessary.

4.3.6 Interference Check Standard

The frequency of analysis of the ICS AB solution was acceptable. The percent recoveries for all analytes present in the ICS AB solution were within the acceptance range of 80-120%. Therefore, data qualification was not necessary.

4.3.7 Laboratory Control Sample

A solid and aqueous LCS was prepared with this batch of samples. With the exception of the solid arsenic recovery (ICP), all analytes were within the control limits given in the QAPP for the solid and aqueous matrices. The solid arsenic recovery exceeded the upper limit of the acceptance range of 80-120% with a recovery of 121%. Therefore, all arsenic results reported by ICP were qualified as estimated (J) to reflect the potential high bias. However, the recovery for all analytes were within the control limits established by the EPA for the solid matrix and the laboratory historical limits for the aqueous matrix. This indicates that satisfactory levels of accuracy were attained on clean sample matrices.

4.3.8 Preparation Blanks and Calibration Blanks

Preparation Blanks

No target analytes were detected in the preparation blank. Therefore, data qualification was not necessary.

Calibration Blanks

No target analytes were detected in the calibration blanks. Therefore, data qualification was not considered necessary.

4.3.9 Duplicate Sample Analysis

An additional aliquot of sample SRA-J272-SGZ-1000 was used by the laboratory to prepare the method duplicate for the ICP metals analysis. An additional aliquot of sample SRA-J027-SGZ-1000 was used to prepare the method duplicate for the AA arsenic analysis. The concentration-dependent evaluation criteria listed in Table 3-1 were met for all analytes. Data qualification was not necessary.

4.3.10 Matrix Spike Analysis

An additional aliquot of sample SRA-J272-SGZ-1000 was used to prepare the matrix spike sample and matrix spike duplicate sample for the ICP metals analysis. An additional aliquot of sample SRA-J027-SGZ-1000 was used to prepare the matrix spike sample and the matrix spike duplicate sample for the AA arsenic analysis. The recoveries for arsenic were within the acceptance range of 75-125%. The matrix spike recovery for lead was not appropriate for assessing accuracy because the sample concentration was greater than four times the spike level. Therefore, data qualification was not considered necessary based on matrix spike recoveries.

4.3.11 Serial Dilutions

The serial dilution analysis was conducted on samples SRA-J83-SGZ-0900 (lead) and SRA-J254-SGZ-0900 (arsenic). The analyte concentrations of arsenic and lead were greater than 50 times their respective MDLs, and as such the results were appropriate for comparing to the evaluation criterion. The %Ds between the original sample results and the results obtained from a sample diluted 1:5 were <10% and data qualification was not necessary.

4.3.12 Field Duplicate Analysis

The field duplicate pair was SRA-J106-SDZ-0900 and SRA-J106-SWY-0900. The concentration-dependent evaluation criteria listed in Table 3-1 were met for all analytes. Data qualification was not necessary.

4.4 Data Package 2000080232-1

Data package 2000080232-1 contained the analytical results for nineteen soil samples and one field duplicate sample. All samples were analyzed for lead and arsenic. The table below lists the laboratory IDs, corresponding field IDs, and QC designations.

Lab ID	Field ID	QC Designation
2000080232-1	SRA-J124N-SGZ-0700	
2000080232-4	SRA-J109-SGZ-0700	
2000080232-5	SRA-J049-SGZ-0800	
2000080232-6	SRA-J046-SGZ-0700	
2000080232-7	SRA-J150-SGZ-0600	SD
2000080232-8	SRA-J169-SGZ-0600	
2000080232-9	SRA-J125-SGZ-0700	
2000080232-10	SRA-048-SGZ-0800	
2000080232-11	SRA-J107-SGZ-0800	
2000080232-12	SRA-J122-SGZ-0800	
2000080232-13	SRA-J151-SGY-0600	FD to sample SRA-J151-SGZ-0600
2000080232-14	SRA-151-SGZ-0600	
2000080232-15	SRA-J181-SGZ-0600	
2000080232-16	SRA-J152-SGZ-0600	
2000080232-17	SRA-J133W-SGZ-0600	
2000080232-18	SRA-J142-SGZ-0600	
2000080232-19	SRA-J133E-SGZ-0600	
2000080232-20	SRA-J144-SGZ-0600	
2000080232-21	SRA-J128-SGZ-0700	
2000080232-22	SRA-J126S-SGZ-0700	MS/MSD/MD/PDS

MD – Method Duplicate
MS – Matrix Spike
SD – Serial Dilution
MSD – Matrix Spike Duplicate
PDS – Post Digestion Spike
FD – Field Duplicate

4.4.1 Overall Assessment

After reviewing the initial data package submitted by Northern Analytical, the reviewer noted that the RL for five samples for arsenic by ICP did not satisfy the requirement specified in the QAPP. Northern Analytical could not reanalyze the samples because they were outside the required holding time. The affected samples are SRA-J049-SGZ-0800, SRA-J151-SGY-0600, SRA-151-SGZ-0600, SRA-J142-SGZ-0600, and SRA-J128-SGZ-0700. However, arsenic was reported as detected between the MDL and RL for these five samples, so the elevated RL does not affect the usability of the data.

The data are considered usable for meeting project objectives with the qualifications noted in the following narrative. The data qualifiers and qualification codes were hand-entered on the data reporting forms. The data sample reporting forms are included in Appendix A.

4.4.2 COC and Sample Receipt Documentation

The samples were shipped to Northern Analytical under (COC). The sample custodian noted that all samples wee received intact.

4.4.3 Holding Times

The samples were prepared and analyzed within the required holding time limits. Data qualification on the basis of holding times was not necessary.

4.4.4 Initial Calibration

Each ICP analytical run was initiated with the analysis of a blank and at least one standard, which satisfied the initial calibration criterion. All metals in the second source ICV were recovered within the acceptance range of 90-110% for all ICV analyses. The initial calibration blank sample results for all analytes were acceptable. Therefore, data qualification for ICP metals data was not necessary based on initial calibration.

4.4.5 Continuing Calibration Verification

The CCV solutions were analyzed at the required frequency for the ICP method. The continuing calibration criterion was satisfied and data qualification was not necessary.

4.4.6 Interference Check Standard

The frequency of analysis of the ICS AB solution was acceptable. The percent recoveries for all analytes present in the ICS AB solution were within the acceptance range of 80-120%. Therefore, data qualification was not necessary.

4.4.7 Laboratory Control Sample

A solid and aqueous LCS was prepared with this batch of samples. The recovery for all analytes were within the control limits given in the QAPP for the solid matrix and for the aqueous matrix. This indicates that satisfactory levels of accuracy were attained on clean sample matrices. Data qualification based on laboratory control sample results was not necessary.

4.4.8 Preparation Blanks and Calibration Blanks

Preparation Blanks

No target analytes were detected in the preparation blank. Therefore, data qualification was not necessary.

Calibration Blanks

No target analytes were detected in the calibration blanks. Therefore, data qualification was not considered necessary.

4.4.9 Duplicate Sample Analysis

An additional aliquot of sample SRA-J126S-SGZ-0700 was used by the laboratory to prepare the method duplicates for the ICP metals analysis. The concentration-dependent evaluation criteria listed in Table 3-1 were met for all analytes. Data qualification was not necessary.

4.4.10 Matrix Spike Analysis

An additional aliquot of sample SRA-J126S-SGZ-0700 was used to prepare the matrix spike sample and matrix spike duplicate sample for the ICP metals analysis. The matrix spike and matrix spike duplicate recoveries for arsenic were below the lower limit of the acceptance range of 75-125% with recoveries of 36% and 38%. Therefore, the arsenic results were qualified as estimated (J/UJ) to reflect the potential low bias. The matrix spike recovery for lead was not appropriate for assessing accuracy because the sample concentration was greater than four times the spike level.

Post-digestion spikes were conducted for arsenic and lead to aid in determining whether the matrix spike results that were out of the acceptance limits were caused by the sample matrix, a bias in the analytical system, or a combination of both. The post-digestion spike recovery for arsenic was within the acceptance range of 75-125%. Based on the post-digestion spike recovery, it is probable that the matrix spike result for arsenic was out of the acceptance range due to a matrix effect on digestion. The post-digestion spike recovery for lead was above the upper limit of the acceptance range of 75-125% with a recovery of 160%. Because the matrix spike results for lead were not appropriate for assessing accuracy, the reviewer considered it necessary to only qualify the lead result for sample SRA-J126S-SGZ-0700 as estimated (J) to reflect the potential high bias.

4.4.11 Serial Dilutions

The serial dilution analysis was conducted on sample SRA-J150-SGZ-0600. The analyte concentrations of arsenic and lead were greater than 50 times their respective MDLs, and as such the results were appropriate for comparing to the evaluation criterion. The %Ds between the original sample results and the results obtained from a sample diluted 1:5 were <10% and data qualification was not necessary.

4.4.12 Field Duplicate Analysis

The field duplicate pair was SRA-J151-SGZ-0600 and SRA-J151-SGGY-0600. The concentration-dependent evaluation criteria listed in Table 3-1 were met for all analytes. Data qualification was not necessary.

4.5 Data Package 2000080232-23

Data package 2000080232-23 contained the analytical results for eight soil samples. All samples were analyzed for lead and arsenic. The table below lists the laboratory IDs, corresponding field IDs, and QC designations.

Lab ID	Field ID	QC Designation
2000080232-23	SRA-J126N-SGZ-0700	MS/MSD/PDS/MD/SD
2000080232-25	SRA-J141-SGZ-0800	
2000080232-26	SRA-J054-SGZ-0800	
2000080232-27	SRA-J053-SGZ-0800	
2000080232-28	SRA-J055-SGZ-0800	

Lab ID	Field ID	QC Designation
2000080232-29	SRA-J063-SGZ-0800	
2000080232-30	SRA-J066-SGZ-0800	
2000080232-31	SRA-J070-SGZ-0800	

MD – Method Duplicate SD – Serial Dilution PDS – Post Digestion Spike
MS – Matrix Spike MSD – Matrix Spike Duplicate FD – Field Duplicate

4.5.1 Overall Assessment

The data are considered usable for meeting project objectives with the qualification noted in the following narrative. The data qualifiers and qualification codes were hand-entered on the data reporting forms. The data sample reporting forms are included in Appendix A.

4.5.2 COC and Sample Receipt Documentation

The samples were shipped to Northern Analytical under chain-of-custody (COC). The sample custodian noted that all samples were received intact.

4.5.3 Holding Times

The samples were prepared and analyzed within the required holding time limits. Data qualification on the basis of holding times was not necessary.

4.5.4 Initial Calibration

Each ICP analytical run was initiated with the analysis of a blank and at least one standard, which satisfied the initial calibration criterion. All metals in the second source ICV were recovered within the acceptance range of 90-110% for all ICV analyses. The initial calibration blank sample results for all analytes were acceptable. Therefore, data qualification for ICP metals data was not necessary based on initial calibration.

4.5.5 Continuing Calibration Verification

The CCV solutions were analyzed at the required frequency for all the ICP method. The continuing calibration criterion for the ICP method was satisfied and data qualification was not necessary.

4.5.6 Interference Check Standard

The frequency of analysis of the ICS AB solution was acceptable. The percent recoveries for all analytes present in the ICS AB solution were within the acceptance range of 80-120%. Therefore, data qualification was not necessary.

4.5.7 Laboratory Control Sample

A solid and aqueous LCS was prepared with this batch of samples. The recovery for all analytes were within the control limits given in the QAPP for the solid matrix and the aqueous matrix. This indicates that satisfactory levels of accuracy were attained on clean sample matrices. Data qualification based on laboratory control sample results was not necessary.

4.5.8 Preparation Blanks and Calibration Blanks

Preparation Blanks

No target analytes were detected in the preparation blank. Therefore, data qualification was not necessary.

Calibration Blanks

No target analytes were detected in the calibration blanks. Therefore, data qualification was not considered necessary.

4.5.9 Duplicate Sample Analysis

An additional aliquot of sample SRA-J126N-SGZ-0700 was used by the laboratory to prepare the method duplicates for the ICP metals analysis. The concentration-dependent evaluation criteria listed in Table 3-1 were met for all analytes. Data qualification was not necessary.

4.5.10 Matrix Spike Analysis

An additional aliquot of sample SRA-J126N-SGZ-0700 was used to prepare the matrix spike sample and matrix spike duplicate sample for the ICP metals analysis. The matrix spike recoveries for lead and arsenic were not appropriate for assessing accuracy because the sample concentrations were greater than four times the spike levels.

Post-digestion spikes were conducted for arsenic and lead. The post-digestion recovery for lead was not appropriate for assessing accuracy because the sample concentration

was greater than four times the spike level. The post-digestion spike recovery for arsenic was below the lower limit of the acceptance range of 75-125% with a recovery of 40%. Because the matrix spike result for lead were not appropriate for assessing accuracy, the reviewer considered it necessary to only qualify the arsenic result for sample SRA-J126N-SGZ-0700 as estimated (J) to reflect the potential low bias suggested by the post-digestion spike recovery.

4.5.11 Serial Dilutions

The serial dilution analysis was conducted on sample SRA-J126N-SGZ-0700. The analyte concentrations of arsenic and lead were greater than 50 times their respective MDLs, and as such the results were appropriate for comparing to the evaluation criterion. The %Ds between the original sample results and the results obtained from a sample diluted 1:5 were <10% and data qualification was not necessary.

4.6 Data Package 2001020128

Data package 2001020128 contained the analytical results for three soil samples and one field duplicate sample. The samples were analyzed for lead by Method 6010 and for arsenic by Method 7062. The table below lists the laboratory IDs, corresponding field IDs, and QC designations.

Lab ID	Field ID	QC Designation
2001020128-1	J127EP021301	MS/MSD/PDS/SD
2001020128-2	J127WP021301	
2001020128-3	J127WW021301	

MD – Method Duplicate SD – Serial Dilution PDS – Post Digestion Spike
MS – Matrix Spike MSD – Matrix Spike Duplicate FD – Field Duplicate

4.6.1 Overall Assessment

The data are considered usable for meeting project objectives with the qualifications noted in the following narrative. The data qualifiers and qualification codes were hand-entered on the data reporting forms. The data sample reporting forms are included in Appendix A.

4.6.2 COC and Sample Receipt Documentation

The samples were shipped to Northern Analytical under COC. The sample custodian noted that all samples were received intact.

4.6.3 Holding Times

The samples were prepared and analyzed within the required holding time limits. Data qualification on the basis of holding times was not necessary.

4.6.4 Initial Calibration

The ICP analytical run was initiated with the analysis of a blank and at least one standard, which satisfied the initial calibration criterion. The arsenic analytical run by 7062 was initiated with the analysis of a blank and five standards, which satisfied the initial calibration crierion. All metals in the second source ICV were recovered within the acceptance range of 90-110% for all ICV analyses. The initial calibration blank sample results for all analytes were acceptable. Therefore, data qualification was not necessary based on initial calibration.

4.6.5 Continuing Calibration Verification

The CCV solutions were analyzed at the required frequency for both methods. The continuing calibration criterion for both methods was satisfied and data qualification was not necessary.

4.6.6 Interference Check Standard

The frequency of analysis of the ICS AB solution was acceptable. The percent recoveries for all analytes present in the ICS AB solution were within the acceptance range of 80-120%. Therefore, data qualification was not necessary.

4.6.7 Laboratory Control Sample

A solid and aqueous LCS was prepared with this batch of samples. The recovery for all analytes were within the control limits given on the QAPP for the solid matrix and the aqueous matrix. This indicates that satisfactory levels of accuracy were attained on clean sample matrices. Data qualification based on laboratory control sample results was not necessary.

4.6.8 Preparation Blanks and Calibration Blanks

Preparation Blanks

No target analytes were detected in the preparation blank. Therefore, data qualification was not necessary.

Calibration Blanks

No target analytes were detected in the calibration blanks. Therefore, data qualification was not considered necessary.

4.6.9 Matrix Spike Analysis

An additional aliquot of sample J127EP021301 was used to prepare the matrix spike sample and matrix spike duplicate sample for the metals analysis. The matrix spike and matrix spike duplicate recoveries for arsenic were within the acceptance range of 75-125%. The matrix spike duplicate recovery for lead slightly exceeded the upper limit of the acceptance range of 75-125%, with a recovery. Because the matrix spike recovery for lead was within the acceptance range, data qualification was not considered necessary.

Post-digestion spikes were conducted for arsenic and lead to aid in determining whether the matrix spike results that were out of the acceptance limits were caused by the sample matrix, a bias in the analytical system, or a combination of both. The post-digestion spike recovery for arsenic and lead were within the acceptance range of 75-125%. Based on the post-digestion spike recovery, it is probable that the matrix spike duplicate result for lead was out of the acceptance range due to a matrix effect.

4.6.10 Serial Dilutions

The serial dilution analysis was conducted on sample J127EP021301. The analyte concentration of lead was greater than 50 times the respective MDL, and as such the results were appropriate for comparing to the evaluation criterion. The %Ds between the original sample result and the result obtained from a sample diluted 1:5 was >10%. Therefore, the lead results were qualified as estimated (J/UJ) to reflect the potential low bias suggested by the serial dilution. The bias direction is considered to be low because the original sample result was less than the diluted sample result

4.7 Data Package 2000080232-24

Data package 2000080232-24 contained the analytical results for one rinsate blank. The table below lists the laboratory IDs, corresponding field IDs, and QC designations.

Lab ID	Field ID	QC Designation
2000080232-24	SRA-J126N-SGR-0700	Rinsate Blank MS/MSD

MD – Method Duplicate
MS – Matrix Spike
SD – Serial Dilution
MSD – Matrix Spike Duplicate
PDS – Post Digestion Spike
FD – Field Duplicate

4.7.1 Overall Assessment

The data are considered usable for meeting project objectives without qualification. The data sample reporting forms are included in Appendix A.

4.7.2 COC and Sample Receipt Documentation

The samples were shipped to Northern Analytical under COC. The sample custodian noted that the sample was received intact..

4.7.3 Holding Times

The samples were prepared and analyzed within the required holding time limits. Data qualification on the basis of holding times was not necessary.

4.7.4 Initial Calibration

Each ICP analytical run was initiated with the analysis of a blank and at least one standard, which satisfied the initial calibration criterion. All metals in the second source ICV were recovered within the acceptance range of 90-110% for all ICV analyses. The initial calibration blank sample results for all analytes were acceptable. Therefore, data qualification for ICP metals data was not necessary based on initial calibration.

4.7.5 Continuing Calibration Verification

The CCV solutions were analyzed at the required frequency for all the ICP method. The continuing calibration criterion for the ICP method was satisfied and data qualification was not necessary.

4.7.6 Interference Check Standard

The frequency of analysis of the ICS AB solution was acceptable. The percent recovery for lead present in the ICS AB solution was within the acceptance range of 80-120%. The final ICS AB percent recovery for arsenic exceeded the acceptance range with a

recovery of 128%. Data qualification was not necessary because the sample did not have concentrations of interfering elements at the same level as the ICS AB standard.

4.7.7 Laboratory Control Sample

An aqueous LCS and LFB was prepared with this batch of samples. The recovery for all analytes were within the control limits given in the QAPP for the aqueous LCS and LFB. However, the arsenic recovery for the LFB exceeded the upper limit of the laboratory's acceptance range of 85-115% with a recovery of 117%. Data qualification was not considered necessary because the arsenic result for the sample is nondetect and the potential bias is high.

4.7.8 Preparation Blanks and Calibration Blanks

Preparation Blanks

No target analytes were detected in the preparation blank. Therefore, data qualification was not necessary.

Calibration Blanks

No target analytes were detected in the calibration blanks. Therefore, data qualification was not considered necessary.

4.7.9 Matrix Spike Analysis

An additional aliquot of sample SRA-J126N-SGR-0700 was used to prepare the matrix spike sample and matrix spike duplicate sample for the ICP metals analysis. Recoveries were all within the acceptance range of 75-125%.

4.8 Data Package 2000100194-7

Data package 2000100194-7 contained the analytical results for two rinsate blank samples. The table below lists the laboratory IDs, corresponding field IDs, and QC designations.

Lab ID	Field ID	QC Designation
2000100194-7	SRA-J104-SGZ-0800	Rinsate Blank MS/MSD
2000100194-21	SRA-J255-SGZ-0900	Rinsate Blank

MD – Method Duplicate
MS – Matrix Spike
SD – Serial Dilution
MSD – Matrix Spike Duplicate
PDS – Post Digestion Spike
FD – Field Duplicate

4.8.1 Overall Assessment

The data are considered usable for meeting project objectives without qualification. The data sample reporting forms are included in Appendix A.

4.8.2 COC and Sample Receipt Documentation

The samples were shipped to Northern Analytical under chain-of-custody (COC). The sample custodian noted that the samples were received intact.

4.8.3 Holding Times

The samples were prepared and analyzed within the required holding time limits. Data qualification on the basis of holding times was not necessary.

4.8.4 Initial Calibration

Each ICP analytical run was initiated with the analysis of a blank and at least one standard, which satisfied the initial calibration criterion. All metals in the second source ICV were recovered within the acceptance range of 90-110% for all ICV analyses. The initial calibration blank sample results for all analytes were acceptable. Therefore, data qualification for ICP metals data was not necessary based on initial calibration.

4.8.5 Continuing Calibration Verification

The CCV solutions were analyzed at the required frequency for all the ICP method. The continuing calibration criterion for the ICP method was satisfied and data qualification was not necessary.

4.8.6 Interference Check Standard

The frequency of analysis of the ICS AB solution was acceptable. The percent recovery for lead present in the ICS AB solution was within the acceptance range of 80-120%. The final ICS AB percent recovery for arsenic exceeded the acceptance range with a

recovery of 128%. Data qualification was not necessary because the sample did not have concentrations of interfering elements at the same level as the ICS AB standard.

4.8.7 Laboratory Control Sample

An aqueous LCS and LFB was prepared with this batch of samples. The recovery for all analytes were within the control limits given in the QAPP for the aqueous LCS and LFB. Data qualification was not considered necessary.

4.8.8 Preparation Blanks and Calibration Blanks

Preparation Blanks

No target analytes were detected in the preparation blank. Therefore, data qualification was not necessary.

Calibration Blanks

No target analytes were detected in the calibration blanks. Therefore, data qualification was not considered necessary.

4.8.9 Matrix Spike Analysis

An additional aliquot of sample SRA-J104-SGZ-0800 was used to prepare the matrix spike sample and matrix spike duplicate sample for the ICP metals analysis. Recoveries were all within the acceptance range of 75-125%.

5. FIELD QUALITY CONTROL SAMPLE RESULTS

During the investigation three rinsate blank samples and three field duplicate samples were collected. The results obtained for these field quality control samples are discussed in the sections below.

5.1 RINSATE BLANK RESULTS

Three rinsate blank samples were collected in association with the soil samples during this sampling event. Arsenic and lead were reported as nondetect in the rinsate blanks. Therefore, data qualification was not necessary.

5.2 Field Duplicate Agreement

Three field duplicate samples were collected during this sampling event. The results for all three field duplicate pairs satisfied the applicable evaluation criterion listed in Table 3-1.

6. OVERALL ASSESSMENT

The soil data are considered to be acceptable for use in reconciliation with project objectives as qualified. A general overall assessment of each of the QAPP's data quality assurance objectives is provided below.

6.1 REPORTING LIMITS

RLs are established by the analytical laboratory based on the method detection limits (MDLs), historical data, and comparison to EPA limits for the respective methods. The RLs for both arsenic and lead did not satisfy the requirements specified in the scope of work (SOW), as the table below illustrates. However, arsenic and lead results were reported as detected for these sample, so the elevated RL does not affect the usability of the data.

ANALYTES	Northern MDL (7062)	Northern RL (7062)	Northern MDL (ICP)	Northern RL (ICP)	Required RL
Arsenic	12 mg/kg	36 mg/kg	3 mg/kg	50 mg/kg	10 mg/kg
Lead	NA	NA	5 mg/kg	20 mg/kg	10 mg/kg

NA – Not Applicable

6.2 ACCURACY

Accuracy is defined as the degree of agreement of a measurement to an accepted reference or true value. Accuracy was measured as the percent recovery (%R) of an analyte in a reference standard or spiked sample.

The results for all calibration standards and laboratory control samples were within acceptance limits demonstrating acceptable overall accuracy of the analytical system.

Although the majority of matrix spike recoveries (11/14) were within acceptance limits, some data required qualification as estimated on the basis of these evaluations.. In general, the overall level of accuracy attained with respect to the site-specific sample matrix is considered to be acceptable and the data have been qualified as necessary to indicate the limitations based on accuracy relative to the sample matrix.

6.3 PRECISION

Precision is defined as the agreement between a set of replicate measurements without assumption or knowledge of the true value. Precision of laboratory measurements was evaluated by the comparison of sample/sample duplicate results.

All laboratory duplicate results satisfied the applicable evaluation criteria. As such, the overall level of precision demonstrated by the analyses is considered to be acceptable.

6.4 COMPLETENESS

All the metal results for soil samples are considered usable as qualified. As such, the analytical completeness for the soil samples, defined as the ratio of the number of valid analytical results (valid analytical results include values estimated) to the total number of analytical results requested on samples submitted for analysis, is 100%. All valid results will be considered for use in meeting project objectives.

6.5 REPRESENTATIVENESS

Representativeness is a qualitative parameter, which expresses the degree to which sample data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or an environmental condition. The design rational for the sampling programs (in terms of the purpose for sampling, selecting the sampling locations, the number of samples to be collected, the ambient conditions for sample collection, the frequencies and timing for sampling, and the sampling techniques) assures that the environmental condition has been sufficiently represented.

Consistent, uniform sample handling protocols, including such tasks as storage, preservation and transportation, were used to assure that the representativeness of the samples gathered during the sampling event met project objectives. Proper documentation in the field and laboratory verified that protocols were followed and that sample identification as well as integrity was preserved.

6.6 COMPARABILITY

Comparability expresses the confidence with which one data set can be compared to another. Comparability can be related to accuracy and precision because these quantities are measures of data reliability. Data are comparable if collection techniques,

measurement procedures, method, and reporting limits are equivalent for the samples within a sample set. As the samples in this set were analyzed in accordance with the quality assurance and quality control measures prescribed in the QAPP; and acceptable levels of overall accuracy and precision were attained, the data within this set are considered to be comparable to each other.

Data Package 2000110002

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000110002

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J027-SGZ-1000 Lab Sample ID: 2000110002-1 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP112700

Date Received: 11/01/00 Date Digested: 11/21/00 Date Analyzed: 11/27/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
~~Arsenic~~	~~3~~	~~50~~	~~50~~	~~1~~	~~---~~
Lead	5	20	215	1	---

Comments:

1/19/01

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 7062 Preparatory Method: 3050B SDG #: 2000110002

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J027-SGZ-1000 Lab Sample ID: 2000110002-1 Matrix: Soil

% Solids: ND Initial Calibration ID: As 02/15/01

Date Received: 11/01/00 Date Digested: 02/14/01 Date Analyzed: 02/15/01

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	0.3 (12)	1 (36)	23	40	F

Comments:

The MDL & RL in parenthesis is adjusted for the dilution factor. F – The analyte was positively identified. The concentration is between the MDL and RL.

3/15/01 SEO

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000110002

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J198-SGZ-1000 Lab Sample ID: 2000110002-2 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP112700

Date Received: 11/01/00 Date Digested: 11/21/00 Date Analyzed: 11/27/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	150	1	---
Lead	5	20	2570	1	---

Comments:

C3604

1/9/01 SEO

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000110002

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J027-SGY-1000 Lab Sample ID: 2000110002-3 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP112700

Date Received: 11/01/00 Date Digested: 11/21/00 Date Analyzed: 11/27/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	70	1	---
Lead	5	20	159	1	---

Comments:

11/9/01 SEO

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000110002

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-025-SGZ-1000 Lab Sample ID: 2000110002-6 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP112700

Date Received: 11/01/00 Date Digested: 11/21/00 Date Analyzed: 11/27/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
~~Arsenic~~	~~3~~	~~50~~	~~50~~	~~1~~	~~---~~
Lead	5	20	332	1	---

Comments:

C00006

1/9/01 SEC

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 7062 Preparatory Method: 3050B SDG #: 2000110002

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J025-SGZ-1000 Lab Sample ID: 2000110002-6 Matrix: Soil

% Solids: ND Initial Calibration ID: As 02/15/01

Date Received: 11/01/00 Date Digested: 02/14/01 Date Analyzed: 02/15/01

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	0.3 (12)	1 (36)	43	40	---

Comments:

The MDL & RL in parenthesis is adjusted for the dilution factor. F – The analyte was positively identified. The concentration is between the MDL and RL.

3/15/01 JEO

007

Northern Analytical Laboratories, Inc.

FORM I
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000110002

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J233-SGZ-1000 Lab Sample ID: 2000110002-7 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP112700

Date Received: 11/01/00 Date Digested: 11/21/00 Date Analyzed: 11/27/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	750	1	---
Lead	5	20	5980	1	---

Comments:

11/9/01

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000110002

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J249-SGZ-1000 Lab Sample ID: 2000110002-8 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP112700

Date Received: 11/01/00 Date Digested: 11/21/00 Date Analyzed: 11/27/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	140	1	---
Lead	5	20	1540	1	---

Comments:

1/9/01 SRO

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000110002

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-~~1249~~ 1012-SGZ-1000 Lab Sample ID: 2000110002-9 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP112700

Date Received: 11/01/00 Date Digested: 11/21/00 Date Analyzed: 11/27/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	80	1	---
Lead	5	20	785	1	---

Comments:

1/9/01

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000110002

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J261-SGZ-1000 Lab Sample ID: 2000110002-10 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP112700

Date Received: 11/01/00 Date Digested: 11/21/00 Date Analyzed: 11/27/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	340	1	---
Lead	5	20	2760	1	---

Comments:

1/19/01

Data Package 2000100194-1

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000100194-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J072-SGZ-0800 Lab Sample ID: 2000100194-1 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP111300

Date Received: 10/17/00 Date Digested: 11/09/00 Date Analyzed: 11/13/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
~~Arsenic~~	~~3~~	~~50~~	~~50~~	~~1~~	~~---~~
Lead	5	20	498	1	---

J MS-L

Comments:

1/19/01

000003

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 7062 Preparatory Method: 3050B SDG #: 2000100194-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J072-SGZ-0800 Lab Sample ID: 2000100194-1 Matrix: Soil

% Solids: ND Initial Calibration ID: As21501

Date Received: 10/17/00 Date Digested: 02/14/01 Date Analyzed: 02/15/01

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	0.3 (12)	1 (36)	24	40	F

Comments:

The MDL and RL values in parenthesis have been adjusted for the dilution factor.
F – The analyte was positively identified at a concentration between the MDL and RL.

3/15/01
JLCO

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000100194-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J78/79-SGZ-0800 Lab Sample ID: 2000100194-2 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP111300

Date Received: 10/17/00 Date Digested: 11/09/00 Date Analyzed: 11/13/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	80	1	--- J LCS-H
Lead	5	20	701	1	--- J MS-L

Comments:

1/19/01 SEO

000004

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000100194-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J075-SGZ-0800 Lab Sample ID: 2000100194-3 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP111300

Date Received: 10/17/00 Date Digested: 11/09/00 Date Analyzed: 11/13/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	100	1	---
Lead	5	20	1180	1	---

J LCS-H
J MS-L

Comments:

11/9/01 SEO

000005

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000100194-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J077-SGZ-0800 Lab Sample ID: 2000100194-4 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP111300

Date Received: 10/17/00 Date Digested: 11/09/00 Date Analyzed: 11/13/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	140	1	---
Lead	5	20	1620	1	---

J LLS-H
J MS-L

Comments:

1/19/01 SEO

000006

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000100194-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J076-SGZ-0800 Lab Sample ID: 2000100194-5 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP111300

Date Received: 10/17/00 Date Digested: 11/09/00 Date Analyzed: 11/13/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier	
Arsenic	3	50	90	1	---	J LCS-H
Lead	5	20	1340	1	---	J MS-L

Comments:

1/19/01

000007

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000100194-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J101-SGZ-0800 Lab Sample ID: 2000100194-6 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP111300

Date Received: 10/17/00 Date Digested: 11/09/00 Date Analyzed: 11/13/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	640	1	---
Lead	5	20	8780	1	---

J LCS-H
J MS-L

Comments:

11/9/01 JEO

000018

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000100194-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J102-SGZ-0800 Lab Sample ID: 2000100194-8 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP111300

Date Received: 10/17/00 Date Digested: 11/09/00 Date Analyzed: 11/13/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	690	1	---
Lead	5	20	9100	1	---

J LCS-H
J MS-L

Comments:

1/19/01 SEO

000009

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000100194-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J103-SGZ-0800 Lab Sample ID: 2000100194-9 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP111300

Date Received: 10/17/00 Date Digested: 11/09/00 Date Analyzed: 11/13/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	650	1	---
Lead	5	20	7520	1	---

J LCS-H
J MS-L

Comments:

1/19/01 SEO

000010

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000100194-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J104-SGZ-0800 Lab Sample ID: 2000100194-10 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP111300

Date Received: 10/17/00 Date Digested: 11/09/00 Date Analyzed: 11/13/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	270	1	---
Lead	5	20	3440	1	---

J LCS-H
J MS-L

Comments:

1/19/01 JEO

000011

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000100194-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J105-SGZ-0800 Lab Sample ID: 2000100194-11 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP111300

Date Received: 10/17/00 Date Digested: 11/09/00 Date Analyzed: 11/13/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	150	1	--- J LCS-H
Lead	5	20	2060	1	--- J MS-L

Comments:

1/9/01 SEW

000012

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000100194-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J84-SGZ-0900 Lab Sample ID: 2000100194-12 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP111300

Date Received: 10/17/00 Date Digested: 11/09/00 Date Analyzed: 11/13/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	230	1	---
Lead	5	20	3740	1	---

J LCS-H
J MS-L

Comments:

1/19/01

000013

Data Package 20001000194-13

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000100194-13

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J83-SGZ-0900 Lab Sample ID: 2000100194-13 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP111300

Date Received: 10/17/00 Date Digested: 11/09/00 Date Analyzed: 11/13/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	290	1	---
Lead	5	20	4560	1	---

J LCS-H

Comments:

1/19/01 SEO

000024

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000100194-13

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J106-SGZ-0900 Lab Sample ID: 2000100194-14 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP111300

Date Received: 10/17/00 Date Digested: 11/09/00 Date Analyzed: 11/13/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	300	1	---
Lead	5	20	4250	1	---

J LCS-H

Comments:

1/19/01 SPW

000025

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000100194-13

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J106-SGY-0900 Lab Sample ID: 2000100194-15 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP111300

Date Received: 10/17/00 Date Digested: 11/09/00 Date Analyzed: 11/13/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	240	1	---
Lead	5	20	2790	1	---

J LCS-H

Comments:

1/19/01 JRW

000026

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000100194-13

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J85-~~SGT~~ SGZ-0900 Lab Sample ID: 2000100194-16 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP111300

Date Received: 10/17/00 Date Digested: 11/09/00 Date Analyzed: 11/13/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	100	1	---
Lead	5	20	1050	1	---

J LCS-H

Comments:

1/19/01

000027

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000100194-13

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J235-SGZ-0900 Lab Sample ID: 2000100194-17 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP111300

Date Received: 10/17/00 Date Digested: 11/09/00 Date Analyzed: 11/13/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	140	1	---
Lead	5	20	3110	1	---

J LCS-H

Comments:

1/19/01

C00028

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000100194-13

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J255-SGZ-0900 Lab Sample ID: 2000100194-18 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP111300

Date Received: 10/17/00 Date Digested: 11/09/00 Date Analyzed: 11/13/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	150	1	---
Lead	5	20	2980	1	---

J LCS-H

Comments:

11/19/01 SEO

000029

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000100194-13

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J256-SGZ-0900 Lab Sample ID: 2000100194-19 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP111300

Date Received: 10/17/00 Date Digested: 11/09/00 Date Analyzed: 11/13/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	800	1	---
Lead	5	20	20,200	1	---

J LCS-H

Comments:

1/19/01 SPO

000036

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000100194-13

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J254-SGZ-0900 Lab Sample ID: 2000100194-20 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP111300

Date Received: 10/17/00 Date Digested: 11/09/00 Date Analyzed: 11/13/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	880	1	---
Lead	5	20	23,500	1	---

J LCS-H

Comments:

1/19/01 JEO

000031

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000100194-13

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J274-SGZ-1000 Lab Sample ID: 2000100194-22 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP111300

Date Received: 10/17/00 Date Digested: 11/09/00 Date Analyzed: 11/13/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
~~Arsenic~~	~~3~~	~~50~~	~~50U~~	~~1~~	~~---~~
Lead	5	20	155	1	---

Comments:

1/19/01 JRW

000032

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 7062 Preparatory Method: 3050B SDG #: 2000100194-17

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J274-SGZ-1000 Lab Sample ID: 2000100194-22 Matrix: Soil

% Solids: ND Initial Calibration ID: As 21501

Date Received: 10/17/00 Date Digested: 02/14/01 Date Analyzed: 2/15/01

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	0.3 (12)	1 (36)	32	40	F

Comments:

The MDL and RL in parenthesis are adjusted for the dilution factor. F – The analyte was positively identified at a concentration between the MDL and RL.

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000100194-13

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J272-SGZ-1000 Lab Sample ID: 2000100194-23 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP111300

Date Received: 10/17/00 Date Digested: 11/09/00 Date Analyzed: 11/13/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	100	1	---
Lead	5	20	922	1	---

J LCS-H

Comments:

11/19/00 SRO

000033

Data Package 2000080232-1

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000080232-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #: DE-99-P-6005

Field Sample ID: SRA-J124N-SGZ-0700 Lab Sample ID: 2000080232-1 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP092900

Date Received: 08/22/00 Date Digested: 09/28/00 Date Analyzed: 09/29/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	130	1	---
Lead	5	20	2910	1	---

MS-L J

Comments:

000004 1/9/01

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000080232-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #: DE-99-P-6005

Field Sample ID: SRA-J109-SGZ-0700 Lab Sample ID: 2000080232-4 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP092900

Date Received: 08/22/00 Date Digested: 09/28/00 Date Analyzed: 09/29/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	110	1	---
Lead	5	20	1630	1	---

J MS-L

Comments:

000005

1/19/01 ARD

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000080232-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #: DE-99-P-6005

Field Sample ID: SRA-J049-SGZ-0800 Lab Sample ID: 2000080232-5 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP092900

Date Received: 08/22/00 Date Digested: 09/28/00 Date Analyzed: 09/29/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	46	1	F
Lead	5	20	519	1	---

J MS-L

Comments:

000006

1/19/01 SEO

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000080232-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #: DE-99-P-6005

Field Sample ID: SRA-J046-SGZ-0700 Lab Sample ID: 2000080232-6 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP092900

Date Received: 08/22/00 Date Digested: 09/28/00 Date Analyzed: 09/29/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	60	1	---
Lead	5	20	742	1	---

J MS-L

Comments:

000007 1/9/01

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000080232-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #: DE-99-P-6005

Field Sample ID: SRA-J150-SGZ-0600 Lab Sample ID: 2000080232-7 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP092900

Date Received: 08/22/00 Date Digested: 09/28/00 Date Analyzed: 09/29/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	600	1	---
Lead	5	20	10,400	1	---

J MS-L

Comments:

000008 1/19/01

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000080232-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #: DE-99-P-6005

Field Sample ID: SRA-J169-SGZ-0600 Lab Sample ID: 2000080232-8 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP092900

Date Received: 08/22/00 Date Digested: 09/28/00 Date Analyzed: 09/29/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	110	1	---
Lead	5	20	1490	1	---

J MS-L

Comments:

000009

11/9/01 SEO

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000080232-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #: DE-99-P-6005

Field Sample ID: SRA-J125-SGZ-0700 Lab Sample ID: 2000080232-9 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP092900

Date Received: 08/22/00 Date Digested: 09/28/00 Date Analyzed: 09/29/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	230	1	—
Lead	5	20	5260	1	—

J MS-L

Comments:

000010 1/19/01

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000080232-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #: DE-99-P-6005

Field Sample ID: SRA-J048-SGZ-0800 Lab Sample ID: 2000080232-10 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP092900

Date Received: 08/22/00 Date Digested: 09/28/00 Date Analyzed: 09/29/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	80	1	---
Lead	5	20	8890	1	---

J MS-L

Comments:

000011

1/19/01

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000080232-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #: DE-99-P-6005

Field Sample ID: SRA-J107-SGZ-0800 Lab Sample ID: 2000080232-11 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP092900

Date Received: 08/22/00 Date Digested: 09/28/00 Date Analyzed: 09/29/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	490	1	---
Lead	5	20	7060	1	---

ms-L J

Comments:

000012 1/19/01 [illegible]

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000080232-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #: DE-99-P-6005

Field Sample ID: SRA-J122-SGZ-0800 Lab Sample ID: 2000080232-12 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP092900

Date Received: 08/22/00 Date Digested: 09/28/00 Date Analyzed: 09/29/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	120	1	---
Lead	5	20	2100	1	---

J mg-L

Comments:

000013

1/19/01 SRD

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000080232-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #: DE-99-P-6005

Field Sample ID: SRA-J151-SGY-0600 Lab Sample ID: 2000080232-13 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP092900

Date Received: 08/22/00 Date Digested: 09/28/00 Date Analyzed: 09/29/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	50	1	---
Lead	5	20	704	1	---

J MS-L

Comments:

000014 1/19/01

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000080232-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #: DE-99-P-6005

Field Sample ID: SRA-J151-SGZ-0600 Lab Sample ID: 2000080232-14 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP092900

Date Received: 08/22/00 Date Digested: 09/28/00 Date Analyzed: 09/29/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	40	1	F
Lead	5	20	638	1	---

J MS-L

Comments:

000015 1/19/01 [illegible]

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000080232-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #: DE-99-P-6005

Field Sample ID: SRA-J181-SGZ-0600 Lab Sample ID: 2000080232-15 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP092900

Date Received: 08/22/00 Date Digested: 09/28/00 Date Analyzed: 09/29/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	90	1	---
Lead	5	20	778	1	---

J MS-L

Comments:

000016

1/19/01 JPS

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000080232-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #: DE-99-P-6005

Field Sample ID: SRA-J152-SGZ-0600 Lab Sample ID: 2000080232-16 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP092900

Date Received: 08/22/00 Date Digested: 09/28/00 Date Analyzed: 09/29/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	40	1	F
Lead	5	20	582	1	---

J MS-L

Comments:

1/19/01

000017

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000080232-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #: DE-99-P-6005

Field Sample ID: SRA-J133W-SGZ-0600 Lab Sample ID: 2000080232-17 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP092900

Date Received: 08/22/00 Date Digested: 09/28/00 Date Analyzed: 09/29/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	100	1	—
Lead	5	20	1240	1	—

J MS-L

Comments:

000018

1/19/01

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000080232-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #: DE-99-P-6005

Field Sample ID: SRA-J142-SGZ-0600 Lab Sample ID: 2000080232-18 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP092900

Date Received: 08/22/00 Date Digested: 09/28/00 Date Analyzed: 09/29/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	40	1	F
Lead	5	20	805	1	---

J mg-L

Comments:

000019 1/9/01 ARD

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000080232-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #: DE-99-P-6005

Field Sample ID: SRA-J133E-SGZ-0600 Lab Sample ID: 2000080232-19 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP092900

Date Received: 08/22/00 Date Digested: 09/28/00 Date Analyzed: 09/29/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	270	1	---
Lead	5	20	1880	1	---

J ms-

Comments:

000020 1/9/01

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000080232-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #: DE-99-P-6005

Field Sample ID: SRA-J144-SGZ-0600 Lab Sample ID: 2000080232-20 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP092900

Date Received: 08/22/00 Date Digested: 09/28/00 Date Analyzed: 09/29/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	550	1	---
Lead	5	20	1050	1	---

J MS-L

Comments:

000021

1/19/01 SRO

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000080232-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #: DE-99-P-6005

Field Sample ID: SRA-J128-SGZ-0700 Lab Sample ID: 2000080232-21 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP092900

Date Received: 08/22/00 Date Digested: 09/28/00 Date Analyzed: 09/29/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	40	1	F
Lead	5	20	671	1	---

J MS-L

Comments:

000022

1/19/01 JRO

Northern Analytical Laboratories, Inc.

FORM I
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000080232-1

Lab Name: Northern Analytical Laboratories, Inc. Contract #: DE-99-P-6005

Field Sample ID: SRA-J126S-SGZ-0700 Lab Sample ID: 2000080232-22 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP092900

Date Received: 08/22/00 Date Digested: 09/28/00 Date Analyzed: 09/29/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	380	1	M
Lead	5	20	4700	1	M

J MS-L
J PDS-H

Comments: Matrix spike/matrix spike duplicate were not within limits for this sample.

000023

1/2/01

Data Package 2000080232-23

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000080232-23

Lab Name: Northern Analytical Laboratories, Inc. Contract #: DE-99-P-6005

Field Sample ID: SRA-J126N-SGZ-0700 Lab Sample ID: 2000080232-23 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP092900

Date Received: 08/22/00 Date Digested: 09/28/00 Date Analyzed: 09/29/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3 (9)	50 (150)	1390	3	M
Lead	5 (15)	20 (60)	20,800	3	M

J PDS-L

Comments:

Matrix spike/matrix spike duplicate were not within limits for this sample.
The MDL & RL values in parenthesis have been adjusted for the dilution factor.

000034

1/19/01 SRO

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000080232-23

Lab Name: Northern Analytical Laboratories, Inc. Contract #: DE-99-P-6005

Field Sample ID: SRA-J141-SGZ-0800 Lab Sample ID: 2000080232-25 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP092900

Date Received: 08/22/00 Date Digested: 09/28/00 Date Analyzed: 09/29/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	150	1	---
Lead	5	20	1460	1	---

Comments:

000035

1/19/01

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000080232-23

Lab Name: Northern Analytical Laboratories, Inc. Contract #: DE-99-P-6005

Field Sample ID: SRA-J054-SGZ-0800 Lab Sample ID: 2000080232-26 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP092900

Date Received: 08/22/00 Date Digested: 09/28/00 Date Analyzed: 09/29/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	140	1	—
Lead	5	20	1880	1	—

Comments:

000036 1/9/01

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000080232-23

Lab Name: Northern Analytical Laboratories, Inc. Contract #: DE-99-P-6005

Field Sample ID: SRA-J053-SGZ-0800 Lab Sample ID: 2000080232-27 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP092900

Date Received: 08/22/00 Date Digested: 09/28/00 Date Analyzed: 09/29/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	110	1	---
Lead	5	20	1730	1	---

Comments:

000037

1/9/01

Northern Analytical Laboratories, Inc.

FORM I
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000080232-23

Lab Name: Northern Analytical Laboratories, Inc. Contract #: DE-99-P-6005

Field Sample ID: SRA-J055-SGZ-0800 Lab Sample ID: 2000080232-28 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP092900

Date Received: 08/22/00 Date Digested: 09/28/00 Date Analyzed: 09/29/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	60	1	---
Lead	5	20	752	1	---

Comments:

000038

11/9/01

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000080232-23

Lab Name: Northern Analytical Laboratories, Inc. Contract #: DE-99-P-6005

Field Sample ID: SRA-J063-SGZ-0800 Lab Sample ID: 2000080232-29 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP092900

Date Received: 08/22/00 Date Digested: 09/28/00 Date Analyzed: 09/29/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	80	1	---
Lead	5	20	1180	1	---

Comments:

000039

1/19/01

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000080232-23

Lab Name: Northern Analytical Laboratories, Inc. Contract #: DE-99-P-6005

Field Sample ID: SRA-J066-SGZ-0800 Lab Sample ID: 2000080232-30 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP092900

Date Received: 08/22/00 Date Digested: 09/28/00 Date Analyzed: 09/29/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	60	1	---
Lead	5	20	818	1	---

Comments:

000040

1/19/01

Northern Analytical Laboratories, Inc.

FORM I
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3050B SDG #: 2000080232-23

Lab Name: Northern Analytical Laboratories, Inc. Contract #: DE-99-P-6005

Field Sample ID: SRA-J070-SGZ-0800 Lab Sample ID: 2000080232-31 Matrix: Soil

% Solids: ND Initial Calibration ID: ICP092900

Date Received: 08/22/00 Date Digested: 09/28/00 Date Analyzed: 09/29/00

Concentration Units (mg/L or mg/kg dry weight): mg/kg

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	3	50	50	1	---
Lead	5	20	699	1	---

Comments:

000041

1/19/01

Data Package 2001020128

FORM I
INORGANIC ANALYSES DATA SHEET

Lab Name: Northern Analytical Laboratories, Inc. SDG No.: 2001020128

Field Sample ID: J127EP021301 Lab Sample ID: 2001020128-1

Date Received: 02/15/01 Date/Time Collected: 02/13/01 1230

Matrix: Soil Concentration Units: mg/kg

Analyte	RL	Concentration	Dil.	Method	Date	Q
Arsenic, dry basis	10	10	10	7062	02/20/01	U
Lead, dry basis	10	258	1	6010B	02/19/01	~~M~~ J SD-L

Comments:
M – The matrix spike duplicate recovery was above the control limit.

3/9/01 JKO
003

FORM 1
INORGANIC ANALYSES DATA SHEET

Lab Name: Northern Analytical Laboratories, Inc. SDG No.: 2001020128

Field Sample ID: J127WP021301 Lab Sample ID: 2001020128-2

Date Received: 02/15/01 Date/Time Collected: 02/13/01 1245

Matrix: Soil Concentration Units: mg/kg

Analyte	RL	Concentration	Dil.	Method	Date	Q
Arsenic, dry basis	10	14	10	7062	02/20/01	---
Lead, dry basis	10	169	1	6010B	02/19/01	---

J SD-L

Comments:

FORM 1
INORGANIC ANALYSES DATA SHEET

Lab Name: Northern Analytical Laboratories, Inc. SDG No.: 2001020128

Field Sample ID: J127WW021301 Lab Sample ID: 2001020128-3

Date Received: 02/15/01 Date/Time Collected: 02/13/01 1420

Matrix: Soil Concentration Units: mg/kg

Analyte	RL	Concentration	Dil.	Method	Date	Q
Arsenic, dry basis	10	10	~~10~~ 10	7062	02/20/01	U
Lead, dry basis	10	66 ~~70~~ 60 2/21	~~1~~ 1	6010B	02/19/01	---

J SD-L

Comments:

005

Data Package 2000080232-24

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3010A SDG #: 2000080232-24

Lab Name: Northern Analytical Laboratories, Inc. Contract #: _____

Field Sample ID: SRA-J126N-SG-R-0700 Lab Sample ID: 2000080232-24 Matrix: Water

% Solids: ND Initial Calibration ID: ICP101100

Date Received: 08/22/00 Date Digested: 10/09/00 Date Analyzed: 10/11/00

Concentration Units (mg/L or mg/kg dry weight): mg/l

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	0.06	5	0.06	1	U
Lead	0.05	1	0.05	1	U

Comments:

Data Package 2000100194-7

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3010A SDG #: 2000100194-7

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J104-SGZ-0800 Lab Sample ID: 2000100194-7 Matrix: Water

% Solids: ND Initial Calibration ID: ICP111300

Date Received: 10/17/00 Date Digested: 11/06/00 Date Analyzed: 11/07/00

Concentration Units (mg/L or mg/kg dry weight): mg/l

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	0.06	0.2	0.2	1	U
Lead	0.07	0.2	0.2	1	U

Comments:

Northern Analytical Laboratories, Inc.

FORM 1
INORGANIC ANALYSES DATA SHEET
RESULTS

Analytical Method: 6010B Preparatory Method: 3010A SDG #: 2000100194-7

Lab Name: Northern Analytical Laboratories, Inc. Contract #:

Field Sample ID: SRA-J255-SGZ-0900 Lab Sample ID: 2000100194-21 Matrix: Water

% Solids: ND Initial Calibration ID: ICP111300

Date Received: 10/17/00 Date Digested: 11/06/00 Date Analyzed: 11/07/00

Concentration Units (mg/L or mg/kg dry weight): mg/l

Analyte	MDL	RL	Concentration	Dilution	Qualifier
Arsenic	0.06	0.2	0.2	1	U
Lead	0.07	0.2	0.2	1	U

Comments:

ATTACHMENT B
Institutional Controls

Ordinance # 2000-4

Excavation and Development within the Jacob Smelter

Sections:

1.10 Findings
1.20 Applicability
1.30 Definitions
1.40 Prohibited activity
1.50 Permits required
1.60 Permit procedures
1.70 Performance Standards
1.80 Soil testing
1.90 Inspection and Maintenance of Permanent Remedy
1.100 Appeals
1.110 Severability

1.10 FINDINGS.

The United States Environmental Protection Agency (EPA) has identified and designated an area known as the Jacob Smelter Tailing site as being contaminated with mining wastes containing high concentrations of lead and arsenic, and has consequently placed such Site on the EPA's National Priorities List for clean up and remediation under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. Section 9601 et seq. The EPA has determined that the concentration of lead and arsenic on the Site pose a potential health risk to humans, especially small children and pregnant women. Also, the EPA has formulated and issued a remedy for clean up of the site as published and set forth in a Record of Decision (ROD) dated 29 July 1999.

1.20 APPLICABILITY.

These regulations shall apply to and govern any development or activity, which may cause or contribute to the movement or disturbance of contaminated soil or other material within the boundaries of the Site as identified and designated by the EPA. And as depicted on the official map as maintained in the office at the Stockton Town Hall, 18 North Johnson Street Stockton Utah 84071-0240. Additional maps of the Site shall be maintained in the Offices of the County Clerk and Recorder, the Utah Department of Environmental Quality (DEQ), and Tooele County Health Department.

1.30 DEFINITIONS

As used in this chapter.

A. "Activity" means any action occurring on, above, or below the surface of the ground within the boundaries of the Site, which results or may result in a disturbance of the permanent remedy applicable to the Site.
B. "Clean fill" means topsoil or other fill material with lead concentration of 200 mg/kg {parts per million (ppm)} or less.
C. "Contaminated soil or materials" mean soil or material containing lead concentration greater than 500 mg/kg (ppm) or 70 mg/kg (ppm) arsenic.
D. "Development" means any construction or man-made change in the use or character of land including but not limited to building, grading, excavating, digging, paving, drilling, demolition work, or planting.

E. "Hard surface cover" means a non-permeable or semi-permeable barrier overlaying the ground surface such as paving, asphalt, concrete, stone, or wood, and including building and other permanent structures.
F. "Permanent remedy" means the remedial action plan specified by the EPA pursuant to its ROD for the Site and any subsequently adopted amendments thereto.
G. "Permanent repository" means a location on Jacob Smelter Operable Unit as designated by the EPA to be utilized for the permanent storage of contaminated soil and material originating within the boundaries of the Site.
H. "Person" means an individual. Partnership, corporation, association, company, landowner, tenant, occupant, contractor, subcontractor or any public body or political subdivision.
I. "Site" means the area in the Town of Stockton boundaries as designated by the United State Environmental Protection Agency (EPA) as Operable Unit 2 (OU2) pursuant to the Comprehensive Environmental Response, compensation, and Liability Act, U.S.C. Section 9601 et seq., as amended and as depicted on the official map maintained by the development services division and signed by an official of the EPA.
J. "Uncontaminated soil or material" means soil or material containing concentration of lead and arsenic less than 200 mg/kg (ppm) and 70 mg/kg (ppm) respectively for vegetable gardens and less than 500 mg/kg (ppm) and 70 mg/kg (ppm) arsenic for all other areas.
K. "Vegetative cover" means plant life, including but not limited to grass, trees, shrubs, vines, and sod, planted or installed in such a manner so as to prevent or minimize the exposure of ground soil.

1.40 PROHIBITED ACTIVITY

No person shall undertake or conduct or cause to undertake or conduct any activity or development within the Site without first complying with the procedures and performance standards as provided in this chapter.

1.50 PERMITS REQUIRED

No person shall undertake or conduct any activities or development within the Site involving the excavation of more than one cubic yard or soil without first obtaining a permit from the Town of Stockton. Activities or development involving excavation of less than one cubic yard of soil shall not require a permit but shall be subject to the requirements as set forth in Section 1.70 of this chapter.

1.60 PERMIT PROCEDURES

A. All permits shall be applied for on a form provided by the Town of Stockton. A fee shall be assessed in accordance with the building permit fees schedule. Each applicant for a permit shall at a minimum provide the following information.
1. The location and nature of the proposed activity or development.
2. The depth of any proposed excavation and volume of soil or material to be excavated or disturbed.
3. The dimensions of all surface areas to be disturbed.
4. The volume of soil or other material to be backfilled on site.
5. The volume of soil or other material proposed to be disposed of off the excavation site.
6. The duration of any exposure of soil or material excavated from below a hard surface cover.
7. The applicant's plans for identification and segregation of clean fill and uncontaminated soil or material from contaminated soil and material during the period of activity or development.

8. The applicant's plans for backfilling with uncontaminated soil or material.
9. The applicant's plans for insuring compliance with the performance standards as set forth in section 1.70 of this chapter.
10. Such additional information as determined by the Town of Stockton and the Tooele County Health Department utilizing the performance standards as set forth in Section 1.70 of this chapter

1.70 PERFORMANCE STANDARDS

The following performance standards shall be adhered to and applied to all activity or development within the Site so as to maintain and ensure the integrity of the permanent remedy.

A. Any disturbed soil or material originating from below a hard surface cover that is to be stored above ground shall be securely contained and covered with a durable non-permeable tarp so as to prevent the leaching of contaminated material onto or into the surface soil. Where such storage is to extend beyond fourteen calendar days, stored soil or material excavated from below the hard surface cover shall be securely fenced to a height of not less than six feet in addition to being covered as herein required. All soil or material excavated from below a hard surface cover, unless as noted below, shall be removed to the permanent repository within the Jacob Smelter Tailing Operable Unit 1 upon approval by the Tooele County Health Department. Disturbed soil or material need not be removed to the permanent repository if the Tooele County Health Department finds that the contamination of the soil or material is less then the 500 mg/kg (ppm) of total lean and less than 70 mg/kg (ppm) arsenic.
B. No contaminated soil or other material shall be removed, placed, stored, transported, or disposed of outside the boundaries of the Site without having first obtained any and all necessary state and/or federal transportation and disposal permits.
C. All activity or development shall be accompanied by dust suppression measures such as the application of water or other soil surfactant to minimize the creation and release of dust and other particulate into the air.
D. No vegetation shall be planted or cultivated within the boundaries of the Site except in established and designated garden beds. Clean fill and uncontaminated soil used in vegetable garden beds shall not be borrowed or taken from any other area within the Site.

1.80 SOIL TESTING.

The Town of Stockton or the Tooele Health Department may require any person undertaking to conduct activity or development within the Site to test any soil or material to establish its total lead (Pb) and arsenic (As) content for purpose of determining the application of any of the provisions of this chapter. All testing shall utilize and adhere to protocols established or approved by the EPA.

1.90 INSPECTION AND MAINTENANCE OF PERMANENT REMEDY.

In addition to all other requirements as set forth in this chapter, the following additional requirements shall apply to the use and maintenance of all lands within the Site, including but not limited to lawns, play areas, and parking lots.

A. All areas within the Site shall be subject to inspection by the Town of Stockton and the Tooele County Health Department in order to enforce the provisions of this chapter. Inspections shall be done with the consent of the property owner or occupant. If consent is denied, inspection shall be obtained pursuant to a warrant.

B. All unremediated areas under hard surface cover within the Site shall be maintained with a hard surface cover. Except as allowed pursuant to a duly obtained permit issued under this chapter, no person shall alter any part of a hard surface cover absent prior notice to the Town of Stockton.

C. Any fence, wall, or other barrier installed to limit or prevent access to contaminated areas within the Site shall be maintained in such a manner so as to insure its effectiveness against trespass or other intrusion.

1.100 APPEALS

A. Any person adversely effected or aggrieved by a decision of the Town of Stockton or the Tooele County Health Department made pursuant to this chapter may appeal such decision to the Town Council. Said appeal shall be filed in writing, and in triplicate, stating the reasons for the appeal with Tooele County Health Department within ten days following the date upon which the decision is made.

B. The Tooele County Health Department shall notify the Town Council of the date of review, in writing, at least seven days proceeding the date set for hearing so that the record may be prepared for the hearing.

C. The Town Council, after proper review of the decision of the Tooele County Health Department may affirm, reverse, alter or remand for further review and consideration any action taken by the Town of Stockton or the Tooele County Health Department.

1.110 SEVERABILITY.

If any provision or clause of this chapter or the application thereof to any person or circumstances is held to be unconstitutional or otherwise invalid by any court of competent jurisdiction, such invalidity shall not affect other sections, provisions, clauses or applications hereof which can be implemented without the invalid provision, clause or application hereof. To this end, the provisions and clauses of this chapter are declared to be severable.

SECTION II In accordance with Section 96211 (e) of Title 42 of the United States Code, this ordinance shall not require or be construed to require the obtaining of a permit by any agency employee, or contractor of the United States for that portion of any removal or remedial action conducted entirely within the Site where such action is selected and carried out in compliance with the provisions of CERCLA, 42 U.S.C.Section 9601, et seq., and the permanent remedy.

SECTION III This ordinance shall not have any effect on existing litigation and shall not operate as an abatement of any action or proceeding now pending under or by virtue of the ordinance repealed or amended as herein provided, and the same shall be construed and concluded under such prior ordinances.

SECTION IV This ordinance shall become effective fifteen days after its passage and upon at least one publication in a newspaper published and having general circulation in Tooele County, except that the following provisions of the ordinance shall become effective and apply to any given parcel or land has been certified by the Remedial Project Manager for the EPA fully remediated in accordance with the permanent remedy and written notice thereof has been provided to the affected landowners. The Environmental Protection agency's written notice to the affected landowners shall cite the following:

(1) Section 1.70, Performance Standards, Vegetable and Flower Gardening or Cultivation;
(2) Section 1.90, Inspection and Maintenance of Permanent Remedy.

Approved and Adopted this 8th day of May, 2000

Barry G. Thomas
Mayor

ATTEST:

Ellen L Montague
Clerk

EXCAVATION PERMIT

Town of Stockton
18 North Johnson Street
P.O. Box 240
Stockton, Utah 84071
Phone # (435) 882-3877 (435) 833-9031

Permit for Excavation is authorized to: _____

_____

Excavation Contractors State License Number _____

Type Of License _____

Excavation permission is limited to the following area of the Stockton Street right-of-way:

It shall be the contractor's responsibility to post a $2,000.00 bond per project, with the Town of Stockton for a two year period covering workmanship and materials, or have the options to post a $10,000.00 annual bond for 3 years starting from January 1 of each year. Plus the Following:

Address of Excavation: _____

Purpose of Excavation: _____

A $25.00 per one hundred lineal footage of excavation within the street right-of-way.

Total lineal footage of excavation if? _____ X $25.00=_____

Date Paid _____ Amount Paid _____

_____ _____
Signature of Applicant Signature of Water Department