REVISION 1

REPORT

RED DEVIL MINE 2002 DEBRIS CONSOLIDATION AND DISPOSAL PROJECT

RED DEVIL, ALASKA

Prepared for
Department of Interior
Bureau of Land Management
Denver Federal Center, Building 50
Denver, Colorado 80225-0047

Contract NAC10005
Delivery Order NADO1WI02

March 17, 2003

WILDER
WILDER CONSTRUCTION COMPANY
WITH URS

Wilder Construction Company
11301 Lang St.
Anchorage, AK 99515
(907) 344-2593

URS Corporation
2700 Gambell St, Suite 200
Anchorage, AK 99503
(907) 562-3366
26219358

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LIST OF ACRONYMS AND ABBREVIATIONS

AAC	Alaska Administrative Code
ACM	asbestos containing material
ADCED	Alaska Department of Commerce and Economic Development
ADEC	Alaska Department of Environmental Conservation
ADNR	Alaska Department of Natural Resources
AHERA	Asbestos Hazard Emergency Response Act
AOC	Area of Contamination
AST	aboveground storage tank
bgs	below ground surface
BLM	Bureau of Land Management
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CSWMP	Conceptual Solid Waste Management Plan
EPA	United States Environmental Protection Agency
°F	Fahrenheit
H	horizontal
HDPE	high-density polyethylene
HSO	site health and safety officer
IDW	investigation-derived waste
mil	millimeter
msl	mean sea level
MT^2	Metals Treatment Technologies Corporation
mg/L	milligrams per liter
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NIOSH	National Institute of Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PCBs	polychlorinated biphenyls
PID	photoionization detector
PPE	personal protective equipment
ppm	parts per million
QA/QC	quality assurance/quality control
RACM	regulated asbestos containing material
RCRA	Resource Conservation Recovery Act
SOW	scope of work
SSHSP	site-specific health and safety plan

LIST OF ACRONYMS AND ABBREVIATIONS (CONTINUED)

SSO	site safety officer
SWPPP	Storm Water Pollution Prevention Plan
TCLP	toxicity characteristic leaching procedure
TNH	Tryck Nyman Hayes, Inc.
TWA	time-weighted average
V	vertical
URS	URS Corporation
USFWS	United States Fish and Wildlife Services
WEC	White Environmental Consultants
WCC	Wilder Construction Company
XRF	x-ray fluorescence

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1.0 INTRODUCTION

Wilder Construction Company (WCC) was contracted by the United States Department of Interior, Bureau of Land Management (BLM) to perform building demolition, debris segregation, monofill construction, and debris burial at the abandoned Red Devil Mine near Red Devil, Alaska. The mine is on Federal lands and under BLM jurisdiction. This report details the field activities completed at Red Devil Mine. The scope of work (SOW) for this project was assigned under BLM Contract NAC10005 and Delivery Order NADO1WI02. The SOW was based on the data presented in a Conceptual Solid Waste Management Plan (CSWMP) developed by Harding ESE under contract with BLM as documented in the *Draft Conceptual Solid Waste Management Plan, Red Devil Mine Site, Red Devil, Alaska* (April 30, 2001). The CSWMP documents the approach used by BLM to manage the remaining building debris at the abandoned Red Devil Mine. The BLM sent the CSWMP to the appropriate regulatory stakeholders for comment, review, and approval.

The debris consolidation SOW at the mine site was not intended to address "site-wide" heavy metal contaminated soils and/or water that may exist at concentrations above human health and ecological risk criteria. The debris consolidation SOW only included work associated with debris consolidation, treatment, and disposal activities as documented in the *Draft Work Plan, Red Devil Mine Site 2002 Debris Consolidation and Disposal Project, Red Devil, Alaska* (May 10, 2002). The debris treatment process at selected areas was intended to reduce arsenic and mercury mobility by chemically encapsulating the contaminants, so that the debris is rendered "non-hazardous waste," as defined by the United States Environmental Protection Agency's (EPA) regulations in Title 40, Chapter 261 of the Code of Federal Regulations (40 CFR 261). The following site-specific plans were completed by WCC and URS Corporation (URS) and reviewed by BLM and BLM-selected stakeholders prior to completing work at the site:

- Site Specific Health and Safety Plan (SSHSP), Red Devil Mine 2002 Debris Consolidation and Disposal Project (May 17, 2002)
- Storm Water Pollution Prevention Plan (SWPPP), Red Devil Mine 2002 Debris Consolidation and Disposal Project (May 13, 2002)
- Draft Work Plan, Red Devil Mine 2002 Debris Consolidation and Disposal Project (May 10, 2002)

1.1 DOCUMENT ORGANIZATION

This report documents the activities associated with 2002 debris consolidation and disposal, and is organized as follows:

- ❖ Section 1.0 presents a discussion of the site background including location, environmental setting, location history, and a description of each investigation area at the site.
- ❖ Section 2.0 includes a description of the work areas, debris waste streams, and waste management procedures.
- ❖ Section 3.0 includes a description of monofill construction details for disposal of inert debris at the General Mine Area (Monofill #1).
- ❖ Section 4.0 includes a description of monofill construction details for debris associated with the Retort Building Area (Monofill #2).
- ❖ Section 5.0 includes the references cited for this document.

Tables, figures, and appendices are included at the end of the report.

1.2 PROJECT LOCATION

The community of Red Devil is situated on the banks of the Kuskokwim River (Figure 1). It is 75 air-miles northeast of Aniak and 250 air-miles west of Anchorage, Alaska. Red Devil Mine is approximately 1.5 miles southeast of the community of Red Devil. According to data from the Alaska Department of Community and Economic Development (ADCED), the community of Red Devil has a population of approximately 48 people (ADCED 2002). Red Devil Mine is at approximately 350 feet above mean sea level (msl) but varies approximately ±150 feet in elevation at various extents of the mine site. The mine encompasses approximately 10 acres of BLM-managed land. A locked gate restricts site access, and BLM has posted signs around the perimeter warning of potential hazardous conditions.

The mine site is at latitude north 61° 45' 00" and longitude west 157° 19' 08". The legal description of the site is Township 19 North, Range 44 West, Section 6, southeast quarter, Seward Meridian. BLM administers the lands within Section 6 and the lands adjacent to the mine site in Sections 5, 7, and 8 (Figure 2). The mine site and land within Section 6 have been selected as a future native patent. The mine site is bounded on the north by the Kuskokwim River, on the south by the power plant, on the east by the milling facilities and aboveground storage tanks (ASTs), and on the west by the westernmost extent of the main camp area (Harding ESE, 2001a). An aerial photograph of the mine site is shown in Figure 3 and an oblique photographic view is shown in Figure 4. Figure 5 shows a general site plan of the mine area and the various mine structures where demolition work was completed in 2002.

An airstrip at the community of Red Devil was used for air access to the mine site. From the airstrip, the mine can be reached by a 2-mile unimproved road or by boat up the Kuskokwim River. A gate restricts mine access and BLM has posted no access signs at the mine.

Transportation of supplies and personnel from Anchorage was completed via barge and air, respectively.

1.3 SITE BACKGROUND AND HISTORY

A detailed history of the mine is included in the CSWMP and is summarized briefly in this report. This report does not summarize all the data that has been collected for this site. Previous assessments and actions completed at the site include hazardous material removal, hazard assessments, preliminary risk screening, documenting subsurface and surface geologic conditions, documentation of site hydrology, and collection of data to determine concentrations of target contaminants in the soil, water, and groundwater at the site.

The Red Devil Mine was established in 1921 to mine mercury deposits in the area. At one time, the mine was one of the largest producers of mercury in the United States. Due to economic conditions, the mine was operated sporadically over the following years until it was shutdown permanently in 1971.

In 1971, the EPA conducted an inspection of the mine. Subsequent investigations and waste removal activities have been completed since that time. As detailed in Section 2.3 of the CSWMP, numerous waste removal actions, site investigations, and sampling activities have been performed at the mine since 1971.

This mine site was registered in 1987 under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (EPA identification AKD980495618). Due to its remote location, Red Devil Mine Site is considered to have a "low potential public health effect." Cleanup of the site is being addressed through the BLM's delegated CERCLA authorities (TNH, 1987).

During the previous investigations at the mine, the main target compounds of concern included antimony, mercury, arsenic, and lead in sediment, water, and soils. Chemicals were also stored at the site and included copper sulfate, sodium hydroxide, and potassium carbonate. Other hazardous materials including asbestos and lead were present in the buildings at the mine. Electrical transformers and capacitors with polychlorinated biphenyls (PCBs) were also formerly used at the mine (Harding ESE, 2001a).

In 1999 and 2000, hazardous material removal actions were completed at the mine site. Wastes, including batteries, PCB-contaminated transformers, used oil, solvents, grease, mercury-contaminated ash and concrete, and mineral processing chemicals, were removed from the mine for off-site disposal at approved disposal facilities. The results of this work by BLM's contractor was documented in the *Retort Building Demolition and Limited Site Investigation, Red Devil Mine, Red Devil Alaska* (March 2001) and *Limited Waste Removal Action, Red Devil Mine, Red Devil Alaska* (November 1999). Asbestos- and lead-contaminated buildings are also present on the mine site. An asbestos and lead survey of the mine buildings was completed in 2000 by EHS Alaska, Inc., as documented in the *Asbestos and Lead Survey Report Various Buildings and Areas, Red Devil Mine, Red Devil, Alaska* (August 2, 2000). All known friable asbestos containing material (ACM) was removed from the site in 2000 by BLM contractors. Regulated asbestos containing materials (RACM) were removed from the retort building at the mine in 2000 (Harding ESE, 2001a). The ACM managed during the 2002 debris consolidation was Category I and II non-friable ACM, which remained in buildings during demolition. Remaining hazards at the mine included non-RACM, lead-contaminated building materials, and mercury- and arsenic-contaminated soils, slag, and brick.

Under EPA oversight, the BLM has implemented an Area of Contamination (AOC) policy at the Red Devil Mine Site as presented in the final National Oil and Hazardous Substances Pollution Contingency Plan (NCP) Federal Register preamble in 55 FR 8758-8760, March 8, 1990. This AOC policy grants the BLM flexibility in managing mine wastes onsite without triggering EPA land disposal restrictions or minimum technology requirements. The AOC encompasses the portion of the mine to the east of Red Devil Creek and includes the former retort building and gravel storage pad area. An AOC is equated to a resource conservation recovery act (RCRA) land-based unit, where consolidation and in-situ treatment of hazardous waste within the AOC does not create a new point of hazardous waste generation for the purposes of RCRA (Harding ESE, 2001a).

In the fall of 2001, WCC, Metals Treatment Technologies Corporation (MT^2), and URS completed a site visit to the mine to collect additional data needed for the 2002 debris consolidation. MT^2 collected treatability study samples of representative soils and debris throughout the site to determine if their chemical stabilization process for arsenic and mercury would be suitable for use at the mine site. The MT^2 treatability study and sample results are included in Appendix A. In summary, MT^2 found that the arsenic- and mercury-contaminated soils and debris at the site were rendered non-hazardous, as defined by EPA regulations in 40 CFR 261, after application of chemical encapsulant. MT^2 also collected samples from areas where lead contamination was expected based on the CSWMP information. However, MT^2 found no debris samples above lead toxicity characteristic leaching procedure (TCLP) standards in their building and soil debris samples. Further discussion of lead-contaminated debris is included in Section 2.0.

1.4 ENVIRONMENTAL SETTING

A detailed description of the environmental setting is included in the CSWMP and is summarized below.

1.4.1 Geology

The Red Devil Mine lies within a Zone 1 seismic zone and along the Red Devil Fault Zone. Mineralization in the area consists of mercuric and antimony sulfides, cinnabar, and stibnite. The Red Devil mineralized zone covers an area of about 500 feet wide, 900 feet long, and 620 feet deep. Process tailing piles from mine operations are found adjacent to Red Devil Creek. Abundant placer cinnabar is visible in Red Devil Creek (Harding ESE, 2001a). Cinnabar was also observed during the 2002 consolidation excavation work.

Based on the CSWMP, permafrost is absent in the mine area. However, ice was encountered during drilling by Harding ESE in 2000 and was thought to be permafrost. Below the mine area, unconsolidated floodplain deposits overlie fractured bedrock. Unconsolidated deposits consist of silt, sand, and gravel to depths up to 40 feet thick (Harding ESE, 2001a).

Boring B05 completed near the Shop Building and General Mine Area showed soils consisted of sandy gravel (GP) to silty sandy gravel (GM) to depths of 30 feet below ground surface (bgs) (elevation 276 feet) where refusal was reached (Figure 6).

Borings completed near the retort building found highly fractured shale at 3 to 6 feet bgs. Mine tailings used as fill consisted of silty sandy gravels (GM) and gravelly sandy silt (ML) was found above the fractured shale. Refusal (shale bedrock) was encountered at approximately 40 feet bgs (elevation 296 feet) at Boring B02, approximately 60 feet northwest of the Retort Building foundation (Figure 6) (Harding ESE, 2001a). Tailings used for the construction of the monofills consisted primarily of ½-inch minus silty sandy gravels (GM) with fractured rock

1.4.2 Hydrology

The Kuskokwim River is approximately 1,000 feet north of the mine. Red Devil Creek bisects the mine and flows to the northeast through the mine area. McCally Creek is located approximately ¾ mile west of the mine. The Red Devil drainage basin covers approximately 687 acres. Red Devil Creek flows north approximately 500 feet from the mine site to its confluence with the Kuskokwim River. No surface water uses of the creek are known (Harding ESE, 2001a). A bedrock aquifer underlies the mine. Groundwater was likely affected by heavy metal mineralization prior to mining activities at the site (Harding ESE, 2001b). The lowest elevation of the mine site is at approximately 279 feet above msl and is approximately 66 feet above the highest recorded flood stage of the Kuskokwim River. Monofill #1 is at approximately 300 feet above msl and Monofill #2 is at 341 feet above msl.

The groundwater elevation at monitoring well MW07, completed 300 feet southwest of the retort building is approximately 327.55 feet above msl (16 feet bgs). The groundwater elevation at monitoring well MW04 on the other side of the mine site near the Shop Building was 279.72 feet above msl (25.3 feet bgs). Groundwater at monitoring well MW01 in the area of the Gravel Storage Pad is at 302.54 feet above msl (17.8 feet bgs). Note that groundwater and boring elevations shown in the Harding ESE documents and WCC Work Plan were relative to an arbitrary 500.00 foot assumed control monument (RDM-0302000), whereas the survey control for the 2002 work assigned RDM-0302000 an elevation of 305.00 feet above msl, which is more representative of the actual elevation. See Appendix B for the survey control data provided by Terra Survey's, LLC. Groundwater flow in the area of the mine site is to the north-northeast. All elevations in this report are based on the 2002 survey data.

There are no drinking water wells within a 1-mile radius of the mine. The closest drinking water well at the Red Devil lodge is 1.25 miles northwest of the mine (Harding ESE, 2001a).

Virtually all of the surface water runoff from the mine area and surrounding slopes flow into Red Devil Creek. Based on the United States Fish and Wildlife Services (USFWS) maps, less than five percent of the land within four miles of the site is classified as wetlands. There are no classified wetlands within the mine site (Harding ESE, 2001a).

1.4.3 Ecology

The region is a mix of bottomland spruce-poplar forest and upland spruce-hardwood forest. White spruce, birch, black spruce, and aspen are typically located throughout the area (Harding ESE, 2001a).

The Kuskokwim River is a major anadromous fish stream and is approximately 1,000 feet north of the general mine area. Red Devil Creek is not known to support a fishery nor have anadromous fish been reported in Red Devil Creek, which bisects the mine property (BLM, 2001).

Neither the BLM, nor other agencies of the Federal Government have designated lands in or near the mine site for special environmental protection. In addition, no plant or animal species, which are currently listed as threatened, endangered, or proposed under the Endangered Species Act, occur near the project site (Harding ESE, 2001a). A letter dated June 14, 2002 from the USFWS states that there are no endangered or threatened species or any designated critical habitat near the mine site (USFWS, 2002).

1.4.4 Climate

The Red Devil area lies in a subarctic transition climactic zone. Climate data are recorded at the Aniak Airport, 75 miles west of the mine. Average monthly temperatures range from -7 degrees Fahrenheit (°F) to 65°F. Extreme temperatures can range from -70°F in January to 90°F in July. Snowfall averages 56 inches, with total mean annual precipitation of 18.8 inches. Mean annual evapotranspiration in nearby Aniak is 17 inches, leaving net precipitation of about 1 inch. The probable maximum 2-year, 24-hour rainfall for the vicinity of Red Devil is approximately 1.5 inches (Harding ESE, 2001a). Average rainfall per hour in nearby Aniak is 0.1 inch (Western Regional Climate Center, Desert Research Institute, www.wrcc.dri.edu).

1.5 PROJECT SCOPE

The general project scope included building demolition, debris removal, and on-site disposal of debris from the General Mine Area and the Retort Building Area (Figure 5). Debris from the General Mine Area was classified as inert building debris and was placed in Monofill #1 on the western side of the mine site (Photo 1). Monofill #1 meets the general requirements of an inert debris monofill outlined in Title 18 of the Alaska Administrative Code (AAC), Chapter 60, Section 440 (18 AAC 60.440); however, based on the BLM SOW, a solid waste permit was not required for the project. Monofill #1, the inert debris monofill, consisted of building debris, concrete, wood, scrap metal, and Category I and II ACM debris. Monofill #1 is described in more detail in Section 3.0. No documented RCRA hazardous wastes, hazardous materials, or RACM was placed into Monofill #1.

The second part of the project included management of debris from the retort building (Photos 2 and 3) and construction of a geomembrane-lined monofill for disposal of all retort building debris at Monofill #2. Retort bricks and retort slag were chemically treated to render the material non-hazardous as defined by EPA TCLP analysis for mercury and arsenic (40 CFR 261). Under a previous contract, retort building debris was pressure washed during previous work at the mine site in 2000. Representative samples of the retort building debris (e.g., wood, scrap metal) were analyzed during a 2001 site inspection and found to be below RCRA toxicity characteristic standards for arsenic, lead, and mercury. Therefore, the retort building debris did not require treatment to render it a non-hazardous waste prior to placement into Monofill #2. However, as a conservative measure, after placement of the retort building debris into Monofill #2, the debris was also treated with a mercury chemical encapsulant.

All processed tailings pile soil used for the construction of Monofill #2 (capping material, void-filling material, material used to maintain grade) was also treated with chemical encapsulant to render the soil non-hazardous for arsenic (Photo 7). The treated retort bricks and slag along with the untreated general building debris were placed into a geomembrane-lined monofill on top of the retort building's concrete foundation. The geomembrane served two primary purposes: (1) to cap treated surface soils adjacent to the retort building foundation and (2) to minimize infiltration of surface water below the concrete slab where soil borings encountered free mercury. This work is described in more detail in Section 4.0.

Two deletions and one addition to the work scope were issued on June 25, 2002 by BLM's on-site representative. Removal of the ore hopper located at the Retort Building Area was deleted from the work scope. BLM determined that this work would be completed during future demolition of the ASTs at the Fuel Storage Area since similar equipment would be required to demolish the steel plate and concrete supports. Additionally, the Powder House location was deleted from the work scope for the 2002 work due to safety concerns. Previous investigations at the site had not indicated if the building had been inspected for explosives. One addition to the work scope included demolishing a previously undocumented house, which was designated as House 2A, near House 2.

1.6 PROJECT TEAM

The on-site project team consisted of the following:

<u>Client</u>

- BLM – was the client for the project and manages the mine property. Harrison Griffin was the BLM representative onsite during all construction activities.

<u>Prime Contractor</u>

- WCC – was the prime contractor and provided all personnel and equipment necessary to demolish, consolidate, manage, and move the building debris to the constructed monofills. WCC was responsible for overall safety and completion of the project. Robert Scott was the WCC on-site project engineer. Jeff Carlstrom and Jerry Moore acted as WCC foreman.

<u>Subcontractors</u>

- MT^2 – directed debris screening and Ecobond™ encapsulant mixing and application. MT^2 screened debris using portable a x-ray fluorescence (XRF) spectrometer unit during the 2001 site inspection. MT^2 was responsible for all aspects of the Ecobond™ encapsulant treatment application and documentation of the bench tests during the 2001 site inspection as documented in Appendix A. Paul Dewitt was the field technician for MT^2 and directed application of the Ecobond™ encapsulant treatment.

- Emerald Alaska, Inc. – provided off-site waste management of investigation-derived wastes (IDW) and hazardous materials encountered during demolition.

- Construction Consultants and Hawaii Liner Technology – provided the field personnel needed to install, weld, and certify the placement of the geomembrane for Monofill #2. Construction Consultants installed the bottom liner and Hawaii Liner Technology provided the remaining services. Chuck Stretch and Donovon Keliipuleole were the on-site liner technicians for Construction Consultants and Hawaii Liner Technology, respectively.

- Polar Supply Company, Inc. – provided the geomembrane and geotextile material for the construction of Monofill #2.

- Terra Surveys LLC (Terra Surveys) – provided licensed surveying services for the project. Karl Woods was the on-site surveyor.

- URS – provided engineering and field sampling personnel as needed for the project.

- White Environmental Company, Inc. (WEC) – provided health and safety monitoring for the project during building demolition and debris disposal. WEC monitored airborne concentrations of contaminants during demolition of the buildings. Matt White of WEC was the project Certified Industrial Hygienist (CIH). Garrett Slaugenhoup and Pete Radano were the on-site air monitoring technicians for WEC.

2.0 WORK AREAS, DEMOLITION, AND DEBRIS MANAGEMENT

2.1 WORK AREAS

The CSWMP designated 21 separate reference areas as shown on Figure 5. Select photographs taken during the project are included in Appendix C and are referenced throughout this report, where applicable. For simplicity, the 2002 Work Plan and this report divide the mine into four general areas. Those areas are discussed below.

2.1.1 Retort Building Area

This area included the former retort building foundation, debris pile, and ore hopper (Photo 3). The retort building was used to process mercury ore (cinnabar). Mercury- and arsenic-contaminated soils are present around and below the concrete retort building foundation. The retort building had already been demolished and the debris pressure-washed prior to the 2002 project. The retort building debris pile was approximately 87 feet by 35 feet by 15 feet high and located on the retort building foundation pad (Photo 3). Mercury- and arsenic-contaminated slag and retort brick were also located in this area and were managed as described in Section 2.3.10. Monofill #2, a 930-cubic yard, geomembrane-lined monofill for the retort building debris (see Section 4.0) was constructed at this area for consolidation of retort building debris. Table 2 shows a description of the estimated debris quantities for Monofill #2.

The ore hopper was deleted from the work scope by BLM. The ore hopper remains in place and was not removed during the 2002 project. Removal of the ore hopper will be completed under a separate BLM contract at a date to be determined by BLM.

2.1.2 General Mine Area – Shop Building and Adjacent Areas

This area included the warehouse, warehouse annex, shop building, hoist shack, shop pad, dry room. The shop building was on the southwestern portion of the mine. Adjacent areas included the western chemical storage shed, power plant, and settling pond areas. Monofill #1, a 4,400 cubic yard inert debris monofill (see Section 3.0) was constructed at this area for consolidation of inert debris from the General Mine Area. Table 2 shows a description of the estimated debris quantities for Monofill #1.

2.1.3 General Mine Area – Housing and Mess Hall Area

The housing and mess hall areas encompassed eight housing structures, the mess hall, bunkhouse, shed, winch shed, powder house, and hoist shack structures.

2.1.4 Gravel Storage Pad

The gravel storage pad is on the eastern side of the site (Photos 17 and 18). The pad was used as a temporary staging area to facilitate waste consolidation, a temporary storage area for debris during construction of Monofill #2, and as a work area. This area was also used to apply Ecobond™ encapsulant chemicals to the retort debris to render the debris non-RCRA hazardous waste as discussed in Section 2.3.10. Ecobond™ mercury encapsulant was applied to the gravel storage pad surface soil after removal of all debris.

A temporary berm was constructed on the Red Devil Creek side of the gravel storage pad to minimize surface water runoff during work in the area (Photo 14). Runoff controls were installed as described in the *Storm Water Pollution Prevention Plan, Red Devil Mine, 2002 Debris Consolidation and Disposal Project* (May 13, 2002).

2.1.5 Fuel Storage Area

This area included the northeast side of the mine. A fuel pipeline and five ASTs are located uphill and to the northeast of the retort building. The ASTs formerly supplied fuel to the power plant, to the southwest of the retort building. All of the ASTs have been drained of liquids during previous work at the mine. Based on the SOW, no demolition or work associated with the ASTs was completed during the 2002 debris consolidation project. However, drainage ditches were completed on the AST access road to minimize surface water runoff towards Monofill #2, as shown in the SWPPP.

2.2 DEMOLITION

Heavy equipment used for the demolition and consolidation work included:

- Komatsu PC150 tracked excavator
- Caterpillar 950G front-end loader
- Volvo A25 haul truck
- Komatsu D39EX21 tracked dozer

The excavator was used with a thumb and/or bucket to demolish intact buildings (Photo 11) and load the haul truck for transport to the appropriate monofill (Photo 14). Many of the buildings at the site had already collapsed or have been demolished during previous debris removal activities or were in poor condition (Photo 10). Therefore, most of the demolition phase of the project focused on proper inspection and segregation of debris. Inspection of the debris piles was required to verify compliance with the Alaska Department of Environmental Conservation (ADEC) and EPA disposal regulations for the on-site monofills.

Reportedly, BLM contractors at the site had removed all petroleum liquids, PCB-contaminated transformers, batteries, antifreeze, RACM, and other hazardous materials during previous work. However, to verify that no undocumented hazardous material was placed into the monofills, the WCC field foreman/engineer inspected all buildings prior to demolition to determine if any hazards existed that required special equipment or management. Segregation of the waste streams was based on the waste management rationale described in Section 2.3.

One portable NITON® XRF unit was used onsite during the demolition phase of work (Photo 8). The XRF unit was calibrated and operated according to manufacturer instructions. The XRF unit was operated by WEC and used primarily for health and safety exposure compliance during demolition activities. WEC posted the daily results of health and safety exposure monitoring at the site and assisted the project team in determining the proper personal protective equipment (PPE) and engineering controls needed to maintain compliance with the health and safety plan. Additionally, the XRF unit was used to determine concentrations of arsenic, mercury, and lead in materials being managed (e.g., soil, building debris, equipment) as described in Section 2.3. XRF screen results, WEC's health, and safety monitoring information are included in Appendix D.

As needed, water was applied to debris and structures prior to demolition to maintain proper dust control and to reduce the likelihood of PPE upgrades (Photos 5 and 11).

Air monitoring downwind of the demolition activities was completed by WEC using a calibrated XRF unit, photoionization detector (PID), and asbestos monitoring equipment to determine the level of PPE for each work activity. Level D PPE was worn for all site activities with Level C upgrades at the discretion of the site safety officer (SSO) based on requirements in the SSHSP. Wetting of the debris piles and area soils occurred as directed by the SSO when monitoring indicated it was needed during demolition and removal activities. Truck haul routes and debris were also wetted down as needed to minimize dust. WEC in conjunction with the WCC field foreman were responsible for determining the need to apply water to maintain dust control. In general, Level C PPE was used when demolishing the retort building slab and applying Ecobond™ encapsulant chemicals to debris and tailings.

Decontamination of all equipment, vehicles, and personnel followed the requirements of the SSHSP and the program *Decontamination Plan* (January 15, 2001). Two decontamination stations were constructed at the mine site. One decontamination station was constructed adjacent to the gravel storage pad and was used for respirator cartridge exchange and disposable Tyvek exchange. Another decontamination station was constructed at the entrance to the mine site. This station was used for removing Level D PPE (e.g., hard hats, steel-toed boots, gloves) at the completion of each day's work. This was required for all personnel exiting the site and eliminated the potential of transporting contaminated soils on personal footwear and other gear back to Red Devil Lodge. Heavy equipment was decontaminated at the completion of work at the site. All IDW was managed as described in Section 2.3.13.

2.3 DEBRIS MANAGEMENT

Where possible, all debris was processed such that it took up the minimum volume practicable in the monofills. Heavy metallic debris such as vehicles, scrap metal, and generators was placed at the bottom of the monofills to minimize subsidence. All debris was compacted and crushed to minimize void space in the monofills. For the project, various waste streams were identified and were managed as discussed in the following sections.

After building demolition and waste segregation, all debris was transported to the appropriate debris monofill (Monofill #1 or #2) and compacted by repeatedly passing over the material with a tracked vehicle (Photo 15). After compaction in the monofills, debris was covered with soil for each waste lift. This soil cover filled major voids in each lift of waste and reduced the chance of blowing debris and dust during work at the mine. Table 2 includes a summary of the volumes of debris placed into each monofill. Process mine tailings treated with 2% Ecobond™ arsenic encapsulant were used for void filler, subgrade construction, and capping at Monofill #2 (Photo 7). The rationale for treating the process tailings on the eastern side of the creek with Ecobond™ encapsulant for use in Monofill #2 was for the treated tailings to contact more surface area on the retort building debris, thus stabilizing any arsenic contamination. Additionally, a goal was to place non-RCRA hazardous material within Monofill #2 to minimize potential future management.

For Monofill #1 at the General Mine Area, soil stockpiled during excavation of the below grade inert debris monofill was used as void filler and to cap Monofill #1 (Photo 14). Based on the BLM SOW, soil used for Monofill #1 was not treated with Ecobond™ encapsulant. No process tailings from the eastern side of the creek were used during construction of Monofill #1.

Tracked vehicles were used to drive over the waste to compact the entire surface of each lift of debris and soil. All debris lifts greater than 1 to 2 feet in depth were compacted with a tracked vehicle. In general, three full passes were made by the equipment during compaction operations. Due to the variety of debris size and type managed during the project, the lift depths and compaction rates were field adjusted to accommodate various types of debris.

The following sections include the management procedures for the mine site waste streams encountered during the project.

2.3.1 General Debris

Field personnel inspected all general debris piles prior to movement to Monofill #1. Care was taken to manage specific waste streams using the procedures identified in the following sections. Waste streams in this category included cable, sheet metal, small pieces of scrap metal, and minor amounts of general refuse. This type of debris was placed above the heaviest materials or used as void filler.

2.3.2 Vehicles and Generators

There was one vehicle at the shop area and two at the gravel storage pad. The former power plant had four large generators. The CSWMP stated that all of the units had been drained of fluids. However, prior to crushing and placement into Monofill #1, each unit was verified to be free of hazardous substances. Any vehicles or generators found to contain any hazardous substances were not placed in the monofills until all hazardous substances had been removed from the units. As applicable, the following check was used to verify that the debris was free of hazardous materials:

- Crankcase oil – removed oil plug to verify no fluids
- Brake fluid – checked master cylinder reservoir
- Batteries – verified that no batteries are located on the units
- Transmission fluid – checked transaxles, transmissions, and transfer cases to verify no fluids
- Fuel tanks – verified that tanks contained no fuels
- Radiators – verified that radiators were free of antifreeze
- Air conditioning units – verified no coolant was contained in these units
- Windshield washer reservoirs – verified no liquid in these units

Other than some power plant generator oil, which was aggregated into a drum for off-site disposal (see Section 2.3.13) and approximately 30 lead-acid batteries, no hazardous materials were found in the generators, debris piles, or vehicles managed at the site. After verification that the vehicles and generators did not contain hazardous substances, they were crushed and placed at the bottom of the monofills to minimize settlement. Disposal of the lead acid batteries and lubrication oil was completed offsite as described in Section 2.3.13.

2.3.3 Transformers

According to the CSWMP and BLM personnel, all transformers containing more than 50 parts per million (ppm) of PCBs had been removed from the site for off-site disposal. Twenty-three transformers remained at the site and prior to crushing and placement into the inert monofill, each transformer was verified to be liquid free. The large power plant transformers that could not be crushed were placed at the bottom of Monofill #1. Drained and empty transformers were documented at the following locations:

- Dry Room – 3 transformers
- Gravel Storage Pad – 15 transformers
- Power Plant – 5 transformers
- Shop Pad / Laboratory – Miscellaneous electrical parts

2.3.4 Non-RACM

During previous investigations, the only RACM identified at the mine was material from the retort building. However, RACM at the retort building was abated and removed from the site in July 2000 and the building demolished (Harding ESE, 2001a). No RACM was encountered during demolition activities in 2002.

No ACM was found in the following buildings during the inspection in 2000 by Harding ESE subcontractors or during the 2002 field work:

- Dry Room
- Powder House
- Warehouse Annex

All the other buildings at the site had Category I and II ACM in various quantities. The CSWMP estimated that the amount of non-RACM at the mine was 27 cubic yards. However, the volume of non-RACM found at the site during the 2002 field project was estimated at 255 cubic yards. Estimates are highly variable due to the difficulty in estimating ACM debris volumes in the collapsed buildings at the site. The total volume was based on an estimate of approximately 15 cubic yards of non-RACM for each of the 17 buildings at the site. Typical types of non-RACM found in the mine buildings included gaskets, cement asbestos board and shingles, pipe insulation (non-friable), wire insulation, floor tile and mastic, brake and clutch shoes, valve packing, and joint compound. All of this debris from the General Mine Area was placed into Monofill #1.

As permitted by current regulations, Category I and II ACM was left in buildings during demolition work at the site. WCC inspected all debris piles (other than those listed with no ACM) prior to demolition to verify that the non-RACM could be managed safely and met the standard of Category I and II ACM. All demolition workers for this project were Asbestos Hazard Emergency Response Act (AHERA) certified. All buildings known to contain ACM were demolished using water to saturate the materials and prevent emissions. Care was taken to prevent ACM material from being crumbled or pulverized during work. WEC was present during the entire field program and provided area monitoring using National Institute of Occupational Safety and Health (NIOSH) 582 methodology. Same-day analysis of airborne fibers was performed according to NIOSH 7400. Personal exposure levels and PPE were based on the current Occupational Safety and Health Administration (OSHA) 8-hour time-weighted average (TWA) of 0.1 fibers/cubic centimeter for airborne asbestos during removal, hauling, and disposal. Appendix D includes the WEC project closeout report for the exposure monitoring at the site.

2.3.5 Wood Debris

Many of the building debris piles on the mine site contained small quantities of wood. No evidence was found during previous work at the mine that wood had been treated with creosote or pentachlorophenol. Additionally, most wood inspected during the 2001 field visit was found to be free of paint; therefore, lead based paint was not an issue for the project. However, during previous investigations, results from several composite samples of wood debris from the five locations were found to be above the RCRA toxicity characteristic limit of 5 milligrams per liter (mg/L) for lead. Management of the lead-contaminated wood debris is discussed in Section 2.3.6.

Wood building debris was not burned at the site due to several factors: the difficulty in properly segregating the material from other debris, possible lead-contamination issues; the relatively limited amount of wood debris on the site, and the fire danger in the area during 2002.

Vegetation and trees (slash) cleared during construction of the monofills was not burned due to the high fire danger in the area during the project. The small volumes of cleared material was placed into Monofill #1 or left at the cleared location. To the extent possible, care was taken to minimize the clearing of vegetation (Photo 12).

2.3.6 Lead-Contaminated Debris

Lead-contaminated debris and bulk lead debris were found at seven locations at the mine site. WEC provided a competent person for all lead monitoring for this project. Based on previous work at the mine, airborne concentrations of lead were likely to be below OSHA action levels. For the 2002 demolition project, no airborne lead exceedances were found during the WEC exposure monitoring. Exposure monitoring results are shown in Appendix D.

The CSWMP indicated that concentrations of lead were detected in debris above the RCRA toxicity characteristic standard of 5 mg/L at five locations.

- Houses #1, #3, and #4
- Mess Hall / Bunkhouse
- Warehouse

The source of lead in the composite wood samples from the above buildings was not uniquely identified in the CSWMP. No obvious paint or bulk lead was noted in the composite samples of the building materials. Additional XRF and TCLP sampling was completed in 2001 by MT^2 and the source of the high lead in the building materials could not be located (see Appendix A for data). The highest concentration of lead found during the 2001 sampling was 1.01 mg/L at the retort building debris pile.

Based on the inconsistency between the 2001 and 2000 XRF data, representative debris samples from the above buildings were collected by WEC and sent off site for 24-hour rush TCLP analysis. In the work plan, the XRF unit was originally going to be used to screen wood debris for lead. However, offsite laboratory analysis was used as a conservative measure since a good correlation between total lead and TCLP concentration could not be determined. The relative percent of different types of materials throughout the building were estimated and represented in the 100-gram sample. None of the TCLP lead results from the debris samples collected from the five buildings were above 5 mg/L; therefore, since the debris was not a RCRA hazardous waste for lead, the building debris was placed into the inert debris monofill. Laboratory results are presented in Appendix E.

The following locations had bulk lead debris that required off-site management:

- Houses #1, #2, #2A, and #5 – Bell and spigot drainpipe was found at these locations and was noted as typically containing metallic lead and cellulose seals. The drainpipe at this location was segregated and managed for off-site disposal.

- ❖ Dry Room – A bell and spigot sewer pipe was found at this location, which was noted as typically containing metallic lead and cellulose seals. The drainpipe at this location was segregated and managed for off-site disposal as discussed in Section 2.3.13.
- ❖ Miscellaneous – Various buildings contained bell-spigot joints with lead and cellulose seals. All joints were manually broken and the lead was extracted and drummed for off-site disposal. Some of the buildings were also equipped with lead heat trace on water piping. All lead heat trace was removed, drummed, and shipped off site for proper disposal as discussed in Section 2.3.13.

The retort building was not assessed for lead contamination during the CSWMP field program. However, in 2001, MT^2 collected representative XRF field screen and TCLP samples of the retort building debris and found the debris to contain less than the 5 mg/L RCRA toxicity characteristic lead regulatory standard (Appendix A). The highest concentration of lead found in the retort debris by MT^2 was 1.01 mg/L. Therefore, off-site management of the retort building debris for lead contamination was not required under EPA disposal regulations.

2.3.7 Drums

Both crushed and uncrushed drums were located at the mine. All of the drums at the site had been reportedly drained of fluids during previous work at the mine. However, prior to crushing and placement into Monofill #1, each drum was verified to be liquid and sludge free. During demolition activities, three drums containing small quantities of possible hydraulic fluid were found. Liquids within the 55-gallon drums were consolidated into one drum and the waste shipped offsite for disposal, as discussed in Section 2.3.13.

2.3.8 Concrete Debris

This waste stream included floor slabs and foundations at the retort building, shop building, power plant, ore hopper, and hoist shack. No other significant amount of concrete debris was located at the mine. With the exception of the retort slab sidewalls and one hoist shack foundation, all concrete slabs and foundations were left in place and not managed for disposal in the monofills. The concrete slab from the hoist base at hoist shack #2 was placed in Monofill #1. All other concrete slabs at the General Mine Area were buried in place.

Concrete collection troughs, small foundation walls, and a foundation base for the furnace at the retort building were all taken down to retort slab grade with heavy equipment (Photo 4). Care was taken when leveling this concrete, and water was used to reduce any visible dust, since the concrete was known to be contaminated with mercury and arsenic (Photo 5). After bringing to slab grade, Ecobond™ mercury encapsulant was applied on the broken concrete and introduced to the cracks in the retort slab for additional treatment (Photo 6). The process tailings fill (Photos 7 and 8) placed over the concrete and concrete slab to establish the bottom grade of Monofill #2 was treated with Ecobond™ arsenic encapsulant prior to placement of the geomembrane (Photos 19, 20, and 21).

2.3.9 Ore Hopper Debris

The cinnabar ore hopper is located upslope of Monofill #2. The ore hopper was removed from the SOW for this contract and was not demolished during the 2002 project.

2.3.10 Retort Building Related Debris

Any debris that appeared to have been related to the retort building or that might have been used in the retort process was disposed in Monofill #2. Unlike other general building debris at the mine, the debris at the retort area had the highest likelihood of coming into contact with the retort process and having higher concentrations of mercury. However, this was a conservative assumption since TCLP testing during the 2001 field visit indicated that the retort building debris (other than slag and retort bricks) was not a RCRA hazardous waste due to mercury or arsenic contamination. The following waste streams were considered retort operation related and placed in Monofill #2:

- Retort bricks
- Slag
- Retort building soils
- Debris located on the retort building foundation
- Retort and rotary kiln components found at the storage pad area

Approximately 20 cubic yards of retort brick debris was located adjacent to the retort building slab and was contaminated with arsenic and mercury above TCLP standards. The retort brick was treated with Ecobond™ encapsulant to render the material non-hazardous RCRA waste for arsenic and mercury prior to placement into Monofill #2. The refractory bricks at the retort area were transported to the gravel storage pad and stockpiled on two layers of 20-millimeter (mil) liner. The retort bricks were covered with 10-mil reinforced plastic sheeting until Ecobond™ treatment took place. For the treatment process, a dump bed from one of the haul trucks left on the site was removed and multiple layers of 20-mil liner were used to create a containment vessel within the bed (Photo 9). The retort bricks were staged on 20-mil liner adjacent to the treatment vessel at the gravel storage pad. A solution of 3% Ecobond™ arsenic encapsulant was mixed in the vessel. The bricks were dipped by hand and stockpiled back on the 20-mil liner to allow penetration of the stabilization chemical. The bricks were cured for a minimum of 24 hours. A

3% Ecobond™ mercury encapsulant solution was mixed in the vessel and the bricks were again hand dipped and stockpiled on 20-mil liner. Again, the bricks were allowed to cure a minimum of 24 hours for penetration of the chemical stabilizer to take place. The bricks were then placed in the empty supersacks that the Ecobond™ arsenic encapsulant was transported in and placed into Monofill #2. Based on the treatability study, Ecobond™-treated material did not require post-treatment confirmation sampling.

Approximately 150 cubic yards of additional unused refractory bricks found at the mine that had never been used in the retort furnace were disposed of in the inert monofill. Nine separate XRF readings were taken to confirm the visual assessment that the bricks were unused. The final three readings taken during removal to Monofill #1 are noted as readings 0718, 0719, and 0720 in Appendix D.

Eight cubic yards of slag was also located adjacent to the retort building slab and was contaminated with arsenic and mercury above RCRA toxicity characteristic standards. The slag was also treated with Ecobond™ encapsulant to render the material a non-RCRA characteristic hazardous waste prior to placement into Monofill #2. Like the retort bricks, the slag pile was stockpiled on two layers of 20-mil liner and was covered with 10-mil reinforced plastic sheeting until treatment, took place. Individual solutions of Ecobond™ arsenic and mercury encapsulant were formulated and applied to the slag pile using mixture concentrations of 2% and 7%, respectively. Each application required thorough mixing of the slag for optimum treatment and the curing process was similar to that of the retort bricks. The slag material was disposed in Monofill #2. Based on the treatability study, Ecobond™-treated material did not require post-treatment confirmation sampling.

Mercury and arsenic-contaminated soil above RCRA toxicity characteristic standards was detected adjacent to and under the retort building slab during previous investigations at the site. Ecobond™ mercury treatment was applied into cracks of the retort building foundation as described in Section 2.3.8 (Photo 6). Additionally, the retort building foundation was capped with a geomembrane liner, as discussed in Section 4.1.

Some additional retort or rotary kiln furnace components were discovered near the Shop Pad (Figure 6). Although these components were not at the retort building area, they appeared to have been formerly used in the retort process. Therefore, these components were hauled to the gravel storage pad and treated with Ecobond™ mercury encapsulant prior to disposal in Monofill #2.

Ecobond™ mercury encapsulant was also applied to all debris after it was placed into Monofill #2 as an additional conservative measure.

2.3.11 Tailings Material (Borrow Source) and General Mine Area Soils Management

Exploration mine tailings were used for structural fill throughout most of the mine site. Processed tailings from the mine operation are predominantly on the eastern side of the mine site near the settling ponds and retort building (Photo 7). Processed mine tailings were used for grading and capping material at the Monofill #2 and to stabilize slopes adjacent to the retort building area. The processed tailings piles consisted of sandy gravel. The process tailings area was graded and contoured after use to stabilize the slope (Photo 8).

Three laboratory soil samples were collected from the processed mine tailings area during the 2001 field sampling program. No exceedances of mercury above the RCRA toxicity characteristic standard of 0.2 mg/L were detected in the three tailings samples (See Appendix E). TCLP mercury concentrations in the processed mine tailings samples ranged from non-detect to 0.0304 mg/L. However, based on previous sampling in the processed mine tailings area (east of Red Devil Creek), arsenic above RCRA toxicity characteristic standards was possible. Therefore, all processed tailings material used for capping, grading, and fill at Monofill #2 was treated by MT^2 with Ecobond^{TM} encapsulant to render the tailings used for construction of Monofill #2 a non-RCRA characteristic hazardous waste for arsenic. Although arsenic would still be present in the unmanaged areas of the eastern side of the site, the rationale used was that any material used for construction of Monofill #2 be treated with Ecobond^{TM} encapsulant to minimize future management of the retort building debris and tailings within Monofill #2. Therefore, the processed mine tailings were treated for arsenic consistent with the MT^2 treatability study report included in Appendix A. Based on the treatability study, Ecobond^{TM}-treated material did not require post-treatment confirmation sampling.

When inert debris Monofill #1 was constructed, the location was selected to avoid any known areas where high concentrations of arsenic, lead, and mercury were present in site soils. Avoiding any high areas of inorganics on the western side of the site was primarily a health and safety issue. Based on CSWMP and the limited sampling completed in 2001 in the area, no mercury or lead concentrations above RCRA toxicity characteristic standards were expected in the Monofill #1 excavation area at the General Mine Area (Photo 13). However, arsenic was detected during the 2001 sampling work at concentrations above RCRA toxicity characteristic standards in General Mine Area surface soils at the following locations:

- Chemical Storage Area – TCLP arsenic at 10.6 mg/L
- Mess Hall / Bunkhouse (downgradient of site) – TCLP arsenic at 10 mg/L
- Warehouse (west side) – TCLP arsenic at 5.5 mg/L

Monofill #1 was not constructed within the above listed areas. Additionally, soil from the above listed areas was not placed into Monofill #1 or used as capping material. Since arsenic was found at high concentrations in various locations at the mine site, and to minimize management of soil in any undocumented areas of high arsenic contamination, field personnel field screened various areas of the General Mine Area during work to determine the general concentrations of inorganics. This monitoring was also completed to comply with health and safety exposure requirements during work at the mine site. Based on the 2001 sampling and XRF correlation data, the following XRF action levels were developed as a general guide in determining areas with elevated concentrations of inorganics:

- Arsenic – 2,000 ppm XRF reading
- Lead – 500 ppm XRF reading
- Mercury – 500 ppm XRF reading

The above screening levels assisted field personnel in minimizing work in areas that potentially had concentrations of target compounds above RCRA toxicity characteristic standards. XRF field screen data is included in Appendix D.

2.3.12 Petroleum-Contaminated Soils

Based on previous sampling at the mine and the CSWMP, petroleum-contaminated soils were not expected to be managed during the project. Petroleum-contaminated soils have been documented at the fuel storage tank area. However, no demolition or excavation work adjacent to the tank area was completed for this project.

No petroleum-contaminated soil was identified during the construction of Monofill #1 or Monofill #2.

2.3.13 Investigation-Derived Waste and Off-Site Waste Disposal

IDW included wastes generated by the project team during work at the mine site. Non-hazardous waste streams included the following:

- Excess geotextile and geomembrane material
- Plastic sheeting
- Miscellaneous general refuse (e.g., paper, product packages, small quantities of plastic)

All of the above materials were disposed of in the inert debris Monofill #1. No liquids or sanitary wastes were disposed in Monofill #1.

The following waste streams were disposed in the Monofill #2:

- PPE cartridges
- Dust-contaminated Tyvek
- Empty Ecobond™ chemical containers

Waste streams generated by the project team that required off-site disposal are listed below:

- Oily sorbent pads
- Oily equipment catch pads (placed under equipment during non-operation periods)
- Waste oil from heavy equipment maintenance

Debris that could not be managed within Monofill #1 and Monofill #2 and required off-site disposal included the following:

- Two 55-gallon drums of lead-contaminated wastes totaling 871 pounds from batteries (approximately 30 lead-acid batteries), lead pipe, and heat tape found at the site.
- One 55-gallon drum of non-RCRA hazardous petroleum-contaminated sorbent pads used during drum consolidation and equipment maintenance (e.g., equipment catch pans, spill containment supplies).
- One 55-gallon drum of waste oil consolidated from three drums of waste found at the site and from a generator oil pan.

All off-site disposed wastes required collection and management in appropriate shipping containers for off-site disposal by Emerald Alaska, Inc. (Emerald). Disposal certificates and shipping manifests for the above listed wastes are included in Appendix G.

3.0 MONOFILL #1 – GENERAL MINE AREA INERT DEBRIS MONOFILL

As introduced in Section 2.0, this portion of the project included construction of one inert debris monofill for disposal of inert debris from the General Mine Area. Monofill #1 was classified as an inert debris monofill by ADEC regulations promulgated in 18 AAC 60.460. Debris placed in the monofill was segregated as described in Section 2.0. Only non-hazardous inert debris and non-RACM were disposed in Monofill #1. Based on 18 AAC 60.460, an inert debris monofill is not required to be lined.

Monofill #1 was constructed on the western side of the mine site in an area already disturbed by mine site activity. The location of the monofill boundary is shown on Figure 6. Monofill #1 had a final debris volume of 4,400 cubic yards (inclusive of soil used for void filler and intermediate soil cover). Based on the site survey, the monofill covered an irregular area of 17,198.30 square feet. The irregular shape was required to maintain the proper setback from Red Devil Creek and to minimize disturbance of areas with high concentrations of arsenic in the soil.

Monofill #1 meets the general requirements for "inert waste" as presented in 18 AAC 60.460. However, BLM has stated that an ADEC permit was not required for the project due to the CERCLA site classification and BLM administration of the site; therefore, a state permit was not obtained prior to construction. Monofill #1 was constructed below grade to a depth of approximately eight feet bgs, relative to the existing grade on the southeastern portion (Photo 13). However, due to the change in natural grade, a cut of approximately 15 feet was required on the northwest corner of Monofill #1. At completion of Monofill #1 construction and prior to placement of debris, the elevation of the bottom of the monofill was surveyed as 297.20 feet above msl. The soil cap on top of the inert debris was at least 2 feet in depth. The soil cap was contoured so that it blended in with the existing grade (Photo 37). The cap slope was not steeper than 3 feet horizontal to 1 foot vertical (3H:1V) where the cap section meets the existing grades and was approximately 14H:1V over most of the soil cap cover. After placement of the Monofill #1 soil cover, the final cap elevation ranged from 305 to 314 feet above msl (see Figure 6). Drainage channels and swales were constructed around the perimeter of the monofill to promote drainage around the cap, as shown in Figure 6 (Photo 36). A cross-section of Monofill #1 is shown in Figure 7.

Soil cover material for the monofill was obtained from the inert debris monofill excavation area. The monofill cover was revegetated as described in Section 3.3.

Although an ADEC solid waste permit was not obtained for this project, the ADEC Solid Waste General Permit For One-Time Disposal of Construction and Demolition Debris (#9940-BA003) and the regulations in 18 AAC 60 were used as general guidance in the construction of Monofill #1. The General Permit is limited to sites with less than 1,000 cubic yards of debris, but it does provide a useful basis for design of the mine monofill, since the mine has similar types of debris. The major design components listed in the General Permit and the regulations are described below, along with a description of how the monofill design has incorporated the requirements.

3.1 SITE PREPARATION

- Maintain vertical separation of at least 10 feet between lowest level of wastes and seasonal high groundwater (18 AAC 60.217) – On August 14, 2000, groundwater was measured at 27.77 feet bgs in monitoring well MW04, which is approximately 60 feet east of Monofill #1. Relative to the measured ground elevation of 305.02 feet above msl near MW04 in 2000, the resulting groundwater elevation was approximately 277.25 feet. The bottom elevation of Monofill #1 and debris limit was surveyed as 297.20 feet above msl. This allows for approximately 20 feet of groundwater separation between the bottom debris layer and the measured level of groundwater on August 14, 2000. Water was not encountered during construction of Monofill #1.
- Maintain water body separation of at least 100 feet from monofill (18 AAC 60.225) – Monofill #1 maintained at least a 100-foot setback away from Red Devil Creek. No wastes were placed in surface water during construction of Monofill #1.
- Maintain 500-foot setback from drinking water well (18 AAC 60.040) – No drinking water sources are within one mile of Monofill #1.
- Maintain 50-foot property boundary setback (18 AAC 60.233) – The Monofill #1 location did not come within 50 feet of the section boundary. BLM controls the mine site property and land within Section 6 and the adjoining Sections 5, 7, and 8. The nearest section boundary is 500 feet south of Monofill #1.
- Site Location (18 AAC 60.227 and 18 AAC 410) – The location of Monofill #1 is not within any known areas of permafrost, as discussed in Section 1.4.1. Based on the CSWMP, the site is not within a floodplain or on a documented earthquake fault.
- Erect Signage – A sign with the following information was erected at the gate to the mine entrance: "Red Devil Mine, U.S. Department of Interior, Bureau of Land Management, Contact: 1-303-236-9436."
- Maintain proper surface water runoff control (18 AAC 60.225 and 40 CFR 122.26) – A SWPPP as documented in *Storm Water Pollution Prevention Plan, Red Devil Mine 2002 Debris Consolidation and Disposal Project, Red Devil, Alaska* (May 28, 2002) was developed for this project and addressed surface water control during the construction of Monofill #1 and management of the debris. The area around Monofill #1 and the cap

material was graded to promote drainage and to limit ponding of runoff water on the cap surface. No major storm events were recorded during the construction and operation of Monofill #1.

- Maintain public access control (18 AAC 60.220) – The community of Red Devil is located approximately 1.5 miles from the mine. However, the mine site is gated and access is limited to authorized personnel. The monofill was open for only a short duration (less than 1.5 months) to allow for disposal and capping of the debris. No public disposal or off-site wastes was allowed in the monofill.

3.2 SITE OPERATION

- Waste restrictions (18 AAC 60.460) – Only non-RACM wastes were placed into the inert monofill. All documented RACM was removed from the site during previous corrective action work by other BLM contractors. The only debris allowed in the monofill included building debris, empty drums and tanks, empty transformers, scrap metal, demolition debris, and general trash. No burning of debris was allowed on the site; therefore, no ash was disposed in Monofill #1. No paints, drums with liquids, batteries, fuels, oils, sludges, greases, or other chemical wastes were disposed in the monofill. No known debris classified as RCRA hazardous waste was placed into Monofill #1 (18 AAC 60.020 and 60.240).
- Vehicle and Construction Equipment Debris (18 AAC 60.035) – All vehicles and generators had batteries and fluids removed prior to disposal as described in Section 2.3.2.
- Cover of non-RACM (18 AAC 60.243) – Non-RACM wastes were covered with a layer of soil within 24 hours after placement in the monofill.
- Landfill working face restriction of 10 feet – Monofill #1 was not constructed above grade and the working face did not exceed 10 feet.
- Petroleum-contaminated soils – No petroleum-contaminated soils were encountered during work at the site.
- Solid waste compaction – All wastes were compacted by running a tracked vehicle (e.g., dozer, excavator) over the debris at least 3 times and in 1-to 2-foot lifts of waste.. However, lifts and compaction rates were altered by the field foreman to handle odd-shaped or large pieces of mine debris.
- Transport (18 AAC 60.015) – Wastes were controlled and contained while transporting from the demolition sites to the monofill.
- Burning restrictions – No burning of building or monofill debris was allowed at this site.
- Access and litter control (18 AAC 60.220 and 60.420) – Only BLM-authorized personnel were allowed on the site, and no public disposal of wastes was allowed. Only mine-related waste was placed in the monofill. On-site personnel verified that wastes placed

into the monofill were secure from being blown from the monofill by wind during operation. A final site walkthrough was completed prior to work completion to collect any scattered debris around the site. All debris is now covered with a soil cap.

3.3 MONITORING, REPORTING, AND MONOFILL CLOSURE

- Visual monitoring during construction – On-site personnel inspected the monofill daily during operation and recorded the observations in the project field book and/or daily log sheets. Photographs were taken during construction of the monofill, placement of the debris, and during final placement of the cover material and application of revegetation. A subset of those photographs is shown in Appendix C.
- Capping of waste with at least 2 feet of soil [18 AAC 60.460(e)] – The monofill was capped with soil consisting of sandy gravels during the 2002 field season. A geomembrane liner or impermeable cover is not required by the ADEC for inert debris monofills, as shown in 18 AAC 60.460. The monofill design for this project required that the monofills be covered with at least two feet of cover soil. All capping soil was compacted in 1-foot soil lifts using tracked equipment. At least three compaction passes with a tracked vehicle was required for each waste lift. No suitable topsoil was located at the mine site or could be obtained without disturbing existing vegetation. Therefore, no layer of topsoil was placed on the monofill soil cap. However, vegetation capable of growing on the mine soils was selected and applied as described below.
- Grading and Sloping – The monofill slopes did not exceed 3H:1V. The soil cap was compacted and graded to prevent ponding. Drainage swales were constructed around the monofills as noted on Figure 6 and sloped to allow surface water to flow around the monofill soil cap.
- Revegetation – All disturbed slopes, monofill drainage ditches, and the monofill soil caps were revegetated as described in Section 3.3.7 of the SWPPP and this section. In summary, the cap was revegetated using the suggested seed mix recommended by the Alaska Plant Materials Center in Palmer, Alaska. Seeding methods used Bering Hairgrass, 'Arctared' fescue, and annual rye grass seed applied at a rate of 2.5 pounds per thousand square feet (110 pounds per acre) with a mix of 45% Bering Hairgrass, 45% 'Arctared' fescue, and 10% annual rye. Annual rye was added to the seed mix to provide rapid development of a root structure to hold soil. Slow-release nitrogen, phosphorus, and potassium (N-P-K) fertilizer (20:20:10) was applied at a rate of 8 pounds per thousand square feet (350 pounds per acre). Fertilizer and seed was broadcast by hand. No fertilizer was applied within 30 feet of any surface water or active channel to avoid fertilizer contamination in case of a high water storm event.
- Groundwater monitoring [18 AAC 60.460(e) and 60.820] – Monitoring well MW04 is located approximately 60 feet east (downgradient) of the Monofill #1 location and was

installed as part of the site investigations at the mine. According to 18 AAC 60.820 (a)(1), an inert waste monofill that receives less than 25 inches of precipitation a year may be exempt from the groundwater monitoring requirements of the solid waste regulations. Average precipitation at Red Devil is 18.8 inches. Therefore, BLM may request that groundwater monitoring associated with the solid waste regulations be suspended and incorporated in the overall site-wide groundwater sampling program associated with the CERCLA monitoring.

- Surveying of monofills – Surveying services were performed by Terra Surveys, LLC. Surveying took place prior to monofill construction and after placement of the final soil cap in order to document the depth, extent, and location of the monofill. Three permanent survey markers were placed at the mine site to delineate the locations of Monofill #1 and #2. The survey meets third-order survey accuracy and includes horizontal and vertical information. Site survey control data and figures are included in Appendix B.
- State Recorders Office notification (18 AAC 660.490) – BLM should forward the as-built information to the state lands office describing the location of Monofill #1 and #2 noting that the land must not be disturbed for any future land development or construction.
- Visual monitoring after completion of monofills – Visual monitoring after the 2002 field season was not included as part of this WCC scope of work. Therefore, BLM personnel and/or their contractors will be responsible for inspection of the mine yearly for at least 5 years to record signs of settlement, damage, or erosion of the monofill.

4.0 MONOFILL #2 – RETORT BUILDING DEBRIS MONOFILL

Monofill #2 was constructed to contain approximately 938 cubic yards of retort building debris. The retort building debris was staged on the concrete slab-on grade foundation. The foundation was not removed and the monofill was constructed above grade. Retort building debris and processed mine tailings going into the retort building debris monofill were treated as required in Sections 2.3.10 and 2.3.11 to render the material a non-RCRA characteristic hazardous waste as defined by EPA regulations. Therefore, the retort building debris monofill meets the definition of an "inert" debris monofill as defined by ADEC in 18 AAC 60. As a secondary precaution, the wastes at Monofill #2 were encapsulated with a geomembrane liner as discussed below.

4.1 COMPARISON OF INERT DESIGN TO INDUSTRIAL WASTE MONOFILL REQUIREMENTS

Discussions with ADEC by BLM near completion of Monofill #2 indicated that ADEC believed that Monofill #2 should be classified as an industrial debris monofill under 18 AAC 60.460. The original design of Monofill #2 in the CSWMP and work plan was based on the general inert debris monofill requirements in 18 AAC 60.460 with the addition of a liner as secondary measure to cap the retort building concrete foundation. The addition of the liner was based on the CSWMP proposal that Monofill #2 be constructed within an AOC as defined in the NCP. For an AOC, EPA interprets RCRA to allow discrete areas of generally dispersed contamination to be a RCRA land-based unit. AOC policy allows waste to be consolidated or treated in-situ within an AOC without triggering land disposal restrictions. With the exception of the slag and retort brick, debris from the retort building area had been tested and found to be below RCRA TCLP limits for mercury and arsenic. However, as a secondary precaution, all debris placed into Monofill #2 was treated with Ecobond™ mercury encapsulant. Additionally, soil used for the construction of Monofill #2 was process mine tailings treated with Ecobond™ arsenic encapsulant. No other contaminated or "polluted" soil as defined by 18 AAC 60 were incorporated into Monofill #2. After Ecobond™ encapsulant treatment, no debris placed into Monofill #2 was classified as a RCRA hazardous waste for mercury.

Although the design of Monofill #2 followed the non-procedural inert debris requirements under 18 AAC 60.460, Monofill #2 also meets the non-procedural ADEC requirements as an industrial waste monofill under 18 AAC 60.486, with the following major exceptions:

- Leachate Collection System [18 AAC 60.485 (b) and 18 AAC 60.330(b)] – A 60-mil high density polyethylene (HDPE) liner was used for the cover of Monofill #2; therefore, no leachate collection system was required or designed for Monofill #2. Additionally, the retort building debris consisted of building and demolition debris and not general municipal solid waste.

- Impermeable Top Soil Layer [18 AAC 60.485 (d)(1)] – The 24 inches of Ecobond™ encapsulant treated mine tailings cover above the 60-mil HDPE liner has a permeability greater than the $1x10^{-5}$ centimeters per second. A 60-mil HDPE liner was substituted for the impermeable soil layer.
- Impermeable Bottom Soil Layer [18 AAC 60.330(c)] – As referenced in 18 AAC 60.485(b), this requirement includes the use of a compacted soil layer beneath the monofill with a hydraulic conductivity no more than $1x10^{-7}$ centimeters per second. The base layer beneath Monofill #2 consisted of one foot of compacted mine tailings which have a hydraulic conductivity greater than $1x10^{-7}$. No clay or silty soils are located at the mine site to meet this requirement without disturbing existing vegetated areas. The tailings beneath Monofill #2 are contaminated with mercury from former mine operations. However, Ecobond™ mercury encapsulant was applied through the cracks of the retort building foundation to assist in limiting mobilization of mercury directly beneath Monofill #2.

If an industrial solid waste permit were required for Monofill #2, waivers under 18 AAC 60.900 would need to be requested by BLM for the above-listed exceptions.

4.2 GEOMEMBRANE LINER RATIONALE

The primary purpose of the synthetic liner system was to reduce the potential exposure of the landfill waste to human and ecological receptors and to cap the retort building foundation. A 60-mil HDPE geomembrane was used to line the bottom and cap Monofill #2. Non-woven geotextile liner material was placed above and below the geomembrane for abrasion protection of the geomembrane. Figure 8 shows a typical cross-section of the Monofill #2 liner system. The geomembrane covers the retort building slab and adjacent soils, which contain concentrations of arsenic and mercury above RCRA toxicity characteristic standards. Mercury TCLP concentrations above the 0.2 mg/L EPA regulatory standard were found adjacent to the southwestern end of the retort foundation. Mercury TCLP concentrations at sample location RT09/FS028 and RT73/FS032 were 0.352 and 0.429 mg/L, respectively. Arsenic TCLP concentrations above the 5 mg/L RCRA toxicity characteristic regulatory standard were found in 14 soil samples collected adjacent to the retort building concrete foundation. Arsenic TCLP concentrations above the EPA regulatory standard ranged from 5.31 to 373 mg/L. Figure 6 shows the positioning of the liner to maximize coverage of the contaminated soil adjacent to the retort building slab. Specifications for the geomembrane and geotextile materials used for the cap and bottom liner are included in Appendix G.

The liner also enclosed the retort building debris that had the highest potential of contamination during the life of the mine. This debris included treated retort brick and slag adjacent to the slab and general building debris from the demolished retort building. A detailed treatability study was performed by MT^2 on the waste streams present at the retort building. MT^2 determined that the wastes at this area could be treated so that the wastes would be rendered non-RCRA hazardous wastes due to arsenic and mercury. This treatment was completed as described in Section 4.3.

The liner installation and welding were supervised by two independent liner technicians. Construction Consultants constructed the bottom liner and Hawaii Liner Technology constructed the top liner and sealed the monofill. Both were qualified liner technicians, and performed the quality assurance and quality control (QA/QC) as specified in the GSE QA/QC manual that was included in the Work Plan. Appendix G includes copies of the applicable QA/QC reports from the Work Plan.

4.3 RETORT DEBRIS AND SOIL ECOBOND™ TREATMENT

Arsenic and/or mercury-contaminated retort building debris was treated with Ecobond™. Ecobond™ encapsulant is a compound that chemically bonds with inorganic contaminants that may be present in the debris or soil, to reduce the leaching potential of the contaminants to the environment. Ecobond™ encapsulant comes in several concentrations and mixtures based on the type of contaminant to be encapsulated (e.g., arsenic, lead, or mercury). Ecobond™ is designed to be applied directly on soils and debris requiring treatment. The Material Safety Data Sheets for Ecobond™ and a detailed treatability study performed at the mine site 2001 are included in Appendix A.

A MT^2 technician was onsite during the application of Ecobond™ encapsulant to retort building debris and mine tailings. The general retort building debris did not require Ecobond™ treatment to render the material a non-RCRA characteristic hazardous waste for mercury or lead as defined by EPA. However, the slag and retort brick waste streams adjacent to the area, as discussed in Section 2.3.10, required Ecobond™ treatment for arsenic and mercury contamination prior to placement into Monofill #2. Additionally, Ecobond™ mercury encapsulant was applied through cracks in the retort building concrete slab prior to placement of the geomembrane as described in Section 2.3.8. Processed mine tailings used to construct the Monofill #2 base and cap were also treated with Ecobond™ arsenic encapsulant as described in Section 2.3.11. Based on the treatability study, Ecobond™-treated material did not require post-treatment confirmation sampling. Therefore, no additional off-site analytical sampling of the treated soil was performed.

Retort slag and brick and general building debris from the retort building was temporarily moved to the gravel storage pad to allow construction of Monofill #2. The gravel storage pad was bounded by a temporary berm on the southeast side for surface water and debris control during work at the area. No soil sampling at the gravel storage pad was completed after removal of the debris since the gravel storage pad was treated with Ecobond™ arsenic and mercury encapsulant after all stockpiled debris was removed and placed into the appropriate monofill. Although lined areas were used during management and treatment of retort debris at the gravel storage pad, this was a good faith effort to treat potential minimal cross contamination from stockpiling retort debris in this area.

4.4 MONOFILL #2 CONSTRUCTION

Monofill #2 meets the general requirements for "inert waste" as described in 18 AAC 60.460. The major modification to the requirements shown in 18 AAC 60.460 is the addition of a geomembrane liner. A 60-mil HDPE geomembrane liner placed between two layers of non-woven geotextile fabric was installed on the top and bottom of the monofill and field welded closed at completion of disposal activities. Placement of the geomembrane liner and geotextile and field-welding of the geomembrane material was supervised by a manufacturer-authorized installer in compliance with the GSE QA/QC manual (Photos 22 and 25).

Inert debris monofill regulations do not require an impermeable liner, but as discussed in Section 4.2, this design element was added to reduce infiltration of surface water to contaminated soils beneath the retort slab and to provide a secondary protection to treated retort building debris within the lined monofill. If Monofill #2 is considered an industrial waste monofill then a minimum a 60-mil HDPE liner is required under ADEC regulations. Monofill #2 was constructed above grade on top of the existing retort building concrete foundation, as shown in Figure 6. The concrete foundation sidewalls were knocked down and protrusions (e.g., rebar, sharp edged rocks) were controlled so that damage to the geomembrane was prevented (Photo 19 and 20). The geomembrane liner contractor verified compliance of the subgrade to GSE's QA/QC procedures prior to placement of the geomembrane (Photo 21). A foot of soil cover was placed on top of the geomembrane-geotextile layer to protect the geomembrane during placement of the retort building debris (Photos 23 and 24).

The above-grade Monofill #2 waste depth was approximately three feet in thickness (Photos 26 and 27). The soil cap on top of the debris was at least three feet in depth with one foot immediately below the top geomembrane and two feet above the top geomembrane (Photos 28 through 32). The cap slope was not steeper than 20H: 1V (Photo 33). The sidewall of the monofill on the western side was approximately 2H:1V. A crown was maintained on the cap to promote surface water drainage off the cap material (Photo 35). Figures 6 and 8 show the location and cross-section of Monofill #2, respectively. Drainage channels and swales were constructed around the perimeter of Monofill #2 to promote drainage around the cap as shown in Figure 6 (Photos 33 and 34). As discussed in Section 2.3.11, cover soil and subgrade construction material for Monofill #2 was obtained from the processed tailings piles at the mine (Photo 7).

The ADEC Solid Waste General Permit for One-Time Disposal of Construction and Demolition Debris (#9940-BA003) was also used as general guidance for the construction of this monofill. The General Permit is limited to sites with less than 1,000 cubic yards of debris, but it does provide a useful basis for design for mine monofills since the mine contains similar types of debris. The major design components listed in the General Permit are described below, along with a description of how the monofill design has incorporated the requirements. As discussed in Section 4.1, if Monofill #2 is considered an industrial waste monofill, it would also meet the general requirements of the regulations in 18 AAC 60.486 with the three major exceptions listed in Section 4.1.

4.4.1 Site Preparation

- Maintain vertical separation of at least 10 feet between lowest level of wastes and seasonal high groundwater (18 AAC 60.217) – The groundwater level in monitoring well MW01 at the gravel storage pad was measured in August 2000 at approximately 17 feet bgs with an elevation of approximately 302.54 feet above msl (Figure 6). MW01 is approximately 160 feet west of Monofill #2. The base liner of Monofill #2 was surveyed at 340.8 feet above msl. Additionally, boring B02, completed near the retort building slab, did not encounter wet soil (no groundwater) until approximately 30 feet bgs (approximate elevation of 305 feet above msl). Therefore, there is an estimated separation of approximately 38 feet from the base liner of Monofill #2 and groundwater.
- Site Location (18 AAC 60.227 and 18 AAC 410) – The location of Monofill #2 is not within any known areas of permafrost, as discussed in Section 1.4.1. Based on the CSWMP, the site is not within a floodplain or on a documented earthquake fault.
- Maintain water body separation of at least 100 feet from monofill (18 AAC 60.225) – Monofill #2 is approximately 300 feet from Red Devil Creek. No wastes will be placed in surface water.
- Maintain 500-foot setback from drinking water well (18 AAC 60.040) – No drinking water sources are within one mile of Monofill #2.
- Maintain 50-foot property boundary setback (18 AAC 60.233) – The Monofill #2 location did not come within 50 feet of the section boundary. BLM controls the mine site property and land within Section 6 and the adjoining Sections 5, 7, and 8. The nearest section boundary is 70 feet south of Monofill #2.

- ❖ Erect Signage – A sign with the following information was erected at the gate to the mine entrance: "Red Devil Mine, U.S. Department of Interior, Bureau of Land Management, Contact: 1-303-236-9436."
- ❖ Maintain proper surface water runoff control (18 AAC 60.225 and 40 CFR 122.26) – A SWPPP as documented in *Storm Water Pollution Prevention Plan, Red Devil Mine 2002 Debris Consolidation and Disposal Project, Red Devil, Alaska* (May 28, 2002) was developed for this project and addressed surface water control during the construction of Monofill #2 and management of the debris. The area around the monofill and the cap material was graded to promote drainage around the cap. No major storm events were recorded during the construction and operation of the monofill.
- ❖ Maintain public access control (18 AAC 60.220) – The community of Red Devil is located approximately 1.5 miles from the mine. However, the mine site is gated and access is limited to authorized personnel. Monofill #2 was only open for a short duration (less than 1.5 months) to allow for disposal and capping of the debris. No public disposal or off-site wastes was allowed in Monofill #2.

4.4.2 Site Operation

- ❖ Waste restrictions (18 AAC 60.460) – The only debris allowed in Monofill #2 was debris from the retort building demolition and Ecobond™-treated slag, retort bricks, and soil. All debris placed in Monofill #2 was classified as a non-hazardous RCRA waste either based on initial assessments of the mine debris or after the debris had been treated with Ecobond™ mercury. Debris was segregated as required in Section 2.0. No burning of debris was allowed on the site; therefore, no ash was disposed in Monofill #2. No paints, drums with liquids, batteries, fuels, oils, sludges, greases, or other chemical wastes were allowed in Monofill #2. Only non-RACM wastes were placed into Monofill #2. All documented RACM was removed from the site during previous corrective action work by other BLM contractors.
- ❖ Cover of non-RACM (18 AAC 60.243) – Non-RACM wastes were covered with a layer of soil within 24 hours after placement in Monofill #2.
- ❖ Landfill working face restriction of 10 feet – The total depth of debris at Monofill #2 was 3 feet.
- ❖ Transport (18 AAC 60.015) – Wastes were controlled and contained while transporting from the demolition sites to the monofill.
- ❖ Petroleum-contaminated soils – No petroleum-contaminated soils were encountered during operation and construction of Monofill #2.
- ❖ Solid waste compaction – All wastes were compacted by running a tracked vehicle (e.g., dozer, excavator) over the wastes at least three times and in one to two foot lifts of waste.

However, lifts and compaction rates were altered by the field foreman to handle odd shaped or large pieces of debris.

- Burning restrictions – No burning of building or monofill debris was allowed at this site.
- Access and litter control (18 AAC 60.220 and 60.420) – Only BLM-authorized personnel were allowed on the site and no public disposal of wastes was allowed. Only retort building related waste or waste believed to be associated with the retorting process were placed in Monofill #2. On-site personnel verified that wastes placed into the monofill was secure from being blown from the monofill by wind during operation. All wastes are now covered with the monofill liner and tailings cap.

4.4.3 Monitoring, Reporting, and Monofill Closure

- Visual monitoring during construction – On-site personnel inspected the monofill daily during operation and recorded the observations in the project field book and/or daily log sheets. Inspections included checking for signs of excessive settlement, geomembrane condition, non-permitted debris, erosion, slope failure, and water ponding within the monofill. On-site personnel documented in the daily log sheets and/or field book wastes going into the monofill. Photographs were taken during construction of the monofill (see Appendix C), placement of the bottom geomembrane liner, placement of the debris, and during final placement of the top geomembrane and soil cover material.
- Capping of waste with at least 2 feet of soil – A geomembrane liner covers the debris in Monofill #2. A one-foot layer of soil was placed on top of the waste prior to placement of the top geomembrane. The geomembrane and geotextile layers were then placed and covered with at least 2 feet of Ecobond™ arsenic treated tailings from the processed tailings piles. This design meets the minimum required 2 foot of cover stipulated in 18 AAC 60.460(e). All capping soil was compacted in 1-foot lifts using tracked equipment. At least three passes with a tracked vehicle were completed for each lift. No suitable topsoil was located at the mine site or could be obtained without disturbing existing vegetation. Therefore, no layer of topsoil was placed on the monofill soil cap. However, vegetation capable of growing on the tailings soils was selected and will be applied as described below.
- Grading and Sloping – The Monofill #2 cap is approximately 20H:1V. The Monofill #2 east side slope is approximately 2H:1V. The side slope on the west side of Monofill #2 is an existing hard rock cut that was created during initial construction of the mine site. The top of the Monofill #2 soil cap was crowned and graded to prevent ponding. Drainage swales were constructed around Monofill #2 as noted on Figure 6 and sloped to allow surface water to flow around the monofill cap.
- Revegetation – All disturbed slopes, monofill drainage ditches, and the Monofill #2 soil cap was revegetated as described in Section 3.3.7 of the SWPPP. In summary, the cap

was revegetated using the suggested seed mix recommended by the Alaska Plant Materials Center in Palmer, Alaska. Seeding methods used Bering Hairgrass, 'Arctared' fescue, and annual rye grass seed applied at a rate of 2.5 pounds per thousand square feet (110 pounds per acre) with a mix of 45% Bering Hairgrass, 45% 'Arctared' fescue, and 10% annual rye. Slow-release nitrogen, phosphorus, and potassium (N-P-K) fertilizer (20:20:10) was applied at a rate of 8 pounds per thousand square feet (350 pounds per acre). Fertilizer was broadcast by hand. No fertilizer was applied within 30 feet of any surface water.

- Groundwater monitoring (18 AAC 60.820) – Two monitoring wells are located approximately 300 feet west (crossgradient) of Monofill #2, and two monitoring wells are located approximately 400 feet north (downgradient) of the monofill. According to 18 AAC 60.820 (a)(1), an inert waste monofill that receives less than 25 inches of precipitation a year may be exempt from the groundwater monitoring requirements of the solid waste regulations. Average precipitation at Red Devil is 18.8 inches. Therefore, BLM may request that groundwater monitoring associated with the solid waste regulations be suspended and incorporated in the overall site-wide groundwater sampling program associated with the CERCLA monitoring.
- Surveying of monofills – Surveying services were performed by Terra Surveys, LLC. Surveying took place prior to Monofill #2 construction and after placement of the final soil cap to document the depth, extent, and location of Monofill #2. Three permanent survey markers were placed at the mine site to delineate the locations of Monofill #1 and #2. The survey meets third-order survey accuracy and includes horizontal and vertical information. Site survey control data and figures are included in Appendix B.
- State Recorders Office notification (18 AAC 660.490) – BLM should forward the as-built information to the state lands office describing the locations of Monofill #1 and #2 and noting that the land must not be disturbed for any future land development or construction.
- Visual monitoring after completion of monofills – Visual monitoring after the 2002 field season was not included as part of this WCC scope of work. Therefore, BLM personnel and/or their contractors will be responsible for inspection of the mine yearly for at least 5 years to record signs of settlement, damage, or erosion of the monofill.

5.0 REFERENCES

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FIGURES

FIGURES

FIGURES

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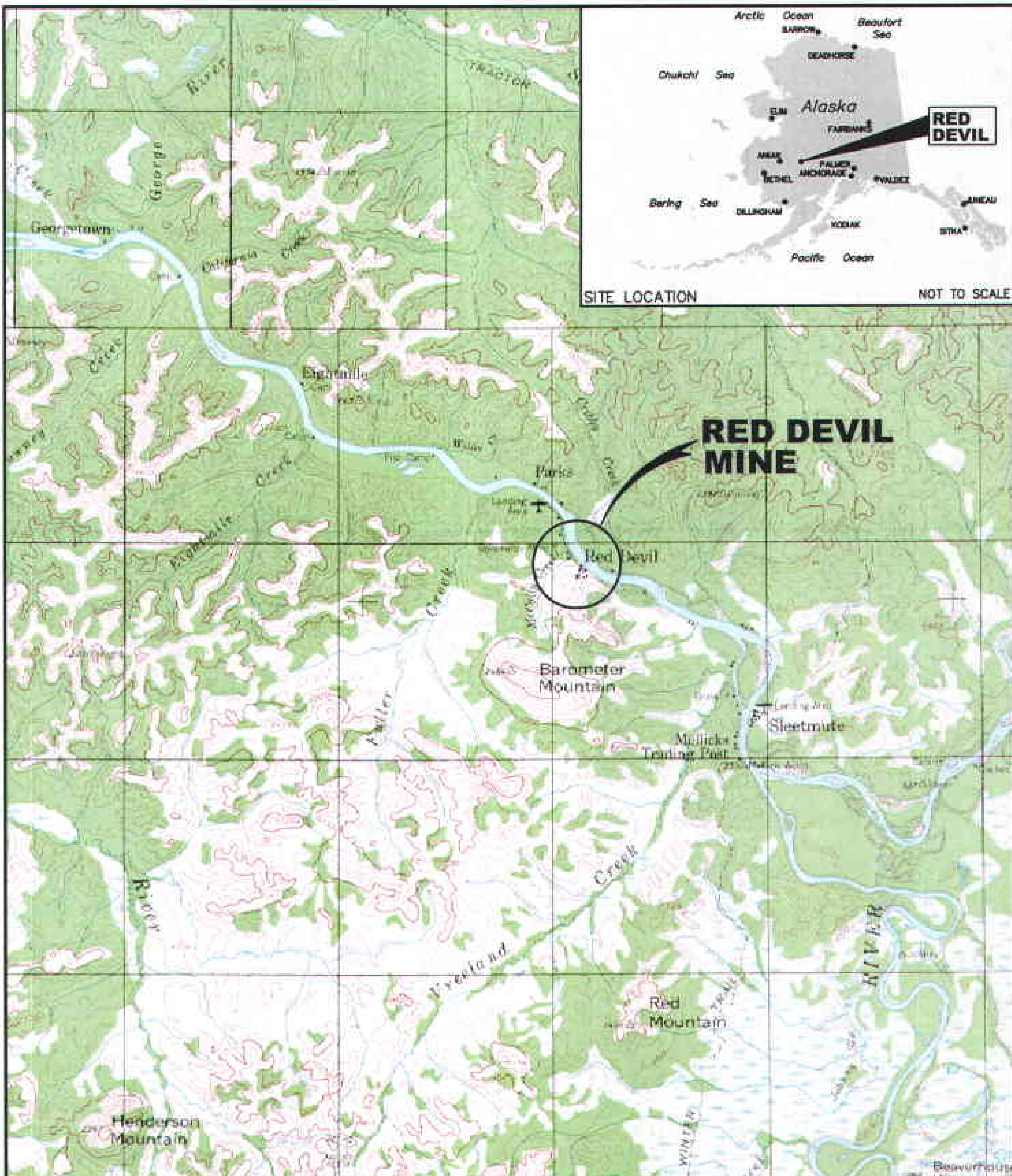


BUREAU OF LAND MANAGEMENT
2002 REMOVAL ACTION

SITE LOCATION AND VICINITY MAP

RED DEVIL MINE, ALASKA

JOB NO: 26219058	DRAWN: ARN	**FIGURE 1**
DATE: 4/23/02	FILE: RED DEVIL 1.DWG	

Source: Aeromap U.S., Photography date 6-14-96, Roll 96-29C, Exp 1-3.

0 500 1000 2000

SCALE IN FEET

N

W E

BUREAU OF LAND MANAGEMENT
2002 REMOVAL ACTION

1974 VICINITY
AERIAL PHOTOGRAPH

RED DEVIL MINE, ALASKA

JOB NO: 26219358	DRAWN: ARN	FIGURE 2
DATE: 12/18/02	FILE: RED DEVIL FIG2.DWG	

Source: Aeromap U.S., Photography date 6-14-96, Roll 96-29C, Exp 1-3.

0 75 150 300
SCALE IN FEET

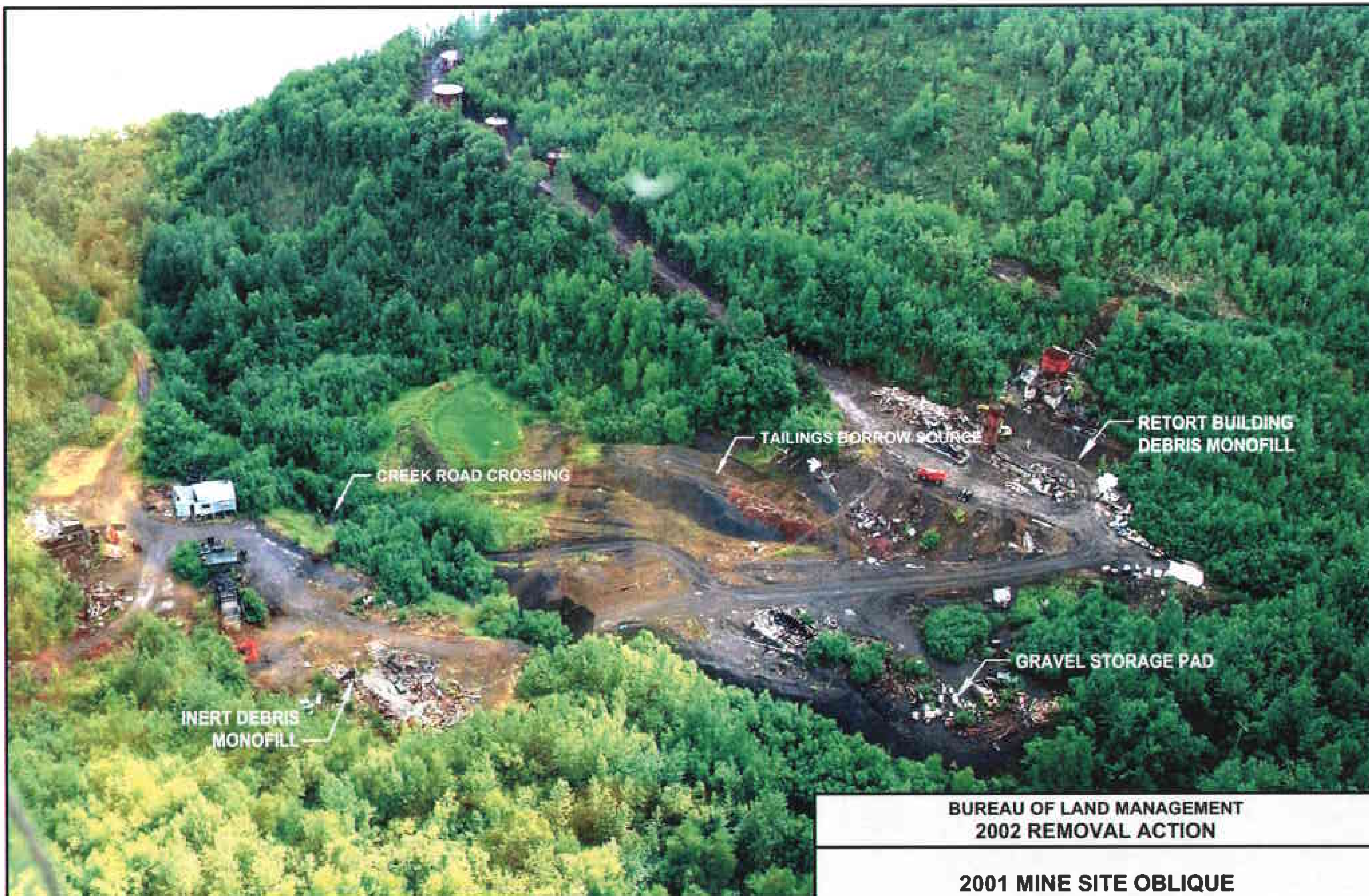
N E W

BUREAU OF LAND MANAGEMENT
2002 REMOVAL ACTION

1996 MINE SITE AERIAL PHOTOGRAPH

RED DEVIL MINE, ALASKA

JOB NO: 26219358	DRAWN: ARN	**FIGURE 3**
DATE: 12/18/02	FILE: RED DEVIL FIG3.DWG	



Source: Harding ESE CSWMP, April 30,2001
June McAtee, Calista Corporation, August 2000
Note: View looking East

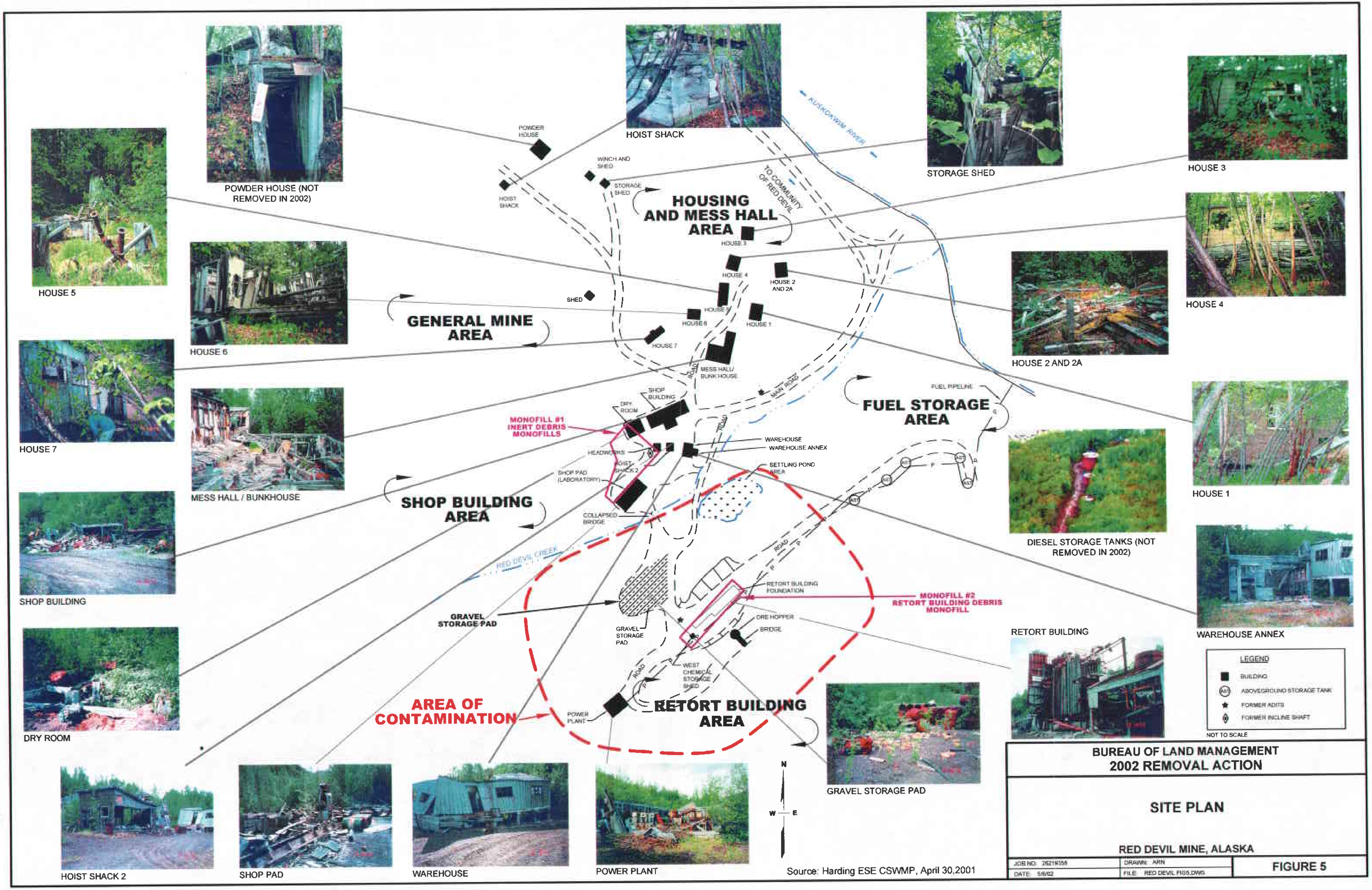
EAST

BUREAU OF LAND MANAGEMENT
2002 REMOVAL ACTION

2001 MINE SITE OBLIQUE PHOTOGRAPH

RED DEVIL MINE, ALASKA

JOB NO: 28219358	DRAWN: ARN/AR	FIGURE 4
DATE: 12/18/02	FILE: RED DEVIL FIG4.DWG	



Source: Harding ESE CSWMP, April 30,2001

MONOFILL DEBRIS VOLUMES
MONOFILL #1 = 4,400 CY
MONOFILL #2 = 930 CY
SEE TABLE 2 AND TEXT ADDITIONAL DETAILS

SURVEY CONTROL DATA

NAD83 GEOGRAPHIC (DEG MIN SEC.sec)	LATITUDE (N)	LONGITUDE (W)	E/Ht (m)	STATION
RDM-01 2000	61°45'37.887"	157°18'51.805"	81.39	RDM-01 GPS
RDM-02 2000	61°45'34.018"	157°18'47.549"	100.60	RDM-02 GPS
RDM-03 2000	61°45'34.912"	157°18'57.343"	84.96	RDM-03 GPS
CORPSCON CONVERSION (ASPC Z6, NAD 83, US FT)				
RDM-01 2000	2836054.78	1759190.39	293.11	RDM-01 GPS
RDM-02 2000	2835664.10	1759399.35	356.22	RDM-02 GPS
RDM-03 2000	2835749.84	1758927.11	305	RDM-03 GPS

LEGEND:

- SURVEY MONUMENT
- MW-04 (279.2) MONITORING WELL WITH AUGUST 2000 GROUNDWATER ELEVATION
- TREE LINE
- MONOFILL #2 INTERIOR TOE OF BERM AND GENERAL DEBRIS BOUNDARY
- MONOFILL #1 DEBRIS BOUNDARY
- MONOFILL #2 EXTENT OF BOTTOM HDPE GEOMEMBRANE
- B05 (281) BORING LOCATION WITH 2000 GROUNDWATER ELEVATION
- DRAINAGE CHANNEL

DRAWING INFORMATION			
DRAWING SCALE	1"=30'		
		INIT.	DATE
SURVEYED BY:	TERRA SURVEYS, LLC		--
DRAWN BY:	ARN		12/30/02
CHECKED BY:	CH		3/17/03
APPROVED BY:	--		--
FILE: RED DEVIL FIG6,B1, B2A.DWG			

BUREAU OF LAND MANAGEMENT

2002 REMOVAL ACTION

MONOFILL LOCATIONS AND FINAL SITE GRADES

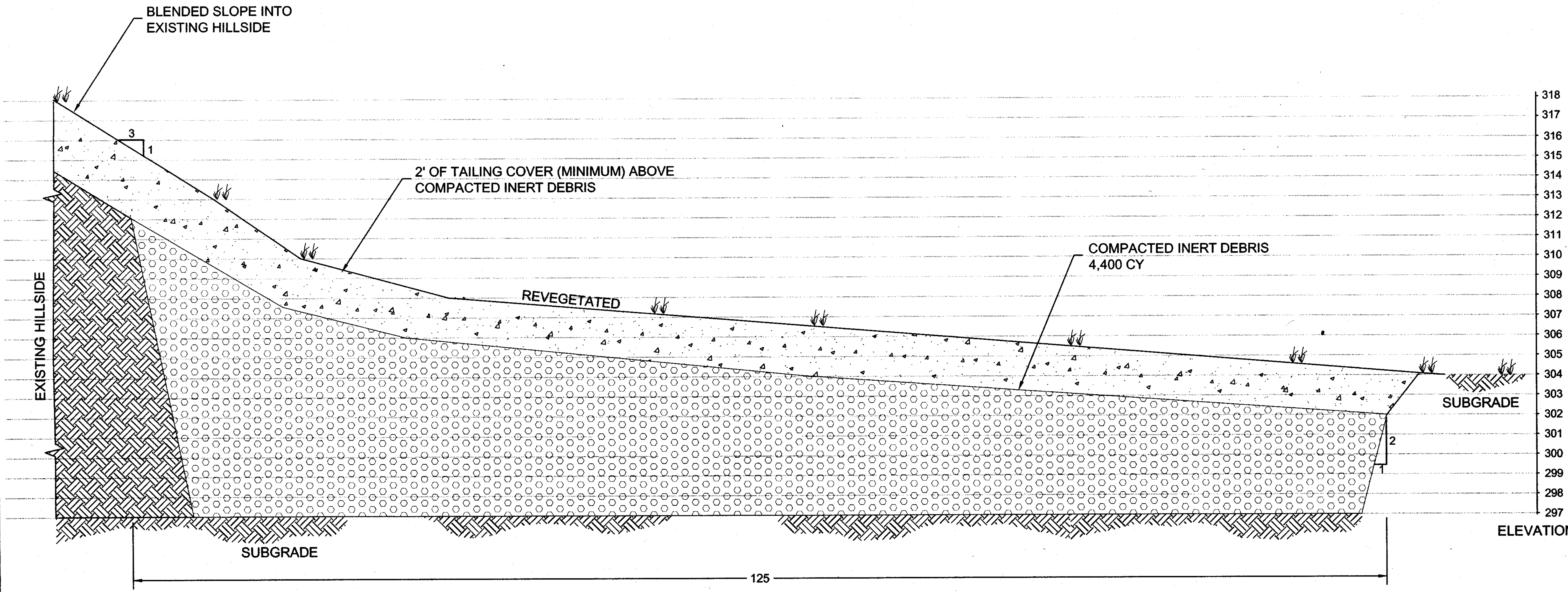
DATE: 3/17/03

JOB NO. 26219358

REVISION 1

DRAWING NO. 6

G:\PROJECTS\26219358\FINAL REPORT\RED DEVIL FIG6,B1, B2A.DWG; Revised Tue, 18 Mar 2003 - 2:05pm; Printed Tue, 18 Mar 2003 - 2:06pm



SECTION A-A: TYPICAL SECTION

APPROXIMATE SCALE: 1" = 10' HORIZONTAL, 1" = 5' VERTICAL

VERTICAL SCALE EXAGERATED

NOTES:

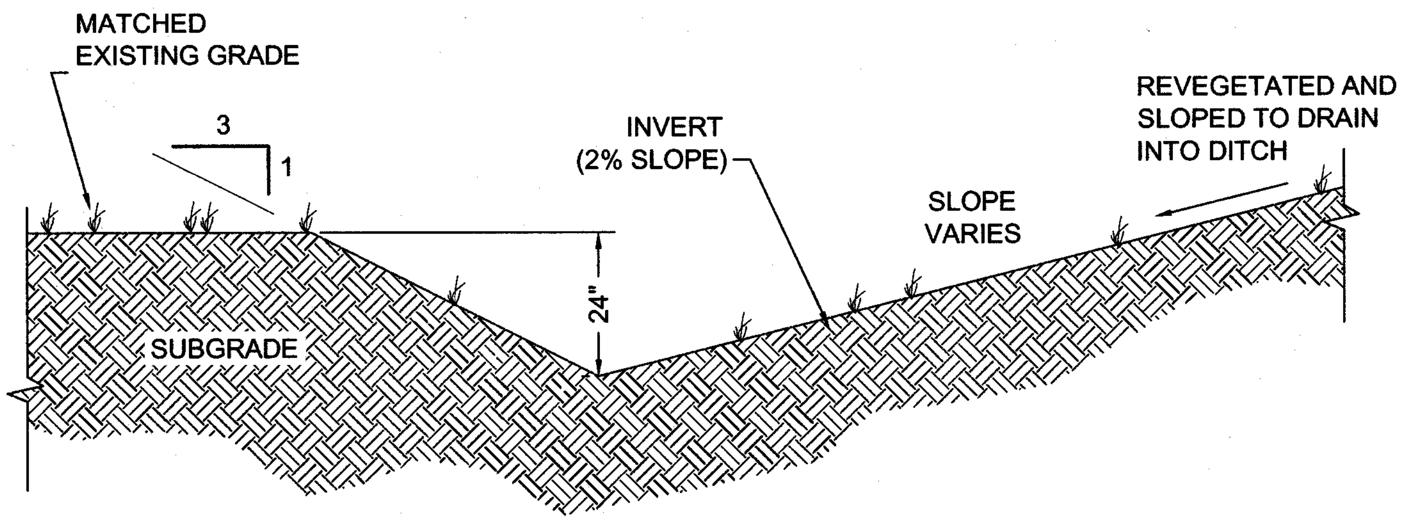
1. ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL
2. SURFACE AREA OF MONOFILL #2 IS 17,198.30 SQUARE FEET (IRREGULAR AREA)
3. MINE TAILINGS USED FOR MONOFILL #1 CONSTRUCTION TAKEN FROM WEST SIDE OF CREEK ONLY

BUREAU OF LAND MANAGEMENT
2002 REMOVAL ACTION

MONOFILL #1
CROSS-SECTION A-A

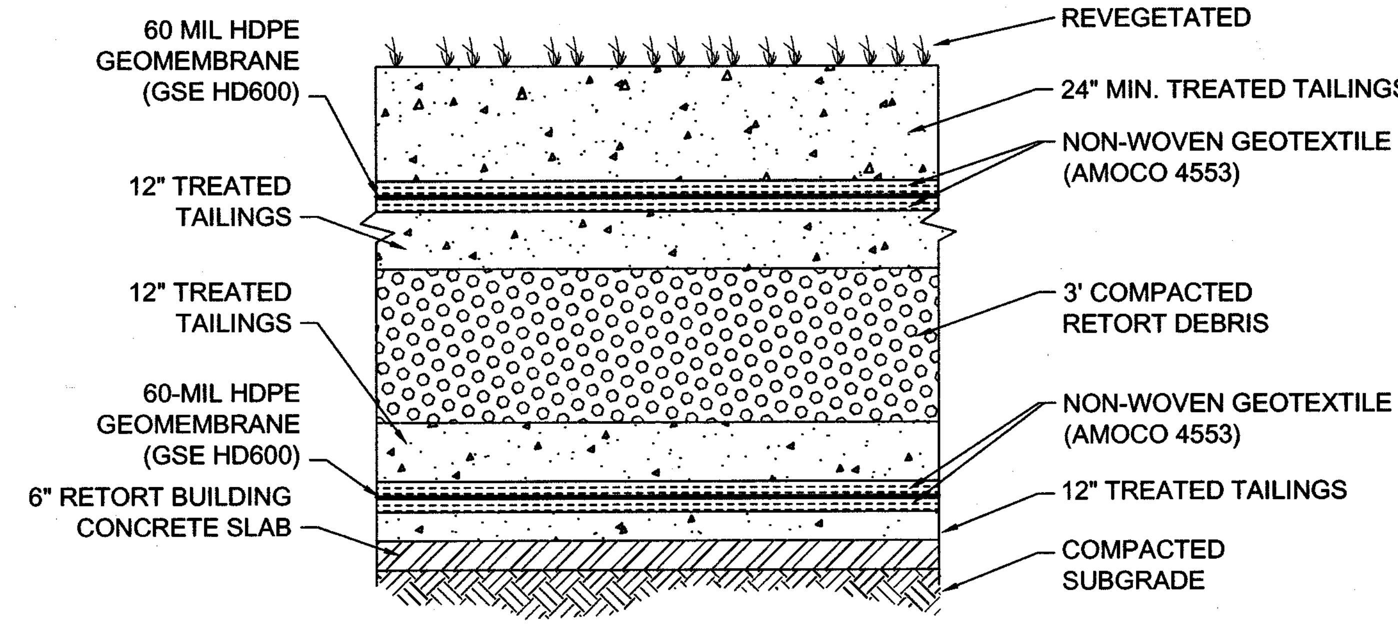
RED DEVIL MINE

JOB NO: 26219358	DRAWN: ARN/AR	**FIGURE 7**
DATE: 2/9/03	FILE: RED DEVIL FIG7.DWG	



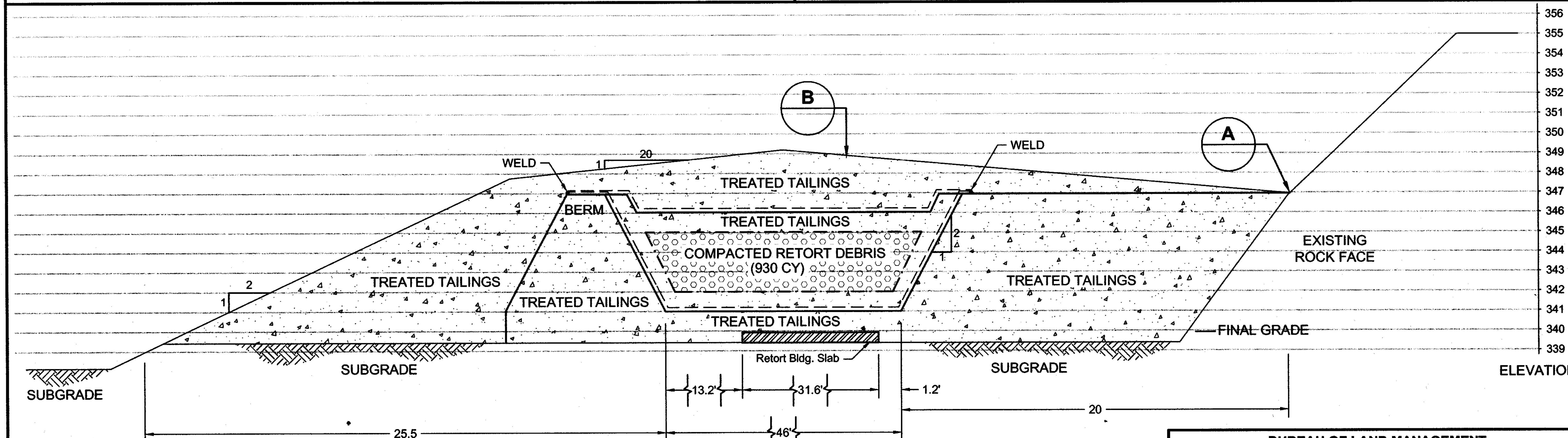
A TYPICAL DRAINAGE DITCH

NOT TO SCALE



B TYPICAL RETORT BUILDING DEBRIS MONOFILL CAP SECTION

NOT TO SCALE



SECTION B-B: TYPICAL SECTION

APPROXIMATE SCALE: 1" = 5' HORIZONTAL (OR AS SHOWN), 1" = 5' VERTICAL

NOTES:

1. BOTTOM LINER DIMENSIONS 72.5'x 259'
2. TOP LINER DIMENSIONS 55'x 240'
3. BOTTOM WIDTH OF MONOFILL IS NOT SHOWN TO SCALE, DIMENSIONS AS SHOWN
4. ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL

BUREAU OF LAND MANAGEMENT 2002 REMOVAL ACTION	
MONOFILL #2 CROSS-SECTION B-B RED DEVIL MINE	
JOB NO: 26219358 DATE: 2/9/03	DRAWN: ARN/AR FILE: RED DEVIL FIG8.DWG
FIGURE 8	

TABLES

TABLES

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TABLE 1

PROJECT TIMELINE
RED DEVIL MINE DEBRIS CONSOLIDATION

6/3/02 – Arrive at Red Devil for debris consolidation
Begin clearing and provide access to mine buildings

6/6/02 – Barge Arrival
Offload barge
Stage Ecobond arsenic treatment along access road to site
All other equipment to general mine area
Send mechanic to Bethel to inspect three potential loaders for rent

6/9/02 – Preliminary survey for monofill locations
Continue clearing
Silt fence placement
Begin excavation of inert debris monofill
WEC CIH arrives
WEC exposure sampling indicated Level D PPE acceptable
Clear hopper legs
Red Devil Creek debris removal

6/11/02 – Installation of TECP/SWPPP engineering controls
Haul road maintenance
BLM scope alteration for non-removal of powder house for removal of newly identified house'2A'
WEC does assessment of potential hazards at site (e.g., asbestos, lead, etc., on house '2A')

6/12/02 – Arrival of new 950G loader on C130 aircraft
Assembly of loader

6/13/02 – Additional debris found south of shop pad (big steel, rotary kiln looking material)
Creek debris removal
Broke through McCally Creek Bridge with loader doing some road maintenance and culvert installation
Removal of newly found debris approximately 200-foot upstream

6/19/02 – Demolition of power plant
Cutting of piping and disassembly of generator engines
Steel debris around ore hopper cut and removed
Demolition completed at shop building, cleaned to top of slab
Demolition of House 2, 2a, and 3 and place debris in inert debris monofill
Segregate and gather all lead components from all buildings and drum for off-site disposal

6/20/02 – Determined XRF was not calibrated for segregating lead debris from suspect houses
Collect representative debris samples from suspect houses for off-site TCLP analysis
Continued excavation of inert debris monofill cell
Scattered debris cleanup around mine site
Discovered miscellaneous debris and makeshift dump behind House 2, cleared and removed to inert cell

6/21/02 – Excavate inert additional area for inert debris monofill cell
Fabricate retort kiln brick bath out of dump truck bed by placing impermeable liner material in bed

TABLE 1

PROJECT TIMELINE
RED DEVIL MINE DEBRIS CONSOLIDATION
(CONTINUED)

6/22/02 – Removal of materials at Gravel Storage Pad including lots of heavy mining equipment and parts
Pipe cutting and empty drum crushing
TCLP samples sent off-site for analysis at laboratory
XRF additional brick material located at Gravel Storage Pad, none were found to have elevated readings
Excavated inert debris monofill cell to the north (deep cut)

6/24/02 – Houses 5, 6, and 7 demolished and debris placed in inert debris monofill cell
Empty drums from power plant hauled, crushed, placed in inert cell
Wood outhouse demolished in place
Miscellaneous materials from Gravel Storage Pad removed to appropriate debris cells

6/25/02 – Finish clearing Gravel Storage Pad, with the exception of some bricks
Collect additional Gravel Storage Pad brick XRF readings, all negative
Power plant demolished and disassembled generator engines (one placed in inert cell)
TCLP results on Houses 3 and 4, Mess Hall, and Warehouse return below TCLP standards
House 1 TCLP results still not received
House 4 demolished and placed in inert debris monofill
Received letter from BLM eliminating demolition of ore hopper from scope

6/26/02 – One final series of XRF readings on Gravel Storage Pad brick (all negative)
Ore hopper bench cleared/cleaned
Continue power plant demolition

6/27/02 – House 1 TCLP results returned from laboratory all are below TCLP standards
Power plant demolition complete and debris placed in inert debris monofill
Continue ore hopper bench debris removal
Miscellaneous debris removed from housing area demolition sites
Demolish and place Warehouse debris in inert debris monofill
Continue excavation of inert debris monofill
All Gravel Storage Area brick disposed in inert debris monofill

6/29/02 – Begin removal of debris from retort building area
Build containment berm around Gravel Storage Pad
Retort brick relocated to Gravel Storage Pad
Gathered remaining debris in woods down gradient of Gravel Storage Pad (mostly ductile pipe)

7/1/02 – Begin retort building debris removal to Gravel Storage Pad
Construct decontamination shack for retort demolition activities
Continue excavation of inert debris monofill cell
Debris down gradient of Mess Hall and Bunk House gathered

7/2/02 – Excavation of inert debris monofill completed
Relocate slag pile to Gravel Storage Pad for treatment
Retort brick segregated
Secure site for holiday weekend

7/7/02 – Arrive back to site, work resumes

TABLE 1

PROJECT TIMELINE
RED DEVIL MINE DEBRIS CONSOLIDATION
(CONTINUED)

7/8/02 – Relocation of retort building debris to Gravel Storage Pad
XRF readings collected to see if certain large steel components could be cut (hot)
Began demolition of concrete troughs and sidewall footers at retort building

7/9/02 – Continue retort building debris removal
Demolished above grade portions of retort building foundation
Application of Ecobond mercury into slab cracks and on concrete (approximately 100 gallons)

7/10/02 – Relocate all Ecobond arsenic treatment materials to power plant area
Begin haul of inert cell spoils to build hot cell grade and berms
6 tons Ecobond arsenic applied to subgrade soils at retort building debris monofill cell
BLM suggests treatment of retort building debris be completed within retort building debris cell

7/11/02 – Finish construction and sweeten subgrade and berms at retort building debris monofill cell
Initiate treatment of process tailings used for construction of retort cell with Ecobond arsenic
Approximately 45 feet of berms to south-west end of cell were constructed with treated tailings

7/12/02 – Begin geotextile and geomembrane layout and weld (2 geomembrane seams, 3 pieces)

7/13/02 – Complete layout and welding of geomembrane and geotextile for entire bottom liner of retort cell
Mess Hall and Bunk House demolition continues

7/15/02 – Haul Ecobond arsenic treated tailings to retort building debris monofill cell for base lift
Begin Ecobond mercury treatment of segregated debris at Gravel Storage Pad
Haul Ecobond treated material to retort building debris monofill cell
Treat and stockpile tailings with arsenic Ecobond for retort building debris monofill cell

7/17/02 – Finish retort building debris treatment and placement in retort building debris monofill
Used all remaining Ecobond mercury treatment on debris in retort building debris monofill cell
Begin final lift of Ecobond arsenic treated tailings in retort building debris monofill cell

7/22/02 – Backfill of inert debris monofill
Cleanup of extraneous debris

7/23/02 – Finish retort building debris monofill cell final lift with design crown
Retort building debris is located from north end to 65 feet of south end
Gradual slope built from final berm at south end of debris to south end of retort cell

7/25/02 – Geotextile and geomembrane lay out and welding of panel seams begins
Steam clean bottom liner flap to be welded for encapsulation

7/28/02 – Welding and extrusion of entire liner completed
Begin backfill for cap

7/30/02 – Final grade and compaction of retort building debris monofill cap
Drainage ditches excavated at retort building debris and inert monofill cells
Revegetate inert debris monofill cell cap
8/1/02 – Demobilize

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TABLE 2

MONOFILL WASTE TYPES AND QUANTITIES
RED DEVIL MINE DEBRIS CONSOLIDATION
RED DEVIL , ALASKA

MONOFILL #1			
Total Monofill #1 Debris Volume:	4,400	Cubic Yards	Note[1]
Total Monofill #1 Volume including Soil Cap:	5,680	Cubic Yards	
	Quantity in Tons [2]	**Quantity in Cubic Yards [3]**	
Industrial Solid Waste	0	0	
Drilling Waste	0	0	
Municipal Solid Waste	0	0	
Inert or C&D Waste	4,180	4,400	Note[1]
Asbestos (RACM)	0	0	
Sewage Solids	0	0	
Other - Mine Tailings (from west side of mine)	1,722	1,275	Note[4]

MONOFILL #2			
Total Monofill #2 Debris Volume:	930	Cubic Yards	Note[1]
Total Monofill #2 Volume including Soil Cap:	4,153	Cubic Yards	
	Quantity in Tons [2]	**Quantity in Cubic Yards [3]**	
Industrial Solid Waste	See Detail Below	See Detail Below	Note[5]
Retort Furnace Slag	8	5	
Retort Furnace Bricks	32.5	20	
Treated Process Mine Tailings (east side of mine)	4,351	3,223	Note[4]
Retort Building Debris	1,000	905	Note[1]
Drilling Waste	0	0	
Municipal Solid Waste	0	0	
Asbestos (RACM)	0	0	
Sewage Solids	0	0	

Notes:

Note[1] *Debris volume inclusive of soil used for void filler and for intermediate soil cover during placement of debris*

Note[2] Tonnage based on average density estimate of debris placed into monofill

Note[3] Volume estimated based on final survey and visual assessment during placement of debris

Note[4] Mine tailings used as monofill base and capping material. Monofill #2 proccess mine tailings treated with Ecobond arsenic encapsulant. Tailings used for construction of Monofill #1 taken from west side of mine site and were not treated. Due the high concentrations of inorganics in the mine tailings, the material would meet the definition of "polluted soil" in 18 AAC 60. Management of the high concentrations of site-wide inorganics to be completed under the CERCLA assessment and remediation process that is ongoing at the mine site.

Note[5] Debris at Monofill #2 was treated with Ecobond mercury encapsulant. The tonnage and volume of industrial waste includes slag, bricks, retort building debris, and treated mine tailings.

APPENDIX A

APPENDIX A

METALS TREATMENT TECHNOLOGY TREATABILITY STUDY

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TREATABILITY STUDY

Red Devil Mine
Red Devil, Alaska

PREPARED FOR:

Wilder Construction Company (WCC)

April 2002

MT2
METALS TREATMENT TECHNOLOGIES

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EXECUTIVE SUMMARY

A characterization of the site was completed so that appropriate site samples could be collected for a sample characterization study and subsequent lab stabilization. The lab stabilization study successfully demonstrated the stabilization of Arsenic (As) and Mercury (Hg) in these samples to RCRA TCLP criteria using MT² EcoBond™ additives.

Sample Characterization

Twenty-seven samples were collected from various locations on the Red Devil site. The samples were collected to represent all the RCRA waste stream types. These samples were to support the treatability study.

Totals analyses of the 27 samples by X-ray fluorescence (XRF) show that these samples contain the following:

- Significant arsenic levels. The highest level is 8.2% (82,000 mg. /kg.); the average level is 0.72% (7,200 mg. /kg.).

- Low mercury levels. The highest level is 0.2% (2,000 mg. /kg.) and the average level is 0.036% (360 mg. /kg.).

- Low lead levels. The highest level is 0.044% (440 mg. /kg.) and the average level is 0.01% (100 mg. /kg.).

The one wood sample and the three brick samples were studied in detail and show the following:

- Most of the lead and mercury contamination is on the surface; however, it does penetrate into the brick.

- Most of the arsenic is on the surface of the wood sample.

- The arsenic is only on the surface of two of the bricks and throughout one brick.

TCLP analyses show that seven samples failed for arsenic. Failed samples came from near the retort, one near the chemical building, and one near the mess hall/bunk house. Three samples failed for mercury, all of them near the retort area. No samples failed for TCLP lead.

A good correlation exists between TCLP arsenic and total arsenic. A total arsenic concentration greater than 0.38% should fail the TCLP. On average, 2.5% of the total arsenic leached in the TCLP. Samples greater than 502 mg. /kg. failed the TCLP for Hg.

The MT^2 treatability study confirms that EcoBond™ formulas are effective in treating the Red Devil mine waste. A factor of safety has been incorporated to meet the site treatment criteria.

Chemical Stabilization

The goal of MT^2's laboratory treatability study was to confirm the most cost-effective EcoBond™ formula to treat the eight expected Red Devil Mine waste streams to below RCRA standards. This laboratory treatability study successfully developed cost-effective formulas to treat the metals of concern to below RCRA standards.
The major highlights from this study are:

- Seven of the samples collected by MT^2 from the site failed the TCLP for arsenic and two for mercury. None of the site samples failed the TCLP for lead. One of the analytical samples failed the TCLP for arsenic and mercury.

- Six of the samples that failed the arsenic TCLP were stabilized with EcoBond™ As-Solid.

- Application of EcoBond™ As-Liquid was as effective as the solid form.

- Two on-site samples that failed the TCLP for both arsenic and mercury were stabilized for both metals by the addition of EcoBond™ As and EcoBond™ Hg added sequentially. One of these samples was stabilized for arsenic and mercury with the addition of EcoBond™ As and EcoBond™ Hg, simultaneously.

- The two on-site mercury samples and the one "analytical" sample were RCRA-stabilized with EcoBond™ Hg-Liquid.

- A site sample was spiked with a lead mineral to demonstrate that lead in the soil samples can be stabilized with EcoBond™ Pb-Solid.

The MT^2 treatability study confirms that EcoBond™ formulas are effective in treating the Red Devil mine waste. A factor of safety has been incorporated to meet the site treatment criteria.

1.0 INTRODUCTION AND BACKGROUND

The Red Devil mine and processing mill in Red Devil, Alaska is earmarked for remediation. This facility mined mercury ore (cinnabar) and converted the mercury sulfide to the metallic state in an on-site retort. The mine and mill have been shut down since 1981 and since then, the site has been the subject of several environmental studies summarized in a recent Harting ESE report "Conceptual Solid Waste Management Plan" dated 4/30/01.

Metals Treatment Technologies, LLC (MT^2) of Wheat Ridge, Colorado has been retained by Wilder Construction Company (WCC) to conduct an on-site and laboratory characterization of samples from many locations on the site. This characterization was then the basis for completing a laboratory program designed to chemically stabilize the RCRA metals arsenic, mercury, and lead to TCLP criteria. The results from the laboratory program will then be used to design an on-site remediation program.

This report includes the on-site characterization, laboratory sample characterization, laboratory treatability/stabilization results, and final treatability approach, which will delineate the remediation chemicals and application mode. The on-site remediation will begin in the spring of 2002.

2.0 FIELD SAMPLING

2.1 Objective

Field sampling activities were performed for the purpose of collecting samples of the various media in order to provide representative samples for the conductance of a laboratory treatability study on the waste streams.

2.2 Site Description

Paul DeWitt of MT^2 visually inspected the site on October 16, 2001. Paul located points of concern and became familiarized with the site's layout and physical and chemical hazards.

Located on a hillside, the retort area is about 150 yards from the site's main entry. At the top of the hill, there is a silo containing debris, slag, cinnabar ore, brick, and steel framing. A 30-foot drop off (from the silo to the foundation of the retort furnace and distilling chamber area) is constructed of slate/rock containing both cinnabar and arsenic in its elemental form. The retort foundation is located about 40 feet from the base of the hillside. The foundation is approximately 160 feet long, with approximately one-third of the foundation having a width of 12 feet. The remaining portion of the foundation is about 30 feet and has an aboveground footer of about 36 inches. Both sides contain 2-foot concrete risers/platforms.

A pile of contaminated furnace slag mixture is located at the northwest corner of the retort building foundation. North of the retort building foundation is a debris pile 60 feet long, 25 to 30 feet wide, and about 12 feet high. This debris pile contains the remains of the retort furnace, wood structure/framing, steel framing/support beams, brick, piping, tin siding, and fiberboard/plywood.

Northeast of the retort foundation (at about 30 feet) are the remains of an old chemical storage building. East of the storage building is the old power plant (about 150 yards up the hill). Northwest (about 100 yards from the retort foundation) is the settling pond area. Across from the settling pond (about 200 yards) is an old gravel storage pad with drums, motors, transformers, and old housing furniture and appliances. The Red Devil Creek is north of this area.

The main area contains an old warehouse, warehouse annex, shop pad (laboratory), hoist shack, dry room, shop building, and a debris pile (about 40 feet long, 20 feet wide and 10 feet high). The debris pile contains mostly wood, tin, rock, and some metal scraps. This site contains numerous areas that have slate/rock that has lifted above ground level.

To the southwest of the main entry are the mess hall and housing areas. These areas are overgrown with vegetation and marked with yellow tape labeled "Caution Asbestos Do Not Enter." The buildings, many of which are constructed into the hillside and on stilts, are decaying and falling down.

2.3 Total Metals Analyses by X-Ray Fluorescence

This section presents X-ray fluorescence (XRF) readings taken (with a field-portable Niton instrument) on various waste materials at different site locations. The Niton instrument determines the total metal concentration in a sample. This information was then used to develop a strategic sampling plan. The data from the site is presented in **Table 1**. Photographs showing the site location where the Niton readings were taken (yellow dots) and where the actual samples were taken (red dots) are presented in **Figures 1 and 2.**

A Niton 700 Series XRF instrument was used to take the readings. Three samples of known metal concentrations were used to ensure the instrument was calibrated and operating accurately. The Niton readings presented in Table 1 are subdivided into four areas as follows:

- Retort area
- Non-soil samples
- Soil samples
- Housing area

A description of the actual sampling location is also presented in **Table 1**. Noteworthy information for the sample areas is summarized below:

- Niton readings #10 and #11 are readings of the dust generated by core drilling of the south-end base of the retort building foundation. These samples were requested both by URS and BLM for two reasons:

    1. During drilling operations, URS was monitoring air contamination and the monitor was showing very high readings for arsenic and mercury.

    2. BLM requested that a visible inspection be taken under the retort building foundation. Because of the high airborne readings, drilling operations were stopped and a visible inspection of the soil could not be obtained.

- Niton reading #11 was a retake of reading #10. After reviewing the Niton results, URS and BLM did not know why we were getting high readings. URS requested that the drilling be stopped because of the airborne reading. BLM agreed and we were unable to visually inspect the soil under the retort building foundation.

- Niton readings #17 and #18 are test samples for recalibration of the instrument and Niton reading #18 was within calibration specifications.

- Niton reading #23 was taken from the debris pile of a piece of steel framing. The steel was too big to cut, so only a Niton reading was taken.

- Since the housing area was posted with asbestos warnings, entry points were limited. The technician only entered accessible areas where one could reach into the buildings without crossing over into any posted areas. Structures were decaying and unstable.

- Niton readings from the housing areas were high in arsenic and low in lead. This is what the site plan was looking for.

2.4 Sample Collection

A list of the samples that were physically taken from the site is presented in **Table 2.** Each sample was assigned a site sample number and an MT^2 laboratory number. The MT^2 laboratory number is used throughout the report to identify each sample. Each sample is also correlated to a waste type. At least one sample of each waste type was taken. Chain-of-custody (COC) sheets, which identify the MT^2 field sampling number, the MT^2 laboratory number, and sample description are on file in the MT^2 Wheat Ridge, Colorado laboratory. A summary of each sample collected from the site is presented in **Table 3.**

TABLE 1
Totals Metals Analyses by XRF of Site Locations and Site Samples

Sample Type (2)	Niton Sample #	Concentration, Thousand ppm or g./kg. (1)														
		As	Cr	Co	Cu	Fe	Pb	Mn	Hg	Mo	Ni	Rb	Se	Sr	Zn	Zr
Retort Area	5	7.2				10.2			0.3			0.04		0.45	0.37	0.02
Retort Area	6	7.7				16.6			0.28	0.01		0.08		0.6	0.4	0.03
Retort Area	7	4.1	2.2	2.3	1.1	12.2		5.9	1	0.04	1.6	0.1	0.6	0.09	3.6	0.03
Retort Area	8	18.2		1.2		15.5			11.1					0.23		
Retort Area	9	2				12						0.08		0.11	0.45	0.03
Retort Area	10	0.06				11						0.05		0.1		
Retort Area	11	0.08				11.1						0.04		0.01		0.02
Retort Area	12	0.21			0.2	0.3			0.02			0.01		0.01	0.06	
Non-Soil	13	1.3				6.1	2.4		0.82	0.01		0.03		0.04	0.4	
Non-Soil	14	0.53	3.1	0.64	64.3	10.6			0.06	0.02	0.04	0.06		0.05		0.15
Non-Soil	15	23.1		0.78		84.8			37.7		4.2	0.51	0.4	0.17	0.88	0.06
Non-Soil	16	1.8				19.6	0.17		0.24			0.04		0.07	0.25	
Non-Soil	19	4.5				21.5			0.11			0.09		0.31		0.06
Non-Soil	23	0.3	21		1.1	17.4		85		0.05						
Soil-Actual Sample(#1A)	20	8.7				24.2			3.7			0.17		0.25		
Soil-Actual Sample(# 2)	21	11.6				80.1					15.3			0.3		0.05
Soil-Actual Sample(# 5)	22	0.85				20.2	0.12			0.02		0.09		0.08		0.06
Soil-Actual Sample(# 12)	25					0.25									0.09	
Soil-Actual Sample(# 13)	26	1.8	12		0.81	14.1		65		0.07						
Soil-Actual Sample(# 14)	27					0.14									0.03	
Housing Areas	28	0.03	0.3			9.5	0.04							0.04		
Housing Areas	29					1.2										
Housing Areas	31	4.9				23.3	0.18					0.08		0.18		0.04
Housing Areas	32			2.4											12	
Housing Areas	33	2				18	0.95		0.16			0.06		0.13	0.2	0.06
Housing Areas	34	1.3				15.2			0.07	0.02		0.05		0.11		0.04
Housing Areas	35	0.2				20.8				0.07	30	0.08		0.05		0.05
Housing Areas	36	0.18				27.3				0.02	19	0.09		0.06		0.1
Housing Areas	37	0.34				12						0.05		0.08	0.06	0.05
Housing Areas	38	1				17.5			0.07	0.02	0.62	0.07		0.11	0.1	0.1
Average		**4**	**7.72**	**1.46**	**13.5**	**18.37**	**0.64**	**51.97**	**3.974**	**0.03**	**10.11**	**0.09**	**0.5**	**0.15**	**1.35**	**0.06**

All blank cells indicate that no reading were recorded.

Notes: (1.) All concentration values are in thousands of parts per million which is g/kgs.

(2.) The number in parenthesis for "Soil-Actual Sample" is the number of the actual sample taken from the site. The Niton reading number of these samples has a different Sample # than the actual sample #. Not all of the actual samples have Niton readings.

(3.) Any missing Niton numbers are not really samples but are calibration readings and therefore not included.

TABLE 1 (Cont'd)

Total Metals Analyses by XRF of Site Locations and Site Samples

Niton Reading #	Sample Area	Sample Location
5	Retort	Surface soil at southwest end of the retort building foundation
6	Retort	Southeast corner of the retort building foundation
7	Retort	East side of the retort building foundation and south of the retort slag pile
8	Retort	North end of the retort building foundation between the foundation and the retort debris pile
9	Retort	West end and center of the retort building foundation
10	Retort	Dust generated by core drilling of the south end base of the retort building foundation
11	Retort	Retake of #10
12	Retort	18 feet East of the retort building foundation just north of the old chemical storage building
13	Retort Foundation	Piece of wood on middle west end of the retort foundation debris pile
14	Chemical Building	Surface of a contaminated brick from under the old chemical building
15	Chemical building	Under the old chemical building
16	Chemical Storage Building	Wood debris pile east of the chemical storage building and just before the power building approximately 50 feet up the road and from the retort building foundation
17 & 18	Test samples - Calibration	Test samples for re-calibration of instrument. Reading #18 was within calibration specs.
19	Retort Area Slag Pile	Slag pile generated from the retort furnace operations located on the northeast side of the retort building foundation, middle of the pile and between the hillside and the foundation
23	Debris Pile	Debris pile of a piece of steel framing
28	Mess Hall/Bunkhouse	West side of the inside wall of the Mess Hall/Bunk house
29	Mess Hall/Bunkhouse	Floor (middle) of the Mess hall/Bunkhouse
30	Housing	Inside wall at the west end of House #1
31	Housing	Floor approximately 5 feet inside of door way of House #2
32 & 33	Housing	Debris around the foundation of House #2
34	Housing	North side wall on the inside door way of House #3
36	Housing	North sidewalk on the inside and 5 feet to the right of the hallway in House #4
37	Housing	Floor covered with debris at the west end of House #4
38	Housing	North end of the center wall at House #5

TABLE 2
Red Devil Site Sample Description

Site Sample No.	MT2 Sample No.	Waste Type	Sample Description
1	10--5	Retort Bldg. Foundation	Drilling dust from Foundation-Retort.Drilling by URS
1A	10--6	Retort Furnace Slag	Soil-like slag sample.NE end of retort. URS RDSlag-01
2	10--7	Retort Building Debris	Soil from under retort bldg. Foundation+Debris north of foundation URS RD Slag-02
3	10--8	As-Hg Impacted Soil	Material from hillside, HgS ore & slag
4	10--9	Pb-Impacted Building Debris	Wood, middle of debris pile
5	10--10	Retort Building Debris	Scrapings from inside of cast iron piping in debris pile
6	10--11	Retort Furnace Slag	Slag, purple color
7	10--12	As-Hg Impacted Soil	Soil from As-Hg Impacted Soil
8	10--13	As-Hg Impacted Soil	From Fuel Tanks, north
9	10--14	As-Hg Impacted Soil	Soil, down-gradient sample
10	10--15	Pb-Impacted Building Debris	Soil debris pile along road to retort
11	10--16	Pb-Impacted Soil	Soil midway from retort ops and settling pond
12	10--17	Pb-Impacted Soil	Soil near old chemical storage bldg.
13	10--18	Pb-Impacted Soil	Soil, center of sedimention pond
14	10--19	Warehouse	Soil, for Warehouse, west side
15	10--20	As-Hg Impacted Soil	Soil, near shop debris and shaft
16	10--21	Pb-Impacted Soil	Soil, Pb impacted between old chemical /powerhouse bldgs.
17	10--22	Retort Building Debris	Soil, slag and dump area, down-gradient (PCB's?)
18	10--23	As-Hg Impacted Soil	Soil, down-gradient SE of pond
19	10--24	Retort Building Debris	Soil, under fines old retort furnace
20	10--25	Mess Hall Bunkhouse	Soil, downgradient messhall/bunk
21	10--26	Houses	Soil, down-graident from House # 3
22	10--27	Houses	Soil, incl. Roof/floor debris betw. Houses # 5, 1
23	10--28	Refractory Bricks	Stored Brick from retort bldg. foundation
24	10--29	Refractory Bricks	Furnace brick from pile under chemical bldg., green
25	10--30	Refractory Bricks	Furnace brick down-gradinet of retort
Ore	10--31	Ore	Ore sample, orange from bank above retort /silo

3.0 SAMPLE CHARACTERIZATION IN THE LABORATORY

3.1 Objective

The objective of the laboratory characterization phase is to complete totals analyses (XRF) and TCLPs to determine which samples are most suitable for conducting the stabilization phase of the program. Specifically the program includes:

- Using the Niton XRF to determine the concentration of lead, arsenic, and mercury on the various samples.
- Preparing the samples, including blending to achieve homogenization.
- For the TCLP, reducing the sample to less than 3/8 inches and running untreated TCLPs on all samples for appropriate metals.

3.2 Sample Descriptions

Paul DeWitt of MT^2 visited the Red Devil mine site on October 16 and 17, 2001 and completed a site characterization. Paul collected 27 samples for the laboratory phase of the site characterization. The samples were collected on a wet day and consequently the samples were somewhat damp.

Table 3
Detailed Description of On-Site Sampling Locations

MT² Sample Number	Sample Site Location
MT² #10-5	Drilling dust, which was obtained for analysis as requested by URS.
MT² #10-6	The first actual soil sample taken from the slag pile at the northeast end of the retort building foundation. (Niton reading #20). The waste stream was the retort furnace slag, URS also sampled the same area with a cross-reference number 21RDSlag-01
MT² #10-7	Soil sample taken under the old retort furnace and debris pile at the north end of the retort building foundation. (Niton reading #21). URS also sampled the same area with a cross-reference number 21RDSlag-02
MT² #10-8	Cinnabar and arsenic. This is a sample of the material located on the bank of the hillside. The hillside is about 30 feet high and 90 feet long.
MT² #10-9	Soil sample was taken from the middle of the retort building foundation on the west side about 2 feet outward.
MT² #10-10	Soil sample taken from the inside of some of the piping used in the distilling operations. This is located at the north end of the debris pile (Niton reading #22).
MT² #10-11	Slag taken from the retort furnace.
MT² #10-12	Soil sample taken 18 feet north of the debris pile and 5 feet south of mining marker number FS008.
MT² #10-13	Soil sample taken 27 feet north of the debris pile and 5 feet south of mining marker number FS008 on an old mining road up the hill towards the diesel storage tanks.
MT² #10-14	Soil sample taken 10 feet north of mining marker number FS015.
MT² #10-15	Soil sample taken 15 feet west of mining marker number FS080 or about 35 feet from the northwest corner of the retort building foundation.
MT² #10-16	Soil sample taken 50 feet from mining marker FS080 and 100 yards above the settling pond.
MT² #10-17	Soil sample #12 (Niton reading #25) taken on the east side of the old chemical storage building 18 feet from mining marker number FS075.
MT² #10-18	Soil sample (Niton reading #26) taken at the settling pond.
MT² #10-19	Soil sample taken at the base of the steps on the east side of the warehouse building foundation. (Niton reading #27) Was also taken at the warehouse foundation steps.
MT² #10-20	Soil sample taken in the middle of the shop building, dry room, hoist shack, and debris pile.
MT² #10-21	Soil sample taken at the base of the road entering the old power plant building.
MT² #10-22	Soil sample taken at the entry of the old drum/equipment storage area. The sample location was at the entry road of the retort operations side.
MT² #10-23	Soil sample taken down gradient of the settling pond.
MT² #10-24	Soil sample taken under the debris pile and as close to the old retort furnace as possible
MT² #10-25	Soil sample taken down gradient of the old mess hall/bunkhouse.
MT² #10-26	Soil sample taken from the south side of the foundation of house #3.
MT² #10-27	Soil sample taken 25 feet west of house #5 in the middle between house #5 and house #1.

Approximately 0.5 to 2 pounds of each sample were collected, triple bagged and shipped to the MT² laboratory in Wheat Ridge, Colorado. The samples arrived safely and were logged in and assigned an MT² laboratory number.

A brief description of the site samples, the MT² laboratory sample number, and the waste type is presented in **Table 2**. Samples from all the waste types outlined in Table 5.1 of the Harding ESE Report dated 4/30/01 were received.

In addition to the site samples, a second grouping of samples was received. This group consisted of the analytical samples received from the WCC selected laboratory. The second group of samples was requested to secure additional samples that fail the RCRA TCLP for mercury and lead, since only three samples failed for mercury and no samples failed for lead. These samples are called "analytical" samples.

The analytical samples were logged in as MT^2 #10-32 through MT^2 #10-47 and assayed for total metals content by Niton XRF. A summary of all the data for the "analytical" samples is found in **Appendix A.**

The data shows that only one of the samples (MT^2 #10-32) was of interest as it contained an average of 0.4% mercury. The next highest sample contained 0.025% mercury and all the remaining samples were significantly lower. In fact sample MT^2 #10-32 was the sample highlighted in the analytical laboratory's chain-of-custody as having visible mercury. Many of the analytical samples showed higher levels of arsenic, with the highest arsenic level being 1.3% and the average total arsenic being 0.35%. Only sample MT^2 #10-32 showed any total lead and that value was low at 0.028%. All samples contained significant iron. A TCLP was completed of the untreated sample MT^2 #10-32. This sample failed the TCLP for arsenic and mercury. The TCLP assay is arsenic at 11.9 ppm and mercury at 5.7 ppm. Only this analytical sample was included in the arsenic and mercury stabilization program.

3.3 Total Metals Analyses of Collected Samples by XRF

3.3.1 Sample Preparation

All 27 samples arrived safely and in plastic bags. The soil, brick, and wood sample preparation procedures for the analyses by Niton XRF determinations are presented below.

- Soil and Soil-Like Samples - Blend in the bags and break up any lumps larger than 3/8 inches.

- Bricks (MT^2 #10-28, -29, -30) - Present as-received surfaces, filed (1/16 inch deep) surfaces, and inner sections of broken bricks to the X-ray beam.

- Wood (MT^2 #10-9) - Present as-received, filed (1/16 inch deep), and cut end-on surfaces to the X-ray beam.

3.3.2 XRF Determinations

The determination of total metal concentrations in site samples is necessary for correlation to TCLP results, health and safety needs, and planning a laboratory stabilization program. Total assays are normally determined by fixed laboratory, wet analytical techniques that are time consuming and can lead to inaccurate results because of the small sample that is run. As previously referenced, MT^2 used a field analytical technique called X-ray fluorescence (XRF). This technique determines total metal concentrations in samples without sample dissolution and is consequently faster. The instrument is a Niton Series 700 portable non-dispersive XRF unit.

Soil samples are measured with the Niton through the plastic sample bag. The Niton is pressed against a flat portion of the soil in the bag that is relatively rock-free and a 60-second reading taken. Usually two to four readings on different portions of the bag are conducted and the average is calculated. Readings for bricks and wood are taken by pressing the Niton against the side of the brick or the wood. The readings are hand recorded as well as ported into a PC. The Niton instrument can measure up to 25 elements. Detection limits for the Niton are influenced by recording time, matrix, and element. Typical soil matrix detection limits for a 60-second reading are as follows:

As - 100 ppm	Co - 700 ppm	Cu – 200 ppm
Pb -70 ppm	Ni – 500 ppm	Zn – 150 ppm
Hg -70 ppm	Fe - 1,000 ppm	Mn - 2,200 ppm

The XRF instrument calibration is conducted to ensure the instrument delivers the most accurate results possible. The Niton is initially self-calibrated (and every hour thereafter). In addition, a series of laboratory control samples (LCS) is completed to ensure that the instrument is operating correctly before site samples are run. All QA/QC data is maintained in MT^2 laboratory notebooks and computers.

The averages of the results for all site samples are presented in **Table 4**. The table lists the results for arsenic, mercury, and lead, which are the elements of most interest. Iron is typically the highest concentration metal for these samples; as well as the next two highest concentration elements. The results are presented as ppm or mg/kg which can be converted to percentages by moving the decimal point four places to the right. Also listed is the natural pH of the sample. The RCRA TCLP pH method was used to measure the natural pH. This means to slurry 5 gms of sample in 96 mls of water and measure the pH with a glass electrode.

The data shows that the natural pH for most of the samples is in the neutral range (4.7 to 7.5) and the average for the 27 samples is 6.4. Only the drilling dust from the retort foundation (which may contain caustic Portland cement) was significantly out of this range with a pH of 11.8.

The totals assays show that there is significant arsenic present on the site. The highest sample is 8.2% and the average for the 27 samples is 0.72%. The total amount of mercury on site is rather low as the highest is 0.2% and the average is 0.036%. The lead totals are also low as the highest is 0.044% and the average of the 27 samples is 0.01%. All samples contain iron with the highest level being 3%. Many of the samples contain Mn.

Because four samples were non-soil (bricks and wood), they were examined in more detail. XRF readings of all sides were recorded and the results averaged to give an indication of the surface metals content. In addition, the sides were filed down (1/16 inch) and reread to determine the amount of total metal on the surface. A summary of this data is presented in **Table 5**; detailed results are presented in **Appendix B**.

TABLE 4
Red Devil Total Analyses for Lab Samples

MT2 Lab Sample No.(1)	Waste Type	Sample Description	Natural pH (2)	Totals Assay (Niton),ppm or mg./kg. (3)					
				As	Hg	Pb	Fe	Other(4)	Other(4)
10--5	Retort Bldg. Foundation	Drilling dust from Foundation-Retort.Drilling by URS	11.82	76.1	24.55	<DL	12.5K	Sr - 152	
10--6	Retort Furnace Slag	Soil- like slag sample.NE end of retort. URS RDSlag-01	4.76	7530	1955	<DL	25.2K	Cr - 6380	Ni - 3210
10--7	Retort Building Debris	Soil from under retort bldg. Foundation+Debris north of foundation	6.32	8270	970.5	<DL	15.0K	Ni - 1220	Zn - 379
10--8	As-Hg Impacted Soil	Material from hillside, HgS ore & slag	6.59	2605	1247.5	120	15.4K	Mn - 9.8K	
10--9	Pb-Impacted Building Debris	Scrapings from inside of cast iron piping in debris pile	6.16	1008.5	109.35	111.3	24.0K	Zr - 166	Sr - 105.8
10--10	Retort Building Debris	Wood, middle of debris pile	5.8	2435	82.6	199	21.0K	Zn - 132	
10--11	Retort Furnace Slag	Slag, purple color	6.68	1610	111.5	50.5	12.2K	Sr - 245	Zn - 62
10--12	As-Hg Impacted Soil	Soil from As-Hg Impacted Soil	6.2	413.5	27.2	29.4	16.5K	Mn - 1069	Zr - 111
10--13	As-Hg Impacted Soil	From Fuel Tanks, north	6.3	487.5	60.5	35.5	14.6K	Mn - 1045	
10--14	As-Hg Impacted Soil	Soil, down-gradient sample	5.4	503	63.55	41.1	16.1K	Mn - 751	
10--15	Pb-Impacted Building Debris	Soil debris pile along road to retort	5.09	197.5	<DL	21	12.1K	Mn - 759	
10--16	Pb-Impacted Soil	Soil midway from retort ops and settling pond	4.75	319.5	23	22.6	17.4K	Zr - 147	
10--17	Pb-Impacted Soil	Soil near old chemical storage bldg.	7.09	4570	74.85	<DL	20.9K	Zn - 293	Sr - 198
10--18	Pb-Impacted Soil	Soil, center of sedimention pond	6.33	3435	241	<DL	20.5K	Mn - 1700	
10--19	Warehouse	Soil, for Warehouse, west side	6.55	2270	135.5	325	17.3K	Mn - 1098	
10--20	As-Hg Impacted Soil	Soil, near shop debris and shaft	7.11	1625	68.65	33	17.1K	Mn - 1815	
10--21	Pb-Impacted Soil	Soil, Pb impacted between old chemical /powerhouse bldgs.	7.19	1560	63.1	<DL	18.5K	Mn - 645	
10--22	Retort Building Debris	Soil, slag and dump area, down-gradient (PCB's?)	6.52	2505	426	173	17.7K	Mn - 1300	
10--23	As-Hg Impacted Soil	Soil, down-gradient SE of pond	7.02	2690	502.5	<DL	18.0K	Mn - 1780	
10--24	Retort Building Debris	Soil, under fines old retort furnace	6.23	82200	250.5	<DL	29.5K	Mn - 2450	
10--25	Mess Hall Bunkhouse	Soil, down-gradient messhall/bunk	6.17	3815	204.5	448.5	12.6K	Mn - 554	
10--26	Houses	Soil, downgraident form House # 3	6.06	2560	128.5	34	17.0K		
10--27	Houses	Soil, incl. Roof/floor debris betw. Houses # 5, 1	6.87	196.5	68.35	31.2	5305	Mn - 502	Zn - 73
10--28	Refractory Bricks	Stored Brick from retort bldg. foundation	6.22	84.8	<DL	30	9.4K	Cu - 666	Sr - 79.7
10--29	Refractory Bricks	Furnace brick from pile under chemical bldg., green	7.49	1904	64.9	59.5	7700	Sr - 510	Cu - 382
10--30	Refractory Bricks	Furnace brick down-gradinet of retort	3.8	44300	1785	<DL	15.9K	Sr - 399	Mn - 2400
10--31	Ore	Ore sample, orange from bank above retort /silo	6.25	14400	264.5	<DL	11.3K	Mn - 965	
		AVERAGES	6.40	7169	358	104			

(1.) This is the sample number assigned to the sample in the MT2 laboratory.
(2.) The natural pH is measured by slurrying 5 gms. of the sample in 96 mls. of water and measureing the pH. This is the US EPA SW-846 TCLP procedure.
(3.) These assays are total metal concentrations in the sample as measure by a portable x-ray instrument (Niton, Series 700); they are the average of at least two measurements taken through the plastic sample bag.

Soil samples were blended in the bag and any lumps broken up before the measurement.

The ore sample (MT2 10--31) was crushed in the bag to minus 3/8 inch in the bag

Slices of the brick samples (MT2 10--28,-29,-30) were taken from the middle of the brick and crushed to minus 3/8 inch in a plastic bag.

The wood sample (MT2 10--10) was reduced minus 3/8 inch pieces with a saw and chisel.

(4.) The "Other" columns contain Niton assay data for the highest and next highest total metals concentrations in the sample.

Table 5
Totals Analyses of Bricks and Wood
(ppm)

MT² Lab No.	Waste Type	Description and Location	Not Scraped				Scraped			
			As	Hg	Pb	Fe	As	Hg	Pb	Fe
10-10	RBD	Wood in the middle of the debris pile	670	111	37	5.5K	160	34	11	0.9K
10-28	RB	Retort building foundation	1.4K	1214	64	8.8K	1404	386	68	7.3K
10-29	RB	Under chemical building	25.9	21	13	9.8K	69	86	28	9K
10-30	RB	Down-gradient of retort	56.7K	5.4K	0	17.1K	10.7K	2K	0	10.2K

RBD = Retort Building Debris; RB = Refractory Bricks

The data shows that scraping the wood removed much of the arsenic, mercury, lead and iron, indicating that much of the metals contamination is on the surface. For the bricks from near the retort, it appears the much of the mercury is on the surface, but for arsenic it's not as clear cut. For the brick from the chemical building it appears that the metal is scattered throughput the brick.

To get an accurate account of how contaminated the inside of the wood and brick are, they were split and the total metals determined on the exposed section. The data is presented in **Table 6**.

Table 6
Newly Exposed Wood and Brick Total Assays

MT² Lab No.	Waste Type	Description and Location	Exposed Section Assays (ppm or mg/kg)			
			As	Hg	Pb	Fe
10-10	RBD	Wood, middle of debris pile	481	0	0	4.1K
10-28	RB	Retort bldg. foundation	179	29	89	5.3K
10-29	RB	Under chemical building	0	0	0	8.2K
10-30	RB	Down-gradient of retort	12.5K	0	0	5.4K

RBD = Retort Building Debris; RB = Refractory Bricks

The exposed section data shows that no mercury or lead is present inside the wood; however, arsenic is. For the bricks, the data shows that very little mercury or lead are present within them. All of the bricks show some amount of arsenic.

3.4 TCLP Data

3.4.1 Sample Preparation and Procedures

The sample preparation procedures for the TCLP are:

- Soil and Soil-Like Samples - Blend in the bags and break up any lumps larger then 3/8 inches.

- Wood (MT^2 #10-10) - Saw into ¼-inch sections and break-up with a chisel to pieces less than 3/8 inches. This is required by the TCLP procedure and would not necessarily be stabilized in the field in this way.

- Bricks (MT^2 #10-28, -29, and -30) - Score and slice off a ½-inch section and crush with a hammer in a plastic bag to less than 3/8 inches. This technique generates a cross section sample of the brick.

The EPA 1311 TCLP is incorporated by reference and can be reviewed at the following Internet link http://www.epa.gov/epaoswer/hazwaste/test/pdfs/1311.pdf

The TCLP was run on all 27 samples and the corresponding data is found in **Table 7**. Detailed TCLP data is provided in **Appendix C**. The RCRA TCLP pass/fail criteria for the filtrate concentration are lead at 5 ppm, arsenic at 5 ppm, and mercury at 0.2 ppm.

TABLE 7
TCLP Data for Lab Samples

MT2 Lab Sample No.(1)	Waste Type	Sample Description	TCLP Assays, mg./L.(2)			
			As	Hg	Pb	Pass/Fail
10--5	Retort Bldg. Foundation	Drilling dust from Foundation-Retort.Drilling by URS			0.20	
10--6	Retort Furnace Slag	Soil- like slag sample.NE end of retort. URS RDSlag-01	**10.8**	**6.09**	0.00	**Fail-As/Hg**
10--7	Retort Building Debris	Soil from under retort bldg. Foundation+Debris north of foundation	**14.6**	**0.26**	0.30	**Fail-As/Hg**
10--8	As-Hg Impacted Soil	Material from hillside, HgS ore & slag	<0.5	0.015	0.00	
10--9	Pb-Impacted Building Debris	Scrapings from inside of cast iron piping in debris pile	2.0	0.15	0.50	
10--10	Retort Building Debris	Wood, middle of debris pile	3.0	0.17	1.10	
10--11	Retort Furnace Slag	Slag, purple color	1.5	0.02	0.70	
10--12	As-Hg Impacted Soil	Soil from As-Hg Impacted Soil	ND	ND	0.20	
10--13	As-Hg Impacted Soil	From Fuel Tanks, north	ND	0.043	0.30	
10--14	As-Hg Impacted Soil	Soil, down-gradient sample	ND	<0.01	0.30	
10--15	Pb-Impacted Building Debris	Soil debris pile along road to retort	ND	0.008	0.30	
10--16	Pb-Impacted Soil	Soil midway from retort ops and settling pond	ND	ND	0.30	
10--17	Pb-Impacted Soil	Soil near old chemical storage bldg.	**10.6**	<0.01	0.00	**Fail-As**
10--18	Pb-Impacted Soil	Soil, center of sedimention pond	4.0	<0.01	0.60	
10--19	Warehouse	Soil, from Warehouse, west side	**5.5**	0.03	0.70	**Fail-As**
10--20	As-Hg Impacted Soil	Soil, near shop debris and shaft	<0.5	<0.01	0.00	
10--21	Pb-Impacted Soil	Soil, Pb impacted between old chemical /powerhouse bldgs.	<0.5	<0.01	0.00	
10--22	Retort Building Debris	Soil, slag and dump area, downgradient (PCB's?)	4.5	0.03	0.00	
10--23	As-Hg Impacted Soil	Soil, down-gradient SE of pond	4.5	0.06	0.60	
10--24	Retort Building Debris	Soil, under fines old retort furnace	**32.0**	0.02	0.60	**Fail-As**
10--25	Mess Hall Bunkhouse	Soil, down-gradient messhall/bunk	**10.0**	0.01	0.60	**Fail-As**
10--26	Houses	Soil, down-graident form House # 3	4.0	<0.01	0.50	
10--27	Houses	Soil, incl. Roof/floor debris betw. Houses # 5, 1	1.0	<0.01	0.50	
10--28	Refractory Bricks	Stored Brick from retort bldg. foundation	<0.5	ND	0.10	
10--29	Refractory Bricks	Furnace brick from pile under chemical bldg., green	<0.5	ND	0.06	
10--30	Refractory Bricks	Furnace brick down-gradient of retort	**48.8**	**2.19**	0.07	**Fail-As /Hg**
10--31	Ore	Ore sample, orange from bank above retort /silo	2.0	0.015	0.09	

ND = Not Done

(1.) This is sample number assigned to the sample in the MT2 laboratory.

(2.) These assays are AA determinations of the TCLP filtrates. Values in bold fail the TCLP RCRA hazardous waste criteria which is (ppm): As 5; Pb 5; Hg 0.2.

TABLE 8
Red Devil Lab Characterization Data
--Arsenic Sort--

MT2 Lab	Waste	Sample Description	Natural	Totals Assay (Niton),mg./kg. (3)						TCLP Assays, mg./L.(4)			
Sample No.(1)	Type		pH (2)	As	Hg	Pb	Fe	Other(5)	Other(5)	As	Hg	Pb	Pass/Fail
10--24	Retort Building Debris	Soil, under fines old retort furnace	6.23	82200	250.5	<DL	29.5K	Mn - 2450		**32.0**	0.02	0.60	**Fail-As**
10--30	Refractory Bricks	Furnace brick down-gradinet of retort	3.8	44300	1785	<DL	15.9K	Sr - 399	Mn - 2400	**48.8**	**2.19**	0.07	**Fail-As/Hg**
10--31	Ore	Ore sample, orange from bank above retort /silo	6.25	14400	264.5	<DL	11.3K	Mn - 965		2.0	0.015	0.09	
10--7	Retort Building Debris	Soil from under retort bldg. Foundation+Debris north of foundation	6.32	8270	970.5	<DL	15.0K	Ni - 1220	Zn - 379	**14.6**	**0.26**	0.30	**Fail-As/Hg**
10--6	Retort Furnace Slag	Soil- like slag sample.NE end of retort. URS RDSlag-01	4.76	7530	1955	<DL	25.2K	Cr - 6380	Ni - 3210	**10.8**	**6.09**	0.00	**Fail-As/Hg**
10--17	Pb-Impacted Soil	Soil near old chemical storage bldg.	7.09	4570	74.85	<DL	20.9K	Zn - 293	Sr - 198	**10.6**	<0.01	0.00	**Fail-As**
10--25	Mess Hall Bunkhouse	Soil, down-gradient messhall/bunk	6.17	3815	204.5	449	12.6K	Mn - 554		**10.0**	0.01	0.60	**Fail-As**
10--18	Pb-Impacted Soil	Soil, center of sedimention pond	6.33	3435	241	<DL	20.5K	Mn - 1700		4.0	<0.01	0.60	
10--23	As-Hg Impacted Soil	Soil, down-gradient SE of pond	7.02	2690	502.5	<DL	18.0K	Mn - 1780		4.5	0.06	0.60	
10--8	As-Hg Impacted Soil	Material from hillside, HgS ore & slag	6.59	2605	1248	120	15.4K	Mn - 9.8K		<0.5	0.015	0.00	
10--26	Houses	Soil, down-graident from House # 3	6.06	2560	128.5	34	17.0K			4.0	<0.01	0.50	
10--22	Retort Building Debris	Soil, slag and dump area, down-gradient (PCB's?)	6.52	2505	426	173	17.7K	Mn - 1300		4.5	0.03	0.00	
10--10	Retort Building Debris	Wood, middle of debris pile	5.8	2435	82.6	199	21.0K	Zn - 132		3.0	0.17	1.10	
10--19	Warehouse	Soil, from Warehouse, west side	6.55	2270	135.5	325	17.3K	Mn - 1098		**5.5**	0.03	0.70	**Fail-As**
10--29	Refractory Bricks	Furnace brick from pile under chemical bldg., green	7.49	1904	64.9	59.5	7700	Sr - 510	Cu - 382	<0.5	ND	0.06	
10--20	As-Hg Impacted Soil	Soil, near shop debris and shaft	7.11	1625	68.65	33	17.1K	Mn - 1815		<0.5	<0.01	0.00	
10--11	Retort Furnace Slag	Slag, purple color	6.68	1610	111.5	50.5	12.2K	Sr - 245	Zn - 62	1.5	0.02	0.70	
10--21	Pb-Impacted Soil	Soil, Pb impacted between old chemical /powerhouse bldgs.	7.19	1560	63.1	<DL	18.5K	Mn - 645		<0.5	<0.01	0.00	
10--9	Pb-Impacted Building Debris	Scrapings from inside of cast iron piping in debris pile	6.16	1008.5	109.4	111	24.0K	Zr - 166	Sr - 105.8	2.0	0.15	0.50	
10--14	As-Hg Impacted Soil	Soil, down-gradient sample	5.4	503	63.55	41.1	16.1K	Mn - 751		ND	<0.01	0.30	
10--13	As-Hg Impacted Soil	From Fuel Tanks, north	6.3	487.5	60.5	35.5	14.6K	Mn - 1045		ND	0.043	0.30	
10--12	As-Hg Impacted Soil	Soil from As-Hg Imapcted Soil	6.2	413.5	27.2	29.4	16.5K	Mn - 1069	Zr - 111	ND	ND	0.20	
10--16	Pb-Impacted Soil	Soil midway from retort ops and settling pond	4.75	319.5	23	22.6	17.4K	Zr - 147		ND	ND	0.30	
10--15	Pb-Impacted Building Debris	Soil debris pile along road to retort	5.09	197.5	<DL	21	12.1K	Mn - 759		ND	ND	0.30	
10--27	Houses	Soil, incl. Roof/floor debris betw. Houses # 5, 1	6.87	196.5	68.35	31.2	5305	Mn - 502	Zn - 73	1.0	<0.01	0.50	
10--28	Refractory Bricks	Stored Brick from retort bldg. foundation	6.22	84.8	<DL	30	9.4K	Cu - 666	Sr - 79.7	<0.5	ND	0.10	
10--5	Retort Bldg. Foundation	Drilling dust from Foundation-Retort.Drilling by URS	11.82	76.1	24.55	<DL	12.5K	Sr - 152		ND	ND	0.20	

ND = Not Done

Notes:

(1.) This is sample number assigned to the sample in the MT2 laboratory.

(2.) The natural pH is measured by slurrying 5 gms. of the sample in 96 mls. of water and measureing the pH. This is the US EPA SW-846 TCLP procedure.

(3.) These assays are total metal concentrations in the sample as measure by a portable x-ray instrument (Niton, Series 700); they are the average of at least two measurements taken through the plastic sample bag.
Soil samples were blended in the bag and any lumps broken up before the measurement.
The ore sample (MT2 10--31) was crushed in the bag to minus 3/8 inch in the bag
Slices of the brick samples (MT2 10--28,-29,-30) were taken from the middle of the brick and crushed to minus 3/8 inch in a plastic bag.
The wood sample (MT2 10--10) was reduced minus 3/8 inch pieces with a saw and chisel.

(4.) These assays are AA determinations of the TCLP filtrates. Values in bold fail the RCRA TCLP hazardous waste criteria which is (ppm): As 5; Pb 5; Hg 0.2.

(5.) The "Other" columns contain Niton assay data for the highest and next highest total metals concentrations in the sample.

Observations:

(1.) A reasonable correlation exists between the total As and the TCLP As concentration, except for the ore which may contain the mineral AsFeS2 which wouldn't leach in the TCLP.

(2.) The highest As level (8.2%) is in the fines under the old retort furance.

(3.) Seven of the 27 samples failed the TCLP As criteria. Five are in the vicinity of the retort area, one near the chemical buiding, and one near the mess hall/bunk house.

(4.) A total As level greater than 0.38% will generate a TCLP concentration > 5 ppm.

(5.) On average only 2.5 % of the total As present in the feed samples leached in the TCLP. The high iron level or the presence of the mineral arsenopyrite would account for this.

TABLE 9
Red Devil Laboratory Characterization Information
--Mercury Sort--

MT2 Lab Sample No.(1)	Waste Type	Sample Description	Natural pH (2)	Totals Assay (Niton),mg./kg. (3)						TCLP Assays, mg./L.(4)			
				As	Hg	Pb	Fe	Other(5)	Other(5)	As	Hg	Pb	Pass/Fail
10--6	Retort Furnace Slag	Soil- like slag sample.NE end of retort. URS RDSlag-01	4.76	7530	1955	<DL	25.2K	Cr - 6380	Ni - 3210	**10.8**	**6.09**	0.00	**Fail-As/Hg**
10--30	Refractory Bricks	Furnace brick downgradinet of retort	3.8	44.3K	1785	<DL	15.9K	Sr - 399	Mn - 2400	**48.8**	**2.19**	0.07	**Fail-As/Hg**
10--8	As-Hg Impacted Soil	Material from hillside, HgS ore & slag	6.59	2605	1248	120	15.4K	Mn - 9.8K		<0.5	0.015	0.00	
10--7	Retort Building Debris	Soil from under retort bldg. Foundation+Debris north of foundation	6.32	8270	970.5	<DL	15.0K	Ni - 1220	Zn - 379	**14.6**	**0.26**	0.30	**Fail-As/Hg**
10--23	As-Hg Impacted Soil	Soil, downgradient SE of pond	7.02	2690	502.5	<DL	18.0K	Mn - 1780		4.5	0.06	0.60	
10--22	Retort Building Debris	Soil, slag and dump area, downgradient (PCB's?)	6.52	2505	426	173	17.7K	Mn - 1300		4.5	0.03	0.00	
10--31	Ore	Ore sample, orange from bank above retort /silo	6.25	14.4K	264.5	<DL	11.3K	Mn - 965		2.0	0.015	0.09	
10--24	Retort Building Debris	Soil, under fines old retort furnace	6.23	82.2K	250.5	<DL	29.5K	Mn - 2450		**32.0**	0.02	0.60	**Fail-As**
10--18	Pb-Impacted Soil	Soil, center of sedimention pond	6.33	3435	241	<DL	20.5K	Mn - 1700		4.0	<0.01	0.60	
10--25	Mess Hall Bunkhouse	Soil, downgradient messhall/bunk	6.17	3815	204.5	449	12.6K	Mn - 554		**10.0**	0.01	0.60	**Fail-As**
10--19	Warehouse	Soil, for Warehouse, west side	6.55	2270	135.5	325	17.3K	Mn - 1098		**5.5**	0.03	0.70	**Fail-As**
10--26	Houses	Soil, downgraident form House # 3	6.06	2560	128.5	34	17.0K			4.0	<0.01	0.50	
10--11	Retort Furnace Slag	Slag, purple color	6.68	1610	111.5	50.5	12.2K	Sr - 245	Zn - 62	1.5	0.02	0.70	
10--9	Pb-Impacted Building Debris	Scrapings from inside of cast iron piping in debris pile	6.16	1008.5	109.4	111	24.0K	Zr - 166	Sr - 105.8	2.0	0.15	0.50	
10--10	Retort Building Debris	Wood, middle of debris pile	5.8	2435	82.6	199	21.0K	Zn - 132		3.0	0.17	1.10	
10--17	Pb-Impacted Soil	Soil near old chemical storage bldg.	7.09	4570	74.85	<DL	20.9K	Zn - 293	Sr - 198	**10.6**	<0.01	0.00	**Fail-As**
10--20	As-Hg Impacted Soil	Soil, near shop debris and shaft	7.11	1625	68.65	33	17.1K	Mn - 1815		<0.5	<0.01	0.00	
10--27	Houses	Soil, incl. Roof/floor debris betw. Houses # 5, 1	6.87	196.5	68.35	31.2	5305	Mn - 502	Zn - 73	1.0	<0.01	0.50	
10--29	Refractory Bricks	Furnace brick from pile under chemical bldg., green	7.49	1904	64.9	59.5	7700	Sr - 510	Cu - 382	<0.5	ND	0.06	
10--14	As-Hg Impacted Soil	Soil, down gradient sample	5.4	503	63.55	41.1	16.1K	Mn - 751		ND	<0.01	0.30	
10--21	Pb-Impacted Soil	Soil, Pb impacted between old chemical /powerhouse bldgs.	7.19	1560	63.1	<DL	18.5K	Mn - 645		<0.5	0.01	0.00	
10--13	As-Hg Impacted Soil	From Fuel Tanks, north	6.3	487.5	60.5	35.5	14.6K	Mn - 1045		ND	0.043	0.30	
10--12	As-Hg Impacted Soil	Soil from As-Hg Imapcted Soil	6.2	413.5	27.2	29.4	16.5K	Mn - 1069	Zr - 111	ND	ND	0.20	
10--5	Retort Bldg. Foundation	Drilling dust from Foundation-Retort.Drilling by URS	11.82	76.1	24.55	<DL	12.5K	Sr - 152		ND	ND	0.20	
10--16	Pb-Impacted Soil	Soil midway from retort ops and settling pond	4.75	319.5	23	22.6	17.4K	Zr - 147		ND	ND	0.30	
10--15	Pb-Impacted Building Debris	Soil debris pile along road to retort	5.09	197.5	<DL	21	12.1K	Mn - 759		ND	ND	0.30	
10--28	Refractory Bricks	Stored Brick from retort bldg. foundation	6.22	84.8	<DL	30	9.4K	Cu - 666	Sr - 79.7	<0.5	ND	0.10	

ND = Not Done

Notes:

(1.) This is sample number assigned to the sample in the MT2 laboratory.
(2.) The natural pH is measured by slurrying 5 gms. of the sample in 96 mls. of water and measureing the pH. This is the US EPA SW-846 TCLP procedure.
(3.) These assays are total metal concentrations in the sample as measure by a portable x-ray instrument (Niton, Series 700); they are the average of at least two measurements taken through the plastic sample bag.
Soil samples were blended in the bag and any lumps broken up before the measurement.
The ore sample (MT2 10--31) was crushed in the bag to minus 3/8 inch in the bag
Slices of the brick samples (MT2 10--28,-29,-30) were taken from the middle of the brick and crushed to minus 3/8 inch in a plastic bag.
The wood sample (MT2 10--10) was reduced minus 3/8 inch pieces with a saw and chisel.
(4.) These assays are AA determinations of the TCLP filtrates. Values in bold fail the RCRA hazardous waste criteria which is (ppm): As 5; Pb 5; Hg 0.2.
(5.) The "Other" columns contain Niton assay data for the highest and next highest total metals concentrations in the sample.

Observations:

(1.) The highest total Hg levels are found retort area, slag, bricks from the retort area, and As-Hg impacted soils (hillside, pond).
(2.) Seven samples are above 260 ppm Hg total including the ore sample
(3.) Three samples failed the TCLP (>0.2 ppm) for Hg. They are soil from the retort area and from a brick down-gradient of the retort.
(4.) The highest totals are the highest TCLP, except for one sample (MT # 10- 8, Hillside ore and slag).

TABLE 10
Red Devil Lab Characterization Data
--Pb Sort--

MT2 Lab Sample No.(1)	Waste Type	Sample Description	Natural pH (2)	Totals Assay (Niton),mg./kg. (3)						TCLP Assays, mg./L.(4)			
				As	Hg	Pb	Fe	Other(5)	Other(5)	As	Hg	Pb	Pass/Fail
10--25	Mess Hall Bunkhouse	Soil, downgradient messhall/bunk	6.17	3815	204.5	449	12.6K	Mn - 554		**10.0**	0.01	0.60	**Fail-As**
10--19	Warehouse	Soil, for Warehouse, west side	6.55	2270	135.5	325	17.3K	Mn - 1098		**5.5**	0.03	0.70	**Fail-As**
10--10	Retort Building Debris	Wood, middle of debris pile	5.8	2435	82.6	199	21.0K	Zn - 132		3.0	0.17	1.10	
10--22	Retort Building Debris	Soil, slag and dump area, downgradient (PCB's?)	6.52	2505	426	173	17.7K	Mn - 1300		4.5	0.03	0.00	
10--8	As-Hg Impacted Soil	Material from hillside, HgS ore & slag	6.59	2605	1248	120	15.4K	Mn - 9.8K		<0.5	0.015	0.00	
10--9	Pb-Impacted Building Debris	Scrapings from inside of cast iron piping in debris pile	6.16	1008.5	109.4	111	24.0K	Zr - 166	Sr - 105.8	2.0	0.15	0.50	
10--29	Refractory Bricks	Furnace brick from pile under chemical bldg., green	7.49	1904	64.9	59.5	7700	Sr - 510	Cu - 382	<0.5	ND	0.06	
10--11	Retort Furnace Slag	Slag, purple color	6.68	1610	111.5	50.5	12.2K	Sr - 245	Zn - 62	1.5	0.02	0.70	
10--14	As-Hg Impacted Soil	Soil, down gradient sample	5.4	503	63.55	41.1	16.1K	Mn - 751		ND	<0.01	0.30	
10--13	As-Hg Impacted Soil	From Fuel Tanks, north	6.3	487.5	60.5	35.5	14.6K	Mn - 1045		ND	0.043	0.30	
10--26	Houses	Soil, downgraident form House # 3	6.06	2560	128.5	34	17.0K			4.0	<0.01	0.50	
10--20	As-Hg Impacted Soil	Soil, near shop debris and shaft	7.11	1625	68.65	33	17.1K	Mn - 1815		<0.5	<0.01	0.00	
10--27	Houses	Soil, incl. Roof/floor debris betw. Houses # 5, 1	6.87	196.5	68.35	31.2	5305	Mn - 502	Zn - 73	1.0	<0.01	0.50	
10--28	Refractory Bricks	Stored Brick from retort bldg. foundation	6.22	84.8	<DL	30	9.4K	Cu - 666	Sr - 79.7	<0.5	ND	0.10	
10--12	As-Hg Impacted Soil	Soil from As-Hg Imapcted Soil	6.2	413.5	27.2	29.4	16.5K	Mn - 1069	Zr - 111	ND	ND	0.20	
10--16	Pb-Impacted Soil	Soil midway from retort ops and settling pond	4.75	319.5	23	22.6	17.4K	Zr - 147		ND	ND	0.30	
10--15	Pb-Impacted Building Debris	Soil debris pile along road to retort	5.09	197.5	<DL	21	12.1K	Mn - 759		ND	0.008	0.30	
10--5	Retort Bldg. Foundation	Drilling dust from Foundation-Retort.Drilling by URS	11.82	76.1	24.55	<DL	12.5K	Sr - 152		ND	0.17	0.20	
10--6	Retort Furnace Slag	Soil- like slag sample.NE end of retort. URS RDSlag-01	4.76	7530	1955	<DL	25.2K	Cr - 6380	Ni - 3210	**10.8**	**6.09**	0.00	**Fail-As/Hg**
10--7	Retort Building Debris	Soil from under retort bldg. Foundation+Debris north of foundation	6.32	8270	970.5	<DL	15.0K	Ni - 1220	Zn - 379	**14.6**	**0.26**	0.30	**Fail-As/Hg**
10--17	Pb-Impacted Soil	Soil near old chemical storage bldg.	7.09	4570	74.85	<DL	20.9K	Zn - 293	Sr - 198	**10.6**	<0.01	0.00	**Fail-As**
10--18	Pb-Impacted Soil	Soil, center of sedimention pond	6.33	3435	241	<DL	20.5K	Mn - 1700		4.0	<0.01	0.60	
10--21	Pb-Impacted Soil	Soil, Pb impacted between old chemical /powerhouse bldgs.	7.19	1560	63.1	<DL	18.5K	Mn - 645		<0.5	<0.01	0.00	
10--23	As-Hg Impacted Soil	Soil, downgradient SE of pond	7.02	2690	502.5	<DL	18.0K	Mn - 1780		4.5	0.06	0.60	
10--24	Retort Building Debris	Soil, under fines old retort furnace	6.23	82.2K	250.5	<DL	29.5K	Mn - 2450		**32.0**	0.02	0.60	**Fail-As**
10--30(1)	Refractory Bricks	Furnace brick downgradinet of retort	3.8	44.3K	1785	<DL	15.9K	Sr - 399	Mn - 2400	**48.8**	**2.19**	0.07	**Fail-As/Hg**
10--31	Ore	Ore sample, orange from bank above retort /silo	6.25	14.4K	264.5	<DL	11.3K	Mn - 965		2.0	0.015	0.09	

ND = Not Done

Notes:

(1.) This is sample number assigned to the sample in the MT2 laboratory.
(2.) The natural pH is measured by slurrying 5 gms. of the sample in 96 mls. of water and measureing the pH. This is the US EPA SW-846 TCLP procedure.
(3.) These assays are total metal concentrations in the sample as measure by a portable x-ray instrument (Niton, Series 700); they are the average of at least two measurements taken through the plastic sample bag.
Soil samples were blended in the bag and any lumps broken up before the measurement.
The ore sample (MT2 # 10--31) was crushed in the bag to minus 3/8 inch in the bag
Slices of the brick samples (MT2 # 10--28,-29,-30) were taken from the middle of the brick and crushed to minus 3/8 inch in a plastic bag.
The wood sample (MT2 # 10--10) was reduced minus 3/8 inch pieces with a saw and chisel.
(4.) These assays are AA determinations of the TCLP filtrates. Values in bold fail the RCRA hazardous waste criteria which is (ppm): As 5; Pb 5; Hg 0.2.
(5.) The "Other" columns contain Niton assay data for the highest and next highest total metals concentrations in the sample.

Observations:

(1.) No samples are Pb RCRA TCLP hazardous. None are even close to the 5.0 ppm criteria.
(2.) The highest totals Pb samples are found in the messhall/bunk house, warehouse, scrapings from inside the pipe, the dump area, and the hillside.

3.4.2 Data

The data in Table 7 shows that only some of the samples are above the RCRA TCLP standard. For arsenic, 7 of the samples failed the TCLP. Three samples failed the TCLP for mercury, and none of the 27 samples failed the TCLP for lead.

3.5 Sample Characterization and Data Interpretation

3.5.1 Sorting and Correlation of Totals and TCLP Data

Arsenic

Table 8 combines the Niton total assays and TCLP data and sorts the total arsenic data in descending order. The following information is obvious:

(1.) A reasonable correlation exists between the total arsenic and the TCLP arsenic concentration, except for the "ore" sample (MT^2 #10-31) which may contain the mineral AsFeS2 which would not leach in the TCLP.

(2.) The highest arsenic level (8.2%) is located in the fines under the old retort furnace. The average value for all 27 samples was 0.72% arsenic.

(3.) Seven of the 21 samples run failed the TCLP arsenic criteria. Five are in the vicinity of the retort area, one is near the chemical building, and one is near the mess hall/bunk house, and one is near the warehouse.

(4.) A total arsenic level greater than 0.38% will generate a TCLP concentration of >5 ppm.

(5.) On average, only 2.5% of the total arsenic present in the feed samples leached in the TCLP. The high iron level in most of the samples or the presence of the mineral arsenopyrite would account for this.

Mercury

Table 9 combines the Niton total assays and TCLP data and sorts the total mercury data in descending order. The following information is obvious:

(1.) The highest total mercury levels are found in the retort area, the slag, bricks from the retort area, and arsenic- and mercury-impacted soils (hillside and pond).

(2.) Only three of the 21 samples failed the TCLP (6.09 ppm, 2.19 ppm, and 0.26 ppm). These samples are from the highest mercury total samples and from the retort area.

(3.) The average total mercury concentration for all 27 samples is 0.036%.

(4.) Seven samples are above 260 ppm mercury, including the ore sample.

Lead

Table 10 combines the Niton total assays and TCLP data and sorts the total lead data in descending order. The following information is obvious:

(1.) No samples failed the TCLP or were even close to the 5.0 ppm criteria. The highest total lead sample is 0.045%. The average of all 27 samples is 0.01%.

(2.) The highest total lead samples were found in the mess hall/bunk house area, the warehouse area, scrapings from inside the pipe, the dump area, and the hillside area.

3.5.2 Placement of TCLP Data on the Site

Because a reasonable number of samples failed the TCLP for arsenic, MT^2 will locate these sample areas on the site. This will give the Ecobond™ field applicators an idea of which areas to focus on. The areas are the retort area, mess hall/bunk house area, and warehouse. Details are listed below:

- Soil from beneath the retort
- Furnace brick down gradient of the retort
- Debris north of the retort
- Soil-like slag from northeast end of the retort
- Soil near old chemical storage building
- Soil from the warehouse area

The three samples (two soils and one brick) that failed the TCLP for mercury are found around the retort area. No samples failed the TCLP for lead.

3.5.3 Environmental Interpretation of Data

The objective of this report is not to interpret environmental regulations for the Red Devil mine site but to determine some target criteria to establish the stabilization formulas. MT^2 assumes that the RCRA TCLP goals are the stabilization targets (TCLP levels of arsenic at 5 mg/l, mercury at 0.2 mg/l, and lead at 5 mg/l).

The report issued by Harting ESE "Conceptual Solid Waste Management Plan" dated 4/30/01 discusses the impact of environmental regulations and rulings for the Red Devil site. It appears that an on-site landfill would be constructed for the RCRA-hazardous waste. We further assume that the RCRA TCLP criteria will still apply to this situation and that all waste must be stabilized to the RCRA TCLP criteria as previously stated.

One item of note is the ruling under the land disposal restrictions (LDR) that any material greater than 260 ppm total mercury is classified as a "high level" waste and must be retorted. The Niton totals analyses found seven samples above this level and presumably these must be retorted. Most of these samples are from the retort area, one is ore material, and two are from the pond area and the hillside area. However, the site may be exempt from these LDR regulations and so the material may be disposed on site in an engineered landfill. It is also assumed that the RCRA TCLP criteria of 0.2 ppm mercury applies to waste disposed in the on-site landfill.

4.0 STABILIZATION IN THE LABORATORY

4.1 Objective

The overall objective of the Red Devil remediation program is to treat the material on site with EcoBond™ chemical additives so the material passes the RCRA TCLP for arsenic, mercury, and lead. A number of untreated samples collected from the site (identified in the previous section) failed the RCRA TCLP. In the stabilization phase of the laboratory program, these samples were treated with various EcoBond™ additives so that they pass the RCRA TCLP. Some untreated samples failed the TCLP for arsenic and were treated with only one EcoBond™ additive. Some of the untreated samples that failed the TCLP for both arsenic and mercury were treated with two EcoBond™ additives.

4.2 Chemical Stabilization

4.2.1 <u>Procedures</u>

The samples were treated with various concentrations and/or combinations of EcoBond™. The typical laboratory procedure was to blend 100 grams of untreated feed sample with the EcoBond™ additive(s). Water was added to facilitate the mixing of the additive into the soil and the amount of water required was determined empirically on a case-by-case basis. The stabilizations were all completed using the following process:

- Weigh 100 grams of the soil, wood, or brick at less than 3/8-inch.
- Weigh a prescribed quantity of the reagent.
- Transfer the additives to the sample.

- Mix and allow to cure at least overnight.

- Run an EPA TCLP.

4.2.2 Samples Investigated

Seven samples from the batch of samples collected on-site by Mr. DeWitt and one sample from the "analytical" samples recently received were investigated in this program. Their descriptions along with the TCLP information are presented in **Table 11**.

4.2.3 Stabilization Chemicals

Different EcoBond™ additives are used to stabilize different metals. A description of the various stabilization chemicals used in the laboratory study is summarized in **Table 12**.

TABLE 11
Characterization of Samples Used in the MT2 Stabilization Study

Client Waste Stream Description	Estimated Cubic Yards	Estimated Tons	Number of Sample Collected	MT2 Sample Number(2)	Untreated TCLP Data (1) Metals As mg./L.	Hg mg./L.	Pb mg./L.
RF Slag	8	12.5	2	10--6	**10.8**	**10.6**	
Retort Bldg. Debris	1067	1000	4	10--7(3)	**14.6**	**0.26**	
Retort Bldg. Debris	1067	1000		10--24	**32**		
Pb Impacted Soil	Unk.	Unk.	4	10--17	**10.6**		
Warehouse	Unk.	Unk.	1	10--19	**5.5**		
Mess Hall/Bunkhouse	Unk.	Unk.	1	10--25	**10**		
Refractory Brick	20	20	3	10--30	**48.8**	**2.19**	
Slag-S. of Retort Pad	Unk.	Unk.		10--32	**11.9**	**5.7**	0.2
Retort Bldg. Foundation	110	208	1				
As and Hg Impacted Soil	390	630	6				
Pb-Impacted Bldg. Debris	735	695	2				
Houses			2				
Total			**26**		**8**	**4**	**0**

Note: (1.) Samples that fail the TCLP RCRA are **bolded.**

(2) These are the samples actually used in the MT² lab stabilization study. Only samples that failed the RCRA TCLP were used in the study.

(3) Depleated this sample after the first stailization test.

Table 12
Description of Stabilizers

Metal Stabilized	Additive	Physical Description
Arsenic	EcoBond™ As-Solid	Small black pellets
Arsenic	EcoBond™ As-Liquid	Dark colored solution
Mercury	EcoBond™ Hg	Dark colored solution
Lead	EcoBond™ Pb	Black pellets or brown powder

4.2.4 Data

A number of stabilization tests were completed using the procedure and additives described above. Results are summarized in **Table 13**. The stabilizations were initially conducted to stabilize only one metal per sample that failed the TCLP. If a sample contained more than one metal that failed the TCLP, then a second stabilizer was added to stabilize both metals. The results are discussed in the following sections.

Arsenic

Of all the samples obtained, seven samples failed the TCLP for arsenic. These samples were treated with various weight percentages of EcoBond™ As-Solid. Water was added to each test as needed to create a moist material. The information in **Table 13** shows that six of the samples were stabilized to below the RCRA TCLP level of 5.0 ppm arsenic. (Sample MT² #10-7 was not optimized with an EcoBond™ formula because only one test could be run on the amount of sample available. Higher levels of EcoBond™ As-Solid would have optimized the formula for this sample.)

Typically, the addition of 2.0 weight % of EcoBond™ As-Solid was required to stabilize the arsenic. However, sample MT² #10-30 required 3.0 weight % and sample MT² #10-24, which was from the retort building debris, proved to be very refractory and, in fact, was not stabilized in the laboratory study. Additions of up to 15 weight % EcoBond™ As-Solid failed to stabilize sample MT² #10-24.

All the initial tests were completed by adding EcoBond™ As-Solid; however, it may be more convenient to apply a liquid version of this additive in the field, especially to debris-like material. Consequently, a liquid version of this additive was added to three of the samples (Tests 5-13-10,-11,-12). The amount added was chemically equivalent to the amount added in the successful solid additive tests. EcoBond™ As-Liquid was added to three samples and stabilized two of them. The one sample that was not stabilized by EcoBond™ As-Liquid was the refractory sample (MT² #10-24).

Some of the samples failed the TCLP for both arsenic and mercury. Samples MT² #10-6 and MT² #10-30 failed the TCLP for arsenic and mercury. Consequently, the mercury content of the TCLP filtrates for tests in which these samples were used was also determined to ascertain if perhaps the mercury was also lowered by the EcoBond™ As additive. In most cases, the TCLP mercury level was lowered, but not to the TCLP criteria. The addition of 3.0 weight % EcoBond™ As-Solid to sample MT[2] #10-6 (Test 5-13-1) not only stabilized the arsenic but also lowered the TCLP mercury from 10.6 ppm to 0.96 ppm.

Using the EcoBond™ As-Liquid formulation on sample MT[2] #10-6(Test 5-13-10) lowered the TCLP mercury to below criteria levels (to 0.08 ppm mercury TCLP). The addition of EcoBond-As to sample MT[2] #10-30 (Test 4-84-11) not only stabilized the arsenic but also lowered the TCLP mercury from 2.19 ppm (untreated) to 1.23 ppm (solid formulation) and to 0.98 ppm (liquid formulation). The EcoBond™ As stabilizer not only stabilizes samples for arsenic, but also lowers the mercury level to near or even below the TCLP mercury criteria.

TABLE 13
Lab Stabilization Data

No.	Test No (Notebook page)	Test Description (Notes, below)	Feed ID: Client ID	Feed ID: MT2 Sample Number	Fixation Amounts (On an as-received basis), Weight %: Enviro Bond As-Solid	Enviro Bond Hg-Liq.	Enviro Bond As-Liq.	Enviro Bond Pb-Solid	Water Added Wt. %	pH After Curing	Stabilized TCLP Leach Data: Leach Solution No.	Filtrate: pH	Filtrate: Color	Metals: As mg./L.	Metals: Hg mg./L.	Metals: Pb mg./L.	TCLP Pass/ Fail	Unstabilized TCLP Data, Metals: As mg./L.	Hg mg./L.	Pb mg./L.
AS STABLIZATION TESTS																				
1	4--84-1	Stabilization	RF Slag	10--6	2.0				10.0	ND	2	4.61	None	1.5	0.297		Pass As	10.8	10.6	
2	4--84-3	Stabilization	Pb Impacted Soil	10--17	2.0				10.0	ND	1	4.73	None	0.5			Pass As	10.6		
3	4--84-4	Stabilization	Warehouse	10--19	2.0				0.0	ND	1	4.7	None	<1			Pass As	5.5		
4	4--84-6	Stabilization	Mess hall/Bunkhouse	10--25	2.0				5.0	ND	1	4.89	None	2			Pass As	10		
5	4--84-7	Stabilization	Refractory Brick	10--30	2.0				15.0	ND	1	4.84	None	5			Pass As	48.8	2.19	
6	4--84-11	Stabilization	Refractory Brick	10--30	3.0				15.0	3.16	1	4.89		0.2	1.23	0.3	Pass As	48.8	2.19	
7	5--13-1	Stabilization	RF Slag	10--6	3.0				0.0	ND	1	4.96		1.3	0.96	3.4	Pass As/Pb	10.8	10.6	
8	5--13-10	Stabilization	RF Slag	10--6			3.9		0.0	3.2	1	4.7		2.7	0.08	0.04		10.8	10.6	
9	5--13-11	Stabilization	Retort Bldg. Debris	10--24			11.6		0.0	2.7	1	4.5		35.6		0.07		32		
10	5--13-12	Stabilization	Refractory Brick	10--30			5.8		10.0	3.21	1	4.6		3.2	0.98	0		48.8	2.19	
HG STABILIZATION TESTS																				
11	4--84-8	Stabilization (1)	Retort Fur. Slag	10--6		5.0			20.0	ND	2	5.1	None		0.2	0.2	Fail Hg	10.8	10.6	
12	4--84-12	Stabilization (1)	Retort Fur. Slag	10--6		7.0			20.0	8.44	1	5.09			<0.01	0.3	Pass Hg	10.8	10.6	
13	4--84-14	Stabilization (1)	Refractory Brick	10--30		3.0			20.0	7.75	1	5.01			<0.01	0.2	Pass Hg	48.8	2.19	
14	5--13-5	Stabilization(1)	Slag-S. of Retort Pad	10--32		3.0			10.0	7.12	1	5.01	None		0.017		Pass Hg	11.9	5.7	0.2
15	5--13-8A	Stabilization(3)	RF Slag	10--6		7.0			0.0	8.34	1	4.96			30.1	0.4	Fail Hg	10.8	10.6	
Pb STABILIZATION																				
16	5--52-6	Stabilization (5)	Sample + PbO	10--22				2.5		6.03	1	4.9				0				0.9
COMBINED (As, Hg) STABILIZATION TESTS																				
17	5--13-3	Stabilization (1,2)	Stabilized sample10-30	4--84-11		3.0			21.0	ND	1	5.29	Brown	0.18	0.023	6.6	Pass Hg/As	0.2	1.23	
18	5--13-9	Stabilization (4)	RF Slag	10--6	2.0	7.0			0.0	4.2	1	4.7		1.6	0.15	0	Pass Hg/As	10.8	10.6	
19	5--36-1	Stabilization (4)	Refractory Brick	10--30		3.0	5.8		5.7	4.04	1	4.62		1.58	0.41	0.12	Pass As/Fail Hg	48.8	2.19	
		Criteria-RCRA TCLP												5	0.2	5				

Notes:

(1.) Add the EcoBond™ Hg-Liq. to 20 mls of water. Adjust the pH to the 8 to 9.5 pH range with HCl (1M) dropwise. Add this slurry to the solid sample spread out on a petri dish.Mix and allow to stand in air overnight.
(2.) The sample that was first stabilized for As (2.0 % EcoBond™ As; TCLP As 1.5 ppm); was then stabilized for Hg (3.0 wt. % EcoBond™ Hg, 0.023 ppm).
(3.) Add the EcoBond™ Hg, as-is, directly to the the sample
(4.) Add these additives at the same time directly to the sample. The EcoBond™ Hg is added as-is.
(5) Add PbO (0.5% Pb) to the sample in a bag. Add the EcoBond™ Pb to the bag.

Combined As and Hg Stabilizations

None of the samples characterized in the laboratory failed the TCLP for just mercury. The three samples that failed for TCLP mercury also failed for TCLP arsenic. Consequently, the approach was to stabilize both metals.

Sample MT² #10-30 which failed the TCLP for both arsenic and mercury (TCLP untreated arsenic at 48.8 ppm and mercury at 2.19 ppm) was treated with both EcoBond™ As and EcoBond Hg stabilization additives. In one test, an overnight cure was used between the additives and in a second test both additives were applied at the same time. The first mode of addition is demonstrated by Tests 4-84-11 and Test 5-13-3. In test 4-84-11, the arsenic was first stabilized with 3.0 weight % EcoBond™ As-Solid; the arsenic was lowered to 0.2 ppm and the mercury to 1.23 ppm from untreated levels of 48.8 ppm arsenic and 2.19 ppm mercury. After curing overnight, this arsenic-stabilized material was then mercury-stabilized (Test 5-13-3) with 3.0 weight % EcoBond™ Hg-Liquid (pH pre-adjusted); the mercury was lowered to 0.023 ppm and the arsenic stayed low at 0.18 ppm. These two tests show that both arsenic and mercury can be stabilized by the <u>sequential</u> application of additives.

The other sample that failed the TCLP for both arsenic and mercury is sample MT² #10-6 (untreated TCLP arsenic at 10.8 ppm and mercury at 10.6 ppm). This sample was stabilized (Test 5-13-9) by the <u>simultaneous</u> addition of 2.0 weight % EcoBond™ As-Solid and 7.0 weight % EcoBond™ Hg-Liquid (no pre-pH adjustment). The stabilized material generated a TCLP of 1.6 ppm arsenic and 0.15 ppm mercury. This test not only shows that a simultaneous treatment is feasible but that the EcoBond™ Hg- Liquid can be applied as-is rather than pre-pH adjusted. The concept of the pre-pH adjustment for the EcoBond™ Hg-Liquid is discussed in the next section.

Mercury

Any samples that failed the TCLP for Hg also failed for As. No samples were found that only failed the TCLP for Hg and not As. Consequently, the approach to stabilizing site samples is to add EcoBond™ As and EcoBond™ Hg which was discussed in the previous section. However, in this section MT² conducted a laboratory treatability study in the event samples are discovered on-site that fail the TCLP for just mercury. This study may be for information purposes only since of all the samples obtained from on-site, three of the samples failed the TCLP for mercury. One of these samples was only marginally hazardous for mercury (0.26 ppm TCLP mercury, criteria is 0.2 TCLP mercury). This is the sample that was depleted early in the program and consequently could not be optimized with an EcoBond™ formula. The other two samples were treated with various weight percentages of EcoBond™ Hg-Liquid. A pH adjustment of the EcoBond™ Hg-Liquid stabilization agent was completed before addition to the sample for most of the early tests. Additionally, water was added to each test, as needed, to create a moist material; that is, moist to the touch. The exact percent of water added is found in the test data in **Table 13**. The table shows that the mercury samples that were above 0.20 mg/l TCLP (untreated) for mercury were stabilized to below the RCRA TCLP level of 0.2 ppm.

The addition of 3.0 weight % EcoBond™ Hg-Liquid stabilized the mercury (<0.01 ppm mercury TCLP) in sample MT² #10-30. In sample MT² #10-6, 7.0 weight % was required to stabilize the material (<0.01 ppm TCLP mercury). In sample MT² #10-32, which is the "analytical" sample received later in the program, 3.0 weight % EcoBond™ Hg-Liquid stabilized the mercury (0.017 ppm mercury TCLP).

The above results were achieved using EcoBond™ Hg-Liquid that was subjected to a pH adjustment before addition to the sample. This pre-treatment step consisted of mixing EcoBond™ Hg-Liquid with water (1:1) and adjusting the pH to the 9.0 range with 1M HCl.

Lead

No samples failed the TCLP for lead. However, previous site literature mentions the presence of material on the site that fails the TCLP for lead. To plan for this scenario, a soil sample from the site that passed the TCLP for lead was spiked with lead. The sample chosen was MT² #10-22 (TCLP untreated lead 0 ppm, arsenic 4.5 ppm, and mercury 0.03 ppm). This sample was chosen because it is a waste form that represents a large tonnage of material (retort building debris) and is from an area that is normally contaminated. The lead spike material chosen was a PbO, a chemical that should dissolve in the TCLP. The spiked, untreated sample was run for lead TCLP. In addition, a similarly spiked sample was first stabilized with EcoBond™ Pb-Solid (2.5 weight %) and then a lead TCLP completed on the cured sample (Test 5-52-6). The addition of EcoBond™ Pb lowered the TCLP lead from 0.9 ppm to 0 ppm in the treated sample and therefore met the 90% reduction criteria.

4.3 Effect of Waste Form on Stabilization

The physical characteristics of the waste form influence the effectiveness of the stabilization additive. A discussion of this aspect of the stabilization program is presented below.

The need for the additive to soak into the wood or brick is not required for some of the material. The lab characterization shows that for wood the arsenic, mercury, lead, and iron are absorbed on the surface (1/16-inch depth) and so penetration into the wood by the additive is not necessary. In addition, the one wood sample MT² #10-9 did not fail the RCRA TCLP (TCLP arsenic 3.0 ppm, mercury 0.17 ppm, and lead 1.1 ppm) and consequently is not a concern. However, if hazardous wood samples are encountered, extensive penetration of the additive will not be necessary.

For the three brick samples, the scenario is not as clear-cut. A review of the totals metals assay for the three different types of bricks is as follows:

- <u>Retort Building Foundation Bricks (MT² #10-28)</u> -Scraping (1/4-inch deep) did not remove the total arsenic (1,400 vs. 1,404 ppm) but did lower the total mercury (1,214 vs. 386 ppm) significantly. Assay of the middle of the brick (end-on) shows little mercury (29 ppm) and only moderate arsenic (179 ppm).

- Brick Under the Retort Foundation (MT^2 #10-29) - Scraping (1/4-inch deep) did not change the already low total arsenic (26, 69 ppm) and did not alter the already low total mercury (21, 86 ppm). Assay of the middle of the brick (end-on) shows no total mercury (0 ppm) or arsenic (0 ppm).

- Furnace Brick, Down-gradient of the Retort (MT^2 #10-30) - Scraping (1/4-inch deep) changed the already high total arsenic (56.7K vs. 10.7K ppm) and lowered the already high total mercury (5.4K vs. 2K ppm). An assay of the middle of the brick (end-on) shows no total mercury (0 ppm) but high total arsenic (12.5K ppm).

Samples MT^2 #10-28 and MT^2 #10-29 did not fail the TCLP, but sample MT^2 #10-30 did (TCLP with arsenic 48.8 ppm, mercury 2.19 ppm, and lead 0.07 ppm). Consequently, this furnace brick (MT^2 #10-30) was included in the stabilization study and several stabilization tests (Tests 4-84-11, 5-13-12, 4-84-14, 5-36-1) demonstrated successful stabilization for arsenic and mercury. The stabilization lab tests utilized cross-section slices of brick that were then crushed, typically to minus 3/8 inches in size. This was done because of the TCLP physical size mandates, and to simulate what would occur in the field when the brick is pulverized. Consequently, crushing furnace brick to minus 3/8 inches is required before stabilization is initiated.

In summary, the wood is not hazardous. However, if it is, it would be stabilized with little penetration required. The bricks from the retort building foundation are not hazardous. However, if they are, they can be stabilized for arsenic and mercury with little breakage required. The furnace bricks are hazardous and will require breakage to minus 3/8 inches.

5.0 FIELD IMPLEMENTATION/DEPLOYMENT PLAN

5.1 Introduction

The section will provide a field implementation plan from information gathered in the treatability study. This plan will detail the actions required in the field to achieve the same results as measured in MT^2's laboratory treatability study.

5.2 EcoBond™ Formulas For Each Waste Stream

Table 14 outlines the quantities for each waste stream; the expected pre-treatment concentrations of arsenic, lead, and mercury; and the corresponding formula and amount of EcoBond™.

Table 14
Waste Stream Analysis and Proposed EcoBond™ Formulas

Waste Stream	Est. Cubic Yards	Est. Tons	Pre-Pb	Pre-As	Pre-Hg	EcoBond™ As %	EcoBond™ As Tons	EcoBond™ Hg %	EcoBond™ Hg Tons
Retort Bldg. Debris	200	200	<5.0	Up to 11	<0.2	2%	4	0%	0
Retort Furnace Slag	5	8	<5.0	10.8	10.6	2%	0.16	7%	0.56
As Impacted Soil	929	1500	<5.0	Up to 11	<0.2	2%	30	0%	0
Refractory Bricks	20	20	<5.0	48.8	2.19	3%	6.0	3%	6.0
Hg in Cracks of Concrete Slab	5	7.6	<5.0	<5.0	5.7	0%	0	7%	0.53
TOTALS							40.16		7.09

5.2.1 Arsenic

Table 15 shows that if the pre-treatment TCLP arsenic is from 5.0 mg/l to 20 mg/l, then a 2% EcoBond™ As will be needed to treat the waste to less than 5.0 mg/l for arsenic. If the TCLP is from 21 mg/l up to 48 mg/l, then a 3% EcoBond™ As will be needed to treat the waste stream to less than 5.0 mg/l. No waste stream was found to be above 48 mg/l for arsenic.

5.2.2 Arsenic and Mercury in Combination

For the waste streams that contain both arsenic and mercury, the correlation for the EcoBond™ As formula needed to treat the arsenic and mercury as stated in **Table 16**.

TABLE 15

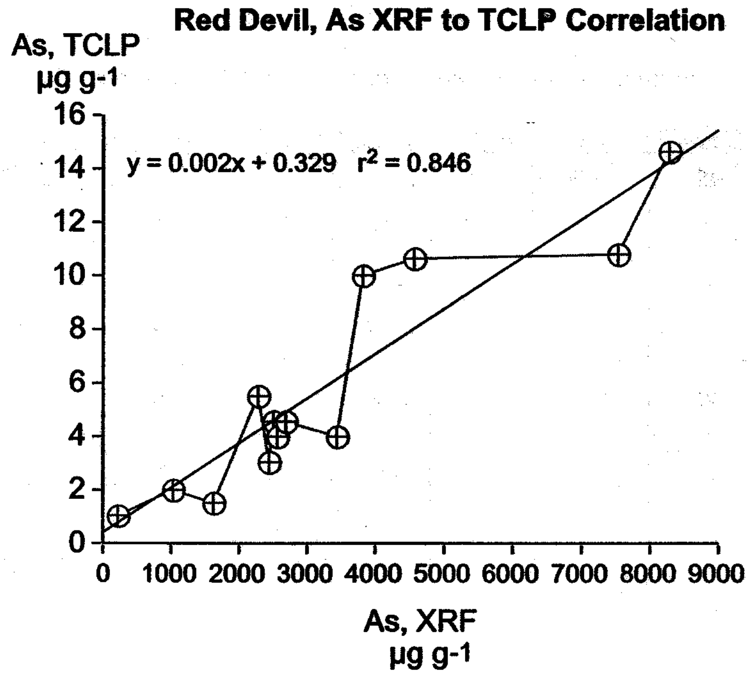
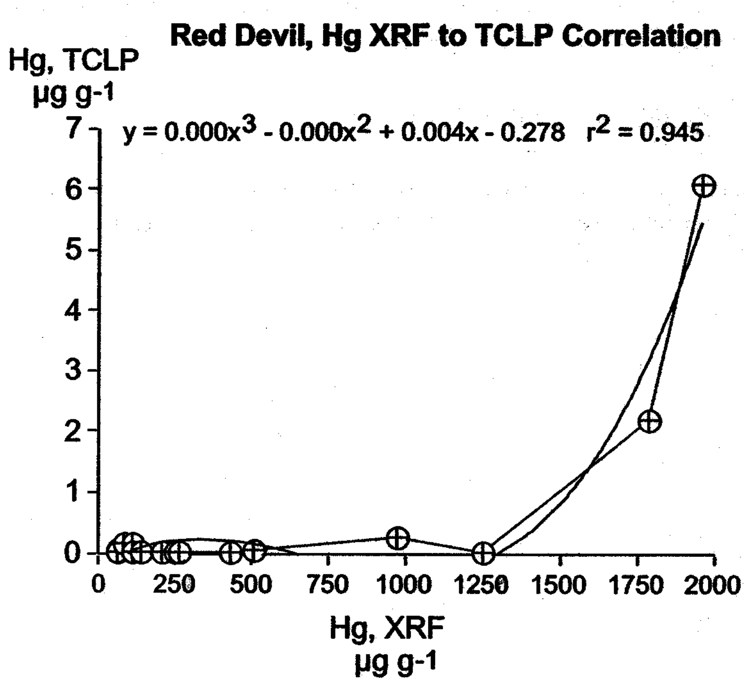


TABLE 16



5.2.3 Mercury

For mercury contamination, there is also a direct correlation between the amount of EcoBond™ Hg formula needed as compared to the pre-treatment mercury concentration. For pre-treatment mercury concentrations from 0.2 mg/l up to 6.0 mg/l, a 3% EcoBond™ Hg will be required. For pre-treatment concentrations of mercury from 7.0 mg/l up to 11 mg/l, a 7% EcoBond™ Hg additive is required. No samples displayed pre-treatment mercury above 11 mg/l.

5.2.4 Lead

As shown in the treatability study, EcoBond™ Pb does reduce the leachability of lead from 0.9 mg/l to 0 mg/l utilizing a 2.5% EcoBond™ additive. As such, MT^2 will plan on utilizing a 2.5% EcoBond™ Pb additive should any lead contaminated debris or soil require treatment.

5.3 Contingencies

MT^2 recommends that 10% extra EcoBond™ formulas be shipped to the site for contingencies. The extra material would account for the potential of the following:

- Additional quantities in each waste stream
- Higher pre-treatment concentrations found in each waste stream

Should the extra EcoBond™ product not be needed, it can be added to the waste streams to deplete any excess inventory.

5.4 Personnel Requirements

WCC will supply all personnel to handle material movement to the landfill for treatment.

MT^2 will supply a technical supervisor to perform the following duties:

- Pre-treatment analysis via the Niton XRF. This data will determine the amount of EcoBond™ formula needed based on the pre-treatment concentrations.
- Record the quantity of waste treated with a corresponding pre-treatment XRF analysis.
- Record the quantity and type of EcoBond™ formula applied to each waste stream.
- Provide oversight during the application of the EcoBond™ formula(s) to ensure uniform coverage and proper mixing of the EcoBond™ into the waste.

- Quality control assistance.

MT^2 will also supply an EcoBond™ application technician to apply the EcoBond™ formula to the waste streams. This technician will follow the directions from the MT^2 technical supervisor.

5.5 Equipment Requirements

5.5.1 EcoBond™ Delivery

MT^2 will deliver the EcoBondTM-Hg in 220-gallon totes, which can be stacked three high to save deck space on the barrage. This tote will be constructed of reinforced cardboard and will be on a pallet. Each tote will weigh approximately 2400 pounds. The EcoBond™-As will be delivered in one-ton super sacks, that can also be stacked at least three high.

5.5.2 EcoBond™ Deployment

For the deployment of the liquid EcoBond™ additives, MT^2 will supply the applicator and hoses. For the deployment of the EcoBond™ dry material, MT^2 will utilize a front-end loader supplied by WCC to deploy the dry product.

It is MT^2's understanding that the EcoBond™ material will be deployed onto the waste in lifts as it arrives in the landfill. The advantages to this procedure are that the deployment of EcoBond™ is centralized in one area and containers of EcoBond™ can stay in one location. Further each lift will be placed in no greater than an eighteen inch lift, which will allow for uniform coverage of EcoBond™ and allow for thorough deployment of the EcoBond™ into the waste.

For mixing of soil that requires treatment, WCC will supply a dozer with rippers or disc to mix the EcoBond™ into the soil and/or a water truck/source to add to the soil to allow the EcoBond™ to disperse into the soil. For the bricks that need to be treated, WCC and the BLM have agreed that the brick will be treated in the original condition even though the treatability study confirmed that crushing of the brick would optimize the treatment. This is not required because the brick is being placed into a lined cell designed to store this waste even with out treatment. The EcoBondTM treatment of the brick will be an added measure of safety. For the debris (i.e., wood, concrete, etc.) to be treated, WCC will lay this material in a lift that allows MT^2 to spray the EcoBond™ additive onto the debris to achieve uniform coverage.

5.6 Deployment Techniques

5.6.1 Pre-treatment Field Verification of Arsenic, Lead, and Mercury Contamination

MT^2 will utilize the Niton Model 700 XRF Analyzer to manage the waste stream. To aid in the management of the waste streams once on site, MT^2 has performed a correlation analysis to determine if the total metals as recorded by the Niton correlate to the TCLP data. Upon our review, the total metals <u>do</u> correlate to the TCLP for arsenic and mercury contamination. The lead data cannot be correlated because all TCLP analysis for lead was below the RCRA treatment criteria.

The charts attached indicate that once arsenic reaches a total concentration of 3,500 mg/kg, then it exceeds the 5.0 mg/l and would therefore require treatment. Mercury requires treatment when the total mercury concentration is above 1,250 mg/kg.

This direct correlation will allow the MT^2 technical supervisor to record the total metal concentration received in the landfill, and based on the XRF readings, we will be able to determine the amount of EcoBond™ additive to treat the material to below RCRA standards.

5.6.2 Refractory Bricks

To achieve the same treatment results in the field as achieved in the laboratory, WCC will crush the brick prior to treatment. However, the method of crushing the brick is not feasible in the field. We will treat the brick with EcoBond™ without crushing. This treatment will provide an added measure of safety as it is placed into the landfill designed to accept this material, even without treatment. The brick will be installed in no greater than an 18-inch lift. This will be done so that a uniform coverage of EcoBond™ can be achieved.

5.7 Post-Treatment Verification

The extensive treatability study confirmed that various concentrations of arsenic and mercury can be treated with EcoBond™. The WCC project team will treat the waste utilizing the same formulas that were effective in the treatability study. This will ensure that the same results are achieved in the field.

Because of the remote location of the site, the design of the landfill to accept untreated material and the verification of achieving the RCRA treatment standards, The WCC project team will not require post-treatment verification via an off-site analytical laboratory.

5.8 Field Documentation and Reporting

The WCC project team will record the following data for field documentation purposes:

- Pre-treatment concentrations of arsenic, lead, and mercury of material placed in lifts in the landfill via an XRF portable analyzer. If the metals concentrations are above the values listed in Section 5.2, then the WCC project team will treat the waste stream with the appropriate EcoBondTM formulation.

- Quantity and type of waste stream that requires treatment for that lift

- Quantity and percentage of EcoBondTM applied to each lift that required treatment

- Location of each lift treated as located in the landfill

- Amount of water applied to each lift that required treatment
- Date of treatment
- Weather conditions

This data will be accumulated in a site log and will then be utilized for incorporation into a final report.

Appendix A

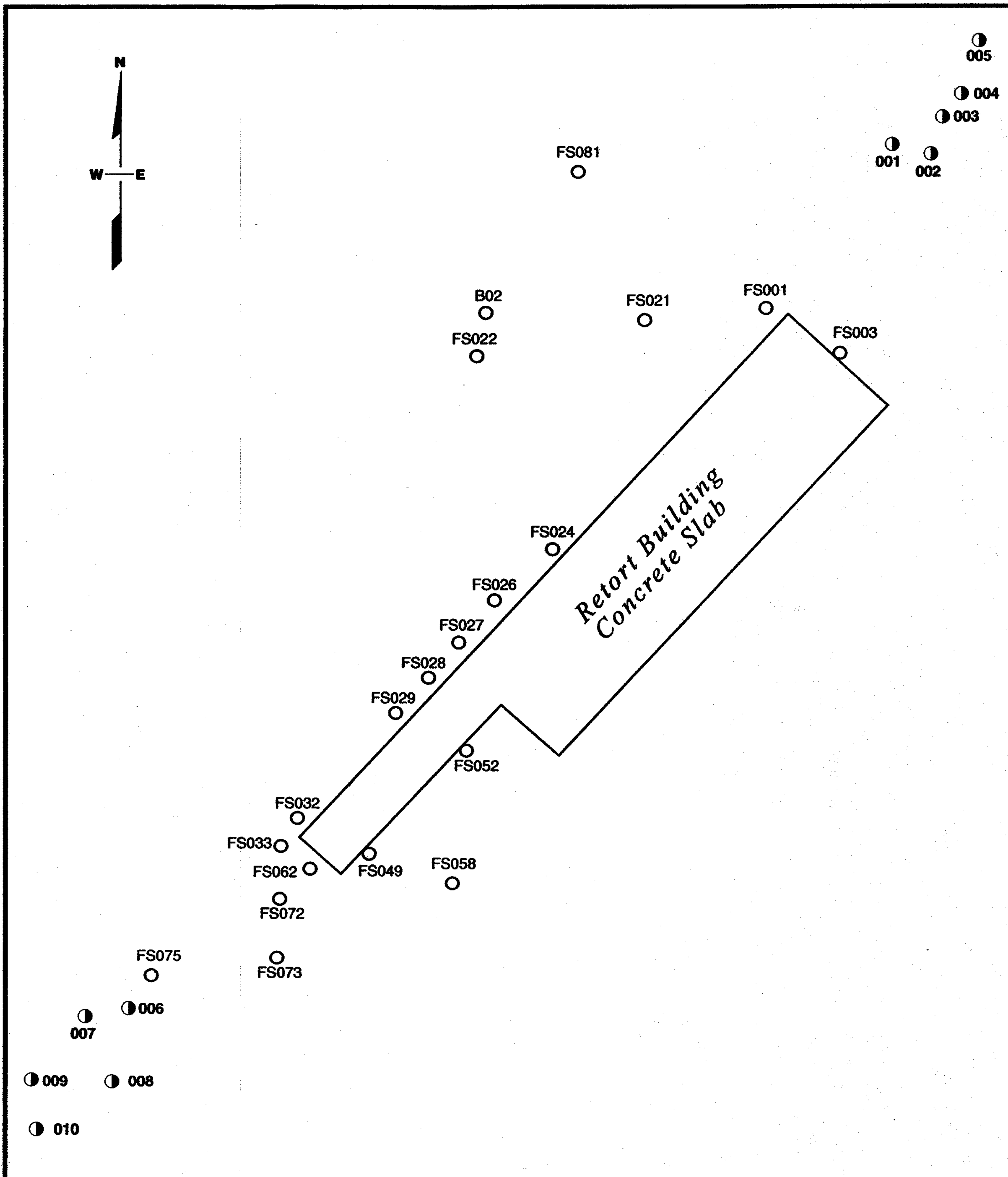
Red Devil Site Assessment
2001 Laboratory Soil Sampling Results

Parameters	Analytical Method	Sample Location	Slag pile (prior to treatment)	West end of retort debris pile (prior to treatment)	Duplicate of 21SLAG-02	Process Tailing Pile	Process Tailing Pile	Process Tailing pile	East of Retort Bldg. Slab	East of Retort Bldg. Slab	East of Retort Bldg. Slab	East of Retort Bldg. Slab
		Sample ID	**21RDSLAG-01**	**21SLAG-02**	**21SLAG-03**	**21RDOR-001**	**21RDOR-002**	**21RDOR-003**	**21RDSL-001**	**21RDSL-002**	**21RDSL-003**	**21RDSL-004**
Total Antimony (mg/kg)	SW846 6020		NT	NT	NT	2650	1620	276	NT	NT	NT	NT
Total Arsenic (mg/kg)	SW846 6020		NT	NT	NT	4080	812	430	647	362	336	738
Total Lead (mg/kg)	SW846 6020		NT	NT	NT	13.3	9.6	13.9	NT	NT	NT	NT
TCLP Mercury (mg/L)	SW7470A		4.5	0.00646	0.00566	0.0304	ND(0.002)	0.0022	NT	NT	NT	NT
Total Mercury (mg/kg)	SW846-7471A		20,300	1,100	1,060	429	259F	261F	240F	2,600	183	45.6

Parameters*	Analytical Method	Sample Location	East of Retort Bldg. Slab	West of Retort Bldg. Slab	West of Retort Bldg. Slab	West of Retort Bldg. Slab	West of Retort Bldg. Slab	West of Retort Bldg. Slab
		Sample ID	**21RDSL-005**	**21RDSL-006**	**21RDSL-007**	**21RDSL-008**	**21RDSL-009**	**21RDSL-010**
Total Arsenic (mg/kg)	SW846 6020		419	5,890	4,960	3,200	3,140	3,100
Total Mercury (mg/kg)	SW846-7471A		95.4	196F	1,640	1,210	666	404

NOTES:

Samples locations collected on October 17, 2001, prior to debris consolidation. Information used for treatability study and XRF correlation. See Figure A-1 in Appendix A sample locations.
mg/kg - milligrams per kilogram
mg/L - milligrams per liter
ND - Not detected; the reporting detection limit is provided in parentheses.
TCLP - toxicity characteristic leaching procedure
F-Indicates an estimated value that falls below PQL, but is greater than the MDL.



◑ Wilder/URS 2001 Surface Soil Sample. See Appendix A for results.
Laboratory Sample ID: 2001-RD-SL-**001**

○ Surface Soil Sample Location Analyzed by HLA for
TCLP Mercury and Arsenic.
Field Screen Sample Location ID: **FS072**
See HLA Source Area Removal and Investigation (April 1, 2001)

0 7.5 15 30 60
APPROXIMATE SCALE IN FEET

2001 Laboratory Soil Sample Locations Red Devil Mine

JOB NO: 26219358	DRAWN: CH	**Figure No. A-1**
DATE: 02/01/03	FILE: 2001 Samples.AI	

APPENDIX A
Niton (XRF) Readings for the "Analytical" Group of Samples

MT2 Sample No.	Sample Description	Niton Sample #	Concentration, ppm or mg./kg. (1)														
			As	Cr	Co	Cu	Fe	Pb	Mn	Hg	Mo	Ni	Rb	Se	Sr	Zn	Zr
10--32	21RDSLAG01	150	10200	1430			33.4K	284		5790		15500	143		319		
		151	9320				27.0K			2980		12000	150		232		35.6
10--33	21RDSLAG02	152	12900				40.2K								282	202	59
		153	14600				38.2K						85.2		313		60.9
10--34	21RDSLAG03	156	14100				45.7K			233			84.3		255		59.5
		157	14400				58.1K			268					206		52.8
10--35	21RDOR001	159	1270				16.1K			106			102		111	141	86
		160	1210				15.4K			102			64.8		142		110
10--36	21RDOR002	161	949				13.2K			60			89.6		88.6	72.2	137
		162	796				13.0K			64.3			97.7		95.6	85.1	115
10--37	21RDOR003	163	239				20.4K			35			115		54.9	123	89.6
		164	318				21.4K		1370				149		60.1	116	85.8
10--38	21RDSL001	165	462		706		16.4K			81.5			121		49.1	90	105
		166	466				17.5K			51.6			97.1		53.8	80.7	96.7
10--39	21RDSL002	167	608				16.7K			134		307	124		76.1		83.8
		168	436				14.9K			103			95.2		34.3		83.1
10--40	21RDSL003	169	279				17.5K			75.3		2410	94.8		54.9		105
		171	340		608		19.6K		1080	72			103		65	75.2	106
10--41	21RDSL004	172	150				12.6K						78.1		68.6		131
		173	174				13.0K		890				91.9		34.6		114
10--42	21RDSL005	174	311				14.9K						81.2		47.2	79.3	127
		175	387				17.4K			54.1			110		44.4		115
10--43	21RDSL006	176	4260				22.0K						121		97.2	107	65.1
		177	4530				20.1K						74		145		63
10--44	21RDSL007	179	4090				20.5K			48.3			142		214		52
		180	4020		618		19.5K		1480	459			146		134		61.5
10--45	21RDSL008	181	2490				20.1K			165			72.7		81.6		63.6
		182	2430				19.9K			158			63.3		106	123	56.3
10--46	21RDSL009	183	2370				21.3K		1520	116			88.8		96		53
		184	1990				21.8K			98.5			100		99.7		71.3
10--47	21RDSL010	185	1690				21.8K		1260	103			120		98.2		82.3
		186	1590				21.0K		1940	86.4			83.1		75.1	102	65.6
	AVERAGE =		3542.97	1430	644			284	1362.86	476.833		7554.25	102.927		119.813	107.423	83.5968

Conclusions:

(1.) Only one sample has high Hg; many samples have low levels of Hg.
(2.) The Pb level is very low; only one sample has Pb.
(3.) Many samples have high As.
(4.) All samples have high iron

APPENDIX B
Red Devil Niton Readings, Brick and Wood Surface Samples

MT2 Sample No.	Total Metals Analyses, Niton, ppm or mg/kg									
Sample Section	Not Scraped					Scraped				
Top	As	Hg	Pb	Fe	Other	As	Hg	Pb	Fe	Other
10--10	869	108	44	7320	Ni-254	128	35	25	1630	Zn-148
10--28	809	82	91	7560	Sr-365	2370	106	0	9130	Sr-347
10--29	422	66	0	9570	Cu-136K	88	0	47	8930	Cu-5690
10--30	69300	5190	0	18500	Ni-35.2K	10700	358	0	12200	Zn-338
Bottom	As	Hg	Pb	Fe	Other	As	Hg	Pb	Fe	Other
10--10	1080	192	77	9500	Zn-153	97	32	0	900	Cu-68.4
10--28	1360	163	0	6940	Zr-504	135	71	123	5530	Mn-761
10--29	354	0	0	10900	Cu-82K	58	0	91	10.1K	Cu-16.1K
10--30	20200	4180	0	15800	Ni-49.1K	55.6K	2970	0	12.9K	Sr-357
Side-1	As	Hg	Pb	Fe	Other	As	Hg	Pb	Fe	Other
10--10	1040	182	63	8450	Zn-291	283	42	0	639	Zn-311
10--28	474	48	82	14300	Sr-504	358	65	103	12.2K	Mn-2290
10--29	142	0	0	9320	Cu-8200	0	0	0	9110	Cu-2440
10--30	50300	3080	0	14300	Sr-456	43.1K	2450	0	12.1K	Sr-376
Side-2	As	Hg	Pb	Fe	Other	As	Hg	Pb	Fe	Other
10--10	229	37	0	1380	Zn-80.5	99	28	0	355	Zn-60.2
10--28	3300	5560	0	8980	Sr-364	3950	1600	0	7210	Mn-3390
10--29	375	0	0	8770	Cu-42.7K	197	258	0	12.9K	Cu-21.6K
10--30	60500	7720	0	20500	Sr-624	114K	2570	0	14.7K	Sr-565
End-1	As	Hg	Pb	Fe	Other	As	Hg	Pb	Fe	Other
10--10	135	35	0	745	Zn-100	191	33	29	969	Zn-114
10--28	1280	219	147	6010	Zr-1060	210	86	114	7510	Sr-413
10--29	0	37	66	10400	Cu-25K	0	172	0	11.9K	Cu-16.5K
10--30	83000	6690	0	16600	Ni-26.1K	38.1K	1700	0	8270	Sr-404
End On(Exposed)	As	Hg	Pb	Fe	Other					
10--10	481	0	0	4100	N/A					
10--28	179	29	89	5320	Mn-699					
10--29	0	0	0	8200	Cu-933					
10--30	12500	0	0	5350	Sr-281					
Averages sides	As	Hg	Pb	Fe	Other	As	Hg	Pb	Fe	Other
10--10	671	111	37	5479		159	34	11	899	
10--28	1445	1214	64	8758		1405	386	68	7345	
10--29	259	21	13	9792		69	86	28	9020	
10--30	56660	5372	0	17140		10700	2010	0	10235	

APPENDIX C
Red Devil TCLP Lab Data

No.	MT2 Test Number	Feed ID		pH Data			TCLPLeach Info			TCLP Filtrate Data					
		Client Description	MT2 Sample Number	Natural pH of Sample	HCl, 1M		Sample Wt. Gms.	Solution Vol. Liters	TCLP Leach Solution No.	Filtrate			Metals Conc.(1)		
					RT	Heat/RT				pH	EMF mv(2)	Color	Pb mg/l	As mg/l	Hg mg/l
1	4-78-1	1	10-5	11.82	9.98	3.23	40.00	0.80	1	11.85	149	n/a	0.20		
2	4-78-2	1A	10-6	4.76			40.00	0.80	1	4.93	505	n/a	0.00	**10.8**	**6.09**
3	4-78-3	2	10-7	6.32	1.62		20.00	0.40	1	5.25	315	n/a	0.30	**14.6**	**0.26**
4	4-78-4	3	10-8	6.59	1.59		40.00	0.80	1	4.95	247	n/a	0.00	<0.5	0.02
5	4-78-5	4	10-9	6.16	1.50		40.00	0.80	1	5.01	482	n/a	0.50	2	0.15
6	4-78-6	5	10-10	5.8	1.44		29.00	0.58	1	4.94	455	n/a	1.10	3	0.17
7	4-78-7	6	10-11	6.68	1.55		40.00	0.80	1	4.94	450	n/a	0.70	1.5	0.02
8	4-78-8	7	10-12	6.2	1.25		40.00	0.80	1	4.88	374	n/a	0.20		
9	4-78-9	8	10-13	6.3	1.14		40.00	0.80	1	4.86	451	n/a	0.30		0.04
10	4-78-10	9	10-14	5.4	1.34		40.00	0.80	1	4.91	510	n/a	0.30		<0.01
11	4-78-11	10	10-15	5.09	1.29		40.00	0.80	1	4.89	546	n/a	0.30		
12	4-78-12	11	10-16	4.75			40.00	0.80	1	4.89	542	n/a	0.30		
13	4-78-13	12	10-17	7.09	1.61		40.00	0.80	1	5.15	456	n/a	0.00	**10.6**	<0.01
14	4-78-14	13	10-18	6.33	1.39		40.00	0.80	1	5.02	442	n/a	0.60	4	<0.01
15	4-78-15	14	10-19	6.55	1.29		40.00	0.80	1	5.00	440	n/a	0.70	**5.5**	0.03
16	4-78-16	15	10-20	7.11	1.58		40.00	0.80	1	5.10	445	n/a	0.00	<0.5	<0.01
17	4-78-17	16	10-21	7.19	1.50		40.00	0.80	1	5.02	484	n/a	0.00	<0.5	<0.01
18	4-78-18	17	10-22	6.52	1.30		40.00	0.80	1	4.97	460	n/a	0.00	4.5	0.03
19	4-78-19	18	10-23	7.02	1.47		40.00	0.80	1	5.33	459	n/a	0.60	4.5	0.06
20	4-78-20	19	10-24	6.23	2.52		40.00	0.80	1	4.94	458	n/a	0.60	**32**	0.02
21	4-78-21	20	10-25	6.17	1.38		40.00	0.80	1	4.99	457	n/a	0.60	**10**	0.01
22	4-78-22	21	10-26	6.06	1.33		40.00	0.80	1	4.99	453	n/a	0.50	4	<0.01
23	4-78-23	22	10-27	6.87	4.83		40.00	0.80	1	6.57	419	n/a	0.50	1	<0.01
24	4-78-24	23	10-28	6.22	1.79		40.00	0.80	1	4.91	302	n/a	0.10	<0.5	
25	4-78-25	24	10-29	7.49	1.21		40.00	0.80	1	4.94	462	n/a	0.06	<0.5	
26	4-78-26	25	10-30	3.8			40.00	0.80	1	4.83	422	n/a	0.07	**48.8**	**2.19**
27	4-78-27	26	10-31	6.25	1.34		40.00	0.80	1	4.85	322	n/a	0.09	2	0.02

Note: (1.) Lab Assays completed by: Pb MT2(AA); As CTE (AA); Hg Hazen(cold vapor)
(2.) EMF measurements are taken vs. a Ag/AgCl reference electrode.

Sample Preparation:

MT2 #10–10: Saw off several boards 1/4 inch pieces. Reduce in size with a chisle to smaller pieces and add to the TCLP vessel.
MT2 #10–28: Scored and then broke off a slice of the brick (1/2 inch) from the middle broken section of the brick. Cruched this section to - 3/8 inch with a hammer in a plastic bag.
MT2# 10–29: Same as above.
MT2 #10–30: Same as above.
MT2 #10–31: This ore sample was crushed to -3/8 inch in a plastic bag with a hammer.

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APPENDIX B

APPENDIX B

SURVEY CONTROL DATA

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TERRA SURVEYS, LLC / WILDER CONSTRUCTION COMPANY, INC.

02017 - RED DEVIL MINE SITE

SURVEY CONTROL DATA

HORIZONTAL DATUM: ALASKA STATE PLANE, ZONE 6, NAD83, US SURVEY FEET
VERTICAL DATUM: SCALED FROM PROJECT PLANS: BUREAU OF LAND MANAGEMENT - 2002 REMOVAL ACTION, FIGURE 5, INERT DEBRIS MONOFILL LOCATIONS (BASED ON USGS MINE SURVEY, 1963)
NOTE: MONUMENT **"RDM-03 2000"** WAS SCALED ON PROJECT PLANS AND RE-ASSIGNED AN ELEVATION OF **305.0'** TO PROVIDE UNIFORMITY BETWEEN SURVEY DATA SETS.

PT NO	ASPC Z6, NAD83, US FT NORTHING	ASPC Z6, NAD83, US FT EASTING	SCALED ELEV	DESCRIPTION	NOTES
1	2836054.78	1759190.39	293.11	**RDM-01 2000**	CONTROL MONUMENT, SET 2" ALCAP ON 5/8"X30" REBAR
2	2835664.10	1759399.35	356.22	**RDM-02 2000**	CONTROL MONUMENT, SET 2" ALCAP ON 5/8"X30" REBAR
3	2835749.84	1758927.11	305.00	**RDM-03 2000**	CONTROL MONUMENT, SET 2" ALCAP ON 5/8"X30" REBAR
21	2835321.88	1759021.92	337.17	RDM-02A SPK	SET 10" SPIKE, TEMP PT, FOR RETORT BLDG LOCATIVE TIES
22	2835592.05	1759005.46	309.40	RDM-02B SPK	SET 10" SPIKE, TEMP PT, FOR TOPOGRAPHIC SURVEY
31	2835837.87	1759626.36	357.10	RDM-02Z SPK	SET 10" SPIKE, TEMP PT, FOR AST LOCATIVE TIES
32	2835909.44	1759713.84	353.77	RDM-02Y SPK	SET 10" SPIKE, TEMP PT, FOR AST LOCATIVE TIES
33	2835939.27	1759877.02	353.45	RDM-02X SPK	SET 10" SPIKE, TEMP PT, FOR AST LOCATIVE TIES

COORDINATES BASED ON STATIC GPS OBSERVATIONS PROCESSED WITH CORS DATA FROM NGS STATIONS: KEN1 (KENAI) AND BAY2 (COLD BAY), 1997 EPOCH DATE.

	NAD83 GEOGRAPHIC (DEG MIN SEC.sec)			
	LATITUDE (N)	LONGITUDE (W)	E Ht (m)	STATION
1001	61°45' 37.887"	157°18' 51.805"	81.39	RDM-01 GPS
1002	61°45' 34.018"	157°18' 47.549"	100.60	RDM-02 GPS
1003	61°45' 34.912"	157°18' 57.343"	84.96	RDM-03 GPS
CORPSCON CONVERSION (ASPC Z6, NAD83, US FT)				
1001	2836054.78	1759190.39	293.11	RDM-01 GPS
1002	2835664.10	1759399.35	356.22	RDM-02 GPS
1003	2835749.84	1758927.11	305.00	RDM-03 GPS

MEAN SITE VALUES	
COVERGENCE:	00°36' 14.059"
SCALE FACTOR:	0.99991605

TERRA SURVEYS, LLC / WILDER CONSTRUCTION COMPANY, INC.

02017 - RED DEVIL MINE SITE

MONITOR WELL LOCATIONS

PT NO	ASPC Z6, NAD83, US FT NORTHING	EASTING	ELEV	DESCRIPTION	NOTES
201	2835457.86	1758933.83	320.34	MW01	AT REFERENCE MARK ON TOP OF PVC MONITOR TUBE
221	2835458.0	1758936.8	317.3	RAN	RANDOM GROUND SURFACE SHOT AT MW01
203	2835808.54	1759209.38	293.67	MW03	AT REFERENCE MARK ON TOP OF PVC MONITOR TUBE
223	2835807.9	1759206.7	291.1	RAN	RANDOM GROUND SURFACE SHOT AT MW03
204	2835757.03	1758970.40	305.02	MW04	AT REFERENCE MARK ON TOP OF PVC MONITOR TUBE
224	2835755.7	1758969.3	302.7	RAN	RANDOM GROUND SURFACE SHOT AT MW04
206	2836054.77	1759263.07	280.29	MW06	AT REFERENCE MARK ON TOP OF PVC MONITOR TUBE
226	2836053.6	1759264.0	277.7	RAN	RANDOM GROUND SURFACE SHOT AT MW06
207	2835198.81	1758912.07	343.55	MW07	AT REFERENCE MARK ON TOP OF PVC MONITOR TUBE
227	2835201.1	1758909.5	340.8	RAN	RANDOM GROUND SURFACE SHOT AT MW07

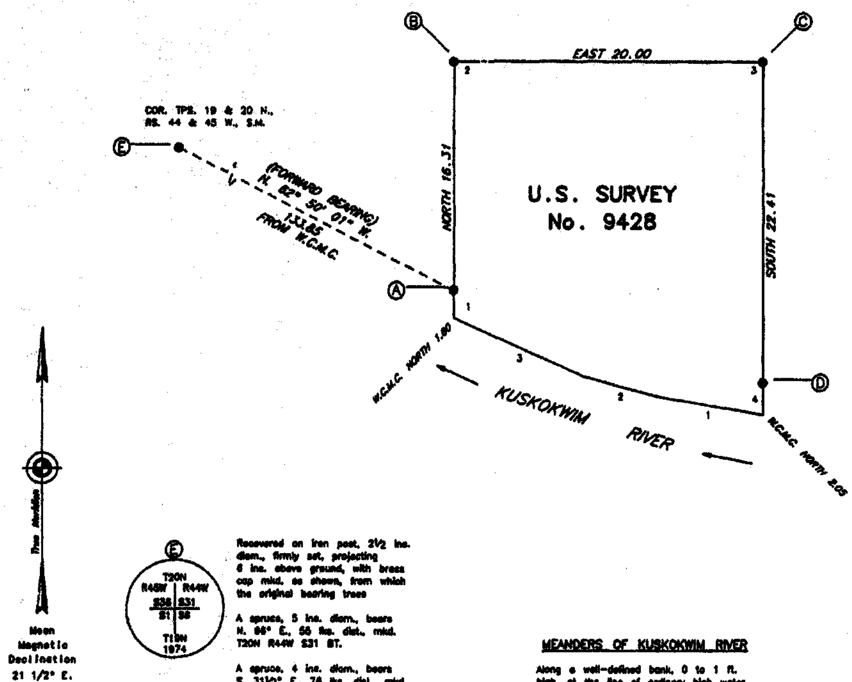
```
Volumes by Triangulation                                        09/09/2002
BORROW AREA QUANTITIES (USING INCLUSION AREA)
Comparing Triangulation files: C:\work2002\02017_red devil\trip2\field dwgs\original surfa
 and C:\work2002\02017_red devil\trip2\field dwgs\final surface.flt
Cut  volume: 90349.65 C.F., 3346.28 C.Y.
Fill volume: 7431.21 C.F., 275.23 C.Y.

Volumes by Triangulation                                        09/09/2002
RETORT MONOFILL QUANTITIES (USING INCLUSION AREA)
Comparing Triangulation files: C:\work2002\02017_red devil\trip2\field dwgs\original surfa
 and C:\work2002\02017_red devil\trip2\field dwgs\final surface.flt
Cut  volume: 2711.61 C.F., 100.43 C.Y.
Fill volume: 112136.41 C.F., 4153.20 C.Y.

Volumes by Triangulation                                        09/09/2002
INERT DEBRIS MONOFILL QUANTITES (USING LAYOUT DESIGN TEMPLATE, PER R.SCOTT)
Comparing Triangulation files: C:\work2002\02017_red devil\trip2\field dwgs\inert design t
 and C:\work2002\02017_red devil\trip2\field dwgs\final surface.flt
Cut  volume: 144.24 C.F., 5.34 C.Y.
Fill volume: 153366.83 C.F., 5680.25 C.Y.
```

Officially Filed ORIGINAL

DATE AUGUST 8, 1989



Recovered an iron post, 2½ ins. diam., firmly set, projecting 6 ins. above ground, with brass cap mkd. as shown, from which the original bearing trees

A spruce, 5 ins. diam., bears N. 86° E., 56 lks. dist., mkd. T20N R44W S31 BT.

A spruce, 4 ins. diam., bears S. 31½° E., 76 lks. dist., mkd. X BT.

A spruce, 5 lns. diam., bears S. 54° W., 74 lks. dist., mkd. T19N R45W S1 BT.

A spruce, 7 ins. diam., bears N. 27½° W., 69 lks. dist., mkd. T20N R45W S36 BT. (Record, N. 35° W.)

MEANDERS OF KUSKOKWIM RIVER

Along a well-defined bank, 0 to 1 ft. high, at the line of ordinary high water.

1.	N. 80° 22' W.,	7.02 chs.
2.	N. 74° 53' W.,	4.83 chs.
3.	N. 68° 26' W.,	9.16 chs.

Set on iron post, 28 ins. long, 2½ ins. diam., 26 ins. in the ground, with brass cap mkd. as shown, from which

A cottonwood, 6 ins. diam., bears N. 89¾° E., 75 lks. dist., mkd. X BT.

A cottonwood, 5 ins. diam., bears N. 16½° W., 101 lks. dist., mkd. X BT.

Bury a clear DEEP-1 magnet at the base of the iron post.

Set on iron post, 28 ins. long, 2½ ins. diam., 26 ins. in the ground, with brass cap mkd. as shown, from which

A cottonwood, 7 ins. diam., bears S. 68¼° W., 43 lks. dist., mkd. X BT.

A cottonwood, 6 ins. diam., bears N. 24¾° W., 37 lks. dist., mkd. X BT.

Bury a clear DEEP-1 magnet at the base of the iron post.

Set on iron post, 28 ins. long, 2½ ins. diam., 26 ins. in the ground, with brass cap mkd. as shown, from which

A spruce, 11 ins. diam., bears S. 27½° W., 57 lks. dist., mkd. C3 S9428 BT.

A cottonwood, 8 ins. diam., bears N. 42¼° W., 87 lks. dist., mkd. X BT.

Bury a clear DEEP-1 magnet at the base of the iron post.

Set on iron post, 28 ins. long, 2½ ins. diam., 26 ins. in the ground, with brass cap mkd. as shown, from which

A cottonwood, 6 ins. diam., bears N. 28¼° E., 41 lks. dist., mkd. X BT.

A spruce, 16 ins. diam., bears N. 29° W., 104 lks. dist., mkd. X BT.

Bury a clear DEEP-1 magnet at the base of the iron post.

I, Stanley E. Sears, Registered Alaska Land Surveyor No. LS-2087, HEREBY CERTIFY upon honor that, in pursuance of Special Instructions dated April 7, 1987, and Contract No. YA-551-CT8-340031 awarded April 11, 1988, I have executed the survey depicted on this plat of survey, in strict conformity with said special instructions, the Manual of Instructions for the Survey of the Public Lands of the United States, 1973, and the specific manner described on this plat.

May 26, 1989 Stanley E. Sears
(Date) (Signature)

STATE OF ALASKA 49TH Stanley E. Sears LS 2087 Registered Professional Land Surveyor

1 0 1 2 3 4 5 10 15 20
Chains

mmh

U.S. SURVEY No. 9428, ALASKA

This plat contains the entire survey record.

Township 19 North, Range 44 West, Seward Meridian, Alaska, was surveyed by Donald L. Dart, Cadastral Surveyor, in 1974 and 1975.

This survey was executed by Stanley E. Sears, Registered Alaska Land Surveyor No. LS-2087, for R&M Consultants, Inc., June 13 through June 29, 1988, in accordance with the specifications set forth in the Manual of Surveying Instructions, 1973, Special Instructions dated April 7, 1987, approved August 4, 1987, Contract No. YA-551-CT8-340031 awarded April 11, 1988, and Notice to Proceed dated June 1, 1988.

Field assistants were:

Michael H. Schoder
William S. Hoef
James R. Cunningham
Robert S. Terry
Karl D. Woods

Area: 39.98 Acres.

The azimuth was obtained from a solar observation and refers to the true meridian.

The geographic position of the witness corner to corner No. 1, a meander corner, as determined from a tie to the corner of Townships 19 and 20 North, Ranges 44 and 45 West, Seward Meridian, is:

Latitude: 61° 45' 44.80" North
Longitude: 157° 17' 34.89" West
NAD 27

The mean magnetic declination was taken from the National Oceanic and Atmospheric Administration McGrath Sectional Aeronautical Chart effective August 25, 1988, and is a 1985 isogonic value.

This survey is situated on the right bank of the Kuskokwim River, approximately 2 miles southeasterly of the village of Red Devil, Alaska.

The land, which is 0 to 10 feet above ordinary high water, is relatively level ground, vegetated by dense alder and willow brush with scattered cottonwood, spruce and birch trees.

Permafrost was not encountered below the topsoil of river silt and sand.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Anchorage, Alaska

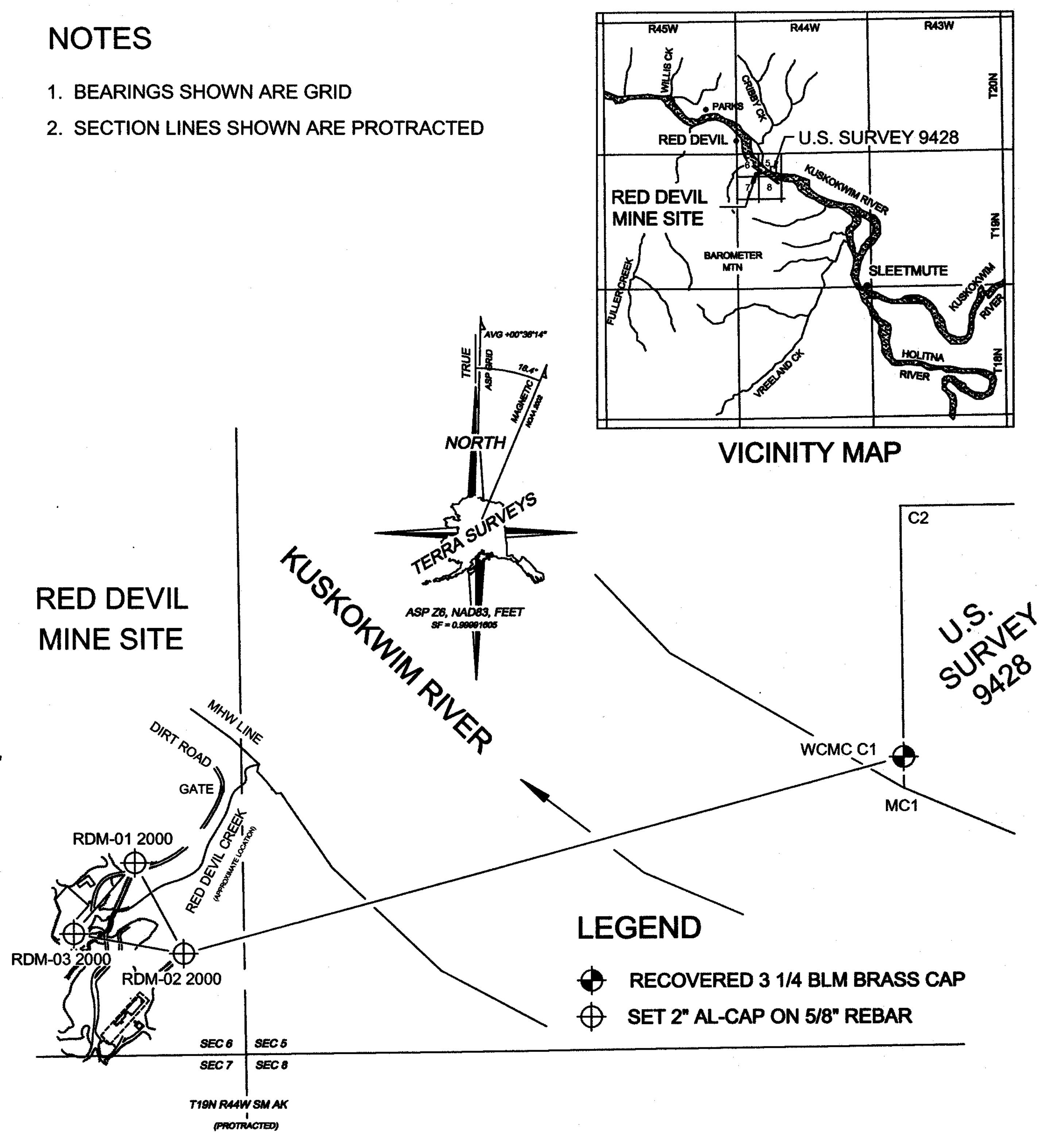
The survey represented by this plat, having been correctly executed in accordance with the requirements of law and the regulations of this Bureau, is hereby accepted.

Robert L. Anderson For the Director 10 JULY 1989
Date

Deputy State Director for Cadastral Survey, Alaska

NOTES

1. BEARINGS SHOWN ARE GRID
2. SECTION LINES SHOWN ARE PROTRACTED



LEGEND

- RECOVERED 3 1/4 BLM BRASS CAP
- SET 2" AL-CAP ON 5/8" REBAR

SOURCE: TERRA SURVEYS, LLC

BUREAU OF LAND MANAGEMENT
2002 REMOVAL ACTION

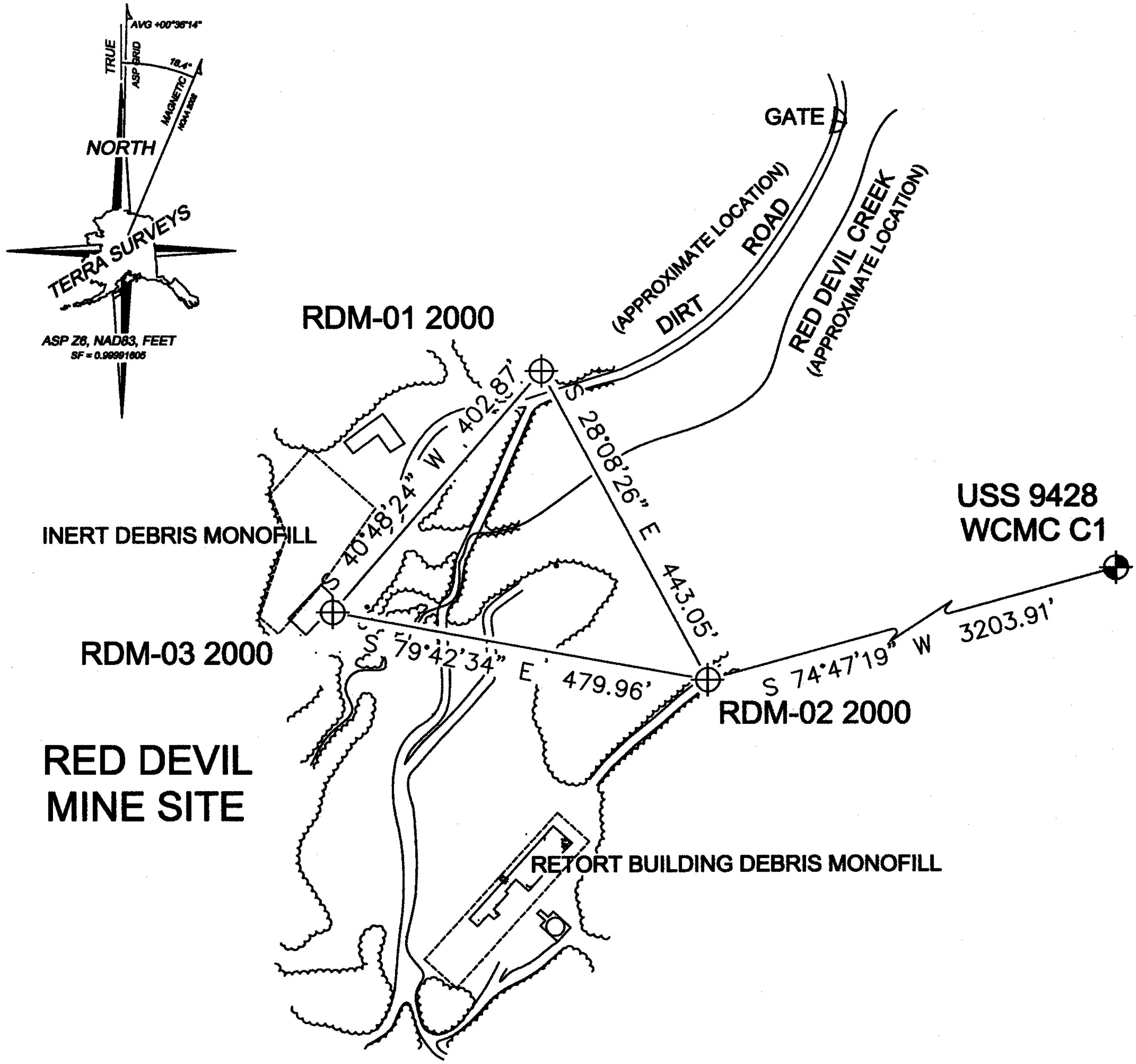
VICINITY SURVEY CONTROL DATA

RED DEVIL MINE, ALASKA

URS

JOB NO: 26219358	DRAWN: ARN
DATE: 12/18/02	FILE: RED DEVIL FIG6,B1, B2.DWG

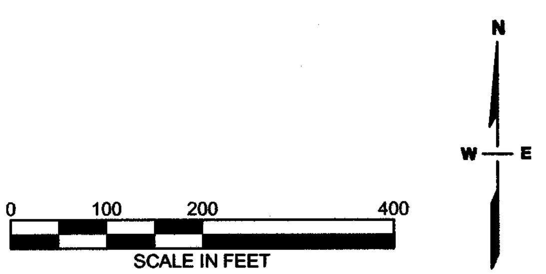
FIGURE B-1



LEGEND

- RECOVERED 3 1/4 BLM BRASS CAP
- SET 2" AL-CAP ON 5/8" REBAR
- GENERAL OUTLINE OF MONOFILLS

SOURCE: TERRA SURVEYS, LLC



BUREAU OF LAND MANAGEMENT 2002 REMOVAL ACTION		
SITE SURVEY CONTROL DATA RED DEVIL MINE, ALASKA		URS
JOB NO: 26219358	DRAWN: ARN	FIGURE B-2
DATE: 12/18/02	FILE: RED DEVIL FIG6,B1, B2.DWG	

G:\PROJECTS\26...8\FINAL REPORT\RED DEVIL FIG6,B1, B2.DWG; Revised Mon, 17 Mar 2003 - 1:42pm; Printed ... 17 Mar 2003 - 1:45pm

APPENDIX C

APPENDIX C

SITE PHOTOGRAPHS

1. Northeast view of mine site area prior to debris removal. Monofill #1 location visible at left of photo. Ore hopper and Monofill #2 location visible at far right of photo.

2. North view of ore hopper and debris at mine site prior to consolidation.

BLM RED DEVIL MINE 2002 DEBRIS CONSOLIDATION PROJECT

3. South view of Retort Building debris pile prior to commencing construction of Monofill #2.

4. North view of Retort Building foundation prior to demolition of sidewalls and construction of berms for Monofill #2.

5. Northeast view of Retort Building foundation during demolition of sidewalls.

6. Applying Ecobond™ mercury encapsulant treatment into Retort Building foundation cracks prior to bringing area to final grade for placement of bottom geomembrane for Monofill #2.

7. Northeast view of process mine tailings area during application of Ecobond™ encapsulant for use as backfill material at Retort Building debris monofill (Monofill #2).

8. North view of process tailings area during grading and contouring of area after completion of work at site.

9. Treating retort furnace bricks with Ecobond^{TM} bath for mercury fixation treatment.

10. Typical view of housing structure prior to demolition (House 3).

11. Typical view of activities during demolition of housing area buildings. Debris was wetted down to minimize dust.

12. Typical view of housing areas after removal of debris to inert debris monofill (Monofill #1).

13. North view during construction of Monofill #1 on north side of site, prior to disposal of inert debris.

14. West view during placement of inert demolition debris in Monofill #1. Temporary stockpile of soil cap material shown at left.

15. Western view during compaction of inert debris and placement of soil cover at Monofill #1.

16. View of Monofill #1 during placement of inert building debris and compaction.

17. Western view of Gravel Storage Pad debris after treatment with Ecobond™ mercury encapsulant, which gives the debris a green hue. Flagging for monitoring well seen in center of photograph.

18. Southwest view of Gravel Storage Pad after removal of all debris. Monitoring well visible in center of photograph with flagging.

19. Northwest view of Monofill #2 after demolishing Retort Building foundation sidewalls. View is during construction and leveling of base course prior to placement of bottom liner geomembrane and geotextile. Tailings have been treated with Ecobond™ arsenic encapsulant.

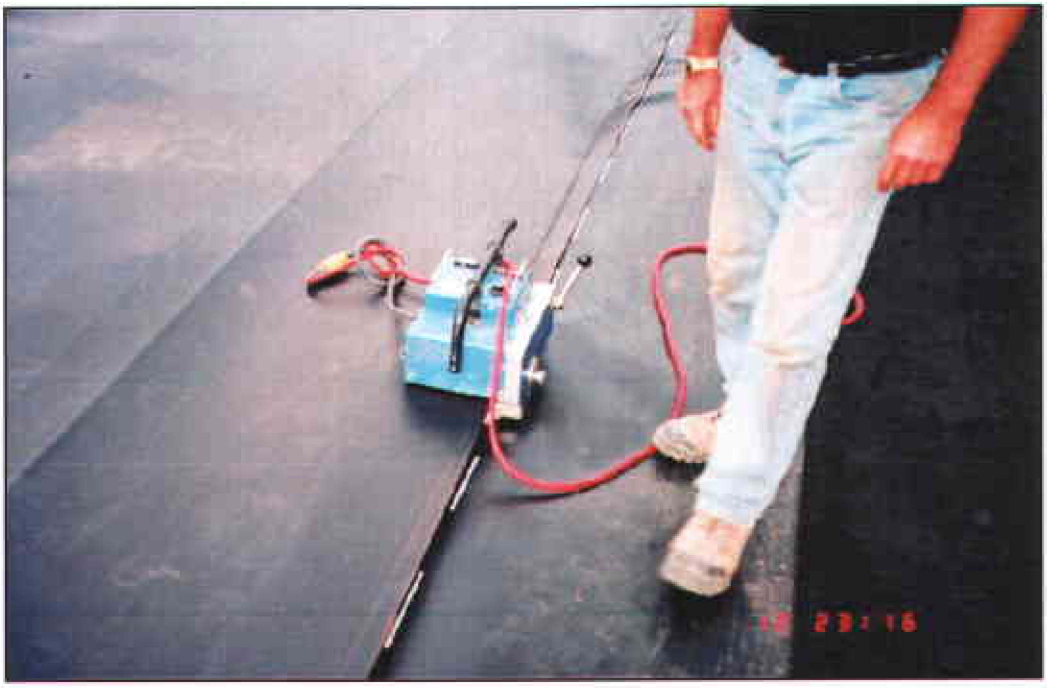
20. South view of Monofill #2 during construction of berms.

21. North view of Monofill #2 during placement of geotextile layers and bottom geomembrane.

22. Southwest view of Monofill #2 during construction. Bottom liner and geotextile visible.

23. North view of Monofill #2 just prior to placement of 1-foot lift of tailings and 3-foot lift of debris.

24. Northwest view of Monofill #2 during placement of a 1-foot layer of tailings treated with Ecobond™ arsenic encapsulant. Tailings layer placed above bottom liner and geotextile layer.



25. Extrusion welding unit used during construction of geomembrane for Monofill #2.

26. North view of Monofill #2 during placement of Retort Building debris and tailings treated with Ecobond™ arsenic encapsulant. Tailings used as void filling material.

27. Northeast view during placement of tailings treated with Ecobond™ arsenic encapsulant on top of Retort Building debris for use as void filler. Excavator is lifting Ecobond™ mercury encapsulant treatment container for spray application on debris.

28. Southeast view of Monofill #2 after placement of Retort Building debris and treated tailings over debris. View prior to placement of top geomembrane.

29. Northeast view during compaction and placement of treated tailings above the Retort Building debris at Monofill #2.

30. Southwest view of Monofill #2 at completion of Retort Building debris compaction and placement of treated tailings. Placement of geotextile liner for top geomembrane visible at left.

31. Southwest view during placement of top geomembrane cover for Monofill #2. Geotextile layer visible underneath the geomembrane.

32. Northeast view of Monofill #2 geomembrane top cover during seam welding operations.

33. West view of Monofill #2 at completion of soil cover above geomembrane. Drainage channel visible at left.

34. Northeast view of Monofill #2 at completion. Drainage channel visible at right. Ore hopper left in place for eventual disposal under separate contract (visible at top-right of photo).

35. Northeast view of Monofill #2 from the southern extent during final grading and cover compaction.

36. View southeast of inert debris Monofill #1 during final cover placement and construction of drainage channel along north perimeter. Former hoist shack foundation in view near excavator.

37. North view of inert debris Monofill #1 at completion, looking from Gravel Storage Pad.

38. Southern view of inert debris Monofill #1 during revegetation of soil cover.

39. Southeast view of inert debris Monofill #1 at completion. Monitoring well MW-04 visible at center of photo.

40. View southwest of inert debris Monofill #1 at completion of cover placement and seeding.

APPENDIX D

APPENDIX D

WEC SITE MONITORING REPORT AND DATA

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WHITE ENVIRONMENTAL CONSULTANTS INC.

CLOSEOUT REPORT

RED DEVIL MINE FIELD SCREENING

AND

EXPOSURE MONITORING

Prepared for
Wilder Construction Inc.
By White Environmental Consultants, Inc.

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Garret Slaugenhoup, Field Manager
Matt White, PE, CIH, Project Design/Oversight

Work Summary

As part of the Red Devil Mine Restoration Project, WEC Inc. conducted field screening of contaminated materials and exposure monitoring of Wilder Construction Inc. personnel during excavation and placement of contaminated mine tailings and building debris. Multi-elemental field portable XRF (X-Ray Fluorescence) was used for comprehensive site-specific study to address localized hazards created during ore processing (e.g., arsenic-enriched tailing piles, mercury vapor condensation zones preserved in structural material, unknown spill areas, etc.).

Monitoring Summary

Personnel and area monitoring for metals and total airborne fibers were performed according to standard OSHA air monitoring practices. NIOSH Method 7400 (Counting rules A), "Asbestos and other airborne fibers via PCM," was used during building demolition. Analysis of airborne metals was performed using NIOSH Method 7702, "Lead by Field Portable XRF." This method was successfully extrapolated to arsenic and particulate mercury.

Time-Weighted Averages (TWAs) for worker exposure to all contaminants did not exceed any of OSHA's PELs during the course of work.

In one instance, a TWA calculated for an area sample (sample # AM-069; Saturday June 29th, 2002) exceeded the Permissible Exposure Limit (PEL) for arsenic. Grade C Protective Equipment (respiratory protection factor of 10) worn by operators successfully reduced breathable dust below the PEL.

Asbestos and other airborne fibers did not exceed EPA clearance levels of 0.01 fibers/cubic centimeters during any work activities.

Please see Attachment 1: "AIR MONITORING RED DEVIL" for all daily reports.

Field Screening Summary

Metals screening of debris, tailings, and sediments associated with the mine restoration were performed according to EPA METHOD 6200, "Field Portable X-Ray Fluorescence spectrometry for the determination of elemental concentrations in soil and sediment." Various sampling media were utilized for screening, including: in-situ soil sampling, sieved/bag soil, wipes, bulk wood, and bulk clothing.

Please see Attachment 2: "NITON READINGS.xls" for field sampling results.

Submitted Nov. 14, 2002

Garret Slaugenhoup

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ATTACHMENT 1 – WEC AIR MONITORING

METALS AIR MONITORING
ASBESTOS AIR MONITORING

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WHITE ENVIRONMENTAL CONSULTANTS INC.

TIME-WEIGHTED AVERAGE CONCENTRATIONS, AIRBORNE METALS

Client Job #

WEC Job #02I-184

Saturday, June 8 2002 | Workday length: 10 hours

SMPL	WORKER	TASK	Filter C, in ug As	Filter C, in ug Hg	Filter C, in ug Pb	Flow, LPM	Min.	M^3	Airborne C, ug/ M3 As	Airborne C, ug/ M3 Hg	Airborne C, ug/ M3 Pb	TWA, ug/M3 As	TWA, ug/M3 Hg	TWA, ug/M3 Pb
AM-003	Julian Iya	dozer / backhoe operation, AM	0.9	2.1	2.1	3.1	135	0.419	2.2	5.0	5.0	0.6	<1.5	<1.6
AM-006		dozer / backhoe operation, PM	0.9	2.1	2.8	3.1	280	0.868	1.0	2.4	3.2			
AM-005	Jerry Moore	dozer / backhoe operation, PM; driving / walking	1.3	3.4	4.8	3.1	250	0.775	1.7	4.4	6.2	<0.5	<1.4	<2.0
AM-002	Bob Nathan	surveying and walking around site	0.7	2.5	2.8	3.1	150	0.465	1.5	5.4	6.0	<0.2	<0.6	<0.7
AM-001	Robert Vanderpool Jr.	cutting pipe with chopsaw, AM	2.6	2.4	15.7	3.1	125	0.388	6.7	6.2	40.5	0.8	<1.1	3.8
AM-004		brush clearing and walking around site, PM	1.1	3	2.5	3.1	115	0.357	3.1	8.4	7.0			
AM-007	Ronnie Vanderpool	clearing brush, PM	1.3	2.1	2.5	3.1	210	0.651	2.0	3.2	3.8	0.6	<0.9	<1.1
AM-008		cutting pipe with chopsaw, PM	1.5	2.5	2.5	3.1	45	0.140	10.8	17.9	17.9			

Gray background = < Limit of Detection

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m^3 (with skin notation)

Mercury: 8 ug/m^3

Lead: 40 ug/m^3; 24 ug/m^3 OSHA "Action Level"

Technician:

Date:

WEC WHITE ENVIRONMENTAL CONSULTANTS INC.

TIME-WEIGHTED AVERAGE CONCENTRATIONS, AIRBORNE METALS

Client Job #

WEC Job #02I-184

Monday, June 10 2002

Workday length: 10 hours

SMPL	WORKER	TASK	Filter C, in ug As	Filter C, in ug Hg	Filter C, in ug Pb	Flow, LPM	Min.	M^3	Airborne C, ug/ M3 As	Airborne C, ug/ M3 Hg	Airborne C, ug/ M3 Pb	TWA, ug/M3 As	TWA, ug/M3 Hg	TWA, ug/M3 Pb
AM-012	Julian Iya	dozer / backhoe operation, AM	0.9	2.1	2.1	3.1	240	0.744	1.2	2.8	2.8	1.1	<1.6	<1.9
AM-013		dozer / backhoe operation, PM	1.7	1.8	2.5	3.1	260	0.806	2.1	2.2	3.1			
AM-010	Jerry Moore	dozer / backhoe operation, PM; driving / walking	0.7	1.6	2.1	3.1	250	0.775	0.9	2.1	2.7	0.3	<0.7	<0.9
AM-011	Ronnie Vanderpool	cutting pipe, clearing around hopper legs	0.5	2.4	2.8	3.1	240	0.744	0.7	3.2	3.8	0.2	<1.0	<0.6

Gray background = < Limit of Detection

Non-worker Samples

SMPL	WORKER	TASK	Filter C, in ug As	Filter C, in ug Hg	Filter C, in ug Pb	Flow, LPM	Min.	M^3	Airborne C, ug/ M3 As	Airborne C, ug/ M3 Hg	Airborne C, ug/ M3 Pb	TWA, ug/M3 As	TWA, ug/M3 Hg	TWA, ug/M3 Pb
AM-014	AREA/DOWNWIND	Dozer headrest, PM	0.7	2.5	2.8	3.1	150	0.465	1.5	5.4	6.0	na	na	na

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m^3 (with skin notation)

Mercury: 8 ug/m^3

Lead: 40 ug/m^3; 24 ug/m^3 OSHA "Action Level"

Technician:

Date:

WHITE ENVIRONMENTAL CONSULTANTS INC.

TIME-WEIGHTED AVERAGE CONCENTRATIONS, AIRBORNE METALS

Client Job # | WEC Job #02I-184

Tuesday, June 11 2002 | Workday length: 10 hours

SMPL	WORKER	TASK	Filter C, in ug			Flow,			Airborne C, ug/ M3			TWA, ug/M3		
			As	Hg	Pb	LPM	Min.	M^3	As	Hg	Pb	As	Hg	Pb
AM-019	Jeff Carlstrom	walking site, cutting brush, constructing silt fence	1.5	2.4	3.1	3.1	286	0.887	1.7	1.4	2.2	0.7	<1.1	<1.4
			Gray background = < Limit of Detection											
			Non-worker Samples											
AM-017	AREA/DOWNWIND	Dozer headrest, all day sample	1.1	2.5	2.8	3.1	515	1.597	0.7	1.6	1.8	na	na	na
AM-018	AREA/DOWNWIND	Dump Truck headrest, all day sample	0.9	2.1	3	3.1	544	1.686	0.5	3.9	0.8	na	na	na

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m^3 (with skin notation)

Mercury: 8 ug/m^3

Lead: 40 ug/m^3; 24 ug/m^3 OSHA "Action Level"

Technician:

Date:

WHITE ENVIRONMENTAL CONSULTANTS INC.

TIME-WEIGHTED AVERAGE CONCENTRATIONS, AIRBORNE METALS

Client Job #

WEC Job #02I-184

Wednesday, June 12 2002

Workday length: 10 hours

SMPL	WORKER	TASK	Filter C, in ug As	Filter C, in ug Hg	Filter C, in ug Pb	Flow, LPM	Min.	M^3	Airborne C, ug/ M3 As	Airborne C, ug/ M3 Hg	Airborne C, ug/ M3 Pb	TWA, ug/M3 As	TWA, ug/M3 Hg	TWA, ug/M3 Pb
AM-022	Robert Vanderpool Jr.	digging around survey stakes and cutting brush	0.9	1.9	2.4	3.1	256	0.794	1.1	1.7	1.4	0.4	<0.8	<1.0
AM-024	Garret Slaugenhoup	soil sampling with NITON and site survey	2.2	2.1	2.4	3.1	242	0.750	2.9	0.7	3.4	0.9	<0.9	<1.0

Gray background = < Limit of Detection

Non-worker Samples

SMPL	WORKER	TASK	Filter C, in ug As	Filter C, in ug Hg	Filter C, in ug Pb	Flow, LPM	Min.	M^3	Airborne C, ug/ M3 As	Airborne C, ug/ M3 Hg	Airborne C, ug/ M3 Pb	TWA, ug/M3 As	TWA, ug/M3 Hg	TWA, ug/M3 Pb
AM-023	AREA/DOWNWIND	Excavator headrest, all day sample	1.3	1.6	2.5	3.1	591	1.832	0.7	0.9	1.4	na	na	na
AM-024	AREA/DOWNWIND	3/4 Ton truck dashboard, all day sample	1.5	1.6	2.1	3.1	579	1.795	0.8	1.9	1.1	na	na	na

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m^3 (with skin notation)

Mercury: 8 ug/m^3

Lead: 40 ug/m^3; 24 ug/m^3 OSHA "Action Level"

Tech[redacted]n:

[redacted]e:

WEC WHITE ENVIRONMENTAL CONSULTANTS INC.

TIME-WEIGHTED AVERAGE CONCENTRATIONS, AIRBORNE METALS

Client Job #

WEC Job #02I-184

Thursday, June 13 2002

Workday length: 11 hours

Non-worker Samples

SMPL	WORKER	TASK	Filter C, in ug As	Filter C, in ug Hg	Filter C, in ug Pb	Flow, LPM	Min.	M^3	Airborne C, ug/ M3 As	Airborne C, ug/ M3 Hg	Airborne C, ug/ M3 Pb	TWA, ug/M3 As	TWA, ug/M3 Hg	TWA, ug/M3 Pb
AM-026	AREA/DOWNWIND	Dozer headrest, all day sample	1.9	2.1	2.5	3.1	573	1.776	1.1	1.2	1.4	na	na	na
AM-027	AREA/DOWNWIND	Survey Tripod- inert #1 hub	1.5	1.6	2.1	3.1	567	1.758	0.9	1.9	1.1	na	na	na
AM-028	AREA/DOWNWIND	Excavator headrest, all day sample	1.3	2.4	2.8	3.1	659	2.043	0.6	3.8	0.7	na	na	na

Gray background = < Limit of Detection

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 7 ug/m^3 (with skin notation)

Mercury: 7 ug/m^3

Lead: 36 ug/m^3; 22 ug/m^3 OSHA "Action Level"

Technician:

Date:

WHITE ENVIRONMENTAL CONSULTANTS INC.

Client Job #

WEC Job #

OSHA PERMISSIBLE EXPOSURE LEVELS (PELS) FOR DIFFERENT WORK DAY LENGTHS, AIRBORNE METALS

		Day Length, Hours											
		8.0	**8.5**	**9.0**	**9.5**	**10.0**	**10.5**	**11.0**	**11.5**	**12.0**	**12.5**	**13.0**	**13.5**
C, in ug/M^3	**Arsenic**	10.0	9.4	8.9	8.4	8.0	7.6	7.3	7.0	6.7	6.4	6.2	5.9
	Mercury	10.0	9.4	8.9	8.4	8.0	7.6	7.3	7.0	6.7	6.4	6.2	5.9
	Lead	50.0	47.1	44.4	42.1	40.0	38.1	36.4	34.8	33.3	32.0	30.8	29.6
	Lead "Action Level"	30.0	28.2	26.7	25.3	24.0	22.9	21.8	20.9	20.0	19.2	18.5	17.8
Fibers/cc	**Asbestos**	0.0100	0.0094	0.0089	0.0084	0.0080	0.0076	0.0073	0.0070	0.0067	0.0064	0.0062	0.0059

PELs are dependent on workday length and Class D personal protection equipment.

Class C PPE (Tyvek, half-face APR) provides a protection factor of 10 times listed PELs.

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WEC WHITE ENVIRONMENTAL CONSULTANTS INC.

TIME-WEIGHTED AVERAGE CONCENTRATIONS, AIRBORNE METALS

Client Job #: A4400-03 | WEC Job #02I-184

Friday, June 14 2002 | Workday length: 10 hours

Non-worker Samples

SMPL	WORKER	TASK	Filter C, in ug As	Filter C, in ug Hg	Filter C, in ug Pb	Flow, LPM	Min.	M^3	Airborne C, ug/ M3 As	Airborne C, ug/ M3 Hg	Airborne C, ug/ M3 Pb	TWA, ug/M3 As	TWA, ug/M3 Hg	TWA, ug/M3 Pb
AM-032	AREA/DOWNWIND	Excavator headrest, all day sample	3	4.8	8.4	3.1	608	1.885	1.6	2.5	4.5	na	na	na
AM-033	AREA/DOWNWIND	Dozer headrest, all day sample	2.2	1.8	2.5	3.1	589	1.826	1.2	1.5	1.7	na	na	na
AM-034	AREA/DOWNWIND	Loader headrest, all day sample	1.3	2.1	3.2	3.1	596	1.848	0.7	3.0	1.1	na	na	na

Gray background = < Limit of Detection

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m^3 (with skin notation)

Mercury: 8 ug/m^3

Lead: 40 ug/m^3; 24 ug/m^3 OSHA "Action Level"

Technician: Date:

WHITE ENVIRONMENTAL CONSULTANTS INC.

TIME-WEIGHTED AVERAGE CONCENTRATIONS, AIRBORNE METALS

Client Job #: A4400-03 | WEC Job #02I-184

Saturday, June 15 2002 | Workday length: 10 hours

Non-worker Samples

SMPL	WORKER	TASK	Filter C, in ug			Flow,			Airborne C, ug/ M3			TWA, ug/M3		
			As	Hg	Pb	LPM	Min.	M^3	As	Hg	Pb	As	Hg	Pb
AM-036	AREA/DOWNWIND	Dump truck cab, all day sample	0.7	1.6	2.5	2.1	559	1.174	0.6	1.4	2.1	na	na	na
AM-037	AREA/DOWNWIND	Dozer headrest, all day sample	0.9	2.1	3	2.1	555	1.166	0.8	2.7	1.1	na	na	na
AM-038	AREA/DOWNWIND	Excavator headrest, all day sample	1.7	2.5	2.4	2.1	605	1.271	1.3	1.9	1.3	na	na	na

Gray background = < Limit of Detection

Test Samples

SMPL	WORKER	TASK	As	Hg	Pb	LPM	Min.	M^3	As	Hg	Pb	As	Hg	Pb
TEST-1	PERSONAL	Tailings pile - walking and digging	24	14	2.5	3.1	550	1.71	14.1	8.1	1.5	22	13	2.3
		*actual volume = approx. 0.03 M3												

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m^3 (with skin notation)

Mercury: 8 ug/m^3

Lead: 40 ug/m^3; 24 ug/m^3 OSHA "Action Level"

Tech[illegible]n:

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WHITE ENVIRONMENTAL CONSULTANTS INC.

TIME-WEIGHTED AVERAGE CONCENTRATIONS, AIRBORNE METALS

Client Job #: A4400-03

WEC Job #02I-184

Monday, June 17 2002

Workday length: 10 hours

Non-worker Samples

SMPL	WORKER	TASK	Filter C, in ug			Flow,			Airborne C, ug/ M3			TWA, ug/M3		
			As	Hg	Pb	LPM	Min.	M^3	As	Hg	Pb	As	Hg	Pb
AM-036	AREA/DOWNWIND	Excavator headrest, all day sample	7.1	2.1	3	3.1	563	1.745	4.1	1.2	1.7	**3.8**	1.1	1.6
AM-037	AREA/DOWNWIND	Dozer headrest, all day sample	2.2	2.1	2.1	3.1	543	1.683	1.3	1.6	1.3	n/a	n/a	n/a
AM-038	AREA/DOWNWIND	Roadway intersection, hot/cold side, on 'caustic' sign	1.1	1.6	2.8	3.1	538	1.668	0.7	2.4	1.2	n/a	n/a	n/a

Gray background = < Limit of Detection

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m^3 (with skin notation)

Mercury: 8 ug/m^3

Lead: 40 ug/m^3; 24 ug/m^3 OSHA "Action Level"

NOTES: **Approaching PEL for Arsenic with Excavator sample. Need to wet more.**

Technician:

Date:

WEC WHITE ENVIRONMENTAL CONSULTANTS INC.

Client Job #: A4400-03 | WEC Job #02I-184

Tuesday, June 18 2002 | Workday length: 10 hours

TIME-WEIGHTED AVERAGE CONCENTRATIONS, AIRBORNE METALS

Non-worker Samples

SMPL	WORKER	TASK	Filter C, in ug As	Filter C, in ug Hg	Filter C, in ug Pb	Flow, LPM	Min.	M^3	Airborne C, ug/ M3 As	Airborne C, ug/ M3 Hg	Airborne C, ug/ M3 Pb	TWA, ug/M3 As	TWA, ug/M3 Hg	TWA, ug/M3 Pb
AM-044	AREA/DOWNWIND	Excavator headrest, all day sample	2.4	4.3	5.1	3.1	592	1.835	1.3	2.3	2.8	n/a	n/a	n/a
AM-045	AREA/DOWNWIND	Dozer headrest, all day sample	1.1	2.4	2.5	3.1	592	1.835	0.6	4.0	0.6	n/a	n/a	n/a

Total Airborne Fibers via NIOSH 7400A

SMPL	WORKER	TASK	Fibers/fields	Flow, LPM	Min.	Liters	Airborne C, Fibers/cc	TWA, F/cc
AA-002	AREA/DOWNWIND	Excavator headrest, all day sample	18/100	3.1	538	1668	0.005	0.005

Gray background = < Limit of Detection

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m^3 (with skin notation)

Mercury: 8 ug/m^3

Lead: 40 ug/m^3; 24 ug/m^3 OSHA "Action Level"

Airborne Asbestos: 0.01 Fibers/cubic centimeters

Tech[illegible]n: [illegible]

WEC WHITE ENVIRONMENTAL CONSULTANTS INC.

Daily Air Monitoring Results
Airborne Metals/Fibers

Client Job #: A4400-03 | WEC Job #02I-184

Wednesday, June 19 2002 | Workday length: 10 hours

Non-worker Samples

SMPL	WORKER	TASK	Filter C, in ug As	Filter C, in ug Hg	Filter C, in ug Pb	Flow, LPM	Min.	M^3	Airborne C, ug/ M3 As	Airborne C, ug/ M3 Hg	Airborne C, ug/ M3 Pb	TWA, ug/M3 As	TWA, ug/M3 Hg	TWA, ug/M3 Pb
AM-048	AREA/DOWNWIND	Dozer headrest	0.9	2.1	3.3	3.1	560	1.736	0.5	1.2	1.9	**n/a**	**n/a**	**n/a**
AM-049	AREA/DOWNWIND	Excavator headrest AM (prior to asb. cassette)	0.7	2.1	4.5	3.1	46	0.143	4.9	14.7	31.6	**n/a**	**n/a**	**n/a**

Worker Samples

SMPL	WORKER	TASK	Filter C, in ug As	Filter C, in ug Hg	Filter C, in ug Pb	Flow, LPM	Min.	M^3	Airborne C, ug/ M3 As	Airborne C, ug/ M3 Hg	Airborne C, ug/ M3 Pb	TWA, ug/M3 As	TWA, ug/M3 Hg	TWA, ug/M3 Pb
AM-047	Jeff Carlstrom	Cutting LBP at power generator	3.9	2.1	2.7	3.1	263	0.815	4.8	2.6	3.3	**1.7**	**<0.9**	**<1.9**
AM-050	Robert Vanderpool, Jr	Cutting structural steel at retort slab	5.1	14	15	3.1	95	0.295	17.3	47.5	50.9	**<0.8**	**<2.2**	**<2.4**

Total Airborne Fibers via NIOSH 7400A

SMPL	WORKER	TASK	Fibers/fields	Flow, LPM	Min.	Liters	Airborne C, Fibers/cc	TWA, F/cc
AA-005	AREA/DOWNWIND	Excavator headrest, all day sample	24/100	3.1	510	1581	0.007	0.007

Gray background = < Limit of Detection

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m^3 (with skin notation)

Mercury: 8 ug/m^3

Lead: 40 ug/m^3; 24 ug/m^3 OSHA "Action Level"

Airborne Asbestos: 0.01 Fibers/cubic centimeters

Technician:

Date:

WHITE ENVIRONMENTAL CONSULTANTS INC.

Daily Air Monitoring Results
Airborne Metals/Fibers

Client Job #: A4400-03 | WEC Job #02I-184

Thursday, June 20 2002 | Workday length: 10 hours

SMPL	WORKER	TASK	Filter C, in ug			Flow, LPM	Min.	M^3	Airborne C, ug/ M3			TWA, ug/M3		
			As	Hg	Pb				As	Hg	Pb	As	Hg	Pb

Total Airborne Fibers via NIOSH 7400A

SMPL	WORKER	TASK	Fibers/fields	Flow, LPM	Min.	Liters	Airborne C, Fibers/cc	TWA, F/cc
AA-007	AREA/DOWNWIND	Excavator headrest, all day sample	21/100	2.1	570	1197	0.009	0.009

Gray background = < Limit of Detection

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m^3 (with skin notation)

Mercury: 8 ug/m^3

Lead: 40 ug/m^3; 24 ug/m^3 OSHA "Action Level"

Airborne Asbestos: 0.01 Fibers/cubic centimeters

Technician:

Date:

WHITE ENVIRONMENTAL CONSULTANTS INC.

Daily Air Monitoring Results
Airborne Metals/Fibers

Client Job #: A4400-03

WEC Job #02I-184

Friday, June 21 2002

Workday length: 10 hours

Non-worker Samples

SMPL	WORKER	TASK	Filter C, in ug			Flow,			Airborne C, ug/ M3			TWA, ug/M3		
			As	Hg	Pb	LPM	Min.	M^3	As	Hg	Pb	As	Hg	Pb
AM-052	AREA/DOWNWIND	Dozer headrest-Monofill#1	1.5	3.3	2.5	3.1	560	1.736	0.9	1.9	1.4	n/a	n/a	n/a
AM-053	AREA/DOWNWIND	Excavator headrest-Monofill#1	0.7	2.5	3.6	3.1	568	1.761	0.4	1.4	2.0	n/a	n/a	n/a

Gray background = < Limit of Detection

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m^3 (with skin notation)

Mercury: 8 ug/m^3

Lead: 40 ug/m^3; 24 ug/m^3 OSHA "Action Level"

Airborne Asbestos: 0.01 Fibers/cubic centimeters

Technician:

Date:

WHITE ENVIRONMENTAL CONSULTANTS INC.

Client Job #: A4400-03 | WEC Job #02I-184

Daily Air Monitoring Results
Airborne Metals/Fibers

Saturday June 22, 2002 | Workday length: 10 hours

Non-worker Samples

SMPL	WORKER	TASK	Filter C, in ug			Flow,			Airborne C, ug/ M3			TWA, ug/M3		
			As	Hg	Pb	LPM	Min.	M^3	As	Hg	Pb	As	Hg	Pb
AM-054	AREA/DOWNWIND	Dozer headrest, all day sample	1.7	3	2.5	3.1	563	1.745	1.0	1.7	1.4	n/a	n/a	n/a
AM-055	AREA/DOWNWIND	Excavator headrest, all day sample	0.7	2.5	3.8	3.1	543	1.683	0.4	6.0	0.6	n/a	n/a	n/a

Gray background = < Limit of Detection

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m^3 (with skin notation)

Mercury: 8 ug/m^3

Lead: 40 ug/m^3; 24 ug/m^3 OSHA "Action Level"

Technician:

Date:

WEC WHITE ENVIRONMENTAL CONSULTANTS INC.

Daily Air Monitoring Results
Airborne Metals/Fibers

Client Job #: A4400-03

WEC Job #02I-184

Monday June 24, 2002

Workday length: 10 hours

SMPL	WORKER	TASK	Filter C, in ug As	Hg	Pb	Flow, LPM	Min.	M^3	Airborne C, ug/ M3 As	Hg	Pb	TWA, ug/M3 As	Hg	Pb

Total Airborne Fibers via NIOSH 7400A

SMPL	WORKER	TASK	Fibers/fields	Flow, LPM	Min.	Liters	Airborne C, Fibers/cc	TWA, F/cc
AA-009	AREA/DOWNWIND	Excavator headrest-all day sample	16/100	2.6	575	1495	0.005	0.005
AA-010	AREA/DOWNWIND	Dump truck headrest-all day sample	8.5/100	2.6	538	1399	0.003	0.003

Gray background = < Limit of Detection

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m^3 (with skin notation)

Mercury: 8 ug/m^3

Lead: 40 ug/m^3; 24 ug/m^3 OSHA "Action Level"

Airborne Asbestos: 0.01 Fibers/cubic centimeters

Technician:

Date:

WHITE ENVIRONMENTAL CONSULTANTS INC.

Daily Air Monitoring Results
Airborne Metals/Fibers

Client Job #: A4400-03

WEC Job #02I-184

Tuesday June 25, 2002

Workday length: 10 hours

Non-worker Samples

SMPL	WORKER	TASK	Filter C, in ug As	Filter C, in ug Hg	Filter C, in ug Pb	Flow, LPM	Min.	M^3	Airborne C, ug/M3 As	Airborne C, ug/M3 Hg	Airborne C, ug/M3 Pb	TWA, ug/M3 As	TWA, ug/M3 Hg	TWA, ug/M3 Pb
AM-057	AREA/DOWNWIND	Excavator Headrest-Gravel St. Pad/Powerhs., Inert Mono#1--All day sample	1.9	2.5	3	3.1	633	1.962	1.0	1.3	1.5	n/a	n/a	n/a
AM-058	AREA/DOWNWIND	Loader Headrest-Gravel St. Pad, Powerhs, Inert Mono#1-All day sample	1.5	2.5	4.1	3.1	568	1.761	0.9	2.9	1.4	n/a	n/a	n/a

Total Airborne Fibers via NIOSH 7400A

SMPL	WORKER	TASK	Fibers/fields	Flow, LPM	Min.	Liters	Airborne C, Fibers/cc	TWA, F/cc
AA-012	AREA/DOWNWIND	Excavator Headrest-Demo of House #4	11.5/100	3.1	172	533	0.010	0.009

Gray background = < Limit of Detection

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m^3 (with skin notation)

Mercury: 8 ug/m^3

Lead: 40 ug/m^3; 24 ug/m^3 OSHA "Action Level"

Airborne Asbestos: 0.01 Fibers/cubic centimeters

Technician:

Date:

WHITE ENVIRONMENTAL CONSULTANTS INC.

Daily Air Monitoring Results
Airborne Metals/Fibers

Client Job #: A4400-03

WEC Job #02I-184

Wednesday June 26, 2002

Workday length: 10 hours

Non-worker Samples

SMPL	WORKER	TASK	Filter C, in ug			Flow,			Airborne C, ug/ M3			TWA, ug/M3		
			As	Hg	Pb	LPM	Min.	M^3	As	Hg	Pb	As	Hg	Pb
AM-061	AREA/DOWNWIND	Robert Vanderpool, Jr.-AM sample	1.1	2.5	3	3.1	167	0.518	2.1	4.8	5.8	0.6	1.3	1.6
		Debris Segregation @hopper												
AM-060	AREA/DOWNWIND	Julian Iya- Excavator headrest-AM sample	1.5	2.8	2.5	3.1	200	0.620	2.4	4.5	4.0	0.8	1.5	1.3
		Debris Segregation @hopper												

Gray background = < Limit of Detection

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m^3 (with skin notation)

Mercury: 8 ug/m^3

Lead: 40 ug/m^3; 24 ug/m^3 OSHA "Action Level"

Airborne Asbestos: 0.01 Fibers/cubic centimeters

Technician:

Date:

WHITE ENVIRONMENTAL CONSULTANTS INC.

Daily Air Monitoring Results
Airborne Metals/Fibers

Client Job #: A4400-03 | WEC Job #02I-184

Thursday June 27, 2002 | Workday length: 10 hours

Non-worker Samples

SMPL	WORKER	TASK	Filter C, in ug			Flow,			Airborne C, ug/ M3			TWA, ug/M3		
			As	Hg	Pb	LPM	Min.	M^3	As	Hg	Pb	As	Hg	Pb
AM-062	AREA/DOWNWIND	Excavator Headrest-all day sample: powerhs.	0.7	2.5	3	3.1	578	1.792	0.4	1.4	1.7	n/a	n/a	n/a
		hopper, inert mono#1												
AM-063	AREA/DOWNWIND	Dozer Headrest-all day sample:	1.3	3.3	2.5	3.1	580	1.798	0.7	1.8	1.4	n/a	n/a	n/a
		powerhs., inert mono#1												
AM-064	AREA/DOWNWIND	Dump Headrest-all day sample: powerhs.,	1.9	2.8	2.5	3.1	593	1.838	1.0	1.5	1.4	n/a	n/a	n/a
		hopper debris												

Gray background = < Limit of Detection

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m^3 (with skin notation)

Mercury: 8 ug/m^3

Lead: 40 ug/m^3; 24 ug/m^3 OSHA "Action Level"

Airborne Asbestos: 0.01 Fibers/cubic centimeters

Technician:

Date:

WEC WHITE ENVIRONMENTAL CONSULTANTS INC.

Daily Air Monitoring Results
Airborne Metals/Fibers

Client Job #: A4400-03 | WEC Job #02I-184

Friday June 28, 2002 | Workday length: 10 hours

Non-worker Samples

SMPL	WORKER	LOCATION/TASK	Filter C, in ug As	Filter C, in ug Hg	Filter C, in ug Pb	Flow, LPM	Min.	M^3	Airborne C, ug/ M3 As	Airborne C, ug/ M3 Hg	Airborne C, ug/ M3 Pb	TWA, ug/M3 As	TWA, ug/M3 Hg	TWA, ug/M3 Pb
AM-066	AREA/DOWNWIND	Adjacent to Wilder tool shed-all day sample	0.7	2.5	3.3	3.1	591	1.832	0.4	1.4	1.8	n/a	n/a	n/a
		Demo of warehouse, truck traffic, etc.												
AM-067	AREA/DOWNWIND	Loader headrest-all day sample	2.2	2.5	3	3.1	243	0.753	2.9	3.3	4.0	n/a	n/a	n/a
		GSP, Warehs demo., H2O roads												

Gray background = < Limit of Detection

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m^3 (with skin notation)

Mercury: 8 ug/m^3

Lead: 40 ug/m^3; 24 ug/m^3 OSHA "Action Level"

Airborne Asbestos: 0.01 Fibers/cubic centimeters

Technician:

Date:

WHITE ENVIRONMENTAL CONSULTANTS INC.

Client Job #: A4400-03 | WEC Job #02I-184

Saturday June 29, 2002 | Workday length: 10 hours

Daily Air Monitoring Results
Airborne Metals/Fibers

Non-worker Samples

SMPL	WORKER	LOCATION/TASK	Filter C, in ug			Flow,			Airborne C, ug/ M3			TWA, ug/M3		
			As	Hg	Pb	LPM	Min.	M^3	As	Hg	Pb	As	Hg	Pb
AM-069	AREA/DOWNWIND	Excavator Headrest-all day sample	19	8.3	0.9	3.1	603	1.869	10.1	4.4	0.5	10.2	4.4	<LOD
		debris from GSParea (AM);retort debris (PM)												
AM-071	AREA/DOWNWIND	Dump truck headrest-all day sample	2.6	3.3	2.8	3.1	555	1.721	1.5	1.9	1.6	2.4	<LOD	<LOD
		debris from GSParea (AM);retort debris (PM)												

Worker Sample Airborne Metals

SMPL	WORKER	LOCATION/TASK	Filter As	Filter Hg	Filter Pb	Flow, LPM	Min.	M^3	Airborne As	Airborne Hg	Airborne Pb	TWA As	TWA Hg	TWA Pb
AM-070	AREA/DOWNWIND	Jeff Carlstrom-(AM) handling retort bricks	5.3	2.5	0.7	3.1	396	1.228	4.3	2.0	0.6	2.8	<LOD	<LOD

Gray background = < Limit of Detection

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m³ (with skin notation)

Mercury: 8 ug/m³

Lead: 40 ug/m³; 24 ug/m³ OSHA "Action Level"

Airborne Asbestos: 0.01 Fibers/cubic centimeters

Tech[illegible]n:

[illegible]:

WHITE ENVIRONMENTAL CONSULTANTS INC.

Daily Air Monitoring Results
Airborne Metals/Fibers

Client Job #: A4400-03 | WEC Job #02I-184

Monday July 1, 2002 | Workday length: 10 hours

SMPL	WORKER	LOCATION/TASK	Filter C, in ug As	Filter C, in ug Hg	Filter C, in ug Pb	Flow, LPM	Min.	M^3	Airborne C, ug/ M3 As	Airborne C, ug/ M3 Hg	Airborne C, ug/ M3 Pb	TWA, ug/M3 As	TWA, ug/M3 Hg	TWA, ug/M3 Pb
		Non-worker Samples												
AM-073	AREA/DOWNWIND	Excavator headrest-all day sample	7.1	3.8	3.6	3.1	542	1.680	4.2	2.3	2.1	n/a	n/a	n/a
		Retort debris/ not operating (PM)												
AM-076	AREA/DOWNWIND	Area sample taken from downwind	0.9	2.5	3.3	3.1	367	1.138	0.8	2.2	2.9	n/a	n/a	n/a
		of retort debris												
		Worker Sample Airborne Metals												
AM-074	AREA/DOWNWIND	Bob Nathan	1.5	2.5	3.7	3.1	356	1.104	1.4	2.3	3.4	0.8	<LOD	2.2
		Watering retort debris												

Gray background = < Limit of Detection

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m^3 (with skin notation)

Mercury: 8 ug/m^3

Lead: 40 ug/m^3; 24 ug/m^3 OSHA "Action Level"

Airborne Asbestos: 0.01 Fibers/cubic centimeters

Technician:

Date:

WHITE ENVIRONMENTAL CONSULTANTS INC.

Client Job #: A4400-03

WEC Job #02I-184

Daily Air Monitoring Results
Airborne Metals/Fibers

Tuesday July 2, 2002

Workday length: 10 hours

Non-worker Samples

SMPL	WORKER	LOCATION/TASK	Filter C, in ug			Flow,			Airborne C, ug/ M3			TWA, ug/M3		
			As	Hg	Pb	LPM	Min.	M^3	As	Hg	Pb	As	Hg	Pb
AM-078	AREA/DOWNWIND	Dozer Headrest-all day sample-GSP, Retort bench, inert monofill	3.6	2.5	2.5	3.1	598	1.854	1.9	1.3	1.3	n/a	n/a	n/a
AM-079	AREA/DOWNWIND	Loader Headrest- loading out hand picked debris	4.4	2.5	2.5	3.1	591	1.832	2.4	1.4	1.4	n/a	n/a	n/a

Gray background = < Limit of Detection

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m^3 (with skin notation)

Mercury: 8 ug/m^3

Lead: 40 ug/m^3; 24 ug/m^3 OSHA "Action Level"

Airborne Asbestos: 0.01 Fibers/cubic centimeters

Technician:

Date:

WEC WHITE ENVIRONMENTAL CONSULTANTS INC.

Daily Air Monitoring Results
Airborne Metals/Fibers

Client Job #: A4400-03

WEC Job #02I-184

Wednesday July 3, 2002

Workday length: 10 hours

Non-worker Samples

SMPL	WORKER	LOCATION/TASK	Filter C, in ug As	Filter C, in ug Hg	Filter C, in ug Pb	Flow, LPM	Min.	M^3	Airborne C, ug/ M3 As	Airborne C, ug/ M3 Hg	Airborne C, ug/ M3 Pb	TWA, ug/M3 As	TWA, ug/M3 Hg	TWA, ug/M3 Pb
AM-082	AREA/DOWNWIND	Loader headrest-all day sample	4.6	2.5	3.3	3.1	249	0.772	6.0	3.2	4.3	n/a	n/a	n/a
AM-083	AREA/DOWNWIND	Area sample adj to decon & retort debris area	1.5	2.5	3	3.1	187	0.580	2.6	4.3	5.2	n/a	n/a	n/a

Worker Sample Airborne Metals

SMPL	WORKER	LOCATION/TASK	Filter C, in ug As	Filter C, in ug Hg	Filter C, in ug Pb	Flow, LPM	Min.	M^3	Airborne C, ug/ M3 As	Airborne C, ug/ M3 Hg	Airborne C, ug/ M3 Pb	TWA, ug/M3 As	TWA, ug/M3 Hg	TWA, ug/M3 Pb
AM-081	Bob Nathan	Handling retort debris, retort bench	8.3	2.5	3.3	3.1	246	0.763	10.9	3.3	4.3	3.4	<LOD	<LOD

Gray background = < Limit of Detection

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m^3 (with skin notation)

Mercury: 8 ug/m^3

Lead: 40 ug/m^3; 24 ug/m^3 OSHA "Action Level"

Airborne Asbestos: 0.01 Fibers/cubic centimeters

Technician:

Date:

WEC WHITE ENVIRONMENTAL CONSULTANTS INC.

Daily Air Monitoring Results
Airborne Metals/Fibers

Client Job #: A4400-03 | WEC Job #02I-184

Monday July 8, 2002 | Workday length: 10 hours

Non-worker Samples

SMPL	WORKER	LOCATION/TASK	Filter C, in ug			Flow,			Airborne C, ug/ M3			TWA, ug/M3		
			As	Hg	Pb	LPM	Min.	M^3	As	Hg	Pb	As	Hg	Pb
AM-085	AREA/DOWNWIND	Excavator Headrest-AM sample	2.6	2.5	3.4	3.1	316	0.980	2.7	2.6	3.5	n/a	n/a	n/a
		Retort bench												
AM-086	AREA/DOWNWIND	Dozer Headrest- All day sample	0.4	2.5	2.8	3.1	573	1.776	0.2	1.4	1.6	n/a	n/a	n/a
		Retort bench												
AM-087	AREA/DOWNWIND	Downwind of retort debris pile	0.9	2.5	3.6	3.1	555	1.721	0.5	1.5	2.1	n/a	n/a	n/a

Gray background = < Limit of Detection

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m^3 (with skin notation)

Mercury: 8 ug/m^3

Lead: 40 ug/m^3; 24 ug/m^3 OSHA "Action Level"

Airborne Asbestos: 0.01 Fibers/cubic centimeters

Technician:

Date:

WHITE ENVIRONMENTAL CONSULTANTS INC.

Daily Air Monitoring Results
Airborne Metals/Fibers

Client Job #: A4400-03

WEC Job #02I-184

Tuesday July 9, 2002

Workday length: 10 hours

Non-worker Samples

SMPL	WORKER	LOCATION/TASK	Filter C, in ug As	Filter C, in ug Hg	Filter C, in ug Pb	Flow, LPM	Min.	M^3	Airborne C, ug/ M3 As	Airborne C, ug/ M3 Hg	Airborne C, ug/ M3 Pb	TWA, ug/M3 As	TWA, ug/M3 Hg	TWA, ug/M3 Pb
AM-089	AREA/DOWNWIND	Loader Headrest-all day sample	4	2.5	3.3	3.1	604	1.872	2.1	1.3	1.8	n/a	n/a	n/a
		Retort bench, powerhs.												
AM-090	AREA/DOWNWIND	Dozer Headrest- (AM) sample	1.5	2.5	8.4	3.1	430	1.333	1.1	1.9	6.3	n/a	n/a	n/a
		Retort bench												
AM-091	AREA/DOWNWIND	Area sample-on fuel pump at GSP	1.9	2.5	3.3	3.1	581	1.801	1.1	1.4	1.8	n/a	n/a	n/a
		adj to decon and truck traffic												

Gray background = < Limit of Detection

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m^3 (with skin notation)

Mercury: 8 ug/m^3

Lead: 40 ug/m^3; 24 ug/m^3 OSHA "Action Level"

Airborne Asbestos: 0.01 Fibers/cubic centimeters

Technician:

Date:

WEC WHITE ENVIRONMENTAL CONSULTANTS INC.

Daily Air Monitoring Results
Airborne Metals/Fibers

Client Job #: A4400-03 | WEC Job #02I-184

Wednesday July 10, 2002 | Workday length: 10 hours

Non-worker Samples

SMPL	WORKER	LOCATION/TASK	Filter C, in ug			Flow,			Airborne C, ug/ M3			TWA, ug/M3		
			As	Hg	Pb	LPM	Min.	M^3	As	Hg	Pb	As	Hg	Pb
AM-093	AREA/DOWNWIND	Loader headrest-all day sample	3.2	2.5	3	3.1	672	2.083	1.5	1.2	1.4	n/a	n/a	n/a
		inert, H2O roads												
AM-095	AREA/DOWNWIND	Adj area sample-downwind of work @retort	1.1	2.4	3.4	3.1	300	0.930	1.2	2.6	3.7	n/a	n/a	n/a

Worker Sample Airborne Metals

SMPL	WORKER	LOCATION/TASK	As	Hg	Pb	LPM	Min.	M^3	As	Hg	Pb	As	Hg	Pb
AM-094	Bob Nathan	Jackhammering concrete, cutting rebar	5.3	2.5	5.3	3.1	320	0.992	5.3	2.5	5.3	2.8	<LOD	2.8

Gray background = < Limit of Detection

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m^3 (with skin notation)

Mercury: 8 ug/m^3

Lead: 40 ug/m^3; 24 ug/m^3 OSHA "Action Level"

Airborne Asbestos: 0.01 Fibers/cubic centimeters

Techn[illegible]n:

D[illegible]:

WHITE ENVIRONMENTAL CONSULTANTS INC.

Daily Air Monitoring Results
Airborne Metals/Fibers

Client Job #: A4400-03 | WEC Job #02I-184

Thursday July 11, 2002 | Workday length: 10 hours

Non-worker Samples

SMPL	WORKER	LOCATION/TASK	Filter C, in ug As	Filter C, in ug Hg	Filter C, in ug Pb	Flow, LPM	Min.	M^3	Airborne C, ug/ M3 As	Airborne C, ug/ M3 Hg	Airborne C, ug/ M3 Pb	TWA, ug/M3 As	TWA, ug/M3 Hg	TWA, ug/M3 Pb
AM-097	AREA/DOWNWIND	Dozer headrest-all day sample grading hot cell	2.2	2.5	3.8	3.1	700	2.170	1.0	1.2	1.8	n/a	n/a	n/a
AM-098	AREA/DOWNWIND	Area adjacent to Ecobond application (GSP)	1.9	2.5	3.3	3.1	594	1.841	1.0	1.4	1.8	n/a	n/a	n/a

Gray background = < Limit of Detection

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m³ (with skin notation)

Mercury: 8 ug/m³

Lead: 40 ug/m³; 24 ug/m³ OSHA "Action Level"

Airborne Asbestos: 0.01 Fibers/cubic centimeters

Technician:

Date:

WEC WHITE ENVIRONMENTAL CONSULTANTS INC.

Daily Air Monitoring Results
Airborne Metals/Fibers

Client Job #: A4400-03

WEC Job #02I-184

Friday July 12, 2002

Workday length: 10 hours

Non-worker Samples

SMPL	WORKER	LOCATION/TASK	Filter C, in ug			Flow,			Airborne C, ug/ M3			TWA, ug/M3		
			As	Hg	Pb	LPM	Min.	M^3	As	Hg	Pb	As	Hg	Pb
AM-100	AREA/DOWNWIND	Excavator headrest-AM sample	4.2	2.5	2.8	3.1	552	1.711	2.5	1.5	1.6	n/a	n/a	n/a
		Moving inert fill, borrow tailings pile, laying liner												
AM-101	AREA/DOWNWIND	Dozer headrest-all day sample	1.7	2.5	3.3	3.1	695	2.155	0.8	1.2	1.5	n/a	n/a	n/a
		Constructing berms for hot cell												
AM-102	AREA/DOWNWIND	Loader headrest-all day sample	2.8	2.5	3.3	3.1	650	2.015	1.4	1.2	1.6	n/a	n/a	n/a
		Loading inert soils into dumptruck												
AM-103	AREA/DOWNWIND	Area sample-adj to Ecobond treatment	1.9	2.1	2.5	3.1	555	1.721	1.1	1.2	1.5	n/a	n/a	n/a
		(Adj to Bob Nathan, Robert Vanderpool Jr.)												

Gray background = < Limit of Detection

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m^3 (with skin notation)

Mercury: 8 ug/m^3

Lead: 40 ug/m^3; 24 ug/m^3 OSHA "Action Level"

Airborne Asbestos: 0.01 Fibers/cubic centimeters

Tech[illegible]n:

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WEC WHITE ENVIRONMENTAL CONSULTANTS INC.

Daily Air Monitoring Results
Airborne Metals/Fibers

Client Job #: A4400-03 | WEC Job #02I-184

Saturday July 13, 2002 | Workday length: 10 hours

Non-worker Samples

SMPL	WORKER	TASK	Filter C, in ug As	Hg	Pb	Flow, LPM	Min.	M^3	Airborne C, ug/ M3 As	Hg	Pb	TWA, ug/M3 As	Hg	Pb
AM-105	AREA/DOWNWIND	Dumptruck headrest-AM sample	1.7	2.1	2.5	3.1	268	0.831	2.0	2.5	3.0	n/a	n/a	n/a
		Hauling debris from Mess Hall												
AM-106	AREA/DOWNWIND	Dozer headrest-AM sample	1.7	2.5	2.5	3.1	262	0.812	2.1	3.1	3.1	n/a	n/a	n/a
		Inert monofill												
AM-107	AREA/DOWNWIND	Loader headrest-AM sample	1.7	2.8	1.8	3.1	265	0.822	2.1	3.4	2.2	n/a	n/a	n/a
		H2O for demo of Mess Hall												

Total Airborne Fibers via NIOSH 7400A

SMPL	WORKER	TASK	Fibers/fields	Flow, LPM	Min.	Liters	Airborne C, Fibers/cc	TWA, F/cc
AA-014	AREA/DOWNWIND	Excavator headrest, all day sample	14.5/100	3.1	143	443	0.015	0.01

Gray background = < Limit of Detection

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment
Arsenic: 8 ug/m^3 (with skin notation)
Mercury: 8 ug/m^3
Lead: 40 ug/m^3; 24 ug/m^3 OSHA "Action Level"
Airborne Asbestos: 0.01 Fibers/cubic centimeters

Technician:

Date:

WEC WHITE ENVIRONMENTAL CONSULTANTS INC.

Daily Air Monitoring Results
Airborne Metals/Fibers

Client Job #: A4400-03

WEC Job #02I-184

Monday July 15, 2002

Workday length: 10 hours

Non-worker Samples

SMPL	WORKER	LOCATION/TASK	Filter C, in ug			Flow,			Airborne C, ug/ M3			TWA, ug/M3		
			As	Hg	Pb	LPM	Min.	M^3	As	Hg	Pb	As	Hg	Pb
AM-109	AREA/DOWNWIND	Dozer Headrest- all day sample	2.4	2.1	2.5	3.1	562	1.742	1.4	1.2	1.4	n/a	n/a	n/a
		moving tailings in lined hot cell												
AM-110	AREA/DOWNWIND	Excavator headrest- all day sample	2.1	2.5	4	3.1	549	1.702	1.2	1.5	2.4	n/a	n/a	n/a
		excavating tailings pile (treated/untreated)												
AM-111	AREA/DOWNWIND	Loader Headrest- all day sample	3.2	2.5	3.4	3.1	570	1.767	1.8	1.4	1.9	n/a	n/a	n/a
		loading tailings for lined cell												
AM-112	AREA/DOWNWIND	Area sample-adj to retort debris	0.9	2.5	3	3.1	185	0.574	1.6	4.4	5.2	n/a	n/a	n/a
		(Bob Nathan/R. Vanderpool Jr. stacking bricks)												

Gray background = < Limit of Detection

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m^3 (with skin notation)

Mercury: 8 ug/m^3

Lead: 40 ug/m^3; 24 ug/m^3 OSHA "Action Level"

Airborne Asbestos: 0.01 Fibers/cubic centimeters

Tech[illegible]n:

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WHITE ENVIRONMENTAL CONSULTANTS INC.

Daily Air Monitoring Results
Airborne Metals/Fibers

Client Job #: A4400-03 | WEC Job #02I-184

Tuesday July 16, 2002 | Workday length: 10 hours

Non-worker Samples

SMPL	WORKER	LOCATION/TASK	Filter C, in ug			Flow,			Airborne C, ug/ M3			TWA, ug/M3		
			As	Hg	Pb	LPM	Min.	M^3	As	Hg	Pb	As	Hg	Pb
AM-114	AREA/DOWNWIND	Loader Headrest- all day sample	2.6	2.5	3.3	3.1	611	1.894	1.4	1.3	1.7	n/a	n/a	n/a
		moving retort debris/Ecobond treated debris												
AM-115	AREA/DOWNWIND	Excavator Headrest- all day sample	7.8	2.5	3.3	3.1	602	1.866	4.2	1.3	1.8	n/a	n/a	n/a
		moving retort debris/Ecobond treated debris												
AM-116	AREA/DOWNWIND	Dozer Headrest- all day sample	2	2.1	2.5	3.1	530	1.643	1.2	1.3	1.5	n/a	n/a	n/a
		prepping Ecobond soils												
AM-117	AREA/DOWNWIND	Area sample-adj to retort debris	2.1	2.5	3.3	3.1	588	1.823	1.2	1.4	1.8	n/a	n/a	n/a
AM-118	AREA/DOWNWIND	Excavator headrest- evening sample	3.6	2.5	3.3	3.1	184	0.570	6.3	4.4	5.8	n/a	n/a	n/a
		Ecobond treatment of tailings (Paul DeWitt-MTT)												

Gray background = < Limit of Detection

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m^3 (with skin notation)

Mercury: 8 ug/m^3

Lead: 40 ug/m^3; 24 ug/m^3 OSHA "Action Level"

Airborne Asbestos: 0.01 Fibers/cubic centimeters

Technician: Date:

WHITE ENVIRONMENTAL CONSULTANTS INC.

Daily Air Monitoring Results
Airborne Metals/Fibers

Client Job #: A4400-03 | WEC Job #02I-184

Wednesday July 17, 2002 | Workday length: 10 hours

Non-worker Samples

SMPL	WORKER	LOCATION/TASK	Filter C, in ug As	Filter C, in ug Hg	Filter C, in ug Pb	Flow, LPM	Min.	M^3	Airborne C, ug/ M3 As	Airborne C, ug/ M3 Hg	Airborne C, ug/ M3 Pb	TWA, ug/M3 As	TWA, ug/M3 Hg	TWA, ug/M3 Pb
AM-120	AREA/DOWNWIND	Excavator Headrest- all day sample	4.4	2.5	2.5	3.1	579	1.795	2.5	1.4	1.4	n/a	n/a	n/a
		moving retort debris/Ecobond treated debris												
AM-121	AREA/DOWNWIND	Loader Headrest- all day sample	4	2.5	2.5	3.1	577	1.789	2.2	1.4	1.4	n/a	n/a	n/a
		moving retort debris/Ecobond treated debris												
AM-123	AREA/DOWNWIND	Area sample-monitor well adj to retort debris	4.4	2.5	2.8	3.1	495	1.535	2.9	1.6	1.8	n/a	n/a	n/a

Worker Sample Airborne Metals

SMPL	WORKER	LOCATION/TASK	Filter C, in ug As	Filter C, in ug Hg	Filter C, in ug Pb	Flow, LPM	Min.	M^3	Airborne C, ug/ M3 As	Airborne C, ug/ M3 Hg	Airborne C, ug/ M3 Pb	TWA, ug/M3 As	TWA, ug/M3 Hg	TWA, ug/M3 Pb
AM-122	Rober Vanderpool Jr.	Treating retort debris with Ecobond/H20	1.7	2.1	3	3.1	488	1.513	1.1	1.4	2.0	1.4	<LOD	2.4

Gray background = < Limit of Detection

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m^3 (with skin notation)

Mercury: 8 ug/m^3

Lead: 40 ug/m^3; 24 ug/m^3 OSHA "Action Level"

Airborne Asbestos: 0.01 Fibers/cubic centimeters

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WHITE ENVIRONMENTAL CONSULTANTS INC.

Daily Air Monitoring Results
Airborne Metals/Fibers

Client Job #: A4400-03 | WEC Job #021-184

Thursday July 18, 2002 | Workday length: 10 hours

Non-worker Samples

SMPL	WORKER	LOCATION/TASK	Filter C, in ug			Flow,			Airborne C, ug/ M3			TWA, ug/M3		
			As	Hg	Pb	LPM	Min.	M^3	As	Hg	Pb	As	Hg	Pb
AM-125	AREA/DOWNWIND	Dozer Headrest- all day sample	2.1	2.5	3.4	3.1	590	1.829	1.1	1.4	1.9	n/a	n/a	n/a
		moving treated tailings in the hot cell												
AM-126	AREA/DOWNWIND	Loader Headrest- all day sample	1.9	2.4	3.6	3.1	593	1.838	1.0	1.3	2.0	n/a	n/a	n/a
		loading/mixing tailings with Ecobond												
AM-127	AREA/DOWNWIND	Excavator Headrest- all day sample	4.9	4.6	5.5	3.1	579	1.795	2.7	2.6	3.1	n/a	n/a	n/a
		loading/mixing tailings with Ecobond												

Worker Sample Airborne Metals

SMPL	WORKER	LOCATION/TASK	As	Hg	Pb	LPM	Min.	M^3	As	Hg	Pb	As	Hg	Pb
AM-128	Pete Radano (WEC)	Monitoring activities, soil sampling etc.	1.9	2.5	3.3	3.1	515	1.597	1.2	1.6	2.1	1	<LOD	<LOD

Gray background = < Limit of Detection

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m^3 (with skin notation)

Mercury: 8 ug/m^3

Lead: 40 ug/m^3; 24 ug/m^3 OSHA "Action Level"

Airborne Asbestos: 0.01 Fibers/cubic centimeters

Technician:

Date:

WHITE ENVIRONMENTAL CONSULTANTS INC.

Daily Air Monitoring Results
Airborne Metals/Fibers

Client Job #: A4400-03 | WEC Job #02I-184

Friday July 19, 2002 | Workday length: 10 hours

Non-worker Samples

SMPL	WORKER	TASK	Filter C, in ug As	Filter C, in ug Hg	Filter C, in ug Pb	Flow, LPM	Min.	M^3	Airborne C, ug/ M3 As	Airborne C, ug/ M3 Hg	Airborne C, ug/ M3 Pb	TWA, ug/M3 As	TWA, ug/M3 Hg	TWA, ug/M3 Pb
			2.4	2.5	3	3.1	597	1.851	1.3	1.4	1.6	n/a	n/a	n/a
AM-130	AREA/DOWNWIND	Excavator headrest-all day sample												
		Treated tailings, adit close out, demo Mess Ha	1.7	2.1	2.6	3.1	585	1.814	0.9	1.2	1.4	n/a	n/a	n/a
AM-131	AREA/DOWNWIND	Loader headrest-AM sample												
		loading tailings for lined cell	1.1	2.5	2.8	3.1	578	1.792	0.6	1.4	1.6	n/a	n/a	n/a
AM-132	AREA/DOWNWIND	Dozer headrest-AM sample												
		grading hot cell												

Total Airborne Fibers via NIOSH 7400A

SMPL	WORKER	TASK	Fibers/fields	Flow, LPM	Min.	Liters	Airborne C, Fibers/cc	TWA, F/cc
AA-016	AREA/DOWNWIND	Excavator headrest, PM sample	7/100	3.1	183	567	0.005	0.001

Gray background = < Limit of Detection

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m^3 (with skin notation)

Mercury: 8 ug/m^3

Lead: 40 ug/m^3; 24 ug/m^3 OSHA "Action Level"

Airborne Asbestos: 0.01 Fibers/cubic centimeters

Technician:

Date:

WHITE ENVIRONMENTAL CONSULTANTS INC.

Daily Air Monitoring Results
Airborne Metals/Fibers

Client Job #: A4400-03 | WEC Job #02I-184

Saturday July 20, 2002 | Workday length: 10 hours

Non-worker Samples

SMPL	WORKER	TASK	Filter C, in ug As	Filter C, in ug Hg	Filter C, in ug Pb	Flow, LPM	Min.	M^3	Airborne C, ug/ M3 As	Airborne C, ug/ M3 Hg	Airborne C, ug/ M3 Pb	TWA, ug/M3 As	TWA, ug/M3 Hg	TWA, ug/M3 Pb
AM-134	AREA/DOWNWIND	Dozer Headrest- all day sample	2.1	2.5	2.5	3.1	561	1.739	1.2	1.4	1.4	n/a	n/a	n/a
		inert cell, Mess Hall												
AM-135	AREA/DOWNWIND	Excavator Headrest- PM sample	2.4	2.5	3.3	3.1	210	0.651	3.7	3.8	5.1	n/a	n/a	n/a
		tailings inert pile												

Total Airborne Fibers via NIOSH 7400A

SMPL	WORKER	TASK	Fibers/fields	Flow, LPM	Min.	Liters	Airborne C, Fibers/cc	TWA, F/cc
AA-018	AREA/DOWNWIND	Excavator headrest--demo MH/BH & Hs. #1	11.5/100	3.1	376	1166	0.005	0.003
AA-019	AREA/DOWNWIND	Robert Vanderpool Jr.-H2o @ MH/BH & Hs. #1	8/100	3.1	312	967	0.004	0.003

Gray background = < Limit of Detection

OSHA Permissible Exposure Levels (PELs) based on a 10-hour workday and Level D Protective Equipment

Arsenic: 8 ug/m^3 (with skin notation)

Mercury: 8 ug/m^3

Lead: 40 ug/m^3; 24 ug/m^3 OSHA "Action Level"

Airborne Asbestos: 0.01 Fibers/cubic centimeters

Technician:

Date:

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ATTACHMENT 2 – WEC FIELD SCREENING FOR METALS

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WHITE ENVIRONMENTAL CONSULTANTS INC.

FIELD SCREENING FOR METALS - EPA METHOD 6200

Client Job #

WEC Job #

JOB SMPL#	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL As	Hg	Pb	NOTES
0001	100	STD	Shutter	NITON INTERNAL CALIBRATION					
0002	101	STD	NIST	Si02 Blank	ppm	<LOD	<LOD	<LOD	
0003	102	STD	NIST	NIST 2710 HIGH	ppm	774	<30	5587	REF = 626.0 As, 32.6 Hg, 5532.0 Pb
0004	103	soil	Bag, rough	10 ft E from NE retort foundation corner	ppm	3460	721	170	
0005	104	soil	Bag, rough	brick pile 15 ft from NE retort fndn corner	ppm	6480	2250	115	
0006	105	soil	Bag, rough	S end of retort debris pile, slab under demo ste	ppm	1430	211	828	
0007	106	soil	Bag, rough	E middle berm of retort debris pile	ppm	4170	433	114	
0008	107	soil	Bag, rough	N end of retort debris pile	ppm	934	476	568	
0009	108	STD	NIST	Si02 Blank	ppm	<LOD	<LOD	<LOD	
0010	109	soil	Bag, rough	15 ft W of NW corner of retort debris pile	ppm	2090	394	193	
0011	110	soil	Bag, rough	W middle berm of retort debris pile	ppm	1540	373	258	
0012	111	soil	Bag, rough	20 ft from bench edge, 2/3 S of d.p. W edge	ppm	2270	337	241	
0013	112	debris/brick	Bag, rough	SW corner of debris pile-crushed bricks	ppm	17100	898	194	
0014	113	soil/brick	Bag, rough	N edge of retort foundation	ppm	11800	1670	382	
0015	114	soil/brick-C	Bag, rough	15 ft E of retort bench edge, midpt of re. Fndtn	ppm	2300	261	134	
0016	115	soil	Bag, rough	10 ft W of SW retort foundation corner	ppm	1510	159	56	
0017	116	soil	Bag, rough	20 ft S of SW retort foundation corner	ppm	4040	543	135	
0018	117	soil/brick	Bag, rough	around 1st bldg SW of retort foundation	ppm	2180	541	72	
0019	118	soil -C	Bag, rough	road intersctn- haul rd/retort entrance	ppm	3090	260	37	
0020	119	STD	NIST	NIST 2710 HIGH	ppm	684	48	5580	REF = 626.0 As, 32.6 Hg, 5532.0 Pb
0021	120	STD	NIST	Si02 Blank	ppm	<LOD	<LOD	<LOD	End AM shift
0022	121	STD	Shutter	NITON INTERNAL CALIBRATION					Start PM shift
0023	122	STD	NIST	NIST 2710 HIGH	ppm	756	<31	5490	
0024	123	STD	NIST	Si02 Blank	ppm	<LOD	<LOD	<LOD	
0025	124	FIELD QC	Bag, rough	DUPLICATE OF #0015	ppm	13100	2100	345	
0026	125	FIELD QC	Bag, rough	DUPLICATE OF #0008	ppm	1340	706	306	

Technician:

Date:

JOB SMPL#	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL			NOTES
						As	Hg	Pb	
0027	126	rock	Stib/Cnbr	Cinnabar/Stibnite Ore	ppm	1600	102K	1970	
0028	127	PPE	Glove	G Slaugenhoup Rubber Glove	ppm	15	<7	<6	
0029	128	STD	NIST	Si02 Blank	ppm	<LOD	<LOD	<LOD	
0030	129	concrete	in situ	retort wall top, S side middle	ppm	7520	111	396	black crust/dust = high As
0031	130	concrete	in situ	retort wall top, 10 ft N of SE corner	ppm	15300	136	<40	black crust/dust = high As
0032	131	plastic/cnct	in situ	lined retort trough, E side, 2/3 S	ppm	64300	8800	<140	dusty plastic is hot
0033	132	brick	in situ	brick in E retort trough	ppm	4680	659	73	black crust/dust = high As
0034	133	concrete	in situ	retort wall, NE corner	ppm	84600	8020	<150	black crust/dust = high As
0035	134	brick	in situ	brick in E retort trough	ppm	4370	1070	126	
0036	135			VOID SAMPLE					
0037	136	concrete	in situ	retort trough, N end of W trough	ppm	232K	8080	<240	
0038	137	STD	NIST	NIST 2710 HIGH	ppm	636	37	5540	REF = 626.0 As, 32.6 Hg, 5532.0 Pb
0039	138	STD	NIST	Si02 Blank	ppm	<LOD	<LOD	<LOD	
0040	139			VOID SAMPLE	ppm				
0041	140	concrete	in situ	west trough support, 2nd from N	ppm	67900	11900	383	black crust/dust = high As
0042	141	concrete	in situ	west trough top, W side, top, 1/3 S	ppm	156K	10900	<240	black crust/dust = high As
0043	142	concrete	in situ	west trough top, W side top, 2/3 S	ppm	101K	27100	<310	black crust/dust = high As
0044	143	cnct/dust	in situ	retort wall interior, N side of W entrance	ppm	103K	3930	<160	black crust/dust = high As
0045	144	cnct/dust	in situ	west trough top, east wall midpoint	ppm	160K	9530	<220	black crust/dust = high As
0046	145	cnct/dust	in situ	retort floor, middle, beside coolers-1	ppm	12998	8557	121	
0047	146	cnct/dust	in situ	retort floor, middle, beside coolers-2	ppm	13000	8860	410	
0048	147			VOID SAMPLE					
0049	148	concrete	in situ	retort slab, middle N	ppm	928	1120	3570	other metals abundant
0050	149	concrete	in situ	retort slab, middle S	ppm	18400	3790	127	
0051	150	STD	NIST	Si02 Blank	ppm	<LOD	<LOD	<LOD	
0052	151	wood	in situ	beam S of retort	ppm	400	35	110	
0053	152	soil	in situ	road to upper benches	ppm	1300	144	35	
0054	153	FIELD QC	in situ	DUPLICATE OF #0054	ppm	1250	109	<21	
0055	154	rock chips	in situ	lower hopper bench, 20 yds SE of hopper base	ppm	770	73	<28	
0056	155	channel iron	in situ	NW edge of lower hopper bench debris pile	ppm	7300	7310	<210	Amosite asbestos in spray-on insul.
0057	156	rock/dust	in situ	inside hopper building	ppm	305	1640	2770	
0058	157	concrete	in situ	N wall exterior of hopper building	ppm	1370	<110	<52	
0059	158	tailings	in situ	high bench, tailings pile S	ppm	1700	36	<27	
0060	159	tailings	in situ	high bench, tailings pile N	ppm	4480	54	<29	
0061	160	tailings	in situ	high bench road, 100 from top	ppm	4040	98	<28	

Tech[illegible]n: [illegible]:

JOB SMPL#	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL As	Hg	Pb	NOTES
0062	161	STD	NIST	NIST 2710 HIGH	ppm	797	49	5500	REF = 626.0 As, 32.6 Hg, 5532.0 Pb
0063	162	STD	NIST	Si02 Blank	ppm	<LOD	<LOD	<LOD	
0064	163	soil	in situ	road to retort, -10 ft elev. from retort bench	ppm	3410	388	<33	
0065	164	soil	in situ	road to retort, -20 ft elev. from retort bench	ppm	2480	196	51	
0066	165	soil	in situ	intersection of haul road and gravel storage pa	ppm	1890	216	34	
0067	166	soil	in situ	5 ft W of liner storage pile	ppm	1460	179	<29	
0068	167	soil	in situ	gravel storage pad, next to Interntl dump truck	ppm	815	94	85	
0069	168	FIELD QC	in situ	DUPLICATE OF # 0068	ppm	809	83	31	
0070	169	STD	NIST	NIST 2710 HIGH	ppm	695	67	5510	REF = 626.0 As, 32.6 Hg, 5532.0 Pb
0071	170	STD	NIST	Si02 Blank	ppm	<LOD	<LOD	<LOD	
0072	171	wood	in situ	red painted plywood in hopper debris pile	ppm	694	200	47	
0073	172	tailings	Bag, rough	E hopper leg base, tailings on corrigated steel	ppm	4960	510	56	fiberglass insul. present
0074	173	tailings	Bag, rough	S hopper leg base, tailings on planks	ppm	6160	106	<29	fiberglass insul. present
0075	174	tailings	Bag, rough	W hopper leg base, tailings in pan	ppm	7630	614	39	fiberglass insul. present
0076	175	NA	NA	VOID SAMPLE					
0077	176	tailings/dust	Bag, rough	N hopper leg base, dust around leg	ppm	6170	2340	56	fiberglass insul. present
0078	177	paint (THIN)	in situ	red paint on W hopper leg	ug/cm2	1.1	4.3	27	units in ug/cm2
0079	178	STD	Shutter	NITON INTERNAL CALIBRATION					
0080	179	steel (THIN)	in situ	doorjam, S corner entrance to warehouse	ug/cm2	<0.9	<1.6	14	
0081	180	steel (THIN)	in situ	red structural steel in roof-2	ug/cm2	<0.7	<0.4	7	
0082	181	steel (THIN)	in situ	red mechanical part	ug/cm2	1.8	<1.5	9	
0083	182	steel (THIN)	in situ	red structural steel in roof-3	ug/cm2	<1.5	<2.6	39	
0084	183	steel (THIN)	in situ	red structural steetl in roof -4	ug/cm2	<1.6	<2.7	36	
0085	184	steel (THIN)	in situ	bed rail of Wilder 3/4 ton truck	ug/cm2	<0.9	9.4	11	
0086	185	soil	in situ	road, 20 ft W of SW warehouse corner	ppm	708	60	53	
0087	186	soil	in situ	road, 30 ft S of SW warehouse corner	ppm	1350	111	27	
0088	187	soil	in situ	road, loop around debris piles-1	ppm	916	64	53	
0089	188	soil	in situ	road, loop around debris piles-2	ppm	1200	131	43	
0090	189	FIELD QC	in situ	DUPLICATE OF # 0098	ppm	1240	145	34	
0091	190	soil	in situ	90 ft S of SW warehouse corner	ppm	4020	1740	170	
0092	191	STD	NIST	NIST 2710 HIGH	ppm	818	55	5450	REF = 626.0 As, 32.6 Hg, 5532.0 Pb
0093	192	STD	NIST	Si02 Blank	ppm	<LOD	<LOD	<LOD	
0094	193	STD	NIST	NIST 2710 HIGH	ppm	750	38.9	5440	
0095	194	STD	NITON	NITON INTERNAL CALIBRATION					
0096	195	STD	NIST	Si02 Blank	ppm	<LOD	<LOD	<LOD	trace Fe?

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JOB SMPL#	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL As	Hg	Pb	NOTES
0097	196	pipe	insitu	lead pipe near warehouse	ppm			error	experiment w/bulk mode (failed)
0098	197	pipe	insitu	lead pipe near warehouse	ug/cm2	<19	46.5	4100	
0099	198	Tyvek suit	insitu	Julian Iya, dirty Tyvek suit at knee	ppm	7.7	4.3	<66	gathered suit at knee for measuremen
0100	199	taiings	insitu	inside hopper base by conveyor belt	ppm	5810	248	<30	
0101	200	board	insitu	inside hopper base by conveyor belt	ppm	1710	162		
0102	201	board	FIELD QC	inside hopper base by conveyor belt	ppm	1720			different read duration
0103	202	board	FIELD QC	inside hopper base by conveyor belt	ppm	1750			different read duration
0104	203			VOID					
0105	204			VOID					
0106	205			VOID					
0107	206	tailings	insitu	hopper building floor, South corner	ppm				
0108	207			VOID					
0109	208	fine tailaings	insitu	haul road to retort, eastward-sloping grade	ppm		1530	2980	
0110	209	fine tailaings	bag	haul road to retort, eastward-sloping grade	ppm	5910	515	<31	
0111	210	FIELD QC	bag	haul road to retort, eastward-sloping grade	ppm	5300	418	<30	
0112	211	mud	insitu	mossy low area on west edge of tailings barrow	ppm	3400	483	128	
0113	212	slag rock	insitu	glassy vessicular slag in tailings barrow	ppm	484	36	<26	
0114	213	FIELD QC	insitu	glassy vessicular slag in tailings barrow	ppm	721	30	32	
0115	214			VOID					
0116	215	STD	NIST	NIST 2710 HIGH	ppm		1010	1700	
0117	216	STD	NIST	Si02 blank	ppm	<LOD	<LOD	<LOD	
0118	217	STD	NITON	NITON INTERNAL CALIBRATION					
0119	218	STD	NIST	NIST 2710 HIGH	ppm	723	<24	5400	
0120	219	STD	NIST	Si02 blank	ppm	<LOD	<LOD	<LOD	
0121	220			VOID					
0122	221			VOID					
0123	222	WIPE	HUD/NITON	NITON Calibration Standard 420-590 ug Pb					
0124	223								
0125	224								
0126	225								
0127	226			VOID					
0128	227			NITON Calibration Standard 420-590 ug Pb	ug	<40	<56	409	
0129	228	Steel	HUD/NITON	Doorjam, red, in warehouse					
0130	229								
0131	230								

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JOB SMPL#	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL			NOTES
						As	Hg	Pb	
0132	231			Doorjam, red, in warehouse	ug	13.2	<8.2	147	80 in2
0133	232	Steel	HUD/NITON	Doorjam, red, in warehouse					
0134	233								
0135	234								
0136	235								
0137	236				ug	8.6	<82	50	
0138	237	pipe	HUD/NITON	retort drain pipe, outside					
0139	238								
0140	239								
0141	240								
0142	241				ug	47.1	14.9	<8.1	40in2
0143	242	pipe	HUD/NITON	retort drain pipe, inside					
0144	243								
0145	244								
0146	245								
0147	246				ug				10 in2
0148	247	STD	NIST	NIST 2710 HIGH	ppm	727	<320	5380	
0149	248	STD	NIST	Si02 blank	ppm	all <LOD			
0150	249	pipe	HUD/NITON	second retort drain pipe, inside					
0151	250								
0152	251								
0153	252								
0154	253				ug	<3.6	<7.9	12.2	
0155	254	tailings	insitu	tailings barrow-west slope, highest mound	ppm	5590	<39	46	
	255	FIELD QC	bag, seived	tailings barrow-west slope, highest mound	ppm	6180	<40	56	
	256	STD	Shutter	NITON INTERNAL CALIBRATION					
	257	37mm MCE	NIOSH7702	BLANK ON TABLE - 1					
	258	37mm MCE	NIOSH7702	BLANK ON TABLE - 2					
	259	37mm MCE	NIOSH7702	BLANK ON TABLE - 3					
	260	37mm MCE	NIOSH7702	BLANK ON TABLE - FINAL	ug	<5.1	<9.9	98.7	
	261			VOID					
	262			VOID					
	263			VOID					
	264			VOID					
	265			VOID					

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JOB SMPL#	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL			NOTES
						As	Hg	Pb	
	266			VOID					
	267			VOID					
	268			VOID					
	269			VOID					
	270	37mm MCE	NIOSH7702	TEST FILTER -1					
	271	37mm MCE	NIOSH7702	TEST FILTER -2					
	272	37mm MCE	NIOSH7702	TEST FILTER -3					
	273	37mm MCE	NIOSH7702	TEST FILTER FINAL	ug	17.7	36.6	<6.4	25 As/25Hg +/- 10 ppm
AM-001	274	37mm MCE	NIOSH7702	Robert Vanderpool Jr. - pipe w/chopsaw					
AM-001	275	37mm MCE	NIOSH7702	Robert Vanderpool Jr. - pipe w/chopsaw					
AM-001	276	37mm MCE	NIOSH7702	Robert Vanderpool Jr. - pipe w/chopsaw					
AM-001	277	37mm MCE	NIOSH7702	Robert Vanderpool Jr. - pipe w/chopsaw	ug	2.2	<3.4	14.7	
AM-001	278	37mm MCE	NIOSH7702	Robert Vanderpool Jr. - pipe w/chopsaw					
AM-001	279	37mm MCE	NIOSH7702	Robert Vanderpool Jr. - pipe w/chopsaw					
AM-001	280	37mm MCE	NIOSH7702	Robert Vanderpool Jr. - pipe w/chopsaw					
AM-001	281	37mm MCE	NIOSH7702	Robert Vanderpool Jr. - pipe w/chopsaw	ug	3.8	<5.1	10.4	
0156	282	STD	NIST	2709 NIST LOW	ppm				bad reading
0157	283	STD	Shutter	NITON INTERNAL CALIBRATION					
AM-009	284	37mm MCE	NIOSH7702	BLANK					
AM-009	285	37mm MCE	NIOSH7702	BLANK					
AM-009	286	37mm MCE	NIOSH7702	BLANK					
AM-009	287	37mm MCE	NIOSH7702	BLANK	ug	2.2	<4.3	<5.5	
AM-002	288	37mm MCE	NIOSH7702	Bob Nathan - surveying / walking site					
AM-002	289	37mm MCE	NIOSH7702	Bob Nathan - surveying / walking site					
AM-002	290	37mm MCE	NIOSH7702	Bob Nathan - surveying / walking site					
AM-002	291	37mm MCE	NIOSH7702	Bob Nathan - surveying / walking site	ug	<0.7	<2.5	<2.8	
AM-003	292	37mm MCE	NIOSH7702	Julian Iya - dozer/excavator - intert #1					
AM-003	293	37mm MCE	NIOSH7702	Julian Iya - dozer/excavator - intert #1					
AM-003	294	37mm MCE	NIOSH7702	Julian Iya - dozer/excavator - intert #1					
AM-003	295	37mm MCE	NIOSH7702	Julian Iya - dozer/excavator - intert #1	ug	0.9	<2.1	<2.1	
AM-004	296	37mm MCE	NIOSH7702	Robert Vanderpool Jr. - clearing brush					
AM-004	297	37mm MCE	NIOSH7702	Robert Vanderpool Jr. - clearing brush					
AM-004	298	37mm MCE	NIOSH7702	Robert Vanderpool Jr. - clearing brush					
AM-004	299	37mm MCE	NIOSH7702	Robert Vanderpool Jr. - clearing brush	ug	1.1	<3.0	<2.5	
AM-005	300	37mm MCE	NIOSH7702	Jerry Moore - dozer/excavator - intert #1					

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AM-005	301	37mm MCE	NIOSH7702	Jerry Moore - dozer/excavator - intert #1					
AM-005	302	37mm MCE	NIOSH7702	Jerry Moore - dozer/excavator - intert #1					
AM-005	303	37mm MCE	NIOSH7702	Jerry Moore - dozer/excavator - intert #1	ug	<1.3	<3.4	<4.8	
AM-006	304	37mm MCE	NIOSH7702	Julian Iya - dozer/excavator - intert #1					
AM-006	305	37mm MCE	NIOSH7702	Julian Iya - dozer/excavator - intert #1					
AM-006	306	37mm MCE	NIOSH7702	Julian Iya - dozer/excavator - intert #1					
AM-006	307	37mm MCE	NIOSH7702	Julian Iya - dozer/excavator - intert #1	ug	0.9	<2.1	<2.8	
AM-007	308	37mm MCE	NIOSH7702	Ronnie Vanderpool - clearing brush					
AM-007	309	37mm MCE	NIOSH7702	Ronnie Vanderpool - clearing brush					
AM-007	310	37mm MCE	NIOSH7702	Ronnie Vanderpool - clearing brush					
AM-007	311	37mm MCE	NIOSH7702	Ronnie Vanderpool - clearing brush	ug	1.3	<2.1	<2.5	
AM-008	312	37mm MCE	NIOSH7702	Ronnie Vanderpool - pipe w/chopsaw					
AM-008	313	37mm MCE	NIOSH7702	Ronnie Vanderpool - pipe w/chopsaw					
AM-008	314	37mm MCE	NIOSH7702	Ronnie Vanderpool - pipe w/chopsaw					
AM-008	315	37mm MCE	NIOSH7702	Ronnie Vanderpool - pipe w/chopsaw	ug	1.5	<2.5	<2.5	
0158	316	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug					
0159	317	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug					
0160	318	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug					
0161	319	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug	ug	2.4	<2.8	33.1	ACCEPTABLE QC
AM-001	320	37mm MCE	NIOSH7702	Robert Vanderpool Jr. - pipe w/chopsaw					
AM-001	321	37mm MCE	NIOSH7702	Robert Vanderpool Jr. - pipe w/chopsaw					
AM-001	322	37mm MCE	NIOSH7702	Robert Vanderpool Jr. - pipe w/chopsaw					
AM-001	323	37mm MCE	NIOSH7702	Robert Vanderpool Jr. - pipe w/chopsaw	ug	2.6	<2.4	15.7	
0162	324	STD	NIST	2710 NIST High	ppm	777	<20	5440	
0163	325	STD	NIST	Si02 Blank	ppm	all <LOD			
0164	326	tailings	sieved/bag	barrow pile, gray, sieved 2mm-250um	ppm	6160	<29	48	
0165	327	tailings	sieved/bag	barrow pile, gray, sieved 250um-125um	ppm	6880	<36	48	
0166	328	tailings	sieved/bag	barrow pile, gray, sieved <125um	ppm	7620	<39	57	
0167	329	STD	Shutter	NITON INTERNAL CALIBRATION					
0168	330	STD	NIST	NIST 2710 HIGH	ppm	698	<32	5490	
0169	331	STD	NIST	Si02 Blank	ppm	all <LOD			
0170	332	wipe	HUD/NITON	HOPPER leg, south, red paint					
0171	333								
0172	334								
0173	335								
0174	336				ug	66	60	124	81 in2
0175	337			3/4Ton Wilder Pickup dashboard wipe					

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JOB SMPL#	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL As	Hg	Pb	NOTES
0176	338								
0177	339								
0178	340								
0179	341								
0180	342			3/4Ton Wilder Pickup dashboard wipe	ug	27	30	11	
0181	343								
0182	344								
0183	345								
0184	346								
0185	347								
0186	348								
0187	349	wipe							
0188	350	wipe							
0189	351	wipe							
0190	352	wipe							
0191	353	wipe	NITON	3/4Ton Wilder Pickup dashboard wipe	ug	29	32	21	
0192	354			VOID					
0193	355			VOID					
0194	356			VOID					
0195	357			VOID					
0196	358			VOID					
0197	359	AM-001	NIOSH7702	Duplicate - Robert Vanderpool 06-08-01					
0198	360	AM-001	NIOSH7702	Duplicate - Robert Vanderpool 06-08-00					
0199	361	AM-001	NIOSH7702	Duplicate - Robert Vanderpool 06-08-01					
0200	362	AM-001	NIOSH7702	Duplicate - Robert Vanderpool 06-08-02	ug	1.9	<1.6	10.9	
0201	363	wipe	NITON	Ronnie Vanderpool face/mask wipe 061002					
0202	364			Ronnie Vanderpool face/mask wipe 061002					
0203	365			Ronnie Vanderpool face/mask wipe 061002					
0204	366			Ronnie Vanderpool face/mask wipe 061002					
0205	367			Ronnie Vanderpool face/mask wipe 061002	ug	6.3	15.5	6.9	
0206	368	wipe	NITON	field blank					
0207	369			field blank					
0208	370			field blank					
0209	371			field blank					
0210	372			field blank	ug	all <LOD			

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JOB SMPL#	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL			NOTES
						As	Hg	Pb	
0211	373	wipe	NITON	Robert Vanderpool face/mask wipe 061002					
0212	374			Robert Vanderpool face/mask wipe 061002					
0213	375			Robert Vanderpool face/mask wipe 061002					
0214	376			Robert Vanderpool face/mask wipe 061002					
0215	377			Robert Vanderpool face/mask wipe 061002	ug	<2.5	<5.7	9.1	
0216	378	wipe	NITON	excavator interior 061002					
0217	379			excavator interior 061002					
0218	380			excavator interior 061002					
0219	381			excavator interior 061002					
0220	382			excavator interior 061002	ug	21	15	13	2 ft2
AM-015	383	37mm MCE	NIOSH7702	BLANK					
AM-015	384	37mm MCE		BLANK					
AM-015	385	37mm MCE		BLANK					
AM-015	386	37mm MCE		BLANK	ug	2.2	<4.8	<4.8	
AM-010	387	37mm MCE	NIOSH7702	Jerry Moore - dozer / excavator operation					
AM-010	388	37mm MCE		Jerry Moore - dozer / excavator operation					
AM-010	389	37mm MCE		Jerry Moore - dozer / excavator operation					
AM-010	390	37mm MCE		Jerry Moore - dozer / excavator operation	ug	<0.7	<1.6	<2.1	
AM-011	391	37mm MCE	NIOSH7702	Ronnie Vanderpool - cutting and clearing hopper legs					
AM-011	392	37mm MCE		Ronnie Vanderpool - cutting and clearing hopper legs					
AM-011	393	37mm MCE		Ronnie Vanderpool - cutting and clearing hopper legs					
AM-011	394	37mm MCE		Ronnie Vanderpool - cutting and clearing hopp	ug	0.5	<2.4	<2.8	
AM-012	395	37mm MCE	NIOSH7702	Julian Iya - dozer and excavator operation, AM					
AM-012	396	37mm MCE	NIOSH7702	Julian Iya - dozer and excavator operation, AM					
AM-012	397	37mm MCE	NIOSH7702	Julian Iya - dozer and excavator operation, AM					
AM-012	398	37mm MCE	NIOSH7702	Julian Iya - dozer and excavator operation, AM	ug	1.5	<2.4	<2.5	
AM-013	399			Julian Iya - dozer and excavator operation, PM	VOID				
AM-013	400			Julian Iya - dozer and excavator operation, PM	VOID				
0221	401	STD	NITON	NITON INTERNAL CALIBRATION					
AM-013	402	37mm MCE	NIOSH7702	Julian Iya - dozer and excavator operation, PM					
AM-013	403	37mm MCE	NIOSH7702	Julian Iya - dozer and excavator operation, PM					
AM-013	404	37mm MCE	NIOSH7702	Julian Iya - dozer and excavator operation, PM					
AM-013	405	37mm MCE	NIOSH7702	Julian Iya - dozer and excavator operation, PM	ug	1.7	<1.8	<2.5	
AM-014	406	37mm MCE	NIOSH7702	AREA - on dozer headrest					
AM-014	407	37mm MCE		AREA - on dozer headrest					

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JOB SMPL#	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL			NOTES
						As	Hg	Pb	
AM-014	408			AREA - on dozer headrest					
AM-014	409			AREA - on dozer headrest	ug	0.9	<2.1	<2.5	
0222	410	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug					
0223	411	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug					
0224	412	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug					
0225	413	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug	ug	2.6	<2.5	22.7	ACCEPTABLE QC
0226	414	STD	NITON	NITON INTERNAL CALIBRATION					
0227	415	STD	NIST	NIST 2710 High	ppm	680	<34	5576	ACCEPTABLE QC
0228	416	STD	NIST	SiO2 Blank	ppm	all <LOD			ACCEPTABLE QC
0229	417	soil	seived/bag	Fe-rich soil in current intert #1 hole	ppm	4690	124	<27	
0230	418	rock	in situ	dark gray petroliferous fg ss in current intert #1	ppm	148	14	19	
0231	419	STD	NITON	NITON INTERNAL CALIBRATION	ppm				
0232	420	STD	NIST	NIST 2710 High	ppm	681	<31	5500	
0233	421	STD	NIST	SiO2 Blank	ppm	all <LOD			ACCEPTABLE QC
0234	422	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug					
0235	423	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug					
0236	424	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug					
0237	425	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug	ug	2.1	<3.0	21.3	ACCEPTABLE QC
0238	426	37mm MCE	NIOSH7702	LAB BLANK					
0239	427	37mm MCE	NIOSH7702	LAB BLANK					
0240	428	37mm MCE	NIOSH7702	LAB BLANK					
0241	429	37mm MCE	NIOSH7702	LAB BLANK	ug	1.1	<2.4	<3.3	
AM-019	430	37mm MCE	NIOSH7702	Jeff Carlstrom, site walking, brush cutting					
AM-019	431	37mm MCE	NIOSH7702						
AM-019	432	37mm MCE	NIOSH7702						
AM-019	433	37mm MCE	NIOSH7702		ug	1.5	<2.4	<3.1	
AM-017	434	37mm MCE	NIOSH7702	FIELD BLANK					
AM-017	435	37mm MCE	NIOSH7702						
AM-017	436	37mm MCE	NIOSH7702						
AM-017	437	37mm MCE	NIOSH7702		ug	all <LOD			
AM-018	438	37mm MCE	NIOSH7702	Dozer headrest, all day sample					
AM-018	439	37mm MCE	NIOSH7702						
AM-018	440	37mm MCE	NIOSH7702						
AM-018	441	37mm MCE	NIOSH7702		ug	1.1	<2.5	<2.8	
0254	442			VOID					

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JOB SMPL#	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL As	Hg	Pb	NOTES
0255	443	37mm MCE	NIOSH7702	Dump Truck, all day sample					
0256	444	37mm MCE	NIOSH7702						
0257	445	37mm MCE	NIOSH7702						
0258	446	37mm MCE	NIOSH7702		ug	0.9	<2.1	<3.0	
0259	447								
0260	448								
0261	449								
0262	450								
0263	451								
0264	452								
0265	453								
0266	454								
0267	455								
0268	456								
0269	457								
0270	458								
0271	459								
0272	460								
0273	461								
0274	462								
0275	463								
0276	464								
0277	465								
0278	466								
0279	467								
0280	468								
0281	469								
0282	470								
AM-020	471	37mm MCE	NIOSH7702	FIELD BLANK					
AM-020	472	37mm MCE	NIOSH7702						
AM-020	473	37mm MCE	NIOSH7702						
AM-020	474	37mm MCE	NIOSH7702		ug	1.3	<1.6	<1.4	
AM-021	475	37mm MCE	NIOSH7702	3/4 Ton Truck Dashboard					
AM-021	476	37mm MCE	NIOSH7702						
AM-021	477	37mm MCE	NIOSH7702						

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JOB SMPL#	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL As	Hg	Pb	NOTES
AM-021	478	filter	NIOSH7702		ug	1.5	<1.6	<2.1	
0283	479	STD	NITON	NITON INTERNAL CALIBRATION					
AM-022	480	37mm MCE	NIOSH7702	Robert Vanderpool Jr. - digging and clearing brush					
AM-022	481	37mm MCE	NIOSH7702						
AM-022	482	37mm MCE	NIOSH7702						
AM-022	483	37mm MCE	NIOSH7702		ug	0.9	<1.9	<2.4	
0284	484	37mm MCE	NIOSH7702	excavator headrest - all day sample					
0285	485	37mm MCE	NIOSH7702						
0286	486	37mm MCE	NIOSH7702						
0287	487	37mm MCE	NIOSH7702		ug	1.3	<1.6	<2.5	
0288	488	37mm MCE	NIOSH7702	Garret Slaugenhoup - NITON survey / soil sampling					
0289	489	37mm MCE	NIOSH7702						
0290	490	37mm MCE	NIOSH7702						
0291	491	37mm MCE	NIOSH7702		ug	2.2	<2.1	<2.4	
0292	492	37mm MCE	NIOSH7702	LAB BLANK					
0293	493	37mm MCE	NIOSH7702						
0294	494	37mm MCE	NIOSH7702						
0295	495	37mm MCE	NIOSH7702		ug	0.9	<1.6	<2.4	
0296	496	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug					
0297	497								
0298	498								
0299	499				ug	1.7	<2.5	26.3	ACCEPTABLE QC
0300	500	STD	NITON	NITON INTERNAL CALIBRATION					
0301	501	STD	NIST	NIST 2710 High	ppm	699	<34	5540	
0302	502	STD	NIST	SiO2 Blank	ppm	all <LOD			
0303	503	lumber	insitu	#1	ppm				Lumber surveyed to assess possible
0304	504	lumber	insitu	#2	ppm				contamination. All screened lumber
0305	505	lumber	insitu	#3	ppm				showed minimal levels of
0306	506	lumber	insitu	#4	ppm				metals of concern.
0307	507	lumber	insitu	#5	ppm				
0308	508	lumber	insitu	#6	ppm				
0309	509	lumber	insitu	#7	ppm				
0310	510	lumber	insitu	#8	ppm				
0311	511	STD	NITON	NITON INTERNAL CALIBRATION					
0312	512	STD	NIST	NIST 2710 High	ppm	690	51.4	5520	ACCEPTABLE QC

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JOB	NITON	SUB-	PREP			METAL			
SMPL#	SMPL#	STRATE	MTHD	LOCATION / Task	UNIT	As	Hg	Pb	NOTES
0313	513	STD	NIST	SiO2 Blank	ppm	all <LOD			ACCEPTABLE QC
AM-026	514	37mm MCE	NIOSH7702	FIELD BLANK 061302					
AM-026	515	37mm MCE	NIOSH7702						
AM-026	516	37mm MCE	NIOSH7702						
AM-026	517	37mm MCE	NIOSH7702		ug	1.1	<1.6	<2.5	
AM-027	518	37mm MCE	NIOSH7702	dozer headrest, all day sample					
AM-027	519	37mm MCE	NIOSH7702						
AM-027	520	37mm MCE	NIOSH7702						
AM-027	521	37mm MCE	NIOSH7702		ug	1.9	<2.1	<2.5	
AM-028	522	37mm MCE	NIOSH7702	VOID					
AM-028	523	37mm MCE	NIOSH7702	VOID					
AM-028	524	37mm MCE	NIOSH7702	VOID					
AM-028	525	37mm MCE	NIOSH7702	VOID	ug				
	526			VOID					
AM-028	527	37mm MCE	NIOSH7702	survey stand, intert #1 hub used 061302, all day sample					
AM-028	528	37mm MCE	NIOSH7702						
AM-028	529	37mm MCE	NIOSH7702						
AM-028	530	37mm MCE	NIOSH7702		ug	1.9	<2.4	<2.5	
AM-029	531	37mm MCE	NIOSH7702	excavator headrest, all day sample					
AM-029	532	37mm MCE	NIOSH7702						
AM-029	533	37mm MCE	NIOSH7702						
AM-029	534	37mm MCE	NIOSH7702		ug	1.3	<2.4	<2.8	
AM-030	535	37mm MCE	NIOSH7702	LAB BLANK 061302					
AM-030	536	37mm MCE	NIOSH7702						
AM-030	537	37mm MCE	NIOSH7702						
AM-030	538	37mm MCE	NIOSH7702		ug	1.1	<2.5	<2.5	
0338	539	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug					
0339	540	37mm MCE	NIOSH7702						
0340	541	37mm MCE	NIOSH7702						
0341	542	37mm MCE	NIOSH7702		ug	1.7	<2.5	24.7	ACCEPTABLE QC
0342	543	37mm MCE	NITON	NITON INTERNAL CALIBRATION					
0343	544	37mm MCE	seive/insitu	road intersection by tool trailer	ppm	1590	94	35	
0344	545	37mm MCE	seive/insitu	road intersection on W side of haul road to reto	ppm	1900	151	30	
0345	546	37mm MCE	seive/insitu	road intersection between tool shed and beach	ppm	1510	121	<24	
0346	547	37mm MCE	seive/insitu	road intersection of beach road/road to town	ppm	703	46	<19	

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JOB SMPL#	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL			NOTES
						As	Hg	Pb	
0347	548	soil	seive/insitu	beach head, 80 ft from shore	ppm	1110	65	<22	
0348	549	soil	seive/insitu	beach head, 40 ft from shore	ppm	608	32	89	
0349	550	sediment	seive/insitu	Red Devil Creek - mouth	ppm	506	19	<17	
0350	551			VOID					
0351	552			VOID					
0352	553			VOID					
0353	554			VOID					
0354	555			VOID					
0355	556	soil	seive/insitu	roadway to town, near "Road Closed Ahead" si	ppm	708	51	<20	
0356	557	soil	seive/insitu	roadway to town, 1st crest from mine	ppm	556	51	24	
0357	558	soil	seive/insitu	roadway to town, 1st cleared length viewing rive	ppm	663	32	87	
0358	559	soil	seive/insitu	200 meters W of previous sample	ppm	830	41	<18	
0359	560			VOID					
0360	561	soil	seive/insitu	roadway to town, 30 m E of McCully Creek brid	ppm	633	46	<19	
0361	562	soil	seive/insitu	on McCully Creek bridge	ppm	721	64	23	
0362	563	soil	seive/insitu	roadway on front of Lenore's house	ppm	385	28	26	
0363	564	rock	insitu	outcrop along road near Lenore's house	ppm	12.3	9	19	
0364	565	rock	insitu	duplicate, previous sample	ppm	<14	<7	19.6	
0365	566			VOID					
0366	567			VOID					
0367	568	STD	NITON	NITON INTERNAL CALIBRATION					
0368	569	STD	NIST	NIST 2710 HIGH	ppm	750	118	5330	ACCEPTABLE QC
0369	570	STD	NIST	Si02 Blank	ppm	all <LOD			
AM-031	571	37mm MCE	NIOSH7702	FIELD BLANK 061402					
AM-031	572	37mm MCE	NIOSH7702						
AM-031	573	37mm MCE	NIOSH7702						
AM-031	574	37mm MCE	NIOSH7702		ug	<0.7	<1.6	<2.5	
AM-032	575	37mm MCE	NIOSH7702	excavator headrest, all day sample					
AM-032	576	37mm MCE	NIOSH7702						
AM-032	577	37mm MCE	NIOSH7702						
AM-032	578	37mm MCE	NIOSH7702		ug	<3.0	<4.8	<8.4	
	579			VOID					
	580			VOID					
	581			VOID					
	582			VOID					

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JOB SMPL#	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL As	Hg	Pb	NOTES
	583			VOID					
	584			VOID					
	585			VOID					
AM-033	586	37mm MCE	NIOSH7702	dozer headrest, all day sample					
AM-033	587	37mm MCE	NIOSH7702						
AM-033	588	37mm MCE	NIOSH7702						
AM-033	589	37mm MCE	NIOSH7702		ug	2.2	<1.8	<2.5	
AM-034	590	37mm MCE	NIOSH7702	Loader headrest, all day sample					
AM-034	591	37mm MCE	NIOSH7702						
AM-034	592	37mm MCE	NIOSH7702						
AM-034	593	37mm MCE	NIOSH7702		ug	1.3	<2.1	3.2	
AM-034	594	37mm MCE	NIOSH7702	Loader headrest, all day sample - duplicate					
AM-034	595	37mm MCE	NIOSH7702						
AM-034	596	37mm MCE	NIOSH7702						
AM-034	597	37mm MCE	NIOSH7702		ug	<5.1	<16	<11	
NITON	598	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug					
NITON	599	37mm MCE	NIOSH7702						
NITON	600	37mm MCE	NIOSH7702						
N ITON	601	37mm MCE	NIOSH7702		ug	<1.3	<2.5	26.4	ACCEPTABLE QC
0394	602								
0395	603								
0396	604								
0397	605								
0398	606								
0399	607								
0400	608								
0401	609								
0402	610								
0403	611								
0404	612								
0405	613								
0406	614								
0407	615								
0408	616	STD	NITON	NITON INTERNAL CALIBRATION					
0409	617	STD	NIST	NIST 2710 HIGH	ppm	738	55.5	5360	

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JOB SMPL#	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL As	Hg	Pb	NOTES
0410	618	STD	NIST	Si02 Blank	ppm				
0411	619			VOID					
AM-035	620	37mm MCE	NIOSH7702	FIELD BLANK 061502					
AM-035	621	37mm MCE	NIOSH7702						
AM-035	622	37mm MCE	NIOSH7702						
AM-035	623	37mm MCE	NIOSH7702		ppm	<1.3	<3.0	<3.9	
AM-036	624	37mm MCE	NIOSH7702	Dump Truck cab, all day sample					
AM-036	625	37mm MCE	NIOSH7702						
AM-036	626	37mm MCE	NIOSH7702						
AM-036	627	37mm MCE	NIOSH7702		ppm	<0.7	<1.6	<2.5	
AM-037	628	37mm MCE	NIOSH7702	dozer headrest, all day sample					
AM-037	629	37mm MCE	NIOSH7702						
AM-037	630	37mm MCE	NIOSH7702						
AM-037	631	37mm MCE	NIOSH7702		ppm	0.9	<2.1	<3.0	
AM-038	632	37mm MCE	NIOSH7702	excavator headrest, all day sample					
AM-038	633	37mm MCE	NIOSH7702						
AM-038	634	37mm MCE	NIOSH7702						
AM-038	635	37mm MCE	NIOSH7702		ppm	1.7	<2.5	<2.4	
TEST	636	37mm MCE	NIOSH7702	Tailings pile test sample, 30 L					
TEST	637	37mm MCE	NIOSH7702						
TEST	638	37mm MCE	NIOSH7702						
TEST	639	37mm MCE	NIOSH7702		ppm	24	13.8	<2.5	
0432	640	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug					
0433	641	37mm MCE	NIOSH7702						
0434	642	37mm MCE	NIOSH7702						
0435	643	37mm MCE	NIOSH7702		ppm	3	<3.0	21.8	ACCEPTABLE QC
0436	644								
0437	645								
0438	646								
0439	647								
0440	648								
0441	649								
0442	650								
0443	651								
0444	652								

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JOB SMPL#	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL As	Hg	Pb	NOTES
0445	653								
0446	654								
0447	655								
0448	656								
0449	657								
0450	658								
0451	659								
0452	660	STD	NITON	NITON INTERNAL CALIBRATION					
AM-039	661	37mm MCE	NIOSH7702	FIELD BLANK 061702					
AM-039	662	37mm MCE	NIOSH7702						
AM-039	663	37mm MCE	NIOSH7702						
AM-039	664	37mm MCE	NIOSH7702		ppm	1.5	<1.6	<2.5	
AM-040	665	37mm MCE	NIOSH7702	Excavator headrest - all day sample					
AM-040	666	37mm MCE	NIOSH7702						
AM-040	667	37mm MCE	NIOSH7702						
AM-040	668	37mm MCE	NIOSH7702		ppm	0.6	2.8	<2.5	
AM-041	669	37mm MCE	NIOSH7702	Dozer headrest - all day sample					
AM-041	670	37mm MCE	NIOSH7702						
AM-041	671	37mm MCE	NIOSH7702						
AM-041	672	37mm MCE	NIOSH7702		ppm	2.2	<2.1	<2.1	
AM-042	673	37mm MCE	NIOSH7702	Roadway, near hot/cold side intersection on 'danger' sign					
AM-042	674	37mm MCE	NIOSH7702						
AM-042	675	37mm MCE	NIOSH7702						
AM-042	676	37mm MCE	NIOSH7702		ppm	1.1	<1.6	2.8	
NITON	677	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug					
NITON	678	37mm MCE	NIOSH7702						
NITON	679	37mm MCE	NIOSH7702						
NITON	680	37mm MCE	NIOSH7702		ppm	1.7	<2.5	22.9	ACCEPTABLE QC
AM-040	681	37mm MCE	NIOSH7702	DUPLICATE READ, Excavator headrest					
AM-040	682	37mm MCE	NIOSH7702						
AM-040	683	37mm MCE	NIOSH7702						
AM-040	684	37mm MCE	NIOSH7702		ppm	7.1	2.1	3	
0477	685								
0478	686								
0479	687								

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	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL As	Hg	Pb	NOTES
0480	688								
0481	689								
0482	690								
0483	691								
0484	692								
0485	693								
0486	694								
0487	695	STD	NITON	NITON INTERNAL CALIBRATION					
0488	696	STD	NIST	NIST 2710 High	ppm	708	57	5530	
0489	697	STD	NIST	Nist SiO2	ppm	<LOD	<LOD	<LOD	
0490	698			VOID SAMPLE					
0491	699			VOID SAMPLE					
0492	700			VOID SAMPLE					
0493	701	Lumber	In situ	Support timber for retort ramp	ppm	68	32	<LOD	
0494	702	Soil	In situ	15' W off S corner of retort foundation	ppm	**3080**	388	159	
0495	703	Metal	In situ	N side exhaust manifold from generator eng.	ppm	<LOD	2.3	125	
0496	704	Wipe 1/4	HUD/Niton	Steel					
0497	705	Wipe 2/4	HUD/Niton						
0498	706	Wipe 3/4	HUD/Niton						
0499	707	Wipe 4/4	HUD/Niton						
0500	708	Wipe final	HUD/Niton		ug	10	29	456	
0501	709	STD	Nist	NIST 2710 High	ppm	10	29	456	
0502	710	Soil	Sieved/bag	Alt. Prep of sample #702	ppm	**4100**	**656**	195	Sieved to <125 um
0503	711	Soil	Sieved/cup	Alt. Prep of sample #702	ppm	**4790**	**767**	268	Sieved to <125 um
0504	712	STD	NITON	NITON INTERNAL CALIBRATION					
AM-043	713	37mm MCE	NIOSH7702	Field Blank 6/18/02					
AM-043	714	37mm MCE	NIOSH7702						
AM-043	715	37mm MCE	NIOSH7702						
AM-043	716	37mm MCE	NIOSH7702			<0.7	<2.1	3.4	ACCEPTABLE QC
0509	717			VOID SAMPLE					
0510	718			VOID SAMPLE					
0511	719			VOID SAMPLE					
0512	720			VOID SAMPLE					
AM-044	721	37mm MCE	NIOSH7702	Excavator headrest - all day sample					
AM-044	722	37mm MCE	NIOSH7702						

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	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL			NOTES
						As	Hg	Pb	
AM-044	723	37mm MCE	NIOSH7702						
AM-044	724	37mm MCE	NIOSH7702		ug	2.4	<4.3	<5.1	
AM-045	725	37mm MCE	NIOSH7702	Dozer headrest - all day sample					
AM-045	726	37mm MCE	NIOSH7702						
AM-045	727	37mm MCE	NIOSH7702						
AM-045	728	37mm MCE	NIOSH7702		ppm	1.1	<2.4	<2.5	
NITON	729	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug					
NITON	730	37mm MCE	NIOSH7702						
NITON	731	37mm MCE	NIOSH7702						
NITON	732	37mm MCE	NIOSH7702		ppm	2.3	<2.1	27.3	ACCEPTABLE QC
0525	733	STD	NITON	NITON INTERNAL CALIBRATION					
0526	734	Wipe 1/4	HUD/Niton	inside washing machine rim and under lid					
0527	735	Wipe 2/4	HUD/Niton	6/16/2002					
0528	736	Wipe 3/4	HUD/Niton						
0529	737	Wipe 4/4	HUD/Niton						
0530	738	Wipe final	HUD/Niton		ug/wipe	<11.0	<21.0	22.4	
0531	739	Wipe 1/4	HUD/Niton	lodge laundry room floor, 1 ft2					
0532	740	Wipe 2/4	HUD/Niton	6/16/2002					
0533	741	Wipe 3/4	HUD/Niton						
0534	742	Wipe 4/4	HUD/Niton						
0535	743	Wipe final	HUD/Niton		ug/wipe	3.3	10.5	52.6	
0536	744	Wipe 1/4	HUD/Niton	lodge laundry room floor, 1 ft2					
0537	745	Wipe 2/4	HUD/Niton	6/18/2002					
0538	746	Wipe 3/4	HUD/Niton						
0539	747	Wipe 4/4	HUD/Niton						
0540	748	Wipe final	HUD/Niton		ug/wipe	<3.0	13.1	39.2	
0541	749	STD	NITON	NITON INTERNAL CALIBRATION					
0542	750	STD	NITON	NITON INTERNAL CALIBRATION					
0543	751	STD	NIST	NIST 2710 HIGH	ppm	667	45.9	5610	Acceptable QC
0544	752	STD	NIST	NIST SIO2 Blank	ppm	<LOD	<LOD	<LOD	Acceptable QC
0545	753	Wood	Bulk	House #3 Demo	ppm	<LOD	<LOD	27.7	TCLP char.
0546	754	Wood	Bulk	House #3 Demo	ppm	<LOD	<LOD	27.7	DUPLICATE of 753
0547	755	VOID							
0548	756	GWB	Bulk	House #3 Demo	ppm	<LOD	29.5	69.2	TCLP char.
0549	757	VOID							

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	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL As	Hg	Pb	NOTES
0550	758	VOID							
0551	759	VOID							
0552	760	GWB	Bulk	House #3 Demo	ppm	<LOD	28.4	175	TCLP char.
0553	761	VOID							
0554	762	VOID							
AM-046	763	37mm MCE	NIOSH7702	Field Blank 6/19/02					
AM-046	764	37mm MCE	NIOSH7702						
AM-046	765	37mm MCE	NIOSH7702						
AM-046	766	37mm MCE	NIOSH7702		ug	<LOD	<LOD	<LOD	ACCEPTABLE QC
0559	767	VOID							
0560	768	VOID							
0561	769	VOID							
0562	770	VOID							
0563	771	VOID							
0564	772	VOID							
0565	773	VOID							
0566	774	VOID							
0567	775	VOID							
0568	776	VOID							
0569	777	VOID							
0570	778	VOID							
0571	779	VOID							
0572	780	VOID							
0573	781	VOID							
0574	782	VOID							
0575	783	VOID							
0576	784	VOID							
0577	785	VOID							
0578	786	VOID							
0579	787	VOID							
0580	788	VOID							
0581	789	VOID							
0582	790	VOID							
0583	791	VOID							
0584	792	VOID							

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	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL			NOTES
						As	Hg	Pb	
0585	793	VOID							
0586	794	NITON	NITON	NITON INTERNAL CALIBRATION					
0587	795	VOID							
0588	796	VOID							
0589	797	VOID							
0590	798	VOID							
0591	799	VOID							
0592	800	VOID							
0593	801	VOID							
0594	802	VOID							
AM-049	803	37mm MCE	NIOSH7702	Excavator headrest-AM sample					
AM-049	804	37mm MCE	NIOSH7702						
AM-049	805	37mm MCE	NIOSH7702						
AM-049	806	37mm MCE	NIOSH7702		ug	<0.7	<2.1	4.5	
		VOID							
AM-050	808	37mm MCE	NIOSH7702	Robert Vanderpool, JR cutting structural steel					
AM-050	809	37mm MCE	NIOSH7702	at retort slab					
AM-050	810	37mm MCE	NIOSH7702						
AM-050	811	37mm MCE	NIOSH7702		ug	<5.1	<14.0	<15.0	
0604	812	VOID							
0605	813	VOID							
0606	814	VOID							
0607	815	VOID							
0608	816	VOID							
0609	817	VOID							
AM-047	818	37mm MCE	NIOSH7702	Jeff Carlstrom-cutting at power generator					
AM-047	819	37mm MCE	NIOSH7702	metal with LBP					
AM-047	820	37mm MCE	NIOSH7702						
AM-047	821	37mm MCE	NIOSH7702		ug	3.9	<2.1	<2.7	
AM-048	822	37mm MCE	NIOSH7702	Dozer headrest-all day sample					
AM-048	823	37mm MCE	NIOSH7702						
AM-048	824	37mm MCE	NIOSH7702						
AM-048	825	37mm MCE	NIOSH7702		ug	0.9	<2.1	<3.3	
0618	826	VOID							
0619	827	VOID							

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	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL As	Hg	Pb	NOTES
0620	828	VOID							
0621	829	VOID							
0622	830	VOID							
0618	831	VOID							
0619	832	STD	NITON	NITON INTERNAL CALIBRATION					
0620	833	Wood	Bulk	House #3 Demo	ppm	<LOD	<LOD	<LOD	TCLP char.
0621	834	Wood	Bulk	House #3 Demo	ppm	<LOD	<LOD	<LOD	TCLP char.
0622	835	Wood	Bulk	House #3 Demo	ppm	<LOD	<LOD	10.9	TCLP char.
0628	836	VOID							
0629	837	GWB	Bulk	House #3 Demo	ppm	22	18.7	78.4	TCLP char.
0630	838	VOID							
0631	839	VOID							
0632	840	Wood	Bulk	House #3 Demo	ppm	<LOD	<LOD	9	TCLP char.
0633	841	Wood	Bulk	House #3 Demo	ppm	<LOD	<LOD	13.6	TCLP char.
0634	842	VOID							
0635	843	VOID							
0636	844	Wood	Bulk	House #3 Demo	ppm	<LOD	<LOD	23.2	TCLP char.
0637	845	Wipe 1/4	HUD/Niton	Hot side, tank adjacent to power house					
0638	846	Wipe 2/4	HUD/Niton	6/20/2002					
0639	847	Wipe 3/4	HUD/Niton						
0640	848	Wipe 4/4	HUD/Niton						
0641	849	Wipe final	HUD/Niton		ug/wipe	115	50.7	180	
0642	850	Wipe 1/4	HUD/Niton	Hot side, center unit adjacent to power house					
0643	851	Wipe 2/4	HUD/Niton	6/20/2002					
0644	852	Wipe 3/4	HUD/Niton						
0645	853	Wipe 4/4	HUD/Niton						
0646	854	Wipe final	HUD/Niton		ug/wipe	96.4	140	2850	
0647	855	Wipe 1/4	HUD/Niton	Hot side, north unit adjacent to power house					
0648	856	Wipe 2/4	HUD/Niton	6/20/2002					
0649	857	Wipe 3/4	HUD/Niton						
0650	858	Wipe 4/4	HUD/Niton						
0651	859	Wipe final	HUD/Niton		ug/wipe	432	152	92.7	
0652	860	STD	NITON	NITON INTERNAL CALIBRATION					
0653	861	STD	NITON	NITON INTERNAL CALIBRATION					
0654	862	STD	NIST	NIST 2710 HIGH	ppm	788	51.3	5350	Acceptable QC

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	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL			NOTES
						As	Hg	Pb	
0655	863	STD	NIST	NIST SIO2 Blank	ppm	<12.0	<6.4	<14	Acceptable QC
0656	864	STD 1/4	NITON	NITON WIPE STD					
0657	865	STD 2/4							
0658	866	STD 3/4							
0659	867	STD 4/4							
0660	868	STD Final			ug/wipe	19.5	33.7	488	Acceptable QC
0667	869	VOID							
0668	870	VOID							
0669	871	VOID		NITON RESULTS for 869-876 ARE REPLICAS					
0670	872	VOID		OF THE NITON WIPE STD USED IN					
0671	873	VOID		SAMPLE 864-868)					
0672	874	VOID							
0673	875	VOID							
0674	876	VOID							
0675	877	STD	NITON	NITON INTERNAL CALIBRATION					
0676	878	STD	NIST	NIST 2710 High	ppm	815	115	5380	Acceptable QC
0677	879	STD	NIST	NIST SIO2	ppm	<11.0	<5.7	<13.0	Acceptable QC
0678	880	Soil	bag, rough	Inert mono #1, excavator disturbing cinnabar	ppm	1170	305	35.6	Fine, but not respirable grain size
0679	881	Soil	bag, rough	Inert mono #1, excavator disturbing cinnabar	ppm	**5430**	209	<LOD	Coarse material(ore), not respirable
0680	882	Soil	in situ	Sec.of road b/t excavtion and fill material	ppm	1160	170	25.8	
0681	883	STD	NIST	NIST 2710 High	ppm	611	247	5270	Acceptable QC
0682	884	VOID							
0683	885	VOID							
0684	886	VOID							
0685	887	VOID							
0686	888	VOID							
0687	889	VOID							
0688	890	VOID							
0689	891	37mm MCE	NIOSH7702	Lab Blank					

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	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL As	Hg	Pb	NOTES
0690	892	37mm MCE	NIOSH7702						
0691	893	37mm MCE	NIOSH7702						
0692	894	37mm MCE	NIOSH7702	Lab Blank	ug	0.9	<3.3	<2.5	
0693	895	37mm MCE	NIOSH7702	VOID READING					
0694	896	37mm MCE	NIOSH7702	VOID READING					
0695	897	37mm MCE	NIOSH7702	VOID READING					
0696	898	37mm MCE	NIOSH7702	VOID READING					
AM-052	899	37mm MCE	NIOSH7702	Dozer Headrest-all day sample Inert fill#1					
AM-052	900	37mm MCE	NIOSH7702						
AM-052	901	37mm MCE	NIOSH7702						
AM-052	902	37mm MCE	NIOSH7702		ug	1.5	<3.3	<2.5	
0701	903	37mm MCE	NIOSH7702	VOID READING					
0702	904	37mm MCE	NIOSH7702	VOID READING					
0703	905	37mm MCE	NIOSH7702	VOID READING					
0704	906	37mm MCE	NIOSH7702	VOID READING					
0705	907	37mm MCE	NIOSH7702	VOID READING					
0706	908	37mm MCE	NIOSH7702	VOID READING					
0707	909	37mm MCE	NIOSH7702	VOID READING					
0708	910	37mm MCE	NIOSH7702	VOID READING					
0709	911	37mm MCE	NIOSH7702	VOID READING					
0710	912	37mm MCE	NIOSH7702	VOID READING					
AM-053	913	37mm MCE	NIOSH7702	Excavator Headrest-all day sample Inert fill#1					
AM-053	914	37mm MCE	NIOSH7702						
AM-053	915	37mm MCE	NIOSH7702						
AM-053	916	37mm MCE	NIOSH7702		ug	<0.7	<2.5	3.6	
0715	917	STD	NITON	NITON INTERNAL CALIBRATION					
0716	918	STD	NIST	NIST 2710 High	ppm	725	140	5460	Acceptable QC
0717	919	STD	NIST	NIST SIO2	ppm	<12.0	<6.1	<13.0	Acceptable QC
0718	920	Brick	In situ	Retort brick on gravel pad, N pile	ppm	186	28.1	48.9	
0719	921	Brick	In situ	Retort brick on gravel pad, center pile	ppm	56.3	16.3	49.9	
0720	922	Brick	In situ	Retort brick on gravel pad, south pile	ppm	86	25.5	43.1	
0721	923			DUPLICATE OF 922					
0722	924	Pipe	In situ	"Hot pipe" in woods near gravel storage pad	ppm	**11.5K**	625	2990	Pipe is lined with retort bricks
0723	925	Wipe 1/4	HUD/Niton	Dashboard of Wilder Pickup					
0724	926	Wipe 2/4	HUD/Niton						

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	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL As	Hg	Pb	NOTES
0725	927	Wipe 3/4	HUD/Niton	Dashboard of Wilder Pickup					Area wiped=1sf
0726	928	Wipe 4/4	HUD/Niton						
0727	929	Wipe Final	HUD/Niton		ug	5.8	10.9	15.2	
0728	930	Wipe 1/1	HUD/Niton	Table for WEC field station					Area wiped=1sf
0729	931	Wipe 2/4	HUD/Niton						
0730	932	Wipe 3/4	HUD/Niton						
0731	933	Wipe 4/4	HUD/Niton						
0732	934	Wipe Final	HUD/Niton		ug	24.7	83.7	41.1	
0733	935	Soil	Bag, sieved	Section of road adjacent to gravel storage pad	ppm	**4270**	**822**	82.3	sieved to 125 um
0734	936	Soil	In situ	Section of road adjacent to gravel storage pad	ppm	**4050**	**547**	49.3	Comparison of bulk vs.sieved method
0735	937	Soil	In situ	Soil adjacent to the tank(S unit) near powerhou	ppm	395	65.4	84.6	
0736	938	Soil	In situ	Soil b/t S. Unit and Center unit	ppm	82.7	15.8	218	
0737	939	Soil	In situ	Soil b/t Center unit and N unit	ppm	101	39.7	75.4	
0738	940	Soil	In situ	Soil 5' N of N. Unit	ppm	23	10.8	43	
0739	941	STD	NITON	NITON INTERNAL CALIBRATION					
0740	942	37mm MCE	NIOSH7702	Lab Blank					
0741	943	37mm MCE	NIOSH7702						
0742	944	37mm MCE	NIOSH7702						
0743	945	37mm MCE	NIOSH7702		ug	1.5	<2.5	<2.5	
AM-054	946	37mm MCE	NIOSH7702	Dozer Headrest-all day sample Inert work all day					
AM-054	947	37mm MCE	NIOSH7702						
AM-054	948	37mm MCE	NIOSH7702						
AM-054	949	37mm MCE	NIOSH7702		ug	1.7	<3.0	<2.5	
AM-055	950	37mm MCE	NIOSH7702	Excavator Headrest-all day sample					
AM-055	951	37mm MCE	NIOSH7702	Monofill#1/Gravel St. Pad					
AM-055	952	37mm MCE	NIOSH7702						
AM-055	953	37mm MCE	NIOSH7702		ug	<0.7	<2.5	3.8	
0752	954	STD	NITON	INTERNAL CALIBRATION					384eV
0753	955	STD	Nist	NIST 2710 High	ppm	737	132	5400	Acceptable QC
0754	956	STD	Nist	NIST SIO2	ppm	<12.0	<6.1	<13.0	Acceptable QC
0755	957	STD	NITON	INTERNAL CALIBRATION					
0756	958	STD	Nist	NIST 2710 High	ppm	744	111	5390	Acceptable QC
0757	959	STD	Nist	NIST SIO2	ppm	<12.0	<6.0	**14.3**	Questionable Pb
0758	960	STD	Nist	NIST SIO2	ppm	<11.0	<6.0	<13.0	Re-read sample- Acceptable QC
0759	961	Soil	In situ	Road entry to retort bench	ppm	**3330**	435	123	Consistent with hot side results

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	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL As	Hg	Pb	NOTES
0760	962	Soil	Bag, sieved	Haul road, b/t RD Creek and Grav. Storage Pa	ppm	**3370**	498	65.5	Sieved<250 um
0761	963	Brick	Bulk, in situ	Gravel Pad, N pile scattered bricks(yellow brick	ppm	116	16.4	32.6	
0762	964	Brick	Bulk, in situ	Gravel Pad, Center pile (red brick)	ppm	25.3	14	<LOD	
0763	965	Brick	Bulk, in situ	Gravel Pad Center pile (yellow brick)	ppm	29.8	12.8	33.2	
0764	966	Brick	Bulk, in situ	Gravel Pad, S Pile (yellow brick)	ppm	<LOD	17.9	62.2	
0765	967	Brick	Bulk, in situ	Retort Trough (E trough)	ppm	1440	107	92.4	5' S of N end of trough
0766	968	Brick	Bulk, in situ	Retort Trough (E trough)	ppm	**10.6K**	**1040**	72.1	5' N of S end of trough
0767	969	Brick	Bulk, in situ	Retort Trough (E trough)	ppm	**4520**	211	49.6	Center of trough
0768	970	Brick	Bulk, in situ	Pile of bricks off SE corner of E trough	ppm	**6140**	**790**	65.8	
0769	971	Brick	Bulk, in situ	15' NE of E trough	ppm	**5970**	255	63	Randomly selected from debris
0770	972			DUPLICATE OF 971					
0771	973			DUPLICATE OF 971					
0772	974			DUPLICATE OF 971					
0773	975	STD	NITON	INTERNAL CALIBRATION					381eV
0774	976	STD	Nist	Nist 2710 High	ppm	842	112	5270	Acceptable QC
0775	977	STD	Nist	SiO2 Blank	ppm	<12.0	<6.1	<13.0	Acceptable QC
0776	978	Brick	Bulk, in situ	Gravel Pad, N Pile broken to read inside of bric	ppm	<LOD	<LOD	33.5	
0777	979	Brick	Bulk, in situ	Gravel Pad, C Pile broken to read inside of bric	ppm	<LOD	<LOD	65.1	
0778	980	Brick	Bulk, in situ	Gravel Pad, S Pile broken to read inside of bric	ppm	33.2	<LOD	45.7	
0779	981	Wood	Bulk, in situ	Retort ramp timber 6"X6"	ppm	203	236	20.7	
0780	982	37mm MCE	NIOSH7702	Lab Blank					
0781	983	37mm MCE	NIOSH7702						
0782	984	37mm MCE	NIOSH7702						
0783	985	37mm MCE	NIOSH7702		ug	1.9	<2.5	<2.5	
AM-060	986	37mm MCE	NIOSH7702	Julian Iya					
AM-060	987	37mm MCE	NIOSH7702	Excavator headrest-AM Sample from debris					
AM-060	988	37mm MCE	NIOSH7702	segregation at hopper (6/26/02)					
AM-060	989	37mm MCE	NIOSH7702		ug	1.5	<2.8	<2.5	
0788	990	VOID							
0789	991	VOID							
0790	992	VOID							
AM-061	993	STD	NITON	INTERNAL CALIBRATION					
AM-061	994	37mm MCE	NIOSH7702	Robert Vanderpool, Jr.-AM Sample debris					
AM-061	995	37mm MCE	NIOSH7702	segregation at hopper (6/26/02)					
AM-061	996	37mm MCE	NIOSH7702						

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	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL As	Hg	Pb	NOTES
AM-061	997	37mm MCE	NIOSH7702		ug	1.1	<2.5	<3.0	
0796	998	37mm MCE	NIOSH7702	Lab Blank					
0797	999	37mm MCE	NIOSH7702						
0798	1000	37mm MCE	NIOSH7702						
0799	1001	37mm MCE	NIOSH7702		ug	1.3	<3.3	<2.5	
AM-057	1002	37mm MCE	NIOSH7702	Excavator headrest- all day sample					
AM-057	1003	37mm MCE	NIOSH7702	Gravel Storage Pad, Powerhouse, House 4 Demo					
AM-057	1004	37mm MCE	NIOSH7702	(6/25/2002)					
AM-057	1005	37mm MCE	NIOSH7702		ug	1.9	<2.5	<3.0	
AM-058	1006	37mm MCE	NIOSH7702	Loader headrest-all day sample					
AM-058	1007	37mm MCE	NIOSH7702	Gravel Storage Pad, Powerhouse, Inert Mono #1					
AM-058	1008	37mm MCE	NIOSH7702	(6/25/02)					
AM-058	1009	37mm MCE	NIOSH7702		ug	1.5	<2.5	4.1	
0808	1	STD	NITON	INTERNAL CALIBRATION					389eV
AM-059	2	37mm MCE	NIOSH7702	Field Blank 6/26/02					
AM-059	3	37mm MCE	NIOSH7702						
AM-059	4	37mm MCE	NIOSH7702						
AM-059	5	37mm MCE	NIOSH7702		ug	<LOD	<LOD	<LOD	
AM-056	6	37mm MCE	NIOSH7702	Field Blank 6/25/02					
AM-056	7	37mm MCE	NIOSH7702						
AM-056	8	37mm MCE	NIOSH7702						
AM-056	9	37mm MCE	NIOSH7702		ug	1.3	<LOD	<LOD	
0817	10	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug					
0818	11	37mm MCE	NIOSH7702						
0819	12	37mm MCE	NIOSH7702						
0820	13	37mm MCE	NIOSH7702		ug	<LOD	<LOD	25.4	Acceptable QC
0821	14	STD	NITON	INTERNAL CALIBRATION					
0822	15	STD	Nist	Nist 2710 High	ppm	764	96.7	5320	Acceptable QC
0823	16	STD	Nist	SiO2 Blank	ppm	<12.0			Acceptable QC
0824	17	Soil	Cup, NITON	Stockplie soil from shop area	ppm	2470	97.9	<LOD	Sieved to <200mm
0825	18	VOID							1 second reading invalid
0826	19	Soil	Cup, NITON	Stockplie soil from shop area	ppm	1590	84.5	<LOD	Sieved to <200mm
0827	20	Soil	Bulk,In situ	Stockpile soil, pile near RD creek	ppm	1460	121	<LOD	
0828	21	Soil	Cup, NITON	Stockpile soil, pile near RD creek	ppm	1280	104	<LOD	Sieved to <200mm
0829	22	Soil	Cup, NITON	Stockpile soil, pile near RD creek	ppm	1370	96.9	<LOD	

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	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL			NOTES
						As	Hg	Pb	
0830	23	VOID							Duplicate of 23
0831	24	VOID							Duplicate of 23
0832	25	VOID							Duplicate of 23
0833	26	VOID							Duplicate of 23
0834	27	Soil	Cup, NITON	FIELD QC OF READING OF #17	ppm	2380	86.2	<LOD	
0835	28	Rock	In situ	Stibnite/cinnabar ore	ppm	750	**5130**	238	
0836	29	Rock	In situ	Less enriched ore	ppm	2920	258	<LOD	
0837	30	Wood	In situ	NW corner of debris pile @hopper	ppm	116	116	14	
0838	31	Metal	In situ	NW corner of debris pile @hopper	ppm	327	50	<LOD	Corrugated metal
0839	32	Metal	In situ	Steel Unit beneath hopper	ppm	**4040**	365	140	
0840	33	Metal	In situ	N of hopper debris pile	ppm	1180	268	<LOD	
0841	34	Metal	In situ	"Ore bin" from debris pile N of hopper	ppm	156	109	14	Iron piece
0842	35	Metal	In situ	NE corner of debris pile @hopper	ppm	184	<LOD	<LOD	Corrugated metal
0843	36	Wood	In situ	Timber in debris pile E of hopper	ppm	12.1	46.1	13.2	
0844	37	NITON	NITON	INTERNAL CALIBRATION					
AM-065	38	37mm MCE	NIOSH7702	Field Blank 6/27/02					
AM-065	39	37mm MCE	NIOSH7702						
AM-065	40	37mm MCE	NIOSH7702						
AM-065	41	37mm MCE	NIOSH7702		ug	1.5	<2.1	<2.5	
AM-062	42	37mm MCE	NIOSH7702	Excavator Headrest-all day sample					
AM-062	43	37mm MCE	NIOSH7702	demo @powerhouse, move debris @hopper					
AM-062	44	37mm MCE	NIOSH7702						
AM-062	45	37mm MCE	NIOSH7702		ug	<0.7	<2.5	<3.0	
AM-063	46	37mm MCE	NIOSH7702	Dozer Headrest-all day sample					
AM-063	47	37mm MCE	NIOSH7702	inert mono#1, powerhs.					
AM-063	48	37mm MCE	NIOSH7702						
AM-063	49	37mm MCE	NIOSH7702		ug	1.3	<3.3	<2.5	
AM-064	50	37mm MCE	NIOSH7702	Dozer Headrest-all day sample					
AM-064	51	37mm MCE	NIOSH7702	inert mono#1, powerhs.					
AM-064	52	37mm MCE	NIOSH7702						
AM-064	53	37mm MCE	NIOSH7702		ug	1.9	<2.8	<2.5	
NITON	54	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug					
NITON	55	37mm MCE	NIOSH7702						
NITON	56	37mm MCE	NIOSH7702						
NITON	57	37mm MCE	NIOSH7702		ug	2.8	<LOD	21.9	Acceptable QC

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	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL As	Hg	Pb	NOTES
0865	58	STD	NITON	INTERNAL CALIBRATION					388eV
0866	59	STD	Nist	Nist 2710 High	ppm	723	79.4	5520	Acceptable QC
0867	60	STD	Nist	SiO2 Blank	ppm	<11.0	<6.1	<13.0	Acceptable QC
0868	61	Soil	In situ	Material from monofill#1	ppm	1590	**1080**	1940	Inconsistent with soil data
0869	62	Soil	In situ	Material from monofill#1	ppm	210	40.5	59	Acceptable
0870	63	Soil	In situ	VOID READING	ppm				Void 4 second reading
0871	64	Soil	In situ	Warehouse soil-background	ppm	**3910**	**733**	<LOD	
0872	65	Iron	In situ	Pipe in woods found near GSP	ppm	1060	105	<110	
0873	66	STD	NITON	INTERNAL CALIBRATION					495eV
0874	67	STD	NITON	INTERNAL CALIBRATION					489eV
0875	68	STD	NITON	INTERNAL CALIBRATION					479eV
0876	69	STD	NITON	INTERNAL CALIBRATION					472eV
0877	70	STD	NITON	INTERNAL CALIBRATION					473eV
0878	71	STD	NITON	INTERNAL CALIBRATION					470eV
0879	72	STD	NITON	INTERNAL CALIBRATION					467eV
0880	73	STD	NITON	INTERNAL CALIBRATION					465eV
0881	74	STD	NITON	INTERNAL CALIBRATION					458eV
0882	75	STD	NITON	INTERNAL CALIBRATION					473eV
0883	76	STD	NITON	INTERNAL CALIBRATION					468eV
0884	77	STD	NITON	INTERNAL CALIBRATION					457eV
0885	78	STD	NITON	INTERNAL CALIBRATION					460eV
0886	79	STD	NITON	INTERNAL CALIBRATION					472eV
0887	80	STD	NITON	INTERNAL CALIBRATION					468eV
0888	81	STD	NITON	INTERNAL CALIBRATION					478eV
0889	82	STD	NITON	INTERNAL CALIBRATION					464eV
0890	83	STD	NITON	INTERNAL CALIBRATION					453eV
0891	84	STD	NITON	INTERNAL CALIBRATION					462eV
0892	85	STD	NITON	INTERNAL CALIBRATION					446eV
0893	86	STD	NITON	INTERNAL CALIBRATION					455eV
0894	87	STD	NITON	INTERNAL CALIBRATION					455eV
0895	88	STD	NITON	INTERNAL CALIBRATION					465eV
0896	89	STD	NITON	INTERNAL CALIBRATION					453eV
0897	90	STD	NITON	INTERNAL CALIBRATION					447eV
0898	91	STD	NITON	INTERNAL CALIBRATION					419eV
0899	92	STD	NITON	INTERNAL CALIBRATION					414eV

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	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL			NOTES
						As	Hg	Pb	
0900	93	STD	NITON	INTERNAL CALIBRATION					405eV
0901	94	STD	NITON	INTERNAL CALIBRATION					402eV
0902	95	STD	NITON	INTERNAL CALIBRATION					406eV
0903	96	STD	NITON	INTERNAL CALIBRATION					402eV
0904	97	STD	NITON	INTERNAL CALIBRATION					394eV
0905	98	STD	NITON	INTERNAL CALIBRATION					398eV
0906	99	STD	NITON	INTERNAL CALIBRATION					402eV
0907	100	STD	NITON	INTERNAL CALIBRATION					397eV
0908	101	STD	NITON	INTERNAL CALIBRATION					393eV
0909	102	STD	NITON	INTERNAL CALIBRATION					401eV
0910	103	STD	NITON	INTERNAL CALIBRATION					387eV
0911	104	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug					
0912	105	37mm MCE	NIOSH7702						
0913	106	37mm MCE	NIOSH7702						
0914	107	37mm MCE	NIOSH7702		ug	1.9	2.5	23.9	Acceptable QC
M-065(2)	108	37mm MCE	NIOSH7702	Field Blank 6/28/02					
M-065(2)	109	37mm MCE	NIOSH7702						
M-065(2)	110	37mm MCE	NIOSH7702						
M-065(2)	111	37mm MCE	NIOSH7702		ug	<LOD	<LOD	<LOD	
AM-066	112	37mm MCE	NIOSH7702	All day sample-Adjacent to Wilder toolshed					
AM-066	113	37mm MCE	NIOSH7702	Demo of warehouse, truck traffic, etc.					
AM-066	114	37mm MCE	NIOSH7702						
AM-066	115	37mm MCE	NIOSH7702		ug	<0.7	<2.5	<3.3	
AM-067	116	37mm MCE	NIOSH7702	Loader headrest-PM sample					
AM-067	117	37mm MCE	NIOSH7702	GSP, Warehs demo, H2O roads etc.					
AM-067	118	37mm MCE	NIOSH7702						
AM-067	119	37mm MCE	NIOSH7702		ug	2.2	<2.5	<3.0	
AM-068	120	37mm MCE	NIOSH7702	Field Blank 6/29/02					
AM-068	121	37mm MCE	NIOSH7702						
AM-068	122	37mm MCE	NIOSH7702						
AM-068	123	37mm MCE	NIOSH7702		ug	1.9	<LOD	<LOD	
	124	VOID		VOID READING					<5 second reading
AM-069	125	37mm MCE	NIOSH7702	Excavator Headrest-all day sample					
AM-069	126	37mm MCE	NIOSH7702	moving debris and brush from GSP (AM)					
AM-069	127	37mm MCE	NIOSH7702	loading retort debris (PM)					

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	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL As	Hg	Pb	NOTES
AM-069	128	37mm MCE	NIOSH7702		ug	18.9	8.3	<0.9	
AM-070	129	37mm MCE	NIOSH7702	Jeff Carlstrom-AM sample					
AM-070	130	37mm MCE	NIOSH7702	handling bricks at retort					
AM-070	131	37mm MCE	NIOSH7702						
AM-070	132	37mm MCE	NIOSH7702		ug	5.3	<2.5	<0.7	
AM-071	133	37mm MCE	NIOSH7702	Dump truck headrest-all day sample					VOID SAMPLE READING
AM-071	134	37mm MCE	NIOSH7702	adj to GSP (AM); retort area (PM)					Detection limits too high
AM-071	135	37mm MCE	NIOSH7702						
AM-071	136	37mm MCE	NIOSH7702		ug	<7.9	<11	<26	
0944	137	REPEAT READING OF NITON SAMPLE # 136							
AM-071	138	37mm MCE	NIOSH7702	Dump truck headrest-all day sample					
AM-071	139	37mm MCE	NIOSH7702	adj to GSP (AM); retort area (PM)					
AM-071	140	VOID #140		REPEAT OF 139					
AM-071	141	37mm MCE	NIOSH7702						
AM-071	142	37mm MCE	NIOSH7702		ug	2.6	<3.3	<2.8	
0950	143	STD	NITON	INTERNAL CALIBRATION					394eV
0951	144	STD	NITON	INTERNAL CALIBRATION					405eV
0952	145	STD	NITON	INTERNAL CALIBRATION					404eV
0953	146	STD	NITON	INTERNAL CALIBRATION					394eV
0954	147	STD	Nist	Nist 2710 High	ppm	900	108	5370	reading high Hg
0955	148	STD	Nist	SiO2 Blank	ppm	<LOD	<LOD	<LOD	Acceptable QC
0956	149	STD	Nist	Nist 2710 High	ppm	822	112	5370	reading high Hg
0957	150	Soil	Cup, sieved	Gravel storage pad	ppm	1970	218	119	ee map for locations (field notes7-1-02
0958	151	Soil	Cup, sieved	Gravel storage pad	ppm	1530	204	97.1	ee map for locations (field notes7-1-02
0959	152	Soil	Cup, sieved	Gravel storage pad	ppm	1500	215	317	ee map for locations (field notes7-1-02
0960	153	Soil	Cup, sieved	Retort debris area	ppm	**5730**	**2710**	498	ee map for locations (field notes7-1-02
0961	154	Soil	Cup, sieved	Retort debris area	ppm	**9850**	**1550**	**1060**	ee map for locations (field notes7-1-02
0962	155	Soil	Cup, sieved	Retort debris area	ppm	1210	357	139	ee map for locations (field notes7-1-02
0963	156	STD	Nist	Nist 2710 High	ppm	794	105	555o	reading high Hg
0964	157	Metal	In situ	Rusty metal tank	ppm	**8920**	**2490**	**3700**	Hot-material not to be cut
0965	158	VOID							
0966	159	VOID							
0967	160	Wood	In situ	Timber in retort debris pile	ppm		1340	3490	Sample spiked by nail?
0968	161	Wood	In situ	Timber in retort debris pile	ppm	301	212	88.8	
0969	162	VOID							

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	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL As	Hg	Pb	NOTES
0970	163	Metal	In situ	Iron unit moved from debris to GSP	ppm	267	108	<LOD	
0971	164	VOID							Void 2 second reading
0972	165	Metal	In situ	Iron beams @SE corner of GSP from retort	ppm	**16.8K**	**3140**	157	Hot-material not to be cut
0973	166	Brick	In situ	Brick inside metal unit by chem bldg.	ppm	**20.5K**	386	<LOD	
0974	167	Brick	In situ	Red brick from retort debris pile-broken	ppm	854	27.5	<LOD	
0975	168	Brick	In situ	Red brick from retort debris pile-surface sampl	ppm	**8830**	199	<LOD	Results prove contaminationon
0976	169	Brick	In situ	Red brick from retort debris pile-surface sampl	ppm	**5010**	196	41.3	is primarily from surface
0977	170	Brick	In situ	Same as #169 but broken open to read inside	ppm	1060	36.2	<LOD	Surface 5X dirtier
0978	171	Brick	In situ	Yellow brick found during excav. of Mono#1	ppm	105	18.2	79	Read from surface
0979	172	STD	NITON	INTERNAL CALIBRATION					374eV
0980	173	STD	Nist	Nist 2710 High	ppm	702	111	5440	High for Hg
0981	174	STD	Nist	SiO2 Blank	ppm	<LOD	<LOD	<LOD	Acceptable QC
0982	175	Soil	Cup, sieved	Field QC READING OF #155	ppm	1270	377	142	Acceptable QC
AM-072	176	37mm MCE	NIOSH7702	Field Blank 7/1/01					
AM-072	177	37mm MCE	NIOSH7702						
AM-072	178	37mm MCE	NIOSH7702						
AM-072	179	37mm MCE	NIOSH7702		ug	1.5	<LOD	<LOD	
AM-073	180	37mm MCE	NIOSH7702	Excavator headrest-all day sample					
AM-073	181	37mm MCE	NIOSH7702	Retort debris/ not operating					
AM-073	182	37mm MCE	NIOSH7702						
AM-073	183	37mm MCE	NIOSH7702		ug	7.1	3.8	3.6	
0991	184	VOID							
AM-074	185	37mm MCE	NIOSH7702	Bob Nathan					
AM-074	186	37mm MCE	NIOSH7702	Watering retort debris					
AM-074	187	37mm MCE	NIOSH7702						
AM-074	188	37mm MCE	NIOSH7702		ug	1.5	<2.5	3.7	
AM-076	189	37mm MCE	NIOSH7702	Area sample taken from downwind					
AM-076	190	37mm MCE	NIOSH7702	of retort debris					
AM-076	191	37mm MCE	NIOSH7702						
AM-076	192	37mm MCE	NIOSH7702		ug	0.9	<2.5	<3.3	
1000	193	VOID							
1001	194	VOID							
1002	195	VOID							
1003	196	VOID							
AM-073	197	37mm MCE	NIOSH7702	QC Sample- Reread AM-073					

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	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL As	Hg	Pb	NOTES
AM-073	198	37mm MCE	NIOSH7702	QC Sample- Reread AM-073					
AM-073	199	37mm MCE	NIOSH7702						
AM-073	200	37mm MCE	NIOSH7702		ug	7.8	4.2	3.6	Acceptable QC
1008	201	Metal	In situ	Corrugated metal west slope off retort bench	ppm	1940	225	874	
1009	202	Wood	In situ	Wood timber west slope off retort bench	ppm	1190	283	23.4	
1010	203	Soil	In situ	Adjacent to RD creek (steep bank on E side)	ppm	38.7	12.6	1.2	
1011	204	Soil	In situ	Same as #203, but sieved to <200mm)	ppm	75.6	35.6	<LOD	
1012	205	Soil	In situ	Adjacent to RD creek 20' S of sample #203	ppm	92.5	48.8	<LOD	
1013	206	STD	NITON	INTERNAL CALIBRATION					359eV
1014	207	STD	Nist	Nist 2710 High	ppm	712	108	5570	High for Hg
1015	208	STD	Nist	SiO2 Blank	ppm	<LOD	<LOD	<LOD	Acceptable QC
AM-077	209	37mm MCE	NIOSH7702	Field Blank 7/2/01					
AM-077	210	37mm MCE	NIOSH7702						
AM-077	211	37mm MCE	NIOSH7702						
AM-077	212	37mm MCE	NIOSH7702		ug	1.5	<LOD	<LOD	
AM-078	213	37mm MCE	NIOSH7702	Dozer Headrest-all day sample					
AM-078	214	37mm MCE	NIOSH7702	inert mono#1, retort bench, GSP					
AM-078	215	37mm MCE	NIOSH7702						
AM-078	216	37mm MCE	NIOSH7702		ug	3.6	<2.5	<2.5	
AM-079	217	37mm MCE	NIOSH7702	Loader headrest-all day sample					
AM-079	218	37mm MCE	NIOSH7702	Loading debris from all over site (AM)					
AM-079	219	37mm MCE	NIOSH7702	retort bench (PM)					
AM-079	220	37mm MCE	NIOSH7702		ug	4.4	<2.5	<2.5	
AM-079	221	37mm MCE	NIOSH7702	FIELD QC REREAD #AM-079					
AM-079	222	37mm MCE	NIOSH7702						
AM-079	223	37mm MCE	NIOSH7702						
AM-079	224	37mm MCE	NIOSH7702		ug	5	<2.5	<3.3	Acceptable QC
1032	225	Brick	In situ	Yellow brick from retort slag	ppm	**3080**	**1090**	85.7	
1033	226	Brick	In situ	Red brick from retort slag	ppm	814	192	45	
1034	227	Slag	In situ	Retort Slag moved to GSP	ppm	**9790**	**4240**	224	
AM-080	228	37mm MCE	NIOSH7702	Field Blank 7/3/01					
AM-080	229	37mm MCE	NIOSH7702						
AM-080	230	37mm MCE	NIOSH7702						
AM-080	231	37mm MCE	NIOSH7702		ug	0.9	<LOD	<LOD	
AM-081	232	37mm MCE	NIOSH7702	Bob Nathan (see next pg.)					

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	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL			NOTES
						As	Hg	Pb	
AM-081	233	37mm MCE	NIOSH7702	Bob Nathan					
AM-081	234	37mm MCE	NIOSH7702	Handling retort debris					
AM-081	235	37mm MCE	NIOSH7702		ug	8.3	<2.5	<3.3	
AM-082	236	37mm MCE	NIOSH7702	Loader headrest-all day sample					
AM-082	237	37mm MCE	NIOSH7702	Retort bench/GSP					
AM-082	238	37mm MCE	NIOSH7702						
AM-082	239	37mm MCE	NIOSH7702		ug	4.6	<2.5	<3.3	
AM-083	240	37mm MCE	NIOSH7702	Area sample taken downwind					
AM-083	241	37mm MCE	NIOSH7702	adj. To Decon and work area					
AM-083	242	37mm MCE	NIOSH7702						
AM-083	243	37mm MCE	NIOSH7702		ug	1.5	<2.5	<3.0	
NITON	244	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug					
NITON	245	37mm MCE	NIOSH7702						
NITON	246	37mm MCE	NIOSH7702						
NITON	247	37mm MCE	NIOSH7702		ug	1.7	<2.5	25.6	Acceptable QC
1055	248	STD	NITON	INTERNAL CALIBRATION					344 eV
1056	249	STD	Nist	Nist 2710 High	ppm	803	<38	5660	Acceptable QC
1057	250	STD	Nist	SiO2 Blank	ppm	<LOD	<LOD	<LOD	Acceptable QC
1058	251	Soil	In situ	Tailings pile- red material @ surface	ppm	**5080**	<LOD	33.9	Sieved <200mm
1059	252	Soil	In situ	Tailings pile- gray material @surface	ppm	**5620**	372	53.8	Sieved <200mm
1060	253	Steel	In situ	Steel beam @ retort (to be cut)	ppm	**4210**	**1420**	32.5	
1061	254	Steel	In situ	Steel beam @ retort (to be cut)	ppm	2660	**1650**	<LOD	
1062	255	Metal	In situ	Rusty metal tank @GSP SE corner	ppm	741	**2150**	<LOD	
1063	256	Metal	In situ	Rails holding "bells" @GSP (cut?)	ppm	**12.1K**	**2040**	<LOD	
1064	257	Metal	In situ	Hg Flask wrapped @ GSP	ppm	**14.7 K**	**1310**	**23.8K**	
AM-084	258	37mm MCE	NIOSH7702	Field Blank 7/3/01					
AM-084	259	37mm MCE	NIOSH7702						
AM-084	260	37mm MCE	NIOSH7702						
AM-084	261	37mm MCE	NIOSH7702		ug	1.3	<LOD	<LOD	
AM-085	262	37mm MCE	NIOSH7702	Excavator headrest-AM sample					
AM-085	263	37mm MCE	NIOSH7702	Retort bench (AM), broken down (PM)					
AM-085	264	37mm MCE	NIOSH7702						
AM-085	265	37mm MCE	NIOSH7702		ug	2.6	<2.5	3.4	
AM-086	266	37mm MCE	NIOSH7702	Dozer Headrest-all day sample					
AM-086	267	37mm MCE	NIOSH7702	Retort					

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	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL As	Hg	Pb	NOTES
AM-086	268	37mm MCE	NIOSH7702	(continued)					
AM-086	269	37mm MCE	NIOSH7702		ug	0.4	2.5	<2.8	
AM-087	270	37mm MCE	NIOSH7702	Area downwind-all day sample					
AM-087	271	37mm MCE	NIOSH7702	Retort NW corner					
AM-087	272	37mm MCE	NIOSH7702						
AM-087	273	37mm MCE	NIOSH7702		ug	0.9	<2.5	3.6	
1081	274	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug					
1082	275	37mm MCE	NIOSH7702						
1083	276	37mm MCE	NIOSH7702						
1084	277	37mm MCE	NIOSH7702		ug	2.2	<2.5	25.1	Acceptable QC
1085	278	STD	NITON	INTERNAL CALIBRATION					346 eV
1086	279	Steel	In situ	Beam in retort debris (#1)	ppm	880	**2520**	<160	High Hg-Wilder instr. to clean surface
1087	280	Steel	In situ	Beam in retort debris (#1) 1st cut	ppm	674	437	189	
1088	281	Steel	In situ	Beam in retort debris (#1) 2nd cut	ppm	694	**1720**	<LOD	Cleaned surface
1089	282	VOID	In situ	Duplicate 281					
1090	283	VOID	In situ	Duplicate 281					
1091	284	VOID	In situ	Duplicate 281					
1092	285	VOID	In situ	Duplicate 281					
1093	286	VOID	In situ	Duplicate 281					
1094	287	Steel	In situ	Beam in retort debris (#2)	ppm	1970	**686**	161	Area cleaned prior to cut
1095	288	STD	Nist	Nist 2710 High	ppm	718	73.3	5560	Acceptable QC
1096	289	STD	Nist	SiO2 Blank	ppm	<LOD	<LOD	<LOD	Acceptable QC
1097	290	Brick	In situ	"Love tube" liner bricks	ppm	284	41.7	52.8	
1098	291	Brick	In situ	"Love tube" liner bricks	ppm	96.5	46	34.4	
1099	292	Iron	In situ	Exterior "Love tube" metal (above bricks)	ppm	**3840**	208	**2100**	
1100	293	Iron	In situ	Exterior "Love tube" metal (center)	ppm	**2600**	90.4	<LOD	
1101	294	VOID		Duplicate of #293					
1102	295	Iron	In situ	FIELD QC # 292	ppm	**4100**	230	**5970**	QC reading high for Pb?
1103	296	VOID		1 second reading					
1104	297	STD	NITON	INTERNAL CALIBRATION					328 eV
1105	298	STD	Nist	Nist 2710 High	ppm	794	<37	5660	Acceptable QC
1106	299	STD	Nist	SiO2 Blank	ppm	<LOD	<LOD	<LOD	Acceptable QC
AM-088	300	37mm MCE	NIOSH7702	Field Blank 7/10/02					
AM-088	301	37mm MCE	NIOSH7702						
AM-088	302	37mm MCE	NIOSH7702						

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	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL			NOTES
						As	Hg	Pb	
AM-088	303	37mm MCE	NIOSH7702	Field Blank 7/10/02	ug	1.7	<LOD	<LOD	
AM-089	304	37mm MCE	NIOSH7702	Loader headrest-all day sample					
AM-089	305	37mm MCE	NIOSH7702	Retort (AM); Repair (PM)					
AM-089	306	37mm MCE	NIOSH7702						
AM-089	307	37mm MCE	NIOSH7702		ug	4	<2.5	<3.3	
AM-090	308	37mm MCE	NIOSH7702	Dozer headrest-all day sample					
AM-090	309	37mm MCE	NIOSH7702	Retort (AM); Powerhs.(PM)					
AM-090	310	37mm MCE	NIOSH7702						
AM-090	311	37mm MCE	NIOSH7702		ug	1.5	<2.5	8.4	
AM-091	312	37mm MCE	NIOSH7702	Area sample-on fuel pump @GSP					
AM-091	313	37mm MCE	NIOSH7702	Adj to decon and truck traffic					
AM-091	314	37mm MCE	NIOSH7702						
AM-091	315	37mm MCE	NIOSH7702		ug	1.9	<2.5	<3.3	
1123	316	VOID							
1124	317	STD	NITON	INTERNAL CALIBRATION					336eV
1125	318	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug					
1126	319	37mm MCE	NIOSH7702						
1127	320	37mm MCE	NIOSH7702						
1128	321	37mm MCE	NIOSH7702		ug	2.3	<LOD	25.7	Acceptable QC
1129	322	Soil	In situ	Stockpile soil, pile E of inert cell	ppm	1350	53.6	31.9	N-S continuum #1 (3 sec read time)
1130	323	Soil	In situ	Stockpile soil, pile E of inert cell	ppm	1290	53.6	31.9	N-S continuum #1
1131	324	Soil	In situ	Stockpile soil, pile E of inert cell	ppm	2090	180	32.5	N-S continuum #2
1132	325	Soil	In situ	Stockpile soil, pile E of inert cell	ppm	1380	<LOD	<LOD	N-S continuum #3 (7 sec read time)
1133	326	Soil	In situ	Stockpile soil, pile E of inert cell	ppm	1400	65.4	42.8	N-S continuum #3
1134	327	Soil	In situ	Stockpile soil, pile E of inert cell	ppm	1220	110	48.6	N-S continuum #4
1135	328	Soil	In situ	Stockpile soil, pile E of inert cell	ppm	1240	52	<LOD	N-S continuum #5
1136	329			MTT Reading					
1137	330			MTT Reading					
1138	331			MTT Reading					
1139	332			MTT Reading					
1140	333			MTT Reading					
1141	334			MTT Reading					
1142	335			MTT Reading					
1143	336			MTT Reading					
1144	337			MTT Reading					

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	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL As	Hg	Pb	NOTES
1145	338			MTT Reading					
1146	339			MTT Reading					
AM-094	340	37mm MCE	NIOSH7702	Bob Nathan- PM sample					
AM-094	341	37mm MCE	NIOSH7702	Jackhammering/cutting rebar @ retort slab					
AM-094	342	37mm MCE	NIOSH7702						
AM-094	343	37mm MCE	NIOSH7702		ug	5.3	<2.5	5.3	
1151	344	STD	NITON	INTERNAL CALIBRATION					324eV
1152	345	STD	Nist	2710 High	ppm	652	48.9	5820	Acceptable QC
1153	346	STD	Nist	SiO2 Blank	ppm	<LOD	<LOD	15.9	Pb?
1154	347	STD	Nist	SiO2 Blank	ppm	<LOD	7.3	<LOD	Hg?
1155	348	STD	Nist	SiO2 Blank	ppm	<LOD	<LOD	<LOD	Acceptable QC
1156	349	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug					
1157	350	37mm MCE	NIOSH7702						
1158	351	37mm MCE	NIOSH7702						
1159	352	37mm MCE	NIOSH7702		ug	1.5	<LOD	26.3	
AM-092	353	37mm MCE	NIOSH7702	Field Blank 7/10/02					
AM-092	354	37mm MCE	NIOSH7702						
AM-092	355	37mm MCE	NIOSH7702						
AM-092	356	37mm MCE	NIOSH7702		ug	0.9	<LOD	<LOD	
AM-093	357	37mm MCE	NIOSH7702	Loader headrest-all day sample					
AM-093	358	37mm MCE	NIOSH7702	(AM) Powerhs.					
AM-093	359	37mm MCE	NIOSH7702	(PM) Loading inert fill, H2O on roads					
AM-093	360	37mm MCE	NIOSH7702		ug	3.2	<2.5	<3.0	
AM-095	361	37mm MCE	NIOSH7702	Adj area sample-downwind of work @ retort					
AM-095	362	37mm MCE	NIOSH7702	jackhammering, cutting rebar, grading					
AM-095	363	37mm MCE	NIOSH7702						
AM-095	364	37mm MCE	NIOSH7702		ug	1.1	<2.4	3.4	
AM-093	365	37mm MCE	NIOSH7702	QC RE-READ of AM-093					
AM-093	366	37mm MCE	NIOSH7702						
AM-093	367	37mm MCE	NIOSH7702						
AM-093	368	37mm MCE	NIOSH7702		ug	2.6	<2.5	<3.0	Acceptable QC
1176	369			MTT Reading					
1177	370			MTT Reading					
1178	371			MTT Reading					
1179	372			MTT Reading					

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	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL As	Hg	Pb	NOTES
1180	373			MTT Reading					
1181	374			MTT Reading					
1182	375			MTT Reading					
1183	376			MTT Reading					
1184	377			MTT Reading					
1185	378			MTT Reading					
1186	379			MTT Reading					
1187	380			MTT Reading					
1188	381	STD	NITON	INTERNAL CALIBRATION					329eV
1189	382	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug					
1190	383	37mm MCE	NIOSH7702						
1191	384	37mm MCE	NIOSH7702						
1192	385	37mm MCE	NIOSH7702		ug	2.6	<LOD	25.6	Acceptable QC
AM-096	386	37mm MCE	NIOSH7702	Field Blank 7/11/02					
AM-096	387	37mm MCE	NIOSH7702						
AM-096	388	37mm MCE	NIOSH7702						
AM-096	389	37mm MCE	NIOSH7702		ug	0.9	<LOD	<LOD	
AM-097	390	37mm MCE	NIOSH7702	Dozer headrest-all day sample					
AM-097	391	37mm MCE	NIOSH7702	Grading hot cell					
AM-097	392	37mm MCE	NIOSH7702						
AM-097	393	37mm MCE	NIOSH7702		ug	2.2	<2.5	3.8	
AM-098	394	37mm MCE	NIOSH7702	Area sample-adj to Ecobond treatment					
AM-098	395	37mm MCE	NIOSH7702	of contaminated bricks					
AM-098	396	37mm MCE	NIOSH7702						
AM-098	397	37mm MCE	NIOSH7702		ug	1.9	<2.5	<3.3	
1205	398	VOID							
1206	399	VOID							
AM-098	400	37mm MCE	NIOSH7702	QC RE-READ of AM-098					
AM-098	401	37mm MCE	NIOSH7702						
AM-098	402	37mm MCE	NIOSH7702						
AM-098	403	37mm MCE	NIOSH7702		ug	1.5	<2.5	3.4	Acceptable QC
1211	404	STD	Nist	Nist 2710 High	ppm	744	<37	5750	Acceptable QC
1212	405	STD	Nist	Nist SiO2 Blank	ppm	<LOD	<LOD	20.5	Lead?
1213	406	STD	Nist	Nist SiO2 Blank	ppm	<LOD	<LOD	<LOD	Acceptable QC
1214	407			MTT Reading					

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	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL As	Hg	Pb	NOTES
1215	408			MTT Reading					
1216	409			MTT Reading					
1217	410			MTT Reading					
1218	411			MTT Reading					
1219	412			MTT Reading					
1220	413	STD	NITON	INTERNAL CALIBRATION					328eV
1221	414	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug					
1222	415	37mm MCE	NIOSH7702						
1223	416	37mm MCE	NIOSH7702						
1224	417	37mm MCE	NIOSH7702		ug	3	<2.5	22.7	Acceptable QC
AM-099	418	37mm MCE	NIOSH7702	Field Blank 7/12/02					
AM-099	419	37mm MCE	NIOSH7702						
AM-099	420	37mm MCE	NIOSH7702						
AM-099	421	37mm MCE	NIOSH7702		ug	1.3	<LOD	<LOD	
AM-100	422	37mm MCE	NIOSH7702	Excavator headrest-AM sample					
AM-100	423	37mm MCE	NIOSH7702	Moving inert fill, borrow tailings pile, laying liner					
AM-100	424	37mm MCE	NIOSH7702						
AM-100	425	37mm MCE	NIOSH7702		ug	4.2	<2.5	<2.8	
AM-101	426	37mm MCE	NIOSH7702	Dozer headrest-all day sample					
AM-101	427	37mm MCE	NIOSH7702	Constructing berms for hot cell					
AM-101	428	37mm MCE	NIOSH7702						
AM-101	429	37mm MCE	NIOSH7702		ug	1.7	<2.5	<3.3	
AM-102	430	37mm MCE	NIOSH7702	Loader headrest-all day sample					
AM-102	431	37mm MCE	NIOSH7702	Loading inert soils into dumptruck					
AM-102	432	37mm MCE	NIOSH7702						
AM-102	433	37mm MCE	NIOSH7702		ug	2.8	<2.5	<3.3	
AM-103	434	37mm MCE	NIOSH7702	Area sample-adj to Ecobond treatment					
AM-103	435	37mm MCE	NIOSH7702	(Adj to Bob Nathan, Robert Vanderpool Jr.)					
AM-103	436	37mm MCE	NIOSH7702						
AM-103	437	37mm MCE	NIOSH7702		ug	1.9	<2.1	<2.5	
1245	438	Soil	Bag, insitu	Tailings pile-bottom of pile#1	ppm	**5740**	342	58.8	
1246	439	Soil	Bag, insitu	Tailings pile-bottom of pile#2	ppm	**5190**	269	<LOD	
1247	440	Soil	Bag, insitu	Tailings pile-bottom of pile#3	ppm	**5420**	289	52.1	
AM-104	441	37mm MCE	NIOSH7702	Field Blank 7/13/02					
AM-104	442	37mm MCE	NIOSH7702						

Technician:

Date:

	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL			NOTES
						As	Hg	Pb	
AM-104	443	37mm MCE	NIOSH7702	Field Blank 7/13/02					
AM-104	444	37mm MCE	NIOSH7702		ug	1.5	<LOD	<LOD	
AM-105	445	37mm MCE	NIOSH7702	Dumptruck headrest-AM sample					
AM-105	446	37mm MCE	NIOSH7702	Hauling debris from Mess Hall					
AM-105	447	37mm MCE	NIOSH7702						
AM-105	448	37mm MCE	NIOSH7702		ug	1.7	<2.1	<2.5	
AM-106	449	37mm MCE	NIOSH7702	Dozer headrest-AM sample					
AM-106	450	37mm MCE	NIOSH7702	Inert monofill					
AM-106	451	37mm MCE	NIOSH7702						
AM-106	452	37mm MCE	NIOSH7702		ug	1.7	<2.5	<2.5	
AM-107	453	37mm MCE	NIOSH7702	Loader headrest-AM sample					
AM-107	454	37mm MCE	NIOSH7702	H2O for demo of Mess Hall					
AM-107	455	37mm MCE	NIOSH7702						
AM-107	456	37mm MCE	NIOSH7702		ug	1.7	<2.8	<1.8	
AM-105	457	37mm MCE	NIOSH7702	QC REREAD of AM-105					
AM-105	458	37mm MCE	NIOSH7702						
AM-105	459	37mm MCE	NIOSH7702						
AM-105	460	37mm MCE	NIOSH7702		ug	2.1	<2.5	<2.8	Acceptable QC
1268	461	STD	NITON	INTERNAL CALIBRATION					338eV
1269	462	STD	Nist	2710 High	ppm	752	37.5	5530	Acceptable QC
1270	463	STD	Nist	SiO2 Blank	ppm	<LOD	<LOD	<LOD	Acceptable QC
1271	464	Soil	Bag, insitu	Soil from dozer tracks after working in tailings	ppm	**3870**	232	124	
1272	465	Iron	In situ	Iron punch	ppm	**5830**	346	<LOD	
1273	466	Brick	In situ	Eco-bonded retort brick	ppm	**12.3K**	**684**	<90	
1274	467	STD	NITON	INTERNAL CALIBRATION					325eV
1275	468	STD	Nist	2710 High	ppm	824	<36	5530	Acceptable QC
1276	469	STD	Nist	SiO2 Blank	ppm	<LOD	<LOD	<LOD	Acceptable QC
1277	470	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug					
1278	471	37mm MCE	NIOSH7702						
1279	472	37mm MCE	NIOSH7702						
1280	473	37mm MCE	NIOSH7702		ug	2.8	<2.5	23.1	
AM-108	474	37mm MCE	NIOSH7702	Field Blank 7/15/02					
AM-108	475	37mm MCE	NIOSH7702						
AM-108	476	37mm MCE	NIOSH7702						
AM-108	477	37mm MCE	NIOSH7702		ug	1.3	<1.8	<3.0	

Technician: Date:

	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL As	Hg	Pb	NOTES
AM-109	478	37mm MCE	NIOSH7702	Dozer Headrest- all day sample					
AM-109	479	37mm MCE	NIOSH7702	moving tailings in lined hot cell					
AM-109	480	37mm MCE	NIOSH7702						
AM-109	481	37mm MCE	NIOSH7702		ug	2.4	<2.1	<2.5	
AM-110	482	37mm MCE	NIOSH7702	Excavator headrest- all day sample					
AM-110	483	37mm MCE	NIOSH7702	excavating tailings pile (treated/untreated)					
AM-110	484	37mm MCE	NIOSH7702						
AM-110	485	37mm MCE	NIOSH7702		ug	2.1	<2.5	4	
AM-111	486	37mm MCE	NIOSH7702	Loader Headrest- all day sample					
AM-111	487	37mm MCE	NIOSH7702	loading tailings for lined cell					
AM-111	488	37mm MCE	NIOSH7702						
AM-111	489	37mm MCE	NIOSH7702		ug	3.2	<2.5	3.4	
AM-112	490	37mm MCE	NIOSH7702	Area sample-adj to retort debris					
AM-112	491	37mm MCE	NIOSH7702	(Bob Nathan/R. Vanderpool Jr. stacking bricks)					
AM-112	492	37mm MCE	NIOSH7702						
AM-112	493	37mm MCE	NIOSH7702		ug	<0.7	<2.4	<3.3	
1301	494			MTT Reading					
1302	495			MTT Reading					
1303	496			MTT Reading					
1304	497			MTT Reading					
1305	498			MTT Reading					
1306	499			MTT Reading					
1307	500			MTT Reading					
1308	501			MTT Reading					
1309	502			MTT Reading					
1310	503			MTT Reading					
1311	504			MTT Reading					
1312	505			MTT Reading					
1313	506			MTT Reading					
1314	507			MTT Reading					
1315	508			MTT Reading					
1316	509			MTT Reading					
1317	510			MTT Reading					
1318	511			MTT Reading					
1319	512			MTT Reading					

Technician: Date:

	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL			NOTES
						As	Hg	Pb	
1320	513			MTT Reading					
1321	514			MTT Reading					
1322	515			MTT Reading					
1323	516			MTT Reading					
1324	517			MTT Reading					
1325	518			MTT Reading					
1326	519			MTT Reading					
1327	520			MTT Reading					
1328	521			MTT Reading					
AM-113	522	37mm MCE	NIOSH7702	Field Blank 7/16/02					
AM-113	523	37mm MCE	NIOSH7702						
AM-113	524	37mm MCE	NIOSH7702						
AM-113	525	37mm MCE	NIOSH7702		ug	1.3	<2.5	<3.0	
AM-114	526	37mm MCE	NIOSH7702	Loader Headrest- all day sample					
AM-114	527	37mm MCE	NIOSH7702	moving retort debris/Ecobond treated debris					
AM-114	528	37mm MCE	NIOSH7702						
AM-114	529	37mm MCE	NIOSH7702		ug	2.6	<2.5	<3.3	
AM-115	530	37mm MCE	NIOSH7702	Excavator Headrest- all day sample					
AM-115	531	37mm MCE	NIOSH7702	moving retort debris/Ecobond treated debris					
AM-115	532	37mm MCE	NIOSH7702						
AM-115	533	37mm MCE	NIOSH7702		ug	7.8	<2.5	<3.3	
AM-116	534	37mm MCE	NIOSH7702	Dozer Headrest- all day sample					
AM-116	535	37mm MCE	NIOSH7702	prepping Ecobond soils					
AM-116	536	37mm MCE	NIOSH7702						
AM-116	537	37mm MCE	NIOSH7702		ug	2	<2.1	<2.5	
1345	538	VOID							
1346	539	STD	NITON	INTERNAL CALIBRATION					328eV
AM-117	540	37mm MCE	NIOSH7702	Area sample-adj to retort debris					
AM-117	541	37mm MCE	NIOSH7702						
AM-117	542	37mm MCE	NIOSH7702						
AM-117	543	37mm MCE	NIOSH7702		ug	2.1	<2.5	<3.3	
1351	544	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug					
1352	545	37mm MCE	NIOSH7702						
1353	546	37mm MCE	NIOSH7702						
1354	547	37mm MCE	NIOSH7702		ug	2.8	<2.5	24.4	

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	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL As	Hg	Pb	NOTES
1355	548	37mm MCE	NIOSH7702	QC REREAD of AM-115					
1356	549	37mm MCE	NIOSH7702						
1357	550	37mm MCE	NIOSH7702						
1358	551	37mm MCE	NIOSH7702		ug	6.3	<2.5	<3.3	
1359	552	37mm MCE	NIOSH7702	Excavator Headrest- evening sample					
1360	553	37mm MCE	NIOSH7702	Paul DeWitt treating tailings					
1361	554	37mm MCE	NIOSH7702						
1362	555	37mm MCE	NIOSH7702		ug	3.6	<2.5	<3.3	
1363	556	STD	NITON	INTERNAL CALIBRATION					331eV
1364	557	STD	Nist	2710 High	ppm	754	43.8	5610	Acceptable QC
1365	558	STD	Nist	SiO2 Blank	ppm	<LOD	<LOD	<LOD	Acceptable QC
1366	559	WIPE	HUD/NITON	NITON Calibration Standard 420-590 ug Pb					
1367	560								
1368	561								
1369	562								
1370	563				ug	23.1	31.3	463	Acceptable QC
1371	564	WIPE	HUD/NITON	Plank to dock at lodge					Wipe area=1sf
1372	565								
1373	566								
1374	567								
1375	568				ug	<2.7	8.3	22	
1376	569	WIPE	HUD/NITON	Lodge-entry to lounge area					Wipe area=1sf
1377	570								
1378	571								
1379	572								
1380	573				ug	10	14.8	21.1	
1381	574	STD	NITON	INTERNAL CALIBRATION					352eV
1382	575	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug					
1383	576	37mm MCE	NIOSH7702						
1384	577	37mm MCE	NIOSH7702						
1385	578	37mm MCE	NIOSH7702		ug			20.9	Unacceptable QC for Lead
1386	579	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug					
1387	580	37mm MCE	NIOSH7702	RE-READ					
1388	581	37mm MCE	NIOSH7702						
1389	582	37mm MCE	NIOSH7702		ug	2.8	<2.5	24.8	Acceptable QC

Technician: Date:

	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL As	Hg	Pb	NOTES
AM-119	583	37mm MCE	NIOSH7702	Field Blank 7/17/02					
AM-119	584	37mm MCE	NIOSH7702						
AM-119	585	37mm MCE	NIOSH7702						
AM-119	586	37mm MCE	NIOSH7702		ug	1.3	<2.5	<3.3	
AM-120	587	37mm MCE	NIOSH7702	Excavator Headrest- all day sample					
AM-120	588	37mm MCE	NIOSH7702	moving retort debris/Ecobond treated debris					
AM-120	589	37mm MCE	NIOSH7702						
AM-120	590	37mm MCE	NIOSH7702		ug	4.4	<2.5	<2.5	
AM-121	591	37mm MCE	NIOSH7702	Loader Headrest- all day sample					
AM-121	592	37mm MCE	NIOSH7702	moving retort debris/Ecobond treated debris					
AM-121	593	37mm MCE	NIOSH7702						
AM-121	594	37mm MCE	NIOSH7702		ug	4	<2.5	<2.5	
AM-122	595	37mm MCE	NIOSH7702	Robert Vanderpool Jr.					
AM-122	596	37mm MCE	NIOSH7702	Treating retort debris with Ecobond/H20					
AM-122	597	37mm MCE	NIOSH7702						
AM-122	598	37mm MCE	NIOSH7702		ug	1.7	<2.1	3	
AM-123	599	37mm MCE	NIOSH7702	Area sample-monitor well adj to retort debris					
AM-123	600	37mm MCE	NIOSH7702						
AM-123	601	37mm MCE	NIOSH7702						
AM-123	602	37mm MCE	NIOSH7702		ug	4.4	<2.5	<2.8	
1410	603	STD	NITON	INTERNAL CALIBRATION					336eV
1411	604	STD	Nist	2710 High	ppm	840	<37	5640	Acceptable QC
1412	605	STD	Nist	SiO2 Blank	ppm	<LOD	<LOD	<LOD	Acceptable QC
1413	606	Soil	Bag, in situ	Treated tailings from tailings pile, S end	ppm	5220	423	<29	
1414	607	Soil	Bag, in situ	Treated tailings from tailings pile, N end	ppm	5480	418	36	
1415	608	Soil	Bag, in situ	Treated tailings from inside hot cell, S end	ppm	5170	319	36.9	
1416	609	Soil	Bag, in situ	Treated tailings from inside hot cell, N end	ppm	5170	382	44.1	
1417	610	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug					
1418	611	37mm MCE	NIOSH7702						
1419	612	37mm MCE	NIOSH7702						
1420	613	37mm MCE	NIOSH7702		ug	2.4	<2.5	25.6	Acceptable QC
AM-124	614	37mm MCE	NIOSH7702	Field Blank 7/18/02					
AM-124	615	37mm MCE	NIOSH7702						
AM-124	616	37mm MCE	NIOSH7702						
AM-124	617	37mm MCE	NIOSH7702		ug	<0.7	<2.4	<3.3	

Technician: Date:

	NITON	SUB-	PREP			METAL			
	SMPL#	STRATE	MTHD	LOCATION / Task	UNIT	As	Hg	Pb	NOTES
AM-125	618	37mm MCE	NIOSH7702	Dozer Headrest- all day sample					
AM-125	619	37mm MCE	NIOSH7702	moving treated tailings in the hot cell					
AM-125	620	37mm MCE	NIOSH7702						
AM-125	621	37mm MCE	NIOSH7702		ug	2.1	<2.5	3.4	
1429	622	VOID							
1430	623	VOID							
1431	624	STD	NITON	INTERNAL CALIBRATION					342eV
AM-126	625	37mm MCE	NIOSH7702	Loader Headrest- all day sample					
AM-126	626	37mm MCE	NIOSH7702	loading/mixing tailings with Ecobond					
AM-126	627	37mm MCE	NIOSH7702						
AM-126	628	37mm MCE	NIOSH7702		ug	1.9	<2.4	3.6	
AM-127	629	37mm MCE	NIOSH7702	Excavator Headrest- all day sample					
AM-127	630	37mm MCE	NIOSH7702	loading/mixing tailings with Ecobond					
AM-127	631	37mm MCE	NIOSH7702						
AM-127	632	37mm MCE	NIOSH7702						
AM-127	633	37mm MCE	NIOSH7702		ug	4.9	<4.6	<5.5	
AM-128	634	37mm MCE	NIOSH7702	Pete Radano (WEC)					
AM-128	635	37mm MCE	NIOSH7702	Monitoring activities, soil sampling etc.					
AM-128	636	37mm MCE	NIOSH7702						
AM-128	637	37mm MCE	NIOSH7702		ug	1.9	<2.5	<3.3	
1445	638	STD	NITON	INTERNAL CALIBRATION					333eV
1446	639	STD	Nist	2710 High	ppm	683	<LOD	5660	Acceptable QC
1447	640	STD	Nist	SiO2 Blank	ppm	<LOD	<LOD	16.1	Lead?
1448	641	STD	Nist	SiO2 Blank	ppm	<LOD	<LOD	<LOD	Acceptable QC
1449	642	STD	NITON	INTERNAL CALIBRATION					348eV
1450	643	STD	Nist	2710 High	ppm	778	48	5720	Acceptable QC
1451	644	STD	Nist	SiO2 Blank	ppm	<LOD	<LOD	<LOD	Acceptable QC
1452	645	Wood	In situ	Desk for WEC field station	ppm	25.2	19.2	16.8	
1453	646	Wood	In situ	Bench in decon. station	ppm	77.3	17.9	30.6	
1454	647	Soil	In situ	Treated tailings for cap	ppm	5380	290	36.1	
1455	648	Soil	In situ	Red-orange tailings- S end tailings pile	ppm	9310	<LOD	<LOD	
1456	649	Soil	In situ	Red-orange tailings- center tailings pile	ppm	4390	<LOD	<LOD	
1457	650	Soil	In situ	Roadway to Mess Hall;adj. to fuel tank	ppm	4220	224	53.1	X-contamination from fueling?
1458	651	Soil	In situ	Roadway to Mess Hall, 1st intersection	ppm	894	56.6	34.8	
1459	652	Soil	In situ	Roadway to Mess Hall, 1st intersection	ppm	2030	141	35.6	

Technician: Date:

	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL As	Hg	Pb	NOTES
1460	653	Soil	In situ	Roadway to Mess Hall, 1st intersection	ppm	1510	109	53.2	
1461	654	Soil	In situ	Roadway towards House #1	ppm	1220	73.9	41.6	
1462	655	Soil	In situ	Roadway between Mess Hall/House #1	ppm	555	57.9	50	
1463	656	Soil	In situ	Roadway in front of House #1	ppm	1210	64.5	<LOD	
1464	657	STD	NITON	INTERNAL CALIBRATION					344eV
1465	658	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug					
1466	659	37mm MCE	NIOSH7702						
1467	660	37mm MCE	NIOSH7702						
1468	661	37mm MCE	NIOSH7702		ug	2	<LOD	24.1	Acceptable QC
AM-129	662	37mm MCE	NIOSH7702	Field Blank 7/19/02					
AM-129	663	37mm MCE	NIOSH7702						
AM-129	664	37mm MCE	NIOSH7702						
AM-129	665	37mm MCE	NIOSH7702		ug	1.9	<2.4	<2.5	
AM-130	666	37mm MCE	NIOSH7702	Excavator Headrest- all day sample					
AM-130	667	37mm MCE	NIOSH7702	Treated tailings, adit close out, demo Mess Hall					
AM-130	668	37mm MCE	NIOSH7702						
AM-130	669	37mm MCE	NIOSH7702		ug	2.4	<2.5	<3	
AM-131	670	37mm MCE	NIOSH7702	Loader Headrest- all day sample					
AM-131	671	37mm MCE	NIOSH7702	loading tailings for lined cell					
AM-131	672	37mm MCE	NIOSH7702						
AM-131	673	37mm MCE	NIOSH7702		ug	1.7	<2.1	2.6	
AM-132	674	37mm MCE	NIOSH7702	Dozer Headrest- all day sample					
AM-132	675	37mm MCE	NIOSH7702	grading hot cell					
AM-132	676	37mm MCE	NIOSH7702						
AM-132	677	37mm MCE	NIOSH7702		ug	1.1	<2.5	<2.8	
1485	678	37mm MCE	NIOSH7702	QC REREAD of AM-131					
1486	679	37mm MCE	NIOSH7702						
1487	680	37mm MCE	NIOSH7702						
1488	681	37mm MCE	NIOSH7702		ug	2.4	<2.5	3.4	Acceptable QC
1489	682	STD	NITON	INTERNAL CALIBRATION					336eV
1490	683	37mm MCE	NIOSH7702	NITON LEAD REFERENCE STD 28 ug					
1491	684	37mm MCE	NIOSH7702						
1492	685	37mm MCE	NIOSH7702						
1493	686	37mm MCE	NIOSH7702		ug	2.2	<2.5	24.5	Acceptable QC
AM-133	687	37mm MCE	NIOSH7702	Field Blank 7/19/02					

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	NITON SMPL#	SUB-STRATE	PREP MTHD	LOCATION / Task	UNIT	METAL			NOTES
						As	Hg	Pb	
AM-133	688	37mm MCE	NIOSH7702	Field Blank 7/19/02 (continued)					
AM-133	689	37mm MCE	NIOSH7702						
AM-133	690	37mm MCE	NIOSH7702		ug	1.5	<LOD	<LOD	
AM-134	691	37mm MCE	NIOSH7702	Dozer Headrest- all day sample					
AM-134	692	37mm MCE	NIOSH7702	inert cell, Mess Hall					
AM-134	693	37mm MCE	NIOSH7702						
AM-134	694	37mm MCE	NIOSH7702		ug	2.1	<2.5	<2.5	
AM-135	695	37mm MCE	NIOSH7702	Excavator Headrest- PM sample					
AM-135	696	37mm MCE	NIOSH7702	tailings pile, inert cell					
AM-135	697	37mm MCE	NIOSH7702						
AM-135	698	37mm MCE	NIOSH7702		ug	2.4	<2.5	<3.3	
1506	699								
1507	700								
1508	701								
1509	702								
1510	703								
1511	704								
1512	705								
1513	706								
1514	707								
1515	708								
1516	709								
1517	710								
1518	711								
1519	712								
1520	713								
1521	714								
1522	715								
1523	716								
1524	717								
1525	718								
1526	719								
1527	720								
1528	721								
1529	722								

Technician: Date:

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APPENDIX E

APPENDIX E

LABORATORY DATA

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RS 6-27

WEC WHITE ENVIRONMENTAL CONSULTANTS INC.
731 I St., Suite 201, Anchorage, AK 99501-
(907) 258-8661
FAX: (907) 258-8662

Toxicity Characteristic Procedure (TCLP) for Lead

WEC Project #: 02I-184
Client Project#:

Report #: 12742
Report Date: 6/26/02

Client: Wilder Construction Company
11301 Lang Street
Anchorage, AK 99515

Collection By: P.Radano
Collection Date: 6/21/02
Samples: 5
Analysis By: D.Cedeno
Analysis Date: 6/26/02
Received By: Slaugenhoup
Received Date: 6/24/02
TAT: RUSH

Project Name/Location: Red Devil Mine
Building:

Client ID #	Lab ID #	Ext Fld by Ph test	Weight (g)	Ext Fld Vol (l)	Pb mg/l	Dilution	mg/l Lead
House #1	AT02-127	1	100.0	2.000	0.9	1.0	0.9
House #3	AT02-128	1	100.0	2.000	0.9	1.0	0.9
House #4	AT02-129	1	100.0	2.000	3.1	1.0	3.1
sshall Bunkhou	AT02-130	1	100.0	2.000	1.0	1.0	1.0
Warehouse	AT02-131	1	100.0	2.000	1.2	1.0	1.2

Comments:

Analyst [signature] Date 6-26-02
QC [signature] Date 6-26-02

Analysis performed by flame atomic absorption spectroscopy NIOSH 7082, preparation method SW846-1311. The Reporting Limit is twice that of the Method Detection Limit (MDL) which is the minimum concentration of analyte that can be reported with 99% confidence that the analyte's concentration is greater than zero, and is determined from statistical analysis of replicate samples in a given matrix containing the analyte as defined in 40CFR Part 136, Appendix B. Any modifications that have been made to the previously referenced test methods are documented in WEC Inc.'s Standard Operating Procedures Manual. Supporting Laboratory Documentation is available upon request. WEC is a current proficient participant in the AIHA ELPAT program (Lab ID# 102739). Test reports must not be reproduced without the approval of WEC Inc., and are subject to WEC Inc. General Terms and Conditions (see reverse).

WEC WHITE ENVIRONMENTAL CONSULTANTS INC.

PROJECT NAME Red Devil
LOCATION Red Devil Mine PROJECT NO.
CLIENT Wilder DATE 6-21-0
CLIENT PROJECT # SHEET NO. 1 OF 1

CHAIN OF CUSTODY RECORD — ANALYTICAL REQUEST

ANALYSIS REQUESTED (circle) TCLP PCM PLM TEM LEAD	TURNAROUND REQUESTED 24 hr	NO. OF SAMPLES 5	COLLECTION DATE: 6-21-02
RELINQUISHED BY: Pete Radano	DATE/TIME 06-21-02	SAMPLES RECIEVED BY Garret Slaugenhoup	DATE/TIME 06-24-02
SHIPPING METHOD USPS	COURIER (signature) Tim for Wilder	SAMPLES RECIEVED BY	DATE/TIME

COMMENTS Matt, Bob, ... This doesn't appear to be the proper COC, but it's all I have out here. If you have questions feel free to call me (907)447-3247 or on Robert Scott's line (907)447-3254.

P.S. If you haven't sent out 37mm MCE filter sleeves PLEASE DO IT NOW! I'm all out! Also waiting for software from NITON so I can download readings.

~Pete

SAMPLE ID #	MATERIAL	LOCATION	COMMENTS
House #1	TCLP	DO TUESDAY 6-25-02	
House #3	TCLP	DO MONDAY 6-24-02	
House #4	TCLP		
MessHall/Bunkhouse	TCLP		
Warehouse	TCLP		

Field Collection Sheet / Houses #1, 3, 4, Moschell/Bunkhouse, Warehouse [6·21·02]

Pete Radano (WEC)

RED DEVIL

TCLP - Composite sample for Lead (Pb)

House #1	%
Brown painted CAB	3%
White over green paint on wood trim	2%
White over green painted GWB	2%
Misc. flooring	1%
Unpainted wood	91%
Insulation (f/glass)	1%
	100%

House #3	%
Brown painted CAB	4%
White painted wood trim	2%
White painted GWB	3%
Misc. flooring	1%
Unpainted wood	86%
~~Fiberglass batting~~	
Misc. Roofing Material	4%
	→ 100%

Warehouse	%
Red painted structural steel	2%
Corrugated metal siding/roofing	6%
Unpainted wood	90%
Unpainted GWB	2%
	100%

House #4	%
Brown painted CAB	3%
Blue/green painted GWB	2%
White painted GWB	2%
Blue/green painted wood trim	1%
White painted wood trim	2%
~~Fiberglass batting~~	
misc. flooring	1%
roofing material (mineral aggregate/paper)	3%
unpainted wood	86%
	100%

Mess Hall / Bunkhouse	%
off white painted GWB	4%
Blue painted wood trim	1%
White painted particle board	1%
White painted wood trim	1%
Mineral Aggregate roofing/siding	5%
Concrete slab (kitchen)	2%
Unpainted wood	85%
Fiberglass batting	1%
	100%

COPY

CTE Environmental Services
Alaska Division
Laboratory Data Report

Project: Red Devil Mine

Client: Wilder Construction Co.

CTE Work Order: 1017397

Contents:

Chain of Custody
Quality Control Summary Forms

Note:

Unless otherwise noted, all quality assurance/quality control criteria is in compliance with the proper regulatory authority and/or CTE's Quality Assurance Program Plan.

Case Narrative

Customer: WILDCON **Wilder Construction Co.**

Project: 1017397 **Red Devil Mine**

1017397004 PS

SW6020 ICP/MS Metals - Detectable amount of Antimony in blank; concentration of Antimony in the sample is 10X greater.

1017397005 PS

SW6020 ICP/MS Metals - Detectable amount of Antimony in blank; concentration of Antimony in the sample is 10X greater.

1017397006 PS

SW6020 ICP/MS Metals - Detectable amount of Antimony in blank; concentration of Antimony in the sample is 10X greater.

1017397016 PS

SW6020 ICP/MS Metals - MS/MSD recoveries for Arsenic, Antimony and Lead were outside acceptance criteria. Post digestion spike was successful.

SW6020 ICP/MS Metals - Detectable amount of Antimony in blank; concentration of Antimony in the sample is 10X greater.

CHAIN OF CUSTODY RECORD

1017397

CT&E Environmental Services Inc.
Laboratory Division

• Maryland
• New Jersey
ginia • New Orleans
www.cteesi.com

(1)
CLIENT: WILDER CONSTRUCTION c/o URS
CONTACT: CHRIS HOLDEN PHONE NO: (907) 562-3366
PROJECT: RED DEVIL MINE PWSID#:
REPORTS TO: CHRIS HOLDEN FAX NO: (907) 562-1297
INVOICE TO: WILDER CONSTRUCTION QUOTE#
P.O. NUMBER: 74-FBM $1073.00

CT&E Reference:

PAGE 1 OF 2

(2)

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	No. CONTAINERS	SAMPLE TYPE (C = COMP, G = GRAB)	TOTAL Hg By 7471	TCLP Hg, As By 1311	TOTAL As, Sb, Pb By 6020	TOTAL As By 6020							REMARKS
1 / 17	21RDSLAG001	10/16/01	1647	SOIL	2	G	X	X									FREE MERCURY !!
2 / 18	21RDSLAG002	10/16/01	1707	SOIL	2	G	X	X									
3 / 19	21RDSLAG003	10/16/01	1707	SOIL	2	G	X	X									
4 / 20	21RDOR001	10/17/01	1811	SOIL	2	G	X	X	X								
5 / 21	21RDOR002	10/17/01	1830	SOIL	2	G	X	X	X								
6 / 22	21RDOR003	10/17/01	1820	SOIL	2	G	X	X	X								
7	21RDSL001	10/17/01	1030	SOIL	1	G	X			X							
8	21RDSL002	10/17/01	1035	SOIL	1	G	X			X							
9	21RDSL003	10/17/01	1040	SOIL	1	G	X			X							
10	21RDSL004	10/17/01	1045	SOIL	1	G	X			X							

Preservatives Used
Analysis Required (3)

(5)

Collected/Relinquished By: (1)	Date	Time	Received By:
[signature]	10/19/01		
Relinquished By: (2)	Date	Time	Received By:
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date 10/19	Time 1520	Received For Laboratory By: Sarita Phillips

(4)
Shipping Carrier:
Shipping Ticket No:
Temperature C: 2.9
Data Deliverables: STANDARD
Level I Level II Level III EDD Type:
Chain of Custody Seal: (Circle)
INTACT BROKEN ABSENT
Requested Turnaround Time and Special Instructions:

200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301
3180 Peger Road Fairbanks, AK 99701 Tel: (907) 474-8656 Fax: (907) 474-9685

White - Retained by Lab (Project File) Yellow - Returned with Report Pink - Retained by Sampler
0-720

CHAIN OF CUSTODY RECORD 1017397

CT&E Environmental Services Inc.
Laboratory Division

ta • land
igan • New Jersey
Virginia • New Orleans
www.cteesi.com

CLIENT: SEE PG. # 1
CONTACT: CHRIS HOLDEN PHONE NO: (907 562-3366
PROJECT: RED DEVIL MINE PWSID#:
REPORTS TO:
FAX NO: ( )
INVOICE TO: QUOTE#
P.O. NUMBER:

CT&E Reference:
PAGE 2 OF 2

Preservatives Used
Analysis Required

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	No. CONTAINERS	SAMPLE TYPE C = COMP G = GRAB	TOTAL Hg By 7471	TOTAL As By 6020								REMARKS
11	21RDSLØØ5	10/17/01	1050	SOIL	1	G	X	X								
12	21RDSLØØ6	10/17/01	1120	SOIL	1	G	X	X								
13	21RDSLØØ7	10/17/01	1130	SOIL	1	G	X	X								
14	21RDSLØØ8	10/17/01	1140	SOIL	1	G	X	X								
15	21RDSLØØ9	10/17/01	1145	SOIL	1	G	X	X								
16	21RDSLØ10	10/17/01	1150	SOIL	1	G	X	X								

Relinquished	Date	Time	Received By
Collected/Relinquished By: (1) [signature]	10/19/01		Received By:
Relinquished By: (2)			Received By:
Relinquished By: (3)			Received By:
Relinquished By: (4)	10/19/01	1520	Received For Laboratory By: [signature] Phillips

Shipping Carrier:
Shipping Ticket No:
Temperature C: 29
Data Deliverables: STANDARD
Level I Level II Level III EDD Type:
Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT
Requested Turnaround Time and Special Instructions:

200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301
3180 Peger Road Fairbanks, AK 99701 Tel: (907) 474-8656 Fax: (907) 474-9685

CT&E Environmental Services Inc.

SAMPLE RECEIPT FORM

CT&E WO. **1017401**

Yes	No	
	X	Are samples **RUSH**, priority, or *within 72 hrs.* of **hold time**?
		If yes have you done *e-mail notification*?
	X	Are samples *within 24 hrs.* of **hold time** or **due date**?
		If yes, have you *spoken with* Supervisor?
	X	Are there any **problems** (e.g., ids, analyses)?
		Were samples preserved correctly and pH verified?
		Has Project Manager been notified of problems?
		Is this an ACOE / AFCEE / ADEC project?
		Will a **data package** be required? ______
		If this is for PWS, provide **PWSID**. ______
		Is there a **quote** for this project? ______
	X	Will courier charges apply?

Completed by (sign): Sarita Phillips (print): Sarita Phillips

Due Date: 11/2
Received Date/Time: 10/19 1520
Received Temperature: 2.9
Matrix of each Sample:

2	" "	1-16
	" "	
	" "	
	Trip Blank	
	BMS/BMSD	

Additional Sample Remarks:

- ______ Extra Sample Volume?
- ______ Limited Sample Volume?
- ______ Field pres'd for volatiles?
- ______ Field-filtered for dissolved ______?
- ______ Lab-filtered for dissolved ______?
- Ref Lab required? ______

Notes: Lids on jars for #3 did not match what with the labels on the jar

*********The following *must* be completed for *all* ACOE & AFCEE: *********

Yes	No	
		Is received temperature 4 ± 2°C? Temp: ______
		Thermometer used: ______
		Was there an airbill, etc.? Note #: ______
		Was cooler sealed with custody seals? Fax'd to COE?
		# / where: ______
		Were seals intact upon arrival?
		Was there a COC with cooler?
		Was the COC filled out properly?
		Did the COC indicate ACOE / AFCEE project? (if applicable)
		Did the COC and samples correspond?
		Were all samples packed to prevent breakage?
		packing material: ______
		Were all samples unbroken and clearly labeled?
		Were all samples sealed in separate plastic bags?
		Were all bottles for volatiles free of headspace?
		Were correct container / sample sizes submitted?
		Is sample condition good?
		Was client notified of problems? (specify below)

# of each Container Received:

	950 ml amber unpres'd
	950 ml amber w / HCl
	500 ml amber w / H_2SO_4
	1L cubies unpres'd
	1L cubies w / HNO_3
	1L cubies w / H_2SO_4
	1L cubies w / NaOH + ZnAc
	120 ml coli bottles
	60 ml Nalgene
22	8 oz amber unpres'd
	4 oz amber unpres'd
	4 oz w / septa w / MeOH
	40 ml vials w / HCl
	Other (specify) ______
	Other (specify) ______

Individual contacted: ______

Date / Time: ______ Phone / Fax: ______

Log-in proofed by: ______

TO BE COMPLETED IN ANCHORAGE UPON ARRIVAL FROM FAIRBANKS:
DATE / TIME: ______ **COOLER TEMP:** ______
CUSTODY SEALS INTACT: YES / NO # / WHERE: ______
COMPLETED BY (INITIAL): ______

Form ...4r03.1 (Revised 03/08/01)

CT&E Environmental Services Inc.

200 W. Potter Drive
Anchorage, AK 99518-1605
Tel: (907) 562-2343
Fax: (907) 561-5301
Web: http://www.cteesi.com

Chris Holden
URS
2700 Gambell
Anchorage, AK 99503

Work Order:	1017397 Red Devil Mine
Client:	Wilder Construction Co.
Report Date:	November 06, 2001

Enclosed are the analytical results associated with the above workorder.

As required by the state of Alaska and the USEPA, a formal Quality Assurance/Quality Control Program is maintained by CT&E. A copy of our Quality Control Manual that outlines this program is available at your request.

Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth in our Quality Assurance Program Plan.

If you have any questions regarding this report or if we can be of any other assistance, please call your CT&E Project Manager at (907) 562-2343.

The following descriptors may be found on your report which will serve to further qualify the data.

U	Indicates the analyte was analyzed for but not detected.
F	Indicates an estimated value that falls below PQL, but is greater than the MDL.
B	Indicates the analyte is found in the blank associated with the sample.
*	The analyte has exceeded allowable limits.
GT	Greater Than
D	Secondary Dilution
LT	Less Than
!	Surrogate out of range

CT&E Environmental Services Inc.

CT&E Ref.#	1017397001	**Client PO#**	
Client Name	Wilder Construction Co.	**Printed Date/Time**	11/06/2001 15:09
Project Name/#	Red Devil Mine	**Collected Date/Time**	10/16/2001 16:47
Client Sample ID	21RDSLAG01	**Received Date/Time**	10/19/2001 15:20
Matrix	Soil/Solid	**Technical Director**	**Stephen C. Ede**
Ordered By		**Released By**	J Windebank

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
Solids								
Total Solids	77.5		%	SM20 2540G			10/24/01	DMR
Metals Department								
Mercury by Cold Vapor	20300	4290	mg/Kg	SW846-7471A		10/24/01	10/24/01	JMP

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CT&E Environmental Services Inc.

CT&E Ref.#	1017397002	**Client PO#**	
Client Name	Wilder Construction Co.	**Printed Date/Time**	11/06/2001 15:09
Project Name/#	Red Devil Mine	**Collected Date/Time**	10/16/2001 17:07
Client Sample ID	21RDSLAG02	**Received Date/Time**	10/19/2001 15:20
Matrix	Soil/Solid	**Technical Director**	**Stephen C. Ede**
Ordered By		**Released By**	J Wendebank

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
Solids								
Total Solids	89.1		%	SM20 2540G			10/24/01	DMR
Metals Department								
Mercury by Cold Vapor	1100	368	mg/Kg	SW846-7471A		10/24/01	10/24/01	JMP

F-701

CT&E Environmental Services Inc.

CT&E Ref.#	1017397003	**Client PO#**	
Client Name	Wilder Construction Co.	**Printed Date/Time**	11/06/2001 15:09
Project Name/#	Red Devil Mine	**Collected Date/Time**	10/16/2001 17:07
Client Sample ID	21RDSLAG03	**Received Date/Time**	10/19/2001 15:20
Matrix	Soil/Solid	**Technical Director**	Stephen C. Ede
Ordered By		**Released By**	J Windebank

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
Solids								
Total Solids	89.9		%	SM20 2540G			10/24/01	DMR
Metals Department								
Mercury by Cold Vapor	1060	367	mg/Kg	SW846-7471A		10/24/01	10/24/01	JMP

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CT&E Environmental Services Inc.

CT&E Ref.#	1017397004	**Client PO#**	
Client Name	Wilder Construction Co.	**Printed Date/Time**	11/06/2001 15:09
Project Name/#	Red Devil Mine	**Collected Date/Time**	10/17/2001 18:11
Client Sample ID	21RDOR001	**Received Date/Time**	10/19/2001 15:20
Matrix	Soil/Solid	**Technical Director**	**Stephen C. Ede**
Ordered By		**Released By**	J Windebank

Sample Remarks:

SW6020 ICP/MS Metals - Detectable amount of Sb in blank; concentration of Sb in the sample is 10X greater.

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
Solids								
Total Solids	86.6		%	SM20 2540G			10/24/01	DMR
Metals Department								
Mercury by Cold Vapor	429	381	mg/Kg	SW846-7471A		10/24/01	10/24/01	JMP
Metals by ICP/MS								
Antimony	2650	0.305	mg/Kg	SW846 6020		10/24/01	10/27/01	WAW
Arsenic	4080	1.02	mg/Kg	SW846 6020		10/24/01	10/27/01	WAW
Lead	13.3	0.204	mg/Kg	SW846 6020		10/24/01	10/27/01	WAW

CT&E Environmental Services Inc.

CT&E Ref.#	1017397005	**Client PO#**	
Client Name	Wilder Construction Co.	**Printed Date/Time**	11/07/2001 14:50
Project Name/#	Red Devil Mine	**Collected Date/Time**	10/17/2001 18:30
Client Sample ID	21RDOR002	**Received Date/Time**	10/19/2001 15:20
Matrix	Soil/Solid	**Technical Director**	Stephen C. Ede
Ordered By		**Released By**	J Wendebank

Sample Remarks:

SW6020 ICP/MS Metals - Detectable amount of Sb in blank; concentration of Sb in the sample is 10X greater.

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
Solids								
Total Solids	78.8		%	SM20 2540G			10/24/01	DMR
Metals Department								
Mercury by Cold Vapor	259F	416	mg/Kg	SW846-7471A		10/24/01	10/24/01	JMP
Metals by ICP/MS								
Antimony	1620	0.356	mg/Kg	SW846 6020		10/24/01	10/27/01	WAW
Arsenic	812	1.19	mg/Kg	SW846 6020		10/24/01	10/27/01	WAW
Lead	9.60	0.237	mg/Kg	SW846 6020		10/24/01	10/27/01	WAW

CT&E Environmental Services Inc.

CT&E Ref.#	1017397006	**Client PO#**	
Client Name	Wilder Construction Co.	**Printed Date/Time**	11/07/2001 14:50
Project Name/#	Red Devil Mine	**Collected Date/Time**	10/17/2001 18:20
Client Sample ID	21RDOR003	**Received Date/Time**	10/19/2001 15:20
Matrix	Soil/Solid	**Technical Director**	**Stephen C. Ede**
Ordered By		**Released By**	J Windebank

Sample Remarks:

SW6020 ICP/MS Metals - Detectable amount of Sb in blank; concentration of Sb in the sample is 10X greater.

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
Solids								
Total Solids	89.7		%	SM20 2540G			10/24/01	DMR
Metals Department								
Mercury by Cold Vapor	261F	360	mg/Kg	SW846-7471A		10/24/01	10/24/01	JMP
Metals by ICP/MS								
Antimony	276	0.326	mg/Kg	SW846 6020		10/24/01	10/27/01	WAW
Arsenic	430	32.6	mg/Kg	SW846 6020		10/24/01	10/27/01	WAW
Lead	13.9	0.217	mg/Kg	SW846 6020		10/24/01	10/27/01	WAW

CT&E Environmental Services Inc.

CT&E Ref.#	1017397007
Client Name	Wilder Construction Co.
Project Name/#	Red Devil Mine
Client Sample ID	21RDSL001
Matrix	Soil/Solid
Ordered By	

Client PO#	
Printed Date/Time	11/07/2001 14:50
Collected Date/Time	10/17/2001 10:30
Received Date/Time	10/19/2001 15:20
Technical Director	Stephen C. Ede
Released By	J Windebank

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
Solids								
Total Solids	83.7		%	SM20 2540G			10/24/01	DMR
Metals Department								
Mercury by Cold Vapor	240F	395	mg/Kg	SW846-7471A		10/24/01	10/24/01	JMP
Metals by ICP/MS								
Arsenic	647	1.17	mg/Kg	SW846 6020		10/24/01	10/27/01	WAW

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CT&E Environmental Services Inc.

CT&E Ref.#	1017397008	**Client PO#**	
Client Name	Wilder Construction Co.	**Printed Date/Time**	11/06/2001 15:09
Project Name/#	Red Devil Mine	**Collected Date/Time**	10/17/2001 10:35
Client Sample ID	21RDSL002	**Received Date/Time**	10/19/2001 15:20
Matrix	Soil/Solid	**Technical Director**	Stephen C. Ede
Ordered By		**Released By**	J Windebank

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
Solids								
Total Solids	86.3		%	SM20 2540G			10/24/01	DMR
Metals Department								
Mercury by Cold Vapor	2600	383	mg/Kg	SW846-7471A		10/24/01	10/24/01	JMP
Metals by ICP/MS								
Arsenic	362	0.788	mg/Kg	SW846 6020		10/24/01	10/27/01	WAW

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CT&E Environmental Services Inc.

CT&E Ref.#	1017397009	**Client PO#**	
Client Name	Wilder Construction Co.	**Printed Date/Time**	11/06/2001 15:09
Project Name/#	Red Devil Mine	**Collected Date/Time**	10/17/2001 10:40
Client Sample ID	21RDSL003	**Received Date/Time**	10/19/2001 15:20
Matrix	Soil/Solid	**Technical Director**	**Stephen C. Ede**
Ordered By		**Released By**	J Windebank

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
Solids								
Total Solids	83.5		%	SM20 2540G			10/24/01	DMR
Metals Department								
Mercury by Cold Vapor	183	39.3	mg/Kg	SW846-7471A		10/24/01	10/24/01	JMP
Metals by ICP/MS								
Arsenic	336	0.846	mg/Kg	SW846 6020		10/24/01	10/27/01	WAW

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CT&E Environmental Services Inc.

CT&E Ref.#	1017397010	**Client PO#**	
Client Name	Wilder Construction Co.	**Printed Date/Time**	11/06/2001 15:09
Project Name/#	Red Devil Mine	**Collected Date/Time**	10/17/2001 10:45
Client Sample ID	21RDSL004	**Received Date/Time**	10/19/2001 15:20
Matrix	Soil/Solid	**Technical Director**	Stephen C. Ede
Ordered By		**Released By**	J Windebank

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
Solids								
Total Solids	79.6		%	SM20 2540G			10/24/01	DMR
Metals Department								
Mercury by Cold Vapor	45.6	40.6	mg/Kg	SW846-7471A		10/24/01	10/24/01	JMP
Metals by ICP/MS								
Arsenic	738	11.5	mg/Kg	SW846 6020		10/24/01	10/27/01	WAW

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CT&E Environmental Services Inc.

CT&E Ref.#	1017397011	**Client PO#**	
Client Name	Wilder Construction Co.	**Printed Date/Time**	11/06/2001 15:09
Project Name/#	Red Devil Mine	**Collected Date/Time**	10/17/2001 10:50
Client Sample ID	21RDSL005	**Received Date/Time**	10/19/2001 15:20
Matrix	Soil/Solid	**Technical Director**	**Stephen C. Ede**
Ordered By		**Released By**	J Weidebank

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
Solids								
Total Solids	83.4		%	SM20 2540G			10/24/01	DMR
Metals Department								
Mercury by Cold Vapor	95.4	38.9	mg/Kg	SW846-7471A		10/24/01	10/24/01	JMP
Metals by ICP/MS								
Arsenic	419	9.94	mg/Kg	SW846 6020		10/24/01	10/27/01	WAW

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CT&E Environmental Services Inc.

CT&E Ref.#	1017397012	**Client PO#**	
Client Name	Wilder Construction Co.	**Printed Date/Time**	11/07/2001 14:50
Project Name/#	Red Devil Mine	**Collected Date/Time**	10/17/2001 11:20
Client Sample ID	21RDSL006	**Received Date/Time**	10/19/2001 15:20
Matrix	Soil/Solid	**Technical Director**	Stephen C. Ede
Ordered By		**Released By**	JWindebank

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
Solids								
Total Solids	88.5		%	SM20 2540G			10/24/01	DMR
Metals Department								
Mercury by Cold Vapor	196F	367	mg/Kg	SW846-7471A		10/31/01	10/31/01	JMP
Metals by ICP/MS								
Arsenic	5890	9.46	mg/Kg	SW846 6020		10/24/01	10/27/01	WAW

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CT&E Environmental Services Inc.

CT&E Ref.#	1017397013	**Client PO#**	
Client Name	Wilder Construction Co.	**Printed Date/Time**	11/06/2001 15:09
Project Name/#	Red Devil Mine	**Collected Date/Time**	10/17/2001 11:30
Client Sample ID	21RDSL007	**Received Date/Time**	10/19/2001 15:20
Matrix	Soil/Solid	**Technical Director**	Stephen C. Ede
Ordered By		**Released By**	J Windebank

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
Solids								
Total Solids	80.8		%	SM20 2540G			10/24/01	DMR
Metals Department								
Mercury by Cold Vapor	1640	402	mg/Kg	SW846-7471A		10/31/01	10/31/01	JMP
Metals by ICP/MS								
Arsenic	4960	11.6	mg/Kg	SW846 6020		10/24/01	10/27/01	WAW

CT&E Environmental Services Inc.

CT&E Ref.#	1017397014	**Client PO#**	
Client Name	Wilder Construction Co.	**Printed Date/Time**	11/06/2001 15:09
Project Name/#	Red Devil Mine	**Collected Date/Time**	10/17/2001 11:40
Client Sample ID	21RDSL008	**Received Date/Time**	10/19/2001 15:20
Matrix	Soil/Solid	**Technical Director**	**Stephen C. Ede**
Ordered By		**Released By**	J. Windebank

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
Solids								
Total Solids	84.9		%	SM20 2540G			10/24/01	DMR
Metals Department								
Mercury by Cold Vapor	1210	385	mg/Kg	SW846-7471A		10/31/01	10/31/01	JMP
Metals by ICP/MS								
Arsenic	3200	10.1	mg/Kg	SW846 6020		10/24/01	10/27/01	WAW

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CT&E Environmental Services Inc.

CT&E Ref.#	1017397015	**Client PO#**	
Client Name	Wilder Construction Co.	**Printed Date/Time**	11/06/2001 15:09
Project Name/#	Red Devil Mine	**Collected Date/Time**	10/17/2001 11:45
Client Sample ID	21RDSL009	**Received Date/Time**	10/19/2001 15:20
Matrix	Soil/Solid	**Technical Director**	Stephen C. Ede
Ordered By		**Released By**	J Windebank

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
Solids								
Total Solids	88.6		%	SM20 2540G			10/24/01	DMR
Metals Department								
Mercury by Cold Vapor	666	371	mg/Kg	SW846-7471A		10/31/01	10/31/01	JMP
Metals by ICP/MS								
Arsenic	3140	9.34	mg/Kg	SW846 6020		10/24/01	10/27/01	WAW

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CT&E Environmental Services Inc.

CT&E Ref.#	1017397016	**Client PO#**	
Client Name	Wilder Construction Co.	**Printed Date/Time**	11/06/2001 15:09
Project Name/#	Red Devil Mine	**Collected Date/Time**	10/17/2001 11:50
Client Sample ID	21RDSL010	**Received Date/Time**	10/19/2001 15:20
Matrix	Soil/Solid	**Technical Director**	Stephen C. Ede
Ordered By		**Released By**	J Windebank

Sample Remarks:

SW6020 ICP/MS Metals - MS/MSD recovery for As, Sb and Pb was outside acceptance criteria. Post digestion spike was successful.
SW6020 ICP/MS Metals - Detectable amount of Sb in blank; concentration of Sb in the sample is 10X greater.

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
Solids								
Total Solids	91.3		%	SM20 2540G			10/24/01	DMR
Metals Department								
Mercury by Cold Vapor	404	357	mg/Kg	SW846-7471A		10/31/01	10/31/01	JMP
Metals by ICP/MS								
Arsenic	3100	0.777	mg/Kg	SW846 6020		10/24/01	10/27/01	WAW

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CT&E Environmental Services Inc.

CT&E Ref.#	1017397017
Client Name	Wilder Construction Co.
Project Name/#	Red Devil Mine
Client Sample ID	21RDSLAG01 TCLP Mercury
Matrix	Soil/Solid
Ordered By	

Client PO#	
Printed Date/Time	11/06/2001 15:09
Collected Date/Time	10/16/2001 16:47
Received Date/Time	10/19/2001 15:20
Technical Director	Stephen C. Ede
Released By	J Windebank

Sample Remarks:

Parameter	Results		PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
Solids									
Total Solids	77.5			%	SM20 2540G			10/24/01	DMR
TCLP Metals									
Mercury by Cold Vapor	4.50	*	0.200	mg/L	SW846-7470A TCLP	(<0.2)	11/01/01	11/01/01	JMP

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CT&E Environmental Services Inc.

CT&E Ref.#	1017397018	**Client PO#**	
Client Name	Wilder Construction Co.	**Printed Date/Time**	11/06/2001 15:09
Project Name/#	Red Devil Mine	**Collected Date/Time**	10/16/2001 17:07
Client Sample ID	21RDSLAG02 TCLP Mercury	**Received Date/Time**	10/19/2001 15:20
Matrix	Soil/Solid	**Technical Director**	**Stephen C. Ede**
Ordered By		**Released By**	J Wendebank

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
Solids								
Total Solids	89.1		%	SM20 2540G			10/24/01	DMR
TCLP Metals								
Mercury by Cold Vapor	0.00646	0.00200	mg/L	SW846-7470A TCLP	(<0.2)	11/01/01	11/01/01	JMP

CT&E Environmental Services Inc.

CT&E Ref.#	1017397019	**Client PO#**	
Client Name	Wilder Construction Co.	**Printed Date/Time**	11/06/2001 15:09
Project Name/#	Red Devil Mine	**Collected Date/Time**	10/16/2001 17:07
Client Sample ID	21RDSLAG03 TCLP Mercury	**Received Date/Time**	10/19/2001 15:20
Matrix	Soil/Solid	**Technical Director**	Stephen C. Ede
Ordered By		**Released By**	J Windebank

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
Solids								
Total Solids	89.9		%	SM20 2540G			10/24/01	DMR
TCLP Metals								
Mercury by Cold Vapor	0.00566	0.00200	mg/L	SW846-7470A TCLP	(<0.2)	11/01/01	11/01/01	JMP

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CT&E Environmental Services Inc.

CT&E Ref.#	1017397020	**Client PO#**	
Client Name	Wilder Construction Co.	**Printed Date/Time**	11/06/2001 15:09
Project Name/#	Red Devil Mine	**Collected Date/Time**	10/17/2001 18:11
Client Sample ID	21RDOR001 TCLP Mercury	**Received Date/Time**	10/19/2001 15:20
Matrix	Soil/Solid	**Technical Director**	**Stephen C. Ede**
Ordered By		**Released By**	J Windebank

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
Solids								
Total Solids	86.6		%	SM20 2540G			10/24/01	DMR
TCLP Metals								
Mercury by Cold Vapor	0.0304	0.00200	mg/L	SW846-7470A TCLP	(<0.2)	11/01/01	11/01/01	JMP

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CT&E Environmental Services Inc.

CT&E Ref.#	1017397021	**Client PO#**	
Client Name	Wilder Construction Co.	**Printed Date/Time**	11/06/2001 15:09
Project Name/#	Red Devil Mine	**Collected Date/Time**	10/17/2001 18:30
Client Sample ID	21RDOR002 TCLP Mercury	**Received Date/Time**	10/19/2001 15:20
Matrix	Soil/Solid	**Technical Director**	**Stephen C. Ede**
Ordered By		**Released By**	J Wundebank

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
Solids								
Total Solids	78.8		%	SM20 2540G			10/24/01	DMR
TCLP Metals								
Mercury by Cold Vapor	0.00200 U	0.00200	mg/L	SW846-7470A TCLP	(<0.2)	11/01/01	11/01/01	JMP

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CT&E Environmental Services Inc.

CT&E Ref.#	1017397022	**Client PO#**	
Client Name	Wilder Construction Co.	**Printed Date/Time**	11/06/2001 15:09
Project Name/#	Red Devil Mine	**Collected Date/Time**	10/17/2001 18:20
Client Sample ID	21RDOR003 TCLP Mercury	**Received Date/Time**	10/19/2001 15:20
Matrix	Soil/Solid	**Technical Director**	Stephen C. Ede
Ordered By		**Released By**	J Windebank

Sample Remarks:

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
Solids								
Total Solids	89.7		%	SM20 2540G			10/24/01	DMR
TCLP Metals								
Mercury by Cold Vapor	0.00220	0.00200	mg/L	SW846-7470A TCLP	(<0.2)	11/01/01	11/01/01	JMP

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CT&E Environmental Services Inc.

CT&E Ref.#	401143	Method Blank	**Printed Date/Time**	11/06/2001 15:09
Client Name	Wilder Construction Co.		**Prep** **Batch**	
Project Name/#	Red Devil Mine		**Method**	
Matrix	Soil/Solid		**Date**	

QC results affect the following production samples:

1017397001, 1017397002, 1017397003, 1017397004, 1017397005, 1017397006, 1017397017, 1017397018, 1017397019, 1017397020, 1017397021

Parameter	Results	PQL	Units	Analysis Date	Init
Solids					
Total Solids		100	%	10/24/01	DMR
Batch SPT 4157					
Method SM20 2540G					
Instrument					

CT&E Environmental Services Inc.

CT&E Ref.#	401144	Duplicate	**Printed Date/Time**		11/06/2001 15:09
Client Name	Wilder Construction Co.		**Prep**	**Batch**	
Project Name/#	Red Devil Mine			**Method**	
Original	1017403026			**Date**	
Matrix	Soil/Solid				

QC results affect the following production samples:

1017397001, 1017397002, 1017397003, 1017397004, 1017397005, 1017397006, 1017397017, 1017397018, 1017397019, 1017397020, 1017397021

Parameter	Original Result	QC Result	RPD	RPD Limits	Analysis Date	Init
Solids						
Total Solids	84.7	84.1	1	(< 20)	10/24/01	DMR

Batch SPT 4157
Method SM20 2540G
Instrument

CT&E Environmental Services Inc.

CT&E Ref.#	401145	Method Blank	**Printed Date/Time**	11/06/2001 15:09
Client Name	Wilder Construction Co.		**Prep Batch**	
Project Name/#	Red Devil Mine		**Method**	
Matrix	Soil/Solid		**Date**	

QC results affect the following production samples:

1017397007, 1017397008, 1017397009, 1017397010, 1017397011, 1017397012, 1017397013, 1017397014, 1017397015, 1017397016, 1017397022

Parameter	Results	PQL	Units	Analysis Date	Init
Solids					
Total Solids		100	%	10/24/01	DMR

Batch SPT 4158
Method SM20 2540G
Instrument

CT&E Environmental Services Inc.

CT&E Ref.#	401146	Duplicate	**Printed Date/Time**	11/06/2001 15:09
Client Name	Wilder Construction Co.		**Prep Batch**	
Project Name/#	Red Devil Mine		**Method**	
Original	1017417004		**Date**	
Matrix	Soil/Solid			

QC results affect the following production samples:

1017397007, 1017397008, 1017397009, 1017397010, 1017397011, 1017397012, 1017397013, 1017397014, 1017397015, 1017397016, 1017397022

Parameter	Original Result	QC Result	RPD	RPD Limits	Analysis Date	Init
Solids						
Total Solids		96.7	0	(< 20)	10/24/01	DMR

Batch SPT 4158
Method SM20 2540G
Instrument

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CT&E Environmental Services Inc.

CT&E Ref.#	401275 Method Blank	**Printed Date/Time**		11/06/2001 15:09
Client Name	Wilder Construction Co.	**Prep**	**Batch**	MXX 9407
Project Name/#	Red Devil Mine		**Method**	
Matrix	Water (Surface, Eff., Ground)		**Date**	10/24/2001

QC results affect the following production samples:

1017397001, 1017397002, 1017397003, 1017397004, 1017397005, 1017397006, 1017397007, 1017397008, 1017397009, 1017397010, 1017397011

Parameter	Results	PQL	Units	Analysis Date	Init
Metals Department					
Mercury by Cold Vapor	0.000200 U	0.00020	mg/L	10/24/01	JMP

Batch MCV 2475
Method SW846-7471A
Instrument HgAA Leeman AutoAnalyzer PS200

CT&E Environmental Services Inc.

CT&E Ref.#	401276 Lab Control Sample	**Printed Date/Time**		11/06/2001 15:09
		Prep	**Batch**	MXX 9407
Client Name	Wilder Construction Co.		**Method**	
Project Name/#	Red Devil Mine		**Date**	10/24/2001
Matrix	Water (Surface, Eff., Ground)			

QC results affect the following production samples:

1017397001, 1017397002, 1017397003, 1017397004, 1017397005, 1017397006, 1017397007, 1017397008, 1017397009, 1017397010, 1017397011

Parameter		QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date	Init
Mercury by Cold Vapor	LCS	0.00211	106	(85-115)			0.002 mg/L	10/24/01	JMP

Batch	MCV 2475
Method	SW846-7471A
Instrument	HgAA Leeman AutoAnalyzer PS200

CT&E Environmental Services Inc.

CT&E Ref.#	402810 Method Blank	**Printed Date/Time**	11/06/2001 15:09
Client Name	Wilder Construction Co.	**Prep Batch**	MXX 9428
Project Name/#	Red Devil Mine	**Method**	
Matrix	Water (Surface, Eff., Ground)	**Date**	10/31/2001

QC results affect the following production samples:

1017397012, 1017397013, 1017397014, 1017397015, 1017397016

Parameter	Results	PQL	Units	Analysis Date	Init
Metals Department					
Mercury by Cold Vapor	0.000200 U	0.00020	mg/L	10/31/01	JMP

Batch MCV 2480
Method SW846-7471A
Instrument HgAA Leeman AutoAnalyzer PS200

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CT&E Environmental Services Inc.

CT&E Ref.#	402811 Lab Control Sample	**Printed Date/Time**	11/06/2001 15:09
		Prep Batch	MXX 9428
Client Name	Wilder Construction Co.	**Method**	
Project Name/#	Red Devil Mine	**Date**	10/31/2001
Matrix	Water (Surface, Eff., Ground)		

QC results affect the following production samples:

1017397012, 1017397013, 1017397014, 1017397015, 1017397016

Parameter		QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date	Init
Mercury by Cold Vapor	LCS	0.00204	102	(85-115)			0.002 mg/L	10/31/01	JMP

Batch MCV 2480
Method SW846-7471A
Instrument HgAA Leeman AutoAnalyzer PS200

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CT&E Environmental Services Inc.

CT&E Ref.#	402866 Method Blank	**Printed Date/Time**		11/06/2001 15:09
Client Name	Wilder Construction Co.	**Prep**	**Batch**	MXX 9433
Project Name/#	Red Devil Mine		**Method**	
Matrix	Water (Surface, Eff., Ground)		**Date**	11/01/2001

QC results affect the following production samples:

1017397017, 1017397018, 1017397019, 1017397020, 1017397021, 1017397022

Parameter	Results	PQL	Units	Analysis Date	Init
Metals Department					
Mercury by Cold Vapor	0.000200 U	0.00020	mg/L	11/01/01	JMP

Batch MCV 2481
Method SW7470/E245.1
Instrument HgAA Leeman AutoAnalyzer PS200

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CT&E Environmental Services Inc.

CT&E Ref.#	402867 Lab Control Sample	**Printed Date/Time**	11/06/2001 15:09
		Prep Batch	MXX 9433
Client Name	Wilder Construction Co.	**Method**	
Project Name/#	Red Devil Mine	**Date**	11/01/2001
Matrix	Water (Surface, Eff., Ground)		

QC results affect the following production samples:

1017397017, 1017397018, 1017397019, 1017397020, 1017397021, 1017397022

Parameter		QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date	Init
Mercury by Cold Vapor	LCS	0.00202	101	(85-115)			0.002 mg/L	11/01/01	JMP

Batch MCV 2481
Method SW7470/E245.1
Instrument HgAA Leeman AutoAnalyzer PS200

CT&E Environmental Services Inc.

CT&E Ref.#	401277	Matrix Spike	**Printed Date/Time**	11/06/2001 15:10
	401278	Matrix Spike Duplicate	**Prep** **Batch**	MXX 9407
			Method	Digestion Mercury (S)
			Date	10/24/2001
Original	1017394001			
Matrix	Soil/Solid			

QC results affect the following production samples:

1017397001, 1017397002, 1017397003, 1017397004, 1017397005, 1017397006, 1017397007, 1017397008, 1017397009, 1017397010, 1017397011

Parameter		Original Result	QC Result	Pct Recov	MS/MSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date	Init
Metals Department										
Mercury by Cold Vapor	MS	0.0504	0.216	100	(75-125)			0.165 mg/Kg	10/24/01	JMP
	MSD		0.245	118		13	(< 20)	0.165 mg/Kg	10/24/01	JMP

Batch MCV 2475
Method SW846-7471A
Instrument HgAA Leeman AutoAnalyzer PS200

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CT&E Environmental Services Inc.

CT&E Ref.#	402815	Matrix Spike	**Printed Date/Time**	11/06/2001 15:10
	402816	Matrix Spike Duplicate	**Prep Batch**	MXX 9428
			Method	Digestion Mercury (S)
			Date	10/31/2001
Original	1017413004			
Matrix	Soil/Solid			

QC results affect the following production samples:

1017397012, 1017397013, 1017397014, 1017397015, 1017397016

Parameter		Original Result	QC Result	Pct Recov	MS/MSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date	Init
Metals Department										
Mercury by Cold Vapor	MS		0.205	98	(75-125)			0.166 mg/Kg	10/31/01	JMP
	MSD		0.228	112		11	(< 20)	0.166 mg/Kg	10/31/01	JMP

Batch MCV 2480
Method SW846-7471A
Instrument HgAA Leeman AutoAnalyzer PS200

CT&E Environmental Services Inc.

CT&E Ref.# 402868 Matrix Spike

Printed Date/Time 11/06/2001 15:10
Prep Batch MXX 9433
Method Digestion Mercury (W)
Date 11/01/2001

Original 1017466002
Matrix Other Solids (Wet Weight)

QC results affect the following production samples:
1017397017, 1017397018, 1017397019, 1017397020, 1017397021, 1017397022

Parameter		Original Result	QC Result	Pct Recov	MS/MSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date	Init
Metals Department										
Mercury by Cold Vapor	MS	0.000526	0.00257	102	(75-125)			0.002 mg/L	11/01/01	JMP

Batch MCV 2481
Method SW7470/E245.1
Instrument HgAA Leeman AutoAnalyzer PS200

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CT&E Environmental Services Inc.

CT&E Ref.#	401161 Method Blank	**Printed Date/Time**	11/06/2001 15:09
Client Name	Wilder Construction Co.	**Prep Batch**	MXX 9404
Project Name/#	Red Devil Mine	**Method**	
Matrix	Soil/Solid	**Date**	10/24/2001

QC results affect the following production samples:

1017397004, 1017397005, 1017397006, 1017397007, 1017397008, 1017397009, 1017397010, 1017397011, 1017397012, 1017397013, 1017397014, 1017397015, 1017397016

Parameter	Results	PQL	Units	Analysis Date	Init
Phosphorus	0.00		mg/Kg	10/27/01	WAW

Batch MMS 1829
Method SW846 6020
Instrument Perkin Elmer Sciex ICP-MS P3

Metals by ICP/MS

Parameter	Results	PQL	Units	Analysis Date	Init
Aluminum	10.0 U	10.0	mg/Kg	10/27/01	WAW
Antimony	0.300 U	0.300	mg/Kg	10/27/01	WAW
Arsenic	1.00 U	1.00	mg/Kg	10/27/01	WAW
Barium	0.500 U	0.500	mg/Kg	10/27/01	WAW
Beryllium	0.100 U	0.100	mg/Kg	10/27/01	[illegible]
Cadmium	0.200 U	0.200	mg/Kg	10/27/01	WAW
Calcium	100 U	100	mg/Kg	10/27/01	WAW
Chromium	1.00 U	1.00	mg/Kg	10/27/01	WAW
Cobalt	0.500 U	0.500	mg/Kg	10/27/01	WAW
Copper	2.00 U	2.00	mg/Kg	10/27/01	WAW
Iron	100 U	100	mg/Kg	10/27/01	WAW
Lead	0.200 U	0.200	mg/Kg	10/27/01	WAW
Potassium	100 U	100	mg/Kg	10/27/01	WAW
Selenium	1.00 U	1.00	mg/Kg	10/27/01	WAW
Silver	0.100 U	0.100	mg/Kg	10/27/01	WAW
Sodium	200 U	200	mg/Kg	10/27/01	WAW
Thallium	0.0200 U	0.0200	mg/Kg	10/27/01	WAW
Vanadium	2.00 U	2.00	mg/Kg	10/27/01	WAW
Zinc	1.00 U	1.00	mg/Kg	10/27/01	WAW
Magnesium	30.0 U	30.0	mg/Kg	10/27/01	WAW
Manganese	2.00 U	2.00	mg/Kg	10/27/01	WAW
Molybdenum	1.00 U	1.00	mg/Kg	10/27/01	WAW
Nickel	2.00 U	2.00	mg/Kg	10/27/01	WAW

Batch MMS 1829
Method SW846 6020
Instrument Perkin Elmer Sciex ICP-MS P3

CT&E Environmental Services Inc.

CT&E Ref.#	401162 Lab Control Sample	**Printed Date/Time**	11/06/2001 15:09
Client Name	Wilder Construction Co.	**Prep Batch**	MXX 9404
Project Name/#	Red Devil Mine	**Method**	
Matrix	Soil/Solid	**Date**	10/24/2001

QC results affect the following production samples:

1017397004, 1017397005, 1017397006, 1017397007, 1017397008, 1017397009, 1017397010, 1017397011, 1017397012, 1017397013, 1017397014, 1017397015, 1017397016

Parameter		QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date	Init
Antimony	LCS	45.8	92	(85-115)			50 mg/Kg	10/27/01	WAW
Arsenic	LCS	49.5	99	(85-115)			50 mg/Kg	10/27/01	WAW
Barium	LCS	49.1	98	(85-115)			50 mg/Kg	10/27/01	WAW
Beryllium	LCS	19.8	99	(85-115)			20.1 mg/Kg	10/27/01	WAW
Cadmium	LCS	22.3	89	(85-115)			25 mg/Kg	10/27/01	WAW
Calcium	LCS	512	102	(85-115)			500 mg/Kg	10/27/01	WAW
Chromium	LCS	48.0	96	(85-115)			50 mg/Kg	10/27/01	WAW
Cobalt	LCS	44.9	90	(85-115)			50 mg/Kg	10/27/01	WAW
Copper	LCS	48.9	98	(85-115)			50 mg/Kg	10/27/01	WAW
Iron	LCS	52.2F	104	(85-115)			50.1 mg/Kg	10/27/01	WAW
Lead	LCS	48.0	96	(85-115)			50 mg/Kg	10/27/01	WAW
Aluminum	LCS	50.9	102	(85-115)			50 mg/Kg	10/27/01	WAW
Manganese	LCS	44.5	89	(85-115)			50 mg/Kg	10/27/01	WAW
Nickel	LCS	48.9	98	(85-115)			50 mg/Kg	10/27/01	WAW
Potassium	LCS	481	96	(85-115)			500 mg/Kg	10/27/01	WAW
Selenium	LCS	47.4	95	(85-115)			50 mg/Kg	10/27/01	WAW
Silver	LCS	9.29	93	(85-115)			10 mg/Kg	10/27/01	WAW
Sodium	LCS	499	100	(85-115)			500 mg/Kg	10/27/01	WAW
Thallium	LCS	47.9	95	(85-115)			50.5 mg/Kg	10/27/01	WAW
Vanadium	LCS	45.1	90	(85-115)			50 mg/Kg	10/27/01	WAW
Zinc	LCS	48.3	97	(85-115)			50 mg/Kg	10/27/01	WAW
Magnesium	LCS	482	96	(85-115)			500 mg/Kg	10/27/01	WAW

Batch MMS 1829
Method SW846 6020
Instrument Perkin Elmer Sciex ICP-MS P3

CT&E Environmental Services Inc.

CT&E Ref.#	401164	Matrix Spike	**Printed Date/Time**	11/06/2001 15:10
			Prep Batch	MXX 9404
			Method	Soils/Solids Digest for Metals
			Date	10/24/2001
Original	1017397016			
Matrix	Soil/Solid			

QC results affect the following production samples:

1017397004, 1017397005, 1017397006, 1017397007, 1017397008, 1017397009, 1017397010, 1017397011, 1017397012, 1017397013, 1017397014, 1017397015, 1017397016

Parameter	Original Result	QC Result	Pct Recov	MS/MSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date	Init

Batch MMS 1829
Method SW846 6020
Instrument Perkin Elmer Sciex ICP-MS P3

Metals by ICP/MS

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CT&E Environmental Services Inc.

CT&E Ref.#	401164	Matrix Spike	**Printed Date/Time**		11/06/2001 15:10
	401165	Matrix Spike Duplicate	**Prep**	**Batch**	MXX 9404
				Method	Soils/Solids Digest for Metals
				Date	10/24/2001
Original	1017397016				
Matrix	Soil/Solid				

Parameter	Original Result	QC Result	Pct Recov	MS/MSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date	Init
Metals by ICP/MS									
Nickel	MS	84.4	94	(75-125)			35.5 mg/Kg	10/27/01	WAW
	MSD	79.2	79		6	(< 20)	35.5 mg/Kg	10/27/01	WAW
Zinc	MS	123	112	(75-125)			35.5 mg/Kg	10/27/01	WAW
	MSD	131	132*		6	(< 20)	35.5 mg/Kg	10/27/01	WAW
Vanadium	MS	98.6	116	(75-125)			35.5 mg/Kg	10/27/01	WAW
	MSD	102	125		3	(< 20)	35.5 mg/Kg	10/27/01	WAW
Thallium	MS	35.4	97	(75-125)			35.8 mg/Kg	10/27/01	WAW
	MSD	35.9	99		1	(< 20)	35.8 mg/Kg	10/27/01	WAW
Sodium	MS	596	85	(75-125)			355 mg/Kg	10/27/01	WAW
	MSD	627	94		5	(< 20)	355 mg/Kg	10/27/01	WAW
Silver	MS	6.79	93	(75-125)			7.09 mg/Kg	10/27/01	WAW
	MSD	6.82	94		0	(< 20)	7.09 mg/Kg	10/27/01	WAW
Selenium	MS	32.2	89	(75-125)			35.5 mg/Kg	10/27/01	WAW
	MSD	32.8	91		2	(< 20)	35.5 mg/Kg	10/27/01	WAW
Manganese	MS	676	93	(75-125)			35.5 mg/Kg	10/27/01	WAW
	MSD	791	418*		16	(< 20)	35.5 mg/Kg	10/27/01	WAW
Magnesium	MS	4710	156*	(75-125)			355 mg/Kg	10/27/01	WAW
	MSD	4740	164*		1	(< 20)	355 mg/Kg	10/27/01	WAW
Arsenic	MS	3010	523*	(75-125)			35.5 mg/Kg	10/27/01	WAW
	MSD	2680	-410*		12	(< 20)	35.5 mg/Kg	10/27/01	WAW
Aluminum	MS	19800	-1910*	(75-125)			35.5 mg/Kg	10/27/01	WAW
	MSD	20800	885*		5	(< 20)	35.5 mg/Kg	10/27/01	WAW
Potassium	MS	5420	77	(75-125)			355 mg/Kg	10/27/01	WAW
	MSD	5770	178*		6	(< 20)	355 mg/Kg	10/27/01	WAW
Antimony	MS	3440	109	(75-125)			35.5 mg/Kg	10/27/01	WAW
	MSD	4100	1970*		18	(< 20)	35.5 mg/Kg	10/27/01	WAW
Lead	MS	48.7	102	(75-125)			35.5 mg/Kg	10/27/01	WAW
	MSD	48.5	102		0	(< 20)	35.5 mg/Kg	10/27/01	WAW
Barium	MS	640	56*	(75-125)			35.5 mg/Kg	10/27/01	WAW
	MSD	766	412*		18	(< 20)	35.5 mg/Kg	10/27/01	WAW
Beryllium	MS	14.4	95	(75-125)			14.3 mg/Kg	10/27/01	WAW
	MSD	14.8	97		3	(< 20)	14.3 mg/Kg	10/27/01	WAW
Cadmium	MS	16.2	89	(75-125)			17.7 mg/Kg	10/27/01	WAW
	MSD	16.1	89		1	(< 20)	17.7 mg/Kg	10/27/01	WAW
Chromium	MS	87.8	94	(75-125)			35.5 mg/Kg	10/27/01	WAW
	MSD	82.6	80		6	(< 20)	35.5 mg/Kg	10/27/01	WAW
Cobalt	MS	42.5	79	(75-125)			35.5 mg/Kg	10/27/01	WAW
	MSD	41.5	76		3	(< 20)	35.5 mg/Kg	10/27/01	WAW
Copper	MS	75.6	86	(75-125)			35.5 mg/Kg	10/27/01	WAW
	MSD	76.8	90		2	(< 20)	35.5 mg/Kg	10/27/01	WAW

5701

CT&E Environmental Services Inc.

CT&E Ref.#	401164	Matrix Spike	**Printed Date/Time**	11/06/2001 15:10
	401165	Matrix Spike Duplicate	**Prep** **Batch**	MXX 9404
			Method	Soils/Solids Digest for Metals
			Date	10/24/2001
Original	1017397016			
Matrix	Soil/Solid			

Parameter		Original Result	QC Result	Pct Recov	MS/MSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date	Init
Metals by ICP/MS										
Calcium	MS		3100	121	(75-125)			355 mg/Kg	10/27/01	WAW
	MSD		2870	56*		8	(< 20)	355 mg/Kg	10/27/01	WAW
Iron	MS		34100	2190*	(75-125)			35.5 mg/Kg	10/27/01	WAW
	MSD		36000	7460*		5	(< 20)	35.5 mg/Kg	10/27/01	WAW

Batch MMS 1829
Method SW846 6020
Instrument Perkin Elmer Sciex ICP-MS P3

APPENDIX F

APPENDIX F

OFFSITE WASTE DISPOSAL CERTIFICATIONS

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Emerald
ALASKA INC.

CERTIFICATE OF DISPOSAL/RECYCLE

GENERATOR:

Bureau of Land Management
Red Devil Mine
Red Devil, Alaska

Wilder Construction
11301 Lang Street
Anchorage, AK 99515

EPA ID#: AKD980495618
MANIFEST DOCUMENT NUMBER: 0793A
DATE OF RECYCLE/DISPOSAL: October 18, 2002

LINE	DESCRIPTION	CONTAINERS	QUANTITY	PROFILE
1a	Combustible Liquid, NOS (Petroleum Oil)	1 DM	55-gallons	AK02907
1b	Batteries, Wet, Filled with Acid (Lead Acid Batteries)	2 DM	871 P	AK07100
1c	Material Not Regulated by DOT (Absorbents)	1 DM	55 G	AK00504

FACILITY OPERATOR:

PRINTED: Roxanne Pedersen

SIGNATURE: Roxanne Pedersen DATE: November 11, 2002

*** IN CASE OF EMERGENCY CALL 1-800-424-9300 ***

NON-HAZARDOUS WASTE MANIFEST

Please print or type (Form designed for use on elite (12 pitch) typewriter)

NON-HAZARDOUS WASTE MANIFEST	1. Generator's US EPA ID No. AKD980495618	Manifest Document No. 0793A	2. Page 1 of 1

3. Generator's Name and Mailing Address: BUREAU OF LAND MANAGEMENT, RED DEVIL MINE, RED DEVIL, AK

4. Generator's Phone (907) 778-2140

5. Transporter 1 Company Name: EMERALD SERVICES, INC.	6. US EPA ID Number: WAD058364647	A. State Transporter's ID:
		B. Transporter 1 Phone: (907) 258-1558
7. Transporter 2 Company Name:	8. US EPA ID Number:	C. State Transporter's ID:
		D. Transporter 2 Phone:
9. Designated Facility Name and Site Address: EMERALD ALASKA, INC. 2020 VIKING DRIVE ANCHORAGE, AK 99501	10. US EPA ID Number: AKR000004184	E. State Facility's ID:
		F. Facility's Phone: (907) 258-1558

11. WASTE DESCRIPTION	12. Containers No.	Type	13. Total Quantity	14. Unit Wt./Vol.
a. COMBUSTIBLE LIQUID, N.O.S. (PETROLEUM OIL), COMBUSTIBLE LIQUID, NA1993, PG-III, ERG#128	1	DM	55	G
b. BATTERIES, WET, FILLED WITH ACID, 8, UN2794, PG-III, ERG#154	2	DM	871	P
c. MATERIAL NOT REGULATED BY D.O.T.	1	DM	55	G
d.				

GENERATOR

G. Additional Descriptions for Materials Listed Above

a) AK02907-A USED OIL (ON-SPEC/OFF-SPEC)(COMBUSTIBLE)
b) AK07100 UNIVERSAL WASTE LEAD ACID BATTERIES FOR RECYCL
c) AK00504 NON-HAZARDOUS PETROLEUM CONTAMINATED MATERIAL (

H. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information
EMERALD ALASKA, INC. JOB # 93-903-AK00793

16. GENERATOR'S CERTIFICATION: I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.

Printed/Typed Name	Signature	Date Month	Day	Year

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date Month	Day	Year
Gary Reed	Gary Reed	10	18	02

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date Month	Day	Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator; Certification of receipt of the waste materials covered by this manifest, except as noted in item 19.

Printed/Typed Name	Signature	Date Month	Day	Year
Roxanne Pedersen for EAI	Roxanne Pedersen	10	18	02

*** IN CASE OF EMERGENCY CALL 1-800-424-9300 ***

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039.

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: AK0980495618
Manifest Document No.: 07936

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address: BUREAU OF LAND MANAGEMENT, RED DEVIL MINE, RED DEVIL, AK

4. Generator's Phone (907) 778-2140

A. State Manifest Document Number

B. State Generator's ID

5. Transporter 1 Company Name: EMERALD SERVICES, INC.

6. US EPA ID Number: WAD058364647

C. State Transporter's ID

D. Transporter's Phone (907) 258-1558

7. Transporter 2 Company Name: CARLILE ENTERPRISES, INC.

8. US EPA ID Number: AKD122081243

E. State Transporter's ID

F. Transporter's Phone (907) 276-7797

9. Designated Facility Name and Site Address: US ECOLOGY IDAHO, INC., 10.5 MI. NW HWY. 78, LEMLEY ROAD, GRAND VIEW, ID 83624

10. US EPA ID Number: IDD073114654

G. State Facility's ID

H. Facility's Phone (800) 274-1516

	HM	11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	12. Containers No.	12. Containers Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, HAZARDOUS WASTE, SOLID, N.O.S. (LEAD), 9, NA1877, PG-III, RQ=10, ERG#171	1	DM	500	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a) USE1573, LEAD WIRE

K. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information
EMERALD ALASKA, INC. JOB # 93-903-AK00793 - DISPOSAL PO # ____________

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; **OR**, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name	Signature	Month	Day	Year
X Harlan Enderson	X Harlan Enderson	10	18	02

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
Zack Hamilton	Zack Hamilton	10	18	02

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month	Day	Year

GENERATOR / TRANSPORTER / FACILITY

*** IN CASE OF EMERGENCY CALL 1-800-424-9300 ***

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039.

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: AKD980495618 — Manifest Document No.: 0793C
2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address: BUREAU OF LAND MANAGEMENT, RED DEVIL MINE, RED DEVIL, AK
4. Generator's Phone (907) 778-2140
5. Transporter 1 Company Name: EMERALD SERVICES, INC.
6. US EPA ID Number: WAD058364647
7. Transporter 2 Company Name: CARLILE ENTERPRISES, INC.
8. US EPA ID Number: AKD122081243
9. Designated Facility Name and Site Address: EMERALD SERVICES, INC., 1825 ALEXANDER AVE, TACOMA, WA 98421
10. US EPA ID Number: WAD981769110

A. State Manifest Document Number

B. State Generator's ID

C. State Transporter's ID

D. Transporter's Phone (907) 258-1558

E. State Transporter's ID

F. Transporter's Phone (907) 276-7797

G. State Facility's ID

H. Facility's Phone (253) 627-4822

	HM	11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, HAZARDOUS WASTE, LIQUID, N.O.S. (TETRACHLOROETHYLENE, TRICHLOROETHYLENE), 9, NA3082, PG-III, RQ=100, ERG#171	1	DM	450	P	D039 D040
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a) Z1819 CHLORINATED OIL

K. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information
EMERALD ALASKA, INC. JOB # 93-903-AK00793 - DISPOSAL PO # [illegible]/FBL-TAC-02

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; **OR**, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name	Signature	Month	Day	Year
Harlan Endres	Harlan Endres	10	25	02

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
Daniel Girard	D. Girard	10	25	02

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month	Day	Year

GENERATOR COPY

APPENDIX G

APPENDIX G

LINER SPECIFICATIONS AND LINER QUALITY ASSURANCE

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GSE

GSE HD

Smooth HDPE Geomembrane

GSE HD is a high quality, high density polyethylene (HDPE) geomembrane produced from specially formulated, virgin polyethylene resin. This polyethylene resin is designed specifically for flexible geomembrane applications. It contains approximately 97.5% polyethylene, 2.5% carbon black and trace amounts of antioxidants and heat stabilizers; no other additives, fillers or extenders are used. GSE HD has outstanding chemical resistance, mechanical properties, environmental stress crack resistance, dimensional stability and thermal aging characteristics. GSE HD has excellent resistance to UV radiation and is suitable for exposed conditions.

Product Specifications

TESTED PROPERTY	TEST METHOD	MINIMUM VALUES				
Thickness, mils (mm)	ASTM D 5199	27 (0.69)	36 (0.91)	54 (1.4)	72 (1.8)	90 (2.3)
Density, g/cm^3	ASTM D 1505	0.94	0.94	0.94	0.94	0.94
Tensile Properties (each direction)	ASTM D 638, Type IV					
Strength at Break, lb/in-width (N/mm)	Dumbell, 2 ipm	122 (21)	162 (28)	243 (43)	324 (57)	405 (71)
Strength at Yield, lb/in-width (N/mm)		63 (11)	84 (15)	130 (23)	173 (30)	216 (38)
Elongation at Break, %	G.L. 2.0 in (51 mm)	700	700	700	700	700
Elongation at Yield, %	G.L. 1.3 in (33 mm)	13	13	13	13	13
Tear Resistance, lb (N)	ASTM D 1004	21 (93)	28 (124)	42 (187)	56 (249)	70 (311)
Puncture Resistance, lb (N)	ASTM D 4833	59 (263)	79 (352)	119 (530)	158 (703)	198 (881)
Carbon Black Content, %	ASTM D 1603	2.0	2.0	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 5596	+Note 1	+Note 1	+Note 1	+Note 1	+Note 1
Notched Constant Tensile Load, hrs	ASTM D 5397, Appendix	400	400	400	400	400
REFERENCE PROPERTY	**TEST METHOD**	**NOMINAL VALUES**				
Thickness, mils (mm)	ASTM D 5199	30 (0.75)	40 (1.0)	60 (1.5)	80 (2.0)	100 (2.5)
Roll Length (approximate), ft (m)		1120 (341)	870 (265)	560 (171)	430 (131)	340 (104)
Oxidative Induction Time, minutes	ASTM D 3895, 200° C; O_2, 1 atm	>100	>100	>100	>100	>100

NOTES:

+Note 1: Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.

GSE HD is available in rolls approximately 22.5 ft (6.9 m) wide and weighing about 2,900 lb (1,315 kg).

All GSE geomembranes have dimensional stability of ±2% when tested with ASTM D 1204 and LTB of <-77° C when tested with ASTM D 746.

Americas
GSE Lining Technology, Inc.
Houston, Texas
Phone: 800-435-2008
281-443-8564
Fax: 281-230-8650

Asia/Pacific
GSE Lining Technology Company Ltd.
Bangkok, Thailand
Phone: 66-2-937-0091
Fax: 66-2-937-0097

Europe/Middle East
GSE Lining Technology GmbH
Hamburg, Germany
Phone: 49-40-767420
Fax: 49-40-7674233

Represented by:

A Gundle/SLT Environmental, Inc. Company
www.gseworld.com

DS005 R12/19/01

Amoco Fabrics and Fibers Company

260 The Bluffs
Austell, GA 30168
PH: (770) 944-4569
FX: (770) 944-4584

STYLE 4553

Amoco Style 4553 is a polypropylene nonwoven needlepunched fabric. This engineered geotextile is stabilized to resist degradation due to ultraviolet exposure. It is resistant to commonly encountered soil chemicals, mildew and insects, and is non-biodegradable. Polypropylene is stable within a pH range of 2 to 13, making it one of the most stable polymers available for geotextiles today. We wish to advise that **Amoco Style 4553** meets the following minimum average roll values:

Property	Test Method	Minimum Average Roll Value (English)	Minimum Average Roll Value (Metric)
Grab Tensile	ASTM-D-4632	203 lbs	0.900 kN
Grab Elongation	ASTM-D-4632	50 %	50 %
Mullen Burst	ASTM-D-3786	380 psi	2619 kPa
Puncture	ASTM-D-4833	130 lb	0.575 kN
Trapezoidal Tear	ASTM-D-4533	80 lb	0.355 kN
UV Resistance	ASTM-D-4355	70 % at 500 hrs	70 % at 500 hrs
AOS(1)	ASTM-D-4751	100 sieve	0.15 mm
Permittivity	ASTM-D-4491	1.5 sec^{-1}	1.5 sec^{-1}
Flow Rate	ASTM-D-4491	110 $gal/min/ft^2$	4470 $L/min/m^2$

(1). max. average roll value

Amoco Fabrics and Fibers Company manufactures the nonwoven fabric indicated above. The values listed are a result of testing conducted in on-site laboratories. A letter certifying the minimum average roll values will be issued from the manufacturing plant by the Quality Control Manager at the time shipment is made.

DATE ISSUED: 01/01/02

Part of the BP Amoco Group

Subgrade Surface Acceptance

Date: 7/12/02

Project: RED DEVIL MINE DEMO Site Mgr. ROBERT SCOTT

Project # NADO1WI02

Location: RED DEVIL, ALASKA Partial: ______ Final: ✓

This document only applies to the acceptability of surface conditions for installation of geosynthetic products. GSE does not accept responsibility for compaction, elevation or moisyure content, nor for the surface maintenance during deployment. Structural integrity of the subgrade and maintenance of these conditions are the responsibility of the owner or earthwork contrator.

For GSE Lining Technology, Inc.

Chuck Stretch

Chuck St[illegible]

For Owner / Contractor

Acceptance Number: 1 Area Accepted Approx 18,500 s.f. Total Area Accepted to date: 18,500 s.f.

CHUCK STRETCH
CONSTRUCTION CONSULTANT

TRIAL WELD INFORMATION

PROJECT NAME: Red Devil Mine PROJECT NUMBER: ______ MATERIAL DESCRIPTION: 60 mil HDPE

DATE/ TIME	AMBIENT TEMP	SEAMER INITIALS	MACHINE NUMBER	EXTRUSION WELDS					FUSION WELDS				PEEL VALUES LBS / INCH			PASS/ FAIL	COMMENTS
				BARREL TEMP		PREHEAT TEMP		WELD THICKNESS MILS	WEDGE TEMP		MEASURED SPEED FT / MIN	WHEEL SETTING			SHEAR		
				SET	PYRO	SET	PYRO		SET	PYRO							
7-12-02 1:30	60°	CS	2184					60	725°		6		112	134	147/156	Pass	
"	"	"	"					"	"		"		127	142	153/141	Pass	
7-12-02 3:30	60°	CS	2031	720°		500°		60					111		145	Pass	
7-13-02	50°	PS	2184	[illegible]°				60	725°		5		126	114	152/146	Pass	
"	"	"	"					"	"		"		123	116	141/147	Pass	

PANEL PLACEMENT FORM

PROJECT NAME: Red Devil Mine PROJECT NUMBER: ______ MATERIAL DESCRIPTION: 60 Mil HDPE

DATE/ TIME	PANEL NUMBER	ROLL NUMBER	PANEL LENGTH	PANEL WIDTH	COMMENTS/ PANEL LOCATION
7-12-02 11:AM	1	855B02 27983B	259'	22.5'	
7-12-02 11:30AM	2	855B02 27983B	259'	22.5'	
7-12-02 7PM	3	855B02 27979B	259	8'	
7-13-02	4	855B02 27983B	259	22.5	

PANEL SEAMING FORM

PROJECT NAME: Red Devil Mine   PROJECT NUMBER: ______   MATERIAL DESCRIPTION: 60 mil HDPE

DATE/ TIME	SEAM NUMBER	PANEL NUMBERS	SEAM LENGTH	SEAMER INITIALS	MACHINE NUMBER	TEMP SETTING	WEATHER	WINDS	AMBIENT TEMP	DES TEST P/F	COMMENTS
7-12-02 1:45 PM	1	1+2	259'	CS.	2184	725°	P/C	NONE	60°		
7-12-02 8:30 PM	2	2+3	259	CS	2184	725°	P/C	NONE	52°		
7-13-02 10 PM	3	3+4	259	RJ	2184	725°	P/C	NONE	50°		

N° Red Devil Mine

PANEL AND SEAM REPAIR LOG

PROJECT #:

DATE / TIME: 7-12-02/2:45PM

TECH ID: CS

ANCHOR SQ. FT.=

PANEL/SEAM LENGTH: 259'

SEAM #: 1

MACH ID: 2184

PANEL SQ. FT.=

#2	#1

REPAIR #	LOCALE X	LOCALE Y	SIZE/ DESCRIPTION	REP. DATE	TECH ID	MACH ID	TEST DATE	TECH ID	P/F

NON DESTRUCTIVE TESTING

DATE	TECH	TIME BEG.	TIME END	PRESSURE BEG.	PRESSURE END	COMP Y/N	V BOX Y/N	LOCATION / COMMENTS
7-12-02	CS	2:43PM	2:49PM	30	30		N	Pass

#2 PANEL # | #1 PANEL #

855B02 27983B ROLL # | 855B02 27983B ROLL #

N O Red Devil Line

PANEL AND SEAM REPAIR LOG

PROJECT #:

DATE / TIME: 7-13-02 / 11PM

TECH ID:

ANCHOR SQ. FT.=

PANEL/SEAM LENGTH: 259'

SEAM #: 2

MACH ID:

PANEL SQ. FT.=

#3	#2

3 | 2

PANEL # PANEL #

REPAIR #	LOCALE X	LOCALE Y	SIZE/ DESCRIPTION	REP. DATE	TECH ID	MACH ID	TEST DATE	TECH ID	P/F

NON DESTRUCTIVE TESTING

DATE	TECH	TIME BEG.	TIME END	PRESSURE BEG.	PRESSURE END	COMP Y/N	V BOX Y/N	LOCATION / COMMENTS
7-13-02	CS	11:10PM	11:15PM	30	30	Y	Y	Pass
~~7-13-02~~	~~CS~~	~~11:20PM~~	~~11:25PM~~	~~30~~	~~30~~	~~Y~~	~~Y~~	~~Pass~~

855 B02 855 B02

279 79B / 27983B

ROLL # ROLL #

N° Red Devil Mine

PANEL AND SEAM REPAIR LOG

PROJECT #: ____________ DATE / TIME: 7-13-02 TECH ID: ____________ ANCHOR SQ. FT.= ____________

PANEL/SEAM LENGTH: 259' SEAM #: 3 MACH ID: ____________ PANEL SQ. FT.= ____________

#4	#3

4	3
PANEL #	PANEL #

REPAIR #	LOCALE X	LOCALE Y	SIZE/ DESCRIPTION	REP. DATE	TECH ID	MACH ID	TEST DATE	TECH ID	P/F

NON DESTRUCTIVE TESTING

DATE	TECH	TIME BEG.	TIME END	PRESSURE BEG.	PRESSURE END	COMP Y/N	V BOX Y/N	LOCATION / COMMENTS
7-13-02	CS	11:20	11:25	30	30	y	n	Pass

855 B02 27977B	855 B02 127979B
ROLL #	ROLL #

DONOVAN KELIIPULEOLE
HAWAII LINER TECHNOLOGY

TRIAL WELD INFORMATION

PROJECT NAME: RED DEVIL MINE PROJECT NUMBER: LANDFILL CAP. MATERIAL DESCRIPTION: 60mil HDPE

DATE/ TIME	AMBIENT TEMP	SEAMER INITIALS	MACHINE NUMBER	EXTRUSION WELDS					FUSION WELDS				PEEL VALUES LBS / INCH			PASS/ FAIL	COMMENTS
				BARREL TEMP		PREHEAT TEMP		WELD THICKNESS MILS	WEDGE TEMP		MEASURED SPEED FT / MIN	WHEEL SETTING			SHEAR		
				SET	PYRO	SET	PYRO		SET	PYRO							
7-28 2:45p	60°	DKK	2184					60	725°			5	127	126	147/150	P	
7-28 3:00p	60°	DKK	2184					60	725°			5	130	134	156/153	P	

PANEL PLACEMENT FORM

PROJECT NAME: Red Devil Mine PROJECT NUMBER: OSP. MATERIAL DESCRIPTION: Gonic HDPE

DATE/ TIME	PANEL NUMBER	ROLL NUMBER	PANEL LENGTH	PANEL WIDTH	COMMENTS/ PANEL LOCATION
7/25 200p	1		240	22.5'	
7/25 215	2		240	22.5'	
7/25 230	3		240	12' ~~22.5~~	

PANEL SEAMING FORM

PROJECT NAME: RED DEVIL MINE PROJECT NUMBER: CDP MATERIAL DESCRIPTION: 60MIL HDPE

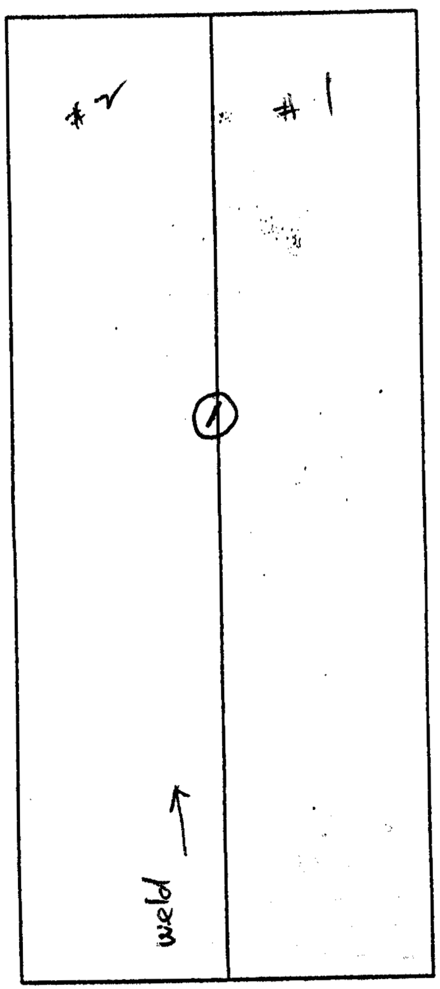
DATE/ TIME	SEAM NUMBER	PANEL NUMBERS	SEAM LENGTH	SEAMER INITIALS	MACHINE NUMBER	TEMP SETTING	WEATHER	WINDS	AMBIENT TEMP	DES TEST P/F	COMMENTS
7/25 300	1	1-2	240	DLL	2184	725°	FAIR	5	60°		
7/25 330	2	2-3	246	"	2184	725°	"	"	"		
~~7/25 4 15~~	~~3~~		~~240~~	~~"~~	~~2187~~	~~725°~~	~~"~~	~~"~~	~~"~~		

N°

PANEL AND SEAM REPAIR LOG

PROJECT #: Red Devil Mine
DATE / TIME: 7/25
TECH ID:
ANCHOR SQ. FT.=

PANEL/SEAM LENGTH: 290'
SEAM #: 1
MACH ID:
PANEL SQ. FT.=



REPAIR #	LOCALE X	LOCALE Y	SIZE/ DESCRIPTION	REP. DATE	TECH ID	MACH ID	TEST DATE	TECH ID	P/F

NON DESTRUCTIVE TESTING

DATE	TECH	TIME BEG.	TIME END	PRESSURE BEG.	PRESSURE END	COMP Y/N	V BOX Y/N	LOCATION / COMMENTS
7/28	DKC	400	405	30	30	N	N	pass

2 | 1 PANEL # | PANEL #

1 ROLL # | ROLL #

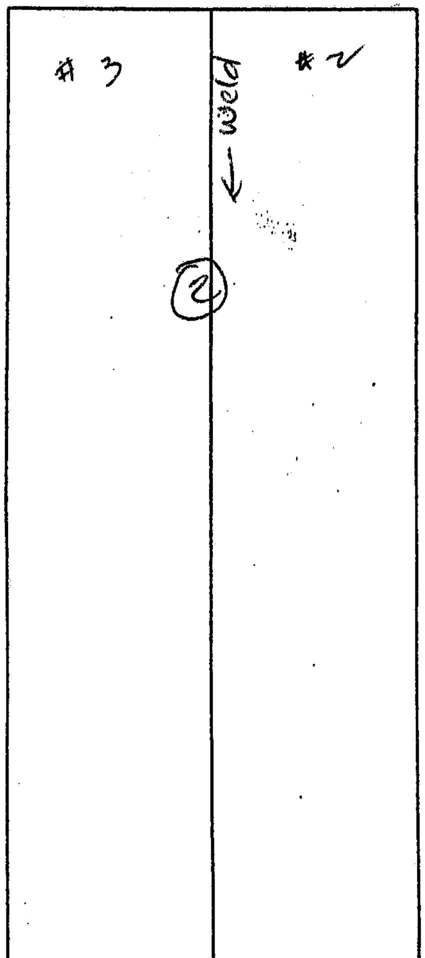
N°

PAGE 5 OF 5

PANEL AND SEAM REPAIR LOG

PROJECT #: Red Devil Mine DATE / TIME: 7/28 TECH ID: ANCHOR SQ. FT.=

PANEL/SEAM LENGTH: 240 SEAM #: 2 MACH ID: PANEL SQ. FT.=



#3, #2

PANEL # PANEL #

1

ROLL # ROLL #

REPAIR #	LOCALE X	LOCALE Y	SIZE/ DESCRIPTION	REP. DATE	TECH ID	MACH ID	TEST DATE	TECH ID	P/F

NON DESTRUCTIVE TESTING

DATE	TECH	TIME BEG.	TIME END	PRESSURE BEG.	PRESSURE END	COMP Y/N	V BOX Y/N	LOCATION / COMMENTS
7/28	DLK	410	415	30	30	N	N	Pass