EPA Contract No. 68-W6-0042

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DRAFT REMEDIAL INVESTIGATION DATA REPORT

Callahan Mining Superfund Site
Brooksville, Maine

June 2005

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LIST OF ACRONYMS

AGP	Acid Generation Potential
ARD	Acid Rock Drainage
EPA	United States Environmental Protection Agency
ESI	Expanded Site Inspection
FS	Feasibility Study
FSP	Field Sampling Plan
HRS	Hazard Ranking System
kg	Kilogram
MEDEP	Maine Department Of Environmental Protection
MEDOT	Maine Department Of Transportation
MEG	Maximum Exposure Guideline
NNP	Net Neutralization Potential
NOAA	National Ocean And Atmospheric Administration
NPL	National Priorities List
PAH	Poly Aromatic Hydrocarbon
ppb	Parts Per Billion
ppm	Parts Per Million
ppt	Parts Per Trillion
PRG	Preliminary Remediation Goal
QAPP	Quality Assurance Project Plan
RAC	Remedial Action Contract
RAG	Remedial Action Guidelines
RI	Remedial Investigation
SIP	Site Inspection Prioritization
SVOC	Semivolatile Organic Compound
TEL	Threshold Effects Level
TRC	TRC Environmental Corporation
ug (or µg)	Micrograms
VOC	Volatile Organic Compound
WRP	Waste Rock Pile

1.0 INTRODUCTION

Metcalf & Eddy, Inc. (M&E) received Work Assignment No. 161-RICO-017H under the United States Environmental Protection Agency (EPA) Response Action Contract (RAC) No. 68-W6-0042 (RAC) to perform a Remedial Investigation at the Callahan Mining Superfund Site (the site) in Brooksville, Maine. M&E assigned primary responsibilities for implementation of most of the tasks in this project to RAC Team Subcontractor, TRC Environmental Corporation (TRC).

This Data Report describes the results of Phase IA of the Remedial Investigation that was conducted at the site from September 2004 through January 2005. Unless otherwise noted, the work described in this report was conducted in accordance with the Sampling and Analysis Plan (TRC, 2004).

1.1 Site Location

Figure 1.1-1 shows the location of the Callahan Mining site on the coast of Maine.

Figure 1.2-1 and Plate 1 show a site plan. The site is an elongate shaped, 150-acre property oriented north-south on Goose Falls Road in Brooksville, Maine, approximately 35 miles west of Bar Harbor, Maine. It is situated at 44° 21’ 05.9” north latitude and 68° 48’ 35.5” west longitude. The site is located on the northwestern coast of a peninsula known as Cape Rosier and is bordered by the Penobscot Bay to the west. East of the site is the Holbrook Island Sanctuary State Park and Goose Pond. A limited number of private residences are located adjacent to the site on Goose Falls Road and Cape Rosier Road.

1.2 Site History

1880 An outcrop of massive zinc and copper ore was discovered at low tide by a clam digger about ten miles west of the Blue Hill mining camp in a tidal estuary known as Goose Falls Pond. Subsequently, a shaft was sunk by William Veague on the nearby shore and mining of high grade zinc-copper ore commenced. The ore was taken from Goose Cove to Castine by barge and piled on a dock. Periodically, coastal schooners picked up the ore in Castine and delivered it to smelters located to the south.

1881 Beginning of two year period of mining. About 10,000 tons of ore were mined from four shafts at the mine, known at the time as the “Penobscot Mine.” The ore was reported to contain 20 percent zinc 2.8 percent copper and some lead. The crude ore was hand sorted, and reportedly, 3,000 tons were shipped.

1887 Mine closes, apparently due to low metal prices.

1914 An attempt to reopen the mine proved unsuccessful.

1940 The St. Joseph Lead Company conducted an exploratory drilling program on the property advancing 13 boreholes totaling 5,501 feet.

1942 U.S. Bureau of Mines drills an additional nine boreholes, totaling 2,883 feet.

1950 U.S. Bureau of Mines conducts additional drilling. Although numerous occurrences of copper and zinc sulfides were encountered, apparently implementation of a mining operation was not considered economic.

1956 The property was optioned by the Penobscot Mining Company, Ltd., of Toronto. The Penobscot Mining Company drilled a few exploratory boreholes that indicated more promising economic conditions at the site, cleaned out the old workings, and mined some ore from underground shafts and tunnels.

1964 The property was brought to the attention of Callahan Mining Corporation. Re-evaluation of all past work indicated that sufficient values might exist to warrant an open pit mining operation. Based on this analysis a lease was negotiated by the Callahan Mining Corporation with the Penobscot Mining Company.

1966 Maine Legislature passes “An Act Relating to Mining Activity under Goose Falls Pond, Town of Brooksville, Hancock County” allowing Callahan Mining Corporation to construct and maintain dams to temporarily exclude and divert tidal and fresh water from Goose Pond.

Callahan Mining Corporation obtains permit from the U.S. Army Corps of Engineers to construct two dams, one at Goose Falls to prevent inflow of sea water and one upstream of the mine to prevent inflow of fresh water. The permit requires Callahan Mining Corporation to monitor effluent discharge and eliminate toxic effects on marine organisms.

Maine Water Improvement Commission issued a Waste Discharge License allowing discharge of effluent from the flotation operation to Goose Pond. The License was later modified to require discharge to Goose Cove.

1967 Dam construction completed.

1968 Open pit mining operations commenced on 2/17/68.

Approximately 225,000 tons of mud flowed into the pit from Stink Cove leaving a 33 foot thick layer of organic silt covering some excavation equipment.

1972 Mining operations ceased in June 1972 due to the depletion of the mineral reserve. At the time mining operations ceased, the mine consisted of a roughly circular open pit approximately 600 feet in diameter and 320 feet deep.

The Goose Pond Reclamation Society was formed and a Reclamation Plan was prepared.

1974 Aquaculture business established to raise oysters and coho salmon.

1979 Aquaculture business files for bankruptcy.

1980 Partial opening of Goose Falls Dam.

1982 EPA conducts Preliminary Assessment of Site.

1985 Goose Pond Reclamation Society obtains approval for dredging of sediment in Goose Cove but the Brooksville Planning Board refused to grant permission for the dredging.

Goose Pond Reclamation Society is dissolved.

1987 USTs removed from operations area. No evidence of contamination was observed.

Permission for removal of the remaining portion of the dam was issued by the Maine DEP to allow unrestricted tidal flow into the pond as occurred prior to the development of the mine. However, the dam was not removed.

1988 The site was acquired by Mr. James Benesen of White's Head, Maine. Mr. Benesen is the current owner of record for the site.

1.3 Site Operations

Figure 1.3-1 shows a flow chart of the ore processing operations performed at the Callahan Mine. Approximately 5 million tons of waste rock and approximately 800,000 tons of ore-bearing rock were removed from the mine by Callahan Mining Corporation. The ore consisted primarily of sphalerite (ZnS), chalcopyrite ($CuFeS_2$) and minor occurrences of galena (PbS). Ore bearing rock was blasted from inside the pit and hauled out in trucks to an ore storage area (the Ore Pad).

An ore concentrate was produced from the ore. Approximately 18% of ore-bearing rock processed was recovered as copper/lead and zinc ore concentrates. The ore concentrate was prepared by crushing the ore-bearing rock into particles smaller than 0.5 inch diameter using a three stage crushing process (a jaw crusher and two cone crushers). The crushed ore was then milled to a fine sand using two ball mills. The milling process produced a seawater slurry of the sand-sized ore particles which was subjected to a flotation separation process.

Flotation separation utilizes the “surface active” property of sulfide mineral particles. The slurry of finely ground ore is passed through flotation cells where it is mixed with flotation reagents and air is bubbled through it. The flotation reagents mixed with the slurry cause the metal sulfide mineral particles to adhere to the surface of the air bubbles and formed a froth that is collected at the surface. Chemical compounds used in the flotation cell process included dithiophosphate, diethyldithiophosphate, aryl phosphorodithioate, cyclohexanol, and cresol. The metal-rich froth was collected, washed, dried, and stockpiled in a portion of the mill where it awaited transportation to a smelter. A series of flotation processes were used to concentrate the individual metals separately. The average ore grade was 1.30% copper, 4.91% zinc, 0.35% lead, and 0.50 ounces per ton of silver.

The non-metalliferous particles remaining in the slurry were discharged to the tailings pond. The approximately 11-acre tailings pond is located in the southern portion of the property, adjacent to Goose Pond. In the tailings pond solid tailings settle from the water, and the clarified water is decanted through a drain under the tailing pond for recycling into the flotation process. As more tailings storage was required, the rock embankment at the downstream side of the tailings pond was built up. The current height of the tailings embankment at the Callahan Mine is approximately 80 feet.

Figure 1.3-2 shows the detail of the ore processing operations area. The map shows the former location of the primary and secondary rock crushers, the flotation cell, office and site laboratory as well as an area where there were reported underground storage tanks removed.

Due to the depth of the pit, water constantly seeped into the pit. This water was constantly pumped out and discharged through a pipe extending under Goose Falls, ending in Goose Cove. Due to excess siltation of Goose Cove, Dyer Cove was later used as a settling pond to remove a portion of the sediment (rock flour and silt) prior to discharging the mine water to Goose Cove.

1.3.1 Site Reclamation

A reclamation program was begun after cessation of mining in 1972. The reclamation program reportedly included the following activities.

- Draining of surface water from the tailings pond and seeding surface
- Grading, seeding and planting of the waste piles
- Removal of the upstream fresh water dam
- Flooding of pit by removing the sluice boards in the salt water (Goose Falls) dam
- Salvage and resale of mining and processing equipment
- Partial demolition of the buildings and equipment foundations

The seeding and plantings of the waste rock piles was not successful due to lack of any suitable soil in these areas.

1.3.2 Post-Reclamation Site Development

In the period between the mine closure and 1980, an aquaculture facility was operated at the Site for the cultivation and sale of Coho Salmon. Oyster cultivation was also conducted on an experimental basis. During this period, restricted tidal flow into Goose Pond was maintained by the Goose Falls dam. No other operations have been located at the site since 1980.

1.4 Site Description

The Callahan Mining Site is an abandoned zinc/copper/lead mine. The following sections describe the conditions of the site before, during and after the Callahan-era mining operations that took place at the site.

1.4.1 Pre-Mining Condition

Figure 1.4-1 is an aerial photograph of the site taken in 1960 prior to construction of the mine. The figure shows the approximate site boundary together with the eventual locations of the open pit mine and the tailings pond. The area that eventually became the open pit mine is located partially on land and partially underwater in Goose Pond.

Prior to the construction of the Callahan Mine, fresh water entered Goose Pond from the south, via a small stream. Salt water also entered the cove, from the north, at Goose Falls, during flood tides. At the time, a prominent feature of the site was the so-called “reversing” Goose Falls. During the incoming flood tide as the sea level rose, water flowed south across the rocks of Goose Falls into Goose Pond. As the tide ebbed, flow reversed and the falls then reversed as well, cascading northward across Goose Falls into Goose Cove. The falls were well known as a picturesque and unique natural phenomenon visited by local residents and vacationing families. Reportedly, the foam caused by the falls was observed to glow at night due to phosphorescent algae in the water.

The site as it appears in 1960 is essentially undeveloped except for the area later to be occupied by the tailings pond where the land appears to have been cleared and possibly used for agricultural purposes (area currently referred to as the former “Redman Farm”). There are also several residences present adjacent to the site along the roadway.

1.4.2 Condition During Mining Operations

Figure 1.4-2 shows an aerial photograph of the site as it appeared when the mine was operating in 1972. Figure 1.4-3 shows a map of the site as it appeared during the time of active mining and Figure 1.4-4 is an aerial photograph from a newspaper article published in 1972 showing the condition of the site, including the open pit excavation.

To allow exploitation of the ore body, the Callahan Mining Corporation drained Goose Pond by constructing two dams, one upstream of the site and one at Goose Falls. Water that previously entered the site from upstream was diverted through a newly constructed channel to the south, allowing water to drain into Weir Cove. Figure 2.4-3 shows numerous facilities on the northern portion of the property, representing the various elements of the mining operation.

The mine pit was approximately 600 to 1,000 feet in diameter and 320 feet deep. Figure 1.4-2 shows that the pit extended east of the former eastern shoreline of Goose Pond, beyond the area that was formerly underwater.

Figure 1.4-3 shows the approximate location of the former discharge pipe that was used to pump water out of the pond after the dam was constructed. Figure 1.4-5 shows a photograph of the character of the discharge water prior to use of Dyer Cove for settling. For a period of time, this discharge was released directly into Goose Cove via a pipe on the sea floor. The water appears to be laden with sediment. Due to concerns over the discharge of sediment, an embayment within Goose Pond (Dyer Cove) was later enclosed during mining and used as a settling pond for the mine. The water in the settling pond was pumped to the mine water sump, where it was then pumped through the pipe that was extended further out into Goose Cove.

1.4.3 Current Condition

Following the end of the mining operations, the mine pit was flooded with seawater by opening an eight foot section of the dam at Goose Falls. The mine is currently under water and is subject to daily tidal exchange in Goose Pond. The site is currently vacant, unfenced and access is not restricted in any way. Trespasser activity is evident from the presence of recreational vehicle tracks, food and beverage wastes, discharged firearms casings and campfire remnants.

Figure 1.4-6 shows an aerial photograph of the site in 2002. The area of the former open pit mine is highlighted as well as the pre-1968 shoreline in the area of the pit. In the area of Waste Rock Pile (WRP) 3, there is an apparent slope failure that is highlighted by a dashed white line. drawn along the toe of the slope. The slope has failed at the location where the line bends out to the east. The site appears relatively bare of vegetation

Figure 1.1-2 shows a map of the Callahan Mining Site as it appeared in 2002. The site currently contains waste rock piles, a tailings pile, and some relic mine operations buildings and structures. The former open pit mine is now underwater in Goose Pond.

Figure 1.4-7 shows a panorama of the site looking north from the top of WRP 1 to provide a general depiction of site features from the ground. This view shows the layout of the Ore Pad uphill from WRP 2 on the left (west); Dyer Cove (the former settling pond), Goose Falls Dam and Stink Cove in the background, Holbrook Island Sanctuary on the far (east) side of Goose Pond, and WRP 3 are also observable in this photo. The orange staining that is observable on Waste Rock Pile 1 (foreground), the Ore Pad and WRP 3 is evidence of sulfide mineral oxidation, which can produce acid rock drainage (ARD).

In June 1967 when the open excavation reached a depth of approximately 100 feet, a large mass (estimated 225,000 tons) of black organic silt began to slide into the excavation from Stink Cove, a former cove located north of Goose Cove. The slide buried some mining equipment including trucks and a power shovel. Callahan Mining Corporation dredged the clay out of the excavation and reportedly placed it in then area at the base of WRP 1. The dredged clay area is now covered with wetland vegetation, and can be seen at the base of WRP 1 in Figure 1.4-7.

Access to the site is currently unrestricted. There are roadway entrances at the north and south boundaries of the property. Numerous signs of recreational trespasser activity are observable at the site, including shotgun shells, broken clay shooting targets, trash, ATV tracks, etc., and recreational trespassers have been observed at the site on numerous occasions. Goose Pond and Goose Cove are reportedly used for shellfish harvesting, although there are posted warning signs on the shore prohibiting this practice.

1.5 Pertinent Regulatory History

1987 Four underground storage tanks located in the vicinity of the metal shop building were removed in 1987. No indication of releases or contaminated soil were observed during the tank removals.

1995 Maine Department of Environmental Protection (ME DEP) completes the Site Inspection Prioritization (SIP) Report.

1999 ME DEP conducts Expanded Site Inspection but no report is issued.

2001	EPA issues Hazard Ranking System (HRS) package indicating a Hazard Ranking Score of 50 based on surface water contamination. Other contaminated media were not addressed in the HRS package.
9/5/02	Site added to National Priorities List

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2.0 STUDY AREA INVESTIGATION

TRC conducted the field-work for this project in accordance with the EPA-approved Sampling and Analysis Plan (TRC 2004). The following field activities were completed from October 2004 through January 2005.

- Reconnaissance
- Terrestrial geophysical surveying
- Marine geophysical surveying
- Topographic survey of site
- Surface soil sampling
- Sediment sampling
- Surface water sampling
- Residential well sampling

EPA currently anticipates that the other activities specified in the Sampling and Analysis Plan will be completed by ME DOT.

2.1 Reconnaissance

During the field investigation, TRC conducted a detailed inspection of the site. A list of significant observations is presented below.

Prior to mobilization, a local resident reported that an open hole appeared on the site adjacent to the location of the former open pit. The site owner arranged for fill material to be brought from off-site and placed over the hole to prevent possible erosion and to provide increased protection against trespasser injury. After the hole was filled, TRC installed concrete barriers along the edge of the open pit slope to provide an additional safety measure in the area.

Site access was observed to be unrestricted and TRC staff spoke with several groups of recreational trespassers who were encountered on the site. To discourage trespassers, especially hunters and other sport riflery, TRC posted signs at each site entrance indicating the presence of site workers.

TRC revised several of the surface soil and sediment sample locations to correspond with areas of staining that were observed.

TRC and EPA ecological staff inspected potential locations for ecological reference samples, and made adjustments to the sampling locations provided in the original October 2004 FSP.

Subsequent to the surface soil sampling activity, a local resident pointed out the location of an abandoned transformer on the eastern slope of WRP 1.

2.2 Terrestrial Geophysical Surveying

Figure 2.2-1 shows the location of the terrestrial geophysical survey that was performed by Hager Geosciences. Appendix B presents the geophysical data report. This survey was conducted to estimate the depth of bedrock across the site. A variety of geophysical methods were used, including seismic refraction (four lines), seismic reflection (two lines) and ground penetrating radar (12 lines).

Seismic Reflection methods were used at the Tailings Pile (lines TP-1 and TP-2) due to the limited horizontal distance available for offset shots and the large vertical variation in surface topography. A 24 geophone array was used in a “roll-along” fashion to achieve 12-fold common depth point coverage. A total of 200 shots were colleted for line TP-1 and 78 shots were collected for TP-2.

Seismic refraction was used at the base of the Tailings Pile (TP-3) and at the base of WRP-1 (Lines WRP-1 and WRP-2). Geophone arrays consisted of either 24 (WRP-1, WRP-2, WRP-3) or 48 (TP-3) geophones. Shots were located at the line midpoint, at the line ends and off the end of each survey line. In areas of low signal-to-noise ratio, “shots” consisting of a 90 pound Propelled Energy Generator were stacked.

Due to the shallow depth of bedrock over much of the areas surveyed, and poor ground coupling of the geophones to the loose rock over much of the site, ground penetrating radar was used to estimate bedrock depths in most of the survey area. A variety of antenna frequencies were used in the survey ranging from 20 MHz to 100 MHz.

2.3 Marine Geophysical Surveying

Appendix B presents the geophysical data report. Hydroterra Environmental Services of Dover, New Hampshire conducted marine geophysical surveys at the site to determine the bathymetry and to examine the character of the sea floor and sub-bottom. A bathymetric survey was conducted in Goose Cove and Goose Pond (Plate 1). Side-Scan sonar and sub-bottom surveying was conducted over the former mine pit area and in Goose Cove.

Due to tidal fluctuations in Goose Cove and Goose Pond, temporary tidal gauges were installed and used to correct for the tidal range in each area.

2.4 Topographic Survey

Plate 1 shows the results of the topographic survey that was conducted at the site by ASEC Corporation of Boston, Massachusetts together with the bathymetric survey informartion. The topographic survey was performed using a combination of aerial photogrammetry and ground surveying. The site boundary was determined from examination of property deeds, but due to missing information at the town offices, portions of the northwestern site boundary are approximated.

2.5 Surface Soil Sampling

Figure 2.5-1 and Plate 1 show all of the surface soil samples that were collected by TRC along with all of the known previous surface soil sampling locations. Table 2.5-1 lists the surface soil samples that were collected by TRC. Appendix A presents the field notes and sampling forms that document the collection of samples by TRC.

Surface soil samples were collected in accordance with the EPA-approved FSP/QAPP at 30 locations at the site including all three waste rock piles, the Ore Pad, Operations Area, one on-site background location and two off-site background locations.

2.6 Sediment Sampling

Figure 2.6-1 and Plate 1 show all of the sediment samples that were collected by TRC. Table 2.6-1 lists the sediment samples that were collected by TRC. Appendix A presents the field notes and sampling forms that document the collection of samples by TRC.

Sediment samples were obtained in accordance with the EPA-approved FSP/QAPP at 23 locations in Goose Cove, Goose Pond, Dyer Cove, Tailings Pile Pond, WRP-1 Wetland, Goose Pond Upstream, and a reference area (Horseshoe Cove). TRC collected samples concurrent with the surface water sampling activity, and proceeded upstream from the furthest downstream location.

2.7 Surface Water Sampling

Figure 2.7-1 and Plate 1 show all of the surface water samples that were collected by TRC. Table 2.7-1 lists the surface water samples that were collected by TRC. Appendix A presents the field notes and sampling forms that document the collection of samples by TRC.

Surface water samples were obtained in accordance with the EPA-approved FSP/QAPP at 12 locations in Goose Cove, Goose Pond, Dyer Cove, Tailings Pile Pond and the WRP-1 Wetland. TRC collected samples concurrent with the sediment sampling activity, and proceeded upstream from the furthest downstream location.

No seeps were active at the time of sampling, but some of the sampling locations appeared to be in areas where seepage was occurring, as evidenced by blue-green copper hydroxide staining.

The standing water depth at each location was at least eight inches, and samples were obtained in areas where the flow of surface water was preferentially lower. Separate samples were obtained at each location for total and dissolved metals.

2.8 Residential Well Sampling

Figure 2.8-1 and Plate 1 show all of the residential well samples that were collected by TRC. Table 2.8-1 lists the residential well samples that were collected by TRC. Appendix A presents the field notes and sampling forms that document the collection of samples by TRC.

Well samples were obtained in accordance with the EPA-approved FSP/QAPP at seven locations. Table 2.8-1 indicates the location from where each sample was collected at each residence. An attempt was made at each location to collect a sample of untreated water as close to the well head as possible. This was not possible at all locations. Each well was purged for a minimum of 15 minutes to remove stagnant water from the piping system.

3.0 PHYSICAL CHARACTERISTICS OF STUDY AREA

Plate 1 presents the site topographic survey showing all of the Remedial Investigation sample locations.

3.1 Geology

Figure 3.1-1 shows a bedrock map of the site vicinity. The Cape Rosier deposit occurs as lenses of mixed sulfides of zinc, copper, lead, and iron replacing highly sheared and altered agglomerate. The country rock of Cape Rosier and of the adjacent portion of the mainland is composed of a series of volcanics – rhyolitic and andesitic flows, agglomerates, and pyroclastics – folded with northeasterly regional strike and intruded by sills and dikes of diorite. The volcanics are collectively called the Castine formation and tentatively assigned to the early or middle Paleozoic. The cover of glacial till averages only a few feet in thickness, and outcrops are numerous, especially along the shores. Four miles east of the mine as the contact between the volcanics and the southwestern end of a late Paleozoic batholith of granite and diorite. In the immediate vicinity of the Cape Rosier Mine, two agglomerates, the Goose Falls and Dyer Point, and a black rhyolite are recognized.

The Goose Falls agglomerate is characterized by fragments ranging from ¼ inch to 5 inches in size and colored grayish buff. The Dyer Point agglomerate is characterized by 5 to 7 inch angular fragments of black rhyolite, which weathers white in a fine-grained groundmass that weathers gray.

The rhyolite is black, massive and very fine-grained. The general strike of these structures is approximately N 17E and the dip is southeasterly. In the area drilled (for mine exploration) the Goose Falls agglomerate is intruded by two diorite sills and several minor tongues of variable thickness and characterized by pinching, swelling and splitting. Typical diorite is massive, un-sheared and fresh; the color is light gray with a slight greenish tone.

Traces of mineralization at the surface are rare, but drilling establishes a mineralized zone that coincides approximately with the zone of intensely sheared and thoroughly altered agglomerate lying chiefly below and to a lesser extent between the diorite sills. The sheared agglomerate has been converted into 1) a green-black macroscopically non-mineralic chlorite schist; or 2) a coarse aggregate of creamy-white non-foliate talc and white calcite, in which the carbonate appears to be healing a talc breccia; or 3) a chlorite-talc-calcite rock. The mineralized zone dips about 55° SE near the surface and flattens with the diorite to about 30° SE at depths down dip of 200 to 400 feet. The thickness of the chief mineralized zone (not the ore) beneath the lower diorite ranges from a few inches up to 100 feet.

Within the mineralized zone, that is, within the zone of sheared agglomerate largely or wholly altered to chlorite, talc and calcite, and carrying disseminated sulfides, there occur several sphalerite-chalcopyrite-galena ore shoots of lens-like habit. The largest of these are localized in the thickest part of the mineralized zone, in the vicinity of shafts 1 and 2. In this area, three lenses – footwall, middle, and hanging wall – lie beneath and essentially conformable in dip with the lower diorite. These lenses are separated by a very lean mineralized zone.

The mineralized zone is oriented N 17° E dipping in a southeasterly direction and was comprised of lenses of zinc-copper-lead sulfides. The country rock is composed of a series of volcanic rocks (rhyolite , andesite, agglomerate and pyroclastics), folded with northeasterly regional strike and intruded with sills and dikes of diorite.

Plate 3.1-2 shows the inferred bedrock elevation based on the results of the geophysical surveying. Bedrock is exposed across much of the site at the surface, but is buried below the waste rock piles and the Tailings Pile. Bedrock is estimated to be approximately 70 feet deep below the crest of WRP-1, 0-20 feet deep at the base of WRP 1 and 2, and approximately 30-60 feet deep under the Tailings Pile.

Figure 3.1-3 shows a seismic reflection profile across the Tailings Pile. The bedrock surface is annotated on the profile showing a sloping bedrock surface deepening to the east.

Figure 3.1-4 shows a side-scan sonar image of the sea floor in Goose Cove superimposed on a map of the cove. Bedrock outcrop can be seen on both shores of the cove and the horizontal linear element on the side-scan image is the former discharge pipe location. The image is interpreted to indicate a gravelly, rocky bottom with little fine grained sediment present.

Figure 3.1-5 shows a sub-bottom profile across the former open pit mine area. This figure shows the form of the bedrock as a series of ledges underwater corresponding to the former haul roads that formed a spiral pattern in the mine pit. The profile shows over 70 feet of sediment filling the bottom of the former pit and a thin (less than five feet) veneer of sediment in the shallower portions of Goose Pond.

3.2 Hydrogeology/Hydrology

3.2.1 Hydrology

The site lies adjacent to Goose Pond, a tidal estuary that empties into the Penobscot Bay. Based on the topography, all surface water runoff from the Site discharges directly or through drainage ditches into Goose Pond Estuary. Goose Pond is tidally influenced and flushes into Goose Cove and Penobscot Bay approximately 500 feet north of the Site during the low tide cycle. Wetland areas and a small, unnamed stream are located approximately 500 to 1,000 feet west of the developed portion of the Site, in a separate surface water drainage area.

The principal surface water feature at the site is the Goose Pond Estuary. Fresh water enters the cove from upstream and salt water enters the cove at Goose Falls (during flood tides) which is now partially dammed, so tidal flow is more restricted than before development of the mine. Goose Pond was approximately 5 to 30 feet deep prior to development of the mine, but now the pond is over 300 feet deep at the location of the former open pit.

Figure 3.2-1 shows the tidal range recorded during the bathymetric survey at Goose Cove and Goose Pond. The mean tidal range in Goose Cove is about two feet, but the range averages over 8 feet outside of Goose Falls Dam. The timing of the tidal cycle appears to lag approximately two hours from the Castine tidal station located across Penobscot Bay.

A small surface water body is also ponded on top of the tailings pile. The depth of water here varies seasonally but is typically less than one foot deep.

There are drainage features on the site which help to direct surface runoff around some of the rock piles. These drainage features are ephemeral streams, running only when there is sufficient runoff water.

3.2.2 Ground Water Flow

No sand and gravel aquifers exist on the peninsula were the Site is located. There are no existing ground water monitoring wells or piezometers at the site, so there is no quantitative evaluation of ground water flow direction, hydraulic gradient or seepage velocity. However, it is evident that ground water in the overburden (including the multiple piles of rock and tailings at the site), is likely directed toward the Goose Pond Estuary. Given the steepness of the waste rock piles, it is likely that the horizontal hydraulic gradients in these areas are large, and given the apparent large average particle size that characterizes these deposits, it is also likely that the ground water is flowing at relatively high seepage velocities, and principally discharging to Goose Pond.

The tailings pile contains finer grained sediments, and the seepage velocity of ground water within the tailings pile is expected to be much lower. However, ground water infiltration and flow through the crushed rock perimeter of the Tailing Pile is anticipated to be much larger.

Several seeps have been historically observed at the site emanating from the base of the Tailings Pile, indicating that ground water is discharging to the surface in places. Some of this seepage may re-infiltrate and some of the seepage may runoff into Goose Pond. In addition, internal drainage structures are know to have been placed in the Tailings Pile which may or may not still be active and could affect the hydrology of that area.

Ground water flow in bedrock is less predictable since there are no piezometric monitoring points. Since the cove was deepened several hundred feet into the underlying bedrock, it is likely that there is exchange of surface water and bedrock ground water in the former mine pit.

All residences on the peninsula are served by private wells, and most wells near the site are completed in the bedrock aquifer.

3.3 Ecology

3.3.1 Fauna

Reclamation efforts by the Callahan Mining Company were of limited success and the mine waste units and process areas appear to be largely un-reclaimed, though some areas are re-vegetated with local “volunteer” plants that have become established. Some trees that were planted over 30 years ago appear today as small saplings but many of the original plantings did not survive.

TRC previously conducted site reconnaissance on August 12 and 13, 2002 to evaluate on-site ecological conditions. Information gathered during that reconnaissance identified non-vegetated areas, three aquatic/wetland habitats and four terrestrial vegetation habitat cover types present on the site and immediate vicinity. Habitats were identified based on descriptions and classifications provided in DeGraaf and Rudis (1986) and Cowardin et al. (1979). Each of the terrestrial cover types generally represents an early successional plant community that is associated with a disturbed environment. The cover types noted on the site and vicinity included the following.

Non-Vegetated Cover Types

1) Unvegetated Areas

Aquatic/Wetland Cover Types

1) Open Water (Estuarine)
2) Salt Marsh (Estuarine Emergent)
3) Shallow Marsh (Palustrine Emergent)

Terrestrial Vegetation Cover Types

1) Grass
2) Shrub – Old Field

3) Birch/Aspen Woodland
4) Spruce/Birch Woodland

Figure 3.3-1 is a map showing the distribution of various cover types. Brief descriptions of each habitat are provided below.

Unvegetated Areas: Areas containing no vegetation or very sparse vegetation were common on the tailings pile, waste rock pile and ore pad as well as other areas including unpaved roadways, former building/structure sites, and in the vicinity of the former settling pond (Dyers Cove). These areas predominately consisted of exposed soil and rocks with occasional scattered saplings, shrubs, and/or herbaceous vegetation present. Portions of these unvegetated areas were located on steep slopes associated with the tailings and waste rock piles.

Open Water (Estuarine Unconsolidated Bottom): This cover type includes Goose Pond and Dyers Cove, an embayment to Goose Pond. Although an eight to ten foot tidal fluctuation was noted at Goose Cove (located in the Penobscot Bay) during the site reconnaissance, the tidal fluctuation within Goose Pond was considerably less (approximately 1.5 to 2.0 feet fluctuation between high and low tide). This difference is believed to be attributable to the narrow constriction (as well as the height of the constriction) associated with Goose Falls. Algae was noted to be abundant within the upper portions of Goose Pond where water depths were generally very shallow. The deepest portions of Goose Pond are associated with the former open pit mine.

Salt Marsh (Estuarine Emergent): A narrow fringe of salt marsh is present along much of the shoreline of Goose Pond. The width of the salt marsh ranges from a few feet to over 100 feet. This cover type is dominated by salt-marsh cord-grass (*Spartina alternifolia*), black grass (*Juncus gerardii*), and salt-marsh plantain (*Plantago maritima*). Other species present include glasswort (*Salicornia europaea*), sea-blite (*Suaeda* sp.), spearscale (*Atriplex patula*), three-square (*Scirpus americanus*), and seaside goldenrod (*Solidago sempervirens*).

Shallow Marsh (Palustrine Emergent): This habitat type is generally present slightly upgradient of the salt marsh cover type as well as within two large depressions that are present on the site. The depressions are located on the large mound where the tailings pond was formerly located (southern portion of the site) and north of the large waste rock pile (central portion of site). The predominant species in this cover type is cat-tail (*Typha angustifolia*) with Baltic sedge (*Juncus balticus*), common reed (*Phragmites australis*), rushes (*Juncus* spp.) and purple loosestrife (*Lythrum salicaria*) also present.

Grass: This cover type is present on the mound where the tailings pond was previously present. This habitat is located adjacent to the shallow marsh community located within the depression present on this mound. Short (e.g., less than 12 inches in height) grass species, lichens, and paper birch (*Betula papyrifera*) seedlings comprise the vegetation within this community.

Shrub – Old Field: The shrub-old field habitat is present in scattered locations throughout the site. These areas are variable in plant species composition with some areas dominated by herbaceous plants and others by saplings and/or shrubs. Species noted include young eastern white pine (*Pinus strobus*), paper birch, balsam fir (*Abies balsamea*), northern white cedar (*Thuja occidentalis*) and quaking aspen (*Populus tremuloides*) with meadowsweet (*Spirea latifolia*), blackberry (*Rubus allegheniensis*), goldenrod (*Solidago* spp.), Queen Anne’s lace (*Dauca carota*), thistle (*Cirsium* sp.), and various grasses also present.

Birch – Aspen Woodland: This early successional forested cover type is predominately present in various locations within the northern portion of the site. Vegetation is comprised predominately of sapling and pole-sized quaking aspen and paper birch trees in the overstory. Each of these tree species is considered to be a short-lived “pioneer” species that typically occur on recently disturbed sites. It is likely that this cover type will continue to expand to other areas of the site that are currently unvegetated or presently contain an earlier successional plant community (i.e., grass or shrub – old field). This habitat is succeeded by the spruce – fir woodland community.

Spruce – Birch Woodland: This woodland community is present within the central portion of the site and downgradient from the tailings pile. In addition, this habitat predominates in the vicinity of the site. This woodland community is comprised primarily of red spruce (*Picea rubens*) and paper birch in the tree overstory with a variety of understory vegetation present including bracken fern (*Pteridium aquilinum*) and wintergreen (*Gaultheria procumbens*). Red spruce represents a long-lived species that is often associated with disturbance.

3.3.2 Flora

Table 3.3-1 lists potential amphibian, reptilian, avian, invertebrate, fish and mammalian receptors that were noted on the site or may potentially occur within each habitat present on the site. This table also provides foraging guild information that is useful in assessing potential exposure to site-related constituents of concern. It is expected that species inhabiting the aquatic/wetland cover types would have greater potential for exposure to constituents of concern than species that are generally associated with terrestrial cover types.

A review of Table 3.3-1 indicates that a variety of omnivorous and piscivorous bird and mammal species that forage within the aquatic/wetland habitats on the site may be exposed to site-related constituents of concern. Some of these species were noted during the site reconnaissance.

In addition to the species listed in Table 3.3-1, a variety of macroinvertebrates and fishes are also expected to inhabit the tidal wetland habitats provided by Goose Pond and the adjacent salt marsh. Invertebrate species noted during the site reconnaissance include blue crab, soft-shell clam, moon jellyfish, and common blue mussel while a dead American eel (approximately 8 inches in length) was noted near the mouth of Dyers Cove.

4.0 NATURE AND EXTENT OF CONTAMINATION

This section presents a discussion of the types of contaminants that were detected in each of the separate media at the Site from all previous environmental investigations. Environmental samples of surface water, sediment, soil, ground water and organisms have been collected at the site periodically since at least 1967. Data from the Remedial Investigation as well as from the historical studies listed below are summarized in the following sections.

- 1967 – 1968: Sampling of Well Water, unknown source
- 1974 – 1975: Testing for Trace Elements in Selected Marine Organisms by Maine Department of Marine Resources
- 1986: Minesite Environmental Review by F.M. Beck
- 1987: Site Investigation by Maine Department of Environmental Protection (ME DEP)
- 1995: Final Site Inspection by ME DEP
- 1999: Expanded Site Inspection by ME DEP

Each of the following sections presents tables of the contaminants that were detected together with the concentrations. Separate tables are presented for each group of contaminants (i.e., volatile organic compounds [VOC], semi-volatile organic compounds [SVOC], metals, etc.). If a particular group of contaminants was not detected for any of the samples in a given study area, no table is presented. Also, the tables only list analytes that were detected in one or more samples. Analytes that were not detected in any sample are not included in the tables, and the contaminant concentration for other analytes that were not detected are simply listed as blank and the tables do not include detection limits for any constituent.

Appendices C through T present a complete tabulation of all laboratory test results obtained during the Remedial Investigation and other previous investigations. The appendices contain all of the results, all of the analytes and all of the data qualifiers. Appendix U presents copies of all of the data validation reports.

4.1 Soil Contamination

Table 4.1-1 presents laboratory analytical results for soil samples collected at the site. The criteria used for screening surface soil samples are the lower of EPA Region IX Preliminary Remediation Goals (PRGs) for Residential Soil, dated October 2002 and the Maine Remedial

Action Guidelines (ME RAGs). The EPA Region IX PRGs were used as a relatively conservative screening criterion, and per EPA Region policy, all of the Region IX PRGs were reduced by a factor of 10, making them even more conservative.

Figure 4.1-1 depicts the distribution of soil concentrations for arsenic, cadmium, copper, lead and zinc. Concentrations of these metals that exceed one or more criteria are highlighted on both the figure and the table.

Former Mine Operations Area: Table 4.1-2 summarizes the number of samples in which contaminants were detected in the Operations Area. Detected concentrations of metals in the former mine operations area are among the highest detected in soil on site. Detected concentrations of several metals exceed the residential PRGs including arsenic, cadmium, copper, lead, mercury, selenium, silver, and zinc. VOCs (acetone and dichloromethane) were detected in one of six samples (sample collected in 1994). Six soil samples tested for SVOCs contained SVOCs at low concentrations. Detected concentrations of VOCs and SVOCs are below residential PRGs.

Ore Pad: Table 4.1-3 summarizes the number of samples in which contaminants were detected in the Ore Pad. Metals concentrations in soils from the Ore Pad are also among the highest on site, due to the fact that residual ore material is still present at this location. Soils samples contained several metals, including arsenic, cadmium, copper, lead and zinc at concentrations exceeding the residential PRGs and residential ME RAGs. No VOCs or SVOCs were detected in soil samples from the Ore Pad.

Waste Rock Pile 1: Table 4.1-4 summarizes the number of samples in which contaminants were detected in soils at WRP-1. Soils samples from WRP-1 contained several metals, including arsenic (maximum 100 ppm), copper (maximum 110,000 ppm), lead (maximum 9100 ppm) and zinc (maximum 18,000 ppm) at concentrations exceeding the residential PRGs and residential ME RAGs. Cadmium is present at concentrations above the Region IX residential PRGs but below the ME RAGs. No VOCs or SVOCs were detected in soil samples from WRP-1.

Waste Rock Pile 2: Table 4.1-5 summarizes the number of samples in which contaminants were detected in soils at WRP-2. Soils samples from WRP-2 contained several metals, including arsenic (maximum 57 ppm), copper (maximum 2000 ppm), lead (maximum 790 ppm) and zinc (maximum 8400 ppm) at concentrations exceeding the residential PRGs and residential ME RAGs. Cadmium (maximum 32 ppm) is present at concentrations above the Region IX residential PRGs but below the ME RAG. No VOCs or SVOCs were detected in soil samples from WRP-2.

Waste Rock Pile 3: Table 4.1-6 summarizes the number of samples in which contaminants were detected in soils at WRP-3. Soils samples from WRP-3 contained several metals, including arsenic (maximum 130 ppm), copper (maximum 3600 ppm), lead (maximum 700 ppm) and zinc at concentrations exceeding the residential PRGs and residential RAGs. No VOCs or SVOCs were detected in soil samples from WRP-3.

Tailings Pile: Table 4.1-7 summarizes the number of samples in which contaminants were detected in surface soils in the Tailings Pile. Soil samples were obtained from several locations on the upper surface of the Tailings Pile. Although the tailings are the non-ore bearing waste product from the mining operation, elevated concentrations of several metals are present, including aluminum, arsenic (maximum 120 ppm), cadmium (maximum 32 ppm), copper, iron, lead (maximum 990 ppm), manganese, thallium, vanadium and zinc. The VOCs detected include acetone, 1,2-dichlorobenzene, 1,3-dichlorobenzene, diethylbenzene, and 3,4-dithiohexane. The SVOCs detected included bis(2-ethylhexyl) phthalate and butyl benzyl phthalate, but all VOC and SVOC concentrations were below residential PRGs.

Background: Table 4.1-8 summarizes the number of samples in which contaminants were detected in soils obtained from background locations. The background samples include 12 collected by TRC plus four samples obtained in 1999. Some of the background samples contained metals at concentrations that exceed one or more of the screening criteria. Arsenic was present at a concentration exceeding the Region IX residential PRG in all 12 samples where arsenic was an analyte, but the maximum concentration of arsenic of 14 ppm only slightly exceeds the MEG of 10 ppm. Elevated concentrations of aluminum, iron, manganese and vanadium were present in several of the background samples, but there is no MEG for these compounds. Cadmium, lead and zinc were not present at concentrations that exceeded any screening criteria in the 12 RI samples. Based on the results, these samples all appear to represent background conditions reasonably.

4.2 Sediment Contamination

Table 4.2-1 shows the results from laboratory testing of sediment from the site and background locations. The sample results are highlighted where they exceed one of the relevant screening criteria. The primary screening criteria used for sediment samples are the National Ocean and Atmospheric Administration (NOAA) Screening Quick Reference Tables (SQuiRTs) for Organics and Inorganics (Freshwater Sediment TEL), dated September 1999. For compounds without a NOAA TEL concentration, benchmark concentrations from the following documents, in order, were used:

- Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Sediment - Associated Biota: 1997 Revision.
- Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities, Volume 1, EPA 1999. (Freshwater or Marine Sediment Toxicity Reference Values).
- Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario, Ontario Ministry of the Environment, 1993. (Lowest Effect Levels).

Figures 4.2-1 and 4.2-2 depict the distribution of sediment water quality for arsenic, cadmium, copper, lead and zinc. Metal concentrations that exceed one or more criteria are highlighted and are considered in this analysis as “elevated.”

Goose Pond: Table 4.2-2 summarizes the number of samples in which contaminants were detected in sediment samples obtained from Goose Pond. Goose Pond sediment contained elevated (relative to screening criteria) concentrations of arsenic, cadmium, copper, lead, mercury, nickel silver and zinc were detected at concentrations exceeding the screening criteria. Detected SVOCs include butyl benzyl phthalate and di(2-ethylhexyl)phthalate.

One area of discolored (blue-green) sediment at the base of WRP-3 (SD-422) contained the highest concentrations of copper (10,000 ppm) of any sediment sample obtained from the site. Elevated concentrations (relative to screening criteria) of arsenic, cadmium, lead and zinc were also detected in this sample.

One sample was collected from Stink Cove. None of the metals were present in this sample in excess of the screening criteria.

Two of the sediment samples from Goose Pond are located upstream of the site. Since the flow direction of Goose Pond was reversed during the years of mining operation, it should be noted that these sample locations could contain sediment from the site that was deposited during that time period. Only cadmium, copper and zinc are present at concentrations above the screening criteria in one of the two samples. Note also, that both the marine and fresh water screening criteria are used for these samples due to the tidal influence in the area and the inflow of freshwater. No VOCs or SVOCs were detected in these samples.

Tailings Pile: Table 4.2-3 summarizes the number of samples in which contaminants were detected in sediment samples obtained from the tailings Pile. Five sediment samples were collected from Tailings Pile drainage channels. These samples contained cadmium (maximum 110 ppm), copper (maximum 3760 ppm), lead (maximum 1100 ppm) and zinc (maximum 23,000 ppm) at concentrations above the freshwater screening criteria.

Sediment samples from the wetland on top of the Tailings Pile contained arsenic, cadmium, copper, lead, mercury and zinc at concentrations above the freshwater screening criteria. No VOCs or SVOCs were detected in these samples.

Seeps: Table 4.2-4 summarizes the number of samples in which contaminants were detected in sediment samples obtained from seeps.

Dyer's Cove: Table 4.2-5 summarizes the number of samples in which contaminants were detected in sediment samples obtained from Dyer's Cove. Arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver and zinc were detected at concentrations exceeding screening criteria in Dyer Cove. Detected VOCs include acetone and methylene chloride. Detected SVOCs include butyl benzyl phthalate and di(2-ethylhexyl)phthalate.

Goose Cove: Table 4.2-6 summarizes the number of samples in which contaminants were detected in sediment samples obtained from Goose Cove. Five samples from Goose Cove sediment contained elevated metals concentrations (relative to screening criteria) for cadmium, copper, lead and zinc. Arsenic and nickel are present at concentrations exceeding the fresh water criteria, but these criteria do not apply to Goose Cove. Sample SD-421 was located at the end of the former discharge pipe and contained the highest metals concentrations of the Goose Cove sediment samples.

WRP-1 Wetland: One sediment sample from the WRP-1 wetland contained nickel and zinc at concentrations exceeding the fresh water screening criteria.

Background: Table 4.2-7 summarizes the number of samples in which contaminants were detected in sediment samples obtained from background sample locations. Only one (BK_HSC_SED9) of the eight background samples contained one metal (arsenic) in excess of the screening criteria, and this sample was the only background sample containing SVOCs (bis(2-ethylhexyl)phthalate, butyl benzyl phthalate and phenanthrene. Based on the detection of theses SVOCs, further consideration of this sample as a suitable background location should be made prior to the risk assessment.

4.3 Surface Water Contamination

Table 4.3-1 presents laboratory analytical results from all of the available surface water sampling. Blank results indicate parameters that were not tested. Analytical results for surface water are compared to three sets of screening criteria as a benchmark for evaluating the results. The primary screening criteria used for surface water are from Suter and Tsao (1996). For compounds without a specified Tier II value, benchmark screening values from the following documents were used.

- National Recommended Water Quality Criteria for Priority Toxic Pollutants (Freshwater/saltwater CCC), November 2002
- Water Quality Criteria Summary Concentrations, EPA 1994

Note that the State of Maine follows the federal standards for surface water, except that there are fewer compounds that have Maine standards. Highlighted values in Table 4.3-1 indicate exceedances of one or more screening criteria.

Figures 4.3-1 and 4.3-2 depict the distribution of surface water quality for arsenic, cadmium, copper, lead and zinc. Metal concentrations that exceed one or more criteria are highlighted.

Tailings Pile: Table 4.3-2 summarizes the number of samples in which contaminants were detected in surface water samples obtained from the Tailings pile area including seeps, the wetland area and ephemeral drainages. Several samples were obtained prior to the RI of Tailings Pile seeps, and some of the seeps were sampled in multiple rounds. Observed concentrations over a five year period at two seeps did not change significantly. VOCs were detected at sample location SW-SA_2 including trichloroethane, 1-butanethiol, ethylbenzene, toluene and xylene. Several metals were detected at concentrations in excess of screening criteria including cadmium (maximum 25 ppb), copper (maximum 550 ppb), lead (maximum 44 ppb) and zinc (12,100 ppb).

Unfiltered samples of water from the wetland on the Tailings Pile contained elevated concentrations (relative to screening criteria) of aluminum, barium, cadmium, copper, lead and zinc. The filtered samples contained concentrations of barium, cadmium, copper and zinc in excess of the fresh water criteria.

WRP-3 Seep: The seep at the base of WRP-3 (SW-422) contained elevated concentrations of several metals (relative to screening criteria), including aluminum, barium, beryllium, cadmium, cobalt, copper (maximum 9790 ppb), iron, lead (maximum 154 ppb), manganese, nickel and zinc (maximum 171,000 ppb) in both the filtered and unfiltered samples.

WRP-1 Wetland: Unfiltered samples of water from the wetland on WRP-1 contained elevated concentrations (relative to screening criteria) of aluminum, barium, beryllium, cadmium, copper, iron, lead, manganese, nickel, vanadium and zinc. The filtered samples contained concentrations of barium, iron, manganese and zinc in excess of the fresh water criteria.

Goose Pond: Table 4.3-3 summarizes the number of samples in which contaminants were detected in surface water samples obtained from the Tailings pile area including seeps, the wetland area and ephemeral drainages. Unfiltered surface water samples from Goose Pond adjacent to the Tailings Pile and WRP-3 contained elevated (relative to screening criteria) concentrations of aluminum, barium, cadmium, copper, lead and zinc. The filtered samples contained concentrations of barium, cadmium, copper and zinc in excess of the fresh water criteria.

Elevated concentrations of metals (relative to screening criteria) were detected in both filtered and unfiltered samples from the Goose Pond samples in the area of the former mine pit. Barium, cadmium, copper and zinc were the most commonly detected metals that exceeded screening criteria. Generally, the filtered and unfiltered concentrations were similar in all samples from this area.

Dyer Cove: Table 4.3-4 summarizes the number of samples in which contaminants were detected in surface water samples obtained from Dyer Cove. Unfiltered and filtered surface water samples from Dyer Cove contained elevated concentrations (relative to screening criteria) of barium, cadmium, copper and zinc.

Goose Cove: Table 4.3-5 summarizes the number of samples in which contaminants were detected in surface water samples obtained from Goose Cove. Elevated concentrations of copper and zinc (relative to screening criteria) were detected at concentrations that exceeded the marine screening criteria.

Background: One surface water sample was collected from Horseshoe Cove (sample 99-BKSW-26). The sample was tested for cadmium, copper, lead, mercury, selenium, silver and zinc, but none of these contaminants were detected.

4.4 Residential Well Water Quality

Table 4.4-1 summarizes available analytical data from testing of private drinking water wells in the area surrounding the site. Figures 4.4-1, 4.4-2 and 4.4-3 depict the distribution of ground water quality for arsenic, cadmium, copper, lead, zinc, sulfate and pH. Metal concentrations that exceed one or more criteria are highlighted. Values that exceed one of the screening criteria are highlighted on both the table and the figure.

The results indicate that elevated concentrations of several metals were detected (relative to screening criteria), including arsenic, cadmium, copper, iron, manganese and zinc were detected in several wells.

4.5 Flora/Fauna Contaminant Concentrations

The flora/fauna data presented in this report is compiled from three monitoring programs.

- Maine Department of Marine Resources, *Bio-Accumulation of Trace Elements in Selected Marine Organisms*, November 20, 1974 to November 19, 1975
- Maine Marine Environmental Monitoring Program, *Marine Monitoring Baseline Data Final Report*, June 1993
- Maine Department of Environmental Protection, Surface Water Ambient Toxic (SWAT) Monitoring Program

Table 4.5-1 and Figure 4.5-1 list the results of available flora/fauna testing. Samples of fin fish (coho salmon fillets), bloodworms, soft shell clams and blue mussels were collected and analyzed for metals content. In addition, two species of seaweed were analyzed and tested.

The primary criteria used for screening fish tissue sample results are the Lowest Chemical Specific No Observed Adverse Effect Level (NOAEL) concentrations for fish, mussel, fish-eating birds or fish-eating mammals developed by the Army Soldier System Center (SSC) of

Natick, Massachusetts. Secondary criteria for screening fish sample results are the EPA Region 3 risk-based concentrations for human health.

The 1974 study by the Maine Department of Marine Resources reports that levels of cadmium, copper, lead, and zinc are several times to several orders of magnitude higher in Goose Cove biota than in samples collected from other stations in midcoastal study areas.

One mussel sample was obtained as part of the Maine Marine Environmental Monitoring Program in 1993, indicating elevated concentrations (relative to screening criteria) of cadmium, chromium, copper, lead, nickel, silver and zinc in one sample from Goose Cove.

The latest available analytical data from the Maine Department of Environmental Protection SWAT Monitoring Program indicate elevated (relative to screening criteria) concentrations of cadmium, copper, lead and zinc in blue mussel samples collected at Cape Rosier in 2001. Concentrations of cadmium and lead were lower and concentrations of lead and copper were higher in 2001 compared to the 1989 sampling.

In general, based on more recent sampling results, concentrations of aluminum, arsenic, cadmium, chromium, copper, lead, nickel and zinc in biota samples exceeded screening criteria.

4.6 Data Usability

Appendix U contains all of the data validation reports for the laboratory testing performed as part of this investigation. And Appendix V contains an analysis of data usability. The data were reviewed and determined to be suitable to achieve the data quality objectives set forth in the Sampling and Analysis Plan (TRC, 2004).

5.0 CONCEPTUAL MODEL

Figure 5.0-1 shows a diagram that presents the recognized potential source areas, release mechanisms, contaminant transport pathways and likely receptors for contamination at the site. A description of each of the aspects of the conceptual risk assessment is presented below.

5.1 Potential Source Areas

There are six primary contaminant source areas at the site: the Tailings Pile, the three Waste Rock Piles, the Ore Pad and the former Operations Area. These areas are the locations of uncontrolled accumulations of potential waste materials.

In addition, there are four secondary contaminant source areas at the site that may have primary accumulations of waste materials, or are locations of secondary accumulations of waste: Dyer Cove, Goose Pond, the Former Mine Pit and Goose Cove.

This section provides an overview of each of the potential contaminant source areas at the site.

5.1.1 Tailings Pile

The Tailings Pile contains a large accumulation of very fine grained pulverized rock from which most of the heavy metals were removed. Available surface soil, surface water and sediment data in the area of the Tailings Pile suggest that this area is a contaminant source for metals since some of the highest metals concentrations at the site were observed near the Tailings Pile. It is possible that the waste rock used to dam the tailings is the source of the elevated metals that were observed in this area of the site or it is possible that there is some other unknown source within the Tailings Pile.

Historical records indicate that as the tailings pile was raised in elevation, additional waste rock was placed around the edge of the tailings pond to act as a dam for the placement of additional mill tailings. This procedure led to a situation at the edge of the Tailings Pile where waste rock is likely situated on top of earlier accumulations of tailings. This situation could cause geotechnical instability of the slopes and has not been examined previously.

Based on past use and visual observations, the Tailings Pile is a potential source of the metals contamination that has been documented in the surface soils, surface water (seeps) and sediment in Goose Pond and should be investigated as a potential source of groundwater contamination (no groundwater contamination has been documented to date)."

5.1.2 Waste Rock Piles

The Waste Rock Piles contain large accumulations of broken-up rock that were once buried deep underground. Most of the rock in the Waste Rock Piles consists of rocks that were present in the rock layers located above the target zone of ore-bearing rocks. These rocks were removed via blasting, then loaded onto trucks, hauled out of the pit and placed onto the waste rock piles. Consequently, it is unlikely that there are any organic contaminants present in the waste rock, other than possibly residual explosives.

However, the waste rock is a potential source of metals contamination, since the bedrock is comprised of naturally occurring inorganic elements and the bedrock is rich in metals. In addition, the sulfide minerals in the rock in the piles reacts with infiltrating rain water and oxygen to form sulfuric acid, which increases the ability of the infiltrating rain and surface water to leach metals from the waste rock. This “Acid Rock Drainage” can cause the leachate that discharges from the waste rock piles to have a low pH and an elevated metals concentration. Sulfide mineral oxidation is typically noticeable as an orange staining on rocks or in areas where leachate or water ponds.

The waste rock piles are not lined or covered.

Waste Rock Pile 1: Waste Rock Pile 1 contains the largest volume of waste rock, but there is only evidence of slight to moderate acid generation on WRP 1. The powder magazine is present on WRP 1 but there are no explosives test data to evaluate whether there have been releases in the area of the powder magazine. Usually, ammonium nitrate fuel oil is used for rock blasting but there were no available records to indicate what materials were used at this site. The area surrounding the powder magazine has not been evaluated for the presence of explosive residuals.

Based on past use and visual observations, WRP 1 is a potential source of metals and possibly explosives contamination in surface soils, surface water (seeps) and sediment in Goose Pond and should be investigated as a potential source of groundwater contamination (no groundwater contamination has been documented to date)."

Waste Rock Pile 2: Waste Rock Pile 2 is located between the Ore Pad and Dyer Cove. There is noticeable oxidation staining at the base of WRP 2, suggesting that acidic leachate is being produced and discharging either over land or underground from WRP 2.

Based on past use, available site test data and visual observations, WRP 2 is a potential source of metals contamination in surface soils, surface water (seeps and discharge to Dyer Cove) and sediment in Dyer Cove and should be investigated as a potential source of groundwater contamination (no groundwater contamination has been documented to date)."

Waste Rock Pile 3: The surface soils at WRP-3 exhibit the most pronounced iron staining and highly weathered rock. There is a large area of dead vegetation at the base of WRP-3 at the base of WRP 3 and blue-green leachate is also discharging from the base. This suggests that there may be a significant acid generation problem at this pile.

There also appears to be a potential geotechnical stability problem associated with WRP 3. Examination of the pile indicated an area where the steep slope appears to have failed. Near the failed mass of rock is a separate potential future failure surface.

WRP 3 is referred to in some historic records as a “Tailings Pile.” Though no tailings are currently observable at the surface of this pile, it is possible that there is an accumulation of tailings underneath or inside of the pile. The presence of buried tailings might be one potential source for the observed geotechnical instability at WRP 3.

Based on past use and visual observations, WRP 3 is a potential source of metals contamination in surface soils, surface water and sediment in Goose Pond and should be investigated as a potential source of groundwater contamination (no groundwater contamination has been documented to date)."

5.1.3 Ore Pad

The Ore Pad is the location where the mine placed the rock that was identified as ore-bearing. Ore was placed on the side of the hill then pushed down the hill into the rock crushers. The Ore Pad today still contains the greatest quantity of ore-bearing rocks and is the location where there is the greatest evidence of acid generation. Virtually the entire Ore Pad is stained orange and covered with disintegrated rock fragments (both indications of acid weathering). A trail of orange staining stretches from the top of the Ore Pad down the hill to the Mine Operations Area. The Ore Pad is not lined.

Based on past use and visual observations, the Ore Pad is a potential source of metals contamination in surface soils and should be investigated as a potential source of groundwater contamination (no groundwater contamination has been documented to date)."

5.1.4 Mine Operations Area

The Mine Operations area is the former location of the machinery that was used to crush and process the rock that was staged in the Ore Pad. At lease two underground fuel storage tanks were located in this area (2,000 and 4,000 gallons respectively, but these were removed in 1987. The Operations Area included a machine shop, and assay laboratory, the two rock crushers and the flotation cells. All of these structures have been removed from the site, except for some of the old building foundations.

Based on past use and visual observations, the Mine Operations Area is a potential source of metals and organic (volatile and semivolatile) contamination in surface soils, surface water and sediment in Goose Pond and should be investigated as a potential source of groundwater contamination (no groundwater contamination has been documented to date)."

5.1.5 Former Open Pit Mine

The Former Open Pit Mine is now located underwater in Goose Pond. This portion of the site is partially located on the Callahan Mine Property and partially under Goose Pond which is a

"Water of the State" and is owned by the State of Maine. Due to the mining operations, the sediment formerly covering the underlying bedrock was removed, thereby exposing the rock. In addition, the open pit was excavated deep into the ore body, potentially resulting in the uncovering and fracturing of bedrock that is naturally enriched in metals and sulfides. The pit represents the deepest point on the site and is one potential receptor point for sediment that is eroded into the pond from the adjacent contaminant source areas.

Based on past use and visual observations, the Open Pit Mine Area is a potential source of metals contamination in surface water and sediments in Goose Pond.

5.1.6 Dyer Cove/Former Settling Pond

Dyer Cove was used as a settling pond for water pumped out of the pit area. As a result, the sediment contained in the cove is enriched in metals and sulfide minerals. In addition, the Cove is adjacent to other potential contaminant source areas and could be a secondary source for sediment that was deposited and accumulated in the Cove. Prior site testing data confirms the presence of elevated metals concentrations in surface water and sediment of Dyer Cove.

Based on past use and existing test data, Dyer Cove is a potential source of metals contamination in surface water and sediment.

5.1.7 Former Discharge Pipe/Goose Cove

During excavation of the mine pit, sediment laden water was pumped through a pipe that discharged into Goose Cove. A photograph of the water discharge is shown in Figure 1.4-5. Reportedly (according to residents of the area who lived in the area at the time of the mining operations), a layer of black sediment was observed to be present in the cove as a result of this discharge. Elevated concentrations of metals that were measured in organisms and sediment of Goose Cove confirm that the Cove is a potential source of contamination.

Based on past use and visual observations, sediment in Goose Cove is a potential source of metals contamination in surface water and sediment.

5.2 Release Mechanisms

Releases from the contaminant source areas can occur as described below.

5.2.1 Acid Rock Drainage and Leaching of Metals into Ground Water

Precipitation that infiltrates through the various waste areas has the potential to dissolve contaminants and leach them from the rock and soil. In the areas where there are sulfide minerals present, the water and oxygen react to form sulfuric acid. The acid increases the leaching of certain metals from the soil and rock. Most metals have a higher solubility at low pH (acidic conditions) including aluminum, copper, lead, manganese, nickel and zinc which commonly are found in Acid Rock Drainage leachate. The most common metal found is iron, in the form of soluble ferrous ions, ferrous hydroxide, ferrous sulfate and ferric sulfate. The soluble iron hydroxides precipitate in non-acidic and oxic environments to cause a strong red-orange staining. The acid also causes more rapid weathering and disintegration of bedrock. The resultant acidic leachate can be greatly enriched in metals concentrations which then can be transported to the ground water.

The production of Acid Rock Drainage is dependent on the balance of the acid generation potential (AGP) and net neutralization potential (NNP) of the rock. In general, if the ratio of NNP to AGP is greater than 3, then it is unlikely that an acidic leachate will be formed. However, even if this ratio is greater than 3, large AGP values can cause leachate that is high in metals and result in rapid decomposition and weathering of the rock. Therefore, both the balance between NNP and AGP and the magnitude of the AGP are important.

The environment can naturally assimilate Acid Rock Drainage through dilution, biologic activity and neutralization, sometimes very close to the point of generation, but sometimes after migrating great distances. At Callahan Mine, the Acid Rock Drainage source areas are located close to surface water bodies, and there is not much opportunity for dilution until the leachate discharges. In addition, some of the waste rock the originally was present above the ore body contained carbonates which can buffer the acid generation. The waste rock piles containing the carbonate rocks may be less significant sources of Acid Rock Drainage, but the location of these rocks within the waste rock piles is not known. Depending on the abundance of buffering rocks and the surface area contact time of the leachate, the natural buffering capacity of the rocks can become depleted over time and again lead to increased Acid Rock Drainage as the mine waste remains exposed and uncontrolled.

5.2.2 Erosion

Contamination that is present in surface soils can be eroded via surface water runoff and transported downhill. In particular, at this site, there is little vegetation to inhibit erosion, so erosion can be an effective release mechanism for contaminants that are present on the surface.

5.2.3 Acid Rock Drainage to Surface Water

Acid Rock Drainage formed as described above, can also discharge to surface water directly or via seeps. Several known seeps are present at the site, and some are discharging blue-green water or are co-located with orange stained areas. The blue green precipitate is a copper hydroxy-oxide that forms when acidic solutions high in copper are neutralized. The importance of dilution of the Acid Rock Drainage into areas such as Dyer Cove or Goose Pond is not known, since the discharge rates and acidity of the leachate have not been measured. Regardless, the effects of Acid Rock Drainage discharging to surface water will be greatest at the edges of the surface water body where the leachate enters. The tidal range in Goose Pond is reported to be less than a foot and the surface water flow patterns in the pond are not documented, so the compensating dilution that would be caused by surface water movement cannot yet be determined.

5.2.4 Windblown Dust

Since there is little vegetation on the various terrestrial waste areas, wind is a potentially effective release/transport mechanism for contaminants present in small particles. This mechanism is particularly important at the Tailings Pile, where the contaminant mass is very fine grained, and approximately 30% of the tailings area is sparsely vegetated. Note that the igneous and metamorphic rocks, like those in the study area, typically are comprised of between 35 and 80 percent silica, so large quantities of silica (a class A1 carcinogen) will be present in the finely crushed tailings.

5.2.5 Catastrophic Slope Failure

The geotechnical stability of the oversteepened rock and tailings piles is questionable, since there appear to have been prior slope failures. Decay of the rock due to sulfide oxidation can also cause instability. Geotechnical stability is a concern for the permanence of any potential remedial measures that are eventually selected as well as being a physical hazard. Though not portrayed on Figure 4.0-1, the potential for a catastrophic slope failure is present at the site, and such a failure could expose large amounts of contaminants to the environment and re-stimulate acid generation of waste rocks that are currently not exposed to infiltration or possibly release contaminants directly into the adjacent surface water bodies. The potential for a catastrophic slope failure should be evaluated in the RI/FS.

5.3 Contaminant Transport Pathways

Figure 5.3-1 portrays the various contaminant transport pathways that are likely to exist at the site. The contaminant transport pathways that are important at this site include wind, soil erosion, sediment transport, surface water flow, ground water flow and the food chain.

5.3.1 Wind

Wind is an important transport mechanism at the portion of this site where contaminants are present in small particle sizes. The specific areas where wind is likely to be effective include the Tailings Pile and the Ore Pad. With little vegetation and the elevated topographic position of each of these areas, wind can effectively transport contaminants away from their primary source areas. Silica (a class A1 carcinogen) is expected to be a contaminant of concern at the Tailings Pile due to the high concentration of silica in bedrock (approximately 35 to 80%), the extremely fine grained size of the crushed rock particles (silt size and finer), the fact that much of the tailings are not vegetated, and dust particles can easily be transported via wind from the source area.

5.3.2 Soil Erosion

Contaminants that are present in surface soils can be eroded via overland water flow and transported to lower elevations and typically into drainage features that exist on the site. Drainage ditches on top of the Tailings Pile and at the base of WRP 1 are possible collection points for contaminated soil that is transported by erosion. Contaminated soils at higher elevations are also susceptible to erosion, especially at the Ore Pad, which is a steeper accumulation of metal-rich crushed rock that has become disintegrated as a result of acid rock drainage. The waste rock piles are also potential areas where soil erosion can occur, but due to much larger particle sizes, erosion is likely less a concern at these locations.

5.3.3 Sediment Transport

Transport of contaminated sediment that has entered the Goose Pond Estuary is possible due to tidally-induced flow of water in and out of Goose Falls Dam. No flow information is available to evaluate the potential for sediment transport in the pond or cove. Sediment was previously transported to Goose Cove via a 16 inch drainage pipe that was used during the mining operation phase of the site.

5.3.4 Surface Water Flow

Despite some surface water controls that were constructed by Callahan Mining Corporation to mitigate this as a contaminant transport pathway, transport of contaminant by surface water is likely still occurring. Surface water erosion of materials is potentially most important at the Tailings Pile and the Ore Pile due to the smaller particle sizes that are present. Surface water seeps are also present at many of the source areas, and visual and chemical evidence of contamination at these locations is apparent. Surface water is likely one of major transport mechanisms for potentially contaminated sediment from Dyer Cove into Goose Pond and the Former Open Pit Area, and from Goose Pond into Goose Cove and potentially into Penobscot Bay.

5.3.5 Ground Water Flow

Contaminants that infiltrate into the ground and reach the water table can be transported by ground water advection to locations that are hydraulically down gradient. This includes possible discharge to wetlands, streams, the coves and the underlying bedrock aquifer that provides drinking water to the private residences near the site.

There are no ground water monitoring wells at the site, so there is currently no understanding of the ground water seepage velocity, hydraulic gradients, or hydraulic conductivities of the water-bearing units at the site. There are no data regarding the hydrostratigraphy at the site, so it is not known whether there are multiple isolated water bearing zones, or if there are perched water tables or other ground water flow complications.

It is likely that the topographically elevated portions of the site, including the waste rock piles, Tailings Pile and Ore Pad are ground water recharge zones where infiltrating precipitation enters the underground flow system. These areas likely have downward vertical hydraulic gradients. While ground water flow paths probably terminate at the surface water bodies somewhere underwater or possibly discharge as springs/seeps at the ground surface, the potential for discharge to the underlying aquifer must be evaluated as part of the RI/FS.

5.4 Potential Receptors

Both human and ecological receptors potentially can be exposed to contamination that is released from the site.

5.4.1 Ecological

Contaminants that enter the surface water bodies on the site can be ingested by aquatic organisms (fin fish and shellfish) that inhabit these areas. Terrestrial mammals and invertebrates can also ingest contaminants directly from contaminated soil and water, or through the food chain in plants and smaller organisms. Avian species can also potentially become exposed to contaminants through incidental ingestion of soil or water and through the food chain.

5.4.2 Human

There are several potential pathways that could result in human exposure to site contaminants. This analysis is conservative since there is no specific re-use plan for the site and the potential exposure scenarios might be more limited than assumed herein. Also note that there are insufficient data to determine whether certain media have actually been impacted by contamination, or whether that contamination, if present, is at concentrations that exceed the EPA’s acceptable risk range. If there is no contamination, or if contamination is not present at a concentration that would cause a significant risk to human health, then some or all of these exposure pathways might not be a concern at this site.

- Dermal exposure to contaminated soil, sediment or surface water through direct contact by site trespassers, construction workers or future occupants of the site (child, teen or adult).

- Ingestion of contaminated ground water by users (child, teen and adult) of the aquifer.

- Ingestion or dermal contact with water or sediment by recreational users (child, teen and adult boaters, swimmers, bathers) in the surface water bodies.

- Inhalation of contaminated dust from the site.

- Human consumption of contaminated fin fish, shell fish, mammals or birds.

6.0 REMEDIAL INVESTIGATION DATA NEEDS

Table 6.0-1 lists the various data needs and recommended investigative activities that should be conducted to address these needs.

7.0 REFERENCES

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Tables

Table 2.3-1: Potential Ecological Receptors

Family	*Common Name*	*Scientific Name*	*Guild*	*Forage Method*	*Breeding Substrate*	*Habitat*							
						1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
Amphibians													
Bufonidae	Eastern American Toad	Bufo a. americanus	I	Ground Ambusher	Water	X	X	X	X	X			X
Hylidae	Gray Treefrog	Hyla versicolor	I	Bark Ambusher	Water				X				
	Northern Spring Peeper	Pseudacris c. crucifer	I	Riparian Ambusher	Water					X			X
Plethodontidae	Redback Salamander	Plethodon c. cinereus	I	Ground Gleaner	Terrestrial Subsurface				X	X			
Ranidae	Green Frog	Rana clamitans melanota	I	Riparian Ambusher	Water								X
	Northern Leopard Frog	Rana pipiens	I	Riparian Ambusher	Water								X
	Pickerel Frog	Rana palustris	I	Riparian Ambusher	Water					X			
	Wood Frog	Rana sylvatica	I	Ground Ambusher	Water				X	X			X
Salamandridae	Red-spotted Newt	Notophthalmus viridescens	I	Water/Ground Gleaner	Water					X			X
Birds													
Accipitridae	Bald Eagle	Haliaeetus leucocephalus	P	Water-Foot Plunger	Tree Branch						X	X	
	Broad-winged Hawk	Buteo platypterus	C	Ground Pouncer	Tree-Branch		X						
	Northern Harrier	Circus cyaneus	C	Ground Pouncer	Riparian Ground						X	X	X
	*Osprey	Pandion haliaetus	P	Water-Foot Plunger	Tree Branch						X		
	Red-tailed Hawk	Buteo jamaicensis	C	Ground Pouncer	Tree-Branch	X	X	X					
	Rough-legged Hawk	Buteo lagopus	C	Ground Pouncer	Not Applicable							X	
	Sharp-shinned Hawk	Accipiter striatus	C	Air Hawker	Tree-Branch		X	X	X	X			
Alcedinidae	*Belted Kingfisher	Ceryle alcyon	P	Water Plunger	Riparian Subsurface						X		
Anatidae	*American Black Duck	Anas rubripes	O	Water Forager	Riparian Ground						X	X	X
	Blue-winged Teal	Anas discors	O	Water Forager	Riparian Ground								X
	Bufflehead	Bucephala albeola	O	Bottom Forager	Not Applicable						X	X	
	Canada Goose	Branta canadensis	H	Ground Grazer	Riparian Ground						X	X	X
	Greater Scaup	Aythya marila	O	Bottom Forager	Not Applicable						X	X	
	Green-winged Teal	Anas crecca	H	Water Grazer	Riparian Ground								X
	Mallard	Anas platyrhynchos	G	Water Forager	Riparian Ground							X	X
	Red-breasted Merganser	Mergus serrator	P	Ocean Diver	Not Applicable						X	X	
Apodidae	Chimney Swift	Chaetura pelagica	I	Air Screener	Buildings	X	X	X			X		
Ardeidae	American Bittern	Botaurus lentiginosus	C	Water Ambusher	Riparian Ground								X

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						1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
	Black-crowned Night Heron	Nycticorax nycticorax	C	Water Ambusher	Riparian Twig-Branch							X	
	*Great Blue Heron	Ardea herodias	C	Water Ambusher	Riparian Twig-Branch							X	X
	Least Bittern	Ixobrychus exilis	C	Water Ambusher	Riparian Herb-Shrub								X
Bombycillidae	*Cedar Waxwing	Bombycilla cedrorum	F	Upper Canopy Gleaner	Tree-Twig			X					
Caprimulgidae	Common Nighthawk	Chordeiles minor	I	Air Screener	Buildings	X	X	X			X		
	Whip-poor-will	Caprimulgus vociferus	I	Air Screener	Ground-Herb			X					
Certhiidae	Brown Creeper	Certhia americana	I	Bark Gleaner	Tree Cavity-Crevice				X	X			
Charadriidae	Killdeer	Charadrius vociferus	I	Ground Gleaner	Ground-Herb	X	X						
Columbidae	*Mourning Dove	Zenaida macroura	G	Ground Gleaner	Tree-Branch	X	X	X		X			
Corvidae	*American Crow	Corvus brachyrhynchos	O	Ground Gleaner	Tree-Branch	X	X	X			X	X	
	*Blue Jay	Cyanocitta cristata	O	Ground Gleaner	Tree-Branch			X		X			
	*Common Raven	Corvus corax	C	Ground Scavenger	Cliff					X			
Falconidae	American Kestrel	Falco sparverius	C	Ground Pouncer	Tree Cavity-Crevice	X	X						X
Fringillidae	*American Goldfinch	Carduelis tristis	O	Ground Gleaner	Shrub	X	X	X	X	X			X
	American Tree Sparrow	Spizella arborea	O	Ground Gleaner	Not Applicable		X	X					X
	Chipping Sparrow	Spizella passerina	O	Ground Gleaner	Shrub	X	X		X	X			
	Common Redpoll	Carduelis flammea	G	Ground Gleaner	Not Applicable	X	X						
	Dark-eyed Junco	Junco hyemalis	G	Ground Gleaner	Ground-Herb		X	X	X	X			
	Evening Grosbeak	Coccothraustes vespertinus	G	Ground Gleaner	Tree-Twig			X		X			
	Field Sparrow	Spizella pusilla	O	Ground Gleaner	Ground-Herb	X	X	X					
	Indigo Bunting	Passerina cyanea	I	Lower Canopy Gleaner	Ground-Herb		X	X	X				
	Lincoln's Sparrow	Melospiza lincolnii	O	Ground Gleaner	Ground-Herb			X					
	Pine Grosbeak	Pinicola enucleator	G	Ground Gleaner	Not Applicable	X				X			
	Pine Siskin	Carduelis pinus	O	Ground Gleaner	Tree-Branch		X		X	X			
	Purple Finch	Carpodacus purpureus	G	Ground Gleaner	Tree-Branch					X			
	Red Crossbill	Loxia curvirostra	G	Upper Canopy Gleaner	Tree-Twig					X			
	Rose-breasted Grosbeak	Pheucticus ludovicianus	O	Lower Canopy Gleaner	Tree-Twig			X	X				
	Savannah Sparrow	Passerculus sandwichensis	O	Ground Gleaner	Ground-Herb	X	X					X	X
	Sharp-tailed Sparrow	Ammodramus	O	Ground Gleaner	Ground-Herb							X	

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						1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
		caudacutus											
	Snow Bunting	Plectrophenax nivalis	G	Ground Gleaner	Not Applicable	X	X						X
	Song Sparrow	Melospiza melodia	O	Ground Gleaner	Ground-Herb		X	X					
	Swamp Sparrow	Melospiza georgiana	I	Ground Gleaner	Riparian Ground								X
	White-throated Sparrow	Zonotrichia albicollis	O	Ground Gleaner	Ground-Herb			X	X	X			
	White-winged Crossbill	Loxia leucoptera	G	Upper Canopy Gleaner	Tree-Branch					X			
Gaviidae	Common Loon	Gavia immer	P	Ocean Diver	Not Applicable						X		
Hirundinidae	Bank Swallow	Riparia riparia	I	Air Screener	Terrestrial Subsurface	X	X	X			X	X	X
	Barn Swallow	Hirundo rustica	I	Air Screener	Buildings		X	X			X	X	X
	Cliff Swallow	Hirundo pyrrhonota	I	Air Screener	Buildings		X	X					X
	Tree Swallow	Tachycineata bicolor	I	Air Screener	Tree Cavity-Crevice	X	X	X				X	X
Icteridae	Baltimore Oriole	Icterus galbula	O	Upper Canopy Gleaner	Tree-Twig				X				
	Common Grackle	Quiscalus quiscula	O	Ground Gleaner	Tree-Branch		X						X
	Red-winged Blackbird	Agelaius phoeniceus	O	Ground Gleaner	Shrub		X					X	X
Laniidae	Northern Shrike	Lanius excubitor	C	Ground Pouncer	Not Applicable		X	X	X	X			X
Laridae	*Arctic Tern	Sterna paradisaea	P	Water Plunger	Beach-Rock-Dune						X		
	Common Tern	Sterna hirundo	P	Water Plunger	Beach-Rock-Dune						X		
	Great Black-backed Gull	Larus marinus	C	Coastal Scavenger	Beach-Rock-Dune						X	X	
	Herring Gull	Larus argentatus	C	Coastal Scavenger	Beach-Rock-Dune		X				X	X	
	*Ring-billed Gull	Larus delawarensis	O	Coastal Scavenger	Beach-Rock-Dune						X	X	
Mimidae	Brown Thrasher	Toxostoma rufum	O	Ground Gleaner	Shrub			X					
	Gray Catbird	Dumetella carolinensis	O	Ground Gleaner	Shrub			X	X				
	*Northern Mockingbird	Mimus polyglottos	O	Ground Gleaner	Shrub			X					
Paridae	*Black-capped Chickadee	Parus atricapillus	I	Lower Canopy Gleaner	Tree Cavity-Crevice			X	X	X			
Parulidae	American Redstart	Setophaga ruticilla	I	Lower Canopy Gleaner	Tree-Twig				X	X			
	Bay-breasted Warbler	Dendroica castanea	I	Lower Canopy Gleaner	Tree-Branch			X		X			
	Black-and-White Warbler	Mniotilta varia	I	Bark Gleaner	Ground-Herb				X	X			
	Blackburnian Warbler	Dendroica fusca	I	Upper Canopy Gleaner	Tree-Branch					X			
	Blackpoll Warbler	Dendroica striata	I	Lower Canopy Gleaner	Tree-Branch					X			
	Black-throated Green	Dendroica virens	I	Upper Canopy Gleaner	Tree-Branch				X	X			

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						1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
	Warbler												
	Black-throated Blue Warbler	Dendroica caerulescens	I	Lower Canopy Gleaner	Shrub				X	X			
	Canada Warbler	Wilsonia canadensis	I	Lower Canopy Gleaner	Riparian Ground				X	X			
	Cape May Warbler	Dendroica tigrina	I	Upper Canopy Gleaner	Tree-Twig					X			
	Chestnut-sided Warbler	Dendroica pensylvanica	I	Lower Canopy Gleaner	Shrub			X	X				
	Common Yellowthroat	Geothlypis trichas	I	Lower Canopy Gleaner	Ground-Herb		X	X					X
	Magnolia Warbler	Dendroica magnolia	I	Lower Canopy Gleaner	Tree-Branch					X			
	Nashville Warbler	Vermivora ruficapilla	I	Lower Canopy Gleaner	Ground-Herb			X	X	X			
	Northern Parula	Parula americana	I	Upper Canopy Gleaner	Tree-Branch					X			
	Ovenbird	Seiurus aurocapillus	I	Ground Gleaner	Ground-Herb				X	X			
	Tennessee Warbler	Vermivora peregrina	I	Upper Canopy Gleaner	Ground-Herb			X		X			
	Yellow Warbler	Dendroica petechia	I	Lower Canopy Gleaner	Shrub			X					
	Yellow-rumped Warbler	Dendroica coronata	I	Lower Canopy Gleaner	Tree-Branch			X		X			
Phalacrocoracidae	*Double-crested Cormorant	Phalacrocorax auritus	P	Ocean Diver	Riparian Ground						X		
Picidae	Downy Woodpecker	Picoides pubescens	I	Bark Gleaner	Tree Cavity-Crevice				X	X			
	*Northern Flicker	Colaptes auratus	I	Ground Gleaner	Tree Cavity-Crevice	X	X	X					
	Yellow-bellied Sapsucker	Sphyrapicus varius	O	Bark Excavator	Tree Cavity-Crevice				X	X			
Ploceidae	House Sparrow	Passer domesticus	G	Ground Gleaner	Buildings			X				X	
Podicipedidae	Horned Grebe	Podiceps auritus	O	Bottom Forager	Not Applicable						X		
Rallidae	Sora	Porzana carolina	O	Riparian Gleaner	Riparian Ground							X	X
	Virginia Rail	Rallus limicola	O	Riparian Gleaner	Riparian Ground							X	X
Scolopacidae	American Woodcock	Scolopax minor	I	Ground Prober	Ground-Herb			X	X				
	Common Snipe	Gallinago gallinago	I	Water Gleaner	Riparian Ground							X	X
	Spotted Sandpiper	Actitis macularia	O	Riparian Gleaner	Ground-Herb		X						
Sittidae	*Red-breasted Nuthatch	Sitta canadensis	I	Bark Gleaner	Tree Cavity-Crevice					X			
	White-breasted Nuthatch	Sitta carolinensis	I	Bark Gleaner	Tree Cavity-Crevice				X				
Strigidae	Barred Owl	Strix varia	C	Ground Pouncer	Tree Cavity-Branch			X		X			
	Great Horned Owl	Bubo virginianus	C	Ground Pouncer	Tree-Branch		X	X	X	X			
Sturnidae	European Starling	Sturnus vulgaris	O	Ground Gleaner	Buildings	X	X					X	

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Family	***Common Name***	***Scientific Name***	***Guild***	***Forage Method***	***Breeding Substrate***	***Habitat***							
						1	***2***	***3***	***4***	***5***	***6***	***7***	***8***
Sylviidae	Golden-crowned Kinglet	Regulus satrapa	I	Lower Canopy Gleaner	Tree-Twig					X			
	Ruby-crowned Kinglet	Regulus calendula	I	Lower Canopy Gleaner	Tree-Twig					X			
Tetraonidae	Ruffed Grouse	Bonasa umbellus	O	Ground Gleaner	Ground-Herb			X	X	X			
	Spruce Grouse	Dendragapus canadensis	O	Ground Gleaner	Ground-Herb					X			
Thraupidae	Scarlet Tanager	Piranga olivacea	I	Upper Canopy Gleaner	Tree-Twig				X				
Trochilidae	Ruby-throated Hummingbird	Archilochus colubris	O	Floral Hover-Gleaner	Tree-Branch			X	X	X			
Troglodytidae	House Wren	Troglodytes aedon	I	Lower Canopy Gleaner	Tree Cavity-Crevice			X	X				
	Winter Wren	Troglodytes troglodytes	I	Ground Gleaner	Tree Cavity-Crevice					X		X	
Turdidae	American Robin	Turdus migratorius	O	Ground Gleaner	Tree-Branch	X	X	X	X	X			
	Hermit Thrush	Catharus guttatus	I	Ground Gleaner	Ground-Herb			X	X	X			
	Swainson's Thrush	Catharus ustulatus	I	Ground Gleaner	Tree-Twig				X	X			
	Veery	Catharus fuscescens	O	Ground Gleaner	Ground-Herb			X	X	X			
	Wood Thrush	Hylocichla mustelina	O	Ground Gleaner	Tree-Branch				X	X			
Tyrannidae	Eastern Kingbird	Tyrannus tyrannus	I	Air Sallier	Tree-Twig		X	X					
	Eastern Phoebe	Sayornis phoebe	I	Air Sallier	Buildings			X					
	Least Flycatcher	Empidonax minimus	I	Air Sallier	Tree-Branch				X	X			
	Olive-sided Flycatcher	Contopus borealis	I	Air Sallier	Tree Branch					X			
	Yellow-bellied Flycatcher	Empidonax flaviventris	I	Air Sallier	Ground-Herb					X			
Vireonidae	Red-eyed Vireo	Vireo olivaceus	I	Upper Canopy Gleaner	Tree-Twig				X	X			
	Solitary Vireo	Vireo solitarius	I	Upper Canopy Gleaner	Tree-Twig					X			
Mammals													
Canidae	Coyote	Canis latrans	O	Ground Forager	Terrestrial Subsurface	X	X	X	X	X			X
	Red Fox	Vulpes vulpes	O	Ground Forager	Terrestrial Subsurface	X	X	X	X	X		X	X
Cervidae	*White-tailed Deer	Odocoileus virginianus	H	Ground Grazer	Ground-Herb		X	X	X	X		X	X
Cricetidae	Deer Mouse	Peromyscus maniculatus	O	Ground Forager	Terrestrial Subsurface			X	X	X			
	Meadow Vole	Microtus pennsylvanicus	H	Ground Grazer	Terrestrial Subsurface		X	X				X	X
	Muskrat	Ondatra zibethicus	H	Water Grazer	Riparian Subsurface						X	X	X
	S. Red-backed Vole	Clethrionomys gapperi	H	Ground Grazer	Terrestrial Subsurface			X	X	X			
	Southern Bog Lemming	Synaptomys cooperi	H	Ground Grazer	Ground-Herb								X
Erethizontidae	Porcupine	Erethizon dorsatum	H	Upper Canopy Browser	Terrestrial Subsurface					X			

Table 2.3-1: Potential Ecological Receptors

Family	*Common Name*	*Scientific Name*	*Guild*	*Forage Method*	*Breeding Substrate*	*Habitat*							
						1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
Felidae	Bobcat	Felis rufus	C	Ground Stalker	Cave-Crevice			X	X	X			
Leporidae	Snowshoe Hare	Lepus americanus	H	Ground Grazer	Ground-Herb			X	X	X			
Mustelidae	Ermine	Mustela erminea	C	Ground Pursuer	Ground-Herb	X	X	X	X	X			
	Fisher	Martes pennanti	C	Upper Canopy Pursuer	Tree Cavity-Crevice			X	X	X			
	Long-tailed Weasel	Mustela frenata	C	Ground Pursuer	Terrestrial Subsurface	X	X	X	X			X	X
	Mink	Mustela vison	P	Water Diver	Riparian Subsurface					X	X	X	X
	River Otter	Lutra canadensis	P	Water Diver	Riparian Subsurface					X	X	X	X
	Striped Skunk	Mephitis mephitis	O	Ground Forager	Terrestrial Subsurface	X	X	X	X	X	X	X	X
Procyonidae	Raccoon	Procyon lotor	O	Ground Forager	Tree Cavity-Crevice	X	X	X	X	X	X	X	X
Sciuridae	Eastern Chipmunk	Tamias striatus	G	Ground Forager	Terrestrial Subsurface			X		X			
	*Red Squirrel	Tamiasciurus hudsonicus	G	Upper Canopy Forager	Tree Cavity-Crevice				X	X			
	Woodchuck	Marmota monax	H	Ground Grazer	Terrestrial Subsurface			X					
Soricidae	Masked Shrew	Sorex cinereus	I	Ground Gleaner	Terrestrial Subsurface			X		X		X	X
	N. Short-tailed Shrew	Blarina brevicauda	I	Ground Gleaner	Terrestrial Subsurface		X	X	X	X		X	X
	Pygmy Shrew	Sorex hoyi	I	Ground Gleaner	Riparian Subsurface				X	X			
	Smoky Shrew	Sorex fumeus	I	Ground Gleaner	Terrestrial Subsurface				X	X			
	Water Shrew	Sorex palustris	I	Water Gleaner	Riparian Subsurface								X
Talpidae	Hairy-tailed Mole	Parascalops breweri	I	Ground Gleaner	Terrestrial Subsurface		X	X	X	X			
	Star-nosed Mole	Condylura cristata	I	Water Gleaner	Riparian Subsurface							X	X
Vespertilionidae	Big Brown Bat	Eptesicus fuscus	I	Air Hawker	Buildings	X	X	X				X	X
	Little Brown Bat	Myotis lucifugus	I	Air Hawker	Buildings	X	X	X				X	X
	Red Bat	Lasiurus borealis	I	Air Hawker	Tree-Twig	X	X	X	X			X	X
	Small-footed Myotis	Myotis leibii	I	Air Hawker	Buildings	X	X	X				X	X
Zapodidae	Meadow Jumping Mouse	Zapus hudsonius	O	Ground Forager	Ground-Herb		X	X	X	X		X	X
	Woodland Jumping Mouse	Napaeozapus insignis	O	Ground Forager	Ground-Herb			X	X	X			
Reptiles													
Colubridae	E. Smooth Green Snake	Opheodrys v. vernalis	I	Ground Ambusher	Terrestrial Subsurface			X	X				X
	Eastern Garter Snake	Thamnophia s. sirtalis	C	Ground Ambusher	Terrestrial Subsurface		X	X	X	X			X
	Eastern Milk Snake	Lampropeltis t.	C	Ground Ambusher	Terrestrial Subsurface				X				

Table 2.3-1: Potential Ecological Receptors

Family	***Common Name***	***Scientific Name***	***Guild***	***Forage Method***	***Breeding Substrate***	***Habitat***							
						1	***2***	***3***	***4***	***5***	***6***	***7***	***8***
		triangulum											
	Northern Redbelly Snake	Storeria o. occipitomaculata	I	Ground Ambusher	Terrestrial Subsurface				X				
	Northern Ringneck Snake	Diadophis punctatus edwardsi	C	Ground Ambusher	Terrestrial Subsurface				X	X			
NOTES:													
Habitats:	1: Unvegetated Areas	5: Spruce - Birch Woodland		Guilds:	C: Carnivore	I: Insectivore							
	2: Grass	6: Open Water (Goose Pond)			F: Frugivore	O: Omnivore							
	3: Shrub - Old Field	7: Salt Marsh (Estuarine Emergent)			G: Granivore	P: Piscivore							
	4: Aspen - Birch Woodland	8: Shalow Marsh (Palustrine Emergent)			H: Herbivore								
* Species observed on the site during site reconnaissance.													

Table 2.5-1: Surface Soil Samples

Location Name	*Sample Event Date*	*Metals*	*SVOC*	*VOC*
SS-401	2004/12/02	D05709	A18S7	A18S7
SS-401 (duplicate)	2004/12/02	D05739	A18D9	A18D9
SS-402	2004/12/02	D05710	A18S8	A18S8
SS-403	2004/11/30	D05711		
SS-404	2004/12/02	D05712	A18S9	A18S9
SS-405	2004/12/02	D05713	A18T0	A18T0
SS-406	2004/11/30	D05714		
SS-407	2004/12/02	D05715	A18T1	A18T1
SS-408	2004/11/30	D05716		
SS-409	2004/11/30	D05717		
SS-410	2004/12/02	D05718	A19C8	A19C8
SS-411	2004/12/02	D05719	A19C9	A19C9
SS-412	2004/12/02	D05720	A19D0	A19D0
SS-413	2004/12/02	D05721	A19D1	A19D1
SS-414	2004/11/30	D05722		
SS-415	2004/11/30	D05723		
SS-416	2004/12/02	D05724	A19D2	A19D2
SS-417	2004/11/30	D05725		
SS-418	2004/11/30	D05726		
SS-419	2004/11/30	D05727		
SS-420	2004/11/30	D05728		
SS-421	2004/11/30	D05729		
SS-422	2004/11/30	D05730		
SS-423	2004/11/30	D05731		
SS-424	2004/11/30	D05732		
SS-425	2004/11/30	D05733		
SS-426	2004/11/30	D05734		
SS-427	2004/11/30	D05735		
SS-427 (duplicate)	2004/11/30	D05740		
SS-428	2004/11/30	D05736		
SS-429	2004/11/30	D05737		
SS-430	2004/11/30	D05738		

Table 2.6-1: Sediment Samples

Location Name	*Date*	*TOC/TCO*	*Metals*
SD-401	2004/11/17	D05638	D05638
SD-402	2004/11/17	D05639	D05639
SD-403	2004/11/12	D05640	D05640
SD-404	2004/11/12	D05641	D05641
SD-405	2004/11/17	D05642	D05642
SD-406	2004/11/17	D05643	D05643
SD-407	2004/11/11	D05644	D05644
SD-408	2004/11/11	D05645	D05645
SD-409	2004/11/18	D05646	D05646
SD-410	2004/11/11	D05647	D05647
SD-411	2004/12/03	D05648	D05648
SD-412	2004/11/12	D05649	D05649
SD-413	2004/11/11	D05650	D05650
SD-415	2004/11/11	D05651	D05651
SD-416	2004/11/11	D05652	D05652
SD-417	2004/11/11	D05653	D05653
SD-420	2004/12/03	D05654	D05654
SD-420 (duplicate)	2004/12/03	D05659	D05659
SD-421	2004/12/03	D05655	D05655
SD-422	2004/11/12	D05656	D05656
SD-422 (duplicate)	2004/11/12	D05660	D05660
SD-423	2004/11/11	D05657	D05657
SD-424	2004/11/18	D05658	D05658
SD-425	2004/12/03	D05706	D05706
SD-426	2004/12/03	D05707	D05707

Table 2.7-1: Surface Water Samples			
Location Name	***Date***	***Sulfate***	***Metals***
SW-403	2004/11/16	D05667	D05667
SW-403 (duplicate)	2004/11/16	D05691	D05691
SW-403 (filtered, duplicate)	2004/11/16		D05692
SW-403 (filtered)	2004/11/16		D05668
SW-405	2004/11/17	D05669	D05669
SW-405 (filtered)	2004/11/17		D05670
SW-406	2004/11/17	D05671	D05671
SW-406 (filtered)	2004/11/17		D05672
SW-407	2004/11/16	D05673	D05673
SW-407 (filtered)	2004/11/16		D05674
SW-410	2004/11/16	D05675	D05675
SW-410 (filtered)	2004/11/16		D05676
SW-411	2004/12/03	D05677	D05677
SW-411 (duplicate)	2004/12/03	D05704	D05704
SW-411 (duplicate)	2004/12/03		D05705
SW-411 (filtered)	2004/12/03		D05678
SW-414	2004/11/16	D05679	D05679
SW-414 (filtered)	2004/11/16		D05680
SW-415	2004/11/16	D05681	D05681
SW-415 (filtered)	2004/11/16		D05682
SW-419	2004/12/02	D05683	D05683
SW-419 (filtered)	2004/12/02		D05684
SW-422	2004/11/17	D05685	D05685
SW-422 (filtered)	2004/11/17		D05686
SW-423	2004/11/16	D05687	D05687
SW-423 (filtered)	2004/11/16		D05688
SW-424	2004/11/18	D05689	D05689
SW-424 (filtered)	2004/11/18		D05690

Table 2.8-1: Residential Well Samples

Location Name	*Address*	*Sample Location*	*Sample Event Date*	*Sulfate*	*Metals*	*VOCs*
DWCA-10	46 Goose Falls Road	Tap at spring	2005/01/12	D05764	MA1GP3	A1GA1
DWCA-11	19 Goose Falls Road	Upstream of pressure tank	2005/01/12	D05760	MA1GP2	A1G97
DWCA-12	9 Goose Falls Road	Upstream of pressure tank	2005/01/12	D05759	MA1GP1	A1G96
DWCA-15	13 Harborside Road (serves multiple homes)	Upstream of pressure tank	2005/01/11	D05766	MA1GP4	A1GN3
DWCA-16	1027 Cape Rosier Road	Upstream of pressure tank	2005/01/11	D05755	MA1GN7	A1G92
DWCA-16 (duplicate)	1027 Cape Rosier Road	Upstream of pressure tank	2005/01/11	D05756	MA1GN8	A1G93
DWCA-17	1043 Cape Rosier Road	Kitchen tap	2005/01/11	D05757	MA1GN9	A1G94
DWCA-18	1071 Cape Rosier Road	Upstream of pressure tank	2005/01/12	D05758	MA1GP0	A1G95

Table 4.1-1
Surface Soil Analytical Results
(Detects Only)

Source Area				WRP-1	WRP-1	WRP-1	WRP-1	WRP-1	WRP-2	WRP-2	WRP-2	WRP-2
Location ID				99-WRP-21	99-WRP-22	SS-407	SS-408	SS-409	SS-417	SS-418	99-SS-05	99-SS-44
				99E-DIN-10875	99E-DIN-11382	SS-407	SS-408	SS-409	SS-417	SS-418	99E-DIN-11361	99E-DIN-11378
Sample Date		Maine RAGs	Region IX PRG	10/4/1999	10/4/1999	12/2/2004	11/30/2004	11/30/2004	11/30/2004	11/30/2004	10/6/1999	10/6/1999
Depth		Residential	for Residential	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
CONSTITUENT	UNITS		Soil	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
Volatile Organic Compounds												
1,2-Dichlorobenzene	(ug/kg)	2700000	110000									
1,3-Dichlorobenzene	(ug/kg)		53000									
Acetone	(ug/kg)	480000	1400000									
Methylene chloride	(ug/kg)	13000	9100									
3,4-Dithiohexane	(ug/kg)											
Diethyl benzene (mixed isomers)	(ug/kg)											
Semivolatile Organic Compounds												
Acetophenone	(ug/kg)											
bis(2-Ethylhexyl) phthalate	(ug/kg)	1200000	35000									
Butyl benzyl phthalate	(ug/kg)		1200000									
Chrysene	(ug/kg)		62000									
Di-n-butyl phthalate	(ug/kg)		610000									
Dimethyl phthalate	(ug/kg)		61000000									
Fluoranthene	(ug/kg)		230000									
Pyrene	(ug/kg)		230000									
Metals												
Aluminum	(mg/kg)		7600			[56000]	[45000]	[60000]	[13000]	[46000]		
Antimony	(mg/kg)		3.1			0.11J	2.6J	0.31J	0.84J	0.35J		
Arsenic	(mg/kg)	10	0.39			[22]J	[51]J	[34]J	[23]J	[57]J		
Barium	(mg/kg)	10000	540			16EB	9.5EB	5.4EB	9.4EB	16EB		
Beryllium	(mg/kg)	4	15			0.24J	0.14J	0.35J	0.31J	0.27J		
Cadmium	(mg/kg)	27	3.7	[8.7]	[13]	0.55J	0.37J	0.81J	[16]J	0.45J	[27]	[17]
Calcium	(mg/kg)					420J	91J	280J	5900J	210J		
Chromium	(mg/kg)		210			13J	4.1JEB	3.1JEB	12JEB	11JEB		
Cobalt	(mg/kg)		900			0.77J	0.31J		4.8J	1.9J		
Copper	(mg/kg)	650	310	[1600]J	[2100]J	[2400]J	[5200]J	[8200]J	[1600]J	[2000]J	[1800]J	[480]J
Iron	(mg/kg)		2300			[47000]	[74000]	[55000]	[17000]	[57000]		
Lead	(mg/kg)	375	40	[780]	[3000]	[140]J	[820]J	[380]J	[520]J	[260]J	[640]	[210]
Magnesium	(mg/kg)					110000J	94000J	120000J	18000J	82000J		
Manganese	(mg/kg)		180			[1400]J	[970]J	[1300]J	[480]J	[1100]J		
Mercury	(mg/kg)	60	2.3	1J	0.5J	0.41	0.35J	0.23J	0.41J	0.14J	0.7J	0.2J
Nickel	(mg/kg)	3800	160			5.3JEB	1.7JEB	0.62JEB	12JEB	7.3JEB		
Potassium	(mg/kg)					4100J	4000	1900	1000J	2100J		
Selenium	(mg/kg)	950	39	7		5.1J	15J	16J	1.9J	7.6J		
Silver	(mg/kg)	950	39	4.1	2.3	1.2J	5.2J	3.3J	2J	1.6J	3.1	0.9
Sodium	(mg/kg)						120J			100J		
Thallium	(mg/kg)		0.52			[1.3]J	[2]J	[0.86]J	0.46J	[1.2]J		
Vanadium	(mg/kg)		7.8			[17]J	[14]J	[14]J	[11]J	[19]J		
Zinc	(mg/kg)	1500	2300	[2400]	[7200]	330J	250J	290J	[5700]J	260J	[8400]	[4200]

Table 4.1-1
Surface Soil Analytical Results
(Detects Only)

Source Area				WRP-2	WRP-2	WRP-2	WRP-3	WRP-3	WRP-3	WRP-3	WRP-3
Location ID				99-SS-45	99-WRP2-10	99-WRP2-48	99-TPL-16	99-TPL-17	99-TPL-18	SS-405	SS-406
				99E-DIN-11390	99E-DIN-10881	99E-DIN-11844	99E-DIN-11384	99E-DIN-11367	99E-DIN-11364	SS-405	SS-406
Sample Date		Maine RAGs	Region IX PRG	10/6/1999	10/4/1999	10/4/1999	10/4/1999	10/4/1999	10/4/1999	12/2/2004	11/30/2004
Depth		Residential	for Residential	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
CONSTITUENT	UNITS		Soil	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
Volatile Organic Compounds											
1,2-Dichlorobenzene	(ug/kg)	2700000	110000								
1,3-Dichlorobenzene	(ug/kg)		53000								
Acetone	(ug/kg)	480000	1400000								
Methylene chloride	(ug/kg)	13000	9100								
3,4-Dithiohexane	(ug/kg)										
Diethyl benzene (mixed isomers)	(ug/kg)										
Semivolatile Organic Compounds											
Acetophenone	(ug/kg)										
bis(2-Ethylhexyl) phthalate	(ug/kg)	1200000	35000								
Butyl benzyl phthalate	(ug/kg)		1200000								
Chrysene	(ug/kg)		62000								
Di-n-butyl phthalate	(ug/kg)		610000								
Dimethyl phthalate	(ug/kg)		61000000								
Fluoranthene	(ug/kg)		230000								
Pyrene	(ug/kg)		230000								
Metals											
Aluminum	(mg/kg)		7600							[41000]	[57000]
Antimony	(mg/kg)		3.1							1.7J	0.3J
Arsenic	(mg/kg)	10	0.39							[130]J	[23]J
Barium	(mg/kg)	10000	540							8.8EB	9.6EB
Beryllium	(mg/kg)	4	15							0.18J	0.17J
Cadmium	(mg/kg)	27	3.7		[32]					0.79J	0.78J
Calcium	(mg/kg)									280J	120J
Chromium	(mg/kg)		210							6.2J	4.6JEB
Cobalt	(mg/kg)		900							0.27J	0.049J
Copper	(mg/kg)	650	310	80J	[1100]J	[540]J	[670]J	[520]J	[630]J	[3600]J	[340]J
Iron	(mg/kg)		2300							[41000]	[40000]
Lead	(mg/kg)	375	40	[120]	[790]	[220]	[230]	[410]	[150]	[700]J	[240]J
Magnesium	(mg/kg)									78000J	120000J
Manganese	(mg/kg)		180							[1100]J	[1300]J
Mercury	(mg/kg)	60	2.3	0.1J	0.9J		0.7J	1J	0.3J	1.5	0.36J
Nickel	(mg/kg)	3800	160							1.8JEB	1.3JEB
Potassium	(mg/kg)									2800	4200
Selenium	(mg/kg)	950	39			9.5	20	4.9	6.6	5.9J	6.3J
Silver	(mg/kg)	950	39		2.7	1.9	3	4		2.9J	1.6J
Sodium	(mg/kg)										
Thallium	(mg/kg)		0.52							[4.4]J	[1.3]J
Vanadium	(mg/kg)		7.8							[10]J	[16]J
Zinc	(mg/kg)	1500	2300	130	[7700]	150	90	390	220	420J	400J

Table 4.1-1
Surface Soil Analytical Results
(Detects Only)

Source Area				Tailings	Tailings	Tailings	Tailings	Tailings	Tailings	Tailings	Tailings	Tailings
Location ID				SS-401	SS-401	SS-402	SS-403	SS-404	TP_SOIL1	TP_SOIL2	99-TPD-11	99-TPD-12
				SS-401	SSE-401	SS-402	SS-403	SS-404	94E-DIN-02236	94E-DIN-02235	99E-DIN-10890	99E-DIN-10889
Sample Date		Maine RAGs	Region IX PRG	12/2/2004	12/2/2004	12/2/2004	11/30/2004	12/2/2004	9/8/1994	9/8/1994	10/5/1999	10/6/1999
Depth		Residential	for Residential	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0.25-0.5
CONSTITUENT	UNITS		Soil	Primary	Duplicate 1	Primary	Primary	Primary	Primary	Primary	Primary	Primary
Volatile Organic Compounds												
1,2-Dichlorobenzene	(ug/kg)	2700000	110000		2J							
1,3-Dichlorobenzene	(ug/kg)		53000		2J							
Acetone	(ug/kg)	480000	1400000							33		
Methylene chloride	(ug/kg)	13000	9100									
3,4-Dithiohexane	(ug/kg)									100J		
Diethyl benzene (mixed isomers)	(ug/kg)									1,270J		
Semivolatile Organic Compounds												
Acetophenone	(ug/kg)											
bis(2-Ethylhexyl) phthalate	(ug/kg)	1200000	35000					48J				
Butyl benzyl phthalate	(ug/kg)		1200000							110		
Chrysene	(ug/kg)		62000									
Di-n-butyl phthalate	(ug/kg)		610000									
Dimethyl phthalate	(ug/kg)		61000000									
Fluoranthene	(ug/kg)		230000									
Pyrene	(ug/kg)		230000									
Metals												
Aluminum	(mg/kg)		7600	[38000]	[46000]	[25000]	[19000]	[37000]				
Antimony	(mg/kg)		3.1	0.44J	0.5J	0.45J	0.44J	0.47J				
Arsenic	(mg/kg)	10	0.39	[120]J	[120]J	[65]J	[65]J	[87]J	[54]	[55]		
Barium	(mg/kg)	10000	540	4.2EB	4.7EB	3.6EB	12EB	4.2EB	24	36		
Beryllium	(mg/kg)	4	15	0.17J	0.19J	0.35J	0.28J	0.19J				
Cadmium	(mg/kg)	27	3.7	0.3J	0.27J	[25]J	[22]J	0.15J	[20]	[32]	[15]	[25]
Calcium	(mg/kg)			330J	550J	62000J	88000J	330J				
Chromium	(mg/kg)		210	5.4J	7.7J	20J	18JEB	13J	25	16		
Cobalt	(mg/kg)		900	0.31J	0.35J	4.7J	4.3J	0.51J				
Copper	(mg/kg)	650	310	[510]J	[510]J	[1200]J	[2500]J	[410]J	[670]	[1900]	[470]J	[1400]J
Iron	(mg/kg)		2300	[51000]	[52000]	[34000]	[30000]	[54000]				
Lead	(mg/kg)	375	40	[480]J	[470]J	[620]J	[990]J	[350]J	[560]	[510]	[780]	[990]
Magnesium	(mg/kg)			76000	92000	50000	39000J	74000J				
Manganese	(mg/kg)		180	[1100]J	[1200]J	[1600]J	[1800]J	[1000]J				
Mercury	(mg/kg)	60	2.3	0.5	0.46	0.42	0.58J	0.38			0.5J	0.5J
Nickel	(mg/kg)	3800	160	2JEB	2.4JEB	17JEB	15JEB	3.7JEB	20	12		
Potassium	(mg/kg)			1800	2000	1500	1800	2200				
Selenium	(mg/kg)	950	39	12J	13J	5.5J	5.8J	9.1J	6	9	4.9	9.9
Silver	(mg/kg)	950	39	3.3J	2.9J	2.4J	3.8J	2.4J	2.7	3.4	4	4.4
Sodium	(mg/kg)			18JEB			18J					
Thallium	(mg/kg)		0.52	[2.8]J	[2.8]J	[1.5]J	[1.4]J	[2]J				
Vanadium	(mg/kg)		7.8	[13]J	[15]J	[16]J	[13]J	[17]J				
Zinc	(mg/kg)	1500	2300	150J	160J	[5900]J	[6600]J	120J	[15000]	[17000]	[4200]	[5800]

Table 4.1-1
Surface Soil Analytical Results
(Detects Only)

Source Area				Tailings	Tailings	Tailings	BKRD	BKRD	BKRD	BKRD	BKRD	BKRD
Location ID				99-TPD-13	99-TPD-14	99-TPD-15	SS-419	SS-420	SS-421	SS-422	SS-423	SS-424
				99E-DIN-10887	99E-DIN-10868	99E-DIN-10869	SS-419	SS-420	SS-421	SS-422	SS-423	SS-424
Sample Date		Maine RAGs	Region IX PRG	10/6/1999	10/6/1999	10/6/1999	11/30/2004	11/30/2004	11/30/2004	11/30/2004	11/30/2004	11/30/2004
Depth		Residential	for Residential	0.25-0.5	0.25-0.5	0.25-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
CONSTITUENT	UNITS		Soil	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
Volatile Organic Compounds												
1,2-Dichlorobenzene	(ug/kg)	2700000	110000									
1,3-Dichlorobenzene	(ug/kg)		53000									
Acetone	(ug/kg)	480000	1400000									
Methylene chloride	(ug/kg)	13000	9100									
3,4-Dithiohexane	(ug/kg)											
Diethyl benzene (mixed isomers)	(ug/kg)											
Semivolatile Organic Compounds												
Acetophenone	(ug/kg)											
bis(2-Ethylhexyl) phthalate	(ug/kg)	1200000	35000									
Butyl benzyl phthalate	(ug/kg)		1200000									
Chrysene	(ug/kg)		62000									
Di-n-butyl phthalate	(ug/kg)		610000									
Dimethyl phthalate	(ug/kg)		61000000									
Fluoranthene	(ug/kg)		230000									
Pyrene	(ug/kg)		230000									
Metals												
Aluminum	(mg/kg)		7600				[19000]	[20000]	[14000]	[15000]	800	720
Antimony	(mg/kg)		3.1				0.19J	0.18J	0.29J	0.21J	0.073J	0.045J
Arsenic	(mg/kg)	10	0.39				[10]J	[13]J	[11]J	[11]J	[0.49]J	[0.59]J
Barium	(mg/kg)	10000	540				37EB	34EB	49JEB	26JEB	13JEB	6.4JEB
Beryllium	(mg/kg)	4	15				0.37J	0.41J	0.3	0.33	0.034	0.022J
Cadmium	(mg/kg)	27	3.7	[19]	[16]		0.11J	0.12J	0.18J	0.12J	0.056J	0.033J
Calcium	(mg/kg)						450J	310J	260J	230J	210J	97J
Chromium	(mg/kg)		210				22JEB	19JEB	20JEB	23JEB	1.2JEB	0.83JEB
Cobalt	(mg/kg)		900				5J	5.5J	3.7J	3.9J	0.1J	0.074J
Copper	(mg/kg)	650	310	[1800]J	[1400]J	180J	14J	10J	15J	14J	0.63J	1.1J
Iron	(mg/kg)		2300				[23000]	[28000]	[19000]	[25000]	800	800
Lead	(mg/kg)	375	40	[840]	[700]	[290]	26J	22J	29J	17J	4J	6.2J
Magnesium	(mg/kg)						2900J	3000J	2200J	2900J	54J	60J
Manganese	(mg/kg)		180				[400]J	[410]J	170	[200]	16	6.6J
Mercury	(mg/kg)	60	2.3	0.5J	0.5J	0.4J	0.078J	0.084J	0.12J	0.052J	0.02J	0.027J
Nickel	(mg/kg)	3800	160				18JEB	17JEB	16JEB	16JEB	0.66JEB	0.47JEB
Potassium	(mg/kg)						700J	510J	570J	620J	120J	120J
Selenium	(mg/kg)	950	39	5.2	4.9	9.8	1.1J	0.86J	0.97J	0.76J		
Silver	(mg/kg)	950	39	4.3	3.7	2	0.22J	0.23J	0.27J	0.32J	0.038J	0.11J
Sodium	(mg/kg)								62J	44J	22J	16J
Thallium	(mg/kg)		0.52				0.12J	0.11J	0.12J	0.11J	0.018J	0.02J
Vanadium	(mg/kg)		7.8				[30]J	[28]J	[32]J	[36]J	3J	2.5J
Zinc	(mg/kg)	1500	2300	[4400]	[3800]	50	76J	95J	72J	64J	3.8J	3.6J

Table 4.1-1
Surface Soil Analytical Results
(Detects Only)

Source Area				BKRD	BKRD	BKRD	BKRD	BKRD	BKRD	BKRD	BKRD	BKRD
Location ID				SS-425	SS-426	SS-427	SS-427	SS-428	SS-429	SS-430	99-BKSS-01	99-BKSS-02
				SS-425	SS-426	SS-427	SSE-427	SS-428	SS-429	SS-430	99E-DIN-11393	99E-DIN-11395
Sample Date		Maine RAGs	Region IX PRG	11/30/2004	11/30/2004	11/30/2004	11/30/2004	11/30/2004	11/30/2004	11/30/2004	10/6/1999	10/6/1999
Depth		Residential	for Residential	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
CONSTITUENT	UNITS		Soil	Primary	Primary	Primary	Duplicate 1	Primary	Primary	Primary	Primary	Primary
Volatile Organic Compounds												
1,2-Dichlorobenzene	(ug/kg)	2700000	110000									
1,3-Dichlorobenzene	(ug/kg)		53000									
Acetone	(ug/kg)	480000	1400000									
Methylene chloride	(ug/kg)	13000	9100									
3,4-Dithiohexane	(ug/kg)											
Diethyl benzene (mixed isomers)	(ug/kg)											
Semivolatile Organic Compounds												
Acetophenone	(ug/kg)											
bis(2-Ethylhexyl) phthalate	(ug/kg)	1200000	35000									
Butyl benzyl phthalate	(ug/kg)		1200000									
Chrysene	(ug/kg)		62000									
Di-n-butyl phthalate	(ug/kg)		610000									
Dimethyl phthalate	(ug/kg)		61000000									
Fluoranthene	(ug/kg)		230000									
Pyrene	(ug/kg)		230000									
Metals												
Aluminum	(mg/kg)		7600	4500	1900	[26000]	[26000]	[24000]	[24000]	[14000]		
Antimony	(mg/kg)		3.1	0.12J	0.052J	0.089J	0.087J	0.39J	0.13J	0.17J		
Arsenic	(mg/kg)	10	0.39	[3.6]J	[1.3]J	[7.9]J	[6.9]J	[14]J	[11]J	[12]J		
Barium	(mg/kg)	10000	540	13JEB	4.5JEB	22JEB	20JEB	20JEB	17JEB	12JEB		
Beryllium	(mg/kg)	4	15	0.089	0.041	0.4	0.36	0.4	0.3	0.16		
Cadmium	(mg/kg)	27	3.7	0.051J	0.025J	0.097J	0.093J	0.087J	0.082J	0.063J		
Calcium	(mg/kg)			140J	130J	170J	610J	240J	140J	110J		
Chromium	(mg/kg)		210	5.5JEB	1.6JEB	23JEB	23JEB	21JEB	22JEB	16JEB		
Cobalt	(mg/kg)		900	0.76J	0.23J	3.4J	4.9J	2.8J	2.3J	1.8J		
Copper	(mg/kg)	650	310	2.7J	1.2J	6.3J	6.7J	8.8J	5.7J	4.7J	56J	51J
Iron	(mg/kg)		2300	[7900]	[2800]	[27000]	[30000]	[34000]	[28000]	[36000]		
Lead	(mg/kg)	375	40	18J	9J	10J	12J	14J	13J	38J	[110]	[110]
Magnesium	(mg/kg)			580J	200J	2800J	5200J	3200J	3100J	1900J		
Manganese	(mg/kg)		180	38	14	[200]	[320]	[250]	170	120		
Mercury	(mg/kg)	60	2.3	0.046J	0.021J	0.075J	0.078J	0.11J	0.09J	0.067J	0.1J	
Nickel	(mg/kg)	3800	160	2.8JEB	0.74JEB	19JEB	16JEB	10JEB	8.9JEB	9.7JEB		
Potassium	(mg/kg)			220J	160J	490J	410J	390J	350J	220J		
Selenium	(mg/kg)	950	39			0.93J		0.83J				4
Silver	(mg/kg)	950	39	0.16J	0.072J	0.18J	0.13J	0.18J	0.17J	0.13J	1.1	1.1
Sodium	(mg/kg)			25J	27J					34J		
Thallium	(mg/kg)		0.52	0.059J	0.035J	0.075J	0.066J	0.086J	0.076J	0.061J		
Vanadium	(mg/kg)		7.8	[15]J	[8.3]J	[32]J	[48]J	[32]J	[34]J	[46]J		
Zinc	(mg/kg)	1500	2300	17J	5.4J	18J	87J	74J	58J	39J	290	270

Table 4.1-1
Surface Soil Analytical Results
(Detects Only)

Source Area				BKRD	BKRD
Location ID				99-BKSS-03	99-SS-04
				99E-DIN-11375	99E-DIN-11360
Sample Date		Maine RAGs	Region IX PRG	10/6/1999	10/6/1999
Depth		Residential	for Residential	0-0.5	0-0.5
CONSTITUENT	UNITS		Soil	Primary	Primary
Volatile Organic Compounds					
1,2-Dichlorobenzene	(ug/kg)	2700000	110000		
1,3-Dichlorobenzene	(ug/kg)		53000		
Acetone	(ug/kg)	480000	1400000		
Methylene chloride	(ug/kg)	13000	9100		
3,4-Dithiohexane	(ug/kg)				
Diethyl benzene (mixed isomers)	(ug/kg)				
Semivolatile Organic Compounds					
Acetophenone	(ug/kg)				
bis(2-Ethylhexyl) phthalate	(ug/kg)	1200000	35000		
Butyl benzyl phthalate	(ug/kg)		1200000		
Chrysene	(ug/kg)		62000		
Di-n-butyl phthalate	(ug/kg)		610000		
Dimethyl phthalate	(ug/kg)		61000000		
Fluoranthene	(ug/kg)		230000		
Pyrene	(ug/kg)		230000		
Metals					
Aluminum	(mg/kg)		7600		
Antimony	(mg/kg)		3.1		
Arsenic	(mg/kg)	10	0.39		
Barium	(mg/kg)	10000	540		
Beryllium	(mg/kg)	4	15		
Cadmium	(mg/kg)	27	3.7		
Calcium	(mg/kg)				
Chromium	(mg/kg)		210		
Cobalt	(mg/kg)		900		
Copper	(mg/kg)	650	310	49J	[1400]J
Iron	(mg/kg)		2300		
Lead	(mg/kg)	375	40	[110]	[210]
Magnesium	(mg/kg)				
Manganese	(mg/kg)		180		
Mercury	(mg/kg)	60	2.3		0.5J
Nickel	(mg/kg)	3800	160		
Potassium	(mg/kg)				
Selenium	(mg/kg)	950	39	4	
Silver	(mg/kg)	950	39		2.9
Sodium	(mg/kg)				
Thallium	(mg/kg)		0.52		
Vanadium	(mg/kg)		7.8		
Zinc	(mg/kg)	1500	2300	260	310

Table 4.1-2: Summary of Chemicals Detected
Operations Area

		Times Sought	Times Detected	Maximum Concentration
CONSTITUENT	UNITS			
VOCs				
1,1,1-trichloroethane	(ug/kg)	5	0	ND
1,1,2,2-Tetrachloroethane	(ug/kg)	5	0	ND
1,1,2-Trichloro-1,2,2-trifluoroethane	(ug/kg)	5	0	ND
1,1,2-Trichloroethane	(ug/kg)	5	0	ND
1,1-Dichloroethane	(ug/kg)	5	0	ND
1,1-Dichloroethene	(ug/kg)	5	0	ND
1,2,4-Trichlorobenzene	(ug/kg)	5	0	ND
1,2-Dibromo-3-chloropropane	(ug/kg)	5	0	ND
1,2-Dichlorobenzene	(ug/kg)	5	0	ND
1,2-Dichloroethane	(ug/kg)	5	0	ND
1,2-Dichloropropane	(ug/kg)	5	0	ND
1,3-Dichlorobenzene	(ug/kg)	5	0	ND
1,4-Dichlorobenzene	(ug/kg)	5	0	ND
2-Butanone (MEK)	(ug/kg)	5	0	ND
2-Hexanone	(ug/kg)	5	0	ND
4-Methyl-2-pentanone	(ug/kg)	5	0	ND
Acetone	(ug/kg)	5	0	ND
Benzene	(ug/kg)	5	0	ND
Bromodichloromethane	(ug/kg)	5	0	ND
Bromoform	(ug/kg)	5	0	ND
Bromomethane	(ug/kg)	5	0	ND
Carbon disulfide	(ug/kg)	5	0	ND
Carbon tetrachloride	(ug/kg)	5	0	ND
Chlorobenzene	(ug/kg)	5	0	ND
Chlorodibromomethane	(ug/kg)	5	0	ND
Chloroethane	(ug/kg)	5	0	ND
Chloroform	(ug/kg)	5	0	ND
Chloromethane	(ug/kg)	5	0	ND
cis-1,2-Dichloroethene	(ug/kg)	5	0	ND
cis-1,3-Dichloropropene	(ug/kg)	5	0	ND
Cyclohexane	(ug/kg)	5	0	ND
Dichlorodifluoromethane	(ug/kg)	5	0	ND
Ethylbenzene	(ug/kg)	5	0	ND
Ethylenedibromide	(ug/kg)	5	0	ND
Fluorotrichloromethane	(ug/kg)	5	0	ND
Isopropylbenzene	(ug/kg)	5	0	ND
Methyl acetate (acetic acid, methyl este	(ug/kg)	5	0	ND
Methyl cyclohexane	(ug/kg)	5	0	ND
Methyl tert-butyl ether	(ug/kg)	5	0	ND
Methylene chloride	(ug/kg)	5	0	ND
Styrene	(ug/kg)	5	0	ND
Tetrachloroethene	(ug/kg)	5	0	ND
Toluene	(ug/kg)	5	0	ND
trans-1,2-Dichloroethene	(ug/kg)	5	0	ND
Trans-1,3-Dichloropropene	(ug/kg)	5	0	ND
Trichloroethene	(ug/kg)	5	0	ND
Vinyl chloride	(ug/kg)	5	0	ND
Xylenes (total)	(ug/kg)	5	0	ND

Table 4.1-2: Summary of Chemicals Detected
Operations Area

		Times Sought	Times Detected	Maximum Concentration
CONSTITUENT	UNITS			
SVOCs				
1,1'-Biphenyl	(ug/kg)	5	0	ND
2,2'-Oxybis(1-Chloropropane)	(ug/kg)	5	0	ND
2,4,5-Trichlorophenol	(ug/kg)	5	0	ND
2,4,6-Trichlorophenol	(ug/kg)	5	0	ND
2,4-Dichlorophenol	(ug/kg)	5	0	ND
2,4-Dimethylphenol	(ug/kg)	5	0	ND
2,4-Dinitrophenol	(ug/kg)	5	0	ND
2,4-Dinitrotoluene	(ug/kg)	5	0	ND
2,6-Dinitrotoluene	(ug/kg)	5	0	ND
2-Chloronaphthalene	(ug/kg)	5	0	ND
2-Chlorophenol	(ug/kg)	5	0	ND
2-Methylnaphthalene	(ug/kg)	5	0	ND
2-Methylphenol	(ug/kg)	5	0	ND
2-Nitroaniline	(ug/kg)	5	0	ND
2-Nitrophenol	(ug/kg)	5	0	ND
3,3'-Dichlorobenzidine	(ug/kg)	5	0	ND
3-Nitroaniline	(ug/kg)	5	0	ND
4,6-Dinitro-2-methylphenol	(ug/kg)	5	0	ND
4-Bromophenyl phenyl ether	(ug/kg)	5	0	ND
4-Chloro-3-methylphenol	(ug/kg)	5	0	ND
4-Chloroaniline	(ug/kg)	5	0	ND
4-Chlorophenyl phenyl ether	(ug/kg)	5	0	ND
4-Methylphenol	(ug/kg)	5	0	ND
4-Nitroaniline	(ug/kg)	5	0	ND
4-Nitrophenol	(ug/kg)	5	0	ND
Acenaphthene	(ug/kg)	5	0	ND
Acenaphthylene	(ug/kg)	5	0	ND
Acetophenone	(ug/kg)	5	2	78
Anthracene	(ug/kg)	5	0	ND
Atrazine	(ug/kg)	5	0	ND
Benzaldehyde	(ug/kg)	5	0	ND
Benzo(a)anthracene	(ug/kg)	5	0	ND
Benzo(a)pyrene	(ug/kg)	5	0	ND
Benzo(b)fluoranthene	(ug/kg)	5	0	ND
Benzo(g,h,i)perylene	(ug/kg)	5	0	ND
Benzo(k)fluoranthene	(ug/kg)	5	0	ND
Bis(2-chloroethoxy) methane	(ug/kg)	5	0	ND
bis(2-Chloroethyl) ether	(ug/kg)	5	0	ND
bis(2-Ethylhexyl) phthalate	(ug/kg)	5	5	480
Butyl benzyl phthalate	(ug/kg)	5	2	240
Caprolactam	(ug/kg)	5	0	ND
Carbazole	(ug/kg)	5	0	ND
Chrysene	(ug/kg)	5	2	58
Di-n-butyl phthalate	(ug/kg)	5	4	110
Di-n-octyl phthalate	(ug/kg)	5	0	ND
Dibenz(a,h) anthracene	(ug/kg)	5	0	ND
Dibenzofuran	(ug/kg)	5	0	ND
Diethyl phthalate	(ug/kg)	5	0	ND

Table 4.1-2: Summary of Chemicals Detected
Operations Area

		Times Sought	Times Detected	Maximum Concentration
CONSTITUENT	UNITS			
Dimethyl phthalate	(ug/kg)	5	2	450
Fluoranthene	(ug/kg)	5	2	100
Fluorene	(ug/kg)	5	0	ND
Hexachlorobenzene	(ug/kg)	5	0	ND
Hexachlorobutadiene	(ug/kg)	5	0	ND
Hexachlorocyclopentadiene	(ug/kg)	5	0	ND
Hexachloroethane	(ug/kg)	5	0	ND
Indeno(1,2,3-cd)pyrene	(ug/kg)	5	0	ND
Isophorone	(ug/kg)	5	0	ND
N-Nitrosodi-n-propylamine	(ug/kg)	5	0	ND
N-Nitrosodiphenylamine	(ug/kg)	5	0	ND
Naphthalene	(ug/kg)	5	0	ND
Nitrobenzene	(ug/kg)	5	0	ND
Pentachlorophenol	(ug/kg)	5	0	ND
Phenanthrene	(ug/kg)	5	0	ND
Phenol	(ug/kg)	5	0	ND
Pyrene	(ug/kg)	5	2	65
Metals				
Aluminum	(mg/kg)	5	5	29000
Antimony	(mg/kg)	5	5	0.96
Arsenic	(mg/kg)	5	5	220
Barium	(mg/kg)	5	5	30
Beryllium	(mg/kg)	5	5	0.53
Cadmium	(mg/kg)	10	10	170
Calcium	(mg/kg)	5	5	11000
Chromium	(mg/kg)	5	5	33
Cobalt	(mg/kg)	5	5	14
Copper	(mg/kg)	10	10	24000
Iron	(mg/kg)	5	5	84000
Lead	(mg/kg)	10	10	8500
Magnesium	(mg/kg)	5	5	49000
Manganese	(mg/kg)	5	5	1800
Mercury	(mg/kg)	10	10	7.2
Nickel	(mg/kg)	5	5	30
Potassium	(mg/kg)	5	5	2300
Selenium	(mg/kg)	10	8	39
Silver	(mg/kg)	10	10	45
Sodium	(mg/kg)	5	5	93
Thallium	(mg/kg)	5	5	6.7
Vanadium	(mg/kg)	5	5	24
Zinc	(mg/kg)	10	10	63000

Table 4.1-3: Summary of Chemicals Detected
Ore Pad

		Times Sought	Times Detected	Maximum Concentration
CONSTITUENT	UNITS			
Aluminum	(mg/kg)	2	2	46000
Antimony	(mg/kg)	1	1	4.1
Arsenic	(mg/kg)	2	2	50
Barium	(mg/kg)	2	2	8.2
Beryllium	(mg/kg)	2	2	0.3
Cadmium	(mg/kg)	4	3	24
Calcium	(mg/kg)	2	2	1500
Chromium	(mg/kg)	2	2	11
Cobalt	(mg/kg)	2	1	1.7
Copper	(mg/kg)	4	4	14000
Iron	(mg/kg)	2	2	83000
Lead	(mg/kg)	4	4	2100
Magnesium	(mg/kg)	2	2	97000
Manganese	(mg/kg)	2	2	960
Mercury	(mg/kg)	4	4	4.4
Nickel	(mg/kg)	2	2	6.8
Potassium	(mg/kg)	2	2	2700
Selenium	(mg/kg)	4	4	46
Silver	(mg/kg)	4	4	19
Sodium	(mg/kg)	2	2	62
Thallium	(mg/kg)	2	2	1.3
Vanadium	(mg/kg)	2	2	16
Zinc	(mg/kg)	4	4	8800

Table 4.1-4: Summary of Chemicals Detected
WRP-1 Soils

		Times Sought	Times Detected	Maximum Concentration
CONSTITUENT	UNITS			
VOCs				
1,1,1-trichloroethane	(ug/kg)	1	0	ND
1,1,2,2-Tetrachloroethane	(ug/kg)	1	0	ND
1,1,2-Trichloro-1,2,2-trifluoroethane	(ug/kg)	1	0	ND
1,1,2-Trichloroethane	(ug/kg)	1	0	ND
1,1-Dichloroethane	(ug/kg)	1	0	ND
1,1-Dichloroethene	(ug/kg)	1	0	ND
1,2,4-Trichlorobenzene	(ug/kg)	1	0	ND
1,2-Dibromo-3-chloropropane	(ug/kg)	1	0	ND
1,2-Dichlorobenzene	(ug/kg)	1	0	ND
1,2-Dichloroethane	(ug/kg)	1	0	ND
1,2-Dichloropropane	(ug/kg)	1	0	ND
1,3-Dichlorobenzene	(ug/kg)	1	0	ND
1,4-Dichlorobenzene	(ug/kg)	1	0	ND
2-Butanone (MEK)	(ug/kg)	1	0	ND
2-Hexanone	(ug/kg)	1	0	ND
4-Methyl-2-pentanone	(ug/kg)	1	0	ND
Acetone	(ug/kg)	2	1	17
Benzene	(ug/kg)	1	0	ND
Bromodichloromethane	(ug/kg)	1	0	ND
Bromoform	(ug/kg)	1	0	ND
Bromomethane	(ug/kg)	1	0	ND
Carbon disulfide	(ug/kg)	1	0	ND
Carbon tetrachloride	(ug/kg)	1	0	ND
Chlorobenzene	(ug/kg)	1	0	ND
Chlorodibromomethane	(ug/kg)	1	0	ND
Chloroethane	(ug/kg)	1	0	ND
Chloroform	(ug/kg)	1	0	ND
Chloromethane	(ug/kg)	1	0	ND
cis-1,2-Dichloroethene	(ug/kg)	1	0	ND
cis-1,3-Dichloropropene	(ug/kg)	1	0	ND
Cyclohexane	(ug/kg)	1	0	ND
Dichlorodifluoromethane	(ug/kg)	1	0	ND
Ethylbenzene	(ug/kg)	1	0	ND
Ethylenedibromide	(ug/kg)	1	0	ND
Fluorotrichloromethane	(ug/kg)	1	0	ND
Isopropylbenzene	(ug/kg)	1	0	ND
Methyl acetate (acetic acid, methyl este	(ug/kg)	1	0	ND
Methyl cyclohexane	(ug/kg)	1	0	ND
Methyl tert-butyl ether	(ug/kg)	1	0	ND
Methylene chloride	(ug/kg)	2	1	56
Styrene	(ug/kg)	1	0	ND
Tetrachloroethene	(ug/kg)	1	0	ND
Toluene	(ug/kg)	1	0	ND
trans-1,2-Dichloroethene	(ug/kg)	1	0	ND
Trans-1,3-Dichloropropene	(ug/kg)	1	0	ND
Trichloroethene	(ug/kg)	1	0	ND
Vinyl chloride	(ug/kg)	1	0	ND
Xylenes (total)	(ug/kg)	1	0	ND

Table 4.1-4: Summary of Chemicals Detected
WRP-1 Soils

		Times Sought	Times Detected	Maximum Concentration
CONSTITUENT	UNITS			
SVOCs				
1,1-Thibisethane	(ug/kg)	1	0	ND
3,4-Dithiohexane	(ug/kg)	1	0	ND
Diethyl benzene (mixed isomers)	(ug/kg)	1	0	ND
Trimethyloxepane	(ug/kg)	1	0	ND
1,1'-Biphenyl	(ug/kg)	1	0	ND
2,2'-Oxybis(1-Chloropropane)	(ug/kg)	1	0	ND
2,4,5-Trichlorophenol	(ug/kg)	1	0	ND
2,4,6-Trichlorophenol	(ug/kg)	1	0	ND
2,4-Dichlorophenol	(ug/kg)	1	0	ND
2,4-Dimethylphenol	(ug/kg)	1	0	ND
2,4-Dinitrophenol	(ug/kg)	1	0	ND
2,4-Dinitrotoluene	(ug/kg)	1	0	ND
2,6-Dinitrotoluene	(ug/kg)	1	0	ND
2-Chloronaphthalene	(ug/kg)	1	0	ND
2-Chlorophenol	(ug/kg)	1	0	ND
2-Methylnaphthalene	(ug/kg)	1	0	ND
2-Methylphenol	(ug/kg)	1	0	ND
2-Nitroaniline	(ug/kg)	1	0	ND
2-Nitrophenol	(ug/kg)	1	0	ND
3,3'-Dichlorobenzidine	(ug/kg)	1	0	ND
3-Nitroaniline	(ug/kg)	1	0	ND
4,6-Dinitro-2-methylphenol	(ug/kg)	1	0	ND
4-Bromophenyl phenyl ether	(ug/kg)	1	0	ND
4-Chloro-3-methylphenol	(ug/kg)	1	0	ND
4-Chloroaniline	(ug/kg)	1	0	ND
4-Chlorophenyl phenyl ether	(ug/kg)	1	0	ND
4-Methylphenol	(ug/kg)	1	0	ND
4-Nitroaniline	(ug/kg)	1	0	ND
4-Nitrophenol	(ug/kg)	1	0	ND
Acenaphthene	(ug/kg)	1	0	ND
Acenaphthylene	(ug/kg)	1	0	ND
Acetophenone	(ug/kg)	1	0	ND
Anthracene	(ug/kg)	1	0	ND
Atrazine	(ug/kg)	1	0	ND
Benzaldehyde	(ug/kg)	1	0	ND
Benzo(a)anthracene	(ug/kg)	1	0	ND
Benzo(a)pyrene	(ug/kg)	1	0	ND
Benzo(b)fluoranthene	(ug/kg)	1	0	ND
Benzo(g,h,i)perylene	(ug/kg)	1	0	ND
Benzo(k)fluoranthene	(ug/kg)	1	0	ND
Bis(2-chloroethoxy) methane	(ug/kg)	1	0	ND
bis(2-Chloroethyl) ether	(ug/kg)	1	0	ND
bis(2-Ethylhexyl) phthalate	(ug/kg)	2	0	ND
Butyl benzyl phthalate	(ug/kg)	2	1	130
Caprolactam	(ug/kg)	1	0	ND
Carbazole	(ug/kg)	1	0	ND
Chrysene	(ug/kg)	1	0	ND
Di-n-butyl phthalate	(ug/kg)	1	0	ND

Table 4.1-4: Summary of Chemicals Detected
WRP-1 Soils

		Times Sought	Times Detected	Maximum Concentration
CONSTITUENT	UNITS			
Di-n-octyl phthalate	(ug/kg)	1	0	ND
Dibenz(a,h) anthracene	(ug/kg)	1	0	ND
Dibenzofuran	(ug/kg)	1	0	ND
Diethyl phthalate	(ug/kg)	1	0	ND
Dimethyl phthalate	(ug/kg)	1	0	ND
Fluoranthene	(ug/kg)	1	0	ND
Fluorene	(ug/kg)	1	0	ND
Hexachlorobenzene	(ug/kg)	1	0	ND
Hexachlorobutadiene	(ug/kg)	1	0	ND
Hexachlorocyclopentadiene	(ug/kg)	1	0	ND
Hexachloroethane	(ug/kg)	1	0	ND
Indeno(1,2,3-cd)pyrene	(ug/kg)	1	0	ND
Isophorone	(ug/kg)	1	0	ND
N-Nitrosodi-n-propylamine	(ug/kg)	1	0	ND
N-Nitrosodiphenylamine	(ug/kg)	1	0	ND
Naphthalene	(ug/kg)	1	0	ND
Nitrobenzene	(ug/kg)	1	0	ND
Pentachlorophenol	(ug/kg)	1	0	ND
Phenanthrene	(ug/kg)	2	0	ND
Phenol	(ug/kg)	1	0	ND
Pyrene	(ug/kg)	2	0	ND
Metals				
Aluminum	(mg/kg)	3	3	60000
Antimony	(mg/kg)	3	3	2.6
Arsenic	(mg/kg)	4	4	100
Barium	(mg/kg)	4	4	16
Beryllium	(mg/kg)	3	3	0.35
Cadmium	(mg/kg)	8	8	150
Calcium	(mg/kg)	3	3	420
Chromium	(mg/kg)	4	4	26
Cobalt	(mg/kg)	3	2	0.77
Copper	(mg/kg)	8	8	110000
Iron	(mg/kg)	3	3	74000
Lead	(mg/kg)	8	8	9100
Magnesium	(mg/kg)	3	3	120000
Manganese	(mg/kg)	3	3	1400
Mercury	(mg/kg)	7	7	1
Nickel	(mg/kg)	4	4	30
Potassium	(mg/kg)	3	3	4100
Selenium	(mg/kg)	8	6	77
Silver	(mg/kg)	8	7	70
Sodium	(mg/kg)	3	1	120
Thallium	(mg/kg)	3	3	2
Vanadium	(mg/kg)	3	3	17
Zinc	(mg/kg)	8	8	18000

Table 4.1-5: Summary of Chemicals Detected
WRP-2

		Times Sought	Times Detected	Maximum Concentration
CONSTITUENT	UNITS			
Aluminum	(mg/kg)	1	1	46000
Antimony	(mg/kg)	1	1	0.35
Arsenic	(mg/kg)	1	1	57
Barium	(mg/kg)	1	1	16
Beryllium	(mg/kg)	1	1	0.27
Cadmium	(mg/kg)	3	2	32
Calcium	(mg/kg)	1	1	210
Chromium	(mg/kg)	1	1	11
Cobalt	(mg/kg)	1	1	1.9
Copper	(mg/kg)	3	3	2000
Iron	(mg/kg)	1	1	57000
Lead	(mg/kg)	3	3	790
Magnesium	(mg/kg)	1	1	82000
Manganese	(mg/kg)	1	1	1100
Mercury	(mg/kg)	2	2	0.9
Nickel	(mg/kg)	1	1	7.3
Potassium	(mg/kg)	1	1	2100
Selenium	(mg/kg)	3	2	9.5
Silver	(mg/kg)	3	3	2.7
Sodium	(mg/kg)	1	1	100
Thallium	(mg/kg)	1	1	1.2
Vanadium	(mg/kg)	1	1	19
Zinc	(mg/kg)	3	3	7700

Table 4.1-6: Summary of Chemicals Detected
WRP-3

		Times Sought	Times Detected	Maximum Concentration
CONSTITUENT	UNITS			
VOCs				
1,1,1-trichloroethane	(ug/kg)	1	0	ND
1,1,2,2-Tetrachloroethane	(ug/kg)	1	0	ND
1,1,2-Trichloro-1,2,2-trifluoroethane	(ug/kg)	1	0	ND
1,1,2-Trichloroethane	(ug/kg)	1	0	ND
1,1-Dichloroethane	(ug/kg)	1	0	ND
1,1-Dichloroethene	(ug/kg)	1	0	ND
1,2,4-Trichlorobenzene	(ug/kg)	1	0	ND
1,2-Dibromo-3-chloropropane	(ug/kg)	1	0	ND
1,2-Dichlorobenzene	(ug/kg)	1	0	ND
1,2-Dichloroethane	(ug/kg)	1	0	ND
1,2-Dichloropropane	(ug/kg)	1	0	ND
1,3-Dichlorobenzene	(ug/kg)	1	0	ND
1,4-Dichlorobenzene	(ug/kg)	1	0	ND
2-Butanone (MEK)	(ug/kg)	1	0	ND
2-Hexanone	(ug/kg)	1	0	ND
4-Methyl-2-pentanone	(ug/kg)	1	0	ND
Acetone	(ug/kg)	1	0	ND
Benzene	(ug/kg)	1	0	ND
Bromodichloromethane	(ug/kg)	1	0	ND
Bromoform	(ug/kg)	1	0	ND
Bromomethane	(ug/kg)	1	0	ND
Carbon disulfide	(ug/kg)	1	0	ND
Carbon tetrachloride	(ug/kg)	1	0	ND
Chlorobenzene	(ug/kg)	1	0	ND
Chlorodibromomethane	(ug/kg)	1	0	ND
Chloroethane	(ug/kg)	1	0	ND
Chloroform	(ug/kg)	1	0	ND
Chloromethane	(ug/kg)	1	0	ND
cis-1,2-Dichloroethene	(ug/kg)	1	0	ND
cis-1,3-Dichloropropene	(ug/kg)	1	0	ND
Cyclohexane	(ug/kg)	1	0	ND
Dichlorodifluoromethane	(ug/kg)	1	0	ND
Ethylbenzene	(ug/kg)	1	0	ND
Ethylenedibromide	(ug/kg)	1	0	ND
Fluorotrichloromethane	(ug/kg)	1	0	ND
Isopropylbenzene	(ug/kg)	1	0	ND
Methyl acetate (acetic acid, methyl este	(ug/kg)	1	0	ND
Methyl cyclohexane	(ug/kg)	1	0	ND
Methyl tert-butyl ether	(ug/kg)	1	0	ND
Methylene chloride	(ug/kg)	1	0	ND
Styrene	(ug/kg)	1	0	ND
Tetrachloroethene	(ug/kg)	1	0	ND
Toluene	(ug/kg)	1	0	ND
trans-1,2-Dichloroethene	(ug/kg)	1	0	ND
Trans-1,3-Dichloropropene	(ug/kg)	1	0	ND
Trichloroethene	(ug/kg)	1	0	ND
Vinyl chloride	(ug/kg)	1	0	ND
Xylenes (total)	(ug/kg)	1	0	ND

Table 4.1-6: Summary of Chemicals Detected
WRP-3

SVOCs				
1,1'-Biphenyl	(ug/kg)	1	0	ND
2,2'-Oxybis(1-Chloropropane)	(ug/kg)	1	0	ND
2,4,5-Trichlorophenol	(ug/kg)	1	0	ND
2,4,6-Trichlorophenol	(ug/kg)	1	0	ND
2,4-Dichlorophenol	(ug/kg)	1	0	ND
2,4-Dimethylphenol	(ug/kg)	1	0	ND
2,4-Dinitrophenol	(ug/kg)	1	0	ND
2,4-Dinitrotoluene	(ug/kg)	1	0	ND
2,6-Dinitrotoluene	(ug/kg)	1	0	ND
2-Chloronaphthalene	(ug/kg)	1	0	ND
2-Chlorophenol	(ug/kg)	1	0	ND
2-Methylnaphthalene	(ug/kg)	1	0	ND
2-Methylphenol	(ug/kg)	1	0	ND
2-Nitroaniline	(ug/kg)	1	0	ND
2-Nitrophenol	(ug/kg)	1	0	ND
3,3'-Dichlorobenzidine	(ug/kg)	1	0	ND
3-Nitroaniline	(ug/kg)	1	0	ND
4,6-Dinitro-2-methylphenol	(ug/kg)	1	0	ND
4-Bromophenyl phenyl ether	(ug/kg)	1	0	ND
4-Chloro-3-methylphenol	(ug/kg)	1	0	ND
4-Chloroaniline	(ug/kg)	1	0	ND
4-Chlorophenyl phenyl ether	(ug/kg)	1	0	ND
4-Methylphenol	(ug/kg)	1	0	ND
4-Nitroaniline	(ug/kg)	1	0	ND
4-Nitrophenol	(ug/kg)	1	0	ND
Acenaphthene	(ug/kg)	1	0	ND
Acenaphthylene	(ug/kg)	1	0	ND
Acetophenone	(ug/kg)	1	0	ND
Anthracene	(ug/kg)	1	0	ND
Atrazine	(ug/kg)	1	0	ND
Benzaldehyde	(ug/kg)	1	0	ND
Benzo(a)anthracene	(ug/kg)	1	0	ND
Benzo(a)pyrene	(ug/kg)	1	0	ND
Benzo(b)fluoranthene	(ug/kg)	1	0	ND
Benzo(g,h,i)perylene	(ug/kg)	1	0	ND
Benzo(k)fluoranthene	(ug/kg)	1	0	ND
Bis(2-chloroethoxy) methane	(ug/kg)	1	0	ND
bis(2-Chloroethyl) ether	(ug/kg)	1	0	ND
bis(2-Ethylhexyl) phthalate	(ug/kg)	1	0	ND
Butyl benzyl phthalate	(ug/kg)	1	0	ND
Caprolactam	(ug/kg)	1	0	ND
Carbazole	(ug/kg)	1	0	ND
Chrysene	(ug/kg)	1	0	ND
Di-n-butyl phthalate	(ug/kg)	1	0	ND
Di-n-octyl phthalate	(ug/kg)	1	0	ND
Dibenz(a,h) anthracene	(ug/kg)	1	0	ND
Dibenzofuran	(ug/kg)	1	0	ND
Diethyl phthalate	(ug/kg)	1	0	ND
Dimethyl phthalate	(ug/kg)	1	0	ND
Fluoranthene	(ug/kg)	1	0	ND
Fluorene	(ug/kg)	1	0	ND

Table 4.1-6: Summary of Chemicals Detected
WRP-3

Hexachlorobenzene	(ug/kg)	1	0	ND
Hexachlorobutadiene	(ug/kg)	1	0	ND
Hexachlorocyclopentadiene	(ug/kg)	1	0	ND
Hexachloroethane	(ug/kg)	1	0	ND
Indeno(1,2,3-cd)pyrene	(ug/kg)	1	0	ND
Isophorone	(ug/kg)	1	0	ND
N-Nitrosodi-n-propylamine	(ug/kg)	1	0	ND
N-Nitrosodiphenylamine	(ug/kg)	1	0	ND
Naphthalene	(ug/kg)	1	0	ND
Nitrobenzene	(ug/kg)	1	0	ND
Pentachlorophenol	(ug/kg)	1	0	ND
Phenanthrene	(ug/kg)	1	0	ND
Phenol	(ug/kg)	1	0	ND
Pyrene	(ug/kg)	1	0	ND
Metals				
Aluminum	(mg/kg)	2	2	57000
Antimony	(mg/kg)	2	2	1.7
Arsenic	(mg/kg)	2	2	130
Barium	(mg/kg)	2	2	9.6
Beryllium	(mg/kg)	2	2	0.18
Cadmium	(mg/kg)	5	2	0.8
Calcium	(mg/kg)	2	2	280
Chromium	(mg/kg)	2	2	6.2
Cobalt	(mg/kg)	2	2	0.27
Copper	(mg/kg)	5	5	3600
Iron	(mg/kg)	2	2	41000
Lead	(mg/kg)	5	5	700
Magnesium	(mg/kg)	2	2	120000
Manganese	(mg/kg)	2	2	1300
Mercury	(mg/kg)	5	5	1.5
Nickel	(mg/kg)	2	2	1.8
Potassium	(mg/kg)	2	2	4200
Selenium	(mg/kg)	5	5	20
Silver	(mg/kg)	5	4	4
Sodium	(mg/kg)	2	0	ND
Thallium	(mg/kg)	2	2	4.4
Vanadium	(mg/kg)	2	2	16
Zinc	(mg/kg)	5	5	420

Table 4.1-7: Summary of Chemicals Detected
Tailing Pile

		Times Sought	Times Detected	Maximum Concentration
CONSTITUENT	UNITS			
VOCs				
1,1,1-trichloroethane	(ug/kg)	4	0	ND
1,1,2,2-Tetrachloroethane	(ug/kg)	4	0	ND
1,1,2-Trichloro-1,2,2-trifluoroethane	(ug/kg)	4	0	ND
1,1,2-Trichloroethane	(ug/kg)	4	0	ND
1,1-Dichloroethane	(ug/kg)	4	0	ND
1,1-Dichloroethene	(ug/kg)	4	0	ND
1,2,4-Trichlorobenzene	(ug/kg)	4	0	ND
1,2-Dibromo-3-chloropropane	(ug/kg)	4	0	ND
1,2-Dichlorobenzene	(ug/kg)	4	1	2
1,2-Dichloroethane	(ug/kg)	4	0	ND
1,2-Dichloropropane	(ug/kg)	4	0	ND
1,3-Dichlorobenzene	(ug/kg)	4	1	2
1,4-Dichlorobenzene	(ug/kg)	4	0	ND
2-Butanone (MEK)	(ug/kg)	4	0	ND
2-Hexanone	(ug/kg)	4	0	ND
4-Methyl-2-pentanone	(ug/kg)	4	0	ND
Acetone	(ug/kg)	6	1	33
Benzene	(ug/kg)	4	0	ND
Bromodichloromethane	(ug/kg)	4	0	ND
Bromoform	(ug/kg)	4	0	ND
Bromomethane	(ug/kg)	4	0	ND
Carbon disulfide	(ug/kg)	4	0	ND
Carbon tetrachloride	(ug/kg)	4	0	ND
Chlorobenzene	(ug/kg)	4	0	ND
Chlorodibromomethane	(ug/kg)	4	0	ND
Chloroethane	(ug/kg)	4	0	ND
Chloroform	(ug/kg)	4	0	ND
Chloromethane	(ug/kg)	4	0	ND
cis-1,2-Dichloroethene	(ug/kg)	4	0	ND
cis-1,3-Dichloropropene	(ug/kg)	4	0	ND
Cyclohexane	(ug/kg)	4	0	ND
Dichlorodifluoromethane	(ug/kg)	4	0	ND
Ethylbenzene	(ug/kg)	4	0	ND
Ethylenedibromide	(ug/kg)	4	0	ND
Fluorotrichloromethane	(ug/kg)	4	0	ND
Isopropylbenzene	(ug/kg)	4	0	ND
Methyl acetate (acetic acid, methyl este	(ug/kg)	4	0	ND
Methyl cyclohexane	(ug/kg)	4	0	ND
Methyl tert-butyl ether	(ug/kg)	4	0	ND
Methylene chloride	(ug/kg)	6	0	ND
Styrene	(ug/kg)	4	0	ND
Tetrachloroethene	(ug/kg)	4	0	ND
Toluene	(ug/kg)	4	0	ND
trans-1,2-Dichloroethene	(ug/kg)	4	0	ND
Trans-1,3-Dichloropropene	(ug/kg)	4	0	ND
Trichloroethene	(ug/kg)	4	0	ND
Vinyl chloride	(ug/kg)	4	0	ND

Table 4.1-7: Summary of Chemicals Detected
Tailing Pile

CONSTITUENT	UNITS	Times Sought	Times Detected	Maximum Concentration
Xylenes (total)	(ug/kg)	4	0	ND
SVOCs				
1,1-Thibisethane	(ug/kg)	2	0	ND
3,4-Dithiohexane	(ug/kg)	2	1	100
Diethyl benzene (mixed isomers)	(ug/kg)	2	1	1300
Trimethyloxepane	(ug/kg)	2	0	ND
1,1'-Biphenyl	(ug/kg)	4	0	ND
2,2'-Oxybis(1-Chloropropane)	(ug/kg)	4	0	ND
2,4,5-Trichlorophenol	(ug/kg)	4	0	ND
2,4,6-Trichlorophenol	(ug/kg)	4	0	ND
2,4-Dichlorophenol	(ug/kg)	4	0	ND
2,4-Dimethylphenol	(ug/kg)	4	0	ND
2,4-Dinitrophenol	(ug/kg)	4	0	ND
2,4-Dinitrotoluene	(ug/kg)	4	0	ND
2,6-Dinitrotoluene	(ug/kg)	4	0	ND
2-Chloronaphthalene	(ug/kg)	4	0	ND
2-Chlorophenol	(ug/kg)	4	0	ND
2-Methylnaphthalene	(ug/kg)	4	0	ND
2-Methylphenol	(ug/kg)	4	0	ND
2-Nitroaniline	(ug/kg)	4	0	ND
2-Nitrophenol	(ug/kg)	4	0	ND
3,3'-Dichlorobenzidine	(ug/kg)	4	0	ND
3-Nitroaniline	(ug/kg)	4	0	ND
4,6-Dinitro-2-methylphenol	(ug/kg)	4	0	ND
4-Bromophenyl phenyl ether	(ug/kg)	4	0	ND
4-Chloro-3-methylphenol	(ug/kg)	4	0	ND
4-Chloroaniline	(ug/kg)	4	0	ND
4-Chlorophenyl phenyl ether	(ug/kg)	4	0	ND
4-Methylphenol	(ug/kg)	4	0	ND
4-Nitroaniline	(ug/kg)	4	0	ND
4-Nitrophenol	(ug/kg)	4	0	ND
Acenaphthene	(ug/kg)	4	0	ND
Acenaphthylene	(ug/kg)	4	0	ND
Acetophenone	(ug/kg)	4	0	ND
Anthracene	(ug/kg)	4	0	ND
Atrazine	(ug/kg)	4	0	ND
Benzaldehyde	(ug/kg)	4	0	ND
Benzo(a)anthracene	(ug/kg)	4	0	ND
Benzo(a)pyrene	(ug/kg)	4	0	ND
Benzo(b)fluoranthene	(ug/kg)	4	0	ND
Benzo(g,h,i)perylene	(ug/kg)	4	0	ND
Benzo(k)fluoranthene	(ug/kg)	4	0	ND
Bis(2-chloroethoxy) methane	(ug/kg)	4	0	ND
bis(2-Chloroethyl) ether	(ug/kg)	4	0	ND
bis(2-Ethylhexyl) phthalate	(ug/kg)	6	1	48
Butyl benzyl phthalate	(ug/kg)	6	1	110
Caprolactam	(ug/kg)	4	0	ND
Carbazole	(ug/kg)	4	0	ND

Table 4.1-7: Summary of Chemicals Detected
Tailing Pile

		Times Sought	Times Detected	Maximum Concentration
CONSTITUENT	UNITS			
Chrysene	(ug/kg)	4	0	ND
Di-n-butyl phthalate	(ug/kg)	4	0	ND
Di-n-octyl phthalate	(ug/kg)	4	0	ND
Dibenz(a,h) anthracene	(ug/kg)	4	0	ND
Dibenzofuran	(ug/kg)	4	0	ND
Diethyl phthalate	(ug/kg)	4	0	ND
Dimethyl phthalate	(ug/kg)	4	0	ND
Fluoranthene	(ug/kg)	4	0	ND
Fluorene	(ug/kg)	4	0	ND
Hexachlorobenzene	(ug/kg)	4	0	ND
Hexachlorobutadiene	(ug/kg)	4	0	ND
Hexachlorocyclopentadiene	(ug/kg)	4	0	ND
Hexachloroethane	(ug/kg)	4	0	ND
Indeno(1,2,3-cd)pyrene	(ug/kg)	4	0	ND
Isophorone	(ug/kg)	4	0	ND
N-Nitrosodi-n-propylamine	(ug/kg)	4	0	ND
N-Nitrosodiphenylamine	(ug/kg)	4	0	ND
Naphthalene	(ug/kg)	4	0	ND
Nitrobenzene	(ug/kg)	4	0	ND
Pentachlorophenol	(ug/kg)	4	0	ND
Phenanthrene	(ug/kg)	6	0	ND
Phenol	(ug/kg)	4	0	ND
Pyrene	(ug/kg)	6	0	ND
Metals				
Aluminum	(mg/kg)	5	5	46000
Antimony	(mg/kg)	5	5	0.5
Arsenic	(mg/kg)	7	7	120
Barium	(mg/kg)	7	7	36
Beryllium	(mg/kg)	5	5	0.35
Cadmium	(mg/kg)	12	11	32
Calcium	(mg/kg)	5	5	88000
Chromium	(mg/kg)	7	7	25
Cobalt	(mg/kg)	5	5	4.7
Copper	(mg/kg)	12	12	2500
Iron	(mg/kg)	5	5	54000
Lead	(mg/kg)	12	12	990
Magnesium	(mg/kg)	5	5	92000
Manganese	(mg/kg)	5	5	1800
Mercury	(mg/kg)	10	10	0.58
Nickel	(mg/kg)	7	7	20
Potassium	(mg/kg)	5	5	2200
Selenium	(mg/kg)	12	12	13
Silver	(mg/kg)	12	12	4.4
Sodium	(mg/kg)	5	2	18
Thallium	(mg/kg)	5	5	2.8
Vanadium	(mg/kg)	5	5	17
Zinc	(mg/kg)	12	12	17000

Table 4.1-8: Summary of Chemicals Detected
Background

CONSTITUENT	UNITS	Times Sought	Times Detected	Maximum Concentration
Aluminum	(mg/kg)	13	13	26000
Antimony	(mg/kg)	13	13	0.39
Arsenic	(mg/kg)	13	13	14
Barium	(mg/kg)	13	13	49
Beryllium	(mg/kg)	13	13	0.41
Cadmium	(mg/kg)	16	13	0.8
Calcium	(mg/kg)	13	13	610
Chromium	(mg/kg)	13	13	23
Cobalt	(mg/kg)	13	13	5.5
Copper	(mg/kg)	16	16	56
Iron	(mg/kg)	13	13	36000
Lead	(mg/kg)	16	16	110
Magnesium	(mg/kg)	13	13	5200
Manganese	(mg/kg)	13	13	410
Mercury	(mg/kg)	14	14	0.12
Nickel	(mg/kg)	13	13	19
Potassium	(mg/kg)	13	13	700
Selenium	(mg/kg)	16	8	4
Silver	(mg/kg)	16	15	1.1
Sodium	(mg/kg)	13	7	62
Thallium	(mg/kg)	13	13	0.12
Vanadium	(mg/kg)	13	13	48
Zinc	(mg/kg)	16	16	290

Table 4.2-1
Sediment Analytical Results
(Detects Only)

Location				G. Pond	G. Pond	Tailings	Tailings	Tailings	Tailings	Tailings	Tailings	Tailings
Type				Upstream	Upstream	Wetland	Wetland					
Location ID				BK_GP_SED11	SD-401	SD-403	SD-412	SAMPLE_1	SAMPLE_2	SD-TP_SPILL	SD-SA1	SD-SA2
Dale		NOAA SQRT	NOAA SQRT	9/8/1994	11/17/2004	11/12/2004	11/12/2004	5/1/1986	5/1/1986	1/1/1987	1/1/1987	1/1/1987
Depth		for Freshwater	for Marine	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
CONSTITUENT	UNITS	Sediment	Sediment	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
Volatile Organic Compounds												
1,1-Thibisethane	(ug/kg)											
Acetone	(ug/kg)											
Methylene chloride	(ug/kg)											
Trimethyloxepane	(ug/kg)											
Semivolatile Organic Compounds												
Bis(2-ethylhexyl)phthalate	(ug/kg)											
Butyl benzyl phthalate	(ug/kg)											
Phenanthrene	(ug/kg)											
Metals												
Aluminum	(mg/kg)				20000J	24000	21000					
Antimony	(mg/kg)				0.18J	0.68J	1.3J					
Arsenic	(mg/kg)	17	41.6	8	7J	[54]J	[85]J					
Barium	(mg/kg)			69	25J	13J	5.9J					
Beryllium	(mg/kg)				0.7	0.34	0.27					
Cadmium	(mg/kg)	3.5	4.2	0.8	[4.3]J	[25]J	[16]J	[33]	[19]	[10]	[110]	[21]
Calcium	(mg/kg)				1800J	64000J	70000J					
Chromium	(mg/kg)	90	160	34	35J	21J	17J					
Cobalt	(mg/kg)				8.7J	3.3J	3.9J					
Copper	(mg/kg)	197	108	28	[120]J	[2100]J	[1100]J	[3760]	[1590]	[730]	[370]	[2800]
Iron	(mg/kg)				19000	24000	34000					
Lead	(mg/kg)	91.3	112	36	69J	[1000]J	[560]J	[740]	[670]	[370]	[510]	[1100]
Magnesium	(mg/kg)				9300J	49000	38000					
Manganese	(mg/kg)				200J	1600J	1400J					
Mercury	(mg/kg)	0.49	0.7		0.15	[0.7]J	[0.79]J					
Nickel	(mg/kg)	35.9	42.8	26	30J	14J	16J					
Potassium	(mg/kg)				2500J	2400J	1400J					
Pyrene	(mg/kg)											
Selenium	(mg/kg)				1.6J	5J	6.4J					
Silver	(mg/kg)		1.8		0.45J	[4.1]J	[3.2]J					
Sodium	(mg/kg)				11000	19J	21J					
Thallium	(mg/kg)				0.34J	1.4J	2.1J					
Vanadium	(mg/kg)				26J	17J	12J					
Zinc	(mg/kg)	315	271	110	[820]J	[6800]J	[3800]J	[8600]	[4800]	[2800]	[23000]	[7600]
Total Combustible Organics (TCO)												
TCO	(mg/kg)				124279	55328	73482J					

Table 4.2-1
Sediment Analytical Results
(Detects Only)

Location				Tailings	Tailings	G. Pond	G. Pond	G. Pond	G. Pond	G. Pond	G. Pond	G. Pond
Type												
Location ID				TPS1_SED6	TPS1_SED6A	TPS2_SED7	TPS2_SED7A	99-SD-29	99-SD-31	SD-402	99-SD-33	99-SD-35
Dale		NOAA SQRT	NOAA SQRT	9/8/1994	9/8/1994	9/8/1994	9/8/1994	10/5/1999	10/5/1999	11/17/2004	10/5/1999	10/5/1999
Depth		for Freshwater	for Marine	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
CONSTITUENT	UNITS	Sediment	Sediment	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
Volatile Organic Compounds												
1,1-Thibisethane	(ug/kg)			2000J								
Acetone	(ug/kg)			33								
Methylene chloride	(ug/kg)			75								
Trimethyloxepane	(ug/kg)			35J								
Semivolatile Organic Compounds												
Bis(2-ethylhexyl)phthalate	(ug/kg)			740		15000						
Butyl benzyl phthalate	(ug/kg)					190						
Phenanthrene	(ug/kg)											
Metals												
Aluminum	(mg/kg)									30000J		
Antimony	(mg/kg)									0.79J		
Arsenic	(mg/kg)	17	41.6	[36]	[27]	[56]	[270]			[44]J		
Barium	(mg/kg)			64	50	64	230			17J		
Beryllium	(mg/kg)									0.47		
Cadmium	(mg/kg)	3.5	4.2	[33]	[28]	[43]	[170]	[33]	[27]	[34]J	[5.2]	[3.9]
Calcium	(mg/kg)									33000J		
Chromium	(mg/kg)	90	160	45	38	41	30			32J		
Cobalt	(mg/kg)									5.1J		
Copper	(mg/kg)	197	108	[970]	[1500]	[1400]	[1600]	[1800]J	[1200]J	[2300]J	[1900]J	[170]J
Iron	(mg/kg)									27000		
Lead	(mg/kg)	91.3	112	[550]	[550]	[1500]	[760]	[770]	[590]	[1200]J	[210]	52
Magnesium	(mg/kg)									53000J		
Manganese	(mg/kg)									1200J		
Mercury	(mg/kg)	0.49	0.7					[0.7]J	0.3J	[0.67]	0.2J	
Nickel	(mg/kg)	35.9	42.8	35	[39]	35	[250]			15J		
Potassium	(mg/kg)									3100J		
Pyrene	(mg/kg)											
Selenium	(mg/kg)				4	6	7	6.9	5.7	6.1J		
Silver	(mg/kg)		1.8	[2.9]	[12]	[5.8]	1	[4.6]	[3.2]	[5.4]J		
Sodium	(mg/kg)									4100		
Thallium	(mg/kg)									1.5J		
Vanadium	(mg/kg)									20J		
Zinc	(mg/kg)	315	271	[16000]	[15000]	[22000]	[58000]	[6900]	[5400]	[7600]J	[3100]	[840]
Total Combustible Organics (TCO)												
TCO	(mg/kg)									56233		

Table 4.2-1
Sediment Analytical Results
(Detects Only)

Location				G. Pond	G. Pond	G. Pond	G. Pond	G. Pond	G. Pond	G. Pond	G. Pond	Dyer	Dyer
Type										Seep	Seep		
Location ID				SD-404	SD-405	SD-406	SD-407	SD-424	SD-410	SD-422	SD-422	99-SD-37	99-SD-39
Dale		NOAA SQRT	NOAA SQRT	11/12/2004	11/17/2004	11/17/2004	11/11/2004	11/18/2004	11/11/2004	11/12/2004	11/12/2004	10/5/1999	10/5/1999
Depth		for Freshwater	for Marine	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.33	0.33-0.83	0.33-0.83	0-0.5	0-0.5
CONSTITUENT	UNITS	Sediment	Sediment	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Duplicate 1	Primary	Primary
Volatile Organic Compounds													
1,1-Thibisethane	(ug/kg)												
Acetone	(ug/kg)												
Methylene chloride	(ug/kg)												
Trimethyloxepane	(ug/kg)												
Semivolatile Organic Compounds													
Bis(2-ethylhexyl)phthalate	(ug/kg)												
Butyl benzyl phthalate	(ug/kg)												
Phenanthrene	(ug/kg)												
Metals													
Aluminum	(mg/kg)			27000	28000J	16000J	15000	5400	7500	35000	33000		
Antimony	(mg/kg)			1.1J	0.88J	0.065J	0.36J	0.056J	0.095J	0.78J	0.8J		
Arsenic	(mg/kg)	17	41.6	[32]J	[38]J	6.8J	16J	4.4J	7.8J	[64]J	[60]J		
Barium	(mg/kg)			37J	17J	23J	26J	4.4J	6.2J	5J	9.7J		
Beryllium	(mg/kg)			1	0.56	0.6	0.57	0.18	0.23	1.3	1.3		
Cadmium	(mg/kg)	3.5	4.2	[20]J	[25]J	2.6J	2.6J	0.67J	1.8J	[32]J	[29]J	[5.5]	[7.3]
Calcium	(mg/kg)			6100J	8900J	2500J	2600J	760J	2200J	32000J	27000J		
Chromium	(mg/kg)	90	160	40J	29J	33J	27J	10J	16J	18J	16J		
Cobalt	(mg/kg)			12J	5.7J	7.6J	9.2J	3.2J	5J	8.1J	17J		
Copper	(mg/kg)	197	108	[2100]J	[2000]J	96J	[200]J	[140]J	[150]J	[10000]J	[9200]J	[190]J	[350]J
Iron	(mg/kg)			31000	29000	20000	22000	8400	14000	35000	33000		
Lead	(mg/kg)	91.3	112	[380]J	[710]J	26J	[120]J	28J	27J	[930]J	[830]J	[120]	[150]
Magnesium	(mg/kg)			25000	43000J	9500J	10000	3300	5400	56000	54000		
Manganese	(mg/kg)			540J	720J	210J	300J	120J	210J	1500J	2100J		
Mercury	(mg/kg)	0.49	0.7	0.24J	0.48	0.045J	0.12J	0.073	0.039J	[0.52]J	0.47J		0.1J
Nickel	(mg/kg)	35.9	42.8	[36]J	18J	29J	26J	8.7J	15J	28J	27J		
Potassium	(mg/kg)			3700J	3100J	3400J	3000J	490J	770J	1800J	1600J		
Pyrene	(mg/kg)												
Selenium	(mg/kg)			3.4J	4.9J	2.3J	1J	0.27J	0.24J	6.9J	6.6J		
Silver	(mg/kg)		1.8	[2.2]J	[3.5]J	0.31J	0.72J	0.19J	0.22J	[3]J	[3]J		
Sodium	(mg/kg)			2400	6200	37000	9100	3200	2100	37J	31J		
Thallium	(mg/kg)			0.94J	1.4J	0.27J		0.077J	0.087J	1.4J	1.3J		
Vanadium	(mg/kg)			39J	25J	31J	29J	11J	14J	17J	16J		
Zinc	(mg/kg)	315	271	[7800]J	[6900]J	[430]J	[810]J	220J	[480]J	[16000]J	[8800]J	[1400]	[1700]
Total Combustible Organics (TCO)													
TCO	(mg/kg)			91448	84771	156326	62780	23679	21777	60854J	62478J		

Table 4.2-1
Sediment Analytical Results
(Detects Only)

Location				Dyer	Dyer	Dyer	Dyer	Dyer	Dyer	Dyer	Dyer	Dyer
Type												
Location ID				DCS_D_SED5	DCS_SED4	DC_SED8	SD-408	SD-413	SD-415	SD-416	SD-417	SD-SP_SEEP
Dale		NOAA SQRT	NOAA SQRT	9/8/1994	9/8/1994	9/8/1994	11/11/2004	11/11/2004	11/11/2004	11/11/2004	11/11/2004	1/1/1987
Depth		for Freshwater	for Marine	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
CONSTITUENT	UNITS	Sediment	Sediment	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
Volatile Organic Compounds												
1,1-Thibisethane	(ug/kg)											
Acetone	(ug/kg)			32								
Methylene chloride	(ug/kg)			39	320							
Trimethyloxepane	(ug/kg)											
Semivolatile Organic Compounds												
Bis(2-ethylhexyl)phthalate	(ug/kg)			4600	430							
Butyl benzyl phthalate	(ug/kg)			200	100							
Phenanthrene	(ug/kg)											
Metals												
Aluminum	(mg/kg)						38000	22000	17000	19000	16000	
Antimony	(mg/kg)						0.55J	0.99J	0.47J	0.31J	1J	
Arsenic	(mg/kg)	17	41.6	[23]	14	[22]	[17]J	[23]J	[23]J	[18]J	[37]J	
Barium	(mg/kg)			110	55	70	27J	28J	21J	24J	8.9J	
Beryllium	(mg/kg)						0.64	0.61	0.67	0.63	0.34	
Cadmium	(mg/kg)	3.5	4.2	[4.9]	[3.6]	[11]	[16]J	[30]J	[19]J	[9]J	[41]J	[11]
Calcium	(mg/kg)						6200J	4400J	2700J	2200J	11000J	
Chromium	(mg/kg)	90	160	40	32	40	38J	37J	33J	29J	33J	
Cobalt	(mg/kg)						8.8J	12J	11J	10J	12J	
Copper	(mg/kg)	197	108	[660]	[990]	[2200]	[1500]J	[2600]J			[2400]J	84
Iron	(mg/kg)						25000	31000	23000	24000	20000	
Lead	(mg/kg)	91.3	112	[260]	[210]	[400]	[630]J	[720]J	[230]J	[200]J	[280]J	[360]
Magnesium	(mg/kg)						62000	19000	14000	13000	22000	
Manganese	(mg/kg)						900J	530J	290J	360J	470J	
Mercury	(mg/kg)	0.49	0.7				0.44J	[0.74]J	0.21J	0.19J	[0.59]J	
Nickel	(mg/kg)	35.9	42.8	[40]	35	34	32J	[39]J	29J	31J	33J	
Potassium	(mg/kg)						3700J	3000J	3000J	2600J	1400J	
Pyrene	(mg/kg)				0.1J							
Selenium	(mg/kg)						1.8J	2.7J	2.2J	0.83J	2.1J	
Silver	(mg/kg)		1.8	[7]	0.6	[2.9]	[3.6]J	[3]J	1.4J	0.92J	[1.9]J	
Sodium	(mg/kg)						7700	5000	14000	6200	3400	
Thallium	(mg/kg)						0.83J	0.45J	0.41J	0.28J	0.49J	
Vanadium	(mg/kg)						34J	31J	33J	30J	23J	
Zinc	(mg/kg)	315	271	[4000]	[2600]	[6200]	[40000]J	[8100]J	[31000]J	[18000]J	[12000]J	[4200]
Total Combustible Organics (TCO)												
TCO	(mg/kg)						73632	31877	117048	41531	33755	

Table 4.2-1
Sediment Analytical Results
(Detects Only)

Location				WRP-1	S. Cove	G. Cove	G. Cove	G. Cove	G. Cove	G. Cove	?	?	?
Type				Wetland							BKGD	BKGD	BKGD
Location ID				SD-423	SD-409	SD-411	CR-3	SD-420	SD-420	SD-421	99-BKSD-23	99-BKSD-24	99-BKSD-25
Dale				11/11/2004	11/18/2004	12/3/2004	1/1/1975	12/3/2004	12/3/2004	12/3/2004	10/6/1999	10/6/1999	10/6/1999
Depth				0.5-1	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
CONSTITUENT	UNITS	NOAA SQRT for Freshwater Sediment	NOAA SQRT for Marine Sediment	Primary	Primary	Primary	Primary	Primary	Duplicate 1	Primary	Primary	Primary	Primary
Volatile Organic Compounds													
1,1-Thibisethane	(ug/kg)												
Acetone	(ug/kg)												
Methylene chloride	(ug/kg)												
Trimethyloxepane	(ug/kg)												
Semivolatile Organic Compounds													
Bis(2-ethylhexyl)phthalate	(ug/kg)												
Butyl benzyl phthalate	(ug/kg)												
Phenanthrene	(ug/kg)												
Metals													
Aluminum	(mg/kg)			22000	7800	14000		22000	22000	17000			
Antimony	(mg/kg)			0.17J		0.67J		0.37J	0.42J	0.57J			
Arsenic	(mg/kg)	17	41.6	15J	4.5J	16J		[17]J	[18]J	[23]J			
Barium	(mg/kg)			59J	11J	14EB		30EB	31EB	18EB			
Beryllium	(mg/kg)			0.74	0.21	0.38J		0.7J	0.71J	0.55J			
Cadmium	(mg/kg)	3.5	4.2	1.8J	0.5J	[10]J	[6.9]	0.8J	0.98J	[14]J			
Calcium	(mg/kg)			2700J	860J	52000J		5000J	1700J	3400J			
Chromium	(mg/kg)	90	160	39J	17J	20JEB		38JEB	36JEB	31JEB			
Cobalt	(mg/kg)			9.2J	3.8J	5.9J	478	15J	16J	6.1J			
Copper	(mg/kg)	197	108	75J	22J	[1000]J		100J	[370]J	[1300]J	14J	18J	14J
Iron	(mg/kg)			26000	11000	21000	2.03	37000	37000	26000			
Lead	(mg/kg)	91.3	112	50J	17J	[200]J	[156]	44J	35J	[240]J	10	11	10
Magnesium	(mg/kg)			8200	4100	17000		9300	9500	21000			
Manganese	(mg/kg)			240J	93J	310JEB		760JEB	800JEB	400JEB			
Mercury	(mg/kg)	0.49	0.7	0.091J	0.021	0.3J		0.039J	0.035J	0.26J			
Nickel	(mg/kg)	35.9	42.8	[41]J	13J	18JEB		[42]JEB	[40]JEB	18JEB			
Potassium	(mg/kg)			2600J	1300J	2300J		3200J	3400J	3200J			
Pyrene	(mg/kg)												
Selenium	(mg/kg)			1.1J	0.56J	2.4J		0.7J	0.37J	4.2J			
Silver	(mg/kg)		1.8	0.45J	0.16J	1.4J	1.49	0.39J	0.4J	1.5J			
Sodium	(mg/kg)			900	6000	13000		3400	3200	21000			
Thallium	(mg/kg)			0.23J	0.12J	0.43J		0.2J	0.17J	0.51J			
Vanadium	(mg/kg)			40J	18J	24J		34J	32J	32J			
Zinc	(mg/kg)	315	271	[720]J	130J	[3100]J	[1090]	[540]J	[570]J	[3500]J	49	64	52
Total Combustible Organics (TCO)													
TCO	(mg/kg)			124042J	53639	161785		33585	34495	167679			

Table 4.2-1
Sediment Analytical Results
(Detects Only)

Location				?	H. Cove	H. Cove	H. Cove	H. Cove
Type				BKGD	BKGD	BKGD	BKGD	BKGD
Location ID				99-SD-27	SD-425	SD-426	BK_HSC_SED10	BK_HSC_SED9
Dale		NOAA SQRT	NOAA SQRT	10/5/1999	12/3/2004	12/3/2004	9/8/1994	9/8/1994
Depth		for Freshwater	for Marine	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
CONSTITUENT	UNITS	Sediment	Sediment	Primary	Primary	Primary	Primary	Primary
Volatile Organic Compounds								
1,1-Thibisethane	(ug/kg)							
Acetone	(ug/kg)							
Methylene chloride	(ug/kg)							
Trimethyloxepane	(ug/kg)							
Semivolatile Organic Compounds								
Bis(2-ethylhexyl)phthalate	(ug/kg)							3400
Butyl benzyl phthalate	(ug/kg)							110
Phenanthrene	(ug/kg)							100J
Metals								
Aluminum	(mg/kg)				10000	8600		
Antimony	(mg/kg)							
Arsenic	(mg/kg)	17	41.6		6.5J	9.4J	10	[17]
Barium	(mg/kg)				16EB	13EB	21	22
Beryllium	(mg/kg)				0.43J	0.35J		
Cadmium	(mg/kg)	3.5	4.2		0.34J	0.36J		
Calcium	(mg/kg)				3100J	26000J		
Chromium	(mg/kg)	90	160		22JEB	16JEB	15	21
Cobalt	(mg/kg)				5.1J	4.5J		
Copper	(mg/kg)	197	108	18J	12J	7.6J	11	45
Iron	(mg/kg)				16000	16000		
Lead	(mg/kg)	91.3	112	16	13J	12J	10	12
Magnesium	(mg/kg)				5700	6000		
Manganese	(mg/kg)				190JEB	200JEB		
Mercury	(mg/kg)	0.49	0.7		0.059J	0.063J		
Nickel	(mg/kg)	35.9	42.8		18JEB	14JEB	22	29
Potassium	(mg/kg)				2200J	1700J		
Pyrene	(mg/kg)							0.39
Selenium	(mg/kg)				0.76J	0.9J		
Silver	(mg/kg)		1.8		0.16J	0.1J		
Sodium	(mg/kg)				7400	7900		
Thallium	(mg/kg)				0.15J	0.15J		
Vanadium	(mg/kg)				22J	19J		
Zinc	(mg/kg)	315	271	84	59J	49J	41	54
Total Combustible Organics (TCO)								
TCO	(mg/kg)				66801	68507		

Table 4.2-2: Summary of Chemicals Detected
Goose Pond Sediment

CONSTITUENT	UNITS	Times Sought	Times Detected	Maximum Concentration
VOCs				
Acetone	(ug/kg)	2	1	33
Methylene chloride	(ug/kg)	2	1	75
1,1-Thibisethane	(ug/kg)	2	1	2000
3,4-Dithiohexane	(ug/kg)	2	0	ND
Diethyl benzene (mixed isomers)	(ug/kg)	2	0	ND
Trimethyloxepane	(ug/kg)	2	1	35
SVOCs				
bis(2-Ethylhexyl) phthalate	(ug/kg)	2	2	15000
Butyl benzyl phthalate	(ug/kg)	2	1	190
Phenanthrene	(ug/kg)	2	0	ND
Pyrene	(ug/kg)	2	0	ND
Metals				
Aluminum	(mg/kg)	8	8	30000
Antimony	(mg/kg)	8	7	1.1
Arsenic	(mg/kg)	12	12	270
Barium	(mg/kg)	12	12	230
Beryllium	(mg/kg)	8	8	1
Cadmium	(mg/kg)	16	16	170
Calcium	(mg/kg)	8	8	33000
Chromium	(mg/kg)	12	12	45
Cobalt	(mg/kg)	8	8	12
Copper	(mg/kg)	16	16	2400
Iron	(mg/kg)	8	8	31000
Lead	(mg/kg)	16	16	1500
Magnesium	(mg/kg)	8	8	53000
Manganese	(mg/kg)	8	8	1200
Mercury	(mg/kg)	11	11	0.7
Nickel	(mg/kg)	12	12	250
Potassium	(mg/kg)	8	8	3700
Selenium	(mg/kg)	16	13	7
Silver	(mg/kg)	16	14	12
Sodium	(mg/kg)	8	8	37000
Thallium	(mg/kg)	8	7	1.5
Vanadium	(mg/kg)	8	8	39
Zinc	(mg/kg)	16	16	58000

Table 4.2-3: Summary of Chemicals Detected
Tailings Pile Sediment

		Times Sought	Times Detected	Maximum Concentration
CONSTITUENT	UNITS			
Aluminum	(mg/kg)	2	2	24000
Antimony	(mg/kg)	2	2	1.3
Arsenic	(mg/kg)	2	2	85
Barium	(mg/kg)	2	2	13
Beryllium	(mg/kg)	2	2	0.34
Cadmium	(mg/kg)	7	7	110
Calcium	(mg/kg)	2	2	70000
Chromium	(mg/kg)	2	2	21
Cobalt	(mg/kg)	2	2	3.9
Copper	(mg/kg)	7	7	3760
Iron	(mg/kg)	2	2	34000
Lead	(mg/kg)	7	7	1100
Magnesium	(mg/kg)	2	2	49000
Manganese	(mg/kg)	2	2	1600
Mercury	(mg/kg)	2	2	0.79
Nickel	(mg/kg)	2	2	16
Potassium	(mg/kg)	2	2	2400
Selenium	(mg/kg)	2	2	6.4
Silver	(mg/kg)	2	2	4.1
Sodium	(mg/kg)	2	2	21
Thallium	(mg/kg)	2	2	2.1
Vanadium	(mg/kg)	2	2	17
Zinc	(mg/kg)	7	7	23000

Table 4.2-4: Summary of Chemicals Detected
Seep Sediments

CONSTITUENT	UNITS	Times Sought	Times Detected	Maximum Concentration
Aluminum	(mg/kg)	2	2	35000
Antimony	(mg/kg)	2	2	0.8
Arsenic	(mg/kg)	2	2	64
Barium	(mg/kg)	2	2	9.7
Beryllium	(mg/kg)	2	2	1.3
Cadmium	(mg/kg)	3	3	32
Calcium	(mg/kg)	2	2	32000
Chromium	(mg/kg)	2	2	18
Cobalt	(mg/kg)	2	2	17
Copper	(mg/kg)	3	3	10000
Iron	(mg/kg)	2	2	35000
Lead	(mg/kg)	3	3	930
Magnesium	(mg/kg)	2	2	56000
Manganese	(mg/kg)	2	2	2100
Mercury	(mg/kg)	2	2	0.52
Nickel	(mg/kg)	2	2	28
Potassium	(mg/kg)	2	2	1800
Selenium	(mg/kg)	2	2	6.9
Silver	(mg/kg)	2	2	3
Sodium	(mg/kg)	2	2	37
Thallium	(mg/kg)	2	2	1.4
Vanadium	(mg/kg)	2	2	17
Zinc	(mg/kg)	3	3	16000

Table 4.2-5: Summary of Chemicals Detected
Dyer Cove Sediment

CONSTITUENT	UNITS	Times Sought	Times Detected	Maximum Concentration
VOCs				
Acetone	(ug/kg)	1	0	ND
Methylene chloride	(ug/kg)	2	2	320
1,1-Thibisethane	(ug/kg)	2	0	ND
3,4-Dithiohexane	(ug/kg)	2	0	ND
Diethyl benzene (mixed isomers)	(ug/kg)	2	0	ND
Trimethyloxepane	(ug/kg)	2	0	ND
SVOCs				
bis(2-Ethylhexyl) phthalate	(ug/kg)	2	2	4600
Butyl benzyl phthalate	(ug/kg)	2	2	200
Phenanthrene	(ug/kg)	2	0	ND
Pyrene	(ug/kg)	2	1	100
Metals				
Aluminum	(mg/kg)	4	4	38000
Antimony	(mg/kg)	4	4	0.99
Arsenic	(mg/kg)	7	7	23
Barium	(mg/kg)	7	7	110
Beryllium	(mg/kg)	4	4	0.67
Cadmium	(mg/kg)	9	9	30
Calcium	(mg/kg)	4	4	6200
Chromium	(mg/kg)	7	7	40
Cobalt	(mg/kg)	4	4	12
Copper	(mg/kg)	9	7	2600
Iron	(mg/kg)	4	4	31000
Lead	(mg/kg)	9	9	720
Magnesium	(mg/kg)	4	4	62000
Manganese	(mg/kg)	4	4	900
Mercury	(mg/kg)	5	5	0.74
Nickel	(mg/kg)	7	7	40
Potassium	(mg/kg)	4	4	3700
Selenium	(mg/kg)	8	4	2.7
Silver	(mg/kg)	9	7	7
Sodium	(mg/kg)	4	4	14000
Thallium	(mg/kg)	4	4	0.83
Vanadium	(mg/kg)	4	4	34
Zinc	(mg/kg)	9	9	40000

Table 4.2-6: Summary of Chemicals Detected
Goose Cove Sediment

CONSTITUENT	UNITS	Times Sought	Times Detected	Maximum Concentration
Aluminum	(mg/kg)	4	4	22000
Antimony	(mg/kg)	4	4	0.67
Arsenic	(mg/kg)	4	4	23
Barium	(mg/kg)	4	4	31
Beryllium	(mg/kg)	4	4	0.71
Cadmium	(mg/kg)	5	5	14
Calcium	(mg/kg)	4	4	52000
Chromium	(mg/kg)	4	4	38
Cobalt	(mg/kg)	5	5	478
Copper	(mg/kg)	4	4	1300
Iron	(mg/kg)	5	5	37000
Lead	(mg/kg)	5	5	240
Magnesium	(mg/kg)	4	4	21000
Manganese	(mg/kg)	4	4	800
Mercury	(mg/kg)	4	4	0.3
Nickel	(mg/kg)	4	4	42
Potassium	(mg/kg)	4	4	3400
Selenium	(mg/kg)	4	4	4.2
Silver	(mg/kg)	5	5	1.5
Sodium	(mg/kg)	4	4	21000
Thallium	(mg/kg)	4	4	0.51
Vanadium	(mg/kg)	4	4	34
Zinc	(mg/kg)	5	5	3500

Table 4.2-7: Summary of Chemicals Detected
Background Sediment

		Times	Times	Maximum
		Sought	Detected	Concentration
CONSTITUENT	UNITS			
VOCs				
Acetone	(ug/kg)	1	0	ND
Methylene chloride	(ug/kg)	1	0	ND
1,1-Thibisethane	(ug/kg)	1	0	ND
3,4-Dithiohexane	(ug/kg)	1	0	ND
Diethyl benzene (mixed isomers)	(ug/kg)	1	0	ND
Trimethyloxepane	(ug/kg)	1	0	ND
SVOCs				
bis(2-Ethylhexyl) phthalate	(ug/kg)	1	1	3400
Butyl benzyl phthalate	(ug/kg)	1	1	110
Phenanthrene	(ug/kg)	1	1	100
Pyrene	(ug/kg)	1	1	390
Metals				
Aluminum	(mg/kg)	3	3	20000
Antimony	(mg/kg)	3	1	0.18
Arsenic	(mg/kg)	6	6	17
Barium	(mg/kg)	6	6	69
Beryllium	(mg/kg)	3	3	0.7
Cadmium	(mg/kg)	9	4	4.3
Calcium	(mg/kg)	3	3	26000
Chromium	(mg/kg)	6	6	35
Cobalt	(mg/kg)	3	3	8.7
Copper	(mg/kg)	9	9	120
Iron	(mg/kg)	3	3	19000
Lead	(mg/kg)	9	9	69
Magnesium	(mg/kg)	3	3	9300
Manganese	(mg/kg)	3	3	200
Mercury	(mg/kg)	3	3	0.15
Nickel	(mg/kg)	6	6	30
Potassium	(mg/kg)	3	3	2500
Selenium	(mg/kg)	9	3	1.6
Silver	(mg/kg)	9	3	0.45
Sodium	(mg/kg)	3	3	11000
Thallium	(mg/kg)	3	3	0.34
Vanadium	(mg/kg)	3	3	26
Zinc	(mg/kg)	9	9	820

Table 4.3-1
Surface Water Analytical Results
(Detects Only)

Area				Tailings	Tailings	Tailings	Tailings	Tailings	Tailings	Tailings	Tailings	Tailings	Tailings
Type				Seep	Seep	Seep	Seep	Seep	Seep	Seep	Seep	Seep	Seep
Location ID		Freshwater	Salt Water	99-TPR-50	SAMPLE_1	SAMPLE_2	SAMPLE_4	SW-SA_1	SW-SA_1	SW-SA_1	SW-SA_1	SW-SA_2	SW-SA_2
Date		Screening	Screening	10/5/1999	1/1/1986	1/1/1986	1/1/1986	1/1/1986	1/1/1987	1/1/1990	1/1/1991	1/1/1986	1/1/1987
CONSTITUENT	UNITS	Criteria	Criteria	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
Total/Filtered		Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total
Volatile Organic Compounds													
1,1,1-trichloroethane	(ug/l)											17	
1-Butanethiol	(ug/l)												
Ethylbenzene	(ug/l)											6	
Toluene	(ug/l)											5	
Xylenes (total)	(ug/l)											36	
Semivolatile Organic Compounds													
Di-n-butylphthalate	(ug/l)							22					
Di-n-octyl phthalate	(ug/l)												
Dioctyl adipate	(ug/l)												
o,o-diethyl phosphorodithiotic acid	(ug/l)										10J		
o,o-diethyl-s-ethyl phosphorothioate	(ug/l)							8J		2.8J	1.55		14J
o,o-diethyl-s-methyl phosphorothioate	(ug/l)								18J	3.1J	1.71		
o,o-s triethyldithiophosphate	(ug/l)												13J
Metals													
Aluminum	(ug/l)	87											
Antimony	(ug/l)	30											
Arsenic	(ug/l)	150	36										
Barium	(ug/l)	4											
Beryllium	(ug/l)	0.66											
Cadmium	(ug/l)	0.25	8.8	[23]	[4]	[25]	[20]	[11]	[24]	[14]	[25]	[18]	[16]
Calcium	(ug/l)												
Chromium	(ug/l)	74											
Cobalt	(ug/l)	23											
Copper	(ug/l)	9	3.1	[84]	[80]	[20]	[20]			[530]			
Iron	(ug/l)	1000											
Lead	(ug/l)	2.5	8.1	[31]	[20]				1	[23]			2
Magnesium	(ug/l)												
Manganese	(ug/l)	120											
Nickel	(ug/l)	52	8.2							[40]			
Potassium	(ug/l)												
Silver	(ug/l)	0.36											
Sodium	(ug/l)												
Vanadium	(ug/l)	20											
Zinc	(ug/l)	120	81	[5860]J	[730]	[10600]	[4910]	[3620]		[6100]	[5410]	[9410]	
Sulfate													
Sulfate	(mg/l)												

Table 4.3-1
Surface Water Analytical Results
(Detects Only)

Area				Tailings	Tailings	WRP-3	WRP-3	Tailings	Tailings	Tailings	Tailings	Tailings	WRP-1
Type				Seep	Seep	Seep	Seep	Wetland	Wetland	Wetland	Open Water	Open Water	Wetland
Location ID		Freshwater	Salt Water	SW-SA_2	SW-SA_2	SW-422	SW-422	SW-TP	SW-403	SW-403	SW-403	SW-403	SW-423
Date		Screening	Screening	1/1/1990	1/1/1991	11/17/2004	11/17/2004	1/1/1987	11/16/2004	11/16/2004	11/16/2004	11/16/2004	11/16/2004
CONSTITUENT	UNITS	Criteria	Criteria	Primary	Primary	Primary	Primary	Primary	Duplicate 1	Primary	Duplicate 1	Primary	Primary
Total/Filtered		Total	Total	Total	Total	Filtered	Total	Total	Total	Total	Filtered	Filtered	Filtered
Volatile Organic Compounds													
1,1,1-trichloroethane	(ug/l)												
1-Butanethiol	(ug/l)			2.9J	1J								
Ethylbenzene	(ug/l)												
Toluene	(ug/l)												
Xylenes (total)	(ug/l)												
Semivolatile Organic Compounds													
Di-n-butylphthalate	(ug/l)												
Di-n-octyl phthalate	(ug/l)												
Dioctyl adipate	(ug/l)												
o,o-diethyl phosphorodithiotic acid	(ug/l)				10J								
o,o-diethyl-s-ethyl phosphorothioate	(ug/l)			6J	4.86								
o,o-diethyl-s-methyl phosphorothioate	(ug/l)			0.6J	10J								
o,o-s triethyldithiophosphate	(ug/l)												
Metals													
Aluminum	(ug/l)	87				[306]	[2490]J		[210]J	[834]J			
Antimony	(ug/l)	30				0.7J	1.5J		0.96J	1.3J	0.76J	0.75J	
Arsenic	(ug/l)	150	36				3.1J		0.96J	3.1J	0.33J	0.39	0.56
Barium	(ug/l)	4				[16.6]	[17.4]		[7.6]J	[8.6]J	[7.5]J	[7.6]J	[14.9]
Beryllium	(ug/l)	0.66				[1.7]	[1.8]						
Cadmium	(ug/l)	0.25	8.8	[8]	[15]	[846]	[854]		[3.2]	[3.9]	[3.2]	[2.9]	0.21
Calcium	(ug/l)					293000	291000		73300	76900	72300	72500	163000
Chromium	(ug/l)	74											
Cobalt	(ug/l)	23				[91.4]	[93.7]						1.9
Copper	(ug/l)	9	3.1	[550]	[30]	[7780]J	[9790]J		[40.4]J	[88.1]J	[24.3]J	[21.8]J	
Iron	(ug/l)	1000					[1590]J		299J	[1030]J			[2680]
Lead	(ug/l)	2.5	8.1	[6]	[10]	[87.2]	[154]J		[12.8]J	[44.2]J	1.4J	1.8	
Magnesium	(ug/l)					154000	170000		7150	8550	6720	6740	49500
Manganese	(ug/l)	120				[8050]	[7680]J		20.2J	54.6J	10.1	11.4	[343]
Nickel	(ug/l)	52	8.2	[60]	[40]	[168]	[163]J		1.8J	4.2J	1.5J	1J	[18.4]
Potassium	(ug/l)					7660	11900		1890J	2400J	1910J	2190J	12300
Silver	(ug/l)	0.36				2.2J							
Sodium	(ug/l)					94900	227000		23000	24400	22800	23700	101000
Vanadium	(ug/l)	20											
Zinc	(ug/l)	120	81	[11500]	[12100]	[171000]J	[169000]J	[390]	[911]J	[1170]J	[808]J	[823]J	[690]J
Sulfate													
Sulfate	(mg/l)						1600		113	110			

Table 4.3-1
Surface Water Analytical Results
(Detects Only)

Area				WRP-1	Tailings	Tailings	Tailings	Tailings	Tailings	Tailings	Tailings	WRP-3	WRP-3
Type				Wetland	Open Wate	Open Wate	Open Water	Open Water	Open Water	Open Wate	Open Water	Open Wate	Open Wate
Location ID		Freshwater	Salt Water	SW-423	99-SW-30	99-SW-32	SAMPLE_3	SW-405	SW-405	SW-GPE1	SW-GPE2	99-SW-34	99-SW-36
Date		Screening	Screening	11/16/2004	10/5/1999	10/5/1999	1/1/1986	11/17/2004	11/17/2004	1/1/1986	1/1/1987	10/5/1999	10/5/1999
CONSTITUENT	UNITS	Criteria	Criteria	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
Total/Filtered		Total	Total	Total	Total	Total	Total	Filtered	Total	Total	Total	Total	Total
Volatile Organic Compounds													
1,1,1-trichloroethane	(ug/l)												
1-Butanethiol	(ug/l)												
Ethylbenzene	(ug/l)												
Toluene	(ug/l)												
Xylenes (total)	(ug/l)												
Semivolatile Organic Compounds													
Di-n-butylphthalate	(ug/l)												
Di-n-octyl phthalate	(ug/l)												
Dioctyl adipate	(ug/l)												
o,o-diethyl phosphorodithiotic acid	(ug/l)												
o,o-diethyl-s-ethyl phosphorothioate	(ug/l)												
o,o-diethyl-s-methyl phosphorothioate	(ug/l)												
o,o-s triethyldithiophosphate	(ug/l)												
Metals													
Aluminum	(ug/l)	87		[17200]J				50.4J	[212]J				
Antimony	(ug/l)	30		0.65J				0.5J					
Arsenic	(ug/l)	150	36	10.6J				0.75J	0.92J				
Barium	(ug/l)	4		[67.1]				[5.1]J	[5.4]J				
Beryllium	(ug/l)	0.66		[0.8]									
Cadmium	(ug/l)	0.25	8.8	[10]	[1.2]	[2.9]	[18]	[0.94]	[1.7]	[2]	[9]	[2.7]	[1]
Calcium	(ug/l)			169000				136000	139000				
Chromium	(ug/l)	74		29									
Cobalt	(ug/l)	23		8									
Copper	(ug/l)	9	3.1	[46.9]J	[26]	[46]	[10]	[4.5]J	[17]J	[40]		[50]	[14]
Iron	(ug/l)	1000		[39600]J					303J				
Lead	(ug/l)	2.5	8.1	[37.2]J	[8]J	[4]J			[3.3]J	[4]		[4]J	[3]J
Magnesium	(ug/l)			55600				439000	447000				
Manganese	(ug/l)	120		[471]J				42	47.8J				
Nickel	(ug/l)	52	8.2	[107]J				1.4J	2.2J				
Potassium	(ug/l)			15000				140000	143000				
Silver	(ug/l)	0.36											
Sodium	(ug/l)			102000				3760000	3700000				
Vanadium	(ug/l)	20		[30.6]									
Zinc	(ug/l)	120	81	[2630]J	[420]J	[850]J	[6500]	[271]J	[330]J	[380]		[790]J	[270]J
Sulfate													
Sulfate	(mg/l)			607					882				

Table 4.3-1
Surface Water Analytical Results
(Detects Only)

Area				WRP-3	WRP-3	Dyer	Dyer	Dyer	Dyer	Dyer	Dyer	Dyer
Type				Open Water	Open Water	Open Wate	Open Wate	Open Water	Open Water	Open Water	Open Water	Open Water
Location ID		Freshwater	Salt Water	SW-406	SW-406	99-SW-38	99-SW-40	SW-414	SW-414	SW-415	SW-415	SW-SP_SEEP
Date		Screening	Screening	11/17/2004	11/17/2004	10/5/1999	10/5/1999	11/16/2004	11/16/2004	11/16/2004	11/16/2004	1/1/1986
CONSTITUENT	UNITS	Criteria	Criteria	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
Total/Filtered		Total	Total	Filtered	Total	Total	Total	Filtered	Total	Filtered	Total	Total
Volatile Organic Compounds												
1,1,1-trichloroethane	(ug/l)											
1-Butanethiol	(ug/l)											
Ethylbenzene	(ug/l)											
Toluene	(ug/l)											
Xylenes (total)	(ug/l)											
Semivolatile Organic Compounds												
Di-n-butylphthalate	(ug/l)											
Di-n-octyl phthalate	(ug/l)											100
Dioctyl adipate	(ug/l)											260
o,o-diethyl phosphorodithiotic acid	(ug/l)											
o,o-diethyl-s-ethyl phosphorothioate	(ug/l)											
o,o-diethyl-s-methyl phosphorothioate	(ug/l)											
o,o-s triethyldithiophosphate	(ug/l)											
Metals												
Aluminum	(ug/l)	87			[106]J				81.6J		[305]J	
Antimony	(ug/l)	30										
Arsenic	(ug/l)	150	36	1.1	1.1J			1.6	1.7J	1.7	2J	
Barium	(ug/l)	4		[6.8]J	[6.5]J			[7.2]J	[7.3]J	[7.3]J	[7.7]J	
Beryllium	(ug/l)	0.66										
Cadmium	(ug/l)	0.25	8.8	[2.6]	[2.7]	[1.1]	[1]	[2.7]	[2.6]	[1.6]	[2]	[60]
Calcium	(ug/l)			231000	227000			275000	275000	291000	291000	
Chromium	(ug/l)	74										
Cobalt	(ug/l)	23		1.1	1.2			1.1	1.2	1.2	1.3	
Copper	(ug/l)	9	3.1	[15.9]J	[20.7]J	[7]	[7]	[6.6]J	[13.6]J	[5.7]J	[16]J	
Iron	(ug/l)	1000			147J				98.5J		392J	
Lead	(ug/l)	2.5	8.1		1.9J		[3]J		2.3J		[4.8]J	[3]
Magnesium	(ug/l)			801000	801000			1000000	996000	1080000	1070000	
Manganese	(ug/l)	120		39.8	41.7J			18.3	20.1J	16.7	24.2J	
Nickel	(ug/l)	52	8.2	1.9J	2J			2J	2.4J	1.9J	3.5J	
Potassium	(ug/l)			239000J	237000J			300000	302000	318000	321000	
Silver	(ug/l)	0.36										
Sodium	(ug/l)			6440000	6390000			8000000	8020000	8520000	8590000	
Vanadium	(ug/l)	20						1.1	1.2	1.2	1.8	
Zinc	(ug/l)	120	81	[511]J	[512]J	[260]J	[260]J	[420]J	[437]J	[280]J	[309]J	[13900]
Sulfate												
Sulfate	(mg/l)				1660				2110		2260	

Table 4.3-1
Surface Water Analytical Results
(Detects Only)

Area				Dyer	Dyer	Dyer	Pond	Pond	Pit	Pit	Pit	Pit
Type				Open Water	Open Water	Open Water	Open Water	Open Water	Open Wate	Open Wate	Open Water	Open Water
Location ID		Freshwater	Salt Water	SW-SP_SEEP	SW-SP_SEEP	SW-SP_SEEP	SW-407	SW-407	99-SW-42	99-SW-49	SW-410	SW-410
Date		Screening	Screening	1/1/1987	1/1/1990	1/1/1991	11/16/2004	11/16/2004	10/5/1999	10/5/1999	11/16/2004	11/16/2004
CONSTITUENT	UNITS	Criteria	Criteria	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
Total/Filtered		Total	Total	Total	Total	Total	Filtered	Total	Total	Total	Filtered	Total
Volatile Organic Compounds												
1,1,1-trichloroethane	(ug/l)											
1-Butanethiol	(ug/l)											
Ethylbenzene	(ug/l)											
Toluene	(ug/l)											
Xylenes (total)	(ug/l)											
Semivolatile Organic Compounds												
Di-n-butylphthalate	(ug/l)											
Di-n-octyl phthalate	(ug/l)											
Dioctyl adipate	(ug/l)											
o,o-diethyl phosphorodithiotic acid	(ug/l)					1.66						
o,o-diethyl-s-ethyl phosphorothioate	(ug/l)					3.49						
o,o-diethyl-s-methyl phosphorothioate	(ug/l)											
o,o-s triethyldithiophosphate	(ug/l)											
Metals												
Aluminum	(ug/l)	87						55.8J				
Antimony	(ug/l)	30										
Arsenic	(ug/l)	150	36				1.5	1.6J			1.8	1.9J
Barium	(ug/l)	4					[7.2]J	[7.4]J			[6.7]J	[7.2]J
Beryllium	(ug/l)	0.66										
Cadmium	(ug/l)	0.25	8.8	[65]	[49]	[51]	[1.4]	[1.5]		[1.2]	[0.47]	[0.52]
Calcium	(ug/l)						282000	284000			308000	310000
Chromium	(ug/l)	74										
Cobalt	(ug/l)	23					1.3	1.2			1.3	1.3
Copper	(ug/l)	9	3.1		[260]	[470]	[8.9]J	[12.1]J	2J	3J		
Iron	(ug/l)	1000						61.4J				
Lead	(ug/l)	2.5	8.1		[3]	[104]		1.3J				
Magnesium	(ug/l)						1040000	1040000			1150000	1150000
Manganese	(ug/l)	120					20.3	21.4J			10.8	13.1J
Nickel	(ug/l)	52	8.2			[60]	1.8J	2J			1.7J	1.8J
Potassium	(ug/l)						307000	309000			348000	353000
Silver	(ug/l)	0.36								[2.3]		
Sodium	(ug/l)						8290000	8270000			9170000	9330000
Vanadium	(ug/l)	20					1.1	1.2			1.6	1.5
Zinc	(ug/l)	120	81		[9000]	[16300]	[268]J	[275]J	[87]J	[110]J	65.2J	67.1J
Sulfate												
Sulfate	(mg/l)							2190				2460

Table 4.3-1
Surface Water Analytical Results
(Detects Only)

Area				Pit	Pit	Pit	Pit	Cove	Cove	Cove	Cove	
Type				Open Wate	Open Wate	Open Water	Open Water	Open Water	Open Water	Open Wate	Open Water	
Location ID		Freshwater	Salt Water	SW-419	SW-419	SW-424	SW-424	SW-411	SW-411	SW-411	SW-411	
Date		Screening	Screening	12/2/2004	12/2/2004	11/18/2004	11/18/2004	12/3/2004	12/3/2004	12/3/2004	12/3/2004	
CONSTITUENT	UNITS	Criteria	Criteria	Primary	Primary	Primary	Primary	Duplicate 1	Primary	Duplicate 1	Primary	
Total/Filtered		Total	Total	Filtered	Total	Filtered	Total	Filtered	Filtered	Total	Total	
Volatile Organic Compounds												
1,1,1-trichloroethane	(ug/l)											
1-Butanethiol	(ug/l)											
Ethylbenzene	(ug/l)											
Toluene	(ug/l)											
Xylenes (total)	(ug/l)											
Semivolatile Organic Compounds												
Di-n-butylphthalate	(ug/l)											
Di-n-octyl phthalate	(ug/l)											
Dioctyl adipate	(ug/l)											
o,o-diethyl phosphorodithiotic acid	(ug/l)											
o,o-diethyl-s-ethyl phosphorothioate	(ug/l)											
o,o-diethyl-s-methyl phosphorothioate	(ug/l)											
o,o-s triethyldithiophosphate	(ug/l)											
Metals												
Aluminum	(ug/l)	87		[168]J	[380]		[103]J		[167]J	51.6J	[167]J	
Antimony	(ug/l)	30									0.71J	
Arsenic	(ug/l)	150	36	0.85J	1.1J	1J	1.2J	1.4	1.4J	1.5J	1.5J	
Barium	(ug/l)	4			[5.2]J	[7]J	[7.2]J	[5.4]J	[6]J	[5.8]J	[6.2]J	
Beryllium	(ug/l)	0.66										
Cadmium	(ug/l)	0.25	8.8	[2.3]	[2.1]	[2.4]	[2.4]	[0.87]	[1]	[0.87]	[1]	
Calcium	(ug/l)			91600	133000	229000	235000	211000	214000	214000	213000	
Chromium	(ug/l)	74										
Cobalt	(ug/l)	23					1.2					
Copper	(ug/l)	9	3.1	[54.7]J	[58.8]	[16]J	[19.8]J	[15.4]J	[22]J	[16.6]J	[21.4]J	
Iron	(ug/l)	1000		147	386		163J		187		203	
Lead	(ug/l)	2.5	8.1		1.5		1.6J				1.1	
Magnesium	(ug/l)			286000	438000	794000	823000	735000	741000	743000	745000	
Manganese	(ug/l)	120		52.2	51.2	37.6	43J	20.8	24.6	21.9	25.4	
Nickel	(ug/l)	52	8.2	2J	2.7J	1.9J	2.5J	1.7J	1.8J	1.6J	2.1J	
Potassium	(ug/l)			86700J	129000	232000J	241000J	215000J	218000J	222000J	216000J	
Silver	(ug/l)	0.36										
Sodium	(ug/l)			2300000	3540000	6330000	6490000	5850000	5870000	5900000	5890000	
Vanadium	(ug/l)	20			1.3			1.2	1.4	1.2	1.4	
Zinc	(ug/l)	120	81	[524]J	[501]J	[429]J	[446]J	[181]J	[187]J	[177]J	[190]J	
Sulfate												
Sulfate	(mg/l)				931		1790			774	1650	

Table 4.3-2: Summary of Chemicals Detected
Tailings Pile Surface Water and Seeps

		Times Sought	Times Detected	Maximum Concentration
CONSTITUENT	UNITS			
VOCs				
1,1,1-trichloroethane	(ug/l)	8	1	17
1-Butanethiol	(ug/l)	8	2	2.9
Ethylbenzene	(ug/l)	8	1	6
Toluene	(ug/l)	8	1	5
Xylenes	(ug/l)	8	1	36
SVOCs				
Di-n-butylphthalate	(ug/l)	8	1	22
Dioctyl adipate	(ug/l)	8	0	ND
Dioctyl phthalate	(ug/l)	8	0	ND
o,o-diethyl phosphorodithiotic acid	(ug/l)	8	2	10
o,o-diethyl-s-ethyl phosphorothioate	(ug/l)	8	6	14
o,o-diethyl-s-methyl phosphorothioate	(ug/l)	8	5	18
o,o-s triethyldithiophosphate	(ug/l)	8	1	13
Metals				
Aluminum	(ug/l)	2	2	834
Antimony	(ug/l)	2	2	1.3
Arsenic	(ug/l)	2	2	3.1
Barium	(ug/l)	2	2	8.6
Beryllium	(ug/l)	2	0	ND
Cadmium	(ug/l)	15	14	25
Calcium	(ug/l)	2	2	76900
Chromium	(ug/l)	2	0	ND
Cobalt	(ug/l)	2	0	ND
Copper	(ug/l)	13	9	550
Iron	(ug/l)	2	2	1030
Lead	(ug/l)	15	9	44.2
Magnesium	(ug/l)	2	2	8550
Manganese	(ug/l)	2	2	54.6
Mercury	(ug/l)	3	0	ND
Nickel	(ug/l)	6	5	60
Potassium	(ug/l)	2	2	2400
Selenium	(ug/l)	3	0	ND
Silver	(ug/l)	3	0	ND
Sodium	(ug/l)	2	2	24400
Thallium	(ug/l)	2	0	ND
Vanadium	(ug/l)	2	0	ND
Zinc	(ug/l)	13	13	12100
Sulfate	(ug/l)	2	2	113000
Cyanide	(ug/l)	6	0	ND

Table 4.3-3: Summary of Chmicals Detected in Goose Pond Surface Water

		Times	Times	Maximum
		Sought	Detected	Concentration
CONSTITUENT	UNITS			
VOCs				
1,1,1-trichloroethane	(ug/l)	1	0	ND
1-Butanethiol	(ug/l)	1	0	ND
Ethylbenzene	(ug/l)	1	0	ND
Toluene	(ug/l)	1	0	ND
Xylenes	(ug/l)	1	0	ND
SVOCs				
Di-n-butylphthalate	(ug/l)	1	0	ND
Dioctyl adipate	(ug/l)	1	0	ND
Dioctyl phthalate	(ug/l)	1	0	ND
o,o-diethyl phosphorodithiotic acid	(ug/l)	1	0	ND
o,o-diethyl-s-ethyl phosphorothioate	(ug/l)	1	0	ND
o,o-diethyl-s-methyl phosphorothioate	(ug/l)	1	0	ND
o,o-s triethyldithiophosphate	(ug/l)	1	0	ND
Metals				
Aluminum	(ug/l)	6	5	380
Antimony	(ug/l)	6	0	ND
Arsenic	(ug/l)	6	6	1.9
Barium	(ug/l)	6	6	7.4
Beryllium	(ug/l)	6	0	ND
Cadmium	(ug/l)	16	14	18
Calcium	(ug/l)	6	6	310000
Chromium	(ug/l)	6	0	ND
Cobalt	(ug/l)	6	4	1.3
Copper	(ug/l)	15	13	58.8
Iron	(ug/l)	6	5	386
Lead	(ug/l)	16	10	50
Magnesium	(ug/l)	6	6	1150000
Manganese	(ug/l)	6	6	51.2
Mercury	(ug/l)	12	0	ND
Nickel	(ug/l)	6	6	2.7
Potassium	(ug/l)	6	6	353000
Selenium	(ug/l)	12	0	ND
Silver	(ug/l)	12	1	2.3
Sodium	(ug/l)	6	6	9330000
Thallium	(ug/l)	6	0	ND
Vanadium	(ug/l)	6	3	1.5
Zinc	(ug/l)	15	14	6500
Sulfate	(ug/l)	6	6	2460000

Table 4.3-4: Summary of Chemicals Detected in Dyer's Cove Surface Water

	Times	Maximum
	Detected	Concentration
CONSTITUENT		
Aluminum	2	305
Antimony	0	ND
Arsenic	2	2
Barium	2	7.7
Beryllium	0	ND
Cadmium	4	2.6
Calcium	2	291000
Chromium	0	ND
Cobalt	2	1.3
Copper	4	16
Iron	2	392
Lead	3	4.8
Magnesium	2	1070000
Manganese	2	24.2
Mercury	0	ND
Nickel	2	3.5
Potassium	2	321000
Selenium	0	ND
Silver	0	ND
Sodium	2	8590000
Thallium	0	ND
Vanadium	2	1.8
Zinc	4	437
Sulfate	2	2260000

Table 4.3-5: Summary of Chemicals Detected in Goose Cove Surface Water

		Times	Times	Maximum
		Sought	Detected	Concentration
CONSTITUENT	UNITS			
Aluminum	(ug/l)	2	2	167
Antimony	(ug/l)	2	1	0.71
Arsenic	(ug/l)	2	2	1.5
Barium	(ug/l)	2	2	6.2
Beryllium	(ug/l)	2	0	ND
Cadmium	(ug/l)	2	2	1
Calcium	(ug/l)	2	2	214000
Chromium	(ug/l)	2	0	ND
Cobalt	(ug/l)	2	0	ND
Copper	(ug/l)	2	2	21.4
Iron	(ug/l)	2	1	203
Lead	(ug/l)	2	1	1.1
Magnesium	(ug/l)	2	2	745000
Manganese	(ug/l)	2	2	25.4
Mercury	(ug/l)	2	0	ND
Nickel	(ug/l)	2	2	2.1
Potassium	(ug/l)	2	2	222000
Selenium	(ug/l)	2	0	ND
Silver	(ug/l)	2	0	ND
Sodium	(ug/l)	2	2	5900000
Thallium	(ug/l)	2	0	ND
Vanadium	(ug/l)	2	2	1.4
Zinc	(ug/l)	2	2	190

Table 4.4-1
Drinking Water Analytical Results
(Detects Only)

		EPA		Maine	Region IX	1F	1F	1F	1F	2F	2F	2F	2F	3F	3F	3F	3F	4F
		MCLs		MEG	Tap Water	12/1/1967	5/1/1968	7/1/1968	9/1/1968	12/1/1967	5/1/1968	7/1/1968	9/1/1968	12/1/1967	5/1/1968	7/1/1968	9/1/1968	12/1/1967
CONSTITUENT	UNITS				PRGs	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
Metals																		
Aluminum	(ug/l)			1430	3650													
Arsenic	(ug/l)	10		10	0.045													
Barium	(ug/l)	2000		2000	255													
Beryllium	(ug/l)	4			7													
Cadmium	(ug/l)	5		3.5	2	0				0.001		0.01		0				0.002
Calcium	(ug/l)																	
Chromium	(ug/l)	100		40	11													
Cobalt	(ug/l)				73													
Copper	(ug/l)	1300		1300	146	0.5	0.4	0.03		0.01	0.1	0.05	0.03	0.05	0.1	0.25		0.03
Iron	(ug/l)				1095													
Lead	(ug/l)	15		10		0				0				0.02				0
Magnesium	(ug/l)																	
Manganese	(ug/l)			500	88													
Mercury	(ug/l)	2		2	1.1													
Nickel	(ug/l)			140	73	0.02				0.02	0.02			0.02	0.02			0.03
Potassium	(ug/l)																	
Sodium	(ug/l)			20000														
Vanadium	(ug/l)				3.6													
Zinc	(ug/l)			2000	1095	1.5			0	1.6	1.3	1.07	0.68	0.1		0.11	0.08	0.1
Sulfate	(ug/l)																	
Boron	(ug/l)			630	730													

Table 4.4-1
Drinking Water Analytical Results
(Detects Only)

		EPA MCLs		Maine MEG	Region IX Tap Water PRGs	4F 5/1/1968 Primary	4F 7/1/1968 Primary	4F 9/1/1968 Primary	5F 12/1/1967 Primary	5F 5/1/1968 Primary	5F 7/1/1968 Primary	5F 9/1/1968 Primary	6F 12/1/1967 Primary	6F 9/1/1968 Primary	7F 12/1/1967 Primary	7F 5/1/1968 Primary	7F 7/1/1968 Primary	8F 12/1/1967 Primary
CONSTITUENT	UNITS																	
Metals																		
Aluminum	(ug/l)			1430	3650													
Arsenic	(ug/l)	10		10	0.045													
Barium	(ug/l)	2000		2000	255													
Beryllium	(ug/l)	4			7													
Cadmium	(ug/l)	5		3.5	2				0.001				0		0.001			0
Calcium	(ug/l)																	
Chromium	(ug/l)	100		40	11													
Cobalt	(ug/l)				73													
Copper	(ug/l)	1300		1300	146	0.07	0.04		0.06	0.2	0.15	0.12	0.2		0.005	0.03	0.04	0.02
Iron	(ug/l)				1095													
Lead	(ug/l)	15		10					0				0.01		0			0.01
Magnesium	(ug/l)																	
Manganese	(ug/l)			500	88													
Mercury	(ug/l)	2		2	1.1													
Nickel	(ug/l)			140	73	0.01			0.03	0.02			0		0.01			0.05
Potassium	(ug/l)																	
Sodium	(ug/l)			20000														
Vanadium	(ug/l)				3.6													
Zinc	(ug/l)			2000	1095		0.04	0.08	1.6	0.08	0.47	0.45	0.1	0.09	0.02		0.03	1.6
Sulfate	(ug/l)																	
Boron	(ug/l)			630	730													

Table 4.4-1
Drinking Water Analytical Results
(Detects Only)

		EPA		Maine	Region IX	8F	8F	9F_HARDING	9F_HARDING	9F_HARDING	9F_HARDING	9F_HARDING	9F_HARDING	10F	10F
		MCLs		MEG	Tap Water	5/1/1968	7/1/1968	12/1/1967	5/1/1968	7/1/1968	9/1/1968	1/1/1986	1/1/1990	12/1/1967	5/1/1968
CONSTITUENT	UNITS				PRGs	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
Metals															
Aluminum	(ug/l)			1430	3650										
Arsenic	(ug/l)	10		10	0.045										
Barium	(ug/l)	2000		2000	255										
Beryllium	(ug/l)	4			7										
Cadmium	(ug/l)	5		3.5	2			0						0	
Calcium	(ug/l)														
Chromium	(ug/l)	100		40	11										
Cobalt	(ug/l)				73										
Copper	(ug/l)	1300		1300	146	0.04	0.04	0.02	0.04	0		0.04	0.02	0.02	0.06
Iron	(ug/l)				1095										
Lead	(ug/l)	15		10				0.01		0.05				0.02	
Magnesium	(ug/l)														
Manganese	(ug/l)			500	88										
Mercury	(ug/l)	2		2	1.1										
Nickel	(ug/l)			140	73	0.15		0.04						0.05	
Potassium	(ug/l)														
Sodium	(ug/l)			20000											
Vanadium	(ug/l)				3.6										
Zinc	(ug/l)			2000	1095		0.72	0.03		0.07	0.01			0.07	
Sulfate	(ug/l)														
Boron	(ug/l)			630	730										

Table 4.4-1
Drinking Water Analytical Results
(Detects Only)

		EPA		Maine	Region IX	10F	10F	11F_ROBINSON	11F_ROBINSON	12F_JGRAY	12F_JGRAY	12F_JGRAY	12F_JGRAY	12F_JGRAY	12F_JGRAY
		MCLs		MEG	Tap Water	7/1/1968	9/1/1968	12/1/1967	1/1/1986	12/1/1967	5/1/1968	7/1/1968	1/1/1986	1/1/1990	1/1/1991
CONSTITUENT	UNITS				PRGs	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
Metals															
Aluminum	(ug/l)			1430	3650										
Arsenic	(ug/l)	10		10	0.045										
Barium	(ug/l)	2000		2000	255										
Beryllium	(ug/l)	4			7										
Cadmium	(ug/l)	5		3.5	2			0.001		0					
Calcium	(ug/l)														
Chromium	(ug/l)	100		40	11										
Cobalt	(ug/l)				73										
Copper	(ug/l)	1300		1300	146	0.03		0.03		0.01	0.04	0.02	0.2	0.09	0.26
Iron	(ug/l)				1095										
Lead	(ug/l)	15		10				0.09		0		0.05			
Magnesium	(ug/l)														
Manganese	(ug/l)			500	88										
Mercury	(ug/l)	2		2	1.1										
Nickel	(ug/l)			140	73			0.03		0.03					
Potassium	(ug/l)														
Sodium	(ug/l)			20000											
Vanadium	(ug/l)				3.6										
Zinc	(ug/l)			2000	1095	0.04	0.02	1.6	0.3	0.04		0.02			0.02
Sulfate	(ug/l)														
Boron	(ug/l)			630	730										

Table 4.4-1
Drinking Water Analytical Results
(Detects Only)

		EPA		Maine	Region IX	13F_SMITH	13F_SMITH	13F_SMITH	13F_SMITH	14F_RANKIN	14F_RANKIN	14F_RANKIN	14F_RANKIN	14F_RANKIN	14F_RANKIN
		MCLs		MEG	Tap Water	12/1/1967	5/1/1968	7/1/1968	1/1/1986	12/1/1967	5/1/1968	7/1/1968	9/1/1968	1/1/1986	1/1/1990
CONSTITUENT	UNITS				PRGs	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
Metals															
Aluminum	(ug/l)			1430	3650										
Arsenic	(ug/l)	10		10	0.045										
Barium	(ug/l)	2000		2000	255										
Beryllium	(ug/l)	4			7										
Cadmium	(ug/l)	5		3.5	2	0.001		0.008		0					
Calcium	(ug/l)														
Chromium	(ug/l)	100		40	11										
Cobalt	(ug/l)				73										
Copper	(ug/l)	1300		1300	146	0.14	0.08		0.03	0.05	0.09	0.11	0.25	0.18	0.04
Iron	(ug/l)				1095										
Lead	(ug/l)	15		10		0.01				0.08					0.005
Magnesium	(ug/l)														
Manganese	(ug/l)			500	88										
Mercury	(ug/l)	2		2	1.1										
Nickel	(ug/l)			140	73	0.03				0.04					
Potassium	(ug/l)														
Sodium	(ug/l)			20000											
Vanadium	(ug/l)				3.6										
Zinc	(ug/l)			2000	1095	0.05		0.03	0.01	0.05		0.04	0.05		
Sulfate	(ug/l)														
Boron	(ug/l)			630	730										

Table 4.4-1
Drinking Water Analytical Results
(Detects Only)

		EPA		Maine	Region IX	14F_RANKIN	CALLAHAN_WATER	DWCA-01	DWCA-01	DWCA-02	DWCA-03	DWCA-04	DWCA-05	DWCA-05	DWCA-06	DWCA-06
		MCLs		MEG	Tap Water	1/1/1991	1/1/1986	8/29/2002	9/10/2003	9/10/2003	9/10/2003	9/10/2003	9/10/2003	8/26/2004	8/29/2002	9/10/2003
CONSTITUENT	UNITS				PRGs	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
Metals																
Aluminum	(ug/l)			1430	3650											
Arsenic	(ug/l)	10		10	0.045				[7.0]							
Barium	(ug/l)	2000		2000	255											
Beryllium	(ug/l)	4			7											
Cadmium	(ug/l)	5		3.5	2									[2.0]		
Calcium	(ug/l)															
Chromium	(ug/l)	100		40	11											
Cobalt	(ug/l)				73											
Copper	(ug/l)	1300		1300	146			31	24	110	86	13	[500]	73	[180]	[270]
Iron	(ug/l)				1095				20	30	10	[3100]	480	20		30
Lead	(ug/l)	15		10						9		[71.0]	7		4.3	
Magnesium	(ug/l)															
Manganese	(ug/l)			500	88					10		80	[150]	[360]		
Mercury	(ug/l)	2		2	1.1											
Nickel	(ug/l)			140	73											
Potassium	(ug/l)															
Sodium	(ug/l)			20000												
Vanadium	(ug/l)				3.6											
Zinc	(ug/l)			2000	1095	0.02	0.02	46	46	71	48	[7400]	170	40	150	100
Sulfate	(ug/l)								45000	12000	11000	9000	12000	13000		18000
Boron	(ug/l)			630	730											

Table 4.4-1
Drinking Water Analytical Results
(Detects Only)

		EPA		Maine	Region IX	DWCA-06	DWCA-07	DWCA-08	DWCA-09	DWCA-10	DWCA-10	DWCA-10	DWCA-11	DWCA-11	DWCA-11	DWCA-12	DWCA-12
		MCLs		MEG	Tap Water	8/26/2004	9/10/2003	9/10/2003	9/10/2003	8/29/2002	9/10/2003	1/12/2005	8/29/2003	9/10/2003	1/12/2005	8/29/2002	1/12/2005
CONSTITUENT	UNITS				PRGs	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
Metals																	
Aluminum	(ug/l)			1430	3650	60											
Arsenic	(ug/l)	10		10	0.045				[4.0]			[0.28]J			[0.25]J		[0.4]J
Barium	(ug/l)	2000		2000	255										4.7		2.9
Beryllium	(ug/l)	4			7										0.06J		0.08J
Cadmium	(ug/l)	5		3.5	2	[3.0]	[11.0]								0.04J		0.06J
Calcium	(ug/l)											24800			9390		17400
Chromium	(ug/l)	100		40	11												
Cobalt	(ug/l)				73										0.16J		0.11J
Copper	(ug/l)	1300		1300	146	95	100		140	34	28	0.79J	[610]	[390]	[317]J	27	80.8J
Iron	(ug/l)				1095	60	10	20	[1300]		40			10	11.6J		287
Lead	(ug/l)	15		10		5			5			0.03J		3	[20.4]J		[162]J
Magnesium	(ug/l)											3720			4930		1740
Manganese	(ug/l)			500	88			30	[160]					10	2.3		16.7
Mercury	(ug/l)	2		2	1.1							0.1			0.1		0.1
Nickel	(ug/l)			140	73							0.29J			1.9		2.3
Potassium	(ug/l)											1320			4940		712
Sodium	(ug/l)			20000								6760			10400		7800
Vanadium	(ug/l)				3.6							0.48J					
Zinc	(ug/l)			2000	1095	240	[2700]		8	10	13	2.2J	24	66	31.9J	10	56.4J
Sulfate	(ug/l)					19000	23000	27000	28000		15000	13600		12000	8750		13500
Boron	(ug/l)			630	730												

Table 4.4-1
Drinking Water Analytical Results
(Detects Only)

		EPA		Maine	Region IX	DWCA-13	DWCA-15	DWCA-15	DWCA-15	DWCA-15	DWCA-16	DWCA-16	DWCA-16	DWCA-16	DWCA-17	DWCA-17
		MCLs		MEG	Tap Water	9/10/2003	8/29/2002	9/10/2003	10/21/2003	1/11/2005	5/13/2003	9/10/2003	1/11/2005	1/11/2005	9/10/2003	11/18/2004
CONSTITUENT	UNITS				PRGs	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Duplicate 1	Primary	Primary
Metals																
Aluminum	(ug/l)			1430	3650											
Arsenic	(ug/l)	10		10	0.045											
Barium	(ug/l)	2000		2000	255								3.6	3.7		
Beryllium	(ug/l)	4			7											
Cadmium	(ug/l)	5		3.5	2								0.03J	0.02J		
Calcium	(ug/l)									40800			24200	24300		
Chromium	(ug/l)	100		40	11											
Cobalt	(ug/l)				73											
Copper	(ug/l)	1300		1300	146	43	21	53	7	11.5J	59	42	71.6J	45J	[270]	[280]
Iron	(ug/l)				1095	10		50				10	54.6	37.9	30	
Lead	(ug/l)	15		10				[1200]	3	4J	4		[10.1]J	2.4J	[11.0]	4
Magnesium	(ug/l)									4970			2550	2560		
Manganese	(ug/l)			500	88								0.87	0.9		
Mercury	(ug/l)	2		2	1.1					0.1			0.1	0.1		
Nickel	(ug/l)			140	73					0.61			0.73	0.59		
Potassium	(ug/l)									1200			5650	5650		
Sodium	(ug/l)			20000						11700			13300	13400		
Vanadium	(ug/l)				3.6					0.53						
Zinc	(ug/l)			2000	1095	32		460		1.6J	44	53	28.7J	31.3J	64	
Sulfate	(ug/l)					16000		18000	18000	9530		12000	13100	13100	8000	
Boron	(ug/l)			630	730											

Table 4.4-1
Drinking Water Analytical Results
(Detects Only)

		EPA		Maine	Region IX	DWCA-17	DWCA-17	DWCA-17	DWCA-17	DWCA-18	DWCA-18	DWCA-19	DWCA-19	DWCA-19	DWCA-20	DWCA-22	DWCA-23
		MCLs		MEG	Tap Water	11/18/2004	11/18/2004	11/18/2004	1/11/2005	9/10/2003	1/12/2005	5/13/2003	6/25/2003	8/26/2004	6/25/2003	8/29/2002	8/29/2002
CONSTITUENT	UNITS				PRGs	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
Metals																	
Aluminum	(ug/l)			1430	3650								140	240			
Arsenic	(ug/l)	10		10	0.045				[0.22]J		[0.33]J						
Barium	(ug/l)	2000		2000	255				0.95J		5.6		4	7			
Beryllium	(ug/l)	4			7						0.04J						
Cadmium	(ug/l)	5		3.5	2				0.02J		0.08J	[3.7]	[3.3]	[9.0]			
Calcium	(ug/l)								19400		11300						
Chromium	(ug/l)	100		40	11						[78.8]	7	1				
Cobalt	(ug/l)				73						0.05J						
Copper	(ug/l)	1300		1300	146	[240]	34	32	34.9J	[490]	82.7J	[290]	[200]	68	7	40	61
Iron	(ug/l)				1095			30	15.1J	20	42.3		[1900]	520			
Lead	(ug/l)	15		10		5			0.77J	4	[14.7]J	[180]	[31.0]	[16.0]			
Magnesium	(ug/l)								3760		2420						
Manganese	(ug/l)			500	88				1.6		1.1		35	20			
Mercury	(ug/l)	2		2	1.1				0.1		0.1						
Nickel	(ug/l)			140	73				0.35J		0.62	8	4	3			
Potassium	(ug/l)								1150		4610						
Sodium	(ug/l)			20000					9310		11000						
Vanadium	(ug/l)				3.6												
Zinc	(ug/l)			2000	1095			36	25.1J	55	22J	[2000]	[1500]	[1700]		10	
Sulfate	(ug/l)							8000	6460	17000	13500		27000	32000			
Boron	(ug/l)			630	730								14				

Table 4.4-1
Drinking Water Analytical Results
(Detects Only)

		EPA		Maine	Region IX	DWCA-24	DWCA-25	DWCA-26	DWCA-27	DWCA-28	DWCA-29	DWCA-30	DWCA-31	HOWARD	MGRAY-SANDECKI
		MCLs		MEG	Tap Water	10/21/2003	10/21/2003	10/21/2003	8/26/2004	8/26/2004	8/26/2004	8/26/2004	8/26/2004	1/1/1987	1/1/1986
CONSTITUENT	UNITS				PRGs	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
Metals															
Aluminum	(ug/l)			1430	3650				70						
Arsenic	(ug/l)	10		10	0.045			[3.0]	[5.0]						
Barium	(ug/l)	2000		2000	255				17						
Beryllium	(ug/l)	4			7										
Cadmium	(ug/l)	5		3.5	2				[3.0]						0.01
Calcium	(ug/l)														
Chromium	(ug/l)	100		40	11										
Cobalt	(ug/l)				73										
Copper	(ug/l)	1300		1300	146		24		120		60	25	23	0.12	0.43
Iron	(ug/l)				1095	10	30		160	110		10	20		
Lead	(ug/l)	15		10			3		4		5				0.003
Magnesium	(ug/l)														
Manganese	(ug/l)			500	88			20	20						
Mercury	(ug/l)	2		2	1.1										
Nickel	(ug/l)			140	73				6						
Potassium	(ug/l)														
Sodium	(ug/l)			20000											
Vanadium	(ug/l)				3.6										
Zinc	(ug/l)			2000	1095	23	12	3	750	13	28	18	5	0.45	0.26
Sulfate	(ug/l)					5000	9000	28000	17000	15000	10000	11000	8000		
Boron	(ug/l)			630	730										

Table 4.4-1
Drinking Water Analytical Results
(Detects Only)

		EPA		Maine	Region IX	MGRAY-SANDECKI	MGRAY-SANDECKI	MGRAY-SANDECKI	NORRINGTON
		MCLs		MEG	Tap Water	1/1/1987	1/1/1990	1/1/1991	1/1/1987
CONSTITUENT	UNITS				PRGs	Primary	Primary	Primary	Primary
Metals									
Aluminum	(ug/l)			1430	3650				
Arsenic	(ug/l)	10		10	0.045				
Barium	(ug/l)	2000		2000	255				
Beryllium	(ug/l)	4			7				
Cadmium	(ug/l)	5		3.5	2	0.005		0.0007	
Calcium	(ug/l)								
Chromium	(ug/l)	100		40	11				
Cobalt	(ug/l)				73				
Copper	(ug/l)	1300		1300	146		0.25	0.4	
Iron	(ug/l)				1095				
Lead	(ug/l)	15		10		0.001			0.003
Magnesium	(ug/l)								
Manganese	(ug/l)			500	88				
Mercury	(ug/l)	2		2	1.1				
Nickel	(ug/l)			140	73				
Potassium	(ug/l)								
Sodium	(ug/l)			20000					
Vanadium	(ug/l)				3.6				
Zinc	(ug/l)			2000	1095		0.04	0.08	
Sulfate	(ug/l)								
Boron	(ug/l)			630	730				

Table 4.5-1
Marine Flora/Fauna Analytical Results
(Detects Only)

			CASTINE_1	CASTINE_1_N	CASTINE_2	CASTINE_3	CASTINE_4	CR-3	GOOSE_COVE	CR-3
			mussel	mussel	mussel	mussel	mussel	mussel	mussel	clam
		Fish Tissue Screening Level	M. edulis 10/6/2001	M. edulis 1/1/1989	M. edulis 10/6/2001	M. edulis 10/6/2001	M. edulis 10/6/2001	M. edulis 12/7/1974	M. edulis 1/1/1993	Mya arenaria 12/7/1974
CONSTITUENT	UNITS									
Polyaromatic Hydrocarbons										
1-Methylphenanthrene	(ug/kg)					0.84	1.4			
Benzo(a)anthracene	(ug/kg)	4.3				1	0.89			
Benzo(b)fluoranthene	(ug/kg)	22				0.77	1.5			
Chrysene	(ug/kg)	22				0.77	1.2			
Fluoranthene	(ug/kg)	22	0.80B		0.92B	1.4B	2.3B			
Phenanthrene	(ug/kg)	210	0.73B		0.76B	1.3B	2.3B			
Pyrene	(ug/kg)	22	0.6		0.64	1	1.4			
Metals										
Aluminum	(mg/kg)	0.8	[283.37]		[371.02]	[381.38]	[198.26]			
Arsenic	(mg/kg)	0.002	[15.13]		[11.97]	[11.89]	[16.5]			
Cadmium	(mg/kg)	0.004	[7.31]	[9.1]	[6.6]	[6.46]	[6.99]	[0.96]	[9.1]	[0.38]
Chromium	(mg/kg)	0.02	[1.63]	[1.3]	[1.2]	[1.52]	[1.5]		[1.3]	
Cobalt	(mg/kg)	4								0.28
Copper	(mg/kg)	0.5	[16.02]	[8.9]	[10.68]	[11.16]	[11.36]	[1.52]	[8.9]	[6.03]
Iron	(mg/kg)		445.66	210	438.67	456.21	388.43	30		736
Lead	(mg/kg)	0.0008	[11.43]	[6.3]	[8.21]	[9.72]	[11.22]	[1.4]	[6.3]	[7]
Mercury	(mg/kg)		0.1059	0.12	0.1192	0.112	0.1065		0.06	
Nickel	(mg/kg)	0.042	[3.29]	[0.95]	[3.03]	[0.99]			[0.95]	0.01
Silver	(mg/kg)	0.37		0.1				0.06	[0.5]	0.09
Zinc	(mg/kg)	0.3	[223.87]	[180]	[167.52]	[171.38]	[202.54]	[37]	[180]	[28]

Table 4.5-1
Marine Flora/Fauna Analytical Results
(Detects Only)

CONSTITUENT	UNITS	Fish Tissue Screening Level	CR-3 bloodworm Glycera dibranchiata 12/7/1974	CR_GOOSE_POND coho salmon Onchorhyncus kisutch 1/1/1975	CR-3 seaweed Fucus sp. 12/7/1974	CR-3 seaweed Chondrus crispus 12/7/1974
Polyaromatic Hydrocarbons						
1-Methylphenanthrene	(ug/kg)					
Benzo(a)anthracene	(ug/kg)	4.3				
Benzo(b)fluoranthene	(ug/kg)	22				
Chrysene	(ug/kg)	22				
Fluoranthene	(ug/kg)	22				
Phenanthrene	(ug/kg)	210				
Pyrene	(ug/kg)	22				
Metals						
Aluminum	(mg/kg)	0.8				
Arsenic	(mg/kg)	0.002				
Cadmium	(mg/kg)	0.004	[0.89]		3.53	0.46
Chromium	(mg/kg)	0.02				
Cobalt	(mg/kg)	4				4.9
Copper	(mg/kg)	0.5	[4.67]	[0.67]	18.4	29.6
Iron	(mg/kg)		57		392	1230
Lead	(mg/kg)	0.0008			5	19.5
Mercury	(mg/kg)					
Nickel	(mg/kg)	0.042	[0.85]			
Silver	(mg/kg)	0.37	0.08		0.52	0.77
Zinc	(mg/kg)	0.3	[26]	[8]	463	188

Table 6.0-1: RI/FS Data Needs		
Data Item	Potential Data Gaps	Comments
Geology		
Bedrock Elevation	yes	The true bedrock surface elevation should be verified via drilling at key locations.
Topography	no	Site survey completed
Soil particle size	yes	Data needed for subsurface soils to evaluate contaminant fate and transport and geotechnical properties.
Hydrogeology		
Overburden hydraulic conductivity, other aquifer parameters	yes	Data needed to evaluate fate and transport and possibly to evaluate dewatering alternatives.
Bedrock hydraulic conductivity, other aquifer parameters	yes	No hydraulic conductivity test data are available for the bedrock. These data will be needed if bedrock aquifer is contaminated.
Vertical hydraulic gradient	yes	Well clusters on the site to evaluate vertical hydraulic gradients in overburden and bedrock and evaluate vertical ground water transport pathways to bedrock and surface water.
Water table elevation/flow direction/seepage velocity	yes	No water table maps exist and there are no ground water monitoring points.
Bedrock aquifer potentiometric surface	yes	No data exist for evaluation of bedrock ground water flow direction. These data will be needed if bedrock aquifer is contaminated.
Goose Pond flow information (tidal flow, floodplain, flow rate, tidal elevation, temperature/ salinity/pH profile with depth in pit)	yes	No data exist regarding flow in Goose Pond. These data will be needed to evaluate the fate and transport of contaminated sediment and surface water.
Sediment thickness and lateral extent	yes	Thickness estimates based on sub-bottom profiling will be useful, but sampling will be needed to determine the thickness of sediments deposited after the mining operations began. Will need these data to estimate remedial costs for sediment dredging or capping.
Annual Precipitation	yes	Data need to be compiled for site.
Ecological		
Wetland extent	yes	No wetland delineation has been completed at the site.
Habitat	no	TRC completed a habitat evaluation.

Table 6.0-1: RI/FS Data Needs		
Data Item	Potential Data Gaps	Comments
Bioassay	yes	Additional data needed in Goose Pond, Goose Cove, Dyer Cove and possibly the Former Pit Area to evaluate impacts to fin fish and shell fish. Toxicity testing of shellfish, benthic invertebrates and fish recommended.
Background	yes	Reference data were collected in the RI.
Nature and Extent of Contamination (On-site)		
Bedrock ground water	yes	No recent test data exist to evaluate bedrock ground water quality. Need background data for metals due to expected natural elevated metals concentrations.
Overburden ground water	yes	No recent test data exist to evaluate overburden ground water quality.
Surface water	yes	Seeps at Tailings Pile, Waste Rock Pile 3 and Waste Rock Pile 2 need to be sampled to determine nature and extent of contamination, for risk assessment and to evaluate fate and transport. Non-chemical water quality parameters (pH, dissolved oxygen, Eh, salinity, temperature, etc.) needed in surface water bodies to evaluate fate and transport of contaminants. Data needed during all phases of tidal cycle.
Sediment	yes	Sediment thickness and lateral extent.
Surface soil	yes	Data needed to evaluate acid generating potential, neutralization potential, sulfur content, metals content and leachability testing of waste materials.
Subsurface soil	yes	Need at least eight subsurface soil samples at each of the Waste Rock Piles, the Tailings Pile, the Ore Pad and the Former Operations Area for Risk Assessment. Subsurface soil contamination in process area not delineated. Geotechnical information needed to evaluate stability of waste rock piles, Ore Pad and Tailings Pile. Data needed to evaluate acid generating potential, neutralization potential, sulfur content, metals content and leachability testing of waste materials. Volume of waste in rock and tailings piles. Consolidation analysis of Tailings Pile (Cone Penetrometer data transect, moisture data, density data.
Air/dust	yes	Given the elevated metals concentrations in surface

Table 6.0-1: RI/FS Data Needs		
Data Item	Potential Data Gaps	Comments
		soils, dust sampling should be performed for metals and silica.
Biota	Yes	Sampling of forage fish, fin fish, shellfish and benthic invertebrates needs to be performed to evaluate impact to the food chain. A taxonomic analysis of the benthic invertebrate population needs to be completed to determine whether there is a noticable impact
Nature and Extent of Contamination (Off-site)		
Residential Wells	yes	Continued monitoring recommended due to variable past results.
Surface water	yes	Sampling in Penobscot Bay should be conducted to determine impact. Sampling of water in sump should be performed
Sediment	yes	Sampling in Penobscot Bay should be conducted. Insufficient data in Weir Cove. Sampling of sediment in sump should be performed
Surface soil	no	Sufficient data exist for HHRA

Figures

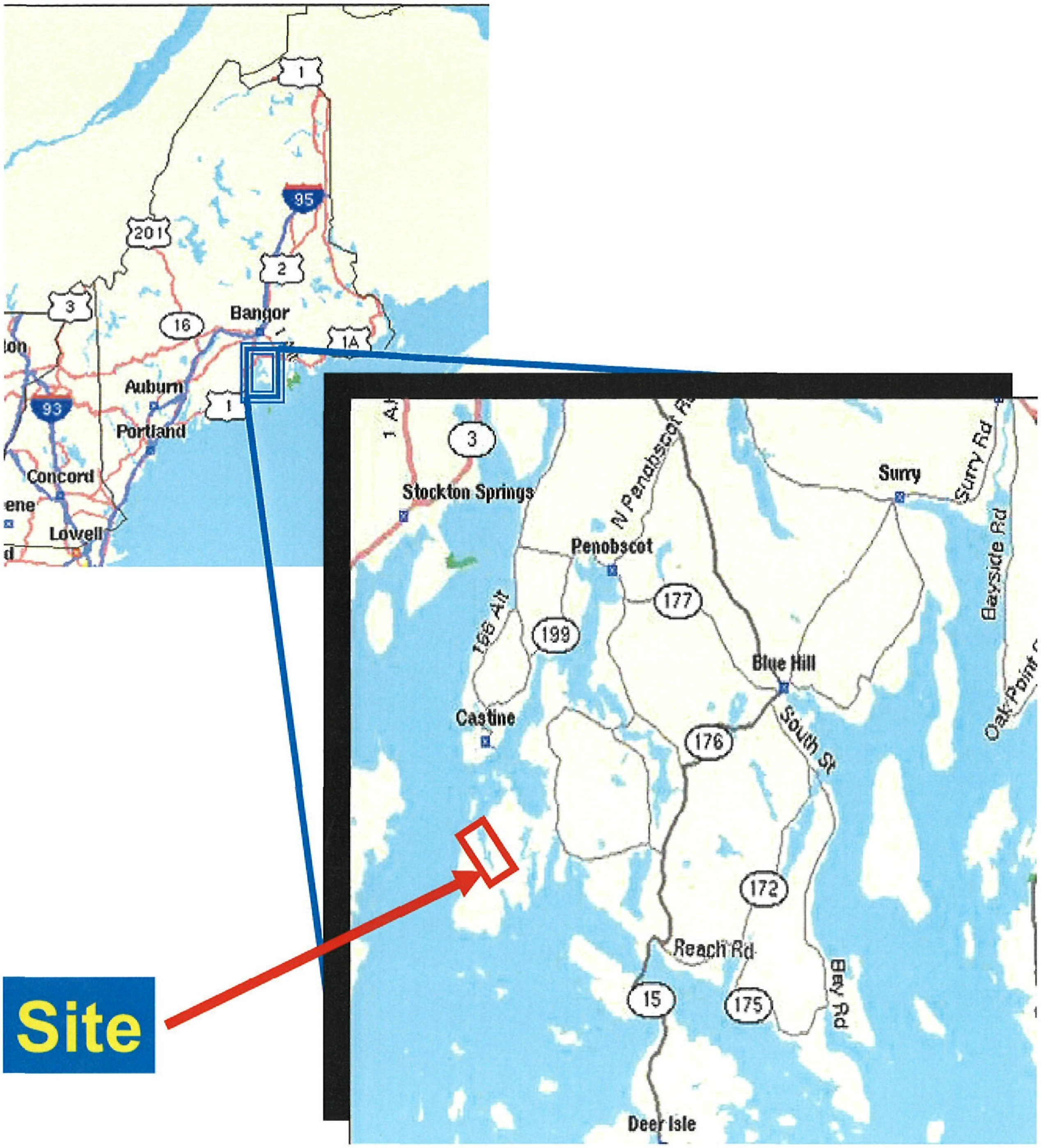


Figure 1.1-1:
Site Location

CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

M&E Metcalf & Eddy

TRC

Boott Mills South
Foot of John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0540-017H9

EPA CONTRACT NO. 68-W6-0042

RAC SUBCONTRACTOR NO. 107061

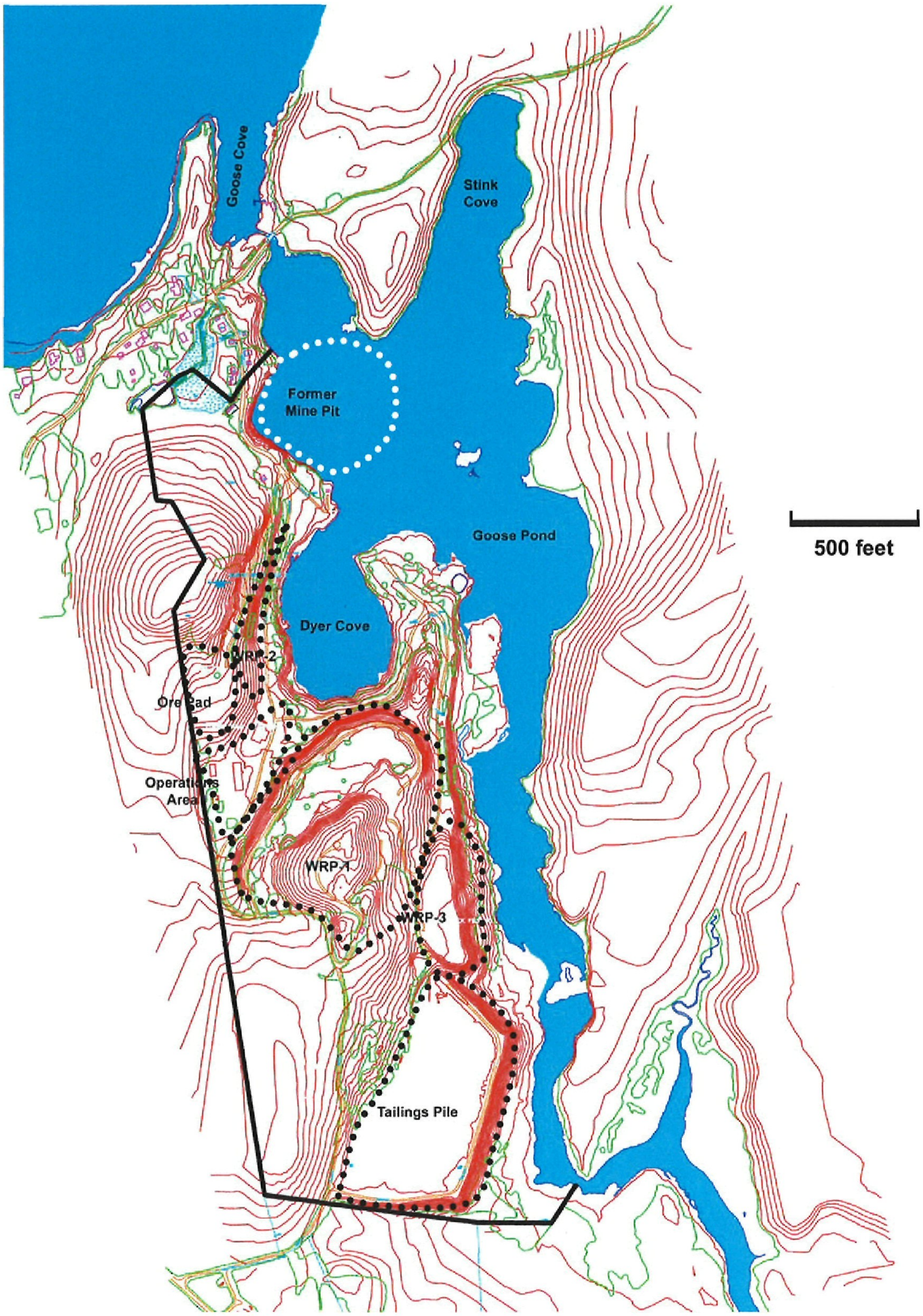


Figure 1.1-2: Site Plan

CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

M&E Metcalf & Eddy

TRC
Boott Mills South
Foot of John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0540-017H9

EPA CONTRACT NO. 68-W6-0042

RAC SUBCONTRACTOR NO. 107061

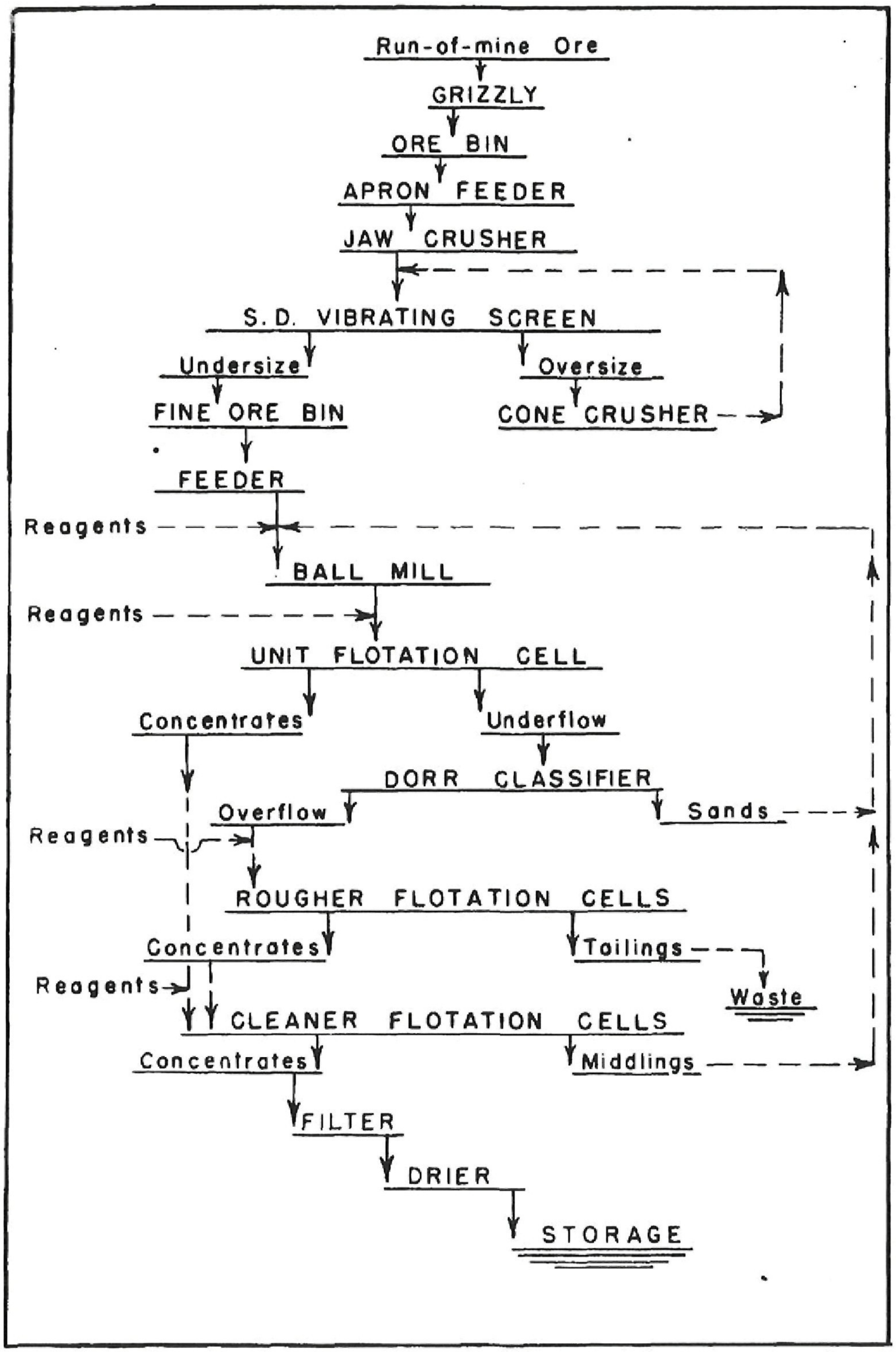


Figure 1.3-1: Flowchart of Mining Operations

CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

Metcalf & Eddy

TRC

Boott Mills South
Foot of John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0540-017H9

EPA CONTRACT NO. 68-W6-0042

RAC SUBCONTRACTOR NO. 107061

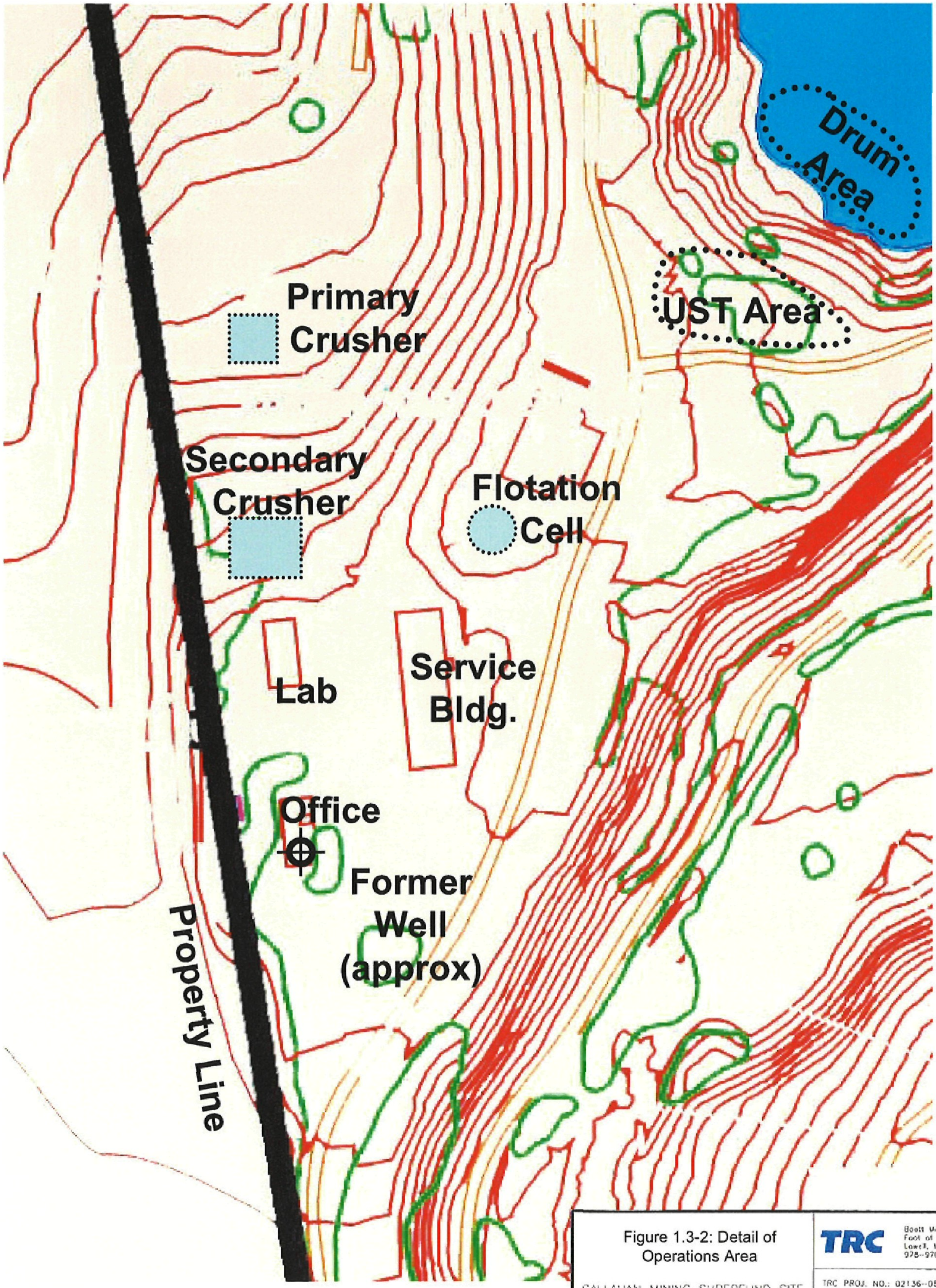


Figure 1.3-2: Detail of Operations Area

CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

M&E Metcalf & Eddy

TRC
Boott Mills South
Foot of John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0540-017H9

EPA CONTRACT NO. 68-W6-0042

RAC SUBCONTRACTOR NO. 107061

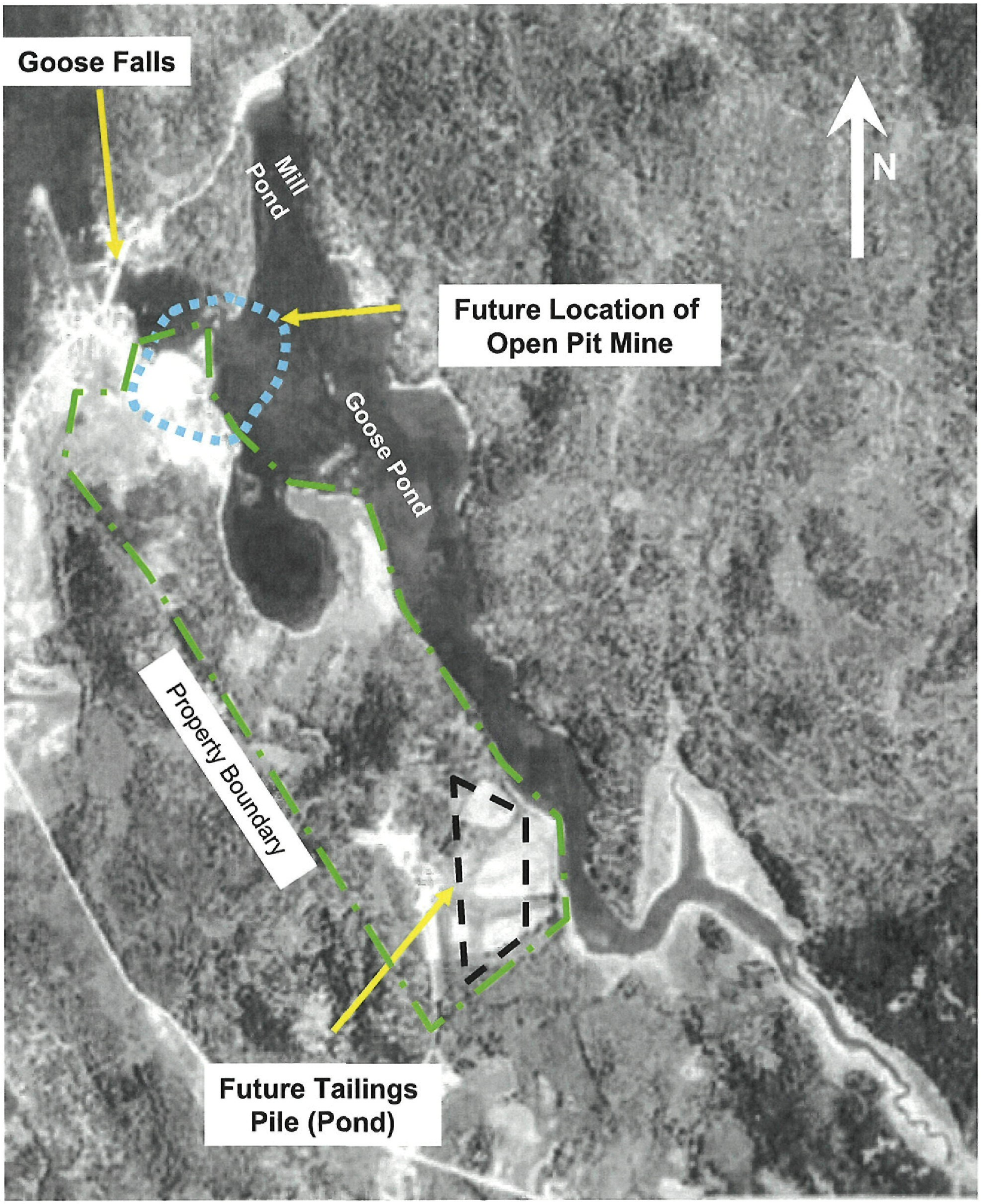


Figure 1.4-1: Aerial Photo, 1960

CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

Metcalf & Eddy

Boott Mills South
Foot of John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0540-017H9

EPA CONTRACT NO. 68-W6-0042

RAC SUBCONTRACTOR NO. 107061

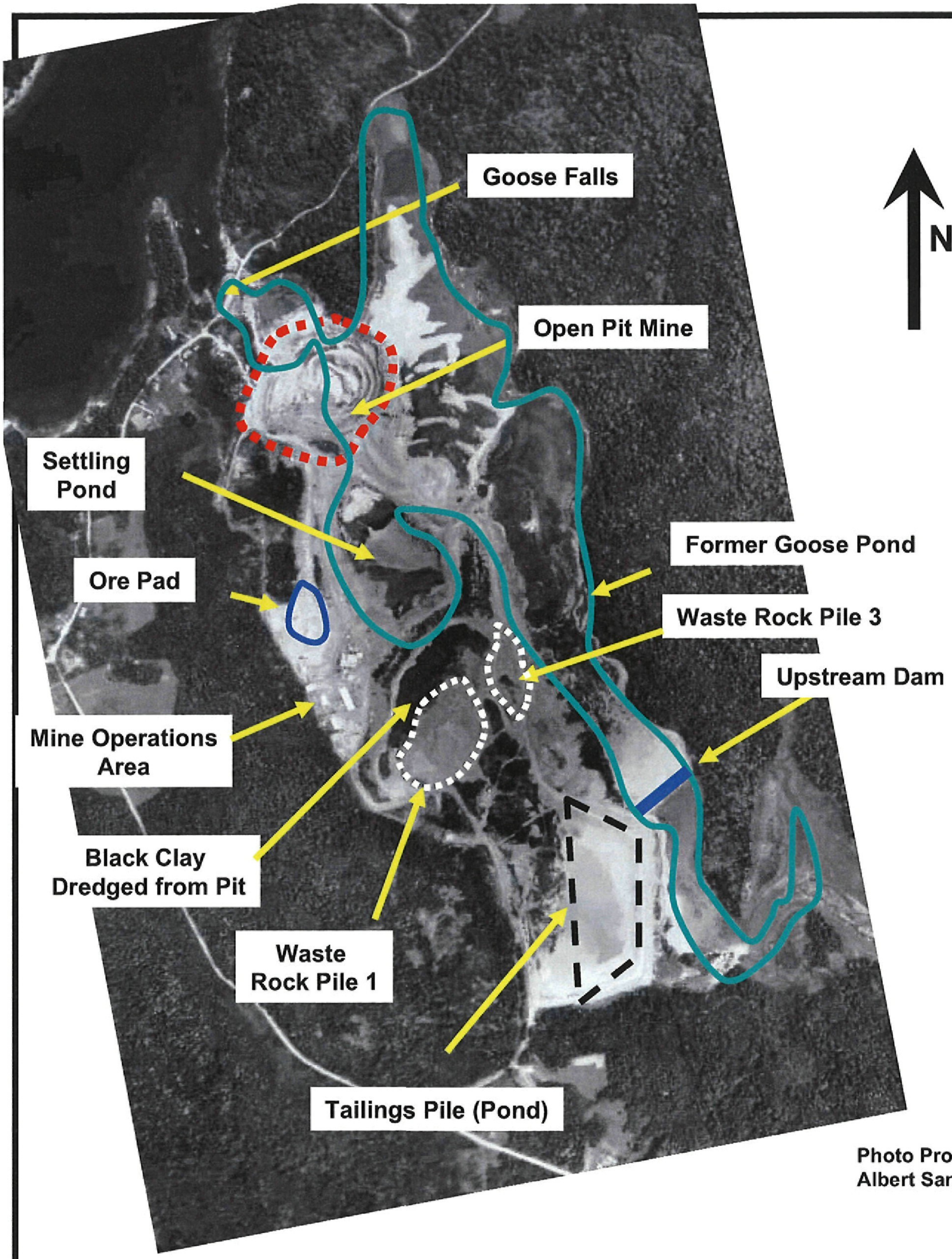


Photo Provided by
Albert Sandecki

Figure 1.4-2: Aerial
Photo, 1972

CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

M&E Metcalf & Eddy

TRC

Boott Mills South
Foot of John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0540-017H9

EPA CONTRACT NO. 68-W6-0042

RAC SUBCONTRACTOR NO. 107061

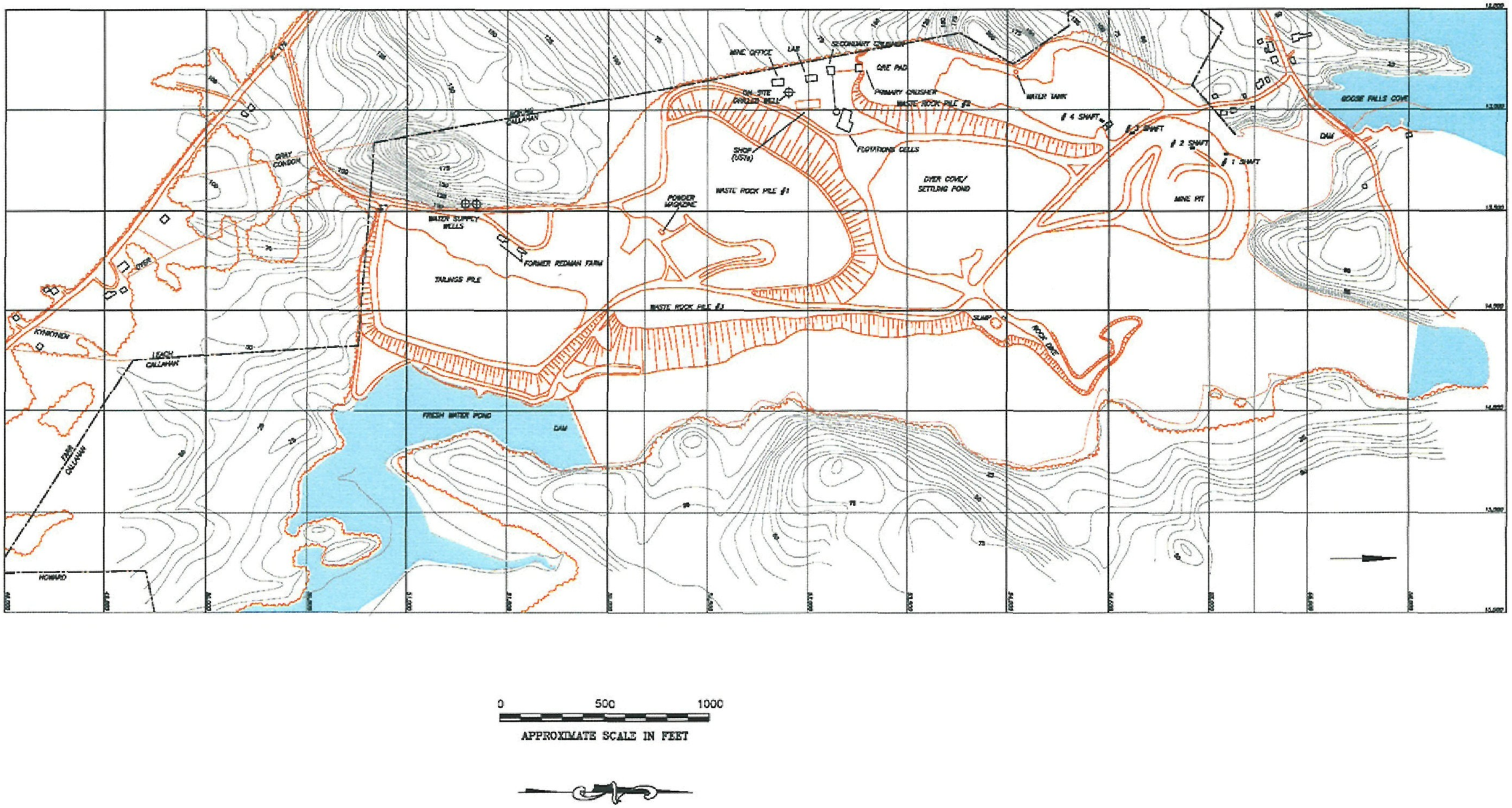


Figure 1.4-3: Map of 1972 Site Conditions

CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

M&E Metcalf & Eddy

TRC

Boott Mills South
Foot of John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0540-017H9

EPA CONTRACT NO.: 68-W6-0042

RAC SUBCONTRACTOR NO.: 107061

Figure 1.4-4: Aerial Photo of Mining Operations

CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

Metcalf & Eddy

TRC

Boott Mills South
Foot of John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0540-017H9

EPA CONTRACT NO.: 68-W6-0042

RAC SUBCONTRACTOR NO.: 107061

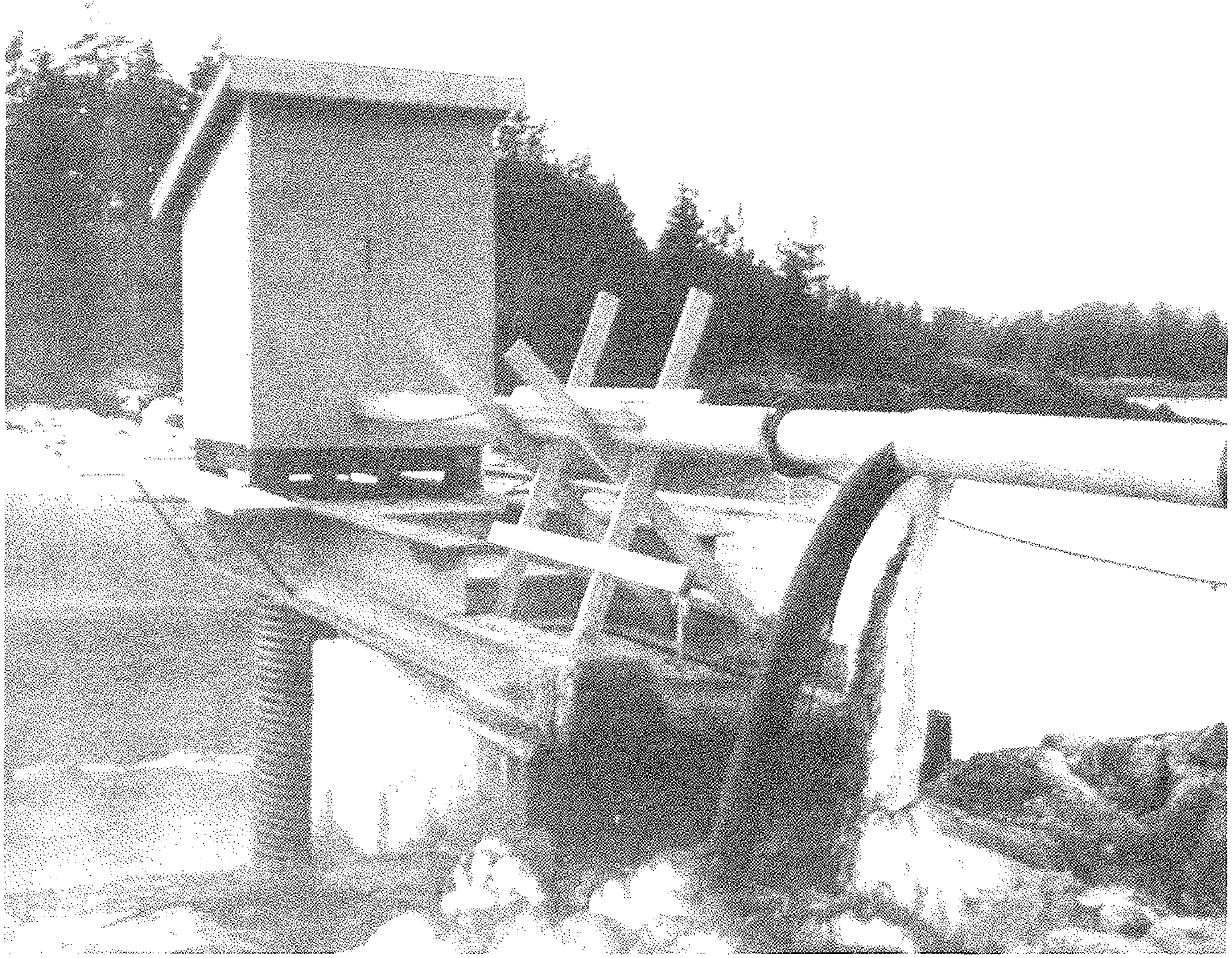


Photo Provided by
Albert Sandecki

Figure 1.4-5: Photo of Discharge Pipe

CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

Metcalf & Eddy

TRC

Boott Mills South
Foot of John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO. 02136-0540-01749

EPA CONTRACT NO. 68-W6-0042

RAC SUBCONTRACTOR NO. 107061

Figure 1.4-6: Aerial Photo, 2002

CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

M&E Metcalf & Eddy

TRC

Boott Mills South
Foot of John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0540-017H9

EPA CONTRACT NO. 68-W6-0042

RAC SUBCONTRACTOR NO.. 107061

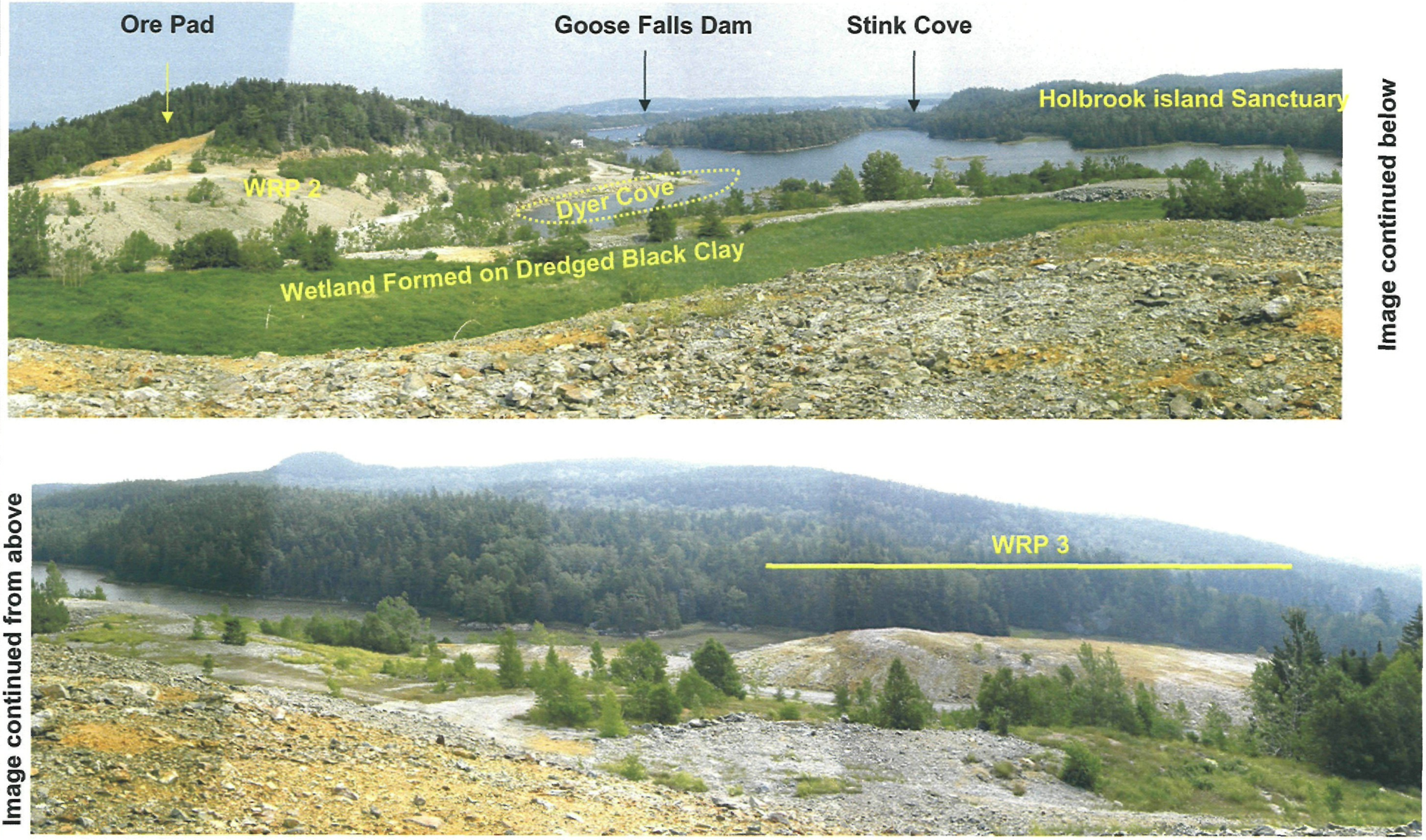


Figure 1.4-7: Photo of
Site from WRP-1

CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

M&E Metcalf & Eddy

TRC

Boott Mills South
Foot of John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0540-017H9

EPA CONTRACT NO.: 68-W6-0042

RAC SUBCONTRACTOR NO. 107061

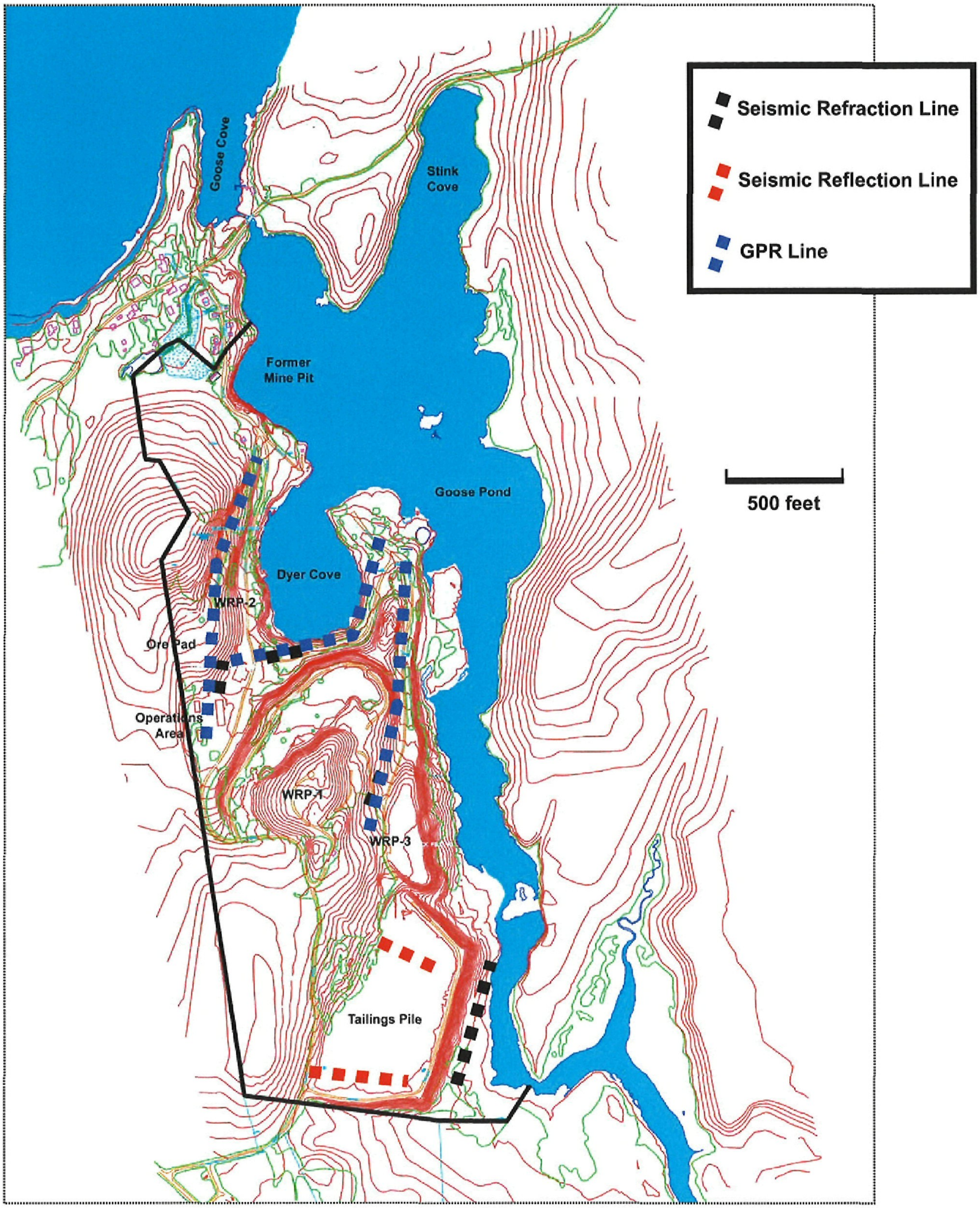


Figure 2.2-1: Geophysical Survey Locations

CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

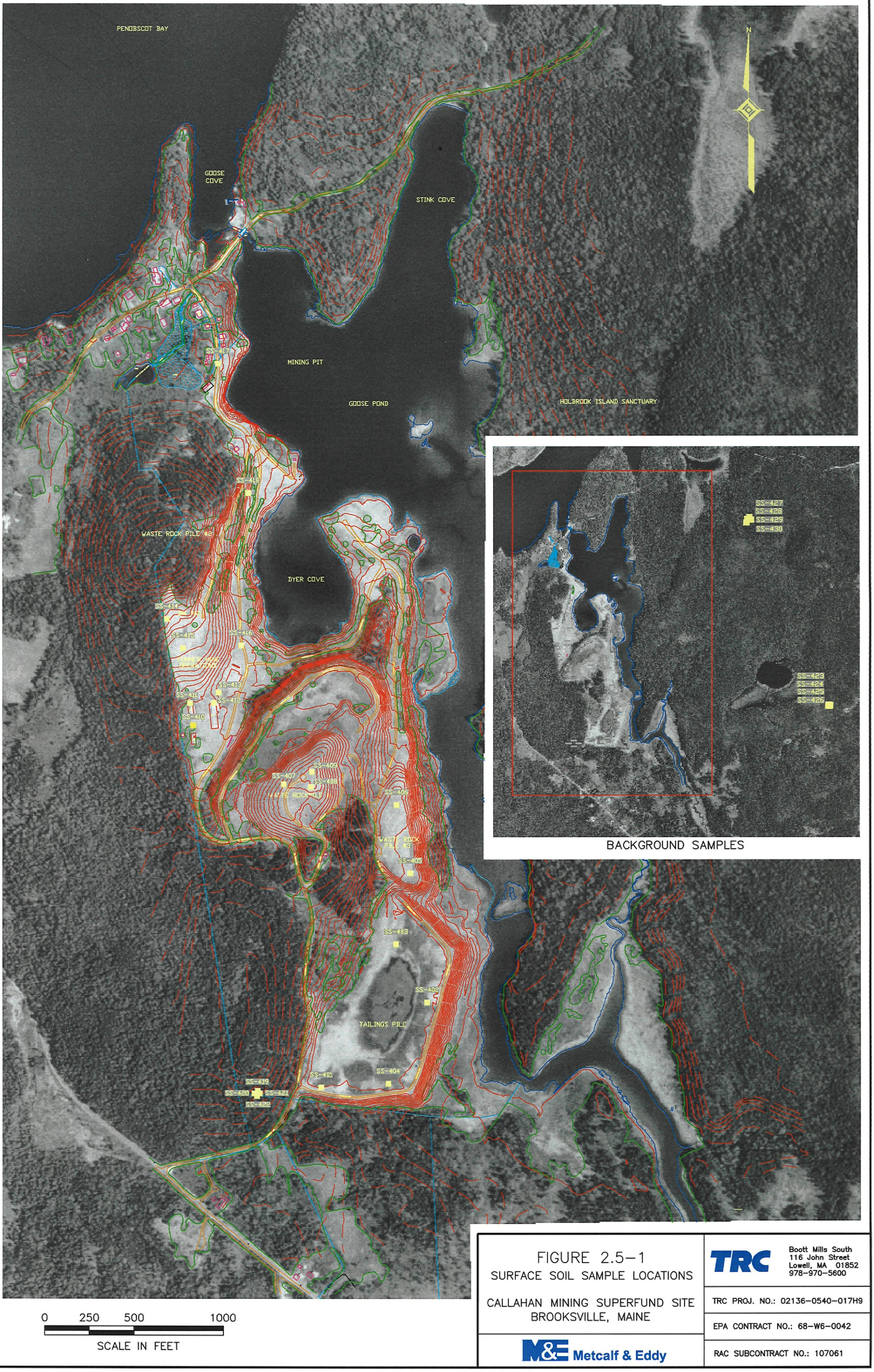
Metcalf & Eddy

Boott Mills South
Foot of John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136--0540--017H9

EPA CONTRACT NO. 68-W6-0042

RAC SUBCONTRACTOR NO. 107061



FILE: 02136\CALLAHAN MINING\RI\SURFACE SOIL SAMPLE LOCATIONS.DWG

FIGURE 2.5–1
SURFACE SOIL SAMPLE LOCATIONS

CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

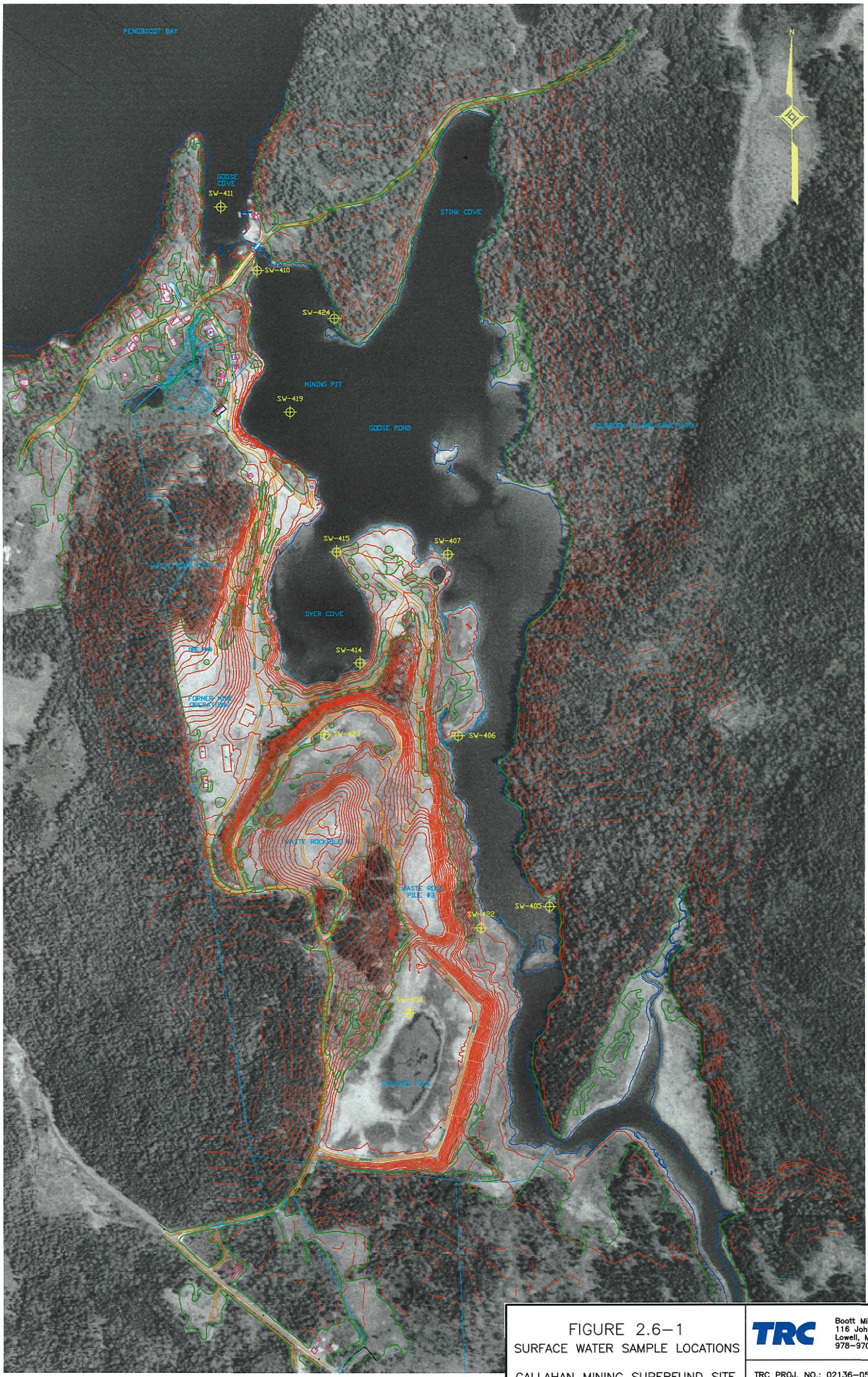
M&E Metcalf & Eddy

TRC
Boott Mills South
116 John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0540-017H9

EPA CONTRACT NO.: 68-W6-0042

RAC SUBCONTRACT NO.: 107061



FILE: 02136\CALLAHAN MINING\SURFACE WATER SAMPLE LOCATIONS.DWG

FIGURE 2.6–1
SURFACE WATER SAMPLE LOCATIONS

CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

M&E Metcalf & Eddy

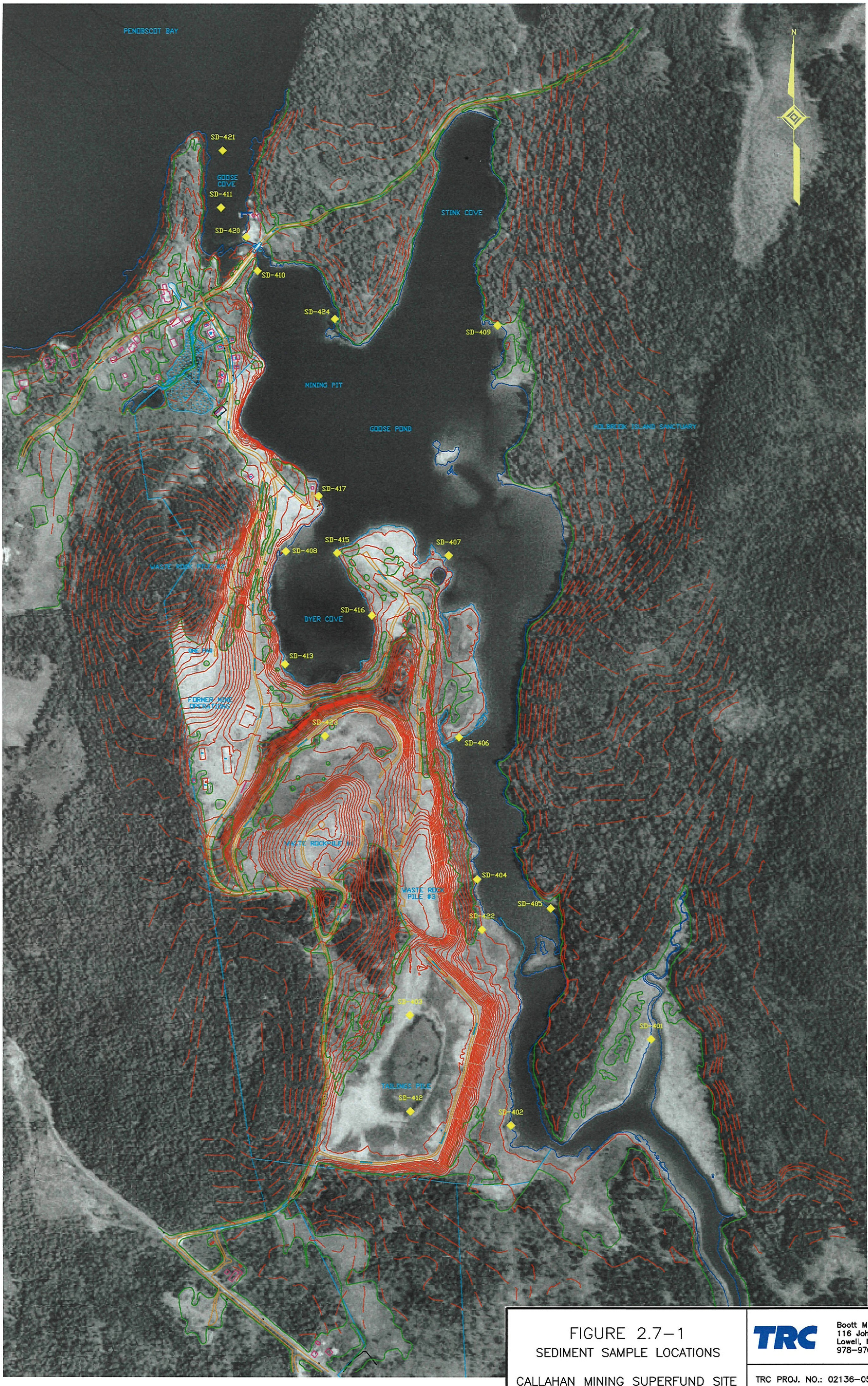
TRC

Boott Mills South
116 John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0540-017H9

EPA CONTRACT NO.: 68-W6-0042

RAC SUBCONTRACT NO.: 107061



FILE: 02136\CALLAHAN MINING\RI\SEDIMENT SAMPLE LOCATIONS.DWG

FIGURE 2.7–1
SEDIMENT SAMPLE LOCATIONS

CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

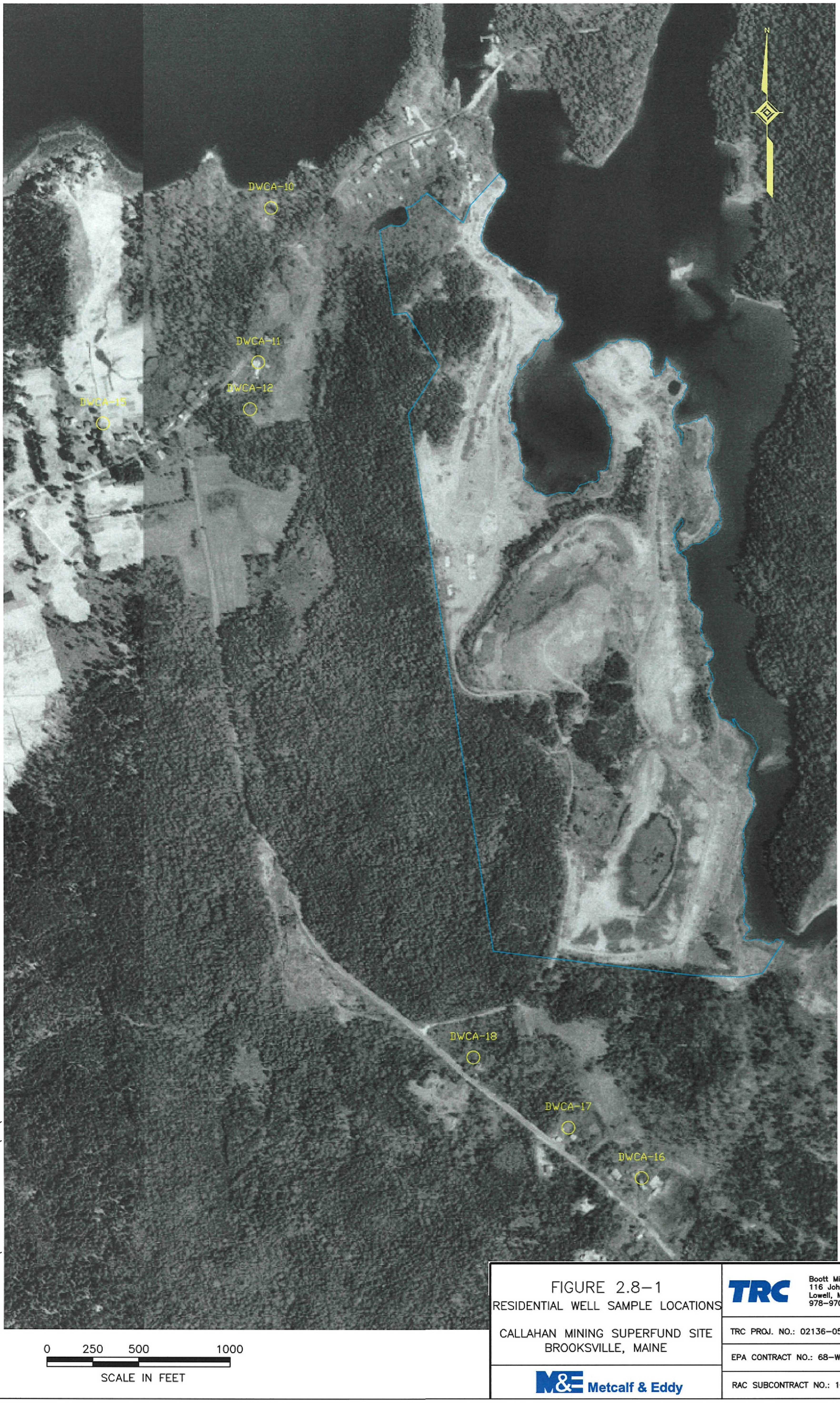
M&E Metcalf & Eddy

TRC
Boott Mills South
116 John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136–0540–017H9

EPA CONTRACT NO.: 68–W6–0042

RAC SUBCONTRACT NO.: 107061



FILE: 02136\CALLAHAN MINING\RI\RESIDENTIAL WELL SAMPLE LOCATIONS.DWG

FIGURE 2.8–1
RESIDENTIAL WELL SAMPLE LOCATIONS

CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

M&E Metcalf & Eddy

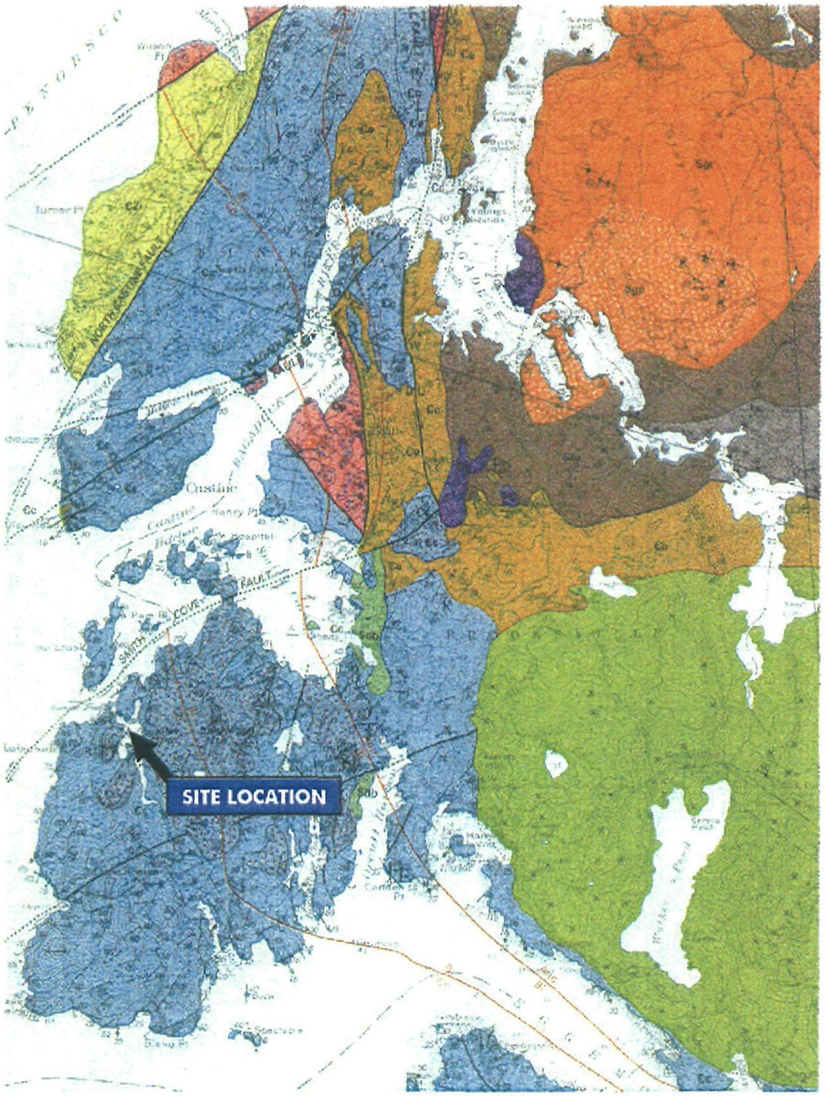
TRC

Boott Mills South
116 John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0540-017H9

EPA CONTRACT NO.: 68-W6-0042

RAC SUBCONTRACT NO.: 107061



Legend:

Ꞓc	Castine Volcanics (Late Cambrian)
Ꞓe	Ellsworth Schist (Middle Cambrian)
Ꞓzl	Islesboro Formation (Cambrian? and Lake Proterozoic?)
Op	Penobscot Formation (Ordovician)
Sdb	Diabase (Silurian?)
Ssg	Granite of Sedgwick (Silurian)
Sbz	Plutonic rocks of the border zone
Sg	Gabbro
Sgp	Granite of Grey Ridge
Scs	Granite of Camp Stream
Jp	Peridotite of Little Deer Isle (Jurassic?)

**BASE MAP IS A PORTION OF THE FOLLOWING:
GEOLOGY OF NORTHERN PENOBSCOT BAY, MAINE
BY DAVID B. STEWART WITH
CONTRIBUTIONS TO GEOCHRONOLOGY
BY ROBERT D. TUCKER, 1998**

Figure 3.1-1
BEDROCK GEOLOGY MAP

CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

Metcalf & Eddy

TRC

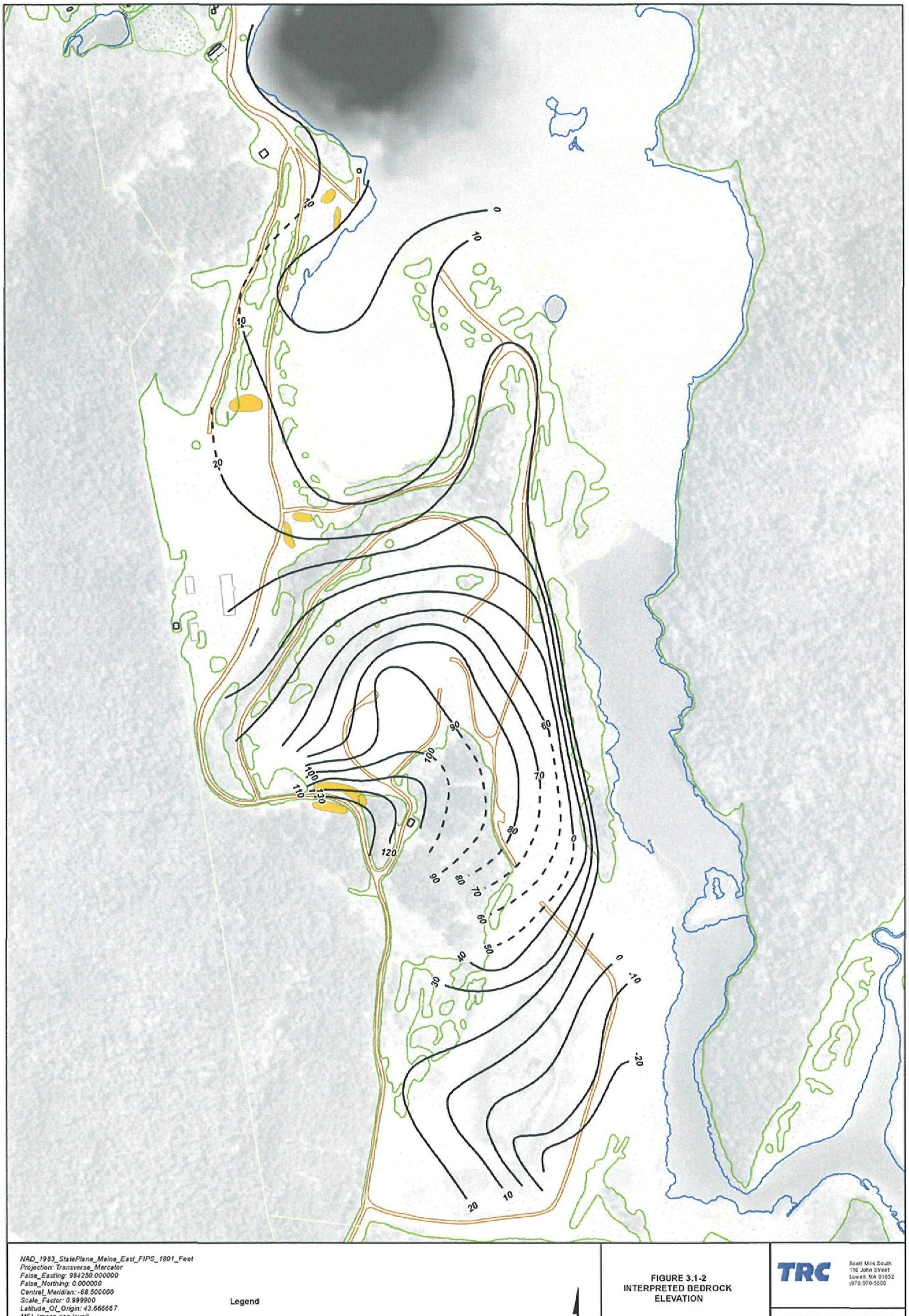
Boott Mills South
Foot of John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0480-017H1

EPA CONTRACT NO.: 68-W6-0042

RAC SUBCONTRACTOR NO.: 107061

02136\CALLAHAN\CONCEPTUAL\BEDROCK



NAD_1983_StatePlane_Maine_East_FIPS_1801_Feet
Projection: Transverse_Mercator
False_Easting: 984250.000000
False_Northing: 0.000000
Central_Meridian: -68.500000
Scale_Factor: 0.999900
Latitude_Of_Origin: 43.666667
MSL (mean sea level)
GCS_North_American_1983

200 100 0 200 Feet

Legend

🟨 BEDROCK OUTCROP OBSERVATION

N

FIGURE 3.1-2
INTERPRETED BEDROCK
ELEVATION

CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

Metcalf & Eddy

TRC

Boott Mills South
116 John Street
Lowell, MA 01852
(978) 970-5600

TRC PROJ NO 02136-0540-017H9

EPA CONTRACT NO 68-W6-0042

RAC SUBCONTRACTOR NO 107061

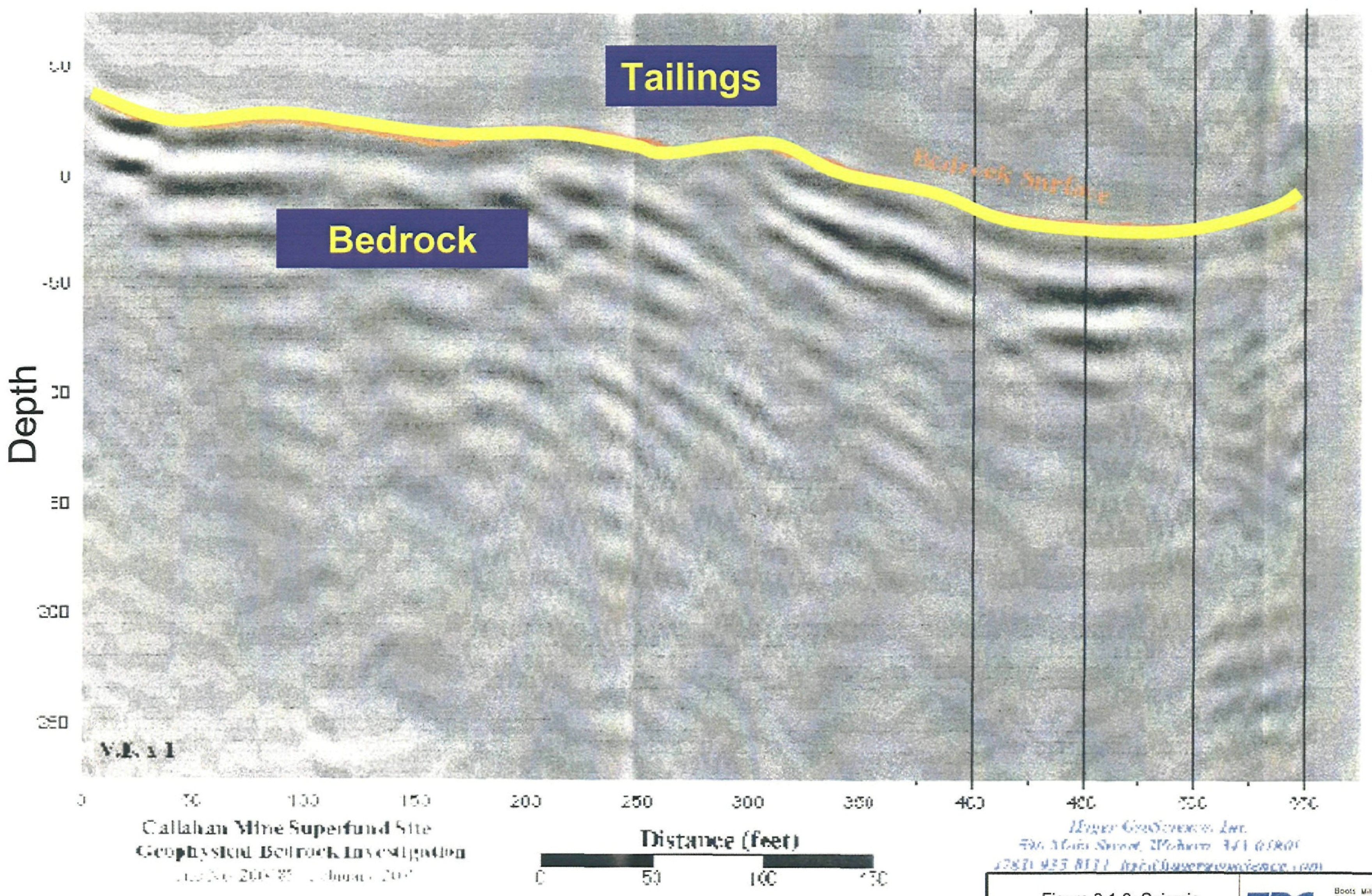


Figure 3.1-3: Seismic Reflection Profile TP-1	TRC Boots Mills South Foot of John Street Lowell, MA 01852 978-970-5600
CALLAHAN MINING SUPERFUND SITE BROOKSVILLE, MAINE	TRC PROJ. NO.: 02136-0540-017H9
	EPA CONTRACT NO.: 68-W6-0042
M&E Metcalf & Eddy	RAC SUBCONTRACTOR NO.: 107061

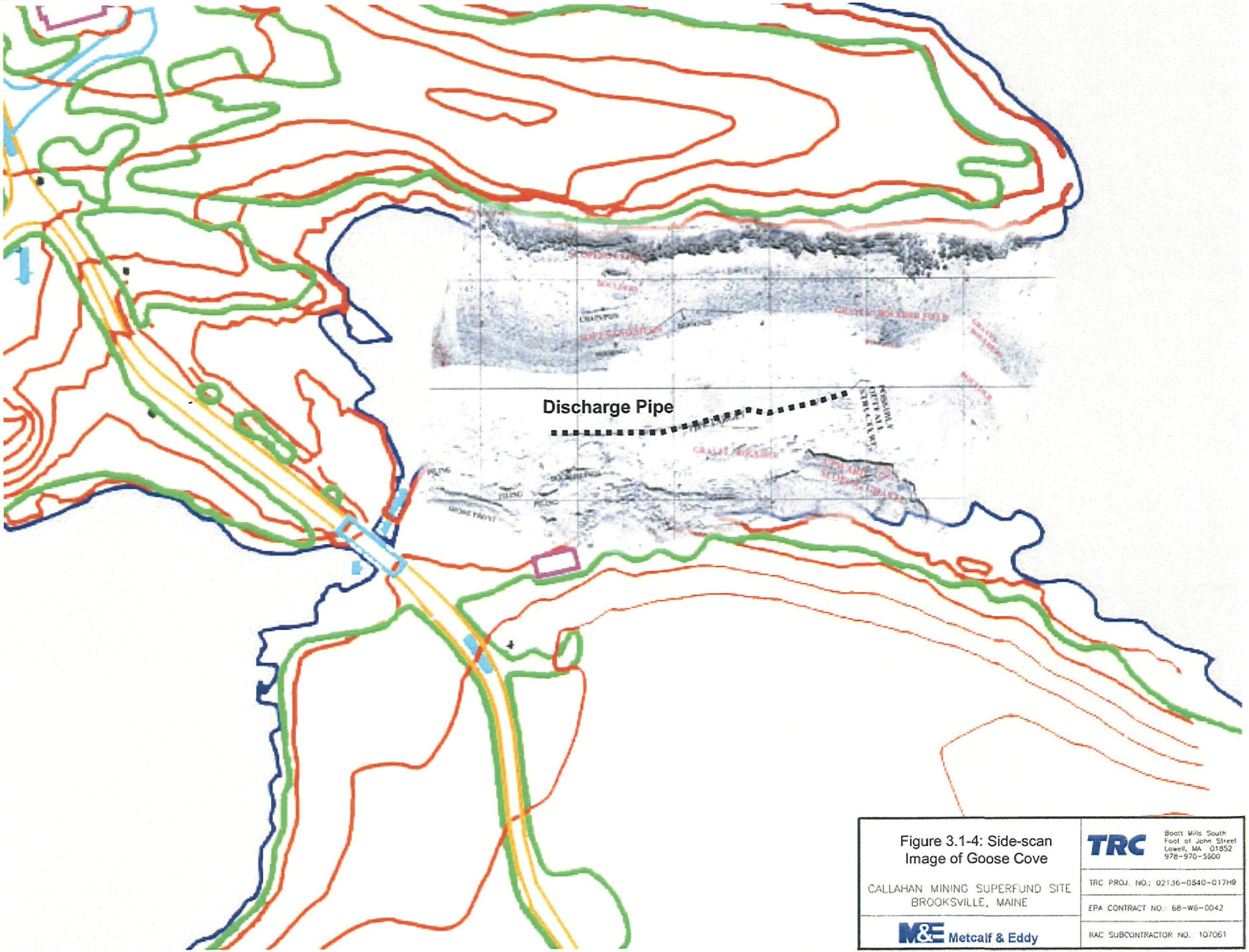


Figure 3.1-4: Side-scan Image of Goose Cove

CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

Metcalf & Eddy

TRC
Boott Mills South
Foot of John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0540-017H9

EPA CONTRACT NO.: 68-W6-0042

RAC SUBCONTRACTOR NO. 107061

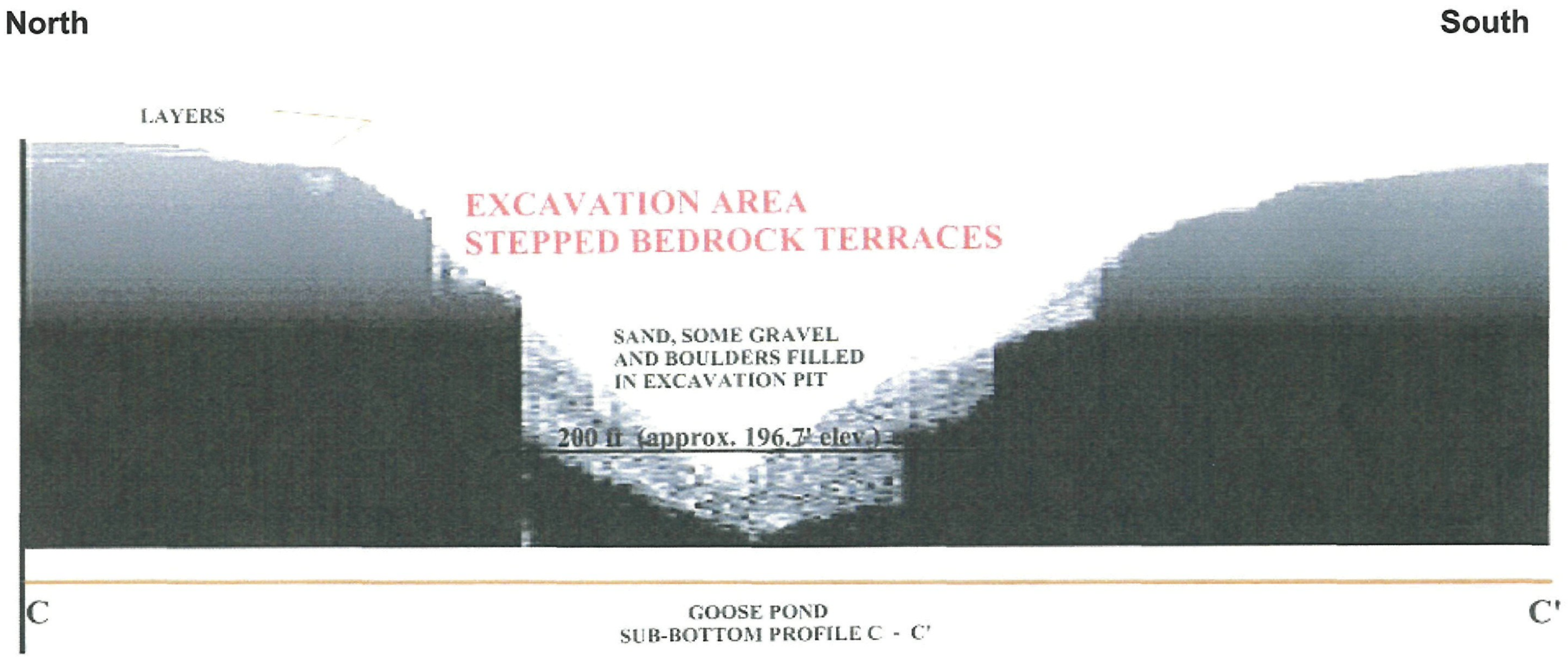


Figure 3.1-5: Sub-bottom Profile of Former Mine Pit

CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

Metcalf & Eddy

TRC

Boott Mills South
Foot of John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0540-017H9

EPA CONTRACT NO.: 68-W6-0042

RAC SUBCONTRACTOR NO.: 107061

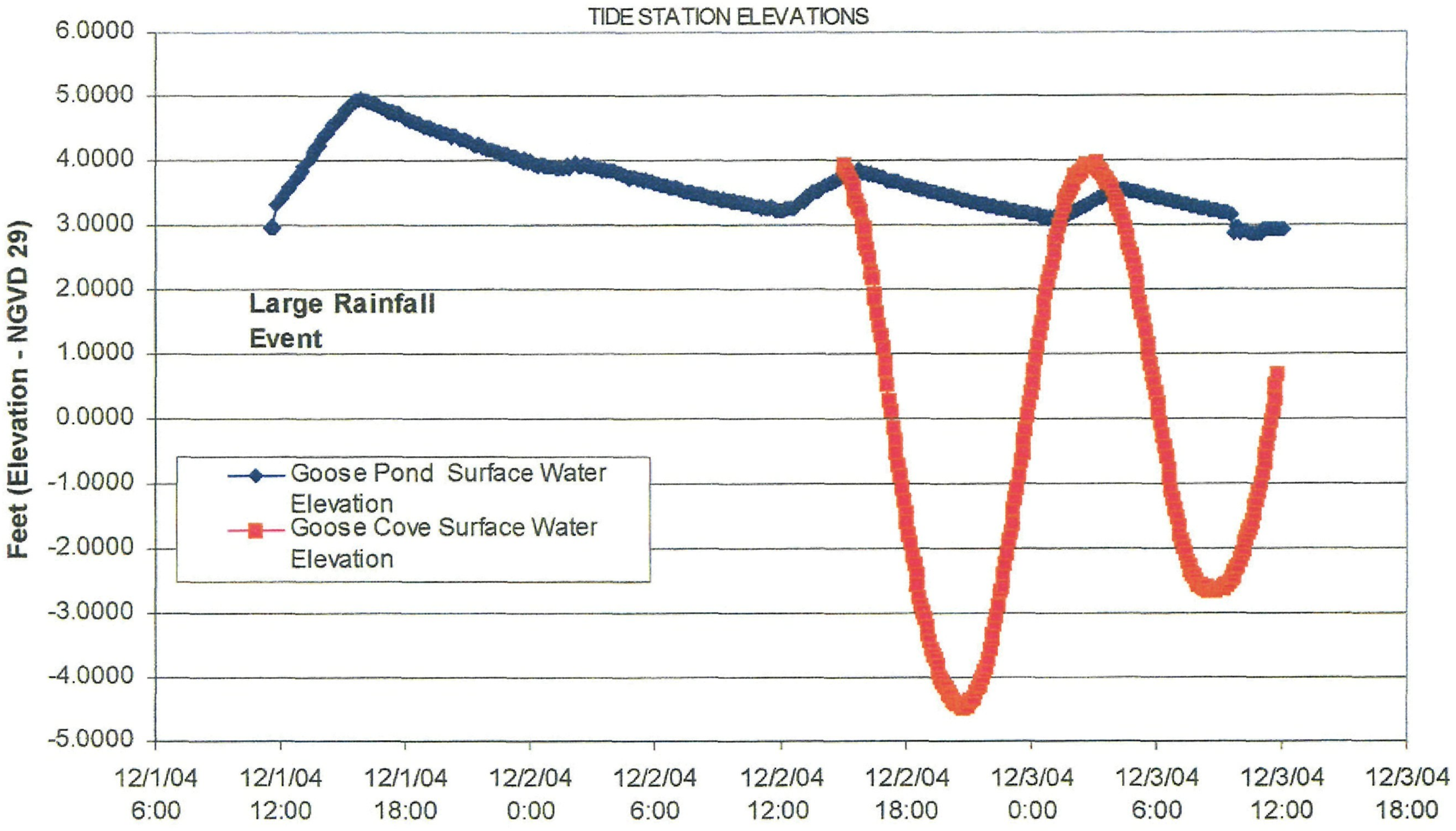


Figure 3.2-1: Water Level
Elevations from Tidal Gauge

CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

Metcalf & Eddy

TRC

Boott Mills South
Foot of John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0540-017H9

EPA CONTRACT NO.: 68-W6-0042

RAC SUBCONTRACTOR NO. 107061

Figure 3.3-1

HABITAT COVER TYPE

CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

M&E Metcalf & Eddy

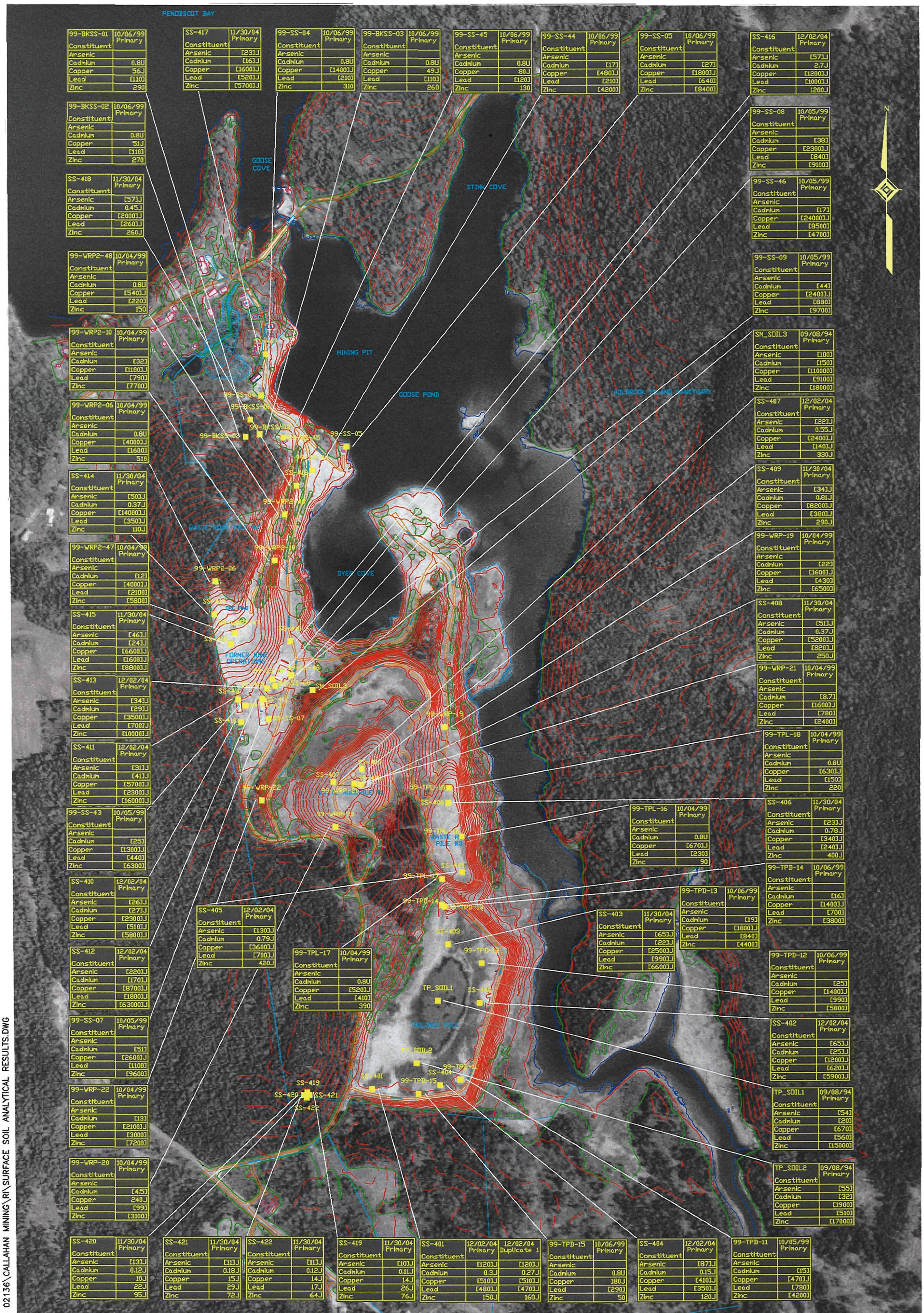
TRC
Boott Mills South
Foot of John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0480-017H2

EPA CONTRACT NO.: 68-W6-0042

RAC SUBCONTRACTOR NO.: 107061

02136\CALLAHAN\CONCEPTUAL MODEL\COVER TYPE



99-BKSS-01 Constituent	10/06/99 Primary
Arsenic	
Cadmium	0.8U
Copper	56J
Lead	[110]
Zinc	290

SS-417 Constituent	11/30/04 Primary
Arsenic	[23]J
Cadmium	[16]J
Copper	[1600]J
Lead	[520]J
Zinc	[5700]J

99-SS-04 Constituent	10/06/99 Primary
Arsenic	
Cadmium	0.8U
Copper	[1400]J
Lead	[210]
Zinc	310

99-BKSS-03 Constituent	10/06/99 Primary
Arsenic	
Cadmium	0.8U
Copper	49J
Lead	[110]
Zinc	260

99-SS-45 Constituent	10/06/99 Primary
Arsenic	
Cadmium	0.8U
Copper	80J
Lead	[120]
Zinc	130

99-SS-44 Constituent	10/06/99 Primary
Arsenic	
Cadmium	[17]
Copper	[480]J
Lead	[210]
Zinc	[4200]

99-SS-05 Constituent	10/06/99 Primary
Arsenic	
Cadmium	[27]
Copper	[1800]J
Lead	[640]
Zinc	[8400]

SS-416 Constituent	12/02/04 Primary
Arsenic	[57]J
Cadmium	2.7J
Copper	[1200]J
Lead	[1000]J
Zinc	1200J

99-BKSS-02 Constituent	10/06/99 Primary
Arsenic	
Cadmium	0.8U
Copper	51J
Lead	[110]
Zinc	270

SS-418 Constituent	11/30/04 Primary
Arsenic	[57]J
Cadmium	0.45J
Copper	[2000]J
Lead	[260]J
Zinc	260J

99-WRP2-48 Constituent	10/04/99 Primary
Arsenic	
Cadmium	0.8U
Copper	[540]J
Lead	[220]
Zinc	150

99-WRP2-10 Constituent	10/04/99 Primary
Arsenic	
Cadmium	[32]
Copper	[1100]J
Lead	[790]
Zinc	[7700]

99-WRP2-06 Constituent	10/04/99 Primary
Arsenic	
Cadmium	0.8U
Copper	[4000]J
Lead	[1600]
Zinc	510

SS-414 Constituent	11/30/04 Primary
Arsenic	[50]J
Cadmium	0.37J
Copper	[14000]J
Lead	[350]J
Zinc	110J

99-WRP2-47 Constituent	10/04/99 Primary
Arsenic	
Cadmium	[12]
Copper	[4000]J
Lead	[2100]
Zinc	[5800]

SS-415 Constituent	11/30/04 Primary
Arsenic	[46]J
Cadmium	[24]J
Copper	[6600]J
Lead	[1600]J
Zinc	[8800]J

SS-413 Constituent	12/02/04 Primary
Arsenic	[34]J
Cadmium	[29]J
Copper	[3500]J
Lead	[700]J
Zinc	[10000]J

SS-411 Constituent	12/02/04 Primary
Arsenic	[31]J
Cadmium	[41]J
Copper	[5700]J
Lead	[2300]J
Zinc	[16000]J

99-SS-43 Constituent	10/05/99 Primary
Arsenic	
Cadmium	[25]
Copper	[1300]J
Lead	[440]
Zinc	[6300]

SS-410 Constituent	12/02/04 Primary
Arsenic	[26]J
Cadmium	[27]J
Copper	[2300]J
Lead	[510]J
Zinc	[5800]J

SS-412 Constituent	12/02/04 Primary
Arsenic	[220]J
Cadmium	[170]J
Copper	[8700]J
Lead	[1800]J
Zinc	[63000]J

99-SS-07 Constituent	10/05/99 Primary
Arsenic	
Cadmium	[51]
Copper	[2600]J
Lead	[1100]
Zinc	[9600]

99-WRP-22 Constituent	10/04/99 Primary
Arsenic	
Cadmium	[13]
Copper	[2100]J
Lead	[3000]
Zinc	[7200]

99-WRP-20 Constituent	10/04/99 Primary
Arsenic	
Cadmium	[4.5]
Copper	240J
Lead	[99]
Zinc	[3100]

99-SS-08 Constituent	10/05/99 Primary
Arsenic	
Cadmium	[38]
Copper	[2300]J
Lead	[840]
Zinc	[9100]

99-SS-46 Constituent	10/05/99 Primary
Arsenic	
Cadmium	[17]
Copper	[24000]J
Lead	[8500]
Zinc	[4700]

99-SS-09 Constituent	10/05/99 Primary
Arsenic	
Cadmium	[44]
Copper	[2400]J
Lead	[880]
Zinc	[9700]

SM_SOIL3 Constituent	09/08/94 Primary
Arsenic	[100]
Cadmium	[150]
Copper	[110000]
Lead	[9100]
Zinc	[18000]

SS-407 Constituent	12/02/04 Primary
Arsenic	[22]J
Cadmium	0.55J
Copper	[2400]J
Lead	[140]J
Zinc	330J

SS-409 Constituent	11/30/04 Primary
Arsenic	[34]J
Cadmium	0.81J
Copper	[8200]J
Lead	[380]J
Zinc	290J

99-WRP-19 Constituent	10/04/99 Primary
Arsenic	
Cadmium	[22]
Copper	[1600]J
Lead	[430]
Zinc	[6500]

SS-408 Constituent	11/30/04 Primary
Arsenic	[51]J
Cadmium	0.37J
Copper	[5200]J
Lead	[820]J
Zinc	250J

99-WRP-21 Constituent	10/04/99 Primary
Arsenic	
Cadmium	[8.7]
Copper	[1600]J
Lead	[780]
Zinc	[2400]

99-TPL-18 Constituent	10/04/99 Primary
Arsenic	
Cadmium	0.8U
Copper	[630]J
Lead	[150]
Zinc	220

99-TPL-16 Constituent	10/04/99 Primary
Arsenic	
Cadmium	0.8U
Copper	[670]J
Lead	[230]
Zinc	90

SS-406 Constituent	11/30/04 Primary
Arsenic	[23]J
Cadmium	0.78J
Copper	[340]J
Lead	[240]J
Zinc	400J

99-TPD-14 Constituent	10/06/99 Primary
Arsenic	
Cadmium	[16]
Copper	[1400]J
Lead	[700]
Zinc	[3800]

99-TPD-13 Constituent	10/06/99 Primary
Arsenic	
Cadmium	[19]
Copper	[1800]J
Lead	[840]
Zinc	[4400]

SS-405 Constituent	12/02/04 Primary
Arsenic	[130]J
Cadmium	0.79J
Copper	[3600]J
Lead	[700]J
Zinc	420J

SS-403 Constituent	11/30/04 Primary
Arsenic	[65]J
Cadmium	[22]J
Copper	[2500]J
Lead	[990]J
Zinc	[6600]J

99-TPL-17 Constituent	10/04/99 Primary
Arsenic	
Cadmium	0.8U
Copper	[520]J
Lead	[410]
Zinc	390

99-TPD-12 Constituent	10/06/99 Primary
Arsenic	
Cadmium	[25]
Copper	[1400]J
Lead	[990]
Zinc	[5800]

SS-402 Constituent	12/02/04 Primary
Arsenic	[65]J
Cadmium	[25]J
Copper	[1200]J
Lead	[620]J
Zinc	[5900]J

TP_SOIL1 Constituent	09/08/94 Primary
Arsenic	[54]
Cadmium	[20]
Copper	[670]
Lead	[560]
Zinc	[15000]

TP_SOIL2 Constituent	09/08/94 Primary
Arsenic	[55]
Cadmium	[32]
Copper	[1900]
Lead	[510]
Zinc	[17000]

SS-420 Constituent	11/30/04 Primary
Arsenic	[13]J
Cadmium	0.12J
Copper	10J
Lead	22J
Zinc	95J

SS-421 Constituent	11/30/04 Primary
Arsenic	[11]J
Cadmium	0.18J
Copper	15J
Lead	29J
Zinc	72J

SS-422 Constituent	11/30/04 Primary
Arsenic	[11]J
Cadmium	0.12J
Copper	14J
Lead	17J
Zinc	64J

SS-419 Constituent	11/30/04 Primary
Arsenic	[10]J
Cadmium	0.11J
Copper	14J
Lead	26J
Zinc	76J

SS-401 Constituent	12/02/04 Primary	12/02/04 Duplicate 1
Arsenic	[120]J	[120]J
Cadmium	0.3J	0.27J
Copper	[510]J	[510]J
Lead	[480]J	[470]J
Zinc	150J	160J

99-TPD-15 Constituent	10/06/99 Primary
Arsenic	
Cadmium	0.8U
Copper	180J
Lead	[290]
Zinc	50

SS-404 Constituent	12/02/04 Primary
Arsenic	[87]J
Cadmium	0.15J
Copper	[410]J
Lead	[350]J
Zinc	120J

99-TPD-11 Constituent	10/05/99 Primary
Arsenic	
Cadmium	[15]
Copper	[470]J
Lead	[780]
Zinc	[4200]

FILE: 02136\CALLAHAN MINING\RI\SURFACE SOIL ANALYTICAL RESULTS.DWG

All results in milligrams per kilogram (mg/kg)

0 250 500 1000

SCALE IN FEET

SURFACE SOIL SCREENING VALUES			
Constituent	Units	Maine RAGs Residential Soil	Region IX PRGs for Residential Soil
Arsenic	mg/kg	10	3.9E-01
Cadmium	mg/kg	27	3.7E+00
Copper	mg/kg	650	3.1E+02
Lead	mg/kg	375	4.0E+01
Zinc	mg/kg	1500	2.3E+03

[conc] indicates concentration exceeds one or more screening values.

FIGURE 4.1-1
SURFACE SOIL ANALYTICAL RESULTS
(mg/kg)
CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

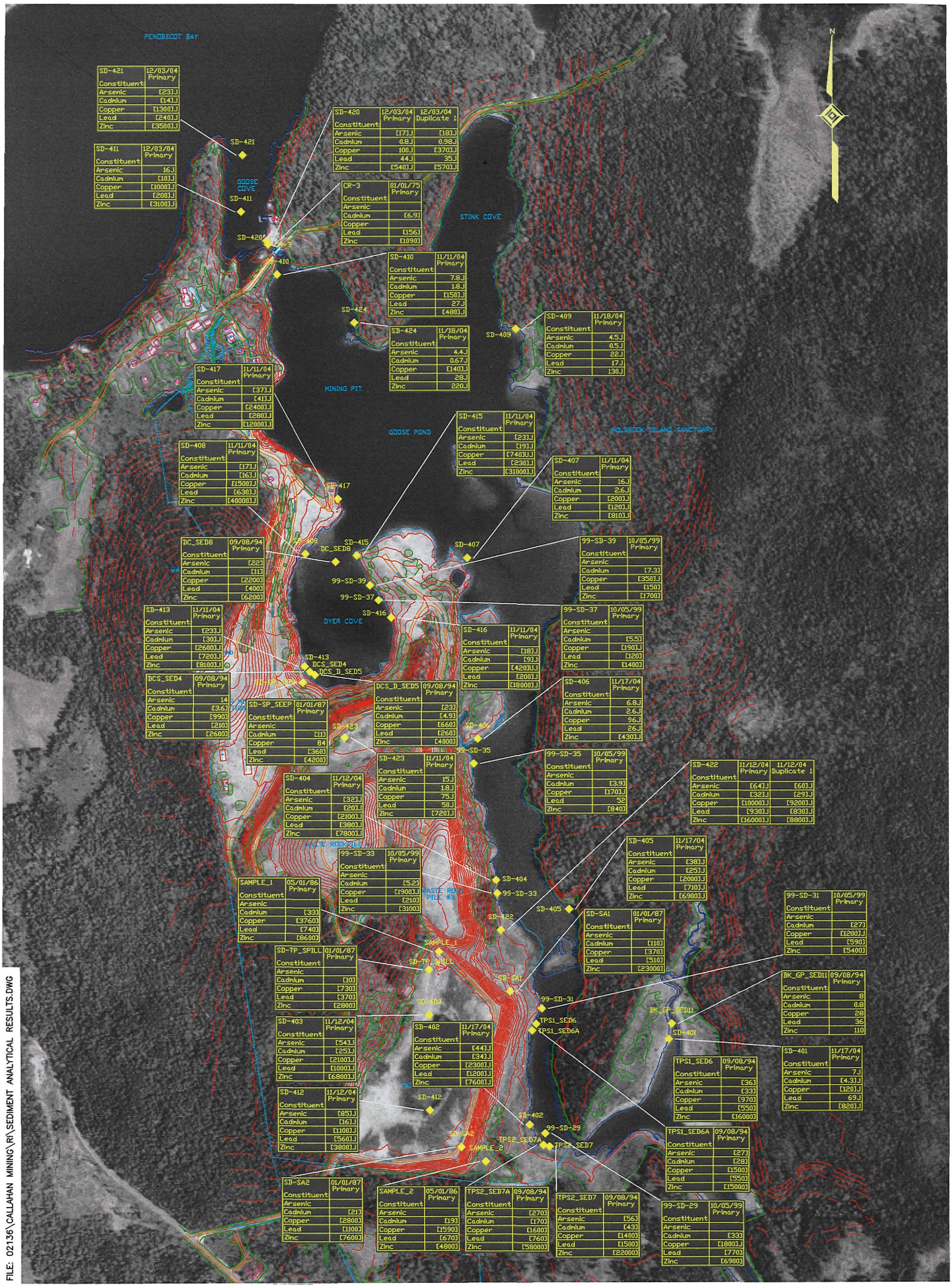
Metcalf & Eddy

TRC
Boott Mills South
116 John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0540-017H9

EPA CONTRACT NO.: 68-W6-0042

RAC SUBCONTRACT NO.: 107061



FILE: 02136\CALLAHAN MINING\RI\SEDIMENT ANALYTICAL RESULTS.DWG

All concentrations in
milligrams per kilogram (mg/kg)

0 250 500 1000

SCALE IN FEET

SEDIMENT SCREENING VALUES

Constituent	Units	NOAA SQRT for Fresh Water Sediment	NOAA SQRT for Marine Sediment
Arsenic	mg/kg	17	41.6
Cadmium	mg/kg	3.5	4.2
Copper	mg/kg	197	108
Lead	mg/kg	91.3	112
Zinc	mg/kg	315	271

[conc] indicates concentration exceeds one or more screening values.

FIGURE 4.2-1
SEDIMENT ANALYTICAL RESULTS

CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

M&E Metcalf & Eddy

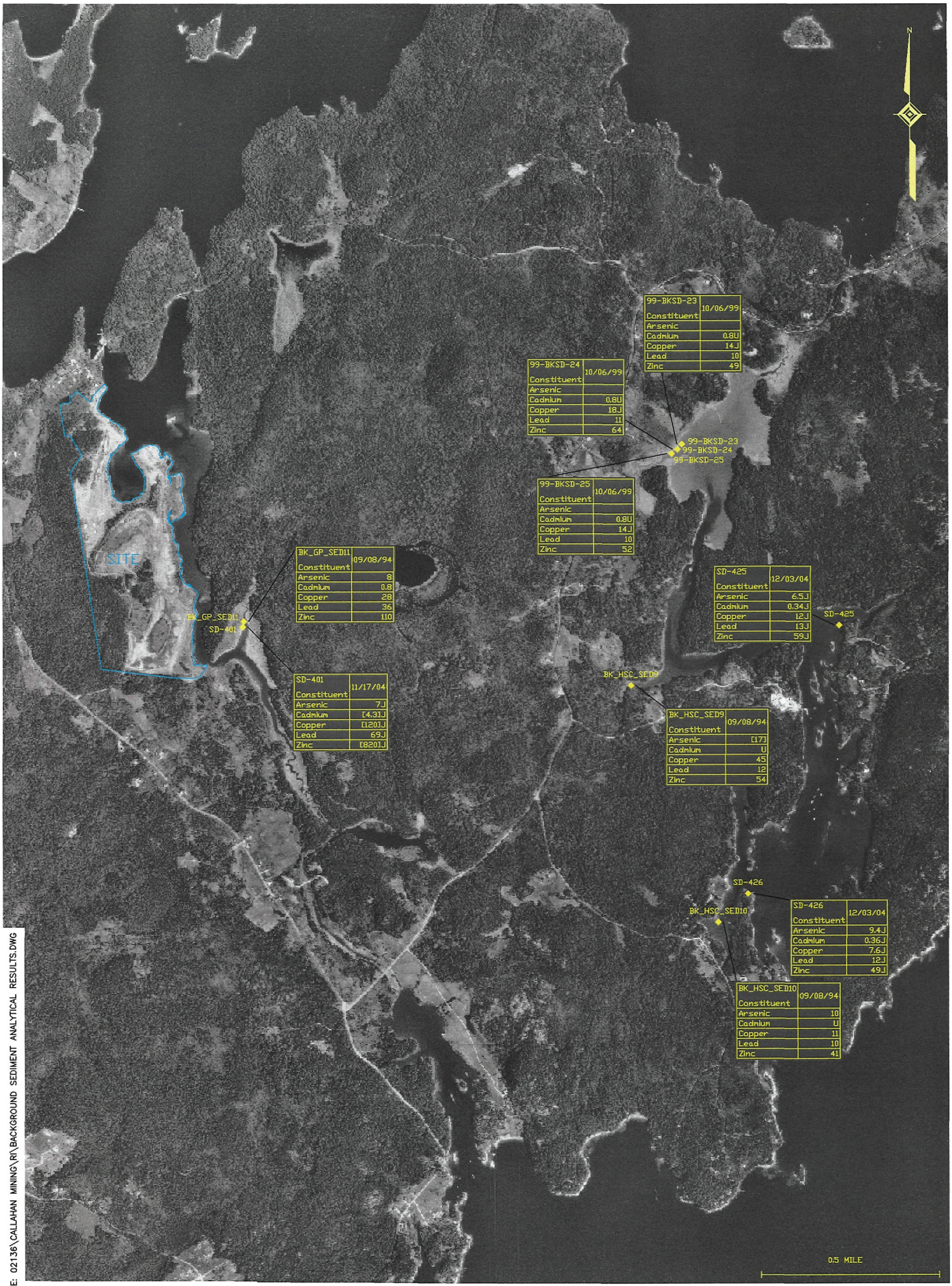
TRC

Boott Mills South
116 John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0540-017H9

EPA CONTRACT NO.: 68-W6-0042

RAC SUBCONTRACT NO.: 107061



99-BKSD-23 Constituent	10/06/99
Arsenic	
Cadmium	0.8U
Copper	14J
Lead	10
Zinc	49

99-BKSD-24 Constituent	10/06/99
Arsenic	
Cadmium	0.8U
Copper	18J
Lead	11
Zinc	64

99-BKSD-25 Constituent	10/06/99
Arsenic	
Cadmium	0.8U
Copper	14J
Lead	10
Zinc	52

BK_GP_SED11 Constituent	09/08/94
Arsenic	8
Cadmium	0.8
Copper	28
Lead	36
Zinc	110

SD-425 Constituent	12/03/04
Arsenic	6.5J
Cadmium	0.34J
Copper	12J
Lead	13J
Zinc	59J

SD-401 Constituent	11/17/04
Arsenic	7J
Cadmium	[4.3]J
Copper	[120]J
Lead	69J
Zinc	[820]J

BK_HSC_SED9 Constituent	09/08/94
Arsenic	[17]
Cadmium	U
Copper	45
Lead	12
Zinc	54

SD-426 Constituent	12/03/04
Arsenic	9.4J
Cadmium	0.36J
Copper	7.6J
Lead	12J
Zinc	49J

BK_HSC_SED10 Constituent	09/08/94
Arsenic	10
Cadmium	U
Copper	11
Lead	10
Zinc	41

FILE: 02136\CALLAHAN MINING\RI\BACKGROUND SEDIMENT ANALYTICAL RESULTS.DWG

All concentrations in milligrams per kilogram (mg/kg)

SEDIMENT SCREENING VALUES

Constituent	Units	NOAA SQRT for Fresh Water Sediment	NOAA SQRT for Marine Sediment
Arsenic	mg/kg	17	41.6
Cadmium	mg/kg	3.5	4.2
Copper	mg/kg	197	108
Lead	mg/kg	91.3	112
Zinc	mg/kg	315	271

[conc] indicates concentration exceeds one or more screening values.

FIGURE 4.2–2

SEDIMENT ANALYTICAL RESULTS
BACKGROUND LOCATIONS
CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

M&E Metcalf & Eddy

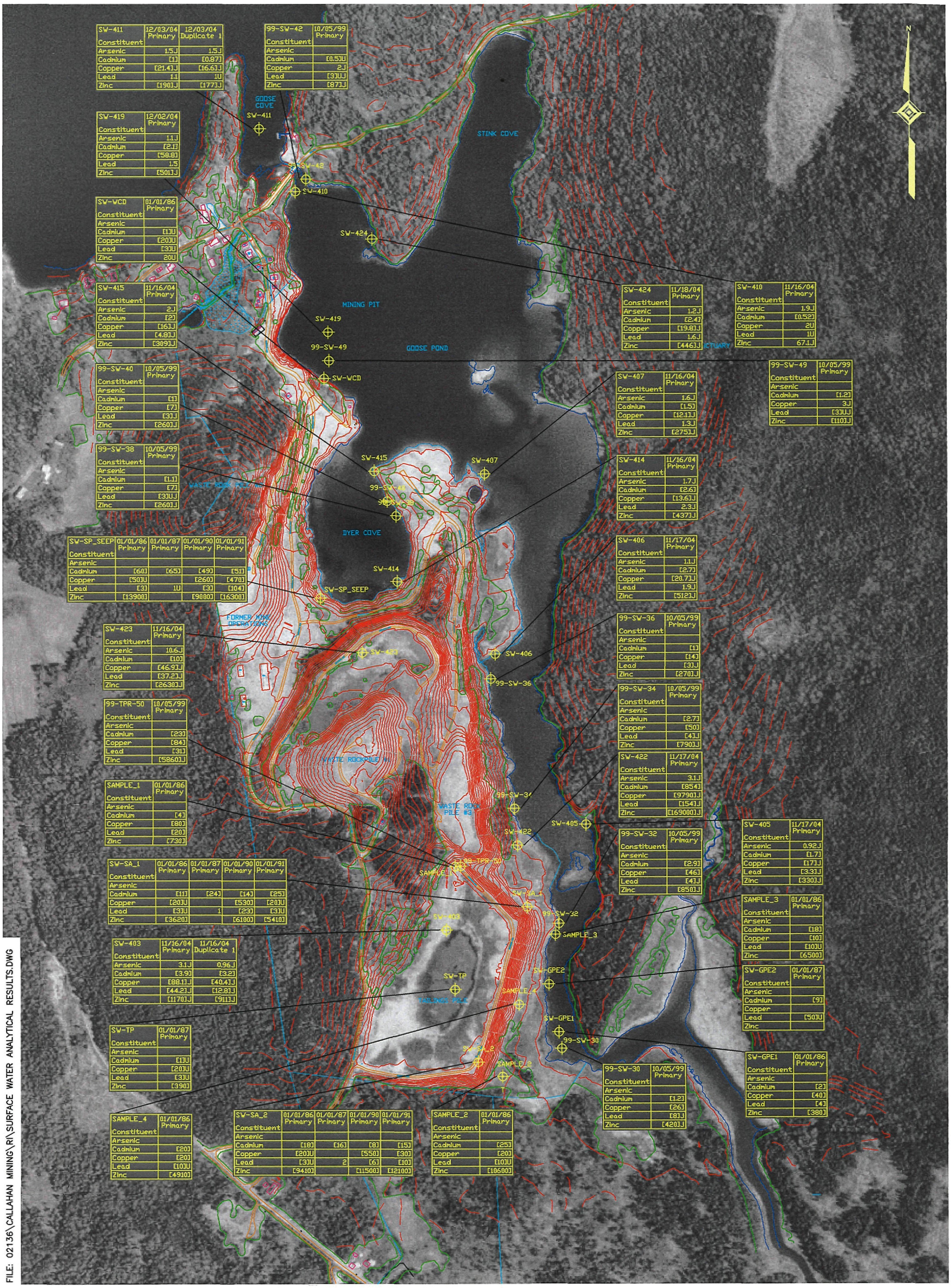
TRC

Boott Mills South
116 John Street
Lowell, MA 01852
978–970–5600

TRC PROJ. NO.: 02136–0540–017H9

EPA CONTRACT NO.: 68–W6–0042

RAC SUBCONTRACT NO.: 107061



SW-411 Constituent	12/03/04 Primary	12/03/04 Duplicate 1
Arsenic	1.5J	1.5J
Cadmium	[1]	[0.87]
Copper	[21.4]J	[16.6]J
Lead	1.1	1U
Zinc	[190]J	[177]J

99-SW-42 Constituent	10/05/99 Primary
Arsenic	
Cadmium	[0.5]U
Copper	2J
Lead	[3]UJ
Zinc	[87]J

SW-419 Constituent	12/02/04 Primary
Arsenic	1.1J
Cadmium	[2.1]
Copper	[58.8]
Lead	1.5
Zinc	[501]J

SW-WCD Constituent	01/01/86 Primary
Arsenic	
Cadmium	[1]U
Copper	[20]U
Lead	[3]U
Zinc	20U

SW-415 Constituent	11/16/04 Primary
Arsenic	2J
Cadmium	[2]
Copper	[16]J
Lead	[4.8]J
Zinc	[309]J

99-SW-40 Constituent	10/05/99 Primary
Arsenic	
Cadmium	[1]
Copper	[7]
Lead	[3]J
Zinc	[260]J

99-SW-38 Constituent	10/05/99 Primary
Arsenic	
Cadmium	[1.1]
Copper	[7]
Lead	[3]UJ
Zinc	[260]J

SW-SP_SEEP Constituent	01/01/86 Primary	01/01/87 Primary	01/01/90 Primary	01/01/91 Primary
Arsenic				
Cadmium	[60]	[65]	[49]	[51]
Copper	[50]U		[260]	[470]
Lead	[3]	1U	[3]	[104]
Zinc	[13900]		[9000]	[16300]

SW-423 Constituent	11/16/04 Primary
Arsenic	10.6J
Cadmium	[10]
Copper	[46.9]J
Lead	[37.2]J
Zinc	[2630]J

99-TPR-50 Constituent	10/05/99 Primary
Arsenic	
Cadmium	[23]
Copper	[84]
Lead	[31]
Zinc	[5860]J

SAMPLE_1 Constituent	01/01/86 Primary
Arsenic	
Cadmium	[4]
Copper	[80]
Lead	[20]
Zinc	[730]

SW-SA_1 Constituent	01/01/86 Primary	01/01/87 Primary	01/01/90 Primary	01/01/91 Primary
Arsenic				
Cadmium	[11]	[24]	[14]	[25]
Copper	[20]U		[530]	[20]U
Lead	[3]U	1	[23]	[3]U
Zinc	[3620]		[6100]	[5410]

SW-403 Constituent	11/16/04 Primary	11/16/04 Duplicate 1
Arsenic	3.1J	0.96J
Cadmium	[3.9]	[3.2]
Copper	[88.1]J	[40.4]J
Lead	[44.2]J	[12.8]J
Zinc	[1170]J	[911]J

SW-TP Constituent	01/01/87 Primary
Arsenic	
Cadmium	[1]U
Copper	[20]U
Lead	[3]U
Zinc	[390]

SAMPLE_4 Constituent	01/01/86 Primary
Arsenic	
Cadmium	[20]
Copper	[20]
Lead	[10]U
Zinc	[4910]

SW-SA_2 Constituent	01/01/86 Primary	01/01/87 Primary	01/01/90 Primary	01/01/91 Primary
Arsenic				
Cadmium	[18]	[16]	[8]	[15]
Copper	[20]U		[550]	[30]
Lead	[3]U	2	[6]	[10]
Zinc	[9410]		[11500]	[12100]

SAMPLE_2 Constituent	01/01/86 Primary
Arsenic	
Cadmium	[25]
Copper	[20]
Lead	[10]U
Zinc	[10600]

SW-424 Constituent	11/18/04 Primary
Arsenic	1.2J
Cadmium	[2.4]
Copper	[19.8]J
Lead	1.6J
Zinc	[446]J

SW-410 Constituent	11/16/04 Primary
Arsenic	1.9J
Cadmium	[0.52]
Copper	2U
Lead	1U
Zinc	67.1J

99-SW-49 Constituent	10/05/99 Primary
Arsenic	
Cadmium	[1.2]
Copper	3J
Lead	[3]UJ
Zinc	[110]J

SW-407 Constituent	11/16/04 Primary
Arsenic	1.6J
Cadmium	[1.5]
Copper	[12.1]J
Lead	1.3J
Zinc	[275]J

SW-414 Constituent	11/16/04 Primary
Arsenic	1.7J
Cadmium	[2.6]
Copper	[13.6]J
Lead	2.3J
Zinc	[437]J

SW-406 Constituent	11/17/04 Primary
Arsenic	1.1J
Cadmium	[2.7]
Copper	[20.7]J
Lead	1.9J
Zinc	[512]J

99-SW-36 Constituent	10/05/99 Primary
Arsenic	
Cadmium	[1]
Copper	[14]
Lead	[3]J
Zinc	[270]J

99-SW-34 Constituent	10/05/99 Primary
Arsenic	
Cadmium	[2.7]
Copper	[50]
Lead	[4]J
Zinc	[790]J

SW-422 Constituent	11/17/04 Primary
Arsenic	3.1J
Cadmium	[854]
Copper	[9790]J
Lead	[154]J
Zinc	[169000]J

99-SW-32 Constituent	10/05/99 Primary
Arsenic	
Cadmium	[2.9]
Copper	[46]
Lead	[4]J
Zinc	[850]J

SW-405 Constituent	11/17/04 Primary
Arsenic	0.92J
Cadmium	[1.7]
Copper	[17]J
Lead	[3.3]J
Zinc	[330]J

SAMPLE_3 Constituent	01/01/86 Primary
Arsenic	
Cadmium	[18]
Copper	[10]
Lead	[10]U
Zinc	[6500]

SW-GPE2 Constituent	01/01/87 Primary
Arsenic	
Cadmium	[9]
Copper	
Lead	[50]U
Zinc	

SW-GPE1 Constituent	01/01/86 Primary
Arsenic	
Cadmium	[2]
Copper	[40]
Lead	[4]
Zinc	[380]

99-SW-30 Constituent	10/05/99 Primary
Arsenic	
Cadmium	[1.2]
Copper	[26]
Lead	[8]J
Zinc	[420]J

FILE: 02136\CALLAHAN MINING\RI\SURFACE WATER ANALYTICAL RESULTS.DWG

All concentrations in micrograms per liter (ug/l)

0 250 500 1000

SCALE IN FEET

SURFACE WATER SCREENING VALUES

Constituent	Units	Fresh Water Screening Criteria	Salt Water Screening Criteria
Arsenic	ug/l	150	36
Cadmium	ug/l	0.25	8.8
Copper	ug/l	9	3.1
Lead	ug/l	2.5	8.1
Zinc	ug/l	120	81

[conc] indicates concentration exceeds one or more screening values.

FIGURE 4.3–1
SURFACE WATER ANALYTICAL RESULTS

CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

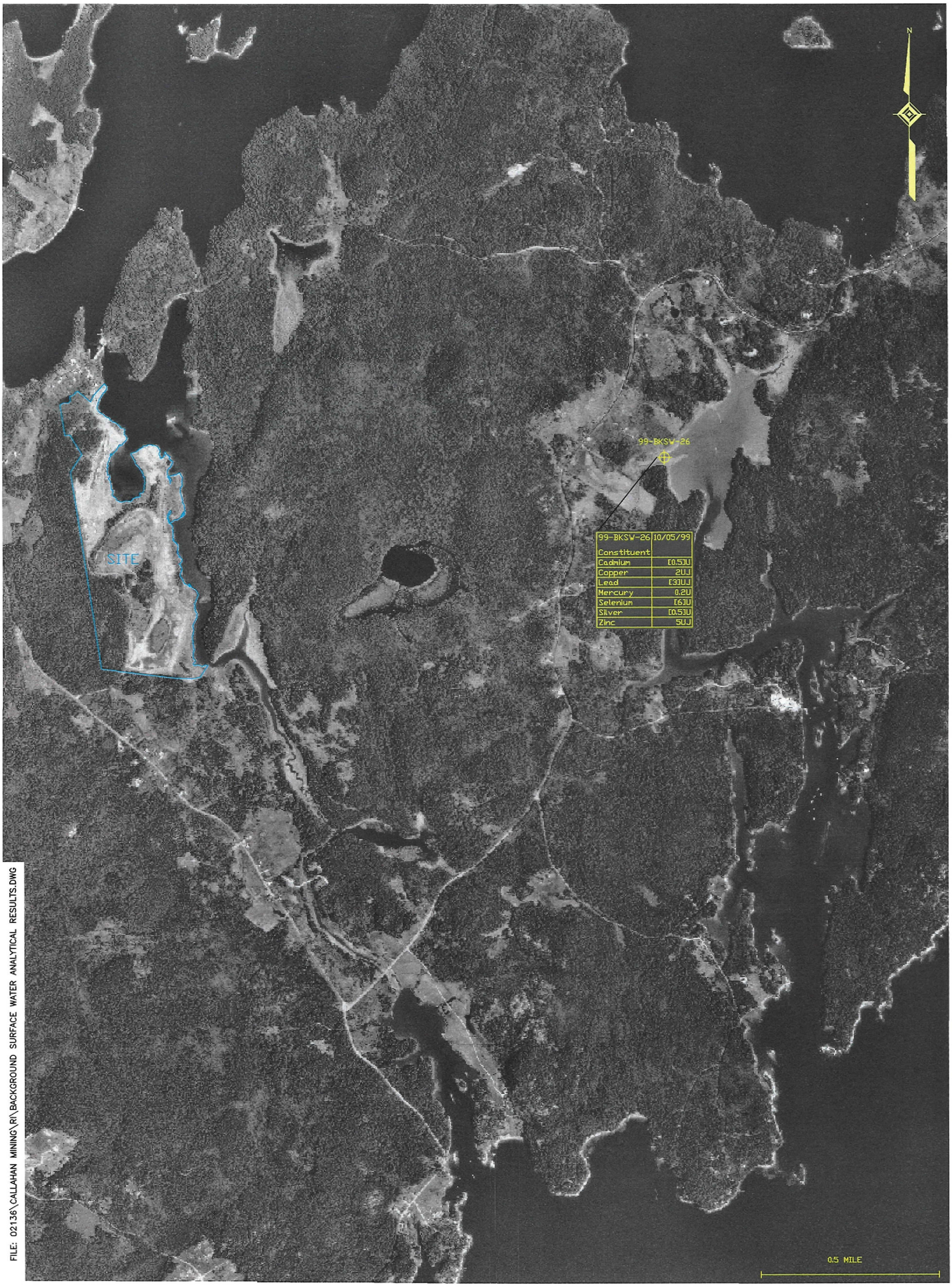
Metcalf & Eddy

TRC
Boott Mills South
116 John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0540-017H9

EPA CONTRACT NO.: 68-W6-0042

RAC SUBCONTRACT NO.: 107061



99-BKSW-26 Constituent	10/05/99
Cadmium	[0.5]U
Copper	2UJ
Lead	[3]UJ
Mercury	0.2U
Selenium	[6]U
Silver	[0.5]U
Zinc	5UJ

FILE: 02136\CALLAHAN MINING\RI\BACKGROUND SURFACE WATER ANALYTICAL RESULTS.DWG

All concentrations in micrograms per liter (ug/l)

SURFACE WATER SCREENING VALUES

Constituent	Units	Fresh Water Screening Criteria	Salt Water Screening Criteria
Arsenic	ug/l	150	36
Cadmium	ug/l	0.25	8.8
Copper	ug/l	9	3.1
Lead	ug/l	2.5	8.1
Zinc	ug/l	120	81

[conc] indicates concentration exceeds one or more screening values.

FIGURE 4.3–2

SURFACE WATER ANALYTICAL RESULTS
BACKGROUND LOCATIONS
CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

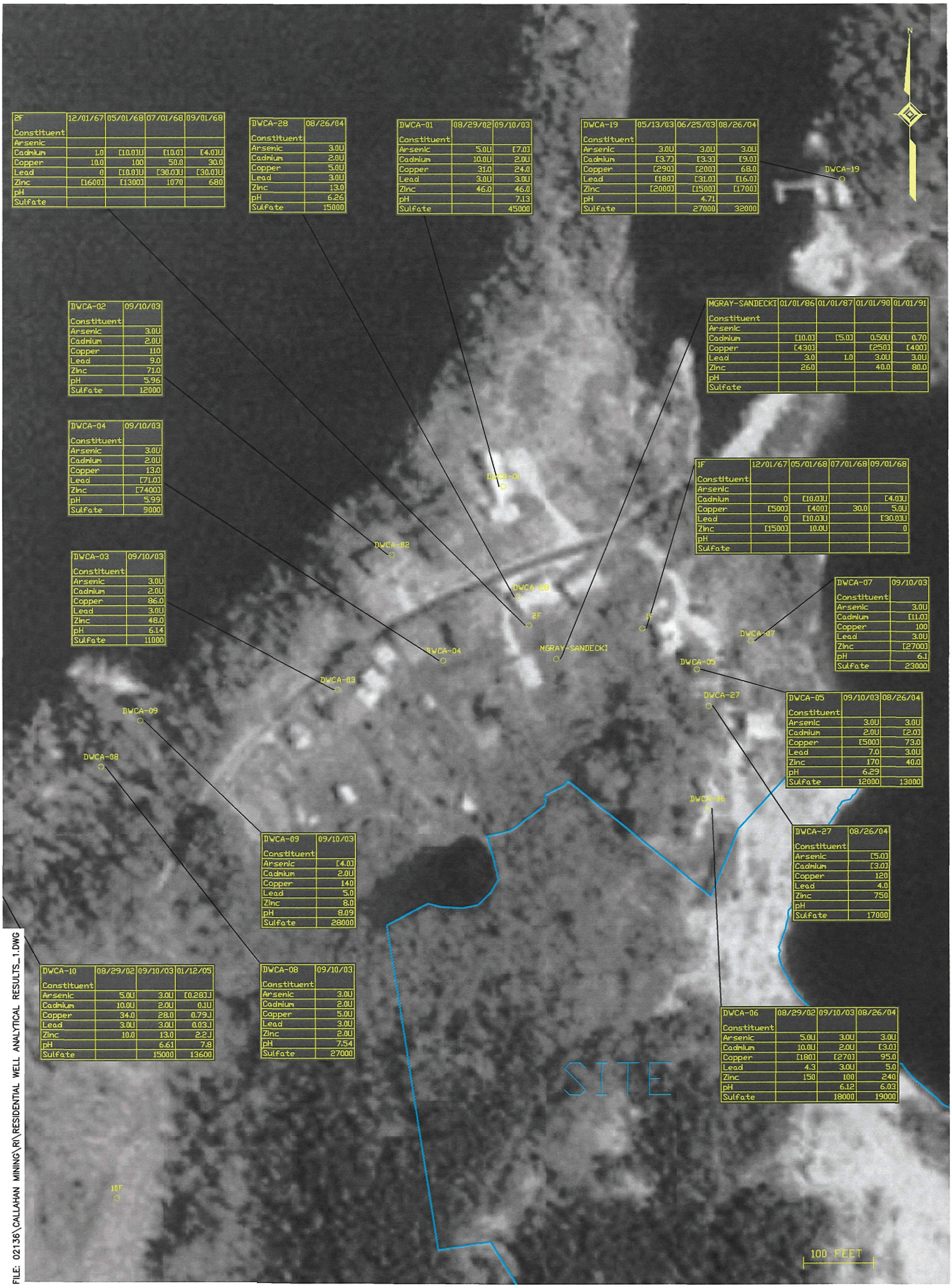
M&E Metcalf & Eddy

TRC
Boott Mills South
116 John Street
Lowell, MA 01852
978–970–5600

TRC PROJ. NO.: 02136–0540–017H9

EPA CONTRACT NO.: 68–W6–0042

RAC SUBCONTRACT NO.: 107061



2F Constituent	12/01/67	05/01/68	07/01/68	09/01/68
Arsenic				
Cadmium	1.0	[10.0]U	[10.0]	[4.0]U
Copper	10.0	100	50.0	30.0
Lead	0	[10.0]U	[30.0]U	[30.0]U
Zinc	[1600]	[1300]	1070	680
pH				
Sulfate				

DWCA-28 Constituent	08/26/04
Arsenic	3.0U
Cadmium	2.0U
Copper	5.0U
Lead	3.0U
Zinc	13.0
pH	6.26
Sulfate	15000

DWCA-01 Constituent	08/29/02	09/10/03
Arsenic	5.0U	[7.0]
Cadmium	10.0U	2.0U
Copper	31.0	24.0
Lead	3.0U	3.0U
Zinc	46.0	46.0
pH		7.13
Sulfate		45000

DWCA-19 Constituent	05/13/03	06/25/03	08/26/04
Arsenic	3.0U	3.0U	3.0U
Cadmium	[3.7]	[3.3]	[9.0]
Copper	[290]	[200]	68.0
Lead	[180]	[31.0]	[16.0]
Zinc	[2000]	[1500]	[1700]
pH		4.71	
Sulfate		27000	32000

DWCA-02 Constituent	09/10/03
Arsenic	3.0U
Cadmium	2.0U
Copper	110
Lead	9.0
Zinc	71.0
pH	5.96
Sulfate	12000

MGRAY-SANDECKI Constituent	01/01/86	01/01/87	01/01/90	01/01/91
Arsenic				
Cadmium	[10.0]	[5.0]	0.50U	0.70
Copper	[430]		[250]	[400]
Lead	3.0	1.0	3.0U	3.0U
Zinc	260		40.0	80.0
pH				
Sulfate				

DWCA-04 Constituent	09/10/03
Arsenic	3.0U
Cadmium	2.0U
Copper	13.0
Lead	[71.0]
Zinc	[7400]
pH	5.99
Sulfate	9000

1F Constituent	12/01/67	05/01/68	07/01/68	09/01/68
Arsenic				
Cadmium	0	[10.0]U		[4.0]U
Copper	[500]	[400]	30.0	5.0U
Lead	0	[10.0]U		[30.0]U
Zinc	[1500]	10.0U		0
pH				
Sulfate				

DWCA-03 Constituent	09/10/03
Arsenic	3.0U
Cadmium	2.0U
Copper	86.0
Lead	3.0U
Zinc	48.0
pH	6.14
Sulfate	11000

DWCA-07 Constituent	09/10/03
Arsenic	3.0U
Cadmium	[11.0]
Copper	100
Lead	3.0U
Zinc	[2700]
pH	6.1
Sulfate	23000

DWCA-05 Constituent	09/10/03	08/26/04
Arsenic	3.0U	3.0U
Cadmium	2.0U	[2.0]
Copper	[500]	73.0
Lead	7.0	3.0U
Zinc	170	40.0
pH	6.29	
Sulfate	12000	13000

DWCA-09 Constituent	09/10/03
Arsenic	[4.0]
Cadmium	2.0U
Copper	140
Lead	5.0
Zinc	8.0
pH	8.09
Sulfate	28000

DWCA-27 Constituent	08/26/04
Arsenic	[5.0]
Cadmium	[3.0]
Copper	120
Lead	4.0
Zinc	750
pH	
Sulfate	17000

DWCA-10 Constituent	08/29/02	09/10/03	01/12/05
Arsenic	5.0U	3.0U	[0.28]J
Cadmium	10.0U	2.0U	0.1U
Copper	34.0	28.0	0.79J
Lead	3.0U	3.0U	0.03J
Zinc	10.0	13.0	2.2J
pH		6.61	7.8
Sulfate		15000	13600

DWCA-08 Constituent	09/10/03
Arsenic	3.0U
Cadmium	2.0U
Copper	5.0U
Lead	3.0U
Zinc	2.0U
pH	7.54
Sulfate	27000

DWCA-06 Constituent	08/29/02	09/10/03	08/26/04
Arsenic	5.0U	3.0U	3.0U
Cadmium	10.0U	2.0U	[3.0]
Copper	[180]	[270]	95.0
Lead	4.3	3.0U	5.0
Zinc	150	100	240
pH		6.12	6.03
Sulfate		18000	19000

FILE: 02136\CALLAHAN MINING\RI\RESIDENTIAL WELL ANALYTICAL RESULTS_1.DWG

All concentrations in micrograms per liter (ug/l)

DRINKING WATER SCREENING VALUES

Constituent	Units	EPA MCLs	State of Maine MEGs	Region IX Tap Water PRGs
Arsenic	ug/l	10	10	0.045
Cadmium	ug/l	5	3.5	1.825
Copper	ug/l	1300	1300	146
Lead	ug/l	15	10	None
Zinc	ug/l	None	2000	1095

[conc] indicates concentration exceeds one or more screening values.

FIGURE 4.4-1

RESIDENTIAL WELL ANALYTICAL RESULTS – NORTHERN AREA
CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

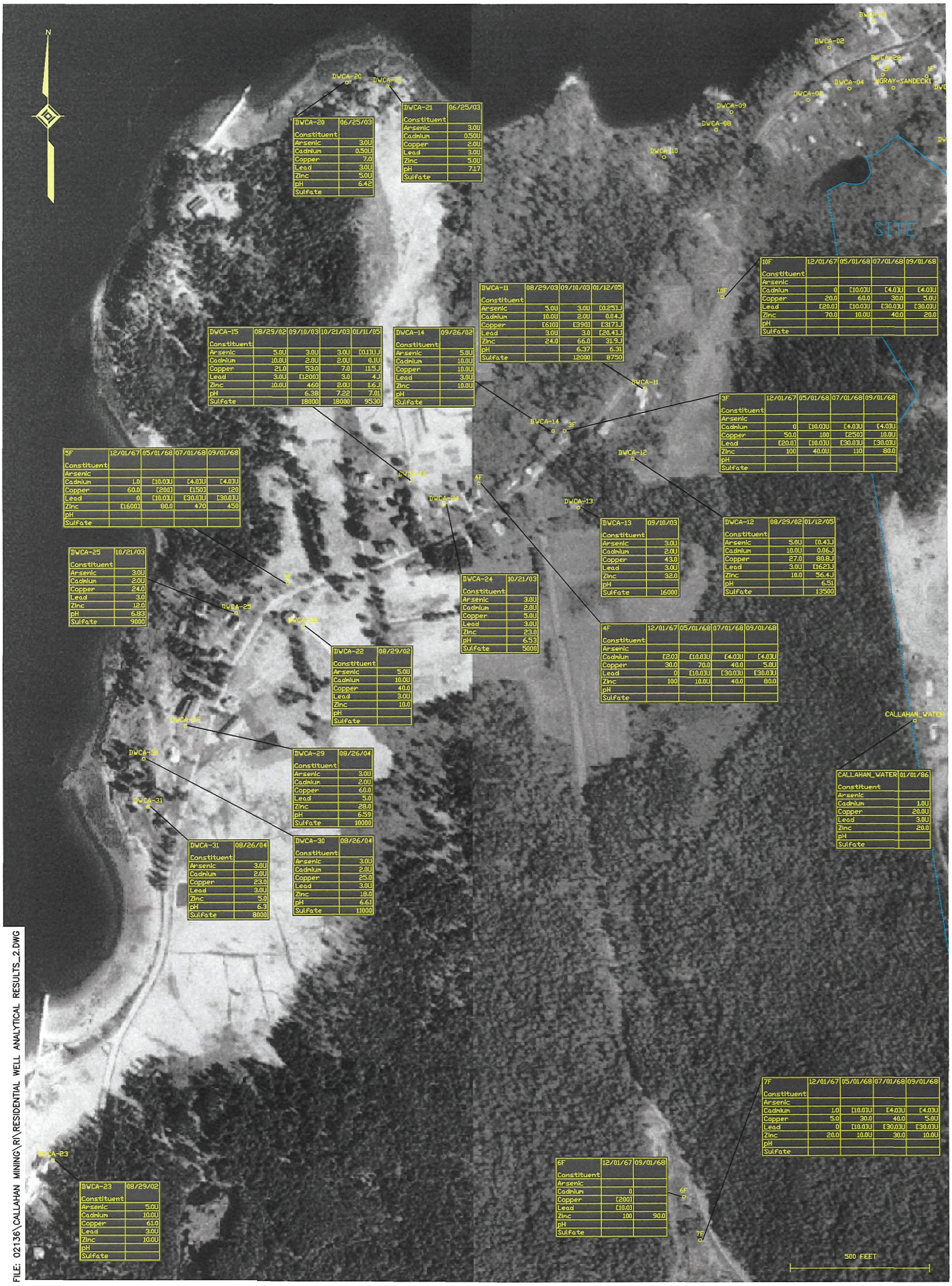
Metcalf & Eddy

TRC
Boott Mills South
116 John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0540-017H9

EPA CONTRACT NO.: 68-W6-0042

RAC SUBCONTRACT NO.: 107061



DWCA-20 Constituent	06/25/03
Arsenic	3.0U
Cadmium	0.50U
Copper	7.0
Lead	3.0U
Zinc	5.0U
pH	6.42
Sulfate	

DWCA-21 Constituent	06/25/03
Arsenic	3.0U
Cadmium	0.50U
Copper	2.0U
Lead	3.0U
Zinc	5.0U
pH	7.17
Sulfate	

10F Constituent	12/01/67	05/01/68	07/01/68	09/01/68
Arsenic				
Cadmium	0	[10.0]U	[4.0]U	[4.0]U
Copper	20.0	60.0	30.0	5.0U
Lead	[20.0]	[10.0]U	[30.0]U	[30.0]U
Zinc	70.0	10.0U	40.0	20.0
pH				
Sulfate				

DWCA-11 Constituent	08/29/03	09/10/03	01/12/05
Arsenic	5.0U	3.0U	[0.25]J
Cadmium	10.0U	2.0U	0.04J
Copper	[610]	[390]	[317]J
Lead	3.0U	3.0	[20.4]J
Zinc	24.0	66.0	31.9J
pH		6.37	6.31
Sulfate		12000	8750

DWCA-15 Constituent	08/29/02	09/10/03	10/21/03	01/11/05
Arsenic	5.0U	3.0U	3.0U	[0.1]UJ
Cadmium	10.0U	2.0U	2.0U	0.1U
Copper	21.0	53.0	7.0	11.5J
Lead	3.0U	[1200]	3.0	4J
Zinc	10.0U	460	2.0U	1.6J
pH		6.38	7.22	7.01
Sulfate		18000	18000	9530

DWCA-14 Constituent	09/26/02
Arsenic	5.0U
Cadmium	10.0U
Copper	10.0U
Lead	3.0U
Zinc	10.0U
pH	
Sulfate	

3F Constituent	12/01/67	05/01/68	07/01/68	09/01/68
Arsenic				
Cadmium	0	[10.0]U	[4.0]U	[4.0]U
Copper	50.0	100	[250]	10.0U
Lead	[20.0]	[10.0]U	[30.0]U	[30.0]U
Zinc	100	40.0U	110	80.0
pH				
Sulfate				

5F Constituent	12/01/67	05/01/68	07/01/68	09/01/68
Arsenic				
Cadmium	1.0	[10.0]U	[4.0]U	[4.0]U
Copper	60.0	[200]	[150]	120
Lead	0	[10.0]U	[30.0]U	[30.0]U
Zinc	[1600]	80.0	470	450
pH				
Sulfate				

DWCA-13 Constituent	09/10/03
Arsenic	3.0U
Cadmium	2.0U
Copper	43.0
Lead	3.0U
Zinc	32.0
pH	
Sulfate	16000

DWCA-12 Constituent	08/29/02	01/12/05
Arsenic	5.0U	[0.4]J
Cadmium	10.0U	0.06J
Copper	27.0	80.8J
Lead	3.0U	[162]J
Zinc	10.0	56.4J
pH		6.51
Sulfate		13500

DWCA-25 Constituent	10/21/03
Arsenic	3.0U
Cadmium	2.0U
Copper	24.0
Lead	3.0
Zinc	12.0
pH	6.83
Sulfate	9000

DWCA-24 Constituent	10/21/03
Arsenic	3.0U
Cadmium	2.0U
Copper	5.0U
Lead	3.0U
Zinc	23.0
pH	6.53
Sulfate	5000

4F Constituent	12/01/67	05/01/68	07/01/68	09/01/68
Arsenic				
Cadmium	[2.0]	[10.0]U	[4.0]U	[4.0]U
Copper	30.0	70.0	40.0	5.0U
Lead	0	[10.0]U	[30.0]U	[30.0]U
Zinc	100	10.0U	40.0	80.0
pH				
Sulfate				

DWCA-22 Constituent	08/29/02
Arsenic	5.0U
Cadmium	10.0U
Copper	40.0
Lead	3.0U
Zinc	10.0
pH	
Sulfate	

CALLAHAN_WATER Constituent	01/01/86
Arsenic	
Cadmium	1.0U
Copper	20.0U
Lead	3.0U
Zinc	20.0
pH	
Sulfate	

DWCA-29 Constituent	08/26/04
Arsenic	3.0U
Cadmium	2.0U
Copper	60.0
Lead	5.0
Zinc	28.0
pH	6.59
Sulfate	10000

DWCA-31 Constituent	08/26/04
Arsenic	3.0U
Cadmium	2.0U
Copper	23.0
Lead	3.0U
Zinc	5.0
pH	6.3
Sulfate	8000

DWCA-30 Constituent	08/26/04
Arsenic	3.0U
Cadmium	2.0U
Copper	25.0
Lead	3.0U
Zinc	18.0
pH	6.61
Sulfate	11000

7F Constituent	12/01/67	05/01/68	07/01/68	09/01/68
Arsenic				
Cadmium	1.0	[10.0]U	[4.0]U	[4.0]U
Copper	5.0	30.0	40.0	5.0U
Lead	0	[10.0]U	[30.0]U	[30.0]U
Zinc	20.0	10.0U	30.0	10.0U
pH				
Sulfate				

6F Constituent	12/01/67	09/01/68
Arsenic		
Cadmium	0	
Copper	[200]	
Lead	[10.0]	
Zinc	100	90.0
pH		
Sulfate		

DWCA-23 Constituent	08/29/02
Arsenic	5.0U
Cadmium	10.0U
Copper	61.0
Lead	3.0U
Zinc	10.0U
pH	
Sulfate	

FILE: 02136\CALLAHAN MINING\RI\RESIDENTIAL WELL ANALYTICAL RESULTS_2.DWG

All concentrations in
micrograms per liter (ug/l)

DRINKING WATER SCREENING VALUES

Constituent	Units	EPA MCLs	State of Maine MEGs	Region IX Tap Water PRGs
Arsenic	ug/l	10	10	0.045
Cadmium	ug/l	5	3.5	1.825
Copper	ug/l	1300	1300	146
Lead	ug/l	15	10	None
Zinc	ug/l	None	2000	1095

[conc] indicates concentration exceeds one or more screening values.

FIGURE 4.4-2

RESIDENTIAL WELL ANALYTICAL RESULTS – EASTERN AREA
CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

M&E Metcalf & Eddy

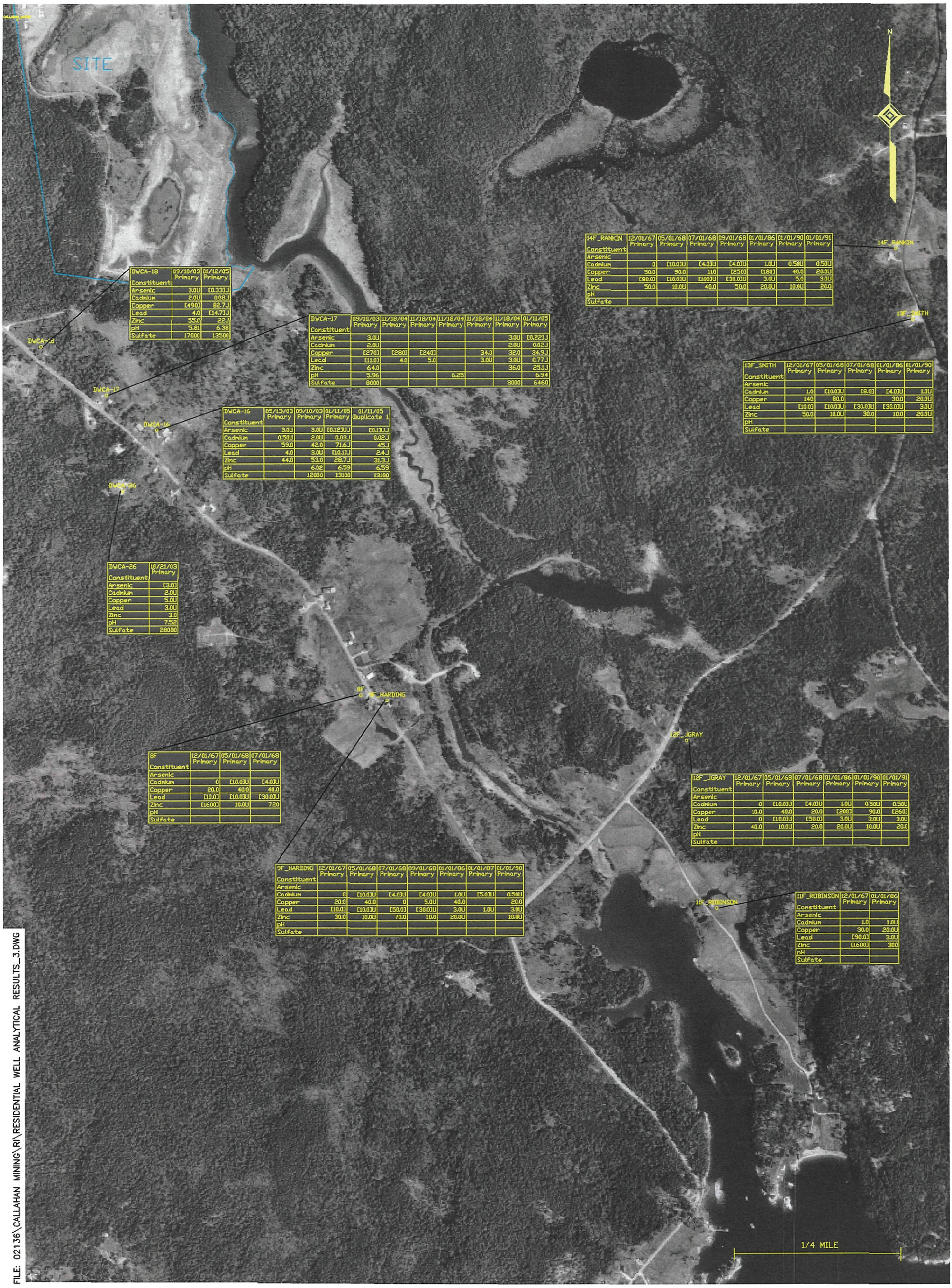
TRC

Boott Mills South
116 John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0540-017H9

EPA CONTRACT NO.: 68-W6-0042

RAC SUBCONTRACT NO.: 107061



DWCA-18 Constituent	09/10/03 Primary	01/12/05 Primary
Arsenic	3.0U	[0.33]J
Cadmium	2.0U	0.08J
Copper	[490]	82.7J
Lead	4.0	[14.7]J
Zinc	55.0	22J
pH	5.81	6.38
Sulfate	17000	13500

DWCA-17 Constituent	09/10/03 Primary	11/18/04 Primary	11/18/04 Primary	11/18/04 Primary	11/18/04 Primary	11/18/04 Primary	01/11/05 Primary
Arsenic	3.0U					3.0U	[0.22]J
Cadmium	2.0U					2.0U	0.02J
Copper	[270]	[280]	[240]		34.0	32.0	34.9J
Lead	[11.0]	4.0	5.0		3.0U	3.0U	0.77J
Zinc	64.0					36.0	25.1J
pH	5.96			6.25			6.94
Sulfate	8000					8000	6460

DWCA-16 Constituent	05/13/03 Primary	09/10/03 Primary	01/11/05 Primary	01/11/05 Duplicate 1
Arsenic	3.0U	3.0U	[0.12]UJ	[0.1]UJ
Cadmium	0.50U	2.0U	0.03J	0.02J
Copper	59.0	42.0	71.6J	45J
Lead	4.0	3.0U	[10.1]J	2.4J
Zinc	44.0	53.0	28.7J	31.3J
pH		6.02	6.59	6.59
Sulfate		12000	13100	13100

DWCA-26 Constituent	10/21/03 Primary
Arsenic	[3.0]
Cadmium	2.0U
Copper	5.0U
Lead	3.0U
Zinc	3.0
pH	7.52
Sulfate	28000

14F_RANKIN Constituent	12/01/67 Primary	05/01/68 Primary	07/01/68 Primary	09/01/68 Primary	01/01/86 Primary	01/01/90 Primary	01/01/91 Primary
Arsenic							
Cadmium	0	[10.0]U	[4.0]U	[4.0]U	1.0U	0.50U	0.50U
Copper	50.0	90.0	110	[250]	[180]	40.0	20.0U
Lead	[80.0]	[10.0]U	[100]U	[30.0]U	3.0U	5.0	3.0U
Zinc	50.0	10.0U	40.0	50.0	20.0U	10.0U	20.0
pH							
Sulfate							

13F_SMITH Constituent	12/01/67 Primary	05/01/68 Primary	07/01/68 Primary	01/01/86 Primary	01/01/90 Primary
Arsenic					
Cadmium	1.0	[10.0]U	[8.0]	[4.0]U	1.0U
Copper	140	80.0		30.0	20.0U
Lead	[10.0]	[10.0]U	[30.0]U	[30.0]U	3.0U
Zinc	50.0	10.0U	30.0	10.0	20.0U
pH					
Sulfate					

8F Constituent	12/01/67 Primary	05/01/68 Primary	07/01/68 Primary
Arsenic			
Cadmium	0	[10.0]U	[4.0]U
Copper	20.0	40.0	40.0
Lead	[10.0]	[10.0]U	[30.0]U
Zinc	[1600]	10.0U	720
pH			
Sulfate			

12F_JGRAY Constituent	12/01/67 Primary	05/01/68 Primary	07/01/68 Primary	01/01/86 Primary	01/01/90 Primary	01/01/91 Primary
Arsenic						
Cadmium	0	[10.0]U	[4.0]U	1.0U	0.50U	0.50U
Copper	10.0	40.0	20.0	[200]	90.0	[260]
Lead	0	[10.0]U	[50.0]	3.0U	3.0U	3.0U
Zinc	40.0	10.0U	20.0	20.0U	10.0U	20.0
pH						
Sulfate						

9F_HARDING Constituent	12/01/67 Primary	05/01/68 Primary	07/01/68 Primary	09/01/68 Primary	01/01/86 Primary	01/01/87 Primary	01/01/90 Primary
Arsenic							
Cadmium	0	[10.0]U	[4.0]U	[4.0]U	1.0U	[5.0]U	0.50U
Copper	20.0	40.0	0	5.0U	40.0		20.0
Lead	[10.0]	[10.0]U	[50.0]	[30.0]U	3.0U	1.0U	3.0U
Zinc	30.0	10.0U	70.0	10.0	20.0U		10.0U
pH							
Sulfate							

11F_ROBINSON Constituent	12/01/67 Primary	01/01/86 Primary
Arsenic		
Cadmium	1.0	1.0U
Copper	30.0	20.0U
Lead	[90.0]	3.0U
Zinc	[1600]	300
pH		
Sulfate		

FILE: 02136\CALLAHAN MINING\RI\RESIDENTIAL WELL ANALYTICAL RESULTS_3.DWG

All concentrations in micrograms per liter (ug/l)

DRINKING WATER SCREENING VALUES

Constituent	Units	EPA MCLs	State of Maine MEGs	Region IX Tap Water PRGs
Arsenic	ug/l	10	10	0.045
Cadmium	ug/l	5	3.5	1.825
Copper	ug/l	1300	1300	146
Lead	ug/l	15	10	None
Zinc	ug/l	None	2000	1095

[conc] indicates concentration exceeds one or more screening values.

FIGURE 4.4-3

RESIDENTIAL WELL ANALYTICAL RESULTS – SOUTHERN AREA

CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

M&E Metcalf & Eddy

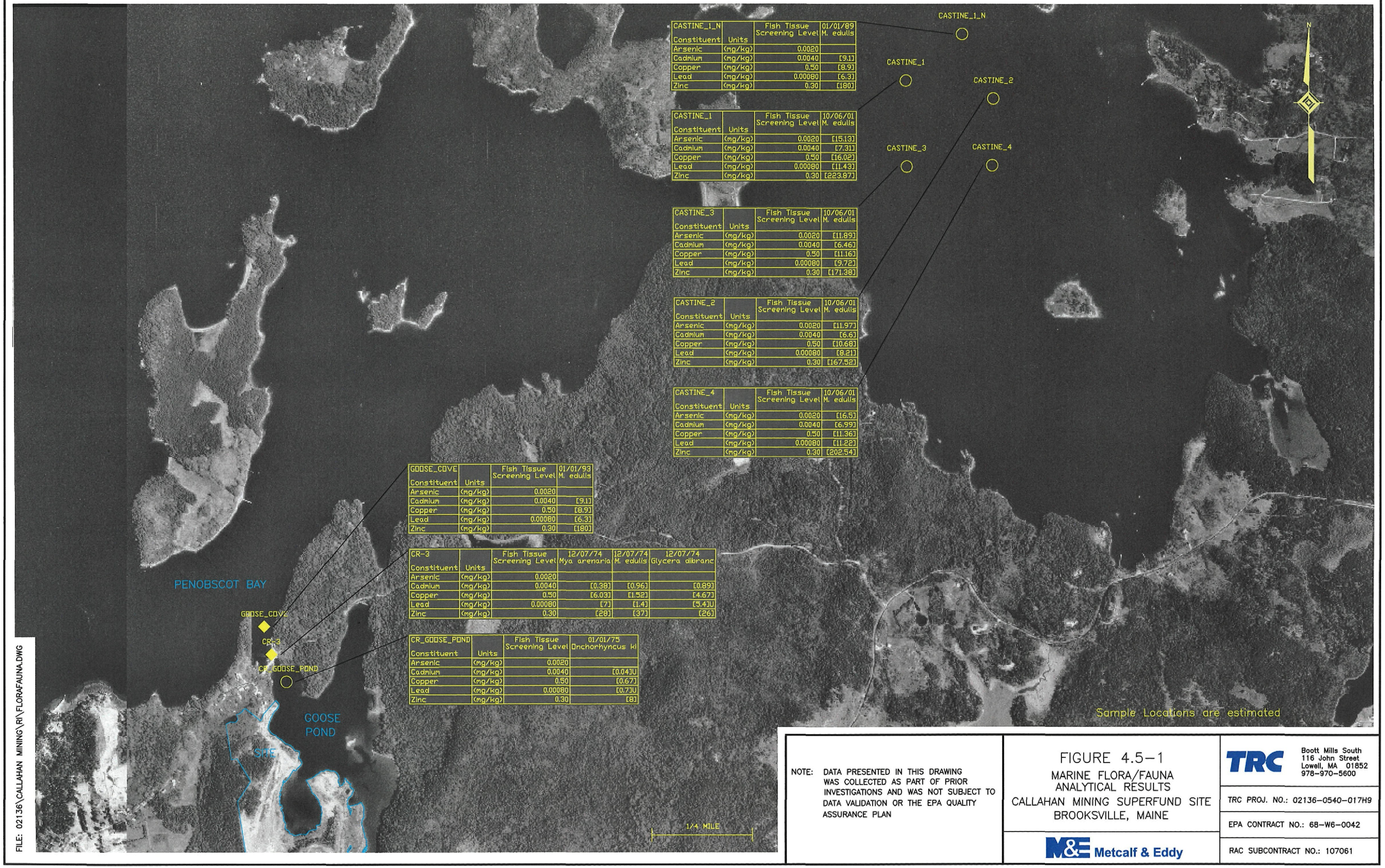
TRC

Boott Mills South
116 John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0540-017H9

EPA CONTRACT NO.: 68-W6-0042

RAC SUBCONTRACT NO.: 107061



CASTINE_1_N Constituent	Units	Fish Tissue Screening Level	01/01/89 M. edulis
Arsenic	(mg/kg)	0.0020	
Cadmium	(mg/kg)	0.0040	[9.1]
Copper	(mg/kg)	0.50	[8.9]
Lead	(mg/kg)	0.00080	[6.3]
Zinc	(mg/kg)	0.30	[180]

CASTINE_1 Constituent	Units	Fish Tissue Screening Level	10/06/01 M. edulis
Arsenic	(mg/kg)	0.0020	[15.13]
Cadmium	(mg/kg)	0.0040	[7.31]
Copper	(mg/kg)	0.50	[16.02]
Lead	(mg/kg)	0.00080	[11.43]
Zinc	(mg/kg)	0.30	[223.87]

CASTINE_3 Constituent	Units	Fish Tissue Screening Level	10/06/01 M. edulis
Arsenic	(mg/kg)	0.0020	[11.89]
Cadmium	(mg/kg)	0.0040	[6.46]
Copper	(mg/kg)	0.50	[11.16]
Lead	(mg/kg)	0.00080	[9.72]
Zinc	(mg/kg)	0.30	[171.38]

CASTINE_2 Constituent	Units	Fish Tissue Screening Level	10/06/01 M. edulis
Arsenic	(mg/kg)	0.0020	[11.97]
Cadmium	(mg/kg)	0.0040	[6.6]
Copper	(mg/kg)	0.50	[10.68]
Lead	(mg/kg)	0.00080	[8.21]
Zinc	(mg/kg)	0.30	[167.52]

CASTINE_4 Constituent	Units	Fish Tissue Screening Level	10/06/01 M. edulis
Arsenic	(mg/kg)	0.0020	[16.5]
Cadmium	(mg/kg)	0.0040	[6.99]
Copper	(mg/kg)	0.50	[11.36]
Lead	(mg/kg)	0.00080	[11.22]
Zinc	(mg/kg)	0.30	[202.54]

GOOSE_COVE Constituent	Units	Fish Tissue Screening Level	01/01/93 M. edulis
Arsenic	(mg/kg)	0.0020	
Cadmium	(mg/kg)	0.0040	[9.1]
Copper	(mg/kg)	0.50	[8.9]
Lead	(mg/kg)	0.00080	[6.3]
Zinc	(mg/kg)	0.30	[180]

CR-3 Constituent	Units	Fish Tissue Screening Level	12/07/74 Mya arenaria	12/07/74 M. edulis	12/07/74 Glycera dibranc
Arsenic	(mg/kg)	0.0020			
Cadmium	(mg/kg)	0.0040	[0.38]	[0.96]	[0.89]
Copper	(mg/kg)	0.50	[6.03]	[1.52]	[4.67]
Lead	(mg/kg)	0.00080	[7]	[1.4]	[5.4]U
Zinc	(mg/kg)	0.30	[28]	[37]	[26]

CR_GOOSE_POND Constituent	Units	Fish Tissue Screening Level	01/01/75 Onchorhyncus kl
Arsenic	(mg/kg)	0.0020	
Cadmium	(mg/kg)	0.0040	[0.04]U
Copper	(mg/kg)	0.50	[0.67]
Lead	(mg/kg)	0.00080	[0.7]U
Zinc	(mg/kg)	0.30	[8]

Sample Locations are estimated

NOTE: DATA PRESENTED IN THIS DRAWING WAS COLLECTED AS PART OF PRIOR INVESTIGATIONS AND WAS NOT SUBJECT TO DATA VALIDATION OR THE EPA QUALITY ASSURANCE PLAN

FIGURE 4.5–1

MARINE FLORA/FAUNA
ANALYTICAL RESULTS
CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

M&E Metcalf & Eddy

TRC

Boott Mills South
116 John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0540-017H9

EPA CONTRACT NO.: 68-W6-0042

RAC SUBCONTRACT NO.: 107061

FILE: 02136\CALLAHAN MINING\RI\FLORAFAUNA.DWG

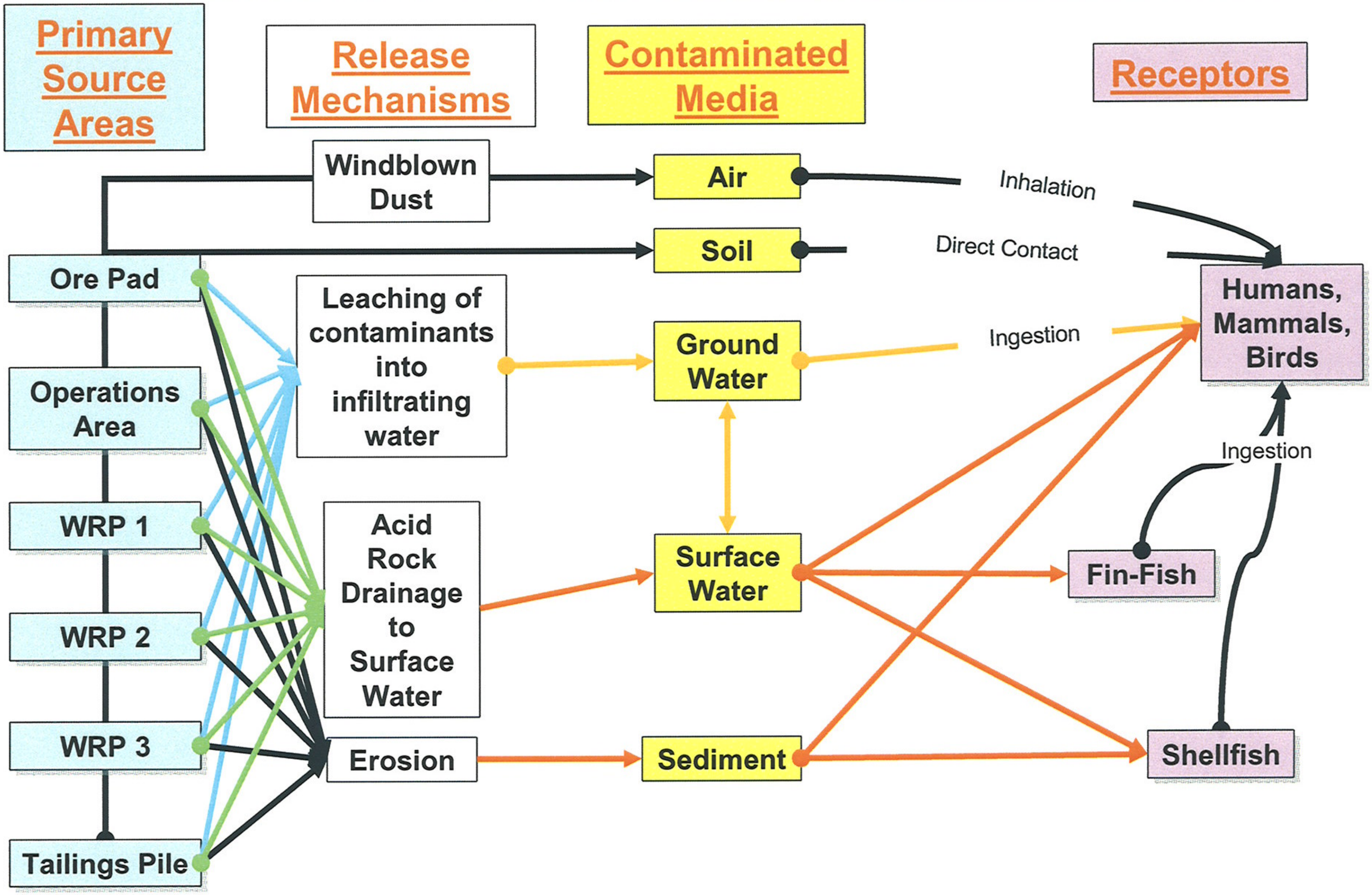


Figure 5.0-1:
Conceptual Model

CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

Metcalf & Eddy

TRC
Boott Mills South
Foot of John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0540-017H9

EPA CONTRACT NO.: 68-W6-0042

RAC SUBCONTRACTOR NO. 107061

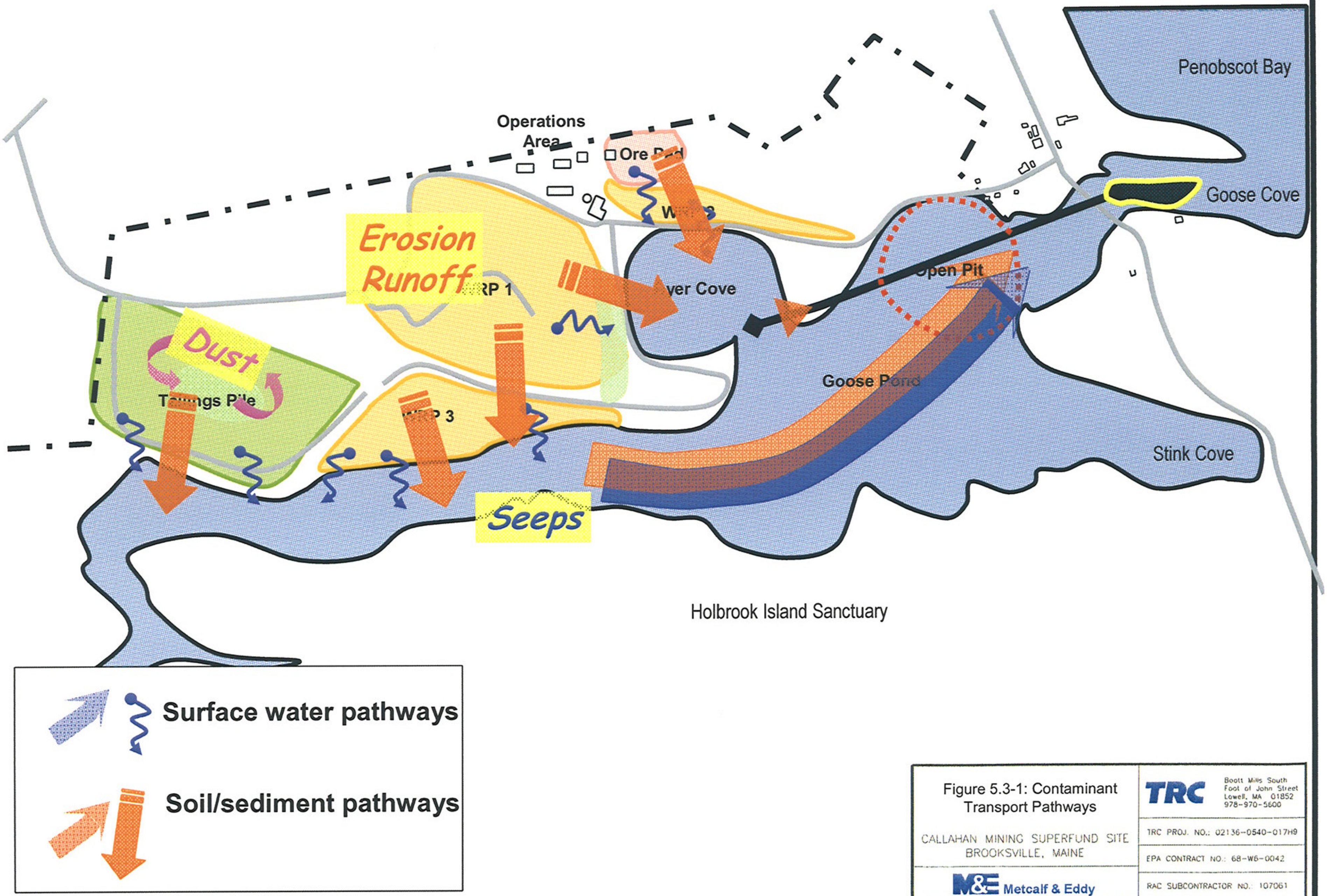


Figure 5.3-1: Contaminant Transport Pathways

CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

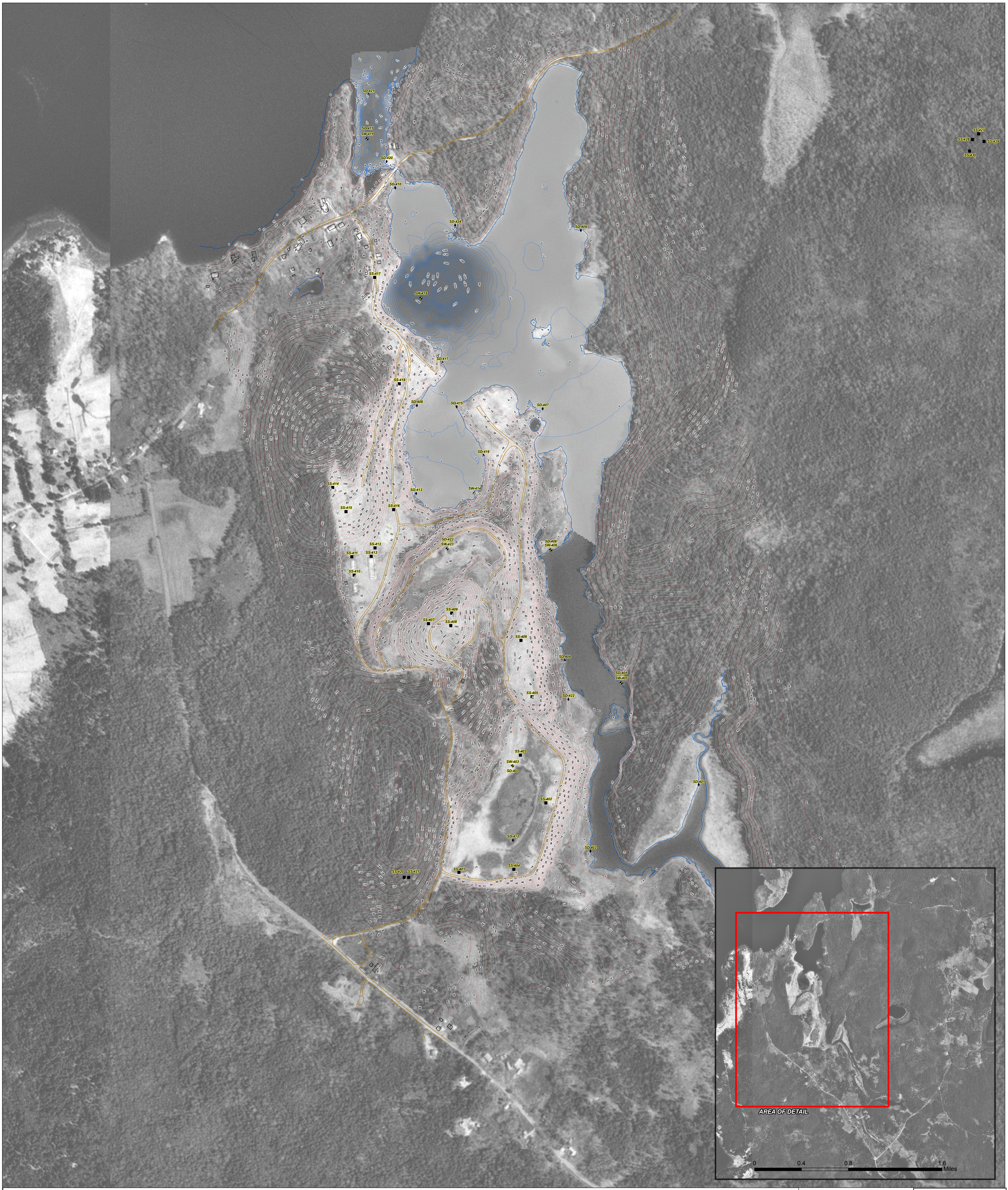
Metcalf & Eddy

TRC
Boott Mills South
Foot of John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0540-017H9

EPA CONTRACT NO.: 68-W6-0042

RAC SUBCONTRACTOR NO.: 107061



NAD_1983_StatePlane_Maine_East_FIPS_1801_Feet
Projection: Transverse_Mercator
False_Easting: 984250.000000
False_Northing: 0.000000
Central_Meridian: -68.500000
Scale_Factor: 0.999900
Latitude_Of_Origin: 43.666667
MSL (mean sea level)
GCS_North_American_1983

N

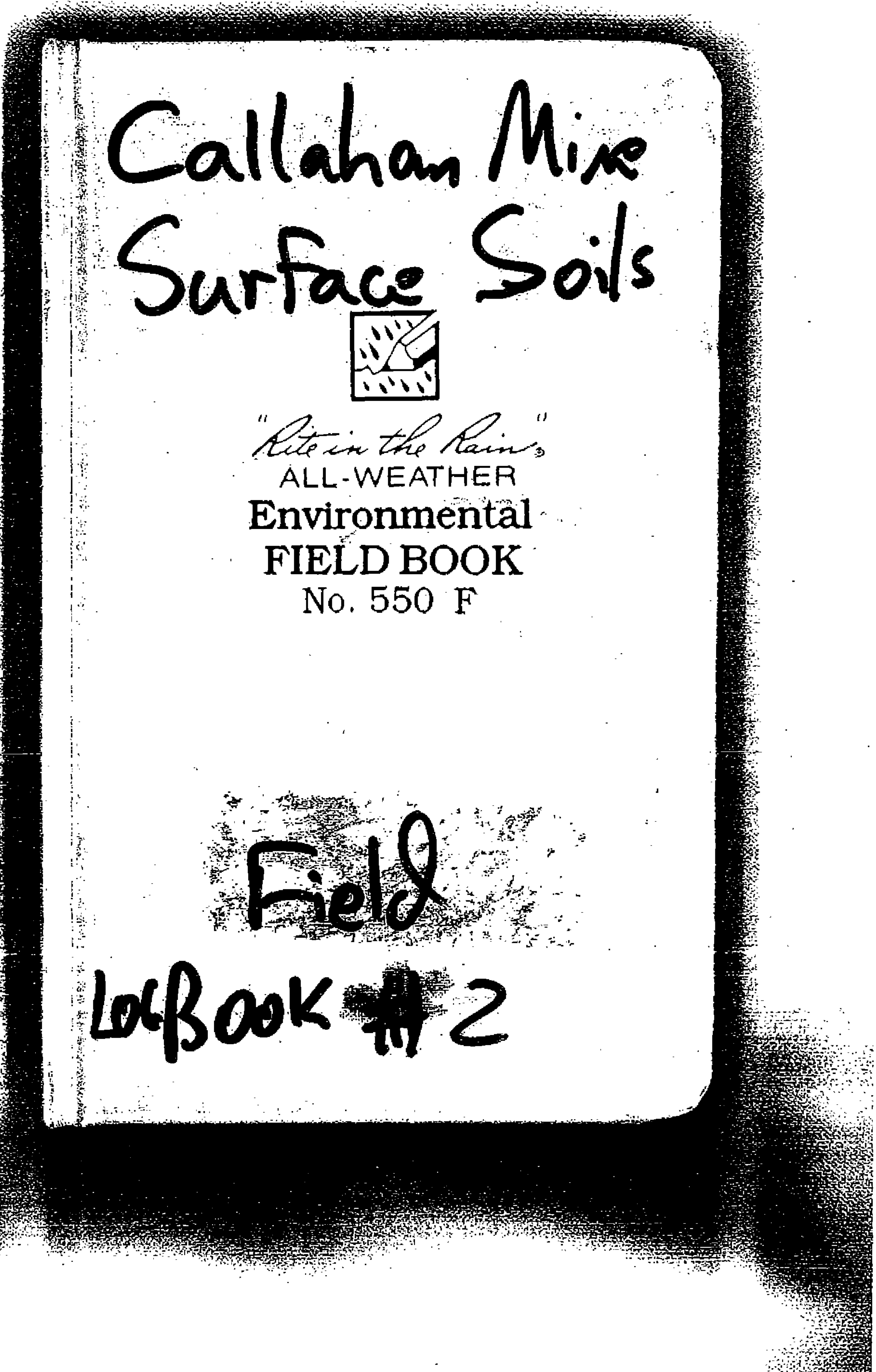
CALLAHAN MINING SUPERFUND SITE
BROOKSVILLE, MAINE

TRC

Boott Mills South
116 John Street
Lowell, MA 01852
(978)970-5600

Appendix A

Field Data Forms



Callahan Mine
Surface Soils

"Rite in the Rain"®
ALL-WEATHER
Environmental
FIELD BOOK
No. 550 F

Field
LogBook #2

J. H.

Location Callahan Mine Date 11/29/04

Project / Client Surface Soil Sampling RI / M+E / EPA

Partly Cloudy, 40°F ppe = Level D

1300 J. Hunter, A. Bergan, (TRC) R. Bartosz (M+E) arrived on Site.

1315 C. Foster gave Site tour & H/S meeting.

1345 Mobilized to locations SS-427 through SS-430. Location approx 1/3 mile south along Ice trail. Sample ~~loca~~ markers straddle trail and are approx. 30 ft. apart

1420 Mobilized to locations SS-423 through SS-426. Locations marked approx. 1,000 ft. west along Fresh Pond Trail; on south slope of Backwood Mtn.

1515 Returned to Site trailer. Organizing for Soil sampling in background areas.

Jeffrey S. Hunter 11/29/04

J. H.

Location Callahan Mine Date 11/30/04

Project / Client Surface Soil Sampling RI / M+E / EPA

Clear, 35°F ppe = level D

0700 Arrived on site: J. Hunter, A. Bergan, C. Foster (TRC), R. Bartosz (M+E)

0730 Prep for field, background samples first

0745 Mob to SS-427 then SS-430

Samples Collected:

SS-427 Log sheet: 120386
- Metals 1 x 8 oz 0830 D05735

SSE-427 (field dup)
- Metals 1 x 8 oz 0900

SS-428 Log sheet: 120388
- Metals 1 x 8 oz. 0840 D05736

SS-429 Log Sheet: 120387
- Metals 1 x 8 oz 0820 D05737

SS-430 Log Sheet: 120393
- Metals 1 x 8 oz 0900 D05738

SS-430 (MS)
- Metals 1 x 8 oz 0900

(cont)

Jeffrey S. Hunter 11/30/04

Location Callahan Mine Date J.H. 11/30/04

Project / Client Surface Soil Sampling RI / MtE / EPA

0950 Mob to SS-423 thru SS-426

Samples collected: (background)

SS-423 Log Sheet: 120389

Metals 1x 8oz 1010 D05731

SS-424 Log Sheet: 120390

Metals 1x 8oz 1012 D05732

SS-425 Log Sheet: 120391

Metals 1x 8oz 1015 D05733

SS-426 Log Sheet: 120392

Metals 1 x 8oz 1018 D05734

1030 Mob to trailer for decon.

1110 Mob to SS-419 thru SS-422

Samples Collected (background)

SS-419 Log Sheet: 120394

Metals 1x 8oz 1140 D05727

SS-420 Log Sheet: 120395

Metals 1x 8oz. 1145 D05728

SS-421 Log Sheet: 120396

Metals 1x 8oz. 1150 D05729

SS-422 Log Sheet: 120397

Metals 1x 8 oz. 1155 D05730

1200 Walked down old abandoned road. Found what look like ~~6 in.~~ two 6 in. metal water (cont)

11/30/04

Location Callahan Mine Date J.H. 11/30/04

Project / Client Surface Soil Sampling

wells in roadway with ~~[illegible]~~ new looking piping outside of one. Also, ~~and~~ an old broken-down metal shed,

1220 Mob to trailer to decon / resupply.

1240 Mob to SS-403

Sample Collected:

SS-403 Log Sheet: 120398

Metals 1 x 8 oz. 1305 D05711

1312 Mob to SS-408

Sample Collected:

SS-408 Log Sheet: 120399

Metals 1 x 8 oz. 1325 D05716

1330 Mob to SS-409

Sample Collected:

SS-409 Log Sheet: 120400

Metals 1 x 8 oz. 1335 D05717

1345 Mob to SS-406

Sample Collected:

SS-406 ~~1 x 8 oz~~ J.H. Log Sheet: 120401

Metals 1 x 8 oz. 1353 D05714

11/30/04 (cont)

Location Callahan Mine Date 11/30/04 J.H.

Project / Client Surface Soil Sampling RI / M+E / EPA

1400 Mob to SS-415
Sample Collected:
SS-415 Log Sheet: 120546
Metals 1x 8oz. 1410 D05723
1412 Mob to SS-414
Sample Collected:
SS-414 Log Sheet: 120547
Metals 1x 8 oz. 1418 D05722
1425 Decon ~~for~~ J.H.
1430 Mob to SS-418
SS-418 Log Sheet: 120548
Metals 1x 8 oz. 1435 D05726
1440 Mob to SS-417
Sample Collected at entrance to mine prop.
SS-417 Log Sheet: 120549
Metals 1x 8 oz. 1455 D05725
1500 Mob to office Decon, paperwork.
1715 Left Site

11/30/04

Location Callahan Date 12/1/04 J.H.

Project / Client Surface Soil Sampling RI / M+E / EPA

Cloudy, heavy rain, 30°F PPE = Level D

0100 Arrived on site.
Decon, paperwork. Prepped samples collected on 11/30/04 for shipment.
1235 Samples sent via Fedex.
Fedex #'s:
8436-7098-1554
8436-7098-1543
1240 Prep for remaining surface Soil sampling On 12/2/04.
Multiple corrections to Forms II Lite and RAS Tags. QA/QC of forms, bottles, tags.
1445 J. Harte, B. Bartesz, A. Bergan left site. C. Foster on site for oversight of subcontractors.

12/1/04

J.H.

Location Callahan Mine Date 12/2/04

Project / Client Surface Soil Sampling RI / M+E / EPA

0700 Arrived on site, prep for field.

0820 Mob to SS-40~~4~~ 2
5mg/10mL methanol ratio per Liz Dunly (TRC)

Samples Collected:

SS-40~~4~~2 0840 Log Sheet: 120552

Metals	1x 8oz.	D05710
VOCs	4x VOA	A1858
SVOCs	1x 8oz	A1858
% Moisture	1x 4oz	A1858

0845 Mob to SS-404.
Location moved to stained area per C. Foster.

Samples collected:

SS-404 0905 Log Sheet: 120553

Metals	1X 8oz.	D05712
VOCs	4 x VOA	A1859
SVOCs	1 x 8oz.	A1859
% Moisture	1X 4oz	A1859

(cont)

12/2/04

J.H.

Location Callahan Mine Date 12/2/04

Project / Client Surface Soil Sampling RI / M+E / EPA

0915 Mob to SS-401. Location moved S to stain per C. Foster.

Samples Collected:

SS-401 0930 Log Sheet: 120550

Metals	1x 8oz	D05709
VOCs	4x VOA	A1857
SVOCs	1x 8oz	A1857
% Moisture	1x 4oz	A1857

Duplicate Sample

SSE-401 1000 Log Sheet: 120551

Metals	1x 8oz.	D05739
VOCs	4x VOA	A1809
SVOCs	1x 8oz.	A1809
% Moisture	1x 4oz.	A1809

(cont)

12/2/04

J.F.

Location Callahan Mine Date 12/2/04

Project / Client Surface Soil Sampling RI / M+E / EPA

1000 Mob to SS-407 Log Sheet: 120555

Samples Collected: x3 for MS/MSD on VOC/SVOC

SS-407	1030	
Metals	1x 8oz	D05715
VOCs x3	4x VOA	A18T1
SVOCs x3	1x 8oz	A18T1
% Moisture	1x 4oz	A18T1

1100 Mob to SS-405

Samples Collected:

SS-405	1115	Log Sheet: 120554
Metals	1x 8oz	D05713
VOCs	4x VOA	A18T0
SVOCs	1x 8oz	A18T0
% Moisture	1x 4oz	A18T0

1130 Back to trailer. 1/2 paperwork.

1330 Mob to SS-410

Samples Collected:

SS-410	1350	Log Sheet: 120556
Metals	1x 8oz	D05718
VOCs	4x VOA	A19C8
SVOCs	1x 8oz	A19C8
% Moisture	1x 4oz	A19C8

(cont)

12/2/04

J.F.

Location Callahan Mine Date 12/2/04

Project / Client Surface Soil Sampling RI / M+E / EPA

1400 Mob to SS-411

Samples Collected:

SS-411	1410	Log Sheet:	120557
Metals	1x 8oz		D05719
VOCs	~~VOCs~~ 4x VOA		A19C9
SVOCs	1x 8oz		A19C9
% Moisture	1x 4oz		A19C9

1420 Mob to SS-412

SS-412	1425	Log Sheet:	120558
Metals	1x 8oz		D05720
VOCs	4x VOA		A19D0
SVOCs	1x 8oz		A19D0
% Moisture	1x 4oz		A19D0

1435 Mob to SS-413 location adjusted East per D. Weiss c/o C. Foster.

SS-413	1440	Log Sheet:	120559
Metals	1x 8oz.		D05721
VOCs	4x VOA		A19D1
SVOCs	1x 8oz		A19D1
% Moisture	1x 4oz		A19D1

(cont)

Jeffrey S. Foster 12/2/04

Location Callahan Mine Date 12/2/04 J.H.

Project / Client Surface Soil Sampling RI / M+E / EPA

1500 Mob to SS-416. Location covered to at least 6" deep in decayed sawdust. Moved location North to an area w/ stain per D. Weiss and C. Foster. (approx 80 ft north).

SS-416	1530	Log Sheet: 120560
Metals	1x 8oz.	D05724
VOCs	4x VOA	A19D2
SVOCs	1x 8oz.	A19D2
% Moisture	1x 4oz	A19D2

1545 Back to office. Paper work, Sample packing, notes.

1750 R. Bortosz (M+E) and A. Bergan left for FedEx in Bangor.

12/2/04

Location Date

Project / Client

Location Callahan Mine Date 12/03/04

Project / Client

1340 SW-411 Water Quality
collected Metals Sulfate
Temp 4.67
Cond 18.226
Salinity 18.24
DO 10.71
pH 6.80 pH
ORP 149.1
See logsheet # ~~120592C~~ f
120593

12/03/04

Location Callahan Mine Date 12/3/04

Project / Client Sediment Sampling

1300 Mob to SD-421
Samples collected
SD-421 1320 Log Sheet: 120583
Metals 3 x 8oz 005655
TCO 1 x 8oz
Grain Size 2 x 16oz

1400 Mob to SD-411. C. Foster
taking SW-411 just prior to sediment
sampling.
SD-411 1405 Log Sheet: 120565
Metals 3 x 8oz. 005648
TCO 1 x 8oz.
Grain Size 2 x 16oz

1420- Approx. 15 attempts at
1500 Sediment sampling at SD-420
location by boat failing due to bedrock &
poor recovery in Ponar dredge.
Location move to eastern shore
by Goose Falls per C. Foster
SD-420 ~~[illegible]~~ 1520 Log Sheet 120566
Metals (3 x 8oz) x 2 D05654
TCO (1 x 8oz) x 2
Grain size (2 x 16oz) x 2

Dup @ 1540

12/3/04

TRC

Sample Log Sheet

Project: Callahan **Project No.:** 02136 0990 107H3
Date/Time: 12/2/04 0930
Sheet 1 **of** 1
Contractor Personnel: R. Bartosz
TRC Personnel: J. Hunter, A. Bergen

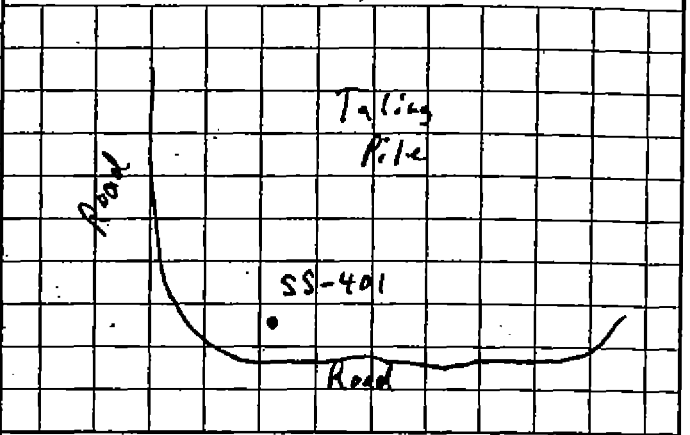
Sample No.: SS-401 / ~~SSE-4~~

Depth/Interval Sampled: 0-6 inches

Sample Type: [✓ Grab] Composite or Both
(circle)

Media: [✓ Surface Soil] Subsurface Soil Other ______ Sediment Surface Water Ground Water
(circle)

Sketch of Sample Location



Field Screening Information:

Type of Meter: OVM 0 ppm

Other Field Measurements:

GPS	TARE	Sample wt.
BD 476474	34.65 g.	5.1 g.
BD 476472	34.68 g.	5.1 g.
BE 014204	32.90 g.	5.0 g.
BE 014272	32.85 g.	5.0 g.

Observations:

Silty sand (SM) Orangish brown, 40% silt, 60% f. sand, v. loose, ~~moist~~ damp

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☐	Trowel	☐
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☑	Dredge Sampler	☐
Bowl (stainless)	☑	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

OTHER:
5 ml. syringe

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% Stainless
Tap Water	☒	
Methanol	☒	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metals	YES [✓ NO]	Ice Only	1x8oz.	0930	D05709	0248M
☑ VOCs	YES [✓ NO]	2xMeOH, 2xWater	4xVOA, ~~1x2oz~~	0930	A18S7	33595
☑ SVOCs	YES [✓ NO]	Ice Only	1x 8oz.	0930	A18S7	33595
☑ % Moisture	YES [✓ NO]	Ice Only	1x2oz.	0930	A18S7	33595
☐	YES NO					
☐	YES NO					

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№ 120550

Signed: ______

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan
Project No.: 02136 0590 01743
Date/Time: 12/2/04 1000
Sheet 1 **of** 1

Contractor Personnel: R. Bartosz
TRC Personnel: J. Hunter, A. Bergan

Sample No.: SSE - 401

Depth/Interval Sampled: 0-6 inches

Sample Type: [✓ Grab], Composite or Both
(circle)

Media: (circle)
[✓ Surface Soil]
Subsurface Soil
Other ______
Sediment
Surface Water
Ground Water

Sketch of Sample Location

Same as SS-401

Field Screening Information:

Type of Meter: OVM 0ppm

Other Field Measurements:

GPS	TARE	Sample wt.
BD476466	34.72 g.	5.1 g.
BD 476475	34.86 g.	5.1 g.
BE 014 182	32.82 g.	5.0 g.
BE 014 202	32.68 g.	4.9 g.

Observations:

Same as SS-401

SAMPLE COLLECTION EQUIPMENT:

Hand Auger ☐
Core Sampler ☐
Spatula/Spoon ☑
Bowl (stainless) ☑
Split-spoon (2" or 3") ☐
Trowel ☐
Shelby Tube ☐
Dredge Sampler ☐
Kemmerer ☐
Extended Arm ☐
Bailer ☐
Backhoe ☐
Van Dorn Bottle ☐

OTHER:
5 mL. syringe

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% Stainless
Tap Water	☒	
Methanol	☒	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metals	YES [✓ NO]	Ice Only	1x8oz	1000	D05739	0248M
☑ VOCs	YES [✓ NO]	2xMeOH, 2xWater	4xVOA	1000	A18D9	33595
☑ SVOCs	YES [✓ NO]	Ice Only	1x8oz	1000	A18D9	33595
☑ % Moisture	YES [✓ NO]	Ice Only	1x2oz	1000	A1809	33595
☐	YES NO					
☐	YES NO					

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№ 120551

Signed: ______

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan
Project No.: 021360590 01743
Date/Time: 12/2/04 0840
Sheet 1 **of** 1

Contractor Personnel: R. Bartosz
TRC Personnel: J. Hunter, A. Bergan

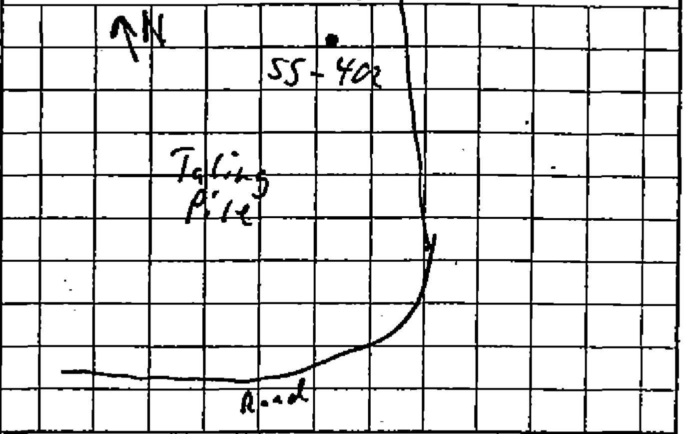
Sample No.: SS-402

Depth/Interval Sampled: 0-6 inches

Sample Type: [✓ Grab], Composite or Both (circle)

Media: (circle)
[✓ Surface Soil]
Subsurface Soil
Other ______
Sediment
Surface Water
Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: OVM 0 ppm

Other Field Measurements:

GPS	Tare wt.	Sample wt.	
BD476414	34.63 g.	4.9 g.	39.53
BD476469	34.88 g.	5.3 g.	40.18
BE 014181	33.70 g.	5.2 g	38.90
BE 014180	32.59 g.	5.0 g.	37.59

Observations:
Silty sand (SM) lt. gray, 40% silt, 60% f. sand, v. loose, moist

SAMPLE COLLECTION EQUIPMENT:

Hand Auger ☐
Core Sampler ☐
Spatula/Spoon ☐
Bowl (stainless) ☑
Split-spoon (2" or 3") ☐
OTHER: 5 mL Syringe

Trowel ☐
Shelby Tube ☐
Dredge Sampler ☐
Kemmerer ☐
Extended Arm ☐
Bailer ☐
Backhoe ☐
Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% Stainless
Tap Water	☒	
Methanol	☒	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metals	YES [✓ NO]	Ice Only	1 x 8oz.	0840	D05710	0248m
☑ VOCs	YES [✓ NO]	2xMeOH, 2xwater	4 x VOA	0840	A1858	33595
☑ SVOCs	YES [✓ NO]	Ice Only	1 x 8oz.	0840	A1858	33595
☑ % Moisture	YES [✓ NO]	Ice Only	1x 2oz.	0840	A1858	33595
☐	YES NO					
☐	YES NO					

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№ 120552

Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan
Project No.: 02136 0590 01743
Date/Time: 11/30/04 1305
Sheet 1 of 1

Contractor Personnel: R. Bartosz
TRC Personnel: Jeff Hunter, A. Bergan

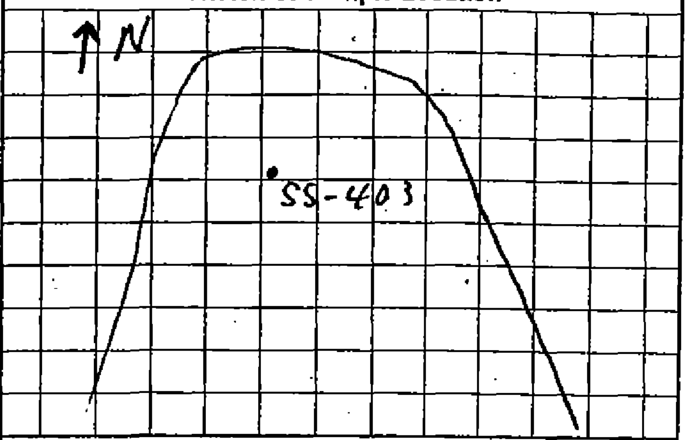
Sample No.: SS-403

Depth/Interval Sampled: 0-6 inches

Sample Type: [✓ Grab], Composite or Both (circle)

Media: (circle)
- [✓ Surface Soil]
- Subsurface Soil
- Other ________
- Sediment
- Surface Water
- Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: N/A

Other Field Measurements:

GPS

Observations:

Silty Clay (CL) lt. olive brown, 40% silt, 60% clay, soft, moist.

SAMPLE COLLECTION EQUIPMENT:

- ☐ Hand Auger
- ☐ Core Sampler
- ☑ Spatula/Spoon
- ☑ Bowl (stainless)
- ☐ Split-spoon (2" or 3")
- OTHER:
- ☐ Trowel
- ☐ Shelby Tube
- ☐ Dredge Sampler
- ☐ Kemmerer
- ☐ Extended Arm
- ☐ Bailer
- ☐ Backhoe
- ☐ Van Dorn Bottle

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% stainless
Tap Water	☒	
Methanol	☒	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metal	YES [✓ NO]	Ice Only	1 x 8oz.	1305	D05711	0248M
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					

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№ 120398

Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan **Project No.:** 02136 0590 01743

Date/Time: 12/2/04 0905

Sheet 1 **of** 1

Contractor Personnel: R. Bartosz

TRC Personnel: J. Hunter, A. Bergan

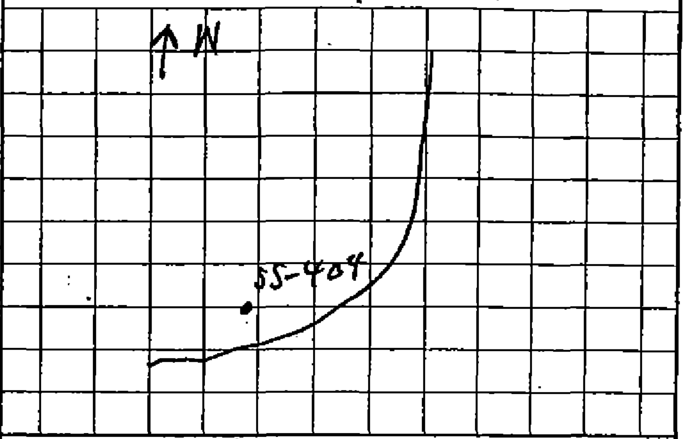
Sample No.: SS-404

Depth/Interval Sampled: 0-6 inches

Sample Type: [✓ Grab], Composite or Both
(circle)

Media: (circle)
[✓ Surface Soil] Sediment
Subsurface Soil Surface Water
Other ________ Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: OVM 0 ppm.

Other Field Measurements:

GPS	TARE	Sample Wt.	
BD 476362	34.87 g.	5.0 g.	39.87
BD 476455	34.70 g.	5.0 g.	39.70
BE 014194	32.70 g.	5.0 g.	37.70
BE 014193	33.03 g.	5.0 g.	38.03

Observations:
Silty sand (SM) Orangish-yellow, 40% silt, 60% F. sand, v. loose, moist

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☐	Trowel	☐
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☐	Dredge Sampler	☐
Bowl (stainless)	☑	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

OTHER:
5 mL Syringe

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% stainless
Tap Water	☒	
Methanol	☒	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metals	YES [✓ NO]	Ice Only	1 x 8oz	0905	D05712	0248M
☑ VOC's	YES [✓ NO]	2xMeOH, 2xWater	4 x VOA	0905	A18S9	33595
☑ SVOCs	YES [✓ NO]	Ice Only	1 x 8oz	0905	A18S9	33595
☑ % Moisture	YES [✓ NO]	Ice Only	1 x 2oz	0905	A18S9	33595
☐	YES NO					
☐	YES NO					

AF-212 № 120553

Signed: ____________

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan **Project No.:** 02136059001743

Date/Time: 12/2/04 1115

Sheet 1 **of** 1

Contractor Personnel: R. Bartosz

TRC Personnel: J. Hunter, A. Bergan

Sample No.: SS-405

Depth/Interval Sampled: 0-6 inches

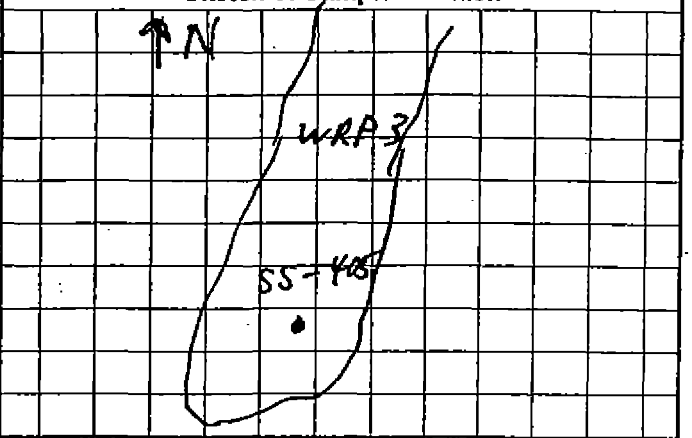
Sample Type: [✓ Grab,] Composite or Both (circle)

Media: (circle)

[✓ Surface Soil] Subsurface Soil Other ______

Sediment Surface Water Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: OVM 0 ppm

Other Field Measurements:

GPS	TARE	Sample wt.
BD 476360	34.80 g.	5.0 g.
BD 476461	34.73 g.	5.0 g.
BE 014 207	32.73 g.	5.0 g.
BE 014 203	32.75 g.	5.1 g.

Observations:

Gravelly Sand, yellowish-orange, 60% F-C Sand, 40% gravel-cobble, loose, dry

39.80
39.73
37.73
37.85

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☐	Trowel	☐
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☐	Dredge Sampler	☐
Bowl (stainless)	☑	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

OTHER: 5 mL Syringe

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% on Stainless
Tap Water	☒	
Methanol	☒	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metals	YES [✓ NO]	Ice Only	1 x 8 oz.	1115	D05713	0248M
☑ VOCs	YES [✓ NO]	2xNaOH, 2xH₂O	4x VOA	1115	A18T0	33595
☑ SVOCs	YES [✓ NO]	Ice Only	1x 8 oz.	1115	A18T0	33595
☑ % Moisture	YES [✓ NO]	Ice Only	1 x 2 oz.	1115	A18T0	33595
☐	YES NO					
☐	YES NO					

AF-212

№ 120554

Signed: J. Hunter

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan **Project No.:** 021360590 01743

Date/Time: 11/30/04 1353

Sheet 1 **of** 1

Contractor Personnel: R. Bartosz

TRC Personnel: J. Hunter, A. Bergan

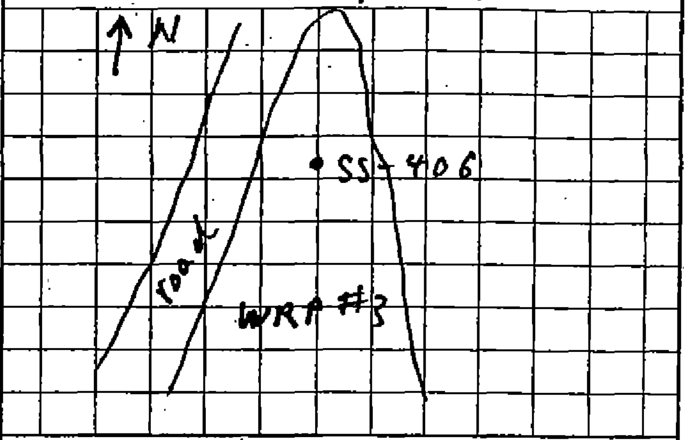
Sample No.: SS-406

Depth/Interval Sampled: 0-6 inches

Sample Type: [✓ Grab] Composite or Both
(circle)

Media: (circle)
[✓ Surface Soil] Sediment
Subsurface Soil Surface Water
Other ________ Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: N/A

Other Field Measurements:
GPS

Observations:
Gravelly sand (SW) orangish-brown, 60% F-C sand, 40% gravel, some cobbles-boulders, loose, dry

SAMPLE COLLECTION EQUIPMENT:

Hand Auger ☐
Core Sampler ☐
Spatula/Spoon ☑
Bowl (stainless) ☑
Split-spoon (2" or 3") ☐
OTHER:

Trowel ☐
Shelby Tube ☐
Dredge Sampler ☐
Kemmerer ☐
Extended Arm ☐
Bailer ☐
Backhoe ☐
Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% Stainless
Tap Water	☒	
Methanol	☒	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metals	YES [✓ NO]	Ice Only	1 x 8 oz.	1353	D05714	0248M
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					

AF-212
№ 120401

Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan
Project No.: 021360590017H3
Date/Time: 12/2/04 1030
Sheet 1 of 1

Contractor Personnel: R. Bartosz
TRC Personnel: J. Hunter, A. Bergan

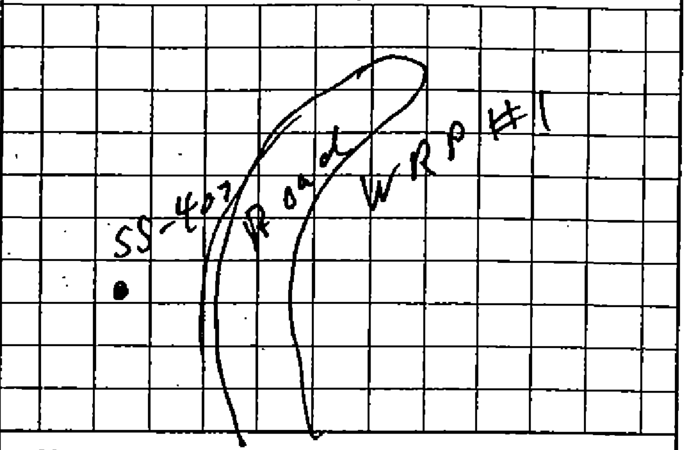
Sample No.: SS-407 + MS/MSD

Depth/Interval Sampled: 0-6 inches

Sample Type: [✓ Grab] Composite or Both (circle)

Media: (circle) [✓ Surface Soil] Subsurface Soil Other ______ Sediment Surface Water Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: OVM 0 ppm

Other Field Measurements: GPS

~~GPS~~	TARE	Sample wt.	
BD 476460	34.58 g.	5.0 g.	39.58
BD 476476	34.75 g.	5.0 g.	39.75 ~~39.58~~
BE 014210	32.72 g.	5.1 g.	37.82
BE 014271	32.87 g.	5.0 g.	37.87

Observations:

Gravelly sand (SW) yellowish-orange, 80% F-C sand, 40% gravel to cobble, loose, damp.

MS Sample:

BD 476416	34.76 g.	5.1 g.	39.86
BD 476454	34.56 g.	4.9 g.	39.46
BE 014286	32.97 g.	5.0 g.	37.97
BE 014273	32.86 g.	5.1 g.	37.96

SAMPLE COLLECTION EQUIPMENT:

- Hand Auger ☐
- Core Sampler ☐
- Spatula/Spoon ☐
- Bowl (stainless) ☑
- Split-spoon (2" or 3") ☐
- Trowel ☑
- Shelby Tube ☐
- Dredge Sampler ☐
- Kemmerer ☐
- Extended Arm ☐
- Bailer ☐
- Backhoe ☐
- Van Dorn Bottle ☐

OTHER: 5 mL. Syringe

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED
Tap water	☒
Alconox	☒
Tap water	☒
HNO_3 (1 or [✓ 10%]) ss	☒
Tap Water	☒
Methanol	☒
Hexane	☐
Acetone	☐
Air Dry	☒
DI Water	☒
Air Dry	☒
None	☐

DESCRIPTION: MSD Samples

BD 476369	34.74 g.	5.1 g.	39.84
BD 476453	34.73 g.	5.1 g.	39.83
BE 014195	32.86 g.	5.1 g.	37.96
BE 014290	32.97 g.	5.1 g.	38.07

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metals	YES [✓ NO]	Ice Only	1 × 8 oz.	1030	D05715	0248M
☑ VOCs	YES [✓ NO]	2×MeOH, 2×H_2O	4 × VOA	1030	A18T1	33595
☑ SVOCs	YES [✓ NO]	Ice Only	1 × 8 oz.	1030	A18T1	33595
☑ % Moisture	YES [✓ NO]	Ice Only	1 × 2 oz.	1030	A18T1	33595
☐	YES NO					
☐	YES NO					

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№ 120555

Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan **Project No.:** 021360590 01743

Date/Time: 11/30/04 1325

Sheet 1 **of** 1

Contractor Personnel: R. Bartosz

TRC Personnel: J. Hunter, A. Bergan

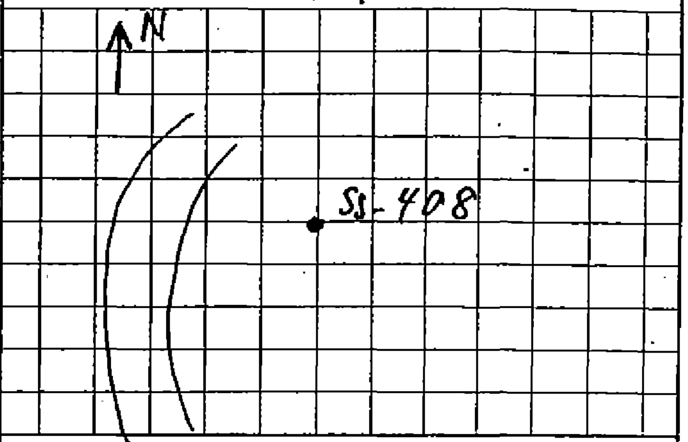
Sample No.: SS-408 / SS-408 MS

Depth/Interval Sampled: 0-6 inches

Sample Type: (circle) [✓ Grab] Composite or Both

Media: (circle)
[✓ Surface Soil]
Subsurface Soil
Other ________
Sediment
Surface Water
Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: N/A

Other Field Measurements:

GPS

Observations:

Gravelly sand (SW), orangish-brown, 60% F-C sand, 40% gravel, some cobbles - boulders, loose, dry

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☐	Trowel	☐
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☑	Dredge Sampler	☐
Bowl (stainless)	☑	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
OTHER:		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or [✓ 10%]) SS	☒	
Tap Water	☒	
Methanol	☒	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metals	YES [✓ NO]	Ice Only	1 x 8oz.	1325	D05716	0248M
☑ Metals (MS)	YES [✓ NO]	Ice Only	1 x 8oz.	1325	D05716	0248M
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					

AF-212 № 120399

Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan **Project No.:** 02136 0590 0AH3

Date/Time: 11/30/04 1335

Sheet 1 **of** 1

Contractor Personnel: R. Bartosz

TRC Personnel: J. Hunter, A. Bergan

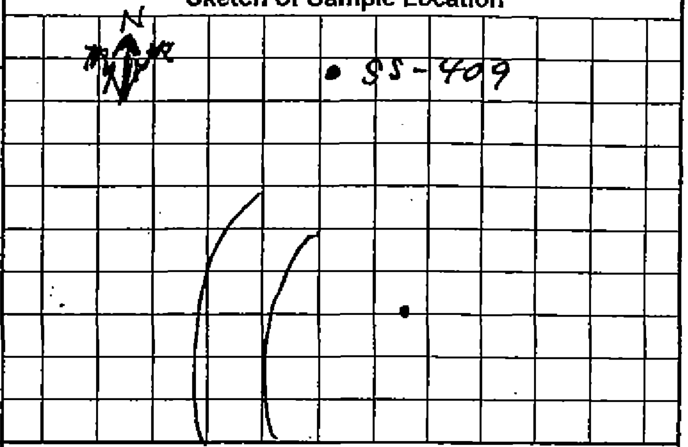
Sample No.: SS- 409

Depth/Interval Sampled: 0-6 inches

Sample Type: [✓ Grab] Composite or Both (circle)

Media: (circle) [✓ Surface Soil] Subsurface Soil Other ______ Sediment Surface Water Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: N/A

Other Field Measurements:

GPS

Observations:

Gravelly Sand (sw), orangish-brown, 60% F-C sand, 40% gravel, some cobbles - boulders, loose, dry

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☐	Trowel	☐
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☑	Dredge Sampler	☐
Bowl (stainless)	☑	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
OTHER:		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO$_3$ (1 or [✓ 10%])	☒	
Tap Water	☒	
Methanol	☒	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metals	YES [✓ NO]	Ice Only	1 x 8oz.	1335	D05717	0248M
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					

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№ 120400

Signed: Jeffrey S. Hunter

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan **Project No.:** 02136 0590 9783

Date/Time: 11/2/04 1350

Sheet 1 **of** 1

Contractor Personnel: R. Bartosz

TRC Personnel: J Hunter M Bergan

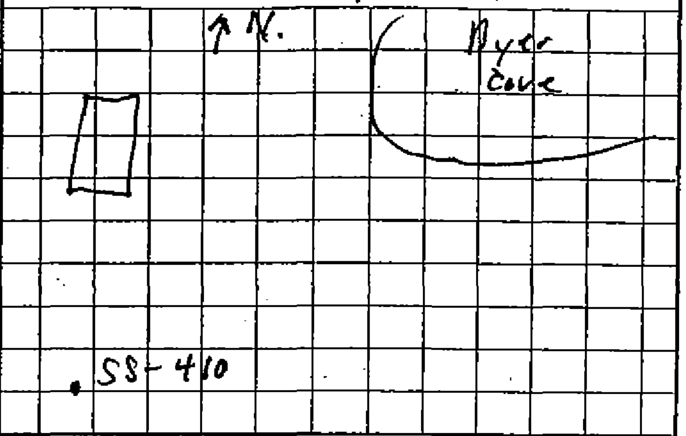
Sample No.: SS-410

Depth/Interval Sampled: 0-6 inches

Sample Type: [✓ Grab], Composite or Both (circle)

Media: (circle)
[✓ Surface Soil]
Subsurface Soil
Other ________
Sediment
Surface Water
Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: OVM 0 ppm

Other Field Measurements:

GPS	TARE	S. wt.
BD476363	34.76 g.	5.0 g.
BD 476417	34.63 g.	5.0 g.
BE 014287	32.96 g.	5.0 g
BE 014270	33.30 g.	5.0 g.

Observations:

SP Gravelly Sand (SW) d. gray, 60% F-C sand, 40% gravel, v. loose, moist.

39.76
39.63
37.96
38.30

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☐	Trowel	☐
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☑	Dredge Sampler	☐
Bowl (stainless)	☑	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

OTHER:

5mL syringe

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or [✓ 10%]) 95	☒	
Tap Water	☒	
Methanol	☒	
Hexane	~~☒~~ CF	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metals	YES [✓ NO]	Ice only	1x 8oz	1350	D05718	0248M
☑ Voc's	YES [✓ NO]	2x MeOH 2x H2O	4x Voa	1350	A19C8	33595
☑ SVOC's	YES [✓ NO]	Ice only	1x 8oz	1350	A19C8	33595
☑ % moisture	YES [✓ NO]	Ice only	1x 8oz	1350	A19C8	33595
☐	YES NO					
☐	YES NO					

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№ 120556

Signed: ______

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan **Project No.:** 02136 0590 0AH3

Date/Time: 12/2/04 1410

Sheet 1 **of** 1

Contractor Personnel: R Bartosz

TRC Personnel: J Hunter, A Bergan

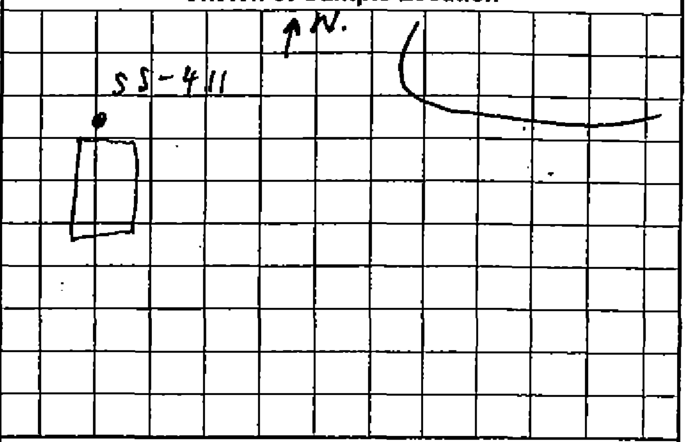
Sample No.: SS-411

Depth/Interval Sampled: 0-6 inches

Sample Type: [✓ Grab] Composite or Both (circle)

Media: (circle)
[✓ Surface Soil] Sediment
Subsurface Soil Surface Water
Other ________ Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: ovm 0ppm

Other Field Measurements:

GPS

80476536	34.56 g.	5.1 g.	39.66
80476463	34.85 g.	5.1 g.	39.95
BE 014209	32.95 g.	5.0 g.	37.95
BE 014192	32.85 g.	4.9 g.	37.75

Observations:

Sandy gravel, d. gray, 30% f-c sand, 70% gravel, loose, wet

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☐	Trowel	☐
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☑	Dredge Sampler	☐
Bowl (stainless)	☑	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

OTHER: 5mL syringe

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	Stainless 10%
Tap Water	☒	
Methanol	☒	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metals	YES [✓ NO]	Ice only	1x8oz	1410	D05719	0248M
☑ VOC's	YES [✓ NO]	2xMeOH 2xH2O	4xVoa	1410	A19C9	33595
☑ SVOC's	YES [✓ NO]	Ice only	1x8oz	1410	A19C9	33595
☑ % moisture	YES [✓ NO]	Ice only	1x2oz	1410	A19C9	33595
☐	YES NO					
☐	YES NO					

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Signed: ____________

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Calahan
Project No.: 02136059001743
Date/Time: 12/2/04 1425
Sheet 1 of 1
Contractor Personnel: R. Bartosz
TRC Personnel: J. Hunter, A. Bergan

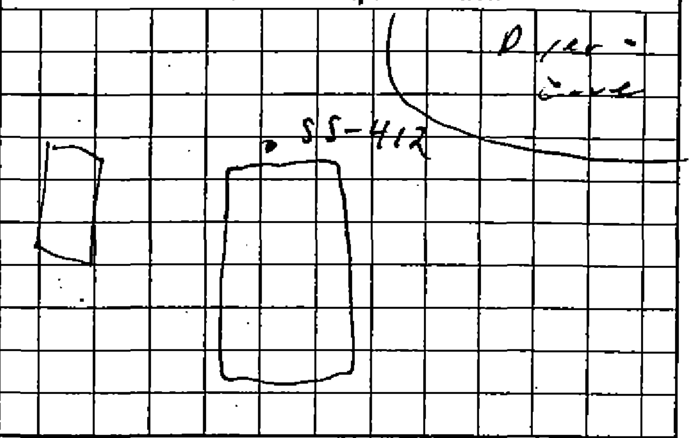
Sample No.: SS-412

Depth/Interval Sampled: 0-6 inches

Sample Type: [✓ Grab] Composite or Both (circle)

Media: (circle)
[✓ Surface Soil] Sediment
Subsurface Soil Surface Water
Other ______ Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: OVM 0 ppm

Other Field Measurements:

GPS

BD 476457	34.83 g.	5.1 g.	39.93
BD 476532	34.73 g.	5.0 g.	39.73
BE 014277	32.92 g.	5.0 g.	37.92
BE 014282	32.68 g.	5.0 g.	37.68

Observations:

Clayey gravel, y. brown, 40% clay, 60% gravel, loose, wet

SAMPLE COLLECTION EQUIPMENT:

Hand Auger ☐
Core Sampler ☐
Spatula/Spoon ☑
Bowl (stainless) ☑
Split-spoon (2" or 3") ☐

OTHER:
5ml syringe

Trowel ☐
Shelby Tube ☐
Dredge Sampler ☐
Kemmerer ☐
Extended Arm ☐
Bailer ☐
Backhoe ☐
Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% Stainless
Tap Water	☒	
Methanol	☒	
Hexane	☒	cF
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metals	YES [✓ NO]	Ice only	1 x 8oz	1425	D05720	0248M
☑ VOC's	YES [✓ NO]	2xMeOH 2xH2O ~~Ice only~~	4yVoa	1425	A19D0	33595
☑ SVOC's	YES [✓ NO]	Ice only	1x8oz	1425	A19D0	33595
☑ % moisture	YES [✓ NO]	Ice only	1x2oz	1425	A19D0	33595
☐	YES NO					
☐	YES NO					

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№ 120558

Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan **Project No.:** 021360590 01743

Date/Time: 12/1/04 1440 **Sheet** 1 **of** 1

Contractor Personnel: R. Bartosz

TRC Personnel: J Hunter, A Bergan

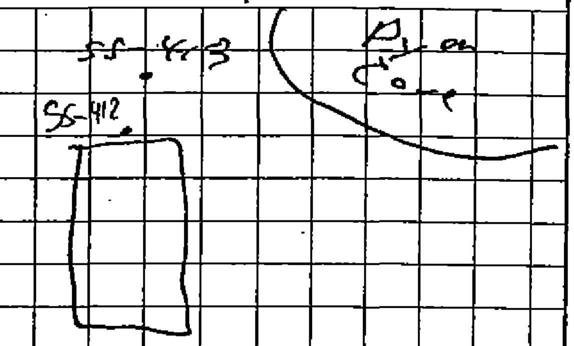
Sample No.: SS-413

Depth/Interval Sampled: 0-6 inches

Sample Type: [✓ Grab] Composite or Both (circle)

Media: (circle) [✓ Surface Soil] Subsurface Soil Other ______ Sediment Surface Water Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: OVM 0 ppm

Other Field Measurements:

GPS

BD 476462	34.52 g.	5.1 g.	39.62
BD 476470	34.02 g.	5.1 g.	39.12
BE 014291	33.05 g.	5.1 g.	38.15
BE 014275	32.80 g.	5.0 g.	37.80

Observations:

Gravelly sand, olive-brown, ≠ 60% F-C Sand, 40% gravel, loose, wet

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☐	Trowel	☐
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☑	Dredge Sampler	☐
Bowl (stainless)	☑	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

OTHER: 5mL syringe

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO3 (1 or10%)	☒	10% Stainless
Tap Water	☒	
Methanol	☒	
Hexane	☐	
Acetone	☐	
Air Dry	☑	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metals	YES [✓ NO]	Ice only	1x 8oz	1440	D0571	0248M
☑ Voc's	YES [✓ NO]	2xMeOH 2xH2O	4x Voa	1440	A19D1	33595
☑ SVoc's	YES [✓ NO]	Ice Only	1x 8oz	1440	A19D1	33595
☑ % moisture	YES [✓ NO]	Ice Only	1x2oz	1440	A19D1	33595
☐	YES NO					
☐	YES NO					

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№ 120559

Signed: ______

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan
Project No.: 02136 0590 01743
Date/Time: 11/30/04 1418
Sheet 1 **of** 1
Contractor Personnel: R. Bartosz
TRC Personnel: J. Hunter

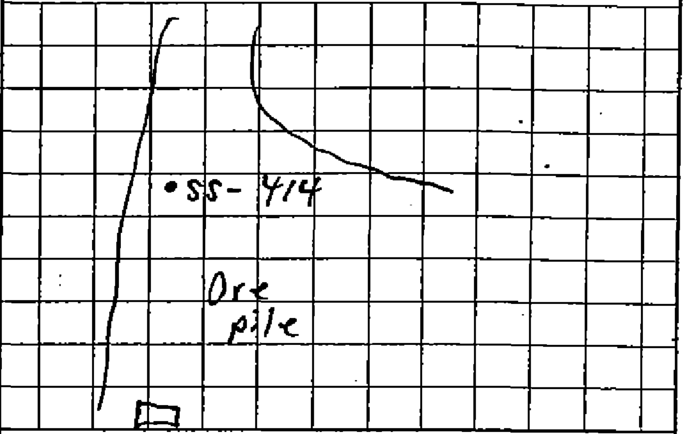
Sample No.: SS-414

Depth/Interval Sampled: 0-6 inches

Sample Type: [✓ Grab,] Composite or Both
(circle)

Media: (circle)
[✓ Surface Soil] Sediment
Subsurface Soil Surface Water
Other ________ Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: N/A

Other Field Measurements:
GPS

Observations:
Silty sand (SM) orangish-brown, 20% silt, 80% f-c sand, v. loose, dry

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☐	Trowel	☐
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☑	Dredge Sampler	☐
Bowl (stainless)	☑	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
OTHER:		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% Stainless
Tap Water	☒	
Methanol	☒	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metals	YES [✓ NO]	Ice Only	1 x 8oz.	1418	D05722	0248M
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					

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№ 120547

Signed: John J. Hunter

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan **Project No.:** 02136 0990 01743

Date/Time: 11/30/04 1410

Sheet 1 **of** 1

Contractor Personnel: R. Bartosz

TRC Personnel: J. Hunter, A. Bergan

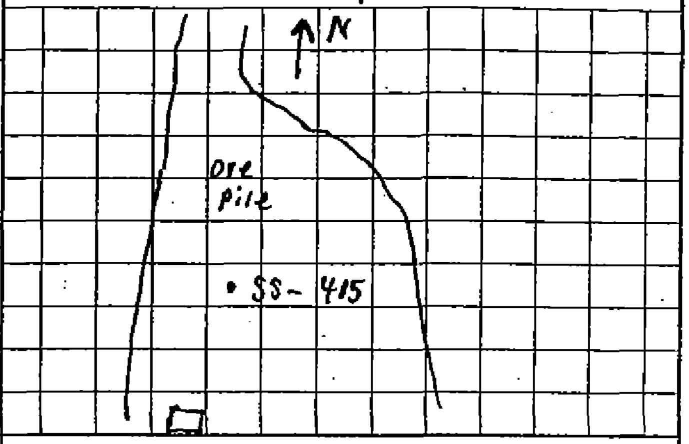
Sample No.: SS-415

Depth/Interval Sampled: 0-6 inches

Sample Type: [✓ Grab], Composite or Both (circle)

Media: (circle)
[✓ Surface Soil] Sediment
Subsurface Soil Surface Water
Other ______ Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: N/A

Other Field Measurements:

GPS

Observations:

Silty sand (SM) orangish-brown, 20% silt; 80% F-C sand, v. loose, moist.

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☐	Trowel	☐
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☑	Dredge Sampler	☐
Bowl (stainless)	☑	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
OTHER:		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% Stanless
Tap Water	☒	
Methanol	☒	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metals	YES [✓ NO]	Ice Only	1 x 8oz.	1410	D05723	0248m
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					

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№ 120546

Signed: Jeffrey A. Hunter

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan
Project No.: 02136 0590 0AH3
Date/Time: 12/2/04 1530
Sheet 1 **of** 1

Contractor Personnel: R. Bartosz
TRC Personnel: J. Hunter, A. Bergen

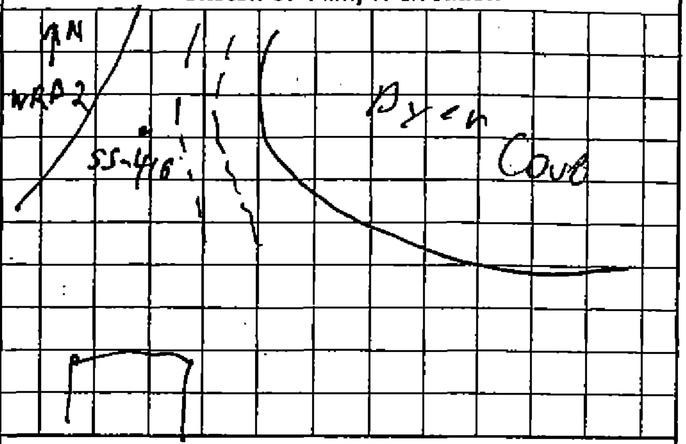
Sample No.: SS-416

Depth/Interval Sampled: 0 - 6 inches

Sample Type: [✓ Grab] Composite or Both
(circle)

Media: (circle)
[✓ Surface Soil]
Subsurface Soil
Other ________
Sediment
Surface Water
Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: OVM 0ppm

Other Field Measurements:

GPS

BD476478	34.59	4.9	39.49
BD476573	34.67	5.1	39.77
BE014267	32.93	5.1	38.03
BE014292	33.04	5.0	38.04

Observations:

Gravelly sand, yellowish-orange, 70% m-c sand, 30% gravel, loose, moist,

SAMPLE COLLECTION EQUIPMENT:

- Hand Auger ☐
- Core Sampler ☐
- Spatula/Spoon ☑
- Bowl (stainless) ☑
- Split-spoon (2" or 3") ☐
- Trowel ☐
- Shelby Tube ☐
- Dredge Sampler ☐
- Kemmerer ☐
- Extended Arm ☐
- Bailer ☐
- Backhoe ☐
- Van Dorn Bottle ☐

OTHER: 5ml syringe

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% Stainless
Tap Water	☒	
Methanol	☒	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metals	YES [✓ NO]	Ice only	1x 8oz	1530	D05724	0248M
☑ Voc's	YES [✓ NO]	2xMeOH, 2xH2O	4x Voa	1530	A19D2	33595
☑ SVoc's	YES [✓ NO]	Ice only	1x 8oz	1530	A19D2	33595
☑ % moisture	YES [✓ NO]	Ice only	1x2oz	1530	A19D2	33595
☐	YES NO					
☐	YES NO					

AF-212
№ 120560

Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan **Project No.:** 02136.0590 01743

Date/Time: 11/30/04 1455

Sheet 1 **of** 1

Contractor Personnel: R. Bartosz

TRC Personnel: J. Hunter, A. Bergan

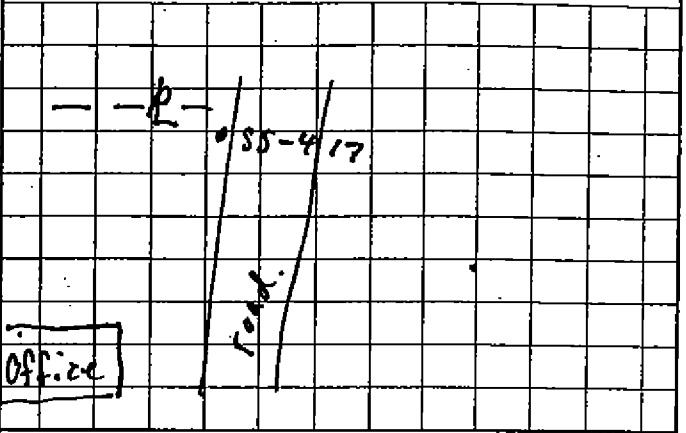
Sample No.: SS-417

Depth/Interval Sampled: 0-6 inches

Sample Type: [✓ Grab]/Composite or Both (circle)

Media: (circle) [✓ Surface Soil] Subsurface Soil Other ______ Sediment Surface Water Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: N/A

Other Field Measurements:

GPS

Observations:

Gravelly Sand (SW) grayish-brown, 60% F-C sand, 40% gravel up to 2 in., dense, damp

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☐	Trowel	☑
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☐	Dredge Sampler	☐
Bowl (stainless)	☑	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
OTHER:		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% SS
Tap Water	☒	
Methanol	☒	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metals	YES [✓ NO]	Ice Only	1 x 8oz.	1455	D05725	0248M
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					

AF-212

№ 120549

Signed: Jay A. Ht

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan
Project No.: 02136.0590 01AH3
Date/Time: 11/30/04 1435
Sheet 1 **of** 1

Contractor Personnel: R. Bartosz

TRC Personnel: J. Hunter, A. Bergan

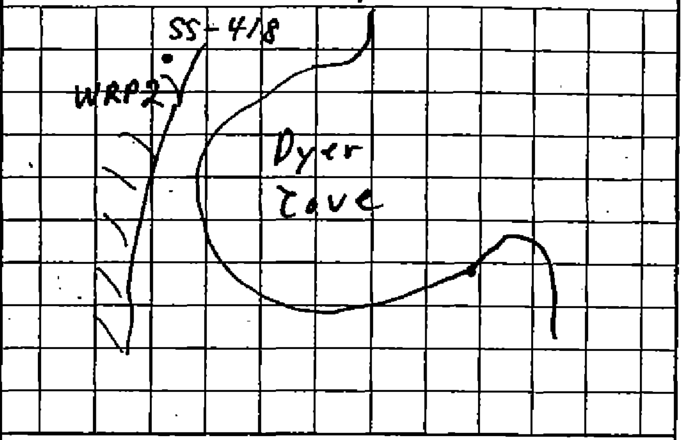
Sample No.: SS-418

Depth/Interval Sampled: 0-6 inches

Sample Type: (circle) [✓ Grab] Composite or Both

Media: (circle)
[✓ Surface Soil] Sediment
Subsurface Soil Surface Water
Other ______ Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: N/A

Other Field Measurements:

GPS

Observations:

Gravelly sand, orangish-brown. 60% F-C sand, 40% gravel, some Cobbles, v. loose, damp

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☐	Trowel	☐
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☑	Dredge Sampler	☐
Bowl (stainless)	☑	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
OTHER:		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	
Tap Water	☒	
Methanol	☒	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metals	YES [✓ NO]	Ice Only	1 x 8oz.	1435	D05726	0248M
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					

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№ 120548

Signed: ______

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan **Project No.:** 02360590 0AH3

Date/Time: 11/30/04 1140

Sheet 1 **of** 1

Contractor Personnel: R. Bartosz

TRC Personnel: J. Hunter, A. Bergan

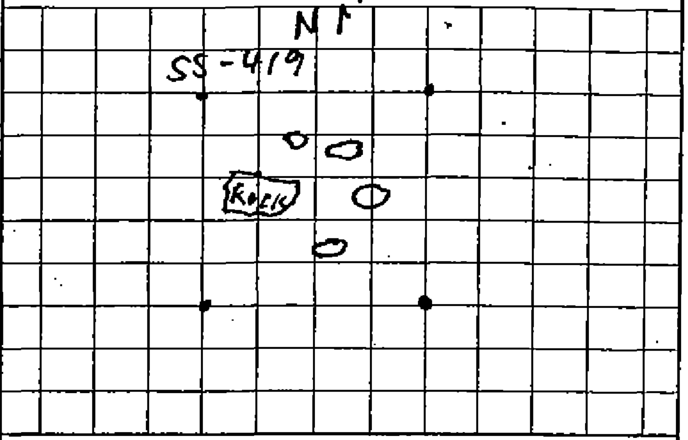
Sample No.: SS-419

Depth/Interval Sampled: 0-6 inches

Sample Type: [✓ Grab,] Composite or Both
(circle)

Media: (circle)
[✓ Surface Soil] Subsurface Soil Other ______
Sediment Surface Water Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: N/A

Other Field Measurements:

GPS

Observations:

Silty Sand (SM) y. brown, 20% silt, 75% f-m sand, trace gravel, loose, dry

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☐	Trowel	☑
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☐	Dredge Sampler	☐
Bowl (stainless)	☑	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
OTHER:		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% Stanless Steel
Tap Water	☒	
Methanol	☒	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metals	YES [✓ NO]	Ice Only	1 x 8 oz.	1140	~~005729~~ JH.	
☐	YES NO				005727	0248M
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					

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№ 120394

Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan **Project No.:** 02136 0590 01743

Date/Time: 11/30/04 1145

Sheet 1 **of** 1

Contractor Personnel: R. Bartosz

TRC Personnel: J. Hunter, A. Bergen

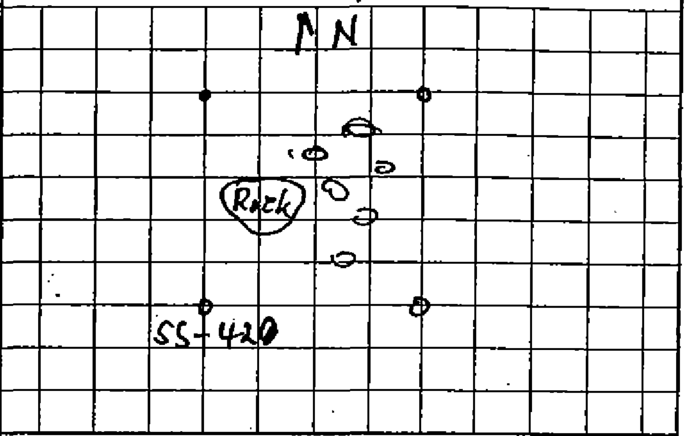
Sample No.: SS-420

Depth/Interval Sampled: 0-6 inches

Sample Type: [✓ Grab], Composite or Both (circle)

Media: (circle)
[✓ Surface Soil] Sediment
Subsurface Soil Surface Water
Other ______ Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: N/A

Other Field Measurements:
GPS

Observations:
Silty sand (SM), y. brown, 20% silt, 75% F-M sand, trace gravel, loose, dry

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☐	Trowel	☑
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☐	Dredge Sampler	☐
Bowl (stainless)	☑	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
OTHER:		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO$_3$ (1 or [✓ 10%]) SS	☒	
Tap Water	☒	
Methanol	☒	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metals	YES [✓ NO]	Ice Only	1×8oz.	1145	D05728	0248M
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					

AF-212 № 120395

Signed: Jeff A. Hunter

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan
Project No.: 02136059001743
Date/Time: 1150 J.H. 11/30/04 ~~445~~
Sheet 1 **of** 1

Contractor Personnel: R. Bartosz
TRC Personnel: J. Hunter, A. Bergan

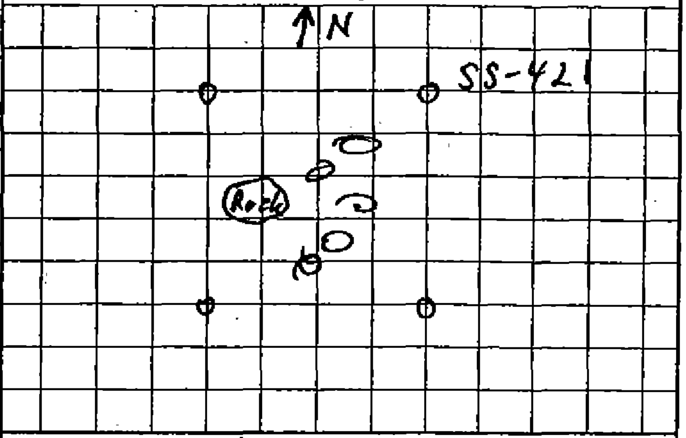
Sample No.: SS-421

Depth/Interval Sampled: 0-6 inches

Sample Type: (circle) [✓ Grab] Composite or Both

Media: (circle)
[✓ Surface Soil] Sediment
Subsurface Soil Surface Water
Other ________ Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: N/A

Other Field Measurements:
GPS

Observations:
Silty sand (SM), y. brown, 20% silt, 75% F-M sand, trace gravel, loose, dry

SAMPLE COLLECTION EQUIPMENT:

Hand Auger ☐
Core Sampler ☐
Spatula/Spoon ☐
Bowl (stainless) ☑
Split-spoon (2" or 3") ☐
OTHER:

Trowel ☑
Shelby Tube ☐
Dredge Sampler ☐
Kemmerer ☐
Extended Arm ☐
Bailer ☐
Backhoe ☐
Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% Stanless
Tap Water	☒	
Methanol	☒	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metals	YES [✓ NO]	Ice Only	1 x 8oz.	1150	D05729	0248M
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					

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№ 120396

Signed: Jeff S. H

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan

Project No.: 021360590017#3

Date/Time: 11/30/04 1155

Sheet 1 **of** 1

Contractor Personnel: R. Bartosz

TRC Personnel: J. Hunter, A. Bergan

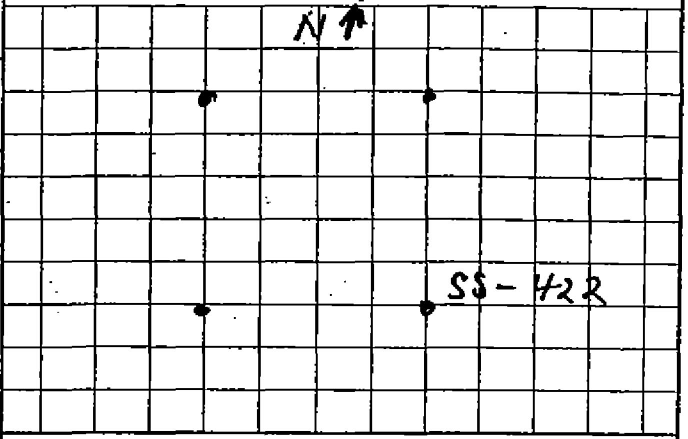
Sample No.: SS-422

Depth/Interval Sampled: 0-6 inches

Sample Type: [✓ Grab] Composite or Both
(circle)

Media: **(circle)**
[✓ Surface Soil]
Subsurface Soil
Other ______
Sediment
Surface Water
Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: N/A

Other Field Measurements:

GPS

Observations:

Silty Sand (SM), y. brown,
20% silt, 75% F-M sand,
trace gravel, loose, dry

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☐	Trowel	☑
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☐	Dredge Sampler	☐
Bowl (stainless)	☑	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
OTHER:		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or [✓ 10%]) SS	☒	
Tap Water	☒	
Methanol	☒	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metals	YES [✓ NO]	Ice Only	1 x 8oz	1155	005730	0248M
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					

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Signed: ______

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan **Project No.:** 02136 0590 01AH3

Date/Time: 11/30/04 1010

Sheet 1 **of** 1

Contractor Personnel: R. Bartosz

TRC Personnel: J. Hunter, A. Bergen

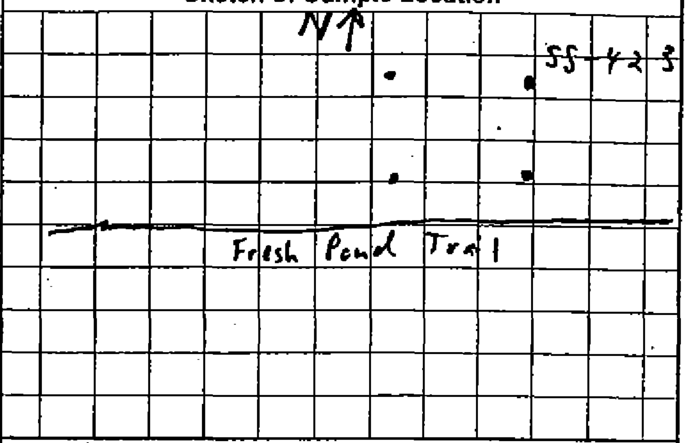
Sample No.: SS - 423

Depth/Interval Sampled: 0 - 6 in.

Sample Type: [✓ Grab,] Composite or Both (circle)

Media: (circle) [✓ Surface Soil] Subsurface Soil Other ______ Sediment Surface Water Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: N/A

Other Field Measurements:

GPS

Observations:

Sand (SW) lt. gray, 90% F-C Sand, 10% gravel, loose, damp

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☐	Trowel	☐
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☑	Dredge Sampler	☐
Bowl (stainless)	☑	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
OTHER:		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO$_3$ (1 or [✓ 10%]) SS	☒	
Tap Water	☒	
Methanol	☒	
Hexane	☒ CP	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metals	YES [✓ NO]	Ice Only	1 x 8 oz.	1010	D05731	02484A
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					

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Signed: Jeff J. Hunter

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan **Project No.:** 021360590001743

Date/Time: 11/30/04 1012

Sheet 1 **of** 1

Contractor Personnel: R. Bartosz

TRC Personnel: J. Hunter, A. Bergan

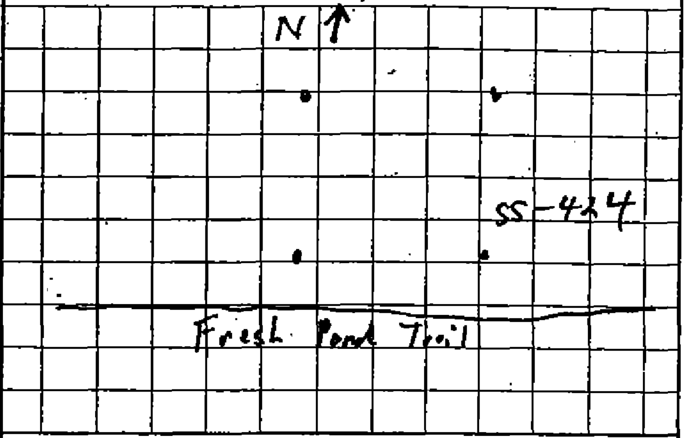
Sample No.: SS-424

Depth/Interval Sampled: 0-6 in.

Sample Type: [✓ Grab], Composite or Both
(circle)

Media: (circle)
[✓ Surface Soil] Sediment
Subsurface Soil Surface Water
Other _________ Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: N/A

Other Field Measurements:

GPS

Observations:

Sand (sw) lt. gray, 90% F-C sand, 10% gravel, loose, damp

SAMPLE COLLECTION EQUIPMENT:

Hand Auger ☐
Core Sampler ☐
Spatula/Spoon ☑
Bowl (stainless) ☑
Split-spoon (2" or 3") ☐
OTHER:

Trowel ☐
Shelby Tube ☐
Dredge Sampler ☐
Kemmerer ☐
Extended Arm ☐
Bailer ☐
Backhoe ☐
Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% SS
Tap Water	☒	
Methanol	☒	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None		

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metals	YES [✓ NO]	Ice Only	1 x 8oz.	1012	D05732	0248M
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					

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№ 120390

Signed: Jeff L. Hunter

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan Project No.: 021360590 01743

Date/Time: 11/30/04 1015

Sheet 1 of 1

Contractor Personnel: R. Bartosz

TRC Personnel: J. Hunter, A. Bergan

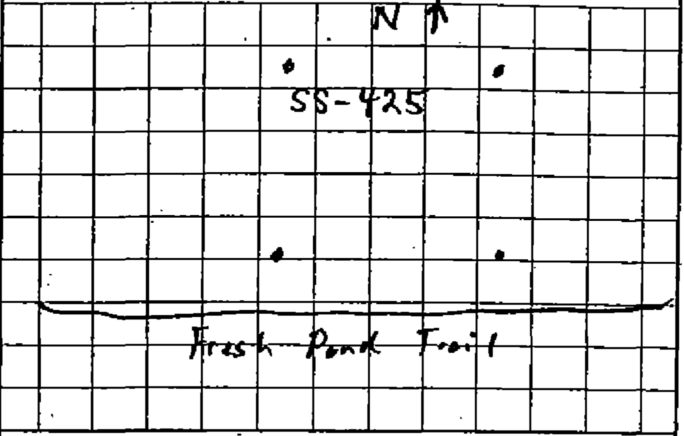
Sample No.: SS - 425

Depth/Interval Sampled: 0-6 inch.

Sample Type: (circle) [✓ Grab] Composite or Both

Media: (circle) [✓ Surface Soil] Subsurface Soil Other ______ Sediment Surface Water Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: N/A

Other Field Measurements:

GPS

Observations:

Sand (SW) olive brown, 90% F-C sand, 10% gravel, loose, damp

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☐	Trowel	☐
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☑	Dredge Sampler	☐
Bowl (stainless)	☑	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
OTHER:		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% SS
Tap Water	☒	
Methanol	☒	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metal	YES [✓ NO]	Ice Only	1 x 8oz	1015	D05733	0248M
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					

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№ 120391

Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan **Project No.:** 02136 0590 01AH3

Date/Time: 11/30/04 1018

Sheet 1 **of** 1

Contractor Personnel: R. Bartosz

TRC Personnel: J. Hunter, A. Bergan

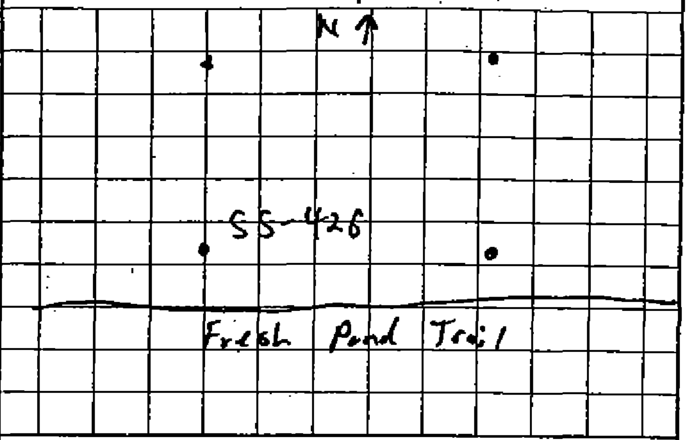
Sample No.: SS - 426

Depth/Interval Sampled: 0- 6 inches

Sample Type: [✓ Grab] Composite or Both (circle)

Media: (circle) [✓ Surface Soil] Subsurface Soil Other ______ Sediment Surface Water Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: N / A

Other Field Measurements:

GPS

Observations:

Sand (SW), olive brown, 90% F-C sand, 10% gravel, loose, damp

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☐	Trowel	☐
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☑	Dredge Sampler	☐
Bowl (stainless)	☑	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
OTHER:		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or [✓ 10%])	☒	
Tap Water	☒	
Methanol	☒	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metals	YES [✓ NO]	Ice Only	1 x 8oz.	1018	D05734	0248M
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					

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№ 120392

Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan

Project No.: 02136 0590 017#3

Date/Time: 11/30 0830

Sheet 1 of 1

Contractor Personnel: R. Bartosz

TRC Personnel: J. Hunter, A. Bergan

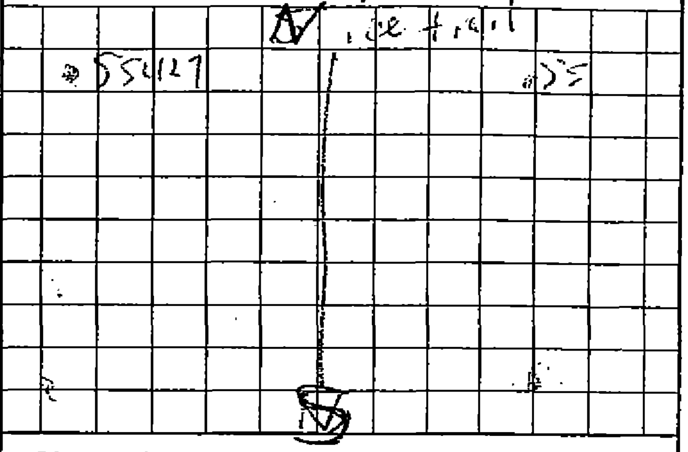
Sample No.: SS427, SSE427
dup @ 1000

Depth/Interval Sampled: 0 - 6 inch

Sample Type: (circle) [✓ Grab] Composite or Both

Media: (circle)
[✓ Surface Soil] Sediment
Subsurface Soil Surface Water
Other ________ Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: N/A

Other Field Measurements:

GPS

Observations:

Silty sand w/gravel, y. brown, 30% silt, 60% f. sand, 10% rounded gravel up to 1 in. axial, moist, v. loose.

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☐	Trowel	☑
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☐	Dredge Sampler	☐
Bowl (stainless)	☑	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
OTHER:		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO$_3$ (1 or [✓ 10%])	☒	
Tap Water	☒	
Methanol	☒	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ metals	YES [✓ NO]	ice only	8 oz	0830	D05735	0248M
☑ metals	YES [✓ NO]	ice only	8 oz	0900-dup	D05740	0248M
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					

AF-212 № 120386

Signed:

Rev: 8 July 1991

TRC
Sample Log Sheet

Project: Callahan **Project No.:** 021360590 01743

Date/Time: 11/30/04 0840

Sheet 1 **of** 1

Contractor Personnel: R. Bartosz

TRC Personnel: J. Hunter; A. Bergan

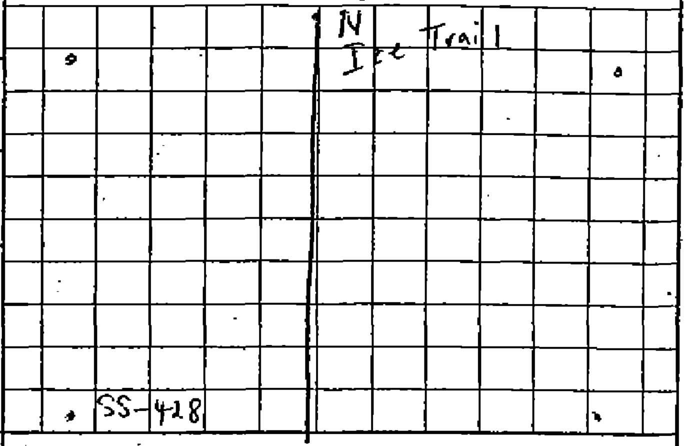
Sample No.: SS 428

Depth/Interval Sampled: 0-6 inch

Sample Type: (circle) [✓ Grab] Composite or Both

Media: (circle) [✓ Surface Soil] Subsurface Soil Other ______ Sediment Surface Water Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: N/A

Other Field Measurements:

GPS

Observations:

Silty sand w/gravel, y. brown, 30% silt, 60% F. Sand, 10% rounded gravel up to 1in. axial, v. loose, moist.

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☐	Trowel	☑
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☐	Dredge Sampler	☐
Bowl (stainless)	☑	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
OTHER:		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or [✓ 10%]) 5S	☒	
Tap Water	☒	
Methanol	☒	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ Metals	YES [✓ NO]	Ice Only	8 oz.	0840	D05736	0248M
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					

AF-212

№ 120388

Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan **Project No.:** 02136 0590 017H3

Date/Time: 11/30/04 0820

Sheet 1 **of** 1

Contractor Personnel: R. Bartosz

TRC Personnel: J. Hunter, A. Bergan

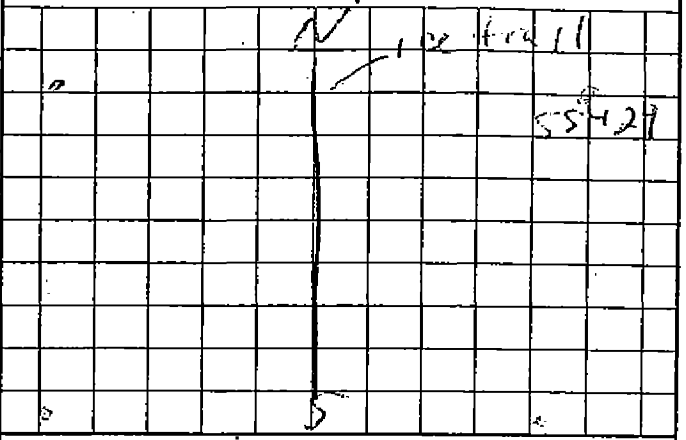
Sample No.: SS42A

Depth/Interval Sampled: 0-6 inch

Sample Type: [✓ Grab] Composite or Both
(circle)

Media: (circle)
[✓ Surface Soil] Sediment
Subsurface Soil Surface Water
Other ______ Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: N/A

Other Field Measurements:

GPS

Observations:

Silty sand w/gravel, y. brown, 30% silt, 60% F. sand, 10% rounded gravel up to 1 in. axial, v. loose, moist.

SAMPLE COLLECTION EQUIPMENT:

Hand Auger ☐
Core Sampler ☐
Spatula/Spoon ☐
Bowl (stainless) ☑
Split-spoon (2" or 3") ☐
OTHER:

Trowel ☑
Shelby Tube ☐
Dredge Sampler ☐
Kemmerer ☐
Extended Arm ☐
Bailer ☐
Backhoe ☐
Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or [✓ 10%]) SS	☒	
Tap Water	☒	
Methanol	☒	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☐ metals	YES [✓ NO]	Ice only	8 oz	08:20	D05737	0248M
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					

AF-212
№ 120387

Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan
Project No.: 02136 0590 OA#3
Date/Time: 11/30/04 0900
Sheet 1 **of** 1

Contractor Personnel: R. Bartosz
TRC Personnel: J. Hunter, A. Bergan

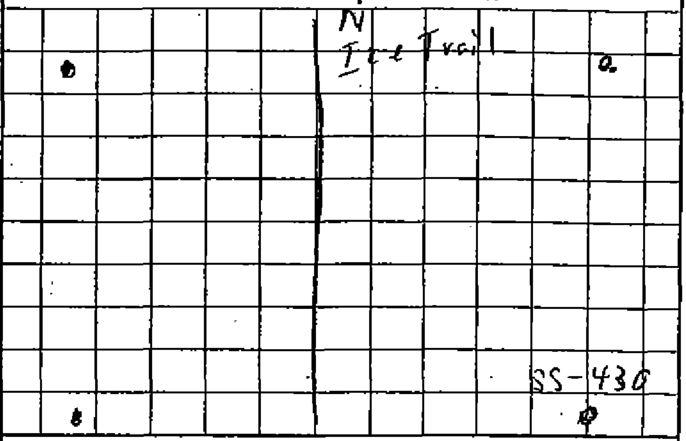
Sample No.: SS-430 / SS-430 MS

Depth/Interval Sampled: 0-6 inch

Sample Type: [✓ Grab], Composite or Both
(circle)

Media: [✓ Surface Soil] Subsurface Soil Other ______ Sediment Surface Water Ground Water
(circle)

Sketch of Sample Location



Field Screening Information:

Type of Meter: N/A

Other Field Measurements:

GPS

Observations:

Silty sand w/gravel, y. brown, 30% silt, 60% F. sand, 10% rounded gravel up to 1inch axial, v. loose, moist

SAMPLE COLLECTION EQUIPMENT:

- Hand Auger ☐
- Core Sampler ☐
- Spatula/Spoon ☐
- Bowl (stainless) ☒
- Split-spoon (2" or 3") ☐
- OTHER:
- Trowel ☑
- Shelby Tube ☐
- Dredge Sampler ☐
- Kemmerer ☐
- Extended Arm ☐
- Bailer ☐
- Backhoe ☐
- Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☐	
Alconox	☐	
Tap water	☐	
HNO_3 (1 or10%)	☐	
Tap Water	☐	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☐	
DI Water	☐	
Air Dry	☐	
None	☐	

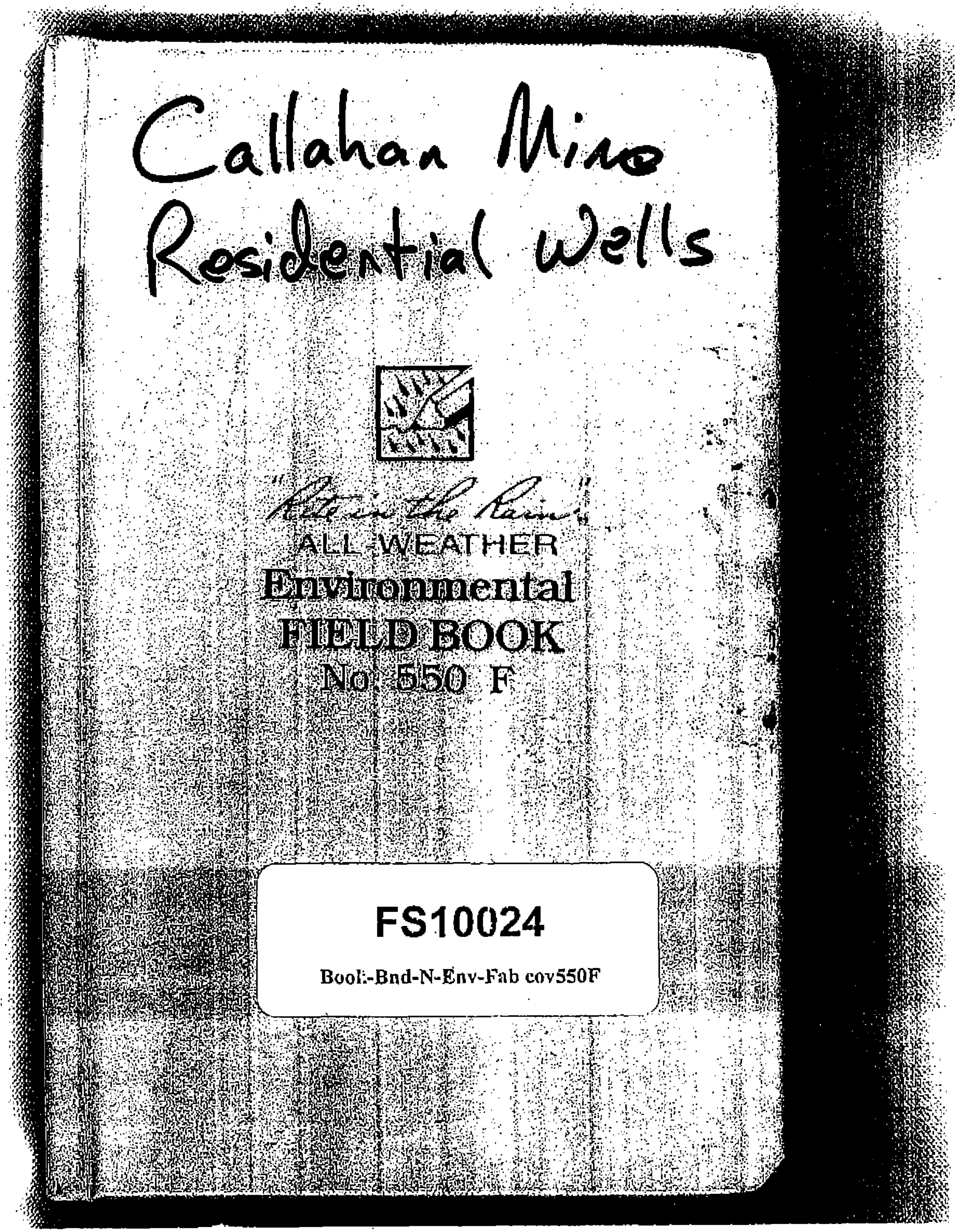
ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metals	YES [✓ NO]	Ice Only	8 oz.	0900	D05738	0248M
☑ Metals (MS)	YES [✓ NO]	Ice Only	8 oz.	0900	D05738	0248M
☐	YES NO					
☐	YES NO					
☐	YES NO					
☐	YES NO					

AF-212

No. 120393

Signed: Jeffrey

Rev: 8 July 1991



Callahan Mine
Residential Wells

"Rite in the Rain"
ALL-WEATHER
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FIELD BOOK
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978 970 5600

Callahan Mine - 207 326 9560
Project Manager - Dale Weiss
978 - 656 - 3560
Site Manager - Leslie McVickar
US EPA

[illegible] "Rite in the Rain" All-Weather Writing Paper - A [illegible] water and enhance the written image. It is widely [illegible] recording critical field data in all kinds of weather [illegible] pencil or an all-weather pen.

	Cover Options	
[illegible]	Polyester Cover	Fabrikoid Cover
[illegible]	Item No. 550	Item No. 550F

CONTENTS

PAGE	REFERENCE	DATE
2	January 2004 RW Sampling	01/11/05

Reference Page Index

147	Error codes, Hazardous classifications, Container types
148	Sampling guidelines (Liquids)
149	Sampling guidelines (Solids)
150	Approximate Volume of Water in Casing or Hole, Ground Water Monitoring Well
151	PVC Pipe Casing tables
152	Soil Classification
153	Soil Classification
154	Conversions (Length, Weight, Volume, Temp., etc.)
155	Conversions (Concentrations, Volume/Flow or Time, Velocity, Acceleration)
156	Maximum Concentration of Contaminants for the Toxicity Characteristic

Location Callahan Mine Date 01/11/05

Project / Client Clear 35° SE Wind.

1145 TRC on Site - C. Foster Mike Dreher. We are organizing Bottles for well Collection from nearby residences.

1240 Dale Weiss called + Mary Gray has a tenant Hal Snow 207-326-8217 who may want us to sample his well. We are to determine map location. This well is attached to a Judy Spears resident also.

1300 Equipment Calibration - YSI in logsheet w/ Todays Date

1400 Called Hal Snow.

1410 Met Hal Snow. Well has a tap adjacent to the well head. Well Run a hose to ground surface through 5 gal bucket to record Water Quality Sheet # 120596.

01/11/05

Location Callahan Mine Date 01/11/05

Project / Client

Well Runs Continuously + 3 Houses running currently

1435 Hose hooked up YSI Logging at 30 seconds

1445 Sample collected 3 voc's 1 PL - Metals 1 PL - Sulfate

Sample ID'S DWCA-15

VOC's - A1GN3

Metals - D05766

Sulfate - D05766

1500 At Lisa Hopkins house cellar way to well head - in the Cellar with taps.

1510 Mike and I mobilize YSI, Bottles + Hose to cellar way. Figured out the valves + tap before filter used

1530 Purging Lines + Recording w/ YSI See sheet # 120597

1540 NTU's are high. Bubbles?

01/11/05

Location Callahan Mine Date 01/11/05

Project / Client

1545 Collected DWCA-16 +
DWCAF16 Duplicate 1600
Cleaned up + Demobe
Sample IDs
Metals D05755 / D05756 Sulfate =
VOC's A1692 / A1693 D05756/55

1615 Dale Weiss called.
Mr. Veague cancelled for
Tommorow

1630 All samples preserved +
on ice and labled.

1650 Called Mrs Condon +
its OK to come by now
Mobilized to DWCA-17
Sheet # 120598

1705 Helen Condon says the
State could not find a
way to sample at the
well head. We looked
downstairs + only a
pressure relief valve
is located before the
pressure tank. She also
noted that the well

01/11/05

Location Callahan Mine 01/11/05

Project / Client

has been pumping as
She was doing laundry
So flow was occurring.

~~1515~~ CF 1715 We've been running the
water for 5 mins + are
now recording with YSI

~~1525~~ CF 1725 Collected ~~MS/MSD~~ CF MS/DUP
Volumes at DWCA-17
~~triple~~ CF VOAs - A1694
Double Metals - D05757
Double Sulfate. - D05757
Lines were purged 15 minutes
with 10 minutes YSI
Logging at 30 seconds

CF ~~1545~~ 1745 At trailer + samples are
labled + in fridge all
are preserved.

CF ~~15~~ 1750 Mike is conducting a
YSI post calibration

1810 Post cal continues note:
Turbidity values fluctuated
at DWCA-16 & 17 This was
thought to be due to Aeration /
Bubbles.

01/11/05

Location Callahan Mine Date 01/12/05
Project / Client overcast 5° am

0715 Mike Drehan is calibrating
YSI for water quality
Measurements. I am
Organizing log sheets
0730 Note: TB-004 Trip Blank
was prepared on 01/11/05
at 1330 ~~Da~~ RAS # A1G99
3 VOC's w/ DI H2O to pH <2
0750 Mobilizing equipment to
DWCA-18 - Jordan Residence
(Mike Maynard is contact)
0805 At Martha Jordan (Mike Maynard
They are a couple. Mike
asked if we want to
sample his Dug well which
is the historical well for
the property which he uses
to water his garden.
I called Dale + left message
0820 We are able to use tap
Before the pressure tank.
we'll log w/ YSI for 10-15
minutes then sample.
01/12/05

Location Callahan Mine Date 01/12/05
Project / Client

0831 Put on tap. Pump kicked
in very quickly. logging
w/ YSI. Note: YSI is
logging at 30 seconds but
clock says 8:35 so it
is ahead of my watch
0845 Sampling DWCA-18
Metals - D05758 Data on
Sulfate - D05758 Sheet #
VOC's - (MS/MSD) - A1G95 120599
0900 Mike Maynard also has a dug
well which he showed us
I'd need a pump or a
peristaltic pump to collect it
water level is down 10-12 ft
Again used for garden
0930 Mike showed us the location
of the artesian well +
it is flowing from a
tap in side of hill. He
says it only freezes in
severe cold weather.
0935 Spoke w/ D. Weiss
01/12/05

Location Callahan Mine Date 01/12/05

Project / Client

① would like to sample Artesian
well (Tap at spring

② would like to sample the
Dug well. However can
wait till spring due to
need to purge it with a
pump.

③ Described that Mike Maynard
also knows where the
Transformer was / is + I
can Photograph it.

④ Still a field call on weather
and possible travel to MASS

~1030 Photographs of transformer
near the Powder Magazine

1105 At Mollie Boring's House
+ she allowed us access to
the cellar. We can again
run a hose out from
before the pressure tank

1120 Began Purging + logging
water quality w/ YSI 650 MDS
will Run till stable 10-15
Minutes

01/12/05

Location Callahan Mine Date 01/12/05

Project / Client Snowing at 11 am

Note: I have photographed the
Pressure tank and subsequent
filter apparatus. This house
has been here for 4
years According to Mollie
Boring.

Sample ID's - Metals - D05759
VOA's - A1G96

We are running H2O through
2 Hoses out to back yard
to prevent any icing near
the Back of house. SHEET # 120600

1205 We are at the Artesian well
This is supposed to be
owned by Alida Fish and
, This well on
the MEDEP says "No information
available" but is labled on
the Map as DWCA -10
and this lot. Because it
is running constantly No
Purge is required. We will
take a spot measurement
with YSI in a graduated
cylinder →
Data Recorded on Sheet # 120602

01/12/05

Location Callahan Mine Date 01/12/05

Project / Client

1225 DWCA-10 collected
VOA's - A1641
Metals - D05764
Sulfate - D05764

1245 ALL Samples are preserved and are on ice

1305 we are at ~~Dye~~ DWCA-11 which is Marion K Boring. Mother of Mollie B at 9 goose falls. She has a treatment tank which apparently is to prevent build up. She allowed me records on the testing of the well + it apparently had alot of Sulfer in the past we configured hose out of the Bulkhead + will run H_2O through hose for 10-15 mins

1330 Running h2O out of tap + logging w/ YSI.

1334 Actual logging time on YSI 1338

01/12/05

Location Callahan Mine Date 01/12/05

Project / Client

We will Run H_2O till Stable + ensure purge water is on the lawn as Mrs. Boring has a ramp w/ wheelchair/walker accessibility.

At onset of Purge, Mike tells me the memory is full on the YSI.

We'll Make readings at 2 minute intervals over a length of time ~ 10 mins + then I'll collect Samples

1345 will go another 5 mins + will collect the sample.

1350 Sample DWCA-~~12~~ CF 11 collected

Data on Sheet #

ID's Are: VOC's = A1697
Metals = D05760
Sulfate = D05760

Marion got records that she has a calcite acid neutralizer - She will let us copy those in April

01/12/05

Location Callahan Mine Date 01/12/05

Project / Client

SNOWING

We Demobilized hoses + equipment + Samples

1415 Having trouble closing the Bulkhead door to hay cellar. The wooden door is warped + ICE that has formed is preventing it from closing all the way

1440 Mike is keeping pressure on it while I try to hook the door closed. Hook now Broken

1500 Returned Mike to trailer For Post calibration of the ESI.

1525 I returned to Mrs. Bonny to put plastic Sheeting on the under side of the Bullkhead Door to prevent drafts. will need to replace hook in the basement Bullkhead door in April.

1645 Loaded all equipment + Samples

1655 TRC off site

01/12/05

Location Date

Project / Client

TRC

Sample Log Sheet

Project: Callahan Mine

Project No.: 02136 0590

Date/Time: 01/11/05 1700

Sheet 1 **of** 1

Contractor Personnel:

TRC Personnel: C. Foster · M. ~~Deh~~ Dreher

Sample No.: DWCA - 17 MS/MSD Sulfate MS/Dup Metals

Depth/Interval Sampled: NA

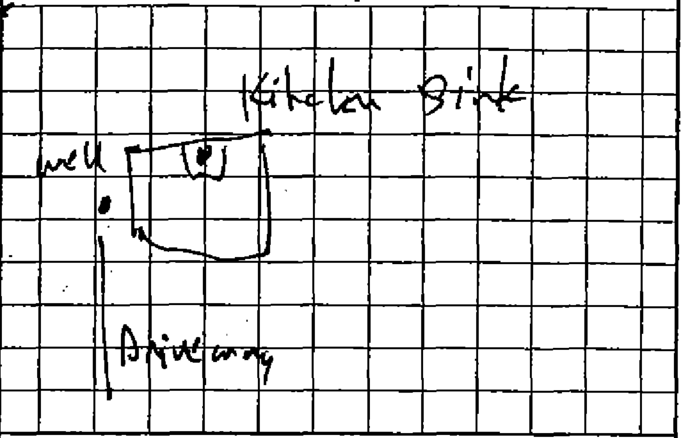
Sample Type: (circle) [✓ Grab,] Composite or Both

Media: (circle)

Surface Soil | Subsurface Soil | Other ______

Sediment | Surface Water | [✓ Ground Water]

Sketch of Sample Location



Field Screening Information:

Type of Meter: YSI 650 MDS

Other Field Measurements:

Temp 8.88 Salinity = N/A
Cond 109
DO 5.77
pH 6.94
ORP 337
NTU 36.0

Observations:

Pipes to kitchen are short.
Ran for 15 minutes, logged w/ YSI for 10 min
NTU's are fluctuating 16 - 36 NTU at random.

SAMPLE COLLECTION EQUIPMENT:

Hand Auger ☐
Core Sampler ☐
Spatula/Spoon ☐
Bowl (stainless) ☐
Split-spoon (2" or 3") ☐
OTHER: TAP

Trowel ☐
Shelby Tube ☐
Dredge Sampler ☐
Kemmerer ☐
Extended Arm ☐
Bailer ☐
Backhoe ☐
Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☐	NA
Alconox	☐	
Tap water	☐	
HNO_3 (1 or10%)	☐	
Tap Water	☐	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☐	
DI Water	☐	
Air Dry	☐	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ Metals	YES [✓ NO]	HNO3 pH <2	1 PL	~~CA 1525~~ 1725	D05757	33748
☑ Sulfate	YES [✓ NO]	ICE	1 PL	~~CF 1525~~ 1725	D05757	33748
☒ VOC's	YES [✓ NO]	HCL pH< 2	3 40 ml	~~CF 1525~~ 1725	A1694	33748
☐	YES NO					
☐	YES NO					
☐	YES NO					

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№ 120598

Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan
Project No.: 02136 0590
Date/Time: 01/12/05
Sheet 1 **of** 1

Contractor Personnel:

TRC Personnel: C. Foster M. Dreher

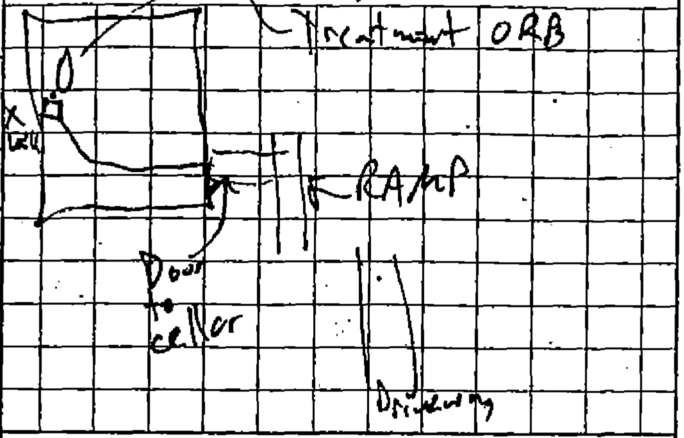
Sample No.: DWCA -11

Depth/Interval Sampled: NA

Sample Type: [✓ Grab], Composite or Both
(circle)

Media: Surface Soil Subsurface Soil Other ________ Sediment Surface Water [✓ Ground Water]
(circle)

Sketch of Sample Location



Field Screening Information:

Type of Meter: YSI 650 MDS

Other Field Measurements:

Temp = 9.6 NTU = 0
Cond = 103
DO = 10.57
pH = 6.31
ORP = 360

Observations:

Ran from tap Before the treatment tank Ran H2O for 15 mins + Recorded Water Quality on a Separate form as YSI Memory was full. Data Recorded to left is Final set of readings

SAMPLE COLLECTION EQUIPMENT:

Hand Auger ☐
Core Sampler ☐
Spatula/Spoon ☐
Bowl (stainless) ☐
Split-spoon (2" or 3") ☐
OTHER: TAP

Trowel ☐
Shelby Tube ☐
Dredge Sampler ☐
Kemmerer ☐
Extended Arm ☐
Bailer ☐
Backhoe ☐
Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☐	NA
Alconox	☐	
Tap water	☐	
HNO_3 (1 or10%)	☐	
Tap Water	☐	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☐	
DI Water	☐	
Air Dry	☐	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ metals	YES [✓ NO]	HNO3 pH<2	1 PL	1350	D05760	33748
☒ Sulfate	YES [✓ NO]	ICE	1 PL	1350	D05760	33748
☒ VOC's	YES [✓ NO]	HCL pH<2	3 40ml	35	A1897	33748
☐	YES NO					
☐	YES NO					
☐	YES NO					

AF-212

№ 120601

Signed: ________

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan

Project No.: 02136 0590

Date/Time: 01/12/05

Sheet 1 **of** 1

Contractor Personnel:

TRC Personnel: C Foster M Dreher

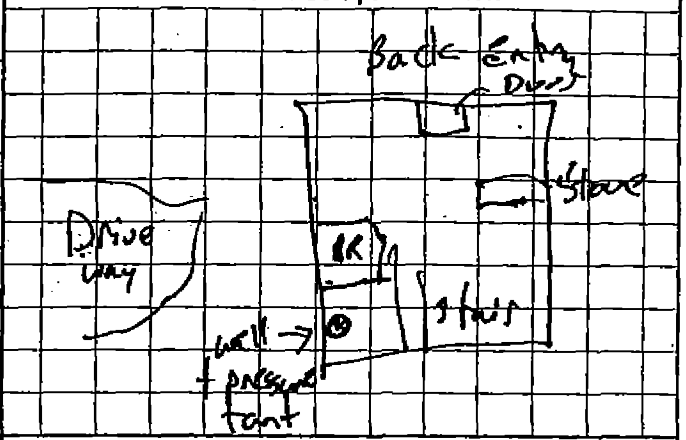
Sample No.: DWCA-12

Depth/Interval Sampled: NA

Sample Type: [✓ Grab] Composite or Both
(circle)

Media: (circle)
Surface Soil
Subsurface Soil
Other ________
Sediment
Surface Water
[✓ Ground Water]

Sketch of Sample Location



Field Screening Information:

Type of Meter: YSI 650 MDS

Other Field Measurements:

Temp = 8.05 NTU = 2.6
Cond = 85
DO = 3.71
pH = 6.51
ORP = 351.1

Observations:

Slight sulfur odor?
Ran + logged w/ YSI for 15 minutes till stable water quality resulted
Direct fill bottles at tap Before pressure tank So Direct from the well head

SAMPLE COLLECTION EQUIPMENT:

Hand Auger ☐
Core Sampler ☐
Spatula/Spoon ☐
Bowl (stainless) ☐
Split-spoon (2" or 3") ☐
OTHER: TAP

Trowel ☐
Shelby Tube ☐
Dredge Sampler ☐
Kemmerer ☐
Extended Arm ☐
Bailer ☐
Backhoe ☐
Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☐	NA
Alconox	☐	
Tap water	☐	
HNO_3 (1 or10%)	☐	
Tap Water	☐	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☐	
DI Water	☐	
Air Dry	☐	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ Metals	YES [✓ NO]	~~pH2~~ HNO_3 pH<2	1PL	1140	D05759	33748
☒ Sulfate	YES [✓ NO]	ICE	1PL	1140	D05759	33748
☒ VOC's	YES [✓ NO]	HCL <2	3 40ml	1140	A1696	33748
☐	YES NO					
☐	YES NO					
☐	YES NO					

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№ 120600

Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan Mine
Project No.: 02136 0590
Date/Time: 01/12/05
Sheet 1 **of** 1

Contractor Personnel:

TRC Personnel: C Foster, M. Dreher

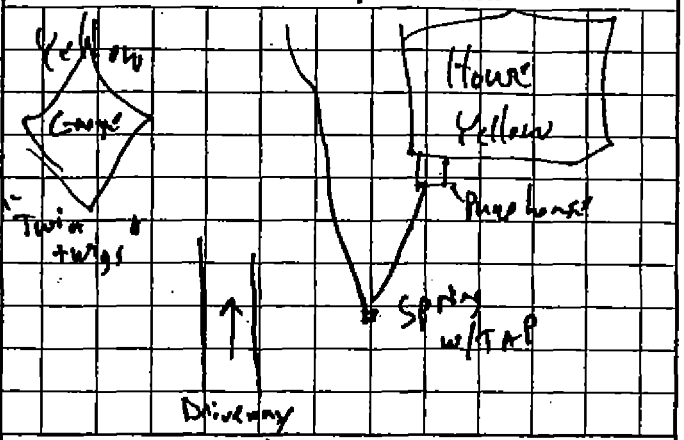
Sample No.: DWCA-10

Depth/Interval Sampled: At surface Spring

Sample Type: [✓ Grab] Composite or Both
(circle)

Media: (circle)
Surface Soil
Subsurface Soil
Other
Sediment
Surface Water
[✓ Ground Water]

Sketch of Sample Location



Field Screening Information:

Type of Meter: YSI Model 650 MDS

Other Field Measurements:

Temp = 7.8 NTU's = 1.5
Cond = 108
DO = 10.55
pH = 7.8
ORP = 326.1

Observations:

Spring with Pipes leading into ground. Flows year round. Is reported by Mike Maynard as the property of Alida Ash which he provided access to. This should be DWCA-10 H2O Artesian flows to House Pump House Runs H2O into House

SAMPLE COLLECTION EQUIPMENT:

Hand Auger ☐
Core Sampler ☐
Spatula/Spoon ☐
Bowl (stainless) ☐
Split-spoon (2" or 3") ☐
OTHER: At tap

Trowel ☐
Shelby Tube ☐
Dredge Sampler ☐
Kemmerer ☐
Extended Arm ☐
Bailer ☐
Backhoe ☐
Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☐	NA
Alconox	☐	
Tap water	☐	
HNO_3 (1 or10%)	☐	
Tap Water	☐	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☐	
DI Water	☐	
Air Dry	☐	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ Metals	YES [✓ NO]	HNO_3 pH<2	1PL	1225	D05764	33748
☒ Sulfate	YES [✓ NO]	Ice	1PL	1225	D05764	33748
☒ VOCs	YES [✓ NO]	HCL pH<2	3,40ml	1225	A1GA1	33748
☐	YES NO					
☐	YES NO					
☐	YES NO					

AF-212 № 120602

Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callan Mine
Project No.: 02136 0590
Date/Time: 01/12/05
Sheet 1 **of** 1
Contractor Personnel:
TRC Personnel: C. Foster M. Drexler

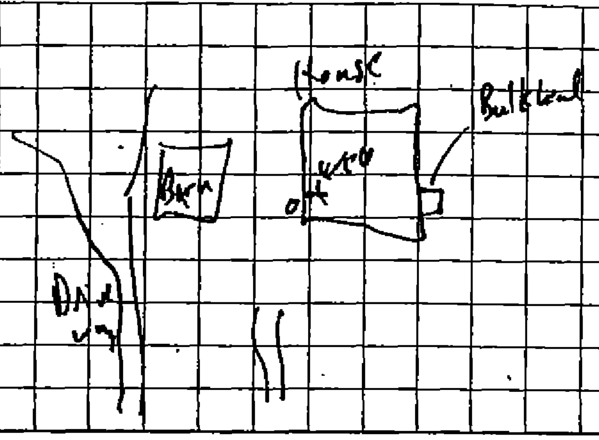
Sample No.: DWCA-18

Depth/Interval Sampled: NA

Sample Type: [✓ Grab], Composite or Both
(circle)

Media: **(circle)**
Surface Soil
Subsurface Soil
Other ________
Sediment
Surface Water
[✓ Ground Water]

Sketch of Sample Location



Field Screening Information:

Type of Meter: YSI 650 MDS

Other Field Measurements:

Temp = 8.22 NTU = 0.0
Cond = 84
DO = 10.14
pH = 6.38
ORP = 357

Observations:

Tap before the pressure tank was used.
Logged w/ YSI 10 minutes purged for 15 mins. Pump from well came on instantly.

SAMPLE COLLECTION EQUIPMENT:

Hand Auger ☐
Core Sampler ☐
Spatula/Spoon ☐
Bowl (stainless) ☐
Split-spoon (2" or 3") ☐
OTHER: TAP

Trowel ☐
Shelby Tube ☐
Dredge Sampler ☐
Kemmerer ☐
Extended Arm ☐
Bailer ☐
Backhoe ☐
Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☐	
Alconox	☐	
Tap water	☐	NA
HNO_3 (1 or10%)	☐	
Tap Water	☐	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☐	
DI Water	☐	
Air Dry	☐	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ Metals	YES [✓ NO]	HNO_3, pH<2	1PL	0845	D05758	33748
☒ Sulfate	YES [✓ NO]	ICE	1PL	0845	D05758	33748
☒ Voc's ms/msd	YES [✓ NO]	HCL <2	3 40ml	0845	A1G95	33748
☐	YES NO					
☐	YES NO					
☐	YES NO					

AF-212
№ 120599

Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan Mine **Project No.:** 02136-0590

Date/Time: 01/11/05 1515 **Sheet** 1 **of** 1

Contractor Personnel:

TRC Personnel: C Foster, M. Dreher

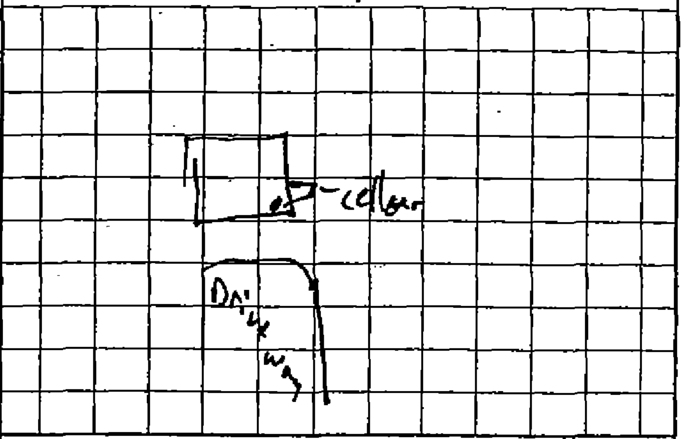
Sample No.: DWCA-16 / DWCAE-16 DupVale

Depth/Interval Sampled: NA

Sample Type: [✓ Grab], Composite or Both
(circle)

Media: (circle)
Surface Soil
Subsurface Soil
Other ____
Sediment
Surface Water
[✓ Ground Water]

Sketch of Sample Location



Field Screening Information:

Type of Meter: YSI 650 MDS

Other Field Measurements:

Temp = 8.63 Salinity = NA
Cond = 135
DO = 11.64
pH = 6.59
ORP = 345.2
NTU = 89.2

Observations:

Value Prior to Filtration / water Softener used
Photographed
High NTU's - House has a filter.
Meter not correct?
Many Bubbles in Bucket

SAMPLE COLLECTION EQUIPMENT:

Hand Auger ☐
Core Sampler ☐
Spatula/Spoon ☐
Bowl (stainless) ☐
Split-spoon (2" or 3") ☐
OTHER: TAP

Trowel ☐
Shelby Tube ☐
Dredge Sampler ☐
Kemmerer ☐
Extended Arm ☐
Bailer ☐
Backhoe ☐
Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☐	NA
Alconox	☐	
Tap water	☐	
HNO_3 (1 or10%)	☐	
Tap Water	☐	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☐	
DI Water	☐	
Air Dry	☐	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ Metals	YES [✓ NO]	HNO_3 <2	1 PL	1545	D05755/56	33748
☒ Sulfate	YES [✓ NO]	ICE	1 PL	1545	D05755/56	33748
☒ VOC's	YES [✓ NO]	HCL <2	3 40 ml	1545	A1G92/93	33748
☐	YES NO					
☐	YES NO					
☐	YES NO					

AF-212 № 120597

Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan Mine **Project No.:** 02136 0590

Date/Time: 1/11/05 **Sheet** 1 **of** 1

Contractor Personnel:

TRC Personnel: C Foster, M. Dreher

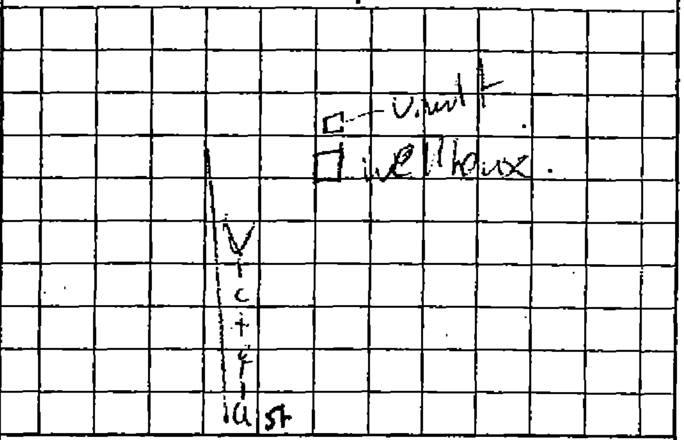
Sample No.: B DWCA -15

Depth/Interval Sampled: Composite of well water

Sample Type: (circle) [✓ Grab], Composite or Both CF

Media: (circle) Surface Soil Subsurface Soil Other ________ Sediment Surface Water [✓ Ground Water]

Sketch of Sample Location



Field Screening Information:

Type of Meter: YSI 650 MDS

Other Field Measurements:

T = 8.48 Salinity = NA
Cond = 187
DO = 9.15
pH = 7.01
ORP = 329.8
NTU = 0.7

Observations:

No treatment
Pump Running
Logged Water Quality
W/ YSI at 30 seconds

SAMPLE COLLECTION EQUIPMENT:

Hand Auger ☐
Core Sampler ☐
Spatula/Spoon ☐
Bowl (stainless) ☐
Split-spoon (2" or 3") ☐
OTHER: TAP

Trowel ☐
Shelby Tube ☐
Dredge Sampler ☐
Kemmerer ☐
Extended Arm ☐
Bailer ☐
Backhoe ☐
Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☐	NA
Alconox	☐	
Tap water	☐	
HNO_3 (1 or10%)	☐	
Tap Water	☐	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☐	
DI Water	☐	
Air Dry	☐	
None	☐	

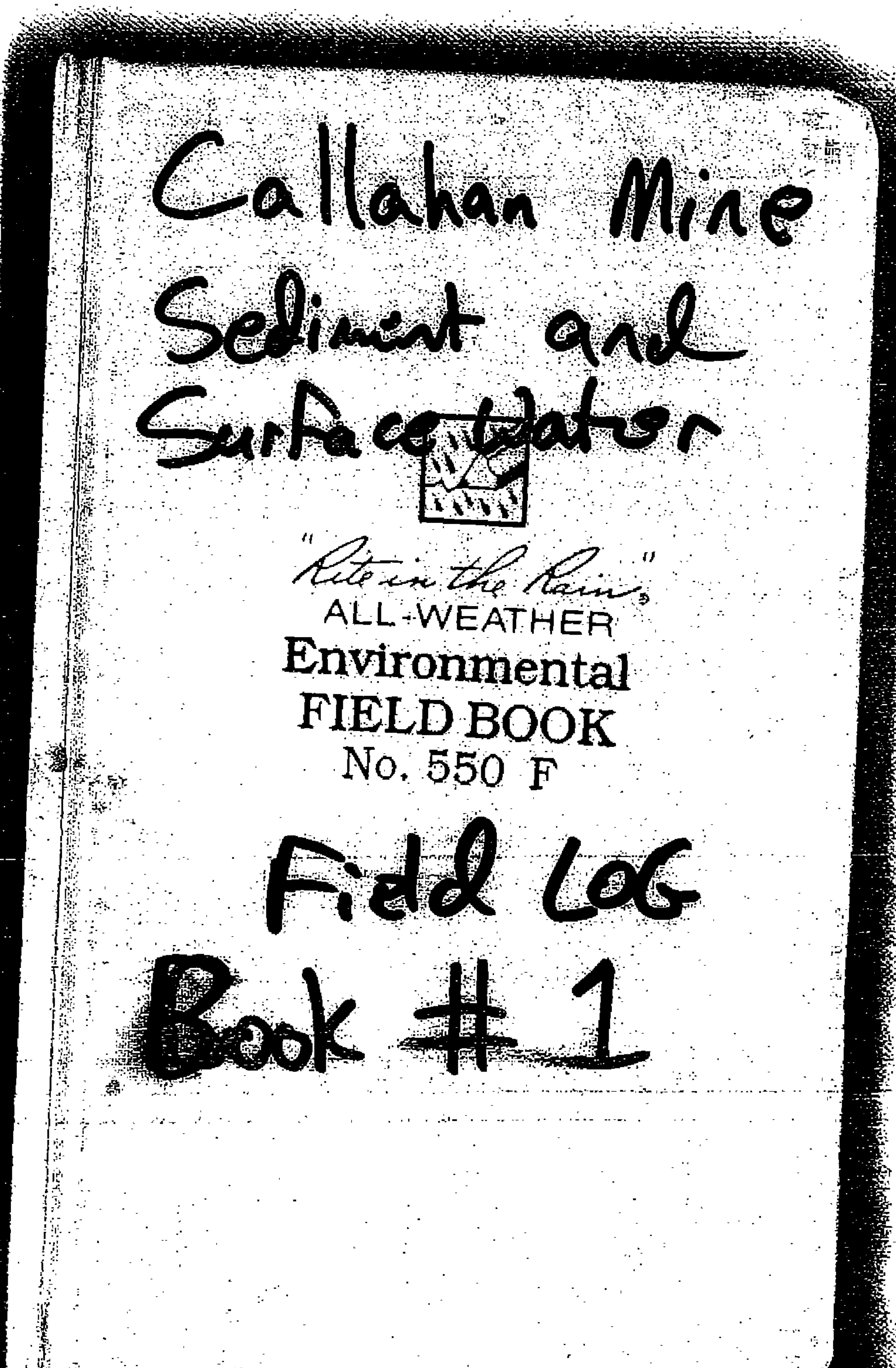
ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ Metals	YES [✓ NO]	HNO_3 <2	1 PL	1445	D05766	33748
☒ Sulfate	YES [✓ NO]	ICE	1 PL	1445	D05766	33748
☒ VOC's	YES [✓ NO]	HCL <2	3 40ml	1445	A1GN3	33748
☐	YES NO					
☐	YES NO					
☐	YES NO					

AF-212

№ 120596

Signed:

Rev: 8 July 1991



Callahan Mine
Sediment and
Surface Water

"Rite in the Rain"
ALL-WEATHER
Environmental
FIELD BOOK
No. 550 F

Field LOG
Book #1

Location Callahan Mine Date 11/11/04

Project / Client Sediment Sampling RI / M+E/EPA

overcast, 40°F PPE = Level D

0745 K. Sears, T. Foley (TRC) mobilizing to SD-408 for sediment sampling.

0755 A. Stattel, C. Foster (TRC) at SD-408 also.

0815 Sampling SD-408 for:

Metals	3 x8oz	cool 4°C	D05645
TOC/TCO	1 x8oz	cool 4°C	D05645
Grain size	1 x16oz	cool 4°C	D05645

See log sheet #120357 for details.

Staff gauge #2 @ 8:00 am read +0.4 ft.

0845 Completed sampling SD-408, mobilizing to SD-417 for sediment sampling.

0900 Staff gauge #2 @ 9:00 am read +0.05 ft.

0905 Sampling SD-417 for:

Metals	3x8oz	cool 4°C	D05653
TOC/TCO	1x8oz	cool 4°C	D05653
Grain size	1x16oz	cool 4°C	D05653

See log sheet #120358 for details

Kiran Sears 11/11/04

Location Callahan Mine Date 11/11/04

Project / Client RI Sediment Sampling / M+E, EPA

overcast 40°F PPE = level D

0935 Mobilizing to SD-413 for sediment sampling.

0945 Sediment is very soft

0950 Sampling SD-413 for:

Metals	3x8oz	cool 4°C	D05650
TOC/TCO	1x8oz	cool 4°C	D05650
Grain size	1x16oz	cool 4°C	D05650

See log sheet #120359 for details

1010 Completed sampling SD-413, mobilizing to SD-416 for sediment sampling.

1030 Sampling SD-416 for,

Metals	3x8oz	cool 4°C	D05652
TOC/TCO	1x8oz	cool 4°C	D05652
Grain size	1x16oz	cool 4°C	D05652

See sample log sheet #120360 for details. ~~Sample taken below~~ KS

1115 Completed sampling SD-416. Mobilizing to field trailer to decon equipment.

1120 Having problems starting TRC vehicle. Leaving it onsite while deconing and trying to contact Ford for assistance.

Kiran Sears 11/11/04

Location Callahan Mine Date 11/11/04

Project / Client RI Sediment Sampling / EPA; M+E

overcast, 40°F PPE= level D

1220 Completed deconing equipment, mobilizing to SD-415 for sediment sampling

1235 Collecting SD-415 for:

Metals	3x8oz	cool 4°C	D05651
TOC/TCO	1x8oz	cool 4°C	D05651
Grain size	1x16oz	cool 4°C	D05651

See sample log sheet #120361 for details.

1300 Mobilizing to SD-407 for sediment sampling.

1310 staff gauge #1 reads + 0.7 ft.

1330 Collecting SD-407 for:

Metals	3x8oz	cool 4°C	D05644
TOC/TCO	1x8oz	cool 4°C	D05644
Grain size	1x16oz	cool 4°C	D05644

See sample log sheet #120362 for details.

1400 Completed sampling SD-407, mobilizing to SD-423 for sediment sampling.

1430 Tow truck onsite to pick up TRC vehicle.

Kiran Sears 11/11/04

Location Callahan Mine Date 11/11/04

Project / Client RI Sediment Sampling / EPA, M+E

overcast, 40°F PPE = Level D

1450 Sampling SD-423 for:

Metals	6x8oz	cool 4°C	D05657	MS/Dup
TOC/TCO	2x8oz	cool 4°C	D05657	MS/Dup
Grain size	1x8oz	cool 4°C	D05657	

1510 Completed sampling SD-423, mobilizing to SD-410 for sediment sampling.

1530 Staff gauge #3 read 0.0 ft. tide is going out of site.

1545 Attempting to find a location that is not too rocky.

1600 Collecting SD-410 for:

Metals	3x8oz	cool 4°C	D05647
TOC/TCO	1x8oz	cool 4°C	D05647
Grain size	1x16oz	cool 4°C	D05647

1620 Completed sampling SD-410. Mobilizing to field trailer for equipment decon, and wrap up for day.

1700 Completed decon and sample storage. Offsite for day.

KSears

Kiran Sears 11/11/04

Location Callahan Mine Date 11/12/04

Project / Client RI Sediment Sampling / EPA + M+E

sunny, 30°F PPE = level D

0715 K. Sears, C. Foster, A. Stattel, T. Foley onsite preparing for sediment sampling.

0800 Mobilizing equipment to SD-404

0840 Walking out to SD-404, noticed ~~tog~~ KS location of heavy green stained sediments. Will go back to sample SD-422 at this location.

0845 Note area with two seeps coming out of the waste rock road. There is heavy orange staining at top of road. Taking sample at bottom of one of the seeps.

0905 Sampling SD-404 for:

Metals	3x8oz	cool 4°C	D05641
TOC/TCo	1x8oz	cool 4°C	D05641
Grain size	1x16oz	cool 4°C	D05641

See sample log sheet #120365 for details.

0910 Mobilizing to SD-422 for sediment sampling. There are three green stained locations within approx. 20 feet of

11/12/04

Location Callahan Mine Date 11/12/04

Project / Client RI Sediment Sampling / EPA + M+E

sunny 30°F PPE = level D

each other. Appear to be 3 seep locations, taking the one closest to the surface water (goose pond) exchange

0930 Sampling SD-422 for:

Metals	6x8oz	D05656/5660 (FD)
TOC/TCO	2x8oz	D05656/5660 (FD)
Grain size	2x16oz	D05656/5660 (FD)

See sample log sheet #120366 for details

1000 Mobilizing to SD-403 at top of road to sample wetland sediments.

1025 Sampling SD-403 for:

Metals	3x8oz	D05640
TOC/TCO	1x8oz	D05640
Grain size	2x16oz	D05640 (Lab Dup)

See sample log sheet #120367 for details

1050 Completed sampling at SD-403, mobilizing to SD-412 for sediment sampling.

11/12/04

Location Callahan Mine Date 11/12/04
Project / Client RI Sediment Sampling / EPA + M+E
Sunny, 35°F PPE = Level D

1105 Sampling SD-412 for:
Metals 3x8oz cool4C D05649
TOC/TCO 1x8oz cool4C D05649
Grain size 1x16oz cool4C D05649

See sample log sheet # 120368 for details.

1130 Completed sampling for day. Mobilizing to field trailer for equipment decon and sample preparation and storage.

Kiran Sears 11/12/04

Location Callahan Mine Date 11/16/04
Project / Client RI Sed/SW Sampling / EPA + M+E
Sunny, 40°F PPE = Level D

1000 Mobilizing to SW/D-410 for surface water sampling

1030 Approximate slack tide. Stream gauge # 1 at approx. -0.4 ft. Flag appears to be missing from sampling location.

1035 Sampling SW-410 for:
Metals, total pH=1 w/ HNO_3 1x1L poly D05675
Metals, diss. pH=1 w/ HNO_3 1x1L poly D05676
Sulfate - 1x500mL poly D05675

See sample log sheet # 120369 for details.

1045 Mobilizing to SW-414 for SW collection

1100 Sampling SW-414 for
Metals, total pH=1 w/ HNO_3 1x1L poly D05679
Metals, diss pH=1 w/ HNO_3 1x1L poly D05680
Sulfate - 1x500mL poly D05679

See sample log sheet # 120370 for details.

1105 Completed sampling SW-414, Mobilizing to SW-415. Flag is still present, sampling form same location as sediments

Kiran Sears 11/16/04

Location Callahan Mine Date 11/16/04

Project / Client RI Sed/SW Sampling / EPA + M+E

Sunny, 40°F PPE=Level D

1110 Sampling SW-415 for:
Metals, total pH=1 w/ HNO_3 1x1L poly D05681
Metals, diss. pH=1 w/ HNO_3 1x1L poly D05682
Sulfate – 1x500mL poly D05681

See sample log sheet # 120361
for details.

1115 Mobilizing to SW-407, flag is
still in place.

1125 Sampling SW-407 for:
Metals, tot pH=1 w/ HNO_3 1x1L poly D05673
Metals, diss pH=1 w/ HNO_3 1x1L poly D05674
Sulfate – 1x500 mL poly D05673

1135 completed sampling SW-407,
mobilizing to the trailer for
sample preservation, filtration and
storage.

Note: All Dissolved Metals Samples were Filtered
with a 0.45 Micron Filter and peristaltic Pump. using
a Dedicated +
Disposable tubing
+ filter for each sample
Prior to preservation w/ HNO 3
to a final pH < 2

K Sears

Kira Sears 11/16/04

Location Callahan Mine Date 11/16/04

Project / Client RI Sed/SW Sampling / EPA + M+E

Sunny, 40°F PPE = Level D

13:00 - Mobe back to SW/~~S~~ 414 to (AS)
collect GIS data.
13:20 Mobe to SW-423
13:30 collect sample SW-423
13:40 Mobe to SW-403
13:55 - Collect SW-403 + Duplicate +
water quality parameters
SW-403 - Sample ID's Tot met + Sulfate - D05691/91
Diss Metals + ~~D05692~~ CF D05668/92
Temp. 4.19° Salinity 0.27
pH 7.78 ORP 286.3
D.O. (mg/L) 11.66 Conductivity (mS/cm) 335
14:10 - Andy Bergan took vehicle
with coolers containing samples
SW-423 & SW-403 back
to trailer to meet K. Sears
and filter / label samples
14:30 C. Foster + A. Stattel back to
trailer with equipment, etc.

Amy Stattel

Amy Stattel 11/16/04

Location Callahan mine Date 11/17/04

Project / Client RI SD/SW Sampling /EPA/ M+E

Sunny 50°F PPE = Level D

1000 K.Sears, C.Foster, A.Bergan (TRC) mobilizing to obtain canoe

1050 Loading sampling equipment into canoe. A. Stattel and C. Foster to use canoe to sample SD/SW-406 and SD/SW-405. K. Sears and A. Bergan to sample SW-422.

1180 K. Sears and A. Bergan at SW-422, preparing to sample surface water.

1135 A. Stattel and C. Foster at SD/SW-406, preparing to sample surface water.

1145 Sampling SW-422 for: See Sample log sheet #

Metals, tot	1x1L	pH=1w/HNO3	D05685
Metals, diss	1x1L	pH=1w/HNO3	D05686
Sulfate	1x500mL	–	D05685

1145 Sampling SW-406 for: See sample log sheet #

Metals, tot	1x1L	pH=1w/HNO3	D05671
metals, diss	1x1L	pH=1w/HNO3	D05672
Sulfate	1x500mL	-	D05671

1150 Obtaining water quality parameters at SW-406. Preparing to sample for sediments.

Kiran Sears 11/17/04

Location Callahan mine Date 11/17/04

Project / Client RI SD/SW Sampling / EPA + M+E

Sunny 50°F PPE = Level D

1200 Sampling SD-406 for:

metals	3x8oz	cool4C	D05643
TOC/TCO	1x8oz	cool4C	D05643
Grainsize	1x16oz	cool4C	D05643

~~1210~~ See sample log sheet # 120374 for details.

1210 C. Foster / A. Stattel meet K. Sears / A. Bergan to drop off SW/SD samples for preservation and storage. C. Foster / A. Stattel to SW/SD-405 for surface water sampling.

1225 Sampling SW-405 for: MS/Dup

Metals, tot	2x1L	pH=1w/HNO3	D05669
metals, diss	2x1L	pH=1w/NNO3	D05670
Sulfate	2x500mL	–	D05669

See sample log sheet # for details

1245 mobilizing to collect sediment at SD-405.

1300 Sampling SD-405 for:

metals	3x8oz	cool4C	D05642
TOC/TCO	1x8oz	cool4C	D05642
Grain size	1x16oz	cool4°C	D05642

Kiran Sears 11/17/04

Location Callahan Mine Date 11/17/04

Project / Client RI SD/SW Sampling / EPA+MtE

Sunny 45°F PPE=Level D

See sample log sheet # 120379 for details.

1315 K. Sears / A. Bergan mobilizing to field trailer with all samples to prepare them for shipment. A. Stattel / C. Foster continuing on to SD-401 for sediment sampling

1340 K. Sears / A. Bergan at field trailer. D. Weiss discussing sampling locations with C. Foster.

1400 C. Foster and A. Stattel at SD-401, preparing for sediment sampling

1420 Sampling SD-401 for:

Metals	3x8oz	cool4C	D05638
TOC/TCO	1x8oz	cool4C	D05638
Grain size	1x16oz	cool4C	D05638

See sample log sheet # 120381 for details.

1430 Mobilizing to SD-402 for sediment sampling

1440 Sampling SD-402 for:

Metals	3x8oz	cool4°C	D05639
TOC/TCO	1x8oz	cool4°C	D05639
Grain size	1x16oz	cool4°C	D05639

Kiran Sears 11/17/04

Location Callahan Mine Date 11/17/04

Project / Client RI SD/SW Sampling / EPA+MtE

Sunny 40°F PPE=Level D

1500 Completed sampling SD-402. Mobilizing to shore near SD/SW-407 to store canoe.

1545 Mobilizing to field trailer to store / preserve / package samples. Also to decon. equipment.

1640 Preparing PE samples for shipment with sediment samples:

1645 CS-111704-01, D05663, Metals, ~~Lot D042542, Cat 542~~ KS
MS01636

1650 CS-111704-03, D05665, TOC/TCO
Lot D042542, Cat 542

1655 Preparing PE Samples for surface water samples:

~~1700 CS-~~ KS In order to meet SDG requirements, one set of PEs for SW will be dated 11/16/04.

11/16/04 16:00 CS-111604-05, D05694, metals IS4679

11/16/04 16:05 CS-111604-06, D05695, Mercury HG3881

Kiran Sears

Location Callahan mine Date 11/17/04

Project / Client RI SD/SW Sampling / MtE & EPA

PPE = Level D, Sunny, 35°F

1700 CS-111704-07, D05696, Sulfate,
Lot P108506, Cat 506

Note: All dissolved Metals samples were Filtered with a dedicated 0.45 micron Filter and dedicated disposable tubing prior to Preservation with HNO_3 to pH <2

K Sears

Kieran Sears 11/17/04

Location Callahan mine Date 11/18/04

Project / Client RI SD/SW Sampling / MtE / EPA

PPE = Level D

0800 Onsite, preparing to sample remaining two locations (SD409, SW/SD-424), also preparing QC samples for shipment.

See Sheets #120384 #120385/83

0810 Prepared RB-003 for surface water metals:
D05693 1x1L, pH=1 w/ HNO_3 ~~DCES~~

Sample run through dedicated poly tubing and filtered as surface water samples have been. 0.45 Micron Filter.

0830 Prepared RB-001 for sediment samples:
D05661, 1x1L, pH=1 w/ HNO_3

used decontaminated bowl, spoon and auger head from SD/SW-405 sample.

0845 Prepared PE sample CS-111804-08 for surface water:
D05697, Metals, IS4680

0850 Prepared PE Sample CS-111804-09 for surface water:
D05698, Mercury only, HG3882

Kieran Sears 11/18/04

Location Callahan mine Date 12/02/04 ~~11/17/04~~ CHF

Project / Client RI SD/SW Sampling / EPA+M+E

PPE = Level D

1130 Mobilizing for SW-419 in Mine Pit - This is a Surface Water Dup/MS location in 2nd SDG for Metals And Sulfate

1155 SW-419 Collected Double Volume

Sheet # 120592 for Details

YSI Conductivity 19.988

DO ≥ 14.66 Bad [illegible]?

Temp 5.26

pH 7.26

Salinity 21.43

ORP 252.7

Sample ID's
TotMets+Sulf = D05683
Diss Metals = D05684

1230 Returned to Stare and Filter Samples & preserve w/Nitric store on ICE

1800 Final Calibration Check on Log sheet for YSI

Note: Calibrated at 7am this Morning.

* Missed Entry - 1340 SW-424 Collected - Sample ID's Tot Metals+Sulfate - D05689 and Diss Metals D05690
11/18/04

CF ~~11/17/04~~ 12/02/04

Location Callahan Mine Date 12/3/04

Project / Client RI SD/SW Sampling / EPA + M+E

Cloudy/Snowing, 30°F PPE = Level D

0720 Arrived on site. Prep for field

0900 Mob to SD-425.

Samples Collected

SD425 × 2 for MS/MSD

0950 Log Sheet 120561

Metals	6 × 8oz.	D05667
TOC	3 × 8oz.	D05667
Grain Size	2 × 16 oz.	D05667

1010 Mob to SD-425

1050 Log Sheet: 120562

Metals	3 × 8oz	D05668
TOC	1 × 8oz.	D05668
Grain Size	1 × 16 oz.	D05668

1340 SW-411 Details on next Page

Note: All Filtered Metals samples (Dissolved Metals) were filtered with a dedicated 0.45 Micron Filter + Dedicated Single Use disposable Peristaltic tubing prior to Preservation w/ HNO_3 to pH < 2

Jeffrey S. Hunter 12/3/04

Location Callahan Mine Date 12/03/04

Project / Client

1340 SW-411 Water Quality
collected Metals Sulfate
+ Diss Metals

Temp 4.67
Cond 18.226
Salinity 18.24
DO 10.71
pH 6.80 pH
ORP 149.1

See logsheet # ~~120592~~ f
120593

Sample ID's are Met/Sulf - D05677
Diss Metals - D05678

Duplicate SWE-411 + SWFE-411 @ 1400
ID's D05704
D05705

12/03/04

R.H.

Location Callahan Mine Date 12/3/04

Project / Client Sediment Sampling

1300 Mob to SD-421
Samples collected
SD-421 1320 Log Sheet: 120563
Metals 3 x 8 oz. D05655
TOC 1 x 8 oz
Grain Size 2 x 16 oz
↓

1400 Mob to SD-411. C. Foster
taking SW-411 just prior to sediment
sampling.
SD-411 1405 Log Sheet: 120565
Metals 3 x 8 oz. D05648
TOC 1 x 8 oz.
Grain Size 2 x 16 oz
↓

1420- Approx. 15 attempts at
1500 Sediment sampling at SD-420
location by boat failing due to bedrock &
poor recovery in Ponar dredge.
Location move to eastern shore
by Goose Falls per C. Foster. Dup @
SD-420 ~~1515/1450~~ R.H. 1520 Log Sheet 120566 1540
Metals (3 x 8 oz) x 2 D05654
TOC (1 x 8 oz) x 2
Grain size (2 x 16 oz) x 2
↓

12/3/04

TRC **Sample Log Sheet**	Project: Callahan Mine Project No.:	Date/Time: 11/16/04 13:55	Sheet 1 of 1
	Contractor Personnel:	TRC Personnel: C. Foster, A. Stattel A. Bergan	

Sample No.: SW - 403 + Duplicate SWE + SWFE 403

Depth/Interval Sampled: ____________

Sample Type: [✓ Grab], Composite or Both
(circle)

Media: (circle)
Surface Soil   Sediment
Subsurface Soil   [✓ Surface Water]
Other ________   Ground Water

Sketch of Sample Location

see sketch on sample log sheet for SD - 403

Field Screening Information:

Type of Meter: YSI

Other Field Measurements:
Temp (°C) = 4.19   ORP = 286.3
pH = 7.78   Salinity = 0.27
D.O. (mg/L) = 11.66
Conductivity (mS/cm) = 335

Observations:
1/4" thick layer of ice over sample location very fine particulates were floating on surface but samples collected from deeper auger hole were sediment free.

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☐	Trowel	☐
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☐	Dredge Sampler	☐
Bowl (stainless)	☐	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
OTHER: ✓		Bailer	☐
Poly Bottles Direct Filled		Backhoe	☐
		Van Dorn Bottle	☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☐	
Alconox	☐	
Tap water	☐	
HNO_3 (1 or10%)	☐	
Tap Water	☐	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☐	
DI Water	☐	
Air Dry	☐	
None	☒	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metals, dissolved	[✓ YES] NO	pH = 1 w/HNO₃	1 x 1L	1355	D056~~77~~ 68	0247M
☑ metals, Total	YES [✓ NO]	pH = 1 w/HNO₃	1 x 1L	1355	D056~~97~~ 67	0247M
☑ Sulfate	YES [✓ NO]	—	1 x 500mL	1355	D056~~97~~ 67	0247M
☑ Duplicate Metals Dissolved	[✓ YES] NO	pH < 2 w/HNO₃	1 x 1PL	1355	D05692	0247M
☑ Duplicate Total Metals	YES [✓ NO]	pH < 2 w/HNO₃	1 x 1PL	1355	D05691	0247M
☑ Duplicate Sulfate	YES [✓ NO]	—	1 x 500ml	1355	D05691	0247M

AF-212
№ 120377

Signed: ____________

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan Mine

Project No.: 024360590017H3

Date/Time: 12/2 1155

Sheet 1 **of** __

Contractor Personnel: Hydroterra Jade McKinnon

TRC Personnel: Charles Foster

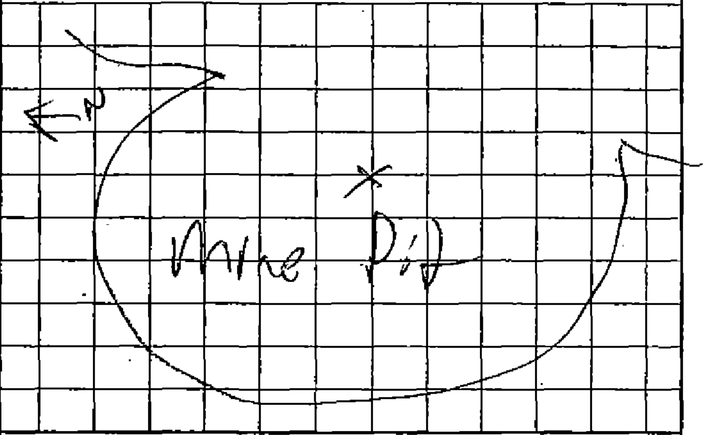
Sample No.: SW-419

Depth/Interval Sampled: 0 - 1ft

Sample Type: [✓ Grab] Composite or Both
(circle)

Media: (circle)
Surface Soil
Subsurface Soil
Other ________
Sediment
[✓ Surface Water]
Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: N/A

Other Field Measurements:
GPS w/Trimble
Conductivity - 19.988
DO - 14.66 - Boat Action
Temp - 5.26
pH - 7.76
Salinity - 21.43
ORP - 252.7

Observations:
Boat Fairly Stationary
at Sample Collection
Collected over Pit

SAMPLE COLLECTION EQUIPMENT:

Hand Auger ☐
Core Sampler ☐
Spatula/Spoon ☐
Bowl (stainless) ☐
Split-spoon (2" or 3") ☐
OTHER: Direct Filled

Trowel ☐
Shelby Tube ☐
Dredge Sampler ☐
Kemmerer ☐
Extended Arm ☐
Bailer ☐
Backhoe ☐
Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☐	
Alconox	☐	
Tap water	☐	
HNO_3 (1 or10%)	☐	
Tap Water	☐	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☐	
DI Water	☐	
Air Dry	☐	
None	☒	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ Total Metals	YES [✓ NO]	HNO3 <2	1 PL	1155	D05683	0247M
☒ Dissolved Metals	[✓ YES] NO	HNO3 <2	1 PL	1155	D05684	0247M
☒ Sulfate	YES [✓ NO]	ICE	1500 ml	1155	D05683	0247M
☐	YES NO					
☐	YES NO					
☐	YES NO					

AF-212 **Nº 120592**

Signed: __________

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan Mine **Project No.:** 02136 0590 0AH3 **Date/Time:** 13:30 11/16/04 **Sheet** 1 **of** 1

Contractor Personnel:

TRC Personnel: C. Foster, A Stattel, A. Bergan

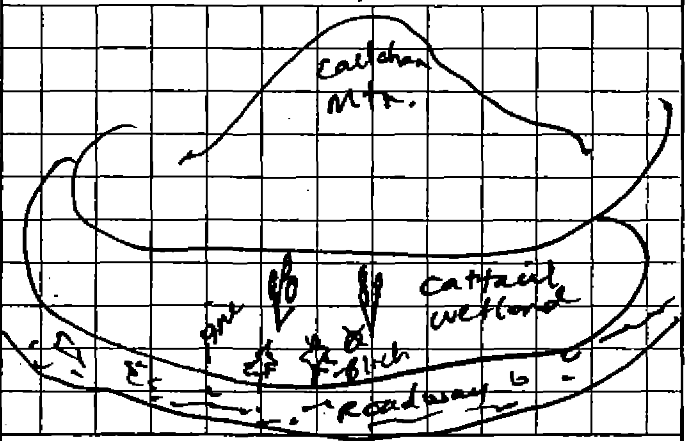
Sample No.: SW-423

Depth/Interval Sampled: ______

Sample Type (circle): [✓ Grab], Composite or Both

Media: (circle) Surface Soil, Subsurface Soil, Other ______, Sediment, [✓ Surface Water], Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: YSI

Other Field Measurements:

Temp(°C) = 1.22 ORP = 207.5

pH = 7.42 Salinity = 0.81

D.O. (mg/L) = 5.65

Conductivity (uS/cm) = 887

Observations:

High turbidity observed in and around sample location. (organic rich) sample has swampy odor. (organic) ~1/4" ice over water at sample location

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☐	Trowel	☐
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☐	Dredge Sampler	☐
Bowl (stainless)	☐	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
OTHER: ✓ Poly bottle(s)		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☐	
Alconox	☐	
Tap water	☐	
HNO_3 (1 or10%)	☐	
Tap Water	☐	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☐	
DI Water	☐	
Air Dry	☐	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample##	CLP Case#
☑ Metals, diss.	[✓ YES] NO	pH=1 w/ HNO_3	1 x 1 L.	1330	D05687	0247M
☑ Metals, total	YES [✓ NO]	pH=1 w/ HNO_3	1 x 1 L.	1330	D05687	0247M
☑ Sulfate	YES [✓ NO]	—	1 x 500mL	1330	D05687	0247M
☐	YES NO					
☐	YES NO					
☐	YES NO					

AF-212 № 120376

Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan Mine

Project No.: 02136 0590 01743

Date/Time: 11/17/04

Sheet 1 **of** 1

Contractor Personnel: –

TRC Personnel: A. Stattel, C. Foster

Sample No.: SW-405 ms/Dup

Depth/Interval Sampled: 0-6"

Sample Type (circle): [✓ Grab] Composite or Both

Media: (circle)
Surface Soil
Subsurface Soil
Other ________
Sediment
[✓ Surface Water]
Ground Water

Sketch of Sample Location

see sample log sheet # 120379 for sample location sketch.

Field Screening Information:

Type of Meter:

Other Field Measurements: YSI:
Temp 2.44
pH 7.06
ORP 355.4
DO 14.4 mg/L
Sal 12.27 ppt
Cond 12015

Observations:
area of fresh water drainage from a cattail wetland

SAMPLE COLLECTION EQUIPMENT:

Hand Auger ☐
Core Sampler ☐
Spatula/Spoon ☐
Bowl (stainless) ☐
Split-spoon (2" or 3") ☐
Trowel ☐
Shelby Tube ☐
Dredge Sampler ☐
Kemmerer ☐
Extended Arm ☐
Bailer ☐
Backhoe ☐
Van Dorn Bottle ☐

OTHER:
dedicated poly bottles

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☐	
Alconox	☐	
Tap water	☐	
HNO_3 (1 or10%)	☐	
Tap Water	☐	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☐	
DI Water	☐	
Air Dry	☐	
None	☒	

ANALYTICAL PARAMETERS	Filtered (circle)	Chemical Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#	
☒ Metals, tot.	YES [✓ NO]	pH=1 w/ HCl	2x1L	1225	D05669	0247M	ms/dup
☒ Metals, diss.	[✓ YES] NO	pH=1 w/ HCl	2x1L	1225	D05669-70	0247M	ms/dup
☒ Sulfate	YES [✓ NO]	—	2x500mL	1225	D05669	0247M	ms/dup
☐	YES NO				~~D05670 for~~	~~dup~~ cf	
☐	YES NO						
☐	YES NO						

AF-212
№ 120380

Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan
Project No.: 02136 0590 017H3
Date/Time: 12/3/04 / 1340
Sheet 1 **of** 1

Contractor Personnel: Hydroterra - Jack Anderson
TRC Personnel: L. Foster, J. Hunter

Sample No.: SW-411 / SWE-411
D05677 / D05678

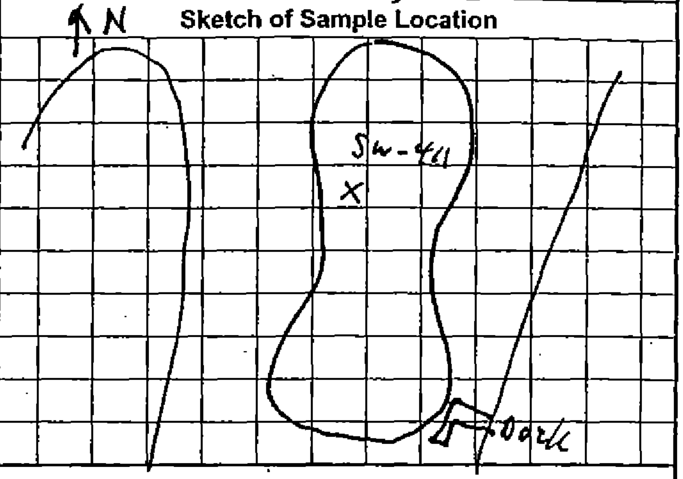
Depth/Interval Sampled: —— +Duplicate SWE-411 SWFE-411

Sample Type: [✓ Grab] Composite or Both
(circle)

Media: (circle)

Surface Soil
Subsurface Soil
Other ______
Sediment
[✓ Surface Water]
Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter:

Other Field Measurements:

Temp: 4.67
Cond: 18.226
Salinity: 18.24
DO: 10.71
pH: 6.80
ORP: 149.1

Observations:

Salinity is low i H_2O leaving goose pond May stay in the cove and exchange in goose cove isn't as complete as thought

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☐	Trowel	☐
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☒	Dredge Sampler	☒
Bowl (stainless)	☒	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
OTHER: Direct Fill H_2O		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% Stainless
Tap Water	☐	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metals, dissolved	[✓ YES] NO	pH=1 w/ HNO_3	1 x 1L	1340	0056~~77~~78	0247M
☑ Metals, Total	YES [✓ NO]	pH=1 w/ HNO_3	1 x 1L	1340	D05677	0247M
☑ Sulfate	YES [✓ NO]	—	1 x 500mL	1340	D05677	0247M
☐	YES NO				~~D005678 [illegible]~~	0247M
☒ Total Metals + Sulfate	YES [✓ NO]	pH < 2 w/ HNO_3 / [illegible]	1 PL, 500 mL	1400	~~CF-dup~~ D05704	D247M
☒ Dissolved Metals	[✓ YES] NO	pH < 2 w/ HNO_3	1 PL	1400	D05705	D247M

AF-212

№ 120593

Signed:

Rev: 8 July 199

TRC

Sample Log Sheet

Project: Callahan Mine Project No.: 02136-0590-017H5

Date/Time: 11/18/04 13:20

Sheet 1 of 1

Contractor Personnel: NA

TRC Personnel: A. Staffel, A. Bergan

Sample No.: SW-424

Depth/Interval Sampled: SW-424

Sample Type (circle): [✓ Grab] Composite or Both

Media (circle): Surface Soil, Subsurface Soil, Other ______, Sediment, [✓ Surface Water], Ground Water

Sketch of Sample Location

See diagram on Field Log Sheet for SD-424.

Field Screening Information:

Type of Meter:

Other Field Measurements:

Temp. 4.36 Salinity = 23.75
pH. = 7.85 ORP= 308.0
Conductivity (µS/cm) = 23,976
D.O. (mg/L) = 13.96

Observations: Sample collected 17 ft. from edge of shore (beginning of grass) and depth of water = 0.6 ft.

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☐	Trowel	☐
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☐	Dredge Sampler	☐
Bowl (stainless)	☐	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
[✓ OTHER:] Poly. bottles Direct Fill		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	NA cf
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% Stainless
Tap Water	☐	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☐	
DI Water	☐	
Air Dry	☐	
None	☐	

Dissolved ID is: D05690 cf

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ metals, total	YES [✓ NO]	pH=1 w/HNO_3	1x1 L	~~[illegible]~~ 13:20	D05688	0247M
☒ metals, diss	[✓ YES] NO	pH=1 w/HNO_3	1x1 L	13:20	~~D05689~~ cf	0247M
☒ sulfate	YES [✓ NO]	—	1x500mL	13:20	D05689	0247M
☐	YES NO				~~D05690 for diss~~ cf	
☐	YES NO					
☐	YES NO					

AF-212

№ 120385

Signed: [illegible] for A Staffel

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan Mine

Project No.: 02136 0590 017H3

Date/Time: 11/17/04 1140

Sheet 1 of 1

Contractor Personnel: —

TRC Personnel: K, Sears, A Bergain

Sample No.: SW - 422

Depth/Interval Sampled: 0 - 3"

Sample Type: [✓ Grab], Composite or Both (circle)

Media: (circle)

Surface Soil
Subsurface Soil
Other ________
Sediment
[✓ Surface Water]
Ground Water

Sketch of Sample Location

See sample log sheet # 120366 for sample location sketch

Field Screening Information:

Type of Meter:

Other Field Measurements: YSI

Temp: 8.23
Cond 4979
Sal 4.06
Do 8.68
pH 6.84
ORP 388.1

Observations:

NO Ice at sample location, limited ice free areas

SAMPLE COLLECTION EQUIPMENT:

Hand Auger ☐
Core Sampler ☐
Spatula/Spoon ☐
Bowl (stainless) ☐
Split-spoon (2" or 3") ☐
OTHER: Dedicated Poly bottles, Direct Fill
Trowel ☐
Shelby Tube ☐
Dredge Sampler ☐
Kemmerer ☐
Extended Arm ☐
Bailer ☐
Backhoe ☐
Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☐	
Alconox	☐	
Tap water	☐	
HNO_3 (1 or10%)	☐	
Tap Water	☐	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☐	
DI Water	☐	
Air Dry	☐	
None	☒	

ANALYTICAL PARAMETERS	Filtered (circle)	Chemical Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ Metals, tot	YES [✓ NO]	pH=1 w/ HNO_3	1x1L	11 45	D05685	0247M
☒ Metals, diss	[✓ YES] NO	pH=1 w/ HNO_3	1x1L	1145	~~D05685~~ 86	0247M
☒ Sulfate	YES [✓ NO]	—	1x500mL	1145	D05685	0247M
☐	YES NO				~~005686 for dup~~	cF
☐	YES NO					
☐	YES NO					

AF-212

№ 120373

Signed: Kim Sears

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan Mine
Project No.: 02136 0590 01743
Date/Time: 4/17/04
Sheet 1 **of** 1

Contractor Personnel: —
TRC Personnel: C Foster, A. Stattel

Sample No.: SW-40C

Depth/Interval Sampled: 0-6"

Sample Type: (circle) [✓ Grab], Composite or Both

Media: (circle)
Surface Soil
Subsurface Soil
Other ________
Sediment
[✓ Surface Water]
Ground Water

Sketch of Sample Location

Field Screening Information:

Type of Meter:

Other Field Measurements: YSI:
Temp (C) 2.6 Cond 14131
PH 6.29
ORP ~~928.3~~ 426.3
DO 13.4 mg/L
Salinity 20.39

Observations:
- High tide mark to sample = 20 ft
- Water Depth = 0.7 ft

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☐	Trowel	☐
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☐	Dredge Sampler	☐
Bowl (stainless)	☐	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

OTHER: dedicated poly bottles

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☐	
Alconox	☐	
Tap water	☐	
HNO_3 (1 or10%)	☐	
Tap Water	☐	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☐	
DI Water	☐	
Air Dry	☐	
None	☒	

ANALYTICAL PARAMETERS	Filtered (circle)	Chemical Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ Metals, tot	YES [✓ NO]	pH=1 w/HNO_3	1x1L	11:45	D05671	0247M
☒ Metals, diss	[✓ YES] NO	pH=1 w/HNO_3	1x1L	11:45	D05672 CF	0247M
☒ Sulfate	YES [✓ NO]	—	1x500mL	11:45	D05671	0247M
☐	YES NO				~~D05672~~	~~for dup~~ CF
☐	YES NO					
☐	YES NO					

AF-212
№ 120375

Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan Mine

Project No.: 02136-0590-01443

Date/Time: 11/16/04 10:30

Sheet 1 of 1

Contractor Personnel: —

TRC Personnel: C. Foster, A. Bergan, A. Stattel, K. Sears

Sample No.: SW-410

Depth/Interval Sampled: 0-6"

Sample Type: [✓ Grab], Composite or Both (circle)

Media: (circle)

Surface Soil Sediment
Subsurface Soil [✓ Surface Water]
Other ________ Ground Water

Sketch of Sample Location

see sample log sheet # for SD-410

Field Screening Information:

Type of Meter:

Other Field Measurements: YSI

Temp 7.03 °C
Cond 29771. μs/cm
Salinity 28.9 ppt
DO 9.59 mg/L
pH ~~6.52~~ 6.56
ORP ~~410.6~~ ~~397~~ 396.7

Observations:

water is clear, sediments have not been aggitated.

LOW TIDE IN GOOSE POND

- Water depth ≈ 0.7'

- Slack tide

SAMPLE COLLECTION EQUIPMENT:

Hand Auger ☐
Core Sampler ☐
Spatula/Spoon ☐
Bowl (stainless) ☐
Split-spoon (2" or 3") ☐

OTHER: dedicated poly bottle

Trowel ☐
Shelby Tube ☐
Dredge Sampler ☐
Kemmerer ☐
Extended Arm ☐
Bailer ☐
Backhoe ☐
Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☐	
Alconox	☐	
Tap water	☐	
HNO_3 (1 or10%)	☐	
Tap Water	☐	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☐	
DI Water	☐	
Air Dry	☐	
None	☒	

ANALYTICAL PARAMETERS	Filtered (circle)	Chemical Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ Metals, total	YES [✓ NO]	pH=1 w/ HNO_3	1x1L	1035	D05675	0247M
☒ Metals	[✓ YES] NO	pH=1 w/ HNO_3	1x1L	1035	D05676	0247M
☒ Sulfate	YES [✓ NO]	—	1 x 500mL	1035	D05675	0247M
☐	YES NO					
☐	YES NO					
☐	YES NO					

AF-212

Nº 120369

Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan Mine
Project No.: 02136 0590 017H3
Date/Time: 11/16/04 1050
Sheet 1 of 1

Contractor Personnel: —
TRC Personnel: C. Foster, Agtattel, A. Bergan, K. Sears

Sample No.: SW-414

Depth/Interval Sampled: 0-6"

Sample Type: [✓ Grab]/Composite or Both
(circle)

Media: (circle)
Surface Soil
Subsurface Soil
Other ________
Sediment
[✓ Surface Water]
Ground Water

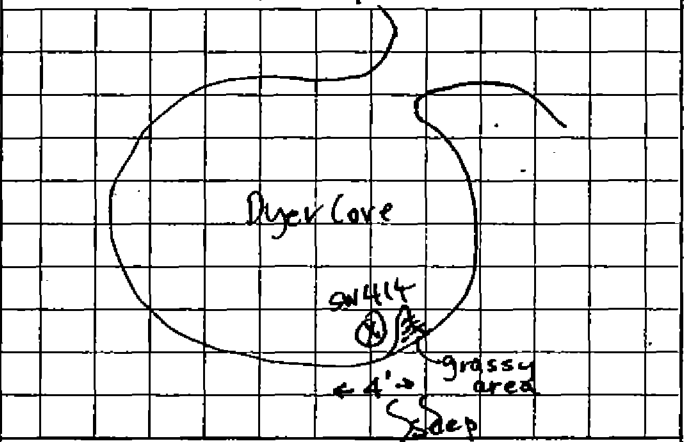
Field Screening Information:

Type of Meter:

Other Field Measurements: YSI

ORP 383.2
pH 7.17
Temp 1.75 °C
Con 2285.14
Sal 25.39 ppt
DO 10.22 mg/L

Sketch of Sample Location



Observations:

Sample within Dyer Cove 20 minutes after tide began entering goose Pond at Bridge

-Water depth = 1 ft

-Slack / incoming tide
At Pond Entrance - No Affect Here

SAMPLE COLLECTION EQUIPMENT:

Hand Auger ☐
Core Sampler ☐
Spatula/Spoon ☐
Bowl (stainless) ☐
Split-spoon (2" or 3") ☐
OTHER:
dedicated poly bottles

Trowel ☐
Shelby Tube ☐
Dredge Sampler ☐
Kemmerer ☐
Extended Arm ☐
Bailer ☐
Backhoe ☐
Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☐	
Alconox	☐	
Tap water	☐	
HNO_3 (1 or10%)	☐	
Tap Water	☐	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☐	
DI Water	☐	
Air Dry	☐	
None	☒	

ANALYTICAL PARAMETERS	Filtered (circle)	Chemical Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ Metals, total	YES [✓ NO]	pH=1 w/ HNO_3	1x1L	1100	D05679	0274M
☒ Metals, diss	[✓ YES] NO	pH=1 w/ HNO_3	1x1L	1100	D05680	0274M
☒ Sulfate	YES [✓ NO]	—	1x500mL	1100	D05679	0274M
☐	YES NO					
☐	YES NO					
☐	YES NO					

AF-212
№ 120370

Signed: Kiran Sears

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan Mine	Project No.: 02136 0590 017H3	Date/Time: 11/16/04 1110	Sheet 1 of 1
Contractor Personnel: —		TRC Personnel: C. Foster, K. Sears, A. Stattel, A Bergan	

Sample No.: SW-415

Depth/Interval Sampled: 0-6"

Sample Type (circle): [✓ Grab], Composite or Both

Media: (circle)
Surface Soil
Subsurface Soil
Other ________
Sediment
[✓ Surface Water]
Ground Water

Sketch of Sample Location

see sample log sheet #120361 for sketch

Field Screening Information:

Type of Meter:

Other Field Measurements: YSI

ORP 381.1
pH 7.50
temp 3.42°c
DO 9.65 mg/L
Sal 26.92 ppt
Cond 25243 µS

Observations:

Sample in Dyer cove 40 minutes after tide entering goose Pond at Bridge

- Water depth = 1.1 ft.

- Slack/incoming tide

SAMPLE COLLECTION EQUIPMENT:

Hand Auger ☐
Core Sampler ☐
Spatula/Spoon ☐
Bowl (stainless) ☐
Split-spoon (2" or 3") ☐
OTHER: dedicated poly bottles

Trowel ☐
Shelby Tube ☐
Dredge Sampler ☐
Kemmerer ☐
Extended Arm ☐
Bailer ☐
Backhoe ☐
Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☐	
Alconox	☐	
Tap water	☐	
HNO_3 (1 or10%)	☐	
Tap Water	☐	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☐	
DI Water	☐	
Air Dry	☐	
None	☒	

ANALYTICAL PARAMETERS	Filtered (circle)	Chemical Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ Metals, tot	YES [✓ NO]	pH=1 w/ HNO_3	1 x 1L	1115	D05681	0274m 47F
☒ Metals, diss	[✓ YES] NO	pH=1 w/ HNO_3	1 x 1L	1115	D05682	0274m 47F
☒ Sulfate	YES [✓ NO]	—	1 x 500mL	1115	D05681	0274m 47F
☐	YES NO					
☐	YES NO					
☐	YES NO					

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№ 120371

Signed: Kiran Sears

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan mine

Project No.: 02136 0590 017H3

Date/Time: 11/16/04 1120

Sheet 1 **of** 1

Contractor Personnel: –

TRC Personnel: C. Foster, A. Bergan, A. Stattel, K. Sears

Sample No.: SW-407

Depth/Interval Sampled: 0-6"

Sample Type: [✓ Grab], Composite or Both (circle)

Media: (circle)

Surface Soil
Subsurface Soil
Other ________
Sediment
[✓ Surface Water]
Ground Water

Sketch of Sample Location

see sample log sheet # for location sketch

Field Screening Information:

Type of Meter:

Other Field Measurements:

Temp 3.31 °C
pH 7.67
ORP 374.8
DO 9.90 mg/L
Sal 26.18 ppt
Cond 24548 µS/cm

Observations:

SAMPLE 50 Minutes after Tide entering at bridge

- Depth of water = 1.4 ft

- Slack/incoming tide

SAMPLE COLLECTION EQUIPMENT:

Hand Auger ☐
Core Sampler ☐
Spatula/Spoon ☐
Bowl (stainless) ☐
Split-spoon (2" or 3") ☐
OTHER:
dedicated poly bottles

Trowel ☐
Shelby Tube ☐
Dredge Sampler ☐
Kemmerer ☐
Extended Arm ☐
Bailer ☐
Backhoe ☐
Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☐	
Alconox	☐	
Tap water	☐	
HNO_3 (1 or10%)	☐	
Tap Water	☐	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☐	
DI Water	☐	
Air Dry	☐	
None	☒	

ANALYTICAL PARAMETERS	Filtered (circle)	Chemical Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ Metals, tot.	YES [✓ NO]	pH=1 w/ HNO_3	1x 1L	1125	D05673	02~~74~~47M cf
☒ Metals, diss.	[✓ YES] NO	pH=1 w/ HNO_3	1x/L	1125	D05674	02~~74~~47M cf
☒ Sulfate	YES [✓ NO]	–	1x500mL	1125	D05673	02~~74~~47M cf
☐	YES NO					
☐	YES NO					
☐	YES NO					

AF-212

№ 120372

Signed: Kevin Sears

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan Mine	**Project No.:** 021360550 0243	**Date/Time:** 1405	**Sheet** 1 **of** 1
Contractor Personnel: Hydroterra Jack McKenna		**TRC Personnel:** C. Foster	

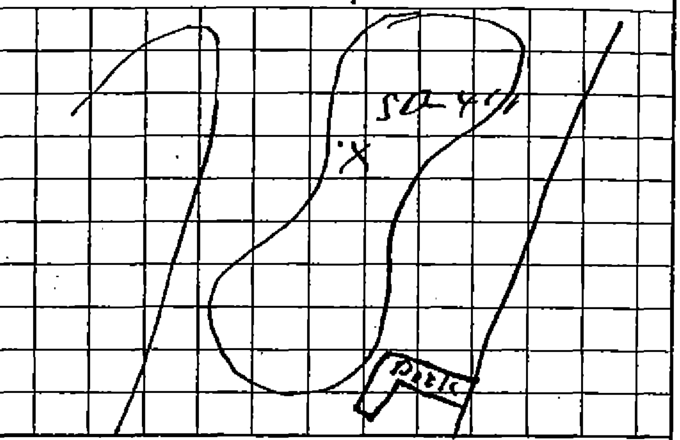
Sample No.: SD-411

Depth/Interval Sampled: ~~0-6~~ d.m. 0-6"

Sample Type: [✓ Grab] Composite or Both
(circle)

Media: (circle)
Surface Soil
Subsurface Soil
Other ______
[✓ Sediment]
~~Surface Water~~
Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: N/A

Other Field Measurements:
GPS

Observations:
Clay (CL) v. d. gray,
100% clay, soft, wet,
Starfish & crab, organic rich

water depth = 15.1'

SAMPLE COLLECTION EQUIPMENT:

Hand Auger ☐
Core Sampler ☐
Spatula/Spoon ☒
Bowl (stainless) ☒
Split-spoon (2" or 3") ☐
OTHER:

Trowel ☐
Shelby Tube ☐
Dredge Sampler ☒
Kemmerer ☐
Extended Arm ☐
Bailer ☐
Backhoe ☐
Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% Stainless
Tap Water	☒	
Methanol	☐	
Hexane	☐	
Acetone	☒	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ Metals	YES [✓ NO]	Ice Only	3x8oz	1405	D05648	0247M
☒ TOC	YES [✓ NO]	Ice Only	1x8oz	1405	D05648	0247M
☒ Grain Size	YES [✓ NO]	Ice Only	2x16oz	1405	D05648	0247M
☐	YES NO					
☐	YES NO					
☐	YES NO					

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№ 120565

Signed:

Rev: 8 July 1991

TRC
Sample Log Sheet

Project: Callahan

Project No.: 02136 0590 01743

Date/Time: 12/3/04 1320

Sheet 1 **of** 1

Contractor Personnel:

TRC Personnel: J. Hunter
E. Foster

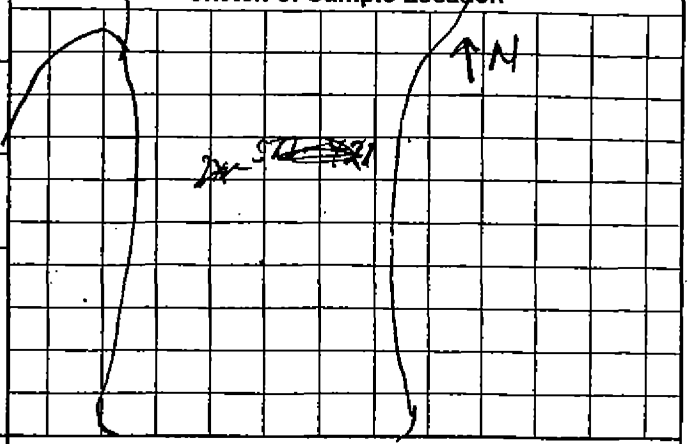
Sample No.: SD421

Depth/Interval Sampled: 0-6 inches

Sample Type: [✓ Grab], Composite or Both (circle)

Media: (circle)
Surface Soil
Subsurface Soil
Other ________
[✓ Sediment]
Surface Water
Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: N/A

Other Field Measurements:

GPS

Observations:

Clay, d. gray, 100% clay, soft, wet, organic rich

water = 14.6' deep

SAMPLE COLLECTION EQUIPMENT:

- Hand Auger ☐
- Core Sampler ☐
- Spatula/Spoon ☑
- Bowl (stainless) ☑
- Split-spoon (2" or 3") ☐
- OTHER: Power dredge
- Trowel ☐
- Shelby Tube ☐
- Dredge Sampler ☒
- Kemmerer ☐
- Extended Arm ☐
- Bailer ☐
- Backhoe ☐
- Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% Stainless
Tap Water	☒	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metals	YES [✓ NO]	Ice Only	3×8oz.	1320	D05655	0247M
☑ TOC	YES [✓ NO]	Ice Only	1×8oz.	1320	D05655	0247M
☑ Grain Size	YES [✓ NO]	Ice Only	2×16oz	1320	D05655	0247M
☐	YES NO					
☐	YES NO					
☐	YES NO					

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№ 120563

Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan **Project No.:** 02136 0590 01743

Date/Time: 12/8/04 1520

Sheet 1 **of** 1

Contractor Personnel: R. Bartosz ME

TRC Personnel: J. Hunter, C. Foster

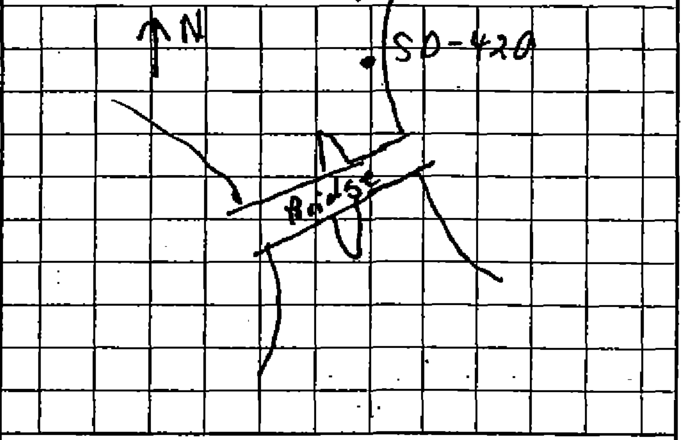
Sample No.: SD-420 / SDE 420 Dup: 1540

Depth/Interval Sampled: 0-4"

Sample Type: [✓ Grab] Composite or Both (circle)

Media: (circle)
Surface Soil
Subsurface Soil
Other ______
[✓ Sediment]
Surface Water
Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: N/A

Other Field Measurements:

GPS

Observations:

Clay (CL) olive brown, 100% clay, soft, wet.

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☒	Trowel	☒
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☑	Dredge Sampler	☐
Bowl (stainless)	☒	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
OTHER:		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% Stainless
Tap Water	☒	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ Metals	YES [✓ NO]	Ice Only	3x8oz.	1520	D05654	0247M
☒ TOC	YES [✓ NO]	Ice Only	1x8oz.	1520	D05654	0247M
☒ Grain Size	YES [✓ NO]	Ice Only	2x16oz.	1520	D05654	0247M
☐	YES NO					
☐	YES NO					
☐	YES NO					

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№ 120566

Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan
Project No.: 02136.0590017H3
Date/Time: K/13/04 0950
Sheet 1 **of** 1
Contractor Personnel:
TRC Personnel: J. Hunter, C. Foster

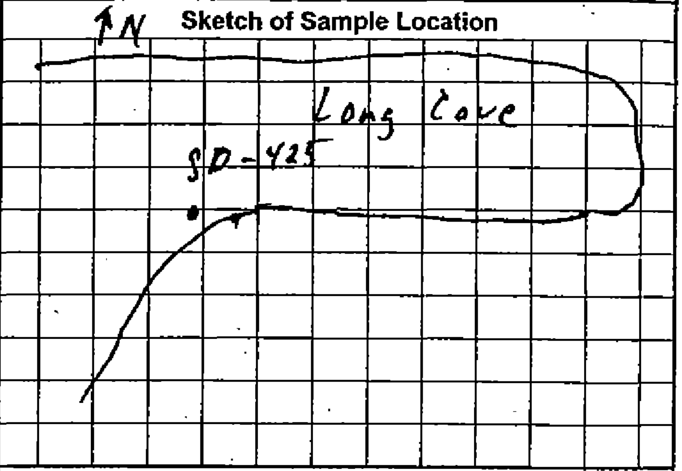
Sample No.: SD425 + MS/MSD

Depth/Interval Sampled: 0-6 inches

Sample Type: Grab, Composite or Both (circle)

Media: (circle)
Surface Soil
Subsurface Soil
Other ______
[✓ Sediment]
Surface Water
Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter: N/A

Other Field Measurements: GPS

Observations:
35' from high tide
1.3' deep (water depth)
abundant mussle shells on shore

Silty Clay (CL) v. d. gray, 70% clay, 30% silt, soft, wet, Abundant mussles, organic rich.

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☒	Trowel	☐
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☒	Dredge Sampler	☐
Bowl (stainless)	☒	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
OTHER:		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10%, Stainless
Tap Water	☒	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metals	YES [✓ NO]	Ice Only	3 x 8oz	0950	D05667	0247M
☑ TOC	YES [✓ NO]	Ice Only	1 x 8oz	0950	D05667	0247M
☑ ~~TOC~~ Grainsize	YES [✓ NO]	Ice Only	1 x 16oz	0950	D05667	0247M
☐	YES NO					
☐	YES NO					
☐	YES NO					

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№ 120561

Signed: ______

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan **Project No.:** 02136 0590 01~~H~~3

Date/Time: 12/3/04/1050

Sheet 1 **of** 1

Contractor Personnel:

TRC Personnel: J. Hunter, C. Foster

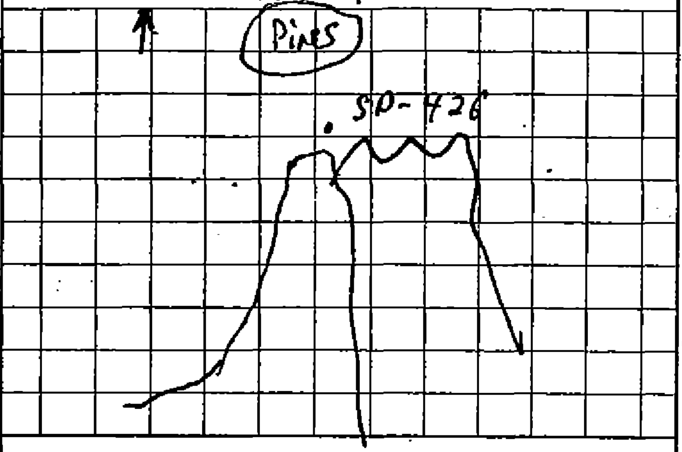
Sample No.: SD-426

Depth/Interval Sampled: 0-6 inches

Sample Type: [✓ Grab] Composite or Both
(circle)

Media: Surface Soil [✓ ~~Sediment~~] Subsurface Soil Surface Water Other ________ Ground Water
(circle)

Sketch of Sample Location



Field Screening Information:

Type of Meter: N/A

Other Field Measurements:

GPS

Observations:

43' from high tide
1.8' deep in water
– Beach covered in muscle shells
Sandy clay (CL) v. d. gray,
70% clay, 30% f. sand, abundant
muscle shell, organic rich

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☒	Trowel	☐
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☒	Dredge Sampler	☐
Bowl (stainless)	☒	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
OTHER:		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% Stainless
Tap Water	☒	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☑ Metals	YES [✓ NO]	Ice Only	3 x 8oz	1050	D05668	0247M
☑ TOC	YES [✓ NO]	Ice Only	1 x 8oz	1050	D05668	0247M
☑ ~~Tot~~ Grain size	YES [✓ NO]	Ice Only	1x16oz	1050	D05668	0247M
☐	YES NO					
☐	YES NO					
☐	YES NO					

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№ 120562

Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan Mine Project No.: 02136-0590-017H3

Date/Time: 11/18/04 14:00

Sheet 1 of 1

Contractor Personnel: NA

TRC Personnel: A. Stattel, A. Bergman

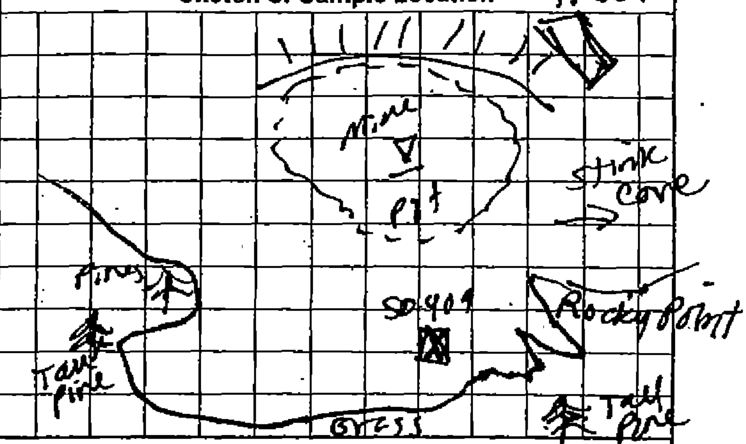
Sample No.: SD-409

Depth/Interval Sampled: 0-6 inches

Sample Type: [✓ Grab], Composite or Both (circle)

Media: (circle)
Surface Soil [✓ Sediment]
Subsurface Soil Surface Water
Other ________ Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter:

Other Field Measurements:
-GPS coordinates taken using Trimble GeoXT
-photographs taken

Observations: Sediment consists of black clay, silt and organics, trace sand. Slight organic odor. Trace clamshells. Sample collected 14 ft from edge of shore (beginning of grass) and in 0.8 ft water.

SAMPLE COLLECTION EQUIPMENT:

Hand Auger ☒
Core Sampler ☐
Spatula/Spoon ☒
Bowl (stainless) ☒
Split-spoon (2" or 3") ☐
OTHER:

Trowel ☐
Shelby Tube ☐
Dredge Sampler ☐
Kemmerer ☐
Extended Arm ☐
Bailer ☐
Backhoe ☐
Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	Stainless 10%
Tap Water	☒	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle).	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ Metals	YES [✓ NO]	cool 4°C	3×8 oz.	14:00	D05646	0247M
☒ TOC/TCD	YES [✓ NO]	cool 4°C	1×8oz.	14:00	D05646	0247M
☒ Grain Size	YES [✓ NO]	cool 4°C	1×16oz.	14:00	D05646	0247M
☐	YES NO					
☐	YES NO					
☐	YES NO					

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№ 120384

Signed: Amy Stattel

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan Mine **Project No.:**

13:30 (SD) / ~~13:30 (SW)~~

Date/Time: 11/18/04 **Sheet** ___ **of** ___

Contractor Personnel: NA

TRC Personnel: A. Stettel
A. Bergan

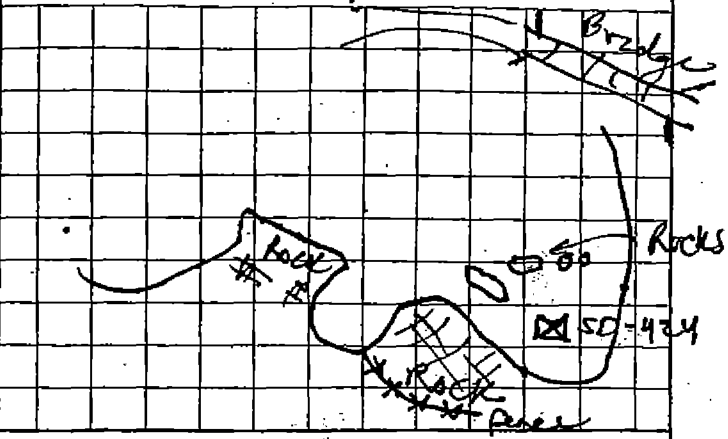
Sample No.: ~~[illegible]~~/SD-424

Depth/Interval Sampled: 0 to 6 Inches

Sample Type: Grab, Composite or Both
(circle)

Media: (circle)
Surface Soil Sediment
Subsurface Soil Surface Water
Other ________ Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter:

Other Field Measurements:

7.85 ~~pH 7.77~~ 7.4 DO ~~13.44 mg/L~~ 13.96 mg/L
4.3 ~~Temp 3.96~~
303 ~~ORP 313.6~~
~~Cond 22.270 23.976~~ ~~.428~~
23.751 ~~27.8~~
- GPS coordinates taken using trimble GeoXT / photos taken

Observations: Sediment consists of dark gray sand, silt and diatomaceous material. No odor. Trace clam shells, trace gravel. Samples collected 17ft from shore line (grass) and in 0.6 ft. of water.

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☒	Trowel	☐
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☒	Dredge Sampler	☐
Bowl (stainless)	☒	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
OTHER:		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	Stainless 10%
Tap Water	☒	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ Metals	YES [✓ NO]	Cool 4°C	3x 8oz.	13:30	D05658	0247M
☒ TOC/TCD	YES [✓ NO]	Cool 4°C	1 x 8oz	13:30	D05658	0247M
☒ Grain Size	YES [✓ NO]	Cool 4°C	1 x 16oz	13:30	D05658	0247M
☐	YES NO					
☐	YES NO					
☐	YES NO					

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№ 120383

Signed: for A. Stettle

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan mine

Project No.: 02136 0590 01743

Date/Time: 14:40 11/17/04

Sheet 1 of 1

Contractor Personnel: —

TRC Personnel: C. Foster, A. Stattel

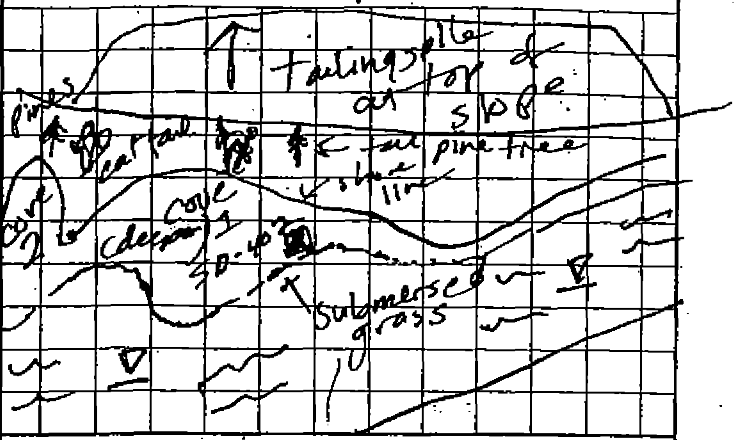
Sample No.: SD-402

Depth/Interval Sampled: 0-6"

Sample Type: [✓ Grab] Composite or Both (circle)

Media: (circle) Surface Soil, Subsurface Soil, Other ________, [✓ Sediment], Surface Water, Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter:

Other Field Measurements:

- GPS coordinates taken using Trimble GeoXT
- photographs taken

Observations: Gray to dark gray stiff silty clay with organics; lt. gray/whitish streaks in clay. Sample collected at 53 ft. from shore and in 0.9 ft. water. organic odor

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☒	Trowel	☐
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☒	Dredge Sampler	☐
Bowl (stainless)	☒	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
OTHER:		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% Stainless
Tap Water	☒	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ Metals	YES [✓ NO]	cool 4°C	3x8oz	1440	D05639	0247M
☒ TOC/TCO	YES [✓ NO]	cool 4°C	1x8oz	1440	D05639	0247M
☒ Grain Size	YES [✓ NO]	cool 4°C	1x16oz	1440	D05639	0247M
☐	YES NO					
☐	YES NO					
☐	YES NO					

AF-212

№ 120382

Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan Mine

Project No.: 02136 0590 017 H3

Date/Time: 11/12/04 1015

Sheet 1 **of** 1

Contractor Personnel: —

TRC Personnel: C.Foster, T.Poley, A.Staltel, K.Scars

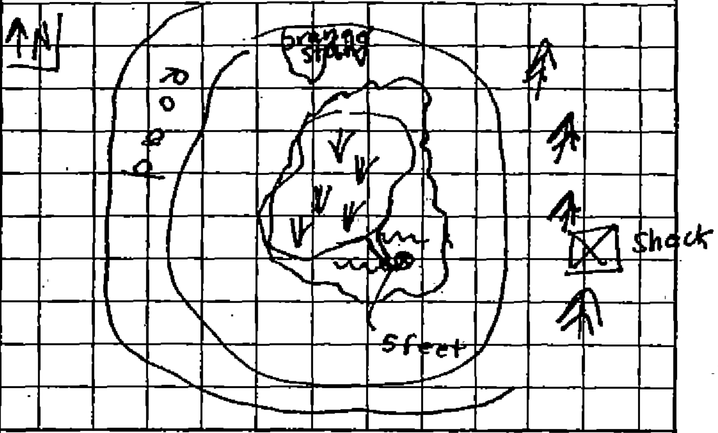
Sample No.: SD-403

Depth/Interval Sampled: 0-6"

Sample Type: [✓ Grab], Composite or Both (circle)

Media: (circle)
Surface Soil
Subsurface Soil
Other ______
[✓ Sediment]
Surface Water
Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter:

Observations:
tan tailing w/mottled grey clay (powdered rock)

Other Field Measurements:
- GPS coordinates taken using Trimble GeoXT SN
- Photographs taken
- Depth of water = 0.3ft

SAMPLE COLLECTION EQUIPMENT:

E2

Hand Auger ☒
Core Sampler ☐
Spatula/Spoon ☒
Bowl (stainless) ☒
Split-spoon (2" or 3") ☐
OTHER:

Trowel ☒
Shelby Tube ☒
Dredge Sampler ☒
Kemmerer ☒
Extended Arm ☐
Bailer ☐
Backhoe ☐
Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	
Tap Water	☒	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ Metals	YES [✓ NO]	cool 4°C	3x8oz	10:25	D05640	0247M
☒ TOC/TCO	YES [✓ NO]	cool 4°C	1x8oz	10:25	D05640	0247M
☒ Grain size	YES [✓ NO]	cool 4°C	2x16oz	10:25	D05640	0247M (LD)
☐	YES NO					
☐	YES NO					
☐	YES NO					

AF-212

№ 120367

Signed: Kieran Sears

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan Mine

Project No.: 02136 0590 01743

Date/Time: 11/12/04 0850

Sheet 1 **of** 1

Contractor Personnel:

TRC Personnel: C.Foster, T.Foley, A.Stattel, K.Sears

Sample No.: SD-404

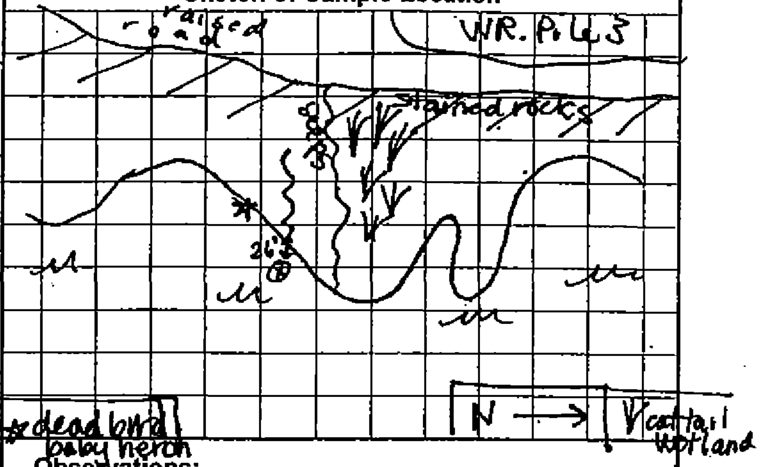
Depth/Interval Sampled: 0-6"

Sample Type: [✓ Grab] Composite or Both (circle)

Media: (circle)

Surface Soil [✓ Sediment]
Subsurface Soil Surface Water
Other ______ Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter:

Other Field Measurements:

- GPS Measurements taken using Thimble GeoXT SN
- Photographs taken
- depth to water = 0.2 ft @ low tide

Observations:

brown silty clay, trace fine gravel

sample taken @ low tide

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☒	Trowel	☐
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☒	Dredge Sampler	☐
Bowl (stainless)	☒	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
OTHER:		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% stainless
Tap Water	☒	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ Metals	YES [✓ NO]	cool 4°C	3x 8oz	0905	D05641	0247M
☒ TOC/TCO	YES [✓ NO]	cool 4°C	1x 8oz	0905	D05641	0247M
☒ Grain size	YES [✓ NO]	cool 4°C	1x 16oz	0905	D05641	0247M
☐	YES NO					
☐	YES NO					
☐	YES NO					

AF-212

№ 120365

Signed: Kim Sears

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan Mine

Project No.: 02136 0890 019A3

Date/Time: 11/11/04 1320

Sheet 1 **of** 1

Contractor Personnel: —

TRC Personnel: C. Foster, T.Foley, A.Stattel, K.Sears

Sample No.: SD-407

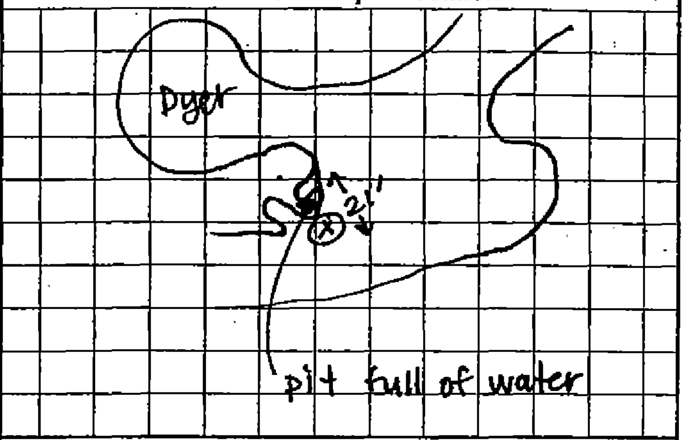
Depth/Interval Sampled: 0-6"

Sample Type: [✓ Grab] Composite or Both (circle)

Media: (circle)

Surface Soil
Subsurface Soil
Other ______
[✓ Sediment]
Surface Water
Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter:

Other Field Measurements:

- GPS coordinates taken using Trimble GeoXT SN4413A0998
- Photographs taken
- Water depth:

Observations:

grey silt and clay, shells, trace fine gravel, sand worms

just offshore from pit not noted on maps.

SAMPLE COLLECTION EQUIPMENT:

Hand Auger ☒
Core Sampler ☐
Spatula/Spoon ☒
Bowl (stainless) ☒
Split-spoon (2" or 3") ☐
OTHER:

Trowel ☐
Shelby Tube ☐
Dredge Sampler ☐
Kemmerer ☐
Extended Arm ☐
Bailer ☐
Backhoe ☐
Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% to Stainless
Tap Water	☒	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ Metals	YES [✓ NO]	cool 4°C	3x8oz	1330	D05644	0247M
☒ TOC/TCD	YES [✓ NO]	cool 4°C	1x8oz	1330	D05644	0247M
☒ Grain Size	YES [✓ NO]	cool 4°C	1x8oz	1330	D05644	0247M
☐	YES NO					
☐	YES NO					
☐	YES NO					

AF-212

№ 120362

Signed: Kira Sears

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan Mine
Project No.: 02136 0590 017H3
Date/Time: 11/11/04 0745
Sheet 1 **of** 1

Contractor Personnel: —
TRC Personnel: C. Foster, T. Foley, A. Stattel, K. Sears.

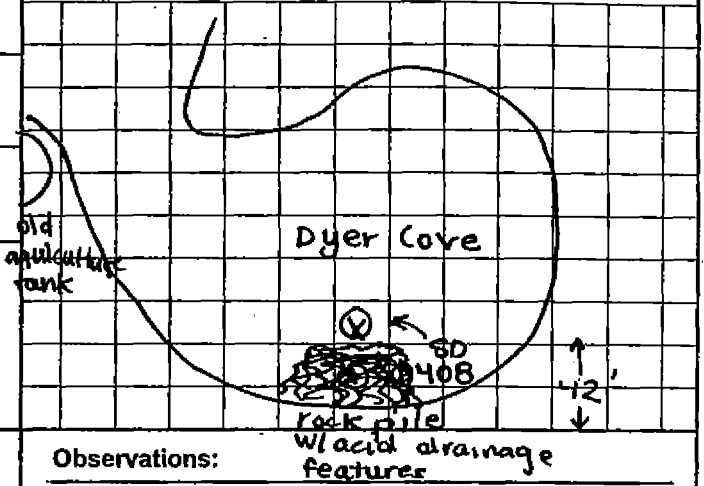
Sample No.: SD - 408

Depth/Interval Sampled: ~~0 - 1.3 ft.~~ KS 0 - 6"

Sample Type: [✓ Grab,] Composite or Both
(circle)

Media: (circle)
Surface Soil
Subsurface Soil
Other ________
[✓ Sediment]
Surface Water
Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter:

Other Field Measurements:

- GPS coordinates using Trimble GeoXT, SN 4413A40998
- Photographed location from 3 angles, ①, ② and ③

Observations:

grey clay w/ white streaks

Water depth = 1.3 feet

SAMPLE COLLECTION EQUIPMENT:

Hand Auger ☒
Core Sampler ☐
Spatula/Spoon ☒
Bowl (stainless) ☒
Split-spoon (2" or 3") ☐
OTHER:

Trowel ☐
Shelby Tube ☐
Dredge Sampler ☐
Kemmerer ☐
Extended Arm ☐
Bailer ☐
Backhoe ☐
Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or [✓ 10%])	☒	Stainless
Tap Water	☒	
Methanol	☒	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ Metals	YES [✓ NO]	cool 4°C	3 x 8oz	0815	D05645	0247M
☒ TOC/TCO	YES [✓ NO]	cool 4°C	1 x 8oz	0815	D05645	0247M
☒ Grain size	YES [✓ NO]	cool 4°C	1 x 16oz	0815	D05645	0247M
☐	YES NO					
☐	YES NO					
☐	YES NO					

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№ 120357

Signed: Kiran Sears

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan Mine	Project No.: 02186 0590 019H3	Date/Time: 11/11/04 1320	Sheet 1 of 1
Contractor Personnel: —		TRC Personnel: C. Foster, A. Stattel, T. Foley, K. Sears	

Sample No.: SD-410

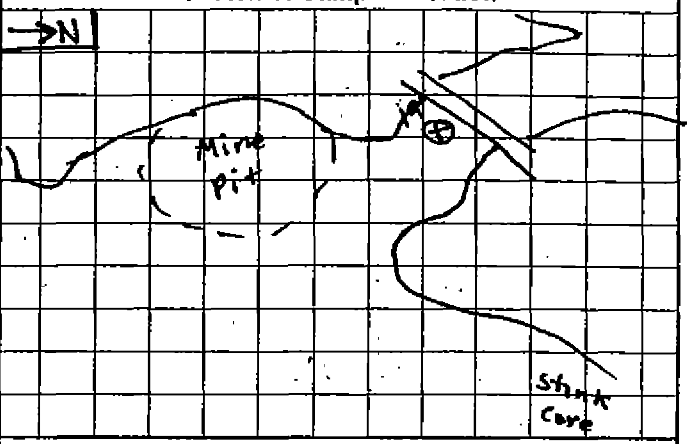
Depth/Interval Sampled: ~~0-4~~ ~~0-0.4~~ 0-4 inches

Sample Type: [✓ Grab,] Composite or Both (circle)

Media: (circle)

Surface Soil | [✓ Sediment]
Subsurface Soil | Surface Water
Other ______ | Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter:

Other Field Measurements:

- GPS coordinates taken using Trimble GeoXL SN4413A0998
- Photographs taken

Observations:

- (with grey) black fine silty sand, clams present.
- out of main channel of flow
- basal clay from 0.4' down
- very wet

- water depth = 0.8 ft

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☒	Trowel	☐
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☒	Dredge Sampler	☐
Bowl (stainless)	☒	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
OTHER:		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO$_3$ (1 or10%)	☒	10% to stainless
Tap Water	☒	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None		

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ Metals	YES [✓ NO]	cool 4°C	3x8oz	1600	D05647	0247M
☒ TOC/TCO	YES [✓ NO]	cool 4°C	1x8oz	1600	D05647	0247M
☒ Grain size	YES [✓ NO]	cool 4°C	1x16oz	1600	D05647	0247M
☐	YES NO					
☐	YES NO					
☐	YES NO					

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№ 120364

Signed: Kevin Sears

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan Mine

Project No.: 02136 0590 019113

Date/Time: 11/12/04 10:50

Sheet 1 **of** 1

Contractor Personnel: —

TRC Personnel: C. Foster, T. Foley, A. Stattel, K. Sears

Sample No.: SD-412

Depth/Interval Sampled: 0-6"

Sample Type: [✓ Grab] Composite or Both (circle)

Media: (circle)
Surface Soil | [✓ Sediment]
Subsurface Soil | Surface Water
Other ________ | Ground Water

Sketch of Sample Location

Field Screening Information:

Type of Meter:

Other Field Measurements:

- GPS coordinates taken using Trimble GeoXT S/N:
- Photographs taken

Depth of Water = 0.2 ft

Observations:

- white-grey ~~fan~~ tailings (powdered rock - artificial man-made clay+silt)
- traces of iron staining @ surface

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☒	Trowel	☐
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☒	Dredge Sampler	☐
Bowl (stainless)	☒	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
OTHER:		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% on Stainless
Tap Water	☒	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ Metals	YES [✓ NO]	cool 4°C	3x8oz	11:05	D05649	0247M
☒ TOC/TCO	YES [✓ NO]	cool 4°C	1x8oz	11:05	D05649	0247M
☒ Grainsize	YES [✓ NO]	cool 4°C	1x16oz	11:05	D05647	0247M
☐	YES NO					
☐	YES NO					
☐	YES NO					

AF-212

№ 120368

Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan Mine

Project No.: 02136 0590 09443

Date/Time: 6/11/04 0940

Sheet 1 **of** 1

Contractor Personnel: —

TRC Personnel: C. Foster, J. Foley, K. Sears, A. Statte

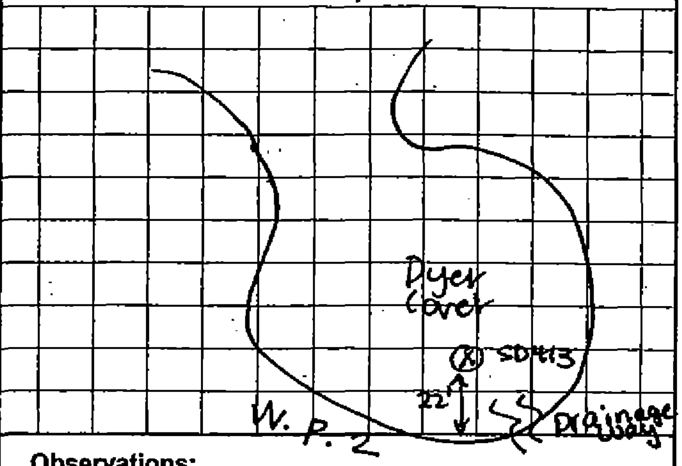
Sample No.: SD-413

Depth/Interval Sampled: 0-6"

Sample Type: [✓ Grab] Composite or Both (circle)

Media: (circle)
Surface Soil
Subsurface Soil
Other ________
[✓ Sediment]
Surface Water
Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter:

Other Field Measurements:

GPS coordinates from Trimble GeoXT SN4413A0998

Photographs

Observations:

- grey clay (w/ black streaks)
- mild petroleum odor
- water depth = 1.6 ft.
- sample taken below drainage way from Waste Rock Pile 2

SAMPLE COLLECTION EQUIPMENT:

Hand Auger ☒
Core Sampler ☐
Spatula/Spoon ☒
Bowl (stainless) ☒
Split-spoon (2" or 3") ☐
OTHER:

Trowel ☐
Shelby Tube ☐
Dredge Sampler ☐
Kemmerer ☐
Extended Arm ☐
Bailer ☐
Backhoe ☐
Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% on Stainless
Tap Water	☒	
Methanol	☒	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ Metals	YES [✓ NO]	cool 4°C	3×8oz	0950	D05650	0247M
☒ TOC/TCO	YES [✓ NO]	cool 4°C	1×8oz	0950	D05650	0247M
☒ Grain size	YES [✓ NO]	cool 4°C	1×16oz	0950	D05650	0247M
☐	YES NO					
☐	YES NO					
☐	YES NO					

AF-212

№ 120359

Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan Mine

Project No.: 02136 0590 017H3

Date/Time: 11/11/04 12:20

Sheet 1 **of** 1

Contractor Personnel: –

TRC Personnel: C. Foster, K. Sears, T. Foley, A. Stattel

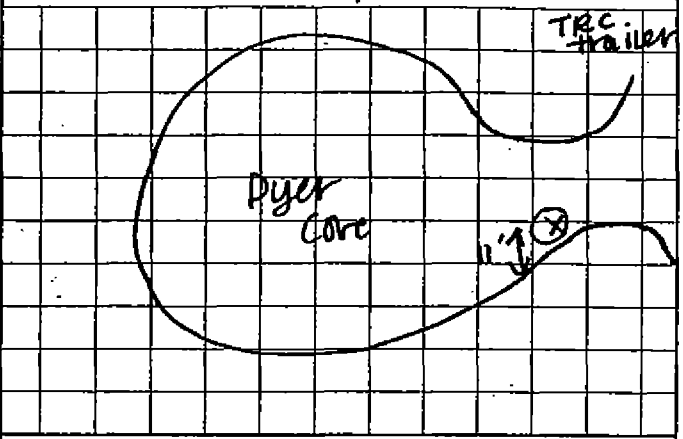
Sample No.: SD-415

Depth/Interval Sampled: 0-6"

Sample Type: [✓ Grab] Composite or Both
(circle)

Media: (circle)
Surface Soil
Subsurface Soil
Other ______
[✓ Sediment]
Surface Water
Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter:

Other Field Measurements:

GPS coordinates taken using Trimble GeoXT SN 4415A0998

Photographs taken

Water Depth 1.9 ft.

Observations:

- grey black silt and clay
- organisms (salt worms, clams) noted

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☒	Trowel	☐
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☒	Dredge Sampler	☐
Bowl (stainless)	☒	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
OTHER:		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% on stainless
Tap Water	☒	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☐ Metals	YES [✓ NO]	cool 4 C	3x 8oz	12:35	D05651	0247M ~~0244M~~
☐ TOC/TCO	YES [✓ NO]		1x 8oz	12:35	D05651	0247M
☐ Grain size	YES [✓ NO]		1x 16oz	12:35	D05651	0247M
☐	YES NO					
☐	YES NO					
☐	YES NO					

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№ 120361

Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan Mine
Project No.: 02136 0590 017H3
Date/Time: 11/11/04 1020
Sheet 1 **of** 1
Contractor Personnel: –
TRC Personnel: C. Foster, T. Foley, A. Stattel, K. Sears

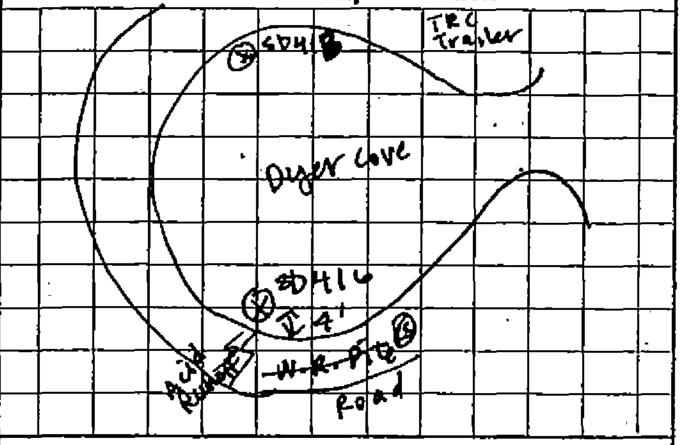
Sample No.: SD-416

Depth/Interval Sampled: 0-6"

Sample Type: [✓ Grab] Composite or Both (circle)

Media: (circle)
Surface Soil
Subsurface Soil
Other ______
[✓ Sediment]
Surface Water
Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter:

Other Field Measurements:
GPS coordinates taken using Trimble GeoXT SN 4413A0998
Photographs taken
Water Depth = 1.8 ft.

Observations:
grey silty clay, presence of clams noted, traces of black staining.

Sample taken directly below area of acid rock drainage.

SAMPLE COLLECTION EQUIPMENT:

- Hand Auger ☒
- Core Sampler ☐
- Spatula/Spoon ☒
- Bowl (stainless) ☒
- Split-spoon (2" or 3") ☐
- OTHER:
- Trowel ☐
- Shelby Tube ☐
- Dredge Sampler ☐
- Kemmerer ☐
- Extended Arm ☐
- Bailer ☐
- Backhoe ☐
- Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or 10%)	☒	10% on Stainless
Tap Water	☒	
Methanol	☒	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ Metals	YES [✓ NO]	cool 4C	3x 8oz	1030	D05652	0247M
☒ TOC/TCO	YES [✓ NO]	cool 4C	1x 8oz	1030	D05652	0247M
☒ Grain size	YES [✓ NO]	cool 4C	1x 16oz	1030	D05652	0247M
☐	YES NO					
☐	YES NO					
☐	YES NO					

AF-212 № 120360

Signed: Kiran Sears

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan Mine

Project No.: 02136 0690 01743

Date/Time: 11/11/04 0855

Sheet 1 **of** 1

Contractor Personnel: —

TRC Personnel: C. Foster, T. Foley, K. Sears, A. Stattel

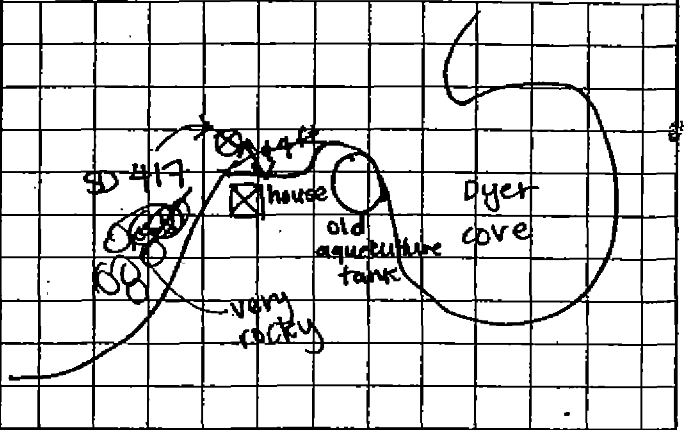
Sample No.: SD-417

Depth/Interval Sampled: 0-6"

Sample Type: [✓ Grab], Composite or Both (circle)

Media: (circle)
Surface Soil [✓ Sediment]
Subsurface Soil Surface Water
Other ________ Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter:

Other Field Measurements:
- GPS coordinates using Trimble GeoXT, SN4413A0998
- Photographed location

Water depth = 1.5 feet

Observations:
- grey black sediment
- clam shells
- sulferous odor

SAMPLE COLLECTION EQUIPMENT:

Hand Auger ☒
Core Sampler ☐
Spatula/Spoon ☒
Bowl (stainless) ☒
Split-spoon (2" or 3") ☐

OTHER:

Trowel ☐
Shelby Tube ☐
Dredge Sampler ☐
Kemmerer ☐
Extended Arm ☐
Bailer ☐
Backhoe ☐
Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% on stainless
Tap Water	☒	
Methanol	☒	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ Metals	YES [✓ NO]	cool 4°C	3 x8oz	0905	D05653	0247M
☒ TOC/TCO	YES [✓ NO]	cool 4°C	1 x8oz	0905	D05653	0247M
☒ Grain size	YES [✓ NO]	cool 4°C	1 x16oz	0905	D05653	0247M
☐	YES NO					
☐	YES NO					
☐	YES NO					

AF-212

№ 120358

Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan Mine

Project No.: 02136 0590 017H3

Date/Time: 11/12/04 0915

Sheet 1 **of** 1

Contractor Personnel: —

TRC Personnel: C.Foster, T. Foley, K.Sears, A.Stattel

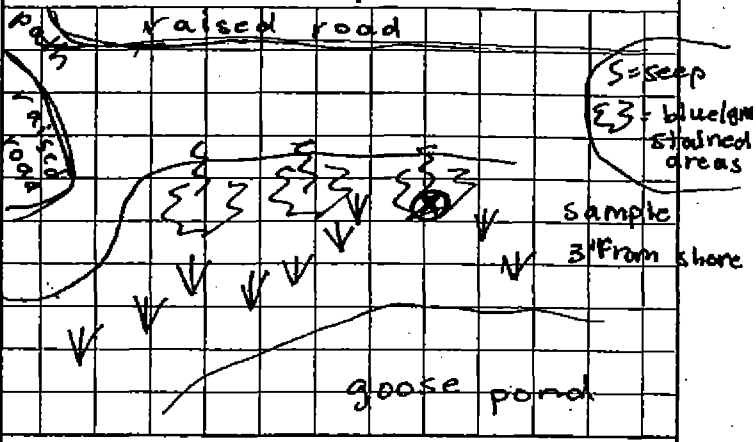
Sample No.: SD-422 Field duplicate SDE-422

Depth/Interval Sampled: 4-10"

Sample Type: [✓ Grab] Composite or Both (circle)

Media: (circle) Surface Soil, Subsurface Soil, Other ______, [✓ Sediment], Surface Water, Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter:

Other Field Measurements:

-GPS measurements taken using Trimble GeoXT
- pictures taken
- Water depth = 0.1 ft.

Observations:

-tan silt and fine sand, some blue/green staining
-root mat up to ~6".
-layer of lt. green slime in area of seep
-low tide

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☒	Trowel	☐
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☒	Dredge Sampler	☐
Bowl (stainless)	☒	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
OTHER:		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% on Stainless
Tap Water	☒	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	original / Field dup

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#	
☒ Metals	YES [✓ NO]	cool 4°C	6x8oz	0930	D05656/ D05660	0247M	FD
☒ TOC/TCO	YES [✓ NO]	cool 4°C	2x8oz	0930	D05656/ D05660	0247M	FD
☒ Grain size	YES [✓ NO]	cool 4°C	2x16oz	0930	D05656/ D05660	0247M	FD
☐	YES NO						
☐	YES NO						
☐	YES NO						

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Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan Mine

Project No.: 02136 0590 017H3

Date/Time: 11/11/04 1430

Sheet 1 **of** 1

Contractor Personnel: —

TRC Personnel: C. Foster, K. Sears, T. Foley, A. Stattel

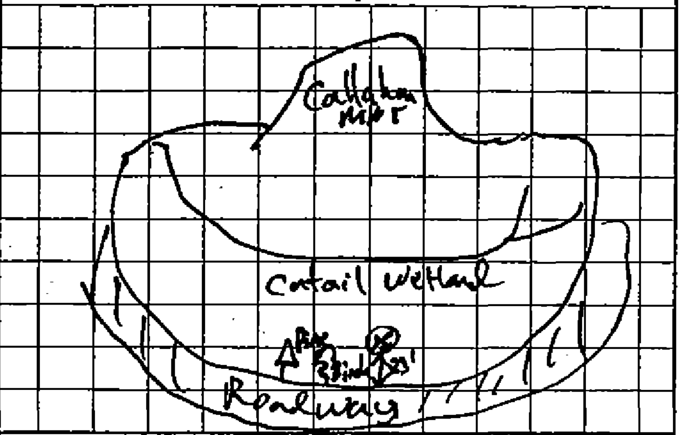
Sample No.: SD-423

Depth/Interval Sampled: 0-6"-12"

Sample Type: [✓ Grab] Composite or Both (circle)

Media: (circle) Surface Soil, Subsurface Soil, Other ______, [✓ Sediment], Surface Water, Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter:

Other Field Measurements:
- GPS coordinates using Trimble GeoXT, SN44132A0998
- Photographed locations

Observations:

0-6" extensive root mat, mossy, root cover

6-12" organic, root rich brown to grey silt and clay, organic, musty odor

Depth of water = 0.3 ft.

SAMPLE COLLECTION EQUIPMENT:

Hand Auger	☒	Trowel	☐
Core Sampler	☐	Shelby Tube	☐
Spatula/Spoon	☒	Dredge Sampler	☐
Bowl (stainless)	☒	Kemmerer	☐
Split-spoon (2" or 3")	☐	Extended Arm	☐
OTHER:		Bailer	☐
		Backhoe	☐
		Van Dorn Bottle	☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% on Stainless
Tap Water	☒	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ Metals	YES [✓ NO]	cool 4°c	6x8oz	1450	D05657	0247M
☒ TOC/TCO	YES [✓ NO]	cool 4°c	2x8oz	1450	D05657	0247M
☒ Grain Size	YES [✓ NO]	cool 4°c	1x16oz	1450	D05657	0247M
☐	YES NO					
☐	YES NO					
☐	YES NO					

AF-212

№ 120363

Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan mine
Project No.: 02136 0590 017H3
Date/Time: 11/11/04 14:20
Sheet 1 **of** 1

Contractor Personnel: —
TRC Personnel: A. Stattel, C. Foster

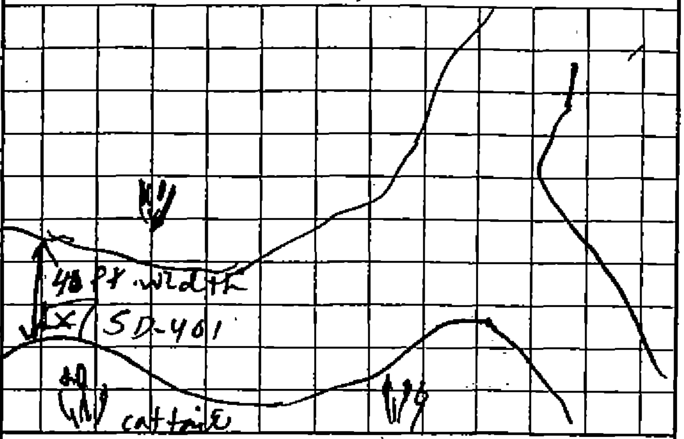
Sample No.: SD-401

Depth/Interval Sampled: 0-6"

Sample Type: [✓ Grab] Composite or Both (circle)

Media: (circle)
Surface Soil
Subsurface Soil
Other ________
[✓ Sediment]
Surface Water
Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter:

Other Field Measurements:
- GPS coordinates taken using Trimble GeoXT
- Photographs taken

Observations: Samplers observed sheets of Ice floating towards narrow tip of waterway. Dark Gray muck/clay; highorganics organics odor. Sample Collected In 0.3 ft. water; sample = 0to6 inches depth Sample collected 7ft from shore.

SAMPLE COLLECTION EQUIPMENT:

Hand Auger ☒
Core Sampler ☐
Spatula/Spoon ☒
Bowl (stainless) ☒
Split-spoon (2" or 3") ☐
OTHER:

Trowel ☐
Shelby Tube ☐
Dredge Sampler ☐
Kemmerer ☐
Extended Arm ☐
Bailer ☐
Backhoe ☐
Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% on Stainless
Tap Water	☒	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☐ Metals	YES [✓ NO]	cool 4°C	3x8oz	1420	D05638	0247M
☐ TOC/TCO	YES [✓ NO]	cool 4°C	1x8oz	1420	D05638	0247M
☐ Grain size	YES [✓ NO]	cool 4°C	1x16oz	1420	D05638	0247M
☐	YES NO					
☐	YES NO					
☐	YES NO					

AF-212
№ 120381

Signed:

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan Mine

Project No.: 02136 0590 017H3

Date/Time: 11/17/04 13:00

Sheet 1 **of** 1

Contractor Personnel: —

TRC Personnel: A. Stattel, C. Foster

Sample No.: SD-405

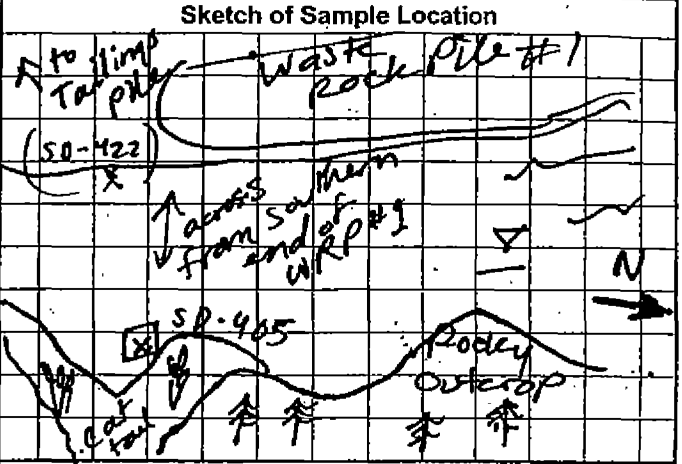
Depth/Interval Sampled: 0-6"

Sample Type: [✓ Grab] Composite or Both (circle)

Media: (circle)

Surface Soil
Subsurface Soil
Other ______
[✓ Sediment]
Surface Water
Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter:

Other Field Measurements:

- GPS measurements taken using trimble GeoXT
- Photographs taken.

Observations:

- grey organic muck, trace root matter. strong odor. trace white streaks. baby snails in sample
- shellfish remains on surface of SD.
- grass in the sediment, root layer
- Water depth = 0.5 ft
- High tide mark to sample = 12 ft

SAMPLE COLLECTION EQUIPMENT:

Hand Auger ☒
Core Sampler ☐
Spatula/Spoon ☒
Bowl (stainless) ☒
Split-spoon (2" or 3") ☐
OTHER:

Trowel ☐
Shelby Tube ☐
Dredge Sampler ☐
Kemmerer ☐
Extended Arm ☐
Bailer ☐
Backhoe ☐
Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	10% on Stainless
Tap Water	☒	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ Metals	YES [✓ NO]	cool 4°C	3x8oz	13:00	D05642	0247M
☒ TOC/TCO	YES [✓ NO]	cool 4°C	1x8oz	13:00	D05642	0247M
☒ Grain size	YES [✓ NO]	cool 4°C	1x16oz	13:00	D05642	0247M
☐	YES NO					
☐	YES NO					
☐	YES NO					

AF-212

№ 120379

Signed: Kirran Sears

Rev: 8 July 1991

TRC

Sample Log Sheet

Project: Callahan Mine
Project No.: 02136 0590 017H3
Date/Time: 11/17/04 1150
Sheet 1 of 1

Contractor Personnel: —
TRC Personnel: A. Stattel, C. Foster

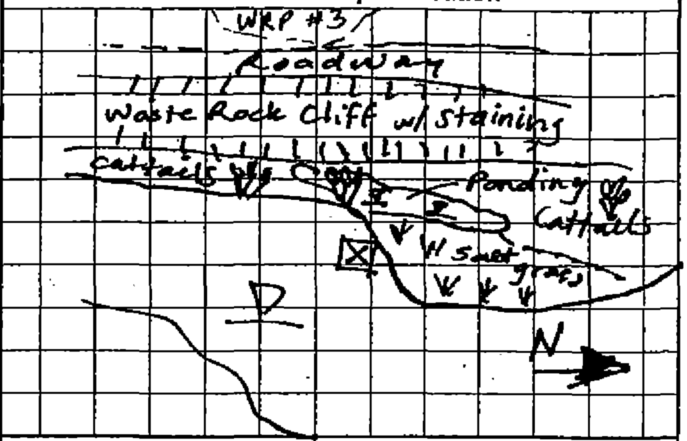
Sample No.: SD-406

Depth/Interval Sampled: 0-6"

Sample Type: [✓ Grab] Composite or Both
(circle)

Media: (circle)
Surface Soil
Subsurface Soil
Other ________
[✓ Sediment]
Surface Water
Ground Water

Sketch of Sample Location



Field Screening Information:

Type of Meter:

Other Field Measurements:

- GPS coordinates taken using Trimble GeoXT
- Photographs of location taken.

Observations:

- dark grey organic clay, strong sulfur odor.
- Depth of water = 0.7 ft.
- High tide mark to sample = 20 ft

SAMPLE COLLECTION EQUIPMENT:

Hand Auger ☒
Core Sampler ☐
Spatula/Spoon ☒
Bowl (stainless) ☒
Split-spoon (2" or 3") ☐
OTHER:

Trowel ☐
Shelby Tube ☐
Dredge Sampler ☐
Kemmerer ☐
Extended Arm ☐
Bailer ☐
Backhoe ☐
Van Dorn Bottle ☐

DECONTAMINATION PROCEDURE:

DECON. FLUID	USED	DESCRIPTION:
Tap water	☒	
Alconox	☒	
Tap water	☒	
HNO_3 (1 or10%)	☒	
Tap Water	☒	
Methanol	☐	
Hexane	☐	
Acetone	☐	
Air Dry	☒	
DI Water	☒	
Air Dry	☒	
None	☐	

ANALYTICAL PARAMETERS	Filtered (circle)	Preservation Method	Volume Required	Time of Collection	CLP Sample	CLP Case#
☒ Metals	YES [✓ NO]	cool 4°C	3x8oz	12:00	D05643	0247M
☒ TOC/TCO	YES [✓ NO]	cool 4°C	1x8oz	12:00	D05643	0247M
☒ Grain size	YES [✓ NO]	cool 4°C	1x16oz	12:00	D05643	0247M
☐	YES NO					
☐	YES NO					
☐	YES NO					

AF-212 № 120374

Signed:

Rev: 8 July 1991

Appendix B

Geophysical Reports

Hager GeoScience Inc.

596 Main Street Woburn, MA 01801

Tel 781-935-8111 Fax 781-935-2717

March 14th, 2005
File 200485

TRC, Inc.
Attention: Mr. Dale Weiss
100 Foot of John Street
Boott Mills South
Lowell, MA 01852

Re: Final Report of Geophysical Investigation
Callahan Mines Superfund Site
Brooksville, Maine

Dear Mr. Weiss:

Enclosed is one (1) complete copy of the final report for the above-referenced site, including all changes/additions you requested. We have also included a CD containing pdfs of all HGI plates, GPR profiles, and the report text.

We have also sent a copy to Michael DeChiara of Metcalf & Eddy.

Please contact us at 781.935.8111 if you have any questions or need additional information.

Respectfully yours,
HAGER GEOSCIENCE, INC.

Jutta L. Hager, Ph.D.
President

Cc: Michael DeChiara

GEOPHYSICAL INVESTIGATION
CALLAHAN MINES SUPERFUND SITE
BROOKSVILLE, MAINE

Prepared for:

Metcalf & Eddy, Inc.
701 Edgewater Drive
Wakefield, MA 01880

Prepared by:

Hager GeoScience, Inc.
596 Main Street
Woburn, Massachusetts 01801

File 200485
March 2005

Hager GeoScience, Inc.

EXECUTIVE SUMMARY

Hager GeoScience, Inc. (HGI) was contracted by Metcalf & Eddy, Inc. (M&E) to perform a geophysical investigation at the Callahan Mines Superfund Site in Brooksville, Maine. The objective of the investigation was to: 1) obtain bedrock depth points at specified locations within the Tailings Pond and Waste-Rock Piles; 2) obtain bathymetric contours for Goose Pond and Goose Cove; 3) determine the character of the Goose Cove seafloor; and 4) provide support for Goose Cove sediment sampling by M&E. Site investigations were coordinated through an on-site representative of TRC, Inc. (TRC).

HGI performed the land geophysical portion of the investigation and retained the services of Hydroterra Environmental Services LLC (Hydroterra) to perform the marine portion of the work. Hydroterra's results are appended to this report as a stand-alone document.

Sub-surface bedrock information was obtained using a combination of seismic refraction/reflection and GPR investigative techniques. Approximately 1,650 lineal feet of seismic and 4,420 lineal feet of GPR data were collected (Plate 1), resulting in 1,538 bedrock depth points (851 seismic and 687 GPR).

Separate bedrock models were constructed for the tailings pond and waste rock pile areas from a combined but segregated database of seismic and GPR data (Plates 3a and 3b). The models articulate an east-dipping bedrock surface in the tailings pond area and a north-dipping bedrock ridge around the waste rock pile areas. The bedrock topography conforms to the pre-mining topography in most of the investigated areas. Seismic data suggest the presence of fracture zones in the tailings pond area. It can be also inferred from the bedrock and surface topography that fractured bedrock persists throughout the site.

1.0 INTRODUCTION AND APPROACH

Hager GeoScience, Inc. (HGI) was contracted by Metcalf & Eddy, Inc. (M&E) to perform a geophysical investigation at the Callahan Mines Superfund Site in Brooksville, Maine. The objective of the investigation was to: 1) obtain bedrock depth points at specified locations within the Tailings Pond and Waste-Rock Piles; 2) obtain bathymetric contours for Goose Pond and Goose Cove; 3) determine the character of the Goose Cove seafloor; and 4) provide support for Goose Cove sediment sampling by M&E. Site investigations were coordinated through an on-site representative of TRC, Inc. (TRC).

HGI performed the land geophysical work from November 29th through December 4th, 2004. Hydroterra Environmental Services LLC (Hydroterra) performed the marine portion of the work in early December. Hydroterra's results are appended to this report as a stand-alone document.

Locations for the geophysical investigations were specified in the RFP and revised subsequent to a site visit and RFP Addenda. Initially designated as seismic refraction surveys, the exploration program was modified by HGI (with the consent from TRC) to include a combination of seismic refraction, seismic reflection, and ground penetrating radar (GPR) investigative methods. The modifications were necessary to compensate for general geological and logistical constraints to the seismic refraction method, including poor geophone and seismic source coupling, shallow bedrock, and shot offset restrictions at the tailings pond area.

After consideration of low-frequency radar, multi-channel active surface wave (MASW), and seismic reflection methods, seismic reflection was chosen as the preferred method within the tailings pond area. HGI concluded that, in the absence of calibration data, the seismic reflection technique would provide the required horizontal and vertical resolution of a dipping bedrock surface beneath overburden with variable seismic velocity values. The seismic refraction method was used at the base of the tailings pond next to Goose Pond. With the exception of a thin crushed rock surface layer, this location was as close to a natural setting as was encountered at the site.

All of the survey locations in the waste rock pile areas were situated on varying thickness of a crushed rock layer containing a variable poorly sorted dry matrix ranging from rock fragments to rock powder. This layer has very low seismic transmissivity and results in poor source-energy and geophone coupling. Seismic refraction surveys incorporating land streamers or sandbags over "spikeless" geophones could be performed over relatively short spread lengths; however, the results of such surveys using longer multi-channel linear arrays result in weak signals and low confidence solutions.

For the above reasons, and because of shallow bedrock along most of Waste Rock Pile (WRP) #3, HGI chose to substitute GPR for the seismic refraction method within these areas. Prior to the investigations, the conventional wisdom regarding the waste rock piles was that they were too thick to be investigated from the top by refraction methods; particularly at Waste Rock Pile (WRP) #1. However, the alleged thick pile of dry crushed rock would be a suitable environment for low-frequency radar investigations. HGI therefore deployed 100-MHz and multiple low-frequency (15- to 80-MHz) antenna systems. For reasons discussed later in the report, higher frequency antennas would be optimal for most survey locations at this site. Short seismic refraction surveys were performed along most GPR traverses to provide depth information to constrain the GPR depth conversion factors.

Surveyors were contracted by M&E to provide survey control for the geophysical investigations. Wood stakes were used to mark GPR and seismic survey locations where possible. This method worked at the tailings pond area where soil conditions were favorable; however, penetration of wood stakes in the waste rock pile areas was minimal. Paint marks were used to supplement stakes as markers in these areas. Between the time of the HGI survey and the GPS survey measurements, inclement weather conditions and/or other influences washed away or covered the paint marks and some wood stakes for survey locations at GPR lines WRP-1 (waste rock pile) and WRP-3. GPS measurements were not obtained for GPR line markers atop Callahan Mountain (WRP #1) and seismic line TP-3, at the base of the tailings pond. Coordinates and elevations for the missing GPS measurements were extrapolated from nearby measurements or estimated from a USGS topographic map. The extrapolations and estimates at the missing locations are adequate, with the exception of those for Callahan Mountain where a small lateral variation in location can result in a large surface elevation variation, and, consequently, a large variation in calculated bedrock elevation.

2.0 DATA ACQUISITION

HGI personnel performed the survey from November 29th through December 4th, 2004. Geophysical data were acquired along four seismic refraction lines, two seismic reflection lines, and twelve GPR lines. Plate 1 shows the locations of the geophysical investigations. Approximately 1,650 lineal feet of seismic and 4,420 lineal feet of GPR data were collected (Plate 1).

2.1 Seismic Refraction Survey

The seismic refraction survey was performed using a Geometrics Geode® 48-channel exploration seismograph at the locations shown on Plate 1. To acquire refraction data, HGI used 14-Hz Mark Products and 4.5-Hz OYO geophones deployed along linear 48- and 24- channel geophone arrays. The geophone arrays were attached to our Geometrics

Geode® exploration seismograph units via seismic cables that relay the motion-induced electrical signals from individual sensors to the seismograph. The electrical signals are converted to digital signals in the seismograph unit and recorded on a computer as SEG-2 Rev 1, 32-bit integer data via Ethernet cable. Our acquisition software provides a number of Windows-based browsers that permitted the on-site display and evaluation of data quality.

Seismic lines WRP-1 (W-E line), WRP-2 (N-S line), and WRP-3 (N-S line) each consisted of 24 geophones spaced 5 feet apart on a land streamer cable system. For reasons mentioned above, these surveys were conducted to obtain bedrock depth information for constraining the GPR depth conversion. These lines were located along existing access roads constructed along the edges of the waste rock piles consisting of crushed dry rock. A 90-pound propelled energy generator (PEG) was used as the seismic energy source. Five shot point locations were used for each survey; two off-end shots, two end shots, and one mid shot.

Seismic Line TP-3 (N-S line) consisted of one 48-geophone spread with geophones spaced 10 to 20 feet apart. This line was located at the east side of the tailings pond at the base of the rock berm next to Goose Pond. The road leading to this area had been destroyed by erosion, and the survey location had to be accessed via a 70+-foot descent along a treacherous washout at the north end of the rock berm. Due to the limited access and because all equipment had to be hand carried by this route, a seisgun was used as the sole energy source. HGI had seven shot point locations for the TP-3 survey; two off-end shots, two end shots, two quarter shots, and one mid shot.

The quality of the seismic signals was verified in the field at each shot location. For records exhibiting low signal-to-noise ratio, additional shots were used to additively stack the coherent parts of the signal, which helps mitigate the detrimental effects of random environmental noise. Shot locations were also mirrored to enable examination of the reciprocity of refractor travel-times.

2.2 Seismic Reflection Survey

Reflection data were collected along two lines (TP-1 & TP-2, Plate 1). Seismic reflection was chosen as the preferred method for imaging the tailings pond area. HGI concluded that, in the absence of calibration data, the seismic reflection technique would provide the required horizontal and vertical resolution of a dipping bedrock surface beneath overburden with variable seismic velocity values.

The seismic reflection survey was also performed using the Geometrics Geode® 48-channel exploration seismograph described in section 2.1. To acquire reflection data, HGI used 100-Hz Mark Products geophones (~70% damping) deployed along a linear 48-

channel geophone array. A roll-along procedure using 24 active geophones was used to achieve 12-fold coverage using the CDP method. This level of fold coverage is usually necessary for land surveys to achieve a stacked record of high quality.

TP-2 was the first line to be acquired. A number of walk-a-way test shots were taken for the TP-2 survey at offsets of 50, 55, 60, and 70 feet. A review of the test data led to the selection of 55 feet as a suitable source-geophone offset. Other acquisition parameters for TP-2 include a record length of 300 ms and a sample rate of .125 ms.

Following the TP-2 survey, acquisition parameters were adjusted for the TP-1 survey. A 50-foot shot offset was used for TP-1. The record length was increased to 750 ms and the sample rate lowered to 0.5 ms, which allowed for signals of up to 1000 Hz to be accurately represented.

As a function of line length, TP-1 consisted of 200 shots and TP-2 consisted of 78 shots.

2.3 GPR Survey

Ground penetrating radar data were collected using a Geophysical Survey Systems, Inc. (GSSI) SIR System 3000 digital ground penetrating radar system. The GPR data were displayed on a color monitor for immediate visual inspection and quality control and simultaneously recorded on the system's flash memory for later processing and interpretation.

The goal of the GPR investigation was to add additional bedrock depth points in parts of the study area originally designated for seismic surveys, but where waste rock debris limited geophone coupling, logistical issues/obstructions prevented the use of appropriate seismic line lengths, and bedrock was too shallow.

GPR surveys were conducted using 100-MHz and multiple-low-frequency (MLF) antennas. The MLF antenna system was operated at 20-, 35- and 40-MHz. The GPR lines and their corresponding collection frequency are listed below:

- CM-1-1&2 – 20-MHz
- WRP-1-ext – 100-MHz
- WRP-2-1&2 – 100-MHz
- WRP-3-1 – 40- & 100-MHz
- WRP-3-2 – 35- & 100-MHz

Low-frequency antennas were initially used where bedrock was reported to be deep. However, in most areas, the bedrock appeared to be much shallower than anticipated. Consequently, lines were re-run using the 100-MHz antenna system. The exception was

CM-1 on top of Callahan Mountain (WRP #1) where the MLF survey was completed at sunset on the last field day. A higher frequency antenna, probably 200 MHz, could have been used for more optimum results. However, based on information available prior to the investigations, lower frequency antenna systems were deployed to the site.

The geophysical techniques and their limitations are discussed in Section 6.

3.0 DATA REDUCTION AND ANALYSIS

Following the field data collection, the geophysical data were downloaded to a PC at the HGI office. The data were archived, processed, and analyzed using the following proprietary software:

- GPR: GSSI's RADAN for Windows NT® with Structural and Stratigraphic Interactive Interpretation Module®
- Seismic Refraction: SIPT2 iterative ray tracing
- Seismic Reflection: Linear Radon Transform
- Grid Modeling: Surfer® 8.0
- Graphic Presentations: Surfer® 8.0; AutoCAD® 2000

The map plates and profiles in the Appendices were created from processing of the multidisciplinary data sets and an integrated database consisting of GPR and seismic data. These appendices contain six map plates, four GPR profiles, and four seismic profiles.

Considerable effort was made to accurately locate data points in the Maine state planar coordinate system. M&E provided GPS coordinates and elevation for selective points along HGI's geophysical survey lines. Using the measured GPS points, HGI calculated the X and Y coordinate values and interpolated elevations for each of the 1,538 interpreted bedrock depth points (851 seismic and 687 GPR).

Re-sampling (x4) followed by moving average (x3) calculations were made to reasonably show the spatial distribution of representative depth and elevation points from the integrated geophysical database used for this study (Plates 2a and 2b). All data were used for analyzing bedrock surface trends.

3.1 Seismic Refraction Survey

Refraction data reduction and analysis initiated with the determination of arrival times of the direct (where applicable) and refracted waves for each shot-receiver pair. These arrivals were identified and 'picked' on a trace-by-trace basis by examining individual seismograms for the break in phase leading the first coherent seismic wavelet arrival.

Coherent arrivals were enhanced through the use of frequency filters that remove both coherent (e.g. electrical) and non-coherent (e.g. wind) noise from individual records.

Direct and refracted wave travel-times expressed as a function of source and receiver locations and elevations were used to generate the earth model most consistent with all observations. HGI analyzes seismic refraction data using Rimrock Geophysics' SIPWin®, a Windows-based version of SIPT2. In the SIPWin® program, picked arrival times are subdivided into individual refractor layers on the basis of refractor geometry. This is accomplished by examining the slope of the line connecting refractor arrival times plotted as a function of distance. Since the slope of the line depends on a layer's seismic velocity, slope changes may be used to discriminate between layers of differing velocity. The SIPWin® program combines this layer information with the principles of travel-time reciprocity to constrain average layer velocities and interface depths (e.g. weathered and non-weathered bedrock surfaces) beneath source and receiver locations.

Modeled results were correlated with available known constraints; i.e. average velocities of the expected media types, and the correlation of model structure with other geophysical data.

Overburden velocities measured along seismic refraction lines WRP-1, WRP-2, and WRP-3 are 2713 ft/s, 4200 ft/s, and 1972 ft/s, respectively. A velocity of approximately 4300 ft/s in natural saturated soil was measured along seismic refraction line TP-3. Poorly consolidated, crushed, porous, back-filled mine tailings tend to have low seismic velocities; however, water-saturated pore space should increase seismic velocities in these materials to sub-water wave speeds, perhaps between 3500ft/s and 4500 ft/s.

The low overburden velocities measured at WRP-1 and WRP-3 are consistent with those of poorly sorted dry crushed rock. These lines are located on ramps constructed of crushed rock and are adjacent to bedrock outcrops. Higher overburden velocities measured at WRP-2 and TP-3 indicate the presence of dense or saturated subsurface natural soils overlying bedrock. Seismic line WRP-2 (located in a pre-mining topographic low or stream drainage and situated on a thin layer of crushed-rock fill) is underlain by saturated natural valley fill. TP-3 (located adjacent to Goose Pond) is also situated over area underlain by saturated natural sediment.

3.2 Seismic Reflection Survey

The TP-1 and TP-2 data were converted to the SEPlib format to enable use of linear Radon Transform. After application of a refraction mute to eliminate the first arrivals, a Band pass filter with corners at 40 and 250 Hz was applied to the data to increase the relative strength of the prime observed reflector. Subsequently,

1) A linear Radon Transform was applied to better isolate the remaining linear ground roll and airwave energy form the hyperbolic-shaped reflector. A mute was then applied in this new domain to remove the separated ground-roll and airwave noise. Noise suppression techniques included a simple x – t domain mute.
2) Noise-suppressed data were sorted to common midpoint with a peak 12-fold coverage.
3) A velocity analysis of the binned DCMP data was undertaken using the standard semblance plot technique. Optimal stacking of the dominant reflector occurred within a range of velocity values from 4200ft/s to 5000 ft/s.
4) A normal moveout (NMO) correction was applied to the data using a stacking velocity $V_{stack} = 4800$ ft/s.
5) The NMO corrected data were stacked to enhance the signal-to-noise ratio of the reflector.
6) The stacked section was converted from time to depth using a uniform velocity of $V_{int}= \sim 3500$ ft/s. The analysis of refractions was used to constrain subsurface velocities.

The seismic reflection data volume contained only one prominent reflector, which had arrival times and offset moveout consistent with a reflection from the top of bedrock. In many places, however, the reflector had non-hyperbolic moveout. Importantly, no reflector was observed earlier than this arrival to help constrain the interval velocity profile above bedrock. A standard velocity semblance analysis was then applied to the noise-suppressed data. This analysis searched through a 3-D parameter space (velocity, midpoint, zero-offset travel time) to find the parameters that optimize stack power.

The results of this analysis were not entirely conclusive, because a range of values (4200 ft/s - 5000 ft/s) generated very similar stack power profiles. The best-fit results varied slightly with midpoint location (i.e., +/-200 ft/s); however, this can be attributed to the fact that non-hyperbolic reflector moveout violates the NMO approximation. Owing to these complications, we applied the NMO correction with a NMO velocity of V_NMO=4800 ft/s, the velocity value that led to the best overall stack.

Robustly estimating depth-varying velocity profiles requires numerous reflectors that provide velocity constraints at different depth locations. Velocity estimation can be done with only 1 reflector; however, this seldom provides sufficient information to resolve any high- or low-velocity lenses or gradients that affect arrival times. Hence, although a NMO velocity of 4800 ft/s yielded the best stack power, considerable variation in the velocity profile could exist (i.e. the 4200 ft/s - 5000 ft/s described above).

Additional constraints on the seismic velocity were also available from the nearby seismic refraction survey, and from material property and saturation information. As stated in Section 3.1, velocities obtained from seismic refraction line TP-3 indicated a natural saturated soil velocity of approximately 4300 ft/s. Overburden velocities measured along refraction lines WRP-1, WRP-2, and WRP-3 are 2713 ft/s, 4200 ft/s, and 1972 ft/s, respectively. Poorly consolidated, crushed, porous, back-filled mine tailings tend to have low seismic velocities; however, water-saturated pore-space should increase seismic velocities to sub-water wave speeds (perhaps between 3500ft/s and 4500 ft/s). Hence, we included this information in the analysis and decided to use the slower estimates from the better-constrained seismic refraction results.

We have mapped the NMO+stack profile to depth using a constant interval velocity V_{int} of 3800 ft/s. This is not really migration per se, because no summation was carried out over diffraction surfaces (e.g. Kirchhoff migration). The time-domain stack section can be obtained by rescaling the depth axis by factor 2/V_int.

Deconvolution was not performed on the data. The seismic data were acquired in wet sandy soil, leading to fairly constant, well-shaped wavelets. Hence, there was little need for wavelet regularization across the shot and receiver axes through deconvolution. Deconvolution could have been included to attempt to balance the wave field spectra and localize the reflector in depth. However, in this case, velocity uncertainty is far greater than depth picking error, making deconvolution a less important processing step.

No F-K (dip) filtering was applied in the processing flow. A tau-p mapping/inversion approach was used to attenuate ground roll and airwave noise. This is a more localized transform (unlike the F-K, which is global) that attenuates noise more effectively in a smaller region. This step is vital to ensure that ground roll and airwave noise are not interpreted as structure.

The stacked sections for TP-1 and TP-2 are shown in Appendix B. The main structural feature is the east-dipping layer with topographic relief of approximately 60 and 64 feet for TP-1 and TP-2, respectively. Based on the cross-sectional models, this reflector is interpreted to be the top of bedrock. Pursuant to the above discussion regarding the possible range of interval velocity, the position of the bedrock reflector as shown in Appendix B is considered to be conservative. The bedrock position could be lowered by 12% if a stacking and interval velocity of 4000 ft/s is used.

A significant amplitude and phase anomaly is present on the interpreted bedrock sections. The discontinuous reflections in these regions are consistent with the interpretation of a localized fracture system or faulting with a minor amount of block offset (shown in red annotations in TP-1a and TP-2a). Raw data records indicate that the causes of the disruption are moderately east-dipping features.

Additional discontinuous layers appear to be present below the interpreted bedrock reflector. These features are probably internal bedrock features related to fractures or rock fabric.

3.3 Ground Penetrating Radar Survey

Bedrock stratigraphy along GPR traverses was determined using GPR reflections that arose due to the back-scattering of the input GPR wave from discontinuous stratigraphic interfaces. Band-pass and/or spatial FFT filters, horizontal smoothing, background removal, gain adjustments, and wavelet deconvolution were performed as essential processing steps. Two-way travel times to the tops of GPR reflectors were then picked and entered into an ASCII file according to file number and traverse offset. All generated ASCII files were then incorporated into a collective database.

Site- and unit-specific GPR propagation velocities were estimated using migration techniques, estimates based on experience, and seismic refraction data. GPR travel-time data were then mapped into the depth domain using these velocity estimates. Penetration depths for both the 100-MHz and MLF systems were more than adequate for the target depths of investigation. For reasons discussed earlier in the report (Sections 1.0 and 2.3), in many areas, the bedrock depth was too shallow to resolve with the antenna systems used at the site. The bedrock horizon in these areas was interpreted using experience and some degree of subjective analysis. This method of interpretation will usually result in slightly deeper bedrock "picks"; however, it will not adversely affect the overall bedrock surface trend analysis. Data resolution in records from both the 40-MHz MLF and 100-MHz antenna systems at the site was suitable for identifying the bedrock horizon where it occurred below the pulse width of the antenna.

4.0 DATA SYNTHESIS

Approximately 1,650 lineal feet of seismic and 4.420 lineal feet of GPR data were collected (Plate 1), resulting in 1,538 bedrock depth points (851 seismic and 687 GPR). These data were used to construct a best-fit 2-D grid model using Surfer® for Windows' kriging algorithm for the top of bedrock. Kriging algorithms incorporating anisotropy parameters were used to create the grids. Areas where data were not acquired or were insufficient to analyze surface trends have been accordingly blanked in the grid model. A final bedrock contour map was then produced with Surfer® for Windows (Plates 3 and 3a). A matrix smoothing function was also applied to the grids to emphasize the surface trends. ***The bedrock model has been developed to emphasize the bedrock surface trends and is best used as a semi-quantitative indication of bedrock depth.***

Seismic and GPR profiles are contained in Appendix B and C, respectively. The bedrock horizons in the seismic models are inversion models constructed from the seismic raw data and articulate the bedrock surface along the seismic lines. Similarly, the GPR profiles show the detailed bedrock profile along the GPR lines. Although based on these data, the bedrock-surface contour model described above was constructed using kriging trend analysis and filtered using a moving average matrix filter to enhance the bedrock surface trends. Consequently, the bedrock elevations in the bedrock surface model along the GPR and seismic lines will vary somewhat from those shown on both the seismic and GPR profiles.

Separate bedrock models were constructed for the tailings pond and waste rock pile areas from a combined but segregated database of seismic and GPR data (Plates 3a and 3b). Large data gaps between the tailings pond and waste rock piles and the Goose Pond inlet north of WRP #1 prevent the valid interpolation of bedrock surface trends in these areas. Incorporating the elevation of bedrock outcrops in the area and performing additional land and marine geophysical surveys atop Callahan Mountain and in the Goose Pond inlet could achieve a contiguous bedrock surface trend across these areas.

5.0 SUMMARY

The bedrock models articulate an east dipping bedrock surface in the tailings pond area and a north dipping bedrock ridge in the waste rock pile areas. The bedrock topography conforms to the pre-mining topography in most of the investigated areas. At a minimum, the bedrock model developed for this study provides an accurate tool for assessing the possible migration pathways of DNAPL or other types of contaminants; however, incorporating additional bedrock structural details would provide a more complete model for analyzing bedrock-influenced groundwater movement.

Seismic data suggest the presence of fracture zones in the tailings pond area. It can also be inferred from the bedrock and surface topography that fractured bedrock persists throughout the site. If not already available, we recommend conducting a fracture trace study and integrating the results with the geophysical study. Other possible categories of useful information include borehole data, old mine plans, etc.

Based on our analysis of the data, we used USGS topographic maps to look at the pre- and post- mining topography. This review showed little differences in the topography in most of the areas of geophysical investigation...including Callahan Mountain (WRP #1). Plate 4 (Appendix A) overlays topographic maps that pre- and post-date the major mining events at the site. The overlay clearly shows areas of positive and negative topographic changes. A more accurate determination of these changes can be achieved by comparing current digital terrain models with pre-mining topographic data.

6.0 THE GEOPHYSICAL TECHNIQUES

6.1 Seismic Refraction

6.1.1. Description of the Method.

We collect seismic data using our Geometrics Geode® exploration seismograph system with 24- or 48-channel geophone arrays. Geophone spacing depends on the depth of investigation, but is between 5 to 20 feet. Shot points are located at a minimum off the ends of each spread, at the end geophones, and in the middle of the spread

6.1.2. Data Analysis and Interpretation.

The seismic data are analyzed using the SIPT2 iterative ray tracing technique. Data are input into the computer and a first-approximation model is created. The computer then compares the modeled arrival times along each ray trace from shot to geophone with the "picked" field arrival times and subsequently adjusts the model. After a number of iterations of this process, a reasonable fit between modeled and actual data is produced (i.e. the travel times along ray paths of modeled and calculated data are similar) which leads to the determination of layer depth beneath each geophone and shot point. The accuracy of the SIPT2 iterative method is contingent on a reasonable first-guess horizontally layered model.

6.1.3. Limitations of the Method.

Analysis of seismic refraction data requires an assumption of a model composed of a number of layers, such as bedrock overlain by overburden, or bedrock overlain by till and overburden. Other limiting assumptions are i) seismic refraction layers are continuous and extend from one end of the refraction line to the other; and ii) layer velocities increase with depth.

Seismic refraction requires a sufficiently strong source so that seismic energy is transmitted to refracting interfaces and returned to the surface to be recorded by each geophone in a seismic spread. When bedrock is deep and/or overburden velocities are low, explosives or seisgun sources may be required to produce sufficient seismic energy to reach most or all of the geophones in a spread. It is becoming increasingly difficult to use intrusive seismic sources, particularly explosives, at many sites.

Seismic refraction can only distinguish between materials if their seismic velocities are sufficiently different. Thus it may not be possible to distinguish between weathered bedrock and till, particularly if the bedrock is shale.

Electric lines with 60-cycle current (and/or greater harmonics) may create interference with seismic data collection along lines adjacent to or beneath them.

6.2 Seismic Reflection

6.2.1 The Method

We collect seismic data using our Geometrics Geode© exploration seismograph system that is capable of recording 48-channel geophone arrays. Geophone spacing generally depends on the depth of investigation, but is usually between 2.5 to 10 feet. Shot points are located a minimum of 50 feet off the end of an array to help reduce the debilitating effects of airwave and ground roll noise. Seismic energy is generated by either hammer blows on a steel plate or by a Betsy seisgun that uses industrial blanks to create an airwave when impacted with a hammer. For the latter source, the nozzle of the seisgun is buried 1.5 to 2 feet below the surface to enhance the amplitude of the signal entering the ground. The quality of the seismic signal for each shot point is verified in the field. The seismograph records all seismic data to an internal hard drive and floppy diskette, and transferred to a desktop computer.

A typical field recording configuration is the common source gather, which involves 24 active geophones and a single source location at a fixed offset from the recording channels. With HGI's 48-channel recording capability, this configuration can be maintained throughout a seismic line by "rolling" the geometrical configuration along the ground surface at 5 feet intervals. In doing so, a number of reflections from different source-receiver geometries are recorded that correspond to the same subsurface reflection point. These can be subsequently stacked to improve the quality of recorded signals.

6.2.2 Data Analysis and Interpretation

A substantial amount of processing is needed before it is possible to make any geologic interpretation of recorded seismic data. A typical processing sequence includes, but is not restricted to, the following: i) initial frequency filtering; ii) pre-stack F/K filtering; iii) trace edit; iv) first arrival mute; v) common offset to CDP sort; vi) application of datum statistics; vii) normal moveout correction; viii) surface consistent residual statistics; ix) CDP stack; x) deconvolution; xi) post-stack F/K filtering; xii) migration; xiii) frequency filtering; and xiv) trace scaling/normalization. HGI utilizes the Kansas Geological Survey WinSeis®-15 Turbo software package to analyze seismic reflection data.

Geologic interpretation is carried out on the CDP stacked data and generally involves identifying continuous reflectors. After reflector horizons have been delineated and stratigraphically assessed, a "time-to-depth" conversion can be applied using velocity information obtained from neighboring borehole data or from typical velocity estimates from compiled tables.

6.2.3 Limitations

Analysis and interpretation of shallow seismic reflection data is inherently limited by a number of factors:

The ability to resolve thin layers is dependent on the dominant frequency of the interrogating energy source. A general "rule of thumb" is that a layer must be thicker than ¼ of the dominant wavelength to produce a noticeable reflection.

The ability to isolate an individual reflector is dependent on the ability to separate it from the wavelets of earlier arrivals.

The magnitude of the reflection from any discontinuous interface is directly related to the impedance contrast across it (where impedance is defined as the product of density and velocity). Thus, situations frequently occur where additional strata exist but have an associated impedance contrast too small to be discerned.

Seismic energy sources must be strong enough for adequate penetration of seismic energy to the target of interest.

The robustness of any "time-to-depth" conversion is directly correlated with the validity of the velocity profile used. For near-surface seismic reflection investigations, this problem is greatly exacerbated by the possibility of strong lateral variations in the velocity profile.

6.3 Ground Penetrating Radar

6.3.1 Description of the Method

The principle of ground penetrating radar (GPR) is the same as that used by police radar, except that GPR transmits electromagnetic energy into the ground. The energy is reflected back to the surface from interfaces between materials with contrasting electrical (dielectric and conductivity) and physical properties. The greater the contrast between two materials in the subsurface, the stronger the reflection observed on the GPR record. The depth of GPR signal penetration depends on the properties of the subsurface materials and the frequency of the antenna used to collect radar data. The lower the antenna frequency, the greater the signal penetration, but the lower the signal resolution.

GPR data are collected using a Geophysical Survey Systems (GSSI) SIR 2000/3000 ground penetrating radar system. GPR data are digitally recorded on the internal hard drive, or flash-memory of the system. System controls allow the GPR operator to filter out noise, attributed to both coupling noise, caused by conductive soil conditions, spurious noise caused by local EMF fields and internal system noise. For shallow surveys, we use 400-, 200-, 100-, 900- or 1500-megahertz (MHz) antennas. For deeper penetration, we use lower frequency antennas ranging from 200 MHz to 15 MHz, depending on the anticipated depth of the target(s) and the degree of signal penetration. All of these antenna configurations can collect data in continuous mode or as discrete point measurements using signal-stacking techniques. Since there is a tradeoff between signal penetration and resolution, test lines are run using different antennas at several frequencies and then the highest frequency antenna that produces the highest quality data is used. In some cases, data are collected with several antenna frequencies.

6.3.2 Data Analysis and Interpretation

The horizontal scale of the GPR record shows distance along the survey traverse. In the continuous data collection mode, the horizontal scale on each GPR record is determined by the antenna speed along the surface. When a survey wheel is used, the GPR system records data with a fixed number of traces per unit distance. The GPR record is automatically marked at specified distance intervals along the survey line. The vertical scale of the radar record is determined by the velocity of the transmitted signal and the recording time window or range. The recording time interval, or range, represents the maximum two-way travel time in which data are recorded. The conversion of two-way travel time to depth depends on the propagation velocity of the GPR signal, which is site specific. When little or no information is available about the makeup of subsurface materials, we estimate propagation velocities from handbook values and experience at similar sites or by CDP velocity surveys with a bi-static antenna.

After completion of data collection, the GPR data are transferred to a PC for review and processing using RADAN NT for Windows NT™ software. When appropriate, we prepare 3D models of GPR data, which can be sliced in the X, Y, and Z directions.

The size, shape, and amplitude of GPR reflections are used to interpret GPR data. Objects such as metallic UST's and utilities produce reflections with high amplitude and distinctive hyperbolic shapes. Clay, concrete pipes boulders and other in-situ features may produce radar signatures of similar shape but lower amplitude. The boundaries between saturated and unsaturated materials such as sand and clay, bedrock and overburden generally also produce strong reflections.

6.3.3 Limitations of the Method

GPR signal penetration is site-specific. It is determined by the dielectric properties of local soil and fill materials. GPR signals propagate well in resistive materials such as sand and gravel; however, soils containing clay, ash- or cinder-laden fill or fill saturated with brackish or otherwise electrically conductive groundwater cause GPR signal attenuation and loss of target resolution. Concrete containing rebar or wire mesh also inhibits signal penetration.

The interpreted depths of objects detected using GPR are based on on-site calibration, handbook values, and/or estimated GPR signal propagation velocities from similar sites. GPR velocities and depth estimates may vary if the medium under investigation or soil water content is not uniform throughout the site.

Utilities are interpreted on the basis of reflections of similar size and depth that exhibit a linear trend; however GPR cannot unambiguously determine that all such reflectors are related. Fiberglass UST's, or utilities composed of plastic or clay may be difficult to detect if situated in soils with similar electromagnetic properties, or if situated in fill with other reflecting targets which generate "clutter" or signal scattering and thus obscure other deeper reflectors. Objects buried beneath reinforced concrete pads or slabs may also be difficult, but possible, to detect.

Changes in the speed at which the GPR antenna is moved along the surface causes slight variations in the horizontal scale of the recorded traverse. Distance interpolation may be performed to minimize the error in interpreted object positions. The variation in the horizontal scale of the GPR record may be controlled, to a certain extent, with a distance encoder or Survey Wheel. The GPR antenna produces a cone-shaped signal pattern that emanates approximately 45 degrees from horizontal front and back of the antenna. Therefore, buried objects may be detected before the antenna is located directly over them. GPR anomalies may appear larger than actual target dimensions.

GPR interpretation is more subjective than other geophysical methods. The interpretive method is based on the identification of reflection patterns that do not uniquely identify a subsurface target. Borings, test pits, site utility plans and other ground-truth are recommended to verify the interpreted GPR results.

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APPENDIX A – MAP PLATES (IN POCKET)

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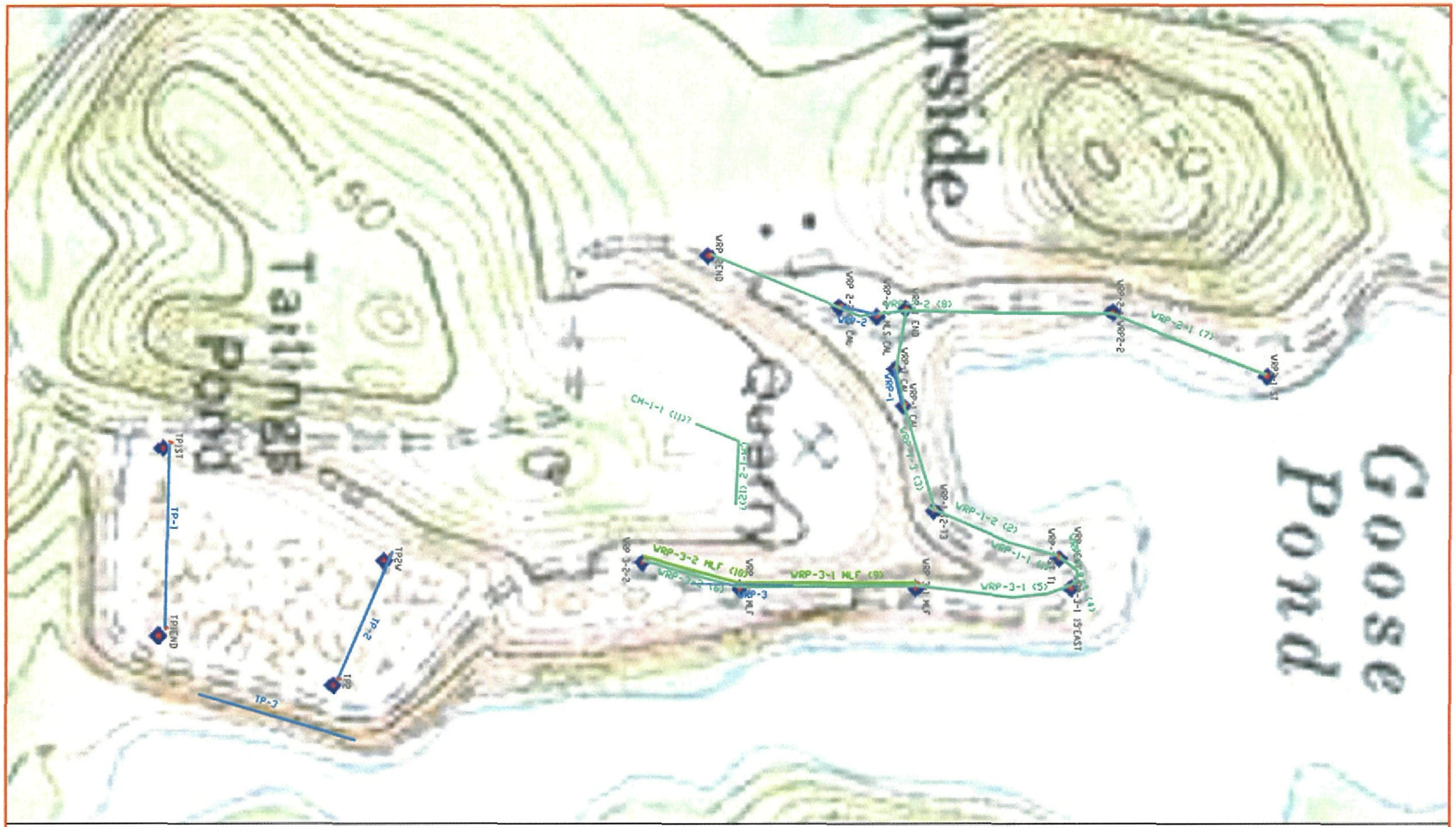
Plate 2a. Location Map – Bedrock Depth Points
Plate 2b. Location Map – Bedrock Elevation Points
Plate 3a. Contour Map – Top of Bedrock
Plate 3b. Color Contour Map – Top of Bedrock
Plate 4. Topographic Map – Pre- & Post Mining Topography



Notes:
1. *Survey locations based on GPS* coordinates provided by TRC.
2. Topographic base map locations approximate. Source: TOPO!®© 2003 National Geographic.

0 250 500 1000

SCALE in FEET

HGI

◆ TRC Survey Point

HGI GPR Line

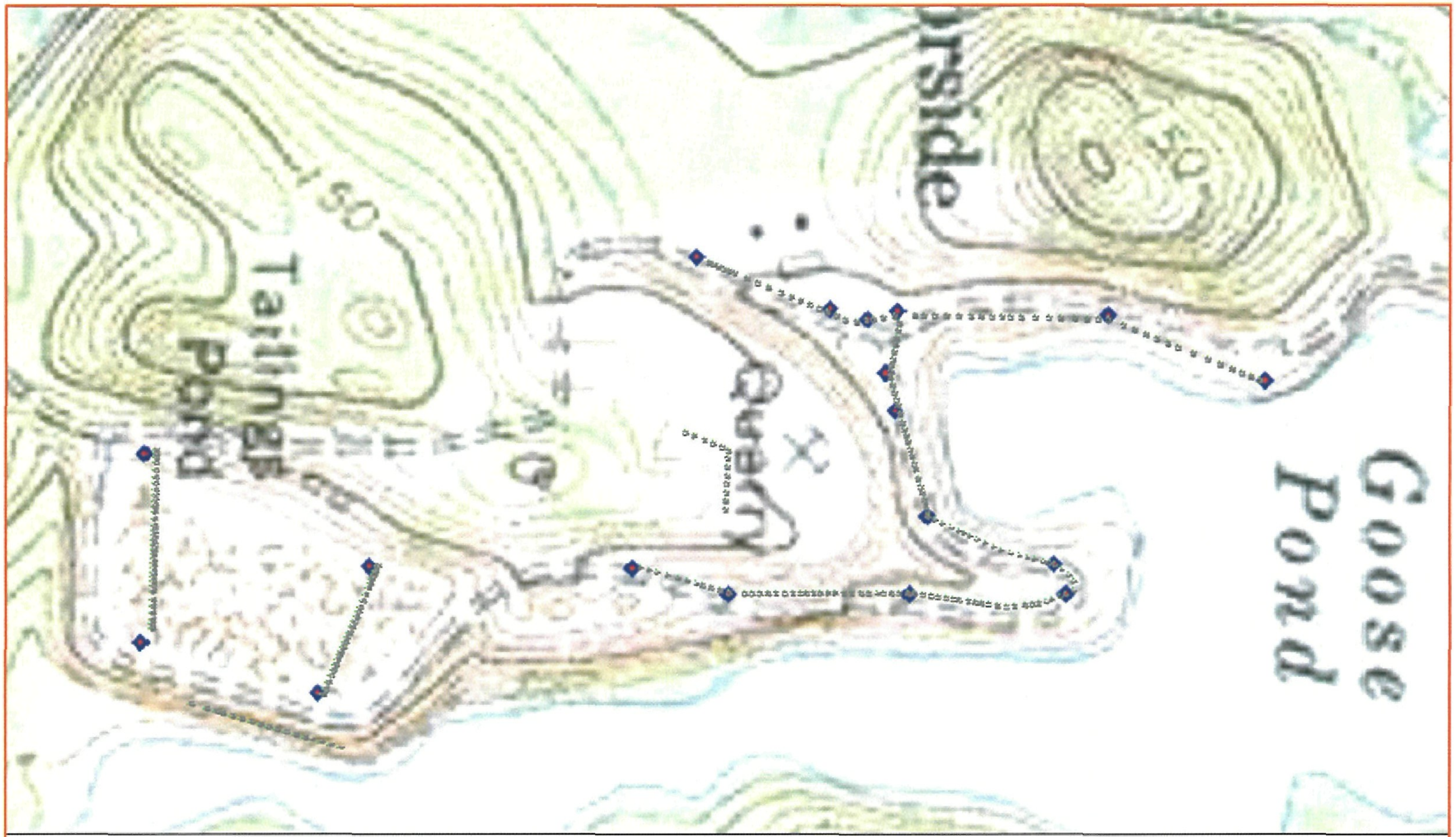
HGI Seismic Line

PLATE 1

JANUARY 2005	FILE NO. 200485

LOCATION MAP
GEOPHYSICAL SURVEYS
CALLAHAN MINES SUPERFUND SITE
BROOKSVILLE, MAINE

Hager GeoScience, Inc.
596 Main Street, Woburn, MA 01801
(781) 935-8111 hgi@hagergeoscience.com



Notes:
1. Survey locations based on GPS coordinates provided by TRC.
2. Topographic base map locations approximate. Source: TOPO!®© 2003 National Geographic.

+15 Depth Point Location (depth in feet bgs)

PLATE 2a

JANUARY 2005	FILE NO. 200485

LOCATION MAP
BEDROCK DEPTH POINTS
CALLAHAN MINES SUPERFUND SITE
BROOKSVILLE, MAINE

Hager GeoScience, Inc.
596 Main Street, Woburn, MA 01801
(781) 935-8111 hgi@hagergeoscience.com

Notes:
1. Survey locations based on GPS coordinates provided by TRC.
2. Topographic base map locations approximate. Source: TOPO!®© 2003 National Geographic.

0 250 500 1000

SCALE in FEET

+15 Elevation Point Location
(elevation in feet above msl)

PLATE 2b

JANUARY 2005	FILE NO. 200485

LOCATION MAP
BEDROCK ELEVATION POINTS
CALLAHAN MINES SUPERFUND SITE
BROOKSVILLE, MAINE

Hager GeoScience, Inc.
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(781) 935-8111 hgi@hagergeoscience.com

Notes:
1. Survey locations based on GPS coordinates provided by TRC.
2. Topographic base map locations approximate. Source: TOPO!®© 2003 National Geographic.

0 250 500 1000

SCALE in FEET

HGI

100

Bedrock Contour
(index contours in red)
C.I. = 5 feet
Elevation in feet

PLATE 3a

JANUARY 2005	FILE NO. 200485

CONTOUR MAP
TOP OF BEDROCK
CALLAHAN MINES SUPERFUND SITE
BROOKSVILLE, MAINE

Hager GeoScience, Inc.
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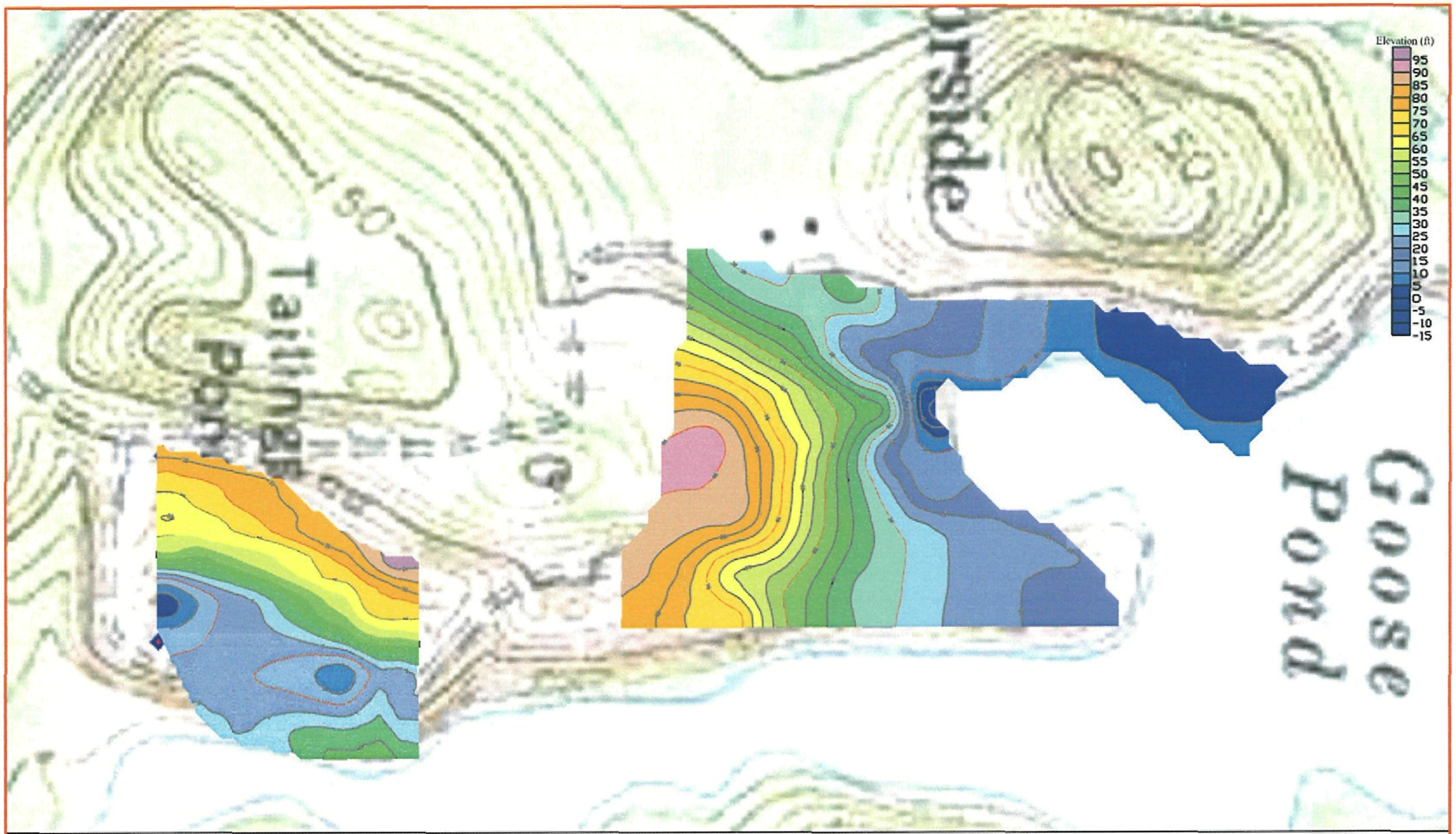

Notes:
1. Survey locations based on GPS coordinates provided by TRC.
2. Topographic base map locations approximate. Source: TOPO!®© 2003 National Geographic.

0 250 500 1000

SCALE in FEET

HGI

100

Bedrock Contour
(index contours in red)
C.I. = 5 feet

PLATE 3b

JANUARY 2005	FILE NO. 200485

COLOR CONTOUR MAP
TOP OF BEDROCK
CALLAHAN MINES SUPERFUND SITE
BROOKSVILLE, MAINE

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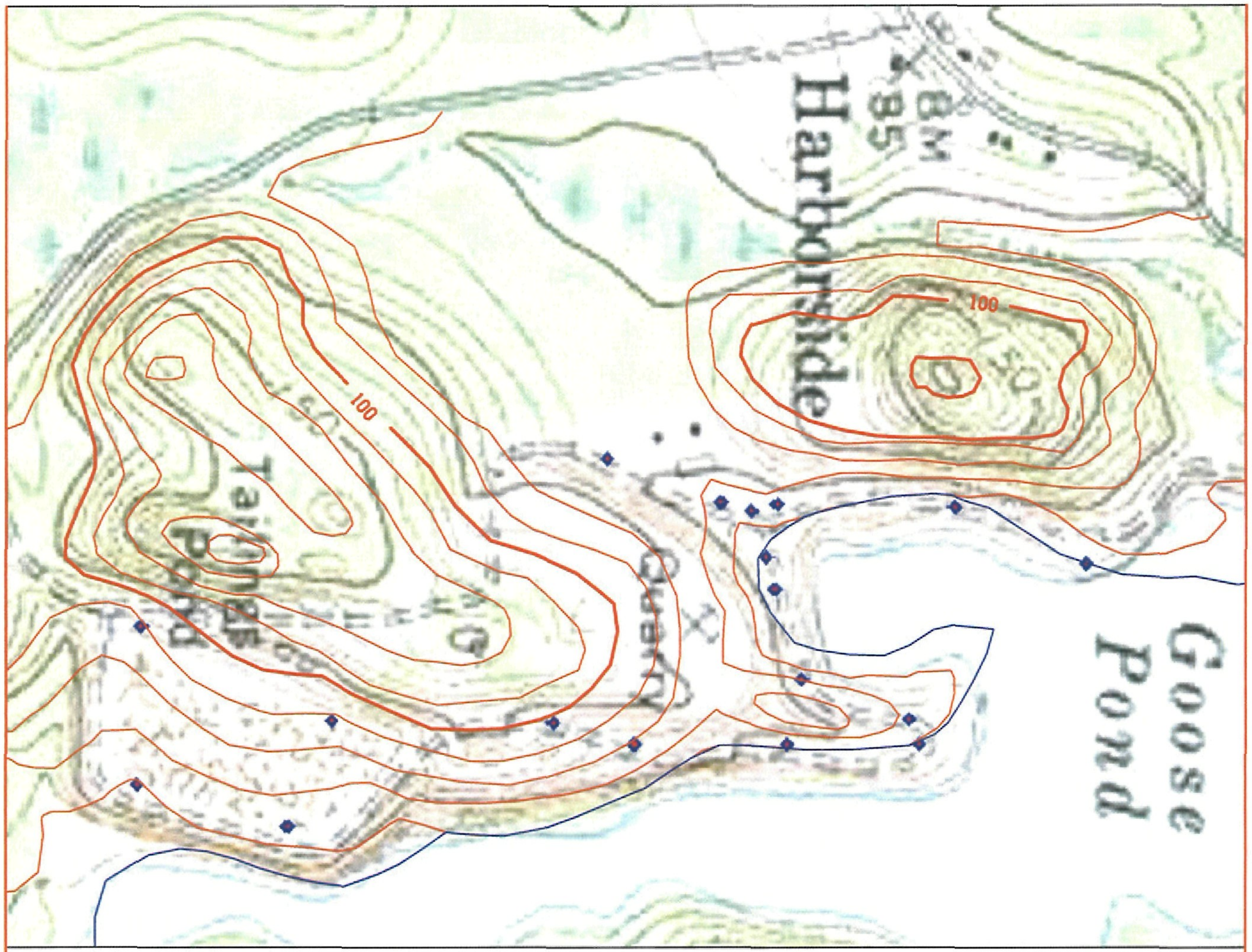

Notes:
1. Survey locations based on GPS coordinates provided by TRC.
2. Topographic base map locations approximate. Source: TOPO!®© 2003 National Geographic.
3. Pre-mining topography from 1943 USGS Cape Rosier topographic map.

PLATE 4

JANUARY 2005	FILE NO. 200485

TOPOGRAPHIC MAP
PRE- & POST MINING TOPOGRAPHY
CALLAHAN MINES SUPERFUND SITE
BROOKSVILLE, MAINE

Hager GeoScience, Inc.
596 Main Street, Woburn, MA 01801
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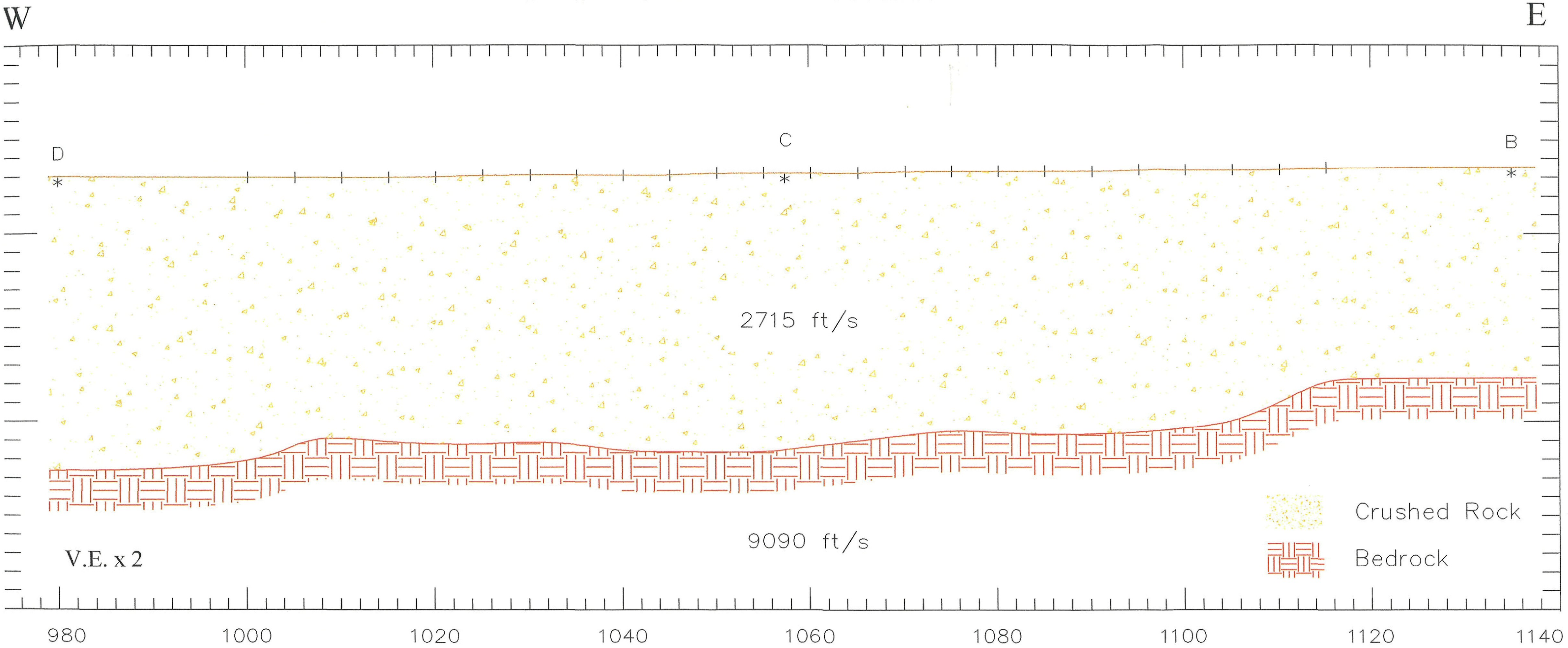
APPENDIX B – SEISMIC PROFILES

Seismic Refraction Line WRP-1 (10 scale)
Seismic Refraction Line WRP-2 (10 scale)
Seismic Refraction LineWRP-3 (10 scale)
Seismic Refraction Line TP-3 (40 scale)
Seismic Reflection Line TP-1 (60 scale)
Seismic Reflection Line TP-1a (60 scale)
Seismic Reflection Line TP-2 (40 scale)
Seismic Reflection Line TP-2a (40 scale)

SEISMIC REFRACTION LINE WRP-1



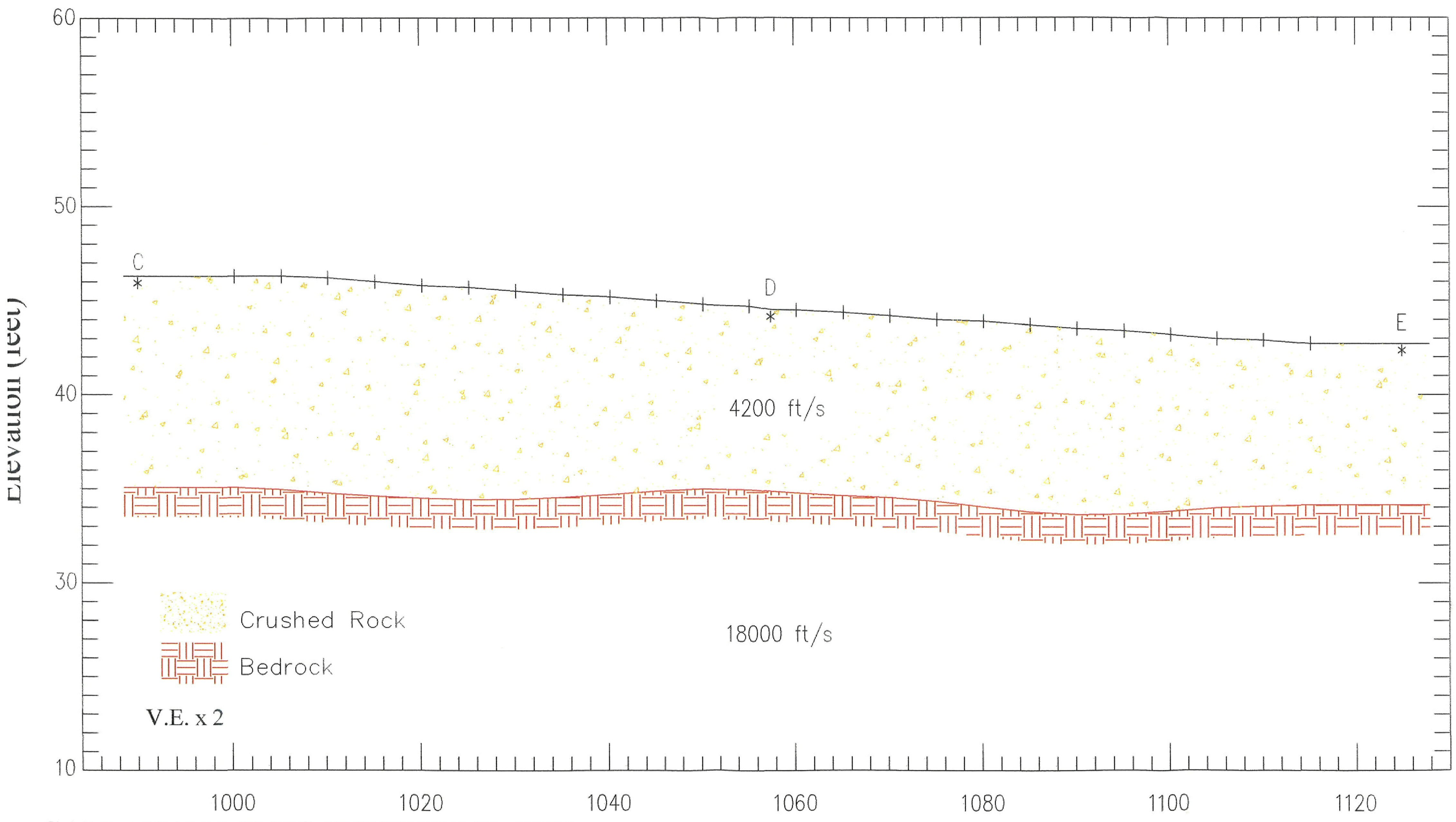
Distance (feet)

CALLAHAN MINES SUPERFUND SITE
GEOPHYSICAL INVESTIGATIONS
BROOKSVILLE, MAINE

February 2005 File No. 200485

Hager GeoScience, Inc.
596 Main Street, Woburn, MA 01801
(781) 935-8111 hgi@hagergeoscience.com

SEISMIC REFRACTION LINE WRP-2



CALLAHAN MINES SUPERFUND SITE
GEOPHYSICAL INVESTIGATIONS
BROOKSVILLE, MAINE
February 2005 File No. 200485

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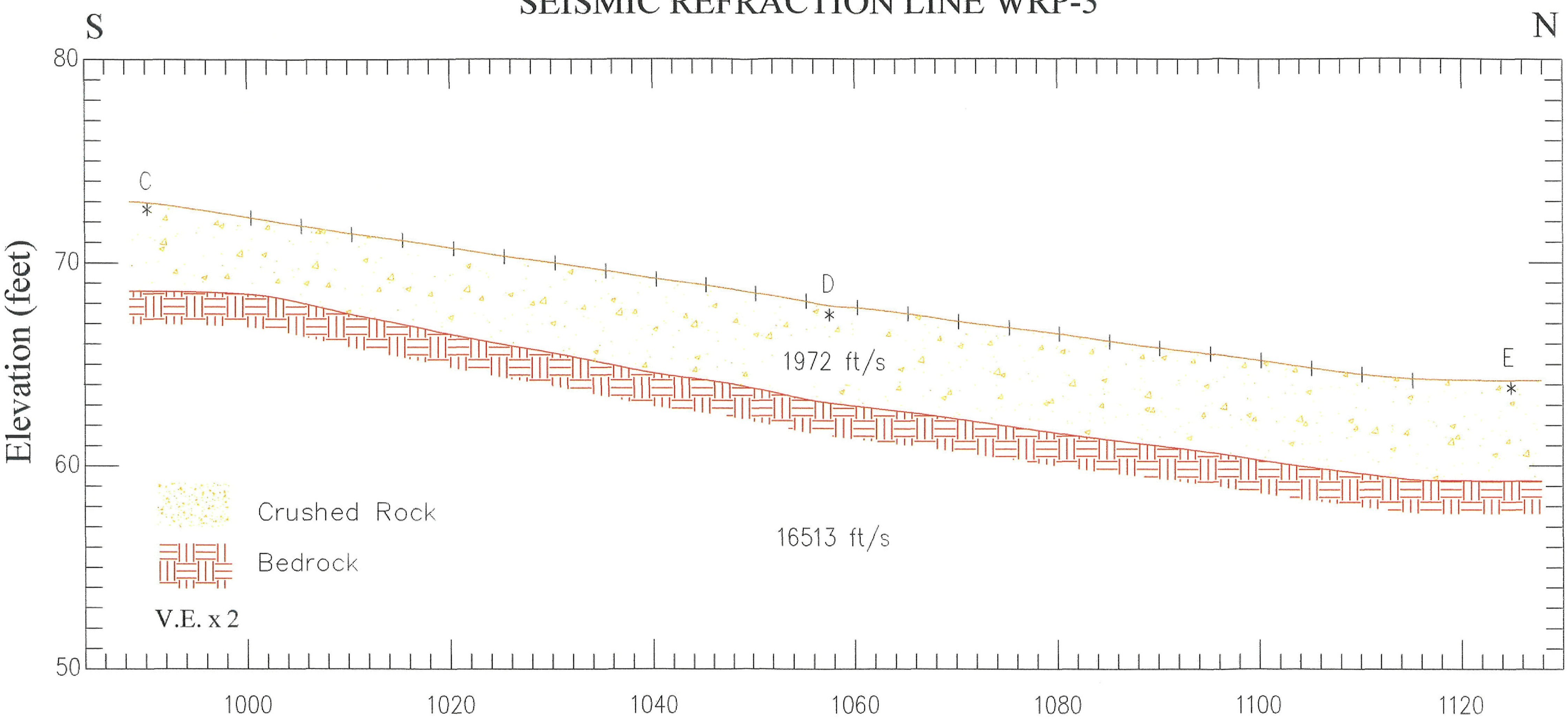
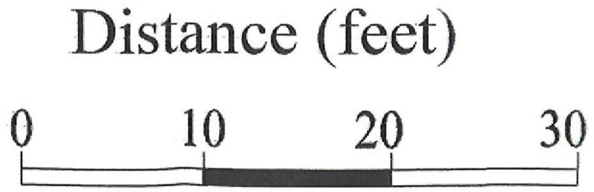
596 Main Street, Woburn, MA 01801
(781) 935-8111 hgi@hagergeoscience.com

SEISMIC REFRACTION LINE WRP-3



CALLAHAN MINES SUPERFUND SITE
GEOPHYSICAL INVESTIGATIONS
BROOKSVILLE, MAINE
February 2005 File No. 200485



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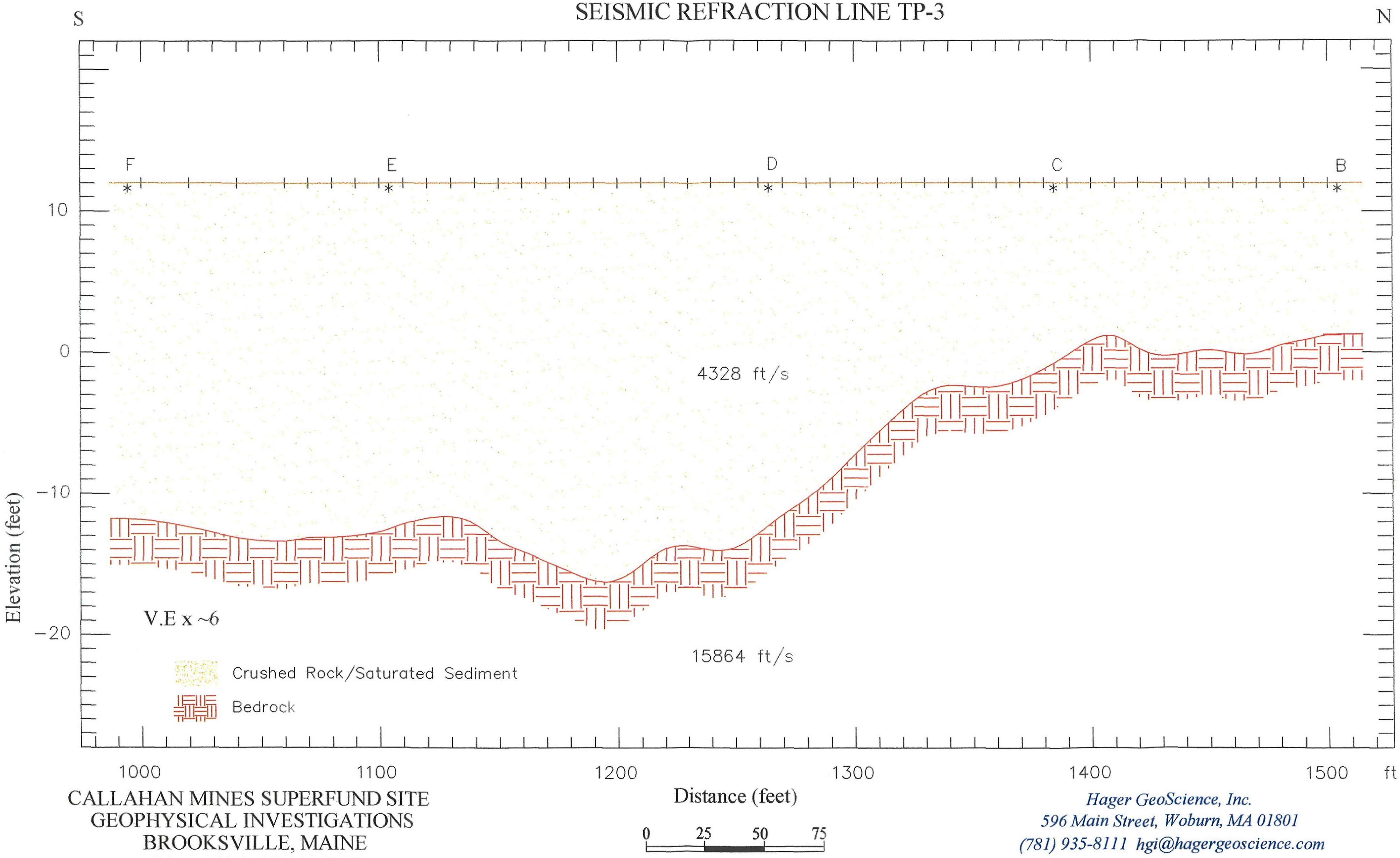
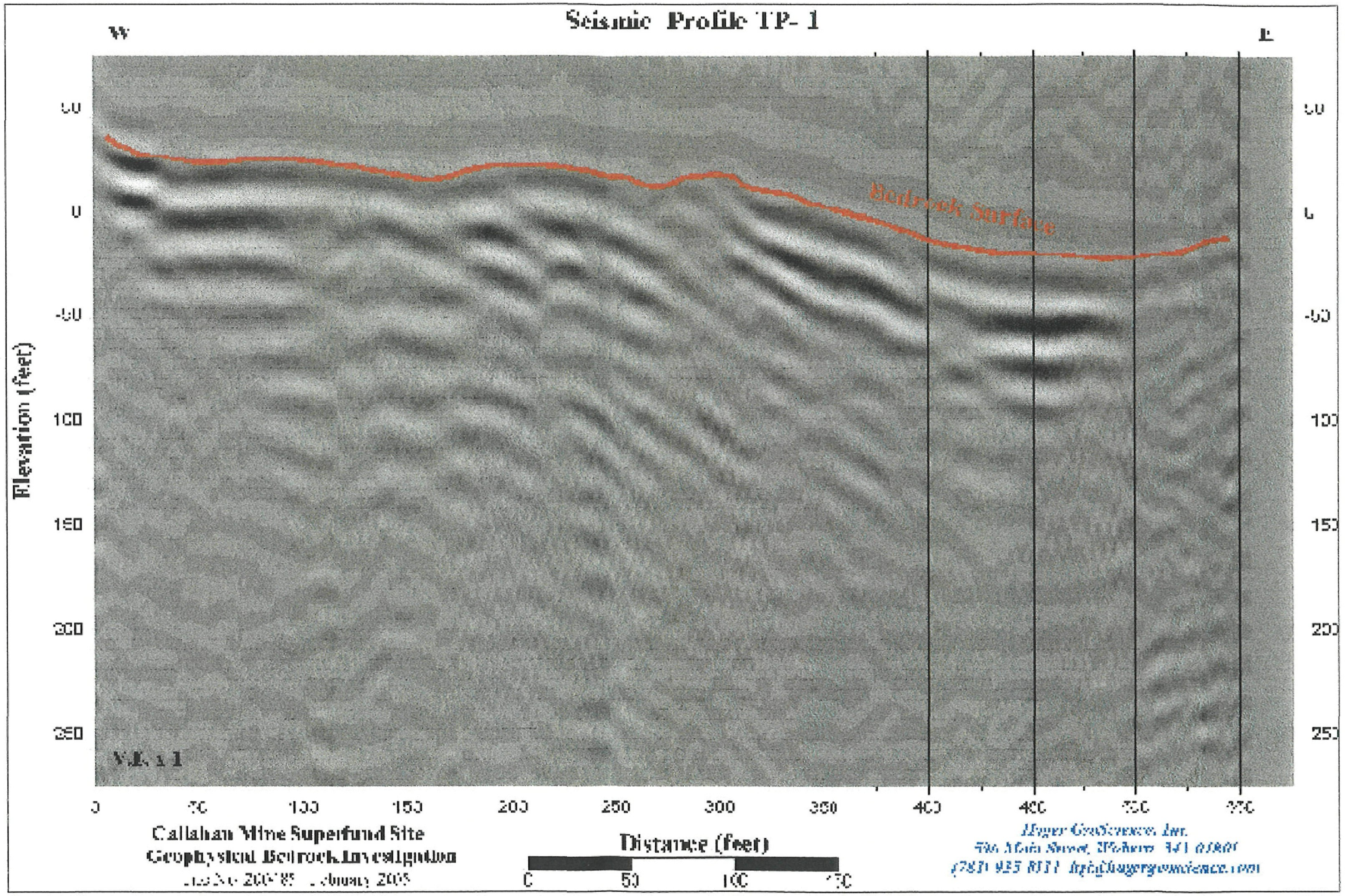
(781) 935-8111 hgi@hagergeoscience.com

SEISMIC REFRACTION LINE TP-3



CALLAHAN MINES SUPERFUND SITE
GEOPHYSICAL INVESTIGATIONS
BROOKSVILLE, MAINE
February 2005 File No. 200485

Hager GeoScience, Inc.
596 Main Street, Woburn, MA 01801
(781) 935-8111 hgi@hagergeoscience.com


Seismic Profile TP- 1

Callahan Mine Superfund Site
Geophysical Bedrock Investigation
File No. 200[illegible] February 2005

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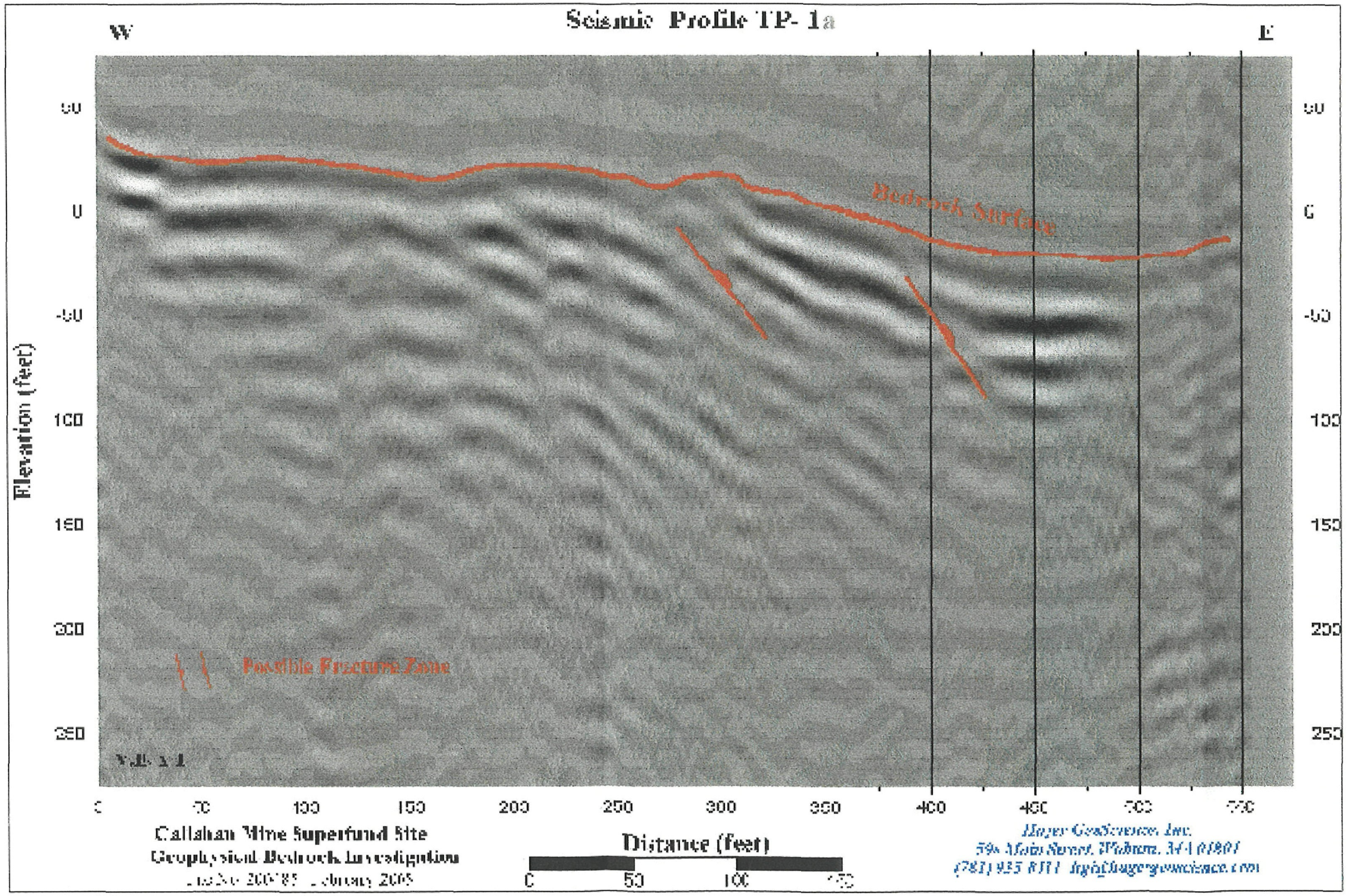
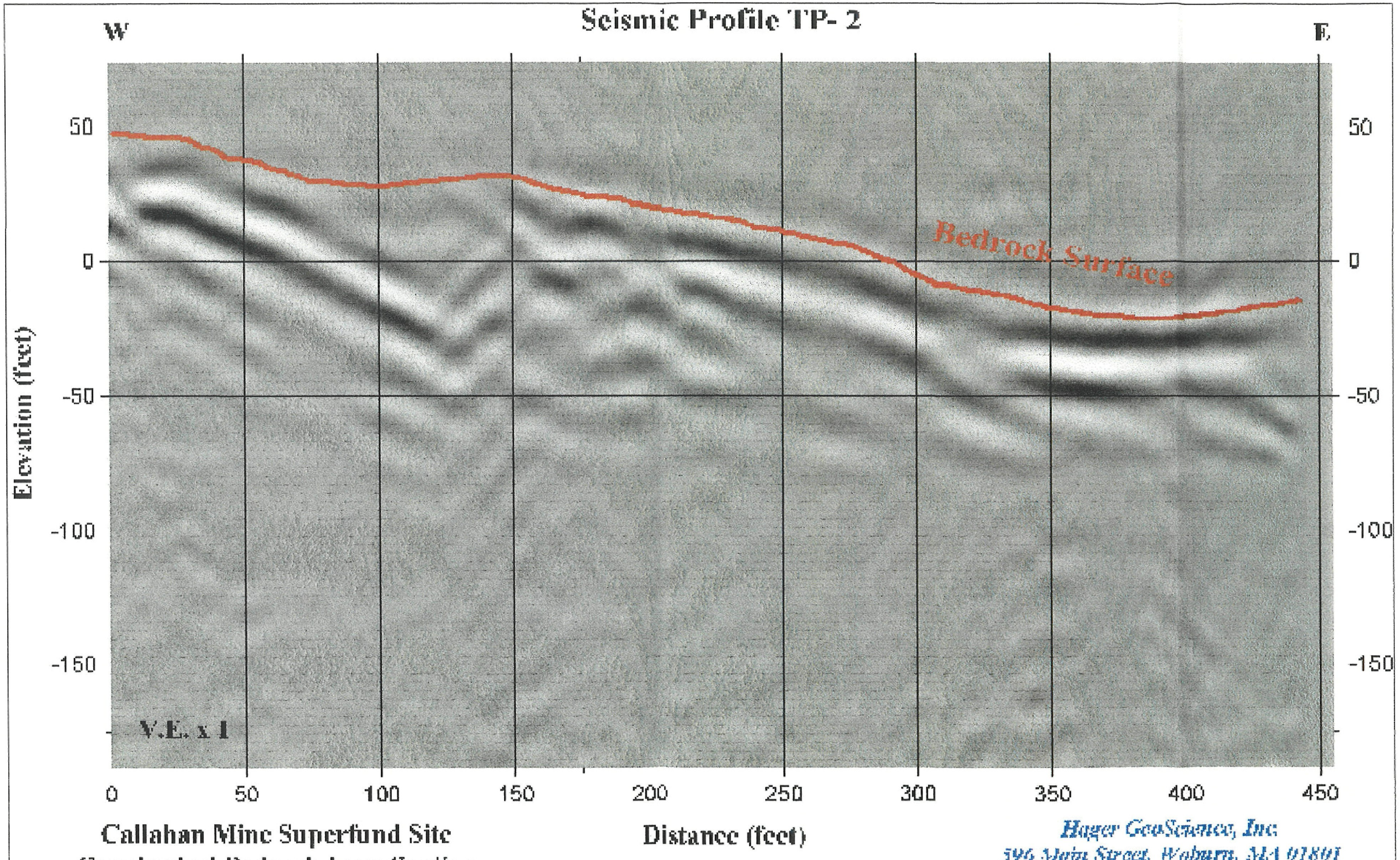
596 Main Street, Woburn MA 01801
(781) 935 8111 hgi@hagergeoscience.com


Seismic Profile TP- 1a
W
E
50
0
-50
100
150
200
250
Elevation (feet)
Bedrock Surface
Possible Fracture Zone
V.E. X 1
0
50
100
150
200
250
300
350
400
400
500
550
Distance (feet)
0
50
100
150
Callahan Mine Superfund Site
Geophysical Bedrock Investigation
File No. 200785 February 2005
Hager GeoScience, Inc.
596 Main Street, Woburn, MA 01801
(781) 935 8111 hgi@hagergeoscience.com

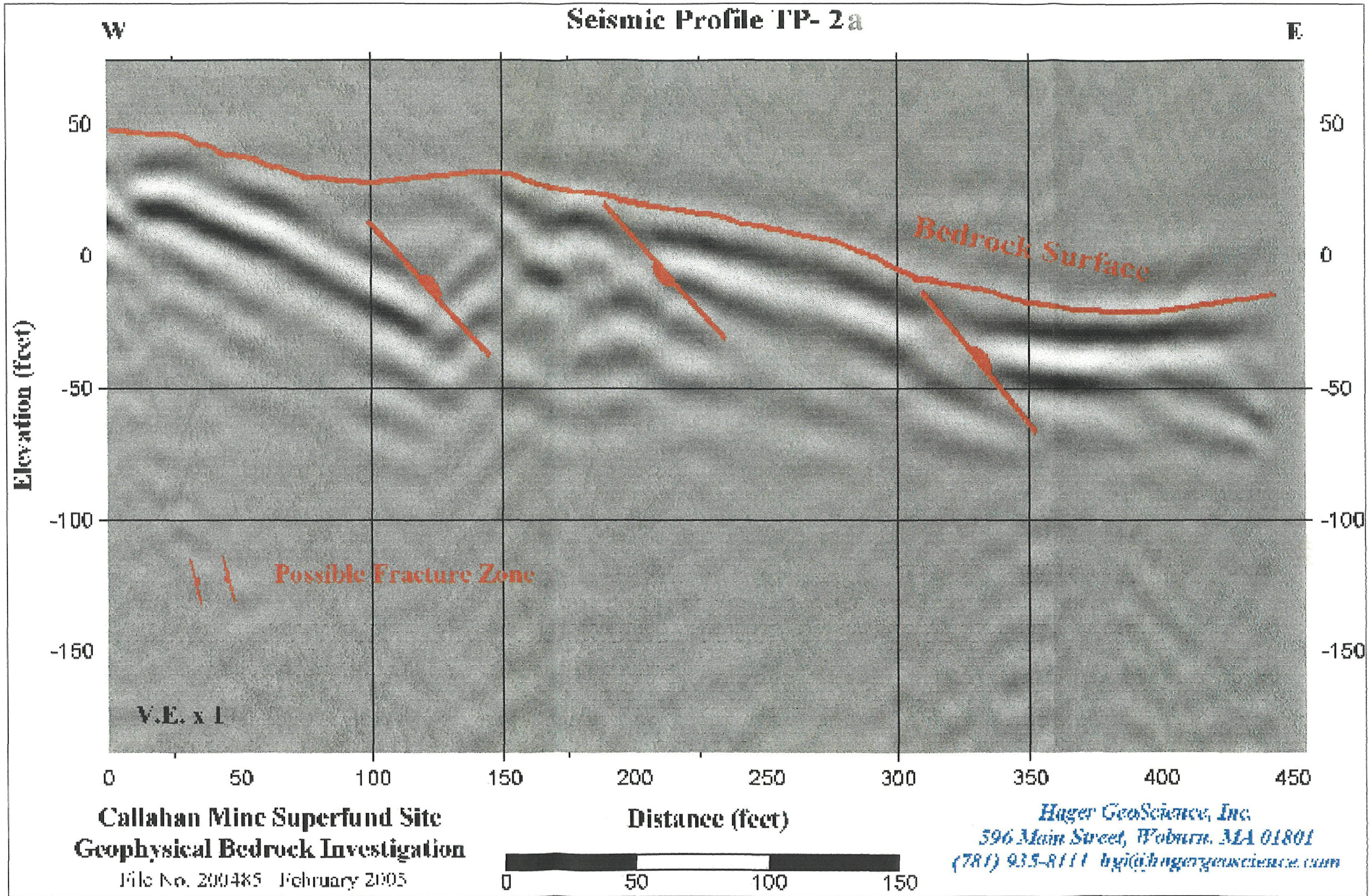
Seismic Profile TP- 2



Callahan Mine Superfund Site
Geophysical Bedrock Investigation
File No. 200485 February 2005

Hager GeoScience, Inc.
596 Main Street, Woburn, MA 01801
(781) 935-8111 hgi@hagergeoscience.com

Seismic Profile TP- 2a



Callahan Mine Superfund Site
Geophysical Bedrock Investigation
File No. 200485 February 2005

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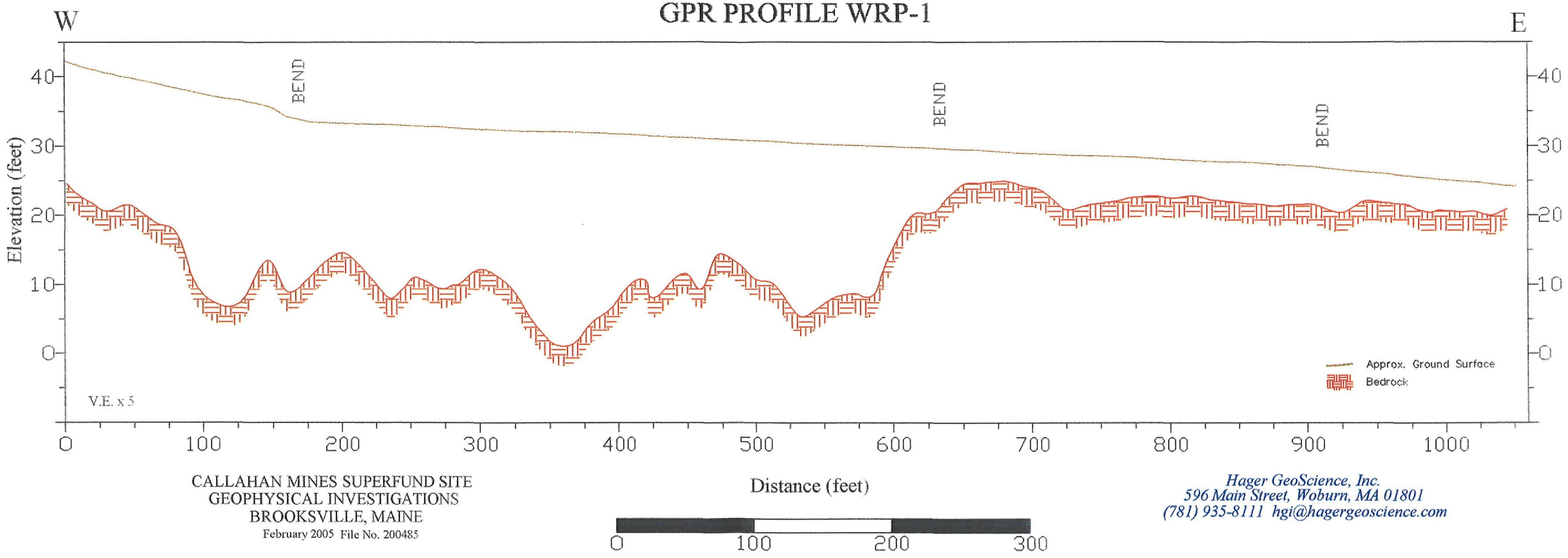
(781) 935-8111 hgi@hagergeoscience.com

APPENDIX C – GPR PROFILES

GPR Line WRP-1 (80 scale)
GPR Line WRP-2 (80 scale)
GPR Line WRP-3 (80 scale)
GPR Line C-M (40 scale)

GPR PROFILE WRP-1



CALLAHAN MINES SUPERFUND SITE
GEOPHYSICAL INVESTIGATIONS
BROOKSVILLE, MAINE
February 2005 File No. 200485

Hager GeoScience, Inc.
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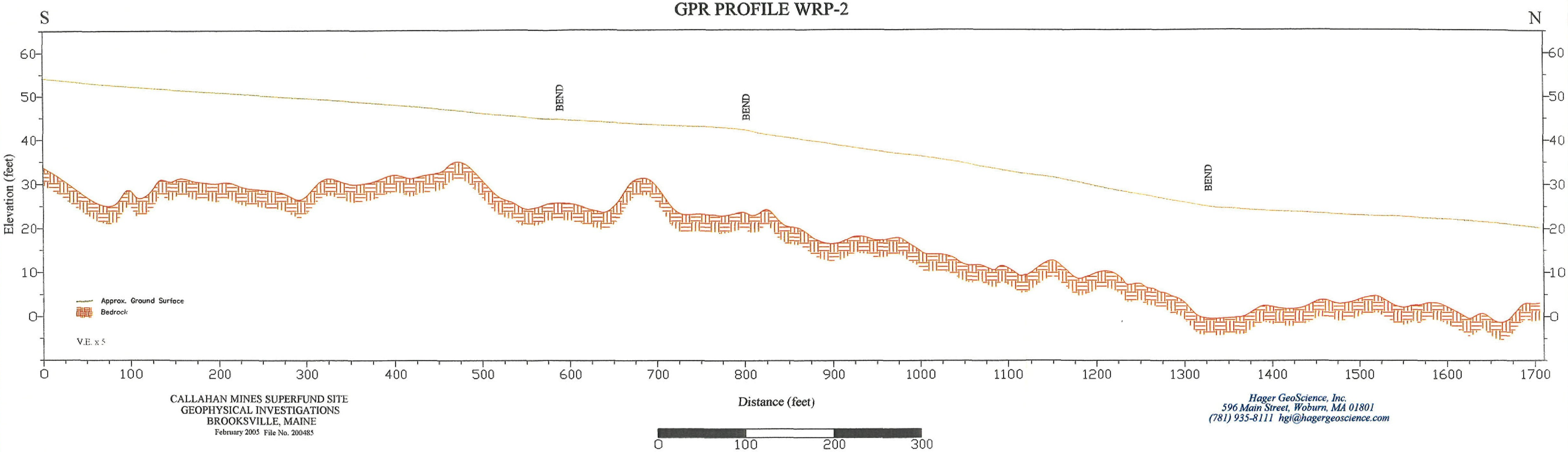
GPR PROFILE WRP-2



CALLAHAN MINES SUPERFUND SITE
GEOPHYSICAL INVESTIGATIONS
BROOKSVILLE, MAINE
February 2005 File No. 200485

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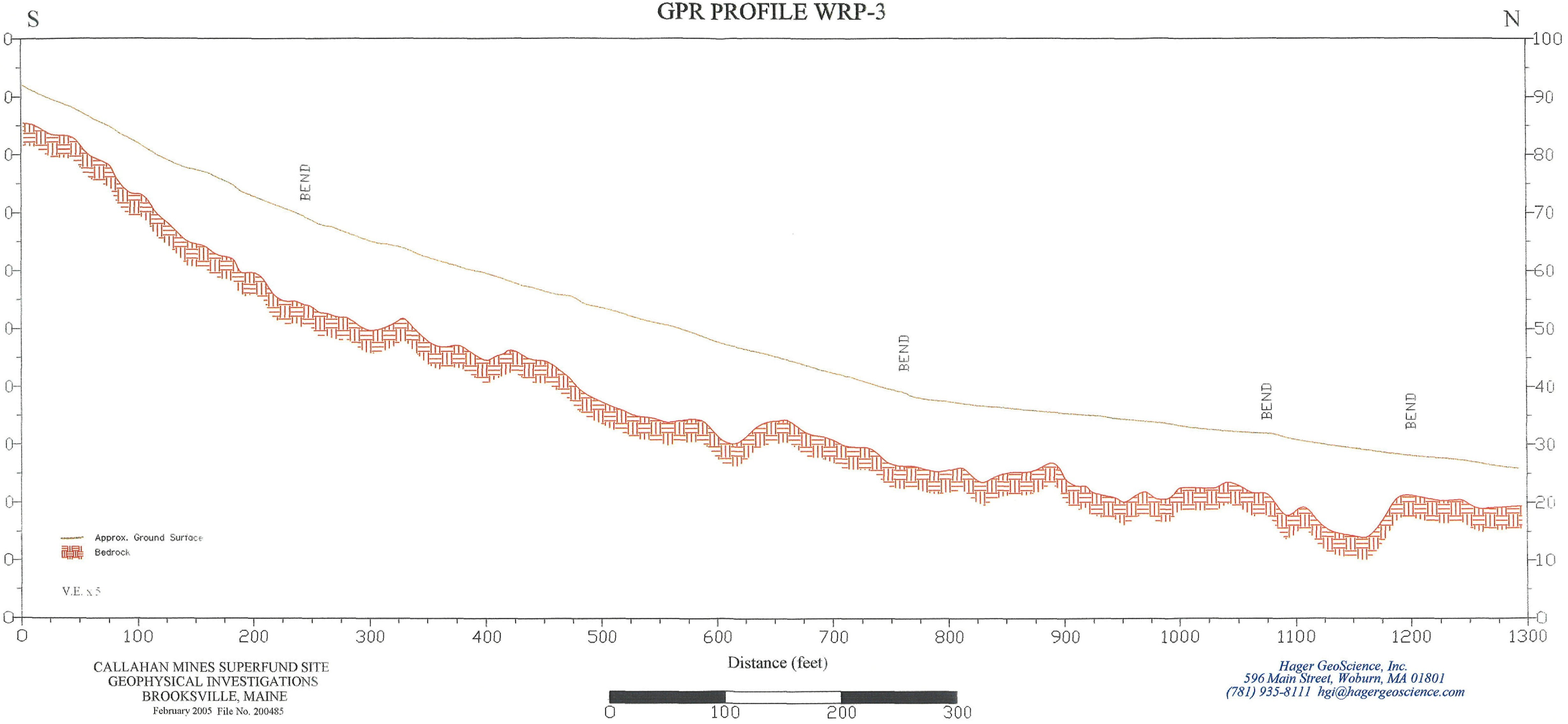
(781) 935-8111 hgi@hagergeoscience.com

GPR PROFILE WRP-3



CALLAHAN MINES SUPERFUND SITE
GEOPHYSICAL INVESTIGATIONS
BROOKSVILLE, MAINE
February 2005 File No. 200485

Hager GeoScience, Inc.
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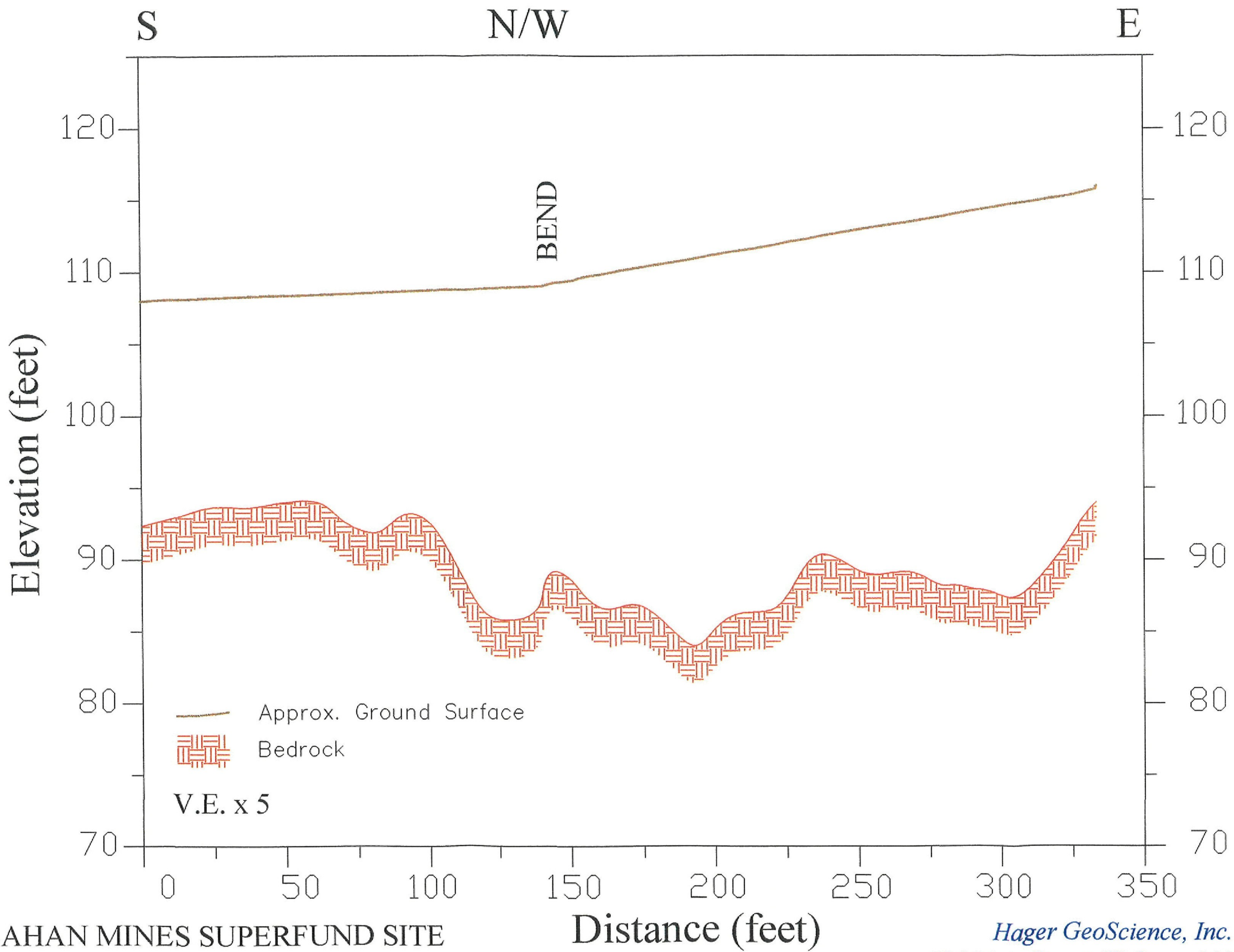
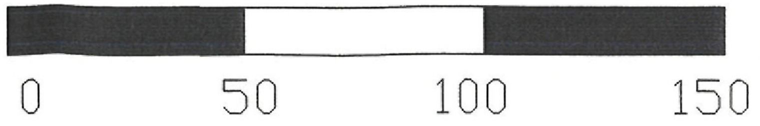
GPR PROFILE C-M





CALLAHAN MINES SUPERFUND SITE
GEOPHYSICAL INVESTIGATIONS
BROOKSVILLE, MAINE
February 2005 File No. 200485

Hager GeoScience, Inc.
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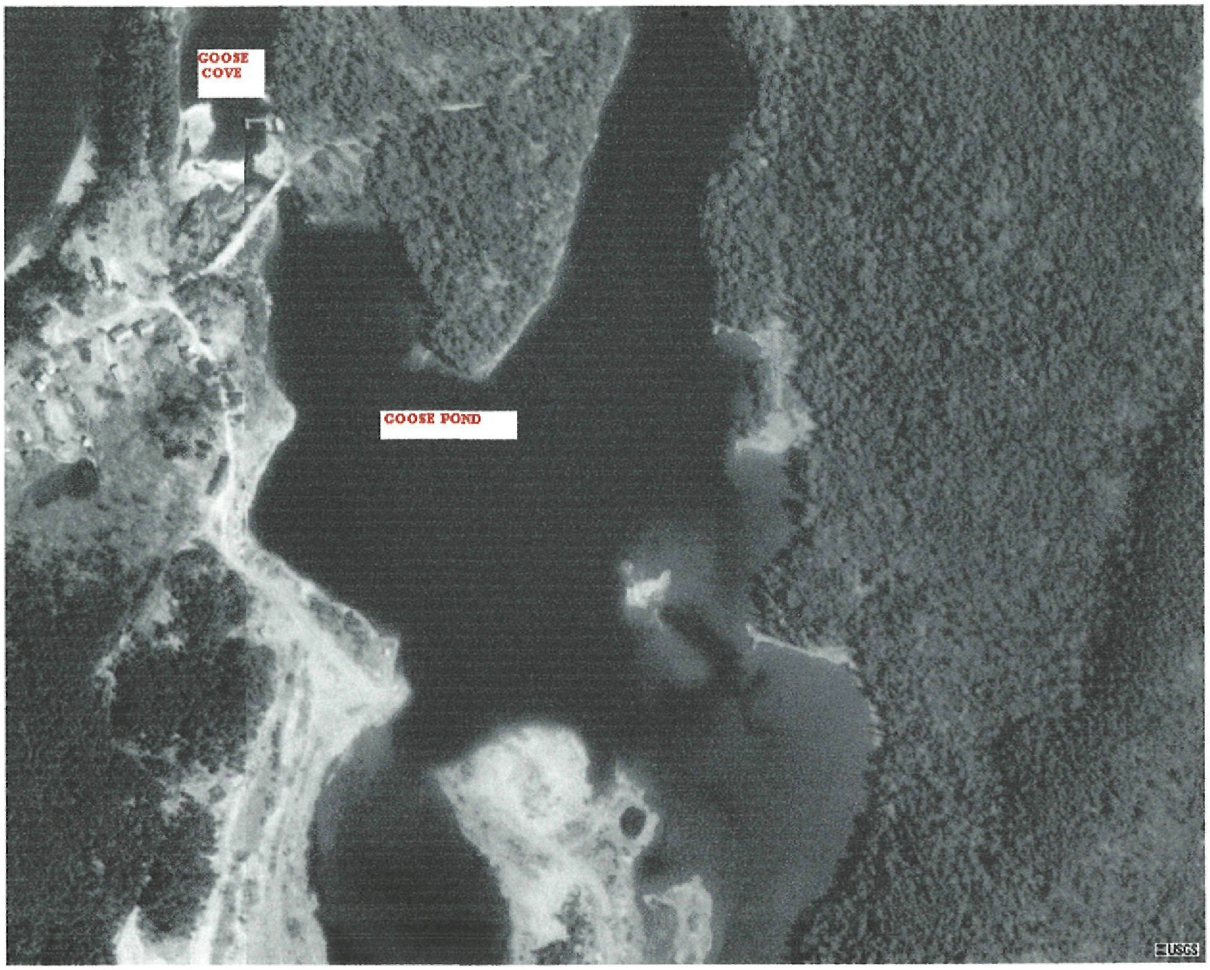
APPENDIX D – GPR PROFILE RECORDS (ON CD)

GPR Line WRP-1
GPR Line WRP-2
GPR Line WRP-3
GPR Line C-M

SUMMARY REPORT

Marine Geophysical Survey
Goose Cove / Goose Pond
Brooksville, Maine



Prepared For:
Hager Geoscience, Inc.
596 Main Street
Woburn, MA 01801

Prepared By:
HYDROTERRA
Environmental Services LLC
272 ½ Dover Point Road
Dover, NH 03820

Revised - March 11, 2005

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LIST OF TABLES

FIGURES

APPENDIX

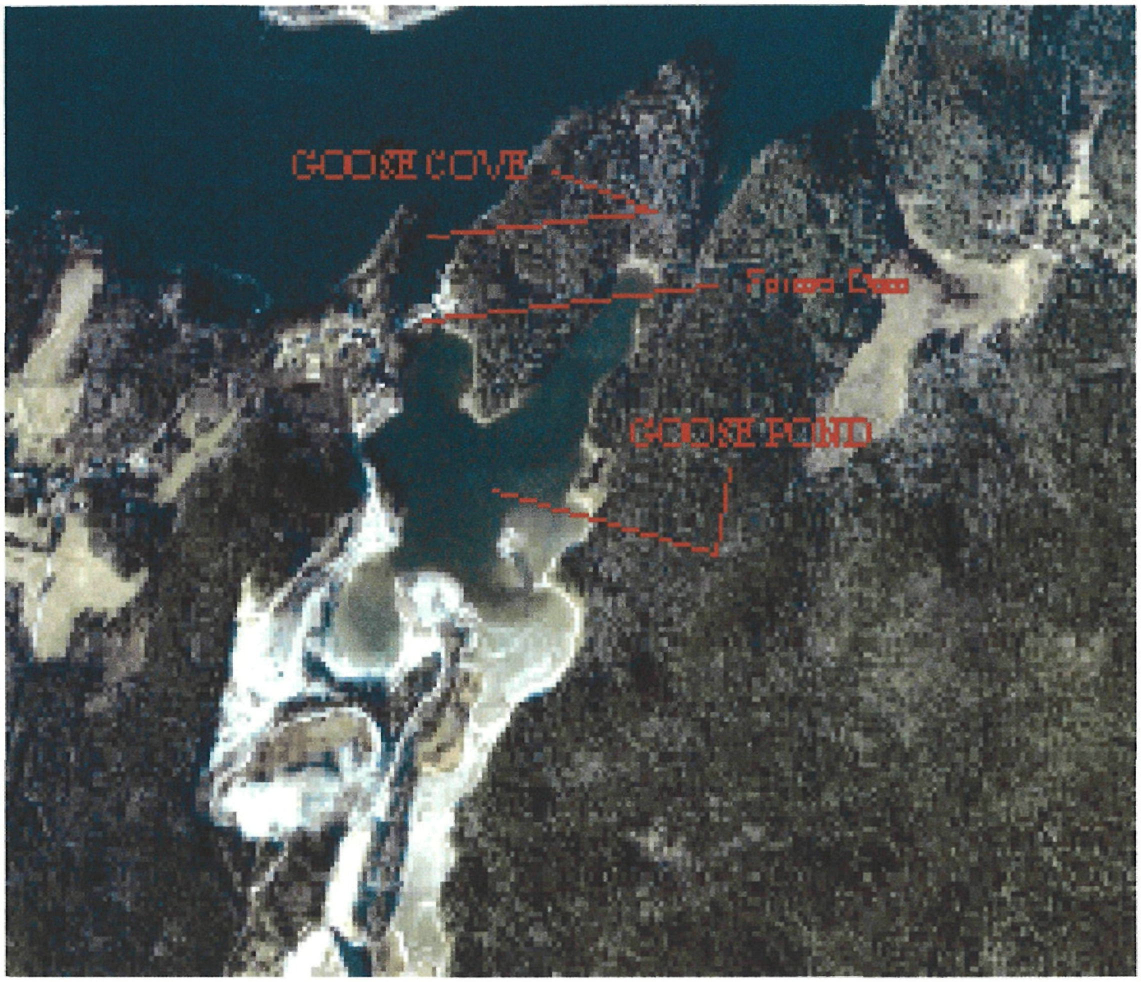
1.0 INTRODUCTION

HYDROTERRA Environmental Services is pleased to submit this summary report for the Bathymetry, and Seafloor Bottom survey services conducted at Goose Pond and Goose Cove in Brooksville, Maine (Callahan Mining Superfund Site). The locations of Goose Pond and Goose Cove (the Study Area) are shown on Figures 1 and 2. The marine survey was performed in December 2004 and included tasks to characterize the nature of the sea floor and sub-bottom features of the Study Area. Field data was collected between December 1 and 3, 2004.

FIGURE 1 STUDY AREA LOCATION

The survey tasks included pond and cove bottom bathymetric soundings, side scan sonar, and sub-bottom profiling. The following sections provide a summary of the tasks completed and a discussion of key results regarding the nature of the sea floor and sub-bottom features of the Study Area.

FIGURE 2 STUDY AREA AERIAL PHOTO



2.0 MARINE SURVEY TASKS

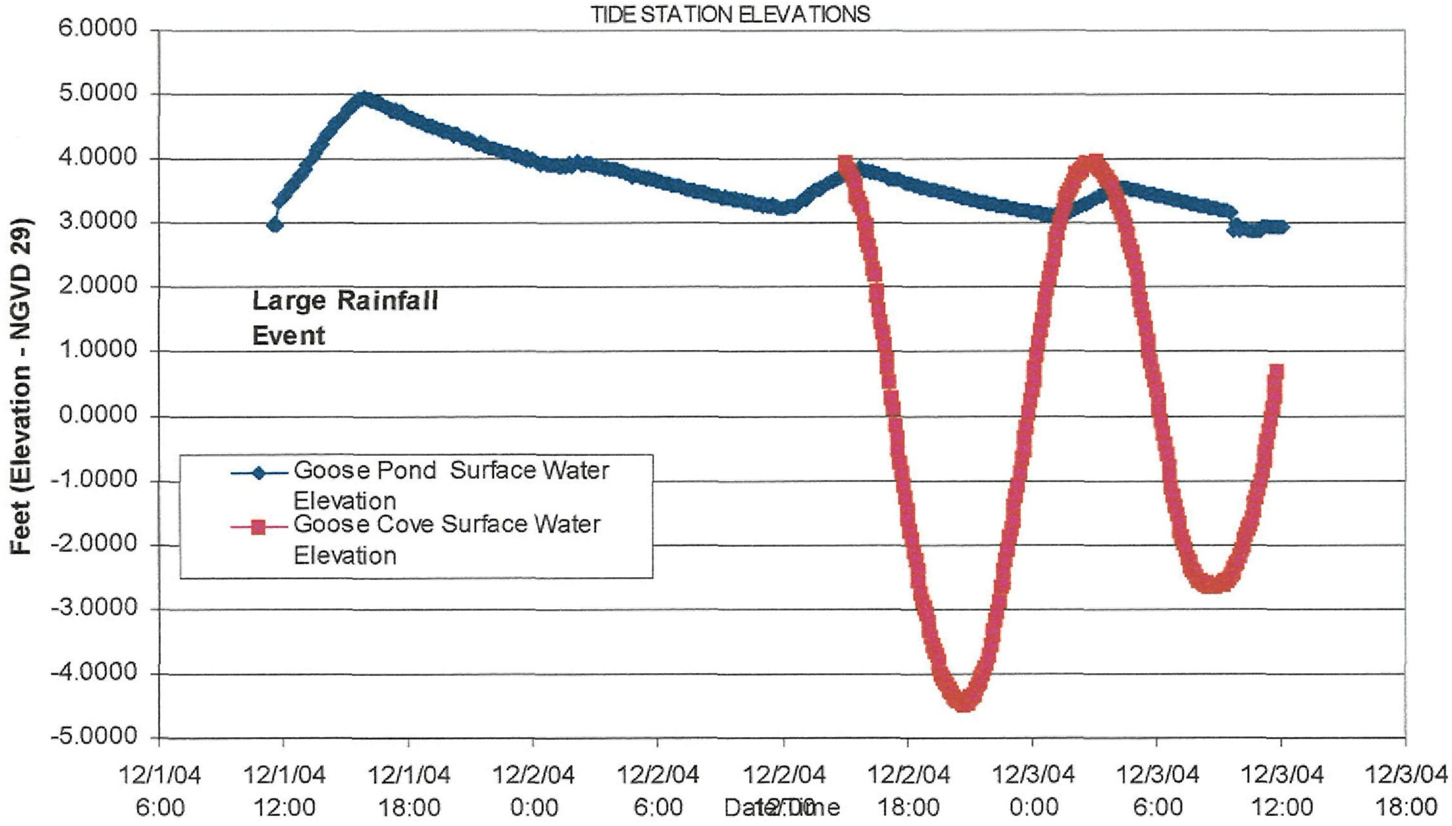
The marine survey tasks were completed using HYDROTERRA's 17-foot survey boat. The survey boat was equipped with recording fathometers, a Differential Global Positioning System (DGPS), an onboard computer and a hydrographic surveying software.

Sounding data was adjusted to the NGVD 1929 datum (established within the Study Area by ASEC Corporation (2005). Positioning data was collected in Geodetic Latitudes and Longitudes (WGS 1984) and reduced to the Eastern Maine State Plane Coordinate System (1983) (northings and eastings in feet).

Two tidal stations were established for the survey. Table 1 presents the details of these stations. Surface water elevations during the survey were recorded every 5 minutes using In-Situ data loggers set up at each station. The electronic data from this monitoring is included on the CD contained in Appendix A. Plots of the surface water elevation changes recorded during the survey are presented on Figure 3. As shown on Figure 3, the surface water elevation in Goose Pond (controlled by the remaining partial dam located at the northern end of the pond) only varied approximately 2 feet and lagged behind the Goose Cove tidal changes by approximately 2 hours. The Goose Cove tide range during the monitoring period was approximately 8.7 feet.

TABLE 1	**TIDE STATION DATA**		
Station ID	**Location** (northing/easting - feet) (East Maine - State Plane 1983)	**Construction Type**	**Elevation Datum** (ASEC Corp. - NVGD 1929)
Goose Pond	249,162.223' 904,301.839'	1" PVC - on steel rod	7.06'
Goose Cove	250,981.152' 903,367.742'	Wooden Piling (dock pier)	11.62'

FIGURE 3 Tide Station Surface Water Elevation Plots



2.1 Seafloor Bottom Survey

HYDROTERRA mapped the bottom and sub-bottom substrate/sediment of the pond and cove. This mapping provided detailed data on bottom surface features such as natural and manmade physical obstructions and also sub-bottom features such as sediment types, thickness, characteristics and depths of bedrock. The purpose of this survey was to identify any piping, or manmade features found on the sea floor and to characterize the nature and distribution of the sea floor materials. The mapping consisted of a geophysical survey which involved side scan sonar transects and acoustic sub-bottom profiling. The survey was completed across Goose Pond and Goose Cove within the areas outlined in the Request for Proposal for Geophysical Surveying Services dated October 15, 2004.

For side scan sonar surveys, HYDROTERRA used a Klein 150kHz system. The side scan system was comprised of a towfish, an onboard computer system, a 100-meter tow cable and a towfish depressor.

In operation, the sonar sensor unit, referred to as the tow-fish, was towed by the survey vessel past an object or through the area of investigation. Two simultaneous fan-shaped acoustic beams, oriented at right angles to the tow-fish, are continually transmitted and then reflected off objects and sea floor features. The reflected signals are received by the transducers in the tow-fish, filtered, amplified and presented graphically to yield a display analogous to an oblique photograph of the sea floor and the objects on it. The side scan sonar system accepted Differential Global Positioning System (DGPS) information which is integrated with side scan sonar data, providing correlation of latitude-longitude and side scan targets. For positioning, HYDROTERRA employed a DGPS navigation and charting/plotting software linked to the side scan system.

The side scan sonar record showed bottom sediment type distribution and sediment features, and identified obstructions laying on the sediment surface such as bedrock ledge, boulders or man-made features including piping.

To collect sub-bottom information in the pond and cove, HYDROTERRA used a sub-bottom acoustic profiling system. The sub-bottom acoustic profiling system (ODEC - *Stratabox)* used the transmission of calibrated FM frequency low frequency acoustic waves (10 kHz) to penetrate the pond/cove bottom and provide resolution of sub-bottom layers and objects. The acoustic survey provided cross sectional data of the pond bottom depths with surface sediment classification, subbottom sediment thickness and characteristics, and possible bedrock depth.

The acoustic tow fish was towed alongside the boat and the onboard hydrographic surveying computer software collected and logged real time bottom / sub-bottom information along with positioning data. The transect intervals were based upon the variations in bottom and sub-bottom features.

The surveys resulted in side scan sonar image maps generated with interpretive plan views showing the materials and features identified on the sea floor. Figures 4, 5 and 6 present the sonar imagery for the Goose Cove area. Figures 7, 8, and 9 present the sonar imagery for the Goose Pond area. Larger scale (1" = 100') plans of these results are included in Appendix B of this report. The AutoCAD Drawings for these figures are contained on the CD included in Appendix A. Table 2 lists the profiles presented on each figure. Plot tracks for the side scan surveys are included in Appendix B.

The sub-bottom survey generated cross sections with interpretation of sediment thickness, type and structures and depth to bedrock. The cross-sectional profiles for the Goose Cove area were plotted on Figure 4 and for the Goose Pond area on Figure 7. The locations of these profiles are shown on each figure. Larger scale (1" = 100') profiles of the sub-bottom sections are included in Appendix B of this report. The AutoCAD Drawings for these figures are contained on the CD included in Appendix A.

2.2 Pond/Cove Bathymetry

HYDROTERRA conducted a bathymetric survey of Goose Pond and Goose Cove. This survey provided bottom elevation data and bottom feature characteristics of the pond and cove. The fathometers were calibrated using a metal striker plate and hand soundings. The onboard hydrographic surveying computer software collected and logged real time depth, water temperature, boat speed, bearing and positioning data on an adjustable interval (at 1-second intervals). Field observations and operator notes are also logged real time by the software. The XYZ electronic data files for the bathymetric survey are contained on the CD included in Appendix A.

Sounding data was adjusted to the NGVD 1929 (established within the Study Area by ASEC Corporation (2005). Positioning data was collected in Geodetic Latitudes and Longitudes (WGS 1984) and reduced to the Eastern Maine State Plane System (1983) in feet.

The survey was completed across Goose Pond and Goose Cove. Based upon bottom depth variability, transect lines were varied during the survey to provide overlapping coverage and to provide sufficient elevation data to generate a pond/cove bottom elevation contour map. The track lines of the bathymetric surveys are included in Appendix B.

HYDROTERRA reduced all sounding data and prepared a hydrographic sounding contour map showing the sea floor elevations for both Goose Pond and Goose Cove. These maps are in AutoCAD DWG format and contained on the CD included in Appendix A. The contours for Goose Cove were drawn at 1 foot intervals. Due to the extreme changes in elevation of the former pond mining excavation area, the contour intervals were varied in accordance to the following sequence to allow for better presentation of the data.

Elevations -300' to -50' contours every 10 feet
Elevations -50' to - 20' contours every 2 feet
Elevations -20' to 0 contours every 1 foot.

TABLE 2 DATA IMAGE PRESENTATION SUMMARY

Figure	Location	AutoCAD File Name	Bottom Elevation	Side Scan Profiles	Sub-Bottom Profiles	Related Data Files (included on CD)
4	Goose Cove	Goose-Cove-Fig4.dwg Goose-Cove-Fig4.dxf	Elevation Contours	2040a	0153, 0602, 0120, 0904 and 0132	*Sounding and Tide Data* - bathycove- xyz , cove-tide-data, *Side Scan Images* - 2032A.tiff, 2034B.tiff, and 2040A.tiff *Sub-bottom Images* - 120 a-a.bmp, 153 b-b.bmp, 132 c-c.bmp, and 904 d-d.bmp
5	Goose Cove	Goose-Cove-Fig5.dwg	"	2032a	none	Same
6	Goose Cove	Goose-Cove-Fig6.dwg	"	2034b	none	Same
7	Goose Pond	Goose-Pond-Fig7.dwg Goose-Pond-Fig7.dxf	"	1726b, 1807c, and 1720c	0147, 0619, 0101, 0252, 0854, and 0623	*Sounding and Tide Data* - pondbathy1-xyz ,Pond-tide-data, *Side Scan Images* - 1720.tiff, 1726A.tiff, 1726B.tiff, 1807c.tiff, and 1815A.tiff *Sub-bottom Images* - 147a-a.bmp, 101b-b.bmp, 252c-c.bmp, 854d-d.bmp, 619e-e.bmp and 623f-f.bmp
8	Goose Pond	Goose-Pond-Fig8.dwg	"	1726AA	none	Same
9	Goose Pond	Goose-Pond-Fig9.dwg	"	1807a, 1738, and 1740	none	Same

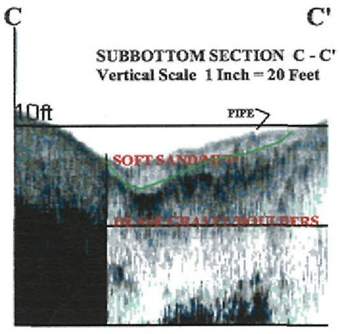
To the best of my knowledge, information, and belief,all information on this plan is true and accurately shown.

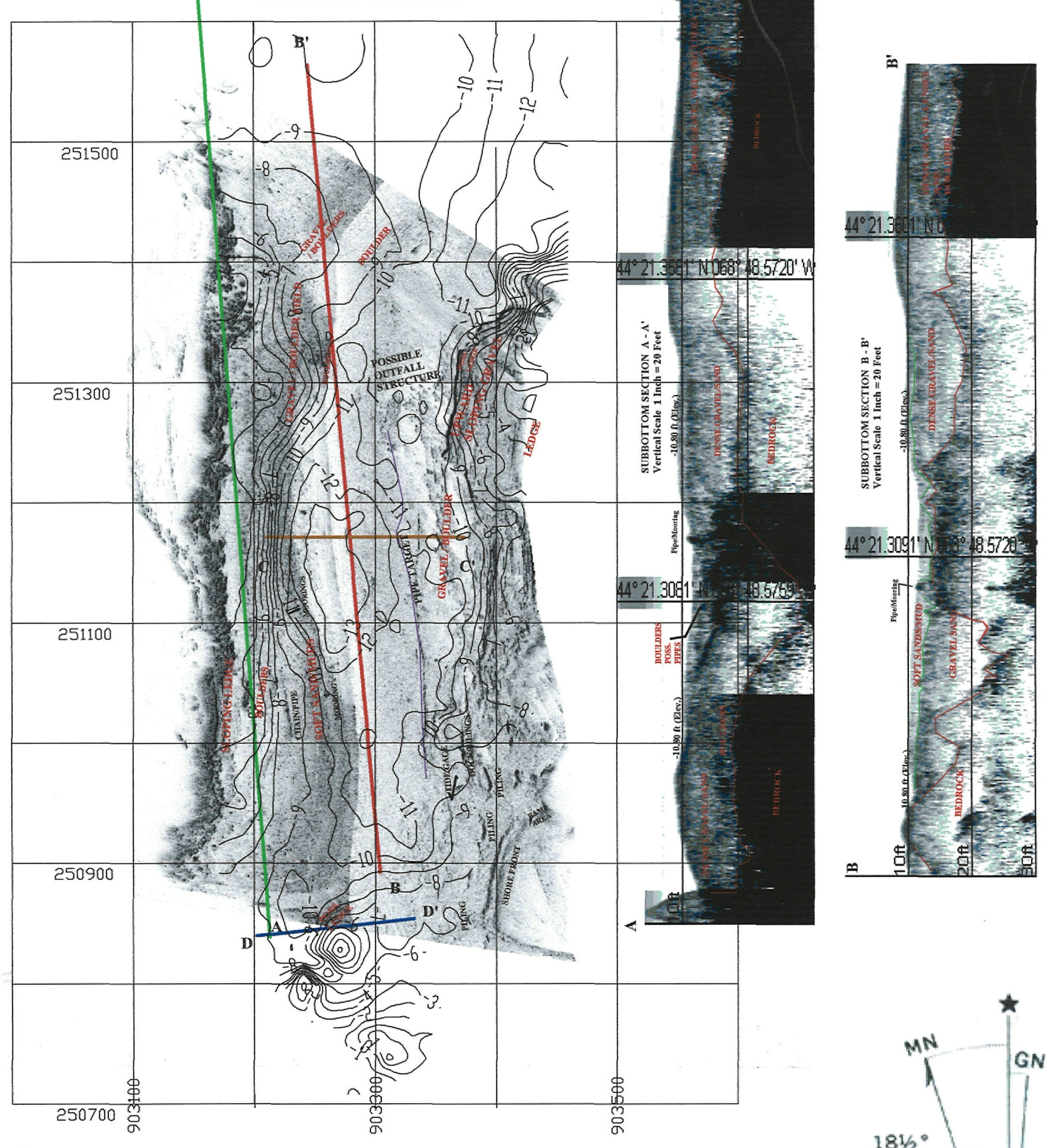
NOTES

Bottom Elevation Contours based on HYDROTERRA's December 2004 soundings. Contour Interval at 1-foot

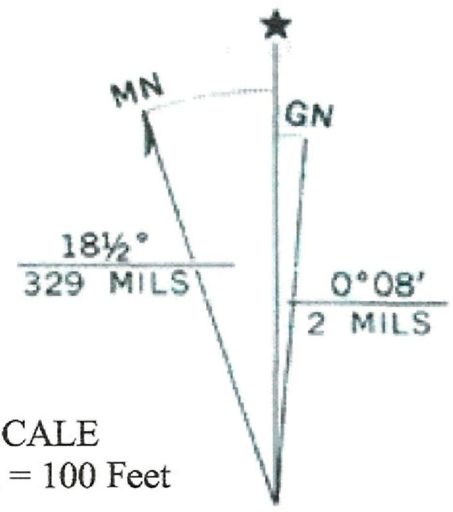
Horizontal Datum = 1983 Eastern Maine State Plane (northings and eastings in feet).

Vertical Datum = 1929 NGVD established onsite by ASEC Corp. (2005) at Goose Cove Tide Station
Station Location 250,981.152', 903,367.742' - 11.62' elev.





SUBBOTTOM SECTION D-D'
Vertical Scale 1 Inch = 20 Feet



SCALE
1 Inch = 100 Feet

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Dover, NH 03820
(603) 743-5728

FIGURE 4

TITLE
GOOSE COVE MARINE SURVEY
Brooksville, Maine

SIZE	CAGE CODE	DWG NO	REV
11X17		8202-2	1

SCALE Hor 1" = 100' Vert (see notes)	SHEET 1 of 3

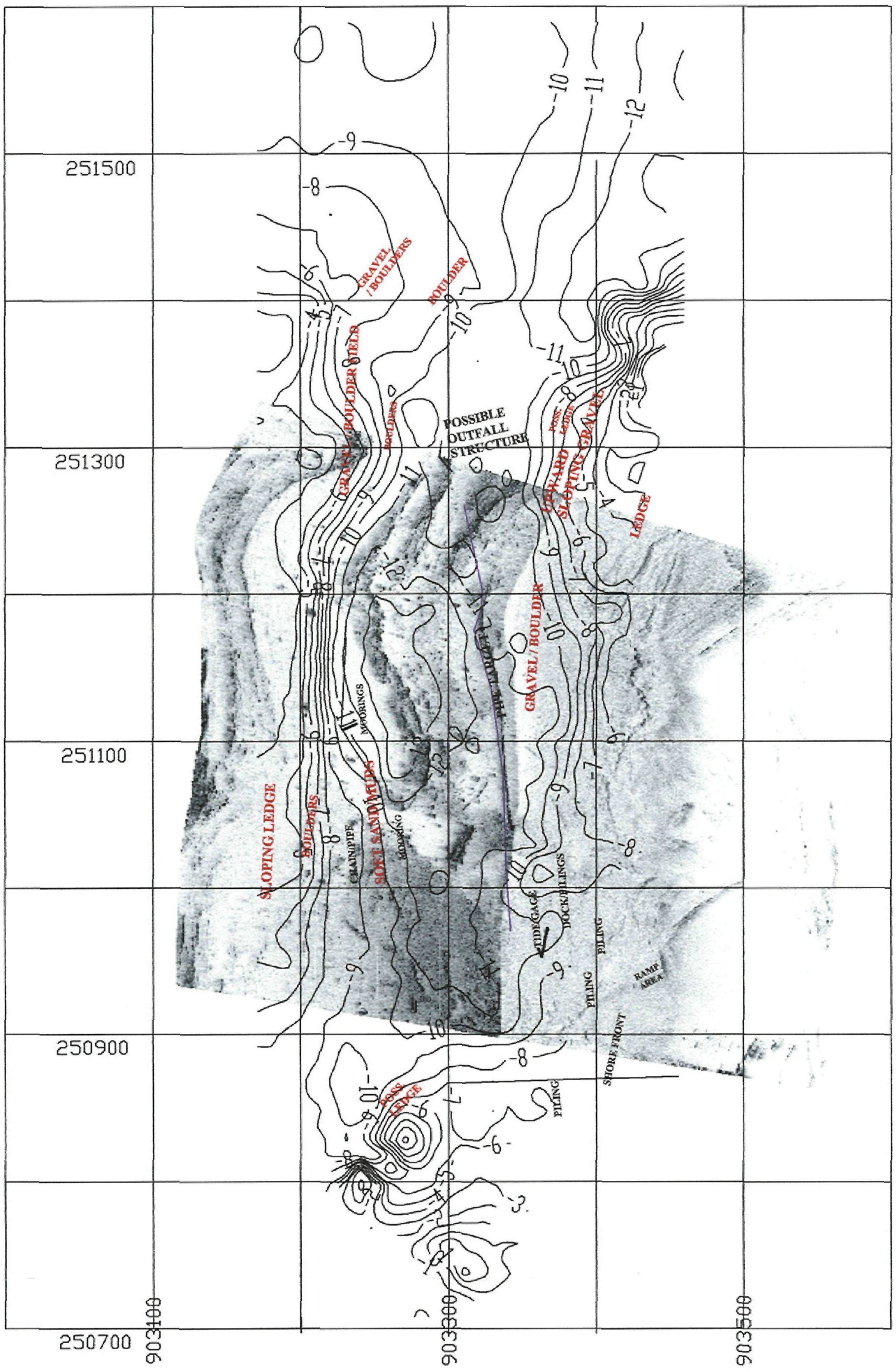
To the best of my knowledge, information, and belief,all information on this plan is true and accurately shown.

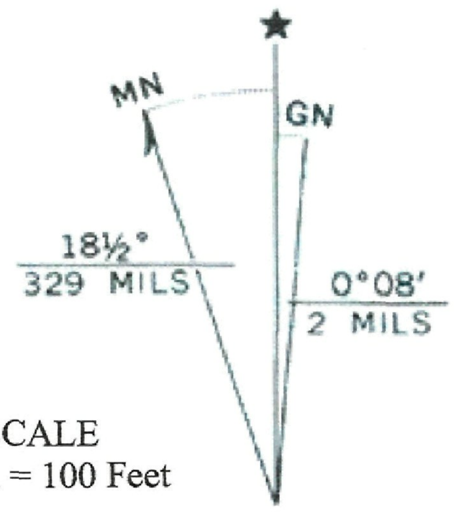
NOTES

Bottom Elevation Contours based on HYDROTERRA's December 2004 soundings. Contour Interval at 1-foot

Horizontal Datum = 1983 Eastern Maine State Plane (northings and eastings in feet).

Vertical Datum = 1929 NGVD established onsite by ASEC Corp. (2005) at Goose Cove Tide Station Station Location 250,981.152', 903,367.742' - 11.62' elev.





SCALE
1 Inch = 100 Feet

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Dover, NH 03820
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FIGURE 5 Side Scan Image
Insert No. 2032A

TITLE
GOOSE COVE MARINE SURVEY
Brooksville, Maine

SIZE	CAGE CODE	DWG NO	REV
11X17		8202-2	1

SCALE Hor 1" = 100' Vert (see notes) SHEET 1 of 3

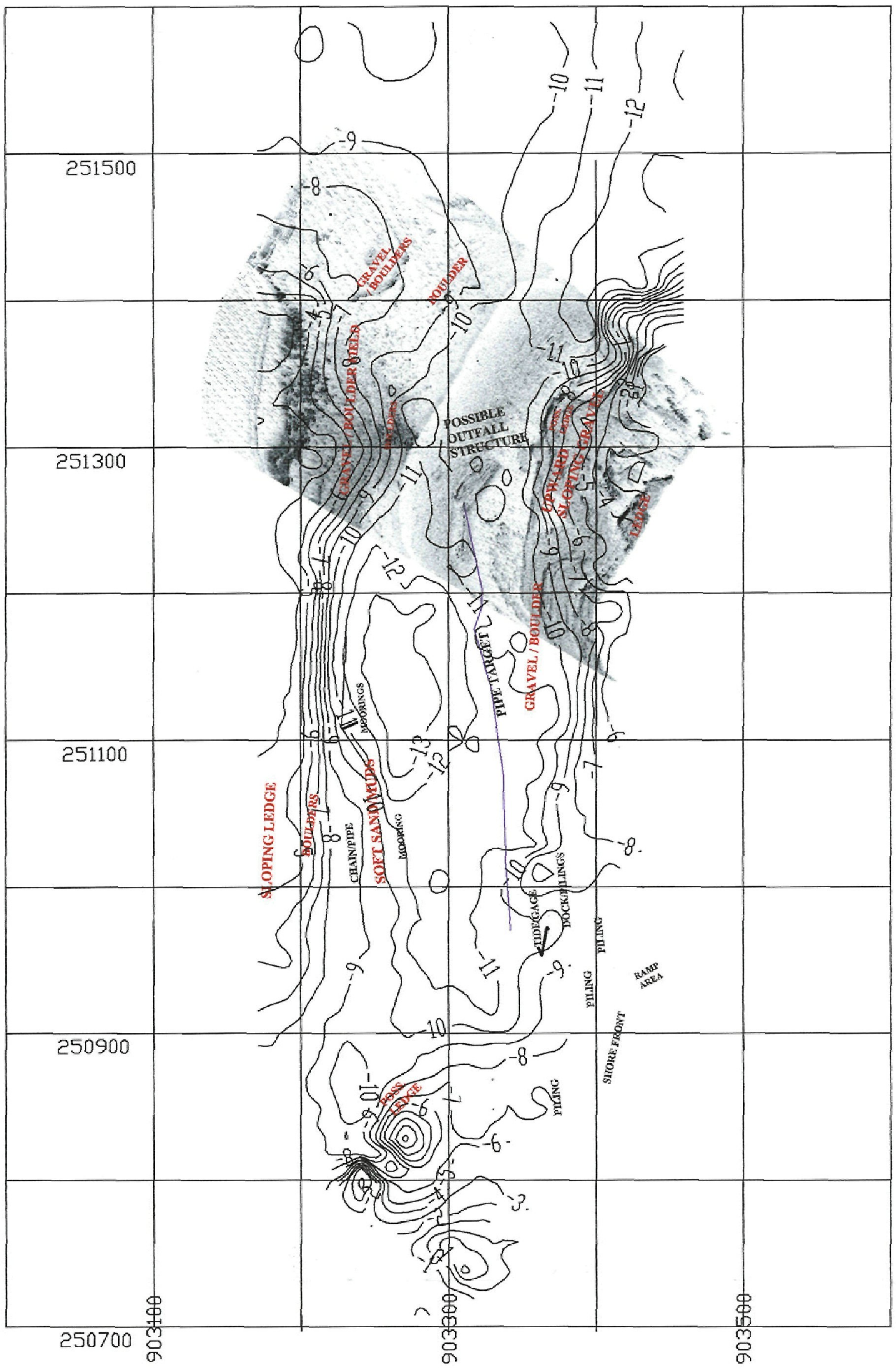
To the best of my knowledge, information, and belief,all information on this plan is true and accurately shown.

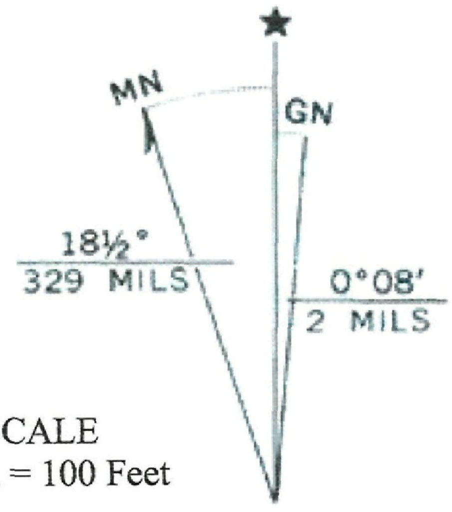
NOTES

Bottom Elevation Contours based on HYDROTERRA's December 2004 soundings. Contour Interval at 1-foot

Horizontal Datum = 1983 Eastern Maine State Plane (northings and eastings in feet).

Vertical Datum = 1929 NGVD established onsite by ASEC Corp. (2005) at Goose Cove Tide Station Station Location 250,981.152', 903,367.742' - 11.62' elev.





SCALE
1 Inch = 100 Feet

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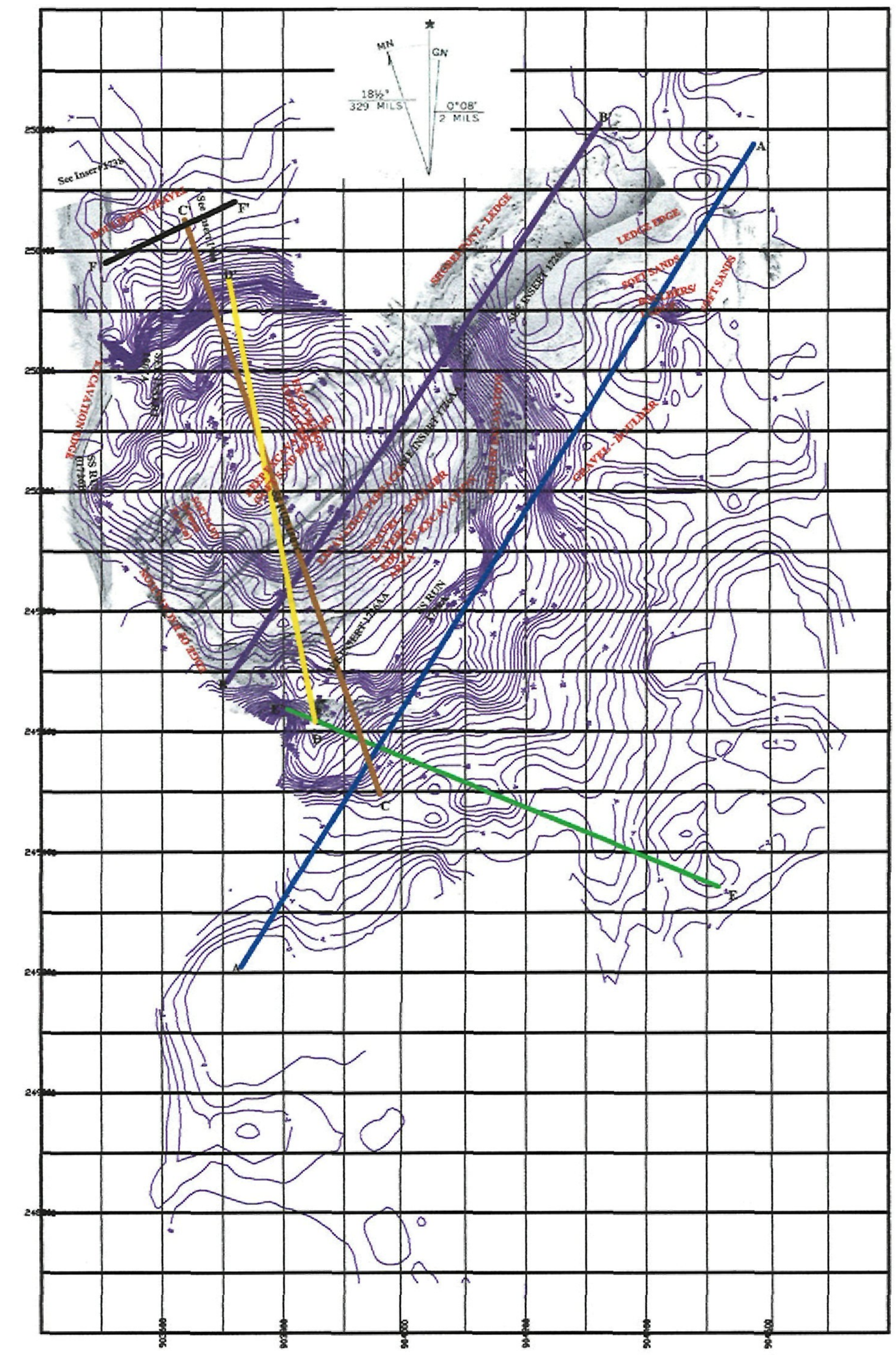
Dover, NH 03820
(603) 743-5728

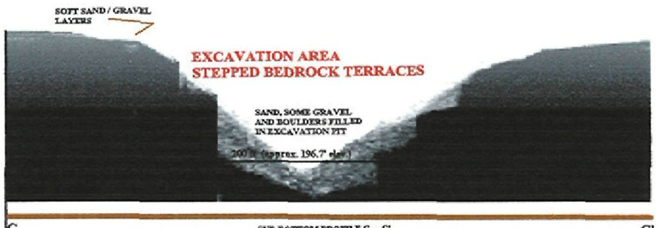
FIGURE 6 Side Scan Image
Insert No. 2034B

TITLE
GOOSE COVE MARINE SURVEY
Brooksville, Maine

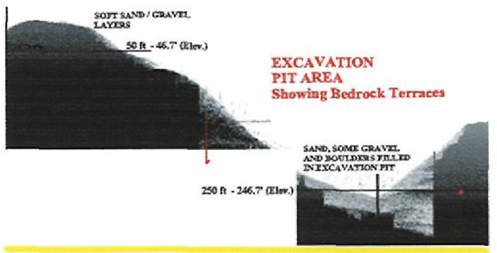
SIZE	CAGE CODE	DWG NO	REV
11X17		8202-2	1
SCALE	Hor 1" = 100' Vert (see notes)	SHEET	3 of 3

To the best of my knowledge, information and belief,
the information on this plan is true and accurately shown.

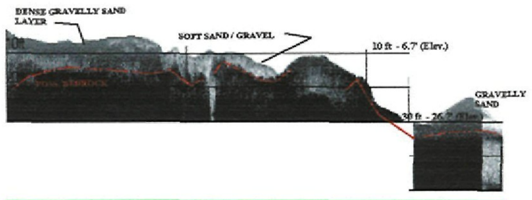




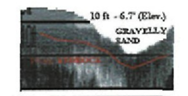
SUB-BOTTOM PROFILE C - C'
Vertical Scale 1 inch = 100 feet



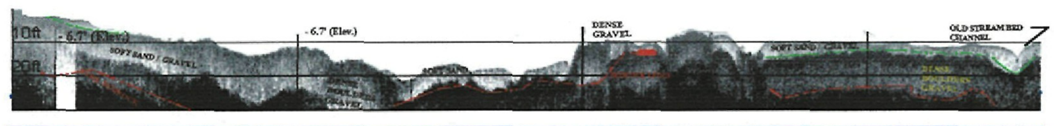
SUB-BOTTOM PROFILE D - D'
Vertical Scale 1 inch = 50 feet



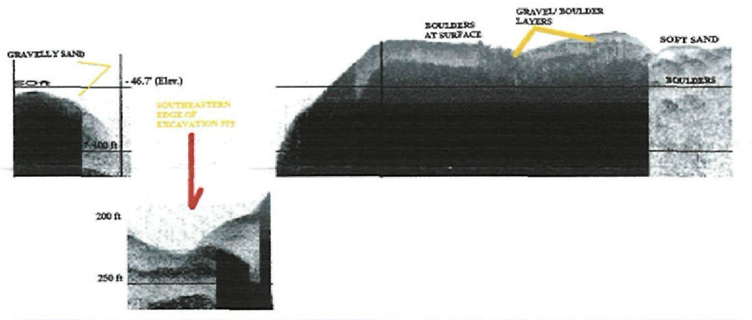
EAST-WEST SUB-BOTTOM PROFILE E - E'
Vertical Scale 1 inch = 20 feet



SUB-BOTTOM PROFILE F - F'
Vertical Scale 1 inch = 20 feet



SUB-BOTTOM PROFILE A - A'
Vertical Scale 1 inch = 20 feet



SUB-BOTTOM PROFILE B - B'
Vertical Scale 1 inch = 50 feet

NOTES

Bottom Elevation Contours based on HYDROTERRA's December 2004 soundings. Contour Intervals varies as followed:

-300 to -50 = 10-foot contour
-50 to -20 = 2-foot contour
-20 to 0 = 1-foot contour

Horizontal Datum = 1983 Eastern Maine State Plane (northings and eastings in feet).

Vertical Datum = 1929 NGVD established onsite by ASEC Corp. (2005) at Goose PondTide Station
Station Location 249,162.223', 904,301.839' - 7.06' elev.

Drawing Horizontal Scale 1 inch = 100 feet
Sub-Bottom Profile Vertical Scale - as noted on profile

HYDROTERRA
Environmental Services LLC
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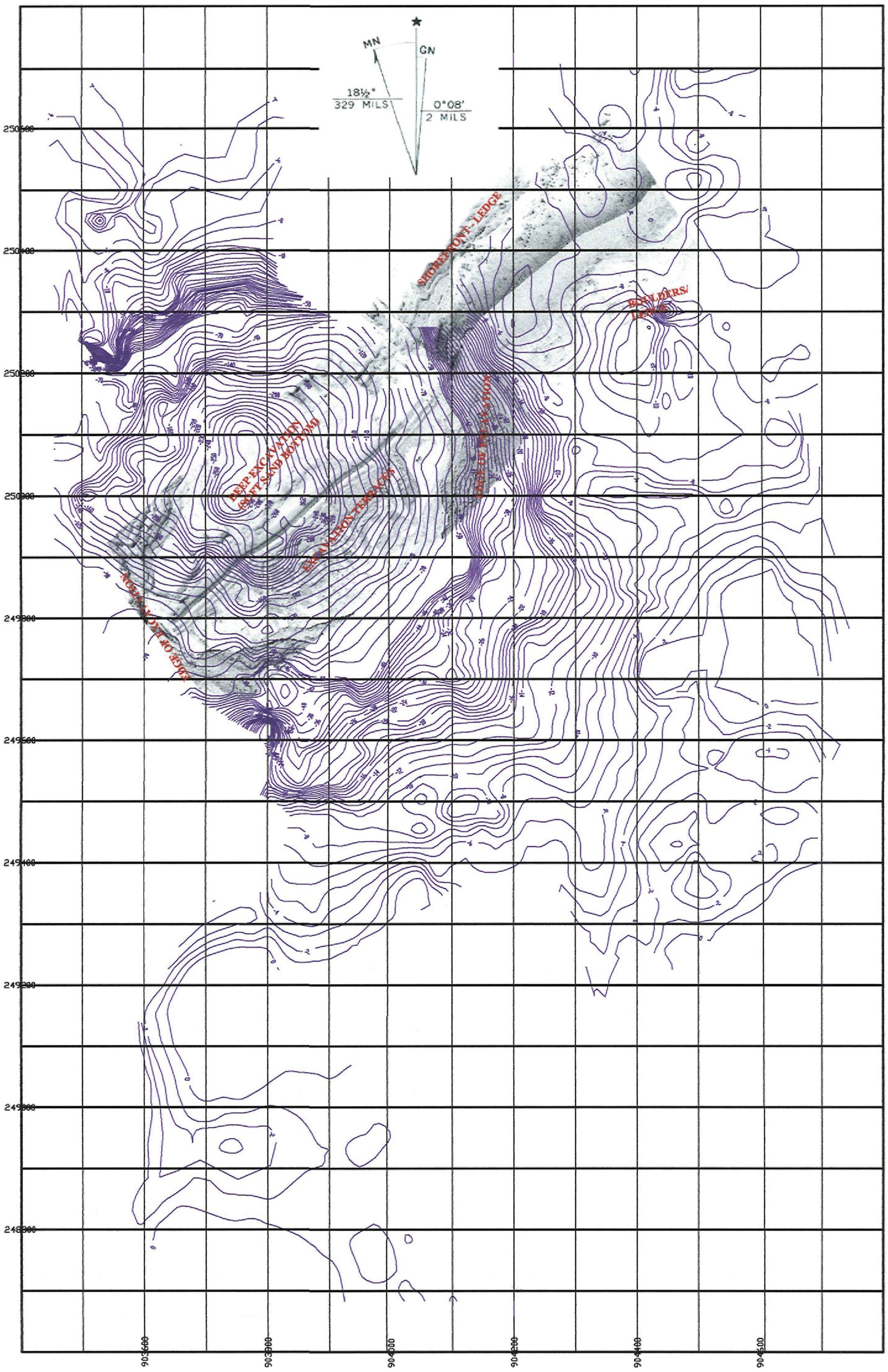
Dover, NH 03820

FIGURE 7

TITLE
GOOSE POND MARINE SURVEY
Brooksville, Maine

SIZE	DWG NO	REV
E	8202-2	1

SCALE Horizontal 1" = 100' Vertical (see notes)
SHEET 1 of 3



To the best of my knowledge, information and belief,
the information on this plan is true and accurately shown.

NOTES

Bottom Elevation Contours based on HYDROTERRA's December 2004 soundings. Contour Intervals varies as followed:

-300 to -50 = 10-foot contour
-50 to -20 = 2-foot contour
-20 to 0 = 1-foot contour

Horizontal Datum = 1983 Eastern Maine State Plane (northings and eastings in feet).

Vertical Datum = 1929 NGVD established onsite by ASEC Corp. (2005) at Goose PondTide Station Station Location 249,162.223', 904,301.839' - 7.06' elev.

Drawing Horizontal Scale 1 inch = 100 feet
Sub-Bottom Profile Vertical Scale - as noted on profile

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Dover, NH 03820

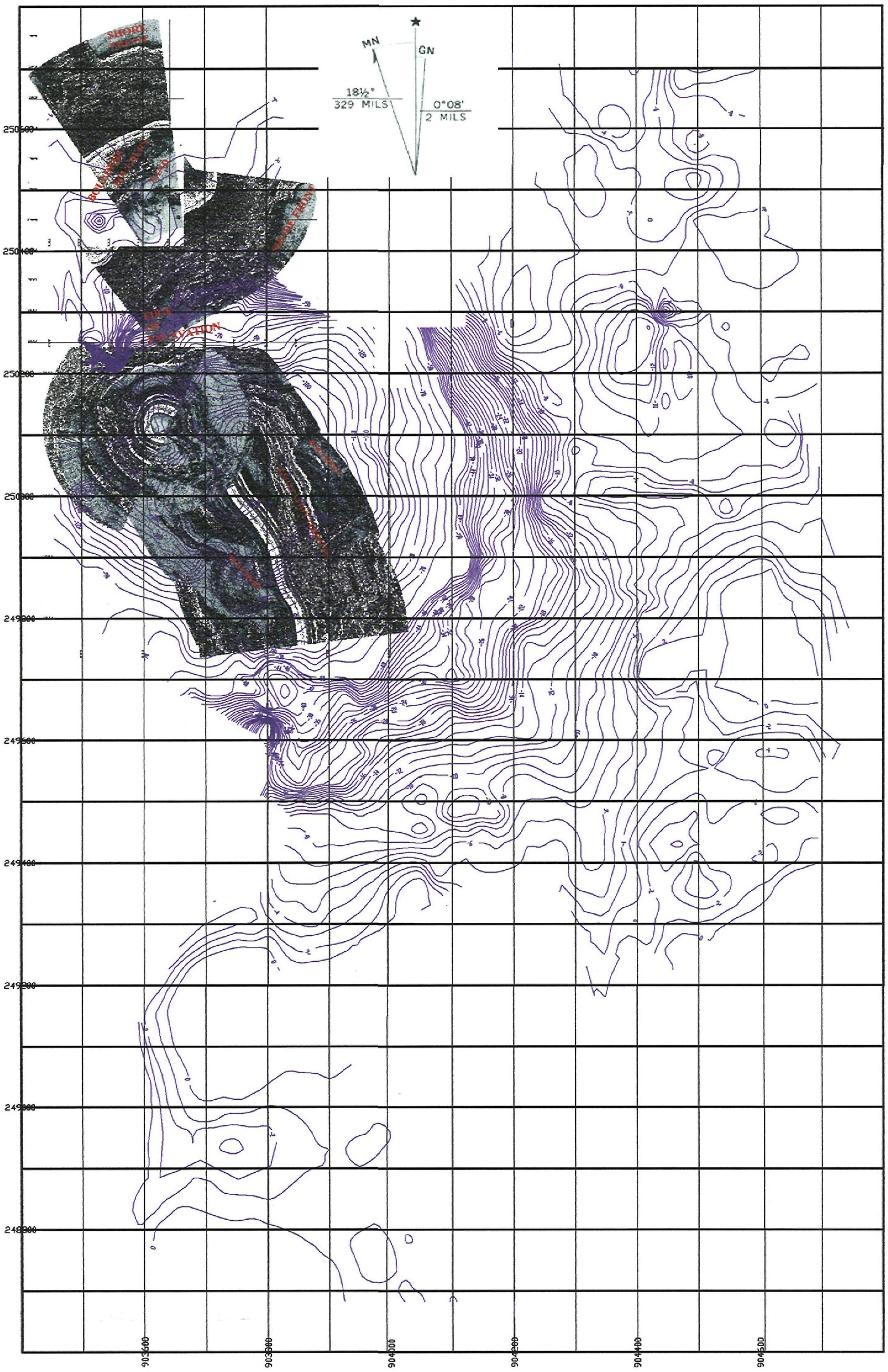
TITLE

FIGURE 8
Scan Side Image
Insert 1726 AA

GOOSE POND MARINE SURVEY
Brooksville, Maine

SIZE	DWG NO	REV
D	8202-2	No. 2 3/12/05

SCALE	SHEET
Horizontal 1" = 100' Vertical (see notes)	2 of 3



To the best of my knowledge, information and belief, the information on this plan is true and accurately shown.

NOTES

Bottom Elevation Contours based on HYDROTERRA's December 2004 soundings. Contour Intervals varies as followed:

-300 to -50 = 10-foot contour
-50 to -20 = 2-foot contour
-20 to 0 = 1-foot contour

Horizontal Datum = 1983 Eastern Maine State Plane (northings and eastings in feet).

Vertical Datum = 1929 NGVD established onsite by ASEC Corp. (2005) at Goose PondTide Station Station Location 249,162.223', 904,301.839' - 7.06' elev.

Drawing Horizontal Scale 1 inch = 100 feet
Sub-Bottom Profile Vertical Scale - as noted on profile

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Environmental Services LLC

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Dover, NH 03820

TITLE

FIGURE 9
Scan Side Images
Inserts 1807a, 1738, and 1740

GOOSE POND MARINE SURVEY
Brooksville, Maine

SIZE	DWG NO	REV
D	8202-2	No. 2 3/12/05

SCALE	SHEET
Horizontal 1" = 100' Vertical (see notes)	2 of 3

3.0 SUMMARY OF FINDING

The following section provides a summary of the key bottom and subbottom features identifed in both Goose Cove and Goose Pond.

3.1 Goose Cove

Sounding data (see Figure 4) suggests that the deepest bottom elevations encountered in the cove (-13 feet) were located along the central mid-section of the cove (location 251,100' and 903,300'). With the exception of the area adjacent to the former dam and along the shorelines, the bottom topography in the cove was generally flat. Bedrock outcrops along the shoreline and adjacent to the former dam area created sharp topographic relief in contrast to the center portions of the cove. The side scan sonar transects and sub-bottom profiles indicated that the majority of the bottom of the cove is covered with a gravelly sand. A soft sand zone was identified within the deepest portion of the cove (location 251,100' and 903,300'). The sub-bottom profiles suggest that the thickness of the soft sand zone was generally less than 3 feet. The denser gravelly sand was estimated at an approximate maximum thickness of 15 feet and located at the deepest bottom channel area. This gravelly sand deposit contained many large boulders with maximum size estimates between 2 and 3 feet diameters. Bedrock elevations varied greatly across the cove (from bedrock outcrop at the water surface adjacent to the shore edges to the deepest elevation to the top of bedrock estimated at -30 feet NGVD).

Several manmade features were identified on the cove bottom, as marked on the Figures 4, 5, and 6. These features included moorings, pilings, chains and pipes. A series of side scan sonar targets which are believed to be associated with a pipe and possible outfall location from the former mining operations were identified trending north-south along an easterly track of approximately 903,400'. Minor mounding was noted at the possible outfall location, however no significant soft sediment mound was observed.

3.2 Goose Pond

With the exception of the former mine excavation hole, sounding data (Figure 7) suggests the bottom elevations of the pond ranged from 0 to -20 feet. Shallowest sections were encountered along the southern end of the pond with downward sloping topography to the northwest. Variartion on bottom topography appears to be controlled by underling bedrock surface. The bathymetric, side scan and sub-bottom data indicates that the excavation hole is well defined and forms a concentric shape. The vertical slopes of the excavation were stepped into terraces. Four distinct terraces were identified from the survey data. Several additional smaller steps were also noted along partial sections of the excavation. The deepest portion of the elevation had an approximate elevation of -300 feet. The sub-bottom and side scan data suggest that a soft sand has been deposited on the terraces and bottom of the excavation. The thickness of this deposit appears to range from 1 foot (over the small terrace) to over 25 feet (at the bottom of the excavation). The side scan sonar imagery also indicated several boulders within the excavation. At an approximable location of 250,001' / 903,901' survey data identified possible man-made debris such as a pipe or metal objects.

For the remaining portions of the pond, the bottom is covered with up to 15 feet of gravelly sand with smaller pockets of layered soft sand. A former stream bed channel was located at location 250,494' / 904,530'. Several large boulders and/or bedrock outcrops were seen thoughout the pond area. No significant man-made objects were noted in pond.

APPENDIX A

ELECTRONIC DATA FILES

APPENDIX B

STUDY AREA DRAWING

To the best of my knowledge, information, and belief,all information on this plan is true and accurately shown.

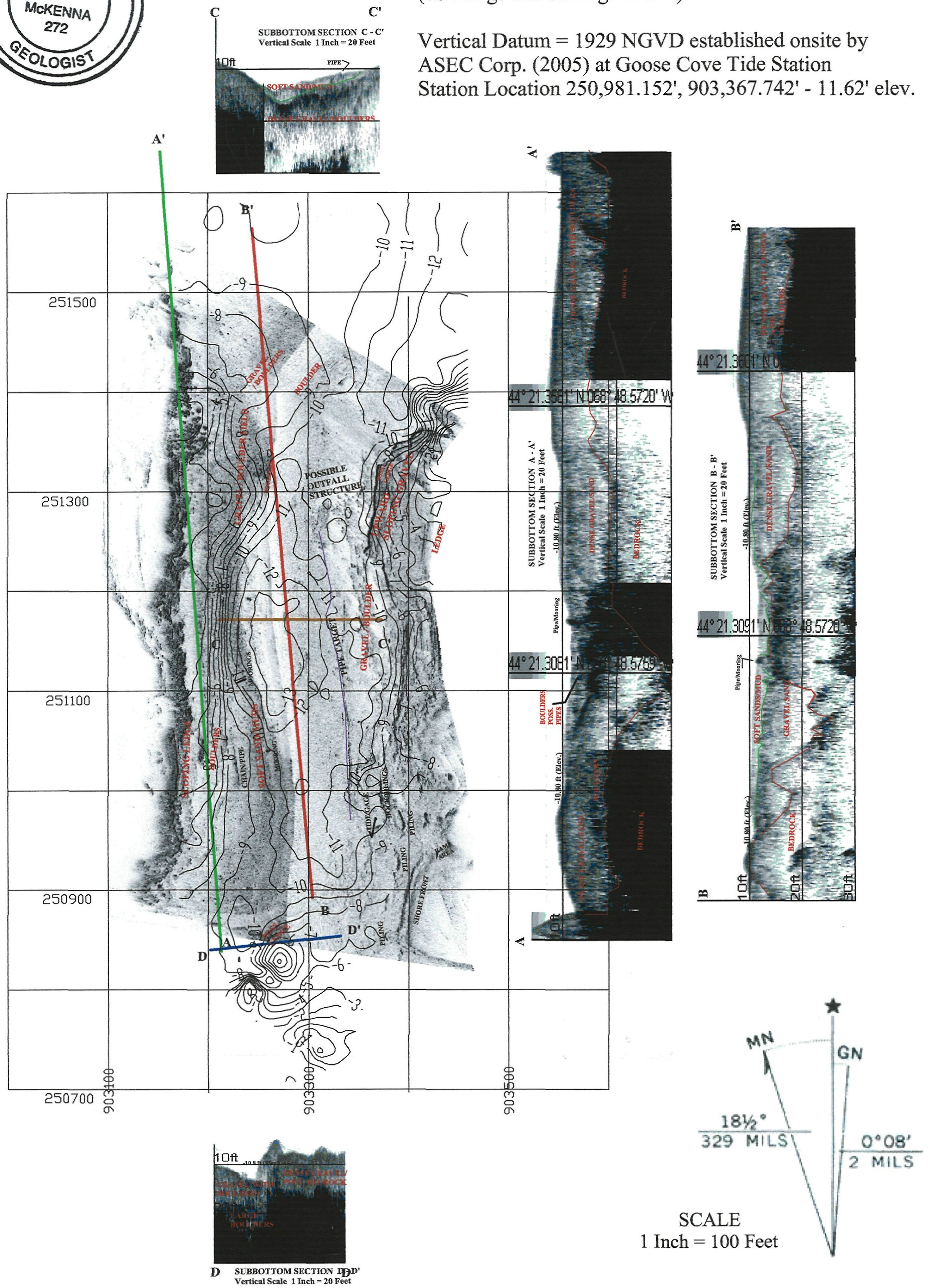
STATE OF MAINE
JACK McKENNA
272
GEOLOGIST

NOTES

Bottom Elevation Contours based on HYDROTERRA's December 2004 soundings. Contour Interval at 1-foot

Horizontal Datum = 1983 Eastern Maine State Plane (northings and eastings in feet).

Vertical Datum = 1929 NGVD established onsite by ASEC Corp. (2005) at Goose Cove Tide Station
Station Location 250,981.152', 903,367.742' - 11.62' elev.



SCALE
1 Inch = 100 Feet

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FIGURE 4

TITLE
GOOSE COVE MARINE SURVEY
Brooksville, Maine

SIZE	CAGE CODE	DWG NO	REV
11X17		8202-2	1

SCALE Hor 1" = 100' Vert (see notes) SHEET 1 of 3

To the best of my knowledge, information, and belief,all information on this plan is true and accurately shown.

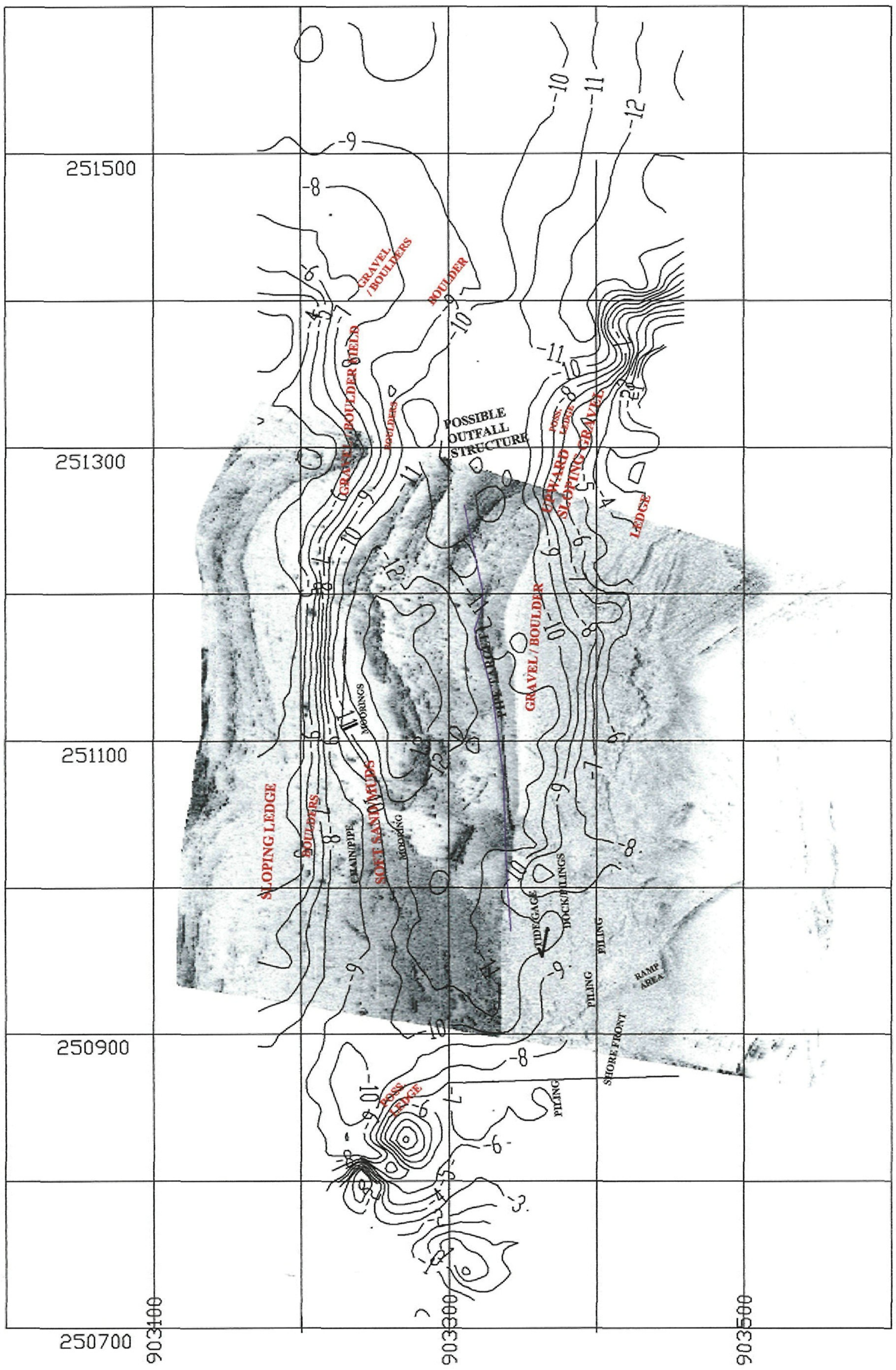
STATE OF MAINE
JACK McKENNA
272
GEOLOGIST

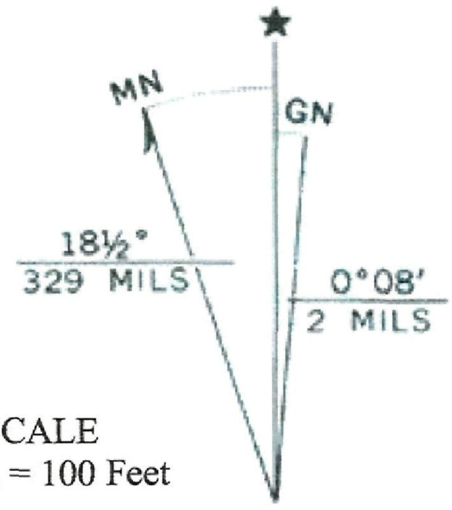
NOTES

Bottom Elevation Contours based on HYDROTERRA's December 2004 soundings. Contour Interval at 1-foot

Horizontal Datum = 1983 Eastern Maine State Plane (northings and eastings in feet).

Vertical Datum = 1929 NGVD established onsite by ASEC Corp. (2005) at Goose Cove Tide Station
Station Location 250,981.152', 903,367.742' - 11.62' elev.





SCALE
1 Inch = 100 Feet

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FIGURE 5 Side Scan Image
Insert No. 2032A

TITLE
GOOSE COVE MARINE SURVEY
Brooksville, Maine

SIZE	CAGE CODE	DWG NO	REV
11X17		8202-2	1

SCALE Hor 1" = 100' Vert (see notes) SHEET 1 of 3

To the best of my knowledge, information, and belief,all information on this plan is true and accurately shown.

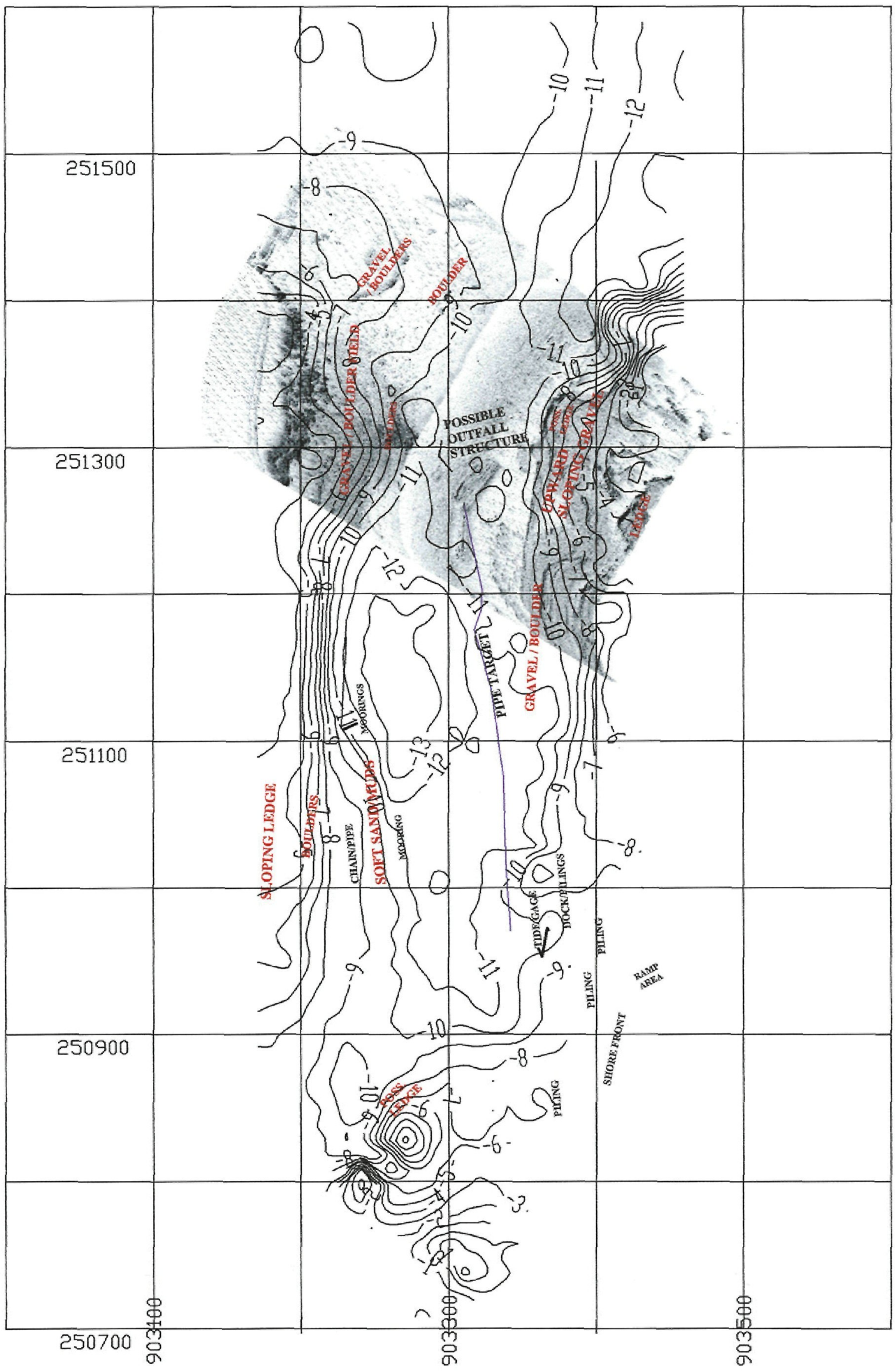
STATE OF MAINE
JACK
McKENNA
272
GEOLOGIST

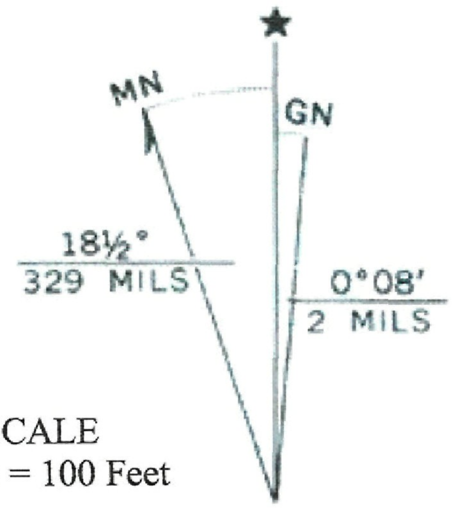
NOTES

Bottom Elevation Contours based on HYDROTERRA's December 2004 soundings. Contour Interval at 1-foot

Horizontal Datum = 1983 Eastern Maine State Plane (northings and eastings in feet).

Vertical Datum = 1929 NGVD established onsite by ASEC Corp. (2005) at Goose Cove Tide Station Station Location 250,981.152', 903,367.742' - 11.62' elev.





SCALE
1 Inch = 100 Feet

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Environmental Services

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FIGURE 6 Side Scan Image
Insert No. 2034B

TITLE
GOOSE COVE MARINE SURVEY
Brooksville, Maine

SIZE	CAGE CODE	DWG NO	REV
11X17		8202-2	1
SCALE	Hor 1" – 100' Vert (see notes)	SHEET	3 of 3

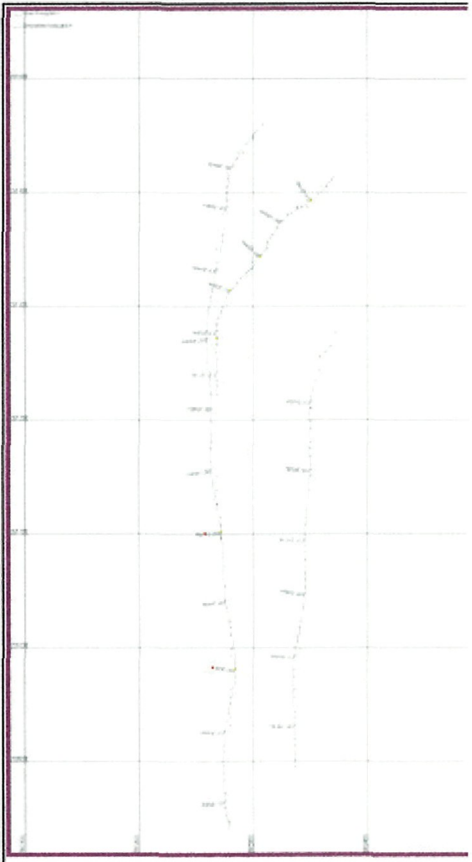
SURVEY TRANSECT INFORMATION

Sonar Processing by SonarWeb V3.16ZL PRO Chesapeake Technology, Inc To replace this message choose a custom logo under the 'HTML Title Block' Option	Hydroterra Environmental Service Jack McKenna

GOOSE COVE SIDE SCAN RUNS

Project Information

HPGN Maine State Planes, Eastern Zone, US Foot

Item	Description	Click thumbnail to see full mosaic	Click thumbnail to see full navigati
Number of Acoustic Data Files	3		
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Total Line Length (US Feet)	1253.9		
Total Swath Area (SQ. US Feet)	345044.0		
Mosaic Size (US Feet)	448.5 X 740.5		
Mosaic Resolution (US Feet/pixel)	0.33		
Mosaic Size Pixels	1368 X 2257		

Click on Sonar File for full Details

Data File	File Size	Start Time	End Time	Line Length	Line Area
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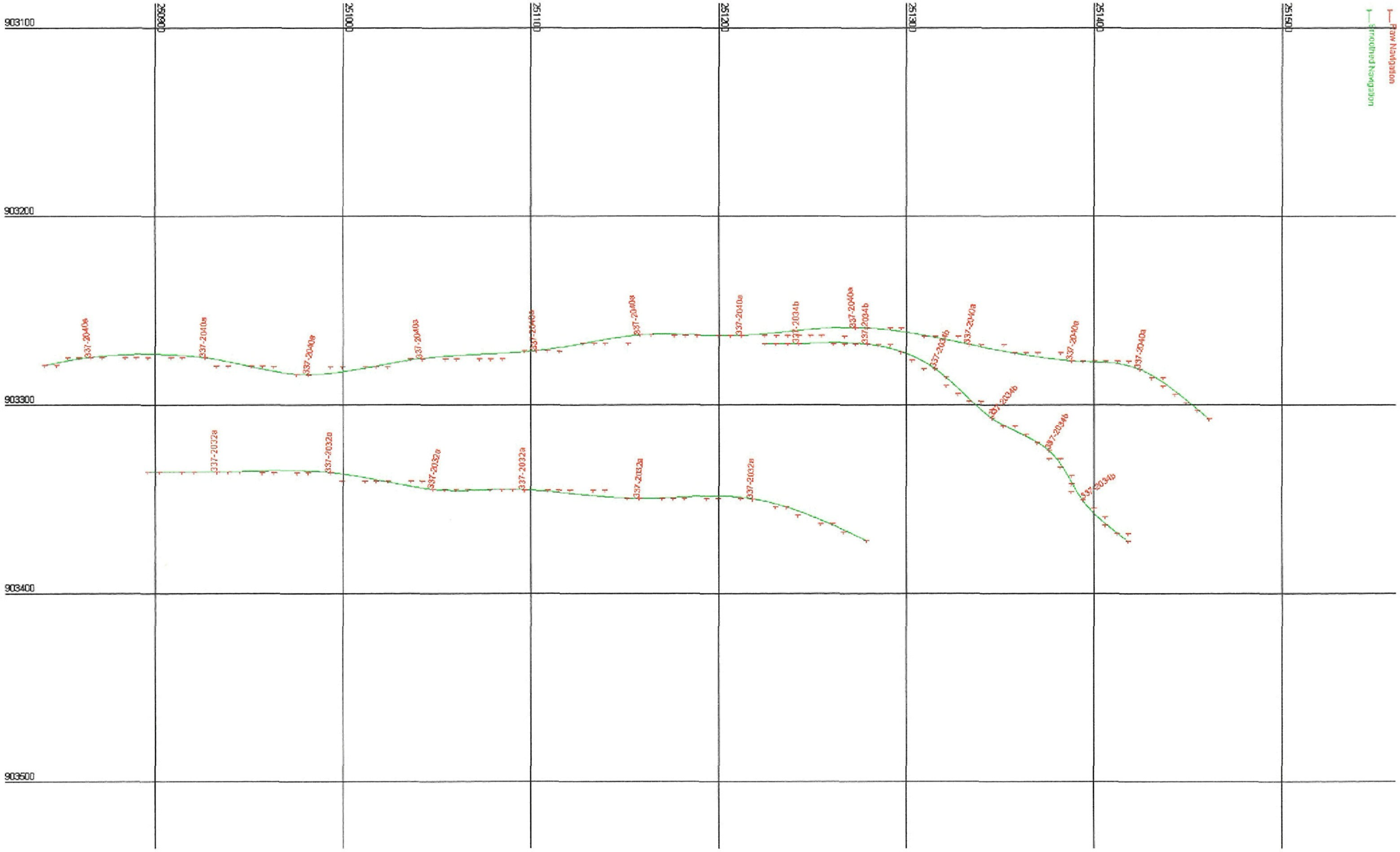
D:\Raw SSS Data\337-2040a.XTF	10820 KB	12/02/2004 20:42:55	12/02/2004 20:45:37	633.1	186268.8
D:\Raw SSS Data\337-2034b.XTF	6429 KB	12/02/2004 20:38:08	12/02/2004 20:39:41	233.7	59713.4

Sonar Processing by SonarWeb V3.16ZL PRO Chesapeake Technology Inc.



Raw Navigation
Smoothed Navigation
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251200
251300
251400
251500
903100
903200
903300
903400
903500
337-2040a
337-2034b
337-2032a

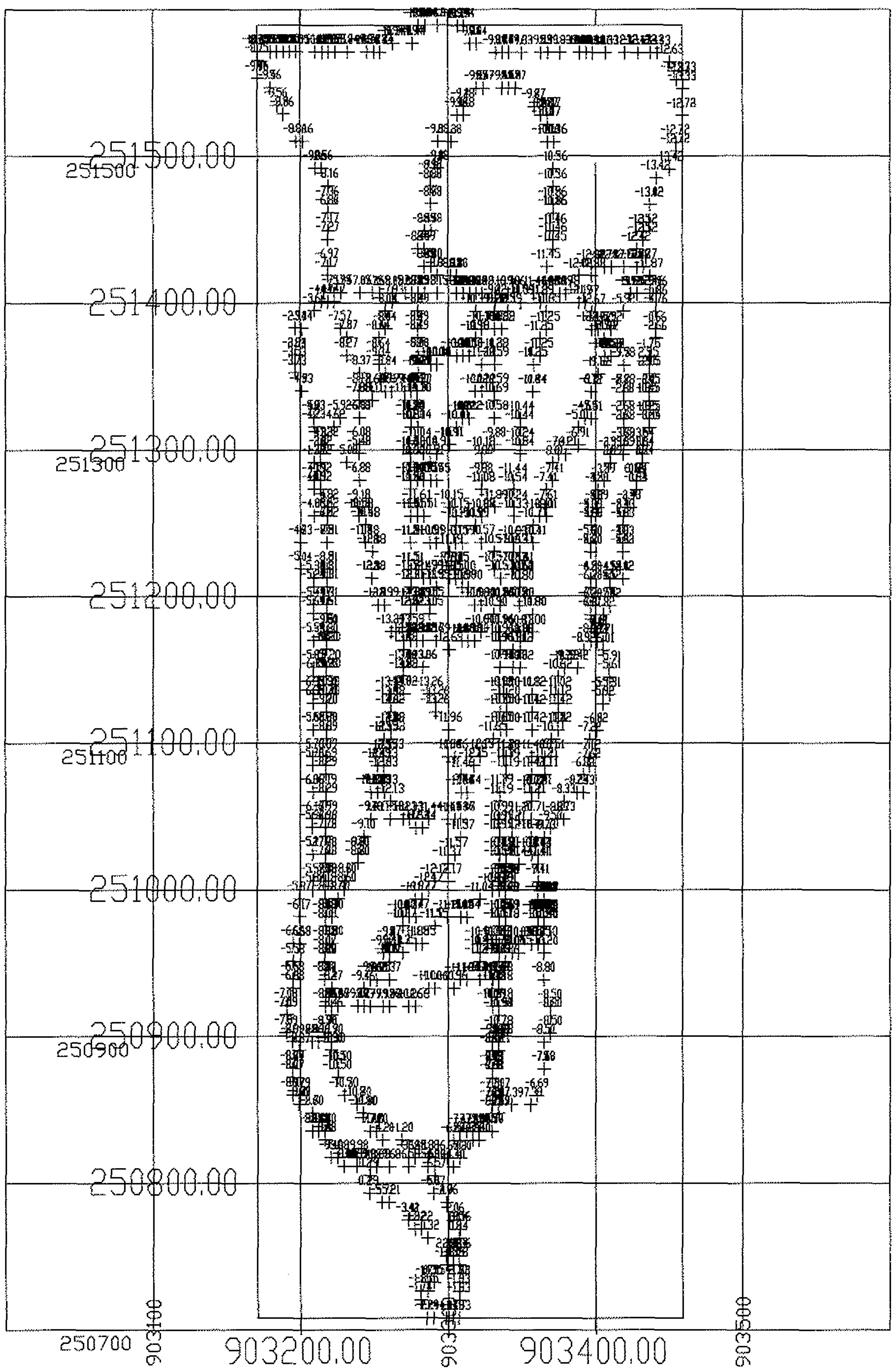
To the best of my knowledge, information, and belief,all information on this plan is true and accurately shown.

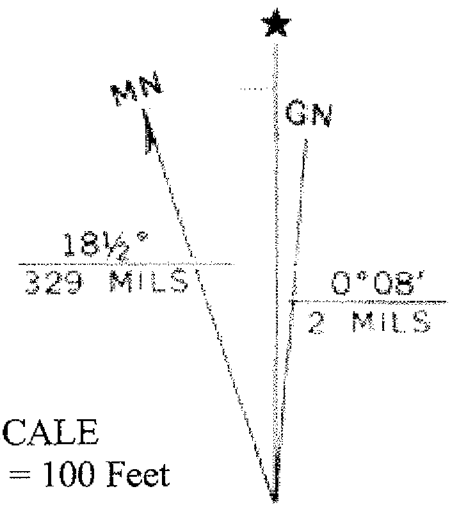
NOTES

Bottom Elevation Contours based on HYDROTERRA's December 2004 soundings. Contour Interval at 1-foot

Horizontal Datum = 1983 Eastern Maine State Plane (northings and eastings in feet).

Vertical Datum = 1929 NGVD established onsite by ASEC Corp. (2005) at Goose Cove Tide Station Station Location 250,981.152', 903,367.742' - 11.62' elev.





SCALE
1 Inch = 100 Feet

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BATHYMETRY TRACKS

TITLE
GOOSE COVE MARINE SURVEY
Brooksville, Maine

SIZE	CAGE CODE	DWG NO	REV
11X17		8202-2	1

SCALE Hor. 1" = 100' Vert. (see notes) SHEET 3 of 3

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GOOSE POND SIDE SCAN RUNS

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<tr><th colspan="4">HPGN Maine State Planes, Eastern Zone, US Foot</th></tr>
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<tr><td>Number of Acoustic Data Files</td><td>7</td><td rowspan="7"></td><td rowspan="7"></td></tr>
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Click on Sonar File for full Details

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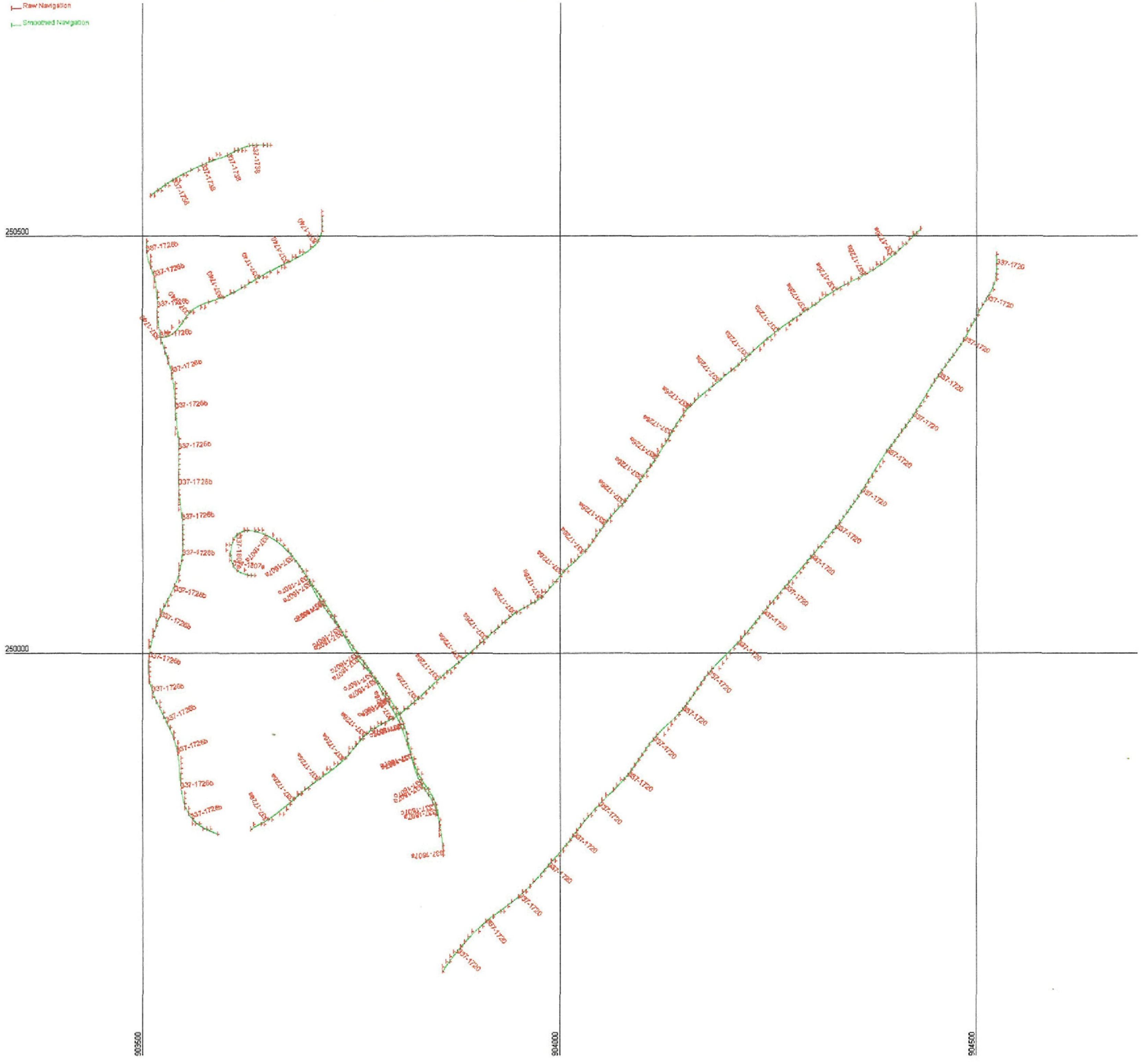
D:\Raw SSS Data\337-1807a.XTF	14136 KB	12/02/2004 18:07:35	12/02/2004 18:11:07	554.6	156688.0

Sonar Processing by SonarWeb V3.16ZL PRO Chesapeake Technology Inc.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Smoothed Navigation
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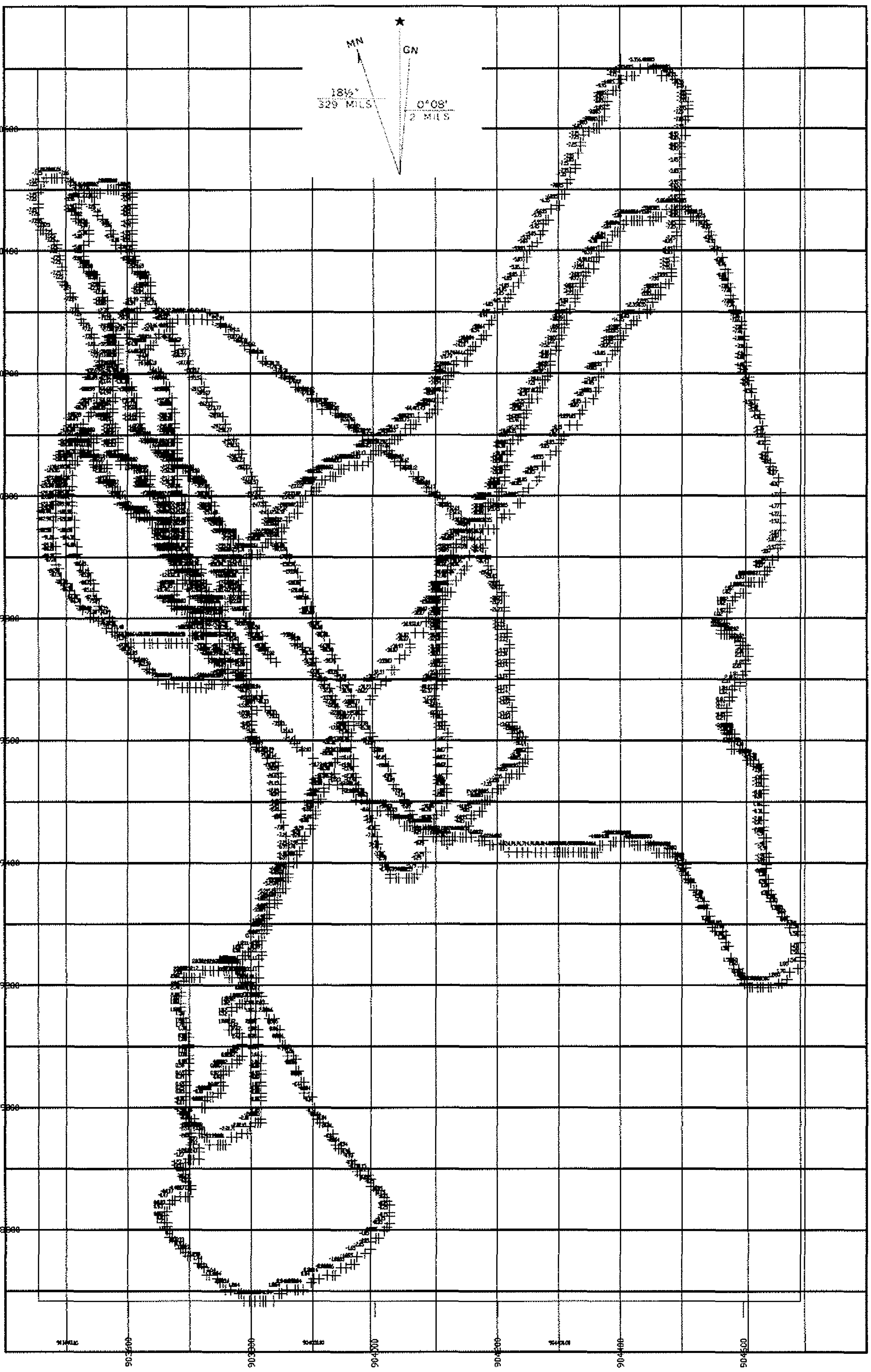
037-1740



To the best of my knowledge, information and belief,
the information on this plan is true and accurately shown.

NOTES

Bottom Elevation Contours based on HYDROTE
December 2004 soundings. Contour Intervals vari
as followed:

-300 to -50 = 10-foot contour
-50 to -20 = 2-foot contour
-20 to 0 = 1-foot contour

Horizontal Datum = 1983 Eastern Maine State Pla
(northings and eastings in feet).

Vertical Datum = 1929 NGVD established onsite
ASEC Corp. (2005) at Goose PondTide Station
Station Location 249,162.223', 904,301.839' - 7.0

Drawing Horizontal Scale 1 inch = 100 feet
Sub-Bottom Profile Vertical Scale - as noted on p

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Dover, NH 03820

TITLE

BATHYMETRY TRA

GOOSE POND MARINE SU

Brooksville, Maine

SIZE	DWG NO	REV
D	8202-2	

SCALE	SHEET
Horizontal 1" – 100' Vertical (see notes)	2 of 3

Appendix C

Surface Soil Sample Laboratory Results, Metals

SURFACE SOIL SAMPLE RESULTS
METALS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	99-BKSS-01 10/06/1999 Primary	99-BKSS-02 10/06/1999 Primary	99-BKSS-03 10/06/1999 Primary	99-SS-04 10/06/1999 Primary	99-SS-05 10/06/1999 Primary	99-SS-07 10/05/1999 Primary
Starting Depth	(feet)	0.00	0.00	0.00	0.00	0.00	0.00
Ending Depth	(feet)	0.50	0.50	0.50	0.50	0.50	0.50
Aluminum	(mg/kg)						
Antimony	(mg/kg)						
Arsenic	(mg/kg)						
Barium	(mg/kg)						
Beryllium	(mg/kg)						
Cadmium	(mg/kg)	0.8U	0.8U	0.8U	0.8U	27	51
Calcium	(mg/kg)						
Chromium	(mg/kg)						
Cobalt	(mg/kg)						
Copper	(mg/kg)	56J	51J	49J	1400J	1800J	2600J
Iron	(mg/kg)						
Lead	(mg/kg)	110	110	110	210	640	1100
Magnesium	(mg/kg)						
Manganese	(mg/kg)						
Mercury	(mg/kg)	0.1J	R	R	0.5J	0.7J	0.4J
Nickel	(mg/kg)						
Potassium	(mg/kg)						
Selenium	(mg/kg)	4U	4	4	11U	4U	4.8
Silver	(mg/kg)	1.1	1.1	0.8U	2.9	3.1	5.3

SURFACE SOIL SAMPLE RESULTS
METALS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	99-BKSS-01 10/06/1999 Primary	99-BKSS-02 10/06/1999 Primary	99-BKSS-03 10/06/1999 Primary	99-SS-04 10/06/1999 Primary	99-SS-05 10/06/1999 Primary	99-SS-07 10/05/1999 Primary
Sodium	(mg/kg)						
Thallium	(mg/kg)						
Vanadium	(mg/kg)						
Zinc	(mg/kg)	290	270	260	310	8400	9600

SURFACE SOIL SAMPLE RESULTS
METALS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

	SITE	99-SS-08	99-SS-09	99-SS-43	99-SS-44	99-SS-45	99-SS-46
CONSTITUENT	DATE	10/05/1999	10/05/1999	10/05/1999	10/06/1999	10/06/1999	10/05/1999
	RESULT TYPE	Primary	Primary	Primary	Primary	Primary	Primary
Starting Depth	(feet)	0.00	0.00	0.00	0.00	0.00	0.00
Ending Depth	(feet)	0.50	0.50	0.50	0.50	0.50	0.50
Aluminum	(mg/kg)						
Antimony	(mg/kg)						
Arsenic	(mg/kg)						
Barium	(mg/kg)						
Beryllium	(mg/kg)						
Cadmium	(mg/kg)	38	44	25	17	0.8U	17
Calcium	(mg/kg)						
Chromium	(mg/kg)						
Cobalt	(mg/kg)						
Copper	(mg/kg)	2300J	2400J	1300J	480J	80J	24000J
Iron	(mg/kg)						
Lead	(mg/kg)	840	880	440	210	120	8500
Magnesium	(mg/kg)						
Manganese	(mg/kg)						
Mercury	(mg/kg)	0.7J	0.7J	0.4J	0.2J	0.1J	7.2J
Nickel	(mg/kg)						
Potassium	(mg/kg)						
Selenium	(mg/kg)	4U	4.2	4U	4U	4U	39
Silver	(mg/kg)	39	4.2	2.3	0.9	0.8U	45

SURFACE SOIL SAMPLE RESULTS
METALS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	99-SS-08 10/05/1999 Primary	99-SS-09 10/05/1999 Primary	99-SS-43 10/05/1999 Primary	99-SS-44 10/06/1999 Primary	99-SS-45 10/06/1999 Primary	99-SS-46 10/05/1999 Primary
Sodium	(mg/kg)						
Thallium	(mg/kg)						
Vanadium	(mg/kg)						
Zinc	(mg/kg)	9100	9700	6300	4200	130	4700

SURFACE SOIL SAMPLE RESULTS
METALS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	99-TPD-11 10/05/1999 Primary	99-TPD-12 10/06/1999 Primary	99-TPD-13 10/06/1999 Primary	99-TPD-14 10/06/1999 Primary	99-TPD-15 10/06/1999 Primary	99-TPL-16 10/04/1999 Primary
Starting Depth	(feet)	0.00	0.25	0.25	0.25	0.25	0.00
Ending Depth	(feet)	0.50	0.50	0.50	0.50	0.50	0.50
Aluminum	(mg/kg)						
Antimony	(mg/kg)						
Arsenic	(mg/kg)						
Barium	(mg/kg)						
Beryllium	(mg/kg)						
Cadmium	(mg/kg)	15	25	19	16	0.8U	0.8U
Calcium	(mg/kg)						
Chromium	(mg/kg)						
Cobalt	(mg/kg)						
Copper	(mg/kg)	470J	1400J	1800J	1400J	180J	670J
Iron	(mg/kg)						
Lead	(mg/kg)	780	990	840	700	290	230
Magnesium	(mg/kg)						
Manganese	(mg/kg)						
Mercury	(mg/kg)	0.5J	0.5J	0.5J	0.5J	0.4J	0.7J
Nickel	(mg/kg)						
Potassium	(mg/kg)						
Selenium	(mg/kg)	4.9	9.9	5.2	4.9	9.8	20
Silver	(mg/kg)	4	4.4	4.3	3.7	2	3

SURFACE SOIL SAMPLE RESULTS
METALS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	99-TPD-11 10/05/1999 Primary	99-TPD-12 10/06/1999 Primary	99-TPD-13 10/06/1999 Primary	99-TPD-14 10/06/1999 Primary	99-TPD-15 10/06/1999 Primary	99-TPL-16 10/04/1999 Primary
Sodium	(mg/kg)						
Thallium	(mg/kg)						
Vanadium	(mg/kg)						
Zinc	(mg/kg)	4200	5800	4400	3800	50	90

SURFACE SOIL SAMPLE RESULTS
METALS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	99-TPL-17 10/04/1999 Primary	99-TPL-18 10/04/1999 Primary	99-WRP-19 10/04/1999 Primary	99-WRP-20 10/04/1999 Primary	99-WRP-21 10/04/1999 Primary	99-WRP-22 10/04/1999 Primary
Starting Depth	(feet)	0.00	0.00	0.00	0.00	0.00	0.00
Ending Depth	(feet)	0.50	0.50	0.50	0.50	0.50	0.50
Aluminum	(mg/kg)						
Antimony	(mg/kg)						
Arsenic	(mg/kg)						
Barium	(mg/kg)						
Beryllium	(mg/kg)						
Cadmium	(mg/kg)	0.8U	0.8U	22	4.5	8.7	13
Calcium	(mg/kg)						
Chromium	(mg/kg)						
Cobalt	(mg/kg)						
Copper	(mg/kg)	520J	630J	1600J	240J	1600J	2100J
Iron	(mg/kg)						
Lead	(mg/kg)	410	150	430	99	780	3000
Magnesium	(mg/kg)						
Manganese	(mg/kg)						
Mercury	(mg/kg)	1J	0.3J	0.3J	0.1J	1J	0.5J
Nickel	(mg/kg)						
Potassium	(mg/kg)						
Selenium	(mg/kg)	4.9	6.6	5.9	4U	7	4U
Silver	(mg/kg)	4	2.1U	2.7	0.8U	4.1	2.3

SURFACE SOIL SAMPLE RESULTS
METALS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	99-TPL-17 10/04/1999 Primary	99-TPL-18 10/04/1999 Primary	99-WRP-19 10/04/1999 Primary	99-WRP-20 10/04/1999 Primary	99-WRP-21 10/04/1999 Primary	99-WRP-22 10/04/1999 Primary
Sodium	(mg/kg)						
Thallium	(mg/kg)						
Vanadium	(mg/kg)						
Zinc	(mg/kg)	390	220	6500	3100	2400	7200

SURFACE SOIL SAMPLE RESULTS
METALS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	99-WRP2-06 10/04/1999 Primary	99-WRP2-10 10/04/1999 Primary	99-WRP2-47 10/04/1999 Primary	99-WRP2-48 10/04/1999 Primary	SM_SOIL3 09/08/1994 Primary	SS-401 12/02/2004 Primary
Starting Depth	(feet)	0.00	0.00	0.00	0.00	0.00	0.00
Ending Depth	(feet)	0.50	0.50	0.50	0.50	0.50	0.50
Aluminum	(mg/kg)						38000
Antimony	(mg/kg)						0.44J
Arsenic	(mg/kg)					100	120J
Barium	(mg/kg)					3	4.2EB
Beryllium	(mg/kg)						0.17J
Cadmium	(mg/kg)	0.8U	32	12	0.8U	150	0.3J
Calcium	(mg/kg)						330J
Chromium	(mg/kg)					26	5.4J
Cobalt	(mg/kg)						0.31J
Copper	(mg/kg)	4000J	1100J	4000J	540J	110000	510J
Iron	(mg/kg)						51000
Lead	(mg/kg)	1600	790	2100	220	9100	480J
Magnesium	(mg/kg)						76000
Manganese	(mg/kg)						1100J
Mercury	(mg/kg)	4.4J	0.9J	1.3J	R		0.5
Nickel	(mg/kg)					30	2JEB
Potassium	(mg/kg)						1800
Selenium	(mg/kg)	46	4U	11	9.5	77	12J
Silver	(mg/kg)	19	2.7	8.3	1.9	70	3.3J

SURFACE SOIL SAMPLE RESULTS
METALS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE	99-WRP2-06	99-WRP2-10	99-WRP2-47	99-WRP2-48	SM_SOIL3	SS-401
	DATE	10/04/1999	10/04/1999	10/04/1999	10/04/1999	09/08/1994	12/02/2004
	RESULT TYPE	Primary	Primary	Primary	Primary	Primary	Primary
Sodium	(mg/kg)						18JEB
Thallium	(mg/kg)						2.8J
Vanadium	(mg/kg)						13J
Zinc	(mg/kg)	510	7700	5800	150	18000	150J

SURFACE SOIL SAMPLE RESULTS
METALS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

	SITE	SS-401	SS-402	SS-403	SS-404	SS-405	SS-406
CONSTITUENT	DATE	12/02/2004	12/02/2004	11/30/2004	12/02/2004	12/02/2004	11/30/2004
	RESULT TYPE	Duplicate 1	Primary	Primary	Primary	Primary	Primary
Starting Depth	(feet)	0.00	0.00	0.00	0.00	0.00	0.00
Ending Depth	(feet)	0.50	0.50	0.50	0.50	0.50	0.50
Aluminum	(mg/kg)	46000	25000	19000	37000	41000	57000
Antimony	(mg/kg)	0.5J	0.45J	0.44J	0.47J	1.7J	0.3J
Arsenic	(mg/kg)	120J	65J	65J	87J	130J	23J
Barium	(mg/kg)	4.7EB	3.6EB	12EB	4.2EB	8.8EB	9.6EB
Beryllium	(mg/kg)	0.19J	0.35J	0.28J	0.19J	0.18J	0.17J
Cadmium	(mg/kg)	0.27J	25J	22J	0.15J	0.79J	0.78J
Calcium	(mg/kg)	550J	62000J	88000J	330J	280J	120J
Chromium	(mg/kg)	7.7J	20J	18JEB	13J	6.2J	4.6JEB
Cobalt	(mg/kg)	0.35J	4.7J	4.3J	0.51J	0.27J	0.049J
Copper	(mg/kg)	510J	1200J	2500J	410J	3600J	340J
Iron	(mg/kg)	52000	34000	30000	54000	41000	40000
Lead	(mg/kg)	470J	620J	990J	350J	700J	240J
Magnesium	(mg/kg)	92000	50000	39000J	74000J	78000J	120000J
Manganese	(mg/kg)	1200J	1600J	1800J	1000J	1100J	1300J
Mercury	(mg/kg)	0.46	0.42	0.58J	0.38	1.5	0.36J
Nickel	(mg/kg)	2.4JEB	17JEB	15JEB	3.7JEB	1.8JEB	1.3JEB
Potassium	(mg/kg)	2000	1500	1800	2200	2800	4200
Selenium	(mg/kg)	13J	5.5J	5.8J	9.1J	5.9J	6.3J
Silver	(mg/kg)	2.9J	2.4J	3.8J	2.4J	2.9J	1.6J

SURFACE SOIL SAMPLE RESULTS
METALS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	SS-401 12/02/2004 Duplicate 1	SS-402 12/02/2004 Primary	SS-403 11/30/2004 Primary	SS-404 12/02/2004 Primary	SS-405 12/02/2004 Primary	SS-406 11/30/2004 Primary
Sodium	(mg/kg)	30UJ	14UJ	18J	20UJ	32UJ	38UJ
Thallium	(mg/kg)	2.8J	1.5J	1.4J	2J	4.4J	1.3J
Vanadium	(mg/kg)	15J	16J	13J	17J	10J	16J
Zinc	(mg/kg)	160J	5900J	6600J	120J	420J	400J

SURFACE SOIL SAMPLE RESULTS
METALS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	SS-407 12/02/2004 Primary	SS-408 11/30/2004 Primary	SS-409 11/30/2004 Primary	SS-410 12/02/2004 Primary	SS-411 12/02/2004 Primary	SS-412 12/02/2004 Primary
Starting Depth	(feet)	0.00	0.00	0.00	0.00	0.00	0.00
Ending Depth	(feet)	0.50	0.50	0.50	0.50	0.50	0.50
Aluminum	(mg/kg)	56000	45000	60000	17000	16000	29000
Antimony	(mg/kg)	0.11J	2.6J	0.31J	0.77J	0.85J	0.74J
Arsenic	(mg/kg)	22J	51J	34J	26J	31J	220J
Barium	(mg/kg)	16EB	9.5EB	5.4EB	25EB	30EB	26EB
Beryllium	(mg/kg)	0.24J	0.14J	0.35J	0.34J	0.46J	0.49J
Cadmium	(mg/kg)	0.55J	0.37J	0.81J	27J	41J	170J
Calcium	(mg/kg)	420J	91J	280J	11000J	7800J	2800J
Chromium	(mg/kg)	13J	4.1JEB	3.1JEB	33J	30J	27J
Cobalt	(mg/kg)	0.77J	0.31J	0.0012UJ	14J	13J	14J
Copper	(mg/kg)	2400J	5200J	8200J	2300J	5700J	8700J
Iron	(mg/kg)	47000	74000	55000	24000	34000	84000
Lead	(mg/kg)	140J	820J	380J	510J	2300J	1800J
Magnesium	(mg/kg)	110000J	94000J	120000J	22000J	18000	49000
Manganese	(mg/kg)	1400J	970J	1300J	1300J	740J	1800J
Mercury	(mg/kg)	0.41	0.35J	0.23J	0.33	1.1	1.2
Nickel	(mg/kg)	5.3JEB	1.7JEB	0.62JEB	30JEB	30JEB	23JEB
Potassium	(mg/kg)	4100J	4000	1900	970	1400	2300
Selenium	(mg/kg)	5.1J	15J	16J	2J	4.3J	19J
Silver	(mg/kg)	1.2J	5.2J	3.3J	2J	3.5J	5.5J

SURFACE SOIL SAMPLE RESULTS
METALS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	SS-407 12/02/2004 Primary	SS-408 11/30/2004 Primary	SS-409 11/30/2004 Primary	SS-410 12/02/2004 Primary	SS-411 12/02/2004 Primary	SS-412 12/02/2004 Primary
Sodium	(mg/kg)	32UJ	120J	26UJ	60JEB	56JEB	63JEB
Thallium	(mg/kg)	1.3J	2J	0.86J	0.49J	0.59J	6.7J
Vanadium	(mg/kg)	17J	14J	14J	23J	24J	21J
Zinc	(mg/kg)	330J	250J	290J	5800J	16000J	63000J

SURFACE SOIL SAMPLE RESULTS
METALS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

	SITE	SS-413	SS-414	SS-415	SS-416	SS-417	SS-418
CONSTITUENT	DATE	12/02/2004	11/30/2004	11/30/2004	12/02/2004	11/30/2004	11/30/2004
	RESULT TYPE	Primary	Primary	Primary	Primary	Primary	Primary
Starting Depth	(feet)	0.00	0.00	0.00	0.00	0.00	0.00
Ending Depth	(feet)	0.50	0.50	0.50	0.50	0.50	0.50
Aluminum	(mg/kg)	22000	46000	40000	21000	13000	46000
Antimony	(mg/kg)	0.96J	R	4.1J	0.61J	0.84J	0.35J
Arsenic	(mg/kg)	34J	50J	46J	57J	23J	57J
Barium	(mg/kg)	26EB	6.5EB	8.2EB	13EB	9.4EB	16EB
Beryllium	(mg/kg)	0.53J	0.12J	0.3J	0.17J	0.31J	0.27J
Cadmium	(mg/kg)	29J	0.37J	24J	2.7J	16J	0.45J
Calcium	(mg/kg)	3600J	30J	1500J	440J	5900J	210J
Chromium	(mg/kg)	27J	1.5JEB	11JEB	27J	12JEB	11JEB
Cobalt	(mg/kg)	11J	0.0012UJ	1.7J	1.7J	4.8J	1.9J
Copper	(mg/kg)	3500J	14000J	6600J	1200J	1600J	2000J
Iron	(mg/kg)	29000	83000	42000	36000	17000	57000
Lead	(mg/kg)	700J	350J	1600J	1000J	520J	260J
Magnesium	(mg/kg)	26000	97000J	77000J	36000	18000J	82000J
Manganese	(mg/kg)	870J	890J	960J	530J	480J	1100J
Mercury	(mg/kg)	0.58	0.14J	1.5J	1.7	0.41J	0.14J
Nickel	(mg/kg)	28JEB	0.2JEB	6.8JEB	13JEB	12JEB	7.3JEB
Potassium	(mg/kg)	1800	2700	2400J	1300	1000J	2100J
Selenium	(mg/kg)	3.2J	24J	10J	7.4J	1.9J	7.6J
Silver	(mg/kg)	4.8J	12J	7J	3.9J	2J	1.6J

SURFACE SOIL SAMPLE RESULTS
METALS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	SS-413 12/02/2004 Primary	SS-414 11/30/2004 Primary	SS-415 11/30/2004 Primary	SS-416 12/02/2004 Primary	SS-417 11/30/2004 Primary	SS-418 11/30/2004 Primary
Sodium	(mg/kg)	93JEB	21J	62J	51JEB	39UJ	100J
Thallium	(mg/kg)	0.64J	1.3J	1.3J	0.77J	0.46J	1.2J
Vanadium	(mg/kg)	22J	16J	15J	19J	11J	19J
Zinc	(mg/kg)	10000J	110J	8800J	1200J	5700J	260J

SURFACE SOIL SAMPLE RESULTS
METALS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE	SS-419	SS-420	SS-421	SS-422	SS-423	SS-424
	DATE	11/30/2004	11/30/2004	11/30/2004	11/30/2004	11/30/2004	11/30/2004
	RESULT TYPE	Primary	Primary	Primary	Primary	Primary	Primary
Starting Depth	(feet)	0.00	0.00	0.00	0.00	0.00	0.00
Ending Depth	(feet)	0.50	0.50	0.50	0.50	0.50	0.50
Aluminum	(mg/kg)	19000	20000	14000	15000	800	720
Antimony	(mg/kg)	0.19J	0.18J	0.29J	0.21J	0.073J	0.045J
Arsenic	(mg/kg)	10J	13J	11J	11J	0.49J	0.59J
Barium	(mg/kg)	37EB	34EB	49JEB	26JEB	13JEB	6.4JEB
Beryllium	(mg/kg)	0.37J	0.41J	0.3	0.33	0.034	0.022J
Cadmium	(mg/kg)	0.11J	0.12J	0.18J	0.12J	0.056J	0.033J
Calcium	(mg/kg)	450J	310J	260J	230J	210J	97J
Chromium	(mg/kg)	22JEB	19JEB	20JEB	23JEB	1.2JEB	0.83JEB
Cobalt	(mg/kg)	5J	5.5J	3.7J	3.9J	0.1J	0.074J
Copper	(mg/kg)	14J	10J	15J	14J	0.63J	1.1J
Iron	(mg/kg)	23000	28000	19000	25000	800	800
Lead	(mg/kg)	26J	22J	29J	17J	4J	6.2J
Magnesium	(mg/kg)	2900J	3000J	2200J	2900J	54J	60J
Manganese	(mg/kg)	400J	410J	170	200	16	6.6J
Mercury	(mg/kg)	0.078J	0.084J	0.12J	0.052J	0.02J	0.027J
Nickel	(mg/kg)	18JEB	17JEB	16JEB	16JEB	0.66JEB	0.47JEB
Potassium	(mg/kg)	700J	510J	570J	620J	120J	120J
Selenium	(mg/kg)	1.1J	0.86J	0.97J	0.76J	0.51UJ	0.54UJ
Silver	(mg/kg)	0.22J	0.23J	0.27J	0.32J	0.038J	0.11J

SURFACE SOIL SAMPLE RESULTS
METALS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	SS-419 11/30/2004 Primary	SS-420 11/30/2004 Primary	SS-421 11/30/2004 Primary	SS-422 11/30/2004 Primary	SS-423 11/30/2004 Primary	SS-424 11/30/2004 Primary
Sodium	(mg/kg)	39UJ	41UJ	62J	44J	22J	16J
Thallium	(mg/kg)	0.12J	0.11J	0.12J	0.11J	0.018J	0.02J
Vanadium	(mg/kg)	30J	28J	32J	36J	3J	2.5J
Zinc	(mg/kg)	76J	95J	72J	64J	3.8J	3.6J

SURFACE SOIL SAMPLE RESULTS
METALS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

	SITE	SS-425	SS-426	SS-427	SS-427	SS-428	SS-429
CONSTITUENT	DATE	11/30/2004	11/30/2004	11/30/2004	11/30/2004	11/30/2004	11/30/2004
	RESULT TYPE	Primary	Primary	Primary	Duplicate 1	Primary	Primary
Starting Depth	(feet)	0.00	0.00	0.00	0.00	0.00	0.00
Ending Depth	(feet)	0.50	0.50	0.50	0.50	0.50	0.50
Aluminum	(mg/kg)	4500	1900	26000	26000	24000	24000
Antimony	(mg/kg)	0.12J	0.052J	0.089J	0.087J	0.39J	0.13J
Arsenic	(mg/kg)	3.6J	1.3J	7.9J	6.9J	14J	11J
Barium	(mg/kg)	13JEB	4.5JEB	22JEB	20JEB	20JEB	17JEB
Beryllium	(mg/kg)	0.089	0.041	0.4	0.36	0.4	0.3
Cadmium	(mg/kg)	0.051J	0.025J	0.097J	0.093J	0.087J	0.082J
Calcium	(mg/kg)	140J	130J	170J	610J	240J	140J
Chromium	(mg/kg)	5.5JEB	1.6JEB	23JEB	23JEB	21JEB	22JEB
Cobalt	(mg/kg)	0.76J	0.23J	3.4J	4.9J	2.8J	2.3J
Copper	(mg/kg)	2.7J	1.2J	6.3J	6.7J	8.8J	5.7J
Iron	(mg/kg)	7900	2800	27000	30000	34000	28000
Lead	(mg/kg)	18J	9J	10J	12J	14J	13J
Magnesium	(mg/kg)	580J	200J	2800J	5200J	3200J	3100J
Manganese	(mg/kg)	38	14	200	320	250	170
Mercury	(mg/kg)	0.046J	0.021J	0.075J	0.078J	0.11J	0.09J
Nickel	(mg/kg)	2.8JEB	0.74JEB	19JEB	16JEB	10JEB	8.9JEB
Potassium	(mg/kg)	220J	160J	490J	410J	390J	350J
Selenium	(mg/kg)	0.56UJ	0.46UJ	0.93J	0.51UJ	0.83J	0.67UJ
Silver	(mg/kg)	0.16J	0.072J	0.18J	0.13J	0.18J	0.17J

SURFACE SOIL SAMPLE RESULTS
METALS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	SS-425 11/30/2004 Primary	SS-426 11/30/2004 Primary	SS-427 11/30/2004 Primary	SS-427 11/30/2004 Duplicate 1	SS-428 11/30/2004 Primary	SS-429 11/30/2004 Primary
Sodium	(mg/kg)	25J	27J	34UJ	32UJ	36UJ	47UJ
Thallium	(mg/kg)	0.059J	0.035J	0.075J	0.066J	0.086J	0.076J
Vanadium	(mg/kg)	15J	8.3J	32J	48J	32J	34J
Zinc	(mg/kg)	17J	5.4J	18J	87J	74J	58J

SURFACE SOIL SAMPLE RESULTS
METALS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

	SITE	SS-430	TP_SOIL1	TP_SOIL2
CONSTITUENT	DATE	11/30/2004	09/08/1994	09/08/1994
	RESULT TYPE	Primary	Primary	Primary
Starting Depth	(feet)	0.00	0.00	0.00
Ending Depth	(feet)	0.50	0.50	0.50
Aluminum	(mg/kg)	14000		
Antimony	(mg/kg)	0.17J		
Arsenic	(mg/kg)	12J	54	55
Barium	(mg/kg)	12JEB	24	36
Beryllium	(mg/kg)	0.16		
Cadmium	(mg/kg)	0.063J	20	32
Calcium	(mg/kg)	110J		
Chromium	(mg/kg)	16JEB	25	16
Cobalt	(mg/kg)	1.8J		
Copper	(mg/kg)	4.7J	670	1900
Iron	(mg/kg)	36000		
Lead	(mg/kg)	38J	560	510
Magnesium	(mg/kg)	1900J		
Manganese	(mg/kg)	120		
Mercury	(mg/kg)	0.067J		
Nickel	(mg/kg)	9.7JEB	20	12
Potassium	(mg/kg)	220J		
Selenium	(mg/kg)	0.604UJ	6	9
Silver	(mg/kg)	0.13J	2.7	3.4

SURFACE SOIL SAMPLE RESULTS
METALS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	SS-430 11/30/2004 Primary	TP_SOIL1 09/08/1994 Primary	TP_SOIL2 09/08/1994 Primary
Sodium	(mg/kg)	34J		
Thallium	(mg/kg)	0.061J		
Vanadium	(mg/kg)	46J		
Zinc	(mg/kg)	39J	15000	17000

Appendix D

Surface Soil Sample Laboratory Results, VOCs

SURFACE SOIL SAMPLE RESULTS
VOCS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE	SM_SOIL3	SS-401	SS-401	SS-402	SS-404	SS-405
	DATE	09/08/1994	12/02/2004	12/02/2004	12/02/2004	12/02/2004	12/02/2004
	RESULT TYPE	Primary	Primary	Duplicate 1	Primary	Primary	Primary
Starting Depth	(feet)	0.00	0.00	0.00	0.00	0.00	0.00
Ending Depth	(feet)	0.50	0.50	0.50	0.50	0.50	0.50
1,1,1-trichloroethane	(ug/kg)		12U	12U	12U	11U	11U
1,1,2,2-Tetrachloroethane	(ug/kg)		12U	12U	12U	11U	11U
1,1,2-Trichloro-1,2,2-trifluoroethane	(ug/kg)		12U	12U	12U	11U	11U
1,1,2-Trichloroethane	(ug/kg)		12U	12U	12U	11U	11U
1,1-Dichloroethane	(ug/kg)		12U	12U	12U	11U	11U
1,1-Dichloroethene	(ug/kg)		12U	12U	12U	11U	11U
1,2,4-Trichlorobenzene	(ug/kg)		12U	12U	12U	11U	11U
1,2-Dibromo-3-chloropropane	(ug/kg)		12U	12U	12U	11U	11U
1,2-Dichlorobenzene	(ug/kg)		12U	2J	12U	11U	11U
1,2-Dichloroethane	(ug/kg)		12U	12U	12U	11U	11U
1,2-Dichloropropane	(ug/kg)		12U	12U	12U	11U	11U
1,3-Dichlorobenzene	(ug/kg)		12U	2J	12U	11U	11U
1,4-Dichlorobenzene	(ug/kg)		12U	12U	12U	11U	11U
2-Butanone (MEK)	(ug/kg)		12U	12U	12U	11U	11U
2-Hexanone	(ug/kg)		12U	12U	12U	11U	11U
4-Methyl-2-pentanone	(ug/kg)		12U	12U	12U	11U	11U
Acetone	(ug/kg)	17	12U	12U	12U	11U	11U
Benzene	(ug/kg)		12U	12U	12U	11U	11U
Bromodichloromethane	(ug/kg)		12U	12U	12U	11U	11U

SURFACE SOIL SAMPLE RESULTS
VOCS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE	SM_SOIL3	SS-401	SS-401	SS-402	SS-404	SS-405
	DATE	09/08/1994	12/02/2004	12/02/2004	12/02/2004	12/02/2004	12/02/2004
	RESULT TYPE	Primary	Primary	Duplicate 1	Primary	Primary	Primary
Bromoform	(ug/kg)		12U	12U	12U	11U	11U
Bromomethane	(ug/kg)		12UJ	12U	12U	11U	11U
Carbon disulfide	(ug/kg)		12U	12U	12U	11U	11U
Carbon tetrachloride	(ug/kg)		12U	12U	12U	11U	11U
Chlorobenzene	(ug/kg)		12U	12U	12U	11U	11U
Chlorodibromomethane	(ug/kg)		12U	12U	12U	11U	11U
Chloroethane	(ug/kg)		12U	12U	12U	11U	11U
Chloroform	(ug/kg)		12U	12U	12U	11U	11U
Chloromethane	(ug/kg)		12U	12U	12U	11U	11U
cis-1,2-Dichloroethene	(ug/kg)		12U	12U	12U	11U	11U
cis-1,3-Dichloropropene	(ug/kg)		12U	12U	12U	11U	11U
Cyclohexane	(ug/kg)		12U	12U	12U	11U	11U
Dichlorodifluoromethane	(ug/kg)		12U	12U	12U	11U	11U
Ethylbenzene	(ug/kg)		12U	12U	12U	11U	11U
Ethylenedibromide	(ug/kg)		12U	12U	12U	11U	11U
Fluorotrichloromethane	(ug/kg)		12U	12U	12U	11U	11U
Isopropylbenzene	(ug/kg)		12U	12U	12U	11U	11U
Methyl acetate (acetic acid, methyl este	(ug/kg)		12U	12U	12U	11U	11U
Methyl cyclohexane	(ug/kg)		12U	12U	12U	11U	11U
Methyl tert-butyl ether	(ug/kg)		12U	12U	12U	11U	11U
Methylene chloride	(ug/kg)	56	12U	12U	12U	11U	11U

SURFACE SOIL SAMPLE RESULTS
VOCS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE	SM_SOIL3	SS-401	SS-401	SS-402	SS-404	SS-405
	DATE	09/08/1994	12/02/2004	12/02/2004	12/02/2004	12/02/2004	12/02/2004
	RESULT TYPE	Primary	Primary	Duplicate 1	Primary	Primary	Primary
Styrene	(ug/kg)		12U	12U	12U	11U	11U
Tetrachloroethene	(ug/kg)		12U	12U	12U	11U	11U
Toluene	(ug/kg)		12U	12U	12U	11U	11U
trans-1,2-Dichloroethene	(ug/kg)		12U	12U	12U	11U	11U
Trans-1,3-Dichloropropene	(ug/kg)		12U	12U	12U	11U	11U
Trichloroethene	(ug/kg)		12U	12U	12U	11U	11U
Vinyl chloride	(ug/kg)		12U	12U	12U	11U	11U
Xylenes (total)	(ug/kg)		12U	12U	12U	11U	11U
1,1-Thibisethane	(mg/kg)	U					
3,4-Dithiohexane	(mg/kg)	U					
Diethyl benzene (mixed isomers)	(mg/kg)	U					
Trimethyloxepane	(mg/kg)	U					

SURFACE SOIL SAMPLE RESULTS
VOCS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	SS-407 12/02/2004 Primary	SS-410 12/02/2004 Primary	SS-411 12/02/2004 Primary	SS-412 12/02/2004 Primary	SS-413 12/02/2004 Primary	SS-416 12/02/2004 Primary
Starting Depth	(feet)	0.00	0.00	0.00	0.00	0.00	0.00
Ending Depth	(feet)	0.50	0.50	0.50	0.50	0.50	0.50
1,1,1-trichloroethane	(ug/kg)	11U	12U	12U	14U	13U	11U
1,1,2,2-Tetrachloroethane	(ug/kg)	11U	12U	12U	14U	13U	11U
1,1,2-Trichloro-1,2,2-trifluoroethane	(ug/kg)	11U	12U	12U	14U	13U	11U
1,1,2-Trichloroethane	(ug/kg)	11U	12U	12U	14U	13U	11U
1,1-Dichloroethane	(ug/kg)	11U	12U	12U	14U	13U	11U
1,1-Dichloroethene	(ug/kg)	11U	12U	12U	14U	13U	11U
1,2,4-Trichlorobenzene	(ug/kg)	11U	12U	12U	14U	13U	11U
1,2-Dibromo-3-chloropropane	(ug/kg)	11U	12U	12U	14U	13U	11U
1,2-Dichlorobenzene	(ug/kg)	11U	12U	12U	14U	13U	11U
1,2-Dichloroethane	(ug/kg)	11U	12U	12U	14U	13U	11U
1,2-Dichloropropane	(ug/kg)	11U	12U	12U	14U	13U	11U
1,3-Dichlorobenzene	(ug/kg)	11U	12U	12U	14U	13U	11U
1,4-Dichlorobenzene	(ug/kg)	11U	12U	12U	14U	13U	11U
2-Butanone (MEK)	(ug/kg)	11U	12U	12U	14U	13U	11U
2-Hexanone	(ug/kg)	11U	12U	12U	14U	13U	11U
4-Methyl-2-pentanone	(ug/kg)	11U	12U	12U	14U	13U	11U
Acetone	(ug/kg)	11U	12U	12U	14U	13U	11U
Benzene	(ug/kg)	11U	12U	12U	14U	13U	11U
Bromodichloromethane	(ug/kg)	11U	12U	12U	14U	13U	11U

SURFACE SOIL SAMPLE RESULTS
VOCS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

	SITE	SS-407	SS-410	SS-411	SS-412	SS-413	SS-416
CONSTITUENT	DATE	12/02/2004	12/02/2004	12/02/2004	12/02/2004	12/02/2004	12/02/2004
	RESULT TYPE	Primary	Primary	Primary	Primary	Primary	Primary
Bromoform	(ug/kg)	11U	12U	12U	14U	13U	11U
Bromomethane	(ug/kg)	11U	12U	12U	14U	13U	11U
Carbon disulfide	(ug/kg)	11U	12U	12U	14U	13U	11U
Carbon tetrachloride	(ug/kg)	11U	12U	12U	14U	13U	11U
Chlorobenzene	(ug/kg)	11U	12U	12U	14U	13U	11U
Chlorodibromomethane	(ug/kg)	11U	12U	12U	14U	13U	11U
Chloroethane	(ug/kg)	11U	12U	12U	14U	13U	11U
Chloroform	(ug/kg)	11U	12U	12U	14U	13U	11U
Chloromethane	(ug/kg)	11U	12U	12U	14U	13U	11U
cis-1,2-Dichloroethene	(ug/kg)	11U	12U	12U	14U	13U	11U
cis-1,3-Dichloropropene	(ug/kg)	11U	12U	12U	14U	13U	11U
Cyclohexane	(ug/kg)	11U	12U	12U	14U	13U	11U
Dichlorodifluoromethane	(ug/kg)	11U	12U	12U	14U	13U	11U
Ethylbenzene	(ug/kg)	11U	12U	12U	14U	13U	11U
Ethylenedibromide	(ug/kg)	11U	12U	12U	14U	13U	11U
Fluorotrichloromethane	(ug/kg)	11U	12U	12U	14U	13U	11U
Isopropylbenzene	(ug/kg)	11U	12U	12U	14U	13U	11U
Methyl acetate (acetic acid, methyl este	(ug/kg)	11U	12U	12U	14U	13U	11U
Methyl cyclohexane	(ug/kg)	11U	12U	12U	14U	13U	11U
Methyl tert-butyl ether	(ug/kg)	11U	12U	12U	14U	13U	11U
Methylene chloride	(ug/kg)	11U	12U	12U	14U	13U	11U

SURFACE SOIL SAMPLE RESULTS
VOCS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

	SITE	SS-407	SS-410	SS-411	SS-412	SS-413	SS-416
CONSTITUENT	DATE	12/02/2004	12/02/2004	12/02/2004	12/02/2004	12/02/2004	12/02/2004
	RESULT TYPE	Primary	Primary	Primary	Primary	Primary	Primary
Styrene	(ug/kg)	11U	12U	12U	14U	13U	11U
Tetrachloroethene	(ug/kg)	11U	12U	12U	14U	13U	11U
Toluene	(ug/kg)	11U	12U	12U	14U	13U	11U
trans-1,2-Dichloroethene	(ug/kg)	11U	12U	12U	14U	13U	11U
Trans-1,3-Dichloropropene	(ug/kg)	11U	12U	12U	14U	13U	11U
Trichloroethene	(ug/kg)	11U	12U	12U	14U	13U	11U
Vinyl chloride	(ug/kg)	11U	12U	12U	14U	13U	11U
Xylenes (total)	(ug/kg)	11U	12U	12U	14U	13U	11U
1,1-Thibisethane	(mg/kg)						
3,4-Dithiohexane	(mg/kg)						
Diethyl benzene (mixed isomers)	(mg/kg)						
Trimethyloxepane	(mg/kg)						

SURFACE SOIL SAMPLE RESULTS
VOCS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	TP_SOIL1 09/08/1994 Primary	TP_SOIL2 09/08/1994 Primary
Starting Depth	(feet)	0.00	0.00
Ending Depth	(feet)	0.50	0.50
1,1,1-trichloroethane	(ug/kg)		
1,1,2,2-Tetrachloroethane	(ug/kg)		
1,1,2-Trichloro-1,2,2-trifluoroethane	(ug/kg)		
1,1,2-Trichloroethane	(ug/kg)		
1,1-Dichloroethane	(ug/kg)		
1,1-Dichloroethene	(ug/kg)		
1,2,4-Trichlorobenzene	(ug/kg)		
1,2-Dibromo-3-chloropropane	(ug/kg)		
1,2-Dichlorobenzene	(ug/kg)		
1,2-Dichloroethane	(ug/kg)		
1,2-Dichloropropane	(ug/kg)		
1,3-Dichlorobenzene	(ug/kg)		
1,4-Dichlorobenzene	(ug/kg)		
2-Butanone (MEK)	(ug/kg)		
2-Hexanone	(ug/kg)		
4-Methyl-2-pentanone	(ug/kg)		
Acetone	(ug/kg)	U	33
Benzene	(ug/kg)		
Bromodichloromethane	(ug/kg)		

SURFACE SOIL SAMPLE RESULTS
VOCS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	TP_SOIL1 09/08/1994 Primary	TP_SOIL2 09/08/1994 Primary
Bromoform	(ug/kg)		
Bromomethane	(ug/kg)		
Carbon disulfide	(ug/kg)		
Carbon tetrachloride	(ug/kg)		
Chlorobenzene	(ug/kg)		
Chlorodibromomethane	(ug/kg)		
Chloroethane	(ug/kg)		
Chloroform	(ug/kg)		
Chloromethane	(ug/kg)		
cis-1,2-Dichloroethene	(ug/kg)		
cis-1,3-Dichloropropene	(ug/kg)		
Cyclohexane	(ug/kg)		
Dichlorodifluoromethane	(ug/kg)		
Ethylbenzene	(ug/kg)		
Ethylenedibromide	(ug/kg)		
Fluorotrichloromethane	(ug/kg)		
Isopropylbenzene	(ug/kg)		
Methyl acetate (acetic acid, methyl este	(ug/kg)		
Methyl cyclohexane	(ug/kg)		
Methyl tert-butyl ether	(ug/kg)		
Methylene chloride	(ug/kg)	U	U

SURFACE SOIL SAMPLE RESULTS
VOCS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	TP_SOIL1 09/08/1994 Primary	TP_SOIL2 09/08/1994 Primary
Styrene	(ug/kg)		
Tetrachloroethene	(ug/kg)		
Toluene	(ug/kg)		
trans-1,2-Dichloroethene	(ug/kg)		
Trans-1,3-Dichloropropene	(ug/kg)		
Trichloroethene	(ug/kg)		
Vinyl chloride	(ug/kg)		
Xylenes (total)	(ug/kg)		
1,1-Thibisethane	(mg/kg)	U	U
3,4-Dithiohexane	(mg/kg)	U	0.1J
Diethyl benzene (mixed isomers)	(mg/kg)	U	1.27J
Trimethyloxepane	(mg/kg)	U	U

Appendix E

Surface Soil Sample Laboratory Results, SVOCs

SURFACE SOIL SAMPLE RESULTS
SVOCS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	SM_SOIL3 09/08/1994 Primary	SS-401 12/02/2004 Primary	SS-401 12/02/2004 Duplicate 1	SS-402 12/02/2004 Primary	SS-404 12/02/2004 Primary	SS-405 12/02/2004 Primary
Starting Depth	(feet)	0.00	0.00	0.00	0.00	0.00	0.00
Ending Depth	(feet)	0.50	0.50	0.50	0.50	0.50	0.50
1,1'-Biphenyl	(ug/kg)		380U	380U	410U	380U	370U
2,2'-Oxybis(1-Chloropropane)	(ug/kg)		380U	380U	410U	380U	370U
2,4,5-Trichlorophenol	(ug/kg)		970U	970U	1000U	950U	930U
2,4,6-Trichlorophenol	(ug/kg)		380U	380U	410U	380U	370U
2,4-Dichlorophenol	(ug/kg)		380U	380U	410U	380U	370U
2,4-Dimethylphenol	(ug/kg)		380U	380U	410U	380U	370U
2,4-Dinitrophenol	(ug/kg)		970U	970U	1000U	950U	930U
2,4-Dinitrotoluene	(ug/kg)		380U	380U	410U	380U	370U
2,6-Dinitrotoluene	(ug/kg)		380U	380U	410U	380U	370U
2-Chloronaphthalene	(ug/kg)		380U	380U	410U	380U	370U
2-Chlorophenol	(ug/kg)		380U	380U	410U	380U	370U
2-Methylnaphthalene	(ug/kg)		380U	380U	410U	380U	370U
2-Methylphenol	(ug/kg)		380U	380U	410U	380U	370U
2-Nitroaniline	(ug/kg)		970U	970U	1000U	950U	930U
2-Nitrophenol	(ug/kg)		380U	380U	410U	380U	370U
3,3'-Dichlorobenzidine	(ug/kg)		380UJ	380UJ	410UJ	380UJ	370UJ
3-Nitroaniline	(ug/kg)		970UJ	970UJ	1000UJ	950UJ	930UJ
4,6-Dinitro-2-methylphenol	(ug/kg)		970U	970U	1000U	950U	930U
4-Bromophenyl phenyl ether	(ug/kg)		380U	380U	410U	380U	370U

SURFACE SOIL SAMPLE RESULTS
SVOCS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	SM_SOIL3 09/08/1994 Primary	SS-401 12/02/2004 Primary	SS-401 12/02/2004 Duplicate 1	SS-402 12/02/2004 Primary	SS-404 12/02/2004 Primary	SS-405 12/02/2004 Primary
4-Chloro-3-methylphenol	(ug/kg)		380U	380U	410U	380U	370U
4-Chloroaniline	(ug/kg)		380U	380U	410U	380U	370U
4-Chlorophenyl phenyl ether	(ug/kg)		380U	380U	410U	380U	370U
4-Methylphenol	(ug/kg)		380U	380U	410U	380U	370U
4-Nitroaniline	(ug/kg)		970U	970U	1000U	950U	930U
4-Nitrophenol	(ug/kg)		970U	970U	1000U	950U	930U
Acenaphthene	(ug/kg)		380U	380U	410U	380U	370U
Acenaphthylene	(ug/kg)		380U	380U	410U	380U	370U
Acetophenone	(ug/kg)		380U	380U	410U	380U	370U
Anthracene	(ug/kg)		380U	380U	410U	380U	370U
Atrazine	(ug/kg)		380U	380U	410U	380U	370U
Benzaldehyde	(ug/kg)		380U	380U	410U	380U	370U
Benzo(a)anthracene	(ug/kg)		380U	380U	410U	380U	370U
Benzo(a)pyrene	(ug/kg)		380U	380U	410U	380U	370U
Benzo(b)fluoranthene	(ug/kg)		380U	380U	410U	380U	370U
Benzo(g,h,i)perylene	(ug/kg)		380U	380U	410U	380U	370U
Benzo(k)fluoranthene	(ug/kg)		380UJ	380UJ	410UJ	380UJ	370UJ
Bis(2-chloroethoxy) methane	(ug/kg)		380U	380U	410U	380U	370U
bis(2-Chloroethyl) ether	(ug/kg)		380U	380U	410U	380U	370U
bis(2-Ethylhexyl) phthalate	(ug/kg)	U	380UJ	380UJ	410UJ	48J	370UJ
Butyl benzyl phthalate	(ug/kg)	130	380U	380U	410U	380U	370U

SURFACE SOIL SAMPLE RESULTS
SVOCS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	SM_SOIL3 09/08/1994 Primary	SS-401 12/02/2004 Primary	SS-401 12/02/2004 Duplicate 1	SS-402 12/02/2004 Primary	SS-404 12/02/2004 Primary	SS-405 12/02/2004 Primary
Caprolactam	(ug/kg)		380U	380U	410U	380U	370U
Carbazole	(ug/kg)		380U	380U	410U	380U	370U
Chrysene	(ug/kg)		380U	380U	410U	380U	370U
Di-n-butyl phthalate	(ug/kg)		380U	380U	410U	380U	370U
Di-n-octyl phthalate	(ug/kg)		380U	380U	410U	380U	370U
Dibenz(a,h) anthracene	(ug/kg)		380U	380U	410U	380U	370U
Dibenzofuran	(ug/kg)		380U	380U	410U	380U	370U
Diethyl phthalate	(ug/kg)		380U	380U	410U	380U	370U
Dimethyl phthalate	(ug/kg)		380U	380U	410U	380U	370U
Fluoranthene	(ug/kg)		380U	380U	410U	380U	370U
Fluorene	(ug/kg)		380U	380U	410U	380U	370U
Hexachlorobenzene	(ug/kg)		380U	380U	410U	380U	370U
Hexachlorobutadiene	(ug/kg)		380U	380U	410U	380U	370U
Hexachlorocyclopentadiene	(ug/kg)		380U	380U	410U	380U	370U
Hexachloroethane	(ug/kg)		380U	380U	410U	380U	370U
Indeno(1,2,3-cd)pyrene	(ug/kg)		380U	380U	410U	380U	370U
Isophorone	(ug/kg)		380U	380U	410U	380U	370U
N-Nitrosodi-n-propylamine	(ug/kg)		380U	380U	410U	380U	370U
N-Nitrosodiphenylamine	(ug/kg)		380U	380U	410U	380U	370U
Naphthalene	(ug/kg)		380U	380U	410U	380U	370U
Nitrobenzene	(ug/kg)		380U	380U	410U	380U	370U

SURFACE SOIL SAMPLE RESULTS
SVOCS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	SM_SOIL3 09/08/1994 Primary	SS-401 12/02/2004 Primary	SS-401 12/02/2004 Duplicate 1	SS-402 12/02/2004 Primary	SS-404 12/02/2004 Primary	SS-405 12/02/2004 Primary
Pentachlorophenol	(ug/kg)		970U	970U	1000U	950U	930U
Phenanthrene	(ug/kg)	U	380U	380U	410U	380U	370U
Phenol	(ug/kg)		380U	380U	410U	380U	370U
Pyrene	(ug/kg)	U	380U	380U	410U	380U	370U

SURFACE SOIL SAMPLE RESULTS
SVOCS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	SS-407 12/02/2004 Primary	SS-410 12/02/2004 Primary	SS-411 12/02/2004 Primary	SS-412 12/02/2004 Primary	SS-413 12/02/2004 Primary	SS-416 12/02/2004 Primary
Starting Depth	(feet)	0.00	0.00	0.00	0.00	0.00	0.00
Ending Depth	(feet)	0.50	0.50	0.50	0.50	0.50	0.50
1,1'-Biphenyl	(ug/kg)	370U	410U	410U	470U	420U	370U
2,2'-Oxybis(1-Chloropropane)	(ug/kg)	370U	410U	410U	470U	420U	370U
2,4,5-Trichlorophenol	(ug/kg)	920U	1000U	1000UJ	1200U	1100U	930U
2,4,6-Trichlorophenol	(ug/kg)	370U	410U	410U	470U	420U	370U
2,4-Dichlorophenol	(ug/kg)	370U	410U	410U	470U	420U	370U
2,4-Dimethylphenol	(ug/kg)	370U	410U	410U	470U	420U	370U
2,4-Dinitrophenol	(ug/kg)	920U	1000U	1000U	1200U	1100U	930U
2,4-Dinitrotoluene	(ug/kg)	370U	410U	410U	470U	420U	370U
2,6-Dinitrotoluene	(ug/kg)	370U	410U	410U	470U	420U	370U
2-Chloronaphthalene	(ug/kg)	370U	410U	410U	470U	420U	370U
2-Chlorophenol	(ug/kg)	370U	410U	410U	470U	420U	370U
2-Methylnaphthalene	(ug/kg)	370U	410U	410U	470U	420U	370U
2-Methylphenol	(ug/kg)	370U	410U	410U	470U	420U	370U
2-Nitroaniline	(ug/kg)	920U	1000U	1000U	1200U	1100U	930U
2-Nitrophenol	(ug/kg)	370U	410U	410U	470U	420U	370U
3,3'-Dichlorobenzidine	(ug/kg)	370UJ	410UJ	410UJ	470UJ	420UJ	370UJ
3-Nitroaniline	(ug/kg)	920UJ	1000UJ	1000UJ	1200UJ	1100UJ	930UJ
4,6-Dinitro-2-methylphenol	(ug/kg)	920U	1000U	1000U	1200U	1100U	930U
4-Bromophenyl phenyl ether	(ug/kg)	370U	410U	410U	470U	420U	370U

SURFACE SOIL SAMPLE RESULTS
SVOCS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE	SS-407	SS-410	SS-411	SS-412	SS-413	SS-416
	DATE	12/02/2004	12/02/2004	12/02/2004	12/02/2004	12/02/2004	12/02/2004
	RESULT TYPE	Primary	Primary	Primary	Primary	Primary	Primary
4-Chloro-3-methylphenol	(ug/kg)	370U	410U	410U	470U	420U	370U
4-Chloroaniline	(ug/kg)	370U	410U	410U	470U	420U	370U
4-Chlorophenyl phenyl ether	(ug/kg)	370U	410U	410U	470U	420U	370U
4-Methylphenol	(ug/kg)	370U	410U	410U	470U	420U	370U
4-Nitroaniline	(ug/kg)	920U	1000U	1000U	1200U	1100U	930U
4-Nitrophenol	(ug/kg)	920U	1000U	1000U	1200U	1100U	930U
Acenaphthene	(ug/kg)	370U	410U	410U	470U	420U	370U
Acenaphthylene	(ug/kg)	370U	410U	410U	470U	420U	370U
Acetophenone	(ug/kg)	370U	54J	410U	78J	420U	370U
Anthracene	(ug/kg)	370U	410U	410U	470U	420U	370U
Atrazine	(ug/kg)	370U	410U	410U	470U	420U	370U
Benzaldehyde	(ug/kg)	370U	410U	410U	470U	420U	370U
Benzo(a)anthracene	(ug/kg)	370U	410U	410U	470U	420U	370U
Benzo(a)pyrene	(ug/kg)	370U	410U	410U	470U	420U	370U
Benzo(b)fluoranthene	(ug/kg)	370U	410U	410U	470U	420U	370U
Benzo(g,h,i)perylene	(ug/kg)	370U	410U	410U	470U	420U	370U
Benzo(k)fluoranthene	(ug/kg)	370UJ	410UJ	410U	470U	420U	370UJ
Bis(2-chloroethoxy) methane	(ug/kg)	370U	410U	410U	470U	420U	370U
bis(2-Chloroethyl) ether	(ug/kg)	370U	410U	410U	470U	420U	370U
bis(2-Ethylhexyl) phthalate	(ug/kg)	370UJ	480J	120J	230J	57J	120J
Butyl benzyl phthalate	(ug/kg)	370U	70J	410U	240J	420U	370U

SURFACE SOIL SAMPLE RESULTS
SVOCS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	SS-407 12/02/2004 Primary	SS-410 12/02/2004 Primary	SS-411 12/02/2004 Primary	SS-412 12/02/2004 Primary	SS-413 12/02/2004 Primary	SS-416 12/02/2004 Primary
Caprolactam	(ug/kg)	370U	410U	410U	470U	420U	370U
Carbazole	(ug/kg)	370U	410U	410U	470U	420U	370U
Chrysene	(ug/kg)	370U	43J	410U	58J	420U	370U
Di-n-butyl phthalate	(ug/kg)	370U	110J	63J	93J	43J	370U
Di-n-octyl phthalate	(ug/kg)	370U	410U	410U	470U	420U	370U
Dibenz(a,h) anthracene	(ug/kg)	370U	410U	410U	470U	420U	370U
Dibenzofuran	(ug/kg)	370U	410U	410U	470U	420U	370U
Diethyl phthalate	(ug/kg)	370U	410U	410U	470U	420U	370U
Dimethyl phthalate	(ug/kg)	370U	250J	410U	450J	420U	370U
Fluoranthene	(ug/kg)	370U	58J	410U	100J	420U	370U
Fluorene	(ug/kg)	370U	410U	410U	470U	420U	370U
Hexachlorobenzene	(ug/kg)	370U	410U	410U	470U	420U	370U
Hexachlorobutadiene	(ug/kg)	370U	410U	410U	470U	420U	370U
Hexachlorocyclopentadiene	(ug/kg)	370U	410U	410U	470U	420U	370U
Hexachloroethane	(ug/kg)	370U	410U	410U	470U	420U	370U
Indeno(1,2,3-cd)pyrene	(ug/kg)	370U	410U	410U	470U	420U	370U
Isophorone	(ug/kg)	370U	410U	410U	470U	420U	370U
N-Nitrosodi-n-propylamine	(ug/kg)	370U	410U	410U	470U	420U	370U
N-Nitrosodiphenylamine	(ug/kg)	370U	410U	410U	470U	420U	370U
Naphthalene	(ug/kg)	370U	410U	410U	470U	420U	370U
Nitrobenzene	(ug/kg)	370U	410U	410U	470U	420U	370U

SURFACE SOIL SAMPLE RESULTS
SVOCS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	SS-407 12/02/2004 Primary	SS-410 12/02/2004 Primary	SS-411 12/02/2004 Primary	SS-412 12/02/2004 Primary	SS-413 12/02/2004 Primary	SS-416 12/02/2004 Primary
Pentachlorophenol	(ug/kg)	920U	1000U	1000U	1200U	1100U	930U
Phenanthrene	(ug/kg)	370U	410U	410U	470U	420U	370U
Phenol	(ug/kg)	370U	410U	410U	470U	420U	370U
Pyrene	(ug/kg)	370U	44J	410U	65J	420U	370U

SURFACE SOIL SAMPLE RESULTS
SVOCS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	TP_SOIL1 09/08/1994 Primary	TP_SOIL2 09/08/1994 Primary
Starting Depth	(feet)	0.00	0.00
Ending Depth	(feet)	0.50	0.50
1,1'-Biphenyl	(ug/kg)		
2,2'-Oxybis(1-Chloropropane)	(ug/kg)		
2,4,5-Trichlorophenol	(ug/kg)		
2,4,6-Trichlorophenol	(ug/kg)		
2,4-Dichlorophenol	(ug/kg)		
2,4-Dimethylphenol	(ug/kg)		
2,4-Dinitrophenol	(ug/kg)		
2,4-Dinitrotoluene	(ug/kg)		
2,6-Dinitrotoluene	(ug/kg)		
2-Chloronaphthalene	(ug/kg)		
2-Chlorophenol	(ug/kg)		
2-Methylnaphthalene	(ug/kg)		
2-Methylphenol	(ug/kg)		
2-Nitroaniline	(ug/kg)		
2-Nitrophenol	(ug/kg)		
3,3'-Dichlorobenzidine	(ug/kg)		
3-Nitroaniline	(ug/kg)		
4,6-Dinitro-2-methylphenol	(ug/kg)		
4-Bromophenyl phenyl ether	(ug/kg)		

SURFACE SOIL SAMPLE RESULTS
SVOCS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	TP_SOIL1 09/08/1994 Primary	TP_SOIL2 09/08/1994 Primary
4-Chloro-3-methylphenol	(ug/kg)		
4-Chloroaniline	(ug/kg)		
4-Chlorophenyl phenyl ether	(ug/kg)		
4-Methylphenol	(ug/kg)		
4-Nitroaniline	(ug/kg)		
4-Nitrophenol	(ug/kg)		
Acenaphthene	(ug/kg)		
Acenaphthylene	(ug/kg)		
Acetophenone	(ug/kg)		
Anthracene	(ug/kg)		
Atrazine	(ug/kg)		
Benzaldehyde	(ug/kg)		
Benzo(a)anthracene	(ug/kg)		
Benzo(a)pyrene	(ug/kg)		
Benzo(b)fluoranthene	(ug/kg)		
Benzo(g,h,i)perylene	(ug/kg)		
Benzo(k)fluoranthene	(ug/kg)		
Bis(2-chloroethoxy) methane	(ug/kg)		
bis(2-Chloroethyl) ether	(ug/kg)		
bis(2-Ethylhexyl) phthalate	(ug/kg)	U	U
Butyl benzyl phthalate	(ug/kg)	U	110

SURFACE SOIL SAMPLE RESULTS
SVOCS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	TP_SOIL1 09/08/1994 Primary	TP_SOIL2 09/08/1994 Primary
Caprolactam	(ug/kg)		
Carbazole	(ug/kg)		
Chrysene	(ug/kg)		
Di-n-butyl phthalate	(ug/kg)		
Di-n-octyl phthalate	(ug/kg)		
Dibenz(a,h) anthracene	(ug/kg)		
Dibenzofuran	(ug/kg)		
Diethyl phthalate	(ug/kg)		
Dimethyl phthalate	(ug/kg)		
Fluoranthene	(ug/kg)		
Fluorene	(ug/kg)		
Hexachlorobenzene	(ug/kg)		
Hexachlorobutadiene	(ug/kg)		
Hexachlorocyclopentadiene	(ug/kg)		
Hexachloroethane	(ug/kg)		
Indeno(1,2,3-cd)pyrene	(ug/kg)		
Isophorone	(ug/kg)		
N-Nitrosodi-n-propylamine	(ug/kg)		
N-Nitrosodiphenylamine	(ug/kg)		
Naphthalene	(ug/kg)		
Nitrobenzene	(ug/kg)		

SURFACE SOIL SAMPLE RESULTS
SVOCS

PERIOD: From 09/08/1994 thru 12/02/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	TP_SOIL1 09/08/1994 Primary	TP_SOIL2 09/08/1994 Primary
Pentachlorophenol	(ug/kg)		
Phenanthrene	(ug/kg)	U	U
Phenol	(ug/kg)		
Pyrene	(ug/kg)	U	U

Appendix F

Sediment Sample Laboratory Results, Metals

SEDIMENT SAMPLE RESULTS
METALS

PERIOD: From 12/07/1974 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	99-BKSD-23 10/06/1999 Primary	99-BKSD-24 10/06/1999 Primary	99-BKSD-25 10/06/1999 Primary	99-SD-27 10/05/1999 Primary	99-SD-29 10/05/1999 Primary	99-SD-31 10/05/1999 Primary
Starting Depth	(feet)	0.00	0.00	0.00	0.00	0.00	0.00
Ending Depth	(feet)	0.50	0.50	0.50	0.50	0.50	0.50
Aluminum	(mg/kg)						
Antimony	(mg/kg)						
Arsenic	(mg/kg)						
Barium	(mg/kg)						
Beryllium	(mg/kg)						
Cadmium	(mg/kg)	0.8U	0.8U	0.8U	0.8U	33	27
Calcium	(mg/kg)						
Chromium	(mg/kg)						
Cobalt	(mg/kg)						
Copper	(mg/kg)	14J	18J	14J	18J	1800J	1200J
Iron	(mg/kg)						
Lead	(mg/kg)	10	11	10	16	770	590
Magnesium	(mg/kg)						
Manganese	(mg/kg)						
Mercury	(mg/kg)	R	R	R	R	0.7J	0.3J
Nickel	(mg/kg)						
Potassium	(mg/kg)						
Selenium	(mg/kg)	4U	4U	4U	4U	6.9	5.7
Silver	(mg/kg)	0.8U	0.8U	0.8U	0.8U	4.6	3.2

SEDIMENT SAMPLE RESULTS
METALS

PERIOD: From 12/07/1974 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	99-BKSD-23 10/06/1999 Primary	99-BKSD-24 10/06/1999 Primary	99-BKSD-25 10/06/1999 Primary	99-SD-27 10/05/1999 Primary	99-SD-29 10/05/1999 Primary	99-SD-31 10/05/1999 Primary
Sodium	(mg/kg)						
Thallium	(mg/kg)						
Vanadium	(mg/kg)						
Zinc	(mg/kg)	49	64	52	84	6900	5400

SEDIMENT SAMPLE RESULTS
METALS

PERIOD: From 12/07/1974 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	99-SD-33 10/05/1999 Primary	99-SD-35 10/05/1999 Primary	99-SD-37 10/05/1999 Primary	99-SD-39 10/05/1999 Primary	BK_GP_SED11 09/08/1994 Primary	BK_HSC_SED10 09/08/1994 Primary
Starting Depth	(feet)	0.00	0.00	0.00	0.00	0.00	0.00
Ending Depth	(feet)	0.50	0.50	0.50	0.50	0.50	0.50
Aluminum	(mg/kg)						
Antimony	(mg/kg)						
Arsenic	(mg/kg)					8	10
Barium	(mg/kg)					69	21
Beryllium	(mg/kg)						
Cadmium	(mg/kg)	5.2	3.9	5.5	7.3	0.8	U
Calcium	(mg/kg)						
Chromium	(mg/kg)					34	15
Cobalt	(mg/kg)						
Copper	(mg/kg)	1900J	170J	190J	350J	28	11
Iron	(mg/kg)						
Lead	(mg/kg)	210	52	120	150	36	10
Magnesium	(mg/kg)						
Manganese	(mg/kg)						
Mercury	(mg/kg)	0.2J	R		0.1J		
Nickel	(mg/kg)					26	22
Potassium	(mg/kg)						
Selenium	(mg/kg)	4U	4U	4U	4U	2U	4U
Silver	(mg/kg)	0.8U	0.8U	0.8U	0.8U	0.2U	0.1U

SEDIMENT SAMPLE RESULTS
METALS

PERIOD: From 12/07/1974 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	99-SD-33 10/05/1999 Primary	99-SD-35 10/05/1999 Primary	99-SD-37 10/05/1999 Primary	99-SD-39 10/05/1999 Primary	BK_GP_SED11 09/08/1994 Primary	BK_HSC_SED10 09/08/1994 Primary
Sodium	(mg/kg)						
Thallium	(mg/kg)						
Vanadium	(mg/kg)						
Zinc	(mg/kg)	3100	840	1400	1700	110	41

SEDIMENT SAMPLE RESULTS
METALS

PERIOD: From 12/07/1974 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE	BK_HSC_SED9	CR-3	DCS_D_SED5	DCS_SED4	DC_SED8	SAMPLE_1
	DATE	09/08/1994	01/01/1975	09/08/1994	09/08/1994	09/08/1994	05/01/1986
	RESULT TYPE	Primary	Primary	Primary	Primary	Primary	Primary
Starting Depth	(feet)	0.00	0.00	0.00	0.00	0.00	0.00
Ending Depth	(feet)	0.50	0.50	0.50	0.50	0.50	0.50
Aluminum	(mg/kg)						
Antimony	(mg/kg)						
Arsenic	(mg/kg)	17		23	14	22	
Barium	(mg/kg)	22		110	55	70	
Beryllium	(mg/kg)						
Cadmium	(mg/kg)	U	6.9	4.9	3.6	11	33
Calcium	(mg/kg)						
Chromium	(mg/kg)	21		40	32	40	
Cobalt	(mg/kg)		478				
Copper	(mg/kg)	45		660	990	2200	3760
Iron	(mg/kg)		2.03				
Lead	(mg/kg)	12	156	260	210	400	740
Magnesium	(mg/kg)						
Manganese	(mg/kg)						
Mercury	(mg/kg)						
Nickel	(mg/kg)	29		40	35	34	
Potassium	(mg/kg)						
Selenium	(mg/kg)	4U		U	U		
Silver	(mg/kg)	0.2U	1.49	7	0.6	2.9	

SEDIMENT SAMPLE RESULTS
METALS

PERIOD: From 12/07/1974 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	BK_HSC_SED9 09/08/1994 Primary	CR-3 01/01/1975 Primary	DCS_D_SED5 09/08/1994 Primary	DCS_SED4 09/08/1994 Primary	DC_SED8 09/08/1994 Primary	SAMPLE_1 05/01/1986 Primary
Sodium	(mg/kg)						
Thallium	(mg/kg)						
Vanadium	(mg/kg)						
Zinc	(mg/kg)	54	1090	4000	2600	6200	8600

SEDIMENT SAMPLE RESULTS
METALS

PERIOD: From 12/07/1974 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	SAMPLE_2 05/01/1986 Primary	SD-401 11/17/2004 Primary	SD-402 11/17/2004 Primary	SD-403 11/12/2004 Primary	SD-404 11/12/2004 Primary	SD-405 11/17/2004 Primary
Starting Depth	(feet)	0.00	0.00	0.00	0.00	0.00	0.00
Ending Depth	(feet)	0.50	0.50	0.50	0.50	0.50	0.50
Aluminum	(mg/kg)		20000J	30000J	24000	27000	28000J
Antimony	(mg/kg)		0.18J	0.79J	0.68J	1.1J	0.88J
Arsenic	(mg/kg)		7J	44J	54J	32J	38J
Barium	(mg/kg)		25J	17J	13J	37J	17J
Beryllium	(mg/kg)		0.7	0.47	0.34	1	0.56
Cadmium	(mg/kg)	19	4.3J	34J	25J	20J	25J
Calcium	(mg/kg)		1800J	33000J	64000J	6100J	8900J
Chromium	(mg/kg)		35J	32J	21J	40J	29J
Cobalt	(mg/kg)		8.7J	5.1J	3.3J	12J	5.7J
Copper	(mg/kg)	1590	120J	2300J	2100J	2100J	2000J
Iron	(mg/kg)		19000	27000	24000	31000	29000
Lead	(mg/kg)	670	69J	1200J	1000J	380J	710J
Magnesium	(mg/kg)		9300J	53000J	49000	25000	43000J
Manganese	(mg/kg)		200J	1200J	1600J	540J	720J
Mercury	(mg/kg)		0.15	0.67	0.7J	0.24J	0.48
Nickel	(mg/kg)		30J	15J	14J	36J	18J
Potassium	(mg/kg)		2500J	3100J	2400J	3700J	3100J
Selenium	(mg/kg)		1.6J	6.1J	5J	3.4J	4.9J
Silver	(mg/kg)		0.45J	5.4J	4.1J	2.2J	3.5J

SEDIMENT SAMPLE RESULTS
METALS

PERIOD: From 12/07/1974 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	SAMPLE_2 05/01/1986 Primary	SD-401 11/17/2004 Primary	SD-402 11/17/2004 Primary	SD-403 11/12/2004 Primary	SD-404 11/12/2004 Primary	SD-405 11/17/2004 Primary
Sodium	(mg/kg)		11000	4100	19J	2400	6200
Thallium	(mg/kg)		0.34J	1.5J	1.4J	0.94J	1.4J
Vanadium	(mg/kg)		26J	20J	17J	39J	25J
Zinc	(mg/kg)	4800	820J	7600J	6800J	7800J	6900J

SEDIMENT SAMPLE RESULTS
METALS

PERIOD: From 12/07/1974 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Soil

	SITE	SD-406	SD-407	SD-408	SD-409	SD-410	SD-411
CONSTITUENT	DATE	11/17/2004	11/11/2004	11/11/2004	11/18/2004	11/11/2004	12/03/2004
	RESULT TYPE	Primary	Primary	Primary	Primary	Primary	Primary
Starting Depth	(feet)	0.00	0.00	0.00	0.00	0.00	0.00
Ending Depth	(feet)	0.50	0.50	0.50	0.50	0.33	0.50
Aluminum	(mg/kg)	16000J	15000	38000	7800	7500	14000
Antimony	(mg/kg)	0.065J	0.36J	0.55J	0.03UJ	0.095J	0.67J
Arsenic	(mg/kg)	6.8J	16J	17J	4.5J	7.8J	16J
Barium	(mg/kg)	23J	26J	27J	11J	6.2J	14EB
Beryllium	(mg/kg)	0.6	0.57	0.64	0.21	0.23	0.38J
Cadmium	(mg/kg)	2.6J	2.6J	16J	0.5J	1.8J	10J
Calcium	(mg/kg)	2500J	2600J	6200J	860J	2200J	52000J
Chromium	(mg/kg)	33J	27J	38J	17J	16J	20JEB
Cobalt	(mg/kg)	7.6J	9.2J	8.8J	3.8J	5J	5.9J
Copper	(mg/kg)	96J	200J	1500J	22J	150J	1000J
Iron	(mg/kg)	20000	22000	25000	11000	14000	21000
Lead	(mg/kg)	26J	120J	630J	17J	27J	200J
Magnesium	(mg/kg)	9500J	10000	62000	4100	5400	17000
Manganese	(mg/kg)	210J	300J	900J	93J	210J	310JEB
Mercury	(mg/kg)	0.045J	0.12J	0.44J	0.021	0.039J	0.3J
Nickel	(mg/kg)	29J	26J	32J	13J	15J	18JEB
Potassium	(mg/kg)	3400J	3000J	3700J	1300J	770J	2300J
Selenium	(mg/kg)	2.3J	1J	1.8J	0.56J	0.24J	2.4J
Silver	(mg/kg)	0.31J	0.72J	3.6J	0.16J	0.22J	1.4J

SEDIMENT SAMPLE RESULTS
METALS

PERIOD: From 12/07/1974 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	SD-406 11/17/2004 Primary	SD-407 11/11/2004 Primary	SD-408 11/11/2004 Primary	SD-409 11/18/2004 Primary	SD-410 11/11/2004 Primary	SD-411 12/03/2004 Primary
Sodium	(mg/kg)	37000	9100	7700	6000	2100	13000
Thallium	(mg/kg)	0.27J	0.32UJ	0.83J	0.12J	0.087J	0.43J
Vanadium	(mg/kg)	31J	29J	34J	18J	14J	24J
Zinc	(mg/kg)	430J	810J	40000J	130J	480J	3100J

SEDIMENT SAMPLE RESULTS
METALS

PERIOD: From 12/07/1974 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Soil

	SITE	SD-412	SD-413	SD-415	SD-416	SD-417	SD-420
CONSTITUENT	DATE	11/12/2004	11/11/2004	11/11/2004	11/11/2004	11/11/2004	12/03/2004
	RESULT TYPE	Primary	Primary	Primary	Primary	Primary	Primary
Starting Depth	(feet)	0.00	0.00	0.00	0.00	0.00	0.00
Ending Depth	(feet)	0.50	0.50	0.50	0.50	0.50	0.50
Aluminum	(mg/kg)	21000	22000	17000	19000	16000	22000
Antimony	(mg/kg)	1.3J	0.99J	0.47J	0.31J	1J	0.37J
Arsenic	(mg/kg)	85J	23J	23J	18J	37J	17J
Barium	(mg/kg)	5.9J	28J	21J	24J	8.9J	30EB
Beryllium	(mg/kg)	0.27	0.61	0.67	0.63	0.34	0.7J
Cadmium	(mg/kg)	16J	30J	19J	9J	41J	0.8J
Calcium	(mg/kg)	70000J	4400J	2700J	2200J	11000J	5000J
Chromium	(mg/kg)	17J	37J	33J	29J	33J	38JEB
Cobalt	(mg/kg)	3.9J	12J	11J	10J	12J	15J
Copper	(mg/kg)	1100J	2600J	740UJ	420UJ	2400J	100J
Iron	(mg/kg)	34000	31000	23000	24000	20000	37000
Lead	(mg/kg)	560J	720J	230J	200J	280J	44J
Magnesium	(mg/kg)	38000	19000	14000	13000	22000	9300
Manganese	(mg/kg)	1400J	530J	290J	360J	470J	760JEB
Mercury	(mg/kg)	0.79J	0.74J	0.21J	0.19J	0.59J	0.039J
Nickel	(mg/kg)	16J	39J	29J	31J	33J	42JEB
Potassium	(mg/kg)	1400J	3000J	3000J	2600J	1400J	3200J
Selenium	(mg/kg)	6.4J	2.7J	2.2J	0.83J	2.1J	0.7J
Silver	(mg/kg)	3.2J	3J	1.4J	0.92J	1.9J	0.39J

SEDIMENT SAMPLE RESULTS
METALS

PERIOD: From 12/07/1974 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	SD-412 11/12/2004 Primary	SD-413 11/11/2004 Primary	SD-415 11/11/2004 Primary	SD-416 11/11/2004 Primary	SD-417 11/11/2004 Primary	SD-420 12/03/2004 Primary
Sodium	(mg/kg)	21J	5000	14000	6200	3400	3400
Thallium	(mg/kg)	2.1J	0.45J	0.41J	0.28J	0.49J	0.2J
Vanadium	(mg/kg)	12J	31J	33J	30J	23J	34J
Zinc	(mg/kg)	3800J	8100J	31000J	18000J	12000J	540J

SEDIMENT SAMPLE RESULTS
METALS

PERIOD: From 12/07/1974 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE	SD-420	SD-421	SD-422	SD-422	SD-423	SD-424
	DATE	12/03/2004	12/03/2004	11/12/2004	11/12/2004	11/11/2004	11/18/2004
	RESULT TYPE	Duplicate 1	Primary	Primary	Duplicate 1	Primary	Primary
Starting Depth	(feet)	0.00	0.00	0.33	0.33	0.50	0.00
Ending Depth	(feet)	0.50	0.50	0.83	0.83	1.00	0.50
Aluminum	(mg/kg)	22000	17000	35000	33000	22000	5400
Antimony	(mg/kg)	0.42J	0.57J	0.78J	0.8J	0.17J	0.056J
Arsenic	(mg/kg)	18J	23J	64J	60J	15J	4.4J
Barium	(mg/kg)	31EB	18EB	5J	9.7J	59J	4.4J
Beryllium	(mg/kg)	0.71J	0.55J	1.3	1.3	0.74	0.18
Cadmium	(mg/kg)	0.98J	14J	32J	29J	1.8J	0.67J
Calcium	(mg/kg)	1700J	3400J	32000J	27000J	2700J	760J
Chromium	(mg/kg)	36JEB	31JEB	18J	16J	39J	10J
Cobalt	(mg/kg)	16J	6.1J	8.1J	17J	9.2J	3.2J
Copper	(mg/kg)	370J	1300J	10000J	9200J	75J	140J
Iron	(mg/kg)	37000	26000	35000	33000	26000	8400
Lead	(mg/kg)	35J	240J	930J	830J	50J	28J
Magnesium	(mg/kg)	9500	21000	56000	54000	8200	3300
Manganese	(mg/kg)	800JEB	400JEB	1500J	2100J	240J	120J
Mercury	(mg/kg)	0.035J	0.26J	0.52J	0.47J	0.091J	0.073
Nickel	(mg/kg)	40JEB	18JEB	28J	27J	41J	8.7J
Potassium	(mg/kg)	3400J	3200J	1800J	1600J	2600J	490J
Selenium	(mg/kg)	0.37J	4.2J	6.9J	6.6J	1.1J	0.27J
Silver	(mg/kg)	0.4J	1.5J	3J	3J	0.45J	0.19J

SEDIMENT SAMPLE RESULTS
METALS

PERIOD: From 12/07/1974 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	SD-420 12/03/2004 Duplicate 1	SD-421 12/03/2004 Primary	SD-422 11/12/2004 Primary	SD-422 11/12/2004 Duplicate 1	SD-423 11/11/2004 Primary	SD-424 11/18/2004 Primary
Sodium	(mg/kg)	3200	21000	37J	31J	900	3200
Thallium	(mg/kg)	0.17J	0.51J	1.4J	1.3J	0.23J	0.077J
Vanadium	(mg/kg)	32J	32J	17J	16J	40J	11J
Zinc	(mg/kg)	570J	3500J	16000J	8800J	720J	220J

SEDIMENT SAMPLE RESULTS
METALS

PERIOD: From 12/07/1974 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	SD-425 12/03/2004 Primary	SD-426 12/03/2004 Primary	SD-SA1 01/01/1987 Primary	SD-SA2 01/01/1987 Primary	SD-SP_SEEP 01/01/1987 Primary	SD-TP_SPILL 01/01/1987 Primary
Starting Depth	(feet)	0.00	0.00	0.00	0.00	0.00	0.00
Ending Depth	(feet)	0.50	0.50	0.50	0.50	0.50	0.50
Aluminum	(mg/kg)	10000	8600				
Antimony	(mg/kg)	0.041UJ	0.035UJ				
Arsenic	(mg/kg)	6.5J	9.4J				
Barium	(mg/kg)	16EB	13EB				
Beryllium	(mg/kg)	0.43J	0.35J				
Cadmium	(mg/kg)	0.34J	0.36J	110	21	11	10
Calcium	(mg/kg)	3100J	26000J				
Chromium	(mg/kg)	22JEB	16JEB				
Cobalt	(mg/kg)	5.1J	4.5J				
Copper	(mg/kg)	12J	7.6J	370	2800	84	730
Iron	(mg/kg)	16000	16000				
Lead	(mg/kg)	13J	12J	510	1100	360	370
Magnesium	(mg/kg)	5700	6000				
Manganese	(mg/kg)	190JEB	200JEB				
Mercury	(mg/kg)	0.059J	0.063J				
Nickel	(mg/kg)	18JEB	14JEB				
Potassium	(mg/kg)	2200J	1700J				
Selenium	(mg/kg)	0.76J	0.9J				
Silver	(mg/kg)	0.16J	0.1J				

SEDIMENT SAMPLE RESULTS
METALS

PERIOD: From 12/07/1974 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	SD-425 12/03/2004 Primary	SD-426 12/03/2004 Primary	SD-SA1 01/01/1987 Primary	SD-SA2 01/01/1987 Primary	SD-SP_SEEP 01/01/1987 Primary	SD-TP_SPILL 01/01/1987 Primary
Sodium	(mg/kg)	7400	7900				
Thallium	(mg/kg)	0.15J	0.15J				
Vanadium	(mg/kg)	22J	19J				
Zinc	(mg/kg)	59J	49J	23000	7600	4200	2800

SEDIMENT SAMPLE RESULTS
METALS

PERIOD: From 12/07/1974 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	TPS1_SED6 09/08/1994 Primary	TPS1_SED6A 09/08/1994 Primary	TPS2_SED7 09/08/1994 Primary	TPS2_SED7A 09/08/1994 Primary
Starting Depth	(feet)	0.00	0.00	0.00	0.00
Ending Depth	(feet)	0.50	0.50	0.50	0.50
Aluminum	(mg/kg)				
Antimony	(mg/kg)				
Arsenic	(mg/kg)	36	27	56	270
Barium	(mg/kg)	64	50	64	230
Beryllium	(mg/kg)				
Cadmium	(mg/kg)	33	28	43	170
Calcium	(mg/kg)				
Chromium	(mg/kg)	45	38	41	30
Cobalt	(mg/kg)				
Copper	(mg/kg)	970	1500	1400	1600
Iron	(mg/kg)				
Lead	(mg/kg)	550	550	1500	760
Magnesium	(mg/kg)				
Manganese	(mg/kg)				
Mercury	(mg/kg)				
Nickel	(mg/kg)	35	39	35	250
Potassium	(mg/kg)				
Selenium	(mg/kg)	U	4	6	7
Silver	(mg/kg)	2.9	12	5.8	1

SEDIMENT SAMPLE RESULTS
METALS

PERIOD: From 12/07/1974 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	TPS1_SED6 09/08/1994 Primary	TPS1_SED6A 09/08/1994 Primary	TPS2_SED7 09/08/1994 Primary	TPS2_SED7A 09/08/1994 Primary
Sodium	(mg/kg)				
Thallium	(mg/kg)				
Vanadium	(mg/kg)				
Zinc	(mg/kg)	16000	15000	22000	58000

Appendix G

Sediment Sample Laboratory Results, VOCs

SEDIMENT SAMPLE RESULTS
VOCS

PERIOD: From 12/07/1974 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE	BK_HSC_SED9 09/08/1994	DCS_D_SED5 09/08/1994	DCS_SED4 09/08/1994	TPS1_SED6 09/08/1994	TPS2_SED7 09/08/1994
Starting Depth	(feet)	0.00	0.00	0.00	0.00	0.00
Ending Depth	(feet)	0.50	0.50	0.50	0.50	0.50
1,1-Thibisethane	(mg/kg)	U	U	U	2J	U
3,4-Dithiohexane	(mg/kg)	U	U	U		
Acetone	(mg/kg)	U	0.032	U	0.033	U
Diethyl benzene (mixed isomers)	(mg/kg)	U	U	U	U	U
Methylene chloride	(mg/kg)	U	0.039	0.32	0.075	U
Trimethyloxepane	(mg/kg)	U	U	U	0.035J	U

Appendix H

Sediment Sample Laboratory Results, SVOCs

SEDIMENT SAMPLE RESULTS
SVOCS

PERIOD: From 12/07/1974 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE	BK_HSC_SED9 09/08/1994	DCS_D_SED5 09/08/1994	DCS_SED4 09/08/1994	TPS1_SED6 09/08/1994	TPS2_SED7 09/08/1994
Starting Depth	(feet)	0.00	0.00	0.00	0.00	0.00
Ending Depth	(feet)	0.50	0.50	0.50	0.50	0.50
3,4-Dithiohexane	(mg/kg)				U	U
Bis(2-ethylhexyl)phthalate (BEHP)	(mg/kg)	3.45	4.63	0.43	0.74	14.65
Butyl benzyl phthalate	(mg/kg)	0.11	0.2	0.1	U	0.19
Phenanthrene	(mg/kg)	0.1J	U	U	U	U
Pyrene	(mg/kg)	0.39	U	0.1J	U	U

Appendix I

Sediment Sample Laboratory Results, TCO

SEDIMENT SAMPLE RESULTS
TOTAL COMBUSTIBLE ORGANICS

PERIOD: From 12/07/1974 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	SD-401 11/17/2004 Primary	SD-402 11/17/2004 Primary	SD-403 11/12/2004 Primary	SD-404 11/12/2004 Primary	SD-405 11/17/2004 Primary	SD-406 11/17/2004 Primary
Starting Depth	(feet)	0.00	0.00	0.00	0.00	0.00	0.00
Ending Depth	(feet)	0.50	0.50	0.50	0.50	0.50	0.50
Total Combustible Organics (TCO)	(mg/kg)	124279	56233	55328	91448	84771	156326

SEDIMENT SAMPLE RESULTS
TOTAL COMBUSTIBLE ORGANICS

PERIOD: From 12/07/1974 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	SD-407 11/11/2004 Primary	SD-408 11/11/2004 Primary	SD-409 11/18/2004 Primary	SD-410 11/11/2004 Primary	SD-411 12/03/2004 Primary	SD-412 11/12/2004 Primary
Starting Depth	(feet)	0.00	0.00	0.00	0.00	0.00	0.00
Ending Depth	(feet)	0.50	0.50	0.50	0.33	0.50	0.50
Total Combustible Organics (TCO)	(mg/kg)	62780	73632	53639	21777	161785	73482J

SEDIMENT SAMPLE RESULTS
TOTAL COMBUSTIBLE ORGANICS

PERIOD: From 12/07/1974 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	SD-413 11/11/2004 Primary	SD-415 11/11/2004 Primary	SD-416 11/11/2004 Primary	SD-417 11/11/2004 Primary	SD-420 12/03/2004 Primary	SD-420 12/03/2004 Duplicate 1
Starting Depth	(feet)	0.00	0.00	0.00	0.00	0.00	0.00
Ending Depth	(feet)	0.50	0.50	0.50	0.50	0.50	0.50
Total Combustible Organics (TCO)	(mg/kg)	31877	117048	41531	33755	33585	34495

SEDIMENT SAMPLE RESULTS
TOTAL COMBUSTIBLE ORGANICS

PERIOD: From 12/07/1974 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	SD-421 12/03/2004 Primary	SD-422 11/12/2004 Primary	SD-422 11/12/2004 Duplicate 1	SD-423 11/11/2004 Primary	SD-424 11/18/2004 Primary	SD-425 12/03/2004 Primary
Starting Depth	(feet)	0.00	0.33	0.33	0.50	0.00	0.00
Ending Depth	(feet)	0.50	0.83	0.83	1.00	0.50	0.50
Total Combustible Organics (TCO)	(mg/kg)	167679	60854J	62478J	124042J	23679	66801

SEDIMENT SAMPLE RESULTS
TOTAL COMBUSTIBLE ORGANICS

PERIOD: From 12/07/1974 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE RESULT TYPE	SD-426 12/03/2004 Primary
Starting Depth	(feet)	0.00
Ending Depth	(feet)	0.50
Total Combustible Organics (TCO)	(mg/kg)	68507

Appendix J

Surface Water Sample Laboratory Results, Dissolved Metals

SURFACE WATER SAMPLE RESULTS
DISSOLVED METALS

PERIOD: From 01/01/1986 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Water

	SITE	SW-403	SW-403	SW-405	SW-406	SW-407	SW-410
CONSTITUENT	DATE	11/16/2004	11/16/2004	11/17/2004	11/17/2004	11/16/2004	11/16/2004
	RESULT TYPE	Primary	Duplicate 1	Primary	Primary	Primary	Primary
Aluminum (Dissolved)	(ug/l)	50U	50U	50.4J	50U	50U	50U
Antimony (Dissolved)	(ug/l)	0.75J	0.76J	0.5J	0.5UJ	0.5UJ	0.5UJ
Arsenic (Dissolved)	(ug/l)	0.39	0.33J	0.75J	1.1	1.5	1.8
Barium (Dissolved)	(ug/l)	7.6J	7.5J	5.1J	6.8J	7.2J	6.7J
Beryllium (Dissolved)	(ug/l)	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U
Cadmium (Dissolved)	(ug/l)	2.9	3.2	0.94	2.6	1.4	0.47
Calcium (Dissolved)	(ug/l)	72500	72300	136000	231000	282000	308000
Chromium (Dissolved)	(ug/l)	2U	2U	2U	2U	2U	2U
Cobalt (Dissolved)	(ug/l)	1U	1U	1U	1.1	1.3	1.3
Copper (Dissolved)	(ug/l)	21.8J	24.3J	4.5J	15.9J	8.9J	2U
Iron (Dissolved)	(ug/l)	50U	50U	50U	50U	50U	50U
Lead (Dissolved)	(ug/l)	1.8	1.4J	1U	1U	1U	1U
Magnesium (Dissolved)	(ug/l)	6740	6720	439000	801000	1040000	1150000
Manganese (Dissolved)	(ug/l)	11.4	10.1	42	39.8	20.3	10.8
Mercury (Dissolved)	(ug/l)	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U
Nickel (Dissolved)	(ug/l)	1J	1.5J	1.4J	1.9J	1.8J	1.7J
Potassium (Dissolved)	(ug/l)	2190J	1910J	140000	239000J	307000	348000
Selenium (Dissolved)	(ug/l)	1U	1U	1U	1U	1U	1U
Silver (Dissolved)	(ug/l)	1U	1U	1U	1U	1U	1U
Sodium (Dissolved)	(ug/l)	23700	22800	3760000	6440000	8290000	9170000
Thallium (Dissolved)	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U

SURFACE WATER SAMPLE RESULTS
DISSOLVED METALS

PERIOD: From 01/01/1986 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	SW-403 11/16/2004 Primary	SW-403 11/16/2004 Duplicate 1	SW-405 11/17/2004 Primary	SW-406 11/17/2004 Primary	SW-407 11/16/2004 Primary	SW-410 11/16/2004 Primary
Vanadium (Dissolved)	(ug/l)	1U	1U	1U	1U	1.1	1.6
Zinc (Dissolved)	(ug/l)	823J	808J	271J	511J	268J	65.2J

SURFACE WATER SAMPLE RESULTS
DISSOLVED METALS

PERIOD: From 01/01/1986 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE	SW-411	SW-411	SW-414	SW-415	SW-419	SW-422
	DATE	12/03/2004	12/03/2004	11/16/2004	11/16/2004	12/02/2004	11/17/2004
	RESULT TYPE	Primary	Duplicate 1	Primary	Primary	Primary	Primary
Aluminum (Dissolved)	(ug/l)	167J	50U	50U	50U	168J	306
Antimony (Dissolved)	(ug/l)	0.5UJ	0.5UJ	0.5UJ	0.5UJ	0.5UJ	0.7J
Arsenic (Dissolved)	(ug/l)	1.4J	1.4	1.6	1.7	0.85J	0.2U
Barium (Dissolved)	(ug/l)	6J	5.4J	7.2J	7.3J	5U	16.6
Beryllium (Dissolved)	(ug/l)	0.2U	0.2U	0.2U	0.2U	0.2U	1.7
Cadmium (Dissolved)	(ug/l)	1	0.87	2.7	1.6	2.3	846
Calcium (Dissolved)	(ug/l)	214000	211000	275000	291000	91600	293000
Chromium (Dissolved)	(ug/l)	2U	2U	2U	2U	2U	2U
Cobalt (Dissolved)	(ug/l)	1U	1U	1.1	1.2	1U	91.4
Copper (Dissolved)	(ug/l)	22J	15.4J	6.6J	5.7J	54.7J	7780J
Iron (Dissolved)	(ug/l)	187	50U	50U	50U	147	500U
Lead (Dissolved)	(ug/l)	1U	1U	1U	1U	1U	87.2
Magnesium (Dissolved)	(ug/l)	741000	735000	1000000	1080000	286000	154000
Manganese (Dissolved)	(ug/l)	24.6	20.8	18.3	16.7	52.2	8050
Mercury (Dissolved)	(ug/l)	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U
Nickel (Dissolved)	(ug/l)	1.8J	1.7J	2J	1.9J	2J	168
Potassium (Dissolved)	(ug/l)	218000J	215000J	300000	318000	86700J	7660
Selenium (Dissolved)	(ug/l)	1U	1U	1U	1U	1U	2.2J
Silver (Dissolved)	(ug/l)	1U	1U	1U	1U	1U	1U
Sodium (Dissolved)	(ug/l)	5870000	5850000	8000000	8520000	2300000	94900
Thallium (Dissolved)	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U

SURFACE WATER SAMPLE RESULTS
DISSOLVED METALS

PERIOD: From 01/01/1986 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	SW-411 12/03/2004 Primary	SW-411 12/03/2004 Duplicate 1	SW-414 11/16/2004 Primary	SW-415 11/16/2004 Primary	SW-419 12/02/2004 Primary	SW-422 11/17/2004 Primary
Vanadium (Dissolved)	(ug/l)	1.4	1.2	1.1	1.2	1U	1U
Zinc (Dissolved)	(ug/l)	187J	181J	420J	280J	524J	171000J

SURFACE WATER SAMPLE RESULTS
DISSOLVED METALS

PERIOD: From 01/01/1986 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	SW-423 11/16/2004 Primary	SW-424 11/18/2004 Primary
Aluminum (Dissolved)	(ug/l)	50U	50U
Antimony (Dissolved)	(ug/l)	0.5UJ	0.5UJ
Arsenic (Dissolved)	(ug/l)	0.56	1J
Barium (Dissolved)	(ug/l)	14.9	7J
Beryllium (Dissolved)	(ug/l)	0.2U	0.2U
Cadmium (Dissolved)	(ug/l)	0.21	2.4
Calcium (Dissolved)	(ug/l)	163000	229000
Chromium (Dissolved)	(ug/l)	2U	2U
Cobalt (Dissolved)	(ug/l)	1.9	1U
Copper (Dissolved)	(ug/l)	2U	16J
Iron (Dissolved)	(ug/l)	2680	50U
Lead (Dissolved)	(ug/l)	1U	1U
Magnesium (Dissolved)	(ug/l)	49500	794000
Manganese (Dissolved)	(ug/l)	343	37.6
Mercury (Dissolved)	(ug/l)	0.2U	0.2U
Nickel (Dissolved)	(ug/l)	18.4	1.9J
Potassium (Dissolved)	(ug/l)	12300	232000J
Selenium (Dissolved)	(ug/l)	1U	1U
Silver (Dissolved)	(ug/l)	1U	1U
Sodium (Dissolved)	(ug/l)	101000	6330000
Thallium (Dissolved)	(ug/l)	0.5U	0.5U

SURFACE WATER SAMPLE RESULTS
DISSOLVED METALS

PERIOD: From 01/01/1986 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	SW-423 11/16/2004 Primary	SW-424 11/18/2004 Primary
Vanadium (Dissolved)	(ug/l)	1U	1U
Zinc (Dissolved)	(ug/l)	690J	429J

Appendix K

Surface Water Sample Laboratory Results, Total Metals

SURFACE WATER SAMPLE RESULTS
TOTAL METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 01/01/1986 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	99-BKSW-26 10/05/1999 Primary	99-RBB-44A 10/05/1999 Primary	99-RBK-43A 10/05/1999 Primary	99-SW-30 10/05/1999 Primary	99-SW-32 10/05/1999 Primary	99-SW-34 10/05/1999 Primary
Aluminum	(ug/l)						
Antimony	(ug/l)						
Arsenic	(ug/l)						
Barium	(ug/l)						
Beryllium	(ug/l)						
Cadmium	(ug/l)	0.5U	0.5U	0.5U	1.2	2.9	2.7
Calcium	(ug/l)						
Chromium	(ug/l)						
Cobalt	(ug/l)						
Copper	(ug/l)	2UJ	2UJ	2UJ	26	46	50
Iron	(ug/l)						
Lead	(ug/l)	3UJ	3UJ	3UJ	8J	4J	4J
Magnesium	(ug/l)						
Manganese	(ug/l)						
Mercury	(ug/l)	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U
Nickel	(ug/l)						
Potassium	(ug/l)						
Selenium	(ug/l)	6U	6U	6U	6U	6U	6U
Silver	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
Sodium	(ug/l)						
Thallium	(ug/l)						

SURFACE WATER SAMPLE RESULTS
TOTAL METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 01/01/1986 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	99-BKSW-26 10/05/1999 Primary	99-RBB-44A 10/05/1999 Primary	99-RBK-43A 10/05/1999 Primary	99-SW-30 10/05/1999 Primary	99-SW-32 10/05/1999 Primary	99-SW-34 10/05/1999 Primary
Vanadium	(ug/l)						
Zinc	(ug/l)	5UJ	5UJ	5UJ	420J	850J	790J
Sulfate	(ug/l)						
Cyanide	(ug/l)						

SURFACE WATER SAMPLE RESULTS
TOTAL METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 01/01/1986 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE	99-SW-36	99-SW-38	99-SW-40	99-SW-42	99-SW-49	99-TPR-50
	DATE	10/05/1999	10/05/1999	10/05/1999	10/05/1999	10/05/1999	10/05/1999
	RESULT TYPE	Primary	Primary	Primary	Primary	Primary	Primary
Aluminum	(ug/l)						
Antimony	(ug/l)						
Arsenic	(ug/l)						
Barium	(ug/l)						
Beryllium	(ug/l)						
Cadmium	(ug/l)	1	1.1	1	0.5U	1.2	23
Calcium	(ug/l)						
Chromium	(ug/l)						
Cobalt	(ug/l)						
Copper	(ug/l)	14	7	7	2J	3J	84
Iron	(ug/l)						
Lead	(ug/l)	3J	3UJ	3J	3UJ	3UJ	31
Magnesium	(ug/l)						
Manganese	(ug/l)						
Mercury	(ug/l)	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U
Nickel	(ug/l)						
Potassium	(ug/l)						
Selenium	(ug/l)	6U	6U	6U	6U	6U	6U
Silver	(ug/l)	0.5U	0.5U	0.5U	0.5U	2.3	0.5U
Sodium	(ug/l)						
Thallium	(ug/l)						

SURFACE WATER SAMPLE RESULTS
TOTAL METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 01/01/1986 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	99-SW-36 10/05/1999 Primary	99-SW-38 10/05/1999 Primary	99-SW-40 10/05/1999 Primary	99-SW-42 10/05/1999 Primary	99-SW-49 10/05/1999 Primary	99-TPR-50 10/05/1999 Primary
Vanadium	(ug/l)						
Zinc	(ug/l)	270J	260J	260J	87J	110J	5860J
Sulfate	(ug/l)						
Cyanide	(ug/l)						

SURFACE WATER SAMPLE RESULTS
TOTAL METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 01/01/1986 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	SAMPLE_1 01/01/1986 Primary	SAMPLE_2 01/01/1986 Primary	SAMPLE_3 01/01/1986 Primary	SAMPLE_4 01/01/1986 Primary	SW-403 11/16/2004 Primary	SW-403 11/16/2004 Duplicate 1
Aluminum	(ug/l)					834J	210J
Antimony	(ug/l)					1.3J	0.96J
Arsenic	(ug/l)					3.1J	0.96J
Barium	(ug/l)					8.6J	7.6J
Beryllium	(ug/l)					0.2U	0.2U
Cadmium	(ug/l)	4	25	18	20	3.9	3.2
Calcium	(ug/l)					76900	73300
Chromium	(ug/l)					2U	2U
Cobalt	(ug/l)					1U	1U
Copper	(ug/l)	80	20	10	20	88.1J	40.4J
Iron	(ug/l)					1030J	299J
Lead	(ug/l)	20	10U	10U	10U	44.2J	12.8J
Magnesium	(ug/l)					8550	7150
Manganese	(ug/l)					54.6J	20.2J
Mercury	(ug/l)					0.2U	0.2U
Nickel	(ug/l)					4.2J	1.8J
Potassium	(ug/l)					2400J	1890J
Selenium	(ug/l)					1U	1U
Silver	(ug/l)					1U	1U
Sodium	(ug/l)					24400	23000
Thallium	(ug/l)					0.5U	0.5U

SURFACE WATER SAMPLE RESULTS
TOTAL METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 01/01/1986 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	SAMPLE_1 01/01/1986 Primary	SAMPLE_2 01/01/1986 Primary	SAMPLE_3 01/01/1986 Primary	SAMPLE_4 01/01/1986 Primary	SW-403 11/16/2004 Primary	SW-403 11/16/2004 Duplicate 1
Vanadium	(ug/l)					1U	1U
Zinc	(ug/l)	730	10600	6500	4910	1170J	911J
Sulfate	(ug/l)					110000	113000
Cyanide	(ug/l)						

SURFACE WATER SAMPLE RESULTS
TOTAL METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 01/01/1986 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	SW-405 11/17/2004 Primary	SW-406 11/17/2004 Primary	SW-407 11/16/2004 Primary	SW-410 11/16/2004 Primary	SW-411 12/03/2004 Primary	SW-411 12/03/2004 Duplicate 1
Aluminum	(ug/l)	212J	106J	55.8J	50U	167J	51.6J
Antimony	(ug/l)	0.5UJ	0.5UJ	0.5UJ	0.5UJ	0.71J	0.5UJ
Arsenic	(ug/l)	0.92J	1.1J	1.6J	1.9J	1.5J	1.5J
Barium	(ug/l)	5.4J	6.5J	7.4J	7.2J	6.2J	5.8J
Beryllium	(ug/l)	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U
Cadmium	(ug/l)	1.7	2.7	1.5	0.52	1	0.87
Calcium	(ug/l)	139000	227000	284000	310000	213000	214000
Chromium	(ug/l)	2U	2U	2U	2U	2U	2U
Cobalt	(ug/l)	1U	1.2	1.2	1.3	1U	1U
Copper	(ug/l)	17J	20.7J	12.1J	2U	21.4J	16.6J
Iron	(ug/l)	303J	147J	61.4J	50U	203	50U
Lead	(ug/l)	3.3J	1.9J	1.3J	1U	1.1	1U
Magnesium	(ug/l)	447000	801000	1040000	1150000	745000	743000
Manganese	(ug/l)	47.8J	41.7J	21.4J	13.1J	25.4	21.9
Mercury	(ug/l)	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U
Nickel	(ug/l)	2.2J	2J	2J	1.8J	2.1J	1.6J
Potassium	(ug/l)	143000	237000J	309000	353000	216000J	222000J
Selenium	(ug/l)	1U	1U	1U	1U	1U	1U
Silver	(ug/l)	1U	1U	1U	1U	1U	1U
Sodium	(ug/l)	3700000	6390000	8270000	9330000	5890000	5900000
Thallium	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U

SURFACE WATER SAMPLE RESULTS
TOTAL METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 01/01/1986 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Water

	SITE	SW-405	SW-406	SW-407	SW-410	SW-411	SW-411
CONSTITUENT	DATE	11/17/2004	11/17/2004	11/16/2004	11/16/2004	12/03/2004	12/03/2004
	RESULT TYPE	Primary	Primary	Primary	Primary	Primary	Duplicate 1
Vanadium	(ug/l)	1U	1U	1.2	1.5	1.4	1.2
Zinc	(ug/l)	330J	512J	275J	67.1J	190J	177J
Sulfate	(ug/l)	882000	1660000	2190000	2460000	1650000	774000
Cyanide	(ug/l)						

SURFACE WATER SAMPLE RESULTS
TOTAL METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 01/01/1986 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Water

	SITE	SW-414	SW-415	SW-419	SW-422	SW-423	SW-424
CONSTITUENT	DATE	11/16/2004	11/16/2004	12/02/2004	11/17/2004	11/16/2004	11/18/2004
	RESULT TYPE	Primary	Primary	Primary	Primary	Primary	Primary
Aluminum	(ug/l)	81.6J	305J	380	2490J	17200J	103J
Antimony	(ug/l)	0.5UJ	0.5UJ	0.5UJ	1.5J	0.65J	0.5UJ
Arsenic	(ug/l)	1.7J	2J	1.1J	3.1J	10.6J	1.2J
Barium	(ug/l)	7.3J	7.7J	5.2J	17.4	67.1	7.2J
Beryllium	(ug/l)	0.2U	0.2U	0.2U	1.8	0.8	0.2U
Cadmium	(ug/l)	2.6	2	2.1	854	10	2.4
Calcium	(ug/l)	275000	291000	133000	291000	169000	235000
Chromium	(ug/l)	2U	2U	2U	2U	29	2U
Cobalt	(ug/l)	1.2	1.3	1U	93.7	8	1.2
Copper	(ug/l)	13.6J	16J	58.8	9790J	46.9J	19.8J
Iron	(ug/l)	98.5J	392J	386	1590J	39600J	163J
Lead	(ug/l)	2.3J	4.8J	1.5	154J	37.2J	1.6J
Magnesium	(ug/l)	996000	1070000	438000	170000	55600	823000
Manganese	(ug/l)	20.1J	24.2J	51.2	7680J	471J	43J
Mercury	(ug/l)	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U
Nickel	(ug/l)	2.4J	3.5J	2.7J	163J	107J	2.5J
Potassium	(ug/l)	302000	321000	129000	11900	15000	241000J
Selenium	(ug/l)	1U	1U	1U	2U	1U	1U
Silver	(ug/l)	1U	1U	1U	1U	1U	1U
Sodium	(ug/l)	8020000	8590000	3540000	227000	102000	6490000
Thallium	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U

SURFACE WATER SAMPLE RESULTS
TOTAL METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 01/01/1986 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	SW-414 11/16/2004 Primary	SW-415 11/16/2004 Primary	SW-419 12/02/2004 Primary	SW-422 11/17/2004 Primary	SW-423 11/16/2004 Primary	SW-424 11/18/2004 Primary
Vanadium	(ug/l)	1.2	1.8	1.3	1U	30.6	1U
Zinc	(ug/l)	437J	309J	501J	169000J	2630J	446J
Sulfate	(ug/l)	2110000	2260000	931000	1600000	607000	1790000
Cyanide	(ug/l)						

SURFACE WATER SAMPLE RESULTS
TOTAL METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 01/01/1986 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	SW-GPE1 01/01/1986 Primary	SW-GPE2 01/01/1987 Primary	SW-SA_1 01/01/1986 Primary	SW-SA_1 01/01/1987 Primary	SW-SA_1 01/01/1990 Primary	SW-SA_1 01/01/1991 Primary
Aluminum	(ug/l)						
Antimony	(ug/l)						
Arsenic	(ug/l)						
Barium	(ug/l)						
Beryllium	(ug/l)						
Cadmium	(ug/l)	2	9	11	24	14	25
Calcium	(ug/l)						
Chromium	(ug/l)						
Cobalt	(ug/l)						
Copper	(ug/l)	40		20U		530	20U
Iron	(ug/l)						
Lead	(ug/l)	4	50U	3U	1	23	3U
Magnesium	(ug/l)						
Manganese	(ug/l)						
Mercury	(ug/l)						
Nickel	(ug/l)					40	40U
Potassium	(ug/l)						
Selenium	(ug/l)						
Silver	(ug/l)						
Sodium	(ug/l)						
Thallium	(ug/l)						

SURFACE WATER SAMPLE RESULTS
TOTAL METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 01/01/1986 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	SW-GPE1 01/01/1986 Primary	SW-GPE2 01/01/1987 Primary	SW-SA_1 01/01/1986 Primary	SW-SA_1 01/01/1987 Primary	SW-SA_1 01/01/1990 Primary	SW-SA_1 01/01/1991 Primary
Vanadium	(ug/l)						
Zinc	(ug/l)	380		3620		6100	5410
Sulfate	(ug/l)						
Cyanide	(ug/l)				10U	50U	50U

SURFACE WATER SAMPLE RESULTS
TOTAL METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 01/01/1986 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE	SW-SA_2	SW-SA_2	SW-SA_2	SW-SA_2	SW-SP_SEEP	SW-SP_SEEP
	DATE	01/01/1986	01/01/1987	01/01/1990	01/01/1991	01/01/1986	01/01/1987
	RESULT TYPE	Primary	Primary	Primary	Primary	Primary	Primary
Aluminum	(ug/l)						
Antimony	(ug/l)						
Arsenic	(ug/l)						
Barium	(ug/l)						
Beryllium	(ug/l)						
Cadmium	(ug/l)	18	16	8	15	60	65
Calcium	(ug/l)						
Chromium	(ug/l)						
Cobalt	(ug/l)						
Copper	(ug/l)	20U		550	30	50U	
Iron	(ug/l)						
Lead	(ug/l)	3U	2	6	10	3	1U
Magnesium	(ug/l)						
Manganese	(ug/l)						
Mercury	(ug/l)						
Nickel	(ug/l)			60	40		
Potassium	(ug/l)						
Selenium	(ug/l)						
Silver	(ug/l)						
Sodium	(ug/l)						
Thallium	(ug/l)						

SURFACE WATER SAMPLE RESULTS
TOTAL METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 01/01/1986 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	SW-SA_2 01/01/1986 Primary	SW-SA_2 01/01/1987 Primary	SW-SA_2 01/01/1990 Primary	SW-SA_2 01/01/1991 Primary	SW-SP_SEEP 01/01/1986 Primary	SW-SP_SEEP 01/01/1987 Primary
Vanadium	(ug/l)						
Zinc	(ug/l)	9410		11500	12100	13900	
Sulfate	(ug/l)						
Cyanide	(ug/l)		10U	50U	50U		

SURFACE WATER SAMPLE RESULTS
TOTAL METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 01/01/1986 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	SW-SP_SEEP 01/01/1990 Primary	SW-SP_SEEP 01/01/1991 Primary	SW-TP 01/01/1987 Primary	SW-WCD 01/01/1986 Primary
Aluminum	(ug/l)				
Antimony	(ug/l)				
Arsenic	(ug/l)				
Barium	(ug/l)				
Beryllium	(ug/l)				
Cadmium	(ug/l)	49	51	1U	1U
Calcium	(ug/l)				
Chromium	(ug/l)				
Cobalt	(ug/l)				
Copper	(ug/l)	260	470	20U	20U
Iron	(ug/l)				
Lead	(ug/l)	3	104	3U	3U
Magnesium	(ug/l)				
Manganese	(ug/l)				
Mercury	(ug/l)				
Nickel	(ug/l)	40U	60		
Potassium	(ug/l)				
Selenium	(ug/l)				
Silver	(ug/l)				
Sodium	(ug/l)				
Thallium	(ug/l)				

SURFACE WATER SAMPLE RESULTS
TOTAL METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 01/01/1986 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	SW-SP_SEEP 01/01/1990 Primary	SW-SP_SEEP 01/01/1991 Primary	SW-TP 01/01/1987 Primary	SW-WCD 01/01/1986 Primary
Vanadium	(ug/l)				
Zinc	(ug/l)	9000	16300	390	20U
Sulfate	(ug/l)				
Cyanide	(ug/l)	50U	50U		

Appendix L

Surface Water Sample Laboratory Results, VOCs

SURFACE WATER SAMPLE RESULTS
VOCS

PERIOD: From 01/01/1986 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE	SW-GPE2 01/01/1987	SW-SA_1 01/01/1986	SW-SA_1 01/01/1987	SW-SA_1 01/01/1990	SW-SA_1 01/01/1991	SW-SA_2 01/01/1986
1,1,1-trichloroethane	(ug/l)	5U	5U	5U	1U	1U	17
1-Butanethiol	(ug/l)	5U	5U	5U	1U	1U	5U
Ethylbenzene	(ug/l)	5U	5U	5U	1U	1U	6
Toluene	(ug/l)	5U	5U	5U	1U	1U	5
Xylene (total)	(ug/l)	5U	5U	5U	1U	1U	36

SURFACE WATER SAMPLE RESULTS
VOCS

PERIOD: From 01/01/1986 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE	SW-SA_2 01/01/1987	SW-SA_2 01/01/1990	SW-SA_2 01/01/1991	SW-SP_SEEP 01/01/1986	SW-SP_SEEP 01/01/1987	SW-SP_SEEP 01/01/1990
1,1,1-trichloroethane	(ug/l)	5U	1U	1U	5U	5U	1U
1-Butanethiol	(ug/l)	5U	2.9J	1J	5U	5U	1U
Ethylbenzene	(ug/l)	5U	1U	1U	5U	5U	1U
Toluene	(ug/l)	5U	1U	1U	5U	5U	1U
Xylene (total)	(ug/l)	5U	1U	1U	5U	5U	1U

SURFACE WATER SAMPLE RESULTS
VOCS

PERIOD: From 01/01/1986 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE	SW-SP_SEEP 01/01/1991
1,1,1-trichloroethane	(ug/l)	1U
1-Butanethiol	(ug/l)	1U
Ethylbenzene	(ug/l)	1U
Toluene	(ug/l)	1U
Xylene (total)	(ug/l)	1U

Appendix M

Surface Water Sample Laboratory Results, SVOCs

SURFACE WATER SAMPLE RESULTS
SVOCS

PERIOD: From 01/01/1986 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE	SW-GPE2 01/01/1987	SW-SA_1 01/01/1986	SW-SA_1 01/01/1987	SW-SA_1 01/01/1990	SW-SA_1 01/01/1991	SW-SA_2 01/01/1986
Di-n-butylphthalate	(ug/l)	10U	22	10U	10U	10U	10U
Di-n-octyl phthalate	(ug/l)	10U	10U	10U	10U	10U	10U
Dioctyl adipate	(ug/l)	10U	10U	10U	10U	10U	10U
o,o-diethyl phosphorodithiotic acid	(ug/l)	10U	10U	10U	10U	10J	10U
o,o-diethyl-s-ethyl phosphorothioate	(ug/l)	10U	8J	10U	2.8J	1.55	10U
o,o-diethyl-s-methyl phosphorothioate	(ug/l)	10U	10U	18J	3.1J	1.71	10U
o,o-s triethyldithiophosphate	(ug/l)	10U	10U	10U	10U	10U	10U

SURFACE WATER SAMPLE RESULTS
SVOCS

PERIOD: From 01/01/1986 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE	SW-SA_2	SW-SA_2	SW-SA_2	SW-SP_SEEP	SW-SP_SEEP	SW-SP_SEEP
	DATE	01/01/1987	01/01/1990	01/01/1991	01/01/1986	01/01/1987	01/01/1990
Di-n-butylphthalate	(ug/l)	10U	10U	10U	10U	10U	10U
Di-n-octyl phthalate	(ug/l)	10U	10U	10U	100	10U	10U
Dioctyl adipate	(ug/l)	10U	10U	10U	260	10U	10U
o,o-diethyl phosphorodithiotic acid	(ug/l)	10U	10U	10J	10U	10U	10U
o,o-diethyl-s-ethyl phosphorothioate	(ug/l)	14J	6J	4.86	10U	10U	10U
o,o-diethyl-s-methyl phosphorothioate	(ug/l)	10U	0.6J	10J	10U	10U	10U
o,o-s triethyldithiophosphate	(ug/l)	13J	10U	10U	10U	10U	10U

SURFACE WATER SAMPLE RESULTS
SVOCS

PERIOD: From 01/01/1986 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE	SW-SP_SEEP 01/01/1991
Di-n-butylphthalate	(ug/l)	10U
Di-n-octyl phthalate	(ug/l)	10U
Dioctyl adipate	(ug/l)	10U
o,o-diethyl phosphorodithiotic acid	(ug/l)	1.66
o,o-diethyl-s-ethyl phosphorothioate	(ug/l)	3.49
o,o-diethyl-s-methyl phosphorothioate	(ug/l)	10U
o,o-s triethyldithiophosphate	(ug/l)	10U

Appendix N

Surface Water Sample Laboratory Results, Gasoline Fuel Oil

SURFACE WATER SAMPLE RESULTS
GASOLINE/FUEL OIL

PERIOD: From 01/01/1986 thru 12/03/2004 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE	SW-SA_1 01/01/1986	SW-SA_2 01/01/1986	SW-SP_SEEP 01/01/1986	SW-SP_SEEP 01/01/1987	SW-SP_SEEP 01/01/1990
Fuel oil no. 2	(ug/l)	50U	50U	50U	20U	
Gasoline	(ug/l)	10U	10U	10U	20U	5U

Appendix O

Drinking Water Well Sample Laboratory Results, Metals

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	10F 12/01/1967 Primary	10F 05/01/1968 Primary	10F 07/01/1968 Primary	10F 09/01/1968 Primary	11F_ROBINSON 12/01/1967 Primary	11F_ROBINSON 01/01/1986 Primary
Aluminum	(ug/l)						
Antimony	(ug/l)						
Arsenic	(ug/l)						
Barium	(ug/l)						
Beryllium	(ug/l)						
Cadmium	(ug/l)	0	0.01U	0.004U	0.004U	0.001	0.001U
Calcium	(ug/l)						
Chromium	(ug/l)						
Cobalt	(ug/l)						
Copper	(ug/l)	0.02	0.06	0.03	0.005U	0.03	0.02U
Iron	(ug/l)						
Lead	(ug/l)	0.02	0.01U	0.03U	0.03U	0.09	0.003U
Magnesium	(ug/l)						
Manganese	(ug/l)						
Mercury	(ug/l)						
Nickel	(ug/l)	0.05	0.01U	0.01U	0.01U	0.03	
Potassium	(ug/l)						
Selenium	(ug/l)						
Silver	(ug/l)						
Sodium	(ug/l)						
Thallium	(ug/l)						

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	10F 12/01/1967 Primary	10F 05/01/1968 Primary	10F 07/01/1968 Primary	10F 09/01/1968 Primary	11F_ROBINSON 12/01/1967 Primary	11F_ROBINSON 01/01/1986 Primary
Vanadium	(ug/l)						
Zinc	(ug/l)	0.07	0.01U	0.04	0.02	1.6	0.3
Sulfate	(ug/l)						
Boron	(mg/l)						
Cyanide	(ug/l)						
Molybdenum	(mg/l)						

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	12F_JGRAY 12/01/1967 Primary	12F_JGRAY 05/01/1968 Primary	12F_JGRAY 07/01/1968 Primary	12F_JGRAY 01/01/1986 Primary	12F_JGRAY 01/01/1990 Primary	12F_JGRAY 01/01/1991 Primary
Aluminum	(ug/l)						
Antimony	(ug/l)						
Arsenic	(ug/l)						
Barium	(ug/l)						
Beryllium	(ug/l)						
Cadmium	(ug/l)	0	0.01U	0.004U	0.001U	0.0005U	0.0005U
Calcium	(ug/l)						
Chromium	(ug/l)						
Cobalt	(ug/l)						
Copper	(ug/l)	0.01	0.04	0.02	0.2	0.09	0.26
Iron	(ug/l)						
Lead	(ug/l)	0	0.01U	0.05	0.003U	0.003U	0.003U
Magnesium	(ug/l)						
Manganese	(ug/l)						
Mercury	(ug/l)						
Nickel	(ug/l)	0.03	0.01U	0.01U		0.04U	0.04U
Potassium	(ug/l)						
Selenium	(ug/l)						
Silver	(ug/l)						
Sodium	(ug/l)						
Thallium	(ug/l)						

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	12F_JGRAY 12/01/1967 Primary	12F_JGRAY 05/01/1968 Primary	12F_JGRAY 07/01/1968 Primary	12F_JGRAY 01/01/1986 Primary	12F_JGRAY 01/01/1990 Primary	12F_JGRAY 01/01/1991 Primary
Vanadium	(ug/l)						
Zinc	(ug/l)	0.04	0.01U	0.02	0.02U	0.01U	0.02
Sulfate	(ug/l)						
Boron	(mg/l)						
Cyanide	(ug/l)					0.05U	0.05U
Molybdenum	(mg/l)						

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE	13F_SMITH	13F_SMITH	13F_SMITH	13F_SMITH	13F_SMITH	14F_RANKIN
	DATE	12/01/1967	05/01/1968	07/01/1968	01/01/1986	01/01/1990	12/01/1967
	RESULT TYPE	Primary	Primary	Primary	Primary	Primary	Primary
Aluminum	(ug/l)						
Antimony	(ug/l)						
Arsenic	(ug/l)						
Barium	(ug/l)						
Beryllium	(ug/l)						
Cadmium	(ug/l)	0.001	0.01U	0.008	0.004U	0.001U	0
Calcium	(ug/l)						
Chromium	(ug/l)						
Cobalt	(ug/l)						
Copper	(ug/l)	0.14	0.08		0.03	0.02U	0.05
Iron	(ug/l)						
Lead	(ug/l)	0.01	0.01U	0.03U	0.03U	0.003U	0.08
Magnesium	(ug/l)						
Manganese	(ug/l)						
Mercury	(ug/l)						
Nickel	(ug/l)	0.03	0.01U	0.01U	0.01U		0.04
Potassium	(ug/l)						
Selenium	(ug/l)						
Silver	(ug/l)						
Sodium	(ug/l)						
Thallium	(ug/l)						

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	13F_SMITH 12/01/1967 Primary	13F_SMITH 05/01/1968 Primary	13F_SMITH 07/01/1968 Primary	13F_SMITH 01/01/1986 Primary	13F_SMITH 01/01/1990 Primary	14F_RANKIN 12/01/1967 Primary
Vanadium	(ug/l)						
Zinc	(ug/l)	0.05	0.01U	0.03	0.01	0.02U	0.05
Sulfate	(ug/l)						
Boron	(mg/l)						
Cyanide	(ug/l)						
Molybdenum	(mg/l)						

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	14F_RANKIN 05/01/1968 Primary	14F_RANKIN 07/01/1968 Primary	14F_RANKIN 09/01/1968 Primary	14F_RANKIN 01/01/1986 Primary	14F_RANKIN 01/01/1990 Primary	14F_RANKIN 01/01/1991 Primary
Aluminum	(ug/l)						
Antimony	(ug/l)						
Arsenic	(ug/l)						
Barium	(ug/l)						
Beryllium	(ug/l)						
Cadmium	(ug/l)	0.01U	0.004U	0.004U	0.001U	0.0005U	0.0005U
Calcium	(ug/l)						
Chromium	(ug/l)						
Cobalt	(ug/l)						
Copper	(ug/l)	0.09	0.11	0.25	0.18	0.04	0.02U
Iron	(ug/l)						
Lead	(ug/l)	0.01U	0.1U	0.03U	0.003U	0.005	0.003U
Magnesium	(ug/l)						
Manganese	(ug/l)						
Mercury	(ug/l)						
Nickel	(ug/l)	0.01U	0.01U	0.01U		0.04U	0.04U
Potassium	(ug/l)						
Selenium	(ug/l)						
Silver	(ug/l)						
Sodium	(ug/l)						
Thallium	(ug/l)						

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

	SITE	14F_RANKIN	14F_RANKIN	14F_RANKIN	14F_RANKIN	14F_RANKIN	14F_RANKIN
CONSTITUENT	DATE	05/01/1968	07/01/1968	09/01/1968	01/01/1986	01/01/1990	01/01/1991
	RESULT TYPE	Primary	Primary	Primary	Primary	Primary	Primary
Vanadium	(ug/l)						
Zinc	(ug/l)	0.01U	0.04	0.05	0.02U	0.01U	0.02
Sulfate	(ug/l)						
Boron	(mg/l)						
Cyanide	(ug/l)					0.05U	0.05U
Molybdenum	(mg/l)						

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE	1F	1F	1F	1F	2F	2F
	DATE	12/01/1967	05/01/1968	07/01/1968	09/01/1968	12/01/1967	05/01/1968
	RESULT TYPE	Primary	Primary	Primary	Primary	Primary	Primary
Aluminum	(ug/l)						
Antimony	(ug/l)						
Arsenic	(ug/l)						
Barium	(ug/l)						
Beryllium	(ug/l)						
Cadmium	(ug/l)	0	0.01U		0.004U	0.001	0.01U
Calcium	(ug/l)						
Chromium	(ug/l)						
Cobalt	(ug/l)						
Copper	(ug/l)	0.5	0.4	0.03	0.005U	0.01	0.1
Iron	(ug/l)						
Lead	(ug/l)	0	0.01U		0.03U	0	0.01U
Magnesium	(ug/l)						
Manganese	(ug/l)						
Mercury	(ug/l)						
Nickel	(ug/l)	0.02	0.01U		0.01U	0.02	0.02
Potassium	(ug/l)						
Selenium	(ug/l)						
Silver	(ug/l)						
Sodium	(ug/l)						
Thallium	(ug/l)						

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	1F 12/01/1967 Primary	1F 05/01/1968 Primary	1F 07/01/1968 Primary	1F 09/01/1968 Primary	2F 12/01/1967 Primary	2F 05/01/1968 Primary
Vanadium	(ug/l)						
Zinc	(ug/l)	1.5	0.01U		0	1.6	1.3
Sulfate	(ug/l)						
Boron	(mg/l)						
Cyanide	(ug/l)						
Molybdenum	(mg/l)						

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	2F 07/01/1968 Primary	2F 09/01/1968 Primary	3F 12/01/1967 Primary	3F 05/01/1968 Primary	3F 07/01/1968 Primary	3F 09/01/1968 Primary
Aluminum	(ug/l)						
Antimony	(ug/l)						
Arsenic	(ug/l)						
Barium	(ug/l)						
Beryllium	(ug/l)						
Cadmium	(ug/l)	0.01	0.004U	0	0.01U	0.004U	0.004U
Calcium	(ug/l)						
Chromium	(ug/l)						
Cobalt	(ug/l)						
Copper	(ug/l)	0.05	0.03	0.05	0.1	0.25	0.01U
Iron	(ug/l)						
Lead	(ug/l)	0.03U	0.03U	0.02	0.01U	0.03U	0.03U
Magnesium	(ug/l)						
Manganese	(ug/l)						
Mercury	(ug/l)						
Nickel	(ug/l)	0.01U	0.01U	0.02	0.02	0.01U	0.01U
Potassium	(ug/l)						
Selenium	(ug/l)						
Silver	(ug/l)						
Sodium	(ug/l)						
Thallium	(ug/l)						

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	2F 07/01/1968 Primary	2F 09/01/1968 Primary	3F 12/01/1967 Primary	3F 05/01/1968 Primary	3F 07/01/1968 Primary	3F 09/01/1968 Primary
Vanadium	(ug/l)						
Zinc	(ug/l)	1.07	0.68	0.1	0.04U	0.11	0.08
Sulfate	(ug/l)						
Boron	(mg/l)						
Cyanide	(ug/l)						
Molybdenum	(mg/l)						

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

	SITE	4F	4F	4F	4F	5F	5F
CONSTITUENT	DATE	12/01/1967	05/01/1968	07/01/1968	09/01/1968	12/01/1967	05/01/1968
	RESULT TYPE	Primary	Primary	Primary	Primary	Primary	Primary
Aluminum	(ug/l)						
Antimony	(ug/l)						
Arsenic	(ug/l)						
Barium	(ug/l)						
Beryllium	(ug/l)						
Cadmium	(ug/l)	0.002	0.01U	0.004U	0.004U	0.001	0.01U
Calcium	(ug/l)						
Chromium	(ug/l)						
Cobalt	(ug/l)						
Copper	(ug/l)	0.03	0.07	0.04	0.005U	0.06	0.2
Iron	(ug/l)						
Lead	(ug/l)	0	0.01U	0.03U	0.03U	0	0.01U
Magnesium	(ug/l)						
Manganese	(ug/l)						
Mercury	(ug/l)						
Nickel	(ug/l)	0.03	0.01	0.01U	0.01U	0.03	0.02
Potassium	(ug/l)						
Selenium	(ug/l)						
Silver	(ug/l)						
Sodium	(ug/l)						
Thallium	(ug/l)						

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	4F 12/01/1967 Primary	4F 05/01/1968 Primary	4F 07/01/1968 Primary	4F 09/01/1968 Primary	5F 12/01/1967 Primary	5F 05/01/1968 Primary
Vanadium	(ug/l)						
Zinc	(ug/l)	0.1	0.01U	0.04	0.08	1.6	0.08
Sulfate	(ug/l)						
Boron	(mg/l)						
Cyanide	(ug/l)						
Molybdenum	(mg/l)						

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

	SITE	5F	5F	6F	6F	7F	7F
CONSTITUENT	DATE	07/01/1968	09/01/1968	12/01/1967	09/01/1968	12/01/1967	05/01/1968
	RESULT TYPE	Primary	Primary	Primary	Primary	Primary	Primary
Aluminum	(ug/l)						
Antimony	(ug/l)						
Arsenic	(ug/l)						
Barium	(ug/l)						
Beryllium	(ug/l)						
Cadmium	(ug/l)	0.004U	0.004U	0		0.001	0.01U
Calcium	(ug/l)						
Chromium	(ug/l)						
Cobalt	(ug/l)						
Copper	(ug/l)	0.15	0.12	0.2		0.005	0.03
Iron	(ug/l)						
Lead	(ug/l)	0.03U	0.03U	0.01		0	0.01U
Magnesium	(ug/l)						
Manganese	(ug/l)						
Mercury	(ug/l)						
Nickel	(ug/l)	0.01U	0.01U	0		0.01	0.01U
Potassium	(ug/l)						
Selenium	(ug/l)						
Silver	(ug/l)						
Sodium	(ug/l)						
Thallium	(ug/l)						

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	5F 07/01/1968 Primary	5F 09/01/1968 Primary	6F 12/01/1967 Primary	6F 09/01/1968 Primary	7F 12/01/1967 Primary	7F 05/01/1968 Primary
Vanadium	(ug/l)						
Zinc	(ug/l)	0.47	0.45	0.1	0.09	0.02	0.01U
Sulfate	(ug/l)						
Boron	(mg/l)						
Cyanide	(ug/l)						
Molybdenum	(mg/l)						

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	7F 07/01/1968 Primary	7F 09/01/1968 Primary	8F 12/01/1967 Primary	8F 05/01/1968 Primary	8F 07/01/1968 Primary	9F_HARDING 12/01/1967 Primary
Aluminum	(ug/l)						
Antimony	(ug/l)						
Arsenic	(ug/l)						
Barium	(ug/l)						
Beryllium	(ug/l)						
Cadmium	(ug/l)	0.004U	0.004U	0	0.01U	0.004U	0
Calcium	(ug/l)						
Chromium	(ug/l)						
Cobalt	(ug/l)						
Copper	(ug/l)	0.04	0.005U	0.02	0.04	0.04	0.02
Iron	(ug/l)						
Lead	(ug/l)	0.03U	0.03U	0.01	0.01U	0.03U	0.01
Magnesium	(ug/l)						
Manganese	(ug/l)						
Mercury	(ug/l)						
Nickel	(ug/l)	0.01U	0.01U	0.05	0.15	0.01U	0.04
Potassium	(ug/l)						
Selenium	(ug/l)						
Silver	(ug/l)						
Sodium	(ug/l)						
Thallium	(ug/l)						

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: *From 12/01/1967 thru 01/12/2005 - Inclusive*
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	7F 07/01/1968 Primary	7F 09/01/1968 Primary	8F 12/01/1967 Primary	8F 05/01/1968 Primary	8F 07/01/1968 Primary	9F_HARDING 12/01/1967 Primary
Vanadium	(ug/l)						
Zinc	(ug/l)	0.03	0.01U	1.6	0.01U	0.72	0.03
Sulfate	(ug/l)						
Boron	(mg/l)						
Cyanide	(ug/l)						
Molybdenum	(mg/l)						

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive.
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	9F_HARDING 05/01/1968 Primary	9F_HARDING 07/01/1968 Primary	9F_HARDING 09/01/1968 Primary	9F_HARDING 01/01/1986 Primary	9F_HARDING 01/01/1987 Primary	9F_HARDING 01/01/1990 Primary
Aluminum	(ug/l)						
Antimony	(ug/l)						
Arsenic	(ug/l)						
Barium	(ug/l)						
Beryllium	(ug/l)						
Cadmium	(ug/l)	0.01U	0.004U	0.004U	0.001U	0.005U	0.0005U
Calcium	(ug/l)						
Chromium	(ug/l)						
Cobalt	(ug/l)						
Copper	(ug/l)	0.04	0	0.005U	0.04		0.02
Iron	(ug/l)						
Lead	(ug/l)	0.01U	0.05	0.03U	0.003U	0.001U	0.003U
Magnesium	(ug/l)						
Manganese	(ug/l)						
Mercury	(ug/l)						
Nickel	(ug/l)	0.01U	0.01U	0.01U			0.04U
Potassium	(ug/l)						
Selenium	(ug/l)						
Silver	(ug/l)						
Sodium	(ug/l)						
Thallium	(ug/l)						

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	9F_HARDING 05/01/1968 Primary	9F_HARDING 07/01/1968 Primary	9F_HARDING 09/01/1968 Primary	9F_HARDING 01/01/1986 Primary	9F_HARDING 01/01/1987 Primary	9F_HARDING 01/01/1990 Primary
Vanadium	(ug/l)						
Zinc	(ug/l)	0.01U	0.07	0.01	0.02U		0.01U
Sulfate	(ug/l)						
Boron	(mg/l)						
Cyanide	(ug/l)						0.05U
Molybdenum	(mg/l)						

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE	CALLAHAN_WATE	DWCA-01	DWCA-01	DWCA-02	DWCA-03	DWCA-04
	DATE	01/01/1986	08/29/2002	09/10/2003	09/10/2003	09/10/2003	09/10/2003
	RESULT TYPE	Primary	Primary	Primary	Primary	Primary	Primary
Aluminum	(ug/l)						
Antimony	(ug/l)						
Arsenic	(ug/l)		5.0U	7.0	3.0U	3.0U	3.0U
Barium	(ug/l)						
Beryllium	(ug/l)						
Cadmium	(ug/l)	0.001U	10.0U	2.0U	2.0U	2.0U	2.0U
Calcium	(ug/l)						
Chromium	(ug/l)		10.0U				
Cobalt	(ug/l)						
Copper	(ug/l)	0.02U	31.0	24.0	110	86.0	13.0
Iron	(ug/l)			20.0	30.0	10.0	3100
Lead	(ug/l)	0.003U	3.0U	3.0U	9.0	3.0U	71.0
Magnesium	(ug/l)						
Manganese	(ug/l)				10.0	10.0U	80.0
Mercury	(ug/l)						
Nickel	(ug/l)		10.0U				
Potassium	(ug/l)						
Selenium	(ug/l)						
Silver	(ug/l)						
Sodium	(ug/l)						
Thallium	(ug/l)						

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	CALLAHAN_WATE 01/01/1986 Primary	DWCA-01 08/29/2002 Primary	DWCA-01 09/10/2003 Primary	DWCA-02 09/10/2003 Primary	DWCA-03 09/10/2003 Primary	DWCA-04 09/10/2003 Primary
Vanadium	(ug/l)						
Zinc	(ug/l)	0.02	46.0	46.0	71.0	48.0	7400
Sulfate	(ug/l)			45000	12000	11000	9000
Boron	(mg/l)						
Cyanide	(ug/l)						
Molybdenum	(mg/l)						

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE	DWCA-05	DWCA-05	DWCA-06	DWCA-06	DWCA-06	DWCA-07
	DATE	09/10/2003	08/26/2004	08/29/2002	09/10/2003	08/26/2004	09/10/2003
	RESULT TYPE	Primary	Primary	Primary	Primary	Primary	Primary
Aluminum	(ug/l)		20.0U			60.0	
Antimony	(ug/l)		3.0U			3.0U	
Arsenic	(ug/l)	3.0U	3.0U	5.0U	3.0U	3.0U	3.0U
Barium	(ug/l)		5.0U			5.0U	
Beryllium	(ug/l)		2.0U			2.0U	
Cadmium	(ug/l)	2.0U	2.0	10.0U	2.0U	3.0	11.0
Calcium	(ug/l)						
Chromium	(ug/l)		1.0U	10.0U		1.0U	
Cobalt	(ug/l)						
Copper	(ug/l)	500	73.0	180	270	95.0	100
Iron	(ug/l)	480	20.0		30.0	60.0	10.0
Lead	(ug/l)	7.0	3.0U	4.3	3.0U	5.0	3.0U
Magnesium	(ug/l)						
Manganese	(ug/l)	150	360		10.0U	10.0U	10.0U
Mercury	(ug/l)		0.20U			0.20U	
Nickel	(ug/l)		2.0U	10.0U		2.0U	
Potassium	(ug/l)						
Selenium	(ug/l)		10.0U			10.0U	
Silver	(ug/l)						
Sodium	(ug/l)						
Thallium	(ug/l)						

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERID: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	DWCA-05 09/10/2003 Primary	DWCA-05 08/26/2004 Primary	DWCA-06 08/29/2002 Primary	DWCA-06 09/10/2003 Primary	DWCA-06 08/26/2004 Primary	DWCA-07 09/10/2003 Primary
Vanadium	(ug/l)						
Zinc	(ug/l)	170	40.0	150	100	240	2700
Sulfate	(ug/l)	12000	13000		18000	19000	23000
Boron	(mg/l)						
Cyanide	(ug/l)						
Molybdenum	(mg/l)		0.01U			0.01U	

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE	DWCA-08	DWCA-09	DWCA-10	DWCA-10	DWCA-10	DWCA-11
	DATE	09/10/2003	09/10/2003	08/29/2002	09/10/2003	01/12/2005	08/29/2003
	RESULT TYPE	Primary	Primary	Primary	Primary	Primary	Primary
Aluminum	(ug/l)					25U	
Antimony	(ug/l)					0.25U	
Arsenic	(ug/l)	3.0U	4.0	5.0U	3.0U	0.28J	5.0U
Barium	(ug/l)					1U	
Beryllium	(ug/l)					0.1U	
Cadmium	(ug/l)	2.0U	2.0U	10.0U	2.0U	0.1U	10.0U
Calcium	(ug/l)					24800	
Chromium	(ug/l)			10.0U		1U	10.0U
Cobalt	(ug/l)					0.5UJ	
Copper	(ug/l)	5.0U	140	34.0	28.0	0.79J	610
Iron	(ug/l)	20.0	1300		40.0	50U	
Lead	(ug/l)	3.0U	5.0	3.0U	3.0U	0.03J	3.0U
Magnesium	(ug/l)					3720	
Manganese	(ug/l)	30.0	160		10.0U	0.5U	
Mercury	(ug/l)					0.1	
Nickel	(ug/l)			10.0U		0.29J	10.0U
Potassium	(ug/l)					1320	
Selenium	(ug/l)					1.5U	
Silver	(ug/l)					0.5U	
Sodium	(ug/l)					6760	
Thallium	(ug/l)					0.25U	

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	DWCA-08 09/10/2003 Primary	DWCA-09 09/10/2003 Primary	DWCA-10 08/29/2002 Primary	DWCA-10 09/10/2003 Primary	DWCA-10 01/12/2005 Primary	DWCA-11 08/29/2003 Primary
Vanadium	(ug/l)					0.48J	
Zinc	(ug/l)	2.0U	8.0	10.0	13.0	2.2J	24.0
Sulfate	(ug/l)	27000	28000		15000	13600	
Boron	(mg/l)						
Cyanide	(ug/l)						
Molybdenum	(mg/l)						

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	DWCA-11 09/10/2003 Primary	DWCA-11 01/12/2005 Primary	DWCA-12 08/29/2002 Primary	DWCA-12 01/12/2005 Primary	DWCA-13 09/10/2003 Primary	DWCA-14 09/26/2002 Primary
Aluminum	(ug/l)		25U		25U		
Antimony	(ug/l)		0.26U		0.28U		
Arsenic	(ug/l)	3.0U	0.25J	5.0U	0.4J	3.0U	5.0U
Barium	(ug/l)		4.7		2.9		
Beryllium	(ug/l)		0.06J		0.08J		
Cadmium	(ug/l)	2.0U	0.04J	10.0U	0.06J	2.0U	10.0U
Calcium	(ug/l)		9390		17400		
Chromium	(ug/l)		1U	10.0U	1U		10.0U
Cobalt	(ug/l)		0.16J		0.11J		
Copper	(ug/l)	390	317J	27.0	80.8J	43.0	10.0U
Iron	(ug/l)	10.0	11.6J		287	10.0	
Lead	(ug/l)	3.0	20.4J	3.0U	162J	3.0U	3.0U
Magnesium	(ug/l)		4930		1740		
Manganese	(ug/l)	10.0	2.3		16.7	10.0U	
Mercury	(ug/l)		0.1		0.1		
Nickel	(ug/l)		1.9	10.0U	2.3		
Potassium	(ug/l)		4940		712		
Selenium	(ug/l)		1.5U		1.5U		
Silver	(ug/l)		0.5U		0.5U		
Sodium	(ug/l)		10400		7800		
Thallium	(ug/l)		0.25U		0.25U		

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	DWCA-11 09/10/2003 Primary	DWCA-11 01/12/2005 Primary	DWCA-12 08/29/2002 Primary	DWCA-12 01/12/2005 Primary	DWCA-13 09/10/2003 Primary	DWCA-14 09/26/2002 Primary
Vanadium	(ug/l)		0.5U		0.5U		
Zinc	(ug/l)	66.0	31.9J	10.0	56.4J	32.0	10.0U
Sulfate	(ug/l)	12000	8750		13500	16000	
Boron	(mg/l)						
Cyanide	(ug/l)						
Molybdenum	(mg/l)						

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

	SITE	DWCA-15	DWCA-15	DWCA-15	DWCA-15	DWCA-16	DWCA-16
CONSTITUENT	DATE	08/29/2002	09/10/2003	10/21/2003	01/11/2005	05/13/2003	09/10/2003
	RESULT TYPE	Primary	Primary	Primary	Primary	Primary	Primary
Aluminum	(ug/l)				25U		
Antimony	(ug/l)				0.25U	6.0U	
Arsenic	(ug/l)	5.0U	3.0U	3.0U	0.1UJ	3.0U	3.0U
Barium	(ug/l)				1U		
Beryllium	(ug/l)				0.1U	0.50U	
Cadmium	(ug/l)	10.0U	2.0U	2.0U	0.1U	0.50U	2.0U
Calcium	(ug/l)				40800		
Chromium	(ug/l)	10.0U			1U	1.0U	
Cobalt	(ug/l)				0.5UJ		
Copper	(ug/l)	21.0	53.0	7.0	11.5J	59.0	42.0
Iron	(ug/l)		50.0	10.0U	50U		10.0
Lead	(ug/l)	3.0U	1200	3.0	4J	4.0	3.0U
Magnesium	(ug/l)				4970		
Manganese	(ug/l)		10.0U	10.0U	0.5U		10.0U
Mercury	(ug/l)				0.1	0.20U	
Nickel	(ug/l)	10.0U			0.61	4.0U	
Potassium	(ug/l)				1200		
Selenium	(ug/l)				1.5U	6.0U	
Silver	(ug/l)				0.5U	0.50U	
Sodium	(ug/l)				11700		
Thallium	(ug/l)				0.25U	5.0U	

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	DWCA-15 08/29/2002 Primary	DWCA-15 09/10/2003 Primary	DWCA-15 10/21/2003 Primary	DWCA-15 01/11/2005 Primary	DWCA-16 05/13/2003 Primary	DWCA-16 09/10/2003 Primary
Vanadium	(ug/l)				0.53		
Zinc	(ug/l)	10.0U	460	2.0U	1.6J	44.0	53.0
Sulfate	(ug/l)		18000	18000	9530		12000
Boron	(mg/l)						
Cyanide	(ug/l)						
Molybdenum	(mg/l)						

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

	SITE	DWCA-16	DWCA-16	DWCA-17	DWCA-17	DWCA-17	DWCA-17
CONSTITUENT	DATE	01/11/2005	01/11/2005	09/10/2003	11/18/2004	11/18/2004	11/18/2004
	RESULT TYPE	Primary	Duplicate 1	Primary	Primary	Primary	Primary
Aluminum	(ug/l)	25U	25U				
Antimony	(ug/l)	0.25U	0.25U				
Arsenic	(ug/l)	0.12UJ	0.1UJ	3.0U			
Barium	(ug/l)	3.6	3.7				
Beryllium	(ug/l)	0.1U	0.2U				
Cadmium	(ug/l)	0.03J	0.02J	2.0U			
Calcium	(ug/l)	24200	24300				
Chromium	(ug/l)	1U	1U				
Cobalt	(ug/l)	0.5UJ	0.5UJ				
Copper	(ug/l)	71.6J	45J	270	280	240	34.0
Iron	(ug/l)	54.6	37.9	30.0			
Lead	(ug/l)	10.1J	2.4J	11.0	4.0	5.0	3.0U
Magnesium	(ug/l)	2550	2560				
Manganese	(ug/l)	0.87	0.9	10.0U			
Mercury	(ug/l)	0.1	0.1				
Nickel	(ug/l)	0.73	0.59				
Potassium	(ug/l)	5650	5650				
Selenium	(ug/l)	1.5U	1.5U				
Silver	(ug/l)	0.5U	0.5U				
Sodium	(ug/l)	13300	13400				
Thallium	(ug/l)	0.25U	0.25U				

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	DWCA-16 01/11/2005 Primary	DWCA-16 01/11/2005 Duplicate 1	DWCA-17 09/10/2003 Primary	DWCA-17 11/18/2004 Primary	DWCA-17 11/18/2004 Primary	DWCA-17 11/18/2004 Primary
Vanadium	(ug/l)	0.5U	0.5U				
Zinc	(ug/l)	28.7J	31.3J	64.0			
Sulfate	(ug/l)	13100	13100	8000			
Boron	(mg/l)						
Cyanide	(ug/l)						
Molybdenum	(mg/l)						

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	DWCA-17 11/18/2004 Primary	DWCA-17 01/11/2005 Primary	DWCA-18 09/10/2003 Primary	DWCA-18 01/12/2005 Primary	DWCA-19 05/13/2003 Primary	DWCA-19 06/25/2003 Primary
Aluminum	(ug/l)		25U		25U		140
Antimony	(ug/l)		0.25U		0.34U	6.0U	6.0U
Arsenic	(ug/l)	3.0U	0.22J	3.0U	0.33J	3.0U	3.0U
Barium	(ug/l)		0.95J		5.6		4.0
Beryllium	(ug/l)		0.1U		0.04J	0.50U	0.50U
Cadmium	(ug/l)	2.0U	0.02J	2.0U	0.08J	3.7	3.3
Calcium	(ug/l)		19400		11300		
Chromium	(ug/l)		1U		78.8	7.0	1.0
Cobalt	(ug/l)		0.5UJ		0.05J		
Copper	(ug/l)	32.0	34.9J	490	82.7J	290	200
Iron	(ug/l)	30.0	15.1J	20.0	42.3		1900
Lead	(ug/l)	3.0U	0.77J	4.0	14.7J	180	31.0
Magnesium	(ug/l)		3760		2420		
Manganese	(ug/l)	10.0U	1.6	10.0U	1.1		35.0
Mercury	(ug/l)		0.1		0.1	0.20U	0.20U
Nickel	(ug/l)		0.35J		0.62	8.0	4.0
Potassium	(ug/l)		1150		4610		
Selenium	(ug/l)		1.5U		1.5U	6.0U	6.0U
Silver	(ug/l)		0.5U		0.5U	0.50U	0.50U
Sodium	(ug/l)		9310		11000		
Thallium	(ug/l)		0.25U		0.25U	5.0U	

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	DWCA-17 11/18/2004 Primary	DWCA-17 01/11/2005 Primary	DWCA-18 09/10/2003 Primary	DWCA-18 01/12/2005 Primary	DWCA-19 05/13/2003 Primary	DWCA-19 06/25/2003 Primary
Vanadium	(ug/l)		0.5U		0.5U		
Zinc	(ug/l)	36.0	25.1J	55.0	22J	2000	1500
Sulfate	(ug/l)	8000	6460	17000	13500		27000
Boron	(mg/l)						0.014
Cyanide	(ug/l)						
Molybdenum	(mg/l)						0.001U

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	DWCA-19 08/26/2004 Primary	DWCA-20 06/25/2003 Primary	DWCA-21 06/25/2003 Primary	DWCA-22 08/29/2002 Primary	DWCA-23 08/29/2002 Primary	DWCA-24 10/21/2003 Primary
Aluminum	(ug/l)	240					
Antimony	(ug/l)	3.0U	6.0U	6.0U			
Arsenic	(ug/l)	3.0U	3.0U	3.0U	5.0U	5.0U	3.0U
Barium	(ug/l)	7.0					
Beryllium	(ug/l)	2.0U	0.50U	0.50U			
Cadmium	(ug/l)	9.0	0.50U	0.50U	10.0U	10.0U	2.0U
Calcium	(ug/l)						
Chromium	(ug/l)	1.0U	1.0U	1.0U	10.0U	10.0U	
Cobalt	(ug/l)						
Copper	(ug/l)	68.0	7.0	2.0U	40.0	61.0	5.0U
Iron	(ug/l)	520					10.0
Lead	(ug/l)	16.0	3.0U	3.0U	3.0U	3.0U	3.0U
Magnesium	(ug/l)						
Manganese	(ug/l)	20.0					1.0U
Mercury	(ug/l)	0.20U	0.20U	0.20U			
Nickel	(ug/l)	3.0	4.0U	4.0U	10.0U	10.0U	
Potassium	(ug/l)						
Selenium	(ug/l)	10.0U	6.0U	6.0U			
Silver	(ug/l)		0.50U	0.50U			
Sodium	(ug/l)						
Thallium	(ug/l)		5.0U	5.0U			

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	DWCA-19 08/26/2004 Primary	DWCA-20 06/25/2003 Primary	DWCA-21 06/25/2003 Primary	DWCA-22 08/29/2002 Primary	DWCA-23 08/29/2002 Primary	DWCA-24 10/21/2003 Primary
Vanadium	(ug/l)						
Zinc	(ug/l)	1700	5.0U	5.0U	10.0	10.0U	23.0
Sulfate	(ug/l)	32000					5000
Boron	(mg/l)						
Cyanide	(ug/l)						
Molybdenum	(mg/l)	0.01U					

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	DWCA-25 10/21/2003 Primary	DWCA-26 10/21/2003 Primary	DWCA-27 08/26/2004 Primary	DWCA-28 08/26/2004 Primary	DWCA-29 08/26/2004 Primary	DWCA-30 08/26/2004 Primary
Aluminum	(ug/l)			70.0			
Antimony	(ug/l)			3.0U			
Arsenic	(ug/l)	3.0U	3.0	5.0	3.0U	3.0U	3.0U
Barium	(ug/l)			17.0			
Beryllium	(ug/l)			2.0U			
Cadmium	(ug/l)	2.0U	2.0U	3.0	2.0U	2.0U	2.0U
Calcium	(ug/l)						
Chromium	(ug/l)			1.0U			
Cobalt	(ug/l)						
Copper	(ug/l)	24.0	5.0U	120	5.0U	60.0	25.0
Iron	(ug/l)	30.0	10.0U	160	110	10.0U	10.0
Lead	(ug/l)	3.0	3.0U	4.0	3.0U	5.0	3.0U
Magnesium	(ug/l)						
Manganese	(ug/l)	10.0U	20.0	20.0	10.0U	10.0U	10.0U
Mercury	(ug/l)			0.20U			
Nickel	(ug/l)			6.0			
Potassium	(ug/l)						
Selenium	(ug/l)			10.0U			
Silver	(ug/l)						
Sodium	(ug/l)						
Thallium	(ug/l)						

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	DWCA-25 10/21/2003 Primary	DWCA-26 10/21/2003 Primary	DWCA-27 08/26/2004 Primary	DWCA-28 08/26/2004 Primary	DWCA-29 08/26/2004 Primary	DWCA-30 08/26/2004 Primary
Vanadium	(ug/l)						
Zinc	(ug/l)	12.0	3.0	750	13.0	28.0	18.0
Sulfate	(ug/l)	9000	28000	17000	15000	10000	11000
Boron	(mg/l)						
Cyanide	(ug/l)						
Molybdenum	(mg/l)			0.01U			

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

	SITE	DWCA-31	HOWARD	LEACH	MGRAY-SANDEC	MGRAY-SANDEC	MGRAY-SANDEC
CONSTITUENT	DATE	08/26/2004	01/01/1987	01/01/1987	01/01/1986	01/01/1987	01/01/1990
	RESULT TYPE	Primary	Primary	Primary	Primary	Primary	Primary
Aluminum	(ug/l)						
Antimony	(ug/l)						
Arsenic	(ug/l)	3.0U					
Barium	(ug/l)						
Beryllium	(ug/l)						
Cadmium	(ug/l)	2.0U	0.004U	0.005U	0.01	0.005	0.0005U
Calcium	(ug/l)						
Chromium	(ug/l)						
Cobalt	(ug/l)						
Copper	(ug/l)	23.0	0.12		0.43		0.25
Iron	(ug/l)	20.0					
Lead	(ug/l)	3.0U	0.03U	0.001U	0.003	0.001	0.003U
Magnesium	(ug/l)						
Manganese	(ug/l)	10.0U					
Mercury	(ug/l)						
Nickel	(ug/l)		0.01U				0.04U
Potassium	(ug/l)						
Selenium	(ug/l)						
Silver	(ug/l)						
Sodium	(ug/l)						
Thallium	(ug/l)						

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	DWCA-31 08/26/2004 Primary	HOWARD 01/01/1987 Primary	LEACH 01/01/1987 Primary	MGRAY-SANDEC 01/01/1986 Primary	MGRAY-SANDEC 01/01/1987 Primary	MGRAY-SANDEC 01/01/1990 Primary
Vanadium	(ug/l)						
Zinc	(ug/l)	5.0	0.45		0.26		0.04
Sulfate	(ug/l)	8000					
Boron	(mg/l)						
Cyanide	(ug/l)						0.05U
Molybdenum	(mg/l)						

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	MGRAY-SANDECKI 01/01/1991 Primary	NORRINGTON 01/01/1987 Primary
Aluminum	(ug/l)		
Antimony	(ug/l)		
Arsenic	(ug/l)		
Barium	(ug/l)		
Beryllium	(ug/l)		
Cadmium	(ug/l)	0.0007	0.005U
Calcium	(ug/l)		
Chromium	(ug/l)		
Cobalt	(ug/l)		
Copper	(ug/l)	0.4	
Iron	(ug/l)		
Lead	(ug/l)	0.003U	0.003
Magnesium	(ug/l)		
Manganese	(ug/l)		
Mercury	(ug/l)		
Nickel	(ug/l)	0.04U	
Potassium	(ug/l)		
Selenium	(ug/l)		
Silver	(ug/l)		
Sodium	(ug/l)		
Thallium	(ug/l)		

DRINKING WATER SAMPLE RESULTS
METALS (INCLUDING CYANIDE AND SULFATE)

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	MGRAY-SANDECKI 01/01/1991 Primary	NORRINGTON 01/01/1987 Primary
Vanadium	(ug/l)		
Zinc	(ug/l)	0.08	
Sulfate	(ug/l)		
Boron	(mg/l)		
Cyanide	(ug/l)	0.05U	
Molybdenum	(mg/l)		

Appendix P

Drinking Water Well Sample Laboratory Results, VOCs

DRINKING WATER SAMPLE RESULTS
VOCS

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	DWCA-10 01/12/2005 Primary	DWCA-11 01/12/2005 Primary	DWCA-12 01/12/2005 Primary	DWCA-15 01/11/2005 Primary	DWCA-16 01/11/2005 Primary	DWCA-16 01/11/2005 Duplicate 1
1,1,1-trichloroethane	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
1,1,2,2-Tetrachloroethane	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
1,1,2-Trichloro-1,2,2-trifluoroethane	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
1,1,2-Trichloroethane	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
1,1-Dichloroethane	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
1,1-Dichloroethene	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
1,2,3-Trichlorobenzene	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
1,2,4-Trichlorobenzene	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
1,2-Dibromo-3-chloropropane	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
1,2-Dichlorobenzene	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
1,2-Dichloroethane	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
1,2-Dichloropropane	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
1,3-Dichlorobenzene	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
1,4-Dichlorobenzene	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
2-Butanone (MEK)	(ug/l)	5U	5U	5U	5U	5U	5U
2-Hexanone	(ug/l)	5U	5U	5U	5U	5U	5U
4-Methyl-2-pentanone	(ug/l)	5U	5U	5U	5U	5U	5U
Acetone	(ug/l)	5U	5U	5U	5U	5U	5U
Benzene	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
Bromochloromethane	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
Bromodichloromethane	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U

DRINKING WATER SAMPLE RESULTS
VOCS

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	DWCA-10 01/12/2005 Primary	DWCA-11 01/12/2005 Primary	DWCA-12 01/12/2005 Primary	DWCA-15 01/11/2005 Primary	DWCA-16 01/11/2005 Primary	DWCA-16 01/11/2005 Duplicate 1
Bromoform	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
Bromomethane	(ug/l)	R	0.5UJ	0.5UJ	R	0.5U	0.5U
Carbon disulfide	(ug/l)	R	0.5UJ	0.5UJ	R	0.5U	0.5U
Carbon tetrachloride	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
Chlorobenzene	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
Chlorodibromomethane	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
Chloroethane	(ug/l)	R	0.5UJ	0.5UJ	R	0.5U	0.5U
Chloroform	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
Chloromethane	(ug/l)	R	0.5UJ	0.5UJ	R	0.5U	0.5U
cis-1,2-Dichloroethene	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
cis-1,3-Dichloropropene	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
Cyclohexane	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
Dichlorodifluoromethane	(ug/l)	R	0.5UJ	0.5UJ	R	0.5U	0.5U
Ethylbenzene	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
Ethylenedibromide	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
Fluorotrichloromethane	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
Isopropylbenzene	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
Methyl acetate (acetic acid, methyl este	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
Methyl cyclohexane	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
Methyl tert-butyl ether	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
Methylene chloride	(ug/l)	0.5UJ	0.5UJ	0.5UJ	0.5UJ	1.9UJ	2UJ

DRINKING WATER SAMPLE RESULTS
VOCS

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	DWCA-10 01/12/2005 Primary	DWCA-11 01/12/2005 Primary	DWCA-12 01/12/2005 Primary	DWCA-15 01/11/2005 Primary	DWCA-16 01/11/2005 Primary	DWCA-16 01/11/2005 Duplicate 1
Styrene	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
Tetrachloroethene	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
Toluene	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
trans-1,2-Dichloroethene	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
Trans-1,3-Dichloropropene	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
Trichloroethene	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
Vinyl chloride	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
Xylenes (total)	(ug/l)	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U

DRINKING WATER SAMPLE RESULTS
VOCS

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	DWCA-17 01/11/2005 Primary	DWCA-18 01/12/2005 Primary
1,1,1-trichloroethane	(ug/l)	0.5U	0.5UJ
1,1,2,2-Tetrachloroethane	(ug/l)	0.5U	0.5UJ
1,1,2-Trichloro-1,2,2-trifluoroethane	(ug/l)	0.5U	0.5UJ
1,1,2-Trichloroethane	(ug/l)	0.5U	0.5UJ
1,1-Dichloroethane	(ug/l)	0.5U	0.5UJ
1,1-Dichloroethene	(ug/l)	0.5U	0.5UJ
1,2,3-Trichlorobenzene	(ug/l)	0.5U	0.5UJ
1,2,4-Trichlorobenzene	(ug/l)	0.5U	0.5UJ
1,2-Dibromo-3-chloropropane	(ug/l)	0.5U	0.5UJ
1,2-Dichlorobenzene	(ug/l)	0.5U	0.5UJ
1,2-Dichloroethane	(ug/l)	0.5U	0.5UJ
1,2-Dichloropropane	(ug/l)	0.5U	0.5UJ
1,3-Dichlorobenzene	(ug/l)	0.5U	0.5UJ
1,4-Dichlorobenzene	(ug/l)	0.5U	0.5UJ
2-Butanone (MEK)	(ug/l)	5U	5UJ
2-Hexanone	(ug/l)	5U	5UJ
4-Methyl-2-pentanone	(ug/l)	5U	5UJ
Acetone	(ug/l)	5U	5UJ
Benzene	(ug/l)	0.5U	0.5UJ
Bromochloromethane	(ug/l)	0.5U	0.5UJ
Bromodichloromethane	(ug/l)	0.5U	0.5UJ

DRINKING WATER SAMPLE RESULTS
VOCS

PERID: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	DWCA-17 01/11/2005 Primary	DWCA-18 01/12/2005 Primary
Bromoform	(ug/l)	0.5U	0.5UJ
Bromomethane	(ug/l)	0.5U	0.5UJ
Carbon disulfide	(ug/l)	0.5U	0.5UJ
Carbon tetrachloride	(ug/l)	0.5U	0.5UJ
Chlorobenzene	(ug/l)	0.5U	0.5UJ
Chlorodibromomethane	(ug/l)	0.5U	0.5UJ
Chloroethane	(ug/l)	0.5U	0.5UJ
Chloroform	(ug/l)	0.5U	0.5UJ
Chloromethane	(ug/l)	0.5U	0.5UJ
cis-1,2-Dichloroethene	(ug/l)	0.5U	0.5UJ
cis-1,3-Dichloropropene	(ug/l)	0.5U	0.5UJ
Cyclohexane	(ug/l)	0.5U	0.5UJ
Dichlorodifluoromethane	(ug/l)	0.5U	0.5UJ
Ethylbenzene	(ug/l)	0.5U	0.5UJ
Ethylenedibromide	(ug/l)	0.5U	0.5UJ
Fluorotrichloromethane	(ug/l)	0.5U	0.5UJ
Isopropylbenzene	(ug/l)	0.5U	0.5UJ
Methyl acetate (acetic acid, methyl este	(ug/l)	0.5U	0.5UJ
Methyl cyclohexane	(ug/l)	0.5U	0.5UJ
Methyl tert-butyl ether	(ug/l)	0.5U	0.5UJ
Methylene chloride	(ug/l)	1.7UJ	0.57UJ

DRINKING WATER SAMPLE RESULTS
VOCS

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	DWCA-17 01/11/2005 Primary	DWCA-18 01/12/2005 Primary
Styrene	(ug/l)	0.5U	0.5UJ
Tetrachloroethene	(ug/l)	0.5U	0.5UJ
Toluene	(ug/l)	0.5U	0.5UJ
trans-1,2-Dichloroethene	(ug/l)	0.5U	0.5UJ
Trans-1,3-Dichloropropene	(ug/l)	0.5U	0.5UJ
Trichloroethene	(ug/l)	0.5U	0.5UJ
Vinyl chloride	(ug/l)	0.5U	0.5UJ
Xylenes (total)	(ug/l)	0.5U	0.5UJ

Appendix Q

Drinking Water Well Sample Laboratory Results, Organic Compounds

DRINKING WATER SAMPLE RESULTS
MISCELLANEOUS ORGANIC ANALYSES

PERIOD: From 12/01/1967 thru 01/12/2005 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE RESULT TYPE	CALLAHAN_WATE 01/01/1986 Primary	MGRAY-SANDEC 01/01/1987 Primary
Fuel oil no. 2	(ug/l)	0.05U	
Gasoline	(ug/l)	0.01U	
Total VOCs	(ug/l)		0.05U
Total SVOCs	(ug/l)		0.01U
Total Pesticides/PCBs	(ug/l)	0.001U	

Appendix R

Biota Sample Laboratory Results, Metals

MARINE FLORA AND FAUNA SAMPLE RESULTS
METALS

PERIOD: From 12/07/1974 thru 10/06/2001 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE	CASTINE_1	CASTINE_1_N	CASTINE_2	CASTINE_3	CASTINE_4	CR-3
	DATE	10/06/2001	01/01/1989	10/06/2001	10/06/2001	10/06/2001	12/07/1974
Aluminum	(mg/kg)	283.37		371.02	381.38	198.26	
Arsenic	(mg/kg)	15.13		11.97	11.89	16.5	
Cadmium	(mg/kg)	7.31	9.1	6.6	6.46	6.99	0.38
Chromium	(mg/kg)	1.63	1.3	1.2	1.52	1.5	
Cobalt	(mg/kg)						0.28
Copper	(mg/kg)	16.02	8.9	10.68	11.16	11.36	6.03
Iron	(mg/kg)	445.66	210	438.67	456.21	388.43	736
Lead	(mg/kg)	11.43	6.3	8.21	9.72	11.22	7
Mercury	(mg/kg)	0.1059	0.12	0.1192	0.112	0.1065	
Nickel	(mg/kg)	3.29	0.95	3.03	0.99	U	0.01
Silver	(mg/kg)	U	0.1	U	U	U	0.09
Zinc	(mg/kg)	223.87	180	167.52	171.38	202.54	28

MARINE FLORA AND FAUNA SAMPLE RESULTS
METALS

PERIOD: From 12/07/1974 thru 10/06/2001 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE	CR-3 12/07/1974	CR-3 12/07/1974	CR-3 12/07/1974	CR-3 12/07/1974	CR_GOOSE_PON 01/01/1975	GOOSE_COVE 01/01/1993
Aluminum	(mg/kg)						
Arsenic	(mg/kg)						
Cadmium	(mg/kg)	0.96	3.53	0.46	0.89	0.04U	9.1
Chromium	(mg/kg)						1.3
Cobalt	(mg/kg)			4.9			
Copper	(mg/kg)	1.52	18.4	29.6	4.67	0.67	8.9
Iron	(mg/kg)	30	392	1230	57		
Lead	(mg/kg)	1.4	5	19.5	5.4U	0.7U	6.3
Mercury	(mg/kg)						0.06
Nickel	(mg/kg)				0.85		0.95
Silver	(mg/kg)	0.06	0.52	0.77	0.08		0.5
Zinc	(mg/kg)	37	463	188	26	8	180

Appendix S

Biota Sample Laboratory Results, PAHs

MARINE FLORA AND FAUNA SAMPLE RESULTS
PAHS

PERIOD: From 12/07/1974 thru 10/06/2001 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE	CASTINE_1 10/06/2001	CASTINE_2 10/06/2001	CASTINE_3 10/06/2001	CASTINE_4 10/06/2001
1,1'-Biphenyl	(ug/kg)	1.0U	1.0U	1.0U	1.0U
1-Methylnaphthalene	(mg/kg)	0.001U	0.001U	0.001U	0.001U
1-Methylphenanthrene	(mg/kg)	0.001U	0.001U	0.00084	0.00144
2,3,5-Trimethylnaphthalene	(mg/kg)	0.001U	0.001U	0.001U	0.001U
2,6-Dimethylnaphthalene	(mg/kg)	0.001U	0.001U	0.001U	0.001U
2-Methylnaphthalene	(ug/kg)	1.0U	1.0U	1.0U	1.0U
Acenaphthene	(ug/kg)	1.0U	1.0U	1.0U	1.0U
Acenaphthylene	(ug/kg)	1.0U	1.0U	1.0U	1.0U
Anthracene	(ug/kg)	1.0U	1.0U	1.0U	1.0U
Benzo(a)anthracene	(ug/kg)	1.0U	1.0U	1.0	0.89
Benzo(a)pyrene	(ug/kg)	2.0U	2.0U	2.0U	2.0U
Benzo(b)fluoranthene	(ug/kg)	1.0U	1.0U	0.77	1.5
Benzo(e)pyrene	(mg/kg)	0.002U	0.002U	0.002U	0.002U
Benzo(g,h,i)perylene	(ug/kg)	2.0U	2.0U	2.0U	2.0U
Chrysene	(ug/kg)	1.0U	1.0U	0.77	1.2
Fluoranthene	(ug/kg)	0.80B	0.92B	1.4B	2.3B
Fluorene	(ug/kg)	1.0U	1.0U	1.0U	1.0U
Indeno(1,2,3-cd)pyrene	(ug/kg)	2.0U	2.0U	2.0U	2.0U
Naphthalene	(ug/kg)	1.0U	1.0U	1.0U	1.0U
Perylene	(mg/kg)	0.002U	0.002U	0.002U	0.002U
Phenanthrene	(ug/kg)	0.73B	0.76B	1.3B	2.3B

MARINE FLORA AND FAUNA SAMPLE RESULTS
PAHS

PERIOD: From 12/07/1974 thru 10/06/2001 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE DATE	CASTINE_1 10/06/2001	CASTINE_2 10/06/2001	CASTINE_3 10/06/2001	CASTINE_4 10/06/2001
Pyrene	(ug/kg)	0.60	0.64	1.0	1.4

Appendix T

Particle Size Data

SOUTHWEST RESEARCH INSTITUTE
CLIENT: METCALF & EDDY
TASK ORDER: 041208-2
SRR: 26941
SDG: D05648
CASE: 0247M
VTSR: December 7, 2004
PROJECT#: 03159.29.00X

GRAIN SIZE ANALYSIS

Southwest Research Institute
Grain Size Report

010032

SwRI Sample ID:	256145	Customer:	Metcalf & Eddy	Case:	0247M
Task Order #:	041208-2	Client Sample ID:	D05648	SDG:	D05648
Project:	03159.29.00X	Sample Matrix:	Sediment		

Sieve of +10

Total Sample Wt: 168.76

Sieve	Wt. Retained	% Retained	% Pass
3"	0	0.0	100.0
2"	0	0.0	100.0
1 1/2"	0	0.0	100.0
1"	0	0.0	100.0
3/4"	0	0.0	100.0
3/8"	2.41	1.4	98.6
#4	6.29	5.2	94.8
#10	24.21	19.5	80.5

Date Analyzed: 01/03/05

Sieve of -20/+200

Weight of Materials used in Hydrometer: 50.01

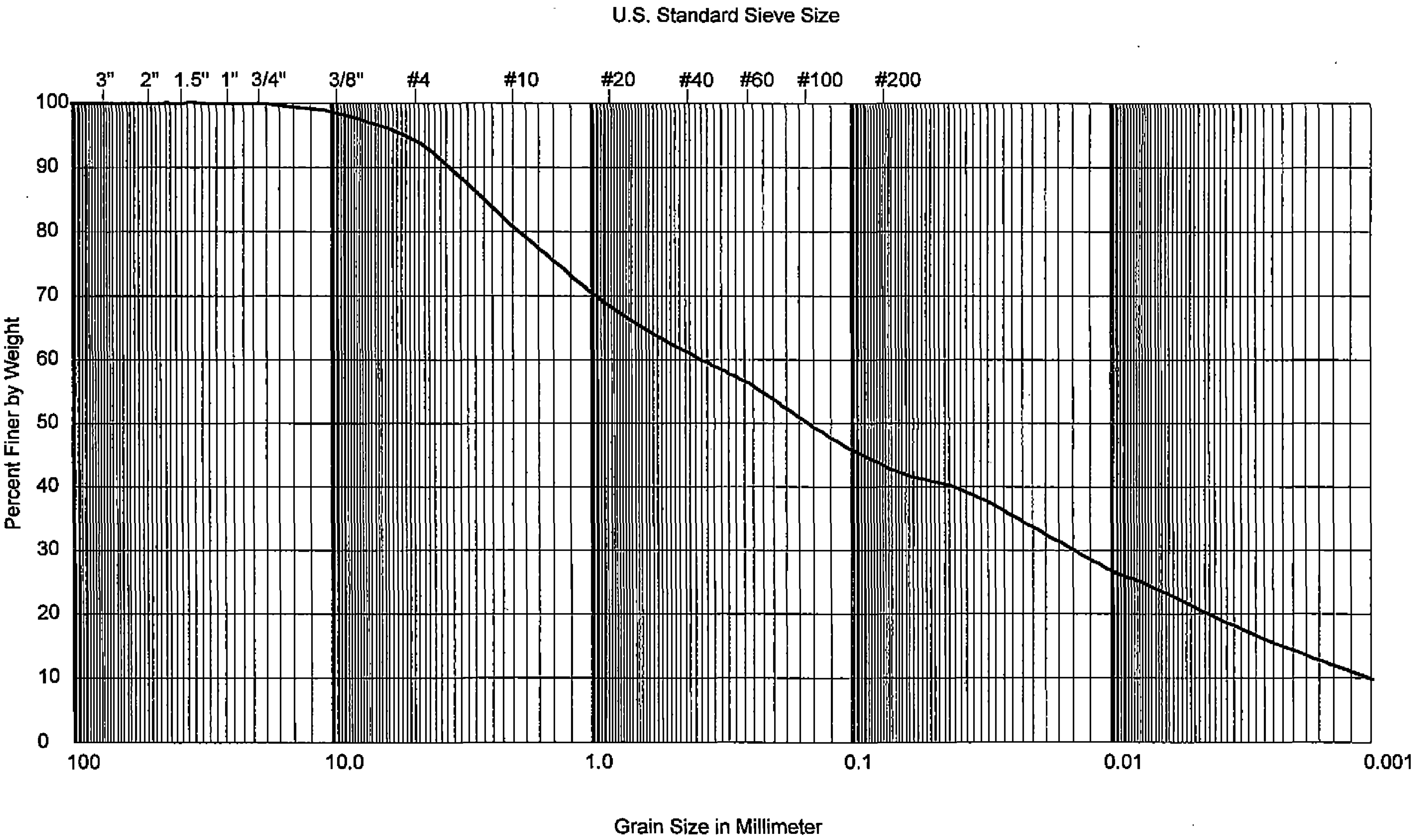
Sieve	Wt. Retained each Sieve	Yield	Wt. Retained	% Retained	% Pass
#20	7.81	21.22	54.13	32.1	67.9
#40	4.45	33.30	66.21	39.2	60.8
#60	2.73	40.72	73.63	43.6	56.4
#100	3.97	51.50	84.41	50.0	50.0
#200	5.05	65.22	98.13	58.1	41.9

Date Analyzed: 01/03/05

Specific Gravity: 2.36 Hydrometer ID: 152-H-001

Temp.	Reading Time	Hydro. Reading	Hydro. Corr.	Corrected Hydro Reading	L	Diam (mm)	% Finer
20	2	29	6	23	11.5	0.0360	40.206
20	5	26	6	20	12.0	0.0233	34.962
20	15	23	6	17	12.5	0.0137	29.717
20	30	21	6	15	12.9	0.0098	26.221
20	60	20	6	14	13.0	0.0070	24.473
20	250	16	6	10	13.7	0.0035	17.481
20	1440	13	6	7	14.2	0.0015	12.237

Date Analyzed: 12/28/04



SwRI Sample ID: 256145

Task Order: 041208-2

Project: 03159.29.00X

Customer: Metcalf Eddy

Client Sample ID: D05648

Sample Matrix: Sediment

Southwest Research Institute
Grain Size Report

SwRI Sample ID: 256146
Task Order #: 041208-2
Project: 03159.29.00X

Customer: Metcalf & Eddy
Client Sample ID: D05654
Sample Matrix: Sediment

Case: 0247M
SDG: D05648

Sieve of +10

Total Sample Wt: 362.44

Sieve	Wt. Retained	% Retained	% Pass
3"	0	0.0	100.0
2"	0	0.0	100.0
1 1/2"	0	0.0	100.0
1"	0	0.0	100.0
3/4"	22.21	6.1	93.9
3/8"	2.76	6.9	93.1
#4	4.34	8.1	91.9
#10	12.41	11.5	88.5

Date Analyzed: 01/03/05

Sieve of -20/+200

Weight of Materials used in Hydrometer: 50.07

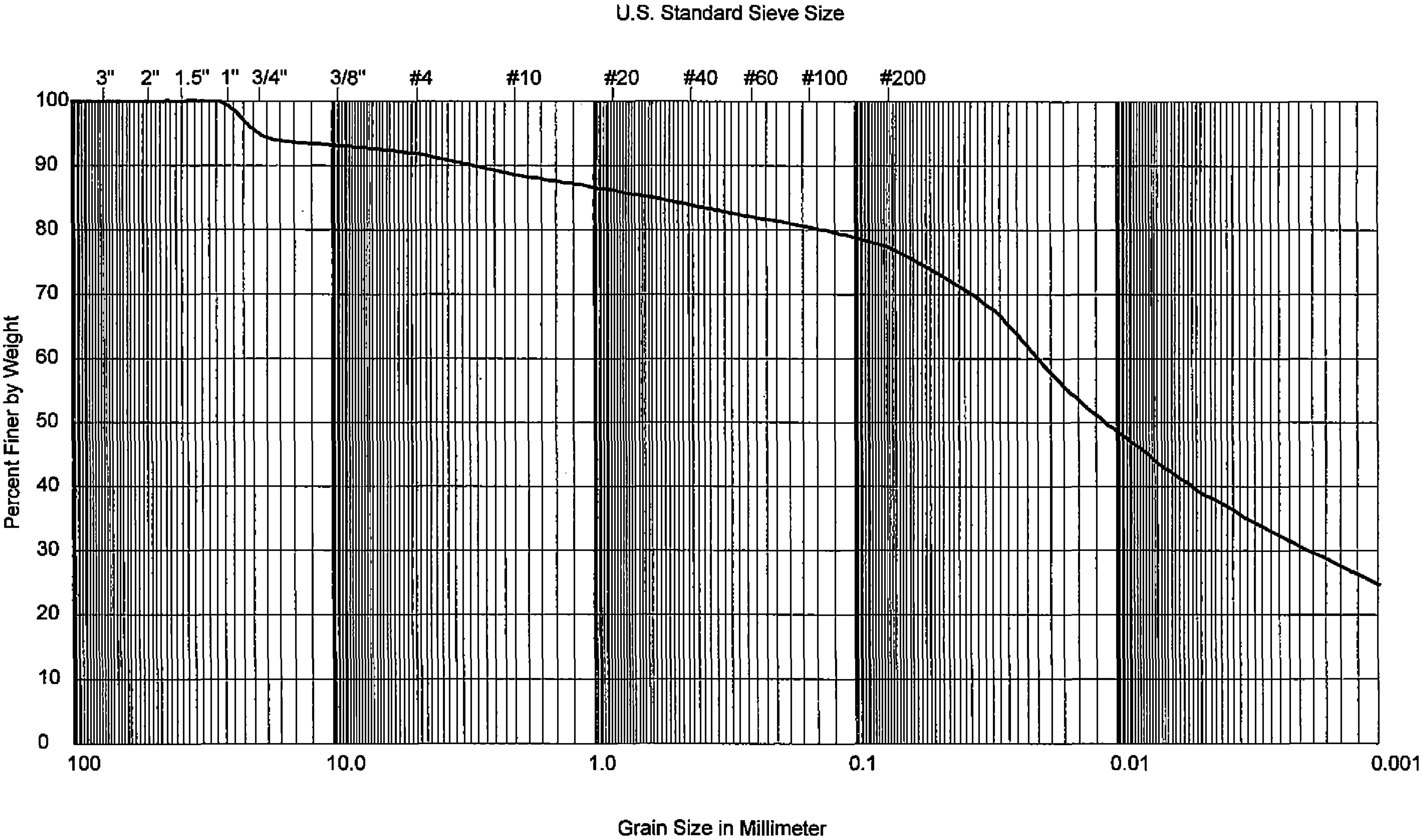
Sieve	Wt. Retained each Sieve	Yield	Wt. Retained	% Retained	% Pass
#20	1.34	8.58	50.30	13.9	86.1
#40	1.34	17.17	58.89	16.2	83.8
#60	1.03	23.76	65.48	18.1	81.9
#100	0.87	29.34	71.06	19.6	80.4
#200	1.53	39.14	80.86	22.3	77.7

Date Analyzed: 01/03/05

Specific Gravity: 2.60 Hydrometer ID: 152-H-002

Temp.	Reading Time	Hydro. Reading	Hydro. Corr.	Corrected Hydro Reading	L	Diam (mm)	% Finer
20	2	45	7	38	8.9	0.0292	67.829
20	5	40	7	33	9.7	0.0193	58.904
20	15	35	7	28	10.6	0.0116	49.979
20	30	33	7	26	10.9	0.0083	46.410
20	60	30	7	23	11.4	0.0060	41.055
20	250	26	7	19	12.0	0.0030	33.915
20	1440	22	7	15	12.7	0.0013	26.775

Date Analyzed: 12/28/04



SwRI Sample ID: 256146

Task Order: 041208-2

Project: 03159.29.00X

Customer: Metcalf Eddy

Client Sample ID: D05654

Sample Matrix: Sediment

Southwest Research Institute
Grain Size Report

SwRI Sample ID:	256147	Customer:	Metcalf & Eddy	Case:	0247M
Task Order #:	041208-2	Client Sample ID:	D05655	SDG:	D05648
Project:	03159.29.00X	Sample Matrix:	Sediment		

Total Sample Wt: 134.29

Sieve of +10

Sieve	Wt. Retained	% Retained	% Pass
3"	0	0.0	100.0
2"	0	0.0	100.0
1 1/2"	0	0.0	100.0
1"	0	0.0	100.0
3/4"	0	0.0	100.0
3/8"	0	0.0	100.0
#4	0	0.0	100.0
#10	0	0.0	100.0

Date Analyzed: 01/03/2005

Sieve of -20/+200

Weight of Materials used in Hydrometer: 50.01

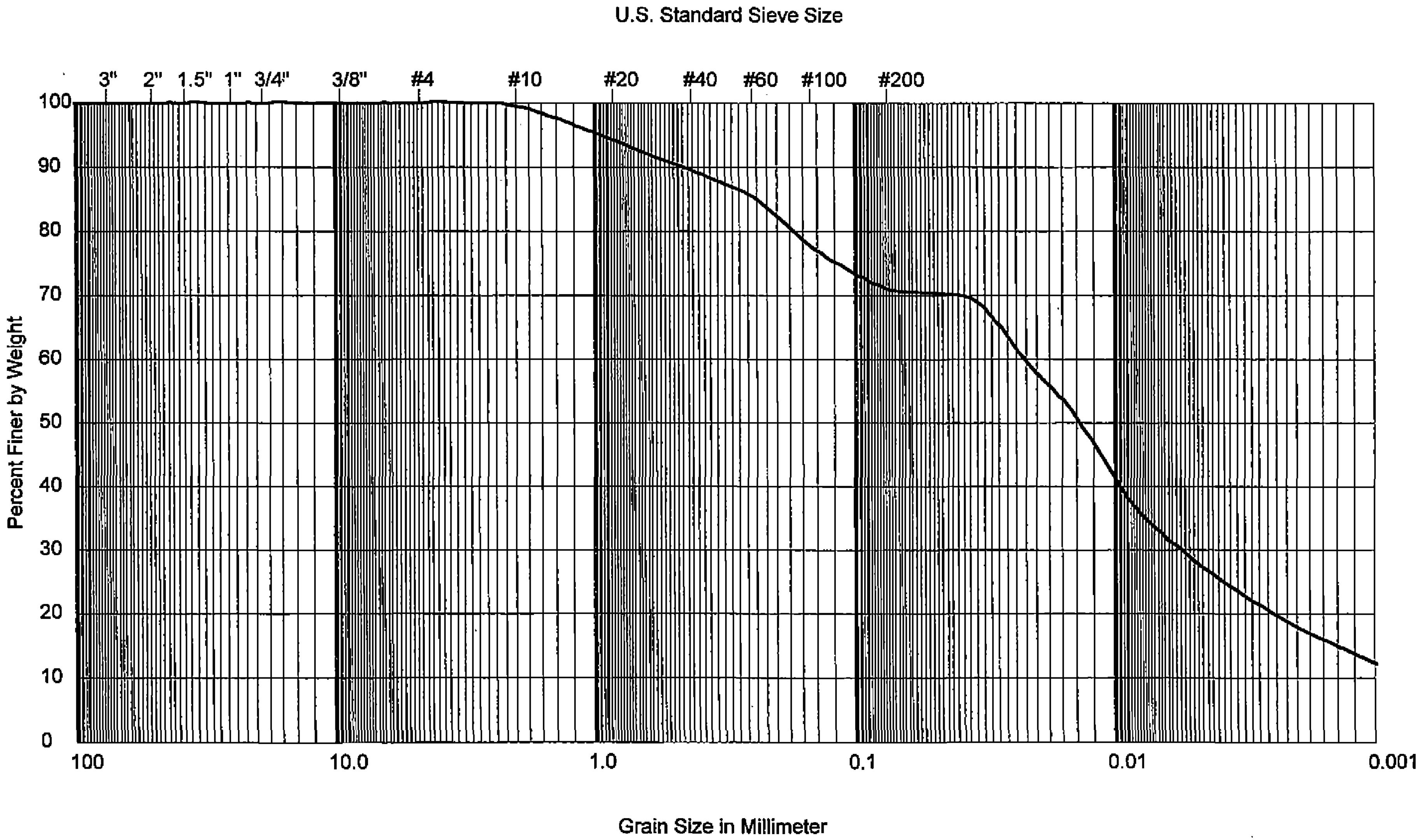
Sieve	Wt. Retained each Sieve	Yield	Wt. Retained	% Retained	% Pass
#20	2.93	7.87	7.87	5.9	94.1
#40	2.40	14.31	14.31	10.7	89.3
#60	1.77	19.07	19.07	14.2	85.8
#100	4.22	30.40	30.40	22.6	77.4
#200	4.32	42.00	42.00	31.3	68.7

Date Analyzed: 01/03/2005

Specific Gravity: 2.33 Hydrometer ID: 152-H-003

Temp.	Reading Time	Hydro. Reading	Hydro. Corr.	Corrected Hydro Reading	L	Diam (mm)	% Finer
20	2	39	7	32	9.9	0.0338	70.258
20	5	34	7	27	10.7	0.0222	59.280
20	15	30	7	23	11.4	0.0132	50.498
20	30	25	7	18	12.2	0.0097	39.520
20	60	22	7	15	12.7	0.0070	32.933
20	250	17	7	10	13.5	0.0035	21.956
20	1440	14	7	7	14.0	0.0015	15.369

Date Analyzed: 12/28/04



SwRI Sample ID: 256147

Task Order: 041208-2

Project: 03159.29.00X

Customer: Metcalf Eddy

Client Sample ID: D05655

Sample Matrix: Sediment

Southwest Research Institute
Grain Size Report

SwRI Sample ID:	256148	Customer:	Metcalf & Eddy	Case:	0247M
Task Order #:	041208-2	Client Sample ID:	D05659	SDG:	D05648
Project	03159.29.00X	Sample Matrix:	Sediment		

Total Sample Wt: 431.59

Sieve of +10

Sieve	Wt. Retained	% Retained	% Pass
3"	0	0.0	100.0
2"	0	0.0	100.0
1 1/2"	0	0.0	100.0
1"	0	0.0	100.0
3/4"	14.95	3.5	96.5
3/8"	5.35	4.7	95.3
#4	6.09	6.1	93.9
#10	10.11	8.5	91.5

Date Analyzed: 01/03/05

Sieve of -20/+200

Weight of Materials used in Hydrometer: 50.00

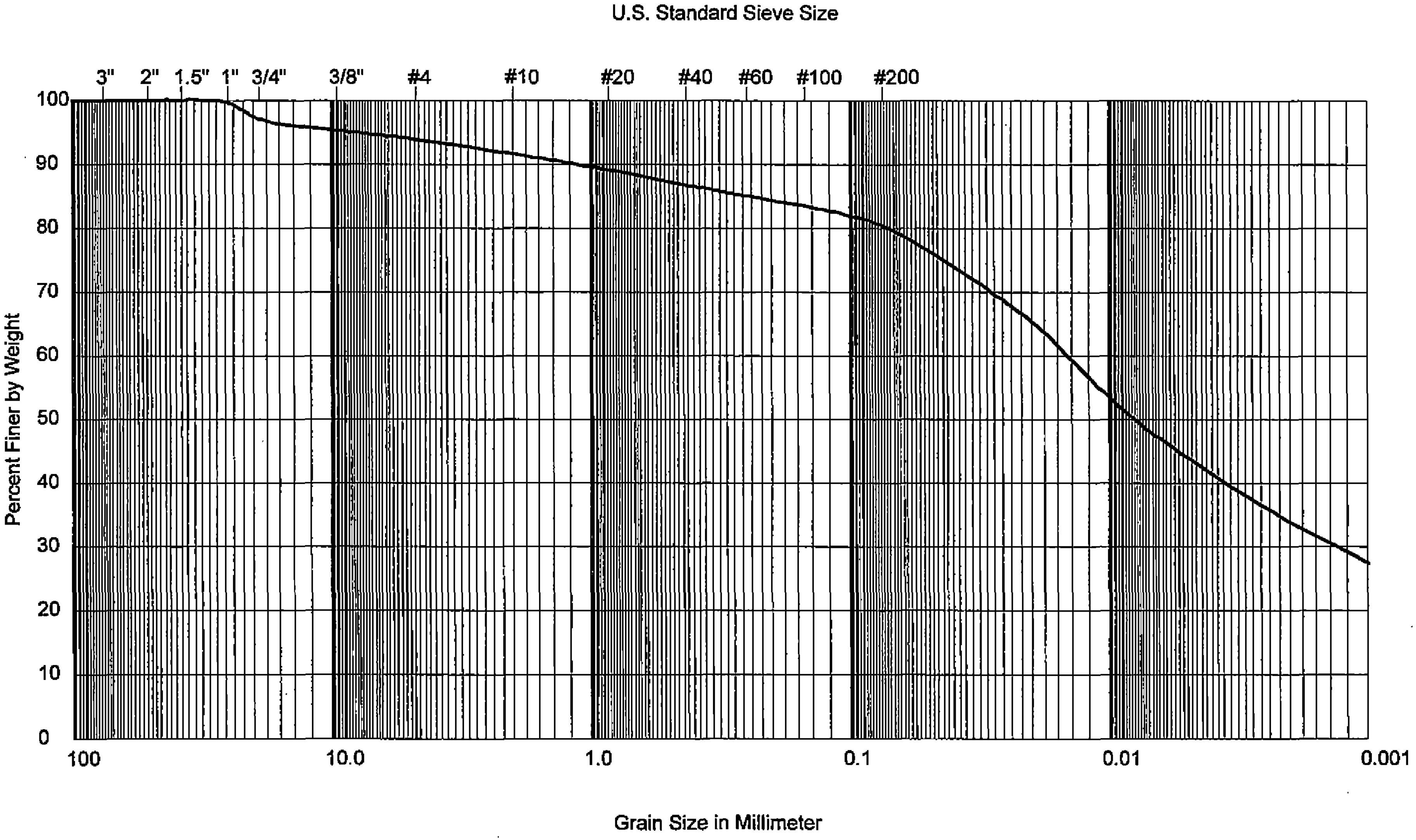
Sieve	Wt. Retained each Sieve	Yield	Wt. Retained	% Retained	% Pass
#20	1.32	10.43	46.93	10.9	89.1
#40	1.33	20.94	57.44	13.3	86.7
#60	0.97	28.60	65.10	15.1	84.9
#100	0.77	34.69	71.19	16.5	83.5
#200	1.43	45.99	82.49	19.1	80.9

Date Analyzed: 01/03/05

Specific Gravity: 2.60 Hydrometer ID: 152-H-004

Temp.	Reading Time	Hydro. Reading	Hydro. Corr.	Corrected Hydro Reading	L	Diam (mm)	% Finer
20	2	45	7	38	8.9	0.0292	70.268
20	5	42	7	35	9.4	0.0190	64.721
20	15	37	7	30	10.2	0.0114	55.475
20	30	34	7	27	10.7	0.0083	49.927
20	60	32	7	25	11.1	0.0060	46.229
20	250	27	7	20	11.9	0.0030	36.983
20	1440	23	7	16	12.5	0.0013	29.587

Date Analyzed: 12/28/04



SwRI Sample ID: 256148
Task Order: 041208-2
Project: 03159.29.00X

Customer: Metcalf Eddy
Client Sample ID: D05659
Sample Matrix: Sediment

Southwest Research Institute
Grain Size Report

SwRI Sample ID:	256150	Customer:	Metcalf & Eddy	Case:	0247M
Task Order #:	041208-2	Client Sample ID:	D05706	SDG:	D05648
Project:	03159.29.00X	Sample Matrix:	Sediment		

Sieve of +10

Total Sample Wt: 131.01

Sieve	Wt. Retained	% Retained	% Pass
3"	0	0.0	100.0
2"	0	0.0	100.0
1 1/2"	0	0.0	100.0
1"	0	0.0	100.0
3/4"	0	0.0	100.0
3/8"	4.63	3.5	96.5
#4	4.42	6.9	93.1
#10	12.61	16.5	83.5

Date Analyzed: 01/03/05

Sieve of -20/+200

Weight of Materials used in Hydrometer:50.09

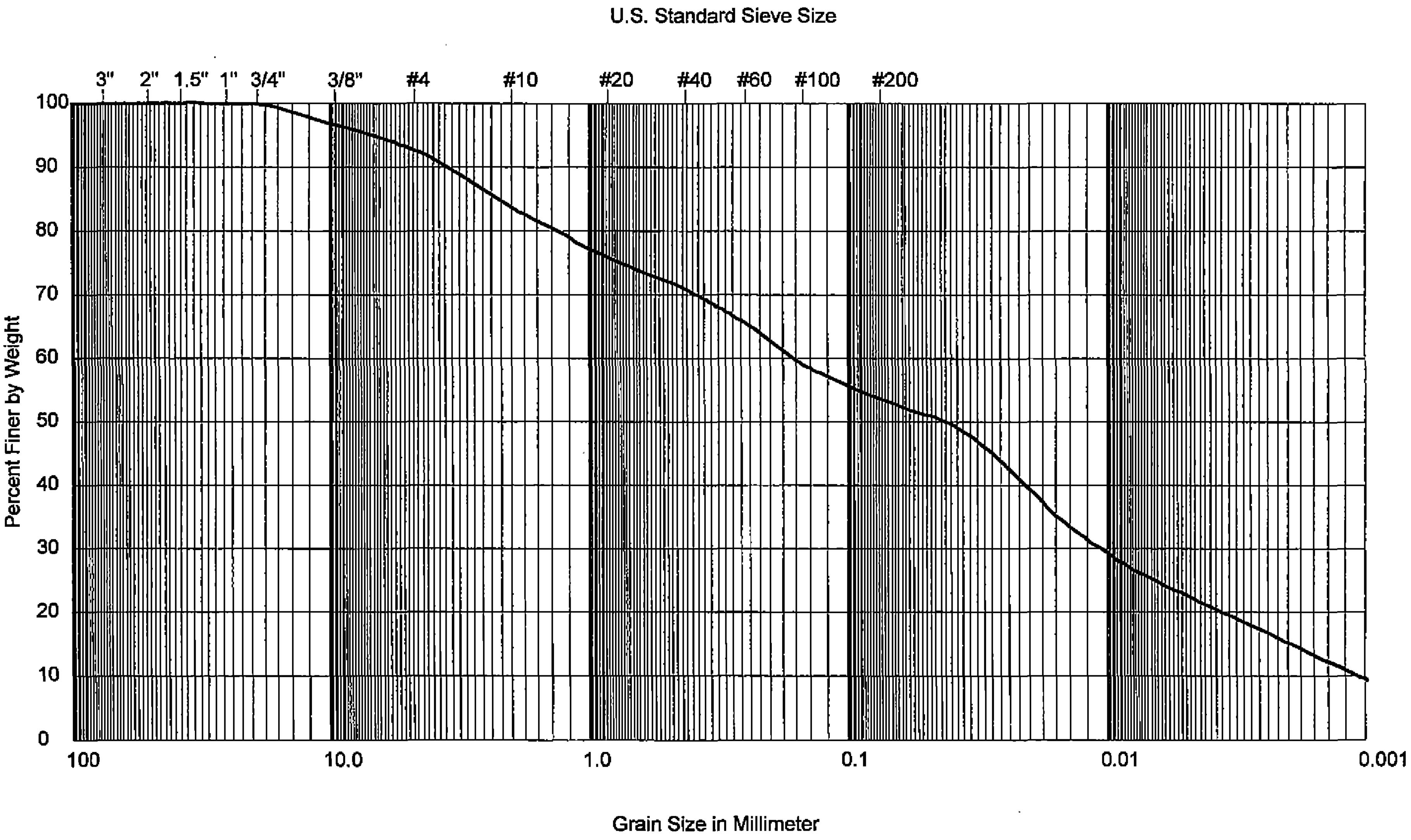
Sieve	Wt. Retained each Sieve	Yield	Wt. Retained	% Retained	% Pass
#20	4.72	10.30	31.96	24.4	75.6
#40	2.82	16.46	38.12	29.1	70.9
#60	3.21	23.47	45.13	34.4	65.6
#100	4.05	32.31	53.97	41.2	58.8
#200	3.99	41.02	62.68	47.8	52.2

Date Analyzed: 01/03/05

Specific Gravity: 2.41 Hydrometer ID: 152-H-005

Temp.	Reading Time	Hydro. Reading	Hydro. Corr.	Corrected Hydro Reading	L	Diam (mm)	% Finer
20	2	35	7	28	10.6	0.0340	49.737
20	5	30	7	23	11.4	0.0223	40.855
20	15	25	7	18	12.2	0.0133	31.974
20	30	23	7	16	12.5	0.0095	28.421
20	60	21	7	14	12.9	0.0068	24.868
20	250	18	7	11	13.3	0.0034	19.539
20	1440	14	7	7	14.0	0.0015	12.434

Date Analyzed: 12/28/04



SwRI Sample ID: 256150
Task Order: 041208-2
Project: 03159.29.00X

Customer: Metcalf Eddy
Client Sample ID: D05706
Sample Matrix: Sediment

Southwest Research Institute
Grain Size Report

SwRI Sample ID:	256151	Customer:	Metcalf & Eddy	Case:	0247M
Task Order #:	041208-2	Client Sample ID:	D05707	SDG:	D05648
Project:	03159.29.00X	Sample Matrix:	Sediment		

Total Sample Wt: 271.14

Sieve of +10

Sieve	Wt. Retained	% Retained	% Pass
3"	0	0.0	100.0
2"	0	0.0	100.0
1 1/2"	0	0.0	100.0
1"	0	0.0	100.0
3/4"	14.40	5.3	94.7
3/8"	16.93	11.6	88.4
#4	22.33	19.8	80.2
#10	37.46	33.6	66.4

Date Analyzed: 01/03/05

Sieve of -20/+200

Weight of Materials used in Hydrometer:50.00

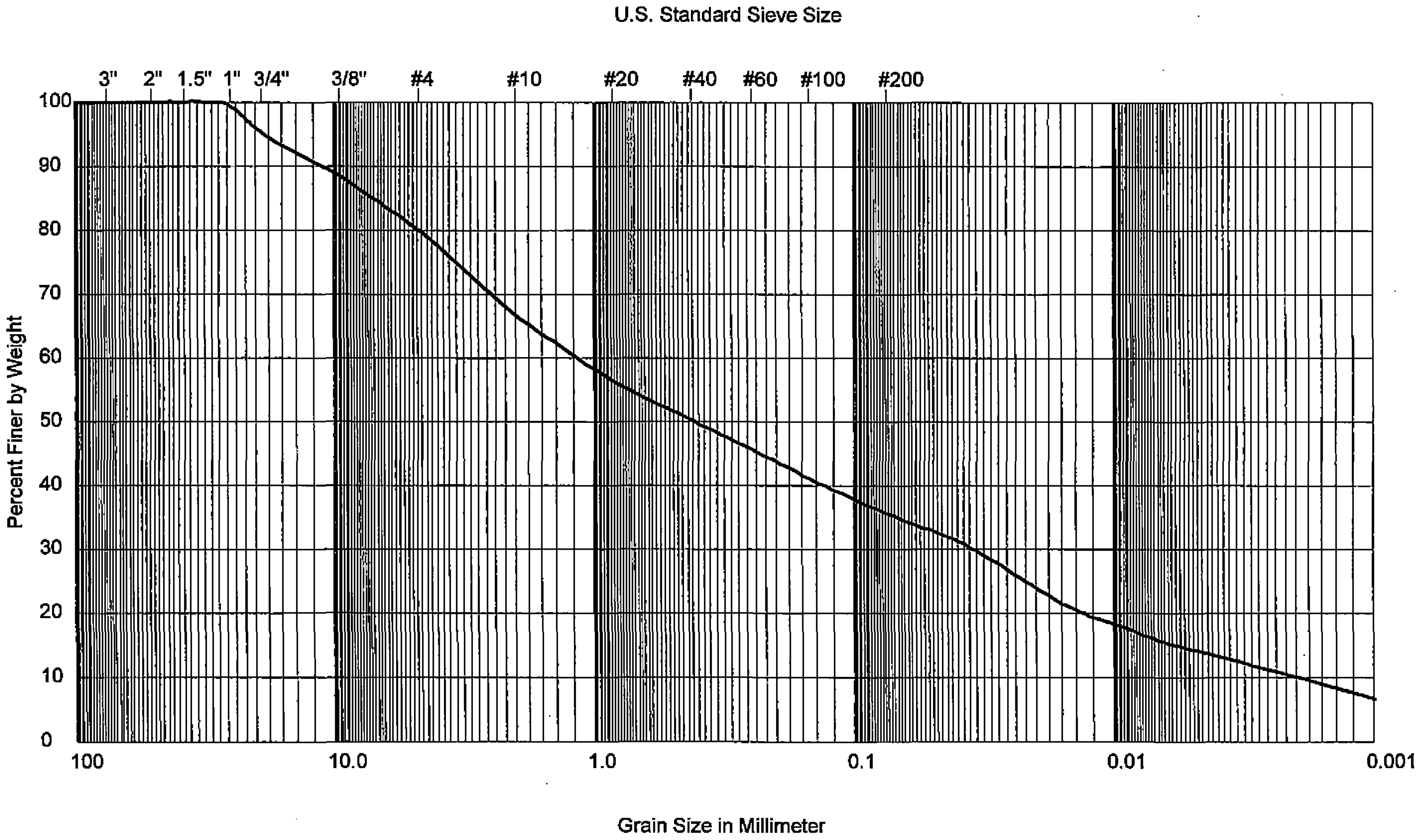
Sieve	Wt. Retained each Sieve	Yield	Wt. Retained	% Retained	% Pass
#20	7.83	28.19	119.31	44.0	56.0
#40	4.44	44.18	135.30	49.9	50.1
#60	3.41	56.45	147.57	54.4	45.6
#100	3.47	68.95	160.07	59.0	41.0
#200	4.36	84.65	175.77	64.8	35.2

Date Analyzed: 01/03/05

Specific Gravity: 2.45 Hydrometer ID: 152-H-006

Temp.	Reading Time	Hydro. Reading	Hydro. Corr.	Corrected Hydro Reading	L	Diam (mm)	% Finer
20	2	29	7	22	11.5	0.0349	30.674
20	5	25	7	18	12.2	0.0227	25.097
20	15	21	7	14	12.9	0.0135	19.520
20	30	20	7	13	13.0	0.0096	18.125
20	60	18	7	11	13.3	0.0068	15.337
20	250	16	7	9	13.7	0.0034	12.548
20	1440	13	7	6	14.2	0.0014	8.366

Date Analyzed: 12/28/04



SwRI Sample ID: 256151

Task Order: 041208-2

Project: 03159.29.00X

Customer: Metcalf Eddy

Client Sample ID: D05707

Sample Matrix: Sediment

Southwest Research Institute

Hygroscopic Moisture Report

Client: METCALF & EDDY
Sample Receipt Report: 26941
Task Order: 041208-2

Lab Code: SWRI
Sample Matrix: Sediment
Project: 03159.29.006

Case: DAS 0247M
SDG: D05648

Field Sample ID#	Lab Sample ID#	Hygroscopic Moisture, %	%RPD
D05648	256145	0.793	
D05654	256146	0.299	
D05655	256147	0.794	
D05659	256148	0.498	
D05706	256150	0.793	
D05706	256150D	0.694	13.3%
D05707	256151	0.699	

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Metcalf & Eddy
TASK ORDER: 041116-5, 041119-7
SRR: 26864, 26889
SDG: D05640
CASE: 0247M
VTSR: November 16/19, 2004
PROJECT#: 03159.29.00X

SAMPLE DATA

Southwest Research Institute
Grain Size Report

SwRI Sample ID: 255316
Task Order #: 041116-5
Project: 03159.29.00X

Customer: Metcalf & Eddy
Client Sample ID: D05640
Sample Matrix: Sediment

Case: 0247M
SDG: D05640

Sieve of +10

Total Sample Wt: 98.83

Sieve	Wt. Retained	% Retained	% Pass
3"	0	0.0	100.0
2"	0	0.0	100.0
1 1/2"	0	0.0	100.0
1"	0	0.0	100.0
3/4"	0	0.0	100.0
3/8"	0	0.0	100.0
#4	0	0.0	100.0
#10	0	0.0	100.0

Date Analyzed: 12/20/2004

Sieve of -20/+200

Weight of Materials used in Hydrometer: 50.05

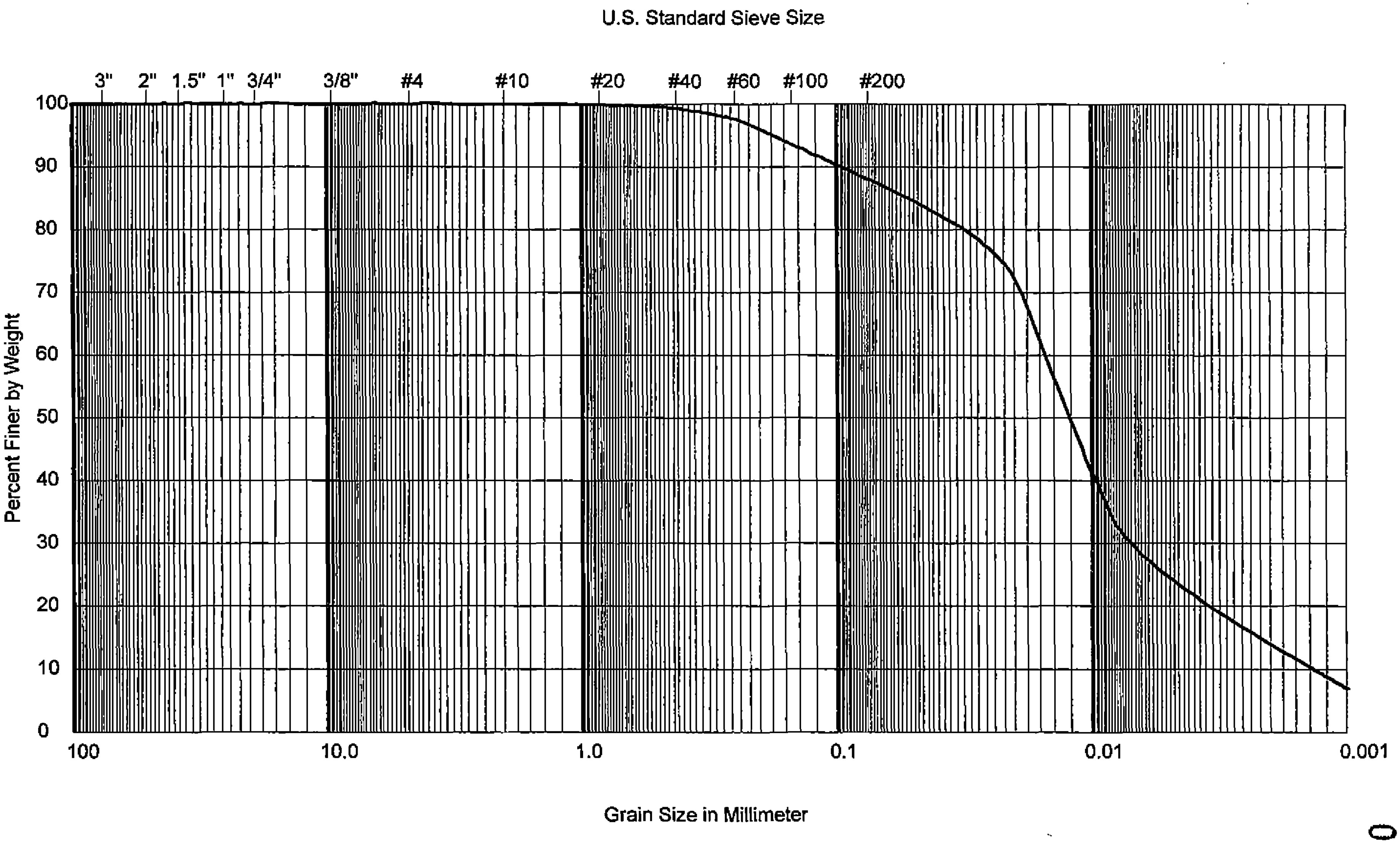
Sieve	Wt. Retained each Sieve	Yield	Wt. Retained	% Retained	% Pass
#20	0.07	0.14	0.14	0.1	99.9
#40	0.25	0.63	0.63	0.6	99.4
#60	0.83	2.27	2.27	2.3	97.7
#100	2.12	6.46	6.46	6.5	93.5
#200	2.74	11.87	11.87	12.0	88.0

Date Analyzed: 12/20/2004

Specific Gravity: 2.44 Hydrometer ID: 152-H-009

Temp.	Reading Time	Hydro. Reading	Hydro. Corr.	Corrected Hydro Reading	L	Diam (mm)	% Finer
20	2	45	7	38	8.9	0.0308	80.024
20	5	42	7	35	9.4	0.0200	73.706
20	15	31	7	24	11.2	0.0126	50.541
20	30	25	7	18	12.2	0.0093	37.906
20	60	20	7	13	13.0	0.0068	27.377
20	250	16	7	9	13.7	0.0034	18.953
20	1440	12	7	5	14.3	0.0015	10.529

Date Analyzed: 12/14/2004



SwRI Sample ID: 255316	Customer: Metcalf Eddy
Task Order: 041116-5	Client Sample ID: D05640
Project: 03159.29.00X	Sample Matrix: Sediment

Southwest Research Institute

Grain Size Report

SwRI Sample ID: 255317
Task Order #: 041116-5
Project: 03159.29.00X

Customer: Metcalf & Eddy
Client Sample ID: D05641
Sample Matrix: Sediment

Case: 0247M
SDG: D05640

Sieve of +10

Total Sample Wt: 111.21

Sieve	Wt. Retained	% Retained	% Pass
3"	0	0.0	100.0
2"	0	0.0	100.0
1 1/2"	0	0.0	100.0
1"	0	0.0	100.0
3/4"	0	0.0	100.0
3/8"	0	0.0	100.0
#4	0.17	0.2	99.8
#10	0.14	0.3	99.7

Date Analyzed: 12/20/2004

Sieve of -20/+200

Weight of Materials used in Hydrometer: 50.05

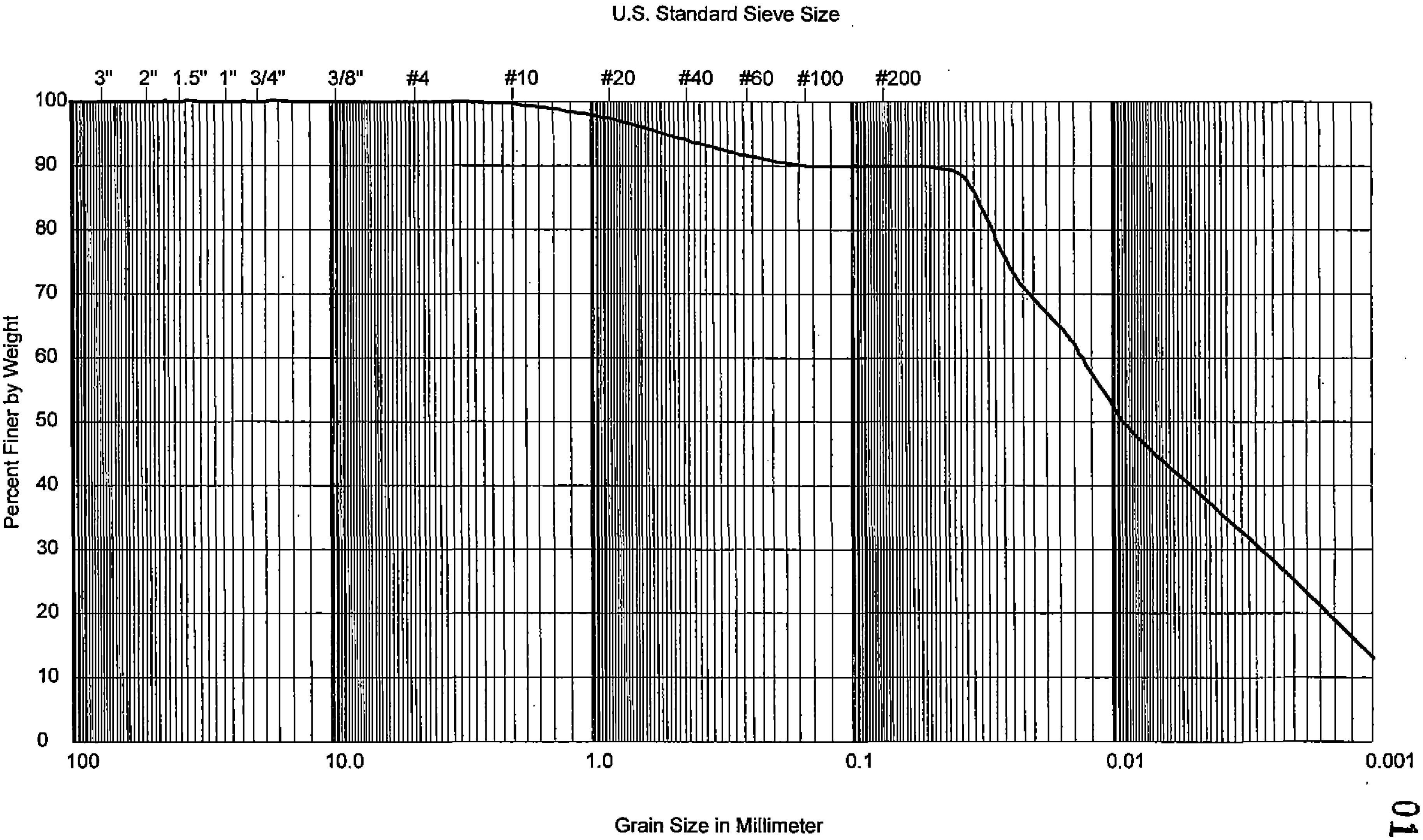
Sieve	Wt. Retained each Sieve	Yield	Wt. Retained	% Retained	% Pass
#20	1.13	2.50	2.81	2.5	97.5
#40	1.84	6.58	6.89	6.2	93.8
#60	1.21	9.26	9.57	8.6	91.4
#100	1.79	13.23	13.54	12.2	87.8
#200	2.49	18.75	19.06	17.1	82.9

Date Analyzed: 12/20/2004

Specific Gravity: 2.03 Hydrometer ID: 152-H-008

Temp.	Reading Time	Hydro. Reading	Hydro. Corr.	Corrected Hydro Reading	L	Diam (mm)	% Finer
20	2	45	8	37	8.9	0.0364	89.791
20	5	38	8	30	10.1	0.0245	72.803
20	15	34	8	26	10.7	0.0146	63.096
20	30	30	8	22	11.4	0.0106	53.389
20	60	27	8	19	11.9	0.0077	46.109
20	250	23	8	15	12.5	0.0039	36.402
20	1440	17	8	9	13.5	0.0017	21.841

Date Analyzed: 12/14/2004



SwRI Sample ID: 255317	Customer: Metcalf Eddy
Task Order: 041116-5	Client Sample ID: D05641
Project: 03159.29.00X	Sample Matrix: Sediment

Southwest Research Institute
Grain Size Report

SwRI Sample ID:	255318	Customer:	Metcalf & Eddy	Case:	0247M
Task Order #:	041116-5	Client Sample ID:	D05644	SDG:	D05640
Project:	03159.29.00X	Sample Matrix:	Sediment		

Total Sample Wt: 213.05

Sieve of +10

Sieve	Wt. Retained	% Retained	% Pass
3"	0	0.0	100.0
2"	0	0.0	100.0
1 1/2"	0	0.0	100.0
1"	0	0.0	100.0
3/4"	0	0.0	100.0
3/8"	10.28	4.8	95.2
#4	12.75	10.8	89.2
#10	16.85	18.7	81.3

Date Analyzed: 12/20/2004

Sieve of -20/+200

Weight of Materials used in Hydrometer: 50.00

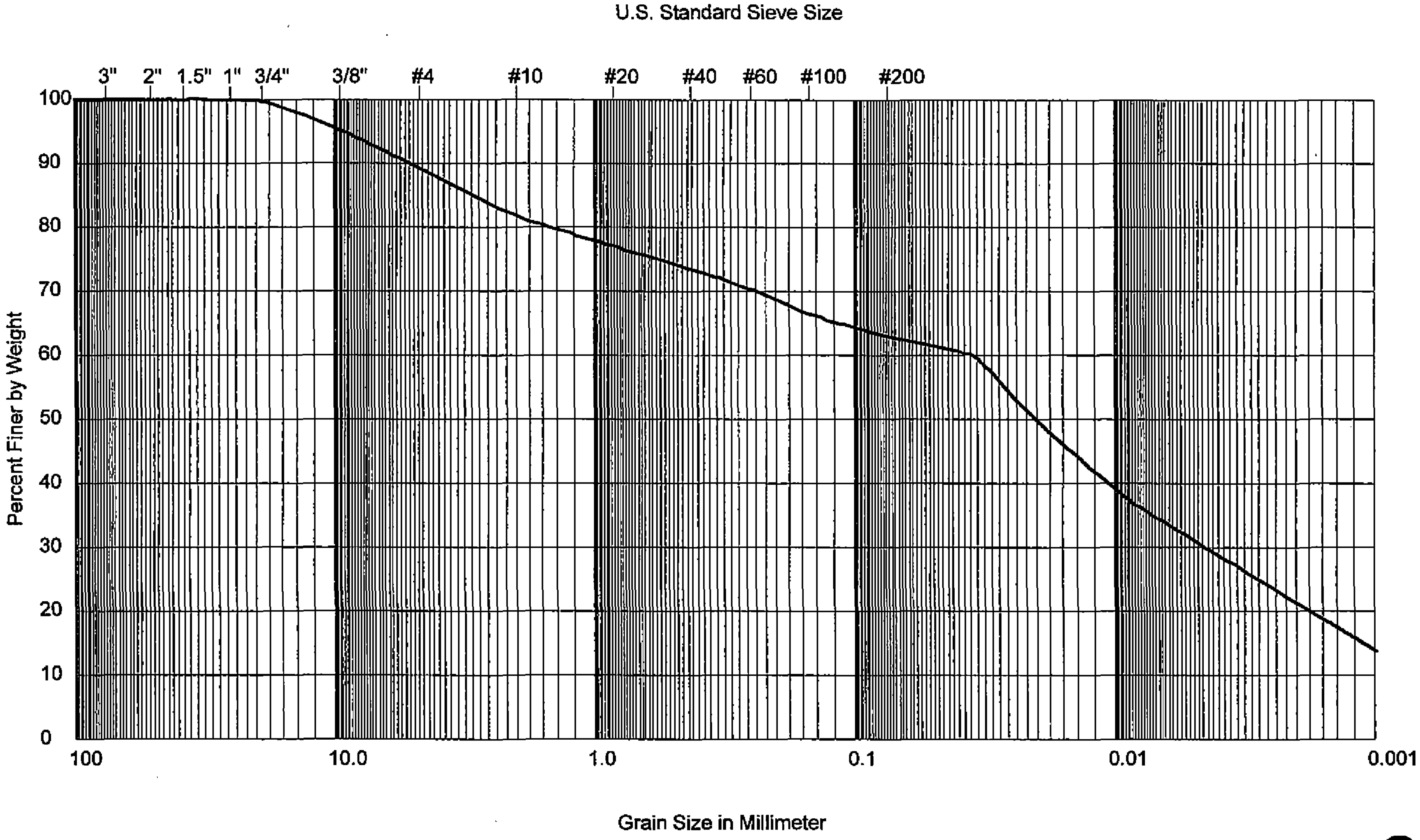
Sieve	Wt. Retained each Sieve	Yield	Wt. Retained	% Retained	% Pass
#20	2.65	9.18	49.06	23.0	77.0
#40	2.21	16.83	56.71	26.6	73.4
#60	1.92	23.48	63.36	29.7	70.3
#100	2.48	32.07	71.95	33.8	66.2
#200	2.17	39.59	79.47	37.3	62.7

Date Analyzed: 12/20/2004

Specific Gravity: 2.28 Hydrometer ID: 152-H-001

Temp.	Reading Time	Hydro. Reading	Hydro. Corr.	Corrected Hydro Reading	L	Diam (mm)	% Finer
20	2	39	6	33	9.9	0.0344	59.976
20	5	34	6	28	10.7	0.0226	50.889
20	15	30	6	24	11.4	0.0135	43.619
20	30	27	6	21	11.9	0.0097	38.166
20	60	25	6	19	12.2	0.0070	34.532
20	250	21	6	15	12.9	0.0035	27.262
20	1440	16	6	10	13.7	0.0015	18.175

Date Analyzed: 12/14/2004



SwRI Sample ID: 255318

Task Order: 041116-5

Project: 03159.29.00X

Customer: Metcalf Eddy

Client Sample ID: D05644

Sample Matrix: Sediment

Southwest Research Institute
Grain Size Report

SwRI Sample ID:	255319	Customer:	Metcalf & Eddy	Case:	0247M
Task Order #:	041116-5	Client Sample ID:	D05645	SDG:	D05640
Project:	03159.29.00X	Sample Matrix:	Sediment		

Sieve of +10

Total Sample Wt: 142.20

Sieve	Wt. Retained	% Retained	% Pass
3"	0	0.0	100.0
2"	0	0.0	100.0
1 1/2"	0	0.0	100.0
1"	0	0.0	100.0
3/4"	0	0.0	100.0
3/8"	0	0.0	100.0
#4	0	0.0	100.0
#10	0	0.0	100.0

Date Analyzed: 12/20/2004

Sieve of -20/+200

Weight of Materials used in Hydrometer: 60.08

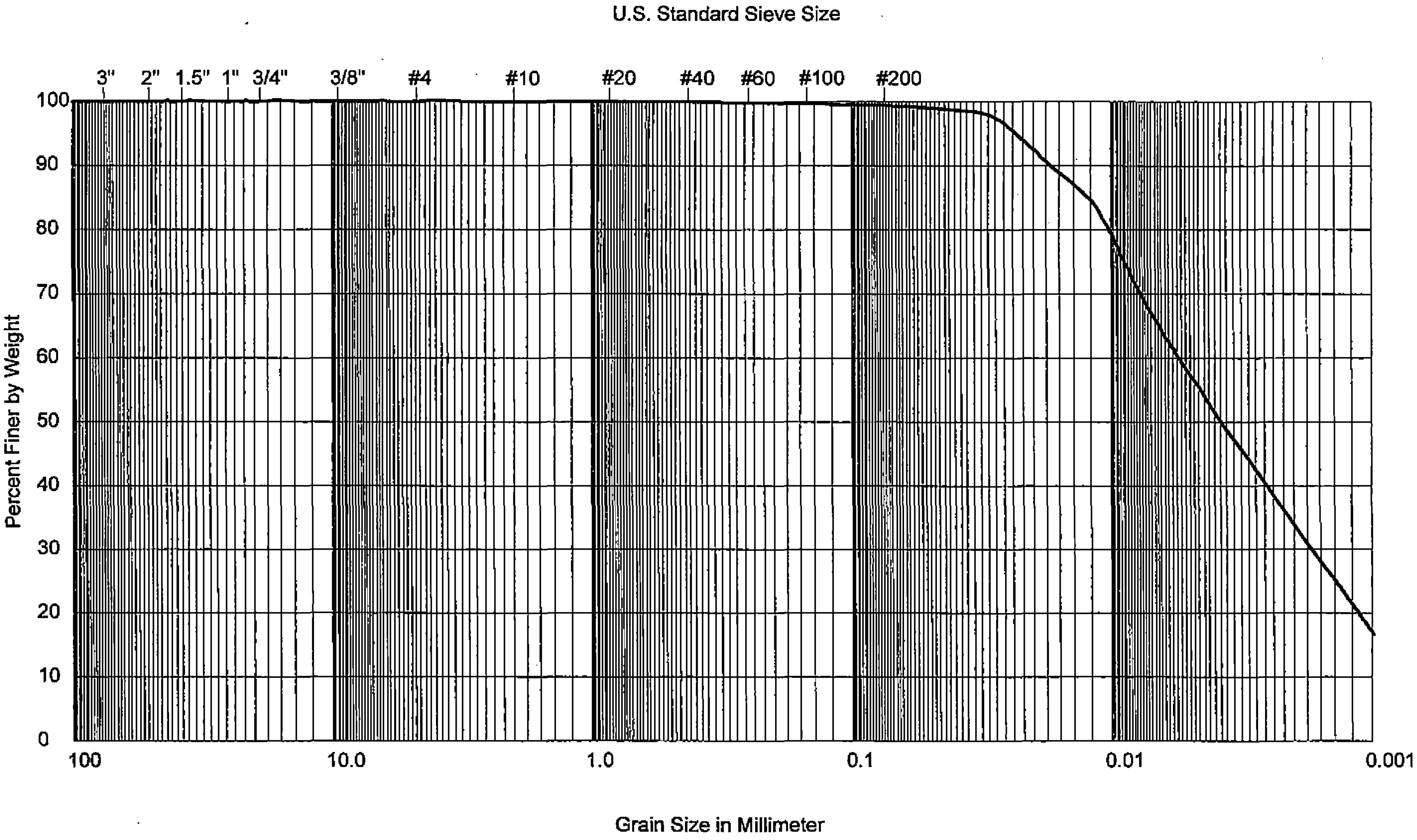
Sieve	Wt. Retained each Sieve	Yield	Wt. Retained	% Retained	% Pass
#20	0.03	0.07	0.07	0.0	100.0
#40	0.05	0.19	0.19	0.1	99.9
#60	0.10	0.43	0.43	0.3	99.7
#100	0.06	0.57	0.57	0.4	99.6
#200	0.12	0.85	0.85	0.6	99.4

Date Analyzed: 12/20/2004

Specific Gravity: 2.29 Hydrometer ID: 152-H-002

Temp.	Reading Time	Hydro. Reading	Hydro. Corr.	Corrected Hydro Reading	L	Diam (mm)	% Finer
20	2	60	7	53	6.5	0.0278	98.272
20	5	56	7	49	7.1	0.0184	90.856
20	15	52	7	45	7.8	0.0111	83.439
20	30	46	7	39	8.8	0.0084	72.314
20	60	41	7	34	9.6	0.0062	63.043
20	250	31	7	24	11.2	0.0033	44.501
20	1440	21	7	14	12.9	0.0015	25.959

Date Analyzed: 12/14/2004



SwRI Sample ID: 255319
Task Order: 041116-5
Project: 03159.29.00X

Customer: Metcalf Eddy
Client Sample ID: D05645
Sample Matrix: Sediment

Southwest Research Institute
Grain Size Report

SwRI Sample ID:	255320	Customer:	Metcalf & Eddy	Case:	0247M
Task Order #:	041116-5	Client Sample ID:	D05647	SDG:	D05640
Project:	03159.29.00X	Sample Matrix:	Sediment		

Sieve of +10

Total Sample Wt: 288.01

Sieve	Wt. Retained	% Retained	% Pass
3"	0	0.0	100.0
2"	0	0.0	100.0
1 1/2"	0	0.0	100.0
1"	0	0.0	100.0
3/4"	0	0.0	100.0
3/8"	1.43	0.5	99.5
#4	21.83	8.1	91.9
#10	44.36	23.5	76.5

Date Analyzed: 12/20/2004

Sieve of -20/+200

Weight of Materials used in Hydrometer:50.05

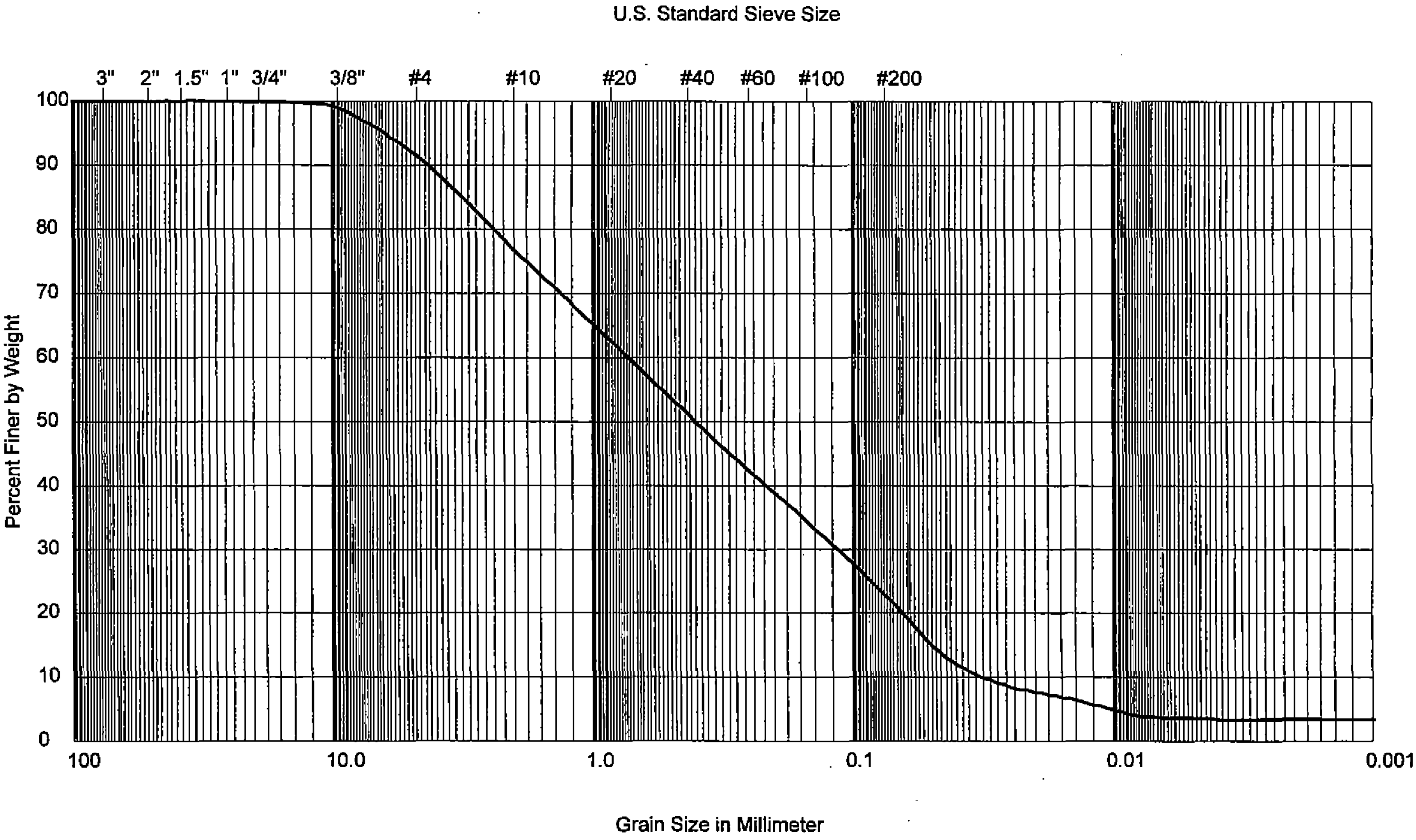
Sieve	Wt. Retained each Sieve	Yield	Wt. Retained	% Retained	% Pass
#20	9.22	40.60	108.22	37.6	62.4
#40	7.60	74.07	141.69	49.2	50.8
#60	5.77	99.47	167.09	58.0	42.0
#100	4.94	121.23	188.85	65.6	34.4
#200	7.41	153.85	221.47	76.9	23.1

Date Analyzed: 12/20/2004

Specific Gravity: 2.40 Hydrometer ID: 152-H-003

Temp.	Reading Time	Hydro. Reading	Hydro. Corr.	Corrected Hydro Reading	L	Diam (mm)	% Finer
20	2	13	7	6	14.2	0.0394	9.816
20	5	12	7	5	14.3	0.0250	8.180
20	15	11	7	4	14.5	0.0146	6.544
20	30	10	7	3	14.7	0.0104	4.908
20	60	9	7	2	14.8	0.0074	3.272
20	250	9	7	2	14.8	0.0036	3.272
20	1440	9	7	2	14.8	0.0015	3.272

Date Analyzed: 12/14/2004



SwRI Sample ID: 255320
Task Order: 041116-5
Project: 03159.29.00X

Customer: Metcalf Eddy
Client Sample ID: D05647
Sample Matrix: Sediment

Southwest Research Institute
Grain Size Report

SwRI Sample ID:	255321	Customer:	Metcalf & Eddy	Case:	0247M
Task Order #:	041116-5	Client Sample ID:	D05649	SDG:	D05640
Project	03159.29.00X	Sample Matrix:	Sediment		

Total Sample Wt: 225.71

Sieve of +10

Sieve	Wt. Retained	% Retained	% Pass
3"	0	0.0	100.0
2"	0	0.0	100.0
1 1/2"	0	0.0	100.0
1"	0	0.0	100.0
3/4"	0	0.0	100.0
3/8"	0	0.0	100.0
#4	0	0.0	100.0
#10	0	0.0	100.0

Date Analyzed: 12/20/2004

Sieve of -20/+200

Weight of Materials used in Hydrometer: 50.08

Sieve	Wt. Retained each Sieve	Yield	Wt. Retained	% Retained	% Pass
#20	0	0.00	0.00	0.0	100.0
#40	0.07	0.32	0.32	0.1	99.9
#60	0.06	0.59	0.59	0.3	99.7
#100	3.51	16.41	16.41	7.3	92.7
#200	13.78	78.51	78.51	34.8	65.2

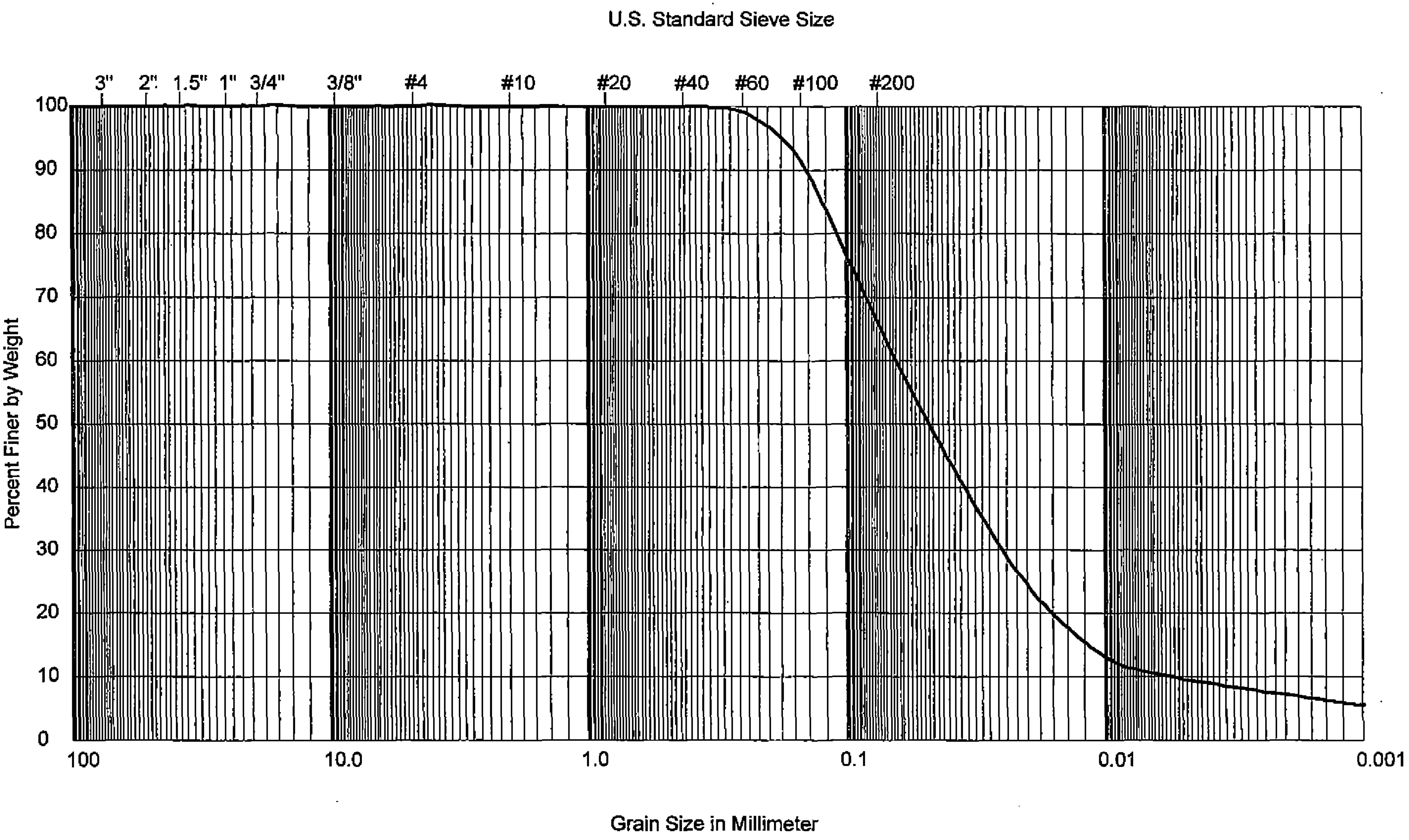
Date Analyzed: 12/20/2004

Specific Gravity: 2.46 Hydrometer ID: 152-H-004

Temp.	Reading Time	Hydro. Reading	Hydro. Corr.	Corrected Hydro Reading	L	Diam (mm)	% Finer
20	2	26	7	19	12.0	0.0355	39.685
20	5	20	7	13	13.0	0.0234	27.153
20	15	15	7	8	13.8	0.0139	16.709
20	30	13	7	6	14.2	0.0100	12.532
20	60	12	7	5	14.3	0.0071	10.443
20	250	11	7	4	14.5	0.0035	8.355
20	1440	10	7	3	14.7	0.0015	6.266

Date Analyzed: 12/14/2004

ver 12/11/2004



SwRI Sample ID: 255321	Customer: Metcalf Eddy
Task Order: 041116-5	Client Sample ID: D05649
Project: 03159.29.00X	Sample Matrix: Sediment

Southwest Research Institute
Grain Size Report

SwRI Sample ID:	255322	Customer:	Metcalf & Eddy	Case:	0247M
Task Order #:	041116-5	Client Sample ID:	D05650	SDG:	D05640
Project:	03159.29.00X	Sample Matrix:	Sediment		

Total Sample Wt: 227.62

Sieve of +10

Sieve	Wt. Retained	% Retained	% Pass
3"	0	0.0	100.0
2"	0	0.0	100.0
1 1/2"	0	0.0	100.0
1"	0	0.0	100.0
3/4"	0	0.0	100.0
3/8"	0	0.0	100.0
#4	0	0.0	100.0
#10	0	0.0	100.0

Date Analyzed: 12/20/2004

Sieve of -20/+200

Weight of Materials used in Hydrometer: 50.04

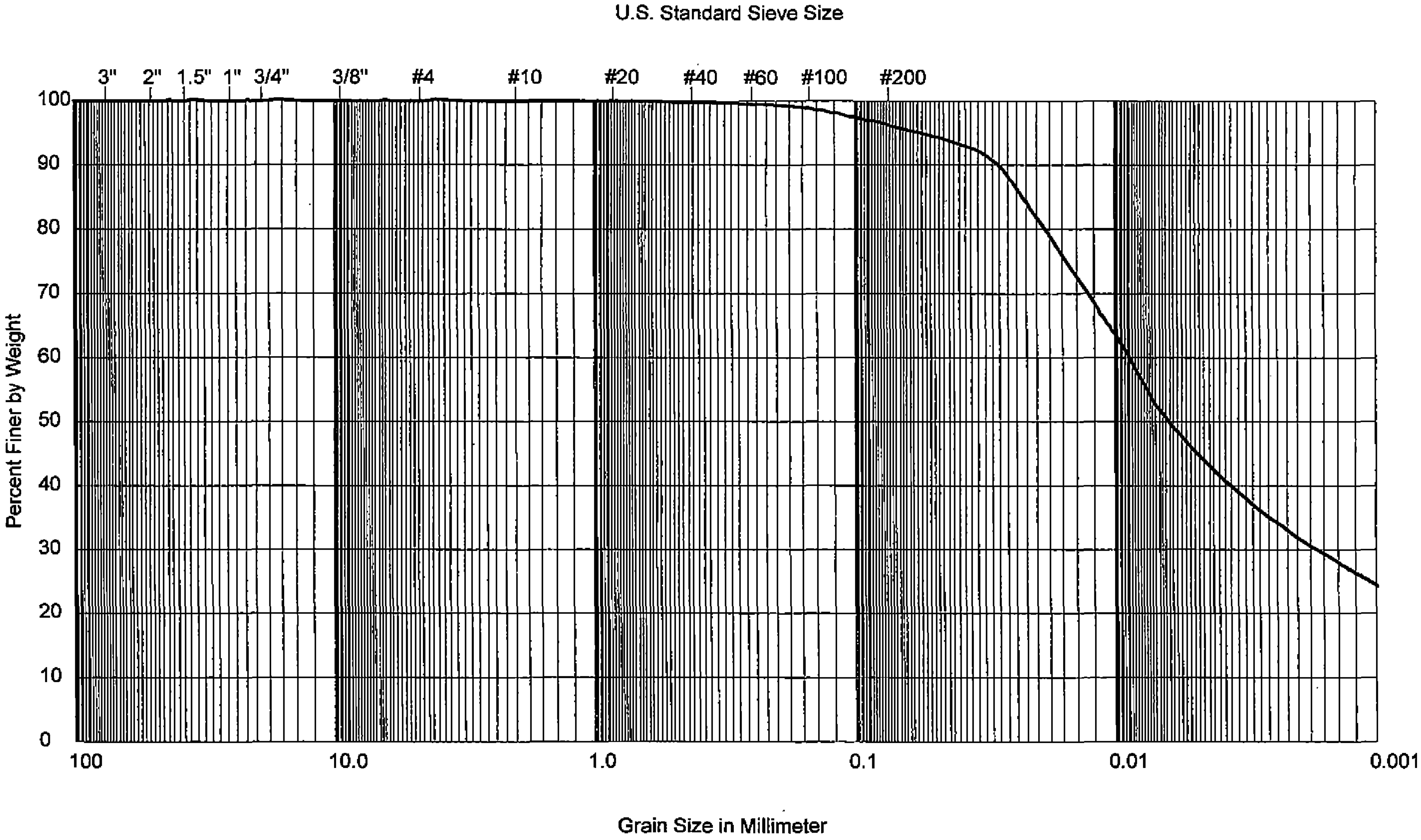
Sieve	Wt. Retained each Sieve	Yield	Wt. Retained	% Retained	% Pass
#20	0.05	0.23	0.23	0.1	99.9
#40	0.09	0.64	0.64	0.3	99.7
#60	0.10	1.09	1.09	0.5	99.5
#100	0.26	2.27	2.27	1.0	99.0
#200	1.42	8.73	8.73	3.8	96.2

Date Analyzed: 12/20/2004

Specific Gravity: 2.40 Hydrometer ID: 152-H-005

Temp.	Reading Time	Hydro. Reading	Hydro. Corr.	Corrected Hydro Reading	L	Diam (mm)	% Finer
20	2	50	7	43	8.1	0.0298	91.946
20	5	45	7	38	8.9	0.0197	81.255
20	15	39	7	32	9.9	0.0120	68.425
20	30	35	7	28	10.6	0.0088	59.872
20	60	30	7	23	11.4	0.0065	49.181
20	250	24	7	17	12.4	0.0033	36.351
20	1440	20	7	13	13.0	0.0014	27.798

Date Analyzed: 12/14/2004



SwRI Sample ID: 255322
Task Order: 041116-5
Project: 03159.29.00X

Customer: Metcalf Eddy
Client Sample ID: D05650
Sample Matrix: Sediment

Southwest Research Institute
Grain Size Report

SwRI Sample ID:	255323	Customer:	Metcalf & Eddy	Case:	0247M
Task Order #:	041116-5	Client Sample ID:	D05651	SDG:	D05640
Project:	03159.29.00X	Sample Matrix:	Sediment		

Total Sample Wt: 146.02

Sieve of +10

Sieve	Wt. Retained	% Retained	% Pass
3"	0	0.0	100.0
2"	0	0.0	100.0
1 1/2"	0	0.0	100.0
1"	0	0.0	100.0
3/4"	0	0.0	100.0
3/8"	19.84	13.6	86.4
#4	8.02	19.1	80.9
#10	4.88	22.4	77.6

Date Analyzed: 12/20/2004

Sieve of -20/+200

Weight of Materials used in Hydrometer: 50.04

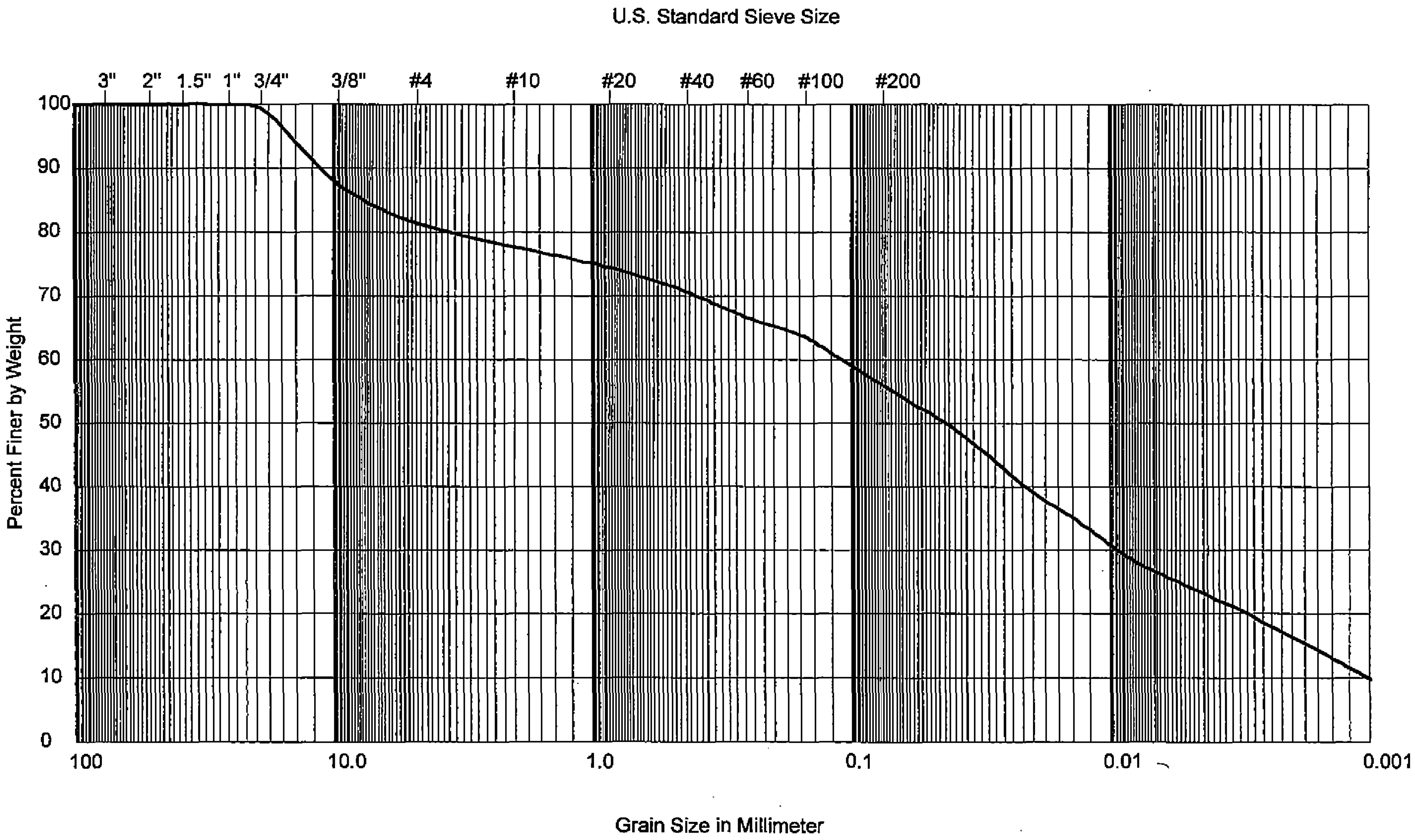
Sieve	Wt. Retained each Sieve	Yield	Wt. Retained	% Retained	% Pass
#20	1.96	4.44	37.18	25.5	74.5
#40	2.61	10.35	43.09	29.5	70.5
#60	2.72	16.50	49.24	33.7	66.3
#100	1.79	20.56	53.30	36.5	63.5
#200	5.40	32.78	65.52	44.9	55.1

Date Analyzed: 12/20/2004

Specific Gravity: 2.43 Hydrometer ID: 152-H-006

Temp.	Reading Time	Hydro. Reading	Hydro. Corr.	Corrected Hydro Reading	L	Diam (mm)	% Finer
20	2	36	7	29	10.4	0.0334	47.567
20	5	31	7	24	11.2	0.0219	39.366
20	15	28	7	21	11.7	0.0129	34.445
20	30	25	7	18	12.2	0.0093	29.524
20	60	23	7	16	12.5	0.0067	26.244
20	250	20	7	13	13.0	0.0033	21.323
20	1440	15	7	8	13.8	0.0014	13.122

Date Analyzed: 12/14/2004



SwRI Sample ID: 255323
Task Order: 041116-5
Project: 03159.29.00X

Customer: Metcalf Eddy
Client Sample ID: D05651
Sample Matrix: Sediment

Southwest Research Institute
Grain Size Report

SwRI Sample ID:	255324	Customer:	Metcalf & Eddy	Case:	0247M
Task Order #:	041116-5	Client Sample ID:	D05652	SDG:	D05640
Project:	03159.29.00X	Sample Matrix:	Sediment		

Sieve of +10

Total Sample Wt: 256.42

Sieve	Wt. Retained	% Retained	% Pass
3"	0	0.0	100.0
2"	0	0.0	100.0
1 1/2"	0	0.0	100.0
1"	0	0.0	100.0
3/4"	0	0.0	100.0
3/8"	6.23	2.4	97.6
#4	11.04	6.7	93.3
#10	23.25	15.8	84.2

Date Analyzed: 12/20/2004

Sieve of -20/+200

Weight of Materials used in Hydrometer: 50.05

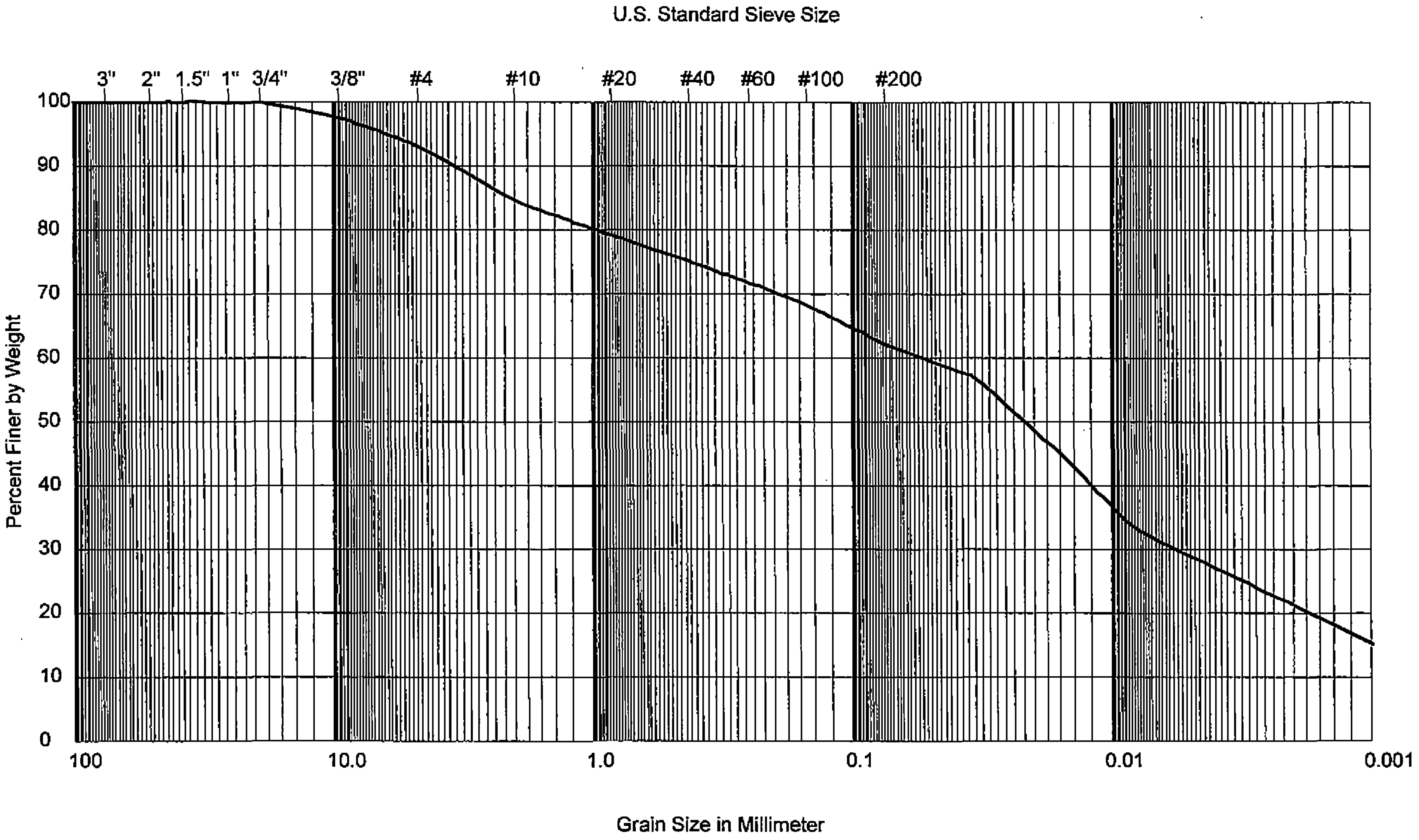
Sieve	Wt. Retained each Sieve	Yield	Wt. Retained	% Retained	% Pass
#20	3.02	13.03	53.55	20.9	79.1
#40	2.47	23.68	64.20	25.0	75.0
#60	1.98	32.22	72.74	28.4	71.6
#100	1.97	40.72	81.24	31.7	68.3
#200	3.80	57.11	97.63	38.1	61.9

Date Analyzed: 12/20/2004

Specific Gravity: 2.34 Hydrometer ID: 152-H-007

Temp.	Reading Time	Hydro. Reading	Hydro. Corr.	Corrected Hydro Reading	L	Diam (mm)	% Finer
20	2	38	7	31	10.1	0.0340	57.053
20	5	34	7	27	10.7	0.0221	49.691
20	15	30	7	23	11.4	0.0132	42.329
20	30	26	7	19	12.0	0.0096	34.968
20	60	24	7	17	12.4	0.0069	31.287
20	250	21	7	14	12.9	0.0034	25.766
20	1440	17	7	10	13.5	0.0015	18.404

Date Analyzed: 12/14/2004



SwRI Sample ID: 255324
Task Order: 041116-5
Project: 03159.29.00X

Customer: Metcalf Eddy
Client Sample ID: D05652
Sample Matrix: Sediment

Southwest Research Institute
Grain Size Report

SwRI Sample ID:	255325	Customer:	Metcalf & Eddy	Case:	0247M
Task Order #:	041116-5	Client Sample ID:	D05653	SDG:	D05640
Project:	03159.29.00X	Sample Matrix:	Sediment		

Total Sample Wt: 333.92

Sieve of +10

Sieve	Wt. Retained	% Retained	% Pass
3"	0	0.0	100.0
2"	0	0.0	100.0
1 1/2"	0	0.0	100.0
1"	0	0.0	100.0
3/4"	0	0.0	100.0
3/8"	54.01	16.2	83.8
#4	51.92	31.7	68.3
#10	44.72	45.1	54.9

Date Analyzed: 12/20/04

Sieve of -20/+200

Weight of Materials used in Hydrometer:50.01

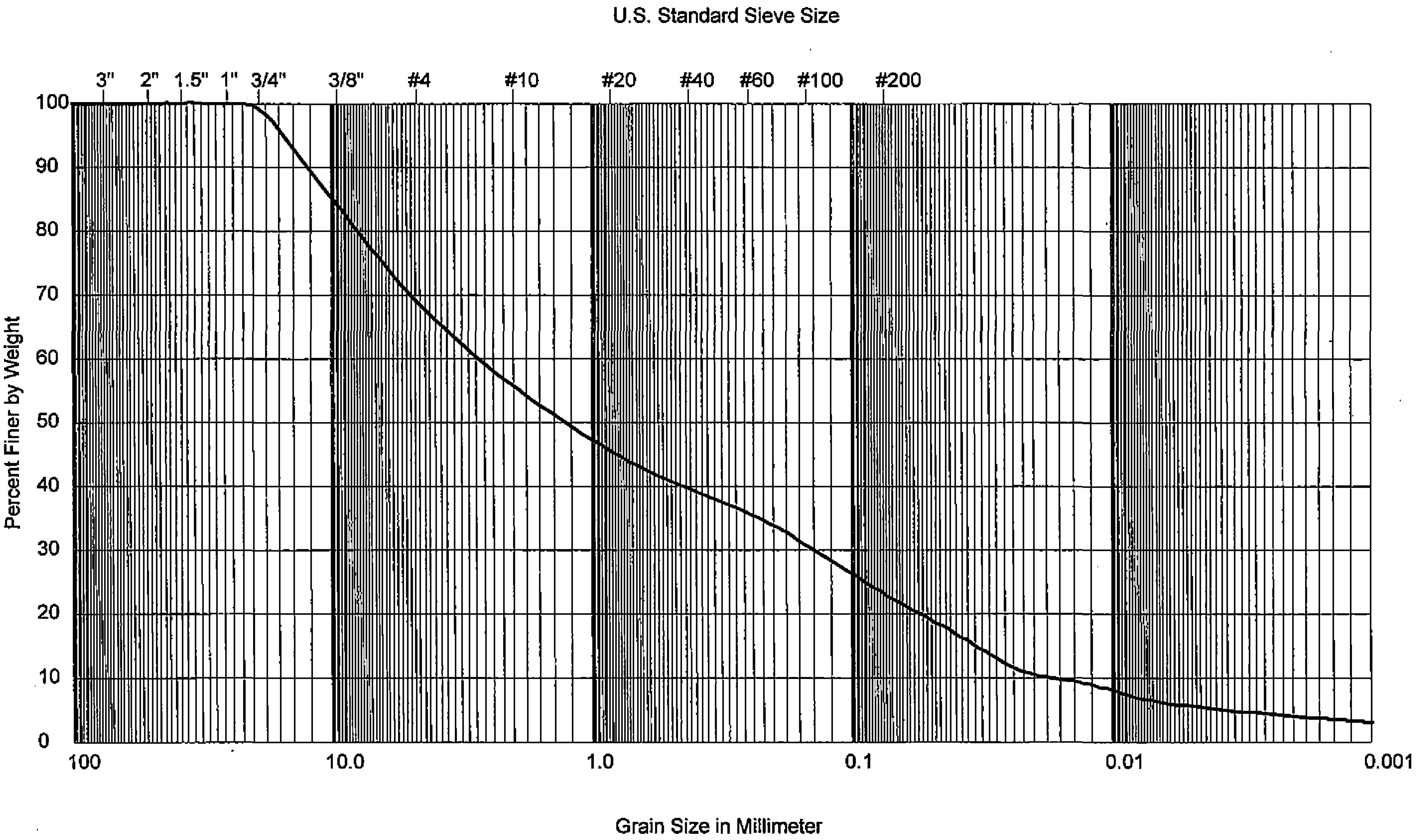
Sieve	Wt. Retained each Sieve	Yield	Wt. Retained	% Retained	% Pass
#20	9.22	33.79	184.44	55.2	44.8
#40	4.83	51.49	202.14	60.5	39.5
#60	3.31	63.62	214.27	64.2	35.8
#100	4.44	79.89	230.54	69.0	31.0
#200	7.75	108.29	258.94	77.5	22.5

Date Analyzed: 12/20/04

Specific Gravity: 2.35 Hydrometer ID: 152-H-010

Temp.	Reading Time	Hydro. Reading	Hydro. Corr.	Corrected Hydro Reading	L	Diam (mm)	% Finer
20	2	21	7	14	12.9	0.0383	16.747
20	5	16	7	9	13.7	0.0250	10.766
20	15	15	7	8	13.8	0.0145	9.570
20	30	14	7	7	14.0	0.0103	8.374
20	60	12	7	5	14.3	0.0074	5.981
20	250	11	7	4	14.5	0.0036	4.785
20	1440	10	7	3	14.7	0.0015	3.589

Date Analyzed: 12/15/04



SwRI Sample ID: 255325
Task Order: 041116-5
Project: 03159.29.00X

Customer: Metcalf Eddy
Client Sample ID: D05653
Sample Matrix: Sediment

Southwest Research Institute
Grain Size Report

SwRI Sample ID:	255326	Customer:	Metcalf & Eddy	Case:	0247M
Task Order #:	041116-5	Client Sample ID:	D05656	SDG:	D05640
Project:	03159.29.00X	Sample Matrix:	Sediment		

Sieve of +10

Total Sample Wt: 241.60

Sieve	Wt. Retained	% Retained	% Pass
3"	0	0.0	100.0
2"	0	0.0	100.0
1 1/2"	0	0.0	100.0
1"	0	0.0	100.0
3/4"	0	0.0	100.0
3/8"	0	0.0	100.0
#4	0	0.0	100.0
#10	0	0.0	100.0

Date Analyzed: 12/20/04

Sieve of -20/+200

Weight of Materials used in Hydrometer:50.06

Sieve	Wt. Retained each Sieve	Yield	Wt. Retained	% Retained	% Pass
#20	0.56	2.70	2.70	1.1	98.9
#40	0.75	6.32	6.32	2.6	97.4
#60	4.31	27.12	27.12	11.2	88.8
#100	10.26	76.64	76.64	31.7	68.3
#200	8.54	117.86	117.86	48.8	51.2

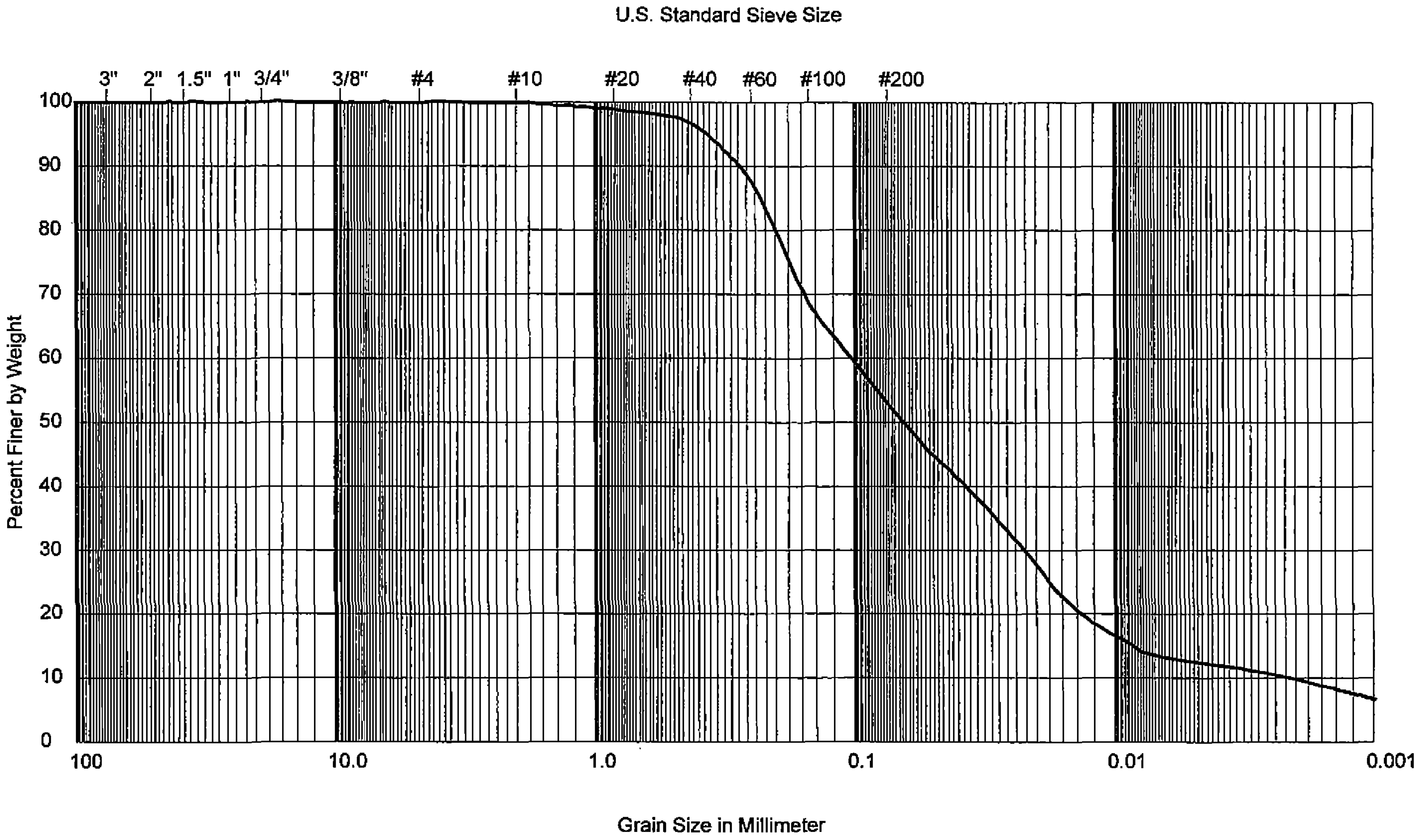
Date Analyzed: 12/20/04

Specific Gravity: 2.48 Hydrometer ID: 152-H-001

Temp.	Reading Time	Hydro. Reading	Hydro. Corr.	Corrected Hydro Reading	L	Diam (mm)	% Finer
20	2	25	6	19	12.2	0.0356	39.397
20	5	21	6	15	12.9	0.0231	31.103
20	15	15	6	9	13.8	0.0138	18.662
20	30	14	6	8	14.0	0.0098	16.588
20	60	12	6	6	14.3	0.0070	12.441
20	250	12	6	6	14.3	0.0034	12.441
20	1440	10	6	4	14.7	0.0015	8.294

Date Analyzed: 12/15/04

ver 12/11/2004



SwRI Sample ID: 255326
Task Order: 041116-5
Project: 03159.29.00X

Customer: Metcalf Eddy
Client Sample ID: D05656
Sample Matrix: Sediment

Southwest Research Institute

010197

Grain Size Report

SwRI Sample ID:	255327	Customer:	Metcalf & Eddy	Case:	0247M
Task Order #:	041116-5	Client Sample ID:	D05657	SDG:	D05640
Project:	03159.29.00X	Sample Matrix:	Sediment		

Sieve of +10

Total Sample Wt: 93.06

Sieve	Wt. Retained	% Retained	% Pass
3"	0	0.0	100.0
2"	0	0.0	100.0
1 1/2"	0	0.0	100.0
1"	0	0.0	100.0
3/4"	0	0.0	100.0
3/8"	0	0.0	100.0
#4	1.21	1.3	98.7
#10	1.17	2.6	97.4

Date Analyzed: 12/20/04

Sieve of -20/+200

Weight of Materials used in Hydrometer: 50.06

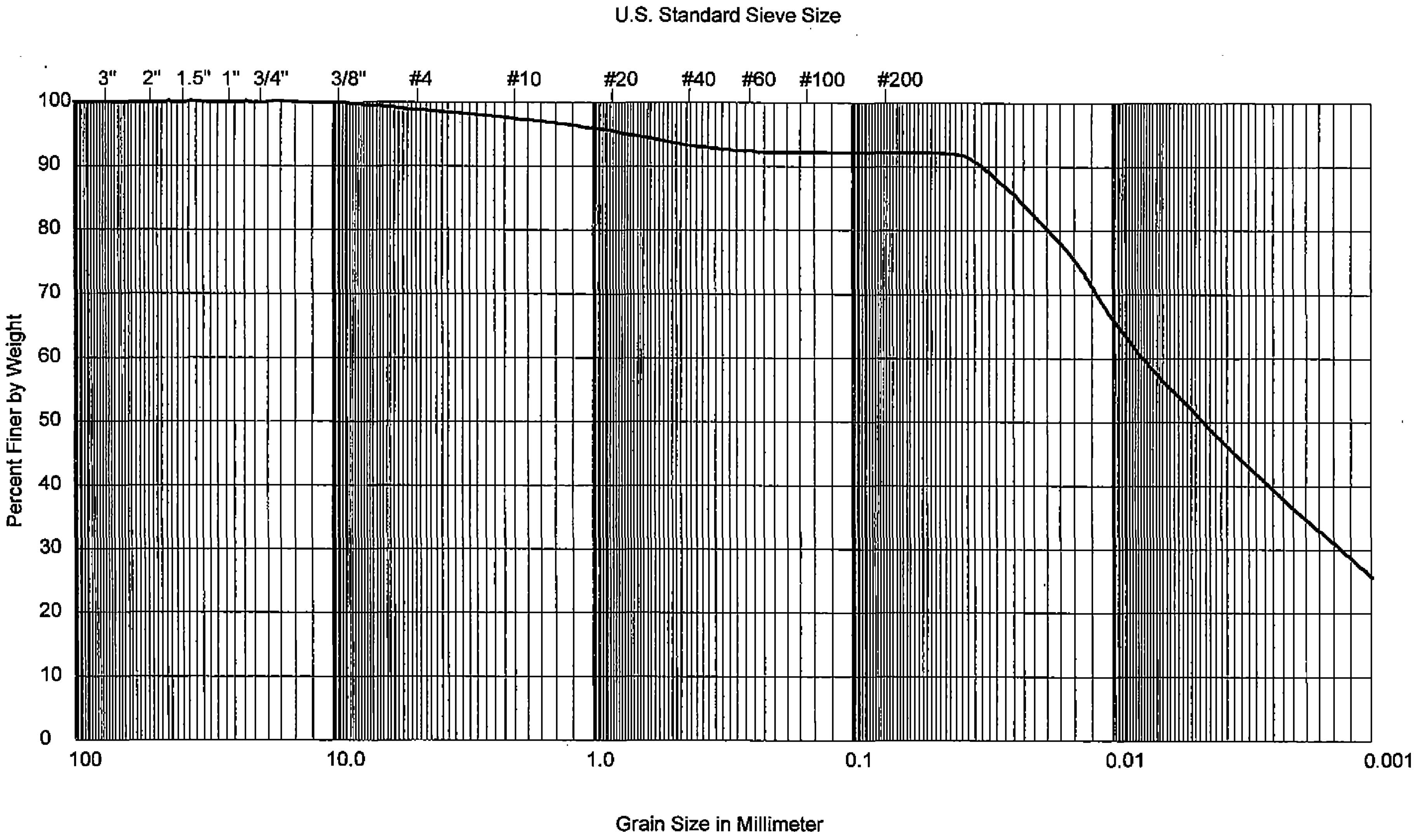
Sieve	Wt. Retained each Sieve	Yield	Wt. Retained	% Retained	% Pass
#20	1.00	1.81	4.19	4.5	95.5
#40	1.23	4.04	6.42	6.9	93.1
#60	1.11	6.05	8.43	9.1	90.9
#100	0.90	7.68	10.06	10.8	89.2
#200	1.40	10.22	12.60	13.5	86.5

Date Analyzed: 12/20/04

Specific Gravity: 2.04 Hydrometer ID: 152-H-002

Temp.	Reading Time	Hydro. Reading	Hydro. Corr.	Corrected Hydro Reading	L	Diam (mm)	% Finer
20	2	46	7	39	8.8	0.0360	92.160
20	5	43	7	36	9.2	0.0233	85.070
20	15	39	7	32	9.9	0.0140	75.618
20	30	35	7	28	10.6	0.0102	66.166
20	60	32	7	25	11.1	0.0074	59.077
20	250	26	7	19	12.0	0.0038	44.898
20	1440	21	7	14	12.9	0.0016	33.083

Date Analyzed: 12/15/04



SwRI Sample ID: 255327
Task Order: 041116-5
Project: 03159.29.00X

Customer: Metcalf Eddy
Client Sample ID: D05657
Sample Matrix: Sediment

Southwest Research Institute
Grain Size Report

SwRI Sample ID: 255328
Task Order #: 041116-5
Project: 03159.29.00X

Customer: Metcalf & Eddy
Client Sample ID: D05660
Sample Matrix: Sediment

Case: 0247M
SDG: D05640

Sieve of +10

Total Sample Wt: 273.03

Sieve	Wt. Retained	% Retained	% Pass
3"	0	0.0	100.0
2"	0	0.0	100.0
1 1/2"	0	0.0	100.0
1"	0	0.0	100.0
3/4"	0	0.0	100.0
3/8"	0	0.0	100.0
#4	0	0.0	100.0
#10	0	0.0	100.0

Date Analyzed: 12/20/04

Sieve of -20/+200

Weight of Materials used in Hydrometer: 50.09

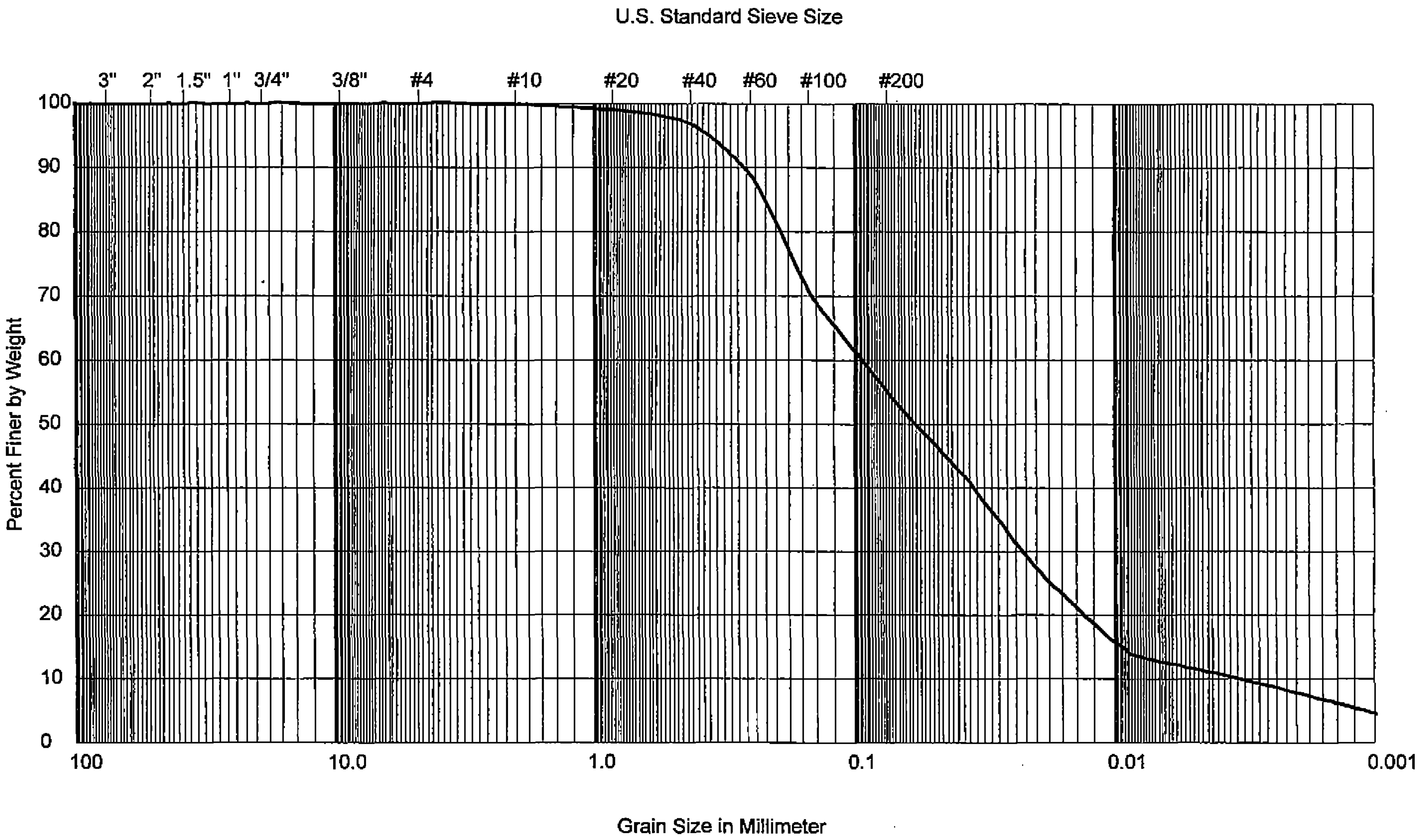
Sieve	Wt. Retained each Sieve	Yield	Wt. Retained	% Retained	% Pass
#20	0.50	2.73	2.73	1.0	99.0
#40	0.76	6.87	6.87	2.5	97.5
#60	3.90	28.13	28.13	10.3	89.7
#100	9.71	81.05	81.05	29.7	70.3
#200	8.57	127.77	127.77	46.8	53.2

Date Analyzed: 12/20/04

Specific Gravity: 2.47 Hydrometer ID: 152-H-003

Temp.	Reading Time	Hydro. Reading	Hydro. Corr.	Corrected Hydro Reading	L	Diam (mm)	% Finer
20	2	27	7	20	11.9	0.0352	41.605
20	5	21	7	14	12.9	0.0232	29.124
20	15	17	7	10	13.5	0.0137	20.803
20	30	14	7	7	14.0	0.0099	14.562
20	60	13	7	6	14.2	0.0070	12.482
20	250	12	7	5	14.3	0.0035	10.401
20	1440	10	7	3	14.7	0.0015	6.241

Date Analyzed: 12/15/04



SwRI Sample ID: 255328
Task Order: 041116-5
Project: 03159.29.00X

Customer: Metcalf Eddy
Client Sample ID: D05660
Sample Matrix: Sediment

Southwest Research Institute
Grain Size Report

SwRI Sample ID: 255620
Task Order #: 041119-7
Project: 03159.29.00X

Customer: Metcalf & Eddy
Client Sample ID: D05638
Sample Matrix: Sediment

Case: 0247M
SDG: D05640

Total Sample Wt: 152.73

Sieve of +10

Sieve	Wt. Retained	% Retained	% Pass
3"	0	0.0	100.0
2"	0	0.0	100.0
1 1/2"	0	0.0	100.0
1"	0	0.0	100.0
3/4"	0	0.0	100.0
3/8"	0	0.0	100.0
#4	0	0.0	100.0
#10	0	0.0	100.0

Date Analyzed: 12/20/04

Sieve of -20/+200

Weight of Materials used in Hydrometer: 50.08

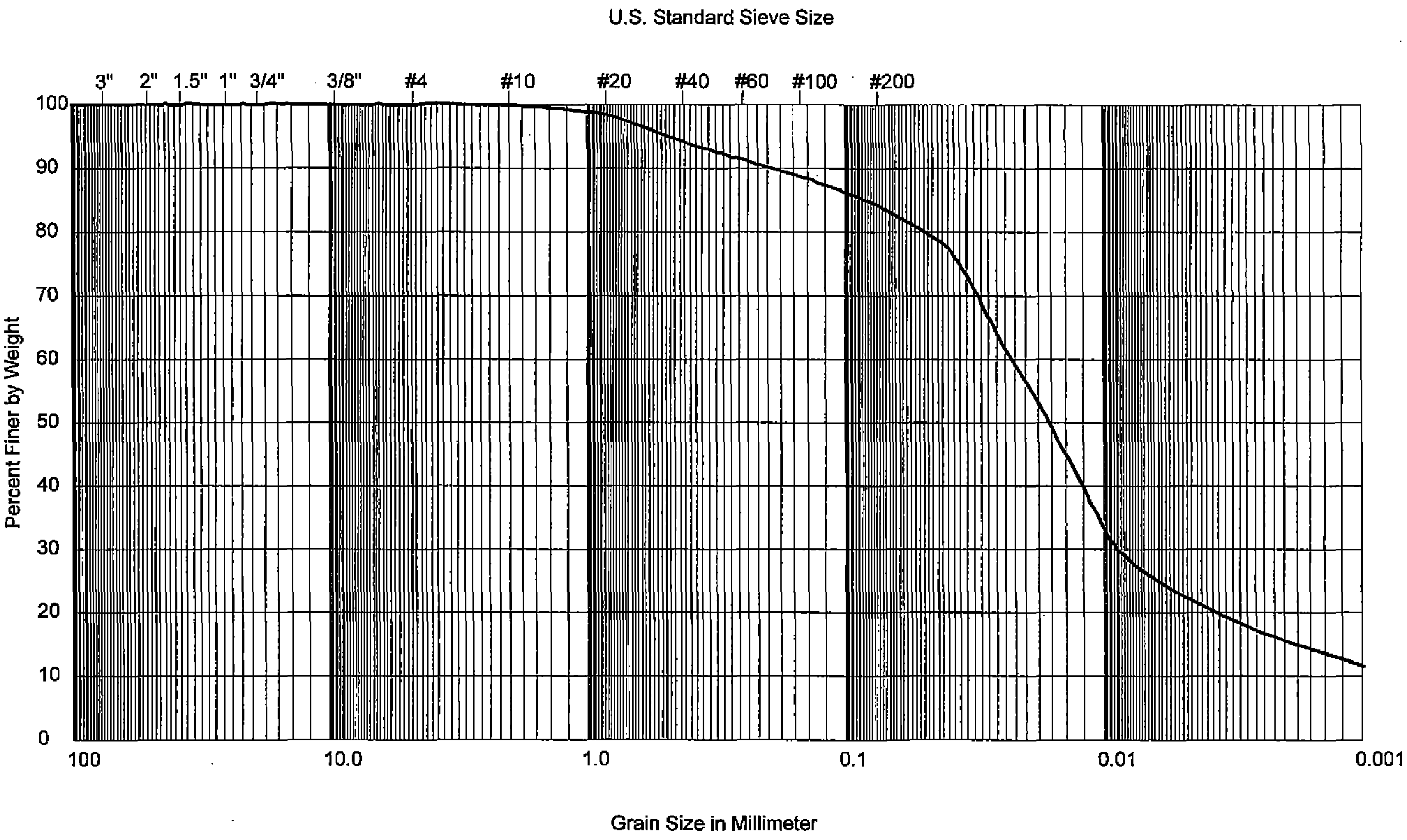
Sieve	Wt. Retained each Sieve	Yield	Wt. Retained	% Retained	% Pass
#20	0.62	1.89	1.89	1.2	98.8
#40	2.39	9.18	9.18	6.0	94.0
#60	1.42	13.51	13.51	8.8	91.2
#100	1.19	17.14	17.14	11.2	88.8
#200	2.30	24.15	24.15	15.8	84.2

Date Analyzed: 12/20/04

Specific Gravity: 2.04 Hydrometer ID: 152-H-004

Temp.	Reading Time	Hydro. Reading	Hydro. Corr.	Corrected Hydro Reading	L	Diam (mm)	% Finer
20	2	39	7	32	9.9	0.0382	77.572
20	5	33	7	26	10.9	0.0254	63.027
20	15	27	7	20	11.9	0.0153	48.482
20	30	22	7	15	12.7	0.0112	36.362
20	60	18	7	11	13.3	0.0081	26.665
20	250	15	7	8	13.8	0.0040	19.393
20	1440	13	7	6	14.2	0.0017	14.545

Date Analyzed: 12/15/04



SwRI Sample ID: 255620

Task Order: 041119-7

Project: 03159.29.00X

Customer: Metcalf Eddy

Client Sample ID: D05638

Sample Matrix: Sediment

Southwest Research Institute
Grain Size Report

SwRI Sample ID: 255621
Task Order #: 041119-7
Project: 03159.29.00X

Customer: Metcalf & Eddy
Client Sample ID: D05639
Sample Matrix: Sediment

Case: 0247M
SDG: D05640

Sieve of +10

Total Sample Wt: 246.41

Sieve	Wt. Retained	% Retained	% Pass
3"	0	0.0	100.0
2"	0	0.0	100.0
1 1/2"	0	0.0	100.0
1"	0	0.0	100.0
3/4"	0	0.0	100.0
3/8"	0	0.0	100.0
#4	0	0.0	100.0
#10	0	0.0	100.0

Date Analyzed: 12/20/2004

Sieve of -20/+200

Weight of Materials used in Hydrometer: 60.03

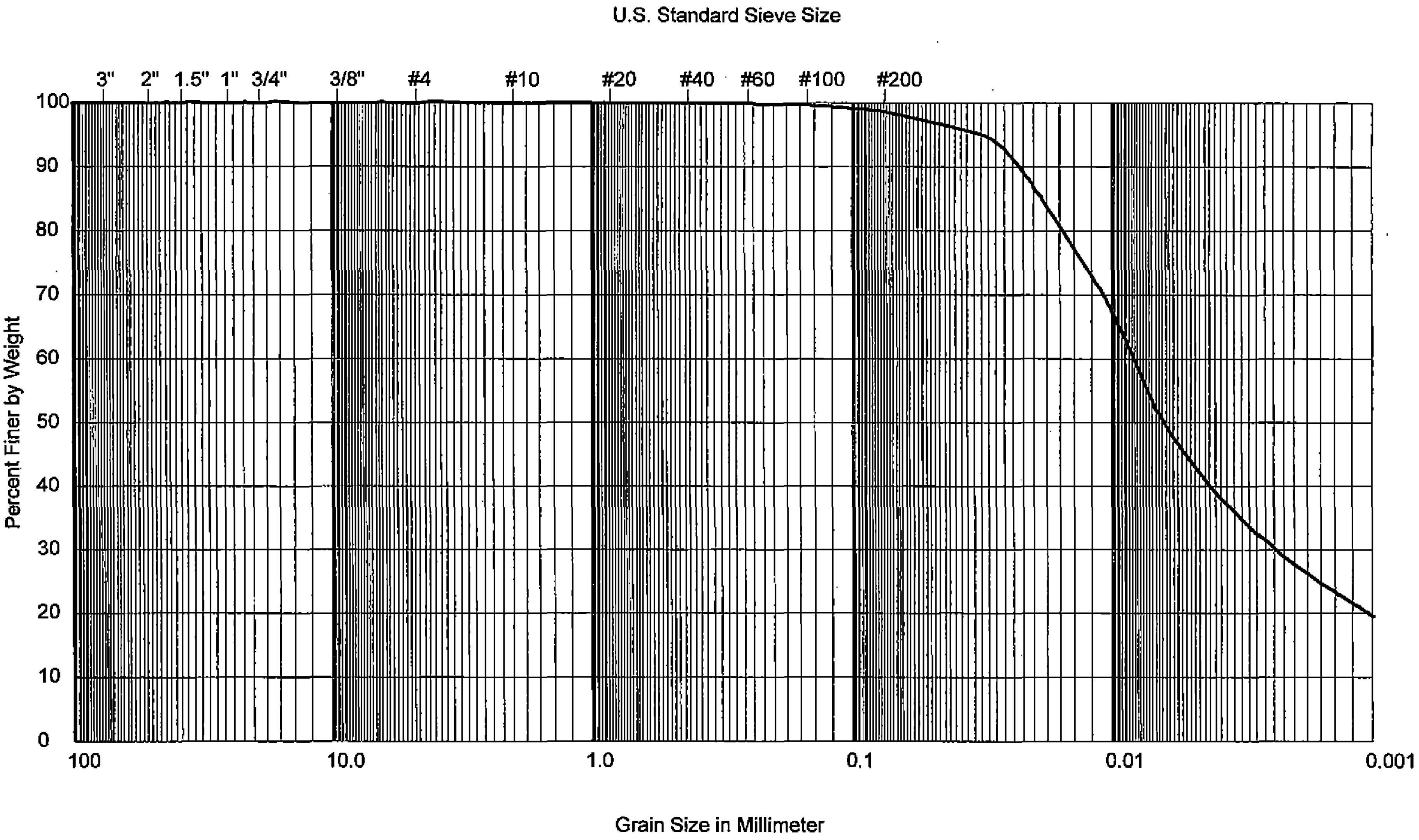
Sieve	Wt. Retained each Sieve	Yield	Wt. Retained	% Retained	% Pass
#20	0.04	0.16	0.16	0.1	99.9
#40	0.03	0.29	0.29	0.1	99.9
#60	0.05	0.49	0.49	0.2	99.8
#100	0.11	0.94	0.94	0.4	99.6
#200	0.50	3.00	3.00	1.2	98.8

Date Analyzed: 12/20/2004

Specific Gravity: 2.40 Hydrometer ID: 152-H-005

Temp.	Reading Time	Hydro. Reading	Hydro. Corr.	Corrected Hydro Reading	L	Diam (mm)	% Finer
20	2	60	7	53	6.5	0.0267	94.469
20	5	54	7	47	7.4	0.0180	83.775
20	15	47	7	40	8.6	0.0112	71.298
20	30	41	7	34	9.6	0.0084	60.603
20	60	34	7	27	10.7	0.0063	48.126
20	250	25	7	18	12.2	0.0033	32.084
20	1440	20	7	13	13.0	0.0014	23.172

Date Analyzed: 12/15/2004



SwRI Sample ID: 255621
Task Order: 041119-7
Project: 03159.29.00X

Customer: Metcalf Eddy
Client Sample ID: D05639
Sample Matrix: Sediment

Southwest Research Institute
Grain Size Report

SwRI Sample ID:	255622	Customer:	Metcalf & Eddy	Case:	0247M
Task Order #:	041119-7	Client Sample ID:	D05642	SDG:	D05640
Project:	03159.29.00X	Sample Matrix:	Sediment		

Sieve of +10

Total Sample Wt: 214.01

Sieve	Wt. Retained	% Retained	% Pass
3"	0	0.0	100.0
2"	0	0.0	100.0
1 1/2"	0	0.0	100.0
1"	0	0.0	100.0
3/4"	0	0.0	100.0
3/8"	0	0.0	100.0
#4	0	0.0	100.0
#10	0.80	0.4	99.6

Date Analyzed: 12/20/04

Sieve of -20/+200

Weight of Materials used in Hydrometer: 50.05

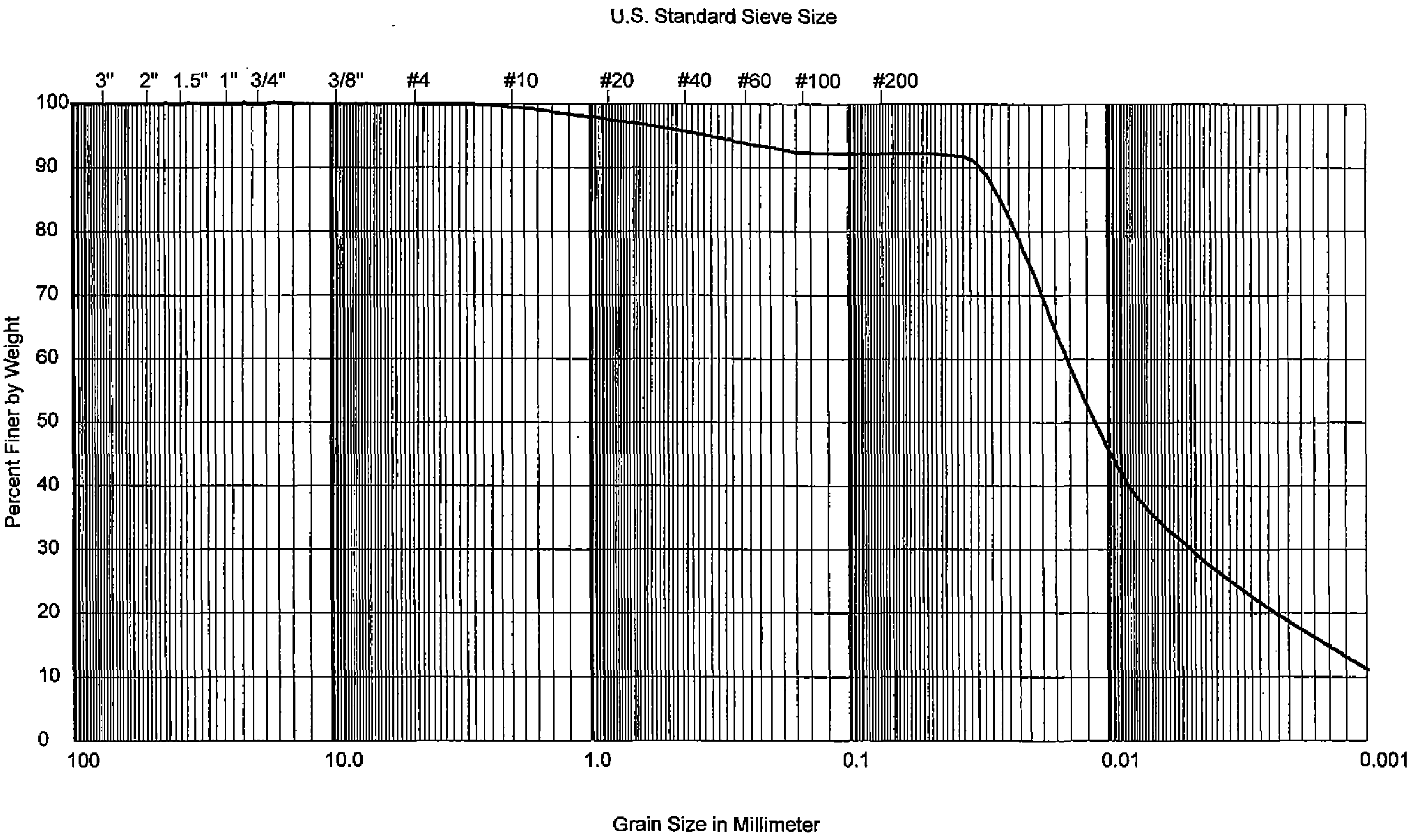
Sieve	Wt. Retained each Sieve	Yield	Wt. Retained	% Retained	% Pass
#20	1.08	4.60	5.40	2.5	97.5
#40	0.91	8.48	9.28	4.3	95.7
#60	0.99	12.69	13.49	6.3	93.7
#100	1.15	17.59	18.39	8.6	91.4
#200	1.73	24.96	25.76	12.0	88.0

Date Analyzed: 12/20/04

Specific Gravity: 2.32 Hydrometer ID: 152-H-006

Temp.	Reading Time	Hydro. Reading	Hydro. Corr.	Corrected Hydro Reading	L	Diam (mm)	% Finer
20	2	49	7	42	8.3	0.0311	92.130
20	5	42	7	35	9.4	0.0209	76.775
20	15	32	7	25	11.1	0.0131	54.839
20	30	27	7	20	11.9	0.0096	43.871
20	60	23	7	16	12.5	0.0070	35.097
20	250	18	7	11	13.3	0.0035	24.129
20	1440	14	7	7	14.0	0.0015	15.355

Date Analyzed: 12/15/04



SwRI Sample ID: 255622

Task Order: 041119-7

Project: 03159.29.00X

Customer: Metcalf Eddy

Client Sample ID: D05642

Sample Matrix: Sediment

Southwest Research Institute
Grain Size Report

SwRI Sample ID:	255623	Customer:	Metcalf & Eddy	Case:	0247M
Task Order #:	041119-7	Client Sample ID:	D05643	SDG:	D05640
Project:	03159.29.00X	Sample Matrix:	Sediment		

Total Sample Wt: 114.72

Sieve of +10

Sieve	Wt. Retained	% Retained	% Pass
3"	0	0.0	100.0
2"	0	0.0	100.0
1 1/2"	0	0.0	100.0
1"	0	0.0	100.0
3/4"	0	0.0	100.0
3/8"	0	0.0	100.0
#4	0	0.0	100.0
#10	0.34	0.3	99.7

Date Analyzed: 12/20/04

Sieve of -20/+200

Weight of Materials used in Hydrometer: 50.03

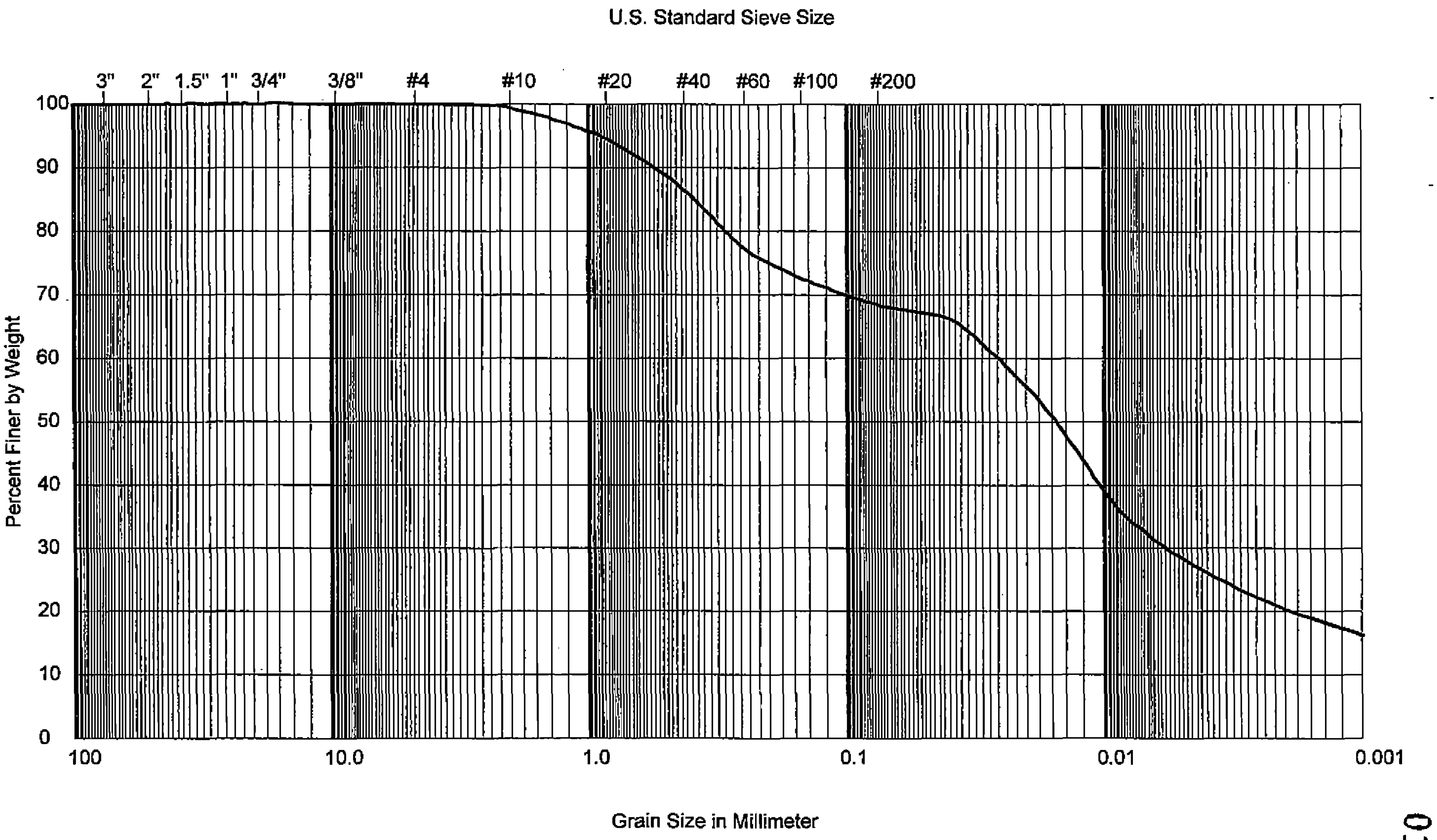
Sieve	Wt. Retained each Sieve	Yield	Wt. Retained	% Retained	% Pass
#20	2.41	5.51	5.85	5.1	94.9
#40	4.21	15.13	15.47	13.5	86.5
#60	4.91	26.36	26.70	23.3	76.7
#100	2.24	31.48	31.82	27.7	72.3
#200	2.13	36.35	36.69	32.0	68.0

Date Analyzed: 12/20/04

Specific Gravity: 2.10 Hydrometer ID: 152-H-007

Temp.	Reading Time	Hydro. Reading	Hydro. Corr.	Corrected Hydro Reading	L	Diam (mm)	% Finer
20	2	35	7	28	10.6	0.0384	66.403
20	5	32	7	25	11.1	0.0249	59.288
20	15	28	7	21	11.7	0.0147	49.802
20	30	24	7	17	12.4	0.0107	40.316
20	60	21	7	14	12.9	0.0077	33.201
20	250	17	7	10	13.5	0.0039	23.715
20	1440	15	7	8	13.8	0.0016	18.972

Date Analyzed: 12/15/04



SwRI Sample ID: 255623
Task Order: 041119-7
Project: 03159.29.00X

Customer: Metcalf Eddy
Client Sample ID: D05643
Sample Matrix: Sediment

Southwest Research Institute
Grain Size Report

SwRI Sample ID:	255624	Customer:	Metcalf & Eddy	Case:	0247M
Task Order #:	041119-7	Client Sample ID:	D05646	SDG:	D05640
Project:	03159.29.00X	Sample Matrix:	Sediment		

Total Sample Wt: 282.63

Sieve of +10

Sieve	Wt. Retained	% Retained	% Pass
3"	0	0.0	100.0
2"	0	0.0	100.0
1 1/2"	0	0.0	100.0
1"	0	0.0	100.0
3/4"	0	0.0	100.0
3/8"	4.01	1.4	98.6
#4	3.56	2.7	97.3
#10	4.98	4.4	95.6

Date Analyzed: 12/20/04

Sieve of -20/+200

Weight of Materials used in Hydrometer: 50.03

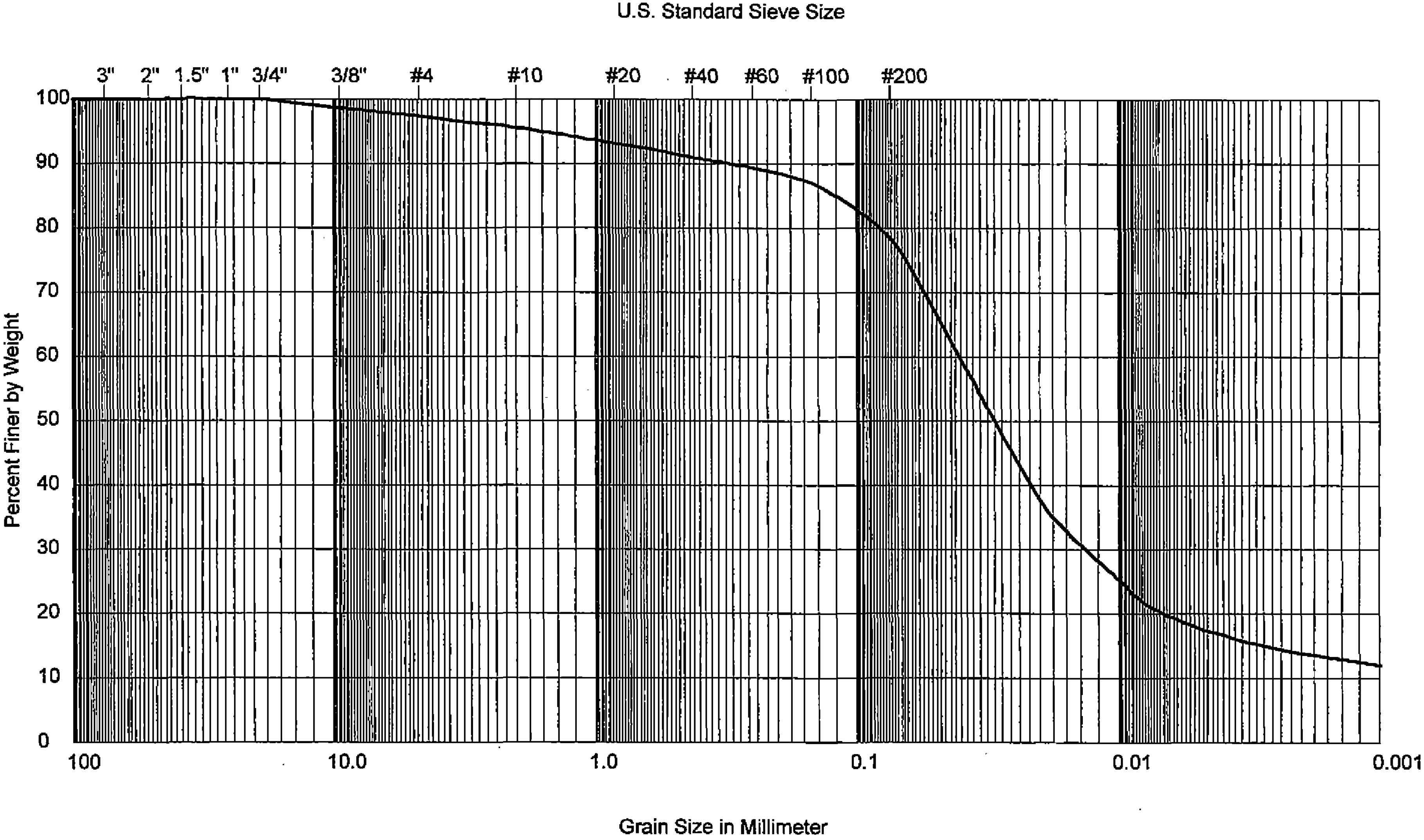
Sieve	Wt. Retained each Sieve	Yield	Wt. Retained	% Retained	% Pass
#20	1.30	7.02	19.57	6.9	93.1
#40	1.12	13.06	25.61	9.1	90.9
#60	0.82	17.49	30.04	10.6	89.4
#100	1.02	23.00	35.55	12.6	87.4
#200	4.04	44.81	57.36	20.3	79.7

Date Analyzed: 12/20/04

Specific Gravity: 2.23 Hydrometer ID: 152-H-008

Temp.	Reading Time	Hydro. Reading	Hydro. Corr.	Corrected Hydro Reading	L	Diam (mm)	% Finer
20	2	34	8	26	10.7	0.0365	56.514
20	5	27	8	19	11.9	0.0244	41.299
20	15	22	8	14	12.7	0.0145	30.431
20	30	20	8	12	13.0	0.0104	26.084
20	60	17	8	9	13.5	0.0075	19.563
20	250	15	8	7	13.8	0.0037	15.215
20	1440	14	8	6	14.0	0.0016	13.042

Date Analyzed: 12/15/04



SwRI Sample ID: 255624
Task Order: 041119-7
Project: 03159.29.00X

Customer: Metcalf Eddy
Client Sample ID: D05646
Sample Matrix: Sediment

Southwest Research Institute

Grain Size Report

010225

SwRI Sample ID: 255625
Task Order #: 041119-7
Project: 03159.29.00X

Customer: Metcalf & Eddy
Client Sample ID: D05658
Sample Matrix: Sediment

Case: 0247M
SDG: D05640

Sieve of +10

Total Sample Wt: 364.54

Sieve	Wt. Retained	% Retained	% Pass
3"	0	0.0	100.0
2"	0	0.0	100.0
1 1/2"	0	0.0	100.0
1"	0	0.0	100.0
3/4"	0	0.0	100.0
3/8"	16.14	4.4	95.6
#4	28.48	12.2	87.8
#10	56.45	27.7	72.3

Date Analyzed: 12/20/04

Sieve of -20/+200

Weight of Materials used in Hydrometer: 50.00

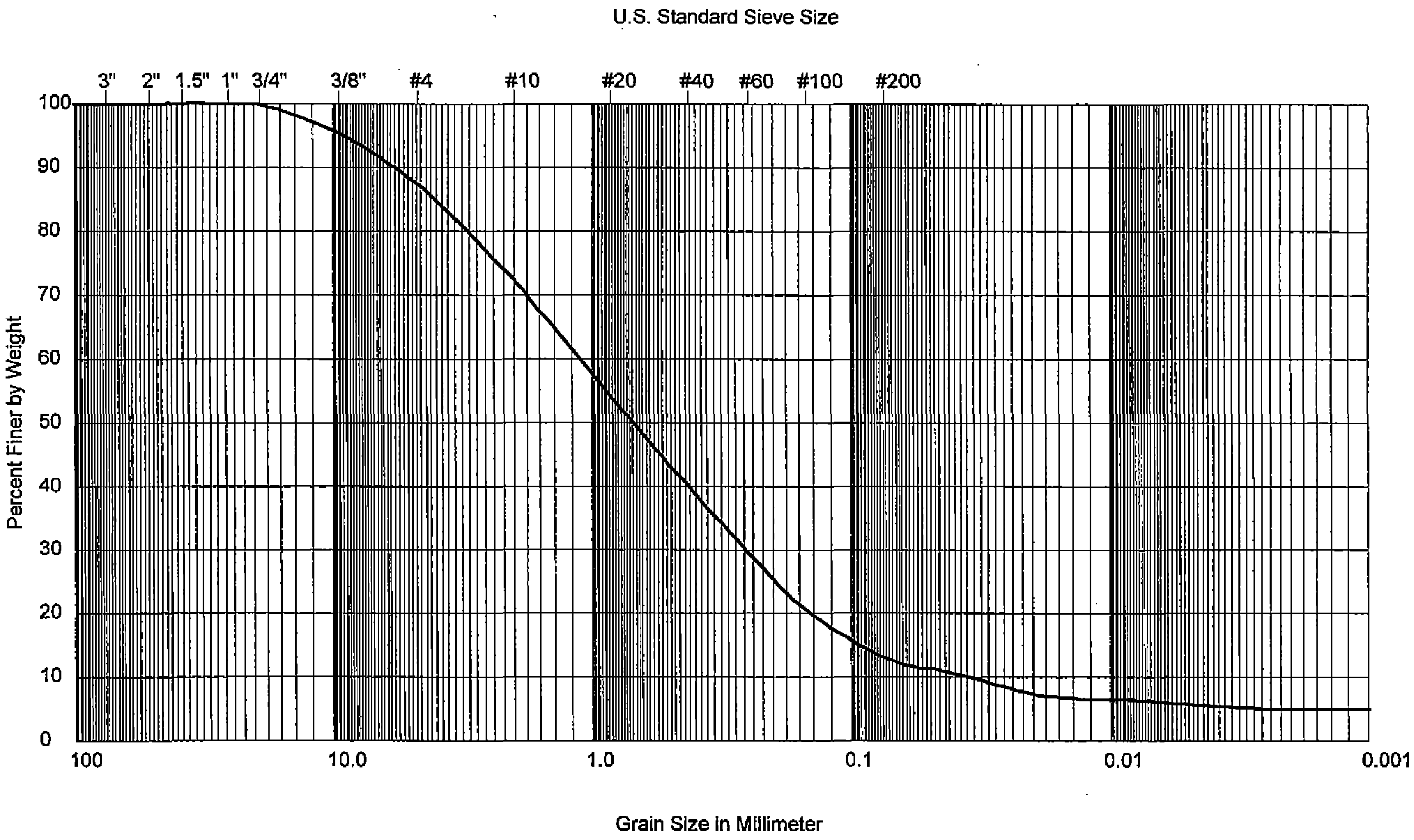
Sieve	Wt. Retained each Sieve	Yield	Wt. Retained	% Retained	% Pass
#20	12.75	67.18	168.25	46.2	53.8
#40	9.89	119.30	220.37	60.5	39.5
#60	6.97	156.03	257.10	70.5	29.5
#100	7.01	192.97	294.04	80.7	19.3
#200	5.37	221.26	322.33	88.4	11.6

Date Analyzed: 12/20/04

Specific Gravity: 2.36 Hydrometer ID: 152-H-009

Temp.	Reading Time	Hydro. Reading	Hydro. Corr.	Corrected Hydro Reading	L	Diam (mm)	% Finer
20	2	14	7	7	14.0	0.0397	10.989
20	5	12	7	5	14.3	0.0254	7.849
20	15	11	7	4	14.5	0.0148	6.279
20	30	11	7	4	14.5	0.0104	6.279
20	60	11	7	4	14.5	0.0074	6.279
20	250	10	7	3	14.7	0.0036	4.709
20	1440	10	7	3	14.7	0.0015	4.709

Date Analyzed: 12/15/04



SwRI Sample ID: 255625

Task Order: 041119-7

Project: 03159.29.00X

Customer: Metcalf Eddy

Client Sample ID: D05658

Sample Matrix: Sediment

Southwest Research Institute

Hygroscopic Moisture Report

Client: METCALF & EDDY
Sample Receipt Report: 26864, 26889
Task Order: 041116-5, 041119-7

Lab Code: SWRI
Sample Matrix: Sediment
Project: 03159.29.006

Case: DAS 0247M
SDG: D05640

Field Sample ID#	Lab Sample ID#	Hygroscopic Moisture, %	%RPD
D05640	255316	0.794	
D05640	255316D	0.795	0.13%
D05641	255317	0.897	
D05644	255318	0.592	
D05645	255319	0.495	
D05647	255320	0.587	
D05649	255321	0.882	
D05650	255322	0.688	
D05651	255323	0.798	
D05652	255324	0.992	
D05653	255325	0.685	
D05656	255326	0.895	
D05657	255327	0.794	
D05660	255328	0.699	
D05638	255620	0.595	
D05639	255621	0.789	
D05642	255622	0.793	
D05643	255623	0.497	
D05646	255624	0.687	
D05658	255625	0.898	

TRC

Soil Boring Log

Hoffmann LaRoche IA-8 Area G	Project Number 20447-0100-00000	Boring Number G-5 Well No.	Sheet 1 of 1
MH/CB Location: 30' DS CB IVS-2		Geologist Kevin Staszowski	

Boring Contractor/ Foreman S2C2/Dumitru Radu	Sampler Model Power Probe 9600 EC	Sampling Description Pre-probe to 10.5', Core 10.5'-14.5'
Sampler Description 48 in. Macrocore	Classification Method Burmeister	Coordinates X = NA Y = NA
Temporary Piezometer or Screen Point	Horizontal Distance from Pipe 15" southeast	Reference Elevation NA ft
Depth	Pipe Type 18" storm	Approximate Depth of Invert 12.00 ft
Screen Length/type	Water Table Depth NA	Surface Elevation NA ft
Riser Length/type	Total depth 14.5 ft	Completion Date 3/19/2003

Depth	Sample Number	PEN/REC	Sample Description	Strati-graphic Description	Field Testing	
1						
2						
3						
4						
5						
6			Pre-probe to 10.5'			
7						
8						
9						
10						
11	S-1	48"/24"	10" brown fine SAND and Silt, trace coarse gravel	▨		
12			3" weathered angular BEDROCK and Silt	▨		
13			11" brown fine SAND and Silt - stained	▨	13.7' - FID = 110.4 ppm 13.8' - FID = 183.8 ppm	
14					13.9 - FID = 112 ppm 14' - FID = 88.4 ppm	
15			EOB 14.5'			

Granular Soils

Blows/ft	Density
0-4	v. loose
4-10	loose
10-30	m. dense
30-50	dense
>50	v. dense

Proportions

trace 0-10% some 20-35%
little 10-20% and 35-50%

Cohesive Soils

Blows/ft	Density
>2	v. soft
2-4	soft
4-8	m. stiff
8-15	stiff
15-30	v. stiff
>30	hard

Grain Size (USCS)

silt/clay	<0.08 mm
f. sand	0.43-0.08 mm
m. sand	2.0-0.43 mm
c. sand	4.8-2.0 mm
f. gravel	19-4.8 mm
c. gravel	75-19 mm
cobble	300-75 mm
boulder	>300 mm

Note 1	Sample Time	12:02
Note 2	Sample Depth	13.6 to 14.1 ft
Note 3	Roche #80797	
Note 4		
Note 5		
Note 6		

Depth of recovered sample measured from bottom of core.

TRC

Soil Boring Log

Hoffmann LaRoche IA-8 Area G	Project Number 20447-0100-00000	Boring Number G-4 Well No.	Sheet 1 of 1
MH/CB Location: 15' DS CB IVS-2		Geologist Kevin Staszowski	

Boring Contractor/ Foreman S2C2/Dumitru Radu	Sampler Model Power Probe 9600 EC	Sampling Description Pre-probe to 9.5', Core 9.5'-13.5'
Sampler Description 48 in. Macrocore	Classification Method Burmeister	Coordinates X = NA Y = NA
Temporary Piezometer or Screen Point	Horizontal Distance from Pipe 15" southeast	Reference Elevation NA ft
Depth	Pipe Type 18" storm	Approximate Depth of Invert 11.00 ft
Screen Length/type	Water Table Depth NA	Surface Elevation NA ft
Riser Length/type	Total depth 13.5 ft	Completion Date 3/19/2003

Depth	Sample Number	PEN/REC	Sample Description	Strati-graphic Description	Field Testing	
1						
2						
3						
4						
5			Pre-probe to 9.5'			
6						
7						
8						
9						
10	S-1	48"/24"	12" red-brown fine SAND and Silt	▨		
11			12" brown fine SAND and Silt, some coarse gravel - stained	▨	12.25' - FID = 14.6 ppm 12.3' - FID = 63.2 ppm 12.4' - FID = 78.9 ppm 12.75' - FID = 70.6 ppm 12.9' - FID = 242.0 ppm 13.25 - FID = 383.0 ppm	
12						
13						
14			EOB 13.5'			
15						

Granular Soils

Blows/ft	Density
0-4	v. loose
4-10	loose
10-30	m. dense
30-50	dense
>50	v. dense

Proportions

trace 0-10%	some 20-35%
little 10-20%	and 35-50%

Cohesive Soils

Blows/ft	Density
>2	v. soft
2-4	soft
4-8	m. stiff
8-15	stiff
15-30	v. stiff
>30	hard

Grain Size (USCS)

silt/clay	<0.08 mm
f. sand	0.43-0.08 mm
m. sand	2.0-0.43 mm
c. sand	4.8-2.0 mm
f. gravel	19-4.8 mm
c. gravel	75-19 mm
cobble	300-75 mm
boulder	>300 mm

Note 1	Sample Time	11:11
Note 2	Sample Depth	12.8 to 13.3 ft
Note 3	Roche #80795	
Note 4	Duplicate sample G-400-13.3 at 1126, Roche #80796	
Note 5		
Note 6		

Depth of recovered sample measured from bottom of core.

TRC **Soil Boring Log**	Hoffmann LaRoche IA-8 Area G	Project Number 20447-0100-00000	Boring Number G-1 Well No.	Sheet 1 of 1
	MH/CB Location: DS CB IVS-6		Geologist Angela Shum	

Boring Contractor/ Foreman S2C2/Dumitru Radu	Sampler Model Bobcat 853B	Sampling Description Pre-probe to 3.5', Core 3.5'-7.5'

Sampler Description 48 in. Macrocore	Classification Method Burmeister	Coordinates X = NA Y = NA
Temporary Piezometer or Screen Point	Horizontal Distance from Pipe 18" southeast	Reference Elevation NA ft
Depth	Pipe Type 12" storm	Approximate Depth of Invert 4.40 ft
Screen Length/type	Water Table Depth NA	Surface Elevation NA ft
Riser Length/type	Total depth 7.5 ft	Completion Date 4/23/2003

Depth	Sample Number	PEN/REC	Sample Description	Strati-graphic Description	Field Testing	
1						
2			Pre-probe to 3.5'			
3						
4	S-1	48"/46"	11" red-brown SILT and fine Sand 3" red-brown fine to medium SAND, some silt 8" red-brown SILT and fine Sand, little coarse gravel 4" red-brown ROCK fragments and coarse Sand, little silt 22" red-brown SILT and fine Sand, some rock fragments/cobbles, little coarse sand	▒ ░ ▒ ▨ ▒	5.5' - FID = 2.4 ppm 6.0' - FID = 19.3 ppm 6.5' - FID = 49 ppm 7.0' - FID = 46.5 ppm	
5						
6						
7						
8			EOB 7.5'			
9						
10						
11						
12						
13						
14						
15						

Granular Soils

Blows/ft	Density
0-4	v. loose
4-10	loose
10-30	m. dense
30-50	dense
>50	v. dense

Proportions

trace 0-10%	some 20-35%
little 10-20%	and 35-50%

Cohesive Soils

Blows/ft	Density
>2	v. soft
2-4	soft
4-8	m. stiff
8-15	stiff
15-30	v. stiff
>30	hard

Grain Size (USCS)

silt/clay	<0.08 mm
f. sand	0.43-0.08 mm
m. sand	2.0-0.43 mm
c. sand	4.8-2.0 mm
f. gravel	19-4.8 mm
c. gravel	75-19 mm
cobble	300-75 mm
boulder	>300 mm

Note 1	Sample Time	8:10
Note 2	Sample Depth	7.0 to 7.5 ft
Note 3	Roche #81105	
Note 4		
Note 5		
Note 6		

Depth of recovered sample measured from bottom of core.

Appendix U

Data Validation Reports

Surface Water

TRC
Customer-Focused Solutions

March 22, 2005

Christine Clark
Regional Sample Control Center
U.S. EPA Region I
11 Technology Drive
North Chelmsford, MA 01863-2431

Subject: Work Assignment No. 161-RICO-017H
Case No. 0247M, SDG D05667_IB
Southwest Research Institute, San Antonio, TX
Callahan Mining Superfund Site, Brooksville, ME
Tier II Inorganic Data Validation

Total Metals:	10/Surface Waters/	D05667, D05669, D05671, D05673, D05675, D05679, D05681, D05685, D05687, D05689 (Field duplicate pair: D05667/D05691)
Dissolved Metals:	8/Surface Waters/	D05668, D05672, D05674, D05676, D05680, D05682, D05686, D05688 (Field duplicate pair: D05668/D05692)
Metals:	2/PE Samples/	D05694, D05695

Dear Ms. Clark:

A Tier II validation, in accordance with the *Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Inorganic Analyses,* June 13, 1988 criteria, and incorporating *Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996 criteria, as deemed appropriate, was performed on the inorganic analytical data for 18 surface water samples and two performance evaluation (PE) samples collected by TRC Environmental Corporation on November 16, 17, and 18, 2004 from the Callahan Mining Superfund Site in Brooksville, ME. The associated field duplicate samples D05691 and D05692, PE sample D05700, and rinsate blank sample D05693 were reported in sample delivery group (SDG) D05670. All samples were analyzed for metals under the Metcalf & Eddy Remedial Action Contract Delivery of Analytical Services (DAS) program using Metcalf & Eddy's DAS Specification, D-137, *Analytical Specification for the Analysis of Total and Dissolved Metals in Marine Water Samples,* October 2004.

In accordance with the EPA-approved project plans for the site, Tier II validation was performed on all samples in this SDG. The data were evaluated based on the following parameters:

- Overall Evaluation of Data and Potential Usability Issues
- * Data Completeness (CSF Audit - Tier I)

*	Holding Times and Sample Preservation
	ICP-MS Tuning and Mass Calibration
	Instrument Calibration
*	Blanks
	ICP Interference Check Sample Results
*	Matrix Spike (MS) Results
*	Laboratory Duplicate Results
	Field Duplicate Results
*	Laboratory Control Sample (LCS) Results
	Internal Standards
*	Laboratory Fortified Blank (LFB) Sample Results
*	Furnace Atomic Absorption Results
*	ICP Serial Dilution Results
	Detection Limit Results
NA	Sample Quantitation Results
	Accuracy Check/PE Samples
*	Comparison of Total and Dissolved Results

* - All criteria were met for this parameter.

Note: Worksheets are not included for parameters that have met criteria or parameters that are not applicable (NA) to Tier II validation.

The following information was used to generate the Data Validation Memorandum attachments:

Table I: Recommendation Summary Table - summarizes validation recommendations
Table II: Overall Evaluation of Data - summarizes site data quality objectives (DQOs) and potential usability issues

Data Summary Tables - summarize accepted, qualified, and rejected data based on the Tier II data validation review.

Overall Evaluation of Data and Potential Usability Issues

Following is a summary of the site DQOs:

- To determine the nature and extent of contamination and to support a human health and ecological risk assessment.

All results are usable for project objectives.

The validation actions applied as a result of sampling error are summarized below:

- The positive results for arsenic, manganese, and nickel in samples D05667, D05669, D05671, D05673, D05675, D05679, D05681, D05685, D05687, and D05689 and aluminum, copper, iron, and lead in samples D05667, D05669, D05671, D05673, D05679, D05681, D05685, D05687, and D05689 were qualified as estimated (J) due to high relative percent differences (RPDs) for these analytes in the evaluation of the field duplicate pair. The direction of the bias cannot be determined from this nonconformance. These results are usable for project objectives as estimated values which may have a minor effect on the data usability.

The validation actions applied as a result of analytical error are summarized below:

- The positive results for copper in sample D05682 and nickel in samples D05668, D05669, D05671, D05672, D05673, D05674, D05675, D05676, D05679, D05680, D05682, and D05689 were qualified as estimated (J) due to high recoveries for these analytes in the CRDL standard analyses. The results are usable for project objectives as estimated values which may be biased high. This qualification has a minor effect on the data usability.

- The positive results for zinc in samples D05673, D05674, D05675, D05676, D05681, and D05682 were qualified as estimated (J) due to positive interference in the ICSA analysis. The results are usable for project objectives as estimated values which may be biased high. This qualification has a minor effect on the data usability.

- The positive and nondetect results for antimony were qualified as estimated (J/UJ) in all surface water samples due to low recoveries of this analyte in the ICSA analysis. The results are usable for project objectives as estimated values and nondetects with estimated quantitation limits which may be biased low. This qualification has a minor effect on the data usability.

- The positive results for copper in samples D05667, D05668, D05669, D05671, D05672, D05673, D05674, D05679, D05680, D05681, D05682, D05685, D05686, D05687, and D05689 and zinc in all surface water samples were qualified as estimated (J) due to PE sample nonconformances. The results may be biased high for copper and zinc. These results are usable for project objectives as estimated values. This qualification has a minor effect on the data usability.

- Positive results which were less than the quantitation limit (QL) were qualified as estimated (J). The following results were affected by this qualification: aluminum in samples D05671, D05673, D05689, and D05679, barium in samples D05667, D05668, D05669, D05671, D05672, D05673, D05674, D05675, D05676, D05679, D05680, D05681, D05682, and D05689, iron in samples D05673 and D05679, selenium in sample D05686, and potassium in samples D05667, D05668, D05671, D05672, and D05689. There is potential uncertainty for the accuracy of these results. The results are usable for project objectives as estimated values which may have a minor effect on the data usability.

The following metals were analyzed by ICP/AES: aluminum, barium, calcium, copper, magnesium, potassium, sodium, and zinc. The following metals were analyzed by ICP/MS: antimony, beryllium, cadmium, chromium, cobalt, iron, lead, manganese, nickel, silver, thallium, and vanadium. The following metals were analyzed by hydride AA: arsenic and selenium.

The attached Table I summarizes the Tier II validation recommendations which were based on the following information:

ICP-MS Tuning and Mass Calibration

In the beryllium analysis performed on 02/18/05, the resolution (0.77) exceeded the control limit of 0.75 atomic mass units (amu) in the final mass resolution check. Validation action was not taken on this basis as all associated analytical quality control results were within acceptance limits indicating acceptable instrument accuracy.

Instrument Calibration

A CRDL standard was analyzed at the required quantitation limit. The following table lists the analytes which exhibited recoveries outside of the validation control limits of 80 - 120%.

[illegible]	[illegible]	[illegible]	[illegible]
Copper	03/01/05	135.0%	Estimate (J) the positive result for copper in sample D05682.
Nickel	02/24/05	126.0%	Estimate (J) the positive results for nickel in samples D05668, D05669, D05671, D05672, D05673, D05674, D05675, D0567 D05679, D05680, D05682, and D05689.
Zinc	03/01/05	140.5%	No validation actions were required as the associated results were greater than the affected range.

ICP Interference Check Sample Results

All recovery criteria were met in the ICSAB analysis.

The following table lists the analytes which exhibited recoveries outside of the control limits (true value ± 2x the QL for ICP/AES or true value ± 3x the QL for ICP/MS) or were detected at levels greater than

2x the QL in the ICSA solution analysis associated with all samples.

[illegible]	[illegible]	[illegible]	[illegible]
Zinc	03/01/05 03/03/05	ICP	Detected at >2x the QL
Antimony	02/24/05	ICP/MS	33%, Result was not within 3x the QL

In the ICP/MS analysis, sodium or calcium were present in all surface water samples at greater than 50% those of the levels in the ICP/MS ICSA solution. The positive and nondetect results for antimony in all surface water samples were qualified as estimated (J/UJ) due to low recovery in the ICSA standard.

For the ICP/AES analysis, the levels of interferents in samples were reviewed. Magnesium was present in samples D05669 (85%), D05671 (153%), D05672 (153%), D05673 (198%), D05674 (198%), D05675 (219%), D05676 (219%), D05679 (190%), D05680 (190%), D05681 (204%), D05682 (206%), and D05689 (157%) at greater than 50% that of the level in the ICSA solution. Professional judgement was used to accept results in which the estimated interference was less than 10% of the sample result.

Sample	[illegible]	Sample Result [illegible]	Estimated Interference [illegible]	[illegible]
D05669	zinc	330	17	Validation action not required; interference <10%.
D05671	zinc	512	30.5	Validation action not required; interference <10%.
D05672	zinc	511	30.5	Validation action not required; interference <10%.
D05673	zinc	275	39.6	Estimate (J) the positive result for zinc.
D05674	zinc	268	39.6	Estimate (J) the positive result for zinc.
D05675	zinc	67.1	43.8	Estimate (J) the positive result for zinc.
D05676	zinc	65.2	43.8	Estimate (J) the positive result for zinc.
D05679	zinc	437	37.9	Validation action not required; interference <10%.
D05680	zinc	420	38	Validation action not required; interference <10%.
D05681	zinc	309	40.8	Estimate (J) the positive result for zinc.
D05682	zinc	280	41.1	Estimate (J) the positive result for zinc.
D05689	zinc	446	31.4	Validation action not required; interference <10%.

Field Duplicate Results

Samples D05667 and D05691 (reported in SDG D05670) were submitted as a field duplicate pair with this sample set and associated with samples D05667, D05669, D05671, D05673, D05675, D05679, D05681, D05685, D05687, and D05689. The following table summarizes the RPDs which were outside of the acceptance criteria.

[illegible]	[illegible]	[illegible]	RPD	[illegible]
Aluminum	834	210	119.5	Estimate (J) the positive results for aluminum in samples D05667, D05669, D05671, D05673, D05679, D05681, D05685, D05687, and D05689.
Arsenic	3.1	0.96	105.4	Estimate (J) the positive result for arsenic in all associated samples.
Copper	88.1	40.4	74.2	Estimate (J) the positive results for copper in samples D05667, D05669, D05671, D05673, D05679, D05681, D05685, D05687, and D05689.
Iron	1030	299	110	Estimate (J) the positive results for iron in samples D05667, D05669, D05671, D05673, D05679, D05681, D05685, D05687, and D05689.
Lead	44.2	12.8	110.2	Estimate (J) the positive results for lead in samples D05667, D05669, D05671, D05673, D05679, D05681, D05685, D05687, and D05689.
Manganese	54.6	20.2	92.0	Estimate (J) the positive result for manganese in all associated samples.
Nickel	4.2	1.8	80	Estimate (J) the positive result for nickel in all associated samples.

All criteria were met in the field duplicate pair D05668/D05692.

Internal Standards

The following table lists the sample internal standard (IS) areas which were outside of the control limits of 60-125%.

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
D05685 (10-fold)	02/23/05	Yttrium/ 239.7%	vanadium	Validation action was not required; result for vanadium was nondetect and therefore not affected by the potential high bias.
D05686 (10-fold)	02/23/05	Yttrium/ 237.3%	vanadium	Validation action was not required; result for vanadium was nondetect and therefore not affected by the potential high bias.
D05685 (10-fold)	02/24/05	Yttrium/ 243.2%	chromium, iron, manganese, nickel	Chromium was nondetect and therefore reported without qualification. The sample was reanalyzed with a 100-fold dilution with acceptable IS recovery. The laboratory reported results for iron, manganese, and nickel from the 100-fold dilution analysis.
D05686 (10-fold)	02/24/05	Yttrium/ 245.7%	chromium, iron, manganese, nickel	Chromium was nondetect and therefore reported without qualification. The sample was reanalyzed with a 100-fold dilution with acceptable IS recovery. The laboratory reported results for iron, manganese, and nickel from the 100-fold dilution analysis.
D05685 (10-fold)	02/24/05	Yttrium/ 272.1%	cobalt	The sample was reanalyzed with a 100-fold dilution with acceptable IS recovery. The laboratory reported the result for cobalt from the 100-fold dilution analysis.
D05686 (10-fold)	02/24/05	Yttrium/ 270.3%	cobalt	The sample was reanalyzed with a 100-fold dilution with acceptable IS recovery. The laboratory reported the result for cobalt from the 100-fold dilution analysis.

Detection Limit Results

The laboratory performed 10-fold dilutions for antimony, cadmium, chromium, cobalt, iron, lead, manganese, nickel, silver, thallium, and vanadium and a 5-fold dilution for beryllium on all samples and quality control (QC) samples. In addition, a two-fold dilution was performed for selenium on sample D05685. These elevated quantitation limits still met the project-required quantitation limits. The following table lists the dilutions required in order to bring results within the instrument linear range.

Sample(s)	Analyte(s)	Dilution Performed
D05671, D05672, D05673, D05674, D05675, D05676, D05679, D05680, D05681, D05682, D05689	Magnesium	2-fold
D05685. D05686	Zinc	10-fold

Samples	Analytes	Dilution Performed
D05669	Potassium and Sodium	20-fold
D05671, D05672, D05673, D05674, D05675, D05676, D05679, D05680, D05681, D05682, D05689	Potassium and Sodium	50-fold

For all analyses, positive results which were < the QL were qualified as estimated (J). The following results were affected by this qualification: aluminum in samples D05671, D05673, D05689, and D05679, barium in samples D05667, D05668, D05669, D05671, D05672, D05673, D05674, D05675, D05676, D05679, D05680, D05681, D05682, and D05689, iron in samples D05673 and D05679, selenium in sample D05686, and potassium in samples D05667, D05668, D05671, D05672, and D05689.

Accuracy Check/PE Samples

The aqueous metals PE samples D05694 (IS4679), D05695 (HG3885), and marine reference PE sample D05700 (SLEW-3) were evaluated with this SDG.

In the analysis of PE sample D05694, 15 out of 16 detected analytes were evaluated as "Within Limits." Selenium was not evaluated. Validation actions were not required on the basis of this evaluation.

In the analysis of PE sample D05695, mercury was evaluated as "Within Limits."

In the analysis of PE sample D05700, the control limits of 70-130% were used for the evaluation as the PE levels were close to the quantitation limits. The following table details the evaluation of the analytes for which certified values were given.

[illegible]	[illegible]	[illegible]	[illegible]
Arsenic	2.1	0.95-1.77	Due to the low concentration, professional judgement was used to accept the results for arsenic without qualification as arsenic recovered within control limits in the other PE sample and LFB and recovered only slightly above the control limits in this PE sample.
Copper	5.3	1.09-2.01	Estimate (J) the positive results for copper in samples D05667, D05668, D05669, D05671, D05672, D05673, D05674, D05679, D05680, D05681, D05682, D05685, D05686, D05687, and D05689.

[redacted]	[redacted]	[redacted]	[redacted]
Manganese	2.3	1.13-2.09	Due to the low concentration, professional judgement was used to accept the results for manganese without qualification as manganese recovered within control limits in the other PE samples, LFBs, and instrument standards and recovered only slightly above the control limits in this PE sample.
Nickel	2.0	0.86-1.6	Due to the low concentration, professional judgement was used to accept the results for nickel without qualification as nickel recovered within control limits in the other PE sample and LFB and recovered only slightly above the control limits in this PE sample.
Vanadium	3.3	1.80-3.34	Within control limits.
Zinc	3.9	0.14 - 0.26	Estimate (J) the positive results for zinc in all surface water samples.
 Cadmium Chromium Cobalt Iron Lead	 0.20 U 2.0 U 1.0 U 50.0 U 1.0 U	True Values 0.048 ug/L 0.183 ug/L 0.042 ug/L 0.568 ug/L 0.009 ug/L	Validation actions were not required as the certified PE values were less than the method detection limits.

Please contact Ms. Elizabeth Denly at (978) 656-3577 should you have any questions or comments concerning this information.

Very truly yours,

TRC Environmental Corporation

Elizabeth Denly for
Lorie MacKinnon
Data Validator

Elizabeth Denly
Elizabeth Denly
Senior QA Chemist

Tier II Attachments:
1. Table I: Recommendation Summary Table
2. Table II: Overall Evaluation of Data
3. Table III: Tentatively Identified Compound Summary (NA)
4. Data Summary Tables
5. IRDA Form
6. Data Validation Worksheets
7. Copy of non-CLP Analytical Method (M&E DAS Specification D-137)
8. PE Score Reports
9. Copies of Telephone Logs/Communication Forms
10. Supporting Data for Reduced Payment Recommendations (NA)
11. Copies of Field Sampling Notes
12. Copies of EPA-approved Amendments to QAPjP or SAP (NA)
13. CSF Audit (DC-2 Form)
14. DQO Summary Form

cc: Ed Hathaway, EPA Remedial Project Manager (DV memo and data summary table)
Project File
PSAdmin

Attachment 1

Table I: Recommendation Summary Table

Table I
Recommendation Summary
for Metals Analyses
Callahan Mining Superfund Site
Case# 0247M SDG D05667_IB

Sample Number	Matrix	Qualifiers
D05667	SW	J^{1}, J^{2}, J^{6}, J^{7}, J^{8}, J^{10}, J^{13}
D05668	SW	J^{4}, J^{6}, J^{7}, J^{8}, J^{10}, J^{13}
D05669	SW	J^{1}, J^{2}, J^{4}, J^{6}, J^{7}, J^{8}, J^{10}
D05671	SW	J^{1}, J^{2}, J^{4}, J^{6}, J^{7}, J^{8}, J^{9}, J^{10}, J^{13}
D05672	SW	J^{4}, J^{6}, J^{7}, J^{8}, J^{10}, J^{13}
D05673	SW	J^{1}, J^{2}, J^{4}, J^{5}, J^{6}, J^{7}, J^{8}, J^{9}, J^{10}, J^{11}
D05674	SW	J^{4}, J^{5}, J^{6}, J^{7}, J^{8}, J^{10}
D05675	SW	J^{1}, J^{4}, J^{5}, J^{6}, J^{8}, J^{10}
D05676	SW	J^{4}, J^{5}, J^{6}, J^{8}, J^{10}
D05679	SW	J^{1}, J^{2}, J^{4}, J^{6}, J^{7}, J^{8}, J^{9}, J^{10}, J^{11}
D05680	SW	J^{4}, J^{6}, J^{7}, J^{8}, J^{10}
D05681	SW	J^{1}, J^{2}, J^{5}, J^{6}, J^{7}, J^{8}, J^{10}
D05682	SW	J^{3}, J^{4}, J^{5}, J^{6}, J^{7}, J^{8}, J^{10}
D05685	SW	J^{1}, J^{2}, J^{6}, J^{7}, J^{8}
D05686	SW	J^{6}, J^{7}, J^{8}, J^{12}
D05687	SW	J^{1}, J^{2}, J^{6}, J^{7}, J^{8}
D05688	SW	J^{6}, J^{8}
D05689	SW	J^{1}, J^{2}, J^{4}, J^{6}, J^{7}, J^{8}, J^{9}, J^{10}, J^{13}

SW - Surface Water

J^{1} - Estimate (J) the positive results for arsenic, nickel, and manganese due to high RPDs for these analytes in the evaluation of the field duplicate pair.

J^{2} - Estimate (J) the positive results for aluminum, copper, iron, and lead due to high RPDs for these analytes in the evaluation of the field duplicate pair.

J^{3} - Estimate (J) the positive result for copper due to high recovery for this analyte in the CRDL standard analysis. The result may be biased high.

J[4] - Estimate (J) the positive result for nickel due to high recovery for this analyte in the CRDL standard analysis. The result may be biased high.

J[5] - Estimate (J) the positive result for zinc due to positive interference in the ICSA analysis. The result may be biased high.

J[6] - Estimate (J/UJ) the positive and nondetect results for antimony due to low recovery in the ICSA analysis. The result may be biased low.

J[7] - Estimate (J) the positive result for copper due to PE sample nonconformances. The result may be biased high.

J[8] - Estimate (J) the positive results for zinc due to PE sample nonconformances. The results may be biased high.

J[9] - Estimate (J) the positive result for aluminum since the result is < the QL.

J[10] - Estimate (J) the positive result for barium since the result is < the QL.

J[11] - Estimate (J) the positive result for iron since the result is < the QL.

J[12] - Estimate (J) the positive result for selenium since the result is < the QL.

J[13] - Estimate (J) the positive result for potassium since the result is < the QL.

Attachment 2
Table II: Overall Evaluation of Data

Table II
Overall Evaluation of Data - Data Validation Memorandum
Case 0247M, SDG D05667_IB

Metals					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability**	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine the nature and extent of contamination and to support a human health risk assessment.	Both - Yes	Refer to qualifications in R/S Key: J^3 through J^{13}	Refer to qualifications in R/S Key $J^{1,2}$		**Low and High Biased Results:** - Potential high bias exists for copper in sample D05682 and nickel in samples D05668, D05669, D05671, D05672, D05673, D05674, D05675, D05676, D05679, D05680, D05682, and D05689 due the to high recoveries in the CRDL standard analysis. - Potential high bias exists for zinc in samples D05673, D05674, D05675, D05676, D05681, and D05682 due to positive interference in the ICSA analysis. - Potential low bias exists for antimony in all surface water samples due to low recovery in the ICSA analysis. - Potential high bias exists for the positive results for copper and zinc in all surface water samples due to high PE results. **Potential Uncertainty in Results:** - Potential uncertainty exists for select aluminum, barium, iron, selenium, and potassium results which were < the QL. -Potential uncertainty exists for arsenic, manganese, and nickel in samples D05667, D05669, D05671, D05673, D05675, D05679, D05681, D05685, D05687, and D05689 and aluminum, copper, iron, and lead in samples D05667, D05669, D05671, D05673, D05679, D05681, D05685, D05687, and D05689 due to the high RPDs for these analytes in the evaluation of the field duplicate pairs. **Results discussed above can still be used for project objectives as estimated values or nondetects with estimated quantitation limits. These issues may have a minor impact on the data usability.**

* The evaluation of "sampling error" cannot be completely assessed in data validation.
** Sampling variability is not assessed in data validation.

Attachment 3
Table III: Tentatively Identified Compound Summary

-not applicable to this SDG

Attachment 4
IRDA Form

Region I

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 0247M

SITE Callahan Mining

LABORATORY SWRI

NO OF SAMPLES/MATRIX 18 SW, 2 PE samples

SDG # D05667 IB

REVIEWER(IF NOT ESD) TRC

SOW # Das D-137

REVIEWER'S NAME Loni Mackiman

DPO:ACTION ______ FYI ✓

COMPLETION DATE 03/22/05

DATA ASSESSMENT SUMMARY

		ICP	HY AA	HG	ICP/MS ~~CYANIDE~~
1.	HOLDING TIMES	O	O	O	O
2.	CALIBRATIONS	O	O	O	O
3.	BLANKS	O	O	O	O
4.	ICS	O	NA	NA	O
5.	LCS	O	O	O	O
6.	DUPLICATE ANALYSIS	O	O	O	O
7.	MATRIX SPIKE	O	O	O	O
8.	MSA	NA	NA	NA	NA
9.	SERIAL DILUTION	O	NA	NA	O
10.	SAMPLE VERIFICATION	NA	NA	NA	NA
11.	OTHER QC	O	O	O	O
12.	OVERALL ASSESSMENT	O	O	O	O

O = Data had no problems, or qualified due to minor problems.

M = Data qualified due to major problems.

Z = Data unacceptable.

X = Problems, but do not affect data.

ACTION ITEMS:

AREAS OF CONCERN:

NOTABLE PERFORMANCE:

Validator: LM

Date: 3/19/05

Attachment 5
Data Summary Tables

Site: Callahan Mining Superfund Site - Brooksville, ME
Case Number 0247M, SDG D05667_IB

DATA SUMMARY TABLE

Metals Analysis (D-137)
Surface Water Samples
(Units: ug/L)

Location Name		SW-403		SW-403		SW-406		SW-406		SW-407		SW-407		SW-410		SW-410		SW-414		SW-414	
TRC Sample ID		SW-403		SWF-403		SW-406		SWF-406		SW-407		SWF-407		SW-410		SWF-410		SW-414		SWF-414	
Lab Sample ID		255627		255628		255631		255632		255633		255634		255635		255636		255637		255638	
DAS Sample ID		D05667		D05668		D05671		D05672		D05673		D05674		D05675		D05676		D05679		D05680	
Comments																					
		Total Metals		Dissolved Metals		Total Metals		Dissolved Metals		Total Metals		Dissolved Metals		Total Metals		Dissolved Metals		Total Metals		Dissolved Metals	
Analyte	QL																				
Aluminum	50	834	J	50.0	U	106	J	50.0	U	55.8	J	50.0	U	50.0	U	50.0	U	81.6	J	50.0	U
Antimony	0.5	1.3	J	0.75	J	0.50	UJ	0.50	UJ	0.50	UJ	0.50	UJ	0.50	UJ	0.50	UJ	0.50	UJ	0.50	UJ
Arsenic	0.2	3.1	J	0.39		1.1	J	1.1		1.6	J	1.5		1.9	J	1.8		1.7	J	1.6	
Barium	5.0	8.6	J	7.6	J	6.5	J	6.8	J	7.4	J	7.2	J	7.2	J	6.7	J	7.3	J	7.2	J
Beryllium	0.2	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
Cadmium	0.2	3.9		2.9		2.7		2.6		1.5		1.4		0.52		0.47		2.6		2.7	
Calcium	50	76,900		72,500		227,000		231,000		264,000		282,000		310,000		308,000		275,000		275,000	
Chromium	2.0	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Cobalt	1.0	1.0	U	1.0	U	1.2		1.1		1.2		1.3		1.3		1.3		1.2		1.1	
Copper	2.0	88.1	J	21.8	J	20.7	J	15.9	J	12.1	J	8.9	J	2.0	U	2.0	U	13.6	J	6.6	J
Iron	50	1030	J	50.0	U	147	J	50.0	U	61.4	J	50.0	U	50.0	U	50.0	U	98.5	J	50.0	U
Lead	1	44.2	J	1.8		1.9	J	1.0	U	1.3	J	1.0	U	1.0	U	1.0	U	2.3	J	1.0	U
Magnesium	50	8550		6740		801,000		801,000		1,040,000		1,040,000		1,150,000		1,150,000		996,000		1,000,000	
Manganese	1.0	54.6	J	11.4		41.7	J	39.8		21.4	J	20.3		13.1	J	10.8		20.1	J	18.3	
Mercury	0.2	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
Nickel	1.0	4.2	J	1.0	J	2.0	J	1.9	J	2.0	J	1.8	J	1.8	J	1.7	J	2.4	J	2.0	J
Potassium	250	2400	J	2190	J	237,000	J	239,000	J	309,000		307,000		353,000		348,000		302,000		300,000	
Selenium	1.0	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Silver	1.0	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Sodium	250	24,400		23,700		6,390,000		6,440,000		8,270,000		8,290,000		9,330,000		9,170,000		8,020,000		8,000,000	
Thallium	0.5	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Vanadium	1.0	1.0	U	1.0	U	1.0	U	1.0	U	1.2		1.1		1.5		1.6		1.2		1.1	
Zinc	2.0	1170	J	823	J	512	J	511	J	275	J	268	J	67.1	J	65.2	J	437	J	420	J
Date Sampled		11/16/04		11/16/04		11/17/04		11/17/04		11/16/04		11/16/04		11/16/04		11/16/04		11/16/04		11/16/04	

QL - Quantitation Limit

J - Estimated value

UJ - Estimated nondetect

U - Not detected at the specified quantitation limit

Site: Callahan Mining Superfund Site - Brooksville, ME
Case Number 0247M, SDG D05667_IB

DATA SUMMARY TABLE

Metals Analysis (D-137)
Surface Water Samples
(Units: ug/L)

Analyte	QL	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
Aluminum	50	305	J	50.0	U	2490	J	308		17,200	J	50.0	U	212	J	103	J
Antimony	0.5	0.50	UJ	0.50	UJ	1.5	J	0.70	J	0.65	J	0.50	UJ	0.50	UJ	0.50	UJ
Arsenic	0.2	2.0	J	1.7		3.1	J	0.20	U	10.8	J	0.56		0.92	J	1.2	J
Barium	5.0	7.7	J	7.3	J	17.4		16.8		67.1		14.9		5.4	J	7.2	J
Beryllium	0.2	0.20	U	0.20	U	1.8		1.7		0.80		0.20	U	0.20	U	0.20	U
Cadmium	0.2	2.0		1.6		854		846		10		0.21		1.7		2.4	
Calcium	50	291,000		291,000		291,000		293,000		169,000		163,000		139,000		235,000	
Chromium	2.0	2.0	U	2.0	U	2.0	U	2.0	U	29.0		2.0	U	2.0	U	2.0	U
Cobalt	1.0	1.3		1.2		93.7		91.4		8.0		1.9		1.0	U	1.2	
Copper	2.0	16.0	J	5.7	J	9790	J	7780	J	46.9	J	2.0	U	17.0	J	19.8	J
Iron	50	392	J	50.0	U	1590	J	500	U	39,600	J	2680		303	J	163	J
Lead	1	4.8	J	1.0	U	164	J	87.2		37.2	J	1.0	U	3.3	J	1.6	J
Magnesium	50	1,070,000		1,080,000		170,000		154,000		55,800		49,500		447,000		823,000	
Manganese	1.0	24.2	J	16.7		7680	J	8050		471	J	343		47.8	J	43.0	J
Mercury	0.2	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
Nickel	1.0	3.5	J	1.9	J	163	J	168		107	J	16.4		2.2	J	2.5	J
Potassium	250	321,000		318,000		11,600		7680		16,000		12,300		143,000		241,000	J
Selenium	1.0	1.0	U	1.0	U	2.0	U	2.2	J	1.0	U	1.0	U	1.0	U	1.0	U
Silver	1.0	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Sodium	250	8,590,000		8,520,000		227,000		94,900		102,000		101,000		3,700,000		6,490,000	
Thallium	0.5	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Vanadium	1.0	1.8		1.2		1.0	U	1.0	U	30.6		1.0	U	1.0	U	1.0	U
Zinc	2.0	309	J	280	J	169,000	J	171,000	J	2630	J	690	J	330	J	448	J
	Date Sampled	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	

QL - Quantitation Limit

J - Estimated value

UJ - Estimated nondetect

U - Not detected at the specified quantitation limit

TRC
Customer-Focused Solutions

March 17, 2005

Christine Clark
Regional Sample Control Center
U.S. EPA Region I
11 Technology Drive
North Chelmsford, MA 01863-2431

Subject: Work Assignment No. 161-RICO-017H
Case No. 0247M, SDG D05670
Southwest Research Institute, San Antonio, TX
Callahan Mining Superfund Site, Brooksville, ME
Tier II Inorganic Data Validation

Total Metals:	4/Surface Waters/	D05677, D05683, D05691, D05704
	(Field duplicate pairs:	D05667/D05691 and D05677/D05704)
Dissolved Metals:	6/Surface Waters/	D05670, D05678, D05684, D05690, D05692, D05705
	(Field duplicate pairs:	D05668/D05692 and D05678/D05705)
	2/Rinsate Blanks/	D05693, D05699
Metals:	4/PE Samples/	D05697, D05698, D05700, D05701

Dear Ms. Clark:

A Tier II validation, in accordance with the *Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Inorganic Analyses,* June 13, 1988 criteria, and incorporating *Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996 criteria, as deemed appropriate, was performed on the inorganic analytical data for ten surface water samples, two rinsate blank samples, and four performance evaluation (PE) samples collected by TRC Environmental Corporation on November 16, 17, and 18, 2004 and December 2 and 3, 2004 from the Callahan Mining Superfund Site in Brooksville, ME. The field duplicate samples D05667 and D05668 and associated PE samples D05694 and D05695 were reported in sample delivery group (SDG) D05667_IB. All samples were analyzed for metals under the Metcalf & Eddy Remedial Action Contract Delivery of Analytical Services (DAS) program using Metcalf & Eddy's DAS Specification, D-137, *Analytical Specification for the Analysis of Total and Dissolved Metals in Marine Water Samples,* October 2004.

In accordance with the EPA-approved project plans for the site, Tier II validation was performed on all samples in this SDG. The data were evaluated based on the following parameters:

	•	Overall Evaluation of Data and Potential Usability Issues
*	•	Data Completeness (CSF Audit - Tier I)
	•	Holding Times and Sample Preservation
	•	ICP-MS Tuning and Mass Calibration
	•	Instrument Calibration
*	•	Blanks
	•	ICP Interference Check Sample Results
*	•	Matrix Spike (MS) Results
*	•	Laboratory Duplicate Results
	•	Field Duplicate Results
*	•	Laboratory Control Sample (LCS) Results
*	•	Internal Standards
*	•	Laboratory Fortified Blank (LFB) Sample Results
*	•	Furnace Atomic Absorption Results
*	•	ICP Serial Dilution Results
	•	Detection Limit Results
NA	•	Sample Quantitation Results
	•	Accuracy Check/PE Samples
*	•	Comparison of Total and Dissolved Results
*	-	All criteria were met for this parameter.

Note: Worksheets are not included for parameters that have met criteria or parameters that are not applicable (NA) to Tier II validation.

The following information was used to generate the Data Validation Memorandum attachments:

Table I: Recommendation Summary Table - summarizes validation recommendations
Table II: Overall Evaluation of Data - summarizes site data quality objectives (DQOs) and potential usability issues

Data Summary Tables - summarize accepted, qualified, and rejected data based on the Tier II data validation review.

Overall Evaluation of Data and Potential Usability Issues

Following is a summary of the site DQOs:

- To determine the nature and extent of contamination and to support a human health and ecological risk assessment.

All results are usable for project objectives.

The validation actions applied as a result of sampling error are summarized below:

- The positive results for aluminum, arsenic, copper, lead, nickel, iron, and manganese were qualified as estimated (J) in sample D05691 due to high relative percent differences (RPDs) for these analytes in the evaluation of the field duplicate pair. The direction of the bias cannot be determined from this nonconformance. These results are usable for project objectives as estimated values which may have a minor impact on the data usability.

- The positive results for copper were qualified as estimated (J) in samples D05678, D05684, and D05705 due to a high RPD for this analyte in the evaluation of the field duplicate pair. The direction of the bias cannot be determined from this nonconformance. These results are usable for project objectives as estimated values which may have a minor impact on the data usability.

The validation actions applied as a result of analytical error are summarized below:

- The positive results for copper in sample D05670 and nickel in all surface water samples were qualified as estimated (J) due to high recoveries for these analytes in the CRDL standard analyses. The results are usable for project objectives as estimated values which may be biased high. This qualification has a minor effect on the data usability.

- The positive results for zinc were qualified as estimated (J) in samples D05677, D05678, D05704, and D05705 due to positive interference in the ICSA sample analysis. The results are usable for project objectives as estimated values which may be biased high. This qualification has a minor effect on the data usability.

- The positive and nondetect results for antimony and nickel were qualified as estimated (J/UJ) in all surface water samples due to low recovery and negative interference, respectively, in the ICSA sample analysis. The results are usable for project objectives as estimated values and nondetects with estimated quantitation limits which may be biased low. This qualification has a minor effect on the data usability.

- The positive results for arsenic, copper, and zinc were qualified as estimated (J) in all surface water samples due to PE sample nonconformances. The results for copper and zinc may be biased high. The direction of the bias cannot be determined for arsenic as the analyte was found both above and below control limits in the PE sample analyses. These results are usable for project objectives as estimated values. This qualification has a minor effect on the data usability.

- Positive results which were less than the quantitation limit (QL) were qualified as estimated (J). The following results were affected by this qualification: aluminum in samples D05670, D05677, D05678, D05684, and D05704, barium in samples D05670, D05677, D05678, D05683, D05690, D05691, D05692, D05704, and D05705, and potassium in samples D05677, D05678, D05684, D05690, D05691, D05692, D05704, and D05705. There is potential uncertainty for the accuracy of these results. The results are usable for project objectives as estimated values which may have a minor impact on the data usability.

The following metals were analyzed by ICP/AES: aluminum, barium, calcium, copper, magnesium, potassium, sodium, and zinc. The following metals were analyzed by ICP/MS: antimony, beryllium, cadmium, chromium, cobalt, iron, lead, manganese, nickel, silver, thallium, and vanadium. The following metals were analyzed by hydride AA: arsenic and selenium.

The attached Table I summarizes the Tier II validation recommendations which were based on the following information:

Holding Times and Sample Preservation

The temperature of the cooler containing PE sample D05700 was recorded at 14 degrees Celsius upon receipt at the laboratory. Validation action was not taken based on this temperature nonconformance as the PE sample does not require refrigeration.

ICP-MS Tuning and Mass Calibration

In the beryllium analysis performed on 02/18/05, the resolution (0.77) exceeded the control limit of 0.75 atomic mass units (amu) in the final mass resolution check. Validation action was not taken on this basis as all associated analytical quality control results were within acceptance limits indicating acceptable instrument accuracy.

Due to laboratory oversight, the final tunes were not performed for the 02/20/05 and 02/25/05 analyses. Validation actions were not taken on this basis as the samples were analyzed within three hours of the initial tune and all associated analytical quality control results were within acceptance limits indicating acceptable instrument accuracy.

Instrument Calibration

A CRDL standard was analyzed at the required quantitation limit. The following table lists the analytes which exhibited recoveries outside of the validation control limits of 80 - 120%.

Analyte	Analysis Date	Recovery	Validation Actions
Copper	02/28/05	143.0%	Estimate (J) the positive result for copper in sample D05670.
Nickel	02/20/05	122.0%	Estimate (J) the positive results for nickel in all surface water samples.
Zinc	02/28/05	132.5%, 124.0%	No validation actions were required as only the PE sample was associated with this CRDL standard.
Nickel	02/24/05	142.0%	No validation actions were required as only the PE sample was associated with this CRDL standard.

ICP Interference Check Sample Results

All recovery criteria were met in the ICSAB analysis.

The following table lists the analytes which exhibited recoveries outside of the control limits (true value ± 2x the QL for ICP/AES or true value ± 3x the QL for ICP/MS) or were detected at levels greater than 2x the QL in the ICSA solution analysis associated with all samples.

Analyte	Analysis Date	Analysis	[illegible]
Zinc	02/28/05	ICP	Detected at >2x the QL
Nickel	02/24/05	ICP/MS	Detected at > (-)2x the QL
Antimony	02/24/05	ICP/MS	33%, Result was not within 3x the QL

For the ICP/MS analysis, the levels of interferents in samples were reviewed. Sodium or calcium was present in samples D05670 (3760%), D05677 (5890%), D05678 (5870%), D05683 (3540%), D05684 (2300%), D05690 (6330%), D05691 (73%), D05692 (72%), D05704 (5900%), and D05705 (5850%) at greater than 50% those of the levels in the ICP/MS ICSA solution. The positive and nondetect results for antimony and nickel in all surface water samples were qualified as estimated (J/UJ) due to the low recovery or negative interference in the ICSA standard.

Sample	Analyte	Sample Result (ug/L)	[illegible]	Actions
D05670	nickel	1.4	-90.2	Estimate (J) the positive result for nickel.
D05677	nickel	2.1	-141	Estimate (J) the positive result for nickel.
D05678	nickel	1.8	-141	Estimate (J) the positive result for nickel.

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
D05683	nickel	2.7	-85	Estimate (J) the positive result for nickel.
D05684	nickel	2.0	-55	Estimate (J) the positive result for nickel.
D05690	nickel	1.9	-152	Estimate (J) the positive result for nickel.
D05691	nickel	1.8	-1.7	Estimate (J) the positive result for nickel.
D05692	nickel	1.5	-1.7	Estimate (J) the positive result for nickel.
D05704	nickel	1.6	-142	Estimate (J) the positive result for nickel.
D05705	nickel	1.7	-140	Estimate (J) the positive result for nickel.

For the ICP/AES analysis, the levels of interferents in samples were reviewed. Magnesium was present in samples D05670 (83%), D05677 (141%), D05678 (141%), D05683 (83%), D05684 (54%), D05690 (142%), D05704 (141%), and D05705 (139%) at greater than 50% that of the level in the ICSA solution. Professional judgement was used to accept results in which the estimated interference was less than 10% of the sample result.

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
D05670	zinc	271	16.6	Validation action not required; interference <10%.
D05677	zinc	190	28.2	Estimate (J) the positive result for zinc.
D05678	zinc	187	28.2	Estimate (J) the positive result for zinc.
D05683	zinc	501	16.6	Validation action not required; interference <10%.
D05684	zinc	524	10.9	Validation action not required; interference <10%.
D05690	zinc	429	28.4	Validation action not required; interference <10%.
D05704	zinc	177	28.2	Estimate (J) the positive result for zinc.
D05705	zinc	181	27.9	Estimate (J) the positive result for zinc.

Field Duplicate Results

Samples D05667 (reported in SDG D05667_IB) and D05691 were submitted as a field duplicate pair with this sample set and associated with sample D05691. The following table summarizes the RPDs which were outside of the acceptance criteria.

[illegible]	[illegible]	[illegible]	RPD	Action
Aluminum	834	210	119.5	Estimate (J) the positive result for aluminum in sample D05691.
Arsenic	3.1	0.96	105.4	Estimate (J) the positive result for arsenic in sample D05691.
Copper	88.1	40.4	74.2	Estimate (J) the positive result for copper in sample D05691.
Iron	1030	299	110	Estimate (J) the positive result for iron in sample D05691.
Lead	44.2	12.8	110.2	Estimate (J) the positive result for lead in sample D05691.
Manganese	54.6	20.2	92.0	Estimate (J) the positive result for manganese in sample D05691.
Nickel	4.2	1.8	80	Estimate (J) the positive result for nickel in sample D05691.

Samples D05678 and D05705 were submitted as a field duplicate pair with this sample set and associated with samples D05678, D05684, and D05705. The following table summarizes the RPDs which were outside of the acceptance criteria.

[illegible]	[illegible]	[illegible]	RPD	Action
Copper	22.0	15.4	35.3	Estimate (J) the positive results for copper in samples D05678, D05684, and D05705.

All criteria were met in the remaining field duplicate pairs.

Detection Limit Results

The laboratory performed 10-fold dilutions for antimony, cadmium, chromium, cobalt, iron, lead, manganese, nickel, silver, thallium, and vanadium and a 5-fold dilution for beryllium on all samples and quality control (QC) samples. These elevated quantitation limits still met the project-required quantitation limits. The following table lists the dilutions required in order to bring results within the instrument linear range.

Samples	Analyte(s)	Dilution Performed
D05690, D05677, D05678, D05704, D05705	Magnesium	2-fold
D05670, D05683	Potassium and Sodium	25-fold
D05690, D05677, D05678, D05704, D05705, D05700	Potassium and Sodium	50-fold
D05684	Potassium and Sodium	20-fold

For all analyses, positive results which were < the QL were qualified as estimated (J). The following results were affected by this qualification: aluminum in samples D05670, D05677, D05678, D05684, and D05704, barium in samples D05670, D05677, D05678, D05683, D05690, D05691, D05692, D05704, and D05705, and potassium in samples D05677, D05678, D05684, D05690, D05691, D05692, D05704, and D05705.

Accuracy Check/PE Samples

The aqueous metals PE samples D05694 (IS4679), D05695 (HG3885), D05697 (IS4680), D05698 (HG3882), and D05701 (HG3873) and marine reference PE sample D05700 (SLEW-3) were evaluated with this SDG.

In the analysis of PE sample D05694, 15 out of 16 detected analytes were evaluated as "Within Limits." Selenium was not evaluated. Validation actions were not required on the basis of this evaluation.

In the analysis of PE sample D05697, 14 out of 16 detected analytes were evaluated as "Within Limits." Selenium was not evaluated and arsenic was evaluated as "Action Low." Arsenic was detected in all surface water samples. The positive results for arsenic were qualified as estimated (J) in all surface water samples. Validation actions were not required for selenium on the basis of this evaluation.

In the analysis of PE samples D05695, D05698, and D05701, mercury was evaluated as "Within Limits."

In the analysis of PE sample D05700, the control limits of 70-130% were used for the evaluation as the PE concentrations were close to the quantitation limits. The following table details the evaluation of the analytes for which certified values were given.

Analyte	[illegible]	[illegible]	Action
Arsenic	2.1	0.95-1.77	Arsenic recovered outside of the control limits in the PE sample D05697. Estimate (J) the positive results for arsenic in all surface water samples.
Copper	5.3	1.09-2.01	Estimate (J) the positive results for copper in all surface water samples.
Manganese	2.3	1.13-2.09	Due to the low concentration, professional judgement was used to accept the results for manganese without qualification as manganese recovered within control limits in the other PE samples, LFBs, and instrument standards and recovered only slightly above the control limits in this PE sample.

[illegible]	[illegible]	[illegible]	[illegible]
Nickel	2.0	0.86-1.6	Due to the low concentration, professional judgement was used to accept the results for nickel without qualification as nickel recovered within control limits in the other PE samples, LFBs, and instrument standards and recovered only slightly above the control limits in this PE sample.
Vanadium	3.3	1.80-3.34	Within control limits.
Zinc	3.9	0.14 - 0.26	Estimate (J) the positive results for zinc in all surface water samples.
		True Values	
Cadmium Chromium Cobalt Iron Lead	0.20 U 2.0 U 1.0 U 50.0 U 1.0 U	0.048 ug/L 0.183 ug/L 0.042 ug/L 0.568 ug/L 0.009 ug/L	Validation actions were not required as the certified PE values were less than the MDLs.

Please contact Ms. Elizabeth Denly at (978) 656-3577 should you have any questions or comments concerning this information.

Very truly yours,

TRC Environmental Corporation

Elizabeth Denly for

Lorie MacKinnon
Data Validator

Elizabeth Denly

Elizabeth Denly
Senior QA Chemist

Tier II Attachments:

1. Table I: Recommendation Summary Table
2. Table II: Overall Evaluation of Data
3. Table III: Tentatively Identified Compound Summary (NA)
4. Data Summary Tables
5. IRDA Form
6. Data Validation Worksheets
7. Copy of non-CLP Analytical Method (M&E DAS Specification D-137)
8. PE Score Reports
9. Copies of Telephone Logs/Communication Forms
10. Supporting Data for Reduced Payment Recommendations (NA)
11. Copies of Field Sampling Notes
12. Copies of EPA-approved Amendments to QAPjP or SAP (NA)
13. CSF Audit (DC-2 Form)
14. DQO Summary Form

cc: Ed Hathaway, EPA Remedial Project Manager (DV memo and data summary table)
Project File
PSAdmin

Attachment 1
Table I: Recommendation Summary Table

Table I
Recommendation Summary
for Metals Analyses
Callahan Mining Superfund Site
Case# 0247M SDG D05670

Sample Number	Matrix	Qualifiers
D05670	SW	J^3, J^4, J^6, J^7, J^8, J^9
D05677	SW	J^4, J^5, J^6, J^7, J^8, J^9, J^{10}
D05678	SW	J^2, J^4, J^5, J^6, J^7,J^8, J^9, J^{10}
D05683	SW	J^4, J^6, J^7, J^9
D05684	SW	J^2, J^4, J^6, J^7, J^8, J^{10}
D05690	SW	J^4, J^6, J^7, J^9, J^{10}
D05691	SW	J^1, J^4, J^6, J^7, J^9, J^{10}
D05692	SW	J^4, J^6, J^7, J^9, J^{10}
D05704	SW	J^4, J^5, J^6, J^7, J^8, J^9, J^{10}
D05705	SW	J^2, J^4, J^5, J^6, J^7, J^9, J^{10}
D05693	RB	A
D05699	RB	A

SW - Surface Water
RB - Rinsate Blank

A	-	Accept results.
J^1	-	Estimate (J) the positive results for aluminum, arsenic, copper, lead, nickel, iron, and manganese due to a high RPD for these analytes in the evaluation of the field duplicate pair.
J^2	-	Estimate (J) the positive result for copper due to a high RPD for this analyte in the evaluation of the field duplicate pair.
J^3	-	Estimate (J) the positive result for copper due to high recovery for this analyte in the CRDL standard analysis. The result may be biased high.
J^4	-	Estimate (J) the positive result for nickel due to high recovery for this analyte in the CRDL standard analysis. The result may be biased high.

J^5 - Estimate (J) the positive result for zinc due to positive interference in the ICSA analysis. The result may be biased high.

J^6 - Estimate (J/UJ) the positive and nondetect results for antimony and nickel due to the low recovery or negative interference for these analytes in the ICSA analysis. The results may be biased low.

J^7 - Estimate (J) the positive results for arsenic, copper, and zinc due to PE sample nonconformances. The results for copper and zinc may be biased high. The direction of the bias cannot be determined for arsenic as this analyte was found both above and below control limits in the analysis of the PE samples.

J^8 - Estimate (J) the positive result for aluminum since the result is < the QL.

J^9 - Estimate (J) the positive result for barium since the result is < the QL.

J^{10} - Estimate (J) the positive result for potassium since the result is < the QL.

Attachment 2
Table II: Overall Evaluation of Data

Table II
Overall Evaluation of Data - Data Validation Memorandum
Case 0247M, SDG D05670

Metals					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability**	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine the nature and extent of contamination and to support a human health and ecological risk assessment.	Both - Yes	Refer to qualifications in R/S Key: J^3 through J^{10}	Refer to qualifications in R/S Key $J^{1,2}$		**Low and High Biased Results:** - Potential high bias exists for copper in sample D05670 and nickel in all surface water samples due to the high recoveries in the CRDL standard analysis. - Potential high bias exists for zinc in samples D05677, D05678, D05704, and D05705 due to positive interference in the ICSA analysis. - Potential low bias exists for antimony and nickel in all surface water samples due to the low recovery or negative interference in the ICSA analysis. - Potential high bias exists for copper and zinc in all surface water samples due to high PE results. **Potential Uncertainty in Results:** - Potential uncertainty exists for arsenic in all surface water samples due to both low and high PE results. - Potential uncertainty exists for select aluminum, barium, and potassium results which were < the QL. -Potential uncertainty exists for aluminum, arsenic, copper, lead, nickel, iron, and manganese in sample D05691 and copper in samples D05678, D05684, and D05705 due to the high RPDs for these analytes in the evaluation of the field duplicate pairs. **Results discussed above can still be used for project objectives as estimated values or nondetects with estimated quantitation limits. These issues may have a minor impact on the data usability.**

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

Attachment 3
Table III: Tentatively Identified Compound Summary

-not applicable to this SDG

Attachment 4
IRDA Form

Region I

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 0247M
SITE Callahan Mining
LABORATORY SwRI
NO OF SAMPLES/MATRIX 10 AQ, 2 FB, 1 PE
SDG # DO5670
REVIEWER(IF NOT ESD) TRC
SOW # Das D-137
REVIEWER'S NAME Lori Mackinnon
DPO:ACTION ______ FYI ✓
COMPLETION DATE 03/16/05

DATA ASSESSMENT SUMMARY

		ICP	ICP/MS ~~AA~~	HG	HY ~~CYANIDE~~
1.	HOLDING TIMES	O	O	O	O
2.	CALIBRATIONS	O	O	O	O
3.	BLANKS	O	O	O	O
4.	ICS	O	O	NA	NA
5.	LCS	O	O	O	O
6.	DUPLICATE ANALYSIS	O	O	O	O
7.	MATRIX SPIKE	O	O	O	O
8.	MSA	NA	NA	NA	NA
9.	SERIAL DILUTION	O	O	NA	NA
10.	SAMPLE VERIFICATION	NA	NA	NA	NA
11.	OTHER QC	O	O	O	O
12.	OVERALL ASSESSMENT	O	O	O	O

O = Data had no problems, or qualified due to minor problems.
M = Data qualified due to major problems.
Z = Data unacceptable.
X = Problems, but do not affect data.

ACTION ITEMS: ______

AREAS OF CONCERN: ______

NOTABLE PERFORMANCE: ______

Validator: Lori Mackinnon
Date: 03/16/05

Attachment 5
Data Summary Tables

Site: Callahan Mining Superfund Site - Brooksville, ME
Case Number 0247M, SDG D05670

DATA SUMMARY TABLE

Metals Analysis (D-137)
Surface Water Samples
(Units: ug/L)

[illegible] Name		SW411		SW411		SW410		SW410		SW403		SW403		SW411		SW411		SW400		SW424		RB-003		RB-007	
TRC Sample ID		SW411		SWF-411		SW419		[illegible]		SWE-403		SWFE403		SWE-411		SWFE-411		SWF-400		SWF-424		RB-003		RB-007	
Lab Sample ID		256182		256183		256184		256185		256647		256645		256160		256159		256630		256648		256649		256186	
DAS Sample ID		D05677		D05678		D05683		D05684		D05681		D05682		D05704		D05706		D05670		D05690		D05693		D05699	
Comments		Total Metals		Dissolved Metals		Total Metals		Dissolved Metals		Total Metals Field Duplicate of D05667*		Dissolved Metals Field Duplicate of D05666*		Total Metals Field Duplicate of D05677*		Dissolved Metals Field Duplicate of D05678*		Dissolved Metals		Dissolved Metals		Rinsate Blank Dissolved Metals		Rinsate Blank Dissolved Metals	
Analyte	QL																								
Aluminum	50	167	J	167	J	380		168	J	210	J	50.0	U	51.6	J	50.0	U	50.4	J	50.0	U	50.0	U	50.0	U
Antimony	0.5	0.71	J	0.50	UJ	0.50	UJ	0.50	UJ	0.96	J	0.76	J	0.50	UJ	0.50	UJ	0.50	UJ	0.50	UJ	0.50	U	0.50	U
Arsenic	0.2	1.5	J	1.4	J	1.1	J	0.65	J	0.96	J	0.33	J	1.5	J	1.4	J	0.75	J	1.0	J	0.20	U	0.20	U
Barium	5.0	6.2	J	6.0	J	5.2	J	5.0	U	7.6	J	7.5	J	5.8	J	5.4	J	5.1	J	7.0	J	5.0	U	5.0	U
Beryllium	0.2	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
Cadmium	0.2	1.0		1.0		2.1		2.3		3.2		3.2		0.87		0.87		0.94		2.4		0.20	U	0.20	U
Calcium	50	213,000		214,000		133,000		91,600		73,300		72,300		214,000		211,000		136,000		229,000		50.0	U	50.0	U
Chromium	2.0	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Cobalt	1.0	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0		1.0	U	1.0	U
Copper	2.0	21.4	J	22.0	J	58.8	J	54.7	J	40.4	J	24.3	J	16.6	J	15.4	J	4.5	J	16.0	J	2.0	U	2.0	U
Iron	50	203		167		366		147		299	J	50.0	U	50.0	U	50.0	U	50.0	U	50.0	U	50.0	U	50.0	U
Lead	1	1.1		1.0	U	1.5		1.0	U	12.8	J	1.4		1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Magnesium	50	745,000		741,000		438,000		286,000		7150		6720		743,000		735,000		439,000		794,000		50.0	U	50.0	U
Manganese	1.0	25.4		24.6		51.2		52.2		20.2	J	10.1		21.9		20.8		42.0		37.6		1.0	U	1.0	U
Mercury	0.2	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
Nickel	1.0	2.1	J	1.8	J	2.7	J	2.0	J	1.8	J	1.5	J	1.6	J	1.7	J	1.4	J	1.9	J	1.0	U	1.0	U
Potassium	250	216,000	J	218,000	J	129,000		86,700		1690	J	1910	J	222,000	J	215,000	J	140,000		232,000	J	250	U	250	U
Selenium	1.0	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Silver	1.0	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Sodium	250	5,890,000		5,870,000		3,540,000		2,300,000		23,000		22,800		5,900,000		5,850,000		3,760,000		6,330,000		250	U	250	U
Thallium	0.5	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Vanadium	1.0	1.4		1.4		1.3		1.0	U	1.0	U	1.0	U	1.2		1.2		1.0	U	1.0	U	1.0	U	1.0	U
Zinc	2.0	190	J	187	J	501	J	524	J	911	J	808	J	177	J	181	J	271	J	429	J	2.0	U	2.0	U
Date Sampled		12/03/04		12/03/04		12/02/04		12/02/04		11/16/04		11/16/04		12/03/04		12/03/04		11/17/04		11/18/04		[illegible]		12/03/04	

QL - Quantitation Limit

J - Estimated value

UJ - Estimated nondetect

U - Not detected at the specified quantitation limit

* - Original sample of field duplicate pair reported in SDG D05667_IB

Surface Soil

M&E
Metcalf & Eddy

701 Edgewater Drive
Wakefield, MA 01880

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036.200100.0061.00005

March 11, 2005

Christine Clark
Regional Sample Control Center
U.S. EPA Region I
11 Technology Drive
North Chelmsford, Massachusetts 01863-2431

Re: Work Assignment No. 161-RICO-017H
Case 0248M, SDG D05729
Woods Hole Group, Raynham, Massachusetts
Callahan Mining Superfund Site, Brooksville, Maine
Tier II Inorganic Data Validation

Low Concentration Metals and Mercury: 11/Surface Soils/D05729, D05730, D05731, D05732, D05733, D05734, D05735, D05736, D05737, D05738, D05740
(Field Duplicate Pair: D05735 and D05740)
1/Aqueous Equipment Blank/D05741
1/Performance Evaluation Sample/D05743

Dear Ms. Clark:

A Tier II data validation was performed by Metcalf & Eddy, Inc. (M&E) on the low concentration metals and mercury analytical data for eleven surface soil samples (including one field duplicate pair), one performance evaluation (PE) sample, and one equipment blank sample collected from the Callahan Mining Superfund Site, located in Brooksville, Maine, by TRC on November 30, 2004. The samples were analyzed through the Response Action Contract (RAC) Delivery of Analytical Services (DAS) program using M&E DAS *Analytical Specification for the Analysis of Low Concentration Metals Including Cyanide in Solid Samples (Including Samples with High Moisture Content* (D-044.2), based on EPA methodology. M&E evaluated these data using the *Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Inorganic Analyses*, February 1989 criteria, modified for the methods and incorporating organic data validation guidance, *Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses*, December 1996 criteria. Additional guidance was provided by *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review,* October 2004.

The Tier II metals data validation was based on the following parameters:

- Overall Evaluation of Data and Potential Usability Issues
- Data Completeness (CSF Audit - Tier I)
- Preservation and Technical Holding Times
- Instrument Calibration
- * ICP-MS Internal Standards
- * ICP-MS Tuning, Mass Calibration, and Resolution Check
- Blanks
- Inductively Coupled Plasma Interference Check Sample
- Matrix Spike
- * Laboratory Duplicate
- Field Duplicates
- NA Furnace Atomic Absorption Analysis
- Inductively Coupled Plasma Serial Dilution
- * Laboratory Fortified Blank
- * Instrument Detection Limits
- Sample Quantitation Results
- Performance Evaluation Sample /Accuracy Check

* - all criteria met for this parameter
NA - parameter not applicable

Note: Worksheets are not included for parameters that have met criteria or for criteria that are not applicable to a Tier II data validation.

The following information was used to generate the Data Validation Memorandum attachments:

Table I: Recommendation Summary Table - summarizes validation recommendations
Table II: Overall Evaluation of Data - summarizes site DQOs and potential usability issues
Data Summary Tables - summarizes accepted, qualified, and rejected data

Copies of the field sampling notes for this sample delivery group (SDG) are included with this Data Validation Memorandum.

Overall Evaluation of Data and Potential Usability Issues

The following is a summary of the site DQOs (Data Quality Objectives):

- To determine nature and extent of contamination and to support a human health risk assessment.

The low concentration metals and mercury sample results were qualified as a result of sampling and analytical error. Qualifications as a result of sampling error are summarized below:

- The positive and nondetect results for barium, chromium, and nickel in all soil samples were qualified "EB" due to equipment blank contamination. An indeterminate amount of sampling error may have affected these sample results. The results are usable for project objectives. These qualifications have a minor impact on data usability.

- The positive results for calcium, magnesium, and zinc in all soil samples were qualified as estimated (J) due to field duplicate imprecision. The results are usable for project objectives as estimated values with an indeterminate direction of bias. This qualification has a minor impact on the data usability.

Qualifications as a result of analytical error are summarized below:

- The positive mercury results in all soil samples and the nondetect mercury result in the aqueous sample were qualified as estimated (J and UJ, respectively) due to holding time exceedances. These results are usable for project objectives as estimated concentrations and quantitation limits with a possible low bias. These qualifications have a minor impact on the data usability.

- The positive thallium results in all soil samples were qualified as estimated (J) due to continuing calibration standard recovery exceedance. The results are usable for project objectives as estimated concentrations with a possible high bias. These qualifications have a minor impact on the data usability.

- The positive results for sodium in samples D05735, D05736, D05737, and D05740 were qualified as nondetect (U) at the reported concentration due to laboratory blank contamination. These results are usable for project objectives as nondetect results. This qualification has a minor impact on data usability. Note that these results were qualified as estimated (J) because they were less than the quantitation limit but greater than the method detection limit (MDL). Therefore, the overall qualification for these results are estimated nondetect (UJ).

- The positive results for selenium in samples D05731, D05732, D05733, D05734, and D05737; and for antimony in sample D05741 were qualified as nondetect (U) at the sample-specific negative blank action level due to negative instrument drift and blank contamination. These results are usable for project objectives as nondetect results. This qualification has a minor impact on data usability. Note that the selenium results in these samples were also qualified as estimated (J) due to positive interferences in the interference check sample (ICS) A solution. Therefore, the overall qualification for this analyte is estimated nondetect (UJ) due to blank contamination and ICSA interferences.

- The positive results for aluminum, calcium, copper, iron, lead, magnesium, sodium, thallium, vanadium, and zinc in sample D05741 were qualified as nondetect (U) at the reported concentration due to method or instrument blank contamination. These results are usable for project objectives as nondetect results. This qualification has a minor impact on data usability. Note that the results for copper, lead, thallium, vanadium, and zinc were also qualified as estimated (J) due to positive interferences seen in the ICSA solution analyses. Therefore, the overall qualification for these analytes is estimated nondetect (UJ) due to blank contamination and ICSA interferences.

- The nondetect result for cobalt in sample D05741 was qualified as estimated (UJ) due to negative instrument drift. This result is usable for project objectives as an estimated quantitation limit with a possible low bias. This qualification has a minor impact on data usability.

- The nondetect results for selenium in samples D05738, D05740, and D05741 were elevated to their sample-specific negative blank action levels due to negative instrument drift and blank contamination. These results are usable for project objectives as elevated quantitation limits. This qualification has a minor impact on data usability.

- The positive and blank-qualified results for antimony, arsenic, cadmium, chromium, cobalt, copper, lead, nickel, thallium, vanadium, and zinc in all soil samples; for manganese in sample D05732; and for chromium, copper, lead, nickel, thallium, vanadium, and zinc in sample D05741 were qualified as estimated (J and UJ, respectively) due to positive interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations and quantitation limits with a possible high bias. This qualification has a minor impact on data usability.

- The positive and nondetect results for selenium in all soil samples and sample D05741 were qualified as estimated (J and UJ, respectively) due to negative interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations and quantitation limits with a possible low bias. This qualification has a minor impact on data usability. Note that the nondetect selenium results in samples D05731, D05732, D05733, D05734, and D05737 were also qualified as estimated (UJ) due to negative instrument drift. Therefore, the overall qualification for this analyte is estimated nondetect (UJ) due to instrument drift and ICSA interferences.

- The positive results for nickel and zinc in all soil samples were qualified as estimated (J) due to high matrix spike recovery. The results are usable for project objectives as estimated values that may be biased high. This qualification has a minor impact on the data usability.

- The positive results for antimony and potassium were qualified as estimated (J) due to low matrix spike recovery. The results are usable for project objectives as estimated values that may be biased low. This qualification has a minor impact on the data usability.

- The positive results for potassium in all soil samples were qualified as estimated (J) due to serial dilution imprecision. The results are usable for project objectives as estimated values with an indeterminate direction of bias. This qualification has a minor impact on the data usability.

- The positive results for arsenic, cadmium, and magnesium in all soil samples were qualified as estimated (J) due to high recoveries in the PE sample. The results are usable for project objectives as estimated values with a possible high bias. This qualification has a minor impact on the data usability.

- The positive results for barium and silver in all soil samples were qualified as estimated (J) due to recovery exceedances in the laboratory control sample. These results are usable for project objectives as estimated concentrations with a possible high bias. This qualification has a minor impact on the data usability.

- The positive and blank-qualified results for the following samples and analytes were qualified as estimated (J and UJ, respectively) because they were less than the quantitation limit but greater than the method detection limit (MDL). These results are usable for project objectives as estimated concentrations and quantitation limits. This qualification has a minor impact on the data usability.

antimony:	D05731, D05732, D05733, D05734, D05735, D05737, D05740
beryllium:	D05732
cobalt:	D05731, D05732, D05733, D05734
copper:	D05731
nickel:	D05731, D05732, D05734
selenium:	D05730, D05731, D05732, D05733, D05734, D05736, D05737
sodium:	all soil samples
thallium:	all soil samples

- The positive and blank-qualified results for aluminum, barium, calcium, chromium, copper, lead, magnesium, nickel, sodium, thallium, vanadium, and zinc in sample D05741 were qualified as estimated (J and UJ, respectively) because they were less than the quantitation limit but greater than the MDL. These results are usable for project objectives as estimated concentrations. This qualification has a minor impact on the data usability.

Data Completeness

The laboratory was contacted on February 8, 2005 concerning the following:

1. The units of measure for iron in the January 4, 2005 and January 12, 2005 ICP-MS sequences are incorrectly listed as "mg/L" instead of "µg/L."

2. There are two sets of aqueous MDLs reported on Form IX. The laboratory was requested to resubmit the forms with MDL data for the solid matrix.

The laboratory provided an acceptable response on February 10, 2005.

Preservation and Technical Holding Times

All mercury analyses were performed outside the 28-day holding time requirement. The soil samples were analyzed 30 days after sampling; the equipment blank was analyzed 29 days after sampling. The positive mercury results in the soil samples and the nondetect result in the aqueous sample were qualified as estimated (J and UJ, respectively) due to holding time exceedances. These results are usable for project objectives as estimated concentrations and quantitation limits.

Instrument Calibration

The continuing calibration verification (CCV) standard recovery for thallium analyzed on January 6, 2005 (11:10AM) was 116%, which exceeded the recovery criteria (90% - 110%). All positive thallium results in all soil samples were qualified as estimated (J) due to this CCV recovery exceedance. These results are usable for project objectives as estimated concentrations with a possible high bias.

Blanks

The following table summarizes the blank contamination detected in the laboratory blanks associated with the soil samples. If a contaminant was detected in more than one blank, the highest concentration was used to qualify associated sample results and is summarized below. The nominal Blank Action Levels (BAL) from the method blank were calculated based on a 1gm sample weight (dry), 50mL final volume, and two-fold dilution. The nominal BALs from instrument blanks were based on a 1gm sample weight (dry) and 50mL final volume. Sample-specific BALs are further adjusted for actual sample weights, moisture content, and any additional dilutions.

Analyte	Blank Type	Maximum Blank Concentration	Nominal Blank Action Level (BAL) mg/Kg	Action/Samples Affected
arsenic	inst	0.13 µg/L	0.065	No action; all results greater than BAL
barium	mb	0.0076 mg/Kg	0.038	No action; all results greater than BAL
calcium	inst	-33 µg/L	-16.5	No action; all results greater than BAL
chromium	mb	0.014 mg/Kg	0.07	No action; all results greater than BAL
cobalt	inst	-0.16 µg/L	-0.08	No action; all results greater than BAL
copper	mb	0.06 mg/Kg	0.30	No action; all results greater than BAL
iron	mb	1.3 mg/Kg	6.5	No action; all results greater than BAL
lead	mb	0.008 mg/Kg	0.04	No action; all results greater than BAL
magnesium	mb	1.1 mg/Kg	5.5	No action; all results greater than BAL
manganese	mb	0.08 mg/Kg	0.40	No action; all results greater than BAL
nickel	inst	-0.28 µg/L	-0.14	No action; all results greater than BAL
potassium	inst	21 µg/L	10.5	No action; all results greater than BAL
	inst	-9.4 µg/L	-4.7	
selenium	inst	0.2 µg/L	0.1	Qualify the positive result as nondetect (U) at sample-specific negative BAL in samples D05731, D05732, D05733, D05734, and D05737 Elevate the reported MDL to the sample-specific negative BAL in samples D05738 and D05740
	inst	-1.4 µg/L	-0.7	
sodium	mb	2.1 mg/Kg	10.5	Qualify the positive result as nondetect (U) at sample-specific BAL in samples D05735, D05736, D05737, and D05740
thallium	inst	0.035 µg/L	0.0175	No action; all results greater than BAL
vanadium	mb	0.08 mg/Kg	0.40	No action; all results greater than BAL
zinc	mb	0.16 mg/Kg	0.80	No action; all results greater than BAL

inst - instrument blank (i.e. ICB or CCB)
mb - method blank

For positive blank contamination, sample results were qualified as follows:

- If the sample result was nondetect, qualification of the data was not required.
- If the sample result was > MDL and ≤ positive BAL, the result was qualified as a nondetect (U) at the reported concentration.
- If the sample result was > positive BAL, qualification of the data was not required.

For negative blank contamination, sample results were qualified as follows:

- If the sample result was positive and ≤ negative BAL, the result was qualified as estimated (J).
- If the sample result was nondetect, the MDL was qualified as estimated (UJ).
- If the sample result was > MDL and > negative BAL, qualification of the data was not required.

For positive and negative blank contamination where the negative BAL is < the positive BAL, sample results were qualified as follows:

- If the sample result was >MDL and > negative BAL but ≤ positive BAL, the result was qualified as nondetect (U) at the reported concentration.
- If the sample result was > MDL and < negative BAL, the result was qualified as nondetect (U) at the negative BAL.
- If the sample result was nondetect, elevate the MDL to the negative BAL.
- If the sample result was > positive BAL, qualification of the data was not required.

For positive and negative blank contamination where the negative BAL is > the positive BAL, sample results were qualified as follows:

- If the sample result was > MDL but ≤ negative BAL, the result was qualified as nondetect (U) at the negative BAL.
- If the sample result was nondetect, elevate the MDL to the negative BAL.
- If the sample result was > negative BAL, qualification of the data was not required.

The following table summarizes the blank contamination detected in the laboratory blanks associated with the aqueous equipment blank sample. If a contaminant was detected in more than one blank, the highest concentration was used to qualify associated sample results and is summarized below. Maximum blank concentrations from instrument blanks were also adjusted for sample dilutions.

Analyte	**Blank Type**	**Maximum Blank Concentration µg/L**	**Blank Action Level (BAL) µg/L**	**Action/Samples Affected**
aluminum	mb	69	345	Qualify positive result nondetect (U) at reported concentration in sample D05741
antimony	inst	0.018	0.18	Qualify the result nondetect (U) at negative BAL in sample D05741
	inst	-0.028	-0.28	
calcium	mb	28	140	Qualify positive result nondetect (U) at reported concentration in sample D05741
cobalt	inst	-0.032	-0.32	Qualify nondetect result estimated (UJ) at reported MDL in sample D05741

Analyte	Blank Type	Maximum Blank Concentration µg/L	Blank Action Level (BAL) µg/L	Action/Samples Affected
copper	mb	1.4	7.0	Qualify positive result nondetect (U) at reported concentration in sample D05741
iron	mb	100	500	Qualify positive result nondetect (U) at reported concentration in sample D05741
lead	mb	1.6	8.0	Qualify positive result nondetect (U) at reported concentration in sample D05741
magnesium	mb	100	500	Qualify positive result nondetect (U) at reported concentration in sample D05741
nickel	mb	0.08	0.40	No action; result above BAL
potassium	mb	39	195	No action; nondetect in sample
selenium	inst	0.1	1.0	Elevate the reported MDL to the negative BAL in sampleD05741
	inst	-0.091	-0.91	
sodium	mb	12	60	Qualify positive result nondetect (U) at reported concentration in sample D05741
thallium	inst	0.035	0.18	Qualify positive result nondetect (U) at reported concentration in sample D05741
vanadium	inst	0.19	1.9	Qualify positive result nondetect (U) at reported concentration in sample D05741
zinc	mb	7.4	37	Qualify positive result nondetect (U) at reported concentration in sample D05741

inst - instrument blank (i.e. ICB or CCB)
mb - method blank

For positive blank contamination, sample results were qualified as follows:

- If the sample result was nondetect, qualification of the data was not required.
- If the sample result was > MDL and ≤ positive BAL, the result was qualified as a nondetect (U) at the reported concentration.
- If the sample result was > positive BAL, qualification of the data was not required.

For negative blank contamination, sample results were qualified as follows:

- If the sample result was positive and ≤ negative BAL, the result was qualified as estimated (J).
- If the sample result was nondetect, the MDL was qualified as estimated (UJ).
- If the sample result was > MDL and > negative BAL, qualification of the data was not required.

For positive and negative blank contamination where the negative BAL is < the positive BAL, sample results were qualified as follows:

- If the sample result was >MDL and > negative BAL but ≤ positive BAL, the result was qualified as nondetect (U) at the reported concentration.
- If the sample result was > MDL and < negative BAL, the result was qualified as nondetect (U) at the negative BAL.
- If the sample result was nondetect, elevate the MDL to the negative BAL.
- If the sample result was > positive BAL, qualification of the data was not required.

For positive and negative blank contamination where the negative BAL is > the positive BAL, sample results were qualified as follows:

- If the sample result was > MDL but ≤ negative BAL, the result was qualified as nondetect (U) at the negative BAL.
- If the sample result was nondetect, elevate the MDL to the negative BAL.
- If the sample result was > negative BAL, qualification of the data was not required

The following table summarizes the level of blank contamination detected in the equipment blank associated with the surface soil samples.

Analyte	Blank Concentration (µg/L)	Action/Samples Affected
aluminum	52	No action; result qualified as nondetect (U) after blank actions.
barium	0.38	Qualify all soil samples (EB).
calcium	50	No action; result qualified as nondetect (U) after blank actions.
chromium	7.6	Qualify all soil samples (EB).
copper	2.9	No action; result qualified as nondetect (U) after blank actions.
iron	44	No action; result qualified as nondetect (U) after blank actions.
lead	1.1	No action; result qualified as nondetect (U) after blank actions.
magnesium	10	No action; result qualified as nondetect (U) after blank actions.
nickel	0.84	Qualify all soil samples (EB).
sodium	30	No action; result qualified as nondetect (U) after blank actions.
thallium	0.070	No action; result qualified as nondetect (U) after blank actions.
vanadium	0.19	No action; result qualified as nondetect (U) after blank actions.
zinc	7.1	No action; result qualified as nondetect (U) after blank actions.

Inductively Coupled Plasma Interference Check Sample

Positive results for antimony, arsenic, cadmium, chromium, cobalt, copper, lead, manganese, nickel, thallium, vanadium, and zinc were reported in the ICSA solution analyses at concentrations greater than the MDLs. Results for copper and selenium were reported in the ICSA solution at a concentration greater than the negative MDL.

The positive and blank-qualified results for antimony, arsenic, cadmium, chromium, cobalt, copper, lead, nickel, thallium, vanadium, and zinc in all soil samples; and for manganese in sample D05732 were qualified as estimated (J) due to positive interferences seen in the ICSA solution analyses. The positive and blank-qualified results for chromium, copper, lead, nickel, thallium, vanadium, and zinc in sample D05741 were qualified as estimated (J) due to positive interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations with a possible high bias.

The positive and nondetect results for selenium in all soil samples and sample D05741 were qualified as estimated (J and UJ, respectively) due to negative interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations and quantitation limits with a possible low bias.

Matrix Spike (MS)

Sample D05738 was analyzed as the matrix spike with this data set. The analytes that did not meet recovery (%R) acceptance criteria of 75-125% and the actions taken are summarized in the table below:

Analyte	Spiked Sample Result (mg/Kg)	Sample Result (mg/Kg)	Spike Added (mg/Kg)	MS %R	Affected Samples/Action
antimony	0.60	0.17	1.2	33	Qualify as estimated (J) the positive results in all soil samples.
nickel	39	9.7	19	154	Qualify as estimated (J) the positive results in all soil samples.
potassium	570	220	473	73	Qualify as estimated (J) the positive results in all soil samples.
Zinc	64	39	19	134	Qualify as estimated (J) the positive results in all soil samples.

Field Duplicates

Samples D05735 and D05740 were the field duplicate pair analyzed in association with this data set. The analytes that did not meet the field duplicate relative percent difference (RPD) criterion of <50% for analytes greater than 5x reporting limit or the absolute difference criterion of >4x reporting limit for those less than <5x reporting limit, and the actions taken are summarized in the following table:

Analyte	D05735 (mg/Kg)	D05740 (mg/Kg)	%RPD	Actions
calcium	170	610	113	Qualify as estimated (J) the positive calcium results in all samples.
magnesium	2800	5200	60	Qualify as estimated (J) the positive magnesium results in all samples.
zinc	18	87	131	Qualify as estimated (J) the positive zinc results in all samples.

Inductively Coupled Plasma Serial Dilution

Potassium exceeded the 15% difference acceptance criteria in the ICP serial dilution analysis (36%). Due to this exceedance, all positive results for potassium in the soil samples were qualified as estimated (J). These results are usable for project objectives as estimated concentrations.

Sample Quantitation Results

The positive and blank-qualified results for the following samples and analytes were qualified as estimated (J and UJ, respectively) because they were less than the quantitation limit but greater than the MDL. These results are usable for project objectives as estimated concentrations. This qualification has a minor impact on the data usability.

aluminum: D05741
antimony: D05731, D05732, D05733, D05734, D05735, D05737, D05740
barium: D05741
beryllium: D05732
calcium: D05741
chromium: D05741
cobalt; D05731, D05732, D05733, D05734
copper: D05731, D05741
lead: D05741
magnesium: D05741
nickel: D05731, D05732, D05734, D05741
selenium: D05730, D05731, D05732, D05733, D05734, D05736, D05737
sodium: all samples in the SDG
thallium: all samples in the SDG
vanadium: D05741
zinc: D05741

Performance Evaluation Sample/Accuracy Check

Performance Evaluation Sample

The metals and mercury PE sample D05743 (EPA ampule number MS01878) was evaluated with this SDG. Eight analytes were scored "Within Limits," eight analytes were scored "Not Evaluated," and four were scored "Warning High." No validation action was necessary on the basis of these results. Three analytes (arsenic, cadmium, and magnesium) were scored "Action High." On the basis of those scores, the positive results for arsenic, cadmium, and magnesium in all soil samples were qualified as estimated (J). These results are usable for project objectives as estimated concentrations.

Laboratory Control Sample

Barium and silver exceeded the 80% - 120% acceptance criteria in the solid laboratory control samples (128% and 124%, respectively). Due to these exceedances, all positive results for barium and silver in the soil samples were qualified as estimated (J). These results are usable for project objectives as estimated concentrations with a possible high bias.

Please contact Ms. Constance Lapite at (781) 224-6628 or at constance.lapite@m-e.com if you have any questions regarding this Tier II validation.

Very truly yours,

Richard Purdy
Data Validator

Elizabeth Denly
Elizabeth Denly
Senior Reviewer

Constance Lapite
Constance Lapite
RAC Lead Chemist

cc: Leslie McVickar, EPA Remedial Project Manager (Data Validation Memorandum, Data Summary Tables)
✓Elizabeth Denly, TRC Project Chemist (entire package)
Denise Laferte, M&E Oversight Chemist (Data Validation Memorandum, Data Summary Tables)
Richard Purdy, M&E Data Validation Chemist (entire package)
Callahan Mine Project File, Work Assignment No. 161-RICO-017H

Attachments:
- IRDA
- Table I: Recommendations Summary Table
- Table II: Overall Evaluation of Data
- Data Summary Tables
- Data Validation Worksheets
- PE Score Report(s)
- Copy of non-CLP Analytical Methods (M&E DAS Specification D-044.2)
- Copies of Telephone Logs/Communications Forms
- Supporting Data for Reduced Payment Recommendations (not applicable)
- Copies of Field Sampling Notes
- Copies of EPA-approved Amendments to QAPjP or SAP (not applicable)
- CSF Completeness Evidence Audit (DC-2 Form)
- DQO Summary Form

Region ✓

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 0248 M
SITE Callahan Mine
LABORATORY WOODS HOLE GROUP
NO. OF SAMPLES/
MATRIX 11 SS, 1EB, 1PE
SDG# D05729
REVIEWER (IF NOT ESD) **Metcalf & Eddy**
SOW# D-044.2
REVIEWER'S NAME **Richard Purdy**
DPO: ACTION ______ FYI **XX** ______
COMPLETION DATE 3/10/05

DATA ASSESSMENT SUMMARY

		ICP-AES	ICP-MS	Hg	CYANIDE
1.	DATA COMPLETENESS		O	O	
2.	HOLDING TIMES		O	M^1	
3.	CALIBRATIONS		O	O	
4.	BLANKS		O^1	O	
5.	ICS		O^2	NA	
6.	MATRIX SPIKE		O^3	O	
7.	LABORATORY DUPLICATES		O	O	
8.	FIELD DUPLICATES		O^3	O	
9.	LABORATORY CONTROL SAMPLE		O^3	O	
10.	LABORATORY FORTIFED BLANK		O	O	
11.	SERIAL DILUTION		O^3	NA	
12.	DETECTION LIMITS		O	O	
13.	SAMPLE QUANTITATION		O	O	
14.	OTHER QC — PE		O^3	O	
15.	OVERALL ASSESSMENT		O	O	

O = Data had no problems/or qualified due to minor problems.
M = Data qualified due to a major problem.
Z = Data unacceptable.
X = Problems, but do not affect data.

ACTION ITEMS: M^1 – MISSED HOLDING TIME; O^1 - minor contamination; O^2 - negative drift; O^3 - minor exceedances

AREAS OF CONCERN:

NOTABLE PERFORMANCE:

Table Ia
Recommendation Summary Table for Low Concentration Metals and Mercury
Callahan Mining Superfund Site
Case 0249M, SDG D05729
Surface Soil Samples

Analyte	Action	Analyte	Action
aluminum	A	magnesium	J^8 J^{10}
antimony	J^3 J^6 J^{11}	manganese	J^4
arsenic	J^3 J^8	mercury	J^1
barium	A^2 J^9	nickel	A^2 J^3 J^5 J^{11}
beryllium	J^{11}	potassium	J^6 J^7
cadmium	J^3 J^8	selenium	A^1 A^3 J^4 J^{11}
calcium	J^{10}	silver	J^9
chromium	A^2 J^3	sodium	A^4 J^{11}
cobalt	J^3 J^{11}	thallium	J^2 J^3 J^{11}
copper	J^3 J^{11}	vanadium	J^3
iron	A	zinc	J^3 J^5 J^{10}
lead	J^3		

A - Accept all data.

A^1 - Qualify the positive results for selenium in samples D05731, D05732, D05733, D05734, and D05737 as nondetect (U) at the negative blank action level due to negative instrument drift and laboratory blank contamination.

A^2 - Qualify "EB" the positive and nondetect results for barium, chromium, and nickel in all soil samples due to equipment blank contamination.

A^3 - Elevate the nondetect results for selenium in samples D05738 and D05740 to the negative blank action level due to negative instrument drift and laboratory contamination.

A^4 - Qualify the positive results for sodium in samples D05735, D05736, D05737, and D05740 as nondetect (U) at the reported concentration due to laboratory blank contamination.

J^1 - Qualify the positive results for mercury in all soil samples as estimated (J) due to holding time exceedances.

J^2 - Qualify the positive results for thallium in all soil samples as estimated (J) due to continuing calibration standard recovery exceedances.

J^3 - Qualify the positive and blank-qualified results for antimony, arsenic, cadmium, chromium, cobalt, copper, lead, nickel, thallium, vanadium, and zinc in all soil samples; and for manganese in sample D05732 were qualified as estimated (J and UJ, respectively) due to positive interferences seen in the ICSA solution analyses.

J^{4} - Qualify the positive and nondetect results for selenium in all soil samples as estimated (J and UJ, respectively) due to negative interferences seen in the ICSA solution analyses.

J^{5} - Qualify the positive results for nickel and zinc in all soil samples as estimated (J) due to high matrix spike recovery.

J^{6} - Qualify the positive results for antimony and potassium in all soil samples as estimated (J) due to low matrix spike recovery.

J^{7} - Qualify the positive results for potassium in all soil samples as estimated (J) due to serial dilution imprecision.

J^{8} - Qualify the positive results for arsenic, cadmium, and magnesium in all soil samples as estimated (J) due to high recoveries in the PE sample.

J^{9} - Qualify the positive results for barium and silver in all soil samples as estimated (J) due to recovery exceedances in the laboratory control sample.

J^{10} - Qualify the positive results for calcium, magnesium, and zinc in all soil samples as estimated (J) due to field duplicate imprecision.

J^{11} - Qualify the positive and blank-qualified results for the following samples and analytes were estimated (J and UJ, respectively) because they were less than the quantitation limit but greater than the MDL.

antimony: D05731, D05732, D05733, D05734, D05735, D05737, D05740
beryllium: D05732
cobalt; D05731, D05732, D05733, D05734
copper: D05731
nickel: D05731, D05732, D05734
selenium: D05730, D05731, D05732, D05733, D05734, D05736, D05737
sodium: D05729, D05730, D05731, D05732, D05733, D05734, D05735, D05736, D05737, D05738, D05740
thallium: D05729, D05730, D05731, D05732, D05733, D05734, D05735, D05736, D05737, D05738, D05740

Table Ib
Recommendation Summary Table for Low Concentration Metals and Mercury
Callahan Mining Superfund Site
Case 0248M, SDG D05729
Aqueous QC Sample

Analyte	Action	Analyte	Action
aluminum	A^2 J^4	magnesium	A^2 J^4
antimony	A^1	manganese	A
arsenic	A	mercury	J^1
barium	J^4	nickel	J^4 J^5
beryllium	A	potassium	A
cadmium	A	selenium	A^3 J^3
calcium	A^2 J^4	silver	A
chromium	J^4 J^5	sodium	A^2 J^4
cobalt	J^2	thallium	A^2 J^4 J^5
copper	A^2 J^4 J^5	vanadium	A^2 J^4 J^5
iron	A^2	zinc	A^2 J^4 J^5
lead	A^2 J^4 J^5		

A - Accept all data.

A^1 - Qualify the result for antimony in sample D05741 as nondetect (U) at the negative blank action limit due to negative instrument drift and laboratory blank contamination.

A^2 - Qualify the positive results for aluminum, calcium, copper, iron, lead, magnesium, sodium, thallium, vanadium, and zinc in samples D05741 as nondetect (U) at the reported concentration due to method or instrument blank contamination.

A^3 - Elevate the nondetect result to the negative blank action level due to negative instrument drift and laboratory contamination.

J^1 - Qualify the nondetect result for mercury in sample D05741 as estimated (UJ) due to holding time exceedance.

J^2 - Qualify the nondetect result for cobalt in sample D05741 as estimated (UJ) due to negative instrument drift.

J^3 - Qualify the nondetect result for selenium in sample D05741 estimated (UJ) due to negative interferences in the ICSA solution analyses.

J^4 - Qualify the positive and blank-qualified results aluminum, barium, calcium, chromium, copper, lead, magnesium, nickel, sodium, thallium, vanadium, and zinc in sample D05741 as estimated (J and UJ, respectively) because they were less than the quantitation limit but greater than the MDL.

J^5 - Qualify the positive and blank-qualified results for chromium, copper, lead, nickel, thallium, vanadium, and zinc in sample D05741 as estimated (J and UJ, respectively) due to positive interferences seen in the ICSA solution analyses.

Table IIa
Overall Evaluation of Data for Low Concentration Metals and Mercury Analyses
Callahan Mining Superfund Site
Case 0248M, SDG D05729
Surface Soil Samples

Low Concentration Metals and Mercury					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: A^1 A^3 A^4 J^1 J^2 J^3 J^4 J^5 J^6 J^7 J^8 J^9 J^{11}	Refer to qualifications in Table I: A^2 J^{10}	Not applicable for Tier II	**Minor Impact on Data Usability (Results usable for project objectives):** The positive and nondetect results for barium, chromium, and nickel in all soil samples were qualified "EB" due to equipment blank contamination. An indeterminate amount of sampling error may have affected these sample results. The positive results for calcium, magnesium, and zinc in all soil samples were qualified as estimated (J) due to field duplicate imprecision. The results are usable for project objectives as estimated values with an indeterminate direction of bias. The positive mercury results in all soil samples were qualified as estimated (J) due to holding time exceedances. These results are usable for project objectives as estimated concentrations that may be biased low. The positive thallium results in all soil samples were qualified as estimated (J) due to continuing calibration standard recovery exceedance. The results are usable for project objectives as estimated concentrations with a possible high bias.

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

Table IIa
Overall Evaluation of Data for Low Concentration Metals and Mercury Analyses
Callahan Mining Superfund Site
Case 0249M, SDG D05729
Surface Soil Samples

Low Concentration Metals and Mercury					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: A^1 A^3 A^4 J^1 J^2 J^3 J^4 J^5 J^6 J^7 J^8 J^9 J^{11}	Refer to qualifications in Table I: A^2 J^{10}	Not applicable for Tier II	**Minor Impact on Data Usability (Results usable for project objectives):** The positive results for sodium in samples D05735, D05736, D05737, and D05740 were qualified as nondetect (U) at the reported concentration due to laboratory blank contamination. These results are usable for project objectives as nondetect results. The positive results for selenium in samples D05731, D05732, D05733, D05734, and D05737 were qualified as nondetect (U) at the negative blank action limit due to negative instrument drift. These results are usable for project objectives as nondetect results. The positive and blank-qualified results for antimony, arsenic, cadmium, chromium, cobalt, copper, lead, nickel, thallium, vanadium, and zinc in all soil samples; and for manganese in sample D05732 were qualified as estimated (J) due to positive interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations and quantitation limits that may be biased high.

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

Table IIa
Overall Evaluation of Data for Low Concentration Metals and Mercury Analyses
Callahan Mining Superfund Site
Case 0248M, SDG D05729
Surface Soil Samples

Low Concentration Metals and Mercury					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: A^1 A^3 A^4 J^1 J^2 J^3 J^4 J^5 J^6 J^7 J^8 J^9 J^{11}	Refer to qualifications in Table I: A^2 J^{10}	Not applicable for Tier II	**Minor Impact on Data Usability (Results usable for project objectives)**: The nondetect results for selenium in samples D05738 and D05740 were elevated to their sample-specific negative blank action levels due to negative instrument drift and blank contamination. These results are usable for project objectives as estimated quantitation limits with a possible low bias. The positive results for nickel and zinc in all soil samples were qualified as estimated (J) due to high matrix spike recovery. The results are usable for project objectives as estimated values that may be biased high. The positive results for antimony and potassium were qualified as estimated (J) due to low matrix spike recovery. The results are usable for project objectives as estimated values that may be biased low. The positive results for barium and silver in all soil samples were qualified as estimated (J) due to recovery exceedances in the laboratory control sample. These results are usable for project objectives as estimated concentrations with a possible high bias.

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

Table IIa
Overall Evaluation of Data for Low Concentration Metals and Mercury Analyses
Callahan Mining Superfund Site
Case 0248M, SDG D05729
Surface Soil Samples

Low Concentration Metals and Mercury					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: A^1 A^3 A^4 J^1 J^2 J^3 J^4 J^5 J^6 J^7 J^8 J^9 J^{11}	Refer to qualifications in Table I: A^2 J^{10}	Not applicable for Tier II	**Minor Impact on Data Usability (Results usable for project objectives):** The positive and nondetect results for selenium in all soil samples were qualified as estimated (J and UJ, respectively) due to negative interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations and quantitation limits with a possible low bias. The positive results for arsenic, cadmium, and magnesium in all soil samples were qualified as estimated (J) due to high recoveries in the PE sample. The results are usable for project objectives as estimated values that may be biased high. The positive results for potassium in all soil samples were qualified as estimated (J) due to serial dilution imprecision. The results are usable for project objectives as estimated values with an indeterminate direction of bias.

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

Table IIa
Overall Evaluation of Data for Low Concentration Metals and Mercury Analyses
Callahan Mining Superfund Site
Case 0248M, SDG D05729
Surface Soil Samples

Low Concentration Metals and Mercury					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: A^1 A^3 A^4 J^1 J^2 J^3 J^4 J^5 J^6 J^7 J^8 J^9 J^{11}	Refer to qualifications in Table I: A^2 J^{10}	Not applicable for Tier II	**Minor Impact on Data Usability (Results usable for project objectives):** The positive and blank-qualified results for the following samples and analytes were qualified as estimated (J and UJ respectively) because they were less than the quantitation limit but greater than the MDL. These results are usable for project objectives as estimated concentrations and quantitation limits. antimony: D05731, D05732, D05733, D05734, D05735, D05737, D05740 beryllium: D05732 cobalt; D05731, D05732, D05733, D05734 copper: D05731 nickel: D05731, D05732, D05734 selenium: D05730, D05731, D05732, D05733, D05734, D05736, D05737 sodium: all soil samples thallium: all soil samples

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

Table IIb
Overall Evaluation of Data for Low Concentration Metals and Mercury Analyses
Callahan Mining Superfund Site
Case 0249M, SDG D05729
Aqueous QC Sample

Low Concentration Metals and Mercury					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: A^1 A^2 A^3 J^1 J^2 J^3 J^4 J^5	Refer to qualifications in Table I: None	Not applicable for Tier II	**Minor Impact on Data Usability (Results usable for project objectives):** The nondetect mercury result in sample D05741 was qualified as estimated (J) due to holding time exceedance. These results are usable for project objectives as an estimated quantitation limits. The positive result for antimony in sample D05741 was qualified as nondetect (U) at the negative blank action limit due to negative instrument drift. This result is usable for project objectives as nondetect results. The positive results for aluminum, calcium, copper, iron, lead, magnesium, sodium, thallium, vanadium, and zinc in sample D05741 were qualified as nondetect (U) at the reported concentration due to method or instrument blank contamination. These results are usable for project objectives as nondetect results. The nondetect result for cobalt in sample D05741 was qualified as estimated (UJ) due to negative instrument drift. These results are usable for project objectives as estimated quantitation limits with a possible low bias.

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

Table IIb
Overall Evaluation of Data for Low Concentration Metals and Mercury Analyses
Callahan Mining Superfund Site
Case 0249M, SDG D05729
Aqueous QC Sample

Low Concentration Metals and Mercury					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: A^1 A^2 A^3 J^1 J^2 J^3 J^4 J^5	Refer to qualifications in Table I: None	Not applicable for Tier II	**Minor Impact on Data Usability (Results usable for project objectives):** The nondetect result for selenium in sample D05741 was elevated to the sample-specific negative blank action level due to negative instrument drift and blank contamination. These results are usable for project objectives as estimated quantitation limits with a possible low bias. The nondetect result for selenium in sample D05741 was qualified as estimated (UJ) due to negative interferences seen in the ICSA solution analyses. This result is usable for project objectives as an estimated quantitation limit with a possible low bias. The positive and blank-qualified results for aluminum, barium, calcium, chromium, copper, lead, magnesium, nickel, sodium, thallium, vanadium, and zinc in sample D05741 were qualified as estimated (J and UJ, respectively) because they were less than the quantitation limit but greater than the MDL. These results are usable for project objectives as estimated concentrations and quantitation limits.

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

Table IIb
Overall Evaluation of Data for Low Concentration Metals and Mercury Analyses
Callahan Mining Superfund Site
Case 0249M, SDG D05729
Aqueous QC Sample

Low Concentration Metals and Mercury					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: A^1 A^2 A^3 J^1 J^2 J^3 J^4 J^5	Refer to qualifications in Table I: None	Not applicable for Tier II	**Minor Impact on Data Usability (Results usable for project objectives)**: The positive and blank-qualified results for chromium, copper, lead, nickel, thallium, vanadium, and zinc in sample D05741 were qualified as estimated (J and UJ, respectively) due to positive interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations and quantitation limits with a possible high bias.

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

SITE: Callahan Mining Superfund Site
CASE NO.: 0248M
SDG NO.: D05729

DATA SUMMARY TABLE
Inorganic Analysis (D-044.2)
Soil (mg/Kg)

	Traffic Report Sample No.	D05729	D05730	D05731	D05732	D05733
	M&E Sample ID	SS-421	SS-422	SS-423	SS-424	SS-425
	Lab Sample ID	0412024-01	0412024-02	0412024-03	0412024-04	0412024-05
	Date Sampled	11/30/04	11/30/04	11/30/04	11/30/04	11/30/04
	% Solids	75.6	74.7	80.9	79.6	70.6
	Comments					
Analyte	RL					
Aluminum	4.0	14000	15000	800	720	4500
Antimony	0.15	0.29 J	0.21 J	0.073 J	0.045 J	0.12 J
Arsenic	0.20	11 J	11 J	0.49 J	0.59 J	3.6 J
Barium	2.0	49 JEB	26 JEB	13 JEB	6.4 JEB	13 JEB
Beryllium	0.040	0.30	0.33	0.034	0.022 J	0.089
Cadmium	0.010	0.18 J	0.12 J	0.056 J	0.033 J	0.051 J
Calcium	8.0	260 J	230 J	210 J	97 J	140 J
Chromium	1.0	20 JEB	23 JEB	1.2 JEB	0.83 JEB	5.5 JEB
Cobalt	2.0	3.7 J	3.9 J	0.10 J	0.074 J	0.76 J
Copper	1.0	15 J	14 J	0.63 J	1.1 J	2.7 J
Iron	4.0	19000	25000	800	800	7900
Lead	0.40	29 J	17 J	4.0 J	6.2 J	18 J
Magnesium	10	2200 J	2900 J	54 J	60 J	580 J
Manganese	1.0	170	200	16	6.6 J	38
Mercury	0.010	0.12 J	0.052 J	0.020 J	0.027 J	0.046 J
Nickel	2.0	16 JEB	16 JEB	0.66 JEB	0.47 JEB	2.8 JEB
Potassium	50	570 J	620 J	120 J	120 J	220 J
Selenium	1.0	0.97 J	0.76 J	0.51 UJ	0.54 UJ	0.56 UJ
Silver	0.020	0.27 J	0.32 J	0.038 J	0.11 J	0.16 J
Sodium	50	62 J	44 J	22 J	16 J	25 J
Thallium	0.40	0.12 J	0.11 J	0.018 J	0.020 J	0.059 J
Vanadium	1.0	32 J	36 J	3.0 J	2.5 J	15 J
Zinc	2.0	72 J	64 J	3.8 J	3.6 J	17 J

SITE: Callahan Mining Superfund Site
CASE NO.: 0248M
SDG NO.: D05729

DATA SUMMARY TABLE
Inorganic Analysis (D-044.2)
Soil (mg/Kg)

Traffic Report Sample No.		D05734	D05735	D05736	D05737	D05738
M&E Sample ID		SS-426	SS-427	SS-428	SS-429	SS-430
Lab Sample ID		0412024-06	0412024-07	0412024-08	0412024-09	0412024-10
Date Sampled		11/30/04	11/30/04	11/30/04	11/30/04	11/30/04
% Solids		78.9	68.3	59.9	59.9	66.1
Comments			FD of D05740			
Analyte	RL					
Aluminum	4.0	1900	26000	24000	24000	14000
Antimony	0.15	0.052 J	0.089 J	0.39 J	0.13 J	0.17 J
Arsenic	0.20	1.3 J	7.9 J	14 J	11 J	12 J
Barium	2.0	4.5 JEB	22 JEB	20 JEB	17 JEB	12 JEB
Beryllium	0.040	0.041	0.40	0.40	0.30	0.16
Cadmium	0.010	0.025 J	0.097 J	0.087 J	0.082 J	0.063 J
Calcium	8.0	130 J	170 J	240 J	140 J	110 J
Chromium	1.0	1.6 JEB	23 JEB	21 JEB	22 JEB	16 JEB
Cobalt	2.0	0.23 J	3.4 J	2.8 J	2.3 J	1.8 J
Copper	1.0	1.2 J	6.3 J	8.8 J	5.7 J	4.7 J
Iron	4.0	2800	27000	34000	28000	36000
Lead	0.40	9.0 J	10 J	14 J	13 J	38 J
Magnesium	10	200 J	2800 J	3200 J	3100 J	1900 J
Manganese	1.0	14	200	250	170	120
Mercury	0.010	0.021 J	0.075 J	0.11 J	0.090 J	0.067 J
Nickel	2.0	0.74 JEB	19 JEB	10 JEB	8.9 JEB	9.7 JEB
Potassium	50	160 J	490 J	390 J	350 J	220 J
Selenium	1.0	0.46 UJ	0.93 J	0.83 J	0.67 UJ	0.60 UJ
Silver	0.020	0.072 J	0.18 J	0.18 J	0.17 J	0.13 J
Sodium	50	27 J	34 UJ	36 UJ	47 UJ	34 J
Thallium	0.40	0.035 J	0.075 J	0.086 J	0.076 J	0.061 J
Vanadium	1.0	8.3 J	32 J	32 J	34 J	46 J
Zinc	2.0	5.4 J	18 J	74 J	58 J	39 J

SITE: Callahan Mining Superfund Site
CASE NO.: 0248M
SDG NO.: D05729

DATA SUMMARY TABLE
Inorganic Analysis (D-044.2)
Soil (mg/Kg)

	Traffic Report Sample No.	D05740
	M&E Sample ID	SSE-427
	Lab Sample ID	0412024-11
	Date Sampled	11/30/04
	% Solids	70.5
	Comments	FD of D05735
Analyte	RL	
Aluminum	4.0	26000
Antimony	0.15	0.087 J
Arsenic	0.20	6.9 J
Barium	2.0	20 JEB
Beryllium	0.040	0.36
Cadmium	0.010	0.093 J
Calcium	8.0	610 J
Chromium	1.0	23 JEB
Cobalt	2.0	4.9 J
Copper	1.0	6.7 J
Iron	4.0	30000
Lead	0.40	12 J
Magnesium	10	5200 J
Manganese	1.0	320
Mercury	0.010	0.078 J
Nickel	2.0	16 JEB
Potassium	50	410 J
Selenium	1.0	0.51 UJ
Silver	0.020	0.13 J
Sodium	50	32 UJ
Thallium	0.40	0.066 J
Vanadium	1.0	48 J
Zinc	2.0	87 J

SITE: Callahan Mining Superfund Site
CASE NO.: 0248M
SDG NO.: D05729

DATA SUMMARY TABLE
Metals and Mercury Analysis (D-044.2)
Aqueous QC Sample (ug/L)

	Traffic Report Sample No.	D05741
	M&E Sample ID	RB-004
	Lab Sample ID	0412024-12
	Date Sampled	12/01/04
	Comments	Equipment Blank
Analyte	RL	
Aluminum	40.0	52 UJ
Antimony	1.5	0.28 U
Arsenic	2.0	0.13 U
Barium	20.0	0.38 J
Beryllium	0.40	0.20 U
Cadmium	0.10	0.098 U
Calcium	80.0	50 UJ
Chromium	10.0	7.6 J
Cobalt	20.0	0.038 UJ
Copper	10.0	2.9 UJ
Iron	40.0	44 U
Lead	4.0	1.1 UJ
Magnesium	100	10 UJ
Manganese	10.0	4.1 U
Mercury	0.10	0.008 UJ
Nickel	20.0	0.84 J
Potassium	500	30 U
Selenium	10.0	0.91 UJ
Silver	0.20	0.12 U
Sodium	500	30 UJ
Thallium	4.0	0.070 UJ
Vanadium	10.0	0.19 UJ
Zinc	20.0	7.1 UJ

DATA SUMMARY TABLE
DEFINITIONS (Inorganics)

EB	As a qualifier for soil/sediment samples: Analyte is also detected in the equipment blank
FD	Field Duplicate
g	gram
J	The concentration is an estimated quantity
mg/Kg	milligrams per Kilogram
R	The data are rejected as unusable
RL	Reporting Limit
U	Analyte was analyzed for but not detected at the specified reporting limit
ug/L	micrograms per Liter
UJ	The sample quantitation limit is an estimated quantity
NA	Not Applicable

Metcalf & Eddy

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036.200100.0061.00005

March 11, 2005

Christine Clark
Regional Sample Control Center
U.S. EPA Region I
11 Technology Drive
North Chelmsford, Massachusetts 01863-2431

Re: Work Assignment No. 161-RICO-017H
Case 0248M, SDG D05711
Woods Hole Group, Raynham, Massachusetts
Callahan Mining Superfund Site, Brooksville, Maine
Tier II Inorganic Data Validation

Low Concentration Metals and Mercury: 10/Surface Soils/D05711, D05714, D05716, D05717, D05722, D05723, D05725, D05726, D05727, D05728
(Field Duplicate Pair: D05735 and D05740, in Case 0248M, SDG D05729)
1/Aqueous Equipment Blank/D05741 (in Case 0248M, SDG D05729)
1/Performance Evaluation Sample/D05743 (in Case 0248M, SDG D05729)

Dear Ms. Clark:

A Tier II data validation was performed by Metcalf & Eddy, Inc. (M&E) on the low concentration metals and mercury analytical data for ten surface soil samples, one performance evaluation (PE) sample, and one equipment blank sample collected from the Callahan Mining Superfund Site, located in Brooksville, Maine, by TRC on November 30, 2004. The samples were analyzed through the Response Action Contract (RAC) Delivery of Analytical Services (DAS) program using M&E DAS *Analytical Specification for the Analysis of Low Concentration Metals Including Cyanide in Solid Samples (Including Samples with High Moisture Content* (D-044.2), based on EPA methodology. M&E evaluated these data using the *Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Inorganic Analyses*, February 1989 criteria, modified for the methods and incorporating organic data validation guidance, *Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses*, December 1996 criteria. Additional guidance was provided by *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

The Tier II metals data validation was based on the following parameters:

- Overall Evaluation of Data and Potential Usability Issues
- Data Completeness (CSF Audit - Tier I)
- Preservation and Technical Holding Times
- Instrument Calibration
- * ICP-MS Internal Standards
- * ICP-MS Tuning, Mass Calibration, and Resolution Check
- Blanks
- Inductively Coupled Plasma Interference Check Sample
- Matrix Spike
- Laboratory Duplicate
- Field Duplicates
- NA Furnace Atomic Absorption Analysis
- Inductively Coupled Plasma Serial Dilution
- Laboratory Fortified Blank
- * Instrument Detection Limits
- Sample Quantitation Results
- Performance Evaluation Sample /Accuracy Check

* - all criteria met for this parameter
NA - parameter not applicable

Note: Worksheets are not included for parameters that have met criteria or for criteria that are not applicable to a Tier II data validation.

Copies of the field sampling notes for this sample delivery group (SDG) are included with the Data Validation Memorandum for Case 0248M, SDG D05729, previously submitted to EPA.

<u>The following information was used to generate the Data Validation Memorandum attachments:</u>

Table I: Recommendation Summary Table - summarizes validation recommendations
Table II: Overall Evaluation of Data - summarizes site DQOs and potential usability issues
Data Summary Tables - summarizes accepted, qualified, and rejected data

<u>Overall Evaluation of Data and Potential Usability Issues</u>

The following is a summary of the site DQOs (Data Quality Objectives):

- To determine nature and extent of contamination and to support a human health risk assessment.

The low concentration metals and mercury sample results were qualified as a result of sampling and analytical error. Qualifications as a result of sampling error are summarized below:

- The positive and nondetect results for barium, chromium, and nickel in all soil samples were qualified "EB" due to equipment blank contamination. An indeterminate amount of sampling error may have affected these sample results. The results are usable for project objectives. These qualifications have a minor impact on data usability.

- The positive results for calcium, magnesium, and zinc in all soil samples were qualified as estimated (J) due to field duplicate imprecision. The results are usable for project objectives as estimated values with an indeterminate direction of bias. This qualification has a minor impact on the data usability.

Qualifications as a result of analytical error are summarized below:

- The positive mercury results in all soil samples were qualified as estimated (J) due to holding time exceedances. These results are usable for project objectives as estimated concentrations with a possible low bias. These qualifications have a minor impact on the data usability.

- The positive results for cobalt in samples D05711, D05714, D05716, D05723, D05725, and D05726; for magnesium in samples D05711, D05714, D05716, and D05717; and for potassium in samples D05723, D05725, D05726, D05727, and D05728 were qualified as estimated (J) due to continuing calibration standard recovery exceedances. The results are usable for project objectives as estimated concentrations with a possible high bias. These qualifications have a minor impact on the data usability.

- The positive results for sodium in samples D05714, D05717, D05725, D05727, and D05728 were qualified as nondetect (U) at the reported concentration due to method blank contamination. These results are usable for project objectives as nondetects. This qualification has a minor impact on data usability. Note that these results were also qualified as estimated (J) because they were less than the quantitation limit but greater than the method detection limit (MDL). Therefore, the overall qualification for this analyte is estimated nondetect (UJ).

- The positive result for cobalt in sample D05714 and the nondetect results for cobalt in samples D05717 and D05722 were qualified as estimated (J and UJ, respectively) due to negative instrument drift. This qualification has a minor impact on data usability. The results are usable for project objectives as an estimated concentrations and quantitation limits with a possible low bias.

- The positive results for arsenic, cadmium, chromium, copper, lead, manganese, nickel, silver, thallium, vanadium, and zinc in all soil samples; and for antimony in all soil samples except D05722 were qualified as estimated (J) due to positive interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations with a possible high bias. This qualification has a minor impact on data usability.

- The positive and nondetect results for cobalt and selenium in all soil samples were qualified as estimated (J and UJ, respectively) due to negative interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations and quantitation limits with a possible low bias. This qualification has a minor impact on data usability.

- The positive results for mercury in all soil samples were qualified as estimated (J) due to high matrix spike recovery. The results are usable for project objectives as estimated values that may be biased high. This qualification has a minor impact on the data usability.

- The positive results for antimony in all soil samples except D05722 were qualified as estimated (J) due to low matrix spike recovery. The results are usable for project objectives as estimated values that may be biased low. This qualification has a minor impact on the data usability.

- The nondetect result for antimony in sample D05722 was rejected (R) due to low matrix spike recovery. The result is not usable for project objectives. This qualification may have a major impact on data usability.

- The positive results for antimony, cadmium, and zinc in all samples were qualified as estimated (J) due to laboratory duplicate imprecision. The results are usable for project objectives as estimated values with an indeterminate direction of bias. This qualification has a minor impact on the data usability.

- The positive results for beryllium, cadmium, cobalt, mercury, silver, sodium, and thallium in all soil samples were qualified as estimated (J) due to serial dilution imprecision. The results are usable for project objectives as estimated values with an indeterminate direction of bias. This qualification has a minor impact on the data usability.

- The positive results for arsenic, cadmium, and magnesium in all soil samples were qualified as estimated (J) due to high recoveries in the PE sample. The results are usable for project objectives as estimated values with a possible high bias. This qualification has a minor impact on the data usability.

- The positive and blank-qualified results for the following samples and analytes were qualified by the laboratory as estimated (J and UJ, respectively) because they were less than the quantitation limit but greater than the MDL. These results are usable for project objectives as estimated concentrations and quantitation limits. This qualification has a minor impact on the data usability.

antimony:	D05717
cobalt:	D05714, D05716
nickel:	D05714, D05717, D05722
sodium:	all soil samples
thallium:	D05727, D05728

Data Completeness

The laboratory was contacted on February 28, 2005 concerning the following:

1. A Form I was not provided for sample D05716

2. The final CCB is not listed on Forms III, XIII, or XV for the January 13, 2005 ICP-MS analysis sequence.

3. Cadmium should be flagged "E"because of the serial dilution exceedance.

The laboratory provided an acceptable response on March 1 and 3, 2005.

Preservation and Technical Holding Times

All mercury analyses were performed 30 days after sampling, which exceeds the 28-day holding time requirement. The positive mercury results in all soil samples were qualified as estimated (J) due to these holding time exceedances. These results are usable for project objectives as estimated concentrations.

Instrument Calibration

The following table summarizes the continuing calibration verification (CCV) standard recoveries that did not meet the 90% - 110% recovery acceptance criteria, the validation action, and the samples affected:

Analyte	CCV	Recovery	Action	Samples Affected
cobalt	01/04/05 10:39	112%	Qualify the positive results as estimated (J)	D05711

Analyte	CCV	Recovery	Action	Samples Affected
cobalt	01/04/05 11:32	112%	Qualify the positive results as estimated (J)	D05714, D05716, D05723, D05725, D05726
chromium	1/13/05 15:43	114%	Qualify the positive results as estimated (J)	None; no reported results prior to this CCV
sodium	01/14/05 13:49	113%	Qualify the positive results as estimated (J)	None; no reported results prior to this CCV
potassium	01/14/05 15:55	111%	Qualify the positive results as estimated (J)	D05723, D05725, D05726, D05727, D05728
sodium	01/14/05 16:02	89%	Qualify the positive results as estimated (J)	None; no reported results prior to this CCV.
barium	01/14/05 16:16	88%	Qualify the positive results as estimated (J)	None; no reported results prior to this CCV
magnesium	01/18/05 20:44	114%	Qualify the positive results as estimated (J)	D05711, D05714, D05716, D05717

The following table summarizes the reporting limit standard (CRI) recoveries that did not meet the 80% - 120% recovery acceptance criteria, the validation action, and the samples affected:

Analyte	CRI	Recovery	Action	Samples Affected
iron	01/20/05 22:37	65%	Qualify the positive and nondetect results as estimated (J and UJ, respectively)	None; all iron results greater than 2x reporting limit.

Blanks

The following table summarizes the blank contamination detected in the laboratory blanks associated with the soil samples. If a contaminant was detected in more than one blank, the highest concentration was used to qualify associated sample results and is summarized below. The nominal Blank Action Levels (BAL) from the method blank were calculated based on a 1gm sample weight (dry), 50mL final volume, and two-fold dilution. The nominal BALs from instrument blanks were based on a 1gm sample weight (dry) and 50mL final volume. Sample-specific BALs are further adjusted for actual sample weights, moisture content, and any additional dilutions.

Analyte	Blank Type	Maximum Blank Concentration	Nominal Blank Action Level (BAL) mg/Kg	Action/Samples Affected
aluminum	mb	1.5 mg/Kg	7.5	No action; all results greater than BAL
arsenic	inst	0.09 µg/L	0.045	No action; all results greater than BAL
	inst	-0.17 µg/L	0.085	
barium	mb	0.0058 mg/Kg	0.029	No action; all results greater than BAL
calcium	mb	1.5 mg/Kg	7.5	No action; all results greater than BAL
	inst	-11 µg/L	5.5	
chromium	inst	-0.17 µg/L	0.085	No action; all results greater than BAL
cobalt	inst	-0.55 µg/L	0.28	Qualify the positive result as estimated (J) in sample D05714. Qualify the nondetect results as estimated (UJ) in samples D05717 and D05722.
copper	mb	0.028 mg/Kg	0.14	No action; all results greater than BAL
iron	mb	2.6 mg/Kg	13.0	No action; all results greater than BAL
	inst	-9.9 µg/L	5.0	No action; all results greater than BAL
lead	mb	0.019 mg/Kg	0.095	No action; all results greater than BAL
magnesium	mb	1.70 mg/Kg	8.5	No action; all results greater than BAL
manganese	mb	0.14 mg/Kg	0.70	No action; all results greater than BAL
potassium	inst	61 µg/L	31.0	No action; all results greater than BAL
	inst	-9.6 µg/L	4.8	
selenium	inst	0.80 µg/L	0.40	No action; all results greater than BAL
	inst	-0.35 µg/L	0.18	
sodium	mb	2.8 mg/Kg	14.0	Qualify the positive result for sample D05714, D05717, D05725, D05727, and D05728 as nondetect (U) at the reported value.
thallium	mb	0.012 mg/Kg	0.060	No action; all results greater than BAL
vanadium	inst	0.34 µg/L	0.17	No action; all results greater than BAL
	inst	-0.47 µg/L	0.24	

Analyte	Blank Type	Maximum Blank Concentration	Nominal Blank Action Level (BAL) mg/Kg	Action/Samples Affected
zinc	mb	0.21 mg/Kg	1.05	No action; all results greater than BAL

inst - instrument blank (i.e., ICB or CCB)
mb - method blank

For positive blank contamination, sample results were qualified as follows:

- If the sample was nondetect, qualification of the data was not required.
- If the sample result was > MDL and ≤ positive BAL, the result was qualified as a nondetect (U) at the reported concentration
- If the sample result was > positive BAL, qualification of the data was not required

For negative blank contamination, sample results were qualified as follows:

- If the sample result was positive and ≤ negative BAL, the result was qualified as estimated (J)
- If the sample result was nondetect, the MDL was qualified as estimated (UJ)
- If the sample result was > MDL and > negative BAL, qualification of the data was not required

For positive and negative blank contamination where the negative BAL is < the positive BAL, sample results were qualified as follows:

- If the sample result was >MDL and > negative BAL but ≤ positive BAL, the result was qualified as nondetect (U) at the reported concentration.
- If the sample result was > MDL and < negative BAL, the result was qualified as nondetect (U) at the negative BAL.
- If the sample result was nondetect, elevate the MDL to the negative BAL.
- If the sample result was > positive BAL, qualification of the data was not required

For positive and negative blank contamination where the negative BAL is > the positive BAL, sample results were qualified as follows:

- If the sample result was > MDL but ≤ negative BAL, the result was qualified as nondetect (U) at the negative BAL.
- If the sample result was nondetect, elevate the MDL to the negative BAL.
- If the sample result was > negative BAL, qualification of the data was not required

The data for the equipment blank sample (D05741) associated with these samples is located in the data package for Case 0248M, SDG D05729 and was validated as part of the data set. As a result of the contamination detected in the equipment blank sample and any validation actions applied to that sample data, the following table summarizes the level of blank contamination detected in the equipment blank associated with the surface soil samples:

Analyte	Blank Concentration (µg/L)	Action/Samples Affected
barium	0.38	Qualify all soil samples (EB).
chromium	7.6	Qualify all soil samples (EB).

Analyte	Blank Concentration (µg/L)	Action/Samples Affected
nickel	0.84	Qualify all soil samples (EB).

Inductively Coupled Plasma Interference Check Sample

Positive results for antimony, arsenic, cadmium, chromium, copper, lead, manganese, nickel, silver, thallium, vanadium, and zinc were reported in the ICSA solution analyses at concentrations greater than the MDLs. Results for cobalt and selenium were reported in the ICSA solution at a concentration greater than the negative MDL.

The positive results for arsenic, cadmium, chromium, copper, lead, manganese, nickel, silver, thallium, vanadium, and zinc in all soil samples; and for antimony in all soil samples except D05722 were qualified as estimated (J) due to positive interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations with a possible high bias.

The positive and nondetect results for cobalt and selenium in all soil samples were qualified as estimated (J and UJ, respectively) due to negative interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations and quantitation limits with a possible low bias.

Matrix Spike (MS)

Sample D05716 was analyzed as the matrix spike with this data set. The analytes that did not meet recovery (%R) acceptance criteria of 75% - 125% and the actions taken are summarized in the table below:

Analyte	Spiked Sample Result (mg/Kg)	Sample Result (mg/Kg)	Spike Added (mg/Kg)	MS %R	Affected Samples/Action
antimony	0.54	0.26	0.98	0	Qualify as estimated (J) the positive results in all samples. Reject (R) the nondetect result in sample D05722.
mercury	0.59	0.38	0.11	198	Qualify as estimated (J) the positive results in all soil samples.

Laboratory Duplicates

Sample D05716 was analyzed as a laboratory duplicate in association with this data set. The analytes that did not meet the relative percent difference (RPD) criterion of <35% for analytes greater than 5x reporting limit or the absolute difference criterion of >2x reporting limit for those less than <5x reporting limit, and the actions taken are summarized in the following table:

Analyte	Sample Result (mg/Kg)	Duplicate Result (mg/Kg)	%RPD	Actions
antimony	2.6	0.50	135	Qualify as estimated (J) the positive antimony results in all samples.
cadmium	0.37	1.1	99	Qualify as estimated (J) the positive cadmium results in all samples.
zinc	250	490	65	Qualify as estimated (J) the positive zinc results in all samples.

Field Duplicates

Samples D05735 and D05740 (located in Case 0248M, SDG D05729) were the field duplicate pair analyzed in association with these soil samples. The analytes that did not meet the field duplicate relative percent difference (RPD) criterion of <50% for analytes greater than 5x reporting limit or the absolute difference criterion of >4x reporting limit for those less than <5x reporting limit, and the actions taken are summarized in the following table:

Analyte	D05735 (mg/Kg)	D05740 (mg/Kg)	%RPD	Actions
calcium	170	610	113	Qualify as estimated (J) the positive calcium results in all samples.
magnesium	2800	5200	60	Qualify as estimated (J) the positive magnesium results in all samples.
zinc	18	87	131	Qualify as estimated (J) the positive zinc results in all samples.

Inductively Coupled Plasma Serial Dilution

An ICP serial dilution analysis was performed on sample D05716. The analytes that did not meet the percent difference (%D) validation criterion of 15% for results greater than 50x the MDL and the actions taken are summarized in the following table:

Analyte	50x MDL (mg/Kg)	Sample (mg/Kg)	Serial Dilution (mg/Kg)	%D	Actions
beryllium	0.061	0.14	0.17	26	Qualify as estimated (J) the positive beryllium results in all samples.
cadmium	0.051	0.37	0.45	22	Qualify as estimated (J) the positive cadmium results in all samples.
cobalt	0.026	0.31	0.12	61	Qualify as estimated (J) the positive cobalt results in all samples.
silver	0.054	5.2	6.2	19	Qualify as estimated (J) the positive silver results in all samples.
sodium	22.1	120	140	17	Qualify as estimated (J) the positive sodium results in all samples.
thallium	0.035	2.0	2.4	21	Qualify as estimated (J) the positive thallium results in all samples.

A serial dilution determination was also performed on sample D05716 for mercury. The %D for this analysis (19%) exceeded the validation criterion of 15% for results greater than 50x the MDL. Although this analysis is not required under the DAS specification, the results were evaluated as an indication of possible matrix interferences. Professional judgment was used to estimate (J) the positive results for all soil samples due to serial dilution imprecision.

Laboratory Fortified Blanks

The recovery for iron (186%) exceeded the 70% - 130% acceptance criteria in the laboratory fortified blank (LFB). Because the concentration of iron in the soil samples were significantly higher than that in the LFB and the laboratory control sample showed acceptance recovery, professional judgment was used to not qualify the positive results for iron.

Performance Evaluation Sample/Accuracy Check

Performance Evaluation Sample

The metals and mercury PE sample D05743 (EPA ampule number MS01878), reported in Case 0248M, SDG D05729, was evaluated with this SDG. Eight analytes were scored "Within Limits," eight analytes were scored "Not Evaluated," and four were scored "Warning High." No validation action was necessary on the basis of these results. Three analytes (arsenic, cadmium, and magnesium) were scored "Action High." On the basis of those scores, the positive results for arsenic, cadmium, and magnesium in all soil samples were qualified as estimated (J). These results are usable for project objectives as estimated concentrations with a possible high bias.

Laboratory Control Sample

All laboratory control samples met the 80% - 120% acceptance criteria. No validation action was required.

Sample Quantitation Results

The positive and blank-qualified results for the following samples and analytes were qualified as estimated (J and UJ, respectively) because they were less than the quantitation limit but greater than the MDL. These results are usable for project objectives as estimated concentrations. This qualification has a minor impact on the data usability.

antimony:	D05717
cobalt:	D05714, D05716
nickel:	D05714, D05717, D05722
sodium:	all soil samples
thallium:	D05727, D05728

Please contact Ms. Constance Lapite at (781) 224-6628 or at constance.lapite@m-e.com if you have any questions regarding this Tier II validation.

Very truly yours,

Richard Purdy
Data Validator

Elizabeth Denly

Elizabeth Denly
Senior Reviewer

Constance Lapite

Constance Lapite
RAC Lead Chemist

cc: Leslie McVickar, EPA Remedial Project Manager (Data Validation Memorandum, Data Summary Tables)
✓Elizabeth Denly, TRC Project Chemist (entire package)
Denise Laferte, M&E Oversight Chemist (Data Validation Memorandum, Data Summary Tables)
Richard Purdy, M&E Data Validation Chemist (entire package)
Callahan Mine Project File, Work Assignment No. 161-RICO-017H

Attachments:
- IRDA
- Table I: Recommendations Summary Table
- Table II: Overall Evaluation of Data
- Data Summary Tables
- Data Validation Worksheets
- PE Score Report(s)
- Copy of non-CLP Analytical Methods (M&E DAS Specification D-044.2)
- Copies of Telephone Logs/Communications Forms
- Supporting Data for Reduced Payment Recommendations (not applicable)
- Copies of Field Sampling Notes (previously submitted)
- Copies of EPA-approved Amendments to QAPjP or SAP (not applicable)
- CSF Completeness Evidence Audit (DC-2 Form)
- DQO Summary Form

Region 1

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 0248M

SITE Callahan Mine

LABORATORY Woods Hole Group

NO. OF SAMPLES/ MATRIX 10 SS

SDG# D05711

REVIEWER (IF NOT ESD) **Metcalf & Eddy**

SOW# D044.2

REVIEWER'S NAME **Richard Purdy**

DPO: ACTION ________ FYI XX ________

COMPLETION DATE 3/3/05

DATA ASSESSMENT SUMMARY

		ICP-AES	ICP-MS	Hg	CYANIDE
1.	DATA COMPLETENESS		O^3	O	
2.	HOLDING TIMES		O	O^1	
3.	CALIBRATIONS		O^2	O	
4.	BLANKS		O^4	O	
5.	ICS		O^2	—	
6.	MATRIX SPIKE		O^2	O^2	
7.	LABORATORY DUPLICATES		O^2	O	
8.	FIELD DUPLICATES		O^2	O	
9.	LABORATORY CONTROL SAMPLE		O	O	
10.	LABORATORY FORTIFED BLANK		O^2	O	
11.	SERIAL DILUTION		O^2	—	
12.	DETECTION LIMITS		O	O	
13.	SAMPLE QUANTITATION		O	O	
14.	OTHER QC		O	O	
15.	OVERALL ASSESSMENT		O	O	

O = Data had no problems/or qualified due to minor problems.
M = Data qualified due to a major problem.
Z = Data unacceptable.
X = Problems, but do not affect data.

ACTION ITEMS: O^1 - minor HT exceedance; O^2 - outside criteria; O^3 - forms required; O^4 - minor contamination

AREAS OF CONCERN: ________

NOTABLE PERFORMANCE: ________

Table I
Recommendation Summary Table for Low Concentration Metals and Mercury
Callahan Mining Superfund Site
Case 0249M, SDG D05711
Surface Soil Samples

Analyte	Action	Analyte	Action
aluminum	A	magnesium	J^2 J^9 J^{10}
antimony	J^4 J^6 J^7 J^{11} J^{12} R^1	manganese	J^4
arsenic	J^4 J^9	mercury	J^1 J^6 J^8
barium	A^2	nickel	A^2 J^4 J^{11}
beryllium	J^8	potassium	J^2
cadmium	J^4 J^7 J^8 J^9	selenium	J^5
calcium	J^{10}	silver	J^4 J^8
chromium	A^2 J^4	sodium	A^1 J^2 J^8 J^{11}
cobalt	J^2 J^3 J^5 J^8 J^{11}	thallium	J^4 J^8 J^{11}
copper	J^4	vanadium	J^4
iron	A	zinc	J^4 J^7 J^{10}
lead	J^4		

A	-	Accept all data.
A^1	-	Qualify positive results for sodium in samples D05714, D05717, D05725, D05727, and D05728 as nondetect (U) at the reported concentration due to method blank contamination.
A^2	-	Qualify "EB" the positive and nondetect results for barium, chromium, and nickel in all soil samples due to equipment blank contamination.
J^1	-	Qualify the positive mercury results in all soil samples as estimated (J) due to holding time exceedances.
J^2	-	Qualify as estimated (J) the positive results for cobalt in samples D05711, D05714, D05716, D05723, D05725, and D05726; for magnesium in samples D05711, D05714, D05716, and D05717; and for potassium in samples D05723, D05725, D05726, D05727, and D05728 due to continuing calibration standard recovery exceedances.
J^3	-	Qualify as estimated (J and UJ) the positive result for cobalt in sample D05714 and the nondetect results for cobalt in samples D05717 and D05722 due to negative instrument drift.
J^4	-	Qualify the positive results for arsenic, cadmium, chromium, copper, lead, manganese, nickel, silver, thallium, vanadium, and zinc in all soil samples; and for antimony in all soil samples except D05722 as estimated (J) due to positive interferences seen in the ICSA solution analyses.
J^5	-	Qualify the positive and nondetect results for cobalt and selenium in all soil samples as estimated (J and UJ, respectively) due to negative interferences seen in the ICSA solution analyses.

J^{6} - Qualify the positive results for mercury in all soil samples as estimated (J) due to high matrix spike recovery.

J^{7} - Qualify the positive results for antimony, cadmium, and zinc in all samples as estimated (J) due to laboratory duplicate imprecision.

J^{8} - Qualify the positive results for beryllium, cadmium, cobalt, mercury, silver, sodium, and thallium in all soil samples as estimated (J) due to serial dilution imprecision.

J^{9} - Qualify the positive results for arsenic, cadmium, and magnesium in all soil samples as estimated (J) due to high recoveries in the PE sample.

J^{10} - Qualify the positive results for calcium, magnesium, and zinc in all soil samples as estimated (J) due to field duplicate imprecision.

J^{11} - Qualify the positive and blank-qualified results for the following samples and analytes as estimated (J and UJ, respectively) because they were less than the quantitation limit but greater than the MDL.

antimony:	D05717
cobalt:	D05714, D05716
nickel:	D05714, D05717, D05722
sodium:	all soil samples
thallium:	D05727, D05728

J^{12} - Qualify the positive results for antimony in all soil samples except D05722 as estimated (J) due to low matrix spike recovery.

R^{1} - Reject (R) the nondetect result for antimony in sample D05722 due to low matrix spike recovery.

Table II
Overall Evaluation of Data for Low Concentration Metals and Mercury
Callahan Mining Superfund Site
Case 0248M, SDG D05711
Surface Soil Samples

Low Concentration Metals and Mercury					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: A^1 J^1 J^2 J^3 J^4 J^5 J^6 J^7 J^8 J^9 J^{11} J^{12} R^1	Refer to qualifications in Table I: A^2 J^{10}	Not applicable for Tier II	**Major Impact on Data Usability (Results are not usable for project objectives):** The nondetect result for antimony in sample D05722 was rejected (R) due to low matrix spike recovery. The result is not usable for project objectives. **Minor Impact on Data Usability (Results usable for project objectives):** The positive and nondetect results for barium, chromium, and nickel in all soil samples were qualified "EB" due to equipment blank contamination. An indeterminate amount of sampling error may have affected these sample results. The positive results for calcium, magnesium, and zinc in all soil samples were qualified as estimated (J) due to field duplicate imprecision. The results are usable for project objectives as estimated values with an indeterminate direction of bias. The positive result for cobalt in sample D05714 and the nondetect results for cobalt in samples D05717 and D05722 were qualified as estimated (J and UJ, respectively) due to negative instrument drift. The results are usable for project objectives as an estimated concentrations and quantitation limits with a possible low bias.

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

Table II
Overall Evaluation of Data for Low Concentration Metals and Mercury Analyses
Callahan Mining Superfund Site
Case 0249M, SDG D05711
Surface Soil Samples

Low Concentration Metals and Mercury					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: A^1 J^1 J^2 J^3 J^4 J^5 J^6 J^7 J^8 J^9 J^{11} J^{12} R^1	Refer to qualifications in Table I: A^2 J^{10}	Not applicable for Tier II	**Minor Impact on Data Usability (Results usable for project objectives):** The positive results for cobalt in samples D05711, D05714, D05716, D05723, D05725, and D05726; for magnesium in samples D05711, D05714, D05716, and D05717; and for potassium in samples D05723, D05725, D05726, D05727, and D05728 were qualified as estimated (J) due to continuing calibration standard recovery exceedances. The results are usable for project objectives as estimated concentrations with a possible high bias. The positive results for sodium in samples D05714, D05717, D05725, D05727, and D05728 were qualified as nondetect (U) at the reported concentration due to method blank contamination. This qualification has a minor impact on data usability. The positive mercury results in all soil samples were qualified as estimated (J) due to holding time exceedances. These results are usable for project objectives as estimated concentrations. The positive results for mercury in all soil samples were qualified as estimated (J) due to high matrix spike recovery. The results are usable for project objectives as estimated values that may be biased high.

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

Table II
Overall Evaluation of Data for Low Concentration Metals and Mercury
Callahan Mining Superfund Site
Case 0248M, SDG D05711
Surface Soil Samples

Low Concentration Metals and Mercury					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: A^{1} J^{1} J^{2} J^{3} J^{4} J^{5} J^{6} J^{7} J^{8} J^{9} J^{11} J^{12} R^{1}	Refer to qualifications in Table I: A^{2} J^{10}	Not applicable for Tier II	**Minor Impact on Data Usability (Results usable for project objectives):** The positive results for antimony in all samples except D05722 were qualified as estimated (J) due to low matrix spike recovery. The results are usable for project objectives as estimated values that may be biased high. The positive results for arsenic, cadmium, chromium, copper, lead, manganese, nickel, silver, thallium, vanadium, and zinc in all soil samples; and for antimony in all soil samples except D05722 were qualified as estimated (J) due to positive interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations with a possible high bias. The positive and nondetect results for cobalt and selenium in all soil samples were qualified as estimated (J and UJ, respectively) due to negative interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations and quantitation limits with a possible low bias. The positive results for antimony, cadmium, and zinc in all samples were qualified as estimated (J) due to laboratory duplicate imprecision. The results are usable for project objectives as estimated values with an indeterminate direction of bias.

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

Table II
Overall Evaluation of Data for Low Concentration Metals and Mercury
Callahan Mining Superfund Site
Case 0248M, SDG D05711
Surface Soil Samples

Low Concentration Metals and Mercury					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: A^1 J^1 J^2 J^3 J^4 J^5 J^6 J^7 J^8 J^9 J^{11} J^{12} R^1	Refer to qualifications in Table I: A^2 J^{10}	Not applicable for Tier II	**Minor Impact on Data Usability (Results usable for project objectives):** The positive results for beryllium, cadmium, cobalt, mercury, silver, sodium, and thallium in all soil samples were qualified as estimated (J) due to serial dilution imprecision. The results are usable for project objectives as estimated values with an indeterminate direction of bias. The positive results for arsenic, cadmium, and magnesium in all soil samples were qualified as estimated (J) due to high recoveries in the PE sample. The results are usable for project objectives as estimated values with a possible high bias. The positive and blank-qualified results for the following samples and analytes were qualified as estimated (J) because they were less than the quantitation limit but greater than the MDL. These results are usable for project objectives as estimated concentrations. antimony: D05717 cobalt: D05714, D05716 nickel: D05714, D05717, D05722 sodium: all soil samples thallium: D05727, D05728

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* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

SITE: Callahan Mining Superfund Site
CASE NO.: 0248M
SDG NO.: D05711

DATA SUMMARY TABLE
Inorganic Analysis (D-044.2)
Soil (mg/Kg)

Traffic Report Sample No.		D05711	D05714	D05716	D05717	D05722
M&E Sample ID		SS-403	SS-406	SS-408	SS-409	SS-414
Lab Sample ID		0412023-01	0412023-02	0412023-03	0412023-04	0412023-05
Date Sampled		11/30/04	11/30/04	11/30/04	11/30/04	11/30/04
% Solids		76.6	87.2	85.2	90.0	83.6
Comments						
Analyte	RL					
Aluminum	4.0	19000	57000	45000	60000	46000
Antimony	0.15	0.44 J	0.30 J	2.6 J	0.31 J	-- R
Arsenic	0.20	65 J	23 J	51 J	34 J	50 J
Barium	2.0	12 EB	9.6 EB	9.5 EB	5.4 EB	6.5 EB
Beryllium	0.040	0.28 J	0.17 J	0.14 J	0.35 J	0.12 J
Cadmium	0.010	22 J	0.78 J	0.37 J	0.81 J	0.37 J
Calcium	8.0	88000 J	120 J	91 J	280 J	30 J
Chromium	1.0	18 JEB	4.6 JEB	4.1 JEB	3.1 JEB	1.5 JEB
Cobalt	2.0	4.3 J	0.049 J	0.31 J	0.0012 UJ	0.0012 UJ
Copper	1.0	2500 J	340 J	5200 J	8200 J	14000 J
Iron	4.0	30000	40000	74000	55000	83000
Lead	0.40	990 J	240 J	820 J	380 J	350 J
Magnesium	10	39000 J	120000 J	94000 J	120000 J	97000 J
Manganese	1.0	1800 J	1300 J	970 J	1300 J	890 J
Mercury	0.0050	0.58 J	0.36 J	0.35 J	0.23 J	0.14 J
Nickel	2.0	15 JEB	1.3 JEB	1.7 JEB	0.62 JEB	0.20 JEB
Potassium	50	1800	4200	4000	1900	2700
Selenium	1.0	5.8 J	6.3 J	15 J	16 J	24 J
Silver	0.010	3.8 J	1.6 J	5.2 J	3.3 J	12 J
Sodium	50	18 J	38 UJ	120 J	26 UJ	21 J
Thallium	0.40	1.4 J	1.3 J	2.0 J	0.86 J	1.3 J
Vanadium	1.0	13 J	16 J	14 J	14 J	16 J
Zinc	2.0	6600 J	400 J	250 J	290 J	110 J

SITE: Callahan Mining Superfund Site
CASE NO.: 0248M
SDG NO.: D05711

DATA SUMMARY TABLE
Inorganic Analysis (D-044.2)
Soil (mg/Kg)

Traffic Report Sample No.		D05723	D05725	D05726	D05727	D05728
M&E Sample ID		SS-415	SS-417	SS-418	SS-419	SS-420
Lab Sample ID		0412023-06	0412023-07	0412023-08	0412023-09	0412023-10
Date Sampled		11/30/04	11/30/04	11/30/04	11/30/04	11/30/04
% Solids		83.4	91.7	84.2	69.7	70.0
Comments						
Analyte	RL					
Aluminum	4.0	40000	13000	46000	19000	20000
Antimony	0.15	4.1 J	0.84 J	0.35 J	0.19 J	0.18 J
Arsenic	0.20	46 J	23 J	57 J	10 J	13 J
Barium	2.0	8.2 EB	9.4 EB	16 EB	37 EB	34 EB
Beryllium	0.040	0.30 J	0.31 J	0.27 J	0.37 J	0.41 J
Cadmium	0.010	24 J	16 J	0.45 J	0.11 J	0.12 J
Calcium	8.0	1500 J	5900 J	210 J	450 J	310 J
Chromium	1.0	11 JEB	12 JEB	11 JEB	22 JEB	19 JEB
Cobalt	2.0	1.7 J	4.8 J	1.9 J	5.0 J	5.5 J
Copper	1.0	6600 J	1600 J	2000 J	14 J	10 J
Iron	4.0	42000	17000	57000	23000	28000
Lead	0.40	1600 J	520 J	260 J	26 J	22 J
Magnesium	10	77000 J	18000 J	82000 J	2900 J	3000 J
Manganese	1.0	960 J	480 J	1100 J	400 J	410 J
Mercury	0.0050	1.5 J	0.41 J	0.14 J	0.078 J	0.084 J
Nickel	2.0	6.8 JEB	12 JEB	7.3 JEB	18 JEB	17 JEB
Potassium	50	2400 J	1000 J	2100 J	700 J	510 J
Selenium	1.0	10 J	1.9 J	7.6 J	1.1 J	0.86 J
Silver	0.010	7.0 J	2.0 J	1.6 J	0.22 J	0.23 J
Sodium	50	62 J	39 UJ	100 J	39 UJ	41 UJ
Thallium	0.40	1.3 J	0.46 J	1.2 J	0.12 J	0.11 J
Vanadium	1.0	15 J	11 J	19 J	30 J	28 J
Zinc	2.0	8800 J	5700 J	260 J	76 J	95 J

DATA SUMMARY TABLE
DEFINITIONS (Inorganics)

EB - As a qualifier for soil/sediment samples: Analyte is also detected in the equipment blank
FD - Field Duplicate
g - gram
J - The concentration is an estimated quantity
mg/Kg - milligrams per Kilogram
R - The data are rejected as unusable
RL - Reporting Limit
U - Analyte was analyzed for but not detected at the specified reporting limit
ug/L - micrograms per Liter
UJ - The sample quantitation limit is an estimated quantity
NA - Not Applicable

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036.200100.0061.00005

March 18, 2005

Christine Clark
Regional Sample Control Center
U.S. EPA Region I
11 Technology Drive
North Chelmsford, Massachusetts 01863-2431

Re: Work Assignment No. 161-RICO-017H
Case 0248M, SDG D05709
Woods Hole Group, Raynham, Massachusetts
Callahan Mining Superfund Site, Brooksville, Maine
Tier II Inorganic Data Validation

Low Concentration Metals and Mercury: 11/Surface Soils/D05709, D05710, D05712, D05713, D05715, D05718, D05719, D05720, D05721, D05724, D05739
(Field Duplicate Pair: D05709 and D05739)
1/Aqueous Equipment Blank/D05742
1/Performance Evaluation Sample/D05744

Dear Ms. Clark:

A Tier II data validation was performed by Metcalf & Eddy, Inc. (M&E) on the low concentration metals and mercury analytical data for eleven surface soil samples (including one field duplicate pair), one performance evaluation (PE) sample, and one equipment blank sample collected from the Callahan Mining Superfund Site, located in Brooksville, Maine, by TRC on December 2, 2004. The samples were analyzed through the Response Action Contract (RAC) Delivery of Analytical Services (DAS) program using M&E DAS *Analytical Specification for the Analysis of Low Concentration Metals Including Cyanide in Solid Samples (Including Samples with High Moisture Content)* (D-044.2), based on EPA methodology. M&E evaluated these data using the *Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Inorganic Analyses*, February 1989 criteria, modified for the methods and incorporating organic data validation guidance, *Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses*, December 1996 criteria. Additional guidance was provided by *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review,* October 2004.

The Tier II metals data validation was based on the following parameters:

- Overall Evaluation of Data and Potential Usability Issues
- Data Completeness (CSF Audit - Tier I)
- * Preservation and Technical Holding Times
- Instrument Calibration
- ICP-MS Internal Standards
- * ICP-MS Tuning, Mass Calibration, and Resolution Check
- Blanks
- Inductively Coupled Plasma Interference Check Sample
- Matrix Spike
- Laboratory Duplicate
- * Field Duplicates
- NA Furnace Atomic Absorption Analysis
- Inductively Coupled Plasma Serial Dilution
- * Laboratory Fortified Blank
- * Instrument Detection Limits
- Sample Quantitation Results
- Performance Evaluation Sample /Accuracy Check

* - all criteria met for this parameter
NA - parameter not applicable

Note: Worksheets are not included for parameters that have met criteria or for criteria that are not applicable to a Tier II data validation.

<u>The following information was used to generate the Data Validation Memorandum attachments:</u>

Table Ia and Ib: Recommendation Summary Table - summarizes validation recommendations
Table IIa and IIb: Overall Evaluation of Data - summarizes site DQOs and potential usability issues
Data Summary Tables - summarizes accepted, qualified, and rejected data

Copies of the field sampling notes for this sample delivery group (SDG) are included with the Data Validation Memorandum for Case 0248M, SDG D05729, previously submitted to EPA.

<u>Overall Evaluation of Data and Potential Usability Issues</u>

The following is a summary of the site DQOs (Data Quality Objectives):

- To determine nature and extent of contamination and to support a human health risk assessment.

The low concentration metals and mercury sample results were qualified as a result of sampling and analytical error. Qualifications as a result of sampling error are summarized below:

- The positive results for barium and nickel in all soils; and for sodium in all soil samples except D05710, D05712, D05713, D05715, and D05739 were qualified "EB" due to equipment blank contamination. An indeterminate amount of sampling error may have affected these sample results. The results are usable for project objectives. These qualifications have a minor impact on data usability.

Qualifications as a result of analytical error are summarized below:

- The positive results for cobalt in samples D05710, D05712, D05713, and D05715; for thallium in samples D05710, D05712, D05713, D05715, D05718, D05719, and D05720; and for magnesium in samples D05712, D05713, D05715, and D05718 were qualified as estimated (J) due to continuing calibration standard recovery exceedances. The results are usable for project objectives as estimated concentrations with a possible high bias. These qualifications have a minor impact on the data usability.

- The positive result for silver in sample D05709 was qualified as estimated (J) due to continuing calibration standard recovery exceedances. The results are usable for project objectives as estimated concentrations with a possible low bias. These qualifications have a minor impact on the data usability.

- The positive results for sodium in samples D05710, D05712, D05713, D05715, and D05739 were qualified as nondetect (U) at the reported concentration due to laboratory blank contamination. These results are usable for project objectives as nondetect results. This qualification has a minor impact on data usability. Note that these results were qualified as estimated (J) because they were less than the quantitation limit but greater than the method detection limit (MDL). Therefore, the overall qualification for these results are estimated nondetect (UJ).

- The positive results for aluminum, calcium, copper, iron, lead, magnesium, potassium, and zinc in sample D05742 were qualified as nondetect (U) at the reported concentration due to method blank contamination. These results are usable for project objectives as nondetect results. This qualification has a minor impact on data usability. Note that the results for calcium, copper, iron, lead, magnesium, potassium, and zinc were also qualified as estimated (J) because they were less than the quantitation limit but greater than the method detection limit (MDL). Therefore, the overall qualification for these results are estimated nondetect (UJ).

- The nondetect result for cobalt in sample D05742 was qualified as estimated (UJ) at the MDL due to negative instrument drift. This qualification has a minor impact on data usability. This result is usable for project objectives as an estimated quantitation limit with a possible low bias.

- The nondetect results for antimony and selenium in sample D05742 had quantitation limits elevated to the negative blank action level due to negative instrument drift and laboratory blank contamination. This qualification has a minor impact on data usability. The results are usable for project objectives as elevated quantitation limits.

- The positive results for antimony, arsenic, chromium, cobalt, copper, lead, manganese, nickel, selenium, silver, thallium, vanadium, and zinc in all soil samples; and for cadmium in samples D05710, D05718, D05719, D05720, and D05721 were qualified as estimated (J) due to positive interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations with a possible high bias. This qualification has a minor impact on data usability.

- The positive and blank-qualified results for copper, lead, nickel, and zinc in sample D05742 were qualified as estimated (J and UJ, respectively) due to positive interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations and quantitation limits with possible high bias. This qualification has a minor impact on data usability.

- The nondetect result for selenium in sample D05742 was qualified as estimated (UJ) due to negative interferences seen in the ICSA solution analyses. This result is usable for project objectives as an estimated quantitation limit with a possible low bias.

- The positive results for vanadium in all soil samples were qualified as estimated (J) due to high matrix spike recovery. The results are usable for project objectives as estimated values that may be biased high. This qualification has a minor impact on the data usability.

- The positive results for antimony in all soil samples and the positive and blank-qualified results for sodium in all soil samples were qualified as estimated (J and UJ, respectively) due to low matrix spike recoveries. The results are usable for project objectives as estimated values and quantitation limits that may be biased low. This qualification has a minor impact on the data usability.

- The positive results for cadmium, calcium, and cobalt in all soil samples were qualified as estimated (J) due to laboratory duplicate imprecision. The results are usable for project objectives as estimated values with an indeterminate direction of bias. This qualification has a minor impact on the data usability.

- The positive results for beryllium, cadmium, calcium, cobalt, copper, thallium, and zinc in all soil samples and the positive and blank-qualified results for sodium in all soil samples were qualified as estimated (J and UJ, respectively) due to serial dilution imprecision. The results are usable for project objectives as estimated values and quantitation limits with an indeterminate direction of bias. This qualification has a minor impact on the data usability.

- The positive result for potassium in sample D05715 was qualified as estimated (J) due to linear range exceedance. This result is usable for project objectives as an estimated concentration. This qualification has a minor impact on the data usability.

- The positive and blank-qualified results for sodium in all soil samples, and for cobalt in samples D05709, D05712, D05713, D05715, and D05739 were qualified by the laboratory as estimated (J and UJ, respectively) as being less than the quantitation limit but greater than the MDL. These results are usable for project objectives as estimated concentrations and quantitation limits. This qualification has a minor impact on the data usability.

- The positive and blank-qualified results for barium, calcium, copper, iron, lead, magnesium, nickel, potassium, sodium and zinc in the equipment blank sample D05742 were qualified by the laboratory as estimated (J and UJ, respectively) because they were less than the quantitation limit but greater than the MDL. These results are usable for project objectives as estimated concentrations and quantitation limits. This qualification has a minor impact on the data usability.

- The positive results for silver in all soil samples were qualified as estimated (J) due to laboratory control sample (LCS) recovery exceedance. These results are usable for project objectives as estimated concentrations with a possible high bias. This qualification has a minor impact on the data usability.

Data Completeness

The laboratory was contacted on March 9, 2005 concerning the following:

1. The percent solids for samples D05715 and D05739 are incorrectly reported on the Form I, which affects the reported sample concentrations.

2. Aluminum and iron exceeded the reporting limit in the aqueous method blank. The associated sample should have been re-digested and re-analyzed.

The laboratory provided an acceptable response on March 10, 2005.

Instrument Calibration

The following table summarizes the continuing calibration verification (CCV) standard recoveries that did not meet the 90% - 110% recovery acceptance criteria, the validation action, and the samples affected:

Analyte	CCV	Recovery	Action	Samples Affected
cobalt	01/05/05 11:31	113%	Qualify the positive results as estimated (J)	D05710, D05712, D05713, D05715,
silver	01/11/05 14:17	89%	Qualify the positive results as estimated (J)	D05709
thallium	01/28/05 14:52	114%	Qualify the positive results as estimated (J)	D05710, D05712, D05713, D05715, D05718, D05719, D05720
magnesium	01/28/05 18:54	113%	Qualify the positive results as estimated (J)	D05712, D05713, D05715, D05718
cobalt	02/01/05 10:43	111%	Qualify the positive results as estimated (J)	None; no results reported from analyses prior to CCV
aluminum	01/12/05 22:46	111%	Qualify the positive results as estimated (J)	None; no results reported from analyses prior to CCV

The following table summarizes the reporting limit standard (CRI) recoveries that did not meet the 80% - 120% recovery acceptance criteria, the validation action, and the samples affected:

Analyte	CRI	Recovery	Action	Samples Affected
silver	01/11/05 13:53	124%	Qualify the positive results as estimated (J)	None; all silver results greater than 2x reporting limit.

Blanks

The following table summarizes the blank contamination detected in the laboratory blanks associated with the soil samples. If a contaminant was detected in more than one blank, the highest concentration was used to qualify associated sample results and is summarized below. The nominal Blank Action Levels (BAL) from the method blank were calculated based on a 1gm sample weight (dry), 50mL final volume, and two-fold dilution. The nominal BALs from instrument blanks were based on a 1gm sample weight (dry) and 50mL final volume. Sample-specific BALs are further adjusted for actual sample weights, moisture content, and any additional dilutions.

Analyte	Blank Type	Maximum Blank Concentration	Nominal Blank Action Level (BAL) mg/Kg	Action/Samples Affected
aluminum	mb	1.2 mg/Kg	6.0	None: all results are greater than BAL
arsenic	mb	0.0055 mg/Kg	0.028	None: all results are greater than BAL
barium	mb	0.0067 mg/Kg	0.034	None: all results are greater than BAL
cadmium	mb	0.009 mg/Kg	0.045	None: all results are greater than BAL
calcium	mb	1.4 mg/Kg	7.0	None: all results are greater than negative BAL
	inst	-66.0 µg/L	33.0	
chromium	inst	0.15 µg/L	0.075	None: all results are greater than BAL
cobalt	inst	-0.24 µg/L	0.12	None: all results are greater than BAL
copper	inst	-1.2 µg/L	0.60	None: all results are greater than negative BAL
iron	mb	2.9 mg/kg	14.5	None: all results are greater than BAL
	inst	-13.0 µg/L	6.5	
lead	inst	0.61 µg/L	0.30	None: all results are greater than BAL
	inst	-0.051 µg/L	0.026	
magnesium	mb	1.3 mg/Kg	6.5	None: all results are greater than BAL
manganese	mb	0.17 mg/Kg	0.85	None: all results are greater than BAL
nickel	mb	0.018 mg/Kg	0.090	None: all results are greater than BAL
potassium	mb	6.8 mg/Kg	34.0	None: all results are greater than BAL
selenium	inst	0.14 µg/L	0.070	None: all results are greater than negative BAL
	inst	-2.1 µg/L	1.1	
sodium	mb	2.8 mg/Kg	14	Qualify the positive results as nondetect (U) at the reported concentration in samples D05710, D05712, D05713, D05715, and D05739
thallium	mb	0.0063 mg/Kg	0.032	None: all results are greater than BAL
vanadium	mb	0.073mg/Kg	0.36	None: all results are greater than BAL
zinc	mb	0.21 mg/Kg	1.05	None: all results are greater than BAL

inst - instrument blank (i.e., ICB or CCB)
mb - method blank

For positive blank contamination, sample results were qualified as follows:

- If the sample was nondetect, qualification of the data was not required.
- If the sample result was > MDL and ≤ positive BAL, the result was qualified as a nondetect (U) at the reported concentration
- If the sample result was > positive BAL, qualification of the data was not required

For negative blank contamination, sample results were qualified as follows:

- If the sample result was positive and ≤ negative BAL, the result was qualified as estimated (J)
- If the sample result was nondetect, the MDL was qualified as estimated (UJ)
- If the sample result was > MDL and > negative BAL, qualification of the data was not required

For positive and negative blank contamination where the negative BAL is < the positive BAL, sample results were qualified as follows:

- If the sample result was >MDL and > negative BAL but ≤ positive BAL, the result was qualified as nondetect (U) at the reported concentration.
- If the sample result was > MDL and < negative BAL, the result was qualified as nondetect (U) at the negative BAL.
- If the sample result was nondetect, elevate the MDL to the negative BAL.
- If the sample result was > positive BAL, qualification of the data was not required

For positive and negative blank contamination where the negative BAL is > the positive BAL, sample results were qualified as follows:

- If the sample result was > MDL but ≤ negative BAL, the result was qualified as nondetect (U) at the negative BAL.
- If the sample result was nondetect, elevate the MDL to the negative BAL.
- If the sample result was > negative BAL, qualification of the data was not required

The following table summarizes the blank contamination detected in the laboratory blanks associated with the aqueous equipment blank sample. If a contaminant was detected in more than one blank, the highest concentration was used to qualify associated sample results and is summarized below. Maximum blank concentrations from instrument blanks were also adjusted for dilutions.

Analyte	Blank Type	Maximum Blank Concentration (µg/L)	Nominal Blank Action Level (BAL) (µg/L)	Action/Samples Affected
aluminum	mb	69.0	345	Qualify the positive result as nondetect (U) at the reported concentration in sample D05742
antimony	inst	0.018	0.18	Elevate the MDL to the negative BAL in sample D05742
	inst	-0.028	0.28	

Analyte	Blank Type	Maximum Blank Concentration (µg/L)	Nominal Blank Action Level (BAL) (µg/L)	Action/Samples Affected
calcium	mb	28.0	140	Qualify the positive result as nondetect (U) at the reported concentration in sample D05742
cobalt	inst	-0.032	0.32	Qualify the nondetect result as estimated (UJ) at the MDL in sample D05742
copper	mb	1.4	7.0	Qualify the positive result as nondetect (U) at the reported concentration in sample D05742
iron	mb	100	500	Qualify the positive result as nondetect (U) at the reported concentration in sample D05742
lead	mb	1.6	8.0	Qualify the positive result as nondetect (U) at the reported concentration in sample D05742
magnesium	mb	100	500	Qualify the positive result as nondetect (U) at the reported concentration in sample D05742
nickel	mb	0.080	0.40	None: result is greater than BAL
potassium	mb	39	195	Qualify the positive result as nondetect (U) at the reported concentration in sample D05742
selenium	inst	0.10	1.0	Elevate the MDL to the negative BAL in sample D05742
	inst	-0.091	0.91	
sodium	mb	12.0	60.0	None: result is greater than BAL
thallium	inst	0.035	0.35	None: result is nondetect
vanadium	inst	0.19	1.9	None: result is nondetect
zinc	mb	7.4	37.0	Qualify the positive result as nondetect (U) at the reported concentration in sample D05742

inst - instrument blank (i.e., ICB or CCB)
mb - method blank

For positive blank contamination, sample results were qualified as follows:

- If the sample was nondetect, qualification of the data was not required.
- If the sample result was > MDL and ≤ positive BAL, the result was qualified as a nondetect (U) at the reported concentration
- If the sample result was > positive BAL, qualification of the data was not required

For negative blank contamination, sample results were qualified as follows:

- If the sample result was positive and ≤ negative BAL, the result was qualified as estimated (J)
- If the sample result was nondetect, the MDL was qualified as estimated (UJ)
- If the sample result was > MDL and > negative BAL, qualification of the data was not required

For positive and negative blank contamination where the negative BAL is < the positive BAL, sample results were qualified as follows:

- If the sample result was >MDL and > negative BAL but ≤ positive BAL, the result was qualified as nondetect (U) at the reported concentration.
- If the sample result was > MDL and < negative BAL, the result was qualified as nondetect (U) at the negative BAL.
- If the sample result was nondetect, elevate the MDL to the negative BAL.
- If the sample result was > positive BAL, qualification of the data was not required

For positive and negative blank contamination where the negative BAL is > the positive BAL, sample results were qualified as follows:

- If the sample result was > MDL but ≤ negative BAL, the result was qualified as nondetect (U) at the negative BAL.
- If the sample result was nondetect, elevate the MDL to the negative BAL.
- If the sample result was > negative BAL, qualification of the data was not required

The following table summarizes the level of blank contamination detected in the equipment blank associated with the surface soil samples.

Analyte	**Blank Concentration (µg/L)**	**Action/Samples Affected**
aluminum	170	No action; result qualified as nondetect (U) after blank actions.
barium	0.16	Qualify all soil samples (EB).
calcium	20	No action; result qualified as nondetect (U) after blank actions.
copper	0.51	No action; result qualified as nondetect (U) after blank actions.
iron	32	No action; result qualified as nondetect (U) after blank actions.
lead	0.36	No action; result qualified as nondetect (U) after blank actions.
magnesium	9.2	No action; result qualified as nondetect (U) after blank actions.
nickel	3.7	Qualify all soil samples (EB).
potassium	42	No action; result qualified as nondetect (U) after blank actions.

Analyte	Blank Concentration (µg/L)	Action/Samples Affected
sodium	62	Qualify all soil samples except D05710, D05712, D05713, D05715, and D05739 (EB).
zinc	6.0	No action; result qualified as nondetect (U) after blank actions.

Inductively Coupled Plasma Interference Check Sample

Positive results for antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, nickel, selenium, silver, thallium, vanadium, and zinc were reported in the ICSA solution analyses at concentrations greater than the MDLs. Results for selenium were also reported in the ICSA solution at a concentration greater than the negative MDL.

The positive results for antimony, arsenic, chromium, cobalt, copper, lead, manganese, nickel, selenium, silver, thallium, vanadium, and zinc in all soil samples; and for cadmium in samples D05710, D05718, D05719, D05720, and D05721 were qualified as estimated (J) due to positive interferences seen in the ICSA solution analyses. Positive and blank-qualified results for copper, lead, nickel, and zinc in sample D05742 were qualified as estimated (J and UJ, respectively) due to positive interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations and quantitation limits with a possible high bias.

The nondetect result for selenium in samples D05742 was qualified as estimated (UJ) due to negative interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations and quantitation limits with a possible low bias.

Matrix Spike (MS)

Sample D05709 was analyzed as the matrix spike with this data set. The analytes that did not meet recovery (%R) acceptance criteria of 75% - 125% and the actions taken are summarized in the table below:

Analyte	Spiked Sample Result (mg/Kg)	Sample Result (mg/Kg)	Spike Added (mg/Kg)	MS %R	Affected Samples/Action
antimony	0.49	0.44	0.95	5	Qualify as estimated (J) the positive results in all soil samples.
sodium	240	18	338	67	Qualify as estimated (J and UJ, respectively) the positive and blank-qualified results in all soil samples.

Analyte	Spiked Sample Result (mg/Kg)	Sample Result (mg/Kg)	Spike Added (mg/Kg)	MS %R	Affected Samples/Action
vanadium	18	13	3.3	143	Qualify as estimated (J) the positive results in all soil samples.

Laboratory Duplicates

Sample D05709 was analyzed as a laboratory duplicate in association with this data set. The analytes that did not meet the relative percent difference (RPD) criterion of <35% for analytes greater than 5x reporting limit or the absolute difference criterion of >2x reporting limit for those less than <5x reporting limit, and the actions taken are summarized in the following table:

Analyte	Sample Result (mg/Kg)	Duplicate Result (mg/Kg)	%RPD	Actions
cadmium	0.30	0.47	45	Qualify as estimated (J) the positive cadmium results in all samples.
calcium	330	610	60	Qualify as estimated (J) the positive calcium results in all samples.
cobalt	0.31	0.45	37	Qualify as estimated (J) the positive cobalt results in all samples.

Inductively Coupled Plasma Serial Dilution

A serial dilution analysis was performed on sample D05709. The percent difference (%D) for beryllium (24%), cadmium (27%), calcium (33%), cobalt (23%), copper (20%), sodium (61%), thallium (21%), and zinc (67%) exceeded the validation control limit of 15% for results greater than 50x the MDL. The positive and blank-qualified results for beryllium, cadmium, calcium, cobalt, copper, sodium, thallium, and zinc were qualified as estimated (J and UJ, respectively) in all soil samples due to these serial dilution exceedances.

Sample Quantitation Results

The concentration of potassium in sample D05715 exceeded the linear range of the ICP-MS and was not re-analyzed at a dilution. The result for potassium in sample D05715 was qualified as estimated (J).

The positive and blank-qualified results for sodium in all soil samples, and for cobalt in samples D05709, D05712, D05713, D05715, and D05739 were qualified by the laboratory as estimated (J and UJ, respectively) because they were less than the quantitation limit but greater than the MDL.

These results are usable for project objectives as estimated concentrations and quantitation limits.

The positive and blank-qualified results for barium, calcium, copper, iron, lead, magnesium, nickel, potassium, sodium and zinc in the equipment blank sample D05742 were qualified by the laboratory as estimated (J and UJ, respectively) because they were less than the quantitation limit but greater than the MDL. These results are usable for project objectives as estimated concentrations and quantitation limits.

Performance Evaluation Sample/Accuracy Check

Performance Evaluation Sample

The metals and mercury PE sample D05744 (EPA ampule number MS01949) was evaluated with this SDG. Fifteen analytes were scored "Within Limits" and eight analytes were scored "Not Evaluated." No validation action was necessary on the basis of these results.

Laboratory Control Sample

The recovery for silver (122%) exceeded the 80% - 120% acceptance criteria for the soil LCS. The positive results for silver in all soil samples are qualified as estimated (J). These results are usable for project objectives as estimated concentrations with a possible high bias.

The recoveries for all analytes in the aqueous LCS met the 80% - 120% acceptance criteria. No validation action was required.

Please contact Ms. Constance Lapite at (781) 224-6628 or at constance.lapite@m-e.com if you have any questions regarding this Tier II validation.

Very truly yours,

Richard Purdy
Data Validator

Elizabeth Denly
Elizabeth Denly
Senior Reviewer

Constance Lapite
RAC Lead Chemist

cc:
Leslie McVickar, EPA Remedial Project Manager (Data Validation Memorandum, Data Summary Tables)
✓ Elizabeth Denly, TRC Project Chemist (entire package)
Denise Laferte, M&E Oversight Chemist (Data Validation Memorandum, Data Summary Tables)
Richard Purdy, M&E Data Validation Chemist (entire package)
Callahan Mine Project File, Work Assignment No. 161-RICO-017H

Attachments:
IRDA
Table I: Recommendations Summary Table
Table II: Overall Evaluation of Data
Data Summary Tables
Data Validation Worksheets
PE Score Report(s)
Copy of non-CLP Analytical Methods (M&E DAS Specification D-044.2)
Copies of Telephone Logs/Communications Forms
Supporting Data for Reduced Payment Recommendations (not applicable)
Copies of Field Sampling Notes (previously submitted)
Copies of EPA-approved Amendments to QAPjP or SAP (not applicable)
CSF Completeness Evidence Audit (DC-2 Form)
DQO Summary Form

Region 1

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 0248M

SITE CALLAHAN MINING

LABORATORY WOODS HOLE GROUP

NO. OF SAMPLES/ MATRIX 11 SS, 1 EB, 1 PE

SDG# D05709

REVIEWER (IF NOT ESD) **Metcalf & Eddy**

SOW# D-044.2

REVIEWER'S NAME **Richard Purdy**

DPO: ACTION ____ FYI **XX**

COMPLETION DATE 3/11/05

DATA ASSESSMENT SUMMARY

		ICP-AES	ICP-MS	Hg	CYANIDE
1.	DATA COMPLETENESS		O^1	O	
2.	HOLDING TIMES		O	O	
3.	CALIBRATIONS		O^2	O	
4.	BLANKS		O^3	O	
5.	ICS		O^2	—	
6.	MATRIX SPIKE		O^2	O	
7.	LABORATORY DUPLICATES		O^2	O	
8.	FIELD DUPLICATES		O	O	
9.	LABORATORY CONTROL SAMPLE		O^2	O	
10.	LABORATORY FORTIFED BLANK		O	O	
11.	SERIAL DILUTION		O^2	—	
12.	DETECTION LIMITS		O	O	
13.	SAMPLE QUANTITATION		O^2	O	
14.	OTHER QC		O	O	
15.	OVERALL ASSESSMENT		O	O	

O = Data had no problems/or qualified due to minor problems.
M = Data qualified due to a major problem.
Z = Data unacceptable.
X = Problems, but do not affect data.

ACTION ITEMS: O^1 - INCORRECT RESULT; O^2 - MINOR EXCEEDANCE; O^3 - MINOR CONTAMINATION)

AREAS OF CONCERN:

NOTABLE PERFORMANCE:

Table Ia
Recommendation Summary Table for Low Concentration Metals and Mercury
Callahan Mining Superfund Site
Case 0249M, SDG D05709
Surface Soil Samples

Analyte	Action	Analyte	Action
aluminum	A	magnesium	J^1
antimony	J^2 J^4	manganese	J^2
arsenic	J^2	mercury	A
barium	A^2	nickel	A^2 J^2
beryllium	J^6	potassium	J^7
cadmium	J^2 J^5 J^6	selenium	J^2
calcium	J^5 J^6	silver	J^1 J^2 J^8
chromium	J^2	sodium	A^1 A^2 J^4 J^6 J^9
cobalt	J^1 J^2 J^5 J^6 J^9	thallium	J^1 J^2 J^6
copper	J^2 J^6	vanadium	J^2 J^3
iron	A	zinc	J^2 J^6
lead	J^2		

A - Accept all data.

A^1 - Qualify the positive results for sodium in samples D05710, D05712, D05713, D05715, and D05739 as nondetect (U) at the reported concentration due to method blank contamination.

A^2 - Qualify "EB" the positive and nondetect results for barium and nickel in all samples, and sodium in all soil samples except D05709, D05712, D05713, D05715, and D05739 due to equipment blank contamination.

J^1 - Qualify as estimated (J) the positive results for cobalt in samples D05710, D05712, D05713, and D05715; for magnesium in samples D05712, D05713, D05715, and D05718; for silver in sample D05709; and for thallium in samples D05710, D05712, D05713, D05715, D05718, D05719, and D05720 due to continuing calibration standard recovery exceedances.

J^2 - Qualify as estimated (J) the positive results for antimony, arsenic, chromium, cobalt, copper, lead, manganese, nickel, selenium, silver, thallium, vanadium, and zinc in all soil samples; and for cadmium in samples D05710, D05718, D05719, D05720, and D05721 due to positive interferences seen in the ICSA solution analyses.

J^3 - Qualify the positive results for vanadium in all soil samples as estimated (J) due to high matrix spike recovery.

J^4 - Qualify the positive results for antimony and the positive and blank-qualified results for sodium in all soil samples as estimated (J and UJ, respectively) due to low matrix spike recovery.

J^5 - Qualify the positive results for cadmium, calcium, and cobalt in all soil samples as estimated (J) due to laboratory duplicate imprecision.

J^6 - Qualify as estimated (J and UJ, respectively) the positive results for beryllium, cadmium, calcium, cobalt, copper, thallium, and zinc and the positive and blank-qualified results for sodium in all soil samples due to serial dilution imprecision.

J^7 - Qualify as estimated (J) the positive result for potassium in sample D05715 due to linear range exceedance.

J^8 - Qualify as estimated (J) the positive results for silver in all soil samples due to LCS recovery exceedance.

J^9 - Qualify as estimated (J and UJ, respectively) the positive and blank-qualified results for sodium in all soil samples, and for cobalt in samples D05709, D05712, D05713, D05715, and D05739 due to concentrations detected less than the quantitation limit but greater than the MDL.

Table Ib
Recommendation Summary Table for Low Concentration Metals and Mercury
Callahan Mining Superfund Site
Case 0249M, SDG D05709
Aqueous QC Sample

Analyte	Action	Analyte	Action
aluminum	A^1	magnesium	A^1 J^4
antimony	A^2 J^2	manganese	A
arsenic	A	mercury	A
barium	J^4	nickel	J^2 J^4
beryllium	A	potassium	A^1 J^4
cadmium	A	selenium	A^2 J^3
calcium	A^1 J^4	silver	A
chromium	A	sodium	J^4
cobalt	J^1	thallium	A
copper	A^1 J^2 J^4	vanadium	A
iron	A^1 J^4	zinc	A^1 J^2 J^4
lead	A^1 J^2 J^4		

A	-	Accept all data.
A^1	-	Qualify the positive results for aluminum, calcium, copper, iron, lead, magnesium, potassium, and zinc in sample D05742 as nondetect (U) at the reported concentration due to method blank contamination.
A^2	-	Elevate the quantitation limits for antimony and selenium in sample D05742 to the negative blank action level due to instrument drift and laboratory blank contamination.
J^1	-	Qualify as estimated (UJ) the nondetect result for cobalt in sample D05742 due to negative instrument drift
J^2	-	Qualify as estimated (J and UJ, respectively) the positive and blank-qualified results for copper, lead, nickel, and zinc in sample D05742 due to positive interferences seen in the ICSA solution analyses.
J^3	-	Qualify as estimated (UJ) the nondetect result for selenium in sample D05742 due to negative interferences seen in the ICSA solution analyses.
J^4	-	Qualify as estimated (J and UJ, respectively) the positive and blank-qualified results for barium, calcium, copper, iron, lead, magnesium, nickel, potassium, sodium and zinc in sample D05742 because they were less than the quantitation limit but greater than the MDL.

Table IIa
Overall Evaluation of Data for Low Concentration Metals and Mercury
Callahan Mining Superfund Site
Case 0248M, SDG D05709
Surface Soil Samples

Low Concentration Metals and Mercury					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: A^1 J^1 J^2 J^3 J^4 J^5 J^6 J^7 J^8 J^9	Refer to qualifications in Table I: A^2	Not applicable for Tier II	**Minor Impact on Data Usability (Results usable for project objectives):** The positive results for barium and nickel in all soil samples and sodium in all soil samples except D05709, D05712, D05713, D05715, and D05739 were qualified "EB" due to equipment blank contamination. An indeterminate amount of sampling error may have affected these sample results. The results are usable for project objectives. The positive results for cobalt in samples D05710, D05712, D05713, and D05715; for thallium in samples D05710, D05712, D05713, D05715, D05718, D05719, and D05720; and for magnesium in samples D05712, D05713, D05715, and D05718 were qualified as estimated (J) due to continuing calibration standard recovery exceedances. The results are usable for project objectives as estimated concentrations with a possible high bias. The positive result for silver in sample D05709 was qualified as estimated (J) due to continuing calibration standard recovery exceedances. The results are usable for project objectives as estimated concentrations with a possible low bias. The positive results for vanadium in all soil samples were qualified as estimated (J) due to high matrix spike recovery. The results are usable for project objectives as estimated values that may be biased high.

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

Table IIa
Overall Evaluation of Data for Low Concentration Metals and Mercury
Callahan Mining Superfund Site
Case 0248M, SDG D05709
Surface Soil Samples

Low Concentration Metals and Mercury					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: A^1 J^1 J^2 J^3 J^4 J^5 J^6 J^7 J^8 J^9	Refer to qualifications in Table I: A^2	Not applicable for Tier II	**Minor Impact on Data Usability (Results usable for project objectives):** The positive results for sodium in samples D05710, D05712, D05713, D05715, and D05739 were qualified as nondetect (U) at the reported concentration due to laboratory blank contamination. These results are usable for project objectives as nondetect results. Note that these results were qualified as estimated (J) because they were less than the quantitation limit but greater than the method detection limit (MDL). Therefore, the overall qualification for these results are estimated nondetect (UJ). The positive results for antimony, arsenic, chromium, cobalt, copper, lead, manganese, nickel, selenium, silver, thallium, vanadium, and zinc in all soil samples; and for cadmium in samples D05710, D05718, D05719, D05720, and D05721 were qualified as estimated (J) due to positive interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations with a possible high bias. The positive results for antimony and the positive and blank-qualified results for sodium in all soil samples were qualified as estimated (J and UJ, respectively) due to low matrix spike recoveries. The results are usable for project objectives as estimated values and quantitation limits that may be biased low.

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

Table IIa
Overall Evaluation of Data for Low Concentration Metals and Mercury
Callahan Mining Superfund Site
Case 0248M, SDG D05709
Surface Soil Samples

Low Concentration Metals and Mercury					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: A^{1} J^{1} J^{2} J^{3} J^{4} J^{5} J^{6} J^{7} J^{8} J^{9}	Refer to qualifications in Table I: A^{2}	Not applicable for Tier II	**Minor Impact on Data Usability (Results usable for project objectives):** The positive results for cadmium, calcium, and cobalt in all soil samples were qualified as estimated (J) due to laboratory duplicate imprecision. The results are usable for project objectives as estimated values with an indeterminate direction of bias. The positive results for beryllium, cadmium, calcium, cobalt, copper, thallium, and zinc and the positive and blank-qualified results for sodium in all soil samples were qualified as estimated (J and UJ, respectively) due to serial dilution imprecision. The results are usable for project objectives as estimated values and quantitation limits with an indeterminate direction of bias. The positive result for potassium in sample D05715 was qualified as estimated (J) due to linear range exceedance. This result is usable for project objectives as an estimated concentration. The positive and blank-qualified results for sodium in all soil samples, and for cobalt in samples D05709, D05712, D05713, D05715, and D05739 were qualified by the laboratory as estimated (J and UJ, respectively) as being less than the quantitation limit but greater than the MDL. These results are usable for project objectives as estimated concentrations and quantitation limits.

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

Table IIa
Overall Evaluation of Data for Low Concentration Metals and Mercury
Callahan Mining Superfund Site
Case 0248M, SDG D05709
Surface Soil Samples

Low Concentration Metals and Mercury

DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: A^1 J^1 J^2 J^3 J^4 J^5 J^6 J^7 J^8 J^9	Refer to qualifications in Table I: A^2	Not applicable for Tier II	**Minor Impact on Data Usability (Results usable for project objectives):** The positive results for silver in all soil samples were qualified as estimated (J) due to LCS recovery exceedance. These results are usable for project objectives as estimated concentrations with a possible high bias.

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

Table IIb
Overall Evaluation of Data for Low Concentration Metals and Mercury
Callahan Mining Superfund Site
Case 0248M, SDG D05709
Aqueous QC Sample

Low Concentration Metals and Mercury					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: A[1] A[2] J[1] J[2] J[3] J[4]	Refer to qualifications in Table I: None	Not applicable for Tier II	**Minor Impact on Data Usability (Results usable for project objectives)**: The positive results for aluminum, calcium, copper, iron, lead, magnesium, potassium, and zinc in sample D05742 were qualified as nondetect (U) at the reported concentration due to method blank contamination. These results are usable for project objectives as nondetect results. Note that the results for calcium, copper, iron, lead, magnesium, potassium, and zinc were also qualified as estimated (J) because they were less than the quantitation limit but greater than the MDL. Therefore, the overall qualification for these results are estimated nondetect (UJ). The nondetect result for cobalt in sample D05742 was qualified as estimated (UJ) at the MDL due to negative instrument drift. This result is usable for project objectives as an estimated quantitation limit with a possible low bias. The quantitation limits for antimony and selenium in sample D05742 were elevated to the negative blank action level due to negative instrument drift and laboratory blank contamination. The results are usable for project objectives.

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

Table IIb
Overall Evaluation of Data for Low Concentration Metals and Mercury
Callahan Mining Superfund Site
Case 0248M, SDG D05709
Aqueous QC Sample

Low Concentration Metals and Mercury					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: A¹ A² J¹ J² J³ J⁴	Refer to qualifications in Table I: None	Not applicable for Tier II	**Minor Impact on Data Usability (Results usable for project objectives):** The positive and blank-qualified results for copper, lead, nickel, and zinc in sample D05742 were qualified as estimated (J and UJ, respectively) due to positive interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations and quantitation limits with a possible high bias. The nondetect result for selenium in sample D05742 was qualified as estimated (UJ) due to negative interferences seen in the ICSA solution analyses. This result is usable for project objectives as an estimated quantitation limit with a possible low bias. The positive and blank-qualified results for barium, calcium, copper, iron, lead, magnesium, nickel, potassium, sodium and zinc in the equipment blank sample D05742 were qualified by the laboratory as estimated (J and UJ, respectively) because they were less than the quantitation limit but greater than the MDL. These results are usable for project objectives as estimated concentrations and quantitation limits.

* The evaluation of "sampling error" cannot be completely assessed in data validation.
** Sampling variability is not assessed in data validation.

SITE: Callahan Mining Superfund Site
CASE NO.: 0248M
SDG NO.: D05709

DATA SUMMARY TABLE
Inorganic Analysis (D-044.2)
Soil (mg/Kg)

Traffic Report Sample No.		D05709	D05710	D05712	D05713	D05715	D05718
M&E Sample ID		SS-401	SS-402	SS-404	SS-405	SS-407	SS-410
Lab Sample ID		0412035-01	0412035-02	0412035-03	0412035-04	0412035-05	0412035-06
Date Sampled		12/02/04	12/02/04	12/02/04	12/02/04	12/02/04	12/02/04
% Solids		86.5	80.5	87.1	86.6	89.0	78.4
Comments		FD of D05739					
Analyte	RL						
Aluminum	4.0	38000	25000	37000	41000	56000	17000
Antimony	0.15	0.44 J	0.45 J	0.47 J	1.7 J	0.11 J	0.77 J
Arsenic	0.20	120 J	65 J	87 J	130 J	22 J	26 J
Barium	2.0	4.2 EB	3.6 EB	4.2 EB	8.8 EB	16 EB	25 EB
Beryllium	0.040	0.17 J	0.35 J	0.19 J	0.18 J	0.24 J	0.34 J
Cadmium	0.010	0.30 J	25 J	0.15 J	0.79 J	0.55 J	27 J
Calcium	8.0	330 J	62000 J	330 J	280 J	420 J	11000 J
Chromium	1.0	5.4 J	20 J	13 J	6.2 J	13 J	33 J
Cobalt	2.0	0.31 J	4.7 J	0.51 J	0.27 J	0.77 J	14 J
Copper	1.0	510 J	1200 J	410 J	3600 J	2400 J	2300 J
Iron	4.0	51000	34000	54000	41000	47000	24000
Lead	0.40	480 J	620 J	350 J	700 J	140 J	510 J
Magnesium	10	76000	50000	74000 J	78000 J	110000 J	22000 J
Manganese	1.0	1100 J	1600 J	1000 J	1100 J	1400 J	1300 J
Mercury	0.010	0.50	0.42	0.38	1.5	0.41	0.33
Nickel	2.0	2.0 JEB	17 JEB	3.7 JEB	1.8 JEB	5.3 JEB	30 JEB
Potassium	50	1800	1500	2200	2800	4100 J	970
Selenium	1.0	12 J	5.5 J	9.1 J	5.9 J	5.1 J	2.0 J
Silver	0.020	3.3 J	2.4 J	2.4 J	2.9 J	1.2 J	2.0 J
Sodium	50	18 JEB	14 UJ	20 UJ	32 UJ	32 UJ	60 JEB
Thallium	0.40	2.8 J	1.5 J	2.0 J	4.4 J	1.3 J	0.49 J
Vanadium	1.0	13 J	16 J	17 J	10 J	17 J	23 J
Zinc	2.0	150 J	5900 J	120 J	420 J	330 J	5800 J

SITE: Callahan Mining Superfund Site
CASE NO.: 0248M
SDG NO.: D05709

DATA SUMMARY TABLE
Inorganic Analysis (D-044.2)
Soil (mg/Kg)

Traffic Report Sample No.		D05719	D05720	D05721	D05724	D05739
M&E Sample ID		SS-411	SS-412	SS-413	SS-416	SSE-401
Lab Sample ID		0412035-07	0412035-08	0412035-09	0412035-10	0412035-11
Date Sampled		12/02/04	12/02/04	12/02/04	12/02/04	12/02/04
% Solids		81.2	70.1	80.3	88	85.8
Comments						FD of D05709
Analyte	RL					
Aluminum	4.0	16000	29000	22000	21000	46000
Antimony	0.15	0.85 J	0.74 J	0.96 J	0.61 J	0.50 J
Arsenic	0.20	31 J	220 J	34 J	57 J	120 J
Barium	2.0	30 EB	26 EB	26 EB	13 EB	4.7 EB
Beryllium	0.040	0.46 J	0.49 J	0.53 J	0.17 J	0.19 J
Cadmium	0.010	41 J	170 J	29 J	2.7 J	0.27 J
Calcium	8.0	7800 J	2800 J	3600 J	440 J	550 J
Chromium	1.0	30 J	27 J	27 J	27 J	7.7 J
Cobalt	2.0	13 J	14 J	11 J	1.7 J	0.35 J
Copper	1.0	5700 J	8700 J	3500 J	1200 J	510 J
Iron	4.0	34000	84000	29000	36000	52000
Lead	0.40	2300 J	1800 J	700 J	1000 J	470 J
Magnesium	10	18000	49000	26000	36000	92000
Manganese	1.0	740 J	1800 J	870 J	530 J	1200 J
Mercury	0.010	1.1	1.2	0.58	1.7	0.46
Nickel	2.0	30 JEB	23 JEB	28 JEB	13 JEB	2.4 JEB
Potassium	50	1400	2300	1800	1300	2000
Selenium	1.0	4.3 J	19 J	3.2 J	7.4 J	13 J
Silver	0.020	3.5 J	5.5 J	4.8 J	3.9 J	2.9 J
Sodium	50	56 JEB	63 JEB	93 JEB	51 JEB	30 UJ
Thallium	0.40	0.59 J	6.7 J	0.64 J	0.77 J	2.8 J
Vanadium	1.0	24 J	21 J	22 J	19 J	15 J
Zinc	2.0	16000 J	63000 J	10000 J	1200 J	160 J

SITE: Callahan Mining Superfund Site
CASE NO.: 0248M
SDG NO.: D05709

DATA SUMMARY TABLE
Inorganic Analysis (D-044.2)
Aqueous QC Sample (ug/L)

Traffic Report Sample No.		D05742
M&E Sample ID		RB-005
Lab Sample ID		0412035-12
Date Sampled		12/02/04
Dilution Factor		2
Mass/Volume of Sample		25 mL
Comments		Equipment Blank
Analyte	RL	
Aluminum	40.0	170 U
Antimony	1.5	0.28 U
Arsenic	2.0	0.13 U
Barium	20.0	0.16 J
Beryllium	0.40	0.20 U
Cadmium	0.10	0.098 U
Calcium	80.0	20 UJ
Chromium	10.0	0.18 U
Cobalt	20.0	0.038 UJ
Copper	10.0	0.51 UJ
Iron	40.0	32 UJ
Lead	4.0	0.36 UJ
Magnesium	100	9.2 UJ
Manganese	10.0	4.1 U
Mercury	0.10	0.008 U
Nickel	20.0	3.7 J
Potassium	500	42 UJ
Selenium	10.0	0.91 UJ
Silver	0.20	0.12 U
Sodium	500	62 J
Thallium	4.0	0.026 U
Vanadium	10.0	0.15 U
Zinc	20.0	6.0 UJ

DATA SUMMARY TABLE
DEFINITIONS (Inorganics)

CRQL - Contract Required Quantitation Limit
EB - As a qualifier for soil/sediment samples: Analyte is also detected in the equipment blank
FD - Field Duplicate
g - gram
J - The concentration is an estimated quantity
mg/Kg - milligrams per Kilogram
R - The data are rejected as unusable
RL - Reporting Limit
U - Analyte was analyzed for but not detected at the specified reporting limit
ug/L - micrograms per Liter
UJ - The sample quantitation limit is an estimated quantity
NA - Not Applicable

TRC
Customer-Focused Solutions

February 24, 2005

Christine Clark
Regional Sample Control Center
U.S. EPA Region I
Office of Environmental Measurement and Evaluation
11 Technology Drive
North Chelmsford, MA 01863-2431

Subject: Work Assignment No. 161-RICO-017H
Case 33595, SDG A18D9
Envirosystems, Inc., Columbia, Maryland
Callahan Mining Superfund Site, Brooksville, Maine
Tier II Organic Data Validation

Volatiles:	11/Surface Soils/	A18D9, A18S7, A18S8, A18S9, A18T0, A18T1, A19C8, A19C9, A19D0, A19D1, A19D2
	(Surface Soil Field Duplicate Pair/A18S7 and A18D9)	
	1/Trip Blank/	A19D6
	1/PE Sample/	A19D4
Semivolatiles:	11/Surface Soils/	A18D9, A18S7, A18S8, A18S9, A18T0, A18T1, A19C8, A19C9, A19D0, A19D1, A19D2
	(Surface Soil Field Duplicate Pair/A18S7 and A18D9)	
	1/Equipment Blank/	A19E0
	1/PE Sample/	A19D5

Dear Ms. Clark:

A Tier II data validation, in accordance with the *Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses*, December 1996 criteria, was performed on the organic analytical data for 11 surface soil samples (including one field duplicate pair), one equipment blank, one trip blank, and two performance evaluation (PE) samples collected from the Callahan Mining Superfund Site in Brooksville, Maine by TRC Environmental Corporation on December 2, 2004. The samples were analyzed for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs) under the Contract Laboratory Program (CLP) Routine Analytical Services (RAS) program using the *USEPA Contract Laboratory Program Statement of Work for Organic Analysis, Multi-Media, Multi-Concentration,* OLM04.3. In accordance with the EPA-approved project plans for the site, Tier II validation was conducted on all samples in this sample delivery group (SDG).

Boott Mills South, Foot of John Street • Lowell, Massachusetts 01852
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The Tier II data validation was based on the following parameters:

	•	Overall Evaluation of Data and Potential Usability Issues
	•	Data Completeness (CSF Audit - Tier I)
*	•	Preservation and Technical Holding Times
*	•	Gas Chromatography/Mass Spectrometry (GC/MS) Tunes
	•	Initial and Continuing Calibrations
	•	Blanks
*	•	Surrogate Recoveries
*	•	Internal Standards
	•	Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
*	•	Field Duplicate Results
NA	•	Sensitivity Check
	•	Accuracy Check/PE Samples
NA	•	Target Compound Identification
*	•	Compound Quantitation and Reported Quantitation Limits
	•	Tentatively Identified Compounds (TICs)
NA	•	Semivolatile Cleanup
NA	•	System Performance

* - All criteria were met.

Note: Worksheets are not included for parameters that have met criteria or parameters that are not applicable (NA) to the method or to Tier II validation.

<u>The following information was used to generate the Data Validation Memorandum attachments</u>:

Tables Ia and Ib:	Recommendation Summary Table - summarizes validation recommendations
Tables IIa and IIb:	Overall Evaluation of Data - summarizes site DQOs and potential usability issues
Table III:	Tentatively Identified Compound Summary - summarizes the TIC results for the VOC and SVOC analyses

Data Summary Tables - summarizes accepted, qualified and rejected data

Overall Evaluation of Data and Potential Usability Issues

Following is a summary of the site DQOs:

- To evaluate the nature and extent of contamination in surface soils and to obtain data for use in a human health risk assessment.

All results are usable for project objectives. Qualifications applied to the data as a result of sampling error are summarized below.

- The positive results for acetone were qualified as nondetects (U) in all soil samples except sample A18T0 due to trip blank contamination. These results are still usable for project objectives. This qualification has a minor impact on data usability.

Qualifications applied to the data as a result of analytical error are summarized below.

- The positive results for caprolactam were qualified as nondetects (U) in samples A18S9, A18T0, A18T1, A19C8, A19C9, A19D0, and A19D1 due to laboratory method blank contamination. These results are still usable for project objectives. This qualification has a minor impact on data usability.
- The nondetect result for bromomethane in sample A18S7 was qualified as estimated (UJ) due to a calibration nonconformance. This result is usable for project objectives as a nondetect with an estimated quantitation limit. This qualification has a minor impact on data usability.
- The positive and nondetect results for bis(2-ethylhexyl)phthalate and benzo(k)fluoranthene in samples A18D9, A18S7, A18S8, A18S9, A18T0, A18T1, A19C8, and A19D2 and the nondetect results for 3-nitroaniline and 3,3'-dichlorobenzidine in all samples in this SDG were qualified as estimated (J/UJ) due to calibration nonconformances. These results are usable for project objectives as estimated values and nondetects with estimated quantitation limits. This qualification has a minor impact on data usability.

The attached Tables Ia and Ib summarize the Tier II validation recommendations which were based on the following information:

Data Completeness (CSF Audit - Tier I)

Minor issues were noted with section titles and page numbers. The laboratory revised the DC-2 form and resubmitted it on January 27, 2005. In addition, the laboratory was requested to submit the internal custody log showing the transfer of samples to the freezer within 48 hours of collection. Due to an error within the laboratory, this transfer was not recorded on the internal custody log and therefore could not be provided.

Initial and Continuing Calibrations

VOCs

All criteria were met in the initial calibration. The percent difference (%D) of bromomethane (25.4) was outside of the acceptance criteria in the continuing calibration associated with sample A18S7. The nondetect result for bromomethane in sample A18S7 was qualified as estimated (UJ).

SVOCs

Compounds that did not meet criteria in the initial and continuing calibrations are summarized in the following table.

Instrument	[illegible]	[illegible]	[illegible]
Compound	[illegible]	[illegible]	[illegible]
3-Nitroaniline	X (67.3)	XX (67.6)	XX (49.3)
3,3'-Dichlorobenzidine	X (33.4)		XX (91.9)
Bis(2-ethylhexyl)phthalate			XX (41.1)
Benzo(k)fluoranthene			XX (31.7)
Associated Samples	All samples in the SDG	A18D9, A19C8 A18T0, A19D2	A18D9, A18S7 A18S8, A18S9 A18T0, A18T1 A19C8, A19D2

X = Initial calibration (IC) percent relative standard deviation (%RSD) > 30; estimate (J/UJ) all positive and nondetect results

XX = Continuing calibration (CC) percent difference (%D) > 25; estimate (J/UJ) all positive and nondetect results

The nondetect results for 3-nitroaniline and 3,3'-dichlorobenzidine were qualified as estimated (UJ) in all samples in this SDG. The positive and nondetect results for bis(2-ethylhexyl)phthalate and benzo(k)fluoranthene were qualified as estimated (J/UJ) in samples A18D9, A18S7, A18S8, A18S9, A18T0, A18T1, A19C8, and A19D2.

Blanks

VOCs

Target compounds were detected in the method blanks and trip blank (A19D6) associated with the samples in this SDG. The following table summarizes the maximum concentrations detected, the action levels associated with these contaminants, and the affected samples.

Compound	Source of Contaminant	Maximum Conc. in Trip Blank (µg/L)	Action Level (µg/kg)	CRQL (µg/kg)	Affected Samples
Acetone	Trip	8	80	10	All samples except A18T0

CRQL - Contract Required Quantitation Limit

Blank Actions (due to blank contaminants):

- If sample concentration was < the CRQL and ≤ the Action Level, qualify the result as a nondetect (U) at the CRQL.
- If sample concentration was > the CRQL and ≤ the Action Level, qualify the result as not detected (U) at the reported concentration.
- If the sample concentration was > the CRQL and > the Action Level, qualification of the data was not required.

The positive results for acetone were qualified as nondetects (U) at the CRQL in all soil samples except sample A18T0. Acetone was not detected in sample A18T0; qualification of the data for this sample was therefore not required. It should be noted that due to the nature of surface soil sampling for VOCs, an equipment blank was not required.

SVOCs

Target compounds were not detected in the associated equipment blank A18E0. Target compounds were detected in the method blanks associated with the samples in this SDG. The following table summarizes the maximum concentrations detected, the action levels associated with these contaminants, and the affected samples.

Compound	Source of Contamination	Maximum Concentration Detected (µg/L)	Action Level (µg/kg)	CRQL (µg/kg)	Affected Samples
Caprolactam	Method	89	445	330	A18S9, A18T0, A18T1, A19C8, A19C9, A19D0, A19D1
Diethylphthalate	Method	150	1500	330	None

CRQL - Contract Required Quantitation Limit

Blank Actions (due to blank contaminants):

- If sample concentration was < the CRQL and ≤ the Action Level, qualify the result as a nondetect (U) at the CRQL.
- If sample concentration was > the CRQL and ≤ the Action Level, qualify the result as not detected (U) at the reported concentration.
- If the sample concentration was > the CRQL and > the Action Level, qualification of the data was not required.

The positive results for caprolactam were qualified as nondetects (U) at the CRQL in samples A18S9, A18T0, A18T1, A19C8, A19C9, A19D0, and A19D1. Qualification of the caprolactam results in the remaining samples and the diethylphthalate results in all samples was not required as these compounds were not detected in these surface soil samples.

It should be noted that the equipment blank was extracted using only 250 mL instead of the normal one-liter volume due to insufficient volume collected. Quantitation limits for the equipment blank were therefore 4x higher than normal.

MS/MSD Results

Sample A18T1 was designated for MS/MSD analyses with this sample set.

VOCs

All criteria were met.

SVOCs

The following table summarizes the nonconformances observed in the MS/MSD analyses performed on sample A18T1.

Compound	MS %R	MSD %R	Acceptance Limits MS/MSD %R	Action
pentachlorophenol	114	118	17-109	No validation action was required since pentachlorophenol was not detected in sample A18T1.

Accuracy Check/PE Samples

VOCs

One volatile soil PE sample, A19D4 (ERA Catalog # 721; Lot # D038721), was evaluated with this SDG. In the analysis of PE sample A19D4, 22 out of 27 detected analytes were evaluated as "Within Limits." Five detected compounds (trichloroethene, bromodichloromethane, dibromochloromethane, bromoform, and 1,1,2,2-tetrachloroethane) were evaluated as above the performance acceptance limits. Since these compounds were not detected in any surface soil samples in this SDG, qualification of the data was not required on the basis of this evaluation. One compound, 1,2,3-trichloropropane, was evaluated as a missed TIC; no validation action was required on the basis of this evaluation.

SVOCs

One semivolatile soil PE sample, A19D5 (ICCSV542), was evaluated with this SDG. In the analysis of PE sample A19D5, 13 out of 17 detected analytes were evaluated as "Within Limits." Three detected compounds (naphthalene, di-n-octylphthalate, and benzo[k]fluoranthene) were evaluated as "Warning High," four detected TICs were evaluated as "Non-Spiked TIC," and one detected compound (caprolactam) was evaluated as "Less Than CRQL." No validation action was required on the basis of these evaluations.

TICs

VOCs

Sample A18T0 contained a TIC which was most likely due to column bleed. This TIC was therefore not reported.

<u>SVOCs</u>

During validation, select TICs were not reported in several samples due to the presence of these TICs in the samples at <10x the concentration in the method blanks.

Please contact Ms. Elizabeth Denly at (978) 656-3577 should you have any questions or comments regarding this information.

Very truly yours,

TRC Environmental Corporation

Elizabeth Denly

Elizabeth Denly
Data Validator

Lori MacKinon

Lorie MacKinnon
Senior Reviewer

Tier II Attachments:

1. Tables Ia and Ib: Recommendation Summary Tables
2. Tables IIa and IIb: Overall Evaluation of Data
3. Table III: Tentatively Identified Compound Summary
4. ORDA Form
5. Data Summary Tables
6. Data Validation Worksheets
7. Copy of non-CLP Analytical Method (NA)
8. PE Score Reports
9. Telephone Logs/Communication Forms
10. Supporting Data for Reduced Payment Recommendations (NA)
11. Field Sampling Notes
12. EPA-approved Amendments to QAPjP or SAP (NA)
13. CSF Completeness Evidence Audit (DC-2 Form)
14. DQO Summary Form

cc: Leslie McVickar, EPA Remedial Project Manager (DV memo and data summary tables)
Project File
PSAdmin

Attachment 1
Table I: Recommendation Summary Table

Table Ia
Recommendation Summary
Volatile Organic Compounds in Surface Soil Samples
Callahan Mining Superfund Site
Case 33595, SDG A18D9

Sample Numbers	Matrix	Qualifiers
A18D9	SO	A^1
A18S7	SO	A^1, J^1
A18S8	SO	A^1
A18S9	SO	A^1
A18T0	SO	A
A18T1	SO	A^1
A19C8	SO	A^1
A19C9	SO	A^1
A19D0	SO	A^1
A19D1	SO	A^1
A19D2	SO	A^1
A19D6	TB	A

SO - Soil
TB - Trip Blank

A - Accept the data.

A^1 - Accept the data, but qualify the positive result for acetone as a nondetect (U) due to trip blank contamination.

J^1 - Estimate (UJ) the nondetect result for bromomethane due to a calibration nonconformance. The direction of bias cannot be determined from this nonconformance.

Table Ib

Recommendation Summary

Semivolatile Organic Compounds in Surface Soil Samples

Callahan Mining Superfund Site

Case 33595, SDG A18D9

Sample Numbers	Matrix	Qualifiers
A18D9	SO	J^1, J^2
A18S7	SO	J^1, J^2
A18S8	SO	J^1, J^2
A18S9	SO	A^1, J^1, J^2
A18T0	SO	A^1, J^1, J^2
A18T1	SO	A^1, J^1, J^2
A19C8	SO	A^1, J^1, J^2
A19C9	SO	A^1, J^1
A19D0	SO	A^1, J^1
A19D1	SO	A^1, J^1
A19D2	SO	J^1, J^2
A19E0	EB	J^1

SO - Soil
EB - Equipment Blank

A^1 - Accept the data, but qualify the positive result for caprolactam as a nondetect (U) due to method blank contamination.

J^1 - Estimate (UJ) the nondetect results for 3,3'-dichlorobenzidine and 3-nitroaniline due to calibration nonconformances. The direction of bias cannot be determined from these nonconformances.

J^2 - Estimate (J/UJ) the positive and nondetect results for bis(2-ethylhexyl)phthalate and benzo(k)fluoranthene due to calibration nonconformances. The direction of bias cannot be determined from these nonconformances.

Attachment 2
Table II: Overall Evaluation of Data

Table IIa
Overall Evaluation of Data for VOCs in Surface Soil Samples
Callahan Mining Superfund Site
Case 33595, SDG A18D9

Volatile Organic Compounds					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine the nature and extent of contamination in the surface soils and to obtain data for use in a human health risk assessment	Sampling Method appropriate - yes Analytical Method appropriate - yes	Refer to qualifications in Table Ia: J^1	Refer to qualifications in Table Ia: A^1	Not applicable for Tier II	**Minor Impact on Data Usability** The positive results for acetone were qualified as nondetects in all surface soil samples except sample A18T0 due to trip blank contamination. Potential uncertainty exists for the bromomethane result in sample A18S7 due to a calibration nonconformance.

*The evaluation of "sampling error" cannot be completely assessed in data validation.

**Sampling variability is not assessed in data validation.

Table IIb
Overall Evaluation of Data for SVOCs in Surface Soil Samples
Callahan Mining Superfund Site
Case 33595, SDG A18D9

Semivolatile Organic Compounds					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine the nature and extent of contamination in the surface soils and to obtain data for use in a human health risk assessment	Sampling Method appropriate - yes Analytical Method appropriate - yes	Refer to qualifications in Table Ib: A^1, J^1, J^2	Refer to qualifications in Table Ib: None	Not applicable for Tier II	**Minor Impact on Data Usability** The positive results for caprolactam were qualified as nondetects in samples A18S9, A18T0, A18T1, A19C8, A19C9, A19D0, and A19D1 due to method blank contamination.
					Potential uncertainty exists for the 3,3'-dichlorobenzidine and 3-nitroaniline results in all samples due to calibration nonconformances.
					Potential uncertainty exists for the bis(2-ethylhexyl)phthalate and benzo(k)fluoranthene results in samples A18D9, A18S7, A18S8, A18S9, A18T0, A18T1, A19C8, and A19D2 due to calibration nonconformances.

*The evaluation of "sampling error" cannot be completely assessed in data validation.

**Sampling variability is not assessed in data validation.

Attachment 3
Table III: Tentatively Identified Compound Summary

Table III
Tentatively Identified Compound (TIC) Summary
for Callahan Mining Superfund Site
Case No. 33595 SDG No. A18D9

Classification/Name	A18D9	A18S7	A18G1	A19C8	A19C9	A19D1	A19D2
n-Hexadecanoic Acid	1	1	1				
Bacchotricuneatin			1				
1,1'-Biphenyl, 2,4',5-trichloro-					1		
1,1'-Biphenyl, 2,4,6-trichloro-				1			
1,1'-Biphenyl, 3,3',4,4'-tetrachloro-				1			
1,1'-Biphenyl, trichloro-				1	2		
1,1'-Biphenyl, 2,3,4',6-tetrachloro-				1	2		
1,1'-Biphenyl, 3,3',4,4'-tetrachloro-				1	3		
1,1'-Biphenyl, 2,3,3',4'-tetrachloro-				2			
1,1'-Biphenyl, 2,2',3,4,6-pentachloro-				1			
1,1'-Biphenyl, 2,3,4',6-tetrachloro-				1			
1,1'-Biphenyl, 2,4,4',6-tetrachloro-					1		
1,1'-Biphenyl, 2,3',4,4'-tetrachloro-					1		
1,1'-Biphenyl, 2,2',6,6'-tetrachloro-					1		
1,1'-Biphenyl, 2,2',4,4',5-pentachloro-					1		
1,1'-Biphenyl, 2,3',4,4',5-pentachloro-					3		
1,1'-Biphenyl, 2,3',4,5',6-pentachloro-					1		
2-Naphthalenol, 1-[4-nitrop)]				1			
.gamma.-Sitosterol						1	
Heptadecane							1
Nonadecane							1
Heneicosane							1
2,6,11-Trimethyldodecane			1				

The number indicated in the above tables represents the number of compounds of that classification identified in the sample.

No TICs were identified in samples A18E0 and A19D6. Only unknown TICs were identified in samples A18S8, A18S9, A18T0, and A19D1. Therefore, these samples were not included in the TIC Summary Table.

Attachment 4
ORDA Form

REGION I, EPA-NE ORGANIC REGIONAL DATA ASSESSMENT (ORDA)*

CASE #: 33595

LAB NAME: Envirosystems

SDG #: A18D9

SOW #/CONTRACT #: OLM04.3/ 68-W6-0042

EPA-NE DV TIER LEVEL: II

TPO/PO: **ACTION ____ FYI ✓

SITE NAME: Callahan Mining Superfund Site

OF SAMPLES/MATRIX: 11/SO, 1/OB, 1/TB, 2/PE

VALIDATION CONTRACTOR: TRC

VALIDATOR'S NAME: Elizabeth Denly

DATE DP REC'D BY EPA-NE: 12/28/04

DV COMPLETION DATE: 2/28/05

ANALYTICAL DATA QUALITY SUMMARY

	VOA	SV	Pest/PCB
1. Preservation and Contractual Holding Times	o	o	NA
2. GC/MS / GC/ECD Instrument Performance Check	o	o	
3. Initial Calibration	o	o	
4. Continuing Calibration	o	o	
5. Blanks	o	o	
6. Surrogate Compounds	o	o	
7. Internal Standards	o	o	
8. Matrix Spike/Matrix Spike Duplicate	o	o	
9. Sensitivity Check	NA	NA	
10. PE Samples-Accuracy Check	o	o	
11. Target Compound Identification	NA	NA	
12. Compound Quantitation and Reported QLs	o	o	
13. Tentatively Identified Compounds	o	o	
14. Semivolatile Cleanup/Pesticide/PCB Cleanup	NA	NA	
15. Data Completeness	o	o	
16. Overall Evaluation of Data	o	o	

o = Data had no problems or were qualified due to minor contractual problems.
m = Data were qualified due to major contractual problems.
z = Data were rejected as unusable due major contractual problems.

ACTION ITEMS: (z items)

AREAS OF CONCERN: (m items)

COMMENTS:

*This form assesses the analytical data quality in terms of contractual compliance only. It does not assess sampling errors and/or non-contractual analytical issues that affect data quality.

**Check "ACTION" only if contractual defects resulted in reduced payment/data rejection recommendations.

Validator: Elizabeth Denly

Date: 2/28/05

INSTRUCTIONS ON REVERSE SIDE

Attachment 5
Data Summary Tables

DATA SUMMARY TABLE

VOC Analysis (OLM04.3)

Surface Soil Samples

(Units: ug/kg)

Site: Callahan Mining Superfund Site - Brooksville, ME
Case Number 33595, SDG A18D9

Analyte	CRQL	[illegible]	DF	[illegible]	DF	[illegible]	DF	[illegible]	DF	[illegible]	DF	[illegible]	DF	[illegible]	DF	[illegible]	DF	[illegible]	DF	[illegible]	DF	[illegible]	DF	[illegible]	DF
Dichlorodifluoromethane	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
Chloromethane	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
Vinyl chloride	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
Bromomethane	10	12 U	1	12 UJ	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
Chloroethane	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
Trichlorofluoromethane	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
1,1-Dichloroethene	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
1,1,2-Trichloro-1,2,2-trifluoroethane	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
Acetone	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	8 J	1
Carbon disulfide	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
Methyl acetate	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
Methylene chloride	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
trans-1,2-Dichloroethene	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
Methyl tert-butyl ether	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
1,1-Dichloroethane	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
cis-1,2-Dichloroethene	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
2-Butanone (MEK)	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
Chloroform	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
1,1,1-Trichloroethane	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
Cyclohexane	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
Carbon tetrachloride	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
Trichloroethene	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
1,2-Dichloroethane	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
Benzene	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
Methylcyclohexane	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
1,2-Dichloropropane	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
Bromodichloromethane	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
cis-1,3-Dichloropropene	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
4-Methyl-2-pentanone	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
Toluene	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
trans-1,3-Dichloropropene	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
1,1,2-Trichloroethane	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
Tetrachloroethene	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
2-Hexanone	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
Dibromochloromethane	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
Ethylenedibromide	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
Chlorobenzene	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
Ethylbenzene	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
Xylenes (total)	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
Styrene	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
Bromoform	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
Isopropylbenzene	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
1,1,2,2-Tetrachloroethane	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
1,3-Dichlorobenzene	10	2 J	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
1,4-Dichlorobenzene	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
1,2-Dichlorobenzene	10	2 J	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
1,2-Dibromo-3-chloropropane	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1
1,2,4-Trichlorobenzene	10	12 U	1	12 U	1	12 U	1	11 U	1	11 U	1	11 U	1	12 U	1	12 U	1	14 U	1	13 U	1	11 U	1	10 U	1

All results reported on a dry weight basis.
CRQL - Contract Required Quantitation Limit (not corrected for percent solids)
DF - Dilution Factor

U - Undetected at the specified quantitation limit
UJ - Estimated nondetect due to nonconformances identified in the validation summary
J - Estimated value

Site: Callahan Mining Superfund Site - Brooksville, ME
Case Number 33595, SDG A18D9

SVOC Analysis (OLM04.3)
Surface Soil Samples
(Units: ug/kg)

Analyte	CRQL	[illegible]	[illegible]	DF	[illegible]	[illegible]	DF	[illegible]	[illegible]	DF	[illegible]	[illegible]	DF	[illegible]	[illegible]	DF	[illegible]	[illegible]	DF	[illegible]	[illegible]	DF	[illegible]	[illegible]	DF	[illegible]	[illegible]	DF	[illegible]	[illegible]	DF	[illegible]	[illegible]	DF
Benzaldehyde	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
Phenol	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
2-Chlorophenol	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
Bis(2-chloroethyl) ether	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
2-Methylphenol	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
2,2'-Oxybis(1-Chloropropane)	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
Acetophenone	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	54	J	1	410	U	1	78	J	1	420	U	1	370	U	1
4-Methylphenol	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
N-Nitrosodi-n-propylamine	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
Hexachloroethane	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
Nitrobenzene	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
Isophorone	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
2-Nitrophenol	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
2,4-Dimethylphenol	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
Bis(2-chloroethoxy) methane	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
2,4-Dichlorophenol	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
Naphthalene	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
4-Chloroaniline	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
Hexachlorobutadiene	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
Caprolactam	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
4-Chloro-3-Methylphenol	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
2-Methylnaphthalene	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
Hexachlorocyclopentadiene	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
2,4,6-Trichlorophenol	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
2,4,5-Trichlorophenol	830	970	U	1	970	U	1	1000	U	1	950	U	1	930	U	1	920	U	1	1000	U	1	1000	U	1	1200	U	1	1100	U	1	930	U	1
1,1'-Biphenyl	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
2-Chloronaphthalene	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
2-Nitroaniline	830	970	U	1	970	U	1	1000	U	1	950	U	1	930	U	1	920	U	1	1000	U	1	1000	U	1	1200	U	1	1100	U	1	930	U	1
Dimethyl phthalate	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	250	J	1	410	U	1	460	J	1	420	U	1	370	U	1
2,6-Dinitrotoluene	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
Acenaphthylene	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
3-Nitroaniline	830	970	UJ	1	970	UJ	1	1000	UJ	1	950	UJ	1	930	UJ	1	920	UJ	1	1000	UJ	1	1000	UJ	1	1200	UJ	1	1100	UJ	1	930	UJ	1
Acenaphthene	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
2,4-Dinitrophenol	830	970	U	1	970	U	1	1000	U	1	950	U	1	930	U	1	920	U	1	1000	U	1	1000	U	1	1200	U	1	1100	U	1	930	U	1
4-Nitrophenol	830	970	U	1	970	U	1	1000	U	1	950	U	1	930	U	1	920	U	1	1000	U	1	1000	U	1	1200	U	1	1100	U	1	930	U	1
Dibenzofuran	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
2,4-Dinitrotoluene	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
Diethyl phthalate	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
Fluorene	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
4-Chlorophenyl phenyl ether	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
4-Nitroaniline	830	970	U	1	970	U	1	1000	U	1	950	U	1	930	U	1	920	U	1	1000	U	1	1000	U	1	1200	U	1	1100	U	1	930	U	1
4,6-Dinitro-2-methylphenol	830	970	U	1	970	U	1	1000	U	1	950	U	1	930	U	1	920	U	1	1000	U	1	1000	U	1	1200	U	1	1100	U	1	930	U	1
N-Nitrosodiphenylamine	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
4-Bromophenyl phenyl ether	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
Hexachlorobenzene	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
Atrazine	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
Pentachlorophenol	830	970	U	1	970	U	1	1000	U	1	950	U	1	930	U	1	920	U	1	1000	U	1	1000	U	1	1200	U	1	1100	U	1	930	U	1
Phenanthrene	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
Anthracene	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
Carbazole	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
Di-n-butyl phthalate	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	110	J	1	63	J	1	93	J	1	43	J	1	370	U	1
Fluoranthene	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	58	J	1	410	U	1	100	J	1	420	U	1	370	U	1
Pyrene	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	44	J	1	410	U	1	65	J	1	420	U	1	370	U	1
Butyl benzyl phthalate	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	70	J	1	410	U	1	240	J	1	420	U	1	370	U	1
3,3'-Dichlorobenzidine	330	380	UJ	1	380	UJ	1	410	UJ	1	380	UJ	1	370	UJ	1	370	UJ	1	410	UJ	1	410	UJ	1	470	UJ	1	420	UJ	1	370	UJ	1
Benzo(a)anthracene	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
Chrysene	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	43	J	1	410	U	1	58	J	1	420	U	1	370	U	1
Bis(2-ethylhexyl) phthalate	330	380	UJ	1	380	UJ	1	410	UJ	1	48	J	1	370	UJ	1	370	UJ	1	480	J	1	120	J	1	230	J	1	57	J	1	120	J	1
Di-n-octyl phthalate	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
Benzo(b)fluoranthene	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
Benzo(k)fluoranthene	330	380	UJ	1	380	UJ	1	410	UJ	1	380	UJ	1	370	UJ	1	370	UJ	1	410	UJ	1	410	U	1	470	U	1	420	U	1	370	UJ	1
Benzo(a)pyrene	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
Indeno(1,2,3-cd)pyrene	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
Dibenzo(a,h) anthracene	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
Benzo(g,h,i)perylene	330	380	U	1	380	U	1	410	U	1	380	U	1	370	U	1	370	U	1	410	U	1	410	U	1	470	U	1	420	U	1	370	U	1
[illegible]	[illegible]	[illegible]			[illegible]			[illegible]			[illegible]			[illegible]			[illegible]			[illegible]			[illegible]			[illegible]			[illegible]			[illegible]		

All results reported on a dry weight basis.
CRQL - Contract Required Quantitation Limit (not corrected for percent solids)
DF - Dilution Factor

U - Undetected at the specified quantitation limit
UJ - Estimated nondetect due to nonconformances identified in the validation summary
J - Estimated value

Site: Callahan Mining Superfund Site - Brooksville, ME
Case Number 33595, SDG A18D9

SVOC Analysis (OLM04.3)
Aqueous QC Sample
(Units: ug/L)

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Benzaldehyde	10	40	U	1
Phenol	10	40	U	1
2-Chlorophenol	10	40	U	1
Bis(2-chloroethyl) ether	10	40	U	1
2-Methylphenol	10	40	U	1
2,2'-Oxybis(1-Chloropropane)	10	40	U	1
Acetophenone	10	40	U	1
4-Methylphenol	10	40	U	1
N-Nitrosodi-n-propylamine	10	40	U	1
Hexachloroethane	10	40	U	1
Nitrobenzene	10	40	U	1
Isophorone	10	40	U	1
2-Nitrophenol	10	40	U	1
2,4-Dimethylphenol	10	40	U	1
Bis(2-chloroethoxy) methane	10	40	U	1
2,4-Dichlorophenol	10	40	U	1
Naphthalene	10	40	U	1
4-Chloroaniline	10	40	U	1
Hexachlorobutadiene	10	40	U	1
Caprolactam	10	40	U	1
4-Chloro-3-Methylphenol	10	40	U	1
2-Methylnaphthalene	10	40	U	1
Hexachlorocyclopentadiene	10	40	U	1
2,4,6-Trichlorophenol	10	40	U	1
2,4,5-Trichlorophenol	25	100	U	1
1,1'-Biphenyl	10	40	U	1
2-Chloronaphthalene	10	40	U	1
2-Nitroaniline	25	100	U	1
Dimethyl phthalate	10	40	U	1
2,6-Dinitrotoluene	10	40	U	1
Acenaphthylene	10	40	U	1
3-Nitroaniline	25	100	UJ	1
Acenaphthene	10	40	U	1
2,4-Dinitrophenol	25	100	U	1
4-Nitrophenol	25	100	U	1
Dibenzofuran	10	40	U	1
2,4-Dinitrotoluene	10	40	U	1
Diethyl phthalate	10	40	U	1
Fluorene	10	40	U	1
4-Chlorophenyl phenyl ether	10	40	U	1
4-Nitroaniline	25	100	U	1
4,6-Dinitro-2-methylphenol	25	100	U	1
N-Nitrosodiphenylamine	10	40	U	1
4-Bromophenyl phenyl ether	10	40	U	1
Hexachlorobenzene	10	40	U	1
Atrazine	10	40	U	1
Pentachlorophenol	25	100	U	1
Phenanthrene	10	40	U	1
Anthracene	10	40	U	1
Carbazole	10	40	U	1
Di-n-butyl phthalate	10	40	U	1
Fluoranthene	10	40	U	1
Pyrene	10	40	U	1
Butyl benzyl phthalate	10	40	U	1
3,3'-Dichlorobenzidine	10	40	UJ	1
Benzo(a)anthracene	10	40	U	1
Chrysene	10	40	U	1
Bis(2-ethylhexyl) phthalate	10	40	U	1
Di-n-octyl phthalate	10	40	U	1
Benzo(b)fluoranthene	10	40	U	1
Benzo(k)fluoranthene	10	40	U	1
Benzo(a)pyrene	10	40	U	1
Indeno(1,2,3-cd)pyrene	10	40	U	1
Dibenzo(a,h) anthracene	10	40	U	1
Benzo(g,h,i)perylene	10	40	U	1

CRQL - Contract Required Quantitation Limit
DF - Dilution Factor
U - Undetected at the specified quantitation limit
UJ - Estimated nondetect due to nonconformances identified in the validation summary

Residential Wells

TRC
Customer-Focused Solutions

March 17, 2005

Christine Clark
Regional Sample Control Center
U.S. EPA Region I
11 Technology Drive
North Chelmsford, MA 01863-2431

Subject: Work Assignment No. 161-RICO-017H
Case No. 33852, SDGs MA1GN7 and MA1GN8
Ceimic Corporation, Narragansett, RI
Callahan Mining Superfund Site, Brooksville, ME
Tier II Inorganic Data Validation

Metals:	8/Residential Wells/	MA1GN7, MA1GN8, MA1GN9, MA1GP0, MA1GP1, MA1GP2, MA1GP3, MA1GP4 (Field duplicate pair: MA1GN7/MA1GN8)
	1/PE Sample/	MA1GP5

Dear Ms. Clark:

A Tier II validation, in accordance with the *Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Inorganic Analyses,* June 13, 1988 criteria, and incorporating *Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996 criteria, as deemed appropriate, was performed on the inorganic analytical data for eight residential well samples and one performance evaluation (PE) sample collected by TRC Environmental Corporation on January 11, 12, and 13, 2005 from the Callahan Mining Superfund Site in Brooksville, Maine. All samples were analyzed for metals under the Contract Laboratory Program (CLP) Routine Analytical Services (RAS) program using the ILM05.3 Statement of Work (SOW). The metals analysis was modified to report lower quantitation limits through Flex Clause Modification Reference #1194.1. It should be noted that the laboratory reported the results for the above-listed samples in two separate sample delivery groups (SDGs) although these samples were submitted together and analyzed under the same Flex Clause Modification Reference number. This report represents the validation of both of these SDGs.

In accordance with the EPA-approved project plans for the site, Tier II validation was performed on all samples in this SDG. The data were evaluated based on the following parameters:

- Overall Evaluation of Data and Potential Usability Issues

* • Data Completeness (CSF Audit - Tier I)

* • Holding Times and Sample Preservation

Boott Mills South, Foot of John Street • Lowell, Massachusetts 01852
Telephone 978-970-5600 • Fax 978-453-1995

*	ICP-MS Tuning and Mass Calibration
	Instrument Calibration
	Blanks
	ICP Interference Check Sample Results
*	Matrix Spike (MS) Results
*	Laboratory Duplicate Results
	Field Duplicate Results
*	Laboratory Control Sample (LCS) Results
	Internal Standards
	Laboratory Fortified Blank Sample (LFB) Results
NA	Furnace Atomic Absorption Results
	ICP Serial Dilution Results
	Detection Limit Results
NA	Sample Quantitation Results
	Accuracy Check/PE Samples

* - All criteria were met for this parameter.

Note: Worksheets are not included for parameters that have met criteria or parameters that are not applicable (NA) to the method or to Tier II validation.

The following information was used to generate the Data Validation Memorandum attachments:

Table I: Recommendation Summary Table - summarizes validation recommendations
Table II: Overall Evaluation of Data - summarizes site data quality objectives (DQOs) and potential usability issues

Data Summary Tables - summarize accepted, qualified, and rejected data based on the Tier II data validation review.

Overall Evaluation of Data and Potential Usability Issues

Following is a summary of the site DQOs:

- To determine the impact to drinking water from the site and to support a human health risk assessment.

All results are usable for project objectives.

The validation actions applied as a result of sampling error are summarized below:

- The positive results for copper and lead were qualified as estimated (J) in all samples due to high relative percent differences (RPDs) for these analytes in the evaluation of the field duplicate pair. The direction of the bias cannot be determined from this nonconformance. These results are usable for project objectives as estimated values which may have a minor impact on the data usability.

The validation actions applied as a result of analytical error are summarized below:

- The following results were qualified as nondetects (U) due to laboratory blank contamination: antimony in samples MA1GN7, MA1GN8, MA1GN9, MA1GP0, MA1GP1, and MA1GP2, arsenic in sample MA1GN7, chromium in samples MA1GN7, MA1GN8, MA1GN9, MA1GP1, MA1GP2, MA1GP3, and MA1GP4, selenium in samples MA1GP0 and MA1GP4, silver in samples MA1GN7, MA1GP0, MA1GP1, and MA1GP2, and vanadium in samples MA1GP1 and MA1GP2. The results are still usable for project objectives. This qualification may have a minor impact on data usability.

- The positive and nondetect results for cobalt in all samples were qualified as estimated (J/UJ) due to negative contamination in the laboratory blank analyses. The results are usable for project objectives as estimated values and nondetects with estimated quantitation limits which may be biased low. This qualification may have a minor effect on the data usability.

- The positive and nondetect results for arsenic were qualified as estimated (J/UJ) in all samples due to low recovery in the LFB sample. The results are usable for project objectives as estimated values and nondetects with estimated quantitation limits which may be biased low. This qualification may have a minor effect on the data usability.

- The positive results for copper and zinc were qualified as estimated (J) due to high percent differences (%Ds) for these analytes in the evaluation of the serial dilution analyses. These results are usable for project objectives as estimated values. This qualification may have a minor effect on the data usability.

- Positive results which were greater than the method detection limit (MDL) but less than the contract-required quantitation limit (CRQL) (for ICP/MS analytes) and ≤2x the MDL (for ICP/AES analytes) were qualified as estimated (J). The following results were affected by this qualification: iron in samples MA1GN9 and MA1GP2, barium in sample MA1GN9, beryllium in samples MA1GP0, MA1GP1, and MA1GP2, cadmium in samples MA1GN7, MA1GN8, MA1GN9, MA1GP0, MA1GP1, and MA1GP2, cobalt in samples MA1GP0, MA1GP1, and MA1GP2, copper, lead, and vanadium in sample MA1GP3, and nickel in samples MA1GN9 and MA1GP3. There is potential uncertainty for the accuracy of theses results. The results are usable for project objectives as estimated values which may have a minor impact on the data usability.

The following metals were analyzed by ICP/AES: aluminum, calcium, iron, magnesium, potassium, and sodium. The following metals were analyzed by ICP/MS: antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, nickel, selenium, silver, thallium, vanadium, and zinc.

The attached Table I summarizes the Tier II validation recommendations which were based on the following information:

Instrument Calibration

A CRQL standard was analyzed at 2x the required quantitation limit. The following table lists the analytes which exhibited recoveries outside of the validation control limits of 80 - 120%.

[illegible]	[illegible]	[illegible]
Antimony	CRQL1 122%	No validation actions were required as project samples were not bracketed by this CRQL standard.
Antimony	CRQL5 137%	No validation actions were required as project samples were not bracketed by this CRQL standard.
Arsenic	CRQL5 130%	No validation actions were required as project samples were not bracketed by this CRQL standard.

Blanks

The following table summarizes the blank contaminants detected in the laboratory blanks and associated action levels.

[illegible]	Action Level
Antimony	2.51 ug/L
Arsenic	0.13 ug/L
Calcium	415 ug/L
Chromium	0.76 ug/L
Cobalt	(-) 0.22 ug/L
Nickel	0.085 ug/L
Selenium	0.63 ug/L

Analyte	Action Level
Silver	0.12 ug/L
Vanadium	0.27 ug/L

Qualification of the data was performed as follows:

For positive contamination,

- If the positive sample value was ≥ the CRQL and ≤ the Action Level, qualify the result as a nondetect (U) at the reported concentration.
- If the positive sample value was < CRQL and ≤ the Action Level, qualify the result as a nondetect (U) at the CRQL.
- If the positive sample value was > the MDL and > the Action Level, report the value unqualified.

For negative contamination,

- If the sample value was nondetect, qualify the result as an estimated nondetect (UJ) at the reported CRQL.
- If the positive sample value was > the MDL and < the Action Level, qualify the result as estimated (J).

Based on the action levels determined, the positive results for antimony in samples MA1GP0, MA1GP1, and MA1GP2 and arsenic in sample MA1GN7 were qualified as nondetect (U) at the reported concentrations. The positive results for antimony in samples MA1GN7, MA1GN8, and MA1GN9, chromium in samples MA1GN7, MA1GN8, MA1GN9, MA1GP1, MA1GP2, MA1GP3, and MA1GP4, selenium in samples MA1GP0 and MA1GP4, silver in samples MA1GN7, MA1GP0, MA1GP1, and MA1GP2, and vanadium in samples MA1GP1 and MA1GP2 were qualified as nondetect (U) at the CRQL. The positive and nondetect results for cobalt in all samples were qualified as estimated (J/UJ) due to negative contamination detected.

ICP Interference Check Sample Results

All recovery criteria were met in the ICSAB analysis.

The following table lists the analytes which exhibited recoveries outside of the control limits of 80 - 120% or were detected at levels greater than 2x the MDL in the ICSA solution analysis associated with all samples. Validation actions were not required as sample interferent levels were less than 50% that of the level in the ICSA solution.

Analyte	Level Detected or Recovery
Sodium	Detected at >2x the MDL
Arsenic	340%
Beryllium	Detected at >2x the MDL

Analyte	[illegible]
Cadmium	59%
Selenium	207%
Zinc	125%
Vanadium	0%

Field Duplicate Results

Samples MA1GN7 and MA1GN8 were submitted as the field duplicate pair with this sample set. The following table summarizes the RPDs which were outside of the acceptance criteria.

Analyte	[illegible]	[illegible]	[illegible]	[illegible]
Copper	71.6	45.0	45.6	Estimate (J) the positive results for copper in all samples.
Lead	10.1	2.4	123	Estimate (J) the positive results for lead in all samples.

Internal Standards (ICP/MS)

The following table lists the sample internal standard (IS) areas which were outside of the control limits of 60-125%.

Sample	Internal Standard	Reported Analyte	IS Recovery (%)	Validation Action
MA1GN8	Lithium-6	Beryllium	133	Validation action was not required; beryllium was reported from the 2-fold dilution which exhibited an acceptable internal standard recovery.
MA1GN9	Lithium-6	Beryllium	161	Validation action was not required as result for beryllium was nondetect.
MA1GN9 2-fold dilution	Lithium-6	Beryllium	134	As IS recovery was outside of control limits in the diluted analysis also, beryllium was reported from the original undiluted analysis.

Laboratory Fortified Blank Sample (LFB) Results

The following table lists the analytes which exhibited recoveries outside of the control limits of 70 - 130% and the resulting validation actions.

Analyte	Recovery (%)	Validation Actions
Arsenic	45	Estimate (J/UJ) the positive and nondetect results for arsenic in all samples.

ICP Serial Dilution Results

An ICP serial dilution analysis was performed on sample MA1GN9. The following table lists the analytes which exhibited %Ds greater than 15 and the resulting validation actions.

Analyte	%D	Validation Actions
Copper	16%	Estimate (J) the positive results for copper in all samples.
Zinc	19%	Estimate (J) the positive results for zinc in all samples.

Detection Limit Results

It should be noted that the quantitation limits were not calculated correctly with the preparation factor. Upon request during validation, the laboratory resubmitted the results for all samples with the correct quantitation limits. The project-required quantitation limits were met in all samples.

For the ICP/MS analysis, in which a multiple point calibration was performed, positive results which were greater than the MDL but less than the CRQL were qualified as estimated (J). The following results were affected by this qualification: barium in sample MA1GN9, beryllium in samples MA1GP0, MA1GP1, and MA1GP2, cadmium in samples MA1GN7, MA1GN8, MA1GN9, MA1GP0, MA1GP1, and MA1GP2, cobalt in samples MA1GP0, MA1GP1, and MA1GP2, copper, lead, and vanadium in sample MA1GP3, and nickel in samples MA1GN9 and MA1GP3.

For the ICP/AES analysis, in which a single point calibration was performed, positive results which were ≤2x the MDL were qualified as estimated (J). The following results were affected by this qualification: iron in samples MA1GN9 and MA1GP2.

Accuracy Check/PE Samples

One metals aqueous PE sample, MA1GP5 (IS4682), was evaluated with this SDG. In the analysis of PE sample MA1GP5, 14 out of 18 detected analytes were evaluated as "Within Limits." Zinc was evaluated as "warning low", selenium was not evaluated, and calcium and magnesium were detected below the CRQL. Validation actions were not required on the basis of these evaluations.

Please contact Ms. Elizabeth Denly at (978) 656-3577 should you have any questions or comments concerning this information.

Very truly yours,

TRC Environmental Corporation

Elizabeth Denly for
Lorie MacKinnon
Data Validator

Elizabeth Denly
Elizabeth Denly
Senior QA Chemist

Tier II Attachments:
1. Table I: Recommendation Summary Table
2. Table II: Overall Evaluation of Data
3. Table III: Tentatively Identified Compound Summary (NA)
4. Data Summary Tables
5. IRDA Form
6. Data Validation Worksheets
7. Copy of CLP Flex Clause Modification Reference #1194.1
8. PE Score Reports
9. Copies of Telephone Logs/Communication Forms
10. Supporting Data for Reduced Payment Recommendations (NA)
11. Copies of Field Sampling Notes
12. Copies of EPA-approved Amendments to QAPjP or SAP
13. CSF Audit (DC-2 Form)
14. DQO Summary Form

cc: Ed Hathaway, EPA Remedial Project Manager (DV memo and data summary table)
Project File
PSAdmin

Attachment 1
Table I: Recommendation Summary Table

Table I
Recommendation Summary
for Metals Analyses
Callahan Mining Superfund Site
Case# 33852 SDGs MA1GN7 and MA1GN8

Sample Number	Matrix	Qualifiers
MA1GN7	DW	A^1, A^2, A^3, A^5, J^1, J^2, J^3, J^4, J^8
MA1GN8	DW	A^1, A^3, J^1, J^2, J^3, J^4, J^8
MA1GN9	DW	A^1, A^3, J^1, J^2, J^3, J^4, J^5, J^6, J^8, J^{11}
MA1GP0	DW	A^1, A^4, A^5, J^1, J^2, J^3, J^4, J^7, J^8, J^9
MA1GP1	DW	A^1, A^3, A^5, A^6, J^1, J^2, J^3, J^4, J^7, J^8, J^9
MA1GP2	DW	A^1, A^3, A^5, A^6, J^1, J^2, J^3, J^4, J^5, J^7, J^8, J^9
MA1GP3	DW	A^3, J^1, J^2, J^3, J^4, J^{10}, J^{11}
MA1GP4	DW	A^3, A^4, J^1, J^2, J^3, J^4

DW - Drinking Water

A^1 - Accept data, but qualify the result for antimony as a nondetect due to contamination detected in the laboratory blanks.

A^2 - Accept data, but qualify the result for arsenic as a nondetect due to contamination detected in the laboratory blanks.

A^3 - Accept data, but qualify the result for chromium as a nondetect due to contamination detected in the laboratory blanks.

A^4 - Accept data, but qualify the result for selenium as a nondetect due to contamination detected in the laboratory blanks.

A^5 - Accept data, but qualify the result for silver as a nondetect due to contamination detected in the laboratory blanks.

A^6 - Accept data, but qualify the result for vanadium as a nondetect due to contamination detected in the laboratory blanks.

J^1 - Estimate (J) the positive results for copper and lead due to a high RPD for these analytes in the evaluation of the field duplicate pair.

Please contact Ms. Elizabeth Denly at (978) 656-3577 should you have any questions or comments concerning this information.

Very truly yours,

TRC Environmental Corporation

Elizabeth Denly for
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14. DQO Summary Form

cc: Ed Hathaway, EPA Remedial Project Manager (DV memo and data summary table)
Project File
PSAdmin

Attachment 1

Table I: Recommendation Summary Table

Table I
Recommendation Summary
for Metals Analyses
Callahan Mining Superfund Site
Case# 33852 SDGs MA1GN7 and MA1GN8

Sample Number	Matrix	Changes
MA1GN7	DW	A^1, A^2, A^3, A^5, J^1, J^2, J^3, J^4, J^8
MA1GN8	DW	A^1, A^3, J^1, J^2, J^3, J^4, J^8
MA1GN9	DW	A^1, A^3, J^1, J^2, J^3, J^4, J^5, J^6, J^8, J^{11}
MA1GP0	DW	A^1, A^4, A^5, J^1, J^2, J^3, J^4, J^7, J^8, J^9
MA1GP1	DW	A^1, A^3, A^5, A^6, J^1, J^2, J^3, J^4, J^7, J^8, J^9
MA1GP2	DW	A^1, A^3, A^5, A^6, J^1, J^2, J^3, J^4, J^5, J^7, J^8, J^9
MA1GP3	DW	A^3, J^1, J^2, J^3, J^4, J^{10}, J^{11}
MA1GP4	DW	A^3, A^4, J^1, J^2, J^3, J^4

DW - Drinking Water

A^1 - Accept data, but qualify the result for antimony as a nondetect due to contamination detected in the laboratory blanks.

A^2 - Accept data, but qualify the result for arsenic as a nondetect due to contamination detected in the laboratory blanks.

A^3 - Accept data, but qualify the result for chromium as a nondetect due to contamination detected in the laboratory blanks.

A^4 - Accept data, but qualify the result for selenium as a nondetect due to contamination detected in the laboratory blanks.

A^5 - Accept data, but qualify the result for silver as a nondetect due to contamination detected in the laboratory blanks.

A^6 - Accept data, but qualify the result for vanadium as a nondetect due to contamination detected in the laboratory blanks.

J^1 - Estimate (J) the positive results for copper and lead due to a high RPD for these analytes in the evaluation of the field duplicate pair.

J^{2} - Estimate (J/UJ) the positive or nondetect result for cobalt due to negative contamination in the laboratory blanks. The result may be biased low.

J^{3} - Estimate (J/UJ) the positive or nondetect result for arsenic due to low recovery for this analyte in the LFB analysis. The result may be biased low.

J^{4} - Estimate (J) the positive results for copper and zinc due to a high %Ds for these analytes in the serial dilution analysis.

J^{5} - Estimate (J) the positive result for iron since the result is ≤2x the MDL.

J^{6} - Estimate (J) the positive result for barium since the result is greater than the MDL but less than the CRQL.

J^{7} - Estimate (J) the positive result for beryllium since the result is greater than the MDL but less than the CRQL.

J^{8} - Estimate (J) the positive result for cadmium since the result is greater than the MDL but less than the CRQL.

J^{9} - Estimate (J) the positive result for cobalt since the result is greater than the MDL but less than the CRQL.

J^{10} - Estimate (J) the positive results for copper, lead, and vanadium since the results are greater than the MDL but less than the CRQL.

J^{11} - Estimate (J) the positive result for nickel since the result is greater than the MDL but less than the CRQL.

Attachment 2
Table II: Overall Evaluation of Data

Table II

Overall Evaluation of Data - Data Validation Memorandum

Case 33852, SDGs MA1GN7 and MA1GN8

Metals					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability**	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine the impact to drinking water from the site and to support a human health risk assessment.	Both - Yes	Refer to qualifications in R/S Key: A^1 through A^6 J^2 through J^{11}	Refer to qualifications in R/S Key J^1		**Low Biased Results:** - Potential low bias exists for cobalt in all samples due to the negative contamination in laboratory blanks. - Potential low bias exists for arsenic in all samples due the to low recovery in the LFB analysis. **Potential Uncertainty in Results:** - Quantitation limits for antimony, arsenic, chromium, selenium, silver, and vanadium were elevated in select samples due to laboratory blank contamination. - Potential uncertainty exists for select vanadium, iron, barium, cadmium, cobalt, copper, beryllium, nickel, and lead results which were ≤2x the MDL for ICP/AES or greater than the MDL but less than the CRQL for ICP/MS. - Potential uncertainty exists for the copper and zinc results in all samples due to high %Ds in the serial dilution analysis. - Potential uncertainty exists for the copper and lead results in all samples due to the high RPDs for these analytes in the evaluation of the field duplicate pair. **Results discussed above can still be used for project objectives as estimated values or nondetects with estimated quantitation limits. These issues may have a minor impact on the data usability.**

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

Attachment 3
Table III: Tentatively Identified Compound Summary

- not applicable to this SDG

Attachment 4
IRDA Form

Region I

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 33852
SITE Callahan Mining
LABORATORY Ceimic Corporation
NO OF SAMPLES/MATRIX 8 AQ, 1 PE
SDG # MA16N7/MA16N8
REVIEWER(IF NOT ESD) TRC
SOW # ILM05.3
REVIEWER'S NAME Lori Mackinnon
DPO:ACTION ______ FYI ✓
COMPLETION DATE 03/07/05

DATA ASSESSMENT SUMMARY

		ICP	ICP/MS ~~AA~~	HG	CYANIDE
1.	HOLDING TIMES	O	O		
2.	CALIBRATIONS	O	O		
3.	BLANKS	O	O		
4.	ICS	O	O		
5.	LCS	O	O		
6.	DUPLICATE ANALYSIS	O	O		
7.	MATRIX SPIKE	O	O		
8.	MSA	NA	NA		
9.	SERIAL DILUTION	O	O		
10.	SAMPLE VERIFICATION	NA	NA		
11.	OTHER QC	O	O		
12.	OVERALL ASSESSMENT	O	O		

O = Data had no problems, or qualified due to minor problems.
M = Data qualified due to major problems.
Z = Data unacceptable.
X = Problems, but do not affect data.

ACTION ITEMS:

AREAS OF CONCERN:

NOTABLE PERFORMANCE:

Validator: Lori Mackinnon
Date: 02/24/05

Attachment 5
Data Summary Tables

Site: Callahan Mining Superfund Site - Brooksville, ME
Case Number 33852, SDGs MA1GN7 and MA1GN8

DATA SUMMARY TABLE

Metals Analysis (ILM05.3)
Drinking Water Samples
(Units: ug/L)

Location Name		**DWCA-16**		**DWCA-16**		**DWCA-17**		**DWCA-18**		**DWCA-12**		**DWCA-11**		**DWCA-10**		**DWCA-15**	
TRC Sample ID		**DWCA-16**		**DWCAE-16**		**DWCA-17**		**DWCA-18**		**DWCA-12**		**DWCA-11**		**DWCA-10**		**DWCA-15**	
Lab Sample ID		**050162-01**		**050162-002**		**050162-03**		**050162-04**		**050162-05**		**050162-06**		**050162-07**		**050162-08**	
RAS Sample ID		**MA1GN7**		**MA1GN8**		**MA1GN9**		**MA1GP0**		**MA1GP1**		**MA1GP2**		**MA1GP3**		**MA1GP4**	
Comments				**Field duplicate of MA1GN7**													
Analyte	**CRQL**																
Aluminum	50	25.0	U	25.0	U	25.0	U	25.0	U	25.0	U	25.0	U	25.0	U	25.0	U
Antimony	0.5	0.25	U	0.25	U	0.25	U	0.34	U	0.28	U	0.26	U	0.25	U	0.25	U
Arsenic	0.2	0.12	UJ	0.10	UJ	0.22	J	0.33	J	0.40	J	0.25	J	0.28	J	0.10	UJ
Barium	2.0	3.6		3.7		0.95	J	5.6		2.9		4.7		1.0	U	1.0	U
Beryllium	0.2	0.10	U	0.20	U	0.10	U	0.04	J	0.08	J	0.06	J	0.10	U	0.10	U
Cadmium	0.2	0.03	J	0.02	J	0.02	J	0.08	J	0.06	J	0.04	J	0.10	U	0.10	U
Calcium	1000	24,200		24,300		19,400		11,300		17,400		9390		24,800		40,800	
Chromium	2.0	1.0	U	1.0	U	1.0	U	78.8		1.0	U	1.0	U	1.0	U	1.0	U
Cobalt	1.0	0.50	UJ	0.50	UJ	0.50	UJ	0.05	J	0.11	J	0.16	J	0.50	UJ	0.50	UJ
Copper	2.0	71.6	J	45.0	J	34.9	J	82.7	J	80.8	J	317	J	0.79	J	11.5	J
Iron	100	54.6		37.9		15.1	J	42.3		287		11.6	J	50.0	U	50.0	U
Lead	0.2	10.1	J	2.4	J	0.77	J	14.7	J	162	J	20.4	J	0.03	J	4.0	J
Magnesium	50	2550		2560		3760		2420		1740		4930		3720		4970	
Manganese	1.0	0.87		0.90		1.6		1.1		16.7		2.3		0.50	U	0.50	U
Nickel	1.0	0.73		0.59		0.35	J	0.62		2.3		1.9		0.29	J	0.61	
Potassium	100	5650		5650		1150		4610		712		4940		1320		1200	
Selenium	3.0	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U
Silver	1.0	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Sodium	1000	13,300		13,400		9310		11,000		7800		10,400		6760		11,700	
Thallium	0.5	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
Vanadium	1.0	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.48	J	0.53	
Zinc	2.0	28.7	J	31.3	J	25.1	J	22.0	J	56.4	J	31.9	J	2.2	J	1.6	J
Date Sampled		01/11/05		01/11/05		01/11/05		01/12/05		01/12/05		01/12/05		01/12/05		01/11/05	
Date Analyzed		02/11/05		02/11/05		02/11/05		02/11/06		02/11/05		02/11/05		02/11/05		02/11/06	

CRQL - Contract-Required Quantitation Limit
J - Estimated value
UJ - Estimated nondetect

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Customer-Focused Solutions

March 1, 2005

Christine Clark
Regional Sample Control Center
U.S. EPA Region I
11 Technology Drive
North Chelmsford, MA 01863-2431

Subject: Work Assignment No. 161-RICO-017H
Case No. 0249M, SDG D05755_IB
Southwest Research Institute, San Antonio, TX
Callahan Mining Superfund Site, Brooksville, ME
Tier II Inorganic Data Validation

Mercury: 8/Drinking Waters/ D05755, D05756, D05757, D05758, D05759, D05760, D05764, D05766
(Field duplicate pair: D05755/D05756)
1/PE Sample/ D05762

Dear Ms. Clark:

A Tier II validation, in accordance with the *Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Inorganic Analyses,* June 13, 1988 criteria, and incorporating *Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996 criteria, as deemed appropriate, was performed on the inorganic analytical data for eight drinking water samples and one performance evaluation (PE) sample collected by TRC Environmental Corporation on January 11, 12, and 13, 2005 from the Callahan Mining Superfund Site in Brooksville, ME. All samples were analyzed for mercury under the Metcalf & Eddy Remedial Action Contract Delivery of Analytical Services (DAS) program using Metcalf & Eddy's DAS Specification, D-004.1, *Analytical Specification for the Analysis of Low Concentration Metals and Cyanide in Aqueous Samples,* June 2001.

In accordance with the EPA-approved project plans for the site, Tier II validation was performed on all samples in this sample delivery group (SDG). The data were evaluated based on the following parameters:

• Overall Evaluation of Data and Potential Usability Issues
* • Data Completeness (CSF Audit - Tier I)
* • Holding Times and Sample Preservation
* • Instrument Calibration
* • Blanks
NA • ICP Interference Check Sample Results

*	•	Matrix Spike (MS) Results
*	•	Laboratory Duplicate Results
*	•	Field Duplicate Results
*	•	Laboratory Control Sample (LCS) Results
*	•	Laboratory Fortified Blank Sample (LFB) Results
NA	•	Furnace Atomic Absorption Results
NA	•	ICP Serial Dilution Results
*	•	Detection Limit Results
NA	•	Sample Quantitation Results
	•	Accuracy Check/PE Samples

* - All criteria were met for this parameter.

Note: Worksheets are not included for parameters that have met criteria or parameters that are not applicable (NA) to the method or to Tier II validation.

<u>The following information was used to generate the Data Validation Memorandum attachments</u>:

Table I:Recommendation Summary Table - summarizes validation recommendations
Table II: Overall Evaluation of Data - summarizes site data quality objectives (DQOs) and potential usability issues

Data Summary Tables - summarize accepted, qualified, and rejected data based on the Tier II data validation review.

Overall Evaluation of Data and Potential Usability Issues

- To determine the impact to drinking water from the site and to support a human health risk assessment.

All results are usable for project objectives. Validation actions were not required as a result of sampling or analytical error.

<u>The attached Table I summarizes the Tier II validation recommendations which were based on the following information:</u>

Accuracy Check/PE Samples

One mercury aqueous PE sample, D05762 (HG3881), was evaluated with this SDG. In the analysis of PE sample D05762, mercury was evaluated as “Within Limits.”

Please contact Ms. Elizabeth Denly at (978) 656-3577 should you have any questions or comments concerning this information.

Very truly yours,

TRC Environmental Corporation

Elizabeth Denly for

Lorie MacKinnon
Data Validator

Elizabeth Denly

Elizabeth Denly
Senior QA Chemist

Tier II Attachments:
1. Table I: Recommendation Summary Table
2. Table II: Overall Evaluation of Data
3. Table III: Tentatively Identified Compound Summary (NA)
4. Data Summary Table
5. IRDA Form
6. Data Validation Worksheets
7. Copy of non-CLP Analytical Method (M&E DAS Specification D-004.1)
8. PE Score Reports
9. Copies of Telephone Logs/Communication Forms (NA)
10. Supporting Data for Reduced Payment Recommendations (NA)
11. Copies of Field Sampling Notes
12. Copies of EPA-approved Amendments to QAPjP or SAP (NA)
13. CSF Audit (DC-2 Form)
14. DQO Summary Form

cc:
Leslie McVickar, EPA Remedial Project Manager (DV memo and data summary table)
Project File
PSAdmin

Attachment 1
Table I: Recommendation Summary Table

Table I
Recommendation Summary for Mercury Analyses
Callahan Mining Superfund Site
Case# 0249M, SDG D05755_IB

Sample Number	Matrix	Qualifiers
D05755	DW	A
D05756	DW	A
D05757	DW	A
D05758	DW	A
D05759	DW	A
D05760	DW	A
D05764	DW	A
D05766	DW	A

DW - Drinking Water

A - Accept results.

Attachment 2
Table II: Overall Evaluation of Data

Table II
Overall Evaluation of Data - Data Validation Memorandum
Case 0249M, SDG D05755_IB

Mercury					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability**	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine the impact to drinking water from the site and to support a human health risk assessment.	Both - Yes	Refer to qualifications in R/S Key: None	Refer to qualifications in R/S Key None		**All results can be used for project objectives without qualifications.**

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

Attachment 3
Table III: Tentatively Identified Compound Summary

-not applicable to this SDG

Attachment 4
IRDA Form

Region I

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 0249.M

SITE Callahan Mining

LABORATORY SwRI

NO OF SAMPLES/MATRIX 8AQ, 1PE

SDG # D05755_IB

REVIEWER(IF NOT ESD) TRC

SOW # ILM04.1 / Das D004.1

REVIEWER'S NAME Lori Mackinnon

DPO:ACTION _____ FYI ✓

COMPLETION DATE 02/28/05

DATA ASSESSMENT SUMMARY

		ICP	AA	HG	CYANIDE
1.	HOLDING TIMES			O	
2.	CALIBRATIONS			O	
3.	BLANKS			O	
4.	ICS			NA	
5.	LCS			O	
6.	DUPLICATE ANALYSIS			O	
7.	MATRIX SPIKE			O	
8.	MSA			NA	
9.	SERIAL DILUTION			NA	
10.	SAMPLE VERIFICATION			NA	
11.	OTHER QC			O	
12.	OVERALL ASSESSMENT			O	

O = Data had no problems, or qualified due to minor problems.

M = Data qualified due to major problems.

Z = Data unacceptable.

X = Problems, but do not affect data.

ACTION ITEMS:

AREAS OF CONCERN:

NOTABLE PERFORMANCE:

Validator: Lori Mackinnon

Date: 02/28/05

Attachment 5
Data Summary Tables

Site: Callahan Mining Superfund Site - Brooksville, ME
Case Number 0249M, SDG D05755_IB

DATA SUMMARY TABLE

Mercury Analysis (D-004.1)
Drinking Water Samples
(Units: ug/L)

Location Name		DWCA-16			DWCA-16			DWCA-17			DWCA-18			DWCA-12			DWCA-11			DWCA-10			DWCA-15		
TRC Sample ID		DWCA-16			DWCAE-16			DWCA-17			DWCA-18			DWCA-12			DWCA-11			DWCA-10			DWCA-15		
Lab Sample ID		257660			257661			257662			257663			257664			257665			257668			257669		
DAS Sample ID		D05755			D05756			D05757			D05758			D05759			D05760			D05764			D05766		
Comments					Field duplicate of A1G92																				
Analyte	QL			DF			DF			DF			DF			DF			DF			DF			DF
Mercury	0.1	0.1	U	1	0.1	U	1	0.1	U	1	0.1	U	1	0.1	U	1	0.1	U	1	0.1	U	1	0.1	U	1
Date Sampled		01/11/05			01/11/05			01/11/05			01/12/05			01/12/05			01/12/05			01/12/05			01/11/05		
Date Analyzed		01/19/05			01/19/05			01/19/05			01/19/05			01/19/05			01/19/05			01/19/05			01/19/05		

QL - Quantitation Limit
DF - Dilution Factor

U - Undetected at the specified quantitation limit

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March 7, 2005

Christine Clark
Regional Sample Control Center
U.S. EPA Region I
Office of Environmental Measurement and Evaluation
11 Technology Drive
North Chelmsford, MA 01863-2431

Subject: Work Assignment No. 161-RICO-017H
Case 33748, SDG A1G92
A4 Scientific, Inc., The Woodlands, Texas
Callahan Mining Superfund Site, Brooksville, Maine
Tier III Organic Data Validation

Volatiles:	8/Drinking Waters/	A1G92, A1G93, A1G94, A1G95, A1G96, A1G97, A1GA1, A1GN3
	(Drinking Water Field Duplicate Pair/A1G92 and A1G93)	
	1/Trip Blank/	A1G99
	1/PE Sample/	A1G98

Dear Ms. Clark:

A Tier III data validation, in accordance with the *USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review* (June 2001) and the *Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses*, December 1996 criteria, as deemed appropriate, was performed on the organic analytical data for eight drinking water samples (including one field duplicate pair), one trip blank, and one performance evaluation (PE) sample collected from the Callahan Mining Superfund Site in Brooksville, Maine by TRC Environmental Corporation on January 11, 12, and 13, 2005. The samples were analyzed for volatile organic compounds (VOCs) under the Contract Laboratory Program (CLP) Routine Analytical Services (RAS) program using the *USEPA Contract Laboratory Program Statement of Work for Analysis of Low Concentration Organic*, OLC03.2. Tier III validation was conducted on all samples in this sample delivery group (SDG).

The Tier III data validation was based on the following parameters:

- Overall Evaluation of Data and Potential Usability Issues
- * Data Completeness (CSF Audit - Tier I)
- * Preservation and Technical Holding Times
- * Gas Chromatography/Mass Spectrometry (GC/MS) Tunes
- Initial and Continuing Calibrations

Boott Mills South, Foot of John Street • Lowell, Massachusetts 01852
Telephone 978-970-5600 • Fax 978-453-1995

	•	Blanks
	•	Surrogate Recoveries
*	•	Internal Standards
	•	Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
*	•	Field Duplicate Results
NA	•	Sensitivity Check
	•	Accuracy Check/PE Samples
	•	Target Compound Identification
*	•	Compound Quantitation and Reported Quantitation Limits
	•	Tentatively Identified Compounds (TICs)
NA	•	Semivolatile Cleanup
*	•	System Performance
*	-	All criteria were met.

Note: Worksheets are not included for parameters that have met criteria or parameters that are not applicable (NA) to the method.

<u>The following information was used to generate the Data Validation Memorandum attachments</u>:

Table I:	Recommendation Summary Table - summarizes validation recommendations
Table II:	Overall Evaluation of Data - summarizes site DQOs and potential usability issues
Table III:	Tentatively Identified Compound Summary - summarizes the TIC results for the VOC analyses

Data Summary Table - summarizes accepted, qualified and rejected data

Overall Evaluation of Data and Potential Usability Issues

Following is a summary of the site DQOs:

- To determine the impact to drinking water from the site and to obtain data for use in a human health risk assessment.

All results are usable for project objectives with the exception of dichlorodifluoromethane, chloromethane, bromomethane, chloroethane, and carbon disulfide in samples A1GN3 and A1GA1. Qualifications applied to the data as a result of sampling error are summarized below.

- The positive results for acetone in samples A1G92, A1G93, A1G94, A1G95, A1G96, A1G97, and A1GN3 and 2-butanone in sample A1G97 were qualified as nondetects (U) due to trip blank contamination. These results are still usable for project objectives. This qualification has a minor impact on data usability.

Qualifications applied to the data as a result of analytical error are summarized below.

- The nondetect results for dichlorodifluoromethane, chloromethane, bromomethane, chloroethane, and carbon disulfide in samples A1GN3 and A1GA1 were rejected (R) due to surrogate recoveries less than 20%. These results are not usable for project objectives. This qualification may have a major impact on data usability.

- The positive results for methylene chloride in all samples were qualified as nondetects (U) due to laboratory method blank contamination. These results are still usable for project objectives. This qualification has a minor impact on data usability.

- The nondetect results for methylene chloride were qualified as estimated (UJ) in all samples due to calibration nonconformances. These results are usable for project objectives as nondetects with estimated quantitation limits. This qualification has a minor impact on data usability.

- The nondetect results for dichlorodifluoromethane, chloromethane, bromomethane, chloroethane, and carbon disulfide in samples A1G96 and A1G97 and the nondetect results for cis-1,3-dichloropropene, trans-1,3-dichloropropene, and 1,1,2-trichloroethane in sample A1G95 were qualified as estimated (UJ) due to low surrogate recoveries. These results are usable for project objectives as nondetects with estimated quantitation limits and may be biased low. This qualification has a minor impact on data usability.

- All nondetect results in sample A1G95 were qualified as estimated (UJ) due to low recoveries in the MS/MSD analyses. These results are usable for project objectives as nondetects with estimated quantitation limits and may be biased low. This qualification has a minor impact on data usability.

The attached Table I summarizes the Tier III validation recommendations which were based on the following information:

Initial and Continuing Calibrations

The percent relative standard deviation (59.2) and percent differences (41.8/45.8) of methylene chloride were outside of the acceptance criteira in the initial and continuing calibrations associated with all samples in this SDG. Methylene chloride was not detected in the samples in this SDG; these nondetect results were qualified as estimated (UJ) due to the calibration nonconformances.

Blanks

Target compounds were detected in the method blanks and trip blank (A1G99) associated with the samples in this SDG. The following table summarizes the maximum concentrations detected.

Compound	[illegible]	Maximum Concentration Detected (µg/L)	CRQL (µg/L)
Methylene chloride	Method	0.89	0.5
Acetone	Trip	15	5
2-Butanone	Trip	3.2	5
1,2,3-Trichlorobenzene	Method	0.10	0.5

CRQL - Contract Required Quantitation Limit

Blank Actions (due to blank contaminants):

Methylene chloride (since detected at <10x the CRQL):

- Sample results < CRQL were qualified as nondetects (U) at the CRQL.
- Sample results ≥ CRQL were qualified as nondetects (U) at the reported concentration if the result was <10x the concentration detected in the blank, based on professional judgment.

Acetone (since detected at >2x the CRQL):

- Sample results < CRQL were qualified as nondetects (U) at the CRQL.
- Sample results ≥ CRQL but < the blank concentration were qualified as nondetects (U) at the reported concentration detected in the blank.
- Sample results ≥ CRQL and > the blank concentration were qualified as nondetects (U) at the reported concentration if the result was <10x the concentration detected in the blank.

2-Butanone (since detected at <2x the CRQL):

- Sample results < CRQL were qualified as nondetects (U) at the CRQL.
- Sample results ≥ CRQL were qualified as nondetects (U) at the reported concentration if the result was <10x the concentration detected in the blank, based on professional judgment.

1,2,3-Trichlorobenzene (since detected at < the CRQL):

- Sample results < CRQL were qualified as nondetects (U) at the CRQL.
- Sample results ≥ CRQL were qualified as nondetects (U) at the reported concentration if the result was <5x the concentration detected in the blank, based on professional judgment.

The positive results for methylene chloride in samples A1G96, A1G97, A1GA1, and A1GN3, acetone in samples A1G92, A1G93, A1G94, A1G95, A1G96, A1G97, and A1GN3, and 2-butanone in sample A1G97 were qualified as nondetects (U) at the CRQL since the concentrations detected were below the CRQL. The positive results for methylene chloride in samples A1G92, A1G93, A1G94, A1G95, and A1G99 were qualified as nondetects (U) at the reported concentrations since the concentrations detected were greater than the CRQL and <10x the blank concentration. 1,2,3-Trichlorobenzene was not detected in any samples in this SDG; qualification of the data for 1,2,3-trichlorobenzene was therefore not required.

Surrogate Recoveries

The following table summarizes the surrogate recoveries which were outside of the acceptance criteria and the associated validation actions.

Sample ID	[illegible]	[illegible]	[illegible]	[illegible]
A1GN3	17	ok	ok	ok
Validation Action	Reject (R) the associated nondetect results.	NA	NA	NA
A1GA1	18	122	ok	134
Validation Action	Reject (R) the associated nondetect results.	None; associated results nondetects.	NA	None; associated results nondetects
A1G97	20	ok	ok	ok
Validation Action	Estimate (UJ) the associated nondetect results.	NA	NA	NA
A1G96	24	ok	ok	ok

Sample ID	chloroethane-d5	toluene-d8	trans-1,3-dichloropropene-d4	1,1,2,2-tetrachloroethane-d2
Validation Action	Estimate (UJ) the associated nondetect results.	NA	NA	NA
A1G95	ok	ok	76	ok
Validation Action	NA	NA	Estimate (UJ) the associated nondetect results.	NA

Associated compounds:
chloroethane-d5: dichlorodifluoromethane, chloromethane, bromomethane, chloroethane, carbon disulfide
toluene-d8: trichloroethene, toluene, tetrachloroethene, ethylbenzene, xylenes (total), styrene, isopropyl benzene
trans-1,3-dichloropropene: cis-1,3-dichloropropene, trans-1,3-dichloropropene, 1,1,2-trichloroethane
1,1,2,2-tetrachloroethane-d2: 1,1,2,2-tetrachloroethane, 1,2-dibromo-3-chloropropane

The nondetect results for dichlorodifluoromethane, chloromethane, bromomethane, chloroethane, and carbon disulfide in samples A1GN3 and A1GA1 were rejected (R) due to surrogate recoveries less than 20%. The nondetect results for dichlorodifluoromethane, chloromethane, bromomethane, chloroethane, and carbon disulfide were qualified as estimated (UJ) in samples A1G96 and A1G97 due to low surrogate recoveries. The nondetect results for cis-1,3-dichloropropene, trans-1,3-dichloropropene, and 1,1,2-trichloroethane were qualified as estimated (UJ) in sample A1G95 due to low surrogate recovery.

MS/MSD Results

Sample A1G95 was designated for MS/MSD analyses with this sample set. The following table summarizes the nonconformances observed in the MS/MSD analyses.

Compound	MS %R	MSD %R	Acceptance Limits MS/MSD %R
1,1-dichloroethene	44	46	61-145
benzene	54	54	76-127
trichloroethene	52	54	71-120
toluene	52	54	76-125
chlorobenzene	52	52	75-130

Target compounds were not detected in sample A1G95. Based on the professional judgement of the validator, all nondetect results in sample A1G95 were qualified as estimated (UJ) due to the low recoveries of all spiked compounds in the MS and MSD analyses.

Accuracy Check/PE Samples

One volatile aqueous PE sample, A1G98 (V80515), was evaluated with this SDG. In the analysis of PE sample A1G98, 17 out of 23 detected analytes were evaluated as "Within Limits." One detected compound, 4-methyl-2-pentanone, was evaluated as "Action High"; qualification of the data on this basis was not required as this compound was not detected in any samples in this SDG. One detected compound (1,2-dibromo-3-chloropropane) was evaluated as "Warning High" and one detected compound (methylene chloride) was evaluated as "Less Than CRQL"; no validation action was required on the basis of these evaluations. Three detected TICs were evaluated as "TIC Found." Hexane was evaluated as "TIC Missed"; however, this TIC was actually detected in the PE sample but the result was reported in the case narrative since this is an alkane. No validation actions were required due to the TIC results.

Target Compound Identification

The spectra of all detected compounds were reviewed during validation. There were several compounds which were reported as detected but the associated spectrum did not exhibit an acceptable match with the reference spectrum. The results for these compounds were changed to nondetects at the CRQL and are summarized in the following table.

Sample ID	Compound Affected	Identification Issue
A1G95	cis-1,3-dichloropropene	poor spectrum; peak most likely due to surrogate artifact
A1GN3	acetone	secondary ion (m/z 58) not present and is in reference spectrum at >10%
	methylcyclohexane	secondary ion (m/z 55) not present and is in reference spectrum at >10%; secondary ion (m/z 98) outside ±20% limits when compared to reference spectrum
	1,2-dichloropropane	secondary ion (m/z 112) not present and is in reference spectrum at >10%

Sample ID	Compound Affected	Identification Issue
	4-methyl-2-pentanone	secondary ions (m/z 58 and 100) not present and are in reference spectrum at >10%
	2-hexanone	secondary ion (m/z 100) not present and is in reference spectrum at >10%

TICs

The identifications of TICs at 4.57 minutes in samples A1G93 and A1G94 were changed from unknown alkane to hexane, based on the professional judgment of the validator. The TICs in samples A1G96, A1G97, and A1GA1 were not reported as these TICs were most likely due to column bleed.

Please contact Ms. Elizabeth Denly at (978) 656-3577 should you have any questions or comments regarding this information.

Very truly yours,

TRC Environmental Corporation

Elizabeth Denly

Elizabeth Denly
Data Validator

for

Lorie MacKinnon
Senior Reviewer

Tier II Attachments:
1. Table I: Recommendation Summary Table
2. Table II: Overall Evaluation of Data
3. Table III: Tentatively Identified Compound Summary
4. ORDA Form
5. Data Summary Tables
6. Data Validation Worksheets

7. Copy of non-CLP Analytical Method (NA)
8. PE Score Reports
9. Telephone Logs/Communication Forms (NA)
10. Supporting Data for Reduced Payment Recommendations (NA)
11. Field Sampling Notes
12. EPA-approved Amendments to QAPjP or SAP (NA)
13. CSF Completeness Evidence Audit (DC-2 Form)
14. DQO Summary Form

cc: Leslie McVickar, EPA Remedial Project Manager (DV memo and data summary tables)
Project File
PSAdmin

Attachment 1
Table I: Recommendation Summary Table

Table I
Recommendation Summary
Volatile Organic Compounds in Drinking Water Samples
Callahan Mining Superfund Site
Case 33748, SDG A1G92

Sample Numbers	Matrix	Qualifiers
A1G92	DW	A^1, A^3, J^1
A1G93	DW	A^1, A^3, J^1
A1G94	DW	A^1, A^3, J^1
A1G95	DW	A^1, A^3, J^1, J^3, J^4
A1G96	DW	A^1, A^3, J^1, J^2
A1G97	DW	A^1, A^2, A^3, J^1, J^2
A1GA1	DW	A^3, J^1, R^1
A1GN3	DW	A^1, A^3, J^1, R^1
A1G99	TB	A^3, J^1

DW - Drinking Water
TB - Trip Blank

A^1 - Accept the data, but qualify the positive result for acetone as a nondetect (U) due to trip blank contamination.

A^2 - Accept the data, but qualify the positive result for 2-butanone as a nondetect (U) due to trip blank contamination.

A^3 - Accept the data, but qualify the positive result for methylene chloride as a nondetect (U) due to method blank contamination.

J^1 - Estimate (UJ) the nondetect result for methylene chloride due to calibration nonconformances. The direction of bias cannot be determined from this nonconformance.

J^2 - Estimate (UJ) the nondetect results for dichlorodifluoromethane, chloromethane, bromomethane, chloroethane, and carbon disulfide due to low surrogate recoveries. These results may be biased low.

J^3 - Estimate (UJ) the nondetect results for cis-1,3-dichloropropene, trans-1,3-dichloropropene, and 1,1,2-trichloroethane due to low surrogate recoveries. These results may be biased low.

J^4 - Estimate (UJ) all nondetect results due to low recoveries in the MS/MSD analyses. These results may be biased low.

R^1 - Reject (R) the nondetect results for dichlorodifluoromethane, chloromethane, bromomethane, chloroethane, and carbon disulfide due to low surrogate recoveries.

Attachment 2
Table II: Overall Evaluation of Data

Table II
Overall Evaluation of Data for VOCs in Drinking Water Samples
Callahan Mining Superfund Site
Case 33748, SDG A1G92

Volatile Organic Compounds					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine the impact to drinking water from the site and to obtain data for use in a human health risk assessment.	Sampling Method appropriate - yes Analytical Method appropriate - yes	Refer to qualifications in Table Ia: A^3, J^1 - J^4, R^1	Refer to qualifications in Table Ia: A^1, A^2	Not applicable for Tier II	**Major Impact on Data Usability** The nondetect results for dichlorodifluoromethane, chloromethane, bromomethane, chloroethane, and carbon disulfide in samples A1GN3 and A1GA1 were rejected due to low surrogate recoveries. These results are not usable for project objectives. **Minor Impact on Data Usability** The positive results for acetone in samples A1G92, A1G93, A1G94, A1G95, A1G96, A1G97, and A1GN3 and 2-butanone in sample A1G97 were qualified as nondetects due to trip blank contamination. The positive results for methylene chloride in all samples were qualified as nondetects due to method blank contamination. Potential uncertainty exists for methylene chloride results in all samples due to calibration nonconformances. Potential low bias exists for dichlorodifluoromethane, chloromethane, bromomethane, chloroethane, and carbon disulfide in samples A1G96 and A1G97 and cis-1,3-dichloropropene, trans-1,3-dichloropropene, and 1,1,2-trichloroethane in sample A1G95 due to low surrogate recoveries. Potential low bias exists for all nondetect results in sample A1G95 due to low recoveries in the MS/MSD analyses.

*The evaluation of "sampling error" cannot be completely assessed in data validation.

**Sampling variability is not assessed in data validation.

Attachment 3

Table III: Tentatively Identified Compound Summary

Table III
Tentatively Identified Compound (TIC) Summary for Callahan Mining Superfund Site
Case No. 33748 SDG No. A1G92

Classification/Isomer	A1G92	A1G93	A1G94
Hexane	1	1	1

The number indicated in the above tables represents the number of compounds of that classification identified in the sample. No TICs were identified in samples A1G95, A1G96, A1G97, A1GA1, A1GN3, and A1G99. Therefore, these samples were not included in the TIC Summary Table.

Attachment 4
ORDA Form

REGION I, EPA-NE ORGANIC REGIONAL DATA ASSESSMENT (ORDA)*

CASE #: 33748

LAB NAME: A4 Scientific, Inc.

SDG #: A1G92

SOW #/CONTRACT #: OLC03.2/68-W6-0042

EPA-NE DV TIER LEVEL: III

TPO/PO: **ACTION ____ FYI ✓

SITE NAME: Callahan Mining Superfund Site

OF SAMPLES/MATRIX: 8/DW, 1/TB, 1/PE

VALIDATION CONTRACTOR: TRC

VALIDATOR'S NAME: Elizabeth Denly

DATE DP REC'D BY EPA-NE: 1/28/05

DV COMPLETION DATE: 3/2/05

ANALYTICAL DATA QUALITY SUMMARY

	VOA	SV	Pest/PCB
1. Preservation and Contractual Holding Times	o	NA	NA
2. GC/MS / GC/ECD Instrument Performance Check	o	↓	↓
3. Initial Calibration	o	↓	↓
4. Continuing Calibration	o	↓	↓
5. Blanks	o	↓	↓
6. Surrogate Compounds	o	↓	↓
7. Internal Standards	o	↓	↓
8. Matrix Spike/Matrix Spike Duplicate	o	↓	↓
9. Sensitivity Check	NA	↓	↓
10. PE Samples-Accuracy Check	o	↓	↓
11. Target Compound Identification	o	↓	↓
12. Compound Quantitation and Reported QLs	o	↓	↓
13. Tentatively Identified Compounds	o	↓	↓
14. Semivolatile Cleanup/Pesticide/PCB Cleanup	NA	↓	↓
15. Data Completeness	o	↓	↓
16. Overall Evaluation of Data	o	↓	↓

o = Data had no problems or were qualified due to minor contractual problems.
m = Data were qualified due to major contractual problems.
z = Data were rejected as unusable due major contractual problems.

ACTION ITEMS: (z items)

AREAS OF CONCERN: (m items)

COMMENTS:

*This form assesses the analytical data quality in terms of contractual compliance only. It does not assess sampling errors and/or non-contractual analytical issues that affect data quality.

**Check "ACTION" only if contractual defects resulted in reduced payment/data rejection recommendations.

Validator: Elizabeth Denly

Date: 3/2/05

INSTRUCTIONS ON REVERSE SIDE

Attachment 5
Data Summary Tables

DATA SUMMARY TABLE

VOC Analysis (OLC03.2)

Drinking Water Samples

(Units: ug/L)

Site: Callahan Mining Superfund Site - Brooksville, ME
Case Number 33746, SDG A1G92

Analyte	CRQL	[illegible]		DF	[illegible]		DF	[illegible]		DF	[illegible]		DF	[illegible]		DF	[illegible]		DF	[illegible]		DF	[illegible]		DF	Trip Blank		DF
Dichlorodifluoromethane	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	UJ	1	0.5	UJ	1		R	1		R	1	0.5	U	1
Chloromethane	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	UJ	1	0.5	UJ	1		R	1		R	1	0.5	U	1
Vinyl chloride	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
Bromomethane	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	UJ	1	0.5	UJ	1		R	1		R	1	0.5	U	1
Chloroethane	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	UJ	1	0.5	UJ	1		R	1		R	1	0.5	U	1
Trichlorofluoromethane	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
1,1-Dichloroethene	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
1,1,2-Trichloro-1,2,2-trifluoroethane	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
Acetone	5	5	U	1	5	U	1	5	U	1	5	UJ	1	5	U	1	5	U	1	5	U	1	5	U	1	15		1
Carbon disulfide	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	UJ	1	0.5	UJ	1		R	1		R	1	0.5	U	1
Methyl acetate	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
Methylene chloride	0.5	1.9	UJ	1	2.0	UJ	1	1.7	UJ	1	0.57	UJ	1	0.5	UJ	1	0.5	UJ	1	0.5	UJ	1	0.5	UJ	1	0.85	UJ	1
trans-1,2-Dichloroethene	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
Methyl tert-butyl ether	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
1,1-Dichloroethane	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
cis-1,2-Dichloroethene	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
2-Butanone (MEK)	5	5	U	1	5	U	1	5	U	1	5	UJ	1	5	U	1	5	U	1	5	U	1	5	U	1	3.2	J	1
Bromochloromethane	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
Chloroform	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
1,1,1-Trichloroethane	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
Cyclohexane	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
Carbon tetrachloride	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
Trichloroethene	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
1,2-Dichloroethane	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
Benzene	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
Methylcyclohexane	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
1,2-Dichloropropane	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
Bromodichloromethane	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
cis-1,3-Dichloropropene	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
4-Methyl-2-pentanone	5	5	U	1	5	U	1	5	U	1	5	UJ	1	5	U	1	5	U	1	5	U	1	5	U	1	5	U	1
Toluene	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
trans-1,3-Dichloropropene	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
1,1,2-Trichloroethane	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
Tetrachloroethene	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
2-Hexanone	5	5	U	1	5	U	1	5	U	1	5	UJ	1	5	U	1	5	U	1	5	U	1	5	U	1	5	U	1
Dibromochloromethane	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
Ethylenedibromide	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
Chlorobenzene	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
Ethylbenzene	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
Xylenes (total)	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
Styrene	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
Bromoform	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
Isopropylbenzene	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
1,1,2,2-Tetrachloroethane	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
1,3-Dichlorobenzene	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
1,4-Dichlorobenzene	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
1,2-Dichlorobenzene	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
1,2-Dibromo-3-chloropropane	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
1,2,4-Trichlorobenzene	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
1,2,3-Trichlorobenzene	0.5	0.5	U	1	0.5	U	1	0.5	U	1	0.5	UJ	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
Date Sampled		[illegible]			[illegible]			[illegible]			[illegible]			[illegible]			[illegible]			[illegible]			[illegible]			[illegible]		
Date Analyzed		[illegible]			[illegible]			[illegible]			[illegible]			[illegible]			[illegible]			[illegible]			[illegible]			[illegible]		

CRQL - Contract Required Quantitation Limit
DF - Dilution Factor
R - Rejected data point due to nonconformance identified in the validation summary

U - Undetected at the specified quantitation limit
UJ - Estimated nondetect due to nonconformances identified in the validation summary
J - Estimated value

Sediment

Metcalf & Eddy

701 Edgewater Drive
Wakefield, MA 01880

Tel: 781-246-5200
Fax: 781-245-6293
www.m-e.com

036.200100.0061.00005

March 29, 2005

Ms. Christine Clark
Regional Sample Control Center
U.S. EPA Region I
11 Technology Drive
North Chelmsford, Massachusetts 01863-2431

Re: Work Assignment No. 161-RICO-017H
Case 0247M, SDG D05640-IB
Woods Hole Group, Raynham, Massachusetts
Callahan Mining Superfund Site, Brooksville, Maine
Tier II Inorganic Data Validation

Low Concentration Metals and Mercury: 19/Sediment Samples/D05638, D05639, D05640, D05641, D05642, D05643, D05644, D05645, D05646, D05647, D05649, D05650, D05651, D05652, D05653, D05656, D05657, D05658, D05660
(Field Duplicate Pair: D05656 and D05660)
1/Aqueous Equipment Blank/D05661
1/Performance Evaluation Sample/D05663

Dear Ms. Clark:

A Tier II data validation was performed by Metcalf & Eddy, Inc. (M&E) on the low concentration metals and mercury analytical data for nineteen sediment samples (including one field duplicate pair), one performance evaluation (PE) sample, and one equipment blank sample collected from the Callahan Mining Superfund Site, located in Brooksville, Maine, by TRC on November 11, 12, 17, and 18, 2004. The samples were analyzed through the Response Action Contract (RAC) Delivery of Analytical Services (DAS) program using M&E DAS *Analytical Specification for the Analysis of Low Concentration Metals Including Cyanide in Solid Samples (Including Samples with High Moisture Content)* (D-044.2), based on EPA methodology. M&E evaluated these data using the *Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Inorganic Analyses*, February 1989 criteria, modified for the methods and incorporating organic data validation guidance, *Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses*, December 1996 criteria. Additional guidance was provided by *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

The Tier II metals and mercury data validation was based on the following parameters:

	•	Overall Evaluation of Data and Potential Usability Issues
	•	Data Completeness (CSF Audit - Tier I)
	•	Preservation and Technical Holding Times
	•	Instrument Calibration
	•	ICP-MS Internal Standards
*	•	ICP-MS Tuning, Mass Calibration, and Resolution Check
	•	Blanks
	•	Inductively Coupled Plasma Interference Check Sample
	•	Matrix Spike
*	•	Laboratory Duplicate
	•	Field Duplicates
NA	•	Furnace Atomic Absorption Analysis
	•	Laboratory Fortified Blanks
	•	Inductively Coupled Plasma Serial Dilution
*	•	Instrument Detection Limits
	•	Sample Quantitation Results
	•	Performance Evaluation Sample /Accuracy Check

* - all criteria met for this parameter
NA - parameter not applicable

Note: Worksheets are not included for parameters that have met criteria or for criteria that are not applicable to a Tier II data validation.

Copies of the field sampling notes for this sample delivery group (SDG) are included with the Data Validation Memorandum for Case 0247M, SDG D05648-IB, previously submitted to EPA.

<u>The following information was used to generate the Data Validation Memorandum attachments:</u>

Table I: Recommendation Summary Table - summarizes validation recommendations
Table II: Overall Evaluation of Data - summarizes site DQOs and potential usability issues
Data Summary Tables - summarizes accepted, qualified, and rejected data

<u>Overall Evaluation of Data and Potential Usability Issues</u>

The following is a summary of the site DQOs (Data Quality Objectives):

- To determine nature and extent of contamination and to support a human health and ecological risk assessment.

The low concentration metals and mercury sample results were qualified as a result of sampling and analytical error. Qualifications as a result of sampling error are summarized below:

- The positive results for barium, cobalt, and zinc in all sediment samples were qualified as estimated (J) due to field duplicate imprecision. The results are usable for project objectives as estimated values with an indeterminate direction of bias. This qualification has a minor impact on the data usability.
- The positive result for mercury in sample D05643 was qualified as estimated (J) due to low solids content. The result is usable for project objectives as an estimated value with an indeterminate direction of bias. This qualification has a minor impact on the data usability.

Qualifications as a result of analytical error are summarized below:

- The positive mercury results in sediment samples D05640, D05641, D05644, D05645, D05647, D05649, D05650, D05651, D05652, D05653, D05656, D05657, and D05660 were qualified as estimated (J) due to holding time exceedances. These results are usable for project objectives as estimated concentrations with a possible low bias. These qualifications have a minor impact on the data usability.
- The positive results for aluminum and magnesium in samples D05638, D05639, D05642, and D05643 and for aluminum in sample D05661 were qualified as estimated (J) due to continuing calibration standard recovery exceedances. The results are usable for project objectives as estimated concentrations with a possible high bias. These qualifications have a minor impact on the data usability.
- The positive result for silver in sample D05657 was qualified as estimated (J) due to continuing calibration standard recovery exceedances. The result is usable for project objectives as an estimated concentration with a possible low bias. This qualification has a minor impact on the data usability.
- The positive results for calcium and potassium in sample D05657 were qualified as estimated (J) due to internal standard recovery exceedances. The results are usable for project objectives as estimated concentrations. This qualification has a minor impact on the data usability.
- The positive results for copper in samples D05651 and D05652 and for thallium in sample D05644 were qualified as nondetect (U) at the reported concentration due to laboratory blank contamination. These results are usable for project objectives as

nondetect results. This qualification has a minor impact on data usability. Note that the results for copper and thallium were also qualified as estimated (J) due to positive interferences seen in the ICSA solution analyses. Therefore, the overall qualification for these analytes is estimated nondetect (UJ) due to blank contamination and ICSA interferences.

- The positive results for aluminum, calcium, copper, lead, magnesium, nickel, sodium, and thallium in sample D05661 were qualified as nondetect (U) at the reported concentration due to laboratory blank contamination. These results are usable for project objectives as nondetect results. This qualification has a minor impact on data usability. Note that these results were also qualified as estimated (J) due to positive interferences seen in the ICSA solution analyses. Therefore, the overall qualification for these analytes is estimated nondetect (UJ) due to blank contamination and ICSA interferences.

- The nondetect result for cobalt in sample D05661 was qualified as estimated (UJ) at the reported MDL due to negative instrument drift. This result is usable for project objectives as an estimated quantitation limit with a possible low bias. This qualification has a minor impact on data usability.

- The nondetect results for antimony and selenium in sample D05661 had quantitation limits elevated to their sample-specific negative blank action levels due to negative instrument drift and blank contamination. These results are usable for project objectives as estimated quantitation limits with a possible low bias. This qualification has a minor impact on data usability.

- The positive and blank-qualified results for arsenic, cadmium, chromium, cobalt, copper, lead, manganese, nickel, silver, thallium, vanadium, and zinc in all sediment samples and for antimony in all samples except D05646 were qualified as estimated (J and UJ, respectively) due to positive interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations and quantitation limits with a possible high bias. This qualification has a minor impact on data usability.

- The blank-qualified results for copper, lead, nickel, and thallium in sample D05661 were qualified as estimated (UJ) due to positive interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated quantitation limits with a possible high bias. This qualification has a minor impact on data usability. Note that these results were also qualified as nondetect (U) at the reported concentration due to laboratory blank contamination. Therefore, the overall qualification for these analytes is estimated nondetect (UJ) due to blank contamination and ICSA interferences.

- The positive results for selenium in all sediment samples and the nondetect result for selenium in sample D05661 were qualified as estimated (J and UJ, respectively) due to negative interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations and quantitation limits with a possible low bias. This qualification has a minor impact on data usability.

- The positive results for chromium and silver in all sediment samples were qualified as estimated (J) due to high matrix spike recovery. The results are usable for project objectives as estimated values that may be biased high. This qualification has a minor impact on the data usability.

- The positive and nondetect results for antimony in all sediment samples were qualified as estimated (J and UJ, respectively) due to low matrix spike recovery. The results are usable for project objectives as estimated values and quantitation limits that may be biased low. This qualification has a minor impact on the data usability.

- The positive and blank-qualified results for calcium, potassium, and thallium in all sediment samples were qualified as estimated (J and UJ, respectively) due to serial dilution imprecision. The results are usable for project objectives as estimated values and quantitation limits with an indeterminate direction of bias. This qualification has a minor impact on the data usability.

- The positive results for barium in all sediment samples were qualified as estimated (J) due to low recoveries in the PE sample. The results are usable for project objectives as estimated values with a possible low bias. This qualification has a minor impact on the data usability.

- The positive result for chromium in sample D05640 was qualified as estimated (J) due to linear range exceedance. This result is usable for project objectives as an estimated concentration. This qualification has a minor impact on the data usability.

- The blank-qualified results for aluminum, calcium, copper, lead, magnesium, nickel, sodium, and thallium in sample D05661 were qualified as estimated (UJ) because they were less than the quantitation limit but greater than the MDL. These results are usable for project objectives as estimated quantitation limits. This qualification has a minor impact on the data usability.

- The positive and blank-qualified results for the following samples and analytes were qualified as estimated (J and UJ, respectively) because they were less than the quantitation limit but greater than the method detection limit (MDL). These results are usable for project objectives as estimated concentrations and quantitation limits. This qualification has a minor impact on the data usability.

antimony:	D05638, D05643, D05657, D05658
selenium:	D05646, D05647, D05652, D05657, D05658
sodium:	D05640, D05649, D05656, D05660
thallium:	D05638, D05641, D05643, D05644, D05646, D05647, D05651, D05652, D05657, D05658

Data Completeness

The laboratory was contacted on March 18, 2005 concerning the following:

1. Confirm the pH of sample D05661. The data (page 1098) indicates the pH is "NA."
2. The aqueous MDL Form IX does not list antimony, calcium, or silver.
3. Explain the laboratory's practice of re-analyzing failed CCVs.

The laboratory provided an acceptable response and resubmittal on March 21, 2005. The pH of sample D05661 was confirmed to be <2, and acceptable. The MDL Form IX was revised to included the missing analytes and resubmitted. It is the laboratory's documented procedure to allow for the reanalysis of a failed CCV one time.

The laboratory was contacted on March 21, 2005 concerning the following:

4. M&E requested, via e-mail dated December 14, 2004, that the laboratory analyze sample D05643 for mercury both prior to and following freeze-drying. Data for the mercury analysis of the freeze-dried sample was not provided in the data package.

The laboratory provided a response on March 25, 2005, stating that mercury analysis was not performed on a freeze-dried aliquot of sample D05643.

Preservation and Technical Holding Times

The mercury analyses for all sediment samples except D05638, D05639, D05642, D05643, D05646, and D05658 were performed outside the 28-day holding time requirement. The positive mercury results in the affected sediment samples were qualified as estimated (J) due to possible sample degradation caused by holding time exceedances.

Note that because of its high moisture content, sample D05643 was freeze-dried prior to preparation for metals analysis. Due to holding time considerations, the sample aliquot used for mercury analysis was not freeze-dried. No further validation action was taken.

Instrument Calibration

The following table summarizes the continuing calibration verification (CCV) standard recoveries that did not meet the 90% - 110% recovery acceptance criteria, the validation action, and the samples affected:

Analyte	CCV	Recovery	Action	Samples Affected
aluminum	02/01/05 14:35	125%	Qualify the positive results as estimated (J)	None; no results reported from analyses prior to CCV
copper	02/01/05 14:35	140%	Qualify the positive results as estimated (J)	None; no results reported from analyses prior to CCV
magnesium	02/01/05 14:35	117%	Qualify the positive results as estimated (J)	None; no results reported from analyses prior to CCV
potassium	02/01/05 14:35	118%	Qualify the positive results as estimated (J)	None; no results reported from analyses prior to CCV
sodium	02/01/05 14:35	115%	Qualify the positive results as estimated (J)	None; no results reported from analyses prior to CCV
zinc	02/01/05 14:35	117%	Qualify the positive results as estimated (J)	None; no results reported from analyses prior to CCV
aluminum	02/01/05 15:40	131%	Qualify the positive results as estimated (J)	None; no results reported from analyses prior to CCV
copper	02/01/05 15:40	113%	Qualify the positive results as estimated (J)	None; no results reported from analyses prior to CCV
magnesium	02/01/05 15:40	126%	Qualify the positive results as estimated (J)	None; no results reported from analyses prior to CCV
potassium	02/01/05 15:40	124%	Qualify the positive results as estimated (J)	None; no results reported from analyses prior to CCV
sodium	02/01/05 15:40	122%	Qualify the positive results as estimated (J)	None; no results reported from analyses prior to CCV
vanadium	02/01/05 15:40	112%	Qualify the positive results as estimated (J)	None; no results reported from analyses prior to CCV

Analyte	CCV	Recovery	Action	Samples Affected
aluminum	02/03/05 17:04	112%	Qualify the positive results as estimated (J)	D05638, D05639, D05642, D05643
magnesium	02/03/05 17:04	111%	Qualify the positive results as estimated (J)	D05638, D05639, D05642, D05643
aluminum	02/03/05 17:34	113%	Qualify the positive results as estimated (J)	None; no results reported from analyses prior to CCV
magnesium	02/03/05 17:34	112%	Qualify the positive results as estimated (J)	None; no results reported from analyses prior to CCV
aluminum	02/03/05 17:40	114%	Qualify the positive results as estimated (J)	None; no results reported from analyses prior to CCV
magnesium	02/03/05 17:40	113%	Qualify the positive results as estimated (J)	None; no results reported from analyses prior to CCV
silver	02/07/05 19:13	89%	Qualify the positive result as estimated (J)	D05657
aluminum	01/12/05 22:46	111%	Qualify the blank-qualified result as estimated (UJ)	D05661

ICP-MS Internal Standards

The recovery for the internal standard scandium in sample D05657 (121%) did not meet the DAS-specified limits of 30% - 120%. This sample was not diluted and re-analyzed. Therefore, positive results for calcium and potassium in sample D05657, which were associated with this internal standard, were qualified as estimated (J).

Blanks

The following table summarizes the blank contamination detected in the laboratory blanks associated with the sediment samples. If a contaminant was detected in more than one blank, the highest concentration was used to qualify associated sample results and is summarized below. The nominal Blank Action Levels (BAL) from the method blank were calculated based on a 1gm sample weight (dry), 50mL final volume, and two-fold dilution. The nominal BALs from instrument blanks were based on a 1gm sample weight (dry) and 50mL final volume. Sample-specific BALs are further adjusted for actual sample weights, moisture content, and any additional dilutions.

Analyte	Blank Type	Maximum Blank Concentration	Nominal Blank Action Level (BAL) mg/Kg	Action/Samples Affected
aluminum	mb	0.92 mg/Kg	4.6	No action; all sediment results above BAL
arsenic	inst	0.11 µg/L	0.055	No action; all sediment results above BAL
barium	mb	0.0055 mg/Kg	0.028	No action; all sediment results above BAL
calcium	mb	1.7 mg/Kg	8.5	No action; all sediment results above BAL
chromium	inst	0.20 µg/L	0.10	No action; all sediment results above BAL
cobalt	inst	-0.19 µg/L	0.095	No action; all sediment results above BAL
copper	inst	6.8 µg/L	3.4	Qualify positive results as nondetect (U) at reported concentrations in samples D05651 and D05652
	inst	-0.43 µg/L	0.22	
iron	inst	33.0 µg/L	16.5	No action; all sediment results above BAL
	inst	-6.4 µg/L	3.2	
lead	inst	0.19 µg/L	0.095	No action; all sediment results above BAL
magnesium	inst	15.0 µg/L	7.5	No action; all sediment results above BAL
manganese	mb	0.1 mg/Kg	0.5	No action; all sediment results above BAL
potassium	inst	38.0 µg/L	19	No action; all sediment results above BAL
	inst	-19.0 µg/L	9.5	
selenium	inst	0.35 µg/L	0.18	No action; all sediment results above BAL
	inst	-0.36 µg/L	0.18	
thallium	mb	0.019 mg/Kg	0.095	Qualify positive result as nondetect (U) at reported concentration in sample D05644
vanadium	mb	0.049 mg/Kg	0.24	No action; all sediment results above BAL
zinc	mb	2.1 µg/L	1.05	No action; all sediment results above BAL

inst - instrument blank (i.e., ICB or CCB)
mb - method blank

For positive blank contamination, sample results were qualified as follows:

- If the sample result was nondetect, qualification of the data was not required.
- If the sample result was > MDL and ≤ positive BAL, the result was qualified as a nondetect (U) at the reported concentration.
- If the sample result was > positive BAL, qualification of the data was not required.

For negative blank contamination, sample results were qualified as follows:

- If the sample result was positive and ≤ negative BAL, the result was qualified as estimated (J).
- If the sample result was nondetect, the MDL was qualified as estimated (UJ).
- If the sample result was > MDL and > negative BAL, qualification of the data was not required.

For positive and negative blank contamination where the negative BAL is < the positive BAL, sample results were qualified as follows:

- If the sample result was >MDL and > negative BAL but ≤ positive BAL, the result was qualified as nondetect (U) at the reported concentration.
- If the sample result was > MDL and < negative BAL, the result was qualified as nondetect (U) at the negative BAL.
- If the sample result was nondetect, elevate the MDL to the negative BAL.
- If the sample result was > positive BAL, qualification of the data was not required.

For positive and negative blank contamination where the negative BAL is > the positive BAL, sample results were qualified as follows:

- If the sample result was > MDL but ≤ negative BAL, the result was qualified as nondetect (U) at the negative BAL.
- If the sample result was nondetect, elevate the MDL to the negative BAL.
- If the sample result was > negative BAL, qualification of the data was not required.

The following table summarizes the blank contamination detected in the laboratory blanks associated with the aqueous equipment blank sample. If a contaminant was detected in more than one blank, the highest concentration was used to qualify associated sample results and is summarized below. Maximum blank concentrations from instrument blanks were also adjusted for sample dilutions.

Analyte	Blank Type	Maximum Blank Concentration (µg/L)	Blank Action Level (BAL) (µg/L)	Action/Samples Affected
aluminum	mb	69.0	345	Qualify positive result as nondetect (U) at reported concentration in sample D05661
antimony	inst	0.018	0.18	Elevate the MDL to the negative BAL in sample D05661
	inst	-0.028	0.28	
calcium	mb	28.0	140	Qualify positive result as nondetect (U) at reported concentration in sample D05661
cobalt	inst	-0.032	0.32	Qualify the nondetect result as estimated (UJ) in sample D05661
copper	mb	1.4	7.0	Qualify positive result as nondetect (U) at reported concentration in sample D05661
iron	mb	100	500	None; not detected in sample

Analyte	Blank Type	Maximum Blank Concentration (µg/L)	Blank Action Level (BAL) (µg/L)	Action/Samples Affected
lead	mb	1.6	8.0	Qualify positive result as nondetect (U) at reported concentration in sample D05661
magnesium	mb	100	500	Qualify positive result as nondetect (U) at reported concentration in sample D05661
nickel	mb	0.080	0.40	Qualify positive result as nondetect (U) at reported concentration in sample D05661
potassium	mb	39.0	195	None; not detected in sample
selenium	inst	0.10	1.0	Elevate the MDL to the negative BAL in sample D05661
	inst	-0.091	-0.91	
sodium	mb	12.0	60.0	Qualify positive result as nondetect (U) at reported concentration in sample D05661
thallium	inst	0.035	0.35	Qualify positive result as nondetect (U) at reported concentration in sample D05661
vanadium	inst	0.19	1.9	None; not detected in sample
zinc	mb	7.4	37.0	None; not detected in sample

inst - instrument blank (i.e. ICB or CCB)
mb - method blank

For positive blank contamination, sample results were qualified as follows:

- If the sample result was nondetect, qualification of the data was not required.
- If the sample result was > MDL and ≤ positive BAL, the result was qualified as a nondetect (U) at the reported concentration.
- If the sample result was > positive BAL, qualification of the data was not required.

For negative blank contamination, sample results were qualified as follows:

- If the sample result was positive and ≤ negative BAL, the result was qualified as estimated (J).
- If the sample result was nondetect, the MDL was qualified as estimated (UJ).
- If the sample result was > MDL and > negative BAL, qualification of the data was not required.
-

For positive and negative blank contamination where the negative BAL is < the positive BAL, sample results were qualified as follows:

- If the sample result was >MDL and > negative BAL but ≤ positive BAL, the result was qualified as nondetect (U) at the reported concentration.
- If the sample result was > MDL and < negative BAL, the result was qualified as nondetect (U) at the negative BAL.
- If the sample result was nondetect, elevate the MDL to the negative BAL.
- If the sample result was > positive BAL, qualification of the data was not required.

For positive and negative blank contamination where the negative BAL is > the positive BAL, sample results were qualified as follows:

- If the sample result was > MDL but ≤ negative BAL, the result was qualified as nondetect (U) at the negative BAL.
- If the sample result was nondetect, elevate the MDL to the negative BAL.
- If the sample result was > negative BAL, qualification of the data was not required

The following table summarizes the level of blank contamination detected in the equipment blank associated with the sediment samples.

Analyte	Blank Concentration (μg/L)	Action/Samples Affected
aluminum	5.0	No action; result qualified as nondetect (U) after blank actions.
calcium	22	No action; result qualified as nondetect (U) after blank actions.
copper	0.43	No action; result qualified as nondetect (U) after blank actions.
lead	0.19	No action; result qualified as nondetect (U) after blank actions.
magnesium	2.0	No action; result qualified as nondetect (U) after blank actions.
nickel	0.10	No action; result qualified as nondetect (U) after blank actions.
sodium	32	No action; result qualified as nondetect (U) after blank actions.
thallium	0.038	No action; result qualified as nondetect (U) after blank actions.

Inductively Coupled Plasma Interference Check Sample

Positive results for antimony, arsenic, cadmium, chromium, cobalt, copper, lead, manganese, nickel, silver, thallium, vanadium, and zinc were reported in the ICSA solution analyses at concentrations greater than the MDLs. Results for selenium were reported in the ICSA solution at concentrations greater than the negative MDL.

The positive and blank-qualified results for arsenic, cadmium, chromium, cobalt, copper, lead, manganese, nickel, silver, thallium, vanadium, and zinc in all sediment samples and for antimony in all samples except D05646 were qualified as estimated (J) due to positive interferences seen in the ICSA solution analyses. The blank-qualified results for copper, lead, nickel, and thallium in sample D05661 were qualified as estimated (UJ) due to positive interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations and quantitation limits with a possible high bias.

The positive results for selenium in all sediment samples and the nondetect result for selenium in sample D05661 were qualified as estimated (J and UJ, respectively) due to negative interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations and quantitation limits with a possible low bias.

Matrix Spike (MS)

Sample D05657 was analyzed as the matrix spike with this data set. The analytes that did not meet recovery (%R) acceptance criteria of 75-125% and the actions taken are summarized in the table below:

Analyte	Spiked Sample Result (mg/Kg)	Sample Result (mg/Kg)	Spike Added (mg/Kg)	MS %R	Affected Samples/Action
antimony	1.0	0.17	1.9	45	Qualify as estimated (J and UJ, respectively) the positive and nondetect results in all sediment samples.
chromium	60	39	13	156	Qualify as estimated (J) the positive results in all sediment samples.
silver	0.61	0.45	0.12	128	Qualify as estimated (J) the positive results in all sediment samples.

Field Duplicates

Samples D05656 and D05660 were the field duplicate pair analyzed in association with this data set. The analytes that did not meet the relative percent difference (RPD) criterion of <50% for analytes greater than 5x reporting limit or the absolute difference criterion of >4x reporting limit for those less than <5x reporting limit, and the actions taken are summarized in the following table:

Analyte	Sample D05656 Result (mg/Kg)	Sample D05660 Result (mg/Kg)	%RPD	Actions
barium	5.0	9.7	64	Qualify as estimated (J) the positive barium results in all sediment samples.
cobalt	8.1	17	71	Qualify as estimated (J) the positive cobalt results in all sediment samples.
zinc	16000	8800	58	Qualify as estimated (J) the positive zinc results in all sediment samples.

Laboratory Fortified Blanks

The recovery for aluminum (246%) exceeded the 70% - 130% acceptance criteria in the laboratory fortified blank (LFB). Because the concentrations of aluminum in the sediment samples were significantly higher than that in the LFB and the laboratory control sample showed acceptance recovery, professional judgment was used to not qualify the positive results for aluminum.

Inductively Coupled Plasma Serial Dilution

An ICP serial dilution analysis was performed on sample D05657. The analytes that did not meet the percent difference (%D) validation criterion of 15% for results greater than 50x the MDL and the actions taken are summarized in the following table:

Analyte	50x MDL (mg/Kg)	Sample (mg/Kg)	Serial Dilution (mg/Kg)	%D	Actions
calcium	26	2700	3400	25	Qualify as estimated (J) the positive results in all sediment samples.
potassium	17	2600	3400	27	Qualify as estimated (J) the positive results in all sediment samples.
thallium	0.07	0.23	0.28	22	Qualify as estimated (J and UJ, respectively) the positive and blank-qualified results in all sediment samples.

Sample Quantitation Results

The concentration of chromium in sample D05640 exceeded the linear range of the ICP-MS and was not re-analyzed at a dilution. The result for chromium in sample D05640 was qualified as estimated (J).

The positive and blank-qualified results for the following sediment samples and analytes were qualified as estimated (J and UJ, respectively) because they were less than the quantitation limit but greater than the MDL. These results are usable for project objectives as estimated concentrations and quantitation limits.

antimony:	D05638, D05643, D05657, D05658
selenium:	D05646, D05647, D05652, D05657, D05658
sodium:	D05640, D05649, D05656, D05660
thallium:	D05638, D05641, D05643, D05644, D05646, D05647, D05651, D05652, D05657, D05658

The blank-qualified results for aluminum, calcium, copper, lead, magnesium, nickel, sodium and thallium in the equipment blank sample D05661 were qualified by the laboratory as estimated (UJ) because they were less than the quantitation limit but greater than the MDL. These results are usable for project objectives as estimated quantitation limits.

The positive result for mercury in sample D05643 was qualified as estimated (J) due to the low solids content of the sample (<30%).

Performance Evaluation Sample/Accuracy Check

Performance Evaluation Sample

The metals and mercury PE sample D05663 (EPA ampule number MS01636) was evaluated with this SDG. Thirteen analytes were scored "Within Limits" and nine analytes were scored "Not Evaluated." No validation action was necessary on the basis of these results. One analyte, barium, was scored "Action Low." On the basis of this score, the positive results for barium in all sediment samples were qualified as estimated (J). These results are usable for project objectives as estimated concentrations with a possible low bias.

Laboratory Control Sample

All laboratory control samples met the 80% - 120% acceptance criteria. No validation action was required.

Please contact Ms. Constance Lapite at (781) 224-6628 or at constance.lapite@m-e.com if you have any questions regarding this Tier II validation.

Very truly yours,

Richard Purdy
Data Validator

for Elizabeth Denly
Senior Reviewer

Constance Lapite
Constance Lapite
RAC Lead Chemist

cc: Leslie McVickar, EPA Remedial Project Manager (Data Validation Memorandum, Data Summary Tables)
Elizabeth Denly, TRC Project Chemist (entire package)
Denise Laferte, M&E Oversight Chemist (Data Validation Memorandum, Data Summary Tables)
Richard Purdy, M&E Data Validation Chemist (entire package)
Callahan Mine Project File, Work Assignment No. 161-RICO-017H

Attachments:
- IRDA
- Table I: Recommendation Summary Table
- Table II: Overall Evaluation of Data
- Data Summary Tables
- Data Validation Worksheets
- PE Score Report(s)
- Copy of non-CLP Analytical Methods (M&E DAS Specification D-044.2)
- Copies of Telephone Logs/Communications Forms
- Supporting Data for Reduced Payment Recommendations (not applicable)
- Copies of Field Sampling Notes (previously submitted)
- Copies of EPA-approved Amendments to QAPjP or SAP (not applicable)
- CSF Completeness Evidence Audit (DC-2 Form)
- DQO Summary Form

Region I

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 0247M

SITE Callahan Mining

LABORATORY Woods Hole Group

NO. OF SAMPLES/ MATRIX 19 SO, 1PE, 1EB

SDG# D05640-IB

REVIEWER (IF NOT ESD) **Metcalf & Eddy**

SOW# D-044.2

REVIEWER'S NAME **Richard Purdy**

DPO: ACTION ______ FYI **XX** ______

COMPLETION DATE 3/18/05

DATA ASSESSMENT SUMMARY

		ICP-AES	ICP-MS	Hg	CYANIDE
1.	DATA COMPLETENESS		O^1	O	
2.	HOLDING TIMES		O	O^2	
3.	CALIBRATIONS		O^3	O	
4.	BLANKS		O^4	O	
5.	ICS		O^4	—	
6.	MATRIX SPIKE		O^3	O	
7.	LABORATORY DUPLICATES		O	O	
8.	FIELD DUPLICATES		O^5	O	
9.	LABORATORY CONTROL SAMPLE		O	O	
10.	LABORATORY FORTIFED BLANK		O^3	O	
11.	SERIAL DILUTION		O^3	O	
12.	DETECTION LIMITS		O	O	
13.	SAMPLE QUANTITATION		O^3	O	
14.	OTHER QC		O	O	
15.	OVERALL ASSESSMENT		O	O	

O = Data had no problems/or qualified due to minor problems.
M = Data qualified due to a major problem.
Z = Data unacceptable.
X = Problems, but do not affect data.

ACTION ITEMS: O^1 - minor incompleteness; O^2 - minor HT exceedance; O^3 - minor exceedance; O^4 - minor contamination

AREAS OF CONCERN: ______

NOTABLE PERFORMANCE: ______

Table Ia
Recommendation Summary Table for Low Concentration Metals and Mercury
Callahan Mining Superfund Site
Case 0247M, SDG D05640-IB
Sediment Samples

Analyte	Action	Analyte	Action
aluminum	J^{2}	magnesium	J^{2}
antimony	J^{5} J^{8} J^{12}	manganese	J^{5}
arsenic	J^{5}	mercury	J^{1} J^{14}
barium	J^{10} J^{13}	nickel	J^{5}
beryllium	A	potassium	J^{4} J^{9}
cadmium	J^{5}	selenium	J^{6} J^{12}
calcium	J^{4} J^{9}	silver	J^{3} J^{5} J^{7}
chromium	J^{5} J^{7} J^{11}	sodium	J^{12}
cobalt	J^{5} J^{13}	thallium	A^{1} J^{5} J^{9} J^{12}
copper	A^{1} J^{5}	vanadium	J^{5}
iron	A	zinc	J^{5} J^{13}
lead	J^{5}		

A - Accept all data.

A^{1} - Qualify the positive results for copper in samples D05651 and D05652 and for thallium in sample D05644 as nondetect (U) at the reported concentration due to laboratory blank contamination.

J^{1} - Qualify the positive results for mercury in samples D05640, D05641, D05644, D05645, D05647, D05649, D05650, D05651, D05652, D05653, D05656, D05657, and D05660 as estimated (J) due to holding time exceedances.

J^{2} - Qualify the positive results for aluminum and magnesium in samples D05638, D05639, D05642, and D05643 as estimated (J) due to continuing calibration standard recovery exceedances.

J^{3} - Qualify the positive result for silver in sample D05657 as estimated (J) due to continuing calibration standard recovery exceedance.

J^{4} - Qualify the positive results for calcium and potassium in sample D05657 as estimated (J) due to internal standard recovery exceedances.

J^{5} - Qualify as estimated (J and UJ, respectively) the positive and blank-qualified results for arsenic, cadmium, chromium, cobalt, copper, lead, manganese, nickel, silver, thallium, vanadium, and zinc in all sediment samples and for antimony in all samples except D05646 due to positive interferences seen in the ICSA solution analyses.

J^{6} - Qualify as estimated (J) the positive results for selenium in all sediment samples due to negative interferences seen in the ICSA solution analyses.

J^{7} - Qualify the positive results for chromium and silver in all sediment samples as estimated (J) due to high matrix spike recovery.

J^{8} - Qualify the positive and nondetect results for antimony in all sediment samples as estimated (J and UJ, respectively) due to low matrix spike recovery.

J^{9} - Qualify the positive and blank-qualified results for calcium, potassium, and thallium in all sediment samples as estimated (J and UJ, respectively) due to serial dilution imprecision.

J^{10} - Qualify the positive results for barium in all sediment samples as estimated (J) due to low recovery in the PE sample.

J^{11} - Qualify the positive result for chromium in sample D05640 as estimated (J) due to linear range exceedance.

J^{12} - Qualify the positive and blank-qualified results for the following samples and analytes as estimated (J and UJ, respectively) because they were less than the quantitation limit but greater than the MDL:

antimony:	D05638, D05643, D05657, D05658
selenium:	D05646, D05647, D05652, D05657, D05658
sodium:	D05640, D05649, D05656, D05660
thallium:	D05638, D05641, D05643, D05644, D05646, D05647, D05651, D05652, D05657, D05658

J^{13} - Qualify the positive results for barium, cobalt, and zinc in all sediment samples as estimated (J) due to field duplicate imprecision.

J^{14} - Qualify the positive result for mercury in sample D05643 as estimated (J) due to low solids content.

Table Ib
Recommendation Summary Table for Low Concentration Metals and Mercury
Callahan Mining Superfund Site
Case 0247M, SDG D05640-IB
Aqueous QC Sample

Analyte	Action	Analyte	Action
aluminum	A^1 J^1 J^6	magnesium	A^1 J^6
antimony	J^3	manganese	A
arsenic	A	mercury	A
barium	A	nickel	A^1 J^4 J^6
beryllium	A	potassium	A
cadmium	A	selenium	J^3 J^5
calcium	A^1 J^6	silver	A
chromium	A	sodium	A^1 J^6
cobalt	J^2	thallium	A^1 J^4 J^6
copper	A^1 J^4 J^6	vanadium	A
iron	A	zinc	A
lead	A^1 J^4 J^6		

A - Accept all data.

A^1 - Qualify the positive results for aluminum, calcium, copper, lead, magnesium, nickel, sodium, and thallium in sample D05661 as nondetect (U) at the reported concentration due to method or instrument blank contamination.

J^1 - Qualify the positive result for aluminum in sample D05661 as estimated (J) due to continuing calibration standard recovery exceedance.

J^2 - Qualify the nondetect result for cobalt in sample D05661 as estimated (UJ) due to negative instrument drift.

J^3 - Elevate the quantitation limits for antimony and selenium in sample D05661 to the negative blank action level due to negative instrument drift and laboratory blank contamination.

J^4 - Qualify the blank-qualified results for copper, lead, nickel, and thallium in sample D05661 as estimated (J and UJ, respectively) due to positive interferences seen in the ICSA solution analyses.

J^5 - Qualify the nondetect result for selenium in sample D05661 as estimated (UJ) due to negative interferences in the ICSA solution analyses.

J^6 - Qualify the blank-qualified results for aluminum, calcium, copper, lead, magnesium, nickel, sodium, and thallium in sample D05661 as estimated (UJ) because they were less than the quantitation limit but greater than the MDL.

Table IIa
Overall Evaluation of Data for Low Concentration Metals and Mercury Analyses
Callahan Mining Superfund Site
Case 0247M, SDG D05640-IB
Sediment Samples

Low Concentration Metals and Mercury					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health and ecological risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: A^1 J^1 J^2 J^3 J^4 J^5 J^6 J^7 J^8 J^9 J^{10} J^{11} J^{12}	Refer to qualifications in Table I: J^{13} J^{14}	Not applicable for Tier II	**Minor Impact on Data Usability (Results usable for project objectives):** The positive results for barium, cobalt, and zinc in all sediment samples were qualified as estimated (J) due to field duplicate imprecision. The results are usable for project objectives as estimated values with an indeterminate direction of bias. The positive mercury results in sediment samples D05640, D05641, D05644, D05645, D05647, D05649, D05650, D05651, D05652, D05653, D05656, D05657, and D05660 were qualified as estimated (J) due to holding time exceedances. These results are usable for project objectives as estimated concentrations with a possible low bias. The positive results for aluminum and magnesium in samples D05638, D05639, D05642, and D05643 were qualified as estimated (J) due to continuing calibration standard recovery exceedances. The results are usable for project objectives as estimated concentrations with a possible high bias.

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

Table IIa
Overall Evaluation of Data for Low Concentration Metals and Mercury Analyses
Callahan Mining Superfund Site
Case 0247M, SDG D05640-IB
Sediment Samples

Low Concentration Metals and Mercury					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health and ecological risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: A[1] J[1] J[2] J[3] J[4] J[5] J[6] J[7] J[8] J[9] J[10] J[11] J[12]	Refer to qualifications in Table I: J[13] J[14]	Not applicable for Tier II	**Minor Impact on Data Usability (Results usable for project objectives)**: The positive result for silver in sample D05657 was qualified as estimated (J) due to continuing calibration standard recovery exceedances. The result is usable for project objectives as an estimated concentration with a possible low bias. The positive results for copper in samples D05651 and D05652 and for thallium in sample D05644 were qualified as nondetect (U) at the reported concentration due to laboratory blank contamination. These results are usable for project objectives as nondetect results. Note that the results for copper and thallium were also qualified as estimated (J) due to positive interferences seen in the ICSA solution analyses. Therefore, the overall qualification for these analytes is estimated nondetect (UJ) due to blank contamination and ICSA interferences. The positive results for selenium in all sediment samples were qualified as estimated (J) due to negative interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations with a possible low bias.

Table IIa

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

Overall Evaluation of Data for Low Concentration Metals and Mercury Analyses
Callahan Mining Superfund Site
Case 0247M, SDG D05640-IB
Sediment Samples

Low Concentration Metals and Mercury					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health and ecological risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: A[1] J[1] J[2] J[3] J[4] J[5] J[6] J[7] J[8] J[9] J[10] J[11] J[12]	Refer to qualifications in Table I: J[13] J[14]	Not applicable for Tier II	**Minor Impact on Data Usability (Results usable for project objectives):** The positive and blank-qualified results for arsenic, cadmium, chromium, cobalt, copper, lead, manganese, nickel, silver, thallium, vanadium, and zinc in all sediment samples and for antimony in all sediment samples except D05646 were qualified as estimated (J and UJ, respectively) due to positive interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations and quantitation limits with a possible high bias. The positive results for chromium and silver in all sediment samples were qualified as estimated (J) due to high matrix spike recovery. The results are usable for project objectives as estimated values that may be biased high. The positive and nondetect results for antimony in all sediment samples were qualified as estimated (J and UJ, respectively) due to low matrix spike recovery. The results are usable for project objectives as estimated values and quantitation limits that may be biased low.

Table IIa

* The evaluation of "sampling error" cannot be completely assessed in data validation.
** Sampling variability is not assessed in data validation.

Overall Evaluation of Data for Low Concentration Metals and Mercury Analyses
Callahan Mining Superfund Site
Case 0247M, SDG D05640-IB
Sediment Samples

Low Concentration Metals and Mercury					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health and ecological risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: A^{1} J^{1} J^{2} J^{3} J^{4} J^{5} J^{6} J^{7} J^{8} J^{9} J^{10} J^{11} J^{12}	Refer to qualifications in Table I: J^{13} J^{14}	Not applicable for Tier II	**Minor Impact on Data Usability (Results usable for project objectives):** The positive and blank-qualified results for calcium, potassium, and thallium in all sediment samples were qualified as estimated (J and UJ, respectively) due to serial dilution imprecision. The results are usable for project objectives as estimated values and quantitation limits with an indeterminate direction of bias. The positive results for barium in all sediment samples were qualified as estimated (J) due to low recoveries in the PE sample. The results are usable for project objectives as estimated values with a possible low bias. The positive result for chromium in sample D05640 was qualified as estimated (J) due to linear range exceedance. This result is usable for project objectives as an estimated concentration. The positive result for mercury in sample D05643 was qualified as estimated (J) due to low solids content. The result is usable for project objectives as an estimated value with an indeterminate direction of bias.

Table IIa
Overall Evaluation of Data for Low Concentration Metals and Mercury Analyses

* The evaluation of "sampling error" cannot be completely assessed in data validation.
** Sampling variability is not assessed in data validation.

Callahan Mining Superfund Site
Case 0247M, SDG D05640-IB
Sediment Samples

Low Concentration Metals and Mercury

DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health and ecological risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: A[1] J[1] J[2] J[3] J[4] J[5] J[6] J[7] J[8] J[9] J[10] J[11] J[12]	Refer to qualifications in Table I: J[13] J[14]	Not applicable for Tier II	**Minor Impact on Data Usability (Results usable for project objectives)**: The positive and blank-qualified results for the following samples and analytes were qualified as estimated (J and UJ, respectively) because they were less than the quantitation limit but greater than the MDL. These results are usable for project objectives as estimated concentrations and quantitation limits. antimony: D05638, D05643, D05657, D05658 selenium: D05646, D05647, D05652, D05657, D05658 sodium: D05640, D05649, D05656, D05660 thallium: D05638, D05641, D05643, D05644, D05646, D05647, D05651, D05652, D05657, D05658 The positive results for calcium and potassium in sample D05657 were qualified as estimated (J) due to internal standard recovery exceedances. The results are usable for project objectives as estimated values.

Table IIb

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* The evaluation of "sampling error" cannot be completely assessed in data validation.
** Sampling variability is not assessed in data validation.

Overall Evaluation of Data for Low Concentration Metals and Mercury Analyses
Callahan Mining Superfund Site
Case 0247M, SDG D05640-IB
Aqueous QC Sample

Low Concentration Metals and Mercury					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health and ecological risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: A^{1} J^{1} J^{2} J^{3} J^{4} J^{5} J^{6}	Refer to qualifications in Table I: None	Not applicable for Tier II	**Minor Impact on Data Usability (Results usable for project objectives):** The positive result aluminum in sample D05661 was qualified as estimated (J) due to continuing calibration standard recovery exceedances. The result is usable for project objectives as an estimated concentration with a possible high bias. The positive results for aluminum, calcium, copper, lead, magnesium, nickel, sodium, and thallium in sample D05661 were qualified as nondetect (U) at the reported concentration due to laboratory blank contamination. These results are usable for project objectives as nondetect results. Note that these results were also qualified as estimated (J) due to positive interferences seen in the ICSA solution analyses. Therefore, the overall qualification for these analytes is estimated nondetect (UJ) due to blank contamination and ICSA interferences. The nondetect result for cobalt in sample D05661 was qualified as estimated (UJ) at the reported MDL due to negative instrument drift. This result is usable for project objectives as an estimated quantitation limit with a possible low bias.

Table IIb

Overall Evaluation of Data for Low Concentration Metals and Mercury Analyses

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

Callahan Mining Superfund Site
Case 0247M, SDG D05640-IB
Aqueous QC Sample

Low Concentration Metals and Mercury					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health and ecological risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: A^1 J^1 J^2 J^3 J^4 J^5 J^6	Refer to qualifications in Table I: None	Not applicable for Tier II	**Minor Impact on Data Usability (Results usable for project objectives):** The nondetect results for antimony and selenium in sample D05661 had quantitation limits elevated to their sample-specific negative blank action levels due to negative instrument drift and blank contamination. These results are usable for project objectives as estimated quantitation limits with a possible low bias. The blank-qualified results for copper, lead, nickel, and thallium in sample D05661 were qualified as estimated (UJ) due to positive interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated quantitation limits with a possible high bias. Note that these results were also qualified as nondetect (U) at the reported concentration due to laboratory blank contamination. Therefore, the overall qualification for these analytes is estimated nondetect (UJ) due to blank contamination and ICSA interferences.

Table IIb
Overall Evaluation of Data for Low Concentration Metals and Mercury Analyses

* The evaluation of "sampling error" cannot be completely assessed in data validation.
** Sampling variability is not assessed in data validation.

Callahan Mining Superfund Site
Case 0247M, SDG D05640-IB
Aqueous QC Sample

Low Concentration Metals and Mercury

DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health and ecological risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: A^1 J^1 J^2 J^3 J^4 J^5 J^6	Refer to qualifications in Table I: None	Not applicable for Tier II	**Minor Impact on Data Usability (Results usable for project objectives)**: The nondetect result for selenium in sample D05661 was qualified as estimated (UJ) due to negative interferences seen in the ICSA solution analyses. This result is usable for project objectives as an estimated quantitation limit with a possible low bias. The blank-qualified results for aluminum, calcium, copper, lead, magnesium, nickel, sodium and thallium in the equipment blank sample D05661 were qualified as estimated (UJ) because they were less than the quantitation limit but greater than the MDL. These results are usable for project objectives as estimated quantitation limits.

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

SITE: Callahan Mining Superfund Site
CASE NO.: 0247M
SDG NO.: D05640-IB

DATA SUMMARY TABLE
INORGANIC ANALYSIS (D-044.2)
Sediment (mg/Kg)

	Traffic Report Sample No.	D05638	D05639	D05640	D05641	D05642	D05643
	M&E Sample ID	SD-401	SD-402	SD-403	SD-404	SD-405	SD-406
	Lab Sample ID	0411094-14	0411094-15	0411094-01	0411094-02	0411094-16	0411094-17
	Date Sampled	11/17/04	11/17/04	11/12/04	11/12/04	11/17/04	11/17/04
	% Solids	33.5	60.1	64.6	42.9	39	51.5
	Comments						Freeze-Dried *
Analyte	RL						
Aluminum	4.0	20000	30000 J	24000	27000	28000 J	16000 J
Antimony	0.15	0.18 J	0.79 J	0.68 J	1.1 J	0.88 J	0.065 J
Arsenic	0.20	7.0 J	44 J	54 J	32 J	38 J	6.8 J
Barium	2.0	25 J	17 J	13 J	37 J	17 J	23 J
Beryllium	0.040	0.70	0.47	0.34	1.0	0.56	0.60
Cadmium	0.010	4.3 J	34 J	25 J	20 J	25 J	2.6 J
Calcium	8.0	1800	33000 J	64000 J	6100 J	8900 J	2500 J
Chromium	1.0	35 J	32 J	21 J	40 J	29 J	33 J
Cobalt	2.0	8.7 J	5.1 J	3.3 J	12 J	5.7 J	7.6 J
Copper	1.0	120 J	2300 J	2100 J	2100 J	2000 J	96 J
Iron	4.0	19000	27000	24000	31000	29000	20000
Lead	0.40	69 J	1200 J	1000 J	380 J	710 J	26 J
Magnesium	10	9300	53000 J	49000	25000	43000 J	9500 J
Manganese	1.0	200 J	1200 J	1600 J	540 J	720 J	210 J
Mercury	0.010	0.15	0.67	0.70 J	0.24 J	0.48	0.045 J
Nickel	2.0	30 J	15 J	14 J	36 J	18 J	29 J
Potassium	50	2500 J	3100 J	2400 J	3700 J	3100 J	3400 J
Selenium	1.0	1.6 J	6.1 J	5.0 J	3.4 J	4.9 J	2.3 J
Silver	0.020	0.45 J	5.4 J	4.1 J	2.2 J	3.5 J	0.31 J
Sodium	50	11000	4100	19 J	2400	6200	37000
Thallium	0.40	0.34 J	1.5 J	1.4 J	0.94 J	1.4 J	0.27 J
Vanadium	1.0	26 J	20 J	17 J	39 J	25 J	31 J
Zinc	2.0	820 J	7600 J	6800 J	7800 J	6900 J	430 J

* - Sample D05643 freeze-dried for all metals except mercury.
The solids content was 28.9% prior to freeze-drying.

SITE: Callahan Mining Superfund Site
CASE NO.: 0247M
SDG NO.: D05640-IB

DATA SUMMARY TABLE
INORGANIC ANALYSIS (D-044.2)
Sediment (mg/Kg)

Traffic Report Sample No.		D05644	D05645	D05646	D05647	D05649	D05650
M&E Sample ID		SD-407	SD-408	SD-409	SD-410	SD-412	SD-413
Lab Sample ID		0411094-03	0411094-04	0411094-18	0411094-05	0411094-06	0411094-07
Date Sampled		11/11/04	11/11/04	11/18/04	11/11/04	11/12/04	11/11/04
% Solids		53.5	55.3	63.8	83.3	72.5	65.7
Comments							
Analyte	RL						
Aluminum	4.0	15000	38000	7800	7500	21000	22000
Antimony	0.15	0.36 J	0.55 J	0.030 UJ	0.095 J	1.3 J	0.99 J
Arsenic	0.20	16 J	17 J	4.5 J	7.8 J	85 J	23 J
Barium	2.0	26 J	27 J	11 J	6.2 J	5.9 J	28 J
Beryllium	0.040	0.57	0.64	0.21	0.23	0.27	0.61
Cadmium	0.010	2.6 J	16 J	0.50 J	1.8 J	16 J	30 J
Calcium	8.0	2600 J	6200 J	860 J	2200 J	70000 J	4400 J
Chromium	1.0	27 J	38 J	17 J	16 J	17 J	37 J
Cobalt	2.0	9.2 J	8.8 J	3.8 J	5.0 J	3.9 J	12 J
Copper	1.0	200 J	1500 J	22 J	150 J	1100 J	2600 J
Iron	4.0	22000	25000	11000	14000	34000	31000
Lead	0.40	120 J	630 J	17 J	27 J	560 J	720 J
Magnesium	10	10000	62000	4100	5400	38000	19000
Manganese	1.0	300 J	900 J	93 J	210 J	1400 J	530 J
Mercury	0.010	0.12 J	0.44 J	0.021	0.039 J	0.79 J	0.74 J
Nickel	2.0	26 J	32 J	13 J	15 J	16 J	39 J
Potassium	50	3000 J	3700 J	1300 J	770 J	1400 J	3000 J
Selenium	1.0	1.0 J	1.8 J	0.56 J	0.24 J	6.4 J	2.7 J
Silver	0.020	0.72 J	3.6 J	0.16 J	0.22 J	3.2 J	3.0 J
Sodium	50	9100	7700	6000	2100	21 J	5000
Thallium	0.40	0.32 UJ	0.83 J	0.12 J	0.087 J	2.1 J	0.45 J
Vanadium	1.0	29 J	34 J	18 J	14 J	12 J	31 J
Zinc	2.0	810 J	40000 J	130 J	480 J	3800 J	8100 J

SITE: Callahan Mining Superfund Site
CASE NO.: 0247M
SDG NO.: D05640-IB

DATA SUMMARY TABLE
INORGANIC ANALYSIS (D-044.2)
Sediment (mg/Kg)

Traffic Report Sample No.		D05651	D05652	D05653	D05656	D05657	D05658
M&E Sample ID		SD-415	SD-416	SD-417	SD-422	SD-423	SD-424
Lab Sample ID		0411094-08	0411094-09	0411094-10	0411094-11	0411094-12	0411094-19
Date Sampled		11/11/04	11/11/04	11/11/04	11/12/04	11/11/04	11/18/04
% Solids		42.5	60.4	74.4	59.5	42	77.2
Comments					FD of D05660		
Analyte	RL						
Aluminum	4.0	17000	19000	16000	35000	22000	5400
Antimony	0.15	0.47 J	0.31 J	1.0 J	0.78 J	0.17 J	0.056 J
Arsenic	0.20	23 J	18 J	37 J	64 J	15 J	4.4 J
Barium	2.0	21 J	24 J	8.9 J	5.0 J	59 J	4.4 J
Beryllium	0.040	0.67	0.63	0.34	1.3	0.74	0.18
Cadmium	0.010	19 J	9.0 J	41 J	32 J	1.8 J	0.67 J
Calcium	8.0	2700 J	2200 J	11000 J	32000 J	2700 J	760 J
Chromium	1.0	33 J	29 J	33 J	18 J	39 J	10 J
Cobalt	2.0	11 J	10 J	12 J	8.1 J	9.2 J	3.2 J
Copper	1.0	740 UJ	420 UJ	2400 J	10000 J	75 J	140 J
Iron	4.0	23000	24000	20000	35000	26000	8400
Lead	0.40	230 J	200 J	280 J	930 J	50 J	28 J
Magnesium	10	14000	13000	22000	56000	8200	3300
Manganese	1.0	290 J	360 J	470 J	1500 J	240 J	120 J
Mercury	0.010	0.21 J	0.19 J	0.59 J	0.52 J	0.091 J	0.073
Nickel	2.0	29 J	31 J	33 J	28 J	41 J	8.7 J
Potassium	50	3000 J	2600 J	1400 J	1800 J	2600 J	490 J
Selenium	1.0	2.2 J	0.83 J	2.1 J	6.9 J	1.1 J	0.27 J
Silver	0.020	1.4 J	0.92 J	1.9 J	3.0 J	0.45 J	0.19 J
Sodium	50	14000	6200	3400	37 J	900	3200
Thallium	0.40	0.41 J	0.28 J	0.49 J	1.4 J	0.23 J	0.077 J
Vanadium	1.0	33 J	30 J	23 J	17 J	40 J	11 J
Zinc	2.0	31000 J	18000 J	12000 J	16000 J	720 J	220 J

SITE: Callahan Mining Superfund Site
CASE NO.: 0247M
SDG NO.: D05640-IB

DATA SUMMARY TABLE
INORGANIC ANALYSIS (D-044.2)
Sediment (mg/Kg)

Traffic Report Sample No.		D05660
M&E Sample ID		SDE-422
Lab Sample ID		0411094-13
Date Sampled		11/12/04
% Solids		60.4
Comments		FD of D05656
Analyte	RL	
Aluminum	4.0	33000
Antimony	0.15	0.80 J
Arsenic	0.20	60 J
Barium	2.0	9.7 J
Beryllium	0.040	1.3
Cadmium	0.010	29 J
Calcium	8.0	27000 J
Chromium	1.0	16 J
Cobalt	2.0	17 J
Copper	1.0	9200 J
Iron	4.0	33000
Lead	0.40	830 J
Magnesium	10	54000
Manganese	1.0	2100 J
Mercury	0.010	0.47 J
Nickel	2.0	27 J
Potassium	50	1600 J
Selenium	1.0	6.6 J
Silver	0.020	3.0 J
Sodium	50	31 J
Thallium	0.40	1.3 J
Vanadium	1.0	16 J
Zinc	2.0	8800 J

SITE: Callahan Mining Superfund Site
CASE NO.: 0247M
SDG NO.: D05640-IB

DATA SUMMARY TABLE
INORGANIC ANALYSIS (D-044.2)
Aqueous QC Sample (ug/L)

	Traffic Report Sample No.	D05661
	M&E Sample ID	RB-001
	Lab Sample ID	0411094-20
	Date Sampled	11/18/04
	Comments	Equipment Blank
Analyte	RL	
Aluminum	40.0	5.0 UJ
Antimony	1.5	0.28 U
Arsenic	2.0	0.13 U
Barium	20.0	0.14 U
Beryllium	0.40	0.20 U
Cadmium	0.10	0.098 U
Calcium	80.0	22 UJ
Chromium	10.0	0.18 U
Cobalt	20.0	0.038 UJ
Copper	10.0	0.43 UJ
Iron	40.0	18 U
Lead	4.0	0.19 UJ
Magnesium	100	2.0 UJ
Manganese	10.0	4.1 U
Mercury	0.10	0.008 U
Nickel	20.0	0.10 UJ
Potassium	500	30 U
Selenium	10.0	0.91 UJ
Silver	0.20	0.12 U
Sodium	500	32 UJ
Thallium	4.0	0.038 UJ
Vanadium	10.0	0.15 U
Zinc	20.0	5.3 U

DATA SUMMARY TABLE
DEFINITIONS (Inorganics)

EB - As a qualifier for soil/sediment samples: Analyte is also detected in the equipment blank
FD - Field Duplicate
g - gram
J - The concentration is an estimated quantity
mg/Kg - milligrams per Kilogram
R - The data are rejected as unusable
RL - Reporting Limit
U - Analyte was analyzed for but not detected at the specified reporting limit
ug/L - micrograms per Liter
UJ - The sample quantitation limit is an estimated quantity
NA - Not Applicable

M&E
Metcalf & Eddy

701 Edgewater Drive
Wakefield, MA 01880

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036.200100.0061.00005

March 21, 2005

Christine Clark
Regional Sample Control Center
U.S. EPA Region I
11 Technology Drive
North Chelmsford, Massachusetts 01863-2431

Re: Work Assignment No. 161-RICO-017H
Case 0247M, SDG D05648-IB
Woods Hole Group, Raynham, Massachusetts
Callahan Mining Superfund Site, Brooksville, Maine
Tier II Inorganic Data Validation

Low Concentration Metals and Mercury:	6/Sediment Samples/D05648, D05654, D05655, D05659, D05706, D05707 (Field Duplicate Pair: D05654 and D05659) 1/Aqueous Equipment Blank/D05662 1/Performance Evaluation Sample/D05664

Dear Ms. Clark:

A Tier II data validation was performed by Metcalf & Eddy, Inc. (M&E) on the low concentration metals and mercury analytical data for six sediment samples (including one field duplicate pair), one performance evaluation (PE) sample, and one equipment blank sample collected from the Callahan Mining Superfund Site, located in Brooksville, Maine, by TRC on December 3, 2004. The samples were analyzed through the Response Action Contract (RAC) Delivery of Analytical Services (DAS) program using M&E DAS *Analytical Specification for the Analysis of Low Concentration Metals Including Cyanide in Solid Samples (Including Samples with High Moisture Content* (D-044.2), based on EPA methodology. M&E evaluated these data using the *Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Inorganic Analyses*, February 1989 criteria, modified for the methods and incorporating organic data validation guidance, *Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses*, December 1996 criteria. Additional guidance was provided by *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review,* October 2004.

The Tier II metals data validation was based on the following parameters:

• Overall Evaluation of Data and Potential Usability Issues
• Data Completeness (CSF Audit - Tier I)
• Preservation and Technical Holding Times
* • Instrument Calibration
* • ICP-MS Internal Standards
* • ICP-MS Tuning, Mass Calibration, and Resolution Check
• Blanks
• Inductively Coupled Plasma Interference Check Sample
• Matrix Spike
* • Laboratory Duplicate
• Field Duplicates
NA • Furnace Atomic Absorption Analysis
• Inductively Coupled Plasma Serial Dilution
* • Laboratory Fortified Blank
* • Instrument Detection Limits
• Sample Quantitation Results
• Performance Evaluation Sample /Accuracy Check

* - all criteria met for this parameter
NA - parameter not applicable

Note: Worksheets are not included for parameters that have met criteria or for criteria that are not applicable to a Tier II data validation.

Copies of the field sampling notes for this sample delivery group (SDG) are included with this Data Validation Memorandum.

The following information was used to generate the Data Validation Memorandum attachments:

Table I: Recommendation Summary Table - summarizes validation recommendations
Table II: Overall Evaluation of Data - summarizes site DQOs and potential usability issues
Data Summary Tables - summarizes accepted, qualified, and rejected data

Overall Evaluation of Data and Potential Usability Issues

The following is a summary of the site DQOs (Data Quality Objectives):

- To determine nature and extent of contamination and to support a human health and ecological risk assessment.

The low concentration metals and mercury sample results were qualified as a result of sampling and analytical error. Qualifications as a result of sampling error are summarized below:

- The positive results for barium, chromium, manganese, and nickel in all sediment samples were qualified "EB" due to equipment blank contamination. An indeterminate amount of sampling error may have affected these sample results. The results are usable for project objectives. These qualifications have a minor impact on data usability.

- The positive results for calcium and copper in all sediment samples were qualified as estimated (J) due to field duplicate imprecision. The results are usable for project objectives as estimated values with an indeterminate direction of bias. This qualification has a minor impact on the data usability.

- The positive result for mercury in sample D05655 was qualified as estimated (J) due to low solids content. The result is usable for project objectives as an estimated value with an indeterminate direction of bias. This qualification has a minor impact on the data usability.

Qualifications as a result of analytical error are summarized below:

- The positive results for aluminum, calcium, copper, lead, magnesium, sodium, and zinc in sample D05662 were qualified as nondetect (U) at the reported concentration due to method blank contamination. These results are usable for project objectives as nondetect results. This qualification has a minor impact on data usability. Note that these results were also qualified as estimated (J) because the concentrations were less than the reporting but greater than the method detection limit (MDL). Therefore, the overall qualification for these analytes is estimated nondetect (UJ).

- The nondetect results for antimony in samples D05706 and D05707 and cobalt in sample D05662 were qualified as estimated (UJ) at the reported MDL due to negative instrument drift. These results are usable for project objectives as estimated quantitation limits with a possible low bias. This qualification has a minor impact on data usability.

- The nondetect results for antimony and selenium in sample D05662 were elevated to their sample-specific negative blank action levels due to negative instrument drift and blank contamination. These results are usable for project objectives with elevated quantitation limits. This qualification has a minor impact on data usability.

- The positive results for arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, nickel, silver, thallium, vanadium, and zinc in all sediment samples and for antimony in samples D05648, D05654, D05655, and D05659 were qualified as estimated (J) due to positive interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations with a possible high bias. This qualification has a minor impact on data usability.

- The positive and blank-qualified results for chromium, copper, lead, nickel, and zinc in sample D05662 were qualified as estimated (J and UJ, respectively) due to positive interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations and quantitation limits with a possible high bias. This qualification has a minor impact on data usability. Note that the results for copper, lead, and zinc were also qualified as nondetect (U) at the reported concentration due to laboratory blank contamination. Therefore, the overall qualification for these analytes is estimated nondetect (UJ) due to blank contamination and ICSA interferences.

- The positive and nondetect results for selenium in all sediment samples and sample D05662 were qualified as estimated (J and UJ, respectively) due to negative interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations and quantitation limits with a possible low bias. This qualification has a minor impact on data usability.

- The positive results for arsenic, cadmium, chromium, lead, and zinc in all sediment samples were qualified as estimated (J) due to high matrix spike recovery. The results are usable for project objectives as estimated values that may be biased high. This qualification has a minor impact on the data usability.

- The positive and nondetect results for antimony in all sediment samples were qualified as estimated (J and UJ, respectively) due to low matrix spike recovery. The results are usable for project objectives as estimated values and quantitation limits that may be biased low. This qualification has a minor impact on the data usability.

- The positive results for calcium in all sediment samples were qualified as estimated (J) due to laboratory duplicate imprecision. The results are usable for project objectives as estimated values with an indeterminate direction of bias. This qualification has a minor impact on the data usability.

- The positive results for cadmium, mercury, potassium, selenium, and thallium in all sediment samples were qualified as estimated (J) due to serial dilution imprecision. The results are usable for project objectives as estimated values with an indeterminate direction of bias. This qualification has a minor impact on the data usability.

- The positive results for the following samples and analytes were qualified as estimated (J) because they were less than the quantitation limit but greater than the MDL. These results are usable for project objectives as estimated concentrations. This qualification has a minor impact on the data usability.

selenium:	D05654, D05659, D05706, D05707
thallium:	D05648, D05654, D05659, D05706, D05707

- The positive and blank-qualified results for aluminum, barium, calcium, chromium, copper, lead, magnesium, manganese, nickel, sodium, and zinc in sample D05662 were qualified as estimated (J and UJ, respectively) because they were less than the quantitation limit but greater than the MDL. These results are usable for project objectives as estimated concentrations and quantitation limits. This qualification has a minor impact on the data usability.

Data Completeness

The laboratory was contacted on March 15, 2005 concerning the following:

1. The chromium result for sample D05654 is incorrectly reported on Form I.
2. There is an un-numbered page between 15 and 16.The validator manually numbered it as page 15a.

The laboratory provided an acceptable response and resubmitted data on March 16, 2005.

Preservation and Technical Holding Times

Note that because of its high moisture content, sample D05655 was freeze-dried prior to preparation for metals analysis. Due to holding time considerations, the sample aliquot used for mercury analysis was not freeze-dried. No further validation action was taken.

Blanks

The following table summarizes the blank contamination detected in the laboratory blanks associated with the sediment samples. If a contaminant was detected in more than one blank, the highest concentration was used to qualify associated sample results and is summarized below. The nominal Blank Action Levels (BAL) from the method blank were calculated based on a 1gm sample weight (dry), 50mL final volume, and two-fold dilution. The nominal BALs from instrument blanks were based on a 1gm sample weight (dry) and 50mL final volume. Sample-specific BALs are further adjusted for actual sample weights, moisture content, and any additional dilutions.

Analyte	**Blank Type**	**Maximum Blank Concentration**	**Nominal Blank Action Level (BAL) mg/Kg**	**Action/Samples Affected**
aluminum	mb	0.38 mg/Kg	1.9	No action; all results greater than BAL
antimony	inst	-0.39 µg/L	0.20	Qualify the nondetect results as estimated (UJ) in samples D05706 and D05707
arsenic	inst	0.065 µg/L	0.032	No action; all results greater than BAL
barium	mb	0.024 mg/Kg	0.12	No action; all results greater than BAL
cadmium	mb	0.0062 mg/Kg	0.031	No action; all results greater than BAL
chromium	mb	0.021 mg/Kg	0.10	No action; all results greater than BAL
	inst	-0.13 µg/L	0.065	
cobalt	inst	-0.030 µg/L	0.015	No action; all results greater than BAL
copper	inst	0.73 µg/L	3.6	No action; all results greater than BAL
	inst	-0.17 µg/L	0.085	
iron	mb	2.0 mg/Kg	10.0	No action; all results greater than BAL
	inst	-9.5 µg/L	4.8	
lead	mb	0.0095 mg/Kg	0.048	No action; all results greater than BAL
magnesium	mb	0.4 mg/Kg	2.0	No action; all results greater than BAL
nickel	inst	-0.47 µg/L	0.24	No action; all results greater than BAL
potassium	mb	4.0 mg/Kg	20	No action; all results greater than BAL
	inst	-45 µg/L	22	
selenium	inst	0.67 µg/L	0.34	No action; all results greater than BAL
sodium	mb	2.1 mg/Kg	10.5	No action; all results greater than BAL
thallium	mb	0.011 mg/Kg	0.055	No action; all results greater than BAL
vanadium	mb	0.032 mg/Kg	0.16	No action; all results greater than BAL

Analyte	**Blank Type**	**Maximum Blank Concentration**	**Nominal Blank Action Level (BAL) mg/Kg**	**Action/Samples Affected**
zinc	mb	0.41 mg/Kg	2.0	No action; all results greater than BAL

inst - instrument blank (i.e., ICB or CCB)
mb - method blank

For positive blank contamination, sample results were qualified as follows:

- If the sample result was nondetect, qualification of the data was not required.
- If the sample result was > MDL and ≤ positive BAL, the result was qualified as a nondetect (U) at the reported concentration.
- If the sample result was > positive BAL, qualification of the data was not required.

For negative blank contamination, sample results were qualified as follows:

- If the sample result was positive and ≤ negative BAL, the result was qualified as estimated (J).
- If the sample result was nondetect, the MDL was qualified as estimated (UJ).
- If the sample result was > MDL and > negative BAL, qualification of the data was not required.

For positive and negative blank contamination where the negative BAL is < the positive BAL, sample results were qualified as follows:

- If the sample result was >MDL and > negative BAL but ≤ positive BAL, the result was qualified as nondetect (U) at the reported concentration.
- If the sample result was > MDL and < negative BAL, the result was qualified as nondetect (U) at the negative BAL.
- If the sample result was nondetect, elevate the MDL to the negative BAL.
- If the sample result was > positive BAL, qualification of the data was not required.

For positive and negative blank contamination where the negative BAL is > the positive BAL, sample results were qualified as follows:

- If the sample result was > MDL but ≤ negative BAL, the result was qualified as nondetect (U) at the negative BAL.
- If the sample result was nondetect, elevate the MDL to the negative BAL.
- If the sample result was > negative BAL, qualification of the data was not required.

The following table summarizes the blank contamination detected in the laboratory blanks associated with the aqueous equipment blank sample. If a contaminant was detected in more than one blank, the highest concentration was used to qualify associated sample results and is summarized below. Maximum blank concentrations from instrument blanks were also adjusted for sample dilutions.

Analyte	Blank Type	Maximum Blank Concentration µg/L	Blank Action Level (BAL) µg/L	Action/Samples Affected
aluminum	mb	69	345	Qualify positive result nondetect (U) at reported concentration in sample D05662
antimony	inst	0.018	0.18	Elevate the reported MDL to the negative BAL in sample D05662
	inst	-0.028	0.28	
calcium	mb	28	140	Qualify positive result nondetect (U) at reported concentration in sample D05662
cobalt	inst	-0.032	0.32	Qualify nondetect result estimated (UJ) at reported MDL in sample D05662
copper	mb	1.4	7.0	Qualify positive result nondetect (U) at reported concentration in sample D05662
iron	mb	100	500	No action; nondetect in sample
lead	mb	1.6	8.0	Qualify positive result nondetect (U) at reported concentration in sample D05662
magnesium	mb	100	500	Qualify positive result nondetect (U) at reported concentration in sample D05662
nickel	mb	0.08	0.40	No action; result above BAL
potassium	mb	39	195	No action; nondetect in sample
selenium	inst	0.1	1.0	Elevate the reported MDL to the negative BAL in sample D05662
	inst	-0.091	0.91	
sodium	mb	12	60	Qualify positive result nondetect (U) at reported concentration in sample D05662
thallium	inst	0.035	0.35	No action; nondetect in sample
vanadium	inst	0.19	1.9	No action; nondetect in sample
zinc	mb	7.4	37	Qualify positive result nondetect (U) at reported concentration in sample D05662

inst - instrument blank (i.e. ICB or CCB)
mb - method blank

For positive blank contamination, sample results were qualified as follows:

- If the sample result was nondetect, qualification of the data was not required.
- If the sample result was > MDL and ≤ positive BAL, the result was qualified as a nondetect (U) at the reported concentration.

- If the sample result was > positive BAL, qualification of the data was not required.

For negative blank contamination, sample results were qualified as follows:

- If the sample result was positive and ≤ negative BAL, the result was qualified as estimated (J).
- If the sample result was nondetect, the MDL was qualified as estimated (UJ).
- If the sample result was > MDL and > negative BAL, qualification of the data was not required.

For positive and negative blank contamination where the negative BAL is < the positive BAL, sample results were qualified as follows:

- If the sample result was >MDL and > negative BAL but ≤ positive BAL, the result was qualified as nondetect (U) at the reported concentration.
- If the sample result was > MDL and < negative BAL, the result was qualified as nondetect (U) at the negative BAL.
- If the sample result was nondetect, elevate the MDL to the negative BAL.
- If the sample result was > positive BAL, qualification of the data was not required.

For positive and negative blank contamination where the negative BAL is > the positive BAL, sample results were qualified as follows:

- If the sample result was > MDL but ≤ negative BAL, the result was qualified as nondetect (U) at the negative BAL.
- If the sample result was nondetect, elevate the MDL to the negative BAL.
- If the sample result was > negative BAL, qualification of the data was not required

The following table summarizes the level of blank contamination detected in the equipment blank associated with the surface sediment samples.

Analyte	Blank Concentration (µg/L)	Action/Samples Affected
aluminum	7.2	No action; result qualified as nondetect (U) after blank actions.
barium	0.21	Qualify all sediment samples (EB).
calcium	18	No action; result qualified as nondetect (U) after blank actions.
chromium	0.32	Qualify all sediment samples (EB).
copper	0.59	No action; result qualified as nondetect (U) after blank actions.
lead	0.35	No action; result qualified as nondetect (U) after blank actions.
magnesium	4.6	No action; result qualified as nondetect (U) after blank actions.
manganese	7.0	Qualify all sediment samples (EB).
nickel	0.64	Qualify all sediment samples (EB).
sodium	39	No action; result qualified as nondetect (U) after blank actions.
zinc	8.1	No action; result qualified as nondetect (U) after blank actions.

Inductively Coupled Plasma Interference Check Sample

Positive results for antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, nickel, silver, thallium, vanadium, and zinc were reported in the ICSA solution analyses at concentrations greater than the MDLs. Results for selenium were reported in the ICSA solution at concentrations greater than the negative MDL.

The positive results for arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, nickel, silver, thallium, vanadium, and zinc in all sediment samples and for antimony in samples D05648, D05654, D05655, and D05659 were qualified as estimated (J) due to positive interferences seen in the ICSA solution analyses. The positive and blank-qualified results for chromium, copper, lead, nickel, and zinc in sample D05662 were qualified as estimated (J and UJ, respectively) due to positive interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations with a possible high bias.

The positive and nondetect results for selenium in all sediment samples and sample D05662 were qualified as estimated (J and UJ, respectively) due to negative interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations and quantitation limits with a possible low bias.

Matrix Spike (MS)

Sample D05706 was analyzed as the matrix spike with this data set. The analytes that did not meet recovery (%R) acceptance criteria of 75-125% and the actions taken are summarized in the table below:

Analyte	Spiked Sample Result (mg/Kg)	Sample Result (mg/Kg)	Spike Added (mg/Kg)	MS %R	Affected Samples/Action
antimony	0.53	0.041 U	1.6	33	Qualify as estimated (J and UJ, respectively) the positive and nondetect results in all sediment samples.
arsenic	10	6.5	2.0	196	Qualify as estimated (J) the positive results in all sediment samples.
cadmium	0.49	0.34	0.10	148	Qualify as estimated (J) the positive results in all sediment samples.
chromium	35	22	10	130	Qualify as estimated (J) the positive results in all sediment samples.

Analyte	Spiked Sample Result (mg/Kg)	Sample Result (mg/Kg)	Spike Added (mg/Kg)	MS %R	Affected Samples/Action
lead	18	13	4.0	128	Qualify as estimated (J) the positive results in all sediment samples.
zinc	86	59	20	134	Qualify as estimated (J) the positive results in all sediment samples.

Laboratory Duplicates

Sample D05706 was analyzed as a laboratory duplicate in association with this data set. The analytes that did not meet the relative percent difference (RPD) criterion of <35% for analytes greater than 5x reporting limit or the absolute difference criterion of 2x reporting limit for those less than <5x reporting limit, and the actions taken are summarized in the following table:

Analyte	Sample Result (mg/Kg)	Duplicate Result (mg/Kg)	%RPD	Actions
calcium	3100	6600	73	Qualify as estimated (J) the positive calcium results in all samples. .

Field Duplicates

Samples D05654 and D05659 were the field duplicate pair analyzed in association with this data set. The analytes that did not meet the RPD criterion of <50% for analytes greater than 5x reporting limit or the absolute difference criterion of <4x reporting limit for those less than <5x reporting limit, and the actions taken are summarized in the following table:

Analyte	D05654 (mg/Kg)	D05659 (mg/Kg)	%RPD	Actions
calcium	5000	1700	99	Qualify as estimated (J) the positive calcium results in all samples.
copper	100	370	115	Qualify as estimated (J) the positive copper results in all samples.
selenium	0.70	0.37	62	No action; both results <4x reporting limit

Inductively Coupled Plasma Serial Dilution

An ICP serial dilution analysis was performed on sample D05706. The analytes that did not meet the percent difference (%D) validation criterion of 15% for results greater than 50x the MDL and the actions taken are summarized in the following table:

Analyte	**50x MDL (mg/Kg)**	**Sample (mg/Kg)**	**Serial Dilution (mg/Kg)**	**%D**	**Actions**
cadmium	0.08	0.34	0.48	40	Qualify as estimated (J) the positive results in all samples.
potassium	14	2200	2600	18	Qualify as estimated (J) the positive results in all samples.
selenium	0.21	0.76	0.91	19	Qualify as estimated (J) the positive results in all samples.
thallium	0.06	0.15	0.18	23	Qualify as estimated (J) the positive results in all samples.

A serial dilution determination was also performed on sample D05706 for mercury. The %D for this analysis (18%) exceeded the validation criterion of 15% for results greater than 50x the MDL. Although this analysis is not required under the DAS specification, the results were evaluated as an indication of possible matrix interferences. Professional judgment was used to estimate (J) the positive results for mercury in all sediment samples due to serial dilution imprecision.

Sample Quantitation Results

The positive results for the following sediment samples and analytes were qualified as estimated (J) because they were less than the quantitation limit but greater than the MDL.

selenium: D05654, D05659, D05706, D05707
thallium: D05648, D05654, D05659, D05706, D05707

The positive and blank-qualified results for aluminum, barium, calcium, chromium, copper, lead, magnesium, manganese, nickel, sodium and zinc in the equipment blank sample D05662 were qualified by the laboratory as estimated (J and UJ, respectively) because they were less than the quantitation limit but greater than the MDL.

The positive result for mercury in sample D05655 was qualified as estimated (J) due to the low solids content of the sample (<30%).

Performance Evaluation Sample/Accuracy Check

Performance Evaluation Sample

The metals and mercury PE sample D05664 (EPA ampule number MS01661) was evaluated with this SDG. Fourteen analytes were scored "Within Limits" and nine analytes were scored "Not Evaluated." No validation action was necessary on the basis of these results.

Laboratory Control Sample

The recoveries for all analytes in the sediment and aqueous LCS were acceptable. No validation actions were required.

Please contact Ms. Constance Lapite at (781) 224-6628 or at constance.lapite@m-e.com if you have any questions regarding this Tier II validation.

Very truly yours,

Richard Purdy
Data Validator

Elizabeth Denly
Elizabeth Denly
Senior Reviewer

Constance Lapite
Constance Lapite
RAC Lead Chemist

cc: Leslie McVickar, EPA Remedial Project Manager (Data Validation Memorandum, Data Summary Tables)
✓ Elizabeth Denly, TRC Project Chemist (entire package)
Denise Laferte, M&E Oversight Chemist (Data Validation Memorandum, Data Summary Tables)
Richard Purdy, M&E Data Validation Chemist (entire package)
Callahan Mine Project File, Work Assignment No. 161-RICO-017H

Attachments:
IRDA
Table I: Recommendations Summary Table
Table II: Overall Evaluation of Data
Data Summary Tables
Data Validation Worksheets
PE Score Report(s)
Copy of non-CLP Analytical Methods (M&E DAS Specification D-044.2)
Copies of Telephone Logs/Communications Forms
Supporting Data for Reduced Payment Recommendations (not applicable)
Copies of Field Sampling Notes
Copies of EPA-approved Amendments to QAPjP or SAP (not applicable)
CSF Completeness Evidence Audit (DC-2 Form)
DQO Summary Form

Region 1

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 0247m

SITE Callahan Mining

LABORATORY Woods Hole Group

NO. OF SAMPLES/ MATRIX 6 SE, 1 EB, 1 PE

SDG# D0564R - IB

REVIEWER (IF NOT ESD) **Metcalf & Eddy**

SOW# D-044.2 (ILM04.1)

REVIEWER'S NAME **Richard Purdy**

DPO: ACTION ______ FYI **XX** ______

COMPLETION DATE 3/16/05

DATA ASSESSMENT SUMMARY

		ICP-AES	ICP-MS	Hg	CYANIDE
1.	DATA COMPLETENESS		O^3	O	
2.	HOLDING TIMES		O	O	
3.	CALIBRATIONS		O	O	
4.	BLANKS		O^2	O	
5.	ICS		O^2	—	
6.	MATRIX SPIKE		O^1	O	
7.	LABORATORY DUPLICATES		O^1	O	
8.	FIELD DUPLICATES		O^1	O	
9.	LABORATORY CONTROL SAMPLE		O	O	
10.	LABORATORY FORTIFED BLANK		O	O	
11.	SERIAL DILUTION		O^1	O^1	
12.	DETECTION LIMITS		O	O	
13.	SAMPLE QUANTITATION		O	O	
14.	OTHER QC		O	O	
15.	OVERALL ASSESSMENT		O	O	

O = Data had no problems/or qualified due to minor problems.
M = Data qualified due to a major problem.
Z = Data unacceptable.
X = Problems, but do not affect data.

ACTION ITEMS: O^1 – MINOR EXCEEDENCE ; O^2 – MINOR CONTAMINATION
O^3 - MINOR INCOMPLETENESS

AREAS OF CONCERN: ______

NOTABLE PERFORMANCE: ______

Table Ia
Recommendation Summary Table for Low Concentration Metals and Mercury
Callahan Mining Superfund Site
Case 0247M, SDG D05648-IB
Sediment Samples

Analyte	Action	Analyte	Action
aluminum	A	magnesium	A
antimony	J^1 J^2 J^5	manganese	A^1 J^2
arsenic	J^2 J^4	mercury	J^8 J^{10}
barium	A^1	nickel	A^1 J^2
beryllium	J^2	potassium	J^8
cadmium	J^2 J^4 J^8	selenium	J^3 J^8 J^9
calcium	J^6 J^7	silver	J^2
chromium	A^1 J^2 J^4	sodium	A
cobalt	J^2	thallium	J^2 J^8 J^9
copper	J^2 J^7	vanadium	J^2
iron	A	zinc	J^2 J^4
lead	J^2 J^4		

A - Accept all data.

A^1 - Qualify the positive for barium, chromium, manganese, and nickel in all sediment samples as "EB" due to equipment blank contamination.

J^1 - Qualify as estimated (UJ) the nondetect results for antimony in samples D05706 and D05707 due to negative instrument drift.

J^2 - Qualify as estimated (J) the positive results for arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, nickel, silver, thallium, vanadium, and zinc in all sediment samples and for antimony in samples D05648, D05654, D05655, and D05659 due to positive interferences seen in the ICSA solution analyses.

J^3 - Qualify as estimated (J) the positive results for selenium in all sediment samples due to negative interferences seen in the ICSA solution analyses.

J^4 - Qualify the positive results for arsenic, cadmium, chromium, lead, and zinc in all sediment samples as estimated (J) due to high matrix spike recovery.

J^5 - Qualify the positive and nondetect results for antimony in all sediment samples as estimated (J and UJ, respectively) due to low matrix spike recovery.

J^6 - Qualify the positive results for calcium in all sediment samples as estimated (J) due to laboratory duplicate imprecision.

J^7 - Qualify the positive results for calcium and copper in all sediment samples as estimated (J) due to field duplicate imprecision.

J^8 - Qualify the positive results for cadmium, mercury, potassium, selenium, and thallium in all sediment samples as estimated (J) due to serial dilution imprecision.

J^9 - Qualify the positive results for the following samples and analytes as estimated (J) because they were less than the quantitation limit but greater than the MDL.

selenium: D05654, D05659, D05706, D05707
thallium: D05648, D05654, D05659, D05706, D05707

J^{10} - Qualify the positive result for mercury in sample D05655 as estimated (J) due to low solids content.

Table Ib
Recommendation Summary Table for Low Concentration Metals and Mercury
Callahan Mining Superfund Site
Case 0247M, SDG D05648-IB
Aqueous QC Sample

Analyte	Action	Analyte	Action
aluminum	A^2 J^4	magnesium	A^2 J^4
antimony	A^1	manganese	J^4
arsenic	A	mercury	A
barium	J^4	nickel	J^2 J^4
beryllium	A	potassium	A
cadmium	A	selenium	A^1 J^3
calcium	A^2 J^4	silver	A
chromium	J^2 J^4	sodium	A^2 J^4
cobalt	J^1	thallium	A
copper	A^2 J^2 J^4	vanadium	A
iron	A	zinc	A^2 J^2 J^4
lead	A^2 J^2 J^4		

A - Accept all data.

A^1 - Elevate the MDL for the nondetect results for antimony and selenium in sample D05662 to the negative blank action level due to negative instrument drift and laboratory blank contamination.

A^2 - Qualify the positive results for aluminum, calcium, copper, lead, magnesium, sodium, and zinc in sample D05662 as nondetect (U) at the reported concentration due to laboratory blank contamination.

J^1 - Qualify the nondetect result for cobalt in sample D05662 as estimated (UJ) due to negative instrument drift.

J^2 - Qualify the positive and blank-qualified results for chromium, copper, lead, nickel, and zinc in sample D05662 as estimated (J and UJ, respectively) due to positive interferences seen in the ICSA solution analyses.

J^3 - Qualify the nondetect result for selenium in sample D05662 as estimated (UJ) due to negative interferences in the ICSA solution analyses.

J^4 - Qualify the positive and blank-qualified results for aluminum, barium, calcium, chromium, copper, lead, magnesium, manganese, nickel, sodium, and zinc in sample D05662 as estimated (J and UJ, respectively) because they were less than the quantitation limit but greater than the MDL.

Table IIa
Overall Evaluation of Data for Low Concentration Metals and Mercury Analyses
Callahan Mining Superfund Site
Case 0247M, SDG D05648-IB
Sediment Samples

Low Concentration Metals and Mercury					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health and ecological risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: J[1] J[2] J[3] J[4] J[5] J[6] J[8] J[9]	Refer to qualifications in Table I: A[1] J[7] J[10]	Not applicable for Tier II	**Minor Impact on Data Usability (Results usable for project objectives):** The positive results for barium, chromium, manganese, and nickel in all sediment samples were qualified "EB" due to equipment blank contamination. An indeterminate amount of sampling error may have affected these sample results. The results are usable for project objectives. The positive results for calcium and copper in all sediment samples were qualified as estimated (J) due to field duplicate imprecision. The results are usable for project objectives as estimated values with an indeterminate direction of bias. The positive results for arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, nickel, silver, thallium, vanadium, and zinc in all sediment samples and for antimony in samples D05648, D05654, D05655, and D05659 were qualified as estimated (J) due to positive interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations with a possible high bias.

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

Table IIa
Overall Evaluation of Data for Low Concentration Metals and Mercury Analyses
Callahan Mining Superfund Site
Case 0247M, SDG D05648-IB
Sediment Samples

Low Concentration Metals and Mercury					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health and ecological risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: J^1 J^2 J^3 J^4 J^5 J^6 J^8 J^9	Refer to qualifications in Table I: A^1 J^7 J^{10}	Not applicable for Tier II	**Minor Impact on Data Usability (Results usable for project objectives):** The nondetect results for antimony in samples D05706 and D05707 were qualified as estimated (UJ) at the reported MDL due to negative instrument drift. These results are usable for project objectives as estimated quantitation limits with a possible low bias. The positive results for selenium in all sediment samples were qualified as estimated (J) due to negative interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations with a possible low bias. The positive results for arsenic, cadmium, chromium, lead, and zinc in all sediment samples were qualified as estimated (J) due to high matrix spike recovery. The results are usable for project objectives as estimated values that may be biased high.

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

Table IIa
Overall Evaluation of Data for Low Concentration Metals and Mercury Analyses
Callahan Mining Superfund Site
Case 0247M, SDG D05648-IB
Sediment Samples

Low Concentration Metals and Mercury					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health and ecological risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: J^1 J^2 J^3 J^4 J^5 J^6 J^8 J^9	Refer to qualifications in Table I: A^1 J^7 J^{10}	Not applicable for Tier II	**Minor Impact on Data Usability (Results usable for project objectives)**: The positive and nondetect results for antimony in all sediment samples were qualified as estimated (J and UJ, respectively) due to low matrix spike recovery. The results are usable for project objectives as estimated values and quantitation limits that may be biased low. The positive results for calcium in all sediment samples were qualified as estimated (J) due to laboratory duplicate imprecision. The results are usable for project objectives as estimated values with an indeterminate direction of bias. The positive result for mercury in sample D05655 was qualified as estimated (J) due to low solids content. The result is usable for project objectives as an estimated value with an indeterminate direction of bias.

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

Table IIa
Overall Evaluation of Data for Low Concentration Metals and Mercury Analyses
Callahan Mining Superfund Site
Case 0247M, SDG D05648-IB
Sediment Samples

Low Concentration Metals and Mercury					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health and ecological risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: J^1 J^2 J^3 J^4 J^5 J^6 J^8 J^9	Refer to qualifications in Table I: A^1 J^7 J^{10}	Not applicable for Tier II	**Minor Impact on Data Usability (Results usable for project objectives)**: The positive results for cadmium, mercury, potassium, selenium, and thallium in all sediment samples were qualified as estimated (J) due to serial dilution imprecision. The results are usable for project objectives as estimated values with an indeterminate direction of bias. The positive results for the following samples and analytes were qualified as estimated (J) because they were less than the quantitation limit but greater than the MDL. These results are usable for project objectives as estimated concentrations. This qualification has a minor impact on the data usability. selenium: D05654, D05659, D05706, D05707 thallium: D05648, D05654, D05659, D05706, D05707

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

Table IIb
Overall Evaluation of Data for Low Concentration Metals and Mercury Analyses
Callahan Mining Superfund Site
Case 0247M, SDG D05648-IB
Aqueous QC Sample

Low Concentration Metals and Mercury					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health and ecological risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: A^1 A^2 J^1 J^2 J^3 J^4	Refer to qualifications in Table I: None	Not applicable for Tier II	**Minor Impact on Data Usability (Results usable for project objectives):** The positive results for aluminum, calcium, copper, lead, magnesium, sodium, and zinc in sample D05662 were qualified as nondetect (U) at the reported concentration due to laboratory blank contamination. These results are usable for project objectives as nondetect results. The nondetect result for cobalt in sample D05662 was qualified as estimated (UJ) at the reported MDL due to negative instrument drift. This result is usable for project objectives as an estimated quantitation limit with a possible low bias. The nondetect results for antimony and selenium in sample D05662 were elevated to their sample-specific negative blank action levels due to negative instrument drift and blank contamination. These results are usable for project objectives with elevated quantitation limits with a possible low bias.

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

Table IIb
Overall Evaluation of Data for Low Concentration Metals and Mercury Analyses
Callahan Mining Superfund Site
Case 0247M, SDG D05648-IB
Aqueous QC Sample

Low Concentration Metals and Mercury					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability **	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine nature and extent of contamination and to support a human health and ecological risk assessment.	Sampling Method Appropriate - yes Analytical Method Appropriate - yes	Refer to qualifications in Table I: A¹ A² J¹ J² J³ J⁴	Refer to qualifications in Table I: None	Not applicable for Tier II	**Minor Impact on Data Usability (Results usable for project objectives):** The positive and blank-qualified results for chromium, copper, lead, nickel, and zinc in sample D05662 were qualified as estimated (J and UJ, respectively) due to positive interferences seen in the ICSA solution analyses. These results are usable for project objectives as estimated concentrations and quantitation limits with a possible high bias. The nondetect result for selenium in sample D05662 was qualified as estimated (UJ) due to negative interferences seen in the ICSA solution analyses. This result is usable for project objectives as an estimated quantitation limit with a possible low bias. The positive and blank-qualified results for aluminum, barium, calcium, chromium, copper, lead, magnesium, manganese, nickel, sodium, and zinc in sample D05662 were qualified as estimated (J and UJ, respectively) because they were less than the quantitation limit but greater than the MDL. These results are usable for project objectives as estimated concentrations and quantitation limits.

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

SITE: Callahan Mining Superfund Site
CASE NO.: 0247M
SDG NO.: D05648-IB

DATA SUMMARY TABLE
Inorganic Analysis (D-044.2)
Sediment (mg/Kg)

Traffic Report Sample No.		D05648	D05654	D05655	D05659	D05706	D05707
M&E Sample ID		SD-411	SD-420	SD-421	SDE-420	SD-425	SD-426
Lab Sample ID		0412036-01	0412036-02	0412036-09	0412036-04	0412036-07	0412036-08
Date Sampled		12/03/04	12/03/04	12/03/04	12/03/04	12/03/04	12/03/04
% Solids		45.0	73.3	86.8	75.3	54.7	59.6
Comments			FD of D05659	Freeze-Dried *	FD of D05654		
Analyte	RL						
Aluminum	4.0	14000	22000	17000	22000	10000	8600
Antimony	0.15	0.67 J	0.37 J	0.57 J	0.42 J	0.041 UJ	0.035 UJ
Arsenic	0.20	16 J	17 J	23 J	18 J	6.5 J	9.4 J
Barium	2.0	14 EB	30 EB	18 EB	31 EB	16 EB	13 EB
Beryllium	0.040	0.38 J	0.70 J	0.55 J	0.71 J	0.43 J	0.35 J
Cadmium	0.010	10 J	0.80 J	14 J	0.98 J	0.34 J	0.36 J
Calcium	8.0	52000 J	5000 J	3400 J	1700 J	3100 J	26000 J
Chromium	1.0	20 JEB	38 JEB	31 JEB	36 JEB	22 JEB	16 JEB
Cobalt	2.0	5.9 J	15 J	6.1 J	16 J	5.1 J	4.5 J
Copper	1.0	1000 J	100 J	1300 J	370 J	12 J	7.6 J
Iron	4.0	21000	37000	26000	37000	16000	16000
Lead	0.40	200 J	44 J	240 J	35 J	13 J	12 J
Magnesium	10	17000	9300	21000	9500	5700	6000
Manganese	1.0	310 JEB	760 JEB	400 JEB	800 JEB	190 JEB	200 JEB
Mercury	0.010	0.30 J	0.039 J	0.26 J	0.035 J	0.059 J	0.063 J
Nickel	2.0	18 JEB	42 JEB	18 JEB	40 JEB	18 JEB	14 JEB
Potassium	50	2300 J	3200 J	3200 J	3400 J	2200 J	1700 J
Selenium	1.0	2.4 J	0.70 J	4.2 J	0.37 J	0.76 J	0.90 J
Silver	0.020	1.4 J	0.39 J	1.5 J	0.40 J	0.16 J	0.10 J
Sodium	50	13000	3400	21000	3200	7400	7900
Thallium	0.40	0.43 J	0.20 J	0.51 J	0.17 J	0.15 J	0.15 J
Vanadium	1.0	24 J	34 J	32 J	32 J	22 J	19 J
Zinc	2.0	3100 J	540 J	3500 J	570 J	59 J	49 J

* - Freeze-dried for all metals except mercury

SITE: Callahan Mining Superfund Site
CASE NO.: 0247M
SDG NO.: D05648-IB

DATA SUMMARY TABLE
Inorganic Analysis (D-044.2)
Sediment (mg/Kg)

	Traffic Report Sample No.	D05648	D05654	D05655	D05659	D05706	D05707
	M&E Sample ID	SD-411	SD-420	SD-421	SDE-420	SD-425	SD-426
	Lab Sample ID	0412036-01	0412036-02	0412036-09	0412036-04	0412036-07	0412036-08
	Date Sampled	12/03/04	12/03/04	12/03/04	12/03/04	12/03/04	12/03/04
	% Solids	45.0	73.3	86.8	75.3	54.7	59.6
	Comments		FD of D05659	Freeze-Dried *	FD of D05654		
Analyte	RL						
Aluminum	4.0	14000	22000	17000	22000	10000	8600
Antimony	0.15	0.67 J	0.37 J	0.57 J	0.42 J	0.041 UJ	0.035 UJ
Arsenic	0.20	16 J	17 J	23 J	18 J	6.5 J	9.4 J
Barium	2.0	14 EB	30 EB	18 EB	31 EB	16 EB	13 EB
Beryllium	0.040	0.38 J	0.70 J	0.55 J	0.71 J	0.43 J	0.35 J
Cadmium	0.010	10 J	0.80 J	14 J	0.98 J	0.34 J	0.36 J
Calcium	8.0	52000 J	5000 J	3400 J	1700 J	3100 J	26000 J
Chromium	1.0	20 JEB	38 JEB	31 JEB	36 JEB	22 JEB	16 JEB
Cobalt	2.0	5.9 J	15 J	6.1 J	16 J	5.1 J	4.5 J
Copper	1.0	1000 J	100 J	1300 J	370 J	12 J	7.6 J
Iron	4.0	21000	37000	26000	37000	16000	16000
Lead	0.40	200 J	44 J	240 J	35 J	13 J	12 J
Magnesium	10	17000	9300	21000	9500	5700	6000
Manganese	1.0	310 JEB	760 JEB	400 JEB	800 JEB	190 JEB	200 JEB
Mercury	0.010	0.30 J	0.039 J	0.26 J	0.035 J	0.059 J	0.063 J
Nickel	2.0	18 JEB	42 JEB	18 JEB	40 JEB	18 JEB	14 JEB
Potassium	50	2300 J	3200 J	3200 J	3400 J	2200 J	1700 J
Selenium	1.0	2.4 J	0.70 J	4.2 J	0.37 J	0.76 J	0.90 J
Silver	0.020	1.4 J	0.39 J	1.5 J	0.40 J	0.16 J	0.10 J
Sodium	50	13000	3400	21000	3200	7400	7900
Thallium	0.40	0.43 J	0.20 J	0.51 J	0.17 J	0.15 J	0.15 J
Vanadium	1.0	24 J	34 J	32 J	32 J	22 J	19 J
Zinc	2.0	3100 J	540 J	3500 J	570 J	59 J	49 J

* - Freeze-dried for all metals except mercury.
The solids content was 29.9% prior to freeze-drying.

SITE: Callahan Mining Superfund Site
CASE NO.: 0247M
SDG NO.: D05648-IB

DATA SUMMARY TABLE
Inorganic Analysis (D-044.2)
Aqueous QC Sample (ug/L)

	Traffic Report Sample No.	D05662
	M&E Sample ID	RB-002
	Lab Sample ID	0412036-05
	Date Sampled	12/03/04
	Mass/Volume of Sample	25 mL
	Comments	Equipment Blank.
Analyte	RL	
Aluminum	40.0	7.2 UJ
Antimony	1.5	0.28 U
Arsenic	2.0	0.13 U
Barium	20.0	0.21 J
Beryllium	0.40	0.20 U
Cadmium	0.10	0.098 U
Calcium	80.0	18 UJ
Chromium	10.0	0.32 J
Cobalt	20.0	0.038 UJ
Copper	10.0	0.59 UJ
Iron	40.0	18 U
Lead	4.0	0.35 UJ
Magnesium	100	4.6 UJ
Manganese	10.0	7.0 J
Mercury	0.10	0.008 U
Nickel	20.0	0.64 J
Potassium	500	30 U
Selenium	10.0	0.91 UJ
Silver	0.20	0.12 U
Sodium	500	39 UJ
Thallium	4.0	0.026 U
Vanadium	10.0	0.15 U
Zinc	20.0	8.1 UJ

DATA SUMMARY TABLE
DEFINITIONS (Inorganics)

EB - As a qualifier for soil/sediment samples: Analyte is also detected in the equipment blank
FD - Field Duplicate
g - gram
J - The concentration is an estimated quantity
mg/Kg - milligrams per Kilogram
R - The data are rejected as unusable
RL - Reporting Limit
U - Analyte was analyzed for but not detected at the specified reporting limit
ug/L - micrograms per Liter
UJ - The sample quantitation limit is an estimated quantity
NA - Not Applicable

TRC
Customer-Focused Solutions

March 1, 2005

Christine Clark
Regional Sample Control Center
U.S. EPA Region I
11 Technology Drive
North Chelmsford, MA 01863-2431

Subject: Work Assignment No. 161-RICO-017H
Case No. 0247M, SDG D05640_IA
Southwest Research Institute, San Antonio, TX
Callahan Mining Superfund Site, Brooksville, ME
Tier II Inorganic Data Validation

TCO: 19/Sediments/ D05638, D05639, D05640, D05641, D05642, D05643,
D05644, D05645, D05646, D05647, D05649, D05650,
D05651, D05652, D05653, D05656, D05657, D05658,
D05660
(Field duplicate pair: D05656/D05660)

Dear Ms. Clark:

A Tier II validation, in accordance with the *Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Inorganic Analyses*, June 13, 1988 criteria, and incorporating *Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses*, December 1996 criteria, as deemed appropriate, was performed on the inorganic analytical data for 19 sediment samples collected by TRC Environmental Corporation on November 11, 12, 17, and 18, 2004 from the Callahan Mining Superfund Site in Brooksville, ME. All samples were analyzed for total combustible organics (TCO) under the Metcalf & Eddy Remedial Action Contract Delivery of Analytical Services (DAS) program using Metcalf & Eddy's DAS Specification, D-005.1, *Analytical Specification for the Analysis of Total Organic Carbon, Total Combustible Organics, Grain Size, Moisture Content, and pH in Soil, Sediment, and Solids,* June 2001.

In accordance with the EPA-approved project plans for the site, Tier II validation was performed on all samples in this sample delivery group (SDG). The data were evaluated based on the following parameters:

    • Overall Evaluation of Data and Potential Usability Issues
*   • Data Completeness (CSF Audit - Tier I)
    • Holding Times and Sample Preservation
*   • Instrument Calibration

Boott Mills South, Foot of John Street • Lowell, Massachusetts 01852
Telephone 978-970-5600 • Fax 978-453-1995

*	Blanks
NA	ICP Interference Check Sample Results
NA	Matrix Spike (MS) Results
	Laboratory Duplicate Results
*	Field Duplicate Results
*	Laboratory Control Sample (LCS) Results
*	Laboratory Fortified Blank Sample (LFB) Results
NA	Furnace Atomic Absorption Results
NA	ICP Serial Dilution Results
*	Detection Limit Results
NA	Sample Quantitation Results
	Accuracy Check/PE Samples

* - All criteria were met for this parameter.

Note: Worksheets are not included for parameters that have met criteria or parameters that are not applicable (NA) to the method or to Tier II validation.

<u>The following information was used to generate the Data Validation Memorandum attachments:</u>

Table I: Recommendation Summary Table - summarizes validation recommendations
Table II: Overall Evaluation of Data - summarizes site data quality objectives (DQOs) and potential usability issues

Data Summary Tables - summarize accepted, qualified, and rejected data based on the Tier II data validation review.

<u>Overall Evaluation of Data and Potential Usability Issues</u>

- To determine the nature and extent of contamination and to support a human health risk assessment.

All results are usable for project objectives.

Validation actions were not applied as a result of sampling error. The validation actions applied as a result of analytical error are summarized below:

- The positive results for TCO in samples D05649, D05656, D05657, and D05660 were qualified as estimated (J) due to a holding time exceedance. The results are usable for project objectives as estimated values. This qualification has a minor effect on the data usability.

The attached Table I summarizes the Tier II validation recommendations which were based on the following information:

Holding Times and Sample Preservation

The TCO analyses of samples D05649RE, D05656, D05657, and D05660 took place one and two days outside of the required holding time. The positive results for TCO in samples D05649, D05656, D05657, and D05660 were qualified as estimated (J).

Laboratory Duplicate Results

All TCO analyses were performed in duplicate. The relative percent difference (RPD) for TCO was below the acceptance limit of 15 for all samples with the exception of sample D05649 (25.0). The laboratory reanalyzed the sample in duplicate outside of holding time; the reanalysis yielded an acceptable RPD for the duplicate analyses. The TCO result from the reanalysis of sample D05649 was therefore reported. Qualification of the data on the basis of laboratory duplicate results was therefore not required.

Accuracy Check/PE Samples

A soil PE for total organic carbon (TOC) analysis was submitted with this sample group. As all samples had TCO concentrations greater than 1%, TOC analysis was not required. Therefore, this PE sample was not analyzed. It should be noted that PE samples are not available for TCO analysis.

Please contact Ms. Elizabeth Denly at (978) 656-3577 should you have any questions or comments concerning this information.

Very truly yours,

TRC Environmental Corporation

Elizabeth Denly for
Lorie MacKinnon
Data Validator

Elizabeth Denly
Elizabeth Denly
Senior QA Chemist

Tier II Attachments:
1. Table I: Recommendation Summary Table
2. Table II: Overall Evaluation of Data
3. Table III: Tentatively Identified Compound Summary (NA)
4. Data Summary Table
5. IRDA Form
6. Data Validation Worksheets
7. Copy of non-CLP Analytical Method (M&E DAS Specification D-005.1)
8. PE Score Reports (NA)
9. Copies of Telephone Logs/Communication Forms
10. Supporting Data for Reduced Payment Recommendations (NA)
11. Copies of Field Sampling Notes
12. Copies of EPA-approved Amendments to QAPjP or SAP (NA)
13. CSF Audit (DC-2 Form)
14. DQO Summary Form

cc:
Leslie McVickar, EPA Remedial Project Manager (DV memo and data summary table)
Project File
PSAdmin

Attachment 1
Table I: Recommendation Summary Table

Table I
Recommendation Summary
for TCO Analyses
Callahan Mining Superfund Site
Case# 0247M, SDG D05640_IA

Sample Number	Matrix	Qualifiers
D05638	SE	A
D05639	SE	A
D05640	SE	A
D05641	SE	A
D05642	SE	A
D05643	SE	A
D05644	SE	A
D05645	SE	A
D05646	SE	A
D05647	SE	A
D05649	SE	J[1]
D05650	SE	A
D05651	SE	A
D05652	SE	A
D05653	SE	A
D05656	SE	J[1]
D05657	SE	J[1]
D05658	SE	A
D05660	SE	J[1]

SE = Sediment

A	-	Accept the data.
J[1]	-	Estimate (J) the positive result for TCO due to a holding time exceedance.

Attachment 2
Table II: Overall Evaluation of Data

Table II
Overall Evaluation of Data - Data Validation Memorandum
Case 0247M, SDG D05640_IA

TCO					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability**	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine the nature and extent of contamination and to support a human health risk assessment.	Both - Yes	Refer to qualifications in R/S Key: J^1	Refer to qualifications in R/S Key None		- Potential uncertainty exists for the positive results for TCO in samples D05649, D05656, D05657, and D05660 due to a holding time exceedance. **Results discussed above can still be used for project objectives as estimated values. These issues may have a minor impact on the data usability.**

* The evaluation of "sampling error" cannot be completely assessed in data validation.
** Sampling variability is not assessed in data validation.

Attachment 3
Table III: Tentatively Identified Compound Summary

-not applicable to this SDG

Attachment 4
IRDA Form

Region I

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 024714
LABORATORY SWRI
SDG # DO 56490-IA 2/14/05
SOW # Das method D-005.1
DPO:ACTION ____ FYI ✓
SITE Callahan Mining
NO OF SAMPLES/MATRIX 19 Sediment
REVIEWER(IF NOT ESD) TRC
REVIEWER'S NAME Lori Mackinnon
COMPLETION DATE 02/28/05

DATA ASSESSMENT SUMMARY

		ICP	AA	HG	~~CYANIDE~~ TCO
1.	HOLDING TIMES				O
2.	CALIBRATIONS				NA
3.	BLANKS				O
4.	ICS				NA
5.	LCS				O
6.	DUPLICATE ANALYSIS				O
7.	MATRIX SPIKE				NA
8.	MSA				NA
9.	SERIAL DILUTION				NA
10.	SAMPLE VERIFICATION				NA
11.	OTHER QC				O
12.	OVERALL ASSESSMENT				O

O = Data had no problems, or qualified due to minor problems.
M = Data qualified due to major problems.
Z = Data unacceptable.
X = Problems, but do not affect data.

ACTION ITEMS:

AREAS OF CONCERN:

NOTABLE PERFORMANCE:

Validator: Lori Mackinnon

Date: 2/28/05

Attachment 5
Data Summary Tables

DATA SUMMARY TABLE

TCO Analysis (D-005.1)
Sediment Samples
(Units: mg/kg)

Site: Callahan Mining Superfund Site - Brooksville, ME
Case Number 0247M, SDG D05640_IA

Location Name		SD-403	SD-404	SD-407	SD-408	SD-410	SD-412	SD-413	SD-415	SD-416	SD-417
TRC Sample ID		SD-403	SD-404	SD-407	SD-408	SD-410	SD-412	SD-413	SD-415	SD-416	SD-417
Lab Sample ID		255316	255317	255318	255319	255320	255321	255322	255323	255324	255325
DAS Sample ID		D05640	D05641	D05644	D05645	D05647	D05649	D05650	D05651	D05652	D05653
Moisture Content		35.1%	51.1%	43.0%	44.3%	16.0%	25.6%	36.8%	59.9%	34.6%	22.2%
Comments											
Analyte	**QL**										
TCO	100	55328	91448	62780	73632	21777	73482 J	31877	117048	41531	33755
Date Sampled		11/12/04	11/12/04	11/11/04	11/11/04	11/11/04	11/12/04	11/11/04	11/11/04	11/11/04	11/11/04
Date Analyzed		11/23/04	11/23/04	11/23/04	11/23/04	11/23/04	11/28/04	11/23/04	11/23/04	11/23/04	11/23/04

QL - Quantitation Limit
J - Estimated value

Site: Callahan Mining Superfund Site - Brooksville, ME
Case Number 0247M, SDG D05640_IA

DATA SUMMARY TABLE

TCO Analysis (D-005.1)
Sediment Samples
(Units: mg/kg)

Location Name		SD-422	SD-423	SD-422	SD-401	SD-402	SD-405	SD-406	SD-409	SD-424
TRC Sample ID		SD-422	SD-423	SDE-422	SD-401	SD-402	SD-405	SD-406	SD-409	SD-424
Lab Sample ID		255326	255327	255328	255620	255621	255622	255623	255624	255625
DAS Sample ID		D05656	D05657	D05860	D05638	D05639	D05642	D05643	D05646	D05658
Moisture Content		33.7%	58.5%	33.1%	65.1%	38.2%	60.4%	69.5%	38.9%	20.6%
Comments				Field duplicate of D05656						
Analyte	QL									
TCO	100	60854 J	124042 J	62478 J	124279	56233	84771	156326	53639	23679
Date Sampled		11/12/04	11/11/04	11/12/04	11/17/04	11/17/04	11/17/04	11/17/04	11/18/04	11/18/04
Date Analyzed		11/27/04	11/27/04	11/27/04	11/27/04	11/27/04	11/27/04	11/28/04	11/27/04	11/27/04

QL - Quantitation Limit
J - Estimated value

TRC
Customer-Focused Solutions

March 1, 2005

Christine Clark
Regional Sample Control Center
U.S. EPA Region I
11 Technology Drive
North Chelmsford, MA 01863-2431

Subject: Work Assignment No. 161-RICO-017H
Case No. 0247M, SDG D05648_IA
Southwest Research Institute, San Antonio, TX
Callahan Mining Superfund Site, Brooksville, ME
Tier II Inorganic Data Validation

TCO: 6/Sediments/ D05648, D05654, D05655, D05659, D05706, D05707
(Field duplicate pair: D05654/D05659)

Dear Ms. Clark:

A Tier II validation, in accordance with the *Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Inorganic Analyses,* June 13, 1988 criteria, and incorporating *Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996 criteria, as deemed appropriate, was performed on the inorganic analytical data for six sediment samples collected by TRC Environmental Corporation on December 3, 2004 from the Callahan Mining Superfund Site in Brooksville, ME. All samples were analyzed for total combustible organics (TCO) under the Metcalf & Eddy Remedial Action Contract Delivery of Analytical Services (DAS) program using Metcalf & Eddy's DAS Specification, D-005.1, *Analytical Specification for the Analysis of Total Organic Carbon, Total Combustible Organics, Grain Size, Moisture Content, and pH in Soil, Sediment, and Solids,* June 2001.

In accordance with the EPA-approved project plans for the site, Tier II validation was performed on all samples in this sample delivery group (SDG). The data were evaluated based on the following parameters:

- Overall Evaluation of Data and Potential Usability Issues
- * • Data Completeness (CSF Audit - Tier I)
- * • Holding Times and Sample Preservation
- * • Instrument Calibration
- * • Blanks
- NA • ICP Interference Check Sample Results
- NA • Matrix Spike (MS) Results

*	•	Laboratory Duplicate Results
*	•	Field Duplicate Results
*	•	Laboratory Control Sample (LCS) Results
*	•	Laboratory Fortified Blank Sample (LFB) Results
NA	•	Furnace Atomic Absorption Results
NA	•	ICP Serial Dilution Results
*	•	Detection Limit Results
NA	•	Sample Quantitation Results
	•	Accuracy Check/PE Samples

* - All criteria were met for this parameter.

Note: Worksheets are not included for parameters that have met criteria or parameters that are not applicable (NA) to the method or to Tier II validation.

<u>The following information was used to generate the Data Validation Memorandum attachments:</u>

Table I: Recommendation Summary Table - summarizes validation recommendations
Table II: Overall Evaluation of Data - summarizes site data quality objectives (DQOs) and potential usability issues

Data Summary Tables - summarize accepted, qualified, and rejected data based on the Tier II data validation review.

Overall Evaluation of Data and Potential Usability Issues

- To determine the nature and extent of contamination and to support a human health risk assessment.

All results are usable for project objectives. Validation actions were not applied as a result of sampling or analytical error.

<u>The attached Table I summarizes the Tier II validation recommendations which were based on the following information:</u>

Accuracy Check/PE Samples

A soil PE for total organic carbon (TOC) analysis was submitted with this sample group. As all samples had TCO concentrations greater than 1%, TOC analysis was not required. Therefore, this PE sample was not analyzed. It should be noted that PE samples are not available for TCO analysis.

Please contact Ms. Elizabeth Denly at (978) 656-3577 should you have any questions or comments concerning this information.

Very truly yours,

TRC Environmental Corporation

Elizabeth Denly for
Lorie MacKinnon
Data Validator

Elizabeth Denly
Elizabeth Denly
Senior QA Chemist

Tier II Attachments:
1. Table I: Recommendation Summary Table
2. Table II: Overall Evaluation of Data
3. Table III: Tentatively Identified Compound Summary (NA)
4. Data Summary Table
5. IRDA Form
6. Data Validation Worksheets
7. Copy of non-CLP Analytical Method (M&E DAS Specification D-005.1)
8. PE Score Reports (NA)
9. Copies of Telephone Logs/Communication Forms
10. Supporting Data for Reduced Payment Recommendations (NA)
11. Copies of Field Sampling Notes
12. Copies of EPA-approved Amendments to QAPjP or SAP (NA)
13. CSF Audit (DC-2 Form)
14. DQO Summary Form

cc: Leslie McVickar, EPA Remedial Project Manager (DV memo and data summary table)
Project File
PSAdmin

Attachment 1
Table I: Recommendation Summary Table

Table I
Recommendation Summary
for TCO Analyses
Callahan Mining Superfund Site
Case# 0247M, SDG D05648_IA

Sample Number	Matrix	Qualifiers
D05648	SE	A
D05654	SE	A
D05655	SE	A
D05659	SE	A
D05706	SE	A
D05707	SE	A

SE = Sediment

A - Accept results.

Attachment 2
Table II: Overall Evaluation of Data

Table II
Overall Evaluation of Data - Data Validation Memorandum
Case 0247M, SDG D05648_IA

TCO					
DQO	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability**	Potential Usability Issues
		Analytical Error	Sampling Error*		
To determine the nature and extent of contamination and to support a human health risk assessment.	Both - Yes	Refer to qualifications in R/S Key: None	Refer to qualifications in R/S Key None		**Results can be used for project objectives without qualifications.**

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

Attachment 3
Table III: Tentatively Identified Compound Summary

-not applicable to this SDG

Attachment 4
IRDA Form

Region I

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 0247M
SITE Callahan Mining
LABORATORY SWRI
NO OF SAMPLES/MATRIX 6 sediment
SDG # D05648-FA
REVIEWER(IF NOT ESD) TRC
SOW # Das D-005.1
REVIEWER'S NAME Loric MacKinnon
DPO:ACTION ______ FYI ✓
COMPLETION DATE 2/28/05

DATA ASSESSMENT SUMMARY

		ICP	AA	HG	TCO ~~CYANIDE~~
1.	HOLDING TIMES				O
2.	CALIBRATIONS (balance, check oven)				O
3.	BLANKS				O
4.	ICS				NA
5.	LCS				O
6.	DUPLICATE ANALYSIS				O
7.	MATRIX SPIKE				NA
8.	MSA				NA
9.	SERIAL DILUTION				NA
10.	SAMPLE VERIFICATION				NA
11.	OTHER QC				O
12.	OVERALL ASSESSMENT				O

O = Data had no problems, or qualified due to minor problems.
M = Data qualified due to major problems.
Z = Data unacceptable.
X = Problems, but do not affect data.

ACTION ITEMS:

AREAS OF CONCERN:

NOTABLE PERFORMANCE:

Validator: Loni MacKinnon

Date: 02/28/07

Attachment 5
Data Summary Tables

DATA SUMMARY TABLE

TCO Analysis (D-005.1)
Sediment Samples
(Units: mg/kg)

Site: Callahan Mining Superfund Site - Brooksville, ME
Case Number 0247M, SDG D05648_IA

	Location Name	[illegible]	SD-420	SD-421	SD-420	SD-425	SD-426
	TRC Sample ID	[illegible]	SD-420	SD-421	SDD-420	SD-425	SD-426
	Lab Sample ID	256145	256146	256147	256148	256150	256151
	CAS Sample ID	[illegible]	D05654	D05655	D05659	D05706	D05707
	Moisture Content	[illegible]	24.9%	66.6%	25.3%	45.1%	38.1%
	Comments				Field duplicate of D05654		
Analyte	QL						
TCO	100	161785	33585	167679	34495	66801	68507
	Date Sampled	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Date Analyzed	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

QL - Quantitation Limit

Appendix V

Data Usability Analysis

Callahan Mine Data Quality Evaluation

I. Usability of Data for Project Objectives

The 1999 and 2004-2005 data validation reports were evaluated for issues which may impact the potential decision-making process or usability of the data. Out of the total population of 670 individual results for sediment samples, six (0.90 percent) were rejected. Out of the total population of 644 individual results for surface water samples, none were rejected. Out of the total population of 2175 individual results for soil samples, four (0.18 percent) were rejected. Out of the total population of 584 individual results for residential well samples, 10 (1.7 percent) were rejected. In general, the majority of the data (99.1 % for sediment, 100% for surface water, 99.8% for soil, and 98.3 % for residential wells) were usable for project objectives. These percentages met the QAPP criterion of greater than 95% completeness for laboratory data. However, several issues were noted which may affect the decision-making process.

- In the case of high-biased data the listed results exceed one or more of the project action levels by a minimal amount. Caution should be used when using these results for decision-making purposes as the actual results could be lower and below the project action levels. However, in all cases the decision-making process reflects the use of conservative values.

- In the case of low-biased data, the listed results fall below one or more of the project action levels by a minimal amount. Caution should be used when using these results for decision-making purposes as the actual results could be higher and above the project action levels.

- In the case of data with an indeterminate bias, potential uncertainty exists for these results. The listed results are below or above one or more of the project action levels by a minimal amount. Caution should be used when using these results for decision-making purposes.

These issues are discussed below and are grouped by matrix.

A. Sediments

All of the results were deemed usable during validation with the exception of mercury in samples 99-BKSD-23, 99-BKSD-24, 99-BKSD-25, 99-SD-27, 99-SD-35, and 99-SD-37 from the 1999 sampling event due to low matrix spike recovery. These results are not usable for project objectives. Table 1 summarizes other data where the decision-making process may have been impacted by the biases or uncertainty of the data noted during data validation.

Table 1

Potential Biases Associated with Sediment Samples

Sample ID	Analyte(s) Affected	Direction of Bias	Reason for Bias	Project Action Level(s) Affected
1999 Sediment Samples				
99-SD-35	copper	indeterminate	field duplicate variability	(1), (2)
99-SD-37	copper	indeterminate	field duplicate variability	(1), (2)
2004 Sediment Samples				
SD-401	cadmium, copper	high	positive interference (ICSA)	Cd: (1), (2) Cu: (2)
SD-402	arsenic	high	positive interference (ICSA)	(1), (2)
SD-403	arsenic	high	positive interference (ICSA)	(1), (2)
SD-404	arsenic, nickel	high	positive interference (ICSA)	(1)
	silver	high	positive interference (ICSA) and high MS recovery	(2)
SD-405	arsenic	high	positive interference (ICSA)	(1)
	silver	high	positive interference (ICSA) and high MS recovery	(2)
SD-406	zinc	high	positive interference (ICSA)	(1), (2)
SD-407	copper, lead	high	positive interference (ICSA)	(1), (2)

Table 1

Potential Biases Associated with Sediment Samples

Sample ID	Analyte(s) Affected	Direction of Bias	Reason for Bias	Project Action Level(s) Affected
SD-408	arsenic, silver	high	positive interference (ICSA)	As: (1) Ag: (2)
	mercury	low	holding time exceedance	(1)
SD-410	copper, zinc	high	positive interference (ICSA)	Cu: (2) Zn: (1), (2)
SD-412	silver	high	positive interference (ICSA) and high MS recovery	(2)
SD-413	arsenic, nickel	high	positive interference (ICSA)	(1)
	silver	high	positive interference (ICSA) and high MS recovery	(2)
SD-415	arsenic	high	positive interference (ICSA)	(1)
SD-416	arsenic	high	positive interference (ICSA)	(1)
SD-417	arsenic	high	positive interference (ICSA)	(1)
	silver	high	positive interference (ICSA) and high MS recovery	(2)
SD-420	nickel	high	positive interference (ICSA) and equipment blank contamination	(1)
	arsenic	high	positive interference (ICSA) and high MS recovery	(1)
	copper	indeterminate	field duplicate variability	(2)
SDE-420	nickel	high	positive interference (ICSA) and equipment blank contamination	(1)

Table 1

Potential Biases Associated with Sediment Samples

Sample ID	Analyte(s) Affected	Direction of Bias	Reason for Bias	Project Action Level(s) Affected
	arsenic	high	positive interference (ICSA) and high MS recovery	(1)
SD-421	arsenic	high	positive interference (ICSA) and high MS recovery	(1)
SD-422	silver	high	positive interference (ICSA) and high MS recovery	(2)
SDE-422	silver	high	positive interference (ICSA) and high MS recovery	(2)
	mercury	low	holding time exceedance	(1)
SD-423	nickel	high	positive interference (ICSA)	(1)
SD-424	copper	high	positive interference (ICSA)	(2)

(1) NOAA Screening Quick Reference Table for Inorganics in Solids (Freshwater Sediment PEL)
(2) NOAA Screening Quick Reference Table for Inorganics in Solids (Marine Sediment ERL)

B. Residential Wells

All of the results were deemed usable during validation with the exception of dichlorodifluoromethane, chloromethane, bromomethane, chloroethane, and carbon disulfide in samples DWCA-15 and DWCA-10 from the January 2005 sampling event due to low surrogate recoveries. Since these compounds are most likely not contaminants of concern at this site and since MCLs or Maine MEGs do not exist for these compounds, the overall usability of the data was not significantly impacted by these unusable data points. However, Table 2 summarizes data where the decision-making process may have been impacted by the biases or uncertainty of the data noted during data validation.

Table 2

Potential Biases Associated with January 2005 Residential Well Samples

Sample ID	Analyte(s) Affected	Direction of Bias	Reason for Bias	Project Action Level(s) Affected
DWCA-11	lead	indeterminate	field duplicate variability	(1)
DWCA-16	lead	indeterminate	field duplicate variability	(2)
DWCA-18	lead	indeterminate	field duplicate variability	(1), (2)

(1) EPA Maximum Contaminant Levels (MCLs)
(2) Maine Maximum Exposure Guidelines (MEGs)

C. Soil Samples:

All of the results were deemed usable during validation the exception of mercury in samples 99-WRP2-48, 99-BKSS-02, and 99-BKSS-03 from the 1999 sampling event and antimony in sample SS-414 from the 2004 sampling event due to low matrix spike recoveries. Since antimony is most likely not a contaminant of concern at this site, the overall usability of the data was not significantly impacted by this unusable data point. The mercury results in the listed samples are not usable for the achievement of project objectives. In addition, Table 3 summarizes data where the decision-making process may have been impacted by the biases or uncertainty of the data noted during data validation.

Table 3

Potential Biases Associated with Soil Samples

Sample ID	Analyte(s) Affected	Direction of Bias	Reason for Bias	Project Action Level(s) Affected
1999 Soil Samples				
99-SS-44	copper	indeterminate	field duplicate variability	(1), (2)
99-TPD-11	copper	indeterminate	field duplicate variability	(1), (2)
99-TPL-16	copper	indeterminate	field duplicate variability	(1)
99-TPL-17	copper	indeterminate	field duplicate variability	(1), (2)
99-TPL-18	copper	indeterminate	field duplicate variability	(1), (2)
99-WRP-20	copper	indeterminate	field duplicate variability	(2)
99-WRP2-48	copper	indeterminate	field duplicate variability	(1), (2)
2004 Surface Soil Samples				
SS-401	copper	indeterminate	positive interference (ICSA) and serial dilution imprecision	(1), (2)
	lead	high	positive interference (ICSA)	(1)
	vanadium	high	positive interference (ICSA)	(2)

Table 3

Potential Biases Associated with Soil Samples

Sample ID	Analyte(s) Affected	Direction of Bias	Reason for Bias	Project Action Level(s) Affected
			and high MS recovery	
SSE-401	copper	indeterminate	positive interference (ICSA) and serial dilution imprecision	(1), (2)
	lead	high	positive interference (ICSA)	(1)
SS-402	lead	high	positive interference (ICSA)	(1)
	cadmium	indeterminate	serial dilution and laboratory duplicate imprecision	(1)
SS-403	cadmium	indeterminate	serial dilution and laboratory duplicate imprecision	(1)
SS-404	copper	indeterminate	positive interference (ICSA) and serial dilution imprecision	(1), (2)
SS-405	vanadium	high	positive interference (ICSA) and high MS recovery	(2)
SS-406	copper	high	positive interference (ICSA)	(2)
SS-408	antimony	indeterminate	low MS recovery and laboratory duplicate imprecision	(2)
SS-409	lead	high	positive interference (ICSA)	(1)
	thallium	high	positive interference (ICSA)	(2)
SS-410	lead	high	positive interference (ICSA)	(1)
	cadmium	indeterminate	positive interference (ICSA) and serial dilution and laboratory duplicate	(1)

Table 3

Potential Biases Associated with Soil Samples

Sample ID	Analyte(s) Affected	Direction of Bias	Reason for Bias	Project Action Level(s) Affected
			imprecision	
	thallium	indeterminate	serial dilution imprecision	(2)
SS-411	thallium	indeterminate	high recovery in calibration standard, positive interference (ICSA), and serial dilution imprecision	(2)
SS-413	thallium	indeterminate	positive interference (ICSA) and serial dilution imprecision	(2)
	cadmium	indeterminate	positive interference (ICSA) and serial dilution and laboratory duplicate imprecision	(1)
SS-414	selenium	low	negative interference (ICSA)	(2)
SS-415	antimony	indeterminate	positive interference (ICSA) and laboratory duplicate imprecision	(2)
	cadmium	indeterminate	serial dilution and laboratory duplicate imprecision	(1)
	mercury	indeterminate	serial dilution imprecision	(2)
SS-416	thallium	indeterminate	positive interference (ICSA) and serial dilution imprecision	(2)
	cadmium	indeterminate	serial dilution and laboratory duplicate imprecision	(2)

Table 3

Potential Biases Associated with Soil Samples

Sample ID	Analyte(s) Affected	Direction of Bias	Reason for Bias	Project Action Level(s) Affected
	zinc	indeterminate	serial dilution imprecision	(1)
SS-417	lead	high	positive interference (ICSA)	(1)
	thallium	indeterminate	serial dilution imprecision	(2)
	cadmium	indeterminate	laboratory duplicate imprecision	(1)
SS-419	arsenic	high	positive interference (ICSA) and high recovery in PE	(1)
SS-420	arsenic	high	positive interference (ICSA) and high recovery in PE	(1)
SS-421	arsenic	high	positive interference (ICSA) and high recovery in PE	(1)
SS-422	arsenic	high	positive interference (ICSA) and high recovery in PE	(1)
SS-423	arsenic	high	positive interference (ICSA) and high recovery in PE	(2)
SS-424	arsenic	high	positive interference (ICSA) and high recovery in PE	(2)
SS-426	vanadium	high	positive interference (ICSA)	(2)
SS-428	arsenic	high	positive interference (ICSA) and high recovery in PE	(1)
SS-429	arsenic	high	positive interference (ICSA) and high recovery in PE	(1)
SS-430	arsenic	high	positive interference (ICSA) and high recovery in PE	(1)

Table 3

Potential Biases Associated with Soil Samples

Sample ID	Analyte(s) Affected	Direction of Bias	Reason for Bias	Project Action Level(s) Affected

(1) Maine Remedial Action Goals (Residential Guideline), May 1997
(2) EPA Region IX PRGs for Residential Soil, October 2004

D. Surface Water:

All of the results were deemed usable during validation. However, the Table 4 summarizes data where the decision-making process may have been impacted by the biases or uncertainty of the data noted during data validation.

Table 4

Potential Biases Associated with Surface Water Samples

Sample ID	Analyte(s) Affected	Direction of Bias	Reason for Bias	Project Action Level(s) Affected
1999 Surface Water Samples				
99-SW-32	lead	high	high CRDL standard recovery	(1)
99-SW-34	lead	high	high CRDL standard recovery	(1)
99-SW-36	lead	high	high CRDL standard recovery	(1)
99-SW-40	lead	high	high CRDL standard recovery	(1)
99-SW-42	copper	low	low CRDL standard recovery	(2)
	zinc	high	high CCV recovery	(2)
99-SW-49	copper	low	low CRDL standard recovery	(2)
	zinc	high	high CCV recovery	(2)
2004 Surface Water Samples				
SW-403	iron	indeterminate	field duplicate variability	(1)
SW-405	lead	indeterminate	field duplicate variability	(1)
SWF-405	copper	high	high CRDL standard and PE	(2)

Table 4

Potential Biases Associated with Surface Water Samples

Sample ID	Analyte(s) Affected	Direction of Bias	Reason for Bias	Project Action Level(s) Affected
			recovery	
SW-406	aluminum, lead	indeterminate	field duplicate variability	(1)
SW-407	nickel	high	high CRDL standard recovery	(1)
	copper	indeterminate	high recovery in PE and field duplicate variability	(1)
	aluminum, lead	indeterminate	field duplicate variability	(1)
SWF-407	nickel	high	high CRDL standard recovery	(2)
	copper	high	high recovery in PE	(2)
SW-411	zinc	high	positive interference (ICSA) and high recovery in PE	(1)
SWE-411	zinc	high	positive interference (ICSA) and high recovery in PE	(1)
	copper	high	high recovery in PE	(1)
SWF-411	zinc	high	positive interference (ICSA) and high recovery in PE	(1)
SWFE-411	copper	high	high recovery in PE	(1)
	zinc	high	positive interference (ICSA) and high recovery in PE	(1)
SW-414	nickel	high	high CRDL standard recovery	(1)
	copper	indeterminate	high recovery in PE and field duplicate variability	(1)

Table 4

Potential Biases Associated with Surface Water Samples

Sample ID	Analyte(s) Affected	Direction of Bias	Reason for Bias	Project Action Level(s) Affected
	aluminum, lead	indeterminate	field duplicate variability	(1)
SWF-414	nickel	high	high CRDL standard recovery	(2)
	copper	high	high recovery in PE	(2)
SW-415	copper	high	high recovery in PE	(1)
SWF-415	nickel	high	high CRDL standard recovery	(2)
	copper	high	high CRDL standard and PE recovery	(2)
SW-424	aluminum, lead	indeterminate	field duplicate variability	(1)
SWF-424	copper	high	high recovery in PE	(1)

(1) National Recommended Water Quality Criteria for Priority Toxic Pollutants (Freshwater CCC), April 1999
(2) National Recommended Water Quality Criteria for Priority Toxic Pollutants (Saltwater CCC), April 1999

II. Analytical Method Deviations for the 2004-2005 Sampling Events

The analytical methods used by the laboratories during the 2004-2005 sampling events were as stated in the *Quality Assurance Project Plan for Remedial Investigation/Feasability Study,Draft,Callahan Mining Superfund Site, Brooksville, Maine,* October 2004 with one exception. A different analytical method was used for the analysis of metals in residential well samples. Due to laboratory capacity issues during the January 2005 sampling event, the metals (minus mercury) analyses of the residential well samples were performed using the EPA Contract Laboratory Program (CLP) Statement of Work (SOW) ILM05.3 with a Flex Clause Modification which included lower reporting limits and the requirement for the laboratory to analyze a laboratory fortified blank at the reporting limit. This was in lieu of using the Delivery of Services (DAS) Analytical Specification D-004.1, as specified in the QAPP. This method change did not affect the project objectives or usability of the data as the method which was utilized was modified to ensure that the low reporting limits were achieved and to contain the same level of quality control as the planned method.

The analytical methods were followed as written in the DAS Analytical Specifications (included in the October 2004 QAPP) and EPA CLP SOWs with the exceptions listed in Table 5. It should be noted that these exceptions were approved prior to the onset of the program and did not affect the quality of data or the achievement of project objectives. No other modifications to the methods were noted during the data validation process.

Table 5

Summary of Analytical Method Deviations for 2004-2005 Sampling Events

Matrix and Methods	Laboratory Deviations From Stated Methods
Surface Water: Metals: D-137	(1) Arsenic and selenium were determined by hydride AA instead of hydride ICP/MS. (2) Remaining metals digested according to ILM04.1 procedures instead of chelate extraction used for select metals. (3) LFB and CRDL recovery limits expanded to 50-150% from 70-130% for analytes with reporting limits less than 5 ug/L.
Surface Soil: Metals: D-044.2 VOCs & SVOCs: OLM04.3	No deviations were noted.
Residential Well: Metals: ILM05.3 Flex Clause 1194.1 Hg: D-004.1 VOCs: OLC03.2	No deviations were noted.
Sediment: Metals: D-044.2 TCO & Grain Size: D-005.1	No deviations were noted.