Reference 17

QUALITY ASSURANCE PROJECT PLAN

FOR

FILE

CALLAHAN MINE, BROOKSVILLE
SAMPLING EVENT
for the
EXPANDED SITE INSPECTION REPORT

CERCLIS ID NO. MED980524128

prepared for

United States Environmental Protection Agency
Region 1
Technical Support and Site Assessment Section

by:

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Bureau of Remediation and Waste Management
Division of Remediation
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1.0 INTRODUCTION

1.1 Project Organization

On October 5-7, 1999, MEDEP staff will conduct sampling at the Callhan Mine site located in Brooksville, Maine. Samples for this project will be collected from waste sources, surface water and sediments. Data collected during this sampling event will be used by the MEDEP Project Manager to prepare an Expanded Site Inspection (ESI) Report and a Hazard Ranking System (HRS) package. EPA personnel will use the data to make decisions regarding listing the site on the National Priorities List (NPL).

Data for this sampling event will be generated both in the field and at the State of Maine Department of Human Services Health and Environmental Testing Laboratory (HETL). The team geologists will collect field data including: soil/sediment classification, GPS locations and sample depths. Field data will be recorded in the geologist's field books. Samples submitted to the HETL will be analyzed for metals (Pb, Cd, Cu, Se, Hg, Zn, Ag), % solids, and sieve size analysis.

Six MEDEP staff, divided into two teams, will conduct sampling activities for this event. The teams will include a team leader, a geologist and a safety coordinator. The team leader will direct sampling activities, and choose sample locations. The safety coordinator will be responsible for the team's safety while onsite, collecting samples and will ensure equipment is inspected and deconed properly. The team geologist will classify sediment or soil types, maintain chain of custody for samples and record data collected in the field. Samples collected will be submitted to the State of Maine Department of Human Services Health and Environmental Laboratory (HETL) for chemical analysis

This QAPP will be reviewed and approved by the MEDEP Division of Remediation Quality Assurance Coordinator (QAC) prior to submittal to EPA. The EPA HRS Coordinator will review and approve this QAPP prior to its implementation. Any questions or comments should be directed to the Project Manager, Jean Firth, at 207-287-7716.

1.2 Project Goals and Data Use

The goal of this sampling event is to collect sufficient data of acceptable quality to use in developing an HRS score for the site. Activities will be conducted in accordance with the HRS Rule 40CFR Part 300 Appendix A, under the authority of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA).

2.0 BACKGROUND INFORMATION

2.1 Site Description

The Callahan Mine Site (Site) is located approximately 1000 feet east and southeast of Harborside Village in the Town of Brooksville, Maine (Latitude N 44° 20' 53"; Longitude W 68° 48' 22"). The mining operation and facilities were developed adjacent to and beneath the Goose Pond tidal estuary (7:pp3-4). The Callahan Mine was operated as a open-pit zinc/copper mine and was perhaps the only inter tidal mine in the world at the time of it's operation (8:p1).

The approximately 150-acre Site is located in a coastal rural setting on the Cape Rosier peninsula. The Site property abuts and extends into Goose Pond Estuary to the east, and private properties to the south, west, and north. The developed portion of the Site extends about 5,000 feet south-southeast from the Goose Falls Road, and approximately 1000 to 1500 feet west from Goose Pond Estuary. The Holbrook Island Sanctuary, a State owned nature preserve, is located on the east shore of the estuary opposite the Site (26).

The developed portion of the Site includes the following areas associated with the operation of the Callahan Mine.

- Tailings Pond:

  Located in the southern portion of the Site, the 11 acre tailings pond received waste rock materials and residual chemical reagents discarded during the ore-milling process. During mining operations, fresh water was retained behind a dam adjacent to the tailings pond and diverted to Weir Cove via a canal dug by the mining company. At that time, no apparent controls were installed to prevent leaching of metals and residual chemicals from the tailings pond area to the fresh water canal and Weir Cove (7:pp4, 5, 6, 10-13).

- Waste Rock Dumps:

  Located in the southern to central portion of the Site, the dumps consist of approximately 5-million tons of non-metal bearing waste rock removed from the mine to access the ore-bearing rock. Approximately 200,000 tons of marine clay removed from the open-pit mine after a mud slide is reportedly deposited on the lower portion of the rock dumps (7:p5, 14, 15).

- Dyer Cove:

  A shallow cove within the central-west portion of Goose Pond Estuary. During operation the cove was separated from the open pit mine by a causeway (25). Dyer Cove was used as a settling pond for water pumped from the open-pit while the mine was operational. In 1986, elevated levels of zinc and copper were found in the sediments. (7:p15).

- Goose Cove:

  Goose Cove, a salt water cove, was connected to Goose Pond prior to development of the mine by a tidal influenced reversing falls (Goose Falls). A dam was constructed at the tidal entrance to Goose Pond to prevent intrusion of salt water during mining operations. The dam was removed some time after 1978 (7:p4). Initially, water containing rock flour and silt was pumped directly from the mine-pit to Goose Cove. Due to excess siltation of Goose Cove, a settling pond (Dyer Cove) was constructed to receive water pumped from the mine prior to discharge to Goose Cove (7:p15, 17, 16).

- Open Pit Mine:

  Located in the northwest corner of Goose Pond, the roughly circular, 600-foot diameter by 320-foot deep, pit was allowed to fill with water after mining operations ceased. Between 1968 and 1972 approximately 5-million tons of non-metal bearing and 800,000 tons of ore-bearing rock ~~was~~ removed from the mine(7:pp5, 18).

- Relict facility buildings and structures:

  A pump house, metal shop building, foundations of the former assay laboratory, a concentration mill, and a primary crusher are located southwest of Dyer Cove. A powder magazine is located in the area between the tailings pond and the waste rock dumps. Four abandoned underground storage tanks were removed from the vicinity of the metal shop building in 1987 (7:p19).

2.1.2 Mining History and Operations

Limited underground mining was performed in the vicinity of the Site from the late 1800's through the 1900's. The Site was operated by the Callahan Mining Corporation as an open-pit mine from 1968 through 1972 (7:pp2-5).

As part of the development of open-pit mining operations, Callahan dammed both the fresh and salt water inlets to the estuary and drained Goose Pond Estuary. The fresh water stream that originally entered the estuary from the south was diverted, via a dug canal, southeast to Weir Cove (fig. 1) (7:p4). Approximately two-thirds of the mine was located in an area beneath the original extent of Goose Pond Estuary. At the time mining operations ceased, the mine consisted of a roughly circular open pit approximately 600 feet in diameter and 320 feet deep (7:p5). Roughly 5 million tons of non-metal bearing waste rock and 798,000 tons of ore-bearing rock were removed from the ground during the mining process (7:p5).

Ore-bearing rock (consisting primarily of sphalerite (ZnS), chalcopyrite ($CuFeS_2$) and minor occurrences of galena (PbS), was processed at an on-site separation mill prior to shipment to smelting facilities. The milling processing included crushing the rock into a fine sand to silt, then separating the ore concentrate from waste rock material using

flotation cells. Approximately 18% of ore-bearing rock processed was recovered as copper/lead and zinc ore concentrates. Waste rock materials (the remaining 82% of processed rock) and residues of chemical reagents used in the flotation cells were discharged to the tailings pond (7:pp5, 11). Based on a review of Material Safety Data Sheets (MSDS), chemical compounds used in the flotation cell process included (7:(A)D):

- dithiophosphate salts;
- aryl phosphorodithioate.
- cyclohexanol; and
- cresol

Sediment laden water containing high concentrations of metals was pumped from the mine-pit and discharged directly to Goose Cove during the initial phases of the mining operations. Due to excess siltation of Goose Cove, Dyer Cove was 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 (7:p15).

2.1.3 Reclamation History

Mining and milling operations ceased in June of 1972 and a reclamation program was begun which included the following (7:pp6-9):

- draining of surface water from the tailings pond and seeding surface;
- grading, seeding and planting of the waste piles;
- removal of the fresh water dam;
- flooding of the 320 foot deep open-pit mine by opening the sluice boards in the salt water (Goose Falls) dam.

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 (7:p7, 8). During this period restricted tidal flow into Goose Pond was maintained by the dam located at the tidal entrance to the pond. No other operations have been located at the site since 1980 (7:p7).

Permission for removal of the remaining portion of the dam was issued by the Maine DEP in 1987 to allow unrestricted tidal flow into the pond as occurred prior to the development of the mine (7:p17).

2.1.4 Previous Environmental Studies (1967 - 1986)

Several studies have been conducted by State and federal agencies to assess the environmental impact of mining operations in the vicinity of Goose Pond. A brief summary of these studies are included in the following paragraphs.

Investigations included the assessment of metal concentrations in groundwater, sea water, benthic marine flora/fauna, and sediments. Investigations conducted from 1967, prior to the beginning of full operations at the mine, through 1979 concluded that mining operations had a major and significant effect on metal concentrations in bottom sediments, rockweed, and softshell clams in Goose Cove (4; 8).

Record high concentrations of Mn, Cd, Cr, Ni, Zn, Pb, Fe, and Co for Atlantic Coast soft shell clams were detected at Goose Cove sampling stations under direct influence of effluents of the Callahan Mine (6:p7). During operation of the mine, sea water samples collected up to one mile from the mine effluent discharge point in Goose Cove contained metal concentrations at levels toxic to uni-cellular algae (6:p9).

Sampling conducted several years after the mining operation had ceased indicated metal contamination was contained near the source area (i.e. Goose Pond Estuary, Dyer Cove, and Goose Cove) and declined markedly away from the source. Many marine species were living with no obvious ill effects in high metal sediments in Goose Cove (8:p4, 5).

There have been isolated occurrences of ~~excessive~~ elevated lead concentrations in wells located in the area, however, sampling of drinking water wells have detected metals below Maximum Contaminat Levels (MCL's).

Several seeps were identified and sampled at the base of the tailings pond as part of an 1986 environmental site assessment (7:p13). Zinc, Pb, and Cd were detected in water samples collected from the seeps. Analyses of sediment samples collected from Dyer Cove (settling pond) and Goose Cove were reported with maximum concentrations of the following metals: Cu, 3760 ppm; Zn, 8600 ppm; Pb, 740 ppm; and Cd, 33 ppm (7:p15).

The 1986 site assessment identified four abandoned underground storage tanks in the area of the former metal shop building (7:p2). Removal of the tanks was required by State regulations. The tanks were removed in 1987 (7:p19).

2.1.5 MEDEP Site Investigation (SI) and Monitoring Program (1986 - 1991)

The MEDEP completed an initial SI package on the Site in 1987. Sampling associated with the SI package was performed in 1986 and included water samples collected from the following locations (17):

- seeps at the base of the tailings pond (Seep #1 & Seep #2);
- a seep at the head of Dyer Cove, downgradient of the facilities' former operations buildings and USTs.

- six (6) overburden and bedrock residential drinking water wells located within approximately one mile of the Site and one (1) on-site well;
- Goose Pond Estuary;
- Weir Cove Ditch; and
- Shallow Surface water located on the top of the tailings pond.

The DEP continued sampling the tailings pond seeps, Dyer Cove seep, and four of the residential drinking water wells through 1991 as part of a monitoring program. Selection of the drinking water wells included in the monitoring program was based on the presence of metals reported from the SI samples. A summary of the analytical results associated with the SI and monitoring program are provided in Appendix 1 (31). Detected parameters are discussed briefly in the following paragraphs.

Metals

The following parameters were detected in samples collected between 1986 and 1991:

- cadmium (Cd) was consistently detected in samples collected at the two tailings pond seeps (Seep #1 & #2, water) and the Dyer Cove Seep;
- cadmium (Cd) was detected in a water sample collected directly from Goose Pond Estuary in 1987;
- lead (Pb) was detected in a water sample collected at Seep #1 in 1987; and
- zinc (Zn) was detected in a water sample collected at Seep #2 and Dyer Cove Seep in 1986 and all three seeps in 1990 and 1991;

Volatile Organic Compounds (VOCs)

Low concentrations of VOCs were detected at Seep #2 in 1986 (1,1,1-trichloroethane, toluene, ethyl benzene, xylene) and 1990 (butane thiol).

Semi-Volatile Organic Compounds (SVOCs)

The semi-volatile organic compounds (SVOCs), o,o,-diethyl-s-ethyl phosphorothioate and o,o,-diethyl-s-methyl phosphorothioate were detected in Seep #1 from 1986 to 1991, in Seep #2 from 1987 to 1991, and in Dyer Cove Seep in 1991. Trace concentrations of o,o,-diethyl phosphorodithioic acid were detected in each seep in 1991. Dioctyl adipate and dioctyl pthalate were detected at the Dyer Cove Seep in 1986 (31).

2.1.6 Pertinent Regulatory History

In 1980, the Goose Pond Reclamation Society (GPRS) received approval from the MEDEP to remove the remainder of the dam located at the tidal entrance to Goose Pond Estuary, and to dredge Goose Pond Cove (Goose Pond). The approval was not acted on and reapplication for the same projects was submitted to the MEDEP in 1987. Approval for the removal of the dam was granted; however, the MEDEP indicated that thorough sampling and analysis of sediments within the pond would be required prior to any approval for dredging (7:p17, 18). Other attempts to gain approval to dredge Goose Cove were denied by State authorities to prevent mobilization of metals and further impacts to the marine environment (7:p15, 16).

The four underground storage tanks located in the vicinity of the metal shop building were removed in 1987 (32). No indication of releases or contaminated soil were observed during the tank removals (31).

2.2 WASTE SOURCE SAMPLING

There are two sources on this site. 1) The tailings pond located in the south east of the site, and 2) the waste rock dump which takes up most of the rest of the site (fig. 2) (25).

TABLE 1
Potential Sources
Callahan Mine Site, Brooksville

Source	Containment	Hazardous Substance	Evidence
Waste Rock Pile	none	Metals, VOCs	ref. 11, 18
Tailings Pond	none	Metals, VOCs	ref. 11, 18

Since 1986 the DEP has been sampling at the Callahan Mine Site. Locations regularly sampled include the tailings Pond and several seep locations. The seep areas are considered soil contamination/ source samples for this report. A summary of data from 1986 to 1991 can be found in Appendix 1 (31).

In September 1994 personnel from the DEP conducted a sampling round for the SIP report. Data from the sources for this event is listed in the following tables (10; 11; 18).

TABLE 2

Metals Results SIP Sampling 9-8-94

Sample #	location	AS	AG	BA	CD	CR	CU	NI	PB	SE	ZN
02236	TP Soil#1	54	2.7	24	20	25	670	20	560	6	15000
02235	TP Soil#2	55	3.4	36	32	16	1900	12	510	9	17000
02230	SM Soil#3	100	70	3	150	26	110000	30	9100	77	18000
02226	TPS#1 SED#6A	27	12	50	28	38	1500	39	550	4	15000
02225	TPS#2 SED#7A	270	1	230	170	30	1600	250	760	7	58000

All metal sample #'s have a prefix of 94E-DIN TP - Tailings Pond SM - Separation Mill
TPS - Tailings Pond Seep Results reported in PPM

TABLE 3
VOC Results SIP Sampling 9-8-84

Sample #	Location	Acetone	DCM	11TBE	TMO	DEB	34DTH
03396	trip blank						
03387	TP Soil #1						
03312	TP Soil #2	0.033				J1.27	J0.10
03389	SM Soil #3	0.017	0.056				

TP - Tailings Pond SM - Separation Mill
DEP - Di(2 ethylhexyl) Phthalate 11TBE - 1,1 Thiobisethane TMO - Trimethyloxepane
TPS - Tailings Pond Seep 34DTH - 3,4 DithiohexaneDEB - Diethylbenzene
DC - Dyer Cove DCM - Dichloromethane
All organic sample #'s have a prefix of 94E-DOR Results reported in PPM

2.3 SURFACE WATER PATHWAY

2.3.1 Hydrologic Setting

The topography of the site is relatively steep. The waste rock pile which dominates the site is over 200 feet in elevation from the estuary (25; 26). Surface run-off is primarily toward Goose Pond Estuary, with multiple probable points of entry (PPEs).

The estuary was drained for the development of the mine (3:p174). After the mine was abandoned the dam which controlled flow in the estuary was removed and the estuary was flooded again (7:p4-7). Currently, the abandoned mine pit is located in the estuary as well as the former settling pond, which is now called Dyer Cove (7:pp7, 15;25).

The fifteen mile surface water pathway begins in Goose Pond Estuary, which is approximately 1.25 miles long. The remainder of the surface water pathway is in the Atlantic Ocean (fig. 4) (26). The entire surface water pathway is in salt water.

2.3.2 Surface Water Targets

The surface water pathway for the Callahan Mine site is considered a fishery for mackerel, shag, alewives, Atlantic Salmon, scallops, and lobsters (27; 34). As of 1968 clams were harvested from Weir Cove and marketed. Weir Cove is influenced tidally by Goose Pond (4:p14). A 1993 report by the Maine Marine Environmental Monitoring Program shows that there are elevated levels of cadmium, lead, and zinc in blue mussels collected from Goose Cove (33:p7).

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 (7:p7, 8).

There are over 100 sensitive environments located within the surface water pathway (Appendix 2) (12; 13). Most are State designated sensitive habitats for seabird nesting and feeding. Also, 11 bald eagle nests are located within fifteen miles of the site (12; 13).

The closest eagle nest is located approximately 0.25 miles north of the site in the Holbrook Island Sanctuary (12:p8map6). These eagles would use Goose Pond Estuary as part of its habitat (23).
There are over 25 miles of vegetated wetland located within a 7 mile radius of the site mostly onisland and mainland shore frontage (15). One wetland, a paulstrine/scrub-shrub/evergreen/saturated/acid, is located within the area of surface water contamination (10:p2; 15).

2.3.4 Surface Water Pathway Sampling and Analysis

Samples have been collected from the surface water pathway near the Callahan Mine site since the beginning of the Mine's operation in 1968 (7:(A)ApII-282). The DEP periodically sampled several seeps which flow into Goose Pond (Appendix 2). The most recent sampling was done in 1994. Sample results are listed on Tables 5 and 6 showing elevated levels of metals and VOCs.

TABLE 5
Metals Results Callahan Mine, Brooksville
SIP Samples September 8, 1994

Sample #	location	AS	AG	BA	CD	CR	CU	NI	PB	SE	ZN
02232	DCS Sed#4	14	0.6	55	3.6	32	990	35	210	ND	2600
02229	DCS D Sed#5	23	0.7	110	4.9	40	660	40	260	ND	4000
02228	TPS#1 SED#6	36	2.9	64	33	45	970	35	550	ND	16000
02227	TPS#2 SED#7	56	5.8	64	43	41	1400	35	1500	6	22000
02233	DC SED#8	22	2.9	70	11	40	2200	34	400	ND	6200
02237	bk HSC SED#9	17	ND.2	2	ND	21	45	29	12	ND4	54
02224	bk HSC SED#10	10	ND.1	21	ND	15	11	22	10	ND4	41
02234	bk GP SED#11	8	ND.2	69	0.8	34	28	26	36	ND2	110

Results reported in PPM All metal sample #'s have a prefix of 94E-DIN
GP - Goose Pond TPS - Tailings Pond Seep TP - Tailings Pond BK - background
SM - Separation Mill DCS - Dyer Cove Seep DC - Dyer Cove HSC - Horse Shoe Cove

TABLE 6
Volatile Organic Analysis Results
Callahan Mine, Brooksville SIP Samples September 8, 1994

Sample #	Location	Acetone	DCM	11TBE	TMO	DEB	34DTH
03390	DCS SED 4		0.32				
03391	DCS D SED 5	0.032	0.039				
03388	TPS #1 SED 6	0.033	0.075	J2	J0.035		
03395	TPS #2 SED 7						
03392	Bk HSC SED 9						

All organic sample #'s have a prefix of 94E-DOR
TP - Tailings Pond BK - background TMO - Trimethyloxepane
SM - Separation Mill HSC - Horse Shoe Cove DEB - Diethylbenzene
DCS - Dyer Cove Seep DEP - Di(2 ethylhexyl) Phthalate 11TBE - 1,1 Thiobisethane
TPS - Tailings Pond Seep 34DTH - 3,4 Dithiohexane
DC - Dyer Cove DCM - Dichloromethane

TABLE 7
ABN Results Callahan Mine, Brooksville
SIP Samples September 8, 1994

Sample #	Location	BBP	DEP	Pyrene	Phen
03403	TP Soil 1				
03401	TP Soil 2	0.11			
03400	SM Soil 3	0.13			
03397	TPS #2 SED 7	0.19	14.65		
03406	DCS D SED 5	0.20	4.63		
03405	DCS SED 4	0.10	0.43	J0.10	
03398	TPS #1 SED 6		0.74		
03404	BK HSC SED 9	0.11	3.45	0.39	J0.10

All organic sample #'s have a prefix of 94E-DOR

TP - Tailings Pond
SM - Separation Mill
DCS - Dyer Cove Seep
TPS - Tailings Pond Seep
DC - Dyer Cove

BK - background
BBP - Butyl Benzyl Phthalate
DEP - Di(2 ethylhexyl) Phthalate
Phen - Penanthrene
HSC - Horse Shoe Cove

2.3.5 Surface Water Pathway Conclusions

Goose Pond Estuary, located adjacent to the site, has been impacted by contaminants from the site. No drinking water intakes are located along the surface water pathway; however, there are over a hundred sensitive environments in this area. A bald eagle nest is located less than 0.25 miles from the site. Fisheries in Goose Cove have been directly impacted by contamination from the site.

3.0 PROJECT DESCRIPTION

3.1 Waste Source Sampling

On October 5-6, 1999, MEDEP staff will be onsite at the Callahan Mine in Brooksville to collect waste source and sediment samples. There are four potential waste sources onsite, one surface impoundment, an area of contaminated soil and two piles. Samples will be collected from each of these (as described below) to determine the size of each source and hazardous constituents associated with each source. These samples will be analyzed for metals, % solids, and sieve size analysis at the HETL.

The first source is the tailings pond which is approximately 11 acres in size. Four samples will be collected from the tailings pond area. One sample will be collected with a geoprobe in an attempt to determine the depth of this source. The other three will be collected from 1-2 feet below the surface with a shovel or auger. The team geologist will determine the depth of the tailings by visual observation of the waste material. The next source is contaminated soil associated with the mill operations. This is an area located on the east side of the site. Six locations will be sampled with a hand auger or a shovel. Four samples will be collected from the Waste Rock Pile with a hand auger or shovel.

This pile is the location of millions of tons of waste rock from the mining process. Three samples will be collected from the Tailings Pile with a hand auger or shovel. Three background soil samples will be collected from a location off site and out of the influence of the mill. These will be used for comparison to the source samples. See the tables on pages 14 and 15 for a complete list of Waste Source samples the figure on page 17 shows approximate sample locations.

3.2 Surface Water Pathway Samples

Six sediment and surface water locations will be sampled in Goose Pond Estuary downgradient of onsite sources. A sample will also be collected from Wier Cove, south of the site. Weir Cove was the outlet from Goose Pond during mill operations when the estuary was dammed and drained. Background samples will be collected from Horse Shoe Cove south east of the site. Background samples will be collected from similar depositional regimes and sediments will similar in grain size to samples collected in the downstream pathway samples. See the Table on page 16 for the complete list of samples that will be collected in the Surface Water pathway. Figures on pages 17 and 18 show the approximate sample locations.

4.0 SAMPLING PROCESS DESIGN

Samples collected during this sampling event will be used to determine whether hazardous substances (as defined by HRS Rule 40CFR Part 300 Appendix A) located on site and whether they are migrating to nearby and downstream water bodies.

To determine the hazardous constituents of the waste on the Callahan Mine site, samples will be collected from 4 locations in the tailings pond, 4 samples will be collected in the tailings pile, 4 from the waste rock pile and 6 soil samples in the mill operations area. Three off site background soil samples will be collected for comparison to these samples.

Six sediment and surface water samples will be collected from Goose Pond Estuary to determine if metals are migrating from the site. An additional sample location in Weir Cove will also be sampled because at the time of mill operations water from Goose Pond drained to this water body. Three background samples for sediment and one for water will be collected from Horse Shoe Cove, southeast of the site, for comparison to these samples.

Solid samples will be submitted for % solids, sieve size analysis and 7 metals (Cd, Pb, Hg, Zn, Cu, Ag, Se) to HETL. Water samples will be analyzed for metals only. Samples locations will be documented with a GPS unit; the data will be mapped and area measurements will be calculated. The team geologist will determine soil and sediment types, collect samples, record data in her field book and maintain sample custody.

ONSITE SOIL SAMPLE LOCATIONS

Location	Media	Parameter	Cost	Rational
99-BKSS-01	Soil	7 Metals	127	This is a background location for comparison to onsite soil samples. Because metals are naturally occurring 3 are collected to determine a range.
		% solid	12	
		Sieve size	30	
99-BKSS-02	Soil	7 Metals	127	This is a background location for comparison to onsite soil samples. Because metals are naturally occurring 3 are collected to determine a range.
		% solid	12	
		Sieve size	30	
99-BKSS-03	soil	7 Metals	127	This is a background location for comparison to onsite soil samples. Because metals are naturally occurring 3 are collected to determine a range.
		% solid	12	
		Sieve size	30	
99-SS-04	Soil	7 Metals	127	This is an onsite location in the mill operation area. This will be used to determine an area of Contamination.
		% solid	12	
		Sieve size	30	
99-SS-05	Soil	7 Metals	127	This is an onsite location in the mill operation area. This will be used to determine an area of Contamination.
		% solid	12	
		Sieve size	30	
99-SS-06	Soil	7 Metals	127	This is an onsite location in the mill operation area. This will be used to determine an area of Contamination.
		% solid	12	
		Sieve size	30	
99-SS-07	Soil	7 Metals	127	This is an onsite location in the mill operation area. This will be used to determine an area of Contamination.
		% solid	12	
		Sieve size	30	
99-SS-08	Soil	7 Metals	127	This is an onsite location in the mill operation area. This will be used to determine an area of Contamination.
		% solid	12	
		Sieve size	30	
99-SS-08	Soil	7 Metals	127	This is an onsite location in the mill operation area. This will be used to determine an area of Contamination.
		% solid	12	
		Sieve size	30	
99-SS-09 (duplicate)	Soil	7 Metals	127	This is an onsite location in the mill operation area. This will be used to determine an area of Contamination.
		% solid	12	
		Sieve size	30	
99-SS-10 (duplicate)	Soil	7 Metals	127	This is an onsite location in the mill operation area. This is a duplicate of 99-SS-09. This will be used to determine an area of cont.
		% solid	12	
		Sieve size	30	
TOTAL			*1859*	

Metals (Ag, Cd, Cu, Hg, Pb, Se, Zn)

WASTE SOURCE SAMPLES

Location	Media	Parameter	Cost	Rational
99-TPd-11	Waste	7 Metals	127	This is from the tailings pond and used to determine contaminants and the size of this source.
		% solid	12	
		Sieve size	30	
99-TPd-12	Waste	7 Metals	127	This is from the tailings pond and used to determine contaminants and the size of this source.
		% solid	12	
		Sieve size	30	
99-TPd-13 (duplicate)	Waste	7 Metals	127	This is from the tailings pond and used to determine contaminants and the size of this source.
		% solid	12	
		Sieve size	30	
99-TPd-14 (duplicate)	Waste	7 Metals	127	This is a duplicate of 99-TPd-13
		% solid	12	
		Sieve size	30	
99-TPd-15	Waste	7 Metals	127	This is from the tailings pond and used to determine contaminants and the size of this source.
		% solid	12	
		Sieve size	30	
99-RBGP-15A	Water	7 metals	122	This is a rinsate blank from the geoprobe sampler.
99-TPl-16	Waste	7 Metals	127	This is from the tailings pile and used to determine contaminants and the size of this source.
		% solid	12	
		Sieve size	30	
99-TPl-17	Waste	7 Metals	127	This is from the tailings pile and used to determine contaminants and the size of this source.
		% solid	12	
		Sieve size	30	
99-TPl-18	Waste	7 Metals	127	This is from the tailings pile and used to determine contaminants and the size of this source.
		% solid	12	
		Sieve size	30	
99-WRP-19	Waste	7 Metals	127	This is from the waste rock pile and used to Determine contaminants and the size of this source.
		% solid	12	
		Sieve size	30	
99-WRP-20	Waste	7 Metals	127	This is from the waste rock pile and used to determine contaminants and the size of this source.
		% solid	12	
		Sieve size	30	
99-WRP-21	Waste	7 Metals	127	This is from the waste rock pile and used to determine contaminants and the size of this source.
		% solid	12	
		Sieve size	30	
99-WRP-22	Waste	7 Metals	127	This is from the waste rock pile and used to determine contaminants and the size of this source.
		% solid	12	
		Sieve size	30	
Total			*2028*	

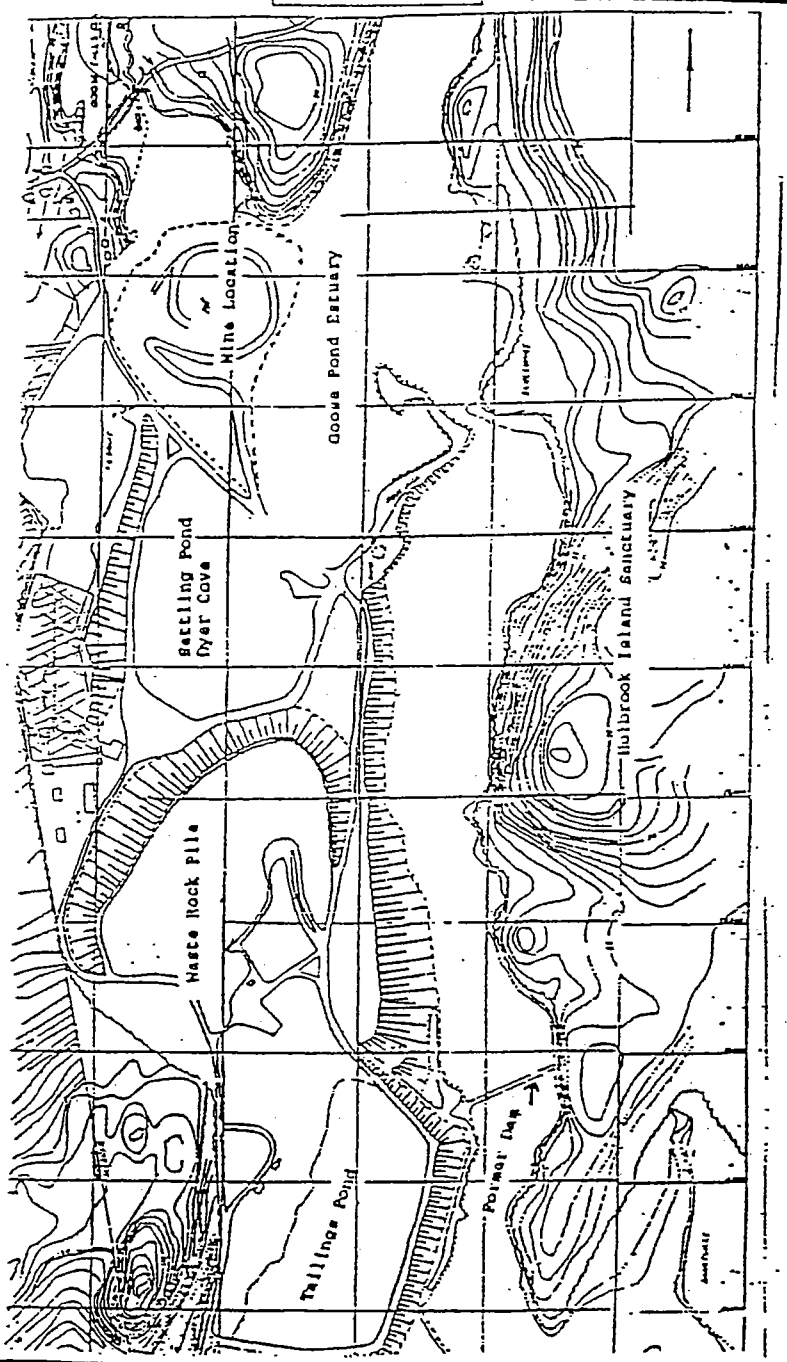
Metals (Ag, Cd, Cu, Hg, Pb, Se, Zn)

SURFACE WATER PATHWAY SAMPLES

Location	Media	Parameter	Cost	Rational
99-BKSD-23	Sediment	7 Metals	127	This is a background location for comparison to onsite sediment samples. Because metals are naturally occurring 3 are collected to determine a range.
		% solid	12	
		Sieve size	30	
99-BKSD-24	Sediment	7 Metals	127	This is a background location for comparison to onsite sediment samples. Because metals are naturally occurring 3 are collected to determine a range.
		% solid	12	
		Sieve size	30	
99-BKSD-25	Sediment	7 Metals	127	This is a background location for comparison to onsite sediment samples. Because metals are naturally occurring 3 are collected to determine a range.
		% solid	12	
		Sieve size	30	
99-BKSW-26	Water	7 Metals	122	This is a background location for comparison to downstream samples.
99-SD-27	Sediment	7 Metals	127	This a sample from Weir Cove near the former outlet from Goose Pond which had a flow in this direction during mine operations.
		% solid	12	
		Sieve size	30	
99-SW-28	Water	7 Metals	122	This is a surface water sample at the same location as 99-SD-27
99-SD-29	Sediment	7 Metals	127	This a sample from Goose Pond near the doengradient of the south edge of the Tailings Pond.
		% solid	12	
		Sieve size	30	
99-SW-30	Water	7 Metals	122	This a surface water sample at the same location as 99-SD-29
99-SD-31	Sediment	7 Metals	127	This is a sample from Goose Pond near the downgradient of the north edge of the Tailings Pond.
		% solid	12	
		Sieve size	30	
99-SW-32	Water	7 Metals	122	This is a surface water sample at the same location as 99-SD-31
99-SD-33	Sediment	7 Metals	127	This is a sample from Goose Pond downgradient of the Tailings Pile.
		% solid	12	
		Sieve size	30	
99-SW-34	Water	7 Metals	122	This is a surface water sample at the same location as 99-SD-33
99-SD-35	Sediment	7 Metals	127	This is a sample from Goose Pond downgradient of the Waste Rock Pile.
		% solid	12	
		Sieve size	30	
99-SW-36	Water	7 Metals	122	This is a surface water sample at the same location as 99-SD-35
99-SD-37	Sediment	7 Metals	127	This is a sample from Dyer Cove (the former settling pond).
(duplicate)		% solid	12	
		Sieve size	30	
99-SW-38	Water	7 Metals	122	This is a surface water sample from the same location as 99-SD-37.
99-SD-39 (duplicate)	Sediment	7 Metals	127	This is a duplicate of 99-SD-37.
		% solid	12	
		Sieve size	30	
99-SW-40	Water	7 Metals	122	This is a duplicate of 99-SW-38.
99-SD-41	Sediment	7 Metals	127	This is a sample from Goose Pond near the outlet to the open ocean.
		% solid	12	
		Sieve size	30	
99-SW-42	Water	7 Metals	122	This is a surface water sample at the same location as 99-SD-41
99-RBB-43	Water	7 Metals	122	This is a rinsate blank of the Beta water column sampler.
99-RBP-44	Water	7 Metals	122	This is a rinsate blank of the Ponar dredge sediment sampler.
TOTAL			*3201*	

Metals (Ag, Cd, Cu, Hg, Pb, Se, Zn)

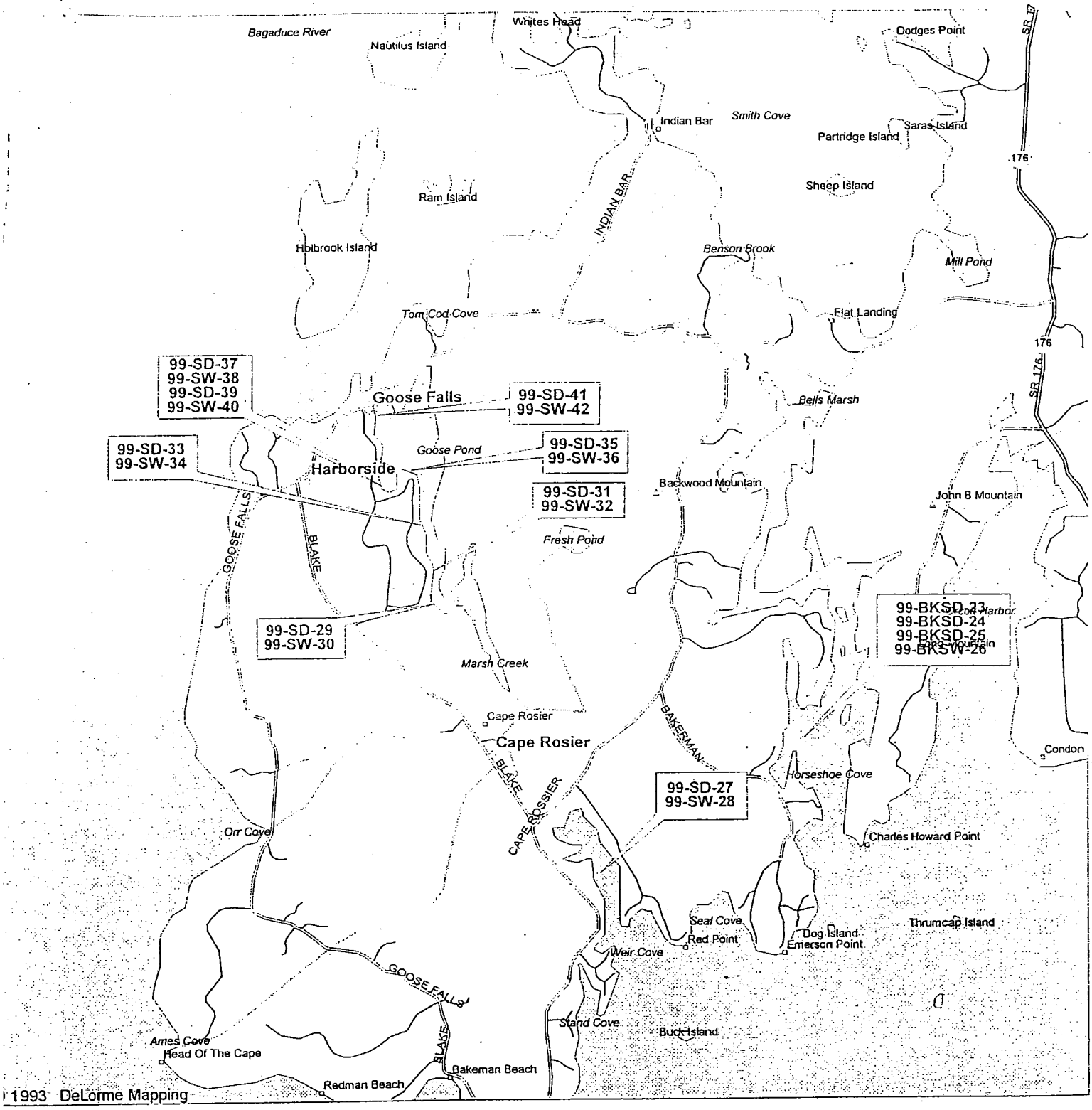
FIGURE 2



Callahan Mining Corporation
Penobscot Unit
Industrial Area
May 1972

Site Diagram
Callahan Mine, Brooksville

Not to Scale



EGEND

- Geo Feature
- Town, Small City
- Hill
- Street, Road
- Trails
- Major Street/Road
- River
- Land Mass
- Open Water
- Intermittent River

Scale 1:37,500 (at center)

2000 Feet

1000 Meters

Mag 14.00
Wed Sep 08 15:27:24 1999

5.0 SAMPLING METHODS REQUIREMENTS

The following Standard Operating Procedures (SOPs) will be followed for sampling methods used onsite:

Surface water and sediment sampling SOP #DR 004,
Decontamination SOP #DR 017
Soil sampling SOP #DR 006
Documentation SOP #DR013
Chain of Custody SOP #DR 012
Soil Sampling eith the Geoprobe Large Bore Soil Sampler SOP# DR 007

The SOPs relevant to this sampling event can be found in the MEDEP Division of Remediation Quality Assurance plan (QAP) Attachment B. All field personnel will review the SOPs prior to the sampling event.

No field activities are anticipated that do not have a written SOP. If any SOP is deviated from in the field, the geologist will note the deviation in the field notebook.

Equipment used in this sampling event will include a Ponar dredge, Beta water column sampler, Geoprobe and a hand auger or shovel.

6.0 SAMPLE HANDELING AND CHAIN OF CUSTODY REQIREMENTS

Samples will be collected according to the above listed SOPs. The team geologists will be responsible for record keeping and maintaining chain of custody for samples collected (see SOP#DR 013 and DR# 012). Each sample container # will be recorded in the geologist field book and on chain of custody sheets. The samples will remain in the geologist possession until locked in a vehicle. The sample location ID will be written on each sample container. Chain of Custody protocol as described in SOP DR# 012 will be followed in delivery of samples to the Lab.

7.0 ANALYTICAL METHOD REQUIREMENTS

Samples for metals analysis, % solids and sieve size analysis will be handled and analyzed according to HETL SOPs. HETL SOP # are as follows and are found in the QAP Attachment C.

SOP EVMETALS- Trace Metals analysis in Environmental Water
SOP DW245 – Analysis of Mercury
For Sieve Size Analysis – Lab SOP Sieve Analysis
For % Solids the lab uses Standard Methods method 2540B.

8.0 QC REQUIREMENTS

Chain of custody sheets will be filled out and samples will be submitted to the lab. Final copies of the chain of custody sheets will be given to the Project Manager.

The laboratory will submit the following information with sample results:

1. Chemist notes on analysis and preparation any dilutions, calculations and sample weights should be included.

2. Instrument calibrations.

3. Instrument Blanks

4. Duplicates

5. Spike recoveries

6. Copies of instrument print outs.

7. Most recent Method Detection Limit Study.

9.0 FIELD QC

Prior to mobilization to the site the site safety coordinator will supervise the check out field equipment and consumables to determine that the equipment is clean and in good condition. Any equipment that is defective or the condition is questionable will not be used for the sampling event. The result of this check will be reported to the Geologist and recorded in their field notebook. After sample containers are inspected they will be stored in a clean dry section of the field vehicle until they are used. Additionally, no field instruments will be used onsite for this sampling event, so no calibration checks are necessary.

Post sampling activities will include delivering samples to HETL and checking them in. The Project Manager will conduct a debriefing meeting after the sampling event to discuss sampling activities and any issues related to the sampling that occurred during the event. Each team member will write a trip report documenting their activities during the sampling event.

Decontamination of the Beta and Ponar between samples within the same water bodies will consist of rinsing the sampler well in the water body and then rinsing with deionized water. A rinsate blank will be collected after each water body if it was used for multiple samples within the water body or at least 1 every 20 samples collected. The Beta and Ponar will be decontaminated between water bodies according to SOP #DR 17. The hand auger and or shovel will be decontaminated between samples (as outlined in SOP

DR# 017) or dedicated sampling equipment will be used. Rinsate blanks will be collected every 20 samples or at least once for the event if equipment is not dedicated.

QC samples will be generated as shown in Section 4.0. Duplicates of each sample type and water body type will be collected as well as rinsate blanks as noted. No trip blanks or field blanks are necessary for the type of samples that will be collected.

If any field activity were not conducted in accordance with the SOPs or as the QAPP directs, the reason they were not followed and how the difference from the SOP or QAPP will be noted in the Geologists field note book.

10.0 INSTRUMENT CALIBRATION AND FREQUENCY

No field instruments will be used for this sampling event. Laboratory analytical calibrations are found in the QAP Attachment C.

11.0 ASSESSMENT AND RESPONSE ACTIONS

The MEDEP QAC will review the QAPP, sampling techniques and documentation for this project to ensure that the project was conducted in accordance with the QAP and QAPP. If deficiencies are noted in the review the QAC will address these with the Project Manager and a plan for rectifying the problems will be generated.

12.0 DATA REVIEW, VALIDATION AND VERIFICATION REQUIREMENTS

Upon receipt of results from HETL, the Project Manager will review the data for completeness. The data package will be forwarded to the EPA Region 1 NPL Coordinator who will arrange for data validation through the EPA Laboratory.

13.0 RECONCILIATION WITH DQOs

If the data generated from this sampling plan is sufficient to use in developing a HRS score fort the site, then the project goal will be met. If the date generated is not sufficient, additional sampling will be required or corrective action taken and re-sampling performed in order to meet the goal.

14.0 SPECIALIZED TRAINING

No specialized training is needed to perform the tasks associated with this QAPP.

15.0 DOCUMENTATION

All field notes will be kept as stated in MEDEP SOP DR# 013- Documentation of Field Notes and Development of a Sampling Event Trip Report. Sample Chain of Custody procedures are stated above in sections 8.0 and 9.0. Any variations or modifications to documentation procedure will be recorded in the geologist field notebook. All documentation will be placed in the site file as a permanent repository, in accordance with the MEDEP DR Quality Assurance Plan (QAP) Section 11.0 Document Control.

16.0 FINAL REPORT

Data gathered during this sampling event will be reported in the Expanded Site Inspection Report for the Kerramerican Mine, Blue Hill, Maine. This report will be written as described in Guidance for Site Inspection Reports Under CERCLA. This report will be written by the Project Manager and submitted to the EPA Region I Site Assessment Manager.

16.0 DISTRIBUTION LIST

Appendix A is the distribution list for the people who will read this document. Key Personnel will sign this prior to implementation of this QAPP.

APPENDIX A

QAPP DISTRIBUTION LIST

DISTRIBUTION LIST

Jean Firth 9-22-99

Project Manager/ Team Leader, Jean Firth

Quality Assurance Coordinator/ Team Leader, Brian Beneski

Team Geologist, Camille Parrish

~~Site Safety Coordinator/~~ Field Sampler, Gordon Fuller

Team Geologist, Troy Smith

~~Site Safety Coordinator/ Field Sampler, Nick Hodgkins~~

USEPA Region 1 NPL Coordinator, Nancy Smith

USEPA Region 1, Chemist

HETL Chemist Inorganic Section, John Nims

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Maine Dept. of Environmental Protection

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PAGE	
2-33	Kerr Ame
34-39	Corinna /

147 Error codes, Haza
148 Sampling guidelin
149 Sampling guidelin
150 Approximate Volu
151 PVC Pipe casing
152 Soil Classificatio
153 Soil Classificatio
154 Conversions (Le
155 Conversions (Co
156 Maximum Conce

1250 After lunch preparing for soil sampling and site survey.
Weather: Rain, windy, temp = in 40's

Troy and Brian will survey waste piles and tailings pond.
Jean, Gordon, and I will conduct soil sampling.

1325 WRP-21
Collected soil sample from top 6"
Orangish light brown silt with some coarse gravel and large rock pieces.
% solids 10873
sieve 10874
metals 10875
Staked location to GPS.

1331 WRP-20
Soil sample from top 6"
Light gray sand and gravel with rock pieces.
Staked location for GPS.

Photo #1 Roll 1
% solids 10894
Sieve 10872
Metals 11383

1345 WRP-22
Soil sample from middle of waste pile. Soil from 0-6"
Light gray silt and gravel
Staked location for GPS
Photo #2 Roll 1
Metals 11382
% solids 11381
Sieve 11380

1400 WRP-19
Soil sampled from base of waste pile 0-6"
Same as WRP-22 soil
Metals 11379
% Solids 11386
Sieve 11385

1410 TPL-16
Middle of slope towards pond
0-6" sample
Orange gravel (flat cleavage) and some silt
Staked for GPS
Metals 11384
% solids 11369
Sieve 11368
Photo #3 Roll 1

1420 TPL-17
Top of tailings pile
0-6" sample
Orange gravel (flat cleavage) and some silt. Rock also present
Metals 11367
% Solids 11366
Sieve 11365

1430 TPL-18
Middle slope of tailings pile
0-6", same soil type
Metals 11364
% Solids 11363

Sieve 10879

1455 WRP2-06
Soil sample from 0-6"
Orange silt and little gravel
Metals 10880
% Solids 11388
Sieve 11387
Photo 4 Roll 1

1510 WRP2-47
Soil sample from top of waste pile in fine orange silt and gravel 0-6"
Metals 10878
% Solids 10877
Sieve 10876

1515 WRP2-10
Soil sample on edge of waste pile on way down road 0-6"
Light gray silt and gravel

Location: Harborside Date: 10/4/99

Project / Client: Callahan Mine

Metals 10887
% Solids 10888
Sieve 10889

1520 WRP2-48
Side of slope near base of waste pile 0-6"
Orange silt and gravel
Metals 10884
% Solid 10885
Sieve 10886

Leaving site 1535 due to weather conditions

Location: Harborside Date: 10/5/99

Project / Client: Callahan Mine

Arrive onsite 900
Troy and Brian head to Tailings Pond to gesprade
Jean Gordon and I put in boat
GPS crew arrives to begin mapping site

955: SD29SW30
Collected 1st sediment and water samples
Dark gray/black very fine clay and silt with organic matter
Water depth ≈ 1 foot
SD29:
Metals 10866
% Solids 11428
Sieve 11429
Water 10902 Metals

1010: SD31SW32
Dark gray/black very fine clay & silt with OM
Water depth ≈ 1 foot

 Location Harborside Date 10/5/99.
Project / Client Callahan Mine

SD Metals 11400
% Solids 11427
Sieve 11426
SW Metals 10919

1025 SD33 SW34
Water depth ≈ 0.5 feet
Light brown fine sand and silt with black organic rich lenses at 1 inch.
Taken at apparent runoff location for tailings pile.
Photo 5 roll 1

SD Metals 11416
% Solids 11417
Sieve 11426
SW Metals 10900

1040 SD35 SW36
Brown silt and clay with few fine sand.
Water depth 1.5'

 Location Harborside Date 10/5/99
Project / Client Callahan Mine

SD Metals 11419
% Solids 11420
Sieve 11421
SW Metals 10901
Photo 6 roll 1

1100 SW 42
By outlet. Collected water from mid-level ≈ 3 feet
SW Metals 10916
Could not obtain sed. sample too rocky

1115 SW 49
In corner of mine.
Collected surface water sample at ≈ 100 feet
SW Metals 10918
Nitric acided to all surface water samples
Lunch

1430 Sampling at Weir Cove. SD27

Collected sediment sample at low tide in drainage that appears to have connected to site using aerial photos.

Organic rich black silt and clay with few cobbles.

SD Metals 11425

Collected rinsate blanks from bowl and dameer

RB for bowl (RBB-44) = 10906
RB for dameer (RBK-43) = 10907

1490 Collecting soil sample from mill operations area

99-SS-043
Metals 11406
% Solids 11405
Sieve 11404

1635 Soil sample location SS-7 in mill operations area
Metals 11403
% Solids ~~11403~~ 10867
Sieve 11402
Near tank removal - slight odor grayish brown sand, silt + gravel

1645 Soil samples in mill operations area.
Green copper rock on surface.
SS 46
Metals 11398
% Solids 11401
Sieve 11399
orange sand, silt + gravel

1655 Soil samples in mill operations area.
SS-9 Metals 11372
% Solids 11373
Sieve 11374

Dup. SS-8 Metals 10871
% Solids 11415
Sieve 11397
Grayish brown sand, silt & gravel in low area behind foundation.

Gordon + Jean collected sediment + surface water from Dyer Cove.
SD-37 SW-38
Dup SD-39 SW-40

Dark gray fine silt & clay with OM.
Saw otters in Dyer Cove.

Photo 7 Roll 1: Troy and Brian goproling at tailings pond.

930 Found background location at head of Horseshoe Cove.
Collected 3 background sediment samples and 1 background surface water sample.
Mixed sediment in dedicated stainless steel bowl.
Dark gray silt and ~~sand~~ clay with organic matter, wet.

Photo 8 Roll 1

BKSD-23	11351	Metals
	11352	% Solids
	11353	Sieve
BKSD-24	11354	Metals
	11355	% Solids
	11356	Sieve
BKSD-25	11357	Metals
	11358	% Solids
	11359	Sieve
BKSW-26	10914	Metals

Location Harbonside Date 10/6/99

Project / Client Callahan Mine

1005 arrive onsite.
Sampling entrance area

SS-45 Location of concrete pad that was fenced off. Possible transformer pad?

Metals 11390
% Solids 11389
Sieve 11349

Light brown fine sand with some silt, damp

1015 Sampling entrance area.

SS-4 Between entrance road and drop to mine
Orange fine sand and some silt with gravel dry
Metals 11360
% Solids 11370
Sieve 11391

Location Harbonside Date 10/6/99

Project / Client Callahan Mine

1025 Sampling entrance area SS-05
Beside Dyer Cave and adjacent to circular tank.
Light gray fine sand and silt, damp
Metals 11361
% Solids 11362
Sieve 11392

1035 Sampling entrance area SS-44
Adjacent to road away from Dyer Cave

Metals 11378
% 11396
Sieve 11371

Light brown to light gray sand, ~~and~~ silt + gravel, damp

Location Harbourside Date 10/6/99

Project / Client Callahan Mine

1050 Background soils location in woods uphill from entrance area

Light brown fine sand and silt.

BKSS-01
Metals 11393
% 11377
Sieve

BKSS-02
Metals 11395
% 11394
Sieve

BKSS-03
Metals 11375
% 11376
Sieve 11350

Photo 9 Roll 1 Brian with rod on top of waste pile

Finished soil sampling

Location Date

Project / Client

Reference 19

STATE of MAINE
DEPARTMENT Of ENVIRONMENTAL PROTECTION

MEMO

TO: Callahan Mine, Brooksville Site File

FROM: Jean Firth, Environmental Specialist Jean Firth

DATE: November 23, 1999

SUBJECT: Trip Report, Sampling for the ESI report

****

On October 4-6, 1999 the following MEDEP staff conducted onsite sampling at Callahan Mine in Brooksville: Camille Parrish (Geologist), Troy Smith (Geologist), Brian Beneski (Oil and Hazardous Materials Specialist), Gordon Fuller (Oil and Hazardous Materials Specialist) and Jean Firth (Environmental Specialist). This group was split into two teams to conduct activities for this event. Troy and Brian were one team and Camille, Gordon and Jean were the other team. Troy and Camille recorded Field notes for their teams. On October 5 the following MEDEP staff from the GIS division were onsite to collect GPS data for the site in order to make a site map: Erika Lloyd, Tracy Weston, and John Lynam.

The weather on the 4th and 5th was approximately 35-40 degrees and rainy. On the 6th the weather was slightly warmer with some periods of sun.

All samples were collected in accordance with the Quality Assurance Project Plan (QAPP) dated September 1, 1999, titled Quality Assurance Project Plan for Callahan Mine, Brooksville Sampling Event for the Expanded Site Inspection Report. Any variances from the QAPP are noted below. All water samples were collected for metals analysis; soil and sediment were collected for metals, sieve size and percent solids.

On October 4th we arrived onsite at approximately 12:30 PM. After lunch, Troy and Brian began surveying the elevations onsite. Camille, Gordon and I collected samples from the Waste Rock Pile, and the Tailings Pile. An additional waste source area was identified and additional samples were added to define this source. This source was called Waste Rock Pile #2 (this is identified on earlier site maps as the Ore Storage Area). The attached sample log sheets notes the sample designations for this area. All samples collected from these sources were from 0-6 inches below the ground surface. Samples were collected with dedicated sampling equipment and therefore no rinsate blanks were necessary. Sample locations were staked so GPS points could be collected later. Samples were stored in a cooler and locked in the truck. We left the site at 3:30 PM due to poor weather conditions.

On October 5th we arrived onsite at 9:00 AM. Troy and Brian geoprobed[8] in the Tailings Pond (TPd-11) to determine the depth of the tailings material and collect a sample (See Troy Smith's

Memo dated November 18, 1999 Subject: Trip Report, October 4-6, 1999 Callahan Mine Site Brooksville, Maine). Gordon, Camille and I launched our boat to collect sediment and surface water samples from Goose Cove. All sediment samples were collected from 0-6 inches deep with dedicated sampling equipment. Surface water samples for SW-30, SW-32, SW-34, and SW-36 were collected by submerging the sample container directly into the water approximately halfway down the water column. SW-42 and SW-49 were collected with a Kemmerer® water column sampler. SW-49 was collected directly over the mine from approximately 100 feet deep. We attempted to collect a sediment sample from near the outlet to Penobscot bay however, the bottom was too rocky and we were unsuccessful.

After lunch Brian and Troy continued geoprobing® in the tailings pond. Camille, Gordon and I went off site to Weir Cove to collect samples. We arrived there at low tide and therefore no water was available to collect this sample (SW-28). We located the approximate area of the drainage ditch outfall and collected a sediment sample. Rinsate blanks of our bowl and Kemmerer® were collected. The sample designations for these samples were changed slightly from the QAPP as noted on the attached sample log sheets.

We arrived back onsite at approximately 4:30 PM; Brian and Troy were still geobrobing® in the Tailings Pond. Camille, Gordon and I collected soil samples in the Mill Operations Area. Soil samples were collected with dedicated sample equipment. An additional source area was added to the sampling plan to better define areas of soil contamination, the Mill Entrance Area. The attached sample log sheets note the sample designations for this area. Gordon and I collected sediment and surface water samples from Dyer Cove. We saw two sea otters frolicking in the water in Dyer Cove. Sample numbers were reported to Camille to record in her field book. Also Camille looked at the samples and recorded information on the sediment type. Troy and Brian completed the geoprobing® and collected a sample from approximately 47 feet below the top of the Tailings Pond surface. No Geoprobe® rinsate blank was collected because the Geoprobe® was only used at one sample location. Because the tailings material had a strange odor an additional sample of the tailings was collected for SVOC and pesticide analysis.

All sample locations collected that day except the Geoprobe® sample point were located with a GPS unit. The Geoprobe® location was staked so the GPS point could be collected later. Some of the previously marked sample locations were GPSed by the GIS staff who were mapping the site. Water samples were preserved with nitric acid. All samples were stored in a cooler and locked in the truck. We left the site at approximately 5:00 PM.

On October 6th we arrived onsite at approximately 9:00 AM. Camille, Gordon and I went off site to Horseshoe Cove to collected the background surface water and sediment samples. Troy and Brian collected the remaining samples from the Tailings Pond. They collected one additional sample (TPR-50) from run-off water in a ditch at the northern edge of the Tailings Pond. This ditch is a breach in the wall of the Tailings Pond, which allows water to run off to Goose Cove. Troy and Brian also completed surveying onsite to determine the elevations.

Gordon, Camille and I arrived back onsite at approximately 10:05 AM and collected soil samples in the Mill Entrance Area as well as the background soil locations. We collected GPS points for any sample locations that were not previously collected.

All samples collected on the 6th were collected with dedicated sampling equipment. The water samples were preserved with nitric acid. All samples were stored in a cooler and locked in the truck. We left the site at approximately 12:30 PM. Samples were delivered to the State of Maine Health and Environmental Testing Laboratory for analysis.

On October 26th I returned to the site to collect additional GPS data. Two sample locations on Waste Rock Pile #2 were not GPSed at the beginning of October. The stakes were still in place and these points were collected. I also GPSed the area of Waste Rock Pile #2.

Callahan Mine 1999 ESI Sample Event

ONSITE SOIL SAMPLE LOCATIONS

Location	Media	Parameter	Sample #	Rational
99-BKSS-01	Soil	7 Metals	11393	This is a background location for comparison to onsite soil samples. Because metals are naturally occurring 3 are collected to determine a range.
		% solid	11377	
		Sieve size	11950	
99-BKSS-02	Soil	7 Metals	11395	This is a background location for comparison to onsite soil samples. Because metals are naturally occurring 3 are collected to determine a range.
		% solid	11394	
		Sieve size	11949	
99-BKSS-03	soil	7 Metals	11375	This is a background location for comparison to onsite soil samples. Because metals are naturally occurring 3 are collected to determine a range.
		% solid	11376	
		Sieve size	11350	
99-SS-04	Soil	7 Metals	11360	This is an onsite location in the ~~mill operation~~ entrance area. This will be used to determine an area of Contamination.
		% solid	11370	
		Sieve size	11391	
99-SS-05	Soil	7 Metals	11361	This is an onsite location in the ~~mill operation~~ entrance area. This will be used to determine an area of Contamination.
		% solid	11362	
		Sieve size	11392	
99-SS-~~06~~ 43	Soil	7 Metals	11406	This is an onsite location in the mill operation area. This will be used to determine an area of Contamination.
		% solid	11405	
		Sieve size	11404	
99-SS-07	Soil	7 Metals	11403	This is an onsite location in the mill operation area. This will be used to determine an area of Contamination.
		% solid	10867	
		Sieve size	11402	
99-SS-~~08~~ 46	Soil	7 Metals	11398	This is an onsite location in the mill operation area. This will be used to determine an area of Contamination.
		% solid	11401	
		Sieve size	11399	
99-SS-08 (duplicate)	Soil	7 Metals	10871	This is an onsite location in the mill operation area. This will be used to determine an area of Contamination.
		% solid	11415	
		Sieve size	11397	
99-SS-09 (duplicate)	Soil	7 Metals	11372	This is an onsite location in the mill operation area. This will be used to determine an area of Contamination. duplicate of SS-08
		% solid	11373	
		Sieve size	11374	
99-SS-~~10~~ 44 ~~(duplicate)~~	Soil	7 Metals	11378	This is an onsite location in the mill ~~operation~~ entrance area. ~~This is a duplicate of 99-SS-09.~~ This will be used to determine an area of cont.
		% solid	11396	
		Sieve size	11371	
TOTAL				

Metals (Ag, Cd, Cu, Hg, Pb, Se, Zn)

99-SS-45	Soil	7 met	11390	This is an onsite location in the mill entrance area.
		% solid	11389	
		Sieve	11349	

WASTE SOURCE SAMPLES

Location	Media	Parameter	Sample #	Rational
99-TPd-11	Waste	7 Metals	10890 35-37	This is from the tailings pond and used to determine contaminants and the size of this source.
		% solid	10891 42-45	
		Sieve size	10870 42-45	
99-TPd-12	Waste	7 Metals	10891	This is from the tailings pond and used to determine contaminants and the size of this source.
		% solid	10892	
		Sieve size	10893	
99-TPd-13 (duplicate)	Waste	7 Metals	10897	This is from the tailings pond and used to determine contaminants and the size of this source.
		% solid	10898	
		Sieve size	10899	
99-TPd-14 (duplicate)	Waste	7 Metals	10868	This is a duplicate of 99-TPd-13
		% solid	10895	
		Sieve size	10896	
99-TPd-15	Waste	7 Metals	10869	This is from the tailings pond and used to determine contaminants and the size of this source.
		% solid	10887	
		Sieve size	10888	
99-RBGP-15A	Water	7 metals	—	This is a rinsate blank from the geoprobe sampler.
99-TPI-16	Waste	7 Metals	11384	This is from the tailings pile and used to determine contaminants and the size of this source.
		% solid	11369	
		Sieve size	11368	
99-TPI-17	Waste	7 Metals	11367	This is from the tailings pile and used to determine contaminants and the size of this source.
		% solid	11366	
		Sieve size	11365	
99-TPI-18	Waste	7 Metals	11364	This is from the tailings pile and used to determine contaminants and the size of this source.
		% solid	11363	
		Sieve size	10879	
99-WRP-19	Waste	7 Metals	11379	This is from the waste rock pile and used to Determine contaminants and the size of this source.
		% solid	11386	
		Sieve size	11385	
99-WRP-20	Waste	7 Metals	11383	This is from the waste rock pile and used to determine contaminants and the size of this source.
		% solid	10894	
		Sieve size	10872	
99-WRP-21	Waste	7 Metals	10875	This is from the waste rock pile and used to determine contaminants and the size of this source.
		% solid	10873	
		Sieve size	10874	
99-WRP-22	Waste	7 Metals	11382	This is from the waste rock pile and used to determine contaminants and the size of this source.
		% solid	11381	
		Sieve size	11380	
Total				

Metals (Ag, Cd, Cu, Hg, Pb, Se, Zn)

WRP2-47 waste (met 10878)(% 10877)(sieve 10876) Second waste pile on Site ~~south~~ west of access Road

WRP2-06 " (met 10880)(% 11388)(sieve 11387)

99 WRP2-10 " (met 10881)(% 10882)(sieve 10883)

99 WRP2-48 " (met 10884)(% 10885)(sieve 10886)

2 or 2°C
Goose Cove Pond

SURFACE WATER PATHWAY SAMPLES

Location	Media	Parameter	Sample #	Rational
99-BKSD-23	Sediment	7 Metals	11351	This is a background location for comparison to onsite sediment samples. Because metals are naturally occurring 3 are collected to determine a range.
		% solid	11352	
		Sieve size	11353	
99-BKSD-24	Sediment	7 Metals	11354	This is a background location for comparison to onsite sediment samples. Because metals are naturally occurring 3 are collected to determine a range.
		% solid	11355	
		Sieve size	11356	
99-BKSD-25	Sediment	7 Metals	11357	This is a background location for comparison to onsite sediment samples. Because metals are naturally occurring 3 are collected to determine a range.
		% solid	11358	
		Sieve size	11359	
99-BKSW-26	Water	7 Metals	10914	This is a background location for comparison to downstream samples.
99-SD-27	Sediment	7 Metals	11425	This a sample from Weir Cove near the former outlet from Goose Pond which had a flow in this direction during mine operations.
		% solid	11414	
		Sieve size	11413	
99-SW-28	Water	7 Metals	Not Collected	This is a surface water sample at the same location as 99-SD-27
99-SD-29	Sediment	7 Metals	10866	This a sample from Goose Pond near the doengradient of the south edge of the Tailings Pond.
		% solid	11429	
		Sieve size	11428	
99-SW-30	Water	7 Metals	10902	This a surface water sample at the same location as 99-SD-29
99-SD-31	Sediment	7 Metals	11400	This is a sample from Goose Pond near the downgradient of the north edge of the Tailings Pond.
		% solid	11427	
		Sieve size	11426	
99-SW-32	Water	7 Metals	10919	This is a surface water sample at the same location as 99-SD-31
99-SD-33	Sediment	7 Metals	11416	This is a sample from Goose Pond downgradient of the Tailings Pile.
		% solid	11417	
		Sieve size	11418	
99-SW-34	Water	7 Metals	10900	This is a surface water sample at the same location as 99-SD-33
99-SD-35	Sediment	7 Metals	11419	This is a sample from Goose Pond downgradient of the Waste Rock Pile.
		% solid	11420	
		Sieve size	11421	
99-SW-36	Water	7 Metals	10901	This is a surface water sample at the same location as 99-SD-35
99-SD-37 (duplicate)	Sediment	7 Metals	11412	This is a sample from Dyer Cove (the former settling pond).
		% solid	11411	
		Sieve size	11410	
99-SW-38	Water	7 Metals	10909	This is a surface water sample from the same location as 99-SD-37.
99-SD-39 (duplicate)	Sediment	7 Metals	11409	This is a duplicate of 99-SD-37.
		% solid	11408	
		Sieve size	11407	
99-SW-40	Water	7 Metals	10908	This is a duplicate of 99-SW-38.
99-SD-41	Sediment	7 Metals	~~11422~~	This is a sample from Goose Pond near the outlet to the open ocean. Sample not Collected
		% solid	~~11423~~	
		Sieve size	~~11424~~	
99-SW-42	Water	7 Metals	10916	This is a surface water sample at the same location as 99-SD-41
99-RBK-43 A	Water	7 Metals	10907	This is a rinsate blank of the ~~Beta~~ water column sampler.
99-RBB-44 A	Water	7 Metals	10906	This is a rinsate blank of the Ponar dredge sediment sampler.
TOTAL				

Metals (Ag, Cd, Cu, Hg, Pb, Se, Zn)

SW-49 Water 10918 Surface Water 100' deep From Mine