SITE: NH Plating
BREAK: 3.2
OTHER: 455682

W92260D

DRAFT
SAMPLING AND ANALYSIS PLAN

TECHNICAL ASSISTANCE

NEW HAMPSHIRE PLATING SITE
MERRIMACK, NEW HAMPSHIRE

HALLIBURTON NUS Environmental Corporation
and
Badger Engineers, Inc.

EPA Work Assignment No. 32-1JG1
EPA Contract No. 68-W8-0117
HNUS Project No. 0768

August 1992

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HNUS ARCS I TEAM

SITE: NH Plating
BREAK: 3.2
OTHER: —

0187-EPA-1964

Contract No. 68-W8-0117

August 24, 1992

Mr. Richard Goehlert, HSN-CAN5
U.S. Environmental Protection Agency
J.F. Kennedy Federal Building
Boston, Massachusetts 02203

Subject: Transmittal of Draft Sampling and Analysis Plan, Technical Assistance, New Hampshire Plating, W.A. No. 32-1JG1

Dear Mr. Goehlert:

Enclosed for your review and comment is one copy of the Draft Sampling and Analysis Plan (SAP) for the subject assignment. This Draft SAP covers the groundwater sampling event. As requested, we have transmitted one copy of the SAP directly to Carol Wood at ESD for her review.

If you have any questions regarding this submittal, please contact me.

Sincerely,

for L Guzman
Robert S. Palermo
Project Manager

PMO-(a)

RSP:ib

Enclosure

cc: D. Kelley/C. Wood (EPA) w/enc.
G. Gardner/L. Guzman (HNUS)
M. Gray (BEI) w/enc.
File 0768-1.0 w/o enc./0768-3.4 w/enc.

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		Date 08/24/92	Revision 0
		Applicability Project Specific	
		Prepared R. Palermo	
Subject CONTROLLED/RESTRICTED COPY ASSIGNMENT		Approved G. Gardner	

The ARCS I Program Manager has authorized the assignment of the noted copy of this manual to the custody of the person listed below:

Copy Number: 1

Name: Richard Goehlert

Organization: U.S. Environmental Protection Agency

Date of Assignment: 8/24/92

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W92260D

DRAFT
SAMPLING AND ANALYSIS PLAN

TECHNICAL ASSISTANCE

NEW HAMPSHIRE PLATING SUPERFUND SITE
MERRIMACK, NEW HAMPSHIRE

Halliburton NUS Environmental Corporation
and
Badger Engineers, Inc.

EPA Work Assignment No. 32-1JG1
EPA Contract No. 68-W8-0117
HNUS Project No. 0768

August 1992

for
Robert S. Palermo
Project Manager

for Arnold Ostrofsky
George D. Gardner
Program Manager

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NEW HAMPSHIRE PLATING SUPERFUND SITE
MERRIMACK, NEW HAMPSHIRE

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1

1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) has been prepared to address the scope of work outlined in U.S. EPA Work Assignment No. 32-1JG1. The work effort involves providing technical assistance to the New Hampshire Department Of Environmental Services (NH DES) for groundwater sampling at the New Hampshire Plating Company (NHPC) Superfund Site.

This document provides detailed information and procedures which are to be followed during execution of the sampling program. The HNUS ARCS I Standard Operating Guidelines (SOGs) will be the procedural basis for field work undertaken on the NHPC site.

2

2.0 SITE BACKGROUND AND HISTORY

The New Hampshire Plating Company (NHPC) site is located on Wright Avenue in the Town of Merrimack, New Hampshire.

The NHPC operated from 1962 through 1985 as an electroplating facility. Wastewater from the electroplating process was discharged into a lagoon system located on-site. The lagoon system included four (4) surface impoundments oriented in a northerly direction. An outlet pipe connected to the NHPC building was used for discharging plating wastewater into the first lagoon. Overflow from the first lagoon was directed into a second lagoon and from the second lagoon into a third lagoon. The lagoons are believed to be natural depressions that were modified by the NHPC to accomodate the wastewater discharge.

The site was recently placed on the NPL and a RI/FS program will follow this work assignment. U.S. EPA/ESD has undertaken a removal action on-site which involved excavating soil and sludge from the lagoons. The excavated material was solidified on-site in an ash mortar mix prior to encapsulation in a high density polyethylene (HDP) envelope. Some of the material was not solidified and was sent off site for disposal.

3

3.0 SAMPLING PROGRAM

3.1 Sampling Program Description

The field effort involves the collection of groundwater samples from fifty-three (53) monitoring wells located on and around the NHPC site. The wells are screened in two water bearing formations consisting of an overburden aquifer and deeper bedrock unit. The wells were installed by different consultants during investigations at the site completed between October 1981 through December 1986. The wells range in depth from eighteen to two-hundred feet.

The field sampling program will involve the collection of samples for analysis by the NHDES laboratory and split samples through the U.S. EPA Contract Laboratory Program (CLP). Samples from all wells will be analyzed by the NHDES laboratory for the following parameters:

- o Volatile organic compounds (VOCs by Method 624),
- o Ten metals (by Methods 3010/6010) and
- o Cyanide (by Method 9012).

Split samples from 18 wells will analyzed through the U.S. EPA CLP for the following parameters:

- Volatile organic compounds (by Special Analytical Services SAS 524.2),
- Semivolatile organic compounds (by Routine Analytical Services RAS),
- Target Analyte List (TAL) for heavy metals (by RAS),
- Pesticides/polychlorinated biphenyls (by RAS) and
- Cyanide (by RAS).

3.2 Field Team Personnel

The field team will consist of a field team leader (Michael Gray, BEI) and several other field staff. The field team leader will report directly to the New Hampshire Plating Technical Assistance Project Manager (Robert S. Palermo). Both BEI and HNUS personnel may be used interchangeably on the project, and in all cases the technical personnel supporting the project will be responsible to the Project Manager.

Key personnel associated with the groundwater sampling program are listed below and are identified by their respective role.

ROLE/ASSIGNMENT	NAME	TELEPHONE NUMBER
EPA RPM	Richard Goehlert	(617) 573-5742
EPA Hydrogeo	Richard Willey	(617) 574-9639
NH DES RPM	Michael Robinette	(603) 271-2014
NH DES Lab	Patricia Bickford	(603) 271-3503
BEI PM	Robert Palermo	(617) 494-7527
BEI FOL	Michael Gray	(617) 494-6883

3.3 Field Measurements and Groundwater Sampling

Static water level, temperature, pH, conductivity and turbidity measurements will be taken before and after each well is sampled. Other pertinent information relating to well diameter size, purged water volume, pumping and sampling equipment used, appearance and condition of the monitoring wells will be documented in the project field log book or field measurement forms. All field measurements and procedures will be performed in accordance with HNUS Standard Operating Guidelines GH-2.4 and GH-2.5 (see Section 3.8). The groundwater sampling locations and required purge water volumes are listed in Table 3-1.

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TABLE 3-1
SUMMARY OF MONITORING WELL DATA AND GROUNDWATER SAMPLING LOCATIONS AT THE NEW HAMPSHIRE PLATING SUPERFUND SITE

WELL DESIGNATION	DEPTH (in Feet)	PURGED WATER VOLUME (in Gal)	LOCATION
MW-107	32	16	SW of RHW Construction
MW-106	102	50	N of Horseshoe Pond and S of F&S Transit Mix Company
MW-106R	201	294;584;884*	
B-10S	26	13	
B-10D	50	25	
MW-105	62	30	S of the NHPC Building
MW-104S	32		
MW-104D	107		
MW-108S	31	15	N of New England Pole Building SE of New England Pole Shed
MW-108D	31	45	
MW-109S	35	18	
MW-109D	82	40	
MW-109R	262	384;768;1153*	
B-1	31	15	E of Boston & Maine Railroad Tracks with N/S Alignment
B-2	26	13	
B-3	26	13	
B-4	33	16	
B-5	31	15	
MW-3	21	10	W of Lagoons on Magnum Leasing & Mortgage Site
MW-4	19	9	
MW-5	18	9	
MW-2	21	10	W and N of Jones Chemical, Inc. S of PSNH Substation
MW-2D	51	25	
MW-4	22	11	
MW-4D	46	22	
MW-6	26	13	
Jones Chemical, Inc. (JCI) Process Water Supply Well		0	S of the JCI Building

TABLE 3-1 (Continued) SUMMARY OF MONITORING WELL DATA AND GROUNDWATER SAMPLING LOCATIONS AT THE NEW HAMPSHIRE PLATING SUPERFUND SITE

WELL DESIGNATION	DEPTH (in Feet)	PURGED WATER VOLUME (in Gal.)	LOCATION
B-8D	81	40	W side of NHPC Building
B-8S	21	10	
MW-8R	145	212;425;638*	
W-1	52	25	Immediately N of NHPC Building
B-3S	25	12	
B-3D	107	52	
B-12S	22	11	NW of NHPC Building
B-12D	75	37	
W-2S	52	25	W of Lagoon 1 and 2
W-2D	53	25	
MW-101	61	30	
OHM-W1	15	70	Wells were installed for dewatering of lagoons during removal action. Not on Map
OHM-W2	15	70	
OHM-W3	15	70	
OHM-W4	15	70	
OHM-W5	15	70	
OHM-W6	15	70	
OHM-W7	15	70	
OHM-W8	15	70	
B-7S	24	12	SE Tip of Lagoon 2
B-7D	80	40	
MW-7R	116	56	
MW-102S	32	16	NW of Lagoon 3 Outside of NHPC Property
MW-102D	71	35	
MW-102R	261	130	
B-6	32	16	Location is not known

Total Number of Wells = 53

Note: * Sequence as follows: 1, 2, 3 purge volumes, respectively

Sampling forms and field records will be partially completed prior to mobilization at the site. The groundwater sampling program will require all field measurements be documented (see Section 3.11).

3.3.1 Sampling Procedure

The following procedure will be followed during sample collection to ensure representativeness of samples. The sampling will involve collection of groundwater from a well triplet monitoring system. The well triplet system involves sampling three wells which are located laterally in approximately in the same area but are screened at increasing depths below the ground surface. In order to minimize drawdown from the overburden wells during well purging the shallower wells will be evacuated and sampled first.

The following information will be collected for each sampling point. Well log reports will be completed for each monitoring well sampled. An example of the report to be completed for each well is shown below as Figure 3-1.

FIGURE 3-1
GROUNDWATER MONITORING WELL REPORT FOR GROUNDWATER SAMPLING NEW HAMPSHIRE PLATING SUPERFUND SITE

1. MONITORING WELL NUMBER/BORING ________________

2. WELL LOCATION ________________

____

3. DATE ________________ 4. TIME ________________

5. PHOTOIONIZATION DETECTOR READING (IN PPM) ________________

6. GROUND SURFACE TO TOP OF CASING ________________

7. STATIC WATER LEVEL FROM TOP OF CASING ________________

8. DEPTH OF WELL FROM TOP OF CASING ________________

9. DIAMETER OF THE WELL CASING ________________

10. PURGED WELL VOLUME (SEE TABLE 3-1 FOR PURGE VOLUME IN GPM)

FORMULA: V = (TR2 (0.163))3

WHERE:
V = purge volume in gallons
T = length of water column (in feet)
R = inside well casing (in inches)
3 = purge volume multiplier
0.163 = derived constant converting casing radius in inches to feet and cubic feet and pi

11. USING A FIVE (5) GALLON MEASURE PURGE VOLUME

____

____

FIGURE 3-1 (Continued)
GROUNDWATER MONITORING
WELL REPORT FOR GROUNDWATER SAMPLING AT THE NEW HAMPSHIRE PLATING SUPERFUND SITE

12. APPEARANCE/CONDITION OF WELL

____

____

13. GROUNDWATER pH ____

Temperature ________________________________

Conductivity _______________________________

Turbidity __________________________________

14. GROUNDWATER CHARACTERISTICS (ODOR, COLOR, ETC.)

____

____

15. COMMENTS

____

____

____

____

____

____

Step 1

Remove the well lock and open the well. Quickly measure well headspace with a photoionization detector (PID). Measure static water level with an electronic water level indicator. Measure the items noted below with fiber/nylon tape (with tape increments in 1/10 of a foot). Document all measurements on the report provided on Figure 3-1 below. The following measurements are to be taken:

- ground surface to top of casing,
- static water level from top of casing,
- depth of the well from top of casing, and
- inside diameter of the well casing.

Step 2

Using a clean stainless steel bailer evacuate into a decontaminated glass or polyethylene beaker or transfer container adequate working volumes of well water and measure:

- pH,
- conductivity,
- temperature
- turbidity

These measurements will be taken before, during and at the end of each well purging activity. Document all measurements on the report provided on Figure 3-1.

Step 3

Evacuate required purge water volume as noted on Table 3-1 by using either an electric submersible pump or a Watera hand operated pump. Verify calculated purge volumes based on actual well measurements according to the following formula:

$$V = (TR2(0.163))3$$

WHERE: V = purge volume in gallons
T = length of water column (in feet)
R = inside well casing radius (in inches)
0.163 = derived constant converting casing radius in inches to feet to gallons and pi
3 = purge volume multiplier

The submersible pump will be used to evacuate water from the deeper wells with larger calculated purge volumes. The submersible pump will be lowered to a depth thirty (30) feet below the static water level. Wellwater purge rates will be controlled to minimize turbid conditions and suspension of solids in the groundwater. All tubing used to evacuate the wells will be dedicated to the well and as such will be left in the well at the conclusion of sampling. This will minimize time otherwise spent decontaminating sampling equipment.

Step 4

Measure purged water volume with a five (5) gallon bucket for those wells evacuated with the Watera pump. Purged volume measurements for the submersible pump will be timed purges based on establishing a set flow rate for the pump. Once the pump flow discharge rate is established it will initially be measured with a five gallon bucket. Subsequent purge volume measurements will be timed based on achieving the total purge volume for the well as noted on Figure 3-1 and verified according to Step 3 above. The discharge lines from the submersible pump will be positioned as far downgradient as possible from the wellhead. The purge water will not be collected and/or containerized.

Step 5

Attach a nylon rope and/or string to a clean stainless steel bailer and lower the bailer down into the well and remove an adequate volume of groundwater to accommodate sample containers. The 40 ml glass vials will be filled directly from the bailer or Watera pump tubing. Decontaminate sample containers after sample collection with clean water to remove spillage from the outside of the glassware. Decontaminate all sampling equipment before reuse (see Section 3.4) and label samples (see Section 3.9).

Step 6

Ensure that all samples are properly acidified to a pH less than two (2) for volatile organic compound and metal analysis. This will be accomplished by checking with pH paper from a separate sample container. If necessary add additional HCl and/or HNO3 to lower pH to 2. Samples collected for cyanide analysis are preserved with NaOH to a pH of twelve (12). Follow the procedures in Section 3.9 for sample identification and Chain-Of-Custody.

3.3.2 Preservation Procedures

Samples will be preserved using reagents provided by HNUS. Aqueous samples will be placed in the appropriate clean sample containers and preserved with appropriate reagents, as outlined in Table 3-2. Aqueous metals samples will be acidified with 2 ml of HNO_3 following sample collection. The sample bottle will be capped and inverted to distribute the acid until homogeneous. The cap will be

TABLE 3-2
SAMPLE CONTAINERS AND PRESERVATIVES FOR GROUNDWATER SAMPLING AT THE NEW HAMPSHIRE PLATING SUPERFUND SITE

MEDIUM	ANALYSES	BOTTLES PER SAMPLE	BOTTLE TYPE	CHEMICAL PRESERVATIVE
Water	Volatile Organic Compounds	2	40 ml teflon lined septum vial w/cap	HCL to a pH≤2 stored @ 4 degrees C
	Semivolatile Organic Compounds Pesticides/ PCBs	2	80 ounce amber glass bottles	None Stored at @ 4 degrees C
	Metals	1	1 liter polyethylene bottle	HNO3 to a pH≤2
	Cyanide	1	1 liter polyethylene bottle	NaOH to a pH≥ 12 stored @ 4 degrees C

Note: C = Symbol indicates that temperature units are in Centigrade.

All sample containers meet Specification and Guidance for Obtaining Contamination Free Sample Containers. OSWER Directive No. 9240.0-05A.

removed and a portion of the sample will be poured into a disposable plastic cup. Narrow range pH paper will be used to measure the pH. If the pH is greater than 2, an additional 1 ml of acid will be added and the above procedure repeated until a pH of less than 2 is reached. A similar process will be followed to preserve the cyanide samples with NaOH to a pH of greater than 12.

VOC aqueous samples requiring pH adjustment will be preserved with HCl by placing 2 drops of HCl in the VOA vials prior to sample collection. VOA vials will not be reopened after sample collection. The pH will be checked by filling a test prepreserved sample container with sample water, closing the container and inverting it. The pH of the test sample will be checked using pH paper. If the pH is greater than 2, two more drops of acid will be added to the test vial and the procedure repeated. If the test sample vial required additional drops of acid, the same total volume of acid will be added to new VOA vials and samples will then be collected. The filled vials will be inverted to distribute the acid.

Adequate acidification of VOCs and metals below a pH of 2 will be verified for the overburden and bedrock aquifer units at a frequency of every fifth sampling location.

3.4 Decontamination Procedures

All non-disposable sampling and testing equipment which comes in contact with the sample medium will be decontaminated to prevent cross-contamination between samples.

Any disposable personal protective equipment used at the site will be properly disposed of. Purge water from evacuated monitoring wells and water generated during decontamination of equipment and personnel will be discharged onsite.

3.5 Critical Data Points

The critical data points are sampling locations on and off the site which are located in key geographical areas. The selected groundwater sampling points for on-site, upgradient and downgradient monitoring wells are noted below. These sampling points will play a critical role in evaluating contaminant migration and transport.

MONITORING WELL	SITE LOCATION	AREA
MW-7R	SW Tip of Lagoon 1	On-site
B-7S and D	SE Area of Lagoon 2	On-site
B-12S and D	West of Lagoon 1	On-site

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MONITORING WELL	SITE LOCATION	AREA
B-3S and D	SE Tip of Lagoon 1	On-site
MW-2S and D	Magnum Leasing	Upgradient
MW-102S, D and R	NE of Lagoon 3	Upgradient
MW-1	NE of RHW Construction	Upgradient
MW-108S and D	North of NE Pole Building	Downgradient
B-1 and B-2	North of MW-108S and D	Downgradient
B-4 and B-5	NW of Jones Chemical	Downgradient
MW-104S and D	South of NHPC Building	Downgradient
MW-105	South Of NHPC Building	Downgradient
MW-106S and R	North of Horseshoe Pond	Downgradient

3.6 NHDES Laboratory Samples

Field samples from all onsite wells will be delivered to the state laboratory for subsequent analysis. Their address and point of contact is listed below:

NH Department of Environmental Services
6 Hazen Drive
Concord, New Hampshire 03301

Laboratory Contact: Ms. Pat Bickford
Telephone Number: (603) 271-3503

The numbers of required field samples, duplicates, blanks, parameters to be analyzed and methods are noted on Table 3-3. The field and QA samples to be collected at specific well locations are summarized in Table 3-4. It is anticipated that approximately seventy (70) samples each will be prepared for shipment to the NHDES laboratory for VOC, ten heavy metals and cyanide analysis. Samples will be hand delivered within two days of sample collection. Sample delivery will be coordinated with NHDES staff.

3.7 CLP Laboratory Samples

Split samples will be collected and analyzed for VOCs metals and cyanide through the EPA contract laboratory program using comparable methods to the NH DES laboratory. In addition, samples will be collected for CLP analysis for pesticides/PCS and TCL SVOCs. Table 3-5 outlines the number of required field samples, duplicates, blanks, and parameters to be analyzed for the samples collected for CLP analysis. The field and QA samples to be collected at specific well locations are summarized in Table 3-4.

For VOC samples, collocated split samples will be collected. Collocated samples are collected by filling the NHDES and split sample containers successively. This is performed in order to minimize the loss of volatiles during the sampling process. For non-VOC samples, split samples will be collected by pouring a small

TABLE 3-3
NH DES LABORATORY SAMPLES FOR GROUNDWATER SAMPLING AT THE NEW HAMPSHIRE PLATING SUPERFUND SITE

PARAMETERS /METHODS	FIELD SAMPLES	SAMPLE DUPLICATES	BOTTLE BLANKS	RINSATE BLANKS	TRIP BLANKS	SAMPLE TOTALS
VOCs by Method 624(1)	53	6	*1	6	6	72
10 Metals by Method 3010/ 6010(2,3)	53	6	*1	6	1	66
Cyanide by Method 9012(3)	53	6	*1	6	1	66
TOTALS:	159	18	*3	18	6	204

Notes: (1) Method includes all Hazardous Substance Compounds (HSL) plus tetrahydrofuran.

(2) The following 3 metals will be analyzed by Graphite Furnace Atomic Absorption (GFAA): Arsenic, Lead, and Cadmium. The following seven metals will be analyzed by Inductively Coupled Plasma (ICP): Total Chrome, Nickel, Sodium, Aluminum, Iron, Manganese and Zinc.

(3) Above methods from Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods SW-846, 3rd Edition, 1986.

* Symbol indicates that bottle blanks will be collected only if necessary. One bottle blank is required per bottle lot number.

TABLE 3-4
SAMPLE BREAKDOWN FOR SELECTED SAMPLING LOCATIONS AT THE NEW HAMPSHIRE PLATING SUPERFUND SITE

WELL DESIGNATION	NH DES SAMPLES FOR VOCs/METALS/CYANIDE	CLP SAMPLES FOR SVOCs	CLP SPLIT SAMPLES FOR VOCs/METALS/CYANIDE
MW-8R	X,D		
B-7S	X	X,D,R	X,D,RM
MW-7R	X	X	
MW-102R	X	X	
MW-107	X		
MW-106	X,D		
MW-106R	X		
B-10S	X		
B-10D	X		
MW-105	X		
MW-104S	X,R	X	
MW-104D	X	X	
MW-108S	X	X	
MW-108D	X	X	
MW-109S	X		
MW-109D	X		
MW-109R	X		
B-1	X,D		
B-2	X		
B-3	X		
B-4	X		
B-5	X		
MW-3	X		
MW-4	X,D		
MW-5	X		
MW-2	X	X,D,R	X,RV
MW-2D	X	X	X
MW-4	X	X	X
MW-4D	X	X	X
MW-6	X		
Jones Chemical Process Water Supply Well	X,D,R		
B-8D	X	X	
B-8S	X	X	
W-1	X	X,D,R	X

TABLE 3-4 (Continued)
SAMPLE BREAKDOWN FOR SELECTED SAMPLING LOCATIONS
NEW HAMPSHIRE PLATING SUPERFUND SITE

WELL DESIGNATION	NH DES SAMPLES FOR VOCs/METALS/CYANIDE	CLP SAMPLES FOR SVOCs	CLP SPLIT SAMPLES FOR VOCs/METALS/CYANIDE
B-3S	X	X	
B-3D	X	X	
B-12S	X		
B-12D	X		
W-2S	X,D		
W-2D	X,R		
MW-101	X		
OHM-W1	X		
OHM-W2	X,R		
OHM-W3	X		
OHM-W4	X		
OHM-W5	X		
OHM-W6	X		
OHM-W7	X,R		
OHM-W8	X		
B-7D	X	X,D,R	X
MW-102S	X,R	X	X,D,RC
MW-102D	X	X	X
B-6	X	X	X

Notes: Symbols indicate the following: X=field sample, D=sample duplicate, R=rinsate blank, RC=rinsate blank for cyanide (only), RV=rinsate blank for VOCs, RM=rinsate blank for metals (only)

TABLE 3-5
CLP SAMPLES FOR GROUNDWATER SAMPLING
NEW HAMPSHIRE PLATING SUPERFUND SITE

PARAMETERS /METHODS(1)	FIELD SAMPLES	SAMPLE DUPLICATES	BOTTLE BLANKS	RINSATE BLANKS	TRIP BLANKS	SAMPLE TOTALS
VOCs by SAS 524.2 (2)	10	1	*1	1	2	15
TAL Metals by RAS (3)	10	1	*1	1	1	16
Cyanide by RAS (3)	10	1	*1	1	1	16
Pesticides /PCBs by RAS (4)	20	2	*1	2	1	28
TCL SVOCs by RAS (4)	20	2	*1	2	1	28
TOTALS:	70	7	*5	7	6	95

Notes:

(1) The Data Quality Objective level for the sampling program is Level IV - V.

(2) EPA Region I SAS "Method for the Determination of Organic Compounds in Drinking Water," EPA-600/4-88-039, December 1988, Revision 3.0 (modified by EPA Region I).

(3) U.S. EPA Contract Laboratory Program, "Statement of Work for Inorganic Analysis, Multi-Media, Multi-Concentration". ILM01.0.

(4) U.S. EPA Contract Laboratory Program, "Statement of Work for Organic Analysis, Multi-Media, Multi-Concentration". OLM01.0.

*Symbol indicates that bottle blanks will be collected only if necessary. One bottle blank is required per bottle lot number.

amount of water into each sample container (both NHDES and split sample containers) successively until they are all filled up. In this way, the water is distributed among the sample containers.

NHDES and CLP split groundwater samples will be collected as noted above from the same bailer aliquot. If the bailer does not contain sufficient volume for all samples, the VOC samples will be taken first. Subsequent bailer aliquots will be divided equally between the NHDES and split sample containers, and the well resampled until the containers are filled.

3.8 Standard Operating Guidelines

The following HNUS Standard Operating Guidelines (SOGs), developed for the ARCS I Program, will serve as guidelines for the field program. Any deviation from the SOGs not specified in this SAP will be documented in a Field Modification Record. Note that for the SOGs listed below, the following identifiers are used: "GH" designates Geology/Hydrogeology Field Methods; "SA" designates Sampling Methods; and "SF" designates Supporting Field Methods.

SOG NUMBER	SUBJECT
GH-2.4	In-Situ Hydraulic Conductivity Testing
GH-2.5	Water Level Measurement/Contour Mapping

SOG NUMBER	SUBJECT
SA-6.1	Sample Identification and Chain-of-Custody
SA-6.2	Sample Packaging and Shipping SA-6.3
	Site Logbook
SA-6.5	Field Reports
SA-6.6	Management of Sampling and Preparation of Required Forms
SF-1.2	Sample Preservation

A copy of the Sampling and Analysis Plan and of all applicable SOGs will be made available to field personnel and will be secured in the field office. A meeting will be held with the field sampling team to review the SAP and the applicable SOGs as part of the pre-mobilization activities. Forms to be used for the collection of various data are located in Appendix A of this SAP. In addition, sample documentation, packaging and shipment will be performed in accordance with the "Users Guide to the Contract Laboratory Program," dated December 1988.

3.9 Sample Identification and Chain-of-Custody

The following sections detail the identification system and the chain-of-custody procedures to be used for all samples collected during the sampling program.

3.9.1 Sample Identification System

The order in which the samples will be collected and location where CLP split samples will be collected are listed on Table 3-6. Each sample will be assigned a unique sample tracking number. The sample tracking number will consist of a four- to five-segment, alpha- numeric code that identifies the site, sample medium, location, or the sampling round and the quality control sample designation, as appropriate. Any other pertinent information regarding sample identification, will be recorded in the field logbook. The alpha-numeric coding to be used in the sample numbering system is explained in the following diagram and the subsequent definitions:

AA	AA	Variable	AA	NN
Site Identifier	Medium	Sample Location	QA Sample Designation	Sample Sequence Number

Character Type:

A = Alpha

N = Numeric

Site Identifier:

NHP = New Hampshire Plating

Medium:

GW = Groundwater from Monitoring Well

TABLE 3-6
SEQUENCE OF SAMPLING AND SAMPLE IDENTIFICATION NUMBERS FOR SELECTED SAMPLING LOCATIONS NEW HAMPSHIRE PLATING SUPERFUND SITE

WELL SAMPLING ORDER	WELL DESIGNATION	NH DES SAMPLE NUMBER	CLP SAMPLE NUMBER
1	MW-8R	NHP-GW-8RW-	NONE
		NHP-GW-8RW-D-	NONE
2	B-7S	NHP-GW-7SW-	NHP-GW-7SW-S
3	MW-7R	NHP-GW-7RW-	NONE
4	MW-102R	NHP-GW-102RW-	NHP-GW-102RW-S
5	MW-107	NHP-GW-107-	NONE
6	MW-106	NHP-GW-106-	NONE
		NHP-GW-106-D-	NONE
7	MW-106R	NHP-GW-106RW-	NONE
8	B-10S	NHP-GW-B10SW-	NONE
9	B-10D	NHP-GW-B10DW-	NONE
10	MW-105	NHP-GW-105-	NONE
11	MW-104S	NHP-GW-104SW-	NHP-GW-104SW-S
12	MW-104D	NHP-GW-104DW-	NHP-GW-104DW-S
13	MW-108S	NHP-GW-108SW-	NHP-GW-108SW-S
14	MW-108D	NHP-GW-108DW-	NHP-GW-108DW-S
15	MW-109S	NHP-GW-109SW-	NONE
16	MW-109D	NHP-GW-109DW-	NONE
17	MW-109R	NHP-GW-109RW-	NONE
18	B-1	NHP-GW-B1-	NONE
		NHP-GW-B1-D-	NONE
19	B-2	NHP-GW-B2-	NONE
20	B-3	NHP-GW-B3-	NONE
		NHP-GW-B3-D-	NONE
21	B-4	NHP-GW-B4-	NONE
		NHP-GW-B4-D-	NONE
22	B-5	NHP-GW-B5-	NONE
23	MW-3	NHP-GW-3-	NONE
24	MW-4	NHP-GW-4-	NONE
25	MW-5	NHP-GW-5	NONE
26	MW-2	NHP-GW-2-	NHP-GW-2-S
27	MW-2D	NHP-GW-2DW-	NHP-GW-2DW-S
28	MW-4	NHP-GW-4-	NHP-GW-4-S
29	MW-4D	NHP-GW-4DW-	NHP-GW-4DW-S

TABLE 3-6 (Continued)
SEQUENCE OF SAMPLING AND SAMPLE IDENTIFICATION NUMBERS FOR SELECTED SAMPLING LOCATIONS
NEW HAMPSHIRE PLATING SUPERFUND SITE

WELL SAMPLING ORDER	WELL DESIGNATION	NH DES SAMPLE NUMBER	CLP SAMPLE NUMBER
30	MW-6	NHP-GW-6-	NONE
31	Jones Chemical Process Water Supply Well	NHP-GW-PW-	NHP-GW-PW-S
32	B-8D	NHP-GW-8DW-	NHP-GW-8DW-S
33	B-8S	NHP-GW-8SW-	NHP-GW-8SW-S
34	W-1	NHP-GW-1-	NHP-GW-1-S
35	B-3S	NHP-GW-3SW-	NHP-GW-3SW-S
36	B-3D	NHP-GW-3DW-	NHP-GW-3DW-S
37	B-12S	NHP-GW-12SW-	NONE
38	B-12D	NHP-GW-12DW	NONE
39	W-2S	NHP-GW-2SW-	NONE
		NHP-GW-2SW-D-	NONE
40	W-2D	NHP-GW-2DW	NONE
41	MW-101	NHP-GW-101-	NONE
42	OHM-W1	NHP-GW-W1-	NONE
43	OHM-W2	NHP-GW-W2-	NONE
44	OHM-W3	NHP-GW-W3-	NONE
45	OHM-W4	NHP-GW-W4-	NONE
46	OHM-W5	NHP-GW-W5-	NONE
47	OHM-W6	NHP-GW-W6-	NONE
48	OHM-W7	NHP-GW-W7-	NONE
49	OHM-W8	NHP-Gw-W8-	NONE
50	B-7D	NHP-GW-7DW-	NHP-GW-7DW-S
51	MW-102S	NHP-GW-102SW-	NHP-GW-102SW-S
52	MW-102D	NHP-GW-102DW-	NHP-GW-102DW-S
53	B-6	NHP-GW-6-	NHP-GW-6-S

Note: (1) Symbol descriptions are defined as follows: R=Rinsate Blank, T=Trip Blank, B=Bottle Blank, D=Duplicate Sample, S=CLP Split Sample, DS=Duplicate Split.

Example: NHP-GW-104SW-[D] or NHP-GW-104SW-[S]

(2) Symbol descriptions for monitoring wells are defined as follows: SW=Shallow Well, RW=Rock Well, and DW=Deep Well.

Example: NHP-GW-104[SW] or NHP-GW-104[DW]

Sample Location:

The sample locations will use the same identifier as used by the previous consultants and/or contractors for the monitoring wells.

Sample Sequence and/or order:

Numerical order in which sample was collected = 1st is 001, 2nd is 002, 3rd is 003, etc.

QA Sample Designation, if appropriate:

B(T) = Trip Blank
B(E) = Rinsate Blank
B(B) = Bottle Blank
Dn = Field Duplicate, where n=1,2...

(Both samples of a field duplicate pair carry the same designation of D1, etc.)

An example for Monitoring Well No. MW-107 for a duplicate sample which was the fifth (5) sample collected during the sampling program would have the following nomenclature:

3.9.2 Sample Chain-of-Custody Procedures

To ensure the integrity of a sample from collection through analysis, it is necessary to have an accurate, written record to trace the possession and handling of the sample. This documentation is referred to as the sample chain-of-custody.

A sample is under custody if:

- The sample is in the physical possession of an authorized person.
- The sample is in view of an authorized person after being in his/her possession.
- The sample is placed in a secure area by an authorized person only.

Custody of samples must be maintained at all times and documented in accordance with HNUS SOG Number SA-6.1. Chain-of-custody begins at the time the sample is collected and is maintained by storing the samples on ice in coolers which are locked in the field vehicle or with which HNUS/BEI personnel maintain visual contact when not secured in the vehicle. Sample documentation must also verify chain-of-custody throughout sample packaging, shipping, laboratory receipt, and analyses, as detailed in SOG SA-6.1. Samples must be shipped to the laboratory no later than the day following sample collection.

A chain-of-custody form will be filled out for samples sent to the NHDES Laboratory. The NHDES Laboratory personnel will sign the chain-of-custody form in the "received by" block for the samples listed in Table 3-1.

Serialized Region I sample tags are attached to all sample containers submitted for CLP laboratory analysis. Sample shipping containers must be sealed with EPA custody seals if they are sent to the laboratory by a commercial carrier. BEI will provide the HNUS ARCS I lead chemist with necessary shipping information by 10:00 AM of the day following shipment of CLP samples. However, if samples will be shipped on a Friday, BEI will contact the HNUS ARCS I lead chemist by 3:00 PM of that day (Friday). Samples are shipped to the laboratory on ice. Sample holding times for each analysis are presented in Table 3-7.

TABLE 3-7
HOLDING TIMES FOR GROUNDWATER SAMPLING
NEW HAMPSHIRE PLATING SUPERFUND SITE

ANALYSES	MAXIMUM HOLDING TIME(1)
Volatile Organic Compounds	14 Days
Semivolatile Organic Compounds Pesticides/PCBs	7 Days to Extraction 40 Days to Analysis
Metals(except mercury)	6 Months
Mercury	28 Days
Cyanide	14 Days

Note: (1) Maximum holding times from sample collection to date of sample preparation or analysis. Holding times are based on sample preservation as noted in Table 3-2.

3.10 Sample Packaging and Shipping

Samples will be packaged and shipped in accordance with the EPA "User's Guide to the Contract Laboratory Program" (EPA, December 1988), with all current U.S. Department of Transportation Regulations (49CFR), with commercial carrier regulations, and with HNUS SOGs SA-6.2 and SA-6.6. The HNUS ARCS I Lead Chemist will be responsible for contacting the EPA Sample Management Office (SMO) for each shipment of samples and will report the following:

- Sampler name and telephone number
- Case number and/or SAS number of the project
- Site name/code
- Number(s), matrices), and concentration(s) of samples shipped
- Laboratory(s) to which samples were shipped
- Carrier name and air bill number(s) for the shipment
- Method of shipment (e.g., overnight, 2-day)

- Date of shipment
- Suspected hazards associated with the samples or site
- Any irregularities or anticipated problems with the samples, including special handling instructions, or deviations from established sampling procedures
- Status of the sampling project (e.g. final shipment, update of future shipments)

Following shipment of samples to the laboratories, the HNUS ARCS I lead chemist must submit copies of the appropriate sampling documentation forms to the Sample Management Office (SMO) and Regional Sample Control Center (RSCC) within 5 days of the sampling activities.

3.11 Documentation

All information related to sampling and field activities will be recorded in a site-dedicated bound/weatherproof field logbook which is maintained by the field team leader. This information includes sampling time, weather conditions, unusual events, field activities, etc. during the period of time the sampling team is present at the site. At a minimum, the following information will be recorded on a daily basis:

- Date, time, and weather.
- Personnel involved in the sampling activities, their company affiliation, and accomplished tasks.
- Sample location, sample depth, pH, conductivity, turbidity, well purge volume and static water elevation before and after sampling.
- Condition of monitoring wells (e.g., well unlocked, apparent vandalism, natural disturbances).
- Sample identification number and corresponding split sample number.
- Specific sample description (i.e.,color, turbidity, consistency, odor, evidence of contamination, etc.).
- Equipment used, ambient readings and calibration results.
- Preservation techniques and/or preservatives.
- Decontamination procedures for the equipment.

- Descriptions and corresponding numbers of any photographs taken.
- Notes of conversations with all coordinating officials.
- Documentation of all packaging, shipping, sample custody, and related form numbers.

3.11.1 Sampling Documentation

In addition to recording information in the field logbook, certain standard forms will be completed for sample description and documentation. These shall include the sample log sheets, the RAS or SAS packing list/chain of custody, and the DQO Summary Form. Examples of these forms can be found in Appendix A of this SAP. A detailed discussion of the use of these forms can be found in the applicable SOG; however, a brief description of each one is supplied below:

Sample Log Sheet

Completed by the field team for all samples taken. This serves as an internal record for the sample.

Packing List/Chain-Of-Custody Record and Seal

Custody of samples must be maintained and documented at all times. Chain-of-Custody begins with collection of the samples in the field. Section 5.3 of HNUS SOG SA-6.1 provides a description of the chain-of-custody procedures to be followed. EPA Chain-of-Custody forms will be included for both NHDES and EPA CLP samples. A completed packing list/chain-of-custody record is included in each sample cooler shipped to the EPA CLP Lab. A RAS packing list is sent to the RAS lab; a SAS packing list is sent to the SAS lab. Two chain-of-custody seals, signed and dated by field personnel, are affixed to opposite diagonal ends of the outside of the sample cooler lid for CLP samples.

DQO Summary Form

A DQO Summary Form must accompany the validated data sent to the EPA RPM. Detailed DQO Summary Form instructions are also included in Appendix A of this SAP.

3.12 Weekly Field Summary Report

A Weekly Field Summary Report (see Appendix A) will be completed by the field team leader to document the field activities. The report will be sent to the BEI Project Manager and transmitted to the EPA

RPM. At the completion of field activities, the field team leader will submit to the BEI Project Manager all field records, data, field notebooks, chain-of-custody forms, sample log sheets, weekly field summary reports, etc. The Project Manager shall ensure that these materials are entered into the ARCS Program document control system in accordance with ARCS I General Operating Procedures (GOP), Section 3.0.

3.13 Field Modification Record

Changes in project operating procedures may be necessary as a result of changed field conditions or unanticipated events. A summary of the sequence of events associated with field changes is as follows:

- If a substantial change is required, the field team leader notifies the BEI Project Manager of the need for the change.

- If necessary, the BEI Project Manager will discuss the change with the pertinent individuals (e.g., EPA Region I RPM) and will provide verbal approval or denial to the field team leader for the proposed change.

- The field team leader will document the change on a Field Modification Record form (see Appendix A) and forward the form to the BEI Project Manager at the earliest convenient time.

- The completed Field Modification Record form will also be attached to the field copy of the affected documents (i.e., Sampling and Analysis Plan).

4

4.0 QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC)

4.1 Data Quality Objective (DQO)

The data quality objective focuses on identifying the end use of the data and on determining the degree of precision, accuracy, representativeness, completeness and comparability necessary to satisfy its intended use. DQO Levels IV and V have been selected to address the data quality needs of the Ecological and Health Risk Characterization studies which will follow under a separate work assignment.

The QA/QC requirements for the groundwater sampling will be consistent wit the HNUS ARCS I Quality Assurance Program Plan (QAPP), December 1990. Standard operating procedures will be observed during the field work. Deviations from standard procedures will be brought to the attention of the EPA RPM.

4.2 Quality Control Samples

Quality control samples will be collected during the groundwater sampling program according to the procedures described below. The frequency at which the samples are to be collected are indicated on Tables 3-3 and 3-4. QC samples include field duplicates, trip blanks, rinsate blanks and bottle blanks.

Field Duplicates

Field duplicates will be collected at a frequency of one (1) for every ten (10) field samples collected. Field duplicates include replicate and collocated samples. Replicate samples will be collected by mixing a double portion of the required volume of the sample and then dividing it into two containers. However, for volatile organic samples, collocates, rather than replicates, are collected in order to avoid the loss of volatiles by mixing and agitation of the samples. Collocated samples are collected by filling sample containers successively, rather than by mixing a samples and then dividing it.

Trip Blanks

Trip blanks will be prepared in the field in an area outside of the area of sampling and prior to any sampling. Trip blanks will contain laboratory grade deionized water which has been boiled for at least fifteen (15) minutes. For VOA trip blanks, two drops of HCl are placed in a 40-ml glass VOA vial followed by laboratory-grade deionized water, which is poured directly into the sample container and then packaged for shipment with the samples. At no time after their preparation are trip blanks opened before they reach the laboratory. One VOA trip blank is required for every 10 samples, or per shipping container, whichever is greater. One trip blank is required per event for all other analyses.

Rinsate Blanks

Rinsate blanks will be collected at a frequency of one (1) for every ten (10) field samples collected. Rinsate blanks will be obtained by running laboratory grade deionized water over the sample collection equipment (stainless steel bailers) after it has been decontaminated.

Bottle Blanks

Bottle blanks will be collected at a frequency of one (1) bottle blank per lot number of sample containers used. These samples will be obtained by pouring laboratory grade deionized water directly into the proper sample container bottles. Bottle blanks are shipped to the laboratory separately from the samples to avoid cross contamination.

4.3 Performance and System Audits

A Quality Assurance (QA) performance audit will be performed by the QA Officer (QAO) once per year. The audit will include checks on adherence to all applicable SOGs and sampling protocols as outlined in this SAP. The auditor shall prepare audit checklists or audit guides. The depth and scope of the audit shall be determined and incorporated into the checklist or guidelines. The audit will cover the following items:

- Adherence to appropriate sample collection SOGs.
- Chain-of-custody.
- Documentation of field activities as per appropriate SOGs.
- Training requirements for field team members.
- Documentation of variances from field activities and corrective actions.

The auditor shall record each finding of nonconformance to an ARCS requirement (observation or deficiency) on a Quality Notice form. When a nonconformance is identified, sufficient investigation shall be conducted to determine the cause of the deficiency. Findings shall be written when there is a clear non-compliance with a specific Standard Operating Guideline.

Any identified findings that require immediate corrective action shall be reported immediately to the BEI Project Manager and recorded on a Quality Notice form.

4.4 Corrective Actions

The need for corrective actions may become apparent during surveillance of field activities, procurement of services and supplies, or other operations that may affect the quality of work. Deficiencies and nonconformances will be promptly identified by the QAO's quality assurance checks in the audit reports outlined in this SAP. Corrective action will be taken immediately by the BEI Project Manager and/or field personnel.

The BEI Project Manager will have overall responsibility for implementing corrective actions, and must identify those responsible for initiating corrective action to remedy immediate effects of the problem.

The corrective action program covers the analysis of the cause of any negative audit findings and the corrective actions required. This program includes the investigation of the cause of significant or repetitious unsatisfactory conditions or other failure to implement or adhere to required quality assurance practices.

Acceptability of laboratory data is defined by the Precision, Accuracy, Representativeness, Completeness, and Comparability (PARCC) parameters specified in this SAP. If the data do not meet this criteria, it may be necessary to resample the locations for which deficiencies were noted. SAS and RAS laboratories have audit and corrective action procedures in place that they must follow.

4.5 Quality Assurance Reports to Management

The QAO shall provide timely input to the ARCS I Program Manager, concerning the QA/QC status for the oversight project including any QA/QC deficiencies noted. Assessment of the measurement of the CLP-RAS data for precision, accuracy, and completeness is performed following EPA Region I Functional Guidelines for evaluating organic and inorganic analyses. Data validation reports are submitted to the Regional Sample Control Center (RSCC) and to the CLP Regional Technical Project Officer.

For CLP-SAS data the assessment of precision, accuracy and completeness of SAS data is performed during data validation. Overall, the same analytical parameters described in the EPA Region I Functional Guidelines for evaluating organic and inorganic analyses are reviewed. Compliance to the specific QC requirements and acceptance criteria requested for the Method in the SAS are evaluated and reported to EPA.

4.6 Instrumentation Calibration Procedures

The field team will use an HNu or MicroTip, pH, conductivity and turbidity meters and submersible and Watera pumps. All field equipment will be calibrated prior to the initiation of field work and every day of use thereafter. Calibration will be documented on an Equipment Calibration Log according to SOG SA-6.4. An example of this form may be found in Appendix A.

Laboratory instrument calibration will be done according to the QC requirements for the CLP organic and inorganic statement of work. For SAS analysis the laboratory will fulfill the QC requirements specified in the SAS request form.

4.7 Preventative Maintenance

Measuring equipment used in environmental monitoring or analysis and test equipment used for calibration and maintenance shall be controlled by established procedures. Procedures include a maintenance check and calibration by the Equipment Manager, or other qualified personnel to ensure proper field instrument operation. During field operations, measuring and test equipment shall have an initial calibration and shall be recalibrated at scheduled intervals against certified standards, according to the manufacturer's instruction. During calibration an appropriate maintenance check will be performed on each piece of equipment. If damaged or failed parts are identified during the daily maintenance check and it is determined that the damage could have an impact on the instrument's performance, the instrument will be removed from service until the identified parts are repaired or replaced. Upon return from field activities, the HNUS ARCS I Equipment Manager is responsible for an equipment maintenance check, an assessment of equipment condition and performance of repairs.

HNUS will supply the sampling and measurement equipment and calibration equipment. In the event that failed equipment cannot be repaired, replacement equipment can be shipped to the site by overnight express carrier to minimize downtime.

In addition, BEI and HNUS will adhere to Section 5.0 of ARCS Management Plan (April 28, 1988) which provides a discussion of property management.

4.8 Precision, Accuracy, Representativeness, Completeness, and Comparability (PARCC) Goals

4.8.1 Precision and Accuracy

No project resources will be expended to develop precision and accuracy data for method (field or analytical) validation except those commonly applied in the CERCLA program for collection of routine QA/QC data. Routine QA/QC data will include analyses from field duplicates and equipment rinsate blanks based on the existing guidance that specified the type and proportion of samples submitted for QA/QC (EPA/540/G-87/003).

Precision and accuracy will be assessed during validation of CLP-RAS/SAS results. In general, results that are rejected by the validation process will be disqualified from application to the intended use. Qualified data will be used to the greatest extent practicable.

4.8.2 Representativeness

Representativeness describes the degree to which analytical data accurately and precisely define the material being measured. Several elements of the sample handling process must be controlled to maximize the representativeness of the analytical data (e.g. sample containers, preservatives, sample storage, holding times, etc.)

The HNUS ARCS I Program Standard Operating Guidelines will be followed to ensure that the sample handling process is performed correctly.

4.8.3 Completeness

Completeness describes the amount of data generated that meets the objectives for precision, accuracy, and representativeness versus the amount of data expected to be obtained. For relatively clean, homogeneous matrices, 100 percent completeness is expected. If in the evaluation of laboratory results it becomes apparent that the data for a specific medium are of insufficient quality, either with respect to the number of samples or an individual analysis, resampling of the deficient data points will be necessary.

4.8.4 Comparability

One of the objectives of the SAP is to provide analytical data of comparable quality both between sample locations and with data from previous investigations. Both analytical procedures (i.e. CLP) and sample collection techniques (as defined in HNUS SOGs) will maximize the comparability of the sampling data within this investigation. Additionally, to enhance comparability between samples, consideration will be given to seasonal conditions or other environmental conditions that could influence the analytical results.

4.9 Data Reduction, Validation, and Reporting

Data reduction, validation, and reporting will be conducted as described below.

4.9.1 Data Reduction

The calculation of final results from raw data varies according to parameter and calibration approach. The ratio of instrument response to analyte concentration is determined for one or more standards. In general, if the concentration/instrument response ratio is linear, the average of the ratios is used to calculate sample results. If the response is not linear, response is plotted against concentration, and sample results are quantitated from the resultant curve.

Results for aqueous samples are expressed in ug/l; air sample results are expressed in ug/m^3. Organic results for solid samples are expressed in ug/kg whereas inorganic results are expressed in mg/kg, both on a dry weight basis.

4.9.2 Data Validation and Reporting

The CLP split data will receive a quick data validation (DV). An in depth data validation review is not anticipated at this time. Since the NH DES results will not be validated the CLP DV will serve to demonstrate that an adequate level of field and laboratory quality control exist. This will be necessary if this data is to be used for the Health Risk Characterization.

The quick data review will include an assessment of the data summary and quality assurance forms. The data will be qualified based on blank contamination, laboratory and field duplicate precision, instrument calibration, ICP interferences, and surrogate/matrix spike recoveries. Data summary tables will be generated. The quick data review does not include assessment of the raw data and no data validation report to the EPA Region I RSCC will be submitted. The Complete Delivery Group File (CSF) will be reviewed according to EPA Region I guidelines.

Chemical/analytical data generated during the study will be reduced to a concise form. The analytical results will be managed using an existing computer program developed by HNUS specifically for chemical data bases. Quality assurance procedures will be implemented to assure that no errors occur during data entry. The data entered into the program are checked by the computer operator, and the printouts are checked against the original laboratory sheets by a chemist.

APPENDIX A

APPENDIX A

FIELD SAMPLING FORMS

NUS CORPORATION
ARCS I PROGRAM
FIELD MODIFICATION RECORD

Site Name	Assignment	Location
EPA Work Assignment Number	Project Number	FMR Number

To: ____________ Location: ____________ Date: ____________

Description:

Reason for Change:

Recommended Disposition:

Field Operations Leader (Signature) Date

Disposition:

Project Manager (Signature) Date

Distribution:

- Program Manager
- Quality Assurance Officer
- Project Manager
- Field Operations Leader

Others as required ____________

NUS
CORPORATION
A Halliburton Company

SAMPLE LOG SHEET - LIQUID PHASE

Page ____ of ____

Site Name ______________________ NUS Project Job No ______________________

Sample Number ______________________ Sample Station: ______________________ (if applicable)

Sample Method ______________________

Depth Sampled ________ ________ feet Total Depth ________ feet (SW only)

Sample Date & Time: / / ________ hours

Samplers: ______________________

Data Recorded By: (Signature) ______________________

TYPE OF SAMPLE: (Check all that apply)

____ Groundwater
____ Surface Water
____ Residential Supply
____ Grab
____ Composite

____ Trip Blank*
____ Rinsate Blank*
____ Field Duplicate Collected
____ Other (Specify):
____

*Include sample source & lot no.

Microtip/OVA Monitor Reading: ________ ppm

WELL PURGE DATA

Well Depth ________ (ft)

Inside Diameter ________ (in)

Water Level ________ (ft)

Well Volume ________ (gal)

Purge Start ________ (hrs.)

Purge Stop Time ________ (hrs.)

Total Gal Purged ________

Purge Method ________

Sampling/Purge Data:

Volume #	Temp °C	pH	Spec Cond mohms/cm2	DO mg/L
0				
1				
2				
3				
4				

ANALYSIS	BOTTLE LOT NO	TRAFFIC REPORT NO.		EPA SAS IDENTIFIER NO.	EPA TAG NO.
		ORGANIC	INORGANIC		

NUS ARCS I FORM 0044

INSTRUMENT NAME: ______________________________

SERIAL NO. ____________ MODEL NO. ____________ EPA TRACKING NO. ____________

CALIBRATION DATE	INITIAL READING	PROCEDURE	FINAL SETTINGS	SIGNATURE	COMMENTS

NUS ARCS I FORM 0032

SAMPLE COLLECTION SUMMARY RECORD

Page ____ of ____

PROJECT NO

PROJECT NAME/SAMPLING EVENT

SAMPLERS (Signature)

FIELD QC

ANALYSES

CASE NO ______________________

SAS NO ______________________

DATE	TIME	SAMPLE LOCATION	FIELD QC	ANALYSES						

NUS ARCS I FORM 0048

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

CUSTODY SEAL

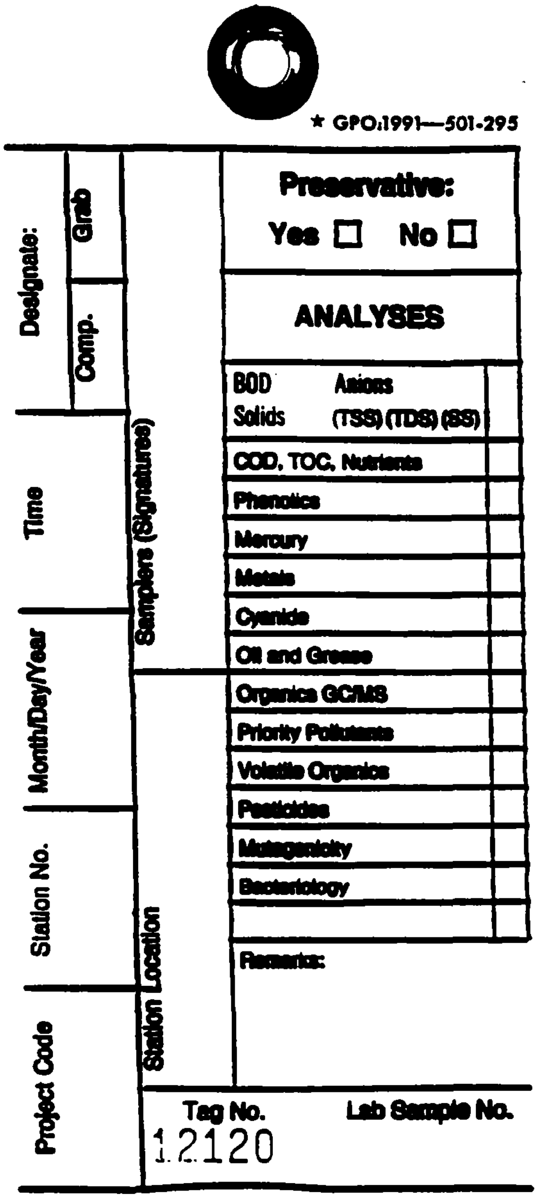
Date ____________________

Signature ____________________

CUSTODY SEAL

Date ____________________

Signature ____________________



★ GPO:1991—501-295

Preservative:

Yes ☐ No ☐

ANALYSES

BOD Anions Solids (TSS) (TDS) (SS)	
COD, TOC, Nutrients	
Phenolics	
Mercury	
Metals	
Cyanide	
Oil and Grease	
Organics GC/MS	
Priority Pollutants	
Volatile Organics	
Pesticides	
Mutagenicity	
Bacteriology	

Remarks:

Tag No. 12120

Lab Sample No.

Designate: Grab Comp.

Time

Month/Day/Year

Station No.

Project Code

Samplers (Signatures)

Station Location

REGION 1

DQO SUMMARY FORM

1. SITE

NAME ____________________

LOCATION ____________________

NUMBER ____________________

EPA REGION ______

PHASE ____________________

RI 1 RI 2 RI 3 ERA FS RD RA

(CIRCLE ONE)

2. MEDIA *(CIRCLE ONE)*	SOIL	GW	SW/SED	AIR	BIO	OTHER ______

3. USE *(CIRCLE ALL THAT APPLY)*	SITE CHARAC. (H&S)	RISK ASSESS.	EVAL. ALTS.	ENG'G DESIGN	PRP DETER.	MONITORING REMEDIAL ACTION	OTHER ______

4. OBJECTIVE ____________________

____

____

5. SITE INFORMATION

AREA ____________________ DEPTH TO GROUND WATER ____________________

GROUND WATER USE ____________________

SOIL TYPES ____________________

SENSITIVE RECEPTORS ____________________

6. DATA TYPES *(CIRCLE APPROPRIATE DATA TYPES)*

A. ANALYTICAL DATA

pH
CONDUCTIVITY
VOA
ABN
TCLP

PESTICIDES
PCB
METALS
CYANIDE
______

TOX
TOC
BTX
COD
______

B. PHYSICAL DATA

PERMEABILITY
POROSITY
GRAIN SIZE
BULK DENSITY
______

HYDRAULIC HEAD
PENETRATION TEST
HARDNESS
______
______

7. SAMPLING METHOD *(CIRCLE METHOD(S) TO BE USED)*

ENVIRONMENTAL BIASED GRAB NON- INTRUSIVE PHASED

SOURCE GRID COMPOSITE INTRUSIVE ______

8. ANALYTICAL LEVELS *(INDICATE LEVEL(S) AND EQUIPMENT & METHODS)*

LEVEL 1 FIELD SCREENING - EQUIPMENT ____________________

LEVEL 2 FIELD ANALYSIS - EQUIPMENT ____________________

LEVEL 3 NON-CLP LABORATORY - METHODS ____________________

LEVEL 4 CLP/RAS - METHODS ____________________

LEVEL 5 NON STANDARD ____________________

9. SAMPLING PROCEDURES

BACKGROUND - 2 PER EVENT OR ____________________

CRITICAL (LIST) ____________________

PROCEDURES ____________________

10. QUALITY CONTROL SAMPLES *(CONFIRM OR SET STANDARD)*

A. FIELD

COLLOCATED - 5% OR ______

REPLICATE - 5% OR ______

FIELD BLANK - 5% OR ______

TRIP BLANK - 1 PER DAY OR ______

B. LABORATORY

REAGENT BLANK - 1 PER ANALYSIS BATCH OR ______

REPLICATE - 1 PER ANALYSIS BATCH OR ______

MATRIX SPIKE - 1 PER ANALYSIS BATCH OR ______

OTHER ____________________

11. BUDGET REQUIREMENTS

BUDGET ____________________ SCHEDULE ____________________

STAFF ____________________

CONTRACTOR ____________________ **PRIME CONTRACTOR** ____________________

SITE MANAGER ____________________ **DATE** ____________________

FOR DETAILS SEE SAMPLING & ANALYSIS PLAN

CDM SF DQO 1.002

DQO SUMMARY FORM INSTRUCTIONS

1. SITE - Identify the site and phase of the work to be conducted

- NAME - Site name or assignment as stated in the WA
- LOCATION - City or Town County and State where site is located
- NUMBER - Site number as stated in the WA
- EPA REGION - EPA Region where the site is located
- PHASE - Circle work phase for which DQO's are being developed: (number sequentially for each phase as appropriate):
  - RI - Remedial
  - ERA - Expedited Response Action
  - FS - Feasibility Study
  - RD - Remedial Design
  - RA - Remedial Action

2. MEDIA - Circle the media being investigated; only one form will be completed for each media.

- SOIL - Surface and subsurface soils
- GW - Ground water
- SW/SED - Surface water and sediment (a sediment sample will be taken if possible at each surface water sampling location)
- AIR - Air quality and respirable dust monitoring
- BIO - Biological monitoring, flora and fauna
- OTHER - Indicate other "media" being investigated i.e. buildings, underground conduits, etc.

3. USE - Circle the intended use(s) of the data to be developed.

- SITE CHARAC. (H&S) - Site characterization which includes a determination of the level(s) of health and safety protection required at the site
- RISK ASSESS - Risk assessment, data to be used to perform the endangerment assessment or public health evaluation
- EVAL. ALTS. - Evaluate alternatives, data will be used to evaluate or screen remedial/technological alternatives
- ENG'G DESIGN - Data will be used to perform detailed engineering design of remedy
- MONITORING - Data will be used to monitor during remedy implementation or establish baseline conditions for long term monitoring after site remediation
- PRP DETERMINATION - Data will be used to confirm/fingerprint contaminants to specific potentially responsible parties for possible future or pending enforcement actions
- OTHER - Indicate other specific data uses

4. OBJECTIVE - Provide a concise, specific statement that answers the question "Why am I taking these samples?"

5. SITE INFORMATION - Provide the site information necessary to gain an overview of the site and the relative complexity and extent of data requirements

- AREA - Indicate the area of the site in acres and an indication of the configuration (length and width)
- DEPTH TO GROUND WATER - Indicate the depth to ground water from the ground surface, to the extent known identify seasonal fluctuation and the depth and thickness of multiple aquifers
- GROUND WATER USE - Identify both potable and non-potable ground water use(s) by aquifer, if appropriate, and the point(s) of extraction relative to the site
- SOIL TYPES - Identify, to the extent known, the site soil strata and relative depths below ground surface
- SENSITIVE RECEPTORS - Identify population and environmental concerns, relative to the site, which could be impacted by contaminant migration

6. DATA TYPES - Circle the appropriate analytical and physical data required to to determine the type, degree, extent and migration characteristics of the contaminants and the required site characteristics. The selection of data types required must be developed by the site manager with the data users as described in section 3.2

7. SAMPLING METHODS - Circle the appropriate sampling method(s) to be used in obtaining the required data in accordance with the objectives above

- ENVIRONMENTAL - Refers to media sampling of air, water, soils and the biological environment to determine the extent of contamination
- SOURCE - Refers to the sampling of the actual contamination source(s)
- BIASED - Refers to sampling which focuses on a specific site area, characteristic or problem factor based upon site knowledge and/or modeling
- GRID - Refers to unbiased sampling which provides a representative estimate of contamination problem over the entire site
- GRAB - Refers to discrete samples which are representative of a specific location at a specific point in time.
- COMPOSITE - The mixture of a number of grab samples to represent the average properties of the parameters of concern over the extent of the area sampled
- NON-INTRUSIVE - Refers to obtaining data using methods and equipment that do not require the physical extraction of sample from the media being sampled
- INSTRUSIVE - Refers to physically extracting samples from the media being sampled
- PHASED- Refers to performing discrete time-phased sampling events and using the information obtained in the previous event to refine the subsequent sampling event

8. ANALYTICAL LEVELS - The analytical levels are described in Section [illegible] of the Guidance

- LEVEL 1 FIELD SCREENING - EQUIPMENT - Identify the field monitoring equipment to be used and the manufacturer's specified detection limits when known
- LEVEL 2 FIELD ANALYSIS - EQUIPMENT - Identify the field analysis to be used and the historically achievable instrument detection limits
- LEVEL 3 NON-CLP LABORATORY - METHODS -Identify the laboratory method(s) to be used and the historically achievable precision and accuracy when available
- LEVEL 4 CLP/RAS - METHODS - Identify the CLP laboratory method(s) to be used and the historically achievable precision and accuracy
- LEVEL 5 NON-STANDARD - Specify requirement for non-standard analysis, analytical procedures to be used and required precision and accuracy

9. SAMPLING PROCEDURES - The procedures to be used in obtaining the required samples are to be defined, a description of the critical samples is to be provided and the requirement of obtaining a minimum of two background samples per sampling event is to be confirmed or the deviation from this minimum standard defined

10. QUALITY CONTROL SAMPLES - The identified minimum standards for the field and laboratory quality control samples must be confirmed or revised on a site specific basis

11. BUDGET REQUIREMENTS - Based upon the analysis summarized above the critical resource requirements shall be defined

- BUDGET - The estimated cost of the sampling and analysis shall be presented in dollars
- SCHEDULE - The total time required to perform the sampling and the estimated time, as appropriate to perform the analysis shall be presented by calendar days, by phase
- STAFF - The key staff disciplines required to perform the sampling shall be identified

The form shall identify the contractor directly responsible for the work the prime contractor and must be signed and dated by the site manager.

EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703 557 2490 FTS 557-2490

Organic Traffic Report & Chain of Custody Record
(For Organic CLP Analysis)

SAS No.
(if applicable)

Case No

1 Project Code

Account Code

Regional Information

Non Superfund Program

Site Name

City, State

Site Spill ID

2 Region No

Sampling Co

Sampler (*Name*)

Sampler Signature

3. Type of Activity

Lead		Pre-Remedial		Remedial		Removal	
				RIFS	☐	CLEM	☐
SF	☐			RD	☐	REMA	☐
PRP	☐	PA	☐	RA	☐	REM	☐
ST	☐	SSI	☐	O&M	☐	OIL	☐
FED	☐	LSI	☐	NPLD	☐	UST	☐

4. Date Shipped

Carrier

Airbill Number

5. Ship To

6. Preservative
(*Enter in Column D*)

1. HCl
2. HNO3
3. $NaHSO_4$
4. H_2SO_4
5. Other (SAS) (*Specify*)
6. Ice only
N. Not preserved

7. Sample Description
(*Enter in Column A*)

1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil/Sediment
6. Oil (SAS)
7. Waste (SAS)
8. Other (SAS) (*Specify*)

CLP Sample Numbers (from labels)	A Enter # from Box 7	B Conc. Low Med High	C Sample Type Comp / Grab	D Preservative from Box 6	E RAS Analysis VOA	BNA	Pest/ PCB	High ARO/ TOX	F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/ Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Inorg. Samp. No.	K Designated Field QC

Shipment for Case complete? (Y/N)

Page 1 of ____

Sample used for a spike and/or duplicate

Additional Sampler Signatures

Chain of Custody Seal Number

CHAIN OF CUSTODY RECORD

Relinquished by: (*Signature*)	Date / Time	Received by: (*Signature*)	Relinquished by: (*Signature*)	Date / Time	Received by: (*Signature*)
Relinquished by: (*Signature*)	Date / Time	Received by: (*Signature*)	Relinquished by: (*Signature*)	Date / Time	Received by: (*Signature*)
Received by: (*Signature*)	Date / Time	Received for Laboratory by: (*Signature*)	Date / Time	Remarks Is custody seal intact? Y/N/none	

Split Samples ☐ Accepted ☐ Declined (*Signature*)

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1-40

EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Inorganic Traffic Report & Chain of Custody Record

(For Inorganic CLP Analysis)

SAS No. (if applicable)

Case No

1 Project Code

Account Code

2. Region No

Sampling Co.

4. Date Shipped

Carrier

Regional Information

Sampler (Name)

Airbill Number

Non-Superfund Program

Sampler Signature

5. Ship To

Site Name

City, State

Site Spill ID

4 Type of Activity

Lead		Pre Remedial		Remedial		Removal	
SF	☐			RIFS	☐	CLEM	☐
PRP	☐	PA	☐	RD	☐	REMA	☐
ST	☐	SSI	☐	RA	☐	REM	☐
FED	☐	LSI	☐	O&M	☐	OIL	☐
				NPLD	☐	UST	☐

6 Preservative (Enter in Column D)

1. HCl
2. HNO3
3. NaOH
4. H_2SO_4
5. $K_2CR_2O_7$
6. Ice only
7. Other (SAS) (Specify)

N. Not preserved

7. Sample Description (Enter in Column A)

1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil/Sediment
6. Oil (SAS)
7. Waste (SAS)
8. Other (SAS) (Specify)

CLP Sample Numbers (from labels)	A Enter # from Box 7	B Conc Low Med High	C Sample Type Comp / Grab	D Preservative from Box 6	E - RAS Analysis							F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Org. Samp. No.	K Designated Field QC
					Metals			Low Conc		High							
					Total	Dissolved	Cyanide	Nitrate/Nitrite	Fluoride	pH	Conductivity						

Shipment for Case complete? (Y/N)

Page 1 of ____

Sample used for a spike and/or duplicate

Additional Sampler Signatures

Chain of Custody Seal Number

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by (Signature)	Date / Time	Received by: (Signature)
Relinquished by (Signature)	Date / Time	Received by: (Signature)	Relinquished by (Signature)	Date / Time	Received by: (Signature)
Received by (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/none	

Split Samples [ ] Accepted (Signature)

[ ] Declined

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Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703 557 2490 FTS 557 2490

Special Analytical Service

Packing List/Chain of Custody

SAS No.

1 Project Code

Account Code

Regional Information

Non-Superfund Program

Site Name

City, State

Site Spill ID

2 Region No

Sampling Co

Sampler *(Name)*

Sampler Signature

3. Type of Activity

Lead		Pre Remedial		Remedial		Removal	
SF	☐			RIFS	☐	CLEM	☐
PRP	☐	PA	☐	RD	☐	REMA	☐
ST	☐	SSI	☐	RA	☐	REM	☐
FED	☐	LSI	☐	O&M	☐	OIL	☐
				NPLD	☐	UST	☐

4 Date Shipped

Carrier

Airbill Number

5. Ship To

6 Sample Description *(Enter in Column A)*

1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil/Sediment
6. Oil
7. Waste
8. Other *(Specify)*

7. Preservative *(Enter in Column C)*

1. HCl
2. HNO3
3. NAHSO$_4$
4. H$_2$SO$_4$
5. NAOH
6. Other (SAS) *(Specify)*
7. Ice only

N. Not preserved

Sample Numbers	A Matrix Enter from Box 6	B Conc Low Med High	C Preservative Used from Box 7	D Analysis	E Sample used for spike and/or duplicate	F Regional Specific Tracking Number or Tag Number	G Station Location Identifier	H Mo/Day/Year/Time Sample Collection	I Sampler Initials	J Designated Field QC
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

Shipment for SAS complete? (Y/N)

CHAIN OF CUSTODY RECORD

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Received by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks Is custody seal intact? Y/N/none	

Split Samples ☐ Accepted *(Signature)*

☐ Declined

EPA Form 9110 3 (4 91)

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APPENDIX B

APPENDIX B

HEALTH AND SAFETY PLAN

W92262D

DRAFT
HEALTH AND SAFETY PLAN

TECHNICAL ASSISTANCE

NEW HAMPSHIRE PLATING SITE
MERRIMACK, NEW HAMPSHIRE

HALLIBURTON NUS Environmental Corporation
and
Badger Engineers, Inc.

EPA Work Assignment No. 32-1JG1
EPA Contract No. 68-W8-0117
HNUS Project No. 0768

August 1992

HALLIBURTON NUS
Environmental Corporation

W92262D

DRAFT
HEALTH & SAFETY PLAN

NEW HAMPSHIRE PLATING COMPANY
MERRIMACK, NEW HAMPSHIRE

HALLIBURTON NUS Environmental Corporation
and
Badger Engineers, Inc.

EPA Work Assignment No. 32-1JG1
EPA Contract No. 68-W8-0117
HNUS Project No. 0768

August 1992

for [illegible]
Robert S. Palermo
Project Manager

Arnold Ostrofsky
George D. Gardner, P.E.
Program Manager

DRAFT HEALTH AND SAFETY PLAN
NEW HAMPSHIRE PLATING COMPANY, MERRIMACK, NEW HAMPSHIRE

SITE:	New Hampshire Plating Company
ACTION:	Draft Health and Safety Plan for HNUS/BEI Personnel
PROJECT NO.:	0768
LOCATION:	Merrimack, New Hampshire Wright Street
DATE PREPARED:	August 24, 1992
WORK DATES:	August 24 - September 15, 1992
PREPARED BY:	Robert Palermo/BEI Dennis Dumont/BEI

APPROVALS:

The following signatures constitutes approval of this Health and Safety Plan. This plan should not be deviated from without prior written or verbal approval.

REVIEWED AND APPROVED BY:	HNUS Health and Safety Officer	(date)
REVIEWED AND APPROVED BY:	BEI Health and Safety Officer	(date)
REVIEWED AND APPROVED BY:	BEI Project Manager	(date)

HEALTH & SAFETY BRIEFING

I agree to follow the H&S plan and have been briefed on the work activities I will be performing.

Name: ______________________
Signature: ______________________
Date: ______________________

Name: ______________________
Signature: ______________________
Date: ______________________

Name: ______________________
Signature: ______________________
Date: ______________________

Name: ______________________
Signature: ______________________
Date: ______________________

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Signature: ______________________
Date: ______________________

Name: ______________________
Signature: ______________________
Date: ______________________

Name: ______________________
Signature: ______________________
Date: ______________________

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DRAFT HEALTH AND SAFETY PLAN, REVISION 0.0
NEW HAMPSHIRE PLATING COMPANY MERRIMACK, NEW HAMPSHIRE

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APPENDICES

APPENDIX

A	CONSTITUENTS DETECTED AT THE NEW HAMPSHIRE PLATING COMPANY SITE
B	CHEMICAL HAZARD SUMMARY TABLE
C	SITE LOCUS MAP
D	HOSPITAL ROUTE MAP

1.0 INTRODUCTION

This document has been prepared to outline requisite health and safety procedures for workers participating in activities on the New Hampshire Plating Company Superfund site. This plan serves to outline waste products and chemical compounds of concern which may be present on-site. Health and safety hazards specific to the proposed work are described in the following section.

2.0 SITE BACKGROUND AND DESCRIPTION

Between 1962 and November 1985, the New Hampshire Plating Company (NHPC) provided electroplating services to various local industries. The metals used in the process included gold, silver, tin, copper, nickel, cadmium, chromium, iron, lead, manganese and zinc. Process waste also included cyanides and various volatile organic compounds. All aspects of the operations were conducted in a 12,500 square foot building located on Wright Avenue in Merrimack, New Hampshire. Plating bath effluent were pumped from this building into a waste lagoon located 325 feet north of the building. The overflow from this half-acre primary lagoon passed into a series of three secondary lagoons. None of the four discharge lagoons were lined or otherwise modified to prevent the infiltration of contaminants into the underlying soil. Acids, cyanide waste, metal bath solutions and solvents such as trichloroethylene, toluene and acetone were discharged into the lagoon system on a daily basis throughout the operating life of the plant. The rate of discharge was from 35,000 to 60,000 gallons per day. Records indicate that solvent use was discontinued at the site during the latter part of the 1970's.

The site consists of a single building, a parking lot and a lagoon system. Four lagoons were used by New Hampshire Plating Company to dispose of their plating solutions. The facility has been inactive for since 1985. Most of the sludge material has been removed from the lagoons and was stabilized on site in a mortar ash mix encapsulated in a high density polyethylene envelope. The removal action was not complete in removing the lagoon sludges. Current work effort involves investigating the volume of sludge material left in place and/or remaining on-site. This H&S plan addresses the site walk over and sampling of 53 groundwater monitoring wells located on and around the NHPC site.

In 1987, the New Hampshire Department of Environmental Service (NH DES) conducted a removal action at the NHPC facility. The action included the treatment of the primary lagoon with lime and a solution of chlorine in an effort to increase the Ph of the lagoon contents, thereby decreasing the mobility of metal ions and decreasing the leach rate of the metals into the underlying soil and groundwater. These efforts were an attempt to minimize the further soil contamination until a more permanent treatment option could be implemented. The NH DES removal report also notes that plating bath solutions and drums were removed from the building at this time.

The U.S. EPA Region I Emergency Planning and Response Branch began an investigation for a removal action in September of 1989. In order to obtain technical guidance, the On-Scene Coordinator requested assistance from the U.S. EPA Environmental Response Team (ERT) in Edison, New Jersey. In October of 1989, ERT personnel conducted land surveys of the site, collected soil/sludge samples to determine the extent of contamination and investigated treatability options. An ecological assessment was also conducted by ERT to assess the various habitats on the site and to determine the impact of the soil contamination on the plant community.

As a results of various studies performed at the site and the groundwater in the site area it has been determined that levels of metals and cyanides ranged from background in the soil to 18% and 2.3% in the sludge. The following contaminants have been identified in the sludge or soil in the lagoons: cadmium, chromium, copper, gold, iron, lead, manganese, nickel, silver, tin, zinc and cyanide. In addition to the above contaminants the following have also been identified in the groundwater: arsenic, barium, selenium, benzene, bromodichloromethane, carbon tetrachloride, chloroform, dibromochloromethane, 1,1-dichloroethane, 1,2-dichloroethylene, dichloromethane, ethylbenzene, mercury, tetrachloroethylene, toluene, trichloroethane, trichloroethylene, 1,1-dichloroethene and xylene.

The building on site has dust and debris heavily contaminated with chromium, cadmium, zinc, nickel, tin and lead.

3.0 KEY PERSONNEL

Personnel supporting the groundwater sampling program are listed below and are identified by their respective roles:

ROLE/ ASSIGNMENT	**NAME**	**TELEPHONE NUMBER**
EPA RPM	Richard Goehlert	1-617-573-5742
NH DES RPM	Michael Robinette	1-603-574-9639
BEI PM	Robert Palermo	1-617-494-7527
BEI FOL	Michael Gray	1-617-494-7951
BEI Work Party	Wendall Griffin	1-617-494-7527
HNUS Work Party	Dennis MacDougall	1-508-658-7899

4.0 CHEMICAL DATA

Chemical data for contaminants which may be encountered during the planned sampling event are listed in Appendix A. These contaminants include several heavy metals and trace levels of volatile organic compounds.

5.0 HAZARDS

The VOCs and heavy metals identified on-site do not pose any unusual flammable or reactive hazards. The R.F. Weston Site Safety Plan dated 23 May 1990 is attached for site characterization information and compounds identified on-site. This document was prepared for a previous sampling effort and not for the activities specifically discussed in this H&S plan.

Chemicals identified as a result of media sampling are tabulated on the attached tables titled Chemical Hazards Summary Table which was extracted from the R.F. Weston Safety Plan. This data contains information on OSHA PELs, IDLH concentrations, ionization potentials, and chemical physical properties of compounds know to be present on-site. A copy of this table is included in Appendix B of this H&S plan. Also, additional data is attached from the removal action which took place on-site in May of 1990. This data is titled Air Monitoring Summary Data New Hampshire Plating Company Site and contains chemical information on air samples collected on-site for Cyanide, Cadmium and Chromium. A copy of the above noted air monitoring data is contained in Appendix A.

5.1 Hazard Assessment

Arsenic

Elemental arsenic has 3 common forms; silver-grey and metallic looking, yellow and black. Other common arsenic compounds are white solids. The TLV for arsenic and arsenic compounds is .2 mg/m^3. Arsenic is a suspected carcinogen.

Health Hazards

The most sensitive areas to arsenic exposure are the mucous membranes, eyes, nose, mouth, lungs and ears. Symptoms of exposure of these areas are itching and watering. Contact with skin should be avoided. Incidents of acute (short term) inhalation have led to coughing, chest pain, giddiness, headache and weakness leading to nausea and diarrhea. Chronic (long term) inhalation can lead to weight loss, nausea and diarrhea. In extreme cases, numbness and loss of coordination in the hands and feet can occur.

Note that inhalation causes deposition of arsenic compounds (and any other dust) on the mucous membranes, which could later be swallowed, entering the GI tract.

Barium

Barium is a silver-white metal. Other common barium compounds are white amorphous solids. The TLV for barium and its compounds is .5 mg/m^3, and the IDLH is 250 mg/m^3.

Health Hazards

Exposure to barium compounds can come through inhalation of dusts or skin or eye contact. Exposure leads to irritation of skin, eyes, nose, or throat. When ingested, as through swallowing phlegm, barium compounds increase the contractility of both voluntary and involuntary muscles. This could lead to a reduction in heart rate.

Bromodichloromethane

Bromodichloromethane (BDCM) is an odorless, volatile liquid. This substance, along with dibromochloromethane, trichloroethane, (chloroform) and tribromomethane are commonly grouped together as total trihalomethanes (TTHM), which are regulated in drinking water.

Health Hazards

BDCM is strongly suspected to be carcinogenic. No exposure limits in air have been established.

Cadmium

Cadmium is a bluish/white metal. It is commonly found in elemental form or as an oxide, a chloride, bromide or acetate. It is extremely corrosion resistant, which accounts for its wide use in industry. It is commonly applied by electroplating. The TLV for Cadmium is 0.05 mg/m^3.

Health Hazards

The primary route of entry is through the respiratory tract. Cadmium causes irritation of the nose and throat. Once absorbed, it has a long half-life and is retained in the kidneys and liver. Symptoms of acute exposure include coughing, chest pain, chills, shortness of breath and weakness. Chronic exposure may lead to a loss of the sense of smell, ulcerations of the nose, shortness of breath and kidney damage. Exposure to Cadmium has been linked to an increased incidence of prostate and renal cancer. This effect is greatly enhanced when the subject is a cigarette smoker.

Chromium

Chromium is present in many forms. The most common is chromium trioxide, also called chromic acid, used in chrome plating and aluminum anodizing operations. It has a dark red color, and is a powdered solid. Other forms are sodium dichromate, a red-orange solid, and potassium chromate, a yellow solid. The most common form of chromium is the +6 oxidation state. Most toxicological data collected deals with this form, as indications are that the +2 and +3 forms are less toxic.

Health Hazards

Some chromium (+6) compounds are known carcinogens. Chromium trioxide and sodium dichromate, both mentioned above, are known to be non-carcinogenic. Potassium chromate is suspected to be non-carcinogenic. It is recommended that if the identity of the chromium compounds is unknown, that they are treated as carcinogens. The TLV for all chromium compounds is 50 mg/m^3.

The route of exposure for chromium compounds is inhalation with concomitant ingestion or skin absorption. Acute effects of inhalation are severe irritation of the throat, nose, and lungs. Chromium trioxide can cause serious eye damage. If ingested, chromates and dichromates can cause vomiting and more serious stomach and kidney problems. Chromium compounds can cause vomiting and more serious stomach and kidney problems. Chromium compounds can cause ulceration of the skin. Chronic effects can include ulceration of the nasal septum and respiratory effects which resemble asthma. Liver damage with yellow jaundice is possible. Skin rashes can occur because chromates breakdown fat tissues. Increased incidences of lung cancer can occur as a result of exposure to calcium, lead, and zinc chromates.

Copper

Copper is reddish brown metal and many copper compounds are bluish or greenish. Most are also odorless. Copper is an excellent conductor of electricity. Copper compounds are used as insecticides, algicides, fungicides, and pigments. The TLV is 1 mg/m^3.

Health Hazards

Copper and its compounds can gain entry into the body through inhalation and skin absorption. Copper salts irritate skin, causing itching and dermatitis, and cause corneal ulcers, cloudiness and conjunctivitis if absorbed into the eyes. Acute exposure to airborne copper causes symptoms similar to a common cold, chills and stuffiness. Small amounts of copper salts induce vomiting, so it is unlikely serious poisoning would occur. Chronic exposure could lead to discoloration of the skin and hair.

Dibromochloromethane

Dibromochloromethane (DBCM) is a clear, odorless, volatile liquid. Its presence in drinking water is regulated, and it is grouped with similar chemicals as total trihalo methanes (TTHMs). See also BDCM. The presence of the TTHMs in the drinking water is a by-product of the chlorination process, and they can be removed by activated charcoal filters. The TLV is 200 ppm.

Health Hazards

Little toxicity data is available on DBCM, but it is a suspected mutagen, and possibly carcinogenic.

Ethylbenzene

Ethylbenzene (EB) is a colorless liquid with a pungent aromatic odor. It is a common industrial solvent, often found with xylene, and is a major component of gasoline. The TLV is 100 ppm and the IDLH level is 2000 ppm.

Health Hazards

Routes of exposure for EB include inhalation, ingestion and eye and skin contact. Symptoms of acute exposure include irritation of the eyes, nose, throat, and skin. Higher concentrations can lead to weakness, drowsiness, and dizziness. Chronic exposure can lead to a skin rash, since EB is a defatting agent. Persons with impaired pulmonary function may risk of aggravation of their condition.

Gold

Certain gold compounds, such as gold chloride, can cause dermatitis. Metallic gold normally does not cause any health problems.

Chronic exposure to gold ores has led to a lung disease resembling bronchitis in some miners. In general, contact with ores, chlorides and other gold salts can cause skin rashes and possibly edema (excess fluid in the body).

Iron

The most common iron compounds are iron dust and iron oxide. The TLV for iron oxide is 5 mg/m^3. There are no limits yet for other iron compounds.

Health Hazards

The route of entry of iron products into the body is through inhalation of dust. Inhalation of iron oxide fumes or dust can cause respiratory irritation and can lead to benign pneumoconiosis (a lung disease).

Lead

Lead and other inorganic lead compounds are widely used in industry. The materials include metallic lead, lead salts and lead oxides. These compounds have various appearances, and are frequently white, powdery solids. The TLV for lead compounds is 0.05 mg/m^3.

Health Hazards

Lead compounds can enter the body through inhalation/ingestion of dusts or fumes and skin and eye contact. Early symptoms of lead exposure are muscle fatigue and aching, headache and digestive problems such as nausea and constipation. Later symptoms include abdominal cramping, severe constipation and characteristic "wrist drop" (weakness of grip), and "lead line" on the gums. Other symptoms include anemia and weakness. Effects of the central nervous system are brought about by inhalation of large quantities of lead. These include severe headache, convulsions, coma, and delirium. Kidney function can also be adversely affected.

Manganese

Manganese (Mn) is a reddish grey to silvery soft metal. It is used in drycell batteries and as an oxidizing agent. The TLV is 1 mg/m^3 and the IDLH is 10,000 mg/m^3.

Health Hazards

Mn can enter the body through inhalation/ingestion and to a lesser extent through skin absorption. Once in the blood stream, Mn accumulates in the spleen, liver, and certain nerve cells of the brain or spinal cord. Susceptibility to contamination varies widely among individuals. Symptoms of early stages resemble drunkenness: apathy, headache followed by unaccountable laughter, euphoria and hallucinations. Later speech disturbance, excessive salivation, and tremors of the arms or legs.

Mn contamination is not fatal, but is debilitating.

Mercury

Mercury and organic and inorganic mercuric compounds are widely used in industry. Metallic mercury and its salts are used as plating agents, and organic mercury compounds are used in mildew proofing. The TLV for mercury is .05 mg/m^3 and the IDLH is 28 mg/m^3.

Health Hazards

Mercury can enter the body through ingestion, inhalation and skin and eye contact. Mercury is a skin and mucous irritant. Acute exposure to high levels of vapors can cause bronchitis. Chronic exposure produces a plethora of symptoms that vary among individuals, but four classic symptoms exist: gingivitis, sialorrhea (excess salivation), increased irritability and muscular tremors. These symptoms may not be present concurrently.

Nickel

Nickel (Ni) is used in alloys (stainless steel). Ni is widely used in plating due to its corrosion resistance. The TLV for Ni is 1 mg/m^3.

Health Hazards

Nickel is a known carcinogen. Routes of entry include inhalation of dusts or fumes and eye and skin contact. Exposure can cause "nickel itch" and conjunctivitis. Chronic exposure to dusts cause increased levels of lung and nasal passages. The latency period averages around 25 years. Effects on the coronary muscles, brain and liver tissues have been seen in animal studies.

Selenium

Selenium (Se) exists in three forms: red, amorphous powder; grey; and red crystals. It is used in electronic applications, alloys, and is often present with copper gold, nickel, and silver. The TLV for Se is .2 mg/m^3 and the IDLH is 100 mg/m^3.

Health Hazards

Selenium compounds are aggressive skin irritants, causing blisters and dermatitis. It has been known to cause "pink-eye", and irritation of the upper respiratory tract.

The most striking aspect of Se exposure is a garlic smell on the breath. Also, workers may observe a metal taste in their mouth.

Other effects include pallor, irritability and giddiness. Most major organs are not seriously affected by Se exposure.

Silver

Silver is a lustrous metal used for aesthetic value; and also because of its high electronic currently carrying ability. The TLV for silver dusts and soluble compounds is 0.01 mg/m^3.

Health Hazards

Silver is an irritant of the skin, eyes and intestinal tract. Skin discoloration and "pink-eye" have been observed. The danger with silver compounds is that they accumulate in the body. Silver can cause pneumonoconiosis.

Tin

Tin and tin compounds are used in brass, solder, pewter and in plating. The TLV for tin compounds is 2.0 mg/m^3 and the IDLH is 400 mg/m^3.

Health Hazards

Tin salts are irritants to the skin and mucous membranes. They can be found in very acidic or basic forms depending on the solution used. Tin compounds can irritate the lungs, causing pneumoconiosis, but severe permanent damage is unlikely.

Zinc

Zinc is used in galvanizing, operations and is corrosion and weather resistant. The TLV for zinc compounds is 5 mg/m^3.

Health Hazards

Zinc compounds can be corrosive to the skin and mucous membranes. Skin can become sensitized to zinc compounds.

Inorganic Cyanides

The most common inorganic cyanides are potassium cyanide (KCN) and sodium cyanide (NaCN). Both are white solids with a faint almond odor. The TLV is 5 mg/m^3, and IDLH is 50 mg/m^3.

Health Hazards

Routes of exposure include inhalation, skin absorption and ingestion. The effects of exposure are weakness, headaches, confusion, nausea, eye and skin irritation and slow gasping respiration.

5.2 Biological Hazards

Poison Ivy (Rhus Radicans)

Poison Ivy is found throughout the site. It is highly recommended that all personnel walking through the site wear a minimum of a paper tyvek to avoid skin contact.

Contact with Poisonous Plants

1. Characteristic Reactions

   The majority of skin reactions following contact with offending plants are allergic in nature and are characterized by:

   a. General symptoms of headache and fever
   b. Itching
   c. Redness
   d. A rash

   Some of the most common and most severe allergic reactions result from contact with plants of the poison ivy group including poison oak and poison sumac. Such plants produce severe rash characterized by redness, blisters, swelling, and intense burning and itching. The victim also may develop a high fever and may be very ill. Ordinarily, the rash begins within a few hours after exposure, but may be delayed for 24 to 48 hours.

2. Distinguishing Features of Poison Ivy Group Plants

The most distinctive features of poison ivy and poison oak are their leaves, which are composed of three leaflets each. Both plants also have greenish-white flowers and berries that grow in clusters.

3. First Aid

a. Remove contaminated clothing; wash all exposed areas thoroughly with soap and water, followed by rubbing alcohol.

b. Apply calamine or other soothing skin lotion if the rash is mild.

c. Seek medical advice if a severe reaction occurs, or if there is a known history of previous sensitivity.

Ticks

The site is heavily infested with ticks. It is highly recommended that all personnel walking throughout the site wear a minimum of a paper tyvek and latex boot covers. The ticks will standout against the light colors. A tick repellent or insect repellent containing DEET is also suggested.

Ticks can transmit germs of several diseases, including Rocky Mountain spotted fever, a disease that occurs in the eastern portion of the United States as well as the western portion and Lyme disease. Ticks adhere tenaciously to the skin or scalp. There is some evidence that the longer an infected tick remains attached, the greater the chance that it will transmit disease.

First Aid

a. Cover the tick with heavy oil (mineral, salad, or machine) to close its breathing pores. The tick may disengage at once; if not, allow the oil to remain in place for a half hour. Then carefully (slowly and gently) remove the tick with tweezers, taking care that all parts are removed. If possible, do not kill the tick before it has been removed.

b. With soap and water, thoroughly but gently scrub the area from which the tick has been removed, because disease germs may be present on the skin, also wipe the bite area with an antiseptic. (Although use of tweezers for removal of a tick and application of heat to the tick's body, as by a lighted cigarette, often have been attempted, these methods may leave tick parts in the wound or may injure the skin).

c. If you have been bitten, place the tick in a jar labeled with the date, location of the bite and location acquired. If any symptom appears, such as expanding red rash, contact a physician immediately.

Lyme Disease

Lyme Disease may cause a number of medical conditions, including arthritis, that can be treated if you recognize the symptoms early and see your doctor. Early signs may include a flu-like illness, and expanding skin rash, and joint pain. If left untreated, Lyme disease can cause serious nerve or heart problems as well as a disabling type of arthritis.

You are more likely to spot early signs or symptoms of Lyme disease rather than see the tick or its bite. That's because the tick is so small (about the size of head on a common pin or a period on this page and a little larger after they fill with blood), you may miss it or signs of a bite. But, it's also easy to miss early symptoms of Lyme disease.

In its early stage, Lyme disease may be a mild illness with symptoms like the flu. It can include a stiff neck, chills, fever, sore throat, headaches, fatigue, and joint pain. But this flu-like illness is usually out of season, commonly happening between May and October when ticks bite.

Most people develop a large, expanding skin rash around the area of the bite. Some people may get more than one rash. The rash may feel hot to the touch and may be painful. Rashes vary in size, shape, and color, but often look like a red ring with a clear center. The outer edges expand in size. It's easy to miss the rash and the connection between the rash and a tic bite. The rash develops from three days to as long as a month after a tick bite. Almost one third of those with Lyme disease never get the rash.

Joint or muscle pain may be another early sign of Lyme disease. These aches and pains may be easy to confuse with the pain that comes with other types of arthritis. However, unlike many other types of arthritis, this pain seems to move or travel from joint to joint.

In later stages, Lyme disease may be confused with other medical problems. These problems can develop months to years after the first tick bite.

Early treatment of Lyme disease symptoms with antibiotics can prevent the more serious medical problems of later stages. If you suspect that you have symptoms of Lyme disease, contact your doctor.

Lyme disease can cause problems with the nervous system that look like other diseases. These include symptoms of stiff neck, severe headache, and fatigue usually linked to meningitis. They may also include pain and drooping of the muscles on the face, called Bell's palsy. Lyme disease can also mimic symptoms of multiple sclerosis or other types of paralysis.

Lyme disease can also cause serious but reversible heart problems, such as irregular heartbeat. Finally, Lyme disease can result in disabling, chronic type of arthritis that most often affects the knees. Treatment is more difficult and less successful in later stages. Researchers think these more serious problems may be linked to how the body's defense or immune system responds to the infection.

6.0 PLANNED SITE ACTIVITY

The work to be undertaken on the NHPC site is noted below. Personnel who will be supporting the sampling program and expected contingency levels of protection are indicated in the site activity breakdown as folllows.

SITE ACTIVITY BREAKDOWN

Personnel	Site Activity/Task	Approved up to Level	Contingency Level	Approved (Y/N)
Rob Palermo	1	A	D/C	Y
Mike Gray	2	A	D/C	Y
Dennis Macdougall	2	A	D/C	Y
Wendall Griffin	2	C	D/C	Y
Marian Rambelle*	2	A	D/C	Y

Note: * Symbol indicates that individual is expected to perform a site visit but is not part of the work party.

All personnel are health and safety trained and participate in a medical monitoring program according to OSHA requirements outlined in 29 CFR 1910.120.

Level B protection may be required if Cyanide is detected at a concentration exceeding the PEL of 5 mg/m3. Drager tubes will be used for Cyanide monitoring.

<u>Task</u>	<u>Work Activity/Task Description</u>
1.	Site walk over will be over the entire site but is a non-intrusive effort. No sampling and/or direct contact with contaminated material is expected.
2.	Sample 51 monitoring wells located on and around the NHPC site. *Work involves collecting groundwater samples for CLP SAS/RAS analysis for hazardous substance list compounds.* Three well volumes will be purged from the wells using submersible and hand operated pumps.

7.0 ANTICIPATED AREAS OF CONTAMINATION AND IMPACTED MEDIA

Contamination is expected to be encountered in the following media:

Soil	Surficial soil/sludge was not completely remediated. Sludge contains heavy metals (chrome, lead, cadmium, and possibly volatile organic compounds, etc.).
Air	Airborne particulates containing heavy metals <u>may</u> be a concern if vegetative cover does not exist in areas where contamination may be present. Most of the contaminated soil is saturated with groundwater. Prior sampling results for metals indicates that airborne emissions of

particulates have not been a problem to date at the site (see attached data).

Water Groundwater may contain residual concentrations of heavy metals and volatile organic compounds. It is not anticipated that compounds will be present in groundwater at elevated levels.

Comments Exposure concerns should be minimal for site walk over and groundwater sampling. Site has already been partially remediated. Some contamination is still present on-site in the former lagoon area but lagoons are covered and VOCs concentrations are believed to be low (100 ppb range). Skin and eye contact will be a concern for workers supporting the groundwater sampling. Protective clothing will be utilized during all groundwater sampling.

8.0 HEALTH & SAFETY RECOMMENDATIONS

The following procedures will be followed:

Task 1 (Site Walk Over)

Wear disposable outer boots and inner latex or vinyl gloves. Do not attempt to disturb soil and/or collect any samples. Do not disturb anything inside the building. Disposable equipment will be bagged and left on-site.

Task 2 (Groundwater Sampling)

Eye protection (safety goggles/glasses) will be worn during well sampling. Inner and outer gloves will be worn during groundwater sampling. Outer gloves will be constructed of Neoprene or Nitrile with inner gloves of vinyl/latex construction. Outer butyl work boots or disposable latex boots will be worn during well sampling. Well headspace will be screened with a photoionization detector for the presence of volatile vapors and/or gases immediately upon removal of the well security casing cover. Measurements in excess of 3 parts per million (ppm) measured in the workers breathing zone will require the use of an air purifying respirator with organic vapor cartridges. MSA Ultra twin respirators with combination cartridges will be utilized. Additionally, if deemed necessary by the HNUS/BEI Health & Safety Officer Cyanide measurements using Drager tubes will be taken from the workers breathing zone.

9.0 DECONTAMINATION

Disposable equipment will be collected and discarded in a plastic trash bag and disposed of without any restrictions. Purge water from the monitoring wells will not be containerized on-site. The purge water will be discharged onto the ground surface downgradient from the monitoring wells. Decon water used to clean equipment will be disposed of on-site.

10.0 EMERGENCY RESPONSE RESOURCES

It is essential that site personnel be prepared in the event of an emergency. Emergencies can take many forms; illnesses or injuries, chemical exposure, fires, explosions, spills, leaks, releases of harmful contaminants, or sudden changes in the weather. The following sections outline the general procedures for emergencies. Emergency information should be posted as appropriate.

10.1 Emergency Contacts for the New Hampshire Plating Company Site

Fire:	Merrimack (603) 424-5557 or 911
Police:	Merrimack (603) 424-2222 or 911
Ambulance:	Merrimack Ambulance Service (603) 424-2222 or 911
Hospital #1:	St. Joseph's Emergency in Merrimack, Open from 0900-2100 hrs, 365 days a year.

Address: 383 Daniel Webster Highway (Route 3), Merrimack, New Hampshire

Telephone: (603) 424-4632 Chemical Trauma Capabilities? Yes

Hospital #2: Nashua Memorial Hospital

Address: 8 Prospect Street, Nashua, New Hampshire

Telephone: (603) 883-5521 Chemical Trauma Capabilities? Yes

Directions from the Site to Hospital #1 (see Appendix C and D):

Exit the site and take a right onto Wright Avenue. At the end of Wright Avenue take a left onto Daniel Webster Highway (Route 3). The hospital is immediately on the right.

Directions from the Site to Hospital #2 (see Appendix C & D):

Exit the site and take a right onto Wright Avenue. At the end of Wright Avenue take a left onto Daniel Webster Highway (Route 3) and follow into Nashua. Take the second left (Prospect Street) after passing Rte. 111.

Poison Control Center: 1-800-562-8236

NOTE: Maps and directions to the hospital are attached.

Additional Emergency Numbers

National Response Center	800-424-8802
Center for Disease Control	404-488-4100 (24 hr)
U.S. EPA Region I	617-223-7265 (24 hr)
AT&F (Explosives Information)	800-424-9555
Chemtrec	800-424-9300
New Hampshire Department of Environmental Services	603-271-3503 1-800-852-3411 (after hours)
EPA Environmental Response Team	201-321-6660